
Chapter 2

Hardware Installation

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



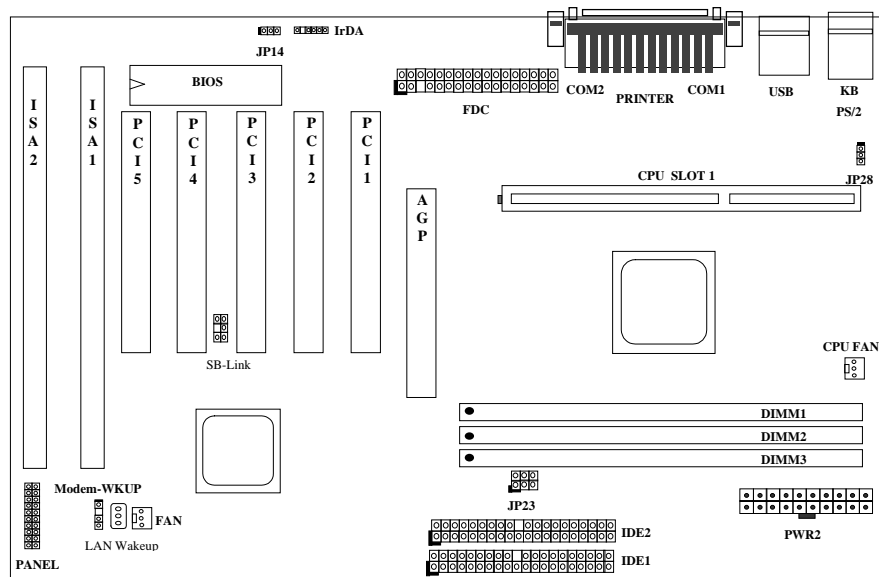
Caution: *Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.*

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.*

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2.1 Jumper and Connector Locations

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



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Jumpers:

JP14:	Clear CMOS
JP23:	AGP Ratio
JP28:	Keyboard/Mouse Wake Up

Connectors:

PS2:	PS/2 mouse connector
KB:	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
CPUFAN:	CPU Fan connector
FAN:	Housing Fan connector
IrDA:	IrDA (Infrared) connector
PANEL:	Front panel (Multifunction) connector
WOM:	Wake On Modem connector
WOL:	Wake On LAN connector
SB-LINK:	Sound Blaster Link connector

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2.2 Jumpers

With the help of Pentium II / Pentium III / Celeron VID signal and SMBus, this motherboard is jumper-less design.

2.2.1 Selecting the CPU Frequency

Pentium II / Pentium III / Celeron VID signal and the SMBus clock generator provide CPU voltage auto-detection and allow the user to set CPU frequency through the CMOS setup, no jumpers or switches are needed. The correct CPU information is saved into the EEPROM. With these technologies, the disadvantages of the Pentium based jumper-less design are eliminated. There will be no worry of wrong CPU voltage detection and no need to re-open the housing if the CMOS battery is lost.

The CPU frequency selection is set by going into:

BOIS Setup à Chipset Features Setup à CPU Clock Frequency

(The possible setting is 66.8, 68.5, 75, 83.3, 100, 103, 112, 117, 124, 129, 133.3, 138, 143, 148 and 153 MHz)

BOIS Setup à Chipset Features Setup à CPU Clock Ratio

(The possible setting is 1.5x, 2x, 2.5x, 3x, 3.5x, 4x, 4.5x, 5x, 5.5x, 6x, 6.5x, 7x, 7.5x, and 8x)

Core frequency = Ratio * External bus clock

INTEL Pentium II	CPU Core Frequency	Ratio	External Bus Clock
Pentium II - 233	233MHz =	3.5x	66MHz
Pentium II - 266	266MHz =	4x	66MHz
Pentium II - 300	300MHz =	4.5x	66MHz
Pentium II - 333	333MHz =	5x	66MHz
Pentium II - 350	350MHz=	3.5x	100MHz
Pentium II - 400	400MHz=	4x	100MHz
Pentium II - 450	450MHz=	4.5x	100MHz
Pentium III - 450	450MHz=	4.5x	100MHz
Pentium III - 500	500MHz=	5x	100MHz
Celeron 266	266MHz=	4x	66MHz
Celeron 300	300MHz=	4.5x	66MHz
Celeron 300A	300MHz=	4.5x	66MHz
Celeron 333	333MHz=	5x	66MHz

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INTEL Pentium II	CPU Core Frequency	Ratio	External Bus Clock
Celeron 366	366MHz=	5.5x	66MHz
Celeron 400	400MHz=	6x	66MHz



Warning: The INTEL 440BX chipset supports a maximum of 100MHz FSB clock, the higher clock settings are for internal test only. **These settings exceed the specification of the BX chipset, which may cause serious system damage.**

2.2.2 Setting the CPU Voltage

This motherboard supports Pentium II / Pentium III / Celeron VID function, the CPU core voltage is automatically detected, the range is from 1.3V to 3.5V.

For overclocking, the CPU voltage also can be adjusted in the BIOS Setup. The CPU voltage is adjustable by going into:

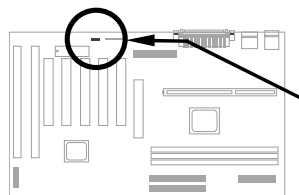
Chipset Features à CPU Voltage Set to

However, note that enlarging the core voltage is probably harmful to your CPU.

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 procedure below:



JP14



Normal Operation
(default)

JP14



Clear CMOS

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The procedure to clear CMOS:

1. Turn off the system and unplug the AC 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.



Tip: If your system hangs or fails to boot because of over-clocking, please clear the CMOS and the system will go back to its default setting (233MHz).

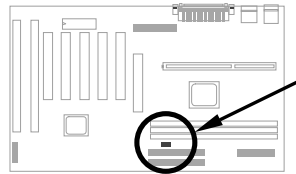
Tip: If your system hangs or fails to boot because of over-clocking, simply use the <Home> key to restore the default setting (233MHz). By this smart design, it would be more convenient to clear CPU frequency setting. For using this function, you just need to press the <Home> key first and then press the Power button at the same time. Note: do not release the <Home> key until the POST screen appears.

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2.2.4 AGP Ratio

JP23	AGP Ratio
1-2	Auto (default)
3-4	2/3
5-6	1/1

To improve system performance, AX6BC Pro has implemented this jumper for AGP to synchronize the CPU 100MHz (or above) external frequency. We recommend choosing a better AGP card for overclocking. Some AGP cards can not take 100MHz bus frequency and may cause overclocking failure.



JP23	JP23	JP23
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Auto (Default)	2/3	1/1

There is a "66/100" signal pin from CPU for BX chipset to automatically identify AGP clock, this is important for jumperless design. When a 66MHz Pentium II CPU is used, the north bridge will synchronize the CPU external frequency and the AGP bus frequency. Therefore, when you set the CPU external frequency to 100MHz, the AGP bus will also runs at 100MHz.

With 100MHz Pentium II CPU, the north bridge automatically set AGP frequency to 2/3 AGP frequency. In other words, the AGP card will still runs at 66MHz while the CPU is running at 100MHz external frequency.

Except Auto setting, you may also set this jumper to 2/3 or 1/1. Below is a table for better understanding:

CPU Type	66/100 signal	Bus clock	AGP clock	JP23
66MHz	Low	66MHz	66MHz	1-2
66MHz	Low	100MHz	100MHz	1-2
66MHz	Low	100MHz	66MHz	3-4
100MHz	High	100MHz	66MHz	1-2
100MHz	High	100MHz	66MHz	3-4
100MHz	High	100MHz	100MHz	5-6
100MHz	High	133MHz	88.6MHz	1-2
100MHz	High	133MHz	88.6MHz	3-4
100MHz	High	133MHz	133MHz	5-6



Warning: The specification of AGP is maximum 66Mhz clock. If the bus clock is larger than 66MHz, setting this

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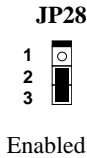
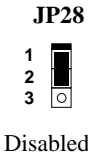
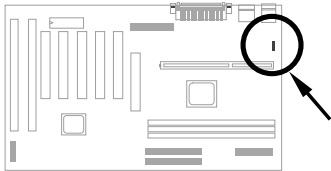
item to Enabled may cause serious system damage.

2.2.5 KB/MS WKUP

<u>JP28</u>	<u>KB/MS WKUP</u>
1-2	Disabled
2-3	Enabled

This jumper is used to enable or disable the Keyboard/Mouse Power ON function. If you select Enabled, you may choose the wakeup mode from the BIOS Setup. To implement this function, the 5V Stand By current must be greater than 800mA.

Note that only PS/2 mouse supports the Wake On Mouse function.



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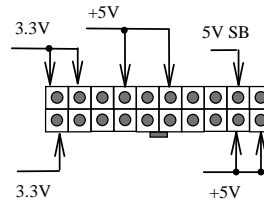
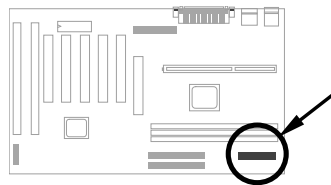
2.3 Connectors

2.3.1 Power Cable

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



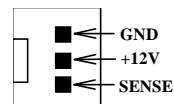
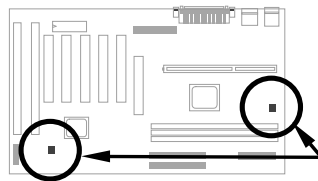
Caution: Make sure that the power supply is off before connecting or disconnecting the power cable.



PWR2

2.3.2 Fan

Plug in the fan cable to the 3-pin fan connector onboard. The fan connector is marked **CPUFAN1** and **FAN1** on the system board.



CPUFAN1
FAN1

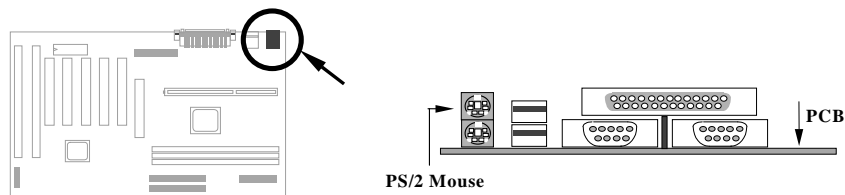


Note: Attach the fan cable to either the CPU FAN connector or the FAN connector. Both of these two fan connectors can support the hardware monitoring function. However, you can only use the CPU FAN connector to control the fan power ON/OFF.

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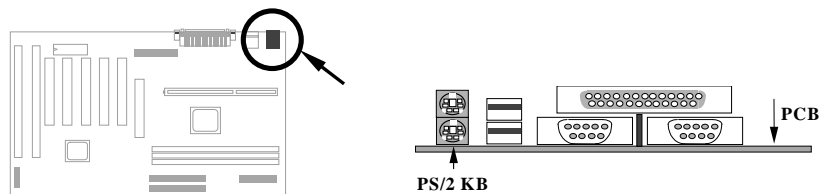
2.3.3 PS/2 Mouse

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



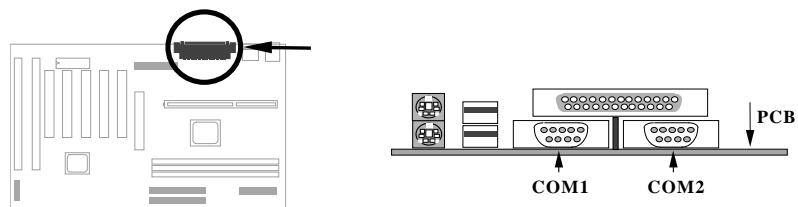
2.3.4 Keyboard

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



2.3.5 Serial Devices (COM1/COM2)

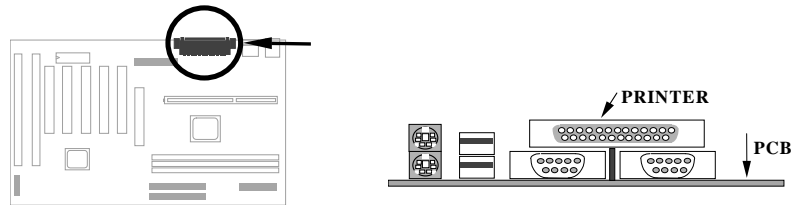
The onboard serial connectors are 9-pin D-type connectors on the back panel of motherboard. The serial port 1 connector is marked as **COM1** and the serial port 2 connector is marked as **COM2**.



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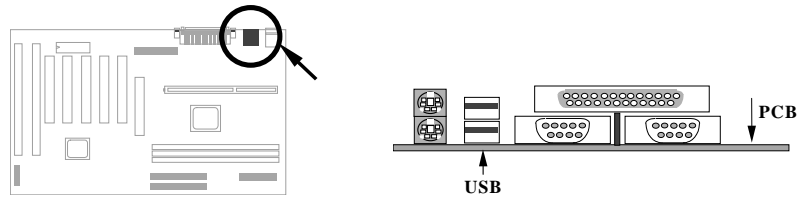
2.3.6 Printer

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



2.3.7 USB Device

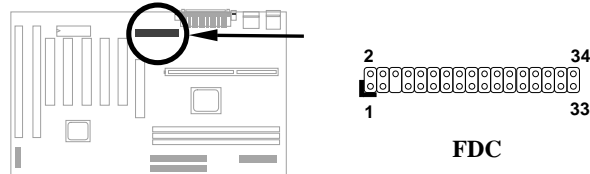
You can attach USB devices to the USB connector. The motherboard contains two USB connectors, which are marked as **USB**.



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2.3.8 Floppy Drive

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

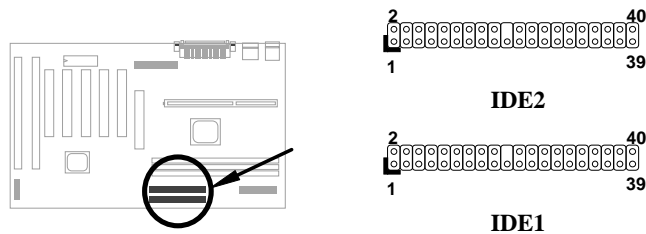


2.3.9 IDE Hard Disk and CD ROM

This motherboard supports two 40 pin IDE connectors marked as **IDE1** and **IDE2**. IDE1 is also known as the primary channel and IDE2 as the secondary channel. Each channel supports two IDE devices that make a 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 the hard disk or the CDROM. The setting as master or slave mode depends on the jumper on your IDE device, so 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.

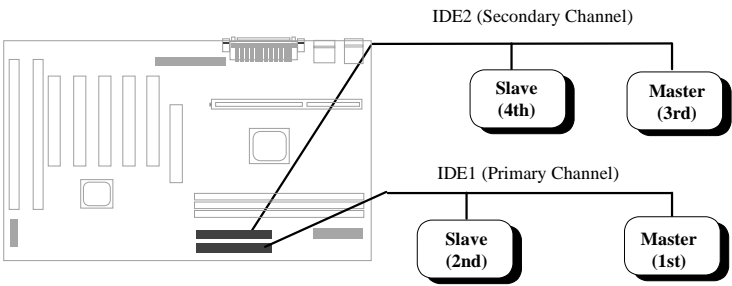


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Caution: The specification of the IDE cable is a maximum of 46cm (18 inches), make sure your cable does not exceed this length.

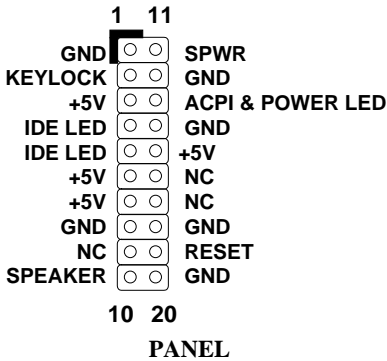
Caution: For better signal quality, it is recommended to set the far end side device to master mode and follow the suggested sequence to install your new device. Please refer to the following figure.



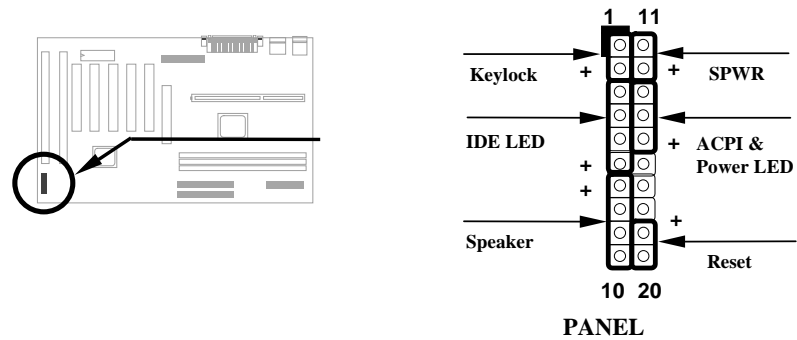
2.3.10 Panel Connector

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

If your ATX housing supports ACPI specification, the ACPI & Power the LED will keep flashing if you have enabled "suspend mode" item in the BIOS Setup.



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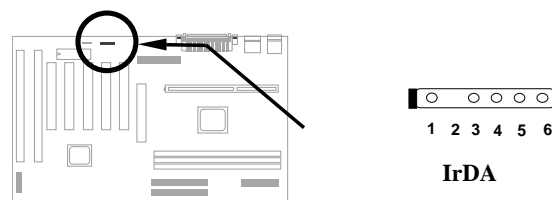


2.3.11 IrDA Connector

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, the user can transfer files to or from laptops, notebooks, PDA devices and printers. This connector supports HPSIR (115.2Kbps, 2 meters) and ASK-IR (56Kbps).

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

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

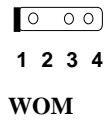
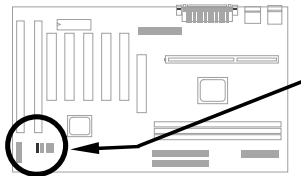


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2.3.12 Wake on Modem Connector

This motherboard implements special circuit to support Wake On Modem, both Internal Modem Card (AOpen MP56) and external box Modem are supported. Since Internal Modem card consumes no power when system power is off, it is recommended to use an internal modem. To use AOpen MP56, connect 4-pin cable from **RING** connector of MP56 to the **WOM** connector on the motherboard.

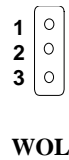
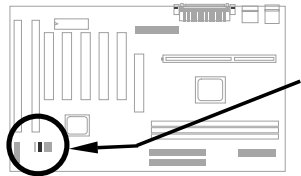
Pin	Description
1	+5V SB
2	NC
3	RING
4	GND



2.3.13 Wake on LAN Connector

This motherboard implements a **WOL** connector. To use Wake On LAN function, you need a network card that supports this feature. In addition, you also need to install network management software.

Pin	Description
1	+5V SB
2	GND
3	LID

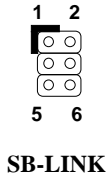
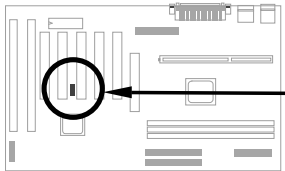


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2.3.14 Sound Blaster LINK

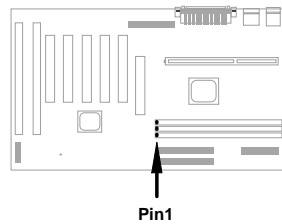
SB-LINK is used to connect Creative PCI sound card. If you have a Creative PCI sound card installed, it is necessary to link the card to this connector for compatibility issue under DOS environment.

<u>Pin</u>	<u>Description</u>
1	GNT#
2	GND
3	NC
4	REQ#
5	GND
6	SIRQ#



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2.4 Configuring the System Memory



The DIMM types supported are SDRAM (Synchronous DRAM) and Registered SDRAM. This motherboard has three 168 pin DIMM sockets (Dual-in-line Memory Module) that allow you to install system memory up to **768MB**. But note that mixing SDRAM and Registered SDRAM is not allowed, you can install one of the DRAM types only.



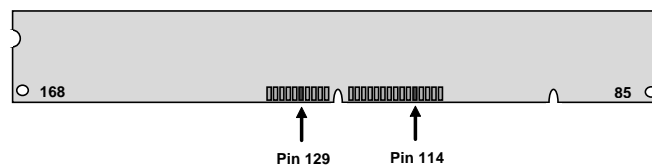
Warning: This motherboard does not support EDO DRAM.

DIMM modules can be identified by the following factors:

- I. **Size:** single side, 1Mx64 (8MB), 2Mx64 (16MB), 4Mx64 (32MB), 8Mx64 (64MB), 16Mx64 (128MB), and double side, 1Mx64x2 (16MB), 2Mx64x2 (32MB), 4Mx64x2 (64MB), 8Mx64x2 (128MB).



Tip: Here is a trick to check if your DIMM is single-side or double-side -- if there are traces connected to golden finger pin 114 and pin 129 of the DIMM, the DIMM is probably double-side; otherwise, it is single-side. The following figure is for your reference.



Note: 768MB memory is achieved by using 128M bit Registered SDRAMs.

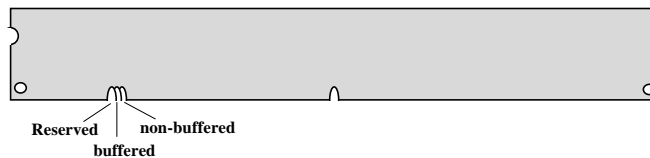
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- II. **Speed:** Normally marked as -12, which means the clock cycle time is 12ns and the maximum clock of this SDRAM is 83MHz. Sometimes you can also find the SDRAM marked as -67, which means maximum clock is 67MHz.



Caution: Some SDRAMs marked as -10 may work fine with 100 MHz CPU clock, but not all of these kinds of modules can work properly under 100MHz external clock. We suggest you choose and install SDRAMs that match **PC 100** specification if 100MHz or above CPU clock is selected.

- III. **Buffered and non-buffered:** This motherboard supports non-buffered DIMMs. You can identify non-buffered DIMMs and buffered DIMMs according to the position of the notch. The following figure is for your reference:



Because the positions are different, only non-buffered DIMMs can be inserted into the DIMM sockets on this motherboard. Although most DIMMs available in the current market are non-buffered, we still recommend you ask your dealer for the correct type.

- IV. **2-clock and 4-clock signals:** Although both 2-clock and 4-clock signals are supported by this motherboard, we strongly recommend choosing 4-clock SDRAM for its reliability.



Tip: To identify 2-clock and 4-clock SDRAM, you may check if there are traces connected to the golden finger pins 79 and 163 of the SDRAM. If there are traces, the SDRAM is probably 4-clock; Otherwise, it is 2-clock.

- V. **Parity:** This motherboard supports standard 64 bit wide (without parity) and 72-bit wide (with parity) DIMM modules.
- VI. **SPD support:** The BIOS will automatically detect DIMMs with SPD, and set to the appropriate timing. DIMMs without SPD are still able to work fine on this board, but the BIOS POST screen will give you a warning message that you use a DIMM without SPD.

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There is no jumper setting required for the memory size or type. It is automatically detected by the system BIOS, and the total memory size is all of them added together.

Total Memory Size = Size of DIMM1 + Size of DIMM2 + Size of DIMM3

The following table lists the recommended SDRAM combinations of DIMM:

DIMM Data chip	Bit size per side	Single/Double side	Chip count	DIMM size	Recommended
1M by 16	1Mx64	x1	4	8MB	Yes
1M by 16	1Mx64	x2	8	16MB	Yes
2M by 8	2Mx64	x1	8	16MB	Yes
2M by 8	2Mx64	x2	16	32MB	Yes
4M by 16	4Mx64	x1	4	32MB	Yes
4M by 16	4Mx64	x2	8	64MB	Yes
8M by 8	8Mx64	x1	8	64MB	Yes.
8M by 8	8Mx64	x2	16	128MB	Yes.

DIMM Data chip	Bit size per side	Single/Double side	Chip count	DIMM size	Recommended
2M by 32	2Mx64	x1	2	16MB	Yes, but not tested.
2M by 32	2Mx64	x2	4	32MB	Yes, but not tested.

The following table lists possible SDRAM combinations that is **NOT** recommended:

DIMM Data chip	Bit size per side	Single/Double side	Chip count	DIMM size	Recommended
4M by 4	4Mx64	x1	16	32MB	No
4M by 4	4Mx64	x2	32	64MB	No
16M by 4	16Mx64	x1	16	128MB	No

Memory error checking is supported by parity checking. To use parity checking you need 72 bit DIMMs (64+8 bit parity), which are automatically detected by the BIOS.

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Warning: The driving capability of new generation chipset is limited due to the lack of a memory buffer (to improve performance). This makes DRAM chip count an important factor to take into consideration when you install DIMMs. Unfortunately, there is no way that the BIOS can identify the correct chip count, you need to calculate the chip count by yourself. The simple rule is: **By visual inspection, use only DIMMs which are less than 16 chips.**



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 odd number of "1", the parity error is occurred and this is called single bit error detection.