

## **Chapter 2**

### **HARDWARE INSTALLATION**

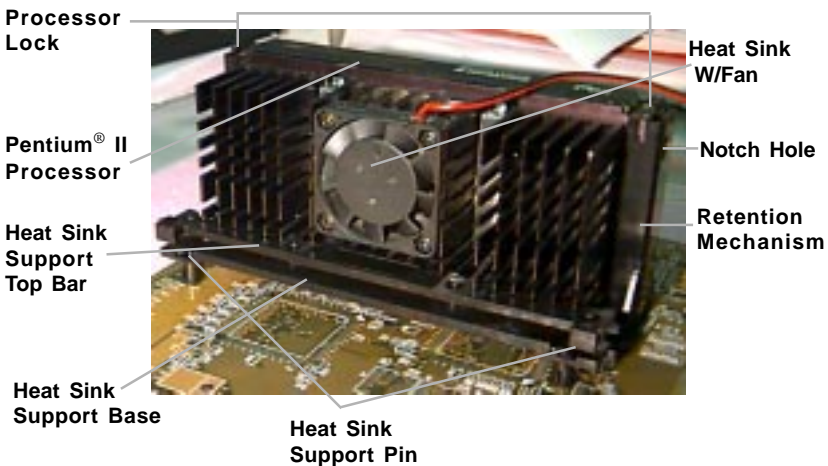
#### **2.1 Central Processing Unit: CPU**

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

Different kinds of Pentium® II processor that is currently used: the OEM version, the Boxed version, and Celeron™. OEM Pentium® II Processor has no Heat Sink, Fan and Heat Sink Support, the Boxed Pentium® II Processor is provided with Heat Sink w/ fan and Heat Sink Support, while the Celeron™ processor is a plain processor card without cover or heatsink..

#### A. OEM Pentium® II processor Installation Procedure



#### Required Things:

**Pentium® II processor** - Processor.

**\*Retention Mechanism(RM)** - Plastic Guide that holds the S.E.C. Catridge/S.E.C.C. 2 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)

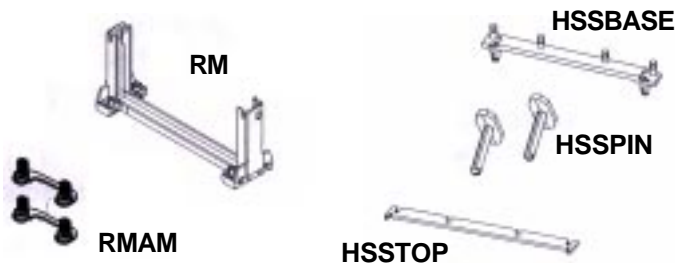
**\*Heat Sink Support Pin (HSSPIN)** - Plastic pins inserted through the HSSBASE to secure it to the mainboard (2 required per Assembly).

**\*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.

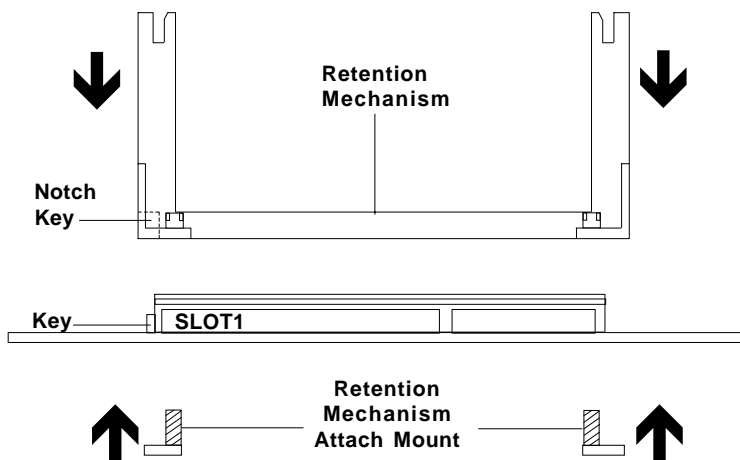
\*\* Provided by Special request.



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

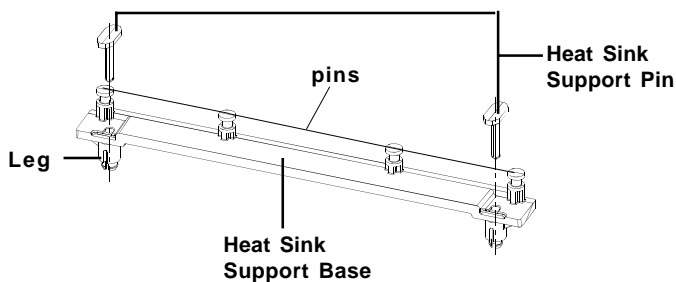
**Step 2:** Install the Retention Mechanism.

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.



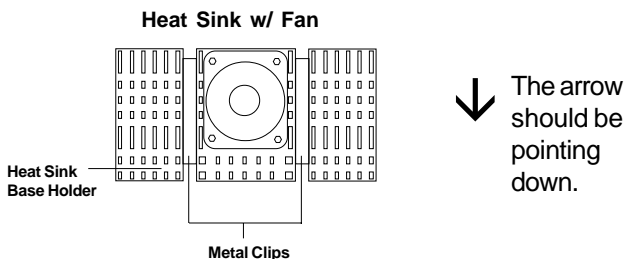
Push the Heat Sink Support Base onto the mainboard, until you hear a click sound. Check for a perfect fit.

**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.

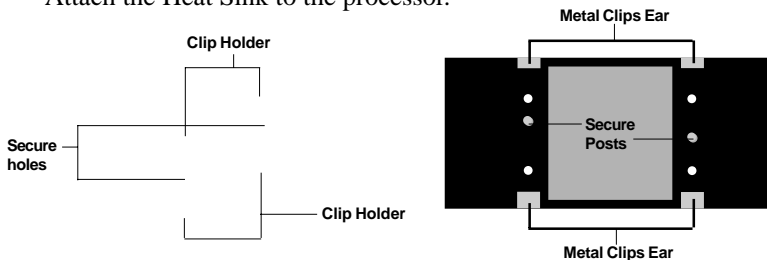
**Step 5:** Install the Heat Sink with Fan to the Processor.

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



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.



**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.



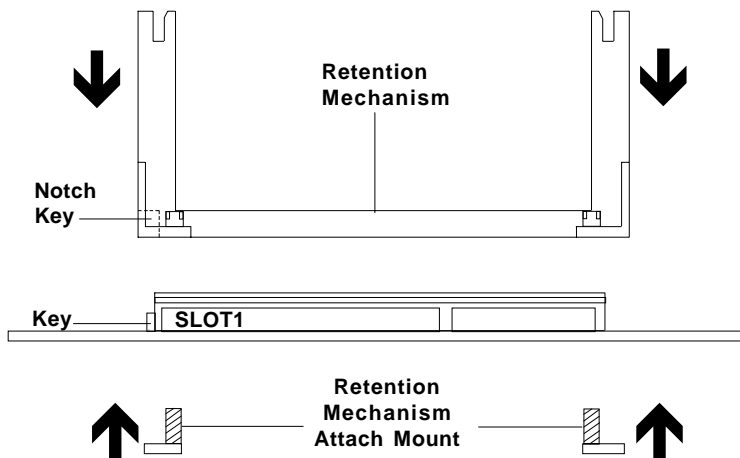
## B. Boxed Pentium® II processor Installation Procedures

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.

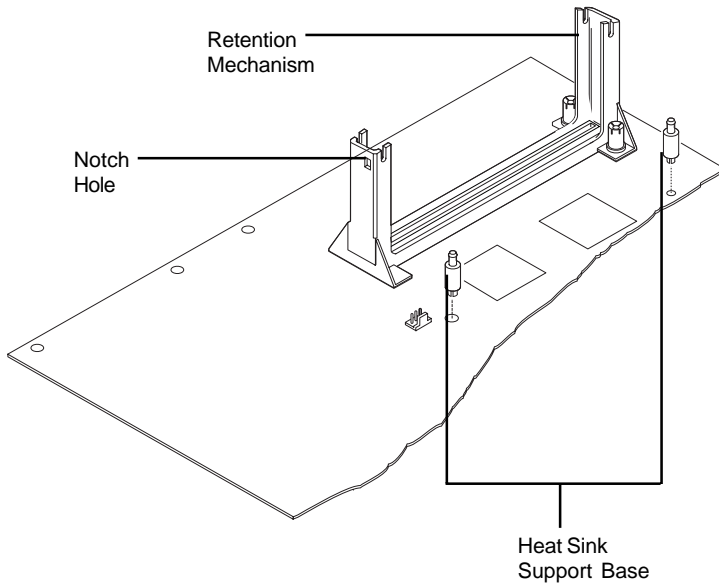
**Step 2:** Install the Retention Mechanism.

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.

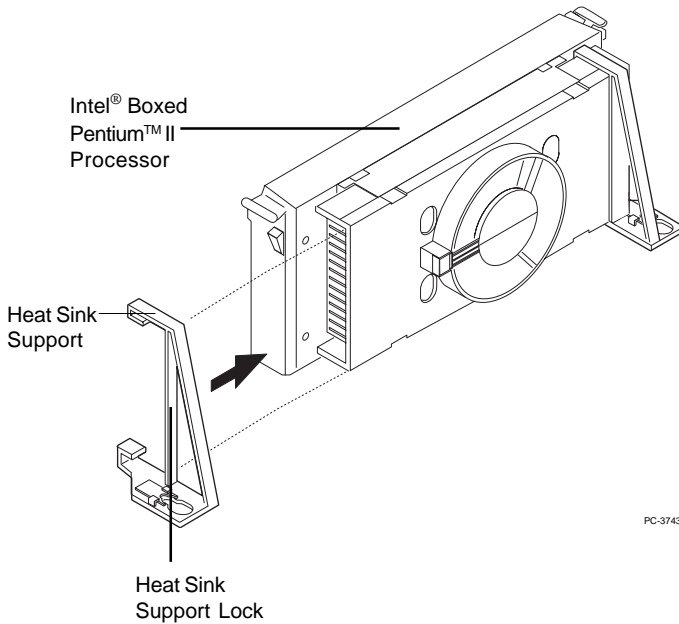
Look for the 2 holes across Slot 1, and match it with the 2 Heat Sink Support Base. Take note that one hole/base is bigger than the other.



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

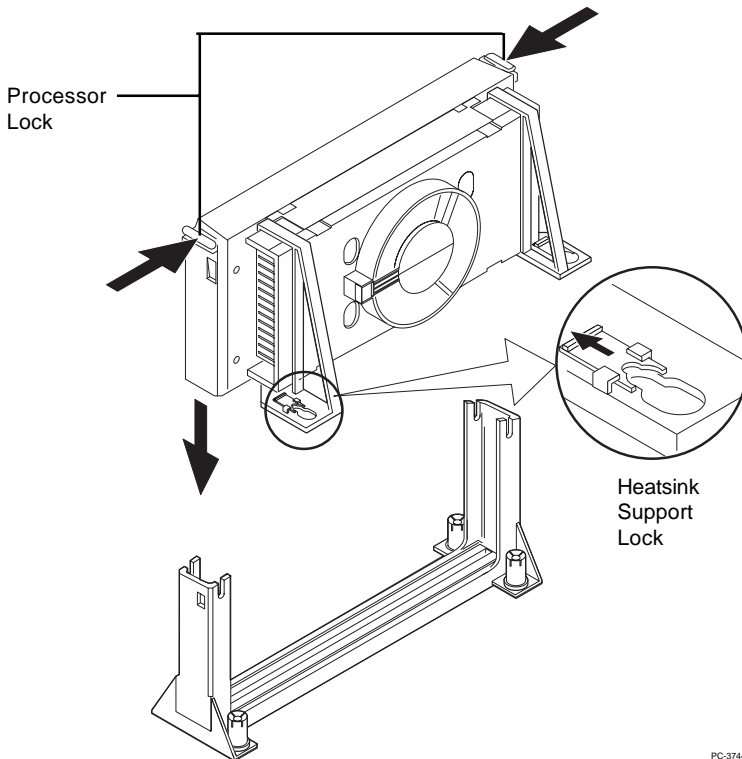
**Step 4:** Install the Heat Sink Support.

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.

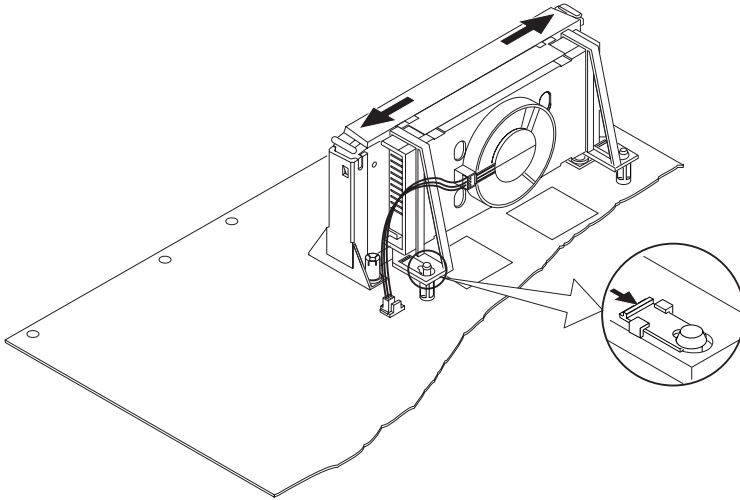


**Step 5:** Unlock the Processor Locks and Heat Sink Support Locks.

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



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



**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.

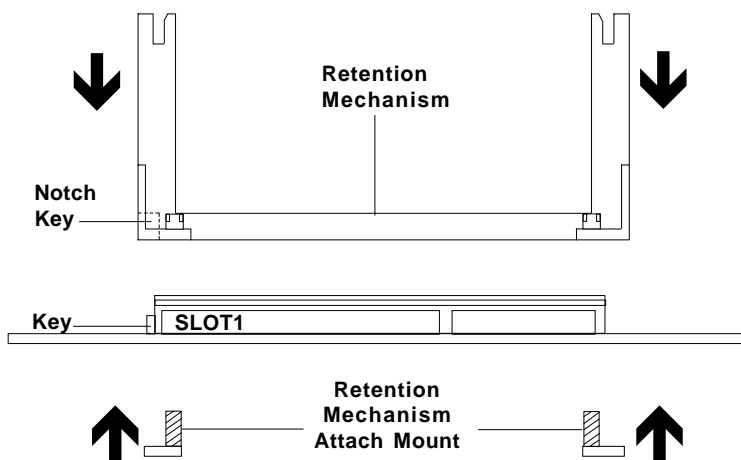
The installation is now complete.

### C. OEM Celeron™ Processor and Pentium II (S.E.C.C. 2) processor Installation Procedures

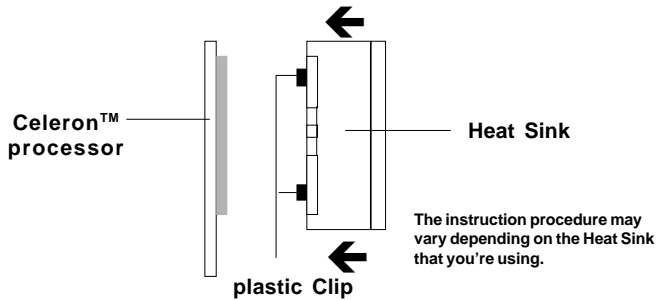
**Step 1:** Insert the Retention Mechanism Attach Mount at the bottom of the mainboard.

**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 MSI Heat Sink (optional) to the Processor.

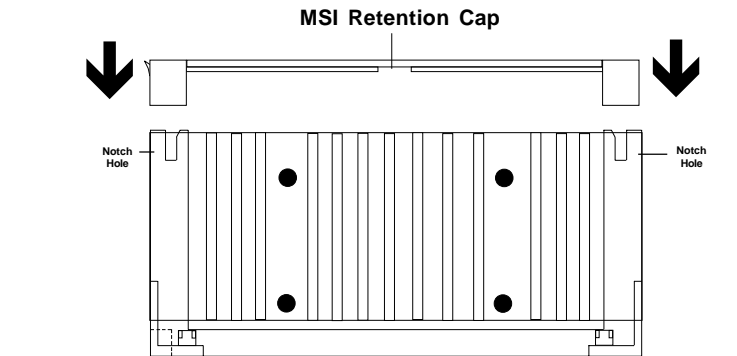


Push down the plastic clips, so that they are in line with the hole on the processor. Check for perfect fit.

**Step 4:** Install the Processor.

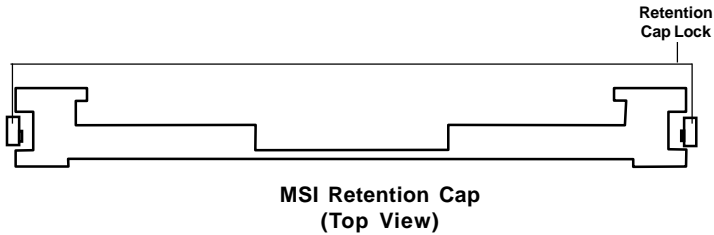
Insert the Processor like inserting a PCI or an ISA card.

**Step 5:** Lock the Processor.



Lock the processor by putting the MSI Retention Cap provided. The MSI Retention Cap will only fit in one direction. The MSI Retention Cap is only used with Intel® Celeron™ processor and Intel® Pentium® II processor (S.E.C.C. 2).

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**Procedure for detaching the MSI Retention Cap:**

To remove the Retention Cap.

- Pull the the Retention Cap Lock outward.
- Pull one side upward at a time.



**2.1-2 CPU Core Speed Derivation Procedure**

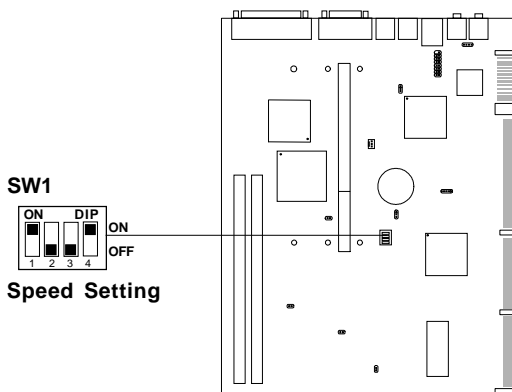
1. The DIP Switch SW1 (1, 2, 3, and 4) is used to set the Core/Bus (Fraction) ratio of the CPU. The actual core speed of the CPU is the Host Clock Frequency multiplied by the Core/Bus ratio. For example:

$$\begin{array}{llll} \text{If} & \text{CPU Clock} & = & 66\text{MHz}/100\text{MHz} \\ & \text{Core/Bus ratio} & = & 4 \\ \text{then} & \text{CPU core speed} & = & \text{Host Clock} \times \text{Core/Bus ratio} \\ & & = & 66\text{MHz} \times 4/100\text{MHz} \times 4 \\ & & = & 266\text{MHz}/400\text{MHz} \end{array}$$

SW1				CPU
1	2	3	4	Core/Bus Ratio
OFF	OFF	ON	OFF	1.5
OFF	OFF	OFF	OFF	2
ON	OFF	ON	ON	2.5
ON	ON	OFF	ON	3
ON	OFF	OFF	ON	3.5
ON	ON	ON	OFF	4
ON	OFF	ON	OFF	4.5
ON	ON	OFF	OFF	5
ON	OFF	OFF	OFF	5.5
OFF	ON	ON	ON	6
OFF	OFF	ON	ON	6.5
OFF	ON	OFF	ON	7
OFF	OFF	OFF	ON	7.5
OFF	ON	ON	OFF	8

### 2.1-3 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.*). The mainboard can auto-detect between 66 or 100MHz CPU Bus Frequency.

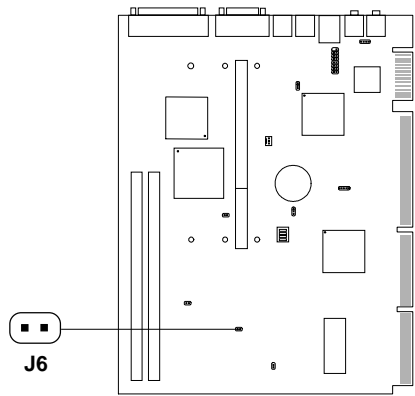




#### WARNINGS

The ATI 3D RAGE PRO Turbo onboard graphics controller should be disabled, when selecting over 100MHz processor BUS speed. The onboard graphics controller support only 66MHz/100MHz bus speed processor.

**2.1-4 CPU Bus Frequency Selector: J6**

The J6 jumper is used to set the CPU Bus Frequencies from 66MHz to 100MHz. When J6 is shorted, this will automatically detect the CPU Bus Frequency. When J6 is open, if you used 66MHz CPU Bus Frequency, this will set it Virtually into 100MHz.



J6	Feature
	Automatically detect 66MHz and 100MHz CPU Bus Frequency
	Virtually set 66MHz CPU Bus Frequency into 100MHz

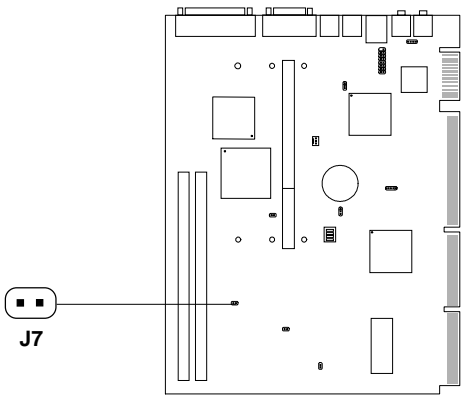




**WARNINGS**

If you used the J6 jumper to set the procesor bus frequency, you need to disable the CPU Plug & Play feature on the BIOS.


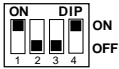



**2.1-5 AGP Bus Frequency Selector: J7**

The J7 jumper is used to set the AGP Bus Frequencies. When J7 is shorted, the AGP Bus Frequency will be set to 66MHz. When J7 is open, the AGP Bus Frequency will be the same with the CPU Bus Frequency.



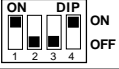
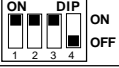
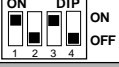
J7	Feature
	66MHz AGP Bus Frequency
	The AGP will have same Bus Frequency with the processor

**a. 66MHz CPU Bus Frequency**

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

**Table 2.1 200 ~ 333MHz Intel® Pentium® II/Celeron™ processor**

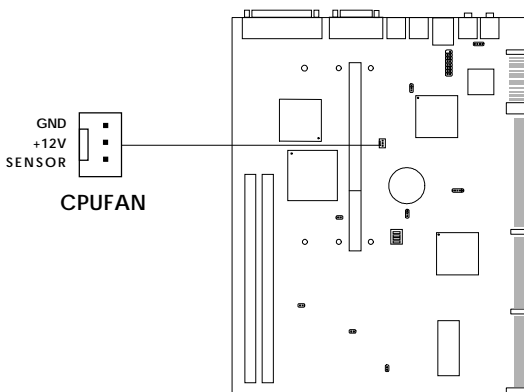
**b. 100MHz CPU Bus Frequency**

CPU Type	SW1
350MHz	 ON OFF
400MHz	 ON OFF
450MHz	 ON OFF

**Table 2.2 350 ~ 450MHz Intel® Pentium® II processor**

### 2.1-6 Fan Power Connector: CPUFAN

This connector 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 had a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

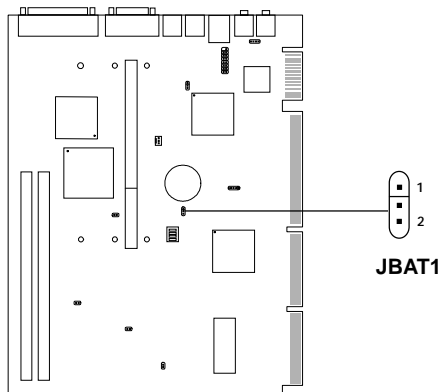




**Note:** For fans with speed sensor, every rotation of the fan will send out 2 pulses. System Hardware monitor will count and report the fan rotation speed.

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2.2 Clear CMOS Jumper: 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
	Keep Data
	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 PIIX4E chipset which is provided by the power supply. Otherwise, the CMOS will not be cleared.

2.3 Power On Mode Jumper: JP1

The mainboard supports two kinds of system power on: 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.

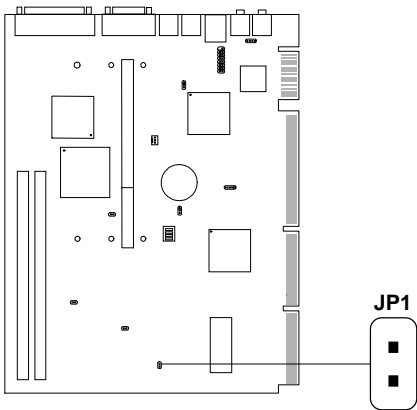




Table 2.3: Power On Mode Feature

JP1	Feature
	Select Boot-Up by Switch
	Select Immediate Boot-Up

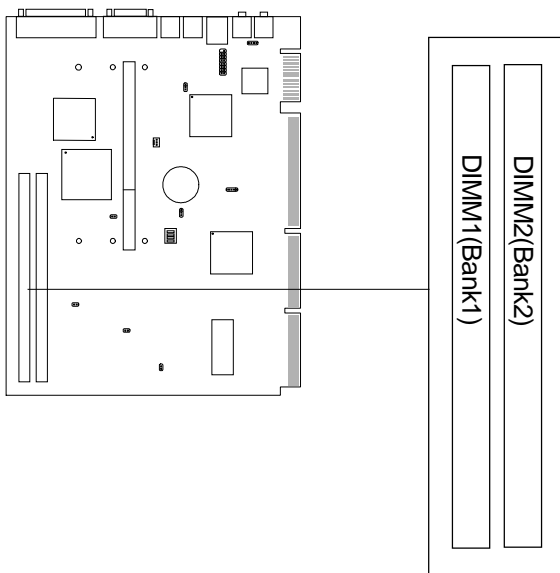
**Note:** Short **JP1**, when using Boot-Up by Switch feature. Open **JP1**, to enable Immediate Boot-Up.



## 2.4 Memory Installation

### 2.4-1 Memory Bank Configuration

The mainboard supports a maximum of 512MB of memory : It provides two 168-pin DIMMs (Double In-Line Memory Module) sockets. It supports 8 MB to 256 Mbytes DIMM memory module. The memory module can only support SDRAM(Synchronous DRAM) MODE DRAM.

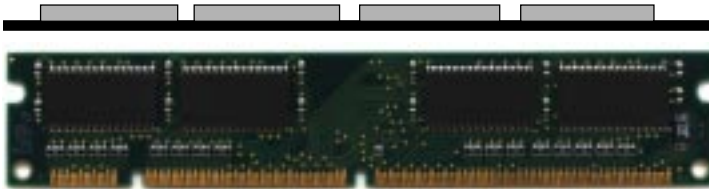


**WARNING!**

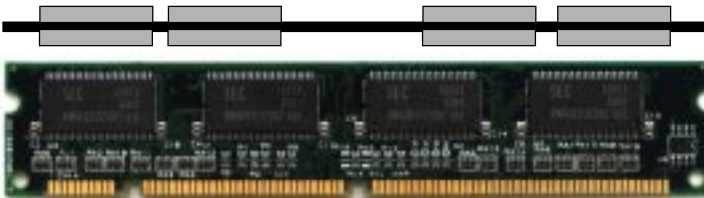
There are two kinds of DIMM specification supported by this mainboard: PC100 and PC66. If you use 66MHz CPU Bus Frequency, these two DIMM Specs. is supported. If you use 100 MHz CPU Bus Frequency, only PC100 DIMM Specs. is supported.

### 2.4-2 Memory Installation Procedures:

#### A. How to install a DIMM Module

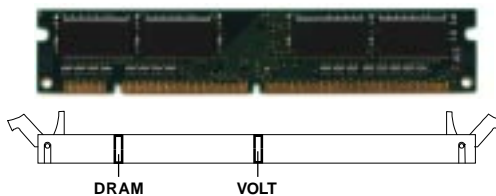


**Single Sided DIMM**



**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.



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

### 2.4-3 Memory Population Rules

1. Supports SDRAM DIMM.
2. To operate properly, at least one 168-pin DIMM module must be installed.
3. This mainboard supports Table Free memory, so memory can be installed on DIMM1 or DIMM 2 in any order.
4. Supports 3.3 volt DIMM.
5. The DRAM addressing and the size supported by the mainboard is shown below:

**Table 2.4-1 SDRAM Memory Addressing**

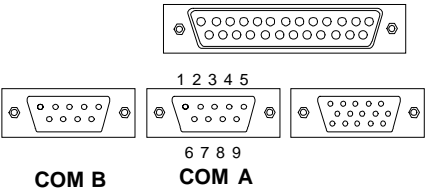
DRAM Tech.	DRAM Density & Width	DRAM Addressing	Address Size		MB/DIMM	
			Row	Column	Single Side(S)	Double Side(D)
16M	1Mx16	ASYM	12	8	8MB	16MB
	2Mx8	ASYM	12	9	16MB	32MB
	4Mx4	ASYM	12	10	32MB	64MB
64M	2Mx32	ASYM	12	9	32MB	64MB
	2Mx32	ASYM	13	8	16MB	32MB
	4Mx16	ASYM	12	10	32MB	64MB
	4Mx16	ASYM	14	8	32MB	64MB
	8Mx8	ASYM	14	9	64MB	128MB
	16Mx4	ASYM	14	10	128MB	256MB

**Note:** \* Both 4M x 4 and 16M x 4 SDRAM device are supported in the form of registered DIMM only.

\* If you used the mainboard onboard VGA, you need to install at least 32MB of SDRAM.

**2.5 Serial Port Connectors: COM A & COM B**

The mainboard provides two 9-pin male DIN connectors for serial port COM A and COM B. These port are 16550A high speed communication ports that send/receive 16 bytes FIFOs. You can attach a mouse or a modem cable directly into this connector.

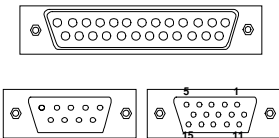


**PIN DEFINITION**

PIN	SIGNAL
1	<b>DCD</b> (Data Carry Detect)
2	<b>SIN</b> (Serial In or Receive Data)
3	<b>SOUT</b> (Serial Out or Transmit Data)
4	<b>DTR</b> (Data Terminal Ready)
5	<b>GND</b>
6	<b>DSR</b> (Data Set Ready)
7	<b>RTS</b> (Request To Send)
8	<b>CTS</b> (Clear To Send)
9	<b>RI</b> (Ring Indicate)

**2.6 VGA DB 15 Pin Connector**

The mainboard provides a DB 15-pin connector to connect to a VGA monitor.

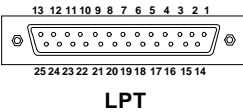


**VGA**

Analog Video Display Connector(DB15-S)	
Pin	Signal Description
1	Red
2	Green
3	Blue
4	Not used
5	Ground
6	Ground
7	Ground
8	Ground
9	Not used
10	Ground
11	Not used
12	SDA
13	Horizontal Sync
14	Vertical Sync
15	SCL

**2.7 Parallel Port Connector: LPT**

The mainboard provides a 25 pin female centronic connector for LPT. A parallel port is a standard printer port that also supports Enhanced Parallel Port(EPP) and Extended capabilities Parallel Port(ECP). See connector and pin definition below:

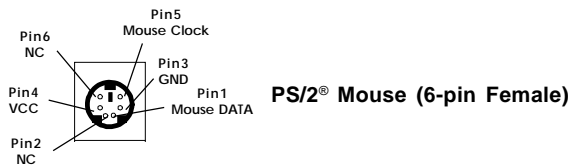


**PIN DEFINITION**

PIN	SIGNAL	PIN	SIGNAL
1	STROBE	14	AUTO FEED#
2	DATA0	15	ERR#
3	DATA1	16	INIT#
4	DATA2	17	SLIN#
5	DATA3	18	GND
6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	FE	25	GND
13	SELECT		

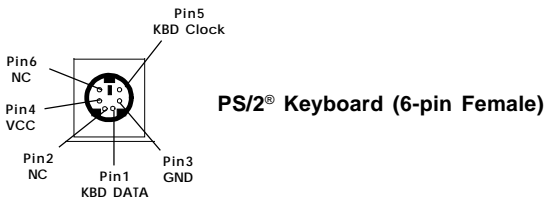
## 2.8 Mouse Connector

The mainboard provides a standard PS/2<sup>®</sup> mouse mini DIN connector for attaching a PS/2<sup>®</sup> mouse. You can plug a PS/2<sup>®</sup> mouse directly into this connector. The connector location and pin definition are shown below:



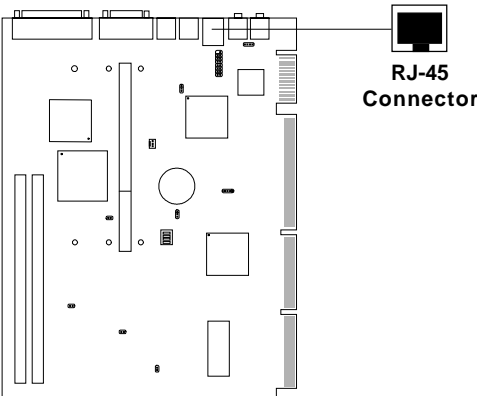
## 2.9 Keyboard Connector

The mainboard provides a standard PS/2<sup>®</sup> keyboard mini DIN connector for attaching a keyboard. You can plug a keyboard cable directly to this connector.



## **2.10 LAN Connector**

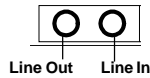
The mainboard provides a RJ-45 connector for your network need.





## 2.11 Audio Port Connectors

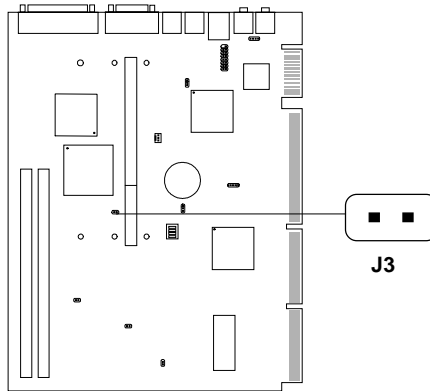
**Line Out** is a connector for Speakers or Headphones. **Line In** is used for external CD player, Tape player, or other audio devices.



### 1/8" Stereo Audio Connectors

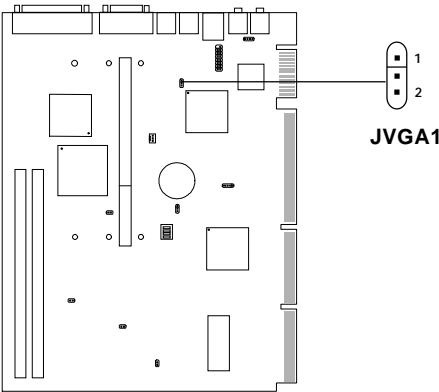
## 2.12 CPU Temperature Sensor: J3 (optional)



This is used to check the CPU temperature. The J3 is a sensor that is placed near the processor heatsink. This will monitor the CPU temperature.



2.13 Onboard VGA Disable/Enable Jumper: JVGA1

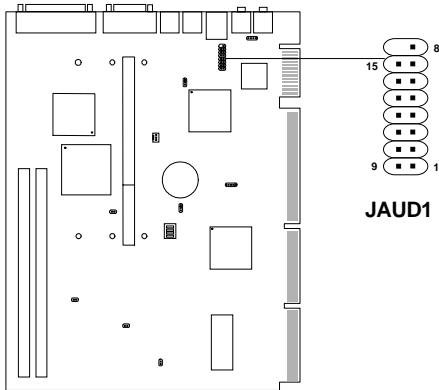
If your mainboard supports onboard VGA, this jumper is used to disable the onboard VGA.



JVGA1	Function
 1 3	Enable Onboard VGA
 1 3	Disable Onboard VGA

2.14 Joystick/Midi Connector: JAUD1

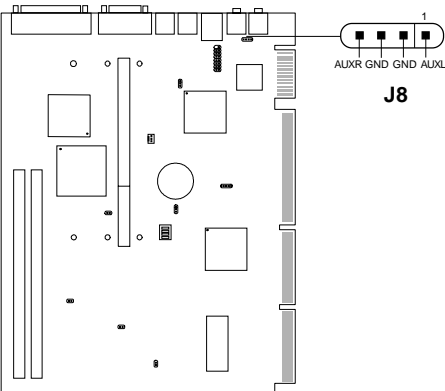
You can connect MIDI keyboard, joystick or game pads to this connector.



PIN	SIGNAL
1	+5v
2	Joystick But0
3	Joystick X1
4	GND
5	GND
6	Joystick Y1
7	Joystick But1
8	+5v
9	+5v
10	Joystick But2
11	Joystick X2
12	Midi Out
13	Joystick Y2
14	Joystick But3
15	Midi In

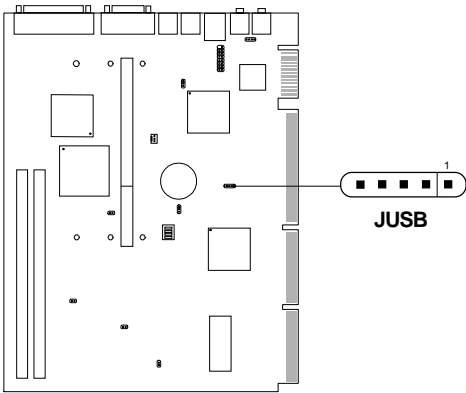
## **2.15 AUX Line In Connector: J8**

This connector is used for DVD Add on Card with Line In connector.



**2.16 Optional USB Connector: JUSB**

This connector is designed for user who need an optional USB connector. This can be connected with USB Port.



PIN	SIGNAL
1	VCC
2	D-
3	D+
4	Key
5	GND