MK79
Online Manual

DOC. NO.: MK79-OL-E0210A

AOpen

Overview

Hardware
Installation

Drivers &
Utilities

AWARD
BIOS Setup

Glossary

Troubleshooting &
Technical Support

What's in this manual

AOpen

AOpen

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.

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.

AOpen

Overview

Thank you for choosing AOpen MK79. The MK79 is based on AMD$^®$ Socket 462 motherboard with micro ATX form factor featuring the NVIDIA nForce™ (IGP and MCP-D). As high performance chipset built in the M/B, the MK79 supports AMD$^®$ Socket 462 series Athlon™ & Duron™ and AthlonXP™ processor and 266/200MHz EV6 system bus. For better graphic performance, GeForce2 GPU 3D Graphics is integrated into the NVIDIA nForce for delivering rich,real-time 3D images and animation consumes valuable system Bandwidth.   MK79 supports 1.5V AGP interface with AGP 4x with Fast Write data transfer, which pipelined spilt-transaction long burst transfer up to 1056MB/sec. This motherboard comes with high speed of 6.4Gb/sec HyperTransport, the Isochronous Link between NVIDIA IGP and MCP-D. DDR266 and DDR200 DDR RAM are applied to the maximum memory size of up to 1GB. The on-board IDE controller supports Ultra DMA 33/66/100 mode and the transfer rate up to 100MB/s. Besides, the MK79 has an AC97 CODEC RealTek ALC202A chipset onboard for provides high performance and magic surround stereo sound to let people enjoy working with it.
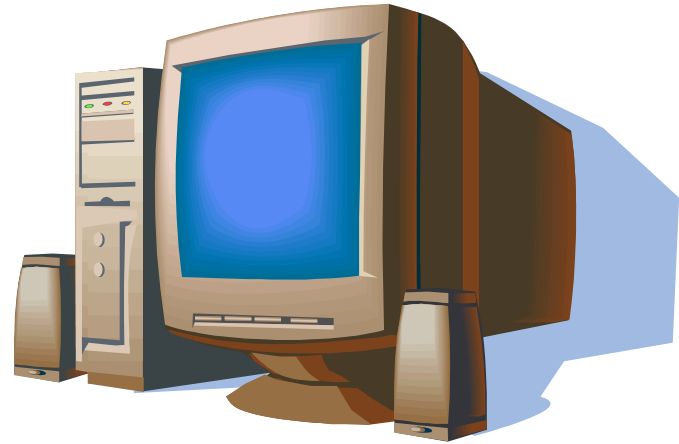
Feature Highlight

CPU

Supports AMD® Socket 462 series CPU with 200MHz and 266MHz, EV6 Bus designed for Socket 462 technology.

Athlon: 600MHz~1.4GHz

Duron: 600MHz~1.2GHz

AthlonXP: 1500+(1.33GHz)~2600+(2.06GHz)

Chipset

The NVIDIA nForce™2 consists of the nVIDIA nForce IGP and MCP-D, which using TwinBank™ Memory Architecture, a Dynamic Adaptive Speculative processor (DASP) to help boost CPU performance and the HyperTransport, a high performance I/O bus interface with high speed of 6.4Gb/sec.   Integrated in this excellent chipset is the Geforce2 GPU, which could provide amazing 3D visual performance to create rich, real-time 3D images and animation and Dolby® Digital 3D audio. Of two PCI slots provided, MK79 supports all master PCI slots with arbitration and decoding for all integrated functions and LPC bus.

Ultra DMA 33/66/100 Bus Master IDE

Embedded within nVIDIA MCP-D, this motherboard equipped with Ultra DMA 33/66/100 that supports two connectors, and that means four IDE devices in two channels, and supports Enhanced IDE devices.

Expansion Slots

Including two 32-bit/33MHz PCI and one AGP 4X slot. 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 1056MB/s. For AD and SBA signaling, MK79 can support 133MHz 2X/4X mode.

Memory

With NVIDIA nForce™2 chipsets, the MK79 supports Double-Data-Rate (DDR) RAM. The DDR RAM interface allows zero wait state bursting between the RAM and the data buffers at 266/200 MHz. The four banks of DDR RAM can be composed of an arbitrary mixture of 64, 128, 256, 512MB DDR RAM and maximum up to 1GB. The MK79 allows DDR RAM to run at either synchronous or pseudo-synchronous mode with the host CPU bus frequency (266/200MHz).

On-board AC97 Sound

MK79 uses the AC97 CODEC RealTek ALC202A chip. This on-board audio includes a complete audio recording and playback system.

ACR Slot

On the strength of nForce MCP-D on chip, which is a highly-integrated Platform LAN Connect device, it provides 10/100 Mbps Ethernet for office and home use. You may use ACR slot with LAN card connected for network access.

Six USB (1.1) Connectors

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

Power Management/Plug and Play

The MK79 supports the power management function that confirms to the power-saving standards of the U.S. Environmental Protection Agency (EPA) Energy Star program. It also offers Plug-and-Play, which helps saving users from configuration problems, thus making the system much more user-friendly.

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

The MK79 provides one high-speed UART compatible serial port, one VGA 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 Driver and Utility

Motherboard Map

Front Audio Connector
Onboard AC97 CODEC
RealTek ALC202A

Black: CD-IN Connector
COM2 Connector

Green: AUX-IN Connector

32-bit PCI Expansion Slot x2

ACR Slot

IrDA Connector

JP14 Clear CMOS Jumper

WOL (Wake on LAN) Connector

Chassis Intrusion Sensor Connector

2Mb Phoenix Award BIOS

2nd USB (1.1) Port Connector

3rd USB (1.1) Port Connector

Front Panel Connector

AGP LED

SYSFAN3 Connector

IDE Connector x 2
(ATA/33/66/100 supported)

PC99 Colored Back Panel

Resetable Fuse

JP28 Keyboard/Mouse Wakeup

SYSFAN2 Connector

JP17 Host Clock Selection

AGP 4x Expansion Slot
(For 1.5V AGP and ADD card only)

462-pin CPU Socket with Voltage
and Frequency Auto-Detection that
supports AMD™ Athlon™/Duron™
and Athlon™XP

NVIDIA nForce IGP and MCP-D
CPUFAN1 Connector

184-pin DIMMx2 supports
DDR266/200
(Max. to 1GB)

STBY LED
ATX Power Connector

FDD Connector

Block Diagram

DDR266/200
DDR RAM Up to 1GB

DDR SDRAM Socket x2

32-bit PCI Slot x3

Socket 462
AMD
Athlon/Duron/AthlonXP
CPU

100/133MHz
System Bus

NVIDIA
nForce2 IGP

PCI Bus

ATA
33/66/100

Primary
Channel

Secondary
Channel

IDE Drive x4

AGP Bus

AGP 4X Slot

MCP-D

AC'97 Link

Audio CODEC

ACR slot

VGA onboard

1st USB Port

2nd USB Port

3rd USB Port

USB (1.1) connector x6

2MBit Flash EEPROM

Parallel Port

Serial Port x1

Floppy Disk Drive x2

AOpen

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.*

AOpen

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

1 **Normal Operation (default)**
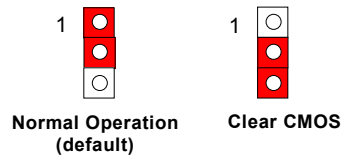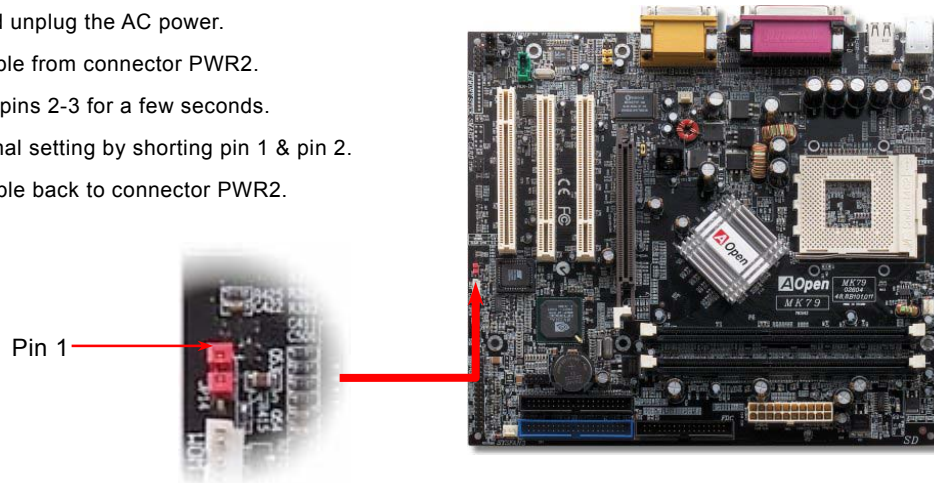
1 **Clear CMOS**

Tip: When should I Clear CMOS?

1. Boot fail because of overclocking…

2. Forget password…

3. Troubleshooting…

CPU Installation

This motherboard supports AMD® Athlon™ & Duron™ and AthlonXP™ Socket 462 series CPU. Be careful of CPU orientation when you plug it into CPU socket.

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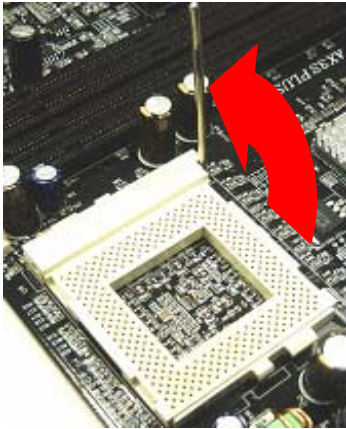
2. Locate Pin 1 in the socket and look for a black dot or cut edge on the CPU upper interface. Match Pin 1 and cut edge, then insert the CPU into the socket.

CPU socket
Lever

CPU pin 1
and cut edge
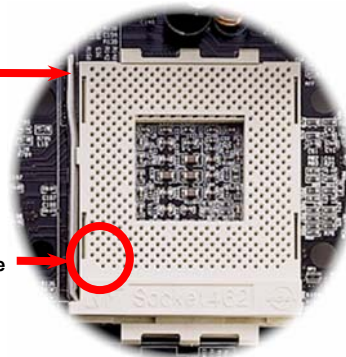
Black dot
and cut edge
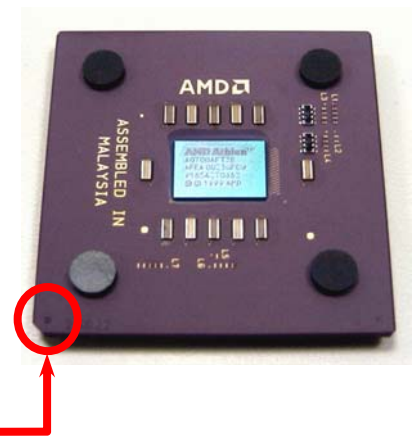
Note: This picture is for example only, it may not exactly be the same motherboard.

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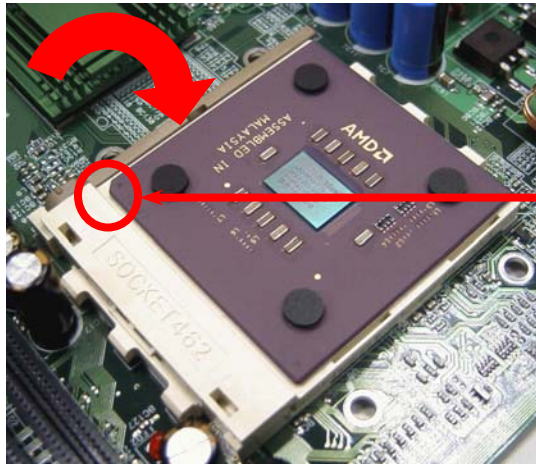
CPU cut edge

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

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

AOpen

CPU Jumper-less Design

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

```
┌───────────────┐          ┌──────────────────┐     ┌────────────┐
│   AMD         │◄─────────│ Clock Generator  │◄────│   BIOS     │
│ Socket 462    │          └──────────────────┘     │ Controlled │
│   CPU         │◄─────────────────────────────────│  Circuit   │
└───────────────┘              CPU Freq. Ratio      └────────────┘
```

CPU VID signal   CPU voltage

Power Regulator

(Automatically generates CPU voltage)
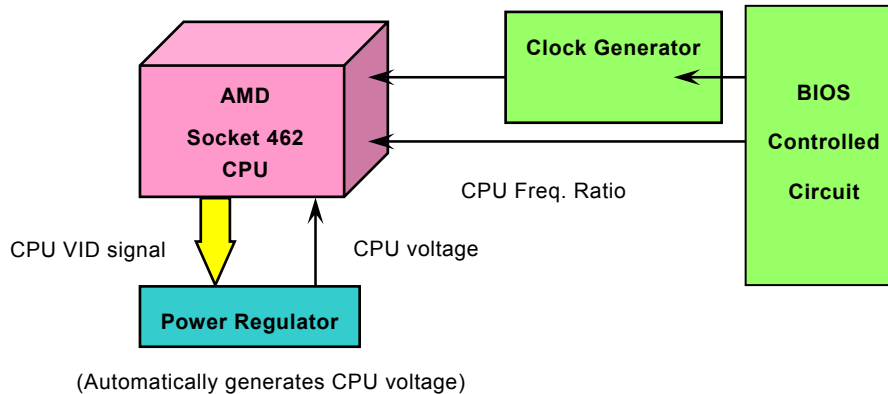
Full-range Adjustable CPU Core Voltage

The CPU core voltage will be automatically detected. It is not necessary to set CPU core voltage.

Setting CPU Frequency

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

BIOS Setup > Frequency/Voltage Control > CPU Speed Setting

CPU Ratio	From 5x to 16x step 0.5x
CPU FSB (By BIOS table)	100,102,103,106,133,138,143,146,150,153,157MHZ

Home

Warning: NVIDIA nForce IGP chipset supports 133MHz FSB (with performance reaches maximum 266MHz EV6 system bus) and 66MHz AGP clock, higher clock setting may cause serious system damage.

AOpen

Supported CPU Frequency

Core Frequency = CPU Bus Clock * CPU Ratio   **EV6 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	EV6 Bus Clock	Ratio
Athlon 1G	1GHz	200MHz	10.0x
Athlon 1.1G	1.1GHz	200MHz	11.0x
Athlon 1.2G	1.2GHz	200MHz	12.0x
Athlon 1.3G	1.3GHz	200MHz	13.0x
Athlon 1G	1GHz	266MHz	7.5x
Athlon 1.13G	1.13GHz	266MHz	8.5x
Athlon 1.2G	1.2GHz	266MHz	9.0x
Athlon 1.33G	1.33GHz	266MHz	10.0x
Athlon 1.4G	1.4GHz	266MHz	10.5x
AthlonXP 1500+	1.3GHz	266MHz	10.0x
AthlonXP 1600+	1.4GHz	266MHz	10.5x
AthlonXP 1700+	1.46GHz	266MHz	11.0x
AthlonXP 1800+	1.53GHz	266MHz	11.5x
AthlonXP 1900+	1.6GHz	266MHz	12.0x
AthlonXP 2000+	1.667GHz	266MHz	12.5x
AthlonXP 2100+	1.73GHz	266MHz	13x
AthlonXP 2200+	1.80GHz	266MHz	13.5x
AthlonXP 2400+	2.0GHz	266MHz	15x
AthlonXP 2600+	2.13GHz	266MHz	16x
Duron 800	800MHz	200MHz	8.0x
Duron 850	850MHz	200MHz	8.5x
Duron 900	900MHz	200MHz	9.0x
Duron 950	950MHz	200MHz	9.5x
Duron 1G	1GHz	200MHz	10.0x
Duron 1.1G	1.1GHz	200MHz	11.0x

Note: With CPU speed changing rapidly, there might be fastest CPU on the market by the time you received this installation guide. This table is kindly for your references only.

Note: This motherboard support CPU auto-detection function. Hence, you don't need to setup the CPU frequency manually.

AOpen

CPU and Housing Fan Connector

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

SYSFAN2 Connector

GND
+12V
SENSOR
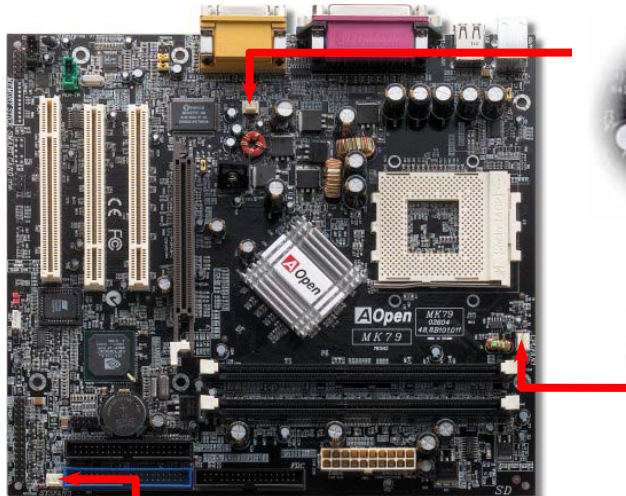
GND
+12V
SENSOR

CPUFAN1 Connector

GND
+12V
SENSOR
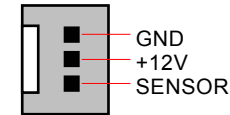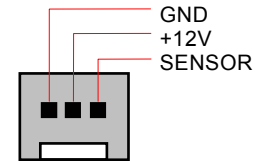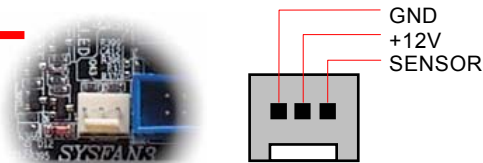
SYSFAN3 Connector

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

AOpen

JP17 Host Clock Selection

This jumper allows you to select different CPU Frequency. You may set pin 1-2 for 100MHz or pin 2-3 for 133MHz. Additionally, You may also choose a specific FSB frequency ranging from 100~106 (say, 100, 102, 103 for example) and 133~157 with reference to a frequency table in BIOS setup program.

Pin 1
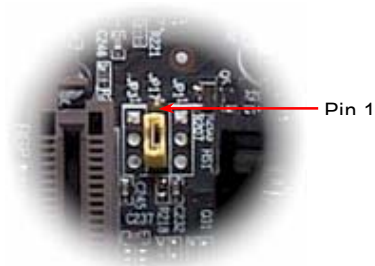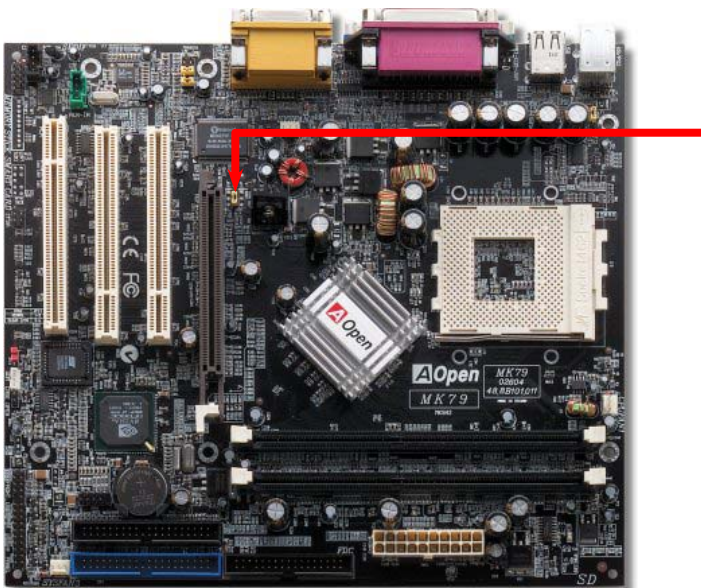
JP17 Host Clock
Select Jumper

100MHz   133MHz
(Default)
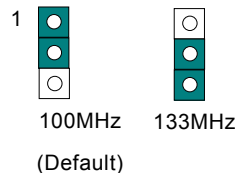
JP28 Keyboard/Mouse Wakeup Enable/Disable Jumper

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

Pin 1

JP28

1

Enable   Disable

(Default)
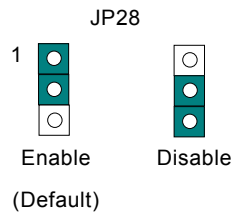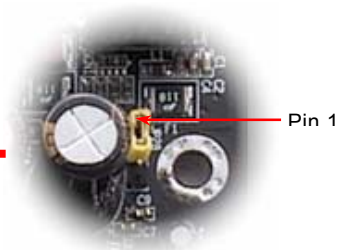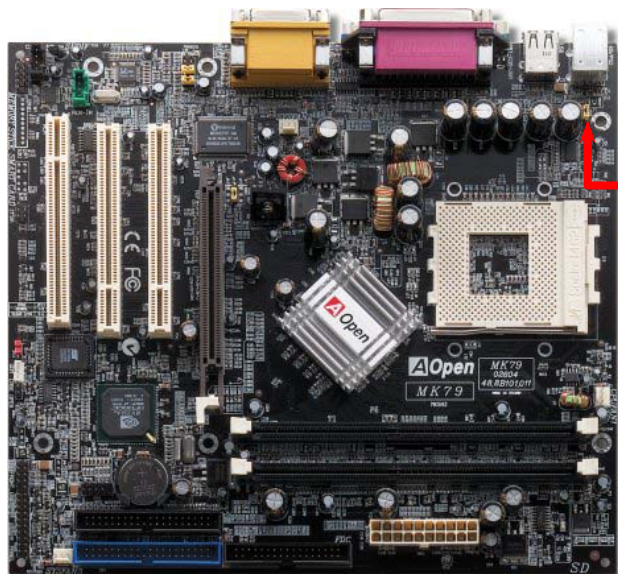
DIMM Sockets

This motherboard has three 184-pin DDR DIMM sockets that allow you to install <u>DDR266</u> or <u>DDR200</u> memory up to 1 GB. Only Non-ECC DDR RAM is supported, otherwise, it will cause serious damage on memory sockets or SDRAM module.
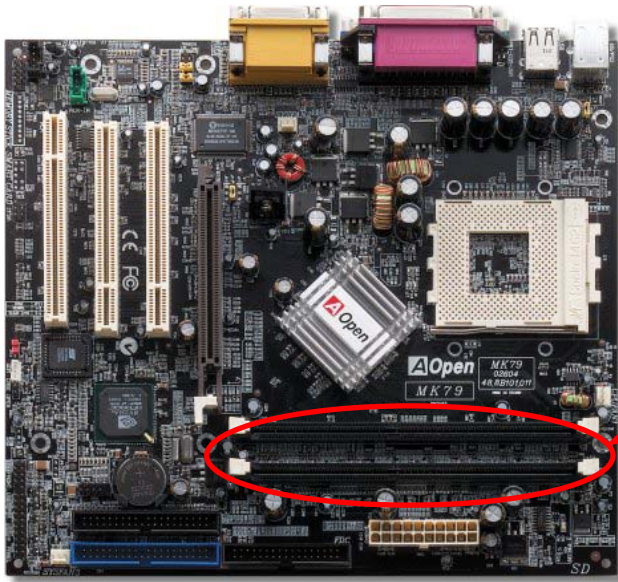
Warning: The MK79 support DDR RAM. Please do not install the SDRAM on the DDR RAM sockets. Otherwise, it will cause serious damage on memory sockets or SDRAM module.

DDR RAM

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.

Pin 1

52 pins   40 pins

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

Tab

Key

Pin 1

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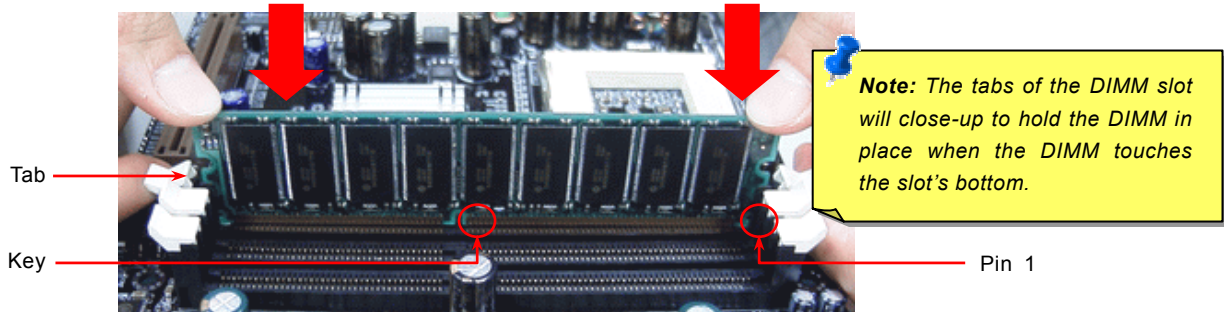
3. Repeat step 2 to finish additional DIMM modules installation.

AOpen

STBY 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.
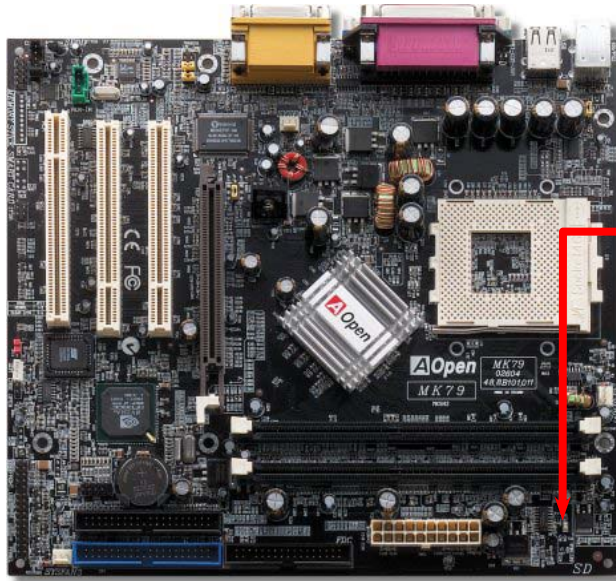
STBY LED

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

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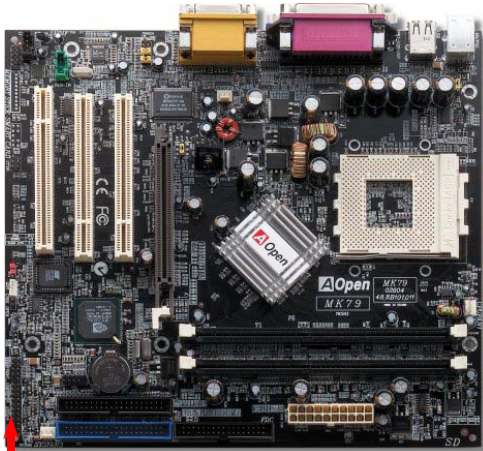
Attach the power LED, speaker, power and reset switch connectors to the corresponding pins. If you enable "Suspend Mode" item in BIOS Setup, the ACPI & Power LED will keep flashing while the system is in suspend mode.

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

Suspend Type	ACPI LED
Power on Suspend (S1) or Suspend to RAM (S3)	Blinking between green and red.
Suspend to Disk (S4)	The LED will be turned off

1

SPWR

IDE LED

ACPI & PWR LED

ACPI LED (Blue)

Speaker

Reset

1

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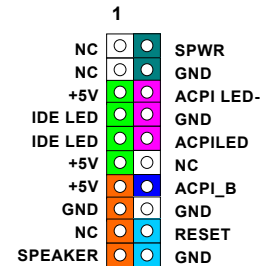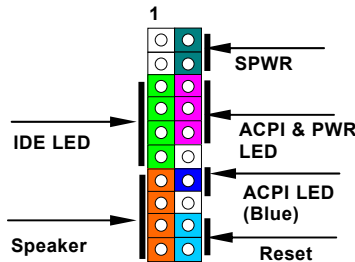
ATX Power Connector

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

20-Pin Power Connector

COM	+5V
+5V	COM
COM	PW-OK
+3.3V	5VSB
+3.3V	+12V
+3.3V	+5V
-12V	+5V
COM	-5V
PS-ON	COM
COM	COM
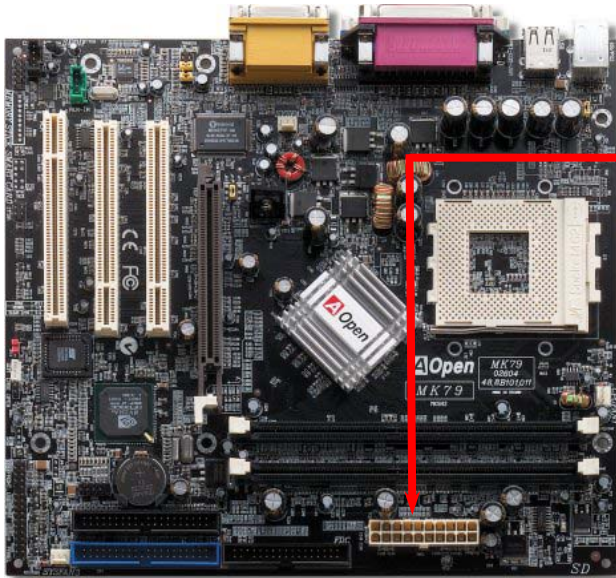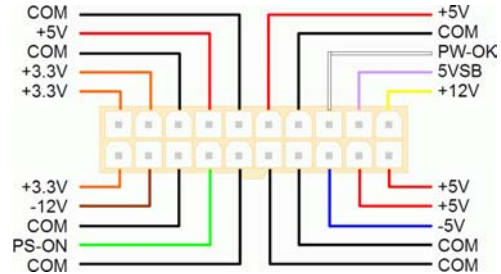
AC Power Auto Recovery

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

IDE and Floppy Connector

Connect 34-pin floppy cable and 40-pin IDE cable to floppy connector FDC connector. Be careful of the pin1 orientation. Wrong orientation may cause system damage.

| Secondary Slave (4th) | Secondary Master (3rd) |

IDE 2 Secondary

IDE 1 Primary

ATA 33/66/100 IDE Connector

Pin 1

| Primary Slave (2nd) | Primary Master (1st) |

Pin 1

FDD Connector
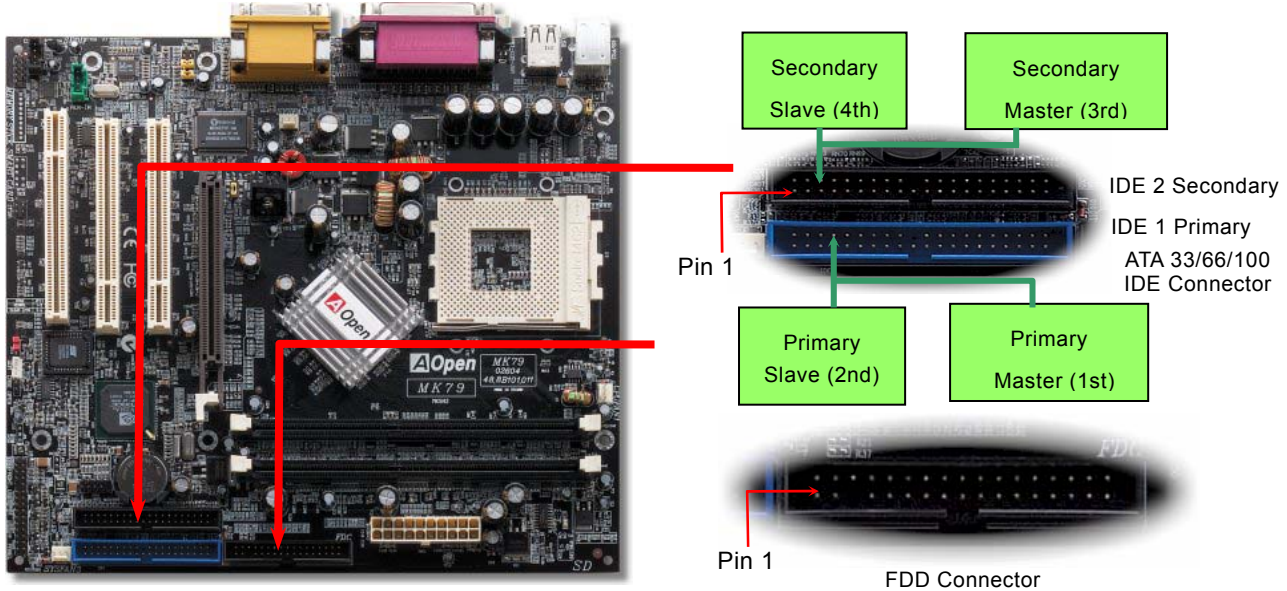
IDE1 is also known as the primary channel and IDE2 as the secondary channel. Each channel supports two IDE devices that make a total of four devices. In order to work together, the two devices on each channel must be set differently to **Master** and **Slave** mode. Either one can be the hard disk or the CDROM. The setting as master or slave mode depends on the jumper on your IDE device, so please refer to your hard disk and CDROM manual accordingly.

This motherboard supports ATA33, ATA66 or ATA100 DE 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

Tip:

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

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

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

AOpen

IrDA Connector

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

Install the infrared module onto the **IrDA** connector and enable the infrared function from BIOS Setup, UART2 Mode, make sure to have the correct orientation when you plug in the IrDA connector.

Pin 1
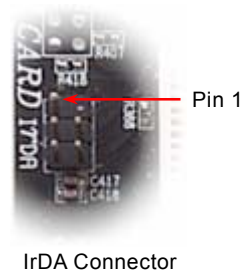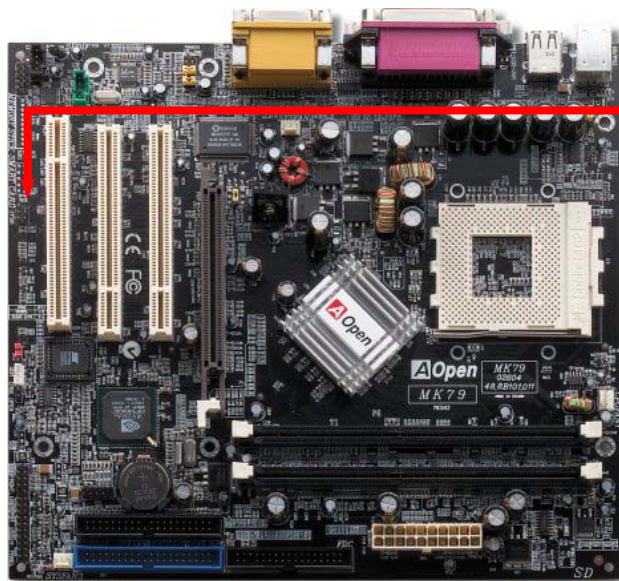
IrDA Connector

	1	
NC	●	KEY
+5V	● ●	GND
IR_TX	● ●	IR_RX

AGP (Accelerated Graphic Port) 4X Expansion Slot

With Intel 845GE chipset implemented, this AGP slot could automatically become an AGP slot or a Multiplexed Intel DVO Output depending on what kind of cards inserted, like AGP, or ADD (AGP Digital Display) cards. With ADD card cabled to this slot, Multiplexed Intel DVO output could provide high-speed digital connection for digital displays or TV-OUT functionality. As for AGP performance, Integrated GeForce4 GPU Graphics could provide amazing 3D visual performance to create rich, real-time 3D images and animation and Dolby® Digital 3D audio. The MK79 provides an AGP 4x 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.
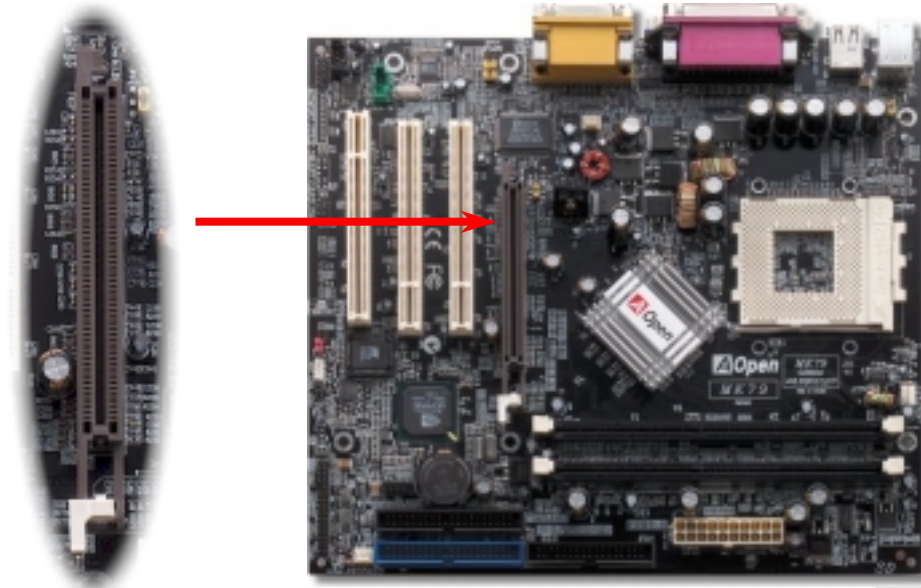
AGP Protection Technology and AGP LED

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
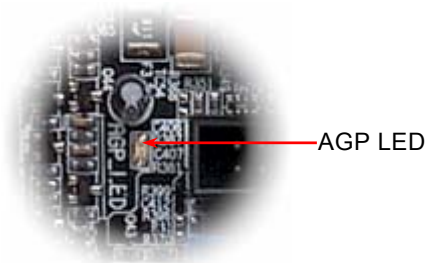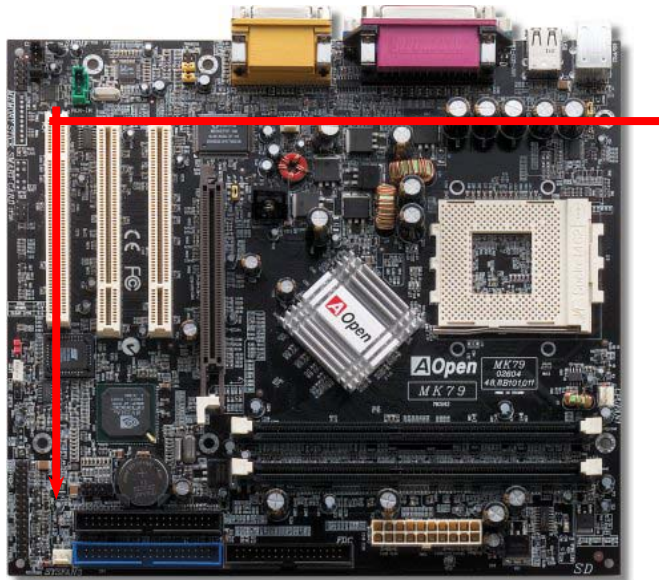
Warning: It is strongly recommended not to install a AGP card with 3.3V, which is not supported, the LED3 will light up to warn you the possible damage.

ACR Slot

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). On the strength of nVIDIA MCP-D controller on chip, which is a highly integrated Platform LAN Connect device, it provides 10/100M bps Ethernet for office and home use.
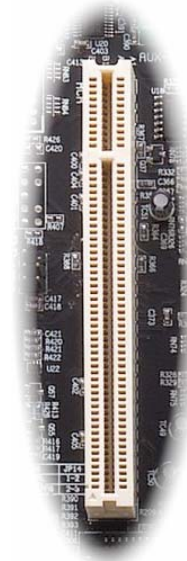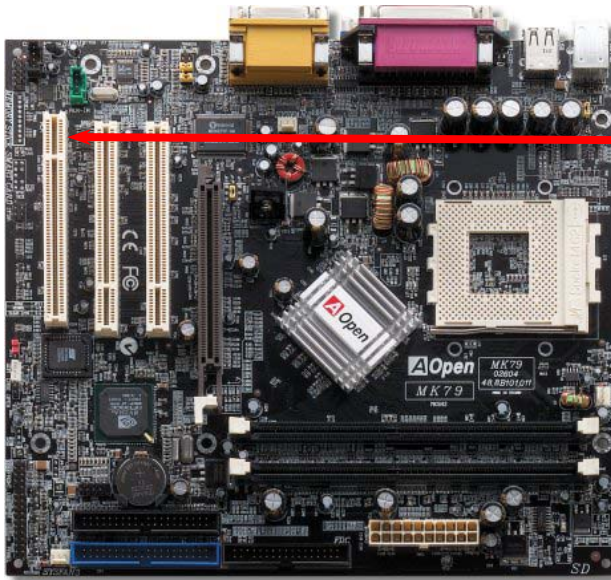
ACR Slot

PC99 Color Coded Back Panel

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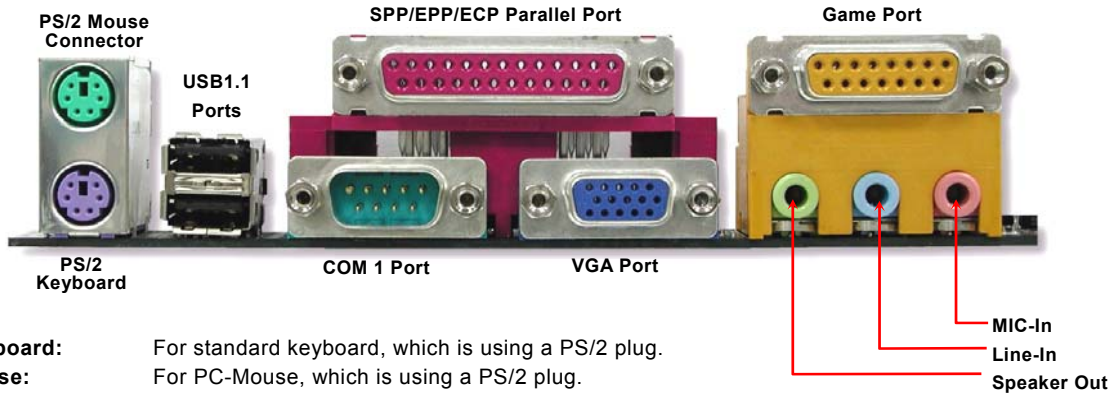
PS/2 Keyboard:	For standard keyboard, which is using a PS/2 plug.
PS/2 Mouse:	For PC-Mouse, which is using a PS/2 plug.
USB Port:	Available for connecting USB devices.
Parallel Port:	To connect with SPP/ECP/EPP printer.
COM1 Port:	To connect with pointing devices, modem or others serial devices.
VGA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

COM2 Connector

This motherboard provides two serial ports. One of them is on back panel connector, and the other is on the upper middle of board. With proper cable, you can connect it to the back panel of chassis.

Pin 1
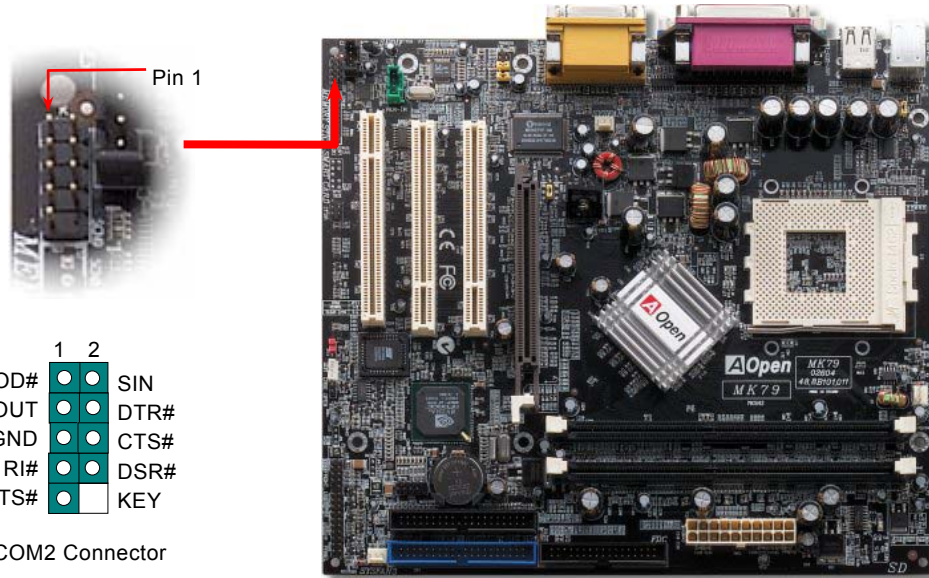
1	2	
DOD#	○ ○	SIN
SOUT	○ ○	DTR#
GND	○ ○	CTS#
RI#	○ ○	DSR#
RTS#	○	KEY

COM2 Connector

AOpen

Support 2nd and 3rd USB (1.1) Port

This motherboard provides six <u>USB</u> connectors to connect USB devices, such as mouse, keyboard, modem, printer, etc. There are four connectors on the PC99 back panel. You can use proper cables to connect the other USB connectors to the USB modules or front panel of chassis.

Pin 1

USB2 Connector

Pin 1

USB3 Connector

SBD3+
SBD3-
+5V   GND
2   NC
1   KEY
+5V   GND
SBD2-
SBD2+
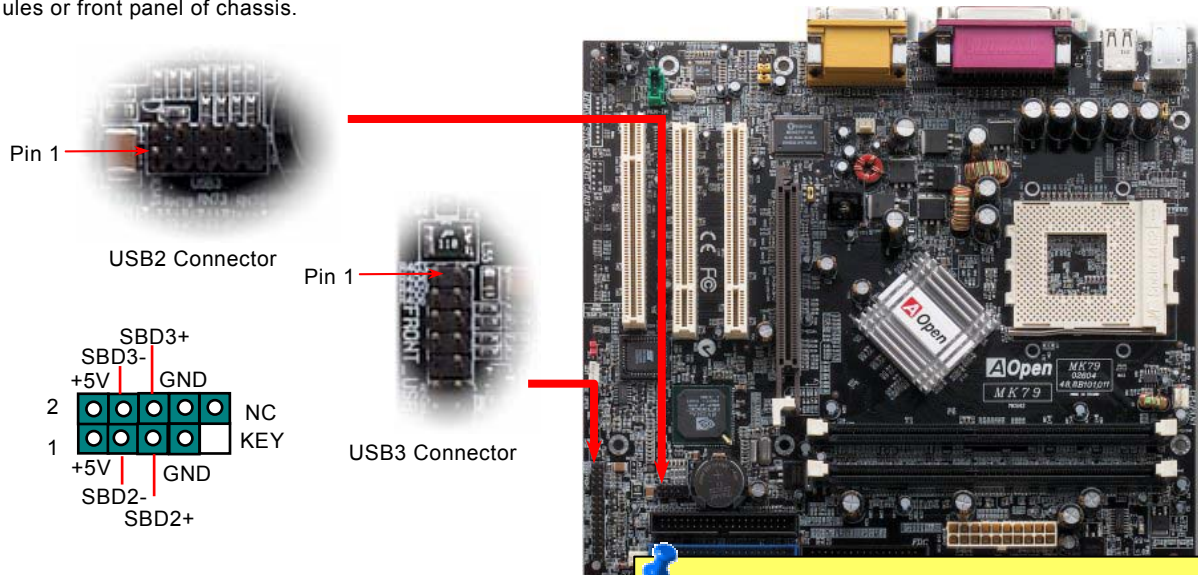
Note: Please note that if you would like to use USB devices (Example: keyboard, mouse.etc.) under DOS environment, you must install driver comes with the devices to make it work.

Chassis Intrusion Sensor Connector

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

Pin 1 →

Case Open Chassis Intrusion
Sensor Connector

1
SENSOR
GND
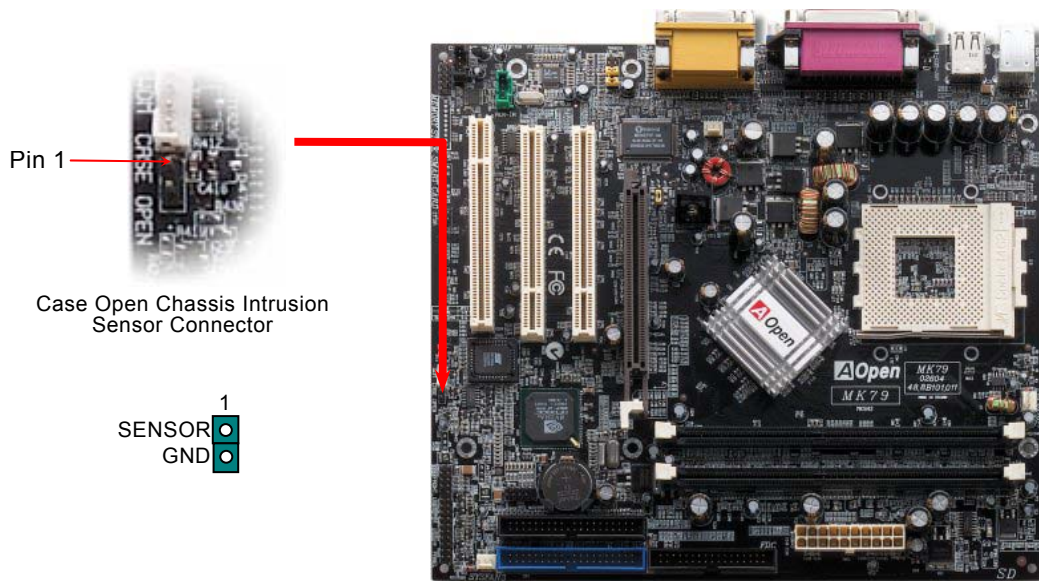
CD Audio Connector

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

R
GND
GND
L

CD-IN Connector

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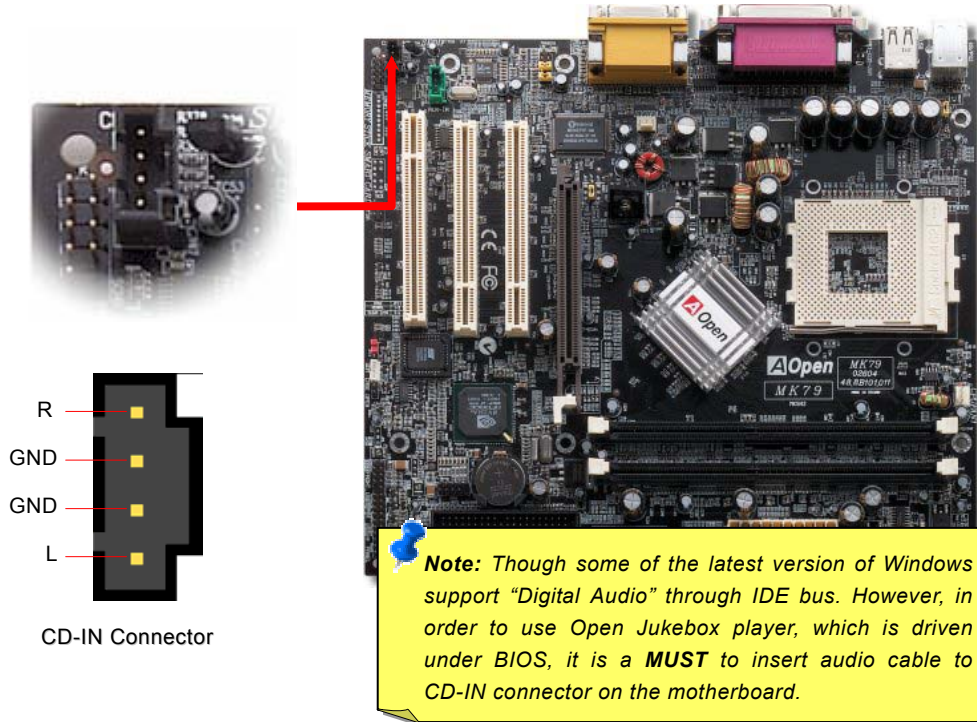
AUX-IN Connector

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

R

GND

GND

L

AUX-IN
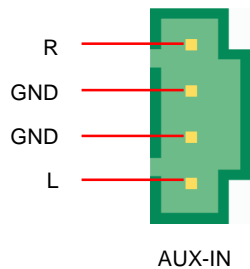
Front Audio Connector

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.

Pin 1
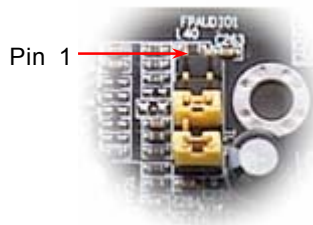
	1	2	
AUD_MIC	○	○	AUD_GND
AUD_MIC_BIAS	○	○	AUD_VCC
AUD_FPOUT_R	○	○	AUD_RET_R
NC	○		KEY
AUD_FROUT_L	○	○	AUD_RET_L
	9	10	
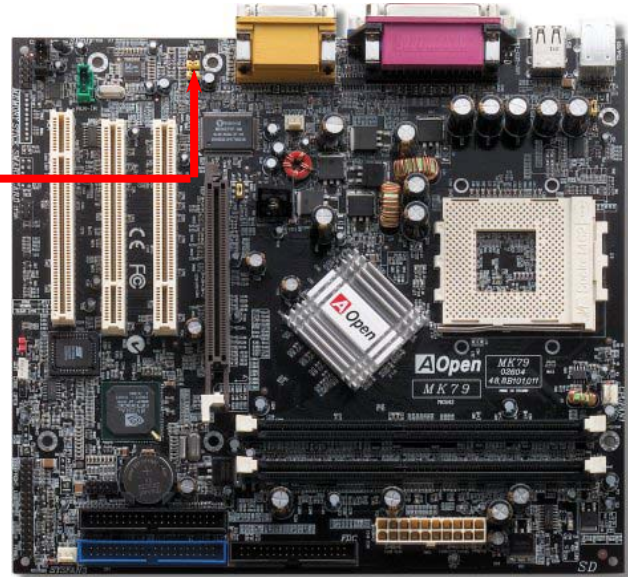
Battery-less and Long Life Design

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.

ATX Stand-by Power   **Battery**

Auto Switch

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

RTC (Real Time Clock) 00:00:00

Flash ROM   **CMOS**

Backup by EEPROM
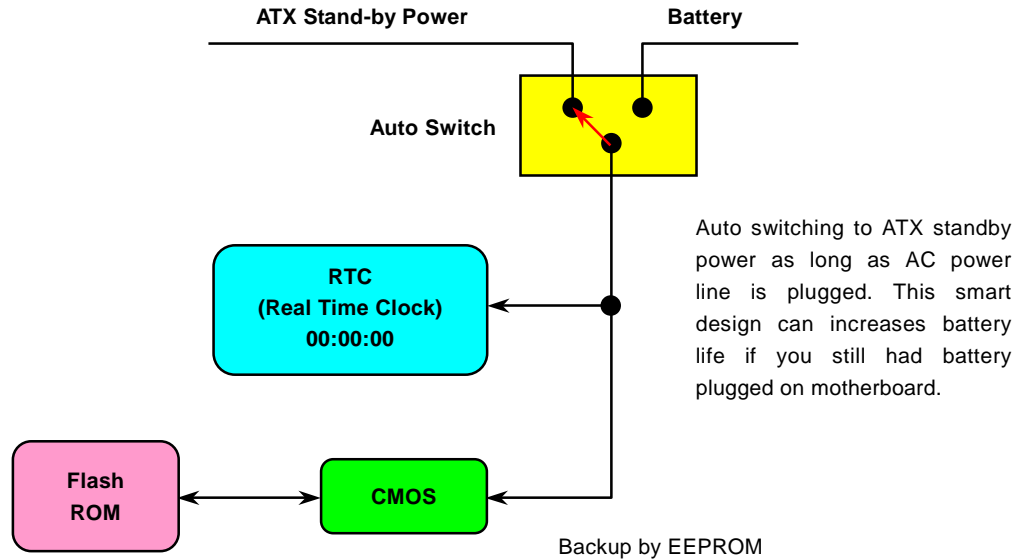
CPU Over-current Protection

Over Current Protection has been popularly implemented on ATX 3.3V/5V/12V switching power supply for a while. However, new generation CPU is able to use regulator of different voltages to transfer 5V 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.

ATX Switching Power Supply

5V (Protected by power supply)

3.3V (Protected by power supply)

12V (Protected by power supply)

Onboard Power Regulator

Over-Current Protection Circuit

CPU Core Voltage
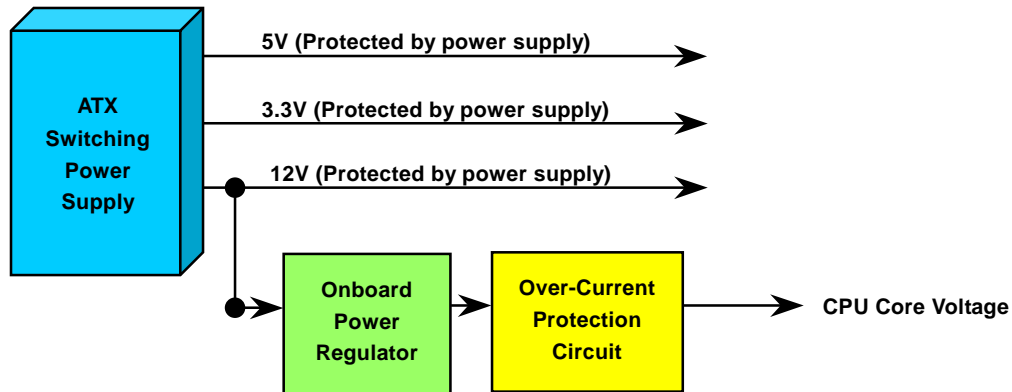
Note: Although we have implemented protection circuit try to prevent any human operating mistake, there is still certain risk that CPU, memory, HDD, add-on cards installed on this motherboard may be damaged because of component failure, human operating error or unknown nature reason. AOpen cannot guaranty the protection circuit will always work perfectly.

AOConfig Utility

NEW!

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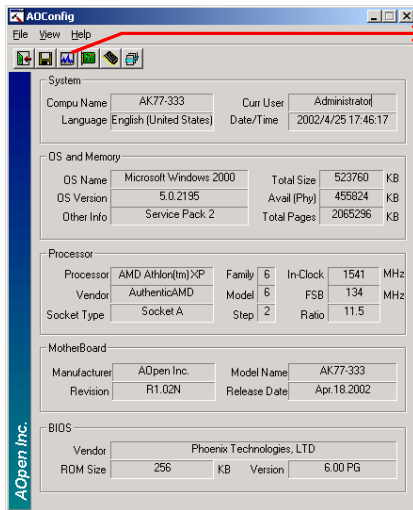
1. The system page shows the detail information of the motherboard, the operating system, the processor, and BIOS version.

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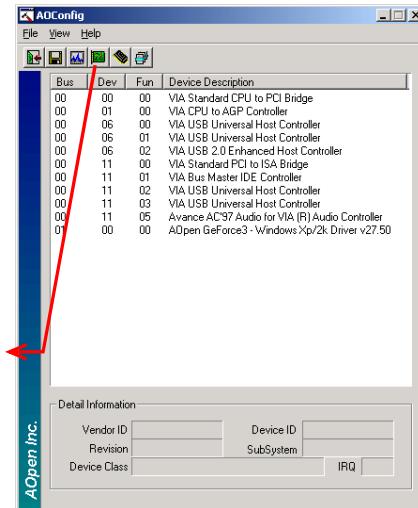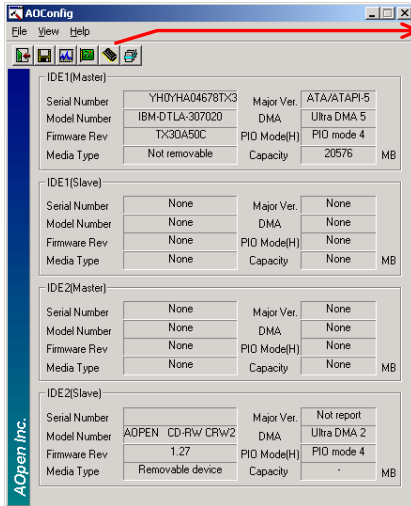
AOpen

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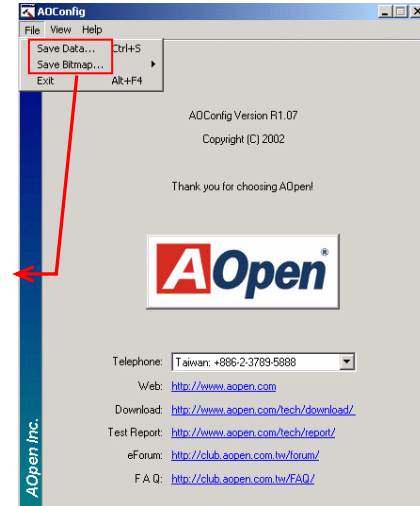
NOTE: *AOconfig can be used in Windows 98SE/ME, NT4.0/2000, or even the latest Windows XP. Please be informed that AOconfig can only be operated in a system equipped with an AOpen motherboard. Meanwhile, all applications must be closed before starting AOconfig.*

Resetable Fuse

Traditional motherboard has fuse for Keyboard and <u>USB</u> 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.

Resetable
Fuse
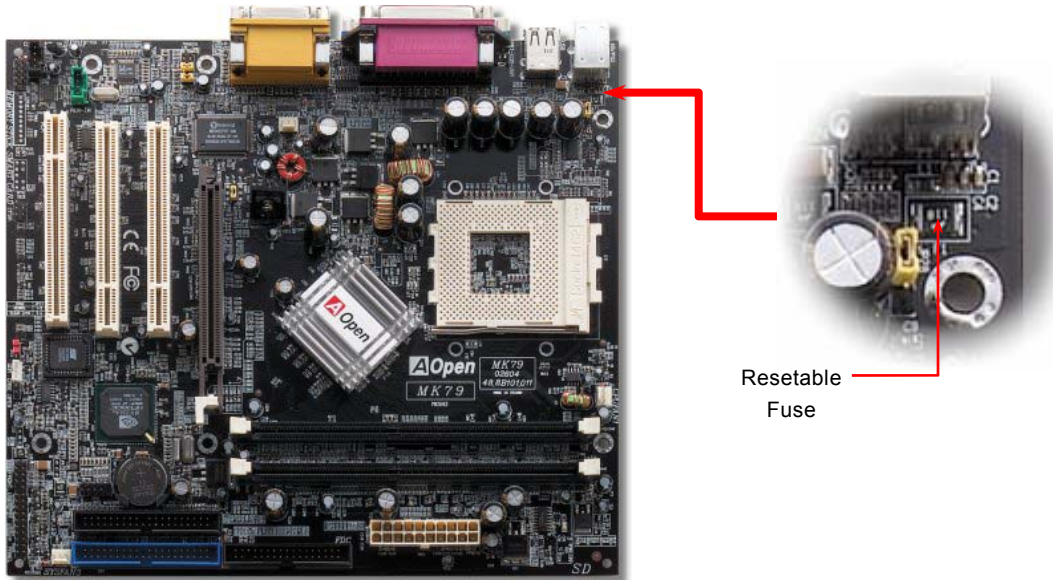
2200 μF Low ESR Capacitor

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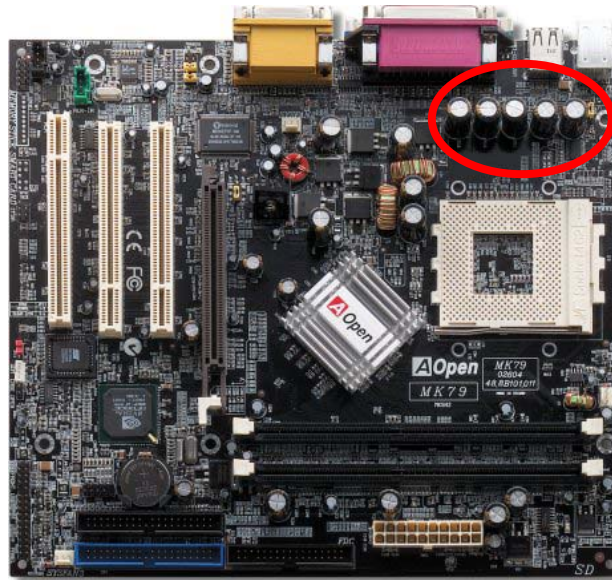
Layout (Frequency Isolation Wall)
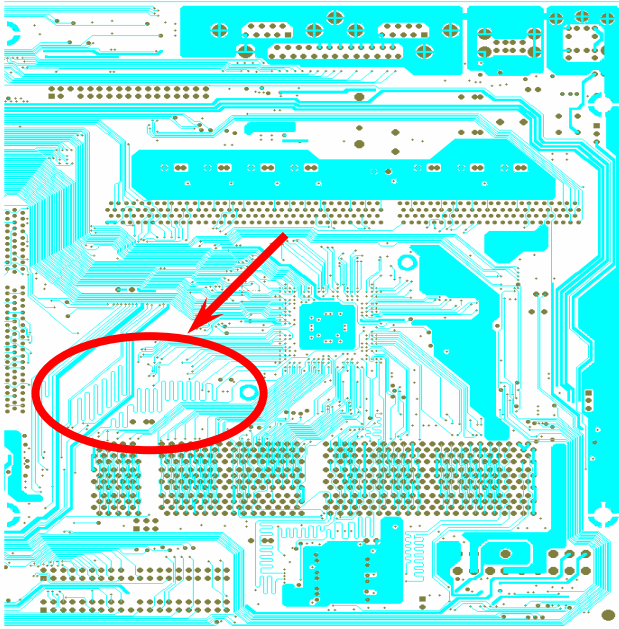
For high frequency operation, especially overclocking, layout is the most important factor to make sure chipset and CPU working in stable condition. The layout of this motherboard implements AOpen's unique design called " Frequency Isolation Wall". Separating each critical portion of motherboard into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

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

Driver and Utility

There are motherboard drivers and utilities included in AOpen Bonus CD disc. 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 Disc

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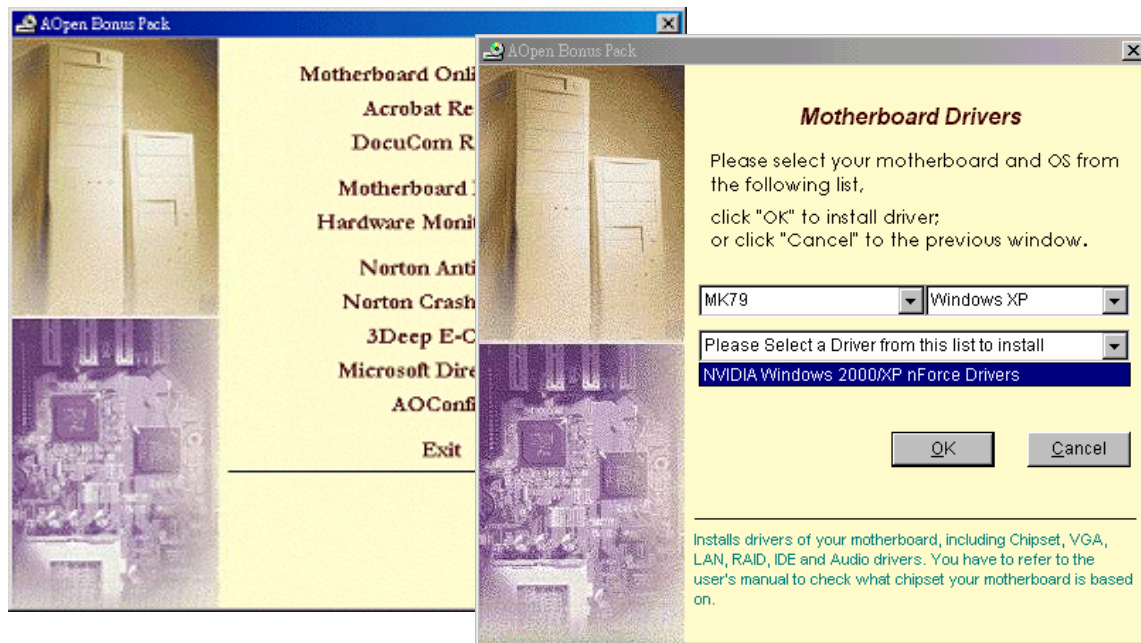
nVIDIA nForce Drivers

This nForce driver is an all in one package, which contains the below components:

GPU driver, Audio driver, Audio utilities, Network driver, GART driver, SMBus driver, Memory controller driver
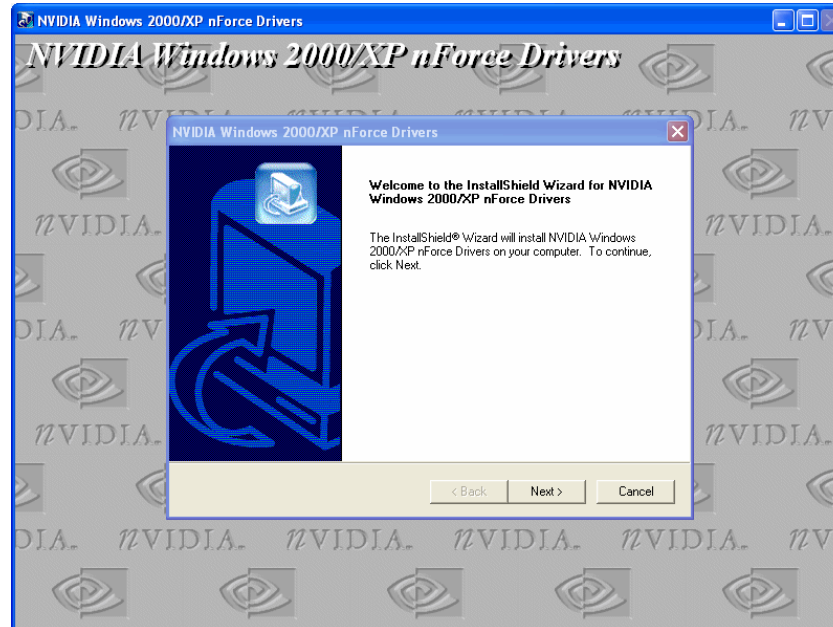
The noise is gone!! ---- SilentTek

NEW!

As the clock of CPU keeps rocketing higher and higher, it inevitably brings higher heat and system temperature in a relative way. The way we deal with this heat problem, however, is to spare no effort to add one fan after another to protect our pampered system, expecting these fans could cool down our machine as much as it could.

But at the same time, we believe that same amount of users are affected terribly while working with their PC by the irritating noises of these fans. As a matter of fact, we do not have to get our fans running at such a high speed in most cases; on the contrary, we discovered that having your fans running at appropriate time and speed could not only reduce the noise, but also consume the least power the system needed, so as to prevent over-wasting of energy resource.

```
        Phoenix - AwardBIOS CMOS Setup Utility
              Silent PC/PC Health Status

   CPU Warning Temp.          60° C/140° F          Item Help

   CPUFan1 Boot Speed         70% 3150 RPM      Menu Level    ▶
   SYSFan2 Boot Speed         70% 3500 RPM
   CPUFan1 OS Speed          100% 4500 RPM      This is fan control
   SYSFan2 OS Speed          100% 5000 RPM      mode during POST and
   Fan Mode              Smart Control          Open Jukebox, after
 x CPUFan1 Fixed Speed       100% 4500 RPM      exitting the Jukebox,
 x SYSFan2 Fixed Speed       100% 5000 RPM      the fan will be set to
   CPU Set Temp.               40° C            Fan OS Speed.
   SYS Set Temp.               30° C
                                                [Full Speed]
   CPU Kernel Temp.           69° C/156° F      Run in full speed.
   CPU Temp.                  47° C/116° F      [Smart Control]
   SYS Temp.                  31° C/107° F      According to the
   CPUFAN1 Speed              4500 RPM          safety temperature you
   SYSFAN2 Speed             5000 RPM           set below, fan speed
   SYSFAN3 Speed              5532 RPM          will be controlled as
   Vcore(V)                    1.48 V           slow as possible.

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

Today, AOpen Motherboard is honored to bring you a new overall solution, SilentTek, to have your system quiet. To collocate with hardware circuit, BIOS and the utility under Windows, SilentTek combined "Hardware-Status Monitoring", "Overheat Warning" and "Fan Speed Control" with user-friendly interfaces to provide you a perfect balance between noises, system performance and stability.

AOpen

The first image you have here is the Voltage Status page. You can find current status of all voltages and set your expected margins of warning level.

In "Temp/Fan/Case" page, you may get aware of the current temperature of CPU and the heat inside chassis, plus checking if fans are running properly.
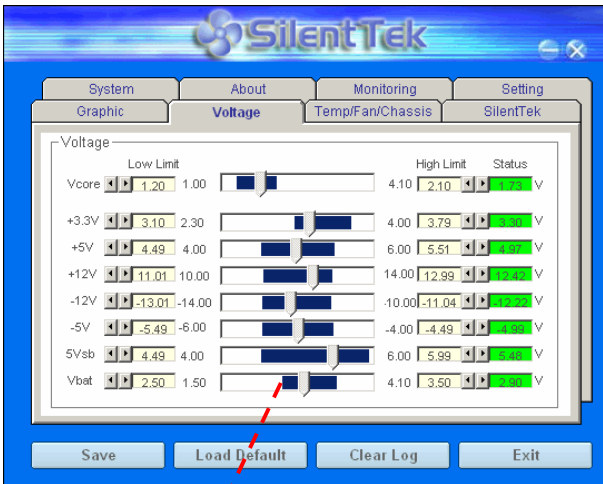
You may check your system voltage from the indicating bar here.
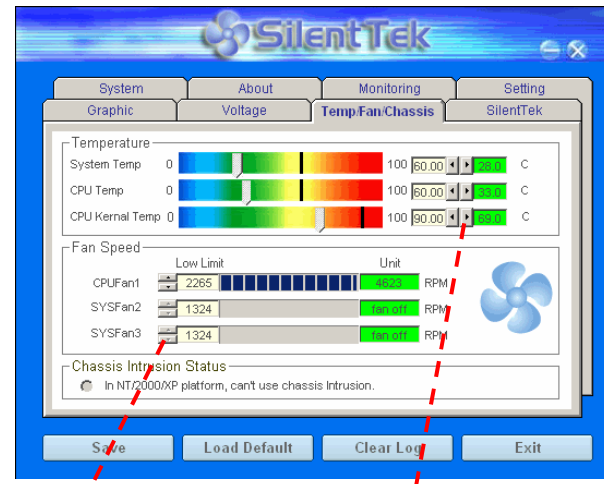
Of course, you may set your defaulted lowest margin for your fans and the SilentTek would also pop up a message box and alarm you when the fan is rotating slower than this specified speed.

You may set the highest margin of your CPU and system temperature as default, and SilentTek would pop up a message box and alert you with alarm when the temperature goes beyond the specified margin.

The following page is sure to be the most important part of this utility, you may control the rotation speed of specific fans you got with options inside in this page. Respectively illustrate as follow:

1. **Smart FAN Control**: This is the default setting of SilentTek and can be used for any branded computer housing. With a special algorithm developed by AOpen, the fan speed is automatically adjusted by the factors of CPU and ambient temperature. Ease-of-use and trouble free at your service.

2. **Fixed FAN Control**: Under this setting, a desired fan speed is set fixed when operating.

3. **Multiple Level Control**: This is the most versatile setting that allows you to set fan speed in relation to temperature. You may find this setting fits youbest.

4. **AOpen Recommend Setting**: This setting is designed specifically for AOpen housing. A series of lab tests were conducted under the real world scenario to determine optimum fan speed to reduce noise level within CPU working condition and temperature. Most of the time, the fan would remain still when CPU is not fully utilized.

CD-ROM Rotation Speed Control: by enabling the CD-ROM Rotation Speed Control, you can adjust the rotation speed of your CD-ROM. When you set the speed to high level, the CD-ROM will work at its fastest speed and it will run at basic required speed while you set the value to low speed.

Note: Due to there are hundreds different brands of fan on the market, there might be some inaccuracy occurred when you have had adjusted your rotation speed; this is still under criterion and please assured that it won't cause any problem to your system.
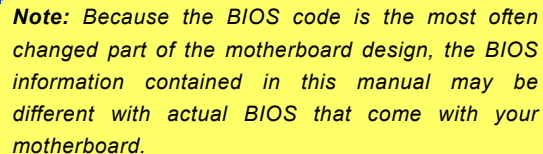
Phoenix Award BIOS

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 MK79 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.*

AOpen

How To Use Phoenix Award™ BIOS Setup Program

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

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

AOpen

Key	Description
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.

```
        CMOS Setup Utility - Copyright (C) 1984-2001 Award Software
```

► Standard CMOS Features	Load Setup Defaults
► Advanced BIOS Features	Load Turbo Defaults
► Advanced Chipset Features	Set Password
► Integrated Peripherals	Save & Exit Setup
► Power Management Setup	Exit Without Saving
► PnP/PCI Configura	faults
► PC Health Status	faults
► Frequency/Voltage	

Load Setup Defaults (Y/N)? Y

```
Esc : Quit                         ↑ ↓ → ←  : Select Item
F10 : Save & Exit Setup            (Shift)F3 : Change Language
```

Load Setup Defaults

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

NEW!

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.

EzWinFlash V1.0.0 - 28 Nov, 2001, 16:54:25	
Flash ROM Information	CheckSum : F1A9H
Flash Type: Intel E82802AB /3.3V (4Mb)	**Option**
Current BIOS Information	☐ Clear PnP Area
Model Name: AX3SPlus	☐ Clear DMI Area
BIOS Version: R1.09	☑ Clear CMOS
Release Date: Oct.09.2001	**Language**
New BIOS Information	⦿ English
Model Name: AX3SPlus	○ German
BIOS Version: R1.09	○ Chinese-BIG5
Release Date: Oct.09.2001	Start Flash / Save BIOS / About / Exit
Message	
If you are sure to program new BIOS, please press [Start Flash] button.	

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: WMK79102.ZIP) with WinZip (http://www.winzip.com) in Windows environment.

3. Save the unzipped files into a folder, for example, WMK79102.EXE & WMK79102.BIN.

4. Double click on the WMK79102.EXE, EzWinFlash will detect the model name and BIOS version of your motherboard. If you had got the wrong BIOS, you will not be allowed to proceed with the flash steps.

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

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

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

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

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

AOpen

Overclocking

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

This section is dedicated to overclockers.

This high performance motherboard is designed for maximum **133MHz** CPU bus clock. But it comes with clock generator of **166MHz** when we design it to accommodate future CPU bus clock. Our lab test results shown that **157MHz** is achievable when proper setting and qualified components were presented, but not guarantee that it would work properly on your side. The CPU clock ratio can be up to 12.5x that supports almost all of Athlon / Duron CPUs in the future and provides flexibility for overclockers..

But not guaranty. ☺

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

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

AOpen

VGA Card & Hard Disk

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

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

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

Glossary

AC97

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

ACPI (Advanced Configuration & Power Interface)

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

AGP (Accelerated Graphic Port)

AGP is a bus interface targeted for high-performance 3D graphic. AGP supports only memory read/write operation and single-master single-slave one-to-one only. AGP uses both rising and falling edge of the 66MHz clock, for 2X AGP, the data transfer rate is 66MHz x 4byte x 2 = 528MB/s. AGP is now moving to 4X mode, 66MHz x 4byte x 4 = 1056MB/s, 66MHz x 4bytes x 8 =2.1GB/s. AOpen is the first company to support 4X AGP motherboards by both AX6C (Intel 820) and MX64/AX64 (VIA 694x), started from Oct 1999.

AOpen

AMR (Audio/Modem Riser)

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

AOpen Bonus Pack CD

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

APM (Advanced Power Management)

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

ATA (AT Attachment)

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

ATA/66

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

ATA/100

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

ATA/133

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

BIOS (Basic Input/Output System)

BIOS is a set of assembly routine/program that reside in 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.

Bus Master IDE (DMA mode)

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

CNR (Communication and Networking Riser)

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

CODEC (Coding and Decoding)

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

DDR (Double Data Rate) RAM

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

DIMM (Dual In Line Memory Module)

DIMM socket has total 168-pin and supports 64-bit data. It can be single or double side, the golden finger signals on each side of PCB are different, and that is why it was called Dual In Line. Almost all DIMMs are made by SDRAM, which operate at 3.3V. Note that some old DIMMs are made by FPM/EDO and only operate at 5V. Do not confuse them with SDRAM DIMM which operates at 2.5V..

DMA (Direct Memory Access)

Channel for communications between the memory and surrounding devices.

ECC (Error Checking and Correction)

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

EDO (Extended Data Output) Memory

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

EEPROM (Electronic Erasable Programmable ROM)

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

EPROM (Erasable Programmable ROM)

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

EV6 Bus

EV6 Bus 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.
For example, 200 MHz EV6 bus is actually using 100 MHz external bus clock, but the equivalent speed is 200 MHz.

FCC DoC (Declaration of Conformity)

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

FC-PGA (Flip Chip-Pin Grid Array)

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

Flash ROM

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

FSB (Front Side Bus) Clock

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

I^2C Bus

See SMBus.

IEEE 1394

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

Parity Bit

The parity mode uses 1 parity bit for each byte, normally it is even parity mode, that is, each time the memory data is updated, parity bit will be adjusted to have even count "1" for each byte. When next time, if memory is read with odd number of "1", the parity error is occurred and this is called single bit error detection.

PBSRAM (Pipelined Burst SRAM)

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

AOpen

PC-100 DIMM

SDRAM DIMM that supports 100MHz CPU FSB bus clock.

PC-133 DIMM

SDRAM DIMM that supports 133MHz CPU FSB bus clock.

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

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

PCI (Peripheral Component Interface) Bus

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

PDF Format

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

PnP (Plug and Play)

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

POST (Power-On Self Test)

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

RDRAM (Rambus DRAM)

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

RIMM (Rambus Inline Memory Module)

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

SDRAM (Synchronous DRAM)

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

Shadow E^2PROM

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

SIMM (Single In Line Memory Module)

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

SMBus (System Management Bus)

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

SPD (Serial Presence Detect)

SPD is a small ROM or 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.

Ultra DMA

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

16.6MB/s x2 = 33MB/s

16.6MB/s x4 = 66MB/s

16.6MB/s x6 = 100MB/s

USB (Universal Serial Bus)

USB is a 4-pin serial peripheral bus that is capable of cascading low/medium speed peripherals (less than 10Mbit/s, but the newly designed USB2.0 has s fancy speed of up to 480Mbps) such as keyboard, mouse, joystick, scanner, printer and modem. With USB, the traditional complex cables from back panel of your PC can be eliminated.

VCM (Virtual Channel Memory)

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

ZIP file

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

Troubleshooting

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

> **Start**

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

> Make sure if all jumper settings are correct.

> Clear CMOS

> **Next**

Continue

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

Turn on the power and check if the power supply and CPU fan work properly.

Yes

No

Next

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

AOpen

Continue

Check if there is display? — **No** → Perhaps your VGA card or monitor is defective.

Yes

Press <Ctrl> and <Alt> key at the same time, hold them and then press <Del> to reboot the system.

Check if the system reboots? — **No** → It is very possible that your keyboard is defective.

Yes

Next

Continue

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

Turn off the system and re-connect IDE cable.

Check if the system can reboot successfully?

No

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

Yes

Re-install the operating system such as Windows 98.

End

AOpen

✚ Technical Support

Dear Customer,

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

Thanks very much for your understanding!

AOpen Technical Supporting Team

---

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

---

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

---

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

---

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

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

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

<table>
<tr><td>**7**</td><td>**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.</td></tr>
</table>

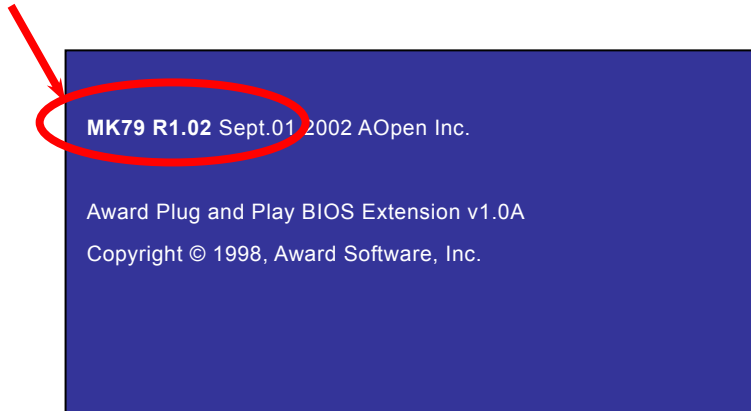## *Part Number and Serial Number*

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

P/N:91.88110.201   S/N:91949378KN73

    Part No.   Serial No.

918811020191949378KN73

    Part No.   Serial No.

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

Model name and BIOS version

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

MK79 R1.02 Sept.01 2002 AOpen Inc.

Award Plug and Play BIOS Extension v1.0A

Copyright © 1998, Award Software, Inc.

MK79 is model name of motherboard, **R1.02** is BIOS version.

AOpen

Product Registration

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

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

- Be upgraded to gold membership of Club AOpen program.

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

- Receive email notification about latest product's announcements.

- Be able to personalize your AOpen web pages.

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

- Have opportunities to participate special product promotional programs.

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

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

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

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

How to Contact Us

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

Pacific Rim AOpen Inc. Tel: 886-2-3789-5888 Fax: 886-2-3789-5899	Europe AOpen Computer b.v. Tel: 31-73-645-9516 Fax: 31-73-645-9604	America AOpen America Inc. Tel: 1-510-489-8928 Fax: 1-510-489-1998
China 艾爾鵬國際貿易(上海)有限公司 Tel: 86-21-6225-8622 Fax: 86-21-6225-7926	Germany AOpen Computer GmbH. Tel: 49-1805-559191 Fax: 49-2102-157799	Japan AOpen Japan Inc. Tel: 81-048-290-1800 Fax: 81-048-290-1820

Web Site: *www.aopen.com*

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*