COVER Book Cover

IBM Personal Computer

300 Series (Type 65XX)
700 Series (Type 68XX)

Hardware
Maintenance
Manual

February 1997

We Want Your Comments!
(Please see page 2.33)

Document Number S83G-7789-08

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+--- **Note** ---+
¦ ¦
¦ Before using this information and the product it supports, be sure to ¦
¦ read the general information under "Notices" in topic 2.36. ¦
¦ ¦
+---+

Ninth Edition (February 1997)

FRONT_1 About This Manual

This manual contains service and reference information for IBM Personal Computer 300 Series (Type 65XX) and 700 Series (Type 68XX) products.

The manual is divided into two sections as follows:

- The service section includes procedures for isolating problems to a FRU, a Symptom-to-FRU Index, related service procedures, and an illustrated parts catalog.

- The reference section includes safety information, product descriptions, and general information about system functions, and the advanced diagnostic tests.

This manual should be used along with the advanced diagnostic tests to troubleshoot problems effectively.

Important

This manual is intended for trained servicers who are familiar with IBM Personal Computer products. Use this manual along with advanced diagnostic tests to troubleshoot problems effectively.

Before servicing an IBM product, be sure to review the "Safety Notices (Multi-lingual Translations)" in topic 2.1 and "Safety Information" in topic 2.2.

FRONT_2 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**
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) (June 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)

CONTENTS Table of Contents

1.0 Service Information

This section contains the general checkout procedures, related service procedures, Symptom-to-FRU indexes, and parts listings for IBM Personal Computer 300/700 Series (Type 65XX and 68XX) products.

+--- **Note** ----------+
¦ ¦
¦ This manual and the diagnostic tests are intended to test ***only*** IBM ¦
¦ products. Non-IBM products of any kind including adapter cards, ¦
¦ accelerator boards, options, or non-IBM devices, can give false errors ¦
¦ and invalid computer responses. If you remove a non-IBM device and ¦
¦ the symptom goes away, the problem is with the device you removed. ¦
¦ ¦
+---------- +

Subtopics

1.1 General Checkout (Type 65XX/68XX)

This general checkout procedure is for Type 65XX and 68XX computers.

If you are servicing a Type 6876 or Type 6886 Micro Channel computer, see "General Checkout (Type 6876/6886)" in topic 1.2**.**

Attention

The drives in the computer you are servicing might have been rearranged or the drive startup sequence changed. Be extremely careful during write operations such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive.

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" in topic 2.16.6.

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. Before replacing any FRUs, ensure the latest level of BIOS is installed on the system. A down-level BIOS might cause false errors and unnecessary replacement of the system board. For more information on how to determine and obtain the latest level BIOS, see "BIOS Levels" in topic 2.13.
2. If multiple error codes are displayed, diagnose the first error code displayed.
3. If the computer hangs with a POST error, go to "Symptom-to-FRU Index" in topic 1.8.
4. If the computer hangs and no error is displayed, go to "Undetermined Problem" in topic 1.9.
5. If an installed device is not recognized by the diagnostics program, that device might be defective.

001

- Power-off the computer and all external devices.
- Check all cables and power cords.
- Set all display controls to the middle position.
- Insert the Diagnostics diskette into drive A.
- Power-on all external devices.
- Power-on the computer.
- Check for the following responses:

1. One or two beeps (depending on the diagnostics version level).
2. Readable instructions or the Main Menu.

DID YOU RECEIVE THE CORRECT RESPONSES?

Yes **No**

002

If Rapid Resume is displayed, do the following:

1. Disable Rapid Resume, see "Running Rapid Resume Manager" in topic 2.18.4.2.
2. Run the diagnostics tests.
3. Enable Rapid Resume after service is complete.

- or -

If the computer hangs during Rapid Resume, do the following:

1. Power-off; then, power-on the computer.
2. When the hard-disk drive activity light comes on, press **Ctrl+Alt+Del** to exit Rapid Resume and restart the computer. (Rapid Resume is now turned off.)

- or -

Go to the "Symptom-to-FRU Index" in topic 1.8.

003

ARE ALL INSTALLED DEVICES IN THE COMPUTER HIGHLIGHTED ON THE MODULE TEST MENU OR HARDWARE CONFIGURATION REPORT?

Yes **No**

004

Go to "Module Test Menu and Hardware Configuration Report" in topic 1.3.

005

Run the Advanced Diagnostics test. If necessary, refer to "Diagnostics and Test Information" in topic 2.16.

- If you receive an error, go to "Symptom-to-FRU Index" in topic 1.8.
- If the test stops and you cannot continue, replace the last device tested.
- If the computer has incorrect keyboard responses, go to "Keyboard" in topic 1.4.
- If the printer has incorrect responses, go to "Printer" in topic 1.5.
- If the display has problems such as jittering, rolling, shifting, or being out of focus, go to "Display" in topic 1.7.

1.2 General Checkout (Type 6876/6886)

This general checkout procedure is for Type 6876 and 6886 computers.

On Type 6876 and 6886 Micro Channel computers, you can start the advanced diagnostics programs in one of three ways:

1. From the 700 Series 6876/6886 Reference Diskette
2. From the 700 Series 6876/6886 Diagnostics Diskette
3. From the System Partition.

Subtopics

1.2.1 From the Reference Diskette (Type 6876/6886)

The Reference Diskette is bootable. Starting the diagnostic programs from the Reference Diskette allows you to test the options installed in the computer or test the base system.

Subtopics

1.2.1.1 To Test Options (Type 6876/6886)

Notes

1. Ensure that Rapid Resume is disabled before starting this procedure.
2. If Rapid Resume is displayed during this procedure, see "Running Rapid Resume Manager" in topic 2.18.4.2.
3. Re-run the diagnostics tests.

To test the options installed in the computer, do the following.

1. Power-off the computer and all external devices.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Insert the Reference Diskette into drive A.
5. Power-on all external devices.
6. Power-on the computer.
7. Check for the following responses:
   a. One beep
   b. IBM Logo
   c. Readable instructions or the Main Menu
8. If you received the correct responses, press **Ctrl+A** (Test the Computer screen appears). Select **Options diagnostics** and follow the instructions on the screen.
9. If you **did not** receive the correct responses, go to "Symptom-to-FRU Index" in topic 1.8.

1.2.1.2 To Test the Base System (Type 6876/6886)

Notes

1. Ensure that Rapid Resume is disabled before starting this procedure.
2. If Rapid Resume is displayed during this procedure, see "Running Rapid Resume Manager" in topic 2.18.4.2.
3. Re-run the diagnostics tests.

To test the base system, do the following:

1. Power-off the computer and all external devices.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Insert the Reference Diskette into drive A.
5. Power-on all external devices.
6. Power-on the computer.
7. Check for the following responses:
   a. One beep
   b. IBM Logo
   c. Readable instructions or the Main Menu
8. If you received the correct responses, do the following.
   a. Press **Ctrl+A**
      (Test the Computer screen appears).
   b. Select **System board diagnostics** and follow the instructions on the screen.
   c. When the QAPlus/PRO Main Menu appears, press **Ctrl+A**.
   d. Select **Diagnostics**.
   e. Select **Module Test**.
      - If the Module Test Menu is correct, run diagnostics.
      - If the Module Test Menu is not correct, go to "Module Test Menu and Hardware Configuration Report" in topic 1.3.
9. If you **did not** receive the correct responses, go to "Symptom-to-FRU Index" in topic 1.8.

1.2.2 From the Diagnostics Diskette (Type 6876/6886)

+--- **Important** ----------+
¦ If the diagnostic program is started from the diagnostics diskette, you **will not** have the option to test the Micro Channel options installed in the computer.
¦
¦ The Diagnostics Diskette is bootable. The procedure for starting the Diagnostics Diskette when servicing Type 6876 and 6886 computers is the same as the Type 65XX and 68XX computer. See "General Checkout (Type 65XX/68XX)" in topic 1.1.
¦
+---------------------------+

1.2.3 From the System Partition (Type 6876/6886)

Starting the diagnostic programs from the System Partition gives you the option of testing the options installed in the computer or testing the base system.

Subtopics

1.2.3.1 To Test Options (Type 6876/6886)

Notes

1. Ensure that Rapid Resume is disabled before starting this procedure.
2. If Rapid Resume is displayed during this procedure, see "Running Rapid Resume Manager" in topic 2.18.4.2.
3. Re-run the diagnostics tests.

To test the options installed in the computer, do the following.

1. Power-off the computer and all external devices.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Remove all media from the drives.
5. Power-on all external devices.
6. Power-on the computer.
7. Check for the following responses:
   a. One Beep
   b. IBM Logo
8. When the F1 prompt appears in the lower left-hand corner of the screen, press **F1** (the IBM logo appears, then the System Programs Main Menu).
9. Press **Ctrl+A**
   (Test the Computer screen appears).
10. If you received the correct responses, select **Options** and follow the instructions on the screen.
11. If you **did not** receive the correct responses, reinstall the System Partition on the hard disk drive from the Reference Diskette.

1.2.3.2 To Test the Base System (Type 6876/6886)

Notes

1. Ensure that Rapid Resume is disabled before starting this procedure.
2. If Rapid Resume is displayed during this procedure, see "Running Rapid Resume Manager" in topic 2.18.4.2.
3. Re-run the diagnostics tests.

To test the base system, do the following.

1. Power-off the computer and all external devices.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Remove all media from the drives.
5. Power-on all external devices.
6. Power-on the computer.
7. Check for the following responses:
   a. One Beep
   b. IBM Logo
8. When the F1 prompt appears in the lower left-hand corner of the screen, press **F1** (a second IBM logo appears followed by the System Programs Main Menu).
9. If you received the correct responses, do the following:
   a. Press **Ctrl+A**
      (Test the Computer screen appears).
   b. Select **System board diagnostics** and follow the instructions on the screen.
   c. When the QAPlus/PRO Main Menu appears, press **Ctrl+A**
   d. Select **Diagnostics**.
   e. Select **Module Test**.
   f. If the Module Test Menu is correct, run diagnostics.
   g. If the Module Test Menu is not correct, go to "Module Test Menu and Hardware Configuration Report" in topic 1.3.
10. If you **did not** receive the correct responses, reinstall the System Partition on the hard disk drive from the Reference Diskette.

1.2.4 System Programs (Type 6876/6886)

The system programs are utility programs for Micro Channel computers that allow you to:

- Change the system configuration
- Set passwords
- Change the date and time
- Set power management features
- Test the computer

The programs are installed in a special protected area of the hard disk drive called the System Partition.

The System Partition appears on the FDISK and FDISKPM screens for DOS and OS/2, so that the partition can be deleted and the disk space (about 6MB) can be used for other programs. Before you delete the System Partition, you must first use the **Back up/Restore system programs** option on the system programs Main Menu to make current copies of the Reference, Diagnostic, and QAPlus/PRO diskettes. Without the System Partition, you must use these diskettes to configure and diagnose the computer.

If the computer was manufactured without a hard disk drive, the system programs were provided on three diskettes:

- Reference Diskette
- Diagnostics Diskette
- QAPlus/PRO for IBM Diskette

1.2.5 Starting the System Programs (Type 6876/6886)

You can start the system programs from the hard disk drive or from the Reference Diskette.

If an error occurs during startup, the computer automatically starts the system programs to help you isolate and correct the problem. If you **do not** want the system programs to automatically start when an error occurs, change the **Bypass System Programs on error** setting in the system programs.

Subtopics

1.2.5.1 From the Hard Disk Drive (Type 6876/6886)

To start the system programs from the hard disk drive, do the following:

1. Remove all media from all the drives.
2. Power-off the computer; then, power it back on. (The IBM logo appears on the screen.)
3. When the F1 prompt appears, press **F1**. (A second IBM logo appears, followed by the system programs main menu.

1.2.5.2 From the Reference Diskette (Type 6876/6886)

To start the system programs from the Reference Diskette, do the following:

1. Power-off the computer.
2. Remove all media from the drives.
3. Insert the Reference Diskette into the primary diskette drive.
4. Power-on the computer.

After a few seconds, the IBM logo appears on the screen; then a second IBM logo screen appears, followed by the system programs main menu.

1.2.6 Power-on Password

To service Type 65XX and 68XX computers with an active and unknown power-on password, power-off the computer and do the following:

> **Note**
>
> On some models, this procedure will also remove the administrator password. See "Passwords" in topic 2.10 and "Riser Card (ISA) Administrator Password" in topic 2.29.19 for more information.

1. Unplug the power cord and remove the top cover.

2. Refer to "System Board Layouts" in topic 2.28 and locate the system board type you are servicing. Depending on the system board, the password is reset by a jumper or switch setting.

3. Move the password jumper to connect the center pin and the pin on the opposite end of the connector; or, change the switch setting as appropriate.

4. Power-on the computer. The system senses the change in the position and erases the password.

   - It is necessary to move the jumper back to the previous position and to reset the switch setting.

5. Remind the user to enter a new password when service is complete.

1.2.7 System Programs Main Menu (Type 6876/6886)

The following tables contain a listing of the System Programs Main Menu items followed by a description of the item.

Item	Description
Start operating system	Exits from the system programs and loads the operating system.
Back up/Restore system programs: □ **Back up the system diskettes**	Makes a backup copy of the Reference, Diagnostic, and QAPlus/PRO diskettes.
□ **Back up the System Partition**	Copies the system programs from the System Partition to the backup diskettes. Also creates backup Reference, Diagnostic, and QAPlus/PRO diskettes. You need at least three 2 MB diskettes for the backup procedure.
□ **Restore the System Partition**	Reinstalls the system programs from backup diskettes to the System Partition. Use this program to rebuild the System Partition in case of accidental loss or damage.
Update System Programs	Copies a new version of the system programs to the System Partition from an updated set of system diskettes.
Set Configuration	Views, changes, backs up, or restores the configuration information stored in the battery-backed memory. The configuration information consist of: □ The amount of memory installed □ The built-in features and their assignments □ The installed options with their location and assignments
□ **View configuration**	Shows the present configuration information for Micro Channel adapters and built-in features.
□ **Change configuration**	Allows you to change the configuration of the Micro Channel adapters. You can also change the **Bypass System Programs** setting from this menu.
□ **Back up configuration**	Copies the configuration information from the battery-backed memory to the hard disk drive.
□ **Restore Configuration**	Retrieves the Micro Channel configuration copied by the Back up Configuration program and restores that information to the battery-backed memory.
□ **Run Automatic Configuration**	Verifies and updates the configuration information for the Micro Channel adapters and built-in features.
□ **Display memory map**	Displays the memory address assigned to the adapters.
□ **Set and View Micro Channel SCSI devices**	Shows the existing Micro Channel device settings and allows you to make limited modification to some devices. Only the information enclosed in brackets ([...]) can be changed.
□ **View PCI configuration**	Shows the current configuration of Peripheral Component Interconnect devices and adapters. Because PCI components are automatically configured each time the computer starts up, you cannot change these settings.
Set Features □ **Set date and time**	Changes the date and time in battery-backed memory.
□ **Set password and security features**	Helps prevent the use of the computer by unauthorized persons. Two types of passwords are available from this program: a power-on password and a privileged-access password.
□ **Set keyboard speed**	Changes the speed at which a character repeats when a key is held down.

□ **Set console**	Select this choice if the computer is going to be used as a server, without a keyboard.
□ **Set startup sequence**	Allows you to specify the sequence of the drives that the computer will attempt to start from when you power it on.
□ **Set power management features** **Note:** If similar power management features are set in the operating system, they will override these settings.	Allows you to change the settings for the following: □ Rapid Resume □ Standby Timeout □ Wake Up on Ring □ Wake Up on Alarm
Copy an option diskette	Copies configuration and diagnostic files from a diskette that comes with an optional device.
Test the Computer	Allows you to test the base computer by selecting **System board diagnostics**, or test the Micro Channel options by selecting **Option diagnostics.**
More Utilities □ **Display revision levels**	Displays updates and changes.
□ **Display system error log**	Shows entries in the error log. Any memory and privileged-access password errors are recorded in this log.
□ **Stand alone utility information**	Describes how to use the UINSTALL program to get information about additional utility programs available on the Diagnostics Diskette. Some of these programs can be used only with specific operating systems. Make sure you read all of the information before installing any of these utility programs.
□ **Set and view system identification**	Records the computer serial number and displays the identification numbers for the system unit, processor board, and system board. This information is also know as the vital product data (VPD).
□ **Set video display information**	Allows you to choose the display type and set a horizontal frequency and refresh rate.

1.3 Module Test Menu and Hardware Configuration Report

Depending on the diagnostics version level you are using, the installed devices in the computer are verified in one of two ways:

1. At the start of the diagnostic tests, the Module Test Menu is displayed. Normally, all installed devices in the computer are highlighted on the menu.
2. At the start of the diagnostic tests, the main menu appears. From this menu, select **System Info** then select **Hardware Configuration** from the next menu. Normally, all installed devices in the computer are highlighted on this report.

If an installed device is not recognized by the diagnostics program:

- The diagnostic code for the device is not on the diagnostic diskette. Run the diagnostics provided with that device.
- The missing device is defective or it requires an additional diskette or service manual.
- An unrecognizable device is installed.
- A defective device is causing another device not to be recognized.
- The SCSI controller failed (on the system board or SCSI adapter).
- Use the procedure in "Undetermined Problem" in topic 1.9 to find the problem.

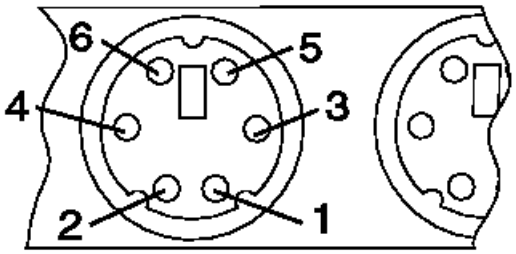
If a device is missing from the list, replace it. If this does not correct the problem, use the procedure in "Undetermined Problem" in topic 1.9.

1.4 Keyboard

+--- **Note** ----------+
¦ If a mouse or other pointing device is attached, remove it to see if ¦
¦ the error symptom goes away. If the symptom goes away, the mouse or ¦
¦ pointing device is defective. ¦
¦ ¦
+---------+

+---+
¦**001**¦
+---+
- Power-off the computer.
- Disconnect the keyboard cable from the system unit.
- Power-on the computer and check the keyboard cable connector on the system unit for the voltages shown.
  All voltages are ± 5%.

Pin	Voltage (Vdc)
1	+5.0
2	Not Used
3	Ground
4	+5.0
5	+5.0
6	Not Used



ARE THE VOLTAGES CORRECT?
Yes **No**
¦ ¦
¦ +---+
¦ ¦**002**¦
¦ +---+
¦ Replace the system board.
¦
¦

+---+
¦**003**¦
+---+
On keyboards with a detachable cable, replace the cable. If the problem remains or if the cable is permanently attached to the keyboard, replace the keyboard. If the problem remains, replace the system board.

1.5 Printer

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

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

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

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

1.6 Power Supply

If the power-on indicator is not on, the power-supply fan is not running, or the computer will not power-off, do the following.

Check/Verify	**FRU/Action**
1. Verify that the voltage-selector switch is set for the correct voltage.	**Correct the voltage-selector switch setting.**
2. Check the following for proper installation. □ Power Cord □ On/Off Switch connector □ On/Off Switch Power Supply connector □ System Board Power Supply connectors	**Reseat**
3. Check the power cord for proper continuity.	**Power Cord**
4. Check the power-on switch for continuity.	**Power-on Switch**

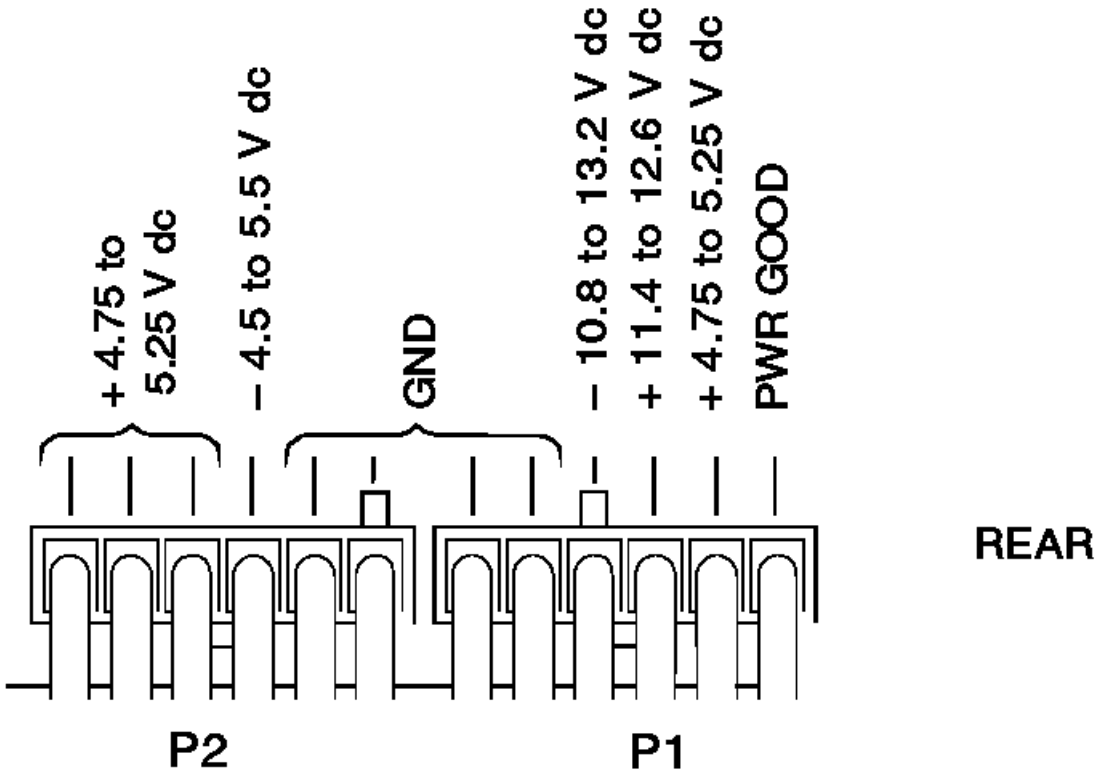
If these are correct, check the following voltages.

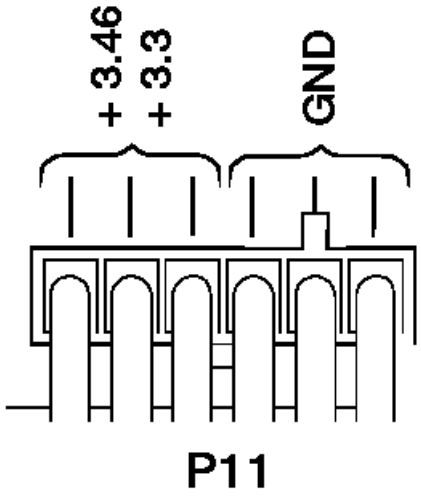
Subtopics
1.6.1 PC 300/700 Series System Board Power-Supply Connections
1.6.2 PC 360-S150 System Board Power-Supply Connections

1.6.1 PC 300/700 Series System Board Power-Supply Connections

For PC 360-S150 Series, see "PC 360-S150 System Board Power-Supply Connections" in topic 1.6.2.

Note: These voltages must be checked with the power supply cables connected to the system board.



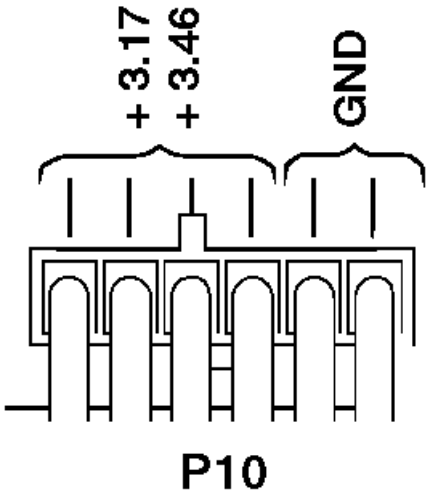


If the voltages are not correct, and the power cord is good, replace the power supply.

If the voltages are correct, and the computer you are servicing has a power supply connector on the riser card, check the following riser card voltages.

Riser Card Connections

Note: These voltages must be checked with the power supply cable connected to the riser card.



If the voltages are not correct, and the power cord is good, replace the power supply.

1.6.2 PC 360-S150 System Board Power-Supply Connections

Attention

These voltages must be checked with the power supply cables connected to the system board.

PICTURE 5

Pin	Signal	Function
1	3.3 V	+3.3 V dc
2	3.3 V	+3.3 V dc
3	COM	Ground
4	5 V	+5 V dc
5	COM	Ground
6	5 V	+5 V dc
7	COM	Ground
8	POK	Power Good
9	5VSB	Standby Voltage
10	12 V	+12 V dc
11	3.3 V	+3.3 V dc
12	-12 V	-12 V dc
13	COM	Ground
14	PS-ON	DC Remote Enable
15	COM	Ground
16	COM	Ground
17	COM	Ground
18	-5 V	-5 V dc
19	5 V	+5 V dc
20	5 V	+5 V dc

1.7 Display

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

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

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

Note

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

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

Note

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

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

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

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

If you are unable to correct the problem, go to "Undetermined Problem" in topic 1.9.

1.8 Symptom-to-FRU Index

The Symptom-to-FRU Index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with "General Checkout (Type 65XX/68XX)" in topic 1.1. This index can also be used to help you decide which FRUs to have available when servicing a computer. If you are unable to correct the problem using this index, go to "Undetermined Problem" in topic 1.9.

Notes

- If you have both an error message and an incorrect audio response, diagnose the error message first.
- If you cannot run the diagnostic tests, but did receive a POST error message, diagnose the POST error message.
- If you did not receive any error message, look for a description of your error symptoms in the first part of this index.
- Check all power supply voltages before you replace the system board. (See "Power Supply" in topic 1.6.)
- Check the hard disk drive jumper settings before you replace a hard disk drive. (See "Hard Disk Drive Jumper Settings" in topic 2.11.)

Important

1. Some errors are indicated with a series of beep codes. (See "Beep Symptoms" in topic 1.8.1.)
2. The processor is a separate FRU from the system board; the processor is not included with the system board FRU. (See "Replacing a System Board" in topic 1.10.)

Subtopics

1.8.1 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	□ One beep □ A pause (or break) □ Two beeps □ A pause (or break) □ Any number of beeps
4	Four continuous beeps

Beep Symptom	**FRU/Action**
1-1-3 CMOS read/write error	1. **Run Setup** 2. System Board
1-1-4 ROM BIOS check error	1. **System Board**
1-2-X DMA error	1. **System Board**
1-3-X	1. **Memory Module** 2. System Board
1-4-4	1. **Keyboard** 2. System Board
1-4-X Error detected in first 64 KB of RAM.	1. **Memory Module** 2. System Board
2-1-1, 2-1-2	1. **Run Setup** 2. System Board
2-1-X First 64 KB of RAM failed.	1. **Memory Module** 2. System Board
2-2-2	1. **Video Adapter** (if installed) 2. System Board
2-2-X First 64 KB of RAM failed.	1. **Memory Module** 2. System Board
2-3-X	1. **Memory Module** 2. System Board
2-4-X	1. **Run Setup** 2. Memory Module 3. System Board
3-1-X DMA register failed.	1. **System Board**
3-2-4 Keyboard controller failed.	1. **System Board** 2. Keyboard
3-3-4 Screen initialization failed.	1. **Video Adapter** (if installed) 2. System Board 3. Display
3-4-1 Screen retrace test detected an error.	1. **Video Adapter** (if installed) 2. System Board 3. Display
3-4-2 POST is searching for video ROM.	1. **Video Adapter** (if installed) 2. System Board
4	1. **Video Adapter** (if installed) 2. System Board

All other beep code sequences.	1. **System Board**
One long and one short beep during POST. Base 640 KB memory error or shadow RAM error.	1. **Memory Module** 2. System Board
One long beep and two or three short beeps during POST. (Video error)	1. **Video Adapter** (if installed) 2. System Board
Three short beeps during POST.	1. **See** "System Board Memory" in topic 2.22. 2. System Board
Continuous beep.	1. **System Board**
Repeating short beeps.	1. **Keyboard stuck key?** 2. Keyboard Cable 3. System Board

1.8.2 No Beep Symptoms

Symptom/Error	**FRU/Action**
No beep during POST but computer works correctly.	1. **System Board**
No beep during POST.	1. **See** "Undetermined Problem" in topic 1.9. 2. System Board 3. Memory Module 4. Any Adapter or Device 5. Riser Card 6. Power Cord 7. Power Supply

1.8.3 Numeric Error Codes

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

Error Code	FRU/Action
000 SCSI Adapter not enabled.	1. **Verify adapter device and Bus Master fields are enabled in PCI configuration program. See documentation shipped with computer.**
02X	1. **SCSI Adapter**
08X Check SCSI terminator installation.	1. **SCSI Cable** 2. SCSI Terminator 3. SCSI Device 4. SCSI Adapter
101 System board interrupt failure.	1. **System Board**
102 System board timer error.	1. **System Board**
106	1. **System Board**
110 System board memory parity error.	1. **Memory Module** 2. System Board
111 I/O channel parity error.	1. **Reseat adapters** 2. Any Adapter 3. System Board
114 Adapter ROM error.	1. **Adapter Memory** 2. System Board
129 Internal cache test error.	1. **Processor** 2. L2 Cache Memory 3. System Board
151 Real-time clock failure.	1. **System Board**
161 Bad CMOS battery.	1. **Run Setup** 2. CMOS Backup Battery (See page 2.1.) 3. System Board
162 Configuration mismatch.	1. **Run Setup and verify Configuration** 2. Had a device been added, removed, changed location? If not, suspect that device. 3. Power-on external devices first, then power-on computer. 4. CMOS Backup Battery (See page 2.1.) 5. System Board
162 And unable to run diagnostics.	1. **Diskette Drive** 2. System Board 3. Diskette Drive Cable
163 Clock not updating or invalid time set.	1. **Time and Date Set?** 2. CMOS Backup Battery (See page 2.1.) 3. System Board
164 POST detected a base memory or extended memory size mismatch error.	1. **Run Setup. Check System Summary menu for memory size change. (See** "Setup Utility Program" in topic 2.18.**)** 2. Run the Extended Memory Diagnostic tests.
17X, 18X	1. **C2 Security**
175	1. **Riser Card** 2. System Board
176	1. **Covers were removed from the**

	computer.
177 Corrupted Administrator Password.	1. **Riser Card** 2. System Board
178	1. **Riser Card** 2. System Board
183	1. **Enter the administrator password**
184 Password removed due to check-sum error.	1. **Enter new password**
185 Corrupted boot sequence.	1. **Set configuration and reinstall the boot sequence.**
186	1. **Riser Card** 2. System Board
189	1. **More than three password attempts were made to access the computer.**
1XX Not listed above.	1. **System Board**
201, 20X Memory data error.	1. **Memory Module** 2. System Board
225	1. **Unsupported Memory**
229 External cache test error.	1. **L2 Cache Memory** 2. System Board
262 POST detected a base memory or extended memory type error.	1. **Run Setup. Check System Summary menu for memory type change. (See** "Setup Utility Program" in topic 2.18.**)** 2. Run the Extended Memory Diagnostic tests.
301	1. **Keyboard** 2. Keyboard Cable 3. System Board
303 With an 8603 error.	1. **Mouse** 2. Keyboard 3. Keyboard Cable 4. System Board
303 With no 8603 error.	1. **Keyboard** 2. Keyboard Cable 3. System Board
3XX Not listed above.	1. **Keyboard** 2. Keyboard Cable 3. System Board
5XX	1. **Video Adapter** (if installed) 2. System Board
601	1. **Diskette Drive A** 2. Diskette Drive Cable 3. System Board
602	1. **Bad Diskette ?** 2. Verify Diskette and retry.
604 And able to run diagnostics.	1. **Run Setup and verify diskette configuration settings** 2. Diskette Drive B 3. Diskette Drive Cable 4. System Board
604 And unable to run diagnostics.	1. **Run Setup and verify diskette configuration settings** 2. **Diskette Drive A** 3. Diskette Drive Cable 4. System Board

605 POST cannot unlock the diskette drive.	1. **Diskette Drive** 2. Diskette Drive Cable 3. System Board
662	1. **Diskette drive configuration error or wrong diskette drive type, run Set Configuration.**
6XX Not listed above.	1. **Diskette Drive** 2. System Board 3. External Drive Adapter 4. Diskette Drive Cable 5. Power Supply
762 Math coprocessor configuration error.	1. **Run Setup** 2. Processor 3. System Board
7XX Not listed above.	1. **Processor** 2. System Board
962 Parallel port configuration error.	1. **Run Configuration** 2. Parallel Adapter (if installed) 3. System Board
9XX	1. **Printer** 2. System Board
1047	1. **16-Bit AT Fast SCSI Adapter**
107X Check SCSI terminator installation.	1. **Check SCSI terminator installation**. 2. SCSI Cable 3. SCSI Terminator 4. SCSI Device 5. SCSI Adapter
1101 Serial connector error, possible system board failure.	1. **Run Advanced Diagnostics**
1101, **1102**, **1106**, **1108**, **1109**	1. **System Board** 2. Any Serial Device
1107	1. **Communications Cable** 2. System Board
1102 Card selected feedback error.	1. **Run Advanced Diagnostics**
1103 Port fails register check.	1. **Run Advanced Diagnostics** 2. System Board
1106 Serial option cannot be turned off.	1. **Run Advanced Diagnostics** 2. System Board
1107	1. **Serial Device Cable** 2. System Board
1110 Register test failed.	1. **Run Advanced Diagnostics** 2. System Board
1116 Interrupt error.	1. **Run Advanced Diagnostics**
1117 Failed baud rate test.	1. **Run Advanced Diagnostics**
1162 Serial port configuration error.	1. **Run Configuration** 2. Serial Adapter (if installed) 3. System Board
11XX Not listed above.	1. **System Board**
1201	1. **System Board** 2. Any Serial Device
1202, **1206**, **1208**, **1209**, **12XX**	1. **Dual Async Adapter/A** 2. System Board

	3. Any Serial Device
1207	1. **Communications Cable** 2. Dual Async Adapter/A
13XX	1. **Game Adapter**
1402 Printer not ready.	Information only
1403 No paper error, or interrupt failure.	Information only
1404 System board timeout failure.	1. **Run Advanced Diagnostics**
1405 Parallel adapter error.	1. **Run Advanced Diagnostics**
1406 Presence test error.	1. **Run Advanced Diagnostics**
14XX Not listed above. Check printer before replacing system board.	1. **Printer** 2. System Board
15XX	1. **SDLC Adapter**
1692 Boot sequence error.	1. **Run FDISK to ensure at least one active partition is set active.**
16XX	1. **36/38 Workstation Adapter**
1762 Hard disk drive configuration error.	1. **Run Configuration (See** "Setup Utility Program" in topic 2.18.**)**
1780 (Disk Drive 0) **1781** (Disk Drive 1) **1782** (Disk Drive 2) **1783** (Disk Drive 3)	1. **See** "Power Supply" in topic 1.6. 2. Hard Disk Drive 3. System Board 4. Hard Disk Cable 5. Power Supply
180X, 185X PCI configuration or resource error.	1. **Run Setup and verify PCI/ISA configuration settings.** 2. If necessary, set ISA adapters to "Not available" to allow PCI adapters to properly configure. 3. Remove any suspect ISA adapters. 4. Rerun diagnostics. 5. PCI Adapter 6. PCI Riser Card
1962 Boot sequence error.	1. **Possible hard disk drive problem, see** "Hard Disk Drive Boot Error" in topic 2.18.6.
209X	1. **Diskette Drive** 2. Diskette Cable 3. 16-bit AT Fast SCSI Adapter
20XX Not listed above	1. **BSC Adapter** 2. Riser Card
21XX	1. **SCSI Device** 2. 16-bit AT Fast SCSI Adapter 3. Alternate BSC Adapter 4. Riser Card
2401, 2402 If screen colors change.	1. **Display**
2401, 2402 If screen colors are OK.	1. **System Board** 2. Display

2409	1. **Display**
2410	1. **System Board** 2. Display
2462 Video memory configuration error.	1. **Check cable connections**. 2. Run Setup and verify video configuration settings. 3. Video Memory Modules 4. Video Adapter (if installed) 5. System Board
3015, 3040 Check for missing wrap or terminator plug on the adapter.	1. **Network Attached?** 2. LF Translator 3. Cable Problem 4. PC Network Adapter 5. Riser Card
30XX	1. **PC Network Adapter** 2. LF Translator 3. Cable Problem? 4. Riser Card
3115, 3140	1. **Network Attached?** 2. LF Translator 3. Alternate PC Network-Adapter 4. Cable Problem 5. Riser Card
31XX	1. **Alternate PC Network Adapter** 2. LF Translator 3. Cable Problem? 4. Riser Card
36XX	1. **GPIB Adapter** 2. Riser Card
38XX	1. **DAC Adapter** 2. Riser Card
4611, 4630	1. **Multiport/2 Interface Board** 2. Multiport/2 Adapter
4612, 4613 4640, 4641	1. **Memory Module Package** 2. Multiport/2 Adapter
4650	1. **Multiport Interface Cable**
46XX Not listed above.	1. **Multiport/2 Adapter** 2. Multiport/2 Interface Board 3. Memory Module
5600	1. **Financial System Controller Adapter**
5962 CD-ROM configuration error.	1. **Run Configuration** 2. CD-ROM Drive 3. CD-ROM Adapter 4. System Board
62XX	1. **1st Store Loop Adapter** 2. Adapter Cable
63XX	1. **2nd Store Loop Adapter** 2. Adapter Cable
64XX	1. **Network Adapter**
71XX	1. **Voice Adapter**
74XX	1. **Video Adapter** (if installed) 2. Riser Card
76XX	1. **Page Printer Adapter**

78XX	1. **High Speed Adapter**
79XX	1. **3117 Adapter**
80XX	1. **PCMCIA Adapter**
84XX	1. **Speech Adapter** 2. Speech Control Assy. 3. Riser Card
8601, 8602	1. **Pointing Device** (Mouse) 2. System Board
8603, 8604	1. **System Board** 2. Pointing Device (Mouse)
86XX Not listed above	1. **Mouse** 2. System Board
89XX	1. **PC Music Adapter** 2. MIDI Adapter Unit 3. Riser Card
91XX	1. **Optical Drive** 2. Adapter
96XX	1. **SCSI Adapter** 2. Any SCSI Device 3. System Board
10101, 10102, 10104 **10105, 10106, 10107** **10108, 10109, 10111** **10112, 10113, 10114** **10115, 10116**	1. **Have customer verify correct operating system device drivers are installed and operational.** 2. Modem
10103, 10110, 101171	1. **System Board** 2. Data/Fax Modem
10117 Not listed above.	1. **Check system speaker** 2. Check PSTN cable 3. External DAA (if installed) 4. Modem
10118	1. **Run Diagnostics and verify the correct operation of the modem slot** 2. Modem
10119	1. **Diagnostics detected a non-IBM modem** 2. Modem
10120	1. **Check PSTN Cable** 2. External DAA (if installed) 3. Modem
10132, 10133, 10134 **10135, 10136, 10137** **10138, 10139, 10140** **10141, 10142, 10143** **10144, 10145, 10146** **10147, 10148, 10149** **10150, 10151, 10152**	1. **Modem**
10153	1. **Data/Fax Modem** 2. System Board
101XX Not listed above.	1. **Modem Adapter/A** 2. Data/Fax Modem 3. System Board
10450, 10451, 10490 **10491, 10492, 10499** Read/write error.	1. **Run Advanced Diagnostics** 2. Riser Card 3. Hard Disk Drive 4. System Board
10452 Seek test error.	1. **Run Advanced Diagnostics**

10453 Wrong drive type?	Information only
10454 Sector buffer test error.	1. **Run Advanced Diagnostics**
10455, 10456 Controller error.	1. **Run Advanced Diagnostics**
10459 Drive diagnostic command error.	Information only
10461 Drive format error	1. **Run Advanced Diagnostics**
10462 Controller seek error.	1. **Run Advanced Diagnostics**
10464 Hard Drive read error.	1. **Run Advanced Diagnostics**
10467 Drive non fatal seek error.	1. **Run Advanced Diagnostics**
10468 Drive fatal seek error.	1. **Run Advanced Diagnostics**
10469 Drive soft error count exceeded.	1. **Run Advanced Diagnostics**
10470, 10471, 10472 Controller wrap error.	1. **Run Advanced Diagnostics**
10473 Corrupt data. Low level format might be required.	Information only
10480	1. **Hard Disk Drive** (ESDI) 2. Drive Cable 3. System Board
10481 ESDI drive D seek error.	1. **Run Advanced Diagnostics**
10482 Drive select acknowledgement bad.	1. **Run Advanced Diagnostics**
106X1	1. **Check Configuration** 2. Ethernet Adapter
10635	1. **Power-off computer, wait ten seconds; then power-on the computer.** 2. Ethernet Adapter
10651, 10660	1. **Check Cables** 2. Ethernet Adapter
106XX Not listed above.	1. **Ethernet Adapter**
107XX	1. **5.25-inch External Diskette Drive** 2. 5.25-inch Diskette Drive Adapter/A
109XX Check the adapter cables.	1. **ActionMedia Adapter/A** 2. System Board
112XX This adapter does not have cache.	1. **SCSI Adapter** 2. Any SCSI Device 3. System Board
119XX	1. **3119 Adapter**
121XX	1. **Modem Adapter** 2. Any Serial Device 3. System Board
136XX	1. **ISDN Primary Rate Adapter** 2. System Board

137XX	1. **System Board**
141XX	1. **Realtime Interface Coprocessor Portmaster Adapter/A**
143XX	1. **Japanese Display Adapter** 2. System Board
14710, 14711	1. **System Board Video Adapter** 2. Adapter Video Memory
148XX	1. **Video Adapter**
14901, 14902 **1491X, 14922**	1. **Video Adapter** (if installed) 2. System Board 3. Display (any type)
14932	1. **External Display** 2. Video Adapter
16101	1. **Riser Card Battery (See page 2.1.)**
161XX	1. **FaxConcentrator Adapter**
164XX	1. **120 MB Internal Tape Drive** 2. Diskette Cable 3. System Board
16500	1. **6157 Tape Attachment Adapter**
16520, 16540	1. **6157 Streaming Tape Drive** 2. 6157 Tape Attachment Adapter
166XX, 167XX	1. **Token Ring Adapter** 2. System Board 3. Riser Card
18001 to **18029**	1. **Wizard Adapter** 2. Wizard Adapter Memory
18031 to **18039**	1. **Wizard Adapter Cable**
185XXXX	1. **DBCS Japanese Display Adapter/A** 2. System Board
20001 to **20003**	1. **Image Adapter/A Image-I Adapter/A** 2. Memory Module DRAM, VRAM
20004	1. **Memory Module DRAM, VRAM** 2. Image Adapter/A Image-I Adapter/A
20005 to **20010**	1. **Image Adapter/A Image-I Adapter/A** 2. Memory Module DRAM, VRAM
200XX Not listed above.	1. **Image Adapter/A Image-I Adapter/A** 2. Memory Module DRAM, VRAM 3. System Board
20101 to **20103**	1. **Printer/Scanner Option** 2. Image Adapter/A 3. Memory Module DRAM, VRAM

20104	1. **Memory Module DRAM, VRAM** 2. Printer/Scanner Option 3. Image Adapter/A
20105 to **20110**	1. **Printer/Scanner Option** 2. Image Adapter/A 3. Memory Module DRAM, VRAM
Image Adapter/A Memory Test failure indicated by graphic of adapter.	1. **Replace memory module (shown in graphic.)**
206XX	1. **SCSI-2 Adapter** 2. Any SCSI Device 3. System Board
208XX Verify there are no duplicate SCSI ID settings on the same bus.	1. **Any SCSI Device**
210XXXX Internal bus, size unknown. **210XXX1** External bus, size unknown.	1. **SCSI Hard Disk Drive** 2. SCSI Adapter or System Board 3. SCSI Cable 4. SCSI ID Switch (on some models)
Tape Drive amber LED remains on.	1. **Tape Drive** 2. SCSI Cable (internal) 3. SCSI Adapter or System Board
Tape Drive green "in use" LED fails to come on.	1. **Tape Drive** 2. SCSI Adapter or System Board 3. SCSI Cable (internal) SCSI Cable (external)
Tape automatically ejected from drive.	1. **Tape Cassette** 2. Drive
SCSI ID on rotary switch does not match SCSI ID set in configuration. Verify drive switches inside cover are set to zero.	1. **Rotary Switch Circuit Board** 2. Circuit Board Cable 3. Tape Drive
Tape sticks/breaks in drive. Verify that the tapes used meet ANSI standard X3B5.	1. **Tape Cassette**
212XX	1. **SCSI Printer** 2. Printer Cable
213XX	1. **SCSI Processor**
214XX	1. **WORM Drive**
215XXXC **215XX**XD **215XX**XE **215XX**XU If an external device, and power-on LED is off, check external voltages.	1. **CD-ROM Drive I** **CD-ROM Drive II** **Enhanced CD-ROM Drive II** **Any CD-ROM Drive** 2. SCSI Cable 3. SCSI Adapter or System Board
216XX	1. **Scanner**
217XX If an external device, and power-on LED is off, check external voltages.	1. **Rewritable Optical Drive** 2. SCSI Adapter or System Board 3. SCSI Cable
218XX Check for multi CD tray, or juke box.	1. **Changer**
219XX	1. **SCSI Communications Device**
24201Y0, **24210**Y0 Be sure wrap plug is attached.	1. **ISDN/2 Adapter** 2. ISDN/2 Wrap Plug

	3. ISDN/2 Communications Cable
273XX	1. **1 Mbps Micro Channel Infrared LAN Adapter**
27501, **27503** **27506**, **27507**	1. **ServerGuard Adapter** 2. System Board
27502, **27504**, **27510** **27511**, **27533**, **27534** **27536**, **27537**	1. **ServerGuard Adapter**
27509	1. **Remove redundant adapters, run Auto Configuration program, then retest.**
27512	1. **WMSELF.DGS diagnostics file missing.** 2. WMSELF.DGS diagnostics file incorrect.
27535	1. **3V Lithium Backup Battery** 2. ServerGuard Adapter
27554	1. **Internal Temperature out of range** 2. ServerGuard Adapter
27555, **27556**	1. **ServerGuard Adapter** 2. Power Supply
27557	1. **7.2V NiCad Main Battery Pack** 2. ServerGuard Adapter
27558, **27559** **27560**, **27561**	1. **PCMCIA Type II Modem** 2. ServerGuard Adapter
27562	1. **External Power Control not connected** 2. External Power Control 3. ServerGuard Adapter
27563, **27564**	1. **External Power Control** 2. ServerGuard Adapter
275XX	1. **Update Diagnostic Software**
27801 to **27879**	1. **Personal Dictation System Adapter** 2. System Board
27880 to **27889**	1. **External FRU** (Speaker, Microphone)
I**99903**0X Hard disk reset failure.	**Possible hard disk drive problem, see** "Hard Disk Drive Boot Error" in topic 2.18.6.

1.8.4 Error Messages

Error Message/Symptom	FRU/Action
Address Exceeds the Size of Your Memory An invalid memory address was entered. Diagnostics Tests display this message during the Locate Bad Chips option.	1. **Enter the correct address.** 2. Memory Module 3. System Board
Arithmetic Functions Failed An error was detected during the CPU Test.	1. **Microprocessor** 2. System Board
Base Memory Test Failed An error was detected in base memory.	1. **Memory Module** 2. System Board
Boot Sector Unreadable A boot sector read error was detected on the hard disk drive.	1. **Hard Disk Drive** 2. Hard Disk Drive Cable 3. Hard Disk Drive Adapter (if installed) 4. System Board
Bus Noise Test Failed RAM Test detected an error in the memory bus.	1. **Memory Module** 2. System Board
Butterfly Cylinder Access Test Failed Hard Disk Drive Test detected mismatch between the data read and the data stored on the drive.	1. **Hard Disk Drive** 2. Hard Disk Drive Cable 3. Hard Disk Drive Adapter (if installed) 4. System Board
Clock Stopped Real-time clock has stopped working.	1. **Real-Time Clock Assembly** 2. System Board
CMOS Clock Test Failed Time and Date Settings for CMOS and DOS **do not** Match.	1. **Real-Time Clock Assembly** 2. System Board
Controller Diagnostic Test Failed An error was detected while testing the Hard Disk Controller (Adapter).	1. **Hard Disk Drive Adapter** (if installed) 2. Hard Disk Drive 3. System Board
Cylinder 0 errors Test detected an error reading the first cylinder of the hard disk drive.	1. **Hard Disk Drive** 2. Hard Disk Drive Adapter (if installed) 3. System Board
Device is Not Ready **Ready the Device...** **or** **Press Any Key**	1. **Ensure the device is powered-on.** 2. Replace failing device 3. Device Adapter (if installed) 4. System Board
Disk Error Encountered Opening Output File Press Any Key To Continue.	1. **Hard Disk Drive** 2. Hard Disk Drive Adapter (if installed) 3. System Board
DMA #X Failed Main Components Test detected an error while testing the DMA controller.	1. **System Board**
DMA Page Register Failed DMA page register error	1. **System Board**
Drive (x) Media (y) Mismatch FAT ID mismatch with installed drive.	1. **Check diskette and diskette drive capacity.** 2. Diskette Drive 3. System Board
Error in video buffer. **Bad bits.** Video memory test error.	1. **Video Adapter** (if installed) 2. System Board 3. Display

Exception Interrupt In Protected Mode Diags Cannot Continue Server error, remove one adapter at a time until the symptom goes away.	1. **Any Adapter** 2. System Board 3. Processor
Extended Memory Test Failed Extended memory error.	1. **Memory Module** 2. System Board
Floppy Drive Failed Diskette drive(s) failed.	1. **Diskette Drive** 2. System Board 3. Diskette Drive Cable
General Function Failed Remove one adapter at a time until the symptom goes away.	1. **Any Adapter** 2. System Board 3. Processor
Hard Drives Failed Hard Disk Drive test error.	1. **Hard Disk Drive** 2. Hard Disk Drive Adapter (if installed) 3. System Board
Incorrect DOS version	1. **Ensure you are using DOS version 3.0 or higher.**
INT Mask Register Failed INT Mask Register error.	1. **Microprocessor** 2. System Board
Invalid Date Clock/DOS date mismatch.	1. **Real-Time Clock Assembly** 2. System Board
Invalid Time Clock/DOS time mismatch. Back-up clock and DOS time of day settings do not match.	1. **Real-Time Clock Assembly** 2. System Board
Linear Cylinder Access Test Failed Hard disk drive error.	1. **Hard Disk Drive** 2. Hard Disk Drive Cable 3. Hard Disk Drive Adapter (if installed) 4. System Board
Logic Function Failed CPU Logic test error.	1. **Microprocessor** 2. System Board
Loopback Error COM Port Test or Parallel Port error. A wrap plug must be installed to successfully complete these tests.	1. **System Board** 2. Wrap Plug
Main Components Failed System board error.	1. **System Board** 2. Processor
Memory test cannot run at this location in memory Not enough free memory available to start the memory test.	1. **Memory Module** 2. System Board
Missing QAPlus/PRO Files(s) One or more diagnostic support files are missing.	1. **Diagnostic Diskette**
NO LOOP-BACK PLUG. Skipping External loopback test No wrap plug installed.	1. **Install wrap plug on the serial port, rerun test.** 2. System Board
Not ready Printer not on-line or not ready.	1. **Ready Printer** 2. Printer 3. Printer Cable 4. System Board
No 'type-amatic' repeat At least one repeat key must be tested during this test or an error will occur. Type-amatic test error.	1. **Keyboard** 2. System Board
Not used by any standard device IRQ is not currently being used by a non-standard device.	1. **System Board**
Numeric Proc Failed	1. **Microprocessor**

NPU test error.	2. System Board
Parallel Ports Failed Test Report Summary message.	1. **System Board**
Pass (N): ** Errors ** Drive (X) Failed Diskette drive read/write test error.	1. **Diskette Drive** 2. System Board 3. Diskette Drive Cable
Pass (N) Drive Not Ready Diskette drive door is open or defective.	1. **Ensure diskette drive is ready.** 2. Diskette Drive 3. System Board 4. Diskette Drive Cable
Pass (N): Drive (X) Write Protected or Unformatted	1. **Insert a non-write protected, formatted diskette into the diskette drive; then rerun the test.** 2. Diskette Drive 3. System Board 4. Diskette Drive Cable
Pass (N): Unknown Media Drive (X) Diskette Drive Test error.	1. **Diskette** 2. Diskette Drive 3. System Board 4. Diskette Drive Cable
Place Hi-density Media in Drive Media/drive mismatch.	1. **Diskette** 2. Diskette Drive 3. System Board 4. Diskette Drive Cable
Printer Failed Printer powered-on and ready?	1. **Printer** 2. Printer Cable 3. System Board
Printer Fault Printer powered-on and ready?	1. **Printer** 2. Printer Cable 3. System Board
Printer Not Selected Ensure the printer is powered-on and ready.	1. **Printer** 2. Printer Cable 3. System Board
Program or File Not Found Press Any Key Diagnostics cannot find the USER(N).COM file.	1. **Diagnostic Diskette** 2. Diskette Drive 3. System Board
Program Too Big To Fit In Memory Too many Terminate and Stay Resident programs in memory.	1. **Reboot the system from the Diagnostic Diskette.**
QAPlus/PRO Cannot Be Re-run Because Of Error In Relocating Program Diagnostics failed to relocate the Diagnostics Test programs so the memory space it resides in was not tested.	1. **Diagnostic Diskette** 2. Memory Module 3. System Board
RAM Memory Error in Block n. Bad bits n Memory error.	1. **Memory Module** 2. System Board
RAM Test Failed Memory error.	1. **Memory Module** 2. System Board
Read error on cylinder n Hard disk drive format error.	1. **Hard Disk Drive** 2. Hard Disk Drive Adapter (if installed) 3. System Board
Read Errors Diskette drive read error.	1. **Diskette** 2. Diskette Drive 3. System Board 4. Diskette Drive Cable
Receive Error Serial Port loopback test error.	1. **Serial Port Cable** 2. System Board

Refresh Failure Diagnostics Test detected an error while testing the DMA controller's RAM refresh cycle.	1. **Memory Module** 2. System Board
RTC Interrupt Failure Diagnostics Test cannot detect the Real-Time clock interrupt.	1. **Real-Time Clock Assembly** 2. System Board
Serial Chip Error COM Port error, general.	1. **Serial Port Cable** 2. System Board
Serial Compare Error COM Port error, information transmitted is not the same as information received.	1. **Serial Port Cable** 2. System Board
Serial Time-out Error COM Port error, time interval is too long between transmitted and received data.	1. **Serial Port Cable** 2. System Board
Serious Memory Error -- Diags Cannot Continue Memory Test error.	1. **Memory Module** 2. System Board
Sorry You Need A Mouse Mouse or mouse driver was not detected.	1. **Mouse** 2. System Board
System Hangs Go to "Undetermined Problem" in topic 1.9.	1. **Any device** 2. Any adapter 3. System Board
The Address Exceeds The Size Of Your Memory An invalid memory address was entered. The Diagnostics Tests display this message during the Locate Bad Chips option under the interact menu if an invalid memory address was entered at the "Enter Memory Address Of Bad Chip" prompt.	1. **Enter correct address** 2. Memory Module 3. System Board
That Number is Out Of Range An invalid bit number was entered. Diagnostics Tests display this message during the Locate Bad Chips option.	1. **Enter the correct number.** 2. Memory Module 3. System Board
Too Many Errors -- Test Aborted Too many errors, the Diagnostics Test cannot continue.	1. **Microprocessor** 2. System Board
Transmit Error Internal or external serial port loopback test failure.	1. **Serial Port Cable** 2. System Board
Video Adapter Failed Test Result Summary, displayed if "Fail" was at the Quit/Fail/Pass menu of any video test.	1. **Video Adapter** (if installed) 2. System Board 3. Display
Write error on cylinder n Hard disk drive write error.	1. **Hard Disk Drive** 2. Hard Disk Drive Adapter (if installed)
Write Errors Diskette drive write error.	1. **Diskette** 2. Diskette Drive 3. System Board 4. Diskette Drive Cable
Write Protected or Unformatted Diskette is Write Protected or not formatted.	1. **Insert a non-write protected, formatted diskette into the diskette drive; then rerun the test.** 2. Diskette Drive 3. System Board 4. Diskette Drive Cable
You Cannot Delete the Motherboard "Remove Board" option was selected. The Diagnostics Tests	1. **Make the correct selection.** 2. Memory Module 3. System Board

display this message during the Locate Bad Chips option.	4. Processor

1.8.5 Miscellaneous Error Messages

Message/Symptom	**FRU/Action**
Changing colors.	1. **Display**
Computer will **not** power-off. See "Power Supply" in topic 1.6.	1. **Power Switch** 2. System Board
Dead computer. See "Power Supply" in topic 1.6.	1. **Power Switch** 2. Power Supply 3. System Board
Diskette drive in-use light remains on or does not light when drive is active.	1. **Diskette Drive** 2. System Board 3. Diskette Drive Cable
Flashing cursor with an otherwise blank display.	1. **System Board** 2. Primary Hard Disk Drive 3. Hard Disk Drive Cable
Incorrect memory size during POST.	1. **Run the Memory tests.** 2. Memory Module 3. System Board
"Insert a Diskette" icon appears with a known-good diagnostics diskette in the first 3.5-inch diskette drive.	1. **Diskette Drive** 2. System Board 3. Diskette Drive Cable 4. Network Adapter
Intensity or color varies from left to right of characters and color bars.	1. **Display** 2. System Board
No power, or fan not running.	1. **See** "Power Supply" in topic 1.6.
Nonsystem disk or disk error-type message with a known-good diagnostic diskette.	1. **Diskette Drive** 2. System Board 3. Diskette Drive Cable
Other display symptoms not listed above (including blank or illegible display).	1. **See** "Display" in topic 1.7. 2. System Board 3. Display
Power-on indicator or hard disk drive in-use light not on, but computer works correctly.	1. **Power Supply** 2. System Board 3. LED Cables
Printer problems.	1. **See** "Printer" in topic 1.5.
Program loads from the hard disk with a known-good diagnostics diskette in the first 3.5-inch diskette drive.	1. **Run Setup** 2. Diskette Drive 3. Diskette Drive Cable 4. System Board 5. Power Supply
Serial or parallel port device failure (system board port).	1. **External Device Self-Test OK?** 2. External Device 3. Cable 4. System Board
Serial or parallel port device failure (adapter port).	1. **External Device Self-Test OK?** 2. External Device 3. Cable 4. Alternate Adapter 5. System Board 6. Riser Card
Some or all keys on the keyboard do not work.	1. **Keyboard** 2. Keyboard Cable 3. System Board
CMOS Backup Battery inaccurate.	1. **CMOS Backup Battery** **See page** 2.1. 2. System Board

1.9 Undetermined Problem

Check the power supply voltages. See "Power Supply" in topic 1.6. If the voltages are correct, return here and continue with the following steps.

1. Power-off the computer.
2. Remove or disconnect the following, one at a time:
   a. Non-IBM devices
   b. External devices (modem, printer, or mouse)
   c. Any adapters
   d. Riser card
   e. Memory modules
      Before removing or replacing memory modules, see "System Board Memory" in topic 2.22.
   f. Extended video memory
   g. External Cache
   h. External Cache RAM
   i. Hard disk drive
   j. Diskette drive
3. Power-on the computer to re-test the system.
4. Repeat steps 1 through 3 until you find the failing device or adapter.

If all devices and adapters have been removed, and the problem continues, replace the system board. See "Replacing a System Board" in topic 1.10.

1.10 Replacing a System Board

Notes

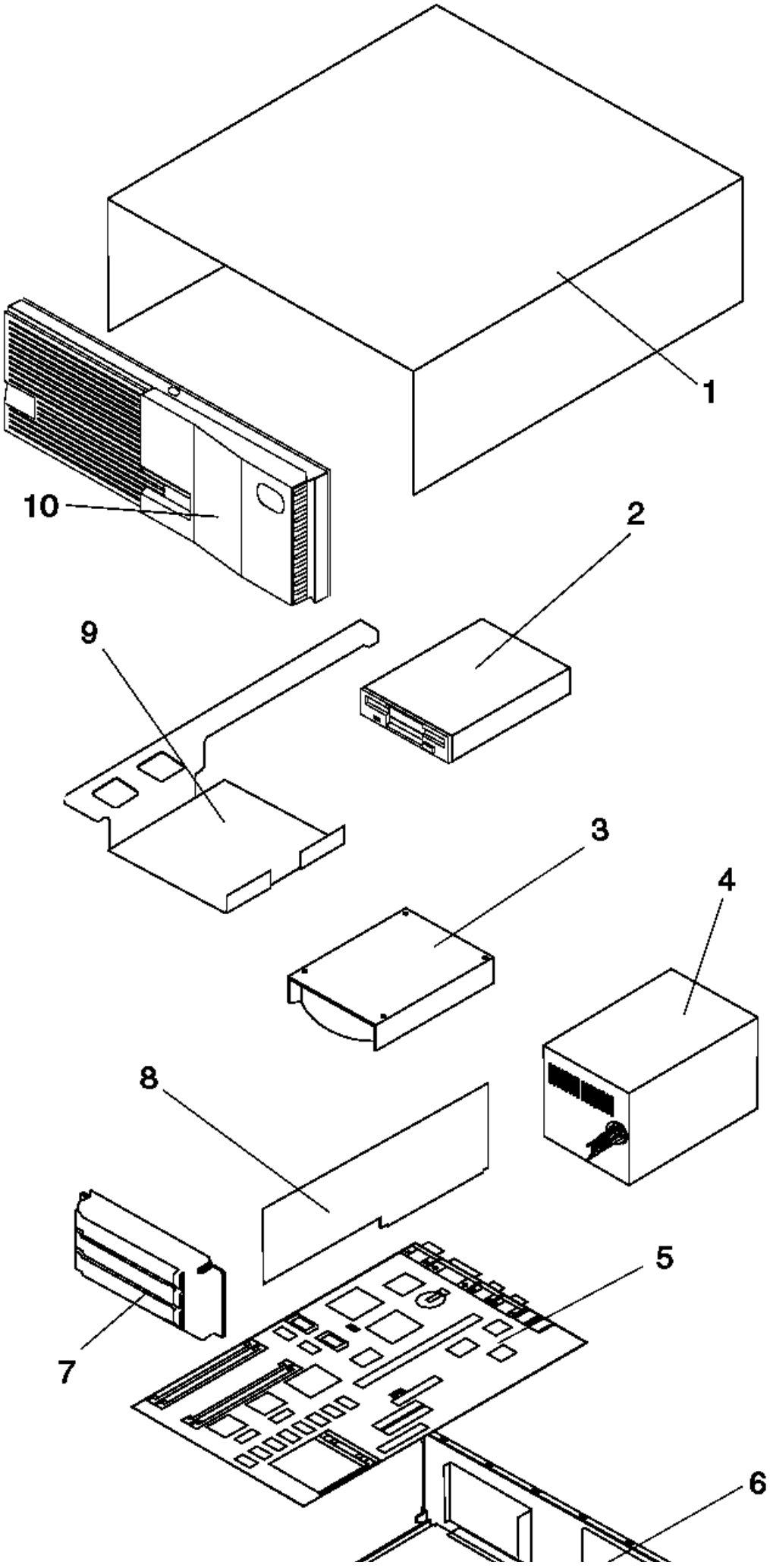
1. The BIOS and Vital Product Data (VPD) for the computer you are servicing must be installed on the new system board (FRU) after it is installed in the computer. To do this, **you must run the Flash Update program using the Flash Update diskette**. See "BIOS Levels" in topic 2.13 "Vital Product Data" in topic 2.14, and "Flash (BIOS/VPD) Update Procedure" in topic 2.15.
2. Always ensure the latest level of BIOS is installed on the computer. A down level BIOS may cause false errors and unnecessary replacement of the system board.
3. The processor is a separate FRU from the system board and is not included with the system board FRU. If you are instructed to replace the system board, do the following.
4. Remove the processor from the old system board and install it on the new system board.
5. Remove any of the following installed options on the old system board, and install them on the new system board.
   - External cache memory and cache tag RAM
   - Memory modules
   - Extended video memory
6. Ensure that the new system board jumper settings match the old system board jumper settings.
7. If the new system board does not correct the problem, reinstall the options on the old system board, reinstall the old system board, then replace the processor.

1.11 Replacing a Processor

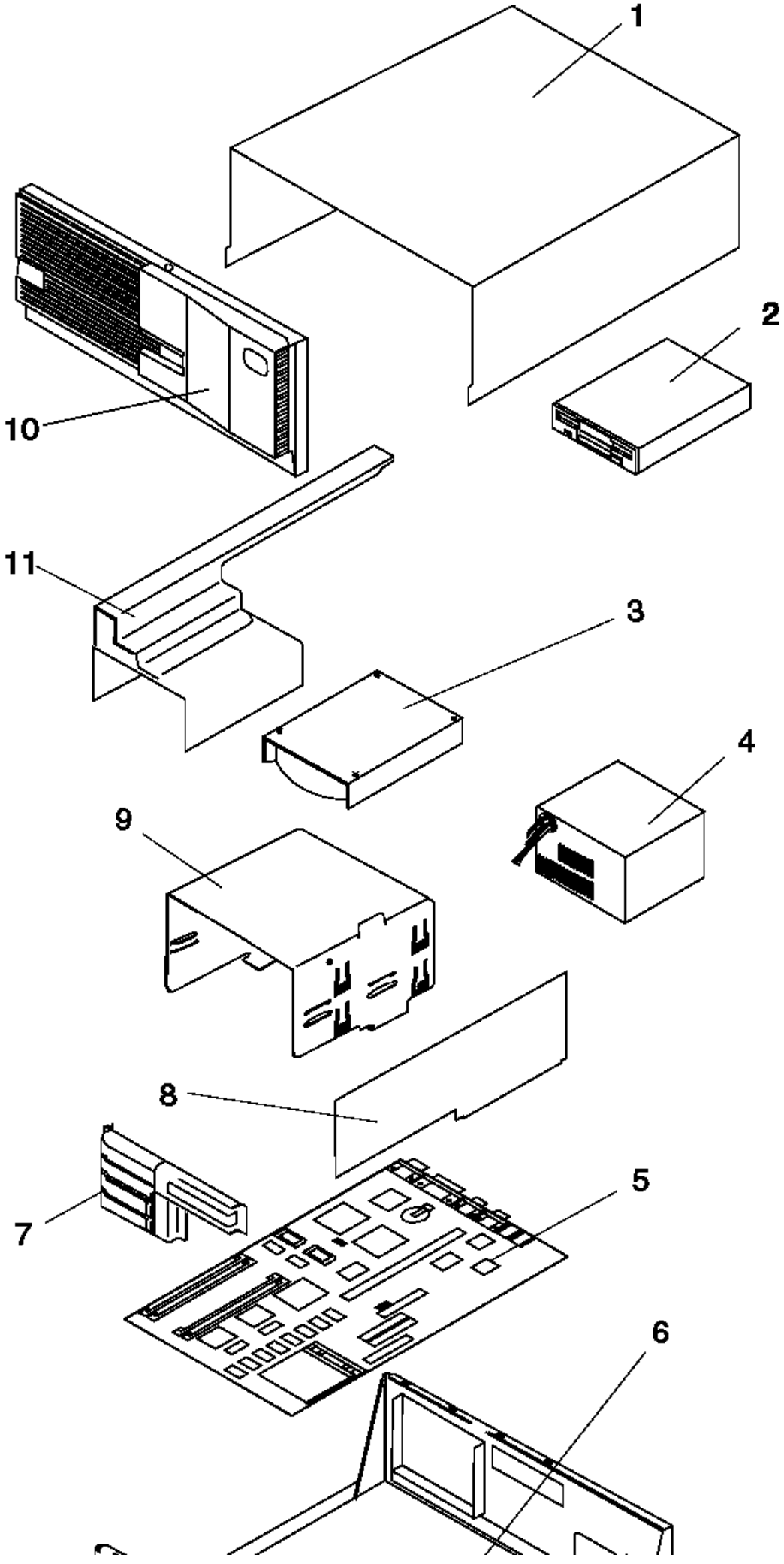
Install the processor with the beveled corner aligned with the beveled corner of the processor socket.

+--- **Important** ----------+
¦ ¦
¦ If the processor is not installed correctly, the system board and the ¦
¦ processor can be damaged. ¦
¦ ¦
+-----------------------------+

1.12 Type 6X7X Parts



1.13 Type 6X8X Parts



Subtopics
1.13.1 Parts Listing

1.13.1 Parts Listing

Index System Unit (Type 6X7X and 6X8X)

1	**Cover**	
	Top Cover 3x3 with Labels (6571, 6573, 6575, 6576, 6577, 6875, 6876, 6877)	06H5722
	Top Cover 5x5 with Labels (6581, 6583, 6585, 6586, 6587)	06H1771
	Top Cover 5x5 with Labels (6587, 6589, 6885, 6886, 6887)	75H7986
	Logo Kit	06H5723
2	**Diskette Drive and Cable**	
	3.5-Inch 1.44 MB Diskette Drive	93F2361
	3.5-Inch 1.44 MB Diskette Drive (Japan Only - Short Button)	41H7675
	3.5-Inch 1.44 MB Diskette Drive (Japan Only - Long Button)	41H7676
	3.5-Inch 2.88 MB Diskette Drive	82G1887
	3.5-Inch Auto-Eject Diskette Drive (Non-EMEA) (6875, 6876, 6885, 6886)	71G0660
	Diskette Drive Cable	06H6344
	Diskette Drive Cable (6577, 6587)	06H6325
	5.25-Inch 1.2 MB Diskette Drive	82G1824
	5.25-Inch Diskette Drive Bracket (6587, 6589, 6887)	06H9408
3	**Hard Disk Drive and Cable**	
	170 MB (1) IDE Hard Disk Drive	71G4958
	270 MB IDE Hard Disk Drive (6571, 6573, 6581, 6583)	06H4152
	270 MB IDE Hard Disk Drive (6575, 6585, 6875, 6876, 6885, 6886)	82G5926
	364 MB IDE Hard Disk Drive	82G5927
	540 MB IDE Hard Disk Drive	82G5928
	540 MB SCSI Hard Disk Drive	82G5932
	635 MB IDE Hard Disk Drive	06H9063
	728 MB IDE Hard Disk Drive	82G5929
	850 MB IDE Hard Disk Drive	06H8419
	1 GB (2) IDE Hard Disk Drive	06H6111
	1 GB SCSI Hard Disk Drive	06H9079
	1.2 GB IDE Hard Disk Drive	07H0383
	1.2 GB SCSI Hard Disk Drive	07H0390
	1.6 GB IDE Hard Disk (6577, 6587, 6589)	75H7497
	1.6 GB IDE Hard Disk Drive (6877, 6887)	06H9064
	2.0 GB SCSI Hard Disk Drive (6877, 6887)	07H1118

Index System Unit (Type 6X7X and 6X8X)

	Hard Disk Drive and Cable (Continued)	
	2.2 GB SCSI Hard Disk Drive (6589)	76H0958
	2.5 GB IDE Hard Disk Drive (6577, 6587)	76H0961
	2.5 GB IDE Hard Disk Drive (6589)	07H1123
	4.2 GB IDE Hard Disk Drive (6589)	76H5820
	SCSI Adapter PCI (6589)	60H7823
	Adaptec SCSI Adapter (6877, 6887)	07H0132
	Hard Disk Drive Cable (IDE)	06H6326
	Hard Disk Drive LED and Cable	93F2388
	SCSI Hard Disk Drive LED and Cable	75H9217
	Hard Disk Drive Bracket	06H9409
	SCSI Cable PCI 3x3 (6575, 6875, 6876, 6877)	71G2556
	SCSI Cable PCI 5x5 (6585, 6885, 6886, 6887)	06H6062
	SCSI Cable PCI 5x5 (6589)	06H9674
4	**Power Supply, Cable, Switch**	
	145 Watt Power Supply 3x3 (6571, 6573)	06H2972
	145 Watt Power Supply 3x3 (6575)	06H3861
	145 Watt Power Supply 3x3 (3.3 Volt) (6576, 6875, 6876)	06H3862
	145 Watt Power Supply 3x3 (3.3 Volt) (6577, 6877)	06H8824
	210 Watt Power Supply 5x5 (6581, 6583, 6585)	06H2967
	210 Watt Power Supply 5x5 (3.3 Volt) (6586, 6885, 6886)	06H2968
	200 Watt Power Supply 5x5 (3.3 Volt) (6577, 6587, 6877, 6887)	06H8825
	200 Watt Power Supply 5x5 (3.3 Volt) (6589)	75H9208
	200 Watt Power Supply 5x5 (3.3 Volt) (6589 - Japan Only)	75H9198
	Power Switch and Cable (6576, 6586 Only)	06H3863
	Power Switch and Cable (All Others)	60G2258

Power Button 3x3 (6571, 6573, 6575, 6576, 6875, 6876)	06H5724
Power Button 3x3 (6577, 6877)	06H9414
Power Button 5x5 (6581, 6583, 6585, 6586, 6885, 6886)	06H1777
Power Button 5x5 (6587, 6887)	06H9403
LED and Power Cable	93F2389

5 System Board

(Without processor, memory, or cache)	
6571, 6573, 6581, 6583	65G4152
6571, 6573, 6581, 6583	96G1819
6575, 6585	88G4282
6576, 6586 Model 3XX, 4XX Only	11H9623
6576, 6586 Model 5XX Only	96G3576
6576, 6586 Model 6XX, 7XX, 8XX, 9XX	96G3573
For P54C (6577, 6587)	93H5966
For P55C (6577, 6587)	93H4690
6589	40H6044
6875, 6885 Model PxH,PxM,RxH,TxH Only	40H4744
6875, 6885 All Other Models	88G4270
6876, 6886 Model PxH,PxM,RxH,TxH Only	40H4743
6876, 6886 All Other Models	11H5545
6877, 6887	60H9453

System Unit (Type 6X7X and 6X8X)

Processor

6571, 6573, 6581, 6583	
486SX-25	71G0790
486SX-33	71G0791
486SX2-25/50	71G0792
486DX-33	71G0793
486DX2-25/50	71G0794
486DX2-33/66	71G0795
486DX4-100 with regulator	82G5056
6575, 6585	
P60-60	06H6055
6576, 6586	
P54C-75	06H7589
P54C-9O	06H7590
P54C-100	06H7591
P54C-133	06H9492
P54C-166	07H0270
6577, 6587	
P54C-100	07H0838
P54C-120	76H5392
P54C-133	07H0843
P54C-166	07H0971
P54C-200	75H9575
P55C-166	12J2758
P55C-200	12J2759
Voltage Regulator Card	76H3658
6589	
P6-180	75H9215
P6-200	75H9212
P6-200 Optional Second Processor	75H9831
Voltage Regulator Card	07H1097
6875, 6876, 6885, 6886	
P54C-75	06H5210
P54C-90	06H5251
P54C-100	06H6063
P54C-120	06H8212
P54C-133	06H8228
6877, 6887	
P54C-100	07H0311
P54C-133	06H9891
P54C-150	06H9892
P54C-166	07H0971

System Unit (Type 6X7X and 6X8X)

72-Pin Memory SIMM (Non-parity)

4 MB Non-parity (6571, 6573, 6575, 6581, 6583, 6585)	92G7540
4 MB Non-parity (6576, 6586)	60G2900
4 MB EDO Non-parity-60 ns (6577, 6587, 6877, 6887)	92G7319
8 MB Non-parity (6571, 6573, 6575, 6581, 6583, 6585)	92G7542
8 MB Non-parity (6576, 6586)	92G7245
8 MB EDO Non-parity-60 ns (6577, 6587, 6877, 6887)	92G7321
16 MB Non-parity (6571, 6573, 6575, 6581, 6583, 6585)	92G7544
16 MB Non-parity (6576, 6586)	92G7247
16 MB EDO Non-parity-60 ns (6577, 6587, 6877, 6887)	92G7323
32 MB Non-parity (6571, 6573, 6575, 6581, 6583, 6585)	92G7546
32 MB Non-parity (6576, 6586)	92G7249
32 MB EDO Non-parity-60 ns (6577, 6587, 6877, 6887)	92G7325

72-Pin Memory SIMM (Parity)

4 MB Parity (6875, 6876, 6885, 6886)	73G3233
4 MB Parity (6877, 6887)	42H2785
8 MB Parity (6875, 6876, 6885, 6886)	92G7521
8 MB Parity (6877, 6887)	42H2786
16 MB Parity (6875, 6876, 6885, 6886)	60G2950
16 MB Parity (6877, 6887)	92G7294
32 MB Parity (6875, 6876, 6885, 6886)	73G3135
32 MB Parity (6877, 6887)	92G7295

168-Pin Memory DIMM

8 MB Non-Parity EDO (6577, 6587, 6877, 6887)	42H2778
16 MB Non-Parity EDO (6577, 6587, 6877, 6887)	42H2779
32 MB Non-Parity EDO (6577, 6587, 6877, 6887)	42H2780
16 MB Non-Parity EDO (6589)	42H2795
32 MB Non-Parity EDO (6589)	42H2797
32 MB EDO ECC (6589)	42H2801
8 MB Parity (6877, 6887)	42H2782
16 MB Parity (6877, 6887)	42H2783
32 MB Parity (6877, 6887)	42H2784

L2 Cache

128 KB (6571, 6573, 6581, 6583)	06H4759
256 KB (6571, 6573, 6581, 6583)	06H4760
256 KB (6875, 6876, 6885, 6886)	06H6052
256 KB (6576, 6586)	06H7586
256 KB (6577, 6587, 6877, 6887)	07H1150
512 KB (6577, 6587, 6877, 6887)	42H2781
1 MB (6875, 6876, 6885, 6886)	92G7552

Video Memory

Video DRAM 1 MB (6575, 6576, 6585, 6586, 6875, 6876, 6885, 6886)	92G7432
Video DRAM 1 MB (6577, 6587)	42H2770

Index System Unit (Type 6X7X and 6X8X)

6 Base Frame Assembly

Base Assembly 3x3 (6571, 6573)	06H5728
Base Assembly 3x3 (6575, 6576, 6875, 6876)	06H5727
Base Assembly 3x3 (6577, 6877)	07H1092
Base Assembly 5x5 (6581, 6583, 6585, 6586, 6885, 6886)	06H1772
Base Assembly 5x5 (6587, 6589, 6887)	06H9405
Foot (Qty 4) 3x3 (6571, 6573, 6575, 6576, 6577, 6875, 6876, 6877)	10H3080
Foot (Qty 4) 5x5 (6581, 6583, 6585, 6586, 6587, 6589, 6885, 6886, 6887)	06H1773
Blank Bezel with and without Audio 3x3 (6571, 6573, 6575, 6576, 6875, 6876)	06H6992
Blank Bezel with and without Audio 3x3 (6577, 6877)	06H9421
Blank Bezel with and without Audio 5x5 (6581, 6583, 6585, 6586, 6885, 6886)	06H1774
Blank Bezel with Audio 5x5 (6587, 6589, 6887)	06H9411
Bottom Cover 5x5 (6587, 6589, 6885, 6886, 6887)	06H1791
Floor Stand Assembly	06H1792

	C-2 Switch Assembly 3x3 (6875, 6876)	06H5748
	C-2 Switch Assembly 3x3 (6877)	06H9971
	C-2 Switch Assembly 5x5 (6885, 6886)	06H1788
	C-2 Switch Assembly 5x5 (6887)	06H9972
	PCMCIA Card Assembly ISA (6571, 6573, 6575, 6875, 6581, 6583, 6585, 6885)	81G4632
	PCMCIA Card Assembly Micro Channel (6876, 6886)	81G4261
	PCMCIA Bay Assembly (6571, 6573, 6575, 6875, 6581, 6583, 6585, 6885)	81G4633
	PCMCIA Cable (6876, 6886)	81G4634
	PCMCIA Bracket 3x3 (6571, 6573, 6575, 6576, 6875, 6876)	82G4982
	PCMCIA Bracket 3x3 (6877)	75H7491
	PCMCIA Bracket 5x5 (6581, 6583, 6585, 6586, 6885, 6886, 6887)	06H1790
	Audio Front Panel Assembly 3x3 (6875, 6876)	06H5749
	Audio Front Panel Assembly 3x3 (6877)	06H9422
	Audio Front Panel Assembly 5x5 (6887)	06H9412
	Audio Front Panel Assembly Bracket 5x5 (6887)	06H9413
	Front Panel Card (All Types)	06H9150
	Front Panel Bracket (6877)	06H9423
	Rear Decorative Panel 3x3 (6571, 6573)	10H2925
	Rear Decorative Panel 3x3 (6575, 6576, 6875, 6876)	06H5742
	Rear Decorative Panel 3x3 (6577, 6877)	06H9420
	Rear Decorative Panel 5x5 (6581, 6583, 6585, 6586, 6885, 6886)	06H1785
	Rear Decorative Panel 5x5 (6587, 6589, 6887)	06H9407
	80 MM Fan Assembly	06H1796
	80 MM Fan Guard 3x3	06H5733
	Air Duct (Processor) (6576, 6577, 6586, 6587)	72H2545

Index System Unit (Type 6X7X and 6X8X)

7	**I/O Panel Assembly**	
	Rear I/O Panel Assembly ISA 3x3 (6571, 6573, 6575, 6576, 6577, 6875, 6877)	06H5744
	Rear I/O Panel Assembly MCA 3x3 (6876)	06H5745
	Rear I/O Panel Assembly ISA 5x5 (6581, 6583, 6585, 6586, 6885)	06H1786
	Rear I/O Panel Assembly MCA 5x5 (6886)	06H1787
	Rear I/O Panel Assembly ISA 5x5 (6587, 6589, 6887)	06H9410
8	**Riser Card**	
	ISA/VESA 3x3 (6571)	88G4250
	ISA/PCI 3x3 (6573)	88G4255
	ISA/PCI 3x3 (6575)	06H4714
	ISA/PCI 3x3 (6576)	11H9624
	ISA/PCI 3x3 (6875)	06H4003
	MCA/PCI 3x3 (6876)	06H4018
	ISA/PCI 3x3 (6577, 6877)	76H0231
	ISA/VESA 5x5 (6581)	88G4260
	ISA/PCI 5x5 (6583)	88G4265
	ISA/PCI 5x5 (6585)	06H4715
	ISA/PCI 5x5 (6586)	11H9625
	ISA/PCI 5x5 (6587, 6589, 6887) (3 Shared / 2 ISA)	07H1266
	ISA/PCI 5x5 (6589) (3 Shared / 2 PCI)	93H1426
	ISA/PCI 5x5 (6885)	06H4008
	MCA/PCI 5x5 (6886)	06H4023
	Card Guide	
	Card Guide 3x3 MCA/PCI (6876)	06H5729
	Card Guide 5x5 MCA/PCI (6886)	06H1778
	Card Guide PCMCIA 3x3 (6571, 6573, 6575, 6576, 6875, 6876)	06H5731
	Card Guide ISA 3x3 (6571, 6573, 6575, 6576, 6875)	06H5730
	Card Guide ISA/PCI 3x3 (6577, 6877)	06H9416
	Card Guide ISA 5x5 (6581, 6583, 6585, 6586, 6589, 6885)	06H1779
	Card Guide ISA/PCI 5x5 (6587, 6887)	07H1091
9	DASD Mounting Tray 3x3 (6571, 6573, 6575, 6576, 6577, 6875, 6876, 6877)	06H5743

9	Removable DASD Tray 5x5 (6581, 6583, 6585, 6586, 6885, 6886)	06H1780
10	Front Bezel w/ Labels 3x3 (6571, 6573, 6575, 6576, 6875, 6876)	06H6994
10	Front Bezel w/ Labels 3x3 (6577)	07H0350
10	Front Bezel w/ Labels 3x3 (6877)	06H9415
10	Front Bezel w/ Labels 5x5 (6581, 6583, 6585, 6586, 6885, 6886)	06H1775
10	Front Bezel w/ Labels 5x5 (6587)	07H0349
10	Front Bezel w/ Labels 5x5 (6589)	75H9214
10	Front Bezel w/ Labels 5x5 (6877)	06H9404
11	Non-removal DASD Tray 5x5 (6581, 6583, 6585, 6586, 6885, 6886)	06H1781

System Unit

EMC Shield (4 each) 3x3 (6571, 6573, 6575, 6576, 6577, 6875, 6876)	06H5747
EMC Shield 3x3 (6877)	75H7928
EMC Shield 5.25-Inch (4 each) 5x5 (6581, 6583, 6585, 6586, 6587, 6589, 6885, 6886, 6887)	06H1782
Speaker (6575, 6585)	92F0421
Speaker (6877)	06H9417
Speaker Enhanced (6875, 6876, 6885, 6886, 6887)	06H5735
Cover Latch 3x3 (6571, 6573, 6575, 6576, 6577, 6875, 6876, 6877)	06H5736
Cover Latch 5x5 (6581, 6583, 6585, 6586, 6589, 6885, 6886, 6887)	06H1783
Cover Latch 5x5 (6587)	07H0844
Blank Bezel Holder 3x3 (6571, 6573, 6575, 6576, 6875, 6876)	06H5740
Blank Bezel PCMCIA 3x3 (6571, 6573, 6575, 6576, 6875, 6876)	06H5741
Blank Bezel PCMCIA 3x3 (6877)	06H9419
Blank Bezel PCMCIA 5x5 (6581, 6583, (6585, 6586, 6589, 6885, 6886, 6887)	06H1784
Backup Battery - CMOS (Lithium) (See page 2.1)	33F8354
Cover Lock Assembly 3x3 (6571, 6573, 6575, 6875, 6876)	06H5737
Cover Lock Assembly 3x3 with Pawl (6577, 6877)	06H9418
Cover Lock Assembly 5x5 (6581, 6583, 6585, 6586, 6589, 6885, 6886)	06H1776
Cover Lock Assembly 5x5 (6587, 6887)	06H9406
Blank Drive Bezel 3.5-Inch 3x3 (6571, 6573, 6575, 6576, 6589, 6875, 6876, 6877, 6887)	06H5739
Blank Drive Bezel 3.5-Inch 5x5 (6587)	76H5856
Blank Drive Bezel 5.25-Inch	06H5738
Mounting Screw Kit	93F0041
Jumper Kit	93F0067
EMC Clips (6 each)	06H5734

Multimedia / Options (Type 6X7X and 6X8X)

Audio Card, 16-bit (6571, 6573, 6575, 6581, 6583, 6585)	10H3157
Cable - Audio Card (6571, 6573, 6575, 6581, 6583, 6585)	10H2924
Audio System Board/Card Cable (6575, 6585, 6885, 6886)	06H6068
Audio Cable to CD-ROM (6877, 6887)	55H8623
Audio Card - DSP (6877, 6887) Australia	75H7457
Audio Card - DSP (6877, 6887) Austria	75H0448
Audio Card - DSP (6877, 6887) Denmark	75H0455
Audio Card - DSP (6877, 6887) EMEA	07H0015
Audio Card - DSP (6877, 6887) Finland	75H0449
Audio Card - DSP (6877, 6887) France	07H0016
Audio Card - DSP (6877, 6887) Germany	07H0018
Audio Card - DSP (6877, 6887) Italy	75H7453
Audio Card - DSP (6877, 6887) Japan	75H7451
Audio Card - DSP (6877, 6887) Netherlands	75H0458
Audio Card - DSP (6877, 6887) Norway	75H7460
Audio Card - DSP (6877, 6887) Portugal	75H7450
Audio Card - DSP (6877, 6887) Spain	75H0459
Audio Card - DSP (6877, 6887) Sweden	75H0454
Audio Card - DSP (6877, 6887) Switzerland	75H0456
Audio Card - DSP (6877, 6887) U.S.	07H0017
DSP Cable for DSP Audio Cards (6877, 6887)	76H2654
Matrox Video Adapter (6598, 6877, 6887)	06H9074
S3 Trio Video Adapter (6589)	75H9213

Auxiliary Video Extension Cable MCA (6876, 6886)	06H6728
Video Adapter Matrox-PCI (6589)	75H9227
Video Card Assembly PCI (6875, 6876, 6885, 6886)	06H5249
SCSI Card Assembly PCI (6575, 6576, 6585, 6586, 6875, 6876, 6885, 6886)	06H9610
Infrared Dongle Card (6877, 6887)	07H0020
CD-ROM Drive IDE, Dual-Speed (2X)	06H5906
CD-ROM Drive IDE, Quad-Speed (4X)	06H7654
CD-ROM Drive IDE, Six-Speed (6X)	75H9601
CD-ROM Drive IDE, Six-Speed (6X)	06H9429
CD-ROM Drive IDE, Six-Speed (6X) (6598)	06H9431
PDCD-ROM Drive IDE, Six-Speed (6X) (6589)	76H0481
CD-ROM Drive IDE, Eight-Speed (8X) (6589)	75H9748
CD-ROM Drive IDE, Eight-Speed (8X) (6589)	76H0472
CD-ROM Drive IDE, (16X Max) (6589)	76H6101
Audio Cable (for CD-ROM Drive)	07H0019
Transformer (6581, 6583 - U.S./Canada)	06H3615
Transformer (6581, 6583 - World Trade)	06H3618
Microphone (6581, 6583)	06H3616
Microphone (6885, 6886)	66G1246
Microphone with Headset	30H2312
Speaker (6581, 6583)	06H3614

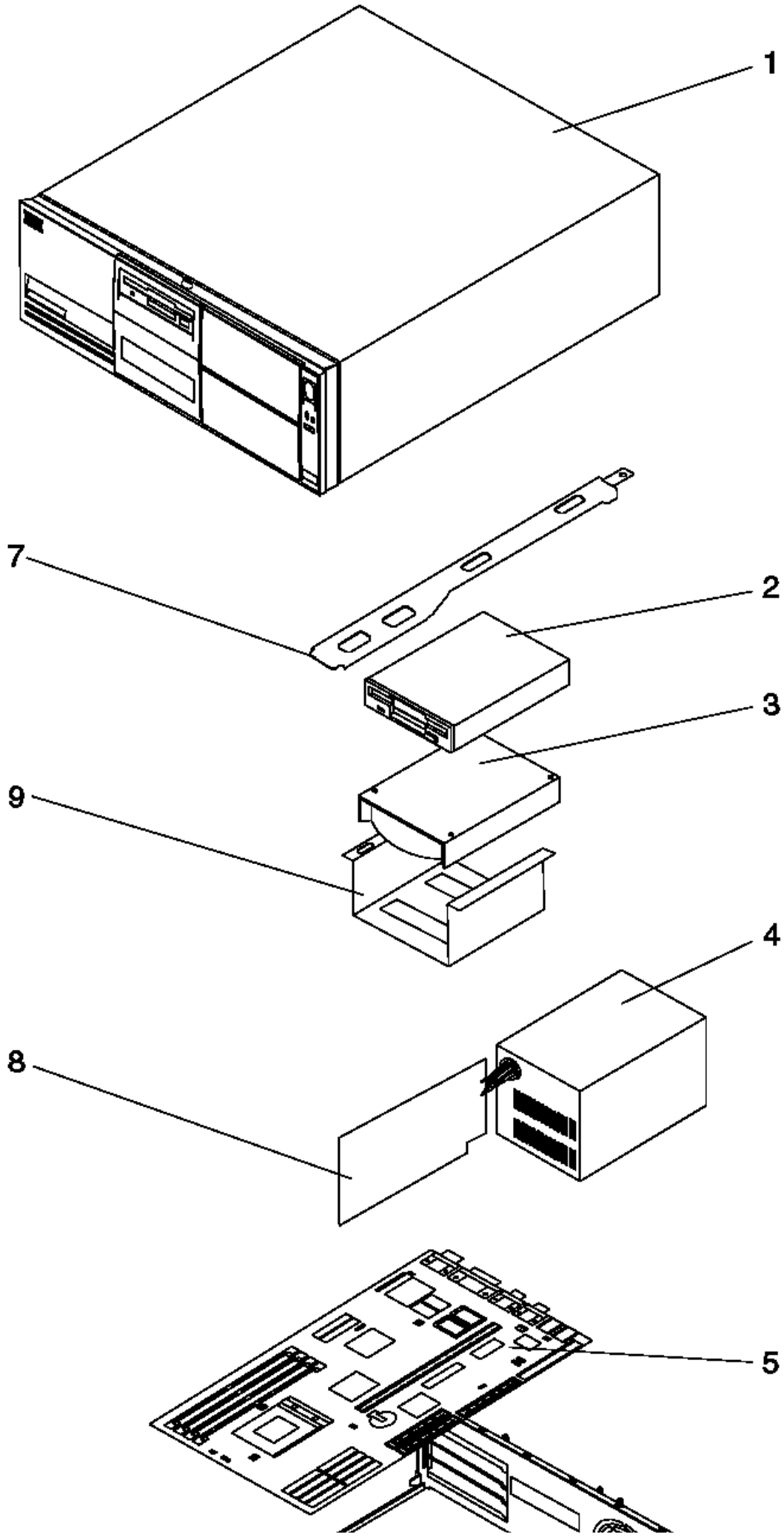
Communications

Token Ring Card Assembly PCI	04H8098
Token Ring Card Assembly PCI (6877, 6887)	55H6810
Ethernet Card Assembly PCI	06H4739
Ethernet Card Assembly PCI (6877, 6887)	25H6151
Wake-On-LAN Cable PCI (6877, 6887)	07H0447
FAX/Modem Assembly ISA	04H5788
FAX/Modem Cable ISA	06H6053

(1) When referring to hard-disk-drive capacity, MB means 1 000 000 bytes; total user-accessible capacity may vary depending on operating environment.

(2) When referring to hard-disk-drive capacity, GB means 1 000 000 000 bytes; total user-accessible capacity may vary depending on operating environment.

1.14 Type 6560 Parts



Subtopics
1.14.1 Parts Listing

1.14.1 Parts Listing

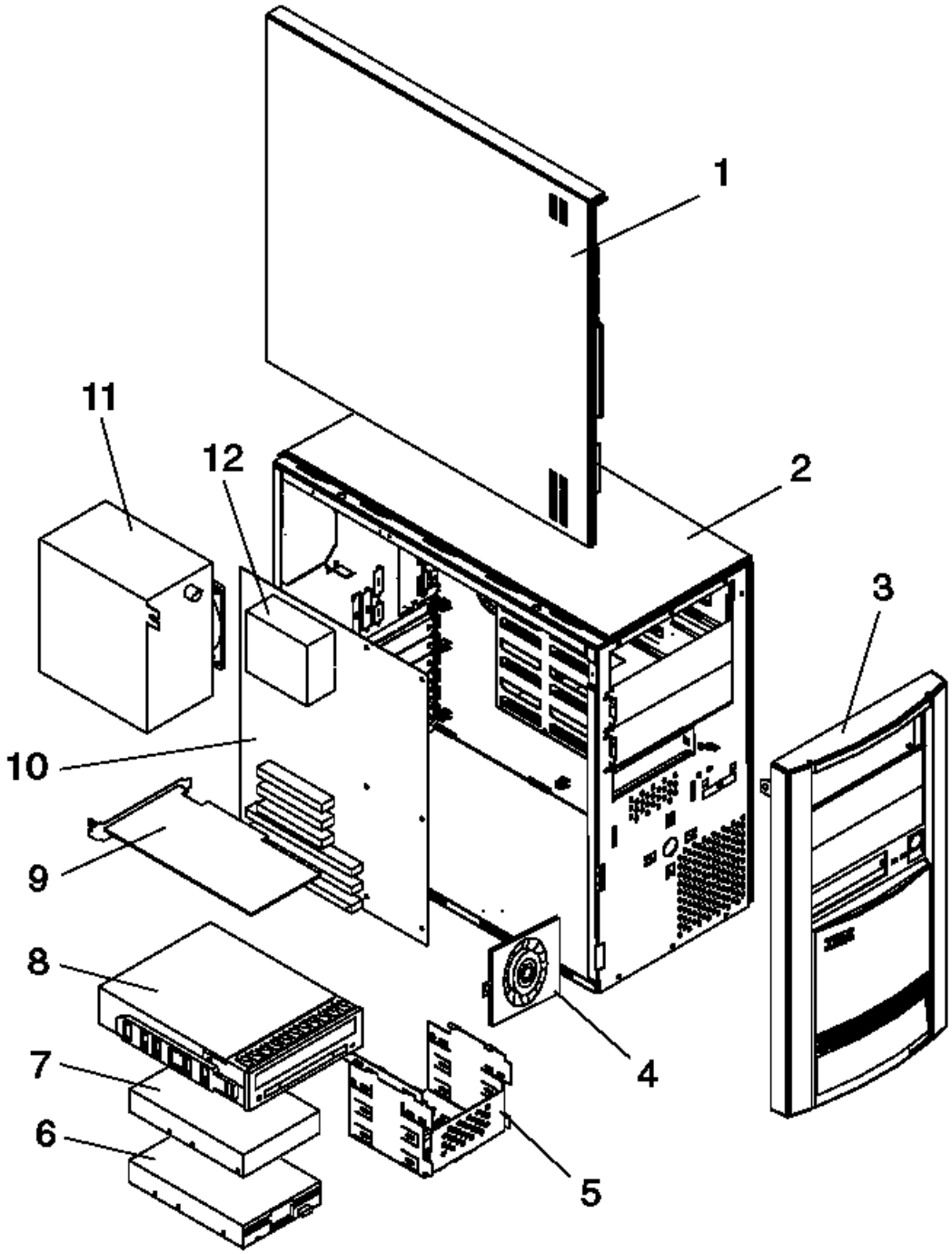
Index System Unit (Type 6560)

1	**Top Cover and Logo**	
	Top Cover, including front bezel 4x4	75H7956
	Label Plate - Personal Computer 340 (6560)	75H7959
	Bezel Covers Kit	75H7958
2	**Diskette Drive and Cable**	
	3.5" 1.44 MB Diskette Drive	93F2361
	3.5-Inch 1.44 MB Diskette Drive (Japan Only - Short Button)	41H7675
	3.5-Inch 1.44 MB Diskette Drive (Japan Only - Long Button)	41H7676
	Diskette Drive Cable	06H6325
3	**Hard Disk/CD Drives and Cables**	
	(Order either one of the same capacity drive)	
	850 MB Hard Disk Drive IDE	06H8419
	850 MB Hard Disk Drive IDE	42H1825
	1.2 GB Hard Disk Drive IDE	07H0383
	1.2 GB Hard Disk Drive IDE	07H1120
	2.5 GB Hard Disk Drive IDE	07H1123
	CD-ROM Drive 6X IDE	75H9601
	CD-ROM Drive 6X IDE	06H9429
	Toroid Kit for 6X CD-ROM Drive	11H6128
	Hard Disk Drive Cable	06H6326
	LED and Cable Power/Hard Disk Drive	07H1444
4	**Power Supply**	
	(Order one of the following power supplies for Type 6560)	
	145 Watt Power Supply	75H8473
	145 Watt Power Supply (without switch bracket)	75H8474
	145 Watt Power Supply	07H1441
	200 Watt Power Supply (Japan)	06H2968
	Switch Cable Assembly (Japan)	06H3863
5	**System Board**	
	(Without processor, memory, or cache)	
	System Board	93H4641
	System Board (with cache)	93H4603
	L2 Cache	
	256 KB	42H2804
	Processors	
	P54C-100	07H1446
	P54C-120	07H1451
	P54C-133	75H8235
	P54C-166	75H8261
	72-Pin Memory (Non-parity) EDO	
	4 MB Non-parity EDO	92G7319
	8 MB Non-parity EDO	92G7321
	16 MB Non-parity EDO	92G7323

Index System Unit (Type 6560)

6	**Base Assembly**	
	Base Assembly 4x4 (6560)	75H7957
	Fan Assembly 80 mm	75H8258
	Foot 4 each	07H1440
	LED and Cable Power/Hard Disk Drive	07H1444
	Lithium Battery (See page 2.1)	33F8354
	Power Button	75H7979
	Ball and Clip (Twist-off)	06H4585
	Jumper Kit	93F0067
	Mouse	06H4595
	Mounting Screws	93F0041
7	**Card Guide**	
	Riser Card Support Bracket	76H1788
8	**Riser Card**	
	4x4 PCI/ISA	12H0897
9	**Removable DASD Tray**	76H1789

1.15 Type 6598 Parts



Subtopics
1.15.1 Parts Listing

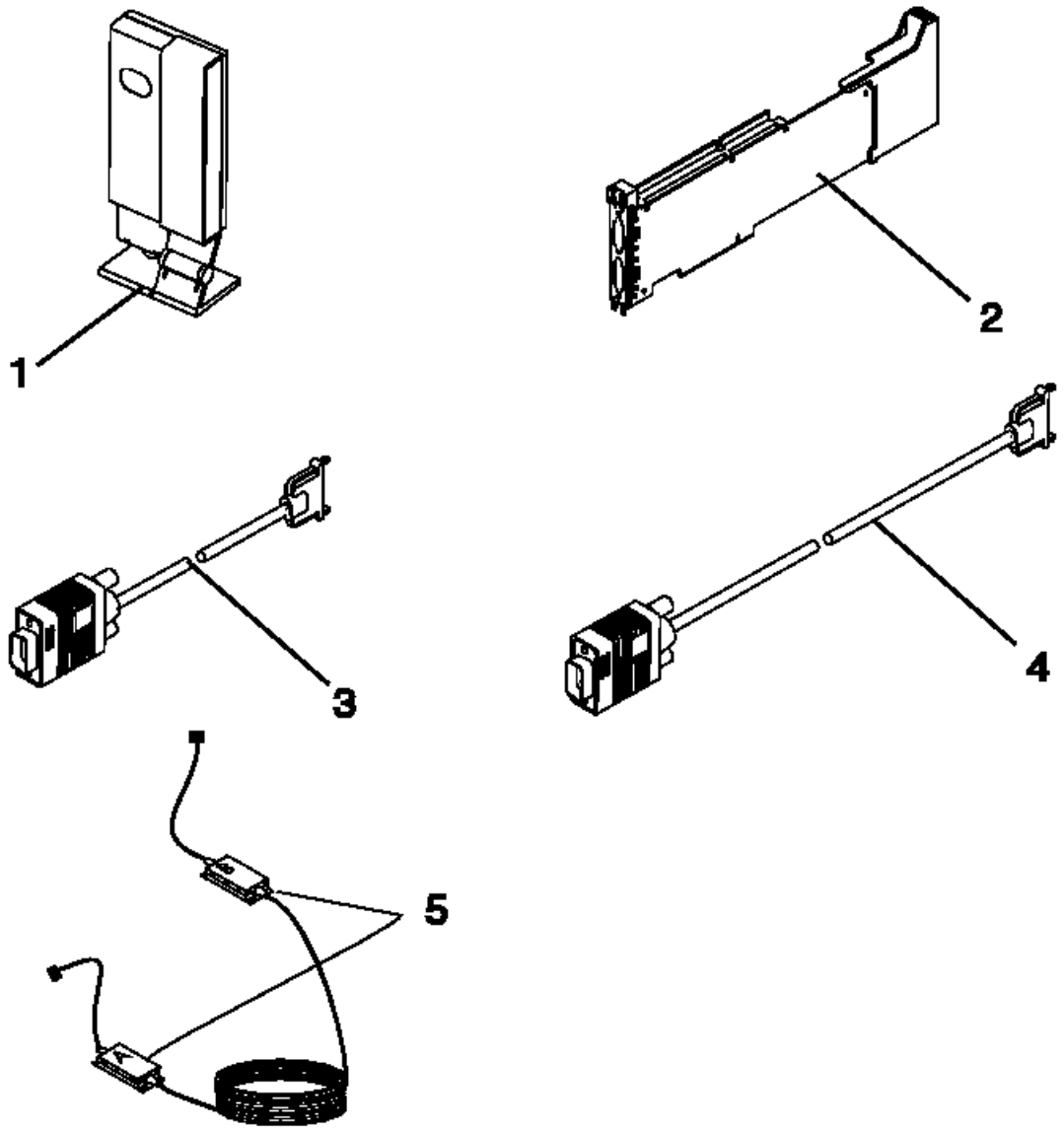
1.15.1 Parts Listing

Index	System Unit (Type 6598)	
1	Side Cover Access Panel	06H9673
2	Base Frame Assembly (with labels)	07H0164
	Rear Frame I/O Icon Label	07H0174
	System Board Label - Inside Cover	07H0173
	EMC Shield	07H0166
3	Front Bezel Assembly	06H9659
4	80 mm Fan Assembly	06H1796
5	DASD Mounting Tray	07H0165
	5.25-Inch Blank Bezel	07H0167
	Hard Disk Drive LED and Cable	06H9670
6	3.5-Inch 1.44 MB Diskette Drive	93F2361
	Diskette Drive Cable	06H6344
7	1.2GB IDE Hard Disk Drive	07H0383
	IDE Hard Disk Drive Cable	06H6326
7	2.2GB SCSI Hard Disk Drive	06H8561
	U-SCSI PCI Cables	06H9674
8	CD-ROM (6X)	06H9431
	CD-ROM EMC Shields (2)	07H0171
	Software Recovery CD	07H1277
9	Matrox Graphics Adapter - PCI	06H9074
	Ultra-SCSI Adapter - PCI (Adaptec)	07H0141
	LED Cable (for Ultra-SCSI Adapter)	07H1278
10	System Board (no processor, memory)	06H9658
	Memory - 8 MB (72-Pin 60 ns Non-parity)	42H2776
	Memory - 16 MB (72-Pin 60 ns Non-parity)	42H2777
	Memory - 16 MB (72-Pin 60 ns Parity)	92G7294
	Lithium Battery	33F8354
11	Power Supply (200W)	06H9660
	Power Switch and Cable	06H9671
12	150 Mhz Processor (without heat sink)	07H0163
12	200 Mhz Processor (without heat sink)	07H1290
	Accessory Kit (4 Rails)	06H9672
	Miscellaneous Parts Kit	07H0170
	Jumper Kit	93F0067

1.16 Common Parts

Subtopics
1.16.1 Wireless LAN Adapter (ISA, Micro Channel Bus)

1.16.1 Wireless LAN Adapter (ISA, Micro Channel Bus)



Index Wireless LAN (ISA, Micro Channel Bus)

1	Radio Module, Australia	80G2708
1	Radio Module, EMEA (Non-Europe)	80G2714
1	Radio Module, ETSI Countries	80G2702
1	Radio Module, Finland	25H0988
1	Radio Module, France	80G2706
1	Radio Module, Japan	80G2703
1	Radio Module, Korea	80G2715
1	Radio Module, Mexico	80G2705
1	Radio Module, New Zealand	80G2704
1	Radio Module, Singapore	80G2709
1	Radio Module US/Canada/Non-EMEA	80G2701
2	IBM Wireless LAN Controller Card	80G2700
2	IBM Wireless LAN Controller Card, No-Cipher	80G2711
3	1.5 m cable	80G2713
4	4 m cable	54G2016
5	Custom Cable Kit	80G4320

Computer Power Cords

Arabic Countries	14F0033
Australia	93F2365
Belgium	1339520
Bulgaria	1339520
Canada	93F2364

Czechoslovakia	1339520
Denmark	13F9997
Finland	1339520
France	1339520
Germany	1339520
Hungary	1339520
Israel	14F0087
Italy	14F0069
Latin-America	93F2366
Netherlands	1339520
New Zealand	93F2365
Norway	1339520
Poland	1339520
Portugal	1339520
Serbia	1339520
Slovakia	1339520
South Africa	14F0015
Spain	1339520
Switzerland	1339520
Switzerland (French, German)	14F0051
U.S.	93F2364
UK, Ireland	14F0033
Yugoslavia	1339520
Display Power Cord	38F3908

Display and Monitor Information

Display and monitor information is separately available and is listed under "Related Publications" in topic FRONT_2.

Mouse

Mouse	06H4595
Mouse Ball and Clip (Twist-off)	06H4585

Keyboards (TrackPoint II)

US English	82G3282
Pointing Stick Caps	66G6444
Canadian/French	82G3286
Latin/Spanish	82G3284

Keyboards (IBM Basic II)

Arabic	06H5256
Belgian-French	06H5257
Belgian-UK/Dutch	06H5258
Brazil/Portugal	06H5692
Bulgarian	06H5259
Chinese/US	06H5291
Czech	06H5260
Danish	06H5261
Dutch	06H5262
French	06H5264
French/Canadian	06H5691
German 129	06H5265
German 453	06H5689
Greek	06H5266
Hebrew	06H5267
Hungarian	06H5268
Icelandic	06H5269
Italian	06H5270
Korea	06H5286
Latin/Spanish	06H5690
Norwegian	06H5272
Polish	06H5273
Portuguese	06H5274
Romanian	06H5275
Russian/Cyrillic	06H5276
Serbian/Cyrillic	06H5277
Slovak	06H5278
Spanish	06H5279
Swiss/Finnish	06H5263
Swiss (French/German)	06H5280
Taiwan	06H5288
Thailand	06H5287
Turkish 179	06H5281
Turkish 440	06H5282
UK English	06H5283
US English	06H5305
Yugoslavia/Lithuania	06H5285

Keyboards (IBM Basic, 101-Key Rubberdome)

Arabic	71G4617
Belgian-French	71G4618

Belgian-UK/Dutch	71G4639
Bulgarian	71G4619
Czech	71G4620
Danish	71G4621
Dutch	71G4622
Swiss/Finnish	71G4623
French	71G4624
French/Canadian	06H2963
German	71G4625
Greek	71G4626
Hebrew	71G4627
Hungarian	71G4628
Icelandic	71G4629
Italian	71G4630
Latin/Spanish	82G3291
Norwegian	71G4631
Polish	71G4632
Portuguese	71G4633
Romanian	71G4634
Russian/Cyrillic	71G4635
Serbian/Cyrillic	71G4636
Slovak	71G4637
Spanish	71G4638
Swiss French/German	71G4640
Turkish 179	71G4642
Turkish 440	82G3255
UK English	71G4643
US English	71G4646
Yugoslavia/Lithuania	71G4647

Keyboards (IBM Enhanced, 101-Key Buckling Spring)

Arabic	1391490
Belgian	1391414
Bulgarian	1399583
Czech	1399570
Danish	1391407
Dutch	1391511
Farsi	52G9811
Finnish	1391411
French	1391402
French/Canadian	82G3280
German	1391403

Greek	1399046
Hebrew	1391408
Hungarian	1399581
Icelandic (with Cap Set 1391495)	1391407
Italian	1393395
Latin/Spanish	82G3294
Norwegian	1391409
Polish	1399580
Portuguese	1391410
Romanian	1399582
Russian/Cyrillic	1399579
Serbian/Cyrillic	1399578
Slovak	1399571
South African	1396790
Spanish	1391405
Swedish	1391411
Swiss - French/German	1391412
Turkish 179	1393286
Turkish 440	8125409
UK English	1391406
US English	82G3278
US English - EMEA	1396790
Yugoslavia/Lithuania	1393669

Keyboards (IBM Enhanced, 101-Key Buckling Spring)
(Type 6877, 6887)

Brazil/Portugal (104-Key)	42H1297
French/Canadian (102-Key)	42H1299
Latin/Spanish (102-Key)	42H1298
US English (101-Key)	42H1296

Keyboards (104-Key)

Arabic	07H0673
Belgian-French	07H0674
Belgian-UK/Dutch	07H0675
Brazil/Portugal	07H0672
Bulgarian	07H0676
Chinese	07H0705
Czech	07H0677
Danish	07H0678
Dutch	07H0679

French	07H0680
French/Canadian	07H0668
German	07H0681
German (2137 Standard)	07H0682
Greek	07H0683
Hebrew	07H0684
Hungarian	07H0685
Icelandic	07H0686
Italian	07H0687
Korea	07H0706
Japan	07H0704
Latin/Spanish	07H0670
Norwegian	07H0688
Polish	07H0689
Portuguese	07H0690
Romania	07H0691
Russian	07H0693
Russian/Cyrillic	07H0692
Serbian/Cyrillic	07H0694
Slovak	07H0695
Spanish	07H0696
Swiss/Finnish	07H0697
Swiss French/German	07H0698
Thailand	07H0707
Turkish (ID 179)	07H0699
Turkish (ID 440)	07H0700
UK English	07H0701
US English	07H0666
US English (ISO 9995 Compliant)	07H0703
Yugoslavia/Lithuania	07H0702

1.17 Special Tools

The following tools are required to service these computers:

- A volt-ohm meter, IBM P/N 73G5404
- Wrap Plug, IBM P/N 72X8546

2.0 Reference Information

Subtopics

2.1 Safety Notices (Multi-lingual Translations)

The safety notices in this section are provided in the following languages:

- English
- Brazilian/Portuguese
- Chinese
- French
- German
- Hungarian
- Italian
- Russian
- Slovakian
- Spanish

Caution Notice 1

Before removing any FRU, power-off the computer, unplug all power cords from electrical outlets, then disconnect any interconnecting cables.

Antes de remover qualquer unidade substituível no local (Field Replaceable Unit - FRU), desligue o computador, retire todos os cabos de alimentaç¦o das respectivas tomadas eléctricas, remremova a pilha (se instalada) e, em seguida, desconecte todos os cabos de interligaç¦o.

PICTURE 11

Avant de retirer une unité remplaçable en clientèle, mettez le système hors tension, débranchez tous les cordons d'alimentation des socles de prise de courant, retirez la batterie et déconnectez tous les cordons d'interface.

Die Stromzufuhr muß abgeschaltet, alle Stromkabel aus der Steckdose gezogen, der Akku entfernt und alle Verbindungskabel abgenommen sein, bevor eine FRU entfernt wird.

PICTURE 12

Prima di rimuovere qualsiasi FRU, spegnere il sistema, scollegare dalle prese elettriche tutti i cavi di alimentazione, rimuovere la batteria e poi scollegare i cavi di interconnessione.

PICTURE 13

PICTURE 14

Antes de quitar una FRU, apague el sistema, desenchufe todos los cables de las tomas de corriente eléctrica, quite la batería y, a continuación, desconecte cualquier cable de conexión entre dispositivos.

Caution Notice 2

The lithium battery can cause a fire, explosion, or severe burn. Do not recharge it, remove its polarized connector, disassemble it, heat

it above 100°C (212°F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

A pilha de lítio representa risco de incêndio, explos¦o ou queimaduras graves. N¦o recarregue, desmonte ou exponha a pilha a temperaturas superiores a 100°C (212°F), n¦o a incinere ou ponha o conteúdo da respectiva célula em contacto com a água nem remova o respectivo conector polarizado. Destrua a pilha de acordo com as normas ou regulamentaç¦es locais. Utilize apenas a pilha com o "part-number" indicado nas listas apropriadas. A utilizaç¦o de uma pilha incorrecta pode resultar na igniç¦ou explos¦o da mesma.

PICTURE 15

Elle présente des risques d'incendie, d'explosion ou de brûlures graves. Ne la rechargez pas, ne retirez pas son connecteur polarisé et ne la démontez pas. Ne l'exposez pas à une temperature supérieure à 100°C, ne la faites pas brûler et n'en exposez pas le contenu à l'eau. Mettez la pile au rebut conformément à la réglementation en vigueur. Une pile inappropriée risque de prendre feu ou d'exploser.

Die Systembatterie ist eine Lithiumbatterie. Sie kann sich entzünden, explodieren oder schwere Verbrennungen hervorrufen. Batterien dieses Typs dürfen nicht aufgeladen, zerlegt, über 100 C erhitzt oder verbrannt werden. Auch darf ihr Inhalt nicht mit Wasser in Verbindung gebracht oder der zur richtigen Polung angebrachte Verbindungsstecker entfernt werden. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Batterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

Caution Notice 2 Continued

PICTURE 16

La batteria di supporto e una batteria al litio e puo incendiarsi, esplodere o procurare gravi ustioni. Evitare di ricaricarla, smontarne il connettore polarizzato, smontarla, riscaldarla ad una temperatura superiore ai 100 gradi centigradi, incendiarla o gettarla in acqua. Smaltirla secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

PICTURE 17

PICTURE 18

La bateria de repuesto es una bateria de litio y puede provocar incendios, explosiones o quemaduras graves. No la recargue, ni quite el conector polarizado, ni la desmonte, ni caliente por encima de los 100°C (212°F), ni la incinere ni exponga el contenido de sus celdas al agua. Deséchela tal como dispone la normativa local.

2.2 Safety Information

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

Subtopics

2.2.1 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.

2.2.2 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.**

2.2.3 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.

2.2.4 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.

2.2.5 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.

2.3 Laser Compliance Statement

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

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

CAUTION:

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

O uso de controles, ajustes ou desempenho de procedimentos diferentes daqueles aqui especificados pode resultar em perigosa exposiç¦o à radiaç¦o.

凡未在这里指明的任何控制用法、调整、行为，

都会导致严重后果。

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

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

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

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

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

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

El uso de controles o ajustes o la ejecución de procedimientos distintos de los aquí especificados puede provocar la exposición a radiaciones peligrosas.

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

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

DANGER:

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

Radiaç¦o por raio laser ao abrir. N¦o olhe fixo no feixe de luz, n¦o olhe diretamente por meio de instrumentos óticos e evite exposiç¦o direta com o feixe de luz.

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

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

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

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

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

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

Keď je laserová jednotka otvorená. Vyhnite sa priamemu pohľadu a nehľadte priamo s optickými nástrojmi do ľúča a vyhnite sa priamemu vystaveniu ľúčov.

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

2.4 Product Description

The PC 300/700 Series computers are available in either 3 x 3, 4 x 4, 5 x 5, or 6 x 6 models as follows:

Type 6X7X Three drive bays, three I/O adapter slots

Type 6560 Four drive bays, four I/O adapter slots

Type 6X8X Five drive bays, five I/O adapter slots

Type 6598 Six drive bays, six I/O adapter slots

Security

- Administrator password
- Cover lock
- Power-on password
- Operating system password
- U-bolt and cable
- C2 security on some models

CMOS backup battery (Lithium)

Common parts
(Varies with each model, see "Type/Model Number Conversion" in topic 2.30.)

- Diskette drive
- Hard disk drive
- Keyboard
- Power supply
- Mouse

Specifications Information (ISO/ANSI)

The model specifications information on the following pages was determined in controlled acoustical environments according to procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779, and are reported in accordance with ISO 9296. Actual sound pressure levels in your location might differ from the average values stated because of room reflections and other nearby noise sources. The declared sound power levels indicate an upper limit, below which a large proportion of machines will operate.

2.5 Specifications Type 6X7X

Feature	Description
Size	Depth: 450 mm (17.7 in.) Height: 130 mm (5.1 in.) Width: 360 mm (14.2 in.)
Weight	Minimum: 8.6 kg (19.0 lb) Maximum: 10.4 kg (23.0 lb) (3)
Environment	Air temperature: - System on: 10° to 32° C (50° to 95°F) - System off: 10° to 43° C (50° to 110°F) Humidity: - System on: 8% to 80% - System off: 8% to 80% Maximum altitude: 2134 m (7000 ft)
Heat Output	Approximate heat output in BTUs per hour: - Minimum: 120 BTU (35 watts) - Maximum: 685 BTU (200 watts) (4) - Deep sleep: 15 BTU (4 watts)
Electrical Input	Sine-wave input (50 to 60 Hz) required. Low range input voltage: - Minimum: 100 V ac - Maximum: 125 V ac High range input voltage: - Minimum: 200 V ac - Maximum: 240 V ac Input kVA (approximately): - Minimum: 0.08 kVA - Maximum: 0.30 kVA
Airflow	Approximately 0.56 cubic meters/minute (20 CFM)
Acoustical Noise Emission Values	Average sound pressure levels: At operator position: - 43 dB operating - 43 dB idle At bystander position (1 meter): - 40 dB operating - 40 dB idle Declared (upper limit) sound power levels: - 5.0 bels operating - 4.8 bels idle

(3) Maximum configuration weight depends on options installed. Figures above are a system fully populated with options.

(4) Maximum power and heat specifications are based on the 145-watt maximum capacity of the system power supply.

(5) For additional information, see the *ISO Supplier's Declaration* available from IBM.

2.6 Specifications Type 6X8X

Feature	**Description**
Size	Depth: 448 mm (17.6 in.) Height: 160 mm (6.3 in.) Width: 420 mm (16.5 in.)
Weight	Minimum: 12.7 kg (28.0 lb) Maximum: 14.1 kg (31.0 lb) (6)
Environment	Air temperature: - System on: 10° to 32°C (50° to 90°F) - System off: 10° to 43°C (50° to 110°F) Humidity: - System on: 8% to 80% - System off: 8% to 80% Maximum altitude: 2134 m (7000 ft)
Heat Output	Approximate heat output in BTUs per hour: - Minimum: 120 BTU (35 watts) - Maximum: 1060 BTU (310 watts) (7) - Deep sleep: 15 BTU (4 watts)
Electrical Input	Sine-wave input (50 to 60 Hz) required. Low range input voltage: - Minimum: 110 V ac - Maximum: 125 V ac High range input voltage: - Minimum: 200 V ac - Maximum: 240 V ac Input kVA (approximately): - Minimum: 0.08 kVA - Maximum: 0.52 kVA
Airflow	Approximately 0.56 cubic meters/minute (20 CFM)
Acoustical Noise Emission Values	Average sound pressure levels: At operator position: - 43 dB operating - 43 dB idle At bystander position (1 meter): - 40 dB operating - 40 dB idle Declared (upper limit) sound power levels: - 5.0 bels operating - 4.8 bels idle

(6) Maximum configuration weight depends on options installed. Figures above are a system fully populated with options.

(7) Maximum power and heat specifications are based on the 200-watt maximum capacity of the system power supply.

(8) For additional information, see the *ISO Supplier's Declaration* available from IBM.

2.7 Specifications Type 6560

Feature	**Description**
Size	Depth: 420 mm (16.53 inches) Height: 102 mm (4.0 inches) Width: 440 mm (17.32 inches)
Weight	Minimum: 8.0 kg (17.61 lb) Maximum: 10.0 kg (22.0 lb) (9)
Environment	Air temperature: - System on: 10° to 35°C (50° to 95°F) - System off: 10° to 43°C (50° to 110°F) Humidity: - System on: 8% to 80% - System off: 8% to 80% Maximum altitude: 2134 m (7000 ft)
Heat Output	Approximate heat output in BTUs per hour: - Minimum: 120 BTU (35 watts) - Maximum: 685 BTU (200 watts) (10) - Deep sleep: 15 BTU (4 watts)
Electrical Input	Sine-wave input (50 to 60 Hz) required. Low range input voltage: - Minimum: 110 V ac - Maximum: 125 V ac High range input voltage: - Minimum: 200 V ac - Maximum: 240 V ac Input kVA (approximately): - Minimum: 0.08 kVA - Maximum: 0.52 kVA
Airflow	Approximately 0.56 cubic meters/minute (20 CFM)
Acoustical Noise Emission Values	Average sound pressure levels: At operator position: - 43 dB operating - 43 dB idle At bystander position (1 meter): - 40 dB operating - 40 dB idle Declared (upper limit) sound power levels: - 5.0 bels operating - 4.8 bels idle

(9) Maximum configuration weight depends on options installed. Figures above are a system fully populated with options.

(10) Maximum power and heat specifications are based on the 200-watt maximum capacity of the system power supply.

(11) For additional information, see the *ISO Supplier's Declaration* available from IBM.

2.8 Specifications Type 6589

Feature	Description
Size	Depth: 455 mm (17.9 in.) Height: 160 mm (6.3 in.) Width: 420 mm (16.5 in.)
Weight	Minimum: 12.7 kg (28.0 lb) Maximum: 14.1 kg (31.0 lb) (6)
Environment	Air temperature: - System on: 10° to 32°C (50° to 90°F) - System off: 10° to 43°C (50° to 110°F) Humidity: - System on: 8% to 80% - System off: 8% to 80% Maximum altitude: 2134 m (7000 ft)
Heat Output	Approximate heat output in BTUs per hour: - Minimum: 120 BTU (35 watts) - Maximum: 1060 BTU (310 watts) (7) - Deep sleep: 15 BTU (4 watts)
Electrical Input	Sine-wave input (50 to 60 Hz) required. Low range input voltage: - Minimum: 90 V ac - Maximum: 137 V ac High range input voltage: - Minimum: 180 V ac - Maximum: 265 V ac Input kVA (approximately): - Minimum: 0.08 kVA - Maximum: 0.52 kVA
Airflow	Approximately 0.56 cubic meters/minute (20 CFM)
Acoustical Noise Emission Values	Average sound pressure levels: At operator position: - 38 dB operating - 43 dB idle At bystander position (1 meter): - 33 dB operating - 37 dB idle Declared (upper limit) sound power levels: - 5.3 bels operating - 4.9 bels idle

(12) Maximum configuration weight depends on options installed. Figures above are a system fully populated with options.

(13) Maximum power and heat specifications are based on the 200-watt maximum capacity of the system power supply.

(14) For additional information, see the *ISO Supplier's Declaration* available from IBM.

2.9 Specifications Type 6598

Feature	**Description**
Size	Depth: 460 mm (18.0 inches) Height: 405 mm (16.0 inches) Width: 210 mm (8.3 inches)
Weight	Weight: 13.4 kg (29.5 pounds) (15)
Environment	Air temperature: - System on: 10° to 35°C (50° to 95°F) - System off: 10° to 43°C (50° to 110°F) Humidity: - System on: 8% to 80% - System off: 8% to 80% Maximum altitude: 2134 m (7000 ft)
Heat Output	Approximate heat output in BTUs per hour: - Minimum: 120 BTU (35 watts) - Maximum: 1060 BTU (310 watts) (16) - Deep sleep: 15 BTU (4 watts)
Electrical Input	Sine-wave input (50 to 60 Hz) required. Low range input voltage: - Minimum: 110 V ac - Maximum: 125 V ac High range input voltage: - Minimum: 200 V ac - Maximum: 240 V ac Input kVA (approximately): - Minimum: 0.08 kVA - Maximum: 0.52 kVA
Airflow	Approximately 0.56 cubic meters/minute (20 CFM)
Acoustical Noise Emission Values	Average sound pressure levels: At operator position: - 43 dB operating - 43 dB idle At bystander position (1 meter): - 40 dB operating - 40 dB idle Declared (upper limit) sound power levels: - 5.0 bels operating - 4.8 bels idle

(15) Maximum configuration weight depends on options installed. Figures above are a system fully populated with options.

(16) Maximum power and heat specifications are based on the 200-watt maximum capacity of the system power supply.

(17) For additional information, see the *ISO Supplier's Declaration* available from IBM.

2.10 Passwords

The following provides information about computer hardware and software-related passwords.

Subtopics

2.10.1 Power-on Password

A power-on password denies access to the computer by an unauthorized user when the computer is powered on. When a power-on password is active, the password prompt appears on the screen each time the computer is powered on. The computer starts after the proper password is entered.

Removing a Power-on Password

To service a computer with an active and unknown power-on password, power-off the computer and do the following:

```
+--- Note ------------------------------------------------------------+
¦                                                                     ¦
¦ On some models, this procedure will also remove the administrator   ¦
¦ password.                                                           ¦
¦                                                                     ¦
+---------------------------------------------------------------------+
```

1. Unplug the power cord and remove the top cover.

2. Refer to "System Board Layouts" in topic 2.28 and locate the system board type you are servicing. Depending on the system board, the password is reset by a jumper or switch block.

3. Move the password jumper to connect the center pin and the pin on the opposite end of the connector; or, change the switch setting as appropriate.

4. Power-on the computer. The system senses the change in the position and erases the password.

   - It is necessary to move the jumper back to the previous position and to reset the switch setting.

5. Remind the user to enter a new password when service is complete.

2.10.2 Administrator Password

The administrator password is used to restrict access to the Configuration/Setup Utility program. If you do not enter the administrator password, the configuration can be viewed but not changed.

Refer to "System Board Layouts" in topic 2.28 and locate the system board type you are servicing. Depending on the system board, the password is set by a jumper or switch block.

+--- **Attention** ----------+
¦ **On some models**, if the administrator password is set and the password ¦
¦ is forgotten, there is no recovery. The system board must be replaced ¦
¦ and the customer charged appropriately. ¦
¦ ¦
+---------------------------+

2.10.3 Operating System Password

An operating system password is very similar to a power-on password and denies access to the computer by an unauthorized user when the password is activated. The computer is unusable until the password is entered and recognized by the computer.

2.11 Hard Disk Drive Jumper Settings

Hard disk drives for Type 65XX and 68XX computers use jumpers to set the drives as primary (master) or secondary (slave).

Attention

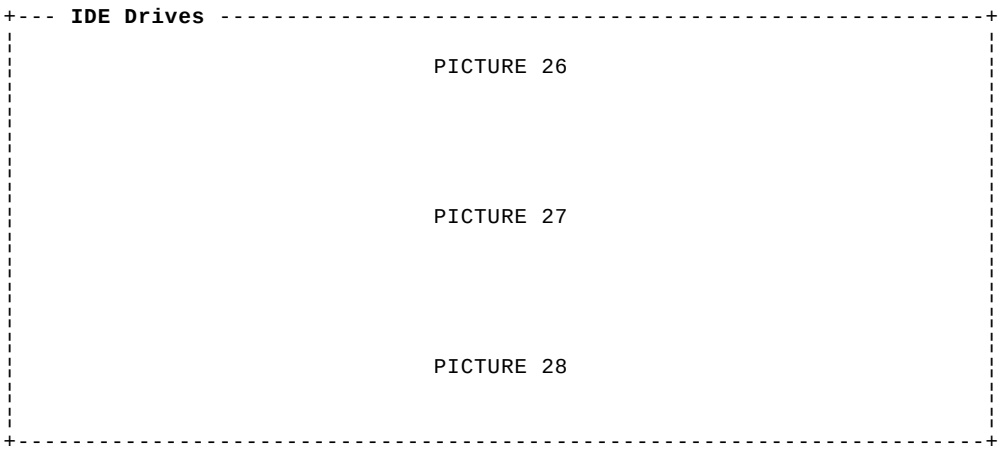
Refer to the hard disk drive label on the drive, or to the figures below for the hard disk drive settings.

Subtopics
2.11.1 IDE Hard Disk Drive Settings
2.11.2 SCSI Hard Disk Drive Settings

2.11.1 IDE Hard Disk Drive Settings

1 Primary (Master) Hard Disk Drive

2 Secondary (Slave) Hard Disk Drive



2.11.2 SCSI Hard Disk Drive Settings

540 MB SCSI

PICTURE 29

SCSI ID	Position 1	2	3	SCSI ID	Position 1	2	3
6	:			2	:		:
5		:		1		:	:
4	:	:		0	:	:	:
3			:				

1 GB SCSI

PICTURE 30

SCSI ID	Position A2	A1	A0	SCSI ID	Position A2	A1	A0
7	On	On	On	3	Off	On	On
6	On	On	Off	2	Off	On	Off
5	On	Off	On	1	Off	Off	On
4	On	Off	Off	0	Off	Off	Off

1.12 GB, 2.25 GB SCSI

PICTURE 31

SCSI ID	Position 3	4	5	6	SCSI ID	Position 3	4	5	6
0	:	:	:	:	8	:	:	:	
1		:	:	:	9		:	:	
2	:		:	:	10	:		:	
3			:	:	11			:	
4	:	:		:	12	:	:		
5		:		:	13		:		
6	:			:	14	:			
7	--Reserved--				15				

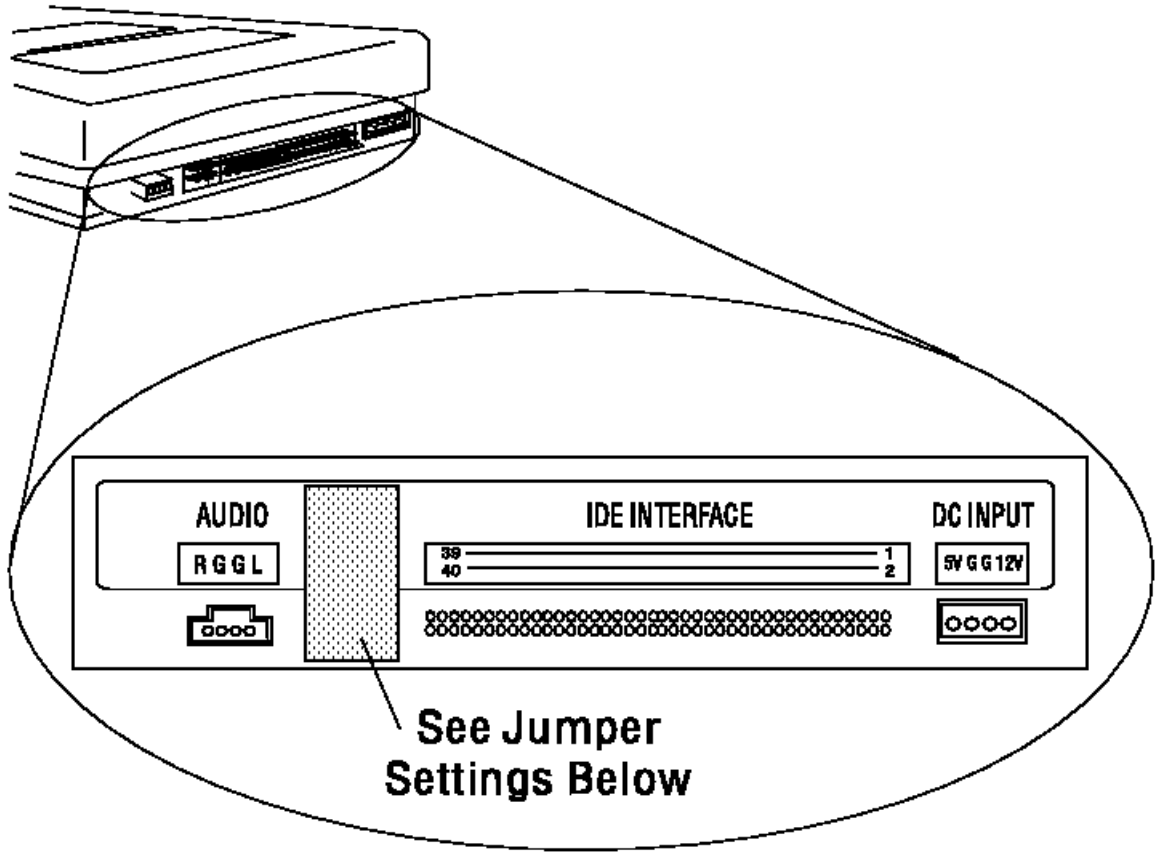
2 GB SCSI

PICTURE 32

SCSI ID	Position 4	3	2		SCSI ID	Position 4	3	2
6	:				2	:		:
5		:			1		:	:
4	:	:			0	:	:	:
3			:					

2.12 CD-ROM, PD/CD-ROM Drive Jumper Settings

CD-ROM and PC/CD-ROM drives use jumpers or tabs to set the drives as primary (master) or secondary (slave). Refer to the drive connector labels or the figures below for the drive settings.



CD-ROM, PD/CD-ROM Type	Primary (Master)	Secondary (Slave)
2X CD-ROM FRU 06H5906	: : ¦ : :	: ¦ : : :
4X CD-ROM FRU 06H7654	: : ¦ : :	: ¦ : : :
6X CD-ROM	: : ¦	: ¦ :
8X CD-ROM	: : ¦	: ¦ :
6X PD/CD-ROM	: : ¦	: ¦ :
16X Max CD-ROM	: : ¦	: ¦ :

2.13 BIOS Levels

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

- Current Level BIOS information.
  - Run the Configuration Utility to determine the level of BIOS installed.
- Sources for determining the latest level BIOS available.
  1. IBM PC Company Home Page
     http://www.pc.ibm.com
  2. Bulletin Board System (BBS)
  3. HelpCenter
  4. Levels 1 and 2 Support
  5. RETAIN
- Sources for obtaining the latest level BIOS available.
  1. IBM PC Company Home Page
     http://www.pc.ibm.com
  2. Bulletin board system (BBS)
  3. HelpCenter
  4. Levels 1 and 2 Support

To update (flash) the BIOS, see "Flash (BIOS/VPD) Update Procedure" in topic 2.15.

2.14 Vital Product Data

Each computer has a unique vital product data (VPD) code stored in the nonvolatile memory on the system board. After you replace the system board, the VPD must be updated. To update the VPD, see "Flash (BIOS/VPD) Update Procedure" in topic 2.15.

2.15 Flash (BIOS/VPD) Update Procedure

Attention

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

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

Subtopics

2.15.1 PC 360-S150 (Type 6598) Flash Recovery Jumper

Attention

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

To perform a Flash/BIOS recovery:

1. Power-off the computer and remove the cover.
2. Move the system board Flash jumper from pins 23-24 to pins 22-23. Refer to "PC 360-S150 (Type 6598) - Pentium 150/200 MHz Jumper Settings" in topic 2.28.21 for more information.
3. Insert the upgrade diskette into the diskette drive.
4. Power-on the computer and listen to the speaker. You should hear beeps in the following sequence.
   a. After you restart the computer, it beeps once. This beep marks the beginning of the power-on self test (POST).
   b. After a short delay (less than 10 seconds), the computer beeps again. This marks the beginning of the recovery process; the recovery code is being copied into the flash component.
   c. After about 30 seconds, the computer beeps twice, marking the end of the recovery process. Wait until the diskette drive in-use light goes out.
5. Power-off the computer and move the jumper back to the normal (default) position.
6. Leave the upgrade diskette in the diskette drive and power-on the computer.
7. Continue with the original upgrade.

2.16 Diagnostics and Test Information

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

- Power-on self-test (POST)
- POST Beep Codes
- Error Code Format
- Diagnostic Test Programs
  - QAPlus/WIN
  - QAPlus/PRO
- Error messages
- IBM Personal Computer Diagnostics Diskette

Subtopics

2.16.1 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 drive is 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 your operating system or application program appears.

If the POST detects a problem, an error message appears on your 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 turn on the system.

2.16.2 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.

2.16.3 Error Code Format

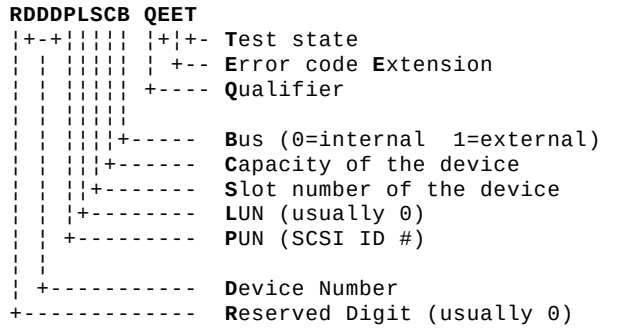
This section provides an explanation of the encoded non-SCSI and SCSI POST error codes.

Error messages are displayed on the screen as three, four, five, eight, twelve, or thirteen digits. An "X" in an error message can be any number or letter. The shorter POST errors are highlighted in the Symptom-to-FRU Index. Some digits will represent different information for SCSI errors versus non-SCSI errors.

The following figure shows which digits display the shorter POST errors. The figure also defines additional SCSI information.

Notes

- Non-IBM device error codes and documentation supersede this list.
- Duplicate SCSI ID settings will cause misleading error symptoms or messages.



2.16.4 Diagnostics Test Programs

Always use the latest PC 300/700 Series Diagnostics Diskette. As of this HMM printing, the current release is Version 5.45. The Diagnostics test programs, developed by DiagSoft for IBM, are the primary method of testing the computer. 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.

Subtopics

2.16.4.1 QAPlus/WIN

QAPlus/WIN, a Windows program, is included in the preinstalled software on certain IBM computers. QAPlus/WIN provides an effective tool for isolating software-related problems, because it encompasses the entire operating system. QAPlus/WIN gathers Windows-related information and also does some hardware device testing.

2.16.4.2 QAPlus/PRO

QAPlus/PRO is a DOS diagnostic program that is available either in preinstalled software or on a diskette. If the computer has DOS or DOS with Windows preinstalled, you can access QAPlus/PRO by typing QAPRO and the C:\ prompt. You must first exit from Windows to use QAPRO.

QAPlus/PRO provides similar diagnostic capacity to QAPlus/WIN, but is more balanced between software and hardware problem determination. The Windows-related information that is available in QAPlus/WIN is not available in QAPlus/PRO. However, QAPlus/PRO does gather a wealth of information about the DOS environment, including device drivers. It more effectively isolates hardware problems than QAPlus/WIN, because it is not limited by the operating system environment.

When OS/2 is preinstalled, QAPlus/PRO is not available from the hard disk. However, you can use the Diskette Factory available on the computer to build the QAPlus/PRO diskette.

If software was not preinstalled on the computer, QAPlus/PRO is provided on a diskette supplied with the computer. To access QAPlus/PRO, boot the computer with the QAPlus/PRO diskette in the primary diskette drive.

2.16.4.3 CoSession for Windows

If the CoSession for Windows program is preinstalled in the computer, IBM HelpCenter personnel can use that program to diagnose the system from a remote location. To use CoSession for Windows, you must have a modem attached to your computer. Contact the IBM HelpCenter for instructions before attempting to use CoSession for Windows.

The test programs include the following features.

Feature	**Description**
Advanced Diagnostic Tests	Identifies most problems associated with the following major components: □ System board □ Hard disk drives □ Diskette drives □ CD-ROM drives □ RAM □ Serial and parallel ports □ Video adapter □ Printer □ Keyboard □ Mouse
Flexible Test Control	Allows you to: □ Run groups of tests in batch □ Specify parameters to use for each test (for example, video modes, disk cylinders, and port addresses) □ Specify the number of passes you want to run (one to continuous) □ Log the test results to a text dBase (DBF) format 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, and device drivers) □ Select System Utilities □ Run a low-level format also contains system utilities. □ Format a diskette

2.16.5 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
- POST beep codes
- Diagnostic error messages
- 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.
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 *first* error message displayed.

2.16.6 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 the device passed its test.
1	Indicated the device failed its test.
2 or greater	Indicates the test stopped or was aborted.

2.17 Using the Test Programs

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

Subtopics

2.17.1 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.

Subtopics
2.17.1.1 Using the First Letter of a Menu Choice
2.17.1.2 Using the Function Keys
2.17.1.3 Command Line Options

2.17.1.1 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.

2.17.1.2 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)
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

2.17.1.3 Command Line Options

The following Command Line Options are available when initially starting the diagnostic program from within its directory.

Type **QAPLPRO/XXX** (where **/XXX** represents one 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 testing.
/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.
/SCRIPT =file[,R]	The **/SCRIPT=file[,R]** command line option with the ",R" runs the selected script. Please see "Scripting" in topic 2.17.3 for a description of scripting. **Note:** You can use a "-" instead of a "/" as the command line switch.

2.17.2 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.

2.17.3 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" in topic 2.17.1, for instructions to save a test script.

2.17.4 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, extended, shadow, and cache memory installed in the computer. This configuration might result in as many as four or five different LUNs in the Memory Test Group. Or you might have base, extended, shadow, and cache memory installed in the system which might result in as many as four or five 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).

2.17.5 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.

Note: In the Hard Disk Test Group specification area, if a software program was to compress your drive, the indicated size is the compressed size of the logical drive.

2.17.6 Starting the Diagnostics Diskette

1. Insert the Diagnostics diskette into drive A.
2. Power-on the computer.
3. When the Diagnostics **Main Menu** is displayed, press **Ctrl+A**. (The screen will not change.)
4. Select Diagnostics; then, press **Enter**.
5. Follow the instructions that appear on your screen. If an error is displayed, go to "Symptom-to-FRU Index" in topic 1.8.

Subtopics

2.17.6.1 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.
2. Select **Diagnostic Menu** from the Main Menu.
3. Select **Quick Checks** 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.

2.17.6.2 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 "DIAMOND" appears next to your selection.

2.17.6.3 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 "DIAMOND" appears next to your selection.

2.17.6.4 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.

   Warning: 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 "DIAMOND") and deselect.

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

5. Press **Enter**.

2.17.6.5 Running an Individual Test

To run an individual test:

1. 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.

2.17.7 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.

2.18 Setup Utility Program

+--- **Attention** ----------+
¦ A customized setup configuration (other than default settings) might ¦
¦ exist on the computer you are servicing. Running the Setup Utility ¦
¦ program might alter those settings. Note the current configuration ¦
¦ settings and verify that the settings are in place when service is ¦
¦ complete. To start the Setup Utility program, see "Setup Utility ¦
¦ Program." ¦
¦ ¦
+---------- +

The Setup Utility (configuration) program is stored in the permanent memory of the computer. This program includes settings for the following:

- Devices and I/O Ports
- Date and Time
- Security
- Start Options
- Advanced Setup
- ISA Legacy Resources
- Rapid Resume Manager

To run the Setup Utility program, do the following:

1. Power-off the computer and wait for a few seconds until all in-use lights go off.
2. Power-on the computer.
3. When the Setup Utility prompt appears on the screen during start-up, press **F1**. The Setup Utility menu appears.
4. Follow the instructions on the screen.
5. When finished, select System Summary to verify that any configuration changes have been accepted.

Subtopics
2.18.1 Adapter Configuration
2.18.2 Plug and Play Adapters
2.18.3 Legacy Adapters
2.18.4 Rapid Resume Manager
2.18.5 Formatting Diskettes
2.18.6 Hard Disk Drive Boot Error
2.18.7 When To Use the Low-Level Format Program
2.18.8 Preparing the Hard Disk Drive for Use
2.18.9 File Editor
2.18.10 File Edit Function Keys
2.18.11 Diagnostics Control Keys

2.18.1 Adapter Configuration

To add adapters to past generations of ISA computers, a variety of switches are provided on the adapters. These switches control the assignment of computer resources such as interrupt request (IRQ) lines, direct memory access (DMA) channels, and memory address ranges. Determining how to set switches for (or *configuring*) these resources can be complex. Plug and Play adapters and devices make this task easier.

2.18.2 Plug and Play Adapters

Plug and Play adapters are easier to install and set up because they are auto-configuring (no jumpers or switches) to set. A Plug and Play adapter comes with built-in identification and configuration specifications set in the adapter memory. This information is sensed by the I/O bus and interpreted by the computer BIOS. The BIOS routines then automatically configure the adapter around the resources already in use by other devices.

PCI adapters are generally Plug and Play devices. Many ISA adapters are not Plug and Play devices. If the adapter you are installing is not a Plug and Play adapter (a *legacy* device), you must configure it manually.

2.18.3 Legacy Adapters

ISA adapters that are not Plug and Play devices are referred to as *legacy* devices. The Configuration/Setup Utility program can help you manually configure legacy adapters.

The Configuration/Setup Utility program screens show the legacy resources typically required by adapters:

- I/O port address
- Memory address
- Interrupt request (IRQ) line
- Direct memory access (DMA) channel

Resources not currently being used by adapters already installed in your computer are highlighted. From these screens you can select available resources for the adapter you are installing. Set the resources used by installed legacy adapters to *not available*. This enables the Plug and Play code to configure around legacy adapters. Then you can make the appropriate jumper or switch settings on the adapter. Using this procedure helps prevent conflicts with other adapters. Refer to the adapter documentation for information about required resources. If your computer comes with preinstalled software, you can also select these resources using the Plug and Play icon.

Note

The Plug and Play feature uses memory addresses ED00h to EFFFh. If you install an ISA legacy adapter or use a memory manager program, do not use the addresses within this range.

2.18.4 Rapid Resume Manager

Personal computers come with built-in energy-saving capabilities. If the computer you are servicing was shipped with DOS and Windows preinstalled, Rapid Resume Manager is available. Rapid Resume Manager reduces the power consumption of the computer. The following are features of Rapid Resume Manager:

- Rapid Resume
- Standby
- Scheduler
- Wake Up on Ring

Subtopics

2.18.4.1 Rapid Resume

With Rapid Resume activated, the computer saves its current state when you power it off with the power switch. Rapid Resume retains all current settings, remembers which programs were active, and saves the position and size of windows and other objects on the screen. When the computer is restarted (with the power-on switch, the Scheduler, or Wake-Up on Ring), it quickly returns to full-power operation in exactly the same state. The programs that were being used will reappear in the state they were in when you suspended operation of the computer.

2.18.4.2 Running Rapid Resume Manager

To select and activate, deactivate, or change Rapid Resume Manager do the following.

1. From Program Manager, select **IBM Management Plus**.
2. Select **Rapid Resume Manager**.
3. View or change settings.
4. Follow the instructions on the screen.

2.18.4.3 Standby

When the Standby feature is enabled, it initiates reduced power modes for the display, microprocessor, and hard disk drive after a specified period of inactivity. The default setting for automatically initiating standby is 20 minutes. The display is blanked and the hard disk drive "spins down' (enters a reduced-power state). Any use of the keyboard, mouse, or hard disk drive causes the computer to exit standby and return to full-power operation. For example, if 40 minutes is selected as the specified period, the computer goes into standby state if the mouse, keyboard, or microprocessor is not active for more than 40 minutes.

To select and activate, deactivate, or change the Standby feature, see "Running Rapid Resume Manager" in topic 2.18.4.2.

2.18.4.4 Scheduler

Use the Scheduler to set a time for the computer to do the following:

- Start a program
- Display a message
- Power-off the computer

If the computer will not already be power-on when it is time to start a program or display a message, a setting can be selected to power-on the computer at the appropriate time.

To select and activate, deactivate, or change the Scheduler feature, see "Running Rapid Resume Manager" in topic 2.18.4.2.

2.18.4.5 Wake Up on Ring

You can select settings so that, if the modems receives a call the computer is in the suspend state, the computer "wakes up" on the first ring; that is, it returns to full-power.

To select the Wake Up on Ring settings, feature, see "Running Rapid Resume Manager" in topic 2.18.4.2.

2.18.5 Formatting Diskettes

To format a diskette within the Diagnostic programs, select one of the following options:

Format A: high density -- 1.44 MB

Format A: low density -- 720 KB

Format B: high density -- 1.44 MB

Format B: low density -- 720 KB

After selecting a diskette format option, follow the instructions that appear on the screen.

2.18.6 Hard Disk Drive Boot Error

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

Cause	**Actions**
The start-up drive is not in the boot sequence in configuration.	Check the configuration and ensure the start-up drive is in the boot sequence.
No operating system installed on the boot drive.	Install an operating system on the boot drive.
The boot sector on the start-up drive is corrupted.	The drive must be formatted, do the following: 1. Attempt to access and recover (back-up) the failing hard disk drive. 2. Using the operating systems programs, format the hard disk drive. 3. Go to "Preparing the Hard Disk Drive for Use" in topic 2.18.8.
The drive is defective.	Replace the hard disk drive.

2.18.7 When To Use the Low-Level Format Program

+--- **Notes** ----------
¦ 1. The low-level format is not available on all diagnostic diskettes. ¦
¦ 2. Before formatting the hard disk drive, make a back-up copy of the ¦
¦ files on the drive to be formatted. ¦
¦ ¦
+----------

Use the Low-Level Format program:

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

2.18.8 Preparing the Hard Disk Drive for Use

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

1. Partition the remainder of the hard disk for your operating system. (The commands vary with the operating system. Refer to your operating-system manual for instructions.)

2. Format the hard disk using your operating system. (The commands vary with the operating system. Refer to your operating-system manual for instructions.)

3. Install the operating system.

You are now ready to restore the files.

2.18.9 File Editor

The File Editor is an ASCII text editor that uses simple function key commands.

To access the File Editor:

1. Select **File Editor** from the ***Utility Menu***; then press **Enter**.
2. Insert a diskette into Drive A or Drive B before selecting the file you want to edit, then select the file you want to edit from the Files selection box.
3. Make your changes. The arrow keys move the cursor, and the function keys perform search and block editing functions. (See "File Edit Function Keys" in topic 2.18.10.)
4. When you are done, press **F10** to update the file with the changes you made, or press **Esc** to quit the editing process without saving the changes.

2.18.10 File Edit Function Keys

The following information describes the function of the function keys and keyboard keys when you are using the File Editor.

Key	**Description**
Arrows	Move the cursor to the place in the text where you want to make changes.
Home	Press **Home** once, to move the cursor to the start of the current line. Press **Home** twice, to move to the beginning of the file. Press **Home** three times, to move to the beginning of the file.
End	Press **End** once, to move the cursor to the end of the current line. Press **End** twice, to move the cursor to the end of the current screen. Press **End** three times, to move the end of the file.
F2	Press **F2** to be in search mode, You are prompted to enter the search word or words on a reverse highlighted line at the bottom of the File Edit Screen. After typing in the search word, press **Enter.**
F3	Press **F3** to find the next occurrence of a search word.
F4	Press **F4** to mark the start of a block of text (if you have not previously marked it). If you previously marked the block of text, pressing this key unmarks the text block.
F5	Press **F5** to complete the block marking (started with F4). If you did not previously press **F4** to start marking a block of text, **F5** is ignored.
F6	Press **F6** while the cursor is within the active block to move an active (marked) block of text. Move the cursor to the new location where the active block is to be moved, then press **F6** again. If there is no active block of text, **F6** is ignored.
F7	To copy an active (marked) block of text to a new location, move the cursor to the new location and then press **F7**. If there is no active block of text **F7** is ignored.
F8	To delete an active (marked) block of text, move the cursor within the active block and press **F8.** If there is no active block of text, **F8** is ignored.
F10	Press **F10**, to save all changes and exit the file.

Notes:

1. Always make a backup copy on a self-starting diskette of the AUTOEXEC.BAT and CONFIG.SYS files *before* making any changes.

2. The default text editing mode of the File Editor is the insert mode. To toggle between overtype and insert modes, press Insert.

2.18.11 Diagnostics Control Keys

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

Control Keys	**When Used**	**Diagnostics Response**
Ctrl+A	Main Menu	Allows you to select test from the sub menus that are highlighted with red letters. **Attention**: If selected, these test 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.
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).

2.19 Recovering from Software Problems (Type 68X7)

+--- **Note** ----------+
¦ The following software-related information is also included in the ¦
¦ *About Your Software* booklet supplied with certain model IBM PC ¦
¦ Computers. It is included here for reference only. ¦
+---------------------+

This section provides information and procedures to help a customer recover from problems that prevent either OS/2 Warp or DOS from starting. To follow many of these procedures, you will need the following diskettes that were created when the computer was initially installed.

- OS/2 Warp Utility Diskettes
- PC DOS 7 Diskettes

Notes:

1. If these diskettes are not available and a problem with the computer prevents you from making them now, you can make them from another IBM Personal Computer that has the same version of PC DOS and OS/2 Warp installed.

2. PC DOS 7.0 *Disk 1* is a multipurpose diskette. It not only is the starting point for installing DOS 7, it is also a general-purpose utility diskette.

Subtopics
2.19.1 Utility Diskettes

2.19.1 Utility Diskettes

Utility diskettes help you correct problems when you cannot start your computer from the hard disk.

The utility diskettes contain programs that allow you to start an editor program, check your hard disk for errors or problems, view and define hard disk partition information, and format a diskette or hard disk. The OS/2 Warp utility diskettes also contain programs that allow you to back up and restore OS/2 Warp. The preinstalled software includes programs to create utility diskettes for both DOS and OS/2 Warp. Make these utility diskettes at the earliest opportunity.

2.20 Creating Utility Diskettes

To create the utility diskette for DOS:

1. Start the Diskette Factory in either OS/2 Warp or Windows.
2. Select **IBM PC DOS 7.0** and follow the instructions on the screen.

To create utility diskettes for OS/2 Warp:

1. On the Desktop, double-click on **OS/2 System**.
2. Double-click on **System Setup**.
3. Double-click on **Create Utility Diskettes**, and follow the instructions on the screen.
4. Label the diskettes:
   - OS/2 Warp Utility Diskette 1
   - OS/2 Warp Utility Diskette 2
   - OS/2 Warp Utility Diskette 3

Subtopics

2.20.1 OS/2 Warp Recovery Choices Program

The Recovery Choices Program built into OS/2 Warp provides a means to recover from some problems that prevent OS/2 Warp from loading successfully, such as:

- A video mode not supported by your hardware
- An incorrect statement in the OS/2 Warp CONFIG.SYS file
- A damaged .INI file
- A hard disk error

If you get an unreadable screen or a message that OS/2 Warp cannot start correctly, you can try to resolve the problem using the Recovery Choices Program.

To start the Recovery Choices Program:

1. Power-on the computer. If the computer is already on, restart it using the **Ctrl+Alt+Del** key sequence.
2. When a small white box appears in the upper left-hand corner of the screen, press **Alt+F1**.
3. When the Recovery Choices screen appears, select from the following:
   - **Esc**: Quits the Recovery Choices program and continues the OS/2 Warp boot (startup) sequence.
   - **C**: Gives you access to an OS/2 command prompt.
   - **V**: Resets the video mode to a base VGA mode and restarts the computer. After the computer restarts, you can select another video mode, if necessary.
   - **X**: Restores OS/2 Warp to its original state (as it was originally installed).
   - **1, 2, or 3**: Starts OS/2 Warp using a set of configuration files used during one of the last three times OS/2 Warp was started. The date when these files were archived appears next to each selection. These selections do not appear on the Recovery Choices screen unless you previously opened the Desktop Settings notebook and selected **Create archive at each system restart** from the Archive page.

   For more information about the Recovery Choices program, refer to the *Master Help Index* located in the Information folder on the OS/2 Desktop.

2.20.2 Editing the CONFIG.SYS File

A CONFIG.SYS file contains lines of instructions that control how the computer starts up and how the computer works with the devices attached to it. The active CONFIG.SYS file for DOS and OS/2 Warp is stored in the root directory. OS/2 Warp maintains other CONFIG.SYS files in other subdirectories for error recovery and other purposes.

Important: If you need to edit the CONFIG.SYS file to remedy a problem, edit the one in your root directory.

For information about statements that can appear in the CONFIG.SYS file, refer to the *Command Reference* located in the Information folder on the OS/2 Desktop.

2.20.3 Using OS/2 Warp to Edit the CONFIG.SYS File

To edit the CONFIG.SYS file while OS/2 Warp is active:

1. On the Desktop, double-click on **OS/2 System**.
2. Double-click on **Command Prompts**.
3. Double-click on **OS/2 Window** or **OS/2 Full Screen**.
4. Type **COPY CONFIG.SYS CONFIG.OLD** and press **Enter**. This copies the current CONFIG.SYS file as CONFIG.OLD in case you need it for future reference.
5. Type **E C:\CONFIG.SYS** where
   - E is the command to start the System Editor.
   - C is the drive where OS/2 Warp is installed.
   - \ is the symbol for the root directory.

   Then press **Enter.**
6. When you are done working on the file, select **File**, and then select **Save**.
7. Select **Type** in the Save Notification window.
8. Select **Plain text**, and then select **Set**.
9. Press **Alt+F4** to exit from the System Editor.
10. Shut down your computer. (You must restart your computer in order for the changes to take effect.)

2.20.4 Using OS/2 Warp Utility Diskettes to Edit the CONFIG.SYS File

To edit the CONFIG.SYS file using the OS/2 Warp Utility Diskettes:

1. Insert *Utility Diskette 1* in your diskette drive.
2. Power-on the computer. If the computer is already on, restart the computer using the **Ctrl+Alt+Del** key sequence.
3. Follow the instructions on the screen until you get to a command prompt.
4. Insert *Utility Diskette 3*.
5. Type **COPY C:\CONFIG.SYS CONFIG.OLD** and press **Enter**. This copies your current CONFIG.SYS file as CONFIG.OLD in case you need it for future reference.
6. Type **TEDIT C:\CONFIG.SYS** and press **Enter**.
7. Press **Esc** to move the cursor from the command line to the editing area.
8. When you are done working on the file, press **F4** (File) to save the file and exit from the editor.
9. Shut down your computer. (You must restart your computer in order for the changes to take effect.)

2.20.5 Using the DOS Utility Diskette to Edit the CONFIG.SYS File

To edit the CONFIG.SYS file from the DOS Utility Diskette:

1. Insert PC DOS *Disk 1* in your diskette drive.
2. Power-on the computer. If the computer is already on, restart the computer using the **Ctrl+Alt+Del** key sequence.
3. When the following prompt appears:

   Do you want to install PC DOS 7 (Y,N)?

   type **N**. The command prompt appears.
4. Type **COPY C:\CONFIG.SYS CONFIG.OLD** and press **Enter**. This copies your current CONFIG.SYS file as CONFIG.OLD in case you need it for future reference.
5. Type **CD \DOS** and press **Enter**.
6. Type **E C:\CONFIG.SYS** and press **Enter**.
7. When you are done working on the file, press **F4** (File) to save the file and exit from the editor.
8. Shut down your computer. (You must restart your computer in order for the changes to take effect.)

2.20.6 Recovering from OS/2 Warp Problems

The following are some problems that might occur when you try to start your system or switch from one operating system to another.

- **Internal Processing Error Message Appears**

  Symptom: The system stops and the screen displays **INTERNAL PROCESSING ERROR** at the top of the message.

  Action: Record the information exactly as it is displayed on the screen, and write a description of what you were doing when the problem occurred. Contact an IBM HelpWare technician for assistance.

- **Unable to switch from DOS or Windows to OS/2 Warp**

  Symptom (DOS): Unable to switch from DOS to OS/2 using the **C:\OS2\BOOT /OS2** command.

  Symptom (Windows): Unable to switch from DOS with Windows to OS/2 using the Go to Warp icon.

  Action: You might have one or more active terminate-and-stay-resident (TSR) or DOS cache programs that take up the available computer memory. End the TSR programs before attempting to switch to OS/2 Warp.

  If you suspect the problem is caused by TSR programs that are loaded from the AUTOEXEC.BAT file, deactivate the programs before attempting to switch to OS/2 Warp. Refer to the instructions that come with your TSR program. If this solves the problem, you might need to deactivate the TSR programs each time you want to switch to OS/2 Warp.

- **System Stops Working**

  Symptom: The system stops and the keyboard and mouse do not respond.

  Action: Press **Ctrl+Esc** or **Alt+Esc** and wait a few seconds to see if the system responds. If this does not resolve the problem, do the following:

  1. Determine if you can move the mouse pointer, but cannot select any object when you press mouse button 1.
  2. Press the Caps Lock and Num Lock keys to see if their status lights come on.
  3. Record a description of what you were doing when the system stopped. If any messages appeared on the screen, record the message text and number.
  4. Call a HelpWare technician for assistance.

- **Stacked Icons**

  Symptom: Some of the icons on your Desktop appear to be stacked on each other.

  Action: Refresh your desktop by doing the following:

  1. Position the pointer on a blank area of the Desktop.
  2. Press mouse button 2. A pop-up menu appears.
  3. Select **Refresh**.
  4. If your screen goes blank, press **Alt+Esc** to switch between programs and force "repainting" of your screen.

- **Folders open and close immediately**

  Symptom: When you attempt to open a folder, it will not stay open.

  Action: Use the OS/2 Warp Recovery Choices Program to recover a set of archived system files. See "OS/2 Warp Recovery Choices Program" in topic 2.20.1 for instructions.

2.20.7 Recovering from Errors on the Hard Disk

You can use the CHKDSK command with the /F parameter to check the hard disk for errors and, if any errors are found, correct them.

2.20.8 Correcting Disk Errors from DOS

To run the CHECKDSK program from DOS:

1. Close all active programs, including Windows.
2. At the DOS command prompt type **CHKDSK /F** and press **Enter**.

The program will check the hard disk and correct any errors found.

2.20.9 Correcting Disk Errors from the DOS Diskette

If you cannot get to a DOS command prompt from your hard disk, use the following procedure.

1. Insert PC DOS *Disk 1* in your diskette drive.
2. Power-on the computer. If the computer is already on, restart the computer using the **Ctrl+Alt+Del** key sequence.
3. When the following prompt appears:

   Do you want to install PC DOS 7 (Y,N)?

   type **N**. The command prompt appears.
4. Type **COPY C:\CONFIG.SYS CONFIG.OLD** and press **Enter**. This copies your current CONFIG.SYS file as CONFIG.OLD in case you need it for future reference.
5. At the DOS command prompt type **CHKDSK /F** and press **Enter**.

2.20.10 Correcting Disk Errors from OS/2 Warp

When you use the CHKDSK /F command, you cannot have any other activity on that disk. Therefore, if you need to use the CHKDSK /F command on the disk where OS/2 is installed, you must shut down OS/2 and use the OS/2 Warp Utility Diskettes.

To correct disk errors on the disk where OS/2 Warp is installed:

1. Shut down OS/2.
2. Insert *Utility Diskette 1* in your diskette drive.
3. Power-on your computer. If the computer is already on, restart it using the **Ctrl+Alt+Del** key sequence.
4. Follow the instructions on the screen until you get to a command prompt.
5. Insert *Utility Diskette 3*.
6. Type **CHKDSK C:/F:2**; then press **Enter**. (C is the drive on which OS/2 is installed.)
7. Follow any instructions that appear on the screen.
8. Remove the diskette from drive A.
9. Restart your computer using the **Ctrl+Alt+Del** key sequence.

To correct disk errors on another drive:

1. On the Desktop, double-click on **OS/2 System**.
2. Double-click on **Command Prompts**.
3. Double-click on **OS/2 Window** or **OS/2 Full Screen**.
4. Type **CHKDSK D: /F:2** and press **Enter**. (If you are checking a drive other than D, substitute that drive letter for the D used in this example.)
5. Follow any instructions that appear on the screen.

2.20.11 Recovering from a Forgotten OS/2 Password

If you forget your OS/2 lockup password, use the following procedure.

1. Power-on the computer.
2. When a small white box appears in the upper left-hand corner of the screen, press **Alt+F1**.
3. When the Recovery Choices screen appears, press **C**.
4. Type **CD \OS/2** and press **Enter**.
5. Type the following:

```
MAKEINI OS2.INI LOCK.RC
```

6. Press **Enter**.
7. Restart the computer.

2.20.12 Backing Up and Restoring Files

The backup routines provided with OS/2 and DOS allow you to back up a single file, a directory, or the entire contents of a disk. Backing up files that contain your day-to-day work will help to protect you from losing data that cannot be recovered from another source. Backing up the entire contents of each disk takes longer, but ensures that you can reinstall your operating system, programs, and data files *exactly* as they were before a major problem occurred.

Procedures for backing up and restoring files using DOS are in the DOS/Windows users guide. Procedures for backing up and restoring files using OS/2 Warp are in the online *OS/2 Command Reference*.

If a problem occurs, you might not be able to view the online *OS/2 Command Reference*, or you might not be able to get to a command prompt. Therefore, the following short procedures have been included to help you to back up and restore the entire contents of your hard disk using the OS/2 Warp Utility Diskettes.

2.20.13 Backing Up Your Hard Disk

To back up the entire contents of your hard disk:

1. Insert *Utility Diskette 1* in your diskette drive.
2. Power-on the computer. If the computer is already on, restart the computer using the **Ctrl+Alt+Del** key sequence.
3. Follow the instructions on the screen until you get to a command prompt.
4. Insert *Utility Diskette 3*.
5. To backup the entire contents of drive C, type

   ```
   BACKUP C:\*.* A: /S
   ```

   and press **Enter**. (To back up another drive, substitute that drive letter for the C in this example.)
6. Follow the instructions on the screen. Be sure to label the diskettes in the correct sequence.

2.20.14 Restoring the Hard Disk

The hard disk must have a formatted partition before you can use the following procedure. If your hard disk does not already have a formatted partition, you can create one using the FDISK and FORMAT programs on *Utility Diskette 3*.

To restore the entire contents of your hard disk:

1. Insert *Utility Diskette 1* in your diskette drive.
2. Power-on the computer. If the computer is already on, restart the computer using the **Ctrl+Alt+Del** key sequence.
3. Follow the instructions on the screen until you get to a command prompt.
4. Insert *Utility Diskette 3*.
5. To restore the entire contents of drive C, type

   ```
   RESTORE A: C:\*.* /S
   ```

   and press **Enter**. (To restore the data to another drive, substitute that drive letter for the C in this example.)
6. Follow the instructions on the screen.

2.21 IBM Wireless LAN

This section provides information on the IBM Wireless LAN. For additional help, detailed messages, and recommended actions, refer to the *Installing and Operating Your Network* manual, supplied with the IBM Wireless LAN product.

Subtopics

2.21.1 ISA Bus Switch Settings

To install the adapter in a computer with an ISA bus, set the dip switches as shown below:

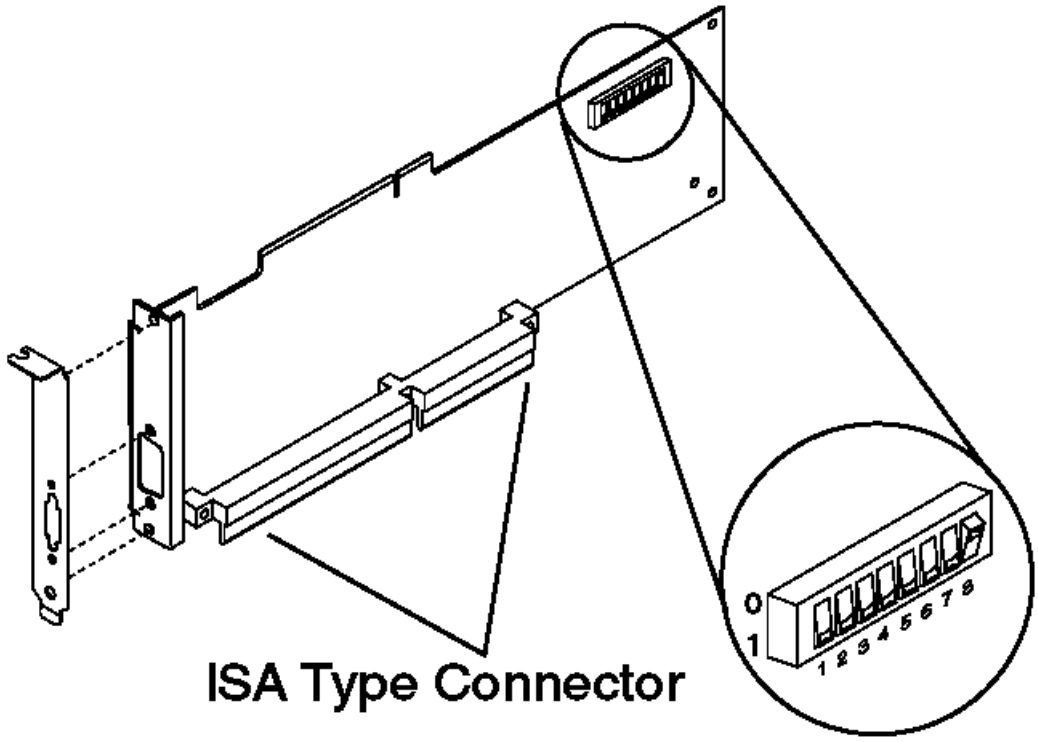


Figure 1. Preparing the Adapter Card for an ISA Based Computer

The switch positions shown in Figure 1 represent the value 00000001, that is, switch 8 has been set to value 1 (one), the others are set to value 0 (zero).

Important

- **For setting the switch positions 0 or 1, use the values shown on the adapter card. DO NOT use the values printed or inscribed on the switch itself.**
- The settings shown in Figure 1 apply to most computer configurations.

2.21.2 ISA Mode Operations Parameters

The following provides the possible values for ISA mode operation parameters that you can select according to your system configuration:

- **Input/Output (I/O) Base Address** (this is used by the computer to identify and communicate with each individual adapter).

Table 1. I/O Base Address, ISA Mode

Switch Positions 1 2 3	I/O Base Address
0 0 0	86A0
1 0 0	96A0
0 1 0	A6A0
1 1 0	B6A0
0 0 1	C6A0
1 0 1	D6A0
0 1 1	E6A0
1 1 1	F6A0

- **Remote Program Loading (RPL) capability** (this allows you to enable or disable the RPL memory).

Table 2. RPL Memory Enable, ISA Mode

Switch Position 4	RPL Memory
0	Disabled (***not*** using the RPL feature)
1	Enabled

- **Interrupt Level, also called Interrupt Request Level IRQ** (this establishes the priority by which the adapter can interrupt the computer, the lowest value is given the highest priority).

Table 3. Interrupt Level (IRQ), ISA Mode

Switch Positions 5 6	Interrupt Level
0 0	9
1 0	10
0 1	11
1 1	15

Important

The IBM Wireless LAN adapter does not support interrupt level sharing. Therefore, make sure that no other adapter in your computer uses the same interrupt level. If necessary, change the interrupt level of the IBM Wireless LAN adapter.

If you want to use interrupt level 9 for the IBM Wireless LAN adapter, make sure that no other adapter in your computer uses interrupt level 2.

- **Direct Memory Access (DMA) arbitration level** (this establishes the priority by which the adapter can access the computer memory, the lowest value is given the highest priority. **The recommended value is 3**).

Table 4. DMA Arbitration Level, ISA Mode

Switch Positions 7 8	ISA DMA Level

0 0	0
1 0	1
0 1	3
1 1	Invalid

Important

- Some values are recommended for specific machine types. For further information, refer to the README.OS2 file, on the IBM Wireless LAN 'OS/2 Base-Workstation diskette' (volume 2).
- Make sure that no other adapter in your computer uses the same DMA level.

2.21.3 Micro Channel Adapter Installation

The IBM Wireless LAN 'OS/2 Base-Workstation diskette' (volume2), is the option diskette and contains the adapter description file (**ADF**).

2.21.4 PCMCIA Portable Computer Support

To operate a Wireless adapter and NDIS Device Driver in a computer using PCMCIA, **you must have installed and configured the set of Card and Socket Services support supplied with your computer**, by following the instructions in the computer documentation. The chosen set of Card and Socket Services must match the machine model and operating system used.

This section also applies to computers with a PCMCIA slot connected to a PCI bus.

2.21.5 Initialization Failure

If the set of Card and Socket Services support supplied with your computer is installed and configured and you have an initialization failure, you might have one of the following problems.

Subtopics

2.21.5.1 Problem 1 - Memory Allocation Conflict between EMM386 (DOS or Windows) and Resource Manager

- **NDIS Workstations:** You must reserve 16K of memory to be used as attribute memory for PC cards. This is the **/MA** parameter for Resource Manager, from the Card and Socket Services you are using, and the **X=nnnn** parameter for EMM386 in the CONFIG.SYS file.

  For example:

  ```
  DEVICE=C:\DOS\EMM386.EXE RAM X=C000-C3FF
  ```

- **ODI Workstations:**

  - If you are using Enabler, you must:

    1. Edit the NET.CFG file and add: **/R:C000** to the following statement:
       Enabler c:\xxxx\IBMWLENA.EXE
       where **C000** is a memory zone between C000 to EF00 in multiples of 100 and **xxxx** is the directory where the IBM Wireless LAN has been installed, for example, WIRELESS.

    2. Exclude memory area C000 to C1FF in the parameter for EMM386 in the CONFIG.SYS file.

       ```
       DEVICE=C:\DOS\EMM386.EXE RAM X=C000-C1FF
       ```

  - If you are using both Enabler and Card and Socket Services and your PCMCIA machine does not have an INTEL 82365SL or compatible port controller, you must exclude only the memory area used by the Enabler.

2.21.5.2 Problem 2 - Incorrect or Missing Parameters for Multiple Adapter Slots

For a PCMCIA machine with multiple adapter slots, update the corresponding switch parameter according to the documentation supplied with your socket services support.

2.21.5.3 Problem 3 - Incompatibility with Card and Socket Services

Compatibility problems may exist with non-IBM PCMCIA Card & Socket Services. In such cases you are recommended to use "universal" Card and Socket Services such as "PlayAtWill" (Ref: 5764-085) when available.

Important

When using PlayAtWill, make sure that no statements from a former Card and Socket Services installation are left in your CONFIG.SYS.

2.21.5.4 Problem 4 - IO Base Address or Interrupt Level Conflicts

Sometimes the Resource Manager (part of Card and Socket Services support) returns an IRQ (INT parameter) or an IO Base Address (PORT parameter) as valid, even if already used by the system.

To resolve the conflicts, you must:

1. Find available values by using a configuration analysis program such as: CardView, CardInfo, MSD, and EZPlay.

2. Change the value(s):

   - Of your computer feature by using its utilities.

   - Of the IBM Wireless LAN adapter by updating these parameters in the PROTOCOL.INI file for NDIS workstations or, in the NET.CFG file for ODI workstations.

2.21.5.5 Problem 5 - Detection Problem for ODI Workstations

Important

This section only applies to **DOS and Windows ODI wireless workstations** with a PCMCIA Type II slot.

If the PCMCIA Credit Card is not detected when you start your computer:

1. Be sure there is no potential conflict (memory allocation, IRQ, PORT ...)

2. Your PCMCIA machine does not have an INTEL 82365SL or compatible port controller. You must add Card and Socket Services support to your machine.

2.21.6 Radio Interference Problem

If there is radio interference caused by other equipment, follow these steps:

- Determine what equipment is creating the interference. For example, a microwave oven or any product working in the 2.4 to 2.5 GHz frequency band.
- Move the base radio module.
- Move the equipment (if possible) that is causing the interference.
- Move the base itself.
- When you have identified the frequency on which there is interference, go to the NAP and forbid that frequency.

See *Installing and Operating Your Network* manual for a table of radio allocations by country.

2.21.7 Running Adapter Diagnostics from the Utilities Diskette

To run the adapter diagnostics, do the following:

1. Insert the IBM Wireless LAN 'Utilities diskette' in drive A, and restart the workstation by pressing **Ctrl+Alt+Del**.

   Important

   Wireless Utilities for MCA Bus with Ethernet Adapter: Computers with an MCA bus and an Ethernet adapter may lock up if the Wireless 'Utilities diskette' is booted when the Ethernet cable is not present or unplugged. A specific message identifies the problem (Code 06421 referring to Ethernet cable unplugged). Once the cable is plugged back in, the 'Utilities diskette' works properly.

2. If the workstation has a PCMCIA Type II slot and you have problems when booting the 'Utilities diskette', you would need to modify your 'Utilities diskette' CONFIG.SYS file to call DOS Card and Socket Services support. This may be the case if your PCMCIA machine does not have an INTEL 82365SL or compatible port controller.

   The following are samples from the CONFIG.SYS file:

   ```
   DEVICE=C:\IBMDSS02.SYS
   DEVICE=C:\IBMDOSCS.SYS
   DEVICE=C:\DICRMU02.SYS
   DEVICE=C:\$ICPMDOS.SYS
   ```

3. Select **Diagnostics Utilities** from the main menu, wait for the diagnostics to complete and follow the recommended action.

2.21.8 Troubleshooting Wireless Network Problems

If you are experiencing wireless network problems and tests of the adapter and radio are OK (through diagnostics from the 'Utilities diskette'), you might have a **wireless software problem** (such as product installation, configuration) or a **networking problem**. The *Installing and Operating Your Network* manual supplied with the product contains a troubleshooting appendix with the following specific sections:

- Base or NAP station initialization failure,
- Base status is 'Not Ready' at the NAP,
- The NAP application is not available,
- OS/2 bridge does not operate,
- Data exchange problems through OS/2 bridged base,
- Workstation registration problems (all red RSSI),
- Communication problems when using 3270 emulation,
- Workstation performance problems,
- Network management does not operate (NetView 6000, NMS,WNM).

2.21.9 Problem Resolution Worksheet

Before calling your service representative:

1. Make a copy of the problem resolution worksheet contained in the *Installing and Operating Your Network* manual or in the README.OS2 file available on the IBM Wireless LAN 'OS/2 Base - Workstation diskette' (volume2).
2. Collect and fill in the information listed in it (see "Obtaining the Necessary Data" in topic 2.21.9.1).
3. Make a backup copy of the important files, depending on your station type (see "Making a Backup Copy of Files" in topic 2.21.9.2).

Subtopics
2.21.9.1 Obtaining the Necessary Data
2.21.9.2 Making a Backup Copy of Files

2.21.9.1 Obtaining the Necessary Data

- Find the level of the operating system, and the date and size of certain system files:

  - **OS/2 base**:

    - Type **SYSLEVEL** at the OS/2 Prompt and record the IBM Wireless LAN application level.

    - Get the size and dates for files by typing:
      DIR IBMWLB.OS2 /S.

  - **NetWare Base**:

    Type **MODULE** at the server prompt on the system console and get size and dates for the following modules:

    - IBMWLCOM.NLM

    - IBMWLNAP.NLM

    - IBMWLWNC.NLM

    - IBMWLWCA.NLM

    - IBMWLERL.NLM or IBMWLPRX.NLM

    - IBMWL.LAN

  - **OS/2 Workstation**:

    - Type **SYSLEVEL** at the OS/2 Prompt and record the IBM Wireless LAN application level.

    - For an NDIS workstation, get size and dates for files by typing **DIR IBMWLO.OS2 /S**.

    - For an ODI workstation, get size and dates for files by typing **DIR IBMWL*.SYS /S**.

  - **DOS/Windows Remote station**

    - For an NDIS workstation:

      - Type **IBMWLLV2** at the DOS Prompt and record the IBM Wireless LAN application level.

      - Get the size and dates for files by typing **DIR IBMWL.DOS /S**.

    - For an ODI workstation:

      - Type **IBMWLLV1** at the DOS Prompt and record the IBM Wireless LAN application level.

      - Get the size and dates for files by typing **DIR IBMWL*.COM /S**.

- Obtain vital product data (**VPD**) for adapter and radio. To do so, follow these steps:

  - Insert the IBM Wireless LAN Utilities diskette in drive A.

  - Restart your workstation.

  - Select **Diagnostic Utilities** from the main menu.

  - When the first set of instruction panels is displayed note the following information:

    - Hardware Change Level
    - Product change level
    - Radio Type and Model
    - Radio Country Type.

2.21.9.2 Making a Backup Copy of Files

- For a NetWare base (directory: SYS:\SYSTEM\):

  - IBMWL*.LOG
  - IBMWL*.BAK
  - IBMWL.NCF
  - AUTOEXEC.NCF

- For an OS/2 base:

  - IBMWL*.LOG
  - IBMWL*.BAK
  - IBMWL.NCF
  - AUTOEXEC.NCF
  - LANTRAN.LOG
  - CONFIG.SYS
  - PROTOCOL.INI

- For an ODI wireless workstation:

  - CONFIG.SYS
  - NET.CFG
  - AUTOEXEC.BAT, if this workstation is running under DOS or Windows.

- For an NDIS wireless workstation:

  - CONFIG.SYS
  - PROTOCOL.INI
  - LANTRAN.LOG, if this workstation is running under OS/2.
  - WIRELESS.LOG and AUTOEXEC.BAT, if this workstation is running under DOS or Windows.

2.21.10 Upgrading Adapter Microcode from the Utilities Diskette

Warning: When you update the adapter functional code on a wireless workstation, data traffic on the wireless workstation is stopped.

To update the adapter functional code, do the following:

1. Stop all operations on your computer (by using the Shutdown function if you are in OS/2), then insert the IBM Wireless LAN 'Utilities diskette' in drive A.

2. Restart the workstation by pressing **Ctrl+Alt+Del**. If you have a PCMCIA slot and you experience problems when you start your system, refer to the step 2 in topic 2.21.7.

3. Select **Wireless LAN Adapter Utilities** from the main menu and press **Enter**.

4. Select **Functional Code Update** from the Utility menu, press **Enter** and follow the instructions on the screen.

   Note: Code update files (IBMWLMC1.UPD for ISA/MCA and IBMWLMC2.UPD for PCMCIA) are available from the current IBM Wireless 'Utilities diskette' or from a Corrective Service Diskette.

2.22 System Board Memory

The following matrix cross-references the name of the computer (printed on the logo) and the size, speed, and type of memory modules supported in the computer.

Attention

All PC 300/700 Series computers support gold-plated SIMMs, **except** Types 6560, 6576/6586, 6577/6587, and 6598 that support only tin-lead SIMMS.

Computer Name	Memory Module		
	Size	**Speed**	**Type**
PC 330/350 80486 Models Type 6571, 6573 6581, 6583	4 MB 8 MB 128 MB Maximum	70 ns	Parity or Non-Parity Gold-plate 72-pin Industry Standard
PC 330/350 Pentium 60 MHz Model Type 6575, 6585	16 MB 32 MB 128 MB Maximum	70 ns	Parity or Non-Parity Gold-plate 72-pin Industry Standard (Matched pairs)
PC 340 Pentium Models 100/133 MHz Type 6560	4 MB 8 MB 16 MB 32 MB 128 MB Maximum	60 ns	Non-Parity Tin-lead 72-pin EDO Industry Standard (Matched pairs)
PC 330/350 Pentium Models 75/90/100/120 133/150/166 MHz Type 6576, 6586	16 MB 32 MB 128 MB Maximum	70 ns	Parity or Non-Parity Tin-lead 72-pin Industry Standard (Matched pairs)
PC 330/350 Pentium Models 100/133/166/ 200 MHz Type 6577, 6587	4 MB 8 MB 16 MB 32 MB 192 MB Maximum	70 ns	Parity or Non-Parity Tin-lead 72-pin Industry Standard (Matched pairs)
PC 360-S150 Pentium Models 150/200 MHz Type 6598	8 MB 16 MB 32 MB ECC 128 MB Maximum	60 ns Fast Page	Non-Parity Tin-lead 72-pin Industry Standard (Matched pairs)
PC 365 Pentium Models 180/200 MHz Type 6589	16 MB 32 MB 512 MB Maximum	60 ns EDO or ECC	Non-Parity or Parity Industry Standard
PC 730/750 Pentium Models	4 MB 8 MB	70 ns	Parity

75/90/100 120/133 MHz Type 6875, 6876, 6885, 6886	16 MB 32 MB 192 MB Maximum		Gold-plate 72-pin Industry Standard (Matched pairs)
PC 730/750 Pentium Models 100/133 150/166 MHz Type 6877, 6887	4 MB 8 MB 16 MB 32 MB 128 MB Maximum	60 ns	Parity Gold-plate 72-pin Industry Standard (Matched pairs)

Subtopics
2.22.1 Supported Memory Configurations

2.22.1 Supported Memory Configurations

Refer to the following tables for the acceptable memory-module kit combinations.

Subtopics

2.22.1.1 PC 330/350 Series (Type 6571, 6573, 6581, 6583) - 80486

These are the recommended combinations of memory-module kits.

Memory	MEM1	MEM2	MEM3	MEM4
4 MB	4 MB	-	-	-
8 MB	4 MB	4 MB	-	-
8 MB	8 MB	-	-	-
12 MB	4 MB	4 MB	4 MB	-
12 MB	4 MB	8 MB	-	-
16 MB	16 MB	-	-	-
16 MB	4 MB	4 MB	8 MB	-
16 MB	8 MB	8 MB	-	-
16 MB	4 MB	4 MB	4 MB	4 MB
20 MB	4 MB	8 MB	8 MB	-
20 MB	4 MB	16 MB	-	-
24 MB	8 MB	8 MB	8 MB	-
24 MB	4 MB	4 MB	8 MB	8 MB
24 MB	4 MB	4 MB	16 MB	-
28 MB	4 MB	8 MB	8 MB	8 MB
28 MB	4 MB	4 MB	16 MB	4 MB
32 MB	16 MB	16 MB	-	-
32 MB	32 MB	-	-	-
32 MB	8 MB	8 MB	16 MB	-
32 MB	8 MB	8 MB	8 MB	8 MB
36 MB	4 MB	16 MB	16 MB	-
40 MB	4 MB	4 MB	32 MB	-
40 MB	4 MB	4 MB	16 MB	16 MB
48 MB	16 MB	16 MB	16 MB	-
48 MB	8 MB	8 MB	32 MB	-
48 MB	8 MB	8 MB	16 MB	16 MB
52 MB	4 MB	16 MB	16 MB	16 MB
64 MB	32 MB	32 MB	-	-
64 MB	16 MB	16 MB	32 MB	-
64 MB	16 MB	16 MB	16 MB	16 MB
68 MB	4 MB	32 MB	16 MB	16 MB
72 MB	4 MB	4 MB	32 MB	32 MB
80 MB	8 MB	8 MB	32 MB	32 MB
84 MB	4 MB	32 MB	32 MB	16 MB
96 MB	32 MB	32 MB	32 MB	-
96 MB	16 MB	16 MB	32 MB	32 MB
100 MB	4 MB	32 MB	32 MB	32 MB
128 MB	32 MB	32 MB	32 MB	32 MB

+----------+

2.22.1.2 PC 330/350 Series (Type 6575, 6585) - Pentium 60 MHz

These are the recommended combinations of memory-module kits. Each bank must contain a matched pair of SIMMs having the same size and speed.

Total Memory	**Bank 1 MEM 1/2**	**Bank 2 MEM 3/4**
8 MB	4 MB	-
16 MB	4 MB	4 MB
16 MB	8 MB	-
24 MB	8 MB	4 MB
32 MB	8 MB	8 MB
32 MB	16 MB	-
40 MB	16 MB	4 MB
48 MB	16 MB	8 MB
64 MB	16 MB	16 MB
64 MB	32 MB	-
72 MB	32 MB	4 MB
80 MB	32 MB	8 MB
96 MB	32 MB	16 MB
128 MB	32 MB	32 MB

2.22.1.3 PC 340 Series (Type 6560) - Pentium 100/133/166 MHz

You can install a maximum of four single inline memory modules (SIMMs) in the computer. The system supports a minimum of 8 MB and a maximum of 128 MB of memory. Use only tin lead, 72-pin, 60 ns, Industry Standard EDO, non-parity SIMMs.

Memory modules are installed in two memory banks, Bank 0 and Bank 1 (see "PC 340 Series (Type 6560) - Pentium 100/133/166 MHz System Board" in topic 2.28.13). Each bank supports 4, 8, 16, or 32 MB single- or double-density SIMMs. Each bank used must contain a pair of SIMMs of the same size and density. For best performance, fill Bank 0 first.

The following table shows some possible SIMM combinations and the total memory size for each combination:

Bank 0		Bank 1		Total
SIMM 1	**SIMM 2**	**SIMM 3**	**SIMM 4**	
4 MB (single)	4 MB (single)	-	-	8 MB
4 MB (single)	4 MB (single)	4 MB (single)	4 MB (single)	16 MB
8 MB (double)	8 MB (double)	-	-	16 MB
8 MB (double)	8 MB (double)	8 MB (double)	8 MB (double)	32 MB
8 MB (double)	8 MB (double)	16 MB (single)	16 MB (single)	48 MB
16 MB (single)	16 MB (single)	-	-	32 MB
16 MB (single)	16 MB (single)	16 MB (single)	16 MB (single)	64 MB
32 MB (double)	32 MB (double)	-	-	64 MB
32 MB (double)	32 MB (double)	4 MB (single)	4 MB (single)	72 MB
32 MB (double)	32 MB (double)	8 MB (double)	8 MB (double)	80 MB
32 MB (double)	32 MB (double)	16 MB (single)	16 MB (single)	96 MB
32 MB (double)	32 MB (double)	32 MB (double)	32 MB (double)	128 MB

2.22.1.4 PC 330/350 Series (Type 6576, 6586) - Pentium 75/90/100/120/133/150/166 MHz

These are the recommended combinations of memory-module kits. Each bank must contain a matched pair of SIMMs having the same size and speed.

Total Memory	**Bank 0**	**Bank 1**
8 MB	4 MB	-
16 MB	4 MB	4 MB
16 MB	8 MB	-
24 MB	4 MB	8 MB
24 MB	8 MB	4 MB
32 MB	8 MB	8 MB
32 MB	16 MB	-
40 MB	4 MB	16 MB
40 MB	16 MB	4 MB
72 MB	4 MB	32 MB
72 MB	32 MB	4 MB
80 MB	8 MB	32 MB
80 MB	32 MB	8 MB
128 MB	32 MB	32 MB

2.22.1.5 PC 330/350 Series (Type 6577, 6587) - Pentium 100/133/166/200 MHz

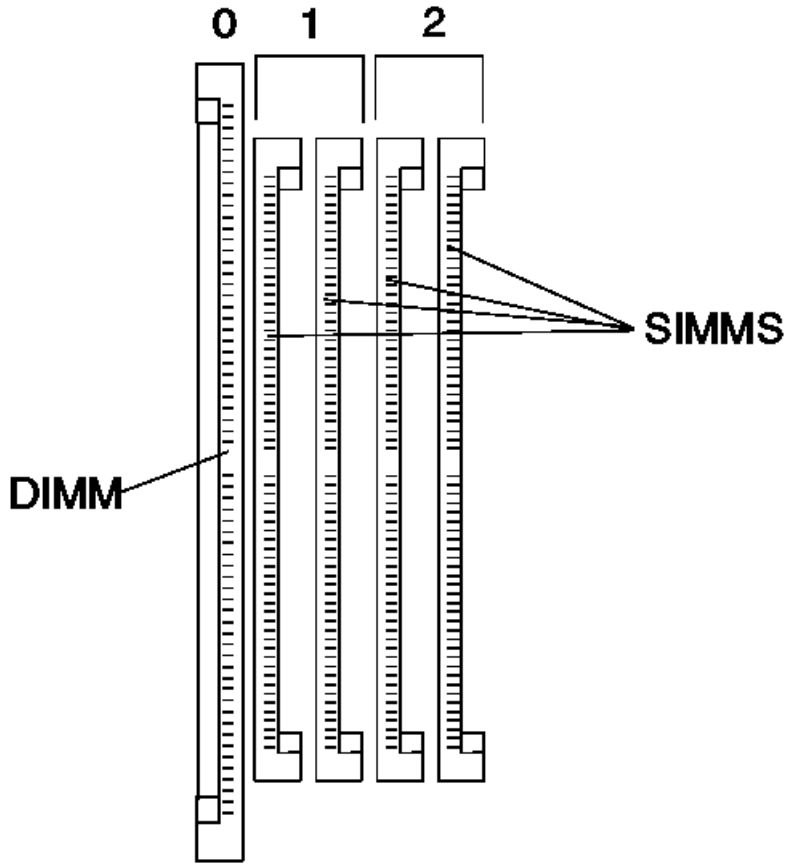
These are the recommended combinations of memory-module kits. Each bank must contain a matched pair of SIMMs having the same size and speed. The maximum (SIMMs/DIMMs) memory supported is 192 MB.

DIMM (0) and SIMMs (1 and 2) in the following figure correspond to the memory banks (0, 1, and 2).

Bank 0 holds DIMM memory modules. Bank 1 and Bank 2 hold matched-pair SIMM memory modules. The banks are filled according to the following memory tables. When installing SIMM memory, a matched-pair is first installed into Bank 1, and then into Bank 2.

Notes:

1. Industry standard 72-pin tin-lead SIMMs and 168-pin gold-lead DIMMs are supported.
2. Install only parity SIMMs/DIMMs to enable parity.
3. A mix of parity and non-parity SIMMs/DIMMs will configure as non-parity.
4. A mix of EDO and FP SIMMs/DIMMs will work, provided that matched pairs are installed in each bank.
5. The Configuration/Setup Utility must be used to install 70 ns memory modules.



Important

Only memory modules with a maximum height of no more than 3.05 cm (1.2 inches) can be installed on the Type 6577, 6587 system board.

The following table shows the 8 MB and 16 MB standard memory-module configurations.

Type	Speed	EDO	Parity	Size	Memory
SIMMs	60 ns	EDO	N	4, 4 MB	8 MB
DIMM	60 ns	EDO	N	16 MB	16 MB

The following table shows the SIMMs and DIMMs that are supported.

Type	Speed	EDO, FP	Parity	Sizes Supported
SIMM	60 ns	EDO	N	4, 8, 16, 32 MB

SIMM	60 ns	FP	Y	4, 8, 16, 32 MB
SIMM	70 ns	FP	N	4, 8, 16, 32 MB
SIMM	70 ns	FP	Y	4, 8 MB
DIMM	60 ns	EDO	N	8, 16, 32 MB
DIMM	60 ns	FP	Y	8, 16, 32 MB

2.22.1.6 PC 360-S150 Series (Type 6598) - Pentium 150/200 MHz

These are the recommended combinations of memory-module kits. Each bank must contain a matched pair of SIMMs having the same size and speed. **Important**: If all four banks are populated, all memory SIMMs must be the same size and speed.

Total Memory	**Bank 1**	**Bank 0**
16 MB	8 MB	-
32 MB	8 MB	8 MB
32 MB	16 MB	-
64 MB	16 MB	16 MB
64 MB	32 MB	-
128 MB	32 MB	32 MB

2.22.1.7 PC 365 Series (Type 6589) - Pentium 180/200 MHz

These are the recommended combinations of DIMMs. However, any combination of DIMM sizes is acceptable. DIMM height must not exceed 1.2 inches. If EDO NP (non-parity) DIMMs and EDO ECC DIMMs are mixed, they will configure as non-parity. Install only EDO ECC DIMMs to enable parity.

Total Memory	**Mem 1**	**Mem 2**	**Mem 3**	**Mem 4**
16 MB	16 MB	-	-	-
32 MB	32 MB	-	-	-
32 MB	16 MB	16 MB	-	-
48 MB	32 MB	16 MB	-	-
48 MB	16 MB	16 MB	16 MB	-
64 MB	64 MB	-	-	-
64 MB	32 MB	32 MB	-	-
64 MB	32 MB	16 MB	16 MB	-
96 MB	32 MB	32 MB	32 MB	-
128 MB	128 MB	-	-	-
128 MB	64 MB	64 MB	-	-
256 MB	128 MB	128 MB	-	-
256 MB	128 MB	64 MB	64 MB	-
512 MB	128 MB	128 MB	128 MB	128 MB

2.22.1.8 PC 730/750 Series (Type 6875, 6876, 6885, 6886) - Pentium 75/90/100/120/133 MHz

These are the recommended combinations of memory-module kits. Each bank must contain a matched pair of SIMMs having the same size and speed.

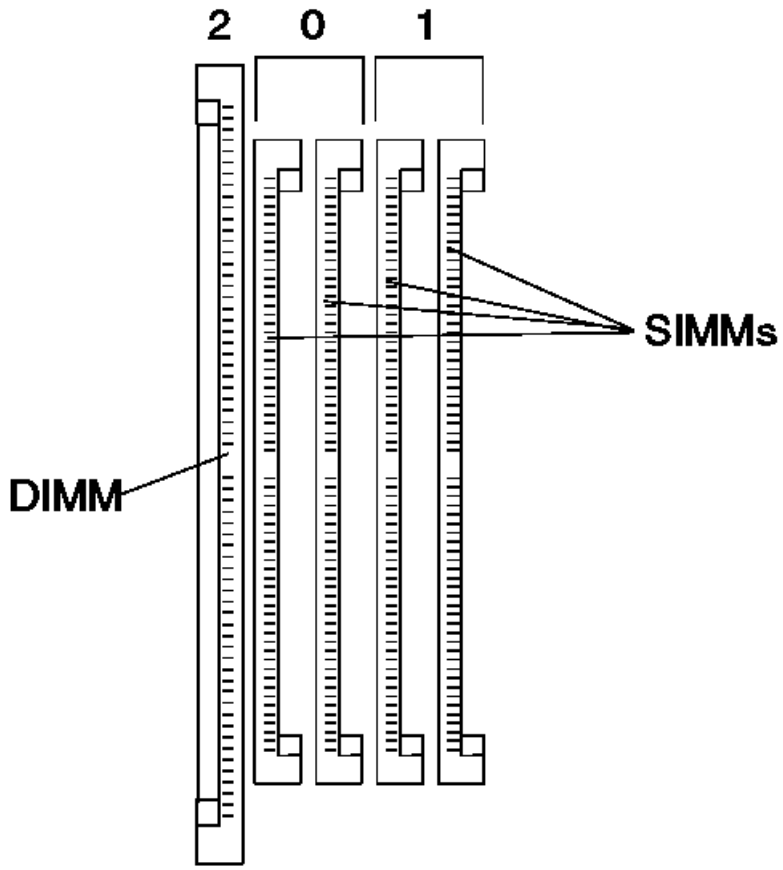
Total Memory	**Bank 1 MEM 1/2**	**Bank 2 MEM 3/4**	**Bank 3 MEM 5/6**
8 MB	4 MB	-	-
16 MB	4 MB	4 MB	-
16 MB	8 MB	-	-
24 MB	4 MB	4 MB	4 MB
24 MB	8 MB	4 MB	-
32 MB	8 MB	8 MB	-
32 MB	16 MB	-	-
40 MB	8 MB	8 MB	4 MB
40 MB	16 MB	4 MB	-
48 MB	8 MB	8 MB	8 MB
48 MB	16 MB	8 MB	-
64 MB	16 MB	16 MB	-
64 MB	32 MB	-	-
72 MB	16 MB	16 MB	4 MB
72 MB	32 MB	4 MB	-
80 MB	16 MB	16 MB	8 MB
80 MB	32 MB	8 MB	-
96 MB	16 MB	16 MB	16 MB
96 MB	32 MB	16 MB	-
128 MB	32 MB	32 MB	-
136 MB	32 MB	32 MB	4 MB
144 MB	32 MB	32 MB	8 MB
160 MB	32 MB	32 MB	16 MB
192 MB	32 MB	32 MB	32 MB

2.22.1.9 PC 730/750 Series (Type 6877, 6887) - Pentium 100/133/150/166 MHz

These are the recommended combinations of memory-module kits. Each bank must contain a matched pair of SIMMs having the same size and speed.

DIMM (2) and SIMMs (0 and 1) in the following figure correspond to the memory banks (0, 1, and 2).

Bank 0 and Bank 1 hold matched-pair SIMM memory modules. Bank 2 holds DIMM memory modules. The banks are filled according to the following memory table. When installing SIMM memory, a matched-pair is first loaded into Bank 0, and then into Bank 1 as required.



Important

Only memory modules with a maximum height of no more than 3.05 cm (1.2 inches) can be installed on the Type 6877, 6887 system board.

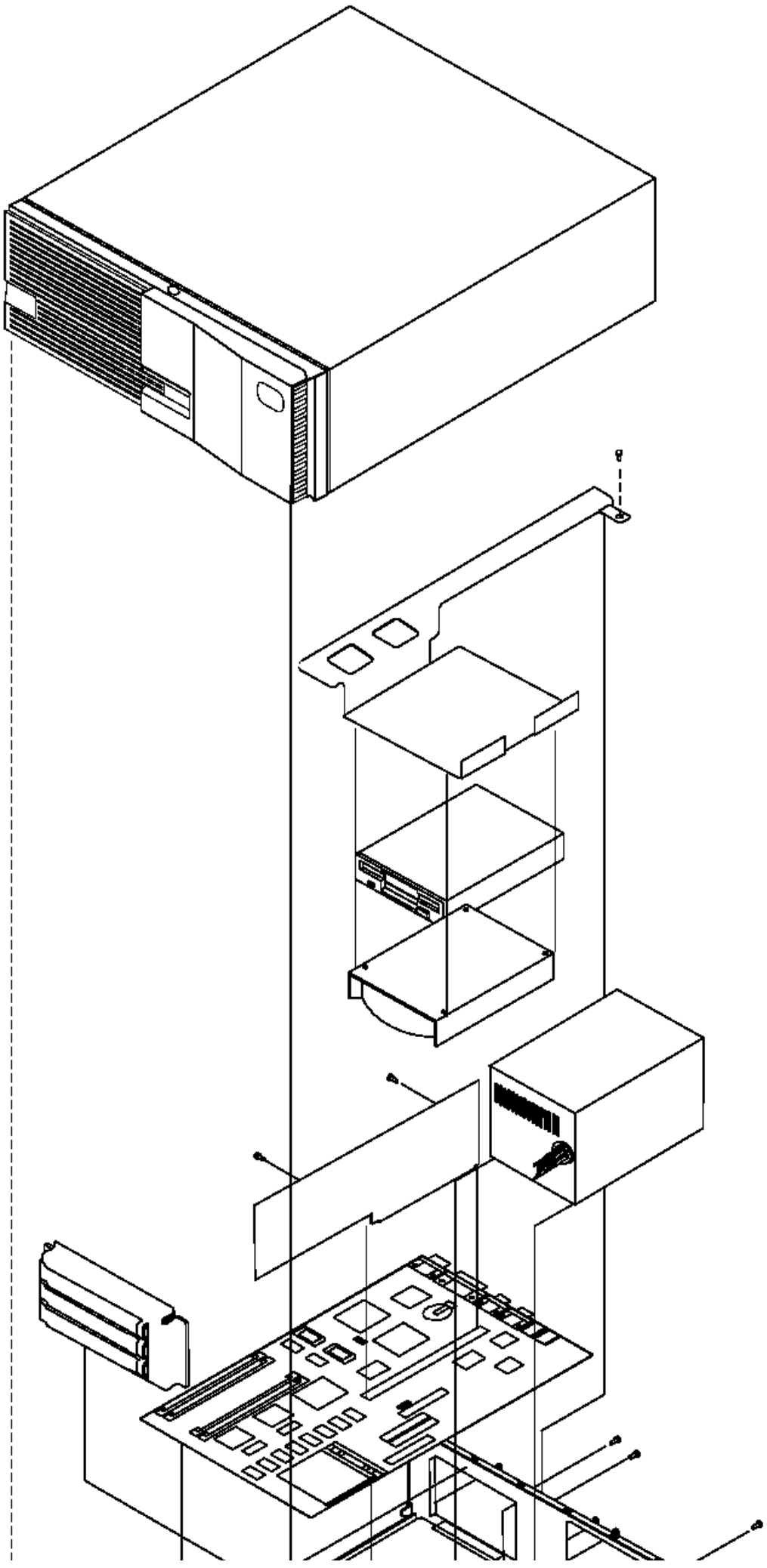
Type	Speed	Memory-Module Size
SIMM	60 ns	4 MB, 8 MB, 16 MB, 32 MB
DIMM	60 ns	8 MB, 16 MB, 32 MB, 64 MB

Total Memory	Bank 0 SIMM 3,4	Bank 1 SIMM 1,2	Bank 2 DIMM
16 MB	0,0	0,0	16
16 MB	4,4	4,4	0
24 MB	0,0	4,4	16
24 MB	4,4	0,0	16
32 MB	0,0	0,0	32
32 MB	8,8	8,8	0
40 MB	4,4	8,8	16

40 MB	0,0	4,4	32
48 MB	4,4	4,4	32
64 MB	8,8	8,8	32
72 MB	4,4	16,16	32
80 MB	8,8	16,16	32
96 MB	16,16	16,16	32
128 MB	16,16	32,32	32

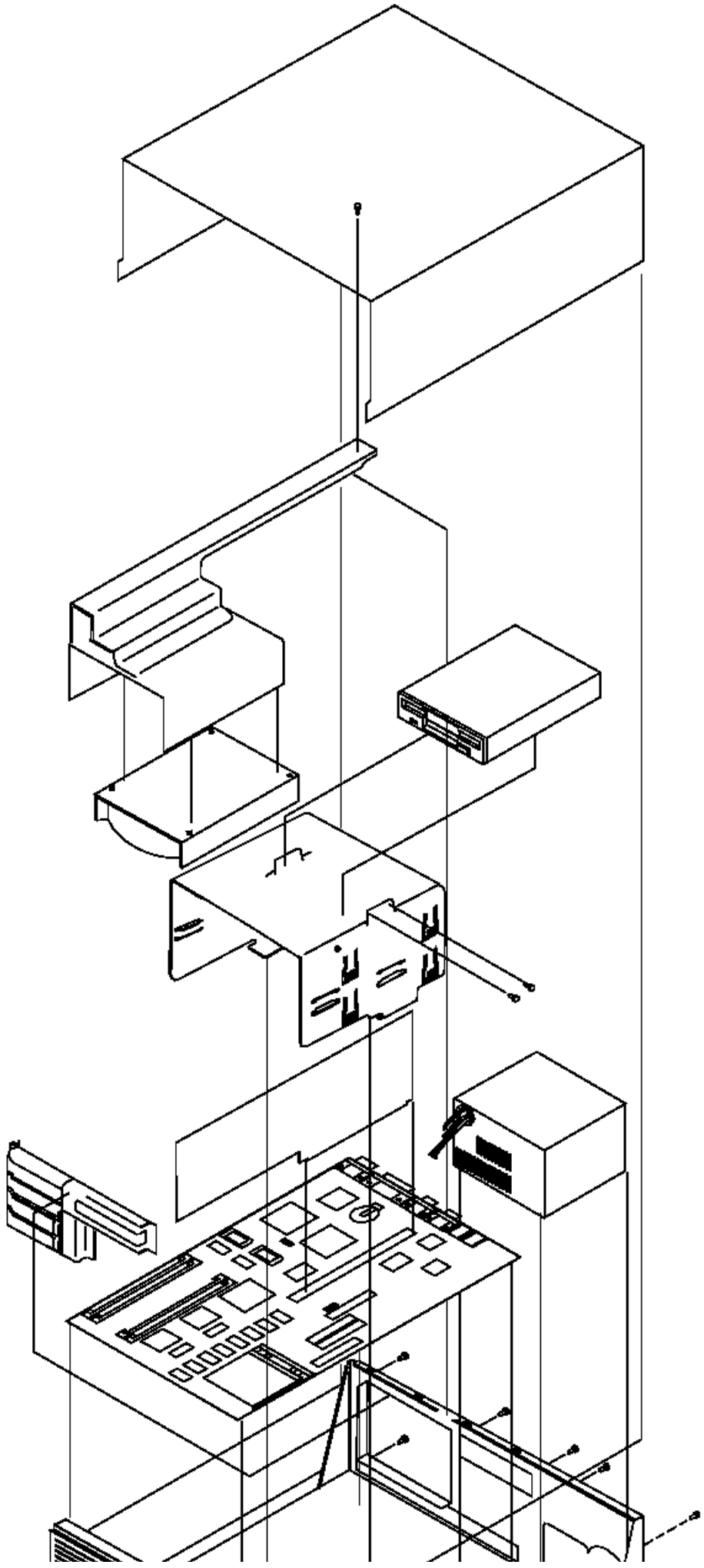
2.23 Computer Exploded View (Type 6X7X)

Computer Exploded View (Type 6X7X)



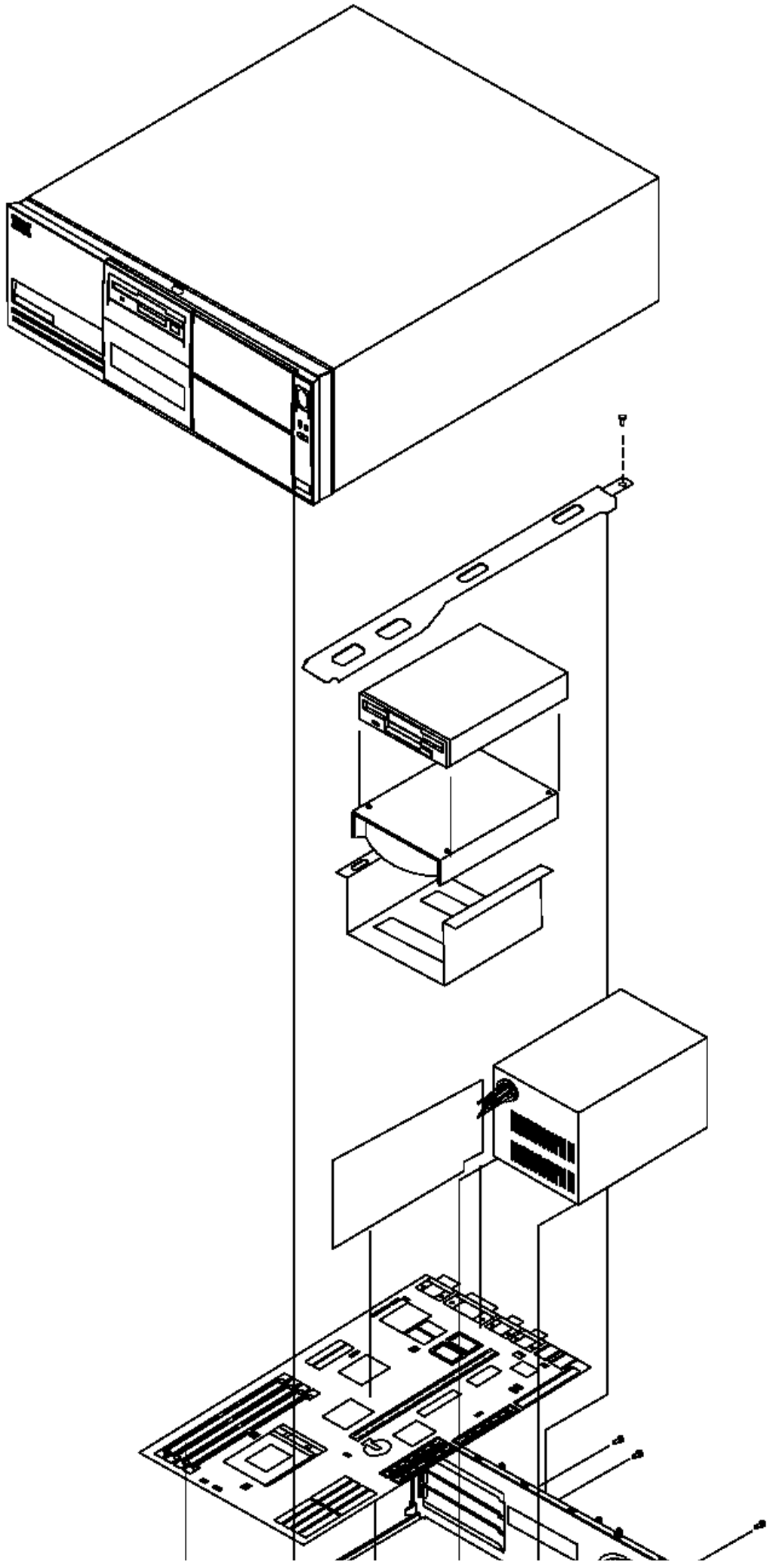
2.24 Computer Exploded View (Type 6X8X)

Computer Exploded View (Type 6X8X)

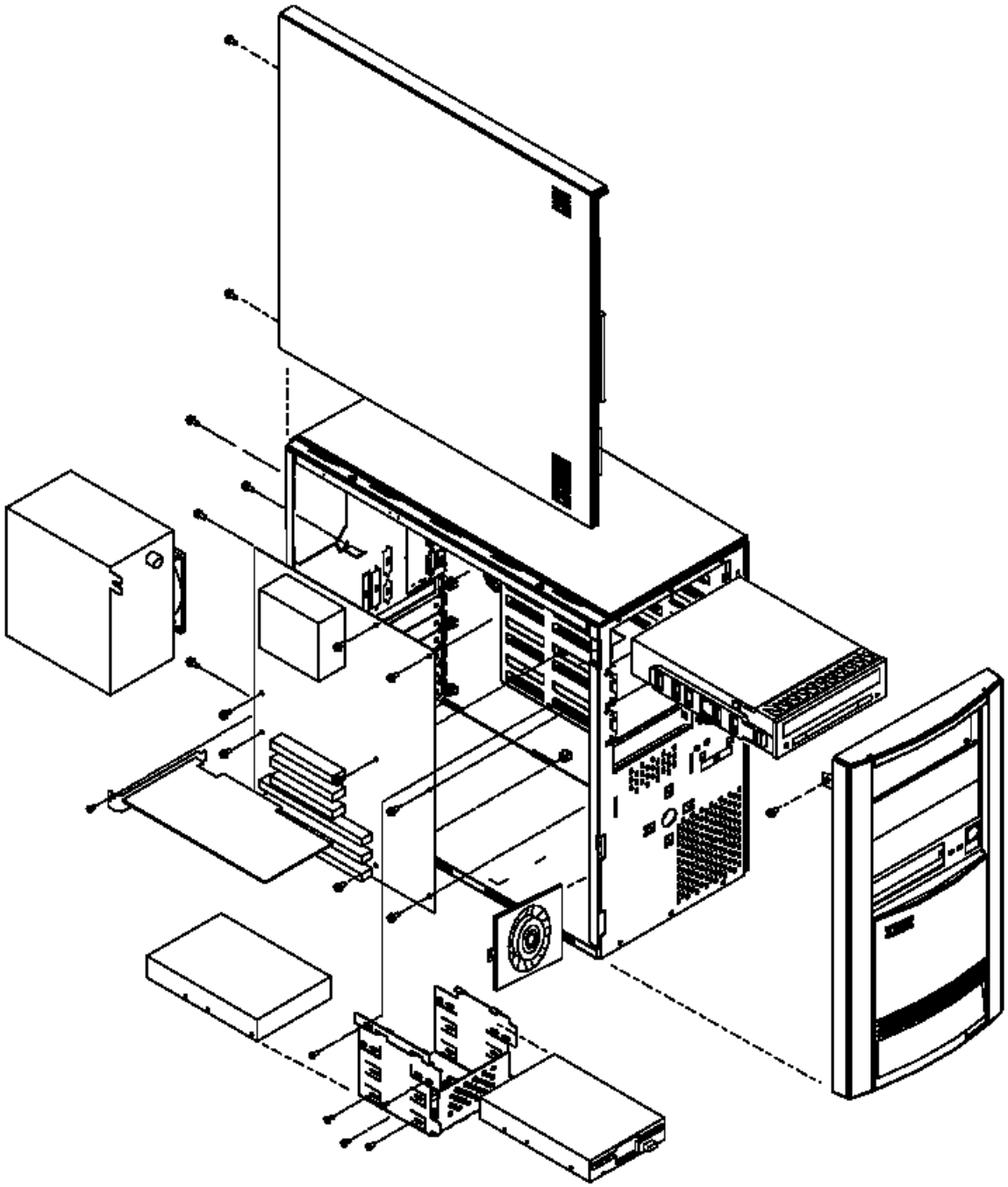


2.25 Computer Exploded View (Type 6560)

Computer Exploded View (Type 6560)



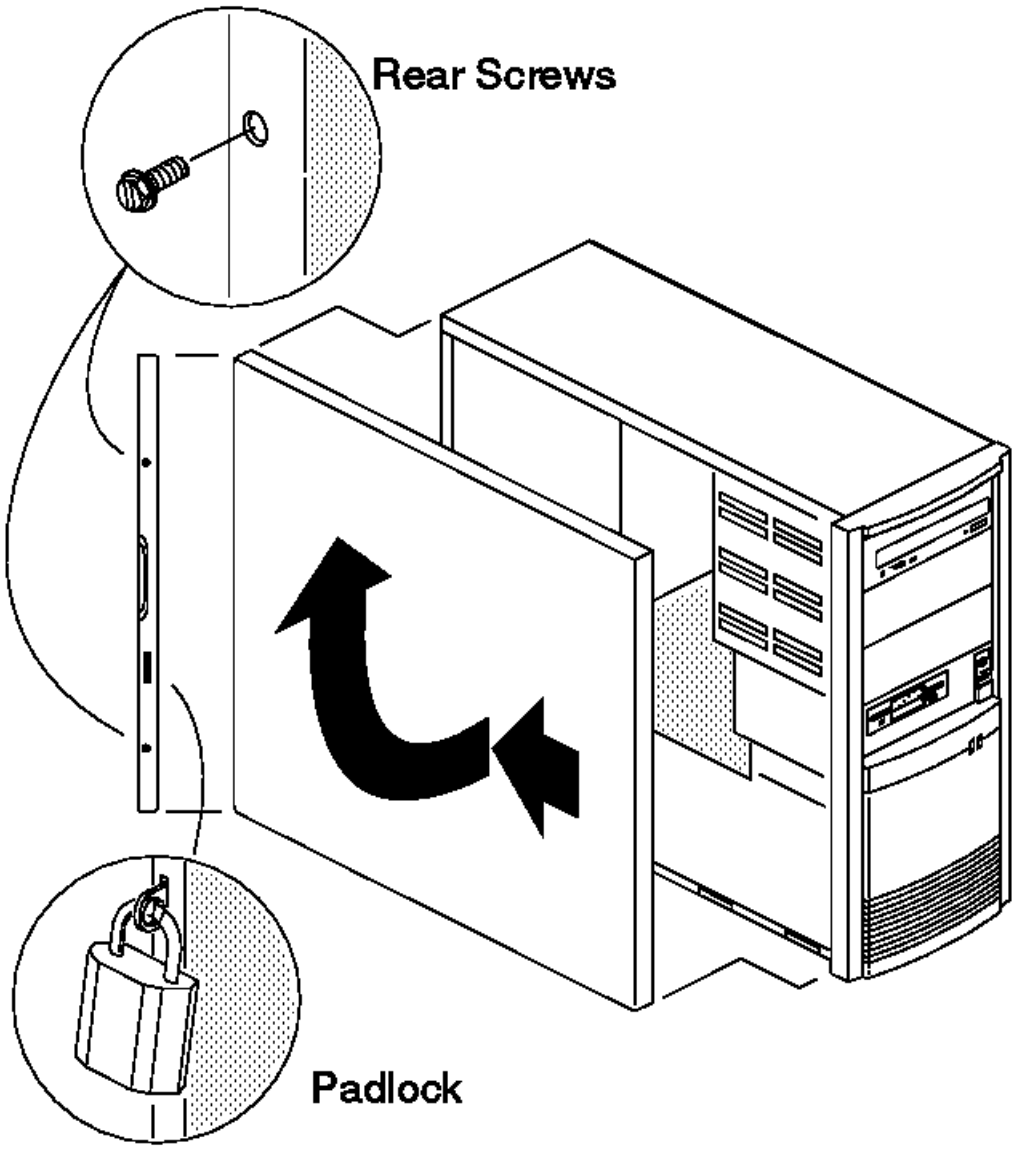
2.26 Computer Exploded View (Type 6598)



Removal procedures for the side cover, bezel, and processor are on the following page.

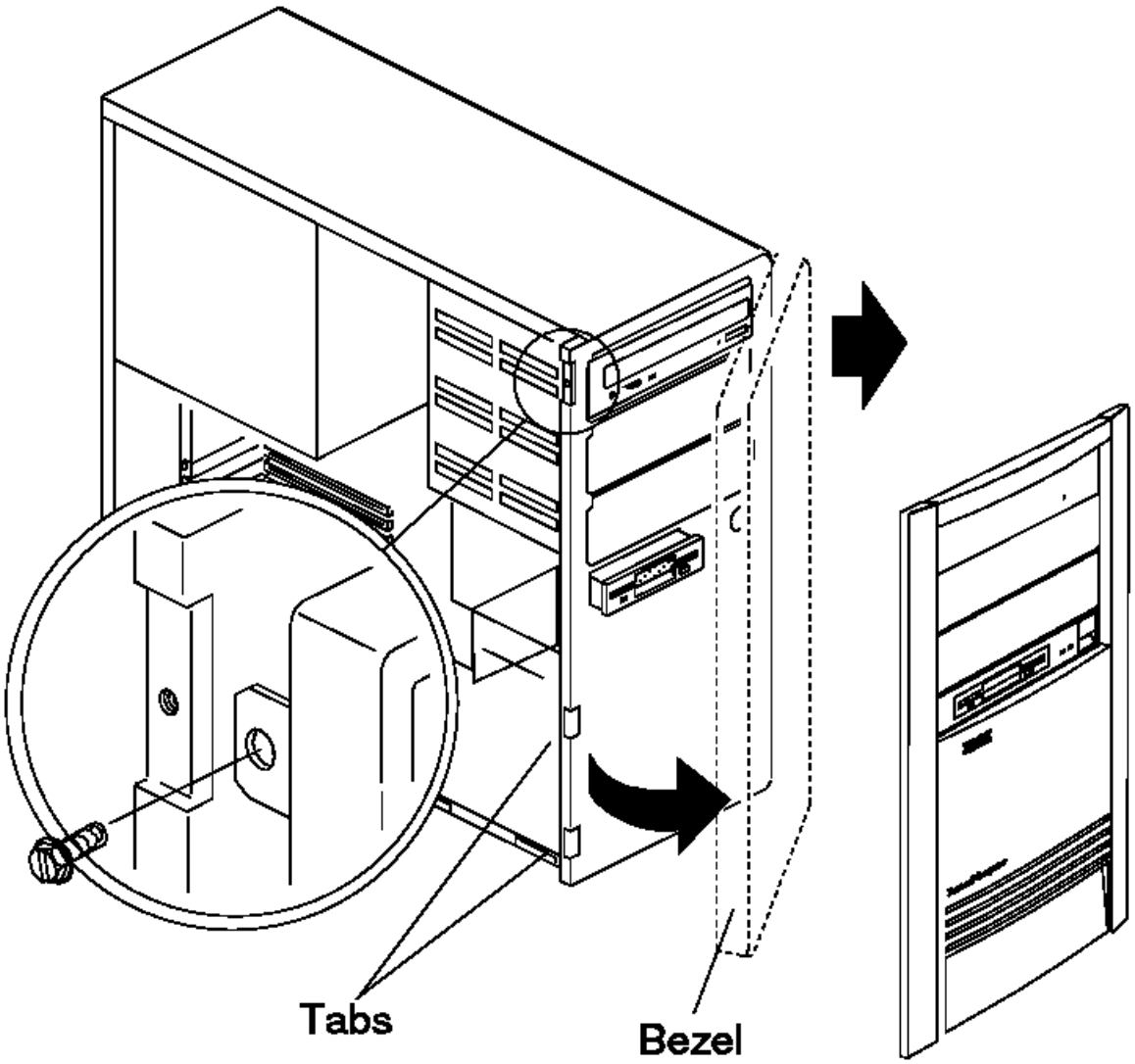
Subtopics
2.26.1 Side Cover Removal

2.26.1 Side Cover Removal



Subtopics
2.26.1.1 Bezel Removal
2.26.1.2 Processor Removal

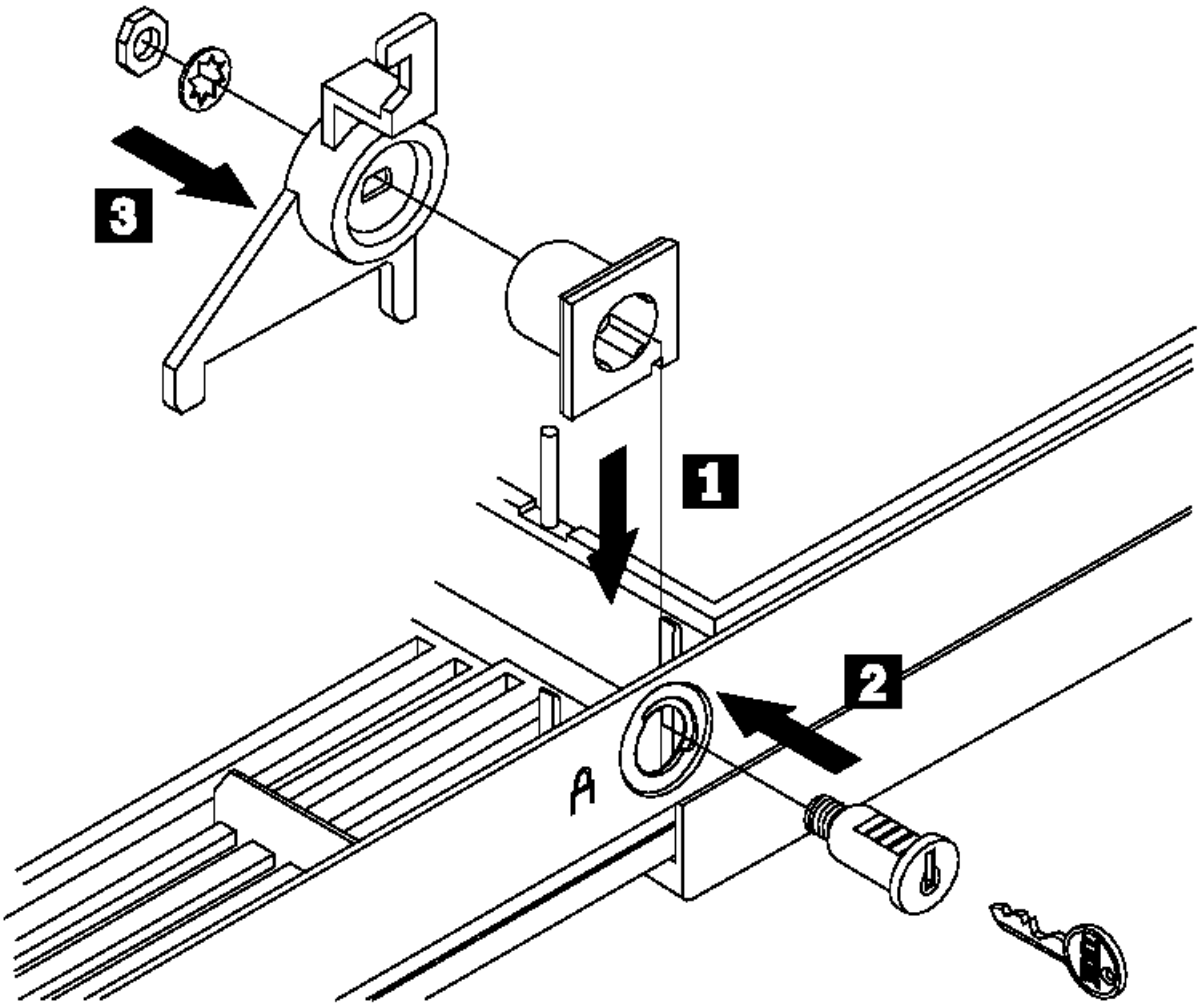
2.26.1.1 Bezel Removal



2.26.1.2 Processor Removal

+--- **Attention** ----------+
¦ Do not flex or twist the system board while removing or installing the ¦
¦ processor. The system board can be damaged during this procedure.   ¦
¦   ¦
+--+

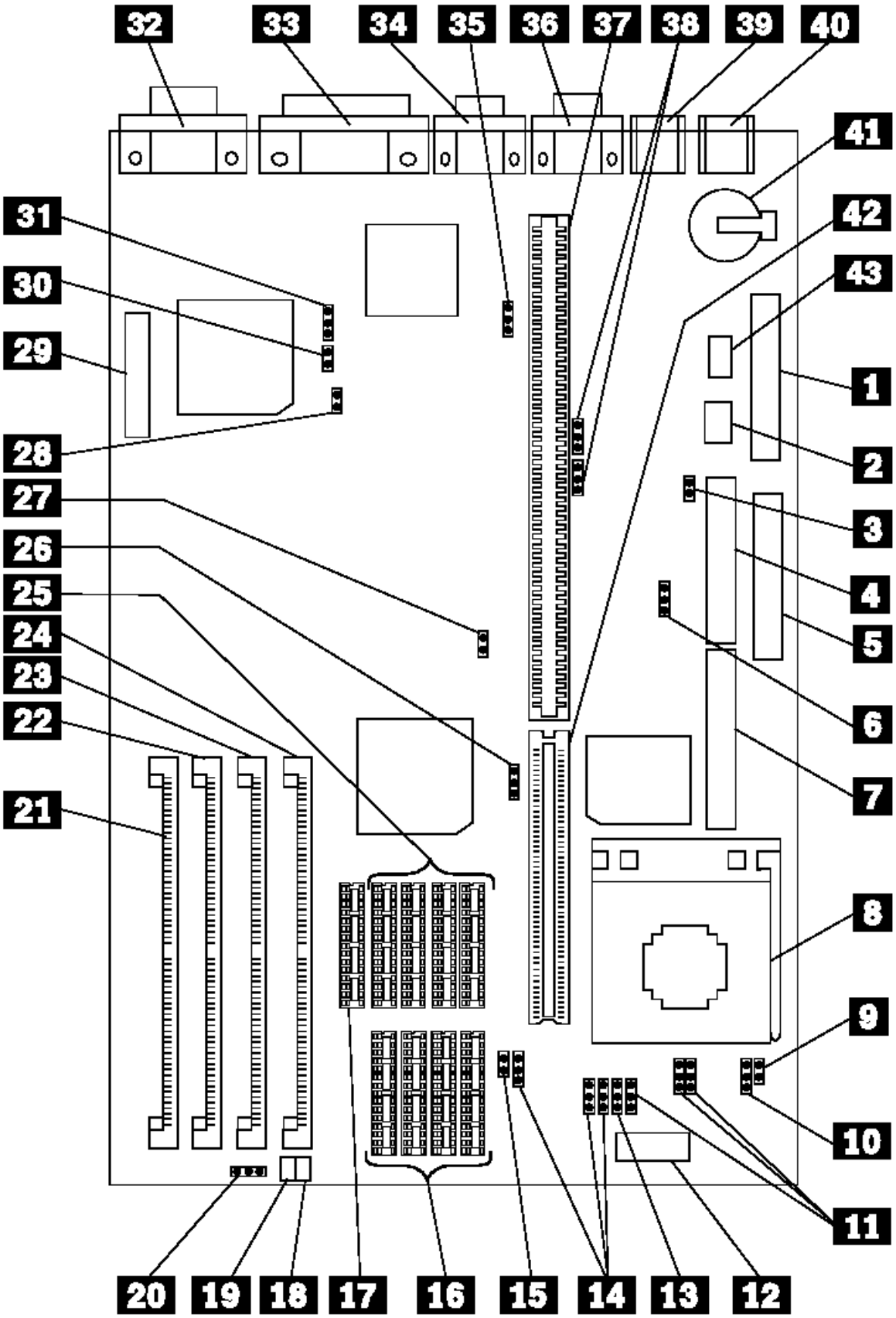
2.27 Keylock Assembly Exploded View



2.28 System Board Layouts

Subtopics

2.28.1 PC 330/350 Series (Type 657X, 658X) - 80486 System Board



2.28.2 PC 330/350 Series (Type 657X, 658X) - 80486 System Board Locations

1 - J8 Power supply connector
2 On/Off Switch Power Supply Connector
3 - JP1 Diskette drive write protect jumper
4 - J7 Diskette drive connector
5 - J9 Primary hard disk drive connector
6 Modem Ring Detect jumper
7 - J10 Secondary hard disk drive connector
8 Processor socket
9 - J24 SX/DX CPU selection jumper
10 - J23 P24T, CPU selection jumper
11 - JP3 Local bus configuration jumper
11 - JP4 Local bus configuration jumper
11 - JP7 Local bus configuration jumper
12 Processor Regulator Connector
13 - JP10 DX4 clock selection jumper
14 - J16 Cache size selection jumper
14 - J17 Cache size selection jumper
14 - J38 Cache size selection jumper
15 - JP13 VESA/PCI jumper
16 128K cache memory connectors
17 Cache TAG RAM connector
18 Power LED connector
19 Hard disk drive LED connector
20 - J27 Speaker connector, with enable jumper
21 - J19 Memory module connector, MEM 4
22 - J20 Memory module connector, MEM 3
23 - J21 Memory module connector, MEM 2
24 - J22 Memory module connector, MEM 1
25 256K cache memory connectors
26 - JP11 VHIMEM jumper
27 - JP12 IRQ12 jumper
28 - JP15 IRQ9 jumper
29 - J14 VESA feature connector
30 - JP14 Power-on password jumper
31 - J15 VGA jumper
32 - J6 Display connector
33 - J5 Parallel connector
34 - J4 Serial connector, COM2
35 - J13 Flash jumper
36 - J3 Serial connector, COM1
37 - J11 ISA riser connector
38 - JP8 ECP DMA-selection jumper
38 - JP9 ECP DMA-selection jumper
39 - J2 Mouse connector
40 - J1 Keyboard connector
41 Battery
42 - J34 VL riser connector
43 On/Off Switch Connector

See "PC 330/350 Series (Type 657X, 658X) - 80486 Jumper Settings" in topic 2.28.3 for jumper settings.

2.28.3 PC 330/350 Series (Type 657X, 658X) - 80486 Jumper Settings

The following tables contain the jumper setting information. (D) indicates the default setting.

CPU Type Selection

Processor	**J23**	**J24**
486SX (D)	1-2	Open
486DX	2-3	Open
P24T	2-3	Closed

CPU Speed Selection

Speed	**J35**	**J36**	**J37**
20 MHz	On	Off	Off
25 MHz (D)	Off	On	On
33 MHz	Off	On	Off
40 MHz	Off	Off	On
50 MHz	Off	Off	Off

Cache Size Selection

Size	**J16**	**J17**
256 K (D)	1-2	Close
128 K	2-3	Open

P24 Clock Selection

JP10	**1-2**	**3-4**
Internal Clock - X3 (D)	Off	Off
Internal Clock - X2	Off	On
Other Multiplier	On	Off

ECP DMA Selection

Setting	**JP8**	**JP9**
DRQ3 (D)	1-2	1-2
DRQ1	2-3	2-3

Local Bus Configuration

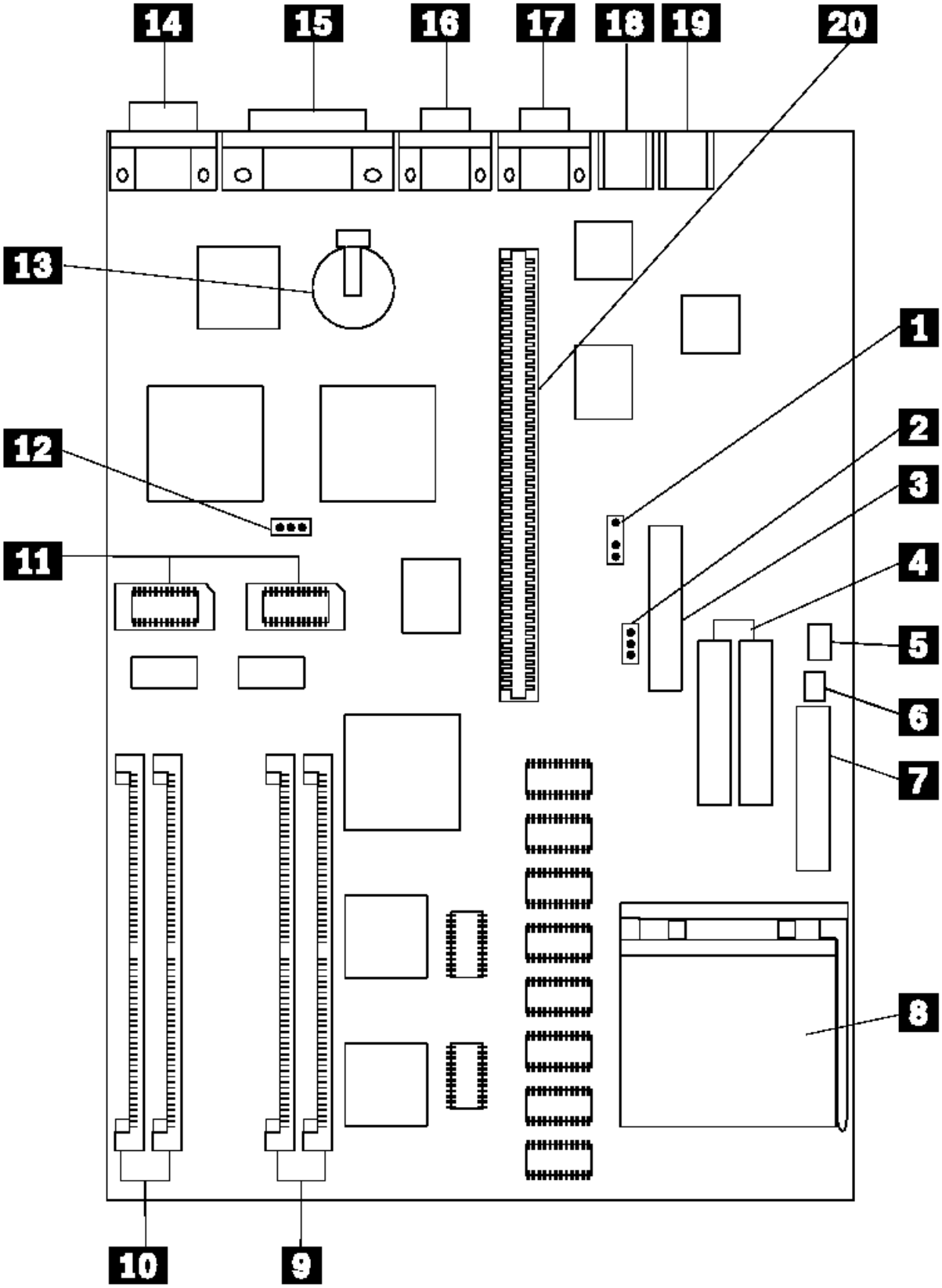
Selection	**JP3**	**JP4**
VESA Local BUS	1-2	1-2

PCI Local BUS	2-3	2-3

Miscellaneous Jumpers

Jumper	Setting	Description
J15	1-2	Enable system board VGA (D)
	2-3	Disable system board VGA
J13	1-2	Program Flash Disable (D)
	2-3	Program Flash Enable
JP14	1-2	Normal (D)
	2-3	Discard CMOS Data

2.28.4 PC 330/350 Series (Type 65X5) - Pentium 60 MHz System Board



2.28.5 PC 330/350 Series (Type 65X5) - Pentium 60 MHz System Board Locations

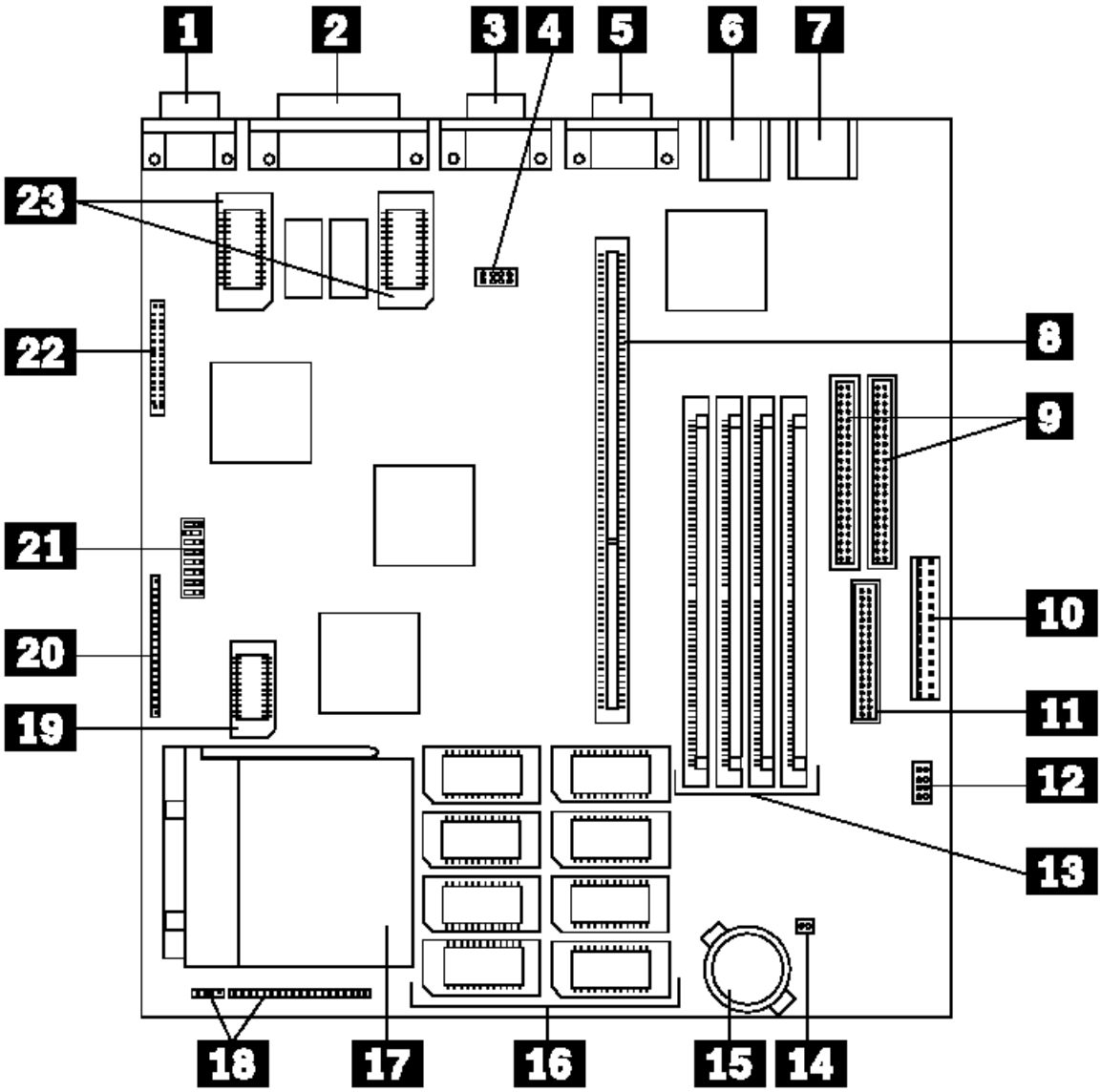
1	Modem Ring Detect jumper
2	- WP Diskette drive write protect jumper
3	Diskette drive connector
4	Hard disk drive connectors
5	- J38 On/Off Switch Power Supply Connector
6	- J37 On/Off Switch Connector
7	Power supply connectors
8	Processor connector
9	Memory connectors (Bank 1)
10	Memory connectors (Bank 2)
11	Video memory modules
12	- PWD Power-on password jumper
13	Battery
14	Display connector
15	Parallel connector
16	Serial connector
17	Serial connector
18	Keyboard connector
19	Mouse connector
20	Riser connector

2.28.6 PC 330/350 Series (Type 65X5) - Pentium 60 MHz Jumper Settings

The following table contains the jumper setting information. (D) indicates the default setting.

Jumper	Setting	Description
MRD	2-3 (D)	Modem answer on ring.
	1-2	Modem no answer on ring.
WP	2-3 (D)	Enable writing to a diskette
	1-2	Disable writing to a diskette.
PWD	1-2 (D)	Password enabled.
	2-3	Password reset.

2.28.7 PC 330/350 Series (Type 65X6) - Pentium 75/90/100 MHz System Board



This system board is for models 3XX, 4XX, 5XX.

See "PC 330/350 Series (Type 65X6) - Pentium 133/166 MHz System Board" in topic 2.28.10 for 6XX, 7XX, 8XX, and 9XX models.

2.28.8 PC 330/350 Series (Type 65X6) - Pentium 75/90/100 MHz System Board Locations

1 Video display connector
2 Parallel port connector
3 Serial port connector
4 - J5J1 BIOS Flash jumper
5 Serial port connector
6 Mouse port connector
7 Keyboard connector
8 PCI/ISA Riser connector
9 Primary (outer) IDE connectors
9 Secondary (inner) IDE connectors
10 Power connector
11 - J9D1 Diskette drive connector
12 - J9C1 Processor VRE Enable
13 Memory module connectors
14 CPU 3.3V voltage regulator
15 RTC Battery
16 512 KB Cache memory connectors
17 Processor connector
18 - J2A2 Front panel I/O connector
19 Cache Tag memory connector
20 - J1D1 Front panel I/O connector
21 - SW1 Configuration switch block
- L2 Cache
- CMOS settings
- Power-on password
- Processor type
22 VESA connector
23 2MB Video memory connectors

See "PC 330/350 Series (Type 65X6) - Pentium 75/90/100 MHz Jumper Settings" in topic 2.28.9 for jumper and switch settings.

2.28.9 PC 330/350 Series (Type 65X6) - Pentium 75/90/100 MHz Jumper Settings

The following tables contain the jumper and switch setting information. (D) indicates the default setting.

L2 Cache Size - SW1 Switch 1, 2

L2 Cache Size	Switch 1	Switch 2
0 KB	On	N/A
256 KB	Off	Off
512 KB	Off	On

CMOS Setup Utility - SW1 Switch 3, 4, 5

Description	Switch 3	Switch 4	Switch 5
Power-on Password Enabled	Off (D)	Off	Off
Power-on Password Reset	On (D)	Off	Off
Normal CMOS Settings	Off	Off (D)	Off
Reset CMOS Settings	Off	On	Off

Processor Type - SW1 Switch 6, 7, 8

Processor	Switch 6	Switch 7	Switch 8
50/75 MHz	Off	Off	Off
60/90 MHz	Off	On	Off
66/100 MHz	Off	Off	On
Reserved	Off	N/A	N/A

BIOS Flash Reset - J5J1

Jumper	Position	Description
J5J1	1-3	Normal (D)
J5J1	1-2	Reset

ISA Bus Clock Speed Jumper - J5J1

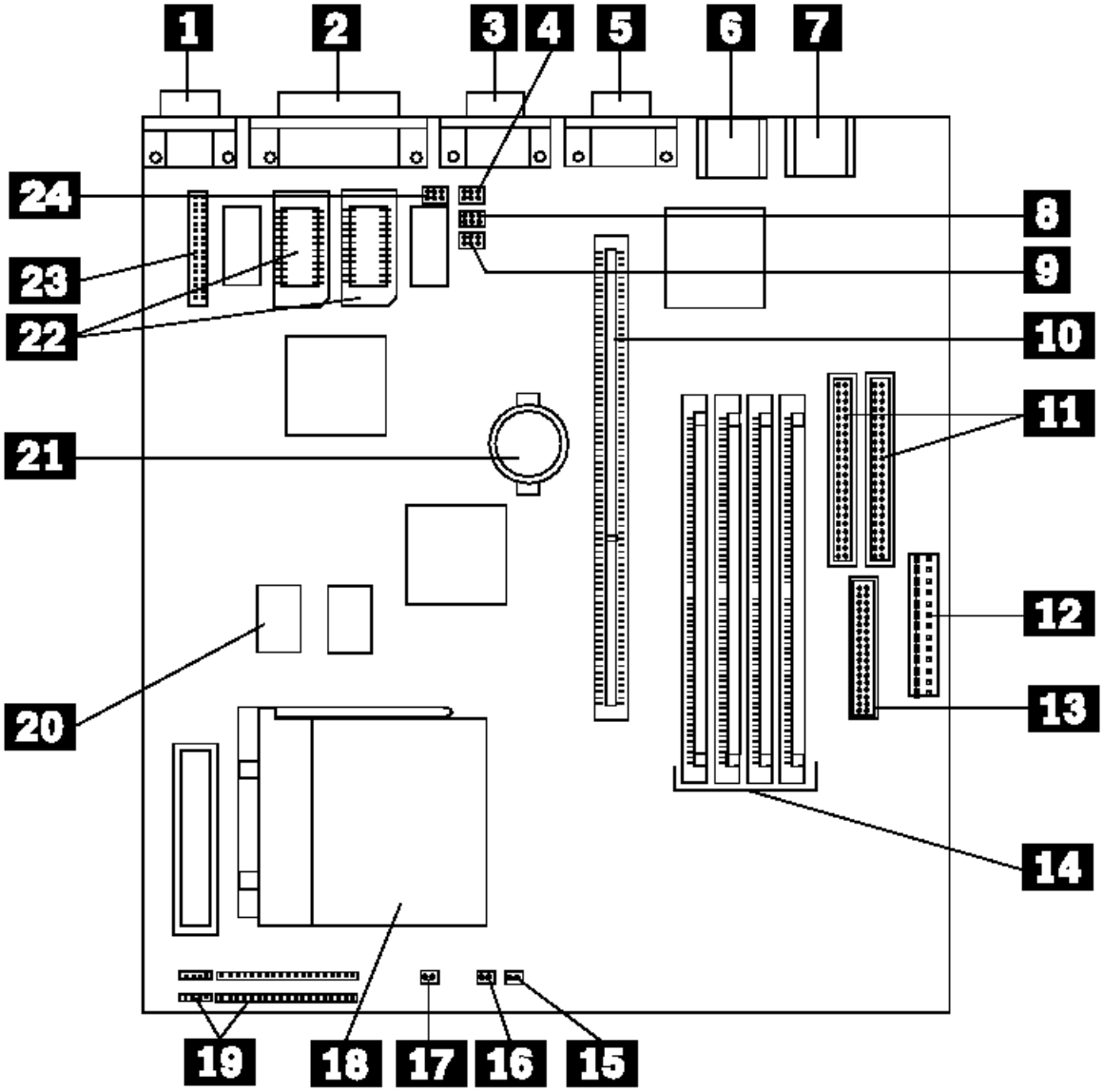
CPU External Clock Speed	ISA 1/6 Clock Speed Jumper 5-7 Not Installed	ISA 1/8 Clock Speed Jumper 5-7 Installed
50/75 MHz	8.33 MHz (D)	6.25 MHz
60/90 MHz	10 MHz	7.5 MHz (D)
66/100 MHz	11 MHz	8.25 MHz

Note: J5J1 pins 4, 6, and 8 are reserved and should not be jumpered.

Processor VRE Enable - J9C1

Jumper	Description
J9C1 1-3 (D)	Standard Voltage Processor
J9C1 5-7	VRE Rated Processor

2.28.10 PC 330/350 Series (Type 65X6) - Pentium 133/166 MHz System Board



This system board is for models 6XX, 7XX, 8XX, 9XX.

See "PC 330/350 Series (Type 65X6) - Pentium 75/90/100 MHz System Board" in topic 2.28.7 for 3XX, 4XX, and 5XX models.

2.28.11 PC 330/350 Series (Type 65X6) - Pentium 133/166 MHz System Board Locations

1 Video Port
2 ECP/EPP Parallel Port
3 Serial (B) Port
4 - J4K2 Configuration Jumpers
5 Serial (A) Port
6 Mouse Port
7 Keyboard Port
8 - J4J2 Configuration Jumpers
9 - J4J1 Configuration Jumpers
10 ISA/PCI Riser Connector
11 Enhanced IDE Connectors
12 Primary Input Power Supply
13 Diskette Connector
14 Four SIMM Sockets (Two Banks)
15 Power-On LED Connector
16 Hard Disk Activity LED Connector
17 Auxiliary Fan Connector
18 Processor Socket (7)
19 Speaker Connector
20 256 KB L2 Cache Sockets
21 Battery
22 1MB Video Memory Sockets (Optional)
23 VESA Feature Connector
24 - J4K1 Configuration Jumpers

See "PC 330/350 Series (Type 65X6) - Pentium 133/166 MHz Jumper Settings" in topic 2.28.12 for jumper and switch settings.

2.28.12 PC 330/350 Series (Type 65X6) - Pentium 133/166 MHz Jumper Settings

The following tables contain the jumper setting information. (D) indicates the default setting.

Processor Speed - J4J1, J4J2, J4K1

Processor	J4J1	J4J2	J4K1
75 MHz	Pin 2-3 Pin 4-5	Pin 2-3 Pin 4-5	Pin 2-3
90 MHz	Pin 2-3 Pin 5-6	Pin 2-3 Pin 4-5	Pin 1-2
100 MHz	Pin 1-2 Pin 4-5	Pin 2-3 Pin 4-5	Pin 1-2
120 MHz	Pin 2-3 Pin 5-6	Pin 2-3 Pin 5-6	Pin 1-2
133 MHz	Pin 1-2 Pin 4-5	Pin 2-3 Pin 5-6	Pin 1-2
150 MHz	Pin 2-3 Pin 5-6	Pin 1-2 Pin 5-6	Pin 1-2
166 MHz	Pin 1-2 Pin 4-5	Pin 1-2 Pin 5-6	Pin 1-2

CMOS Setup Access and ISA Bus Speed - J4K1

Jumper	Position	Description
J4K1	1-2	1/4 PCI (D)
J4K1	2-3	1/3 PCI
J4K1	4-5	Enabled (D)
J4K1	5-6	Disabled

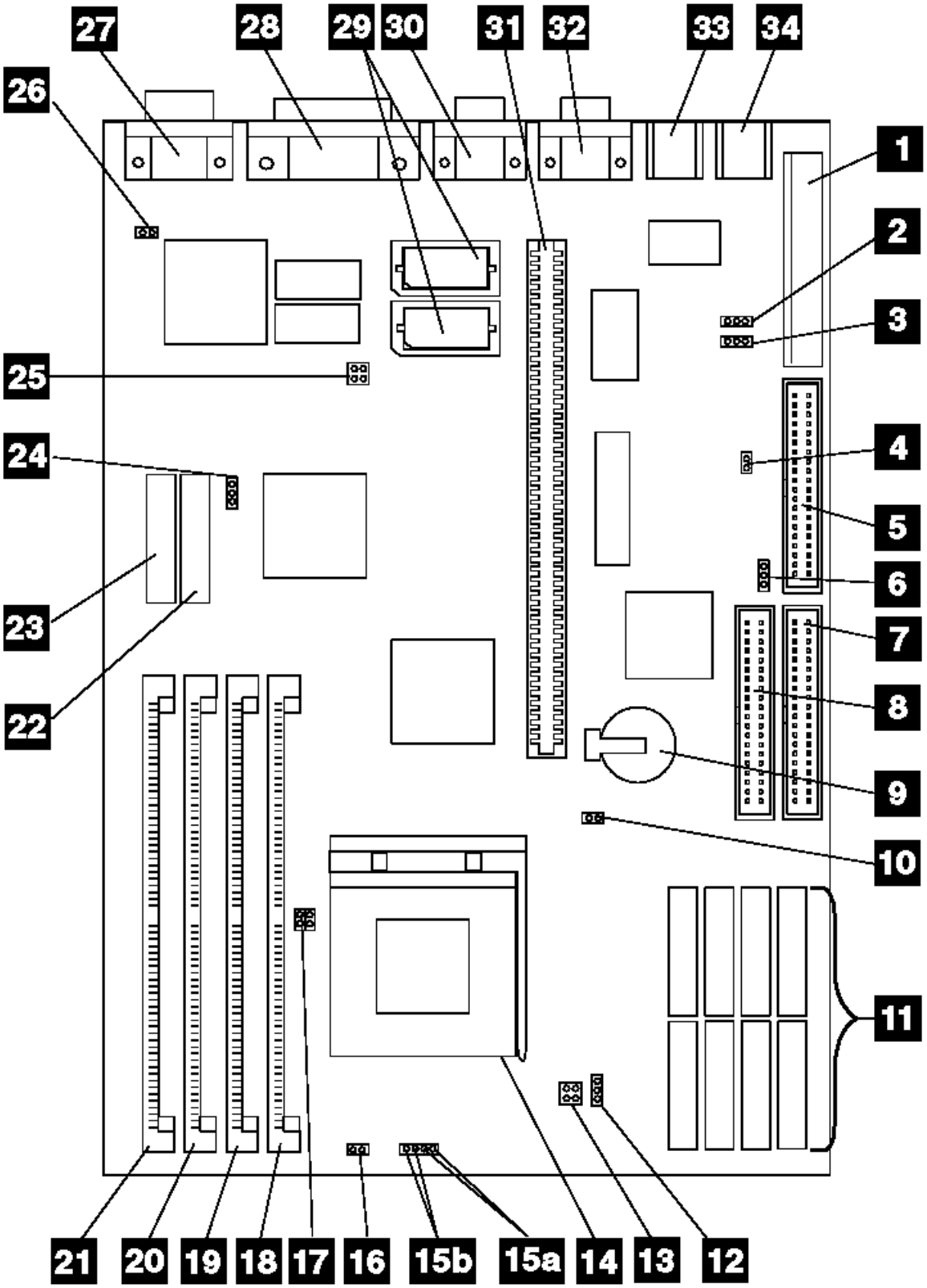
CMOS and Power-on Password - J4K2

Jumper	Position	Description
J4K2	1-2	Normal (D)
J4K2	2-3	Reset CMOS
J4K2	4-5	Normal (D)
J4K2	5-6	Reset Password

BIOS Flash Recovery - J4A2

Jumper	Position	Description
J4A2	1-2	Normal (D)
J4A2	2-3	Flash Enabled
J4A2	4-5	Reserved

2.28.13 PC 340 Series (Type 6560) - Pentium 100/133/166 MHz System Board



2.28.14 PC 340 Series (Type 6560) - Pentium 100/133/166 MHz System Board Locations

1 - J3 Power supply connector
2 - JP11 Flash Jumper
3 - JP21 FDD write protect
4 - JP4 PS/2 Mouse Enable/Disable
5 - J5 Diskette drive connector
6 - JP23 HDD Detect
7 - J8 Primary IDE hard disk drive connector
8 - J7 Secondary IDE hard disk drive connector
9 Battery
10 - J9 Power-on password/CMOS mode
11 CACHE memory connectors
12 - JP22 Burst Mode
13 - JP19 CPU voltage
14 Processor socket
15a - J12 Hard disk drive LED connector
15b - J12 Power LED connector
16 - J13 CPU fan connector
17 - JP17 CPU clock
18 Memory module connector 1 - Bank1
19 Memory module connector 2 - Bank1
20 Memory module connector 3 - Bank0
21 Memory module connector 4 - Bank0
22 Tag RAM socket
23 - J6 Feature connector
24 - JP13 Cache memory size
25 - JP14 CPU Bus clock
26 - JP3 On-board VGA
27 - P4 Display connector
28 - P1 Parallel connector
29 Video memory sockets
30 - P2 Serial connector COM2
31 PCI/ISA riser connector
32 - P3 Serial connector COM1
33 - J2 Mouse connector
34 - J1 Keyboard connector

See "PC 340 Series (Type 6560) - Pentium 100/133/166 MHz System Board Jumper Settings" in topic 2.28.15 for jumper settings.

2.28.15 PC 340 Series (Type 6560) - Pentium 100/133/166 MHz System Board Jumper Settings

The following tables contain the jumper setting information. A (D) indicates the default setting.

Processor Type Selection

Processor	JP14	JP17
P75 MHz	1-2	Open
P90 MHz	3-4	Open
P100 MHz	1-2, 3-4	Open
P120 MHz	3-4	1-2
P133 MHz	1-2, 3-4	1-2
P166 MHz	1-2, 3-4	1-2, 3-4

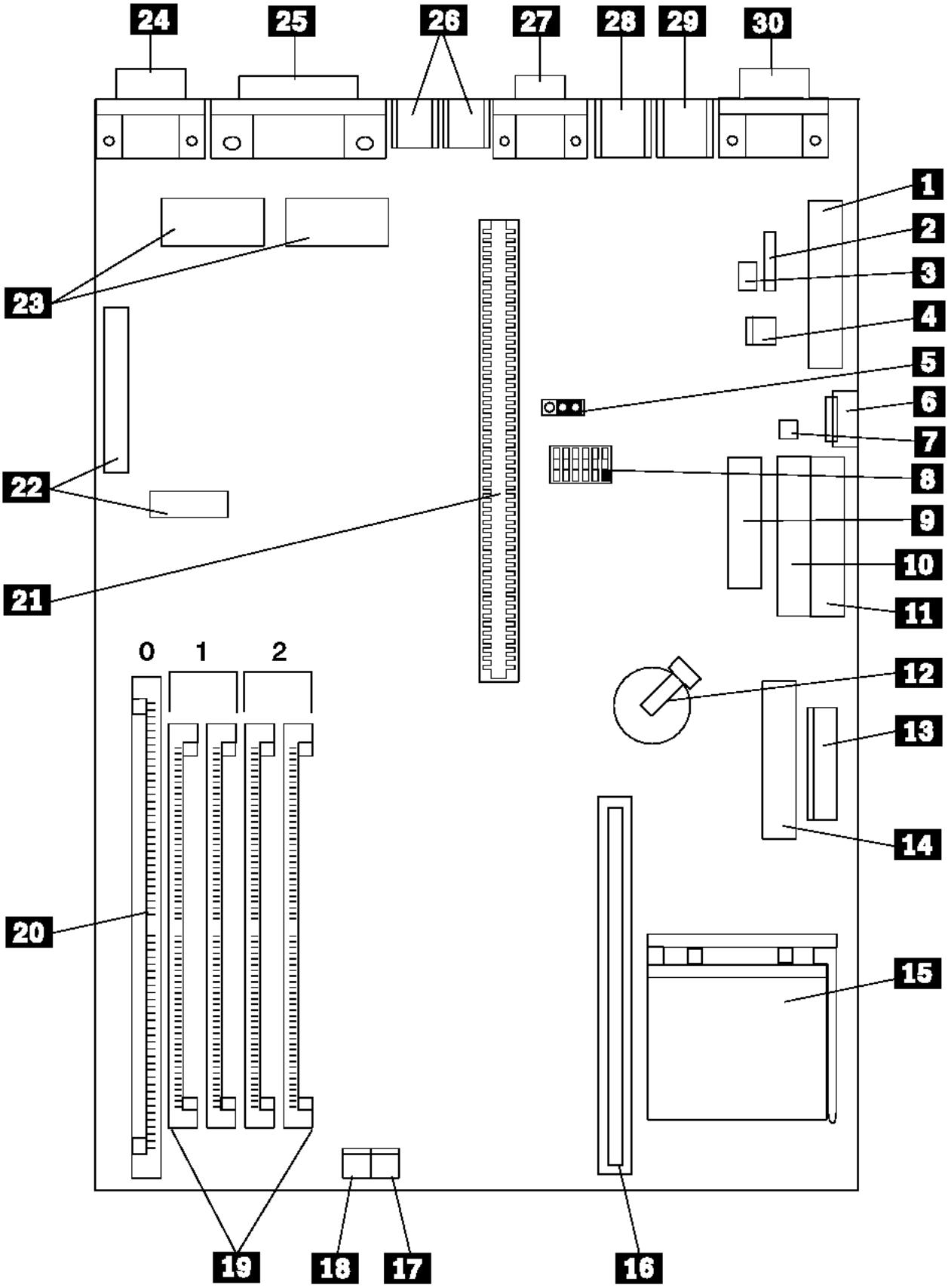
Cache Size Selection

Size	JP13
256 KB (D)	1-2
512 KB	2-3

Miscellaneous Jumpers

Jumper	Setting	Description
JP3	Short	Enable on-board VGA (D)
	Open	Disable on-board VGA
JP4	Short	Enable PS/2 mouse (D)
	Open	Disable PS/2 mouse
J9	1-2	Normal (D)
	2-3	CMOS Data Clear (all setup data reset to default and Power-On-Password cleared)
JP11	1-2	Enable Flash (D)
	2-3	Flash Lock
JP19	1-2	STD 3.3 volt
	2-3	VRE 3.52 volt (D)
JP21	1-2	FDD protect, Normal (D)
	2-3	FDD Write protect
JP22	1-2	Non-Linear burst, Async Cache (D)
	2-3	Linear burst, sync Cache
JP23	1-2	HDD detect (D)
	2-3	HDD non-detect

2.28.16 PC 330/350 Series (Type 6577, 6587) - Pentium 100/133/166/200 MHz System Board



2.28.17 PC 330/350 Series (Type 6577, 6587) - Pentium 100/133/166/200 MHz System Board Locations

1 Power connector (5 V)
2 Modem ring
3 LAN Wake-Up
4 Modem ring
5 Password jumper (CMOS clear)
6 Auxiliary power
7 On/Off switch
8 Configuration switch set
9 Diskette connector
10 Primary IDE connector
11 Secondary IDE connector
12 Battery
13 Power connector (3.3 V)
14 Voltage Regulator connector (P55C only)
15 Processor upgrade socket
16 Cache memory module connector
17 Power LED connector
18 Hard disk access LED connector
19 SIMM connectors (Bank 1/2)
20 DIMM connector (Bank 0)
21 Riser connector
22 VESA passthrough connectors
23 Video upgrade sockets
24 Video port
25 ECP/EPP parallel port
26 USB ports (1, 2)
27 Serial (A) port
28 Mouse port
29 Keyboard port
30 Infrared port

2.28.18 PC 330/350 Series (Type 6577, 6587) - Pentium 100/133/166/200 MHz Switch/Jumper Settings

The following tables contain the switch and jumper setting information. (D) indicates the default setting.

Processor Speed Switch Settings (SW1 1-4)

Speed	SW1-1	SW1-2	SW1-3	SW1-4
75 MHz	Off	Off	On	On
90 MHz	Off	Off	On	Off
100 MHz	Off	Off	Off	On
120 MHz	On	Off	On	Off
133 MHz	On	Off	Off	On
150 MHz	On	On	On	Off
166 MHz	On	On	Off	On
200 MHz	Off	On	Off	On

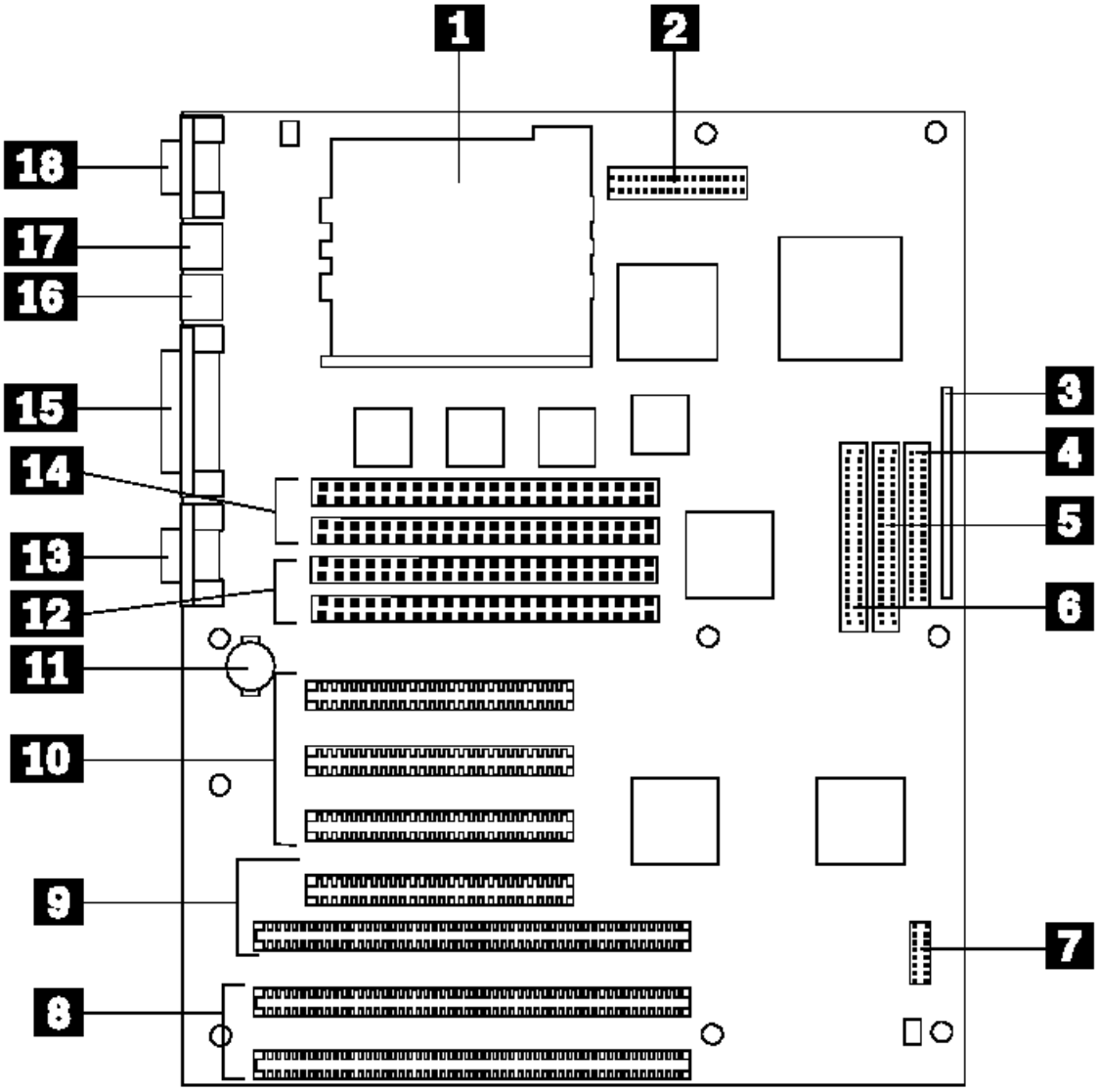
Additional Switch Settings (SW1 5-6)

Description	SW1-5	SW1-6
Normal Diskette Operation	N/A	Off (D)
Read-Only Diskette Operation	N/A	On

Password Jumper Settings

Jumper	Setting	Description
J15	1-2	Password Disabled
	2-3 (D)	Password Enabled

2.28.19 PC 360-S150 (Type 6598) - Pentium 150/200 MHz System Board



Also see "Matrox Graphics Adapter (MGA) Switch Settings" in topic 2.28.23 for MGA video adapter locations and switch settings.

2.28.20 PC 360-S150 (Type 6598) - Pentium 150/200 MHz System Board Locations

1 Processor connector
2 Power supply connector
3 Front panel I/O connector
4 Diskette drive connector
5 Hard Disk Drive connector
6 CD-ROM drive connector
7 Configuration jumpers (J25)
8 ISA adapter slots
9 PCI/ISA adapter slots
10 PCI adapter slots
11 Backup battery
12 Bank 0 memory connectors
13 Serial port 2
14 Bank 1 memory connectors
15 Parallel port
16 Mouse port
17 Keyboard port
18 Serial port 1

See "PC 360-S150 (Type 6598) - Pentium 150/200 MHz Jumper Settings" in topic 2.28.21 and "PC 360-S150 (Type 6598) - Pentium 150/200 MHz Jumper Setting Procedures" in topic 2.28.22 for jumper settings and procedures.

2.28.21 PC 360-S150 (Type 6598) - Pentium 150/200 MHz Jumper Settings

See "PC 360-S150 (Type 6598) - Pentium 150/200 MHz Jumper Setting Procedures" in topic 2.28.22 for additional jumper procedure information.

Attention

The following are the factory-configuration jumper settings. Do *not* change jumper 26-27 from the factory setting.

PICTURE 51

The following table contains the jumper setting information. (D) indicates the default setting.

Jumper	Setting	Description
Bus Speed Clock Ratio PCI/ISA	1-2 4-5 7-8 11-12	**150 MHz Processor** Bus = 60.14 MHz Clock ratio = 5/2 PCI = 30 MHz ISA = 7.51 MHz
Bus Speed Clock Ratio PCI/ISA	2-3 5-6 7-8 10-11	**200 MHz Processor** Bus = 66.48 MHz Clock ratio = 3/1 PCI = 33 MHz ISA = 8.31 MHz
Password	14-15 (D) 13-14	Password Enabled Password Reset
CMOS	17-18 (D) 16-17	CMOS Normal CMOS Reset
Setup Utility	20-21 (D) 19-20	Setup Enabled Setup Disabled
Flash Recovery	23-24 (D) 22-23	Normal Flash Recovery Enabled
Reserved	26-27 (D)	(Do Not Change)

2.28.22 PC 360-S150 (Type 6598) - Pentium 150/200 MHz Jumper Setting Procedures

Processor/Bus-Speed/Clock-Ratio Jumper

Set these jumpers to match the processor installed.

Password Reset

1. Power-off the computer.
2. Move the jumper from pins 14-15 to 13-14.
3. Power-on the computer. This erases both the power-on and administrator passwords.
4. Power-off the computer.
5. Move the jumper from pins 13-14 to 14-15.

CMOS Jumper

1. Power-off the computer.
2. Move the jumper from pins 17-18 to 16-17.
3. Power-on the computer. This erases the CMOS information.
4. Power-off the computer.
5. Move the jumper from pins 16-17 to 17-18.

Configuration/Setup Utility Jumper

This jumper setting enables and disables the Configuration/Setup Utility.

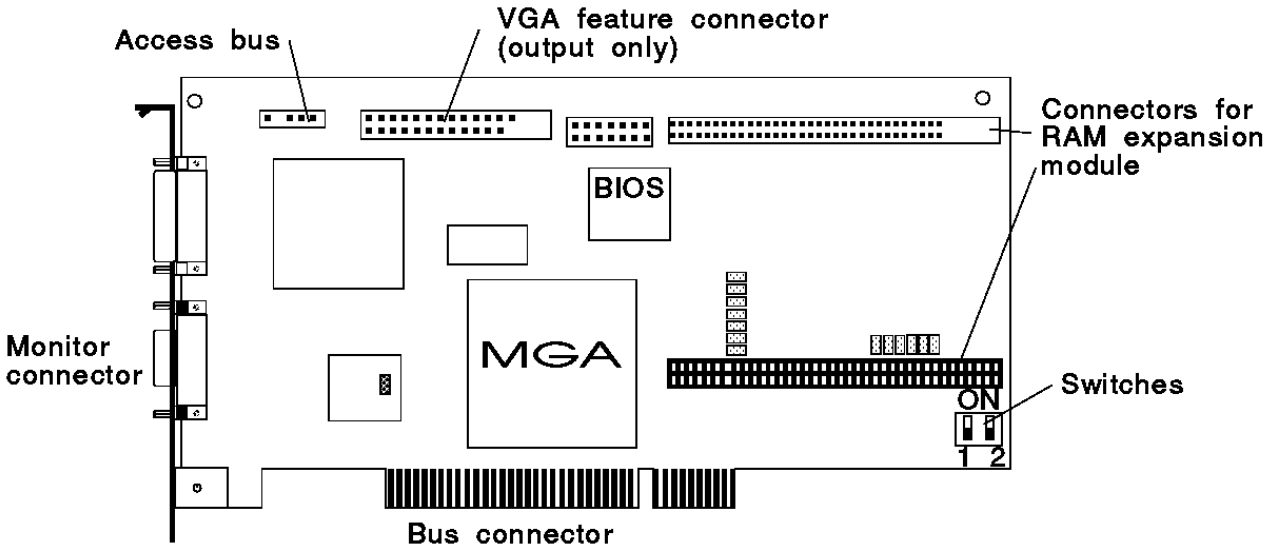
Flash Recovery Jumper

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

1. Power-off the computer.
2. Move the jumper from pins 23-24 to 22-23.
3. Insert the upgrade diskette into the drive A.
4. Power-on the computer and listen to the speaker. You should hear beeps in the following sequence.
   a. After the computer is powered-on, it beeps once. This beep marks the beginning of the POST.
   b. After a short delay (less than 10 seconds), the computer beeps again. This marks the beginning of the recovery process. The recovery code is being copied into the flash component.
   c. After about 30 seconds, the computer beeps twice, marking the end of the recovery process. Wait until the diskette drive in-use light goes out.
5. Power-off the computer and move the jumper from pins 22-23 to 23-24.
6. Leave the upgrade diskette in the diskette drive and power-on the computer.
7. Retry the original upgrade procedure.

2.28.23 Matrox Graphics Adapter (MGA) Switch Settings

There are two switches on the adapter that are used to change the way the adapter operates.



Subtopics
2.28.23.1 VGA BIOS Flash Upgrade Enable - Switch 1
2.28.23.2 VGA Enable/Disable Switch - Switch 2

2.28.23.1 VGA BIOS Flash Upgrade Enable - Switch 1

To upgrade the VGA BIOS, use the software utility diskette and BIOS upgrade file.

1. Remove the adapter to access the switches.
2. Set Switch 1 to On to allow re-programming of the Flash EPROM.

   Note: Do not leave this switch On during normal use, as the Flash EPROM in this state is susceptible to being erased without warning.

3. Reinstall the adapter.
4. Follow the instructions supplied with the flash utility.
5. Power-off the computer and remove the adapter.
6. Set Switch 1 to Off.
7. Reinstall the adapter.
8. Remove the flash utility diskette.

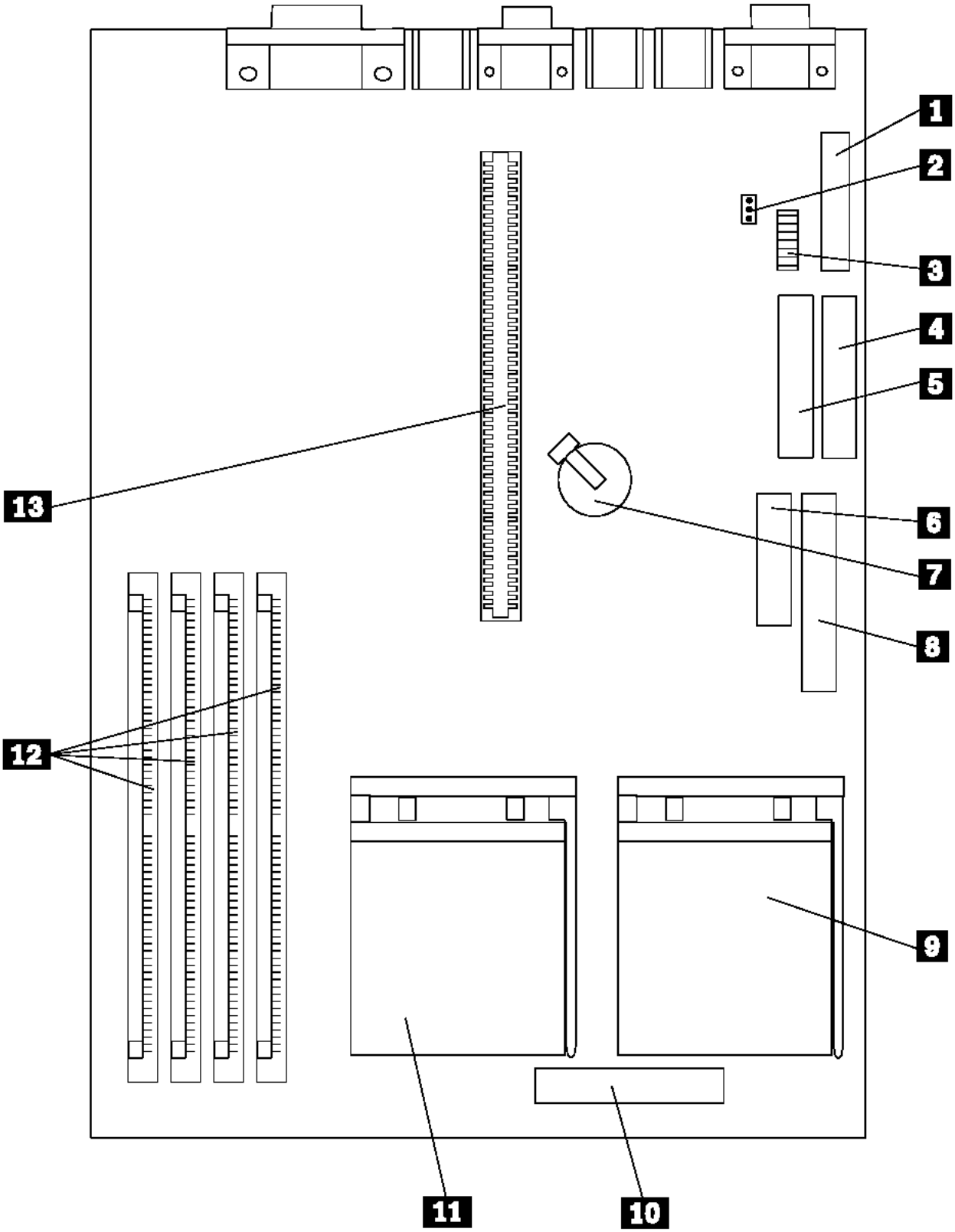
2.28.23.2 VGA Enable/Disable Switch - Switch 2

By default, the MGA adapter VGA feature is enabled (Switch 2=Off) for single-screen operation, which means that any other installed VGA must be disabled.

This switch should be set to On to support a dual-screen configuration. In this case, a VGA adapter in another expansion slot will be used for output to the second monitor.

1. Remove the adapter to access the switches.
2. Set Switch 2 to On to enable dual-screen operation.
3. Reinstall the adapter.

2.28.24 PC 365 (Type 6589) - System Board



Also see "Matrox Graphics Adapter (MGA) Switch Settings" in topic 2.28.23 for MGA video adapter locations and switch settings.

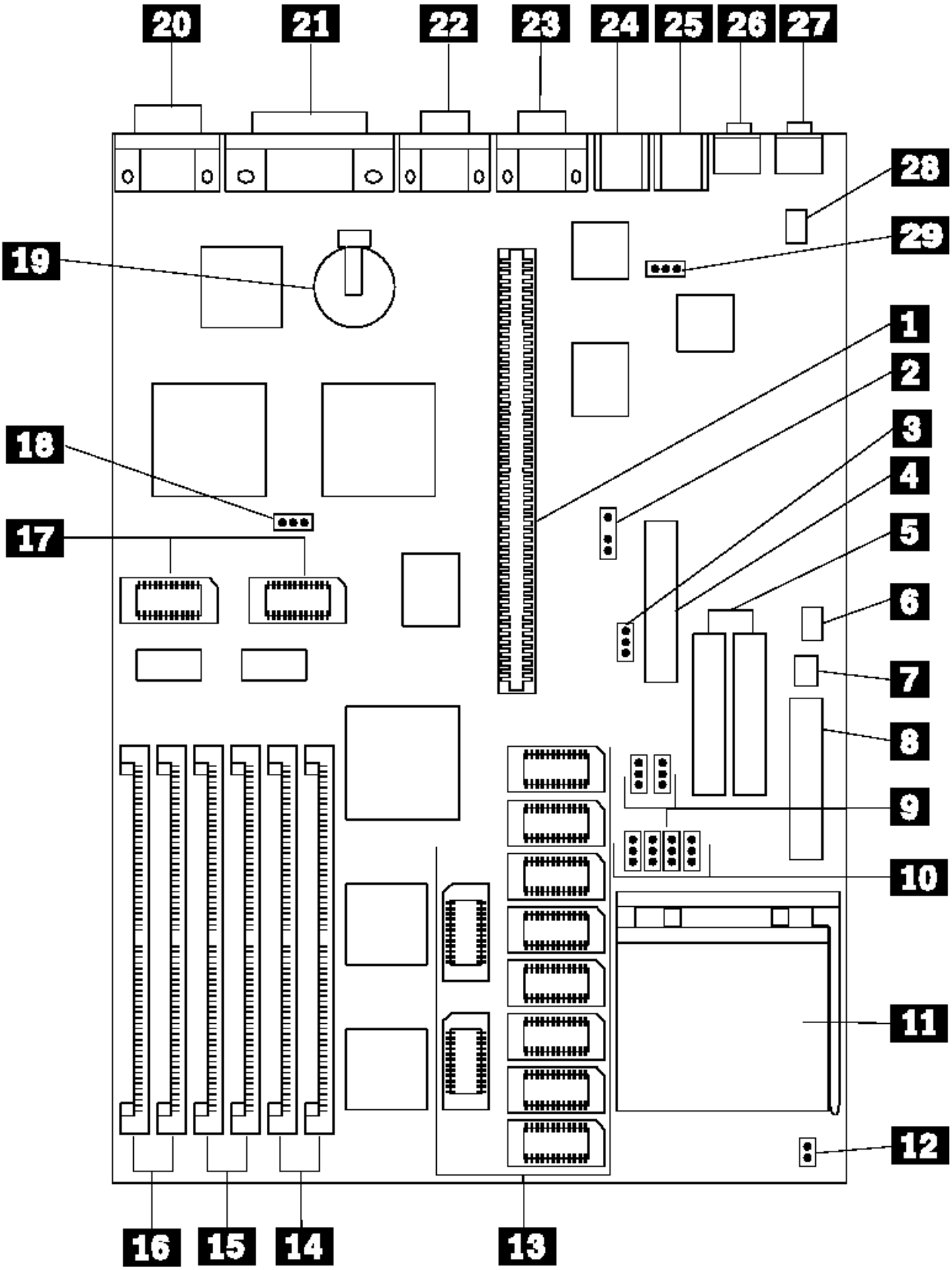
2.28.25 PC 365 (Type 6589) - System Board Locations

1 Diskette drive connector
2 CMOS, Password Jumper
3 Processor, Diskette Switch Settings
4 Secondary IDE connector
5 Primary IDE connector
6 3.3V power connector
7 Battery
8 Main power connector
9 Second processor connector
10 Voltage regulator module (VRM) connector for second processor
11 Primary processor connector
12 Memory connectors
13 Riser-card connector

2.28.26 PC 365 (Type 6589) Switch Settings

The following table contains the switch setting information. (D) indicates the default setting.

Description	**Setting**
180 MHz Processor	1, 3, 4, 5 On 2, 6, 7, 8 Off
200 MHz Processor	1, 3, 4, 6 On 2, 5, 7, 8 Off
Normal Diskette Operation	8 On (D)
Read-only Diskette Operation	8 Off
Password/CMOS Enabled	J8 1-2 (D)
Password/CMOS Erase	J8 2-3



2.28.28 PC 730/750 Series (Type 6875, 6876, 6885, 6886) - Pentium 75/90/100/120/133 MHz System Board Locati

1 Riser connector
2 - MRD Modem Ring Detect jumper
3 - WP Diskette drive write protect jumper
4 Diskette drive connector
5 Hard disk drive connectors
6 - J38 On/Off Switch power supply connector
7 - J37 On/Off Switch connector
8 Power supply connectors
9 Bus/CPU Speed (MHz)
10 Processor jumpers
11 Processor connector
12 - J19 Bus/Core Ratio
13 Cache connectors
14 Memory connectors (Bank 2)
15 Memory connectors (Bank 1)
16 Memory connectors (Bank 3)
17 - PWD Video memory modules
18 Power-on password jumper
19 Battery
20 Display connector
21 Parallel connector
22 Serial connector
23 Serial connector
24 Mouse connector
25 Keyboard connector
26 Audio (input jack)
27 IDE CD-ROM audio connector
28 - J28 Mouse jumper

See "PC 730/750 Series (Type 6875, 6876, 6885, 6886) - Pentium 75/90/100/120/133 MHz Jumper Settings" in topic 2.28.29 for jumper settings.

2.28.29 PC 730/750 Series (Type 6875, 6876, 6885, 6886) - Pentium 75/90/100/120/133 MHz Jumper Settings

The following table contains the jumper setting information. (D) indicates the default setting.

Jumper	Setting	Description
MRD	2-3 (D)	Modem answer on ring.
	1-2	Modem no answer on ring.
J19	1-2 (D)	2/3 Bus/Core Ratio
	2-3	1/2 Bus/Core Ratio
J28	1-2 (D)	Mouse enabled
	2-3	Mouse disabled
J29 (WP)	2-3 (D)	Enable writing to a diskette
	1-2	Disable writing to a diskette.
J40 (PWD)	1-2 (D)	Password enabled.
	2-3	Password reset.

Subtopics
2.28.29.1 Bus/CPU Speed MHz Setting
2.28.29.2 Cache Jumper Settings

2.28.29.1 Bus/CPU Speed MHz Setting

The following table contains the Bus/CPU Speed settings.

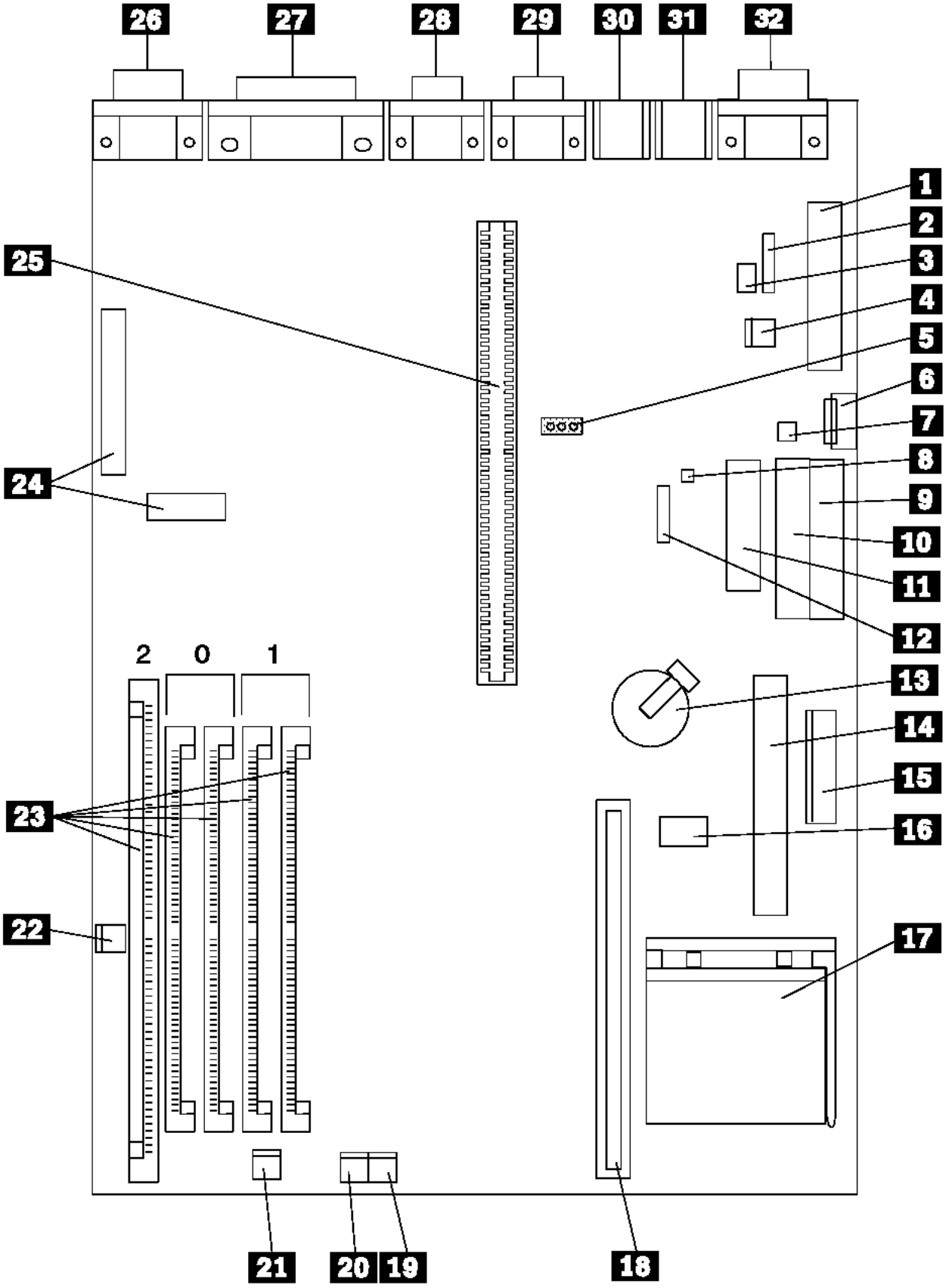
Jumper	**50/75**	**60/90 60/120**	**66/100 66/133**
J26	2-3	2-3	1-2
J27	2-3	1-2	1-2

2.28.29.2 Cache Jumper Settings

The following table contains the cache jumper settings.

Cache	J21	J22	J23	J24
256 KB	1-2	1-2	1-2	1-2
512 KB	1-2	1-2	2-3	2-3
1 MB	2-3	2-3	2-3	2-3

2.28.30 PC 730/750 Series (Type 6877, 6887) - Pentium 100/133/150/166 MHz System Board



2.28.31 PC 730/750 Series (Type 6877, 6887) - Pentium 100/133/150/166 MHz System Board Locations

1 Power connector (5 V)
2 - J9 Modem ring
3 - J14 LAN wake-up
4 - J13 External ring wake-up
5 - J15 Password jumper (CMOS Clear)
6 - J16 Auxiliary power
7 - J18 On/Off switch
8 - J19 Tamper connector
9 Secondary IDE connector
10 Primary IDE connector
11 Diskette connector
12 Tamper (Reserved)
13 Battery
14 Voltage regulator connector
15 Power connector (3.3 V)
16 Switch set (SW1)
17 Processor socket
18 Cache memory module connector
19 Power LED connector
20 Hard Disk access LED connector
21 Speaker connector
22 DSP Audio connector
23 DIMM/SIMM connectors
24 VESA passthrough connector
25 Riser connector
26 Video port
27 ECP/EPP parallel port
28 Serial (B) port
29 Serial (A) port
30 Mouse port
31 Keyboard port
32 Infrared port

2.28.32 PC 730/750 Series (Type 6877, 6887) - Pentium 100/133/150/166 MHz Switch/Jumper Settings

The following tables contain the switch and jumper setting information. (D) indicates the default setting.

Processor Speed Switch Settings (SW1 1-4)

Speed	SW1-1	SW1-2	SW1-3	SW1-4
75 MHz	Off	Off	On	On
90 MHz	Off	Off	On	Off
100 MHz	Off	Off	Off	On
120 MHz	On	Off	On	Off
133 MHz	On	Off	Off	On
150 MHz	On	On	On	Off
166 MHz	On	On	Off	On

Additional Switch Settings (SW1 5-6)

Description	SW1-5	SW1-6
Administrator Password Enabled	On (D)	N/A
Administrator Password Disabled	Off	N/A
Normal Diskette Operation	N/A	Off (D)
Read-Only Diskette Operation	N/A	On

Jumper Settings

Jumper	Setting	Description
J15	1-2 (D)	Password Enabled
	2-3	Password Disabled

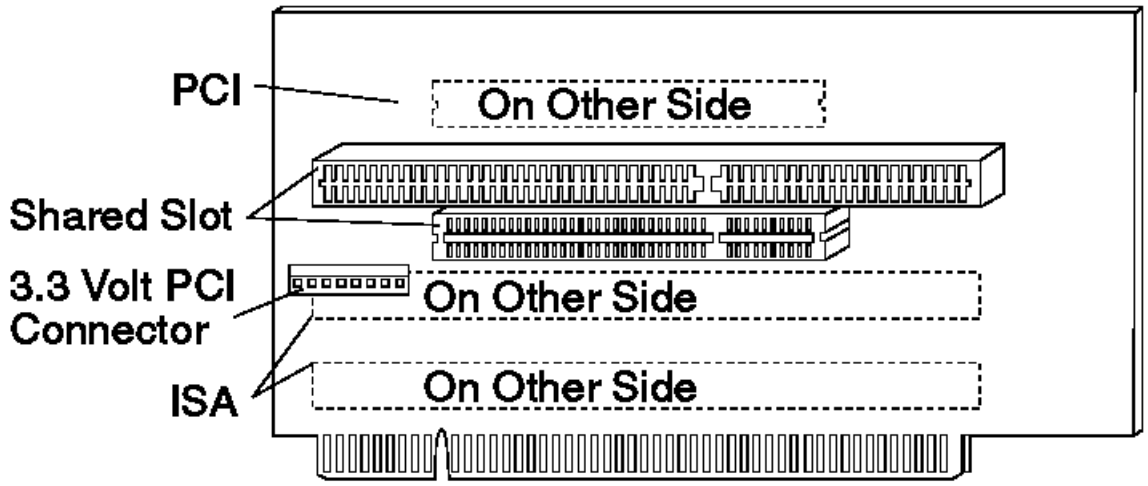
2.29 Riser Card Layouts

Notes

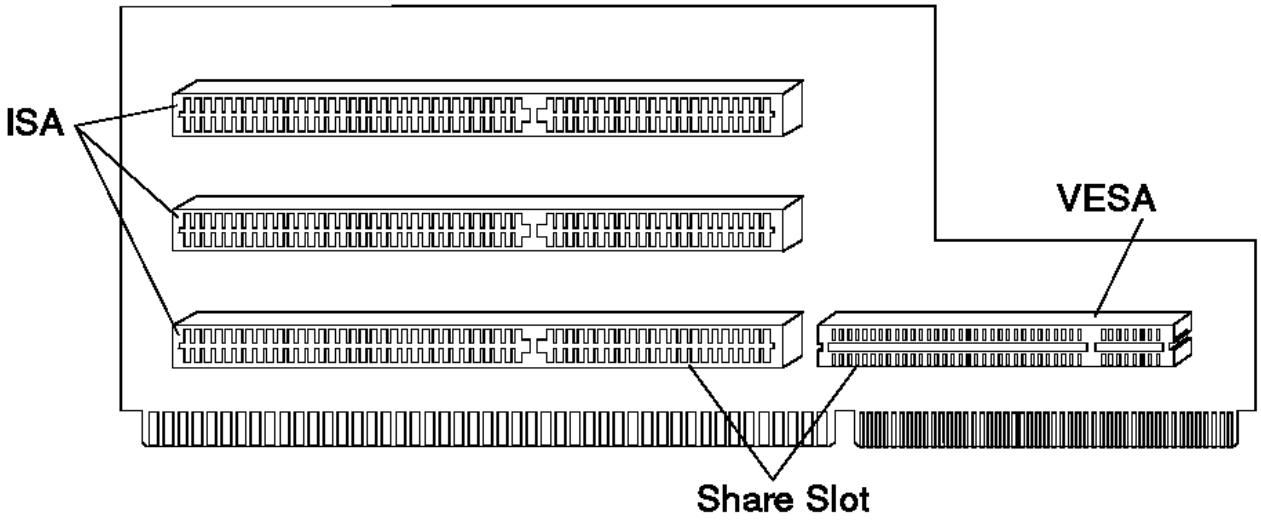
- PCI adapters plug into the PCI riser slot with the component-side facing the system board.
- ISA adapters plug into the ISA riser slot with the component-side facing upward.

Subtopics

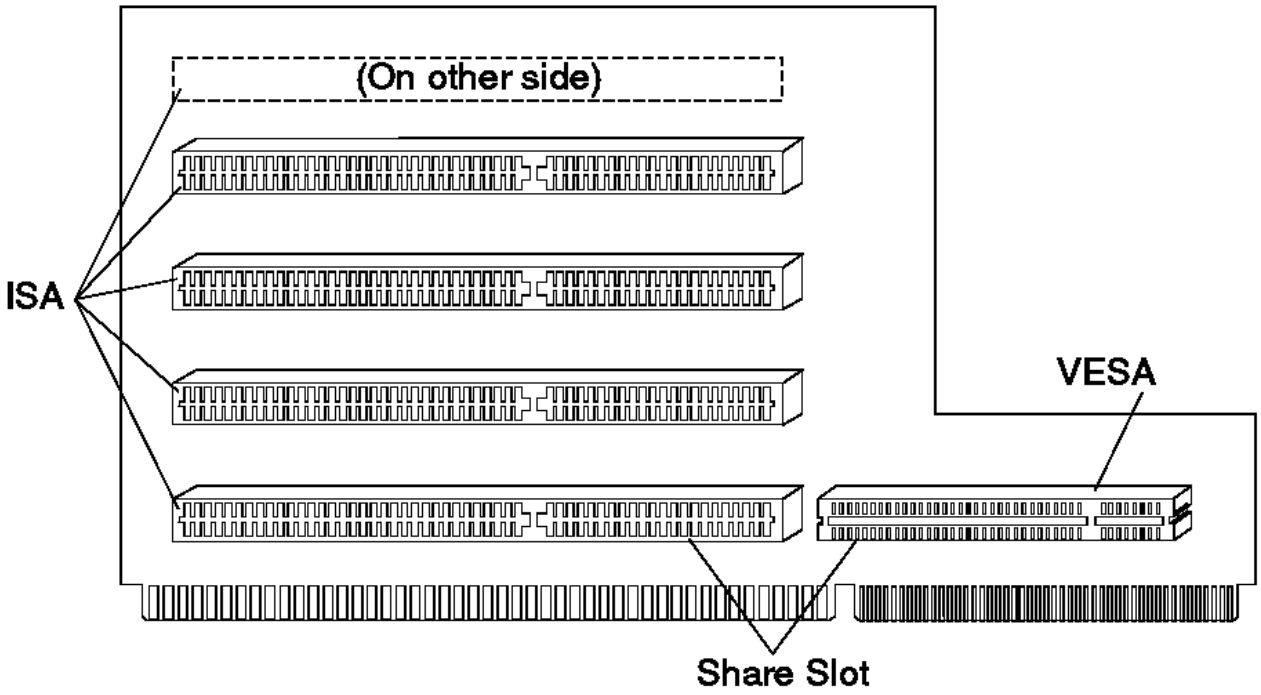
2.29.1 PC 340 (Type 6560) PCI/ISA



2.29.2 PC 330 (Type 6571) ISA/VESA

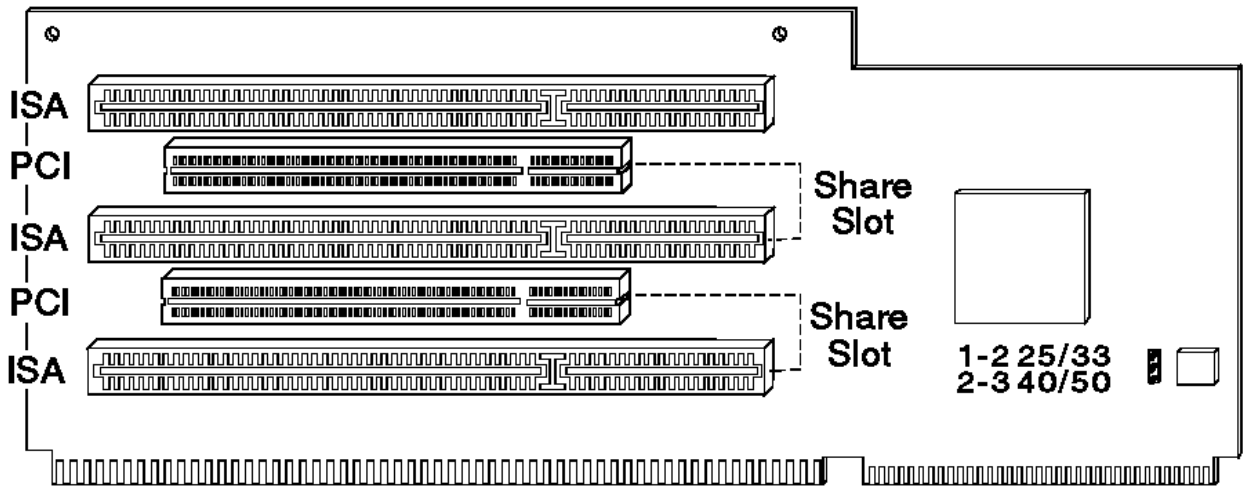


2.29.3 PC 350 (Type 6581) ISA/VESA

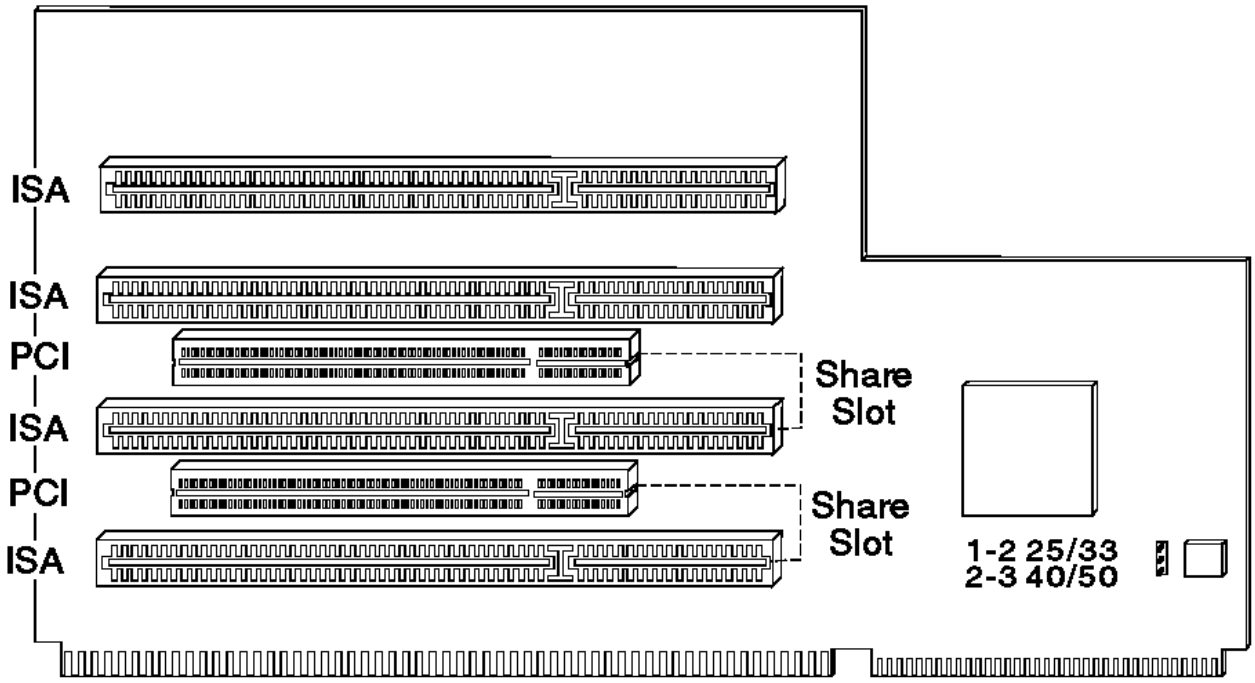


Continued on the following page.

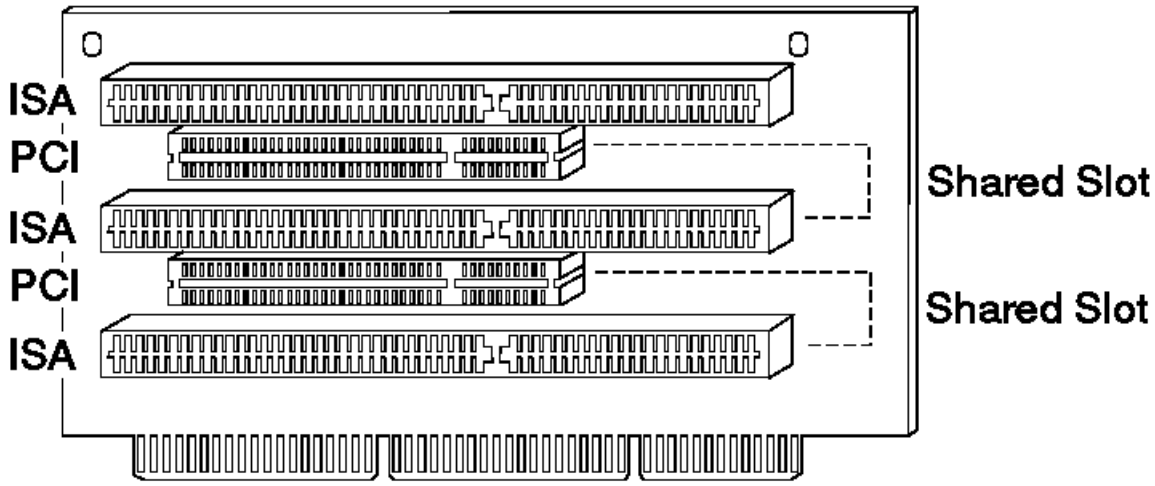
2.29.4 PC 330 (Type 6573) PCI/ISA



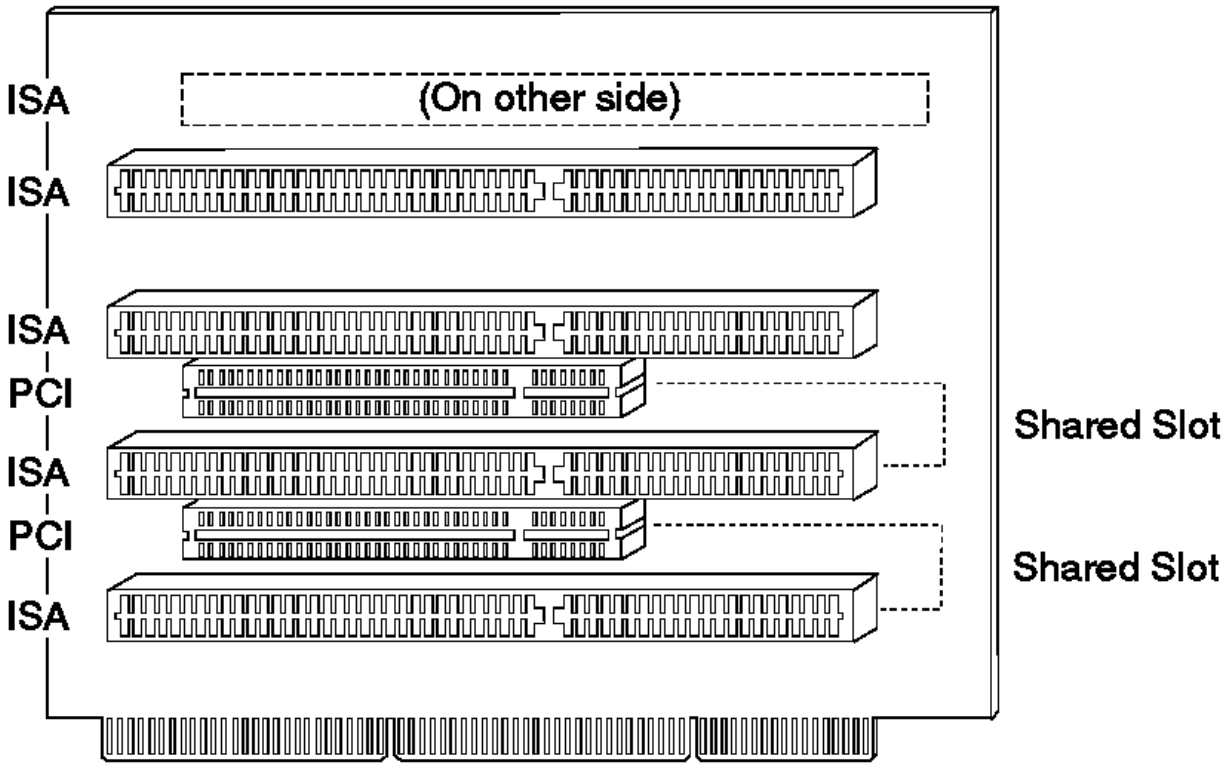
2.29.5 PC 350 (Type 6583) PCI/ISA



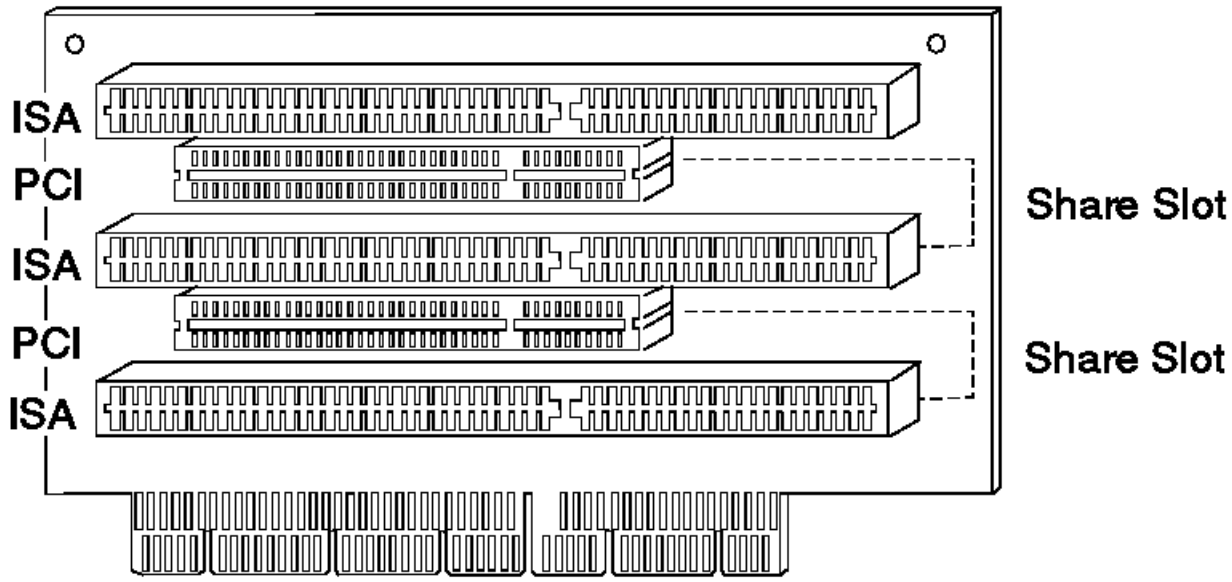
2.29.6 PC 330 (Type 6575) PCI/ISA



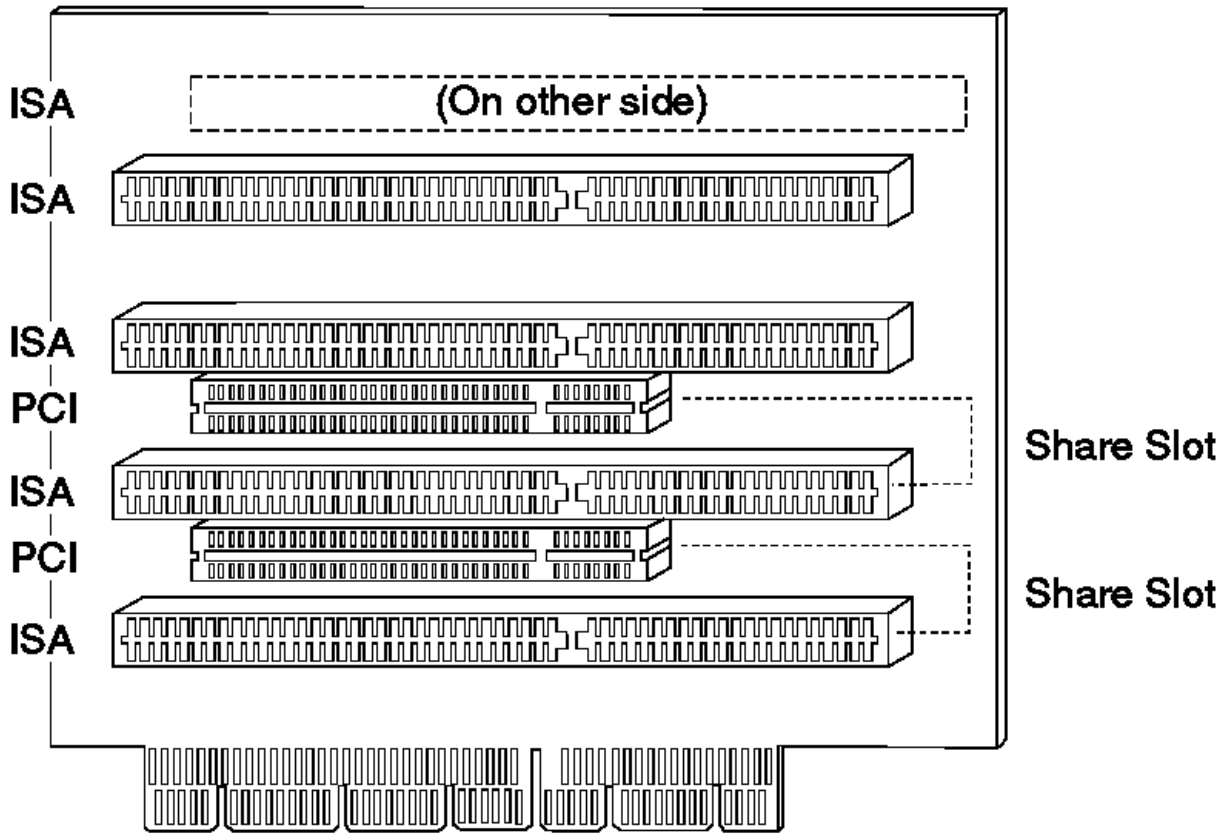
2.29.7 PC 350 (Type 6585) PCI/ISA



2.29.8 PC 330 (Type 6576) PCI/ISA

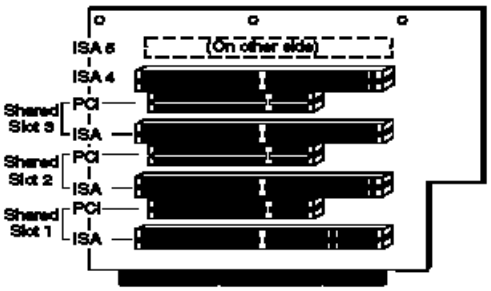


2.29.9 PC 350 (Type 6586) PCI/ISA

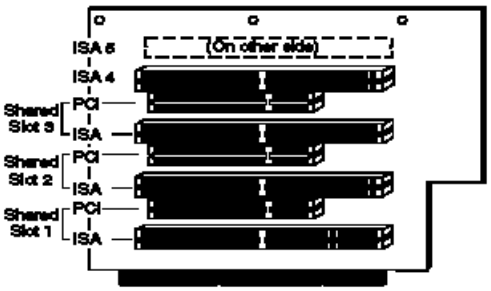


2.29.10 PC 330 (Type 6577) ISA/PCI

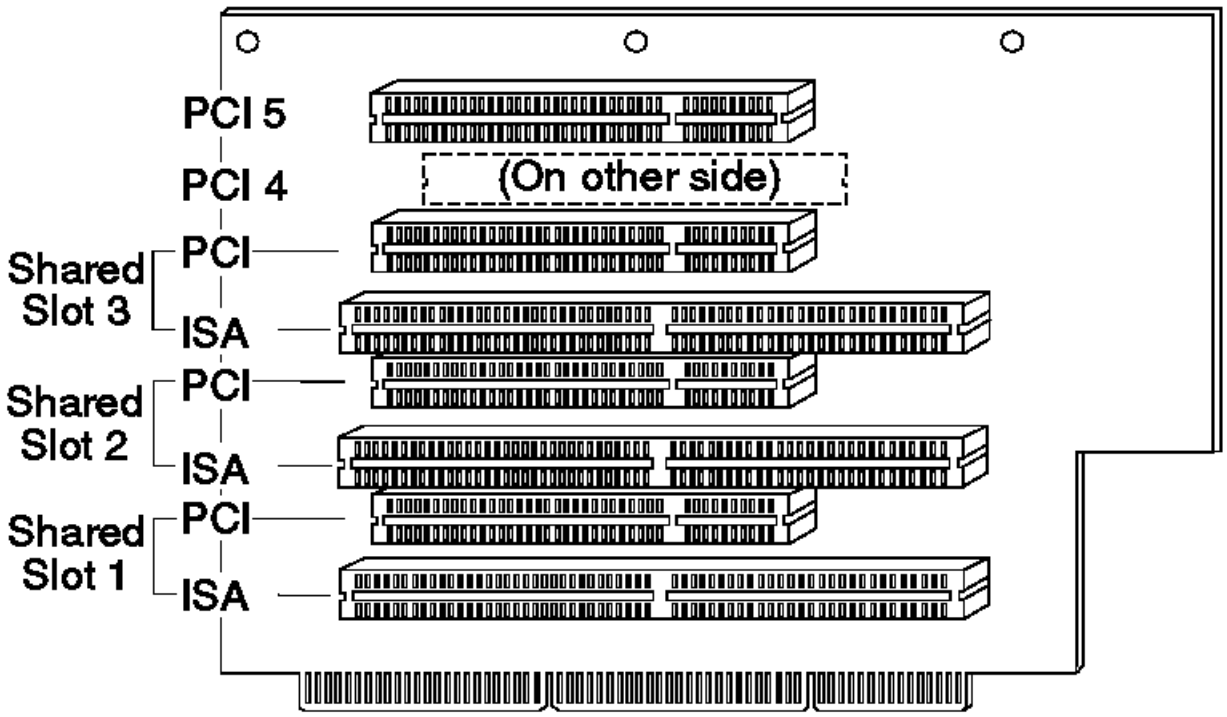
2.29.11 PC 350 (Type 6587) ISA/PCI



2.29.12 PC 365 (Type 6589) ISA/PCI

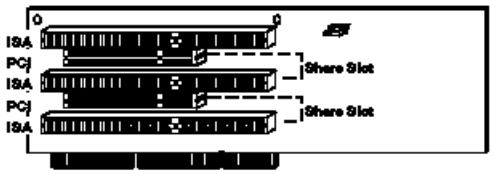


(3 Shared / 2 ISA)

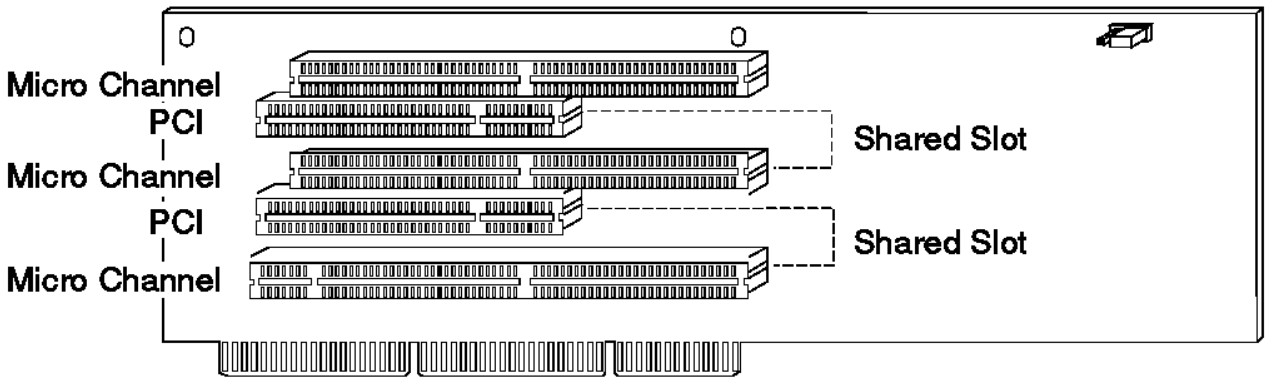


(3 Shared / 2 PCI)

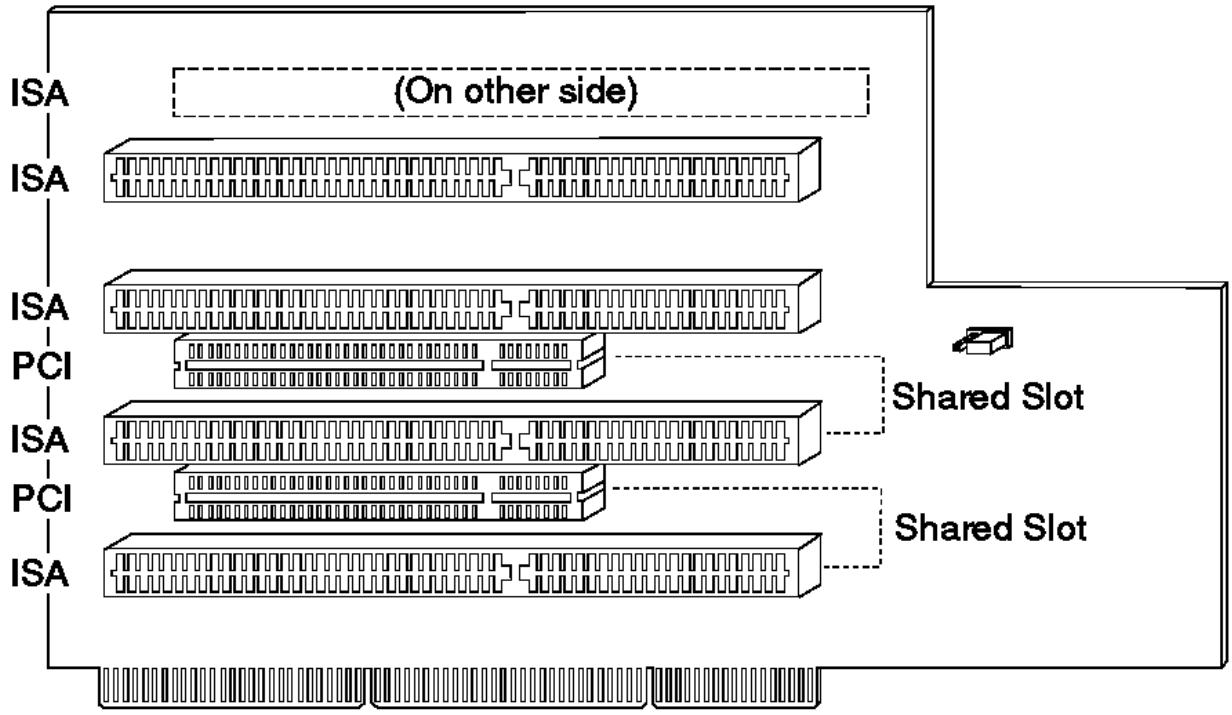
2.29.13 PC 730 (Type 6875) PCI/ISA



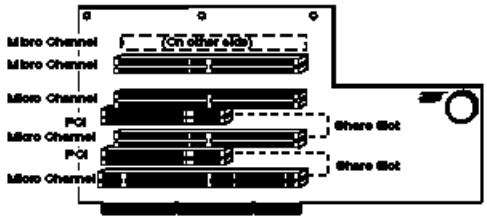
2.29.14 PC 730 (Type 6876) PCI/Micro Channel



2.29.15 PC 750 (Type 6885) PCI/ISA

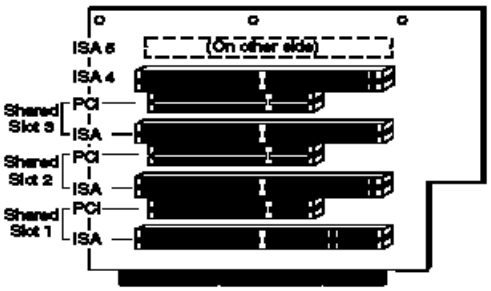


2.29.16 PC 750 (Type 6886) PCI/Micro Channel



2.29.17 PC 730 (Type 6877) ISA/PCI

2.29.18 PC 750 (Type 6887) ISA/PCI



2.29.19 Riser Card (ISA) Administrator Password

ISA riser cards have an administrator password jumper located to the left of the battery.

Note: This jumper **will not** remove the password.

The setting of this jumper determines if an Administrator Password can or cannot be set on the computer.

Important

PC 730/750 Series Only:
If the Administrator Password is lost or forgotten, the password cannot be changed or removed. If this occurs, the system board must be replaced and the customer charged accordingly.

PC 330/350 Series:
The Administrator Password can be reset on PC 330/350 Series computers.

Jumper Position	Results
1-2 (pins closest to the battery) (D)	Administrator Password **can** be set
2-3 (pins farthest from the battery)	Administrator password **cannot** be set

2.30 Type/Model Number Conversion

This section provides an explanation of the Type and Model numbers of the Type 65XX and 68XX computers. These numbers identify the features of the computer.

The Type Number contains the following information:

- Commercial Desktop series computer identification (300 or 700)
- Number of slots and bays
- Type of system board/riser connector(s) (Series specific)

The Model Number contains the following information:

- Processor Type
- Hard disk drive size and type
- Amount of memory installed and preloaded software information, if installed

The following figure shows the position of each digit of the type number and model number, and description of each position.

```
 +-------  Type number
 ¦    +--  Model number
+--+ +-+
CDBS-PHM
+¦¦¦ ¦¦+-  M = Memory/Preloaded software
 ¦¦¦ ¦+--  H = Hard disk drive size and type
 ¦¦¦ +---  P = Processor
 ¦¦+-----  S = System board/Riser connector(s)
 ¦¦                    (Series specific)
 ¦+------  B = Slots/Bays
 +------- CD = Commercial Desktop series
                       (65=300  68=700)
```

As an example, if the machine type number and model number are **6573-H3C**, each digit decodes as follows:

Digits	Information
65	Commercial Desktop 300 Series computer
7	Computer has 3 slots and 3 bays
3	486 MHz System board with PCI/ISA Riser connector(s) (300 Series computers only)
H	486DX-33 MHz processor installed
3	270 MB IDE hard disk drive installed
C	Shipped with 4 MB of memory and preloaded with OS/2

The codes for the type and model numbers, followed by descriptions for the codes are listed below.

Notes

- Other Type and Model numbers not listed here can be found in "Country/Language Model Configuration" in topic 2.31 and "Type/Model Configuration Tables" in topic 2.31.1.
- For 6560 models 4XX, 5XX, 6XX, see "Country/Language Model Configuration" in topic 2.31 and "Type/Model Configuration Tables" in topic 2.31.1.
- For 6589 models, see "Country/Language Model Configuration" in topic 2.31 and "Type/Model Configuration Tables" in topic 2.31.1.

CD -- Commercial Desktop Series Codes

CD	Commercial Desktop Series
65	300
68	700

B -- Slots/Bay Codes

B	Slots and Bays
6	4 Slots and 4 Bays
7	3 Slots and 3 Bays

8	5 Slots and 5 Bays
9	6 Slots and 6 Bays

S -- System Board/Riser Connector - 300 Series only

S	**System Board/Riser connector**
1	486 MHz with VL/ISA
3	486 MHz with PCI/ISA
5	Pentium 5V with PCI/ISA
6, 0	Pentium 3V with PCI/ISA
8	Pentium Pro with PCI/ISA
9	Pentium Pro with PCI/ISA (with Dual Processor capability)

S -- System Board/Riser Connector - 700 Series only

S	**System Board/Riser Connector**
5	Pentium-3V with PCI/ISA (2 PCI Slots)
6	Pentium-3V with PCI/MCA (2 PCI Slots)
7	Pentium-3V with PCI/ISA (3 PCI Slots)

P -- Processor, Hard Disk Drive (Type 68X7 Only)

P	**Processor, Hard Disk Drive**
6	P54C-166 MHz, 1.2 GB IDE
8	P54C-166 MHz, 1.6 GB IDE
9	P54C-166 MHz, 2.0 GB SCSI
E	P54C-100 MHz, Open Bay
F	P54C-133 MHz, Open Bay
H	P54C-166 MHz, Open Bay
K	P54C-100 MHz, 1.2 GB IDE
M	P54C-100 MHz, 1.2 GB SCSI
N	P54C-100 MHz, 1.6 GB IDE
V	P54C-133 MHz, 1.2 GB IDE
X	P54C-133 MHz, 1.2 GB SCSI
Y	P54C-133 MHz, 1.6 GB IDE

P -- Processor (Type 6577, 6587 Only)

P	**Processor**
K	P55C-166 MHz
L	P55C-200 MHz

P -- Processor (All Other Types)

P	**Processor**
C	S150 Pentium Pro (Type 6598)

G	P54C-200 MHz
H	486DX-33 MHz
K	486DX2-25/50 MHz
L	486DX2-33/66 MHz
P	P54C-90 MHz
R	P54C-100 MHz
T	P54C-133 MHz
W	486DX4-100 MHz with regulator
1	P5-60 MHz or P54C-100 MHz (No Cache)
2	P54C-75 MHz (No Cache)
3	P54C-75 MHz (256 KB L2 Cache)
4	P54C-90 MHz (256 KB L2 Cache)
5	P54C-100 MHz
6	P54C-120 MHz
7	P54C-133 MHz
8	P54C-150 MHz
9	P54C-166 MHz

H -- CD-ROM, Network Adapter, DSP/Video
(Type 68X7 Only)

H	**CD-ROM, Network Adapter, DSP/Video**
1	6X CD-ROM, No Network Adapter, DSP
6	6X CD-ROM, No Network Adapter, Matrox Graphics Adapter
A	No Features Installed
B	Ethernet Adapter Only
C	Token-Ring Adapter Only
F	4X CD-ROM, No Network Adapter, DSP
P	4X CD-ROM, No Network Adapter, Matrox Graphics Adapter

H -- Hard Disk Drive Size and Type (Type 6577, 6587 Only)

H	**Hard Disk Drive Size and Type**
B	2.5 GB IDE
N	1.6 GB IDE with Windows NT
S	2.5 GB IDE with Windows NT

H -- Hard Disk Drive Size and Type (All Other Types)

H	**Hard Disk Drive Size and Type**
0	No Hard Disk Drive Installed
2	170 MB IDE
3	270 MB IDE
4	364 MB IDE

5	540 MB IDE
6	635 MB IDE
7	850 MB IDE
8	1 GB IDE
9	1.2 GB IDE
A	1.6 GB IDE
B	360 MB SCSI
C	540 MB SCSI
D	720 MB SCSI
E	1 GB SCSI
F	2.2 GB SCSI with Multimedia (CD-ROM)
N	270 MB IDE with Multimedia (CD-ROM)
P	364 MB IDE with Multimedia (CD-ROM)
R	540 MB IDE with Multimedia (CD-ROM)
S	850 MB IDE with Multimedia (CD-ROM)
T	1 GB IDE with Multimedia (CD-ROM)
U	Universal
V	Open Bay System
W	Special Bid
Y	635 MB IDE with Multimedia (CD-ROM)
X	1.2 GB IDE with Multimedia (CD-ROM)
Z	1.6 GB IDE with Multimedia (CD-ROM)

M -- Memory and Preload Software - 300 Series, All Types

M	**Memory and Preload Software - U.S. only**
A	4 MB (Open Bay System) or 8 MB with DOS/Windows
B	4 MB with DOS and Microsoft Windows
D	4 MB with no Preloaded Software
E	8 MB (Open Bay System)
F	8 MB with SelectaSystem
G	8 MB with OS/2
H	16 MB with SelectaSystem
J	16 MB with OS/2 Warp/Connect Full Pack
K	32 MB with OS/2 Warp/Connect Full Pack
M	16 MB with DOS/Windows
S	8 MB with Windows 95 or DOS and Windows
T	16 MB with Windows 95 or DOS and Windows
U	16 MB (Open Bay System)
V	32 MB with Windows 95 or DOS and Windows
X	32 MB (Open Bay System)

M -- Memory and Preloaded Software - 700 Series
(Type 68X7 Only)

M	Memory and Preload Software - U.S. only
A	16 MB EDO, Ready to Configure
C	16 MB Parity, Ready to Configure
D	32 MB Parity, Ready to Configure
E	16 MB EDO, SelectaSystem Preload
F	32 MB EDO, SelectaSystem Preload
G	16 MB Parity, SelectaSystem Preload
H	32 MB Parity, SelectaSystem Preload
N	16 MB EDO, Windows 95
P	32 MB EDO, Windows 95
R	16 MB Parity, Windows 95
S	32 MB Parity, Windows 95

M -- Memory and Preloaded Software - 700 Series
(All Other Types)

M	Memory and Preload Software - U.S. only
E	8 MB (Open Bay System)
F	8 MB with DOS and Microsoft Windows
G	8 MB with OS/2
H	16 MB with DOS and Microsoft Windows
J	16 MB with OS/2
M	16 MB with SelectaSystem, High-Video
N	16 MB with OS/2, High-Video

2.31 Country/Language Model Configuration

Use this section for specific Type and Models that are not listed in the "Type/Model Number Conversion" in topic 2.30.

In most cases, country or language designation will be identified by the last digit of the model number.

Table 5. Country/Language Model Definition.

EMEA	**Model**
EMEA preload	xx**0**
North America	**Model**
US English	xx**U**
Canadian French	xx**F**
Latin America (LA)	**Model**
Portuguese (Brazil)	xx**P**
LA Spanish	xx**S**
LA English	xx**L**
Asia Pacific (AP)	**Model**
AP English w/Keyboard	xx**A**
AP English w/o Keyboard	xx**B**
Japan (Japanese)	xx**J**
Hong Kong (AP English)	xx**H**
China (Chinese)	xx**C**
China (AP English)	xx**D**
Thailand (Thai)	xx**T**
Taiwan (Chinese)	xx**V**
Taiwan (AP English)	xx**W**
Korea (Korean)	xx**K**
Korea (AP English)	xx**R**

Subtopics
2.31.1 Type/Model Configuration Tables

2.31.1 Type/Model Configuration Tables

Table	No.
PC 300 Type 6560 Models, 4XX, 5XX, 6XX	2.31.1
PC 300 Type 6589 Models	2.31.1

Notes

- Some models are identified as AAP (Authorized Assembler Program) models. AAP models are manufactured by IBM without certain devices such as:
  - Graphics
  - Hard Disk Drive
  - CD-ROM unit
  - Memory
  - Video or other option card
  - Preload

  IBM Authorized Dealers and Business Partners install certain devices (IBM options) in AAP models.

  The IBM HelpCenter has information, based on system serial number, for identifying installed IBM options in AAP models.
- 16X Max drive runs at a constant speed. This allows for eight-speed reading at the disk hub and sixteen-speed reading at the disk edge.

Table 6. PC 300 Type 6560 Models 4xx, 5xx, 6xx.

Model	Processor	Memory	Hard Drive	Graphics	Slots/Bays	CD-ROM	Preload
40X	P54C 133	16 MB	N/A	Cirrus 5436, 1 MB	4X4	N/A	N/A
42X	P54C 133	16 MB	1.2 GB	Cirrus 5436, 1 MB	4X4	N/A	DOS/Windo
44X	P54C 133	16 MB	1.2 GB	Cirrus 5436, 1 MB	4X4	N/A	Windows 9
46X	P54C 133	16 MB	2.5 GB	Cirrus 5436, 1 MB	4X4	N/A	Windows 9
48X	P54C 133	16 MB	2.5 GB	Cirrus 5436, 1 MB	4X4	6X	Windows 9
50X	P54C 166	16 MB	N/A	Cirrus 5436, 1 MB	4X4	N/A	N/A
52X	P54C 166	16 MB	2.5 GB	Cirrus 5436, 1 MB	4X4	N/A	Windows 9
56X	P54C 120	16 MB	N/A	Cirrus 5436, 1 MB	4X4	N/A	N/A
58X	P54C 120	8 MB	1.2 GB	Cirrus 5436, 1 MB	4X4	N/A	DOS/Windo
60X	P54C 120	16 MB	1.2 GB	Cirrus 5436, 1 MB	4X4	N/A	DOS/Windo
62X	P54C 120	16 MB	1.2 GB	Cirrus 5436, 1 MB	4X4	N/A	Windows 9
64X	P54C 133	8 MB	850 MB	Cirrus 5436, 1 MB	4X4	N/A	DOS/Windo
66X	P54C 166	16 MB	1.2 GB	Cirrus 5436, 1 MB	4X4	N/A	Windows 9

Notes:

1. Refer to "Type/Model Number Conversion" in topic 2.30 for 6560 models not listed here.
2. N/A = Not included in model.
3. Memory = Non Parity unless designated as P for Parity.

Table 7. PC 300 Type 6589

Model	Processor	Memory	Hard Drive	Graphics	Slots/Bays	CD-ROM	Preload
110	P6-200 MHz	32 MB EDO	2.5 GB IDE	S3	3X3	16X Max	Windows N
130	P6-180 MHz	32 MB EDO	2.5 GB IDE	S3	3X3	16X Max	Windows N
150	P6-200 MHz	32 MB EDO ECC	4.2 GB IDE	Matrox	3X3	16X Max	Windows N
10X	P6-180 MHz	16 MB	1.6 GB IDE	S3	5X5	N/A	N/A
12X	P6-200 MHz	32 MB	1.6 GB IDE	S3	5X5	8X	Windows N
14X	P6-200 MHz	32 MB ECC	2.2 GB SCSI	Matrox	5X5	6X PD-CD	Windows N
17X - AAP	P6-180 MHz	32 MB	N/A	S3	5X5	N/A	N/A
18X - AAP	P6-200 MHz	32 MB	N/A	S3	5X5	N/A	N/A

Notes:

1. N/A = Not included in model
2. Memory = Non Parity unless designated as P for Parity
3. AAP = Authorized Assembler Program. See "Type/Model Configuration Tables."

2.32 Miscellaneous Information

Acronyms, Abbreviations and Terms

Term	Information
ACPA/A	Audio Capture and Playback Adapter
ADP	Automatic Data Processing
Alt	Alternate
ANSI	American National Standards Institute
ARTIC	A Real Time Interface Coprocessor
ASCII	American National Standard Code for Interface Interchange
AT	Advanced Technology (as in AT Bus)
AVC	Audio Video Connection
BIOS	Basic Input/Output System (Controls System Resources)
bps	Bits Per Second
BPS	Bytes Per Second
CCITT	The International Telephone and Telegraph Consultative Committee
CCS	Common Command Set
CCSB	Common Complete Status Block
CCSB	Configuration Control Sub Board
CD	Compact Disc
CDPD	Cellular Digital Packet Data
CD-ROM	CD Read Only Memory (stores data/audio)
CGA	Color Graphics Adapter (See EGA, VGA, XGA)
CRC	Cyclic Redundancy Check
CRT	Cathode Ray Tube
CSA	Canadian Standards Association
CSD	Corrective Service Diskette
DASD	Direct Access Storage Device (hard disk, diskette)
DMA	Direct Memory Access
DRAM	Dynamic Random Access Memory
ECA	Engineering Change Announcement
ECC	Error Correction Code
EGA	Enhanced Graphics Adapter
ESD	Electrostatic Discharge
ESDI	Enhanced Small Device Interface
EEPROM	Electrically Erasable Programmable Read Only Memory
EWS	Energy Work Station
FRU	Field Replaceable Unit (replaceable part)
GPIB	General Purpose Interface Bus (IEEE 348)
GSA	General Services Administration
Ht	Height
IDE	Integrated Drive Electronics

IC	Integrated Circuit
IEEE	Institute of Electrical and Electronics Engineers
IEC	International Electrotechnical Commission
IML	Initial Machine Load
IPL	Initial Program Load
ISA	Industry Standard Architecture
ISO	International Organization for Standardization
ISDN	Integrated-Services Digital Network
LAN	Local Area Network
LBA	Local Block Address
LTB	Local Transfer Bus
LUN	Logical Unit Number (as in SCSI)
MAP	Maintenance Analysis Procedure
MCGA	Modified Color Graphics Adapter (320 x 200 x 256)
MCA	Micro Channel Architecture (bus structure)
MHz	Mega Hertz (million cycles per second)
MIDI	Musical Instrument Digital Interface
MM	Multimedia
N/A	Not Available or Not Applicable
NDD	National Distribution Division
NDIS	Network Driver Interface Specification
NMI	Non-Maskable Interrupt
NSC	National Support Center
NVRAM	Non Volatile Random Access Memory
OEM	Original Equipment Manufacturer
PCI	Peripheral component interconnect
PCMCIA	Personal Computer Memory Card International Association
POS	Programmable Option Select
PUN	Physical Unit Number (as in SCSI)
RAID	Redundant Array of Inexpensive Disks (disk array models)
RAM	Random Access Memory (read/write)
RGB	Red Green Blue (as in monitors)
RIPL	Remote Initial Program Load
ROM	Read Only Memory
SASD	Sequential Access Storage Device (Tape)
SCB	Subsystem Control Block
SCSI	Small Computer Systems Interface
SCSI ID	SCSI Identification Number (assigned device number)
SPD	Software Product Description
SR	Service Representative

SRAM	Static Random Access Memory
SVGA	Super Video Graphics Array
STN	Super Twisted Nematic
T/A	NDD Technical Advisor (See your Marketing Representative)
TDD	Telecommunications Device for the Deaf
TFT	Thin-Film Transistor
TPF	ThinkPad File
TSR	Terminate and Stay Resident
UL	Underwriters Laboratory
VCA	Video Capture Adapter
VESA	Video Electronics Standards Association
VGA	Video Graphics Array (640x480x16)
VPD	Vital Product Data
VRAM	Video Random Access Memory
WORM	Write Once, Read Many Media
XGA	Extended Graphics Array (1024 x 768 x 256)
Y/C	Luminance/Chrominance Signal (Video)

2.33 Send Us Your Comments!

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

Name

Phone Number

1. Do you like this manual?

   _____ Yes _____ No

   ---

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

   ---

3. What is your service experience level?

   _____ Less than five years

   _____ More than five years

   ---

4. Which computers do you service most?

Thanks in advance for your response!

2.34 Do You Need Technical References?

We have a wide range of hardware technical references that provide in-depth information about IBM personal computer products. Our Technical Reference Library includes information about:

- Micro Channel, Setup, and Subsystem Control Block architectures
- Common interfaces (including microprocessors, system timers, parallel and serial port controllers, keyboards and keystrokes, SCSI, DMA, video, and more)
- Specific Personal System/2 systems (including system board connectors, jumpers, memory subsystems, I/O subsystems, programming interfaces and registers, and error codes)
- Basic input/output system (BIOS)
- Options and adapters

Note

A catalog of our current offerings is available on the World Wide Web at:

http://www.pc.ibm.com/desktop/pcdcat.html

Technical information manuals for the latest Commercial Desktop computers are available on the World Wide Web. These publications can be viewed online in BookManager format, or they can be downloaded as PostScript files. Go to **http://www.pc.ibm.com/cdt** and then select the "Technical information" topic.

2.35 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.

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 - Winnepeg
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.
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QAPlus/P	ODiagSoft, Inc.
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Triplett	Triplett Corp.
VESA	Video Electronics Standards Association
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