Chapter 2

Hardware Installation

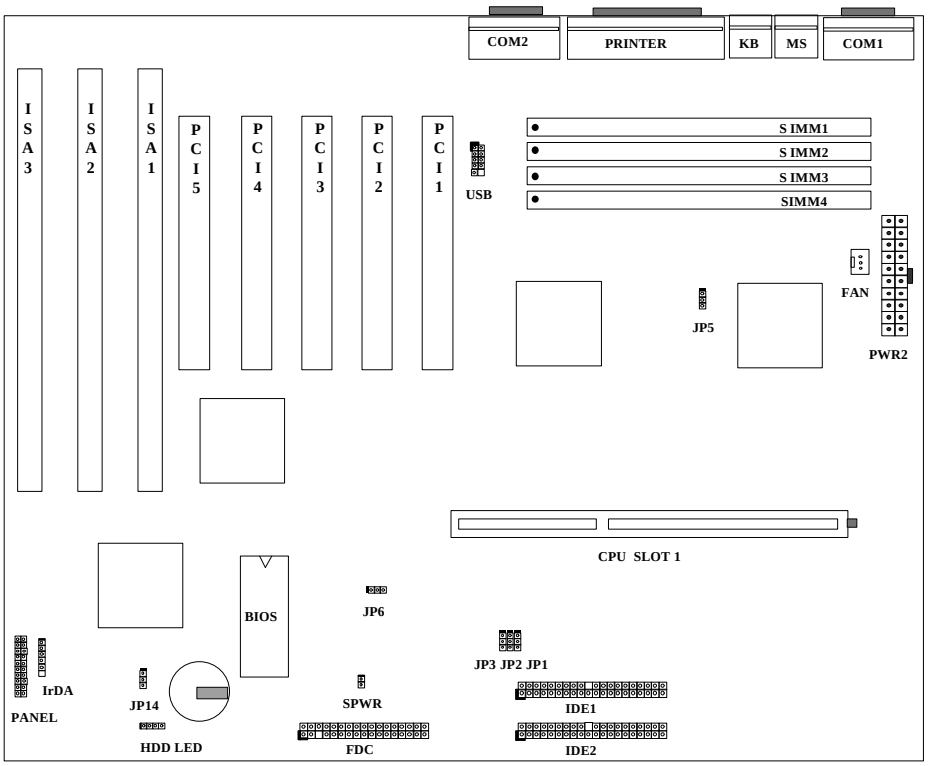
This chapter gives you a step-by-step procedure on how to install your system. Follow each section accordingly.

Caution: *Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.*

1. *Do not remove a component from its protective packaging until you are ready to install it.*
2. *Wear a wrist ground strap and attach it to a metal part of the system unit before handling a component. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.*

2.1 Jumper and Connector Locations

The following figure shows the locations of the jumpers and connectors on the system board:



Jumpers:

JP1,JP2,JP3:	*CPU frequency ratio*
JP5:	*CPU bus clock (chipset)*
JP6:	*CPU bus clock (clock generator)*
JP14:	*Clear CMOS*

Connectors:

PS2 MS:	*PS/2 mouse connector*
KB2:	*PS/2 keyboard connector*
COM1:	*COM1 connector*
COM2:	*COM2 connector*
PRINTER:	*Printer connector*
PWR2:	*ATX power connector*
USB:	*USB connector*
FDC:	*Floppy drive connector*
IDE1:	*IDE1 primary channel*
IDE2:	*IDE2 secondary channel*
FAN:	*CPU fan connector*
IrDA:	*IrDA (Infrared) connector*
HDD LED:	*HDD LED connector*
PANEL:	*Front panel (Multifunction) connector*

2.2 Jumpers

Jumpers are made by pin headers and plastic connecting caps for the purpose of customizing your hardware. Doing so requires basic knowledge of computer hardware, be sure you understand the meaning of the jumpers before you change any setting. The onboard jumpers are normally set to their default with optimized settings.

On the mainboard, normally there is a bold line marked beside pin 1 of the jumper, sometimes, there are numbers also. If we connect (short) plastic cap to pin 1 and 2, we will say set it at 1-2, and when we say jumper is open, that means no plastic cap connected to jumper pins.

Open

Short

Jumper set at 1-2

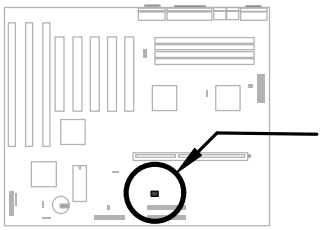
Jumper set at 2-3

2.2.1 Selecting the CPU Frequency

JP1	JP2	JP3	CPU Frequency Ratio
2-3	1-2	2-3	1.5x
1-2	1-2	1-2	2x
1-2	1-2	2-3	2.5x
1-2	2-3	1-2	3x
1-2	2-3	2-3	3.5x
2-3	1-2	1-2	4x
2-3	1-2	2-3	4.5x
2-3	2-3	1-2	5x
2-3	2-3	2-3	5.5x
1-2	1-2	1-2	6x
1-2	1-2	2-3	6.5x
1-2	2-3	1-2	7x
1-2	2-3	2-3	7.5x
2-3	1-2	1-2	8x

Intel Pentium II (Klamath) is designed to have different Internal (Core) and External (Bus) frequency. The ratio of Core/Bus frequency is selected by **JP1, JP2** and **JP3**, which CPU is using to multiply external clock and produce internal frequency.

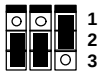
Core frequency = Ratio * External bus clock



JP3 & JP2 & JP1

3x

JP3 & JP2 & JP1

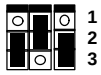


3.5x

JP3 & JP2 & JP1

4x

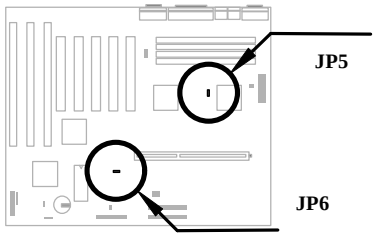
JP3 & JP2 & JP1



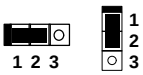
4.5x

JP6	JP5	CPU External Clock
1-2	1-2	66MHz (default)
2-3	2-3	60MHz

JP6 and **JP5** are selection of CPU external clock (bus clock). **JP6** is actually the selection of clock from clock generator and **JP5** is used to inform chipset the CPU bus clock.

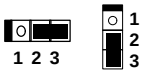


JP6 & JP5



66MHz
(default)

JP6 & JP5



60MHz

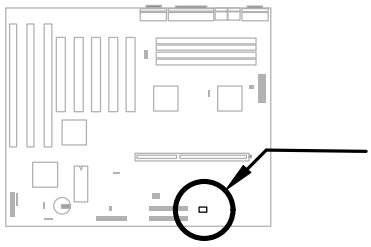
Caution: *Following table are possible settings of current CPU available on the market. The correct setting may vary because of new CPU product, refer to your CPU specification for more details.*

INTEL Pentium II	CPU Core Frequency	Ratio	External Bus Clock	JP3 & JP2 & JP1	JP6 & JP5
Klamath 200	200MHz =	3x	66MHz	1-2 & 2-3 & 1-2	1-2 & 1-2
Klamath 233	233MHz =	3.5x	66MHz	2-3 & 2-3 & 1-2	1-2 & 1-2
Klamath 266	266MHz =	4x	66MHz	1-2 & 1-2 & 2-3	1-2 & 1-2

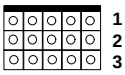
2.2.2 Setting the CPU Voltage

JP7~JP11	CPU Core Voltage
Open	CPU voltage auto-detection (default)

JP7~JP11 is reserved for test only and will be removed after mass production. This mainboard supports Pentium II (Klamath) VID function, the CPU core voltage is automatic detected, the range is from 1.3V to 3.5V.



JP11,JP10,JP9,JP8,JP7

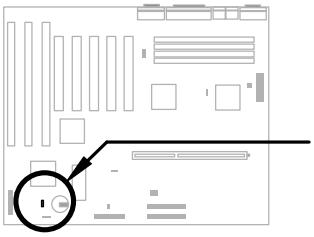


Open for Auto-detection

2.2.3 Clearing the CMOS

JP14	Clear CMOS
1-2	Normal operation (default)
2-3	Clear CMOS

You need to clear the CMOS if you forget your system password. To clear the CMOS, follow the procedures listed below:



Normal Operation (default)

Clear CMOS

The procedure to clear CMOS:

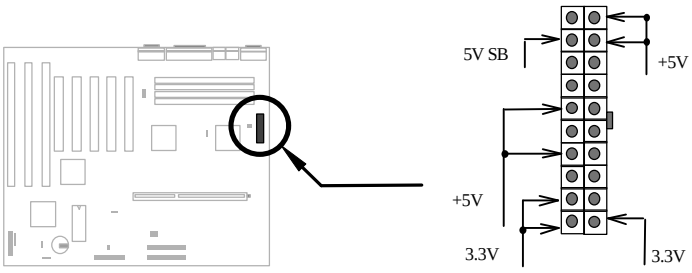
1. Turn off the system power.
2. Remove ATX power cable from connector PWR2.
3. Locate **JP14** and short pins 2-3 for a few seconds.
4. Return **JP14** to its normal setting by shorting pins 1-2.
5. Connect ATX power cable back to connector PWR2.
6. Turn on the system power.
7. Press DEL during bootup to enter the BIOS Setup Utility and specify a new password, if needed.

2.3 Connectors

2.3.1 Power Cable

The ATX power supply uses 20-pin connector shown below. Make sure you plug in the right direction.

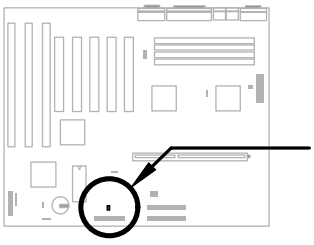
Caution: *Make sure that the power supply is off before connecting or disconnecting the power cable.*



PWR2

2.3.2 ATX Soft-Power Switch Connector

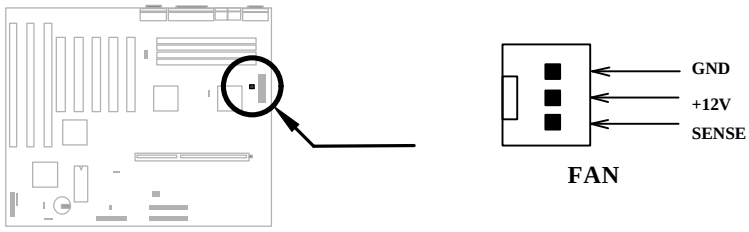
The ATX soft-power switch connector is a 2-pin header on the system board. Locate the power switch cable from your ATX housing. It is 2-pin female connector from the housing front panel. Plug this connector to the soft-power switch connector marked **SPWR.**



SPWR

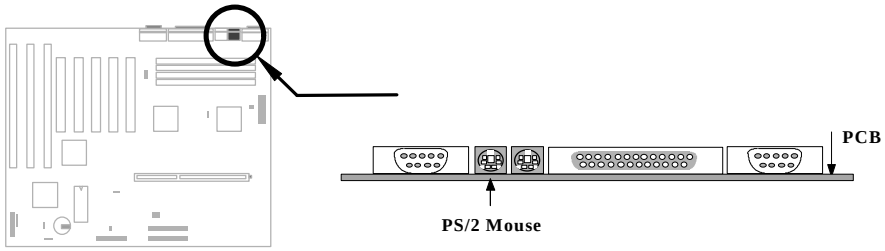
2.3.3 CPU Fan

Plug in the fan cable to the two-pin fan connector onboard. The fan connector is marked **FAN** on the system board.



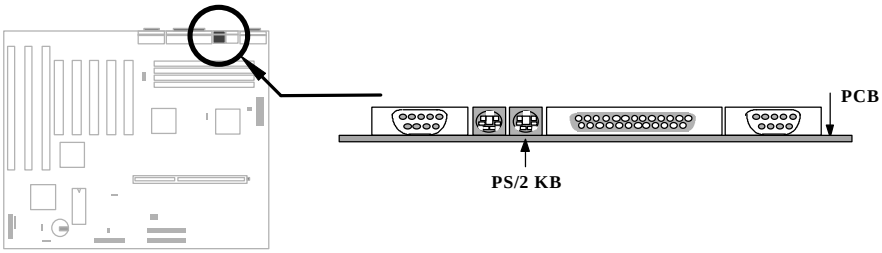
2.3.4 PS/2 Mouse

The onboard PS/2 mouse connector is a 6-pin Mini-Din connector marked **PS2 MS**. The view angle of drawing shown here is from back panel of the housing.



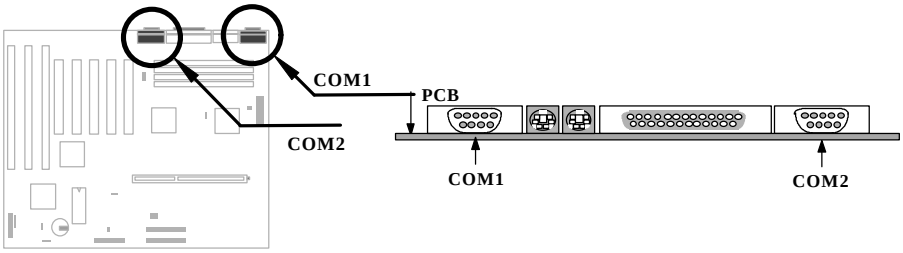
2.3.5 Keyboard

The onboard PS/2 keyboard connector is a 6-pin Mini-Din connector marked **KB2**. The view angle of drawing shown here is from back panel of the housing.



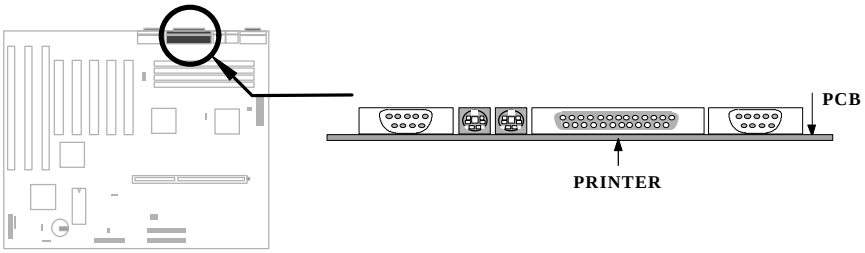
2.3.6 Serial Devices (COM1/COM2)

The onboard serial connectors are 9-pin D-type connector on the back panel of mainboard. The serial port 1 connector is marked as **COM1** and the serial port 2 connector is marked as **COM2.**



2.3.7 Printer

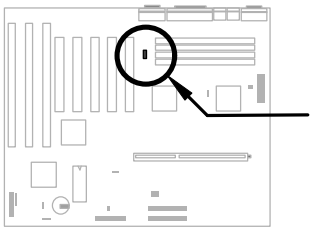
The onboard printer connector is a 25-pin D-type connector marked **PRINTER**. The view angle of drawing shown here is from back panel of the housing.

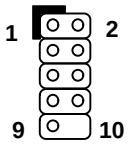


2.3.8 USB Device

You need a USB bracket to have your system to support additional USB device(s). To attach a USB bracket, simply insert the bracket cable to the onboard USB connector marked as **USB.**

Pin	Description	Pin	Description
1	V0	2	V1
3	D0-	4	D1-
5	D0+	6	D1+
7	GND	8	GND
9	NC	10	NC

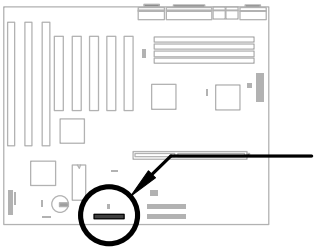


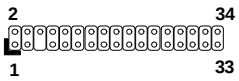


USB

2.3.9 Floppy Drive

Connect the 34-pin floppy drive cable to the floppy drive connector marked as **FDC** on the system board.





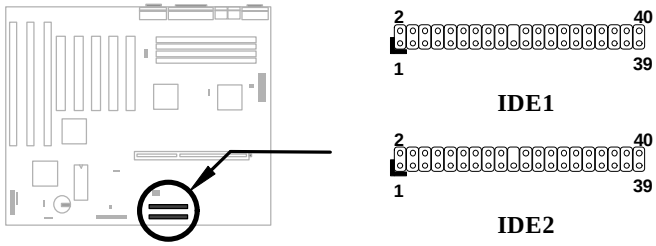
FDC

2.3.10 IDE Hard Disk and CD ROM

This mainboard supports two 40 pin IDE connectors marked as **IDE1** and **IDE2.** IDE1 is also known as primary channel and IDE2 as secondary channel, each channel supports two IDE devices that makes total of four devices.

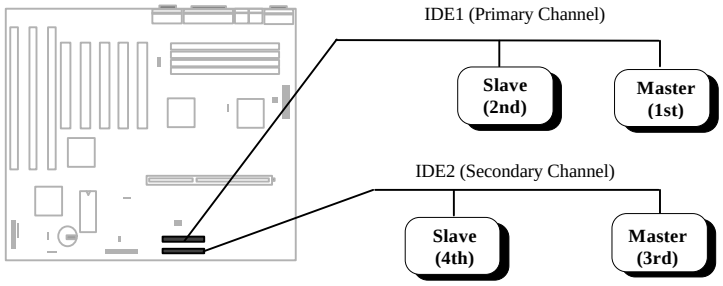
In order to work together, the two devices on each channel must be set differently to master and slave mode, either one can be hard disk or CDROM. The setting as master or slave mode depends on the jumper on your IDE device, please refer to your hard disk and CDROM manual accordingly.

Connect your first IDE hard disk to master mode of the primary channel. If you have second IDE device to install in your system, connect it as slave mode on the same channel, and the third and fourth device can be connected on secondary channel as master and slave mode respectively.



***Caution**: The specification of IDE cable is maximum 46cm (18 inches), make sure your cable does not excess this length.*

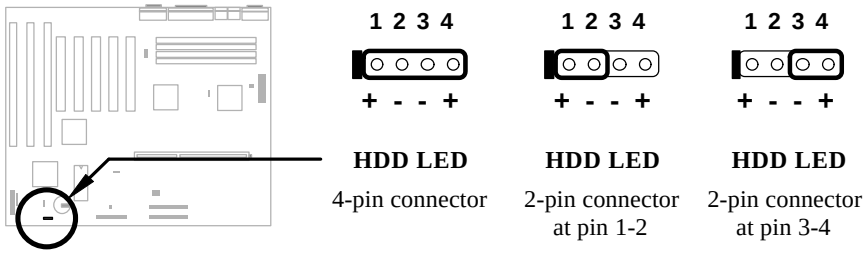
***Caution:** For better signal quality, it is recommended to set far end side device to master mode and follow the suggested sequence to install your new device . Please refer to following figure.*



2.3.11 Hard Disk LED

The HDD LED connector is marked as **HDD LED** on the board. This connector is designed for different type of housing, actually only two pins are necessary for the LED. If your housing has four pin connector, simply plug it in. If you have only two pin connector, please connect to pin 1-2 or pin 3-4 according to the polarity.

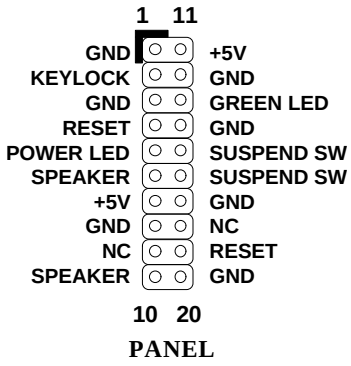
Pin	Description
1	HDD LED
2	GND
3	GND
4	HDD LED

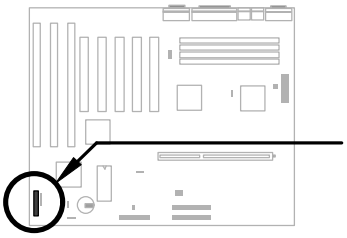


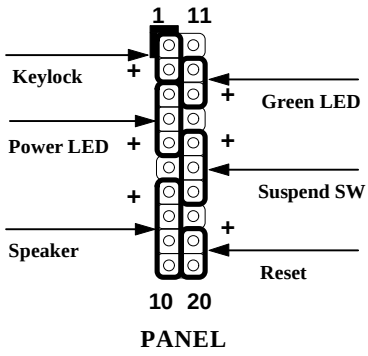
2.3.12 Panel Connector

The Panel (multifunction) connector is a 20-pin connector marked as **PANEL** on the board. Attach the power LED, keylock, speaker, reset switch, suspend switch, and green mode LED connectors to the corresponding pins as shown in the figure.

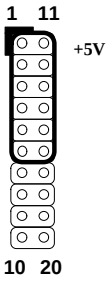
Some housings have a five-pin connector for the keylock and power LED Since power LED and keylock are aligned together, you can still use this kind of connector.







Other housings may have a 12-pin connector. If your housing has this type of connector, connect it to PANEL as shown in the figure. Make sure that the red wire of the connector is connected to +5V.



Note: *If your housing comes with Turbo switch and Turbo LED connectors, you may use these connectors for Suspend switch and Green mode LED functions, respectively.*

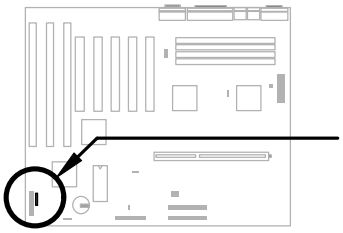
Note*: Pressing the Suspend switch allows you to manually force the system to suspend mode. However, this is possible only if the Power Management function in the BIOS Setup menu is enabled.*

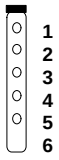
2.3.13 IrDA Connector

The IrDA connector can be configured to support wireless infrared module, with this module and application software such as Laplink or Win95 Direct Cable Connection, user can transfer files to or from laptops, notebooks, PDA and printers. This connector supports HPSIR (115.2Kbps, 2 meters), ASK-IR (19.2Kbps) and Fast IR (4Mbps, 2 meters).

Install infrared module onto **IrDA** connector and enable infrared function from BIOS setup, make sure to have correct orientation when you plug onto IrDA connector.

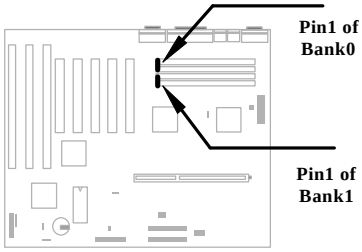
Pin	Description
1	+5V
2	FIRRX
3	IRRX
4	GND
5	IRTX
6	NC





IrDA

2.4 Configuring the System Memory



This mainboard has four 72 pin SIMM sockets (Single-in-line Memory Module) that allow you to install system memory from minimum 4MB up to maximum 512MB.

The SIMM supported by this mainboard can be identified by 4 kinds of factors:

- Size: single side, 1Mx32 (4MB), 4Mx32 (16MB), 16Mx32 (64MB), and double side, 1Mx32x2 (8MB), 4Mx32x2 (32MB), 16Mx32x2 (128MB).
- Speed: 60ns or 70ns access time
- Type: FPM (Fast page mode) or EDO (Extended data output)
- Parity: without parity (32 bit wide) or with parity (36 bit wide).

Because Pentium II processor has 64 bit bus width, the four SIMM sockets are arranged in two banks of two sockets each, they are Bank0 and Bank1. Both SIMMs in each bank must be in the same size and type. It is allowed to have different speed and type in different bank, for example, 70ns FPM in one bank and 60ns EDO in another bank, in such case, each bank is independently optimized for maximum performance. The memory timing requires at least 70ns fast page mode DRAM chip, but for optimum performance, 60ns EDO DRAM is recommended.

***Warning**: The default memory timing setting is 60ns to obtain the optimal performance. Because of the specification limitation, 70ns SIMM is recommended to be used only for CPU external clock 60MHz.*

***Tip:** EDO DRAM is designed to improve the DRAM read performance. Unlike traditional fast page mode, that tri-states the memory output data to start the precharge activity, EDO DRAM holds the memory data valid until the next memory access cycle, which is similar to pipe-line effect and reduces one clock state.*

There is no jumper setting required for the memory size or type. It is automatically detected by the system BIOS. You can use any single side SIMM combination list below for, and the total memory size is to add them together, the maximum is 512MB.

SIMM1	SIMM2	Subtotal of Bank0
None	None	0MB
4MB	4MB	8MB
8MB	8MB	16MB
16MB	16MB	32MB
32MB	32MB	64MB
64MB	64MB	128MB
128MB	128MB	256MB

SIMM3	SIMM4	Subtotal of Bank1
None	None	0MB
4MB	4MB	8MB
8MB	8MB	16MB
16MB	16MB	32MB
32MB	32MB	64MB
64MB	64MB	128MB
128MB	128MB	256MB

Total Memory Size = Subtotal of Bank0 + Subtotal of Bank1

Caution: *Make sure that you install the same SIMM type and size for each bank.*

The driving capability of new generation chipset is limited because the lack of memory buffer (to improve performance). This makes DRAM chip count an important factor to be taking into consideration when you install SIMM. Unfortunately, there is no way that BIOS can identified the correct chip count, you need to calculate the chip count by yourself. The simple rule is: By visual inspection, use only SIMM with chip count less than 24 chips.

***Warning**: Do not install any SIMM that contains more than 24 chips. SIMMs contain more than 24 chips exceed the chipset driving specification. Doing so may result in unstable system behavior.*

***Tip:** The SIMM chip count can be calculated by following example:*

1. *For 32 bit non-parity SIMM using 1M by 4 bit DRAM chip, 32/4=8 chips.*
2. *For 36 bit parity SIMM using 1M by 4 bit DRAM chip, 36/4=9 chips.*
3. *For 36 bit parity SIMM using 1M by 4 bit and 1M by 1 bit DRAM, the chip count will be 8 data chips(8= 32/4) plus 4 parity chips(4=4/1), total is 12 chips.*

Following table list the recommended DRAM combinations:

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
1M by 4	None	1Mx32	x1	8	4MB	Yes
1M by 4	None	1Mx32	x2	16	8MB	Yes
1M by 4	1M by 1	1Mx36	x1	12	4MB	Yes
1M by 4	1M by 4	1Mx36	x1	9	4MB	Yes
1M by 4	1M by 4	1Mx36	x2	18	8MB	Yes
1M by 16	None	1Mx32	x1	2	4MB	Yes
1M by 16	None	1Mx32	x2	4	8MB	Yes
1M by 16	1M by 4	1Mx36	x1	3	4MB	Yes
1M by 16	1M by 4	1Mx36	x2	6	8MB	Yes
4M by 4	None	4Mx32	x1	8	16MB	Yes
4M by 4	None	4Mx32	x2	16	32MB	Yes
4M by 4	4M by 1	4Mx36	x1	12	16MB	Yes
4M by 4	4M by 1	4Mx36	x2	24	32MB	Yes

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
16M by 4	None	16Mx32	x1	8	64MB	Yes, but not tested.
16M by 4	None	16Mx32	x2	16	128MB	Yes, but not tested.
16M by 4	16M by 4	16Mx36	x1	9	64MB	Yes, but not tested.
16M by 4	16M by 4	16Mx36	x2	18	128MB	Yes, but not tested.

***Warning**: 64MB SIMMs using 16M by 4 bit chip (64M bit technology) are not available in the market and are not formally tested by AOpen quality test department yet. However they are supported by design specification of chipset and they will be tested as soon as they are available. Note that 64MB SIMMs using 16M by 1 bit chip (16M bit technology) have chip count exceed 24 and are strongly not recommended.*

***Tip:** 8 bit = 1 byte, 32 bit = 4 byte. The SIMM size is represented by number of data byte (whether with or without parity), for example, the size of single side SIMM using 1M by 4 bit chip is 1Mx32 bit, that is, 1M x 4 byte = 4MB. For double side SIMM, simply multiply it by 2, that is, 8MB.*

Following table are possible DRAM combinations that is **NOT** recommended:

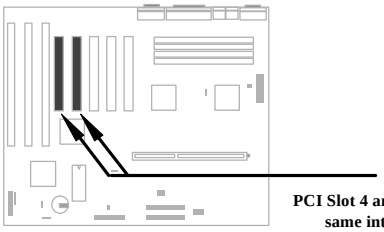
SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
1M by 1	None	1Mx32	x1	32	4MB	No
1M by 1	1M by 1	1Mx36	x1	36	4MB	No
1M by 4	1M by 1	1Mx36	x2	24	8MB	No
4M by 1	None	4Mx32	x1	32	16MB	No
4M by 1	4M by 1	4Mx36	x1	36	16MB	No
16M by 1	None	16Mx32	x1	32	64MB	No
16M by 1	16M by 1	16Mx36	x1	36	64MB	No

Memory error checking is supported by two modes, parity check or ECC (Error Check and Correction). To use memory error check you need 36 bit SIMM (32 bit data + 4 bit parity or ECC bit). 36 bit parity or ECC SIMMs are automatically detected by BIOS, however you must enter BIOS setup to configure the memory for either parity or ECC mode.

Tip: *The parity mode uses 1 parity bit for each byte, normally it is even parity mode, that is, each time the memory data is updated, parity bit will be adjusted to have even count "1" for each byte. When next time, if memory is read with old number of "1", the parity error is occurred and this is called single bit error detection.*

Tip: *The ECC mode needs 8 ECC bit for 64 bit data, because 36 bit SIMM has 4 bit more for parity, the ECC mode can be supported by two traditional parity SIMMs, it is no need to have special ECC SIMM. Each time memory is accessed, ECC bits are updated and checked by special algorithm, the ECC algorithm has the ability to detect double bit error and automatically correct single bit error.*

2.5 PCI Slot



PCI Slot 4 and Slot 5 share the same interrupt INTD.

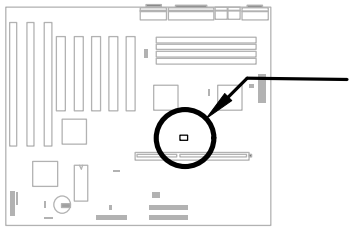
Each PCI slot has four PCI interrupts aligned as listed in the table below. Most of the PCI cards use only one interrupt at location 1 (pin A6), because the chipset supports only 4 PCI interrupts. PCI slot 4 and PCI slot 5 share the same interrupt INTD.

Tip: *Since normally PCI VGA does not use interrupt, you may plug VGA card at either slot 4 or slot 5, and the other slot can be used for another PCI card.*

PCI Slot	Location 1 (pin A6)	Location 2 (pin B7)	Location 3 (pin A7)	Location 4 (pin B8)
Slot 1	INTA	INTB	INTC	INTD
Slot 2	INTB	INTC	INTD	INTA
Slot 3	INTC	INTD	INTA	INTB
Slot 4	INTD	INTA	INTB	INTC
Slot 5	INTD	INTA	INTB	INTC

Note: *The onboard USB ports share PCI INTD too. If you enable "USB Host Controller" in BIOS setup, INTD will be occupied by USB port. That is, PCI slot 4 and slot 5 can only use PCI card that does not need interrupt, such as VGA.*

2.6 CPU Thermal Protection



This mainboard implements special thermal protection circuit under the CPU heatsink. When temperature is higher than 55 degree C, the CPU speed will automatically slow down and there will be warning from BIOS and also ADM (AOpen Desktop Manager, similar as Intel LDCM), if ADM is installed.

It is automatically implemented by BIOS and ADM, no hardware installation is needed.