

IBM PC Servers

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**PC Server 325 - Type 8639
Hardware Maintenance
Manual Supplement**

November 1996

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



Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 139.

First (November 1996)

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About This Supplement

This supplement contains diagnostic information, Symptom-to-FRU Index, service information, error codes, error messages, and configuration information for the PC Server 325 Type 8639.

This supplement should be used with the advanced diagnostic tests and 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 126.

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
PC Servers	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, 560, 760, SelectaDock)	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/G Series) (July 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/Diagnostics

QAPLus/PRO

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The following Maintenance Analysis Procedure (MAP) and diagnostic information should be used to isolate problems on servers that are supported by the QAPLus/PRO Diagnostics test.

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 with a hardware option. 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. (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 the "Symptom-to-FRU Index" on page 107.
3. If the computer hangs and no error is displayed, go to "Undetermined Problems" on page 135.
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 QAPLus/PRO 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 107.

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 107 .

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 QAPLus/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 QAPLus/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: 10px 0;"> <p style="text-align: center;">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 QAPLus/PRO Diagnostics Diskette

Note

The "PC Server System Board Diagnostic Diskette" contains the QAPLus/PRO diagnostics for the PC Server 325 Type 8639.

1. Insert the QAPLus/PRO Diagnostics Diskette into drive A.
2. Power-on the computer.
3. When the QAPLus/PRO 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 the "Symptom-to-FRU Index" on page 107.

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 QAPLus/PRO Diagnostics 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.

3. 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.

QAPLus/PRO Diagnostics Control Keys

The following is a list of the QAPLus/PRO 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. Attention If selected, these tests will erase the information stored on the diskette or hard disk drive.
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).

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Features

Note

The PC Server 325 Type 8639 has Selectable Startup.

Microprocessor

- 60/180 MHz¹ Pentium Pro
- 66/200 MHz Pentium Pro
- Expandable to two microprocessors

Cache Memory

- 16 KB level-1 cache
- 256 KB level-2 internal cache

Memory

- Standard: 32 MB (min.), expandable to 512 MB
- DIMM (Dual Inline Memory-Module)
 - 60 ns
 - Buffered EDO (Extended Data Out)
 - ECC (Error Correcting Code)
- 4 DIMM sockets

Diskette Drive

- Supports one diskette Drive
- Standard: one 3.5-inch, 1.44 MB
- Optional (internal):
 - 3.5-inch, 2.88 MB
 - 3.5-inch, 1.44 MB

Hard Disk Drive

- Supports up to 6 SCSI hard disk drives by the system SCSI controller
 - 5 internal SCSI hard disk drives
 - 1 external SCSI hard disk drive

CD-ROM Drive

- Standard: SCSI

Keyboard and Mouse

(Floor model)

- 101-key keyboard
- Mouse

Expansion Slots

- 1 PCI
- 4 shared PCI/EISA
- 1 EISA

¹ MHz denotes internal clock speed of the microprocessor only; other factors also affect application performance.

Expansion Bays

- Two 5.25-inch drive bays
- Five 3.5-inch drive bays
- The number of bays available for expansion varies by model.

Upgradable POST and BIOS

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

Security Features

- Bolt-down capability
- Door lock
- LogicLock security enabled
- Power-on and administrator passwords
- Selectable drive-startup
- Security-error indicator

Integrated Functions

- 2 serial ports
- Infrared port
- 1 parallel port
- Mouse port
- Keyboard port
- 16-bit Ultra SCSI controller
 - 1 External connector (16-bit)
 - 1 Internal connector (16-bit)
- Ethernet controller
 - 10Base-T port
 - AUI port
- Video controller port, compatible with:
 - Super video graphics array (SVGA)
 - Video graphics adapter (VGA)
 - Color graphics adapter (CGA)
 - 1 MB video memory

Power Supply

- 250 watt with voltage switch (115–230 V ac)
- Built-in overload and surge protection
- Automatic restart after a momentary loss of power

Additional Service Information

The following additional service information is for the PC Server 325 - Type 8639.

- "Checkpoint Codes."
- "Configuration" on page 22.
- "Configuration Conflicts" on page 30.
- "Configuration/Setup Utility Program" on page 33.
- "Diagnostic Programs" on page 36.
- "Ethernet Controller" on page 39.
- "Ethernet Controller Messages" on page 39.
- "Ethernet Diagnostics" on page 67.
- "Ethernet Ports" on page 67.
- "Password" on page 68.
- "Power Supply" on page 80.
- "SCSI Drives" on page 82.
- "SCSISelect Utility Program" on page 83.
- "Specifications (PC Server 325 - Type 8639)" on page 86.
- "System/Processor Board Replacement" on page 87.
- "Symmetric Multiprocessors/Multiprocessing" on page 87.

Checkpoint Codes

During POST, the computer displays the status of the components being tested in the form of Checkpoint (CP) codes in the upper right-hand corner of the screen. The following is a list of the CP codes followed by the routine in process and the boot mode.

CP Code	Routine	Boot Mode
01	Test CPU Regs	Cold
02	Wait for RTC	Cold
04	Init Timer 0	Cold+Warm+SAD
05	Test DMA	Cold+Warm+SAD
06	Test Page Regs	Cold+Warm+SAD
07	Verify Refresh	Cold
08	Enable Parity	Cold+Warm+SAD
09	Clear first 64 K	Cold+Warm
0A	POST with Stack	Cold+Warm+SAD
0B	BIOS Shadow	Cold+Warm
0C	Phase 2 POST	Cold+Warm+SAD
0D	Init KBD Data	Cold+Warm+SAD
10	Test DMS Locations	Cold+Warm+SAD
12	Test PICs	Cold+Warm+SAD
14	Init Vector Table	Cold+Warm+SAD
15	Init Keyboard	Cold+Warm+SAD
16	Std CMOS Checksum_NS	Cold+Warm

CP Code	Routine	Boot Mode
17	Check Configuration	Cold+Warm
20	Test Timer Tick	Cold
21	Test Timer 2	Cold+Warm+SAD
23	Test RTC	Cold+Warm+SAD+SR
26	vpd_main	Cold+Warm
30	Shadow VPD	Cold+Warm
31	Save ID	Cold+Warm+SAD
32	Check P54C	Cold
33	Init Q Boot	Cold+Warm
34	Periph Config	Cold+Warm+SAD
35	Init Timeout Tables	Cold+Warm+SAD
36	Pos_Setup	Cold+Warm
37	TCPC	Cold+Warm
38	Find Serial Ports	Cold+Warm
39	Find Parallel Ports	Cold+Warm
3A	Enable Timer Init	Cold+Warm+SAD
3B	Clear Mem Size Error	Cold
3C	Mfg Boot Fork	Cold
3D	SignOn	Cold+Warm
3E	CPU Name	Cold+Warm
3F	CPU Speed	Cold+Warm
40	Enable Video	SAD
41	Size Memory Above 64 K	Cold+Warm
42	Password Not Entered	Cold
43	Test PS2 Mouse	Cold+Warm
44	Check for Mouse Buttons	Cold
45	Init KBD Flags	Cold+Warm+SAD
46	Test KBD	Cold+Warm
47	TCPC_Error	Cold+Warm
48	Mem Test Prompt	Cold+Warm
49	Test Memory	Cold+SR
4A	Clear EBDA	Warm
4B	Allocate EBDA	Cold+Warm+SR
4C	xfer_EBDA_vars	Cold+Warm+SR
4D	Set Warm Boot Flag	Warm
4E	Clear Speed Bits	Cold+Warm+SAD
4F	E_FLOB	Cold+Warm+SAD+SR
50	Enable System Interrupts	Cold+Warm+SAD+SR
51	C2Sec_Chk	Cold
52	Init KBD	Cold+Warm+SAD+SR
53	Check for NPX	Cold+Warm+SAD+SR

CP Code	Routine	Boot Mode
54	reset_hdctl	Cold+Warm+SAD+SR
55	FD_INIT	Cold+Warm+SAD+SR
56	Set Floppy Config	Cold+Warm+SAD+SR
57	Unlock Early	Cold
58	Init A20	Cold+Warm+SAD+SR
59	HD Setup	Cold+Warm+SAD+SR
5A	PnP_Assign Card Select Numbers	Cold+Warm+SR
5B	Verify CMOS Config	Cold+Warm+SR
5C	Clear Screen	Cold+Warm+SAD
5D	PnP_Assign Resources	Cold+Warm+SR
5E	Init Time of Day	Cold+Warm+SAD+SR
5F	Check for Locked KBD	Cold+Warm+SAD+SR
60	Init Enable NMI	Cold+Warm+SAD+SR
61	Set Boot Speed	Cold+Warm+SR
62	Set KBD LEDs	Cold+Warm+SAD
63	Check for Setup Hot Key	Cold+Warm
64	CSET_AFT_MTEST	Cold+Warm
65	CSET_AFT_CMCFG	Cold+Warm+SR
66	CSET_BFR_OPROM	Cold+Warm+SR
67	Phase 2 Exit Big Real	Cold+Warm+SAD+SR
90	Disable Video	Cold+Warm+SAD
91	Phase 1 Enter Big Real	Cold+Warm+SAD
93	Init Refresh	Cold+Warm
94	Init Chip_NS	Cold+Warm+SAD
95	CSET_Init	Cold+Warm+SAD
96	Disable Parity	Cold+Warm+SAD
97	Periph Init	Cold+Warm+SAD
98	Init RTC	Cold+Warm+SAD
99	Init Timer 2	Cold+Warm+SAD
9A	Setup GPIO Addr	Cold+Warm+SAD
9B	Post LED On_NS	Cold+Warm+SAD
9C	CPU1 LED On_NS	Cold+Warm+SAD
B0	Disable Appl 1 Local APIC	Cold+Warm
B3	Display SMP Sign On	Cold+Warm
B4	AP Cache Init	Cold+Warm
D1	Cache Init	Cold+Warm+SAD
D3	Cache Configure	Cold+Warm+SAD+SR
DA	EISA_Hook 6	Cold+Warm+SAD
DB	EISA Configure	Cold+Warm+SAD
DC	EISA Errors	Cold+Warm

CP Code	Routine	Boot Mode
E0	Reclaim Onboard Option ROM Space	Cold+Warm+SAD+SR
EA	PCI Reset	Cold+Warm
EB	PCI Video	Cold+Warm
EC	PCI Configure	Cold+Warm+SR
ED	PCI IDE	Cold+Warm
EE	PCI SCSI	Cold+Warm

Configuration

Note

DASD and other adapters may require additional configuration information.

Configuration is the allocation of the server resources to organize and interconnect hardware devices and software programs. The steps required to configure the server depend on the number and variety of devices and programs installed.

The PC Server 325 Type 8639 supports the following types of adapters.

- Peripheral Component Interconnect (PCI)
- Extended Industry Standard Architecture (EISA)
- Industry Standard Architecture (ISA)

The following hardware configuration utility programs are supplied with the server.

- Built-in Configuration/Setup program
Configures system board functions, such as the serial and parallel port assignments. It also allows you to set passwords for starting up and accessing the Setup program, and allows IRQ assignments of PCI devices.
- PC Server 325 EISA Configuration Diskette
Configures EISA and ISA adapters.
- Built-in SCSISelect Utility program
Configures SCSI devices. You can use SCSISelect to change default values, resolve configuration conflicts, and perform a low-level format on SCSI hard disk drives.
- PC Server Utilities diskette
Use the PC Server Utilities diskette to backup and restore the CMOS and NVRAM configuration data.

Adapters:

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

Adapter Considerations:

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

- PCI adapters
- EISA adapters
- ISA adapters

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

High-performance PCI adapters, such as RAID adapters, are installed in the two PCI slots closest to the processor board. See "Expansion Slots" on page 93 and "System Board" on page 103.

Attention

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

Assigning Interrupt Levels:

A rotational interrupt technique is used to configure PCI adapters. This technique enables the installation of PCI adapters that currently do not support sharing of PCI interrupts.

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

If a situation occurs where you need an additional interrupt, you can use an interrupt from another function that you might not need, such as COM2 (Interrupt 3) or parallel port (Interrupt 5 or 7).

EISA Configuration Diskette:

You must use the EISA Configuration Diskette anytime you want to change resource allocations, such as:

- Adding or removing devices
- Moving devices
- Changing device function
- Resolving conflicts
- Adding or removing EISA or ISA adapters

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

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

configure correctly appear on the EISA Configuration screens.

Backing Up the EISA Configuration Diskette:

Use an operating system command, such as the DOS DISKCOPY command, to make a *complete* backup copy of the EISA Configuration Diskette. Using the backup copy can prevent damage to the original diskette. The operating system documentation provides information on backing up diskettes.

EISA Configuration Menu Selections:

When you start the EISA Configuration Diskette, an introductory screen appears. Press **Y** at the prompt. After you press Enter, the main menu, **Steps in configuring the computer**, appears. The EISA Configuration program main menu contains five steps:

Step 1: Important EISA configuration information

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

Step 2: Add or remove boards

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

Step 3: View or edit details

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

Note

You can view the settings for PCI devices, but you cannot change them through the EISA Configuration utility program. To change settings for PCI devices, see "PCI Bus Control" on page 34.

Step 4: Examine switches or print report

After Steps 1 and 2 have been completed correctly, this step displays the correct switch and jumper settings for the

installed devices that have switches and jumpers. Also, you can choose to print a system configuration report.

Step 5: Save and exit

This step allows you to save the configuration or to discard the changes before exiting the program.

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

You can access help information through:

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

Recording EISA Configuration Settings:

Record the configuration settings you made in **Step 3: View or edit details** and **Step 4: Examine switches or print report** on a separate sheet and store it in a safe place for future reference. If a printer is attached to the server, you can use the **Print Screen** key to print these settings. The settings are helpful when you install additional options. Also, record the new settings each time you make changes. Be sure to record the current configuration settings for the user.

Starting the EISA Configuration Diskette

Note

Use a backup copy of the EISA Configuration Diskette. (see "Backing Up the EISA Configuration Diskette" on page 24).

To start the EISA Configuration Diskette:

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

Note

Adapters installed in the server appear automatically on the EISA Configuration screens *after* you copy the adapter's configuration file (file with an extension of .CFG) to the EISA Configuration Diskette. If you want to manually add an adapter that you have not yet installed in the server, add it using Step 2 from the menu. To configure ISA adapters, follow the instructions on the screen.

EISA Configuration Advanced Function:

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

To use the Advanced functions, do the following:

1. Start the EISA Configuration Diskette (see "Starting the EISA Configuration Diskette" on page 25).
2. At the main menu, select **Step 3**, The View or edit details screen appears.
3. Press **F7**. The Advanced functions screen appears.
4. Follow the instructions on the screen to:
 - a. Lock or unlock boards
 - b. View additional system information
 - c. Set verification mode
 - d. Maintain SCI files

EISA, ISA, and PCI Adapters:

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

When installing different types of adapters at the same time, install and configure them in the following sequence:

1. ISA
2. EISA
3. PCI

Note

During POST, the server automatically configures PCI devices.

1. Run the Setup program and record the current configuration settings. See "Recording EISA Configuration Settings" on page 25
2. Start the EISA Configuration Diskette. See "Starting the EISA Configuration Diskette" on page 25.
 - a. Record the current settings.

- b. Install configuration files (.CFG).

Note

If the .CFG files were not supplied with the adapter, see "Files."

3. Set jumpers or switches on the server system board. See "System Board Jumpers" on page 105.
4. Set jumpers or switches on the device. Refer to the instructions supplied with the adapter.
5. Install the adapter in the server.
6. Install software programs. Refer to the installation instructions supplied with the software.
7. If necessary, resolve any configuration conflicts. See "Configuration Conflicts" on page 30.

EISA or ISA Features and Options:

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

- Configuration files (.CFG)
- Diagnostic files (.DGS)
- Device drivers
- Sample applications (mini-applications)

To configure the server for an ISA or EISA adapter:

1. Read the documentation supplied with the adapter.
2. Copy any files with the extension of .CFG from the option diskette to the EISA Configuration Diskette. See "Files" for important information about configuring ISA adapters.
3. Start the EISA Configuration Diskette (see "Starting the EISA Configuration Diskette" on page 25).
4. Record the new configuration information (see "Recording EISA Configuration Settings" on page 25).
5. Save the new configuration settings to the EISA Configuration Diskette and to the nonvolatile random access memory (NVRAM) (see "Starting the EISA Configuration Diskette" on page 25).
6. Set any jumpers or switches on the adapter.
7. Install the adapter in the server.

Files:

A configuration file is required to configure the server for ISA or EISA adapters. You must copy this configuration file, which has a file-name extension of .CFG, from the device diskette to the EISA Configuration Diskette before installing the device in the server. The configuration file reserves the system resources that the adapter needs to function properly.

Some ISA adapters are supplied with a diskette that contains the .CFG file for the adapter. If ISA adapters are installed that were not supplied with their own CFG files,

you must use the PC Server EISA Configuration Diskette for the system you are servicing to create a unique .CFG file for each adapter.

Note

The unique .CFG file is system resource sensitive. To use a configured adapter card in another system, the adapter configuration must be cleared. See the instructions that were supplied with the adapter.

To create a unique .CFG file for an ISA adapter, do the following:

1. Insert the IBM PC Server EISA Configuration Diskette for the system you are servicing into diskette drive A.
2. Start the configuration utility program.
3. At the main menu, select Step 2, **Add or remove boards**.
4. At the next menu, select the slot in which you installed the adapter.
5. At the next screen, select **OK**.
6. At the next screen, press **F5**; then, select **Create .CFG file**.
7. Press **Enter**.
8. At the Create a board CFG file screen, type in the adapter manufacturer and description (for example IBM Token Ring); then, press **Enter**.
9. Refer to the adapter documentation for information about specific configuration parameters (such as IRQ or DMA channel) required for the adapter. Then, follow the instructions on the screen to enter the appropriate parameters on the menu.

Notes

1. Normally, ISA adapters do not use every parameter. Most adapters require only a port address.
2. The SVGA video controller in the server requires specific memory and I/O address assignments to function properly. To avoid configuration conflicts, do not assign the following SVGA memory and I/O addresses to other adapters or options in the server:
 - Memory address space:
A000H – C7FFH
 - I/O address spaces:
02E0h – 02EFh
03B0h – 03DFh
46E8h

10. After you type in all of the appropriate parameters, press **F10**.

11. At the next screen, carefully verify that the information is correct; then, press **Enter**.
12. At the Add Confirmation window, press **Enter** again.
13. In the next window (add), press **Enter**. The adapter description appears in the selected slot.
14. Verify the installation; then press **F10**.
15. At the next menu, select **Save and exit the configuration utility**.

Note

PCI devices do *not* require .CFG files.

Device Drivers:

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

Sample Applications:

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

Memory:

Notes

1. Not performing the following procedure could result in memory errors, POST error 164, and in the operating system not recognizing the added (or removed) memory.
2. After you add or remove memory, you must update the Configuration/Setup Utilities program.

1. Power-on the server and watch the screen.
2. When the message **Press F1 to enter Configuration/Setup** appears, press **F1**.
3. Select **Save Settings**, then exit Setup.

Notes

1. The server supports 60 ns, 32 MB, 64 MB, and 128 MB, Buffered EDO, ECC DIMMs.
2. For signal quality, install the largest size DIMM starting from the outside edge DIMM connector, J2. See "Processor Board" on page 101.

PCI Features and Options:

PCI devices automatically communicate with the server's configuration information. This usually results in automatic configuration of a PCI device. If a conflict does occur, refer to "Configuration Conflicts" on page 30.

Multiple-function PCI adapters use more than one interrupt. When installing one of these adapters, IRQ assignments should be reviewed in the Configuration/Setup utility programs to assure the IRQ assignments are correct.

The PC Server 325 automatically configures PCI adapters. This enables the installation of a variety of PCI adapters that currently do not support sharing of PCI interrupts. For information on manually overriding the interrupt, see "Advanced Setup" on page 33.

Configuration Conflicts

The resources used by a server consist of interrupt request levels (IRQs), direct memory access channels (DMAs), I/O ports, 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, if you install an ISA network adapter and an EISA network adapter, both requesting *IRQ 5*, only one of the adapters can be configured.)
- 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).
- An installed software program 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 in the system.

If a hardware configuration error is detected, a *configuration error* message appears after the server completes POST, but before the operating system starts. You can bypass the error or start one of the configuration utility programs. Use the up and down arrow keys (↑ and ↓) to select **Continue** or **Exit Setup**, then, press **Enter**. **Continue** will start the Configuration/Setup Utilities program. **Exit Setup** will bypass the error and load the operating system. You can also press **Esc** to exit setup and load the operating system. To start the EISA Configuration Diskette, insert the diskette in the diskette drive and press **Esc**.

The Configuration/Setup Utility program and the EISA Configuration program configure the system hardware and PCI interrupt requests. These programs do not consider the requirements of the operating system or the application programs.

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.

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

Resolving Hardware Configuration

Conflicts:

Use the following information to help resolve hardware configuration conflicts:

1. Run the Setup program to view and change resources used by the system board functions and the PCI interrupt requests (IRQs), if necessary. Record the current settings before making any changes. (See "Configuration/Setup Utility Program" on page 33.)
2. Determine which adapter or device is causing the error. The EISA Configuration program specifies how the server checks for resource conflicts. Initially, this verification mode is set to automatic. Use the **Advanced** selection of the EISA Configuration Diskette's **View or edit details** screen to change the setting (see "EISA Configuration Advanced Function" on page 26).

The automatic verification mode might disable adapters or system board features. For example, if you choose IRQ 4 for an adapter, the program disables Serial Port 1, which uses IRQ 4. If this happens, and you do not want this feature disabled, choose another IRQ for the adapter.

If you set the verification mode to *manual*, the configuration utility program does *not* try to resolve a conflict. Instead, you have to determine if a resource conflict has occurred and then resolve the conflict. When the verification mode is set to manual, an asterisk (*) appears on the View or edit details screen next to adapters in conflict.

If the EISA Configuration program cannot resolve a configuration error, it *deactivates* the adapter and displays the deactivated status (<>) on the View or edit details screen. Use the **Advanced** selection of the EISA Configuration Diskette's View or edit details screen to update or copy the server's system

configuration information file (see “EISA Configuration Advanced Function” on page 26).

3. Change configuration resource allocations. Use the built-in Setup program to view or change system board resource allocations. Use the **Advanced** selection of the EISA Configuration Diskette's View or edit details screen to view the available or the used system resources (see “EISA Configuration Advanced Function” on page 26). Use the **Edit Changes** selection to change resource allocations for complex configurations.
4. Change adapter jumpers or switches. Jumpers and switches define the system resources that a device can use. If the settings are incorrect or set to use a resource that cannot be shared, a conflict occurs and the device remains deactivated by the configuration program. Use the EISA Configuration Diskette's Step 4, **Examine switches or print report** screen to verify switches (see “EISA Configuration Menu Selections” on page 24). Read the documentation supplied with the device.
5. Change system board jumpers or switches. Remove the cover; then, refer to the system-board diagram inside the server.
6. Remove the device or adapter. Some configurations are not supported (for example, you cannot operate the server with two PCI SVGA adapters installed).
7. Assign EISA memory addresses starting with DFFFF (in hexadecimal), and work downward to address C8000 (in hexadecimal). PCI devices are automatically assigned memory addresses starting from C8000 working upwards.

Resolving Software Configuration Conflicts:

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

If there is a conflict, 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.

You can resolve conflicts by changing either the software or the hardware configuration.

Note

Start the EISA Configuration Diskette to view the addresses used by the system board functions. Use the **Advanced** function of Step 3, **View or edit details** to view the addresses used by the adapters. (See “EISA Configuration Advanced Function” on page 26 for instructions.)

Configuration/Setup Utility Program

To access the Setup program:

1. Remove all diskettes from the server.

Note

Never start the Setup program while using the EISA Configuration program.

2. Power-on the server and watch the screen. Be ready to act quickly.
3. After the IBM logo screen appears, you are prompted to Press <F1> to enter SETUP. As soon as you see that prompt, press the **F1** key. If the Setup program screen doesn't appear, restart the system and try again.

Notes

1. If a configuration error occurs, a prompt appears before the operating system starts (see “Configuration Conflicts” on page 30).
2. Record the current settings before making changes to the configuration.

4. Follow the instructions on the screen to view or change the configuration.

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

5. Press **Esc** or move the cursor to the **Exit Setup** option on the menu bar.
6. Select **Exit Setup** from the menu bar.
7. Select **Save changes and exit**.

Advanced Setup:

Select **Advanced Setup** from the Configuration/Setup Utility program to change values for advanced hardware features such as cache control and ROM shadowing.

A warning message appears when you select this choice, to alert you that the system may malfunction if these options are configured incorrectly. Follow the instructions on the screen carefully.

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

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

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

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

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

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

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

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

If an adapter requires a memory address in the C8000 to CFFFF (hexadecimal) range, the memory address of the server's SCSI ROM must be changed. Select **SCSI ROM Address** to assign an alternate address.

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

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

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

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

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

Devices and I/O Ports:

Software recognizes ports from their port assignments. Each port must have a unique port assignment. The Configuration/Setup utility program normally handles this. Special hardware or software might require a change to these assignments.

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

Note

The infrared connector and Serial B connector share a single port assignment. By default, the infrared connector is configured as **Disabled**.

Serial ports can be added by installing a serial adapter in an expansion slot. See the documentation that is shipped with the serial adapter for information about port assignments.

The parallel port can be configured as *bidirectional*. In bidirectional mode, the server supports Extended Capabilities Port (ECP) and Enhanced Parallel Port (EPP).

Note

When the parallel port is configured as bidirectional, use an IEEE 1284-compliant cable. The maximum length of the cable must not exceed 3 meters (9.8 feet).

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

Note

If you disable the serial, parallel, infrared ports or the Diskette drive in the Configuration/Setup Utility program, you might also need to use the EISA Configuration diskette to make the same changes.

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

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

Note

If an Administration password is set, you must enter the Administration password to view the full Configuration/Setup menu, otherwise, a limited set of choices will appear in the Configuration/ Setup menu. If no Administration password is set, the full Configuration/Setup menu will appear.

Diagnostic Programs

The QAPLus/PRO diagnostic program developed for IBM by DiagSoft, Inc. and supplied with the server is the primary method of testing the server. See "Diagnostics" on page 3. Option-specific diagnostic files are supplied with some optional devices and adapters. These files provide a more specialized test of the option. "Installing Additional Test Programs" provides additional information about installing and using diagnostic files. Also, refer to the documentation supplied with the option for information on installing and running option-specific diagnostics.

A PC Server PCI Ethernet Diagnostics diskette is supplied with the PC Server 325 for viewing Ethernet parameters and testing.

Option Diskettes:

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

Installing Additional Test Programs:

You can add other test programs to the Diagnostic Diskette. These other programs are usually provided on the diskette supplied with a device. After you add the programs to the Diagnostic Diskette, you can include information from the programs in the Test Log.

Before the test programs can find these programs to run as the User Diags test group, information about them must be included in a file called USERDIAG.CFG. This is an ASCII text file. It must include the following three items for each test to run:

- Program Name (.COM and .EXE files only)
- Test Description of the test to be run
- Command-line parameters to be passed to the program identified in the first item of this list

Notes

1. All of the information for a given test must be on a single line, and a semicolon (;) must separate the items on the line.
2. Make sure you press **Enter** at the end of each line of text in the USERDIAG.CFG file. This creates a carriage return line feed (CR LF) which is necessary for the User Diagnostics to be found and executed.
3. If the program executable file is in a directory other than the root directory (or other directory you have designated to contain the QA files), that directory must be listed in the PATH= section of the AUTOEXEC.BAT file on the QAPLus/PRO diagnostic diskette.
4. You can use a .CFG file other than USERDIAG.CFG if you use the command line "USRCONFIG=*filename*," when running the diagnostic programs. For example, you might use: QAPLPRO /USRCONFIG=MYTESTS.CFG.

USERDIAG.CFG Example:

An example USERDIAG.CFG file might look like the following:

Program Name	Test Description	Command-Line Parameter
BBSMODEM.EXE;	9600 Baud 5 Line Modem;	5
TEST1.EXE;	Generic 1;	
TEST2.EXE;	Generic 2;	
TESTALL.EXE;	CMD 1;	1
TESTALL.EXE;	CMD 2;	2
TESTALL.EXE;	CMD 3;	3

Note

You can have more than one command-line parameter for any given test.

When you view these tests on the Test Group window for the User Diag test group, they appear as follows:

- (◆) 9600 Baud 5 Line Modem
- (◆) Generic 1
- (◆) Generic 2
- (◆) CMD 1
- (◆) CMD 2
- (◆) CMD 3

The diagnostic program automatically assigns a test number to each test. The test numbers start at 201 and continue upward as needed. The numbers for the tests listed above are as follows:

- 202 9600 Baud 5 Line Modem
- 203 Generic 1
- 204 Generic 2
- 205 CMD 1
- 206 CMD 2
- 207 CMD 3

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.

Ethernet Controller Messages

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

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

Explanation: The user entered an incorrect parameter keyword.

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

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

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

Action: Perform the following steps:

1. Verify that the Ethernet jumper on the system board is set to the default, enabled position.
 2. Go to "General Checkout/Diagnostics QAPLus/PRO" on page 1 to run the diagnostic utility.
-

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

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

Action: Perform the following steps:

1. Verify that the IRQ settings in the NET.CFG file match the configuration settings in the Configuration/Setup utility programs. See "PCI Bus Control" on page 34 for information on setting the interrupt requests.
 2. Verify that the EEPROM on the system board is programmed correctly.
-

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

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

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

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

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

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

PCNTNW-NW-072 A resource tag is unavailable.

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

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

PCNTNW-NW-073 Unable to allocate memory.

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

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

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

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

Action: Perform the following steps:

1. Verify that the Ethernet jumper on the system board is set to the default, enabled position.
 2. Make sure that the interrupt request numbers are set correctly, and that no other devices are using the interrupt. See "PCI Bus Control" on page 34 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 that you are using. Restart the server.

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

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

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

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

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

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

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

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

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

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

Explanation: The MSMTx Free Count is not initialized properly.

Action: Restart the server. If the error recurs, 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 "PCI Bus Control" on page 34 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 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: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. Go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.
-

PCNTNW-NW-164 Device not found at IOADDRESS.

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

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

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

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

Action: Perform the following steps:

1. Verify that the Ethernet jumper on the system board is set to the default, enable position.
2. Edit the NET.CFG file to change the BUSTYPE keyword to PCI1.
3. If the problem persists, go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

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

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

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

Novell NetWare DOS ODI Driver Messages:

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

PCNTW-DOS-1 The LSL is not loaded.

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

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

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

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

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

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

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

Action: None.

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

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

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

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

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

Action: Run the Ethernet diagnostic.

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

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

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

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 "PCI Bus Control" on page 34 for information on setting the interrupt requests.
3. If the problem persists, go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

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

Explanation: The Ethernet controller initialization failed.

Action: Perform the following steps:

1. Verify that the Ethernet jumper on the system board is set to the default, enabled position. Go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

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

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

Action: Verify that the IRQ settings in the NET.CFG file match the configuration settings in the Configuration/Setup utility programs. See "PCI Bus Control" on page 34 for information on setting the interrupt requests. Verify that the EEPROM on the system board is programmed correctly.

PCNTNW-DOS-61 PCI device IRQ number mismatch.

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

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

PCNTNW-DOS-64 The device was not found.

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

Action: Verify that the Ethernet enable jumper is set to the default (enable) position. Go to "Ethernet Diagnostics" on page 67 to run the diagnostic utility.

PCNTNW-DOS-65 Device not found at IOADDRESS.

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

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

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

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

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. Use the BUSTYPE keyword to specify a value of PCI1.
 3. If the problem persists, go to "Ethernet Diagnostics" on page 67 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 section contains the error messages for the NetWare OS/2 ODI driver. The explanation and recommended action is included with each message.

PCNTNW-OS2-1 The LSL is not loaded.

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

Action: Load LSL.SYS before loading the driver.

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

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

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

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

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

Action: Check the system configuration.

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

Explanation: The board initialization failed.

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. Go to "General Checkout/Diagnostics QAPLus/PRO" on page 1 to run the diagnostic utility.
-

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

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

Action: Assign a different IRQ in the Configuration/Setup utility programs. See "PCI Bus Control" on page 34 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/Setup utility programs. See "PCI Bus Control" on page 34 for information on setting the interrupt requests. Verify that the EEPROM on the system board is programmed correctly.

PCNTNW-OS2-61 PCI device IRQ number mismatch.

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

Action: Remove the IRQ number in the NET.CFG file. Or, see “PCI Bus Control” on page 34 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/Diagnostics QAPlus/PRO” on page 1 to run the diagnostic utility.

PCNTNW-OS2-65 Device not found at IOADDRESS.

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

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

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

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

Action: Perform the following steps:

1. Verify that the Ethernet jumper on the system board is set to the default, enable position.
 2. Edit the NET.CFG file to change the BUSTYPE keyword to PCI1.
 3. If the problem persists, go to “General Checkout/Diagnostics QAPlus/PRO” on page 1 to run the diagnostic utility.
-

PCNTNW-OS2-73 Unable to allocate memory.

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

Action: Check the system configuration.

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:

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

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

Explanation: The NDIS stack is not configured properly.

Action: Check and correct 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: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.
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: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.
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: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

PCNTND-DOS-23 WARNING: PCNET IRQ found =

Explanation: The IRQ setting in PROTOCOL.INI does not match the hardware IRQ setting.

Action: Remove the IRQ setting from PROTOCOL.INI (or match the IRQ setting in PROTOCOL.INI with the configuration settings in the Configuration/Setup utility programs. See "PCI Bus Control" on page 34 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: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
 2. Go to "General Checkout/Diagnostics QAPLus/PRO" on page 1 to run the diagnostic utility.
-

PCNTNW-DOS-29 WARNING: DMA number is not necessary for PCI device.

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

Action: Remove the DMA setting in PROTOCOL.INI.

PCNTNW-DOS-32 IRQ number is already in use by another PCNET device.

Explanation: The specified IRQ number is already in use by another Ethernet controller or device.

Action: Modify the IRQ setting in the PROTOCOL.INI file, or modify the IRQ settings in the Configuration/Setup utility programs. See "PCI Bus Control" on page 34 for information on setting the interrupt requests in the Configuration/Setup utility programs.

PCNTNW-DOS-33 PCNET device with specified IOBASE is already in use.

Explanation: The specified IO address number is already in use by another Ethernet controller or device.

Action: Modify the IO address setting on the hardware, or modify the IO address setting in the PROTOCOL.INI file.

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 by a "Missing Configuration Parameter" message and several hex numbers. The hex numbers must be converted to decimal values so that they correspond to the error numbers used in this manual.

PCNTN3-9 IO base address is already in use by another PCNET device.

Explanation: The specified IO address number is already in use by another device.

Action: Modify the IO address setting on the hardware or modify the IO Address setting in the setup dialog box.

PCNTN3-13 IRQ and/or DMA number is already in use by another device.

Explanation: The specified IRQ is specified by another device.

Action: Modify the IRQ setting in the setup dialog box.

PCNTN3-18 PCI scan specified, device not found.

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

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default **Enable** position.
2. If the problem persists, go to "General Checkout/Diagnostics QAPLus/PRO" on page 1 to run the diagnostic utility.

PCNTN3-19 LanceOpenAdapter failed.

Explanation: The configuration is set up incorrectly.

Action: Rerun the setup program.

PCNTN3-20 Device at specified IO base address not found.

Explanation: The Ethernet controller cannot be found at the specified IO address.

Action: Verify that the IO address matches with the board. Otherwise, remove the IO Address specification from the setup.

PCNTN3-21 Device not found.

Explanation: The driver cannot find any PCnet device.

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default **Enable** position.
2. Go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

Packet Driver Messages:

This section contains the error messages for the packet driver. The explanation and recommended action are included with each message.

PCNTPK-DOS-1 The command syntax is PCNTPK [-n] [-d] [-w] <INT=packet_int_no> [IRQ=int_no] [IOADDR=io_addr] [DMA=dma_no] [BUSTYPE=bus] [DMAROTATE] [TP] [LED0=xx] [BUSTYPE=bus] [LED0=xx] [LED2=xx] [LED3=xx]

Explanation: The driver command was not entered correctly.

Action: If you entered the command from the command line, enter the command with the correct syntax. If the command is in the AUTOEXEC.NET file, edit the file to correct the syntax. The only parameters that should be included are PCNTPK and BUSTYPE=PCI1.

PCNTPK-DOS-2 Unable to reset the PCnet device.

Explanation: The software could not reset the Ethernet controller.

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to "General Checkout/Diagnostics QAPLUS/PRO" on page 1 to run the diagnostic utility.

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

Explanation: The software could not initialize the Ethernet controller.

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Check the interrupt settings in the Configuration/Setup utility programs. For more information, go to "PCI Bus Control" on page 34.
3. If the problem persists, go to "General Checkout/Diagnostics QAPLUS/PRO" on page 1 to run the diagnostic utility.

**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 reload the driver. If you want to load the driver at a different memory location, specify another software interrupt address on the INT parameter.

**PCNTPK-DOS-6 <IRQ=int_no> should be between 0
and 15 inclusive.**

Explanation: The specified IRQ is out of range for the Ethernet controller.

Action: Use valid IRQ values.

**PCNTPK-DOS-7 Packet driver failed to initialize the
board.**

Explanation: The board initialization failed.

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

**PCNTPK-DOS-8 <INT=packet_int_no> should be in the
range 0x60 to 0x80.**

Explanation: The specified software interrupt number is out of the allowable range.

Action: Specify a valid value for the INT parameter.

PCNTPK-DOS-12 PCI device IRQ number mismatch.

Explanation: The specified IRQ number does not match with the IRQ number assigned by the PCI BIOS.

Action: Remove the IRQ setting.

PCNTPK-15 The device was not found.

Explanation: The driver cannot find an Ethernet controller.

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

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

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

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. If the problem persists, go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

Packet driver is at segment xxxx.

Explanation: The memory address where the packet driver is loaded is xxxx.

Action: None.

Packet interrupt number xxxx.

Explanation: The interrupt number used by the packet driver is xxxx.

Action: None.

My Ethernet address is xxxxxxxxxxxx.

Explanation: The Ethernet address of this station is xxxxxxxxxxxx.

Action: None.

My ARCnet address is xxxx.

Explanation: The ARCnet address of this station is xxxx.

Action: None.

UNIX Messages:

This section contains the error messages for the following UNIX drivers.

- SCO UNIX LLI
- UnixWare DPLI
- SunSoft Solaris

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

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

Action: Perform the following steps:

1. Run netconfig to search for another Ethernet controller.
2. Verify that the Ethernet enable jumper is set to the default (enable) position.
3. If the problem persists, go to “General Checkout/Diagnostics QAPLus/PRO” on page 1 to run the diagnostic utility.

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/Setup utility 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 the Streams parameters.

Explanation: The system is out of Streams memory blocks.

Action: Use the CRASH utility to increase the number of Streams memory blocks for the failing size.

pnt0-11 device not found!

Explanation: The driver cannot find an Ethernet controller.

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

pnt0-12 device failed checksum test!

Explanation: The driver cannot find an Ethernet controller.

Action: Perform the following steps:

1. Verify that the Ethernet enable jumper is set to the default (enable) position.
2. Go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

pnt0-13 add_intr_handler failed! Interrupts already enabled.

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

Action: Perform the following steps:

1. Modify 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/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

pnt0-15 No more devices to open.

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

Action: Perform the following steps:

1. Verify that additional IBM PCI Ethernet adapters are present or replace the Ethernet adapter that fails to respond.
2. Go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

pnt0-17 Device fault... Reset initiated!

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

Action: Perform the following steps:

1. Verify that additional IBM PCI Ethernet adapters are present or replace the PCnet card that fails to respond.
2. Go to "General Checkout/Diagnostics QAPlus/PRO" on page 1 to run the diagnostic utility.

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: Perform the following steps:

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: Perform the following steps:

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: Perform the following steps:

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: Perform the following steps:

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: Perform the following steps:

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 by

pnt0-31 IO address is not necessary for the PCI device.

Explanation: The I/O address specified is not required.

Action: Remove the assigned IO address specified for the Ethernet controller.

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 325 - Type 8639. 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.

Ethernet Diagnostics

You must use the IBM PC Server PCI 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.

Ethernet Ports

The PC Server 325 Type 8639 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 is shipped 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.

Password

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

Note

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

If a power-on password is set and forgotten, you can regain access to the server by using either of the following methods:

- Entering the administration password at the power-on prompt. Start the Configuration/Setup Utility programs and change the power-on password.
- Changing the position of the power-on password jumper (J12). See "System Board" on page 103. When you restart the server, POST proceeds without prompting for the password for this startup only. Start the Configuration/Setup Utilities programs and set a new power-on password. Leave the power-on password jumper (J12) in its new position, unless you need to perform this procedure again.

Alarm/Wakeup Settings:

For proper operation of the **Alarm/Wakeup Settings** options, set the **Password Prompt** choice to **Off**. See "Configuration/Setup Utility Program" on page 33.

Set the Wakeup features immediately before you plan to Power-off the server. The server locks and cannot be used after you exit, saving settings. When the server restarts, in either Attended or Unattended mode, the Wakeup features return to the default, disabled settings.

When both Wakeup features are enabled, the server starts when the first event (time or signal) occurs.

PC Server Advanced Systems Management Adapter (FRU No. 76H3240)

Note

For a list of FRUs for this product see "Parts Listing (PC Server Advanced Systems Management Adapter)" on page 123.

The IBM PC Server Advanced Systems Management Adapter provides monitoring and event recording functions for ISA and EISA systems when used with TME 10 NetFinity Version 4.1.

Installation Requirements:

The Adapter can be installed only in ISA or EISA systems. The Adapter is supported by TME 10 NetFinity Version 4.1.

Note

If the server has TME 10 NetFinity Version 4.0 installed, download the IBM PC Server Advanced Systems Management Adapter files from:

- IBM PC Server World Wide Web page at <http://www.pc.ibm.com/servers/>
- IBM PC Company Bulletin Board Service (BBS) at (919) 517-0001

Read the README file for instructions.

Device drivers for OS/2, Microsoft Windows NT, and Novell NetWare are provided with the Adapter.

Resetting the Adapter and Clearing the Configuration:

If you removed an adapter from one system and are reinstalling it in a different system, you must reset the adapter. (clear the configuration) before you reinstall it to avoid possible configuration conflicts. With the adapter removed from the system:

1. Remove the battery from the adapter and set it aside.
2. With a metal paper clip or small metal screwdriver, short the battery-socket contacts on the adapter together. This resets the adapter and clears the configuration.
3. Reinstall the battery on the adapter.

System and Adapter Configuration:

The IBM PC Server Advanced Systems Management Adapter must be configured after installation.

Configuration Considerations:

- The adapter uses only adapter COM B for external communication, therefore a modem or null-modem cable must be connected to adapter COM B.
- To share adapter COM B with the system, adapter COM B must be assigned one of the following I/O addresses:
 - 3F8 (COM 1)
 - 2F8 (COM 2)
 - 3E8 (COM 3)
 - 2E8 (COM 4)
- To dedicate the adapter COM B to the adapter only, adapter COM B must be disabled with the adapter configuration program to prevent the system from accessing it.
- The adapter COM A is not used by the adapter. For the system to use adapter COM A, it must be configured with the adapter configuration program.
- Each port I/O address covers eight contiguous address bytes as shown in the table on page 70.
- Make sure there are no conflicts between the adapter port I/O addresses and interrupts you configure, and previously assigned system I/O addresses and interrupts.

The adapter can be configured to the following I/O address ranges and interrupts:

I/O Address Ranges (hex)	Interrupts
100–107	3
120–127	4
140–147	5
168–16F	9
188–18F	10
200–207	11
220–227	14
240–247	15
268–26F	N/A
300–307	N/A

Note: Any listed I/O address range can be assigned with any listed interrupt as long as there are no conflicts with previously assigned system I/O addresses and interrupts.

- If you have an EISA Configuration Utility program (called System Configuration Utility on some systems) go to “EISA Configuration Utility:” on page 71.
- If you do not have an EISA Configuration Utility program, and the system's Configuration/Setup Utility has the ISA Legacy Resources option go to “Configuration/Setup Utility ISA Legacy Resources:” on page 71.

- If you do not have an EISA Configuration Utility program or the Configuration/Setup Utility ISA Legacy Resources option go to “Manual I/O Address and Interrupt Assignment” on page 72.

EISA Configuration Utility:

1. Load the EISA Configuration Utility program.
2. Select Step 2 from the main menu to add the adapter and create the CFG file.
3. Display the available I/O addresses. Refer to the list in the table on page 70 and “Configuration Considerations:” on page 70, and assign I/O addresses for the adapter ports.
4. Display the available interrupts.
5. Refer to the list in the table on page 70, and assign interrupts for the adapter ports.
6. Enter the assigned I/O addresses and interrupts on the Configuration Data Worksheet on page 72.
7. Follow the on-screen prompts to exit the utility program.

Go to “Adapter Configuration:” on page 72.

Configuration/Setup Utility ISA Legacy Resources:

1. Restart the system and run the Configuration/Setup Utility.
2. Select the ISA Legacy Resources option.
3. Select I/O Port Resources.
4. Refer to the list in the table on page 70 and “Configuration Considerations:” on page 70, and reserve I/O addresses for the adapter ports.
5. Enter the reserved I/O addresses on the Configuration Data Worksheet on page 72.
6. Select Interrupt Resources.
7. Refer to the list in the table on page 70, and reserve interrupts for the adapter service processor port and the two adapter COM ports.
8. Enter the reserved interrupts on the Configuration Data Worksheet on page 72.
9. Follow the on-screen prompts to exit the Configuration/Setup Utility.

Go to “Adapter Configuration:” on page 72.

Manual I/O Address and Interrupt Assignment:

If you do not have the EISA Configuration Utility program or the Configuration/Setup Utility ISA Legacy Resources option follow this procedure.

1. Refer to the lists in the table on page 70 and “Configuration Considerations:” on page 70, and select available I/O addresses and interrupts for the adapter ports.
2. Enter these I/O addresses and interrupts on the Configuration Data Worksheet below.

Configuration Data Worksheet		
	I/O Address	Interrupt
Service Processor Port		
Adapter COM A		
Adapter COM B		

Continue with “Adapter Configuration:.”

Adapter Configuration:

1. Power-off the system.
2. Make sure the adapter configuration diskette is not write protected.
3. Insert the adapter configuration diskette into the diskette drive.
4. Press **Ctrl+Alt+Del** to restart the system.

The adapter configuration Flash Utility menu is displayed:

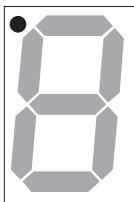
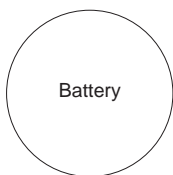
Flash Utility

Select one:

Configure Service Processor
View Service Processor Configuration
Update Service Processor
Set Up COM Ports
Configure OS Watchdog Timer
Exit

Enter F1=Help F3=Exit

5. Look at the two LED displays on the adapter and check the dot on each LED for the indications listed in the table on page 73.



CR2



CR1

CR1 Dot On	CR1 Dot Off
<p>Problem indication. Check: 34-pin interface cable connection Replace: Cable then, Adapter.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note</p> <p>For Advanced Systems Management External Power Control Units, replace the 10-pin External Power Source Cable then, the External Power Control Unit.</p> </div>	<p>Normal. Check CR2 Dot.</p>
CR2 Dot Blinking	CR2 Dot Off
<p>Normal; microcode is loaded. Go to step 6.</p>	<p>Microcode is not loaded. Select Update Service Processor on the Flash Utility menu and follow the prompts. Then return to step 5 on page 72. If CR2 continues to be off, replace the adapter battery. (See "Battery Notice" on page 131)</p>
<p>Note: If you reset the adapter by following the procedure "Resetting the Adapter and Clearing the Configuration" on page 69, CR2 Dot will be off and you must select Update Service Processor on the Flash Utility menu.</p>	

6. Refer to the configuration data worksheet on page 72 and complete the following steps.
 - a. Choose **Configure Service Processor** from the Flash Utility menu and select the port and IRQ you entered in the configuration data worksheet. The utility program writes an SM.INI file to the diskette. This file is used during the device driver installation.
 - b. Follow the on-screen prompts and choose **Setup COM Ports** from the Flash Utility menu. Select the COM port I/O addresses and interrupts you entered on the configuration worksheet.

7. Follow the on-screen prompts to exit from the adapter configuration utility program.
8. Replace the system cover.

Go to "Device Driver Installation" for device driver installation instructions.

Device Driver Installation:

If the operating system is OS/2, go to "OS/2 Device Driver Installation."

If the operating system is Windows NT, go to "Windows NT Device Driver Installation."

If the operating system is Novell NetWare, go to "Novell NetWare Device Driver Installation" on page 75.

OS/2 Device Driver Installation:

The OS/2 adapter device driver is stored in the C:\OS2 and C:\OS2\DLL directories unless otherwise specified by you. The CONFIG.SYS file is also updated.

To install the adapter device driver and dynamic link library (DLL):

1. Insert the adapter configuration diskette into the diskette drive.
2. Open an OS/2 window.
3. At the OS/2 prompt type:
A:
and press **Enter**.
4. At the A: prompt type:
OS2\SETUP
and press **Enter**.
5. Follow the menu prompts to complete the installation.
6. Restart the system to activate the device driver.

Refer to the TME 10 NetFinity Version 4.1 documentation for information on the operation and functions of the adapter.

Windows NT Device Driver Installation:

The Windows NT adapter device drivers are stored in the Windows NT system directories.

To install the adapter device drivers:

1. Insert the adapter configuration diskette into the diskette drive.
2. Log on with administrator privileges.
3. Open a DOS window.
4. At the DOS prompt type:
A:
and press **Enter**.
5. Type CD\NT
and press **Enter**.
6. Type SETUP

and press **Enter**.

The adapter device drivers are loaded and started.

Refer to the TME 10 NetFinity Version 4.1 documentation for information on the operation and functions of the adapter.

Novell NetWare Device Driver Installation:

To install the Novell Netware adapter device driver:

1. Insert the adapter configuration diskette into the diskette drive.
2. At the NetWare prompt type
LOAD A:\NETWARE\SETUP
and press **Enter**.
3. Follow the on-screen prompts. If you accept the default choices, the adapter device driver is copied to the hard disk as SYS:\SYSTEM\IBMSPN.NLM, and the AUTOEXEC.NCF file is updated.
4. To load the adapter device driver:
 - a. Restart the system.Or
 - b. At the NetWare prompt type
SEARCH ADD *path* (where *path* is the path the driver was copied to in step 3)
and press **Enter**.

At the NetWare prompt type

```
LOAD IBMSPN port-adrs irq (where  
port-adrs is the port address you selected  
and irq is the interrupt you selected during  
the adapter configuration procedure)  
and press Enter.
```

The adapter device driver will load without restarting the server.

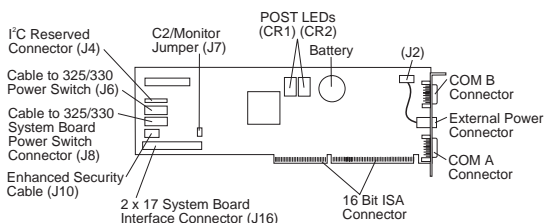
Refer to the TME 10 NetFinity Version 4.1 documentation for information on the IBM PC Server Advanced Systems Management Adapter operation and functions.

Adapter Cable to System Board

Connections:

Note

It is easier to connect the cables to the system board and Adapter before you install the Adapter in the system.



PC Server 325:

Refer to the IBM PC Server 325 Hardware Maintenance Manual for system board layout.

- 34-pin cable from Adapter (J16) to System Management Cable Connector (J19) on system board.
- 16-pin cable from Adapter (J8) to Operator Panel Connector (J7) on system board.
- Cable from Operator Panel to Adapter (J6).

PC Server 330:

Refer to the IBM PC Server 330 Hardware Maintenance Manual for system board layout.

- 34-pin cable from Adapter (J16) to System Management Cable Connector (J19) on system board.
- 16-pin cable from Adapter (J8) to Operator Panel Connector (J7) on system board.
- Cable from Operator Panel to Adapter (J6).

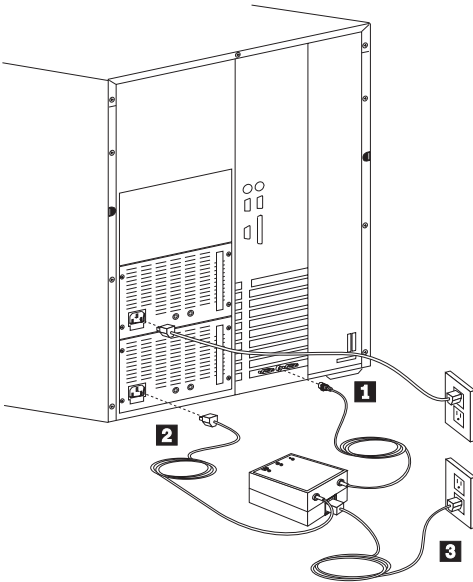
PC Server 704:

Refer to the IBM PC Server 704 Hardware Maintenance Manual for system board layout.

Note

The PC Server 704 Adapter installation requires:

- 34-pin-to-26-pin PC Server Systems Management Cable (separately purchased)
 - PC Server Advanced Systems Management External Power Control Unit (separately purchased)
- 26-pin end of the systems management cable to the System Management Cable Connector (J3G1) on the system board.
 - 34-pin end of the systems management cable to Adapter connector (J16).
 - Connect the External Power Control Unit control cable, **1**, external power control unit power cord, **2**, and system power cords, **3**, as shown:

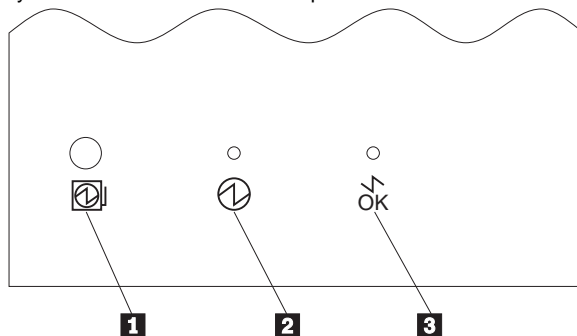


Note

For other ISA or EISA PC Server Advanced Systems Management Power Unit Connections, see the Adapter installation instruction.

External Power Control Unit Operation and Indicators:

The external power control unit provides power to the system under control of the adapter.



- The Power Status LED **2** On indicates power is enabled to the system. The Power Status LED Off indicates power is disabled to the system.
- The Cable Attached LED **3** On indicates the power unit control cable is connected to the adapter. The Cable Attached LED Off indicates the external power control unit control cable is not connected to the adapter.
- If system power from the external power control unit is disabled by the adapter, press the external power control unit power on button **1** to enable system power from the external power control unit.

Power Status LED 2	Cable Attached LED 3	Indicates	Action/FRU
On	On	System power is enabled and the external power control unit signal cable is connected to adapter.	None
Off	On	The adapter has caused system power to be removed and the external power control unit signal cable is connected to adapter.	<ol style="list-style-type: none"> 1. Press the external power control unit power on button 1 to restore system power. 2. Check system power-on switch. 3. Bypass power module unit by plugging the Server directly into the AC wall socket. 4. Power module 5. A.C. power cord
	Off	External power control unit signal cable is not connected to adapter.	<ol style="list-style-type: none"> 1. Connect the cable to the adapter. 2. External power control unit signal cable 3. External power control unit 4. Adapter

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.

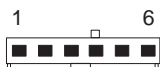
If the power-on indicator is not on, and the power-supply fan is not running, check the power cord for proper installation and continuity.

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 Problems” on page 135.

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



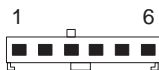
-Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
2	1	+11.52V	+12.6V
3	4	+4.8V	+5.25V

P9



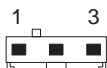
-Lead Pin	+Lead Pin	V dc Minimum	V dc Maximum
3	1	+4.8V	+5.25V
Pin	Description		
2	- Power On Request		
4	EPW (No connection on system board)		
5	VFAN (No connection on system board)		

P10/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

P12



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

SCSI Drives

The server supports *small computer system interface* (SCSI) drives. You can attach multiple SCSI drives to the two Ultra SCSI connectors on the system board, which share the same Ultra SCSI bus.

The SCSI controller on the system board can support up to 6 internal SCSI devices and 1 external SCSI device.

If you install additional SCSI devices, you must set a unique identification (ID) for each SCSI device that you connect to the Ultra SCSI connector, so that the Ultra SCSI adapter can identify the devices and ensure that different devices do not attempt to transfer data at the same time.

Note

Any information about SCSI drives also applies to other SCSI devices, such as scanners and backup tape drives.

Setting SCSI IDs:

The PC Server 325 Type 8639 supports SCSI IDs 0 to 15. ID 7 is reserved for the Ultra SCSI controller. The scanning sequence for preinstalled SCSI devices proceeds from the lowest SCSI ID to the highest, starting with 0.

For 16-bit devices, set the IDs to any unused number between 8 and 15. For 8-bit devices, set the IDs to any unused number between 0 and 6.

The preinstalled SCSI CD-ROM drive is shipped with the SCSI ID set to 3. If the server is shipped with a SCSI hard disk, its SCSI ID will be set to 6.

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

Termination Requirements:

Both ends of the SCSI cable must be terminated. Install SCSI devices starting at the ends of the internal and external SCSI cables. The SCSI device, at the end of the SCSI cable, should be terminated, otherwise a special connector, called a terminator, must be used to terminate the end of the SCSI cable.

If you have only internal SCSI devices connected to the internal SCSI connector *and* the bulkhead cable has not been installed, the SCSI controller becomes the termination for the external SCSI connector.

If internal SCSI devices are attached to the SCSI controller, the last internal device on the bus (cable) must be terminated, and the termination must be disabled on the other devices connected to the SCSI connector. The SCSI bus on the system board is already terminated.

If you use the internal SCSI connector *and* the external SCSI connector on the system board, both internal and external ends of the cable must be terminated.

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

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

System board jumper J29 must also be jumpered as follows:

- If an 8-bit device is connected to the external SCSI cable, J29 pins 1-2 must be jumpered.
- For any other combination of SCSI devices attached to the SCSI external or internal cables, J29 pins 2-3 can be jumpered. See "System Board" on page 103 and "System Board Jumpers" on page 105.

SCSISelect Utility Program

The PC Server is shipped with a menu-driven configuration utility program, called SCSISelect, that allows you to view and change SCSI settings.

Use the SCSISelect Utility program to:

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

Starting the SCSISelect Utility Program:

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

Note

If the screen displays a Not Ready message, you might have pressed **Ctrl+A** before the drives spun up. Restart the server.

Use the Up Arrow (↑) and Down Arrow (↓) key to move the highlight bar to the various menu choices. Press **Esc** to return to the previous menu. Also, you can press the F5 key to switch between color and monochrome modes (if 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 instructions on the screen. This menu has the following selections:

Host Adapter SCSI ID

Change the SCSI ID of the SCSI controller from its default value of 7.

SCSI Parity Checking

Enable or disable SCSI adapter parity checking. The default value is *Enabled*. This default value should not be changed.

Host Adapter SCSI Termination

Configure SCSI controller termination. The default value is *Low On / High On*.

SCSI Device Configuration

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

View or change the settings for advanced configuration options. These options include enabling support for large hard disk drives and support for drives with Ultra SCSI speed.

SCSI Disk Utilities:

To view 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.

Low-Level Format Program:

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

Depending on the hard disk capacity, the Low-Level Format program could take up to two hours.

Use the Low-Level Format program:

- When installing software that requires a low-level format
- When 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

Make sure all files on the hard disk are backed up before doing a low level format. Refer to the operating-system documentation.

Starting the Low-Level Format Program

Important

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

Specifications (PC Server 325 - Type 8639)

Size

- With pedestal:
 - Depth: 473 mm (18.6 in.)
569 mm (22.6 in.) with cable cover
 - Height: 455 mm (17.9 in.)
 - Width: 315 mm (12.4 in.)
- Without pedestal:
 - Depth: 473 mm (18.6 in.)
569 mm (22.6 in.) with cable cover
 - Height: 425 mm (16.7 in.)
 - Width: 195 mm (7.7 in.)
- Drawer model:
 - Depth: 465 mm (18.3 in.)
 - Height: 216 mm (8.5 in.)
 - Width: 482 mm (19.0 in.)

Weight

- Typical server as shipped: 17.0 kg (37.5 lb)

Environment

- Air temperature:
 - Server on: 10° to 35° C
(50° to 95° F)
Altitude: 0 to 914 m (3000 ft.)
 - Server on: 10° to 32° C
(50° to 90° F)
Altitude: 914 m (3000 ft.) to 2133 m (7000 ft.)
 - Server off: 10° to 43° C
(50° to 110° F)
Maximum Altitude: 2133 m (7000 ft.)
- Humidity:
 - Server on: 8% to 80%
 - Server off: 8% to 80%
- Maximum altitude: 2133 m (7000 ft)

Electrical Input

- Sine-wave input (50 to 60 Hz) is required
- Input voltage:
 - Low range:
 - Minimum: 90 V ac
 - Maximum: 137 V ac
 - High range:
 - Minimum: 180 V ac
 - Maximum: 265 V ac
 - Input kilovolt-amperes (kVA) approximately:
 - Minimum configuration as shipped: 0.08 kVA
 - Maximum configuration: 0.52 kVA

Total Power Available for Drives

- Nominal Operating Current allowed:
 - +5 V dc line: 5.3 A
 - +12 V dc line: 5.0 A

Heat Output

- Approximate heat output in British Thermal Units (BTU) per hour:
 - Minimum configuration: 350 BTU (102 watts)
 - Maximum configuration: 860 BTU (251 watts)

System/Processor Board Replacement

When replacing the system board, make sure jumpers, cables, adapter cards, and processor board are installed and seated correctly on the new system board.

The PC Server 325 Type 8639 computer might have two processors, and other components installed on the processor board. When replacing the processor board, remove all of the installed components from the old processor board and install them on the new processor board. If the problem remains, check the following:

- The processor is installed and seated correctly in socket (U5) on the processor board.
- If installed, the optional processor is seated correctly in socket (U6) on the processor board.
- All other components removed from the old processor board or system board are installed and seated correctly on the new board.

Note

If the processor(s) are not seated correctly, intermittent problems can occur.

Symmetric Multiprocessors/Multiprocessing

The PC Server 325 Type 8639 has a second upgradeable processor socket on the processor board to support Symmetric Multiprocessors/Multiprocessing (SMP). The SMP capability extends processing performance by allowing tasks to be dispatched to the next available processor rather than being queued until the busy processor has completed its task. The SMP capability also provides a level of high availability in that some operating systems run in a uni-processor mode if one of the processors should experience a failure. This function will allow the LAN to continue operation so that service can be scheduled at a non-critical time.

Note

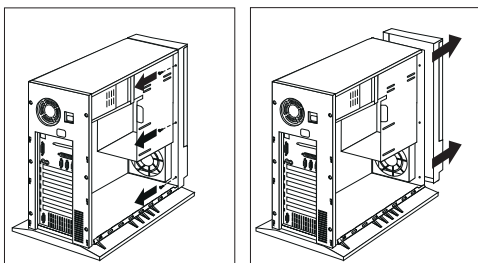
If the optional processor is installed, the optional processor is the boot processor.

Locations

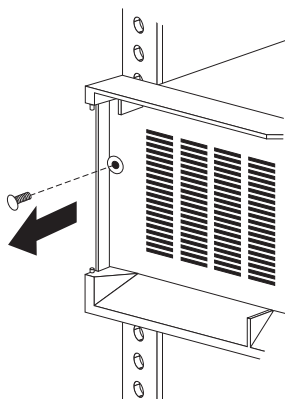
- “Bezels”
- “Controls and Status Indicators” on page 89
- “Covers” on page 91
- “Doors” on page 91
- “Drawer Model Rails” on page 92
- “Drives” on page 92
- “Expansion Slots” on page 93
- “Input/Output Connectors” on page 94
- “Internal Drive Bays” on page 95
- “Keylock Assembly Exploded View” on page 96
- “Operator Panel and Cable” on page 97
- “Operator Panel Status Indicators” on page 98
- “Optional Microprocessor” on page 100
- “Processor Board” on page 101
- “System Board” on page 103
- “U-Bolt Security (Option)” on page 106

Bezels

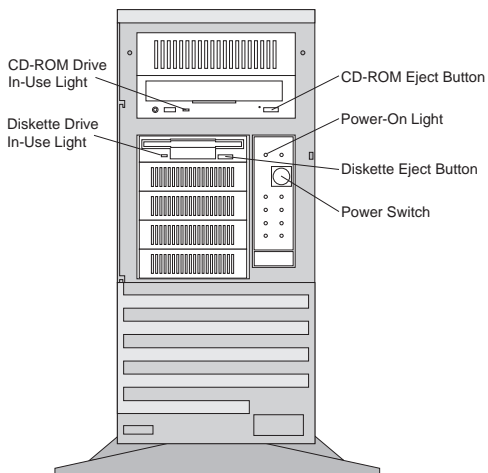
Floor Model



Drawer Model



Controls and Status Indicators



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

Diskette-Drive In-Use Light: This lights when the drive is accessing a diskette.

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



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

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

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

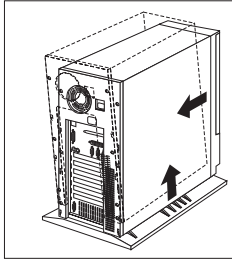
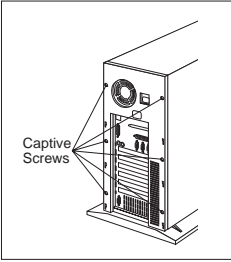
You can configure the server to start at a specified date and time, or when it receives a signal from either serial port.

The result of pressing the power switch varies, depending on whether the server is in attended, unattended, or standby mode.

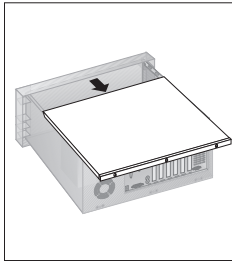
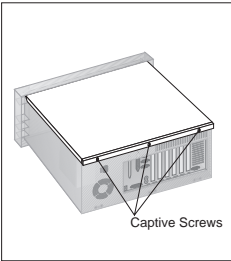
- To power-on the server from standby mode, press and release the power switch.
- To power-off the server when in unattended mode, press the power switch in slowly just until the power-on light goes out and then immediately release the switch.
- To power-off unattended mode but leave the server on, press and release the power switch.
- To turn unattended mode and return to standby mode, press the power switch just until the power LEDs go out.

Covers

Floor Model

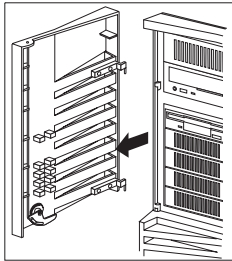
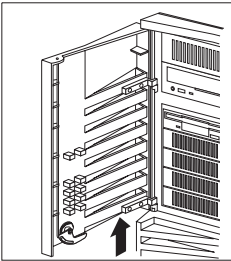


Drawer Model

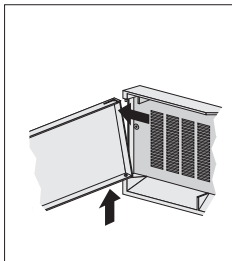
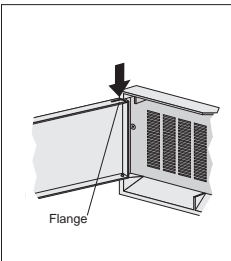


Doors

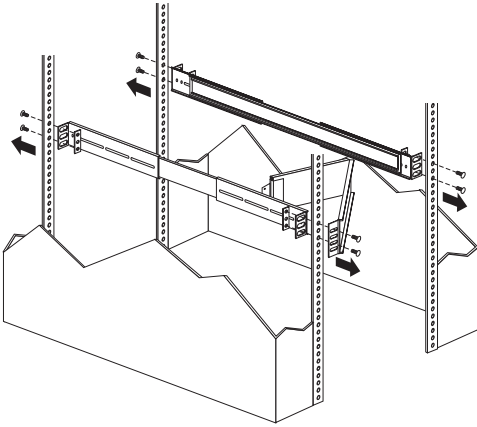
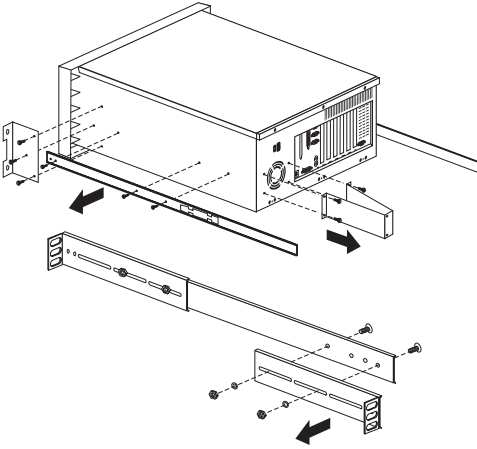
Floor Model



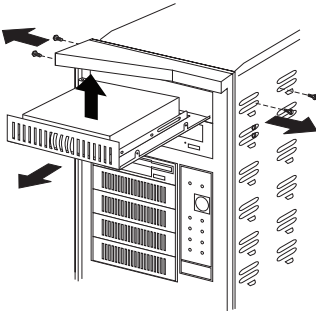
Drawer Model



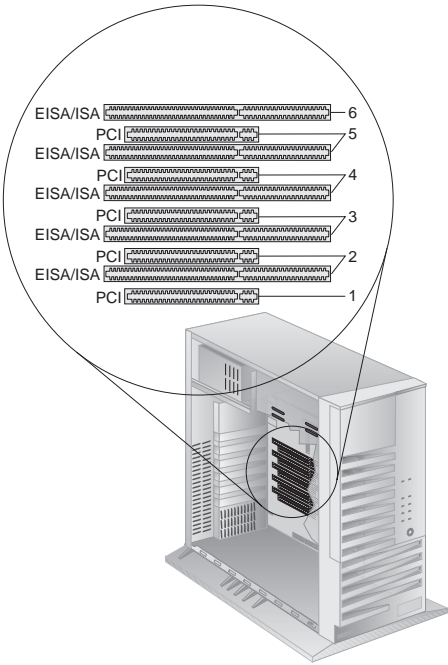
Drawer Model Rails



Drives



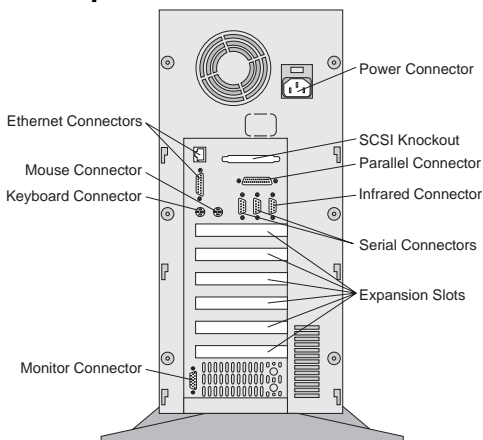
Expansion Slots



Notes

- Expansion slots 2 through 5 are shared slots. That is, the shared slots use the same expansion-slot opening on the back of the server.
- See “System Board” on page 103.

Input/Output Connectors



Ethernet Connectors: There are two Ethernet connectors: a DB-15 and an RJ-45. The DB-15 attachment unit interface (AUI) connector is for attachment of external 10BASE2, 10BASE5, or 10BASE-F medium attachment unit (MAU). The RJ-45 connector is for attachment to the integrated 10BASE-T (twisted-pair) transceiver.

Note

If the server is shipped with an Ethernet interface cable, it must be attached to the RJ-45 connector on the server, and the cable on the 10BASE-T device.



Mouse Connector: This is where the mouse cable connects to the server. This connector sometimes is called an auxiliary-device or pointing-device port.



Keyboard Connector: The cable from the keyboard connects here.



Monitor Connector: The monitor signal cable connects here.



SCSI Connector: Attach external SCSI devices here.



Parallel Connector: One 25-pin parallel port is provided. This is where the signal cable for a parallel printer, or other parallel device, connects to the server.



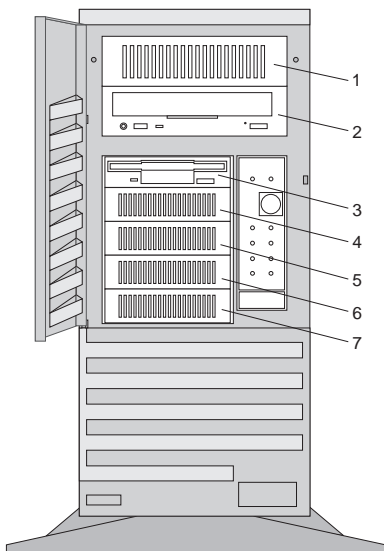
Infrared Connector: The server has one connector for an infrared (IR) transceiver module option.



Serial Connectors: Two 9-pin serial connectors, A (COM1) and B (COM2), are provided. The serial signal cable for a modem or other serial device usually connects here. If you are using a 25-pin signal cable, you need a 9-pin to 25-pin adapter cable.

Internal Drive Bays

Internal drives are installed in *bays*. The bays are numbered 1 through 7.



Note

If you install a drive that uses removable media (diskette, optical disc, or tape), you might need to remove or change the cover plate.

- Bay 1 is for 5.25-inch devices only. Some models are supplied with a hard disk drive preinstalled in bay 7.
- Bay 2 has a preinstalled SCSI CD-ROM drive.
- Bay 3 is for 3.5-inch diskette interface devices, such as a diskette drive or tape backup unit that uses the diskette cable. All models are supplied with a diskette drive preinstalled in bay 3.
- Bays 4–7 are for 3.5-inch drives.
- A full-high drive occupies two bays between bay 3 and 7. If you are installing a removable media device in bays 3 through 7, you must remove the tray from the front of both bays.
- The PC Server 325 Type 8639 is shipped with a 7 drop, 16-bit SCSI cable.

To install an 8-bit device, you will need a 16-bit to 8-bit SCSI Internal Converter. See “SCSI Drives” on page 82 for additional information.

- The IBM 3.5-inch rewritable optical disc drive requires a special mounting bracket.

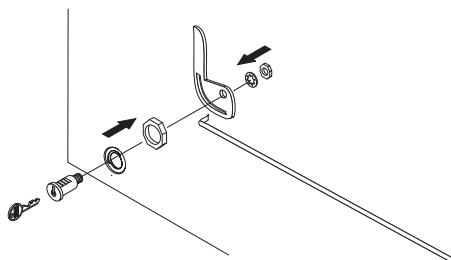
The PC Server 325 Type 8639 is shipped with a CD-ROM drive installed in bay 2, and a diskette drive installed in bay 3. Some models come with a preinstalled hard disk drive.

Bay	Drive Width	Drive Type	Drive Height
1	3.5-inch or 5.25-inch	Removable media drive or hard disk drive ¹	41.3 mm (1.6 in.)
2	5.25-inch	CD-ROM	41.3 mm (1.6 in.)
3	3.5-inch	Diskette drive	41.3 mm (1.6 in.)
4-7	3.5-inch	Hard disk ² ,	25.4 mm (1.0 in.) 41.3 mm (1.6 in.) ³

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.
3. A 41.3 mm drive installed in bays 4 through 7 occupies two bays.

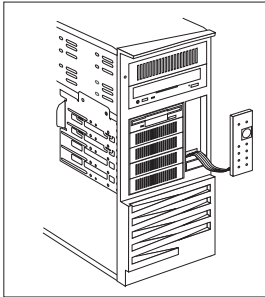
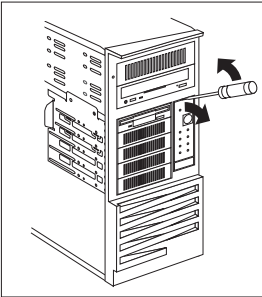
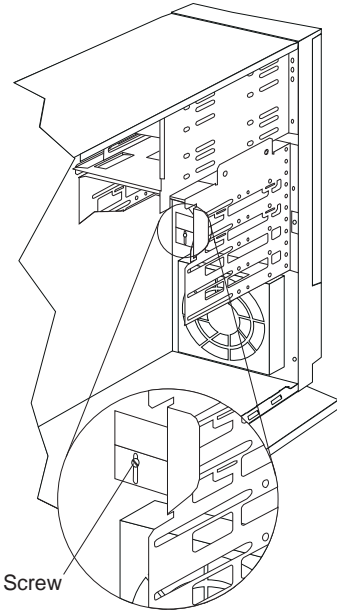
Keylock Assembly Exploded View



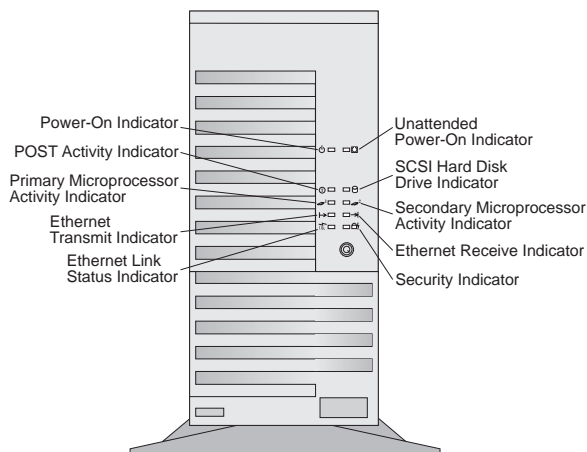
Operator Panel and Cable

Note

Loosen, do not remove screw.



Operator Panel Status Indicators



Notes:

1. During the power-on self test (POST), some of the LEDs come on briefly.
2. The amber LEDs might blink to show activity, and remain on to indicate that a problem condition exists.



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









Unattended Power-On Light: This green LED lights when the server powers on in unattended mode.



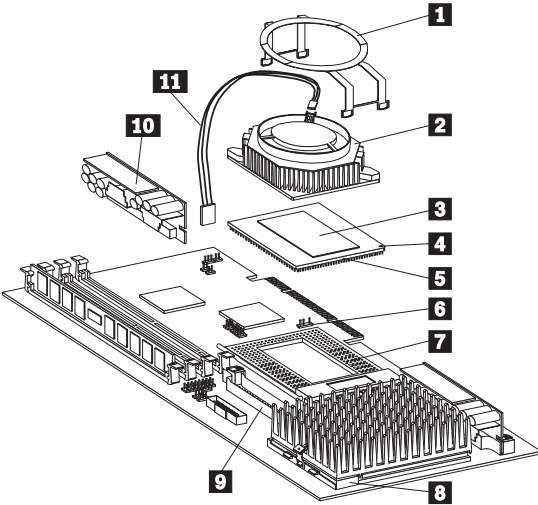
POST Activity Indicator: This amber LED lights while the power-on self test (POST) and the configuration utility programs are running. If this light remains illuminated, either a POST error has occurred, or the system microprocessor has stopped.



SCSI Hard Drive In-Use Light: This amber LED lights when the server is accessing a SCSI device. If this light remains illuminated, this might indicate that either the SCSI bus or the system microprocessor has stopped.

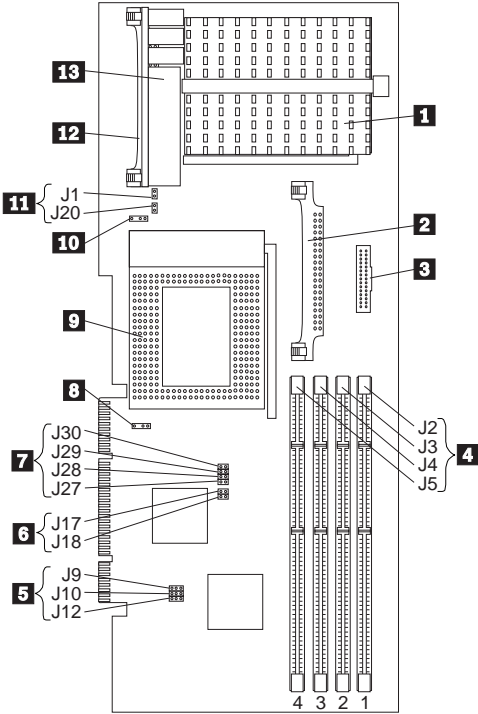
-  **1 Primary Microprocessor In-Use Light:** This amber LED blinks to indicate the activity of the primary microprocessor; it also comes on during POST.
-  **2 Optional (Secondary) Microprocessor In-Use Light:** When an optional microprocessor is installed, this amber LED blinks to show the activity of the optional microprocessor; it also lights during POST. When installed, this optional microprocessor becomes the boot, or startup processor.
-  **Ethernet Transmit Light:** This amber LED shows transmit activity on the network.
-  **Ethernet Receive Light:** This amber LED shows receive activity on the network.
-  **Ethernet Link Status Light:** This green LED shows an active link connection on the 10BASE-T interface.
-  **Security Light:** When tamper-detection software is installed and enabled, this amber LED shows that a security hardware or software error occurred.

Optional Microprocessor



- 1** Heat sink retention clip
- 2** Fan sink
- 3** Heater spreader
- 4** Pin 1 location
- 5** Microprocessor
- 6** Fan power cable connector (J21)
- 7** Optional processor board socket (U6), empty, with lever in closed, locked position
- 8** Primary processor board socket (U5), with lever in closed, locked position
- 9** Optional voltage regulator connector
- 10** Optional voltage regulator module (VRM)
- 11** Fan power cable

Processor Board



- 1** Primary Microprocessor Connector (U5)
- 2** Optional Voltage Regulator Module Connector
- 3** Reserved
- 4** Memory Connectors (J2, J3, J4, J5)
- 5** Reserved (J9, J10, J12)
- 6** PMC Frequency Selection Jumper (J17, J18)
- 7** Core Frequency Jumper (J30, J29, J28, J27)
- 8** Optional Microprocessor Fan Connector (J21)
- 9** Optional Microprocessor Connector (U6)
- 10** Primary Microprocessor Fan Connector (J22)
- 11** Clock Frequency Jumper (J1, J20)
- 12** Primary Voltage Regulator Module Connector
- 13** Primary Voltage Regulator Module

Processor Board Jumpers

Notes

1. Power-off the server, and disconnect the power cord before moving any jumpers.
2. Refer to the documentation that is shipped with the microprocessor or other option for correct jumper settings for the option.

Attention

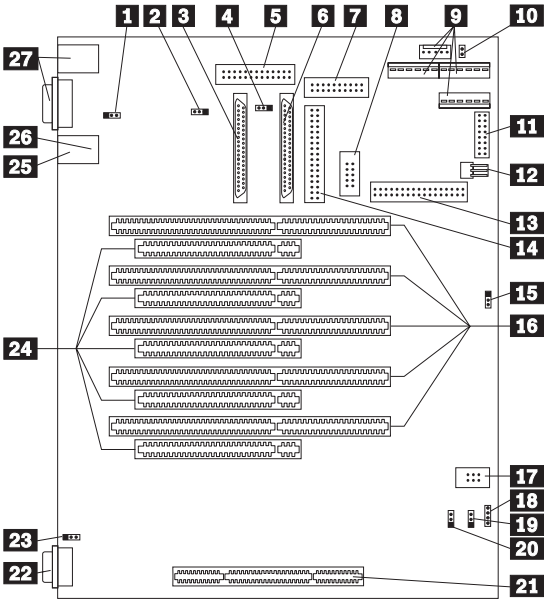
If the microprocessor frequency jumpers are incorrect, system board components will overheat and component damage can occur. Be sure that the microprocessor bus-to-core ratio jumper is set properly.

Jumper	Description	Frequency	Setting
J1	Clock Frequency	200/66 180/60 166/66	Jumper No Jumper Jumper
J17	PMC Frequency	200/66 180/60 166/66	No Jumper Jumper No Jumper
J18	PMC Frequency	200/66 180/60 166/66	Jumper No Jumper Jumper
J20	Clock Frequency	200/66 180/60 166/66	No Jumper Jumper No Jumper
J27	Core Frequency	200/66 180/60 166/66	Jumper Jumper Jumper
J28	Core Frequency	200/66 180/60 166/66	Jumper Jumper No Jumper
J29	Core Frequency	200/66 180/60 166/66	No Jumper No Jumper Jumper
J30	Core Frequency	200/66 180/60 166/66	Jumper Jumper Jumper

System Board

Note

Note: A black square (■) indicates pin 1.



- 1** Ethernet Enable Jumper (J22)
- 2** SCSI Controller Enable Jumper (J26)
- 3** External SCSI Connector
- 4** External SCSI Termination Jumper (J29)
- 5** Parallel Connector
- 6** Internal SCSI Connector
- 7** Serial Connector
- 8** Infrared Connector
- 9** Power Connectors
- 10** Hard Drive Fan Connector
- 11** Operator Panel Connector
- 12** System Fan Connector
- 13** System Management Connector
- 14** Diskette Drive Connector
- 15** Flash Write Protect Jumper (J30)
- 16** EISA/ISA Connectors
- 17** C2 Security Cable Connector
- 18** Speaker Connector
- 19** System Management Jumper (J49)
- 20** Power-on Password Jumper (J12)
- 21** Processor Board Connector
- 22** Video Connector
- 23** Video Enable Jumper (J25)
- 24** PCI Connectors
- 25** Keyboard Connector
- 26** Mouse Connector
- 27** Ethernet Connectors

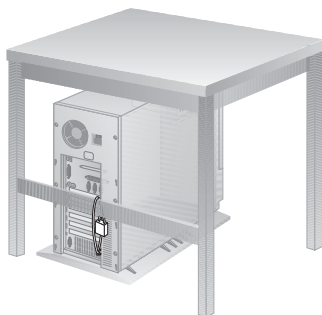
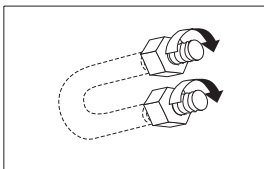
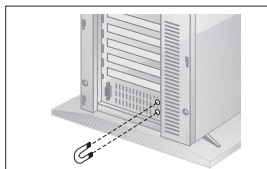
System Board Jumpers

Jumper	Description	Setting
J12	Power-on Password	Pins 1-2 Pins 2-3 (default)
J22	Ethernet Enable	Pins 1-2 Disabled Pins 2-3 Enabled (default)
J25	Video Enable	Pins 1-2 Enabled (default) Pins 2-3 Disabled
J26	SCSI Controller Enable	Pins 1-2 Disabled Pins 2-3 Enabled (default)
J29	External SCSI Termination — See "Termination Requirements" on page 82	Pins 1-2 8-bit External SCSI device attached Pins 2-3 16-bit SCSI devices attached (default)
J30	Flash Write Enable	Pins 1-2 enabled (default) Pins 2-3 disabled
J49	System Management Adapter	Pins 1-2 Adapter installed Pins 2-3 Adapter not installed (default)

U-Bolt Security (Option)

Note

Thread the cable through the U-bolt and around an object that is not a part of or permanently secured to the building structure or foundation, and from which it cannot be removed; then fasten the cable ends together with a lock.



Symptom-to-FRU Index

This index supports the PC Server 325 Type 8639.

Always start with “General Checkout” on page 2.

The Symptom-to-FRU Index lists beeps, errors, symptoms, and the possible causes. The most likely cause is listed first. Use this Symptom-to-FRU Index and the Symptom-to-FRU Index (QAPLus/PRO) on page 61 in the PS/2 Hardware Maintenance Manual to help you decide which FRUs to have available when servicing the computer.

Note

For IBM devices not supported by the QAPLus/PRO diagnostics code, refer to the manual for that device.

For information on:	Go to:
Additional service help. (For example, OS/2 Trap)errors, or	“Related Service Information” on page 125.
Possible software and hardware mismatch problems. (Not repairable by replacing FRUs)	“Software/Hardware Mismatch Problems” on page 133.
Memory Configuration Problems	“Memory” on page 29.
Replacing the system board does not correct the problem.	See “System/Processor Board Replacement” on page 87.

No Beep Symptoms

No Beep/Symptom	FRU/Action
No Beeps occur after successfully completing POST	<ol style="list-style-type: none">1. Disconnected speaker2. Speaker3. System board

Beep Symptoms

Beep 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
1-1-2 (Microprocessor register test failed)	<ol style="list-style-type: none"> 1. Optional Microprocessor (if installed) 2. Microprocessor
1-1-3 (CMOS write/read test failed)	<ol style="list-style-type: none"> 1. Real-Time Clock with Battery 2. System board
1-1-4 (BIOS ROM checksum failed)	<ol style="list-style-type: none"> 1. System board
1-2-1 (Programmable Interval Timer failed)	<ol style="list-style-type: none"> 1. System board 2. Microprocessor Board
1-2-2 (DMA initialization failed)	<ol style="list-style-type: none"> 1. System board 2. Microprocessor Board
1-2-3 (DMA page register write/read failed)	<ol style="list-style-type: none"> 1. System board 2. Microprocessor Board
1-2-4 RAM refresh verification failed	<ol style="list-style-type: none"> 1. System board 2. Microprocessor Board
1-3-1 (1st 64K RAM test failed)	<ol style="list-style-type: none"> 1. DIMM 2. Microprocessor Board
1-3-2 (1st 64K RAM parity test failed)	<ol style="list-style-type: none"> 1. DIMM 2. Microprocessor Board 3. System Board
2-1-1 (Secondary DMA register failed)	<ol style="list-style-type: none"> 1. System board 2. Microprocessor Board
2-1-2 (Primary DMA register failed)	<ol style="list-style-type: none"> 1. System board 2. Microprocessor Board
2-1-3 (Primary interrupt mask register failed)	<ol style="list-style-type: none"> 1. System board 2. Microprocessor Board
2-1-4 (Secondary interrupt mask register failed)	<ol style="list-style-type: none"> 1. System board 2. Microprocessor Board
2-2-1 (Interrupt vector loading failed)	<ol style="list-style-type: none"> 1. System board 2. Microprocessor Board
2-2-2 (Keyboard controller failed)	<ol style="list-style-type: none"> 1. System Board
2-2-3 (CMOS power failure and checksum checks failed)	<ol style="list-style-type: none"> 1. Real-Time Clock with Battery 2. System board
2-2-4 (CMOS configuration info validation failed)	<ol style="list-style-type: none"> 1. Real-Time Clock with Battery 2. System Board
2-3-1 (Screen initialization failed)	<ol style="list-style-type: none"> 1. System Board

Beep/Symptom	FRU/Action
2-3-2 (Screen memory failed)	1. System Board
2-3-3 (Screen retrace failed)	1. System Board
2-3-4 (Search for video ROM failed)	1. System Board
2-4-1 (Video failed, screen believed operable)	1. System Board
3-1-1 (Timer tick interrupt failed)	1. System Board
3-1-2 (Interval timer channel 2 failed)	1. System Board
3-1-3 (RAM test failed above address 0FFFFh)	1. DIMM 2. Microprocessor Board 3. System Board
3-1-4 (Time-Of-Day clock failed)	1. Real-Time Clock with Battery 2. System Board
3-2-1 (Serial port failed)	1. System Board
3-2-2 (Parallel port failed)	1. System board
3-2-3 (Math coprocessor failed)	1. Optional Microprocessor (if installed) 2. Microprocessor 3. Microprocessor Board
3-2-4 (Failure comparing CMOS memory size against actual)	1. DIMM 2. Microprocessor Board 3. Real-Time Clock with Battery
3-3-1 (Memory size mismatch occurred)	1. DIMM 2. Microprocessor Board 3. Real-Time Clock with Battery
Three Short Beeps	1. DIMM 2. Microprocessor Board 3. System Board
One Continuous Beep	1. Optional Microprocessor (if installed) 2. Microprocessor 3. Microprocessor Board 4. System Board
Repeating Short Beeps	1. Keyboard 2. System Board

Beep/Symptom	FRU/Action
One Long and One Short Beep	<ol style="list-style-type: none"> 1. Video adapter (if present) 2. System Board 3.
One Long and Two Short Beeps	<ol style="list-style-type: none"> 1. Video adapter (if present) 2. System Board
Two Long and Two Short Beeps	<ol style="list-style-type: none"> 1. Video adapter

Error Codes

In the following error codes, *X* can be any number or letter.

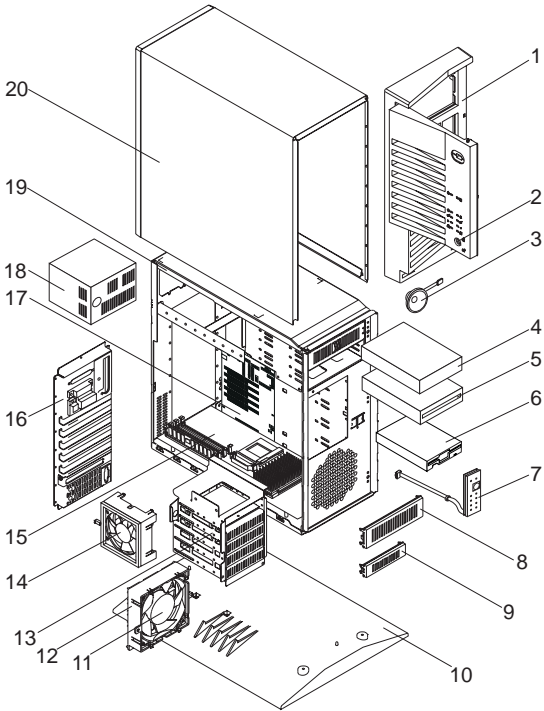
Error Code/Symptom	FRU/Action
E100, E101 (Invalid EISA configuration)	<ol style="list-style-type: none"> 1. Run EISA Configuration 2. Failing EISA adapter 3. Real-Time Clock with Battery 4. System Board
E10X (Invalid EISA configuration for Slot X)	<ol style="list-style-type: none"> 1. Run EISA Configuration 2. Failing EISA adapter in slot X
101, 102 (System and microprocessor error)	<ol style="list-style-type: none"> 1. System Board 2. Microprocessor Board
106 (System and microprocessor error)	<ol style="list-style-type: none"> 1. System Board 2. Microprocessor Board
111 (I/O channel check error)	<ol style="list-style-type: none"> 1. Failing EISA/ISA Adapter 2. Memory DIMM 3. System Board
114 (Adapter read-only memory error)	<ol style="list-style-type: none"> 1. Failing Adapter 2. Run Diagnostics
129 (Internal Cache error)	<ol style="list-style-type: none"> 1. Optional Microprocessor (if installed) 2. Microprocessor 3. Microprocessor Board
151 (Real time clock error)	<ol style="list-style-type: none"> 1. Run Diagnostics 2. Real-Time Clock with Battery 3. System Board
162 (Device Configuration Error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup; then, run the EISA Configuration Utility 2. Failing Device 3. Real-Time Clock with Battery 4. System Board
163 (Real-Time Clock error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Real-Time Clock with Battery 3. System Board
164 (Memory configuration changed)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. DIMM 3. Microprocessor Board

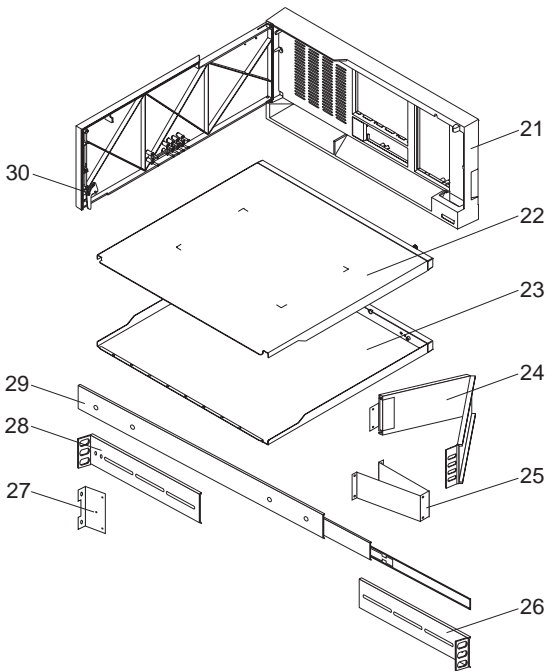
Error Code/Symptom	FRU/Action
173 (System CMOS checksum bad)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Real-Time Clock with Battery 3. System Board
175 (Hardware error)	<ol style="list-style-type: none"> 1. System board 2. Microprocessor Board
176 (Computer cover or cable cover was removed without a key being used)	<ol style="list-style-type: none"> 1. Run Configuration/Setup
177, 178 (Security hardware error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System Board
182 (System board error)	<ol style="list-style-type: none"> 1. System board
183 (Administration password not entered)	<ol style="list-style-type: none"> 1. System board
184 (Power-on password corrupted)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System board
185 (Drive startup sequence information corrupted)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System board
186 (System board or security hardware error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System Board
187 (System board or security hardware error)	<ol style="list-style-type: none"> 1. System board
188 (System board or security hardware error)	<ol style="list-style-type: none"> 1. System board
189 (An attempt was made to access the server with invalid passwords)	<ol style="list-style-type: none"> 1. Run Configuration/Setup, enter the administrator password
201 (Memory test error)	<ol style="list-style-type: none"> 1. DIMM 2. Processor Board 3. System Board
229 (Cache error)	<ol style="list-style-type: none"> 1. Optional Microprocessor (if installed) 2. Microprocessor 3. Microprocessor Board
301 (Keyboard or keyboard controller error)	<ol style="list-style-type: none"> 1. Keyboard 2. System Board

Error Code/Symptom	FRU/Action
604 (Diskette drive error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup and Diagnostics 2. Diskette Drive 3. Drive Cable 4. System Board
605 (Diskette Unlock failure)	<ol style="list-style-type: none"> 1. Diskette Drive 2. Drive Cable 3. System Board
662 (Diskette drive configuration error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup and Diagnostics 2. Diskette Drive 3. Drive Cable 4. System Board
962 (Parallel port error)	<ol style="list-style-type: none"> 1. Disconnect external cable on parallel port 2. Run Configuration/Setup 3. System Board
11XX (System-board serial port 1 or 2 error)	<ol style="list-style-type: none"> 1. Disconnect external cable on serial port 2. Run Configuration/Setup 3. System board
1762 (Fixed Disk Configuration error)	<ol style="list-style-type: none"> 1. Fixed Disk Cables 2. Run Configuration/Setup 3. Fixed Disk Adapter 4. Fixed Disk Drive 5. System Board
178X (Fixed Disk error)	<ol style="list-style-type: none"> 1. Fixed Disk Cables 2. Run Diagnostics 3. Fixed Disk Adapter 4. Fixed Disk Drive 5. System Board
1800 (No more hardware interrupt available for PCI adapter)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Run EISA Configuration 3. Failing Adapter 4. System Board
1801 (No room for PCI option ROM)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Run EISA Configuration 3. Failing Adapter 4. System Board
1802 (No more I/O space available for PCI adapter)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board

Error Code/Symptom	FRU/Action
1803 (No more memory (above 1 MB for PCI adapter))	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
1804 (No more memory (below 1 MB for PCI adapter))	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Move failing adapter to slot 1 or 2 3. Failing Adapter 4. System Board
1805 (PCI option ROM checksum error)	<ol style="list-style-type: none"> 1. Remove Failing PCI Card 2. System Board
1806 (PCI to PCI Bridge error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Move failing adapter to slot 1 or 2 3. Failing Adapter 4. System Board
2400 (Video controller test failure)	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
2462 (Video memory configuration error)	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
8603 (Pointing Device Error)	<ol style="list-style-type: none"> 1. Pointing Device 2. System Board
I9990301 (Fixed boot sector error, no operating system installed)	<ol style="list-style-type: none"> 1. Run Configuration/Setup for correct startup 2. Verify operating system installed
I9990305 (Fixed boot sector error, no operating system installed)	<ol style="list-style-type: none"> 1. Install operating system to hard disk drive

Parts Listings





System

Index	System (PC Server 325 - Type 8639)	FRU No.
1	Front Bezel/Door Assembly (Tower models only)	55H8166
2	Keylock with Keys	33F8433
3	Speaker	76H3473
4	2 GB Fast/Wide Hard Disk Drive	76H0958
5	8X SCSI CD-ROM Drive	73H2601
6	1.44 MB Diskette Drive (Tower models only)	93F2361
6	1.44 MB Diskette Drive (Rack models only)	76H4091
7	LED/On/Off Switch Cable Assembly (Tower models only)	55H8168
7	LED/On/Off Switch Cable Assembly (Rack models only)	72H2649
8	5.25-Inch Blank Bezel (Tower models only)	71G0771
8	5.25-Inch Blank Bezel (Rack models only)	76H3451
9	3.5-Inch Blank Bezel (Tower models only)	55H8174
9	3.5-Inch Blank Bezel (Rack models only)	76H3449
10	Pedestal	96G2412
11	Fan Assembly 120 mm with Connector	76H3447
12	Card Guide	55H8158
13	DASD 5-Drive Cage Assembly	55H8160
14	Fan Assembly 92 mm with Connector	06H2647
15	Processor Board with Voltage Regulator, without processor chip	75H7419
16	Shadow box	55H8164
17	System Board, without Memory and Processor Board	07H1194
18	250W Power Supply Assembly	40H7563
18	250W Power Supply Assembly (Japan)	40H7566
19	Base Frame	55H8151
20	Access Cover with Back Panel (Tower models only)	55H8153
21	Front Bezel/Door Assembly (Rack models only)	72H2647
22	Access Cover with Back Panel (Top) (Rack models only)	72H2643
23	Access Cover with Back Panel (Bottom) (Rack models only)	72H2643
24	Cable Management Arm (Rack models only)	72H2657
25	Cable Management Arm Bracket (Rack models only)	72H2674
26	Slide Management Bracket (1 each) (Rack models only)	76H4943
27	Chassis Drawer Bracket (1 each) (Rack models only)	72H2676
28	Slide Management Bracket (1 each) (Rack models only)	76H4943
29	Rack Slides 21-inch (2 each) (Rack models only)	72H2653
30	Keylock with Keys	33F8433

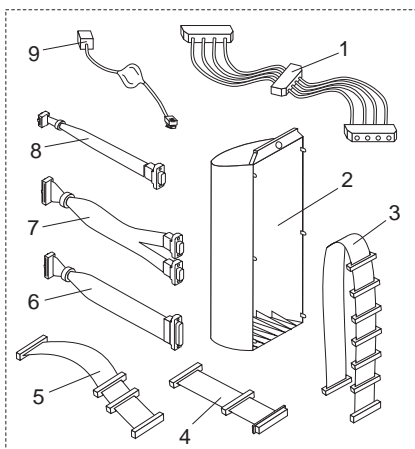
Index	System (PC Server 325 - Type 8639)	FRU No.
	32 MB Memory DIMM	42H2773
	64 MB Memory DIMM	42H2774
	128 MB Memory DIMM	76H0656
	Blank Bezel 8 mm (Tower models only)	72H2668
	Blank Bezel 8 mm (Rack models only)	76H3461
	C2 Security Cable	76H0206
	Converter, CD-ROM 16/8 Bit SCSI	92F0324
	EMC Shield, 8 mm	72H2666
	Fan Heat Sink with Clip	76H1813
	Heat Sink, with Tape and Clip	76H1814
	Hinge, for front bezel/door assembly (Tower models only)	55H8186
	Keyboard (See "Keyboards (101/102 Key)" on page 121)	
	Label, PC Server 325 (Tower models only)	75H8325
	Label, PC Server 325 (Rack models only)	76H3459
	Miscellaneous Parts Kit	55H8179
	<ul style="list-style-type: none"> • 32X5/16-Inch Screws (6 each) • EMC Contact • EMC Ground Contacts (4 each) • I/O Blank • FEM-Nut 4-40 Screws (2 each) • Floppy M3 Screws (2 each) • HF 6-32 Screws (2 each) • PL M3X8 HEX Screws (3 each) • Planar Edge Support • PWR Switch Bracket 	
	Miscellaneous Rack Kit	76H3486
	<ul style="list-style-type: none"> • 8/32-Inch Screws (21 each) • 8/32 Nuts (5 each) • #8 Lockwashers (5 each) • 10/32 Bar Nuts (5 each) • 10X32X0.5-Inch Screws (13 each) • 10X32X1.0-Inch Screws (3 each) • Floating Nuts (3 each) 	
	Mouse (Tower models only)	06H4595
	Power cord (See "Power Cords" on page 122)	
	Processor Chip, P6 180/60, with Heat Sink, Clip, and Grease (Models EJ0, JJ0)	12J2680
	Processor Chip, P6 200/66, with Heat Sink, Clip, and Grease (Models ES0, ESV, JS0, JSV, RS0, TS0)	75H9831
	Real Time Clock with Battery (See "Battery Notice" on page 131)	82G3620
	Voltage Regulator Module	76H1815

Index	System (PC Server 325 - Type 8639)	FRU No.
	Voltage Regulator Module	75H1097

Note

This FRU can be used if Voltage Regulator FRU number 76H1815 is not available.

Cables



Index	Cables (PC Server 325 - Type 8639)	FRU No.
1	Hard Drive Power Splitter Cable	76H3478
2	Cable Cover (Tower models only)	55H8188
3	SCSI Hard File Fast/Wide Cable (7X)	55H8192
4	SCSI Short Cable to I/O Panel (Bulkhead Cable)	55H8190
5	Diskette Signal Cable	92F0423
6	Parallel Data Cable	55H8206
7	Y Serial Data Cable	55H8204
8	Infrared Data Cable	55H8194
9	Ethernet Cable	76H3480

Keyboards (101/102 Key)

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	8125409
Turkish 440	1393286
U.K. English	1391406
U.S. English (with cable) (Tower models only)	75H9505
U.S. English (E/ME/A use only)	1396790

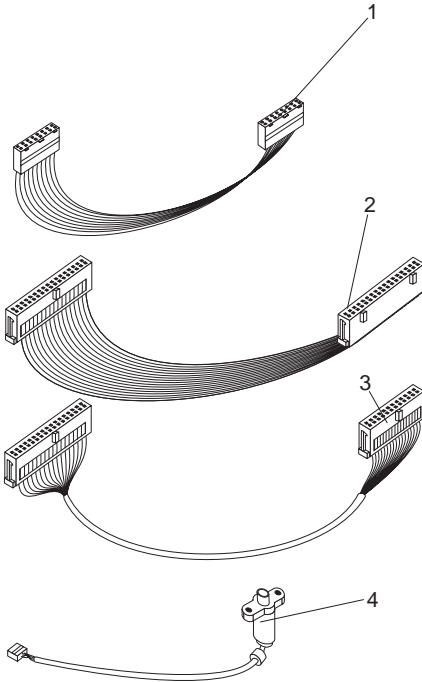
Power Cords

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

Parts Listing (PC Server Advanced Systems Management Adapter)

Index	PC Server Advanced Systems Management Adapter	FRU No.
	PC Server Advanced Systems Management Adapter (Service Processor Adapter)	76H3240
	Lithium battery (See "Battery Notice" on page 131)	33F8354
	External Power Control Unit	71G6222

Cables



Index	Cables (PC Server Advanced Systems Management Adapter)	FRU No.
1	16-pin Interface Cable	76H6827
2	34-pin Interface Cable	76H3257
3	34/26-pin Interface Cable	76H6828
4	Processor Adapter External Power Connector Cable	76H4054

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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Electrical Safety	127
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Grounding Requirements	130
Battery Notice	131
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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 Austausch 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.

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

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

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 Problems

You are here because the diagnostic tests did not identify the failure, there is no Devices List, or the system is inoperative.

Note: If you suspect a software mismatch is causing failures (solid or intermittent), be sure to see “Software/Hardware Mismatch Problems” on page 133.

Check the power supply voltages. See “Power Supply” on page 80. If the voltages are not correct, replace the power supply. If the voltages are correct, return here and do the following:

1. Power-off the computer.
2. Remove or disconnect the following (one at a time) until you find the failure (power-on the computer and reconfigure each time).
 - Any external devices
 - Surge suppressor device (on the computer)
 - Modem, printer, mouse, or non-IBM devices
 - Each adapter
 - Drives
 - Memory-Module Kits

Note

Minimum operating requirements for the PC Server 325, Type 8639 are:

- System board
- Processor board with:
 - Processor
 - 1 memory DIMM
- Cooling fan

3. Power-on the computer. If the problem remains, suspect the system board, then the processor board in that order.

Note

If the problem goes away when you remove an adapter, and replacing that adapter does not correct the problem, suspect the system board or processor board.

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 136.

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	Business Partner Marketing Support
905-316-5556	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 (Fax)	Parts Regular Orders, Exchange
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 (Fax)	Service Management Support
905-316-4150	Service (Warranty) Manager
905-316-4100 (Fax)	Service (Warranty) Manager
905-316-4872	Service Quality Programs
905-316-4100 (Fax)	Service Quality Programs
800-661-2131	Skill Dynamics (Education)
800-565-3344	ThinkPad EasyServe
416-443-5835 (Fax)	Warranty Claim Fulfillment
905-316-2445	Warranty Claim Reimbursement
905-316-3515 (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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Novell	Novell, Inc.
Open Server	The Santa Cruz Operation, Inc.
PCMCIA	Personal Computer Memory Card International Association
Pentium	Intel Corporation
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QAPIus/PRO	DiagSoft, Inc.
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SCSISelect	Adaptec, Inc.
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