

Chapter 2

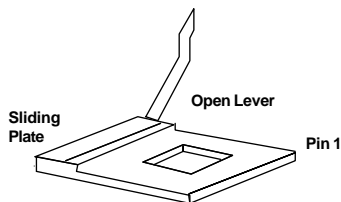
HARDWARE INSTALLATION

2.1 Central Processing Unit: CPU

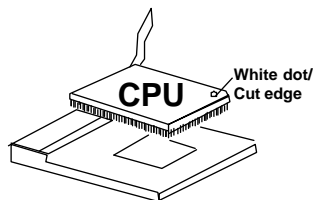
The MSI ATX TX5 mainboard operates with **Intel® Pentium® processor/ Pentium® processor with MMX™ technology, Cyrix® 6x86/6x86L/ 6x86MX and AMD® K5/K6** processors. It could operate with 2.1V to 3.5V processors. The mainboard provides a 321-pin ZIF Socket 7 for easy CPU installation, a DIP switch (SW1) to set the proper speed for the CPU and a Jumper block (JV1) for setting the CPU voltage. The CPU should always have a cooling fan attached to prevent overheating.

2.1-1 CPU Installation Procedures

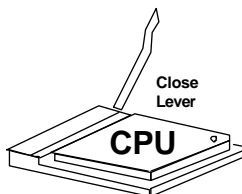
1. Pull the lever sideways away from the socket. Then raise the lever up to a 90-degree angle.



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

The mainboard uses two kind of Clock generator: ICS9148-04 and IMI643. These two clock generator have different clock frequency.

1. The DIP Switch SW1 (4, 5, and 6) is used to adjust the CPU clock frequency.

A. Clock Generator: ICS9148-04

SW1			CPU
4	5	6	Clock
ON	ON	ON	50MHz
ON	OFF	OFF	60MHz
OFF	OFF	OFF	66.6MHz
OFF	ON	OFF	75MHz
ON	OFF	ON	83MHz

B. Clock Generator: IMI643

SW1			CPU
4	5	6	Clock
OFF	OFF	ON	50MHz
ON	ON	OFF	55MHz
ON	OFF	OFF	60MHz
OFF	OFF	OFF	66.8MHz
OFF	ON	OFF	75MHz
ON	ON	ON	83MHz

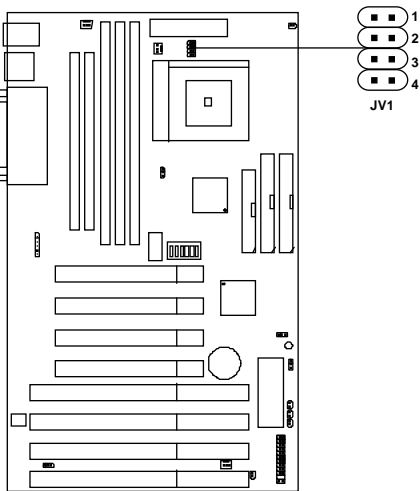
2. The DIP Switch SW1 (1, 2, and 3) is used to set the Core/Bus (Fraction) ratio of the CPU. The actual core speed of the CPU is the Host Clock Frequency multiplied by the Core/Bus ratio. For example:





If	<u>CPU Clock</u>	=	66MHz
	<u>Core/Bus ratio</u>	=	3/2
then	<u>CPU core speed</u>	=	<u>Host Clock</u> x <u>Core/</u>
			<u>Bus ratio</u>
		=	66MHz x 3/2
		=	100MHz








SW1			CPU
1	2	3	Core/Bus Ratio
OFF	OFF	OFF	1.5 /3.5
ON	OFF	OFF	2
ON	ON	OFF	2.5
OFF	ON	OFF	3
ON	OFF	ON	4
ON	ON	ON	4.5

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

2.1-3 CPU Voltage Setting: JV1

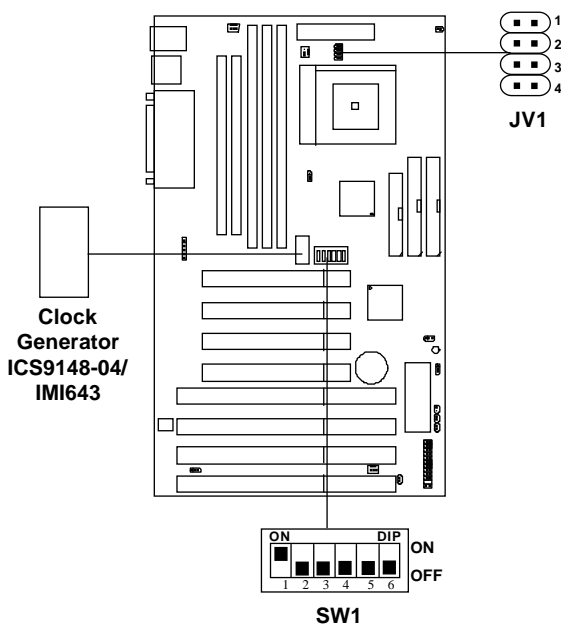


V I/O	Vcore	JV1
3.5	3.5	
3.3	3.3	
3.3	3.2	
3.3	2.9	

V I/O	Vcore	JV1
3.3	2.8	
3.3	2.5	
3.3	2.4	
3.3	2.3	
3.3	2.2	
3.3	2.1	
3.3	2.0	

2.1-4 CPU Speed and Voltage Setting: SW1 & JV1





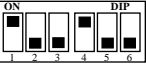


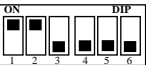

To adjust the speed and voltage of the CPU, you must know the specifications of your CPU (*always ask the vendor for CPU specifications*). This mainboard uses two different Clock Generator, so before adjusting SW1, check your clock generator. Then refer to **Table 2.1 (Intel® Pentium® processor/Pentium® processor with MMX™ technology)**, **Table 2.2 (Cyrix® 6x86/6x86L/6x86MX processor)** and **Table 2.3 (AMD® K5/K6 processor)** for proper setting.







Note: The table provided can be used by both clock generator. The only difference with the **ICS9148-04** and **IMI643** Clock Generator is the CPU clock frequency of 50, 55, 83 MHz. Since these 3 frequencies are not supported by the current CPUs, so the jumper settings for both regulator are the same.

Table 2.1 Intel® Processor

a. Intel® Pentium® Processor

CPU Type	CPU Voltage			CPU Speed
	VI/O	Vcore	JV1	SW1
90MHz	3.38/3.52			 ON OFF
100MHz				 ON OFF
120MHz				 ON OFF
133MHz				 ON OFF
150MHz				 ON OFF
166MHz				 ON OFF
200MHz				 ON OFF

b. Intel® Pentium® Processor with MMX™ Technology



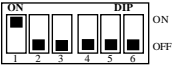




166MHz	3.3	2.8		 ON OFF
200MHz				 ON OFF
233MHz				 ON OFF

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


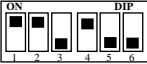
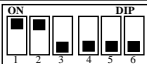




Table 2.2 Cyrix® Processor

Cyrix® 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 has 120MHz core speed in Cyrix® processor. Cyrix® processor should always uses a more powerful fan (ask vendor for proper cooling fan).

a. Cyrix® 6x86/6x86L Processor

CPU Type	CPU Voltage			CPU Speed
	VI/O	Vcore	JV1	SW1
6x86 PR150	3.5		 1 2 3 4	 ON OFF
6x86 PR166				 ON OFF
6x86L PR166	3.3	2.8	 1 2 3 4	 ON OFF
6x86 PR200	3.5	2.8	 1 2 3 4	
6x86L PR200	3.3		 1 2 3 4	

b. Cyrix® 6x86MX Processor







CPU Type	CPU Voltage				CPU Speed
	VI/O	Vcore	JV1		SW1
6x86MX PR166	3.3	2.9		60 x 2.5	
6x86MX PR200				66 x 2.5	
6x86MX PR233				75 x 2.5	
				66 x 3	
6x86MX PR266				75 x 3	
				66 x 3.5	

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® K5 processor.

a. AMD® K5 Processor

CPU Type	CPU Voltage			CPU Speed
	VI/O	Vcore	JV1	SW1
PR90	3.52			
PR100				
PR120				
PR133/PR150				
PR166				

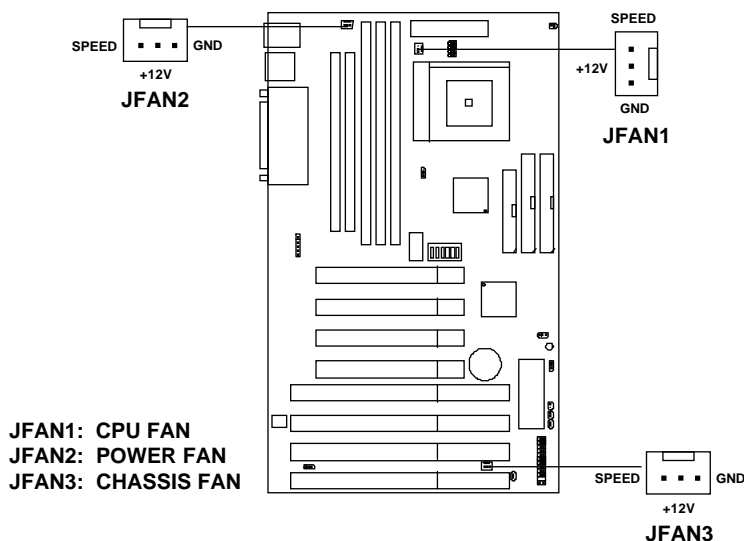
b. AMD® K6 Processor

PR166	3.3	2.9		
PR200				
PR233	3.3	3.2		

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

2.1-5 CPU Fan Power Connector: JFAN1 / JFAN2 & JFAN3 (Reserved)

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 LM78 on board, you need to use a specially designed fan with speed sensor to take advantage of LM78's CPU fan control function.

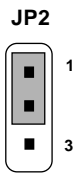
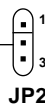
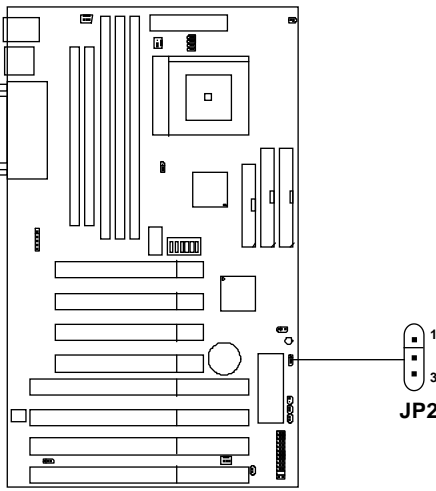


For fans with fan speed sensor, every rotation of the fan will send out 2 pulses. LM78 will count and report the fan rotation speed.

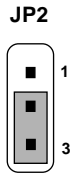
- Note:**
1. **JFAN2 & JFAN3** are the Power and Chassis Cooling Fan Speed Connectors (reserved for LM78 System Hardware Monitor Option.)
 2. Always consult vendor for proper CPU cooling fan.

2.2 BIOS Reflash Boot Block Feature: JP2

This jumper is for setting the Flash ROM BIOS.



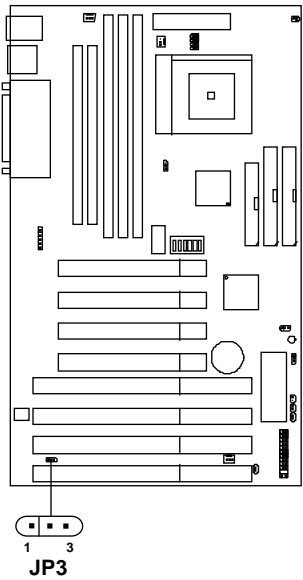
PNP Setting
(cannot update new BIOS)



Update NEW BIOS

**2.3 Internal Modem Ring Wake-up Connector:
JP3**

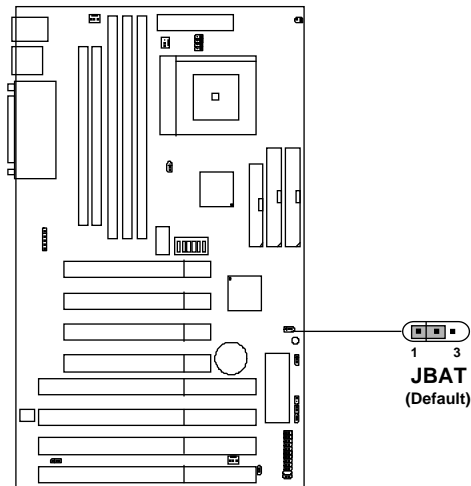
The JP3 connector is used for special internal modem that has 3 pins that support the ring power on function. The 3 pins of the internal modem should have the same pin definition with JP3.



Pin 1:	Standby 5V
Pin 2:	Ring Single Input
Pin 3:	Ground

2.4 Battery Connector: JBAT

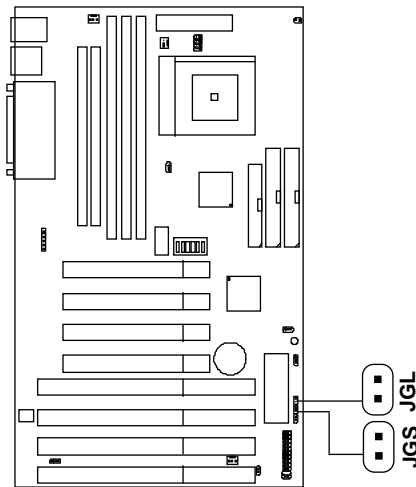
A battery must be used to retain the mainboard configuration in CMOS RAM. To retain the on-board battery you must always short pins 1,2 of JBAT.



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.

2.5 Power Saving Switch Connector: JGS/ Power Saving LED Connector: JGL

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

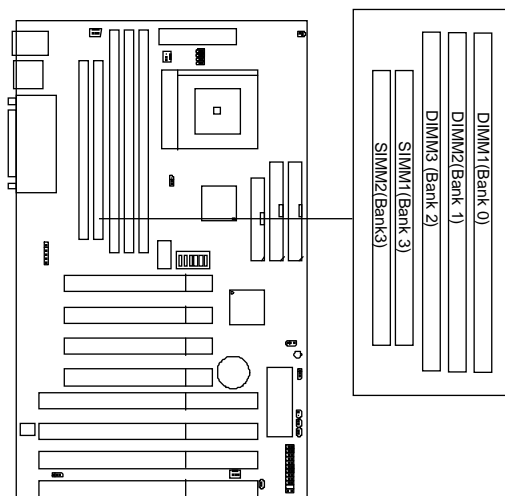


Note: To make JGS function, you must go to the BIOS power management and enable it there.

2.6 Memory Installation

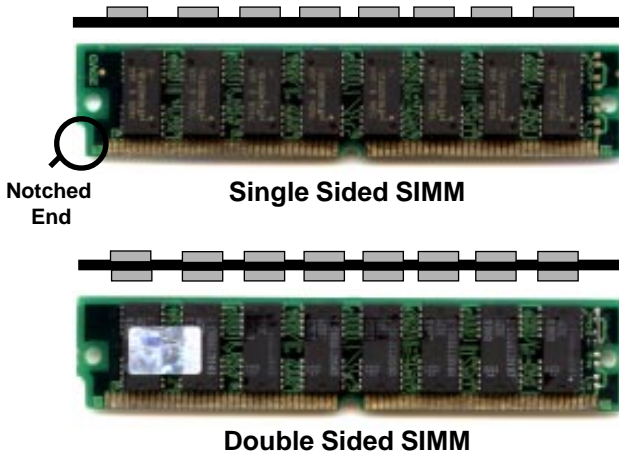
2.6-1 Memory Bank Configuration

The mainboard provides two 72-pin SIMMs (Single In-Line Memory Module) and three 168-pin DIMM(Double In-Line Memory) sockets. It supports five memory banks for a maximum of 256MB memory. You can use SIMM from 4MB, 8MB, 16MB, 32MB, 64MB to 128MB, and DIMM from 8MB, 16MB, 32MB, 64MB, 128MB to 256MB.

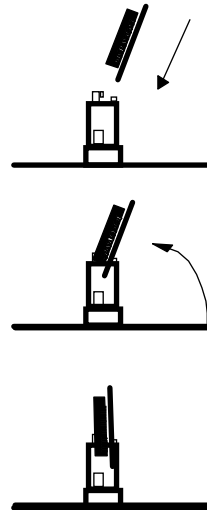


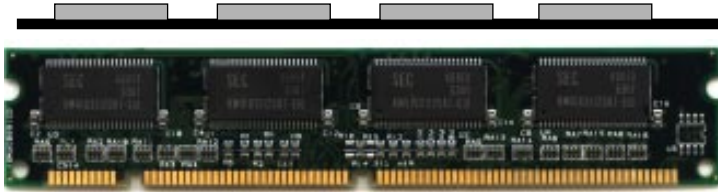
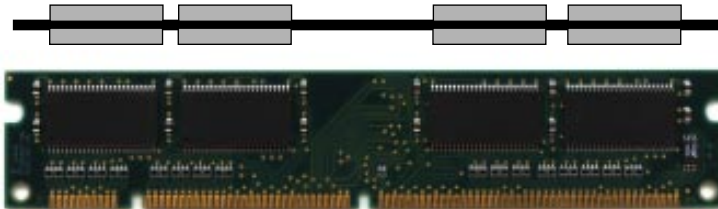
2.6-2 Memory Installation Procedures:

A. How to install SIMM Module

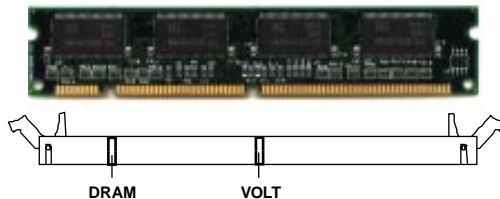


1. The SIMM slot has a “*Plastic Safety Tab*” and the SIMM memory module has a “Notched End”, so the SIMM memory module can only fit in one direction.
2. Insert the SIMM memory modules into the socket at 45-degree angle. Then, push into a vertical position so that it will snap into place.
3. The Mounting Holes and Metal Clips should fit over the edge and hold the SIMM memory modules in place.



B. 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. Close the plastic clip at the side of the DIMM slot.

2.6-3 Memory Population Rules

1. Make sure that the SIMM banks are using the same type and equal size density memory.
 2. To operate properly, at least two 72-pin SIMM module must be installed in the same bank or one 168-pin DIMM module must be installed. The system cannot operate with only one 72-pin SIMM module.
 3. Before using SIMM and DIMM modules, look at the chart below and the chart on the next page.
- A. 32MB SDRAM Configuration

DIMM1	DIMM2	DIMM3	SIMM1/SIMM2
D/S	D/S	D	N
D/S	D/S	S	S
D/S	D/S	N	D/S

B. 64MB SDRAM Configuration

DIMM1	DIMM2	DIMM3	SIMM1/SIMM2
D/S	D/S	N	N

D-Double

S-Single

N-None

4. Each RAS can not exceed 16 pcs of DRAM.
5. It is not recommended to mix 3V SDRAM with 5V EDO/FP, for it may cause unreliability.

Table 2.6-1 Minimum (upgradeable) and Maximum Memory Size for each configuration for SDRAM

DRAM Tech.	DRAM Density & Width	DRAM Addressing	Address Size		MB/SDRAM	
			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

Table 2.6-2 Minimum (upgradeable) and Maximum Memory Size for each configuration for DIMM

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	12	8	8MBx4	16MBx8
	2Mx8	ASYM	12	9	16MBx8	32MBx16
	4Mx4	ASYM	12	10	32MB	64MB
64M	2Mx32	ASYM	12	10	32MBx2	64MBx4
	2Mx32	ASYM	13	8	16MBx2	32MBx4
	4Mx16	ASYM	14	8	32MB	64MB
	8Mx8	ASYM	14	9	64MB	128MB
	16Mx4	ASYM	14	10	128MB	256MB

2.7 Case Connector: JFP

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

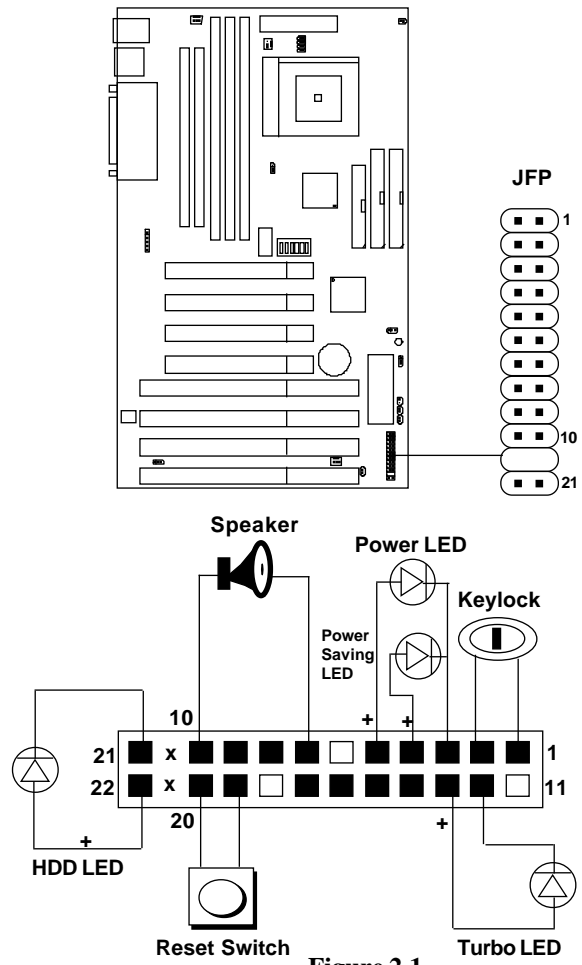


Figure 2.1

2.7-1 Turbo LED

This mainboard is always on Turbo speed. Connecting a Turbo LED will just lit the LED. (See Figure 2.1)

2.7-2 Hardware Reset

Reset switch are 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)

2.7-3 Keylock

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

2.7-4 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)

2.7-5 Speaker

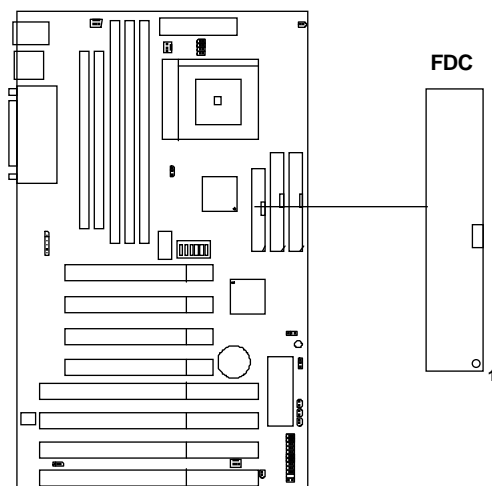
Speaker from the system case are connected to this pin. (See Figure 2.1)

2.7-6 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).

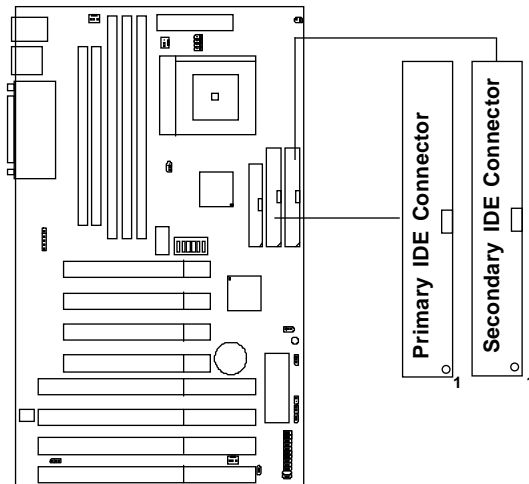
2.8 Floppy Disk Connector: FDC

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.



2.9 Hard Disk Connectors: IDE1 & IDE2

The mainboard 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)

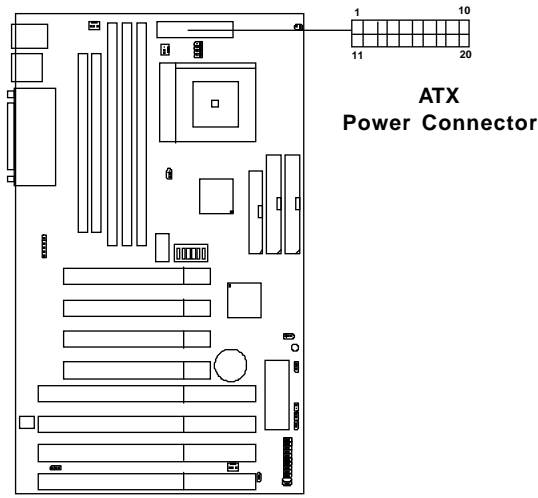
The first hard disk should always be connected to IDE1. IDE1 can connect a Master and a Slave drive.

IDE2(secondary IDE connector)

IDE2 can connect a Master and a Slave drive.

2.10 ATX 20-pin Power Connector: JWR1

This type of connector already supports the remote ON/OFF function. However, you need to connect the **Remote Power On/OFF switch (JRMS1 or JRMS2)**.

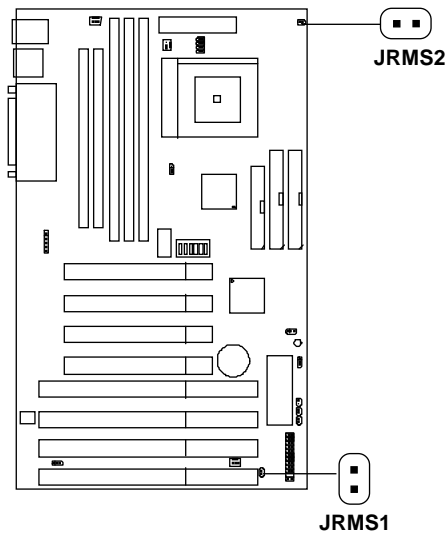


ATX Power Connector Pin Description

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

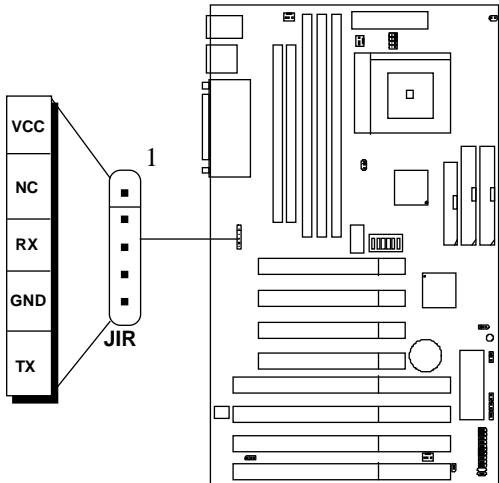
2.11 Remote Power On/Off Switch: JRMS1/JRMS2

Connect to a 2-pin push button switch to JRMS1 or 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. This is used for ATX type power supply. You can program this through BIOS. Refer to Soft-Off by PWR-BTTN in BIOS.

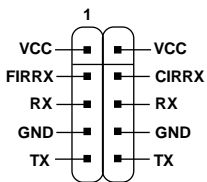


2.12 Infrared Module Connector: JIR

The mainboard provides a 5-pin infrared connector(IR) for IR module or 2 x 5-pin module (use only for W83977ATF). 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.

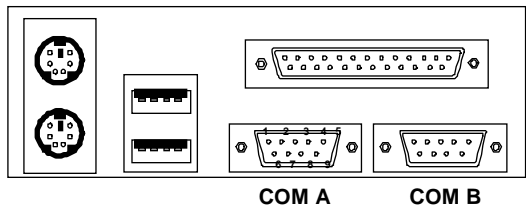


Reserved for W83977ATF



2.13 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)

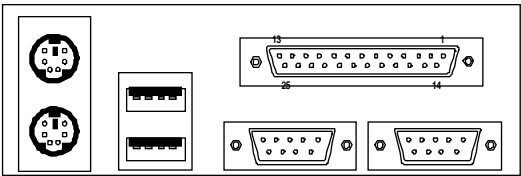
PIN DEFINITION

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

2.14 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

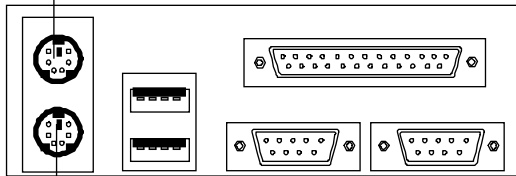
PIN #	DEFINITION	PIN #	DEFINITION
1	STROBE	14	AUTO FEED#
2	DATA0	15	ERR#
3	DATA1	16	INIT#
4	DATA2	17	SLIN#
5	DATA3	18	GND
6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SELECT		

2.15 Keyboard Connector: PSKBC Mouse Connector: PSMSC

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

PS/2® Mouse (6-pin Female)

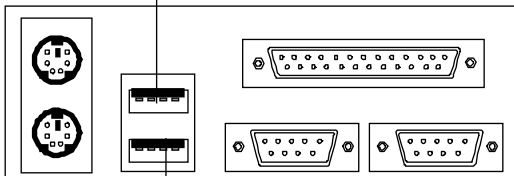


PS/2® Keyboard (6-pin Female)

2.16 USB Connectors: USB

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

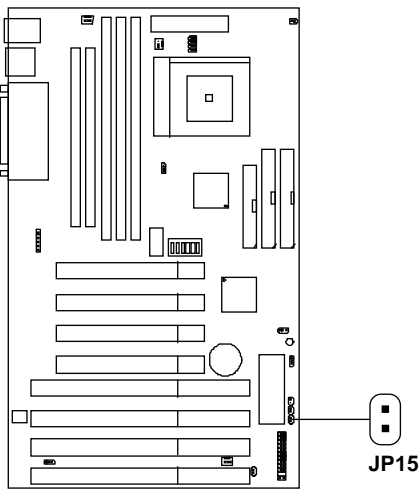
USB port 1



USB port 2

2.17 Instant-On Jumper: JP15

When JP15 is open, if you plug the power cord of your system into a power outlet. The system will automatically power on. But when JP3 is shorted, then this function will not work.



FUNCTION	JP15
Instant-On	
Standard	