

## Chapter 2

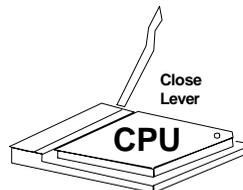
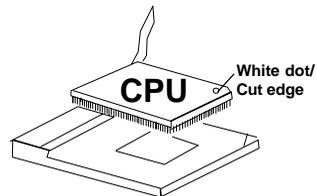
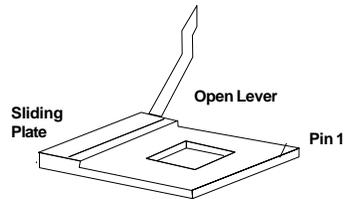
### HARDWARE INSTALLATION

#### 2.1 Central Processing Unit: CPU

The ATX AL9 mainboard operates with **Intel® Pentium® processor/ Pentium® processor with MMX™ technology, Cyrix® 6x86/6x86L/ 6x86MX, AMD® K6/K6-2 and IDT C6™** processors. It could operate with 2.1V to 3.5V processors. The mainboard provides a 321-pin ZIF Socket 7 for easy CPU installation, a jumper switch (S1) to set the proper speed for the CPU and (S2) for setting the CPU voltage. The CPU should always have a cooling fan attached to prevent overheating.

##### 2.1-1 CPU Installation Procedures

1. Pull the lever sideways away from the socket. Then, raise the lever up to a 90-degree angle.
2. Locate Pin 1 in the socket and look for the white dot or cut edge in the CPU. Match Pin 1 with the white dot/cut edge. Then, insert the CPU. It should insert easily.
3. Press the lever down to complete the installation.



### 2.1-2 CPU Core Speed Derivation Procedure

1. The Jumper S1 (4, 5 & 6) is used to adjust the CPU clock frequency.

4	5	6	CPU Clock
0	0	0	100
0	0	1	75*
0	1	0	83
0	1	1	66
1	0	0	95
1	0	1	50
1	1	0	75**
1	1	1	60

\* AGP = 60/PCI = 30

\*\* AGP = 75/PCI = 37.5

**0 = Open      1 = Short**

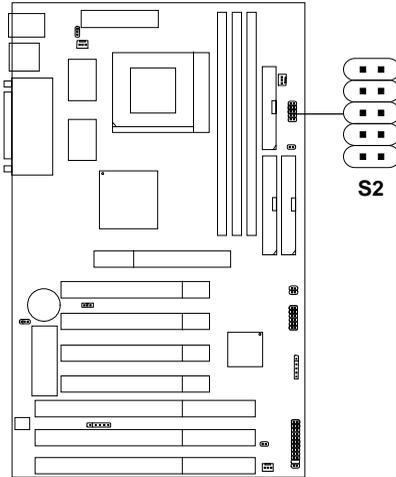
2. The Jumper S1 (1, 2, and 3) is used to set the Core/Bus (Fraction) ratio of the CPU. The actual core speed of the CPU is the Host Clock Frequency multiplied by the Core/Bus ratio. For example:

$$\begin{array}{lcl}
 \text{If} & \text{CPU Clock} & = 66\text{MHz} \\
 & \text{Core/Bus ratio} & = 3/2 \\
 \text{then} & \text{CPU core speed} & = \text{Host Clock} \times \text{Core/Bus ratio} \\
 & & = 66\text{MHz} \times 3/2 \\
 & & = 100\text{MHz}
 \end{array}$$

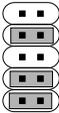
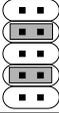
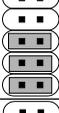
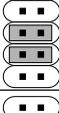
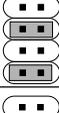
1	2	3	CPU	
0	0	0	1.5/3.5	
0	1	0	3x	<b>Intel AMD Cyrix IDT</b>
1	0	0	2x	
1	1	0	2.5x	
0	0	1	5.5x	
0	1	1	5x	
1	0	1	4x	
1	1	1	4.5x	

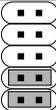
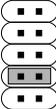
**0 = Open      1 = Short**

2.1-3 CPU Voltage Setting: S2



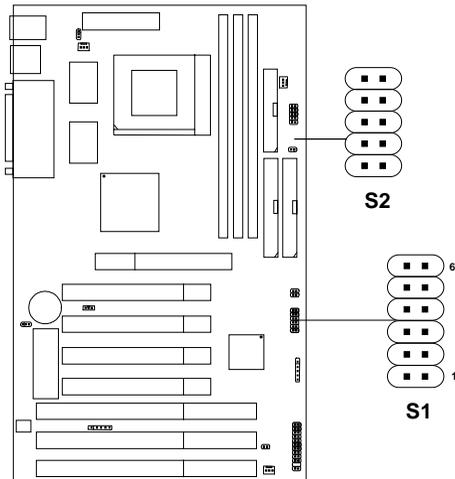
V I/O	Vcore	S2
3.45	3.5	
3.45	3.4	
3.45	3.3	
3.45	3.2	

V I/O	Vcore	S2
3.45	3.1	
3.45	3.0	
3.45	2.9	
3.45	2.8	
3.45	2.7	
3.45	2.6	
3.45	2.5	
3.45	2.4	

V I/O	Vcore	S2
3.45	2.3	
3.45	2.2	
3.45	2.1	
3.45	2.0	

### 2.1-4 CPU Speed and Voltage Setting: S1 and S2

To set the proper speed and voltage of the CPU, you must know the specifications of your CPU (*always ask the vendor for CPU specifications*). Then refer to **Table 2.1 (Intel® Processor)**, **Table 2.2 (Cyrrix® Processor)**, **Table 2.3 (AMD® Processor)** and **Table 2.4 (IDT C6™)** for proper setting.



**Table 2.1 Intel® Processor**

**a. Intel® Pentium® Processor**

CPU Type	CPU Voltage		CPU Speed	
	VI/O	Vcore	S2	S1
100 MHz	3.38	3.38		
133 MHz				
166 MHz				
200 MHz				

**b. Intel® Pentium® Processor with MMX™ Technology**

166 MHz	3.3   3.45	2.8		
200 MHz				
233 MHz				

**Note:** If you encounter a CPU with different voltage, just go to **Section 2.1-3** and look for the proper voltage settings.

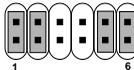
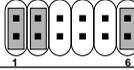
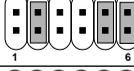
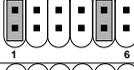
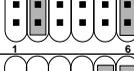
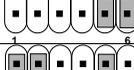
**Table 2.2 Cyrix® Processor**

Cyrix® 6x86 processor uses PR to rate the speed of their processors based on Intel® Pentium® processor core speed. For example, PR150 (120MHz) has 150MHz core speed of Intel® Pentium® processor, but it has 120MHz core speed in Cyrix® processor. Cyrix® 6x86 processor should always use a more powerful fan (ask vendor for proper cooling fan).

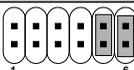
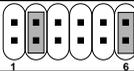
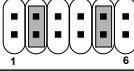
**a. Cyrix® 6x86/6x86L processor**

CPU Type	CPU Voltage		CPU Speed	
	VI/O	Vcore	S2	S1
6x86 PR166	3.5			
6x86L PR166	3.3   3.45	2.8		
6x86 PR200	3.5			
6x86L PR200	3.3   3.45	2.8		

b. Cyrix® 6x86MX Processor

CPU Type	CPU Voltage		CPU Speed	
	VI/O	Vcore	S2	S1
PR200 (66 x 2.5)	3.3   3.45	2.9		
PR233 (75 x 2.5)				
(66 x 3)				
(83 x 2)				
PR266 (75 x3)				
(66 x 3.5)				
(83 x 2.5)				

c. Cyrix® MII Processor

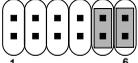
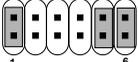
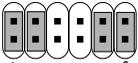
CPU Type	CPU Voltage		CPU Speed	
	VI/O	Vcore	S2	S1
PR300 (66 x 3.5)	3.3   3.45	2.9		
(75 x 3)				
PR333 (83 x 3)				

**Note:** If you encounter a CPU with different voltage, just go to **Section 2.1-3** and look for the proper voltage settings.

**Table 2.3 AMD® Processor**

AMD® K5/K6 processor uses PR to rate the speed of their processors based on Intel® Pentium® processor core speed . For example, PR133(100MHz) has 133MHz core speed of Intel® Pentium® processor but has 100MHz core speed in AMD® processor.

**a. AMD® K5 Processor**

CPU Type	CPU Voltage		CPU Speed	
	VI/O	Vcore	S2	S1
PR100	3.52	3.52		
PR133				
PR166				

**b. AMD® K6 Processor**

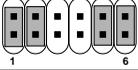
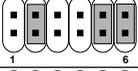
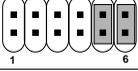
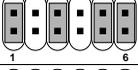
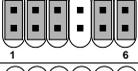
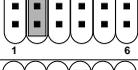
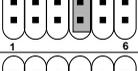
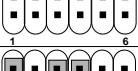
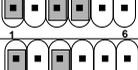
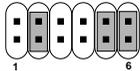
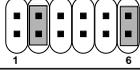
166MHz	3.3   3.45	2.9		
200MHz				
233MHz	3.3   3.45	3.2		
266MHz				
300MHz	3.3   3.45	2.2		
K6-2 300MHz				
K6-2 333MHz				
K6-2 350MHz				
K6-2 380MHz				
K6-2 400MHz				

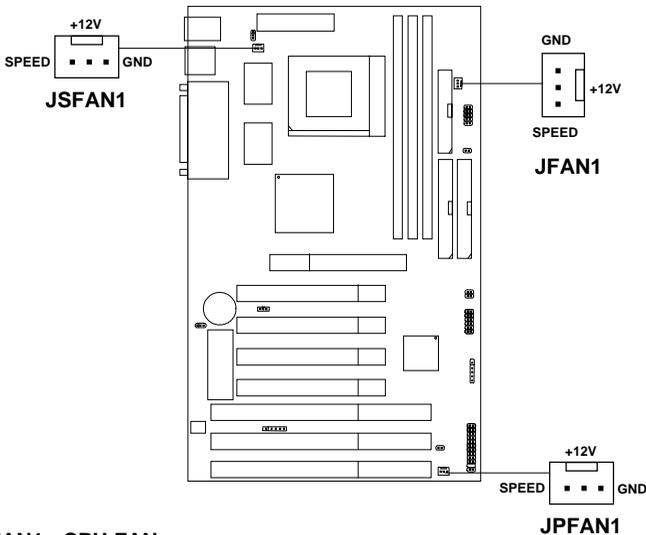
Table 2.4 IDT Processor

IDT C6™ Processor

CPU Type	CPU Voltage		CPU Speed	
	VI/O	Vcore	S2	S1
200MHz		3.3		
225Mhz				

### 2.1-5 Fan Power Connectors: JFAN1, JSFAN1, & JPFAN1

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 has System Hardware Monitor chipset on-board, you can use a specially designed fan w/ speed sensor to take advantage of System Hardware Monitor's CPU fan control.



**JFAN1: CPU FAN**  
**JPFAN1: POWER FAN**  
**JSFAN1: CHASSIS FAN**

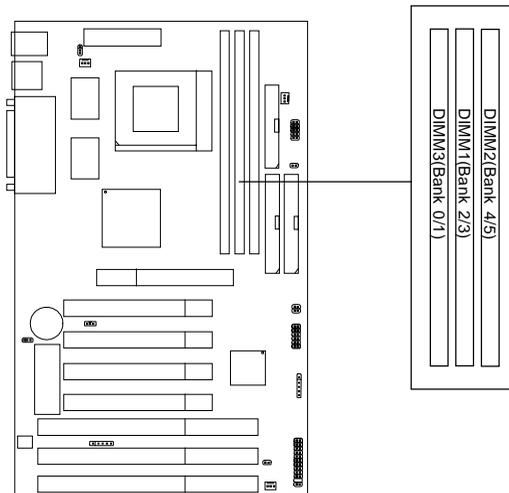
For fans with fan speed sensor, every rotation of the fan will send out 2 pulses. System Hardware Monitor will count and report the fan rotation speed.

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

## 2.2 Memory Installation

### 2.2-1 Memory Bank Configuration

The mainboard provides three 168-pin DIMM(Double In-Line Memory) sockets. It supports six memory banks for a maximum of 768MB memory. You can use DIMM from 8MB, 16MB, 32MB, 64MB, 128MB to 256MB.



**WARNING!**

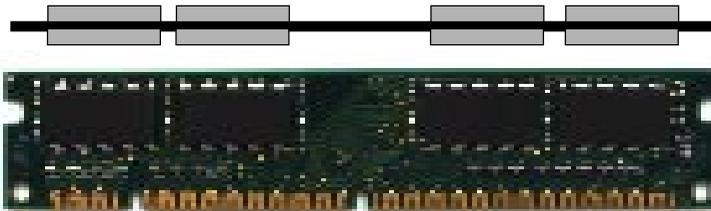
If you use 100 MHz CPU Bus Frequency, only PC100 DIMM Specs. is supported.

## 2.2-2 Memory Installation Procedures:

### A. How to install DIMM Module

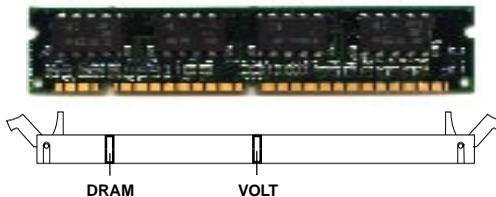


**Single Sided DIMM**



**Double Sided DIMM**

1. The DIMM slot has two keys marked “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..

**2.2-3 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.
4. Using 100MHz CPU Bus frequency, only PC100 DIMM is supported.

Table 2.2-1 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	16MBx8
	1Mx16	ASYM	12	8	8MBx4	16MBx8
	2Mx8	ASYM	11	10	16MBx8	32MBx16
	2Mx8	ASYM	12	9	16MBx8	32MBx16
	4Mx4	SYMM	11	11	32MBx16	64MBx32
	4Mx4	ASYM	12	10	32MBx16	64MBx32
64M	2Mx32	ASYM	11	10	16MBx2	32MBx4
	2Mx32	ASYM	12	9	16MBx2	32MBx4
	2Mx32	ASYM	13	8	16MBx2	32MBx4
	4Mx16	SYMM	11	11	32MBx4	64MBx8
	4Mx16	ASYM	12	10	32MBx4	64MBx8
	8Mx8	ASYM	12	11	64MBx8	128MBx16

Table 2.2-2 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		

### 2.3 Case Connector: JFP

The Hardware Reset, Key Lock, Power LED, Speaker and HDD LED are all grouped in JFP connector block for easy installation.

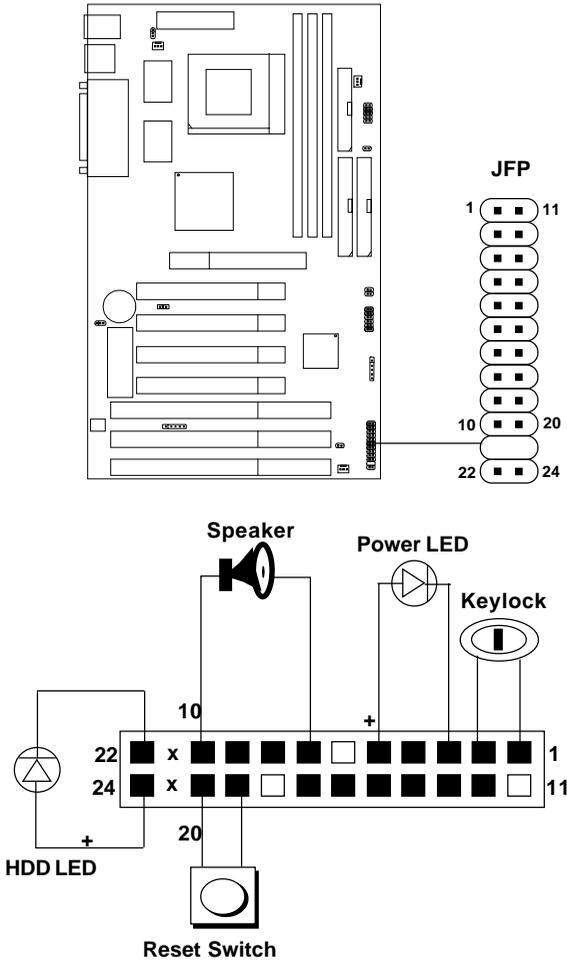


Figure 2.1

### **2.3-1 Hardware Reset**

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

### **2.3-2 Keylock**

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

### **2.3-3 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)

### **2.3-4 Speaker**

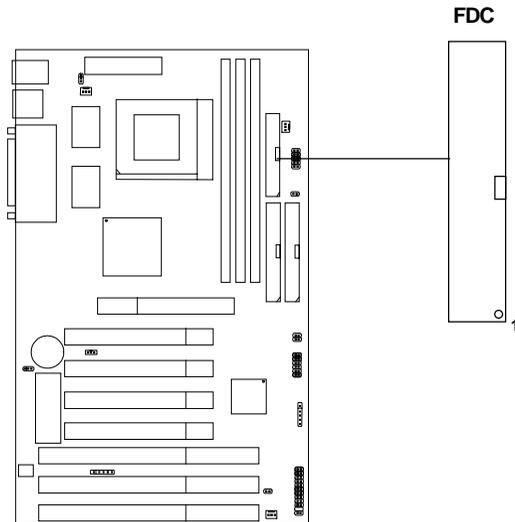
Speaker from the system case is connected to this pin. (See Figure 2.1)

### **2.3-5 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).

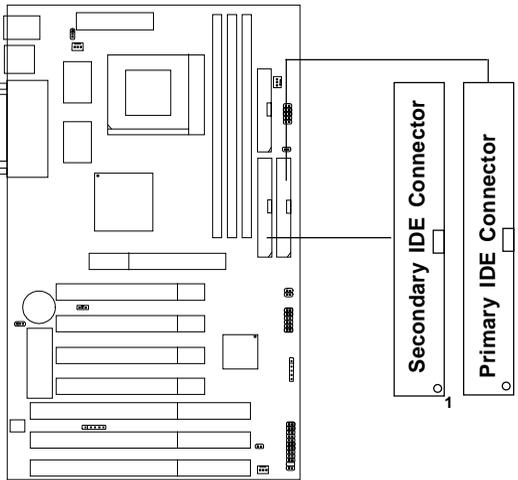
## 2.4 Floppy Disk Connector: FDC

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



## 2.5 Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE Controller that provides two HDD connectors IDE1 (Primary) and IDE2 (Secondary). You can connect up to four hard disk drives, CD-ROM, 120MB Floppy and other devices to IDE1 and IDE2.



### **IDE1(Primary IDE Connector)**

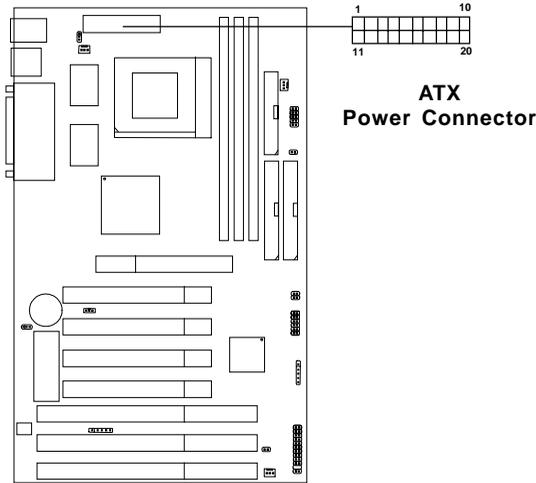
The first hard disk should always be connected to IDE1. IDE1 can connect a Master and a Slave drive.

### **IDE2(Secondary IDE Connector)**

IDE2 can connect a Master and a Slave drive.

## 2.6 ATX 20-pin Power Connector: J1

This type of connector already supports the remote ON/OFF function. However, you need to connect the **Remote Power On/OFF switch (JRMS1/JP1)**.

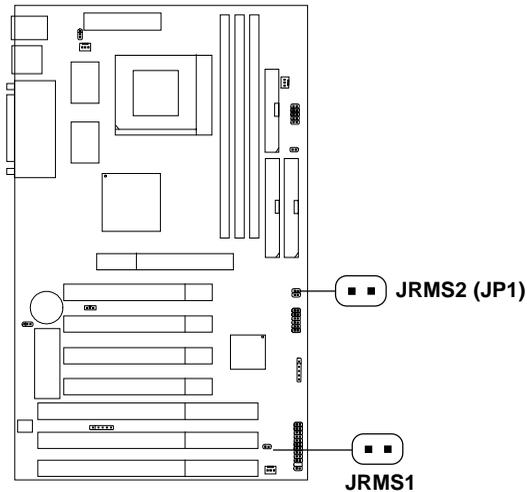


### ATX Power Connector Pin Description

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

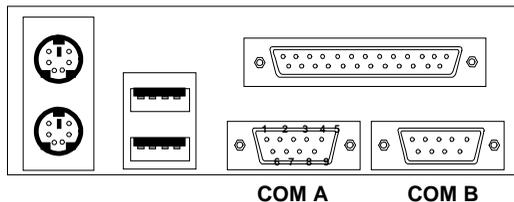
## 2.7 Remote Power On/Off Switches: JRMS1/ JRMS2 (JP1)

Connect to a 2-pin push button switch to JRMS1/JRMS2. Every time the switch is shorted by pushing it once, the power supply will change its status from OFF to ON. During ON stage: push once and the system goes to sleep mode; push it more than 4 seconds will change its status from ON to OFF.



## 2.8 Serial Port Connectors: COM A & COM B

The mainboard has two serial ports COMA and COMB. 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.



**Serial Ports (9-pin Male)**

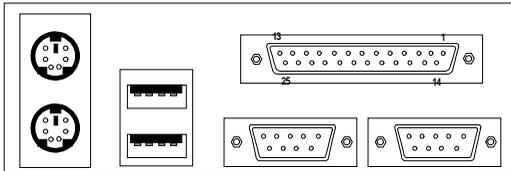
### PIN DEFINITION

Pin #	Definition
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)

## 2.9 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).

### Parallel Port (25-pin Female) LPT



### PIN DEFINITION

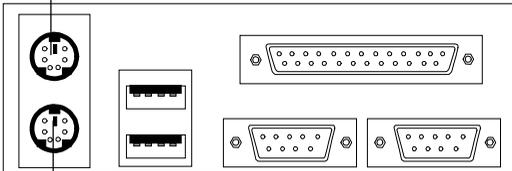
PIN #	DEFINITION	PIN #	DEFINITION
1	STROBE	14	AUTO FEED#
2	DATA0	15	ERR#
3	DATA1	16	INIT#
4	DATA2	17	SLIN#
5	DATA3	18	GND
6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SELECT		

## 2.10 Keyboard Connector: PSKBC Mouse Connector: PSMSC

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.

It also 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 are shown below:

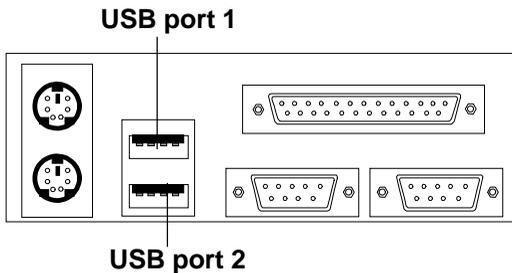
**PS/2<sup>®</sup> Mouse (6-pin Female)**



**PS/2<sup>®</sup> Keyboard (6-pin Female)**

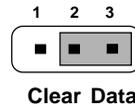
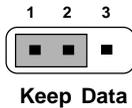
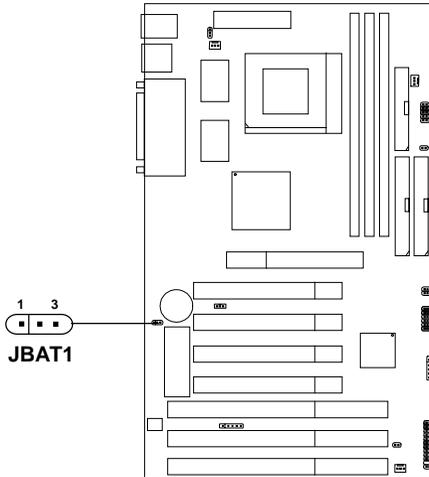
## 2.11 USB Connectors: USB

The mainboard provide a **USB(Universal Serial Bus)** connector for attaching USB devices like keyboard, mouse or etc. You can plug it directly to this connector.



## 2.12 Clear CMOS Jumper: JP10

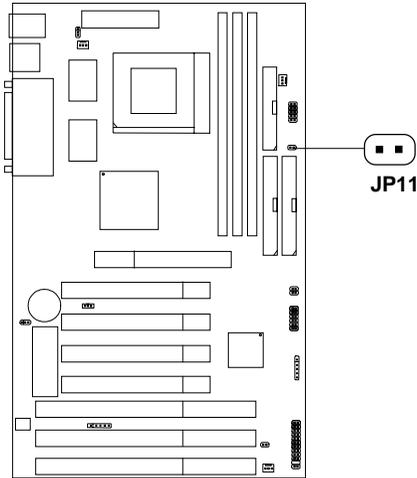
A battery must be used to retain the mainboard configuration in CMOS RAM. Short 1-2 pins of JBAT1 to store the CMOS data.



**Note:** You can clear CMOS by shorting 2-3 pin, while the system is off. Then, return to 1-2 pin position. Avoid clearing the CMOS while the system is on, it will damage the mainboard. Always unplug the power cord from the wall socket.

### 2.13 Power On Mode Feature: JP11

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.



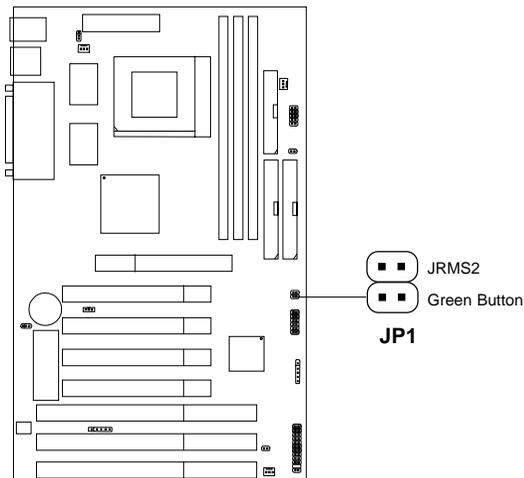
**Table 2.13: Power On Mode Feature**

JP11	Feature
	Select Immediate Boot-Up
	Select Boot-Up by Switch

**Note:** Short **JP11**, when using Boot-Up by Switch feature. Open **JP11**, to enable Immediate Boot-Up.

## 2.14 Green Button and Power Switch: JP1

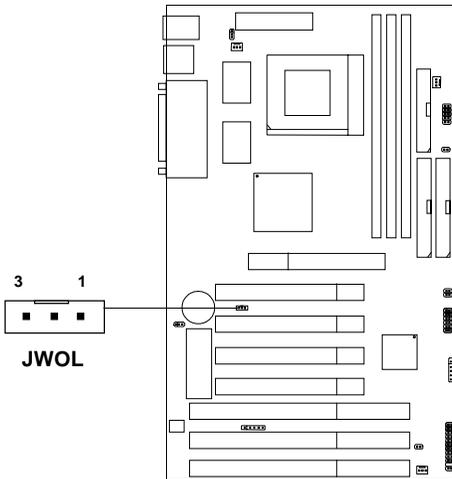
Attach a power saving switch to JP1(Green Button). When the switch is pressed, the system immediately goes into suspend mode. Press any key and the system wakes up.



**Note:** The JP1(JRMS2) have the same function with JRMS1. (see **Remote Power On/Off switches: JRMS1/JRMS2**)

## 2.15 Wake-Up on LAN Connector: JWOL

The JWOL connector is for use with LAN add-on cards that supports Wake Up on LAN function. To use this function, you need to set the “Resume By Ring” to enable at the BIOS Power Management Setup.



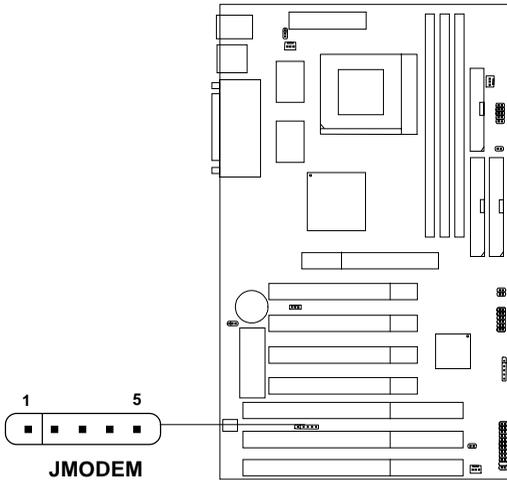
PIN	SIGNAL
1	5VSB
2	GND
3	MP_WAKEUP

**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)

## 2.16 Modem Wake Up Connector: JMODEM

The JMODEM connector is for used with Modem add-on card that supports the Modem Wake Up function. To use this function, you need to set the “Resume By Ring” to enable at the BIOS Power Management Setup.



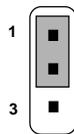
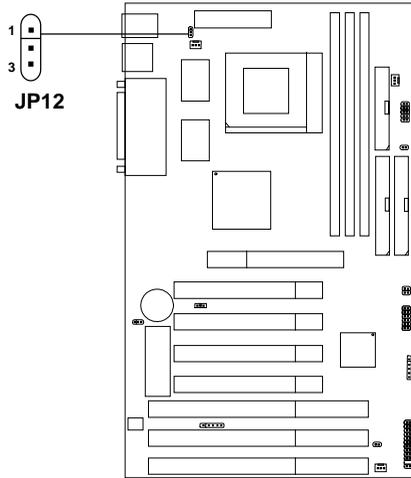
PIN	SIGNAL
1	NC
2	GND
3	MDM_WAKEUP
4	NC
5	5VSB

**Note:** Modem wake-up signal is active “low”.

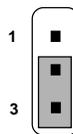
**Note:** To be able to use this function, you need a power supply that provide enough power for this feature.  
(750 ma power supply with 5V Stand-by)

## 2.17 Keyboard Power: JP12

The JP12 jumper is for setting keyboard power on feature. The function should be set in the BIOS keyboard Wake-up function.



5V (default)  
Disable keyboard  
power on function



5V Standby  
Enable keyboard  
power on function

**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 IrDA Infrared Module Connector: JP7

The mainboard provides one 5-pin infrared (IR) connector for IR modules. This connector is for optional wireless transmitting and receiving infrared module. You must configure the setting through the BIOS setup to use the IR function. FIR and Consumer IR are reserved functions.

