

## Installation Procedures

The PA-2001 has several user-adjustable jumpers on the board that allow you to configure your system to suit your requirements. This chapter contains information on the various jumper settings on your mainboard.

Before using the computer, you must complete the following steps:

- Step 1 -  
**Set system jumpers**
- Step 2 -  
**Install system RAM modules**
- Step 3 -  
**Install the Central Processing Unit (CPU)**
- Step 4 -  
**Install expansion cards**
- Step 5 -  
**Connect ribbon cables, cabinet wires, and power supply**
- Step 6 -  
**Set up BIOS software** (Please read Chapter Three)

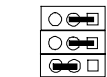
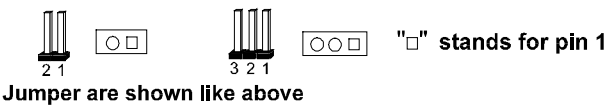
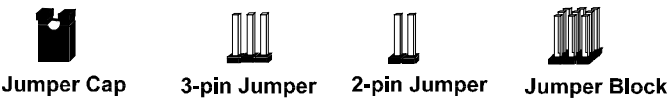
**WARNING:** Excessive torque may damage the mainboard. When using an electric screwdriver on the mainboard, make sure that the torque is set to the allowable range of 5.0 ~ 8.0kg/cm. Mainboard and components contain very delicate Integrated Circuit (IC) chips. To prevent static electricity from harming any of the mainboard's sensitive components, you should follow some precautions whenever working on the computer:

1. Unplug the computer when working on the inside.
2. Hold components by the edges and try not to touch the IC chips, leads, or circuitry.
3. Wear an anti-static wrist strap which fits around the wrist.
4. Place components on a grounded anti-static pad or on the bag that came with the component whenever the components are separated from the system.

## 1). Set System Jumpers

### *Jumpers*

Jumpers are used to select the operation modes for your system. Some jumpers on the board have three metal pins with each pin representing a different function. A “1” is written besides pin 1 on jumpers with three pins. To **set** a jumper, a black cap containing metal contacts is placed over the jumper pin/s according to the required configuration. A jumper is said to be **shorted** when the black cap has been placed on one or two of its pins. The types of jumpers used in this manual are shown below:



Jumpers in a Block

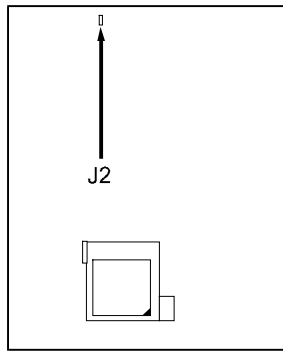
**NOTE :** Users are not encouraged to change the jumper settings not listed in this manual. Changing the jumper settings improperly may adversely affect system performance.

### ***Clear Password: JCP***

This jumper allows you to set the password configuration to Enabled or Disabled. You may need to enable this jumper if you forget your password.

### ***Flash EPROM Type Selection: J2***

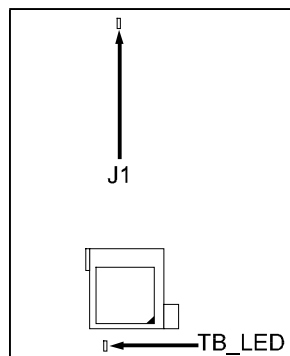
This jumper allow you to configure the Flash EPROM chip.



Flash EPROM Power Supply	J2
SST Boot Block (Default)	
Intel Boot Block	

### ***LED Indicator Select: J1***

This jumper allows you to set the function of the TB\_LED indicator.



TB_LED Mode Select	J1
TB_LED is a Turbo LED.	
TB_LED is a Green LED.	

## **2). Install System RAM Modules**

### **DRAM Memory**

The working space of the computer is the Random Access Memory (RAM). The system cannot act upon data unless it is loaded into RAM. When more memory is added, the working memory of the computer is larger, thereby increasing total performance.

The PA-2001's RAM is comprised of four industry standard 72-pin Single In-line Memory Modules (SIMMs) and can accommodate onboard memory from 2 to 64MB. The mainboard has two memory banks - Bank 0 and Bank 1. Each bank has two SIMM sockets which can accept either a 1MB, 4MB, 8MB or 16MB SIMM in each socket, either 60ns or 70ns FPM (Fast Page Mode) (asymmetric or symmetric) and high-speed EDO (Enhanced Data Out) DRAM (parity is not supported).

Occasionally the system must break apart data files because the entire file does not fit into the RAM area. Consequently, when the system needs data that is not in RAM, it must access the disk where the balance of the data is stored. Compared to the lightning speed access of the system has to RAM, accessing a mechanical disk drive is a slow process.

Before making DRAM upgrades, you should verify the type and speed of the RAM currently installed from your dealer. Installing mixtures of RAM types other than those described in this manual, will have unpredictable results.

## DRAM Module Configuration

DRAM modules in Bank 0 and Bank 1 can be installed in many combinations. Some of them are listed in the following table.

TOTAL MEMORY	BANK 0 SIMM 1 (72-PIN)	BANK 0 SIMM 2 (72-PIN)	BANK 1 SIMM 3 (72-PIN)	BANK 1 SIMM 4 (72-PIN)
2MB	1MB	1MB		
4MB	1MB	1MB	1MB	1MB
8MB	4MB	4MB		
10MB	4MB	4MB	1MB	1MB
16MB	4MB	4MB	4MB	4MB
18MB	8MB	8MB	1MB	1MB
24MB	8MB	8MB	4MB	4MB
32MB	8MB	8MB	8MB	8MB
34MB	16MB	16MB	1MB	1MB
40MB	16MB	16MB	4MB	4MB
48MB	16MB	16MB	8MB	8MB
64MB	16MB	16MB	16MB	16MB

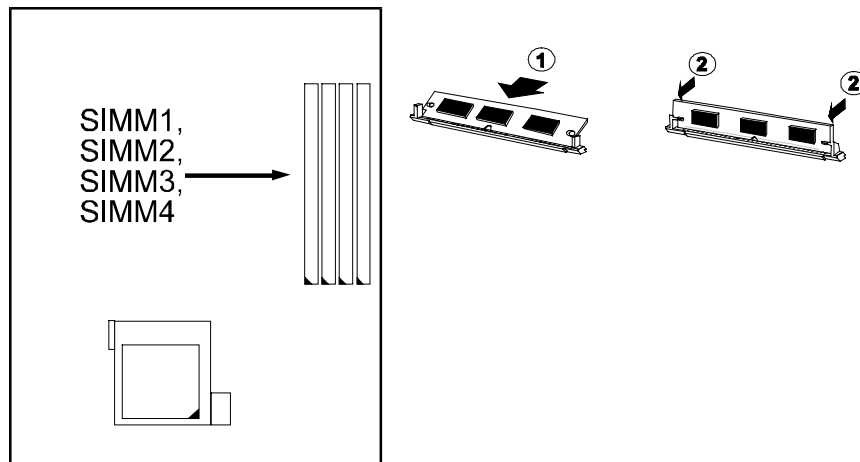
**NOTE :** SIMMs (ECC memory or parity check is not supported) with latency time of 60ns, 70ns is allowed on this mainboard.  
All memory banks use 72-pin memory modules.

## Install SIMMs

Complete the following procedures to install SIMMs:

**CAUTION:** Always turn the system power off before installing or removing any device.  
Always observe static electricity precautions. See “Handling Precautions” at the start of this manual.

1. Locate the SIMM slots on the mainboard. (See figure below.)



**NOTE :** SIMMs in each bank must be of the same type; System BIOS automatically configures the memory size.

2. Carefully fit a SIMM at a 45 degree angle into each empty socket to be populated, making sure that all the contacts are aligned with the socket. The SIMM memory modules will only fit in one orientation as shown because of a “Plastic Safety Tab” on one end of the SIMM sockets which requires the “Notched End” of the SIMM memory modules.
3. With your fingers, swing each SIMM into its upright, locked position so that it clicks into place. When locking a SIMM in place, push on each end of the SIMM - do not push in the middle.
4. The plastic guides should go through the two “Mounting Holes” on the sides and the “Metal Clips” should snap on the other side.

## Remove SIMMs

To remove the SIMMs, pull on the retaining latch (Metal Clips) on both ends of the socket and reverse the procedure above.

## Cache Memory

Cache memory access is very fast compared to main memory access. The cache holds data for imminent use. Since cache memory is from five to more than ten times faster than main memory, the CPU's access time is reduced, giving you better system performance.

Pentium mainboards may implement various types of L2 cache SRAMs. Pipeline Burst SRAM is one of them, delivering the best price performance ratio. They perform much better than asynchronous SRAMs.

**NOTE :** The cache memory is user upgradeable. Use the correct chips for the amount of cache memory you want to add. Install both the correct cache and Tag SRAM.

## Installing Cache Memory

**CAUTION:** Always turn the system power off before installing or removing any device.  
Always observe static electricity precautions. See "Handling Precautions" at the start of this manual.

If you do not have the confidence to make the installation, consult a service technician for assistance.

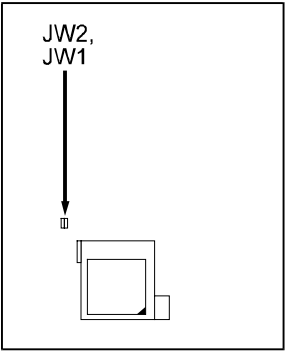
1. Locate the cache memory on the mainboard. Be guided by the cache SRAM settings depending on the desired SRAM configuration.

Correct orientation of the chip is necessary for the cache to operate properly. Normally, the chips have either a curved notch or a dot. This marker on the chip must be matched to the marker on the socket for correct alignment.

2. Align the chip with the marker on the socket. Press the chip onto the socket, ensuring that the pins on the chip are aligned with the corresponding connections on the socket.
3. Press the chip completely into the socket so that the pins are properly seated.

## Using Various Voltage SRAM

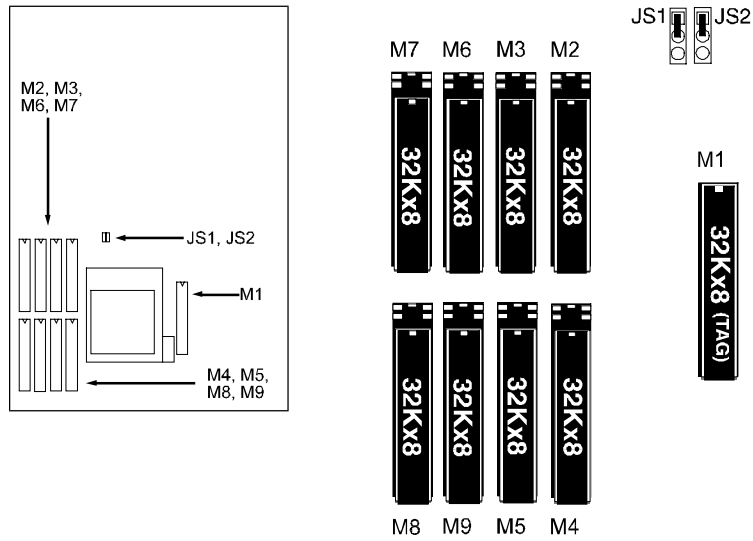
Cache sockets M2 to M9 can take 3.3V or mix-voltage SRAMs. However, cache socket M1 can only take 5.0V SRAMs. The jumper settings are listed below.



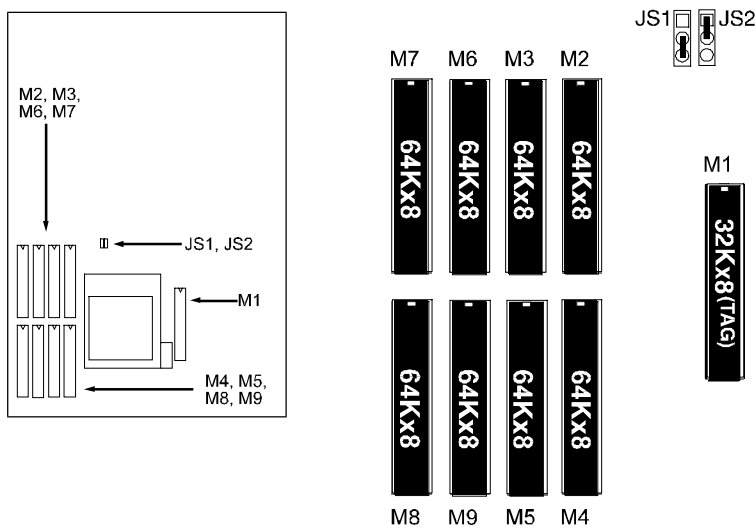
<b><i>Jumper setting for mix-voltage SRAMs (M2-M9).</i></b>	
JW1	JW2
<b><i>Jumper setting for 3.3V SRAMs (M2-M9).</i></b>	
JW1	JW2



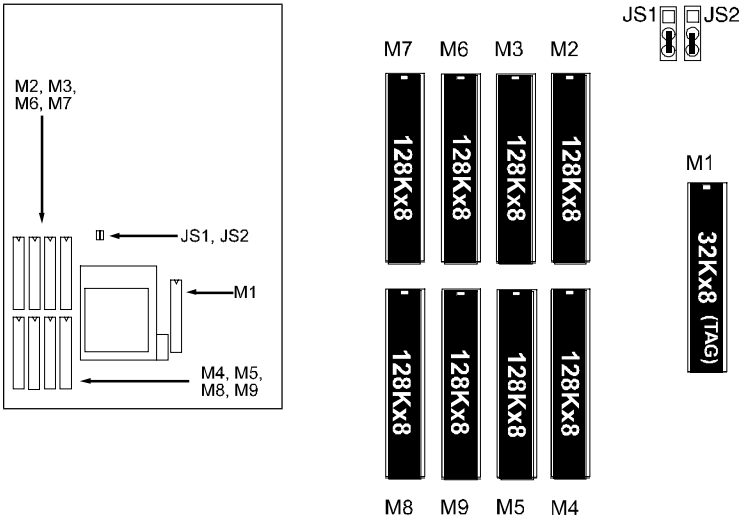
### Option 1: 256KB Cache SRAM



### Option 2: 512KB Cache SRAM



Option 3: 1MB Cache SRAM



### 3). Install the Central Processing Unit (CPU)

The CPU module resides in a 321-pin Zero Insertion Force (ZIF) Socket 5 on the mainboard. The CPU that came with the mainboard should have a fan attached to it to prevent overheating. If this is not the case then purchase a fan before turning on the system. Apply thermal jelly to the CPU top and then install the fan onto the CPU.

**NOTE :** Without a fan circulating air on the CPU it can overheat and cause damage to both the CPU and the mainboard.

**CAUTION:** Always turn the system power off before installing or removing any device.  
Always observe static electricity precautions. See “Handling Precautions” at the start of this manual.  
Inserting the CPU chip incorrectly may damage the chip.

To install the CPU, first turn off the system and remove its cover before doing the following:

1. Locate the ZIF socket and open it by first pulling the lever sideways away from the socket then upwards to a 90-degree right angle.
2. Handle the chip by its edges and try not to touch any of the pins.
3. Place the CPU in the socket. The chip has a notched corner with the white dot to correctly orient the chip. Align the notch with pin one of the socket by pointing the white dot towards the end of the lever. Pin one is located in the blank triangular area where one hole is missing from that corner of the square array of pin holes. Do not force the chip as the CPU has a corner pin for three of the four corners, the CPU will only fit in the one orientation. With the added weight of the CPU fan, the CPU should slide easily into the socket.
4. Once completely inserted, hold down on the fan and swing the lever to the down position to lock the CPU in place.
5. See the following sections for information on the CPU jumpers settings.

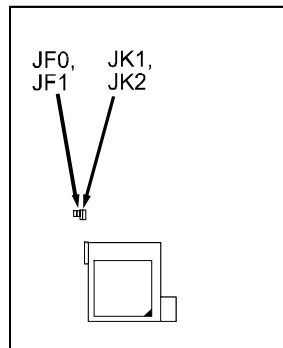
**NOTE :** You must set jumpers for “CPU to BUS Frequency Ratio” and “CPU External Clock (BUS) Frequency” depending on the CPU that you install.



## Select Frequency and Voltage

### *CPU to BUS Frequency Ratio: JF0, JF1*

These two jumpers are used in combination to decide the ratio of the internal frequency of the CPU to the external frequency (called the BUS clock) within the CPU. These must be set together with the jumpers on the next page (CPU external clock BUS frequency).



Bus/CPU Clock Ratio	JF0	JF1
1/2		
1/3		
2/3		
2/5		

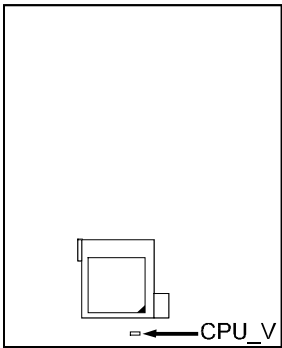
### *Frequency*



The table below shows the jumper settings for the CPU based on its internal clock speed.

CPU Speed	External Clock	JK1	JK2	CPU Clock Rate		
				Int. Multiple	JF0	JF1
133 MHz	66 MHz			2 x Ext.		
120 MHz	60 MHz			2 x Ext.		
100 MHz	66 MHz			1.5 x Ext.		
90 MHz	60 MHz			1.5 x Ext.		
75 MHz	50 MHz			1.5 x Ext.		

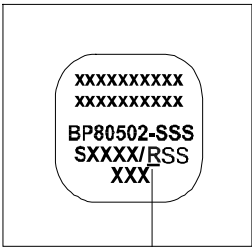
**Voltage**

This jumper sets the voltage supplied to the CPU. The voltage regulators will automatically detect and switch between Single Power Plane and Dual Power Planes.



CPU Voltage Mode	CPU_V
STD / VR (Default) 3.384V	
VRE 3.49V	

**Intel Pentium CPU  
Bottom Side Marking**



**R (Identflier for Voltage Range) :**  
V for VRE Voltage Range  
or  
S for Standard Voltage Range

## 4). Install Expansion Cards

**NOTE :** Make sure to unplug the power supply when adding or removing expansion cards or other system components. Failure to do so may cause severe damage to both the mainboard and expansion cards.

The mainboard features four 16-bit ISA Bus and three 32-bit PCI expansion slots. This section describes how to connect an expansion card to the system's expansion slot. An expansion card is a printed circuit board that, when connected to the mainboard, allows you to increase the capabilities of the system. For example, an expansion card can provide video and sound capabilities.

**CAUTION:** Always turn the system power off before installing or removing any device.  
Always observe static electricity precautions. See "Handling Precautions" at the start of this manual.

To install an expansion card, do the following:

1. Remove the computer chassis cover and locate an empty ISA/PCI expansion slot.
2. Holding the edge of the peripheral card, carefully align the edge connector with the expansion slot.
3. Push the card firmly into the slot. Push down on one end of the expansion card, then the other. Use this "rocking" motion until the add-on card is firmly seated inside the slot. Make sure that the card has been placed evenly and completely into the expansion slot.
4. Read the expansion card documentation on any hardware and software settings that may be required to setup the specific card.
5. Set any necessary jumpers on the add-on card.
6. Replace the computer system's cover.
7. Setup the BIOS if necessary.
8. Install the necessary software drivers for the add-on card.

## Assigning IRQs for Expansion Cards

Some expansion cards need to use an IRQ to operate. Generally an IRQ must be exclusively assigned to one use. In a standard design there are 16 IRQs available but most of them are already in use by parts of the system which leaves 6 free for expansion cards.

Currently, there are two types of ISA cards. The original ISA expansion card design, now referred to as “Legacy” ISA cards, requires that you configure the card’s jumpers manually and then install it in any available slot on the ISA bus. You may use Microsoft’s Diagnostic (MSD.EXE) utility included in the Windows directory to see a map of the used and free IRQs. For Windows 95 users, the “Control Panel” icon in “My Computer” contains a “System” icon which gives you a “Device Manager” tab. Double clicking on a specific device gives you a “Resources” tab which shows the Interrupt number and address. Make sure that no two devices use the same IRQs or the computer will experience problems when two devices are in use at the same time.

To simplify this process the mainboard has complied with the Plug and Play (PnP) specification which was developed to allow automatic system configuration whenever a PnP-compliant card is added to the system. For PnP cards, IRQs are assigned automatically from those available. For older Legacy cards that does not work with the BIOS, contact your vendor for an ISA Configuration Utility.

## Assigning DMA Channels for ISA Cards

Some ISA cards, both Legacy and PnP may also need to use a DMA (Direct Memory Access) channel. DMA assignments for the mainboard are handled the same way as the IRQ assignment process described above. You can select a DMA channel in the PnP configuration section of the BIOS Setup utility.



## 5). Connector Cables and Power Supply

### Connectors

<b>NOTE :</b> Some pins are used for connectors or power sources. These are clearly separated from jumpers. Placing jumper caps over these will cause damage to the mainboard.
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Ribbon cables should always be connected with the red stripe on the Pin 1 side of the connector. The four corners of the connectors are labeled on the mainboard. Pin 1 is the side closest to the power connector on hard drives and floppy drives. IDE ribbon cable must be less than 18in. (46cm), with the second drive connector no more than 6in. (15cm) from the first connector.

Connectors allow the mainboard to link electronically with other parts of the system. Some malfunctions encountered may be caused by loosed or improper connections. Ensure that all connections are in place and firmly attached.

#### ***Floppy Diskette Drive Connector (34-pin block): FDD***

This 34-pin block connector connects to your floppy disk drive using the cable that is provided with this mainboard. After connecting the single end to the board, connect the two plugs on the other end to the floppy drives. Pin 5 is removed to prevent inserting in the wrong orientation when using ribbon cables with pin 5 plugged.

#### ***Infrared Connector: IR***

This 10-pin male connector is used for connecting to the infrared (SIR) port and allows the data transaction with another system which also supports the SIR feature.

#### ***Serial Port Connectors (Two 9-pin Male): COM1, COM2***

These two connectors allow you to connect with devices that take serial ports, such as a serial mouse or a modem. Usually, it is recommended to connect the serial mouse to COM1 and the fax/modem to COM2. Because COM2 and IR utilizes the same IRQ, COM2 will not work if an IR device is connected to the IR connector.

#### ***Standard Power Connector: POWER***

This 12-pin block connector is used for connecting to the standard 5V power supply. Notice that, in most cases, there are two marks "P8" and "P9" on the surface of the connector. You have to insert the "P8" plug into the "P8" section of the connector, and so forth for "P9". Two black wires must be facing each other.

### ***IDE HDD Device Connector (Two 40-pin Block): P\_IDE, S\_IDE***

These two 40-pin block connector are used for your IDE hard disks. If you have one IDE hard disk, connect it to the PRIMARY connector using the IDE HDD flat cable provided with the mainboard. The BIOS auto detection sets it to be a “Primary Master” disk. If you want to install another IDE hard disk or CD-ROM drive, please use the SECONDARY connector. If two hard disks are connected to PRIMARY connector using the same cable, one of them is the master drive, the other one is the slave drive. You may need to set jumpers for the slave drive; please refer to the hard disk drive manual for details. Pin 20 is removed to prevent inserting in the wrong orientation when using ribbon cables with pin 20 plugged.

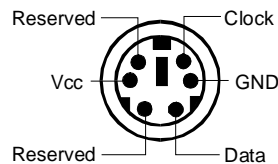
You may configure two hard disks to be both Masters using one ribbon cable to the primary IDE connector and another ribbon cable on the secondary IDE connector. You may install one operating system on an IDE drive and another on a SCSI drive and select the boot disk through the BIOS Setup.

### ***AT Keyboard Connector (6-pin Female): AT\_KB***

This connector is used to connect a standard keyboard using an AT plug (large DIN) to the system. This connector will not allow PS/2 size (mini DIN) keyboard plugs. You may use a mini DIN to DIN adapter on standard PS/2 keyboards.

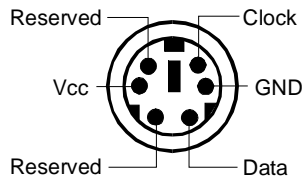
### ***PS/2 Keyboard Connector (6-pin Female): PS2\_KB***

This connector is used to connect a standard keyboard using a PS/2 plug (mini DIN) to the system. This connector will not allow standard AT size (large DIN) keyboard plugs. You may use a DIN to mini DIN adapter on standard AT keyboards.



### ***PS/2 Mouse Connector (6-pin Female): PS2\_MS***

This connector is used to connect the PS/2 mouse to the system. The system will direct IRQ12 to the PS/2 mouse if one is detected. If not detected, expansion cards can use IRQ12.



### ***CPU Fan Connector: CPUFAN***

This connector support cooling fan of 500mAMP (6WATT) or less. Depending on the fan manufacturer, the wiring and plug may be different. The red wire should be positive, while the black wire should be ground. Connect the fan's plug to the board taking into consideration the polarity of the connector. Either one is connected to the CPU fan. CPUFAN causes the CPU fan to be activated upon booting the system – for as long as the system is on, irrespective of CPU temperature.

**NOTE :** The CPU and/or mainboard will overheat if there is no airflow across the CPU. Damage may occur to the mainboard and/or CPU fan if these pins are incorrectly used. These are not jumpers, do not place jumper caps over these pins.

***Front Panel Connectors:***

This block connector includes: KBLOCK, TB\_LED, RESUME, SPEAK, I\_LED, and RESET connectors.

ITEM	CONNECTOR	PIN TYPE	FEATURE
A	KBLOCK	5-pin male	The system power LED lights when the system is powered on. It also allows the keyboard to access the system
B	TB_LED	2-pin male	indicates if the system speed is in normal or turbo. It also indicates when the system is in Suspend mode when LED is lit.
C	RESUME	2-pin male	Suspend mode switch allows user to manually place the system into a suspend mode or "Green" mode where system activity will be instantly decreased to save electricity and expand the life of certain components when the system is not in use. This connector connects to the case-mounted suspend switch. Wake-up can be controlled by settings in the BIOS but the keyboard will always allow wake-up. If you want to use this connector, the corresponding function in the Power Management Setup of the BIOS software section should be on the default setting of Enable.
D	SPEAK	4-pin male	This connector connects to the case-mounted speaker.
E	I_LED	2-pin male	This connector supplies power to the cabinet's IDE activity LED. Indicates the IDE HDD I/O (read and write activity by devices connected to the Primary and Secondary IDE connectors) is being accessed when LED is lit
F	RESET	2-pin male	This connector connects to the case-mounted reset switch for rebooting the system without having to turn off power switch. This is a preferred method of rebooting in order to prolong the life of the system's power supply.

***Parallel Printer Connector (25-pin Female): LPT***

The onboard 26-pin female connector allows the system to link with printer devices via a printer cable. Serial printers must be connected to the serial port.

## Power Connection Procedures

1. After all jumpers and connections are made, close the system case cover.
2. Make sure that all switches are in the off position.
3. Connect the power supply cord into the power supply located at the back of your system case as instructed by the system user's manual.
4. Connect the power cord into a power outlet that is equipped by a surge protector.
5. You may then turn on your devices in the following order:
  - a. The monitor
  - b. External SCSI devices (starting with the last device on the chain)
  - c. The system power
6. The power LED on the front panel will light. The monitor LED may light after the system's if it complies with "Green" standards or if it has a power standby feature. The system will then run power-on tests. While the tests are running, additional messages will appear on the screen. If you do not see anything within 30 seconds from the time you turn on the power, the system may have failed a power-on test. Recheck the jumper settings and connections or call the retailer for assistance.
7. During power-on, hold down the <Delete> key to enter BIOS Setup. Follow the next chapter for instructions.

## Powering Off the Computer

You must first exit or shut down the operating system before switching off the power switch. For Windows 95 users, select shut down the computer from the "Start" button and the system will give three quick beeps after about 30 seconds and power off after Windows shut down.