Chapter 2
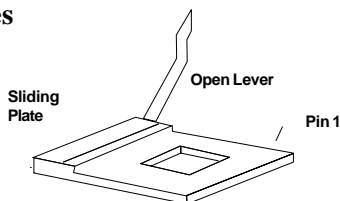
HARDWARE INSTALLATION
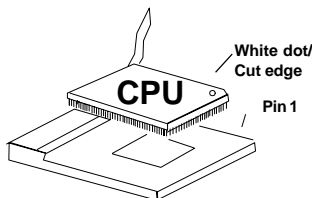
2.1 Central Processing Unit: CPU

The mainboard operates with **Intel® Pentium® III (FC-PGA) processor.** The mainboard uses a CPU socket called Socket 370 for easy CPU installation. The CPU should always have a Heat Sink and a cooling fan attached to prevent overheating.
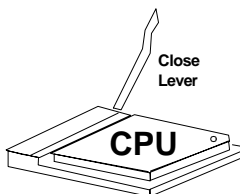
2.1-1 CPU Installation Procedures

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.

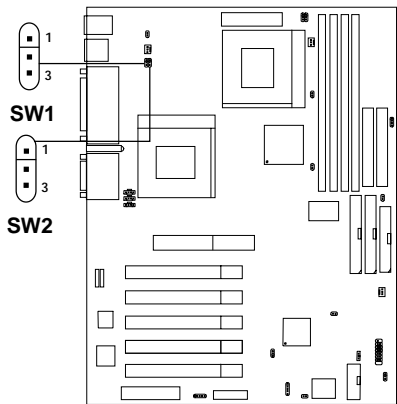3. Press the lever down to complete the installation.

2.1-2 CPU Core Speed Derivation Procedure

The BIOS can be used to set the CPU Host Bus Frequency Clock.

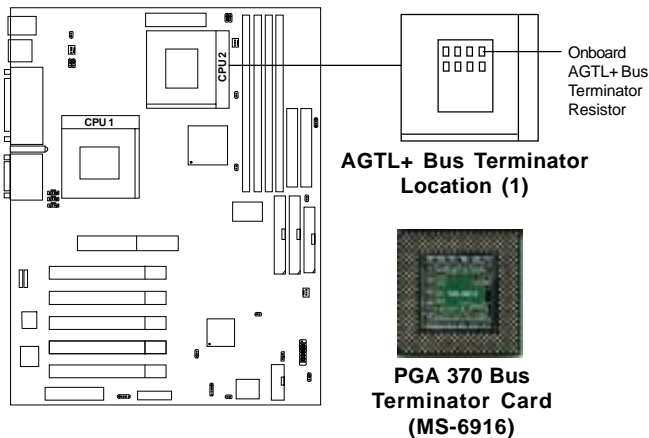|		
If	<u>CPU Clock</u>	= 66MHz
	<u>Core/Bus ratio</u>	= 3.5
then	<u>CPU core speed</u>	= <u>Host Clock</u> x <u>Core/Bus ratio</u>
		= 66MHz x 3.5
		= 233MHz

2.1-3 CPU Speed Setting: SW1/SW2

To adjust the speed of the CPU, you must know the specification of your CPU (*always ask the vendor for CPU specification*). The mainboard can auto-detect between 66, 100 or 133MHz CPU Bus Frequency.

SW2	SW1	Function
1-2	1-2	Auto
1-2	Null	$66.6 \rightarrow 100$ MHz
Null	1-2	$100 \rightarrow 133$ MHz
2-3	1-2	$133 \rightarrow 100$ MHz
2-3	2-3	$133 \rightarrow 66.6$ MHz $100 \rightarrow 66.6$ MHz

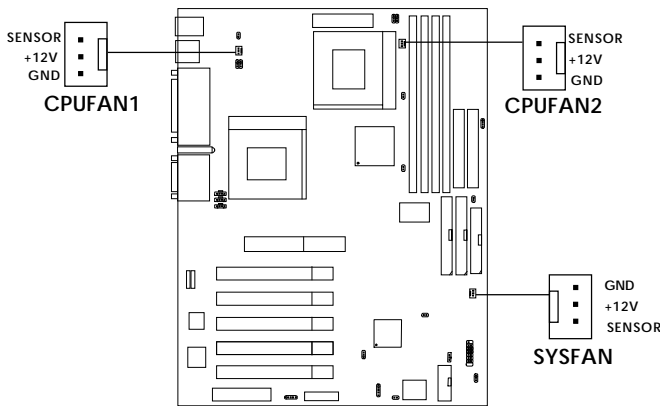## 2.1-4 Dual Processor or Single Processor Installation

Intel® Pentium III processor has termination circuitry for the processor's AGTL+ bus. In a two processor platform, each end of the bus must be properly terminated, whether or not both processor socket locations have processors installed. The 694DPro has implemented 2 methods to meet Intel® Design guide. Please check onboard AGTL+ bus terminator resistor support at location (1). If there's no onboard AGTL+ Bus Terminator Resistor, users should get PGA 370 bus terminator card (MS-6916) from MSI to plug into CPU 2.

Onboard
AGTL+ Bus
Terminator
Resistor

AGTL+ Bus Terminator Location (1)

PGA 370 Bus Terminator Card (MS-6916)

Processor	Function
Dual Processor	**CPU 1 + CPU 2**
Single Processor	**CPU 1 + PGA 370 Bus Terminator Card (CPU 2) or** **CPU 1 + Onboard AGTL+ Bus Terminator Resistor (located inside CPU 2)**

2.1-5 Fan Power Connectors: CPUFAN1/CPUFAN2/SYSFAN

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 must use a specially designed fan with speed sensor to take advantage of this function.

CPUFAN1: Processor Fan 1
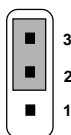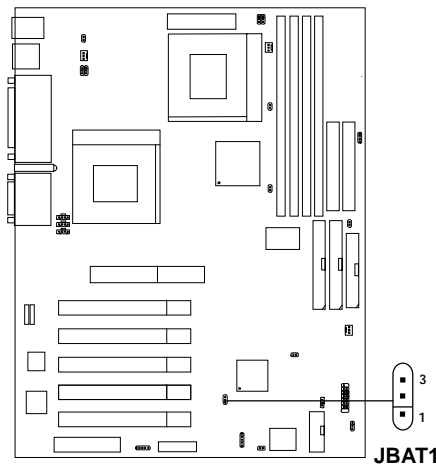**CPUFAN2**: Processor Fan 2
SYSFAN: System Fan (Non speed report)

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.
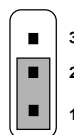
Note: **1.** Always consult vendor for proper CPU cooling fan.
2. CPU FAN supports the FAN control. You can install PC Alert utility. This will automatically control the CPU FAN Speed according to the actual CPU temperature.

2.2 Clear CMOS Jumper: JBAT1

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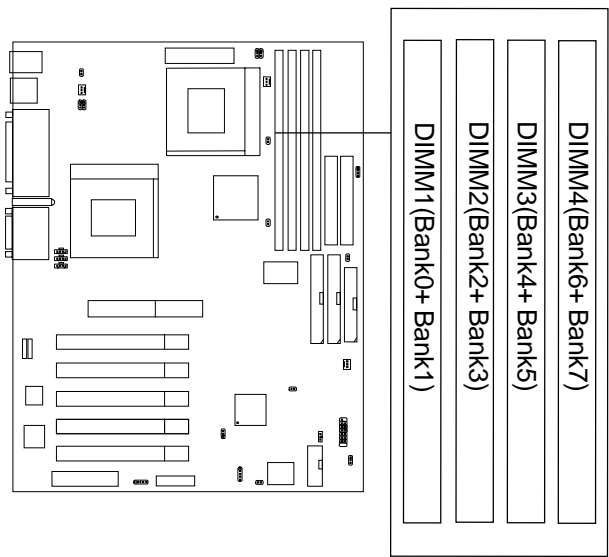

JBAT1

Clear Data

Keep 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.

2.3 Memory Installation

2.3-1   Memory Bank Configuration

The mainboard supports a maximum memory size of 512MB (8M x 8) or 1G (16M x 4) registered DIMM for SDRAM: It provides four 168-pin **unbuffered** DIMMs (Double In-Line Memory Module) sockets. It supports 8 MB to 256 Mbytes DIMM memory module.
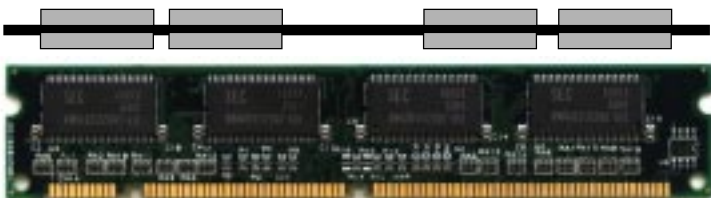

There are three kinds of DIMM specification supported by this mainboard: PC133, PC100 and PC66. If you use 66MHz CPU Bus Frequency, these four DIMM Specs. is supported. If you use 100 MHz CPU Bus Frequency, only PC100 DIMM Specs. is supported.If you use 133 MHz CPU Bus Frequency, only PC133 DIMM Specs. is supported.

WARNING!

2.3-2　Memory Installation Procedures

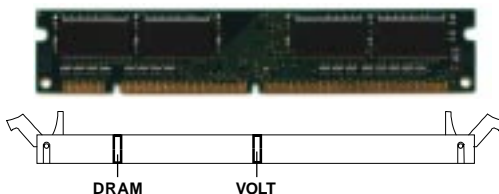### A. How to install a DIMM Module

Single Sided DIMM

Double Sided DIMM

1. The DIMM slot has 2 Notch Keys "VOLT and DRAM", so the DIMM memory module can only fit in one direction.

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

DRAM　　**VOLT**

3. The plastic clip at the side of the DIMM slot will automatically close.
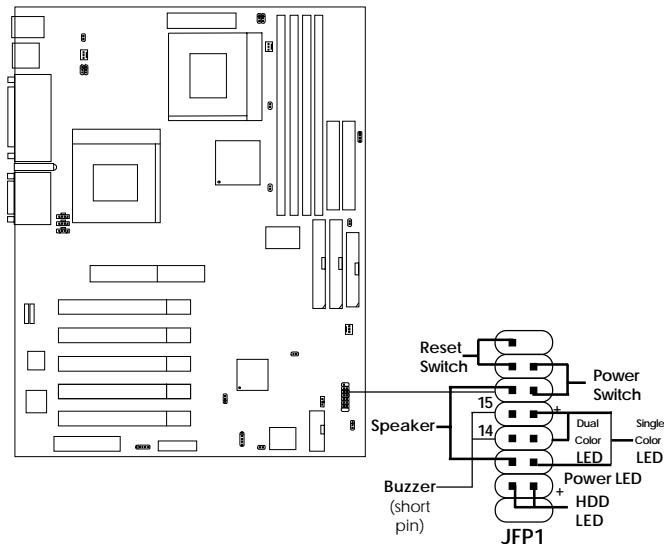
2.3-3 Memory Population Rules

1. Supports only SDRAM DIMM.

2. To operate properly, at least one 168-pin DIMM module must be in-stalled.

3. This mainboard supports Table Free memory, so memory can be installed on DIMM1, DIMM 2, DIMM 3 or DIMM 4 in any order.

4. Supports 3.3 volt DIMM.

5. The DRAM addressing and the size supported by the mainboard is shown below:

Table 2.3-1 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	12	8	16MB	32MB
	4Mx16	ASYM	13	8	32MB	64MB
	8Mx8	ASYM	13	9	64MB	128MB
	16Mx4	ASYM	13	10	128MB	256MB

2.4 Case Connector: JFP1

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

2.4-1 Power Switch

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

2.4-2 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.

2.4-3 Power LED

The Power LED is lit while the system power is on. Connect the Power LED from the system case to this pin. There are two types of LED that you can use: 3-pin single color LED or 2-pin dual color LED(ACPI request).

> **a.** 3 pin single color LED connect to pin 4, 5, & 6. This LED will lit when the system is on.
> **b.** 2 pin dual color LED connect to pin 5 & 6.
> > **GREEN** Color: Indicate the system is in full on mode.
> > **ORANGE** Color: Indicate the system is in suspend mode.

2.4-4 Speaker

Speaker from the system case is connected to this pin.
If on-board Buzzer is available:
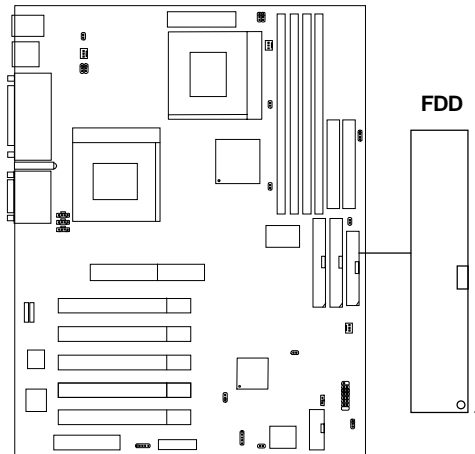Short pin 14-15:   On-board Buzzer Enabled.
Open pin 14-15:   On-board Buzzer Disabled.

2.4-5 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.
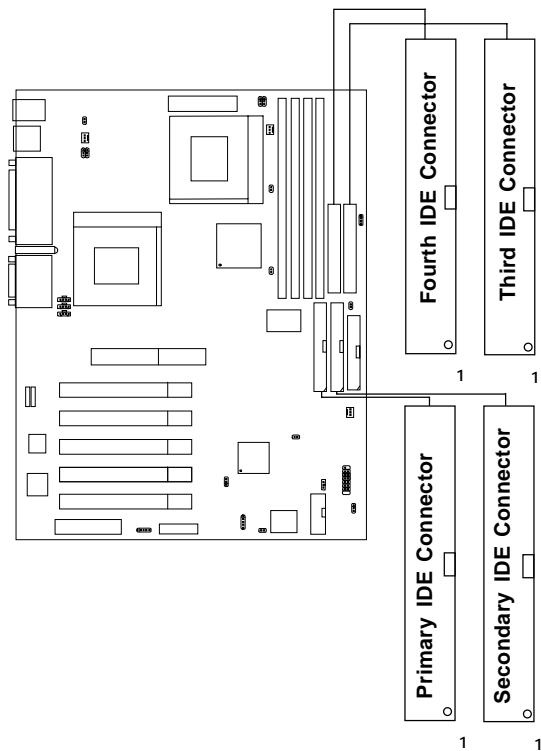
2.5 Floppy Disk Connector: FDD

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

2.6 Hard Disk Connectors: IDE1, IDE2, IDE3 & IDE4

The mainboard has a 32-bit Enhanced PCI IDE Controller that provides PIO mode 0~4, Bus Master, and Ultra DMA function. It has four HDD connectors IDE1 (primary), IDE2 (secondary), IDE3 and IDE4. You can connect up to eight hard disk drives, CD-ROM, 120MB Floppy (reserved for future BIOS) and other devices to IDE1, IDE2, IDE3 and IDE4. These connectors support the provided IDE hard disk cable.

IDE1 (Primary IDE Connector)

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

IDE2 (Secondary IDE Connector)

IDE2 can also connect a Master and a Slave drive.

IDE3 (Third IDE Connector)

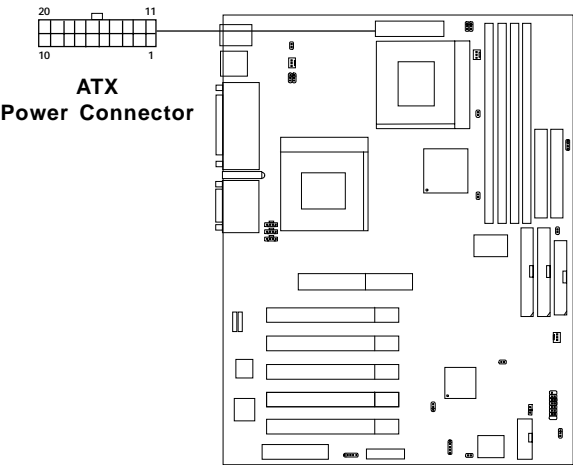ATA100(1) can also connect a Master and a Slave drive.

IDE4 (Fourth IDE Connector)

ATA100(2) can also connect a Master and a Slave drive.

2.7 Power Supply

2.7-1   ATX 20-pin Power Connector: JWR1

This connector supports the power button on-board. Using the ATX power supply, functions such as Modem Ring Wake-Up and Soft Power Off are supported by this mainboard. This power connector supports instant power on function which means that system will boot up instantly when the power connector is inserted on the board.
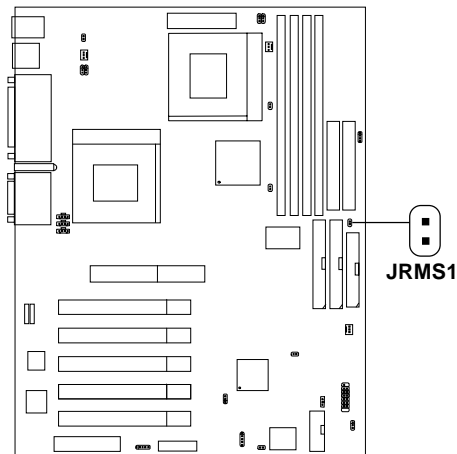

**ATX
Power Connector**

PIN DEFINITION

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

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.

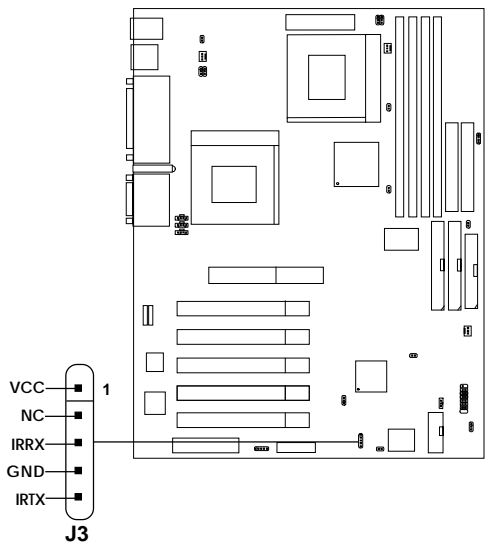## 2.7-2   Remote Power On/Off Switch: JRMS1

Connect to a 2-pin push button switch. During OFF state, press once and the system turns on. **During ON stage, push once and the system goes to sleep mode: pushing it more than 4 seconds will change its status from ON to OFF**. If you want to change the setup, you could go to the BIOS Power Management Setup. This is only used for ATX type power supply.
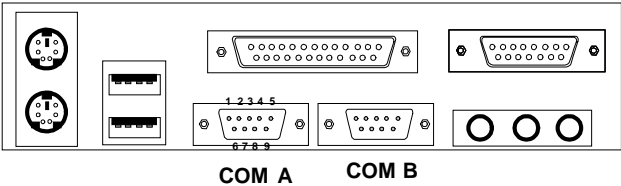
2.8 HP Infrared Module Connector: J3

The mainboard provides one infrared (J3) 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.

2.9 Serial Port Connectors: COM A and COM B

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

COM A   **COM B**

Serial Port (9-pin Male)
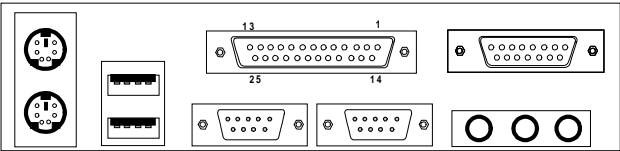
PIN DEFINITION

PIN	SIGNAL
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)

2.10 Parallel Port Connector: LPT1

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:

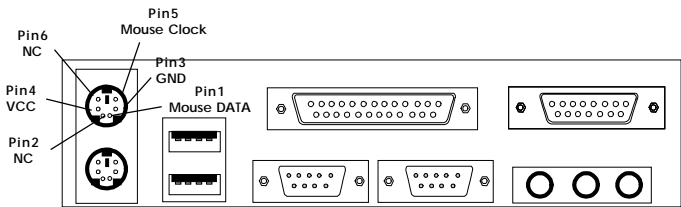### Parallel Port (25-pin Female)

LPT 1

PIN DEFINITION

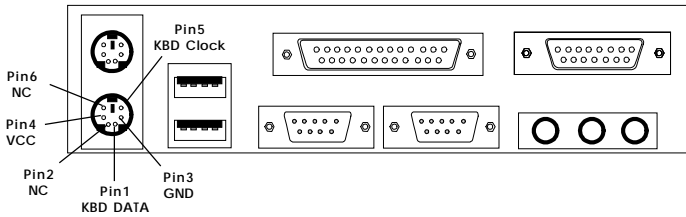| PIN	SIGNAL	PIN	SIGNAL
1	STROBE	14	AUTO FEED#
2	DATA0	15	ERR#
3	DATA1	16	INIT#
4	DATA2	17	SLIN#
5	DATA3	18	GND
6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SELECT		

2.11 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)
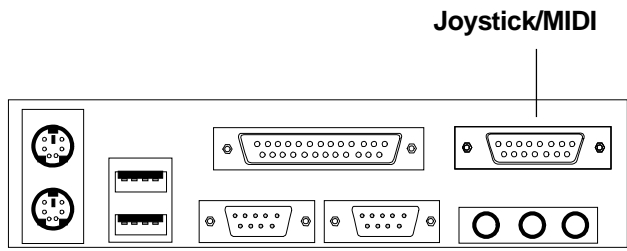
2.12 Keyboard Connector: JKBMS1

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.
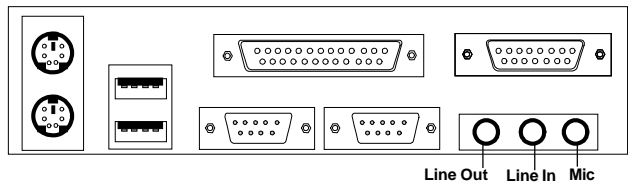

PS/2 Keyboard (6-pin Female)

2.13 Joystick/Midi Connectors

You can connect joystick or game pad to this connector.

Joystick/MIDI

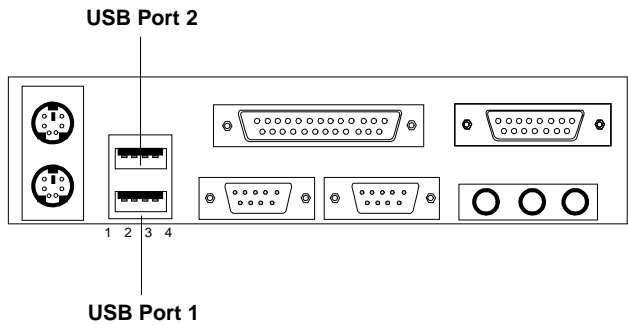## 2.14 Audio Port Connectors

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.

Line Out   Line In   Mic

1/8" Stereo Audio Connectors
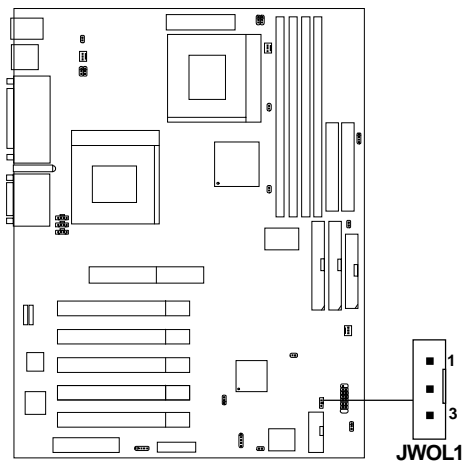
2.15 USB Connectors

The mainboard provides a **UHCI (Universal Host Controller Interface) 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.

USB Port 2

USB Port 1

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

2.16 Wake-Up on LAN Connector: JWOL1

The JWOL1 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 "Wake-Up on LAN" to enable at the BIOS Power Management Setup.
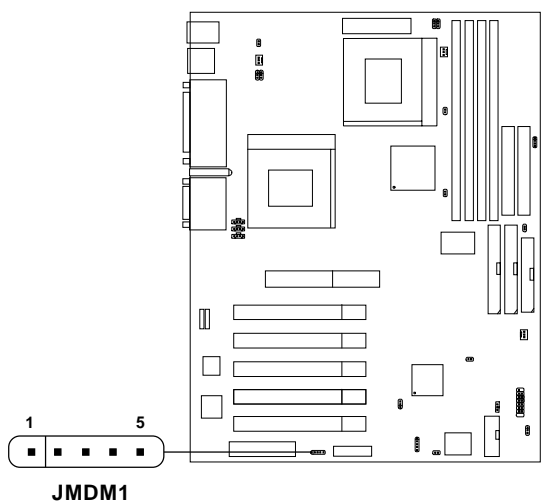

PIN	SIGNAL
1	5VSB
2	GND
3	MP_WAKEUP

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. (Power supply with 750mA 5V Stand-by)

2.17 Modem Wake Up Connector: JMDM1

The JMDM1 connector is for use with Modem add-on card that supports the Modem Wake Up function.

JMDM1

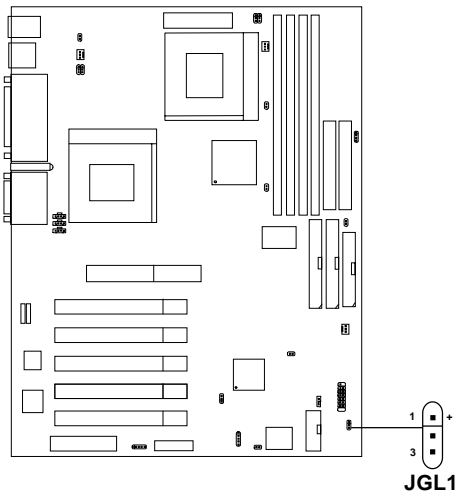| PIN	SIGNAL
1	NC
2	GND
3	MDM_WAKEUP
4	NC
5	5VSB

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. (Power supply with 750mA 5V Stand-by)
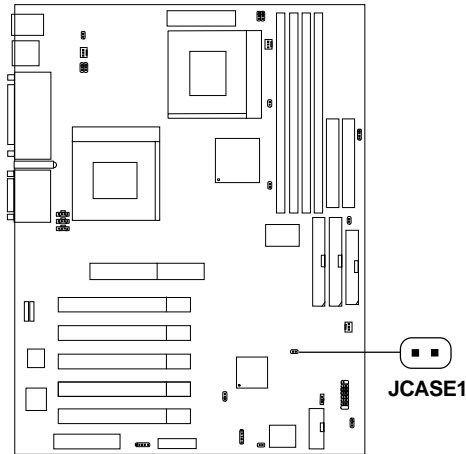
2.18 Power Saving LED Connector: JGL1

JGL1 can be connected with dual color LED. There are two types of LED that you can use: 3-pin LED or 2-pin LED (ACPI request). When the 2-pin LED is connected to JGL1, the light will turn green, when system is On. During sleep mode, the 2-pin LED will change color from Green to Orange. For 3-pin LED, when LED is connected to JGL1, this will light when the system is On and blinks when it is in suspend/sleep mode.

JGL1

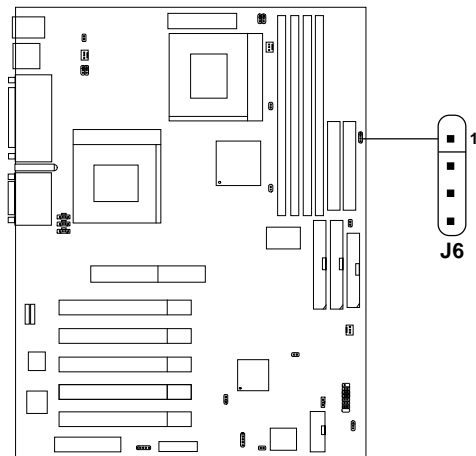| 3-pin LED	2-pin LED
1-2 Single Color 1-3 Blink	1-2 Dual Color

2.19 Chassis Intrusion Switch Case: JCASE1

This connector is connected to 2-pin connector chassis switch. If the
Chassis is open, the switch will be short. The system will record this status.
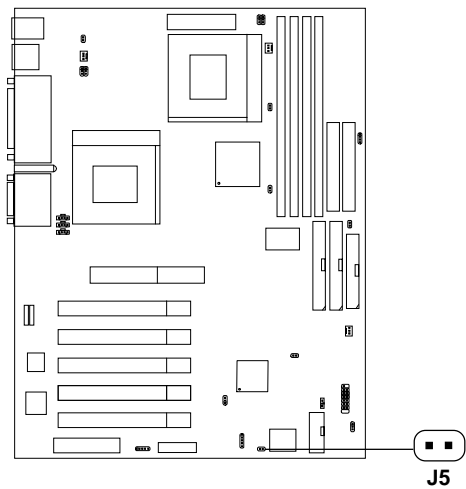To clear the warning, you must enter the BIOS settting and clear the status.

JCASE1

2.20 Ultra DMA 100 LED Connector: J6

This connector is used for Ultra DMA 100 IDE 3 & IDE 4 HDD LED status. The Ultra DMA 100 HDD LED shows the activity of the hard disk drive.

2.21 BIOS Flash Jumper: J5

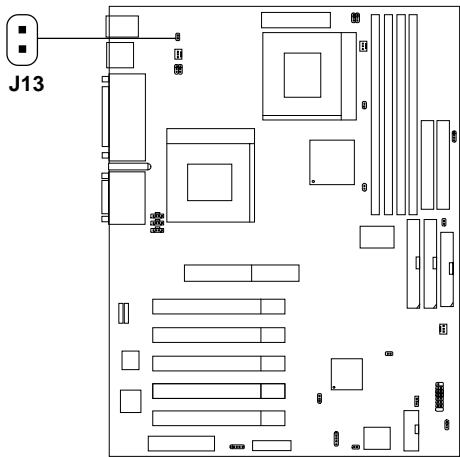This jumper is used to locked/unlocked BIOS Flash. This Jumper should be unlock when flashing/programming the BIOS.

J5

BIOS Flash Locked

BIOS Flash Unlocked
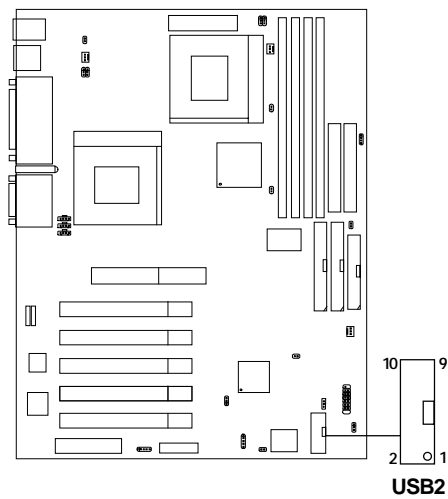
2.22 USB Power Jumper: J13

This jumper is used for setting the 5V standby power for rear USB port.

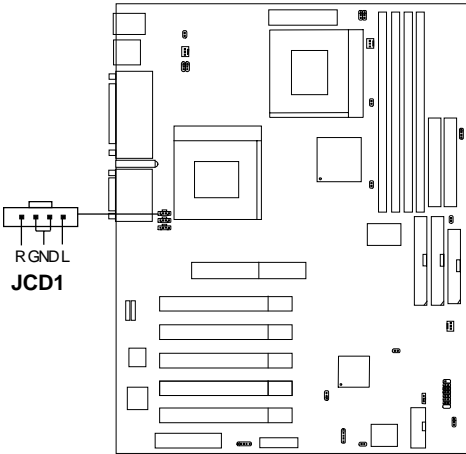| J13	Function
Short	5V Standby power for Rear USB port
Open	No 5V Standby power for Rear USB port

2.23 USB Front Connector: USB2

The mainboard provides a **front Universal Serial Bus connector**. This is an optional USB connector for Front Panel.

USB2

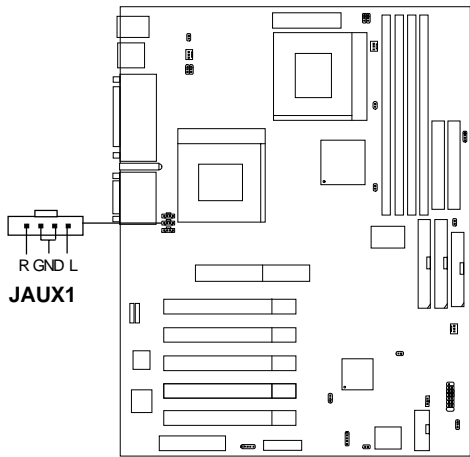| Pin	Description	Pin	Description
1	NC	6	+Data
2	VCC	7	GND
3	GND	8	-Data
4	NC	9	GND
5	NC	10	NC

2.24 CD-In Connector: JCD1

This connector is for CD-ROM audio connector.

R GND L

JCD1

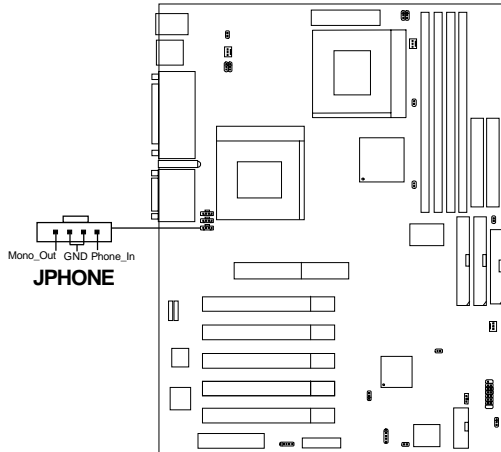## 2.24 AUX Line In Connector: JAUX1

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

2.25 Modem-In: JPHONE

The connector is for Modem with internal voice connector.
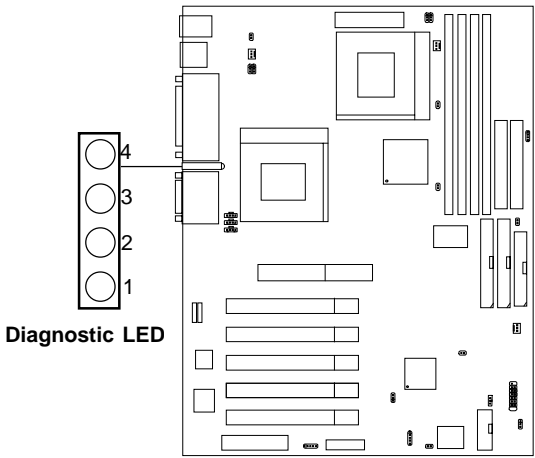
Mono_Out   GND Phone_In
JPHONE

Mono_Out is connected to the Modem Speaker Out connector.
Phone_In is connected to the Modem Microphone In connector.

2.26 Diagnostic LED

The mainboard provides a Special Diagnostic LED for users to be aware of their mainboard conditions. The LED helps user determine the problem of the mainboard.
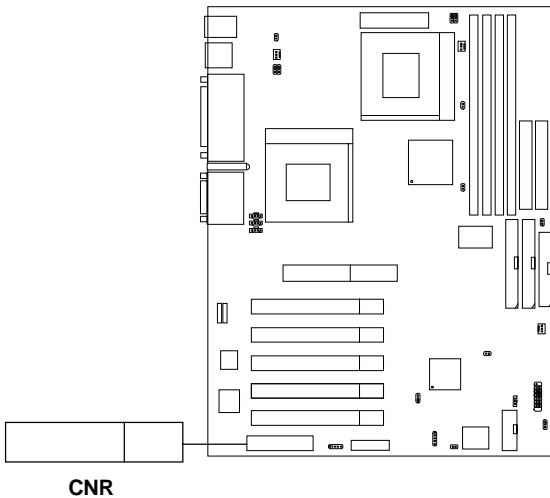

Diagnostic LED

Diagnostic LED Function

Diagnostic LED 4	3	2	1	Description	Possible Problem/ Solution
0	0	0	0	System Power ON. This will start BIOS Initialization	System D-LED will hang here The Processor might be damage or not installed properly Damage/Discharge Lithium Battery
0	0	0	1	Early Chipset Initialization	***
0	0	1	0	Memory Detection Test Testing Onboard memory size	System D-LED will hang here The Memory module might be damage or not installed properly.
0	0	1	1	Decompressing BIOS image to RAM for fast booting.	***
0	1	0	0	Initializing Keyboard Controller	***
0	1	0	1	Testing VGA BIOS This will start writing VGA sign-on messages to the screen.	System D-LED will produce Beep sound The VGA card might be damage or not inserted properly.
0	1	1	0	Processor Initialization This will show information regarding the processor (like brand name, system bus, etc...)	***
0	1	1	1	Testing RTC (Real Time Clock)	Low Lithium Battery
1	0	0	0	Initializing Video Interface This will start detecting CPU clock, checking type of video onboard. Then, detect and initialize the video adapter	***
1	0	0	1	BIOS Sign On This will start showing information about Logo, processor brand name, etc.....	***
1	0	1	0	Testing Base and Extended Memory Testing base memory from 240K to 640K and extended memory above 1MB using various patterns.	***
1	0	1	1	Assign Resource to all ISA	***
1	1	0	0	Initializing Hard Drive Controller This will initialize IDE drive and controller	Check IDE cable for proper installation
1	1	0	1	Initializing Floppy Drive Controller This will initialize Floppy Drive and controller	System D-LED will hang here The Floppy Drive Cable might not be installed properly
1	1	1	0	Boot Attempt This will set low stack and boot via INT19h.	***
1	1	1	1	Operating System Booting.	***

1 = GREEN 0 = RED   ***** Check local Vendor for possible internal mainboard problem.**
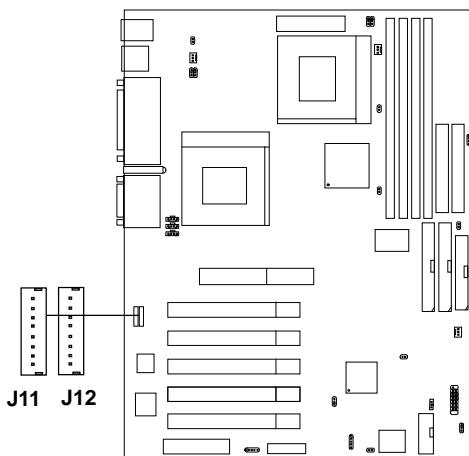
2.27   CNR (Communication Network Riser)

The Communication Network Riser specification is an open industry-standard specification that defines a hardware scalable Original Equipment Manufacturer (OEM) mainboard riser board and interface, **which supports modem only.**

CNR

2.28   IEEE 1394 Connector(optional)

The IEEE 1394 high-speed serial bus complements USB by providing enhanced PC connectivity for a wide range of devices, including consumer electronics audio/video (A/V) appliances, storage peripherals, other PCs, and portable devices.

J11   J12

A. Software Support

IEEE 1394 Driver is provided by Windows® 98 SE and Windows® 2000. Just plug in the IEEE 1394 connector into J11 & J12. These Operating System will install the driver for IEEE 1394.

B. Hardware Installation

IEEE 1394 Port

Locate the IEEE 1394 connector (J11, J112) on the mainboard.

Insert the IEEE 1394 Port into the connector.

Place the IEEE 1394 Port into the first slot of your system case.