

## Chapter 2

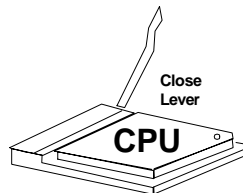
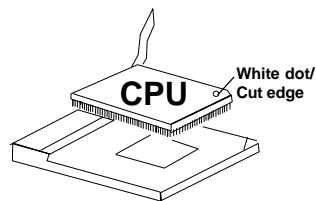
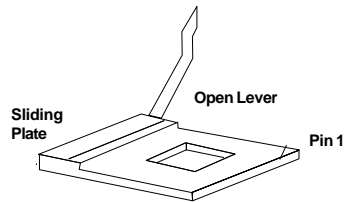
## HARDWARE INSTALLATION

### 2.1 Central Processing Unit: CPU

The MICRO ATX AL14 mainboard operates with Intel® Pentium® processor with MMX™ technology, AMD® K6/K6-2/K6-III, and Cyrix® 6x86L/6x86MX/III processors. It could operate with 2.0V to 1.3V 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 (JV1) for setting the CPU voltage. It is recommended that the processor should have a cooling fan attached to prevent from overheating.

#### 2.1-1 CPU Installation Procedure

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

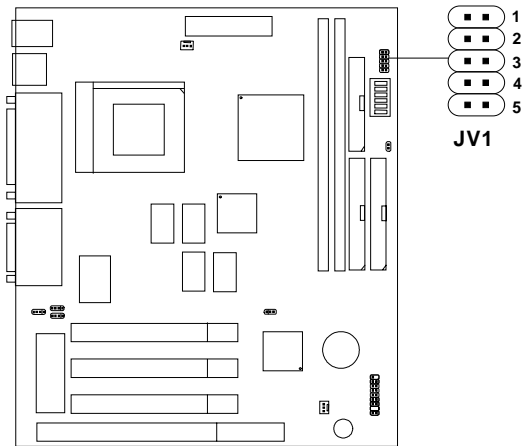
SW1			CPU
4	5	6	Clock
OFF	OFF	OFF	100MHz
ON	OFF	OFF	95MHz
OFF	ON	OFF	83MHz
OFF	OFF	ON	75MHz
OFF	ON	ON	66MHz
ON	ON	ON	60MHz
ON	OFF	ON	68MHz

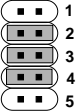
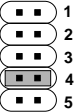
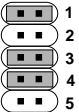
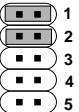
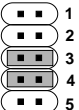
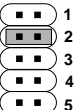
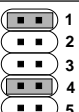
2. The DIP Switch SW1 (1, 2, and 3) is used to set the Core/Bus (Fraction) ratio of the CPU. The actual core speed of the CPU is the Host Clock Frequency multiplied by the Core/Bus ratio. For example:

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

SW1			CPU
1	2	3	Core/Bus Ratio
OFF	OFF	ON	5.5x
OFF	ON	ON	5x
ON	ON	ON	4.5x
ON	OFF	ON	4x
OFF	OFF	OFF	3.5x
OFF	ON	OFF	3x
ON	ON	OFF	2.5x
ON	OFF	OFF	2x

2.1-3 CPU Voltage Setting: JV1



V I/O	Vcore	JV1	V I/O	Vcore	JV1
3.4	3.4		3.4	2.8	
3.4	3.3		3.4	2.3	
3.4	3.2		3.4	2.2	
3.4	2.9				

**Other CPU Voltage Setting**

1	2	3	4	5	V/I/O	VCore
OFF	OFF	OFF	OFF	ON	3.45	1.3
ON	OFF	OFF	OFF	ON	3.45	1.35
OFF	ON	OFF	OFF	ON	3.45	1.4
ON	ON	OFF	OFF	ON	3.45	1.45
OFF	OFF	ON	OFF	ON	3.45	1.5
ON	OFF	ON	OFF	ON	3.45	1.55
OFF	ON	ON	OFF	ON	3.45	1.6
ON	ON	ON	OFF	ON	3.45	1.65
OFF	OFF	OFF	ON	ON	3.45	1.7
ON	OFF	OFF	ON	ON	3.45	1.75
OFF	ON	OFF	ON	ON	3.45	1.8
ON	ON	OFF	ON	ON	3.45	1.85
OFF	OFF	ON	ON	ON	3.45	1.9
ON	OFF	ON	ON	ON	3.45	1.95
ON	ON	ON	ON	ON	3.45	2.0
ON	OFF	OFF	OFF	OFF	3.45	2.1
OFF	ON	OFF	OFF	OFF	3.45	2.2
ON	ON	OFF	OFF	OFF	3.45	2.3
OFF	OFF	ON	OFF	OFF	3.45	2.4
ON	OFF	ON	OFF	OFF	3.45	2.5
OFF	ON	ON	OFF	OFF	3.45	2.6
ON	ON	ON	OFF	OFF	3.45	2.7
OFF	OFF	OFF	ON	OFF	3.45	2.8
ON	OFF	OFF	ON	OFF	3.45	2.9
OFF	ON	OFF	ON	OFF	3.45	3.0
ON	ON	OFF	ON	OFF	3.45	3.1
OFF	OFF	ON	ON	OFF	3.45	3.2
ON	OFF	ON	ON	OFF	3.45	3.3
OFF	ON	ON	ON	OFF	3.45	3.4
ON	ON	ON	ON	OFF	3.45	3.5

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

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)**, and **Table 2.3 (AMD® Processor)** for proper setting.

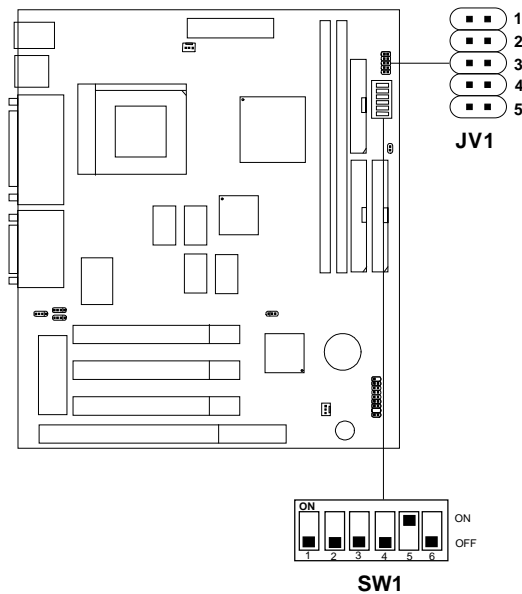
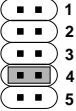


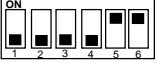


Table 2.1 Intel® Processor

a. Intel® Pentium® Processor with MMX™ Technology

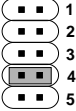
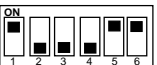
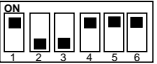
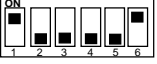
166 MHz	3.4	2.8		
200 MHz				
233 MHz				

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

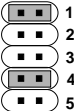





Table 2.2 Cyrix® Processor

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).

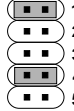

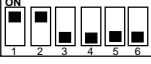
a. Cyrix® 6x86L processor

CPU Type	CPU Voltage			CPU Speed
	VI/O	Vcore	JV1	SW1
PR166 133MHz (66x2)	3.4	2.8		
PR150 120MHz (60x2)				
PR200 166MHz(66x2.5)				

b. Cyrix® 6x86MX Processor

CPU Type	CPU Voltage			CPU Speed
	VI/O	Vcore	JV1	SW1
PR200 (75 x 2)	3.4	2.9	 1 2 3 4 5	
PR233 (66 x 3)				
(75 x 2.5)				
(83 x 2)				
PR266 (83 x 2.5)				















c. Cyrix® MII processor

CPU Type	CPU Voltage			CPU Speed
	VI/O	Vcore	JV1	SW1
PR300 (66x3.5)	3.4	2.9	 1 2 3 4 5	
PR333 (100x2.5)				

**Note:** In case, 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® 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.

CPU Type	CPU Voltage			CPU Speed
	VI/O	Vcore	JV1	SW1
166MHz	3.4	2.9		 ON OFF
200MHz				 ON OFF
233MHz	3.4	3.2		 ON OFF
266MHz	3.4	2.2		 ON OFF
300MHz				 ON OFF
K6-2 300MHz				 ON OFF
K6-2 333MHz				 ON OFF
K6-2 350MHz				 ON OFF
K6-2 366MHz				 ON OFF
K6-2 380MHz				 ON OFF
K6-2 400MHz				 ON OFF

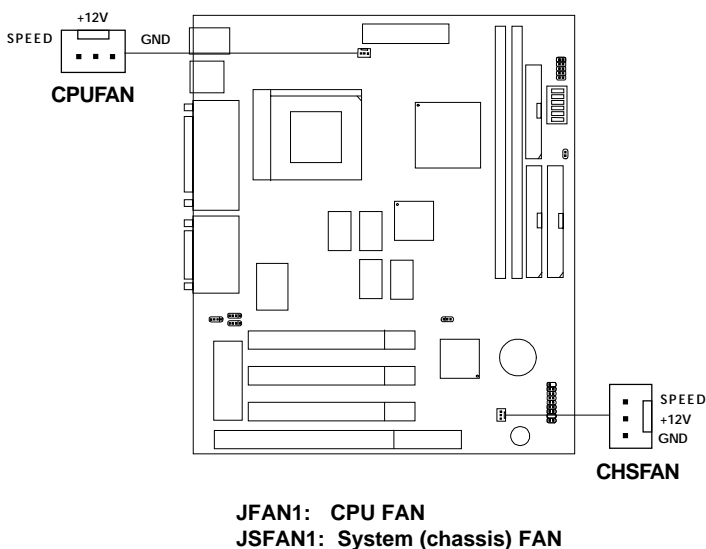


CPU Type	CPU Voltage			CPU Speed
	VI/O	Vcore	JV1	SW1
K6-2 450MHz	3.4	2.4	<div><div>■ ■</div><div>■ ■</div><div>■ ■</div><div>■ ■</div><div>■ ■</div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div>	<div><div>ON</div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>ON</div><div>OFF</div></div>
K6-2 475MHz				<div><div>ON</div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>ON</div><div>OFF</div></div>
K6-3 400MHz				<div><div>ON</div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>ON</div><div>OFF</div></div>
K6-3 450MHz				<div><div>ON</div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>ON</div><div>OFF</div></div>

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

### 2.1-6 Fan Power Connectors: CPUFAN & CHSFAN

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.



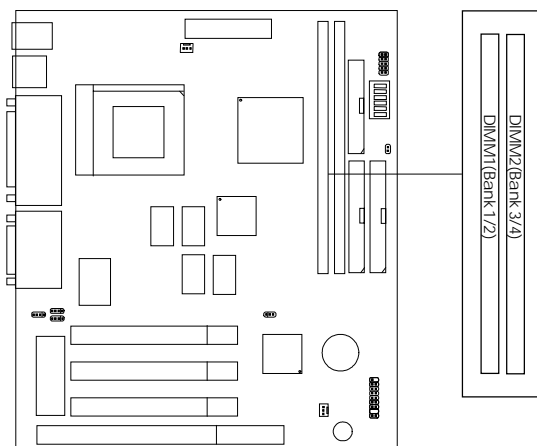
For fans with fan speed sensor, every rotation of the fan will send out 2 pulses. System Hardware Monitor will count and report the fan rotation speed.

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

## 2.2 Memory Installation

### 2.2-1 Memory Bank Configuration

The mainboard provides two 168-pin DIMM (Double In-Line Memory) sockets. It supports four memory banks for a maximum of 512MB memory. You can use DIMM from 8MB, 16MB, 32MB, 64MB, 128MB to 256MB.

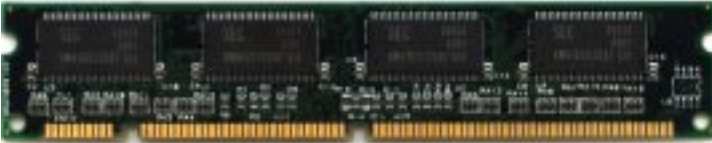


**WARNING!**

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

## 2.2-2 Memory Installation Procedure:

### A. How to install DIMM Module

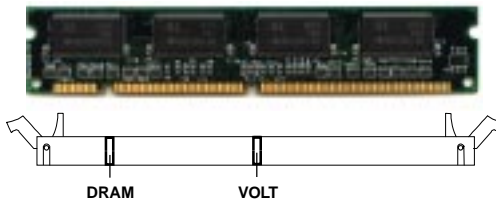


**Single Sided DIMM**



**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 or DIMM2 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

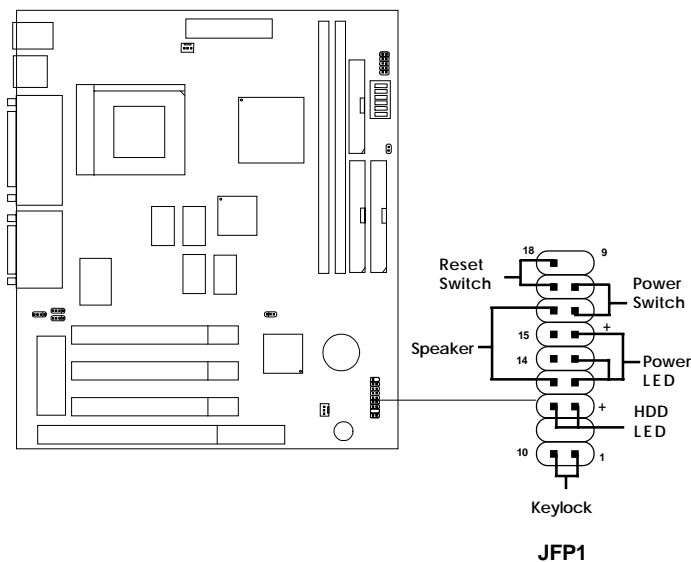
DRAM Tech.	DRAM Density & Width	DRAM Addressing	Address Size		MB/DIMM	
			Row	Column	Single no. Side(S) pcs.	Double no. Side(D) pcs.
16M	1Mx16	SYMM	10	10	8MBx4	16MBx8
	1Mx16	ASYM	12	8	8MBx4	16MBx8
	2Mx8	ASYM	11	10	16MBx8	32MBx16
	2Mx8	ASYM	12	9	16MBx8	32MBx16
	4Mx4	SYMM	11	11	32MBx16	64MBx32
	4Mx4	ASYM	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
	2Mx32	ASYM	11	8		
64M	4Mx16	ASYM	12	8		
	8Mx8	ASYM	12	9		
	16Mx4	ASYM	12	10		

**2.3 Case Connector: JFP1**

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



**2.3-1 Power Switch**

Connect to a 2-pin push button switch. This switch has the same function with JRMS1.

**2.3-2 Reset Switch**

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

**2.3-3 Keylock**

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

**2.3-4 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.

**2.3-5 Speaker**

Speaker from the system case is connected to this pin.

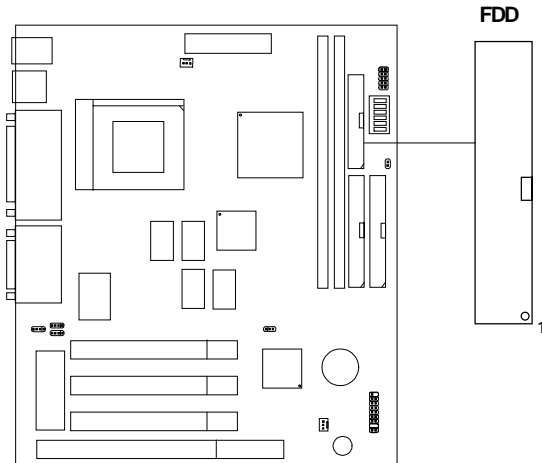
**2.3-6 HDD LED**

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.



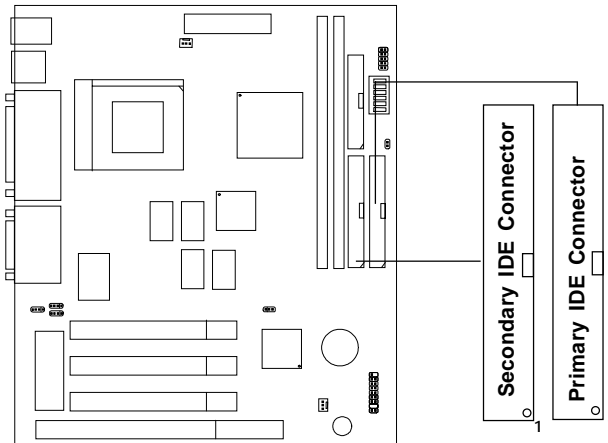
## 2.4 Floppy Disk Connector: FDD

The mainboard also provides a standard floppy disk connector, FDD 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)

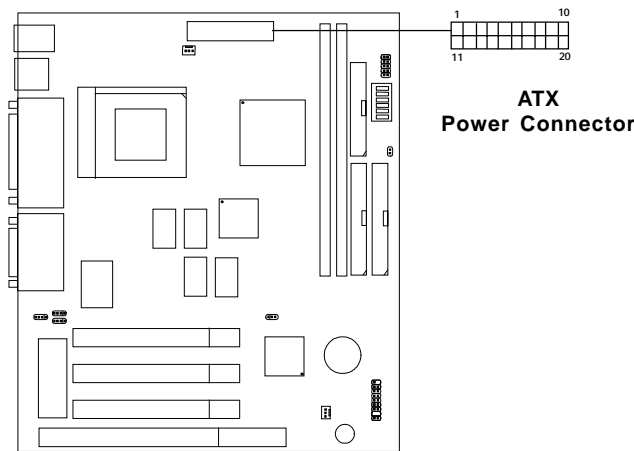
The first hard disk should always be connected to IDE1. IDE1 can connect a Master and a Slave drive.

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

IDE2 can connect a Master and a Slave drive.

2.6 ATX 20-pin Power Connector: JWR1

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



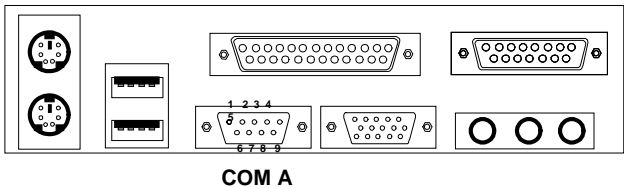
PIN DEFINITION

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

**Warning:** Since the mainboard has the instant power on function, make sure that all components are installed properly before inserting the power connector to ensure that no damage will be done.

**2.7 Serial Port Connector: COM A**

The mainboard has a 9-pin male DIN connector for serial port COM A. This port is a 16550A high speed communication port that send/receive 16 bytes FIFOs. You can attach a mouse or a modem cable directly into this connector.



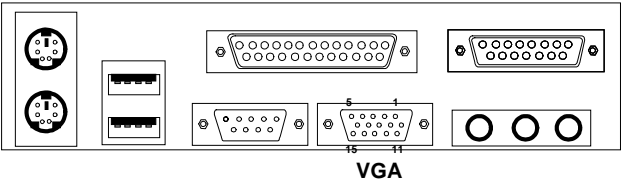
**Serial Ports (9-pin Male)**

**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)

**2.8 VGA DB 15 Pin Connector**

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



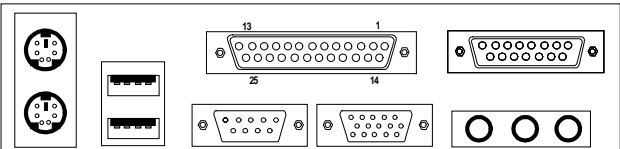
Analog Video Display Connector(DB15-S)	
Pin	Signal Description
1	Red
2	Green
3	Blue
4	Not used
5	Ground
6	Ground
7	Ground
8	Ground
9	Not used
10	Ground
11	Not used
12	SDA
13	Horizontal Sync
14	Vertical Sync
15	SCL

**2.9 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:

**Parallel Port (25-pin Female)**

**L P T**

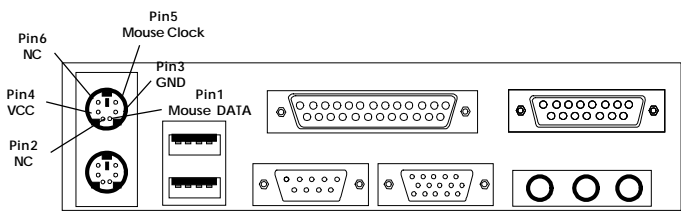


**PIN DEFINITION**

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	PE	25	GND
13	SELECT		

**2.10 Mouse Connector: JKBMS1**

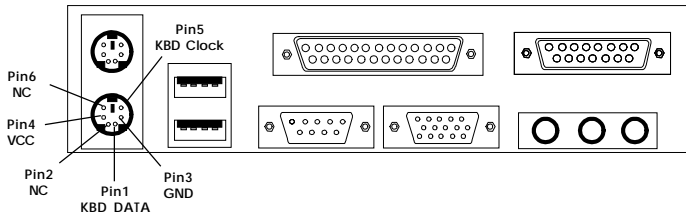
The mainboard provides a standard PS/2® mouse mini DIN connector for attaching a PS/2® mouse. You can plug a PS/2® mouse directly into this connector. The connector location and pin definition are shown below:



**PS/2 Mouse (6-pin Female)**

**2.11 Keyboard Connector: JKBMS1**

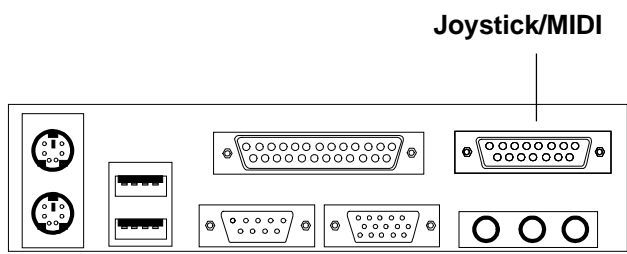
The mainboard provides a standard PS/2® keyboard mini DIN connector for attaching a keyboard. You can plug a keyboard cable directly to this connector.



**PS/2 Keyboard (6-pin Female)**

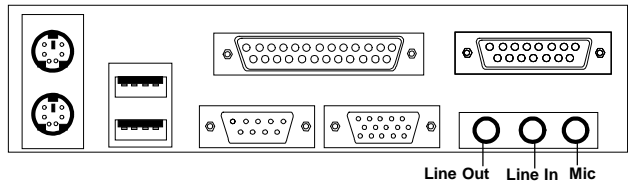
2.12 Joystick/Midi Connector

You can connect joystick or game pads to this connector.



2.13 Audio Port Connectors

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

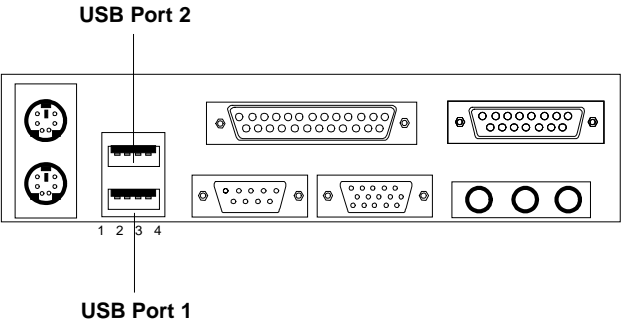


1/8" Stereo Audio Connectors



2.14 USB Connectors

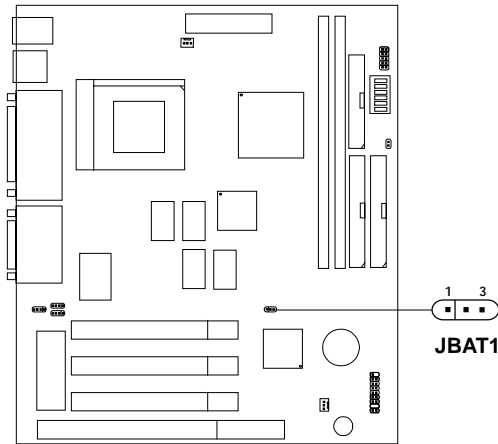
The mainboard provides a **Universal Serial Bus root** for attaching USB devices like: keyboard, mouse and other USB devices. You can plug the USB device directly to this connector.



PIN	SIGNAL
1	VCC
2	-Data0
3	+Data0
4	GND

## 2.15 Clear CMOS Jumper: JBAT1

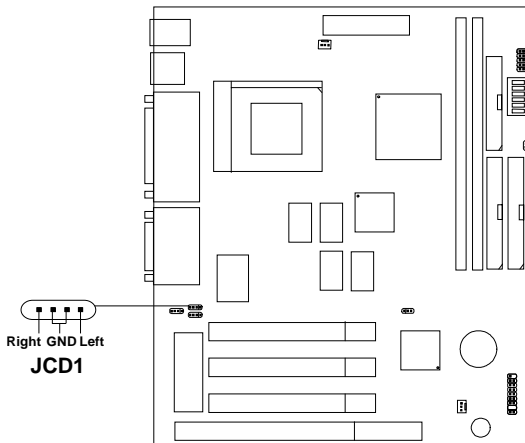
A battery must be used to retain the mainboard configuration in CMOS RAM. If you use the on-board battery, you must short 1-2 pins of JBAT1 to keep the CMOS data.



**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 socket wall.

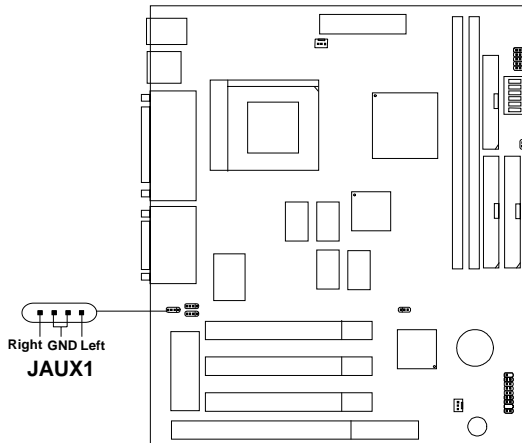
## 2.16 CD Line-In: JCD1

The mainboard provides CD Line-in connector to let you connect to the cable provided by the CD-ROM.



## 2.17 Audio Auxiliary Connector: JAUX1

Connect the audio cable provided by the CD, TV Tuner, or etc. into this connector.



## **2.18 Internal Voice Modem Connector: JTAD1**

This connector is for Internal Modem Card with internal voice connector.

