Chapter 2

Hardware Installation

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

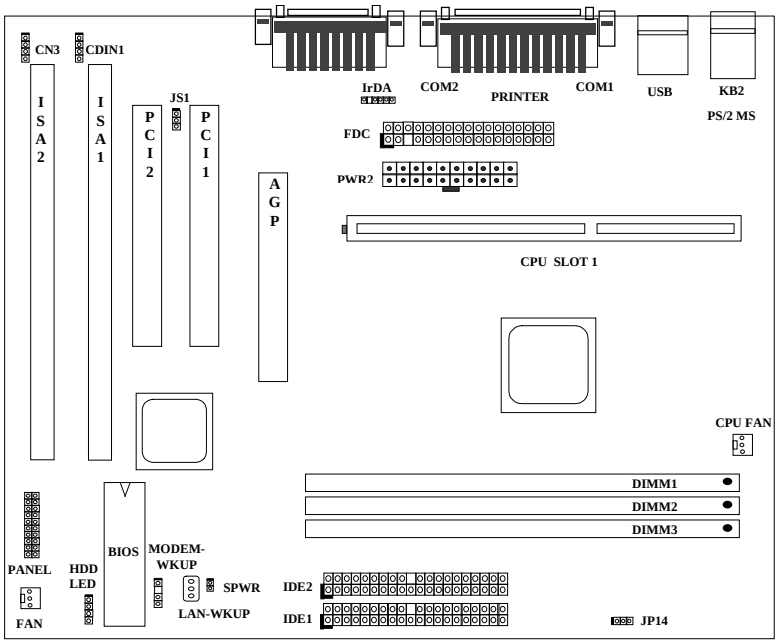
Caution: *Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.*

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:

JP14:	Clear CMOS
JS1:	Disable Sound

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
HDD LED:	HDD LED connector
PANEL:	Front panel (Multifunction) connector
SPWR:	ATX Soft-Power Switch Connector
MODEM-WKUP:	Modem Wake Up Connector
LAN-WKUP:	Lan Wake Up Connector
CDIN1:	CD-audio connector
CN3:	Mono in (Pin 1-2) and Mic out (Pin 3-4)

2.2 Jumpers

With the help of Pentium II VID signal and SMbus, this motherboard is jumper-less design. The only jumper left is to clear CMOS, which is a safety hook if you forget the password.

2.2.1 Selecting the CPU Frequency

Pentium II VID signal and SMbus clock generator provide CPU voltage auto-detection and allow user to set CPU frequency through CMOS setup, no jumper or switch is needed. The correct CPU information is saved into EEPROM, with these technologies, the disadvantages of Pentium base jumper-less design are eliminated. There will be no worry of wrong CPU voltage detection and no need to re-open the housing if CMOS battery loss.

The CPU frequency selection is set by going into:

BOIS Setup à **Chipset Features Setup** à **CPU Clock Frequency**

(The possible setting is 66, 68.5, 75 and 83.3 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
Klamath 233	233MHz =	3.5x	66MHz
Klamath 266	266MHz =	4x	66MHz
Klamath 300	300MHz =	4.5x	66MHz
Klamath 333	333MHz =	5x	66MHz
Celeron 266	266MHz=	4x	66MHz
Celeron 300	300MHz	4.5x	66MHz

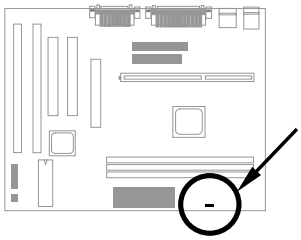
2.2.2 Setting the CPU Voltage

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

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 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.

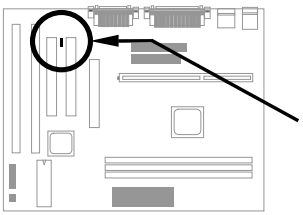
Tip: *If your system hangs or fails to boot because of over-clocking, please clear CMOS and the system will go back to default setting (233MHz).*

Tip: *Except using JP14, you may also press <Home> key. By this smart design, it would be more convenient to clear CPU frequency setting. For using this function, you just need to press <Home> key first and then press Power button at the same time. Please note that do not release <Home> key until POST screen appearing .*

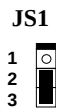
2.2.6 Disable Onboard Sound Card

JS1	Disable Onboard Sound Card
1-2	Enabled (default)
2-3	Disabled

If you want to install other sound card, you have to disable the onboard sound card by setting this jumper to Disabled.



Enabled (default)



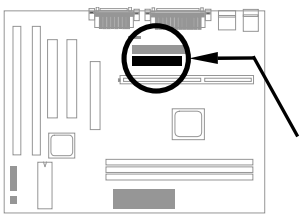
Disabled

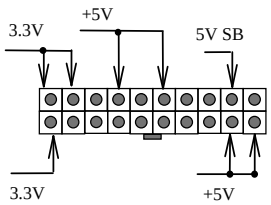
2.3 Connectors

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.*

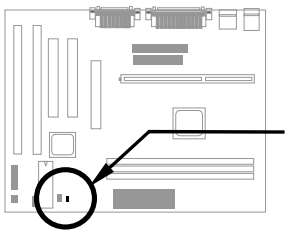




PWR2

2.3.2 ATX Soft-Power Switch Connector

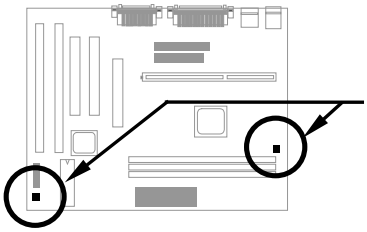
The ATX soft-power switch connector is a 2-pin header on the system board. Locate the power switch cable from your ATX housing. It is 2-pin female connector from the housing front panel. Plug this connector to the soft-power switch connector marked **SPWR**.

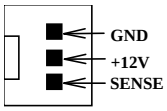


SPWR

2.3.3 Fan

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



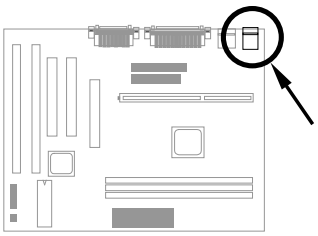


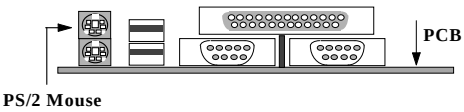
CPUFAN & FAN

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

2.3.4 PS/2 Mouse

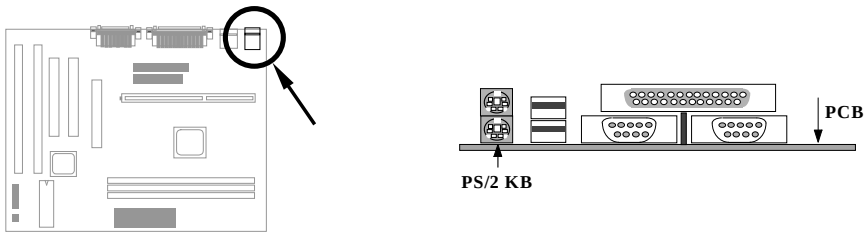
The onboard PS/2 mouse connector is a 6-pin Mini-Din connector marked **PS2**. The view angle of drawing shown here is from back panel of the housing.





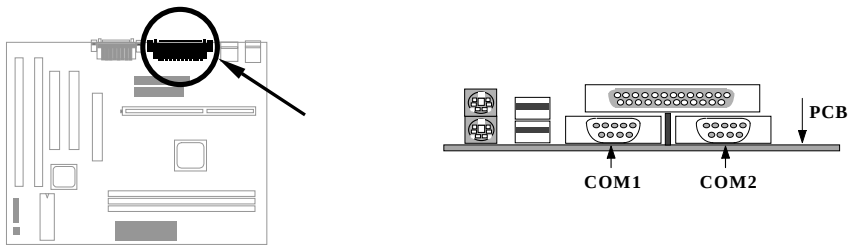
2.3.5 Keyboard

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.



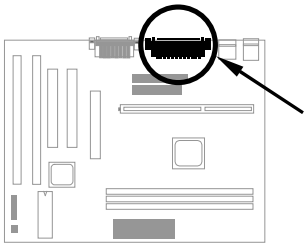
2.3.6 Serial Devices (COM1/COM2)

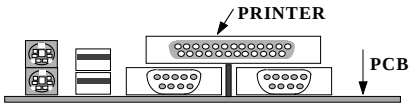
The onboard serial connectors are 9-pin D-type connector on the back panel of mainboard. The serial port 1 connector is marked as **COM1** and the serial port 2 connector is marked as **COM2.**



2.3.7 Printer

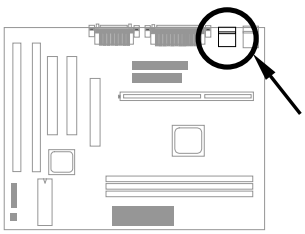
The onboard printer connector is a 25-pin D-type connector marked **PRINTER**. The view angle of drawing shown here is from back panel of the housing.

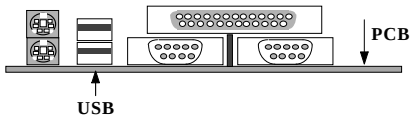




2.3.8 USB Device

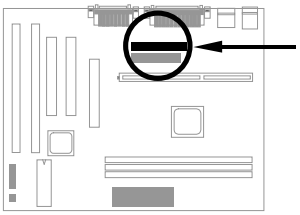
You can attach USB devices to the USB connector. The motherboard contains two USB connectors, which are marked as **USB.**

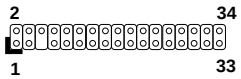




2.3.9 Floppy Drive

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





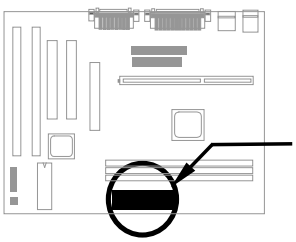
FDC

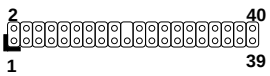
2.3.10 IDE Hard Disk and CD ROM

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.

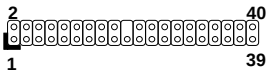
In order to work together, the two devices on each channel must be set differently to master and slave mode, either one can be hard disk or CDROM. The setting as master or slave mode depends on the jumper on your IDE device, please refer to your hard disk and CDROM manual accordingly.

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.





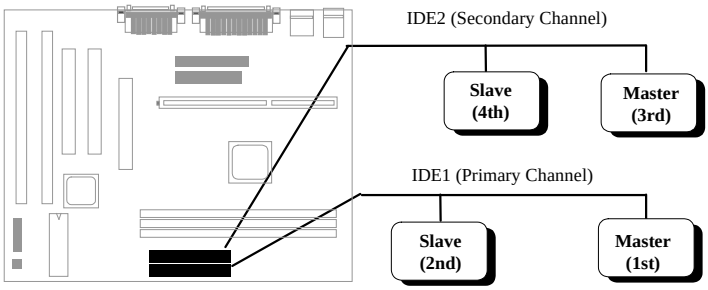
IDE2



IDE1

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

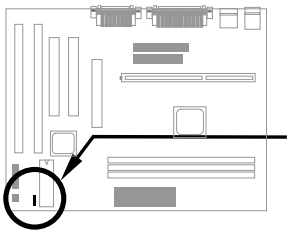
***Caution:** For better signal quality, it is recommended to set far end side device to master mode and follow the suggested sequence to install your new device . Please refer to following figure.*

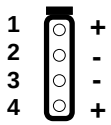


2.3.11 Hard Disk LED

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.

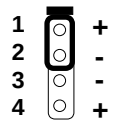
Pin	Description
1	HDD LED
2	GND
3	GND
4	HDD LED





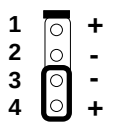
HDD LED

4-pin connector



HDD LED

2-pin connector at pin 1-2



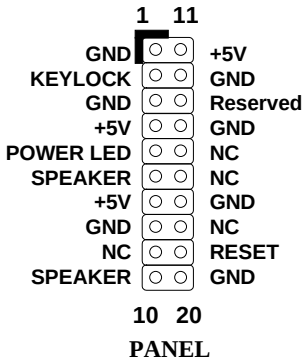
HDD LED

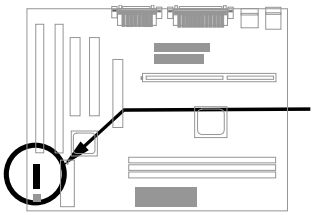
2-pin connector at pin 3-4

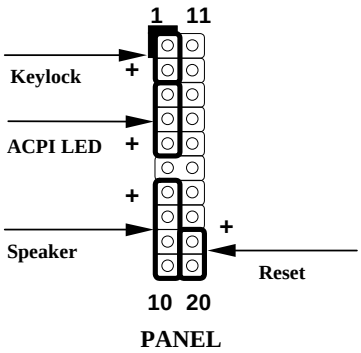
2.3.12 Panel Connector

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

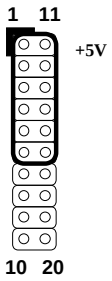
Some housings have a five-pin connector for the keylock and power LED Since power LED and keylock are aligned together, you can still use this kind of connector.







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.

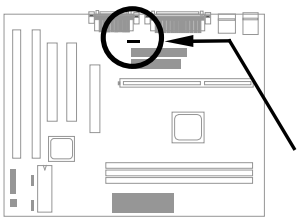


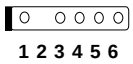
2.3.13 IrDA Connector

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 (56Kbps) 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	NC
3	IRRX
4	GND
5	IRTX
6	NC



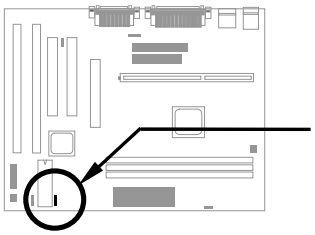


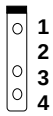
IrDA

2.3.14 Modem Wake-up Connector

This motherboard implements special circuit to support Modem Ring-On, 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 Internal Modem. To use AOpen MP56, connect 4-pin cable from **RING** connector of MP56 to **WKUP** connector on the mainboard.

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



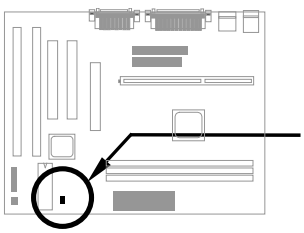


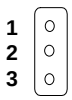
MODEM-WKUP

2.3.15 LAN Wake-up Connector

This mainboard implements a **LAN-WKUP** connector. To use LAN Wake-up function, you need a network card that supports this feature. In addition, you also need to install a network management software, such as ADM.

Pin	Description
1	+5V SB
2	GND
3	LID

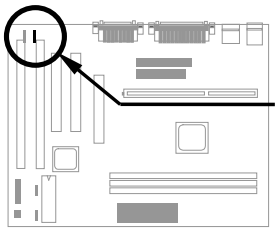


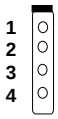


LAN-WKUP

2.3.16 CD Audio Connector

This connector is used to connect CD audio cable.





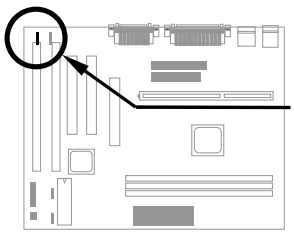
CDIN1

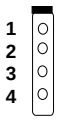
2.3.16 Mono In/Mic Out Connector

This connector is used to connect Mono In/Mic Out connector of an internal modem card. The pin 1-2 is **Mono In**, and the pin 3-4 is **Mic Out**. Please note that there is no standard for this kind of connector yet, only some internal modem cards implement this connector.

Please see the pin definitions to connect the cable.

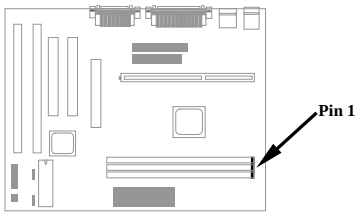
Pin	Description
1	
2	
3	
4	





Mono In/Mic Out

2.4 Configuring the System Memory

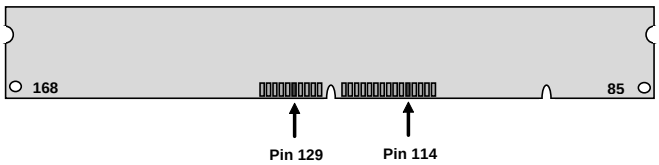


The DIMM types supported are EDO (Extended Data Out) and SDRAM (Synchronous DRAM). This mainboard has three 168 pin DIMM sockets (Dual-in-line Memory Module) that allow you to install system memory up to **256MB**.

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. Following figure is for your reference.*



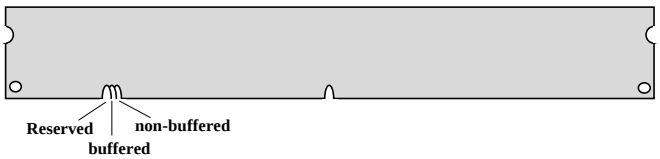
Warning: *If you want to install DRAMs on DIMM2 and DIMM3 at the same time, it is very important to identify single/double side. Under this configuration, only single side DRAMs are acceptable.*

II. Speed:

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

EDO: the access time of EDO RAM can be 60ns or 70ns.

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, 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 of DIMMs on current market are non-buffered, we still recommend you to ask your dealer for the correct type.

IV. **2-clock and 4-clock signals:** Although both of 2-clock and 4-clock signals are supported by AX6LC Lite, we strongly recommend you to choose 4-clock SDRAM in consideration of reliability.

Tip: *To identify 2-clock and 4-clock SDRAM, you may check if there are traces connected to golden finger pin 79 and pin 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.

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 to add them together. **The maximum is 256MB**.

EX chipset only supports 3V EDO or SDRAM, so we can mix EDO and SDRAM without any problem.

Every DIMM socket can be EDO or SDRAM. **Please note that the maximum DRAM size of DIMM1 is 128MB, but DIMM2 plus DIMM3 can only be 128MB**.

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

Following table list the recommended DRAM 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.

Following table are possible DRAM 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

The EDO and SDRAM that AOpen had tested are listed below.

Size/Type	Vendor	Model	Single/Double	Chip Count
8M/EDO	Micron	MT4LCM16E5TG6	x1	8
16M/EDO	Micron	MT4LC2M8E7DJ-6	x1	4
16M/EDO	Hitachi	51W17805BJ6	x1	8
32M/EDO	Hitachi	51W17405BLTS6	x1	16
64M/EDO	Hyndai	HY51V65804 TC-60	x1	8
8M/SDRAM	SEC	KM416511220AT-G12	x1	4
8M/SDRAM	TI	TMS626162DGE M-67	x1	4
8M/SDRAM	TI	TMS626162DGE-15	x1	4
16M/SDRAM	TI	TMS626162DGE-15	x2	8
16M/SDRAM	TI	TMS626812DGE-15	x1	8
16M/SDRAM	NEC	D4516821G5-A12-7JF	x1	8
16M/SDRAM	Toshiba	TC59S1608AFT-12A	x1	8
16M/SDRAM	TI	TMS626812DGE-12A	x1	8
16M/SDRAM	TI	TMS626812DGE-12A	x1	8
16M/SDRAM	LGS	GM72V16821BT10K	x1	8
32M/SDRAM	Toshiba	TC59S1608AFT-12A	x2	16
32M/SDRAM	NEC	D4516821G5-A10-7JF	x2	16
128M/SDRAM	NEC	D4564841G5-A10-9JF	x2	16
16M/SDRAM	IBM	0316169CT3B	x2	8
16M/SDRAM	Hitachi	HM5216165TT10	x1	8
16M/SDRAM	IBM	0316809CT4B	x1	8

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

Warning: *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 DIMM. 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 DIMM which is 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.*