AX4BE

Online Manual

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AOpen

Overview

Hardware
Installation

Drivers &
Utilities

AWARD
BIOS Setup

Glossary

Troubleshooting &
Technical Support

What's in this manual

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Before You Start

This Online Manual will introduce to the user how this product is installed. All useful information will be described in later chapters. Please keep this manual carefully for future upgrades or system configuration changes. This Online Manual is saved in PDF format, we recommend using Adobe Acrobat Reader 4.0 for online viewing, it is included in Bonus CD disc or you can get free download from Adobe web site.

Although this Online Manual is optimized for screen viewing, it is still capable for hardcopy printing, you can print it by A4 paper size and set 2 pages per A4 sheet on your printer. To do so, choose **File > Page Setup** and follow the instruction of your printer driver.

Thanks for the help of saving our earth.

Overview

Thank you for choosing AOpen AX4BE motherboard. The AX4BE is Intel® Socket 478 motherboard (M/B) based on the ATX form factor featuring the Intel® 845D (Brookdale) chipset. As high performance chipset built in the M/B, the AX4BE motherboard can support Intel® Socket 478 Pentium® 4 (Brookdale) and 400/533 MHz Front Side Bus (FSB) clock. In the AGP performance, it has one AGP slot, which supports 1.5V AGP interface with 4x SBA/Data Transfer and 2x/4x Fast Write capability and pipelined spilt-transaction long burst transfer up to 1056MB/sec. According to different customer's requirements, the Intel 845D chipset memory interface supports DDR SDRAM devices with densities of 64, 128, 256, 512Mb and 1G DDR SDRAM DIMM modules and the maximum memory size can be up to 2 GB. The onboard IDE controller supports Ultra DMA 33/66/100 mode and the transfer rate up to 100MB/s. Further flexibility can be achieved by taking advantage of the Communication and Network Riser (CNR) card option that allows audio, modem on a single baseboard design. Besides, the AX4BE has an AD1885 AC97 CODEC chipset onboard, providing high performance and magic surround stereo sound to let people enjoy working with it. Now, let's enjoy all features from AOpen AX4BE motherboard.
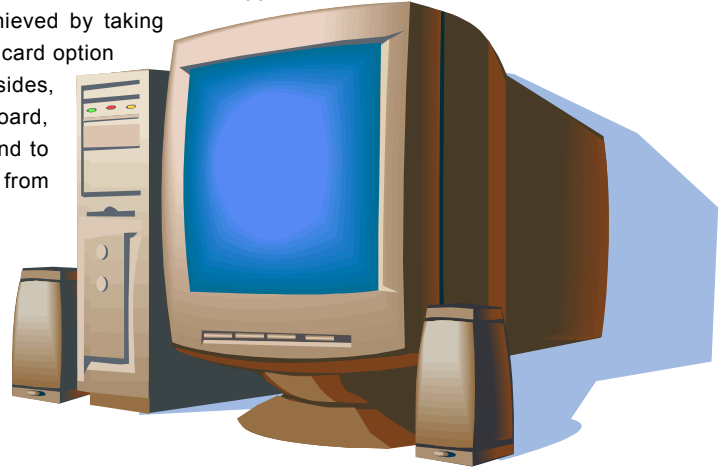
Feature Highlight

CPU

Supports Intel$^®$ Socket 478 Pentium$^®$ 4 (Brookdale) 1.4GHz~2.4GHz+ with 400/533MHz Front Side Bus (FSB) designed for Socket 478 technology.

Chipset

With the Intel$^®$ 845D (Brookdale) chipset, Intel delivers a discrete graphics solution with all the performance, innovative features and proven reliability of the Intel$^®$ 845D chipset. With its highly scalable design, the new 845D chipset offers an ideal, leading-edge AGP graphics solution for Intel$^®$ Pentium$^®$ 4 processor platforms. And the smart integration in the Intel 845 chipset's I/O Controller Hub (ICH2) features two USB controllers supporting four USB ports.

Expansion Slots

Including five 32-bit/33MHz PCI, one CNR and one AGP 1x2x4X slots. The PCI local bus throughput can be up to 132MB/s. The Communication & Nectworking Riser (CNR) slot provided from AX4BE can support CNR interface for a Modem/Audio card. The Accelerated Graphics Port (AGP) specification provides a new level of video display sophistication and speed which supports data transfer rate up to 1056MB/s. AX4BE motherboard includes one 1.5V AGP expansion slot with 4x SBA/Data Transfer and 2x/4x Fast Write capability. For AD and SBA signaling, AX4BE motherboard can support 4X mode. Of five PCI slots provided, all of them are master PCI slots with arbitration and decoding for all integrated functions and LPC bus.

Memory

Provides three 184-pin DDR SDRAM DIMM sockets that support up to 2GB of PC-200/266 compliant DDR SDRAM (Synchronous Dynamic Random Access Memory). You may install 64, 128, 256, 512Mb DDR SDRAM DIMM modules into each socket.

Ultra DMA 33/66/100 Bus Master IDE

Comes with an on-board PCI Bus Master IDE controller with two connectors that supports four IDE devices in two channels, supports Ultra DMA 33/66/100, PIO Modes 3 and 4 and Bus Master IDE DMA Mode 5, and supports Enhanced IDE devices.

On-board AC'97 Sound

AX4BE uses the AD 1885 AC97 sound chip. This on-board audio includes a complete audio recording and playback system.

1MHz Stepping Frequency Adjustment

Provides "1MHz Stepping Frequency Adjustment" function in the BIOS. This magic function allows you adjust CPU FSB frequency from 100~248 by 1MHz stepping adjustment, and lets your system can get maximum performance.

Watch Dog Timer

Includes AOpen "Watch Dog Timer" function that can auto-reset system in 4.8 seconds when you fail to system overclocking.

Four USB Connectors

Provides two ports, four USB connectors for USB interface devices, such as mouse, keyboard, modem, scanner, etc.

Dr. LED (User Upgrade Optional)

The Dr. LED has 8 LEDs on this AX4BE M/B to easily show what kind of problems you may encounter.

AGP Protection Technology

With AGP Protection Technology implemented, this motherboard will automatically detect the voltage of AGP card and prevent your chipsets from being burnt out.

Power Management/Plug and Play

Supports the power management function that confirms to the power-saving standards of the U.S. Environmental Protection Agency (EPA) Energy Star program. It also offers Plug-and-Play, which helps save users from configuration problems, thus making the system much user-friendlier.

Hardware Monitoring Management

Supports CPU or system fans status, temperature and voltage monitoring and alert, through the on-board hardware monitor module.

Enhanced ACPI

Fully implement the ACPI standard for Windows® 98/ME/2000/XP series compatibility, and supports Soft-Off, STR (Suspend to RAM, S3), STD (Suspend to Disk, S4) features.

Super Multi-I/O

Provides two high-speed UART compatible serial ports and one parallel port with EPP and ECP capabilities. UART can also be directed from COM1 to the Infrared Module for the wireless connections.

Quick Installation Procedure

This page gives you a quick procedure on how to install your system. Follow each step accordingly.

1. Installing CPU and Fan

2. Installing System Memory (DIMM)

3. Connecting Front Panel Cable

4. Connecting IDE and Floppy Cable

5. Connecting ATX Power Cable

6. Connecting Back Panel Cable

7. Power-on and Load BIOS Setup Default

8. Setting CPU Frequency

9. Reboot

10. Installing Operating System (such as Windows 98)

11. Installing Driver and Utility

Motherboard Map

Green: AUX-IN Connector

Red: MODEM-CN Connector

Black: CD-IN Connector

Onboard AC'97 CODEC

CNR Expansion Slot

IrDA Connector

Dr. LED Connector

Front Audio Connector

JP14 CMOS Clear Jumper

Chassis Intrusion Connector

4Mbit Flash ROM

2nd USB Connector

Front Panel Connector

ATA/33/66/100 IDE Connector x2

SYSFAN3 Connector

FDD Connector

GPO1 Connector

PC99 Colored Back Panel

Resetable Fuse

JP28 Keyboard/Mouse Wakeup Enable/Disable Jumper

SYSFAN2 Connector

32-bit PCI Expansion Slot x5

2200 μ F Low ESR Capacitors

4-pin 12V. ATX Power Connector

AGP 4x Expansion Slot (for 1.5V AGP card)

478-pin CPU socket with Voltage and Frequency Auto-detection that support Intel® Pentium® 4 1.4~2.4GHz+ CPU

Intel® 845D chipset (Brookdale)

CPUFAN1 Connector with H/W Monitoring Function

184-pin DIMM Socket x3 supports PC-200/266 DDR SDRAM maximum up to 2 GB

WOM Connector

WOL Connector

ATX Power Connector

Block Diagram

PC-200/266 DDR
SDRAM Up to 2GB

32-bit PCI Slot x5

DIMM Socket x3

Socket 478
Intel
Pentium 4
CPU

400/533MHz
System Bus

Intel 845D
RG82845
MCH

PCI Bus

ATA
33/66100

Primary
Channel

Secondary
Channel

IDE Drive x4

AGP 4X Slot

Intel
FW82801BA
ICH2

AC97
CODEC

AC Link

CNR Slot

USB
Connector x4

1st USB Port

2nd USB Port

Low Pin
Count
Super
I/O

Firmware Hub

4Mbit Flash EEPROM

Parallel Port

Serial Port x2

Floppy Disk Drive x2

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Hardware Installation

This chapter describes jumpers, connectors and hardware devices of this motherboard.

Note: 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.*

About "Manufacturer Upgrade Optional" and "User Upgrade Optional"…

When you read this online manual and start to assemble your computer system, you may find some of functions are called "Manufacturer Upgrade Optional", and some are called "User Upgrade Optional". Though all AOpen motherboards include many amazing and powerful features, in some situations, these powerful features are not used to every user. Hence, we changed some key features as "Manufacturer Upgrade Optional" for you to choose. Some optional functions that can be upgraded by users, we call them "User Upgrade Optional". As for those optional functions that can't be upgraded by ourselves, we call them "Manufacturer Upgrade Optional". If needed, you can contact our local distributors or resellers for purchasing "User Upgrade Optional" components, and again you can visit AOpen official web site: http://english.aopen.com.tw/ for more detail information.

JP14 Clear CMOS Data

You can clear CMOS to restore system default setting. To clear the CMOS, follow the procedure below.

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 pin 1 & pin2.

5.　Connect ATX power cable back to connector PWR2.
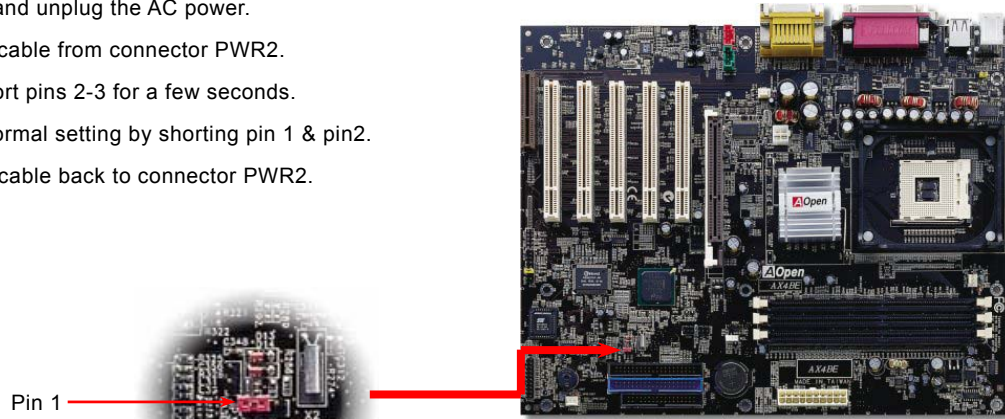
Pin 1

1　　　　　　1
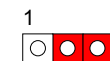
Normal
(default)　　Clear CMOS

Tip: When should I Clear CMOS?

1. Boot fail because of overclocking…

2. Forget password…

3. Troubleshooting…

CPU Installation

This motherboard supports Intel® Pentium 4 Socket 478 series CPU. Be careful of CPU orientation when you plug it into CPU socket.

1. Pull up the CPU socket lever and up to 90-degree angle.
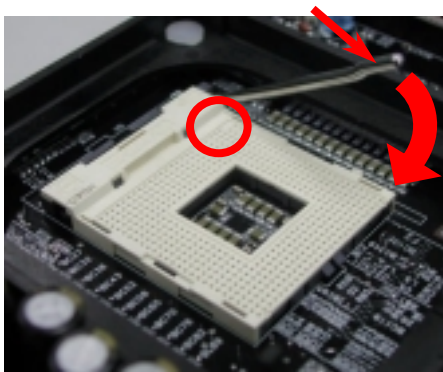
2. Locate Pin 1 in the socket and look for a cut edge on the CPU upper interface. Match Pin 1 and cut edge, then insert the CPU into the socket.

CPU socket Lever

CPU pin 1 and cut edge
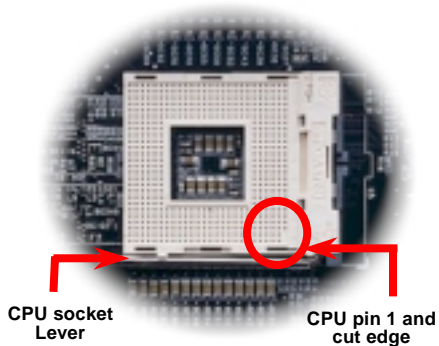
CPU cut edge

Note: These pictures are for example only, it may not exactly be the same motherboard.

3. Press down the CPU socket lever and finish CPU installation.
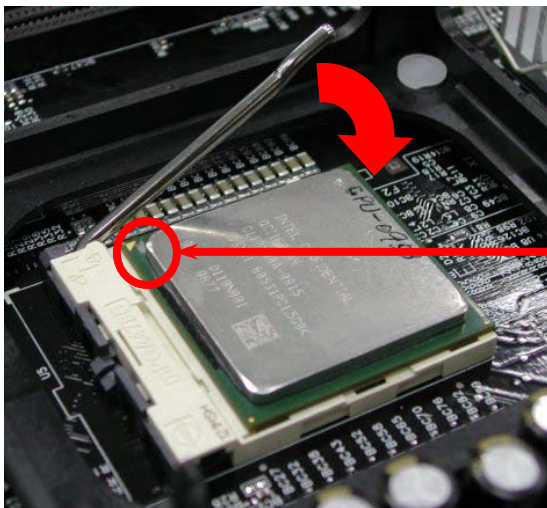
CPU cut edge

Note: If you do not match the CPU socket Pin 1 and CPU cut edge well, it may damage the CPU.

Note: This socket supports Micro-FC-PGA2 package CPU, which is the latest CPU package developed by Intel. Other forms of CPU package are impossible to be fitted in.

Note: This picture is for example only, it may not exactly be the same motherboard.

CPU Fan Installation

This motherboard comes with a retention module attached on the CPU socket when shipped, we strongly recommend you to install AOpen special designed CPU Fan as shown below on the retention module for better heat dissipation. Please install the CPU Fan correctly as the following pictures shown.

1. Gently put the CPU Fan down on the retention module with clips aligning correctly to the four corners.
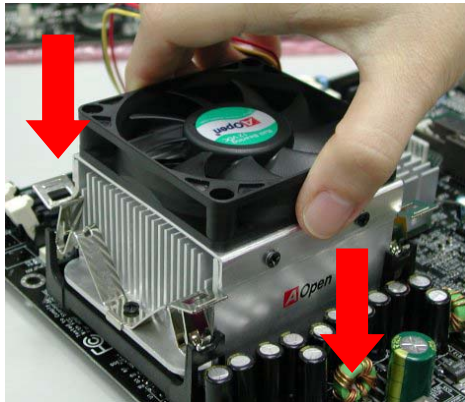
2. Pressing down the four clips with force one by one on the retention module.

Clip
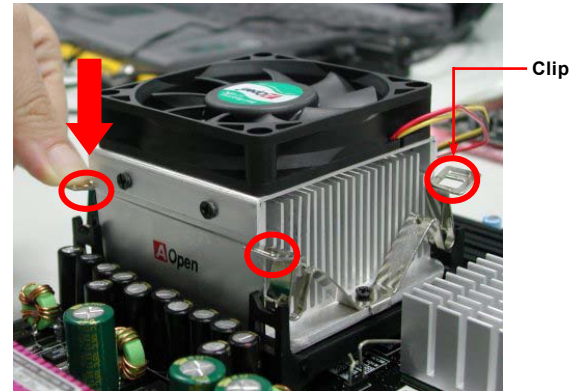
CPU Jumper-less Design

CPU VID signal and SMbus clock generator provide CPU voltage auto-detection and allows the user to set the CPU frequency through the BIOS setup, therefore no jumpers or switches are used. The disadvantages of the Pentium based jumper-less designs are eliminated. There will be no worry of wrong CPU voltage detection.

Intel$^®$ Socket 478

Pentium 4 CPU

Clock Generator

BIOS

Controlled

Circuit

CPU Freq. Ratio

CPU VID signal

CPU voltage

Power Regulator

(Automatically generates CPU voltage)
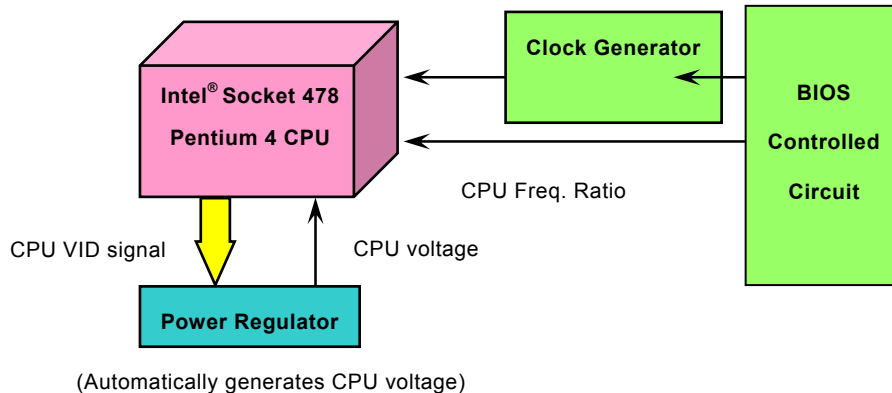
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AOpen "Watch Dog Timer"

With this motherboard, AOpen provides a very special, useful feature for overclockers. When you power-on the system, the BIOS will check last system POST status. If it succeeded, the BIOS will enable "Watch Dog Timer" function immediately, and set the CPU FSB frequency by user's setting that stored in the BIOS. If system failed in BIOS POST, the "Watch Dog Timer" will reset the system to reboot in five seconds. Then, BIOS will detect the CPU's default frequency and POST again. With this special feature, you can easily overclock your system to get higher system performance, and without removing the cover of system housing to set the jumper to clear CMOS data when your system hanged.

Enable/Disable Signal
from BIOS

| BIOS |

Reset Signal

| AOpen Watch Dog Timer |

| Clock Generator |

CPU ID Signal

Countdown about 5 seconds if fails in POST

| CPU |
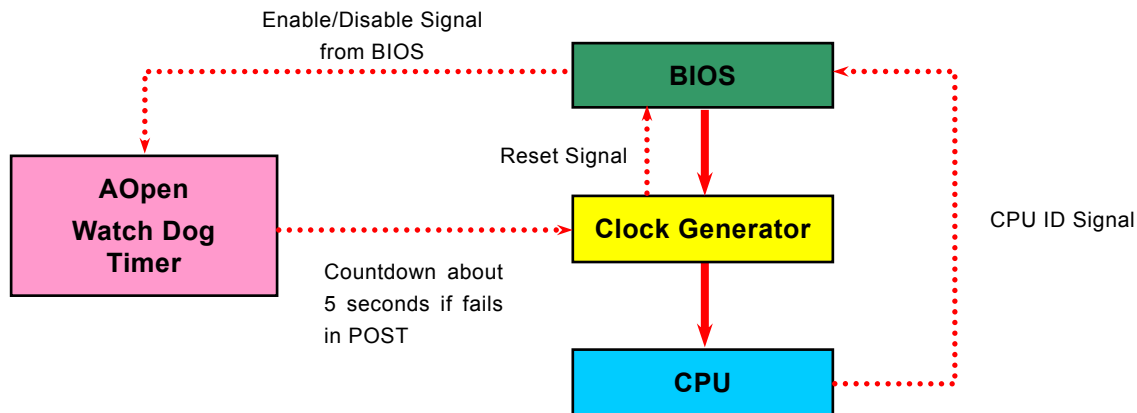
Full-range Adjustable CPU Core Voltage

This function is dedicated to overclockers and supports Adjustable CPU Core Voltage from 1.10V to 1.85V. But this motherboard can also automatically detects CPU VID signal and generates proper CPU core voltage.

Setting CPU Frequency

BIOS Setup > Frequency/Voltage Control > CPU Clock Setting

This motherboard is CPU jumper-less design, you can set CPU frequency through the BIOS setup, and no jumpers or switches are needed.

CPU Ratio	8x, 9x, 10x,…22x, 23x, 24x
CPU FSB	100~248MHz

Home

> *Tip:* If your system hangs or fails to boot because of overclocking, simply use <Home> key to restore the default setting or you can wait the AOpen "Watch Dog Timer" reset the system after five seconds and system will auto-detect hardware again.

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Core Frequency = CPU FSB Clock * CPU Ratio

PCI Clock = CPU FSB Clock / Clock Ratio

AGP Clock = PCI Clock x 2

Northwood CPU	CPU Core Frequency	FSB Clock	System Bus	Ratio
Pentium 4 1.6G	1600MHz	100MHz	400MHz	16x
Pentium 4 1.6G	1600MHz	133MHz	533MHz	12x
Pentium 4 1.7G	1700MHz	133MHz	533MHz	13x
Pentium 4 1.8G	1800MHz	100MHz	400MHz	18x
Pentium 4 2.0G	2000MHz	100MHz	400MHz	20x
Pentium 4 2.2G	2200MHz	100MHz	400MHz	22x
Pentium 4 2.26G	2260MHz	133MHz	533MHz	17x
Pentium 4 2.4G	2400MHz	100MHz	400MHz	24x
Pentium 4 2.4G	2400MHz	133MHz	533MHz	18x
Pentium 4 2.53G	2530MHz	133MHz	533MHz	19x
Pentium 4 2.66G	2660MHz	133MHz	533MHz	20x
Pentium 4 2.80G	2800MHz	133MHz	533MHz	21x

Willamette CPU	CPU Core Frequency	FSB Clock	System Bus	Ratio
Pentium 4 1.8G	1800MHz	100MHz	400MHz	18x
Pentium 4 1.9G	1900MHz	100MHz	400MHz	19x
Pentium 4 2.0G	2000MHz	100MHz	400MHz	20x

Celeron CPU	CPU Core Frequency	FSB Clock	System Bus	Ratio
1.7G	1700MHz	100MHz	400MHz	17x
1.8G	1800MHz	100MHz	400MHz	18x

*Warning: Intel® 845D chipset supports maximum 533MHz (133MHz*4) system bus and 66MHz AGP clock; higher clock setting may cause serious system damage.*

DIMM Sockets

This motherboard has three 184-pin DDR DIMM sockets that allow you to install DDR200 or DDR266 memory up to 2 GB. Both ECC and Non-ECC DDR SDRAM are supported, but you can't install them both on DIMM. Otherwise, it will cause serious damage on memory sockets or SDRAM module.
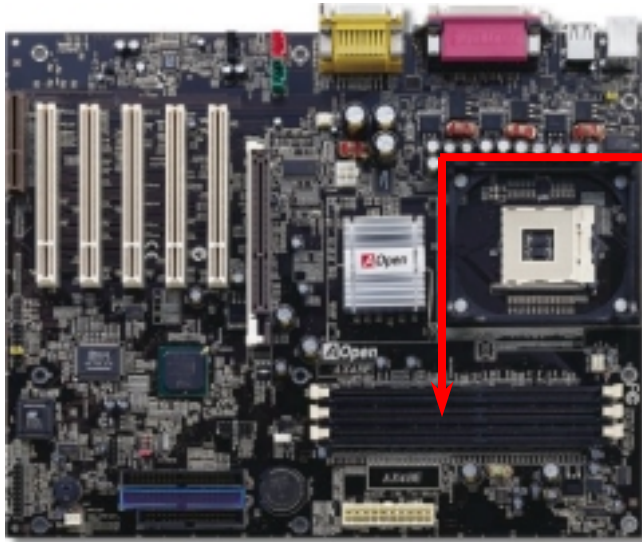
DIMM1
DIMM2
DIMM3

Warning: Please note that double-side DDR SDRAM is not allowed to be installed on both DIMM2 and DIMM3. But if you have had installed two double-side DDR SDRAM on them, the system can only read one side DDR SDRAM on each DIMM2 and DIMM3. However, you are not recommended to do so, otherwise, it will cause serious damage on memory sockets or SDRAM module.

You Must Know When Using FSB 533

Though Intel 845D only claims FSB of 400MHz, we are managed to fine-tune the FSB to 533Mhz by BIOS. Hence, in due of overclocking, the following testing of various memory modules of different brands had been approved for you to be running smoothly on any operation.

DDR Spec.	IC Vendor	IC No.	Module Vendor
333	KingMax	KDL684T4A2A-05	KingMax
400	Winbond	W942508BH-5	ADATA
333	KingMax	KDL684T4AA-50	KingMax
266	Samsung	K4H560838B-TCB0	Apacer
266	Elixir	N2DS25680AT75B	
266	Elixir	N2DS12H80AT75B	SYNNEX
266	Samsung	K4H560838B-TCB0	Apacer

Warning: *You are advised to use the configuration, which we have tested running properly for you. Otherwise, you are taking your own risk for any over clocking performance.*

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How to Install Memory Modules

Please follow the procedure as shown below to finish memory installation.

1. Make sure the DIMM module's pin face down and match the socket's size as depicted below.

40 pins   52 pins
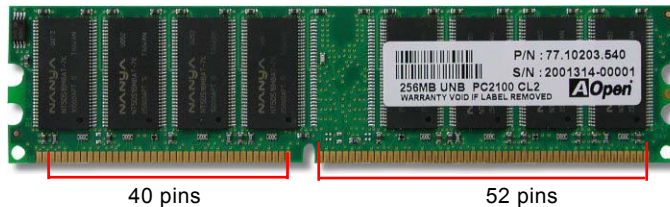
2. Insert the module straight down to the DIMM slot with both hands and press down firmly until the DIMM module is securely in place.

Tab

Note: The tabs of the DIMM slot will close-up to hold the DIMM in place when the DIMM touches the slot's bottom.
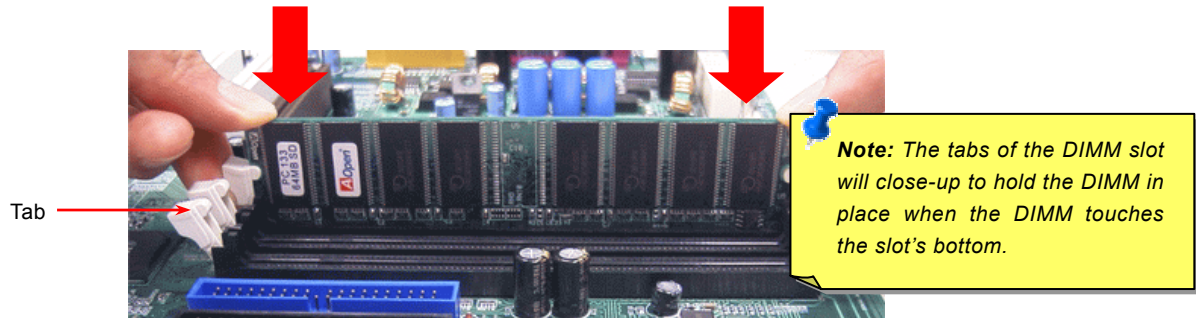
3. Repeat step 2 to finish additional DIMM modules installation.

CPU and System Fan Connector (with H/W Monitoring)

Plug in the CPU fan cable to the 3-pin **CPUFAN1** connector. If you have chassis fan, you can also plug it on **SYSFAN2** (FAN2) or **SYSFAN3** (AUX Fan) connector.

GND
+12V
SENSOR
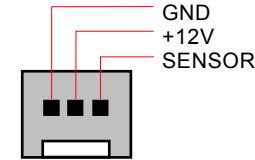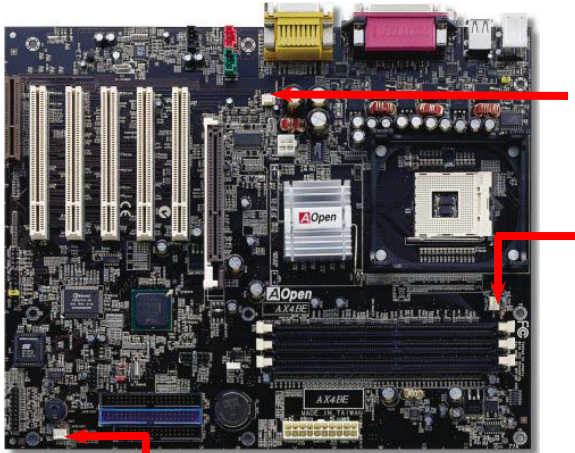
SYSFAN2 Connector

GND
+12V
SENSOR
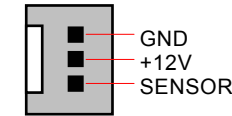
CPUFAN1 Connector

GND
+12V
SENSOR
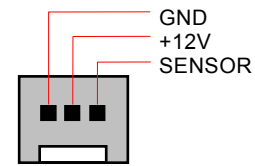
SYSFAN3 Connector

Note: Some CPU fans do not have sensor pin, so that cannot support hardware monitoring function.

JP28 Keyboard/Mouse Wake-up Enable/Disable Jumper

This motherboard provides keyboard / mouse wake-up function. You can use JP28 to enable or disable this function, which could resume your system from suspend mode with keyboard or mouse installed. The factory default setting is set to "Disable"(1-2), and you may enable this function by setting the jumper to 2-3.
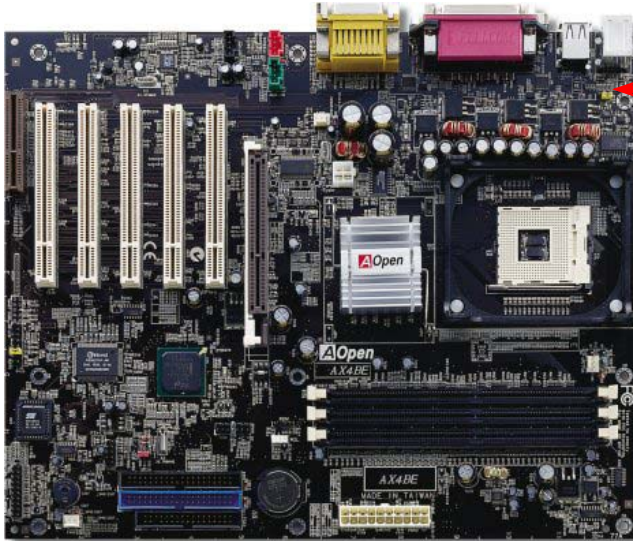
JP28

KB/Mouse Wake-up

Disable   Enable

(Default)

Front Panel Connector
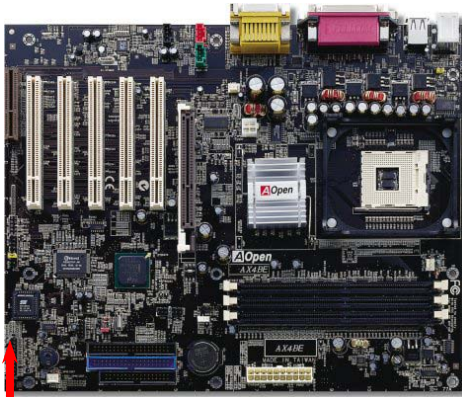
Attach the power LED, Keylock, speaker, power and reset switch connectors to the corresponding pins. If you enable "Suspend Mode" item in BIOS Setup, the ACPI & Power LED will keep flashing while the system is in suspend mode.

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**.

Suspend Type	ACPI LED
Power on Suspend (S1) or Suspend to RAM (S3)	Blinking between green and red
Suspend to Disk (S4)	Turn off

SPWR

IDE LED

ACPI & PWR LED

Speaker

Reset

NC	5VSB
NC	SPWR
+5V	ACPILED-
IDE LED	GND
IDE LED	ACPILED+
+5V	NC
+5V	NC
GND	GND
NC	RESET
SPEAKER	GND
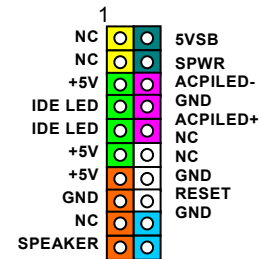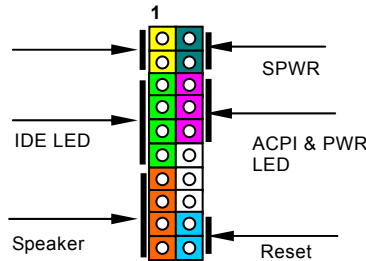
ATX Power Connector

This motherboard comes with a 20-pin and 4-pin ATX power connector. Make sure you plug in the right direction. We strongly recommend you to connect the 4-pin 12V ATX connector before connecting the 20-pin ATX power connector and use standard power supply specially designed for Pentium 4 system.
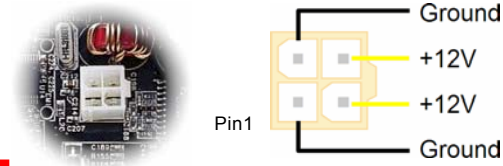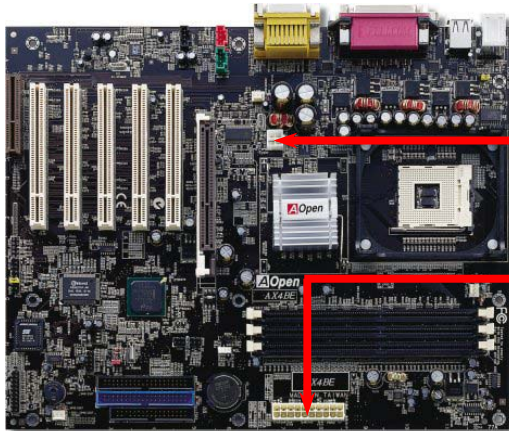
Pin1

4-Pin 12V ATX Power Connector

20-Pin Power Connector
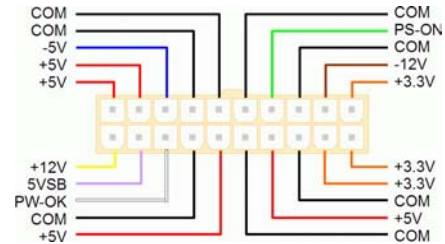
AC Power Auto Recovery

A traditional ATX system should remain at power off stage when AC power resumes from power failure. This design is inconvenient for a network server or workstation, without an UPS, that needs to keep power-on. This motherboard implements an AC Power Auto Recovery function to solve this problem.

IDE and Floppy Connector

Connect 34-pin floppy cable and 40-pin IDE cable to floppy connector FDC and IDE connector. The blue connector is IDE1 for clear identification. Be careful of the pin1 orientation. Wrong orientation may cause system damage.

Secondary Slave (4th)

Secondary Master (3rd)

IDE 2 (Secondary)

IDE 1 (Primary)

Pin 1

Primary Slave (2nd)

Primary Master (1st)

ATA 33/66/100
IDE Connector

Pin

FDD Connector
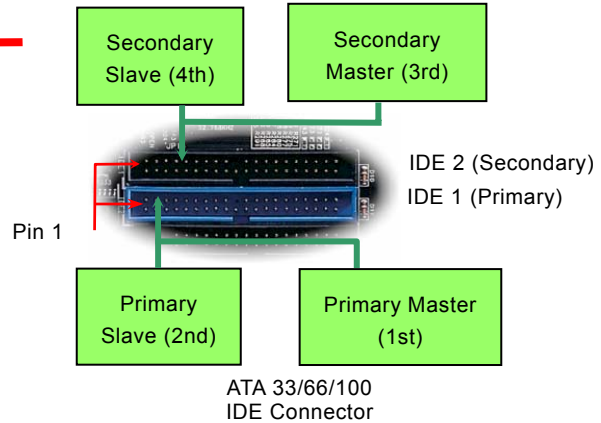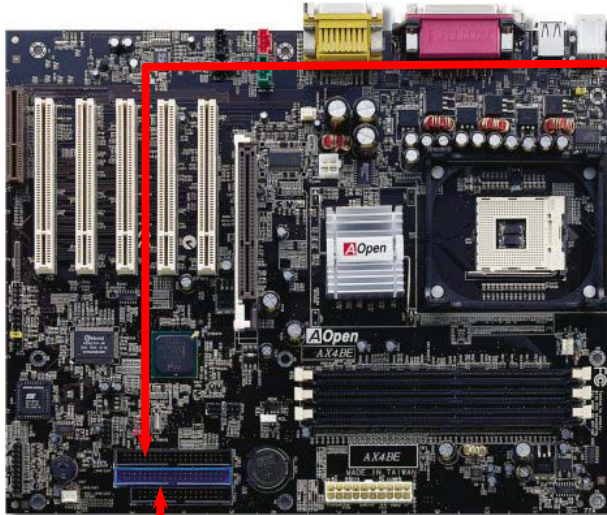
IDE1 is also known as the primary channel and IDE2 as the secondary channel. Each channel supports two IDE devices that make a total of four devices. In order to work together, the two devices on each channel must be set differently to **Master** and **Slave** mode. Either one can be the hard disk or 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.

This motherboard supports ATA33, ATA66 or ATA100 IDE devices. Following table lists the transfer rate of IDE PIO and DMA modes. The IDE bus is 16-bit, which means every transfer is two bytes.

Mode	Clock Period	Clock Count	Cycle Time	Data Transfer Rate
PIO mode 0	30ns	20	600ns	(1/600ns) x 2byte = 3.3MB/s
PIO mode 1	30ns	13	383ns	(1/383ns) x 2byte = 5.2MB/s
PIO mode 2	30ns	8	240ns	(1/240ns) x 2byte = 8.3MB/s
PIO mode 3	30ns	6	180ns	(1/180ns) x 2byte = 11.1MB/s
PIO mode 4	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
DMA mode 0	30ns	16	480ns	(1/480ns) x 2byte = 4.16MB/s
DMA mode 1	30ns	5	150ns	(1/150ns) x 2byte = 13.3MB/s
DMA mode 2	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
ATA 33	30ns	4	120ns	(1/120ns) x 2byte x2 = 33MB/s
ATA 66	30ns	2	60ns	(1/60ns) x 2byte x2 = 66MB/s
ATA100	20ns	2	40ns	(1/40ns) x 2byte x2 = 100MB/s

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

Tip:

1. 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 above diagram

*2. To achieve the best performance of Ultra DMA 33/66/100 hard disks, a special **80-wires IDE cable** for Ultra DMA 33/66/100 is required.*

IrDA Connector

The IrDA connector can be configured to support wireless infrared module, with this module and application software such as Laplink or Windows 95 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 BIOS Setup, UART Mode, make sure to have the correct orientation when you plug in the IrDA connector.

Pin 1

GND
KEY   IR_RX
1   NC   IR_TX
+5V

IrDA Connector
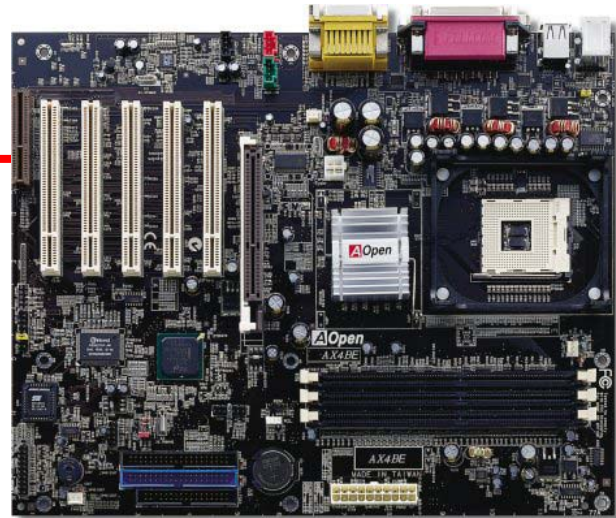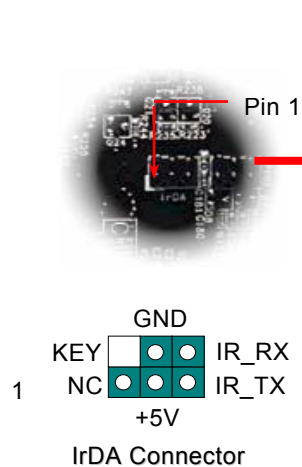
AGP (Accelerated Graphic Port) Expansion Slot

The AX4BE provides an AGP 4x slot. The AGP 1x2x4x is a bus interface targeted for high-performance 3D graphic. AGP supports only memory read/write operation and single-master single-slave one-to-one only. AGP uses both rising and falling edge of the 66MHz clock, for 2X AGP, the data transfer rate is 66MHz x 4bytes x 2 = 528MB/s. AGP is now moving to AGP 4x mode, 66MHz x 4bytes x 4 = 1056MB/s. Please note that this AGP expansion slot support 1.5V AGP card only.
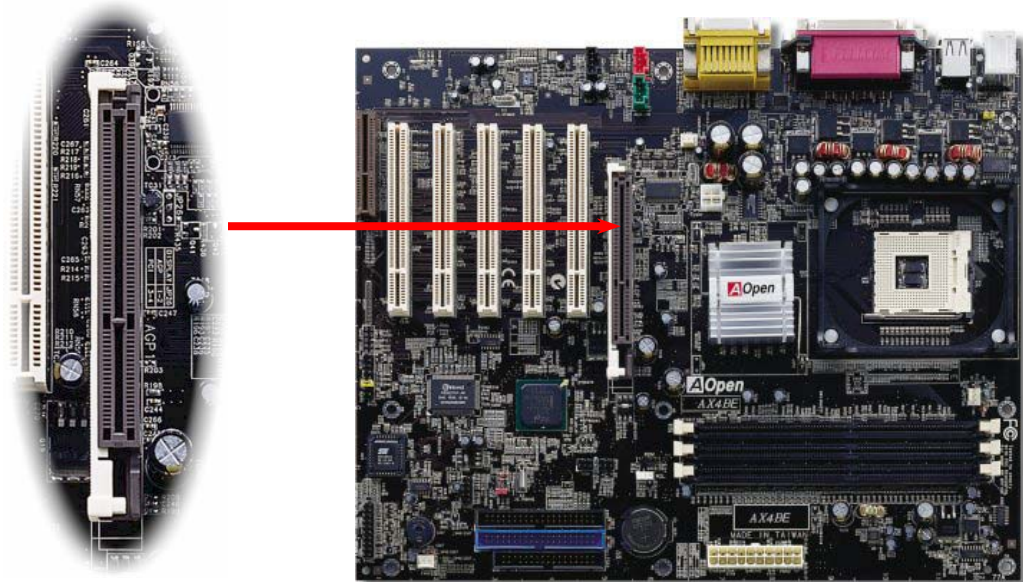
AGP Protection Technology

With the outstanding R&D ability of AOpen and its specially developed circuit, AX4BE implements an all-new technology to protect your motherboard from being damaged by over-voltaging of AGP card. With AGP Protection Technology implemented, this motherboard will automatically detect the voltage of AGP card and prevent your chipsets from being burnt out. Please note that if you install a AGP card with 3.3V, which is not supported by Intel 845D, the LED3 will light up to warn you the possible damage with that exceeding voltage. You may contact the vendor of your AGP card for further support.
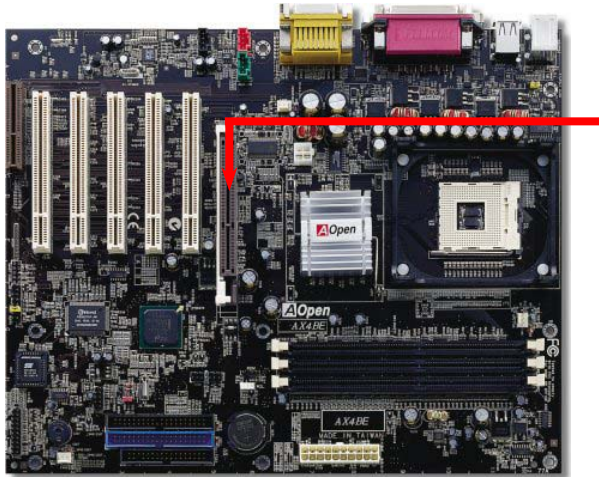
> *Warning:* It is strongly recommended not to install a AGP card with 3.3V, which is not supported by Intel 845, the LED3 will light up to warn you the possible damage.

WOM (Zero Voltage Wake on Modem) Connector

This motherboard implements special circuit to support Wake On Modem, both Internal modem card 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 internal modem, connect 4-pin cable from RING connector of modem card to the WOM connector on the motherboard.

Pin 1

WOM Connector

RI-

+5VSB   GND

NC
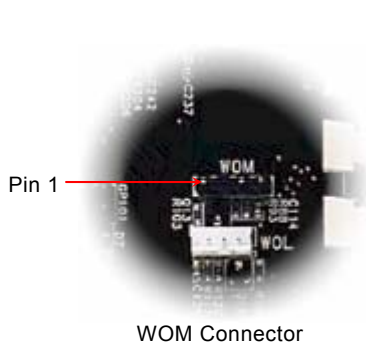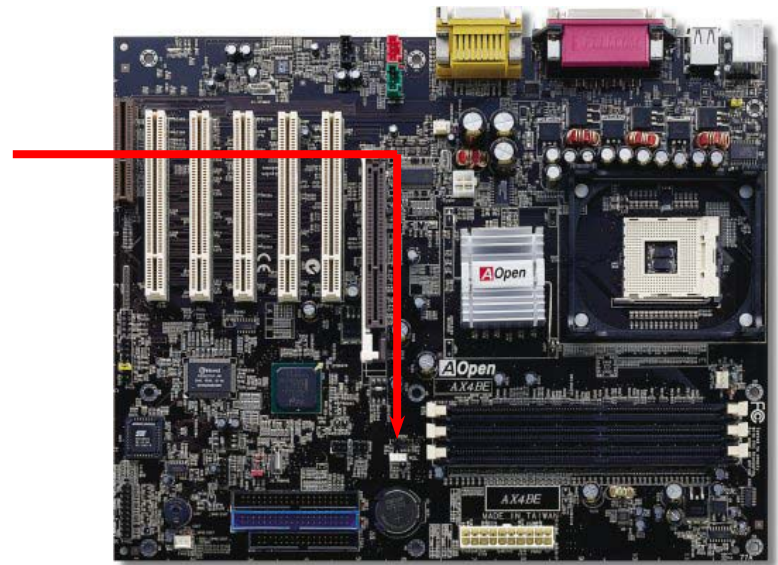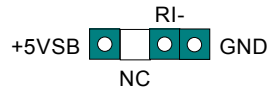
WOM by External BOX Modem

Traditional Green PC suspend mode does not really turn off the system power supply, it uses external box modem to trigger MB COM port and resume back to active.

Serial Port
(Modem Side)

Serial Port
(Motherboard Side)
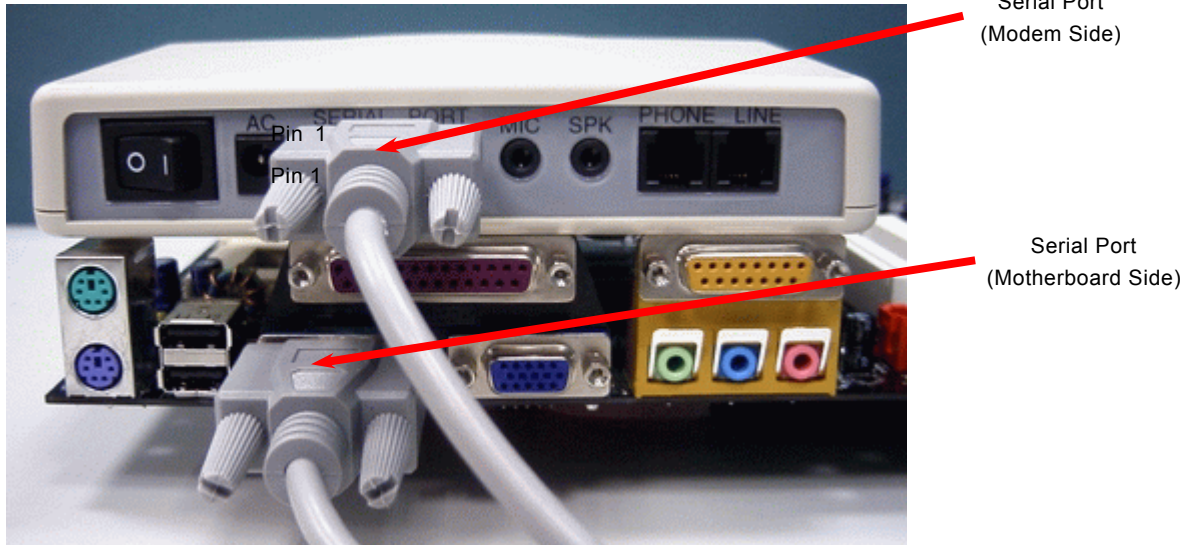
Note: This picture is for example only, it may not be exactly the same as this motherboard.

WOM by Internal Modem Card

With the help of the ATX soft power On/Off, it is possible to have a system totally power off, and wakeup to automatically answer a phone call as an answering machine or to send/receive a fax. You may identify whether or not your system is in true power off mode by checking to see if the fan of your power supply is off. Both an external box modem and an internal modem card can be used to support Modem Wake Up, but if you use an external modem, you have to leave your box modem on.
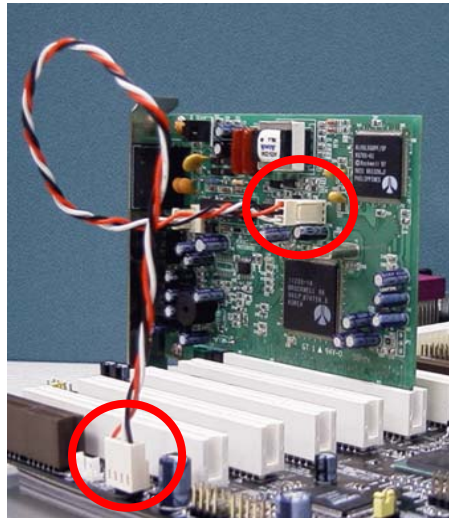
Note: This picture is for example only, it may not be exactly the same as this motherboard.

WOL (Wake on LAN)

This feature is very similar as Wake On Modem, but it goes through local area network. To use Wake On LAN function, you must have a network card with chipset that supports this feature, and connect a cable from LAN card to motherboard WOL connector. The system identification information (probably IP address) is stored on network card and because there is a lot of traffic on the Ethernet, you need to install network management software, such as ADM, for the checking of how to wake up the system. Note that, at least 600mA ATX standby current is required to support the LAN card for this function.

+5VSB

GND

LID
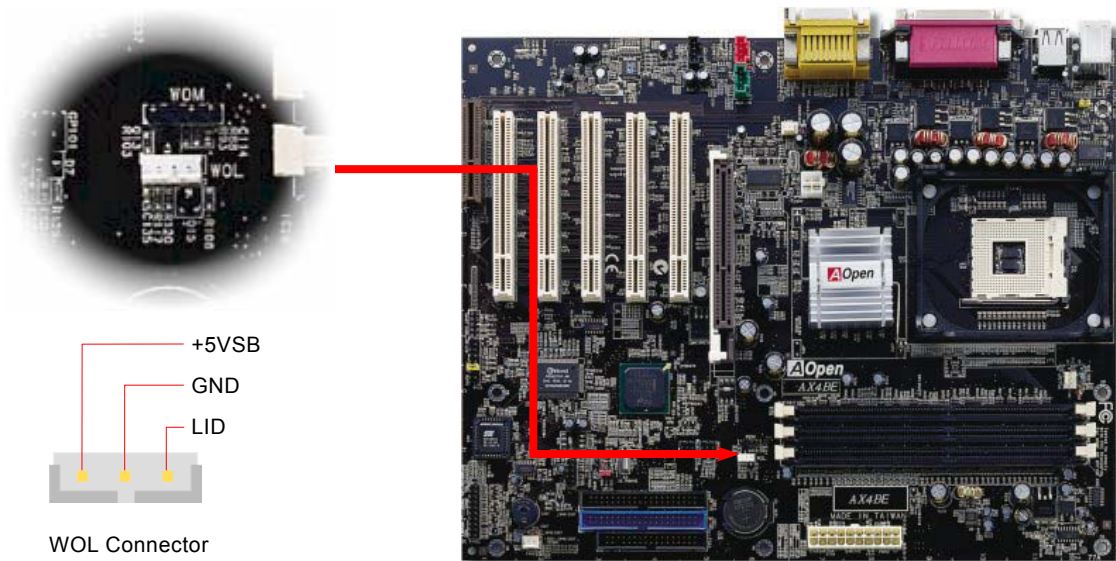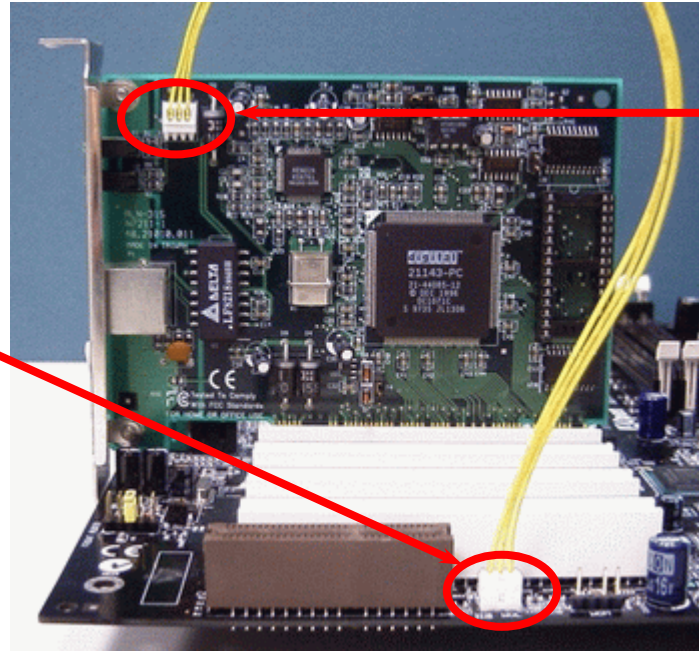
WOL Connector

WOL Connector
(Ethernet Card Side)

WOL Connector
(Motherboard Side)

Note: This picture is for example only, it may not exactly be the same motherboard.

CNR (Communication and Network Riser) Expansion Slot

CNR is a riser card specification to replace the AMR (Audio/Modem Riser) that supports V.90 analog modem, multi-channel audio, and phone-line based networking. Owing to CPU computing power getting stronger, the digital processing job can be implemented in main chipset and share CPU power. The analogy conversion (CODEC) circuit requires a different and separate circuit design, which is put on CNR card. This motherboard implements sound CODEC on board, but reserve CNR slot for the option of modem function. Note that you can still use PCI modem card.
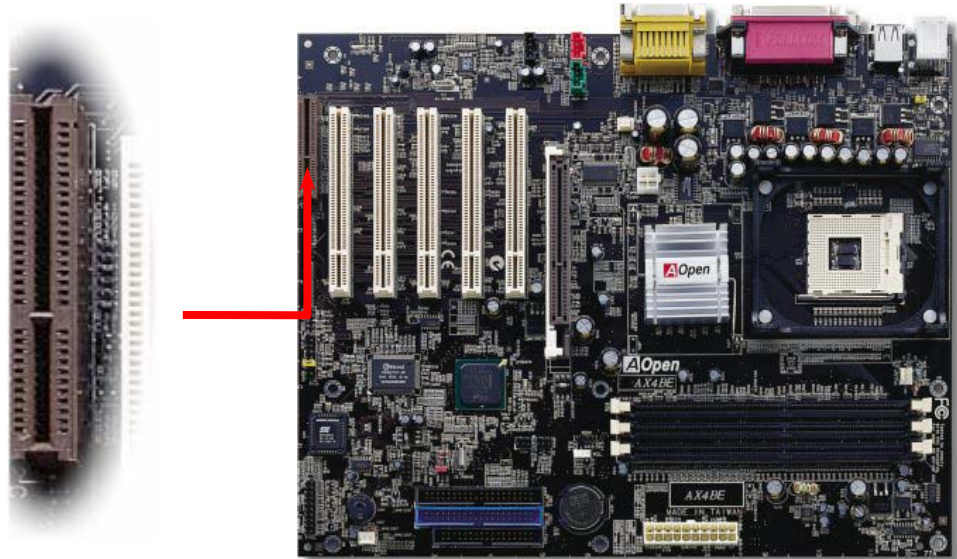
PC99 Color Coded Back Panel

The onboard I/O devices are PS/2 Keyboard, PS/2 Mouse, COM1 and COM2, Printer, four USB, AC97 sound and game ports. The view angle of drawing shown here is from the back panel of the housing.
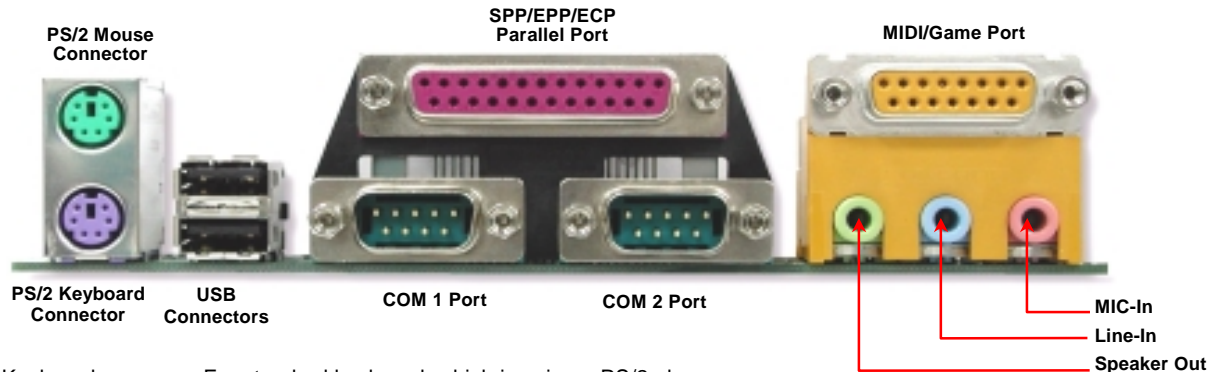
PS/2 Keyboard: For standard keyboard, which is using a PS/2 plug.
PS/2 Mouse: For PC-Mouse, which is using a PS/2 plug.
USB Port: Available for connecting USB devices.
Parallel Port: To connect with SPP/ECP/EPP printer.
COM1/COM2 Port: To connect with pointing devices, modem or others serial devices.
Speaker Out: To External Speaker, Earphone or Amplifier.
Line-In: Comes from the signal sources, such as CD/Tape player.
MIC-In: From Microphone.
MIDI/Game Port: For 15-pin PC joystick, game pad or MIDI devices.

Support 2nd USB Port

This motherboard provides four USB connectors to connect USB devices, such as mouse, keyboard, modem, printer, etc. There are two connectors on the PC99 back panel. You can use proper cable to connect the other USB connector to the back panel or front panel of chassis.

Pin 1

USB2 Connector

	1	2	
USBPWR0	○	○	USBPWR0
USB_FP_P0-	○	○	USB_FP_P1-
USB_FP_P0+	○	○	USB_FP_P1+
GND	○	○	GND
KEY		○	USB_FP_OC0
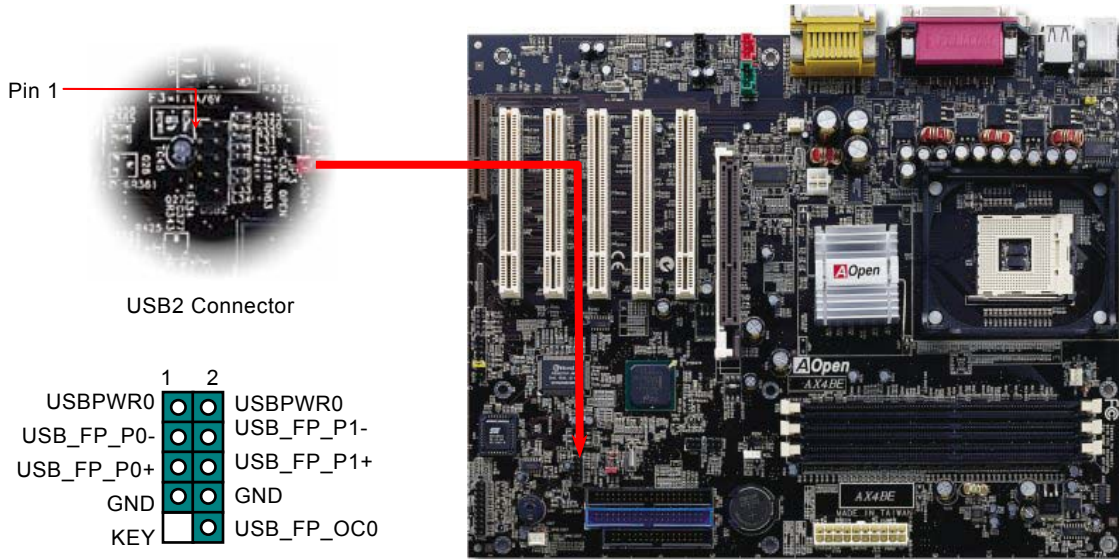
Chassis Intrusion Connector

The "CASE OPEN" header provides chassis intrusion-monitoring function. To make this function works, you have to enable it in the system BIOS, connect this header to a sensor somewhere on the chassis. So, whenever the sensor is triggered by lights or the opening of the chassis, the system will send out beep sound to inform you. Please be informed that this useful function only applies to advanced chassis, you may purchase an extra sensor, attach it on your chassis, and make a good use of this function.
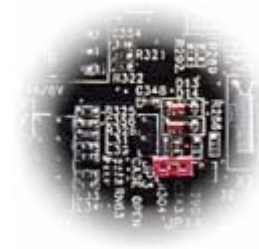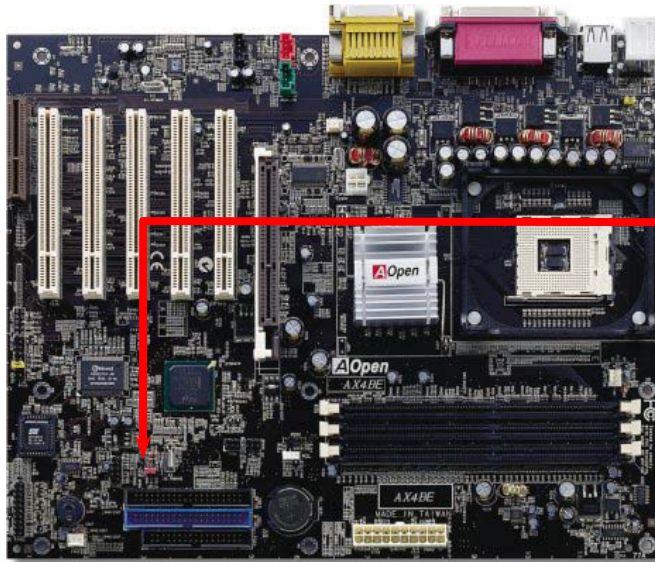
1 SENSOR
   GND

Chassis Intrusion
Connector

CD Audio Connector

This connector is used to connect CD Audio cable from CDROM or DVD drive to onboard sound.

R

GND

GND

L

CD-IN

Note: *Though some of the latest version of Windows support "Digital Audio" through IDE bus. However, in order to use Open Jukebox player, which is driven under BIOS, it is a* **MUST** *to insert audio cable to CD-IN connector on the motherboard.*
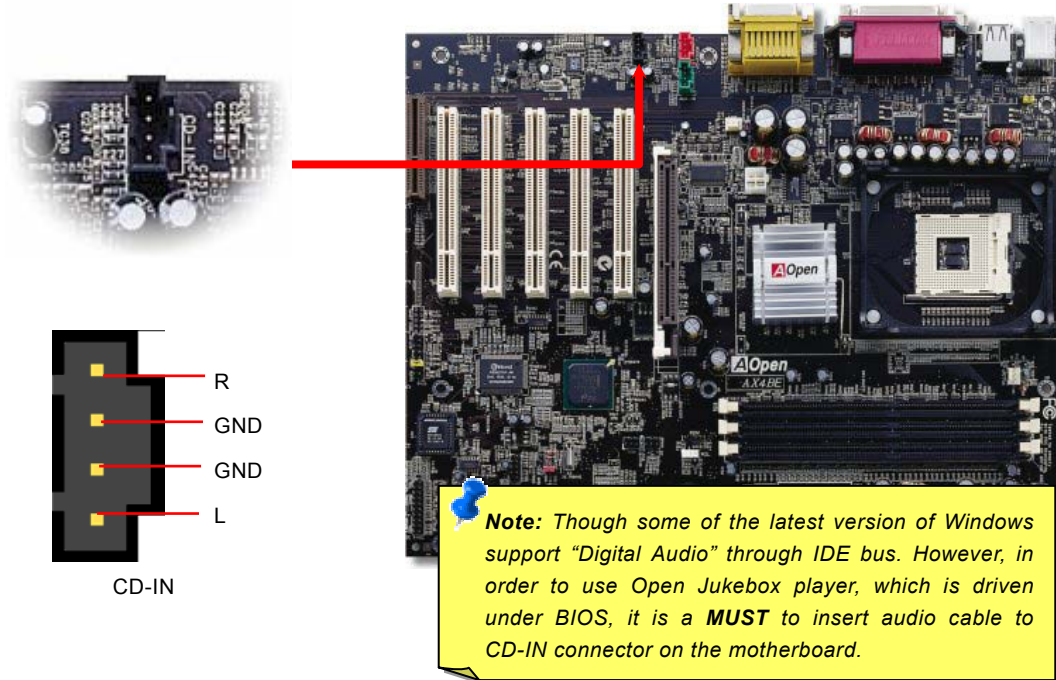
Modem Audio Connector

This connector is used to connect Mono In/MIC Out cable from internal modem card to onboard sound circuit. 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.

Mono In
GND
GND
Mic Out
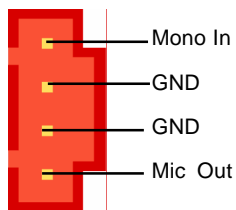
MODEM-CN
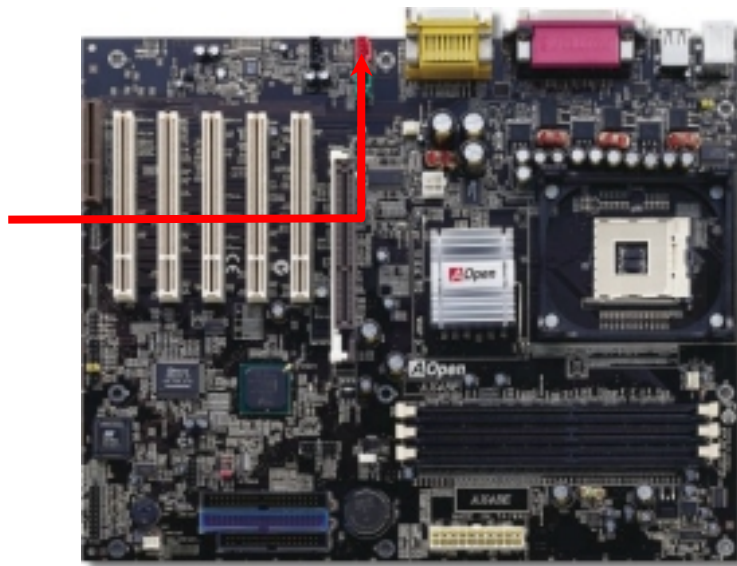
AUX-IN Connector

This connector is used to connect MPEG Audio cable from MPEG card to onboard sound.

R
GND
GND
L
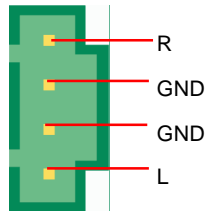
AUX-IN

GPO (General Purpose Output) Connector

GPO (General Purpose Output) is an advanced specification developed by AOpen for power users to define the further function by oneself. For example, you can design a daughter board to provide additional capabilities, such as an alarm, a buzzer, a timekeeper, etc.

```
            2       6
              GPO27
GPO24 [        ] GPO28
3.3V  [        ] GND
               NC
            1       5
```
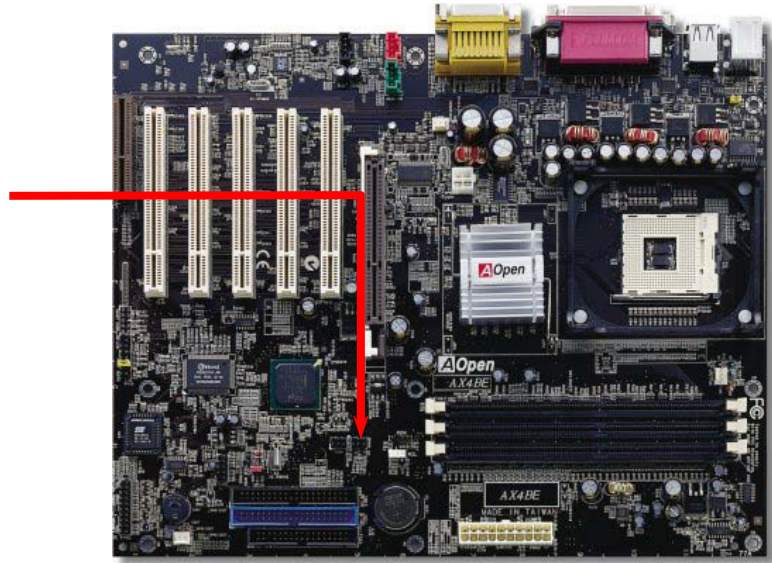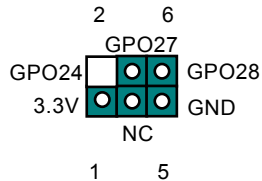
Front Audio Connector

If the housing has been designed with an audio port on the front panel, you'll be able to connect onboard audio to front panel through this connector. By the way, please remove the jumper cap from the Front Audio Connector before you connect the cable. Do not remove this yellow jumper cap if housing without an audio port on the front panel.

Pin 1 ——————→

```
          1   2
AUD_MIC  [O] [O]  AUD_GND
     NC  [ ] [O]  AUD_VCC
AUD_FPOUT_R [O] [O]  AUD_RET_R
     NC  [O] [O]  KEY
AUD_FROUT_L [O] [O]  NC
          9   10
```
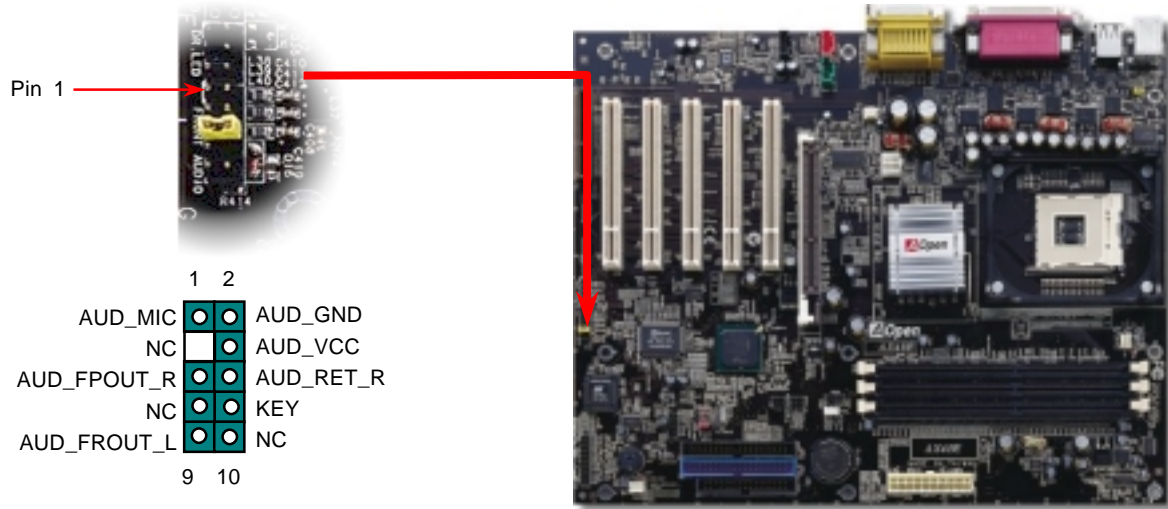
Note: Please remove the jumper cap from the Front Panel Audio Connector before you connect the cable. Do not remove this yellow jumper cap if housing without an audio port on the front panel.

Dr. LED Connector

In conjunction with Dr. LED (Upgrade Optional), which can easily shows what kind of problems may occur on your system during assembly. It can clearly indicate whether there is a component issue or an installed issue by the 8 LEDs on the front panel of Dr. LED. This can helps you to have a self-diagnostic to your system status quickly.

Pin 1

```
        1   2
3.3V  [O] [O]  S1
           [O]  S2
GND   [O] [O]  S3
        5   6
```
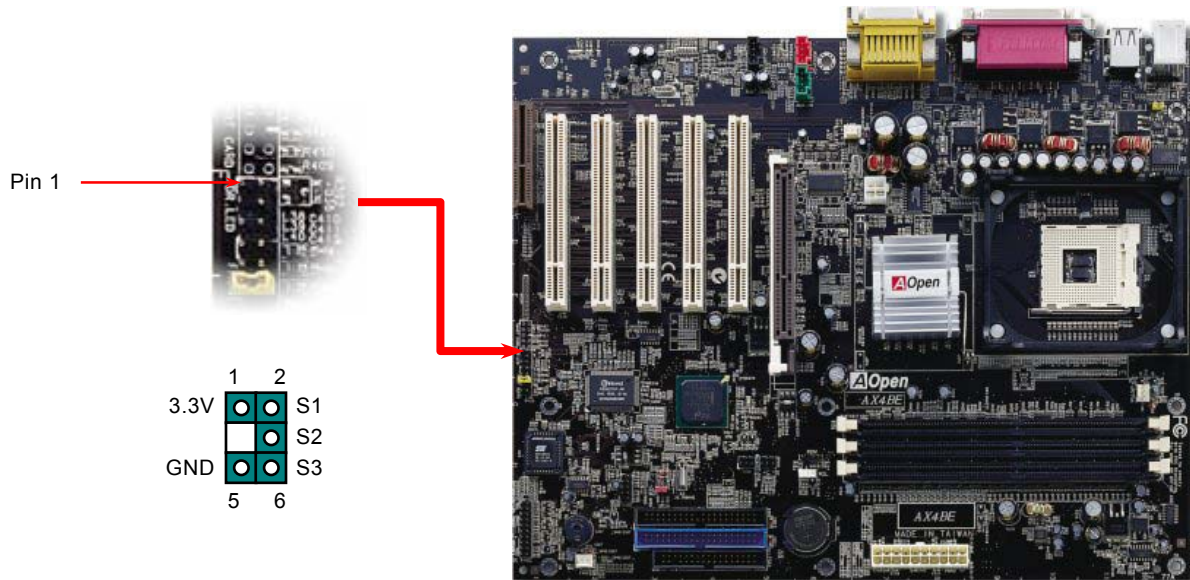
Dr. LED is a CD disc storage box with 8 LEDs on its front panel, the size of Dr. LED is exactly the same as 5.25 in floppy drive, so that it can be mount into normal 5.25 in drive bay of any housing.

7	6	5	4	3	2	1	0
○	○	○	○	○	○	○	○
Boot O.K.	KB	HDD	Floppy	PCI	Video	Memory	CPU
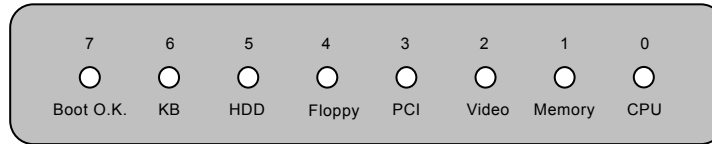
The total 8 LEDs light up alternatively if the system fails in one of eight stages. Once the LED7 (latest LED) is lit, this indicates that the system has completed its boot-up procedure.

The 8 LEDs indicate the following messages when lit:

LED 0 - Indicates that the CPU may have been installed incorrectly or is damaged.

LED 1 - Indicates that the memory may have been installed incorrectly or is damaged.

LED 2 - Indicates that the AGP may have been installed incorrectly or is damaged.

LED 3 - Indicates that the PCI card may have been installed incorrectly or is damaged.

LED 4 - Indicates that the floppy disk drive may have been installed incorrectly or is damaged.

LED 5 - Indicates that the HDD may have been installed incorrectly or is damaged.

LED 6 - Indicates that the keyboard may have been installed incorrectly or is damaged.

LED 7 - Indicates that the system is OK.

*Note: During POST (**P**ower **O**n **S**elf **T**est) procedure, the Debug LED will light on sequentially from LED0 to LED7 until the system boot O.K*

AOpen

Battery-less and Long Life Design

This Motherboard implements Flash ROM and a special circuit that allows you to save your current CPU and CMOS Setup configurations without the need of a battery. The RTC (real time clock) can also keep running as long as the power cord is plugged. If you lose your CMOS data by accident, you can just reload the CMOS configurations from Flash ROM and the system will recover as usual.

ATX Stand-by Power   **Battery**

Auto Switch

**RTC
(Real Time Clock)
00:00:00**

Auto switching to ATX standby power as long as AC power line is plugged. This smart design increases battery life if you still plug battery on motherboard.

**Flash
ROM**

CMOS

Backup by EEPROM
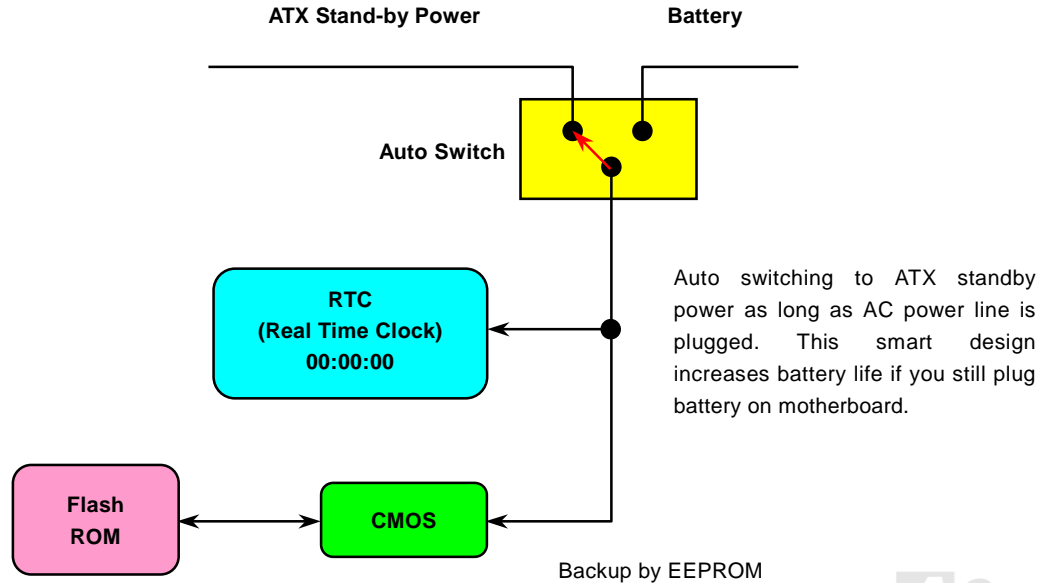
CPU Over-current Protection

Over Current Protection has been popularly implemented on ATX 3.3V/5V/12V switching power supply for a while. However, new generation CPU is able to use regulator of different voltages to transfer 12V to CPU voltage (for example, to 2.0V). This motherboard is with switching regulator onboard that supports CPU over-current protection, and it applies to 3.3V/5V/12V power supply for providing full line over-current protection.

```
┌────────────┐      5V (Protected by power supply)        ───►
│            │
│    ATX     │      3.3V (Protected by power supply)      ───►
│  Switching │
│   Power    │      12V (Protected by power supply)       ───►
│   Supply   │
│            │      ┌──────────┐    ┌──────────┐
└────────────┘      │ Onboard  │    │Over-Current│
                    │  Power   │──► │ Protection │──►   CPU Core Voltage
                    │Regulator │    │  Circuit   │
                    └──────────┘    └──────────┘
```
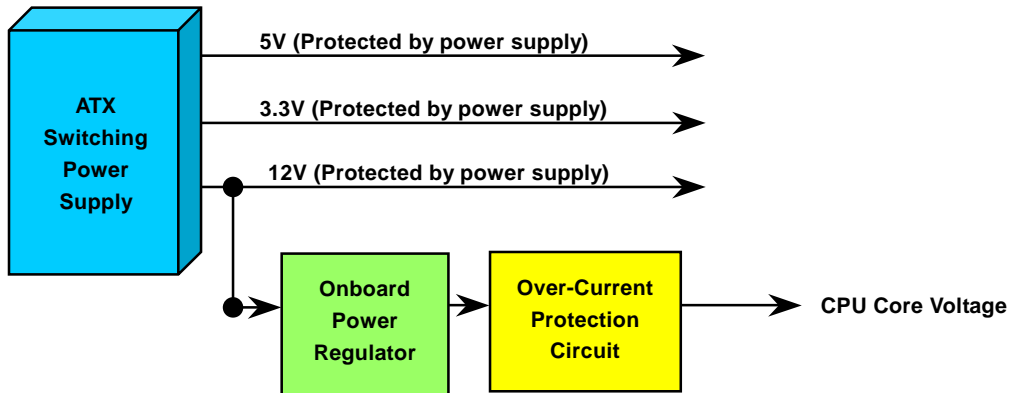
*Note: Although we have implemented protection circuit try to prevent any human operating mistake, there is still certain risk that CPU, memory, HDD, add-on cards installed on this motherboard may be damaged because of component failure, human operating error or unknown nature reason. **AOpen cannot guaranty the protection circuit will always work perfectly.***

AOpen

Hardware Monitoring

This motherboard implements a hardware monitoring system. As you turn on your system, this smart design will continue to monitor your system's working voltage, fan status and CPU temperature. If any of these systems' status goes wrong, there will be an alarm through the chassis external speaker or buzzer of motherboard (if existed) to warn the user.

```
  Fan  ──── Fan Speed ────►  ┌──────────────┐
                             │              │
  CPU  ──── CPU Temperature ─┤  Detection   │──►  AOpen H/W Monitoring
       ──── CPU Voltage ─────┤   Circuit    │          Utility
                             │              │
 Power ──── System Voltage ─►└──────────────┘
```
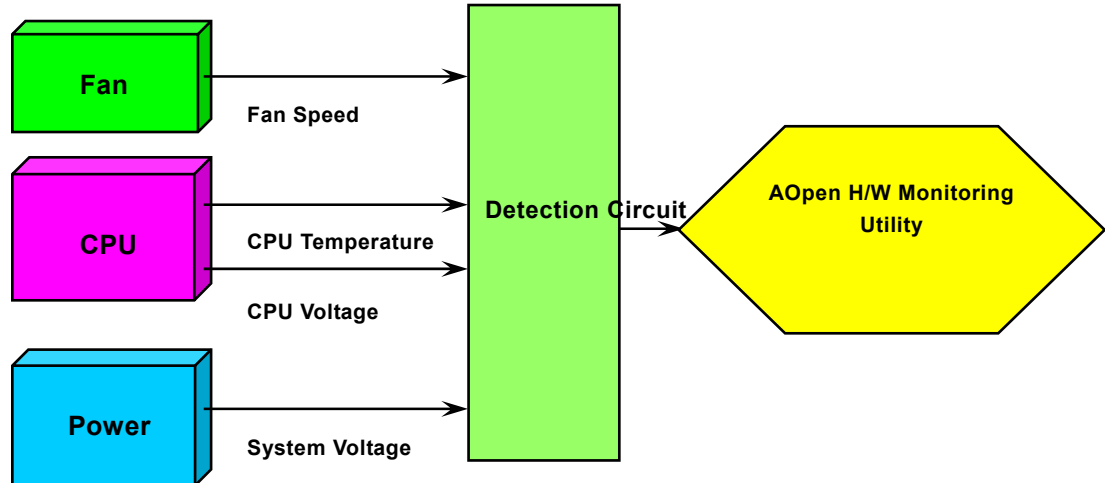
Resetable Fuse

Traditional motherboard has fuse for Keyboard and USB port to prevent over-current or shortage. These fuses are soldered onboard that when it is broken (function as protecting the motherboard), user still cannot replace it and the motherboard is still malfunctioning.

With expensive Resetable Fuse, the motherboard can be resumed back to normal function after the fuse had done its protection job.
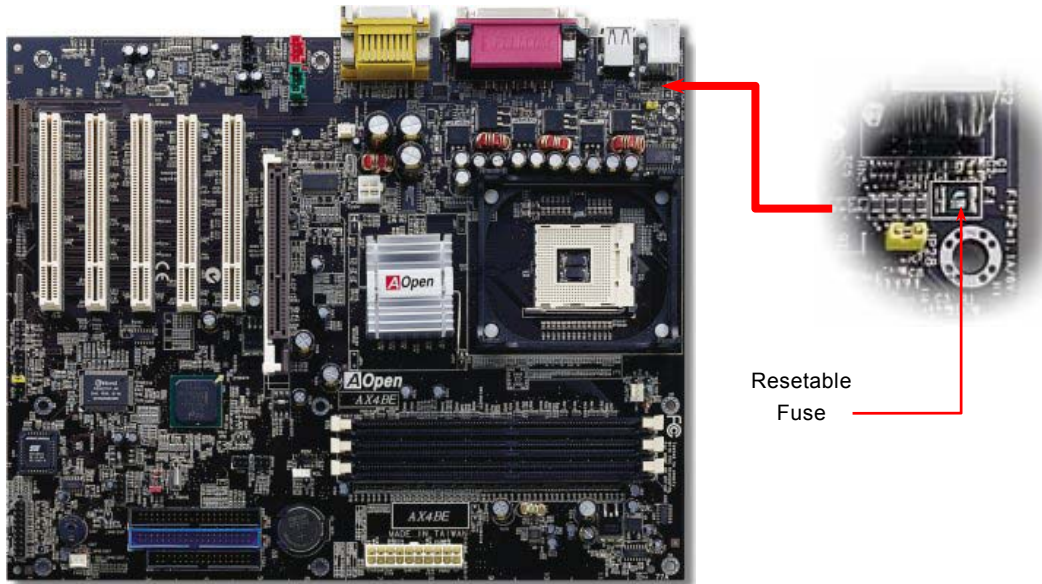
Resetable
Fuse

2200 μ F Low ESR Capacitor

The quality of low ESR capacitor (Low Equivalent Series Resistance) during high frequency operation is very important for the stability of CPU power. The idea of where to put these capacitors is another know-how that requires experience and detail calculation.

Not only that, AX4BE implements 2200 μ F capacitors, which is much larger than normal capacitor (1000 and 1500 μ f) and it provides better stability for CPU power.
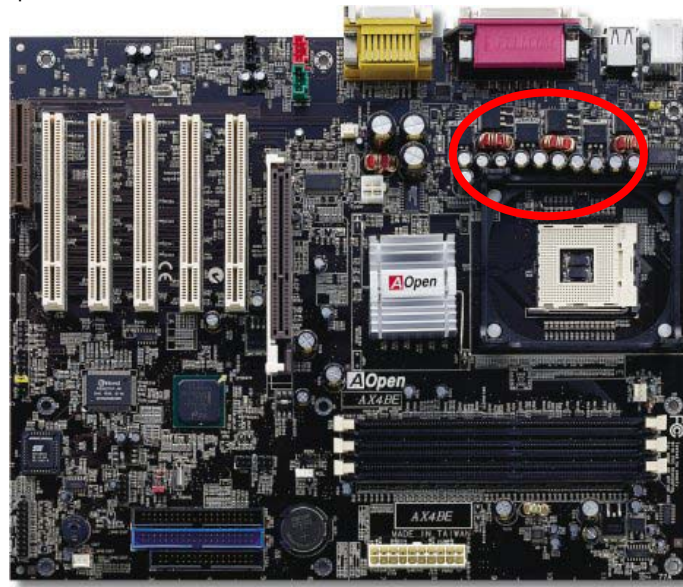
Layout (Frequency Isolation Wall)
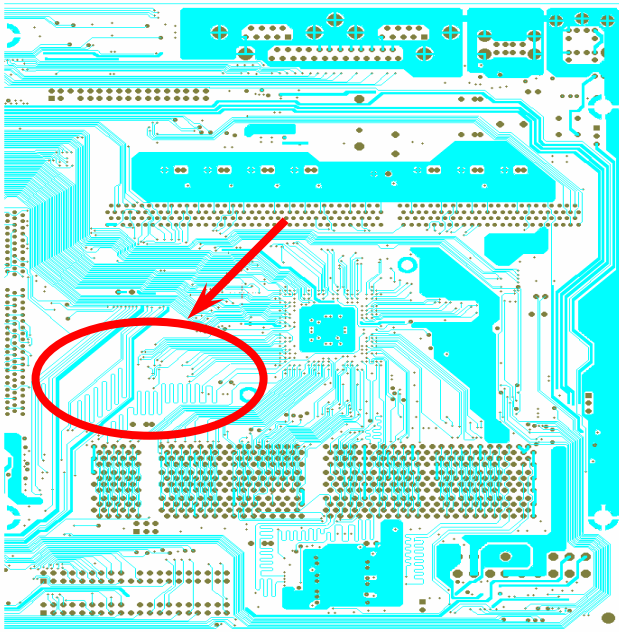
For high frequency operation, especially overclocking, layout is the most important factor to make sure chipset and CPU working in stable condition. The layout of this motherboard implements AOpen's unique design called " Frequency Isolation Wall". Separating each critical portion of motherboard into regions where each region operates in a same or similar frequency range to avoid cross talk and frequency interference between each region's operations and condition. The trace length and route must be calculated carefully. For example, the clock trace must be equal length (not necessarily as short as possible) so that clock skew will be controlled within few a pico second (1/10^{12} Sec)

Note: This diagram for example only, it may not be exactly the same as this motherboard.

Enlarged Aluminum Heatsink

Cool down CPU and Chipset is important for system reliability. Enlarged aluminum heat sink provides better heat consumption especially when you are trying to over clocking the CPU.
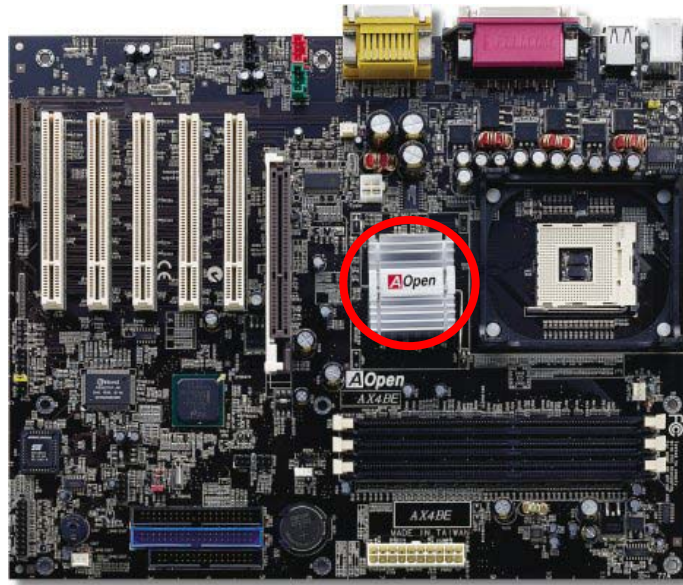
Open JukeBox Player

Here we are pleased to provide you a brand-new powerful interface—Open JukeBox. Without any cost you can have your PC turn into a fashionable CD player! This latest Open JukeBox motherboard aims at helping you directly operate your CD player on the PC without any hassle of entering Windows operation system.

How Your Open JukeBox Works

The operation of Open JukeBox Player is the same as other CD players. By pressing specific keys on the keyboard you will find playing Open JukeBox Player couldn't be easier than the traditional CD Players. Below is the function description of respective buttons.

Power-Off Button —

Boot to Operation System —

Display Screen

Function Key

Power:	Pressing **O**, to directly power off your computer with no hassle of entering Windows Operation System.
Boot:	Pressing **B**, to intelligently boot to Windows Operation System for you.
Play:	Pressing **A,** to start playing CD music.
Stop:	Pressing **S**, to stop the music playing.
Pause:	Pressing **P**, to pause the music playing temporarily.
Eject:	Pressing **E**, to eject CD tray for you to change CD disc.
Repeat:	Like other CD Players, pressing **R**, to shift the repeat mode.
Volume +/-:	Pressing **+** or **–** to adjust the volume of playing music.
Rewind/Forward ← / →:	Pressing **arrow keys**, to rewind or forward the music.

*Note: Though some of the latest version of Windows support "Digital Audio" through IDE bus. However, in order to use Open Jukebox player, which is driven under BIOS, it is a **MUST** to insert audio cable to CD-IN connector on the motherboard.*

Your Open JukeBox Settings in BIOS

There are three Open JukeBox settings in BIOS as follows.

```
          Phoenix - AwardBIOS CMOS Setup Utility
                  Advanced BIOS Features

   Virus Warning              Disabled      ▲        Item Help
   CPU L1 & L2 Cache          Enabled
   Quick Power On Self Test   Enabled           Menu Level    ▶
   First Boot Device          CDROM
   Second Boot Devic ┌─────────────────────────────────────┐
   Third Boot Device │  Enter AOpen CD Player              │
   Boot Other Device │                                     │
   Swap Floppy Drive │  Auto            ..... [■]          │
   Boot Up Floppy Se │  Press Insert Key ..... [ ]          │
   Boot Up NumLock S │  CD Player        ..... [ ]          │
   Typematic Rate Se │                                     │
 x Typematic Rate (C │                                     │
 x Typematic Delay ( │                                     │
   Security Option   │                                     │
   APIC Mode         │                                     │
   MPS Version Contr │                                     │
   OS Select For DRA │  ↑↓:Move ENTER:Accept ESC:Abort      │
   Enter Aopen CD Pl └─────────────────────────────────────┘
   Show Logo On Screen        Enabled       ▼

  ↑↓→←:Move  Enter:Select +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
 F2:Item Help F3:Language F5:Previous Values F6:Setup Defaults F7:Turbo Defaults
```

Auto: The default setting is "**Auto**" with which the Open JukeBox will automatically check the CD player every time you power on. The Open JukeBox will automatically be launched when it detects a music CD in your CD player.

Press Insert Key: Choosing this setting will allow a reminder message popped up on the screen during BIOS POST. It reminds you of pressing "Ins" key on your keyboard to start Open JukeBox Player; otherwise the system will launch the Windows Operation System.

CD Player: Choosing this setting allows the system to launch Open JukeBox Player every time you power on. However, by pressing **B** on your keyboard the Windows Operation System will be launched.

Your Open JukeBox EzSkin

Except these powerful functions above, Open JukeBox Player is also equipped with another fancy feature for you to change its "skin". You can download as many skins as you want from AOpen Website, and changing them whenever you want by using this useful utility – **EzSkin** – which may also be downloaded from our website.

Even more, you may design your own skins with innovative idea and sharing them to users around the world by uploading to our website. For further technical information, we welcome you to visit our website at

http://english.aopen.com.tw/tech/download/skin

Vivid BIOS technology

Have you been fed up with the conservative and immutable POST screen? Let's rule out the tradition idea that POST screen are stiff and frigid, and let AOpen show you the newly developed VividBIOS to experience the lively vivid colorful POST screen!

Unlike earlier graphic POST screen, which could occupy the whole screen and mask text information during POST, AOpen VividBIOS deals with graphics and texts separately, and makes them running simultaneously during POST. With this innovative design, VividBios now brings you a beautiful and sleek 256 colors screen without missing any important information shown on POST screen.

In addition, the limited space of BIOS ROM is another big issue. When all of the traditional BIOS can only show space-consuming and uncompressed Bitmap, AOpen has considerately tuned the BIOS to next generation, to recognize the smaller-sized GIF format and even dynamic-showing GIF animation.

Vivid BIOS shares the same fundamental technology with Open JukeBox CD Player, you may use the same EzSkin utility to

change your Vivid BIOS screen or to download your favorite Open JukeBox skin. If you see this little logo shown beside your model name on the BIOS download page, http://english.aopen.com.tw/tech/download/skin, it is assured that your motherboard supports this innovative feature!

Driver and Utility

There are motherboard drivers and utilities included in <u>AOpen Bonus CD disc</u>. You don't need to install all of them in order to boot your system. But after you finish the hardware installation, you have to install your operation system first (such as Windows 98) before you can install any drivers or utilities. Please refer to your operation system's installation guide.

> **Note:** *Please follow recommended procedure to install <u>Windows 95</u> and <u>Windows 98</u>.*

Auto-run Menu from Bonus CD Disc

You can use the auto-run menu of Bonus CD disc. Choose the utility and driver and select model name.
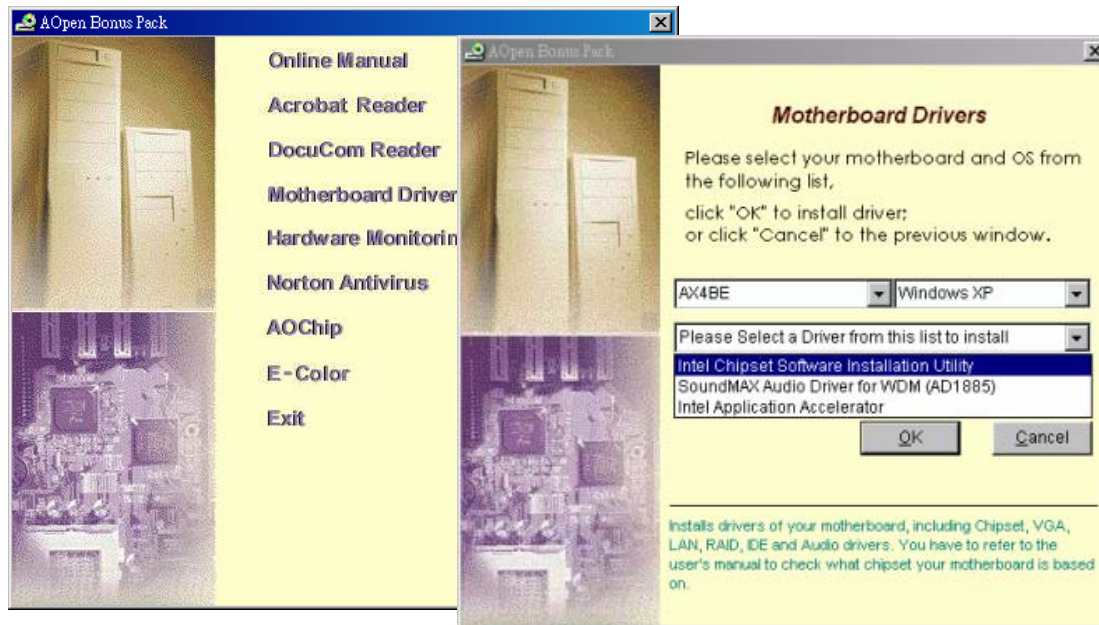
Installing Intel® Chipset Software Installation Utility

You can install the Intel INF Update Utility from the Bonus Pack CD disc auto-run menu to eliminate the "?" marks, but except Windows 95 and 98 (First version).
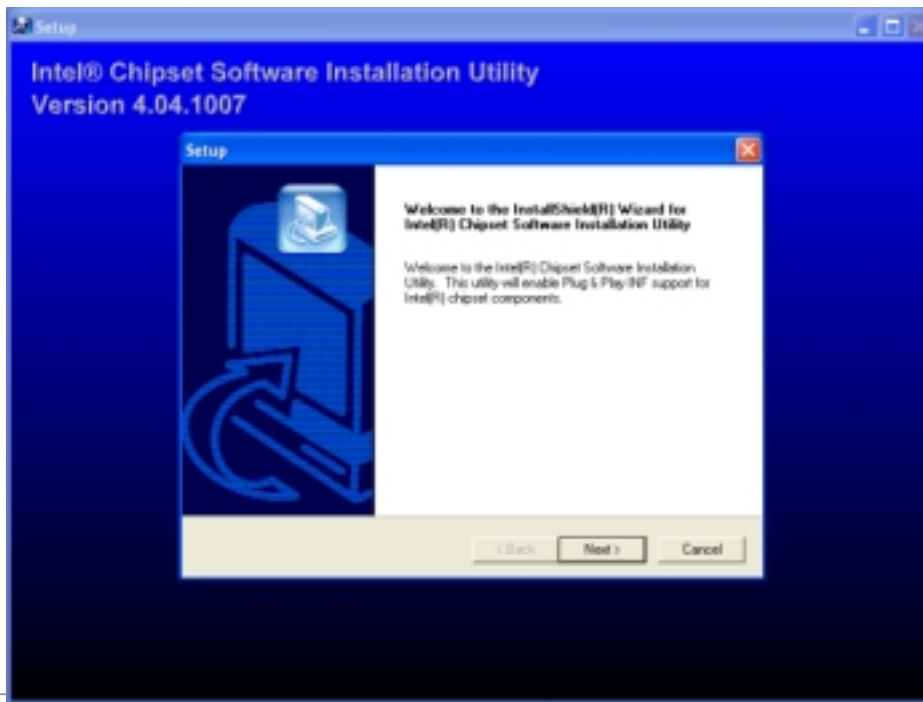
Installing Intel IAA Driver

You can install Intel IAA Driver to increase the performance of software applications and reduce PC boot times. You can find it in the AOpen Bonus Pack CD disc.

Installing Onboard Sound Driver

This motherboard comes with AD1885 AC97 CODEC. You can find the audio driver from the Bonus Pack CD disc auto-run menu.
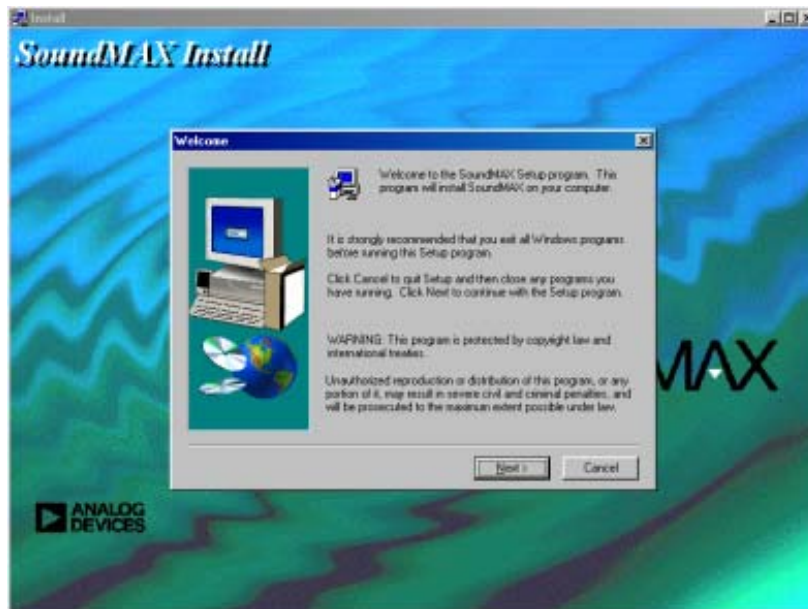
Installing Hardware Monitoring Utility III

You can install Hardware Monitoring Utility to monitor CPU temperature, fans and system voltage. The hardware monitoring function is automatically implemented by the BIOS and utility software. No hardware installation is needed.

ACPI Suspend to Hard Drive

ACPI Suspend to Hard Drive is basically controlled by Windows operation system. It saves your current work (system status, memory and screen image) into hard disk, and then the system can be totally power off. Next time, when power is on, you can resume your original work directly from hard disk within few seconds without go through the Windows booting process and run your application again. If your memory is 64MB, normally, you need to reserve at least 64MB HDD space to save your memory image.

When go into Suspend:

System Image & Status
Save into

Hard Disk

When power-on next time:

System Image & Status

Hard Disk

within seconds
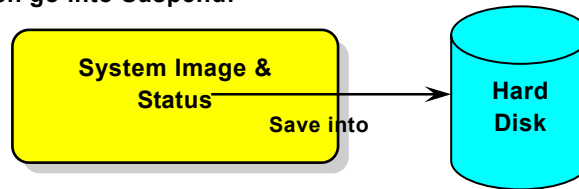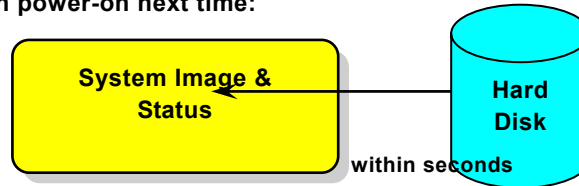
System Requirement

1.   **AOZVHDD.EXE 1.30b** or later.

2.   Delete **config.sys** and **autoexec.bat**.

Fresh installation of Windows 98 on a new system

1. Execute "**Setup.exe /p j**" to install Windows 98

2. After Windows 98's installation is complete, go to the Control Panel > Power Management.

   a. Set Power Schemes > System Standby to "Never".

   b. Click on "Hibernate" and select "Enable Hibernate Support" then "Apply".

   c. Click on the "Advanced" tab, you'll see "Hibernate" on "Power Buttons". Note that this option will only be seen after step b mentioned above has been completed; otherwise only "Standby" and "Shutdown" will be shown. Select "Hibernate" and "Apply".

3. Clean boot into DOS and run AOZVHDD utility.

   a. If you assign the whole disk to your Win 98 system (FAT 16 or FAT 32), please run "**aozvhdd /c /file**". Please remember sufficient free space has to be reserved in the disk, e.g. if you have 64 MB DRAM and 16 MB VGA card installed, the system needs at least 80 MB free space. The utility will locate the space automatically.

   b. If you assign an individual partition for Win 98, please run "**aozvhdd /c /partition**". Of course, the system needs to provide unformatted an empty partition.

4. Reboot system.

5. You've already implemented ACPI Suspend to-Hard Drive. Click "Start > Shut Down > Standby" then the screen will go off

immediately. And 1 minute or so will be taken for the system to save what's in the memory to the hard drive; the larger the memory size the longer this process will take.

Changing from APM to ACPI (Windows 98 only)

1. Run "**Regedit.exe**"

   a. Go through the following path

      HKEY_LOCAL_MACHINE

         SOFTWARE

            MICROSOFT

               WINDOWS

                  CURRENT VERSION

                    DETECT

   b. Select "ADD Binary" and name it as "**ACPIOPTION**".

   c. Right click and select Modify, add "01" after "0000" to make it "0000 01".

   d. Save changes.

2. Select "Add New Hardware" under Control Panel. Allow Windows 98 to detect new hardware. (It will find "**ACPI BIOS**" and remove "**Plug and Play BIOS**")

3. Reboot system.

4. Clean boot into DOS and run "AOZVHDD.EXE /C /File"

Changing from ACPI to APM

1. Run "**Regedit.exe**"

   a. Go through the following path

HKEY_LOCAL_MACHINE

SOFTWARE

MICROSOFT

WINDOWS

CURRENT VERSION

DETECT

ACPI OPTION

b. Right click and select "Modify, change "01" to "02" to make it "0000 02".

Tip: "02" means Windows 98 is ACPI acknowledged but the ACPI function is disabled.
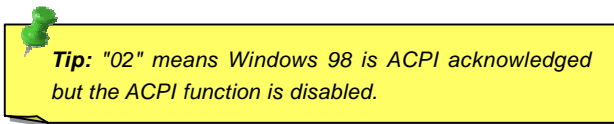
c. Save changes.

2. Select "Add New Hardware" under Control Panel. Allow Windows 98 to detect new hardware. (It will find "**Plug and Play BIOS**" and **remove "ACPI BIOS**")

3. Reboot system.

4. Run "Add New Hardware" again and it will find "Advanced Power Management Resource".

5. Click "OK".

ACPI Suspend to RAM (STR)

This motherboard supports ACPI Suspend to RAM function. With this function, you can resume your original work directly from DRAM without going through the Windows 98 booting process and run your application again. Suspend to DRAM saves your current work in the system memory, it is faster than Suspend to Hard Drive but requires power supplied to DRAM, while Suspend to Hard Drive requires no power.

When go into Suspend:

System Image & Status in the DRAM	←	**Other System Devices**	✖

Backup by 3.3V Power

Power loss

When power-on next time:

System Image & Status in the DRAM	←	**Other System Devices**	←

Power back to work

Power back to work

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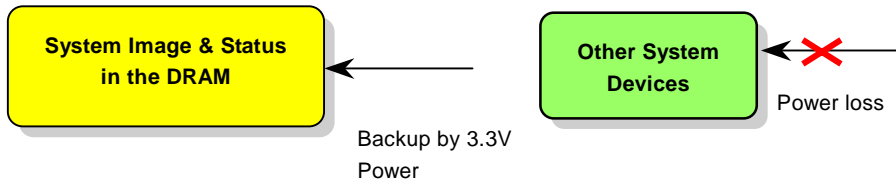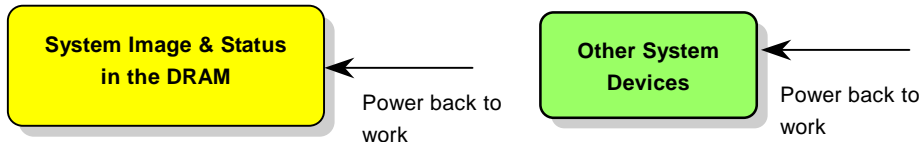
To implement ACPI Suspend to DRAM, please follow the procedures as below:

System Requirement

1.   An ACPI OS is required. Currently, except Windows 95 and Windows NT, all other Windows Systems support ACPI.

2.   The Intel® Chipset Software Installation Utility must have been installed properly.

Procedures

1.   Changed the following BIOS settings.

      BIOS Setup > Power Management Setup > ACPI Function: Enabled

      BIOS Setup > Power Management Setup > ACPI Suspend Type: S3.

2.   Go to Control Panel > Power Management. Set "Power Buttons" to "Standby".

3.   Press power button or standby button to wake up the system.

AWARD BIOS
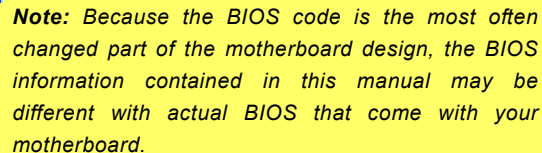
System parameters can be modified by going into BIOS Setup menu, this menu allows you to configure the system parameters and save the configuration into the 128 bytes CMOS area, (normally in the RTC chip or in the main chipset).

The AwardBIOS™ that installed in the Flash ROM of the motherboard is a custom version of an industry standard BIOS. The BIOS provides critical low-level support for standard devices such as hard disk drives, serial and parallel ports.

Most BIOS setting of AX4BE had been optimized by AOpen's R&D engineering team. But, the default setting of BIOS still can't fine-tune the chipset controlling entire system. Hence, the rest of this chapter is intended to guide you through the process of configuring your system using setup.

Currently there are two kinds of beep sound when system fails to boot at POST. The first type of beep sound consists of a single long beep and two short beeps, indicating a video error has failed BIOS from initializing video screen for displaying any additional information. The 2nd type of beep sound is a single long beep that beeping repeatedly, signaling a DRAM error has occurred. You may look over the indicated error according to different beep significances.

To enter to BIOS setup menu, press <Del> when POST (Power-On Self Test) screen is shown on your monitor.

> **Note:** *Because the BIOS code is the most often changed part of the motherboard design, the BIOS information contained in this manual may be different with actual BIOS that come with your motherboard.*

About BIOS Function Description…

AOpen always dedicates to give users a more friendly computer system. Now, we include all function descriptions of BIOS setup program into the BIOS Flash ROM. When you select one function of BIOS setup program, the function description will appeared at right side of screen. Hence, you don't need read this manual while you changing the BIOS setting.

```
           CMOS Setup Utility - Copyright (C) 1984-2000 Award Software
                              Advanced BIOS Features

     Virus Warning              Disabled              │      Item Help
     CPU Internal Cache         Enabled               │
     External Cache             Enabled               │  Menu Level   ▶
     CPU L2 Cache ECC Checking  Enabled               │
     Quick Power On Self Test   Disabled              │  Allows you to choose
     First Boot Device          Floppy                │  the VIRUS warning
     Second Boot Device         HDD-0                 │  feature for IDE Hard
     Third Boot Device          LS120                 │  Disk boot sector
     Boot Other Device          Enabled               │  protection. If this
     Swap Floppy Drive          Disabled              │  function is enabled
     Boot Up Floppy Seek        Enabled               │  and someone attempt to
     Boot Up NumLock Status     On                    │  write data into this
     Gate A20 Option            Fast                  │  area , BIOS will show
     Typematic Rate Setting     Disabled              │  a warning message on
   x Typematic Rate (Chars/Sec) 6                     │  screen and alarm beep
   x Typematic Delay (Msec)     250                   │
     Security Option            Setup                 │
     OS Select For DRAM > 64MB  Non-OS2               │
     Video BIOS Shadow          Enabled               │

   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
          F5:Previous Values    F6:Fail-Safe Defaults   F7:Optimized Defaults
```

Menu Items Select Window   Item Function Description Window

How To Use Award™ BIOS Setup Program

Generally, you can use the arrow keys to highlight items that you want to choose, then press <Enter> key to select, and use the <Page Up> and <Page Down> key to change setting value. You also can press <F1> key for help and press <Esc> key to quit Award™ BIOS setup program. The following table provides details about how to use keyboard in the Award™ BIOS setup program. By the way, all products of AOpen also provides a special function in the BIOS setup, you can press <F3> key selecting preferred menu language to display.

Key	Description
Page Up or +	Changing setting to next value or increase the value.
Page Down or -	Changing setting to previous value or decrease value.
Enter	Select the item.
Esc	1. In main menu: Quit and don't save any change. 2. In sub menu: Exit current menu to main menu.
Up Arrow	Highlight previous item.
Down Arrow	Highlight next item.
Left Arrow	Move the light bar to left side of menu.
Right Arrow	Move the light bar to right side of menu.
F1	Get menu or item help description.
F3	Changing menu language.
F5	Load previous setting value from CMOS.

Key	Description
F6	Load Setup Default setting value from CMOS.
F7	Load turbo setting value from CMOS.
F10	Save changed setting and exit setup program.

How To Enter BIOS Setup

After you finish the setting of jumpers and connect correct cables. Power on and enter the BIOS Setup, press <Del> during POST (Power-On Self Test). Choose "Load Setup Defaults" for recommended optimal performance.

```
          CMOS Setup Utility - Copyright (C) 1984-2001 Award Software
     ┌──────────────────────────────────────────────────────────────────────┐
     │  ▶ Standard CMOS Features              Load Setup Defaults             │
     │                                                                        │
     │  ▶ Advanced BIOS Features              Load Turbo Defaults             │
     │                                                                        │
     │  ▶ Advanced Chipset Features           Set Password                    │
     │                                                                        │
     │  ▶ Integrated Peripherals              Save & Exit Setup               │
     │                                                                        │
     │  ▶ Power Management Setup              Exit Without Saving             │
     │                                                                        │
     │  ▶ PnP/PCI Configura┌─────────────────────────────────┐faults         │
     │                     │ Load Setup Defaults (Y/N)? Y     │               │
     │  ▶ PC Health Status │                                 │faults         │
     │                     └─────────────────────────────────┘               │
     │  ▶ Frequency/Voltage                                                   │
     ├──────────────────────────────────────────────────────────────────────┤
     │  Esc : Quit                    ↑ ↓ → ←  : Select Item                  │
     │  F10 : Save & Exit Setup       (Shift)F3 : Change Language             │
     ├──────────────────────────────────────────────────────────────────────┤
     │                     Load Setup Defaults                                │
     └──────────────────────────────────────────────────────────────────────┘
```

Warning: *Please avoid of using "Load Turbo Defaults", unless you are sure your system components (CPU, DRAM, HDD, etc.) are good enough for turbo setting.*

BIOS Upgrade under Windows environment

With outstanding R&D ability of AOpen, we now bring you a whole new BIOS Flash wizard ---- EzWinFlash. With an eye to users convenience, EzWinFlash combines the BIOS binary code and flash module together, so the only thing you have to do is just clicking on the utility you downloaded from web and let it helps you complete the flash process automatically. EzWinFlash detects your motherboard and checks the BIOS version cleverly to prevent your system from any possible failure. Moreover, EzWinFlash has been taken into consideration to go with any windows platform you might be using, no matter if you're using Windows 95/98, 98SE/ME, NT4.0/2000, or even the latest Windows XP.

In the meanwhile, in order to provide a much more user-friendly operating environment, AOpen EzWinFlash is natively designed to have multi-language function to provide easier way for users' usage in changing BIOS setting.
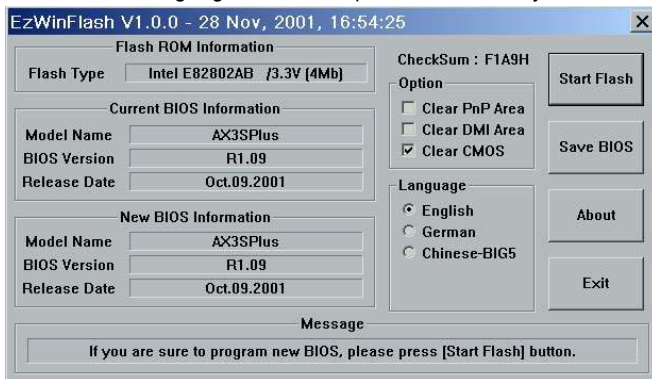
Caution: By updating your motherboard, you are taking a risk of BIOS flash failure. If your motherboard is working stable, and there are no major bugs that had been fixed by a latter BIOS revision, we recommend that you DO NOT try to upgrade your BIOS.

If you intent on upgrading, PLEASE BE SURE to get the right BIOS revision for the right motherboard model to avoid any possibility failure.

Note: The model name on this BIOS picture is for reference only. It may not be the exact model name.

You may accomplish BIOS upgrade procedure with EzWinFlash by the following steps, and it's STRONGLY RECOMMMANDED to close all the applications before you start the upgrading.

1. Download the new version of BIOS package zip file from AOpen official web site. (ex: http://english.aopen.com.tw/)

2. Unzip the download BIOS package (ex: WAX4BE02.ZIP) with WinZip (http://www.winzip.com) in Windows environment.

3. Save the unzipped files into a folder, for example, WAX4BE02.EXE & WAX4BE02.BIN.

4. Double click on the WAX4BE02.EXE, EzWinFlash will detect the model name and BIOS version of your motherboard. If you had got the wrong BIOS, you will not be allowed to proceed with the flash steps.

5. You may select preferred language in the main menu, then click [Start Flash] to start the BIOS upgrade procedure.

6. EzWinFlash will complete all the process automatically, and a dialogue box will pop up to ask you to restart Windows. You may click [YES] to reboot Windows.

7. Press <Del> at POST to enter BIOS setup, choose "Load Setup Defaults", then "Save & Exit Setup". Done!

It is strongly recommended NOT to turn off the power or run any application during FLASH PROCESS.

> *Warning: The new BIOS upgrade will permanently replace your original BIOS's settings when flashing. You may need to reconfigure your BIOS setting so that your system can go back to work as normal.*
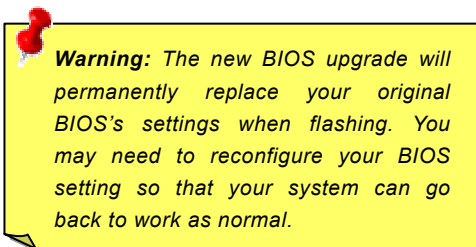
AOpen

Overclocking

As a leading manufacturer in motherboard industry, AOpen always listens to what customers want and develop products to fit different user's requirements. Reliability, compatibility, leading technology and friendly features are our basic goals when designing motherboards. Other than above mentioned design criteria, there are power users who are always seeking to push the limitation of the system performance by overclocking which we call them "Overclocker".

This section is dedicated to overclockers.

This high performance motherboard is designed for maximum **533MHz** CPU bus clock. But it comes with clock generator of **248MHz** when we design it to accommodate with future CPU bus clock. Our lab test results showed that **133MHz** is achievable when proper setting and qualified components were presented. Not only that, the CPU clock ratio can be up to 24x that supports almost all of Pentium® 4 CPUs in the future and provides flexibility for overclockers.

But not guaranty. ☺

> *Tip: Note that overclocking may also cause thermal problem. Please make sure that the cooling fan and the heatsink were adequate to dissipate excessive heat that's generated by overclocking the CPU.*

> *Warning: The design of this product follows CPU and chipset vendor's design guideline. Any attempts to push beyond product specification are not recommended and you are taking your own risk to damage your system or important data. Before doing overclocking, you must make sure your components are able to tolerate such abnormal setting, especially CPU, DRAMs, hard disks, and AGP VGA cards.*

VGA Card & Hard Disk

VGA and HDD is key components for overclocking, for your reference, the following list are what have been successful overclocked in our lab. Please note that AOpen can not guaranty they can be successful overclocked again. Please check the **Available Vendor List (AVL)** by link to our official website.

VGA: http://english.aopen.com.tw/tech/report/overclk/mb/vga-oc.htm

HDD: http://english.aopen.com.tw/tech/report/overclk/mb/hdd-oc.htm

Glossary

AC97

Basically, AC97 specification separates sound/modem circuit to two parts, digital processor and a CODEC for analogy I/O they are linked by AC97 link bus. Since digital processor can be put into motherboard main chipset, the cost of sound/modem onboard solution can be reduced.

ACPI (Advanced Configuration & Power Interface)

ACPI is the power management specification of PC97 (1997). It intends to save more power by taking full control of power management to operating system and bypass BIOS. The chipset or super I/O chip needs to provide standard register interface to operating system (such as Windows 98). This is a bit similar as the PnP register interface. ACPI defines ATX momentary soft power switch to control the power state transition.

AGP (Accelerated Graphic Port)

AGP is a bus interface targeted for high-performance 3D graphic. AGP supports only memory read/write operation and single-master single-slave one-to-one only. AGP uses both rising and falling edge of the 66MHz clock, for 2X AGP, the data transfer rate is 66MHz x 4byte x 2 = 528MB/s. AGP is now moving to 4X mode, 66MHz x 4byte x 4 = 1056MB/s. AOpen is the first company to support 4X AGP motherboards by both AX6C (Intel 820) and MX64/AX64 (VIA 694x), started from Oct 1999.

AMR (Audio/Modem Riser)

The CODEC circuit of AC97 sound/modem solution can be put on motherboard or put on a riser card (AMR card) that connects to motherboard through AMR connector.

AOpen Bonus Pack CD

A disc bundled with AOpen motherboard product; there are motherboard drivers, Acrobat Reader for PDF online manual and other useful utilities.

APM (Advanced Power Management)

Unlike ACPI, BIOS controls most APM power management functions. AOpen Suspend to Hard Drive is a good example of APM power management.

ATA (AT Attachment)

ATA is the specification of diskette interface. In 80's, many software and hardware manufacturers instituted the ATA specification together. The AT is meaning International Business Machines Corporation (IBM) personal computer/AT's bus structure.

ATA/66

ATA/66 uses both rising edge and falling edge but doubles UDMA/33 transfer rate. The data transfer rate is 4 times of the PIO mode 4 or DMA mode 2, 16.6MB/s x4 = 66MB/s. To use ATA/66, you need special ATA/66 IDE cable.

ATA/100

ATA/100 is a new IDE specification under developing. ATA/100 uses both rising edge and falling edge as <u>ATA/66</u> but clock cycle time is reduced to 40ns. The data transfer rate is (1/40ns) x 2 bytes x 2 = 100MB/s. To use ATA/100, you need special 80-wire IDE cable, the same as ATA/66.

ATA/133

ATA/133 is a new IDE specification under developing. ATA/133 uses both rising edge and falling edge as <u>ATA/66</u> but clock cycle time is reduced to 30ns. The data transfer rate is (1/30ns) x 2 bytes x 2 = 133MB/s. To use ATA/133, you need special 80-wire IDE cable, the same as ATA/66.

BIOS (Basic Input/Output System)

BIOS is a set of assembly routine/program that reside in <u>EPROM</u> or <u>Flash ROM</u>. BIOS controls Input/output devices and other hardware devices of motherboard. In general, to provide hardware independent portability, operation system and drivers is required to access BIOS without directly access hardware devices.

AOpen

Bus Master IDE (DMA mode)

The traditional PIO (Programmable I/O) IDE requires the CPU to involve in all the activities of the IDE access including waiting for the mechanical events. To reduce the workload of the CPU, the bus master IDE device transfers data from/to memory without interrupting CPU, and releases CPU to operate concurrently while data is transferring between memory and IDE device. You need the bus master IDE driver and the bus master IDE HDD to support bus master IDE mode.

CNR (Communication and Networking Riser)

The CNR specification provides the PC industry the opportunity to deliver a flexible and cost reduced method of implementing LAN, home networking, DSL, USB, wireless, audio and modem subsystems widely used in today's "connected PCs". The CNR specification is an open industry specification and is supported by OEMs, IHV card manufacturers, silicon supplier and Microsoft.

CODEC (Coding and Decoding)

Normally, CODEC means a circuit that can do digital to analog conversion and also the analog to digital conversion. It is part of AC97 sound/modem solution.

DDR (Double Data Rated) SDRAM

DDR SDRAM utilizes the existing DRAM infrastructure and technology while doubling the nominal bandwidth available to systems in an easy to design and simple to adopt way. Initially a perfect solution for memory intensive server and workstation applications, DDR low cost and low voltage will ultimately make it an ideal solution for all segments of the PC market, high performance desktop and mobile PCs, Value PCs and even Internet Appliances and mobile devices.

DIMM (Dual In Line Memory Module)

DIMM socket has total 168-pin and supports 64-bit data. It can be single or double side, the golden finger signals on each side of PCB are different, and that is why it was called Dual In Line. Almost all DIMMs are made by SDRAM, which operate at 3.3V. Note that some old DIMMs are made by FPM/EDO and only operate at 5V. Do not confuse them with SDRAM DIMM.

DMA (Direct Memory Access)

Channel for communications between the memory and surrounding devices.

ECC (Error Checking and Correction)

The ECC mode needs 8 ECC bits for 64-bit data. Each time memory is accessed; ECC bits are updated and checked by a special algorithm. The ECC algorithm has the ability to detect double-bit error and automatically correct single-bit error while parity mode can only detect single-bit error.

EDO (Extended Data Output) Memory

The EDO DRAM technology is actually very similar to FPM (Fast Page Mode). Unlike traditional FPM that tri-states the memory output data to start the pre-charge activity, EDO DRAM holds the memory data valid until the next memory access cycle, that is similar to pipeline effect and reduces one clock state.

EEPROM (Electronic Erasable Programmable ROM)

Also known as E^{2}PROM. Both EEPROM and Flash ROM can be re-programmed by electronic signals, but the interface technology is different. Size of EEPROM is much smaller than flash ROM.

EPROM (Erasable Programmable ROM)

Traditional motherboard stores BIOS code in EPROM. EPROM can only be erased by ultra-violet (UV) light. If BIOS has to be upgraded, you need to remove EPROM from motherboard, clear by UV light, re-program, and then insert back.

EV6 Bus

EV6 Bus in the technology of Alpha processor from Digital Equipment Corporation. EV6 bus uses both rising and falling clock edge to transfer data, similar as DDR SDRAM or ATA/66 IDE bus.
EV6 Bus Speed = CPU external bus clock x 2.
For example, 200 MHz EV6 bus is actually using 100 MHz external bus clock, but the equivalent speed is 200 MHz.

FCC DoC (Declaration of Conformity)

The DoC is component certification standard of FCC EMI regulations. This standard allows DIY component (such as motherboard) to apply DoC label separately without a shielding of housing.

FC-PGA (Flip Chip-Pin Grid Array)

FC means Flip Chip, FC-PGA is a package of Intel for Pentium III CPU. It can plug into SKT370 socket.

Flash ROM

Flash ROM can be re-programmed by electronic signals. It is easier for BIOS to upgrade by a flash utility, but it is also easier to be infected by virus. Because of increase of new functions, BIOS size is increased from 64KB to 256KB (2M bit). AOpen AX5T is the first board to implement 256KB (2Mbit) Flash ROM. Now flash ROM size is moving to 4M bit on AX6C (Intel 820) and MX3W (Intel 810) motherboard. , AOpen motherboard uses EEPROM for jumper-less and battery-less design.

FSB (Front Side Bus) Clock

FSB Clock means CPU external bus clock.
CPU internal clock = CPU FSB Clock x CPU Clock Ratio

I^2C Bus

See SMBus.

IEEE 1394

IEEE 1394 is a low-cost digital interface originated by Apple Computer as a desktop LAN and developed by the IEEE 1394 working group. The IEEE 1394 can transport data at 100, 200 or 400 Mbps. One of the solutions to connect digital television devices together at 200 Mbps. Serial Bus Management provides overall configuration control of the serial bus in the form of optimizing arbitration timing, guarantee of adequate electrical power for all devices on the bus, assignment of isochronous channel ID, and notification of errors. There are two type of IEEE 1394 data transfer: asynchronous and isochronous. Asynchronous transport is the traditional computer memory-mapped, load and store interface. Data requests are sent to a specific address and an acknowledgment is returned. In addition to an architecture that scales with silicon technology, IEEE 1394 features a unique isochronous data channel interface. Isochronous data channels provide guaranteed data transport at a pre-determined rate. This is especially important for time-critical multimedia data where just-in-time delivery eliminates the need for costly buffering.

Parity Bit

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.

PBSRAM (Pipelined Burst SRAM)

For Socket 7 CPU, one burst data read requires four QWord (Quad-word, 4x16 = 64 bits). PBSRAM only needs one address decoding time and automatically sends the remaining QWords to CPU according to a predefined sequence. Normally, it is 3-1-1-1, total 6 clocks, which is faster than asynchronous SRAM. PBSRAM is often used on L2 (level 2) cache of Socket 7 CPU. Slot 1 and Socket 370 CPU do not need PBSRAM.

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PC-100 DIMM

[SDRAM](#) DIMM that supports 100MHz CPU [FSB](#) bus clock.

PC-133 DIMM

[SDRAM](#) DIMM that supports 133MHz CPU [FSB](#) bus clock.

PC-1600 / PC-2100/ PC-2700 / PC-3200 DDR DRAM

Based on FSB frequency, the DDR DRAM has 200MHz, 266MHz and 333 MHz three types of working frequency. Because of DDR DRAM data bus is 64-bit, it provides data transfer bandwidth up to 200x64/8=1600MB/s, 266x64/8=2100MB/s, 333x64/8=2700MB/s and 400x64/8=3200MB/s. Hence, the PC-1600 DDR DRAM is working with 100MHz, PC-2100 DDR DRAM is working with 133MHz, PC-2700 DDR DRAM is working with 166MHz and PC-3200 DDR DRAM is working with 200MHz FSB frequency.

PCI (Peripheral Component Interface) Bus

Bus for the internal connection of peripheral devices, high-speed data channel between the computer and expansion card.

PDF Format

A file format for electronic document, PDF format is independent from platform, you can read PDF file under Windows, Unix, Linux, Mac … with different PDF reader. You can also read PDF file by web browser such as IE and Netscape, note that you need to install PDF plug-in first (Included in Acrobat Reader).

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PnP (Plug and Play)

The PnP specification suggests a standard register interface for both BIOS and operating system (such as Windows 95). These registers are used by BIOS and operating system to configure system resource and prevent any conflicts. PnP BIOS or operating system will automatically allocate the IRQ/DMA/Memory. Currently, almost all the PCI cards and most ISA cards are already PnP compliant.

POST (Power-On Self Test)

The BIOS self-test procedure after power-on, sometimes, it is the first or the second screen shown on your monitor during system boot.

RDRAM (Rambus DRAM)

Rambus is a memory technology that uses large burst mode data transfer. Theoretically, the data transfer should be high than SDRAM. RDRAM is cascaded in channel operation. For Intel 820, only one RDRAM channel is supported, 16-bit data per channel, and this channel may have maximum 32 RDRAM devices, no matter how many RIMM sockets.

RIMM (Rambus Inline Memory Module)

184-pin memory module that supports RDRAM memory technology. A RIMM memory module may contain up to maximum of 16 RDRAM devices.

SDRAM (Synchronous DRAM)

SDRAM is one of the DRAM technologies that allow DRAM to use the same clock as the CPU host bus (EDO and FPM are asynchronous and do not have clock signal). It is similar as PBSRAM to use burst mode transfer. SDRAM comes in 64-bit 168-pin DIMM and operates at 3.3V. AOpen is the first company to support dual-SDRAM DIMMs onboard (AP5V), from Q1 1996

Shadow E^{2}PROM

A memory space in Flash-ROM to simulate E^{2}PROM operation, AOpen motherboard uses Shadow E^{2}PROM for jumper-less and battery-less design

SIMM (Single In Line Memory Module)

SIMM socket is only 72-pin, and is only single side. The golden finger signals on each side of PCB are identical. That is why it was called Single In Line. SIMM is made by FPM or EDO DRAM and supports 32-bit data. SIMM had been phased out on current motherboard design.

SMBus (System Management Bus)

SMBus is also called I2C bus. It is a two-wire bus developed for component communication (especially for semiconductor IC). For example, set clock of clock generator for jumper-less motherboard. The data transfer rate of SMBus is only 100Kbit/s, it allows one host to communicate with CPU and many masters and slaves to send/receive message.

SPD (Serial Presence Detect)

SPD is a small ROM or <u>EEPROM</u> device resided on the <u>DIMM</u> or <u>RIMM</u>. SPD stores memory module information such as DRAM timing and chip parameters. SPD can be used by <u>BIOS</u> to decide best timing for this DIMM or RIMM.

Ultra DMA

Ultra DMA (or, more accurately, Ultra DMA/33) is a protocol for transferring data between a hard disk drive through the computer's data path (or bus) to the computer's random access memory (RAM). The Ultra DMA/33 protocol transfers data in burst mode at a rate of 33.3MB/s, twice as fast as the previous <u>Direct Access Memory (DMA)</u> interface. Ultra DMA was developed as a proposed industry standard by the Quantum corporation, makes of hard disk drives, and Intel, makes of chipset that support computer bus technology. Ultra DMA support in your computer means that it will boot (start) and open new applications more quickly. It will help users of graphic-intensive and applications that require large amounts of access to data on the hard disk drive. Ultra DMA uses Cyclical Redundancy Checking (CRC), offering a new level of data protection. Ultra DMA uses the same 40-pin IDE interface cable as PIO and DMA.

16.6MB/s x2 = 33MB/s

16.6MB/s x4 = 66MB/s

16.6MB/s x6 = 100MB/s

USB (Universal Serial Bus)

Compared to traditional USB 1.0/1.1 with the speed of 12Mbps, USB 2.0 has a fancy speed up to 480 Mbps that is 40 times faster than the traditional one. Except for the speed increase, USB 2.0 supports old USB 1.0/1.1 software and peripherals, offering impressive and even better compatibility to customers.

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VCM (Virtual Channel Memory)

NEC's Virtual Channel Memory (VCM) is a new DRAM core architecture that dramatically improves the memory system's ability to service multimedia requirements. VCM increases memory bus efficiency and performance of any DRAM technology by providing a set of fast static registers between the memory core and I/O pins. Using VCM technology results in reduced data access latency and reduced power consumption.

ZIP file

A compressed file format to reduce file size. To unzip file, run shareware PKUNZIP (http://www.pkware.com/) for DOS and other operating system or WINZIP (http://www.winzip.com/) for windows environment.

Troubleshooting

If you encounter any trouble to boot you system, follow the procedures accordingly to resolve the problem.

Start

Turn off the power and unplug the AC power cable, then remove all of the add-on cards and cables, including VGA, IDE, FDD, COM1, COM2 and printer.

Make sure if all jumper settings are correct.

Clear CMOS

Next

Continue

Install the VGA card. Then connect your monitor and keyboard.

Yes
Turn on the power and check if the power supply and CPU fan work properly.
No

Next

The problem is probably caused by power supply or motherboard failure. Please contact your reseller or local distributor for repairing.

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```
                              ┌──────────────────┐
                              │     Continue     │
                              └──────────────────┘
                                        │
                                        ▼
                                                        No      ┌─────────────────────────┐
                         ◇ Check if there is display? ◇─────────▶│ Perhaps your VGA card   │
                                                                 │ or monitor is defective.│
                                                                 └─────────────────────────┘
                              Yes │
                                  ▼
                  ┌──────────────────────────────────────────────┐
                  │ Press <Ctrl> and <Alt> key at the same time, hold │
                  │ them and then press <Del> to reboot the system.  │
                  └──────────────────────────────────────────────┘
                                        │
                                        ▼
                                                        No      ┌─────────────────────────┐
                         ◇  Check if the system   ◇─────────────▶│ It is very possible that your │
                         ◇      reboots?          ◇              │ keyboard is defective.  │
                                                                 └─────────────────────────┘
                              Yes │
                                  ▼
                              ┌──────────────────┐
                              │       Next       │
                              └──────────────────┘
```

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Continue

During system rebooting, press <Del> to enter BIOS setup. Choose "Load Setup Default".

Turn off the system and re-connect IDE cable.

Check if the system can reboot successfully?

No

The problem should be caused by the IDE cable or HDD itself.

Yes

Re-install the operating system such as Windows 98.

End

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Technical Support

Dear Customer,

Thanks for choosing AOpen products. To provide the best and fastest service to our customer is our first priority. However, we receive numerous emails and phone-calls worldwide everyday, it is very hard for us to serve everyone on time. We recommend you follow the procedures below and seek help before contact us. With your help, we can then continue to provide the best quality service to more customers.

Thanks very much for your understanding!

AOpen Technical Supporting Team

1
Online Manual: Please check the manual carefully and make sure the jumper settings and installation procedure are correct.
http://english.aopen.com.tw/tech/download/manual/default.htm

2
Test Report: We recommend choosing board/card/device from the compatibility test reports for assembling your PC.
http://english.aopen.com.tw/tech/report/default.htm

3
FAQ: The latest FAQ (Frequently Asked Questions) may contain a solution to your problem.
http://english.aopen.com.tw/tech/faq/default.htm

4
Download Software: Check out this table to get the latest updated BIOS/utility and drivers.
http://english.aopen.com.tw/tech/download/default.htm

5 | **News Group:** News posted by computer experts, you are welcome to join any discussion and learning from it.
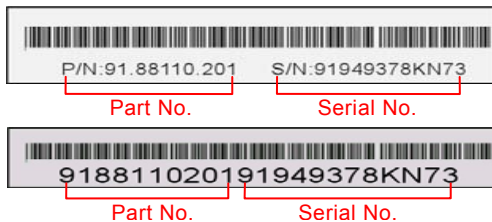http://english.aopen.com.tw/tech/newsgrp/default.htm

6 | **Contact Distributors/Resellers:** We sell our products through resellers and integrators. They should know your system configuration very well and should be able to solve your problem more efficiently than us. After all, their attitude of service is an important reference for you if next time you want to buy something else from them.

7 | **Contact Us:** Please prepare detail system configuration and error symptom before contacting us. The **part number**, **serial number** and **BIOS version** are also very helpful.

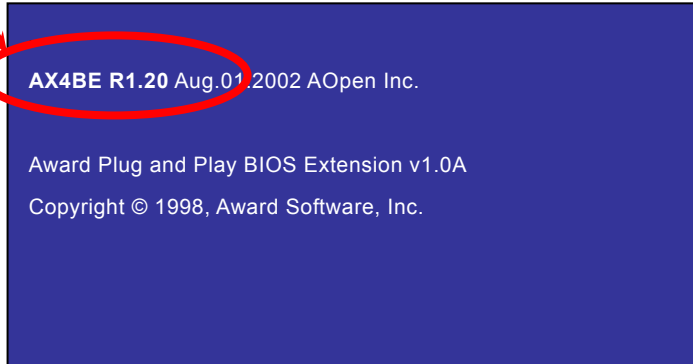## Part Number and Serial Number

The Part Number and Serial number are printed on bar code label. You can find this bar code label on the outside packing, or on component side of PCB. For example:

P/N:91.88110.201   S/N:91949378KN73
Part No.   Serial No.

918811020191949378KN73
Part No.   Serial No.

P/N: 91.88110.201 is part number, **S/N: 91949378KN73** is serial number.

Model name and BIOS version

Model name and BIOS version can be found on upper left corner of first boot screen (POST screen). For example:

AX4BE R1.20 Aug.01.2002 AOpen Inc.

Award Plug and Play BIOS Extension v1.0A

Copyright © 1998, Award Software, Inc.

AX4BE is model name of motherboard; **R1.20** is BIOS version.

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Product Registration

Thank you for choosing AOpen product. AOpen encourages you to spend few minutes in completing the following product registration. To register your product will ensure the high quality of services from AOpen. After the registration, you will:

- Have opportunities to play online slot machine and win a prize from AOpen by accumulating your bonuses for later prize exchange.

- Be upgraded to gold membership of Club AOpen program.

- Receive email notification about product safety alerts. Its purpose is to alert consumers quickly and conveniently when products contain technical issues.

- Receive email notification about latest product's announcements.

- Be able to personalize your AOpen web pages.

- Receive e-mail notification about latest BIOS/Driver/Software release information.

- Have opportunities to participate special product promotional programs.

- Enjoy higher service priority to receive technical assistance provided by AOpen specialists worldwide.

- Be able to join the discussions of web-based news groups.

AOpen makes sure that the information you provide is encrypted, so that it cannot be read or intercepted by other people or companies. Further, AOpen will not disclose any of information you submitted under any conditions. Please consult our online privacy policy for further information on our company policy.

Note: If registering products purchased from different dealers/retails and/or purchased on different dates, please submit a separate form for each product.

How to Contact Us

Please do not hesitate contact us if you have any problem about our products. Any opinion will be appreciated.

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China 艾爾鵬國際貿易(上海)有限公司 Tel: 86-21-6225-8622 Fax: 86-21-6225-7926	Germany AOpen Computer GmbH. Tel: 49-1805-559191 Fax: 49-2102-157799	Japan AOpen Japan Inc. Tel: 81-048-290-1800 Fax: 81-048-290-1820

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Simplified Chinese	*http://www.aopen.com.cn/tech/default.htm*