**Chapter 2**

HARDWARE INSTALLATION

2.1   Central Processing Unit: CPU

The mainboard operates with **Intel®Pentium®II processor with MMX™ technology.** The mainboard uses a CPU Slot called Slot 1 for easy CPU installation and a DIP switch (SW1) to set the proper speed for the CPU. The CPU should always have a Heat Sink and a cooling fan attached to prevent overheating.

2.1-1 CPU Installation Procedures

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
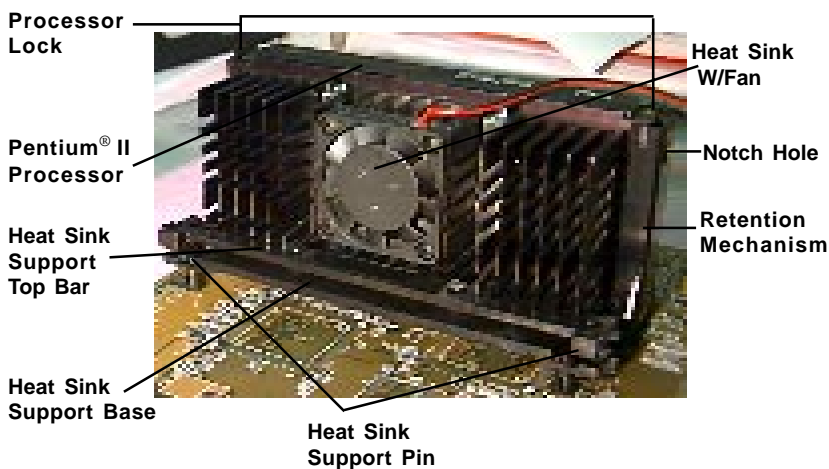
Required Things:

Pentium® II processor - Processor.

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

*Retention Mechanism Attach Mount(RMAM) - Bolt/Bridge assemblies inserted up through the bottom of the motherboard. RM secures to RMAM (2 RMAM required per RM).

*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 attached to the **Pentium® II processor with metal clip.
Note: * Provided by MSI mainboard.
          ** Provided by Special request.

**HSSBASE**

RM

HSSPIN

RMAM   **HSSTOP**

Step 1: Insert the Retention Mechanism Attach Mount at the bottom of the mainboard.

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 proper direction. Then, attach the Retention Mechanism to the Retention Mechanism Attach Mount. Use a Screwdriver to secure the Retention Mechanism.
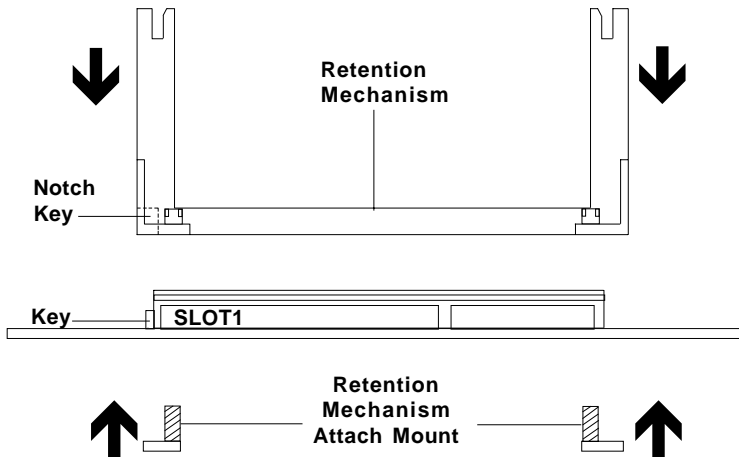
Step 3: Install the Heat Sink Support Base.

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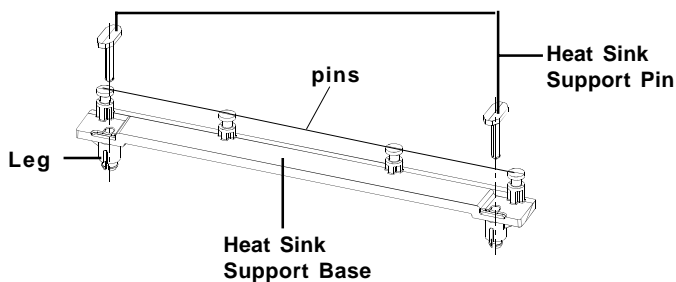
Push the Heat Sink Support Base onto the mainboard, until you hear
a click sound. Check for a perfect fit.

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

Heat Sink
Base Holder

Metal Clips

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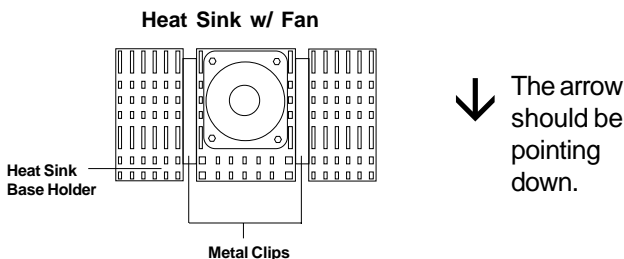
In case the metal clips are detached from the Heat Sink, re-attach them. Look for the arrow on the metal clip. This arrow should be pointing down and aligned with the Heat Sink Support Base Holder.
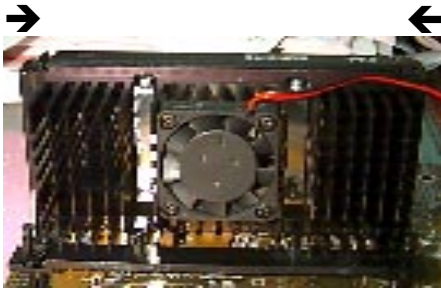
Attach the Heat Sink to the processor.

Clip Holder

Secure holes

Clip Holder

Metal Clips Ear

Secure Posts
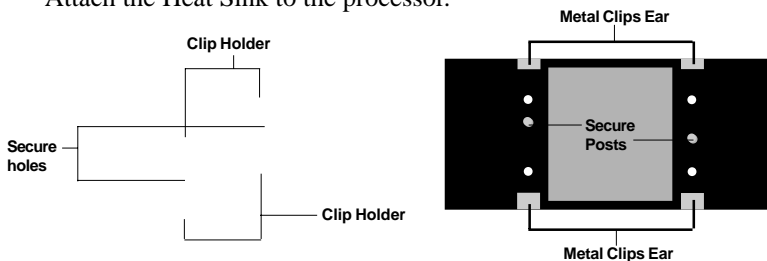
Metal Clips Ear

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.
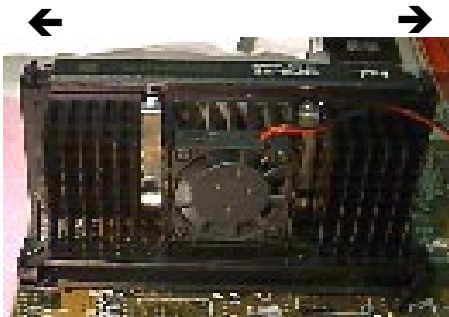
Step 6: Install the Processor.

Unlock the Processor by pushing in the Processor Locks.

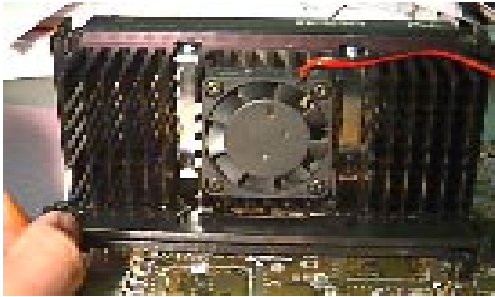

Insert the Processor like inserting a PCI or an ISA card.

Step 7: Lock the Processor Locks.

Secure the CPU by pulling the Processor Locks out.

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.

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 the Boxed processor, all you need is the Retention Mechanism.

**Step 1:** Insert the Retention Mechanism Attach Mount at the bottom of the mainboard.

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 proper direction. Then, attach the Retention Mechanism to the Retention Mechanism Attach Mount. Use a Screwdriver to secure the Retention Mechanism.
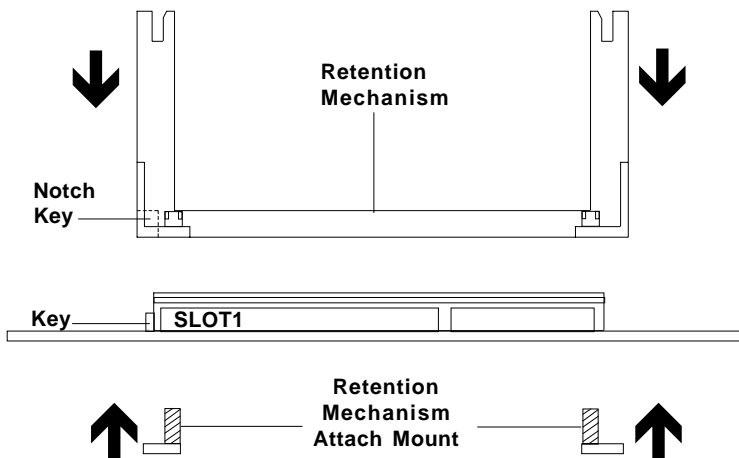
Step 3: Install the Heat Sink Support Base.

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.
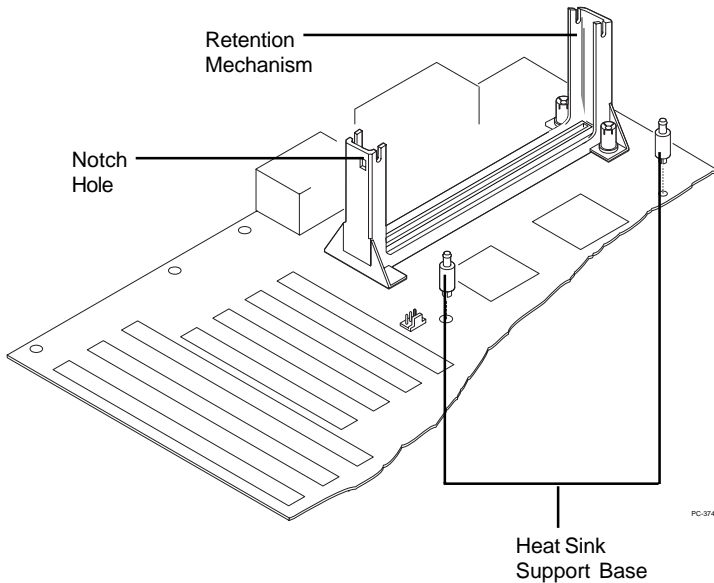
Retention
Mechanism

Notch
Hole

PC-3742

Heat Sink
Support Base

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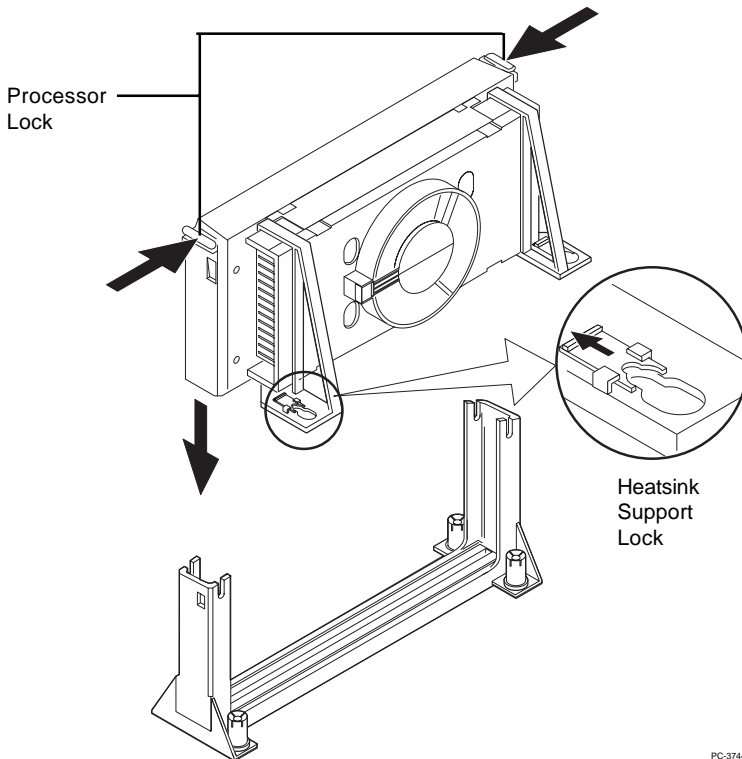
Step 4: Install the Heat Sink Support.

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.
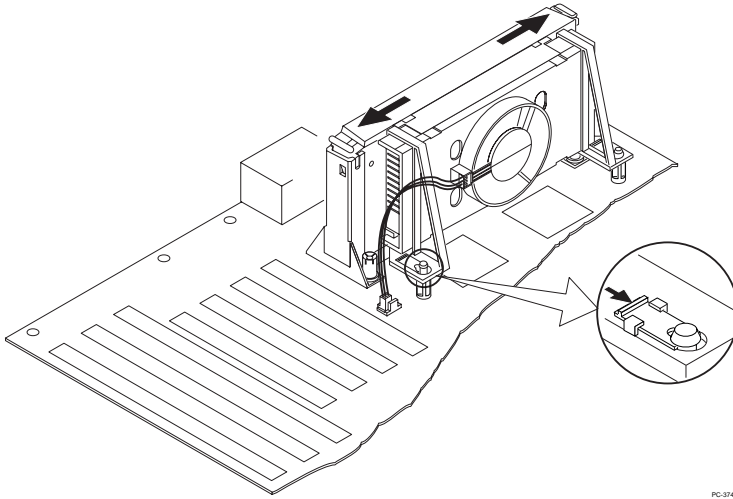
Intel® Boxed
Pentium™ II
Processor

Heat Sink
Support

PC-3743

Heat Sink
Support Lock
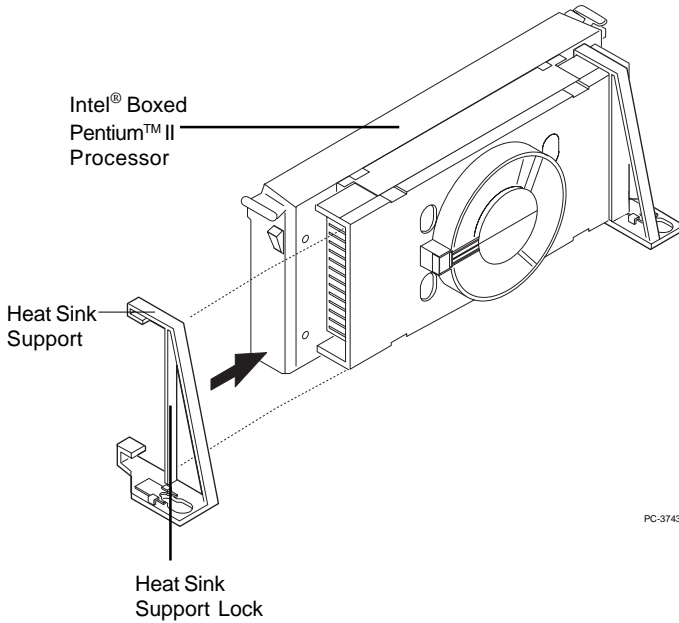
Step 5: Unlock the Processor Locks and Heat Sink Support Locks.

Push in the Processor Locks. Open the Heat Sink Support Locks.

Processor
Lock

Heatsink
Support
Lock

PC-3744

Step 6: Insert the Processor like inserting a PCI or an ISA card.

PC-3745

Step 7: Lock the Processor Locks and Heat Sink Support Locks

Secure the CPU by pushing out the Processor Locks. Close the Heat Sink Support Locks.

The installation is now complete.

2.1-2 CPU Speed Setting: SW1

To adjust the speed of the CPU, you must know the specifications of your CPU (*always ask the vendor for CPU spec.*). Then look at **Table 2.1 (200 ~ 333MHz Intel®Pentium® II processor)** for setting.
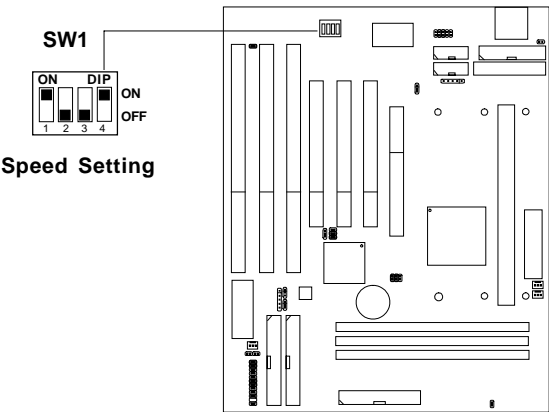

Table 2.1 200 ~ 333MHz   Intel® Pentium® II processor

CPU Type	SW1
200MHz	
233MHz	
266MHz	
300MHz	
333MHz	

2.1-3 Fan Power Connectors: CPUFAN1/CFAN2/SFAN1/ PSFAN1

These connectors support system cooling fan with +12V. It supports three pin head connector. When connecting the wire to the connector, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. If your mainboard have a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan speed detect feature.
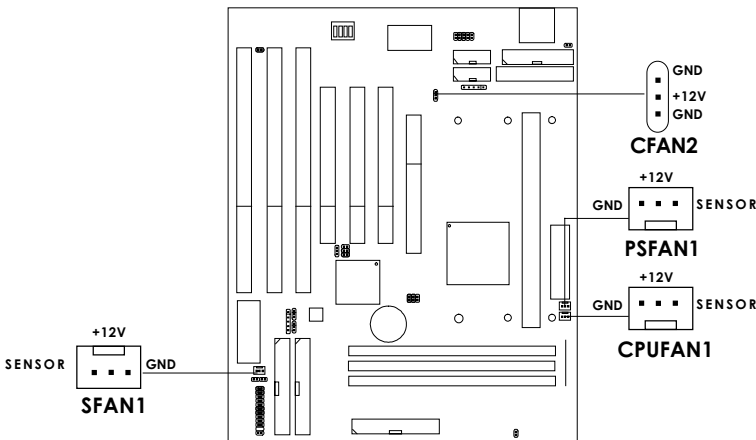

CPUFAN1	: processor fan
CFAN2	: processor fan
PSFAN1	: power supply fan
SFAN1	: system fan

Note: There are four fan connectors provided by this mainboard. But the System Hardware Monitor can only monitor up to three fans, so the JFAN is not supported. For fans with speed sensor, every rotation of the fan will send out 2 pulses. System Hardware monitor will count and report the fan rotation speed.

2.2 External Battery Connector: JBAT1

A battery must be used to retain the mainboard configuration in CMOS
RAM.   If you use the on-board battery, you must short 1-2 pins of JBAT1
to keep the CMOS data.
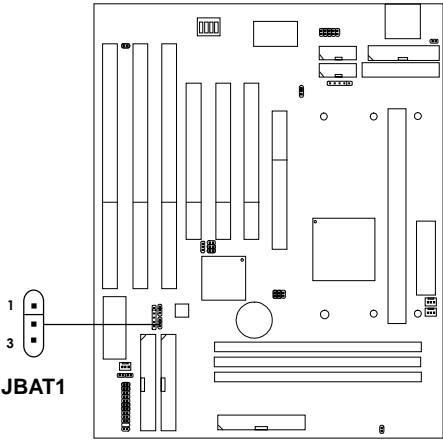
| JBAT1	Function
1 3	**Keep Data**
1 3	**Clear Data**

Note: You can clear CMOS by shorting 2-3 pin, while the system is off.
Then, return to 1-2 pin position. To be able to clear the CMOS, you
need to unplug the power plug of the system, because there's a 3V
standby power for PIIX4 chipset which is provided by the power
supply. Otherwise, the CMOS will not be cleared.

2.3 Flash ROM Programming Voltage: JMODE1

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

JMODE1

Voltage Setting

JMODE1

+12V
PWD
VCC

1
3

+12V

JMODE1

+12V
PWD
VCC

1
3

+5V
(default)
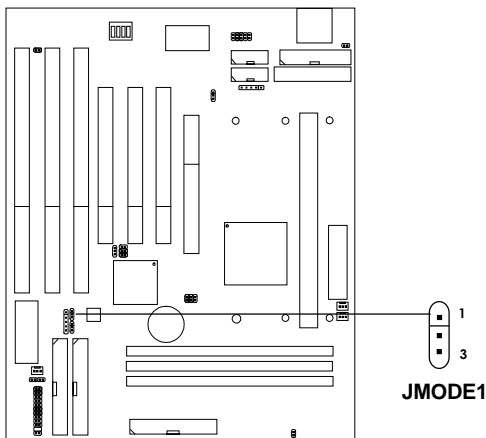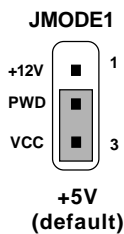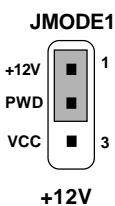
Note: a. Short 1-2 pin, if you're using Intel®or MXIC®flash memory and
                you want to flash the ROM data.
           b. Short 2-3 pin, if you're using Intel®or MXIC®flash memory for
                normal operation.

2.4 Power On Mode Jumper: J12

The mainboard supports two kinds of system boot up: the Boot-Up by switch and the Immediate Boot-Up. With the Boot-Up by Switch, the system will boot up only when the power on switch is pressed. For Immediate Boot-Up, the system will boot up instantly when the power connector is connected into the system.

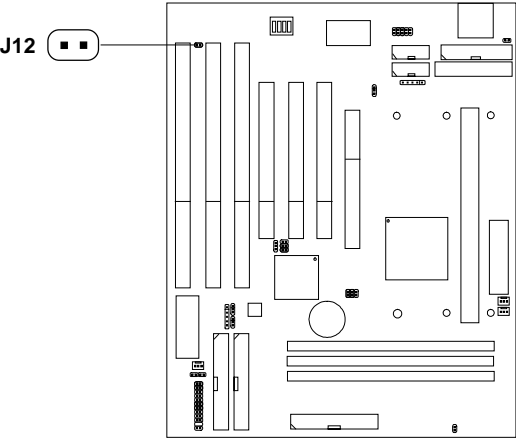**Table 2.4: Power On Mode Feature**

J12	Feature
▪ ▪ **J12**	Select Boot-Up by Swtich
▪ ▪ **J12**	Select Immediate Boot-Up

> **Note:** Short **J12**, when using Boot-Up by Switch feature. Open **J12**, to enable Immediate Boot-Up.

2.5 Memory Installation

2.5-1   Memory Bank Configuration

The mainboard supports a maximum of 768MB of memory for EDO and
384MB for SDRAM: It provides three 168-pin **unbuffered** DIMMs (Double
In-Line Memory Module) sockets. It supports 8 MB to 256 Mbytes DIMM
memory module.
The memory module can be either SDRAM or EDO (Extended Data Output)
Mode DRAM.

| DIMM3(Bank4, 5) |
| DIMM2(Bank2, 3) |
| DIMM1(Bank0, 1) |
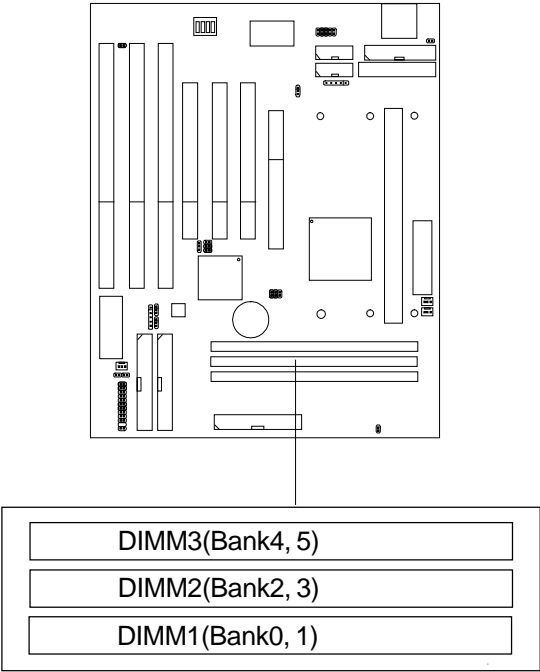
2.5-2 Memory Installation Procedures:
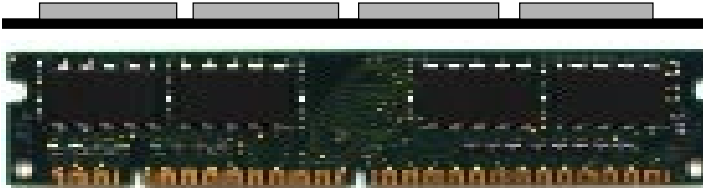
Single Sided DIMM
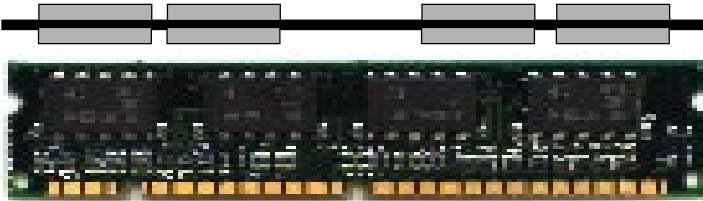
Double Sided DIMM

1. The DIMM slot has a two Notch Key "VOLT and DRAM", so the DIMM memory module can only fit in one direction.

2. Insert the DIMM memory module vertically into the DIMM slot. Then push it in.

DRAM   VOLT
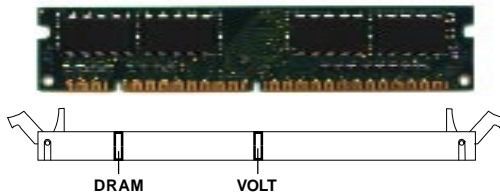
3. The plastic clip at the side of the DIMM slot will automatically close.

2.5-3 Memory Population Rules

1. This mainboard supports Table Free memory, so memory can be installed in DIMM1, DIMM2, or DIMM 3 in any order.

2. Use only 3.3v unbuffered DIMM.

3. The DRAM addressing and the size supported by the mainboard is shown next page.

Table 2.5-1 EDO DRAM Memory Addressing

| DRAM Tech.	DRAM Density & Width	DRAM Addressing	Address Size		MB/DIMM	
			Row	Column	Single no. Side(S) pcs.	Double no. Side(D) pcs.
16M	1Mx16	SYMM	10	10	8MBx4	8MBx4
	1Mx16	ASYM	12	8	8MBx4	8MBx4
	2Mx8	ASYM	11	10	16MBx8	16MBx8
	2Mx8	ASYM	12	9	16MBx8	16MBx8
	4Mx4	SYMM	11	11	32MBx6	32MBx16
	4Mx4	ASYM	12	10	32MBx6	32MBx16
64M	2Mx32	ASYM	11	10	16MBx2	16MBx2
	2Mx32	ASYM	12	9	16MBx2	16MBx2
	2Mx32	ASYM	13	8	16MBx2	16MBx2
	4Mx16	SYMM	11	11	32MBx4	32MBx4
	4Mx16	ASYM	12	10	32MBx4	32MBx4
	8Mx8	ASYM	12	11	64MBx8	64MBx8
	16Mx4	SYMM	12	12	128MBx16	128MBx16

Table 2.5-2 SDRAM Memory Addressing

DRAM Tech.	DRAM Density & Width	DRAM Addressing	Address Size		MB/DIMM	
			Row	Column	Single no. Side(S) pcs.	Double no. Side(D) pcs.
16M	1Mx16	ASYM	11	8	8MBx4	16MBx8
	2Mx8	ASYM	11	9	16MBx8	32MBx16
	4Mx4	ASYM	11	10	32MB	64MB
64M	2Mx32	ASYM	11	9	32MBx2	64MBx4
	2Mx32	ASYM	12	8	16MBx2	32MBx4
	4Mx16	ASYM	11	10	32MB	64MB
	4Mx16	ASYM	13	8	32MB	64MB
	8Mx8	ASYM	13	9	64MB	128MB
	16Mx4	ASYM	13	10	128MB	256MB
64M	2Mx32	ASYM	11	8		
	4Mx16	ASYM	12	8		
	8Mx8	ASYM	12	9		
	16Mx4	ASYM	12	10		

2.6 Case Connector: JFP1

The Turbo LED, Reset Switch, Key Lock, Power LED, Speaker and HDD
LED are all connected to the JFP1 connector block.
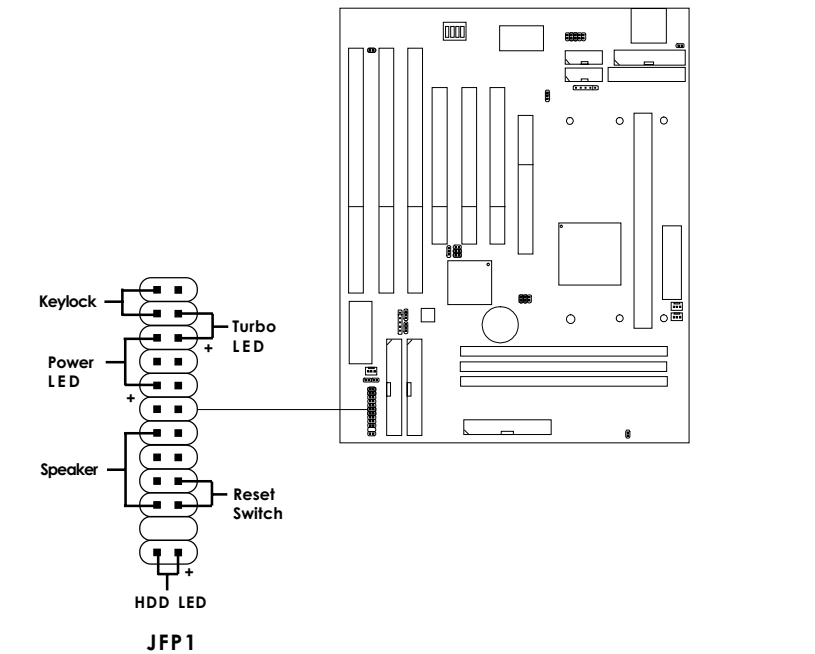
2.6-1 Turbo LED

The Turbo LED is always ON. You can connect the Turbo LED from the system case to this pin.

2.6-2 Reset Switch

Reset switch is used to reboot the system rather than turning the power ON/OFF.

2.6-3 Keylock

Keylock allows you to disable the keyboard for security purposes. You can connect the keylock to this pin.

2.6-4 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.

2.6-5 Speaker

Speaker from the system case is connected to this pin.

2.6-6 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.

2.7 Floppy Disk Connector: FDC

The mainboard also provides a standard floppy disk connector FDC that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types. This connector support the provided floppy drive ribbon cables.

FDC
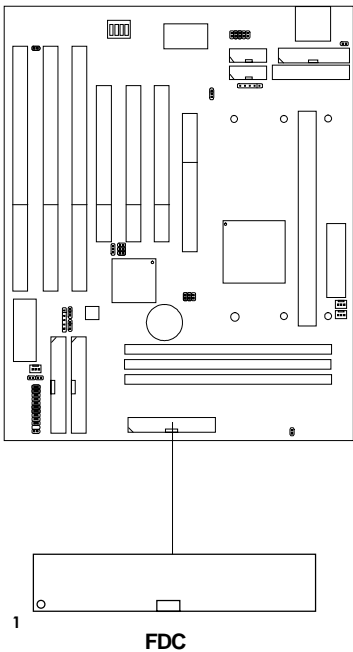
2.8 Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE Controller that provides PIO
mode 0~4, Bus Master, and Ultra DMA/33 function. It has 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. These connectors support the
provided IDE hard disk cable.
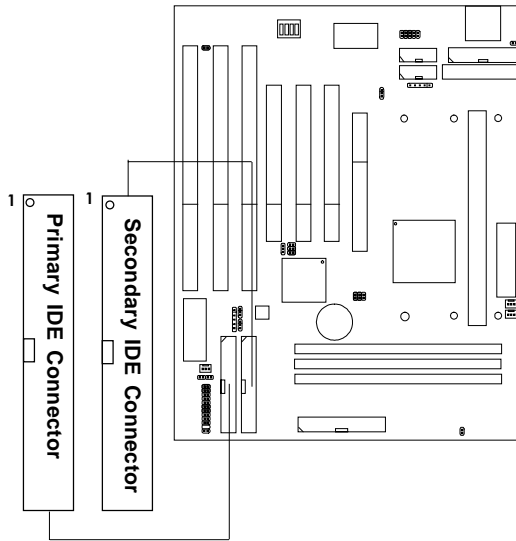
IDE1(Primary IDE Connector)

The first hard drive should always be connected to IDE1. IDE1 can
connect a Master and a Slave drive. You must configure second hard
drive to Slave mode by setting the jumper accordingly.

IDE2(Secondary IDE Connector)

IDE2 can also connect a Master and a Slave drive.

2.9 Power Supply

2.9-1 ATX 20-pin Power Connector: JPWR1

This connector supports the power button on-board. Using the ATX power supply, functions such as Modem Ring Wake-Up and Soft Power Off are supported by this mainboard.
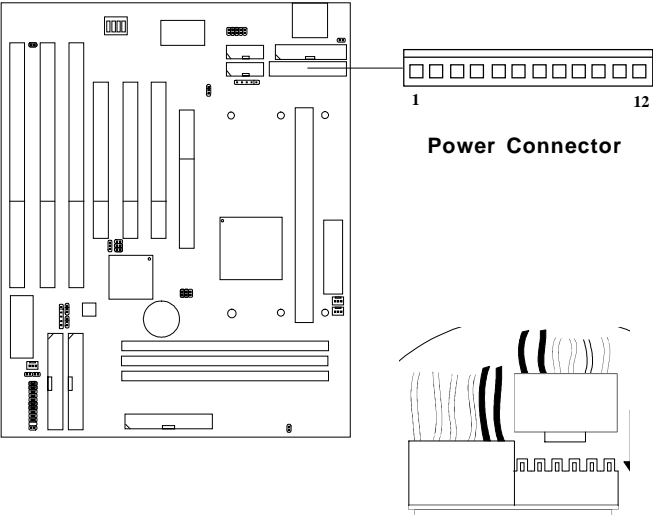

**ATX
Power Connector**
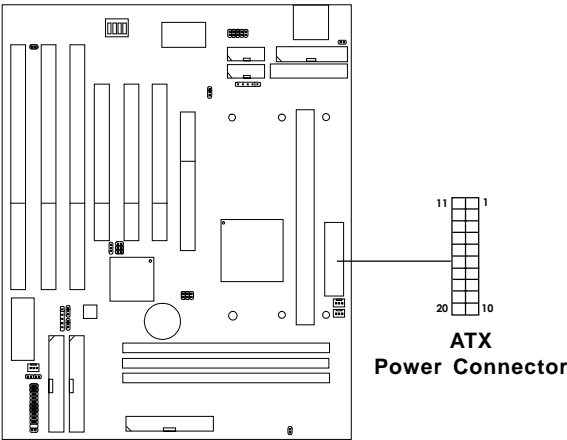
PIN DEFINITION

PIN	SIGNAL	PIN	SIGNAL
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

2.9-2 AT Power Supply Connector: ATP1

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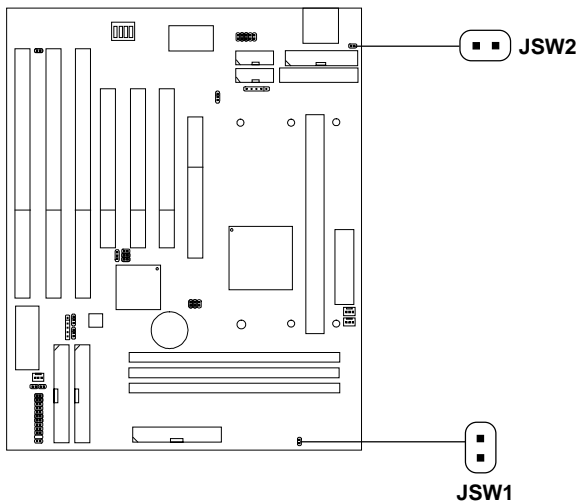

Power Connector

PIN DEFINITION

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

## 2.9-3   Remote Power On/Off Switches: JSW1/JSW2

Connect to a 2-pin push button switch. If Instant-on is Enabled, every time the switch is shorted by pushing it once, the power supply will change its status from OFF to ON. **If Instant-on is Disabled: During ON stage, push once and the system goes to sleep mode: pushing it more than 4 seconds will change its status from ON to OFF**. If you want to change the setup, you could go to the BIOS Power Management Setup. This is used for ATX type power supply.

Note: The two switches are provided by the mainboard for your convenience, so you can use any of them. The two switches have the same function.

2.10 Serial Port Connectors: COM A & COM B

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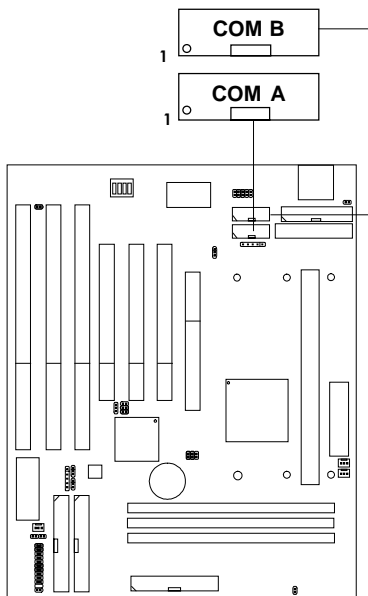
2.11   Parallel Port Connector: LPT

The mainboard provides a connector for LPT. A parallel port is a standard
printer port that also supports Enhanced Parallel Port(EPP) and Extended
capabilities Parallel Port(ECP).
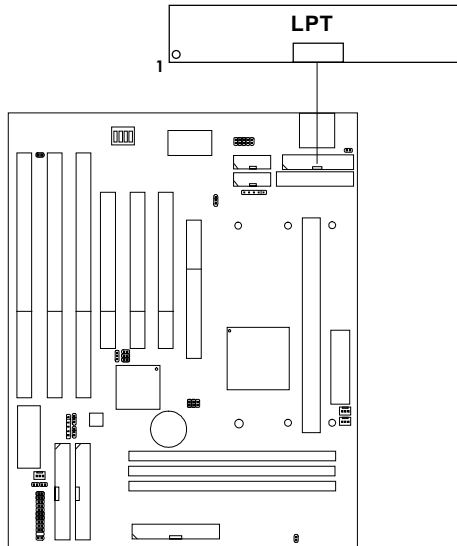
2.12 Infrared Module Connector: IR

The mainboard provides a 5-pin infrared connector(IR) for IR module. This
connector is for optional wireless transmitting and receiving infrared module.
If you want to use this function, you must configure the setting through
BIOS setup.
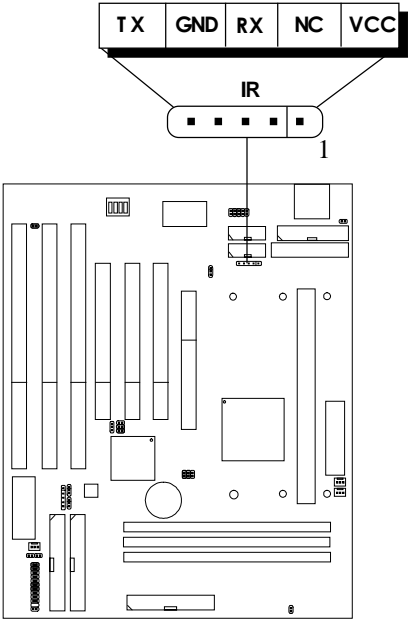
2.13 Power Saving Switch Connector: JGS1/ Power Saving LED Connector: JGL1

Attach a power saving switch to JGS1. When the switch is pressed, the system immediately goes into suspend mode. Press any key and the system wakes up. JGL1 can be connected with LED to monitor the JGS1. This will lit while the system is in suspend mode.

JGS1 (▪ ▪)(▪ ▪) **JGL1**
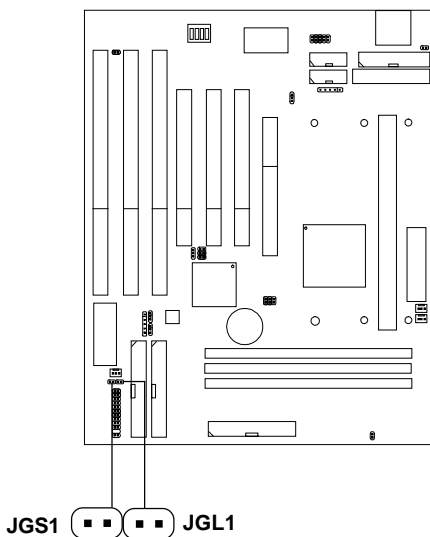
Note: To make JGS1 function, you must go to the BIOS power management and enable it there.

2.14 Keyboard Connector: ATKBC

The mainboard provides a standard AT® keyboard DIN connector for attaching a keyboard. You can plug a keyboard cable directly to this connector.
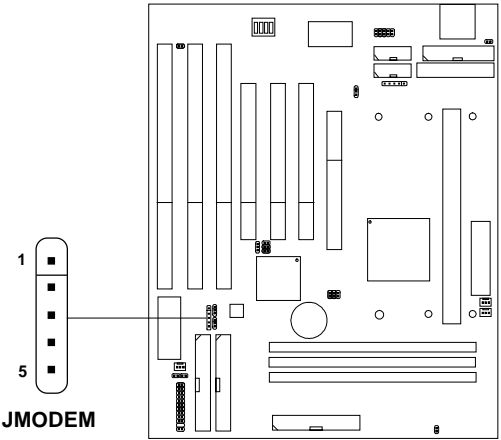

Pin1
NC

Pin5
C L K

Pin2
VCC

Pin3
DATA

Pin4
GND

AT® Keyboard Connector
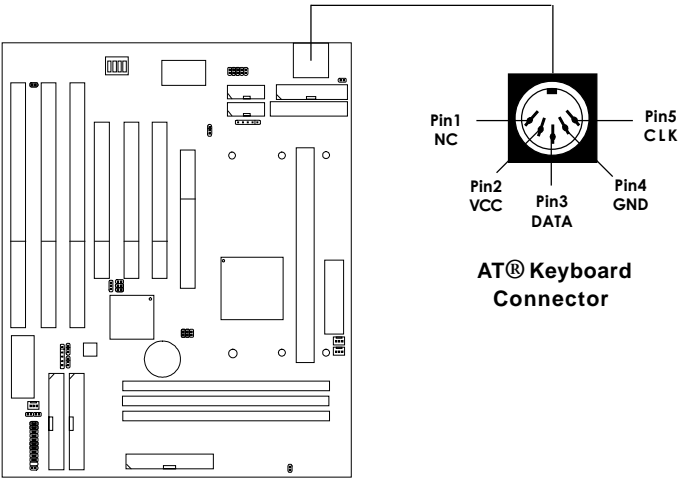
2.15 USB Connector: USB

Connect a USB cable to support USB device, such as keyboard and mouse.

GND	GND	D1+	D1-	VCC
VCC	DO-	DO+	GND	GND

USB
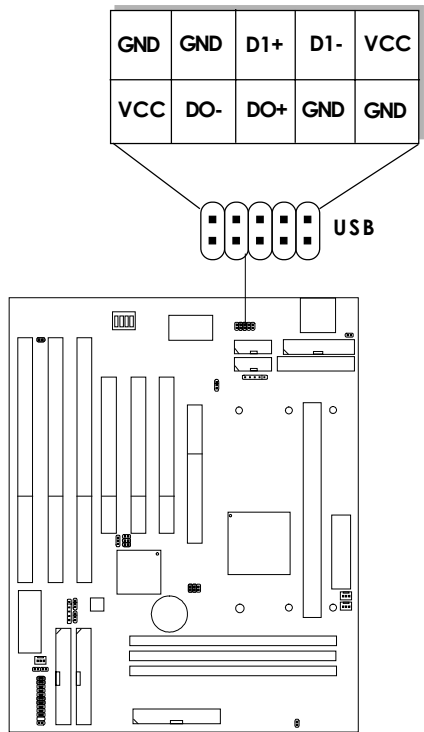
2.16 Modem Wake Up Connector: JMODEM

The JMODEM connector is for used with Modem add-on card that supports the Modem Wake Up function.

JMODEM

PIN	SIGNAL
1	NC
2	GND
3	MDM_WAKEUP
4	NC
5	5VSB

Note: Modem wake-up signal is active "low".

Note: To be able to use this function, you need a power supply that provide enough power for this feature.
(750 ma power supply with 5V Stand-by)

2.17 Wake-Up on LAN Connector: JWOL

The JWOL connector is for use with LAN add-on cards that supports Wake Up on LAN function.
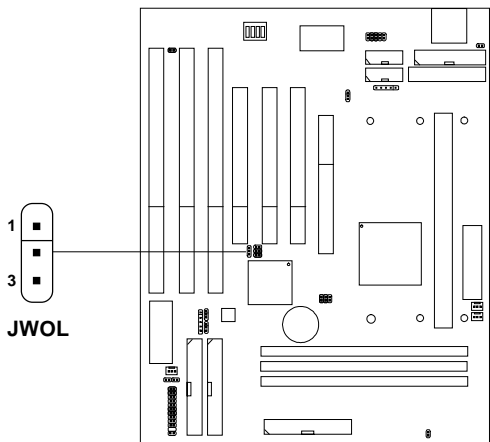
PIN	SIGNAL
1	5VSB
2	GND
3	MP_WAKEUP

Note: LAN wake-up signal is active "high".

Note: To be able to use this function, you need a power supply that provide enough power for this feature.
(750 ma power supply with 5V Stand-by)

2.18 Add-On Card Sound Connector: J7

The mainboard provides a distributed DMA connector for PCI sound card
with this feature, such as Creative® PCI 3D sound card.

J7
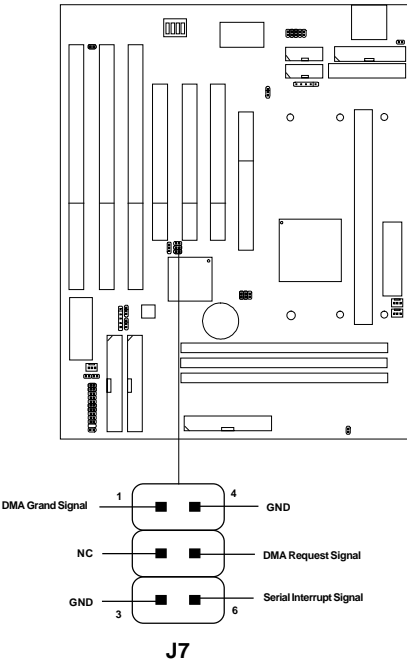
2.19 Mouse Connector: JMS1

The mainboard provides a 5-pin connector for PS/2 mouse cable (optional).
You can plug a PS/2 style mouse to PS/2 mouse cable. The connector
location as shown below.

JMS1
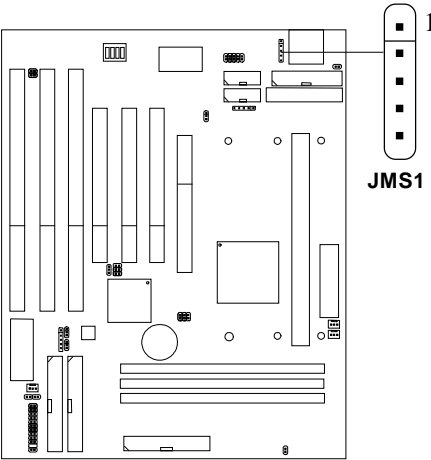
Pin 1	VCC
Pin 2	-
Pin 3	GND
Pin 4	CLK
Pin 5	DATA