

Chapter 1

Introduction

The MS-5149 is a high-performance personal computer mainboard. This mainboard supports Intel® Pentium® processors/Pentium® processor with MMX™ technology, Cyrix® 6x86/6x86L/6x86MX processors and AMD® K5/K6 processors. The system board supports the Peripheral Component Interconnect (PCI) Local Bus standard and provides four 32-bit PCI bus master slots.

It has a cache subsystem that can be configured for 256K or 512 K cache memory to improve overall throughput.

The system board uses the highly integrated Intel® 83430VX Chipset to support the PCI/ISA and Green standards, and to provide the Host/PCI bridge. The Intel® 82430VX chipset integrates all system control functions.

CHAPTER 1 INTRODUCTION

1.1 System Board Features

CPU

- Socket 7 supports Intel® Pentium® processors and Pentium® processor with MMX™ technology
- The Cyrix® 6x86/6x86L/6x86MX and AMD® K5/K6 processors are also supported.

Chip Set

- Intel® 82430 VX chip set.

Cache Memory

- Supports 256K/512K pipelined burst cache memory.
- Supports Directed Map Organization and Write-Back cache policy.

Main Memory

- Supports four memory banks using four 72-pin SIMM sockets and two 168-pin DIMM sockets.
- Up to 128 Mbytes main memory.
- Supports EDO Hyper Page Mode DRAM or Standard Fast Page mode DRAM and SDRAM

Slots

- Four 32-bit Master PCI Bus slots and three 16-bit ISA bus slots wherein one shared slot that can be used as ISA or PCI.

On-Board Peripherals

- On-Board Peripherals include:
 - 1 floppy port supports 2FDD
 - 2 serial ports (COMA + COMB)
 - 1 parallel port supports ECP or EPP mode
 - 2 PCI Bus Master IDE ports (up to four IDE HDD)
 - USB (reserved)

Dimensions

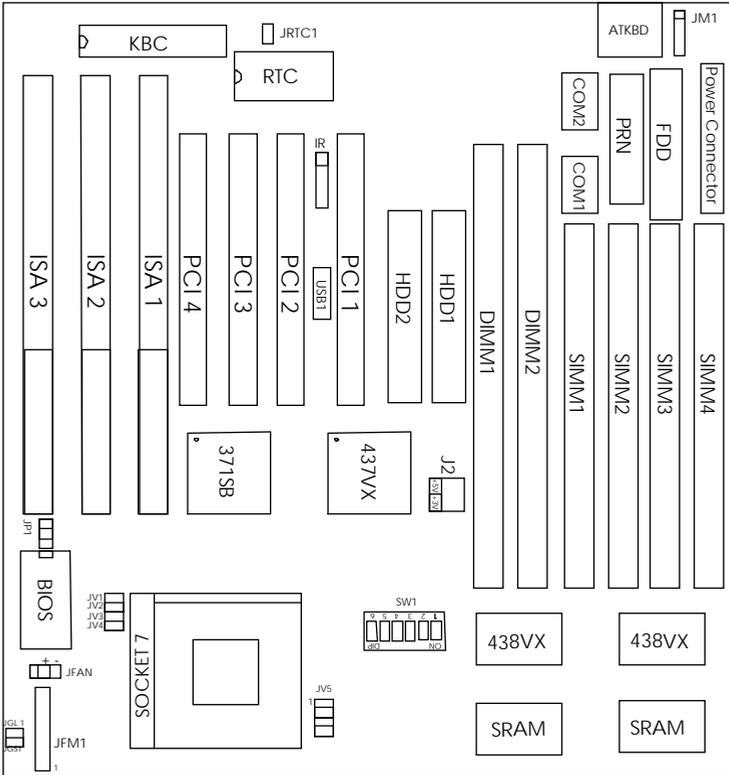
- Baby-AT® form factor
- 26cm(L) x 22cm(W) x 4 layer PCB

Mounting

- 5 mounting holes

CHAPTER 1 INTRODUCTION

1.3 System Board Layout



MS-5149

Chapter 2

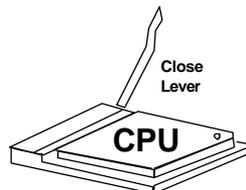
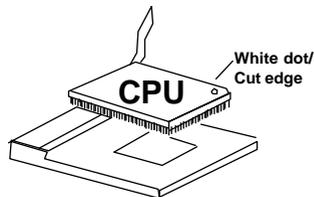
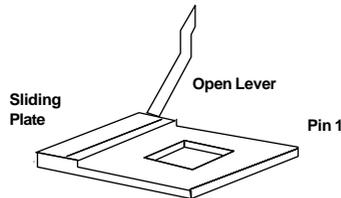
Hardware Installation

2.1 Central Processing Unit: CPU

The MS-5149 motherboard operates with **Intel® Pentium® processors/ Pentium® processor with MMX technology, Cyrix® 6x86/6x86L/6x86MX,** and **AMD® 5K86/K6** processors. It could operate with 2.8V to 3.52V processors. The motherboard 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 - JV4, JV5) for setting the CPU voltage. The CPU should always have a cooling fan attached to prevent 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.



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2.1-2 CPU Core Speed Derivation Procedure

1. The 4 CPU clock frequencies that the system supports are 50 MHz, 55MHz, 60MHz and 66.6MHz (To adjust SW1 pin 1, 2 , and 3). See the following chart to set the different Host Clock Frequencies.

SW1			CPU
1	2	3	CLOCK
ON	ON	OFF	50MHz
OFF	ON	OFF	55MHz
ON	OFF	OFF	60MHz
OFF	OFF	OFF	66.6MHz

2. The DIP Switch SW1 (4, 5 and 6) 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:

$$\begin{aligned}
 \text{If } & \text{CPU Clock} & = & 66.6\text{MHz} \\
 & \text{Core/Bus ratio} & = & 3/2 \\
 \text{then } & \text{CPU core speed} & = & \text{Host Clock} \times \text{Core/Bus ratio} \\
 & & = & 66.6\text{MHz} \times 3/2 \\
 & & = & 100\text{MHz}
 \end{aligned}$$

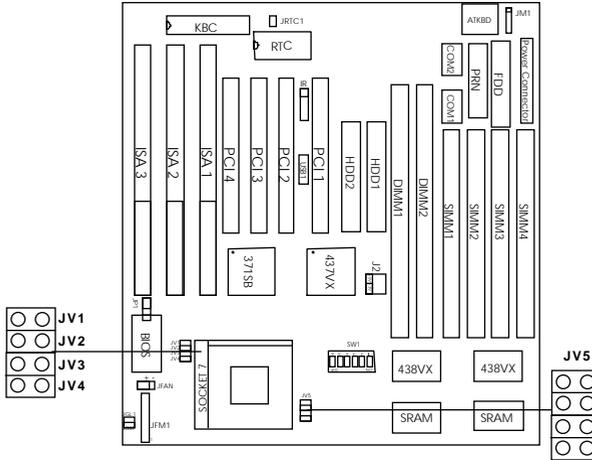
SW1			CPU
4	5	6	Core/Bus Ratio
OFF	OFF	OFF	1.5
ON	OFF	OFF	2
ON	ON	OFF	2.5
OFF	ON	OFF	3
OFF	ON	OFF	3
OFF	OFF	OFF	3.5

Note: ■ Shaded Part are used by Intel® Pentium® processor with MMX™ technology and AMD® K6

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

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2.1-3 CPU Voltage Setting: JV1 - JV4, JV5

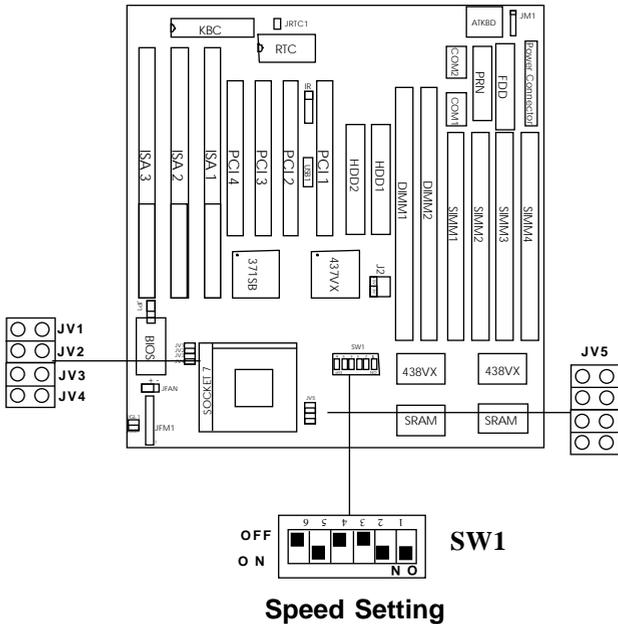


V I/O	Vcore	JV1~JV4	JV5
3.3	3.3		
3.5	3.5		
3.3	3.2		
3.3	2.8		
3.3	2.9		

CHAPTER 2 HARDWARE INSTALLATION

2.1-3 CPU Speed and Voltage Setting: SW1 & JV1-JV4, JV5

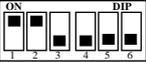
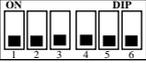
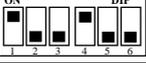
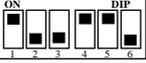
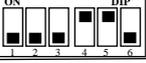
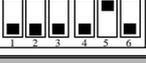
To adjust the speed and voltage of the CPU, you must know the specification of your CPU (*always ask the vendor for CPU specification*). Then refer to **Table 2.1 (Intel® processors)**, **Table 2.2 (Cyrix® processors)** and **Table 2.3 (AMD® processors)** for proper setting.



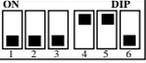
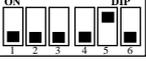
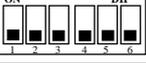
CHAPTER 2 HARDWARE INSTALLATION

Table 2.1 Intel® Pentium® processors

a. Intel® Pentium® processors

CPU Type	CPU Voltage				CPU Speed	
	VI/O	Vcore	JV1~JV4	JV5	SW1	
75MHz	3.3					
90MHz	3.3					
	3.5					
100MHz	3.3					
120MHz	3.3					
133MHz	3.5					
150MHz	3.5					
166MHz	3.5					
200MHz	3.5					

b. Intel® Pentium® processors with MMX™ technology

166MHz						
200MHz	3.3	2.8				
233MHz						

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Table 2.2 Cyrix® 6x86 processor

Cyrix® processor uses PR to rate the speed of their processors based on Intel® processor core speed. For example P120+ (100MHz) has 120MHz core speed of an Intel® processor but has 100MHz core speed in Cyrix® processor. Cyrix® processor should always uses a more powerful fan (ask vendor for proper cooling fan).

CPU Type	CPU Voltage				CPU Speed
	VI/O	Vcore	JV1~JV4	JV5	SW1
P120+ (100MHz)	3.5	3.5			
P133+ (110MHz)					
P150+ (120MHz)					
P166+ (133MHz)					

Cyrix® 6x86L processor

PR166 (166MHz)	3.3	2.8			
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Cyrix® 6x86MX processor

PR166	3.3	2.9			
*PR200					
*PR233					

Note: * This CPU type is reserved for future support.

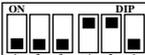
CHAPTER 2 **HARDWARE INSTALLATION**

Table 2.3 AMD® K5 processor

AMD® K5 processor uses PR to rate the speed of their processors based on Intel® processor core speed. For example: P133+ (100MHz) has 133MHz core speed of Intel® processor but has 100MHz core speed in AMD® processor. AMD® processor should always uses a more powerful fan (ask vendor for proper cooling fan).

CPU Type	CPU Voltage			CPU Speed	
	VI/O	Vcore	JV1-JV4	JV5	SW1
PR90 (90MHz)	3.5				
PR100 (100MHz)					
PR133 (133MHz)					
PR166 (166MHz)					

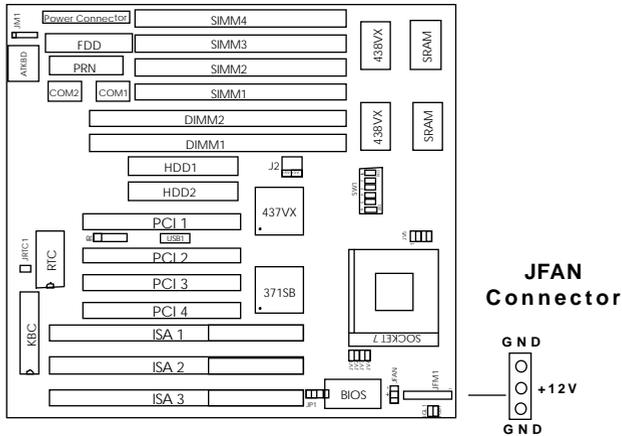
AMD® K6 processor

PR166 (166MHz)	3.3	2.9			
PR200 (200MHz)					

CHAPTER 2 HARDWARE INSTALLATION

2.1-4 CPU Fan Power Connector: JFAN

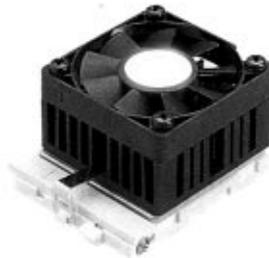
This connector supports CPU cooling fan with +12V. It supports both two and three pin head connector. When connecting the wire to the connector, always take note that the red wire is the positive and should be connected to the +12V.



Recommended CPU cooling fan specification:

- Metallic Clip
- RPM 5000
- CFM 10
- +12V
- 52x52x10mm
- Ball Bearing

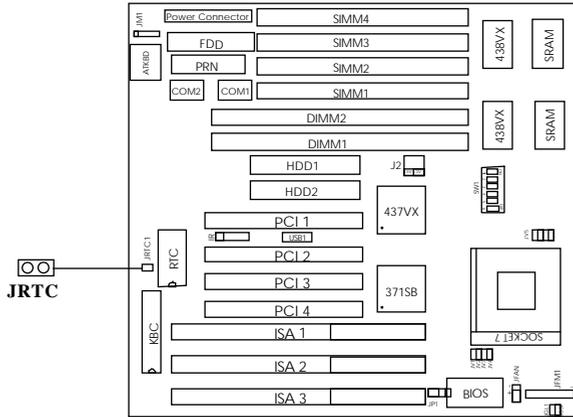
Note: Always consult vendor for proper CPU cooling fan.



CHAPTER 2 HARDWARE INSTALLATION

2.1-5 CMOS RAM Clear: JRTC

This jumper is for clearing the RTC data.



**keep Data
(default)**



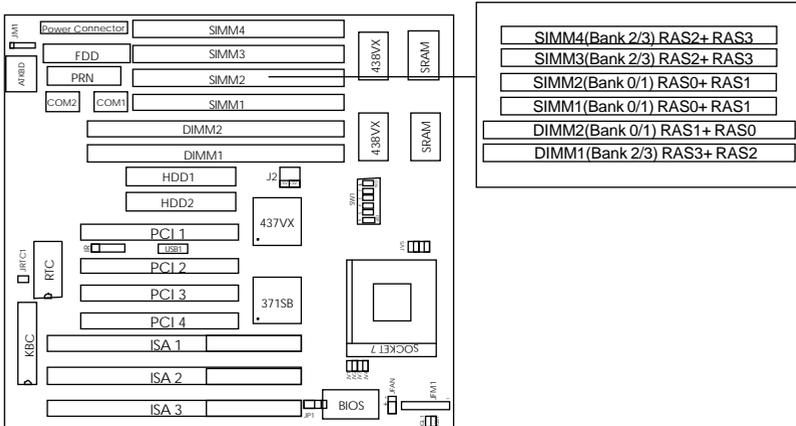
clear

CHAPTER 2 HARDWARE INSTALLATION

2.2 Memory Installation

2.2-1 Memory Bank Configuration

The system board supports a maximum of 128M of memory. It provides four 72-pin SIMMs (Single In-Line Memory Module) and two 168-pin DIMM sockets. This board supports 4 banks wherein each bank supports memory ranging from 4MB to 32MB. A Bank always has a pair of SIMM or a single DIMM. Each bank supports 4M, 8M, 16M and 32M. The 2MB is the minimum and the 16MB is the maximum for one 72-pin single sided memory module.

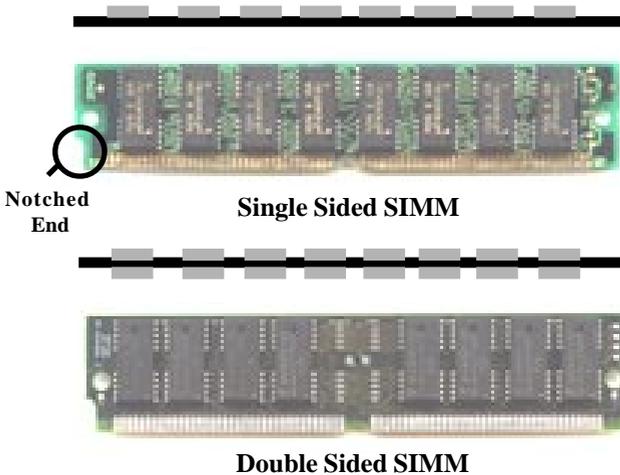


Warning! SIMM Socket 1-4 power level is 5 volts. DIMM Socket 1 & 2 power level is 3.3 V/5V. We suggest not to install both the SIMM & DIMM at the same time. But if you want to install both SIMM & DIMM slot, you must use a 3.3 volt DIMM with 5 volt I/O signal tolerance or use a full 5 volt DIMM module. Otherwise it may cause damage to the DIMM.

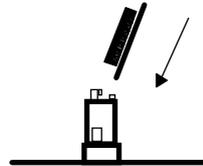
CHAPTER 2 HARDWARE INSTALLATION

2.2-2 Memory Installation Procedures:

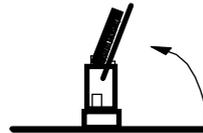
A. How to install a SIMM Module



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.



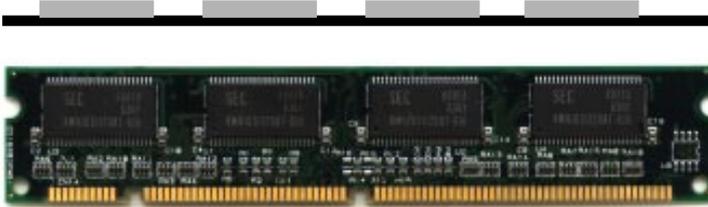
3. The Mounting Holes and Metal Clips should fit over the edge and hold the SIMM memory modules in place.



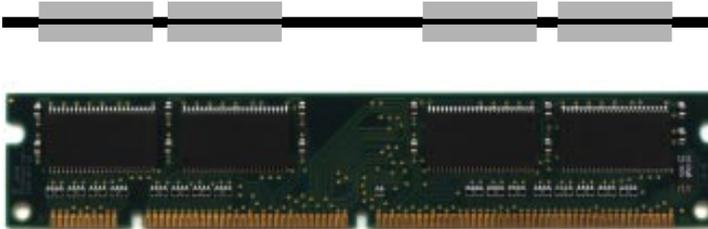
Note: Always use a 5 volts SIMM with 70 ns or above(Fast Page or EDO)

CHAPTER 2 **HARDWARE INSTALLATION**

B. How to install a DIMM Module

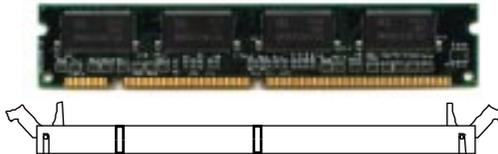


Single Sided DIMM



Double Sided DIMM

1. The DIMM slot has a two key mark “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.

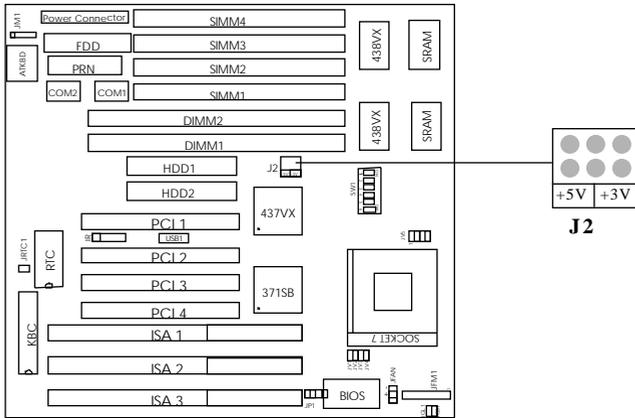


3. Close the plastic clip at the side of the DIMM slot.

Note: If you have installed SIMM and DIMM at the same time, you must use a 3.3 volt DIMM with 5 volt I/O signal tolerance or a full 5 volt DIMM module (EDO, FP or SDRAM). Look for J2 to select the DIMM voltage.

CHAPTER 2 HARDWARE INSTALLATION

A.1 DIMM Power Voltage Selector : J2



DIMM Voltage	J2
5V	 +5V +3V J2
3.3V	 +5V +3V J2

DIMM Power Level : 3.3V or 5V
SIMM Power Level : Fixed at 5V

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2.2-3 Memory Population Rule

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. This mainboard supports Table Free memory so memory can be installed on Bank 0 (SIMM1 + SIMM2), Bank 1 (SIMM3 + SIMM4), Bank 2 (DIMM1) or Bank3 (DIMM 2) in any order.

S = Single D = Double Shaded = See Warning

SIMM1 + SIMM2 Bank0 + Bank1	SIMM3+ SIMM4 Bank2 +Bank3	DIMM1 Bank2+Bank3	DIMM2 Bank0+Bank1
S	-	-	-
S	S	-	-
S	D	-	-
D	-	-	-
D	S	-	-
D	D	-	-
-	S	-	-
-	-	S	-
-	D	-	-
-	-	D	-
-	-	-	S
-	-	S	S
-	-	-	D
-	-	D	D
S	-	-	S
S	S	-	S
D	-	S	-
D	-	D	-
D	S	S	-
-	S	-	S
-	S	S	S
-	S	S	D
-	D	-	S
-	D	-	D

CHAPTER 2 HARDWARE INSTALLATION

2.3 Case Connector : JFP

The Turbo LED, Turbo Switch, Hardware Reset, Key Lock, Power LED, Power Saving LED, Sleep Switch, Speaker and HDD LED are all connected to the JFP connector block.

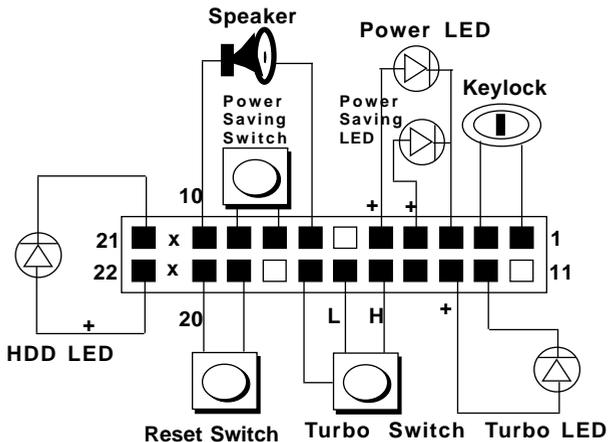
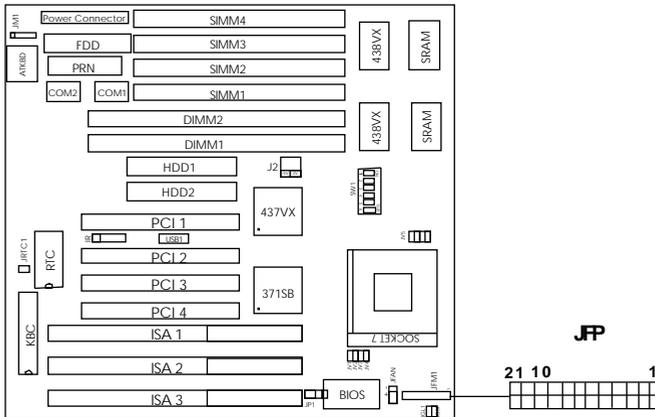


Figure 2.1

CHAPTER 2 **HARDWARE INSTALLATION**

2.3-1 Turbo LED

The Turbo LED is used to monitor if the turbo switch is ON/OFF. You can connect the Turbo LED from the system case to this pin. (See Figure 2.1)

2.3-2 Hardware Reset

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. (See Figure 2.1)

2.3-3 Keylock

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

2.3-4 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. (See Figure 2.1)

2.3-5 Suspend Switch

The Turbo switch or Suspend switch allows the user to suspend the system while not in use. It can be controlled by BIOS power management setup switch function. You can connect the Turbo Switch from the system case to this pin. (See Figure 2.1)

2.3-6 Speaker

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

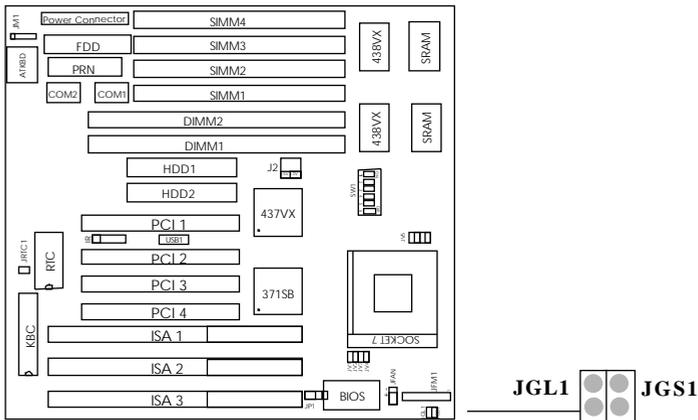
2.3-7 HDD LED

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).

CHAPTER 2 HARDWARE INSTALLATION

2.4 Power Saving Switch Connector: JGS1/ Power Saving LED Connector: JGL1

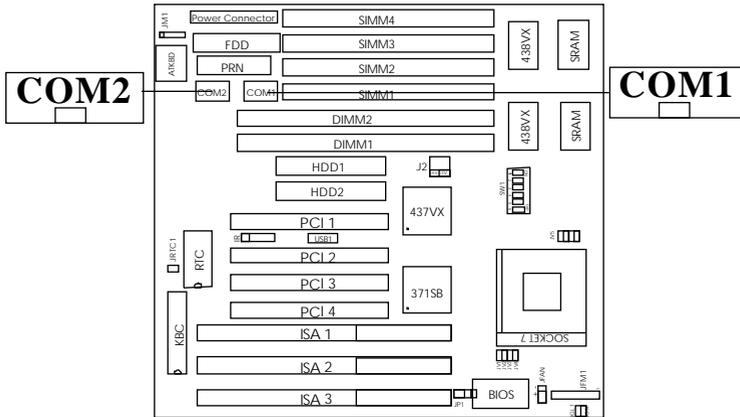
Attach a a power saving switch to this connector. When the switch is pressed, the system immediately goes into suspend mode. Press any key and the system wakes up.



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2.5 Serial Port Connectors: COM1 & COM2

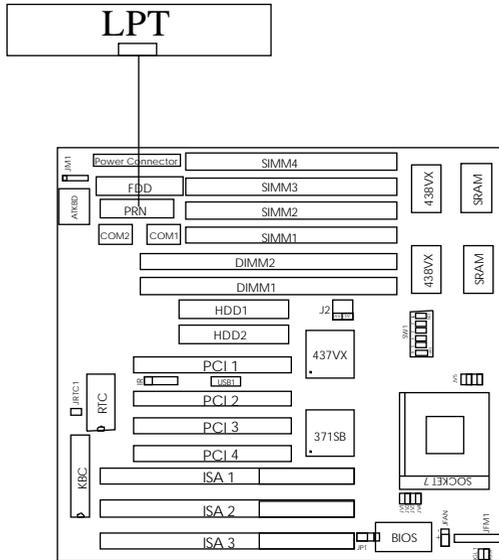
The system board has two connectors for serial ports COM1 and COM2. These two ports are 16550A high speed communication ports that send/receive 16 bytes FIFOs. You can attach a mouse or a modem cable directly into these connectors.



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2.6 Parallel Port Connector: LPT

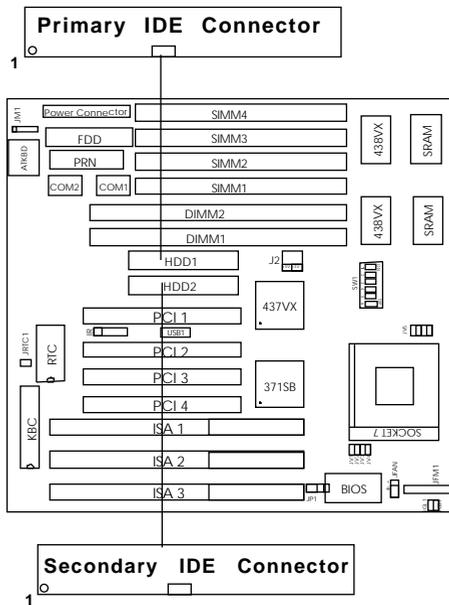
The system board provides a connector for LPT. A parallel port is a standard printer port that also supports Enhanced Parallel Port(EPP) and Extended capabilities Parallel Port(ECP).



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2.8 Hard Disk Connectors: IDE1 & IDE2

The system board 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.

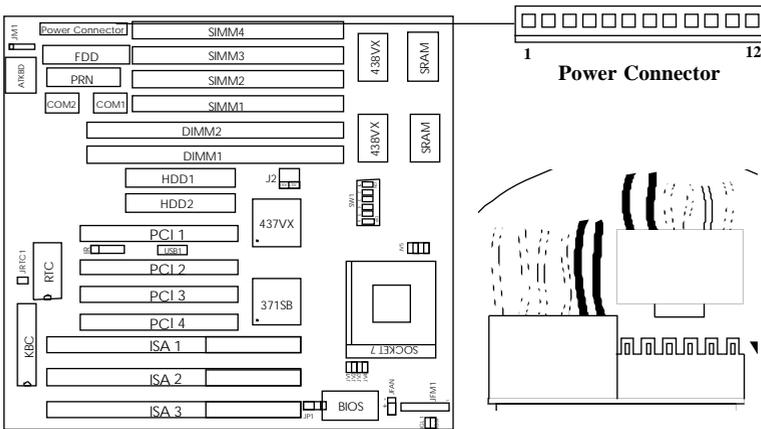
IDE2(secondary IDE connector)

IDE2 can connect a Master and a Slave drive.

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2.9 Power Supply Connector: JPW1

JPW1 is a standard 12-pin AT® connector. Be sure to attach the connectors with the two black wires at the center.

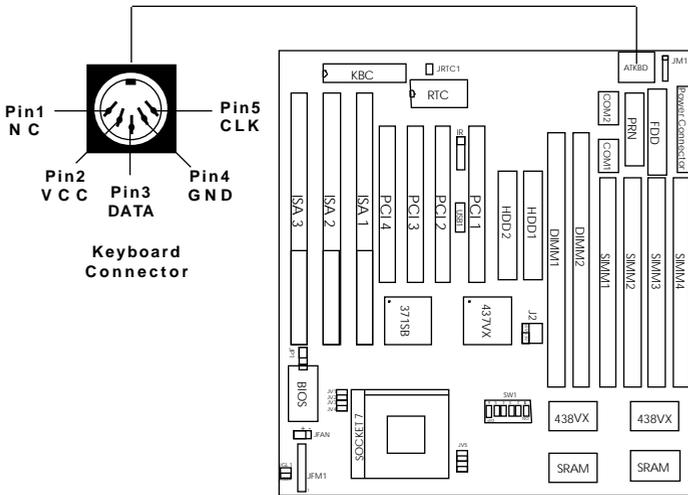


Pin	Description	Pin	Description
1	Power Good	7	Ground
2	+5V DC	8	Ground
3	+12V DC	9	-5V DC
4	-12V DC	10	+5V DC
5	Ground	11	+5V DC
6	Ground	12	+5V DC

CHAPTER 2 HARDWARE INSTALLATION

2.10 Keyboard Connector: ATKBD

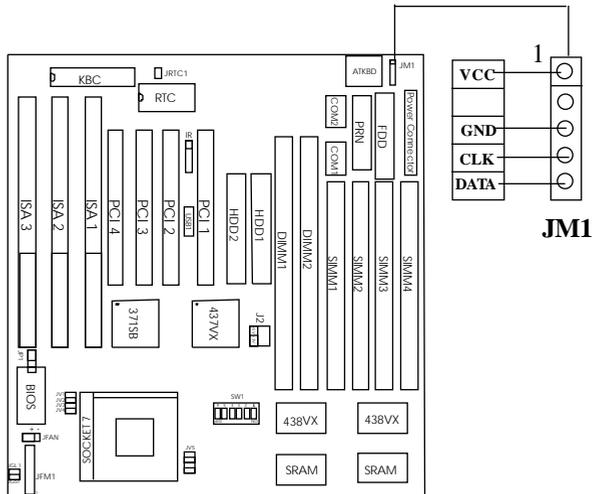
The system board provides a standard AT[®] keyboard mini DIN connector for attaching a keyboard. You can plug a keyboard cable directly to this connector.



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2.11 Mouse Connector: JM1

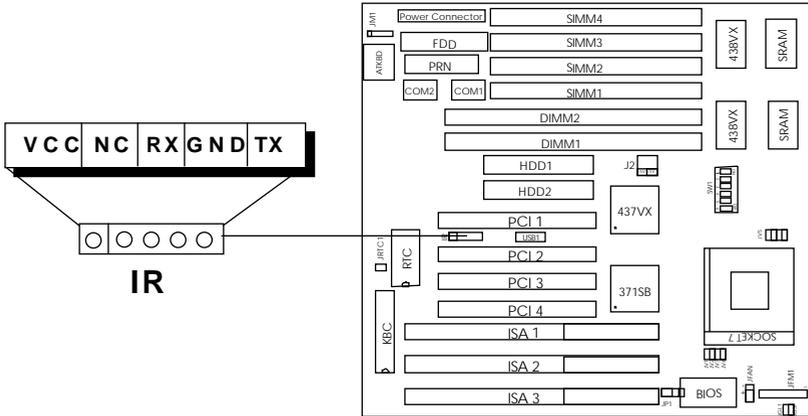
The system board provides a 5-pin connector for PS/2[®] mouse cable (optional). You can plug a PS/2[®] mouse to PS/2[®] mouse cable. The connector location is shown below.



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2.12 IrDA Infrared Module Connector: IR

The system board provides a 5-pin infrared connector (IR) for IR module. This connector is for optional wireless transmitting and receiving infrared module. You must configure the setting through BIOS setup.



2.13 USB Connector: USB (Reserved)

This 10-pin connector supports USB devices. This function is a reserved function.

