Chapter 2

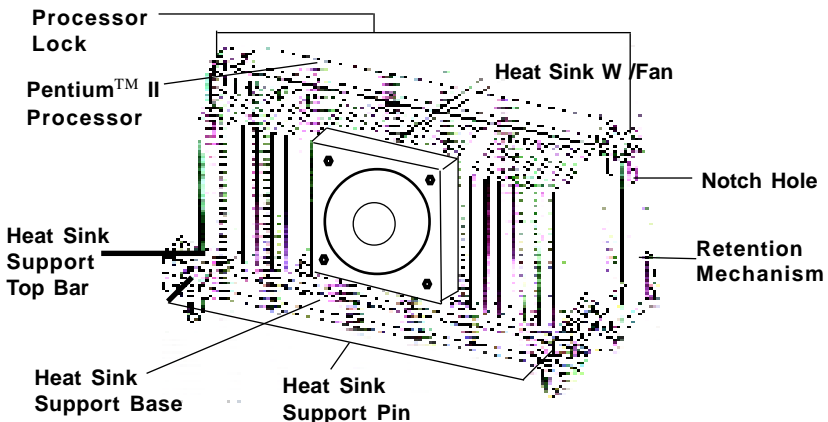## Hardware Installation

2.1 Central Processing Unit: CPU

The mainboard operates with **Intel® Pentium™ II Processor** with MMX™ Technology. The mainboard provides a CPU Slot called Slot 1for easy CPU installation, a DIP switch (SW) to set the proper speed for the CPU. The CPU should always have a Heat Sink and a cooling fan attached to prevent from overheating.

CHAPTER 2   HARDWARE INSTALLATION

2.1-1 CPU Installation Procedure

There are two kinds of Pentium™ II Processor that is currently used. The OEM Pentium™ II Processor and the Boxed Pentium™ II Processor. OEM Pentium™ II Processor has no Heat Sink, Fan and Heat Sink Support, while the Boxed Pentium™ II Processor is provided with Heat Sink w/ fan and Heat Sink Support.

A. OEM Pentium™ II Processor Installation Procedures

Required Things:

Pentium™ II Processor - Processor.

*Retention Mechanism(RM) - Plastic Guide that holds the S.E.C. Catridge in the Slot 1 connector.

*Heat Sink Support Base (HSSBASE) - Plastic support bar mounted to the mainboard under the ATX heatsink. (One leg is always bigger than the other one)

*Heat Sink Support Pin (HSSPIN) - Plastic pins inserted through the HSSBASE to secure it to the mainboard (2 required per Assembly).

*Heat Sink Support Top Bar (HSSTOP) - Plastic bar that clips onto the HSSBASE through the fins on the ATX heatsink.

Heat Sink w/ fan - Heat Sink that can be attach to the **Pentium™ II Processor with metal clip.

Note: * Provided by MSI mainboard.
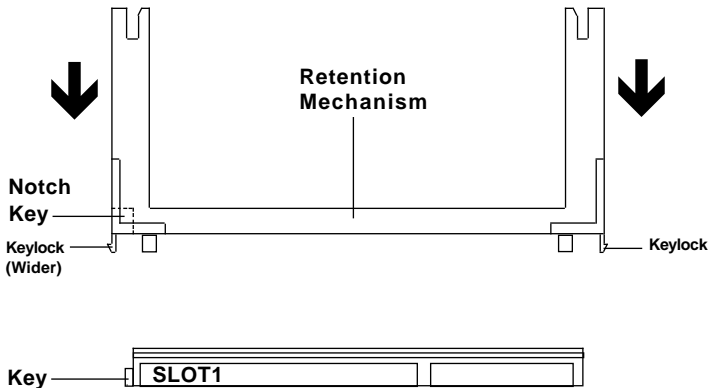   ** Provided by Special request.

CHAPTER 2   HARDWARE INSTALLATION

Step 1: Place the bubble bag that came with your mainboard or use any soft material like Styrofoam underneath the mainboard. Find a flat surface to do the installation.

Step 2: Install the Retention Mechanism.

Look for the key on Slot 1, and match it with the Notch Key on the Retention Mechanism for the proper direction. Then, insert the Two Keylock of the Retention Mechanism into the two holes on the sides of Slot 1. Take note that one hole is wider than the other. The Retention Mechanism will only fit in one direction.
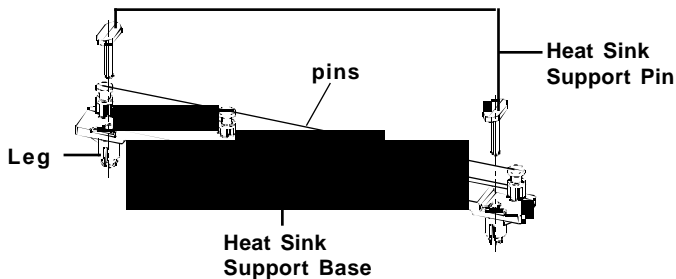

Push the Retention Mechanism onto the mainboard, until you hear a "click" sound. Check for a perfect fit.

CHAPTER 2   HARDWARE INSTALLATION

Step 3: Install the Heat Sink Support Base.

Look for the Two holes across Slot 1, and match it with the Two legs of the Heat Sink Support Base for the proper direction. Take note that one hole/leg is bigger than the other. The Four top pins of the Heat Sink Support Base should also be oriented towards Slot 1.

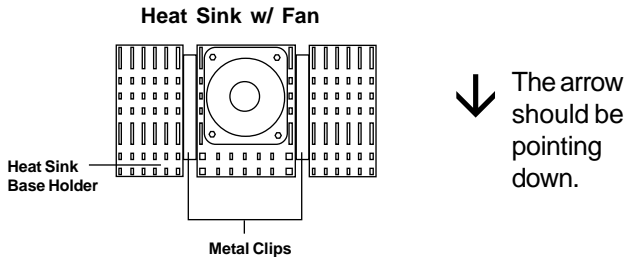Push the Heat Sink Support Base onto the mainboard, until you hear a click sound. Check for a perfect fit.

Step 4: Install the Heat Sink Support Pin.

Push the Heat Sink Support Pins onto the two holes of the Heat Sink Support Base. Check for a perfect fit. These pins are used to secure the Heat Sink Support Base.
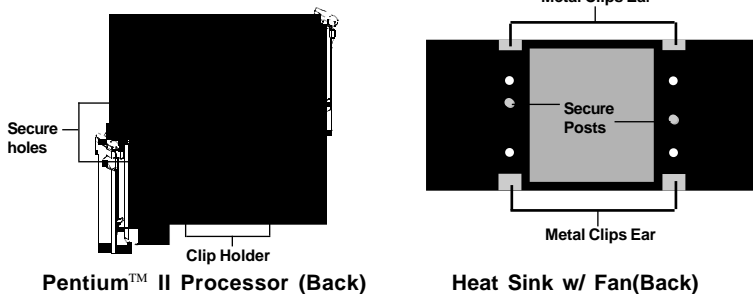
Step 5: Install the Heat Sink with Fan to the Processor.

Push down the metal clips, so that they are in line with the back of the Heat Sink. Be careful, so as not detach the metal clips from the Heat Sink.

Heat Sink w/ Fan

The arrow should be pointing down.

Heat Sink Base Holder

Metal Clips

In case the metal clips are detached from the Heat Sink, re-attach them. Look for the arrow on the metal clip. This arrow should be pointing down and aligned with the Heat Sink Support Base Holder.

Attach the Heat Sink to the processor.

Metal Clips Ear

Secure holes

Secure Posts

Clip Holder

Metal Clips Ear

Pentium™ II Processor (Back)   **Heat Sink w/ Fan(Back)**

- Look at the back of the Heat Sink and take note of the 2 secure posts. Insert these 2 Secure posts to the 2 secure holes on the back of the processor.

- Align the ears of the metal clips with the clip holders on the back of the processor. Use a screw driver to push the metal clips onto the clip holders. Check for a perfect fit.

CHAPTER 2   HARDWARE INSTALLATION
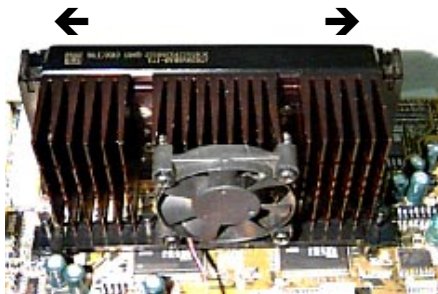
Step 6: Install the Processor.

Unlock the Processor by pushing in the Processor

Insert the Processor like inserting a PCI or an ISA card.
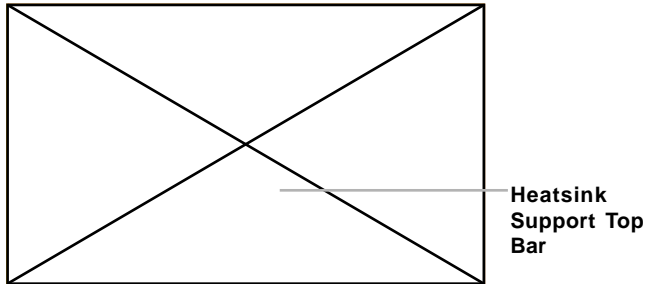
Step 7: Lock the Processor Locks.

Secure the CPU by pushing out the Processor Locks.

Step 8: Install the Heat Sink Support Top Bar.

Push the Heat Sink Support Top Bar to the Heat Sink Support Base,
Until you hear a "click" sound. Check for a perfect fit.

Heatsink
Support Top
Bar

The installation is now complete.
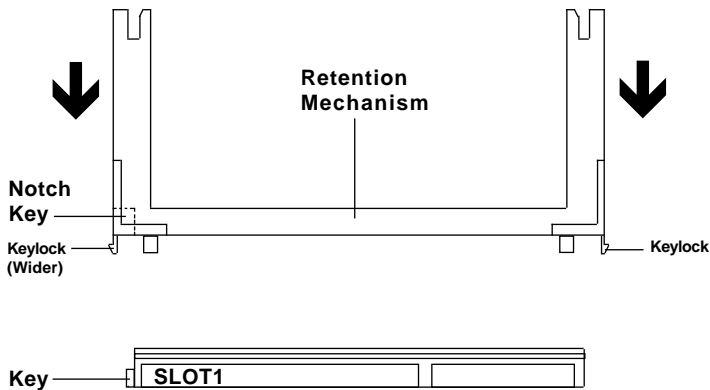
CHAPTER 2   HARDWARE INSTALLATION

B. Boxed Pentium™ II Processor Installation Procedures

The Boxed Pentium™ II Processor has a built- in Fan and Heat Sink. It also has a Heat Sink Support. So if you're going to use a Boxed Pentium™ II Processor, all you need is the Retention Mechanism.

Step 1: Place the bubble bag that came with your mainboard or use any soft material like Styrofoam underneath the mainboard. Find a flat surface to do the installation.

Step 2: Install the Retention Mechanism.

Look for the key on Slot 1, and match it with the Notch Key on the Retention Mechanism for the proper direction. Then, insert the Two Keylock of the Retention Mechanism into the two holes on the sides of Slot 1. Take note that one hole is wider than the other. The Retention Mechanism will only fit in one direction.
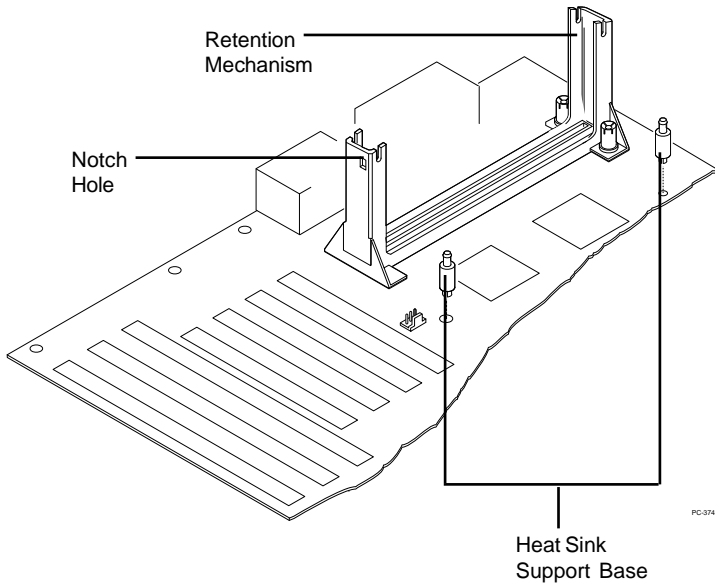

Push the Retention Mechanism onto the mainboard, until you hear a "click" sound. Check for a perfect fit.

CHAPTER 2   HARDWARE INSTALLATION

Step 3: Install the Heat Sink Support Base.

Look for the 2 holes across Slot 1, and match it with the 2 Heat Sink Support Base. Take note that one hole/base is bigger than the other.
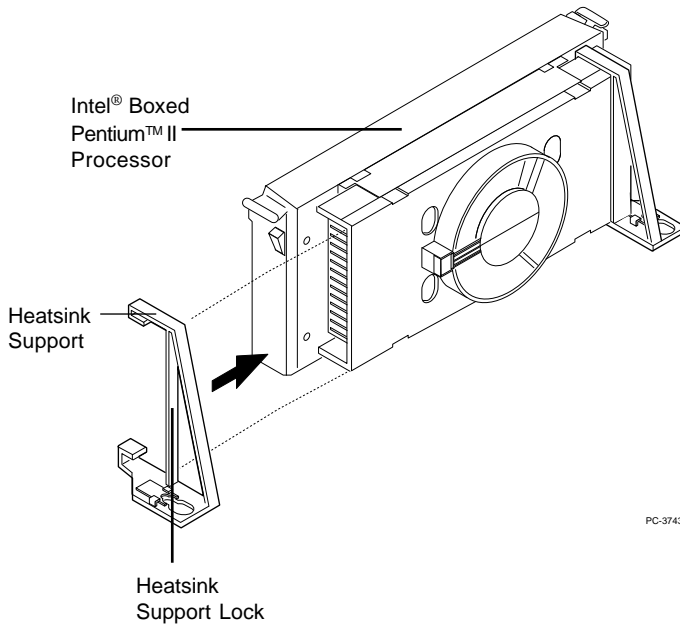

Push the Heat Sink Support Base onto the mainboard, until you hear a click sound. Check for a perfect fit.
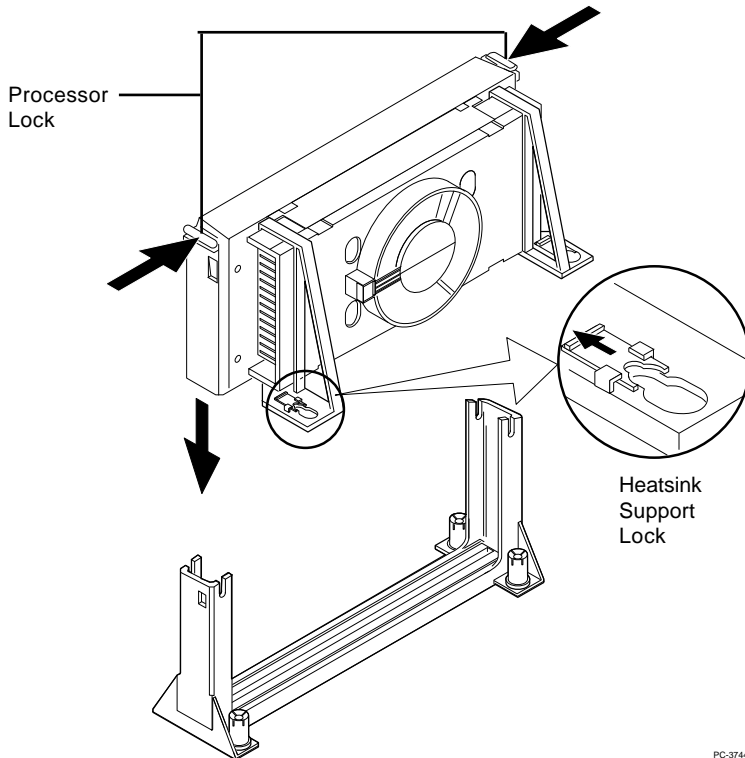
Step 4: Install the Heat Sink Support.

Attach the 2 Heat Sink Supports to the sides of the Processor. These Heat Sink Supports will fit in any direction, so be sure that the Heat Sink Support Locks are oriented outwards for the proper direction.

Intel® Boxed
Pentium™ II
Processor

Heatsink
Support

PC-3743

Heatsink
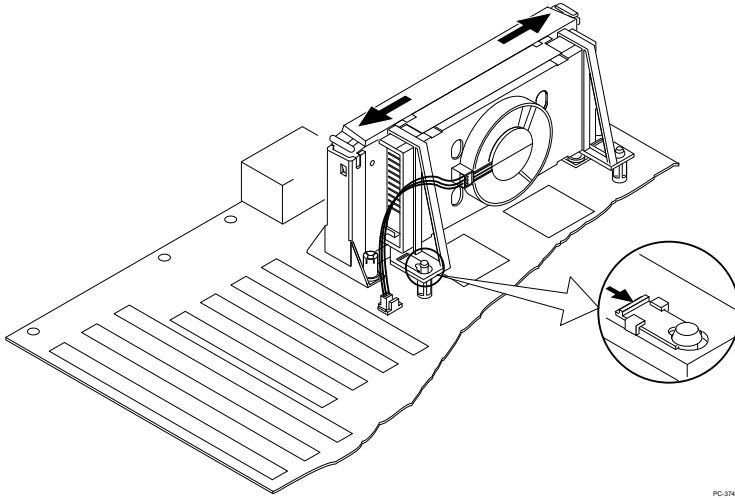Support Lock

PC-3744

Step 5: Push in the Processor Lock.

Step 6: Open the Heatsink Support Lock.

Step 7: Insert Intel's Boxed Pentium™ II Processor like inserting a ISA or PCI card.

PC-3745

Step 8: Lock the CPU by Pulling the Processor Card Lock .

Note: *To unlock, push the Processor Card Lock until you heard a "Click" sound.*

Step 9: Close the Heatsink Support Lock.

The installation is now completed.

CHAPTER 2   HARDWARE INSTALLATION

2.1-2   CPU Core Speed Derivation Procedure

1. The 2 CPU clock frequencies that the system supports are 60 MHz, 66MHz
   (To adjust SW1 pin 1, 2, 3 and 4). See the following chart to set the
   different Host Clock Frequencies.

SW1				CPU
1	**2**	**3**	**4**	**CLOCK**
OFF	OFF	ON	ON	60MHz
ON	ON	OFF	OFF	66MHz

2. The DIP Switch SW1 (5, 6, 7 and 8) is used to set the Core/Bus (Fraction)
   ratio of the CPU. The actual core speed of the CPU is the Host Clock
   Frequency multiplied by the Core/Bus ratio. For example:

If	CPU Clock	=	66MHz
	Core/Bus ratio	=	7/2
then	CPU core speed	=	Host Clock x Core/Bus ratio
		=	66.6MHz x 7/2
		=	233MHz

SW1				CPU
5	**6**	**7**	**8**	**CORE/BUS RATIO**
ON	ON	ON	OFF	4/1
ON	ON	OFF	OFF	5/1
ON	OFF	OFF	ON	7/2
ON	OFF	ON	OFF	9/2
ON	OFF	OFF	OFF	11/2
OFF	ON	ON	ON	6/1
OFF	ON	OFF	ON	7/1
OFF	ON	ON	OFF	8/1
OFF	OFF	ON	ON	13/2
OFF	OFF	OFF	ON	15/2

3. The PCI Bus Clock is the CPU Clock Frequency divided by 2.

CHAPTER 2   HARDWARE INSTALLATION

2.1-3 CPU Speed Setting: SW

To adjust the speed of the CPU, you must know the specification of your
CPU (*always ask the vendor for CPU specification*) then look at **Table 2.1
(Intel® 233 ~ 266MHz Pentium™ II Processor)** for proper setting.

Speed Setting

CHAPTER 2   HARDWARE INSTALLATION

Table 2.1 Intel® 233 ~ 266MHz Pentium™ II Processor

Intel® Pentium™ II Processor is currently available in two speed setting 233MHz and 266MHz. For future reference, refer to the CPU core speed derivation procedure on **Section 2.2-1**.
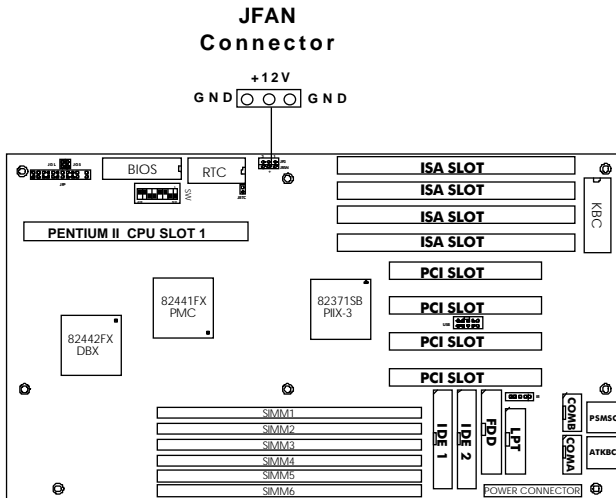
SPEED SETTING

Intel® 233MHz Pentium® II Processor

Intel® 266MHz Pentium® II Processor

2.1-4 CPU Fan Power Connector: JFAN

This connector supports CPU cooling fan with +12V. It supports both two and three pin head connector.   When connecting the wire to the connector, always take note that the red wire is positive and should be connected to the +12V.
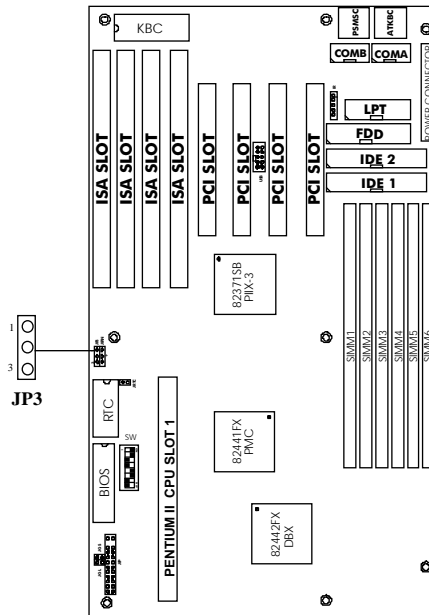

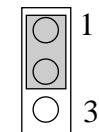**Note:**   Always consult vendor for proper CPU cooling fan.

CHAPTER 2   HARDWARE INSTALLATION

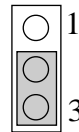## 2.2 Flash ROM Programming Voltage: JP3

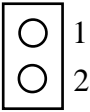This jumper is for setting the Voltage of the Flash ROM BIOS.
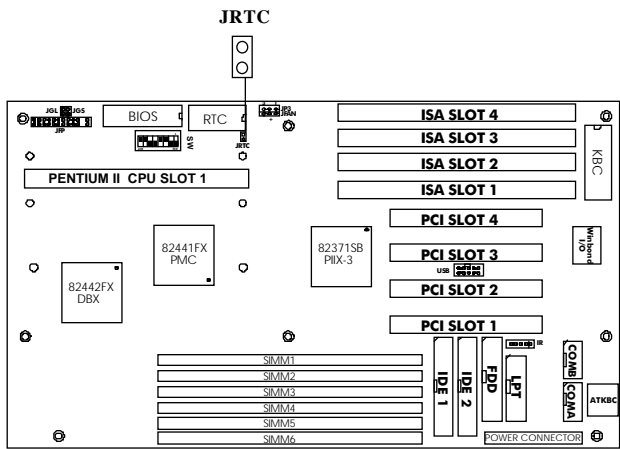

Voltage Setting

+12V

+5V
(default)

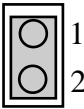**Note:** SST & Winbond Flash ROM are set in +5V
MXIC & Intel Flash ROM are set in +12V.

2.3 CMOS RAM Clear: JRTC

This jumper is for clearing the RTC data.
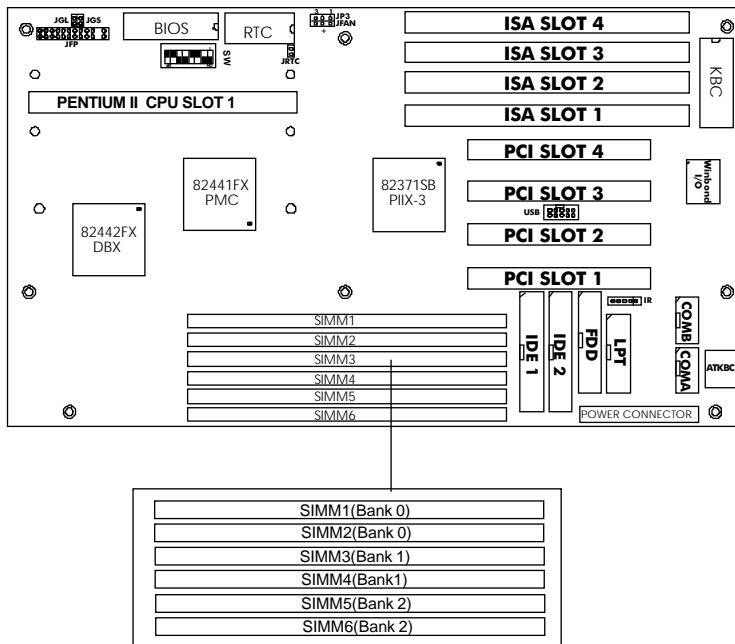
JRTC

**keep Data
(default)**

clear

CHAPTER 2   HARDWARE INSTALLATION

2.4 Memory Installation

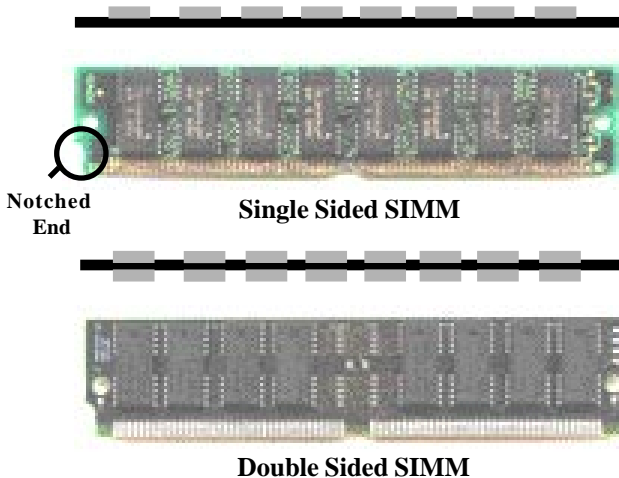### 2.4-1   Memory Bank Configuration

The system board supports a maximum of 768 MB of memory: It provides six 72-pin SIMMs (Single In-Line Memory Module) sockets. It support 4 MB up to 128 MB of memory. The memory module can be either FP (Fast Page), EDO (Extended Data Output) or BEDO (Burst Extended Data Output) Mode DRAM. A Bank consists of a pair of SIMMs.
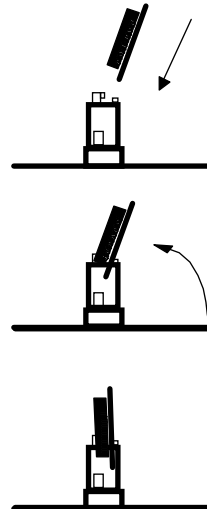
2.4-2 Memory Installation Procedures:

A. How to install a SIMM Module

Single Sided SIMM

Notched End

Double Sided SIMM

1. The SIMM slot has a "*Plastic Safety Tab*" and the SIMM memory module has a "Notched End", so the SIMM memory module can only fit in one direction.

2. Insert the SIMM memory modules into the socket at 45-degree angle, then push into a vertical position so that it will snap into place.

3. The Mounting Holes and Metal Clips should fit over the edge and hold the SIMM memory modules in place.

Note: Always use 5 volts SIMM with 70 ns or below(Fast Page or EDO) DRAM

CHAPTER 2   HARDWARE INSTALLATION

2.4-3 DRAM Population Rules

In order to create a memory array, certain rules must be followed. The following set of rules allows for optimum configuration.

1. Dram modules must be populated in pairs.

2. DRAM modules can populated in any order(i.e. SIMM1/2 does not have to populated before SIMM3/4 and SIMM5/6 or vise versa).

3. DRAM module pairs need to be populated with the same densities(Single or Double). For example, SIMM1/2 sockets should be populated with identical densities. However SIMM3/4 or SIMM5/6 sockets can be populated with different densities.

4. BEDO, EDO, FP modes can be mixed in the memory array. But only one type per Bank. For example, SIMM1/2 can be populated with EDO, while SIMM3/4 or SIMM5/6 can be populated with FP or EDO.

5. The DRAM timing which provides the DRAM speed grade control for the entire memory array must be programmed to use the timing of the slowest DRAM that is currently installed.

6. The DRAM addressing and the size supported by the system board is shown next page:

Note: To use the ECC (Error Code Correct) function, a SIMM module with parity support must be used. At this time you can turn on the ECC function in the BIOS setup.

CHAPTER 2   HARDWARE INSTALLATION

Table 2.4-1 Minimum (upgradeable) and Maximum Memory Size for each configuration for SIMM

DRAM Tech.	DRAM Density & Width	DRAM Addressing	Address Size		MB/SIMM	
			Row	Column	Single no. Side(S) pcs.	Double no. Side(D) pcs.
4M	1Mx4	SYMM	10	10	4MBx8	8MBx16
16M	1Mx16	SYMM	10	10	4MBx2	8MBx4
	1Mx16	ASYM	12	8	4MBx2	8MBx4
	2Mx8	ASYM	11	10	8MBx4	16MBx8
	4Mx4	SYMM	11	11	16MBx8	32MBx16
	4Mx4	ASYM	12	10	16MBx8	32MBx16
64M	2Mx32	ASYM	12	9	8MBx1	16MBx2
	4Mx16	SYMM	11	11	16MBx2	32MBx4
	4Mx16	ASYM	12	10	16MBx2	32MBx4
	8Mx8	ASYM	12	11	32MBx4	64MBx8
	16Mx4	SYMM	12	12	64MBx8	128MBx16

CHAPTER 2   HARDWARE INSTALLATION

2.5 Case Connector: JFP

The Turbo LED, Hardware Reset, Key Lock, Power LED, Power Saving LED, Power Saving Switch, Speaker and HDD LED are all connected to the JFP connector block.
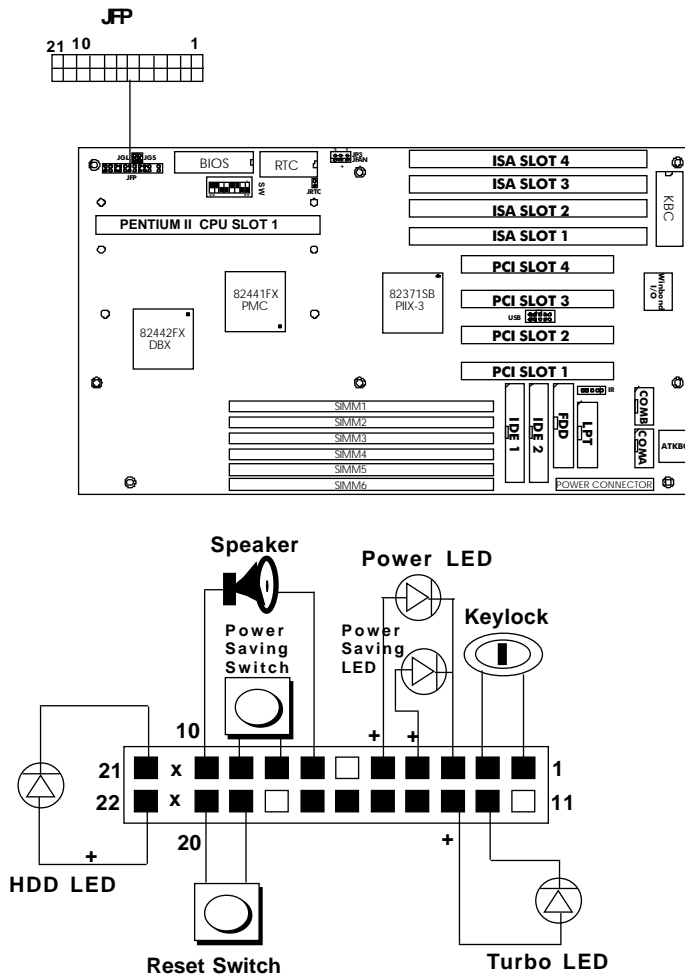

Figure 2.1

CHAPTER 2   HARDWARE INSTALLATION

2.5-1 Turbo LED

The Turbo LED is always lit. You can connect the Turbo LED from the system case to this pin. (See Figure 2.1)

2.5-2 Hardware Reset

Reset switch are use to reboot the system rather than turning the power ON/ OFF. You can connect the Reset switch from the system case to this pin. Avoid rebooting while the HDD LED is lit.   (See Figure 2.1)

2.5-3 Keylock

Keylock allows you to disable the keyboard for security purposes. You can connect the keylock to this pin. (See Figure 2.1)

2.5-4 Power LED

The Power LED is always lit while the system power is on. You can connect the Power LED from the system case to this pin. (See Figure 2.1)

2.5-5 Speaker

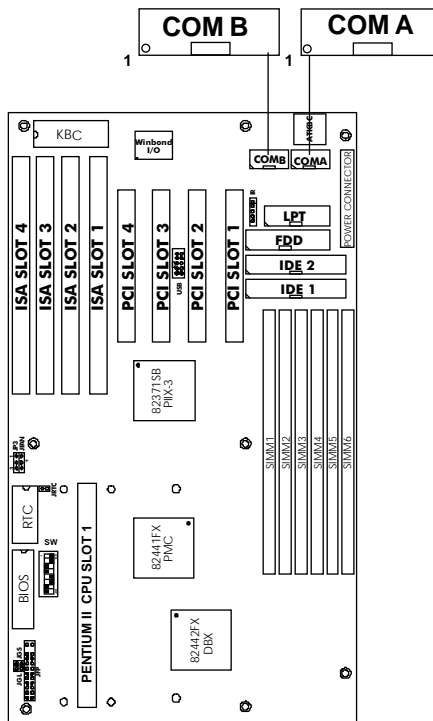Speaker from the system case are connected to this pin. (See Figure 2.1)

2.5-6 HDD LED

HDD LED shows the activity of a hard disk drive. Avoid turning the power off while the HDD led is lit. You can connect the HDD LED from the system case to this pin. (See Figure 2.1).
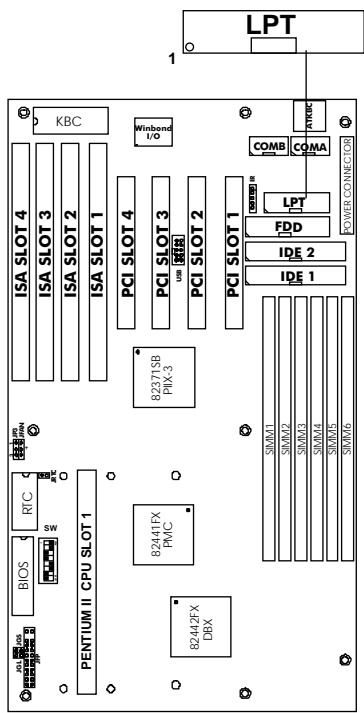
2.6 Serial Port Connectors: COM A & COM B

The system board has two serial ports COM A and COM B. These two ports are 16550A high speed communication ports that send/receive 16 bytes FIFOs. You can attach a mouse or a modem cable directly into these connectors.
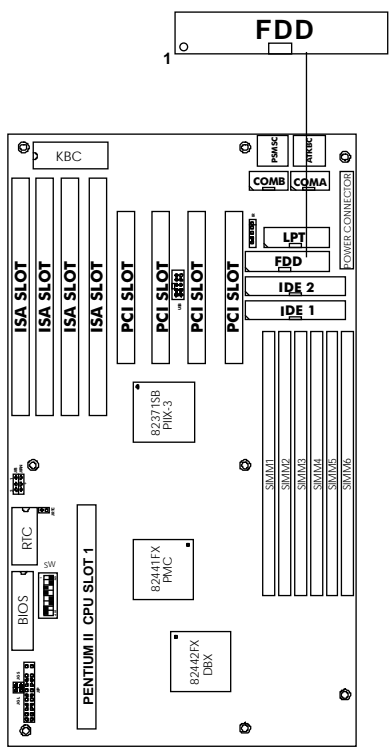
2.7 Parallel Port Connectors: LPT

The system board provides a connector for LPT. A parallel port is a stand-ard printer port that also supports Enhanced Parallel Port(EPP) and Extended capabilities Parallel Port(ECP).

CHAPTER 2   HARDWARE INSTALLATION
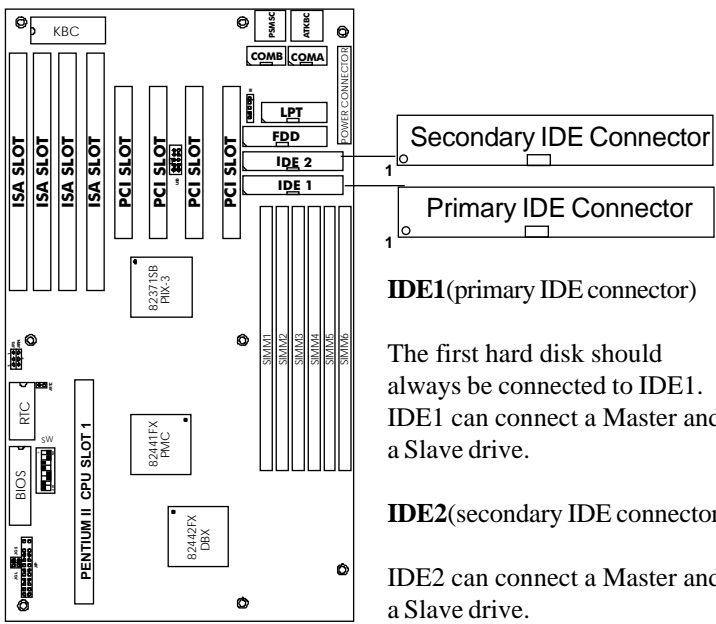
2.8 Floppy Disk Connector: FDD

The system board also provides a standard floppy disk connector (FDD)
that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types. You
can attach a floppy disk cable directly to this connector.

CHAPTER 2   HARDWARE INSTALLATION

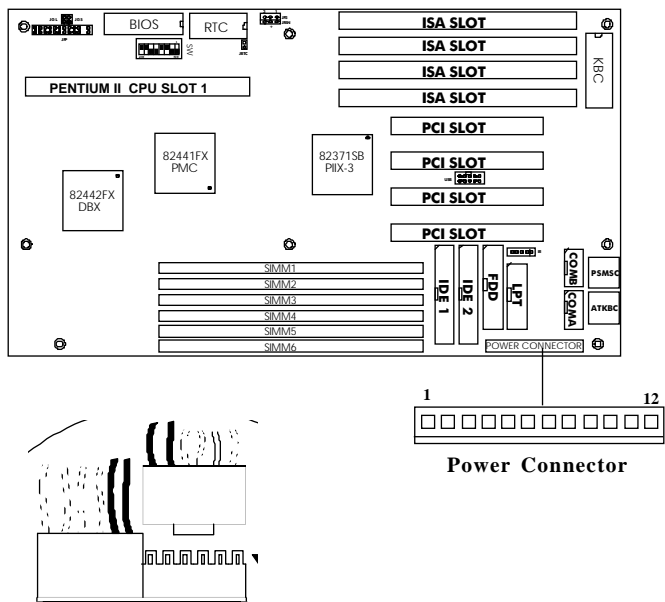## 2.9 Hard Disk Connector: IDE1 & IDE2

The system board has a 32-bit Enhanced PCI IDE Controller that provides
for two HDD connectors IDE1 (primary) and IDE2 (secondary). You can
connect up to four hard disk drives, CD-ROM, 120MB Floppy (reserved for
future BIOS) and other devices to IDE1 and IDE2.

IDE1 (primary IDE connector)

The first hard disk should
always be connected to IDE1.
IDE1 can connect a Master and
a Slave drive.

IDE2 (secondary IDE connector)

IDE2 can connect a Master and
a Slave drive.

CHAPTER 2   HARDWARE INSTALLATION

2.10 Power Supply Connector: PWR12

PWR12 is a standard 12-pin AT-type or PS/2 type connector.   Be sure to attach the connectors with the two black wires at the center.
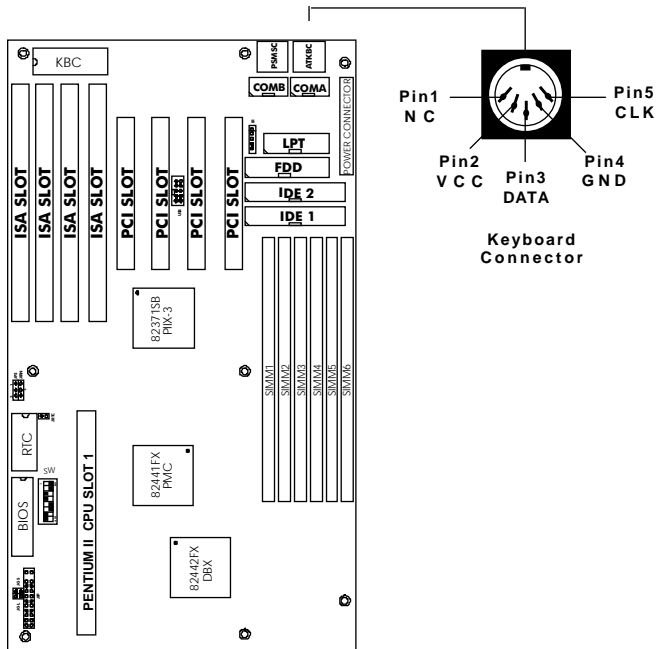

Power Connector

Pin	Description	Pin	Description
1	Power Good	7	Ground
2	+5V DC	8	Ground
3	+12V DC	9	-5V DC
4	-12V DC	10	+5V DC
5	Ground	11	+5V DC
6	Ground	12	+5V DC

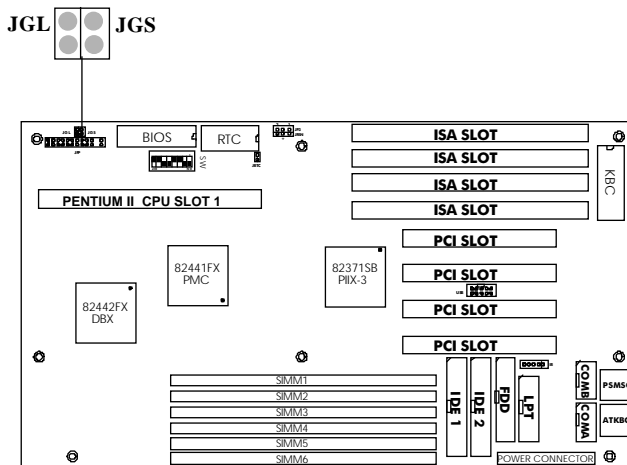## 2.11 Keyboard Connector: ATKBC

The system board provides a standard AT style keyboard DIN connector
for attaching a keyboard. This is an option to a PS/2 style keyboard DIN
connector. You can plug a keyboard cable directly to this connector.

Keyboard
Connector

CHAPTER 2   HARDWARE INSTALLATION

2.12 Power Saving Switch Connector: JGS/ Power Saving LED Connector: JGL
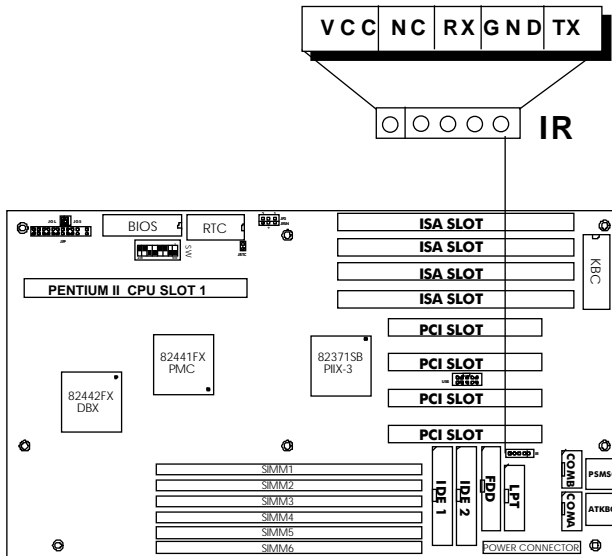
Attach a power saving switch to this connector. When the switch is pressed, the system immediately goes into suspend mode. Press any key and the system wakes up.

CHAPTER 2   HARDWARE INSTALLATION

2.13 IrDA Infrared Module Connector: IR

The system board provides a 5-pin infrared connector(IR) for IR module.
This connector is for optional wireless transmitting and receiving infrared
module. You must configure the setting through BIOS setup. FIR (reserved)

2.14 USB Connector: USB (Reserved)

This 10-pin connector supports USB devices. This function is a reserved function.