

# **MX46U2-VN**

## **Online Manual**

DOC. NO.: MX46U2VN-OL-E0303A

Overview

Hardware  
Installation

Drivers &  
Utilities

AWARD  
BIOS Setup

Glossary

Troubleshooting &  
Technical Support

## What's in this manual

<b>MX46U2-VN .....</b>	<b>1</b>
<i>What's in this manual</i> .....	2
<i>You Must Notice</i> .....	7
<i>Before You Start</i> .....	8
<i>Overview</i> .....	9
<i>Feature Highlight</i> .....	10
<i>Quick Installation Procedure</i> .....	13
<i>Motherboard Map</i> .....	14
<i>Block Diagram</i> .....	15
<b>Hardware Installation .....</b>	<b>16</b>
<i>About "User Upgrade Optional" and "Manufacture Upgrade Optional"</i> .....	17
<i>JP14 Clear CMOS Data</i> .....	18
<i>CPU Installation</i> .....	19
<i>CPU Jumper-less Design</i> .....	22
<i>AOpen "Watch Dog ABS"</i> .....	23
<i>Setting CPU Frequency</i> .....	24
<i>CPU and System Fan Connector (with H/W Monitoring)</i> .....	26
<i>JP28 Keyboard/Mouse Wake-up Jumper</i> .....	27

*DIMM Sockets* ..... 28

*Front Panel Connector* ..... 30

*ATX Power Connector* ..... 31

*AC Power Auto Recovery* ..... 31

*IDE and Floppy Connector* ..... 32

**NEW!** *ATA/133 Supported* ..... 34

*IrDA Connector* ..... 35

*Support 10/100 Mbps LAN onboard* ..... 36

*PC99 Color Coded Back Panel* ..... 37

**NEW!** *Support USB 2.0 Ports* ..... 38

*CD Audio Connector* ..... 39

*Front Audio Connector* ..... 40

*Battery-less and Long Life Design* ..... 41

*Over-current Protection* ..... 42

*Hardware Monitoring* ..... 43

*Resettable Fuse* ..... 44

*Low ESR Capacitor* ..... 45

*Layout (Frequency Isolation Wall)* ..... 46

*Enlarged Aluminum Heatsink* ..... 47



Vivid BIOS technology..... 48

**Driver and Utility .....49**

Auto-run Menu from Bonus CD ..... 50

Installing VGA Driver ..... 51


Installing AGP Driver ..... 52

Installing Audio Driver..... 53

Installing IDE Driver..... 54

Installing LAN Driver..... 55

Installing USB2.0 Driver ..... 57

 AConfig Utility ..... 58


ACPI Suspend to Hard Drive..... 60

ACPI Suspend to RAM (STR) ..... 64

**AWARD BIOS .....66**

How To Use Award™ BIOS Setup Program..... 67

How To Enter BIOS Setup..... 69

 BIOS Upgrade under Windows environment ..... 70

**Glossary .....72**

AC97 CODEC ..... 72

ACPI (Advanced Configuration & Power Interface)..... 72



<i>ACR (Advanced Communication Riser)</i> .....	72
<i>AGP (Accelerated Graphic Port)</i> .....	73
<i>AMR (Audio/Modem Riser)</i> .....	73
<i>ATA (AT Attachment)</i> .....	73
<i>BIOS (Basic Input/Output System)</i> .....	74
<i>Bluetooth</i> .....	74
<i>CNR (Communication and Networking Riser)</i> .....	74
<i>DDR (Double Data Rate) RAM</i> .....	75
<i>ECC (Error Checking and Correction)</i> .....	75
<i>EEPROM (Electronic Erasable Programmable ROM)</i> .....	75
<i>EPROM (Erasable Programmable ROM)</i> .....	75
<i>EV6 Bus</i> .....	76
<i>FCC DoC (Declaration of Conformity)</i> .....	76
<i>FC-PGA (Flip Chip-Pin Grid Array)</i> .....	76
<i>FC-PGA2 (Flip Chip-Pin Grid Array)</i> .....	76
<i>Flash ROM</i> .....	76
<i>Hyper Threading</i> .....	77
<i>IEEE 1394</i> .....	77
<i>Parity Bit</i> .....	77

<i>PCI (Peripheral Component Interface) Bus</i> .....	78
<i>PDF Format</i> .....	78
<i>PnP (Plug and Play)</i> .....	78
<i>POST (Power-On Self Test)</i> .....	78
<i>PSB (Processor System Bus) Clock</i> .....	78
<i>RDRAM (Rambus Dynamic Random Access Memory)</i> .....	79
<i>RIMM (Rambus Inline Memory Module)</i> .....	79
<i>SDRAM (Synchronous DRAM)</i> .....	79
<i>SATA (Serial ATA)</i> .....	79
<i>SMBus (System Management Bus)</i> .....	80
<i>SPD (Serial Presence Detect)</i> .....	80
<i>USB 2.0 (Universal Serial Bus)</i> .....	80
<i>VCM (Virtual Channel Memory)</i> .....	80
<i>Wireless LAN – 802.11b</i> .....	81
<i>ZIP file</i> .....	81
<b>Troubleshooting</b> .....	<b>82</b>
<b>Technical Support</b> .....	<b>86</b>
<b>Product Registration</b> .....	<b>89</b>
<b>How to Contact Us</b> .....	<b>90</b>

## You Must Notice



Adobe, the Adobe logo, Acrobat is trademarks of Adobe Systems Incorporated.

AMD, the AMD logo, Athlon and Duron are trademarks of Advanced Micro Devices, Inc.

Intel, the Intel logo, Intel Celeron, Pentium II, Pentium III and Pentium 4 are trademarks of Intel Corporation.

Microsoft, Windows, and Windows logo are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

All product and brand names used on this manual are used for identification purposes only and may be the registered trademarks of their respective owners.

All of the specifications and information contained in this manual are subject to change without notice. AOpen reserves the right to revise this publication and to make reasonable changes. AOpen assumes no responsibility for any errors or inaccuracies that may appear in this manual, including the products and software described in it.

**This documentation is protected by copyright law. All rights are reserved.**

**No part of this document may be used or reproduced in any form or by any means, or stored in a database or retrieval system without prior written permission from AOpen Corporation.**

**Copyright® 1996-2003, AOpen Inc. All Rights Reserved.**



## 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 5.0 for online viewing, it is included in Bonus CD or you can get free download from [Adobe web site](#).

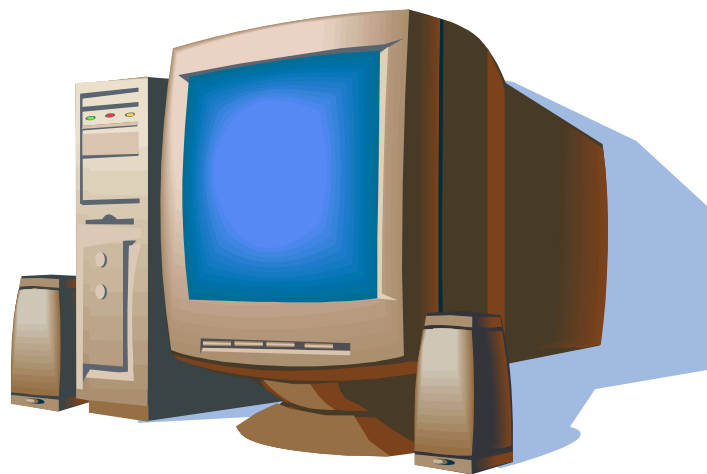
Although this Online Manual is optimized for screen viewing, it is still capable for hardcopy printing, you can print it by A4 paper size and set 2 pages per A4 sheet on your printer. To do so, choose **File > Page Setup** and follow the instruction of your printer driver.

Thanks for the help of saving our earth.



## Overview

Thank you for choosing AOpen MX46U2-VN motherboard. MX46U2-VN is Intel® Socket 478 motherboard (M/B) based on the micro-ATX form factor featuring the [SIS 650GX chipset](#). As high performance chipset built in the M/B, MX46U2-VN motherboard support Intel® Socket 478 Pentium® 4 (Willamette / Northwood) and 400MHz [Front Side Bus \(FSB\)](#) clock. According to different customer's requirements, this motherboard supports DDR 200/266 RAM up to 2GB maximum. The onboard IDE controller supports [Ultra DMA](#) 33/66/100/133 mode and the transfer rate is up to 133MB/s. More than that, on the strength of Realtek 8201BL PHY on board, which is a highly-integrated Platform LAN Connect device, it provides 10/100M bps Ethernet for office and home use. Besides, MX46U2-VN has an [AC97 CODEC](#) chipset onboard providing high performance stereo sound to let people enjoy working with it. This motherboard also supports [USB 2.0](#) function with a fancy speed up to 480Mbps. Now, let's enjoy all features from AOpen MX46U2-VN motherboard.



## Feature Highlight

### CPU

Supports Intel® Socket 478 Pentium® 4 (Willamette / Northwood) 1.4GHz~2.4GHz+ with 400MHz [Front Side Bus \(FSB\)](#) designed for Socket 478 technology.

### Chipset

This motherboard is equipped with SIS 650GX chipset. SIS 650 IGUI Host Memory Controller integrates a high performance host interface for Intel Pentium 4 processor and a high performance 2D/3D Graphic Engine. The SIS 962L MuTIOL Media I/O integrates one Universal Serial Bus 2.0 Host Controllers, the Audio Controller with AC97 Interface, three Universal Serial Bus 1.1 Host Controllers and the IDE Master/Slave controllers. The PCI to LPC Bridge, I/O Advanced Programmable Interrupt Controller, legacy system I/O and legacy power management functionalities are integrated as well.

### Expansion Slots

Including three 32-bit/33MHz PCI slots. The [PCI](#) local bus throughput can be up to 132MB/s. Of three PCI slots provided, all of them are master PCI slots with arbitration and decoding for all integrated functions and LPC bus.

### Memory

Provides two 184-pin DDR [SDRAM](#) DIMM sockets that support up to 2GB of DDR200 and DDR266 compliant SDRAM (Synchronous Dynamic Random Access Memory).

### **1MHz Stepping Frequency Adjustment**

Provides “1MHz Stepping Frequency Adjustment” function in the BIOS. This magic function allows you to adjust CPU FSB frequency from 90~200MHz by 1MHz stepping adjustment, and helps your system get maximum performance.

### **WatchDog ABS**

Includes AOpen “WatchDog ABS” function that can auto-reset default settings in 4.8 seconds when you fail to system overclocking.

### **LAN Port**

On the strength of Realtek 8201BL PHY on board, which is a highly-integrated Platform LAN Connect device, it provides 10/100 Mbps Ethernet for office and home use.

### **Ultra DMA 33/66/100/133 Bus Mater IDE**

Comes with an on-board PCI Bus Master IDE controller with two connectors that support four IDE devices in two channels, supports Ultra DMA 66/100/133, PIO Modes 3 and 4 and Bus Master IDE DMA Mode 5, and supports Enhanced IDE devices.

### **On-board AC'97 Sound**

MX46U2-VN uses RealTek [AC97](#) sound chip. This on-board audio includes a complete audio recording and playback system.

## Six USB 2.0 Ports

Provides four ports on the back panel, one connector on the board for USB 2.0 interface devices, such as mouse, keyboard, modem, scanner, etc.

## Power Management/Plug and Play

Supports the power management function that conforms 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

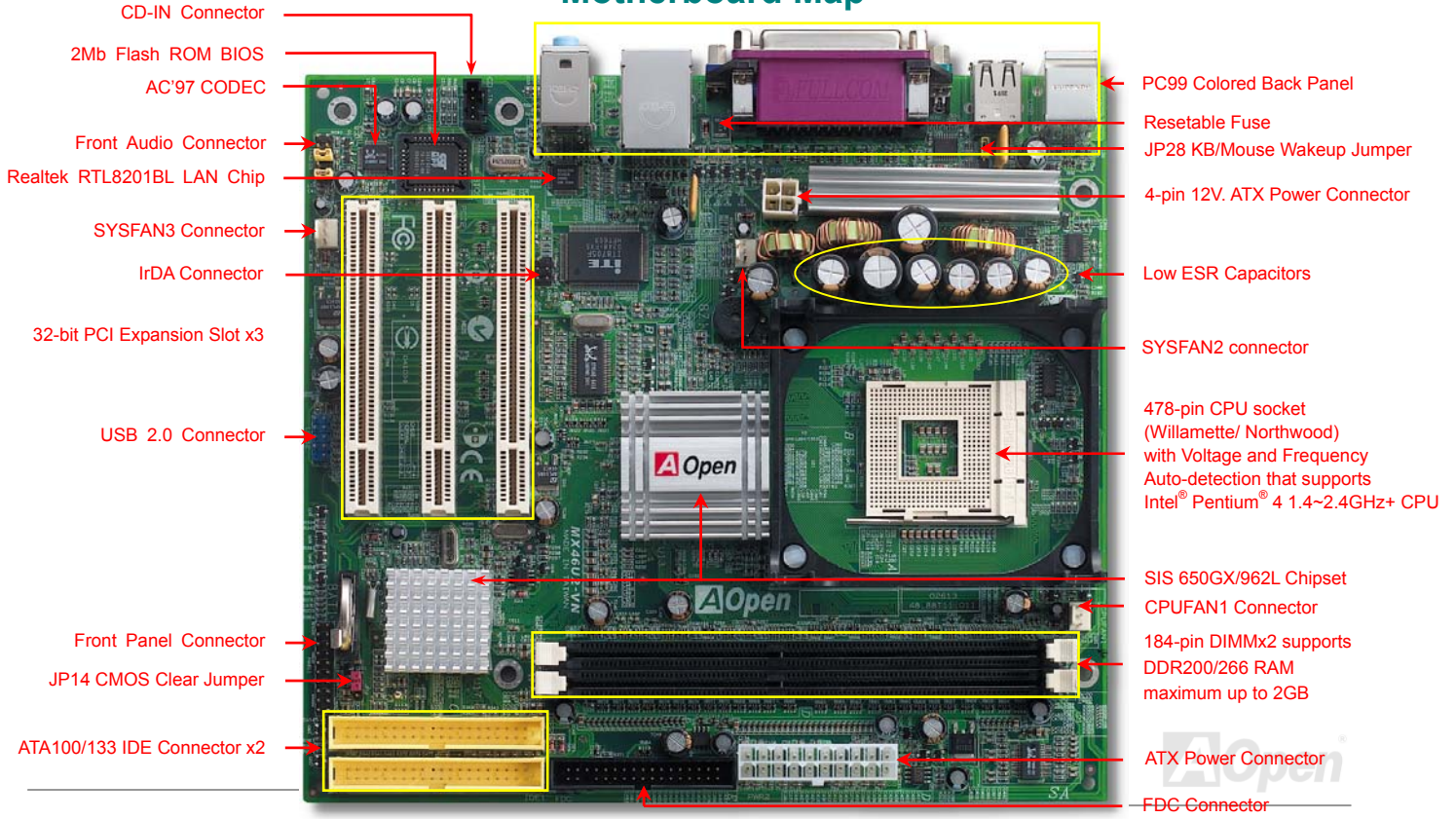
Provides two high-speed UART compatible serial ports and one parallel port with EPP and ECP capabilities. UART can also be directed from COM1 to the Infrared Module for the wireless connections.

## **Quick Installation Procedure**

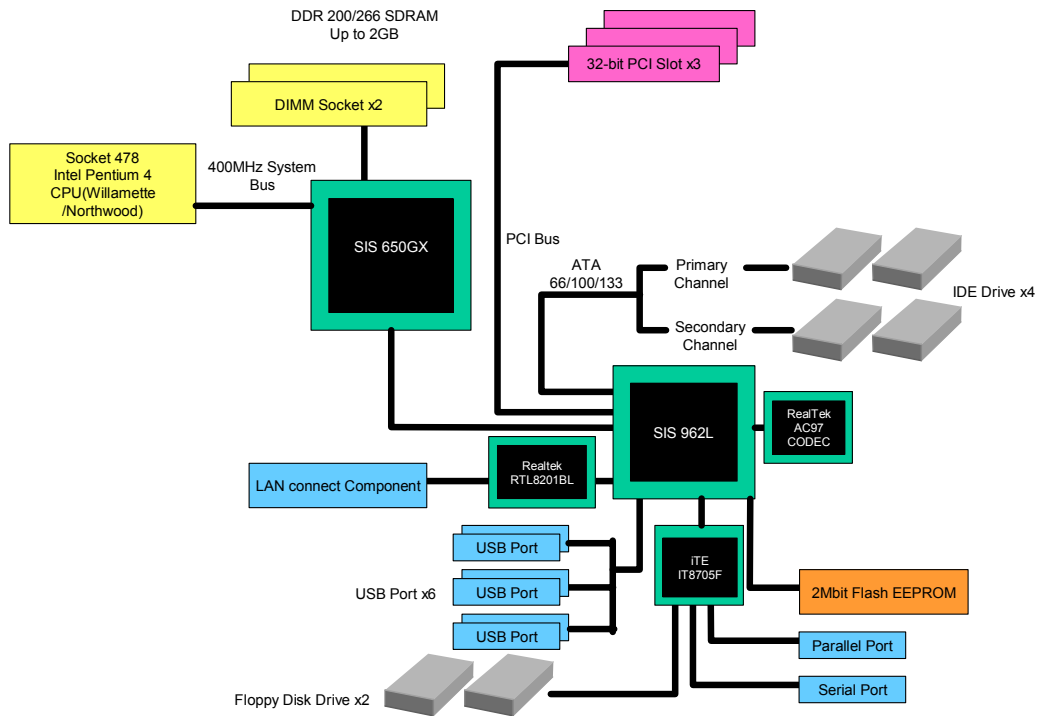
This page gives you a quick procedure on how to install your system. Follow each step accordingly.

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



# Block Diagram



# 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 “User Upgrade Optional” and “Manufacture Upgrade Optional”...

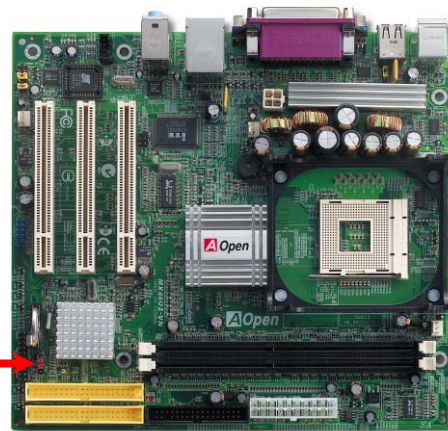
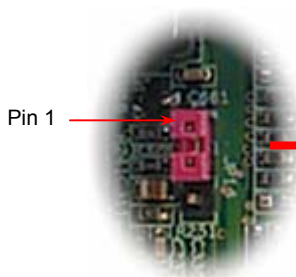
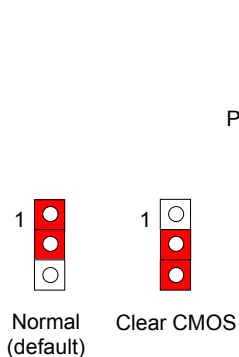
When you read this online manual and start to assemble your computer system, you may notice that some of the functions are marked as “User Upgrade Optional” or “Manufacture Upgrade Optional”. Although all of AOpen’s motherboards have included many amazing and powerful features, sometimes not every user is familiar with these powerful features. As a result of this we define features that can be upgraded by users as “User Upgrade Optional”. You can upgrade these functions by purchasing additional devices. As for functions that cannot be upgraded by users, we define them as “Manufacture Upgrade Optional”. If need be, you can contact our local distributors or resellers to purchase “Manufacture Upgrade Optional” components, and again you are also welcome to visit our official website at [english.aopen.com.tw](http://english.aopen.com.tw) for detail information.



## JP14 Clear CMOS Data

You can clear CMOS to restore system default setting. To clear 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 & pin 2.
5. Connect ATX power cable back to connector PWR2.



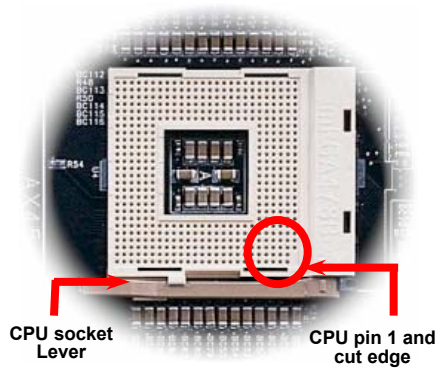
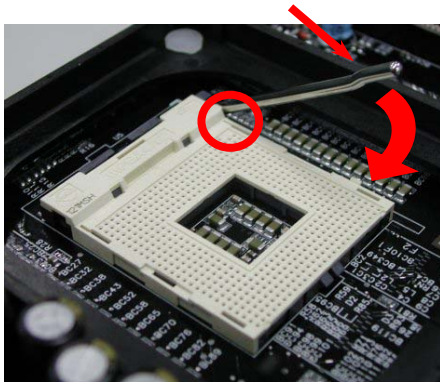
### Tip: When should I Clear CMOS?

1. Boot fails because of overlocking...
2. Forget password...
3. Troubleshooting...

## CPU Installation

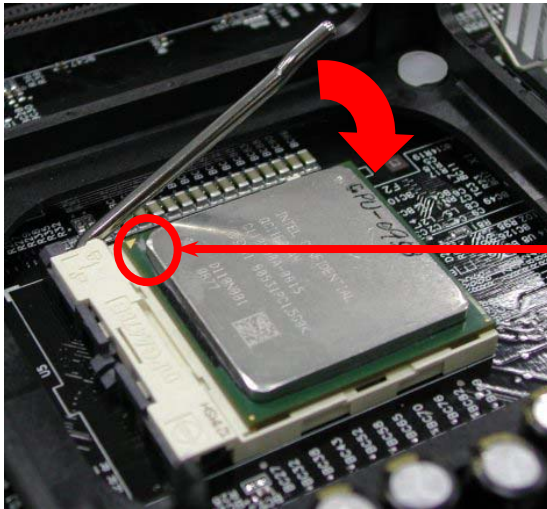
This motherboard supports Intel® Pentium 4 Socket 478 series CPU (Willamette / Northwood). Be careful of CPU orientation when you plug it into CPU socket.

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



Note: Those pictures are for example only; they may not look the same with the motherboard you purchased.

- 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, you may damage the CPU.

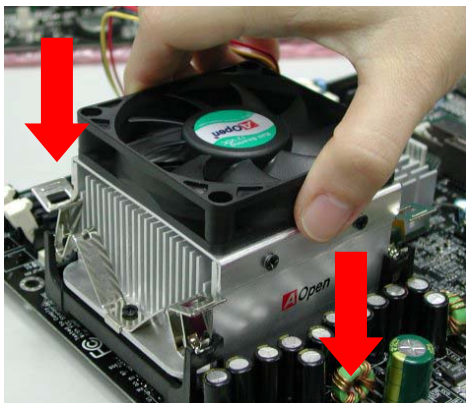
**Note:** This socket supports Micro-FC-PGA2 package CPU, which is the latest CPU package developed by Intel. Other forms of CPU package are impossible to be fitted in.

Note: This picture is for example only; it may not look the same with the motherboard you purchased.

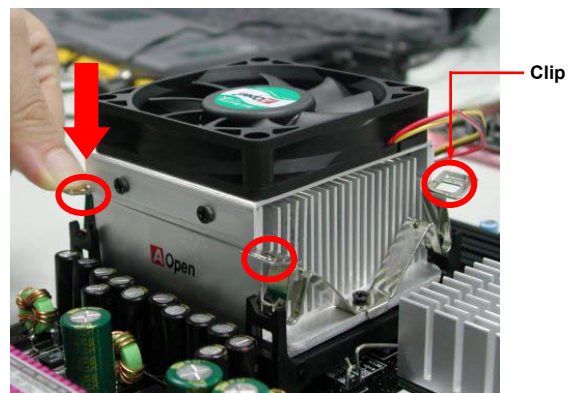
## CPU Fan Installation

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.

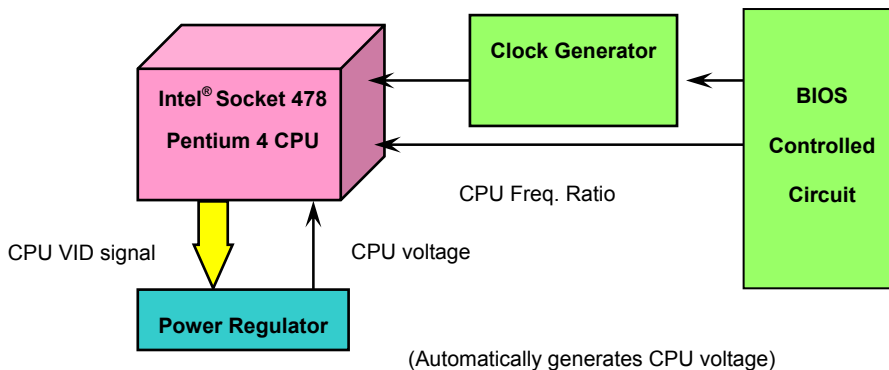


2. Pressing down the four clips with force one by one on the retention module.



## CPU Jumper-less Design

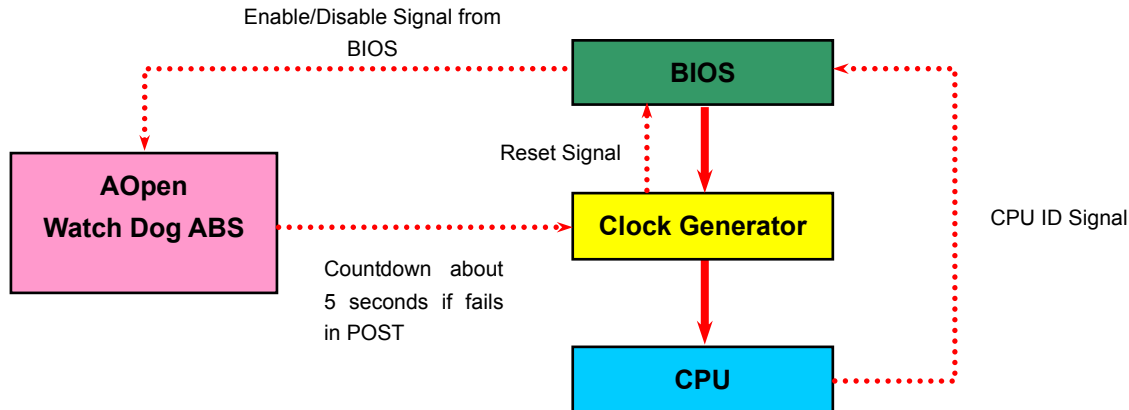
CPU VID signal and [SMBus](#) clock generator provide CPU voltage auto-detection and allows the user to set the CPU frequency through the BIOS setup, therefore no jumpers or switches are used. The disadvantages of the Pentium based jumper-less designs are eliminated. There will be no worry of wrong CPU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



## AOpen “Watch Dog ABS”



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 ABS” 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 ABS” 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.



## Setting CPU Frequency

### BIOS Setup > Frequency/Voltage Control

This motherboard is CPU jumper-less design, you can set CPU frequency through the BIOS setup, and no jumpers or switches are needed. The default setting is "table select mode". You can adjust the FSB from "CPU Host/SDRAM/PCI Clock" for overclocking.

$$\text{Core Frequency} = \text{CPU FSB Clock} * \text{CPU Ratio}$$

$$\text{PCI Clock} = \text{CPU FSB Clock} / \text{Clock Ratio}$$

$$\text{AGP Clock} = \text{PCI Clock} * 2$$

CPU Ratio	8x, 10x... 21x, 22x, 23x, 24x
CPU FSB (By BIOS table)	90-200MHz



Northwood CPU	CPU Core Frequency	FSB Clock	System Bus	Ratio
Pentium 4 1.6G	1600MHz	100MHz	400MHz	16x
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 2.4G	2400MHz	100MHz	400MHz	24x

Celeron CPU	CPU Core Frequency	FSB Clock	System Bus	Ratio
Celeron 1.7G	1700MHz	100MHz	400MHz	17x
Celeron 1.8G	1800MHz	100MHz	400MHz	18x
Celeron 2.0G	2000MHz	100MHz	400MHz	20x
Celeron 2.1G	2100MHz	100MHz	400MHz	21x

Willamette CPU	CPU Core Frequency	FSB Clock	System Bus	Ratio
Pentium 4 1.5G	1500MHz	100MHz	400MHz	15x
Pentium 4 1.6G	1600MHz	100MHz	400MHz	16x
Pentium 4 1.7G	1700MHz	100MHz	400MHz	17x
Pentium 4 1.8G	1800MHz	100MHz	400MHz	18x
Pentium 4 1.9G	1900MHz	100MHz	400MHz	19x
Pentium 4 2.0G	2000MHz	100MHz	400MHz	20x

**Warning:** SIS 650GX chipset supports maximum 400MHz (100MHz\*4) system clock; higher clock setting may cause serious system damage.

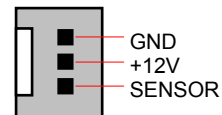
**Note:** Since the latest processor, Northwood, would detect the clock ratio automatically, you may not be able to adjust the clock ratio in BIOS manually.

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

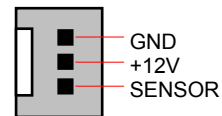
Plug in the CPU fan cable to the 3-pin **CPUFAN1** connector. If you have chassis fan, you can also plug it on **SYSFAN2** or **SYSFAN3** connector.



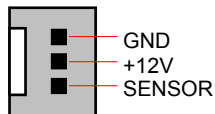
SYSFAN2 Connector



CPUFAN1 Connector



SYSFAN3 Connector

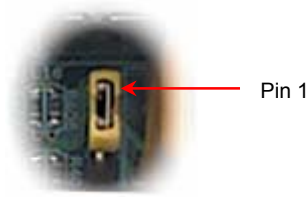
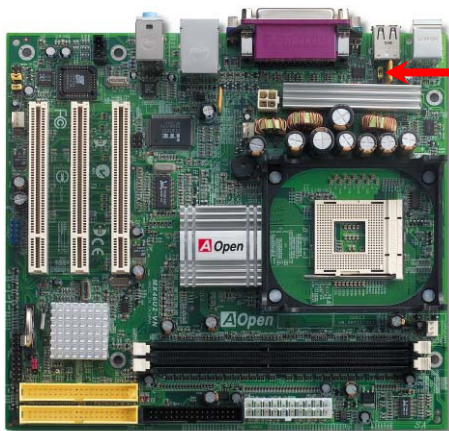


**Note:** Some CPU fans do not have sensor pin, so that they cannot support hardware monitoring function.



## JP28 Keyboard/Mouse Wake-up 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 Jumper



Disable  
(Default)



Enable

## **DIMM Sockets**

This motherboard has two 184-pin DDR [DIMM](#) sockets that allow you to install DDR266 memory or DDR200 memory up to 2GB.

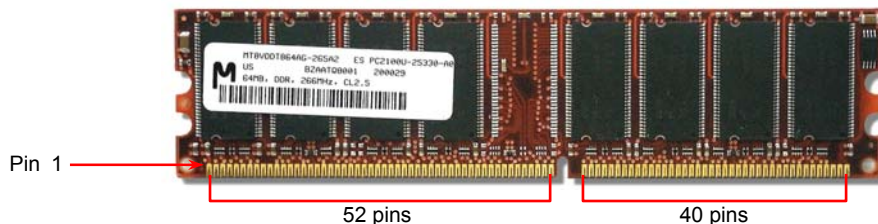


DIMM1  
DIMM2

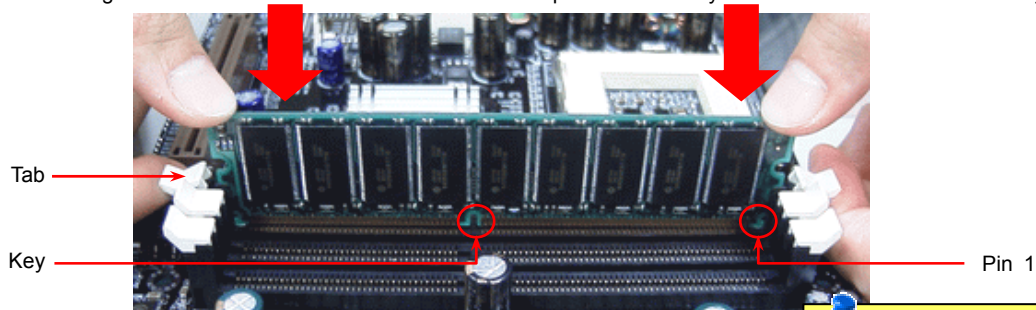
## How to Install Memory Modules

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.



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.



3. Repeat step 2 to finish additional DIMM modules installation.

**Note:** The tabs of the DIMM slot will close-up to hold the DIMM in place when the DIMM touches the slot's bottom.

## Front Panel Connector



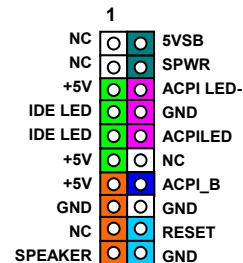
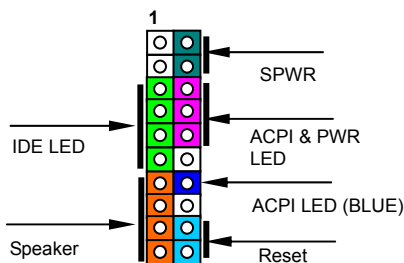
Pin1



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.

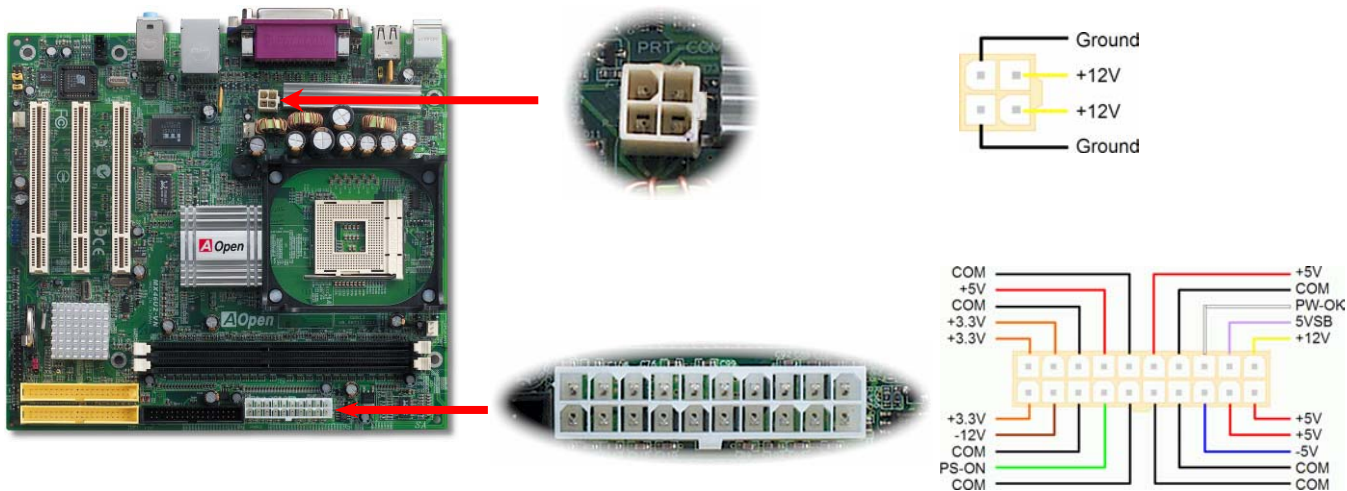
Locate the power switch cable from your ATX housing. It is 2-pin female connector from the housing front panel. Plug this connector to the soft-power switch connector marked **SPWR**.

Suspend Type	ACPI LED
Power on Suspend (S1)	Flashing in red and green for every second
Suspend to RAM (S3)	Flashing in red
Suspend to Disk (S4)	The LED will be turned off



## 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.

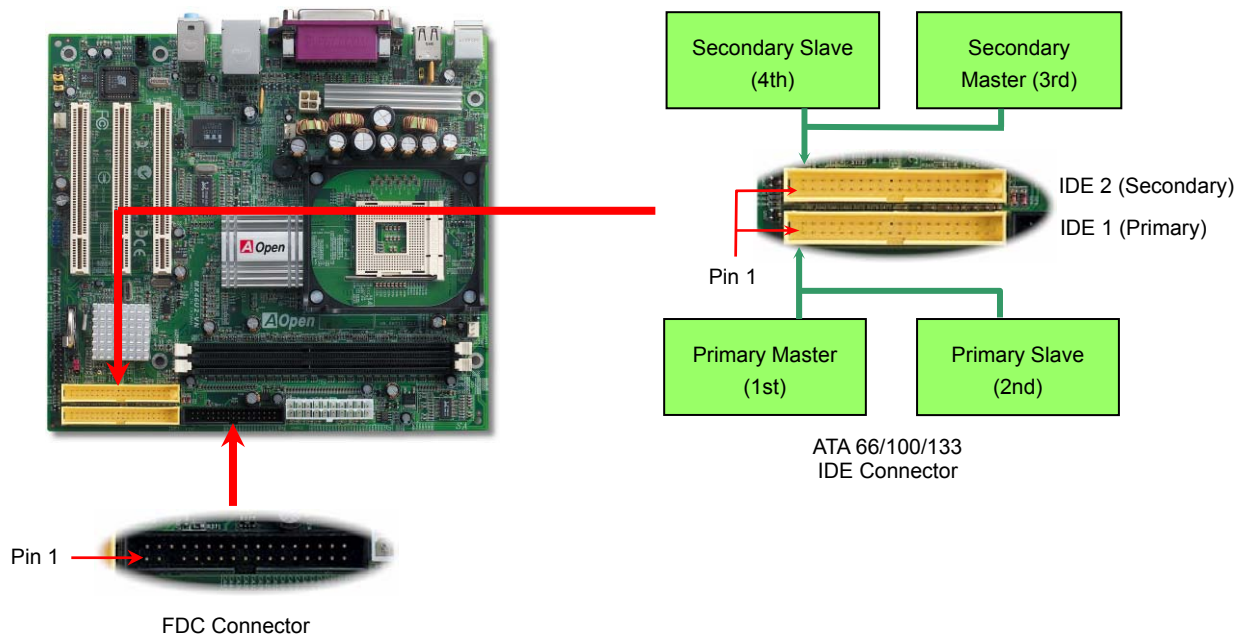


## AC Power Auto Recovery

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 FDD and IDE connector. Be careful of the pin1 orientation. Wrong orientation may cause system damage.






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.

**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 66/100/133 hard disks, a special **80-wires IDE cable** for Ultra DMA 66/100/133 is required.

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



## ATA/133 Supported

This motherboard supports [ATA66](#), [ATA100](#) or [ATA133](#) 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. As the hard drive industry introduces faster and higher capacity hard drives, the current Ultra ATA/100 interface causes a data bottleneck between the drive and the host computer. To avoid this problem, hard disk manufacturers have introduced the new Ultra ATA-133 interface technology. Compared to traditional ATA/100, ATA/133 has up to 33 percent increase in interface speed with transfer rate of 133MB/s. ATA/133 performance is ideal for new operating systems, such as Window XP, that demand more storage space and faster data transfer rates from more responsive computing experiences.

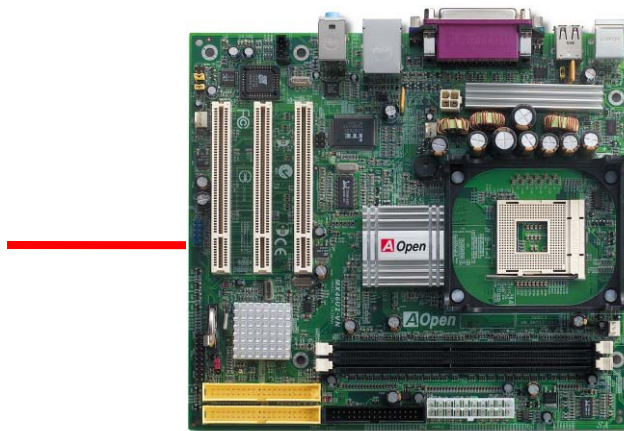
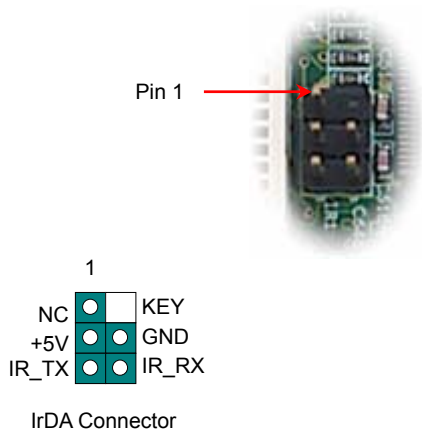
To make good use of this new technology and enjoy its best performance, we recommend you to pair your system with a hard disk equipped with ATA/133 technology so that your system's need for speed on this motherboard can be satisfied.

Mode	Clock Period	Clock Count	Cycle Time	Data Transfer Rate
PIO mode 0	30ns	20	600ns	$(1/600\text{ns}) \times 2\text{byte} = 3.3\text{MB/s}$
PIO mode 1	30ns	13	383ns	$(1/383\text{ns}) \times 2\text{byte} = 5.2\text{MB/s}$
PIO mode 2	30ns	8	240ns	$(1/240\text{ns}) \times 2\text{byte} = 8.3\text{MB/s}$
PIO mode 3	30ns	6	180ns	$(1/180\text{ns}) \times 2\text{byte} = 11.1\text{MB/s}$
PIO mode 4	30ns	4	120ns	$(1/120\text{ns}) \times 2\text{byte} = 16.6\text{MB/s}$
DMA mode 0	30ns	16	480ns	$(1/480\text{ns}) \times 2\text{byte} = 4.16\text{MB/s}$
DMA mode 1	30ns	5	150ns	$(1/150\text{ns}) \times 2\text{byte} = 13.3\text{MB/s}$
DMA mode 2	30ns	4	120ns	$(1/120\text{ns}) \times 2\text{byte} = 16.6\text{MB/s}$
ATA 66	30ns	2	60ns	$(1/60\text{ns}) \times 2\text{byte} \times 2 = 66\text{MB/s}$
ATA 100	20ns	2	40ns	$(1/40\text{ns}) \times 2\text{byte} \times 2 = 100\text{MB/s}$
ATA 133	15ns	2	30ns	$(1/30\text{ns}) \times 2\text{byte} \times 2 = 133\text{MB/s}$

## IrDA Connector

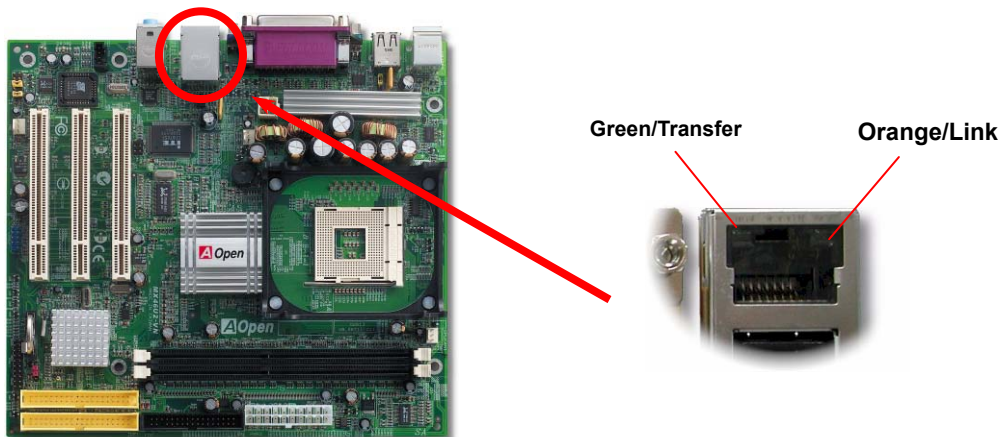
The IrDA connector can be configured to support wireless infrared module, with this module and application software such as Laplink or Windows 95 Direct Cable Connection, the user can transfer files to or from laptops, notebooks, PDA devices and printers. This connector supports HPSIR (115.2Kbps, 2 meters) and ASK-IR (56Kbps).

Install the infrared module onto the **IrDA** connector and enable the infrared function from BIOS Setup, UART Mode. Make sure that you plug in the IrDA connector with correct orientation.



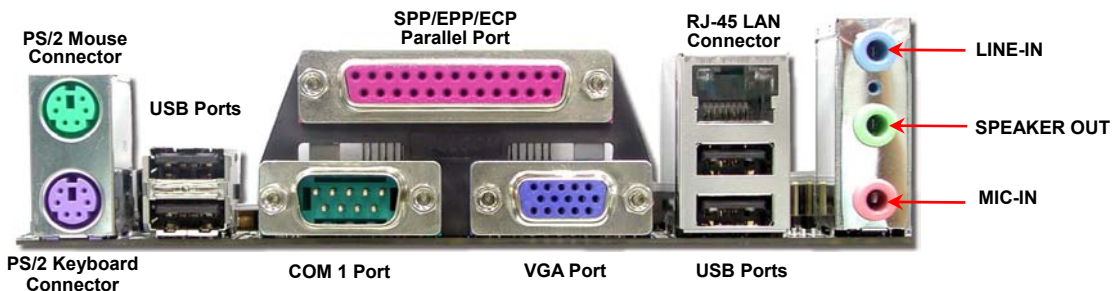
## Support 10/100 Mbps LAN onboard

On the strength of Realtek 8201BL PHY on board, which is a highly-integrated Platform LAN Connect device, it provides 10/100M bps Ethernet for office and home use, the Ethernet RJ45 connector is located on top of USB connectors. The orange LED indicates the link mode, it lights when linking to network. The green LED indicates the transfer mode, and it lights when data is transferring. To enable or disable this function, you may simply adjust it through BIOS.



## PC99 Color Coded Back Panel

The onboard I/O devices are PS/2 Keyboard, PS/2 Mouse, RJ-45 LAN Connector, COM1, VGA, Printer, [USB](#), and AC97 sound 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.
RJ-45 LAN connector	To connect Ethernet for home or office use.
VGA Connector:	To connect with PC monitor.
Speaker Out:	To External Speaker, Earphone or Amplifier.
Line-In:	Comes from the signal sources, such as CD/Tape player.
MIC-In:	From Microphone.

## Support USB 2.0 Ports



This motherboard provides six [USB](#) ports to connect USB devices such as mouse, keyboard, modem, printer, etc. There are four connectors on the PC99 back panel. You can use proper cables to connect USB devices from PC99 back panel or connect USB 2.0 header to the front panel of chassis.

Compared to traditional USB 1.0/1.1 with the speed of 12Mbps, USB 2.0 has a fancy speed up to 480Mbps which 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. On this motherboard, all six ports support USB 2.0 function.

	1	
+5V	●	+5V
SBD2-	●	SBD3-
SBD2+	●	SBD3+
GND	●	GND
KEY	□	NC

Pin 1

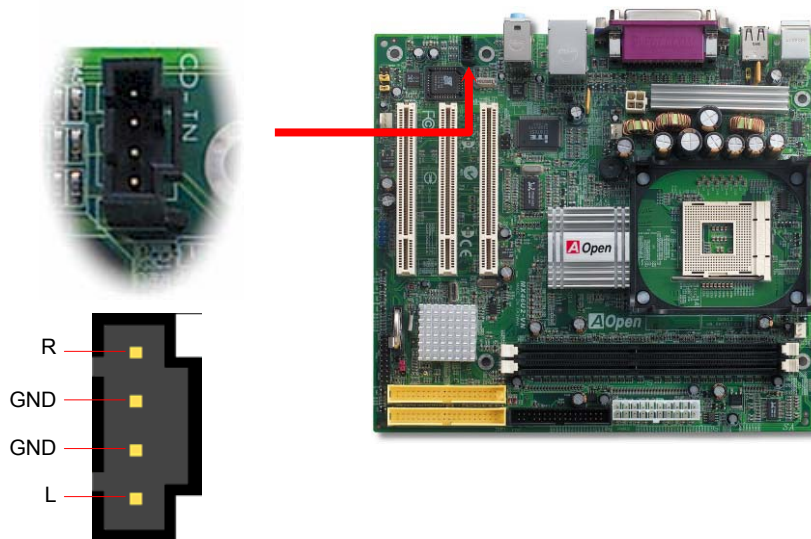


USB 2.0 Connector



## CD Audio Connector











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



CD-IN Connector

## 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 these jumpers cap from the Front Audio Connector before you connect the cable. Do not remove this yellow jumper cap if your housing doesn't have an audio port on the front panel.

	1		
AUD_MIC			AUD_GND
AUD_MIC_BIAS			AUD_VCC
AUD_FPOUT_R			AUD_RET_R
NC			KEY
AUD_FPOUT_L			AUD_RET_L

Front Audio Connector

Pin 1

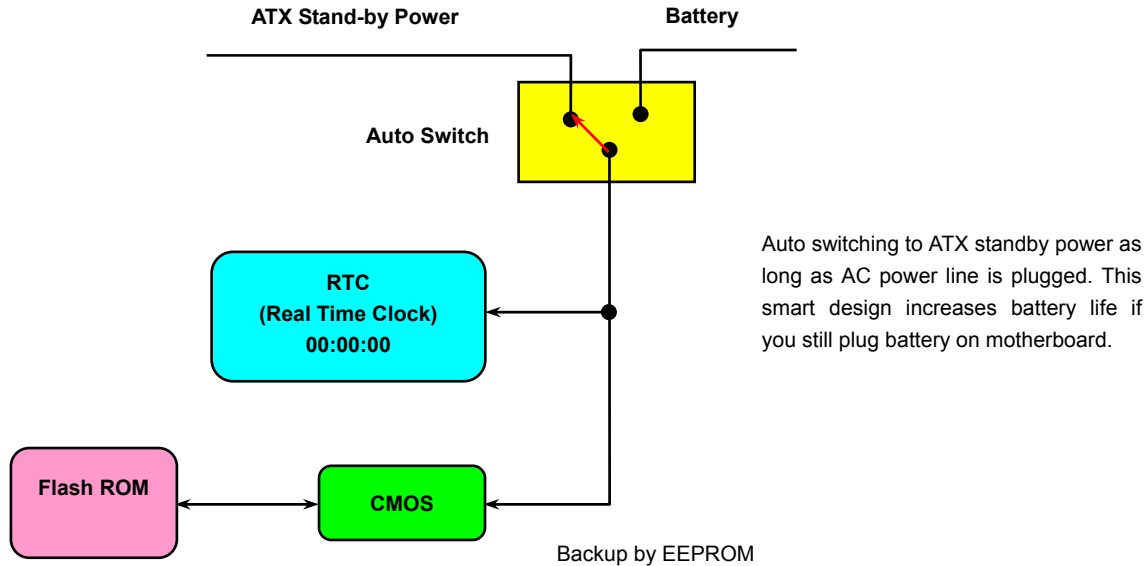


**Note:** Please remove the jumper cap from the front audio connector before you connect the cable. Do not remove this yellow jumper cap if your housing doesn't have an audio port on the front panel.



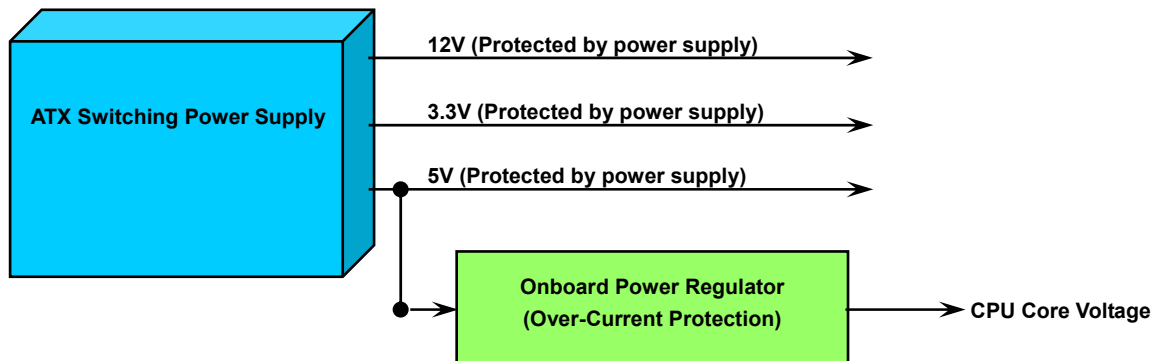
## Battery-less and Long Life Design

This Motherboard implements a [Flash ROM](#) and a special circuit that provide you no batter power consumption of current CPU and CMOS Setup configurations. 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.



## Over-current Protection

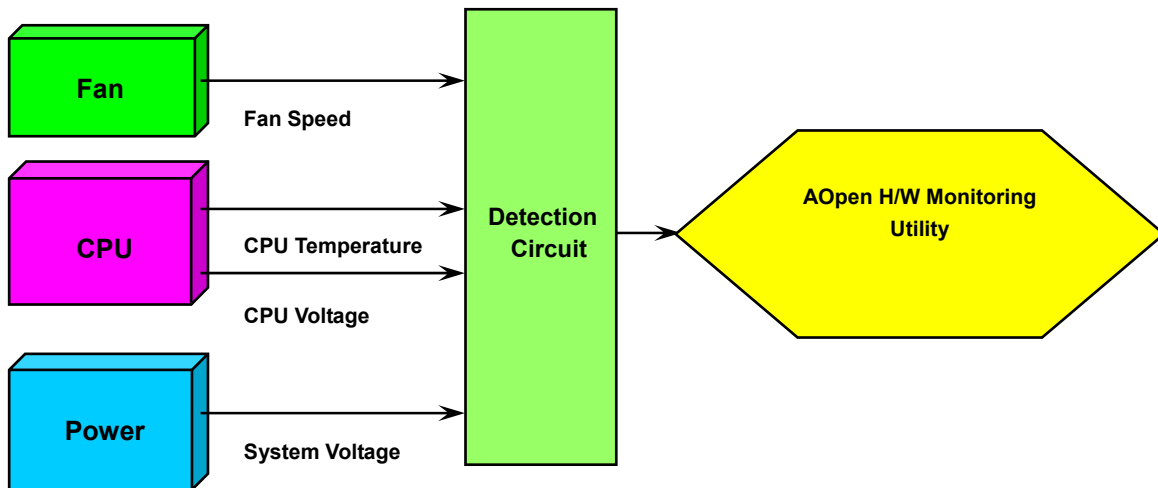
The Over Current Protection is a popular implementation on ATX 3.3V/5V/12V switching power supply. However, the new generation CPU uses different voltage with a regulator to transfer 12V to CPU voltage (for example, 2.0V), and thus makes 5V over current protection useless. This motherboard is with switching regulator onboard supporting CPU over-current protection; in conjunction with 3.3V/5V/12V power supply provide the full line over-current protection.



**Note:** Although we have implemented protection circuit and tried to prevent any human operating mistake, certain risks might still happen when CPU, memory, HDD or add-on cards installed on this motherboard is damaged due to component failure, human operating error or other unknown natural reasons. **AOpen cannot guarantee that the protection circuit will always work perfectly.**

## Hardware Monitoring

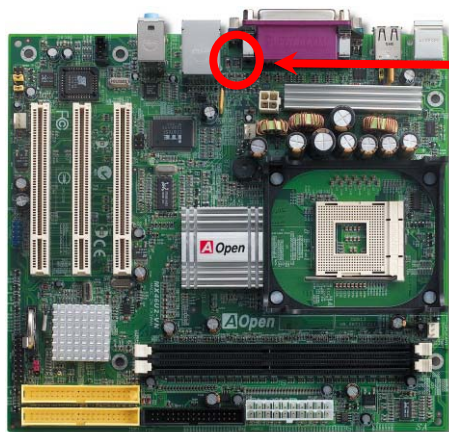
This motherboard implements a hardware monitoring system. As you turn on your system, this smart design will monitor your system's working voltage, fan status and CPU temperature. If any of those systems' status goes wrong, there will be an alarm through the chassis external speaker or buzzer of motherboard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



## Resetable Fuse

Traditional motherboard uses fuses to prevent Keyboard and USB port from over-current or shortage. These fuses are soldered onboard that when it is broken (function to protect motherboard), user cannot replace them and result in malfunction of motherboard.

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

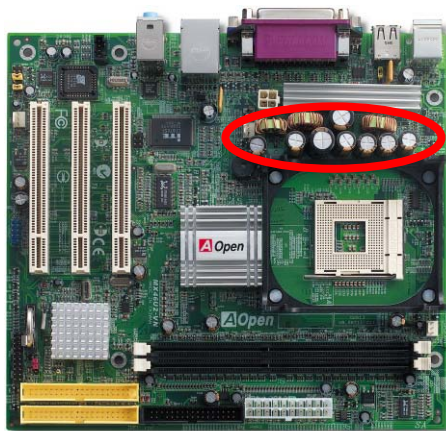


Resetable  
Fuse

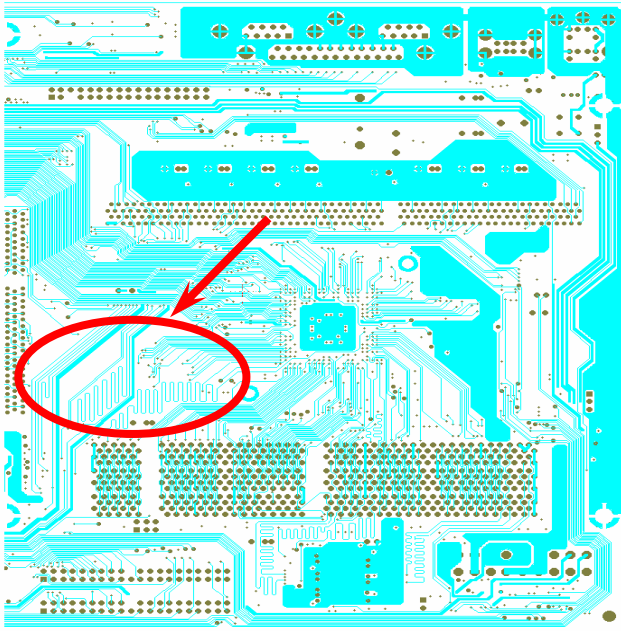
## Low ESR Capacitor

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, MX46U2-VN implements 2200  $\mu F$  and 3300  $\mu F$  capacitors, which are much larger than normal capacitors (1000 & 1500  $\mu F$ ) and they provides better stability for CPU power.



## Layout (Frequency Isolation Wall)

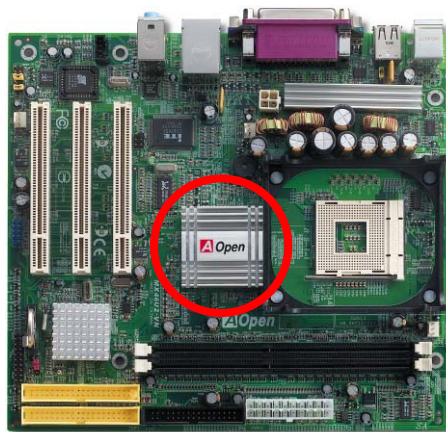


For high frequency operation, especially when overclocking, layout is the most important factor to make sure both chipset and CPU are working in stable condition. The layout of this motherboard implements AOpen's unique design called "Frequency Isolation Wall". Separating each critical portion of motherboard into regions, where each region operates in a same or similar frequency range, we can 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 to 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 look exactly the same as the motherboard you purchased.

## **Enlarged Aluminum Heatsink**

Cool down CPU and Chipset are important for system reliability. Enlarged aluminum heat sink provides better heat consumption especially when you are trying to over-clock the CPU.



## 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 considerably tuned the BIOS to next generation, to recognize the smaller-sized GIF format and even dynamic-showing GIF animation.



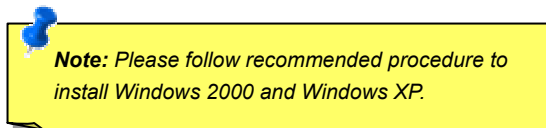
Vivid BIOS shares the same fundamental technology with Open JukeBox CD Player, you may use the same EzSkin utility to change your

Vivid BIOS screen or to download your favorite Open JukeBox skin. If you see this little  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!



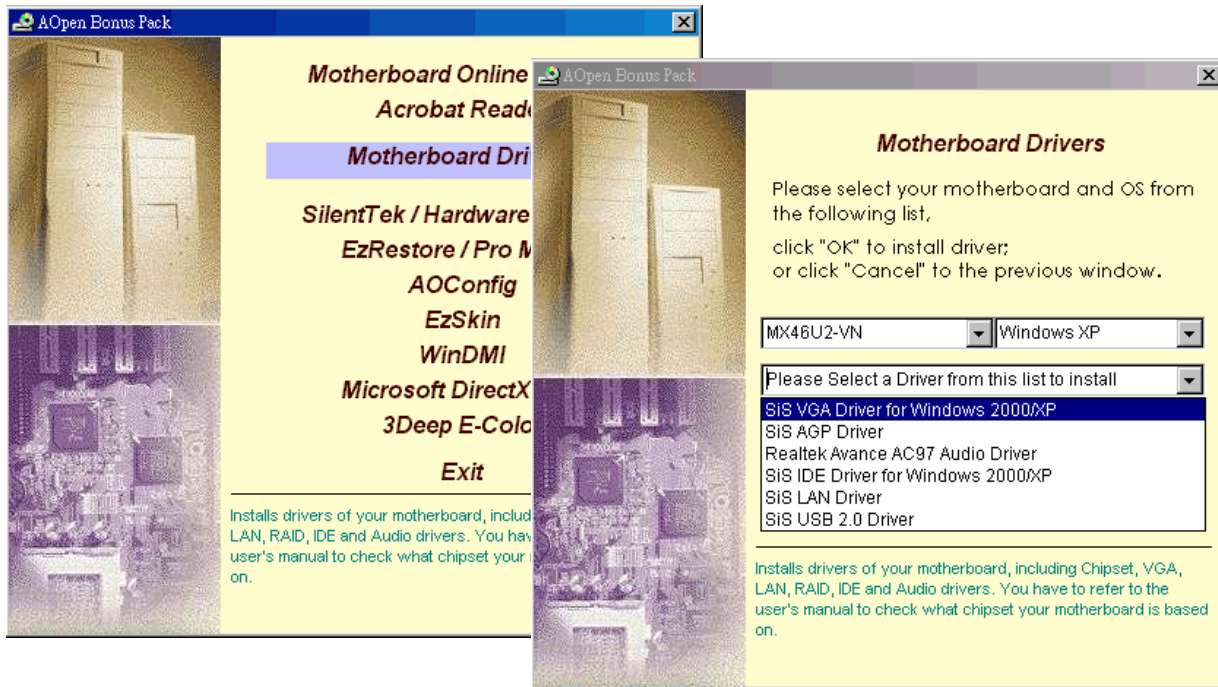
## Driver and Utility

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



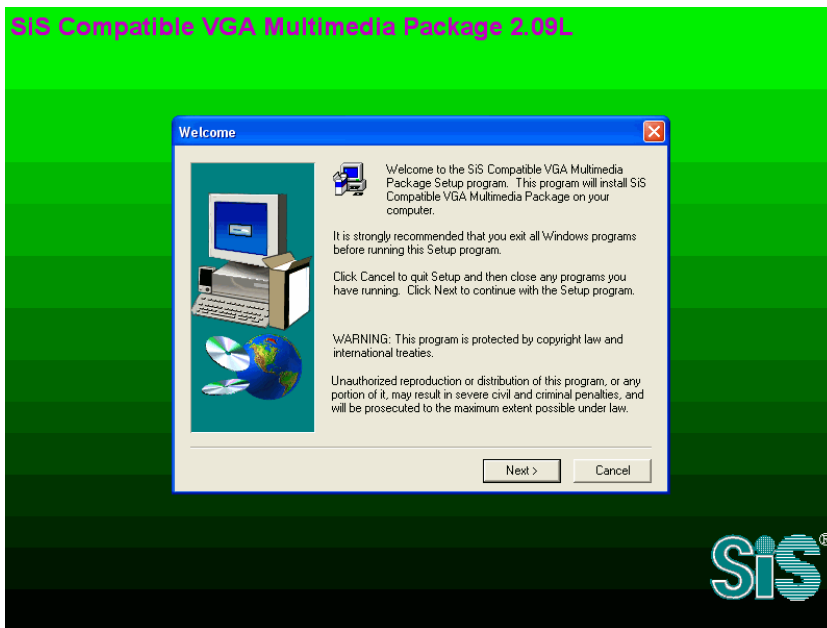
## Auto-run Menu from Bonus CD

You can use the auto-run menu of Bonus CD. Choose the utility and driver and select model name.



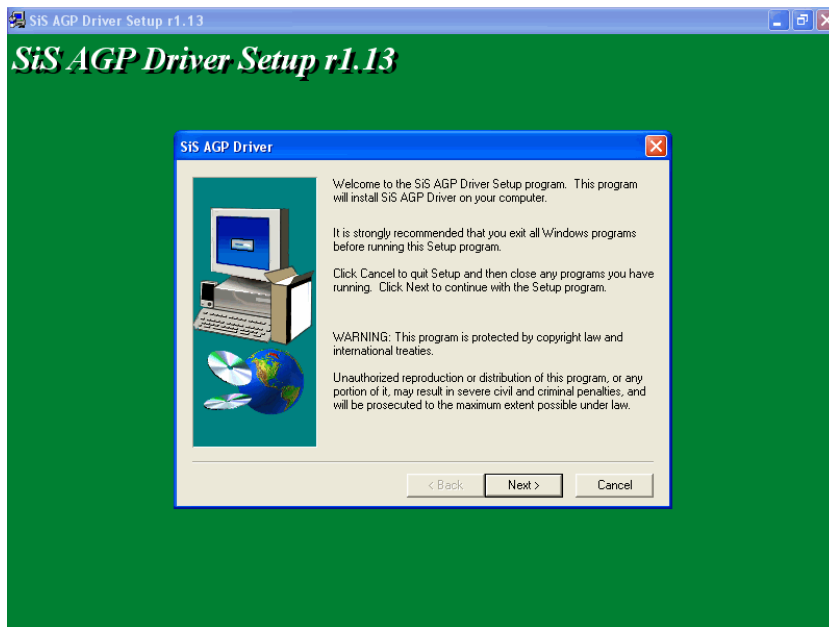
## Installing VGA Driver

This motherboard integrates VGA Engine in chipset. You can install VGA driver from the Bonus Pack CD auto-run menu.



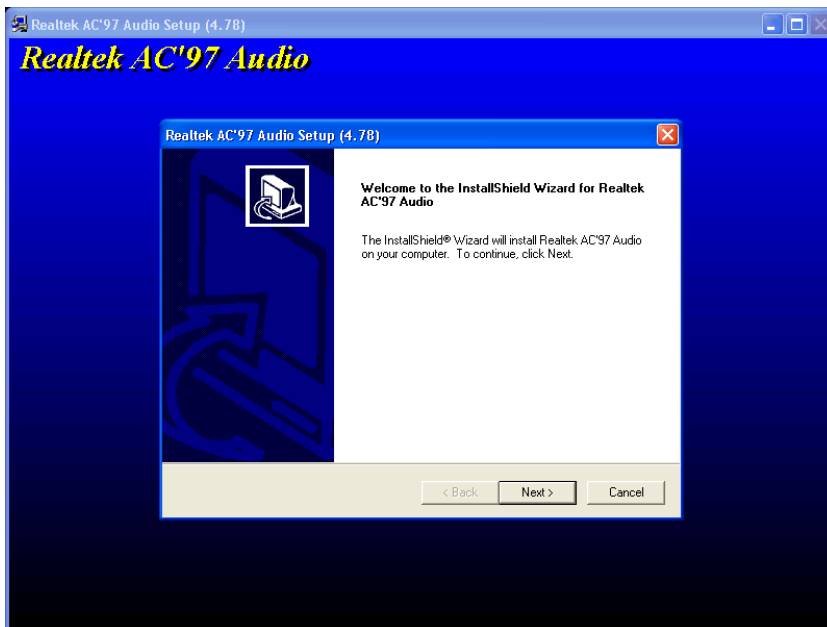
## Installing AGP Driver

In Bonus Pack CD, you can install AGP driver from the following screen.



## Installing Audio Driver

This motherboard comes with [AC97 CODEC](#). You can find the audio driver from the Bonus Pack CD auto-run menu.



## Installing IDE Driver

To use IDE devices you have to install IDE driver from Bonus Pack CD.



## Installing LAN Driver

In Bonus Pack CD, you can install LAN driver from the following screen.



To install the SiS PCI Fast Ethernet adapter and driver for use with Windows NT 4.0, please do the following:

1. Double click the Network icon in the Control Panel.
2. Select the "Adapter" tab and click "Add..."
3. Select Have Disk. Insert the "Bonus CD" in your CD-ROM drive and specify the correct path "[CD-ROM]:\Driver\SiS\LAN\NT40"
6. Select one of the following models: "SiS 900 PCI Fast Ethernet Adapter" then click OK.
7. In the dialog box that appears, select the Media Type and enter the Network address for the adapter if necessary(You can click Help for more detailed information about these settings). Click OK to complete this dialog box (or Cancel to terminate the configuration without completing it).
8. Exit the Network control panel window. Windows NT asks if you wish to reboot. You must reboot before the adapter will function properly.



## Installing USB 2.0 Driver

In Bonus Pack CD, you can install USB 2.0 driver for Windows 2000/XP from the following screen. You can download the newest the drivers for Windows98SE/ME systems from <http://download.sis.com/sisd/c/index.jsp>. To install the drivers of Bonus CD in these systems only get USB 1.0/1.1 function.

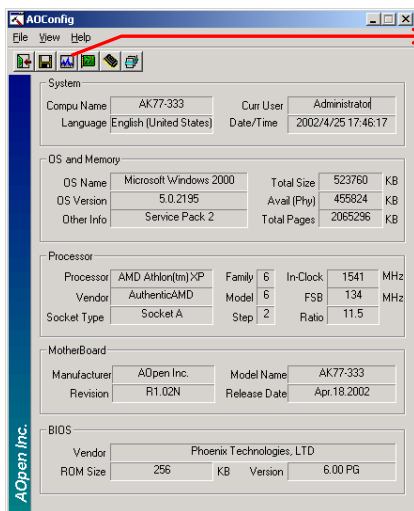


## AOConfig Utility

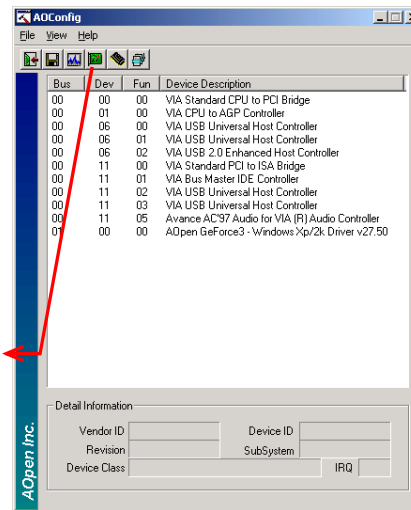


AOOpen always dedicated to provide users a much friendly computer environment. We now bring you a comprehensive system detection utility. AOConfig is a Windows based utility with user-friendly interface that allows users to obtain information of the operation system and hardware such as motherboard, CPU, memory, PCI devices and IDE devices. The powerful utility also displays the version of BIOS and firmware for your convenience of maintenance.

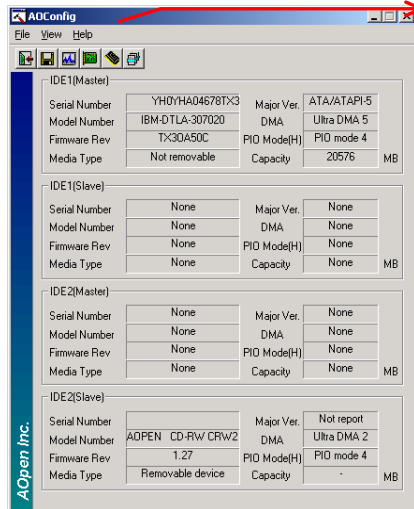
Moreover, AOConfig allows users to save information in \*.BMP or \*.TXT format which users may collect the system information in detail and send them to AOOpen directly for technical support or for further diagnose of system problems.



1. The system page shows the detailed information of the motherboard, operating system, processor, and BIOS version.

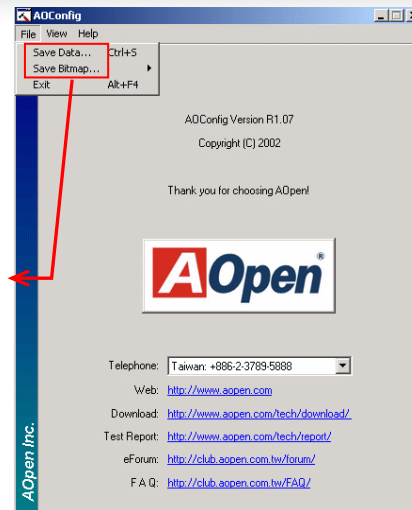


2. The PCI device page shows the configurations of all PCI devices installed in your motherboard.



3. This page presents the IDE device information, such as serial number, manufacturer, firmware version, and capacity.

4. From this page, users can obtain the technical support information of AOpen. Moreover, detailed information could be saved in .bmp or .txt format.



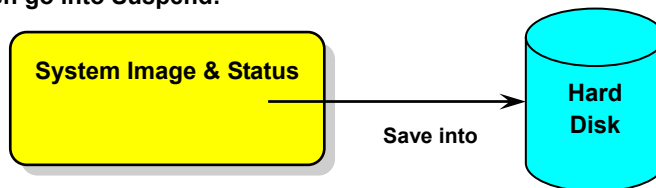
#### NOTE:

*AOConfig can be used under Windows 98SE/ME, NT4.0/2000, or even the latest Windows XP. Please also note that AOConfig can only be operated in a system equipped with an AOpen motherboard. Before running AOConfig, all applications must be closed.*

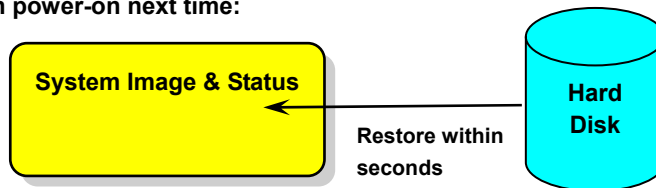
## ACPI Suspend to Hard Drive

[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:**



**When power-on next time:**



## 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 "**aozvhd /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 "**aozvhd /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

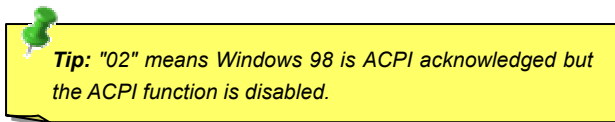
WINDOWS

CURRENT\_VERSION

DETECT

ACPI\_OPTION

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



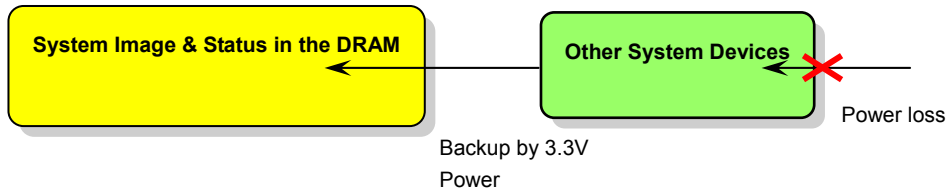
c. Save changes.

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".

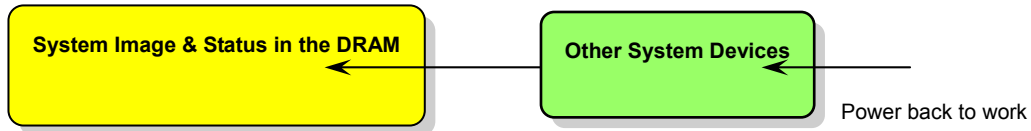
## ACPI Suspend to RAM (STR)

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:



### When power-on next time:





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

## System Requirement

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

## 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.

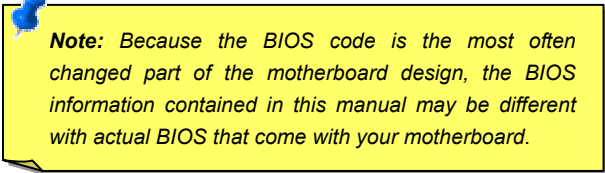
## AWARD BIOS

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).

AwardBIOS™ 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 settings of MX46U2-VN have 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. Therefore, the rest of this chapter intends to guide you the process of configuring your system setup.

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.*

## How To Use Award™ BIOS Setup Program

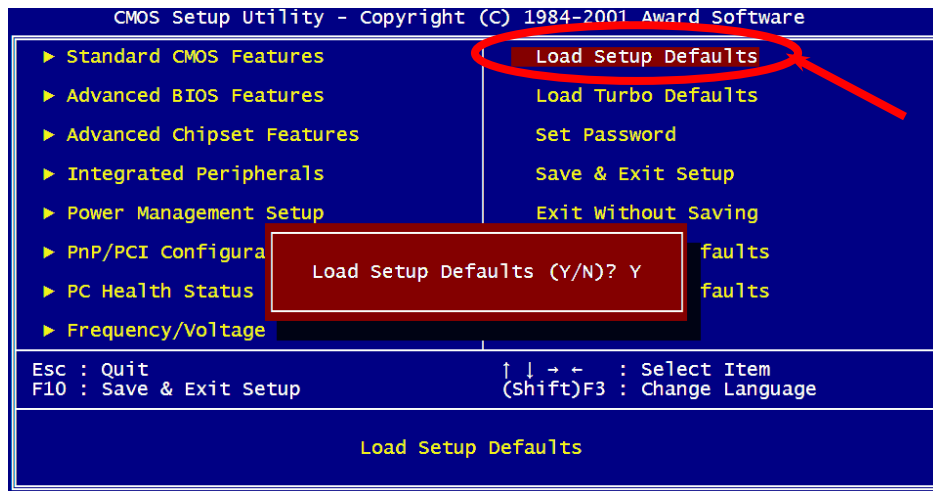
Generally, you can use arrow keys to highlight items that you want to choose, then press <Enter> key to select, and use the <Page Up> and <Page Down> key to change setting values. You can also press <F1> key for help and press <Esc> key to quit Award™ BIOS setup program. The following table provides details about how to use keyboard in the Award™ BIOS setup program.

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.
F5	Load previous setting value from CMOS.

<b>Key</b>	<b>Description</b>
F6	Load fail-save 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 jumper settings and connect correct cables, power on and enter the BIOS Setup. Press <Del> during [POST \(Power-On Self Test\)](#) and choose "Load Setup Defaults" for recommended optimal performance.



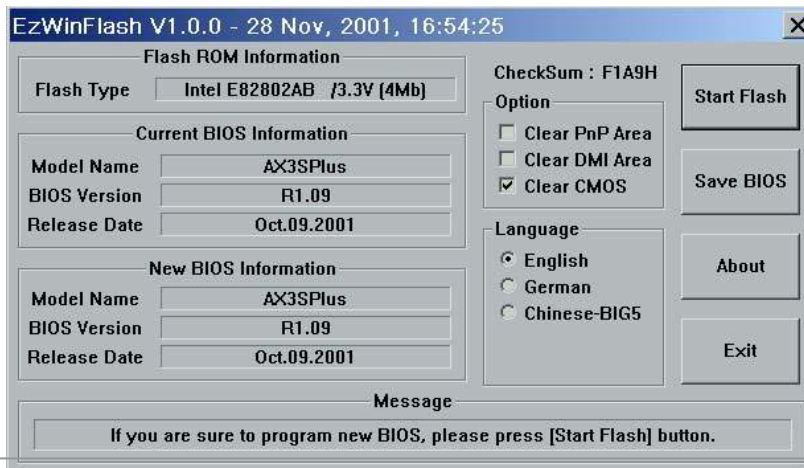
**Warning:** Please avoid of using "Load Turbo Defaults", unless you are sure your system components (CPU, DRAM, HDD, etc.) are good enough for turbo setting.

## 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 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.

You may accomplish BIOS upgrade procedure with EZWinFlash by the following steps, and it's STRONGLY RECOMMENDED 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://www.aopen.com>)
2. Unzip the download BIOS package (ex: WMX46U2102.ZIP) with WinZip (<http://www.winzip.com>) in Windows environment.
3. Save the unzipped files into a folder, for example, WMX46U2102.EXE & WMX46U2102.BIN.
4. Double click on the WMX46U2102.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.

# Glossary

## AC97 CODEC

Basically, AC97 CODEC is the standard structure of PCI sound card. As we know, computer is digital-based, but music is based on analog-based. Therefore, there must be a process to turn digital into analog during the last stage processing of sound in computer. Hence, the component on sound card that play this important task is what we called CODEC.

Audio CODEC 97 (briefly called AC97) is the specification regulated by Intel, and it's about the structure of audio conversion. The special place about CODEC is that it is separated from sound card (CODEC is an independent chipset). Therefore, PCI sound card could possess with 90db and do other application process as well. We called CODEC that meets this structure AC97 CODEC.

## 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.

## ACR (Advanced Communication Riser)

Building on the PC motherboard riser architecture, ACR slot is backward compatible with AMR but beyond the limitation of it. The ACR specification is designed to support modem, audio, Local Area Network (LAN) and Digital Subscriber Line (DSL).



### AGP (Accelerated Graphic Port)

The main function of AGP simply put is to tell monitor what screen information had to be shown, a visual transmission device actually. With the rapid developing of AGP card, we can see that it had been developed from single colorful AGP card to 2D and 3D graphic. AGP supports only memory read/write operation and single-master single-slave one-to-one only. Though AGP and PCI share the same algorithm of 32-bit, its frequencies are 66MHz and 33MHz respectively. AGP interface had been developed from 2X to 8x.

1X AGP, data transfer rate is  $66\text{MHz} \times 4\text{byte} \times 1 = 264\text{MB/s}$

2X AGP, data transfer rate is  $66\text{MHz} \times 4\text{byte} \times 2 = 528\text{MB/s}$

4X AGP, data transfer rate is  $66\text{MHz} \times 4\text{byte} \times 4 = 1056\text{MB/s}$ .

8X AGP, data transfer rate is  $66\text{MHz} \times 4\text{byte} \times 8 = 2112\text{MB/s}$ .

### 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.

### ATA (AT Attachment)

Before talking about ATA (AT Attachment), we must understand **DMA** (Direct Memory Access), which allows devices to skip the CPU devices and access memory directly. DMA specification could not only eliminate the workload of CPU, but also accelerate the transmission of data. DMA begins with a data transfer rate of 16.6MB/Sec, but afterward developed to new data rate of 33.3MB/Sec, which is twice the data rate and we called it **Ultra DMA**. **ATA** details power and data signals between the drive and integrated drive controller and the computer's motherboard. Two drives (master and slave) are supported. The ATA specification allows the drive to connect directly to the ISA bus on the computer. ATA transfer rate then had been developed to 133MHz/Sec and would come out with fastest rate later (please refer to [Serial ATA](#)).

**DMA**, data transfer rate is 16.6MHz/s.

**Ultra DMA**, data transfer rate is  $16.6\text{MHz} \times 2 = 33\text{MB/s}$ .

**ATA/66**, data transfer rate is  $16.6\text{MHz} \times 4 = 66\text{MB/s}$ .

**ATA/100**, data transfer rate is  $16.6\text{MHz} \times 6 = 100\text{MB/s}$ .

**ATA/133**, data transfer rate is  $16.6\text{MHz} \times 8 = 133\text{MB/s}$ .

(ATA/133 uses both rising edge and falling edge as ATA/66 but clock cycle time is reduced to 30ns.)

### **BIOS (Basic Input/Output System)**

BIOS, is a set of assembly routine/program that reside in [EPROM](#) or [Flash ROM](#). 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.

### **Bluetooth**

Bluetooth is a wireless transferring technology that enables short-range wireless connections between desktop and laptop computers, personal digital assistants (PDAs), cellular phones, printers, scanners, digital cameras and even home appliances. The principle of Bluetooth (a chipset) is to transfer information and voices at the frequency of ISM Band. Every Bluetooth technology devices do come with a standard address for you to connect one-to-one or one-to-seven (to form a Pico-net), with transferring range up to 10 meters (100 meters to follow), using low power radio. Bluetooth do not only possess high transfer rate of 1MB/s, it also could be encrypted with pin code. With hopping rate of 1600 hops per second, it's difficult to be intercepted and are less interrupted by electromagnetic wave.

### **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.

### **DDR (Double Data Rate) RAM**

DDR RAM utilizes the existing [SDRAM](#) (For ex, PC-100, PC-133) infrastructure and technology while doubling the nominal bandwidth available to systems in an easy to design and simple to adopt way. Based on FSB frequency, DDR RAM on the market are DDR200, DDR266 and DDR333 with more coming around soon.

**DDR200**, transfer bandwidth up to  $200 \times 64 / 8 = 1600 \text{MB/s}$  (PC1600)

**DDR266**, transfer bandwidth up to  $266 \times 64 / 8 = 2100 \text{MB/s}$  (PC2100)

**DDR333**, transfer bandwidth up to  $333 \times 64 / 8 = 2700 \text{MB/s}$  (PC2700)

**DDR400**, transfer bandwidth up to  $400 \times 64 / 8 = 3200 \text{MB/s}$  (PC3200)

### **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.

### **EEPROM (Electronic Erasable Programmable ROM)**

Also known as E<sup>2</sup>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 is the technology of Alpha processor from Digital Equipment Corporation. EV6 bus uses both rising and falling clock edge to transfer data, similar as DDR RAM or ATA/66 IDE bus.

EV6 Bus Speed = CPU external bus clock x 2.

**200 MHz EV6 bus**, 200MHz = 100 MHz external bus clock x 2

### **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 for 0.18 $\mu$ m process CPU, which can be plugged into SKT370 socket.

### **FC-PGA2 (Flip Chip-Pin Grid Array)**

After FC-PGA, FC-PGA2 is the package for 0.13 $\mu$ m process CPU developed by Intel, which can be plugged into SKT423/478 socket as well.

### **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 512KB (4M bit).

## Hyper Threading

Hyper-Threading technology is an innovative design from Intel that enables multi-threaded software applications to process threads in parallel within each processor resulting in increased utilization of processor execution resources. As a result, an average improvement of ~40% in CPU resource utilization yields higher processing throughput.

## IEEE 1394

IEEE 1394, which also called Firewire, is a serial data transfer protocol and interconnection system. The main feature of the Firewire that assures its adoption for the digital video and audio (A/V) consumer application is its low cost. Fire wire interface is capable of supporting various high-end digital A/V applications, such as consumer A/V device control and signal routing, Digital Video (DV) editing, home networking, and more than 32 channels of digital mixing. Gone are those days of expensive video capture cards. Firewire allows for video capture from both newer DV camcorders with Firewire ports and older analog equipment using A/V to Firewire converters.

The advantages of the IEEE1394:

**High data transfer rate** – Start from 400 Mbps, (with 800/1600/3200 Mbps coming soon), which is about 30 times faster than USB 1.1.

**Supports up to 63 devices** (16 - daisy chained) with cable length up to about 4.5 m (14 feet).

**Hot-pluggable** (like USB). No need to turn of your device to connect or disconnect, and you don't need to reboot your PC. Also, it is a plug-and-play bus.

**IEEE1394 is very easy to connect** (Like USB1.1/2/0).

## 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.

### **PCI (Peripheral Component Interface) Bus**

Developed by Intel, Peripheral Component Interconnect (PCI) is a local bus standard. A bus is a channel used to transfer data to (input) and from (output) a computer and to or from a peripheral device. Most PCs have a PCI bus usually implemented at 32-bits providing a 33 MHz clock speed with a throughput rate of 133 MBps.

### **PDF Format**

With PDF file, it is easy to do universal document exchange. Virtually any document may be converted in Portable Document Format (PDF). Contents in PDF documents are exactly the same as the original file, including fonts and graphics, and they can be distributed by e-mail or stored on the World Wide Web, an intranet, a file system, or a CD-ROM for other users to view on any platforms. You may download Acrobat Reader in order to read PDF file from its website ([www.adobe.com](http://www.adobe.com)).

### **PnP (Plug and Play)**

Oversimplified, Plug-and-Play automatically tells the software (device drivers) where to find various pieces of hardware (devices) such as modems, network cards, sound cards, etc. Plug-and-Play's task is to match up physical devices with the software (device drivers) that operates them and to establish channels of communication between each physical device and its driver.

### **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.

### **PSB (Processor System Bus) Clock**

PSB Clock means the external bus clock of CPU.

CPU internal clock = CPU PSB Clock x CPU Clock Ratio

### **RDRAM (Rambus Dynamic Random Access Memory)**

A DRAM technology developed by Rambus Corporation\*, to achieve high speed of memory through the use of multiple channels in parallel by 16-bits. Basically, RDRAM uses new structure of Multibank, which is quite different from FPM, EDO, SDRAM. Using different memory module as well, RDRAM uses "RIMM" with transfer rate of 600/700/800MHz, providing bandwidth as high to 1.6GB.

### **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, and have been gradually replaced by DDR RAM.

### **SATA (Serial ATA)**

The Serial ATA specification is designed to overcome speed limitations while enabling the storage interface to scale with the growing media rate demands of PC platforms. Serial ATA is to replace parallel [ATA](#) with the compatibility with existing operating systems and drivers, adding performance headroom for years to come. It is developed with data transfer rate of 150 Mbytes/second, and 300M/bs, 600M/bs to come. It reduces voltage and pins count requirements and can be implemented with thin and easy to route cables.

### **SMBus (System Management Bus)**

SMBus is also called I<sup>2</sup>C 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 [EEPROM](#) device resided on the DIMM or [RIMM](#). SPD stores memory module information such as DRAM timing and chip parameters. SPD can be used by [BIOS](#) to decide best timing for this DIMM or RIMM.

### **USB 2.0 (Universal Serial Bus)**

A Universal Serial Bus (USB) is an external bus (an interconnect) standard that supports data transfer rates of 12 Mbps. A single USB port can be used to connect up to 127 peripheral devices, such as mouse, modems and keyboards. Introduced in 1996, USB has completely replaced serial and parallel ports. It also supports plug-and-play installations and hot plugging. Plug-and-play is the ability to add and remove devices to a computer while the computer is running and have the operating system automatically recognize the change. USB 2.0, which supports data transfer rates of 480 Mbps, has been widely used in motherboard these days.

### **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.



### **Wireless LAN – 802.11b**

802.11 is a specification developed by IEEE and Wireless LAN technology, which is an interface between a wireless client and a base station or between two wireless clients.

802.11 family includes the following specifications and with more coming:

**802.11** = 1 or 2 Mbps transmission in the 2.4 GHz band, using either frequency hopping spread spectrum (FHSS) or direct sequence spread spectrum (DSSS)).

**802.11a** = 54 Mbps in the 5GHz band, using orthogonal frequency division multiplexing)

**802.11b** (11 Mbps transmission in the 2.4 GHz band, using direct sequence spread spectrum (DSSS).

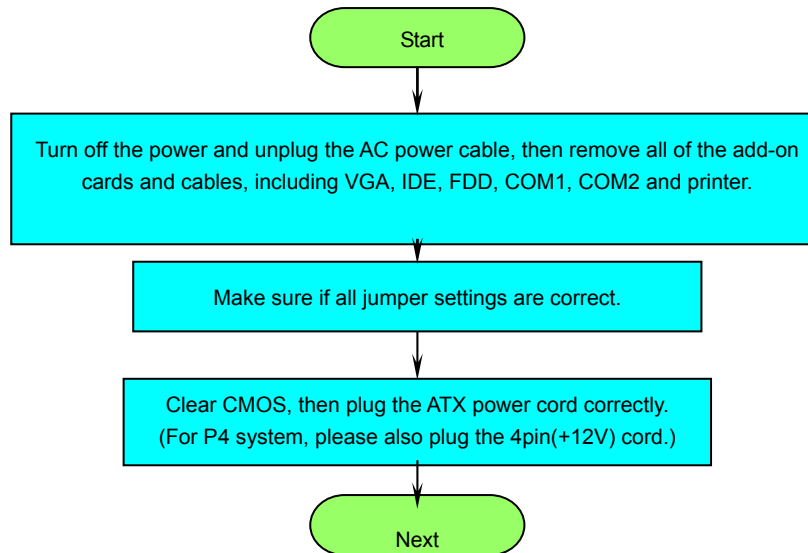
### **ZIP file**

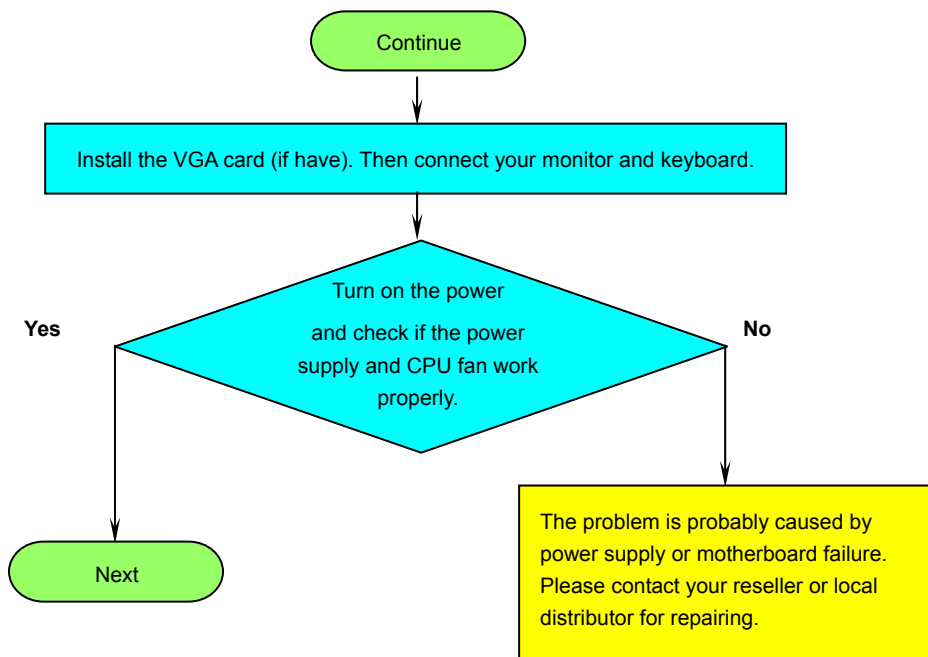
A compressed file format to reduce file size. To unzip file, run shareware PKUNZIP (<http://www.pkware.com/>) for DOS and other operating system or WINZIP (<http://www.winzip.com/>) for windows environment.

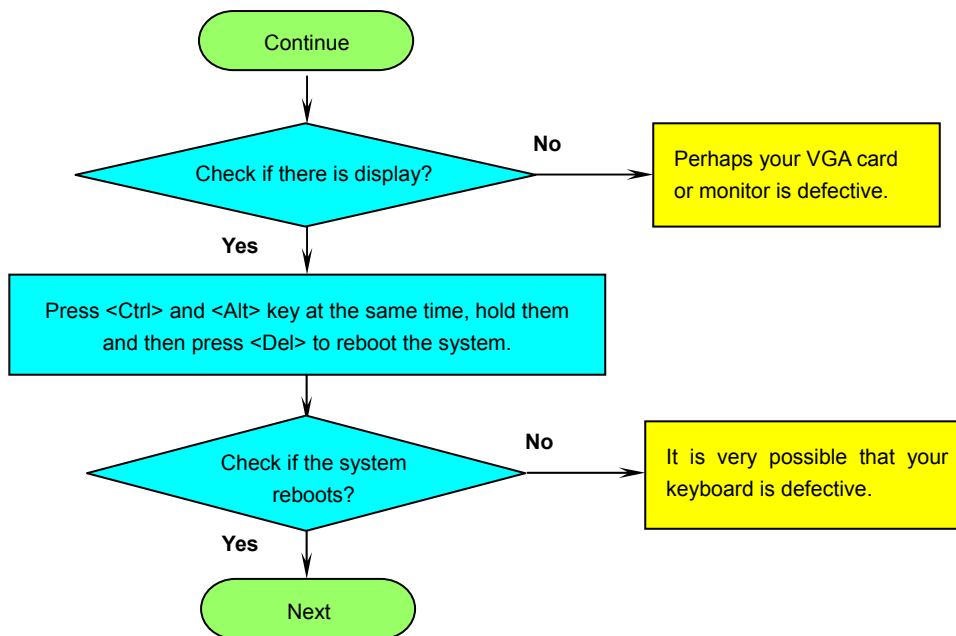


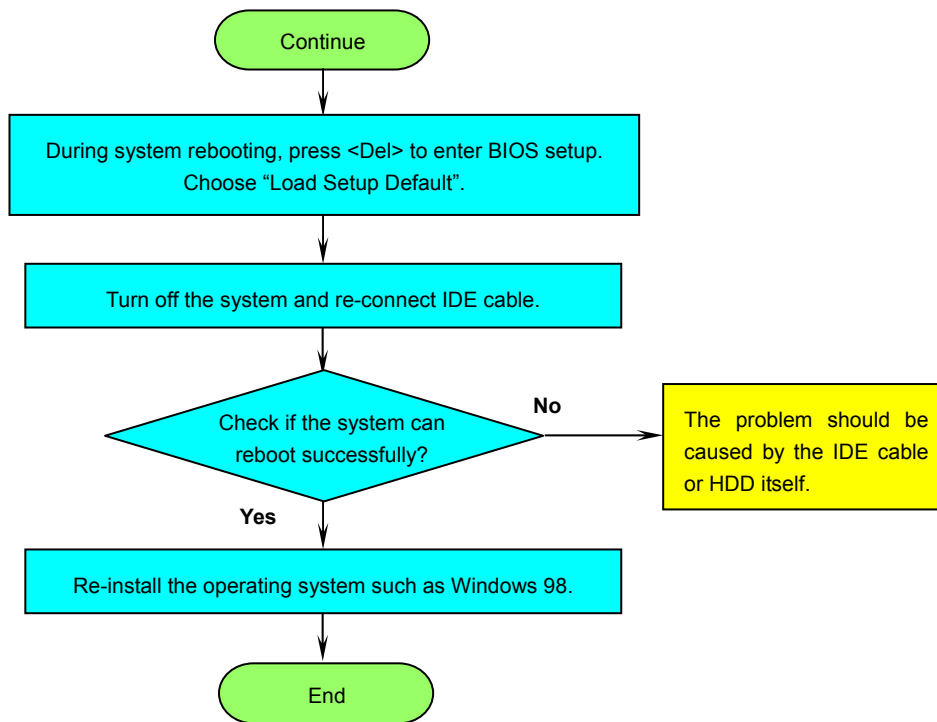
# Troubleshooting

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











# 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:** To download manual, please log on and then select your preferred language. Under “Type” directory, choose “Manuals” to go to our manual database. You can also find the manual and EIG in AOpen Bonus Pack.

<http://club.aopen.com.tw/downloads>

**2**

**Test Report:** We recommend you to choose board/card/device from the compatibility test reports for assembling your PC. It may prevent incompatibility problems.

<http://english.aopen.com.tw/tech/report/default.htm>

**3**

**FAQ:** Here we list problems that users often encounter and FAQ (Frequently Asked Questions). You may be able to find a solution to your problem.

<http://club.aopen.com.tw/faq/>

**4**

**Download Software:** After log on and having language selected, you may get the latest updated BIOS/utility and drivers you need under “Type” directory. In most case, newer versions of drivers and BIOS have solved earlier bugs or compatibility problems.

<http://club.aopen.com.tw/downloads>

**5**

**eForum:** AOpen eForum is provided to discuss our products with other users, in which your problem probably had been discussed before or will be answered. After log on, you may select your preferred language under "Multi-language".

<http://club.aopen.com.tw/forum/>

**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 efficiently and provide important reference for you.

**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 the component side of PCB. For example:



Part No.

Serial No.



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:



**MX46U2-VN R1.00** Mar.01.2003 AOpen Inc.

Award Plug and Play BIOS Extension v1.0A

Copyright © 2003, Award Software, Inc.

**MX46U2-VN** is model name of motherboard; **R1.00** is BIOS version.





# Product Registration

Club AOpen

Welcome to AOpen Inc.



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.*

AOpen



## How to Contact Us



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

### Pacific Rim

AOpen Inc.

Tel: 886-2-3789-5888

Fax: 886-2-3789-5899

### Europe

AOpen Computer b.v.

Tel: 31-73-645-9516

Fax: 31-73-645-9604

### America

AOpen America Inc.

Tel: 1-510-489-8928

Fax: 1-510-489-1998

### 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

**Web Site:** <http://www.aopen.com.tw>

**E-mail:** Send us email by going through the contact form below.

**English** <http://english.aopen.com.tw/tech/default.htm>

**Japanese** <http://www.aopen.co.jp/tech/default.htm>

**Chinese** <http://www.aopen.com.tw/tech/default.htm>

**German** <http://www.aopencom.de/tech/default.htm>

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