




**MK89-N**  
**MK89-L**  
**MK89-1394**  
**Online Manual**

DOC. NO.: MK89N-OL-E0308A

## What's in this manual

<b>MK89-N / MK89-L / MK89-1394 .....</b>	<b>1</b>
<i>What's in this manual .....</i>	2
<i>You Must Notice .....</i>	8
<i>Before You Start .....</i>	9
<i>Overview .....</i>	10
<i>MK89-N / MK89-L / MK89-1394 Comparison Table .....</i>	11
<i>Feature Highlight .....</i>	12
<i>Quick Installation Procedure .....</i>	16
<i>Motherboard Map .....</i>	17
<i>Block Diagram .....</i>	18
<b>Hardware Installation.....</b>	<b>19</b>
<i>About "Manufacturer Upgrade Optional" and "User Upgrade Optional" .....</i>	20
<i>CPU Installation .....</i>	21
 <i>Open Overheat Protection (O.H.P.) Technology .....</i>	23
<i>CPU Over-current Protection .....</i>	24
<i>CPU and Housing Fan Connector .....</i>	26
<i>Enlarged Aluminum Heatsink .....</i>	27
<i>DIMM Sockets .....</i>	28



ATX Power Connector.....	30
AC Power Auto Recovery.....	30
IDE and Floppy Connector.....	31
Front Panel Connector.....	33
 AGP (Accelerated Graphic Port) 8X Expansion Slot.....	34
USB2.0 Connector.....	35
10/100/1000Mbps LAN Onboard.....	36
Front Audio Connector.....	37
Color Coded Back Panel.....	38
Super 5.1 Channel Audio Effect.....	39
IEEE 1394 Connectors (For MK89-1394).....	40
IrDA Connector.....	41
Game Port Bracket Supported.....	42
CD Audio Connector.....	43
AUX-IN Connector.....	44
 S/PDIF (Sony/Philips Digital Interface) Connector.....	45
Case Open Connector.....	46
STBY (Standby) LED.....	47
AGP Protection Technology and AGP LED.....	48

*JP14 Clear CMOS Data* ..... 49

*JP28 Keyboard/Mouse Wakeup Jumper*..... 50

*Battery-less and Long Life Design* ..... 51

*Resetable Fuse* ..... 52

*2200  $\mu$ F Low ESR Capacitor*..... 53

*AOConfig Utility*..... 55

*AOpen "Watch Dog ABS"* ..... 57

**Phoenix Award BIOS..... 58**

*How To Use Phoenix Award™ BIOS Setup Program*..... 59

*How To Enter BIOS Setup* ..... 60

**NEW** *BIOS Upgrade under Windows environment* ..... 61

**NEW** *Vivid BIOS technology*..... 63

**NEW** *EzClock*..... 64

**Driver and Utility ..... 68**

*Auto-run Menu from Bonus CD* ..... 68

*NVIDIA NForce 3 Windows driver* ..... 69

*NVIDIA USB2.0 driver*..... 70

*Installing LAN driver (for MK89-N and MK89-1394)*..... 72

*Installing LAN driver (for MK89-L)* ..... 75



<b>Glossary .....</b>	<b>87</b>
<i>AC97 CODEC .....</i>	<i>87</i>
<i>ACPI (Advanced Configuration &amp; Power Interface) .....</i>	<i>87</i>
<i>ACR (Advanced Communication Riser).....</i>	<i>87</i>
<i>AGP (Accelerated Graphic Port) .....</i>	<i>88</i>
<i>AMR (Audio/Modem Riser).....</i>	<i>88</i>
<i>ATA (AT Attachment) .....</i>	<i>88</i>
<i>BIOS (Basic Input/Output System) .....</i>	<i>89</i>
<i>Bluetooth.....</i>	<i>89</i>
<i>CNR (Communication and Networking Riser).....</i>	<i>90</i>
<i>DDR (Double Data Rate) RAM.....</i>	<i>90</i>
<i>ECC (Error Checking and Correction) .....</i>	<i>91</i>
<i>EEPROM (Electronic Erasable Programmable ROM).....</i>	<i>91</i>
<i>EPROM (Erasable Programmable ROM) .....</i>	<i>91</i>
<i>EV6 Bus .....</i>	<i>91</i>
<i>FCC DoC (Declaration of Conformity) .....</i>	<i>92</i>
<i>FC-PGA (Flip Chip-Pin Grid Array).....</i>	<i>92</i>
<i>FC-PGA2 (Flip Chip-Pin Grid Array).....</i>	<i>92</i>
<i>Flash ROM.....</i>	<i>92</i>

<i>Hyper Threading</i> .....	92
<i>IEEE 1394</i> .....	93
<i>Parity Bit</i> .....	93
<i>PCI (Peripheral Component Interface) Bus</i> .....	94
<i>PDF Format</i> .....	94
<i>PnP (Plug and Play)</i> .....	94
<i>POST (Power-On Self Test)</i> .....	94
<i>PSB (Processor System Bus) Clock</i> .....	95
<i>RDRAM (Rambus Dynamic Random Access Memory)</i> .....	95
<i>RIMM (Rambus Inline Memory Module)</i> .....	95
<i>SDRAM (Synchronous DRAM)</i> .....	95
<i>SATA (Serial ATA)</i> .....	96
<i>SMBus (System Management Bus)</i> .....	96
<i>SPD (Serial Presence Detect)</i> .....	96
<i>USB 2.0 (Universal Serial Bus)</i> .....	96
<i>VCM (Virtual Channel Memory)</i> .....	97
<i>Wireless LAN – 802.11b</i> .....	97
<i>ZIP file</i> .....	97
<b>Troubleshooting</b> .....	<b>98</b>

**Technical Support ..... 102**  
**Product Registration ..... 105**  
**How to Contact Us ..... 106**

## **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, 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**



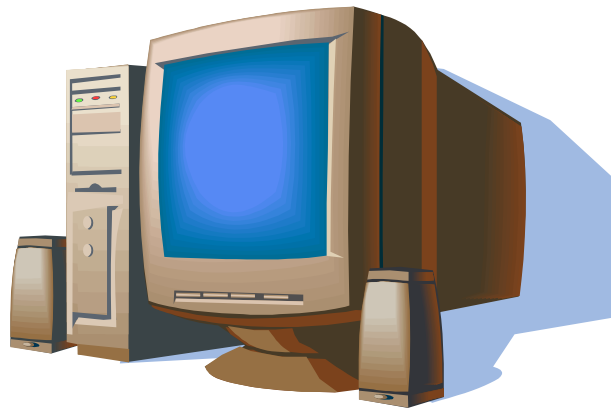
This Online Manual will introduce to the user how this product is installed. All useful information will be described in later chapters. Please keep this manual carefully for future upgrades or system configuration changes. This Online Manual is saved in [PDF format](#), we recommend using Adobe Acrobat Reader 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 MK89-N / MK89-L / MK89-1394. The MK89-N / MK89-L / MK89-1394 is based on AMD® K8 Socket 754 motherboard with micro ATX form factor featuring the [AMD K8 CPU](#). As high performance chipset built in the M/B, MK89-N / MK89-L / MK89-1394 support AMD® K8 Socket 754 series [Nvidia NForce3 processor](#) and 200MHz system clock. In the AGP performance, it has one AGP slot and supports AGP 8X mode for you to insert 1.5V AGP card. According to different customer's requirements, [DDR400](#), [DDR333](#) and [DDR266 DDR RAM](#) can be applied to the maximum memory size of up to 2GB. The on-board IDE controller supports Ultra DMA 66/100/133 mode and the transfer rate up to 133MB/s. MK89-N / MK89-L / MK89-1394 has an [AC97 CODEC](#) chipset onboard and supports 5.1 channels to provide high performance and magic surround stereo sound to let people enjoy working with it. More than that, on the strength of Realtek LAN controller on board, which is a highly-integrated Platform LAN Connect device, it provides 10/100Mbps or GbE Ethernet for office and home use. Furthermore, this motherboard has a S/PDIF connector and supports [USB 2.0](#) with a fancy speed of up to 480Mbps and [IEEE1394](#) (for MK89-1394) provided data transfer rate up to 400Mbps. Now, enjoy all features from AOpen MK89-N / MK89-L / MK89-1394.



## **MK89-N / MK89-L / MK89-1394 Comparison Table**

Following we list the different functions in those four models. “V” represents those functions that the model equips with and “X” represents functions that model doesn’t have. Please always refer to this page to see the functions of your model.

	<b>MK89-N</b>	<b>MK89-L</b>	<b>MK89-1394</b>
<b>IEEE 1394 Function</b>	X	X	V
<b>IEEE 1394 Connector</b>	X	X	V
<b>10/100Mbps LAN</b>	V	V	V
<b>Gigabits LAN</b>	X	V	X

## **Feature Highlight**

### **CPU**

Supports AMD® Socket 754 series CPU with 200MHz system clock designed for Socket 754 technology.

### **Chipset**

The NVIDIA® nForce3 processor is a single-chip, highly integrated, high-performance, low-cost PC2001-compliant peripheral controller with AGP 8X and an AMD K8 CPU interface. The nForce3 implements a fast dedicated HyperTransport link, running at up to 3600MB/s, to communicate with the AMD K8 CPU. Its architecture accommodates AGP 8X, up to six PCI slots, three ATA-133, up to six USB2.0, Fast Ethernet, LPC, and AC'97 audio/modem peripherals.

### **Ultra DMA 66/100/133 Bus Master IDE**

This motherboard equips with Ultra DMA 66/100/133 that supports two connectors, and that means four IDE devices in two channels, and supports Enhanced IDE devices.

### **Expansion Slots**

Including three 32-bit/33MHz PCI and one AGP 8X slot which supports 1.5V AGP cards. The [PCI](#) local bus throughput can be up to 132MB/s. The [Accelerated Graphics Port \(AGP\)](#) specification provides a new level of video display sophistication and speed with data transfer rate up to 2.1GB/s.

## Memory

MK89-N / MK89-L / MK89-1394 supports [Double-Data-Rate \(DDR\) RAM](#). The DDR RAM interface allows zero wait state bursting between the SDRAM and the data buffers at 333/266/200MHz. The two slots of DDR RAM can be composed of an arbitrary mixture of 64, 128, 256, 512MB or 1GB DDR RAM and maximum up to 2GB. The MK89-N / MK89-L / MK89-1394 allows DDR RAM to run at either synchronous or pseudo-synchronous mode with the host CPU bus frequency (400/333/266MHz).

## Six USB Connectors

Equips with four ports on the back panel, a total of six [USB](#) connectors is provided with transfer rates at high speed of 480Mbps for USB interface devices such as mouse, keyboard, modem, scanner, etc.

## On-board AC'97 Sound

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

## LAN Port

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

## IEEE 1394 (for MK89-1394)

This motherboard comes with great function of IEEE1394 which has transfer data rate up to 400Mbps.

### **S/PDIF Connector**

S/PDIF (Sony/Philips Digital Interface) is the newest audio transfer file format, which provides impressive quality through optical fiber and allows you to enjoy digital audio instead of analog audio.

### **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 saving users from configuration problems, thus making the system much more user-friendly.

### **Watch Dog ABS**

Includes AOpen “Watch Dog ABS” functions that can auto-reset default settings in few seconds when you fail to system overclocking.

### **Hardware Monitoring Management**

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

### **Enhanced ACPI**

Fully implement the [ACPI](#) standard for Windows® 95/98/ME/NT/2000/XP series compatibility, and supports Soft-Off, STR (Suspend to RAM, S3), STD (Suspend to Disk, S4) features.

### **Super Multi-I/O**

Provides one high-speed UART compatible serial port and one parallel port with EPP and ECP capabilities.

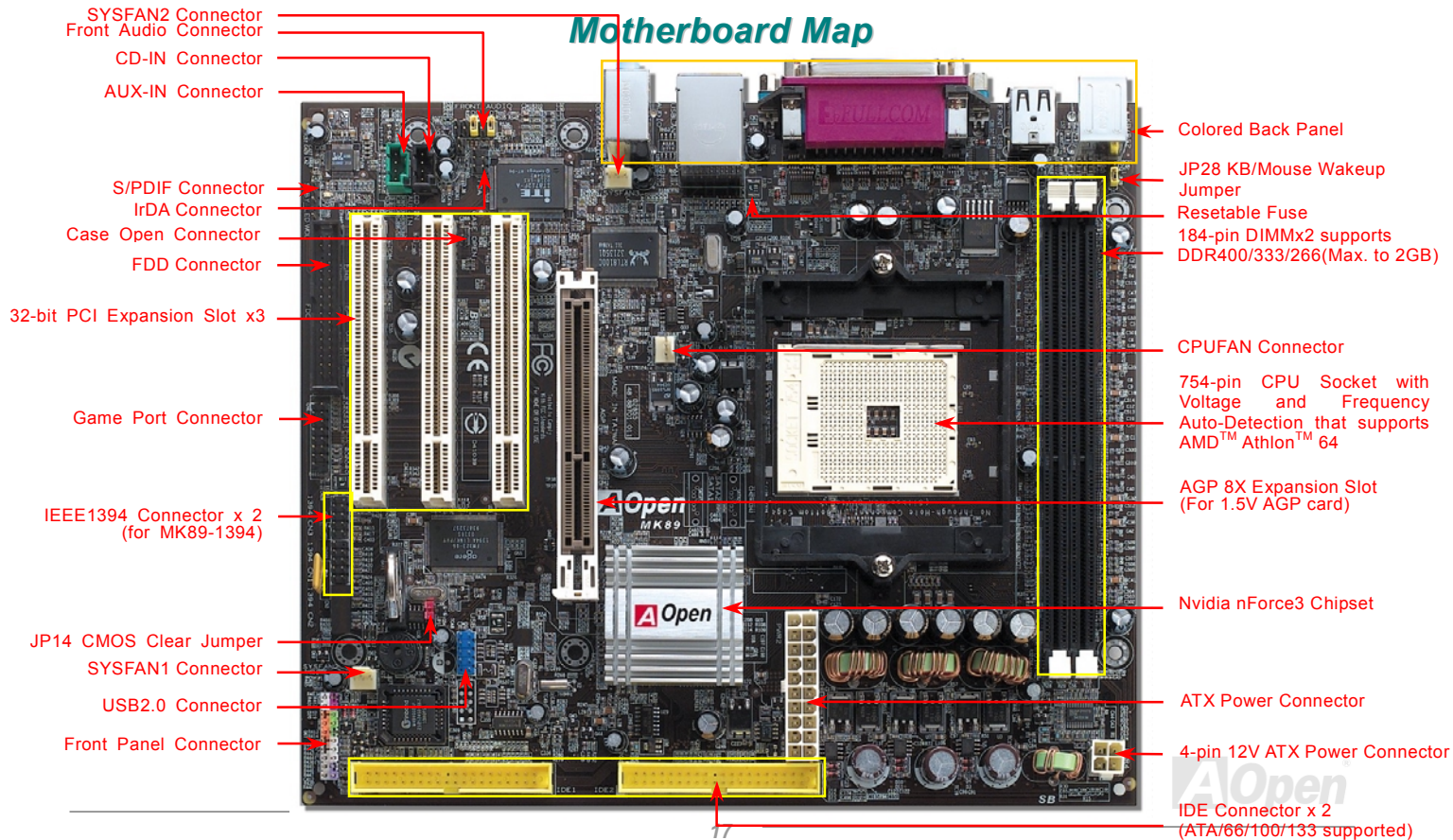
## **Quick Installation Procedure**

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

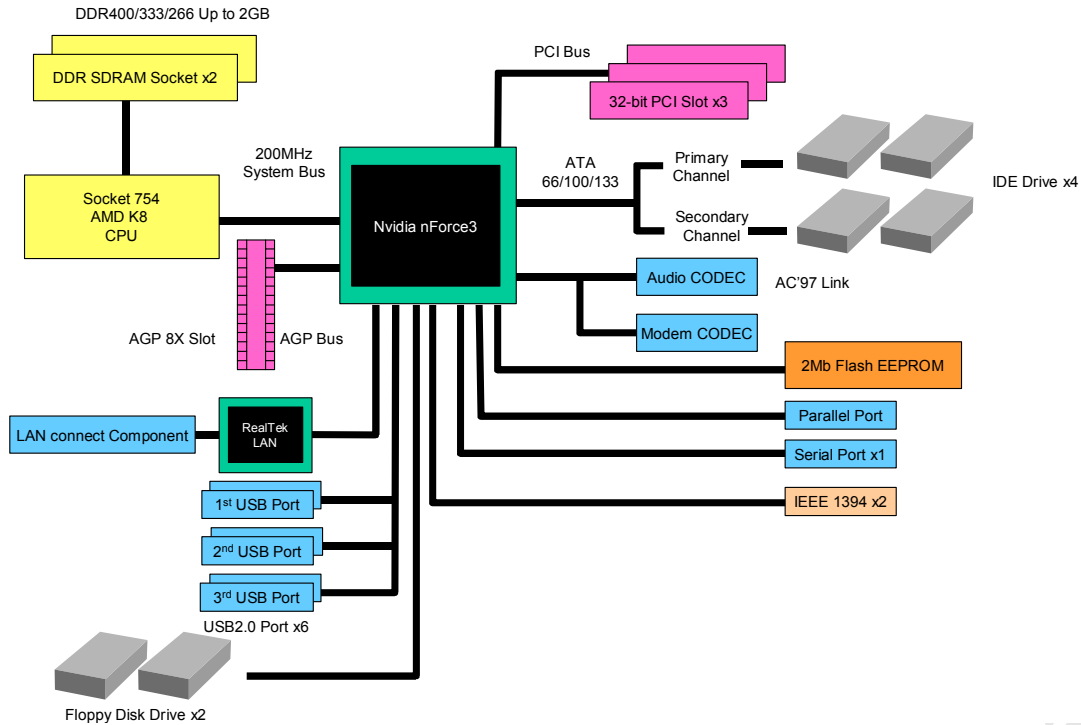
1. [Installing CPU and Fan](#)
2. [Installing System Memory \(DIMM\)](#)
3. [Connecting Front Panel Cable](#)
4. [Connecting IDE and Floppy Cable](#)
5. [Connecting ATX Power Cable](#)
6. [Connecting Back Panel Cable](#)
7. [Power-on and Load BIOS Setup Default](#)
8. [Setting CPU Frequency](#)
9. Reboot
10. Installing Operating System (such as Windows XP)
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 procedures requiring ESD protection.*

## About “Manufacturer Upgrade Optional” and “User Upgrade Optional”...

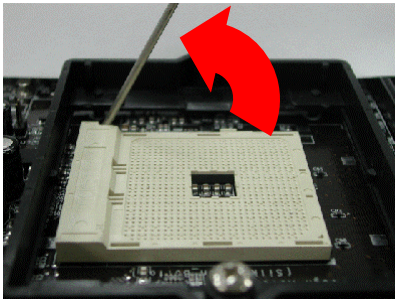
When you read this online manual and start to assemble your computer system, you may find some of functions are called “Manufacturer Upgrade Optional”, and some are called “User Upgrade Optional”. Though all AOpen motherboards include many amazing and powerful features, in some situations, these powerful 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.



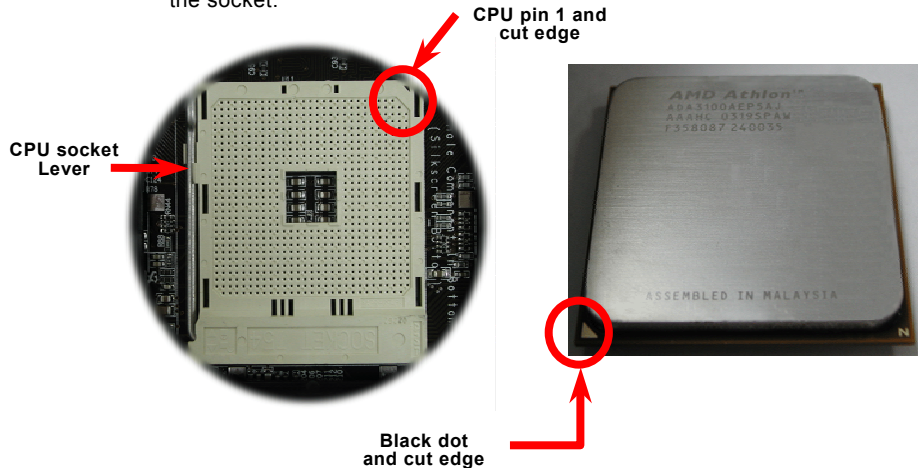
## CPU Installation

This motherboard supports AMD® Socket 754 series CPU. Be careful of CPU orientation when you plug it into CPU socket (with **CPU Overheat Protection** function implemented, the system will be automatically powered off when CPU temperature reaches 97 degree).

1. Pull up the CPU socket lever and up to 90-degree angle.



2. Locate Pin 1 in the socket and look for a black dot or cut edge on the CPU upper interface. Match Pin 1 and cut edge, then insert the CPU into the socket.



Note: This picture is 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

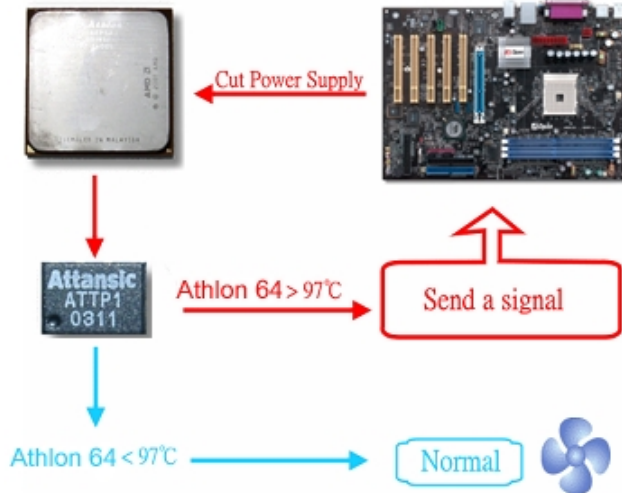
**Note:** If you do not match the CPU socket Pin 1 and CPU cut edge well, you may damage the CPU.

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

## AOpen Overheat Protection (O.H.P.) Technology



With AMD platform substantially keeps increasing the speed of its CPU, it inevitably led to the annoying problem of high CPU operation temperature at the same time. In order to prevent accidental failure of CPU fan, which could cause the burning down of the Athlon 64 CPU, we, AOpen, have meticulously developed a new technology, named, O.H.P. (Overheat Protection) Technology to protect them. Thanks to the intelligent monitoring design of AOpen O.H.P. technology, user can now finally set their mind at ease even when fan failed to work without fearing the possible damage of CPU.

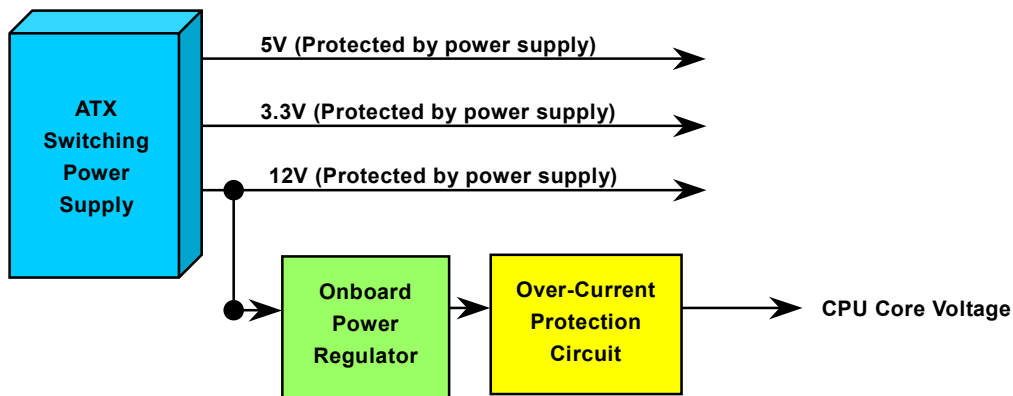


Under the circumstances that CPU fan is running properly, Athlon 64 temperature should be way below the highest temperature limit of 97°C. However, if CPU fan accidentally becomes malfunction or improperly installed, the CPU temperature would rocket abruptly, and you may find your system hang up or crying over the smoking CPU if you haven't installed AOpen O.H.P. previously. With AOpen O.H.P. technology applied, the specific thermal detection pins on Athlon 64 CPU would sense voltage difference when processor is overheated with fan failed, and the overheat

protection system would immediately send out a signal to abort your system by cutting CPU electricity before any damage is done. Unlike other manufacturers who use BIOS or software to control the power supply of CPU, AOpen O.H.P. Technology is purely hardware-controlled the minute after system boot-up, and occupies no system resource. We are pleasant to phase in this practical function on all AOpen AMD series motherboards to protect customer's valuable hardware and personal data.

## 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.



**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.**



## Supported CPU Frequency

Core Frequency = CPU Bus Clock \* CPU Ratio

Bus Speed = CPU external bus clock x 2

PCI Clock = CPU Bus Clock / Clock Ratio

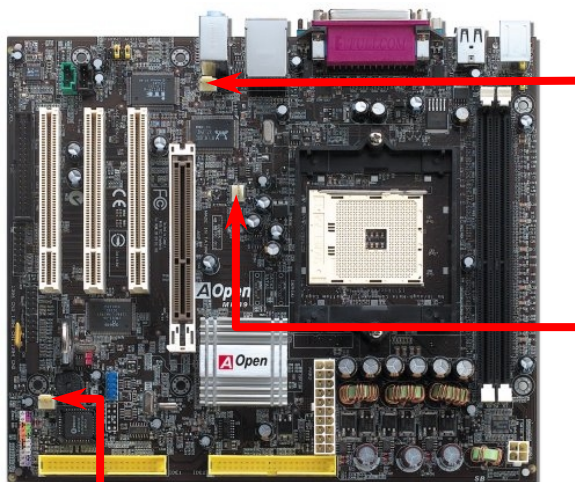
AGP Clock = PCI Clock x 2

CPU	CPU Core Frequency	Hyper Transport Bus Clock	Ratio
Athlon 64 3200+	1.8GHz	200MHz	9x
Athlon 64 3400+	2.0GHz	200MHz	10x
Athlon 64 3700+	2.2GHz	200MHz	11x
Athlon 64 4000+	2.4GHz	200MHz	12x

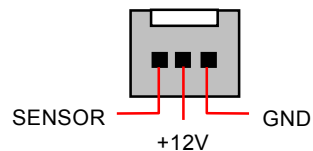
**Note:** You have to adjust CPU FSB in BIOS after installing CPU; otherwise CPU will run at default speed of CPU FSB value.

## CPU and Housing Fan Connector

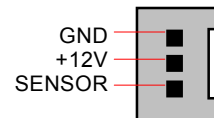
Plug in the CPU fan cable to the 3-pin **CPUFAN** connector. If you have chassis fan, you can also plug it on **SYSFAN1** or **SYSFAN2** connector.



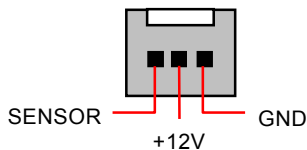
SYSFAN2 Connector



CPUFAN Connector



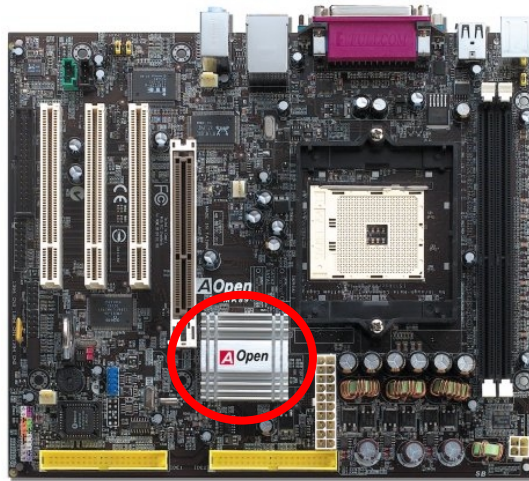
SYSFAN1 Connector



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

## **Enlarged Aluminum Heatsink**

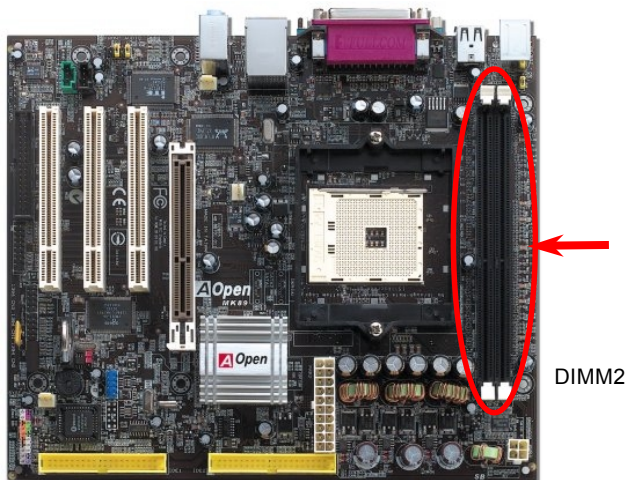
Cool down CPU and Chipset is important for system reliability. Enlarged aluminum heat sink provides better heat consumption especially when you are trying to over clocking the CPU.



## DIMM Sockets

# DDR400

This motherboard supports DDR400/333/266 with maximum capacity up to 2GB. This motherboard has two 184-pin [DDR DIMM sockets](#) that allow you to install [DDR400](#) or [DDR333](#) or [DDR266](#) memory up to 2GB. Only Non-ECC DDR RAM is supported, other type of modules will cause serious damage on memory sockets or SDRAM module.



DIMM2



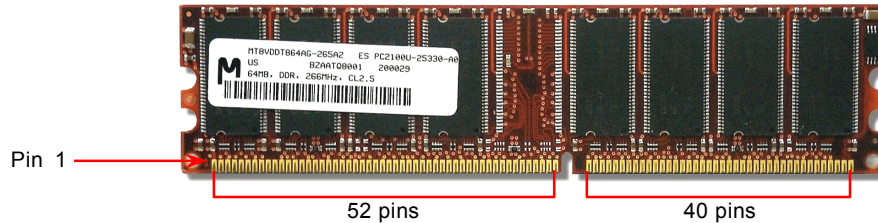
DIMM1

**Warning:** This motherboard supports DDR RAM. Please do not install the SDRAM on the DDR RAM sockets; otherwise, it will cause serious damage on memory sockets or SDRAM module.

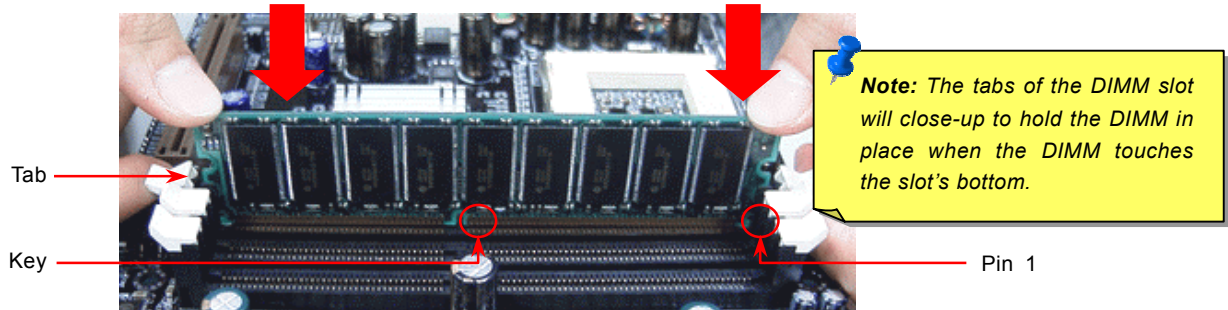
## How to Install Memory Modules

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.



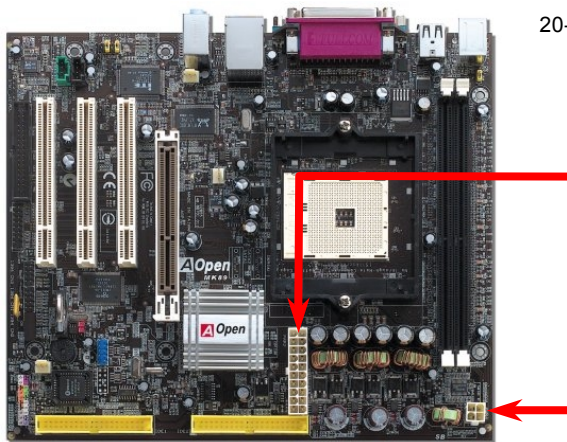
2. Insert the module straight down to the DIMM slot with both hands and press down firmly until the DIMM module is securely in place.



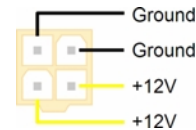
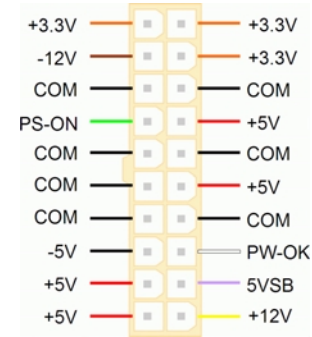
3. Repeat step 2 to finish additional DIMM modules installation.

## 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.



20-Pin Power Connector



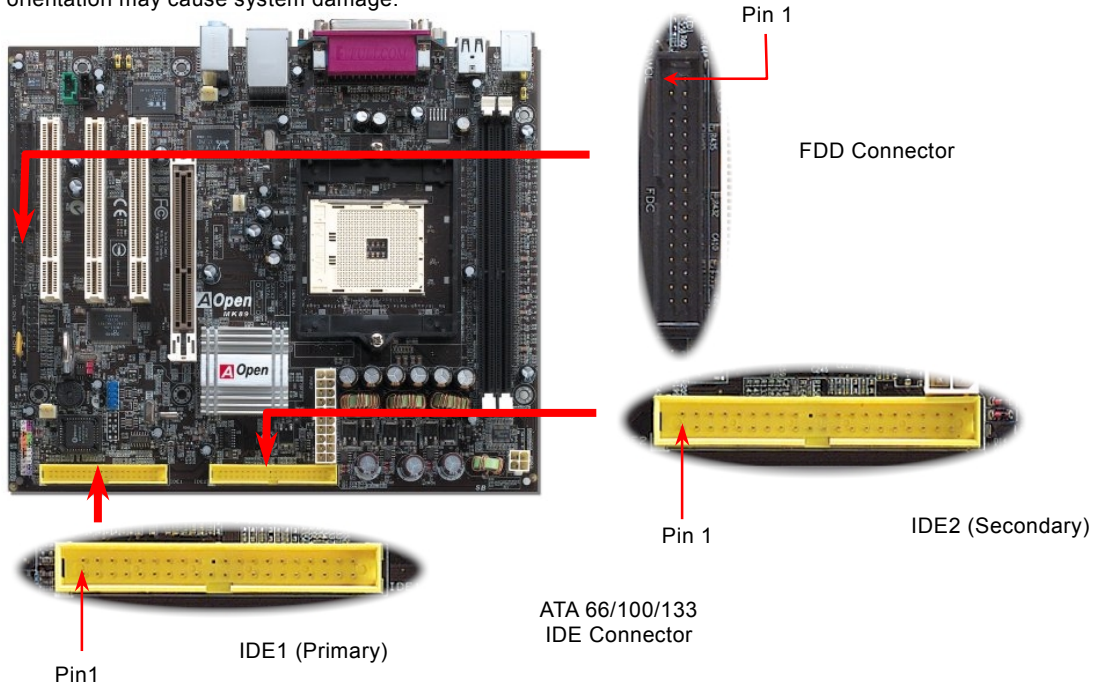
## AC Power Auto Recovery

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 FDD 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.

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.

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
ATA33	30ns	4	120ns	(1/120ns) x 2byte x 2 = 33MB/s
ATA66	30ns	2	60ns	(1/60ns) x 2byte x 2 = 66MB/s
ATA100	20ns	2	40ns	(1/40ns) x 2byte x 2 = 100MB/s
ATA133	15ns	2	30ns	(1/30ns) x 2byte x 2 = 133MB/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 66/100/133 hard disks, a special **80-wires IDE cable** for Ultra DMA 66/100/133 is required.

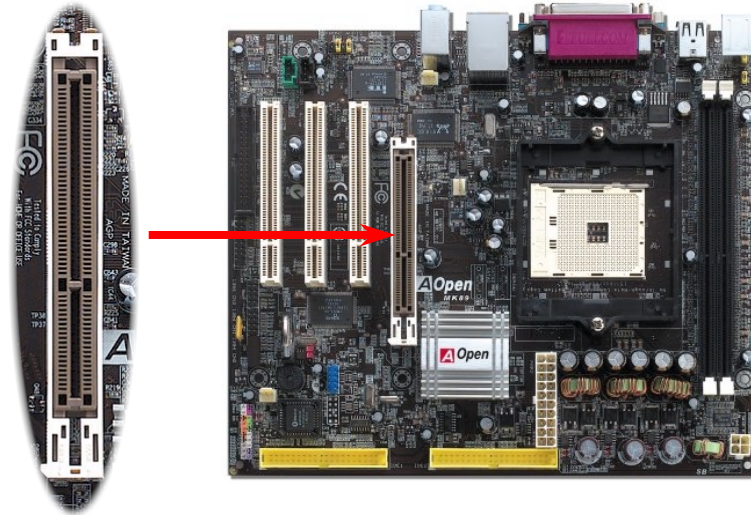




## AGP (Accelerated Graphic Port) 8X Expansion Slot



This motherboard provides an [AGP](#) 8X slot targeted for high-performance 3D graphic. AGP uses both rising and falling edge of the 66MHz clock, for 4X AGP, the data transfer rate is 66MHz x 4bytes x 4 = 1056MB/s. AGP is now moving to AGP 8X mode, which is 66MHz x 4bytes x 8 =2.1GB/s. This AGP slot could automatically become an AGP slot or a Multiplexed Intel DVO Output depending on what kind of cards inserted, like AGP cards.



## USB2.0 Connector



**USB2.0**

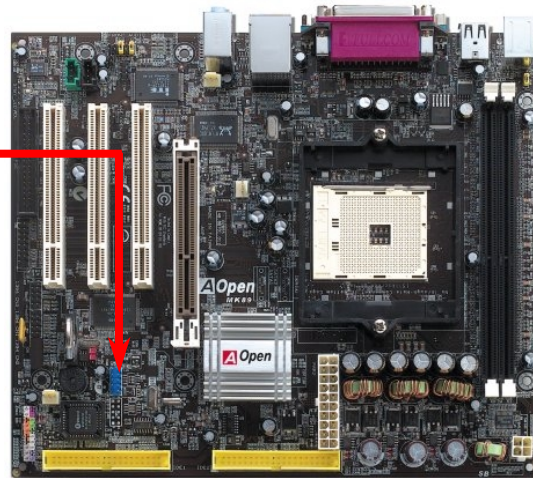
This motherboard provides six [USB](#) connectors for you to connect USB devices such as mouse, keyboard, modem, printer, etc. There are four connectors on the back panel and one front USB connector on the board. You can use proper cable to connect the Front USB connector to USB modules or front panel 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.

**Note:** Please note that if you would like to use USB devices (Example: keyboard, mouse etc.) under DOS environment, you must install driver comes with the devices to make it work.

Pin 1



USB Port

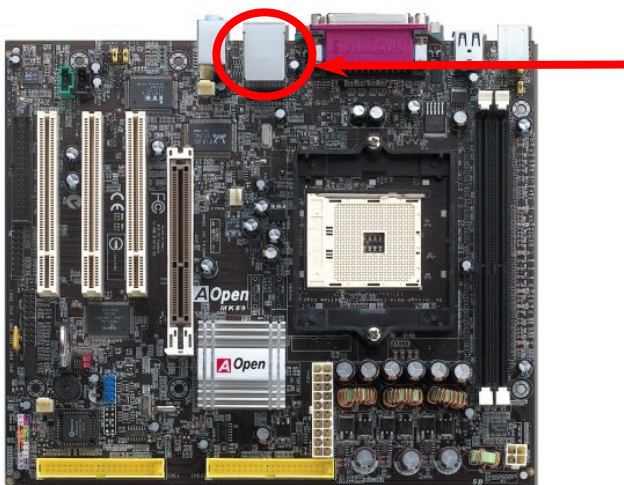


	1	
+5V	●	+5V
SBD2-	●	SBD3-
SBD2+	●	SBD3+
GND	●	GND
KEY	□	NC



## 10/100/1000Mbps LAN Onboard

On the strength of Realtek8100C Phy (for MK89-N) or 8110S-32 LAN controller (MK89-L) on board, they provide 10/100Mbps or gigabits Ethernet for office and home use. The Ethernet RJ45 connector is located on top of USB connectors. The right-hand side LED on RJ45 connector indicates linking mode; it shows yellow whenever accessing to network. The left-hand side LED on RJ45 connector indicates transferring mode; it lights in green when 100Mbps LAN is connected (no light while 10Mbps is connected), and lights in orange when gigabits LAN is connected. To enable or disable this function, you can simply adjust it in BIOS.



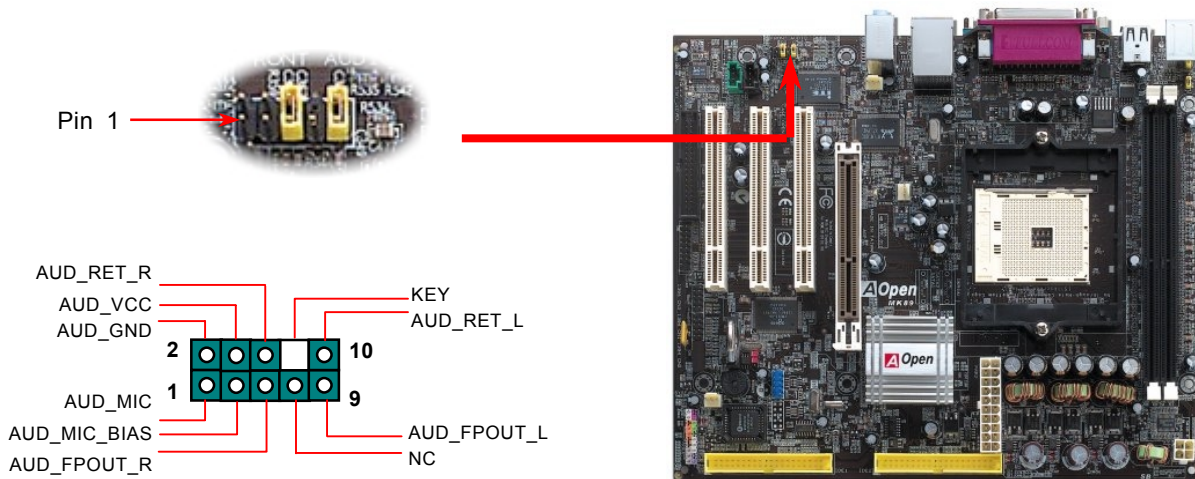
**Left: Transferring  
Green (100Mbps)  
Orange (1000Mbps)**



**Right: Linking  
(Yellow)**

## Front Audio Connector

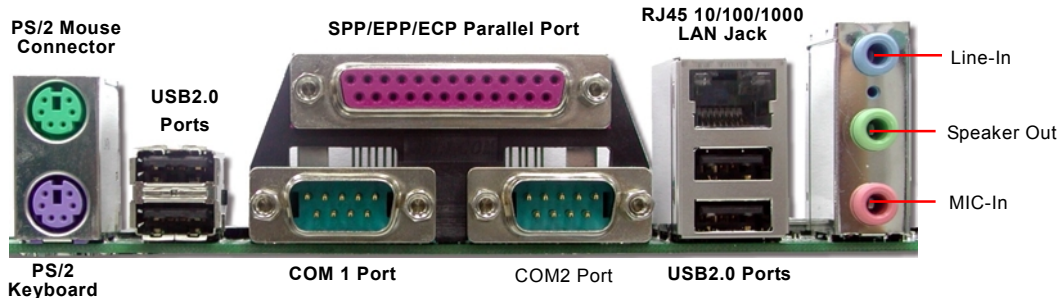
If the housing has been designed with an audio port on the front panel, you'll be able to connect onboard audio to front panel through this connector. By the way, please remove 5-6 and 9-10 jumper caps from the Front Audio Connector before connecting the cable. Please do not remove these 5-6 and 9-10 yellow jumper caps if there's no audio port on the front panel.



**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.

## Color Coded Back Panel

The onboard I/O devices are PS/2 Keyboard, PS/2 Mouse, serial ports COM1, COM2, LAN, Printer, [USB](#), AC97 sound and game port. The view angle of drawing shown here is the back panel of the housing.

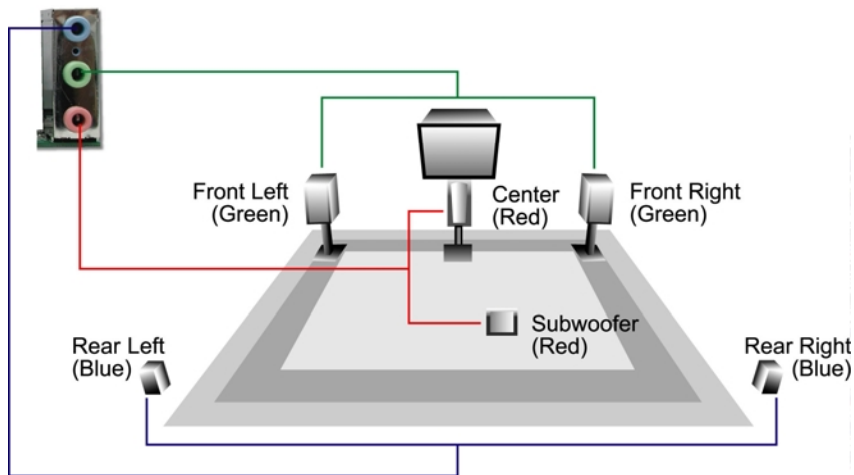


<b>PS/2 Keyboard:</b>	For standard keyboard, which is using a PS/2 plug.
<b>PS/2 Mouse:</b>	For PC-Mouse, which is using a PS/2 plug.
<b>USB Port:</b>	Available for connecting USB devices.
<b>Parallel Port:</b>	To connect with SPP/ECP/EPP printer.
<b>COM1/COM2 Port:</b>	To connect with pointing devices, modem or others serial devices.
<b>Speaker Out:</b>	To External Speaker, Earphone or Amplifier.
<b>Line-In:</b>	Comes from the signal sources, such as CD/Tape player.
<b>MIC-In:</b>	From Microphone.
<b>MIDI/Game Port:</b>	For 15-pin PC joystick, game pad or MIDI devices.



## Super 5.1 Channel Audio Effect

This motherboard comes with an ALC655 CODEC, which supports high quality of 5.1 Channel audio effects, bringing you a brand new audio experience. On the strength of the innovative design of ALC655, you're able to use standard line-jacks for surround audio output without connecting any external module. To apply this function, you have to install the audio driver in the Bonus Pack CD as well as an audio application supporting 5.1 Channel. Picture bellow represents the standard location of all speakers in 5.1Channel sound track. Please connect the plug of your front speakers to the green "Speaker out" port, rear speakers' plug to the blue "Line in" port and both of the center and subwoofer speakers to the red "MIC in" port.

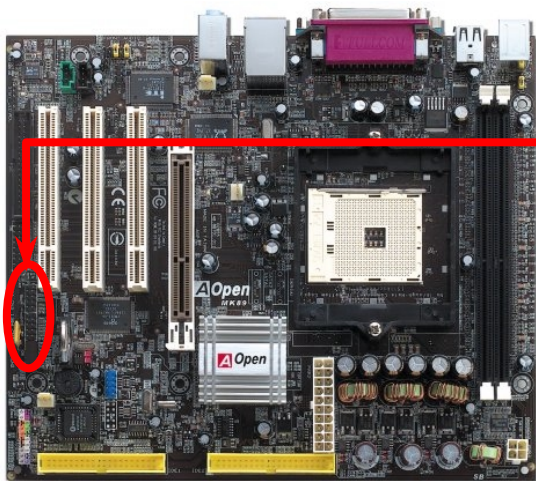


## IEEE 1394 Connectors (For MK89-1394)



### IEEE 1394

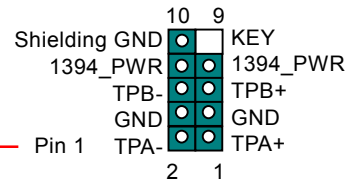
With AGERE FW323 onboard, the IEEE 1394 provides data transfer rate up to 400Mb/s, and USB1.0/1.1 just has 12Mbps. Therefore, the IEEE 1394 interface can connect with the devices that need high data transferring performance, such as digital camera, scanner or other IEEE 1394 devices. Please use the proper cable to connect with devices.



IEEE 1394  
Port 1

IEEE 1394  
Port 2

IEEE 1394  
Port 1, 2 & 3



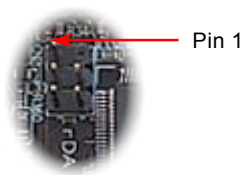
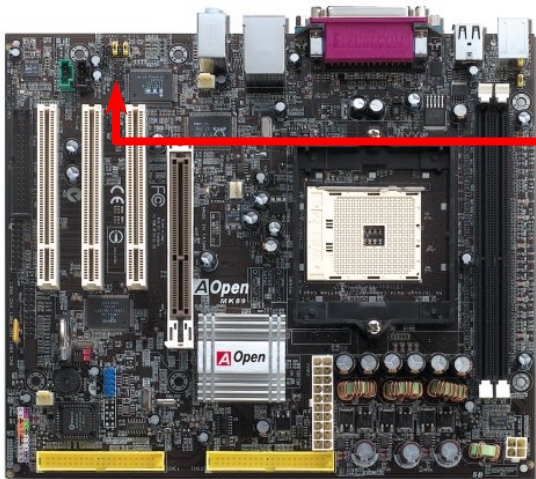
**Warning:** Please DO NOT Hot-Plug IEEE 1394 device, otherwise it will burn the IC of the controller and damage the motherboard.



## 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, 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 infrared module onto **IrDA** connector and enable the infrared function from BIOS Setup, UART2 Mode. Make sure you have the correct orientation when connecting IrDA connector.

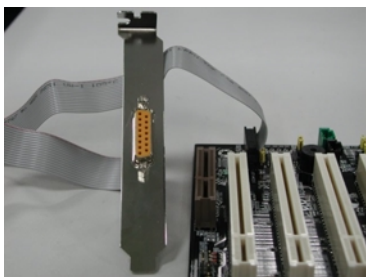


	1	
NC		KEY
+5V		GND
IR_TX		IR_RX

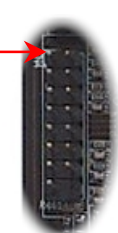
## Game Port Bracket Supported

This motherboard comes with a game port (Joystick-Midi) for you to connect any midi devices or joysticks. To use this function you have to have a joystick module and connect it with a game port cable to this port on the motherboard.

Joystick Module  
(User Upgrade Optional)

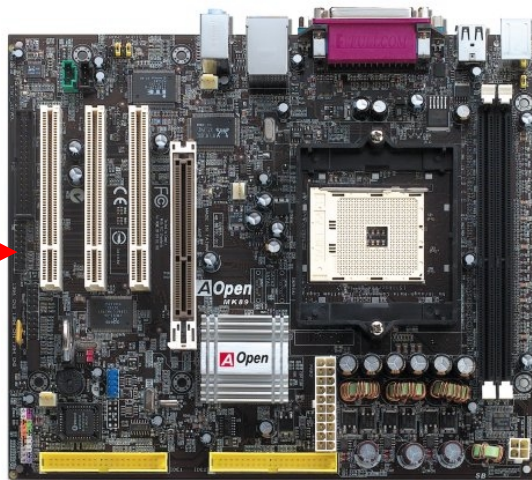


Pin1



Game Port

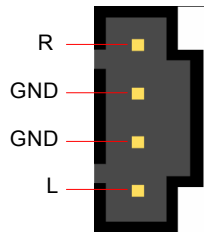
1			
+5V	●	●	+5V
JAB1	●	●	JBB1
JACX	●	●	JBCX
GND	●	●	MIDI_TXD
GND	●	●	JBCY
JACY	●	●	JBB2
JAB2	●	●	MIDI_RXD
+5V	●	□	KEY



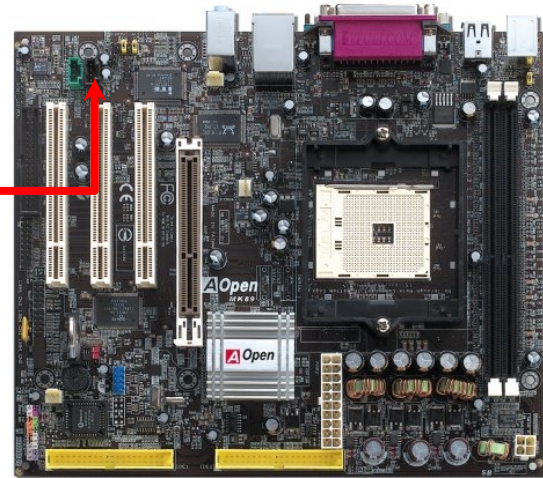
Note: This picture is for example only; it may not exactly look the same with the motherboard you purchased.

## CD Audio Connector

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



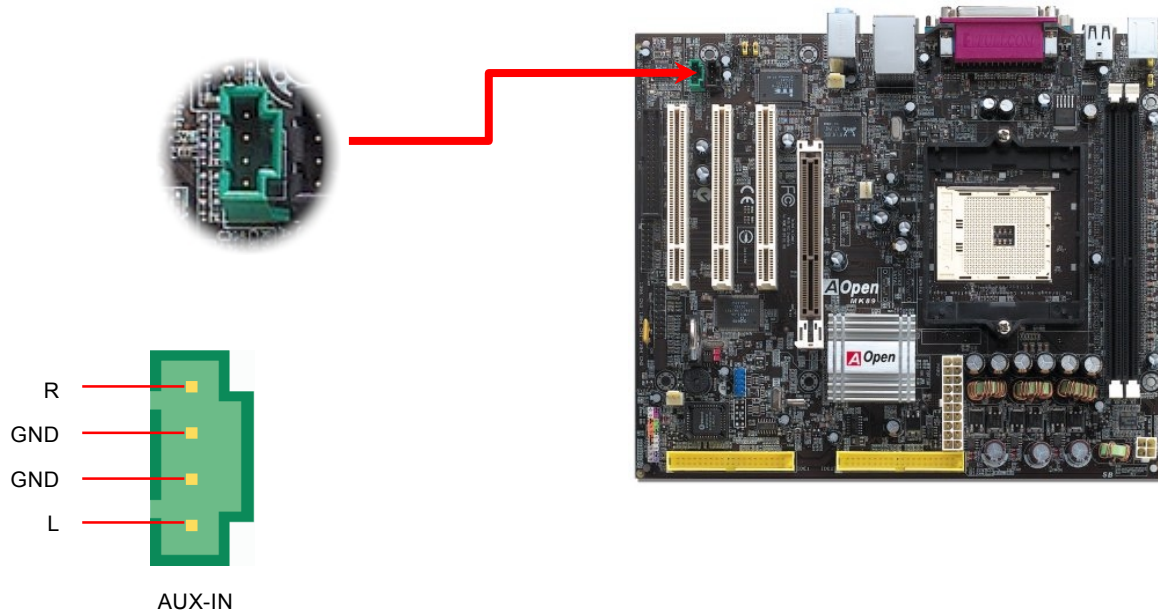
CD-IN Connector



**Note:** Though some of the latest Windows versions 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.

## AUX-IN Connector

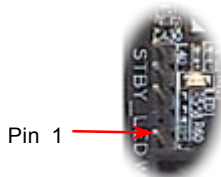
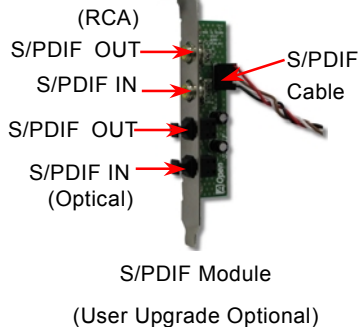
This connector is used to connect MPEG Audio cable from MPEG card to onboard sound.





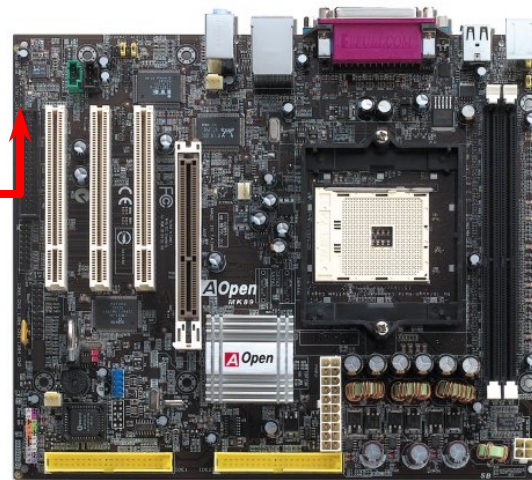
## S/PDIF (Sony/Philips Digital Interface) Connector

S/PDIF (Sony/Philips Digital Interface) is a newest audio transfer file format, which provides impressive audio quality through optical fiber and allows you to enjoy digital audio instead of analog audio. Through a specific audio cable, you can connect the S/PDIF connector to other end of the S/PDIF audio module, which bears S/PDIF digital output. Normally there are two S/PDIF outputs as shown, one for RCA connector, the most common one used for consumer audio products, and the other for optical connector with better audio quality. Same as outputs, you can also connect RCA or optical audio products to input connectors on the module and have the voice or music come out from your computer. However, you must have a S/PDIF supported speaker/amplifier/decoder with S/PDIF digital input/output to connect to the S/PDIF digital input/output to make the most out of this function.



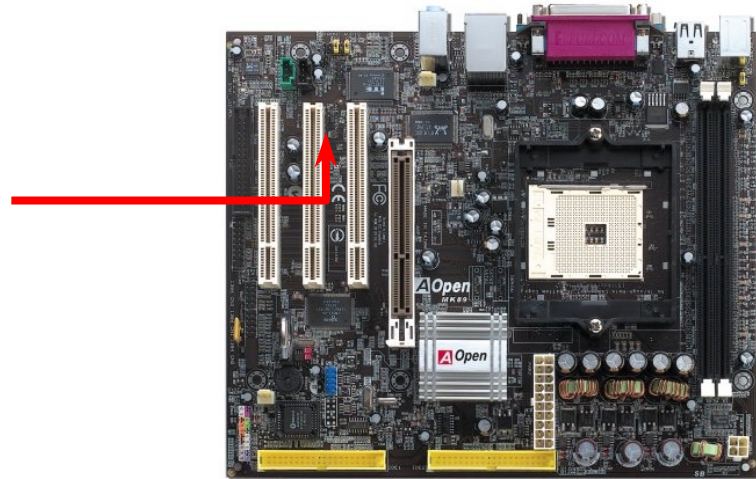
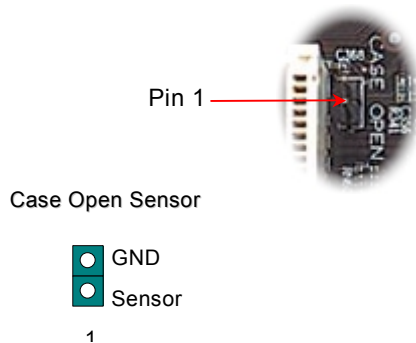
Pin 1 →

- 5 ● SPDIFIN
- GND
- SPDIFOUT
- NC
- 1 ● +5V



## Case Open Connector

The “CASE OPEN” header provides case open-monitoring function. To make this function work, you have to enable it in the system BIOS, connect this header to a sensor somewhere on the case. So, whenever the sensor is triggered by lights or when you open 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.

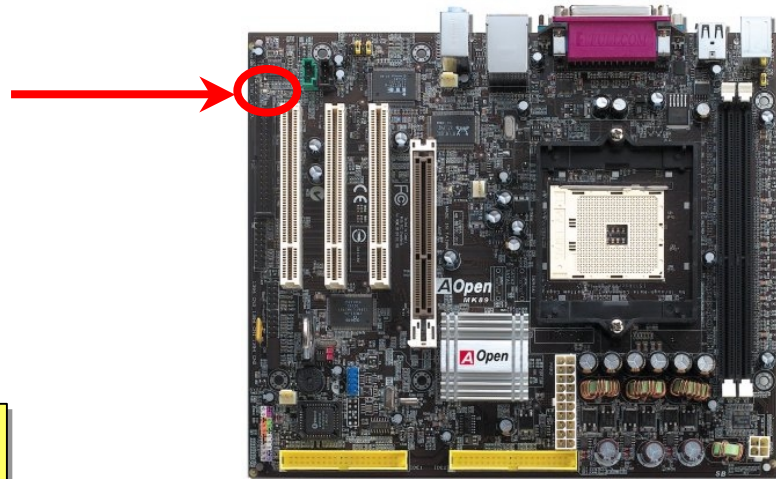


## STBY (Standby) LED

STBY LED is AOpen's considerate design that aims at providing you friendly system information. The STBY LED will light up when power is connected to the motherboard. This is a convenient indication for you to check the system power status in many circumstances such as power on/off, stand-by mode and RAM power status during Suspend to RAM mode.



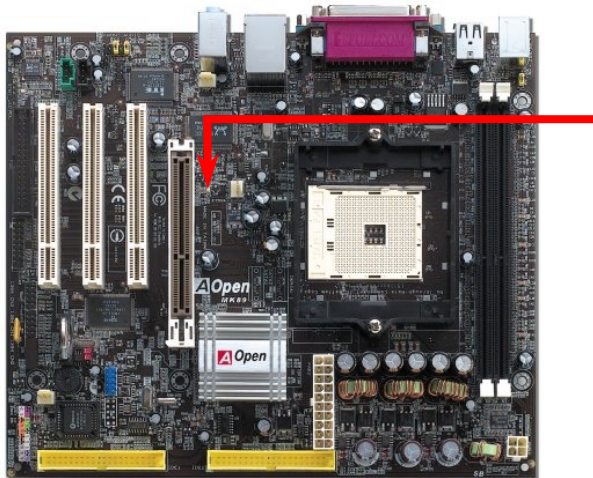
STBY LED



**Warning:** Do not install or remove the DIMM module or others devices when the STBY LED lights on.

## AGP Protection Technology and AGP LED

With the outstanding R&D ability of AOpen and its specially developed circuit, this model implements a blend new technology to protect your motherboard from being damaged by over-voltaging of AGP card. When AGP Protection Technology is 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, the AGP LED on the motherboard will light up to warn you the possible damage of the exceeding voltage. You may contact your AGP card vendor for further support.



AGP LED

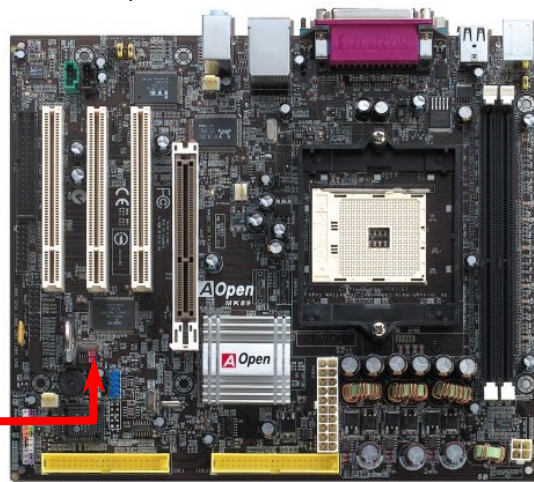
**Warning:** It is strongly recommended not to install a AGP card with 3.3V, which is not supported, the AGP LED will light up to warn you the possible damage.



## JP14 Clear CMOS Data

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



Pin 1



Normal Operation  
(default)



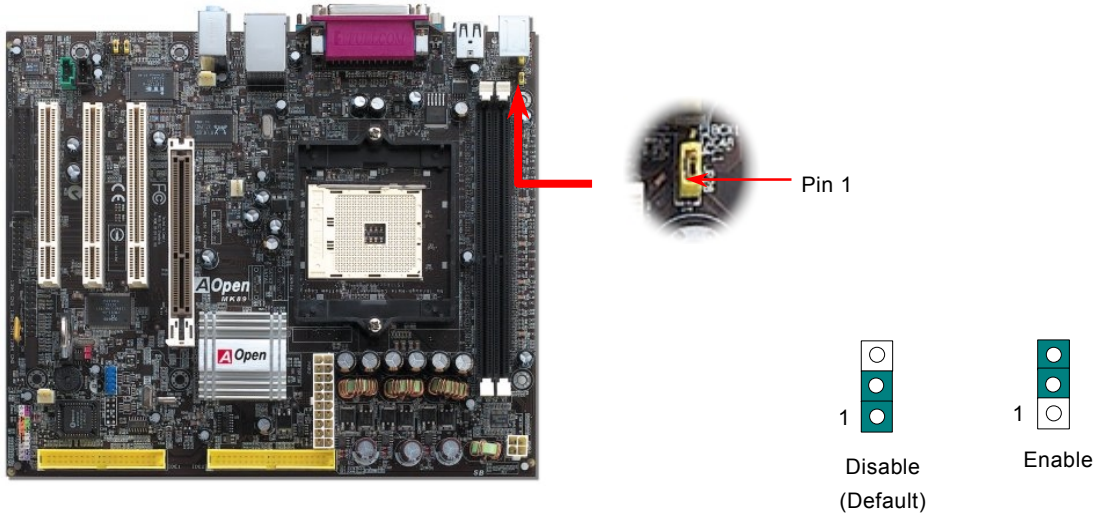
Clear CMOS

**Tip:** When should I Clear CMOS?

1. Boot fail because of overclocking...
2. Forget password...
3. Troubleshooting...

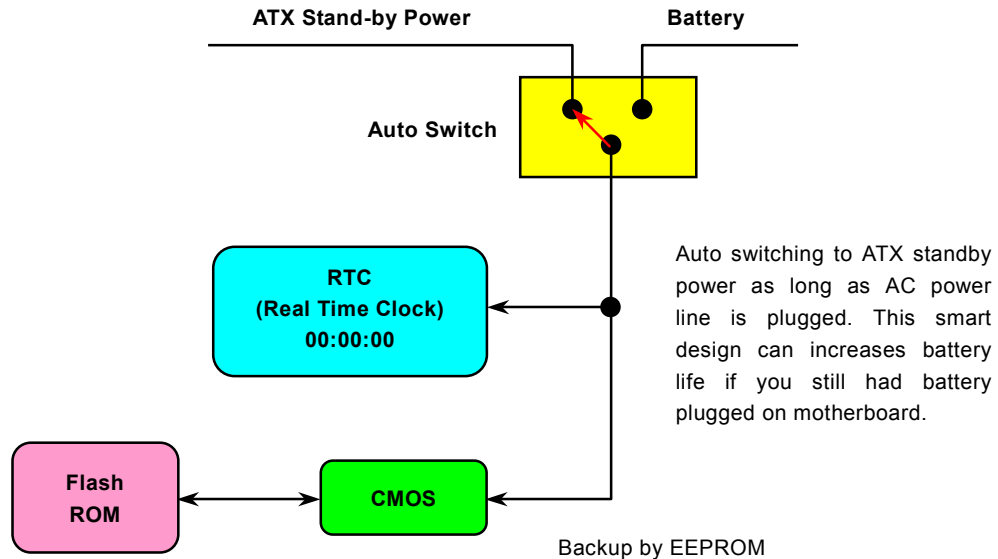
## JP28 Keyboard/Mouse Wakeup Jumper

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 connected. The factory default setting is set to "Disable"(1-2), and you may enable this function by setting the jumper to pin2-3.



## Battery-less and Long Life Design

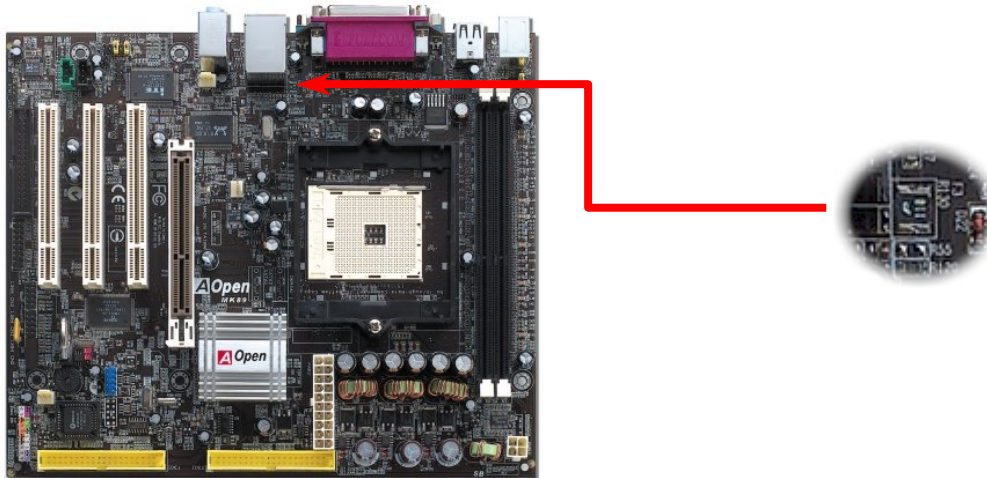
This Motherboard implements [Flash ROM](#) and a special circuit that allows you to save your current CPU and CMOS Setup configurations without using the battery. The RTC (real time clock) can also keep running as long as the power cord is plugged. If you lose your CMOS data by accident, you can just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



## **Resetable Fuse**

Traditional motherboard has fuse for Keyboard and [USB](#) port to prevent over-current or shortage. These fuses are soldered onboard that user cannot replace it when it is damaged (did the job to protect motherboard), and the motherboard remains malfunction.

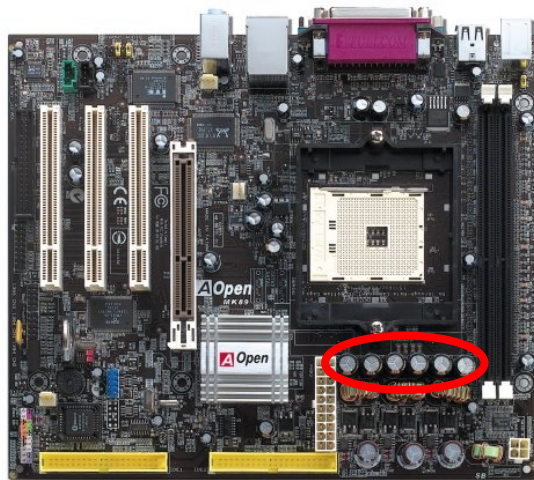
With expensive Resetable Fuse, the motherboard can resume back to normal function after fuse had done its protection job.



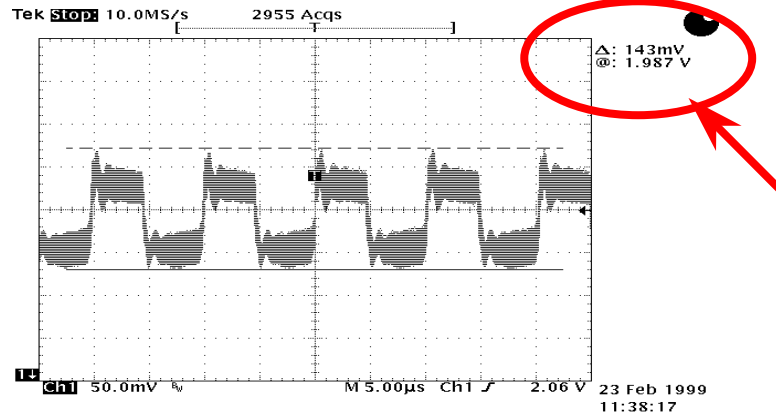
## 2200 $\mu$ F Low ESR Capacitor

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, this motherboard implements 2200  $\mu$ F capacitor, which is much larger than normal capacitor (1000 or 1500  $\mu$ F) and it provides better stability for CPU power.



The power circuit of the CPU core voltage must be checked to ensure system stability for high speed CPUs. A typical CPU core voltage is 2.0V, so a good design should control voltage between 1.860V and 2.140V. That is, the transient must be below 280mV. Below is a timing diagram captured by a Digital Storage Scope, it shows the voltage transient is only 143mV even when maximum 60A current is applied.



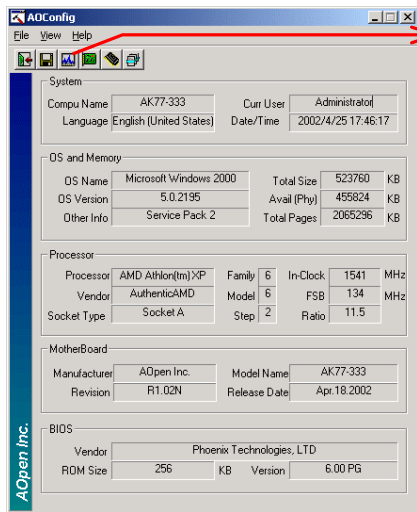
Note: This diagram for example only; it may not be exactly the same as the motherboard you purchased.

## AOConfig Utility



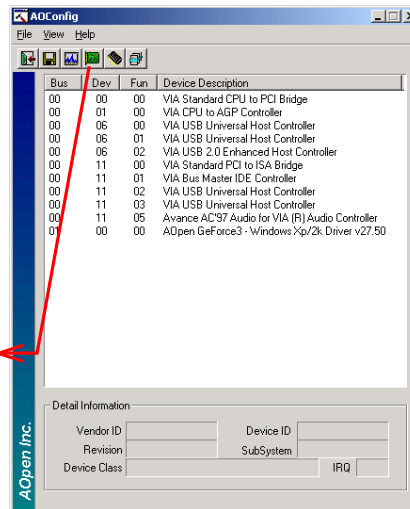
AOpen always dedicated to provide users a much friendlier computer environment. We now bring you a comprehensive system detective utility. AOConfig is a Windows based utility with user-friendly interface that allows users to obtain information of the operation system and hardware such as motherboard,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

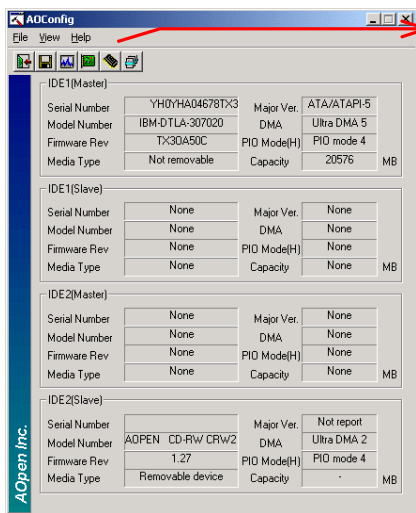
Moreover, AOConfig allows users to save information in \*.BMP or \*.TXT format which users may collect the system information in detail and send them to AOpen directly for technical support or further diagnosis of system problem.



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

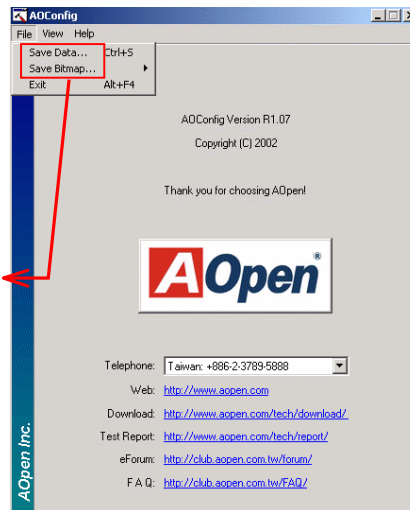
2. The PCI device page shows the configurations of all PCI devices installed on your motherboard.





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

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



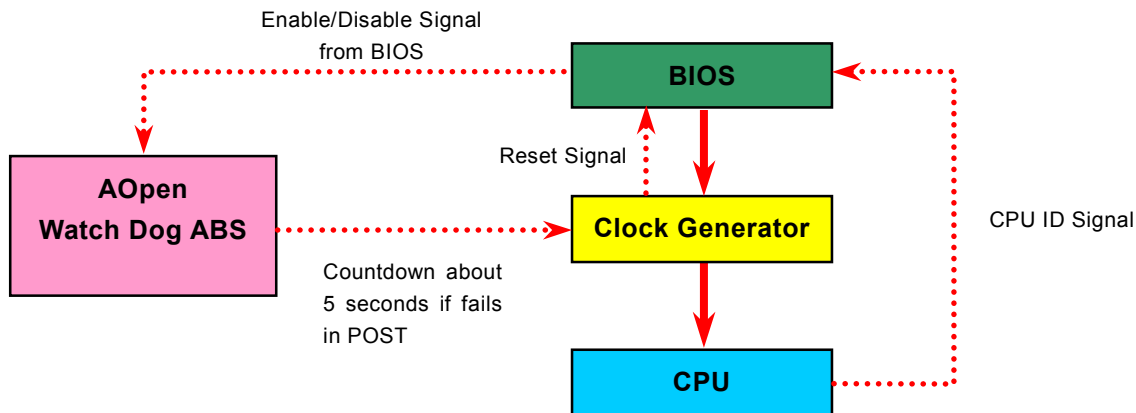
**NOTE:** AOConfig can be used in Windows 98SE/ME, NT4.0/2000, or even the latest Windows XP. Please be informed that AOConfig can only be operated in a system equipped with an AOpen motherboard. Meanwhile, all applications must be closed before starting AOConfig.



## AOpen “Watch Dog ABS”



AOpen provides a special and useful feature on this motherboard 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 according to user’s settings 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 a higher system performance without removing the system housing and save the hassle from setting the jumper to clear CMOS data when system hangs.



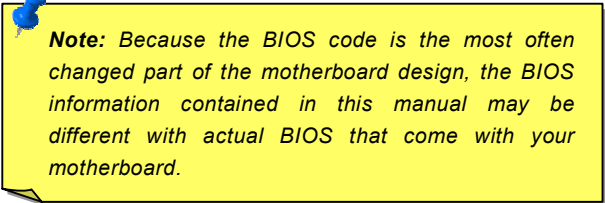
# Phoenix Award BIOS

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

[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.*

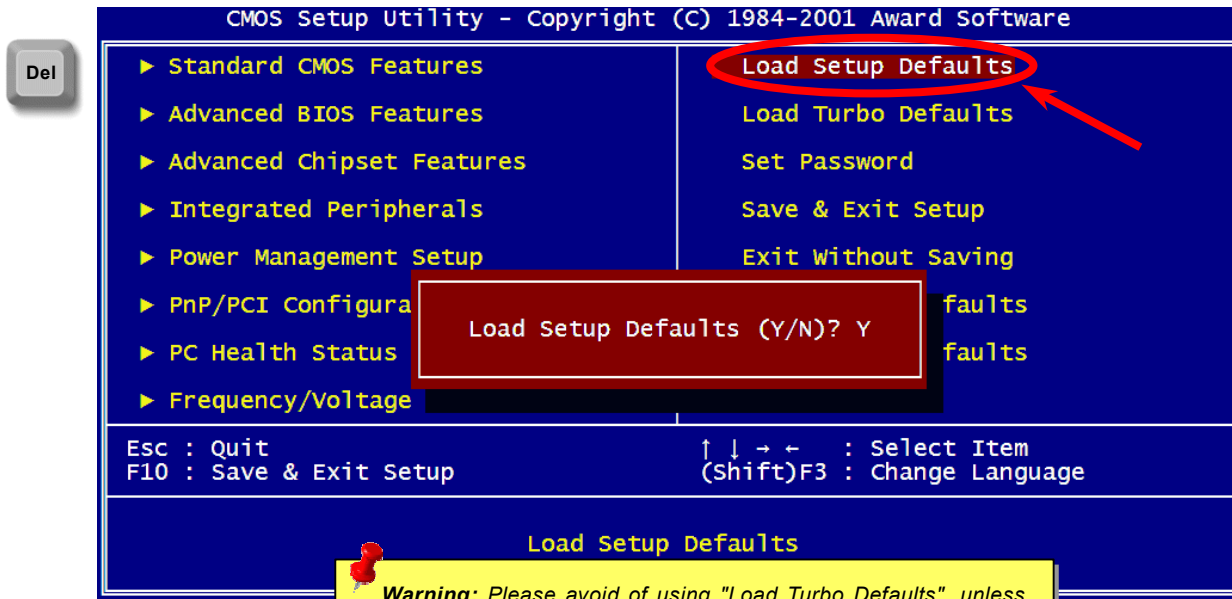
## How To Use Phoenix Award™ BIOS Setup Program

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 press <Esc> key to quit Phoenix-Award™ BIOS setup program. The following table provides details about how to use keyboard in the Phoenix-Award™ BIOS setup program. Alternatively, it's strongly recommended to install AOpen's newest WinBIOS Utility to get more detailed description, further powerful functions and advanced setting of BIOS.

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.
F6	Load Setup Defaults 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.



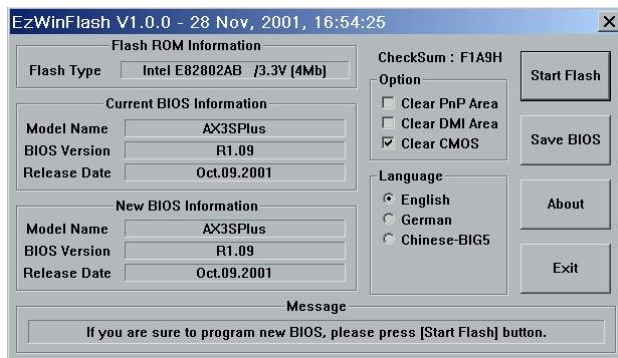


## BIOS Upgrade under Windows environment



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.

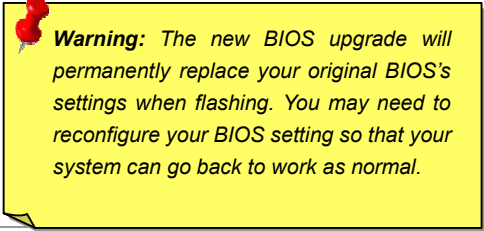
If you intent on upgrading, PLEASE BE SURE to get the right BIOS revision for the right motherboard model to avoid any possibility failure.

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 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://english.aopen.com.tw/>)
2. Unzip the download BIOS package (ex: WMK89N102.ZIP) with WinZip (<http://www.winzip.com>) in Windows environment.
3. Save the unzipped files into a folder, for example, WMK89N102.EXE & WMK89N102.BIN.
4. Double click on the WMK89N102.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.



## 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 colourful 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 colours 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 favourite Open JukeBox skin. If you see this little logo  shown beside your model name on the BIOS download page, <http://download.aopen.com/downloads>, it is assured that your motherboard supports this innovative feature!





## EzClock



Have you ever thought how great it would be if you can adjust the frequency setting on your motherboard under Windows environment and be a real master of your system? Everybody knows that the ratio and frequency setting are key factors to influence the system performance, however, it's

absolutely not an easy task for an amateur to adjust the setting value. On most traditional motherboards, you have to get into BIOS screen for the frequency and reboot the system again and again. But from now on, you don't have to surfer the boring stuffs anymore.

With brand-new and user-friendly EzClock that AOpen specially designs for his users, you can adjust those important values as you please and think of suitable. This tailor-made EzClock allows you to set the voltage and frequency of CPU, VGA, PCI and memory under Windows environment as well as in BIOS setting page; even better, those settings will be displayed realtime. Having this handy EzClock, you can monitor the system when you're fine-tuning the performance of your system. It provides you detailed and necessary information. Now let's take a look how it works on utility, BIOS and POST.



AOpen



## How You Adjust the Settings in EzClock Utility

In EzClock utility, you can adjust CPU Front Side Bus (FSB), the voltage and frequency of VGA, AGP, PCI and DRAM. Besides, the CPU related information such as CPU voltage, temperature and CPUFAN rotation speed will also be displayed on this utility.

### CPU Color Bars:

The color bar will light on and show different colors as values change. On default values, it will show green.



On the left circle area shows Ratio, FSB and frequency information about CPU. When the values are set to factory default, the light on the top and bottom of the circle will show green and it will vary as you change these CPU settings.

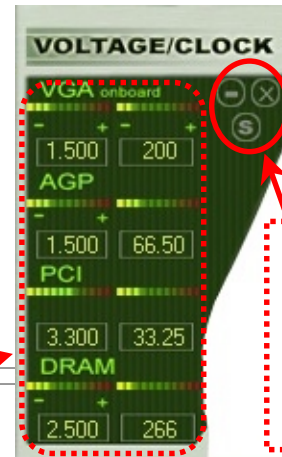
### CPU Ratio, FSB and frequency displaying area:

You can adjust CPU FSB here by entering preferred value.

On the right part of the panel is the section that you adjust the settings of VGA, AGP, PCI and memory. To adjust the voltage and clock frequency of those installments, you can press “-” or “+” on corresponding items. The color parts represent the situation of values. The higher value you set, the light on the color bar goes to right and turns red. After finishing those value settings, you can press “S” button on the upper right hand corner to save changes to CMOS.

### VGA, AGP, PCI and DRAM Voltage / Clock Area:

Pressing “-” and “+” buttons, you can adjust the voltage and clock frequency values of onboard VGA, AGP, PCI and DRAM.



### Control buttons:

“-” button allows you to minimize the utility and “X” button to close the utility. Pressing “S” button you can save the changes to CMOS.

On the bottom rectangular panel represents CPU fan speed, CPU voltage and CPU temperature. The three color bars on the right hand side will light on according to operation temperature. Please refer to the picture shown above.

**CPU Color Bars:**

The color bars will light on according to CPU operation temperature.

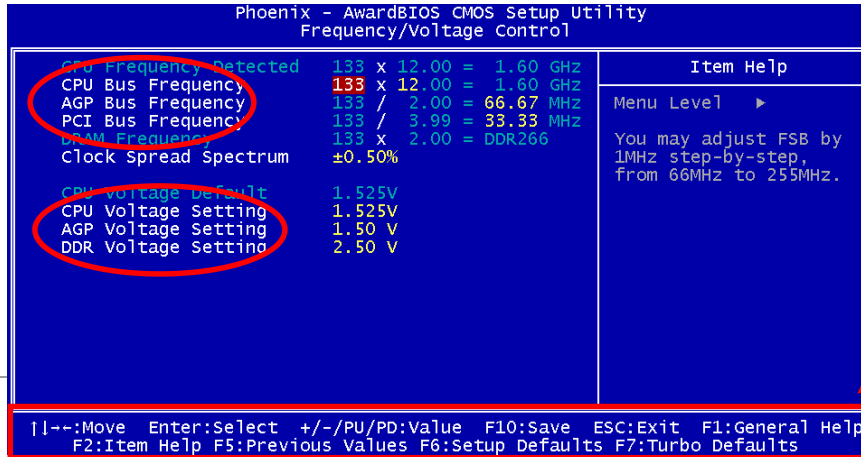


**CPU Fan, Voltage and Temperature:**

representing CPU fan speed, CPU voltage and CPU temperature in Celsius and Fahrenheit degrees.

**How You Adjust the Settings in BIOS**

Apart from EzClock utility, the voltage and frequency values of CPU, PCI and memory can also be adjusted on BIOS page. By pressing “+”, “-”, “PgUp” or “PgDn” keys, you can adjust the frequency values of CPU Bus, PCI Bus and DRAM.



Also, the same keys help you adjust the voltage of CPU and DDR settings. Some values may change while you adjust the settings. You can press “F10” to save the changes you’ve made.

Function Keys Description



## How Your Boot Screen Looks Like

After you finish setting BIOS, these setting values will be displayed on the boot screen like the shown picture here.

Every time you boot your system, both default and current settings will pop up on the screen. Your personal settings that had been adjusted earlier will be highlighted; thus, you can have clear idea how your system functions and monitor your system more easily.

Current values of your system

**Note:** Due to BIOS versions are updated in an extremely fast speed, it's strongly recommended to download the latest version of EzClock from our website for best compatibility.

```

Phoenix-Award BIOS v6.00PG, An Energy Star Ally
Copyright (C) 2002, Phoenix Technologies, LTD

Jan.13.2003 AOpen Inc.

Main Processor : Intel Pentium(R) 4 1.60GHz(133x12.0)
Memory Testing : 262144K OK
CPU Brand Name : Intel(R) Pentium(R) 4 CPU 2.53GHz

CPU          Default  Current  Default  Current
Voltage      1.525V   1.525V   1.250V   1.250V
DRAM         2.50 V   2.50 V   266MHz   333MHz
AGP          1.50 V   1.50 V   66.67MHz 66.67MHz
PCI          3.30 V   3.30 V   33.33MHz 33.33MHz

Primary Master : IC35L020AUTR07-0 ER20A44A
Primary Slave  : None
Secondary Master : CD-ROM 52X/48X A64
Secondary Slave : None

Primary IDE channel no 80 conductor cable installed

AOpen vivid BIOS

Press DEL to enter SETUP, INS to enter Open JukeBox
01/13/2003-17205-W83627-6A69UAB9C-00
  
```

Default settings of this motherboard

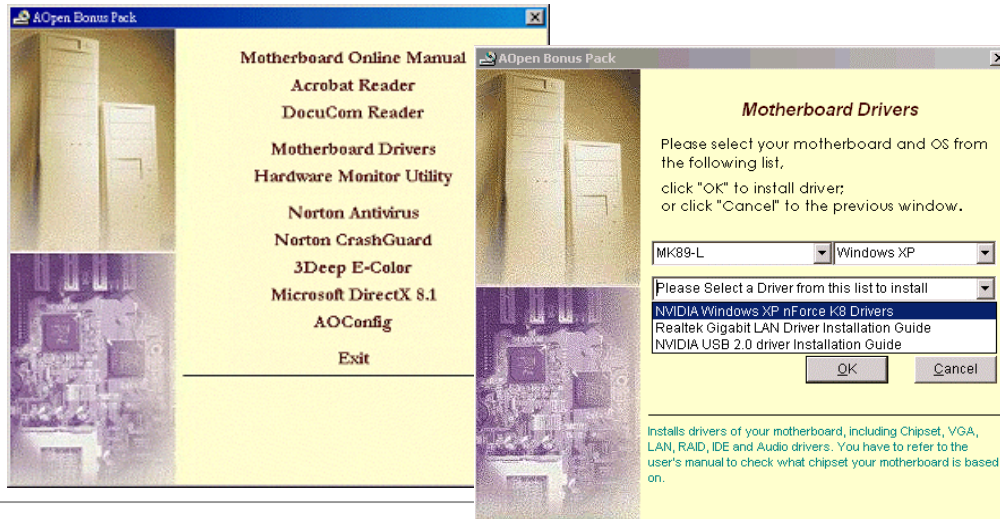
The highlighted setting value you manually adjust

# Driver and Utility

There are motherboard drivers and utilities included in [AOpen Bonus CD](#). 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 2000/XP) before you can 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.



## **NVIDIA NForce 3 Windows driver**

This Nvidia driver is an all in one package, which contains the below components:  
Audio driver, Audio utilities, GART driver, SMBus driver, Memory controller driver.



## NVIDIA USB2.0 driver

### NOTICE:

If you have installed Windows XP Service Pack1, it is not necessary to install USB2.0 driver as USB2.0 driver is packed in Service Pack1

\*\*\*\*\*

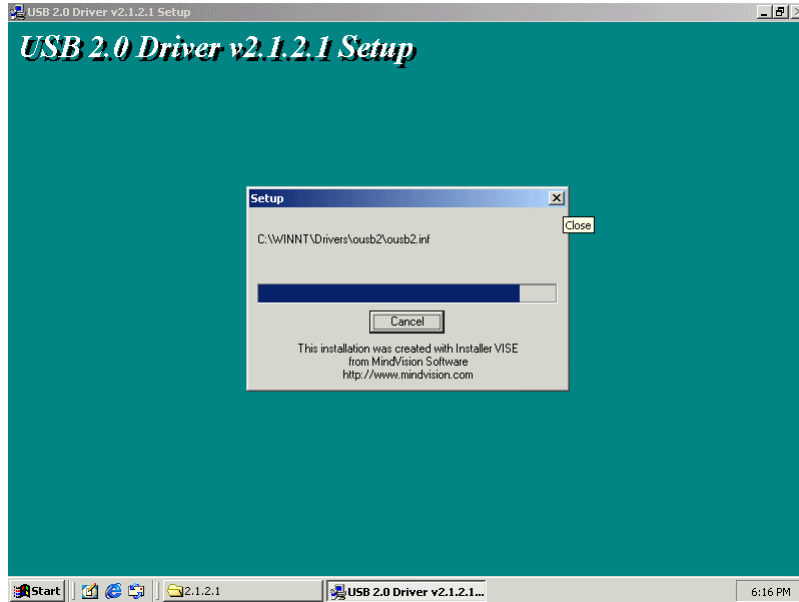
Installing Driver in Existing Windows XP System

\*\*\*\*\*

After enabling the USB 2.0, Windows XP setup will show a "Found New Hardware" dialog box. Under Windows XP, "Universal Serial Bus (USB) Controller" will be displayed.

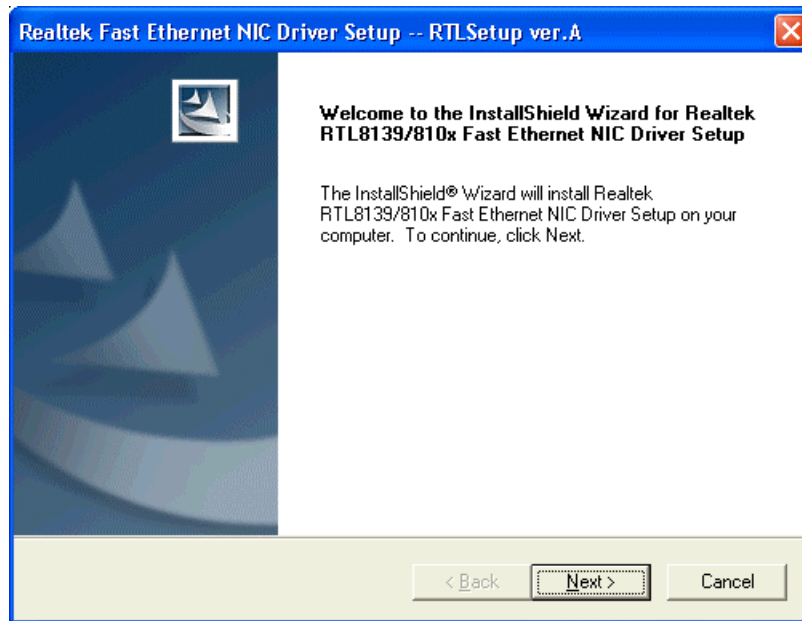
1. Click on "Next," and from the generated list box, choose "Install from a list or special location (Advanced)". Click "Next"
2. Click on "Next," and from the generated choices, choose "Include this location in the search:"
3. Insert the Bonus CD in CD-ROM.
4. Type "[CD-ROM]:\Driver\Nvidia\USB2.0\WinXP" in the text box that appears.
5. Click on "Next." A message informing you that Windows XP has found "NVIDIA PCI to USB Enhanced Host Controller W/ Filter FPGA (3616)" will appear.
6. When the New Hardware Wizard has finished installing the USB driver, click on "Finish" for Windows 98SE/ME/2000 Installation

For Windows98SE/ME, please install the driver from our bonus CD.



## **Installing LAN driver (for MK89-N and MK89-1394)**

For Windows98SE/ME/2000/XP users, please install the LAN driver from our bonus CD.





For Windows95/NT4.0 users, please follow the procedures below to install the LAN driver.

[Windows95]

Installing driver procedure on Microsoft Windows 95 :

- 
1. Ask you to select which driver you want to install, select "Driver from disk provided by hardware manufacturer".
  2. Specify the setup file pathname  
[CD-ROM]:\Driver\LAN\RTL8100\Windows\95\WIN95A (for Windows 95 and Win95A) or  
[CD-ROM]:\Driver\LAN\RTL8100\Windows\95\W95OSR2 (for Windows 95 OSR2).
  3. Windows 95 will appear some messages to insert Windows 95 system disk to complete setup step.
  4. Windows 95 will finish the other installation procedure automatically, then you restart the system.

[Windows NT 3.5, 3.51 & 4.0]

Installing driver procedure on Microsoft Windows NT :

-----

When you are in Windows NT :

1. In the Main group of NT, select the "Control Panel" icon.
2. In the Control Panel window, choose the "Network" icon.
3. In the Network Settings dialog box, choose the "Add Adapter" button. The Add Network Adapter dialog box appears.
4. In the list of network cards, select "<other> Requires disk from manufacturer", and then press <Enter> button.

5. Enter drive and pathname

[CD-ROM]:\Driver\LAN\RTL8100\Windows\NT (for NT 4.0) which is the path where the setup file OEMSETUP.INF is located, and then choose the OK button.

6. The screen will appear "Select Line Speed" dialog box which is provide by RTL8139.SYS driver. The default value is "auto" so that the RTL8139 PCI Fast Ethernet adapter and its driver RTL8139.SYS will auto-detect the line speed, 10Mb or 100Mb, while the RTL8139.SYS is loading. The other values, "10" or "100", are only used when you want to forced RTL8139 PCI Fast Ethernet adapter to 10Mb or 100Mb.

7. The screen will appear "Input EthernetID" dialog box which is provide by RTL8139.SYS driver. This option is only required when you have more than one Realtek RTL8139 PCI Fast Ethernet adapters on this computer. Select "SKIP" if only one adapter is installed on this computer.

8. "Bus Location" display in next screen. Your machine contains more than one hardware bus, please select the Bus Type and Bus number on which your network adapter card is installed.

9. NT will then perform the binding process. If any additional network software options were installed, you may be prompted for specific information for these packages.

10. Restarting your system you will acquire network service.

NOTES:

-----

\* Installing Multiple LAN Adapters:

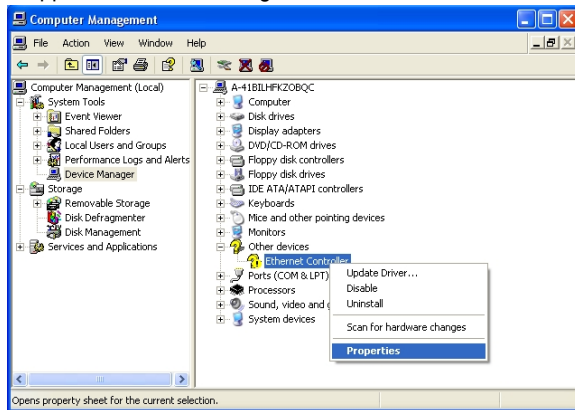
Enter Windows NT and follow above setup procedure step 2, in the "Network Settings" dialog box, choose the "Configure.." button. The "Input Ethernet ID" dialog box appears and input adapter's Ethernet ID. Last step to select OK and close NETWORK SETUP. Select SKIP if only one adapter is installed on this computer.



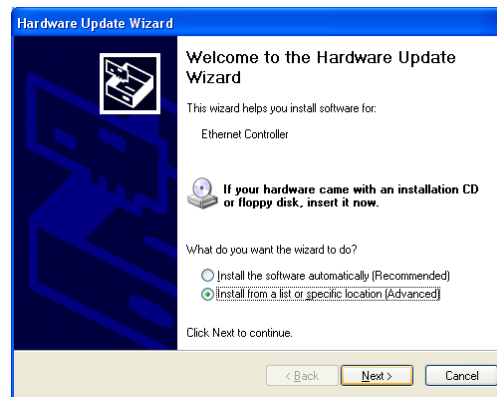
## Installing LAN driver (for MK89-L)

For Windows XP users, please follow the procedures below to install the LAN driver.

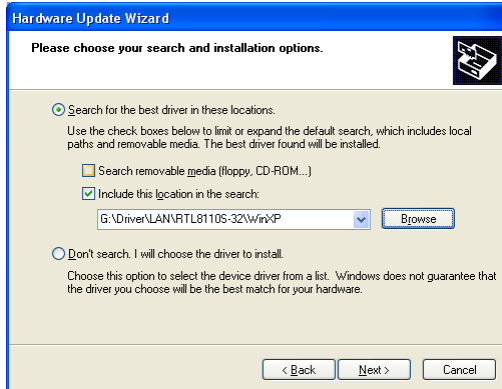
1. Open the Device Manager and check if there is "Ethernet Controller" in "Other devices".
2. Insert the supplied "Bonus CD". Right click "Ethernet Controller", then select "Update Driver".



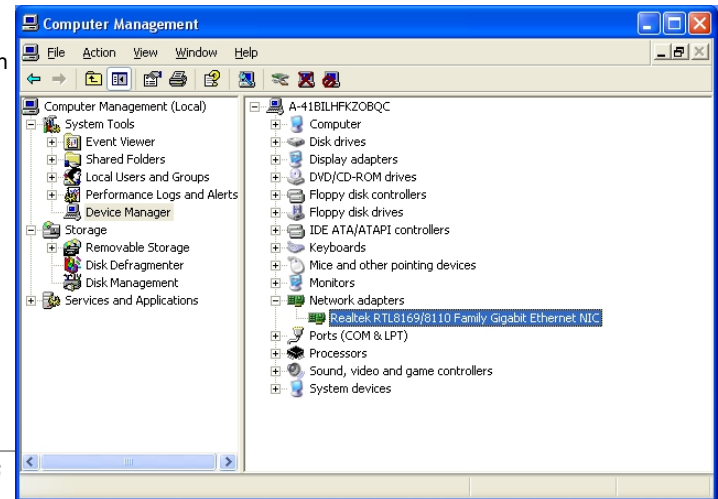
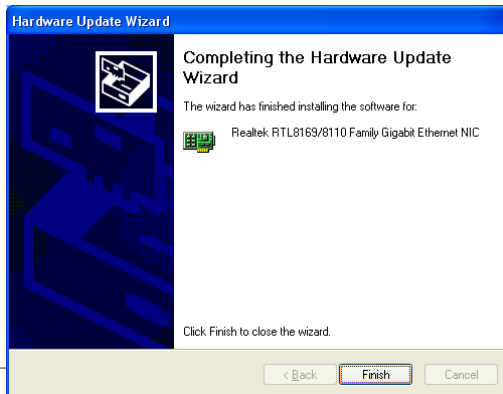
3. Select "Install from a list or specific location (Advanced)", and then click "Next".



4. Choose "Search for the best driver in these locations", and then select "Include this location in the search:" Type "G:\Driver\LAN\RTL8100S-32\WinXP" in the text box that appears. Press " Next ".

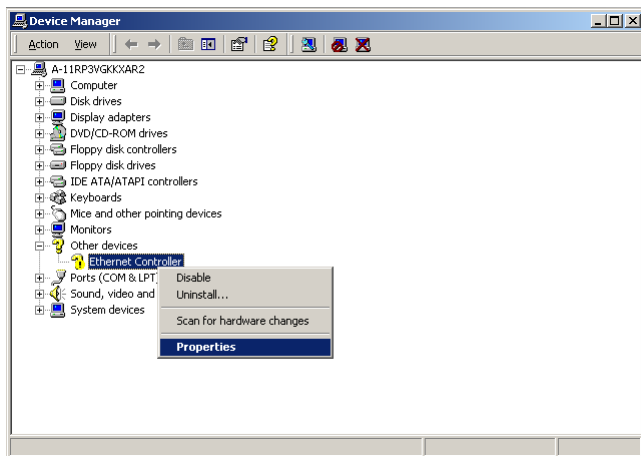


5. Driver installed and you can Confirm Windows XP Installation

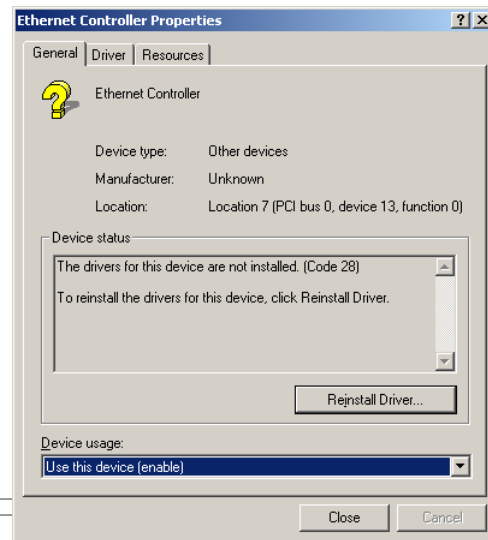


For Windows 2000 users, please follow the procedures below to install the LAN driver.

1. Open the Device Manager and check if there is a "Ethernet Controller" in "Other devices"
2. Insert the supplied "Bonus CD". Right click "Ethernet Controller", then select "Update Driver".

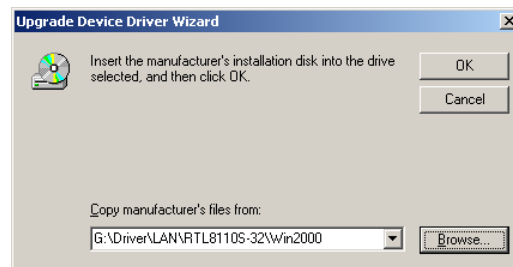
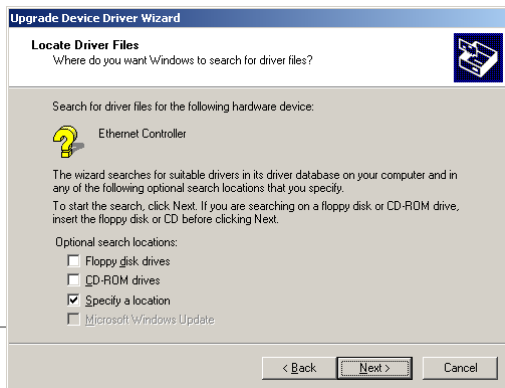


3. Click "Reinstall Driver" in the General Tab. Select "Search for a suitable driver for my device (recommended)"

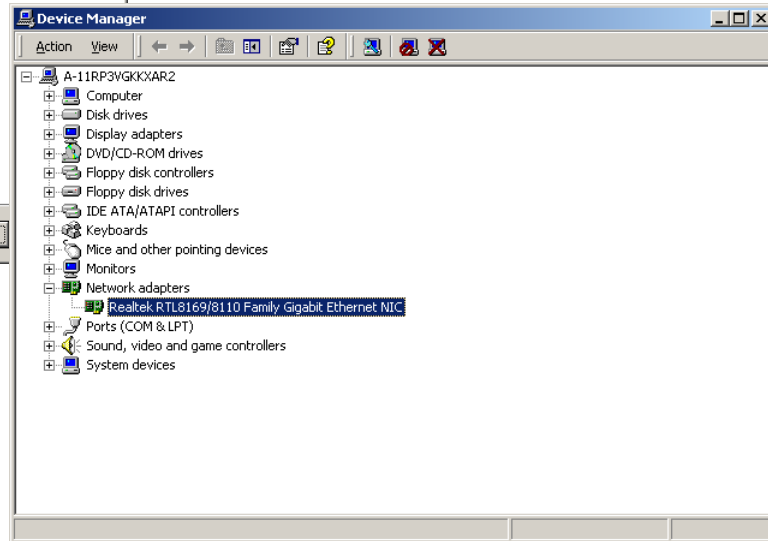
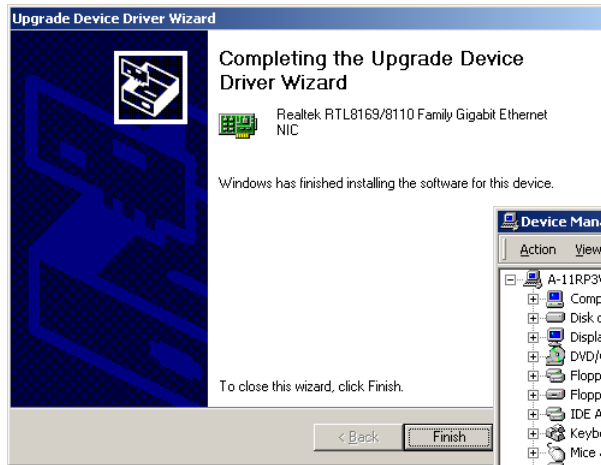




4. Select "Specify a location", and then click "Next". Type "[G:\Driver\LAN\RTL8100S-32\Win2000](#)" in the text box that appears. Press "OK".

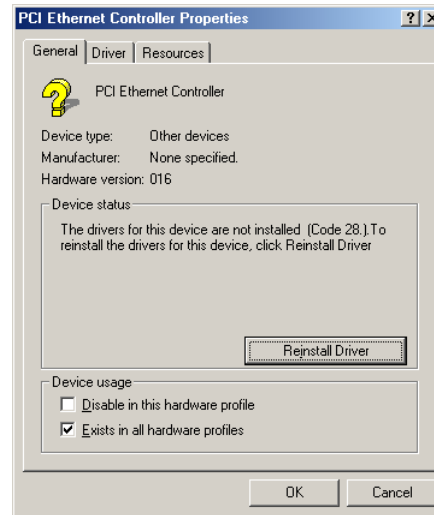
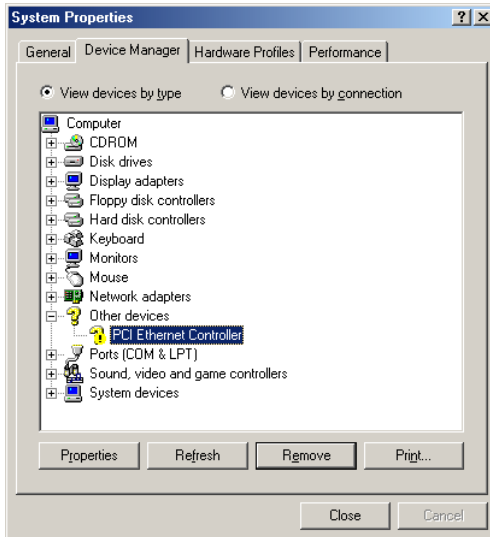


5. Driver installed and you can Confirm Windows 2000 Installation



For Windows ME users, please follow the procedures below to install the LAN driver.

1. Open the Device Manager and check if there is a "PCI Ethernet Controller" in "Other devices"
2. Insert the supplied "Bonus CD". Double click "PCI Ethernet Controller ", and click "Reinstall Driver" in the General Tab."

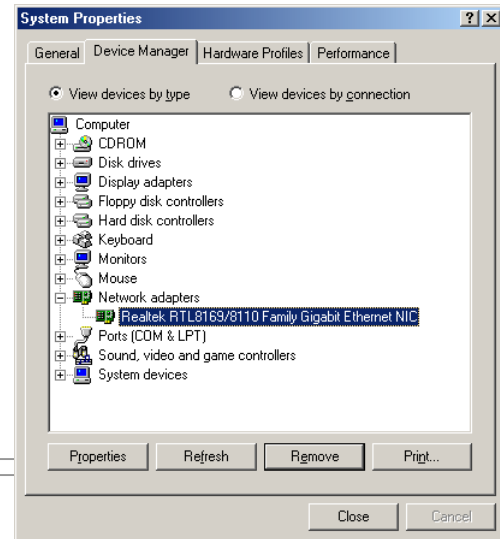
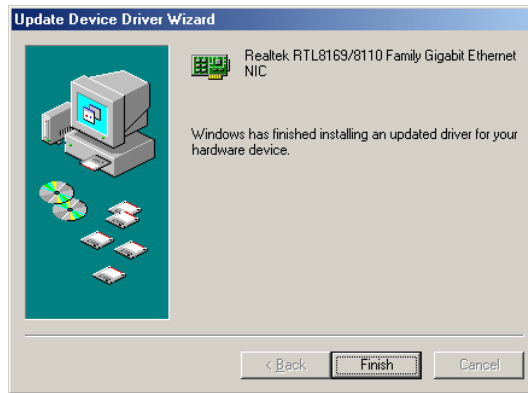


3. Select "Specify the location of the driver (Advanced)". Choose "Search for a better driver than the one your device is using now (Recommended)", and then select "Specify a location". Type "G:\Driver\LAN\RTL8100S-32\WinME" in the text box that appears. Press "Next".



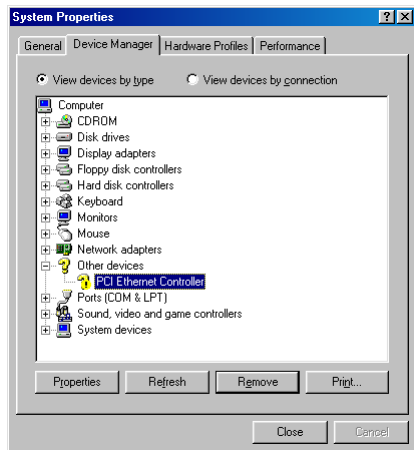


7. Driver installed. Restart computer. You can confirm Windows ME Installation



For Windows 98 users, please follow the procedures below to install the LAN driver.

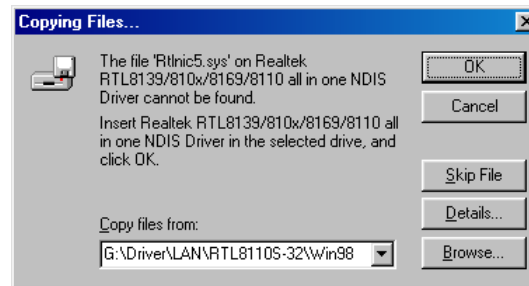
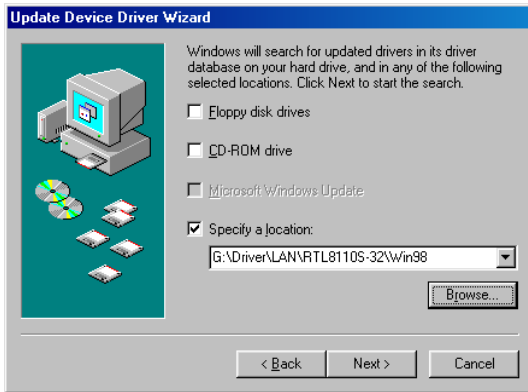
1. Open the Device Manager and check if there is a "PCI Ethernet Controller" in "Other devices"
2. Insert the supplied "Bonus CD". Double click "PCI Ethernet Controller ", and click "Reinstall Driver" in the General Tab."



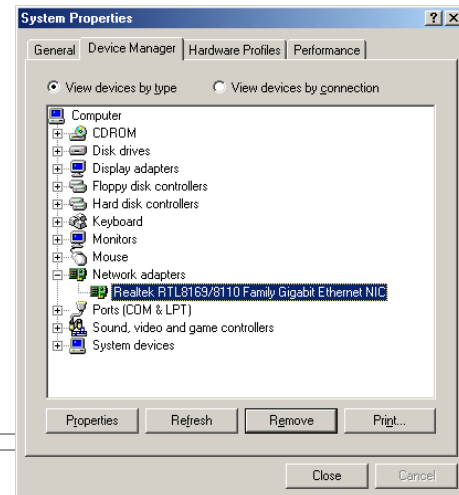
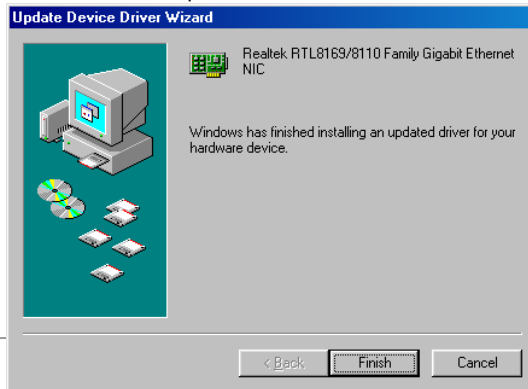
3. Select "Search for a better driver than the one your device is using now. (Recommended)"



4. Select "Specify a location", and type "G:\Driver\LAN\RTL8100S-32\Win98" in the text box that appears. Press " Next". System will ask you to provide the file path for loading driver. Please type "G:\Driver\LAN\RTL8100S-32\Win98" in the text box that appears and press " OK". System will ask you to insert "Windows 98 CD-ROM".

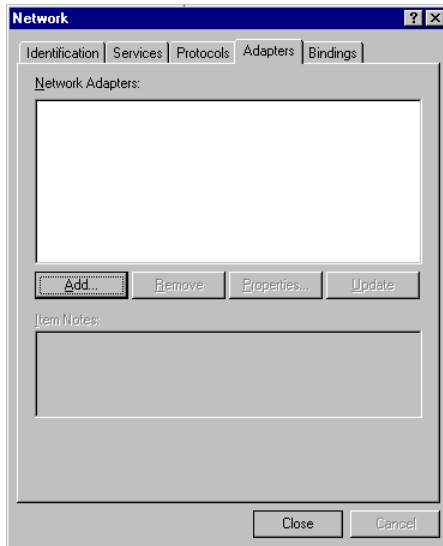


5. Driver installed. Restart computer. You can confirm Windows 98 Installation



For Windows NT users, please follow the procedures below to install the LAN driver.

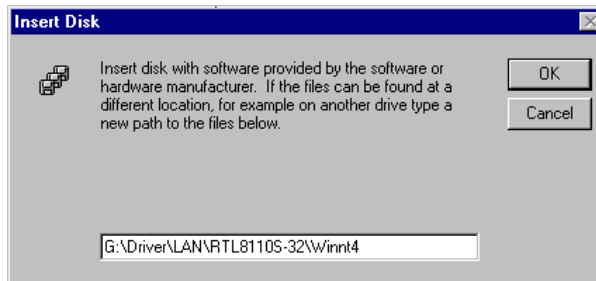
1. In the Control Panel, double-click the Network icon. When the Network window opens, select the Adapters tab.



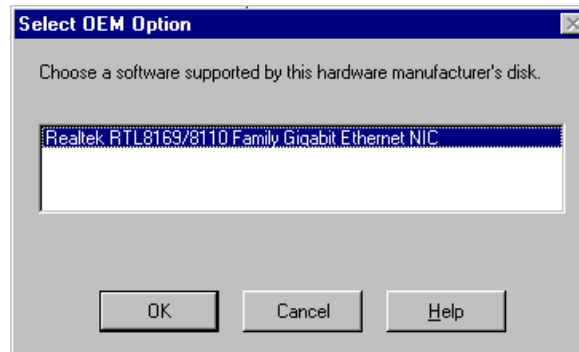
2. Click "Add" to install a new adapter. All previously installed drivers are listed under Network Adapters.



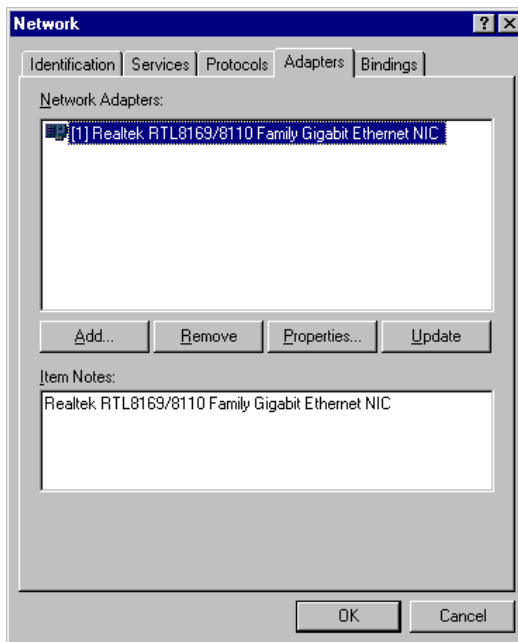
- When the Select Network Adapter window opens, click "Have Disk". When prompted, insert the BONUS CD. Type the path "G:\Driver\LAN\RTL8100S-32\Winnt4" to the driver, and click "OK".



- With "Realtek RTL8169/8110 Family Gigabit Ethernet NIC" highlighted in the Select OEM Option window, click "OK".



5. Restart computer and you can confirm Windows NT Installation



# 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 16.6MHz x 2 = 33MB/s.

**ATA/66**, data transfer rate is 16.6MHz x 4 = 66MB/s.

**ATA/100**, data transfer rate is 16.6MHz x 6 = 100MB/s.

**ATA/133**, data transfer rate is 16.6MHz x 8 = 133MB/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 interconnection) 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 completed 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**

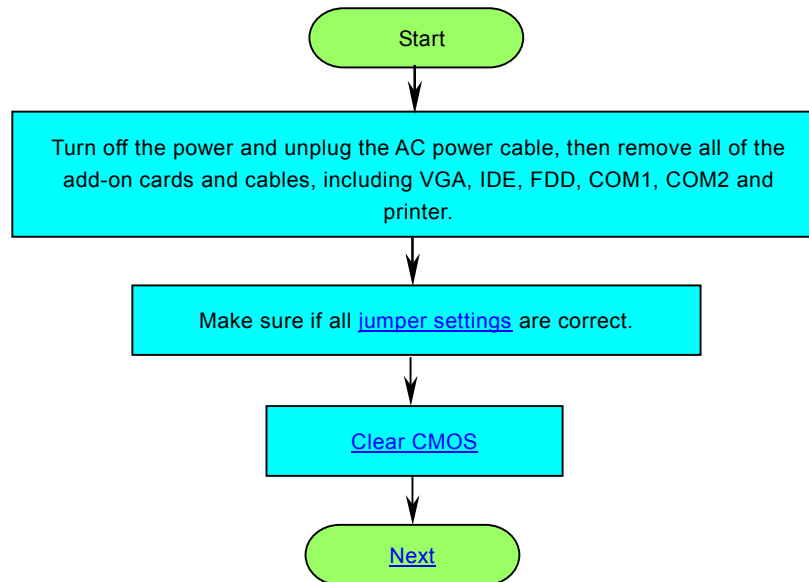
A compressed file format to reduce file size. To unzip file, run shareware PKUNZIP (<http://www.pkware.com/>) for DOS and other operating system or WINZIP (<http://www.winzip.com/>) for windows environment.

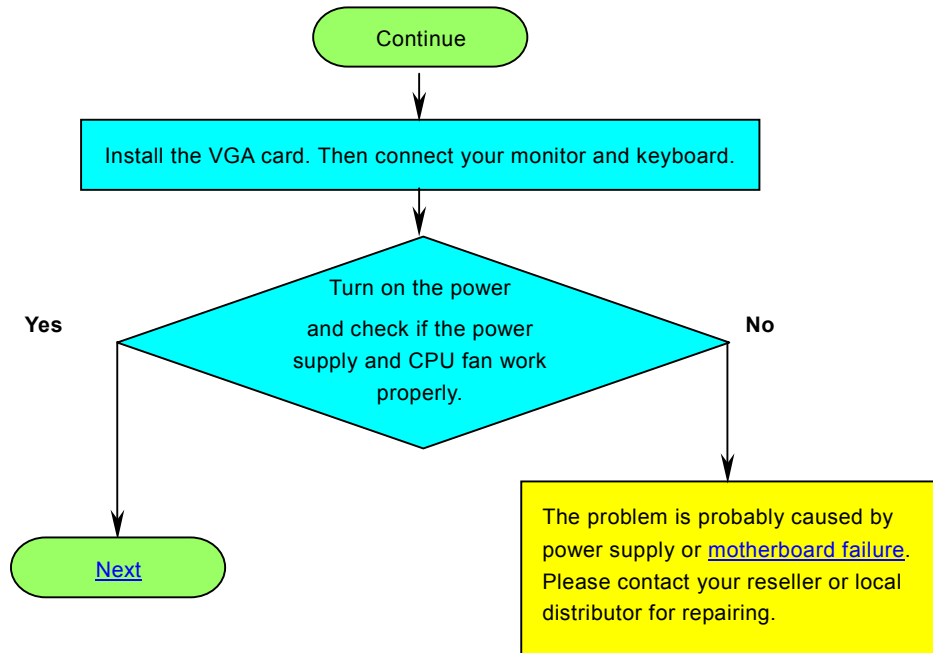


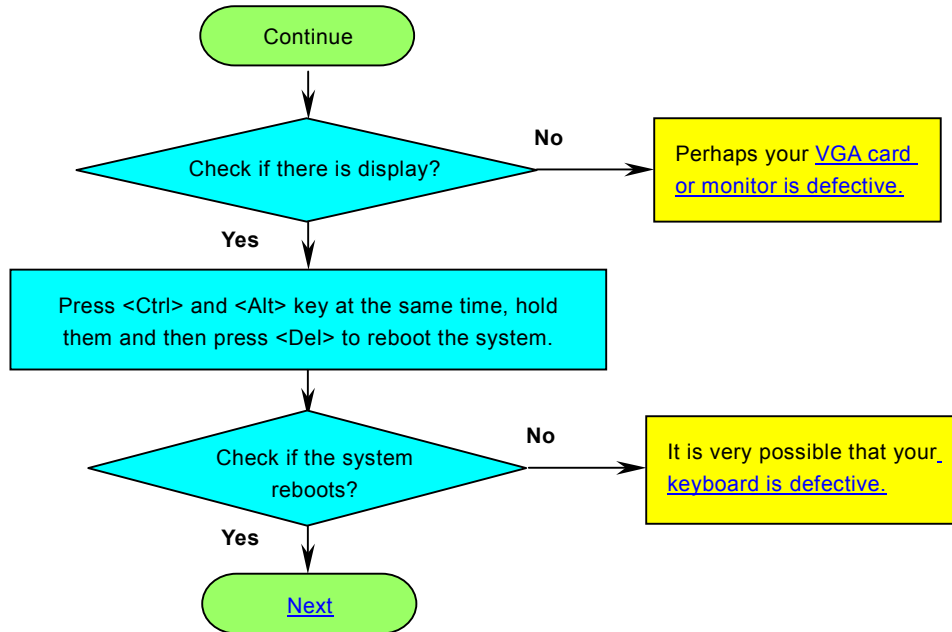


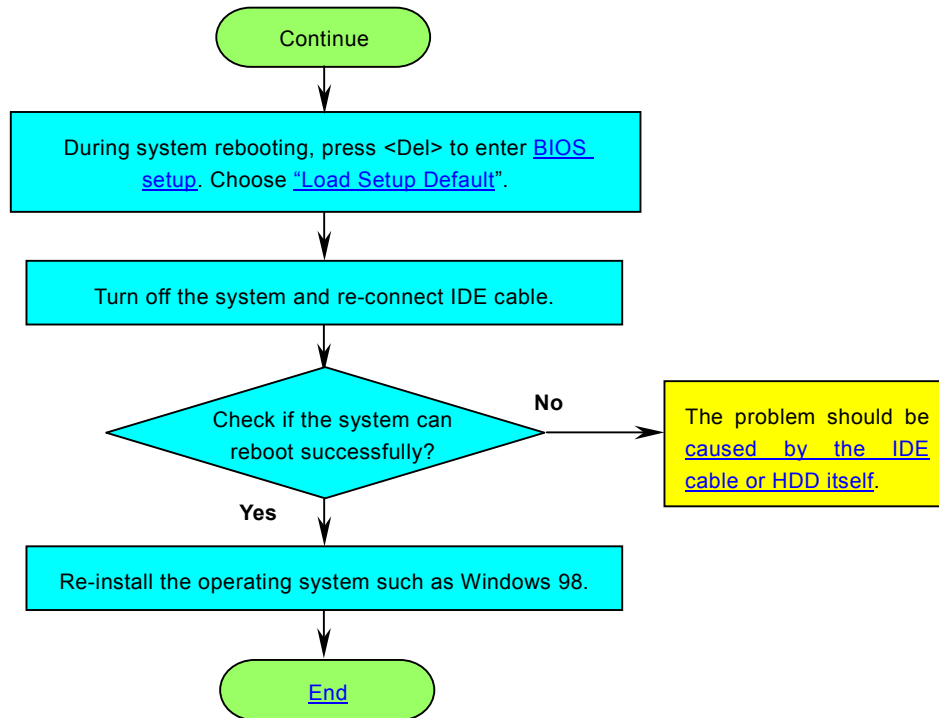
# Troubleshooting

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://download.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 select your preferred language after log on and 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://download.aopen.com.tw/downloads>

**5**

**eForum:** We welcome you to join AOpen eForum to discuss our products with other users. Your problem probably had been discussed before or will be answered by other power users here.

<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 component side of PCB. For example:



Part No.

Serial No.



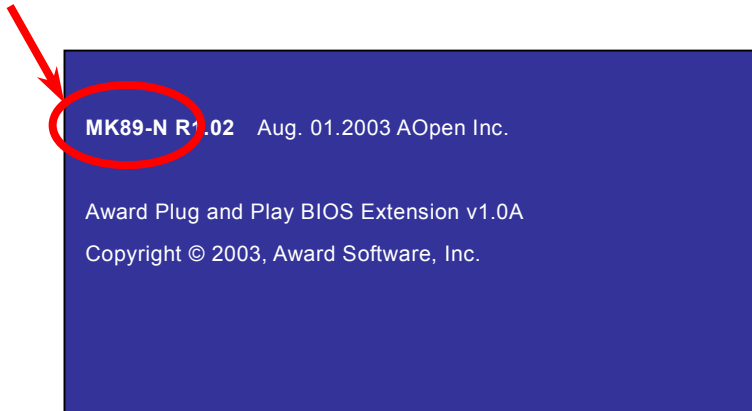
Part No.

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:



**MK89-N** is model name of motherboard, **R1.02** is BIOS version.





# Product Registration

ClubAOpen

Welcome to AOpen Inc.



GWS

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

Email: Support@AOpen.NL

### 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: 49-2131-1243-710

Fax: 49-2131-1243-999

### Japan

AOpen Japan Inc.

Tel: 81-048-290-1800

Fax: 81-048-290-1820

**Web Site:** <http://english.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>

