
Chapter 1

Overview

AX59 Pro is a high-performance Pentium®-based system board that utilizes VIA MVP3 AGPset on **ATX** PCI/ISA platform. This motherboard supports new architectures such as high speed **AGP**, **SDRAM**, **Ultra DMA/33**, **Bus master IDE** and **USB** port. It has **512KB or 1MB** pipelined-burst second-level cache onboard and support two single in-line memory module (SIMM) plus three Dual in-line memory module (DIMM) that allows to **mix EDO and SDRAM** memory and expansion up to a maximum of **1GB**.

Not only above features, AX59 Pro implements most advanced technology as following.

Zero Voltage Modem Wake Up In conjunction with ATX soft power On/Off, it is possible to have system totally power off and wakeup to automatically answer a phone call such as answering machine or to send/receive fax. The most important break through is not only external box modem but also internal modem card can be used to support Modem Wake Up. The AX59 Pro and MP56 internal modem card implement special circuit (patent applied) to make sure the modem card work properly without any power.

LAN Wake Up This feature is very similar as Modem Wake Up, but it is through local area network. To use LAN Wake Up function, you must have a network card that supports this feature and also need to install a network management software.

RTC Wake Up Timer The Wake Up Timer is more like an alarm, which wakes up and power on your system at a pre-defined time for specific application. It can be set to wake up everyday or on specific date within a month. The date/time accurate is second.

High Efficient Synchronous Switching Regulator Most of the current switching designs are Asynchronous mode, which from the technical point

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of view, still consumes very high power as well as heat. AX59 Pro implements high efficient synchronous switching design that the temperature of MOS FET is far less than Schottky diode of Asynchronous design.

CPU Thermal Protection AX59 Pro has a special thermal detection circuit to have warning through application software when the temperature is higher than a predefined value.

CPU core current protection AX59 Pro implements CPU core voltage 15A over-current protection to prevent any accident short circuit and prevent system damage.

CPU and Housing Fan Monitoring AX59 Pro has one more "fan monitoring" function to prevent system overheat. There are two fan connectors, one is for CPU and the other can be a extra housing fan. The system will report and alarm fan malfunction though utility software such as Hardware Monitor utility (named AOhw100, where 100 means version number).

System Voltage Monitoring Further more, AX59 Pro implements a voltage monitoring system, As you turn on your system, this smart design will continue to monitor your system working voltage. If any of the system voltage is over the component's standard. There will be alarm though software such as Hardware Monitor utility for a warning to user.

Full-range CPU core voltage This motherboard supports the CPU core voltage from 1.3V to 3.5V, that can be applied to various CPU type in future.

Resetable Fuse AX59 Pro implements resetable fuses to prevent any accidental short circuit caused by key board or USB devices hot plug.

FCC DoC certificate AX59 Pro has passed FCC DoC test. The radiation is very low, you can use any kind of housing.

Powerful utility software supported AOpen Bonus Pack companion CDROM contains many useful utilities, such as Norton Anti-virus, AOchip, Hardware Monitor utility, and BIOS flash utility.

1.1 Specifications

Form Factor	ATX
Board Size	305 mmx 202 mm
CPU	Intel Pentium Processor P54C, PP/MT (P55C), AMD K5/K6/K6-2/K6-III, Cyrix 6x86/M2 and IDT WinChip C6 family.
System Memory	72-pin SIMM x2, and SDRAM 168-pin x3, maximum 1GB.
Second-level Cache	512KB or 1MB pipeline-burst cache onboard
Chipset	VIA MVP3 AGP set
Expansion Slots	ISA x2, PCI x4 and AGP x1
Serial Port	Two serial ports UART 16C550 compatible, and the 3rd UART for IR function.
Parallel Port	One parallel port supports standard parallel port (SPP), enhanced parallel port (EPP) or extended capabilities port (ECP).
Floppy Interface	Floppy interface supports 3.5 inches drives with 720KB, 1.44MB or 2.88MB format or 5.25 inches drives with 360KB, 1.2MB format.
IDE Interface	Dual-channel IDE interface support maximum 4 IDE hard disks or CDROM, mode 4, bus master hard disk drives and Ultra DMA/33 mode hard drives are also supported.
USB Interface	Two USB ports supported by USB bracket, the BIOS also supports USB driver to simulate legacy keyboard.
PS/2 Mouse	Mini-Din PS/2 mouse connector onboard.
Keyboard	Mini-Din PS/2 keyboard connector onboard.
RTC and Battery	RTC build in MVP3 chipset, Lithium (CR-2032) battery.

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BIOS	AWARD Plug-and-Play, 2Mbit Flash ROM BIOS.
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Zero Voltage Modem Wake Up	Special circuit (patent applied) to support modem wake up by external box modem or internal AOpen F56/MP56 modemcard.
LAN Wake Up	By using a network card that supports this feature and a network management software, you can wake up a system through a local area network.
RTC Wake Up Timer	Program the date/time to wake up your system
Synchronous Switching Regulator	High efficient synchronous switching regulator for future CPU.
Over-current Protection	CPU core voltage 1.5A over-current protection to prevent any accident short circuit.
CPU Thermal Protection	Warning when CPU temperature is higher than a predefined value.
Fan Monitoring	Three fan connectors, warning when CPU or housing fan is malfunction.
System Voltage Monitoring	Warning when system voltage (5V, 12V, 3.3V, 2.8V) are abnormal.

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1.2 Overclocking

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

This section is dedicated to Overclockers.

This high performance AX59 Pro motherboard is designed for maximum 100MHz CPU bus clock. But it comes with clock generator of 112MHz and 124MHz when we design it to accommodate future CPU bus clock. Our lab test results shown that 112MHz is achievable when proper setting and quality components were presented, we feel quite comfortable overclocking to 112MHz. Not only that, AX59 Pro has 32 Vcore (CPU core voltage) settings and up to 5.5x CPU ratio, that supports almost all of Socket 7 CPUs in the future and provides flexibility for overclockers. As for 124MHz, we do not recommend at this time. For your reference, the following configurations are what we feel comfortable at 112 MHz bus clock. But not guaranty. 😊



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

Warning: 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.

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VGA and HDD are 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.

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VGA Card

VGA model/ Vendor	Chipset model	Driver
Asus	S3 –Virge/dx(86c375)	Asus
VENUS T-775	S3 Trio 64V2(86C775)	Venus
VENUS 67TV	Trident 9685	Venus
GALAXIE	Trident 9685 (PS-68)	Venus
ATI	MACH 64 210888GX00	Win95 default
MATROX	MY220P/4+	MGA
MATROX	MGA-MIL/4+	MGA
MATROX	MIL2P/4+	MGA

Hard Disk:

Vender	Model	Size
Maxtor	90680D4	6.8G
Maxtor	90845D5	8.4G
Maxtor	72004AP	2.0G
Maxtor	82560A4	2.5G
Seagate	ST36530A	6.5G
Seagate	ST31277A	1.2G
Quantum	FireballST4320AT	4.3G
Quantum	T-Rex Bigfoot TX6.0AT	6.0G
Quantum	T-Rex Bigfoot TX8.0AT	8.0G
Quantum	T-Rex Bigfoot TX12.0AT	12.0G
IBM	DHEA-34330	4.3G
IBM	DTTA-351010	10.1G
IBM	DTTA-350840	8.4G
IBM	DTTA-350640	6.4G

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IBM	DAQA-32160	2.1G
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AX59 Pro Overclocking Settings

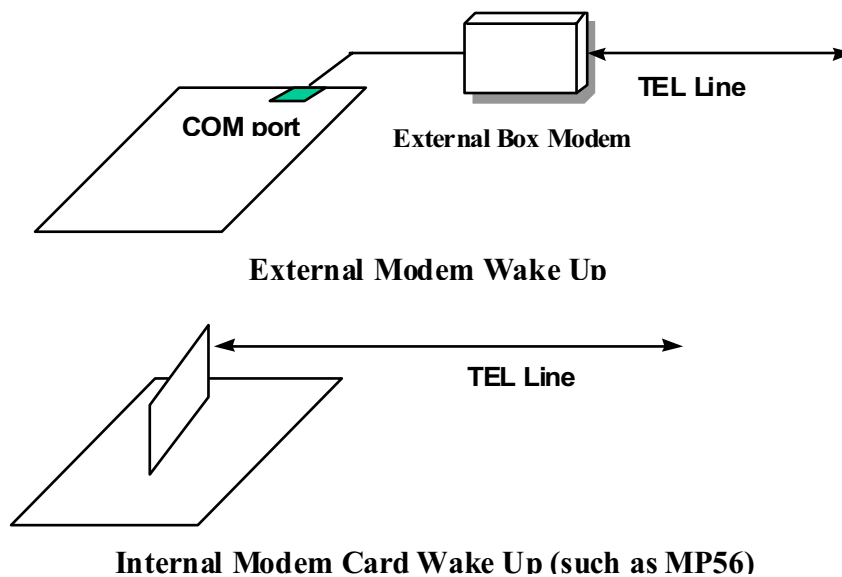
The following table lists the overclocking settings in AOpen's lab for your reference.

CPU	Intel MMX-233MHz
DRAM	SEC KOREA 801 KM48S2020CT-GH 32MB
HDD	IBM DHEA-34330
VGA	ATI 3D RAGE PRO AGP 2X
OS	Windows 95 OSR2
BIOS	R2.00d Load BIOS Setup Default for 112MHz * 2.5 = 280MHz (O.K.) 112MHz * 2 = 224MHz (O.K.) Load BIOS Turbo Default for 100MHz * 2.5 = 250MHz (O.K.)

1.3 Zero Voltage Modem Wake Up

The Modem Wake Up discussed here is to wakeup from true power off (identified by fan of power supply is off), This motherboard still supports traditional green PC suspend mode but it is not discussed here.

With the help ATX soft power On/Off, it is possible to have system totally power off (The traditional suspend mode of power management function does not really turn off the system power supply), and wakeup to automatically answer a phone call such as answering machine or to send/receive fax. You may identify the true power off by checking fan of your power supply. Both external box modem and internal modem card can be used to support Modem Wake Up, but if you use external modem, you have to keep the box modem always power-on. AOpen AX59 Pro and internal modem card implement special circuit (patent applied) and make sure the modem card works properly without any power. We recommend you choose AOpen modem card (MP56) for Modem Wake Up applications.



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For Internal Modem Card (AOpen MP56):

1. Go into BIOS setup, Power Management → Modem Wake Up, select Enable.
2. Setup your application, put into Windows 95.
3. Turn system power off by soft power switch.
4. Connect 4-pin Modem Ring-On cable from MP56 RING connector to AX59 Pro connector WKUP.
5. Connect telephone line to MP56. You are now ready to use Modem Ring-On.

For External Box Modem:

1. Go into BIOS setup , Power Management → Modem Wake Up, select Enable.
2. Setup your application, put into Windows 95 Start Up.
3. Turn system power off by soft power switch.
4. Connect RS232 cable of external box Modem to COM1 or COM2.
5. Connect telephone line to external box Modem. Turn on Modem power (you must keep Modem power always on). You are now ready to use Modem Ring



Tip: External modem wake up signal is detected through COM1 or COM2. Internal modem card wake up signal is detected through cable from connector RING (on modem card) to WKUP (on mainboard).

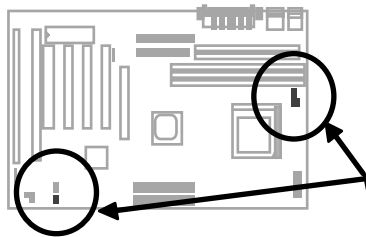


Note: If you use external modem, the power of external modem must be kept on to receive signal from telephone line. Internal modem card has no such limitation.

1.4 System Voltage Monitoring

This motherboard implements a voltage monitoring system. As you turn on your system, this smart design will continue to monitor your system working voltage. If any of the system voltage is over the component's standard. There will be alarm through application software such as Hardware Monitor utility for a warning to user. System voltage monitoring function monitors CPU core voltage. It is automatically implemented by BIOS and Hardware Monitor utility (the file name is like aohw100.exe, where 100 means the version number, no hardware installation is needed).

1.5 Fan Monitoring



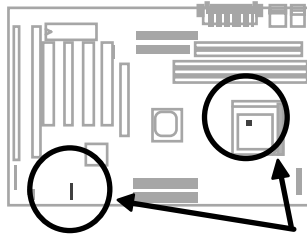
There are three fan connectors, two is for CPU, the other can be a housing fan. The fan monitoring function is implemented by connecting fan to 3-pin fan connector **CPUFAN2** and installing Hardware Monitor utility.



Note: You need 3-pin fan that supports *SENSE* signal for fan monitoring function to work properly.

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1.6 CPU Thermal Protection



This motherboard implements special thermal protection circuit below the CPU. When temperature is higher than a predefined value, the CPU speed will automatically slow down and there will be warning from BIOS and also Hardware Monitoring Utility software.

CPU Thermal Protection is automatically implemented by BIOS and utility software, no hardware installation is needed.