

***USER'S MANUAL***  
***Of***  
***AMD 790GX & AMD SB750***  
***Based***  
***M/B For Socket AM2+ Quad Core***  
***AMD Processor***

**NO. G03-M379GDGEXTLF**

***Rev: 2.0***

**Release date: April, 2010**

**Trademark:**

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## Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. To minimize pollution and ensure environment protection of mother earth, please recycle.



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## Safety Environmental Instruction

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- Avoid the dusty, humidity and temperature extremes. Do not place the product in any area where it may become wet.
- 0 to 40 centigrade is the suitable temperature. (The figure comes from the request of the main chipset)
- Generally speaking, dramatic changes in temperature may lead to contact malfunction and crackles due to constant thermal expansion and contraction from the welding spots' that connect components and PCB. Computer should go through an adaptive phase before it boots when it is moved from a cold environment to a warmer one to avoid condensation phenomenon. These water drops attached on PCB or the surface of the components can bring about phenomena as minor as computer instability resulted from corrosion and oxidation from components and PCB or as major as short circuit that can burn the components. Suggest starting the computer until the temperature goes up.
- The increasing temperature of the capacitor may decrease the life of computer. Using the close case may decrease the life of other device because the higher temperature in the inner of the case.
- Attention to the heat sink when you over-clocking. The higher temperature may decrease the life of the device and burned the capacitor.

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## Manual Revision Information

Reversion	Revision History	Date
2.0	Second Edition	April, 2010

### Item Checklist

- AMD790GX Platform Processor Chipset based motherboard
- CD for Motherboard Utilities
- User's Manual
- Switch Card
- 4 in 1 Cable Package (optional)
- SATA Cable (optional)
- I/O Back Panel Shield

## AMD K10 Processor Family Cooling Solutions

As processor technology pushes to faster speeds and higher performance with increasing operation clock, thermal management becomes increasingly crucial while building computer systems. Maintaining the proper computing environment without thermal increasing is the key to reliable, stable, and 24 hours system operation. The overall goal is keeping the processor below its specified maximum case temperature. Heatsinks induce improved processor heat dissipation through increasing surface area and concentrated airflow from attached active cooling fans. In addition, interface materials allow effective transfers of heat from the processor to the heatsink. For optimum heat transfer, AMD recommends the use of thermal grease and mounting clips to attach the heatsink to the processor.

Please refer to the website for collection of heatsinks evaluated and recommended for Socket AM2+ processors by AMD. In addition, this collection is not intended to be a comprehensive listing of all heatsinks that support Socket-AM2+ processors.

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# Chapter 1

## Introduction of AMD790GX Motherboards

### 1-1 Features of motherboard

The AMD790GX chipset motherboard series are based on the latest AMD790GX Chipset and the SB750 chipset which supports the innovative 64-bit AMD Socket AM3/AM2+AM2 dual core and quad core AMD Phenom™ processors and 64-bit AMD Socket AM3/AM2+/AM2 multi-tasking Socket AM2 Athlon64 X2 processors and Sempron Processors. With an integrated low-latency high-bandwidth DDRII and DDRIII memory controller and a highly-scalable Hyper Transport technology-based system bus up to HT 3.0. AMD790GX Platform Processor Chipset motherboard series deliver the outstanding system performance and professional desktop platform solution with the advantages of new generation 64-bit AMD Socket AM3/AM2+ / AM2 AMD Phenom™ FX, AMD Phenom™ Athlon64 FX , Athlon64 X2, Athlon64 & Sempron processors.

The AMD790GX Series motherboards come with two DDRII memory slots and two DDRIII memory slots to support two DDRII533 /667 /800 (AM2 Sempron processors only support up to DDRII667 memory) memory modules up to 4GB or two DDRIII 1066/ 1333 memory modules up to 8GB. The board also supports dual-channel function. The AMD790GX Series motherboards are embedded with SB750 chipset of providing 1 ULTRA ATA 133 connector and Serial ATA2 with RAID 0, 1, 10, 5 functions which support up to two IDE hard disk drive devices and six Serial ATA2 devices to accelerate hard disk drives and guarantee the data security without failure in advanced computing performance.

The AMD790GX motherboards provide 10/100/1000 LAN function with Gigabit LAN which supports 10/100/1000Mbps data transfer rate. And the embedded HD Audio CODEC is fully compatible with Sound Blaster Pro standards that offer you with the home cinema quality and satisfying software compatibility.

The AMD790GX Series motherboards deliver outstanding value and performance for gamers, with a true bandwidth design for Multi-GPU configurations. This high bandwidth architecture in the AMD 790GX chipset is with the flexibility for single or dual card or three cards configurations. The AMD 790GX chipset provide 2 x16 by 8 lane PCI Express 2.0 slots to support simultaneous operation of graphics cards for astonishing performance with brilliant and intense 3D graphics.

AMD790GX Series motherboard series offer two PCI-Express2.0x16 graphics slots that deliver up to 4Gbyte/sec data transfer rate at each relative direction. When PE4 installed switch card, the PE1 will doubled its bandwidth. One PCI Express x1 I/O slot offers 512 Mbyte/sec concurrently, over 3.5 times more bandwidth than PCI at 133Mbyte/sec, tackling the most demanding multimedia tasks nowadays .The AMD790GX motherboards also carry one 32-bit PCI slot guarantee the rich connectivity for the I/O peripheral devices. This motherboard support Hybrid CrossFireX function, the VGA Card on PE1 or PE4 will activate a Hybrid CrossFire with the onboard VGA Card when select sideport function in BIOS, the performance will be increased 15% to 75%.

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Embedded USB controllers as well as capability of expanding to 10 of USB2.0 functional ports delivering 480Mb/s bandwidth of rich connectivity, these motherboards meet the future USB demands which are also equipped with hardware monitor function on system to monitor and protect your system and maintain your non-stop business computing.

Some special features--- **CPU Thermal Throttling/ CPU Vcore 7-shift / CPU Smart Fan / OC-CON / G.P.I. Function** etc. in this motherboard are designed for power user to use the over-clocking function in more flexible ways. But please be caution that the over-clocking maybe causes the fails in system reliabilities. This motherboard provides the guaranteed performance and meets the demands of the next generation computing. But if you insist to gain more system performance with variety possibilities of the components you choose, please be careful and make sure to read the detailed descriptions of these value added product features, please get them in the coming section.

### 1-1.1 Special Features of Motherboard

#### **CPU Thermal Throttling Technology**—The CPU Overheat Protection Technology

To prevent the increasing heat from damage of CPU or accidental shutdown while at high workload, the CPU Thermal Throttling Technology will force CPU to enter partially idle mode from 87.5% to 12.5% according to preset CPU operating temperature in BIOS (from 40°C to 90°C). When the system senses the CPU operating temperature reaching the preset value, the CPU operating bandwidth will be decreased to the preset idle percentage to cool down the processor. When at throttling mode the beeper sound can be optionally selected to indicate it is in working. (For detail operating please read Section 3-11 Bi-turbo Configuration)

#### **CPU Smart Fan**—The Noise Management System

It's never been a good idea to gain the performance of your system by sacrificing its acoustics. CPU Smart Fan Noise Management System is the answer to control the noise level needed for now-a-day's high performance computing system. The system will automatically increase the fan speed when CPU operating loading is high, after the CPU is in normal operating condition, the system will low down the fan speed for the silent operating environment. The system can provide the much longer life cycle for both CPU and the system fans for game use and business requirements.

#### **CPU Vcore 7-Shift**—Shift to Higher Performance

The CPU voltage can be adjusted up by 31 steps for the precisely over-clocking of extra demanding computing performance.

#### **OC-CON(optional)**—High-polymer Solid Electrolysis Aluminum Capacitors

The working temperature is from 55 degrees Centigrade below zero to 125 degrees Centigrade, OC-CON capacitors possess superior physical characteristics that can be while reducing the working temperature between 20 degrees Centigrade each time, intact extension 10 times of effective product operation lives, at not rising degrees Centigrade of working temperatures each time a relative one, life of product decline 10% only too.

#### **G.P.I Function(optional)**—Green power indicator function)

G.P.I is a technology with remarkable power saving function: when you are using a computer with G.P.I mode turned on, you save averagely 10.5w in power consumption in the whole process than normal computer without G.P.I technology.

#### **DIY Clear(optional)**

The CMOS button is to facilitate the clear CMOS process for power user overclocking function. The user can easily clear or restore CMOS setting by pressing the button without tacking trouble to remove the case and locate the jumper for clear CMOS .

#### **Power On Button(optional)**

You can easily start the computer by pressing down this button for a few seconds, without troubling yourself to locate the front panel jumpers to find the Power on jumper.

#### **Reset Button(optional)**

You can easily restart the computer by pressing down this button for a few seconds, without troubling yourself to locate the front panel jumpers to find the reset jumper.

### 3D Audio((optional)

OP with two-stage Butterworth filter and quadruple noninverting amplifier enhances bass effect under the 100MHz range to perfect audio effect, brings you stunning shock experience in video game, true-to-life simulated feeling when watching films and the greatest touch as that in the concert.

## 1-2 Specification

Spec	Description
<b>Design</b>	<ul style="list-style-type: none"><li>● ATX form factor ; PCB size:24.5cm x24.5cm</li></ul>
<b>Chipset</b>	<ul style="list-style-type: none"><li>● AMD790GX North Bridge Chipset</li><li>● AMD SB750 South Bridge Chipset</li></ul>
<b>CPU Socket</b>	<ul style="list-style-type: none"><li>● Support 64bit AMD Athlon64 940-Pin package utilizes Flip-Chip Pin Grid Array package processor</li><li>● Support for future AMD Athlon64 940-pin Dual –Core Athlon 64x2 processor, Athlon 64 &amp; Sempron Processors with HTT Frequency 1GHz and the latest AMD Phenom™ FX, quad core AMD Phenom™ processors with HTT 3.0.</li><li>● Ready for AM3 CPU</li></ul>
<b>Memory Socket</b>	<ul style="list-style-type: none"><li>● 240-pin DDRII Module socket x 2</li><li>● 240-pin DDRIII Module socket x 2</li><li>● Support 2pcs DDRII533/667/800 Modules Expandable to 4GB or 2pcs DDRIII 1066/ 1333 Modules Expandable to 8GB</li><li>● Dual channel supported</li></ul>
<b>GPU Memory</b>	<ul style="list-style-type: none"><li>● DDRIII 128Mb GPU Memory (optional)</li></ul>
<b>Expansion Slot</b>	<ul style="list-style-type: none"><li>● 2pcs PCI-Express x16 by 8 lane</li><li>● 1pcs PCI-Express x1 slot</li><li>● 32-bit PCI slot x 1pcs</li></ul>
<b>Integrate IDE and Serial ATA2 RAID</b>	<ul style="list-style-type: none"><li>● One IDE controllers support PCI Bus Mastering, ATA PIO/DMA and the ULTRA DMA 33/66/100/133 functions that deliver the data transfer rate up to 133 MB/s for 2 IDE Devices and for 6 Serial ATA2 ports providing 300 MB/sec data transfer rate with RAID 0, 1, 10, 5 functions</li></ul>
<b>Gigabit LAN</b>	<ul style="list-style-type: none"><li>● Integrated PCI-E 10 / 100 / 1000 LAN.</li><li>● Support Fast Ethernet LAN function of providing 10Mb/100Mb/1000 Mb/s data transfer rate</li></ul>
<b>HD-Audio</b>	<ul style="list-style-type: none"><li>● Realtek HD Audio Codec integrated</li><li>● Support 3D surround &amp; Positioning Audio</li><li>● Audio driver and utility included</li></ul>
<b>BIOS</b>	<ul style="list-style-type: none"><li>● AMI 8MB SPI Flash ROM BIOS</li></ul>
<b>Multi I/O</b>	<ul style="list-style-type: none"><li>● PS/2 keyboard and PS/2 mouse connectors</li><li>● Coaxial and optical SPDIF_OUT connector(optional)</li><li>● HDMI Connector / DVI Connector / VGA Connector(HDMI Connector and DVI Connector can not be used at the same time)</li><li>● USB2.0 port x 4 and headers x 3</li><li>● ESATA Connector x1</li><li>● SATA Connector x6</li><li>● RJ-45 Connector x1</li><li>● Audio connector x1 (8CH Audio)</li><li>● Hard Disk Drive Connector x1</li><li>● Serial port header x1</li><li>● HDMI-SPDIF header x1</li><li>● IR header x1</li></ul>

## 1-3 Performance List

The following performance data list is the testing result of some popular benchmark testing programs. These data are just referred by users, and there is no responsibility for different testing data values gotten by users (the different Hardware & Software configuration will result in different benchmark testing results.)

### Performance Test Report

**CPU:** AMD Phenom II 940  
**DRAM:** DDR II 1066 1GB\*2  
**VGA Card:** onboard(HD3300)  
**Hard Disk Driver:** ST sata 1000GB  
**BIOS:** T02  
**OS:** winxp+sp3 (en)

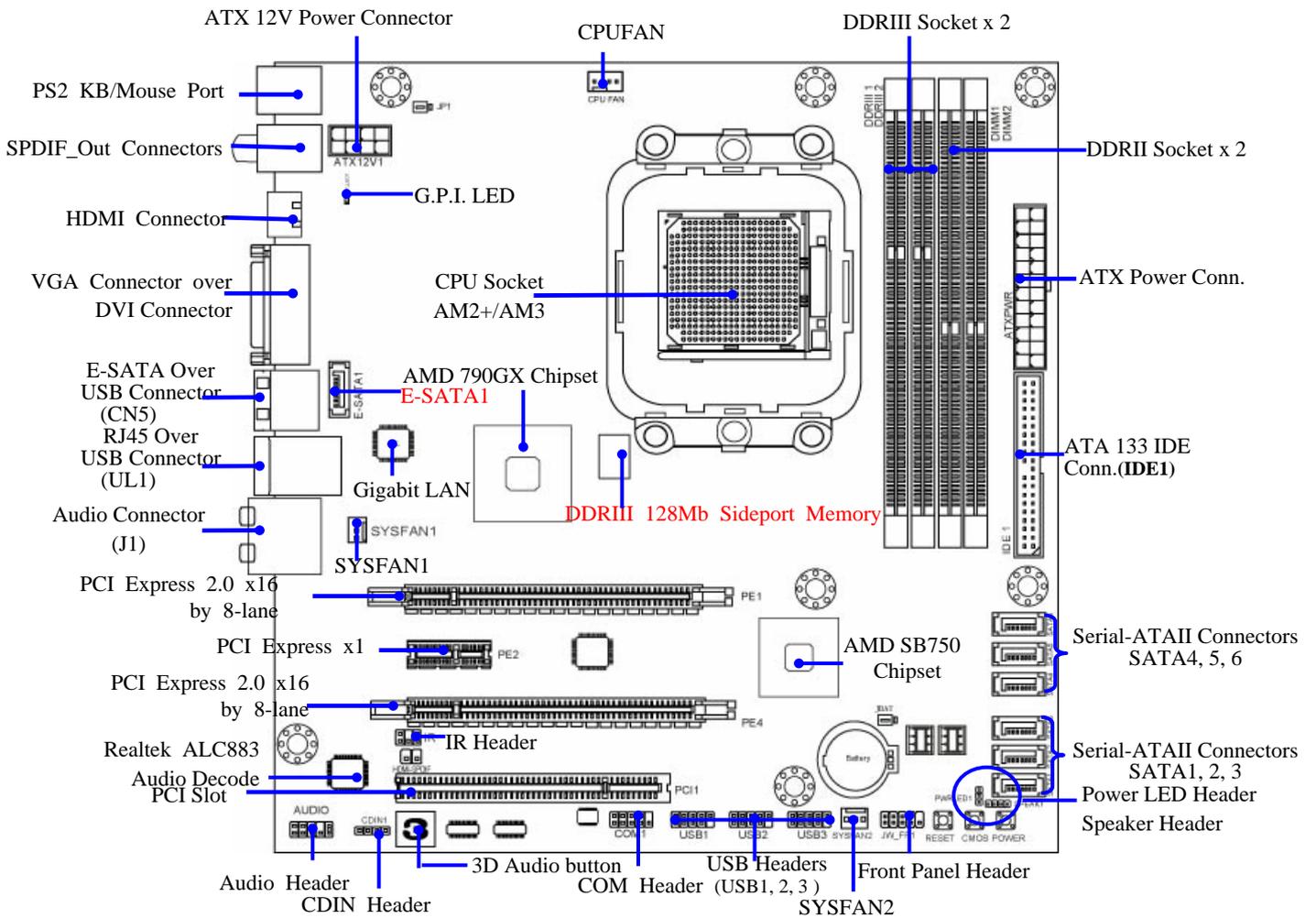
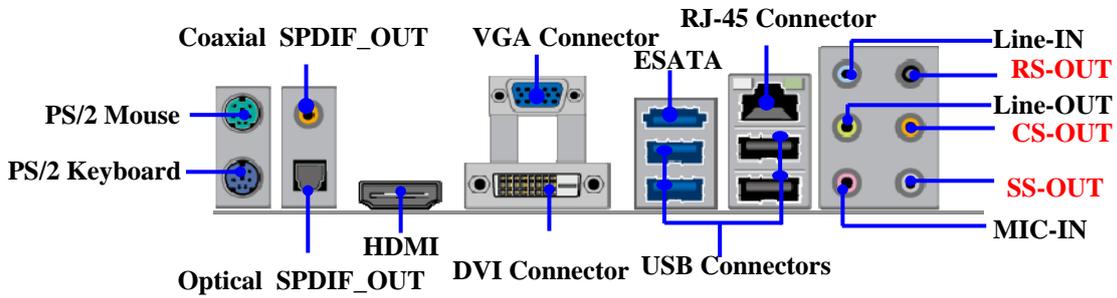
		AMD 790GX
<b>3D Mark 2003</b>		5648
<b>3D Mark 2005</b>		4647
<b>3D Mark 2006</b>		2151
<b>AQUAMRK3</b>		48805
<b>PCMark2005</b>		
<b>System / CPU / Memory</b>		6860/9052/5126
<b>Graph / HDD</b>		2955/6255
<b>Content Creation Winstone 2004</b>		52.4
<b>Business Winstone 2004</b>		34.1
<b>Winbench 99 V2.0:</b>		
<b>Business /Hi-end Disk Winmark99</b>		6220/29400
<b>SYSMark 2004: SISMark Rating(Internet Content Creation / Office Productivity )</b>		
<b>SYSMark 2004</b>		409
<b>3D Creation/2D Creation</b>		215/633
<b>Web publication</b>		501
<b>Office productivily</b>		301
<b>Communication/Document Creation</b>		252/364
<b>DATA Analysis</b>		296
<b>SISOFT Sandra 2009 : 1.CPU Arithmetic Benchmark 2.CPU Multi-Media Benchmark 3.Memory bandwidth Benchmark</b>		
DHRYSTON ALU	GIPS	39.96
WHETSTONE ISSE3	GFLOPS	39.12
Multi-Media int x8 asse2	Mpixel/s	116.06
Multi-Media float x4 isse2	Mpixel/s	51.07
Multi-Media doubled x2 isse2	Mpixel/s	27.95
Integer	GB/S	9.75
Floating	GB/S	9.81
<b>UT2003 Benchmark (flyby/botmatch)</b>		19.496958/134.963776/251.091202/135.045868
<b>Quake3 DEMO1 /DEMO2</b>	FPS	619.4/62.07
<b>DOOM 3</b>	FPS	95.0
<b>Super Pi (1M)</b>	Second	22.96s
<b>CPUZ System / CPU Clock</b>		3000.3MHZ

**CPU:** AMD AM3 925  
**DRAM:** DDR III 1333 1GB\*2  
**VGA Card:** onboard(HD3300)  
**Hard Disk Driver:** ST sata 1000GB  
**BIOS:** T02  
**OS:** winxp+sp3 (en)

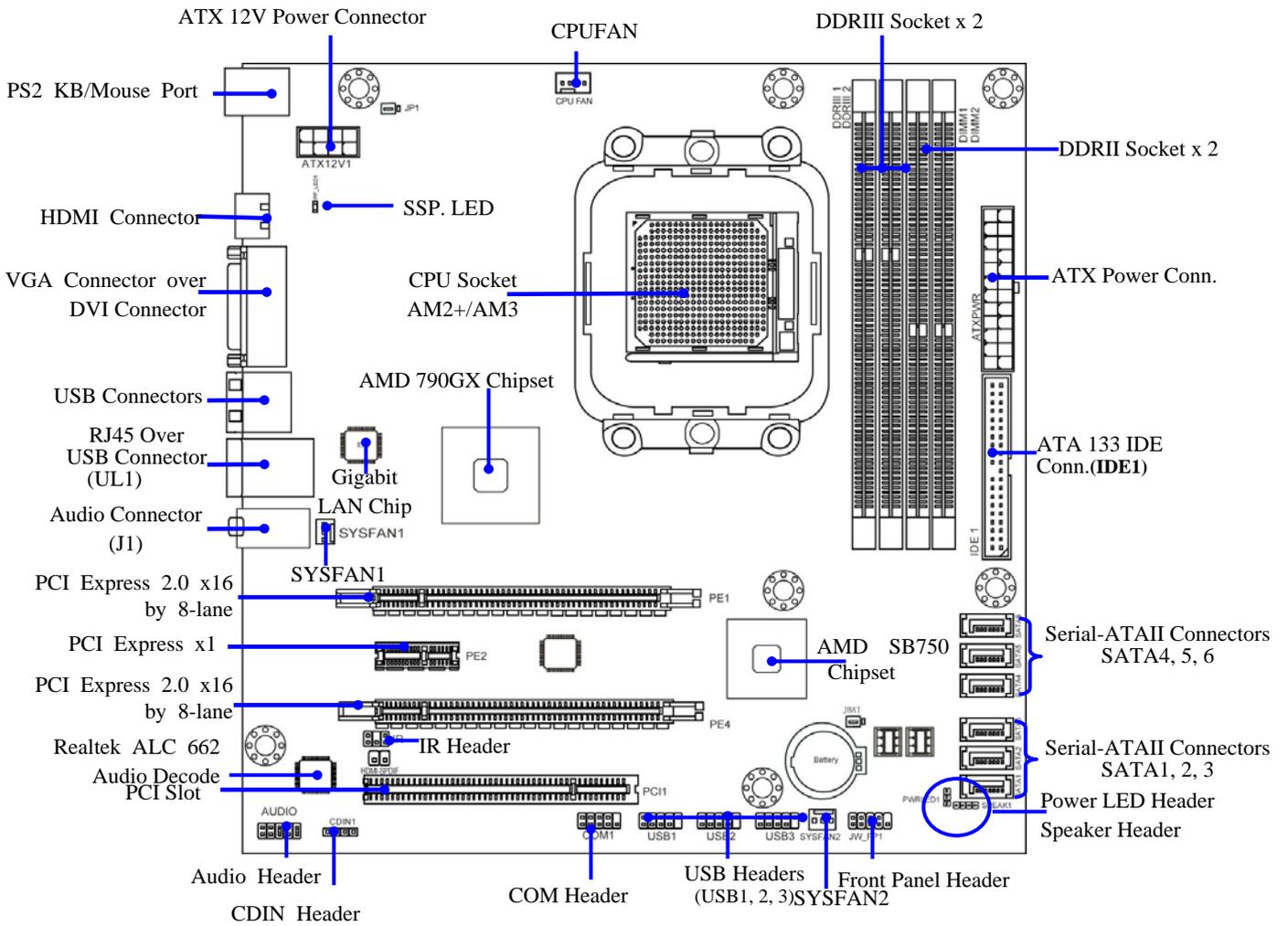
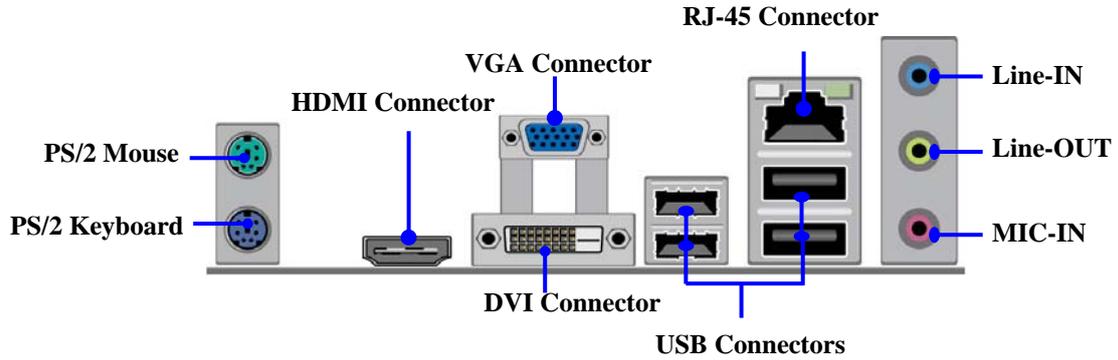
		AMD 790GX
<b>3D Mark 2003</b>		5919
<b>3D Mark 2005</b>		4835
<b>3D Mark 2006</b>		2224
<b>AQUAMRK3</b>		50568
<b>PCMark2005</b>		
<b>System / CPU / Memory</b>		6493/8520/4987
<b>Graph / HDD</b>		3043/6242
<b>Content Creation Winstone 2004</b>		49.5
<b>Business Winstone 2004</b>		32.5
<b>Winbench 99 V2.0:</b>		
<b>Business /Hi-end Disk Winmark99</b>		7900/27100
<b>SYSMark 2004: SISMark Rating(Internet Content Creation / Office Productivity )</b>		
<b>SYSMark 2004</b>		400
<b>3D Creation/2D Creation</b>		217/609
<b>Web publication</b>		485
<b>Office productivily</b>		294
<b>Communication/Document Creation</b>		246/351
<b>DATA Analysis</b>		295
<b>SISOFT Sandra 2009 : 1.CPU Arithmetic Benchmark 2.CPU Multi-Media Benchmark 3.Memory bandwidth Benchmark</b>		
DHRYSTON ALU	GIPS	36.81
WHETSTONE ISSE3	GFLOPS	36.62
Multi-Media int x8 asse2	Mpixel/s	108.06
Multi-Media float x4 isse2	Mpixel/s	47.56
Multi-Media doubled x2 isse2	Mpixel/s	26.05
Integer	GB/S	11.24
Floating	GB/S	11.24
<b>UT2003 Benchmark (flyby/botmatch)</b>		28.933/131.817/244.0370/131.8953
<b>Quake3 DEMO1 /DEMO2</b>	FPS	616.6/608.0
<b>DOOM 3</b>	FPS	98.6
<b>Super Pi (1M)</b>	Second	24.360
<b>CPUZ System / CPU Clock</b>		2800.4MHZ

# 1-4 Layout Diagram

For MA3-79GDG Extreme-L Motherboard series:



**For MA3-79GEXTLC-LF Motherboard series:**



## Jumpers

Jumper	Name	Description
JP1	Keyboard/USB Power On Enabled/Disabled	3-pin Block
JBAT	Clear CMOS Header	3-pin Block

## Connectors

Connector	Name	Description
ATXPWR1	ATX Power Connector	24-pin Block
ATX12V1	ATX 12V Power Connector	8-pin Block
KB	PS/2 Mouse & PS/2 Keyboard Connector	6-pin Female
UL1/CN5 for USB	USB2.0 Port Connector	4-pin Connector
UL1 for RJ-45LAN	Gigabit LAN Port Connector	RJ-45 Connector
J1	8-CH HD Audio Connector	6- phone jack Conn.
FDD	Floppy Driver Connector	34-pin Block
IDE1	Primary IDE Connector	40-pin Block
SATA1~SATA6; E-SATA1 (optional)	Serial ATAII Hard Disk Driver Connectors	7-pin Connector
CN5 for ESATA	External Serial ATAII Connector	7-pin Connector
VGA	D-Sub Connector	15-pin Connector
DVI1	Digital Visual Interface	29-pin Connector
HDMI	High-Definition Multimedia	19-pin Connector
SPDIF_OUT1/ SPDIF_Out 2 (optional)	Coaxial/ Optical SPDIF Out Connector	1-phone connector

## Headers

Header	Name	Description
AUDIO1	Front Panel SPEAKER, MIC header	9-pin Block
USB1, USB2, USB3	USB Port Headers	9-pin Block
SPEAK	PC Speaker connector	4-pin Block
PWR LED	Power LED	3-pin Block
JW_FP1 (Reset/IDE LED/Power Button)	Front Panel Header (including IDE activity LED/Reset switch / Power On Button lead)	9-pin Block
SYSFAN1/2	System FAN Headers	3-pin Block
CPUFAN	CPU FAN Header	4-pin Block
CDIN1	CD Audio-In Header	4-pin Block
IR	IR infrared module Headers	5-pin Block
COM1	Serial Port COM1 Header	9-pin Block
HDMI-SPDIF	SPDIF Out header	2-pin Block

## Expansion Sockets

Socket/Slot	Name	Description
ZIF Socket AM2	CPU Socket	940-pin PGAB Athlon64 CPU Socket
DDRIII1/DDRIII2	DDRIII Module Socket	240-pin DDRIII Module Socket
DIMM1/ DIMM2	DDRII Module Socket	240-pin DDRII Module Socket
PCI1	PCI Slot	32-bit PCI Local Bus Expansion slot
PE2	PCI-Express x1Slot	PCI-Express x1 Expansion Slot
PE1,PE4	PCI-Express 2.0x16 Slot	PCI-Express2.0 x16 Expansion Slot

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## Chapter 2

### Hardware Installation

**WARNING!** Turn off your power when adding or removing expansion cards or other system components. Failure to do so may cause severe damage to both your motherboard and expansion cards.

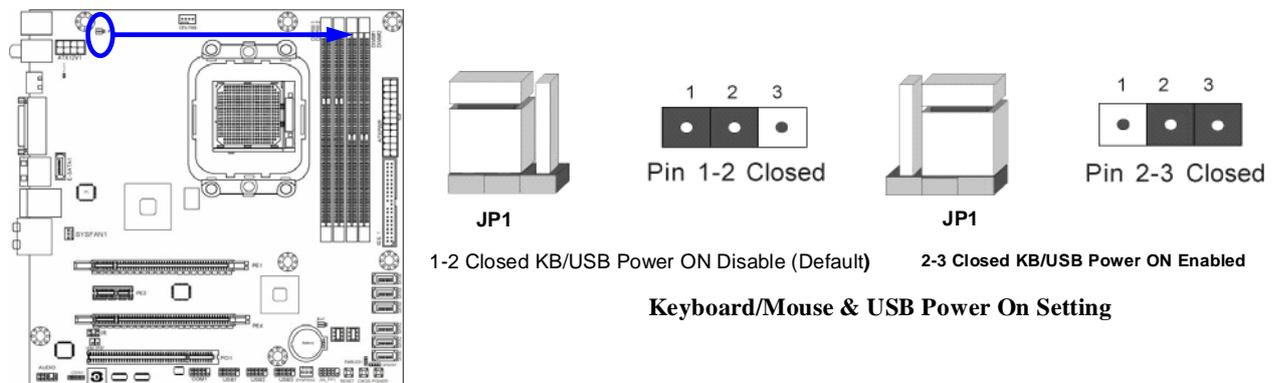
#### 2-1 Hardware installation Steps

Before using your computer, you had better complete the following steps:

1. Check motherboard jumper setting
2. Install CPU and Fan
3. Install System Memory (DIMM)
4. Install Expansion cards
5. Connect IDE and Front Panel /Back Panel cable
6. Connect ATX Power cable
7. Power-On and Load Standard Default
8. Reboot
9. Install Operating System
10. Install Driver and Utility

#### 2-2 Checking Motherboard's Jumper Setting

##### (1) Keyboard/USB function Enabled/Disabled: JP1



##### (2) CMOS RAM Clear (3-pin): JBAT

A battery must be used to retain the motherboard configuration in CMOS RAM short 1-2 pins of JBAT to store the CMOS data.

To clear the CMOS, follow the procedure below:

1. Turn off the system and unplug the AC power
2. Remove ATX power cable from ATX power connector
3. Locate JBAT and short pins 2-3 for a few seconds
4. Return JBAT to its normal setting by shorting pins 1-2
5. Connect ATX power cable back to ATX power connector

**Note: When should clear CMOS**

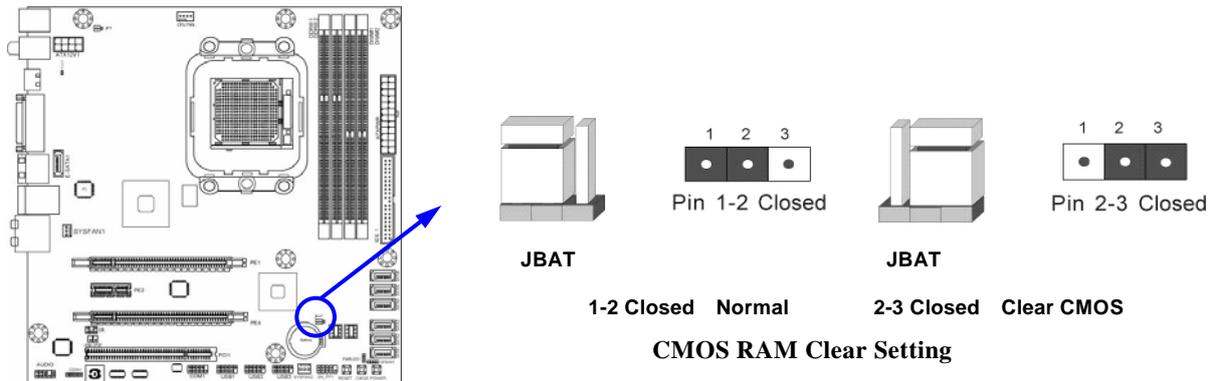
##### 1. Troubleshooting

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2. *Forget password*

3. *After over clocking system boot fail*



## 2-3 Install CPU

### 2-3-1 Glossary

**Chipset (or core logic)** - two or more integrated circuits which control the interfaces between the system processor, RAM, I/O devices, and adapter cards.

**Processor socket** - the socket used to mount the system processor on the motherboard.

**Slot (PCI-E, PCI, RAM)** - the slots used to mount adapter cards and system RAM.

**PCI** - Peripheral Component Interconnect - a high speed interface for video cards, sound cards, network interface cards, and modems; runs at 33MHz.

**PCI Express2.0**- Peripheral Component Interconnect Express2.0, developed in 2003, the speed of each line doubled from the previous PCI-E of 2.5 Gbps to 5 Gbps.

**Serial Port** - a low speed interface typically used for mouse and external modems.

**Parallel Port** - a low speed interface typically used for printers.

**PS/2** - a low speed interface used for mouse and keyboards.

**USB** - Universal Serial Bus - a medium speed interface typically used for mouse, keyboards, scanners, and some digital cameras.

**Sound (interface)** - the interface between the sound card or integrated sound connectors and speakers, MIC, game controllers, and MIDI sound devices.

**LAN (interface)** - Local Area Network - the interface to your local area network.

**BIOS (Basic Input/Output System)** - the program logic used to boot up a computer and establish the relationship between the various components.

**Driver** - software, which defines the characteristics of a device for use by another device or other software.

**Processor** - the "central processing unit" (CPU); the principal integrated circuit used for doing the "computing" in "personal computer"

**Front Side Bus Frequency** - the working frequency of the motherboard, which is generated by the clock generator for CPU, DRAM and PCI BUS.

**CPU L2 Cache** - the flash memory inside the CPU, normal it depend on CPU type.

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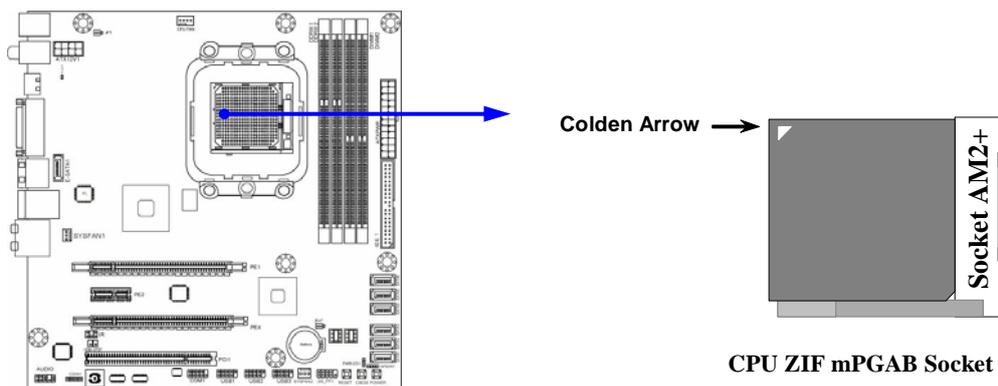
## 2-3-2 About AMD Athlon64 Socket AM2+/AM3 CPU Socket

This motherboard provides a socket AM2+/AM3 surface mount, Zero Insertion Force (ZIF) socket, referred to as the mPGA941 socket supports AM3/ AM2+ AMD processor utilizes Flip-Chip Pin Grid Array package technology.

The CPU that comes with the motherboard should have a cooling FAN attached to prevent overheating. If this is not the case, then purchase a correct cooling FAN before you turn on your system.

**WARNING!** Be sure that there is sufficient air circulation across the processor's heatsink and CPU cooling FAN is working correctly, otherwise it may cause the processor and motherboard overheat and damage, you may install an auxiliary cooling FAN, if necessary.

To install a CPU, first turn off your system and remove its cover. Locate the ZIF socket and open it by first pulling the level sideways away from the socket then upward to a 90-degree angle. Insert the CPU with the correct orientation as shown below. The notched corner should point toward the end of the level. Because the CPU has a corner pin for two of the four corners, the CPU will only fit in the orientation as shown.



When you put the CPU into the ZIF socket, No force required to insert of the CPU, and then press the level to locate position slightly without any extra force.

## 2-4 Install Memory

This motherboard provides two 240-pin DDR II DUAL INLINE MEMORY MODULES (DIMM) socket for DDR II memory SDRAM expansion available from minimum memory volume of 128MB to maximum memory volume of 4 GB and two 240-pin DDR III SDRAM DUAL INLINE MEMORY MODULES (DIMM) socket for DDR III memory expansion available from minimum memory volume of 128MB to maximum memory volume of 8 GB.

### Valid Memory Configurations for DDR II

Bank	240-Pin DIMM	PCS	Maximum Capacity
DIMM1	DDR II 667/DDR II 800	X1	2GB
DIMM2	DDR II 667/DDR II 800	X1	2GB
Total	System Memory (Max 4GB)	2	4GB

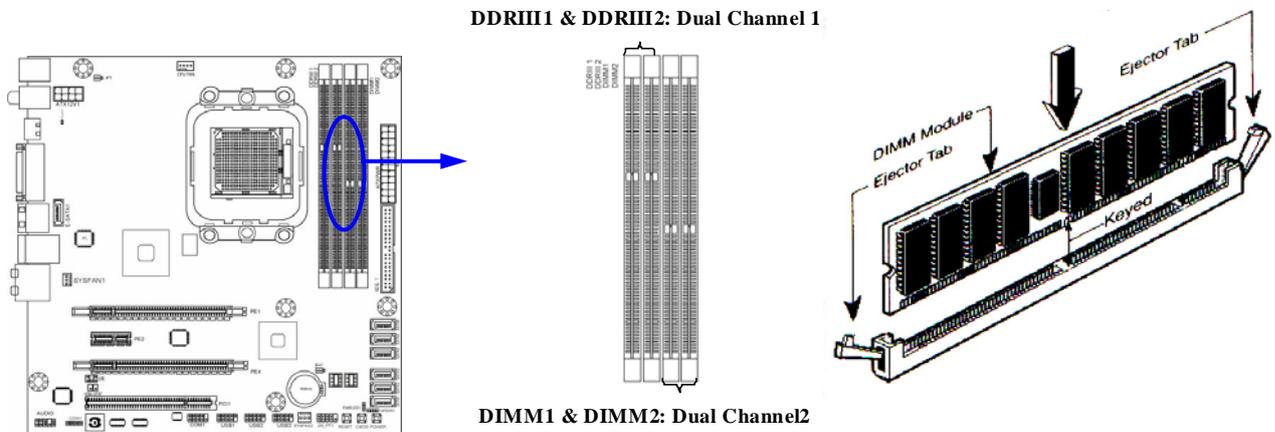
## Valid Memory Configuration for DDR III

Bank	240-Pin DIMM	PCS	Maximum Capacity
DDR III 1	DDRIII1066/DDRIII 1333	X1	4 GB
DDR III 2	DDRIII1066/DDRIII 1333	X1	4 GB
Total	System Memory (Max. 8 GB)	2	8 GB

### NOTICE!

1. If there is only one DDRII memory module, please install in DIMM1 slot; if there is only one DDRIII memory module, please install in DDRIII1 slot.
2. Dual channel function only supports when 2 DDRIII memory modules plug in DIMM1 & DIMM2; or 2 DDRIII memory modules plug in DDR III 1 & DDR III .
3. Memory modules must be of the same type, same size, and same frequency for dual channel function.
4. DIMM1 and DIMM2 is for installing DDR II memory modules only while DDRIII1 and DDRIII2 is for installing DDRIII memory modules only.
5. User can only install DDRII memory module(s) in DDR II memory module slot(s) when an AM2 or AM2+ CPU is installed;
6. User can choose either installing DDRII memory module(s) in DDR II memory module slot(s) or DDRIII memory module(s) in DDR III memory module slot(s), but NEVER both DDRII and DDRIII memory module(s) at the same time under any circumstances.

Install DDR SDRAM modules to your motherboard is not difficult, you can refer to figure below to see how to install a 240-Pin DDR II 667/DDR II 800 or a DDR III 1066 and DDR III 1333SDRAM module.



Graph 2-4

### NOTICE!

When you install DIMM module fully into the DIMM socket the eject tab should be locked into the DIMM module very firmly and fit into its indentation on both sides.

### WARNING!

This motherboard only supports DDR II 667/800 or higher frequency- compliant DDR II Modules in DDRII memory slots and DDR III 1066 or higher frequency-compliant DDR III Modules in DDRIII memory slots.

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## 2-5 Expansion Cards

### 2-5-1 Procedure For Expansion Card Installation

1. Read the documentation for your expansion card and make any necessary hardware or software setting for your expansion card such as jumpers.
2. Remove your computer's cover and the bracket plate on the slot you intend to use.
3. Align the card's connectors and press firmly.
4. Secure the card on the slot with the screen you remove above.
5. Replace the computer system's cover.
6. Set up the BIOS if necessary.
7. Install the necessary software driver for your expansion card.

### 2-5-2 Assigning IRQs For Expansion Card

Some expansion cards need an IRQ to operate. Generally, an IRQ must exclusively assign to one use. In a standard design, there are 16 IRQs available but most of them are already in use.

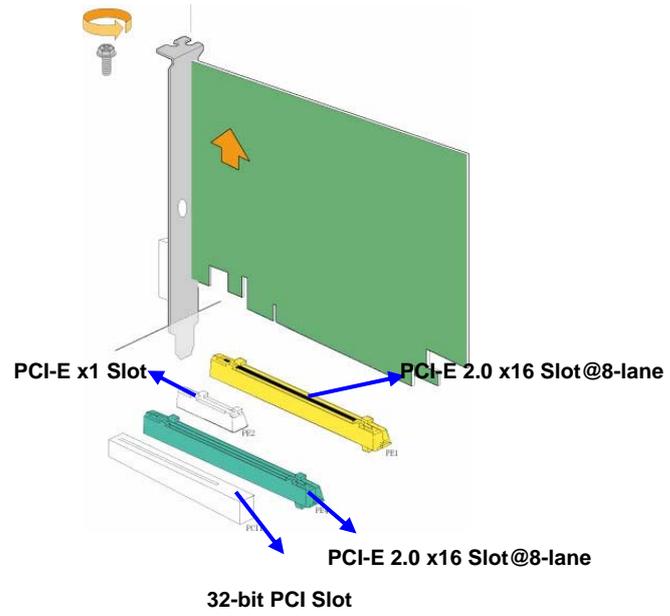
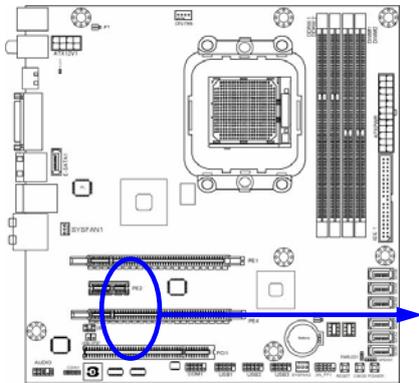
#### Standard Interrupt Assignments

IRQ	Priority	Standard function
0	N/A	System Timer
1	N/A	Keyboard Controller
2	N/A	Programmable Interrupt
3 *	8	Communications Port (COM2)
4 *	9	Communications Port (COM1)
5 *	6	Sound Card (sometimes LPT2)
6 *	11	Floppy Disk Controller
7 *	7	Printer Port (LPT1)
8	N/A	System CMOS/Real Time Clock
9 *	10	ACPI Mode when enabled
10 *	3	IRQ Holder for PCI Steering
11 *	2	IRQ Holder for PCI Steering
12 *	4	PS/2 Compatible Mouse Port
13	N/A	Numeric Data Processor
14 *	5	Primary IDE Channel
15 *	1	Secondary IDE Channel

\* These IRQs are usually available for ISA or PCI devices.

### 2-5-3 PCI Express Slot

Two PCI-Express2.0 x16@8 lane graphic slot offer 4Gbyte/sec data transfer rate at each relative direction and up to 8Gbyte/sec concurrent bandwidth at full speed, fully compliant to *PCI Express Base Specification revision2.0*, support PCI Express VGA card, and other PCI Express device. This motherboard support Hybrid CrossFireX function. One x1 PCI Express 1.0 a Slot offer 512 Mbyte/sec concurrently over 3.5 times more bandwidth than PCI at 133Mbyte/sec, tackling the most demanding multimedia tasks nowadays.



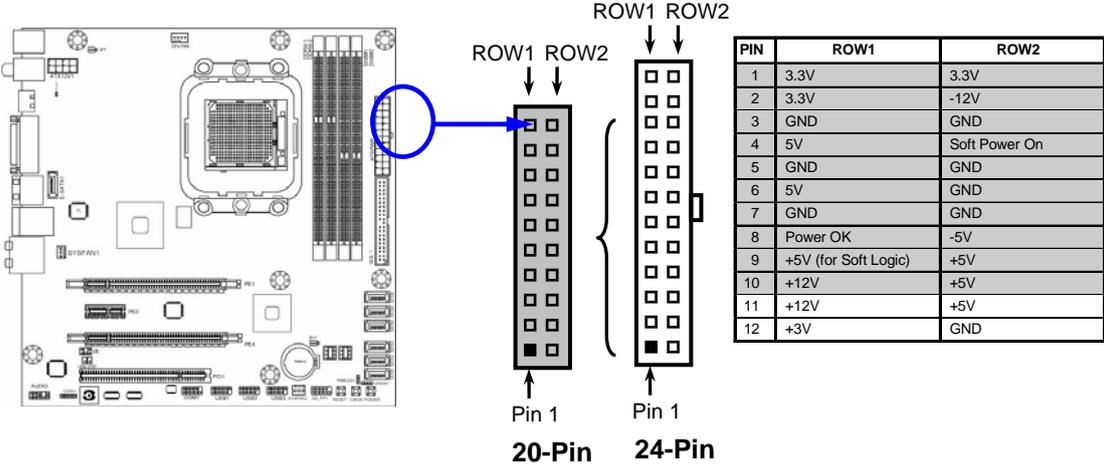
# 2-6 Connectors, Headers

## 2-6-1 Connectors

### (1) Power Connector (24-pin block): ATXPWR1

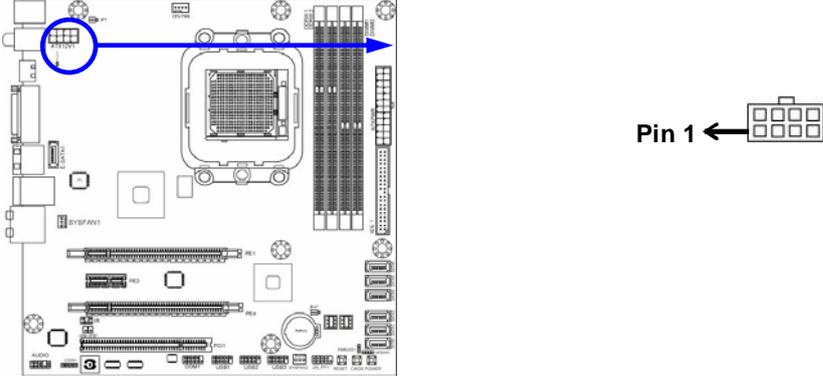
ATX Power Supply connector: This is a new defined 24-pins connector that usually comes with ATX case. The ATX Power Supply allows using soft power on momentary switch that connect from the front panel switch to 2-pins Power On jumper pole on the motherboard. When the power switch on the back of the ATX power supply turned on, the full power will not come into the system board until the front panel switch is momentarily pressed. Press this switch again will turn off the power to the system board.

- \*\* We recommend that you use an ATX 12V Specification 2.0-compliant power supply unit (PSU) with a minimum of 350W power rating. This type has 24-pin and 4-pin power plugs.
- \*\* If you intend to use a PSU with 20-pin and 4-pin power plugs, make sure that the 20-pin power plug can provide at least 15A on +12V and the power supply unit has a minimum power rating of 350W. The system may become unstable or may not boot up if the power is inadequate.



### (2) ATX 12V Power Connector (8-pin block) : ATX12V1

This is a new defined 8-pins connector that usually comes with ATX Power Supply. The ATX Power Supply which fully supports Socket AM2+ processor must including this connector for support extra 12V voltage to maintain system power consumption. Without this connector might cause system unstable because the power supply can not provide sufficient current for system.



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**(3) PS/2 Mouse & PS/2 Keyboard Connector: KB**

The connectors are for PS/2 keyboard and PS/2 Mouse.

**(4) USB Port connector: CN5/ UL1 for USB**

The connectors are 4-pin connector that connects USB devices to the system board.

**(5) LAN Port connector: UL1 for RJ45 LAN**

The connector is a standard RJ45 connector for Network. It supports 10M/100Mb/1000Mb s data transfer rate.

**(6) Audio Line-In, Lin-Out, MIC, RS-Out, CS-Out, SS-Out connector : J1(Optional)**

Depending on different models of motherboards, the audio connector can be either of 3-phone connector or 6-phone connector. Please refer to the product you purchased for audio connector definitions:

**Line-in(BLUE)** : Audio input to sound chip

**Line-out (GREEN)** : Audio output to speaker

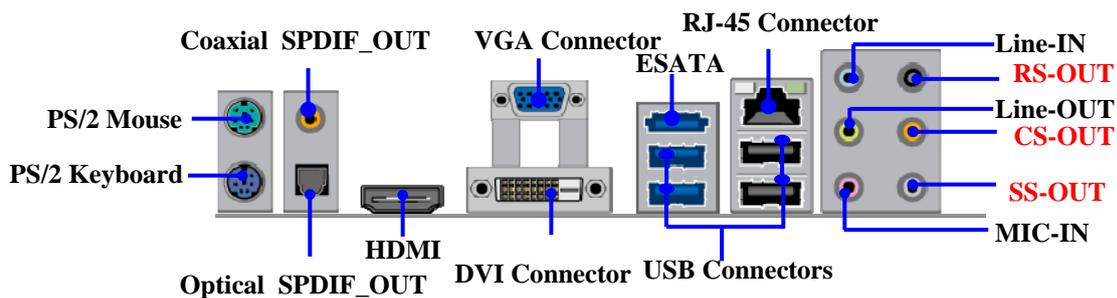
**MIC(PINK)**: Microphone Connector

**RS-OUT(BLACK)**: Rear-Surround audio output (optional)

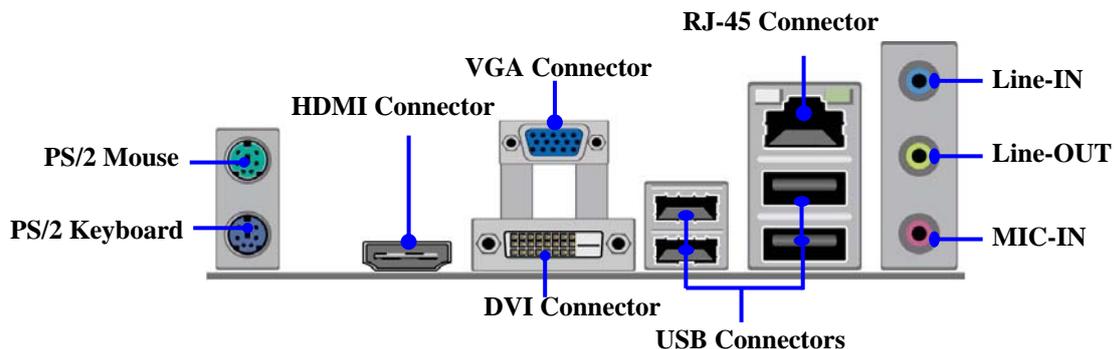
**CS-OUT(ORANGE)**: Center/ Subwoofer audio output (optional)

**SS-OUT(GRAY)**:Side-Surround audio output (optional)

**For MA3-79GDG Extreme-L Motherboard series:**

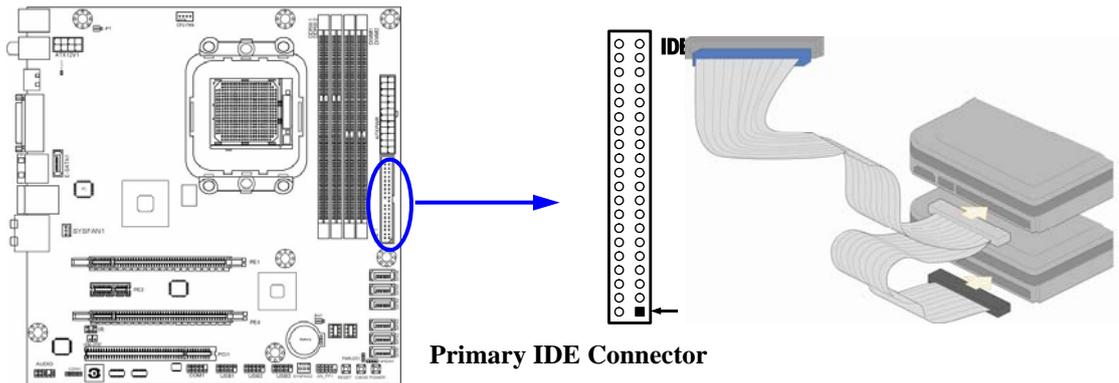


**For MA3-79GEXTLC-L Motherboard series:**



**(7) Primary IDE Connector (40-pin block): IDE1**

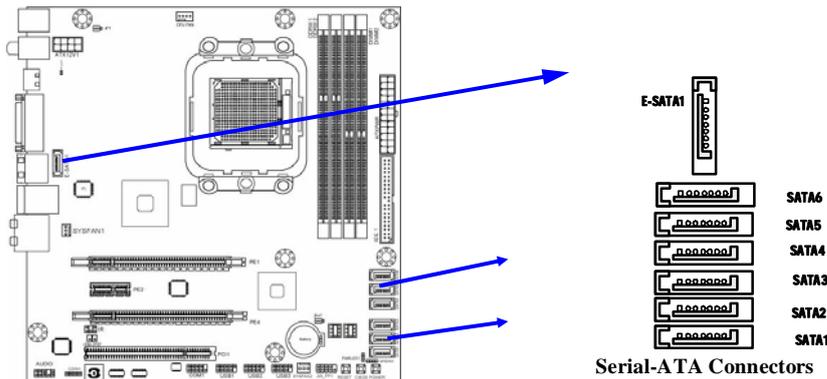
This connector supports the provided IDE hard disk ribbon cable. After connecting the single plug end to motherboard, connect the two plugs at other end to your hard disk(s). If you install two hard disks, you must configure the second drive to Slave mode by setting its jumpers accordingly. Please refer to the documentation of your hard disk for the jumper settings.



- Two hard disks can be connected to each connector. The first HDD is referred to as the “Master” and the second HDD is referred to as the “Slave”.
- For performance issues, we strongly suggest you don’t install a CD-ROM or DVD-ROM drive on the same IDE channel as a hard disk. Otherwise, the system performance on this channel may drop.

**(8) Serial-ATAII Port connector: SATA1~SATA6; E-SATA1(optional)**

This connector supports the provided Serial ATA2 IDE hard disk cable to connecting the motherboard with serial ATAII hard disk. E-SATA1 is not for SATA hard drive, it is only for connecting to SATAII 1, SATA II 2, SATA3, SATA4, SATA5, and SATA6 to let the ESATA port work.



**(9) ESATA Port: CN5 for ESATA (optional)**

This connector supports the External Serial ATA2 (ESATA) enable the full SATA interface speed outside the chassis, up to 3Gb/s. The ESATA port can be enabled only when the E-SATA 1 is connected to one of SATA 1~SATA6.

**(10) D-Sub 15-pin Connector: VGA**

VGA is the 15-pin D-Subminiature female connector; it is for the display devices, such as the CRT monitor, LCD monitor and so on.

**(11) Digital Visual Interface: DVI 1**

This interface standard designed to maximize the visual quality of digital display devices such as flat panel LCD computer displays and digital projectors.

**(12) High-Definition Multimedia Interface: HDMI**

This point-to-point interface is for audio and video signals designed as a single-cable solution for home theater and consumer electronics equipment.

**NOTE!**

**DVI and HDMI Connector can not be used at the same time.**

**(13) Coaxial SPDIF\_OUT and optical SPDIF\_OUT connectors:**

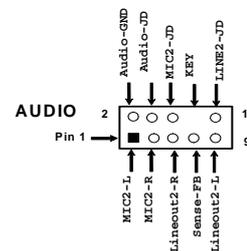
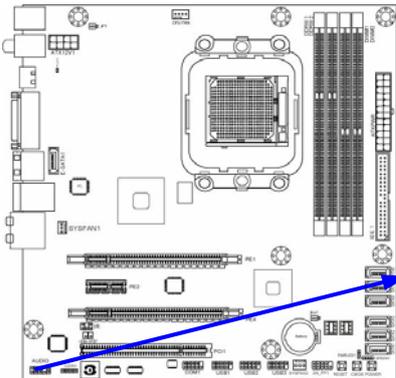
**SPDIF\_OUT1/ SPDIF\_OUT2(optional)**

The SPDIF output is capable of providing digital audio to external speakers or compressed AC3 data to an external Dolby digital decoder. Use this feature only when your stereo system has digital input function. The board has coaxial and optical SPDIF\_OUT connectors.

## 2-6-2 Headers

**(1) Line-Out/MIC Header for Front Panel (9-pin): AUDIO1**

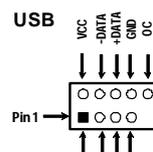
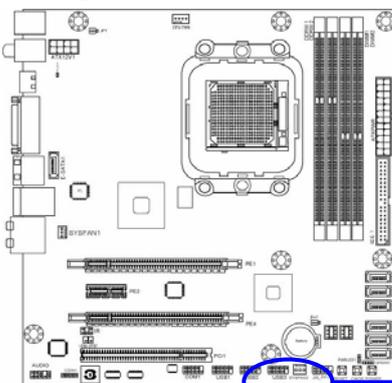
These headers connect to Front Panel Line-out, MIC connector with cable.



Line-Out, MIC Headers

**(2) USB Port Headers (9-pin): USB1/USB2/USB3**

These headers are used for connecting the additional USB port plug. By attaching an option USB cable, your can be provided with two additional USB plugs affixed to the back panel.



USB Port Headers

**(3) Speaker connector: SPEAK**

This 4-pin connector connects to the case-mounted speaker. See the figure below.

**(4) Power LED: PWR LED**

The Power LED is light on while the system power is on. Connect the Power LED from the system case to this pin.

**(5) IDE Activity LED: HD LED**

This connector connects to the hard disk activity indicator light on the case.

**(6) Reset switch lead: RESET**

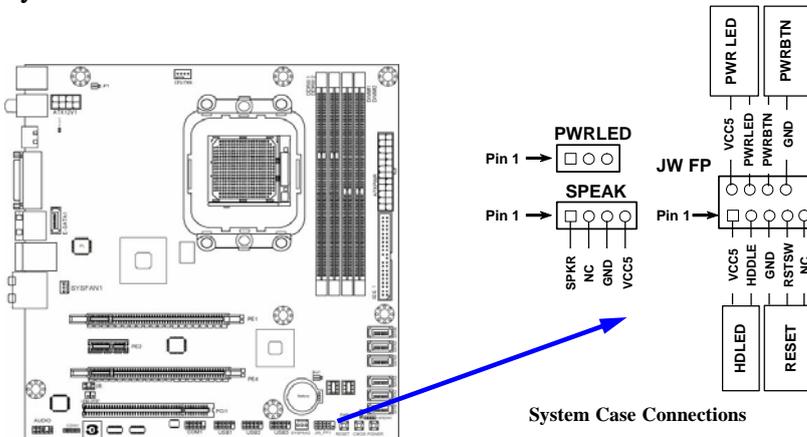
This 2-pin connector connects to the case-mounted reset switch for rebooting your computer without having to turn off your power switch. This is a preferred method of rebooting in order to prolong the life of the system's power supply. See the figure below.

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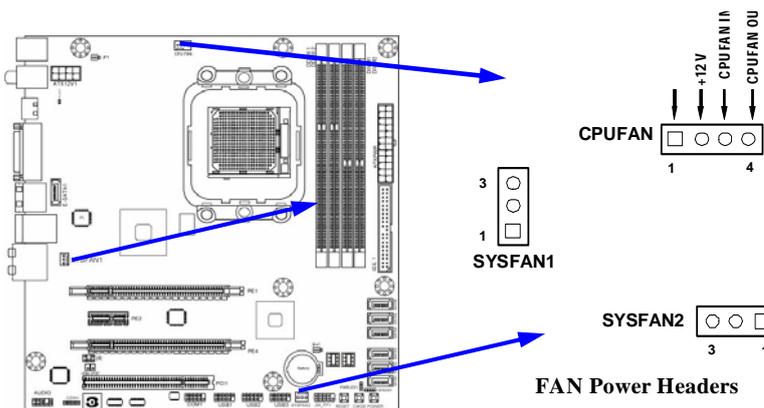
### (7) Power switch: PWR BTN

This 2-pin connector connects to the case-mounted power switch to power ON/OFF the system.



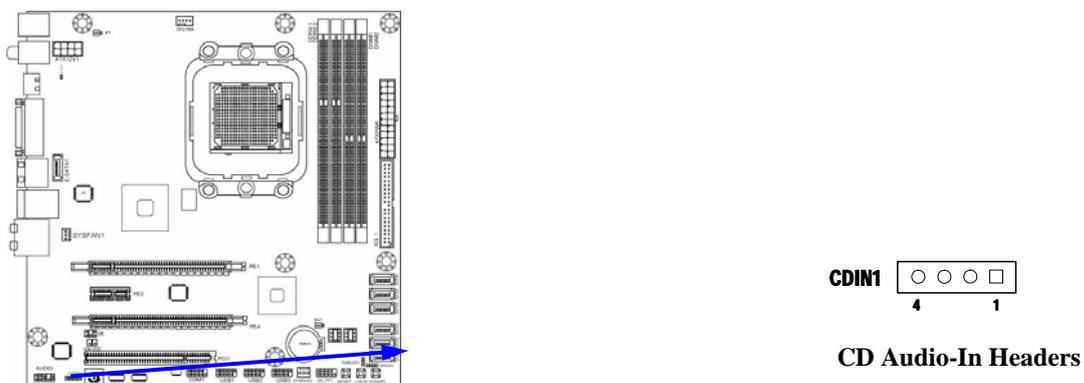
### (8) FAN Power Headers: SYSFAN1, SYSFAN2 (3-pin), CPUFAN (4-pin)

These connectors support cooling fans of 350mA (4.2 Watts) or less, depending on the fan manufacturer, the wire and plug may be different. The red wire should be positive, while the black should be ground. Connect the fan's plug to the board taking into consideration the polarity of connector.



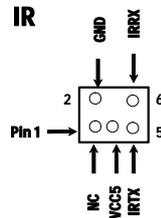
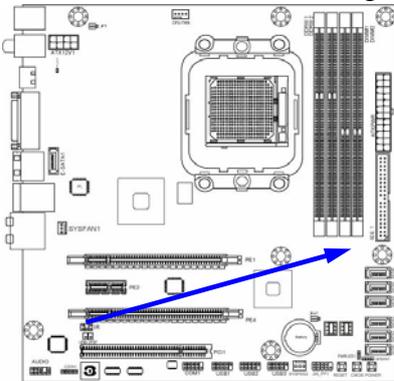
### (9) CD Audio-In Headers (4-pin): CDIN1

CDIN are the connectors for CD-Audio Input signal. Please connect it to CD-ROM CD-Audio output connector.



**(10) IR infrared module Headers (5-pin): IR1**

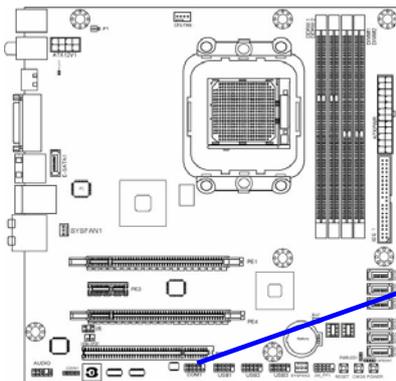
This connector supports the optional wireless transmitting and receiving infrared module. You must configure the setting through the BIOS setup to use the IR function.



**IR infrared module Headers**

**(11) Serial COM Port header: COM1**

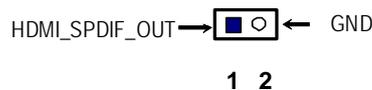
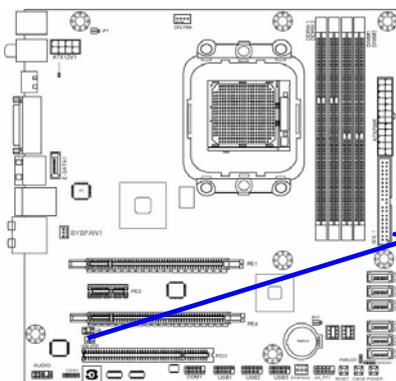
COM1 is the 9-pin block pin-header. The On-board serial port can be disabled through BIOS SETUP. Please refer to Chapter 3 “INTEGRATED PERIPHERALS SETUP” section for more detail information.



**Serial COM Port 9-pin Block**

**(12) HDMI-SPDIF Out header: SPDIF Out header**

The SPDIF output is capable of providing digital audio to external speakers or compressed AC3 data to an external Dolby digital decoder. Use this feature only when your stereo system has digital input function. Some of the VGA Card need connect SPDIF-IN Connector, so its HDMI Port can make sounds .



**HDMI\_SPDIF Header**

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## 2-7 Starting Up Your Computer

1. After all connection are made, close your computer case cover.
2. Be sure all the switch are off, and check that the power supply input voltage is set to proper position, usually in-put voltage is 220V~240V or 110V~120V depending on your country's voltage used.
3. Connect the power supply cord into the power supply located on the back of your system case according to your system user's manual.
4. Turn on your peripheral as following order:
  - a. Your monitor.
  - b. Other external peripheral (Printer, Scanner, External Modem etc...)
  - c. Your system power. For ATX power supplies, you need to turn on the power supply and press the ATX power switch on the front side of the case.
5. The power LED on the front panel of the system case will light. The LED on the monitor may light up or switch between orange and green after the system is on. If it complies with green standards or if it is has a power standby feature. The system will then run power-on test. While the test is running, the BIOS will alarm beeps or additional message will appear on the screen.

If you do not see any thing within 30 seconds from the time you turn on the power. The system may have failed on power-on test. Recheck your jumper settings and connections or call your retailer for assistance.

6. During power-on, press <Delete> key to enter BIOS setup. Follow the instructions in BIOS SETUP.
7. **Power off your computer:** You must first exit or shut down your operating system before switch off the power switch. For ATX power supply, you can press ATX power switching after exiting or shutting down your operating system. If you use Windows 9X, click "**Start**" button, click "**Shut down**" and then click "**Shut down the computer?**" The power supply should turn off after windows shut down.

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# Chapter 3

## Introducing BIOS

The BIOS is a program located on a Flash Memory on the motherboard. This program is a bridge between motherboard and operating system. When you start the computer, the BIOS program will gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization. Only when these tasks are completed done it gives up control of the computer to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

In the BIOS Setup main menu of Figure 3-1, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press <Esc> to quit the BIOS Setup.
- Press ↑↓←→ (up, down, left, right) to choose, in the main menu, the option you want to confirm or to modify.
- Press <F10> when you have completed the setup of BIOS parameters to save these parameters and to exit the BIOS Setup menu.
- Press <+>/<-> keys when you want to modify the BIOS parameters for the active option.

### 3-1 Entering Setup

Power on the computer and by pressing <Del> immediately allows you to enter Setup.

If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the “RESET” button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

**Press <Del> to enter Setup**

### 3-2 Getting Help

#### Main Menu

The on-line description of the highlighted setup function is displayed at the bottom of the screen.

#### Status Page Setup Menu/Option Page Setup Menu

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc>.

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### 3-3 The Main Menu

Once you enter AMI BIOS Setup Utility, the Main Menu (Figure 3-1) will appear on the screen. The Main Menu allows you to select from 12 setup functions and 2 exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.

<b>Standard BIOS Features</b>	<b>Thermal Throttling Function</b>
<b>Advanced BIOS Features</b>	<b>Power User Overclock Settings</b>
<b>Advanced Chipset Features</b>	<b>Password Settings</b>
<b>Integrated Peripherals</b>	<b>Load Optimal Defaults</b>
<b>Power Management Features</b>	<b>Load Stand Defaults</b>
<b>Miscellaneous Control</b>	<b>Save changes and Exit</b>
<b>PC Health Status</b>	<b>Discard changes and Exit</b>
↑↓→←: Move Enter: Select +/-/: Value F10: Save ESC: Exit F1:General Help F5: Previous Values F6: Standard Defaults F7: Optimized Defaults	

Figure 3-1

#### **Standard CMOS Features**

Use this Menu for basic system configurations.

#### **Advanced BIOS Features**

Use this menu to set the Advanced Features available on your system.

#### **Advanced Chipset Features**

Use this menu to change the values in the chipset registers and optimize your system's performance.

#### **Integrated Peripherals**

Use this menu to specify your settings for integrated peripherals.

#### **Power Management Features**

Use this menu to specify your settings for power management.

#### **Miscellaneous Control**

Use this menu to specify your settings for **Miscellaneous Control**.

#### **PC Health Status**

This entry shows your PC health status.

#### **Power User Overclock Settings**

Use this menu to specify your settings (frequency, Voltage) for overclocking demand.

#### **Thermal Throttling Function**

The selection is set for activating the active CPU Thermal Protection by flexible CPU loading adjustment in the range of temperature you define.

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### Load Stand Defaults

This menu uses a minimal performance setting, but the system would run in a stable way.

### Load Optimal Defaults

Use this menu to load the BIOS default values these are setting for optimal performances system operations for performance use.

### Password Settings

This entry for setting Supervisor password and User password

### Save Charges and Exit

Save CMOS value changes to CMOS and exit setup.

### Discard Charges and Exit

Abandon all CMOS value changes and exit setup.

## 3-4 Standard BIOS Features

The items in Standard CMOS Setup Menu are divided into several categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <+> or <-> and numerical keyboard keys to select the value you want in each item.

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
Standard BIOS Features

Language	English	Help Item
System Date	Fri 05/15/2009	Select the Current default language used by the BIOS
System Time	22 : 46 : 33	
Primary IDE Master	Not Detected	
Primary IDE Slave	Not Detected	
Primary SATA Channel 5	Not Detected	
Primary SATA Channel 6	Not Detected	
Primary SATA Channel 1	Not Detected	
Primary SATA Channel 3	Not Detected	
Primary SATA Channel 2	Not Detected	
Primary SATA Channel 4	Not Detected	
FLOPPY A	1.44MB, 3 $\frac{1}{2}$ "	
System Memory		
Size: 448 MB	768MB(DDR3 Memory)	

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

### Language

Use this item to select the current default language used in BIOS. The Optional settings are: Chinese (GB): English.

### System Date

The date format is <day><month><date><year>.

**Day** Day of the week, from Sun to Sat, determined by BIOS. Read-only.

**Month** The month from Jan. through Dec.

**Date** The date from 1 to 31 can be keyed by numeric function keys.  
**Year** The year depends on the year of the BIOS.

**System Time**

The time format is <hour><minute><second>.

**Primary IDE Master / Slave**

**SATA Channel 1, 2, 3, 4, 5, 6**

While entering setup, BIOS auto detect the presence of IDE devices. This displays the status of auto detection of IDE devices.

**Type:** The optional settings are: Not Installed; Auto; CD/DVD and ARMD

**LBA/Large Mode:** The optional settings are Auto; Disabled.

**Block (Multi-Sector Transfer):** The optional settings are: Disabled and Auto.

**PIO Mode: the optional settings are:** Auto, 0, 1, 2, 3 and 4.

**DMA MODE:** the optional settings are Auto, SWDMAn, MWDMAAn , UDMAAn.

**S.M.A.R.T.:** This option allows you to enable the HDD S.M.A.R.T Capability (Self-Monitoring, Analysis and Reporting Technology). The optional settings are Auto; Disabled; and ENABLED.

**32 Bit Data Transfer:** the optional settings are: Disabled and Enabled.

**Floppy A**

This item is for specific floppy disk drive settings. Select according to the specification of the floppy disk you use.

**System Memory**

This item will show information about the memory modules(s) installed.

**3-5 Advanced BIOS Feature**

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
 Advanced BIOS Features

Advanced Settings	Help Item
WARNING: Setting wrong values in below sections May cause system to malfunction  CPU Configuration <span style="float: right;">Press Enter</span> Quick Boot <span style="float: right;">Enabled</span> Boot up Num-Lock <span style="float: right;">On</span> ACPI APIC Support <span style="float: right;">Enabled</span> MPS Revision <span style="float: right;">1.1 1.4(DDR3 Memory)</span> Quiet Boot <span style="float: right;">Disabled</span>	Configure CPU
↑↓←→ Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults	

**Quick Boot**

Allow BIOS to skip certain tests while booting. This will decrease the needed to boot the system.

**1<sup>st</sup> Boot Device**

Specify the boot sequence from the available devices. A device enclosed in parenthesis has been disabled in corresponding type menu.

---

---

### Boot Up NumLock Status

The default value is On.

**On** (default) Keypad is numeric keys.

**Off** Keypad is arrow keys.

### ACPI APIC Support

Include ACPI APIC table pointer to RSDT pointer list.

### MPS Revision

This option is only valid for multiprocessor motherboards as it specifies the version of the Multiprocessor Specification (MPS) that the motherboard will use.

### Quiet Boot

The optional settings are Enabled and Disable.

Disabled: Display normal POST message.

Enabled: Displays OME logo instead of POST message.

## 3-6 Advanced Chipset Features

The Advanced Chipset Features Setup option is used to change the values of the chipset registers. These registers control most of the system options in the computer.

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
Advanced Chipset Features

Memory Configuration	Press Enter	Help Item
Internal Graphics Configurations	Press Enter	
PCI Express Configuration	Press Enter	Dynamic clock Gating ok IOC/NT/MCU/CFG
HDMI Audio	Enabled	
NB Power Management Feature	Auto	
Primary Video Controller	PCI-GFX0-GPP-IGFX	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### NB Power Management Features

Dynamic clock rating for IOC/NT/MCU/CFG items.

### HDMI Audio

Use this item to select HDMI audio, the optional setting are: Enabled, Disabled.

### Primary Video Controller

This item is for user to choose primary video controller.

## 3-6-1 Memory Configuration

### DDRII Memory configuration

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
Memory Configuration

DRAM Timing Mode	Auto	Help Item
Memory CLK:	400MHz	
CAS Latency (Tcl):	5.0	Options
RAS/CAS Delay(Trcd):	5CLK	Auto
Row Precharge Time(Trp):	5 clk	DCT0
Min Active RAS(Tras):	18CLK	
Row Cycle(Trc)	23 CLK	
Write Recover Time(Twr)	6 CLK	
Bank Interleaving	Auto	
Enabled clock to AL1 DIMMs	Disabled	
Mem CLK Tristate C3/ATL VID	Disabled	
Memory Hole Remapping	Enabled	
DCI Unganged Mode	Always	
Power Down Enabled	Enabled	
Power Down Mode	Channel	
↑↓← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### DDRIII Memory configuration

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
Memory Configuration

DRAM Timing Mode	Auto	Help Item
Memory CLK	N/A 400MHz	
CAS Latency (Tcl)	N/A 6CLK	Options
RAS/CAS Delay (Trcd)	N/A 6CLK	Auto
Row Precharge Time (Trp)	N/A 6CLK	DCT0
Min Active RAS (Tras)	N/A 15CLK	
RAS/RAS Delay (Trrd)	M/A 4CLK	
Row Cycle (Trc)	N/A 21 CLK	
Write Recovery Time (Twr)	M/A 6CLK	
Bank Interleaving	Auto	
Enabled clock to AL1 DIMMs	Disabled	
Mem CLK Tristate C3/ATL VID	Disabled	
Memory Hole Remapping	Enabled	
DCI Unganged Mode	Always	
Power Down Enabled	Enabled	
Power Down Mode	Channel	
↑↓← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

---

---

### Bank Interleaving

Use this item to enable bank memory interleaving.

### Enable Clock to ALL DIMMs

Enable unused clocks to DIMMS when memory slots are not populated.

### Mem CLK Tristate during C3 and Alt VID.

Enable and disable Mem CLK Tri-stating during C3 and Alt VID

### Memory Hole Remapping

Enable Memory Remapping around Memory Hole.

### DCT Unganged Mode

This allows selection of unganged DRAM MODE (64- bit width).

Auto=Ganged Mode; Always= Unganged Mode.

### Power Down Enable

Enable or Disable power down mode.

### Power Down Mode

Set the DDR power down mode. The optional settings are Channel; Chipset.

## 3-6-2 Internal Graphics Configurations

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.

### Internal Graphics Configurations

Internal Graphics Mode	UMA+SIDEPORT	Help Item
UMA Frame Buffer Size	Auto	Options
Sideport clock speed	667 MHz	Disabled
GFX Engine Clock Override	Enabled	UMA
GFX Engine clock	700	SIDEPORT
UMA-SP Interleave Mode	Auto	UMA+SIDEPORT
SP Power Management	Auto	
SP Memory Termination	Enabled	
SP cmd Hold	Enabled	
SP DATA Hold	Enabled	
Surround View	Disabled	
FB Location	Above 4G	

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

### UMA Frame Buffer Size

The optional settings are: Auto; 32MB; 64 MB; 128 MB; 256 MB and 512 MB.

### Surround View

The item is for Hyprid CrossFire function. The optional settings are: Enabled; Disabled.



## 3-7-1 Onboard SATA Device

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
Onboard SATA Device

Onchip SATA Channel	Enter	Help Item	
Onchip SATA Type	Native IDE		
Option ROM POST Delay	Disabled	Select the time out value for detecting ATA/ATAPI device(s)	
SATA IDECombined Mode	Enabled		
PATA Channel Config	SATA as Secondary		
Onboard PCI IDE Controller	Both		
Hard Disk Write Protest	Disabled		
IDE Detect Time Out(Sec)	35		
ATA (PI) 80 pin Cable Detect	Host & Device		
↑↓← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults			

### OnChip SATA Channel

Press Enter to enable or disable OnChip SATA Channel.

### On Chip SATA Type

Press Enter to select the SATA type. The optional settings are: Native IDE; RAID; AHCI; Legacy IDE.

### Onboard PCI IDE Controller

The optional settings are Disabled; Primary; Secondary and Both.

## 3-7-2 OnChip Device Control

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
OnChip Device Control

Onboard PCIE LAN	Enabled	Help Item
Onboard Lan BootRom	Disabled	
HD Audio Azalia Device	Enable	Options
Azalia Front Panel	Auto	Disabled
USB configuration	Press Enter	Enabled
↑↓← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### Onboard PCI E Lan

Use this item to enable or disable Onboard PCI E Lan

### HD Audio Azalia Device

This item allows you to decide to enable/disable the chipset family to support HD Audio. The optional settings are: Auto; Enabled and Disabled.

### USB Configuration

Press Enter to set values for sub-items as: Legacy USB Support, USB 2.0 Controller Mode BIOS EHCI Hand-OFF.

### 3-7-3 Super IO Configuration

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
Super IO Configuration

Configure F71863 Super IO Chipset	Help Item
Serial port 1 Address      3F8/IRQ4	Allows BIOS to Enable or Disable Floppy Controller
Serial Port 2 Address      2F8/IRQ3	
IRDA Mode Select            IRDA (1.6bus)	
IR Duplex Mode              Half Duplex	
IR TX Pin Select             Normal	
IR RX Pin Select             Normal	
IR TX to RX Delay Select    No Delay	
IR RX to TX Delay Select    No Delay	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults	

#### IR Duplex Mode

Allows BIOS to select full or half duplex for serial port 2.

#### IR TX Pin Select

Allows BIOS to select Transmit pin is in normal condition or inverse the IRTX.

#### IR TX to RX Delay Select

Allows BIOS to select IR FROM tx to RX 4 CHARACTERS Time Delay for serial port.

### 3-8 Power Management Setup

The Power Management Setup allows you to configure your system to most effectively save energy saving while operating in a manner consistent with your own style of computer use.

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
Power Management Setup

Power Management Feature	Help Item	
Power management/APM      Enabled	Disable/Enable RTC to generate a wake event	
Suspend Time Out            Disabled		
Power Button Mode            On/Off		
Video Power Down Mode      Suspend		
Hard Disk Power Down MODE   Suspend		
Hard Disk Time Out (Minute)   Disabled		
Power on by PCI Card        Disabled		
Wake-up by PCIE             Disabled		
Power on by Keyboard        Disabled		
Power on by Mouse            Disabled		
Restore on AC Power Loss     Disabled		
RTC Resume                    Disabled		
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

#### Power Management/APM

Use this item to enable or disable SMI based power management and APM support.

#### Suspend Time Out

If it is set Enabled and no activity during this time period, the BIOS will place the system into suspend low power state. The optional settings are: Enable; 1~64 minutes.

#### Power Button Mode

The optional settings are: On/Off; Suspend.

#### Video Power Down Mode

The optional settings are: Disabled; Standby and Suspend.

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### Restore on AC Power Loss

The optional settings are: Disabled; Power on; Power Off and last state.

## 3-9 Miscellaneous Control

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.

### Miscellaneous Control

Advanced PCI/PnP Setting	Help Item
<b>WARNING: Setting wrong values in below sections may cause system to malfunction</b>	<b>Options</b>
Clear NVRAM <span style="float:right">No</span>	Clear NVRAM during System Boot
Plug &Play O/S <span style="float:right">No</span>	
PCI LATENCY Timer <span style="float:right">64</span>	
Allocate IRQ to PCI VGA <span style="float:right">Yes</span>	
Palette Snooping <span style="float:right">Disabled</span>	
PCI IDE Bus Master <span style="float:right">Disabled</span>	
Off Board PCI/ISA IDE Card <span style="float:right">Auto</span>	
IRQ Resources <span style="float:right">Press Enter</span>	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults	

#### Plug &Play O/S

The optional settings are: No; Yes

No: Let the BIOS configure all the devices in the system.

Yes: Let the operating system configure Plug and Play devices, not required for boot if your system has a Plug and Play system.

#### Allocate IRQ for PCI VGA

The optional settings are: No; Yes.

Yes: Assigns IRQ to PCI VGA card if card requests IRQ.

No: Does not assign IRQ to PCI VGA card even card requests an IRQ.

#### Palette Snooping

The optional settings are: Enabled; Disabled.

Enable: inform the PCI device that an ISA graphics devices is installed in the system so the card will function correctly.

#### PCI IDE Bus Master

The optional settings are: Enabled; Disabled.

Enable: BIOS uses PCI bus mastering for reading/writing to IDE devices.

#### Off board PCI/ISA IDE Card

Some PCI IDE cards may require this to be set to the PCI slot number that is holding the card.

## 3-10 PC Health Status

This section shows the Status of you CPU, Fan, and Warning for overall system status. This is only available if there is Hardware Monitor onboard.

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
PC Health Status

PC Health Status	Help Item
Smart FAN Configuration H/W Health Function	Press Enter Enabled
CPU Temperature:	49°C/120°F
System Temperature:	34°C/93°F
CPUFAN Speed:	2057RPM
SYSFAN1 Speed:	N/A
SYSFAN Speed:	N/A
NB1.2V :	1.152V, 1.152V(DDR3 Memory)
VDIMM :	1.956V, 1.620V(DDR3 Memory)
VCORE:	1.320V, 1.320V(DDR3 Memory)
NBPCIE:	1.136V, 1.136v(DDR3 Memory)
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults	

### H/W Health Function,

it displays information list below when set as below. The choice is either Enabled or Disabled.

### CPU Temperature/ System Temperature/CPUFAN/SYSFAN1 Speed/SYSFAN2 Speed /NB1.2V/VDIMM/VCORE/NBPCIE

This will show the CPU/ /System voltage chart and FAN Speed, etc.

## 3-10-1 Smart FAN Configuration

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
Smart FAN Configuration

Smart FAN Configuration	Help Item
FAN1 Mode Setting Temperature Limit of High	Auto Fan by RPM 050
Fan Configuration Mode Setting	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults	

### Smart FAN Configurations FAN1 Mode Setting

The optional settings are: Auto Fan by RPM

## 3-11 Thermal Throttling Options

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
Thermal Throttling Options

CPU Thermal-Throttling	Enabled	Help Item
CPU Throttling Temp	70°C	
CPU Throttling Duty	50%	Options Disabled Enabled
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### CPU Thermal Throttling

Use this item to enable or disable CPU thermal Throttling. The optional settings are: Enable; Disabled. When set as Enabled, the two following items will show.

### CPU Thermal Throttling Temp

Use this item to set CPU thermal Throttling temperature. The selectable arrange is from 40 to 100 °C.

### CPU Thermal Throttling Duty

Use this item to set CPU Thermal Throttling Duty. The selectable range is from: 12.5% to 87.5%.

## 3-12 Power User Overclock Setting

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.  
Power User Overclock Setting

AMD Overclocking Configuration		Help Item
CPU/HT Reference Clock(MHz)	200	Menu Level >
PCI E Reference Clock (MHz)	100	
SB Reference Clock(MHz)	100	
Spread Spectrum	Disabled	
Processor Frequency Multipli	Auto	
Processor Voltage	Auto	
Over Voltage Configuration		
AOD Compatibility	Disabled	
CPU Vcore 7-Shift	Default	
Set Memory Voltage	1.90 V 1.60V (DDR3 Memory)	
NB-Core Voltage Setting	1.30V	
NB -PCIE Voltage Setting	1.15V	
NODEQ PCI-X2 HT Link		
Link Speed	Auto	
Link Width	Auto	
DRAM Command Rate	2T	
Memory Clock Mode	Auto	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### CPU/HT Reference Clock

Use this item to set CPU/HT Reference Clock. The optional setting range is: 190~400 MHz.

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### PCI E Reference Clock

The optional setting range is: 90~250 MHz.

### SB Reference Clock

The optional setting range is: 90~150 MHz.

### Spread Spectrum

The optional settings are: Disabled; SRC CLK; CPUHT CLK and All CLK.

### Processor Voltage

The optional settings are: Auto; 0.800V~1.350V.

### AOD Compatibility

Choose Enabled means only AMD over drive can adjust voltage

Choose Disabled means only BIOS can adjust voltage

### CPU Vcore 7-Shift

Use this item to set value in CPU Vcore 7-Shift function. The optional settings are: Defaults and a range from 5% to 35%.

### Set Memory Voltage

Use this item to set memory voltage. The optional setting rang is from 1.85V to 2.20V.

### NB-Core Voltage Setting

The optional settings are from 1.20v to 1.30v.

### NB-PCIE Voltage Setting

The optional settings are from 1.10v to 1.25v.

### Memory Clock Mode

The optional settings are: Auto; Limit and Manual.

## 3-13 Password Settings

CMOS Setup Utility-Copyright(C)1985-2005 American Megatrends. Inc.

### Password Setting

Security Settings	Help Item
Supervisor Password: Not Installed	Install or change the password
User Password: Not Installed	
Change Supervisor Password Press Enter	
Change User Password Press Enter	
Boot Sector Virus Protection Disabled	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Fail-safe Defaults F7:Optimized Defaults	

You can set either supervisor or user password, or both of them. The differences are:

**Supervisor password:** Can enter and change the options of the setup menus.

**User password:** Can only enter but do not have the right to change the options of the setup menus. When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

### ENTER PASSWORD:

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm that the password will be disabled. Once the password is

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disabled, the system will boot and you can enter Setup freely.

### **PASSWORD DISABLED.**

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to “System”, the password will be required both at boot and at entry to Setup. If set to “Setup”, prompting only occurs when trying to enter Setup.

## **3-14 Load Optimized Defaults/ Load Fail-Safe Defaults**

### **Load Optimal Defaults**

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

```
Load Optimal Defaults?  
【OK】    【Cancel】
```

Pressing <OK> loads the default values that are factory settings for optimal performance system operations.

### **Load stand Defaults**

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

```
Load Stand Defaults?  
【OK】    【Cancel】
```

Pressing <OK> loads the default values that are factory settings for stable performance system operations.

## **3-15 Save Changes and Exit / Discard and Exit**

### **Save Changes and Exit**

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

```
Save Configuration Changes and Exit Setup?  
【OK】    【Cancel】
```

Pressing <OK> save the values you made previously and exit BIOS setup.

### **Load Fail-Safe Defaults**

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

```
Discard Changes and Exit Setup?  
【OK】    【Cancel】
```

Pressing <OK> to leave BIOS setting without saving previously set values.

<p><b>Notice!</b> The BIOS options in this manual are for reference only. Different configurations may lead to difference in BIOS screen and BIOS screens in manuals are usually the first BIOS version when the board is released and may be different from your purchased motherboard. Users are welcome to download the latest BIOS version form our official website.</p>
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## Chapter 4

### Driver & Free Program Installation

Check your package and there is A MAGIC INSTALL CD included. This CD consists of all DRIVERS you need and some free application programs and utility programs. In addition, this CD also include an auto detect software which can tell you which hardware is installed, and which DRIVERS needed so that your system can function properly. We call this auto detect software MAGIC INSTALL.

#### Magic Install supports Windows XP(SP3)/Vista/7

Insert CD into your CD-ROM drive and the MAGIC INSTALL Menu should appear as below. If the menu does not appear, double-click MY COMPUTER / double-click CD-ROM drive or click START / click RUN / type X:\SETUP.EXE (assuming X is your CD-ROM drive).



From MAGIC INSTALL MENU you may take 11 selections:

1. ATI                   install ATI   integrated driver
2. SOUND               install ALC 883HD Audio driver
3. LAN                   install LAN
4. RAIDDISK           install RAID SATA Driver and Utility
5. NORTON              install NORTON anti-virus program
6. PC-HEALTH          install My Guard PC-Health utility
7. FUSION              install FUSION
8. HDMI                install HDMI
9. OVER CLOCK        install over clock
10. BROWSE CD        to browse the contents of the CD
11. EXIT               to exit from MAGIC INSTALL menu

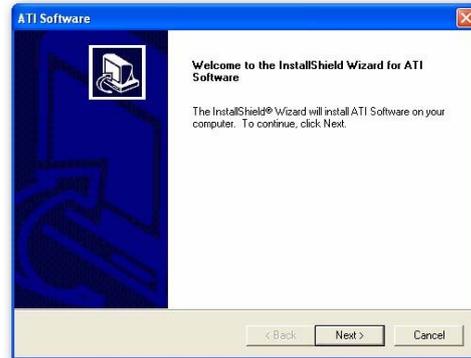
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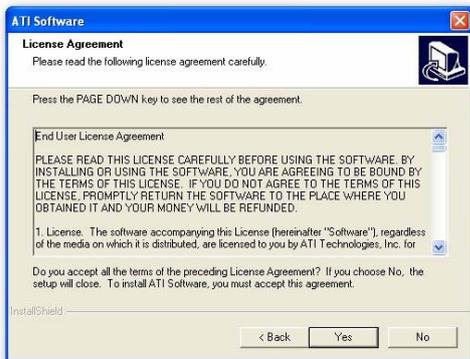
## 4-1 ATI Install ATI Driver Pack



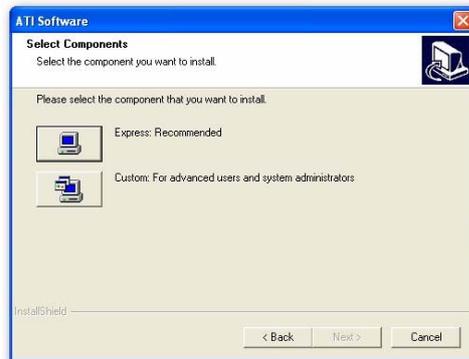
1. Click ATI when the MAGIC INSTALL MENU appears.



2. Click NEXT when ATI software driver pack appears.



3. Click "Yes" to accept the license agreement and start installation..



4. Click Express, recommended.



5. Click Continue Anyway.

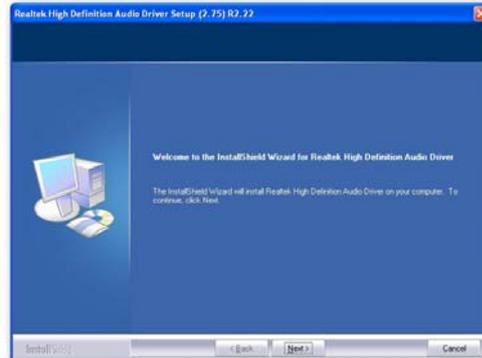


6. Finish the installing.

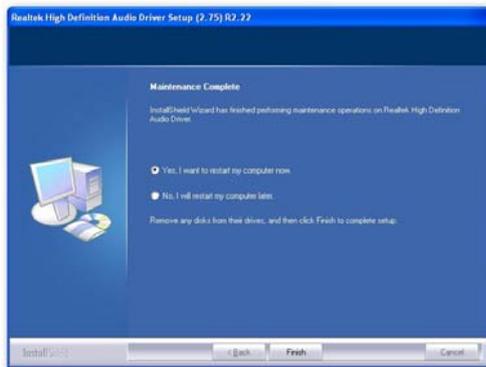
## 4-2 SOUND Install ALC883 HD Audio Codec Driver



1. Click SOUND when MAGIC INSTALL MENU appears



2. Click NEXT When Realtek High Definition Audio driver windows appear



3. Click FINISH and restart your computer



4. Manual Sound Effect Setting



5. Devices and mixer setting



6. Audio input and output setting.



7. Microphone effect setting.



8. 3D demo setting.

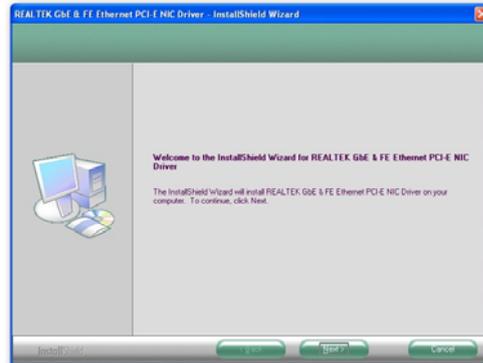
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NOTE: Please upgrade your Windows XP to Service Pack 3 before you install the HD Audio CODEC driver.

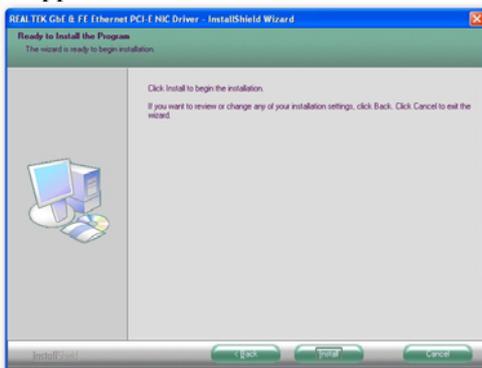
## 4-3 LAN Install LAN



1 Click LAN when MAGIC INSTALL MENU appears



2. Click Next .



3 Click Install



2. Finish.

## 4-4 RAID Install ATI SATA Driver and Utility



1 Click RAIDDisk when MAGIC INSTALL MENU appears



2. Install RAID Disk.

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## 4-5 Norton Install Norton 2009 Anti-virus program



1 Click NORTON when MAGIC INSTALL MENU appears

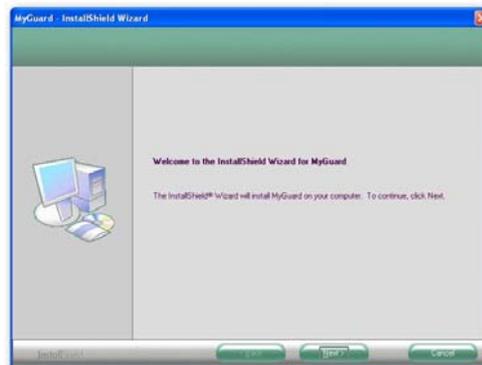


2. Please select Agree&install.

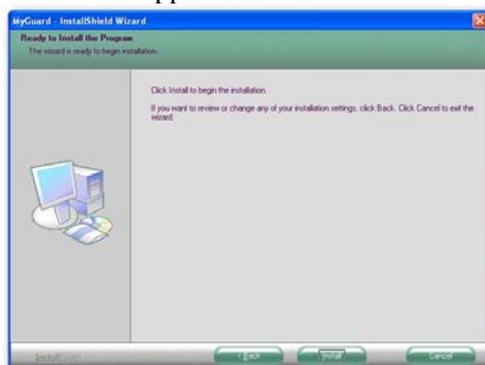
## 4-6 PC-Health Install MyGuard Hardware Monitor Utility



1. Click PC-HEALTH when MAGIC INSTALL MENU appears



2. Click Next on Install shield wizard Window appears



3. Click Install to begin the installation.



4. Click Finish to complete the installation.

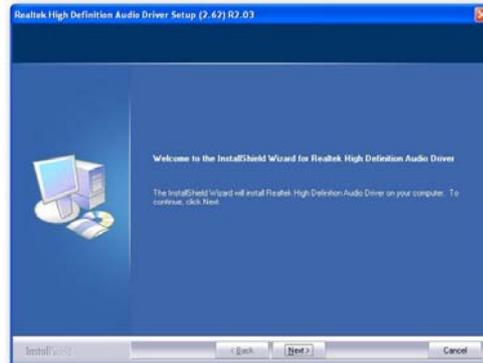
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## 4-7 HDMI Install HDMI Utility



1. Click HDMI when MAGIC INSTALL MENU appears



2. Click Next



1. Choose no, then click finish.

## 4-8 OVER CLOCK Install OVERCLOCK Drive Utility



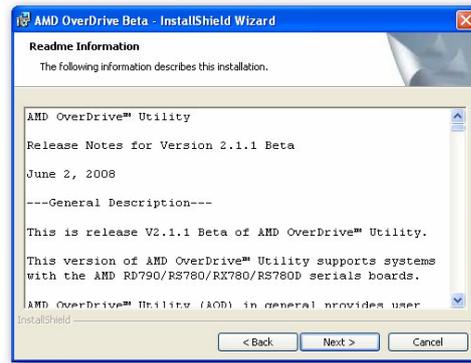
1. Click OVER CLOCK when MAGIC INSTALL MENU appears



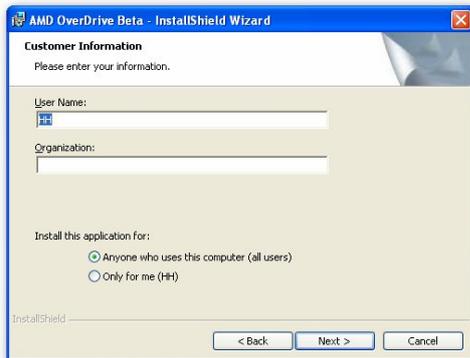
2. Click Next



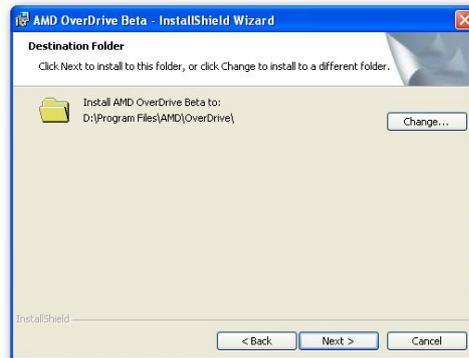
3. Choose “I accept the terms in the license agreement”.



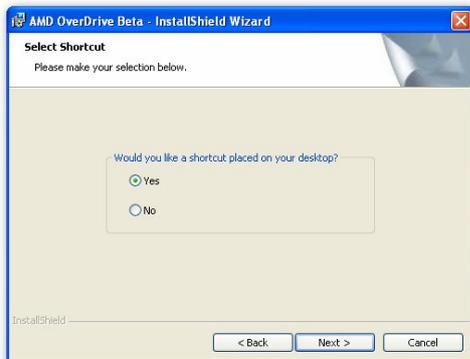
4. The information describe the installation, Click Next



5. Choose “Anyone who use this computer” Click Next.



6. Choose Yes and Next.



7. Ready to install the program, click Install.



8. Finish the installation.

## 4-9 How to Update BIOS

- Step 1** Prepare a bootable floppy disk. (You may make one by click START click RUN type SYS A: click OK)
- Step 2** Download upgrade tools and the latest BIOS files of the motherboard from official website and then make a copy of it to your bootable floppy disk after decompressing these files
- Step 3** Insert the disk into A: ,start your computer and then type in “A:\xxxxxxx.BAT”(xxxxxxx being the file name of the latest BIOS )
- Step 4** Type Enter to update and flash the BIOS. The system will restart automatically

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when BIOS is upgraded.

## 4-10 AMD Platform RAID Function Installation

Please set these choice in the BIOS as RAID : BIOS setup \Integrated Peripherals \Onchip SATA Device \ Onchip SATA Type. When the below figures appeared, please press [Ctrl-F] into figure 2



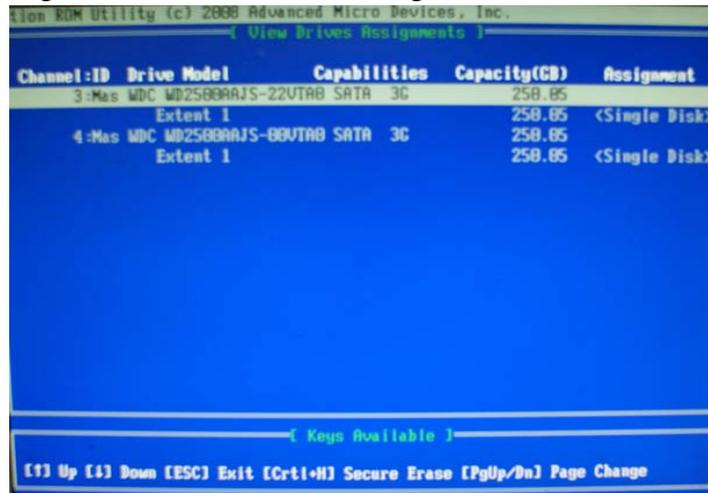
[figure1]

Function: press[1] key, showing the RAID; press [2] key , building RAID; press [3] key, delete the RAID; press[4] key, showing the information of controller.



[figure2]

press [1] key , showing the RAID , as the below figure

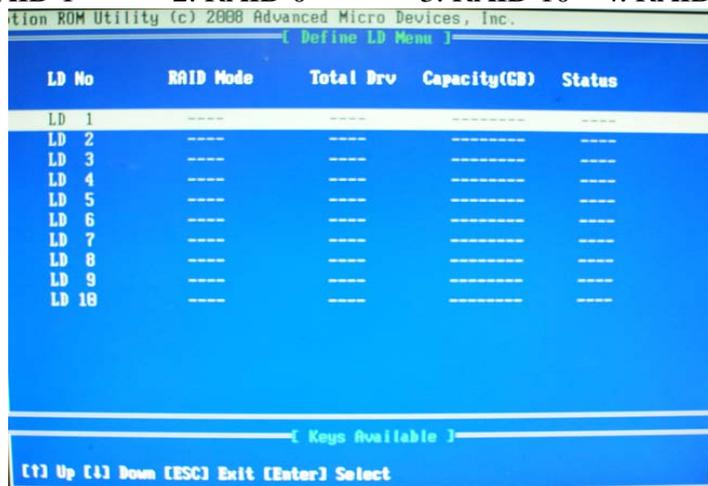


[figure3]

Press [2] key, the interface of RAID, as figure 4.

RAID function:

1. RAID 1
2. RAID 0
3. RAID 10
4. RAID 5
5. JBOD

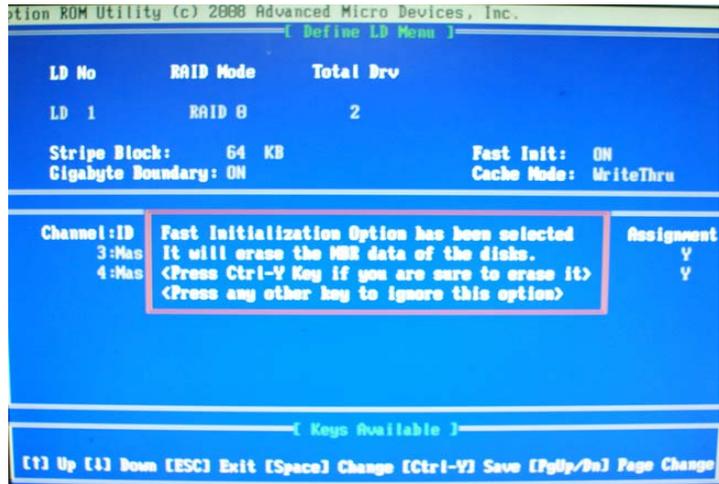


[figure4]

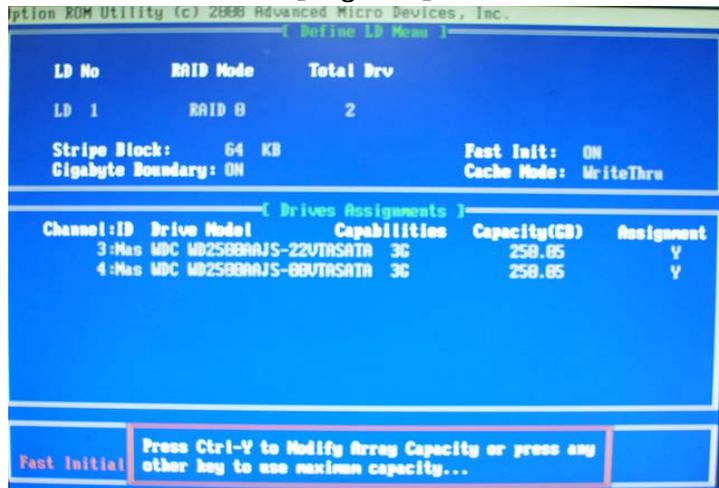
Choose LD 1 then press Enter.

Take Raid0 for example, use [ ↑ ] [ ↓ ] to shift the cursor, press space key to change the choice, press [Ctrl-Y] to keep.

Set Assignment mode as [Y], press [Ctrl-Y] to keep , then figure 5 appeared, erase the MBR. choose [Ctrl-Y],figure 6 appeared. Press any key, finished the RAID.

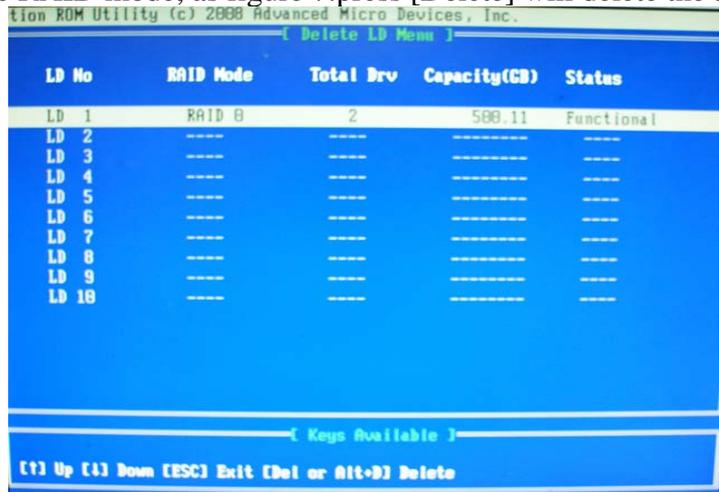


[figure5]



[figure6]

Press [3], delete the RAID mode, as figure 7. press [Delete] will delete the array. As figure 7 .



[figure7]

Press [4], showing the information of controller, as figure 8.



[figure8]

### **Making RAID driver diskette before Install WindowsXP/2000**

Before you install the Windows XP or Windows 2000, you will need to make a RAID driver diskette before you start to install the Operating System.

#### **How to make a RAID driver diskette?**

- 1: Insert the diskette which is being formatted in floppy drive on a system which can start OS.
- 2: After booting OS insert the bundle CD in your CD-ROM
- 3: Copy all the files from \NF-orce4\RAIDDisk to floppy diskette

Once you have the SATA driver diskette ready, you may start to install Windows XP or Windows 2000 on your System.

#### **Installation of Windows XP/ VISTA/7**

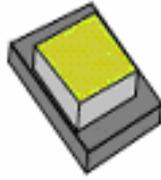
For installation of Windows OS, please insert OS CD into the CD-ROM drive. Then remove the floppy diskette, and boot the system. At the very beginning, you will see the message at the bottom of screen, "Press F6 if you need to install a third party SCSI or RAID driver...."

At this moment, please press <F6> key and follow the instructions of Windows OS for the proper installation.

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## 4-11 G.P.I. Function LED Display:



**PP\_LED 4**

Lights off. It means the motherboard in the G.P.I. mode. CPU works with the low power consumption.



**PP\_LED 4**

Lights on. It means that the CPU works with high power consumption.

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## APPENDIX

### Subject 1: Regarding the Application of 3-Phase or 3+1 Phase Power Supply Mold



As a result of the increasing power consumption demand from many AMD CPUs in current market, we suggest not to use a CPU that demands more than 65W power consumption at work for an AMD CPU compliant board that comes with power supply design as 3 phase or 3+1 phase mold and MOSFET design as working in High SideX1 and Low SideX1 mold so as to avoid MOSFET getting burned or other phenomena like a halted system or system instability. So please take notice of the CPU you are using and make sure that it is one that demand not more than 65 W to ensure long-term working order.

#### Note:

1. The relation between CPU Power Consumption Amount and Power Phase: depending on difference in voltage rating, one-phase of power can provide 25~30W to the motherboard.
2. 3- Phase Power Supply Mold: motherboard with 3 inductances for CPU power supply, and each inductance carries with it 2 MOSFET (6 MOSFETs in total) (Figure1)  
3+1-Phase Power Supply Mold: motherboard with 4 inductances for CPU power supply, and each inductance carries with it 2 MOSFET (8 MOSFETs in total) (Figure2)

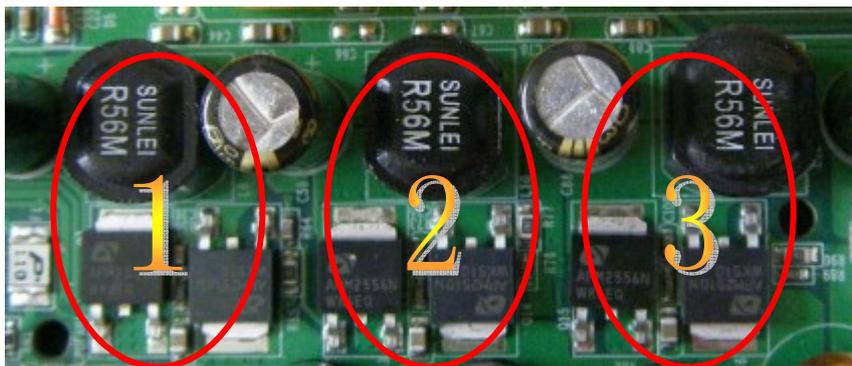


Figure 1

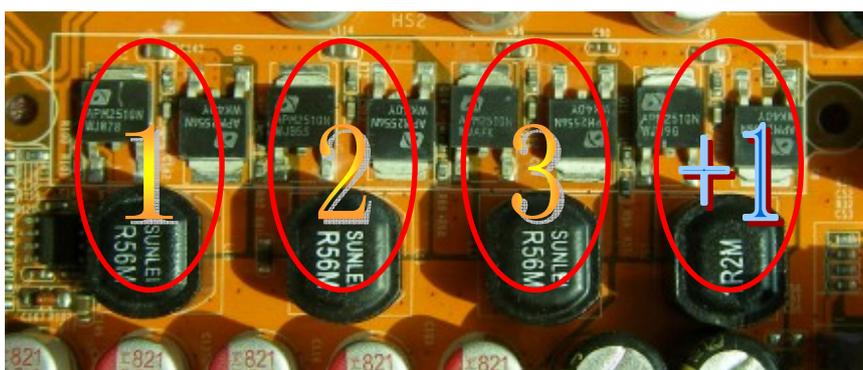


Figure 2

#### Solution:

We recommend users choose motherboards with power design of 4-phase, 4+1 phase or more for CPUs that demand 89W or 95W power consumption.

We recommend users choose motherboards with power design of 5-phase, 5+1 phase or more for CPUs that demand 125W or 140W power consumption.

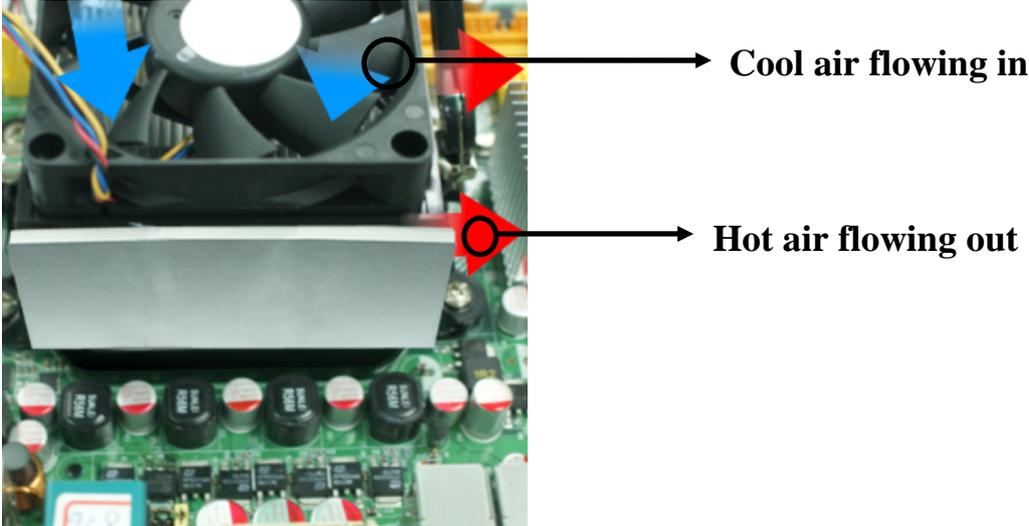
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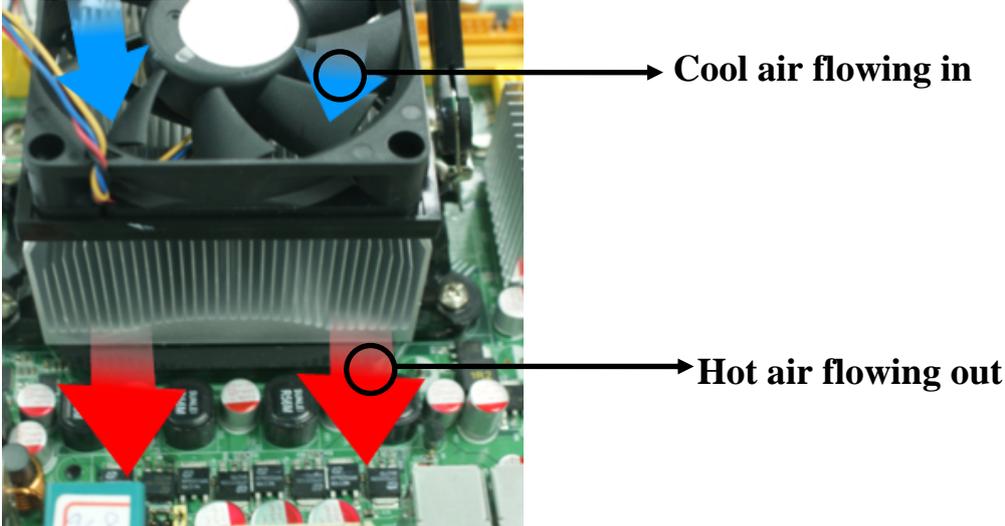
## Subject 2: Suggestion on choosing electric fan



Both the amount of electric current to MOSFET and the heat produced from the motherboard go up as AMD's CPU power consumption increases. In this case we recommend users select a CPU fan with air outlet towards MOSFET so that CPU fan can carry away heat produced by MOSFET, for better heat dissipation effects. At the same time we suggest using well-ventilated cases to maintain temperature as 38°C approximately inside.( 38°C is recommended by CPU manufactures)



**Figure 1----** CPU Fan can not blow off the heat produced by MOSFET. We suggest not to using fans of this kind



**Figure 2----** CPU Fan can blow off the heat produced by MOSFET. We suggest using fans of this kind