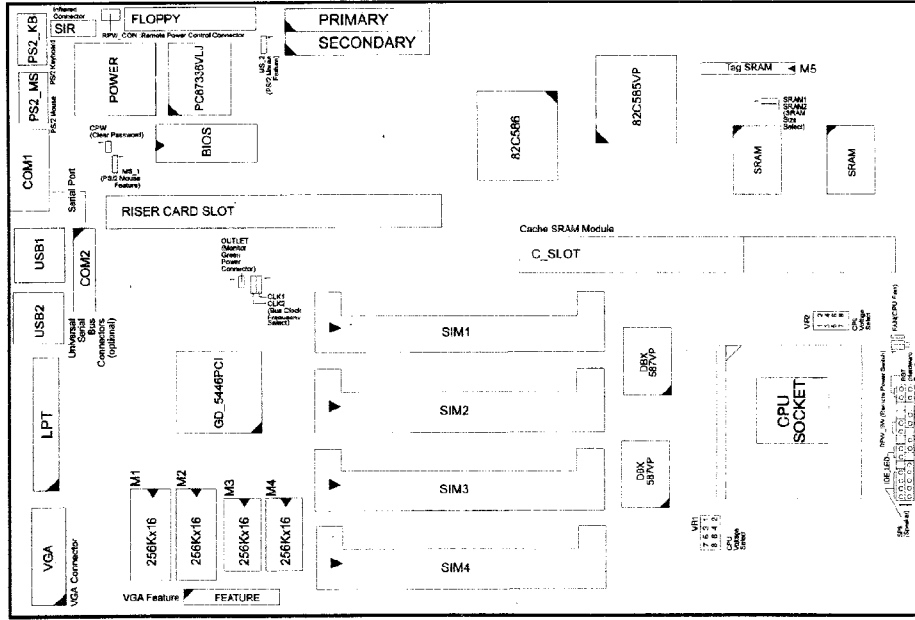


Mainboard Layout



JUMPERS

CLK1, 2	P2-15	3-pin male	To set the external frequency of the CPU
CPW	P2-5	2-pin male	To clear password
FREQ1, 2	P2-15	3-pin male	To set the internal frequency of the CPU
MS1, 2	P2-5	3-pin male	To release the IRQ12
SRAM1, 2	P2-10	3-pin male	To select the SRAM size
VR1, 2	P2-17	8-pin male	To select voltage for different type CPU

SLOTS

C_SLOT	P2-10		A 160-pin expansion slot for RAM module
SIMM	P2-8		DRAM memory expansion slot
SL1	P2-24		A 188-pin expansion slot for riser card

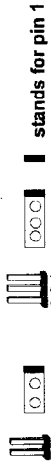
CONNECTORS

COM1	P2-25	9-pin male	To be connected with the serial port device
COM2	P2-25	10-pin male	To be connected with the serial port device by a serial ribbon cable
FAN	P2-25	3-pin male	To supply 12V for the CPU fan power
FLOPPY	P2-29	34-pin block	To be connected with the floppy disk drive
F_PNL	P2-26	22-pin block	To conclude PW_LED, KB_LOCK, TB_LED, SP_SW, SPK, SP_LED, IDE_LED, RST
IR	P2-27	10-pin male	To allow the SIR data communication
LPT	P2-28	26-pin male	To be connected to the printer
POWER	P2-29	12-pin block	To be connected with the power supply
PRIMARY, SECONDARY	P2-29	40-pin block	To be connected with the IDE HDD
PS2_KB	P2-30	5-pin female	To be connected to the PS/2 keyboard
PS2_MS	P2-30	5-pin female	To be connected to the PS/2 mouse
RPW_CON	P2-31	3-pin male	To be connected to the remote power supply
USB1, 2	P2-31	(Reserved)	To provide a port that allows you to attach a USB hub (Reserved for future upgrade)
VGA	P2-33	15-pin female	To be connected to your monitor

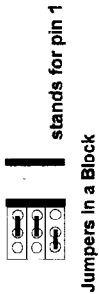
1). Set System Jumpers

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. 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:



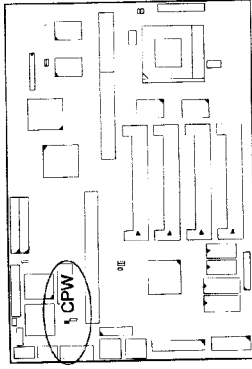
Jumpers are shown as above



→ **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.**

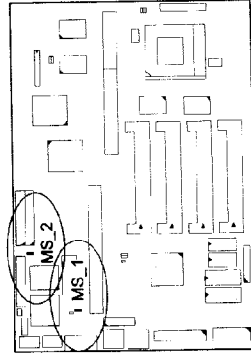
Clear Password: CPW

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.



PS/2 Mouse Feature: MS_1 and MS_2

These two jumpers allow you to release the IRQ12 if you do not use the PS/2 mouse.



2). Install DRAM Modules

DRAM Memory

The working space of the computer is the Random Access Memory. The system cannot act upon data unless it is loaded into RAM. A system RAM is comprised of industry-standard 72-pin Single In-line Memory Modules (SIMMs). The DRAMs are installed onto the SIMM expansion slots.

Extended Data Out (EDO) memory are the latest DRAM chip designs that perform a lot better than the fast page mode DRAM type. With EDO memory, CPU access to memory is 10 to 15% faster.

When more RAM is added, the working area of the computer is larger, thereby increasing total performance. You should verify the type and speed of the RAM currently installed from your dealer. Mixtures of RAM types, other than those described in this manual, will have unpredictable results.

The PAC-2003 is able to support standard FPM (Fast Page Mode), or EDO (Extended Data Out) DRAM; and can accommodate onboard memory from 8 to 512MB using SIMMs (Single-In-Line Memory Modules). The mainboard has two memory banks — Bank 0 and Bank 1. Each bank has two SIMM sockets which can accept either a pair of 4MB, 8MB, 16MB or 32MB SIMM in each socket.

Banks 0 and 1 can use different types of SIMMs (e.g., 4 or 16MB). However, you must populate each memory bandwidth with the same type of SIMM. For example, Bank0 may contain two 8MB SIMMs and Bank1 may contain two 4MB SIMMs.

DRAM Configuration

DRAM modules can be installed in a variety of configurations, as shown below:

TOTAL MEMORY	BANK0 (72-PIN x 2)	BANK1 (72-PIN x 2)
8MB	4MB & 4MB	2MB & 2MB
12MB	4MB & 4MB	
16MB	8MB & 8MB	4MB & 4MB
24MB	4MB & 4MB	4MB & 4MB
32MB	8MB & 8MB	8MB & 8MB
	16MB & 16MB	
40MB	16MB & 16MB	4MB & 4MB
48MB	16MB & 16MB	8MB & 8MB
64MB	16MB & 16MB	16MB & 16MB
	32MB & 32MB	
72MB	32MB & 32MB	4MB & 4MB
80MB	32MB & 32MB	8MB & 8MB
96MB	32MB & 32MB	16MB & 16MB
128MB	32MB & 32MB	32MB & 32MB
	64MB & 64MB	
256MB	64MB & 64MB	64MB & 64MB
512MB	128MB & 128MB*	128MB & 128MB*

→ NOTE :

- All memory banks use 72-pin memory modules.
- * A SIMM of this size was not available yet for testing when this book was printed.

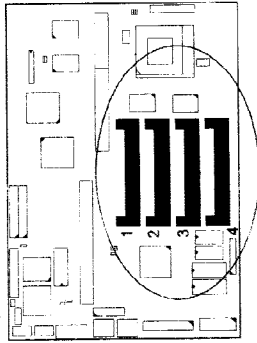
Install SIMMs

Complete the following procedures to install SIMMs:



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

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



NOTE :

1. SIMMs in each bank must be of the same type.
2. The BIOS automatically configures the memory size.

2. Carefully fit a SIMM at a 45 degree angle into each of the empty sockets to be populated. All the SIMMs should be facing the same direction.
3. Swing each SIMM into its upright, locked position. When locking a SIMM in place, push on each end of the SIMM - do not push in the middle.

Remove SIMMs

To remove the SIMMs, pull the retaining latch 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 five to more than ten times faster than main memory, the CPU's access time is reduced, giving you better system performance.

Pentiums 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.

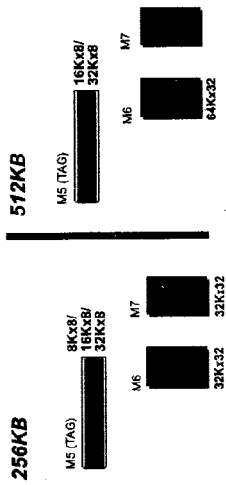
The specification of the cache SRAM module requires Intel Coast Standard version 3.X, such as FIC PB512K-3.0.

The PAC-2003 comes with onboard 256KB/512KB synchronous 3V Pipeline Burst SRAMs, and one optional 256KB/512KB cache SRAM module (FIC PB512K-3.0 is recommended) that can be installed on the cache SRAM module slot.

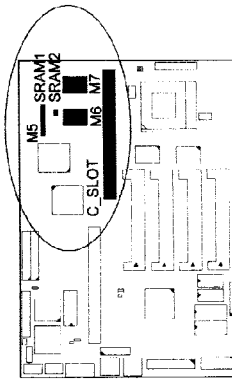


NOTE : Use the correct chips for the amount of cache memory you want to add. Install both the correct Cache and Tag SRAM.

Onboard Cache RAM (256KB/512KB)

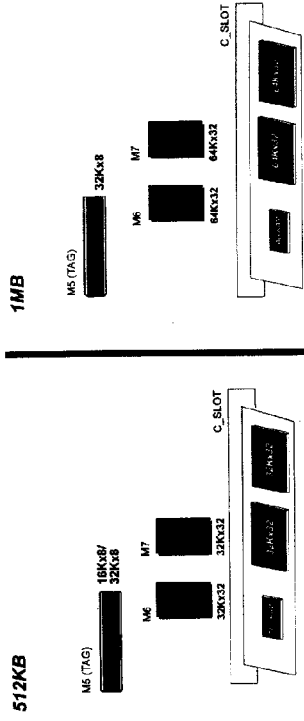


Cache Size	SRAM1	SRAM2
256K	1	1
512K	1	1

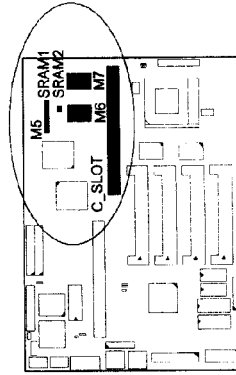


PAC-2003

Onboard Cache RAM and SRAM Module Mixture (512KB/1MB)

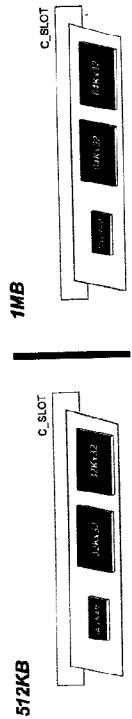


Cache Size	SRAM1	SRAM2
256K	1	1
1M	1	1

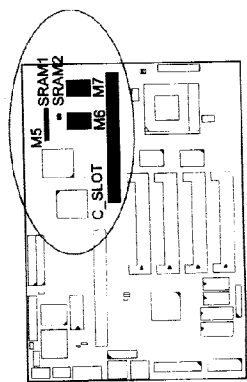


PAC-2003

SRAM Module (256KB/512KB)

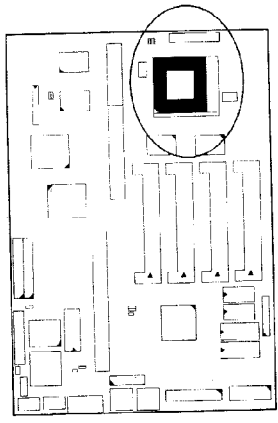


Cache Size	SRAM1	SRAM2
256K	1	1
512K	1	1



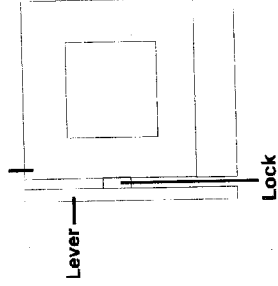
3). Install the CPU

The CPU module resides in a Zero Insertion Force (ZIF) socket on the mainboard. The figure below shows how to fit the CPU in the socket.



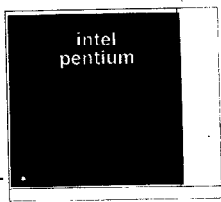
Socket Without CPU

Triangular Blank Area



Socket With CPU

Notch





CAUTION :

- 1. Always turn the system power off before installing or removing any device.
- 2. Always observe static electricity precautions. See "Handling Precautions" at the start of this manual.
- 3. Inserting the CPU chip incorrectly may damage the chip.

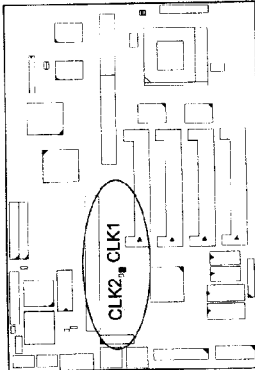
To install the CPU, do the following:









- 1. Lift the lever on the side of the CPU socket.
- 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 notch to correctly orientation the chip. Align the notch with pin one of the socket. Pin one locates around the triangular blank area, as shown in the picture on Page 2-13. Do not force the chip. The CPU should slide easily into the socket.
- 4. 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.

Select Frequency and Voltage

CPU External Clock (BUS) Frequency: CLK1 and CLK2

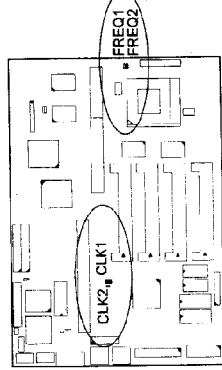
The table below shows the jumper settings for the different CPU speed configurations. Set the corresponding External Clock and CPU Clock Rate jumpers according to the CPU speed of the system by following the table below. The External Clock and Int. Multiple column values are for your reference.











CLK1	CLK2
 66 MHz	 66 MHz
 60 MHz	 60 MHz
 55 MHz	 55 MHz
 50 MHz	 50 MHz

CPU to Bus Frequency Ratio: FREQ1 and FREQ2

These two jumpers, in combination, are used to decide the ratio of the internal frequency of the CPU to the bus clock.



FREQ1	FREQ2
 3 x Ext.	 3 x Ext.
 2.5 x Ext.	 2.5 x Ext.
 2 x Ext.	 2 x Ext.
 1.5 x Ext.	 1.5 x Ext.

Voltage

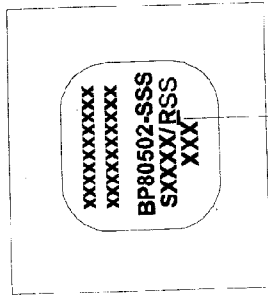
VR1 VR2

Core : 3.4V-3.6V
IO : Same
P54C VRE

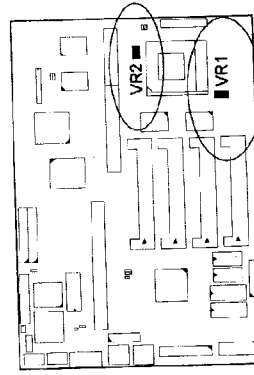
Core : 3.3V
IO : Same
P54C STD

Core : 2.8V
IO : 3.3V
P55C

Intel Pentium CPU Bottom Side Marking



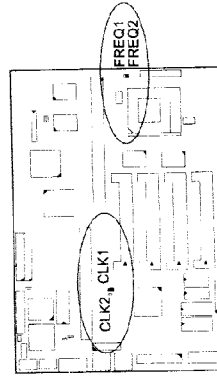
R (Identifier for Voltage Range) :
V for VRE Voltage Range
or
S for Standard Voltage Range



Intel Pentium CPUs

Frequency

CPU Speed	External (CPU/CLK)	CLK1	CLK2	CPU Clock Rate		
				Internal	FREQ1	FREQ2
200 MHz	66 MHz			3 x Ext.		
166 MHz	66 MHz			2.5 x Ext.		
150 MHz	60 MHz			2.5 x Ext.		
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.		

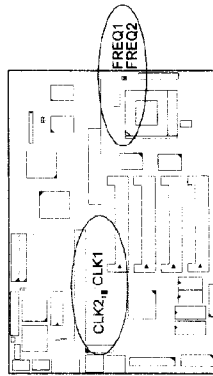


AMD-K5 CPUs

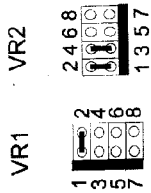
Frequency

Model Name	CPU Speed	External (CPU/CLK)	CLK1	CLK2	CPU Clock Rate	
					Internal	FREQ1 FREQ2
K5-PR166 *	133 MHz	66 MHz	1 [1] [1]	1 [1] [1]	2 x Ext.	[1] [1] [1] [1]
K5-PR150 *	120 MHz	60 MHz	1 [1] [1]	1 [1] [1]	2 x Ext.	[1] [1] [1] [1]
K5-PR133 *	100 MHz	66 MHz	1 [1] [1]	1 [1] [1]	1.5 x Ext.	[1] [1] [1] [1]
K5-PR120 *	90 MHz	60 MHz	1 [1] [1]	1 [1] [1]	1.5 x Ext.	[1] [1] [1] [1]
K5-PR100 *	100 MHz	66 MHz	1 [1] [1]	1 [1] [1]	1.5 x Ext.	[1] [1] [1] [1]
K5-PR90	90 MHz	60 MHz	1 [1] [1]	1 [1] [1]	1.5 x Ext.	[1] [1] [1] [1]
K5-PR75	75 MHz	50 MHz	1 [1] [1]	1 [1] [1]	1.5 x Ext.	[1] [1] [1] [1]

→ **NOTE : * This CPU had not yet been tested when this manual was printed.**



Voltage

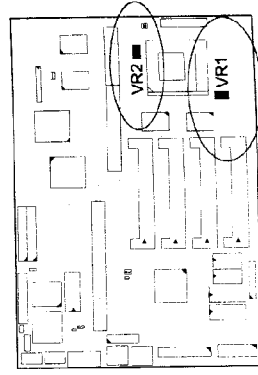
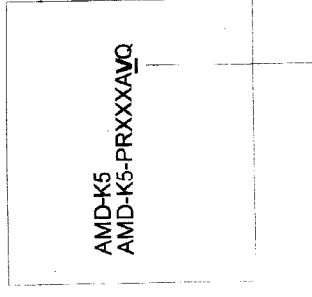


V (Identifier for Operation Voltage) :

- B
- C
- F
- H
- J
- K

Please refer to the left-hand-side table

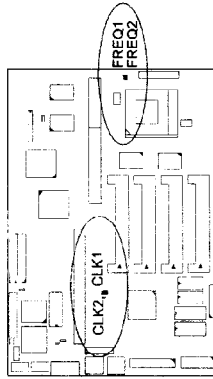
AMD-K5 CPU Top Side Marking



Cyrix 6x86 CPUs

Frequency

Model Name	CPU Speed	External (CPU/CLK)	CLK1	CLK2	CPU Clock Rate	
					Internal	FREQ1 FREQ2
6x86-P166+	133 MHz	66 MHz	1	1	2 x Ext.	1 1
6x86-P150+	120 MHz	60 MHz	1	1	2 x Ext.	1 1
6x86-P133+	110 MHz	55 MHz	1	1	2 x Ext.	1 1
6x86-P120+	100 MHz	50 MHz	1	1	2 x Ext.	1 1

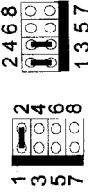


Installation of Cyrix CPU Fan

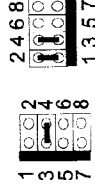
→ **WARNING :** When you install a Cyrix 6x86 CPU, the CPU's cooler model must be approved by Cyrix. Please make sure that the CPU's cooler model has been approved. Otherwise, your system may overheat.

Voltage

VR1 VR2

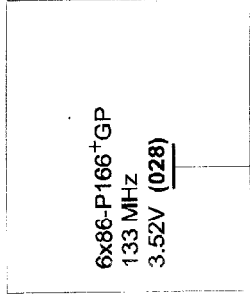


Core : 3.3V
IO : Same
Cyrix 6x86-016

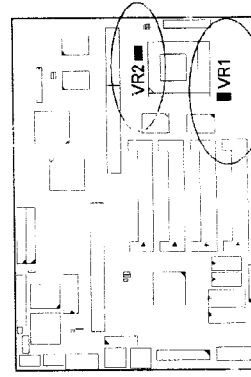


Core : 3.4V-3.6V
IO : Same
Cyrix 6x86-028

**Cyrix 6x86 CPU
Top Side Marking**



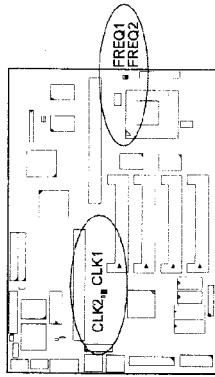
(016) : 3.3V
(028) : 3.52V



IBM 6x86 CPUs

Frequency

Model Name	CPU Speed	External (CPU/CLK)	CLK1	CLK2	CPU Clock Rate	
					Internal	FREQ1 FREQ2
6x86-P166+	133 MHz	66 MHz	1 1/2	1 1/2	1	1
6x86-P150+	120 MHz	60 MHz	1 1/2	1 1/2	1	1
6x86-P133+	110 MHz	55 MHz	1 1/2	1 1/2	1	1
6x86-P120+	100 MHz	50 MHz	1 1/2	1 1/2	1	1

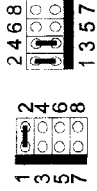


Installation of IBM 6x86 CPU Fan

→ **WARNING :** When you install an IBM 6x86 CPU, the CPU's cooler model must be approved by IBM. Please make sure that the CPU's cooler model has been approved. Otherwise, your system may overheat.

Voltage

VR1 VR2

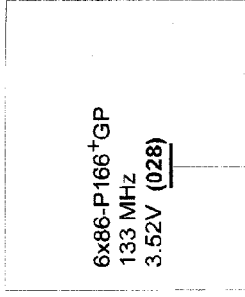


Core : 3.3V
IO : Same
IBM 6x86-016

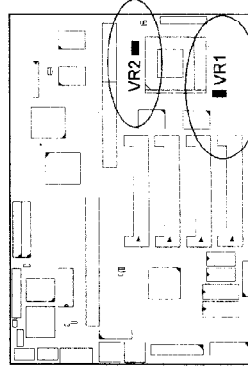


Core : 3.4V-3.6V
IO : Same
IBM 6x86-028

**IBM 6x86 CPU
Top Side Marking**



(016) : 3.3V
(028) : 3.52V



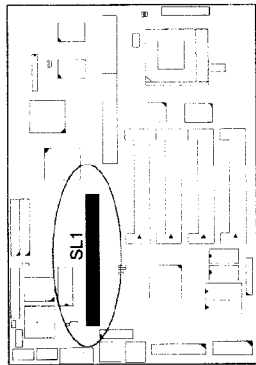
72

4). Install Expansion Cards

This section describes how to connect an add-on card to one of your system's expansion slots. Add-on cards are printed circuit boards that, when connected to the mainboard, increase the capabilities of your system. For example, add-on cards can provide video and sound capabilities.

To install an add-on card, do the following:

1. Insert the target add-on card on the riser card.
2. Locate the slot of the riser card on the mainboard.



3. Remove the chassis cover and select an empty expansion slot.
4. Remove the corresponding slot cover from the chassis. Unscrew the mounting screw that secures the slot cover and pull the slot cover out from the chassis. Keep the slot cover mounting screw nearby.
5. Holding the edge of the riser card, carefully align the edge connector with the riser card expansion slot.
6. Push the riser card firmly into the riser slot. Push down on one end of the add-on card, then the other. Use this "rocking" motion until the add-in card is firmly seated inside the slot.
7. Secure the board with the mounting screw removed in Step 4. Make sure that the card has been placed evenly and completely into the expansion slot.

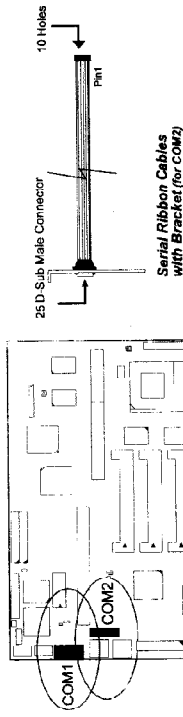
5). Connect Cables and Power Supply

Connectors (In Alphabetical Order)

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

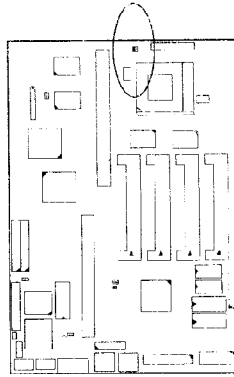
Serial Port Connector: COM1 and COM2

The COM1 is a 9 D-Sub male connector that allows you to connect with your device that takes serial ports, such as a modem. The COM2 serial connector is an onboard 10-pin male connector on the PAC-2003 mainboard can also be used as another IR Port. Usually, your serial mouse is attached to COM1. Your modem is linked to COM2. When you do not use the modem, you can set the BIOS to let COM2 be an IR port to save a dedicated SIR port.



CPU Fan Connector: FAN

This 3-pin male connector is linked to the CPU fan.



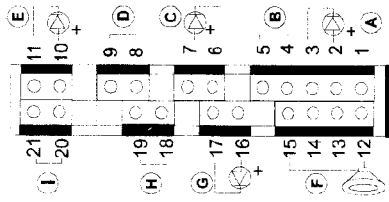
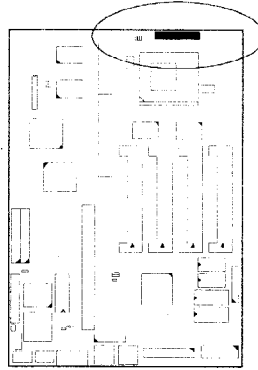
Floppy Diskette Drive Connector: FLOPPY

This 34-pin block connector connects to your floppy diskette drive (FDD) using the cable that is provided with this mainboard.



Block Connector: F_PNL

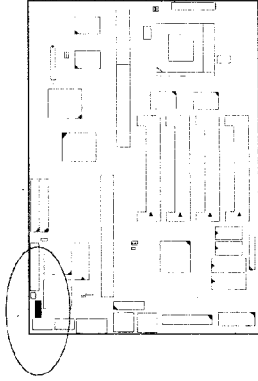
This block connector concludes: PW_LED, KB_LOCK, TB_LED, SP_SW, SPK, IDE_LED, IDE_LED, and RST connectors.



Item	Connector	PIN TYPE	Feature
A	PW_LED	2-pin male	Power LED, indicates the system power on/off status. LED lit : power on
B	KB_LOCK	2-pin male	Keyboard Lock, allows the keyboard to access the system.
C	TB_LED	2-pin male	Turbo Speed LED, indicates the system speed is in normal or turbo speed. LED lit : turbo speed
D	SP_SW	2-pins male	Suspend Mode Switch
E	SP_LED	2-pins male	Suspend LED, indicates the system into suspend mode when LED lit
F	SPK	4-pins male	Speaker, connects to the speaker.
G	IDE_LED	2-pin male	IDE HDD LED, indicates the IDE HDD I/O access. LED lit : IDE HDD read / write
H	RPW_SW	2-pin male	Remote Power Switch
I	RST	2-pin male	Hardware Reset Switch, to reset the system.

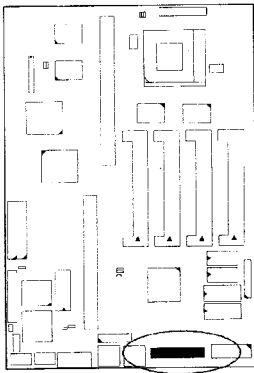
Infrared Connector: IR

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



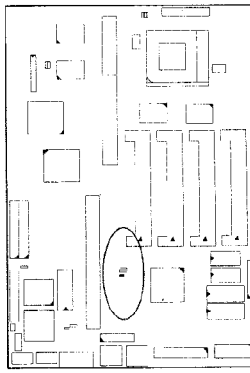
Printer Block Connector: LPT

This 25 D-Sub female connector is connected to your printer.



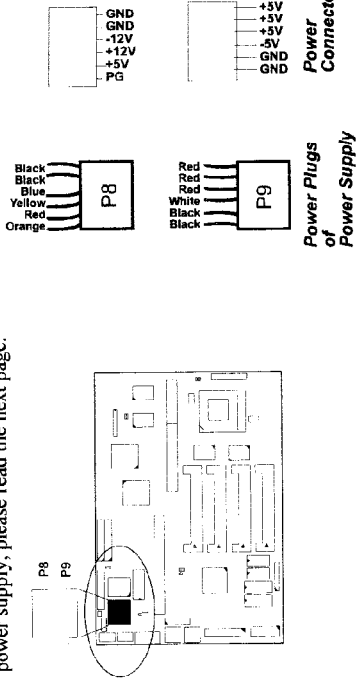
Outlet Connector: OUTLET

This 2-pin male connector is used for connecting to the system power supply for enabling (disabling) the power output from the direct connection of the system power supply. (This feature is designed for monitors without DPMS mode support, and only applies if the monitor is directly connected to the system power supply.)



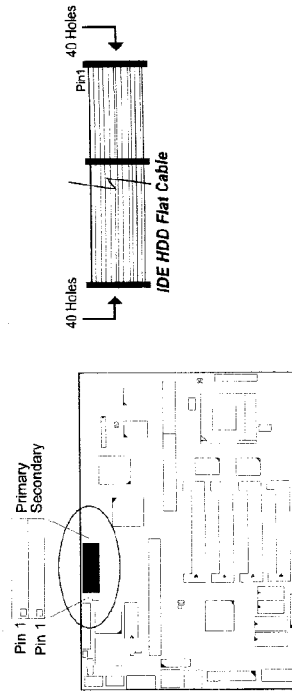
Power Block Connector: POWER

This 12-pin block connector is used for connecting to your standard 5V power supply. In the picture below, 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 in the middle. For remote power supply, please read the next page.



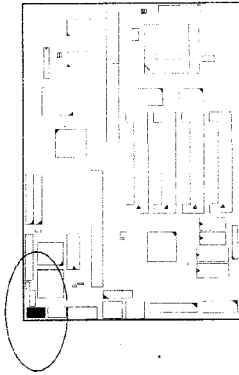
IDE HDD Device Connector: PRIMARY and SECONDARY

This two 40-pin block connectors 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, please use the SECONDARY connector. If two hard disks are connected to the 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 HDD manual for details.



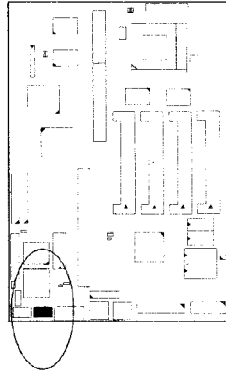
PS/2 Keyboard Connector: PS2_KB

This 5-pin female connector is used for your PS/2 keyboard.



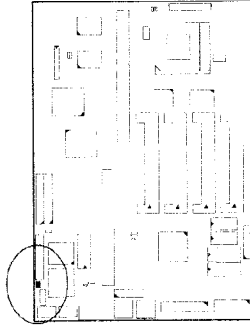
PS/2 Mouse Connector: PS2_MS

This 5-pin female connector is used for your PS/2 mouse.



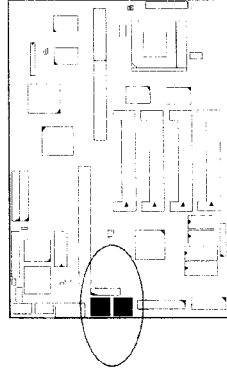
Remote Power Connector: RPW_CON

This 3-pin male connector allows you to enable or disable the system power if the RPW_SW is on or off. This allows you to adapt the remote power switch feature. Please contact your dealer for further information.



Universal Serial Bus Connector: USB1 and USB2 (Reserved For Future Upgrade)

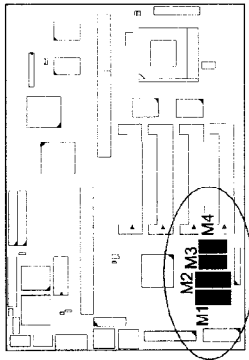
This connects to the port that allows you to attach a USB hub. The USB connectors are built-in for future upgrade of devices or peripherals that support Universal Serial Bus features.



VGA Connector: VGA

VGA Subsystem

The PAC-2003 has a built-in Cirrus Logic 5446 VGA controller that supports the resolutions of up to 1280 x 1024 in 256 colors. The related data about resolutions are listed in Appendix A. To upgrade the onboard video DRAM to 2 MB, insert two 256K x 16Bit - 7 (SOI-type) DRAMs at the sockets of M1 and M2.



The instructions in this chapter assume that you understand elementary concepts of MS-DOS. Before running any utilities or installing any drivers, an understanding of the MS-DOS directory structure and operations is needed to perform functions like formatting of diskettes, copying and deletion of files, and so on.

The PAC-2003 supplies drivers for DOS and Windows-based programs. These drivers will help you utilize and enhance your system's video subsystem. The driver diskette contains a READ.ME file that is accessible through any word processor using the ASCII or non-document mode.

NOTE :

1. You should have made backup copies of the original diskettes and should be using the backup ones.
2. Be sure to use the correct chips for the amount of DRAM you want to add. Always observe static electricity precautions.

The VGA controller is supplied with software drivers for the following application programs:

- MS Windows® 3.1, MS Windows® NT, MS Windows® 95
- MS Windows DPMS®
- Galileo™
- Autodesk™
- 3D Studio™
- AutoShade™
- MicroStation PC™
- OS/2™



NOTE : Please refer to the READ.ME file on the driver diskette for installation instructions and news of more recent updates. Software drivers for other Operating Systems may be available in the future or upon request.

The Connector

This 15 D-Sub female connector is linked to the VGA monitor with a cable.

