

**PC Server 315 - Type 8638
Models KJ0, KS0, PJ0, PS0, PSV,**

**Hardware Maintenance
Manual Supplement**

May 1997

**Use this supplement with the
PC Servers Hardware
Maintenance Manual**

**We Want Your Comments!
(Please see page 142)**



Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 146.

First Edition (May 1997)

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About This Supplement

This supplement contains diagnostic information, Symptom-to-FRU Indexes, service information, error codes, error messages, and configuration information for the PC Server 315 - Type 8638.

This supplement should be used with the information in the *IBM Personal System/2 Hardware Maintenance Manual* (part number 83G8990, form number S52G-9971) and *IBM PC Servers Hardware Maintenance Manual* (part number 70H0751, form number S30H-2501) to troubleshoot problems effectively.

Important

This manual is intended for trained servicers who are familiar with IBM PC Server products.

Before servicing an IBM product, be sure to review "Safety Information" on page 134.

Related Publications

The following publications are available for IBM products. For more information, contact IBM or an IBM Authorized Dealer.

For Information About	See Publication
IBM PC Servers not listed in this manual	IBM PC Servers Hardware Maintenance Manual (S30H-2501)
PS/2 Computers	IBM Personal System/2 Hardware Maintenance Manual (S52G-9971)
PS/ValuePoint Computers	IBM PS/ValuePoint Hardware Maintenance Service and Reference (S61G-1423)
Laptop, Notebook, Portable, and ThinkPad Computers (L40, CL57, N45, N51, P70/P75, ThinkPad 300, 350, 500, 510, 710T, Expansion Unit, Dock I, Dock II)	IBM Mobile Systems Hardware Maintenance Manual Volume 1 (S82G-1501)
ThinkPad Computers (ThinkPad 340, 355, 360, 370, 700, 701, 720, 750, 755)	IBM Mobile Systems Hardware Maintenance Manual Volume 2 (S82G-1502)
ThinkPad Computers (ThinkPad 365, 760)	IBM Mobile Systems Hardware Maintenance Manual Volume 3 (S82G-1503)
Monitors (Displays) (February 1993)	IBM PS/2 Display HMM Volume 1 (SA38-0053)
Monitors (December 1993)	IBM Color Monitor HMM Volume 2 (S71G-4197)
IBM Monitors (P Series) (February 1996)	IBM Monitor HMM Volume 3 (S52H-3679)
IBM 2248 Monitor (February 1996)	IBM Monitor HMM Volume 4 (S52H-3739)
Disk Array technology overview and using the IBM RAID Configuration Program	Configuring Your Disk Array booklet (S82G-1506)
Installation Planning for Personal System/2 computers	Personal System/2 Installation Planning and Beyond (G41G-2927)
Installation Planning for Advanced Personal System/2 Servers	Advanced PS/2 Servers Planning and Selection Guide (GG24-3927)

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General Checkout

This general checkout procedure is for computers that are supported by the QAPlus/PRO Diagnostics test.

Diagnostic error messages appear when a test program finds a problem test *Passed*, *Failed*, or *Aborted*, the test programs check the error-return code at test completion. (See "Return Codes" on page 5.)

General error 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 supplied with that software package.

Notes

1. If multiple error codes are displayed, diagnose the first error code displayed.
2. If the computer reports a POST error, go to "Symptom-to-FRU Index" on page 101.
3. If the computer hangs and no error is displayed, go to "Undetermined Problem" on page 79.
4. If a device cannot be selected from the Module Test menu, that device might be defective.

001

- Power-off the computer and all external devices.
- Check all cables and power cords.
- Set all display controls to the middle position.
- Insert the Diagnostics diskette into drive A.
- Power-on all external devices.
- Power-on the computer.
- Check for the following responses:
 1. One beep.
 2. Readable instructions or the Main Menu.

DID YOU RECEIVE THE CORRECT RESPONSES?

Yes No

002

Find the failure symptom in the "Symptom-to-FRU Index" on page 101.

003

Run the Advanced Diagnostics Test. If necessary, refer to "Diagnostics" on page 3.

If you receive an error, go to the "Symptom-to-FRU Index" on page 101 .

Diagnostics

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
- Diagnostics Diskette

Power-On Self-Test (POST)

Each time you power-on the system, it performs a series of tests that 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
- Starts the video operation
- Verifies that the diskette drives are working
- Verifies that the hard disk drive is working

If the POST finishes without detecting any problems, a single beep sounds and the first screen of the operating system or application program appears.

If the POST detects a problem, an error message appears on the screen. A single problem can 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 power-on the system.

POST Beep Codes

The Power On Self-Test generates a beeping sound to indicate successful completion of POST or to indicate that the tests detect an error.

One beep and the appearance of text on the display indicates successful completion of the POST. More than one beep indicates that the POST detects an error.

Test Programs

The QAPIus/PRO test programs on the PC Server System Board Diagnostic Diskette, developed by DiagSoft for IBM, are the primary method of testing the PC Server. You can use them to test the IBM components of the system and some external devices. The amount of time required to test all components depends on the number of components. The more optional adapters and devices you have attached to the system, the longer the testing takes.

Diagnostic programs from the QAPIus/PRO **Main Menu** include the following features.

Feature	Description
Quick Check	Identifies most problems associated with the following major components: <ul style="list-style-type: none"> • System board • Hard disk drives • Diskette drives • CD-ROM drives • RAM • Serial and parallel ports • Video adapter • Printer • Keyboard • Mouse
Module Test	Allows you to: <ul style="list-style-type: none"> • Run groups of tests in batch • Specify parameters to use for each test (for example, video modes, disk cylinders, port addresses, and so on) • Specify the number of passes you want to run (one to continuous) • Log the test results to a text or dBase Format (DBF) file • Save all test settings for future use • View System Information • View the server's configuration information. (For example, you can view the IRQ/DMA assignments, memory usage, device drivers, and so on.) • Select System Utilities • Format a diskette

Error Messages

Messages generated by the software—the operating system or application programs—generally are text messages, but they also can be numeric. Basically, there are five types of error messages.

- POST error messages
- Diagnostic error messages
- POST beep codes
- Software generated messages.
- Multiple messages

Error Message	Description
POST Error Messages	Displayed when POST finds problems with the hardware or detects a change in the hardware configuration.
POST Beep Codes	Sounds emitted from the speaker if POST finds a problem. One beep indicates POST completed successfully. Multiple beeps indicate a problem was found by the POST.
Diagnostic Error Messages	Displayed when a test program finds a problem with a hardware option.

Error Message	Description
Software Generated Error Messages	Displayed 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 supplied with that software package.
Multiple Messages	The first error that occurs can cause additional errors. Follow the suggested action of the first error displayed. In this case, the system displays more than one error message. Always follow the suggested action instructions for the <i>first</i> error message displayed.

Return Codes

For the test programs to properly determine if a test *Passed*, *Failed*, or *Aborted*, the test programs check the error-return code at test completion. To register the test properly in the test log, the test programs must generate one of the following return codes:

Return Code	Description
0	Indicates that the device passed its test.
1	Indicated that the device failed its test.
2 or greater	Indicates that the test stopped or was aborted.

Using the Test Programs

The test programs provide advanced functions and utilities for service or support professionals to troubleshoot even the most difficult problems.

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.

Intruder Alert:

When you load QAPLus/PRO diagnostics, Intruder Alert checks for damage to the Diagnostic Diskette. If a virus or program alteration is detected, the diagnostic programs do not load.

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

Using the First Letter of a Menu Choice

Throughout the test programs, pressing the first letter of an option on a menu is the same as moving to that item with the cursor and pressing Enter; however, this function is not enabled on Test Group Screens.

Using the Function Keys

Use the following keys to maneuver throughout the test programs:

Keys	Action
Enter	Select an item, run the test module, or run the test
Down Arrow (↓)	Moves the cursor down
Up Arrow (↑)	Moves the cursor up
F1	Calls up the appropriate Help information. Use the up arrow key (↑) or the 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. One of the important help categories is function key usage. Pressing Esc exits Help and returns to where you left off.
Esc	Go back to the previous menu

Additional functions are available in the Test Module Selection screen and the Test Group screen using the following keys:

Keys	Action
Tab	Move to test group (or move to parameters)

Keys	Action
Spacebar	Toggle modules on/off (or toggle tests on/off)
F2	View test results log
F10	Local menu
+	Next logical unit number (for example, LUN 1, LUN 2, and so on)
-	Previous logical unit number

Command Line Options

The following Command Line Options are available when initially loading the diagnostic program from within its directory of a DOS operating system. Loading QAPlus/PRO from a DOS system command line allows selected tests and options to run with minimum memory.

At a **DOS** operating system prompt, where the QAPlus/PRO files reside, type **QAPLPRO /XXX** (where **XXX** represents one or more of the following from the list below) then, press **Enter**.

Command	Action
/B&W	The /B&W command line option forces the program to load in Black and White (Monochrome) mode, which is often more readable on laptop computers.
/LOG=file	The /LOG=file command line option directs the test programs to start using a specified Error Log file.
/INT10	The /INT10 command line option forces the test programs to use the BIOS for screen writes.
/OXXX	The /OXXX command line option, where XXX=test group (for example, MBD, MEM, VID, HDU, FDU, KBD, COM, LPT, and so on), omits the designated test group from loading.
/OALL	The /OALL command line option omits all test groups from loading. This command can be used in conjunction with the /IXXX command.
/IXXX	The /IXXX command line option, where XXX=test group (for example, MBD, MEM, VID, HDU, FDU, KBD, COM, LPT, and so on), loads the designated test group for testing. This option is helpful if you have insufficient memory available to load all of the test programs simultaneously.
/USRCONFIG=file	The /USERCONFIG=file command line option tells the test programs to look for a user diagnostic configuration file other than the default USERDIAG.CFG.

Command	Action
/SCRIPT =file[,R]	<p>The /SCRIPT=file[,R] command line option with the “,R” runs the selected script. Please see “Scripting” on page 8 for a description of scripting.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note</p> <p>You can use a “-” instead of a “/” as the command line switch.</p> </div>

Viewing the Test Groups

As you move the cursor bar up or down in the Test Module Selection window, the right hand screen changes to show the attributes, parameters, and the selected tests of the corresponding Test Group. The diamond “◆” mark indicates a module selected for testing.

The indicated attributes are characteristics of the selected test module that are used by the test programs to determine which tests to run or how to run selected tests. Attributes are also used to limit the allowable range of parameters (for example, – ending cylinder).

Parameters are values you select to establish the scope of tests. For example, you can select Extended Memory testing parameters and limit the testing to a specific range of test blocks by specifying the starting and ending memory block. This might be appropriate if prior experience indicates that problems are likely to exist in a specific area of memory. By selecting these limiting parameters, you reduce memory testing time.

Scripting

Scripting allows you to select specific groups of tests, testing parameters, and options. Your selection is saved for later use as a test *Script*. To set up a test script, first select all the appropriate test groups and specific tests you want to run from the Module Testing section under Diagnostics. You should also select appropriate testing parameters and options. See “Program Navigation” on page 6, for instructions to save a test script.

Changing Logical Unit Numbers

In some instances, you can have more than one logical unit number (LUN) for a particular module. LUNs represent individual devices within a test group or module. For example, you might have two diskette drives or two hard disk drives; or, you might have base and extended memory installed in the computer. This configuration might result in as many as two or three different LUNs in the Memory Test Group.

From either the Module Test Menu or the Test Group window, you can change to a different LUN (where applicable) by pressing the plus (+) key (next LUN), or the minus (-) key (previous LUN).

Test Group Specifications

In the upper-right-hand portion of the testing screen (or just the upper portion if you switched to an individual test group screen) are the specifications for the related test group.

Starting the PC Server 315 Diagnostic Diskette

Note

The "PC Server System Board Diagnostic Diskette" contains the QAPlus/PRO diagnostics for the PC Server.

1. Insert the Diagnostics Diskette into drive A.
2. Power-on the computer.
3. When the Diagnostics **Main Menu** is displayed, press **Ctrl+A**.
4. Select Diagnostics; then, press **Enter**.
5. Follow the instructions that appear on the screen. If an error is displayed, go to "Symptom-to-FRU Index" on page 101.

Module Testing Mode

If the test programs do not find a problem, or you want to perform in-depth testing, the Module Testing mode provides a method to run individual tests on a single module. For example, you can run an individual test for the diskette drive, or you can run groups of tests for several modules.

In the Module Testing mode, you can define how many times each test should run and how the test program should log the errors.

To start the Module Testing mode:

1. Start the diagnostics diskette. See "Starting the PC Server 315 Diagnostic Diskette."
2. Select **Diagnostic** from the Main Menu.
3. Select **Module Tests** from the next menu.
4. Use the up and down arrow keys (↑ and ↓) to move the highlight bar from one selection to the next.
5. Follow the instructions on the screen.

Note

As you scroll down the selection menu, the Test Group window to the right changes to correspond to the highlighted Module.

Running Selected Module Tests

To run all selected tests for a test group:

1. Use the up and down arrow keys (↑ and ↓) to move the cursor to your selection.
2. Press **Enter**.

Note

A “◆” appears next to your selection.

Running All Selected Modules

To run all selected test modules:

1. Use the down arrow key (↓) to move the cursor to the last choice, **Run All Selected Modules**.
2. Press **Enter**.

Note

A “◆” appears next to your selection.

Changing Selected Tests in Test Groups

To change selected tests in a Test Group:

1. In the Module Tests Menu, use the up and down arrow keys (↑ and ↓) to move the cursor to your selection.
2. Press **Tab** to move into the expanded Test Group window.
3. Scroll to the test you want to select or deselect.

Attention

Items indicated by a directly adjacent “*” (red text on color screens) are destructive tests.

4. Press the spacebar at the highlighted test to toggle between select (indicated by a “◆”) and deselect.

Note

Pressing the first letter of a test does not activate the test, unlike menu operation.

5. Press **Esc** to return to the Test Group.
6. Press **Enter** to run the selected tests.

Running an Individual Test

To run an individual test:

1. From the expanded Test Group, use the up and down arrow keys (↑ and ↓) to move to the highlighted bar to the test you want to run.
2. Press **Enter** to run the test.

Note

The results of the test appear in the lower-right-hand Test Log window. Also, if you enabled Test Logging, the results are recorded in the Test Log.

- When the test completes, press Esc to return to the Test Group Menu.

Stopping the Tests

To stop running a specific test or stop testing after you have started a test, press Esc while the test is running. The test pauses at the first possible opportunity, and the Skip/Abort Test Menu appears with the following options:

Option	Action
Continue	The test program begins testing where it left off.
Skip to next test	The test program skips the current test, but remaining tests for the selected Test Module continue.
Skip to next group	The test program skips the remaining tests in the current test group.
Abort all tests	The test program stops and returns to the previous menu.

Diagnostics Control Keys

The following is a list of the Diagnostics Control Keys, when used and a description of the diagnostics response.

Control Keys	When Used	Diagnostics Response
Ctrl+A	Main Menu	Allows you to select test from the sub menus that are highlighted with red letters. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"><p style="text-align: center;">Attention</p><p>If selected, these tests will erase the information stored on the diskette or hard disk drive.</p></div>
Up and Down Arrow Keys	Main Menu Module Test Menu Test Group Menu	Highlights an item you want to select.

Control Keys	When Used	Diagnostics Response
Space Bar	Module Test Menu Test Group Menu	Adds a diamond to the left of the highlighted test. The test will run when Run All Selected is highlighted and the Enter key is pressed. Also removes the diamond to the left of the item. The test will not run when Run All Selected is highlighted and the Enter key is pressed.
Tab Key	Main Menu Module Test Menu	Selects the additional test for the menu you are in.
+/- Keys	Test Group Menu	Selects additional test. The LUN displayed on the top right Test Group Menu shows which test is selected and how and remain (example LUN 1 of 2).

Extended Memory Test

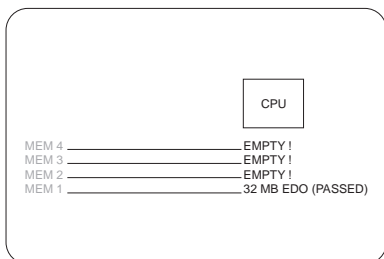
To run the extended memory test, do the following.

1. Insert the PC Server 315 Extended Memory Diagnostic diskette in drive A.
2. Reboot the server (press **Ctrl+Alt+Del**).

The following is an example of how the DIMMs being tested are displayed on the screen. The test runs automatically with good DIMMs highlighted in green as PASSED and non functional DIMM in red as FAILED.

Note

The reference designators shown on the left of the screen in the following diagram (MEM1, MEM2, etc) indicate the failing memory socket and are not displayed on the actual diagnostic screen.



3. Refer to the graphic on screen to determine if the DIMMs passed or failed the extended memory test.

To locate the memory socket positions the system board, see “System Board” on page 96.

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Features

The features in the server vary according to the model. The following is a summary of the features that are available with the PPC Server 315 - Type 8638.

Microprocessor

- Intel® Pentium® Pro with:

Cache Memory

- Level-1 cache, 16 KB
- Level-2 cache, 256 KB

Memory

- 32 MB minimum, expandable to 512 MB
- 60 ns, EDO ECC
- Four DIMM sockets

Diskette Drives

- Standard: 3.5-inch, 1.44 MB
- Optional (internal): 3.5-inch, 1.44 MB

Hard Disk Drives

- Supports up to four internal hard disk drives
- Number and capacities of drives vary by model

CD-ROM Drive

- Standard: SCSI

Keyboard and Mouse (Auxiliary-Device)

- IBM keyboard
- Mouse

Expansion Bays

- One 3.5-inch diskette drive bay
- One 5.25-inch CD-ROM drive bay
- One 3.5-inch or 5.25-inch drive bay
- Three 3.5-inch drive bays

Expansion Slots

- Four 32-bit PCI bus slots
- Two 16-bit ISA bus slots
- One shared PCI/ISA bus slot
- The number of slots available for expansion varies by model

Video

- Super video graphics array (SVGA) PCI adapter
- 1 MB VRAM, expandable to 2 MB
- Compatibility:
 - Color graphics adapter (CGA)
 - Video graphics array (VGA)

Security Features

- Bolt-down capability
- Door lock
- Selectable drive-startup
- Power-on and administrator passwords

Upgradable POST and BIOS

- Upgradable EEPROM on the system board
- POST/BIOS upgrades (when available)

Input/Output Connectors

- One infrared port
- One keyboard port

- One mouse (auxiliary-device) port
- Two serial ports
- One universal serial bus (USB) port
- One parallel port
- One SVGA PCI adapter
- One UltraSCSI adapter
 - One 8-bit internal port
 - One 16-bit internal port
 - One 16-bit external port
- One Ethernet adapter 100BASE-TX (100/10 Mbps) installed on some models

Power Supply

- 250 Watts with switch (115–230 V ac)
- Built-in overload and surge protection

Additional Service Information

The following additional service information is for the PC PC Server 315 - Type 8638.

- “100/10 Ethernet Adapter Configuration” on page 21.
- “100/10 Ethernet Adapter Troubleshooting” on page 26.
- “100/10 Ethernet Controller” on page 27.
- “100/10 Ethernet Controller Messages” on page 27.
- “100/10 Ethernet Device Drivers” on page 51.
- “100/10 Ethernet Diagnostics” on page 52.
- “100/10 Ethernet Ports” on page 53.
- “BIOS Levels” on page 53.
- “Display” on page 54.
- “Flash (BIOS/VPD) Update Procedure” on page 55.
- “Hard Disk Drive Boot Error” on page 56.
- “Memory Configurations” on page 56.
- “Plug and Play” on page 57.
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- “Software/Hardware Mismatch Problems” on page 78.
- “Undetermined Problem” on page 79.
- “Vital Product Data” on page 79.

100/10 Ethernet Adapter Configuration

Some PC Server 315 models come with an Ethernet adapter preinstalled as a standard feature. The adapter contains three LEDs visible from the back of the server that show the status of the connection, monitor read and write activity, and indicate a 100 Mbps connection. Refer to "100/10 Ethernet Adapter Troubleshooting" on page 26 for more information about the LEDs.

During POST, the server automatically configures the Ethernet adapter.

The Ethernet Configuration and Drivers program automatically installs necessary Novell NetWare 4.0 drivers, tests the adapter, and displays a help file with installation instructions for unsupported network operating-system drivers.

Note

You must use Category 5 cabling when operating the Ethernet adapter at 100 Mbps.

The Ethernet Configuration and Drivers program supports Windows NT Server 4.0.

Installing Multiple Adapters: Use the Ethernet Configuration and Drivers program each time you install an adapter. You can also use the program to isolate problems during troubleshooting.

Repeat the configuration procedures for each adapter that you want to install. Even though the Ethernet Configuration and Drivers program can detect all the PCI adapters in the server, you must perform the installation process before you can use the adapter.

Configuring for Windows NT Server 4.0: To configure the Ethernet adapter for the Windows NT Server 4.0 operating system:

1. Double-click on the Network icon on the Control Panel.
2. Click on the **Adapters** button; click on the **Add** button; then, click on the **Have Disk** button.
3. Insert the Ethernet Configuration and Drivers diskette 1 of 2 in drive A. Then, click on **OK**.
4. When the Select OEM Option screen appears, highlight the IBM 100/10 PCI Ethernet Adapter. Then, click on **OK**.

The Ethernet Configuration and Drivers program automatically scans server resources and determines which resources were assigned to the adapter. This may take a few seconds.

If a message appears stating *The system has not enabled busmastering on the device you are*

installing, the device driver will attempt to enable mastering when it loads. Run the adapter diagnostics to see if busmastering is allowed in the slot selected.

5. Click on **Test**.

Notes:

- When testing a newly configured adapter, the network device driver will not be active. The diagnostic will test only the adapter and its connection to the network.
 - When testing a previously configured adapter, the network device driver will be active. The diagnostic will test the adapter, its connection to the network, and the device driver. The test will also track the actual network activity of the device driver.
6. When testing completes, click on **OK** to accept the configuration. Then, click on **OK** again.
 7. Under Network Adapter, select the IBM 100/10 PCI Ethernet Adapter. Then, click on **Close**.

Note:

If you have other LAN protocols installed, such as TCP/IP, additional screens will appear requesting configuration information. If this occurs, follow the instructions on the screen.

8. Remove the Ethernet Configuration and Driver diskette from drive A.
9. Click on **Yes** in the Network Settings dialog box to restart Windows NT Server Version 4.0.

Troubleshooting

- Make sure that you are using the device drivers that come with this adapter.
- Make sure that the device driver is loaded and the protocols are bound. See the Network Bindings dialog box in Windows NT Server 4.0 to verify this.
- Make sure that you are using Category 5 cabling when operating the Ethernet adapter at 100 Mbps.
- Test the adapter using the instructions in "Configuring for Windows NT Server 4.0" on page 21.
- Check with the LAN administrator.

Configuring for Other Operating Systems

Refer to the help files on the Ethernet Configuration and Drivers program for instructions on configuring for other operating systems.

To view the help files:

1. Insert the Ethernet Configuration and Drivers diskette in drive A, and switch to that drive.
2. At the operating-system prompt, type `SETUP \README`.
3. Press **Enter**.

4. Select **Installing 100/10 PCI Ethernet adapter drivers**; then, follow the instructions on the screen.

Duplexing: Duplexing is a performance option that lets you choose how the adapter sends and receives packets over the network.

There are three duplex modes:

- | | |
|-----------------------|--|
| Full duplex | The adapter sends and receives packets at the same time, increasing adapter performance. This mode requires a full-duplex hub. |
| Half duplex | The adapter performs one operation at a time: it either sends or receives packets. |
| Auto-negotiate | The adapter negotiates with the hub how to send and receive packets, either full or half duplex. |

Configuring for Full-Duplex: If you have a hub that does not support auto-negotiation, manually configure the adapter for full-duplex support. Configuration is specific to the device driver that you are loading for the network operating system.

Note

You must set the adapter speed when configuring for full-duplex support. Do not leave the speed set to auto-negotiate.

Driver	How To Set Duplex Mode
Windows NT Server 4.0	Define the Setup program: <ol style="list-style-type: none">1. Double-click on the Network icon on the Control Panel.2. Click on the Adapters button.3. Click on the Properties button.4. Click on the Change button.5. Under Network Speed, select 100 Mbps or 10 Mbps.6. Under Duplex Mode, select Half Duplex or Full Duplex.7. Click on Ok. Then, click on Ok again.8. Click on Close.9. Click on Ok to restart Windows NT Server Version 4.0.
Other Network Operating Systems	See the README file. To view the README files, insert the Ethernet Configuration and Drivers diskette, and type <code>SETUP \README</code> at the DOS prompt. Then, press Enter .

Fast Ethernet Hubs

New hubs are available to support a variety of Fast Ethernet LAN configurations. These hubs can be divided into two basic types: shared and switched. 100/10 PCI Ethernet adapters can be used with either type of hub for 10 Mbps or 100 Mbps operations.

Shared Hubs: In a shared network environment, servers are connected to hubs. A repeater is built into each port of the hub. All ports of the repeater hub share a fixed amount of bandwidth, or data capacity. A 100 Mbps shared hub means that all nodes on the hub must share the 100 Mbps or bandwidth. As stations are added to the hub, the effective bandwidth available to any individual station becomes smaller.

All nodes must operate at the same speed, either 10 Mbps or 100 Mbps. Fast Ethernet repeaters provide 100 Mbps of available bandwidth, ten times more than what is available with a 10 BASE-T repeater.

Repeaters use a well established, uncomplicated design, making them highly cost-effective for connecting workstations in a workgroup.

Switched Hubs: In a switched network environment, each port uses a fixed, dedicated amount of bandwidth. Network bandwidth is not shared among all stations. Each new station added to the hub receives access to the full bandwidth of the network. Data is sent only to the port that leads to the correct workstation.

If a new workstation is added to a 100 Mbps switching hub, the new workstation receives its own dedicated, 100 Mbps link that does not affect the 100 Mbps bandwidth of other workstations. Switching hubs can effectively increase the overall bandwidth available on the network, significantly improving performance.

100/10 Ethernet Adapter Troubleshooting

The following information is for troubleshooting problems that might occur when the 100/10 PCI Ethernet Adapter is installed in the server.

Network Connection Problems: If the adapter cannot connect to the network, check the following:

- Make sure the cable is installed correctly.

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

If you set the Ethernet adapter to operate at 100 Mbps you must use Category 5 cabling. Refer to the **Hardware Specifications and Cabling Information** section in the help file for a list of recommended cables and information on how to install cabling.

If you directly connect two workstations (no hub), use a crossover cable. Refer to the **Hardware Specifications and Cabling Information** section in the help file.

- Check the LEDs on the rear of the Ethernet adapter.

The Ethernet adapter has three diagnostic LEDs beside the cable connector. These lights help indicate whether a problem exists with the connector, cable, or hub.

- The LNK LED illuminates when the adapter receives a LNK pulse from the hub. If the LED is OFF, there might be a bad connector or cable, or a problem with the hub. The LNK LED is also OFF when you run the diagnostic tests in the Setup program.
- The ACT LED illuminates when the adapter detects read or write activity on the network, even when there is no activity on the adapter. If the ACT LED is not on, make sure that the hub and network are operating and that the correct drivers are loaded.

- The 100 LED illuminates when a 100 Mbps connection is established.
- Make sure that you are using the correct drivers.
- Check for operating system-specific causes for the problem.
- Test the adapter.

Select **Test adapter** from the Main Menu on the Ethernet adapter Configuration and Drivers diskette. How you test the adapter depends on which operating system you are using.

100/10 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 (FDX) operation.

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.

Note

Before installing an IBM PC Ethernet adapter, be sure to run the Ethernet diagnostics and record the server's Ethernet configuration information.

100/10 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
- NDIS Adapter for level 2.01
- NDIS Adapter for level 3.0
- Packet Driver
- SCO UNIX LLI, UnixWare DLPI, and SunSoft Solaris

Novell NetWare Server ODI Driver

Messages: This following error messages are 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: Do the following:

1. Verify that the Ethernet jumper on the system board is set to the default, enabled position.
 2. Go to "General Checkout" on page 2.
-

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: Do the following:

1. Verify that the IRQ settings in the NET.CFG file match the configuration settings in the configuration programs. See "Resolving Hardware Configuration Conflicts" on page 77 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 an IBM Ethernet adapter was installed, 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: Do the following:

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 "Resolving Hardware Configuration Conflicts" on page 77 for more information.
-

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 installed. 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 installed. 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 installed. 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 were shipped with 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, replace the system board.

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, replace the system board.

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, replace the system board.

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 the hardware configuration matches the software settings. See “Resolving Hardware Configuration Conflicts” on page 77 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, replace the system board.

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, replace the system board.

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

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

Action: Restart the server. If the error recurs, replace the system board.

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, replace the system board.

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.

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: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. Go to "General Checkout" on page 2.
-

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 "General Checkout" on page 2.

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:

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

PCNTW-DOS-1 The LSL is not loaded.

Explanation: The Link 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 315 - Type 8638, 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.

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.

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 the 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.

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 "Resolving Hardware Configuration Conflicts" on page 77 for information on setting the interrupt requests.
3. If the problem persists, go to "General Checkout" on page 2.

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 "General Checkout" on page 2.

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 programs. See "Resolving Hardware Configuration Conflicts" on page 77 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 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 "100/10 Ethernet Diagnostics" on page 52 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: Do the following:

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 “100/10 Ethernet Diagnostics” on page 52 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.

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 following error messages are the 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 "General Checkout" on page 2.

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 programs. See "Resolving Hardware Configuration Conflicts" on page 77 for information on setting the interrupt requests.

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 programs. See "Resolving Hardware Configuration Conflicts" on page 77 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 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 “Resolving Hardware Configuration Conflicts” on page 77 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 “General Checkout” on page 2.

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: Do the following:

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 “General Checkout” on page 2.
-

PCNTNW-OS2-73 Unable to allocate memory.

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

Action: Check the system configuration.

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.

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

NDIS 2.01 Driver Messages: The following error messages are 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 the configuration.

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

Explanation: The driver could not allocate the requested buffers.

Action: Check the 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 the configuration.

PCNTND-DOS-8 Bad status for Protocol Manager.

Explanation: The NDIS stack is not configured correctly.

Action: Check and correct the 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 the 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 the configuration.

PCNTND-DOS-11 Protocol Manager registration failed.

Explanation: The NDIS stack is not configured properly.

Action: Check and correct the configuration.

PCNTND-DOS-15 Device not found.

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

Action: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to "General Checkout" on page 2.
3. Replace the system board.

PCNTND-DOS-16 PCI scan specified, device not found.

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

Action: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to “General Checkout” on page 2.
3. Replace the system board.

PCNTND-DOS-21 Board failed checksum test. Please run configuration utility.

Explanation: The driver cannot find an Ethernet controller.

Action: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to “General Checkout” on page 2.

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 programs. See “Resolving Hardware Configuration Conflicts” on page 77 for information on setting the interrupt requests.)

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: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Go to “General Checkout” on page 2.

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 programs. See "Resolving Hardware Configuration Conflicts" on page 77 for information on setting the interrupt requests in the configuration 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.

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: Do the following:

1. Verify that the Ethernet enable jumper is set to the default **Enable** position.
 2. If the problem persists, go to "General Checkout" on page 2.
-

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.

PCNTN3-21 Device not found.

Explanation: The driver cannot find any PCnet device.

Action: Do the following:

1. Verify that the Ethernet enable jumper is set to the default **Enable** position.
2. Go to "General Checkout" on page 2.

Packet Driver Messages: The following error messages are 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: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. If the problem persists, go to "General Checkout" on page 2.
-

PCNTPK-DOS-3 Unable to initialize the PCnet device.

Explanation: The software could not initialize the Ethernet controller.

Action: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. Check the interrupt settings in the configuration programs. For more information, go to "Resolving Hardware Configuration Conflicts" on page 77.
 3. If the problem persists, go to "General Checkout" on page 2.
-

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: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. Go to "General Checkout" on page 2.
-

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: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. If the problem persists, go to "General Checkout" on page 2.
-

PCNTPK-DOS-18 PCI scan specified, device not found.

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

Action: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. If the problem persists, go to "General Checkout" on page 2.
-

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: The following error messages are for the following UNIX drivers.

- SCO UNIX LLI
- UnixWare DPLI
- SunSoft Solaris

pnt0-2 PCI search specified, PCI device not found!

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

Action: Do the following:

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 “General Checkout” on page 2.

pnt0-6 Cannot allocate memory for the adapter during an interrupt. Please check the Streams parameters.

Explanation: The system is out of Streams memory blocks.

Action: Perform the following steps:

1. Use the CRASH utility to increase the number of Streams memory blocks for the failing size.
2. Modify the IRQ settings in the configuration programs, or run netconfig to match the hardware settings.

pnt0-6 Cannot allocate memory for the adapter during an interrupt! Please check the 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: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. Go to "General Checkout" on page 2.
-

pnt0-12 device failed checksum test!

Explanation: The driver cannot find an Ethernet controller.

Action: Do the following:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. Go to "General Checkout" on page 2.
-

pnt0-13 add_intr_handler failed! Interrupts already enabled.

Explanation: The IRQ specified or found conflicts with other devices in the system.

Action: Do the following:

1. Modify the 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 "General Checkout" on page 2.
-

pnt0-15 No more devices to open.

Explanation: The SunSoft Solaris driver cannot find any more Ethernet controllers.

Action: Do the following:

1. Verify that additional IBM PCI Ethernet adapters are present or replace the Ethernet adapter that fails to respond.
2. Go to "General Checkout" on page 2.

pnt0-17 Device fault... Reset initiated!

Explanation: The SunSoft Solaris driver has been reset due to device fault.

Action: Do the following:

1. Verify that additional IBM PCI Ethernet adapters are present or replace the PCnet card that fails to respond.
2. Go to "General Checkout" on page 2.

pnt0-19 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.

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: Do the following:

1. Modify the 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: Do the following:

1. Modify the 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: Do the following:

1. Modify the 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: Do the following:

1. Modify the 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: Do the following:

1. Modify the hardware settings.
2. Run netconfig to search for another Ethernet controller.

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.

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.

100/10 Ethernet Device Drivers

The following is a list of Ethernet device drivers and the directory/path in which they are located for the operating systems supported by the PC Server 315 - Type 8638.

The device drivers are located on three diskettes labeled 1, 2, and 3. These diskettes are supplied with the server.

Note

The device driver names are printed in **bold** type.

- Disk 1
 - NDIS 2.0.1 Driver (DOS, OS/2)
 - A:\MSLANMAN.DOS\DRIVERS\ETHERNET\PCNTND\ **PCNTND.DOS**
 - A:\MSLANMAN.OS2\DRIVERS\ETHERNET\PCNTND\ **PCNTND.OS2**
 - A:\LANSRVR**PCNTND.OS2**
 - ODI Driver (DOS, OS/2, Server)
 - A:\NOVELL\SERVER\3.1X**PCNTNW.LAN**
 - A:\NOVELL\SERVER\4.X**PCNTNW.LAN**
 - Novell Support files
 - A:\NOVELL\WKSTN\DOSODI**PCNTNW.COM**
 - A:\NOVELL\WKSTN\OS2ODI**PCNTNW.OS2**
 - ODI LAPP Driver (DOS)
 - A:\LAPP\DOSODI**PCLAPP.COM**
 - NDIS 3.x for Windows NT 3.51
 - A:\WINNT351**AMDPCN.SYS**
 - SCO UNIX Open Server 5.0 MDI driver
 - Driver support is built into SCO UNIX 5.0.
 - Unixware 2.0 DLPI driver
 - Driver support is built into UNIXWARE 2.x.
- Disk 2
 - DOS Client for IBM LAN Server
 - A:\IBMADOS**PCNTND.DOS**
 - A:\IBMLSP**PCNTND.DOS**
 - Packet Driver
 - A:\PKTDRVR**PCNTPK.COM**
- Disk 3
 - Sun Solaris Driver (for v2.4)
 - This diskette is Unix PkgAdd format. the driver's name extension is **pcnt**.

100/10 Ethernet Diagnostics

You must use the Ethernet Diagnostic Diskette 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 IBM PC Server PCI Ethernet diagnostic diskette. Using the backup copy can prevent damage to the original diskette. The 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. Power-on the server, or if it is already on, shut down the operating system and restart the server.
3. Type **/diags**; then, press **Enter**.
4. Follow the instructions on the screen.
5. When the diagnostic tests are complete, remove the diskette from the diskette drive; then, restart the server.

100/10 Ethernet Ports

The PC Server 315 Type 8638 has Ethernet connectors for 10Base-T or Attachment Unit Interface (AUI) devices. The controller automatically detects which port is connected to the network, and then uses that port for communication.

Notes

- If the server comes with an Ethernet interface cable, it must be installed to comply with FCC requirements.
- 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.

To connect the 10Base-T port to a 10Base-T port on a repeater, use an unshielded twisted-pair (UTP) cable with RJ-45 connectors at both ends. Use a straight-through UTP cable when connecting to a crossover port (also called MDI-X port), and use crossover cables to connect to a repeater that is not a crossover port (also known as a MDI port).

To connect the AUI port to a 10Base-5, 10Base-2, or 10Base-F segment, use an AUI cable.

BIOS Levels

An incorrect level of BIOS can cause false error and unnecessary FRU replacement. Use the following information to determine the current level of BIOS installed in the computer, the latest BIOS available for the computer, and where to obtain the latest level of BIOS.

- Current Level BIOS information.
 - Run the Configuration Utility to determine the level of BIOS installed.
- Sources for determining the latest level BIOS available.
 1. IBM PC Company Home Page
<http://www.pc.ibm.com>
 2. Bulletin Board System (BBS)
 3. HelpCenter

4. Levels 1 and 2 Support
 5. RETAIN
- Sources for obtaining the latest level BIOS available.
 1. IBM PC Company Home Page
<http://www.pc.ibm.com>
 2. Bulletin board system (BBS)
 3. HelpCenter
 4. Levels 1 and 2 Support

To update (flash) the BIOS, see “Flash (BIOS/VPD) Update Procedure” on page 55.

Display

If the screen is rolling, replace the display assembly. If that does not correct the problem, replace the video adapter (if installed) or replace the system board.

If the screen is not rolling, do the following to run the display self-test:

1. Power-off the computer and display.
2. Disconnect the display signal cable.
3. Power-on the display.
4. Turn the brightness and contrast controls clockwise to their maximum setting.
5. Check for the following conditions:
 - You should be able to vary the screen intensity by adjusting the contrast and brightness controls.
 - The screen should be white or light gray, with a black margin (test margin) on the screen.

Note

The location of the test margin varies with the type of display. The test margin might be on the top, bottom, or one or both sides.

If you do not see any test margin on the screen, replace the display. If there is a test margin on the screen, replace the video adapter (if installed) or replace the system board.

Note

During the first two or three seconds after the display is powered on, the following might occur while the display synchronizes with the computer.

- Unusual patterns or characters
- Static, crackling, or clicking sounds
- A “power-on hum” on larger displays

A noticeable odor might occur on new displays or displays recently removed from storage.

These sounds, display patterns, and odors are normal; do not replace any parts.

If you are unable to correct the problem, go to “Undetermined Problem” on page 79.

Flash (BIOS/VPD) Update Procedure

Attention

Refer to the information label located inside the system unit cover for any model-specific information.

1. Power-off the computer.
2. Insert the flash update diskette into drive A.
3. Power-on the computer.
4. When the Update Utility appears; select your country/keyboard, then press **Enter**.
5. If the computer serial number was previously recorded, the number is displayed with an option to update it. Press **Y** to update the serial number.
6. Type the 7-digit serial number of the computer you are servicing; then, press **Enter**.
7. Type the 7-digit machine type/model of the computer you are servicing; then, press **Enter**.
8. Follow the instructions on the screen to complete the flash (BIOS/VPD) update procedure.

Note

When you are prompted to change the Logo, press the **N** key.

Flash Recovery Jumper

Attention

If an interruption occurs during a Flash/BIOS upgrade, the BIOS might be left in an unusable state. This jumper enables you to restart the system and recover the BIOS.

To perform a Flash/BIOS recovery:

1. Power-off the computer and remove the cover.
2. Move the system board Flash jumper from pins 23-24 to pins 22-23.
3. Insert the upgrade diskette into the diskette drive.
4. Power-on the computer and listen to the speaker. You should hear beeps in the following sequence.
 - a. After you restart the computer, it beeps once. This beep marks the beginning of the power-on self test (POST).
 - b. After a short delay (less than 10 seconds), the computer beeps again. This marks the beginning of the recovery process; the recovery code is being copied into the flash component.
 - c. After about 30 seconds, the computer beeps twice, marking the end of the recovery process. Wait until the diskette drive in-use light goes out.
5. Power-off the computer and move the jumper back to the normal (default) position.

6. Leave the upgrade diskette in the diskette drive and power-on the computer.
7. Continue with the original upgrade.

Hard Disk Drive Boot Error

A hard disk drive boot error (error codes 1962 and I999030X) can be caused by the following:

Cause	Actions
The start-up drive is not in the boot sequence in configuration.	Check the configuration and ensure the start-up drive is in the boot sequence.
No operating system installed on the boot drive.	Install an operating system on the boot drive.
The boot sector on the start-up drive is corrupted.	The drive must be formatted, do the following: <ol style="list-style-type: none"> 1. Attempt to access and recover (back-up) the failing hard disk drive. 2. Using the operating systems programs, format the hard disk drive. 3. Go to "Preparing the Hard Disk Drive for Use" on page 61.
The drive is defective.	Replace the hard disk drive.

Memory Configurations

The following DIMM configurations are supported.

Note

Standard memory-module configurations are subject to change.

Configuration	Speed	Type	Size (MB)
Standard	60 ns	EDO ECC	32
Optional	60 ns	EDO ECC	32, 64, 128

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

The UltraSCSI adapter in the server supports SCSI IDs 0 to 15. ID 7 is reserved for the adapter. The scanning sequence for (preinstalled) SCSI devices proceeds from the lowest SCSI ID to the highest SCSI ID, starting with 0. If the server comes with a preinstalled hard disk drive, this is the startup drive, and it already has a SCSI ID of 0.

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

Termination Requirements: All PC Server 315 models come with UltraSCSI adapter preinstalled as a standard feature. This adapter provides termination for one end of the SCSI bus (cable) in the server. However, both ends of the SCSI bus must be terminated. The steps required to set the termination for the other end of the SCSI bus are as follows:

- PC Server 315 models that come with a hard disk drive preinstalled in bay 6.

The termination for the hard disk drive is set to Enabled. When you install additional SCSI devices in bays 3, 4, and 5, you must disable the termination for the devices before you install them.

- PC Server 315 models that do not come with a preinstalled hard disk drive.

These models come with a terminator attached to the last connector on the SCSI cable. When you install a hard disk drive, it should be installed in bay 6.

Enable termination on the drive and remove the terminator from the last connector on the SCSI cable. Connect the last connector on the SCSI cable to the hard disk drive.

Note

The terminator is used for factory tests only and should not be used during normal operation.

Refer to the instructions that come with the SCSI device for more information about termination.

Plug and Play

Plug and Play is a technology designed to make expanding the server easier. Plug and Play adapter support is built into the system board in the server. PCI adapters generally support Plug and Play.

Plug and Play Adapters: Plug and Play adapters are easier to install and set up because they are auto-configuring. This means that there are no jumpers or switches to set.

A Plug and Play adapter comes with built-in identification and configuration specifications set in memory on the adapter that provides installation information to the server during startup. This information is sensed by the input/output (I/O) bus and interpreted by the server *Basic*

Input/Output System (BIOS). The BIOS routines then automatically configure the adapter around the resources already in use by other devices.

Most adapters designed for PCI slots are Plug and Play devices. However, many ISA adapters are not Plug and Play devices. These adapters are discussed in “Legacy Adapters.”

Notes.

1. If a resource conflict arises after you install a Plug and Play adapter, you might need to change the default resource settings on the adapter. For more information, refer to the documentation that comes with the adapter.
2. For a description of resource conflicts, see “Server Configuration Conflicts” on page 76.

Legacy Adapters: If an adapter that you install is not Plug and Play compatible, the *Setup* utility program can help you manually configure the adapter. Adapters that are not Plug and Play compatible are known as *legacy devices*.

Setup Utility Program: Within the *Setup* utility program, the ISA Legacy Resources screen displays server resources that are typically required by adapters:

- I/O port address
- Memory address
- IRQ line
- DMA channel

From the *Setup* utility program screens you can select available resources for the adapter you are installing. Resources not currently being used by adapters that are already installed in the server are listed as **[Available]**. The system resources that are in use by other devices are listed as a **[System Resource]**.

Refer to the documentation that comes with the adapter for information about required system resources. Then make the appropriate jumper or switch settings on the adapter.

If you have a resource conflict, set the resources used by the ISA legacy adapter to **[Not available]**. This will manually configure the ISA legacy adapter to that specific server resource. Once Plug and Play detects that a resource is not available, it will skip that resource, and reconfigure to other available system resources.

Power Supply

Note

Verify that the voltage-select switch is set for the correct voltage. If the voltage switch is set to the wrong position, permanent damage might occur to the server when you power it on.

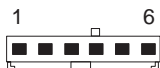
If the power-on indicator is not on, and the power-supply fan is not running, check the power cord for proper installation and continuity.

If the power cord is OK, either the power supply is defective or a defective device is causing the power supply to shut off. Check the power supply voltages.

The power supply is rated at 250 watts. Too many devices (adapters or hard disk drives) can cause power consumption to exceed 250 watts and cause the power supply to shut down. Remove adapters or devices to determine if this is the cause.

If the voltages are incorrect, replace the power supply. If the voltages are correct, and the Symptom-to-FRU index does not solve the problem, go to "Undetermined Problem" on page 79.

P1



-Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
5, 6	1	Power Good	
5	2	+4.8V	+5.25V
6	3	+11.52V	+12.60V
6	4	-10.8V	-13.2V

P2



-Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
1	3	-4.5V	-5.5V
2	4	+4.8V	+5.25V
2	5	+4.8V	+5.25V
2	6	+4.8V	+5.25V

P3



-Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
2	1	+4.8V	+5.25V
3	4	+11.52V	+12.6V

P4, P5, P6, P7, and P8



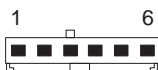
-Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
2	1	+11.52V	+12.6V
3	4	+4.8V	+5.25V

P9/P12



-Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
3	1	+4.8V	+5.25V
Pin	Description		
2	- Power On Request		

P10



-Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
4	1	+3.3V	+3.5V
5	2	+3.3V	+3.5V
6	3	+3.3V	+3.5V

P11



-Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
4	1	+3.3V	+3.5V
5	2	+3.3V	+3.5V
6	3	+3.3V	+3.5V

Preparing the Hard Disk Drive for Use

When the Low-Level Format program is finished, restore to the hard disk all the files that you previously backed up.

1. Partition the remainder of the hard disk for the operating system. (The commands vary with the operating system. Refer to the operating-system manual for instructions.)
2. Format the hard disk using the operating system. (The commands vary with the operating system. Refer to the operating-system manual for instructions.)
3. Install the operating system.

You are now ready to restore the files.

Printer

1. Make sure the printer is properly connected and powered on.
2. Run the printer self-test.

If the printer self-test does not run correctly, the problem is in the printer. Refer to the printer service manual.

If the printer self-test runs correctly, install a wrap plug in the parallel port and run the diagnostic tests to determine which FRU failed.

If the diagnostic tests (with the wrap plug installed) do not detect a failure, replace the printer cable. If that does not correct the problem, replace the system board or adapter connected to the printer cable.

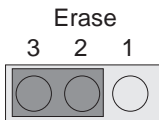
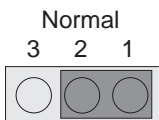
Removing an Unknown Power-On/Administrator Password

The following procedure outlines how to remove an unknown (or forgotten) power-on password.

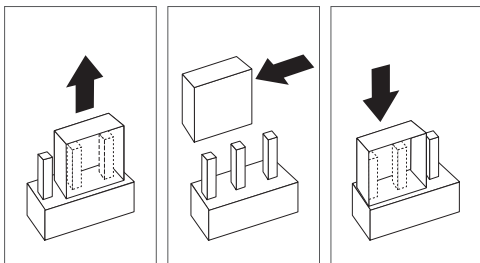
Attention

This procedure erases the current server configuration. Be sure to record the server configuration before performing this procedure. You must reconfigure the server after you move the password jumper. The `&admp.` and power-on password share the same jumper, known as the password jumper.

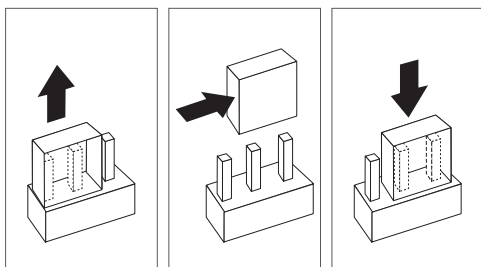
1. Power-off the server.
2. Locate the password jumper (PWD) in the system-board illustration in "System Board" on page 96. The jumper settings are shown in the following illustration.



3. 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.
 - c. Slide the jumper over these pins.This procedure removes the password.



4. Wait one minute; then, move the jumper back to its original position. You are now able to set a new password.



To set a new power-on password, follow the instructions in “Setting a Power-on Password” on page 72.

Replacing a System Board

Notes

1. The BIOS and Vital Product Data (VPD) for the computer you are servicing must be installed on the new system board (FRU) after it is installed in the computer. To do this, **you must run the Flash Update program using the Flash Update diskette**. See “BIOS Levels” on page 53 “Vital Product Data” on page 79, and “Flash (BIOS/VPD) Update Procedure” on page 55.
2. Always ensure the latest level of BIOS is installed on the computer. A down level BIOS may cause false errors and unnecessary replacement of the system board.
3. The processor is a separate FRU from the system board and is not included with the system board FRU. If you are instructed to replace the system board, do the following.
4. Remove the processor from the old system board and install it on the new system board.
5. Remove any installed options on the old system board, and install them on the new system board.
6. Ensure that the new system board jumper settings match the old system board jumper settings.
7. If the new system board does not correct the problem, reinstall the options on the old system board, reinstall the old system board, then replace the processor.

Replacing a Processor

Orientate the processor so that the pins on the processor align with the holes in the processor socket when the lever is in the vertical position. The processor should fit easily into the processor socket.

Important

Do not force the processor or damage may occur.

SCSISelect Utility Program

The SCSI adapter 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:

- Change the default values
- Verify and change configuration conflicts
- Format a new 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 logo screen appears briefly and then disappears. Press **Ctrl+A** immediately after the SCSISelect prompt appears. Use the Up Arrow (↑) or 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 the 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

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
Select this choice to enable or disable SCSI adapter parity checking. The default value is *Enabled*. This setting should not be changed.
- Host Adapter SCSI Termination
Select this choice to configure SCSI controller termination.

- **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 multiple drives with DOS Version 5.0 and higher.

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.

Using the Low-Level Format Program: You can format hard disk drives using the *Low-Level Format* 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 Low-Level Format Program:

Use the Low-Level Format 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 the files, see the operating-system documentation.

Starting the Low-Level Format Program

Attention

The Low-Level Format program 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, replace the drive.

Server Configuration

The Configuration/Setup utility programs are stored in the *basic input/output system (BIOS)* that comes with the server.

Two hardware configuration utility programs come with the server:

- Configuration/Setup
- SCSISelect

The built-in Configuration/Setup utility program configures system-board functions, such as serial and parallel port assignments, and the startup sequence for drives that are installed. This utility program also allows you to set passwords for starting up and accessing the Configuration/Setup utility program.

The built-in SCSI utility program, SCSISelect, allows you to configure the SCSI devices that are installed in the server. You can use SCSISelect to change default values, resolve configuration conflicts, and perform a low-level format on SCSI hard disk drives.

Before installing a new device or program, read the documentation that comes with it. Reading the instructions helps you to determine the steps required for installation and configuration. The following scenario provides a preview of the actions that might be required to configure the 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 "System Board" on page 96.
3. Set jumpers or switches on the device.
See the device installation instructions.
4. Install the device in the server. If the device is an ISA adapter that is not a Plug and Play device, use the ISA Legacy Resources Setup menu, which is part of the Configuration/Setup utility program, to set the ISA legacy resources. These include memory, I/O ports, direct memory access (DMA), and interrupt request levels (IRQs). See "ISA Legacy Resources" on page 75 for more information.
5. Install software programs. See the installation instructions shipped with the software.

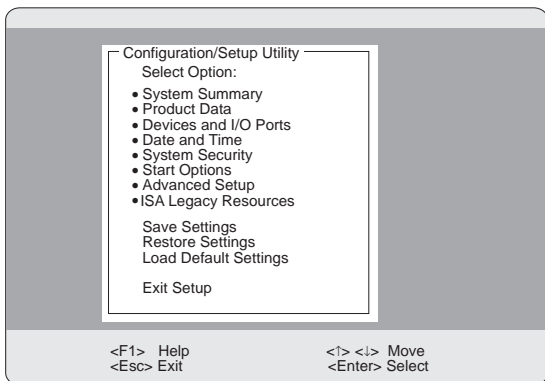
6. Resolve configuration conflicts. See “Server Configuration Conflicts” on page 76.

Using the Configuration/Setup Utility Program:

The built-in Configuration/Setup utility program provides a convenient method to configure various system features. In most cases, the server will operate using the default settings. You need to change the settings only to resolve configuration conflicts or to enable or change device function (for example, defining diskette types).

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 information and the information that comes with the device before making changes. Also, record the current settings before making any changes.

The following menu appears when you start the Configuration/Setup utility program.



Note

Depending on the level of password protection, a limited version of the menu might appear. See “Password Overview” on page 70 for more information.

You can advance through the screens by pressing the Page Up (PgUp) or Page Down (PgDn) key. Use the Up Arrow (↑) or Down Arrow (↓) key to move through the items on the screen. To change a setting, highlight the item that you want to change; then, use the Left Arrow (←) or Right Arrow (→) key to view the choices.

Press **F1** for online Help information on each selection.

Starting the Configuration/Setup Utility Program

Note

If a configuration error occurs, a prompt appears before the operating system starts (see “Server Configuration Conflicts” on page 76).

To access the Configuration/Setup Utility program:

1. Power-on the server and watch the screen.
2. When the message Press F1 for Setup appears, press **F1**.
3. Follow the instructions on the screen to view or change the configuration.
4. Select the **Exit Setup** option on the menu or press **Esc** to exit the Configuration/Setup utility program.

Note

You must *correctly* exit from the Configuration/Setup utility program to save the configuration information.

If you change configuration information, and the change causes an error during the power-on self-test (POST), a “▲” displays next to the menu selection that contains the change.

System Summary: Select this choice to view system information, including the type and speed of the microprocessor, amount of memory, and amount of cache installed in the server.

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.

Product Data: Select this choice to display information about the PC Server 315, 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.

Changes that you make on other menus are reflected on this summary screen. You cannot edit any fields.

The Product Data choice appears on the full Configuration/Setup menu.

Devices and I/O Ports: Select this choice to view or change the assignments for devices and ports. Some programs and devices require specific assignments. Review the documentation that comes with the device for more information.

To display or change the port assignments:

1. Power-on the system. When the **F1** prompt appears, press **F1**. The *Setup* utility program Main Menu appears.
2. Select **Devices and I/O Ports**.
3. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the assignment that you want to change. Use the Left Arrow (←) or Right Arrow (→) key to select from the list of available choices.

Note

If the assignment conflicts with another assignment, an asterisk appears next to the conflicting setting. You must change one of the conflicting settings to a value that does not conflict.

4. When you complete all changes to the menu, press **Esc** to return to the Configuration/Setup menu.

Changing the Serial and Infrared Port

Assignments: The system comes with two 9-pin, serial ports and one infrared port. For a description and illustration of these ports, see “Input/Output Connectors” on page 91.

Select **Serial Port** to view or change serial and infrared port assignments.

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

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.

You can connect an optional infrared transceiver module to the infrared connector. This enables you to transfer data to and from other infrared-capable computers or printers.

Note

Set switch 7 to the ON position to enable the serial B/infrared port. When switch 7 is set to ON, serial port B or the infrared port can be selected using the Configuration/Setup Utility. Switch 7 should always be set to ON.

Configuring Parallel Ports: Select **Parallel Port** to configure the parallel port.

The system comes with one 25-pin, parallel port. For a description and illustration of this port, see “Input/Output

Connectors” on page 91. This choice allows you to change values for resources used by the parallel port. These resources include:

- Parallel port address
- Parallel mode
- Extended mode
- Extended mode DMA
- Parallel port IRQ

Configuring Video: The video setup screen allows you to do the following:

- View the video controller type
- View the amount of video memory
- Enable/disable palette snooping and video interrupts.

Select **Video Setup**; then, use the Left Arrow (←) or Right Arrow (→) key to select from the list of available choices.

Date and Time: Select **Date and Time** to change or set values for the system date and time. Use this option to set the real-time clock in the server.

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

The system date is in the standard format for your country. For example, in the United States, the format is MM/DD/YYYY (Month/Day/Year).

Select **Date and Time**; then, use the Left Arrow (←) or Right Arrow (→) key 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.

System Security: To control access to the server, you can implement the security features described in the *User's Reference*, including defining two levels of password protection and restricting diskette drive access.

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

Password Overview: The server supports both a power-on password and an administrator password.

If passwords are set, the server displays the Enter password prompt when:

- The password prompt is set to **On** and a power-on password is set.
- The password prompt is set to **On** and a power-on password and an administrator password are set.
- An administrator password is the only password set.
- You enter the Configuration/Setup utility program.

- You start the server from a diskette.

The server does not display a password prompt when:

- No passwords are set.
- The password prompt is set to **Off**, only a power-on password is set, and the server is not being started from a diskette.

In this case, the server starts, but the keyboard is locked. The keyboard can be unlocked by entering the power-on password.

The passwords do not appear on the screen as you type them. When you enter the correct password, OK appears on the screen. If you enter the wrong password, Incorrect password appears on the screen, and Enter password is again displayed. After three incorrect attempts, you must power-off the server and start again.

The following table summarizes the levels of security with the different levels of password protection.

Type of Password	Results
No password set	<ul style="list-style-type: none"> • No password required to start system. • User can access all choices on the <i>Setup</i> utility program menu.
Power-on password only	<ul style="list-style-type: none"> • User must enter password to complete the system startup. • Power-on password provides access to all choices on the <i>Setup</i> utility program menu.
Administrator password	<ul style="list-style-type: none"> • User must enter password to access the <i>Setup</i> utility program menu. • Administrator password provides access to all choices on the <i>Setup</i> utility program menu.
Administrator and power-on password	<ul style="list-style-type: none"> • User can enter either password to complete the system startup. • Administrator password provides access to all choices on the <i>Setup</i> utility program menu. Administrator password menu can enable the power-on password user to change the power-on password. • Power-on password provides access to a limited set of choices on the <i>Setup</i> utility program menu.

Setting an Administrator Password: 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, you must move the password jumper to clear the password and regain access to the Configuration/Setup utility program. This procedure erases the current server configuration (see “Removing an Unknown Power-On/Administrator Password” on page 62 for more information). You must then reconfigure the server.

To set an administrator password:

1. Select **Administrator Password** on the System Security menu; then, press **Enter**.
2. Type the password in the **Enter Administrator Password** data field.

Note

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

3. Move the cursor to the **Enter Administrator Password Again** data field and type the password again.
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 **Esc** 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**.
2. Select **Delete Administrator Password**; then, press **Enter**.
3. A confirmation window appears. Press **Enter** to delete the administrator password.
4. Press **Esc** to return to the System Security menu.

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

Attention:

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 a power-on password is set and then forgotten, and no administrator password is set, then, you must move the password jumper to clear the password and regain access to the Configuration/Setup utility program. This procedure erases the current server configuration (see "Removing an Unknown Power-On/Administrator Password" on page 62 for more information). You must then reconfigure the server.

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 the power-on password. Keep a record of the 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.

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**.
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.

Restricting Access to Diskette Drives: The setting for the **Secure Diskette Drives** option controls who has access to the diskettes (user and administrator, or administrator only). The server comes with this feature set to **Enabled**, so that both the user and administrator have access to the diskette drives.

To change this setting so that the access to the diskette drives is disabled, select the System Security menu option; then, select **Secure Diskette Drives**. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the assignment that you want to change. Press the Left Arrow (←) or Right Arrow (→) key to toggle the entry to the appropriate value. If the administrator password is enabled, only the administrator can change this setting.

Updating POST/BIOS: POST/BIOS Update options allows you to run the POST/BIOS Update utility from a remote system without requiring an administrator password.

Select **POST/BIOS Update** on the System Security menu. Use the Up Arrow (↑) or Down Arrow (↓) key to select the **Enable** or **Disabled** option.

Start Options: Start options take effect when you start the server.

Select **Start Options**; then, use the Up Arrow (↑) or Down Arrow (↓) key to highlight the assignment that you want to change. Use the Left Arrow (←) or Right Arrow (→) key to select from the list of available choices.

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

The server uses a startup sequence to determine the diskette drive, hard disk drive, or network adapter from which the operating system loads. You can specify up to four devices in the **Startup** data fields. For example, you can define a startup sequence that checks for a startable diskette in the primary diskette drive, then checks the bays for a hard disk drive.

Select **Startup** on the Start Options menu; then, press **Enter**. Follow the menu to set the startup sequence.

You can enable the server to run without checking for the presence or state of a monitor, keyboard, or diskette drive. The devices are disabled after the POST completes and the operating system has loaded. This allows you to enter a password and update the Configuration/Setup utility program in keyboardless operation.

You can select a test that the server runs at startup. For example, you can select to run a virus detection test. You can also choose whether to run the POST in enhanced or quick mode.

Advanced Setup: Select **Advanced Setup** to change values for advanced hardware feature such as ROM shadowing.

Note

A warning message appears when you select this choice, to alert you that the system might malfunction if this option is configured incorrectly. Follow the instructions on the screen carefully.

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

Select **Advanced Setup**; then, use the Up Arrow (↑) or Down Arrow (↓) key to highlight the assignment that you want to change. Use the Left Arrow (←) or Right Arrow (→) key to select from the list of available choices.

Select **Cache Control** to view/change the cache state and view the cache size.

Note

The default setting for the Cache State is enable. Changing this setting will severely degrade the performance of the server.

Select **PCI Control** to disable the PCI burst mode of data transfer. Some PCI adapters require burst mode to be disabled. Change this value to **Disabled**, if required for a PCI adapter. This screen also allows you to enable/disable the Bus Master function for certain types of PCI devices. Select enable if an installed device(s) requires the Bus Master function to be enabled when the server is powered on.

Select **Plug and Play Control** to control the device node. When you change this value to **Disabled**, the system is unable to update the configuration during POST.

Select **Processor Control** to control the microprocessor BIOS updates during system startup. When you change this value to **Disabled**, the system is unable to update the microprocessor during startup. This screen also allows you to view the stepping level of the processor.

Select **ROM Shadowing** to specify whether the information in ROM will be copied to the system RAM.

ISA Legacy Resources: Select **ISA Legacy Resources** to identify resources used by ISA adapters. These resources include:

- Memory
- I/O ports
- DMA
- Interrupt

Note

The menus do not contain resources that are used by the system or by previously installed Plug and Play adapters.

From the Configuration/Setup utility program screens, you can select available resources for the adapter that you are installing. Resources not currently being used by adapters that are already installed in the server are listed as **[Available]**. The system resources that are in use by other devices are listed as a **[System Resource]**.

Select **ISA Legacy Resources**; then, use the Up Arrow (↑) or Down Arrow (↓) key to highlight the assignment that you want to change. Use the Left Arrow (←) or Right Arrow (→) key to select from the list of available choices.

The **ISA Legacy Resources** choice appears only on the full Configuration/Setup menu.

Server Configuration Conflicts

The resources used by the server consist of IRQs, DMA, I/O ports (for example, serial and parallel), 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 *COM 1* to two different serial ports).
- A software program is installed that requires the same resource as a hardware device (for example, an expanded memory specification (EMS) device driver that uses the address required by the SVGA video adapter).

The steps required to resolve a configuration error are determined by the number and variety of hardware devices and software programs installed. 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 only the system hardware. The program does not consider the requirements of the operating system or the application programs. See "Resolving Software Configuration Conflicts" on page 77 for additional information.

Resolving Hardware Configuration

Conflicts: Use the following information to help resolve hardware configuration conflicts:

1. Run the Configuration/Setup utility program to view the settings. Record the current settings before making any changes. (See “Starting the Configuration/Setup Utility Program” on page 68 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. Remove the device or adapter. Some configurations are not supported (for example, you cannot operate the server with two PCI SVGA adapters installed).

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 occurs, 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 the system board functions.

Changing the Software Configuration: 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 the operating-system documentation or the documentation supplied with the device drivers.

Software/Hardware Mismatch Problems

If a failure appears to be the result of a defective FRU, but the diagnostic tests run error-free, there might be a software and hardware mismatch. These problems might be intermittent, and they are usually difficult to diagnose.

If you are experiencing this type of problem, and the operating system is of the “direct driver” variety, which bypasses the BIOS interface, such as:

- AIX
- Netware
- SCO UNIX
- Some “windowing” interfaces
- Other Unix-based software

the most-likely cause of the problem is a mismatch between the software and the hardware.

The following information is provided to help you resolve these problems:

Software Can Be Sensitive to the Hardware

Direct-driver software is sensitive to variations in hardware design. The resulting incompatibilities are usually addressed with a revision (sometimes referred to as a patch), to the direct-driver software. Make certain the software is current and that all known revisions are installed. The IBM on-line bulletin board (sometimes referred to as PCPROD), and other software tools sources, such as Novell Netware, should be referenced by the software support personnel for any revisions provided by the appropriate software vendor.

The most-likely cause of these types of problems, when direct-driver software is involved, is the failure to obtain the latest revisions from the software vendor. **Software Installation**

It is very important to follow the vendor's installation procedures. The software should not be migrated from another system, unless the installation instructions indicate that migration is supported (especially from a different model in the product line).

Important

Migrating adapters from slower systems to faster systems might cause problems. This is due to device-specific, system-specific, or time-dependent software code, that controls these devices.

Adapter and Software Compatibility

Hardware adapters for some operating systems must be approved by the software vendor to be compatible with that software. The approval is specific to the system, adapter E.C. level, and the software version. Contact the software vendor to confirm that system and adapter configuration is supported by their software level. The compatibility support is especially important for, (but not limited to), all LAN adapters and RIPL applications.

Software Failures After a Hardware Change

After the initial installation, any changes in the hardware configuration (addition or changes of adapters or features), might result in computer failures and require the reinstallation of the operating system or the software revisions.

Specific hardware configuration changes (such as memory address, interrupt level, or programmable option select), might result in a computer failure if the software has unique operating requirements.

Undetermined Problem

Check the power supply voltages. If the voltages are correct, return here and continue with the following steps.

1. Power-off the computer.
2. Remove or disconnect the following, one at a time:
 - a. Non-IBM devices
 - b. External devices (modem, printer, or mouse)
 - c. Any adapters
 - d. Riser card
 - e. Memory modules
 - f. Extended video memory
 - g. Hard disk drive
 - h. Diskette drive
3. Power-on the computer to re-test the system.
4. Repeat steps 1 through 3 until you find the failing device or adapter.

If all devices and adapters have been removed, and the problem continues, replace the system board. See "Replacing a System Board" on page 63.

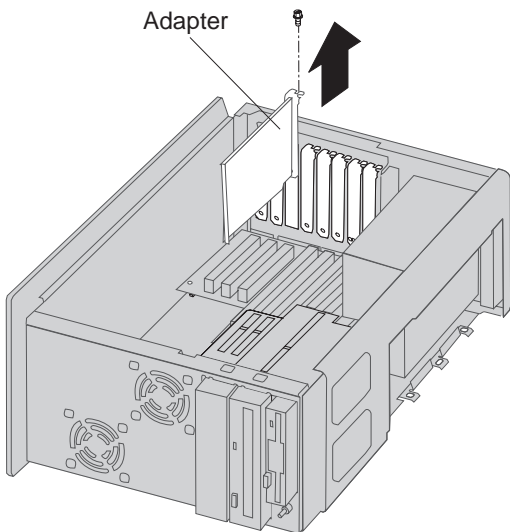
Vital Product Data

Each computer has a unique vital product data (VPD) code stored in the nonvolatile memory on the system board. After you replace the system board, the VPD must be updated. To update the VPD, see "Flash (BIOS/VPD) Update Procedure" on page 55.

Locations

- “Adapter” on page 81.
- “Battery” on page 81.
- “Controls and Status Indicators” on page 82.
- “Cover” on page 83.
- “DIMM Kits” on page 83.
- “Expansion Bays” on page 84.
- “Expansion-Slot Cover” on page 85.
- “Floor Stand” on page 85.
- “Identification Numbers” on page 86.
- “Internal Drives” on page 87.
- “Input/Output Connectors” on page 91.
- “Microprocessor” on page 93.
- “Riser Card” on page 94.
- “System Board” on page 96.
- “U-Bolt” on page 99.
- “Video Memory-Module Kits” on page 100.

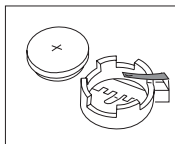
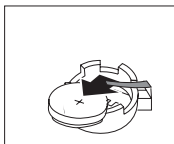
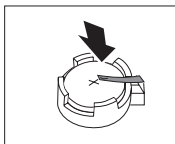
Adapter



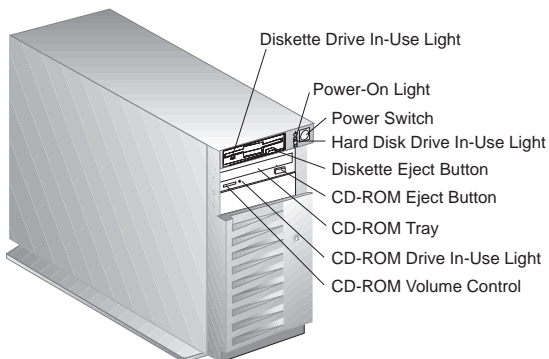
Battery

Note

See "Battery Notice" on page 139 before replacing this FRU.



Controls and Status Indicators

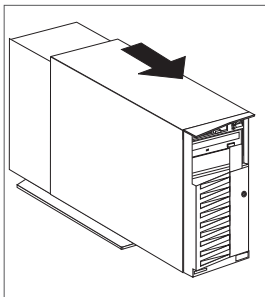
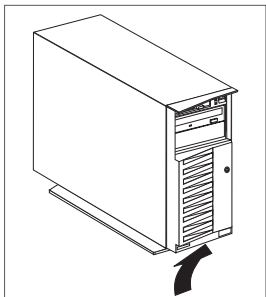


Diskette-Drive In-Use Light	Lights when the drive is accessing a diskette.
Power-On Light	Lights when you power-on the server.
Power Switch	Press to power-on or power-off the server. Do not power-off the server if any of the drive in-use lights are on. This might damage the information stored on a hard disk or diskette.
Hard Drive In-Use Light	Lights when the server is accessing a SCSI device.
Diskette Eject Button	Push to release a diskette from the drive.
CD-ROM Eject Button	Push to release a CD-ROM from the drive.
CD-ROM Tray	Holds the CD-ROM disc.
CD-ROM Drive In-Use Light	Lights when the CD-ROM drive is accessed.
CD-ROM Volume Control:	Turn to adjust the CD-ROM playback volume, if headphones or speakers are plugged into the jacks on the CD-ROM drive.

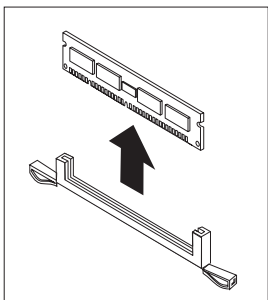
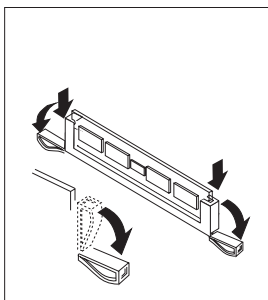
Cover

Note

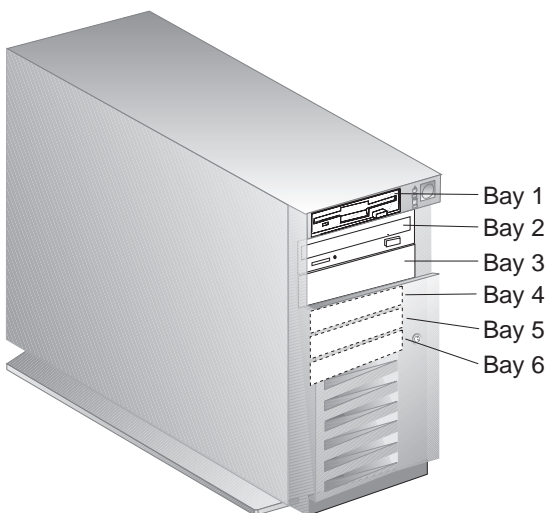
The cover release latch is located on the bottom edge on the front of the server.



DIMM Kits

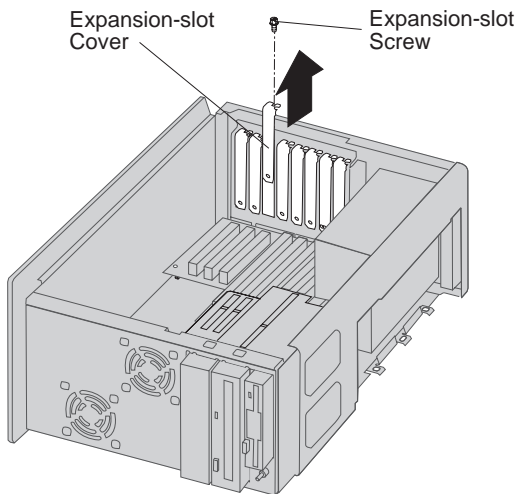


Expansion Bays

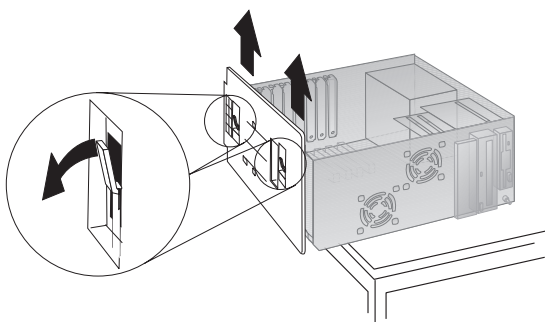


Diskette Drive	<p>All models come with a 3.5-inch, 1.44 MB diskette drive in expansion bay 1 that uses 1 MB (unformatted) and 2 MB (unformatted) diskettes. For optimum use, format 1 MB diskettes to store 720 KB of data and 2 MB diskettes to store 1.44 MB of data.</p>
CD-ROM Drive	<p>All models come with a SCSI CD-ROM drive.</p>
Open Bays	<p>The server's design accommodates 3.5-inch and 5.25-inch hard disk, tape, and rewritable optical-disc drives.</p> <p>For information about the supported types of drives and their installation, see "Internal Drives" on page 87.</p>
Hard Disk Drive	<p>The number of preinstalled drives and their capacities vary by model.</p>

Expansion-Slot Cover



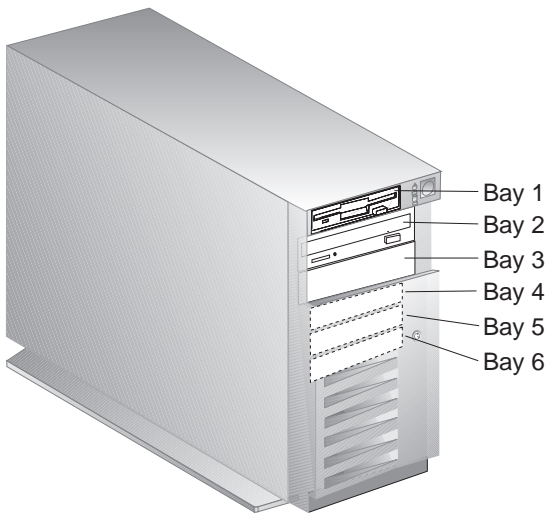
Floor Stand



Identification Numbers



Internal Drives



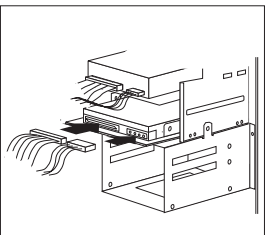
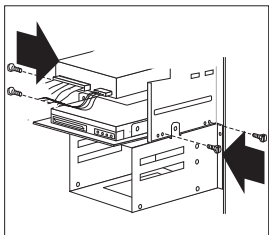
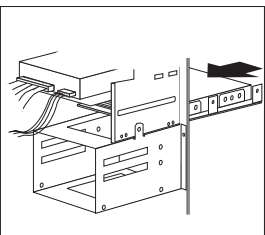
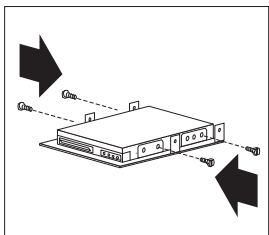
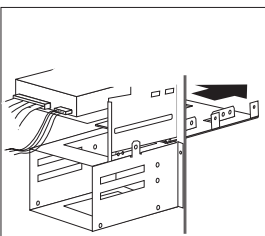
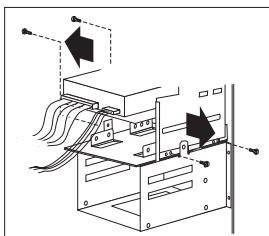
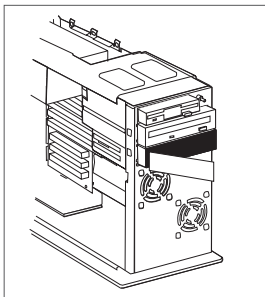
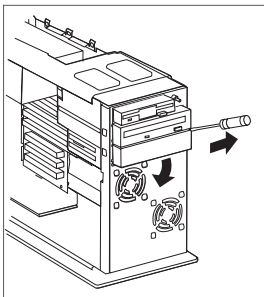
width=column frame=box rules=both.

Bay	Drive Width	Drive Type	Drive Height
1	3.5-inch	Diskette drive	25.4 mm (1.0 in.)
2	5.25-inch	CD-ROM	41.3 mm (1.6 in.)
3	3.5-inch 5.25-inch	Removable media drive, hard disk drive ¹	25.4 mm (1.0 in.) 41.3 mm (1.6 in.)
4, 5, 6	3.5-inch	Hard disk ²	25.4 mm (1.0 in.)

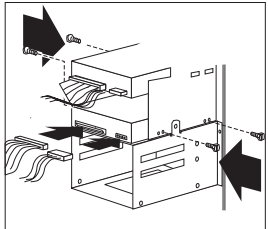
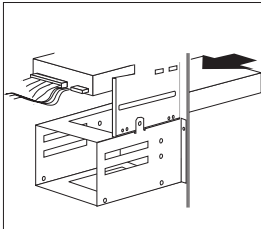
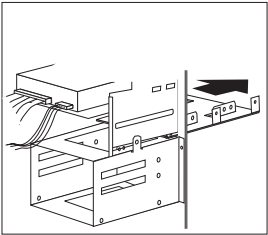
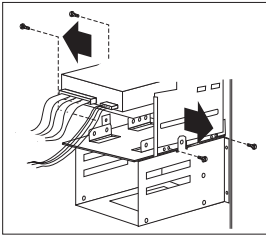
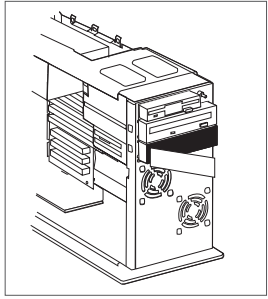
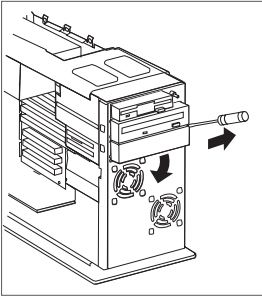
Notes:

1. Removable media include CD-ROMs, optical discs, and tapes.
2. If a hard disk drive is preinstalled, it is the startup (or boot) drive.

Bay 3 (3.5-Inch Drive)



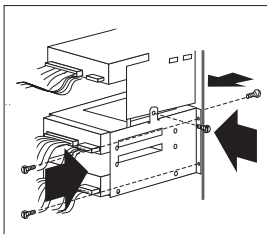
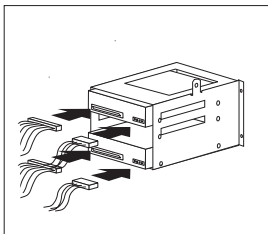
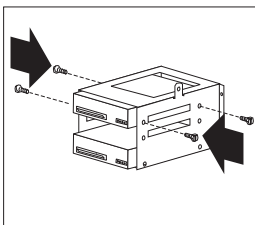
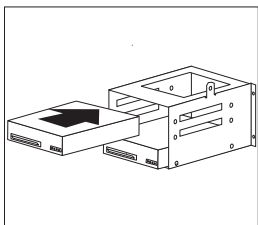
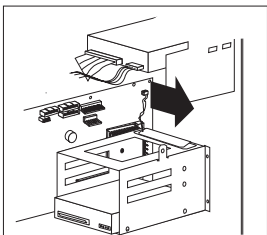
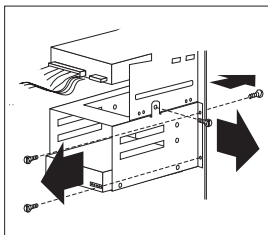
Bay 3 (5.25-Inch Drive)



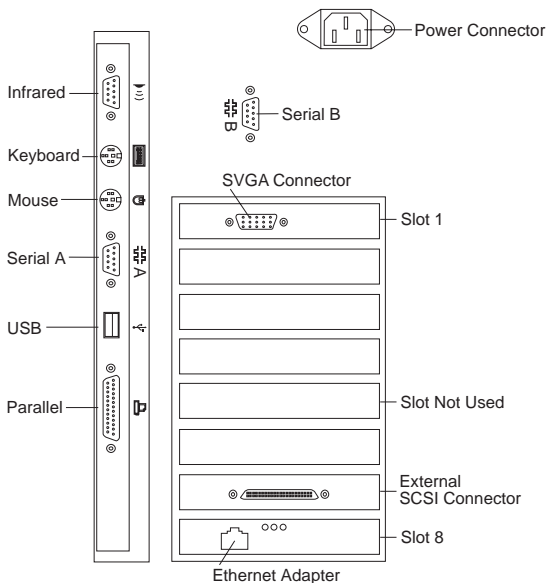
Bays 4, 5, and 6


Note


If necessary, disconnect the fan's power connector for the system board. See "System Board" on page 96.



Input/Output Connectors



- 
Power Connector

The server power cable attaches here.
- 
Serial Connectors

The server has two 9-pin, universal asynchronous receiver/transmitter (UART) serial connectors (A and B). Serial signal cables for modems or other serial devices attach here. To attach 25-pin signal cables, you must use a 9-pin-to-25-pin adapter cable. For information about displaying and changing port assignments, see “Devices and I/O Ports” on page 68.
- SVGA Connector**

The monitor signal cable attaches here. If the server has an adapter other than the one shown here, refer to the instructions that come with the adapter or monitor.
- External SCSI Connector**

External SCSI devices attach here.
- Ethernet Connector**

The cable for the Ethernet network attaches here.



**Parallel
Connector**

The server has one 25-pin parallel port. A signal cable for a parallel device, such as a printer, attaches here. For information about displaying and changing port assignments, see “Devices and I/O Ports” on page 68.



**Universal
Serial Bus
(USB)
Connector**

You can use a 4-pin USB cable to attach I/O devices to the USB connector.



**Mouse
(Auxiliary-Device)
Connector**

The mouse (auxiliary-device) cable attaches here.



**Keyboard
Connector**

The keyboard cable attaches here.



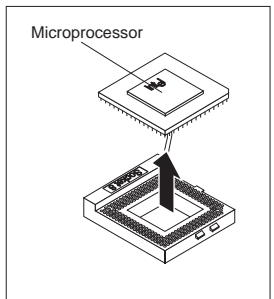
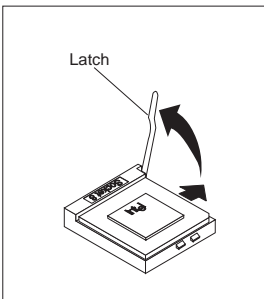
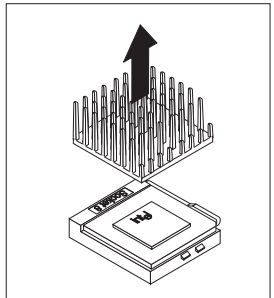
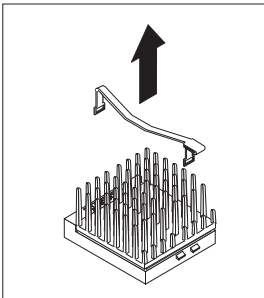
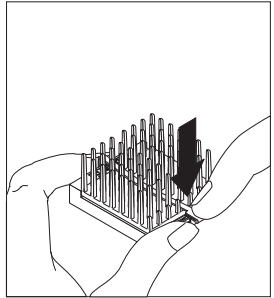
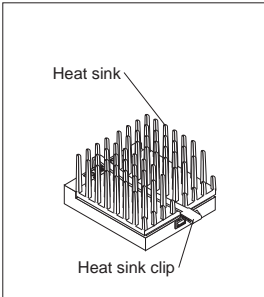
**Infrared
Connector**

An optional infrared (IR) transceiver module can attach here.

Microprocessor

Attention

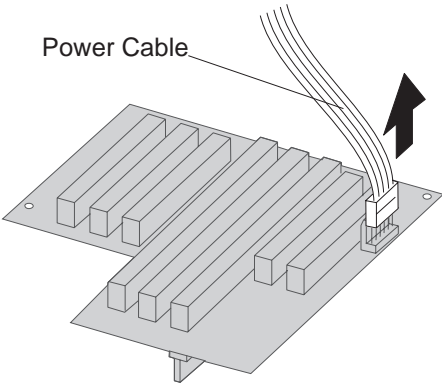
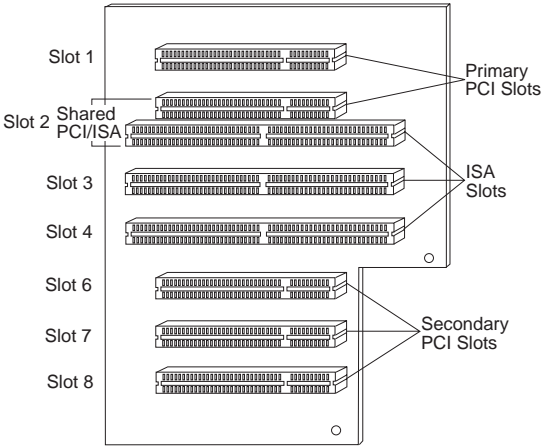
- Selecting a frequency jumper setting that is greater than the actual frequency of the microprocessor might damage the microprocessor. See “Microprocessor” on page 97.
- Avoid getting the thermal grease on your skin or clothing. Use a soft, lint-free cloth to remove the thermal grease before storing the old microprocessor, heat sink, and heat sink clip.

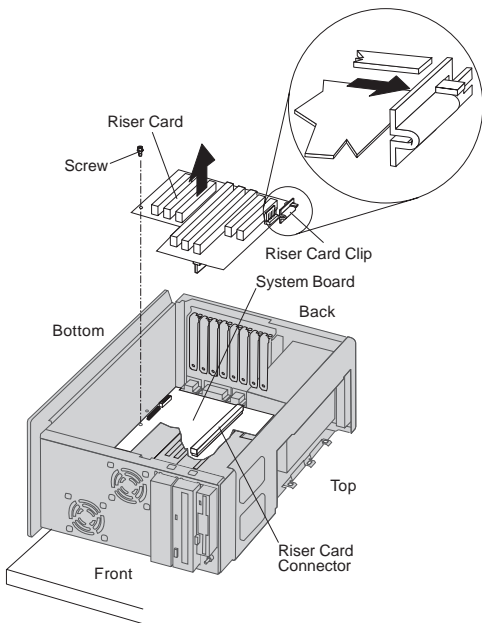


Riser Card

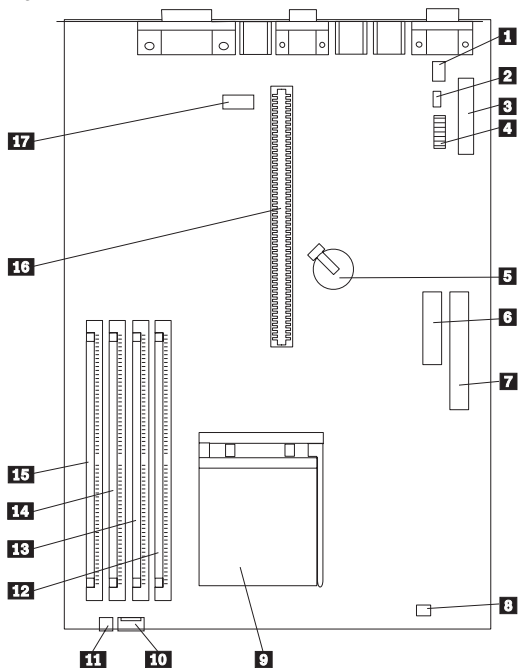
Note

You can install only one adapter in the shared slot.





System Board



- 1** Auxiliary power connector
- 2** CMOS clear (password) jumper
- 3** Diskette drive connector
- 4** Switches for microprocessor speeds, diskette write protection, and serial port B
- 5** Battery
- 6** 3.3 V ac power connector
- 7** Main power connector
- 8** Secondary fan connector
- 9** Microprocessor
- 10** Power LED connector
- 11** First fan connector
- 12** System memory connector 4 (MEM4)
- 13** System memory connector 3 (MEM3)
- 14** System memory connector 2 (MEM2)
- 15** System memory connector 1 (MEM1)
- 16** Riser card connector
- 17** Serial B port

Switch Settings

Attention

If the microprocessor bus-to-core ratio is incorrect, system-board components will overheat and component damage might occur. Be sure that microprocessor switch settings on the microprocessor switch are set properly according to the speed of the microprocessor.

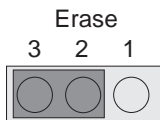
There are eight switch settings on the microprocessor switch. The switch settings have the following meanings:

Switch Number	Purpose
1	Core ratio
2	Core ratio
3	Core ratio
4	Core ratio
5	System bus speed
6	System bus speed
7	Serial B port <ul style="list-style-type: none">• On - Enables Serial B port• Off - Disables Serial B port
8	Diskette Drive <ul style="list-style-type: none">• Off - Normal diskette operation• On - Enables read-only diskette operation

Microprocessor



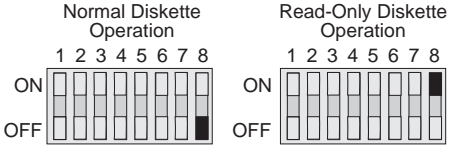
Password Jumper



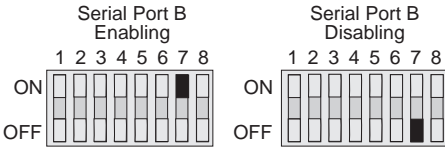
Diskette Write-Protect

Note

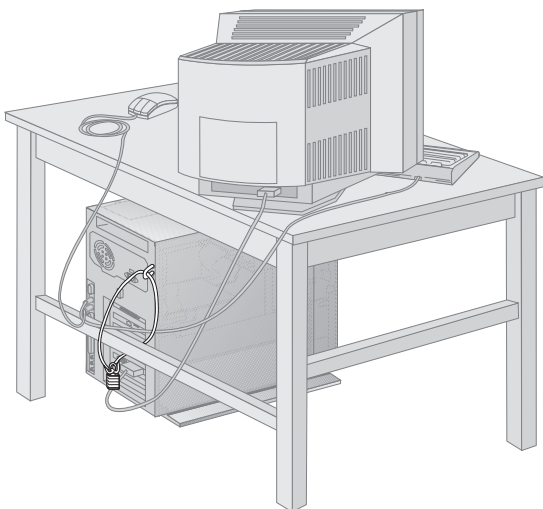
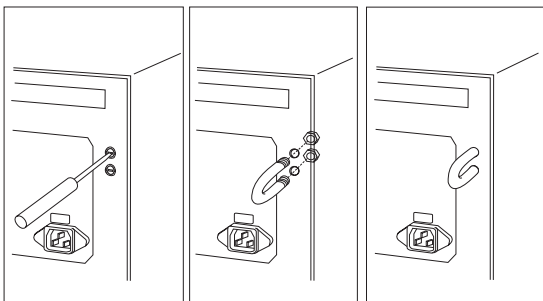
This switch does not affect the ability to read information from a diskette.



Serial B Port/Infrared Port



U-Bolt

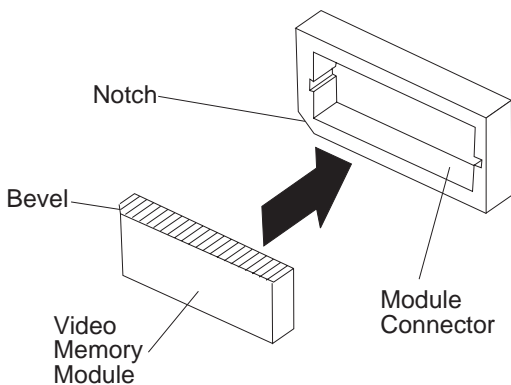
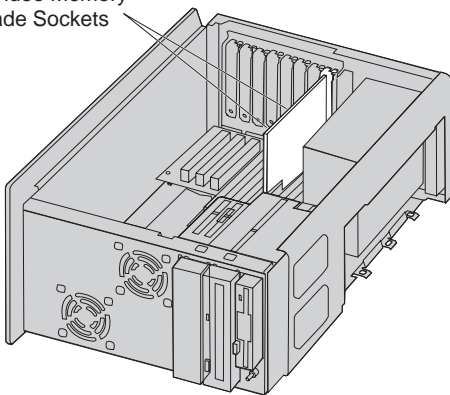


Video Memory-Module Kits

Note

You must install two 512 KB video-memory modules to upgrade the video memory.

Two Video Memory Upgrade Sockets



Symptom-to-FRU Index

The Symptom-to-FRU Index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with "General Checkout" on page 2. This index can also be used to help you decide which FRUs to have available when servicing a computer. If you are unable to correct the problem using this index, go to "Undetermined Problem" on page 79.

Notes

- If you have both an error message and an incorrect audio response, diagnose the error message first.
- If you cannot run the diagnostic tests, but did receive a POST error message, diagnose the POST error message.
- If you did not receive any error message, look for a description of your error symptoms in the first part of this index.
- Check all power supply voltages before you replace the system board. (See "Power Supply" on page 59.)

Important

1. Some errors are indicated with a series of beep codes. (See "Beep Symptoms" on page 102.)
2. The processor is a separate FRU from the system board; the processor is not included with the system board FRU. (See "Replacing a System Board" on page 63.)

Beep Symptoms

Beeps symptoms are short tones or a series of short tones separated by pauses (intervals without sound). See the following examples.

Beeps	Description
1-2-X	<ul style="list-style-type: none"> • One beep • A pause (or break) • Two beeps • A pause (or break) • Any number of beeps
4	Four continuous beeps

Beep Symptom	FRU/Action
1-1-3 CMOS read/write error	<ol style="list-style-type: none"> 1. Run Setup 2. System Board
1-1-4 ROM BIOS check error	<ol style="list-style-type: none"> 1. System Board
1-2-X DMA error	<ol style="list-style-type: none"> 1. System Board
1-3-X	<ol style="list-style-type: none"> 1. Memory Module 2. System Board
1-4-4	<ol style="list-style-type: none"> 1. Keyboard 2. System Board
1-4-X Error detected in first 64 KB of RAM.	<ol style="list-style-type: none"> 1. Memory Module 2. System Board
2-1-1, 2-1-2	<ol style="list-style-type: none"> 1. Run Setup 2. System Board
2-1-X First 64 KB of RAM failed.	<ol style="list-style-type: none"> 1. Memory Module 2. System Board
2-2-2	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
2-2-X First 64 KB of RAM failed.	<ol style="list-style-type: none"> 1. Memory Module 2. System Board
2-3-X	<ol style="list-style-type: none"> 1. Memory Module 2. System Board
2-4-X	<ol style="list-style-type: none"> 1. Run Setup 2. Memory Module 3. System Board
3-1-X DMA register failed.	<ol style="list-style-type: none"> 1. System Board
3-2-4 Keyboard controller failed.	<ol style="list-style-type: none"> 1. System Board 2. Keyboard
3-3-4 Screen initialization failed.	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board 3. Display

Beep Symptom	FRU/Action
3-4-1 Screen retrace test detected an error.	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board 3. Display
3-4-2 POST is searching for video ROM.	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
4	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
All other beep code sequences.	<ol style="list-style-type: none"> 1. System Board
One long and one short beep during POST. Base 640 KB memory error or shadow RAM error.	<ol style="list-style-type: none"> 1. Memory Module 2. System Board
One long beep and two or three short beeps during POST. (Video error)	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
Three short beeps during POST.	<ol style="list-style-type: none"> 1. System Board Memory 2. System Board
Continuous beep.	<ol style="list-style-type: none"> 1. System Board
Repeating short beeps.	<ol style="list-style-type: none"> 1. Keyboard stuck key? 2. Keyboard Cable 3. System Board

No Beep Symptoms

Symptom/Error	FRU/Action
No beep during POST but computer works correctly.	<ol style="list-style-type: none"> 1. System Board
No beep during POST.	<ol style="list-style-type: none"> 1. See “Undetermined Problem” on page 79. 2. System Board 3. Memory Module 4. Any Adapter or Device 5. Riser Card 6. Power Cord 7. Power Supply

Numeric Error Codes

In the following index, "X" can represent any number.

Error Code	FRU/Action
000 SCSI Adapter not enabled.	1. Verify adapter device and Bus Master fields are enabled in PCI configuration program. See documentation shipped with computer.
02X	1. SCSI Adapter
08X Check SCSI terminator installation.	1. SCSI Cable 2. SCSI Terminator 3. SCSI Device 4. SCSI Adapter
101 System board interrupt failure.	1. System Board
102 System board timer error.	1. System Board
106	1. System Board
110 System board memory ECC error.	1. Memory Module 2. System Board
111 I/O channel parity error.	1. Reseat adapters 2. Any Adapter 3. System Board
114 Adapter ROM error.	1. Adapter Memory 2. System Board
129 Internal cache test error.	1. Processor 2. System Board
151 Real-time clock failure.	1. System Board
161 Bad CMOS battery.	1. Run Setup 2. CMOS Backup Battery 3. System Board
162 Configuration mismatch.	1. Run Setup and verify Configuration 2. Had a device been added, removed, changed location? If not, suspect that device. 3. Power-on external devices first, then power-on computer. 4. CMOS Backup Battery 5. System Board
162 And unable to run diagnostics.	1. Diskette Drive 2. System Board 3. Diskette Drive Cable

Error Code	FRU/Action
163 Clock not updating or invalid time set.	<ol style="list-style-type: none"> 1. Time and Date Set? 2. CMOS Backup Battery 3. System Board
164 POST detected a base memory or extended memory size mismatch error.	<ol style="list-style-type: none"> 1. Run Setup. Check System Summary menu for memory size change. 2. Run the Extended Memory Diagnostic tests.
175	<ol style="list-style-type: none"> 1. Riser Card 2. System Board
176	<ol style="list-style-type: none"> 1. Covers were removed from the computer.
177 Corrupted Administrator Password.	<ol style="list-style-type: none"> 1. Riser Card 2. System Board
178	<ol style="list-style-type: none"> 1. Riser Card 2. System Board
17X Not listed above	<ol style="list-style-type: none"> 1. C2 Security
183	<ol style="list-style-type: none"> 1. Enter the administrator password
184 Password removed due to check-sum error.	<ol style="list-style-type: none"> 1. Enter new password
185 Corrupted boot sequence.	<ol style="list-style-type: none"> 1. Set configuration and reinstall the boot sequence.
186	<ol style="list-style-type: none"> 1. Riser Card 2. System Board
189	<ol style="list-style-type: none"> 1. More than three password attempts were made to access the computer.
18X Not listed above	<ol style="list-style-type: none"> 1. C2 Security
1XX Not listed above.	<ol style="list-style-type: none"> 1. System Board
201, 20X Memory data error.	<ol style="list-style-type: none"> 1. Memory Module 2. System Board
225	<ol style="list-style-type: none"> 1. Unsupported Memory
262 POST detected a base memory or extended memory type error.	<ol style="list-style-type: none"> 1. Run Setup. Check System Summary menu for memory type change. 2. Run the Extended Memory Diagnostic tests.

Error Code	FRU/Action
301	<ol style="list-style-type: none"> 1. Keyboard 2. Keyboard Cable 3. System Board
303 With an 8603 error.	<ol style="list-style-type: none"> 1. Mouse 2. Keyboard 3. Keyboard Cable 4. System Board
303 With no 8603 error.	<ol style="list-style-type: none"> 1. Keyboard 2. Keyboard Cable 3. System Board
3XX Not listed above.	<ol style="list-style-type: none"> 1. Keyboard 2. Keyboard Cable 3. System Board
5XX	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
601	<ol style="list-style-type: none"> 1. Diskette Drive A 2. Diskette Drive Cable 3. System Board
602	<ol style="list-style-type: none"> 1. Bad Diskette ? 2. Verify Diskette and retry.
604 And able to run diagnostics.	<ol style="list-style-type: none"> 1. Run Setup and verify diskette configuration settings 2. Diskette Drive B 3. Diskette Drive Cable 4. System Board
604 And unable to run diagnostics.	<ol style="list-style-type: none"> 1. Run Setup and verify diskette configuration settings 2. Diskette Drive A 3. Diskette Drive Cable 4. System Board
605 POST cannot unlock the diskette drive.	<ol style="list-style-type: none"> 1. Diskette Drive 2. Diskette Drive Cable 3. System Board
662	<ol style="list-style-type: none"> 1. Diskette drive configuration error or wrong diskette drive type, run Set Configuration.
6XX Not listed above.	<ol style="list-style-type: none"> 1. Diskette Drive 2. System Board 3. External Drive Adapter 4. Diskette Drive Cable 5. Power Supply
762 Math coprocessor configuration error.	<ol style="list-style-type: none"> 1. Run Setup 2. Processor 3. System Board
7XX Not listed above.	<ol style="list-style-type: none"> 1. Processor 2. System Board

Error Code	FRU/Action
962 Parallel port configuration error.	<ol style="list-style-type: none"> 1. Run Configuration 2. Parallel Adapter (if installed) 3. System Board
9XX	<ol style="list-style-type: none"> 1. Printer 2. System Board
1047	<ol style="list-style-type: none"> 1. 16-Bit AT Fast SCSI Adapter
107X Check SCSI terminator installation.	<ol style="list-style-type: none"> 1. Check SCSI terminator installation. 2. SCSI Cable 3. SCSI Terminator 4. SCSI Device 5. SCSI Adapter
1101 Serial connector error, possible system board failure.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics
1101, 1102, 1106, 1108, 1109	<ol style="list-style-type: none"> 1. System Board 2. Any Serial Device
1107	<ol style="list-style-type: none"> 1. Communications Cable 2. System Board
1102 Card selected feedback error.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics
1103 Port fails register check.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics 2. System Board
1106 Serial option cannot be turned off.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics 2. System Board
1107	<ol style="list-style-type: none"> 1. Serial Device Cable 2. System Board
1110 Register test failed.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics 2. System Board
1116 Interrupt error.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics
1117 Failed baud rate test.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics
1162 Serial port configuration error.	<ol style="list-style-type: none"> 1. Run Configuration 2. Serial Adapter (if installed) 3. System Board
11XX Not listed above.	<ol style="list-style-type: none"> 1. System Board
1201	<ol style="list-style-type: none"> 1. System Board 2. Any Serial Device

Error Code	FRU/Action
1202, 1206, 1208, 1209, 12XX	<ol style="list-style-type: none"> 1. Dual Async Adapter/A 2. System Board 3. Any Serial Device
1207	<ol style="list-style-type: none"> 1. Communications Cable 2. Dual Async Adapter/A
13XX	<ol style="list-style-type: none"> 1. Game Adapter
1402 Printer not ready.	Information only
1403 No paper error, or interrupt failure.	Information only
1404 System board timeout failure.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics
1405 Parallel adapter error.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics
1406 Presence test error.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics
14XX Not listed above. Check printer before replacing system board.	<ol style="list-style-type: none"> 1. Printer 2. System Board
15XX	<ol style="list-style-type: none"> 1. SDLC Adapter
1692 Boot sequence error.	<ol style="list-style-type: none"> 1. Run FDISK to ensure at least one active partition is set active.
16XX	<ol style="list-style-type: none"> 1. 36/38 Workstation Adapter
1762 Hard disk drive configuration error.	<ol style="list-style-type: none"> 1. Run Configuration.
1780 (Disk Drive 0) 1781 (Disk Drive 1) 1782 (Disk Drive 2) 1783 (Disk Drive 3)	<ol style="list-style-type: none"> 1. See "Power Supply" on page 59. 2. Hard Disk Drive 3. System Board 4. Hard Disk Cable 5. Power Supply
180X, 185X PCI configuration or resource error.	<ol style="list-style-type: none"> 1. Run Setup and verify PCI/ISA configuration settings. 2. If necessary, set ISA adapters to "Not available" to allow PCI adapters to properly configure. 3. Remove any suspect ISA adapters. 4. Rerun diagnostics. 5. PCI Adapter 6. PCI Riser Card

Error Code	FRU/Action
1962 Boot sequence error.	1. Possible hard disk drive problem, see “Hard Disk Drive Boot Error” on page 56.
209X	1. Diskette Drive 2. Diskette Cable 3. 16-bit AT Fast SCSI Adapter
20XX Not listed above	1. BSC Adapter 2. Riser Card
21XX	1. SCSI Device 2. 16-bit AT Fast SCSI Adapter 3. Alternate BSC Adapter 4. Riser Card
2401, 2402 If screen colors change.	1. Display
2401, 2402 If screen colors are OK.	1. System Board 2. Display
2409	1. Display
2410	1. System Board 2. Display
2462 Video memory configuration error.	1. Check cable connections. 2. Run Setup and verify video configuration settings. 3. Video Memory Modules 4. Video Adapter (if installed) 5. System Board
3015, 3040 Check for missing wrap or terminator plug on the adapter.	1. Network Attached? 2. LF Translator 3. Cable Problem 4. PC Network Adapter 5. Riser Card
30XX	1. PC Network Adapter 2. LF Translator 3. Cable Problem? 4. Riser Card
3115, 3140	1. Network Attached? 2. LF Translator 3. Alternate PC Network-Adapter 4. Cable Problem 5. Riser Card
31XX	1. Alternate PC Network Adapter 2. LF Translator 3. Cable Problem? 4. Riser Card

Error Code	FRU/Action
36XX	<ol style="list-style-type: none"> 1. GPIB Adapter 2. Riser Card
38XX	<ol style="list-style-type: none"> 1. DAC Adapter 2. Riser Card
4611, 4630	<ol style="list-style-type: none"> 1. Multiport/2 Interface Board 2. Multiport/2 Adapter
4612, 4613 4640, 4641	<ol style="list-style-type: none"> 1. Memory Module Package 2. Multiport/2 Adapter
4650	<ol style="list-style-type: none"> 1. Multiport Interface Cable
46XX Not listed above.	<ol style="list-style-type: none"> 1. Multiport/2 Adapter 2. Multiport/2 Interface Board 3. Memory Module
5600	<ol style="list-style-type: none"> 1. Financial System Controller Adapter
5962 CD-ROM configuration error.	<ol style="list-style-type: none"> 1. Run Configuration 2. CD-ROM Drive 3. CD-ROM Adapter 4. System Board
62XX	<ol style="list-style-type: none"> 1. 1st Store Loop Adapter 2. Adapter Cable
63XX	<ol style="list-style-type: none"> 1. 2nd Store Loop Adapter 2. Adapter Cable
64XX	<ol style="list-style-type: none"> 1. Network Adapter
71XX	<ol style="list-style-type: none"> 1. Voice Adapter
74XX	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. Riser Card
76XX	<ol style="list-style-type: none"> 1. Page Printer Adapter
78XX	<ol style="list-style-type: none"> 1. High Speed Adapter
79XX	<ol style="list-style-type: none"> 1. 3117 Adapter
80XX	<ol style="list-style-type: none"> 1. PCMCIA Adapter
84XX	<ol style="list-style-type: none"> 1. Speech Adapter 2. Speech Control Assembly 3. Riser Card
8601, 8602	<ol style="list-style-type: none"> 1. Pointing Device (Mouse) 2. System Board
8603, 8604	<ol style="list-style-type: none"> 1. System Board 2. Pointing Device (Mouse)
86XX Not listed above	<ol style="list-style-type: none"> 1. Mouse 2. System Board

Error Code	FRU/Action
89XX	<ol style="list-style-type: none"> 1. PC Music Adapter 2. MIDI Adapter Unit 3. Riser Card
91XX	<ol style="list-style-type: none"> 1. Optical Drive 2. Adapter
96XX	<ol style="list-style-type: none"> 1. SCSI Adapter 2. Any SCSI Device 3. System Board
10101, 10102, 10104 10105, 10106, 10107 10108, 10109, 10111 10112, 10113, 10114 10115, 10116	<ol style="list-style-type: none"> 1. Have customer verify correct operating system device drivers are installed and operational. 2. Modem
10103, 10110, 101171	<ol style="list-style-type: none"> 1. System Board 2. Data/Fax Modem
10117 Not listed above.	<ol style="list-style-type: none"> 1. Check system speaker 2. Check PSTN cable 3. External DAA (if installed) 4. Modem
10118	<ol style="list-style-type: none"> 1. Run Diagnostics and verify the correct operation of the modem slot 2. Modem
10119	<ol style="list-style-type: none"> 1. Diagnostics detected a non-IBM modem 2. Modem
10120	<ol style="list-style-type: none"> 1. Check PSTN Cable 2. External DAA (if installed) 3. Modem
10132, 10133, 10134 10135, 10136, 10137 10138, 10139, 10140 10141, 10142, 10143 10144, 10145, 10146 10147, 10148, 10149 10150, 10151, 10152	<ol style="list-style-type: none"> 1. Modem
10153	<ol style="list-style-type: none"> 1. Data/Fax Modem 2. System Board
101XX Not listed above.	<ol style="list-style-type: none"> 1. Modem Adapter/A 2. Data/Fax Modem 3. System Board
10450, 10451, 10490 10491, 10492, 10499 Read/write error.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics 2. Riser Card 3. Hard Disk Drive 4. System Board
10452 Seek test error.	<ol style="list-style-type: none"> 1. Run Advanced Diagnostics

Error Code	FRU/Action
10453 Wrong drive type?	Information only
10454 Sector buffer test error.	1. Run Advanced Diagnostics
10455, 10456 Controller error.	1. Run Advanced Diagnostics
10459 Drive diagnostic command error.	Information only
10461 Drive format error	1. Run Advanced Diagnostics
10462 Controller seek error.	1. Run Advanced Diagnostics
10464 Hard Drive read error.	1. Run Advanced Diagnostics
10467 Drive non fatal seek error.	1. Run Advanced Diagnostics
10468 Drive fatal seek error.	1. Run Advanced Diagnostics
10469 Drive soft error count exceeded.	1. Run Advanced Diagnostics
10470, 10471, 10472 Controller wrap error.	1. Run Advanced Diagnostics
10473 Corrupt data. Low level format might be required.	Information only
10480	1. Hard Disk Drive (ESDI) 2. Drive Cable 3. System Board
10481 ESDI drive D seek error.	1. Run Advanced Diagnostics
10482 Drive select acknowledgement bad.	1. Run Advanced Diagnostics
106X1	1. Check Configuration 2. Ethernet Adapter
10635	1. Power-off computer, wait ten seconds; then power-on the computer. 2. Ethernet Adapter
10651, 10660	1. Check Cables 2. Ethernet Adapter
106XX Not listed above.	1. Ethernet Adapter

Error Code	FRU/Action
107XX	<ol style="list-style-type: none"> 1. 5.25-inch External Diskette Drive 2. 5.25-inch Diskette Drive Adapter/A
109XX Check the adapter cables.	<ol style="list-style-type: none"> 1. ActionMedia® Adapter/A 2. System Board
112XX This adapter does not have cache.	<ol style="list-style-type: none"> 1. SCSI Adapter 2. Any SCSI Device 3. System Board
119XX	<ol style="list-style-type: none"> 1. 3119 Adapter
121XX	<ol style="list-style-type: none"> 1. Modem Adapter 2. Any Serial Device 3. System Board
136XX	<ol style="list-style-type: none"> 1. ISDN Primary Rate Adapter 2. System Board
137XX	<ol style="list-style-type: none"> 1. System Board
141XX	<ol style="list-style-type: none"> 1. Realtime Interface Coprocessor Portmaster Adapter/A
143XX	<ol style="list-style-type: none"> 1. Japanese Display Adapter 2. System Board
14710, 14711	<ol style="list-style-type: none"> 1. System Board Video Adapter 2. Adapter Video Memory
148XX	<ol style="list-style-type: none"> 1. Video Adapter
14901, 14902 1491X, 14922	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board 3. Display (any type)
14932	<ol style="list-style-type: none"> 1. External Display 2. Video Adapter
16101	<ol style="list-style-type: none"> 1. Riser Card Battery
161XX	<ol style="list-style-type: none"> 1. FaxConcentrator Adapter
164XX	<ol style="list-style-type: none"> 1. 120 MB Internal Tape Drive 2. Diskette Cable 3. System Board
16500	<ol style="list-style-type: none"> 1. 6157 Tape Attachment Adapter
16520, 16540	<ol style="list-style-type: none"> 1. 6157 Streaming Tape Drive 2. 6157 Tape Attachment Adapter
166XX, 167XX	<ol style="list-style-type: none"> 1. Token Ring Adapter 2. System Board 3. Riser Card

Error Code	FRU/Action
18001 to 18029	<ol style="list-style-type: none"> 1. Wizard Adapter 2. Wizard Adapter Memory
18031 to 18039	<ol style="list-style-type: none"> 1. Wizard Adapter Cable
185XXXX	<ol style="list-style-type: none"> 1. DBCS Japanese Display Adapter/A 2. System Board
20001 to 20003	<ol style="list-style-type: none"> 1. Image Adapter/A Image-I Adapter/A 2. Memory Module DRAM, VRAM
20004	<ol style="list-style-type: none"> 1. Memory Module DRAM, VRAM 2. Image Adapter/A Image-I Adapter/A
20005 to 20010	<ol style="list-style-type: none"> 1. Image Adapter/A Image-I Adapter/A 2. Memory Module DRAM, VRAM
200XX Not listed above.	<ol style="list-style-type: none"> 1. Image Adapter/A Image-I Adapter/A 2. Memory Module DRAM, VRAM 3. System Board
20101 to 20103	<ol style="list-style-type: none"> 1. Printer/Scanner Option 2. Image Adapter/A 3. Memory Module DRAM, VRAM
20104	<ol style="list-style-type: none"> 1. Memory Module DRAM, VRAM 2. Printer/Scanner Option 3. Image Adapter/A
20105 to 20110	<ol style="list-style-type: none"> 1. Printer/Scanner Option 2. Image Adapter/A 3. Memory Module DRAM, VRAM
Image Adapter/A Memory Test failure indicated by graphic of adapter.	<ol style="list-style-type: none"> 1. Replace memory module (shown in graphic.)
206XX	<ol style="list-style-type: none"> 1. SCSI-2 Adapter 2. Any SCSI Device 3. System Board
208XX Verify there are no duplicate SCSI ID settings on the same bus.	<ol style="list-style-type: none"> 1. Any SCSI Device

Error Code	FRU/Action
<p>210XXXX Internal bus, size unknown.</p> <p>210XXX1 External bus, size unknown.</p>	<ol style="list-style-type: none"> 1. SCSI Hard Disk Drive 2. SCSI Adapter or System Board 3. SCSI Cable 4. SCSI ID Switch (on some models)
<p>Tape Drive amber LED remains on.</p>	<ol style="list-style-type: none"> 1. Tape Drive 2. SCSI Cable (internal) 3. SCSI Adapter or System Board
<p>Tape Drive green "in use" LED fails to come on.</p>	<ol style="list-style-type: none"> 1. Tape Drive 2. SCSI Adapter or System Board 3. SCSI Cable (internal) SCSI Cable (external)
<p>Tape automatically ejected from drive.</p>	<ol style="list-style-type: none"> 1. Tape Cassette 2. Drive
<p>SCSI ID on rotary switch does not match SCSI ID set in configuration. Verify drive switches inside cover are set to zero.</p>	<ol style="list-style-type: none"> 1. Rotary Switch Circuit Board 2. Circuit Board Cable 3. Tape Drive
<p>Tape sticks/breaks in drive. Verify that the tapes used meet ANSI standard X3B5.</p>	<ol style="list-style-type: none"> 1. Tape Cassette
<p>212XX</p>	<ol style="list-style-type: none"> 1. SCSI Printer 2. Printer Cable
<p>213XX</p>	<ol style="list-style-type: none"> 1. SCSI Processor
<p>214XX</p>	<ol style="list-style-type: none"> 1. WORM Drive
<p>215XXXC 215XXXD 215XXXE 215XXXU If an external device, and power-on LED is off, check external voltages.</p>	<ol style="list-style-type: none"> 1. CD-ROM Drive I CD-ROM Drive II Enhanced CD-ROM Drive II Any CD-ROM Drive 2. SCSI Cable 3. SCSI Adapter or System Board
<p>216XX</p>	<ol style="list-style-type: none"> 1. Scanner
<p>217XX If an external device, and power-on LED is off, check external voltages.</p>	<ol style="list-style-type: none"> 1. Rewritable Optical Drive 2. SCSI Adapter or System Board 3. SCSI Cable
<p>218XX Check for multi CD tray, or juke box.</p>	<ol style="list-style-type: none"> 1. Changer
<p>219XX</p>	<ol style="list-style-type: none"> 1. SCSI Communications Device

Error Code	FRU/Action
24201Y0, 24210Y0 Be sure wrap plug is attached.	<ol style="list-style-type: none"> 1. ISDN/2 Adapter 2. ISDN/2 Wrap Plug 3. ISDN/2 Communications Cable
273XX	<ol style="list-style-type: none"> 1. 1 Mbps Micro Channel Infrared LAN Adapter
27501, 27503 27506, 27507	<ol style="list-style-type: none"> 1. ServerGuard Adapter 2. System Board
27502, 27504, 27510 27511, 27533, 27534 27536, 27537	<ol style="list-style-type: none"> 1. ServerGuard Adapter
27509	<ol style="list-style-type: none"> 1. Remove redundant adapters, run Auto Configuration program, then retest.
27512	<ol style="list-style-type: none"> 1. WMSELF.DGS diagnostics file missing. 2. WMSELF.DGS diagnostics file incorrect.
27535	<ol style="list-style-type: none"> 1. 3V Lithium Backup Battery 2. ServerGuard Adapter
27554	<ol style="list-style-type: none"> 1. Internal Temperature out of range 2. ServerGuard Adapter
27555, 27556	<ol style="list-style-type: none"> 1. ServerGuard Adapter 2. Power Supply
27557	<ol style="list-style-type: none"> 1. 7.2V NiCad Main Battery Pack 2. ServerGuard Adapter
27558, 27559 27560, 27561	<ol style="list-style-type: none"> 1. PCMCIA Type II Modem 2. ServerGuard Adapter
27562	<ol style="list-style-type: none"> 1. External Power Control not connected 2. External Power Control 3. ServerGuard Adapter
27563, 27564	<ol style="list-style-type: none"> 1. External Power Control 2. ServerGuard Adapter
275XX	<ol style="list-style-type: none"> 1. Update Diagnostic Software
27801 to 27879	<ol style="list-style-type: none"> 1. Personal Dictation System Adapter 2. System Board
27880 to 27889	<ol style="list-style-type: none"> 1. External FRU (Speaker, Microphone)

Error Code	FRU/Action
I999030X Hard disk reset failure.	Possible hard disk drive problem, see "Hard Disk Drive Boot Error" on page 56.

Error Messages

Error Message/Symptom	FRU/Action
Address Exceeds the Size of Your Memory An invalid memory address was entered. Diagnostics Tests display this message during the Locate Bad Chips option.	<ol style="list-style-type: none"> 1. Enter the correct address. 2. Memory Module 3. System Board
Arithmetic Functions Failed An error was detected during the CPU Test.	<ol style="list-style-type: none"> 1. Microprocessor 2. System Board
Base Memory Test Failed An error was detected in base memory.	<ol style="list-style-type: none"> 1. Memory Module 2. System Board
Boot Sector Unreadable A boot sector read error was detected on the hard disk drive.	<ol style="list-style-type: none"> 1. Hard Disk Drive 2. Hard Disk Drive Cable 3. Hard Disk Drive Adapter (if installed) 4. System Board
Bus Noise Test Failed RAM Test detected an error in the memory bus.	<ol style="list-style-type: none"> 1. Memory Module 2. System Board
Butterfly Cylinder Access Test Failed Hard Disk Drive Test detected mismatch between the data read and the data stored on the drive.	<ol style="list-style-type: none"> 1. Hard Disk Drive 2. Hard Disk Drive Cable 3. Hard Disk Drive Adapter (if installed) 4. System Board
Clock Stopped Real-time clock has stopped working.	<ol style="list-style-type: none"> 1. Real-Time Clock Assembly 2. System Board
CMOS Clock Test Failed Time and Date Settings for CMOS and DOS do not Match.	<ol style="list-style-type: none"> 1. Real-Time Clock Assembly 2. System Board
Controller Diagnostic Test Failed An error was detected while testing the Hard Disk Controller (Adapter).	<ol style="list-style-type: none"> 1. Hard Disk Drive Adapter (if installed) 2. Hard Disk Drive 3. System Board

Error Message/Symptom	FRU/Action
<p>Cylinder 0 errors Test detected an error reading the first cylinder of the hard disk drive.</p>	<ol style="list-style-type: none"> 1. Hard Disk Drive 2. Hard Disk Drive Adapter (if installed) 3. System Board
<p>Device is Not Ready Ready the Device... or Press Any Key</p>	<ol style="list-style-type: none"> 1. Ensure the device is powered-on. 2. Replace failing device 3. Device Adapter (if installed) 4. System Board
<p>Disk Error Encountered Opening Output File Press Any Key To Continue.</p>	<ol style="list-style-type: none"> 1. Hard Disk Drive 2. Hard Disk Drive Adapter (if installed) 3. System Board
<p>DMA #X Failed Main Components Test detected an error while testing the DMA controller.</p>	<ol style="list-style-type: none"> 1. System Board
<p>DMA Page Register Failed DMA page register error</p>	<ol style="list-style-type: none"> 1. System Board
<p>Drive (x) Media (y) Mismatch FAT ID mismatch with installed drive.</p>	<ol style="list-style-type: none"> 1. Check diskette and diskette drive capacity. 2. Diskette Drive 3. System Board
<p>Error in video buffer. Bad bits. Video memory test error.</p>	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board 3. Display
<p>Exception Interrupt In Protected Mode Diags Cannot Continue Server error, remove one adapter at a time until the symptom goes away.</p>	<ol style="list-style-type: none"> 1. Any Adapter 2. System Board 3. Processor
<p>Extended Memory Test Failed Extended memory error.</p>	<ol style="list-style-type: none"> 1. Memory Module 2. System Board
<p>Floppy Drive Failed Diskette drive(s) failed.</p>	<ol style="list-style-type: none"> 1. Diskette Drive 2. System Board 3. Diskette Drive Cable
<p>General Function Failed Remove one adapter at a time until the symptom goes away.</p>	<ol style="list-style-type: none"> 1. Any Adapter 2. System Board 3. Processor
<p>Hard Drives Failed Hard Disk Drive test error.</p>	<ol style="list-style-type: none"> 1. Hard Disk Drive 2. Hard Disk Drive Adapter (if installed) 3. System Board

Error Message/Symptom	FRU/Action
Incorrect DOS version	1. Ensure you are using DOS version 3.0 or higher.
INT Mask Register Failed INT Mask Register error.	1. Microprocessor 2. System Board
Invalid Date Clock/DOS date mismatch.	1. Real-Time Clock Assembly 2. System Board
Invalid Time Clock/DOS time mismatch. Back-up clock and DOS time of day settings do not match.	1. Real-Time Clock Assembly 2. System Board
Linear Cylinder Access Test Failed Hard disk drive error.	1. Hard Disk Drive 2. Hard Disk Drive Cable 3. Hard Disk Drive Adapter (if installed) 4. System Board
Logic Function Failed CPU Logic test error.	1. Microprocessor 2. System Board
Loopback Error COM Port Test or Parallel Port error. A wrap plug must be installed to successfully complete these tests.	1. System Board 2. Wrap Plug
Main Components Failed System board error.	1. System Board 2. Processor
Memory test cannot run at this location in memory Not enough free memory available to start the memory test.	1. Memory Module 2. System Board
Missing QAPIus/PRO Files(s) One or more diagnostic support files are missing.	1. Diagnostic Diskette
NO LOOP-BACK PLUG. Skipping External loopback test No wrap plug installed.	1. Install wrap plug on the serial port, rerun test. 2. System Board
Not ready Printer not on-line or not ready.	1. Ready Printer 2. Printer 3. Printer Cable 4. System Board
No 'type-amatic' repeat At least one repeat key must be tested during this test or an error will occur. Type-amatic test error.	1. Keyboard 2. System Board

Error Message/Symptom	FRU/Action
<p>Not used by any standard device IRQ is not currently being used by a non-standard device.</p>	<p>1. System Board</p>
<p>Numeric Proc Failed NPU test error.</p>	<p>1. Microprocessor 2. System Board</p>
<p>Parallel Ports Failed Test Report Summary message.</p>	<p>1. System Board</p>
<p>Pass (N): ** Errors ** Drive (X) Failed Diskette drive read/write test error.</p>	<p>1. Diskette Drive 2. System Board 3. Diskette Drive Cable</p>
<p>Pass (N) Drive Not Ready Diskette drive door is open or defective.</p>	<p>1. Ensure diskette drive is ready. 2. Diskette Drive 3. System Board 4. Diskette Drive Cable</p>
<p>Pass (N): Drive (X) Write Protected or Unformatted</p>	<p>1. Insert a non-write protected, formatted diskette into the diskette drive; then rerun the test. 2. Diskette Drive 3. System Board 4. Diskette Drive Cable</p>
<p>Pass (N): Unknown Media Drive (X) Diskette Drive Test error.</p>	<p>1. Diskette 2. Diskette Drive 3. System Board 4. Diskette Drive Cable</p>
<p>Place Hi-density Media in Drive Media/drive mismatch.</p>	<p>1. Diskette 2. Diskette Drive 3. System Board 4. Diskette Drive Cable</p>
<p>Printer Failed Printer powered-on and ready?</p>	<p>1. Printer 2. Printer Cable 3. System Board</p>
<p>Printer Fault Printer powered-on and ready?</p>	<p>1. Printer 2. Printer Cable 3. System Board</p>
<p>Printer Not Selected Ensure the printer is powered-on and ready.</p>	<p>1. Printer 2. Printer Cable 3. System Board</p>
<p>Program or File Not Found Press Any Key Diagnostics cannot find the USER(N).COM file.</p>	<p>1. Diagnostic Diskette 2. Diskette Drive 3. System Board</p>

Error Message/Symptom	FRU/Action
<p>Program Too Big To Fit In Memory Too many Terminate and Stay Resident programs in memory.</p>	<p>1. Reboot the system from the Diagnostic Diskette.</p>
<p>QAPLUS/PRO Cannot Be Re-run Because Of Error In Relocating Program Diagnostics failed to relocate the Diagnostics Test programs so the memory space it resides in was not tested.</p>	<p>1. Diagnostic Diskette 2. Memory Module 3. System Board</p>
<p>RAM Memory Error in Block n. Bad bits n Memory error.</p>	<p>1. Memory Module 2. System Board</p>
<p>RAM Test Failed Memory error.</p>	<p>1. Memory Module 2. System Board</p>
<p>Read error on cylinder n Hard disk drive format error.</p>	<p>1. Hard Disk Drive 2. Hard Disk Drive Adapter (if installed) 3. System Board</p>
<p>Read Errors Diskette drive read error.</p>	<p>1. Diskette 2. Diskette Drive 3. System Board 4. Diskette Drive Cable</p>
<p>Receive Error Serial Port loopback test error.</p>	<p>1. Serial Port Cable 2. System Board</p>
<p>Refresh Failure Diagnostics Test detected an error while testing the DMA controller's RAM refresh cycle.</p>	<p>1. Memory Module 2. System Board</p>
<p>RTC Interrupt Failure Diagnostics Test cannot detect the Real-Time clock interrupt.</p>	<p>1. Real-Time Clock Assembly 2. System Board</p>
<p>Serial Chip Error COM Port error, general.</p>	<p>1. Serial Port Cable 2. System Board</p>
<p>Serial Compare Error COM Port error, information transmitted is not the same as information received.</p>	<p>1. Serial Port Cable 2. System Board</p>
<p>Serial Time-out Error COM Port error, time interval is too long between transmitted and received data.</p>	<p>1. Serial Port Cable 2. System Board</p>
<p>Serious Memory Error — Diags Cannot Continue Memory Test error.</p>	<p>1. Memory Module 2. System Board</p>

Error Message/Symptom	FRU/Action
<p>Sorry You Need A Mouse Mouse or mouse driver was not detected.</p>	<ol style="list-style-type: none"> 1. Mouse 2. System Board
<p>System Hangs Go to "Undetermined Problem" on page 79.</p>	<ol style="list-style-type: none"> 1. Any device 2. Any adapter 3. System Board
<p>The Address Exceeds The Size Of Your Memory An invalid memory address was entered. The Diagnostics Tests display this message during the Locate Bad Chips option under the interact menu if an invalid memory address was entered at the "Enter Memory Address Of Bad Chip" prompt.</p>	<ol style="list-style-type: none"> 1. Enter correct address 2. Memory Module 3. System Board
<p>That Number is Out Of Range An invalid bit number was entered. Diagnostics Tests display this message during the Locate Bad Chips option.</p>	<ol style="list-style-type: none"> 1. Enter the correct number. 2. Memory Module 3. System Board
<p>Too Many Errors — Test Aborted Too many errors, the Diagnostics Test cannot continue.</p>	<ol style="list-style-type: none"> 1. Microprocessor 2. System Board
<p>Transmit Error Internal or external serial port loopback test failure.</p>	<ol style="list-style-type: none"> 1. Serial Port Cable 2. System Board
<p>Video Adapter Failed Test Result Summary, displayed if "Fail" was at the Quit/Fail/Pass menu of any video test.</p>	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board 3. Display
<p>Write error on cylinder n Hard disk drive write error.</p>	<ol style="list-style-type: none"> 1. Hard Disk Drive 2. Hard Disk Drive Adapter (if installed)
<p>Write Errors Diskette drive write error.</p>	<ol style="list-style-type: none"> 1. Diskette 2. Diskette Drive 3. System Board 4. Diskette Drive Cable
<p>Write Protected or Unformatted Diskette is Write Protected or not formatted.</p>	<ol style="list-style-type: none"> 1. Insert a non-write protected, formatted diskette into the diskette drive; then rerun the test. 2. Diskette Drive 3. System Board 4. Diskette Drive Cable

Error Message/Symptom	FRU/Action
<p>You Cannot Delete the Motherboard "Remove Board" option was selected. The Diagnostics Tests display this message during the Locate Bad Chips option.</p>	<ol style="list-style-type: none">1. Make the correct selection.2. Memory Module3. System Board4. Processor

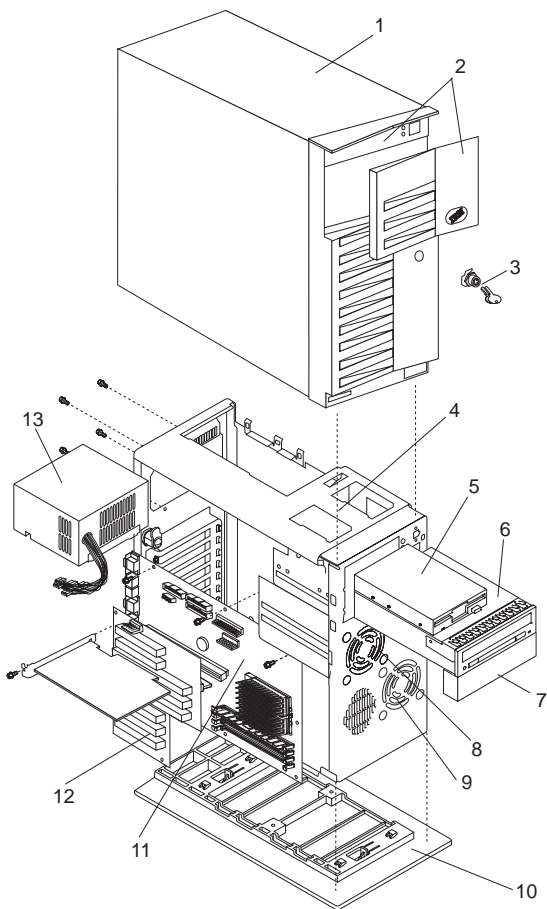
Miscellaneous Error Messages

Message/Symptom	FRU/Action
Changing colors.	1. Display
Computer will not power-off. See "Power Supply" on page 59.	1. Power Switch 2. System Board
Dead computer. See "Power Supply" on page 59.	1. Power Switch 2. Power Supply 3. System Board
Diskette drive in-use light remains on or does not light when drive is active.	1. Diskette Drive 2. System Board 3. Diskette Drive Cable
Flashing cursor with an otherwise blank display.	1. System Board 2. Primary Hard Disk Drive 3. Hard Disk Drive Cable
Incorrect memory size during POST.	1. Run the Memory tests. 2. Memory Module 3. System Board
"Insert a Diskette" icon appears with a known-good diagnostics diskette in the first 3.5-inch diskette drive.	1. Diskette Drive 2. System Board 3. Diskette Drive Cable 4. Network Adapter
Intensity or color varies from left to right of characters and color bars.	1. Display 2. System Board
No power, or fan not running.	1. See "Power Supply" on page 59.
Nonsystem disk or disk error-type message with a known-good diagnostic diskette.	1. Diskette Drive 2. System Board 3. Diskette Drive Cable
Other display symptoms not listed above (including blank or illegible display).	1. See "Display" on page 54. 2. System Board 3. Display
Power-on indicator or hard disk drive in-use light not on, but computer works correctly.	1. Power Supply 2. System Board 3. LED Cables
Printer problems.	1. See "Printer" on page 61.
Program loads from the hard disk with a known-good diagnostics diskette in the first 3.5-inch diskette drive.	1. Run Setup 2. Diskette Drive 3. Diskette Drive Cable 4. System Board 5. Power Supply
Serial or parallel port device failure (system board port).	1. External Device Self-Test OK? 2. External Device 3. Cable 4. System Board

Message/Symptom	FRU/Action
Serial or parallel port device failure (adapter port).	<ol style="list-style-type: none"> 1. External Device Self-Test OK? 2. External Device 3. Cable 4. Alternate Adapter 5. System Board 6. Riser Card
Some or all keys on the keyboard do not work.	<ol style="list-style-type: none"> 1. Keyboard 2. Keyboard Cable 3. System Board
CMOS Backup Battery inaccurate.	<ol style="list-style-type: none"> 1. CMOS Backup Battery 2. System Board

Parts Listings (PC Server 315 - Type 8638)

System



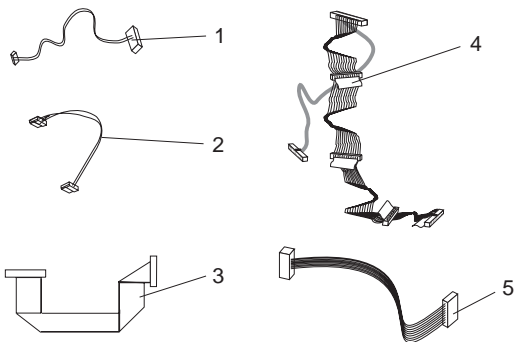
Note

Models PJ0, PS0, PSV, KJ0, and KS0 contain the following FRUs at the time of shipping unless indicated. However, other FRUs are supported in each model as options.

Index	System (PC Server 315 - Type 8638)	FRU No.
1	Top Cover (Models PJ0, PS0, PSV, KJ0, KS0)	60H8359
2	Front Bezel (Models PJ0, PS0, PSV, KJ0, KS0)	60H8385
3	Keylock with Keys (Models PJ0, PS0, PSV, KJ0, KS0)	33F8433
4	Base Frame (Models PJ0, PS0, PSV, KJ0, KS0)	60H8358
5	1.44MB Diskette Drive (Models PJ0, PS0, PSV, KJ0, KS0)	93F2361
6	8X CD-ROM Drive MKE CR-504 (Models PJ0, PS0, PSV, KJ0, KS0)	73H2601
7	5.25-Inch Blank Bezel (Models PJ0, PS0, PSV, KJ0, KS0)	42H0345
8	80mm Fan Assembly (Models PJ0, PS0, PSV, KJ0, KS0)	06H1796
9	92mm Fan Assembly (Models PJ0, PS0, PSV, KJ0, KS0)	60H9749
10	Pedestal (Models PJ0, PS0, PSV, KJ0, KS0)	60H9731
11	System Board without Memory and Processor (Models PJ0, PS0, PSV, KJ0, KS0)	93H4873
12	I/O Riser Card (Models PJ0, PS0, PSV, KJ0, KS0)	60H6989
13	250 Watt 3.3 Volt Power Supply Assembly (Models PJ0, PS0, PSV)	40H7563
13	250 Watt 3.3 Volt PFC Power Supply Assembly (Models KJ0, KS0)	40H7566
	32 MB ECC Memory DIMM (Models PJ0, PS0, PSV, KJ0, KS0)	42H2801
	64 MB ECC Memory DIMM (Models PJ0, PS0, PSV, KJ0, KS0)	42H2802
	128 MB ECC Memory DIMM (Models PJ0, PS0, PSV, KJ0, KS0)	42H2803
	100 MB Ethernet Adapter (Models PSV)	25H4383

Index	System (PC Server 315 - Type 8638)	FRU No.
	2 GB Hard Disk Drive (Models PSV)	07H1132
	4 GB Fast/Narrow Hard Disk Drive	76H4615
	Battery (Models PJ0, PS0, PSV, KJ0, KS0) (See "Battery Notice" on page 139 before replacing this FRU.)	33F8354
	DASD Tray Assembly (Models PJ0, PS0, PSV, KJ0, KS0)	60H8355
	EMC Shield (Models PJ0, PS0, PSV, KJ0, KS0)	06H1782
	Keyboard with Cable (Models PJ0, PS0, PSV, KJ0, KS0) See "Keyboards (101/102 Key)" on page 130.	
	Miscellaneous Mounting Screws and Riser Card Clip (Models PJ0, PS0, PSV, KJ0, KS0)	60H9754
	Mouse (Models PJ0, PS0, PSV, KJ0, KS0)	06H4595
	P6 180MHz Processor Chip with Heat Sink (Models PJ0, KJ0)	75H9215
	P6 200MHz Processor Chip with Heat Sink (Models PS0, PSV, KS0)	75H9212
	Power Cord (Models PJ0, PS0, PSV, KJ0, KS0) See "Power Cords" on page 131	
	Power Switch with Cable (Models PJ0, PS0, PSV, KJ0, KS0)	60H9334
	S3 Trio Video Adapter (Models PJ0, PS0, PSV, KJ0, KS0)	60H8386
	SCSI Ultra-Wide Adaptec Card (Models PJ0, PS0, PSV, KJ0, KS0)	12J3094

Cables



Index	Cables (PC Server 315 - Type 8638)	FRU No.
1	SCSI LED Cable (Models PJ0, PS0, PSV, KJ0, KS0)	60H8357
2	LED and Power Cable (Models PJ0, PS0, PSV, KJ0, KS0)	93F2389
3	Serial Port Cable (Models PJ0, PS0, PSV, KJ0, KS0)	75H9218
4	Hard Disk Drive Fast/Narrow Cable (5X) (Models PJ0, PS0, PSV, KJ0, KS0)	60H9337
5	Diskette Drive Cable (Models PJ0, PS0, PSV, KJ0, KS0)	75H8905
	Hard Disk Drive Option Cable (5X) (Models PJ0, PS0, PSV, KJ0, KS0)	60H9755

Keyboards (101/102 Key)

	FRU No.
Arabic	1391490
Belgium-Dutch	1391414
Belgium-French	1391526
Bulgarian	1399583
Czech	1399570
Danish	1391407
Dutch	1391511
Finnish	1391411
French	1391402
German	1391403
Greek	1399046
Hebrew	1391408
Hungarian	1399581
Iceland	1391495
Italy	1393395
Latvia	1391406
Norwegian	1391409
Polish	1399580
Portuguese	1391410
Romanian	1399582
Russian-Cyrillic	1399579
Serbian-Cyrillic	1399578
Slovak	1399571
Slovenia/Croatia/Bosnia	1393669
South Africa	1396790
Spanish	1391405
Swedish	1391411
Swiss-French	1391412
Swiss-German	1391412
Turkish 179	75H9538
Turkish 440	75H9539
U.K. English	1391406
U.S. English	75H9505
U.S. English (E/ME/A only)	1396790

Power Cords

	FRU No.
Arabic	14F0033
Belgium	1339520
Bulgaria	1339520
Czech Republic	1339520
Denmark	13F9997
Finland	1339520
France	1339520
Germany	1339520
Hungary	1339520
Israel	14F0087
Italy	14F0069
Latvia	1339520
Netherlands	1339520
Norway	1339520
Poland	1339520
Portugal	1339520
Serbia	1339520
Slovakia	1339520
South Africa	14F0015
Spain	1339520
Switzerland	1339520
Switzerland (French/German)	14F0051
U.S. English	62X1045
U.K./Ireland	14F0033
Yugoslavia	1339520

Related Service Information

Important

The service procedures are designed to help you isolate problems. They are written with the assumption that you have model-specific training on all computers, or that are familiar with the computers, functions, terminology, and service information provided in this supplement and the PS/2 Hardware Maintenance Manual (part number 83G8990, form number S52G-9971-02).

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Safety Information

The following section contains the safety information that you need to be familiar with before servicing an IBM mobile computer.

General Safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
 1. Ensure you can stand safely without slipping.
 2. Distribute the weight of the object equally between your feet.
 3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
 4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Remember: Metal objects are good electrical conductors.

- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

Electrical Safety

Observe the following rules when working on electrical equipment.

Important

Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
 - Performing a mechanical inspection
 - Working near power supplies
 - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has *exposed* electrical circuits, observe the following precautions:
 - Ensure that another person, familiar with the power-off controls, is near you.

Remember: Another person must be there to switch off the power, if necessary.
 - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
 - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
 - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts *with the power on* when they are removed from their normal operating places in a machine:
 - Power supply units
 - Pumps
 - Blowers and fans
 - Motor generators

and similar units. (This practice ensures correct grounding of the units.)

- If an electrical accident occurs:
 - **Use caution; do not become a victim yourself.**
 - **Switch off power.**
 - **Send another person to get medical aid.**

Safety Inspection Guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
 - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
 - b. The power cord should be the appropriate type as specified in the parts listings.
 - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling Electrostatic Discharge-Sensitive Devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

Note: The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the AC plug on AC-operated computers.

Grounding Requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Battery Notice

CAUTION

Pour éviter tout risque d'explosion, remplacez la pile selon les instructions du fabricant qui en définit les équivalences. Ne cherchez pas à la démonter ou à la recharger. Ne l'exposez ni au feu, ni à l'eau. Ne la mettez pas en court-circuit. Pour le recyclage ou la mise au rebut des piles usagées, conformez-vous à la réglementation en vigueur.

Die Batterie kann bei unsachgemäßem Austauschen explodieren. Eine verbrauchte Batterie nur durch eine gleichwertige, vom Hersteller empfohlene Batterie ersetzen. Die Batterie nicht zerlegen, wiederaufladen oder kurzschließen. Die Batterie vor Feuer und Nässe schützen. Bei der Entsorgung der aufladbaren Batterie die örtlichen Richtlinien für Sondermüll sowie die allgemeinen Sicherheitsbestimmungen beachten.

Se la batteria è sostituita in modo non corretto potrebbe esserci pericolo di esplosione. Si raccomanda di sostituirla con una batteria dello stesso tipo o equivalente. Non smontarla, ricaricarla, gettarla nell'acqua o nel fuoco, o cortocircuitarla. Smaltire la batteria secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali).

Hay peligro de explosión si la batería se sustituye incorrectamente. No la desmonte, recargue, eche al fuego o al agua, ni la cortocircuite. Deseche la batería tal y como disponga la normativa local.

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer's instructions. Do not disassemble it, recharge it, throw it into fire or water, or short-circuit it. Dispose of the battery as required by local ordinances or regulations.

Laser Compliance Statement

Some IBM Personal Computer 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.

O uso de controles, ajustes ou desempenho de procedimentos diferentes daqueles aqui especificados pode resultar em perigosa exposição à radiação.

凡未在这里指明的任何控制用法、调整、行为，都会导致严重后果。

Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites.

Werden Steuer- und Einstellelemente anders als hier festgesetzt verwendet, kann gefährliche Laserstrahlung auftreten.

Az itt előírt eljárásoktól, beállításoktól és vezérlésektől eltérni a lézersugárzás veszélye miatt kockázatos !

L'utilizzo di controlli, regolazioni o l'esecuzione di procedure diverse da quelle specificate possono provocare l'esposizione a

Использование элементов настройки и выполнение процедур иных, чем указано здесь, может привести к опасному радиационному облучению.

Použitie kontrôl, úprav alebo iných vykonaní od iných výrobcov, ako je v tomto špecifikované, mohlo by mať za následok nebezpečenstvo vystavenia sa vyžiarovaniu.

El uso de controles o ajustes o la ejecución de procedimientos distintos de los aquí especificados

puede provocar la exposición a radiaciones peligrosas.

Opening the CD-ROM drive could result in exposure to 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.

Radiação por raio laser ao abrir. Não olhe fixo no feixe de luz, não olhe diretamente por meio de instrumentos óticos e evite exposição direta com o feixe de luz.

开启时会有激光发射时，请勿盯视激光光束，请勿直接查看视觉仪器，并且避免直接接触在激光光束之中。

Rayonnement laser si carter ouvert. Évitez de fixer le faisceau, de le regarder directement avec des instruments optiques, ou de vous exposer au rayon.

Laserstrahlung bei geöffnetem Gerät. Nicht direkt oder über optische Instrumente in den Laserstrahl sehen und den Strahlungsbereich meiden.

Kinyitáskor lézersugár ! Ne nézzen bele se szabad szemmel, se optikai eszközökkel. Kerülje a sugárnyalábbal való érintkezést !

Aprenendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici e evitare l'esposizione diretta al fascio.

Открывая, берегитесь лазерного излучения. Не смотрите на луч, не разглядывайте его с помощью оптических инструментов, а также избегайте прямого воздействия лазерного луча.

Keď je laserová jednotka otvorená. Vyhnite sa priamemu pohľadu a nehládte priamo s optickými nástrojmi do lúča a vyhnite sa priamemu vystaveniu lúčov.

Radiación láser al abrir. No mire fijamente ni examine con instrumental óptico el haz de luz. Evite la exposición directa al haz.

Send Us Your Comments!

We want to know your opinion about this manual (part number 84H7201). Your input will help us to improve our publications.

Please photocopy this survey, complete it, and then fax it to **IBM HMM Survey** at **919-543-8167 (USA)**.

Name _____

Phone Number _____

1. Do you like this manual?

- Yes No

2. What would you like to see added, changed, or deleted in this manual?

3. What is your service experience level?

- Less than five years
 More than five years

4. Which Servers do you service most?

Thanks in advance for your response!

Problem Determination Tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Processor or hard disk upgrades
- Failure symptom
 - Do diagnostics fail?
 - What, when, where, single, or multiple systems?
 - Is the failure repeatable?
 - Has this configuration ever worked?
 - If it has been working, what changes were made prior to it failing?
 - Is this the original reported failure?
- Reference/Diagnostics Diskette Version
 - Type and version level
- Hardware configuration
 - Print (print screen) configuration currently in use
 - BIOS level
- Operating system software
 - Type and version level

Important

To eliminate confusion, identical systems are considered *identical* only if they:

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same Reference/Diagnostics Diskette (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operation system control files

Comparing the configuration and software set-up between “working and non-working” systems will often lead to problem resolution.

Phone Numbers, U.S. and Canada

Note

EMEA customers should contact their Dealer or IBM Service organization.

Before you place a call to the Support Center, refer to "Problem Determination Tips" on page 143.

Authorized Dealers or Servicers

Number	Information
919-517-0001	Bulletin Board Service - PC Company
800-528-7705	Bulletin Board Service - TSS Only
800-937-3737	IBM Business Partner Education
800-426-2472	IBM Customer Engineer Technical Support
800-IBM-DEAL	IBM Dealer Support Center
800-342-6672	IBM Direct Desktop Software Sales
303-924-4015	IBM Part Number ID and Look Up
800-426-7763	IBM PC HelpCenter
800-237-5511	IBM Software Defect Support (CSDs)
800-327-5711	IBM Software Ordering (Publications)
800-426-1484	IBM Supplies Technical Hotline
800-388-7080	IBM Warranty Parts Claims Center

U.S. Customers and Helpware Subscribers

Number	Information
919-517-0001	Bulletin Board Service - PC Company
800-426-8322	Customer Education Business Unit
800-999-0052	Customized Operational Services
800-237-4824	EduQuest (Educational Computers)
800-964-8523	End User HelpDesk Support
800-742-2493	IBM Anti-Virus Services
800-447-4700	IBM Authorized Dealer Referrals
800-426-2468	IBM Dealer Referral
800-426-3333	IBM Information Referral Service
800-IBM-SERV	IBM Service
800-772-2227	IBM PC HelpCenter and HelpDesk
800-426-7282	IBM Technical Manuals
800-426-9402 (Ext. 150)	Multimedia Information Center
800-241-1620	Multimedia HelpCenter
800-342-6672	OS/2 Information Line
800-237-5511	OS/2 Support Services
800-284-5933	Prodigy
914-962-0310	Prodigy User Questions
800-547-1283	Technical Coordinator Program
	SystemXtra for Personal Systems
	LAN Automated Distribution/2
	OS/2 Bulletin Board
	OS/2 Application Assistance Center
800-551-2832	Technical Solutions Magazine

IBM Canada Customer and Servicer Support

Number	Information
800-661-PSMT 905-316-5556	Business Partner Marketing Support Business Partner Marketing Support - Toronto
514-938-6048	Business Partner Marketing Support - French
800-465-4YOU	Customer Relations
800-IBM-SERV	Customer Service Dispatch
800-263-2769	Customer Service Parts
800-465-2222	Customer Support Center (ISC)
416-443-5701	Customer Service Repair Centre
800-505-1855	Dealer Support Group (DSG)
800-465-7999	HelpClub Registration / IBM Direct
800-465-3299	HelpFax
905-316-3299	HelpFax - Toronto
800-565-3344	HelpPC
905-513-3355	IBM Certification Administrator Mail to: 50 Acadia Drive Markham, Ontario L3R 0B3
800-661-2131	IBM Education (A+ Course)
800-268-3100	IBM Information Network Support
800-387-8343	IBM PC Service Partners
800-487-7426	International Warranty Registration
800-663-7662	Lexmark Product Information
800-IBM-9990	PartnerLine
800-263-2769	Parts Orders, Exchange or Emergency
416-443-5808	Parts Regular Orders, Exchange
(Fax)	Parts Orders, Inquiries
416-443-5755	Parts Orders, Inquiries
514-938-3022	PC Co Bulletin Board - Montreal
905-316-4255	PC Co Bulletin Board - Markham
604-664-6464	PC Co Bulletin Board - Vancouver
204-934-2735	PC Co Bulletin Board - Winnipeg
800-661-7768	PS Marketing Support (PSMT)
800-565-3344	PS/1 Warranty Customer Helpline
800-387-8483	PS/1 Warranty Service (DOAs)
800-465-1234	Publications Ordering
905-316-4148	Service Management Support
905-316-4100	Service Management Support
(Fax)	Service (Warranty) Manager
905-316-4150	Service (Warranty) Manager
905-316-4100	Service (Warranty) Manager
(Fax)	Service Quality Programs
905-316-4872	Service Quality Programs
905-316-4100	Service Quality Programs
(Fax)	Skill Dynamics (Education)
800-661-2131	Skill Dynamics (Education)
800-565-3344	ThinkPad EasyServe
416-443-5835	Warranty Claim Fulfillment
(Fax)	Warranty Claim Reimbursement
905-316-2445	Warranty Claim Reimbursement
905-316-3515	Warranty Claim Reimbursement
(Fax)	Warranty Claim Reimbursement
416-443-5778	Warranty Claim Parts Inquiry
800-505-1855	Warranty Provider Support Hotline
800-267-7472	Warranty Service, ThinkPad

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