



PC Server 325

**User's Handbook**

**Note**

Before using this information and the product it supports, be sure to read the general information under Appendix E, "Notices" on page 251. Also read the general information under "Product Warranties and Notices" in the *User's Reference*.

**First Edition (September 1996)**

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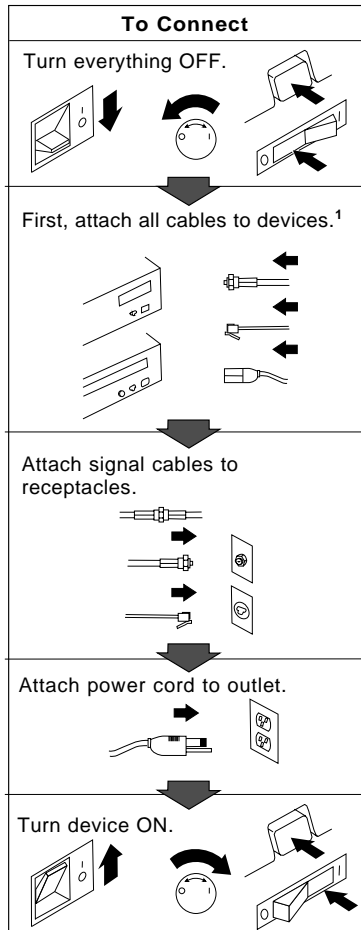


# Safety Information

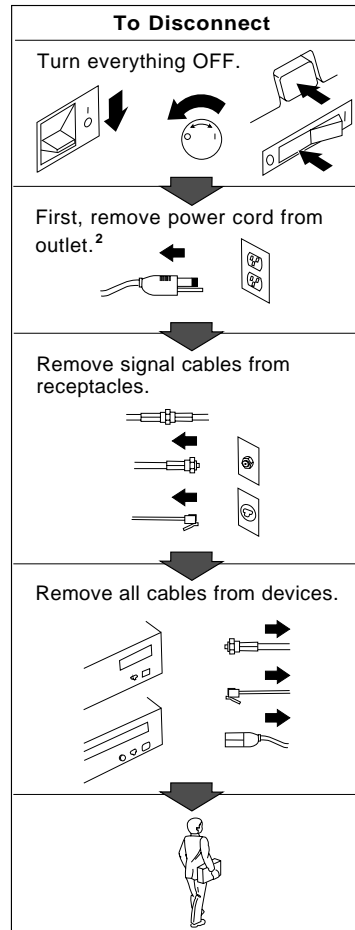


## DANGER:

Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly grounded outlet.



<sup>1</sup> In the U.K., by law, the telephone cable must be connected after the power cord.

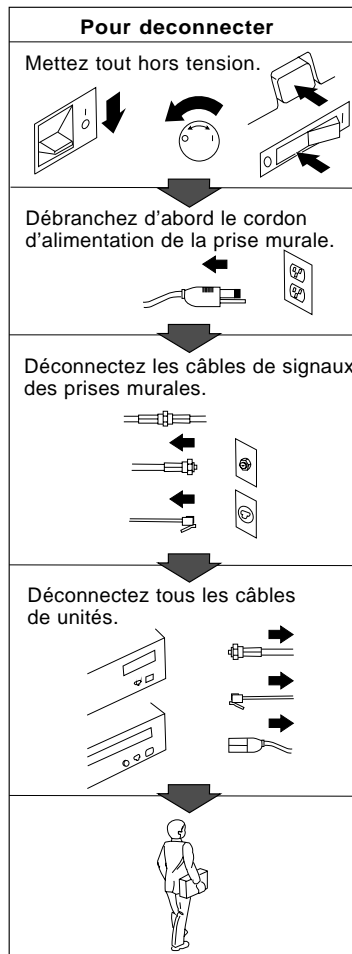
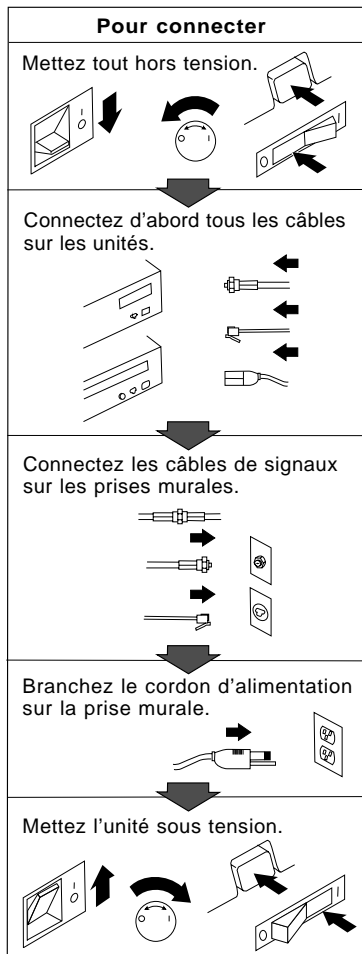


<sup>2</sup> In the U.K., by law, the power cord must be disconnected after the telephone line cable.



**DANGER:**

Le courant électrique provenant des câbles d'alimentation, téléphoniques et de transmission peut présenter un danger. Pour éviter tout risque de choc électrique, connectez et déconnectez ces câbles comme indiqué ci-dessous lorsque vous installez ou déplacez ce matériel ou les unités connectées, ou que vous soulevez un carter.\*



\*Le cordon d'alimentation doit être branché sur un socle de prise de courant correctement mis à la terre.



## Laser Compliance Statement

Some IBM server models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

When a CD-ROM drive is installed, note the following.



### CAUTION:

**Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

Opening the CD-ROM drive might result in exposure of hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. **Do not open.**

Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

### DANGER

**Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.**

**Laser Compliance Statement**

## About This Book

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This book provides instructions on how to configure your PC Server 325 and how to install and remove options. This book also provides information to help you solve many simple problems that might occur. If you have not yet set up your server, refer to the *Setup and Installation* sheet for detailed information on unpacking the server, attaching cables, and installing the operating system. Refer to the *User's Reference* for more detailed information on the features of the server.

### How This Book is Organized

Chapter 1, "Getting Started with PC Server 325," provides a general introduction to using your server, such as how to use the CD-ROM drive.

Chapter 2, "Configuring Your Server," describes how to use the Configuration/Setup utility program to configure your server. This chapter also provides instructions for using various utility programs.

Chapter 3, "Installing Options," contains instructions for installing and removing options, such as memory, adapters, and internal drives. Instructions for connecting external options are also included in this chapter.

Chapter 4, "Solving Problems," includes an overview of the diagnostic tools, instructions for testing the server, lists of error messages, and troubleshooting charts. This chapter also contains information about checking the server for damage and resolving configuration conflicts.

Chapter 5, "Getting Help, Service, and Information," provides instructions on how to obtain service and technical assistance for your PC Server 325 and other IBM products that you might plan to use. This chapter also contains information about other publications, products, warranties, and services that IBM offers. Also included are fax numbers, toll-free telephone numbers, and access information for electronic bulletin boards, online services, and the World Wide Web.

## Notices Used in This Book

Appendix A, “Jumpers,” describes jumper locations and settings, and contains instructions for changing jumpers.

Appendix B, “Server Records,” provides a section to record and update important information about your server, including serial numbers, key number, and device records. Whenever you add options to your server, be sure to update the information in this appendix.

Appendix C, “Ethernet Cable Specifications,” provides a description of the cables that you can use to connect the server to an Ethernet, IEEE Standard 802.3 network.

Appendix D, “Installing a PC Server 325 in a Server Rack,” describes how to install the server in a 19-inch server rack.

Appendix E, “Notices,” contains product notices and trademarks.

An index follows the appendixes.

## Notices Used in This Book

This book contains notices to highlight information or provide safety information:

- **Notes**

These notices provide important tips, guidance, or advice.

- **Attention**

These notices indicate possible damage to programs, devices, or data. An attention notice is placed just *before* the instruction or situation in which damage could occur.

- **Caution**

These notices indicate situations that can be potentially hazardous to you. A caution notice is placed just *before* descriptions of potentially hazardous procedure steps or situations.

## Related Publications

The following publications come with your PC Server 325:

- The PC Server 325 *Setup and Installation* sheet contains information about setting up your server.
- The PC Server 325 *User's Reference* contains detailed information about the advanced features of your server.
- The *PC Server Service and Support* pamphlet contains important information and phone numbers to call for different types of support for your PC Server.

The ServerGuide documentation describes the advantages of IBM ServerGuide and describes how to use the ServerGuide software.

The *IBM PC Servers Hardware Maintenance Manual Supplement* is available for purchase. It contains a parts catalog, error codes, and advanced diagnostic procedures. This manual is intended for trained service technicians. (Diagnostic diskettes are not included.)

The following pertain to the server's Ethernet controller.

*IBM LAN Technical Reference IEEE 802.2 and NETBIOS API*,  
SC30-3587

*IBM Transmission Control Protocol/Internet Protocol Version 2.1 for DOS: Programmer's Reference*, SC31-7046

*IBM LAN Server Command and Utilities*, S10H-9686

*Guide to LAN Server Books*, S10H-9688

*DOS LAN Services and User's Guide*, S10H-9684

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

- In the U.S. and Puerto Rico, call 1-800-426-7282.
- In Canada, call 1-800-465-1234.
- In other countries, contact the IBM support organization that services your area, your IBM marketing representative, or your IBM reseller.

## Welcome and Thank You

### Welcome and Thank You

We appreciate your decision to purchase an IBM PC Server 325. Your server offers speed, power, expandability, and compatibility.

Your server comes with the ServerGuide package, which contains a number of CDs. These CDs contain operating systems, application programs, utility programs, online documentation, and more. Refer to the ServerGuide documentation for more information.

You can access the World Wide Web for updates to flash BIOS and the latest information about product compatibility and configuration. You can also link to other locations for additional information. IBM gives you direct access to trained specialists who can help you set up, install, and configure your server.

The PC Server 325 comes with a limited three-year on-site warranty. In addition, IBM's PC Server Startup Support provides coverage to PC Server customers during the first 90 days after installation at no additional charge.\*

This comprehensive program enhances IBM's support for setup, installation, configuration, and problem determination. It provides assistance for popular network operating systems and network adapters from IBM and non-IBM vendors. In the U.S., call IBM at 1-800-772-2227, or in Canada, call 1-800-565-3344 if you need assistance.

In all other countries, contact the IBM support organization that services your area, your IBM marketing representative, or your IBM reseller.

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\* Response time will vary depending on the number and nature of calls received.

# Chapter 1. Getting Started with PC Server 325

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Your PC Server 325 combines powerful microprocessor performance, large data-storage capacity, and improved system expandability. This server is designed by IBM to support the demands of today's network environment for smaller workgroups. Incorporating the extended industry standard architecture (EISA) and the peripheral component interconnect (PCI) bus architectures, your server provides compatibility with a wide range of existing hardware and software.

As an open-architecture, industry-standard system, the PC Server 325 has been tested for compatibility with numerous IBM and non-IBM adapters and devices. Rugged dependability is achieved by incorporating various quality standards and design points, such as stringent IBM systems assurance testing.

Refer to the *User's Reference* for more detailed information on the server features. That book also includes a glossary, warranty information, and other important notices.

Refer to the *Setup and Installation* sheet for instructions for setting up your server. Be sure to read the publications that come with the IBM ServerGuide package before you set up your server.

This chapter contains an overview of the server features and components.



**CAUTION:**

**To avoid possible injury while moving or lifting the server, ask another person to help you.**

**This chapter contains:**

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## Features at a Glance

The following table summarizes the features of the PC Server 325.

<p><b>Microprocessor</b></p> <ul style="list-style-type: none"> <li>• Pentium Pro microprocessor</li> <li>• 16 KB of level-1 cache</li> <li>• 256 KB of level-2 cache (min)</li> <li>• Clock rate varies by model</li> </ul> <p><b>Memory</b></p> <ul style="list-style-type: none"> <li>• Standard: 32 MB (min), expandable to 512 MB</li> <li>• 60 ns, buffered Extended Data Out (EDO), Error Correcting Code (ECC)</li> <li>• Four dual inline memory-module sockets</li> </ul> <p><b>Diskette Drive</b></p> <ul style="list-style-type: none"> <li>• Supports one diskette drive</li> <li>• Standard: One 3.5-inch, 1.44 MB</li> <li>• Optional (internal): <ul style="list-style-type: none"> <li>- 3.5-inch, 1.44 MB</li> <li>- 3.5-inch, 2.88 MB</li> </ul> </li> </ul> <p><b>Hard Disk Drives</b></p> <ul style="list-style-type: none"> <li>• Number and capacities of hard disk drives vary by model</li> <li>• Supports up to five internal hard disk drives</li> </ul> <p><b>CD-ROM Drive</b></p> <ul style="list-style-type: none"> <li>• Standard: SCSI</li> </ul>	<p><b>Keyboard and Auxiliary Device</b> (some models)</p> <ul style="list-style-type: none"> <li>• Keyboard</li> <li>• Mouse</li> </ul> <p><b>Expansion Slots</b></p> <p>Supports up to six adapters.</p> <ul style="list-style-type: none"> <li>• One PCI dedicated slot</li> <li>• Four shared PCI/EISA slots</li> <li>• One dedicated EISA slot</li> </ul> <p><b>Expansion Bays</b></p> <ul style="list-style-type: none"> <li>• Two 5.25-inch drive bays</li> <li>• Five 3.5-inch drive bays</li> <li>• The number of bays available for expansion varies by model.</li> </ul> <p><b>Upgradeable POST and BIOS</b></p> <ul style="list-style-type: none"> <li>• POST/BIOS upgrades (when available) can update EEPROM on the system board</li> </ul> <p><b>Security Features</b></p> <ul style="list-style-type: none"> <li>• Bolt-down capability</li> <li>• Door lock</li> <li>• LogicLock security enabled</li> <li>• Power-on and administrator passwords</li> <li>• Selectable drive-startup</li> <li>• Security-error indicator</li> </ul>	<p><b>Integrated Functions</b></p> <ul style="list-style-type: none"> <li>• Two serial ports</li> <li>• One infrared port</li> <li>• One parallel port</li> <li>• Mouse port</li> <li>• Keyboard port</li> <li>• 16-bit UltraSCSI controller <ul style="list-style-type: none"> <li>- One external connector (16-bit)</li> <li>- One internal connector (16-bit)</li> </ul> </li> <li>• Ethernet controller <ul style="list-style-type: none"> <li>- 10BASE-T port</li> <li>- AUI port</li> </ul> </li> <li>• Video controller port, compatible with: <ul style="list-style-type: none"> <li>- Super video graphics array (SVGA)</li> <li>- Video graphics adapter (VGA)</li> <li>- Color graphics adapter (CGA)</li> <li>- 1 MB video memory</li> </ul> </li> </ul> <p><b>Power Supply</b></p> <ul style="list-style-type: none"> <li>• 250 W with voltage switch (115–230 V ac)</li> <li>• Built-in overload and surge protection</li> <li>• Automatic restart after a momentary loss of power</li> </ul>
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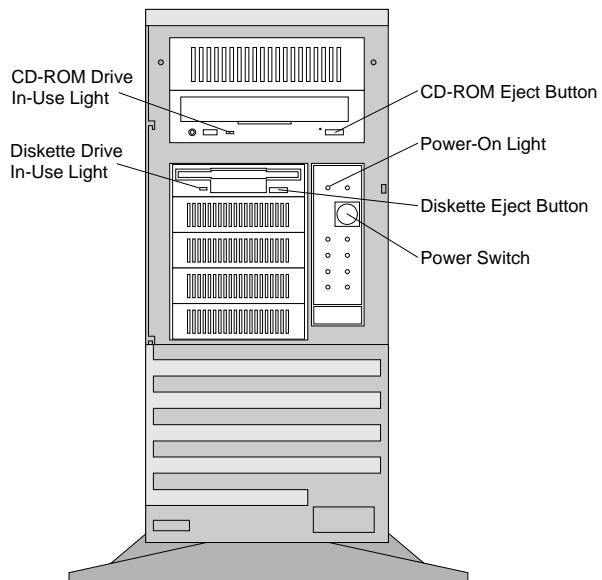
## Controls and Indicators

### Controls and Indicators

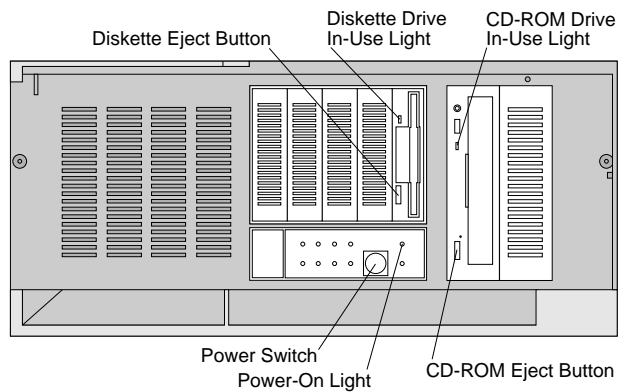
The most commonly used controls and indicators are on the front of your server.

#### PC Server 325 Controls

##### Tower model



##### Drawer model



## Controls and Indicators

**CD-ROM Eject Button:** Push this button to release a CD from the CD-ROM drive.

**Diskette Eject Button:** Push this button to release a diskette from the drive.



**Power-On Light:** This green LED lights when you turn on your server by pressing the power switch, and when the server powers on in the Unattended mode.

**Power Switch:** Use this switch to turn your server on manually, or return the server to *Standby mode*. The automatic restart feature, which enables the server to restart following a momentary power loss, means that the server is never completely turned off. Do not set the server to the Standby mode if any of the drive In-Use lights are on. This might damage the information stored on a hard disk or diskette.

You can configure the server to start at a specified date and time, or when it receives a signal from either serial port. (For information on setting Unattended startup, see “Alarm/Wakeup Settings” on page 26.)

To toggle the server

- To the Attended mode from the Standby mode, press and release the power switch.
- From the Attended mode to the Standby mode, press the power switch in slowly just until the power-on light goes out and then immediately release the switch.

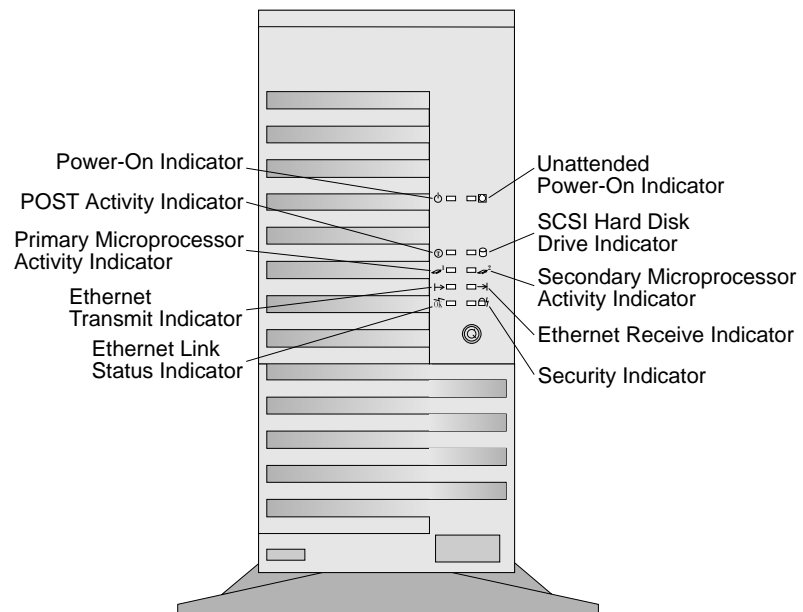
**Diskette-Drive In-Use Light:** This light comes on when the drive is accessing a diskette.

**CD-ROM Drive In-Use Light:** This light comes on when the CD-ROM drive is accessed.

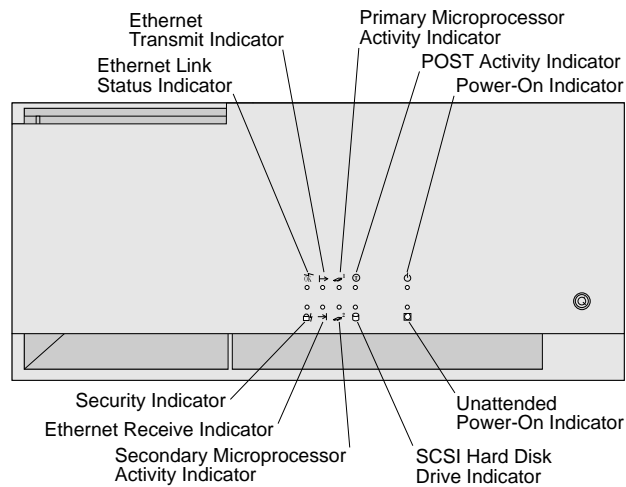
## Controls and Indicators

### Operator Panel Status Indicators











#### Tower model



#### Drawer model



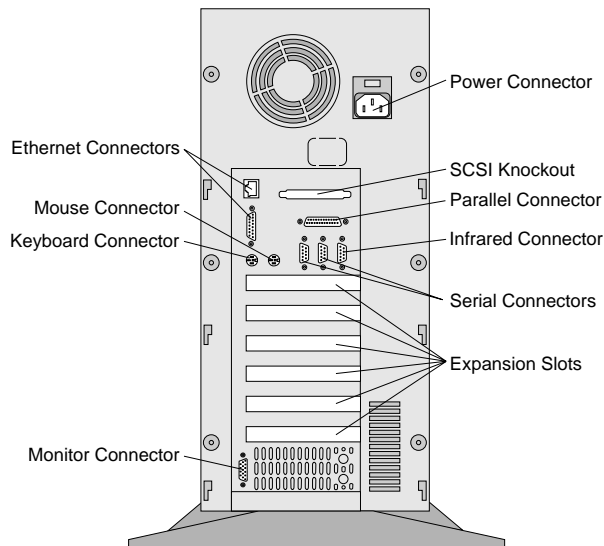
## Controls and Indicators

-  **Unattended Power-On Indicator:** This green LED lights when the server powers on in Unattended mode.
-  **SCSI Hard Drive In-Use Indicator:** This amber LED lights when your server is accessing a SCSI device. If this light remains illuminated, this might indicate that either the SCSI bus or the system microprocessor has stopped.
-  **Secondary Microprocessor In-Use Indicator:** This amber LED blinks to show the activity of a microprocessor installed in the secondary microprocessor socket. The LED lights during POST to indicate the presence of the microprocessor. When you install a secondary microprocessor, it becomes the startup microprocessor.
-  **Ethernet Receive Indicator:** This amber LED shows receive activity on the network.
-  **Security Indicator:** When tamper-detection software is installed and enabled, this amber LED shows that a security hardware error occurred.
-  **Ethernet Link Status Indicator:** This green LED shows an active link connection on the 10BASE-T interface.
-  **Ethernet Transmit Indicator:** This amber LED shows transmit activity on the network.
-  **Primary Microprocessor In-Use Indicator:** This amber LED blinks to indicate the microprocessor activity; it also comes on during POST.
-  **POST Activity Indicator:** This amber LED lights while the power-on self-test (POST) and the configuration utility programs are running. If this light remains on, either a POST error has occurred, or the system microprocessor has stopped.
-  **Power-On Indicator:** This green LED lights when you turn on your server by pressing the power switch, and when the server powers on in Unattended mode.

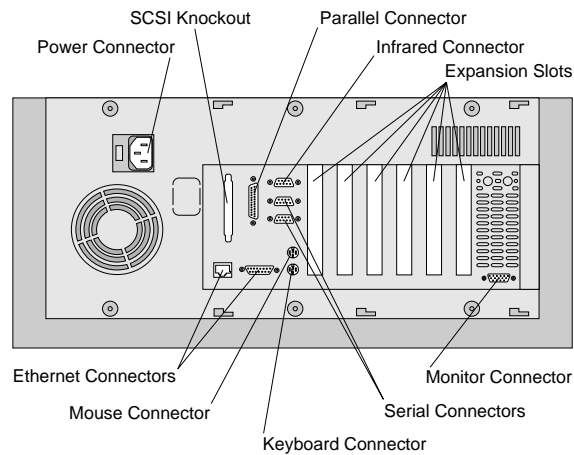
## Input/Output Connectors

# Input/Output Connectors

### Tower model



### Drawer model



*Note:* For pin assignments and other details about these connectors, see the *User's Reference*.

## Input/Output Connectors

**Power Connector:** The server power cable connects here.



**SCSI Knockout:** Remove this knockout panel to install the SCSI external connector cable. For more information, see “Installing the External SCSI Cable Connector” on page 106.



**Parallel Connector:** A signal cable for a parallel device, such as a printer, connects here.



**Infrared Connector:** An infrared (IR) transceiver module option can connect here. See “Devices and I/O Ports” on page 24 for port assignment information.



**Serial Connectors:** Signal cables for modems or other serial devices connect here to the 9-pin serial connectors, serial ports A and B. Serial port B shares a port assignment with the infrared port. See “Devices and I/O Ports” on page 24 for port assignment information.

**Expansion Slots:** Cables to the external connectors on EISA, ISA, and PCI adapters connect here.



**Monitor Connector:** The monitor signal cable connects here.



**Keyboard Connector:** The keyboard cable connects here.



**Mouse Connector:** The mouse cable connects here. This connector is sometimes called the auxiliary-device port.

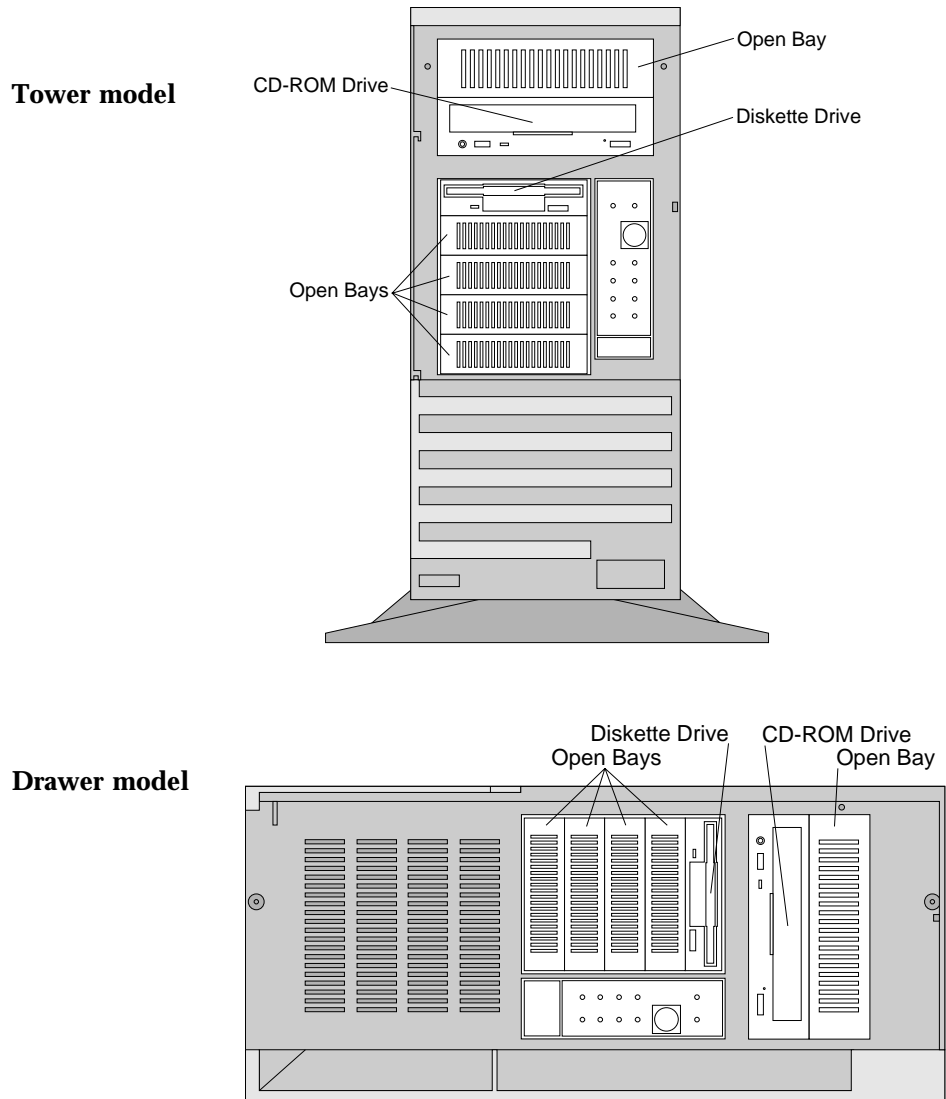


**Ethernet Connectors:** There are two Ethernet connectors: a DB-15 and an RJ-45. The DB-15 attachment unit interface (AUI) connector is for attachment of external 10BASE2, 10BASE5, or 10BASE-F medium attachment unit (MAU). The RJ-45 connector is for attachment to the integrated 10BASE-T (twisted-pair) transceiver. If your server comes with an Ethernet interface cable, you must attach it to the RJ-45 connector on the server, and the cable on the 10BASE-T device.

For more information about cables, see Appendix C, “Ethernet Cable Specifications” on page 225.

## Expansion Bays

### Expansion Bays





## Checking the Voltage Setting

**Open Bays:** Your server's design accommodates 3.5-inch and 5.25-inch devices, such as hard disk, tape, and rewritable optical disk drives. The number and capacities of the hard disk drives vary by model.

For information on the supported types of drives and their installation, see “Installing Internal Drives” on page 81.

**Diskette Drive:** The 3.5-inch, 1.44 MB (MB is approximately 1 000 000 bytes) diskette drive uses 1 MB (unformatted) or 2 MB (unformatted) diskettes.

**CD-ROM Drive:** Your server comes with a SCSI CD-ROM drive.

See the *User's Reference* for additional information about the SCSI subsystem and SCSI hard disk drives.

## Checking the Voltage Setting

Check the voltage-selection switch and verify that it is in the correct position.

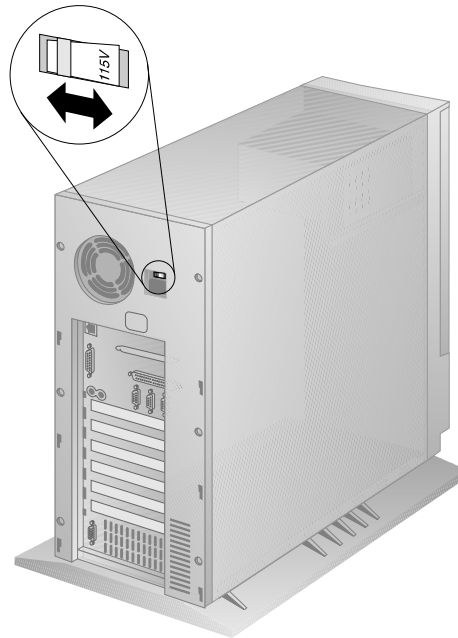
**Attention:** If you set the voltage switch to the wrong position, you might permanently damage your server when you turn it on.

- If the voltage range in your country is between 90 and 137 volts, check to see that 115 is visible. (Use the 115-volt setting in the U.S. and Canada.)
- If the voltage range in your country is between 180 and 265 volts, check to see that 230 is visible.

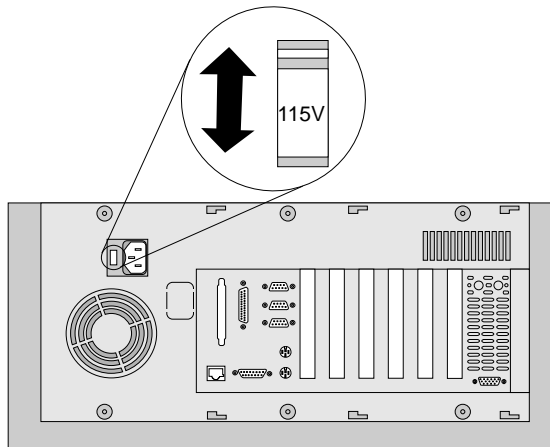
## Checking the Voltage Setting

If you need to adjust the voltage setting, slide the switch to the correct position.

### Tower model



### Drawer model



## Arranging Your Workspace

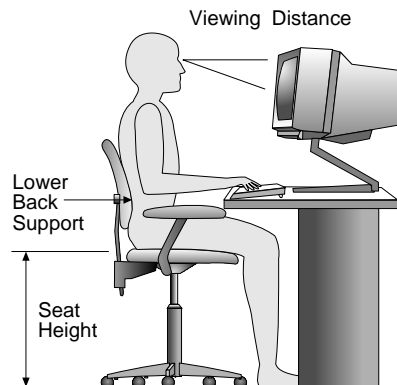
To get the most from your server, arrange both the equipment you use and your work area to suit your needs and the kind of work you do. Your comfort is of foremost importance, but light sources, air circulation, and the location of electrical outlets also can affect the way you arrange your workspace.

### 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,

## Arranging Your Workspace

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 exhausted other methods of reducing glare.

Dust buildup compounds problems associated with glare. Remember to clean your monitor screen periodically using a soft cloth 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, 51 mm (2 in.) of air space is sufficient. Also, make sure the vented air is not blowing on someone else.

## Getting Help on the World Wide Web

### 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 cord directly into an electrical outlet.
- 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 *User's Reference*.

### Getting Help on the World Wide Web

You can access the latest information about product compatibility and configuration on the World Wide Web. This information is updated as new PC Server products are announced.

The following is a sample of the information available at <http://www.pc.ibm.com/servers/> on the World Wide Web.

- Current updates to device drivers, flash BIOS, and other software.
- A listing of products that have been tested for compatibility with IBM PC Servers.
- Certification and compatibility information about network operating systems (NOS) and operating systems (OS).

For additional information, service, or assistance, see Chapter 5, “Getting Help, Service, and Information” on page 199.

## **IBM PC Server Startup Support**

The IBM PC Server Startup Support program provides comprehensive telephone assistance 24 hours a day, 7 days a week, during the first 90 days after installation of your server at no additional charge.\* IBM gives you direct access to trained specialists who can help you set up, install, and configure your server.

Help is available for IBM and non-IBM network operating systems, network interface adapters, and other optional peripherals. To receive a list of the network products supported by the IBM PC Server Startup Support program, call the IBM PC Company Automated Fax System at 1-800-426-3395 in the U.S., or call 1-800-465-3299 in Canada, and ask for document number 16125.

For more information about this program, or for help with the installation of your server:

- In the U.S., call IBM at 1-800-772-2227.
- In Canada, call IBM at 1-800-565-3344.
- In all other countries, contact the IBM support organization that services your area, your IBM marketing representative, or your IBM reseller.

*Note:* For additional information, service, or assistance, see Chapter 5, “Getting Help, Service, and Information” on page 199.

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\* Response time will vary depending on the number and nature of calls received.

## Chapter 2. Configuring Your Server

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This chapter provides information about the configuration and utility programs that come with your server, as well as instructions that tell you when and how to use them.

The Configuration/Setup utility programs are part of the *basic input/output system (BIOS)* that comes with your server. Using these programs, you can set the system date and time, define input and output device parameters, and define system security.

The PC Server System Board Diagnostic Diskette that comes with the server provides additional configuration and diagnostic support for the system board, disk drives, and other system components.

The built-in SCSISelect utility program configures the SCSI devices that you install in your server. You can use SCSISelect to change default values, resolve configuration conflicts, and perform a low-level format on a SCSI hard disk drive.

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# Configuration Overview

You play a key role in how your server allocates resources to organize and interconnect hardware devices and software programs. This allocation process is referred to as *configuration*. The steps required to configure your server depend on the number and types of devices and programs that you install.

Your server supports several types of adapters. This flexibility lets you choose from among thousands of adapters and devices that comply with any of the following standards:

- Peripheral Component Interconnect (PCI)
- Extended Industry Standard Architecture (EISA)
- Industry Standard Architecture (ISA)
- Small Computer System Interface (SCSI)

In general, the greater the number and variety of hardware devices and software programs that you install in your server, the more you will have to interact with your server and your devices to correctly configure your system.

Your server comes with the following hardware configuration utility programs:

- The built-in Configuration/Setup utility program configures system board functions, such as serial and parallel port assignments, change interrupt requests settings, and the startup sequence for drives that you install. You can also use this utility program to set passwords for starting up the server and accessing the Configuration/Setup utility program.
- Use the EISA Configuration utility program on the PC Server 325 EISA Configuration Diskette to configure EISA and ISA adapters.
- You use the built-in SCSISelect utility program to configure the SCSI devices that you install in your server. You can use SCSISelect to change default values, resolve configuration conflicts, and perform a low-level format on a SCSI hard disk drive.

## Configuration Overview

- Use the utility programs on the PC Server Utilities Diskette to back up and restore the CMOS and NVRAM configuration data.

Before installing a new device or program, read the documentation that comes with it. Reading the instructions helps you determine the steps required for installation and configuration. The following actions are typically, but not always, required to configure your server.

1. Run the Configuration/Setup utility program and record the current configuration settings.
2. Set jumpers or switches on the server's system board.  
See Appendix A, "Jumpers" on page 207.
3. Set jumpers or switches on the device.  
See the device installation instructions.
4. Install the device in the server.  
See Chapter 3, "Installing Options" on page 51.
5. Install software programs.  
See the installation instructions that come with the software.
6. Resolve configuration conflicts.  
See "Resolving Configuration Conflicts" on page 43.

## The Configuration/Setup Utility

For most configurations, the server will operate using the default system settings. You need to change the settings only to resolve configuration conflicts or to enable or change device functions (for example, enabling the infrared port).

When you want or need to change the default settings, the Configuration/Setup utility program provides a convenient way to display and change the settings.

After you run and exit the Configuration/Setup utility program, configuration information is stored in nonvolatile RAM (NVRAM). The configuration information remains available for the next system startup while the server is powered off.

Always run the Configuration/Setup utility program if you have added or removed any hardware option, or if you receive an error message instructing you to do so. Review this chapter and the information that comes with the device before making changes. Also, record the current settings (see Appendix B, “Server Records” on page 217) before making any changes.

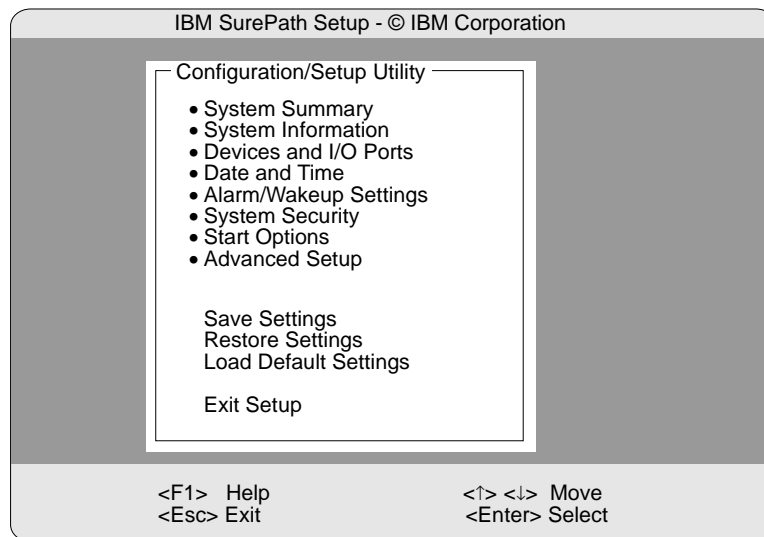
### Starting the Configuration/Setup Utility Program

To start the Configuration/Setup utility program:

1. Turn on the server and watch the screen.
2. When the message Press F1 to enter Configuration/Setup appears, press **F1**.

The Configuration/Setup utility Main Menu appears. For information about the menus, see “Using the Configuration/Setup Utility Main Menu” on page 22.

## Using the Configuration/Setup Utility Main Menu



*Note:* Some menus might differ slightly, depending on the BIOS version that comes with your server.

## Using the Configuration/Setup Utility Main Menu

The Configuration/Setup utility program Main Menu lets you select settings you want to change.

Pressing **F1** displays Help information for a selected menu item.

*Notes:*

1. If you enter only the power-on password and an administrator (supervisor-level) password is also set, a limited version of the menu appears.
2. The choices on some menus might differ slightly, depending on the BIOS version that comes with your server.

## Using the Configuration/Setup Utility Main Menu

To change configuration settings:

1. Use the Up Arrow (↑) or Down Arrow (↓) keys to select the menu item for the configuration setting you want to change. Selected items are highlighted. Then press **Enter**.
2. Select the configuration setting you want to change. Use the Page Up (PgUp) and Page Down (PgDn) keys to scroll through the menu, if needed.
3. Use the Right Arrow (→) or Left Arrow (←) keys to select the appropriate setting for the selected item.
4. Repeat Steps 1 through 3 for each setting you want to change. Press Esc to return to the Configuration/Setup Main Menu.
5. After making changes, you can select
  - **Save Settings** to save the selected changes.
  - **Restore Settings** to delete the changes and restore the previous settings.
  - **Load Default Settings** to cancel the changes and restore the factory settings.
6. To exit from the Main Menu, select **Exit Setup**. The system prompts you to confirm your choice. You can save your changes and exit, exit without saving your changes, or return to the Main Menu.

### System Summary

Select this choice to display configuration information, such as the type and speed of the microprocessor, and amount of memory.

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

The System Summary choice appears on the full Configuration/Setup menu and on the limited Configuration/Setup user's menu.

## Using the Configuration/Setup Utility Main Menu

### System Information

Select this choice to display information about your PC Server 325, and to view the interrupt request (IRQ) settings for the SCSI and Ethernet controllers on the system board, and other PCI adapters that you purchase and install.

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 menu.

### *Product Data*

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

### *PCI Routing*

Select this choice to view the settings for interrupt requests for PCI adapters. In addition, you can view the interrupt requests for the Ethernet and SCSI controllers on the system board.

### Devices and I/O Ports

Software recognizes ports from their port assignments. Each port must have a unique port assignment. The Configuration/Setup utility program normally handles this, but you might have special hardware or software that requires you to change these assignments.

Select the Devices and I/O Ports choice to view or change the assignments for devices and input/output ports.

## Using the Configuration/Setup Utility Main Menu

### Notes:

1. The infrared connector and Serial B connector share a single port assignment. By default, the infrared connector is configured as **Disabled**.
2. The serial, parallel, and infrared ports, and the diskette drive must have the same configuration in the Configuration/Setup utility programs and the EISA Configuration Diskette. See “Using the EISA Configuration Diskette” on page 36 for more information.
3. When you configure the parallel port as bidirectional, use an IEEE 1284-compliant cable. The maximum length of the cable must not exceed 3 meters (9.8 feet).

You can add serial ports by installing a serial adapter in an expansion slot. See the documentation that comes with the serial adapter for information about port assignments.

The parallel port can be configured as *bidirectional*, that is, data can be both read from and written to a device. In bidirectional mode, the server supports Extended Capabilities Port (ECP) and Enhanced Parallel Port (EPP).

To display or change the assignments for devices, or the infrared, serial, or parallel ports:

1. Select **Devices and I/O Ports**.
2. Select a device or port; then, use the Left Arrow (←) and Right Arrow (→) keys to advance through the settings available.

The Devices and I/O Ports choice appears only on the full Configuration/Setup menu.

## Using the Configuration/Setup Utility Main Menu

### Date and Time

Select this choice to set the system date and time.

The system time is in a 24-hour format: hour/minute/second. The system date is in standard format for your country. For example, in the United States, the format is **MM/DD/YY** (Month/Day/Year).

Select **Date and Time**, then use the Left Arrow (←) and Right Arrow (→) keys to advance through each data field. Type the new information; the system saves the information as you type it.

The **Date and Time** choice appears only on the full Configuration/Setup menu.

### Alarm/Wakeup Settings

You can start your server manually or at a predefined event. The server enters one of the following states.

**Attended mode** This is the “on” state that occurs when you press the power switch from the Standby or Unattended mode. The Power-On light comes on whenever the server is on.

**Unattended mode** The server starts at a specified date and time, or when it receives a signal from either serial port. When the server powers on in the Unattended mode, the Unattended Power-On light and the Power-On light come on.

**Standby mode** The server is powered down. The automatic restart feature, which enables the server to restart following a momentary power loss, means that the server is never completely turned off.

The server must be in the Standby mode (off) for the **Alarm/Wakeup Settings** features that you define to take effect.

Select the **Alarm/Wakeup Settings** choice to enable and disable the Unattended mode.



## Using the Configuration/Setup Utility Main Menu

The result of pressing the power switch varies, depending on which mode the server is in. To toggle from

- Standby mode to Attended mode, press and release the power switch.
- Attended mode to Standby mode, press the power switch in slowly just until the power-on light goes out and then immediately release the switch.
- Unattended mode to Attended mode, press and release the power switch. The server restarts in Attended mode.
- Unattended mode to Standby mode, press the power switch just until the power LEDs go out.

### *Notes:*

1. For proper operation of the **Alarm/Wakeup Settings** options, set the **Password Prompt** choice to **Off**. On receiving a signal for an unattended startup, the server bypasses the password prompt and continues the startup.
2. Set the Wakeup features immediately before you plan to turn off the server. The server locks and cannot be used after you exit, saving the settings. When the server restarts, in either Attended or Unattended mode, the Wakeup features return to the default, disabled, setting.
3. When both wakeup features are enabled, the server starts when the first event (time or signal) occurs.

The **Alarm/Wakeup Settings** choice appears only on the full Configuration/Setup menu.

### *Wakeup Timer*

With this option, you can specify a time and date when the server will turn on automatically.

To set the Unattended mode, select **Alarm/Wakeup Settings**, then select **Wakeup Timer**. Then, set or change the settings. Select **Wakeup Date** to specify a date up to 31 days away. Select **Wakeup Time** to specify the time, using a 24-hour clock format.

## Using the Configuration/Setup Utility Main Menu

### *Wakeup on Ring*

When this option is enabled, the server turns on automatically when it receives a signal from serial port A or B.

### System Security

To control access to your server, you can implement the security features described in your *User's Reference*. These features include two levels of password protection.

To set, change, or delete a password:

1. Select **System Security**.
2. Select the password that you want to change.

The **System Security** choice appears only on the full Configuration/Setup menu.

After you set a power-on or administrator password, you must enter the password when you turn on the server. (The passwords do not appear on the screen as you type them.)

## Using the Configuration/Setup Utility Main Menu

Type of Password	Results
No password set	<ul style="list-style-type: none"><li>No password required to start system.</li><li>User can access all choices on the Configuration/Setup utility program menu.</li></ul>
Power-on password only	<ul style="list-style-type: none"><li>User must enter password to complete the system startup.</li><li>Power-on password provides access to all choices on the Configuration/Setup utility program menu.</li></ul>
Administrator password	<ul style="list-style-type: none"><li>User must enter password to complete the system startup.</li><li>Administrator password provides access to all choices on the Configuration/Setup utility program menu.</li></ul>
Administrator <i>and</i> power-on password	<p>User can enter either password to complete the system startup.</p> <ul style="list-style-type: none"><li>Administrator password provides access to all choices on the Configuration/Setup utility program 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.</li><li>Power-on password provides access to a limited set of choices on the Configuration/Setup utility program menu. This might include changing or deleting the power-on password.</li></ul>

### *Using the Administrator Password Menu*

The administrator password (sometimes called a supervisor-level password) controls access to some features of the server, including the Configuration/Setup utility program.

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

To set an administrator password:

1. Select **Administrator Password** on the System Security menu; then press **Enter**.

The **Administrator Password** menu appears.

2. Type the password in the **Enter Administrator Password** data field.

## Using the Configuration/Setup Utility Main Menu

A password can contain any combination of up to seven alphanumeric characters (A-Z, a-z, and 0-9). Keep a record of your password in a secure place.

3. Move the cursor to the **Enter Administrator Password Again** data field and type the password again.

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

4. Select **Set or Change Administrator Password** to save the new password; then press **Enter**. The password becomes effective immediately.

*Note:* A message appears if the two passwords do not match. If this happens, press **Enter** to cancel the request and return to the System Security menu.

To delete an administrator password:

1. Select **Administrator Password** on the System Security menu; then press **Enter**.

Following a warning, the **Administrator Password** menu appears.

2. Select **Delete Administrator Password**; then press **Enter**.
3. A confirmation window appears. Press **Enter** to delete the administrator password. Press **Esc** to return to the System Security menu.

To enable a user to change the power-on password:

1. Select **Administrator Password** on the System Security menu; then press **Enter**.

The **Administrator Password** screen appears.

2. Select **Power-on password changeable by user**. Press the Left Arrow (←) or Right Arrow (→) key to toggle the entry to **Yes**.

When this choice is enabled, **System Security** appears on the limited Configuration/Setup menu. The System Security menu contains the **Power-on Password** choice.

## Using the Configuration/Setup Utility Main Menu

### *Using the Power-on Password Menu*

When a power-on password is set, you must enter a password each time you start the system.

To set a power-on password:

1. Select **Power-on Password** on the System Security menu; then press **Enter**.

The **Power-on Password** menu appears.

2. Type the password in the **Enter Power-on Password** data field.

You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for your power-on password. Keep a record of your password in a secure place.

3. Move the cursor to the **Enter Power-on Password Again** data field and type the password again.
4. Select **Set or Change Power-on Password** to save the new password; then press **Enter**.

*Note:* A message appears if the two passwords do not match. If this happens, press **Esc** to cancel the request and return to the System Security menu.

If you forget the power-on password, and an administrator password has been set, use the administrator password at the power-on prompt; then start the Configuration/Setup utility program and change the power-on password. If no administrator password has been set, you can bypass the power-on password prompt during POST, and set a new password. For instructions, see “Bypassing an Unknown Power-on Password” on page 212.

To delete a power-on password:

1. Select **Power-on Password** on the System Security menu; then press **Enter**.

The **Power-on Password** menu appears.

2. Select **Delete Power-on Password**; then press **Enter**.

## Using the Configuration/Setup Utility Main Menu

3. A confirmation window appears. Press **Enter** to delete the power-on password. Press **Esc** to cancel the request and return to the System Security menu.

To turn off the prompt for the power-on password:

1. Select **Power-on Password** on the System Security menu; then press **Enter**.

The **Power-On Password** screen appears.

2. Select **Password Prompt**. Press the Left Arrow (←) or Right Arrow (→) key to toggle the entry to **Off**.

## Start Options

Start options take effect when you start your server.

You can select keyboard operating characteristics, such as the keyboard speed. You can also specify whether the keyboard number lock starts on or off.

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 primary diskette drive, then checks the hard disk drive in bay 7, and then checks a network adapter.

You can enable a virus-detection test that checks for changes in the master boot record at start up. You can also choose to run POST in an enhanced mode or a quick mode.

Select **Start Options**, then use the Left Arrow (←) and Right Arrow (→) keys to advance through each data field.

The **Start Options** choice appears only on the full Configuration/Setup menu.

## Advanced Setup

Select **Advanced Setup** to change values for advanced hardware features such as cache control and ROM shadowing.

## Using the Configuration/Setup Utility Main Menu

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

Use the Left Arrow (←) and Right Arrow (→) keys to advance through the options for the selected menu item.

The **Advanced Setup** choice appears only on the full Configuration/Setup menu.

### *Cache Control*

Select this choice to enable or disable the microprocessor cache state. In addition, you can define the microprocessor cache type as write-back or write-through.

You can also enable or disable video BIOS caching, and define buffers for video and option ROM caching.

### *ROM Shadowing*

Select this choice to enable ROM shadowing in specified areas. When these areas are enabled, the contents can be cached, using the **Cache Control** option.

### *PCI Bus Control*

Select this choice to manually assign the interrupt requests (IRQs) for PCI adapters installed in the server, and for the SCSI and Ethernet controllers on the system board.

You can also enable the generation of a non-maskable interrupt (NMI) when a PCI data parity error occurs.

If you install an adapter that requires a memory address in the C8000 to DFFFF (hexadecimal) range, you must change the memory address of the server's SCSI ROM. Select **SCSI ROM Address** to assign an alternate address.

To enable or disable the CPU to PCI write posting, select **CPU-PCI Write Buffers**.

## Using the Configuration/Setup Utility Main Menu

### Exiting From the Configuration/Setup Utility Program

Select **Exit Setup** to exit from the Configuration/Setup utility programs Main Menu; then, press **Enter**.

The system prompts you to confirm your choice. If you want to make additional changes, you can return to the Configuration/Setup Utility. If you made any changes and did not save them with the **Save Settings** choice, the system prompts you to save or discard the changes before exiting the Configuration/Setup utility programs.

When you finish configuring your server, you can save the CMOS and NVRAM configuration data to a diskette. This is useful in case you have to clear CMOS or replace the system board, and you want to restore the existing configuration.

Refer to the README file on the PC Server Utilities Diskette for specific procedures on backing up and restoring CMOS and NVRAM configuration data.



### Configuring Options

Before installing a new device or program, read the documentation that comes with it. Reading the instructions helps you to determine the steps that are required for installation and configuration. The following list provides a preview of the actions that might be required to configure your server.

1. Run the Configuration/Setup program and record the current configuration settings.  
See “Starting the Configuration/Setup Utility Program” on page 21.
2. Start the EISA Configuration Diskette and:
  - a. Record the current settings.
  - b. Install the configuration file (.CFG) and/or overlay (.OVL) files.  
*Note:* If the .CFG file did not come with the adapter, see “Configuration Files” on page 40.  
See “Recording EISA Configuration Settings” on page 38 and “Starting the EISA Configuration Diskette” on page 38.
3. Set jumpers or switches on the server system board.  
See Appendix A, “Jumpers” on page 207.
4. Set jumpers or switches on the device.  
See the instructions that come with the adapter.
5. Install the adapter in the server.  
See “Working with Adapters” on page 61.
6. Install software programs.  
See the installation instructions that came with the software.
7. Resolve configuration conflicts.  
See “Resolving Configuration Conflicts” on page 43.

## Using the EISA Configuration Diskette

### Using the EISA Configuration Diskette

You must use the EISA Configuration Diskette anytime you want to add, move, or remove EISA or ISA adapters. In addition, you might need to use the diskette to resolve configuration conflicts.

In addition, if you disable the serial, parallel, infrared, or diskette drive in the Configuration/Setup utility programs, you might need to run the EISA configuration Diskette, and make the same change. Refer to the README file on the EISA Configuration Diskette for more information.

Each time you use the EISA Configuration Diskette to configure your server, the configuration information is saved in a *System Configuration Information (SCI)* file and in the NVRAM configuration. Only devices that you install and configure correctly appear on the EISA Configuration screens.

### Making Menu Selections

When you start the backup copy of the EISA Configuration Diskette, an introductory screen appears. Press **Y**. The Main Menu, **Steps in configuring your computer**, appears. The EISA Configuration program main menu contains five steps:

#### **Step 1: Important EISA configuration information**

This step provides information about the differences between the ISA configuration process and the EISA configuration process.

#### **Step 2: Add or remove boards**

If the server is configured correctly, this step provides a list of the devices installed in the expansion slots. The **Add** choice allows you to add ISA devices to the configuration. If EISA adapters are installed in your server, and you have not copied the *.CFG* file to the EISA Configuration Diskette, you are prompted to insert the adapter configuration diskette into the diskette drive. The *.CFG* file is copied to your diskette. If the adapter *.CFG* file is copied to the EISA Configuration Diskette before starting the diskette, and the

## Using the EISA Configuration Diskette

adapter is installed in your server, EISA devices are added automatically.

### Step 3: View or edit details

After adding EISA or ISA adapters in Step 2, use the **Edit** selection of this step to configure them. Use the **Edit Resources** selection of this step for complex configurations. If you change a setting in this step, you might have to change a switch or jumper setting on the system board or on a device.

*Note:* You can view the settings for PCI devices, but you cannot change them through the EISA Configuration utility program. To change settings for PCI devices, see “PCI Bus Control” on page 33.

### Step 4: Examine switches or print report

After Steps 1 and 2 have been completed correctly, this step displays the correct switch and jumper settings for the installed devices that have switches and jumpers. Also, you can choose to print a system configuration report.

### Step 5: Save and exit

This step allows you to save your configuration or to discard the changes before you exit from the program.

Use the Up Arrow (↑) or Down Arrow (↓) key to highlight your selection; then press **Enter** to make your selection. To help you track your progress, a checkmark (✓) appears on the main menu next to the completed steps.

You can access help information through:

- Help windows, which remain active.
- Information windows, which appear automatically as a result of some configuration activities.
- The `Help=F1` prompt, which allows you to access the Help Menu for screens displaying the prompt. To remove the Help Menu, press **Esc**.

## Using the EISA Configuration Diskette

### Recording EISA Configuration Settings

Record the configuration settings you made in Step 3, **View or edit details** and Step 4, **Examine switches or print report** on a separate sheet and store it in a safe place for future reference. If you have a printer attached to your server, you can use the **Print Screen** key to print these settings. The settings are helpful when you install additional options, or if you need to have your system serviced. Also, record the new settings each time you make changes. Be sure to record the current configuration settings in the tables in “Installed Device Records” on page 218.

If you have more than one server, make a backup copy of each server's configuration.

### Starting the EISA Configuration Diskette

To start the EISA Configuration Diskette:

1. Insert the backup copy of the EISA Configuration Diskette into the diskette drive.
2. Turn on the server, or if it is already on, shut down the operating system and restart the server.
3. When the first screen appears, press **Y**. Follow the instructions on the screen until the Main Menu, **Steps in configuring your computer**, appears.
4. Use the Up Arrow (↑) or Down Arrow (↓) key to advance through the items on the screen. Use the Tab key to select choices on the bottom of the screen. Press the Esc key to return to a previous menu.
5. Press **Enter** to make a selection.

## Using the EISA Configuration Diskette

6. Follow the instructions on the screen to view or change (edit) the configuration information.

*Note:* Adapters that are installed in your server appear automatically on the EISA Configuration screens *after* you copy the adapter configuration file (file with an extension of *.CFG*) to the EISA Configuration Diskette. If you want to manually add an EISA adapter that you have not yet installed in your server, add it using Step 2 from the menu. (see “Making Menu Selections” on page 36). To configure ISA adapters, follow the instructions on the screen.

## Using the Advanced Functions

Locking an ISA adapter reserves the selected resources and prevents the system from using them to resolve resource conflicts. Use the **Advanced** function to *lock* ISA boards. An exclamation mark (!) appears next to locked adapters.

To use the Advanced functions:

1. Start the backup copy of the EISA Configuration Diskette (see “Starting the EISA Configuration Diskette” on page 38).
2. At the main menu, select Step 3, **View or edit details**.
3. Press **F7**. The Advanced functions screen appears.
4. Follow the instructions on the screen to:
  - a. Lock or unlock boards
  - b. View additional system information
  - c. Set verification mode
  - d. Maintain SCI files

## Configuring EISA, ISA, and PCI Adapters

### Configuring EISA, ISA, and PCI Adapters

Always use the backup copy of the EISA Configuration Diskette when assigning interrupts for EISA and ISA adapters. You cannot assign an EISA or ISA adapter the same interrupt that you have assigned to a PCI adapter. This is because the PC Server 325 does not support interrupt sharing among PCI, EISA, and ISA adapters.

If a situation occurs where you need an additional interrupt, you can use an interrupt from another function that you might not need, such as COM2 (Interrupt 3).

### Configuring ISA or EISA Features and Options

Some ISA and most EISA devices come with option diskettes. These diskettes can contain any or all of the following types of information:

- Configuration files (.CFG) and overlay files (.OVL)
- Device drivers
- Sample applications (mini-applications)

#### *Configuration Files*

A configuration file is required to configure the server for ISA or EISA adapters. You have to copy this configuration file, which has a file-name extension of *.CFG*, from the device diskette to the EISA Configuration Diskette before installing the device in the server.

The configuration file reserves the system resources that the adapter needs to function properly.

Some ISA adapters come with a diskette that contains the *.CFG* file for the adapter. If you want to install ISA adapters that do not come with their own *.CFG* files, you must create a *.CFG* file for for each adapter.

## Configuring EISA, ISA, and PCI Adapters

To create a unique .CFG file for an ISA adapter:

1. Insert the EISA Configuration Diskette into diskette drive A.
2. Start the EISA configuration utility program. See “Starting the EISA Configuration Diskette” on page 38.
3. At the main menu, select Step 2, **Add or remove boards**.
4. At the next menu, select the slot in which you installed the adapter.
5. At the next screen, select **OK**.
6. At the next screen, press **F5**; then, select **Create .CFG file**.
7. Press **Enter**.
8. At the **Create a board CFG file** screen, type in the adapter manufacturer and description (for example, IBM Token Ring); then press **Enter**.
9. Refer to the adapter documentation for information about specific configuration parameters (such as IRQ or DMA channel) required for the adapter. Then, follow the instructions on the screen to enter the appropriate parameters on the menu.  
*Note:* Normally, ISA adapters do not use every parameter. Most adapters require only a port address.
10. The controllers on your system board require specific memory and I/O address assignments to function properly. To avoid configuration conflicts, do not assign the following memory and I/O addresses to other adapters or options in your server:  
A0000H – C7FFFH
11. After you type in all of the appropriate parameters, press **F10**.
12. At the next screen, carefully verify that the information is correct; then, press **Enter**.
13. At the Add Confirmation window, press **Enter** again.
14. In the next window (add), press **Enter**.  
The adapter description appears in the selected slot.
15. Verify the installation; then press **F10**.
16. At the next menu, select **Save and exit the configuration utility**.

## Configuring EISA, ISA, and PCI Adapters

### *Device Drivers*

Device drivers are programs designed to support a specific type of hardware device. They provide instructions that enable the computer to interact with the device, or to take advantage of a device's special feature. The device driver might come with the operating system, the application program, or on the option diskette. Not all devices require device drivers. Refer to the documentation that comes with the option for additional information.

### *Sample Applications*

Some optional devices provide small applications or sampler files. These applications demonstrate the capabilities of the device and serve as software examples for programming the device. Refer to the documentation that comes with the option for additional information.

## Configuring PCI Features and Options

PCI devices automatically communicate with the server configuration information. This usually results in automatic configuration of a PCI device. If a conflict does occur, see “Resolving Configuration Conflicts” on page 43.

Multiple-function PCI adapters use more than one interrupt. When you install one of these adapters, review the IRQ assignments in the Configuration/Setup utility programs (see “PCI Bus Control” on page 33). Verify that the IRQ assignments are correct.

Your PC Server 325 uses a rotational interrupt technique to configure PCI adapters. This technique enables you to install a variety of PCI adapters that currently do not support sharing of PCI interrupts. For information on manually overriding the interrupt, see “PCI Bus Control” on page 33.



### Resolving Configuration Conflicts

The resources used by your server consist of IRQs, DMA, I/O port addresses, and memory. This information is useful when a resource configuration conflict occurs.

Conflicts in the configuration occur if:

- A device is installed that requires the same resource as another device. (For example, a conflict occurs when two adapters try to write to the same address space.)
- A device resource is changed (for example, changing jumper settings).
- A device function is changed (for example, assigning *COM1* to two serial ports).
- A software program is installed that requires the same resource as a hardware device

The steps required to resolve a configuration error are determined by the number and variety of hardware devices and software programs you install. If a hardware configuration error is detected, a *configuration error* message appears after the server completes POST and before the operating system is loaded. You can bypass the error by pressing **Esc** while the error message is displayed.

The Configuration/Setup utility program configures the system hardware and PCI interrupt requests. The program does not consider the requirements of the operating system or the application programs. See “Resolving Software Configuration Conflicts” on page 45 for additional information.

## Resolving Configuration Conflicts

### Resolving Hardware Configuration Conflicts

Use the following information to help resolve hardware configuration conflicts:

1. Run the Configuration/Setup utility program to view and change resources used by the system board functions and the PCI interrupt requests (IRQs), if necessary. Record the current settings before making any changes. (See “Starting the Configuration/Setup Utility Program” on page 21 for instructions.)
2. Determine which adapter or device is causing the error.
3. Change configuration resource allocations. Use the Configuration/Setup utility program to view or change system board resource allocations.
4. Change adapter jumpers or switches. Jumpers and switches define the system resources a device uses. If the settings are incorrect or set to use a resource that cannot be shared, a conflict occurs and the device will remain deactivated by the configuration program.
5. Change system board jumpers or switches. See “Preparing to Add Options” on page 55 for instructions on removing the cover. Then, refer to the system-board diagram inside your server.
6. Remove the device or adapter. Some configurations are not supported. If you must remove an adapter, see “Removing Adapters” on page 67.
7. Assign EISA memory addresses starting with DFFFF (in hexadecimal), and work downward to address C8000 (in hexadecimal). Configure PCI devices starting from C8000 (in hexadecimal), the default PCI assignments.

## Resolving Configuration Conflicts

### Resolving Software Configuration Conflicts

The memory-address space and IRQs used by some hardware options might conflict with addresses defined for use through application programs or the EMS. (EMS is used only with DOS.)

If a conflict exists, one or more of the following conditions might exist:

- The system cannot load the operating system.
- The system does not work.
- An application program does not operate, or it returns an error.
- Screen messages indicate a conflict exists.

To resolve conflicts, you can change the software or hardware configuration.

*Note:* Start the Configuration/Setup utility program to view the addresses used by your system board functions.

The best way to resolve memory-address conflicts is to change the addresses used by the application program or the device driver. You can use the Configuration/Setup utility program to change addresses.

If a device driver is causing a memory-address conflict, refer to your operating-system documentation or the documentation supplied with the device drivers.

## Configuring the Ethernet Controller

### Configuring the Ethernet Controller

The Ethernet controller on the system board provides an efficient, high-speed interface to a 10-Mbps Ethernet network, with automatic configuration.

The controller provides full-duplex operation (FDX), which allows simultaneous transmission and reception of data on the Ethernet LAN.

The controller also provides an automatic sensing function. The server automatically detects which of the two Ethernet ports is connected to the network, and then uses that port for communication. This function, always active, eliminates the need for a media type parameter and facilitates changing from one media type to another.

If you need additional Ethernet connectors, you can install an Ethernet adapter, such as the IBM PCI Ethernet adapter.

*Note:* If you are installing an IBM PCI Ethernet adapter, be sure to run the Ethernet diagnostics and record the server's Ethernet configuration information before you install the adapter.

## Using the SCSISelect Utility Program

Your server comes with a menu-driven configuration utility program, called SCSISelect, that allows you to view and change SCSI settings.

You can use the SCSISelect Utility program to:

- View and change the default SCSI ID values
- Verify and change configuration conflicts
- Perform a low-level format on a SCSI hard disk

## Starting the SCSISelect Utility Program

You can access this program when you start the server. The SCSISelect prompt appears after the IBM PC Server screen appears briefly and then disappears. A message appears as each drive spins up. Press **Ctrl+A** immediately after all drives have spun up.

Use the Up Arrow (↑) and Down Arrow (↓) key to move the highlight bar to the various menu choices. Press **Esc** to return to the previous menu. Also, you can press the F5 key to switch between color and monochrome modes (if your monitor permits). To change the settings of the displayed items, follow the directions on the screen.

## SCSISelect Utility Program Options

The following options appear on the SCSISelect Utility program menu:

- Configure/View Host Adapter Settings
- SCSI Disk Utilities

## Using the SCSISelect Utility Program

### *Configure/View Host Adapter Settings*

To view or change the SCSI controller settings, select **Configure/View Host Adapter Settings** and follow the directions on the screen. This menu has the following selections:

- Host Adapter SCSI ID  
Select this choice to change the SCSI ID of the SCSI controller from its default value of 7.
- SCSI Parity Checking  
The default value is *Enabled*. This value should not be changed.
- Host Adapter SCSI Termination  
Select this choice to configure SCSI controller termination. The default value is *Low On / High On*.
- 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.
- Advanced Configuration Options  
Select this choice to view or change the settings for advanced configuration options. These options include enabling support for large hard disk drives and support for drives with Ultra SCSI speed.

### *SCSI Disk Utilities*

To see the IDs that are assigned to each SCSI device or to format a SCSI device, select **SCSI Disk Utilities** from the SCSISelect Utility program menu.

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

*Note:* If the following screen displays, you might have pressed **Ctrl+A** before the selected drives spun up. 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 SCSISelect Utility Program

```
Unexpected SCSI Command Failure

Target SCSI ID:      4
SCSI CDB Sent:      03 00 00 00 0E 00 07 00 02 00
Host Adapter Status: 00h - No host adapter error
Target Status:      02h - Check condition
Sense Key:          02h - Not ready
+Sense Code:         04h
+Sense Code Qualifier: 02h

Press 'Esc' to continue.
```

### *Performing a Low-Level Disk Format*

You can perform a low-level format on hard disk drives using the *Format Disk* feature of the SCSISelect Utility program.

Depending on the hard disk capacity, the low-level format program could take up to two hours.

### *When To Use the Format Disk Program*

Use the Format Disk program:

- When you are installing software that requires a low-level format
- When you get recurring messages from the diagnostic tests directing you to run the Low-Level Format program on the hard disk
- As a last resort before replacing a failing hard disk drive

*Note:* For information about backing up all of your files, see your operating-system documentation.

## Saving Configuration Settings

### *Starting the Low-Level Format*

**Attention:** The low-level format erases *all* data and programs.

1. If the hard disk is working, make a backup copy of all the files and programs on the hard disk.
2. Select **Format disk** from the SCSISelect Disk Utilities menu; then follow the instructions on the screen.

*Note:* Hard disks normally contain more tracks than their stated capacity (to allow for defective tracks). A message appears on the screen if the defect limit is reached. If this happens, have the system serviced.

3. To install an operating system after the hard disk drive is formatted, refer to the README file in **Start Here** on the ServerGuide Main CD.

## Saving Configuration Settings

When you finish configuring your server, you can save the CMOS and NVRAM configuration data to a diskette. This is useful in case you have to clear CMOS or replace the system board, and you want to restore the existing configuration.

Refer to the README file on the PC Server Utilities Diskette for specific procedures on backing up and restoring CMOS and NVRAM configuration data.

*Note:* You will need to have a formatted diskette for each server configuration that you back up.



## Chapter 3. 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. If you have several internal options to install, these instructions enable you to add them all at one time.

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## Before You Begin

### Before You Begin

- Become familiar with the safety and handling guidelines specified under “Safety Information” on page vii, “Electrical Safety” on page 53, and “Handling Static-Sensitive Devices” on page 54. These guidelines will help you work safely while working with your server and options.
- Make sure you have an adequate number of properly grounded electrical outlets for your server, monitor, and any other options you intend to install.
- Place your server in a location that is dry. Rain or spilled liquids might damage your server.
- Leave about 51 mm (2 in.) of space around the front and rear of the server to allow the server cooling system to work properly.
- Have a supply of 1 MB and 2 MB, 3.5-inch diskettes available.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.

Be sure to leave space around the server to allow the server cooling system to work properly.

- On a tower model, leave about 51 mm (2 in.) of space around the front and rear of the server.
- On a drawer model, refer to the documentation that comes with the rack.

## Electrical Safety



**CAUTION:**

**Electrical current from power, telephone, and communication cables can be hazardous. To avoid any shock hazard, disconnect all power cords and cables as described in the following information.**

For your safety, always do the following *before* removing the cover:

1. Turn off the server and any attached devices, such as printers, monitors, and external drives.

*Note:* If you are in the United Kingdom and have a modem or fax machine attached to your server, you must disconnect the telephone line from the server *before* unplugging any power cords (also known as power cables). When reassembling your server, you must reconnect the telephone line *after* you plug in the power cords.

2. Unplug all the power cords from electrical outlets.
3. Disconnect all communication cables from external receptacles.
4. Disconnect all cables and power cords from the back of the server.

*Note:* Reconnect the cables or power cords only after you reassemble the server and put the cover back on.



**CAUTION:**

**Never remove the cover on the power supply. If you have a problem with the power supply, have your system serviced.**

## Handling Static-Sensitive Devices

### Handling Static-Sensitive Devices

Static electricity, though harmless to you, can seriously damage server components or options.

*Note:* When you are adding an internal option, do not open the static-protective package containing the option until you are instructed to do so.

When you handle options and other server components, take these precautions to avoid damage from static electricity:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters, the processor board, and memory-module kits by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.
- When you are installing a new option, touch the static-protective package containing the option to a metal expansion-slot screw or other unpainted metal surface on the server for at least two seconds. (This reduces static electricity from the package and from your body.)
- When possible, remove the option and install it directly into the server without setting the option down. When this is not possible, place the static-protective package that the option comes in on a smooth, level surface and place the option on it.
- Do not place the option on the server's covers or any metal surface.

## Preparing to Add Options

### Before you begin

- Be sure your current server configuration is working properly.
- Locate the key to the cover lock.
- Obtain a small, flat-blade screwdriver.
- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.

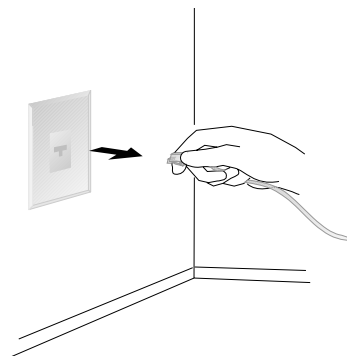
1. Unlock and open the server door.
2. Remove any media (diskettes or CDs) from the drives, and then turn off all attached devices and the server.
3. If you have a tower model, continue with “Preparing a Tower Model.”

If you have a drawer model, go to “Preparing a Drawer Model” on page 58.

### Preparing a Tower Model

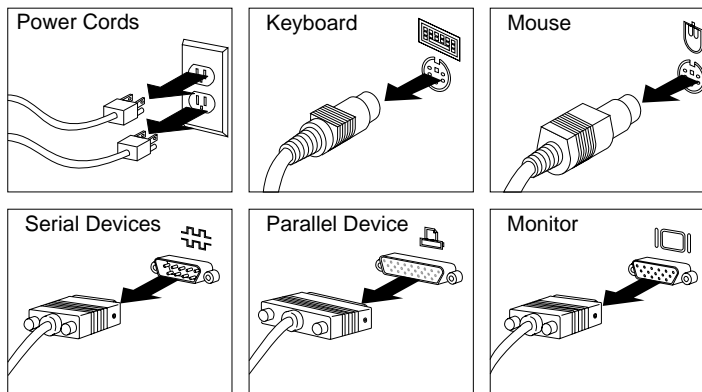
1. If you have a modem or fax machine attached to the server, disconnect the telephone line from the wall outlet and the server.

*Note:* If you are in the United Kingdom, you must perform this step before disconnecting the power cord.

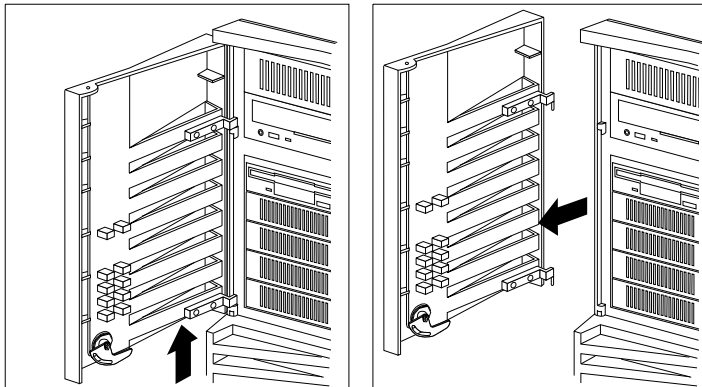


## Preparing to Add Options

2. Unplug all power cords (cables) from electrical outlets, and then disconnect all other cables from the back of the server.



3. Remove the front door by carefully lifting it up and off of the hinges. Set the door aside.

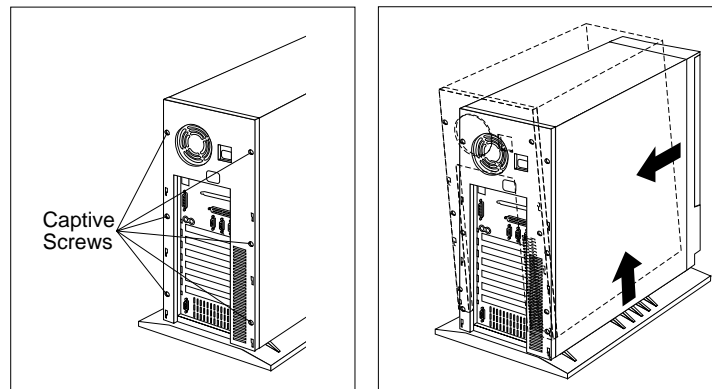


## Preparing to Add Options

- Loosen the six screws in the recessed holes on the back of the cover.

*Note:* The screws stay in place; do not attempt to remove them.

- Grasp the sides of the cover and slide it back a few inches.
- Grasp the cover at the top edge with one hand, and just above the expansion slots with the other hand.
- Remove the cover gently, pulling upward, as shown.



- Store the cover in a safe place.

### To install or remove

- An adapter, go to “Working with Adapters” on page 61
- A memory-module kit, go to “Working with Memory-Module Kits” on page 70
- An internal drive, go to “Working with Internal Drives” on page 77
- A microprocessor upgrade, go to “Working with Microprocessor Upgrades” on page 97

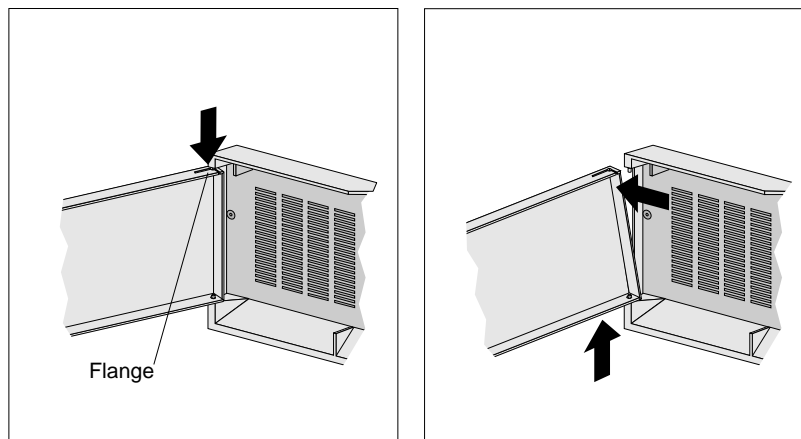
## Preparing to Add Options

### Preparing a Drawer Model

You can install the PC Server 325 in a drawer in a 19-inch rack unit. Refer to the documentation that comes with the rack for additional safety and operating information.

To install options in a drawer model:

1. Unlock and open the door on the front of the server.
2. Remove the front door:
  - a. Locate the flange on the top edge of the front door, near the hinge.
  - b. Press the flange while pressing out on the door; then lift the door off the hinge and store in a safe place.



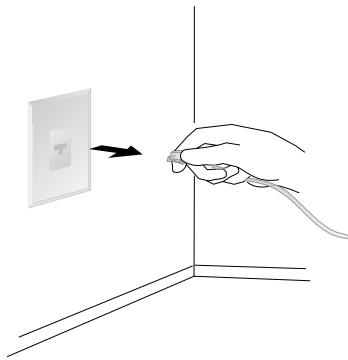
3. Remove the screws on either side of the front bezel, and set them aside.
4. Pull the drawer out until both slide rails lock, and you can easily reach the cables on the back of the server.



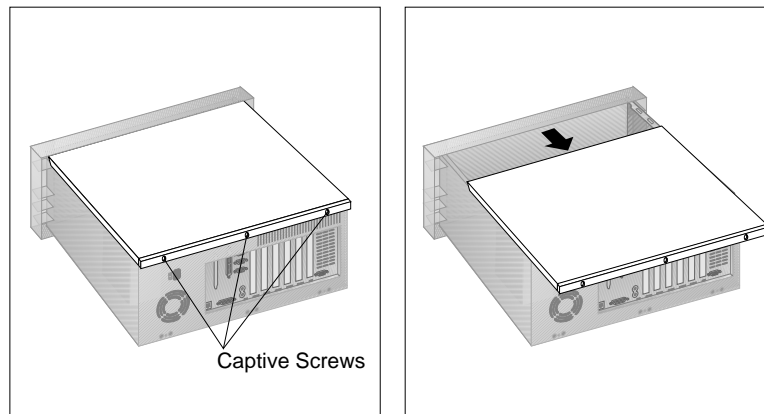
## Preparing to Add Options

5. If you have a modem or fax machine attached to the server, disconnect the telephone line from the wall outlet and the server.

*Note:* If you are in the United Kingdom, you must perform this step before disconnecting the power cord.



6. Unplug all power cords (cables) from electrical outlets, and then disconnect all other cables from the back of the server.
7. Remove the top cover, and if necessary, the bottom cover:
  - a. Loosen the three screws in the recessed holes on the rear of the cover.
  - b. Slide the cover back about one inch; then, lift the cover and remove it.



## Preparing to Add Options

- c. Set the cover aside in a safe place.

*Notes:*

- a. You can leave the bottom cover in place, unless you are installing or removing a 5.25-inch internal drive.
  - b. The screws on the cover stay in place; do not attempt to remove them.
8. If you need to remove the drawer model from the rack, go to “Removing the Drawer Model from a Rack” on page 248; then, return here.

**To install or remove**

- An adapter, go to “Working with Adapters” on page 61
- A memory-module kit, go to “Working with Memory-Module Kits” on page 70
- An internal drive, go to “Working with Internal Drives” on page 77
- A microprocessor upgrade, go to “Working with Microprocessor Upgrades” on page 97
- A security option, go to “Adding Security Options” on page 108

## Working with Adapters

Adding an adapter, such as a communication or audio adapter, extends the capabilities and power of your server. For example, you can add a RAID (redundant array of independent disks) adapter that can enhance logical-drive capacity and performance, and continue operation after a hard-disk drive failure. You can install up to six adapters in the connectors on the system board.

### Adapter Considerations

Three types of adapters are available for your PC Server 325:

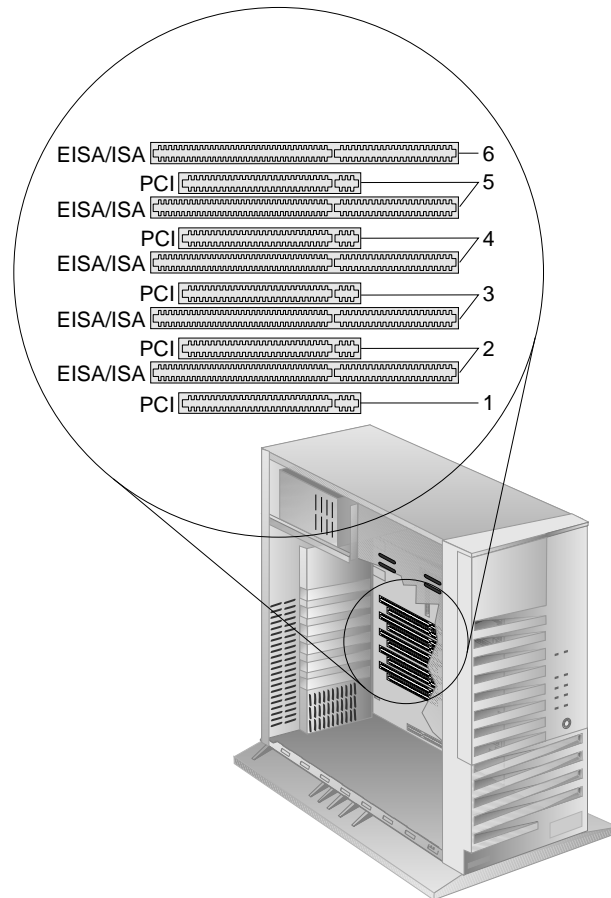
- PCI adapters
- EISA adapters
- ISA adapters

The system board in your server contains one 32-bit, EISA/ISA-bus expansion slot and one 32-bit PCI-bus expansion slot. The remaining slots are shared PCI/EISA slots. Your server supports only 5.0-volt adapters on the PCI bus.

- You can install PCI adapters in slots 1–5 only.
- If you have high-performance PCI adapters, such as RAID adapters, install them in the two PCI slots closest to the processor board.
- You can install EISA or ISA adapters in slots 2–6. You can install full-length adapters only in the three shared PCI/EISA slots closest to the processor board.

## Working with Adapters

The following figure shows the location of the PCI and EISA expansion slots.



*Note:* Expansion slots 2 through 5 are shared slots. That is, the shared slots use the same expansion-slot opening on the back of the server.

**Attention:** To avoid possible damage to adapters and server components, be sure that the adapters you install do not touch each other or the other components (such as the microprocessor) inside the server.

## Installing Adapters

### Before you begin

- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Read the instructions that come with the adapter.
- Turn off the server.
- Disconnect all external cables and power cords (see “Preparing to Add Options” on page 55).
- Remove the server cover (see “Preparing a Tower Model” on page 55 for a tower model model; if you have a drawer model, see “Preparing a Drawer Model” on page 58).

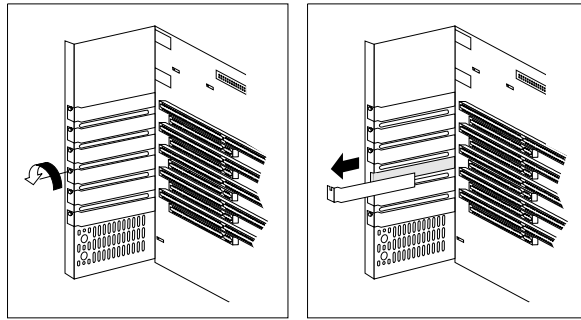
1. Review the instructions that come with the adapter to determine if the adapter must be installed in a certain slot; otherwise, use any empty, bus-compatible slot.



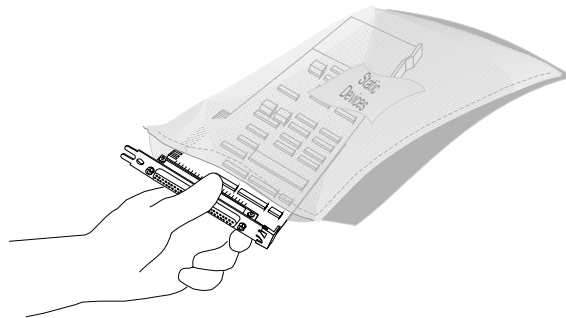
2. If you are installing a video adapter, you might have to change a jumper position on the system board. See Appendix A, “Jumpers” on page 207 for detailed information on changing jumper positions.

## Working with Adapters

3. Remove the expansion-slot cover.
  - a. Loosen and remove the screw on the top of the expansion-slot cover.
  - b. Slide the expansion-slot cover out of the server.
  - c. Store it in a safe place for future use.

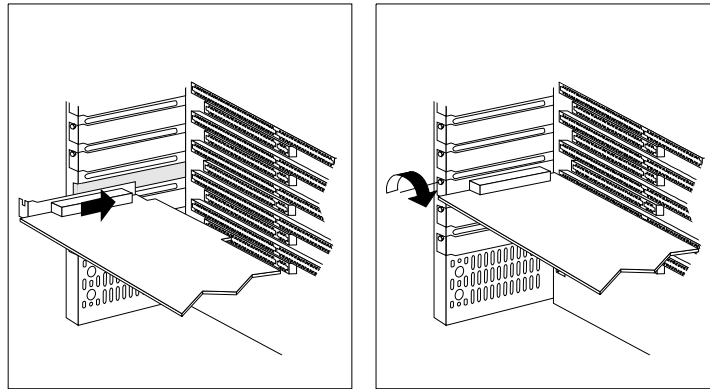


4. Touch the static-protective package to any *unpainted* metal surface on the server; then remove the adapter from the package.

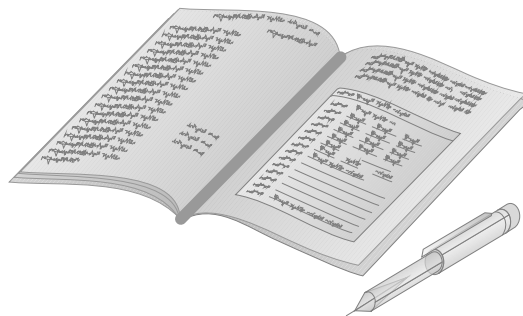


## Working with Adapters

5. Install the adapter.
  - a. Carefully grasp the adapter and align it with the expansion slot. On long adapters, align the end of the adapter with the card guide on the fan housing.
  - b. Press the adapter *firmly* into the expansion slot.
  - c. Tighten the expansion-slot screw on the top of the adapter bracket.



6. Go to Table 9 on page 221, and write the name and configuration information next to the slot into which the adapter is installed.



## Working with Adapters

### What to do next

- To install or remove:
  - A memory-module kit, go to “Working with Memory-Module Kits” on page 70
  - An internal drive, go to “Working with Internal Drives” on page 77
  - A microprocessor upgrade, go to “Working with Microprocessor Upgrades” on page 97
  - A security option, go to “Adding Security Options” on page 108
- To complete the installation, go to “Completing the Installation” on page 111.

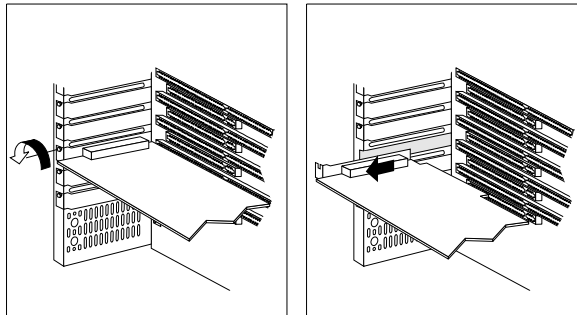


## Removing Adapters

### Before you begin

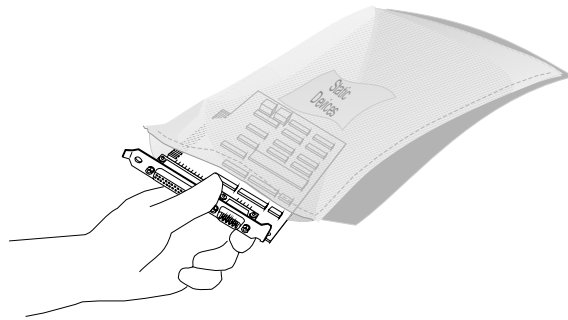
- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Turn off the server.
- Disconnect all external cables and power cords.
- Remove the server cover (see “Preparing to Add Options” on page 55 for a tower model model; if you have a drawer model, see “Preparing a Drawer Model” on page 58).

1. Note the expansion-slot position of the adapter that you want to remove, and then remove the adapter.
2. Loosen and remove the screw on top of the adapter bracket.
3. If there are any internal cables attached to the adapter, disconnect them.
4. Carefully pull the adapter out of the slot.

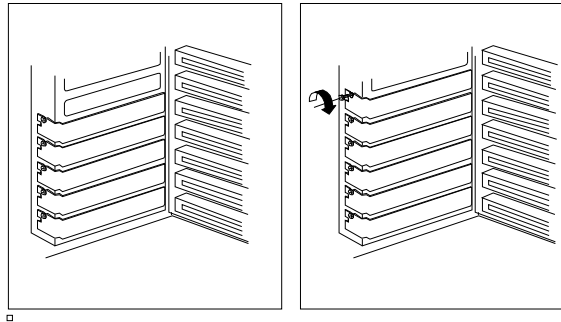


## Working with Adapters

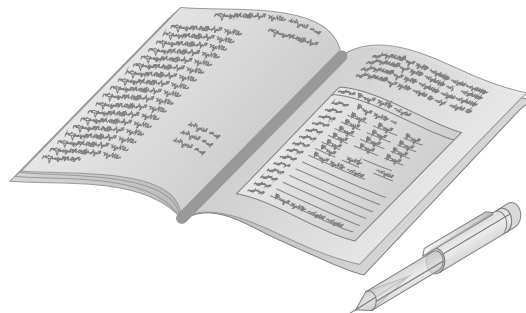
5. Insert the adapter you removed into a static-protective package.



6. Install an expansion-slot cover in the empty expansion slot.



7. Go to Table 9 on page 221, and delete the name of the adapter you removed.



## Working with Adapters

### What to do next

- To install or remove:
  - A memory-module kit, go to “Working with Memory-Module Kits” on page 70
  - An internal drive, go to “Working with Internal Drives” on page 77
  - A microprocessor upgrade, go to “Working with Microprocessor Upgrades” on page 97
  - A security option, go to “Adding Security Options” on page 108
- To complete the installation, go to “Completing the Installation” on page 111.

### Working with Memory-Module Kits

Adding system memory to your server is an easy way to make programs run faster. You can increase the amount of system memory by installing options called *memory-module kits*, or by installing memory-module kits with larger capacity memory. The kit consists of one industry-standard, 168-pin, 60 ns, buffered extended data output (EDO), Error Correcting Code (ECC), dual inline memory module (DIMM). The server uses a noninterleaved memory configuration, with Error Correcting Code (ECC) data protection.

When you are instructed to install the kits (in step 5 on page 72), install them in adjacent connectors, with no vacant memory connectors in between. Your server comes with one memory-module kit installed in connector J2, the connector closest to the edge of the processor board. Install additional memory-module kits in connector J3, and then continue with connectors J4 and J5, in that order.

#### Notes:

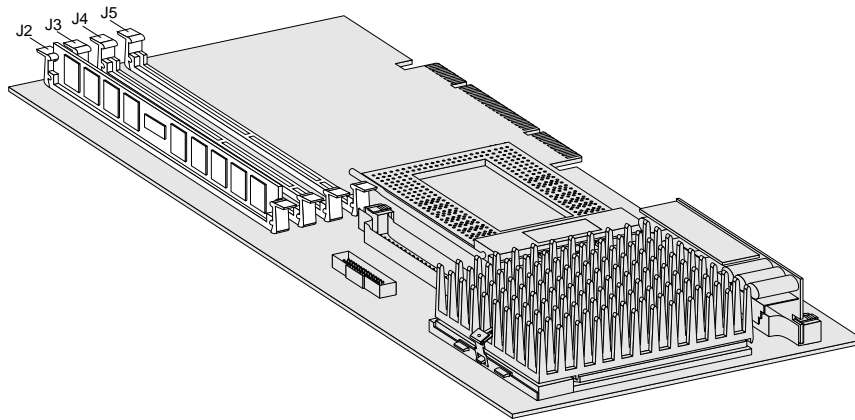
1. Install only buffered EDO, ECC DIMMs.
2. If you are installing DIMMs of different sizes, install DIMMs with greater memory capacity starting with the connector closest to the edge of the processor board (J2).
3. After installing or removing a DIMM, you must save the new configuration information in the Configuration/Setup Utility program. See "Using the Configuration/Setup Utility Main Menu" on page 22.
4. The server supports 60 ns, 32 MB, 64 MB, and 128 MB memory-module kits.

## Installing Memory-Module Kits

### Before you begin

- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Turn off the server.
- Disconnect all external cables and power cords, and then remove the server cover (see “Preparing to Add Options” on page 55).

1. Locate the memory connectors on the processor board.

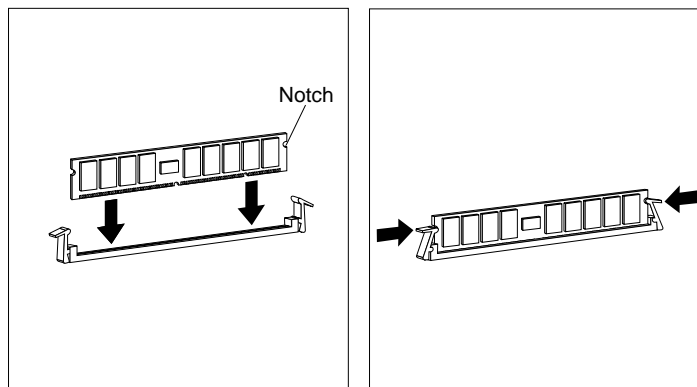


### Notes:

- a. Each connector slot contains two keys (dividers), which are used to assure that a memory-module kit can be installed only in the correct position.
  - b. A retaining clip at each end of the connector locks the memory-module kit into place.
2. Press the retaining clips at the ends of the connector outward, to the open position.
  3. Touch the static-protective package containing the DIMM to any *unpainted* metal surface on the server; then, remove the memory-module kit from the package.

## Working with Memory-Module Kits

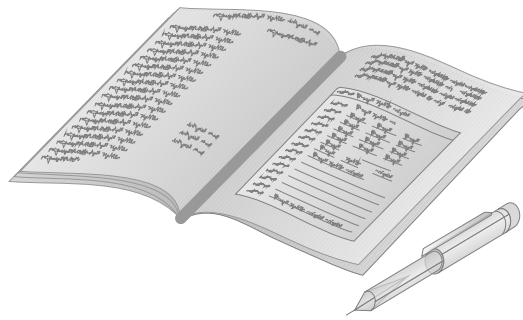
4. Position the DIMM so that the two key slots (openings in the connector pins) on the bottom edge align with the corresponding sections in the connector.
5. After aligning the DIMM, push the DIMM firmly straight down into the connector. (The retaining clips on both sides of the connector automatically come up into the notches on the sides of the DIMM.)



*Note:* Adding or removing memory-module kits changes the configuration information in the server. When you restart the server, the system displays POST error 164. Start the Configuration/Setup utility program and select **Save Settings**.

## Working with Memory-Module Kits

6. Go to Table 8 on page 221, and update the current configuration of the memory-module kits.



### What to do next

- To install or remove:
  - An internal drive, go to “Working with Internal Drives” on page 77
  - A microprocessor upgrade, go to “Working with Microprocessor Upgrades” on page 97
  - A security option, go to “Adding Security Options” on page 108
- To complete the installation, go to “Completing the Installation” on page 111.

## Working with Memory-Module Kits

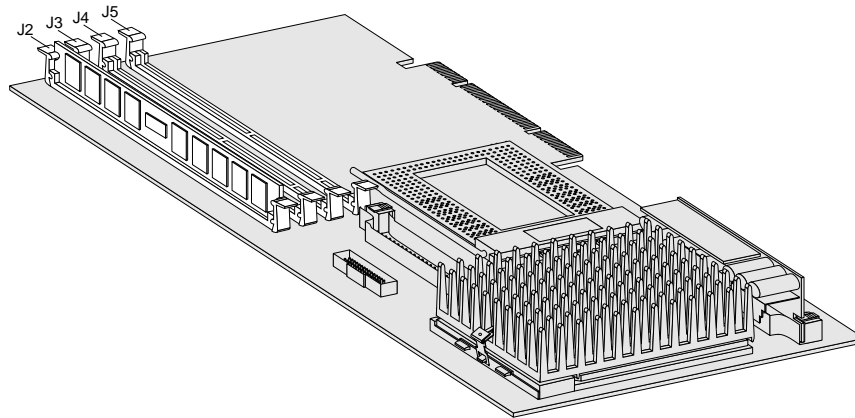
### Removing Memory-Module Kits

#### Before you begin

- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Turn off the server.
- Disconnect all external cables and power cords, and then remove the server cover (see “Preparing to Add Options” on page 55).

To remove a dual inline memory module:

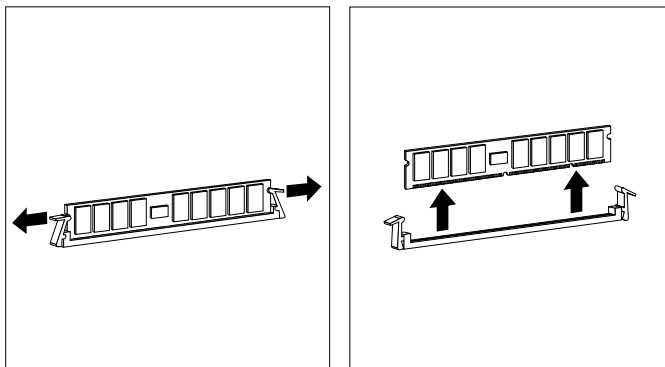
1. Locate the memory-module kit connectors on the processor board. Note the retaining clips at the ends of the connectors. The clips are used to lock the memory-module kits into place, and to eject them from the slot.





## Working with Memory-Module Kits

2. Firmly push downward on the retaining clips at both ends of the dual inline memory module connector. This ejects the dual inline memory module from the connector.
3. Lift the dual inline memory module out of the connector.



4. Store any memory-module kits you are no longer using in a static-protective package. Make a note of the kit size, type, and speed for future reference.



**Note:** Adding or removing memory-module kits changes the configuration information in the server. When you restart the server, the system displays POST error 164. Start the Configuration/Setup utility program and select **Save Settings**.

## Working with Memory-Module Kits

5. Go to Table 8 on page 221 and update the current configuration of the memory-module kits.



### What to do next

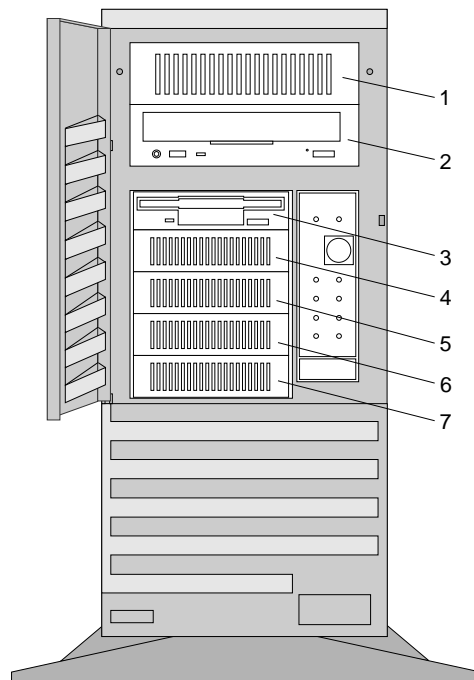
- To install or remove:
  - An internal drive, go to “Working with Internal Drives” on page 77
  - A microprocessor upgrade, go to “Working with Microprocessor Upgrades” on page 97
  - A security option, go to “Adding Security Options” on page 108
- To complete the installation, go to “Completing the Installation” on page 111.

## Working with Internal Drives

Drives are devices that your server uses to store and retrieve data. You can add drives to your server to increase storage capacity and to enable your server to read other types of media.

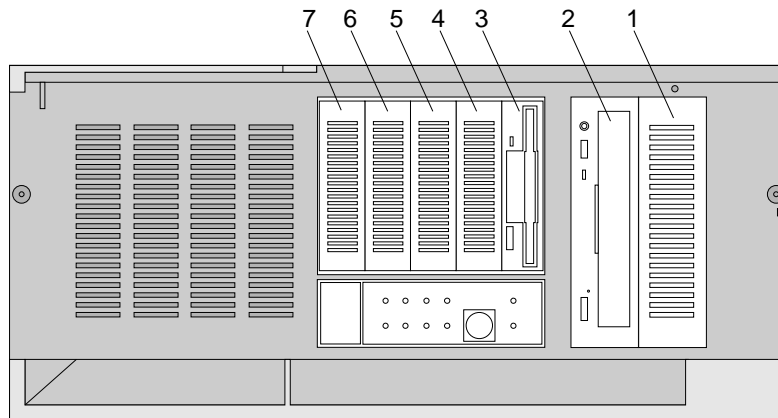
Internal drives are installed in *bays*. The bays are referred to as bay 1, bay 2, and so on.

The following illustrations show the locations of the bays in your server.



Tower model

## Working with Internal Drives



Drawer model, with door removed

Your server comes with a CD-ROM drive installed in bay 2, and a diskette drive installed in bay 3. Some models come with a preinstalled hard disk drive.

Bay	Drive Width	Drive Type	Drive Height
1	3.5-inch 5.25-inch	Removable media drive, hard disk drive <sup>1</sup>	41.3 mm (1.6 in.)
2	5.25-inch	CD-ROM	41.3 mm (1.6 in.)
3	3.5-inch	Diskette drive	25.4 mm (1.0 in.)
4 through 7	3.5-inch	Hard disk <sup>2</sup>	25.4 mm (1.0 in.) 41.3 mm (1.6 in.) <sup>3</sup>
<p><i>Notes:</i></p> <ol style="list-style-type: none"> <li>1. Removable media include CD-ROMs, optical discs, and tapes.</li> <li>2. If a hard disk drive is preinstalled, it is the startup (or boot) drive.</li> <li>3. A 41.3 mm drive installed in bays 4 through 7 occupies two bays.</li> </ol>			

Table 1. Maximum Allowable Drive Sizes

## Working with Internal Drives

Your server supports drives that conform to the *small computer system interface* (SCSI). This design allows you to attach multiple drives to a single SCSI connector.

*Note:* Any information about SCSI drives also applies to other SCSI devices, such as scanners and printers.

If you install additional SCSI devices, you must set a unique identification (ID) for each SCSI device. This enables the SCSI controller to identify the devices and ensure that different devices do not attempt to transfer data at the same time.

Drives connect to your server with cables. Each cable connector is designed to fit a corresponding connector on a drive.

Three types of internal cables connect to the drives in your server:

- A four-wire power cable connects to each drive. The server has three two-drop drive power cables. One drive power cable provides two types of power connectors: one connector is for the installed diskette drive; the other connector can connect to a SCSI device such as a hard disk drive.

*Note:* Some models come with a supplemental two-drop drive power cable. You must attach this cable to a connector on a drive power cable when you fully populate the drive bays.

- A flat-ribbon signal cable connects the internal diskette drive.

This cable has three drive connectors. A fourth connector attaches to the system board. The primary diskette drive installed in your server (usually known as drive A) is attached to the connector on the end of this cable.

*Note:* The primary diskette drive must always be attached to the drive connector on the end of this cable.

- Another cable connects internal SCSI devices. This SCSI cable has seven connectors that connect to SCSI devices. An eighth connector attaches to the SCSI connector on the system board.

## Working with Internal Drives

The internal SCSI cable is attached to the CD-ROM drive, any preinstalled hard disk drives, and the SCSI connector on the system board. You can attach additional SCSI devices to this cable.

### *SCSI IDs*

If you install additional SCSI devices, you must set a unique identification (ID) for each SCSI device that you connect to your server. This enables the SCSI controller to identify the devices and ensure that different devices do not attempt to transfer data at the same time.

The SCSI controller in your server supports SCSI IDs 0 to 15; ID 7 is reserved for the controller. Use SCSISelect to view the SCSI IDs of SCSI devices in your server. (See “Using the SCSISelect Utility Program” on page 47 for more information.)

If you install wide (16-bit) SCSI devices, you can set the IDs to any whole number between 8 and 15. If you install narrow (8-bit) SCSI devices, you can set the IDs to any whole number between 0 and 6.

### *Termination Requirements*

The devices at both ends of the SCSI bus must be terminated. If you attach SCSI devices (internal or external), you must terminate the last device in the chain. A special connector, called a terminator, is used to terminate a SCSI chain.

Refer to the instructions that come with the SCSI devices for information about setting a SCSI ID.

If you have only internal SCSI devices connected to the internal SCSI controller *and* the external SCSI cable has not been installed, the controller becomes the termination at one end of the cable.

If you attach internal SCSI devices to the SCSI controller in your server, you must terminate the last internal device on the bus (cable) and disable the termination on the other devices connected to the SCSI connector. The SCSI bus on the system board is already terminated.

## Working with Internal Drives

If you use the internal SCSI connector *and* the external SCSI connector on the system board, both ends of the bus must be terminated. In addition, if you connect an 8-bit device to the external connector, you must change the position of the external SCSI termination jumper (J29). See “System Board Jumpers” on page 210 for the location and default jumper position of this jumper.

Refer to the instructions that come with the SCSI device for more information about termination. Refer to the *User's Reference* for additional information about your server's SCSI subsystem.

## Installing Internal Drives

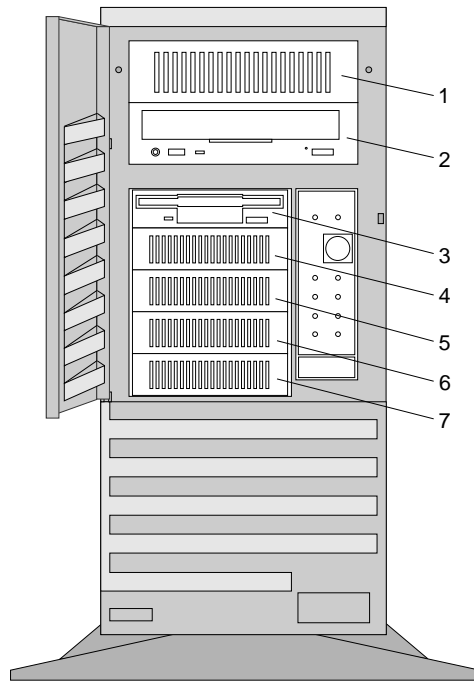
### Before you begin

- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Read the instructions that come with the internal drive.
- Turn off the server.
- Disconnect all external cables and power cords, and then remove the server cover (see “Preparing to Add Options” on page 55).

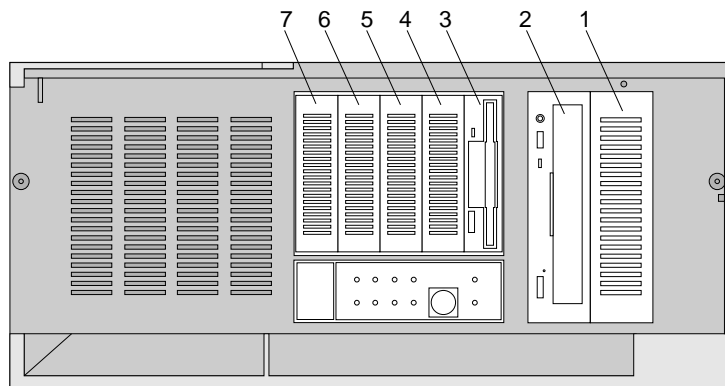
1. Determine the location for the drive you want to install.

## Working with Internal Drives

**Tower model**



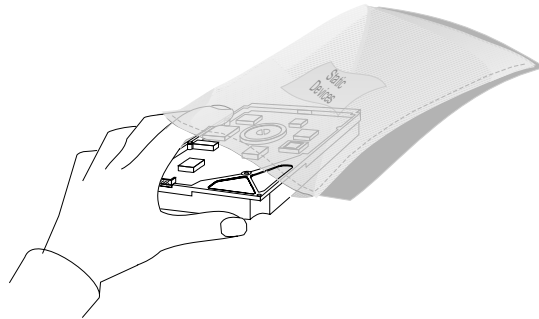
**Drawer model**





## Working with Internal Drives

2. Touch the static-protective package to any *unpainted* metal surface on the server; then remove the drive from the package.



3. Using the instructions that came with the drive, check that any switches or jumpers on the drive are set correctly. Change them if necessary.

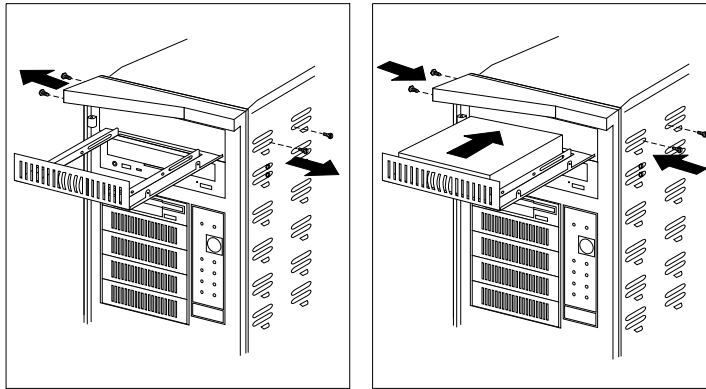
### What to do next

- To install a drive in bay 1 or bay 2, continue with the next step.
- To install a drive in bay 3 through bay 7, go to step 14 on page 87.

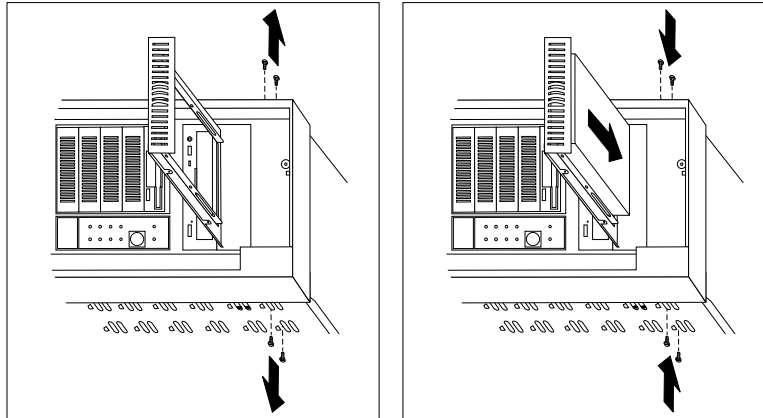
4. If a tray is attached to a drive that you intend to install, you must remove the tray before installing the drive. Follow the instructions in the documentation that comes with the drive.

## Working with Internal Drives

5. Remove the screws that secure the tray (from both sides of the tray housing) in the target bay. Then, slide the tray out of the bay.



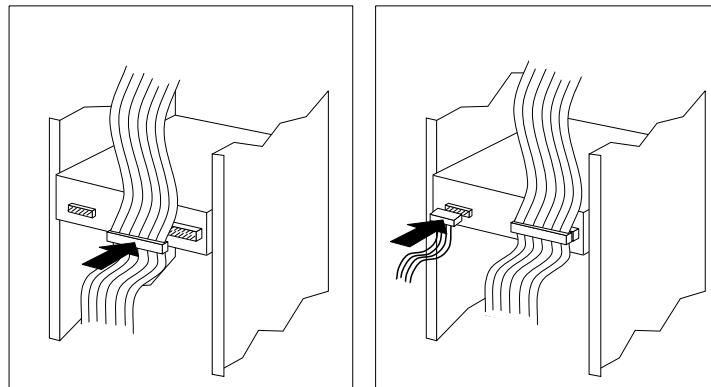
### Tower Model



### Drawer Model

## Working with Internal Drives

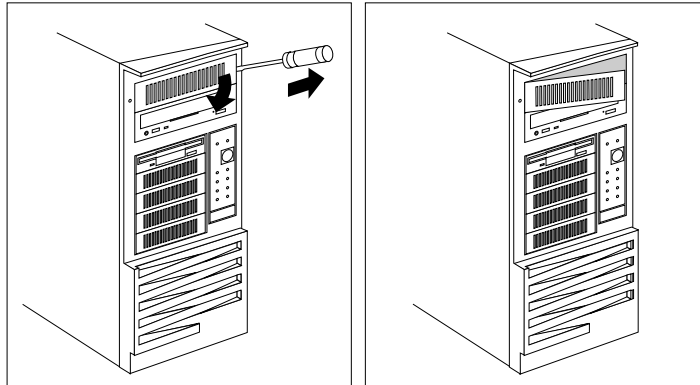
6. Place the drive on the tray, with the connectors facing the rear of the tray.
7. Insert the screws that come with the drive into the holes on the tray. Tighten the screws.  
**Attention:** To ensure that the drive functions properly, do not overtighten the screws.
8. Slide the drive and tray into the target bay.
9. Reinstall and tighten the four screws that you removed in step 5 on page 84. Go to step 11.
10. If you are installing a 5.25-inch drive in bay 1 or bay 2:
  - a. Position the drive with the connectors facing the rear of the server.
  - b. Slide the drive to the rear until it stops.
  - c. Loosely reinstall the four screws that you removed from the tray housing in step 5 on page 84.**Attention:** To ensure that the drive functions properly, do not overtighten the screws.
  - d. Store the drive tray in a safe place.
11. Connect the drive to a connector on the SCSI cable.
12. Connect one of the 4-pin power cables to the drive.



## Working with Internal Drives

*Note:* If your server comes with a supplemental two-drop drive power cable, and you have fully populated the drive bays, attach the two-drop cable to one of the drive power cables.

13. If you are installing a removable media drive in bay 1, remove the cover plate:
  - a. Insert a small flat-blade screwdriver under the side of the cover plate.
  - b. Lift the cover plate and remove it from the server front panel. (Save the cover plate for future use.)



### What to do next

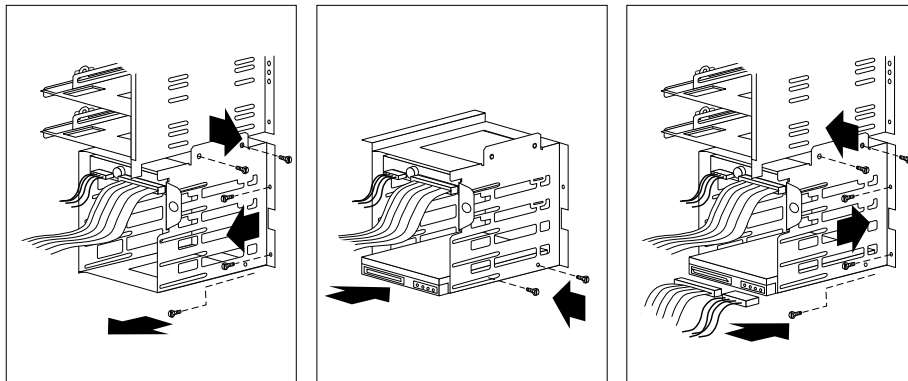
- To install a drive in bays 3 through bay 7, continue with the next step.
- If you do not want to install any other drives, go to step 18 on page 89.

## Working with Internal Drives

14. Remove the five screws from the drive housing that contains bays 3 through 7. Remove the housing from the server.

*Notes:*

- a. The fifth screw is located under the housing, on the left-hand side.
- b. If you are installing a removable media device in bays 3 through 7, you must also remove the flat metal plate from the front of the bay. Remove the two screws (one on each side of the housing) that connect the metal plate to the housing.
- c. A 41.3 mm drive occupies two bays. If you are installing a removable media device in bays 3 through 7, you must remove the flat metal plates from the front of both bays.
- d. You might need to disconnect the SCSI cable from drives that are installed in the drive housing.

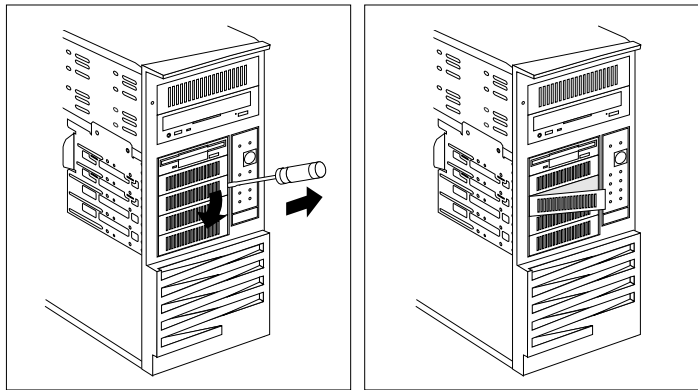


15. Attach the drive to the drive housing, using the screws that came with the drive kit.

**Attention:** To ensure that the drive functions properly, do not overtighten the screws.

## Working with Internal Drives

16. If you installed a removable media drive, remove the cover plate from the bay.
  - a. Insert a small flat-blade screwdriver under the side of the cover plate.
  - b. Lift the cover plate and remove it from the server front panel. (Save the cover plate for future use.)



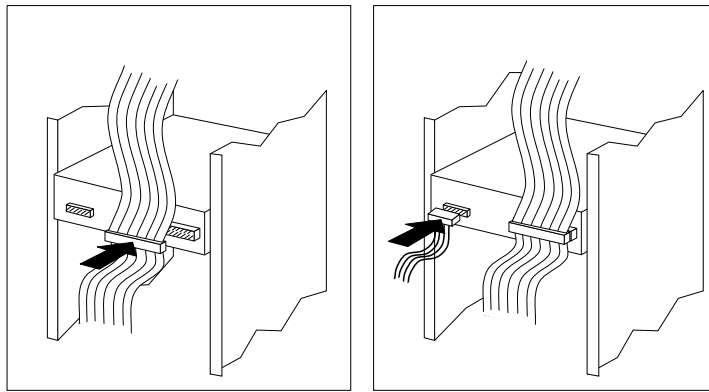
### What to do next

- To install additional drives in bay 3 through bay 7, go to step 14 on page 87.
- If you do not want to install any other drives, go to step 17 on page 89.

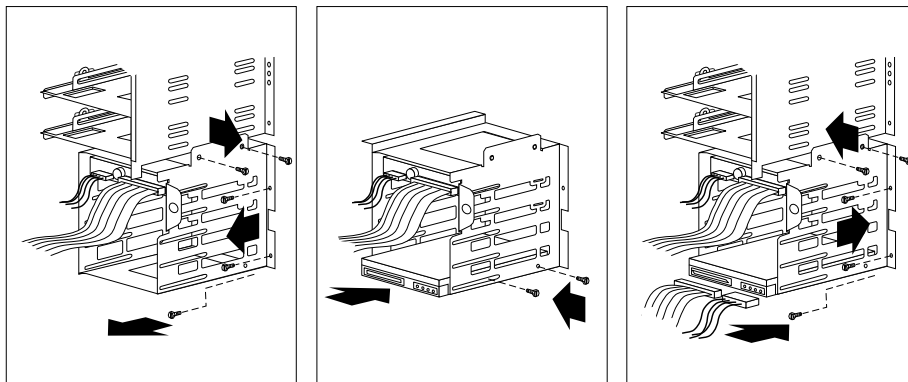
## Working with Internal Drives

17. Connect the SCSI and power cables to each of the installed drives.

*Note:* If you have difficulty connecting a cable, turn the cable connector over and try again; cable connectors are keyed and connect only one way.

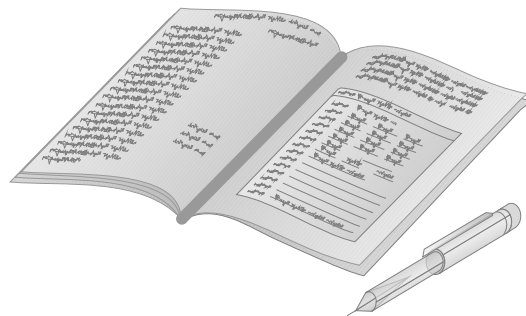


18. Reinstall the drive housing, using the screws that you removed in step 14 on page 87.



## Working with Internal Drives

19. Go to Table 6 on page 218, and update the drive information.



### What to do next

- To install or remove:
  - A memory-module kit, go to “Working with Memory-Module Kits” on page 70
  - An internal drive, go to “Working with Internal Drives” on page 77
  - A microprocessor upgrade, go to “Working with Microprocessor Upgrades” on page 97
  - A security option, go to “Adding Security Options” on page 108
- To complete the installation, go to “Completing the Installation” on page 111.



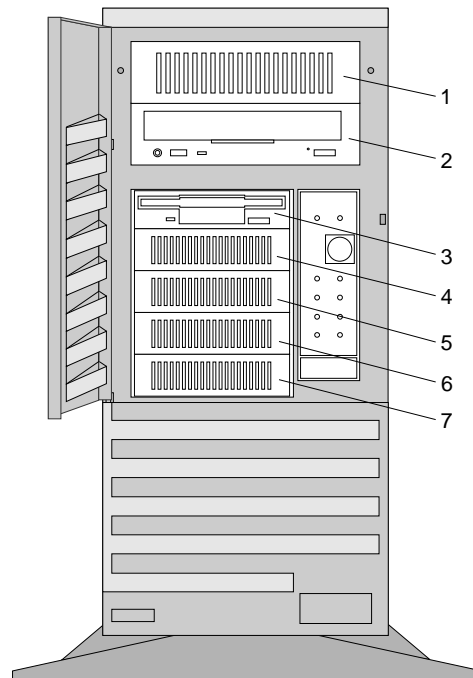
## Removing Internal Drives

### Before you begin

- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Turn off the server.
- Disconnect all external cables and power cords, and then remove the server cover (see “Preparing to Add Options” on page 55).

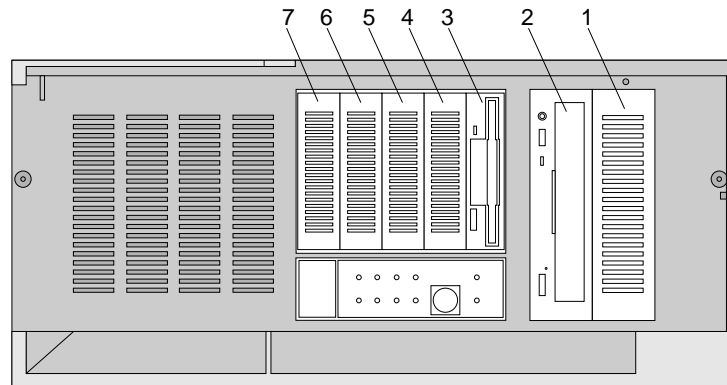
1. Determine the location of the drive you want to remove.

### Tower model



## Working with Internal Drives

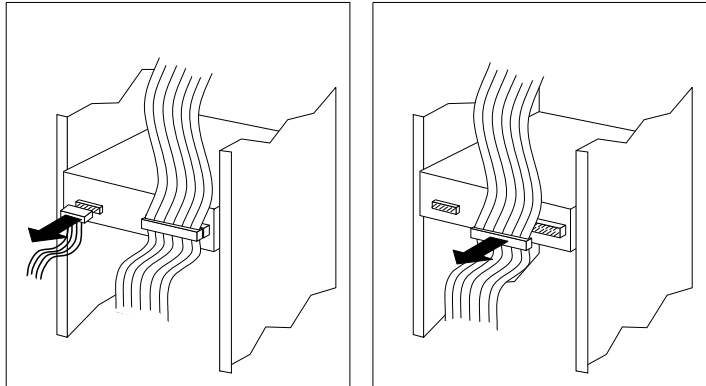
### Drawer model



#### What to do next

- To remove a drive from bay 1 or bay 2, continue with the next step.
- To remove a drive from bay 3 through bay 7, go to step 6 on page 93.

#### 2. Disconnect the SCSI and power cables from the drive.



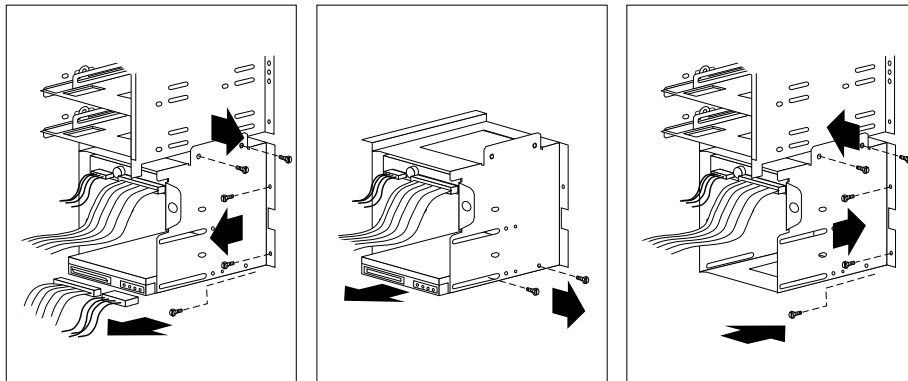
## Working with Internal Drives

3. Remove the screws that secure the drive (from both sides of the drive housing) in the target bay.
4. Slide the drive out of the bay.
5. Store the drive in a safe place. If the drive is attached to a drive tray, remove the drive before storing it.

### What to do next

- To remove a drive from bay 3 through bay 7, continue with the next step.
- If you have completed removing drives, go to step 8 on page 94.
- To install an internal drive, go to “Installing Internal Drives” on page 81.

6. Remove the five screws from the drive housing that contains bays 3 through 7. Remove the housing from the server.



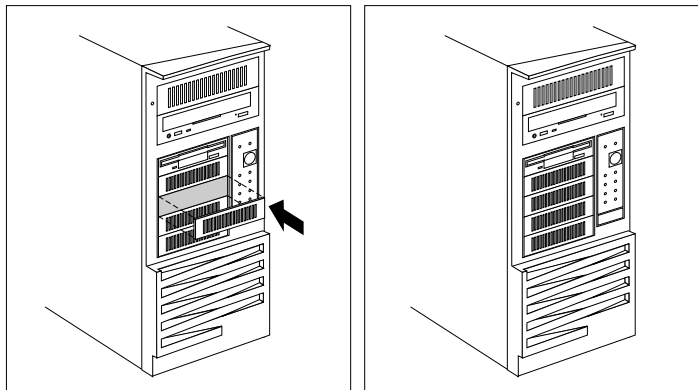
7. Remove the selected drive from the drive housing.

## Working with Internal Drives

### What to do next

- If you have completed removing drives from the drive housing bracket, continue with the next step.
- To install an internal drive, go to “Installing Internal Drives” on page 81.

8. If you removed a drive (other than a hard disk drive) from the bay, reinstall the cover plate.
  - a. Locate the original blank cover plate that was shipped with your server.
  - b. Insert the tabs on the right end of the cover plate into the slots on the right side of the panel in front of the empty drive bay.
  - c. Pivot the plate and press it into place.

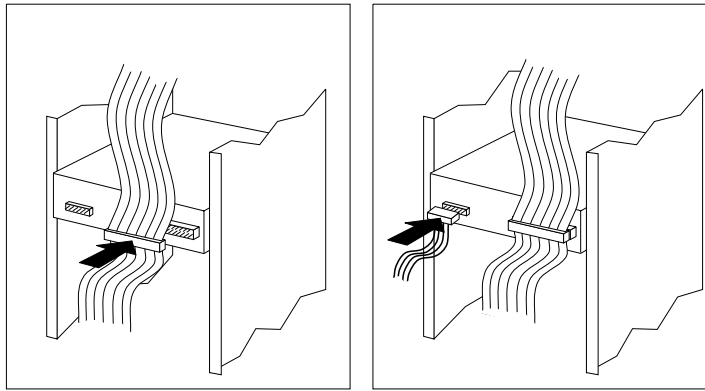


9. Reinstall the drive housing, using the screws that you removed in step 6 on page 93.

## Working with Internal Drives

10. Reconnect the signal and power cables to each remaining drive.

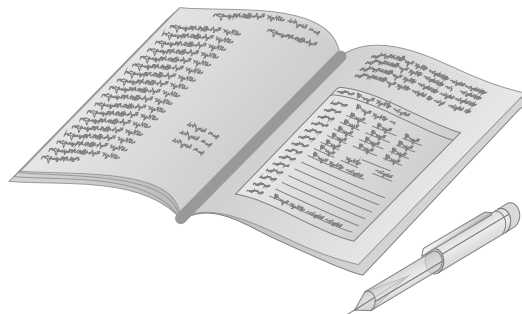
*Note:* If you have difficulty connecting a cable, turn the cable connector over and try again; cable connectors are keyed and connect only one way.



### What to do next

- To install an internal drive, go to “Installing Internal Drives” on page 81.
- If you do not want to install or remove any other internal drives, go to step 11.

11. Go to Table 6 on page 218 and update the drive information.



## Working with Internal Drives

### What to do next

- To install or remove:
  - A memory-module kit, go to “Working with Memory-Module Kits” on page 70
  - A microprocessor upgrade, go to “Working with Microprocessor Upgrades” on page 97
  - A security option, go to “Adding Security Options” on page 108
- To complete the installation, go to “Completing the Installation” on page 111.

## Working with Microprocessor Upgrades

When you install an additional microprocessor, your PC Server 325 can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load between microprocessors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications that use multiple, simultaneous threads.

### Installing Microprocessor Upgrades

The microprocessor upgrade comes with a voltage regulator module (VRM) and a heat sink with an integrated fan (fan sink). The VRM plugs into a connector on the processor board. Because each microprocessor has specific power and voltage requirements, be sure to use the VRM that comes with the microprocessor.

#### Before you begin

- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Read the instructions that come with the microprocessor upgrade.
- Turn off the server.
- Disconnect all external cables and power cords, and then remove the server cover (see “Preparing to Add Options” on page 55).
- Obtain an SMP operating system (optional). For a list of supported operating systems, see <http://www.pc.ibm.com/servers/> on the World Wide Web.

#### Attention:

- If you install an additional microprocessor that is different from the currently installed microprocessor, your server operation might become unreliable. To prevent this, use a microprocessor with the same internal and external clock speed, and the same cache size as those of the currently installed microprocessor. Microprocessor internal and external clock frequencies and cache size must be identical.

## Working with Microprocessor Upgrades

- To avoid damaging the microprocessor or socket during installation, make sure that the socket latch is fully opened to the vertical position before you insert the microprocessor.
- The fan sink clip is under tension. Be careful when installing or removing the microprocessor assembly. Do not let the clips scrape against the processor board, sockets, or other components.
- If you select a setting for the frequency jumper (the J17/J18 jumper block) that is greater than the actual frequency of the microprocessor, you might damage the microprocessor.

### *Notes:*

1. The illustrations in this section might differ slightly from your hardware.
2. To avoid damage and ensure proper server operation when you install a new or additional microprocessor, use the same speed and voltage requirements as those of the currently installed microprocessor. Microprocessor internal and external clock frequencies must be identical.
3. To order additional microprocessors, contact your IBM marketing representative or your IBM reseller.
4. When you install a second microprocessor, it becomes the startup (boot) microprocessor.
5. The pins on the microprocessor are delicate and susceptible to damage from static electricity and physical mishandling. Do not touch or bend the exposed pins. Protect the pins while carrying the microprocessor and during installation.



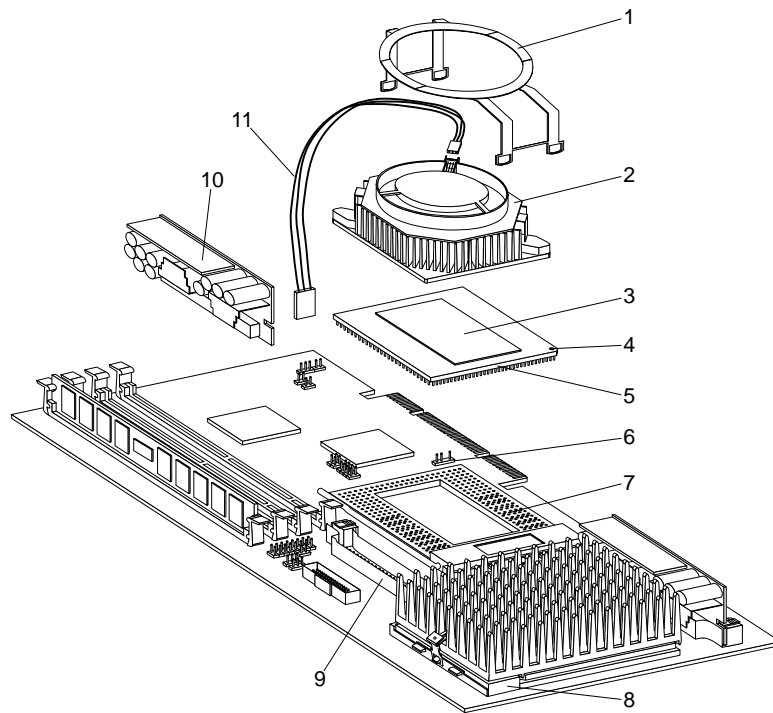
## Working with Microprocessor Upgrades



### CAUTION:

If your server has been operating, the heat sinks on the installed microprocessors will be hot. You can avoid getting a burn while removing an existing microprocessor or installing an additional one, if you let the components cool for 10 minutes before continuing with the procedures described in this section.

The following figure identifies components that you will work with while performing the steps in this section.



## Working with Microprocessor Upgrades

- 1** Heat sink retention clip
- 2** Fan sink
- 3** Heater spreader
- 4** Pin 1 location
- 5** Microprocessor
- 6** Fan power cable connector (J21)
- 7** Secondary microprocessor socket, empty, with lever in closed, locked position
- 8** Primary processor board socket, with latch in closed position
- 9** Secondary VRM connector
- 10** Voltage regulator module
- 11** Fan power cable

1. Locate the secondary microprocessor socket on the processor board.

*Note:* When you install a microprocessor that is the same clock speed as the microprocessor that comes with your server, you do not need to change any jumper positions. If you install microprocessors that have a different clock speed from the one that comes with your server, you must change microprocessor jumper positions on the processor board.

See “Processor Board Jumpers” on page 214 for detailed information on the jumper positions.

2. Lift the latch on the socket.

**Attention:** The pins on the microprocessor are delicate and susceptible to damage from static electricity and physical mishandling. Do not touch or bend the exposed pins. Protect the pins while carrying the microprocessor and while installing the microprocessor and the fan sink.

## Working with Microprocessor Upgrades

3. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the server; then remove the microprocessor from the package. Place it pin-side down on the static-protective foam that it came shipped on.
4. Both microprocessors on a processor board must have the same internal and external clock speed and cache size to ensure proper server operation.
5. Open the thermal grease packet, and empty the contents evenly across the heat spreader (the raised, gold area on the top of the microprocessor).

*Note:* If thermal grease touches your skin, wash your hands with soap and water.

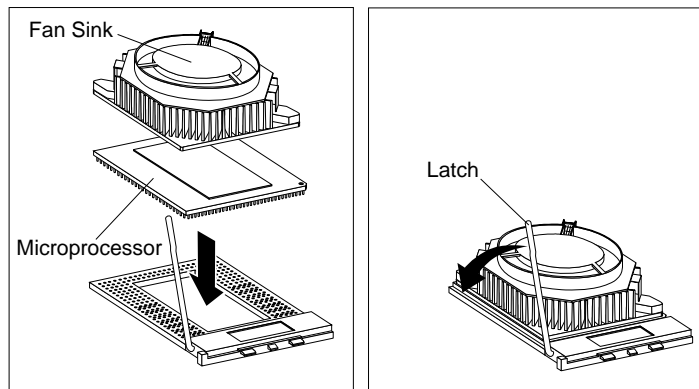
6. Position the fan sink above the microprocessor, aligning the heat spreaders; then, place the fan sink on the microprocessor.
7. Slide the fan sink back and forth across the microprocessor several times to ensure that the thermal grease fully covers both heat-spreaders.
8. Align the edges of the microprocessor and fan sink, and press firmly.

*Note:* When you move the microprocessor/fan sink assembly to the socket on the processor board, be sure to hold the edges of both the fansink and the microprocessor. This maintains the alignment and helps to reduce the risk of dropping the assembly.

## Working with Microprocessor Upgrades

- Center the microprocessor over the socket. Note the pattern of the pins on the microprocessor; align the pins with the corresponding holes on the socket.
- Carefully insert the microprocessor into the socket. Ensure that the pins on the microprocessor align with the holes in the socket.

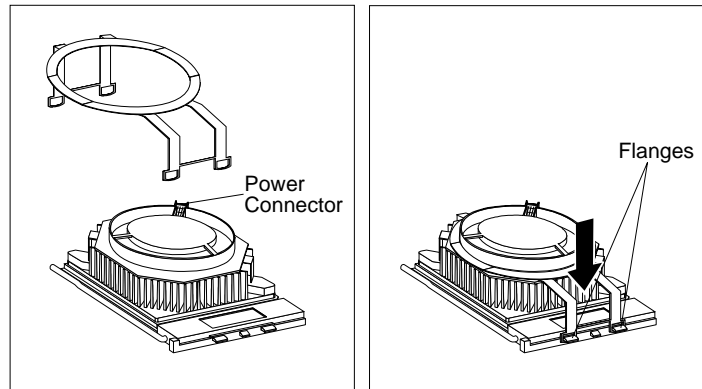
**Attention:** Do not force the pins into the socket. If you feel any resistance, remove the microprocessor and check the orientation and alignment.



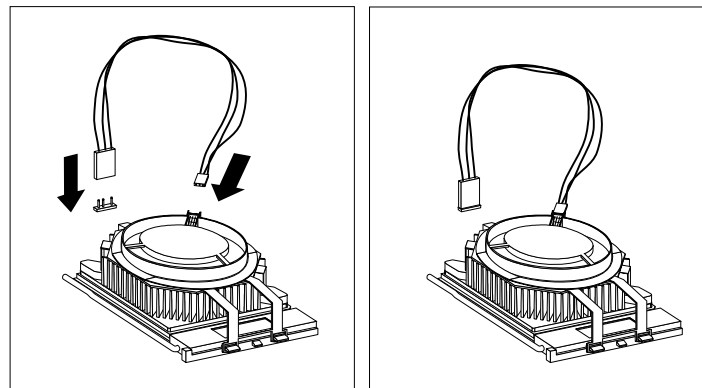
- Press the microprocessor firmly into the socket to ensure proper seating. Continue to press down firmly while moving the latch downward until the microprocessor is completely locked into the socket. Make sure the latch is in the fully closed position.

## Working with Microprocessor Upgrades

12. Clip the straight side of the fan sink clip over the flange.
13. Slide the fan sink clip under the fan's power connector. Then, center the clip over the fan sink, pressing gently on the top of the arched side of the clip.

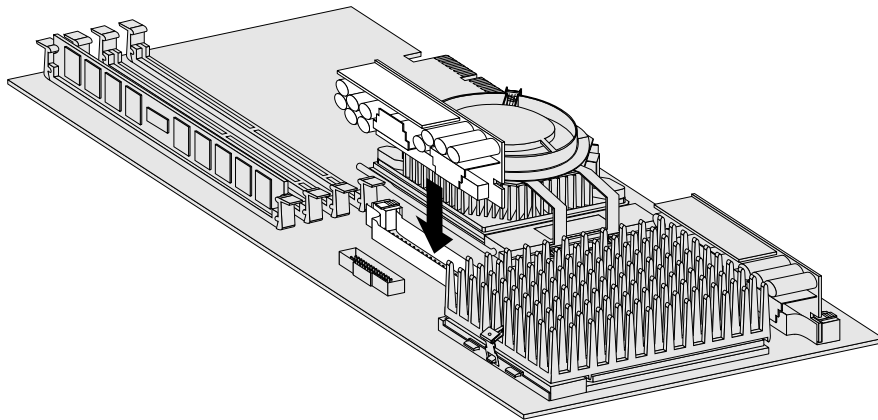


14. Press on the arched side, until each snaps over the flange.
  15. Attach the smaller connector on the power cable to the fan sink.
- Note:* If you have difficulty connecting a cable, turn the cable connector over and try again; cable connectors are keyed and connect only one way.

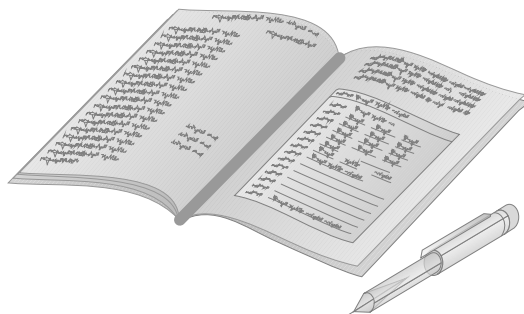


## Working with Microprocessor Upgrades

16. Connect the other end of the power cable to the secondary microprocessor fan connector (J21) on the processor board. (Refer to the system service label for the location of the fan connector.)
17. Install the voltage regulator module (VRM) in the secondary VRM connector:
  - a. Position the VRM above the processor board connector as shown in the illustration.
  - b. Press the VRM firmly into the connector until it snaps into place.



18. Go to Table 7 on page 219 and update the processor-upgrade socket information.



## Working with Microprocessor Upgrades

19. Because you installed a new microprocessor in your server, you might need to make changes to your operating system.
  - If your operating system does not support SMP, install one of the SMP operating systems supported on your server. See <http://www.pc.ibm.com/servers/> on the World Wide Web.
  - If your operating system does support SMP, refer to your operating system documentation. You might need to make changes so that the operating system recognizes the new microprocessor.

### What to do next

- To install or remove:
  - A memory-module kit, go to “Working with Memory-Module Kits” on page 70
  - An internal drive, go to “Working with Internal Drives” on page 77
  - A security option, go to “Adding Security Options” on page 108
- To complete the installation, go to “Completing the Installation” on page 111.

# Installing the External SCSI Cable Connector

### Before you begin

- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Read the instructions that come with the option.
- Turn off the server.
- Disconnect all external cables and power cords, and then remove the server cover (see “Preparing to Add Options” on page 55).

Your server comes with a SCSI cable that you can use to connect SCSI devices. You must remove the SCSI knockout on the rear of the server; then, you can connect the cable from the SCSI connector on the system board to the rear of the server.

**Attention:** After you install the SCSI cable, you *must* connect a terminator or a properly terminated SCSI device to the external connector.

In this procedure, you will remove the SCSI knockout panel. Two narrow metal strips hold the panel in place.

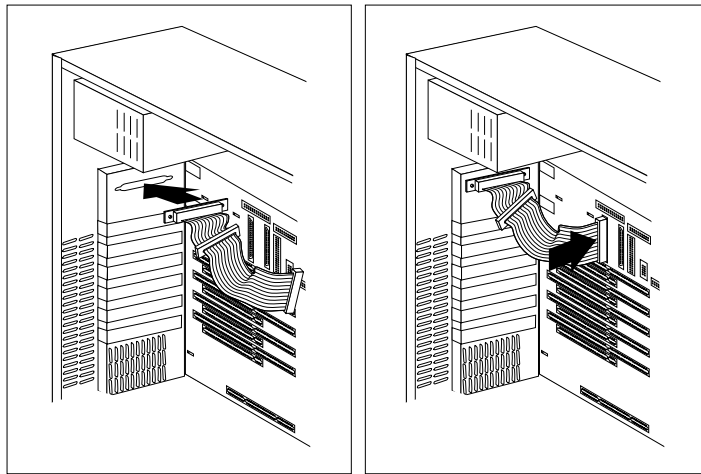
To install the SCSI cable connector:

1. Locate the center of the SCSI knockout panel.
2. Use the screwdriver to carefully tap on the middle of the knockout panel, near the bottom edge. The panel will bend toward the interior of the server.
3. Working from the inside of the server, bend the knockout back and forth several times, until it comes off.
4. Remove the screws from the connector end of the external SCSI cable. Set the screws aside.
5. Insert the other end of the cable in the external SCSI connector on the system board.

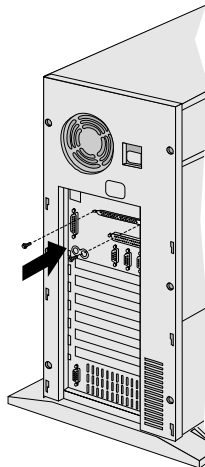


## Installing the External SCSI Cable Connector

6. Insert the connector end of the cable through the opening on the rear of the server.



7. Insert the screws through the holes on the cable connector; then tighten the screws.



8. Complete the installation (see “Completing the Installation” on page 111).

## Adding Security Options

### Adding Security Options

You can add options to your server to protect the machine itself from theft and tampering, and to protect the data and programs stored in the server from unauthorized access and use.

### Installing a U-Bolt and Security Cable

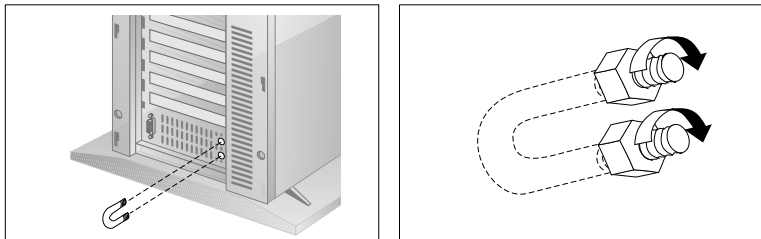
You can deter unauthorized removal of your tower model PC Server 325 by installing a U-bolt and security cable on the rear of your server.

#### Before you begin

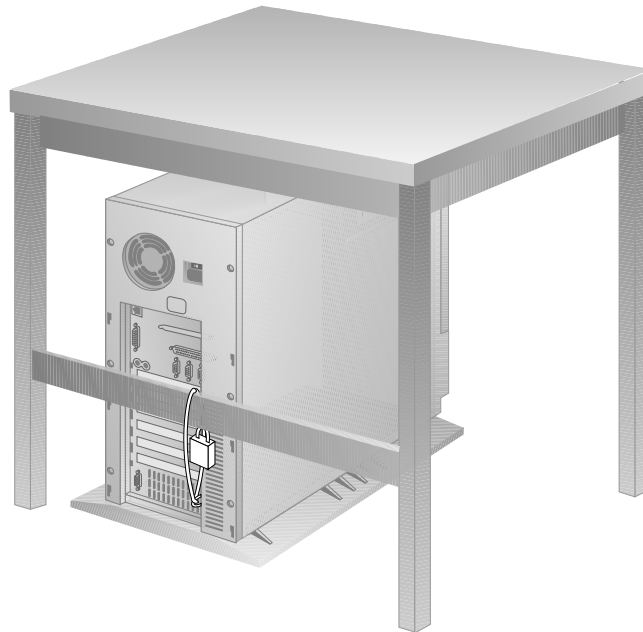
- Obtain the following:
  - A flat-blade screwdriver
  - An adjustable wrench
  - A 19 mm (3/4 in.) U-bolt or wire rope (similar to National Manufacturing No. 3230, Stock No. 176-735)
  - Threaded nuts that fit the U-bolt
  - A security cable
  - A lock, such as a combination lock or padlock
- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Turn off the server.
- Disconnect all external cables and power cords, and then remove the server cover (see “Preparing to Add Options” on page 55).

## Adding Security Options

1. Insert the U-bolt through the holes and secure it in place with the nuts.



2. Thread the cable through the U-bolt and around an object from which it cannot be removed; then, fasten the cable ends together with a lock.



## Adding Security Options

3. If you have completed installing the U-bolt and do not want to install any other internal options, replace the server cover and reconnect all external cables and power cords (see “Completing the Installation” on page 111 if you need additional information).

### Security-Cover Option

For additional security, you might want to control access to the cables and cable connectors on your server. The optional PC Server Security Cover restricts cable access while creating a sleek, streamlined profile. Your *User's Reference* describes this optional feature. Installation instructions are in a separate booklet that comes with the security cover. If you want to purchase this option, contact your IBM marketing representative or your IBM reseller for additional information.



## Completing the Installation

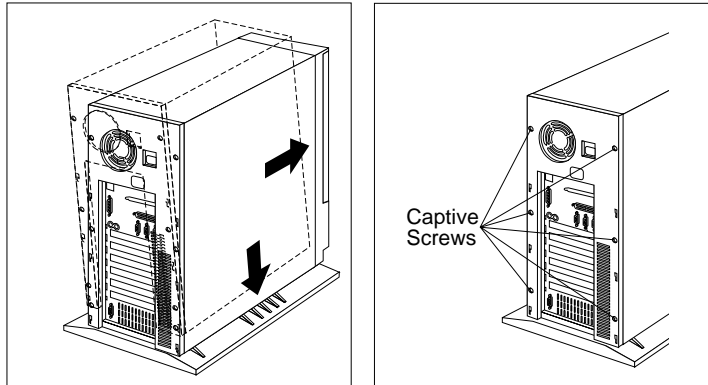
### Before you begin

Complete all the installation procedures for the internal options you have chosen to install.

- If you have a tower model, continue with “Completing the Tower Model Installation.”
- If you have a drawer model, go to “Completing the Drawer Model Installation” on page 114.

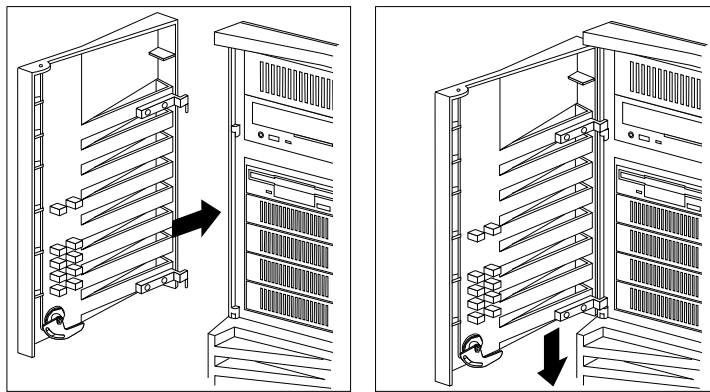
### Completing the Tower Model Installation

1. Install the cover on the server.
  - a. Align the cover over the frame of the server and slide the cover in place.
  - b. Tighten the six screws in the recessed holes on the cover.



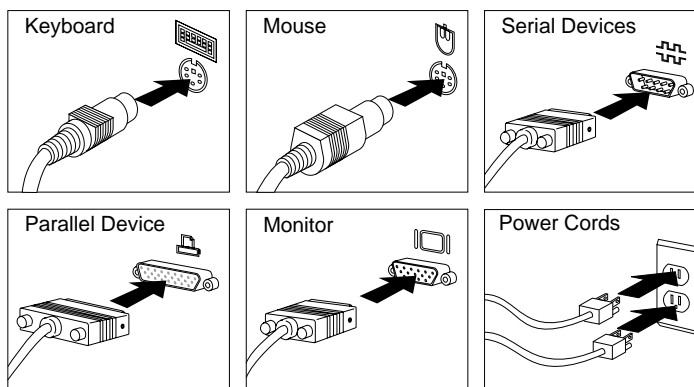
## Completing the Installation

- c. Close and lock the server door.



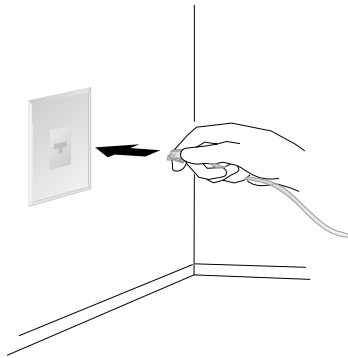
**Attention:** Be sure to maintain a clearance of at least 51 mm (2 inches) on all sides of the server to allow for air circulation.

2. Reconnect the cables to the back of the server; then, plug the power cords into properly grounded electrical outlets.



## Completing the Installation

3. If you have a modem or fax machine attached to the server, reconnect the telephone line to the wall outlet and the server.



### What to do next

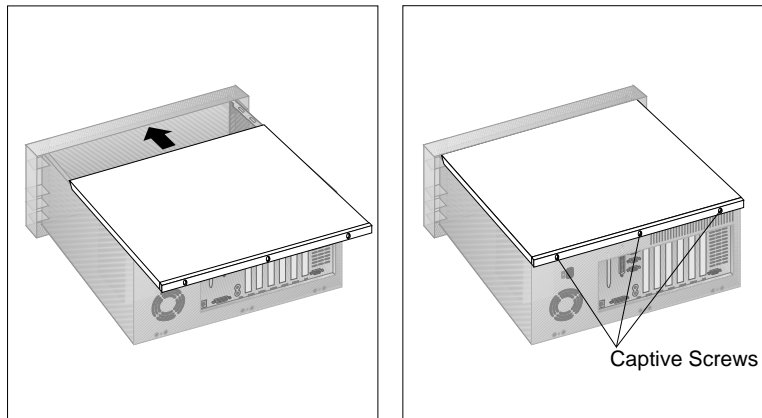
When you have completed installing the cover and cables, go to “Updating the Server Configuration” on page 121.

## Completing the Installation

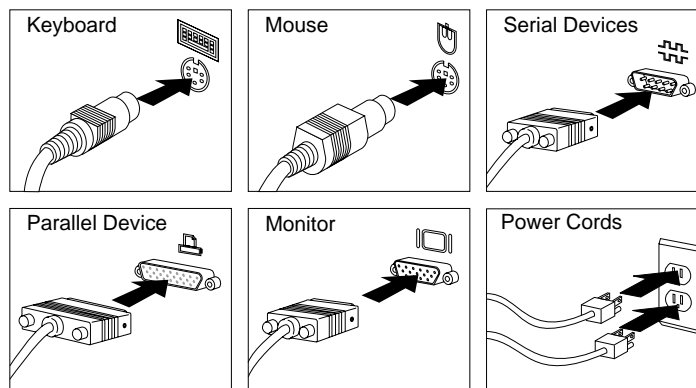
### Completing the Drawer Model Installation

Replace the top or bottom cover:

1. Align the cover over the frame of the server.
2. Press the cover into place; then, slide the front edge of the cover under the rear edge of the server frame.
3. Tighten the screws in the back of the cover.



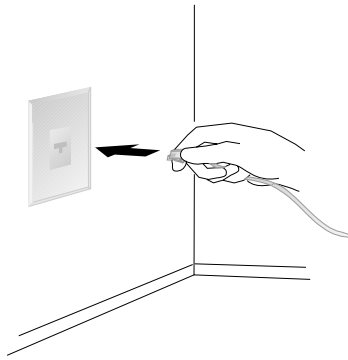
4. Attach the monitor, keyboard, and power cables to the corresponding connectors on the server. Refer to the rack documentation for instructions.



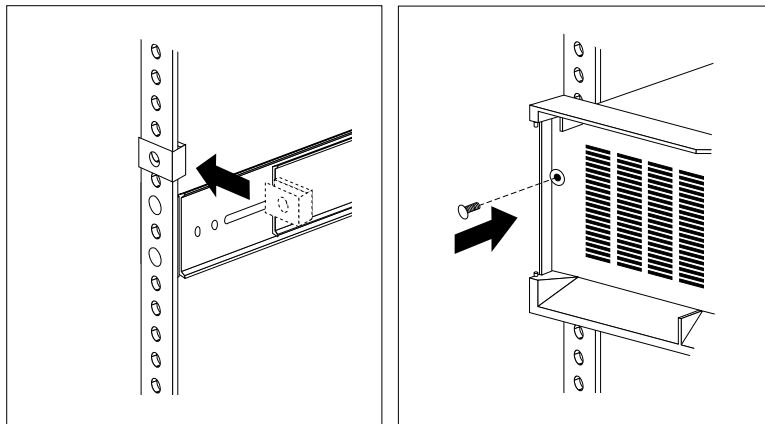


## Completing the Installation

5. If you have a modem or fax machine attached to the server, reconnect the telephone line to the wall outlet and the server.



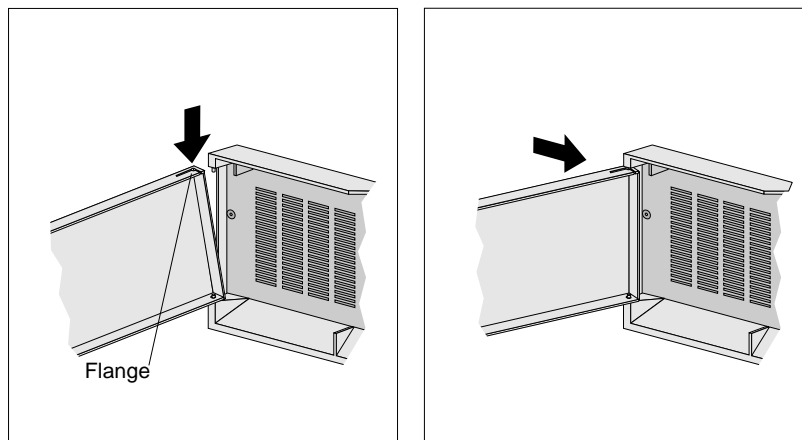
6. Secure the drawer in the rack.
  - a. Slide the drawer into the rack.



- b. Locate the screws that you removed in step 3 on page 58.
  - c. Insert the screws through the bezel, mounting rail, and nut clip.

## Completing the Installation

7. Replace the front door.
  - a. Align the bottom hinges on the front door with the pin on the server.
  - b. Press the flange on the top edge and slide the door over the pin.
  - c. Release the flange.
  - d. Close and lock the door.



### What to do next

When you have completed installing the cover and cables, go to “Updating the Server Configuration” on page 121.

### Connecting External Options

To connect external options (SCSI drives and storage enclosures, printers, modems, and other serial and parallel devices), see the documentation that comes with the options.

The information in this section supplements the instructions that come with the external option. Use the instructions that come with the option to prepare it for installation.

### Adding a Hot-Swap Storage Expansion Enclosure

The IBM PC Server Enterprise Expansion Enclosure is one of several SCSI storage enclosures that you can attach to your server. You can connect the storage enclosure to the external SCSI connector on a separately installed SCSI adapter, such as the 16-bit UltraSCSI controller or PC ServeRAID Adapter. Contact your IBM marketing representative or your IBM reseller for additional information.



## Connecting External Options

### Adding External SCSI Devices

*Notes:*

1. You can attach only one external SCSI device to the server's external SCSI connector. To attach additional external SCSI devices, you must install a SCSI adapter.
2. If you plan to install both internal and external SCSI devices, you must follow the instructions given in "Working with Internal Drives" on page 77 in addition to the instructions in this section. Read "Working with Internal Drives," and then return here.
3. You might need to change the setting of the external SCSI termination jumper (J29). See "System Board Jumpers" on page 210 for more information.

If you plan to attach an external SCSI device, you must order an additional SCSI cable. That is, to use an external device with the PC Server 325, you must connect it to the external SCSI connector, using a SCSI cable. This SCSI cable must have the proper connector for the SCSI external connector on one end, and the proper connector for the external device on the other end. To select and order the correct SCSI cable for use with the external device, contact your IBM marketing representative or your IBM reseller.

The SCSI controller on the system board can support up to six internal SCSI devices and one external SCSI device.

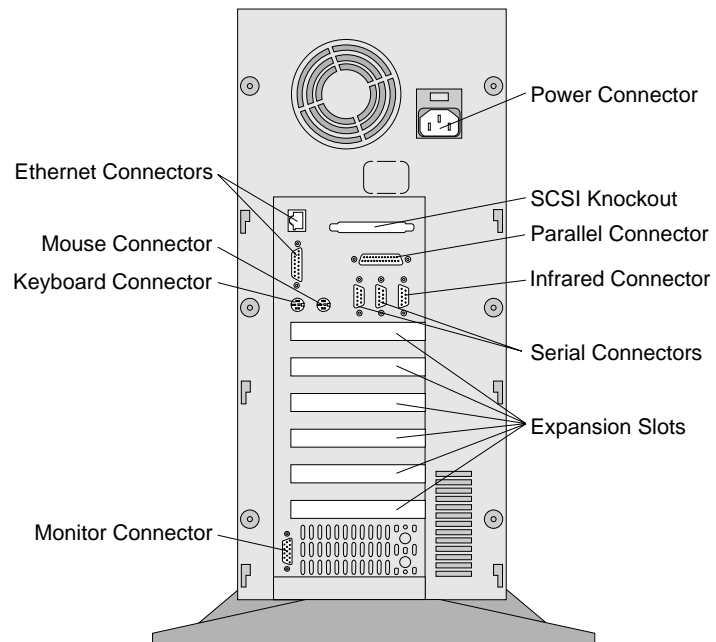
### Adding External Options

To add an external option:

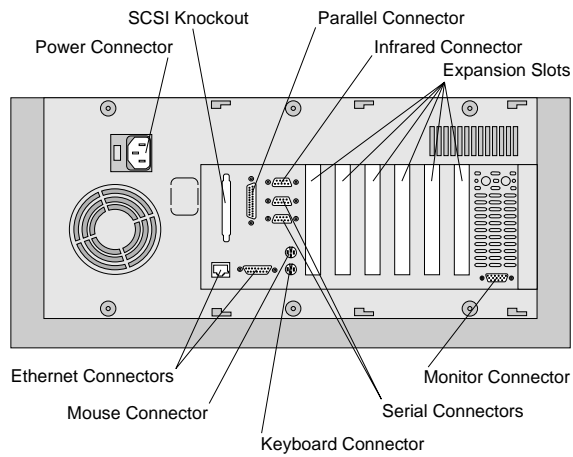
1. Turn off the server and all attached devices.
2. Follow the instructions that come with the option to connect it to the server.

## Connecting External Options

### Tower model



### Drawer model



## Connecting External Options

### What to do next

- Device drivers to install? See the instructions that come with the option to determine if device drivers are required, and, if so, how to install them.
- If you do not need to install any device drivers or update the system configuration, your server is ready to use.

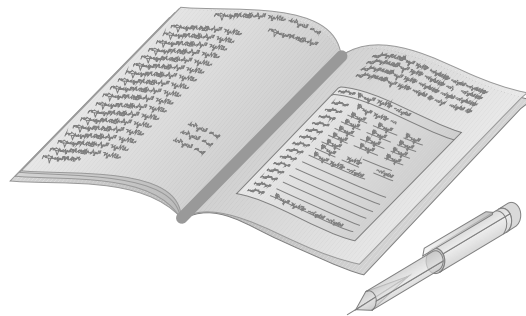
## Updating the Server Configuration

When you start your server for the first time after you add or remove an internal option or an external small computer systems interface (SCSI) device, you might see a message telling you the configuration has changed. You might need to install device drivers (required only if the option has a device driver). Refer to the documentation that comes with your option for information about installing any required device drivers.

*Notes:*

1. If you remove a SCSI device, the server might not recognize any SCSI devices that are still connected. See Chapter 4, “Solving Problems” for information on correcting this situation.
2. When a hard disk drive is added and you want to include it in your startup sequence, use the **Start Options** selection of the Configuration/Setup utility programs (see “Start Options” on page 32).

Record the new configuration information in Appendix B, “Server Records” on page 217.



**Updating the Server Configuration**



## Chapter 4. Solving Problems

---

System problems can be caused by the hardware, the software, or a user error. (An example of a user error is pressing the wrong key.)

You can check the hardware by using the test programs and the information in this chapter. If the hardware is OK, and you have not made an error, you might have a software problem. If you suspect that you have a software problem, refer to the information that comes with that software package.

### **This chapter contains:**

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Power-On Self-Test (POST) . . . . .	125
POST Beep Codes . . . . .	126
Test Programs . . . . .	126
Types of Error Messages . . . . .	127
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### Getting Started

If you are not familiar with the diagnostic tools, continue reading the following sections. If you are familiar with these topics, select the appropriate instructions from this chapter's table of contents.

### Diagnostic Tools Overview

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

- Power-on self-test (POST)
- POST beep codes
- Test programs
- Error messages
- Troubleshooting charts
- Option Diskettes

### Power-On Self-Test (POST)

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

POST does the following:

- Checks some basic system-board operations
- Checks the memory operation
- Compares the current system configuration with the stored system configuration information
- Starts the video operation
- Verifies that drives (such as the diskette, CD-ROM, and hard disk drives) are working

While the memory is being tested, the amount of available memory appears on the screen. These numbers advance as the system progresses through POST. If POST finishes without detecting any problems, a single beep sounds and the first screen of your operating system or application program appears.

## Diagnostic Tools Overview

If POST detects a problem, an error message appears on your screen. A single problem might cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you turn on the system.

### POST Beep Codes

POST generates beeping sounds to indicate successful completion or the detection of an error.

One beep and the startup of the operating system or application program indicates successful completion of POST. More than one beep indicates that POST detected an error.

For more information on beep codes, see “Beep Codes” on page 185.

### Test Programs

The PC Server Diagnostic Diskette contains the QAPLus/PRO test programs, developed by DiagSoft, Inc. for IBM. These programs are the primary method of testing the system board, memory, disk drives, and many other options that you can install in the PC Server 325.

You can use the programs to test the IBM components of the system and some external devices. The more optional adapters and devices you have attached to your system, the longer the testing takes.

If you cannot determine whether a problem is caused by the hardware or by the software, you can run the test programs to confirm that the hardware is working correctly.

## Diagnostic Tools Overview

The programs on the PC Server Diagnostic Diskette include:

- Diagnostic Tests

These tests identify most problems associated with the major components of your system: the system board; RAM; hard disk, diskette, and CD-ROM drives; serial and parallel ports; the video adapter; and the keyboard and mouse.

Test options let you batch groups of tests, specify test parameters (for example, video modes, port addresses, and so on), specify the number of passes you want to run (one through continuous), log test results to a file, and save test settings for future use.

These test programs also allow you to view the server's configuration information. For example, you can view the interrupt request (IRQ) and direct memory access (DMA) assignments, memory usage, device drivers, and so on.

- Utility Programs

The utility programs include a text editor and a diskette formatter.

## Types of Error Messages

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 indicated by error messages should be performed by a trained service technician. Hardware error messages that appear on the screen can be text, numeric, or both.

Messages generated by your software generally are text messages, but they also can be numeric. There are four types of error messages: POST error messages, POST beep codes, diagnostic error messages, and software-generated messages.

### *POST Error Messages*

POST error messages appear when, during startup, POST finds problems with the hardware or detects a change in the hardware configuration. A list of these error messages is given in "POST Error Message Table" on page 142.

## Diagnostic Tools Overview

### *Diagnostic Error Messages*

Diagnostic error messages appear when a test program finds a problem with a hardware option. Normally, these messages are text, but they can be numeric. The test programs will generate one of the following return codes:

<b>Return Code</b>	<b>Description</b>
<b>0</b>	The device passed its test.
<b>1</b>	The device failed its test.
<b>2 or higher</b>	The test stopped.

### *Software-Generated Error Messages*

These messages appear if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information that comes with your software package.

## Troubleshooting

The charts in “Troubleshooting Charts” on page 176 list symptoms of problems (for example, a symptom might be “the mouse is not working”), along with steps to correct the problems.

## Option Diskettes

An optional device or adapter might come with a diskette. Option Diskettes usually contain diagnostic or configuration files.

If your optional device or adapter comes with an Option Diskette, you might need to install some configuration files and/or diagnostic files. See Chapter 2, “Configuring Your Server” on page 17 for instructions on installing the configuration files, or see “Installing Additional Test Programs” on page 191 for installing diagnostic files.

## About the Test Programs

This section includes useful information about navigating through the test programs, as well as procedures for starting and stopping them. These programs are designed to test the IBM PC Server 325. Non-IBM products tested with these programs might present misleading error messages or unexpected system responses. If you want to test a non-IBM product, refer to the information that comes with that product.

### Using the PC Server Diagnostic Diskette

*Note:* Always use the backup copy of the PC Server Diagnostic Diskette when troubleshooting your server.

To start the diagnostic diskette:

1. Insert the backup copy of the PC Server Diagnostic Diskette into the diskette drive; then, turn on the system. Or, if the system is turned on already, press **Ctrl+Alt+Del**.

The system begins POST. If a power-on or administrator password is set, the system prompts you for it.

2. After a few moments, the Main Menu appears. Follow the instructions on the screen.

If the server stops during testing and you cannot continue, have the system serviced.

If the diagnostic programs do not find a problem, see “Troubleshooting” on page 176 and look for the problem symptom.

### Using the Main Menu

The Main Menu, the starting point for the diagnostic tests, contains the following choices:

- **Diagnostics:** When you select this choice from the Main Menu, the Diagnostics Menu appears. The Diagnostics Menu contains the following choices:
  - **Quick Check** automatically checks the hardware configuration and builds a group of tests based on the

## About the Test Programs

configuration check. The diagnostic program then runs the tests for each of the devices or modules found during the configuration check. Upon completion of the Quick Check, you are prompted to Press any key to continue. Pressing any key then returns you to the Diagnostics Menu.

- **Module Tests** more rigorously test an individual module (or device such as a diskette drive) or specify a group of tests for several modules. In addition, you can specify how many times to run an individual test and how the test program will note and log any errors that it finds. See “Using the Module Tests” on page 136 for more information about running the module tests.
- **Options** sets or changes defaults that affect the reporting, error logging, and presentation of the error information. For more information about the options available, see “Test Options” on page 138.
- **System Info:** When you select this choice from the Main Menu, the System Info Menu appears. From the System Info Menu, you can view the server's hardware and software configuration information. For example, you can view the IRQ and DMA assignments, memory usage, address and attribute information for device drivers, and so on.
- **Reports:** When you select this choice from the Main Menu, the Reports Menu appears. From the Reports Menu, you can print the system information.
- **Utilities:** When you select this choice from the Main Menu, the Utilities Menu appears. The Utilities Menu provides access to additional programs on the Diagnostic Diskette. These utility programs include: RAM Chip Locator, File Editor, and Format Diskette. For more information about the File Editor, see “Using the File Editor” on page 194.
- **Exit:** Select this choice to exit from the Diagnostic Diskette.



## Program Navigation

You can maneuver within the test programs by typing the first letter of a menu choice, using the function keys, or using command-line options.

### *Using the Function Keys*

You can use the following keys to maneuver within the test programs:

<b>Enter</b>	Selects an item, runs the test module, or runs the test.
<b>Down Arrow (↓)</b>	Moves the cursor down.
<b>Up Arrow (↑)</b>	Moves the cursor up.
<b>F1</b>	Displays the appropriate Help information. Use the Up Arrow (↑) or Down Arrow (↓) key to scroll through the information. Pressing F1 from within a Help screen provides a help index from which you can select different categories. Pressing Esc exits Help and returns to where you left off.
<b>Esc</b>	Returns to the previous menu.
<b>Tab</b>	Moves the highlight bar (or cursor) to the test group (or moves to parameters).
<b>Spacebar</b>	Toggles modules on or off (or toggles tests on or off).
<b>F2</b>	Displays the current test results log.

## About the Test Programs

<b>F10</b>	Displays the Local Menu when the Module Tests Menu is displayed or from individual Test Group test screens. Local Menu includes the following selections: <ul style="list-style-type: none"><li>• Test Options serves as a shortcut to accessing and changing the test options without having to back up through menus.</li><li>• Single Test moves from the <b>Module Test Menu</b> to the relevant Test Group window for test selection.</li><li>• Next and Previous LUN changes from one Logical Unit Number (LUN) or device to another (for example, HD1 to HD2, or Base Memory to Extended Memory).</li></ul>
+	Displays the next logical unit number (only used in the Test Module menu and on the Test Group screens).
-	Displays the previous logical unit number (only used in the Test Module menu and on the Test Group screens).

### *Using the Command Line Options*

The following Command Line Options allow you to define specific conditions for running the diagnostic programs at startup time.

At the operating system prompt, type QAPRO /XXX (where /XXX represents one of the following); then press **Enter**.

<b>/B&amp;W</b>	The <b>/B&amp;W</b> option forces the program to load in black and white (monochrome) mode.
<b>/LOG=file</b>	The <b>/LOG=file</b> option directs the test programs to start using a specified Error Log file.
<b>/INT10</b>	The <b>/INT10</b> option forces the test programs to use the Basic Input/Output System (BIOS) for screen writes.

## About the Test Programs

- /OXXX** The **/OXXX** option, where **XXX**=test group, omits the designated test group from testing. (See **/IXXX** for a list of valid test groups.)
- /OALL** The **/OALL** option omits all test groups from testing. (See **/IXXX** for more information.)
- /IXXX** The **/IXXX** option, where **XXX**=test group, includes the designated test group. When used in conjunction with the **/OALL** option, you can specify the tests that you want to include. These options are helpful if you have insufficient memory available to load all of the test programs simultaneously, or if you want to test specific test groups.

The valid test groups are:

<b>LPT</b>	Parallel port
<b>COM</b>	Serial ports
<b>FDU</b>	Diskette drive
<b>VID</b>	Video
<b>MBD</b>	System board
<b>KBD</b>	Keyboard
<b>PDV</b>	Pointing device or mouse
<b>MEM</b>	Memory
<b>SCU</b>	SCSI
<b>CDR</b>	CD-ROM
<b>SYS</b>	System information/Utilities

You can include this option multiple times. For example, to run the keyboard, SCSI, and CD-ROM test groups, type:

```
QAPRO.EXE /OALL /IKBD /ISCU /ICDR
```

- /USRCONFIG=*file*** The **/USERCONFIG=*file*** option tells the test programs to look for a user diagnostic configuration file other than the default **USERDIAG.CFG**.

## About the Test Programs

**/SCRIPT=file[,R]**      The **/SCRIPT=file[,R]** option with the **[,R]** runs the selected script.

*Note:* You can use a “-” instead of a “/” as the command line switch.

### IntruderAlert

When you run the diagnostic programs, IntruderAlert checks for damage to the Diagnostic Diskette. If a virus or program alteration is detected, the diagnostic programs do not load.

To suspend IntruderAlert and continue loading the diagnostic programs, press **Esc**.

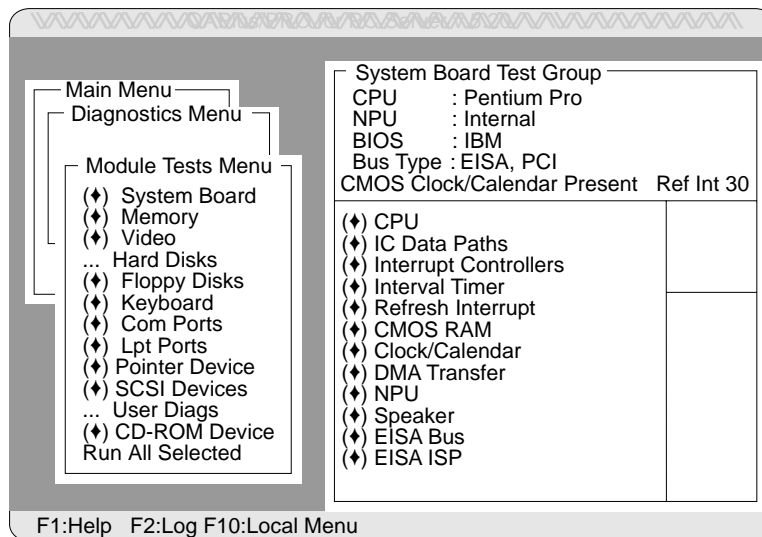
### *The Test Group Window*

When you select Quick Tests or Module Tests from the Diagnostic Menu, a Test Group window appears. (For Module Tests, if you press Tab, the window expands to a full screen.) The Test Group window shows the attributes, parameters, and selected tests of the corresponding Test Group. The diamond “◆” mark indicates a module or device selected for testing.

## About the Test Programs

**Test Group Specifications:** In the upper portion of the Test Group window are the specifications for the related test group.

The following illustration is an example of the Test Group Window when the System Board is selected from the Module Tests Menu.



## About the Test Programs

### Using the Module Tests

To start the Module Tests from the Main Menu of the Diagnostic Diskette:

1. Start the diagnostic programs. If you do not know how to do this, see “Using the PC Server Diagnostic Diskette” on page 129.
2. Select **Diagnostic** from the Main Menu, then press **Enter**.
3. Select **Module Tests**, then press **Enter**. Use the **Up Arrow** (↑) or **Down Arrow** (↓) key to move the highlight bar from one selection to the next within the Module Tests menu.
4. To select or deselect a test, use the Spacebar (the Spacebar toggles your selection on or off). When you have selected a test, a diamond (◆) appears next to the selection.

**Attention:** An asterisk (\*) directly adjacent to an item indicates that running that test might damage your data. Make sure to back up all of your data *before* running the tests.

5. If you want to run all of the selected tests, you can do so by moving the highlight bar to the last choice, **Run All Selected Modules**, then pressing **Enter**. If you want to run each test, one at a time, press **Enter** at the highlight bar of the desired selection.
6. When you are done, press **Esc** to return to the Test Group window.

*Note:* As you move the highlight bar up or down the selection menu, the Test Group window to the right changes to correspond to the highlighted module.

## Changing Selected Tests in Test Groups

To add or remove a test from a Test Group:

1. In the Module Tests Menu, use the **Up Arrow** (↑) or **Down Arrow** (↓) key to move the highlight bar to your selection.
2. Press **Tab** to move into the expanded Test Group window.
3. Move the highlight bar to the test you want to select or deselect.
4. Press the Spacebar at the highlighted test to toggle between select (indicated by a diamond (“◆”)) and deselect.

**Attention:** An asterisk (\*) directly adjacent to an item indicates that running that test might damage your data. Make sure to back up all of your data *before* running the tests.

5. Press **Enter**.

## Creating Test Scripts

Scripting allows you to select specific groups of tests, testing parameters, and options. You can then save your selections for later use as a test *script*.

To set up a test script:

1. Select **Diagnostics** from the Main Menu; then press **Enter**.
2. Select **Module Tests**; then press **Enter**.
3. Select the test groups and specific tests.
4. Select **Save Script** (the last item on the Options Menu).
5. Type in a file name. The test program automatically adds the extension “QA.”
6. To load and run the test program with this test setting, type: QAPRO /SCRIPT-*Filename*,R and then, press **Enter**.

*Note:* Adding the “,R” runs the tests listed in the named Test Script. If this is omitted, the diagnostic program loads only the program with the test settings as previously saved in the chosen Script File.

## About the Test Programs

### Test Options

Each option that appears on the Options Menu is briefly described below.

- **Halt on Error:** The default is **No**. If you select **Yes**, you can resume testing after a halt by pressing any key. If you select **No**, any error detected is logged (only if you enabled the Test Log) and the program continues testing without halting.
- **Beep on Error:** The default is **No**. If you select **Yes**, a beep sounds whenever the test program detects an error.
- **Lap Count:** This option allows you to set the number of times to run each group of tests. The default setting is 1. You can enter a number from 0 to 10. The looping is controlled on a block basis, not on an individual test basis. Therefore, if you select tests A, B, and C and the Lap Count is set to 3, the test sequence is ABC/ABC/ABC.
- **Pause Control:** You can choose to have the test programs pause between test modules and wait for you to press any key to continue. Also, you can choose to have the test program wait for a user response to indicate if the video tests pass. The default setting is **Pause Between**. The available choices are **Pause Between** and **No Pause**. If you choose **No Pause**, the test programs continue testing without a pause from one video test to the next, and from one test module to the next.
- **Test Log:** Allows you to select whether or not to do logging. You can select one of the following five choices:
  - No Logging
  - COM1
  - LPT1
  - ASCII
  - .DBF

**No Logging** is the only selection that turns off Test Log. The other four selections enable Test Logging.



## About the Test Programs

When Test Log starts, the test programs create a log with the following information:

- The date and time the log was opened
- The start and end times of each module tested and for each test selected for that module
- The results of testing
- The date and time the log was closed

Disabling the Test Log writes the date and time to the Test Log along with a message that the log was closed. Any Test Log is closed automatically when the program finishes.

If you enable Test Log, the hardware configuration is entered automatically at the beginning of the log.

If you select **ASCII File**, the test programs prompt you to type in the name of the Test Log file. The test programs automatically assign the extension **.LOG** to the file if you do not specify a file-name extension. The file is stored in ASCII text format. You can then examine the file with most word processors and text editors at a later time.

If you select **.DBF File**, the test programs prompt you to fill in the information on an Open DBF File screen. This creates a new file or opens an existing data base compatible file to insert new information on the current test machine. The Machine Type, Serial Number, and Work Center lines identify the system that is being tested.

*Note:* If you plan to run hard disk tests and to do test logging, do the test logging on a drive other than the drive to be tested. If you log to a drive that is to be tested, the logging is disabled for the remainder of the test cycle.

## About the Test Programs

- **Test Log Mode:** This choice determines the amount of data to be logged after you select COM1, LPT1, ASCII, or .DBF. The available options are LogAll or LogFail. LogAll logs all test information. LogFail logs only failures.
- **Log Message Queue:** Pressing F2 allows you to examine the test results to date via a Log Message Queue. This information is generated whether or not you select a Test Log. It does not, however, allow you to examine previous Test Logs.
- **Save Script:**  
See “Creating Test Scripts” on page 137 for a more detailed description of scripting.

## Running the Ethernet Diagnostics

You must use the Ethernet diagnostics to perform diagnostic tests on the integrated Ethernet controller. This diagnostic diskette includes the LANAIID utility program.

### *Backing Up the Ethernet Diagnostic Diskette*

Use an operating system command, such as the DOS DISKCOPY command, to make a *complete* backup copy of the PC Server PCI Ethernet Diagnostic Diskette. Using the backup copy can prevent damage to the original diskette. Your operating system documentation provides information on backing up diskettes.

### *Starting the Ethernet Diagnostics*

To start the Ethernet Diagnostic Diskette:

1. Insert the backup copy of the Ethernet diagnostic diskette into the diskette drive.
2. Turn on the server, or if it is already on, shut down the operating system and restart the server.
3. At the LANAIIDC prompt, enter **/diags**; then, press **Enter**.
4. Follow the instructions on the screen.
5. When diagnostics tests are complete, remove the diskette from the diskette drive; then, restart the server.

### Option Diskettes

An optional device or adapter might come with a diskette that contains option-specific test programs. If it does, follow the instructions that come with the option. Different instructions apply depending on whether the Option Diskette is startable or not startable.

### Error Messages

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 indicated by these error messages should be performed by a trained service technician.

### Types of Messages

System problems can result in two types of error messages:

- POST error messages appear when, during startup, POST finds problems with the hardware or detects a change in the hardware configuration.
- Diagnostic error messages appear when the diagnostic program finds a problem with hardware.

Messages generated by your software generally are text messages, but they also can be numeric. Information about these messages is not included in this handbook. For information about these error messages, refer to the documentation that comes with your software.

### Multiple Messages

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

## Error Messages

### Passwords

If you have a power-on password or administrator password set, you must type the password and press **Enter** before POST will continue.

The level of password protection determines the number of choices that are available on the Configuration/Setup utility program menu.

### POST Error Message Table

The following table shows error messages that might appear on the screen during the power-on self-test (POST).

*Notes:*

1. The actions for some of the messages require you to start the Configuration/Setup utility program. (For instructions, see Chapter 2, "Configuring Your Server.")
2. If a password prompt appears with a POST message, type the administrator or power-on password; then press **Enter**.

POST Message	Description
E100	POST detected an invalid EISA configuration.
E101	<i>Action:</i> Run the EISA configuration utility.
E10x	POST detected an invalid EISA configuration for slot x. This error occurred because an EISA adapter was added or removed. <i>Action:</i> Run the EISA configuration utility.
101 102 106	A failure occurred during testing of the system board and microprocessor. <i>Action:</i> Have the system serviced.
111	An input/output (I/O) channel check occurred during testing of the system board and memory. This failure is generally caused by an adapter. <i>Action:</i> Have the system serviced.

## Error Messages

POST Message	Description
114	<p>An adapter read-only memory (ROM) error occurred.</p> <p><i>Action:</i> Remove the options. If you can start the system without the option installed, reinstall each option and retest. When an option fails, replace it.</p> <p>If you cannot isolate and correct the problem, have the system serviced.</p>
129	<p>An internal cache error occurred.</p> <p><i>Action:</i> Have the system serviced.</p>
151	<p>A failure occurred during the testing of the real-time clock.</p> <p><i>Action:</i> Have the system serviced.</p>
162	<p>A change in device configuration occurred. This error occurs under one or more of the following conditions:</p> <ul style="list-style-type: none"><li>• A new device has been installed.</li><li>• A device has been moved to a different location or cable connection.</li><li>• A device has been removed or disconnected from a cable.</li><li>• A device is failing and is no longer recognized by the server as being installed.</li><li>• An external device is not turned on.</li><li>• An invalid checksum is detected in the battery-backed memory.</li></ul> <p><i>Action:</i> Verify that all external devices are turned on. You must turn on external devices before turning on the server.</p> <p>If you did not add, remove, or change the location of a device, a device is probably failing. Running the diagnostic programs might isolate the failing device, but you must have the system serviced.</p>
163	<p>The time of day has not been set.</p> <p><i>Action:</i> Set the correct date and time. If the date and time are set correctly and saved and the 163 error message reappears, have the system serviced.</p> <p>Until the system is serviced, the server can be used, but any application programs that use the date and time will be affected.</p>

## Error Messages

POST Message	Description
164	<p>A change in the memory configuration occurred. This message can be caused by adding memory, or removing memory.</p> <p><i>Note:</i> The server can be used with decreased memory capacity.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"><li>1. If you have newly installed memory, start the Configuration/Setup utility programs; then, exit, saving the new configuration settings. Restart the server. If the message appears again, reseal the memory-module kit.</li><li>2. Running the diagnostic tests might isolate the location of the problem memory-module kit and provide additional information.</li><li>3. If the diagnostic tests fail, have the system serviced.</li></ol>
173	<p>A change in configuration occurred. One or more errors occurred in accessing the VPD.</p> <p><i>Action:</i> Have the system serviced.</p>
175	<p>A hardware error occurred.</p> <p><i>Action:</i> Have the system serviced.</p>
176	<p>The server cover has been removed improperly.</p> <p><i>Action:</i> Check for indications that the server has been tampered with.</p>
177	<p>A security hardware error occurred.</p>
178	<p><i>Action:</i> Check for indications that the server has been tampered with.</p>
182	<p>A system board error occurred.</p> <p><i>Action:</i> Have the system serviced.</p>
183	<p>An administrator password is set and must be entered.</p> <p><i>Action:</i> Enter the administrator password.</p> <p><b>Attention:</b> You have only three chances to enter the password correctly. After three attempts, turn off your server. Wait at least five seconds; then turn it on. You have three more chances to enter the password. If you have forgotten the correct password, you must have the system serviced (see "Using the Administrator Password Menu" on page 29 for more information).</p>

## Error Messages

POST Message	Description
184	<p>The power-on password information stored in your server was removed.</p> <p><i>Action:</i> From the Configuration/Setup utility program Main Menu, select <b>System Security</b>. Then, follow the instructions on the screen. For instructions on using the Configuration/Setup utility programs, see "Using the Configuration/Setup Utility Main Menu." If this information cannot be restored, have the system serviced.</p>
185	<p>A power failure damaged the stored information about the drive-startup sequence.</p> <p><i>Action:</i> From the Configuration/Setup utility program Main Menu, select <b>Start Options</b>. Then, follow the instructions on the screen. For more information about using the Configuration/Setup utility programs, see "Using the Configuration/Setup Utility Main Menu."</p>
186	<p>A system board or hardware error occurred.</p> <p><i>Action:</i> Have the system serviced.</p>
187	<p>VPD serial number not set.</p> <p><i>Action:</i> Have the system serviced.</p>
188	<p>System ID information destroyed. Bad VPD CRC#2.</p> <p><i>Action:</i> Have the system serviced.</p>
189	<p>An attempt has been made to access the server with invalid passwords. After three incorrect attempts, the server locked up.</p>
201	<p>A failure occurred during testing of the memory. This error can be caused by:</p> <ul style="list-style-type: none"><li>• Incorrectly installed memory</li><li>• A failing memory-module kit</li><li>• A processor-board failure</li><li>• A system-board failure</li></ul> <p><i>Action:</i></p> <ol style="list-style-type: none"><li>1. If you just installed memory, see "Working with Memory-Module Kits" on page 70 to verify that the new memory is correct for your system. Verify that the memory-module kit is installed correctly.</li><li>2. Run the diagnostic tests to verify the problem.</li></ol> <p>If the diagnostic tests fail, have the system serviced.</p>

## Error Messages

POST Message	Description
229	<p>An cache error or failure occurred.</p> <p><i>Action:</i> Have the system serviced.</p>
301	<p>A failure occurred during testing of the keyboard and keyboard controller. These error messages also might be accompanied by continuous beeping.</p> <p><i>Action:</i> Ensure that:</p> <ol style="list-style-type: none"><li>1. Nothing is resting on the keyboard and pressing a key.</li><li>2. No key is stuck.</li><li>3. The keyboard cable is connected correctly to the keyboard and to the correct connector on the server.</li></ol> <p>Running the diagnostic tests can isolate the server component that failed, but you must have your system serviced. If the error message remains, have the keyboard, cable and system serviced.</p> <p><i>Note:</i> If you have just connected a new mouse or other pointing device, turn the server off and disconnect that device. Wait at least 5 seconds, and then turn the server on. If the error message goes away, replace the device.</p>
604	<p>A failure occurred during the testing of a diskette drive.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"><li>1. Verify that the Configuration/Setup utility programs correctly reflect the type of diskette drive you have installed.</li><li>2. Run the diagnostic programs.</li><li>3. If the diagnostic programs fail, replace the diskette drive.</li></ol>
605	<p>A failure occurred during testing of a diskette drive. This error occurred when the system could not unlock the diskette drive for the insertion or removal of diskettes.</p> <p><i>Action:</i> The server can be used; diskettes that are presently in diskette drives will work. However, you cannot insert a diskette into or remove a diskette from the locked drive.</p>



## Error Messages

POST Message	Description
662	<p>A diskette drive configuration error occurred.</p> <p><i>Action:</i> If you removed a diskette drive, make sure the diskette drive setting is correct in the Configuration/Setup utility programs. If the setting is not correct, change the setting. For instructions on using the Configuration/Setup utility programs, see Chapter 2, "Configuring Your Server."</p>
962	<p>A parallel port configuration error occurred.</p> <p><i>Action:</i> If you changed a hardware option, make sure the parallel port setting is correct in the Configuration/Setup utility programs. If the setting is not correct, change the setting. For instructions on using the Configuration/Setup utility programs, see Chapter 2, "Configuring Your Server."</p>
11XX	<p>A failure occurred during testing of the system-board serial port.</p> <p><i>Action:</i> 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:</p> <ol style="list-style-type: none"><li>1. Turn off the server.</li><li>2. Disconnect the serial cable from the serial port.</li><li>3. Wait five seconds; then, turn on the server.</li></ol> <p>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.)</p> <p>If the POST error message reappears, have the system serviced.</p>
1762	<p>A hard disk configuration error occurred.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"><li>1. Make sure the cables are securely attached to all drives.</li><li>2. Make sure the settings for the drive options are correct in the Configuration/Setup utility programs. If the settings are not correct, change them. For instructions on using the Configuration/Setup utility programs, see Chapter 2, "Configuring Your Server."</li></ol>
178X	<p>A failure occurred during testing of the hard disk drive.</p> <p><i>Action:</i> Run the diagnostic tests.</p>

## Error Messages

POST Message	Description
1800	<p>A PCI adapter has requested a hardware interrupt that is not available.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"><li>1. Make sure the PCI adapter and all other adapters are set correctly in the Configuration/Setup utility programs. If the interrupt resource settings are not correct, change the settings. For instructions on using the Configuration/Setup utility programs, see "PCI Bus Control."</li><li>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. For instructions on removing adapters, see "Working with Adapters" on page 61. For instructions on setting interrupts, see "PCI Bus Control."</li></ol>
1801	<p>A PCI adapter has requested memory resources that are not available.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"><li>1. Make sure the PCI adapter and all other adapters are set correctly in the Configuration/Setup utility programs. If the memory resources settings are not correct, change the settings. For instructions on using the Configuration/Setup utility programs, see Chapter 2, "Configuring Your Server."</li><li>2. If all memory resources are being used, you might need to remove an adapter to make memory available to the PCI adapter. For instructions on removing adapters, see "Working with Adapters" on page 61.</li></ol>
1802	<p>A PCI adapter has requested an I/O address that is not available, or the PCI adapter might be defective.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"><li>1. Make sure the PCI adapter and all other adapters are set correctly in the Configuration/Setup utility programs.</li><li>2. If the I/O port resource settings are correct, the PCI adapter might be defective.</li></ol>

## Error Messages

POST Message	Description
1803	<p>A PCI adapter has requested a memory address that is not available, or the PCI adapter might be defective.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"><li>1. Make sure that all other adapters are set correctly in the Configuration/Setup utility programs. If the memory resource settings are not correct, change the settings. For instructions on using the Configuration/Setup utility programs, see Chapter 2, "Configuring Your Server."</li><li>2. If the memory resource settings are correct, the PCI adapter might be defective.</li></ol>
1804	<p>A PCI adapter has requested a memory address that is not available.</p> <p><i>Action:</i> If all memory addresses are being used, you might need to remove an adapter to make memory addresses available to the PCI adapter. For instructions on removing adapters, see "Working with Adapters" on page 61.</p>
1805	<p>A PCI adapter ROM error occurred.</p> <p><i>Action:</i> Remove the PCI adapters. If you can start the system without the adapters, reinstall each adapter and retest. When an option fails, replace it.</p> <p>If you cannot isolate and correct the problem, have the system serviced.</p>

## Error Messages

POST Message	Description
1806	<p>A PCI-to-PCI bridge error has occurred. More than one PCI bus tried to access memory below 1 MB.</p> <p><i>Action:</i> Remove the PCI adapter that has the PCI bridge. If you can start the system without the adapter, reinstall the adapter and retest. When an option fails, replace it.</p> <p>If you cannot isolate and correct the problem, have the system serviced.</p>
2400	<p>A failure occurred during testing of the video controller on the system board. This error can be caused by a failing monitor, a failing system board, or, if a video adapter is installed, a failing video adapter.</p> <p><i>Action:</i> Verify that the monitor is connected correctly to the video connector. If it is have the system serviced.</p>
2462	<p>A video memory configuration error occurred.</p> <p><i>Action:</i></p> <ol style="list-style-type: none"><li>1. Make sure the monitor cables are correctly and securely connected to the system.</li><li>2. If the error persists, have the system serviced.</li></ol>
8603	<p>A failure occurred during testing of the pointing device (mouse) and pointing device controller. This error can be caused by the addition or removal of a pointing device or by a failing system board.</p> <p><i>Note:</i> 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, and then turn it back on.</p> <p><i>Action:</i> Ensure that the keyboard and pointing device are attached to the correct connectors. If they are connected correctly, use the following procedure:</p> <ol style="list-style-type: none"><li>1. Turn off the server.</li><li>2. Disconnect the pointing device from the server.</li><li>3. Turn on the server.</li></ol> <p>If the POST error message does not reappear, the pointing device is probably failing. (See the documentation that comes with the pointing device for additional testing information.) If the problem remains, have the pointing device serviced.</p> <p>If the POST error message reappears, run the diagnostic tests to isolate the failure. If the diagnostic tests do not find a problem and the POST error message remains, have the system serviced.</p>

## Error Messages

<b>POST Message</b>	<b>Description</b>
19990301	A hard disk failure occurred. <i>Action:</i> Have the system serviced.
19990305	An operating system could not be found. <i>Action:</i> Install an operating system. If you already installed the operating system, check the drive startup sequence (see "Start Options" on page 32). If the drive sequence is correct, run the diagnostics to verify that the hard disk is functioning correctly. If there is a problem with the hard disk (such as a bad sector), you might have to reinstall the operating system.  If you cannot reinstall the operating system, have the system serviced.
Other Numbers	The POST found an error. <i>Action:</i> Follow the instructions on the screen.

## SCSI Messages

The following table lists messages that reflect problems with the SCSI controller or SCSI device.

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

SCSI Messages	Description
All	<p>One or more of the following might be causing the problem.</p> <ul style="list-style-type: none"><li>• A failing SCSI device (adapter, drive, controller)</li><li>• An improper SCSI configuration or SCSI termination jumper setting</li><li>• Duplicate SCSI IDs in the same SCSI chain</li><li>• A missing or improperly installed SCSI terminator</li><li>• A defective SCSI terminator</li><li>• An improperly installed cable</li><li>• A defective cable</li></ul> <p><i>Action:</i> Verify that:</p> <ul style="list-style-type: none"><li>• The external SCSI devices are turned on. External SCSI devices must be turned on before the system.</li><li>• The cables for all external SCSI devices are connected correctly.</li><li>• If you have attached an external device to the server's external SCSI connector, the external SCSI termination jumper (J29) is set to the proper position (see Table 2 on page 211).</li><li>• The last device in each SCSI chain is terminated correctly. (See "Working with Internal Drives" on page 77 for more information about SCSI termination.)</li><li>• The SCSI devices are configured correctly.</li></ul> <p>If the above are correct, run the diagnostics for additional information about the failing device. If the error recurs, have the system serviced.</p>

## Ethernet Controller Messages

The integrated Ethernet controller might display messages from the following drivers:

- Novell NetWare Server ODI
- Novell NetWare Server DOS ODI
- Novell NetWare Server OS/2 ODI
- Novell NetWare Server LAN
- NDIS Adapter for level 2.01
- NDIS Adapter for level 3.0
- SCO UNIX LLI, UnixWare DLPI, and SunSoft Solaris
- Packet Driver

### Novell NetWare Server ODI Driver Messages

This section contains the error messages for the Novell NetWare server ODI driver. The explanation and recommended action are included with each message.

---

**PCNTNW-NW-026 The MSM is unable to parse a required custom keyword.**

**Explanation:** The user entered an incorrect parameter keyword.

**Action:** Enter the keyword correctly. Then, reload the driver.

---

**PCNTNW-NW-054 The board did not respond to the initialization command.**

**Explanation:** The board did not respond when the driver tried to initialize it.

**Action:** Perform the following steps:

1. Verify that the Ethernet jumper on the system board is set to the default, enabled position.
2. Go to “About the Test Programs” on page 129 to run the diagnostic utility.

## Ethernet Controller Messages

---

**PCNTNW-NW-58 The board did not respond to the initialization command.**

**Explanation:** The IRQ setting might be incorrect with the hardware setting, or the EEPROM might be corrupted.

**Action:** Perform the following steps:

1. Verify that the IRQ settings in the NET.CFG file match the configuration settings in the Configuration/Setup utility programs. See “PCI Bus Control” on page 33 for information on setting the interrupt requests.
2. Verify that the EEPROM on the system board is programmed correctly.

---

**PCNTNW-NW-66 The cable might be disconnected from the board.**

**Explanation:** The cable might be disconnected from the server's Ethernet port.

**Action:** Verify that a cable is connected to the AUI port or the 10BASE-T port.

---

**PCNTNW-NW-071 The matching virtual adapter could not be found.**

**Explanation:** You tried to load another instance of the driver with a different I/O address. This new board could not be found.

**Action:** If you installed an IBM Ethernet adapter, make sure the adapter is seated properly. Also, check the I/O settings of the board with the settings supplied to the drive.

---

**PCNTNW-NW-072 A resource tag is unavailable.**

**Explanation:** The driver tried to allocate some resources that were not available.

**Action:** Add or free some memory in the server. Then, restart the server.

---

**PCNTNW-NW-073 Unable to allocate memory.**

**Explanation:** The driver failed to allocate the memory needed for normal operation.

**Action:** Add more memory, or free some memory resources in the server. Then, restart the server.

---

**PCNTNW-NW-074 The hardware interrupt cannot be set.**

**Explanation:** An attempt was made to initialize a given hardware interrupt. The attempt was not successful.

**Action:** Perform the following steps:

1. Verify that the Ethernet jumper on the system board is set to the default, enabled position.
2. Make sure that the interrupt request numbers are set correctly, and that no other devices are using the interrupt. See “PCI Bus Control” on page 33 for more information.



## Ethernet Controller Messages

---

**PCNTNW-NW-075 The MLID cannot be registered with the LSL.**

**Explanation:** An error occurred while the driver was trying to register with Link Support Layer.

**Action:** Check the version of Netware Operating System. Make sure that this driver is correct for the version of Netware that you are using. Restart the server.

---

**PCNTNW-NW-076 The polling procedure cannot be added.**

**Explanation:** An error occurred while the driver was adding a polling procedure to the Netware Operating System polling routines.

**Action:** Check the version of Netware Operating System. Make sure that this driver is correct for the version of Netware that you are using. Restart the server.

---

**PCNTNW-NW-077 The event notification cannot be registered.**

**Explanation:** The driver failed to register its event notification routines with the Netware Operating System.

**Action:** Check the version of Netware Operating System. Make sure that this driver is correct for the version of Netware that you are using. Restart the server.

---

**PCNTNW-NW-078 The firmware file cannot be read.**

**Explanation:** The driver to read a firmware file. The read process failed.

**Action:** Make sure that the support files that accompany the driver are present. Restart the server.

---

**PCNTNW-NW-079 The MLID did not initialize MSMTx Free Count.**

**Explanation:** The MSMTx Free Count is not initialized properly.

**Action:** Restart the server. If the error recurs, call for service.

---

**PCNTNW-NW-084 Unable to allocate memory below the 16 megabyte boundary.**

**Explanation:** A request was made to allocate memory below 16 megabytes. The request did not complete successfully.

**Action:** Free some memory below 16 megabytes, or add more memory below the 16 megabyte boundary.

---

**PCNTNW-NW-086 The driver parameter block is too small.**

**Explanation:** The driver parameter block is too small.

**Action:** Restart the server. If the error recurs, call for service.

## Ethernet Controller Messages

---

**PCNTNW-NW-087 The media parameter block is too small.**

**Explanation:** The driver media parameter block is too small.

**Action:** Restart the server. If the error recurs, call for service.

---

**PCNTNW-NW-091 The hardware configuration conflicts.**

**Explanation:** You tried to load a new frame type for the existing adapter. The hardware assumptions made in doing so are incorrect.

**Action:** Make sure that your hardware configuration matches the software settings. See "PCI Bus Control" on page 33 for information on viewing and changing interrupt requests.

---

**PCNTNW-NW-092 Cannot schedule AES without an HSM routine.**

**Explanation:** The Netware Operating System needs a Hardware Support Module routine before it schedules an AES event.

**Action:** Restart the server. If the error is still present, call for service.

---

**PCNTNW-NW-093 Cannot schedule interrupt time call back without an HSM routine.**

**Explanation:** The driver needs a Hardware Support Module routine before it can schedule an interrupt time call back.

**Action:** Restart the server. If the error recurs, call for service.

---

**PCNTNW-NW-094 Cannot set hardware interrupt without an HSM routine.**

**Explanation:** The driver needs a hardware interrupt call back routine routine before it sets the interrupt.

**Action:** Restart the server. If the error recurs, call for service.

---

**PCNTNW-NW-095 Cannot add polling without an HSM routine.**

**Explanation:** The driver needs an HSM polling routine before it can start the polling process.

**Action:** Restart the server. If the error recurs, call for service.

---

**PCNTNW-NW-126 The group bit in the node address override was cleared.**

**Explanation:** The IEEE address has a group bit indicating that an address belongs to a group of stations. This bit is used only as a destination address; it cannot be used as a source address. You tried to enter a source address with this bit set. The driver cleared the group bit of the source address.

**Action:** None.

## Ethernet Controller Messages

---

**PCNTNW-NW-127 The local bit in the node address override was set.**

**Explanation:** The local bit in the IEEE address format indicates that the addresses are being managed locally. If you use the node address override capabilities of this driver to enter a new address, the local bit should be set. You entered an address without the local bit set. The driver has set the local bit.

**Action:** None.

---

**PCNTNW-NW-164 The device was not found.**

**Explanation:** The driver cannot find an Ethernet controller in the server.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**PCNTNW-NW-164 Device not found at IOADDRESS.**

**Explanation:** The Ethernet controller cannot be found at the IO address specified in the NET.CFG file.

**Action:** Verify that the IO Address in the NET.CFG file matches with the board. Otherwise, remove the PORT keyword from the NET.CFG file.

---

**PCNTNW-NW-167 PCI scan specified, device not found.**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Perform the following steps:

1. Verify that the Ethernet jumper on the system board is set to the default, enable position.
2. Edit the NET.CFG file to change the BUSTYPE keyword to PCI1.
3. If the problem persists, go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**PCNTNW-NW-180 The DMA parameter is not necessary for PCI device.**

**Explanation:** The Ethernet controller does not require a DMA setting.

**Action:** Delete the DMA parameter from the NET.CFG file.

## Novell NetWare DOS ODI Driver Messages

This section contains the error messages for the Novell NetWare DOS ODI device driver. The explanation and recommended action are included with each message.

## Ethernet Controller Messages

---

**PCNTW-DOS-1 The LSL is not loaded.**

**Explanation:** The Link Support support module (LSL.COM) is not loaded.

**Action:** Load LSL.COM; then, load the device driver.

---

**PCNTW-DOS-2 The LSL has no more room for a board using Frame <string>.**

**Explanation:** The maximum number of adapters, whether virtual or physical, has been registered with the Link Support Layer. In the PC Server 325, the DOS ODI LSL can support up to five PCI Ethernet adapters, plus the Ethernet controller in the system board.

**Action:** Reduce the number of active adapters in the systems by removing an adapter, or by decreasing the number of frame types activated by Multiple Link Interface Driver (MLID).

---

**PCNTW-DOS-3 Could not find PCNTNW MLID to unload.**

**Explanation:** A request was made to unload PCNTNW MLID, but the MLID is not loaded.

**Action:** None.

---

**PCNTW-DOS-4 A TSR is loaded above the PCNTNW MLID.**

**Explanation:** You tried to unload the PCNTNW MLID from memory, but the PCNTNW MLID detected another Terminate and Stay Resident (TSR) program loaded above the MLID. For the PCNTNW MLID to unload safely, you must first unload any TSR programs that were loaded after you loaded the MLID.

**Action:** Either unload the other TSR program before loading the PCNTNW MLID, or unload the TSR program before attempting this operation.

---

**PCNTW-DOS-5 PCNTNW MLID could not be unloaded; the operation was aborted.**

**Explanation:** The PCNTNW MLID attempted to remove the resident PCNTNW MLID from memory, and failed. A hardware error has probably occurred.

**Action:** Run the Ethernet diagnostic.

---

**PCNTW-DOS-6 The adapter did not initialize. PCNTNW did not unload.**

**Explanation:** The hardware did not initialize correctly. The PCNTNW driver did not load.

**Action:** Check the hardware. Make sure that the board's hardware setting matches its settings in the NET.CFG file.

## Ethernet Controller Messages

---

**PCNTW-DOS-7 You need another PCNTNW MLID Section Heading in the NET.CFG file in order to load the MLID again.**

**Explanation:** You tried to load the PCNTNW MLID a second time. Normally, you would do this so that you could use two or more Ethernet controllers in the server. When two or more of the same type of Ethernet controllers are installed in the server, an associated PCNTNW MLID section heading must be specified in the NET.CFG file.

**Action:** Create a NET.CFG file and add the commands for both PCNTNW MLID boards to the file. Then, restart the server.

---

**PCNTNW-DOS-8 A NET.CFG is required to load the MLID again.**

**Explanation:** You tried to load the PCNTNW MLID a second time. Normally, you would do this so that you could use two or more Ethernet controllers in the server. When two or more of the same type of Ethernet controllers are installed in the server, an associated PCNTNW MLID section heading must be specified in the NET.CFG file.

**Action:** Create a NET.CFG file and add the commands for both PCNTNW MLID boards to the file. Then, restart the server.

---

**PCNTNW-DOS-9 The NET.CFG entry has been ignored.**

**Explanation:** The PCNTNW ignored the NET.CFG entry.

**Action:** Verify that the entries in the NET.CFG file are correct.

---

**The PCNTNW MLID has been successfully removed.**

**Explanation:** A request was made to unload a PCNTNW MLID. The PCNTNW MLID has been removed from memory.

**Action:** None.

---

**PCNTNW-DOS-11 The MLID does not support frame <string>. The PROTOCOL keyword has been ignored.**

**Explanation:** The NET.CFG files specified the PROTOCOL option for a PCNTNW MLID. The specified frame type is not supported by the PCNTNW MLID.

**Action:** Check the PROTOCOL line in the NET.CFG file for possible omissions of required dashes and underscores or any misspellings.

## Ethernet Controller Messages

---

**PCNTNW-DOS-12 The protocol keyword must have a frame type. Entry ignored.**

**Explanation:** The PROTOCOL option was specified in the NET.CFG file for a PCNTNW MLID. The entry failed to specify the associated frame type for the protocol ID addition. An entry in the NET.CFG file for the PROTOCOL option should use the following format:

```
LINK DRIVER PCNTNW
PROTOCOL IPX 8137 ETHERNET_II
```

**Action:** Specify a frame with the PROTOCOL option.

---

**PCNTNW-DOS-13 The MLID could not register Protocol ID <string> for protocol stack <string> for frame type.**

**Explanation:** The PCNTNW MLID could not register the specified Protocol ID.

**Action:** Verify the protocol information in the NET.CFG file.

---

**PCNTNW-DOS-14 This version of LSL is not supported.**

**Explanation:** The PCNTNW MLID cannot run successfully using this version of the LSL.

**Action:** Update your LSL.COM to a newer version.

---

**PCNTNW-DOS-15 The frame type is already activated for frame <string>. The NET.CFG entry has been ignored.**

**Explanation:** Two FRAME keywords under the same main section heading specified the same frame type. A specified frame type can be specified only once per driver.

**Action:** Remove the duplicate FRAME keyword entry.

---

**PCNTNW-DOS-16 The node address was incorrectly specified in NET.CFG.**

**Explanation:** You used the NODE ADDRESS option in the NET.CFG file to override the node address on the network board. The number specified was not a valid Ethernet address. An Ethernet address is six bytes in length. This error occurs if Bit 0 of the first address byte is a 1. This bit must always be 0. For example, if the first byte has the following address, an invalid Ethernet address is generated.

```
    FIRST BYTE
  7 6 5 4 3 2 1 0
  0 0 0 0 0 0 0 1
```

This byte will produce node addresses in the 0100 0000 0000 to 01FF FFFF FFFF range (in hexadecimal), all of which will be invalid.

**Action:** Specify a valid node address in the NET.CFG file.

## Ethernet Controller Messages

---

**PCNTNW-DOS-17 An invalid keyword was specified in NET.CFG on line xx.**

**Explanation:** The keyword specified in the NET.CFG file is incorrect.

**Action:** Check the keyword in question. Make sure that the keyword is correctly spelled.

---

**PCNTNW-DOS-18 The frame type specified in the NET.CFG file is not supported.**

**Explanation:** The NET.CFG file specified the PROTOCOL option for a PCNTNW MLID. The specified frame type is not supported by the PCNTNW MLID.

**Action:** Check the PROTOCOL line in the NET.CFG file for possible omissions of required dashes and underscores, or any misspellings. Check the PCNTNW MLID documentation for supported frame types.

---

**PCNTNW-DOS-19 An invalid Ethernet node address is specified in NET.CFG. The MLID modified the incorrect address bits.**

**Explanation:** The NET.CFG file has an invalid node address. The PCNTNW MLID modified and corrected the address.

**Action:** Verify the node address entries in the NET.CFG file.

---

**PCNTNW-DOS-50 The board cannot be found.**

**Explanation:** The Ethernet controller is either not configured correctly or is disabled.

**Action:** Perform the following steps:

1. Verify that the Ethernet jumper on the system board is set to the default, enabled position.
2. Check the settings for the Ethernet controller (for example, the I/O and interrupt request settings) against the settings in the NET.CFG. See "PCI Bus Control" on page 33 for information on setting the interrupt requests.
3. If the problem persists, go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**PCNTNW-DOS-54 The board did not respond to the initialization command.**

**Explanation:** The Ethernet controller initialization failed.

**Action:** Verify that the Ethernet jumper on the system board is set to the default, enabled position. Go to "About the Test Programs" on page 129 to run the diagnostic utility.

## Ethernet Controller Messages

---

**PCNTNW-DOS-58 The board did not respond to the initialization command.**

**Explanation:** The IRQ setting might be incorrect with the hardware setting, or the EEPROM might be corrupted.

**Action:** Verify that the IRQ settings in the NET.CFG file match the configuration settings in the Configuration/Setup utility programs. See "PCI Bus Control" on page 33 for information on setting the interrupt requests. Verify that the EEPROM on the system board is programmed correctly.

---

**PCNTNW-DOS-61 PCI device IRQ number mismatch.**

**Explanation:** The IRQ number specified in the NET.CFG file does not match with the IRQ number assigned in the Configuration/Setup utility programs.

**Action:** Remove the IRQ number in the NET.CFG file.

---

**PCNTNW-DOS-64 The device was not found.**

**Explanation:** The driver cannot find any PCnet device in the server.

**Action:** Verify that the Ethernet enable jumper is set to the default (enable) position. Go to "Running the Ethernet Diagnostics" on page 140 to run the diagnostic utility.

---

**PCNTNW-DOS-65 Device not found at IOADDRESS.**

**Explanation:** The device was not found at the IO address specified in the NET.CFG file. The driver cannot find an Ethernet controller in the server.

**Action:** Verify that the IO address in the NET.CFG file matches with the with the board. Otherwise, remove the PORT keyword from the NET.CFG file.

---

**PCNTNW-DOS-67 PCI scan specified, device not found.**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Use the BUSTYPE keyword to specify a value of PCI1.
3. If the problem persists, go to "Running the Ethernet Diagnostics" on page 140 to run the Ethernet diagnostics.

---

**PCNTNW-DOS-75 Unsupported bus ID specified.**

**Explanation:** The bus ID number specified in the NET.CFG file is not supported by Novell.

**Action:** Correct the bus ID number in the NET.CFG file.



## Ethernet Controller Messages

---

**PCNTNW-DOS-76 Wrong bus ID specified.**

**Explanation:** The bus ID number specified in the NET.CFG file is different from the bus type found in the server.

**Action:** Correct the bus ID number in the NET.CFG.

---

**PCNTNW-DOS-80 The DMA parameter is not necessary for PCI device.**

**Explanation:** The board does not require a DMA setting.

**Action:** Edit the NET.CFG file to delete the DMA parameter.

## Novell NetWare OS/2 ODI Driver Messages

This section contains the error messages for the NetWare OS/2 ODI driver. The explanation and recommended action is included with each message.

---

**PCNTNW-OS2-1 The LSL is not loaded.**

**Explanation:** The Link Support Layer module (LSL.SYS) is not loaded.

**Action:** Load LSL.SYS before loading the driver.

---

**PCNTNW-OS2-21 Could not add the MLID Protocol ID.**

**Explanation:** The PCNTNW MLID could not register the specified Protocol ID.

**Action:** Edit the NET.CFG file and correct the protocol information.

---

**PCNTNW-OS2-22 Could not allocate memory. The virtual board did not load.**

**Explanation:** The driver could not allocate memory for the virtual adapter.

**Action:** Check the system configuration.

---

**PCNTNW-OS2-54 The board did not respond to the initialization command.**

**Explanation:** The board initialization failed.

**Action:** Verify that the Ethernet enable jumper is set to the default (enable) position. Go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**PCNTNW-OS2-56 This interrupt is already used and cannot be shared.**

**Explanation:** The interrupt is already used by another device and cannot be shared.

**Action:** Assign a different IRQ in the Configuration/Setup utility programs. See "PCI Bus Control" on page 33 for information on setting the interrupt requests.

## Ethernet Controller Messages

---

**PCNTNW-OS2-58 The board did not respond to the initialization command.**

**Explanation:** The IRQ setting might be incorrect with the hardware setting, or the EEPROM might be corrupted.

**Action:** Verify that the IRQ settings in the NET.CFG file match the configuration settings in the Configuration/Setup utility programs. See “PCI Bus Control” on page 33 for information on setting the interrupt requests. Verify that the EEPROM on the system board is programmed correctly.

---

**PCNTNW-OS2-61 PCI device IRQ number mismatch.**

**Explanation:** The IRQ number specified in the NET.CFG file does not match with the IRQ number assigned in the Configuration/Setup utility programs. The IRQ numbers might be assigned automatically, or you might have manually assigned the IRQ number.

**Action:** Remove the IRQ number in the NET.CFG file. Or, see “PCI Bus Control” on page 33 for information on setting the interrupt requests.

---

**PCNTNW-OS2-64 The device was not found.**

**Explanation:** The driver cannot find the Ethernet controller in the server.

**Action:** Verify that the Ethernet enable jumper is set to the default (enable) position. Go to “About the Test Programs” on page 129 to run the diagnostic utility.

---

**PCNTNW-OS2-65 Device not found at IOADDRESS.**

**Explanation:** The Ethernet controller cannot be found at the IO address specified in the NET.CFG file.

**Action:** Verify that the IO address in NET.CFG matches with the board. Otherwise, remove the PORT keyword from the NET.CFG file.

---

**PCNTNW-OS2-67 PCI scan specified, device not found.**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Perform the following steps:

1. Verify that the Ethernet jumper on the system board is set to the default, enable position.
2. Edit the NET.CFG file to change the BUSTYPE keyword to PCI1.
3. If the problem persists, go to “About the Test Programs” on page 129 to run the diagnostic utility.

---

**PCNTNW-OS2-73 Unable to allocate memory.**

**Explanation:** The driver could not allocate memory for the virtual board.

**Action:** Check the system configuration.

## Ethernet Controller Messages

---

**PCNTNW-OS2-80 The DMA parameter is not necessary to PCI device.**

**Explanation:** The Ethernet controller does not require a DMA setting. This parameter is not a valid driver parameter. The PCI system BIOS automatically sets the DMA channel number.

**Action:** Edit the NET.CFG file to delete the DMA parameter.

## NDIS 2.01 Driver Messages

This section contains the error messages for the NDIS 2.01 drivers. The explanation and recommended action are included with each message.

---

**PCNTND-DOS-1 Unable to open the Protocol Manager.**

**Explanation:** The NDIS stack is not configured properly.

**Action:** Check and correct your configuration.

---

**PCNTND-DOS-6 Out of memory while allocating buffers.**

**Explanation:** The driver could not allocate the requested buffers.

**Action:** Check your system configuration. Edit the PROTOCOL.INI file to reduce the number of Txbuffers and Rxbuffers specified for the driver.

---

**PCNTND-DOS-7 Protocol Manager device error.**

**Explanation:** The NDIS stack is not configured properly.

**Action:** Check and correct your configuration.

---

**PCNTND-DOS-8 Bad status for Protocol Manager.**

**Explanation:** The NDIS stack is not configured correctly.

**Action:** Check and correct your configuration.

---

**PCNTND-DOS-9 Cannot find PROTOCOL.INI entry.**

**Explanation:** The NDIS stack is not configured properly in the PROTOCOL.INI file.

**Action:** Check and correct your configuration.

---

**PCNTND-DOS-10 The Protocol Manager ioctl failed.**

**Explanation:** The NDIS stack is not configured properly in the PROTOCOL.INI file.

**Action:** Check and correct your configuration.

## Ethernet Controller Messages

---

**PCNTND-DOS-11 Protocol Manager registration failed.**

**Explanation:** The NDIS stack is not configured properly.

**Action:** Check and correct your configuration.

---

**PCNTND-DOS-15 Device not found.**

**Explanation:** The driver cannot find an Ethernet controller in the server.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
  2. If the problem persists, go to “About the Test Programs” on page 129 to run the diagnostic utility.
  3. Call for service.
- 

**PCNTND-DOS-16 PCI scan specified, device not found.**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
  2. If the problem persists, go to “About the Test Programs” on page 129 to run the diagnostic utility.
  3. Call for service.
- 

**PCNTND-DOS-21 Board failed checksum test. Please run configuration utility.**

**Explanation:** The driver cannot find an Ethernet controller.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
  2. If the problem persists, go to “About the Test Programs” on page 129 to run the diagnostic utility.
- 

**PCNTND-DOS-23 WARNING: PCNET IRQ found =**

**Explanation:** The IRQ setting in PROTOCOL.INI does not match the hardware IRQ setting.

**Action:** Remove the IRQ setting from PROTOCOL.INI (or match the IRQ setting in PROTOCOL.INI with the configuration settings in the Configuration/Setup utility programs. See “PCI Bus Control” on page 33 for information on setting the interrupt requests.)

## Ethernet Controller Messages

---

**PCNTNW-DOS-24 WARNING: PCNET IRQ doesn't match protocol.ini.**

**Explanation:** The IRQ setting in PROTOCOL.INI does not match the hardware IRQ setting.

**Action:** Remove the IRQ setting from PROTOCOL.INI or match the IRQ setting in PROTOCOL.INI with the hardware jumper setting.

---

**PCNTNW-DOS-25 PCI scan specified, PCI bus not found!**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**PCNTNW-DOS-29 WARNING: DMA number is not necessary for PCI device.**

**Explanation:** The Ethernet controller does not require a DMA setting.

**Action:** Remove the DMA setting in PROTOCOL.INI.

---

**PCNTNW-DOS-32 IRQ number is already in use by another PCNET device.**

**Explanation:** The specified IRQ number is already in use by another Ethernet controller or device.

**Action:** Modify the IRQ setting in the PROTOCOL.INI file, or modify the IRQ settings in the Configuration/Setup utility programs. See "PCI Bus Control" on page 33 for information on setting the interrupt requests in the Configuration/Setup utility programs.

---

**PCNTNW-DOS-33 PCNET device with specified IOBASE is already in use.**

**Explanation:** The specified IO address number is already in use by another Ethernet controller or device.

**Action:** Modify the IO address setting on the hardware, or modify the IO address setting in the PROTOCOL.INI file.

## Ethernet Controller Messages

### NDIS 3.0 Driver Messages

Windows NT error messages are logged into a log file. You can view the file with the Event Viewer. Error messages appear with the “PCNTN3” prefix followed by a “Missing Configuration Parameter” message and several hex numbers. The hex numbers must be converted to decimal values so that they correspond to the error numbers used in this manual.

---

**PCNTN3-9 IO base address is already in use by another PCNET device.**

**Explanation:** The specified IO address number is already in use by another device.

**Action:** Modify the IO address setting on the hardware or modify the IO Address setting in the setup dialog box.

---

**PCNTN3-13 IRQ and/or DMA number is already in use by another device.**

**Explanation:** The specified IRQ is specified by another device.

**Action:** Modify the IRQ setting in the setup dialog box.

---

**PCNTN3-18 PCI scan specified, device not found.**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default **Enable** position.
2. If the problem persists, go to “About the Test Programs” on page 129 to run the diagnostic utility.

---

**PCNTN3-19 LanceOpenAdapter failed.**

**Explanation:** The configuration is set up incorrectly.

**Action:** Rerun the setup program.

---

**PCNTN3-20 Device at specified IO base address not found.**

**Explanation:** The Ethernet controller cannot be found at the specified IO address.

**Action:** Verify that the IO address matches with the board. Otherwise, remove the IO Address specification from the setup.

## Ethernet Controller Messages

---

### PCNTN3-21 Device not found.

**Explanation:** The driver cannot find any PCnet device.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default **Enable** position.
2. Go to “About the Test Programs” on page 129 to run the diagnostic utility.

## Packet Driver Messages

This section contains the error messages for the packet driver. The explanation and recommended action are included with each message.

---

### PCNTPK-DOS-1 The command syntax is PCNTPK [-n] [-d] [-w]

```
<INT=packet_int_no>  
[IRQ=int_no] [IOADDR=io_addr] [DMA=dma_no] [BUSTYPE=bus]  
[DMAROTATE] [TP] [LED0=xx] [BUSTYPE=bus] [LED0=xx]  
[LED2=xx] [LED3=xx]
```

**Explanation:** The driver command was not entered correctly.

**Action:** If you entered the command from the command line, enter the command with the correct syntax. If the command is in the AUTOEXEC.NET file, edit the file to correct the syntax. The only parameters that should be included are PCNTPK and BUSTYPE=PCI1.

---

### PCNTPK-DOS-2 Unable to reset the PCnet device.

**Explanation:** The software could not reset the Ethernet controller.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to “About the Test Programs” on page 129 to run the diagnostic utility.

---

### PCNTPK-DOS-3 Unable to initialize the PCnet device.

**Explanation:** The software could not initialize the Ethernet controller.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Check the interrupt settings in the Configuration/Setup utility programs. For more information, go to “PCI Bus Control” on page 33.
3. If the problem persists, go to “About the Test Programs” on page 129 to run the diagnostic utility.

## Ethernet Controller Messages

---

**PCNTPK-DOS-5 There is already a packet driver at xxxx.**

**Explanation:** The driver is already loaded at this memory location. It cannot be loaded a second time at the same location.

**Action:** Do not load the driver again. If you want to load the driver at a different memory location, specify another software interrupt address on the INT parameter.

---

**PCNTPK-DOS-6 <IRQ=int\_no> should be between 0 and 15 inclusive.**

**Explanation:** The specified IRQ is out of range for the Ethernet controller.

**Action:** Use valid IRQ values.

---

**PCNTPK-DOS-7 Packet driver failed to initialize the board.**

**Explanation:** The board initialization failed.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**PCNTPK-DOS-8 <INT=packet\_int\_no> should be in the range 0x60 to 0x80.**

**Explanation:** The specified software interrupt number is out of the allowable range.

**Action:** Specify a valid value for the INT parameter.

---

**PCNTPK-DOS-12 PCI device IRQ number mismatch.**

**Explanation:** The specified IRQ number does not match with the IRQ number assigned by the PCI BIOS.

**Action:** Remove the IRQ setting.

---

**PCNTPK-15 The device was not found.**

**Explanation:** The driver cannot find an Ethernet controller.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to "About the Test Programs" on page 129 to run the diagnostic utility.



## Ethernet Controller Messages

---

**PCNTPK-DOS-18 PCI scan specified, device not found.**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**Packet driver is at segment xxxx.**

**Explanation:** The memory address where the packet driver is loaded is xxxx.

**Action:** None.

---

**Packet interrupt number xxxx.**

**Explanation:** The interrupt number used by the packet driver is xxxx.

**Action:** None.

---

**My Ethernet address is xxxxxxxxxxxx.**

**Explanation:** The Ethernet address of this station is xxxxxxxxxxxx.

**Action:** None.

---

**My ARCnet address is xxxx.**

**Explanation:** The ARCnet address of this station is xxxx.

**Action:** None.

## UNIX Messages

This section contains the error messages for the following UNIX drivers.

- SCO UNIX LLI
- UnixWare DPLI
- SunSoft Solaris

## Ethernet Controller Messages

---

**pnt0-2      PCI search specified, PCI device not found!**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Perform the following steps:

1. Run netconfig to search for another Ethernet controller.
2. Verify that the Ethernet enable jumper is set to the default (enable) position.
3. If the problem persists, go to “About the Test Programs” on page 129 to run the diagnostic utility.

---

**pnt0-6      Cannot allocate memory for the adapter during an interrupt. Please check your Streams parameters.**

**Explanation:** The system is out of Streams memory blocks.

**Action:** Use the CRASH utility to increase the number of Streams memory blocks for the failing size. another Ethernet controller.

**Action:** Modify the IRQ settings in the Configuration/Setup utility programs, or run netconfig to match the hardware settings.

---

**pntO-6      Cannot allocate memory for the adapter during an interrupt! Please check your Streams parameters.**

**Explanation:** On a SunSoft Solaris system, this message indicates that the system is out of Streams memory blocks.

**Action:** Use the CRASH utility to increase the number of Streams memory blocks for the failing size.

---

**pnt0-7      Cannot allocate memory for the adapter during reset! Please check your Streams parameters.**

**Explanation:** The system is out of Streams memory blocks.

**Action:** Use the CRASH utility to increase the number of Streams memory blocks for the failing size.

---

**pnt0-11      device not found!**

**Explanation:** The driver cannot find an Ethernet controller.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Go to “About the Test Programs” on page 129 to run the diagnostic utility.

## Ethernet Controller Messages

---

**pnt0-12 device failed checksum test!**

**Explanation:** The driver cannot find an Ethernet controller.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**pnt0-13 add\_intr\_handler failed! Interrupts already enabled.**

**Explanation:** The IRQ specified or found conflicts with other devices in the system.

**Action:** Perform the following steps:

1. Modify your hardware settings.
2. Run netconfig to match the hardware settings.

---

**pnt0-14 Cannot locate hardware.**

**Explanation:** The SunSoft Solaris driver cannot find any Ethernet controller.

**Action:** Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**pntO-15 No more devices to open.**

**Explanation:** The SunSoft Solaris driver cannot find any more Ethernet controllers.

**Action:** Perform the following steps:

1. Verify that additional IBM PCI Ethernet adapters are present or replace the Ethernet adapter that fails to respond.
2. Go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**pntO-17 Device fault... Reset initiated!**

**Explanation:** The SunSoft Solaris driver has been reset due to device fault.

**Action:** Perform the following steps:

1. Verify that additional IBM PCI Ethernet adapters are present or replace the PCnet card that fails to respond.
2. Go to "About the Test Programs" on page 129 to run the diagnostic utility.

---

**pntO-19 IRQ found for PCnet hardware does not match space.c!**

**Explanation:** This is a warning message referring to the IRQ found in the system.

**Action:** Ignore this message if you are sure that this is what you want to do. Otherwise, run netconfig to match the hardware settings.

## Ethernet Controller Messages

---

**pnt0-19      IRQ found for PCnet hardware does not match pnt.conf!**

**Explanation:** This is a warning message referring to the IRQ that the SunSoft Solaris driver found in the system.

**Action:** Ignore this message if you are sure that this is what you want to do. Otherwise, run netconfig to match the hardware settings.

---

**pnt0-20      add\_intr\_handler failed! Unknown interrupt type.**

**Explanation:** The IRQ specified or found conflicts with other devices in the system.

**Action:** Perform the following steps:

1. Modify your hardware settings.
  2. Run netconfig to search for another Ethernet controller.
- 

**pnt0-21      add\_intr\_handler failed! Out of range interrupt number.**

**Explanation:** The IRQ specified or found conflicts with other devices in the system.

**Action:** Perform the following steps:

1. Modify your hardware settings.
  2. Run netconfig to search for another Ethernet controller.
- 

**pnt0-22      add\_intr\_handler failed! Out of range IPL.**

**Explanation:** The IRQ specified or found conflicts with other devices in the system.

**Action:** Perform the following steps:

1. Modify your hardware settings.
  2. Run netconfig to search for another Ethernet controller.
- 

**pnt0-23      add\_intr\_handler failed! Vector already occupied.**

**Explanation:** The IRQ specified or found conflicts with other devices in the system.

**Action:** Perform the following steps:

1. Modify your hardware settings.
  2. Run netconfig to search for another Ethernet controller.
- 

**pnt0-24      add\_intr\_handler failed! Vector already shared at different IPL.**

**Explanation:** The IRQ specified or found conflicts with other devices in the system.

**Action:** Perform the following steps:

1. Modify your hardware settings.
2. Run netconfig to search for another Ethernet controller.

## Ethernet Controller Messages

---

**pnt0-26**     **The DMA number is not necessary for PCI device.**

**Explanation:** The IBM PCI Ethernet adapter does not require a DMA setting.

**Action:** Edit the SPACE.C file to delete the DMA parameter.

---

**pnt0-29**     **The IRQ number is already in use by another**

**Explanation:** The IBM PCI Ethernet adapter

**Explanation:** The specified IO address is already in use by

---

**pnt0-31**     **IO address is not necessary for the PCI device.**

**Explanation:** The I/O address specified is not required.

**Action:** Remove the assigned IO address specified for the Ethernet controller.

# Troubleshooting

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

## Troubleshooting Charts

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

---

<b>CD-ROM Drive Problems</b>	<b>Action</b>
The CD is not working properly.	Clean the CD by wiping it with a soft, lint-free cloth, from the center of the CD to the outer edge. Do not clean in a circular pattern. This can cause loss of data.  If this does not correct the problem, clean the optical-head lens. Discs for cleaning the lens are available from your place of purchase.  If a problem still exists, have the system serviced.
CD-ROM drive tray not working	The system must be turned on. If the system is on and the tray does not eject, insert the end of a paper clip into the manual tray-release opening. If the drive still does not work correctly, have the system serviced.
CD-ROM Drive Not Recognized	Use SCSISelect to verify the SCSI ID of the CD-ROM drive (see "SCSISelect Utility Program Options" on page 47 for information on the SCSISelect utility program).

---

## Troubleshooting

---

<b>Diskette Drive Problems</b>	<b>Action</b>
Diskette drive in-use light stays on, or the system bypasses the diskette drive.	<p>If there is a diskette in the drive, verify that:</p> <ol style="list-style-type: none"><li>1. The diskette drive is enabled in the Configuration/Setup utility programs.</li><li>2. The diskette is good and not damaged. (Try another diskette if you have one.)</li><li>3. The diskette is inserted correctly in the drive.</li><li>4. The diskette contains the necessary files to start the system.</li><li>5. Your software program is OK (see <b>Software Problem</b> at the end of these troubleshooting charts).</li></ol> <p>If the diskette drive in-use light stays on, or the system continues to bypass the diskette drive, have the system serviced.</p>

---

<b>Monitor Self-Tests</b>	<b>Action</b>
	<p>Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, refer to the information supplied with the monitor for adjusting and testing instructions.</p> <p>If you still cannot find the problem, have the monitor and system serviced.</p>

---

<b>Monitor Problems</b>	<b>Action</b>
Screen flickers.	<p>Set the monitor for the highest, noninterlaced refresh rate available.</p> <p>To reset the refresh rate, use a utility program, such as AnyView Professional or WinMode.</p>
The monitor works when you turn on the system, but goes blank when you start some application programs.	<p>Verify that the primary monitor cable is connected to the video port.</p> <p>To find the video port, see "Input/Output Connectors" on page 8.</p> <p>Be sure you installed the necessary drivers for the applications.</p>

---

## Troubleshooting

<b>Monitor Problems</b>	<b>Action</b>
Wavy, unreadable, rolling, distorted screen, or screen jitter.	<p>If the monitor self-tests show the monitor is OK, 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 the monitor on.</p> <p><i>Note:</i></p> <ol style="list-style-type: none"><li>1. The distance between monitors and diskette drives should be at least 76 mm (3 in.) to prevent diskette drive read/write errors.</li><li>2. Non-IBM monitor cables might cause unpredictable problems.</li><li>3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. See your IBM reseller or IBM marketing representative for information about the enhanced monitor cable.</li></ol> <p>If the problem recurs, have the monitor and system serviced.</p>
Blank screen	<p>Verify that:</p> <ol style="list-style-type: none"><li>1. The system power cord is plugged into the system and a working electrical outlet.</li><li>2. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly.</li><li>3. The monitor signal cable is connected to the correct connector on the system.</li></ol> <p>If the items above are correct and the screen remains blank, have the system serviced.</p>
Only the cursor appears.	Have the system serviced.
Wrong characters appear on the screen.	Have the system serviced.
<b>General Problems</b>	<b>Action</b>
Problems such as broken cover locks or indicator lights not working.	Have the system serviced.



## Troubleshooting

<b>General Problems</b>	<b>Action</b>
The server does not power on.	Verify that: <ol style="list-style-type: none"><li>1. The power cables are properly connected to the server.</li><li>2. The power outlet functions properly.</li><li>3. 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.</li><li>4. The type of memory installed is correct.</li></ol>
<b>Intermittent Problems</b>	<b>Action</b>
A problem occurs only occasionally and is difficult to detect.	Verify that: <ol style="list-style-type: none"><li>1. All cables and cords are connected securely to the rear of the system and attached options.</li><li>2. When the system is turned on, air is flowing from the rear of the system at the fan grill. If there is no air flow, the fan is not working. This causes the system to overheat and shut down.</li><li>3. The last external device in each SCSI chain is terminated correctly. (See your SCSI documentation.)</li></ol> <p>If the items above are correct, have the system serviced.</p>
<b>Microprocessor Problems</b>	<b>Action</b>
The server emits a continuous, 1 KHz tone during POST.	The startup (boot) microprocessor is not working properly. If your server contains two microprocessors, the microprocessor in the secondary microprocessor socket is the boot microprocessor. Restart the server. If the problem recurs, perform the following steps: <ol style="list-style-type: none"><li>1. Verify that the boot microprocessor is seated properly.</li><li>2. If your server contains two microprocessors, remove the boot microprocessor and restart the server. If the server starts properly, replace the old boot microprocessor</li><li>3. Replace the boot microprocessor. Restart the server.</li></ol> <p>If the problem recurs, have the system serviced.</p>

## Troubleshooting

---

<b>Keyboard, Mouse, or Pointing-Device Problems</b>	<b>Action</b>
All or some keys on the keyboard do not work.	<ol style="list-style-type: none"><li>1. Make sure the keyboard cable is properly connected to the system.</li><li>2. Make sure the system and the monitor are turned on.</li></ol> <p>If the items above are correct, have the system serviced.</p>
The mouse or pointing device does not work.	<p>Verify that the mouse or pointing-device cable is securely connected and the device drivers are installed correctly.</p> <p>If the problem recurs, have the server and the device serviced.</p>

---

<b>Memory Problems</b>	<b>Action</b>
The amount of memory displayed is less than the amount of memory installed.	<p>Verify that:</p> <ol style="list-style-type: none"><li>1. The memory-module kits are seated properly.</li><li>2. You have installed the correct type of memory (see "Working with Memory-Module Kits" on page 70).</li><li>3. If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program.</li></ol> <p>If the above items are correct, run the memory test program from the System Board Diagnostic Diskette. The system might have detected a bad memory module and automatically reallocated memory to enable you to continue to operate. If the memory tests fail, have the system serviced.</p>

---

## Troubleshooting

<b>Option Problems</b>	<b>Action</b>
An IBM option that used to work does not work now.	<p>Verify that all of the option hardware and cable connections are secure.</p> <p>If the option comes with its own test instructions, use those instructions to test the option.</p> <p>If the items above are correct and the test programs found no problem, have the server and option serviced.</p> <p>If the failing option is a SCSI option, verify that:</p> <ol style="list-style-type: none"><li>1. The cables for all external SCSI options are connected correctly.</li><li>2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly.</li><li>3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the system.</li></ol> <p>For more information, see your SCSI documentation.</p> <p>If the problem recurs, have the system serviced.</p>
An IBM option that was just installed does not work.	<p>Verify that:</p> <ol style="list-style-type: none"><li>1. The option is designed for the system.</li><li>2. You followed the installation instructions supplied with the option.</li><li>3. The option is installed correctly.</li><li>4. You have not loosened any other installed options or cables.</li><li>5. You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration.</li></ol>
<b>Parallel Port Problems</b>	<b>Action</b>
The number of parallel ports displayed is less than the number of parallel ports installed.	<p>Verify that:</p> <ol style="list-style-type: none"><li>1. Each port is assigned a unique address.</li><li>2. The parallel-port adapter, if you installed one, is seated properly.</li></ol> <p>If the items above are correct, have the system serviced.</p>

## Troubleshooting

<b>Serial Port Problems</b>	<b>Action</b>
The number of serial ports displayed is less than the number of serial ports installed.	Verify that: <ol style="list-style-type: none"><li>1. Each port is assigned a unique address.</li><li>2. The serial-port adapter, if you installed one, is seated properly.</li></ol> If the items above are correct, have the system serviced.
A serial device does not work.	Verify that: <ol style="list-style-type: none"><li>1. The serial port is enabled and is assigned a unique address.</li><li>2. If the serial device is connected to serial port B, the infrared port is set to <b>Disabled</b>.</li></ol>
<b>Infrared Port Problems</b>	<b>Action</b>
An infrared device does not work.	Verify that: <ol style="list-style-type: none"><li>1. No serial device is assigned to serial port B.</li><li>2. The infrared port is enabled and is assigned a unique address.</li><li>3. The infrared transceiver is properly installed.</li><li>4. The infrared device drivers have been properly installed.</li><li>5. Nothing is blocking the infrared transceiver.</li></ol> If the items above are correct, have the system serviced.
<b>Printer Problems</b>	<b>Action</b>
The printer does not work.	Verify that: <ol style="list-style-type: none"><li>1. The printer is turned on and is online.</li><li>2. The printer signal cable is connected to the correct serial or parallel-port on the system. (For the location of the serial or parallel port, see "Input/Output Connectors" on page 8.)</li></ol> <p><i>Note:</i> Non-IBM printer cables might cause unpredictable problems.</p> <ol style="list-style-type: none"><li>3. You have assigned the printer port correctly in your operating system or application program.</li><li>4. You have assigned the printer port correctly using the Configuration/Setup utility programs.</li></ol> If the items above are correct and the printer still does not work, run the tests described in the documentation that comes with your printer. If the tests show the printer is OK, have the system serviced.

## Troubleshooting

---

Software Problem	Action
Is your software program OK?	<p>To determine if problems are caused by the software, verify that:</p> <ol style="list-style-type: none"><li>1. Your system has the minimum memory requirements needed to use the software. Refer to the information that comes with the software to verify memory requirements.</li></ol> <p><i>Note:</i> If you have just installed an adapter or memory, you might have a memory address conflict.</p> <ol style="list-style-type: none"><li>2. The software is designed to operate on your system.</li><li>3. Other software works on your system.</li><li>4. The software you are using works on another system.</li></ol> <p>If you received any error messages when using the software program, refer to the information supplied with the software for a description of the messages and solutions to the problem.</p> <p>If the items above are correct and the problem remains, contact your place of purchase or service technician for help.</p>

---

*Note:* If you cannot find the problem in the troubleshooting charts, go to “About the Test Programs” on page 129 to test the system. If you already have run the test program, or if running the test does not reveal the problem, have the system serviced.

## Troubleshooting Other Network Adapters

### Troubleshooting Other Network Adapters

This section provides general troubleshooting information for problems that might occur when a network adapter is installed in the server. For more specific details about troubleshooting your network adapter, see your network-adapter documentation.

If the network adapter cannot connect to the network, or if the network adapter contains LEDs that do not work, check the following:

- Make sure that:
  - You installed the latest revision levels of the device drivers that came with the network adapter, as described in your operating-system documentation.
  - The network adapter is seated firmly in the connector (see “Installing Adapters” on page 63).
  - You installed the correct network cable. (If you need information about selecting the correct cable, contact your IBM marketing representative or your IBM reseller.)
  - The network cable is securely attached at all connections. If the cable is attached correctly but the problem persists, try a different cable.
- Check for operating-system-specific causes for the problem. Refer to your operating-system documentation and your network-adapter documentation.
- Test the network adapter. The adapter test requirements depend on which operating system you are using. Refer to your operating-system documentation and your network-adapter documentation for details.
- If the network adapter fails during testing, remove it and install another network adapter as described in “Installing Adapters” on page 63.

### *Network Adapter Troubleshooting Chart*

You can use the following troubleshooting chart to find solutions to network-adapter problems that have definite symptoms.

<b>Adapter Problem</b>	<b>Action</b>
The Setup program reports the network adapter's interrupt as "0" or "255."	The PCI BIOS is not configuring the network adapter correctly.
The Setup program reports "No PCI Bus."	The PCI BIOS is not configuring the network adapter correctly.
The server stops running when loading device drivers.	Change the PCI BIOS interrupt settings.
Data is corrupted or sporadic.	Make sure that you are using the correct types of cables.
The network adapter stopped working when another adapter was added to the server.	Check the following: <ul style="list-style-type: none"><li>• Make sure that the network cable is connected to the network adapter.</li><li>• Make sure that your PCI system BIOS is current.</li><li>• Reseat the network adapter (see "Installing Adapters" on page 63).</li></ul>
The network adapter stopped working without apparent cause.	Check the following: <ul style="list-style-type: none"><li>• Reseat the network adapter or try a different connector.</li><li>• Reinstall the device drivers (see your operating-system documentation and your network-adapter documentation).</li><li>• Use a different network adapter (see "Installing Adapters" on page 63).</li></ul>

## Beep Codes

One beep and the appearance of text on the monitor indicates successful completion of POST. More than one beep indicates that POST detects an error.

Beep codes are sounded in a series of two or three sets of beeps. The duration of each beep is constant, but the length of the pause between the beeps varies. For example, a 1-2-4 beep code sounds like one beep, a pause, two consecutive beeps, another pause, and four more consecutive beeps.

## Beep Codes

It is possible to misinterpret a beep code if you do not understand exactly how they work. Keeping in mind that POST-error beep codes vary in the length of the pause, and not the duration of the beep tones, will help you to distinguish the beeps.

### *Beep Code Chart*

Beep Code	Description
1-1-2	Microprocessor register test is in progress
1-1-3	CMOS write/read test is in progress or has failed
1-1-4	BIOS ROM checksum is in progress or has failed
1-2-1	Programmable Interval Timer test is in progress or has failed
1-2-2	DMA initialization is in progress or has failed
1-2-3	DMA page register write/read test is in progress or has failed
2-1-1	Secondary DMA register test is in progress or has failed
2-1-2	Primary DMA register test is in-progress or has failed
2-1-3	Primary interrupt mask register test has failed
2-1-4	Secondary interrupt mask register test is in progress or has failed
2-2-1	Interrupt vector loading is in progress
2-2-2	Keyboard controller test is in progress or has failed
2-2-3	CMOS power failure and checksum checks are in progress
2-2-4	CMOS configuration information validation is in progress
2-3-1	Screen initialization is in progress or has failed
2-3-2	Screen memory test is in progress or has failed
2-3-3	Screen retrace tests are in progress or have failed
2-3-4	Search for video ROM is in progress
2-4-1	Screen believed operable
3-1-1	Timer tick interrupt test is in progress or has failed
3-1-2	Interval timer channel 2 test is in progress or has failed
3-1-3	RAM test is in progress or has failed above address hex 0FFFF
3-1-4	Time-of-Day clock test is in progress or has failed
3-2-1	Serial port test is in progress or has failed
3-2-2	Parallel port test is in progress or has failed
3-2-3	Math Coprocessor test is in progress or has failed
3-2-4	Comparison of CMOS memory size against actual is in progress
3-3-1	Memory size mismatch occurred
	<i>Action:</i> Have the system serviced.
1-2-4	RAM refresh verification is in progress or has failed
1-3-1	First 64 KB RAM test is in progress
1-3-2	First 64 KB RAM parity test is in progress or has failed
	<i>Action:</i> Reseat the memory module kits. If the problem recurs, have the system serviced.



## Beep Codes

Beep Code	Description
Continuous tone	Boot microprocessor has failed. <i>Action:</i> Replace the boot microprocessor. If you installed a microprocessor in the secondary microprocessor socket, it became the boot microprocessor. Replace the boot microprocessor and restart the server. If the continuous tone recurs, call for service.

The following list contains more detailed descriptions of the possible types of beeps that your server might emit.

### *Beep Descriptions*

#### **Beep Type    Meaning**

##### **No Beeps**

If no beeps occur after your server successfully completes POST, your server might contain a defective system board, a defective speaker, or a disconnected speaker.

##### **One Short Beep**

If this occurs after your server successfully completes POST, then POST has no configuration or functional errors to report. One beep also occurs if you enter an incorrect power-on password.

##### **Two Short Beeps**

This beep combination indicates that POST encountered an error.

##### **Three Short Beeps**

This beep combination indicates a system memory error. This combination occurs only if the video BIOS cannot display the error code.

##### **Continuous Beep**

This beep type indicates that your server system board or speaker subsystem might contain a failing component.

## Beep Codes

### **Repeating Short Beeps**

This beep combination indicates that your server system board might contain a failing component, your keyboard might be defective, or a key on the keyboard might be stuck.

### **One Long and One Short Beep**

This beep combination indicates that POST encountered an error on a video adapter.

### **One Long and Two Short Beeps**

This beep combination indicates that a video I/O adapter ROM is not readable, or the video subsystem is defective. If you hear this beep combination twice, both the server system board and an optional video adapter have failed. This beep combination might also indicate that your server system board contains a failing component.

### **One Long and Three Short Beeps**

This beep combination indicates that 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 recurs, have the system serviced.

### **Two Long and Two Short Beeps**

This beep combination indicates that POST does not support the system board video subsystem. This beep combination occurs when the video subsystem is upgraded or replaced with another that is incompatible with your server.

## Checking the System for Damage

This section provides instructions on what to do if your system might be damaged.

### After Dropping It

Look for loose cables and obvious damage. If any cables are loose, reconnect them securely. If there is obvious damage to the system, have it serviced.

If you see no damage, turn on the system. If it works correctly, the system probably did not suffer any damage.



#### **CAUTION:**

**Observe all safety and electrostatic precautions listed in this book to avoid personal injury or damage to your system.**

If the system does not work correctly, turn it off and check the adapters and memory modules to ensure that they are connected correctly. Go to “Electrical Safety” on page 53 and follow the instructions for opening your system; then reseal all adapters and memory modules.

If the system still does not work correctly, use the diagnostic program and test the system. Refer to “About the Test Programs” on page 129 for instructions.

## Checking the System for Damage

### After Spilling Liquid on It

If liquid gets on the keyboard:

1. Turn off the system.
2. Unplug the keyboard from the back of the system.
3. Turn the keyboard upside down to drain excess liquid.
4. Dry off the keyboard with a lint-free cloth.

After the keyboard is completely dry, plug it in and turn on the system. If it does not work correctly, have the keyboard serviced.

If liquid gets inside the monitor:

1. Turn off the monitor.
2. Turn off the system.
3. Unplug the monitor from the system and the electrical outlet.
4. Have the monitor serviced immediately.

If liquid gets inside the system:

1. Turn off the system and all attached devices.
2. Unplug the system from the electrical outlet and all attached devices.
3. Have the system serviced immediately.

### Installing Additional Test Programs

You can add other test programs to the PC Server Diagnostic Diskette. These other programs are usually provided on the diskette that comes with a device. After you add the programs to the PC Server Diagnostic Diskette, you can include information from the programs in the Test Log.

Before the test programs can find these programs to run as the User Diags test group, information about them must be included in a file called USERDIAG.CFG. This is an ASCII text file. It must include the following three items for each test to run:

- Program Name (.COM and .EXE files only)
- Test Description of the test to be run
- Command-line parameters to be passed to the program identified in the first item of this list

The PC Server Diagnostic Diskette includes a sample file called SAMPLE.CFG.

The user diagnostic tests must generate the following return codes upon completion so that the test results register properly in the test log:

- |                     |                   |
|---------------------|-------------------|
| <b>0</b>            | The test passed.  |
| <b>1</b>            | The test failed.  |
| <b>2 or greater</b> | The test aborted. |

Abort messages from the user diagnostic test program also report the ABORT return code.

*Notes:*

1. All of the information for a given test must be on a single line, and a semicolon (;) must separate the items on the line.
2. Make sure you press Enter at the end of each line of text in the USERDIAG.CFG file. This creates a carriage return line feed (CR LF), which is necessary for the User Diagnostics to be found and run.

## Installing Additional Test Programs

3. If the executable program file is in a directory other than the QA directory (or other directory you have designated to contain the QA files), that directory must be listed in the PATH= section of the AUTOEXEC.BAT.
4. You can use a .CFG file other than USERDIAG.CFG if you use the command line "USRCONFIG=*filename*," when running the diagnostic programs. For example, you might use: QAPLPRO /USRCONFIG=MYTESTS.CFG.

## Installing Additional Test Programs

### *USERDIAG.CFG Example*

An example USERDIAG.CFG file might look like the following:

<b>Program Name</b>	<b>Test Description</b>	<b>Command-Line Parameter</b>
BBSMODEM.EXE;	9600 Baud 5 Line Modem;	5
TEST1.EXE;	Generic 1;	
TEST2.EXE;	Generic 2;	
TESTALL.EXE;	CMD 1;	1
TESTALL.EXE;	CMD 2;	2
TESTALL.EXE;	CMD 3;	3

*Note:* You can have more than one command-line parameter for any given test.

When you view these tests on the Test Group window for the User Diag test group, they appear as follows:

- (◆) 9600 Baud 5 Line Modem
- (◆) Generic 1
- (◆) Generic 2
- (◆) CMD 1
- (◆) CMD 2
- (◆) CMD 3

The diagnostic program automatically assigns a test number to each test. The test numbers start at 201 and continue upward as needed. The numbers follow:

- 202 9600 Baud 5 Line Modem
- 203 Generic 1
- 204 Generic 2
- 205 CMD 1
- 206 CMD 2
- 207 CMD 3

## Using the Utility Programs

### Using the Utility Programs

The PC Server System Board Diagnostic Diskette contains utility programs for formatting diskettes and editing.

#### Formatting Diskettes

To format a diskette within the diagnostic programs, insert a diskette into diskette drive A or B; then, select one of the following options:

**Format A:** high density — 1.44MB

**Format A:** low density — 720 KB

**Format B:** high density — 1.44MB

**Format B:** low density — 720 KB

After selecting one of the above options to format a diskette, follow the instructions that appear on the screen.

#### Using the File Editor

The file editor allows you to modify text files. By modifying files, such as your AUTOEXEC.BAT or CONFIG.SYS files, you can improve the test system's performance and eliminate unnecessary lines of information in those files.

*Note:* Always make a backup copy on a self-starting diskette of the AUTOEXEC.BAT and CONFIG.SYS files *before* making any changes.

The File Editor is an ASCII text editor that uses the following function keys:

<b>Key</b>	<b>Description</b>
<b>Arrows</b>	Use the arrow keys to move the cursor to the place in the text where you want to make changes.
<b>Home</b>	To move the cursor to the start of the current line, press Home once. To move to the beginning of the current screen, press Home twice. To move to the beginning of the file, press Home three times.



## Using the Utility Programs

- End** To move the cursor to the end of the current line, press End once. To move the cursor to the end of the current screen, press End twice. To move to the end of the file, press End three times.
- F2** To be in search mode, press **F2**. You are prompted to enter the search word or words on a reverse highlighted line at the bottom of the File Edit Screen. After typing in the search word, press **Enter**.
- F3** To find the next occurrence of a search word, press **F3**.
- F4** To mark the start of a block of text (if you have not previously marked it), press **F4**. If you previously marked the block of text, pressing this key unmarks the text block.
- F5** To complete the block marking (started with F4), press **F5**. If you did not previously press **F4** to start marking a block of text, F5 is ignored.
- F6** To move an active (marked) block of text, first press **F6** while the cursor is within the active block. Then, move the cursor to the new location where the active block is to be moved, and press **F6** again. If there is no active block of text, F6 is ignored.
- F7** To copy an active (marked) block of text to a new location, move the cursor to the new location and press **F7**. If there is no active block of text, F7 is ignored.
- F8** To delete an active (marked) block of text, move the cursor within the active block and press **F8**. If there is no active text block, F8 is ignored.
- F10** To save all changes and exit from the file, press **F10**.
- Insert** Insert is the default text-editing mode of the File Editor. To toggle between replace and insert modes, press Insert.

To access the File Editor:

1. Select **File Editor** from the Utilities Menu; then press **Enter**.
2. Insert a diskette into drive A or drive B before selecting the file you want to edit; then select the file from the Files Selection box.

## Resolving Configuration Conflicts

3. Press **Enter**.
4. Make your changes.
5. When you are done, press **F10** to update the file with the changes you made, or press **Esc** to quit the editing process without saving the changes.

*Note:* Pressing F1 when inside the File Editor displays all of the keyboard functions available to you while editing.

## Resolving Configuration Conflicts

The Configuration/Setup utility programs configure only the system hardware. They do not consider the requirements of the operating system or the application programs. For these reasons, memory-address configuration conflicts might occur.

## Resolving Memory-Address Conflicts

The Configuration/Setup utility programs might change the memory-address space used by some hardware options. If this happens, the new address might conflict with addresses defined for use through expanded memory specification (EMS). (EMS is used only with DOS.)

If a memory conflict exists, one or more of the following conditions might exist:

- The system cannot load the operating system.
- The system does not work.
- An application program does not operate, or it returns an error.
- Screen messages indicate that a memory-address conflict exists.

You can resolve memory-address conflicts by changing either the software or hardware configuration setup.

## Resolving Configuration Conflicts

### Changing the Software Configuration Setup

The best way to resolve memory-address conflicts is to change the software configuration by changing the addresses that the EMS device driver defined. The SVGA video memory occupies 8 KB (1 KB = 1024 bytes) of space in the hex C0000 to C7FFF EMS memory area. EMS device drivers must use addresses different from those assigned to video read-only memory (ROM). You can use the Configuration/Setup utility program to view or change the current setting for video ROM.

If the SVGA or EMM386 device driver is causing the memory-address conflict, refer to your DOS documentation. For conflicts caused by device drivers supplied with application programs instead of those supplied with DOS, refer to the documentation supplied with the device drivers.

### Changing the Hardware Configuration Setup

An alternative way to resolve memory-address conflicts is to change the address of the conflicting hardware option.

**Resolving Configuration Conflicts**

## Chapter 5. Getting Help, Service, and Information

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

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

### Before You Call for Service

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

Most servers, operating systems, and application programs come with documentation that contains troubleshooting procedures and explanations of error messages. (For troubleshooting and error information about your PC Server 325, see Chapter 4, “Solving Problems” on page 123)

If you suspect a hardware problem, run the diagnostic tests and make a note of any error messages you receive. Then look up the message in Chapter 4, “Solving Problems” on page 123, and take the appropriate action.

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

### Using the HelpWare Support Family

IBM HelpWare is the solution for IBM PC service and support wherever IBM products are sold and serviced. Purchasing an IBM PC hardware product entitles you to standard help and support during the warranty period. If you need additional support and services, HelpWare provides a wide variety of extended services that address almost any need.

## Using the HelpWare Support Family

### Using Electronic Support Services

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

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

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

The IBM PC Company Bulletin Board System (BBS) can be reached 24 hours a day, 7 days a week. Modem speeds of up to 14 400 baud are supported. Long distance telephone charges might apply. To access the PC Company BBS:

- In the U.S., call 1-919-517-0001.
- In Canada:
  - In Halifax, call 902-420-0300.
  - In Montreal, call 514-938-3022.
  - In Toronto, call 905-316-4255 or 416-956-7877.
  - In Vancouver, call 604-664-6461 or 604-664-6464.
  - In Winnipeg, call 204-934-2735.

Commercial online services that contain information about IBM products include:

- CompuServe

Use the following GO words: APTIVA, IBMPS2, ThinkPad, PowerPC, ValuePoint, IBMSVR, or IBMOBI.

## Using the HelpWare Support Family

- PRODIGY  
Use the Jump command; type **IBM** and select **PC Product Support**.
- America Online  
Use the “Go to” keyword **IBM Connect**.

## Using the World Wide Web

On the World Wide Web, the IBM Personal Computers home page has information about IBM Personal Computer products and support. The address for the IBM Personal Computer home page is:

<http://www.pc.ibm.com>

Also available to you is the latest information about product compatibility and configuration. This information is updated as new PC Server products are announced. For a product to be included in the PC Server compatibility list, it must pass a strict set of hardware and operating system compatibility tests. The following is a sample of the information available at <http://www.pc.ibm.com/servers/> on the World Wide Web.

- A listing of products that have been tested for compatibility with IBM PC Servers.
- Certification and compatibility information about Network Operating Systems (NOS) and Operating Systems (OS)\*
- Direct access to device drivers, flash BIOS updates, and other code
- Descriptions of PC Server compatibility and certification tests
- Detailed reports about the performance of PC Servers

## 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 free marketing and technical information on many topics, including hardware, operating

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\* IBM makes no guarantee regarding the compatibility of specific products.

## Using the HelpWare Support Family

systems, and local area networks (LANs). You can call the IBM PC Company 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.

To access the IBM PC Company Automated Fax System, do the following:

- In the U.S., call 1-800-426-3395.
- In Canada, call 1-800-465-3299.

## Getting Help by Telephone

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

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

In addition, you are eligible for PC Server Startup Support for 90 days after installation. This service provides assistance for:

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

Please have the following information ready when you call:

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



## Purchasing Additional HelpWare Services

If possible, be at your server when you call.

These services are available 24 hours a day, 7 days a week.\*

- In the U.S. and Puerto Rico, call 1-800-772-2227.
- In Canada, call 1-800-565-3344.

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

## Getting Help Around the World

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

For more information or to register for International Warranty Service in the U.S. or Canada, call 1-800-497-7426.

## Purchasing Additional HelpWare Services

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

## Network and Server Support Line

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

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

## Purchasing Additional HelpWare Services

This service includes technical support for:

- Installing and configuring client workstations and servers
- Identifying system problems and correcting problems on the client or the server
- Installing and configuring your out-of-warranty IBM computer
- Installing and configuring non-IBM options in IBM computers
- Using IBM operating systems in IBM and non-IBM computers
- Using application programs and games
- Tuning performance
- Installing device drivers remotely
- Using IBM and non-IBM network operating systems
- Interpreting documentation

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

## Ordering Support Line Services

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

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

For more information or to purchase these services:

- In the U.S., call 1-800-772-2227.
- In Canada, call 1-800-465-7999.

## Purchasing Additional HelpWare Services

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

### Warranty and Repair Services

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

Warranty upgrades in the U.S. include:

- Carry-in service to on-site service

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

- On-site service to premium on-site service

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

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

For more information about warranty upgrades and extensions:

- In the U.S., call 1-800-426-7697.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your IBM reseller or IBM marketing representative.

## Ordering Publications

### Ordering Publications

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

- In the U.S., Canada, and Puerto Rico, call 1-800-879-2755.
- In other countries, contact your IBM reseller or IBM marketing representative.

## Appendix A. Jumpers

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Jumpers located on the system board and the processor board help you to customize the way your server operates.

### Changing Jumper Positions

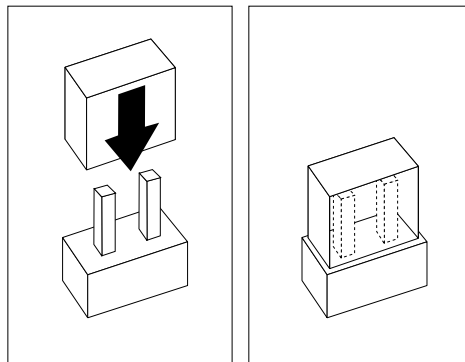
Your system board and processor board contain two-pin and three-pin jumper blocks.

In some cases, groups of two-pin jumpers combine to define a function. For example, the settings of jumpers J1 and J20 together define the clock speed of the microprocessor.

#### Two-Pin Jumper Blocks

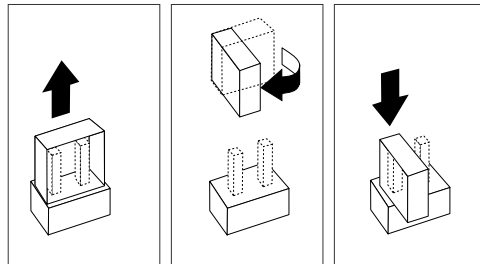
Covering both pins with a jumper defines one function of the jumper block. To change the function of the jumper block, cover one pin only or remove the jumper entirely. To change a jumper's position for a two-pin jumper block:

1. Turn off the server; then disconnect the server power cord.
2. Remove the server cover (see "Preparing to Add Options" on page 55).
3. Do one of the following:
  - Lift the jumper straight off the pin block.
  - Align the holes in the bottom of the jumper with the two pins on the pin block, and then slide the jumper onto these pins.



## Changing Jumper Positions

- Align one of the holes in the bottom of the jumper with one of the pins on the pin block, and then slide the jumper onto that pin only.



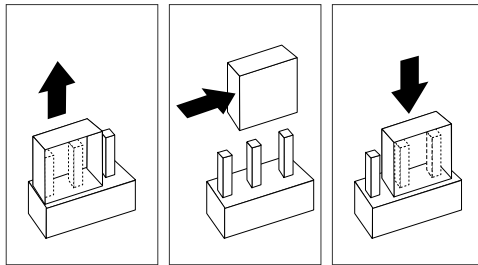
4. Reinstall the server cover and connect the cables (see “Completing the Installation” on page 111 for instructions).

## Changing Jumper Positions

### Three-Pin Jumper Blocks

With the three-pin jumper blocks, each jumper covers two of the three pins on a pin block. You can position the jumper to fit over the center pin and either the pin to the rear or to the front of the center pin (as you face the front of the server). To change a jumper's position for a three-pin jumper block:

1. Turn off the server; then disconnect the server power cord.
2. Remove the server cover.
3. Lift the jumper straight off the pin block.
4. Align the holes in the bottom of the jumper with the center pin and the pin that was not covered previously.

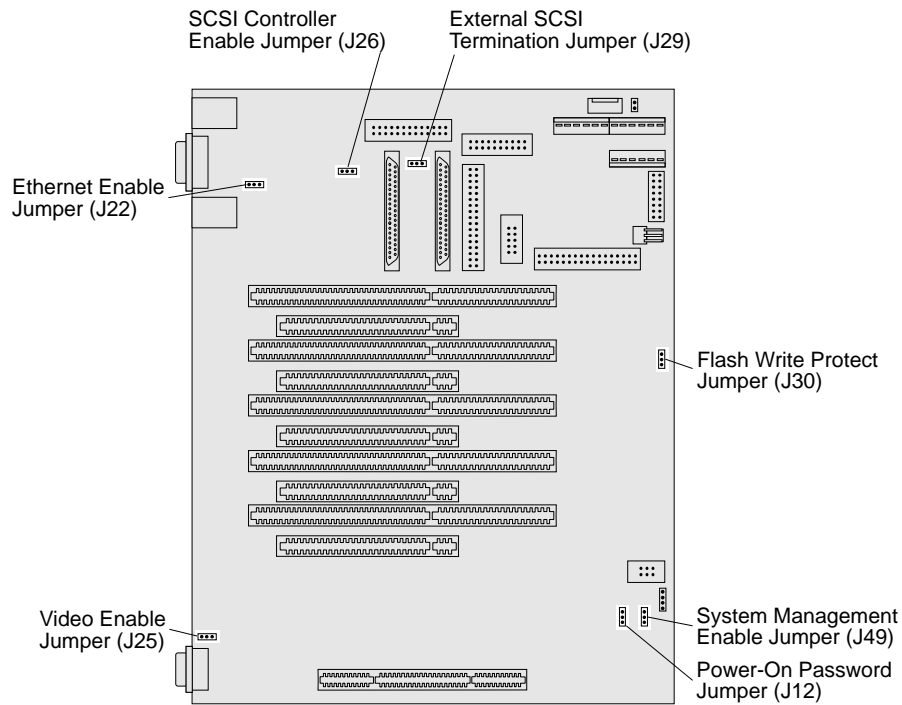


5. Slide the jumper fully onto these pins.
6. Reinstall the server cover and reconnect the cables (see “Completing the Installation” on page 111 for instructions).

## System Board Jumpers

### System Board Jumpers

The following illustration shows the location of each jumper on the system board.











The following table provides the system board jumper identifiers and descriptions of these jumpers.

*Note:* Turn off the server, and disconnect the power cord before moving any jumpers.



## System Board Jumpers

<i>Table 2. System Board Jumpers</i>		
Identifier	Default Jumper Position	Description
J12		Power-on password reset For instructions on resetting the power-on password, see “Bypassing an Unknown Power-on Password” on page 212.
J22		Ethernet enable
J25		Video enable
J26		SCSI controller enable Move the jumper to the disable position if you are not using the SCSI controller on the system board, for example, if you install a SCSI adapter, and plan to connect all drives to it. By disabling the system board SCSI controller, you free system resources.
J29	 	External SCSI termination. Use the default jumper position when you install a 16-bit SCSI external device, or when no external device is attached. Use this jumper position when you install an 8-bit external SCSI device.
J30		Flash update enable jumper The default jumper position enables you to update the flash BIOS on the system board.
J49		When your model supports the System Management Adapter, the LogicLock features are enabled.

## System Board Jumpers

### Bypassing an Unknown Power-on Password

When a power-on password is set, the POST does not complete until you enter the password. If you forget the power-on password, you can regain access to the server in the following ways:

- Enter the administrator password at the power-on prompt. Start the Configuration/Setup utility programs and change the power-on password. See “Using the Power-on Password Menu” on page 31.
- Change the position of the power-on password jumper. When you restart the server, POST proceeds without prompting for the password for this startup only. Start the Configuration/Setup utility programs and set a new power-on password.

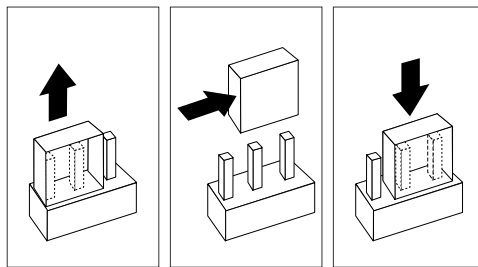
#### Before you begin

- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Turn off the server.
- Disconnect all external cables and power cords, and then remove the server cover (see “Preparing to Add Options” on page 55).

1. Locate the power-on password jumper (J12).
2. Change the jumper's position:
  - a. Lift the jumper straight off the pin block.
  - b. Align the holes in the bottom of the jumper with the center pin and the pin that was not covered previously.

## System Board Jumpers

- c. Slide the jumper over these pins. POST will bypass the power-on password the next time that you restart the server.

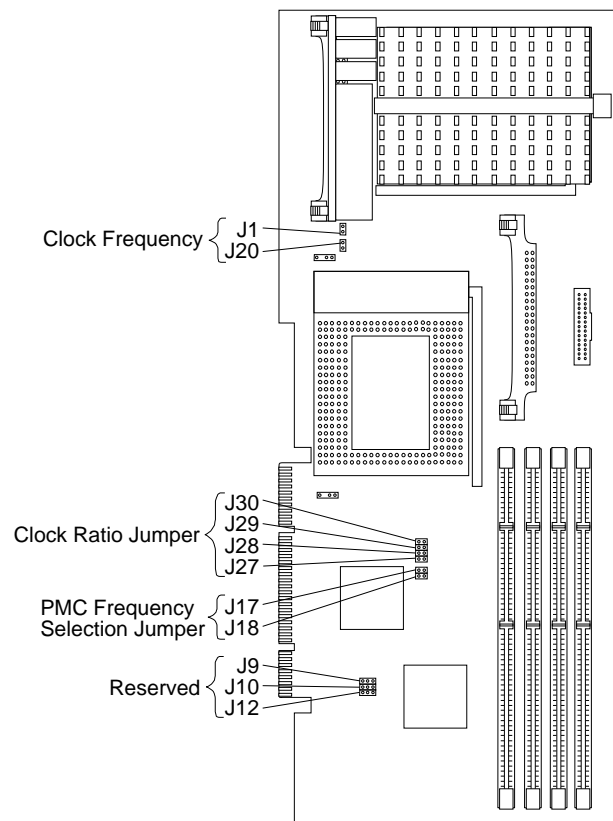


3. Replace the server cover and reconnect all external cables and power cords (see “Completing the Installation” on page 111 if you need additional information).
4. Use the Configuration/Setup utility programs to set a new power-on password. Refer to “Using the Power-on Password Menu” on page 31 for more information.

## Processor Board Jumpers

### Processor Board Jumpers

The following illustration shows the location of the jumpers on the processor board. Table 3 on page 215 contains the identifiers and descriptions of these jumpers.











## Processor Board Jumpers

### Notes:

- Turn off the server, and disconnect the power cord before moving any jumpers.
- Refer to Table 4 on page 216 for the correct clock speed and frequency selection jumper settings for the microprocessor. For example, if you have a 200 MHz microprocessor installed and the system bus speed is 66 MHz (the default), be sure that the jumpers are set to a bus-to-core ratio 3 (200/66.66).




MHz denotes internal clock speed of the microprocessor only; other factors might also affect application performance.

**Attention:** If the microprocessor bus-to-core ratio is incorrect, system board components will overheat and component damage can occur. Be sure that the microprocessor bus-to-core ratio jumper is set properly.

Identifier	Default Jumper Position	Description
J1		Clock speed jumper block. The default setting is 66.66 MHz. Use the appropriate microprocessor clock speed for the microprocessor you have installed.
J20		
J30		Frequency selection jumper block. The default Core/Bus fraction is 3.
J29		
J28		
J27		
J17		Microprocessor memory controller (PMC) frequency selection jumper block. The default setting is 66.66 MHz.
J18		

























## Processor Board Jumpers

*Table 3 (Page 2 of 2). Defining Microprocessor Operating Parameters*

Identifier	Default Jumper Position	Description
J9		Reserved
J10		
J12		

When you install a microprocessor, check the jumper settings carefully. Make sure that the setting for the clock speed jumper matches the clock speed of the microprocessor that you installed.

*Table 4. Frequency Parameters*

Speed (in MHz)	Multiplier	Clock speed	PMC frequency
200/66.66	J30  J29  J28  J27 	J1  J20 	J17  J18 
180/60	J30  J29  J28  J27 	J1  J20 	J17  J18 
166/66.66	J30  J29  J28  J27 	J1  J20 	J17  J18 

## Appendix B. Server Records

---

Whenever you add options to your server, be sure to update the information in this appendix. Accurate, up-to-date records make it easier to add other options and, if the need should arise, to report a hardware problem.

### Record the Identification Numbers

Record and retain the following information.

Product Name	IBM PC Server 325
Machine Type 8639 Model Number	Pentium Pro Microprocessor _____ <input type="checkbox"/> with preinstalled hard disk drive <input type="checkbox"/> without preinstalled hard disk drive
Serial Number	_____
Key Serial Number	_____
ServerGuide License Diskette Serial Number	_____

*Table 5. PC Server 325 Identification Numbers*

The server serial number and other identification numbers are located on a label on the rear of the server.

The server serial number is also located on the front bezel. On the tower model, the identification numbers are located near the bottom of the front bezel. On the drawer model, the model number is located to the right of the 5.25-inch drive bays.

*Note:* Two keys are provided with your server. Store the keys in a safe place. If you lose the keys, you must order a replacement lock mechanism and keys from IBM.

## Installed Device Records

### Installed Device Records

Use the following tables to keep a record of the options installed in or attached to your system. You can also record your system's default configuration settings. This information can be helpful when you install additional options in your server or if you ever need to have your server serviced. Copy these tables before recording information in them, in case you need extra space to write new values later, when you update your system's configuration.

Record the types and SCSI IDs for drives or devices attached to your server in the following table. If you attach a drive or other device to an adapter, be sure to record the descriptive information appropriately.

Location	Drive or Device Description
	Internal Devices
Bay 1	_____
Bay 2	<u>5.25-Inch CD-ROM Drive</u>
Bay 3	<u>3.5-Inch 1.44MB Diskette Drive</u>
Bay 4	_____
Bay 5	_____
Bay 6	_____
Bay 7	_____
	External Devices
SCSI ID	_____
SCSI ID	_____
SCSI ID	_____
SCSI ID	_____

Table 6. Internal and External Drives and Devices



## Installed Device Records

*Table 7 (Page 1 of 2). Configuration/Setup Program Defaults and Changes*

Option	Default Value	New Value	Additional Information
<b>System Summary</b>			
Microprocessor	Pentium Pro	_____	_____
Microprocessor Speed	_____	_____	_____
Secondary Microprocessor	(Pentium Pro)*	_____	_____
Secondary Microprocessor Speed	_____	_____	_____
System Memory	640 KB	_____	_____
Extended Memory	31 MB	_____	_____
Cache Size (internal)	_____	_____	_____
Shadow RAM	384 KB	_____	_____
System ROM	E0000h — FFFFFh	_____	_____
PCI Data Parity NMI	[ Enabled ]	_____	_____
Diskette Drive A	1.44 MB 3.5-inch diskette drive	_____	_____
Diskette Drive B	[ Not Installed ]	_____	_____
Mouse	[ Installed ]	_____	_____
<i>Note:</i> The secondary microprocessor must have the same cache size and type, and the same clock speed as the primary microprocessor.			
<b>System Information</b>			
Product Data			
Flash EEPROM Revision Level	_____	_____	_____
BIOS Date	_____	_____	_____
PCI Routing			
Planar SCSI IRQ	IRQ15	_____	_____
Planar Ethernet IRQ	IRQ11	_____	_____
<i>Note:</i> The screen displays Int_A, Int_B, Int_C, and Int_D for each PCI slot. The default value for each is <b>not routed</b> .			
<b>Devices and I/O Ports</b>			
Serial Port A Address	[3F8h - IRQ 4]	_____	_____
Serial Port B Address	[2F8h - IRQ 3]	_____	_____
Infrared Connector	[ Disabled ]	_____	_____
Infrared DMA	[ Disabled ]	_____	_____
Parallel Port	[3BCh - IRQ 7]	_____	_____
Parallel Port Mode	[ Standard ]	_____	_____
Parallel Port Extended Mode	[ _____ ]	_____	_____
Parallel Port DMA	[ Disabled ]	_____	_____
Mouse	[ Installed ]	_____	_____
Diskette Drive A	1.44 MB 3.5-inch diskette drive	_____	_____
Diskette Drive B	[ Not Installed ]	_____	_____
<b>System Security</b>			
Power-On Password	_____	_____	_____
Administrator Password	_____	_____	_____

## Installed Device Records

Table 7 (Page 2 of 2). Configuration/Setup Program Defaults and Changes

Option	Default Value	New Value	Additional Information
<b>Start Options</b>			
Keyboard NumLock State	[ On ]	_____	_____
Keyboard Speed	[ Fast ]	_____	_____
Keyboardless Operation Mode	[ Disabled ]	_____	_____
First Startup Device	[ Diskette Drive 0 ]	_____	_____
Second Startup Device	[ Hard Disk 0 ]	_____	_____
Third Startup Device	[ Disabled ]	_____	_____
Fourth Startup Device	[ Disabled ]	_____	_____
Power On Self Test	[ Enhanced ]	_____	_____
Virus Detection*	[ Disabled ]	_____	_____
<i>Note:</i> The Virus Detection test checks for changes to the boot sector.			
<b>Advanced Setup</b>			
<b>Cache Control</b>			
Cache State	[ Enabled ]	_____	_____
Cache Type	[ Write-Back ]	_____	_____
Cache Size	_____	_____	_____
Video BIOS Caching	[ Enabled ]	_____	_____
Video Buffer Caching	[ Disabled ]	_____	_____
Option ROM Caching	[ Disabled ]	_____	_____
<b>ROM Shadowing</b>			
F0000h - FFFFFh (System BIOS)	Enabled	_____	_____
E0000h - EFFFFh (System BIOS)	Enabled	_____	_____
D8000h - DFFFFh	[ Disabled ]	_____	_____
D0000h - D7FFFh	[ Disabled ]	_____	_____
C8000h - CFFFFh	[ Enabled ]	_____	_____
C0000h - C7FFFh (Video BIOS)	Enabled	_____	_____
<b>PCI Bus Control</b>			
PCI Data Parity NMI	[ Enabled ]	_____	_____
CPU-PCI Write Buffers	[ Disabled ]	_____	_____
SCSI ROM Address	[ C8000 ]	_____	_____
<b>PCI Interrupt Requests</b>			
Planar SCSI IRQ	[ Automatic ]	_____	_____
Planar Ethernet IRQ	[ Automatic ]	_____	_____
Slot1 IntA IRQ	[ Automatic ]	_____	_____
Slot2 IntA IRQ	[ Automatic ]	_____	_____
Slot3 IntA IRQ	[ Automatic ]	_____	_____
Slot4 IntA IRQ	[ Automatic ]	_____	_____
Slot5 IntA IRQ	[ Automatic ]	_____	_____
<i>Note:</i> The screen displays IntA, IntB, IntC, and IntD for each slot. The default value for each is <b>Automatic</b> .			

## Installed Device Records

The following table shows the defaults for system memory and extended memory in your server. Record changes to existing memory and upgrades here.

Option	Default Value	New Value	Additional Information
<b>System Memory</b>	640 KB	_____	_____
<b>Extended Memory</b>	31 MB	_____	_____
Connector J2	_____	_____	32 MB Kit <input type="checkbox"/> 64 MB Kit <input type="checkbox"/> 128 MB <input type="checkbox"/>
Connector J3	_____	_____	32 MB Kit <input type="checkbox"/> 64 MB Kit <input type="checkbox"/> 128 MB <input type="checkbox"/>
Connector J4	_____	_____	32 MB Kit <input type="checkbox"/> 64 MB Kit <input type="checkbox"/> 128 MB <input type="checkbox"/>
Connector J5	_____	_____	32 MB Kit <input type="checkbox"/> 64 MB Kit <input type="checkbox"/> 128 MB <input type="checkbox"/>
Total Memory	_____	_____	_____

Table 8. RAM Default Settings and Changes

Record expansion slot configuration information for your server in the following table.

Slot	Type	IRQ	DMA	I/O Port	ROM/RAM Address	Option Description and Additional Information
6	EISA	_____	_____	_____	_____	_____
5	Shared	_____	_____	_____	_____	_____
4	Shared	_____	_____	_____	_____	_____
3	Shared	_____	_____	_____	_____	_____
2	Shared	_____	_____	_____	_____	_____
1	PCI	_____	_____	_____	_____	_____

*Notes:*

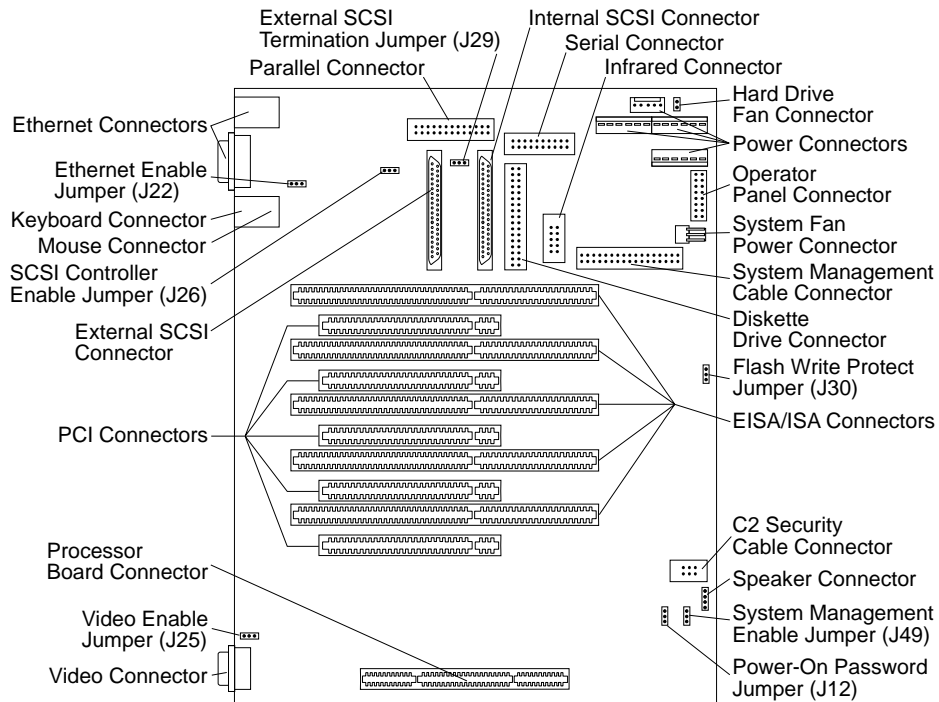
- Slots 2 through 5 are shared by PCI and EISA connectors.
- Before setting values, review "Resolving Configuration Conflicts" on page 43 and follow the instructions for avoiding configuration conflicts.

Table 9. Expansion Slot Configuration Information

## Installed Device Records

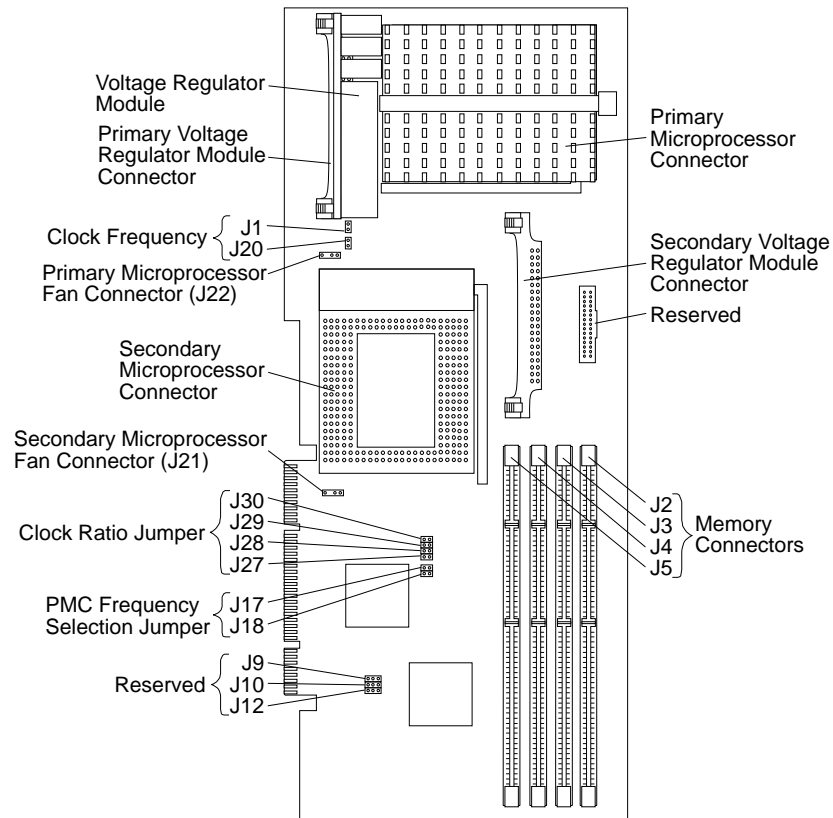
### System Board Illustration

The following simplified layout of the system board identifies server components. You might need to refer to the diagram when recording information in the tables in this appendix.



## Processor Board Illustration

The following simplified layout of the processor board identifies server components. You might need to refer to the diagram when recording information in the tables in this appendix.



**Installed Device Records**

## Appendix C. Ethernet Cable Specifications

---

This appendix contains the specifications for the unshielded twisted-pair (UTP) and attachment unit interface (AUI) cables that can be used to connect the server to an IEEE Standard 802.3 network.

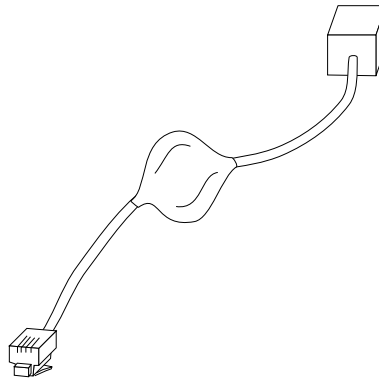
### 10BASE-T Cables

To connect to the server's 10BASE-T port to a 10BASE-T port on a repeater, use a UTP cable with RJ-45 connectors at both ends.

The cables used in a 10BASE-T link segment do not require grounding. However, all of the devices connected to the cables must be grounded.

If your server comes with an Ethernet interface cable, you must install it to comply with FCC requirements.

1. Attach the Ethernet interface cable to the RJ-45 connector on the server.



2. Connect the male end of the UTP cable to the female end of the interface cable.
3. Connect the UTP cable to the repeater.
  - a. If the port on the repeater is a crossover port (also called an MDI-X port), use a UTP cable that is wired as a straight-through cable.

## 10BASE-T Cables

- b. If the port on the repeater is not a crossover port (also known as an MDI port), use a UTP cable that is wired as a crossover cable.

Do not use telephone extension cables to connect the server to a 10BASE-T repeater. The wire pairs in those cables are not twisted and the cable does not meet other requirements for use in a 10BASE-T network. You can identify telephone extension cables by their flat and thin appearance. UTP cables are rounder and thicker than telephone extension cables.

Table 10 describes the specifications for UTP cable used in 10BASE-T link segments.

*Table 10. Cabling Specifications for 10BASE-T Link Segments*

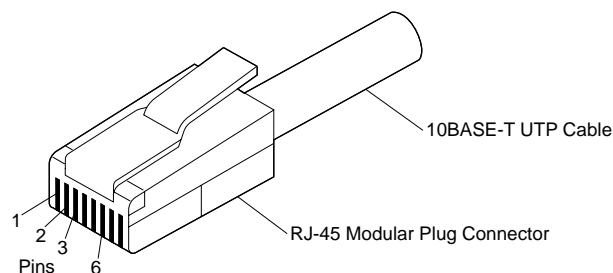
Characteristic	Specification <sup>1</sup>
Cable type	UTP cable with 2 twisted pairs of 22, 24, or 26 AWG <sup>2</sup>
Nominal impedance	100 ohms
Velocity of propagation	0.585 c <sup>3</sup>
Maximum attenuation	8 to 10 dB per 100 m at 10 MHz

<sup>1</sup> Cables that have been certified as EIA/TIA-568 Category 3, 4, and 5 are among the cable types that meet all of the 10BASE-T specifications.

<sup>2</sup> The cable can contain two to four twisted pairs, but only two of the pairs will be used by the 10BASE-T network.

<sup>3</sup> The c represents the velocity of light traveling in a vacuum, which is 300 000 km/sec (186 400 mi/sec).

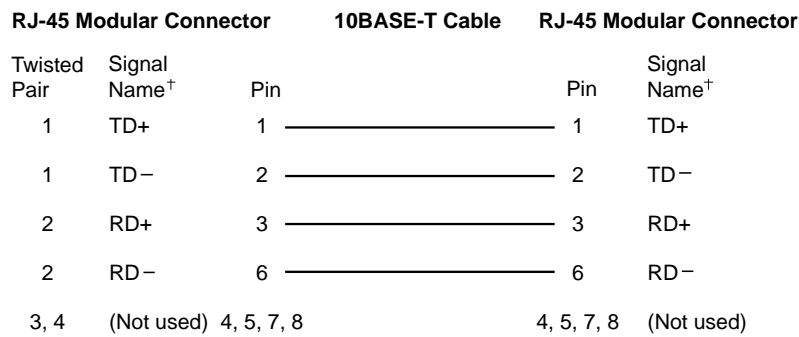
The following figure illustrates the RJ-45 connector.





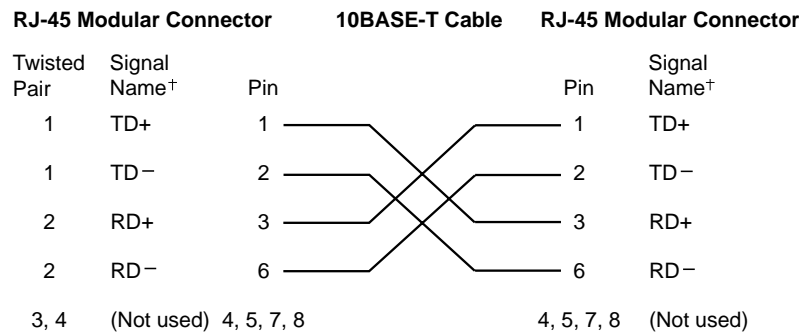
## AUI Cable

The following figure illustrates the wiring in straight-through cables.



<sup>†</sup> Relative to the device connected to the Adapter

The following figure illustrates the wiring in crossover cables.



<sup>†</sup> Relative to the device connected to the Adapter

## AUI Cable

To connect the server's AUI port to a 10BASE5 segment, use an AUI cable to connect the server to the 10BASE5 transceiver. An AUI cable can also be used to connect the server's AUI port to a 10BASE2 or 10BASE-F transceiver.

## AUI Cable

The following illustration shows the server's AUI port.

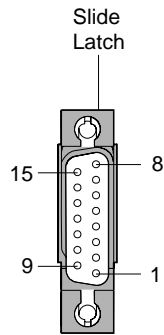


Table 11 provides the pin assignments for the server AUI port.

*Table 11. Pin Assignments for AUI Port*

Pin Number	Description
3	Data out +
10	Data out -
11	Digital ground
5	Data in +
12	Data in -
4	Digital ground
7	no connection
15	no connection
8	Digital ground
2	Collision in +
9	Collision in -
1	Digital ground
6	Digital ground
13	+ 12 volts
14	Digital ground
Shell	Frame ground

## Appendix D. Installing a PC Server 325 in a Server Rack

---

This appendix provides instructions for installing a PC Server 325 drawer model in a 19-inch server rack enclosure.

- If you have a drawer model, your server comes with a PC Server Rack Mount Kit. Review the preinstallation information in “Before You Begin”; then, continue at “Installing the Drawer Model in a Rack” on page 236.
- If your PC Server 325 is a tower model and you want to install it as a drawer in a server rack enclosure, you must order the PC Server Rack Mount Kit. This kit contains the appropriate front, top, and bottom covers, in addition to the brackets and the cable management arm that you need to install the server into the rack. Review the preinstallation information in “Before You Begin”; then, continue at “Preparing a Tower Model for Rack Installation” on page 231.

### Before You Begin

- You will need the following items:
  - Flat-blade screwdriver
  - 8-inch adjustable wrench or pliers
  - Tape
  - Pencil

Some of the installation procedures require two people.

- Before you begin to install your server in the rack, review the safety and handling guidelines specified under “Safety Information” on page vii, “Electrical Safety” on page 53, and “Handling Static-Sensitive Devices” on page 54. These guidelines will help you work safely while working with your server and options.
- Review the documentation that comes with your rack enclosure for safety or cabling considerations. Ensure that your planned installation is within the rack's guidelines for heat generation, electrical requirements, air flow, and mechanical loading.
- To ensure cabinet stability, plan the installation of servers in the rack starting from the bottom.

## Before You Begin

- Verify that the rack can meet the drawer model operating parameters, as detailed in Table 12.

<p><b>Size</b></p> <ul style="list-style-type: none"> <li>- Depth: 465 mm (18.3 in.)</li> <li>- Height: 216 mm (8.5 in.)</li> <li>- Width: 482 mm (19.0 in.)</li> </ul> <p><b>Weight</b></p> <ul style="list-style-type: none"> <li>• Typical server as shipped: 17 kg (37.5 lb)</li> </ul> <p><b>Environment</b></p> <ul style="list-style-type: none"> <li>• Air temperature: <ul style="list-style-type: none"> <li>- Server on: 10° to 35° C (50° to 95° F) Altitude: 0 to 914 m (3000 ft.)</li> <li>- Server on: 10° to 32° C (50° to 90° F) Altitude: 914 m (3000 ft.) to 2133 m (7000 ft.)</li> <li>- Server off: 10° to 43° C (50° to 110° F) Maximum Altitude: 2133 m (7000 ft.)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Humidity: <ul style="list-style-type: none"> <li>- Server on: 8% to 80%</li> <li>- Server off: 8% to 80%</li> </ul> </li> <li>• Maximum altitude: 2133 m (7000 ft)</li> </ul> <p><b>Electrical Input</b></p> <ul style="list-style-type: none"> <li>• Sine-wave input (50 to 60 Hz) is required</li> <li>• Input voltage: <ul style="list-style-type: none"> <li>- Low range: <ul style="list-style-type: none"> <li>- Minimum: 90 V ac</li> <li>- Maximum: 137 V ac</li> </ul> </li> <li>- High range: <ul style="list-style-type: none"> <li>- Minimum: 180 V ac</li> <li>- Maximum: 265 V ac</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> <li>- Minimum configuration as shipped: 0.08 kVA</li> <li>- Maximum configuration: 0.52 kVA</li> </ul> </li> </ul> <p><b>Total Power Available for Drives</b></p> <ul style="list-style-type: none"> <li>• Nominal Operating Current allowed: <ul style="list-style-type: none"> <li>- +5 V dc line: 5.3 A</li> <li>- +12 V dc line: 5.0 A</li> </ul> </li> </ul> <p><b>Heat Output</b></p> <ul style="list-style-type: none"> <li>• Approximate heat output in British Thermal Units (Btu) per hour: <ul style="list-style-type: none"> <li>- Minimum configuration: 350 Btu (102 watts)</li> <li>- Maximum configuration: 860 Btu (251 watts)</li> </ul> </li> </ul>
--	---	--

Table 12. PC Server 325 Operating Specifications

## Preparing a Tower Model for Rack Installation

### Preparing a Tower Model for Rack Installation

If you plan to install your tower model PC Server 325 in a rack enclosure, you must remove the floor stand, and replace the covers.

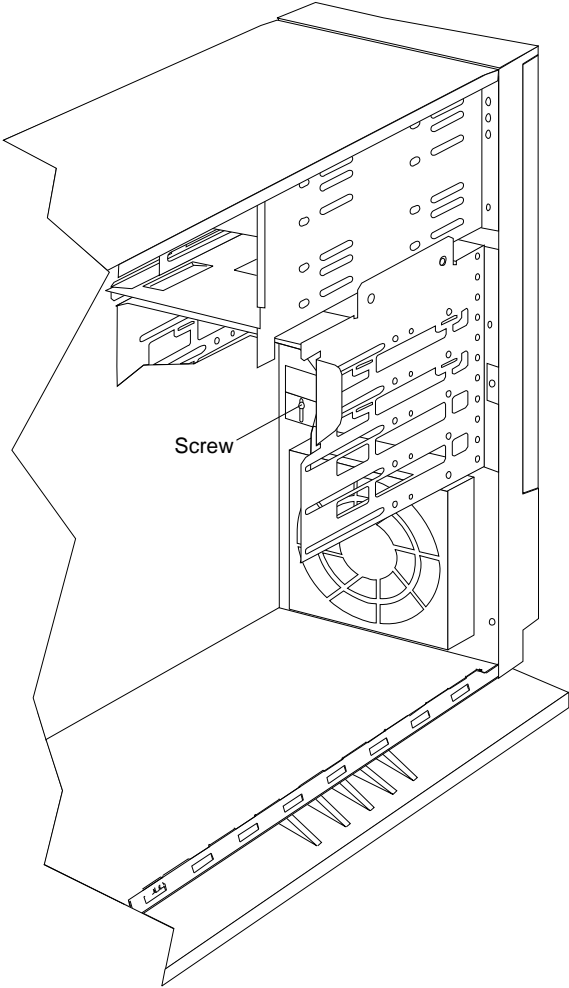
#### Before you begin

- Obtain the PC Server 325 Rack Mount Kit.
- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54. In addition, read the safety information in the documentation that came with your rack.
- Turn off the server.
- Disconnect all external cables and power cords, and then remove the server cover (see “Preparing to Add Options” on page 55).

1. Remove the door on the front bezel.
2. Disconnect the cables from the speaker and operator panel connectors on the system board. Refer to the system label inside your server for the locations of the connectors.
3. If any adapters are installed in the expansion slots closest to the processor board, you might need to remove them. Be sure to disconnect any cables that might be attached. Note carefully the position of each adapter and cable before you remove it.

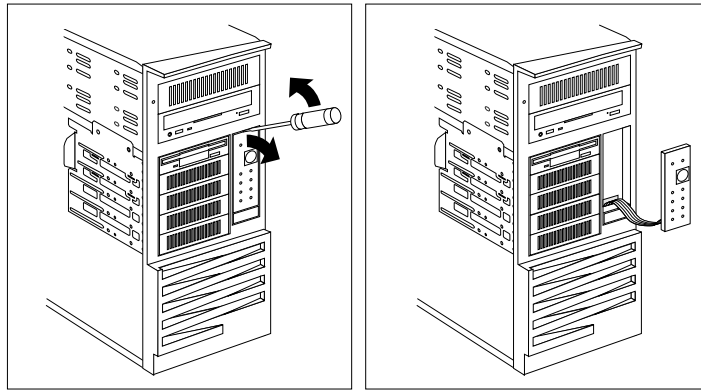
**Preparing a Tower Model for Rack Installation**

- 4. Loosen the strain relief screw (located above the fan housing and between the front of the server and the drive bracket).

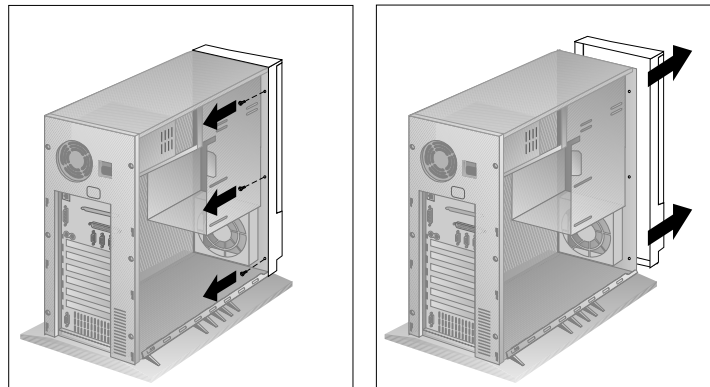


## Preparing a Tower Model for Rack Installation

5. Use a screwdriver to pry loose the operator LED panel from the front bezel; then remove it. If necessary, pull gently on the panel's cable to pull it through the hole on the front of the server.



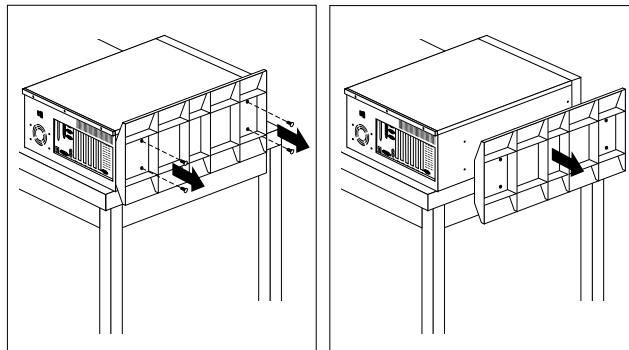
6. Remove the front bezel.
  - a. Remove the three screws on each side of the rear edge of the front bezel.
  - b. Pull on the front bezel to remove it.



- c. Remove the speaker from the back of the bezel. Set the speaker and screws aside; you will reinstall them in step 10d on page 235.
    - d. Store the bezel in a safe place.

## Preparing a Tower Model for Rack Installation

7. Position the server on its side on a desk or table with the floor stand extending past the edge of the table.
8. Remove the floor stand.
  - a. Tilt the server on its side.
  - b. Remove the four screws on the bottom of the server.
  - c. Gently pull the floor stand from the bottom of the server.

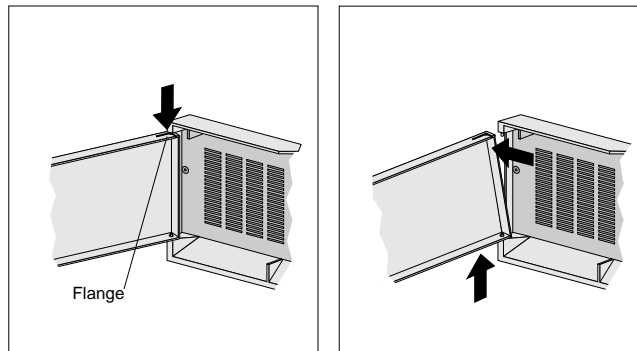


9. The Rack Mount Kit includes a replacement bezel and switch cap for the operator LED panel; you can install them so that the front cover of the drawer is all one color. If you do not want to replace the bezel and switch cap, go to step 10 on page 235. Otherwise, continue with the following steps.
  - a. Place the Operator LED assembly and the Operator LED bezel from the Rack Mount Kit face down on a flat work area.
  - b. Remove the three screws on the back of the Operator LED panel assembly.
  - c. Carefully remove the front bezel and switch cap. Be sure that you do not lose the spring, located inside the switch cap.
  - d. Move the spring from the switch cap, and place it in the switch cap from the Rack Mount Kit.
  - e. Attach the Operator LED panel to the new bezel, using the three screws that you removed in step 9b.



## Preparing a Tower Model for Rack Installation

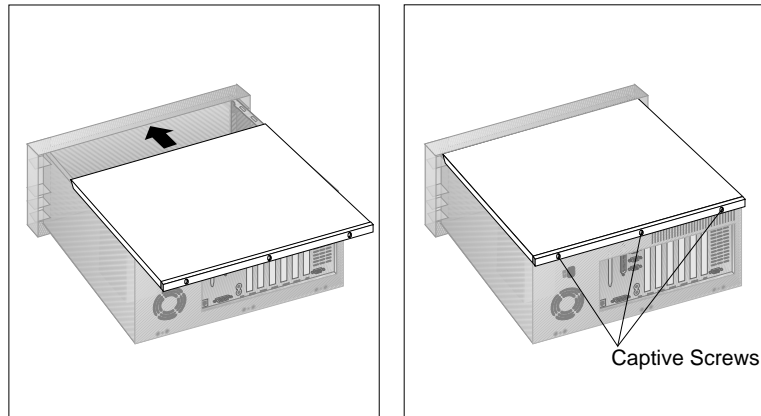
10. Install the new front bezel from the Rack Mount Kit.
  - a. Open the door on the new front bezel.
  - b. Press the flange on the top of the door, and lift off the door.



- c. Align the bottom of the Operator LED panel with the opening in the bezel, and press until it snaps into place.
- d. Install the speaker into the back of the bezel, using the round speaker bracket and the two screws that you removed in step 6c on page 233.
- e. Insert the cable from the operator LED panel and the speaker through the hole on the front of the server.
- f. Align the posts on the back of the bezel with the holes on the front of the server.
- g. Press the bezel into place, and fasten with the six screws that you removed in step 6a on page 233.
- h. Tighten the strain relief screw (located above the fan housing and between the front of the server and the drive bracket).
- i. Attach the cables that you removed in step 2 on page 231 to the speaker and the operating panel connectors on the system board. (Refer to the system label inside your server for the locations of the connectors.)
- j. If you removed any adapters or cables in step 3 on page 231, reconnect them to the original positions.

## Installing the Drawer Model in a Rack

11. If you are installing drives into bays 3 through 7 at this time, go to “Installing Internal Drives” on page 81; then return here.
12. Install the top and bottom covers:
  - a. Align the cover with the frame of the server.
  - b. Press the cover onto the server; then, slide the front edge of the cover under the lip of the server frame.
  - c. Tighten the screws in the back of the cover.



13. Continue the installation at “Installing the Drawer Model in a Rack.”

## Installing the Drawer Model in a Rack

During this procedure, you must install parts on the rack and the server. This process can be divided into three parts:

- Preparing the server
- Preparing the rack
- Installing the server into the rack

## Installing the Drawer Model in a Rack

### Before you begin

- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54, and the safety information in your rack documentation.
- Turn off the server.
- Refer to your rack documentation for additional information on preparing the rack.

## Preparing the Server

In this section, you will use the following parts:

- Two chassis brackets
- One cable arm bracket
- The inner slide from two slide brackets
- 18 short screws (8-32 by 0.325 inch)



### CAUTION:

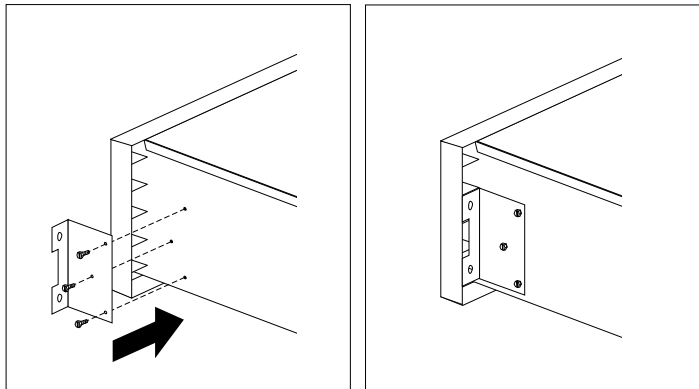
**Due to the weight of the server, do not attempt to lift the server by yourself. To avoid risking possible injury, get another person to help you.**

**Attention:** To avoid damage to internal components, use only the 8-32 by 0.325-inch screws included with the Rack Mounting kit.

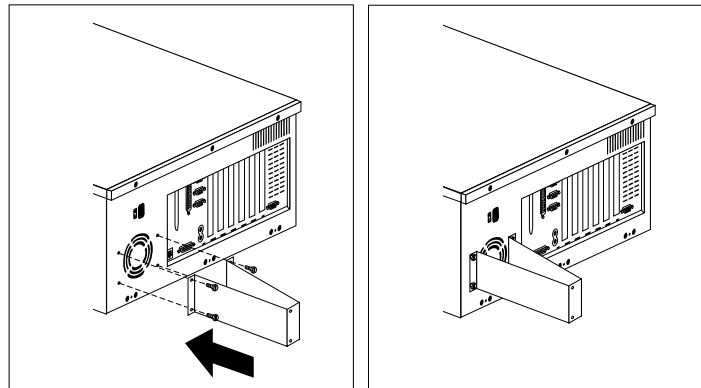
To prepare the PC Server 325 for installation in a 19-inch rack enclosure:

1. Attach the chassis brackets to the sides of the server.
  - a. Align the holes on each chassis bracket with the holes on the side of the server.
  - b. Attach the chassis bracket using three 8-32 by 0.325-inch screws.

## Installing the Drawer Model in a Rack

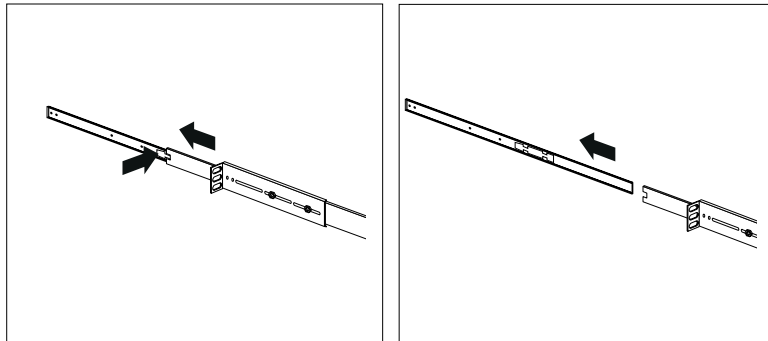


2. Attach the cable arm bracket to the rear of the server.
  - a. Align the cable arm bracket with the holes on the sides of the fan, keeping the longer, angled arm of the bracket toward the middle of the server.
  - b. Attach the bracket with four 8-32 by 0.325-inch screws.

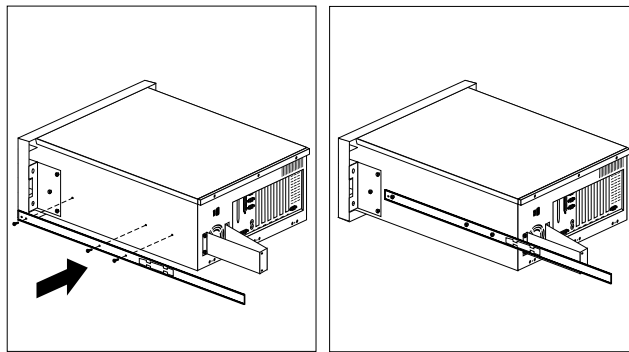


3. Attach the inner slide section of each slide rail to the side of the server.
  - a. Pull the inner slide until the safety latch locks.
  - b. Press the safety latch; then, pull the inner slide firmly until it detaches from the outer slide rail.

## Installing the Drawer Model in a Rack



- c. Align the holes on the inner slide with the holes on sides of the server; then, attach the slide with three 8-32 by 0.325-inch screws.



## Preparing the Rack

In this section, you will use the following parts:

- Two slide brackets
- Two outer slide rails
- One cable-management arm
- Eight long screws (10-32 by 0.5-inch long)
- Four short screws (8-32 by 0.325-inch long)
- Four nuts
- Four washers
- Four bar nuts
- Installation template
- Tape

## Installing the Drawer Model in a Rack

**Attention:** To ensure cabinet stability, plan the installation of servers in the rack starting from the bottom.

*Notes:*

1. This procedure requires two people.
2. Some slide brackets have threaded holes on the flange. These brackets do not require the bar nuts.

To attach the mounting hardware to the rack:

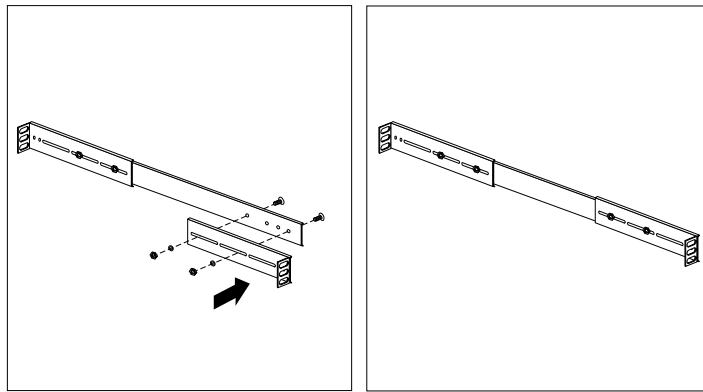
1. Mark the positions of the slide brackets on the mounting rails on the rack.
  - a. Position the template on the front mounting on the rack, aligning the holes. Secure the template in place with tape.
  - b. Mark the holes for the slide brackets and nut clips.
  - c. Carefully remove the tape from the mounting rails, and attach the template to the rear mounting rails. Mark the locations for the slide brackets.

*Note:* You must align the slide brackets properly, or the installation cannot be completed.

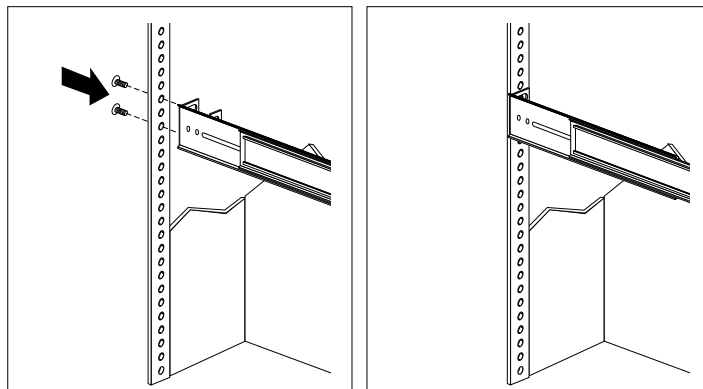
2. Attach an outer slide rail to each slide bracket.
  - a. Align the outer slide rail and the slide bracket.
  - b. Extend the outer slide rail in the rack to determine the approximate length needed.
  - c. Insert two short (8-32 by 0.325-inch) screws through the slide rail and bracket, at the appropriate holes.

## Installing the Drawer Model in a Rack

- d. Attach a washer and a nut to each screw. *Do not tighten the nuts at this time.*

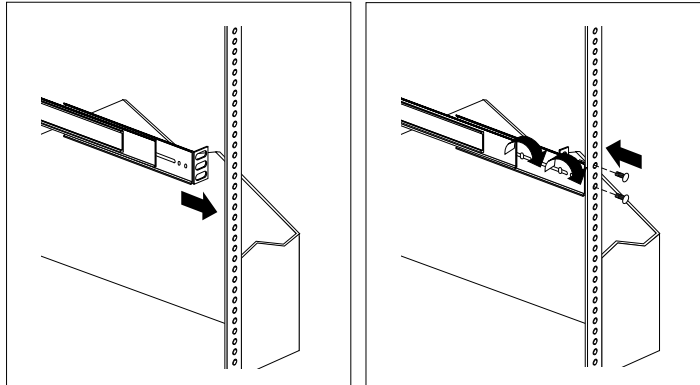


3. Attach the brackets to the left side of the rack:
- Extend the outer slide rail until it is flush against the inside of the left front mounting rail. Align the slide rail with the marked holes on the mounting rail.
  - Align the holes on the bar nut with the holes on the slide rail and mounting rail.
  - From the front of the rack, insert two long screws through the mounting rail, slide rail, and bar nut. Press the slide rail until it is flush with the inner edge of the mounting rail; then, tighten the screws.



## Installing the Drawer Model in a Rack

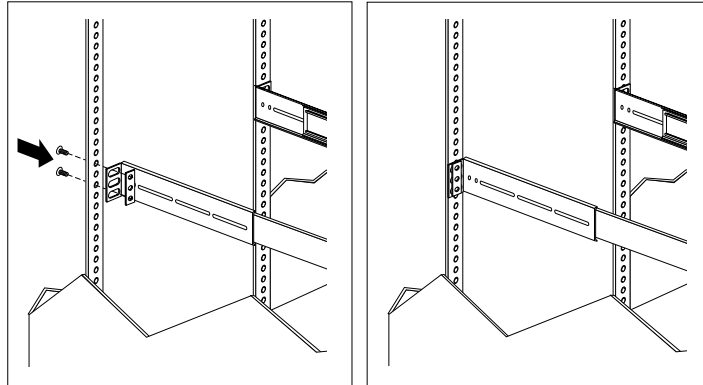
- d. Attach the slide bracket to the left rear side of the rack.
- 1) Align the holes on the bracket with the bar nut.
  - 2) Align the holes on the bracket and bar nut assembly with the marked holes on the rear mounting rail.
  - 3) From the rear of the rack, insert two long screws through the mounting rail, slide bracket, and bar nut; then, tighten the screws.
  - 4) Tighten the nuts on the slide rail, using pliers or an adjustable wrench.





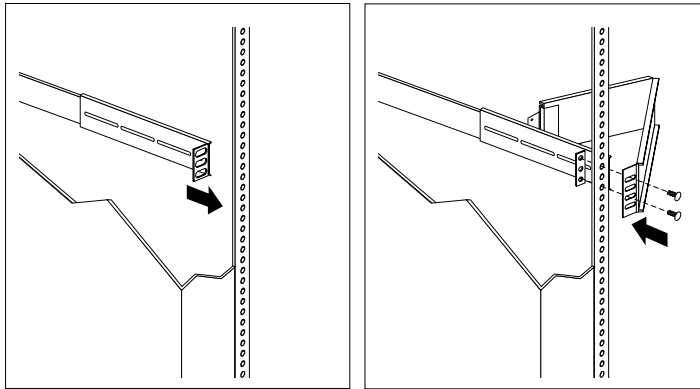
## Installing the Drawer Model in a Rack

4. Attach the slide rail to the right side of the rack.
  - a. Extend the outer slide rail until it is flush against the inside of the right front mounting rail. Align the slide rail with the marked holes on the mounting rail.
  - b. Align the holes on the bar nut with the holes on the slide rail.
  - c. From the front of the rack, insert two long screws through the mounting rail, slide rail, and bar nut. Press the slide rail so that it is flush with the inner edge of the mounting rail and tighten the screws.



## Installing the Drawer Model in a Rack

- d. Attach the slide bracket and cable management arm to the right rear of the rack.
- 1) Align the holes on the bracket with the bar nut.
  - 2) Align the holes on the bracket and bar nut assembly with the marked holes on the rear mounting rail.
  - 3) From the rear of the rack, align the holes on the cable arm mounting panel with the marked holes on the rear mounting rail.



- 4) From the rear of the rack, insert a long screw through holes in the cable arm bracket, mounting rail, slide bracket, and bar nut; then, tighten the screws.

*Note:* To facilitate alignment of the cable arm, be sure to insert the screws through the first and third holes, as shown.

- 5) Tighten the nuts on the slide rail, using pliers or an adjustable wrench.

## Installing the Drawer Model in a Rack

### Installing the Server in the Rack

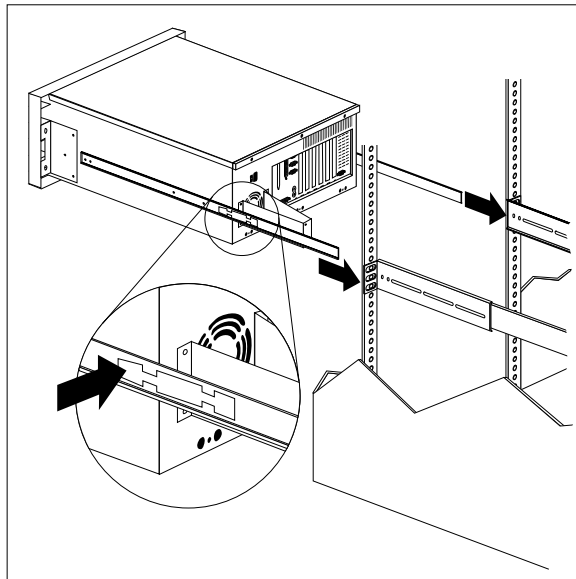
In this section, you will use the following parts:

- Two screws (10-32 by 0.5-inch long)
- Two nut clips
- Cable ties
- Two screws (10-32 by 1.0-inch long)

To install the server into the rack:

1. Position the PC Server 325 horizontally, with the 3.5-inch drive bays on the top.
2. Align the inner slides on the sides of the server with the slide rails; then, slide the server onto the outer slide, until the slide rails click into place.

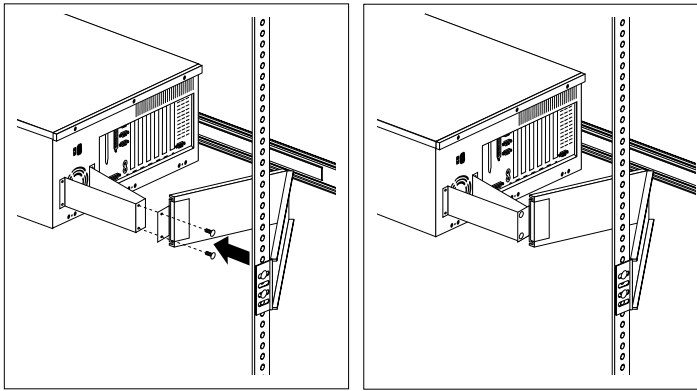
*Note:* When the drawer is fully extended, safety latches on the slide rails lock into place. This prevents the server from being accidentally pulled out too far and dropped. To release the safety latch, press in.



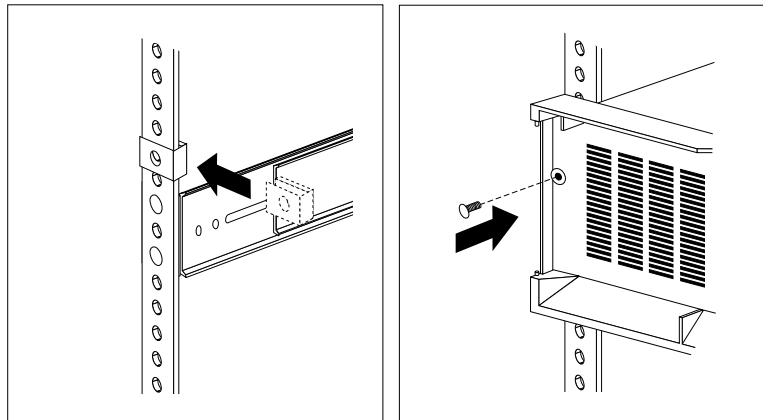
3. Press the safety latches and slide the drawer about halfway into the rack.

## Installing the Drawer Model in a Rack

4. Attach the cable-management arm to the cable arm bracket, using two long (10-32 by 0.5-inch) screws.

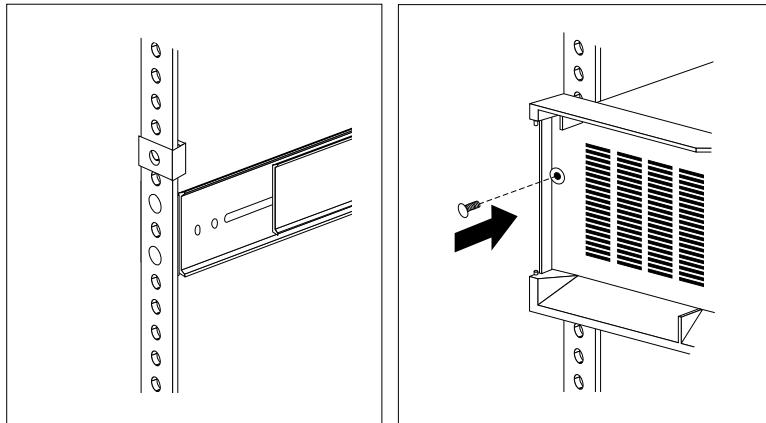


5. Attach the monitor, keyboard, and power cables to the corresponding connectors on the server. Refer to the rack documentation for instructions.
6. Attach the cables to the cable-management arm using the cable ties.
7. Secure the drawer in the rack.
  - a. Install a nut clip to each front mounting rail, as shown.
  - b. Slide the drawer into the rack.

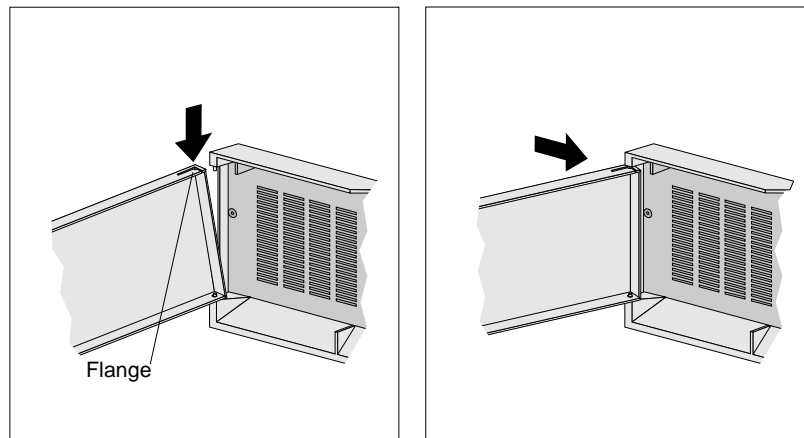


## Installing the Drawer Model in a Rack

- c. Secure the server to both sides of the rack by inserting an extra long screw (10-32 by 1.0-inch long) through the bezel, mounting rail, and nut clip.



8. Attach the front door to the server.
  - a. Align the bottom hinges on the front door with the pin on the server.
  - b. Press the flange on the top edge and slide the door over the pin.
  - c. Release the flange.



## Removing the Drawer Model from a Rack

9. Close and lock the door.
10. To complete the installation, refer to the documentation that comes with the rack.

## Removing the Drawer Model from a Rack

In some configurations, installing options in the drawer model might be more convenient if you remove the server from the rack. For example, you might prefer to remove the server if you are installing an internal drive in a drawer model that is installed in the bottom bay in a rack.

### Before you begin

- Read “Electrical Safety” on page 53 and “Handling Static-Sensitive Devices” on page 54.
- Turn off the server.
- Follow any additional installation and safety instructions that come with the rack.

## Removing the Drawer



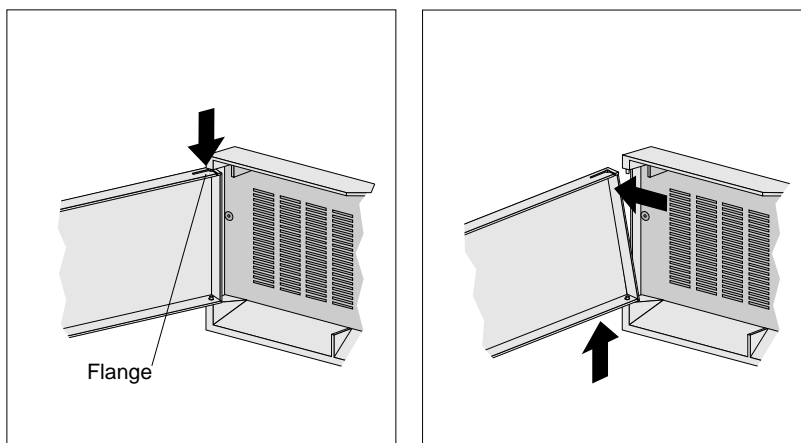
### CAUTION:

**Due to the weight of the server, do not attempt to lift the server by yourself. To avoid risking possible injury, get another person to help you.**

## Removing the Drawer Model from a Rack

To remove the PC Server 325 from a 19-inch rack enclosure:

1. Unlock and remove the front door on the server.



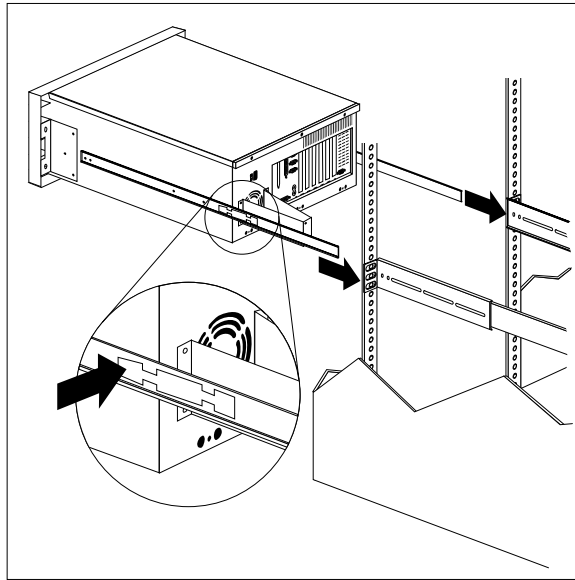
2. Remove the screw from each side of the front bezel. Set the screws aside for later use.
3. Slide the server out of the rack.
4. If you have a modem or fax machine attached to the server, disconnect the telephone line from the wall outlet and the server.

*Note:* If you are in the United Kingdom, you must perform this step before disconnecting the power cord.

5. Disconnect all cables and power cords from the rear of the server.
6. Remove the two screws from the cable arm bracket.

## Removing the Drawer Model from a Rack

7. Press the safety release latch on each slide rail.



8. Lift the server at a slight angle, and pull it from the slide rails. Then place the server on a flat, nonconductive surface.



## Appendix E. Notices

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Part Number: 76H8831

Printed in U.S.A.

September 1996

76H8831

