

**M4N78 PRO**

**Motherboard**

**ASUS®**

E4387

First Edition V1

January 2009

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# Contents

Contents .....	iii
Notices .....	v
Safety information .....	vi
About this guide .....	vi
M4N78 PRO specifications summary .....	viii

## Chapter 1 Product introduction

1.1	Welcome! .....	1-1
1.2	Package contents .....	1-1
1.3	Special features .....	1-1
1.4	Before you proceed .....	1-3
1.5	Motherboard overview .....	1-4
1.5.1	Placement direction .....	1-4
1.5.2	Screw holes .....	1-4
1.5.3	Motherboard layout .....	1-5
1.5.4	Layout contents .....	1-5
1.6	Central Processing Unit (CPU) .....	1-6
1.6.1	Installing the CPU .....	1-6
1.6.2	Installing the heatsink and fan .....	1-7
1.7	System memory .....	1-9
1.7.1	Overview .....	1-9
1.7.2	Memory configurations .....	1-9
1.7.3	Installing a DIMM .....	1-13
1.7.4	Removing a DIMM .....	1-13
1.8	Expansion slots .....	1-14
1.9	Jumpers .....	1-15
1.10	Connectors .....	1-16
1.10.1	Rear panel connectors .....	1-16
1.10.2	Internal connectors .....	1-18
1.11	Software support .....	1-26
1.11.1	Installing an operating system .....	1-26
1.11.2	Support DVD information .....	1-26

## Chapter 2 BIOS setup

2.1	Managing and updating your BIOS .....	2-1
2.2	BIOS setup program .....	2-6

# Contents

<b>2.3</b>	<b>Main menu .....</b>	<b>2-9</b>
<b>2.4</b>	<b>Ai Tweaker menu .....</b>	<b>2-12</b>
2.4.1	AI Overclocking [Auto] .....	2-12
2.4.2	DRAM Frequency Control [Auto] .....	2-13
2.4.3	HT Link Speed [Auto].....	2-13
2.4.4	CPU Voltage [Auto].....	2-16
2.4.5	CPU/NB Voltage [Auto].....	2-16
2.4.6	CPU VDDA Voltage [Auto].....	2-16
2.4.7	DRAM Voltage [Auto].....	2-17
2.4.8	HT Voltage [Auto].....	2-17
2.4.9	NB Voltage [Auto].....	2-17
2.4.10	CPU/LDT Spread Spectrum [Disabled].....	2-17
2.4.11	PCIe Spread Spectrum [Disabled].....	2-17
2.4.12	SATA Spread Spectrum [Disabled] .....	2-17
2.4.13	PCI Spread Spectrum [Disabled] .....	2-17
<b>2.5</b>	<b>Advanced menu .....</b>	<b>2-18</b>
2.5.1	CPU Configuration .....	2-18
2.5.2	Chipset.....	2-19
2.5.3	Onboard Devices Configuration.....	2-20
2.5.4	PCIe PnP .....	2-21
2.5.5	USB Configuration .....	2-21
<b>2.6</b>	<b>Power menu.....</b>	<b>2-22</b>
<b>2.7</b>	<b>Boot menu .....</b>	<b>2-24</b>
<b>2.8</b>	<b>Tools menu .....</b>	<b>2-26</b>
2.8.1	ASUS EZ Flash 2.....	2-26
2.8.2	Express Gate [Enabled].....	2-26
2.8.3	ASUS O.C. Profile.....	2-27
2.8.4	AI NET 2.....	2-27
<b>2.9</b>	<b>Exit menu.....</b>	<b>2-28</b>

# Notices

## Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



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The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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## Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.



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**DO NOT** throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

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**DO NOT** throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

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# Safety information

## Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Ensure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

## Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, ensure that all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

## About this guide

This user guide contains the information you need when installing and configuring the motherboard.

### How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**

This chapter describes the features of the motherboard and the new technology it supports.

- **Chapter 2: BIOS setup**

This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

## Conventions used in this guide

To ensure that you perform certain tasks properly, take note of the following symbols used throughout this manual.



**DANGER/WARNING:** Information to prevent injury to yourself when trying to complete a task.



**CAUTION:** Information to prevent damage to the components when trying to complete a task.



**IMPORTANT:** Instructions that you **MUST** follow to complete a task.



**NOTE:** Tips and additional information to help you complete a task.

## Where to find more information

Refer to the following sources for additional information and for product and software updates.

### 1. ASUS websites

The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.

### 2. Optional documentation

Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

## Typography

### **Bold text**

Indicates a menu or an item to select.

*Italics*

Used to emphasize a word or a phrase.

<Key>

Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.

Example: <Enter> means that you must press the Enter or Return key.

<Key1>+<Key2>+<Key3>

If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).

Example: <Ctrl>+<Alt>+<D>

**Command**

Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.

Example: At the DOS prompt, type the command line:

**a.fudos /iM4N78PRO.ROM**

## M4N78 PRO specifications summary

<b>CPU</b>	<p>AMD® Phenom™ X4 / Phenom™ X3 / Athlon™ X2 / Athlon™ / Sempron™ processors (socket AM2+/AM2)</p> <p>Compatible with AMD® Phenom™ II / Athlon™ X4 / Athlon™ X3 / Athlon™ X2 (AM3 CPU)</p> <p>AMD® 45nm CPU support</p> <p>AMD Cool'n'Quiet™ Technology</p>
<b>Chipset</b>	NVIDIA GeForce® 8300
<b>System bus</b>	<p>Up to 5200 MT/s; HyperTransport™ 3.0 interface for AM3 / AM2+ CPU</p> <p>2000 / 1600 MT/s for AM2 CPU</p>
<b>Memory</b>	<p>Dual-channel memory architecture</p> <ul style="list-style-type: none"> <li>- 4 x 240-pin DIMM sockets support unbuffered ECC / non-ECC DDR2 1066* / 800 / 667 MHz memory modules</li> <li>- Supports up to 16 GB system memory</li> </ul> <p>*Due to AMD CPU limitation, DDR2 1066 is supported by AM2+ / AM3 CPUs for one DIMM per channel only. Refer to <a href="http://www.asus.com">www.asus.com</a> or this user manual for the Memory QVL (Qualified Vendors Lists).</p> <p>** Due to OS limitation, when installing total memory of 4GB capacity or more, Windows 32-bit operation system may only recognize less than 3GB. Hence, a total installed memory of less than 3GB is recommended.</p>
<b>VGA</b>	<p>Integrated NVIDIA® GeForce® 8 series GPU</p> <ul style="list-style-type: none"> <li>- Hybrid SLI™ support (for Windows® Vista™ only)</li> <li>- Supports HDMI™ Technology with max. resolution up to 1920 x 1200</li> <li>- Supports DVI with max. resolution up to 1920 x 1200 @ 60Hz</li> <li>- Supports D-Sub with max. resolution up to 1920 x 1440 @ 75 Hz</li> </ul> <p>HDMI / DVI / RGB support</p> <ul style="list-style-type: none"> <li>- Supports Microsoft® DirectX 10, OpenGL 2.0, Pixel Shader 4.0</li> <li>- Supports PCIe 2.0 / 1.0 architecture</li> </ul>
<b>Expansion Slots</b>	<p>1 x PCIe 2.0 x16 slot</p> <p>2 x PCIe x1 slots</p> <p>3 x PCI 2.2 slots</p>
<b>LAN</b>	<p>NVIDIA® Gigabit MAC</p> <p>Gigabit LAN controller featuring AI NET 2</p>
<b>USB</b>	<p>12 x USB 2.0 / 1.1 ports (8 at mid-board; 4 on the rear panel)</p>

*(continued on the next page)*

## M4N78 PRO specifications summary

<b>Storage</b>	<p>NVIDIA GeForce 8300</p> <ul style="list-style-type: none"> <li>- 1 x Ultra DMA 133/100</li> <li>- 6 x SATA 3.0 Gb/s connectors (Legacy IDE operation is only supported on SATA_1/2/3/4 connectors)</li> <li>- NVIDIA® MediaShield™ RAID supports RAID 0, 1, 5, 10 and JBOD</li> </ul>
<b>High Definition Audio</b>	<p>VIA1708S 8-channel High Definition Audio CODEC</p> <ul style="list-style-type: none"> <li>- Supports Jack-Detection, Multi-Streaming and Front Panel Jack-Retasking</li> <li>- Optical S/PDIF Out port at back I/O</li> <li>- ASUS Noise Filtering</li> </ul>
<b>ASUS Unique Features</b>	<p><b>ASUS Power Solution:</b></p> <ul style="list-style-type: none"> <li>- ASUS 4+1 Phase Power Design</li> <li>- ASUS Anti-Surge Protection</li> </ul> <p><b>Express Gate</b></p> <p><b>ASUS Green Design:</b></p> <ul style="list-style-type: none"> <li>- ASUS EPU*</li> <li>- ASUS AI Nap</li> </ul> <p>*ASUS EPU is supported by AM3/AM2+ CPU only.</p> <p><b>ASUS Quiet Thermal Solution:</b></p> <ul style="list-style-type: none"> <li>- ASUS Fanless Design: Stylish heatsink solution</li> <li>- ASUS Q-Fan 2</li> </ul> <p><b>ASUS Crystal Sound:</b></p> <ul style="list-style-type: none"> <li>- ASUS Noise Filtering</li> </ul> <p><b>ASUS EZ DIY</b></p> <ul style="list-style-type: none"> <li>- ASUS Q-Connector</li> <li>- ASUS CrashFree BIOS 2</li> <li>- ASUS O.C. Profile</li> <li>- ASUS EZ Flash 2</li> </ul>
<b>Special Features</b>	<p>Uses 100% All High-quality Conductive Polymer Capacitors! (5000hrs VRM, over 57 years' operation lifespan at 65°C) ASUS MyLogo 2™</p>
<b>ASUS Exclusive Overclocking Features</b>	<p><b>Intelligent overclocking tools:</b></p> <ul style="list-style-type: none"> <li>- AI Overclocking (Intelligent CPU Frequency Tuner)</li> <li>- ASUS TurboV</li> <li>- ASUS Turbo Key</li> </ul> <p><b>Precision Tweaker:</b></p> <ul style="list-style-type: none"> <li>- vCore: Adjustable CPU voltage at 50mv increment</li> <li>- vDIMM: 8-step DRAM voltage control</li> <li>- vChipset: 4-step Chipset voltage control</li> </ul> <p><b>SFS (Stepless Frequency Selection):</b></p> <ul style="list-style-type: none"> <li>- FSB tuning from 200MHz up to 600MHz at 2MHz increment</li> <li>- PCIe frequency tuning from 100MHz to 200MHz at 1MHz increment</li> </ul> <p><b>Overclocking protection:</b></p> <ul style="list-style-type: none"> <li>- ASUS C.P.R. (CPU Parameter Recall)</li> </ul>

*(continued on the next page)*

## M4N78 PRO specifications summary

<b>Rear panel I/O ports</b>	1 x PS/2 keyboard port (purple) 1 x PS/2 mouse port (green) 1 x S/PDIF Out (Optical) 1 x HDMI Out 1 x D-Sub 1 x DVI 1 x LAN (RJ-45) 4 x USB 2.0/1.1 8-channel audio I/O
<b>Internal I/O connectors</b>	4 x USB connectors support additional 8 USB ports 1 x Floppy disk drive connector 1 x COM connector 1 x IDE connector 6 x SATA connectors 1 x CPU Fan connector 1 x Chassis Fan connector 1 x Power Fan connector 1 x Front panel audio connector 1 x S/PDIF Out Header 1 x Chassis Intrusion connector 1 x CD audio in 1 x 24-pin ATX Power connector 1 x 4-pin ATX 12V Power connector 1 x System Panel (Q-Connector)
<b>BIOS features</b>	8 Mb Flash ROM, AMI BIOS, PnP, DMI 2.0, WfM2.0, SM BIOS 2.5, ACPI 2.0, ASUS EZ Flash 2
<b>Support DVD contents</b>	Drivers Express Gate ASUS PC Probe II ASUS Update Anti-Virus Utility (OEM version)
<b>Form factor</b>	ATX form factor: 12 in x 9.6 in (30.5 cm x 24.4 cm)

\*Specifications are subject to change without notice.

# Chapter 1

## Product introduction

### 1.1 Welcome!

Thank you for buying an ASUS® M4N78 PRO motherboard!

The motherboard delivers a host of new features and latest technologies, making it another standout in the long line of ASUS quality motherboards!

Before you start installing the motherboard, and hardware devices on it, check the items in your package with the list below.

### 1.2 Package contents

Check your motherboard package for the following items.

Motherboard	ASUS M4N78 PRO motherboard
Cables	2 x Serial ATA cable 1x Ultra DMA 133/100/66 cable
Accessories	1 x I/O shield 1 x 2 in 1 Q-connector (USB, System Panel; Retail Version only)
Application DVD	ASUS motherboard support DVD
Documentations	User manual



If any of the above items is damaged or missing, contact your retailer.

### 1.3 Special features

#### 1.3.1 Product highlights

##### **AMD® Phenom™ II / Athlon™ X4 / Athlon™ X3 / Athlon™ X2 processors (socket AM3)**

This motherboard supports AMD® AM3 multi-core processors with unique L3 cache and delivers better overclocking capabilities with less power consumption. It features dual-channel DDR2 1066 memory support and accelerates data transfer rate up to 5200MT/s via HyperTransport™ 3.0 based system bus. This motherboard also supports AMD® CPUs in the new 45nm manufacturing process.

##### **AMD® Phenom™ X4 / Phenom™ X3 / Athlon™ X2 / Athlon™ / Sempron™ processors (socket AM2+ / AM2)**

The motherboard supports AMD® Socket AM2+ multi-core processors. It features dual-channel DDR2 1066 memory support, data transfer rate up to 5200MT/s via HyperTransport™ 3.0 based system bus and AMD® Cool 'n' Quiet!™ Technology.

## **NVIDIA® GeForce 8300® chipset**

NVIDIA® GeForce 8300 offers the latest support of Hybrid SLI Technology, DirectX® 10 graphics features, HD video playback with HDMI/DVI output. It also supports HyperTransport™ 3.0 interface, PCI Express™ 2.0 bus architecture, Serial ATA 3 Gb/s devices and is optimized with AMD's latest AM3/AM2+ and multi-core CPUs to provide excellent system performance.

## **Dual channel DDR2 1066 support**

This motherboard supports DDR2 1066, which provides faster data transfer rate and more bandwidth to increase memory data transfer rate and computing efficiency. This enhances system performance in 3D graphics and other memory demanding applications.



Due to AM3/AM2+ CPU limitation, only one DDR2 1066 is supported per channel. When four DDR2 1066 DIMMs are installed, all DIMMs run at 800MHz frequency by default for system stability.

## **NVIDIA® Hybrid SLI™**

Hybrid SLI™ technology is a unique hybrid multi-GPU technology built upon NVIDIA. Hybrid SLI technology today includes two primary features: GeForce® Boost and HybridPower™. GeForce® Boost turbo-charges performance of NVIDIA discrete graphics cards when combined with this series motherboard GPUs. HybridPower™ unleashes graphics performance when needed and enables low-power operation when performance is not needed. You can switch from the discrete GeForce® GPU(s) to the motherboard GPU for a quiet, low power PC experience.



GeForce® Boost and HybridPower™ are independent on selected GeForce® GPUs. Refer to [www.nvidia.com/hybridсли](http://www.nvidia.com/hybridсли) for more information.

## **1.3.2 Innovative ASUS features**

### **ASUS 4+1 Phase Power Design**

Unleashes ultimate memory performances with independent power to core components, while providing fast transient response and stability for the CPU under heavy loading or overclocking modes. ASUS M4N78 PRO also features an extra 1 phase power dedicated to integrated memory/HT controller.

### **ASUS EPU**

The ASUS EPU (Energy Processing Unit) provides total system power management by detecting current PC loadings and intelligently moderating power in real-time. It automatically provides the most appropriate power usage for the CPU, VGA card, hard drives, and CPU/chassis fans- helping save power and money!



ASUS EPU is supported by AM3/AM2+ CPU only.

### **ASUS Anti-Surge**

This special design prevents expensive devices and the motherboard from damage caused by power surges from switching power supply (PSU).

### **AI Nap**

With AI Nap, the system can continue running at minimum power and noise when you are temporarily away. To wake the system and return to the OS environment, simply click the mouse or press a key.

## ASUS EZ O.C.

### ASUS TurboV

Feel the adrenaline rush of real-time O.C.—now a reality with the ASUS TurboV. This easy O.C. tool allows you to overclock without exiting or rebooting the OS, and its user-friendly interface makes overclock with just a few clicks away. Moreover, the ASUS OC Profiles in TurboV provides the best O.C. settings in different scenarios.

### ASUS Turbo Key

ASUS Turbo Key allows the user to turn the PC power button into an overclocking button. After the easy setup, Turbo Key can boost performances without interrupting ongoing work or games—with just one touch!

### Other ASUS Features

#### ASUS Express Gate

Taking only 5 seconds to bootup, Express Gate is the one-stop gateway to instant fun! It's a unique motherboard built-in OS. You can utilize the most popular Instant Messengers (IM) like MSN, Skype, Google talk, QQ, and Yahoo! Messenger to keep in touch with friends, or quickly check on the weather and e-mails just before leaving your house. What's more, the user-friendly picture manager lets you view your pictures without entering Windows at anytime!



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The actual boot time depends on the system configuration.

---

## 1.4 Before you proceed

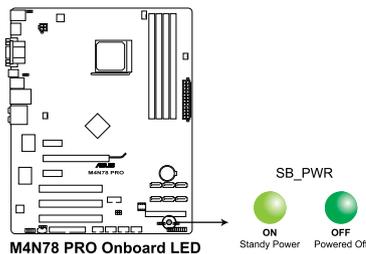
Take note of the following precautions before you install motherboard components or change any motherboard settings.



- Unplug the power cord from the wall socket before touching any component.
  - Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, to avoid damaging them due to static electricity.
  - Hold components by the edges to avoid touching the ICs on them.
  - Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
  - Before you install or remove any component, switch off the ATX power supply and detach its power cord. Failure to do so may cause severe damage to the motherboard, peripherals, or components.
- 

### Onboard LED

The motherboard comes with a standby power LED that lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows the location of the onboard LED.



## 1.5 Motherboard overview

### 1.5.1 Placement direction

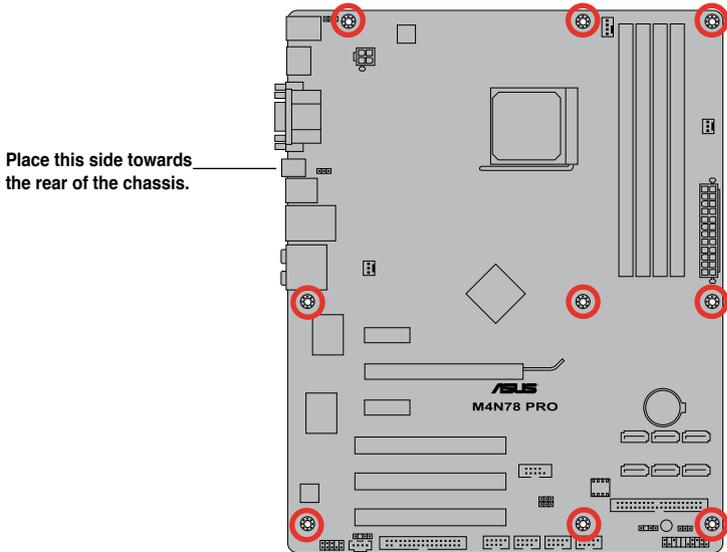
When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

### 1.5.2 Screw holes

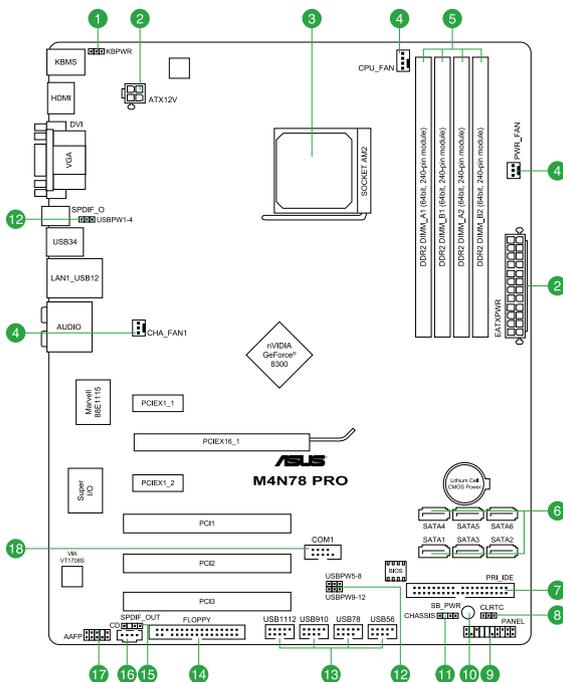
Place nine (9) screws into the holes indicated by circles to secure the motherboard to the chassis.



Do not overtighten the screws! Doing so can damage the motherboard.



## 1.5.3 Motherboard layout



## 1.5.4 Layout contents

Connectors/Jumpers/Slots	Page
1. Keyboard power (3-pin KBPWR)	1-15
2. ATX power connectors (24-pin EATXPWR, 4-pin ATX12V)	1-20
3. CPU socket AM2+/AM2	1-6
4. CPU, Chassis and Power Fan connectors (4-pin CPU_FAN, 3-pin CHA_FAN1, 3-pin PWR_FAN)	1-19
5. DDR2 DIMM slots	1-9
6. Serial ATA connectors (7-pin SATA1-6)	1-22
7. IDE connector (40-1 pin PRL_IDE)	1-21
8. Clear RTC RAM (CLRRTC)	1-15
9. System panel connector (10-1 pin PANEL)	1-23
10. Onboard LED (SB_PWR)	1-3
11. Chassis intrusion connector (4-1 pin CHASSIS)	1-19
12. USB device wake-up (3-pin USBPW1-4, USBPW5-8, USBPW9-12)	1-16
13. USB connectors (10-1 pin USB56, USB78, USB910, USB1112)	1-24
14. Floppy disk drive connector (34-1 pin FLOPPY)	1-24
15. Digital audio connector (4-1 pin SPDIF_OUT)	1-23
16. Optical drive audio in connector (4-pin CD)	1-18
17. Front panel audio connector (10-1 pin AAFP)	1-25
18. Serial port connector (10-1 pin COM1)	1-20

## 1.6 Central Processing Unit (CPU)

The motherboard comes with a CPU socket designed for AMD® AM3 Phenom™ II / Athlon™ X4 / Athlon™ X3 / Athlon™ X2 processors and AM2+ / AM2 Phenom™ X4 / Phenom™ X3 / Athlon™ X2 / Athlon™ / Sempron™ processors.

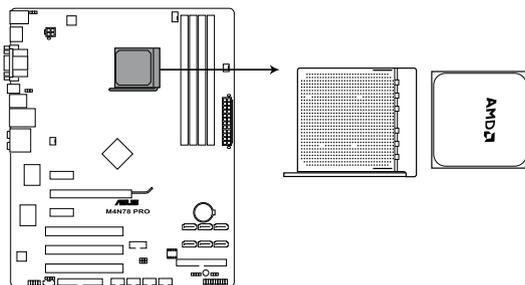


The CPU socket is not compatible with AMD® Opteron™ processors. Do not install an Opteron™ processor on this motherboard.

### 1.6.1 Installing the CPU

To install a CPU:

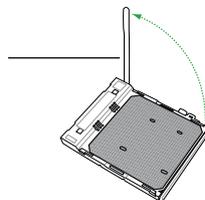
1. Locate the CPU socket on the motherboard.



**M4N78 PRO CPU socket AM2+/AM2**

2. Press the lever sideways to unlock the socket, then lift it up to a 90°-100° angle.

Socket lever

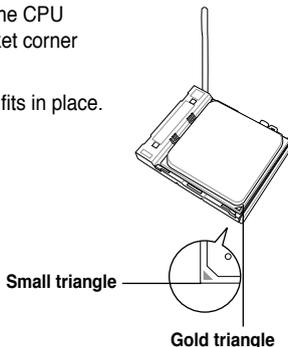


Ensure that the socket lever is lifted up to 90°-100° angle, otherwise the CPU will not fit in completely.

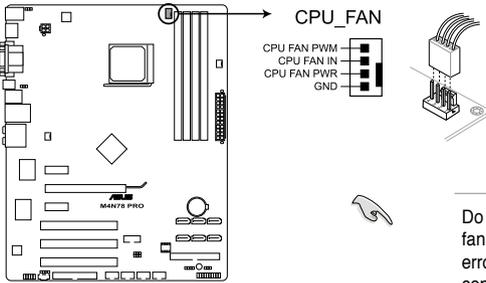
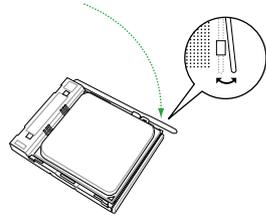
3. Position the CPU above the socket such that the CPU corner with the gold triangle matches the socket corner with a small triangle.
4. Carefully insert the CPU into the socket until it fits in place.



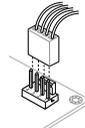
The CPU fits only in one correct orientation. DO NOT force the CPU into the socket to prevent bending the pins and damaging the CPU!



- When the CPU is in place, push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.
- Install a CPU heatsink and fan following the instructions that came with the heatsink package. You can also refer to section **1.6.2 Installing heatsink and fan** for instructions.
- Connect the CPU fan cable to the CPU\_FAN connector on the motherboard.



**M4N78 PRO CPU fan connector**



Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

## 1.6.2 Installing the heatsink and fan



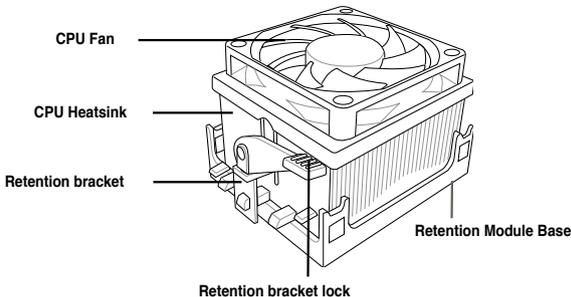
Ensure that you use only AMD-certified heatsink and fan assembly.

To install the CPU heatsink and fan:

- Place the heatsink on top of the installed CPU, making sure that the heatsink fits properly on the retention module base.



- The retention module base is already installed on the motherboard upon purchase.
- You do not have to remove the retention module base when installing the CPU or installing other motherboard components.
- If you purchased a separate CPU heatsink and fan assembly, ensure that a Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.



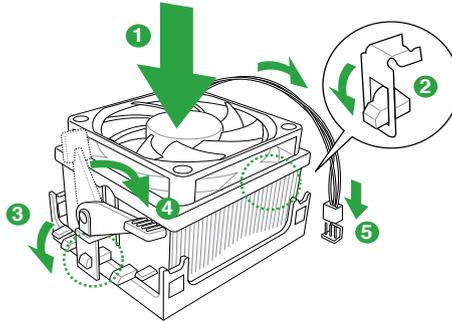


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Your boxed CPU heatsink and fan assembly should come with installation instructions for the CPU, heatsink, and the retention mechanism. If the instructions in this section do not match the CPU documentation, follow the latter.

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2. Attach one end of the retention bracket to the retention module base.



3. Align the other end of the retention bracket to the retention module base. A clicking sound denotes that the retention bracket is in place.



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Ensure that the fan and heatsink assembly perfectly fits the retention mechanism module base, otherwise you cannot snap the retention bracket in place.

---

4. Push down the retention bracket lock on the retention mechanism to secure the heatsink and fan to the module base.
5. When the fan and heatsink assembly is in place, connect the CPU fan cable to the connector on the motherboard labeled CPU\_FAN.



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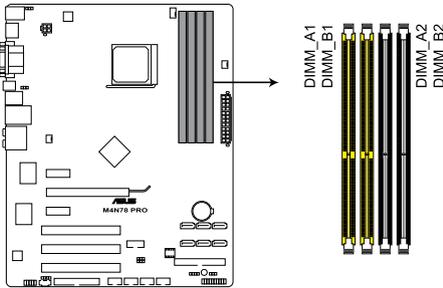
Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

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## 1.7 System memory

### 1.7.1 Overview

The motherboard comes with two Double Data Rate 2 (DDR2) Dual Inline Memory Modules (DIMM) sockets. A DDR2 module has the same physical dimensions as a DDR DIMM but has a 240-pin footprint compared to the 184-pin DDR DIMM. DDR2 DIMMs are notched differently to prevent installation on a DDR DIMM socket. The figure illustrates the location of the DDR2 DIMM sockets:



**M4N78 PRO 240-pin DDR2 DIMM sockets**

Channel	Sockets
Channel A	DIMM_A1 and DIMM_A2
Channel B	DIMM_B1 and DIMM_B2

### 1.7.2 Memory configurations

You may install 512MB, 1GB, 2GB and 4GB unbuffered ECC/non-ECC DDR2 DIMMs into the DIMM sockets.



- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor.
- Due to the memory address limitation on 32-bit Windows OS, when you install 4GB or more memory on the motherboard, the actual usable memory for the OS can be about 3GB or less. For effective use of memory, we recommend that you install a 64-bit Windows OS when having 4GB or more memory installed on the motherboard.
- This motherboard does not support DIMMs made up of 256 megabit (Mb) chips or less.



- The default memory operation frequency is dependent on its SPD. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.
- For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs) or overclocking condition.

## M4N78 PRO Motherboard Qualified Vendors Lists (QVL)

### DDR2-1066MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing Dimm (Bios)	Voltage	DIMM socket support (Optional)		
								A*	B*	C*
A-Data	Heat-Sink Package	4096MB(Kit of 2)	DS	N/A	AD21066E002GU	5-5-5-15	2.1V	*	*	*
Apacer	Heat-Sink Package	2048MB(kit of 2)	DS	N/A	78.0AC9S 9K4	5-5-5-15		*	*	*
Apacer	Heat-Sink Package	4096MB(kit of 2)	DS	N/A	78.AAGAL 9KZ	5-5-5-15		*	*	*
G.SKILL	Heat-Sink PackageSN: 815130037562	1024MB	DS	N/A	F2-8500CL5S-1GBPK	5-5-5-15		*	*	*
G.SKILL	Heat-Sink Package	2048MB(Kit of 2)	DS	N/A	F2-8500CL5D-2GBPK	5-5-5-15		*	*	*
G.SKILL	Heat-Sink Package	4096MB(kit of 2)	DS	N/A	F2-8500CL5D-4GBPK	5-5-5-15		*	*	*
GEIL	GL2L128M88BA25AB	1024MB	SS	GEIL	GB24GB8500C5QC	5		*	*	*
GEIL	Heat-Sink Package	1024MB	SS	GEIL	GE22GB1066C5DC	5		*	*	*
GEIL	Heat-Sink Package	1024MB	SS	GEIL	GE24GB1066C5QC	5		*	*	*
GEIL	Heat-Sink Package	4096MB(kit of 2)	DS	N/A	GX24GB8500C5UDC	5		*	*	*
Kingmax	KKA8FFIXF-JFS-18A	1024MB	DS	Kingmax	KLED48F-A8K15			*	*	*
Kingston	Heat-Sink Package	512MB	SS	Kingston	KHX8500D2/ 512			*	*	*
Kingston	Heat-Sink Package	512MB	SS	Kingston	KHX8500D2K2/1GN			*	*	*
Kingston	Heat-Sink Package	1024MB	DS	Kingston	KHX8500D2K2/2GN			*	*	*
OCZ	Heat-Sink Package	2048MB(Kit of 2)	DS	OCZ	OC22N1066SR2DK(Epp)	5-5-5-15		*	*	*
Qimonda	HYB18T1G800C2F-1.9FSS25253	1024MB	DS	Qimonda	HYS64T128000EU-1.9-C2			*	*	*
Transcend	Heat-Sink Package	2048MB(Kit of 2)	SS	N/A	TX1066QLU-2GK	5		*	*	*
Transcend	Heat-Sink Package	2048MB(Kit of 2)	DS	Transcend	TX1066QLJ-2GK	5		*	*	*
Transcend	Heat-Sink Package	4096MB(kit of 2)	DS	Transcend	TX1066QLU-4GK	5		*	*	*
AENEON	Heat-Sink Package	2048MB(Kit of 2)	DS	AENEON	AXT760UD00-19DC97X	5		*	*	*
AENEON	Heat-Sink Package	4096MB(Kit of 2)	DS	AENEON	AXT860UD20-19E	6		*	*	*
KingBox	EPD21280200E-2	2048MB	DS	KingBox	UL2GD21066PS			*	*	*
Mushkin	Heat-Sink Package	2048MB(kit of 2)	DS	N/A	996612	5-5-5-15	2.1V	*	*	*
Mushkin	Heat-Sink Package	4096MB(kit of 2)	DS	N/A	996619	5-5-5-15	2.1V	*	*	*



Due to AM3/AM2+ CPU limitation, only one DDR2 1066 DIMM is supported per channel. When four DDR2 1066 DIMMs are installed, all DIMMs run at 800MHz frequency by default for system stability.

### DDR2-800MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing Dimm (Bios)	Voltage	DIMM socket support (Optional)		
								A*	B*	C*
A-Data	AD29608A8A-25EG80812	512MB	SS	ADATA	M20AD6G3H3160Q1E58			*	*	*
A-Data	Heat-Sink Package	2048MB (Kit of 2)	SS	N/A	AD2800E001GOU	4-4-4-12		*	*	*
A-Data	AD29608A8A-25EG80810	1024MB	DS	ADATA	M20AD6G314170Q1E58			*	*	*
A-Data	Heat-Sink Package	4096MB (Kit of 2)	DS	N/A	AD2800E002GOU	4-4-4-12	1.9-2.1V	*	*	*
Apacer	AM4B598CQJJS8E0749D	1024MB	SS	Apacer	78.01GA0.9K5	5		*	*	*
Apacer	AM4B598CQJJS8E0740E	2048MB	DS	Apacer	78.A1GA0.9K4	5		*	*	*
Corsair	Heat-Sink Package	1024MB	DS	Corsair	XMS2-6400	4		*	*	*
Corsair	Heat-Sink Package	4096MB (Kit of 2)	DS	N/A	CM2X2048-6400C5	5		*	*	*
Crucial	Heat-Sink Package	2048MB (Kit of 2)(EPP)	SS	N/A	BL12864AA804.8FE5			*	*	*
Crucial	Heat-Sink Package	2048MB (Kit of 2)(EPP)	SS	N/A	BL12864AL804.8FE5	4		*	*	*
G.SKILL	Heat-Sink Package SN: 8151030036642	512MB	SS	G.SKILL	F2-6400CL5D-1GBNQ	5-5-5-15		*	*	*
G.SKILL	Heat-Sink Package	1024MB	DS	G.SKILL	F2-6400CL4D-2GBPK	4		*	*	*
G.SKILL	Heat-Sink Package	1024MB	DS	G.SKILL	F2-6400CL5D-2GBNQ	5		*	*	*
G.SKILL	Heat-Sink Package	2048MB	DS	G.SKILL	F2-6400CL4D-4GBPK	4		*	*	*
G.SKILL	Heat-Sink Package	2048MB	DS	G.SKILL	F2-6400CL5D-4GBPK	5		*	*	*
G.SKILL	Heat-Sink Package	4096MB	DS	N/A	F2-6400CL6Q-16GMQ	5		*	*	*
GEIL	GL2L64M088BA30EB	1024MB	DS	GEIL	GB22GB6400C4DC	5		*	*	*
GEIL	GL2L64M088BA30EB	1024MB	DS	GEIL	GB22GB6400C5DC	5		*	*	*
GEIL	GL2L64M088BA30EB	1024MB	DS	GEIL	GB24GB6400C4QC	4		*	*	*
GEIL	GL2L64M088BA30EB	1024MB	DS	GEIL	GB24GB6400C5QC	5		*	*	*
GEIL	Heat-Sink Package	1024MB	DS	GEIL	GE22GB800C4DC	4		*	*	*
GEIL	Heat-Sink Package	1024MB	DS	GEIL	GE22GB800C5DC	5		*	*	*
GEIL	Heat-Sink Package	1024MB	DS	GEIL	GE24GB800C4QC	4		*	*	*
GEIL	Heat-Sink Package	1024MB	DS	GEIL	GE24GB800C5QC	5		*	*	*
GEIL	Heat-Sink Package	1024MB	DS	GEIL	GX22GB6400DC	5		*	*	*
GEIL	GL2L128M88BA25AB	2048MB	DS	GEIL	GB24GB6400C5DC	5		*	*	*
GEIL	GL2L128M88BA25AB	2048MB	DS	GEIL	GB28GB6400C4QC	4		*	*	*
GEIL	GL2L128M88BA25AB	2048MB	DS	GEIL	GB28GB6400C5QC	5		*	*	*
GEIL	Heat-Sink Package	2048MB	DS	GEIL	GE24GB800C4DC	4		*	*	*
GEIL	Heat-Sink Package	2048MB	DS	GEIL	GE24GB800C5DC	5		*	*	*
GEIL	Heat-Sink Package	2048MB	DS	GEIL	GE28GB800C4QC	4		*	*	*
GEIL	Heat-Sink Package	2048MB	DS	GEIL	GE28GB800C5QC	5		*	*	*

## DDR2-800MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing Dimm (Bios)	Voltage	DIMM socket support (Optional)
								A* B* C*
GEIL	Heat-Sink Package	2048MB	DS	GEIL	GX24GB6400DC	5		* * *
HV	HY6PS12821CFP-S5	512MB	SS	Hynix	HYMP564U64CP8-SS AB			* * *
HV	HY6PS12821CFPS5	1024MB	DS	Hynix	HYMP 512U64CP8-SS AB	5		* * *
Kingmax	KLDD48F-B8K85	1024MB	SS	Kingmax	KK88FPBXF-CFA-25U			* * *
kingmax	KK88FPBXF-CFA-25U	2048MB	DS	kingmax	KLDE88F-B8K85			* * *
Kingston	E5108AJBG-8E-E 0803A9082	512MB	SS	ELPIDA	KVR800D2N5/ 512			* * *
Kingston	E5108AJBG-8E-E	512MB	SS	Elpida	KVR800D2N6/ 512			* * *
Kingston	Heat-Sink Package	512MB	SS	Kingston	KHX6400D2LLK2/1GN			* * *
Kingston	D6408TR4CGL25US L362406PECCA	1024MB	DS	Kingston	KVR800D2N5/1G			* * *
Kingston	Heat-Sink Package	1024MB	DS	Kingston	KHX6400D2LL/1G			* * *
Kingston	Heat-Sink Package	2048MB	DS	N/A	KHX6400D2K2/2G			* * *
Kingston	E1108ACBG-8E-E	2048MB	DS	Elpida	KVR800D2N5/2G			* * *
Kingston	Heat-Sink Package	2048MB	DS	Kingston	KHX6400D2/2G			* * *
Kingston	KVR800D2N6/2G	2048MB	DS	Kingston	461625.010819 PTGC	6		* * *
Micron	6E022D9GKX(ECC)	512MB	SS	Micron	MT9HTF6472AY-80ED4			* * *
Micron	D9HNP 7YE22(ECC)	1024MB	SS	Micron	MT9HTF12872AY-800E1			* * *
Micron	6TD22D9GKX(ECC)	1024MB	DS	Micron	MT18HTF12872AY-80ED4			* * *
OCZ	Heat-Sink Package	1024MB	DS	OCZ	OC2Z6800R22GK	5		* * *
OCZ	Heat-Sink Package	1024MB	DS	OCZ	OC2P800R22GK	4		* * *
OCZ	Heat-Sink Package	1024MB	DS	OCZ	OC22RPPR8002GK	4		* * *
OCZ	Heat-Sink Package	1024MB	DS	OCZ	OC22U8004GK	6		* * *
OCZ	Heat-Sink Package	4096MB (Kit of 2)	DS	N/A	OC22P8004GK	5		* * *
PSC	A3R1GE3CFF734MAA0E	2048MB	DS	PSC	AL8E8F73C-8E1	5		* * *
PSC	A3R1GE3CFF750RABBP(ECC)	2048MB	DS	PSC	AL7E8E63H-10E1K			* * *
PSC	PL8E8F73C-8E1	2048MB	DS	PSC	SHG772-AA3G			* * *
PSC	PL8E8G73E-8E1	2048MB	DS	PSC	XCP271A3G-A			* * *
Samsung	M37816553GZS-CF7	512MB	SS	Qimonda	K4T51083QG-HCF7	6		* * *
Samsung	K4T1G084QQ-HCF7(ECC)	1024MB	SS	Samsung	M391T2863QZ3-CF7			* * *
Samsung	M37812863QZS-CF7	1024MB	SS	Qimonda	K4T1G084QQ-HCF7	6		* * *
Samsung	K4T1G084QQ-HCF7(ECC)	2048MB	DS	Samsung	M391T5663QZ3-CF7			* * *
Samsung	K4T2G084QA-HCF7	4096MB	DS	Samsung	M378T5263AZ3-CF7			* * *
Transcend	TS64MLQ64V8J	512MB	SS	Micron	7HD22 D9GMH	5		* * *
Transcend	E1108ACBG-8E-E	1024MB	SS	ELPIDA	TS128MLQ64V8U	5		* * *
Transcend	TQ1243PCF8	1024MB	SS	Transcend	JM800QLU-1G	5		* * *
Transcend	7HD22D9GMH	1024MB	DS	Micron	TS128MLQ64V8J	5		* * *
Transcend	TQ123PJF8F0801	1024MB	DS	Transcend	JM800QLJ-1G	5		* * *
Transcend	E1108ACBG-8E-E(ECC)	2048MB	DS	Elpida	TS256MLQ72V8U			* * *
Transcend	E1108ACBG-8E-E	2048MB	DS	Elpida	TS256MLQ64V8U	5		* * *
AENEON	AE193F25DB 0621	512MB	SS	AENEON	AE1660UD00-25DB98X			* * *
AENEON	AE103R250C 0732	1024MB	SS	AENEON	AE1760UD00-25DC08X	5		* * *
AENEON	AE193R25DB 0640	1024MB	DS	AENEON	AE1760UD00-25DB97X	5		* * *
ASINT	DDR11208-GE 8115	1024MB	SS	ASINT	SLY2128M8-JGE			* * *
ASINT	DDR11208-GE 8115	2048MB	DS	ASINT	SLZ2128M8-JGE			* * *
Century	HY6PS12821CFP-S5	1024MB	DS	Hynix	28V0H8	5		* * *
Elixir	N2TU16800E-AC	1024MB	SS	Elixir	M2Y1G64TU88D5B-AC 0828.GS			* * *
ELIXIR	N2TU 51280BE-25C802006Z1DV	1024MB	DS	ELIXIR	M2Y1G64TU88B0B-25C	5		* * *
Elixir	N2TUG80DE-AC	2048MB	DS	Elixir	M2Y2G64TU88D5B-AC 0826.SG			* * *
MDT	18D 51280D-2.50726F	512MB	SS	MDT	MDT 512MB	5		* * *
TAKEMS	MS18T 51280-2.5P0710	512MB	SS	takeMS	TMS51B264C081-805EP	5		* * *
UMAX	U2S12D30TP-8E	1024MB	DS	UMAX	D48001GP3-63BJU			* * *
UMAX	U2S24D30TP-8E	2048MB	DS	UMAX	D48002GP0-73BCU	5		* * *
VDATA	VD29608A8A-25EG20813	512MB	SS	VDATA	M2G0V663H3160Q1E52			* * *

## DDR2-667MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing Dimm (Gios)	Voltage	DIMM socket support (Optional)		
								A*	B*	C*
A-Data	AD29608A8A-3EG80814	1024MB	DS	ADATA	M20AD5G31417001C58			*	*	*
A-Data	AD20908A8A-3EG 30724	2048MB	DS	ADATA	M20AD5H3J417011C53			*	*	*
Apacer	AM4M5708GQJS7E06332F	512MB	SS	Apacer	AU 512E667C5KBGC	5	*	*	*	*
Apacer	AM4M5708JQS7E0751C	512MB	SS	Apacer	78.91G92.9K5	5	*	*	*	*
Apacer	AM4M5808CQJS7E0751C	1024MB	SS	Apacer	78.01G90.9K5		*	*	*	*
Apacer	AM4M5708GQJS7E0636B	1024MB	DS	Apacer	AU01GE667C5KBGC		*	*	*	*
Apacer	78.A11301.9K4	2048MB	DS	Apacer	AM4M5808CQJS7E0749B	5	*	*	*	*
Corsair	Heat-Sink Package	1024MB	DS	Corsair	XMS2-5400	4	*	*	*	*
G.SKILL	D2 64M8CCF 0815 C7173S	2048MB	DS	G.SKILL	F2-5400PHU2-2GBNT	5-5-5-15	*	*	*	*
G.SKILL	Heat-Sink Package SN: 8151030036559	(Kit of 2) 4096MB	DS	G.SKILL	F2-5300CL5D-4GBMQ	5-5-5-15	*	*	*	*
GEIL	Heat-Sink Package	2048MB	DS	GEIL	GX22GB5300LX	5	*	*	*	*
GEIL	Heat-Sink Package	2048MB	DS	GEIL	GX24GB5300LDC	5	*	*	*	*
Kingmax	KKEA88B4LAUG-29DX	512MB	SS	Kingmax	KLCC28F-A8KB5		*	*	*	*
Kingmax	KKEA88B4LAUG-29DX	1024MB	DS	Kingmax	KLCC48F-A8KB5		*	*	*	*
Kingston	S212037850813BP	512MB	SS	Kingston	KVR667D2N5/512		*	*	*	*
Kingston	D6408TR4CGL25USL0749 05PECNB									
Kingston	E5108AJBG-8E-E(ECC)	1024MB	DS	Elipida	KVR667D2E5/1G		*	*	*	*
Kingston	S01280420822 SOP	1024MB	DS	Kingston	KVR667D2N5/1G		*	*	*	*
Kingston	D6408TR4CGL25USL1563 04PECCA									
Kingston	7RE22 D9HNL	2048MB	DS	Micron	KVR667D2N5/2G		*	*	*	*
Kingston	E1108ACBG-8E-E 0813A90CC	2048MB	DS	ELPIDA	KVR667D2N5/2G		*	*	*	*
Kingston	NT5TU128M8DE-3C(ECC)	2048MB	DS	Nanya	KVR667D2E5/2G		*	*	*	*
Nanya	NT51264M8A1BY-3C	512MB	SS	Nanya	NT 512164U88A1BY-3C		*	*	*	*
Nanya	NT1GT64U8HB0BY-3C	1024MB	DS	Nanya	NT51U64M8BE-3C72155700CP	5	*	*	*	*
PSC	A3R12E3JFF717B9A00	512MB	SS	PSC	AL6E8E63J-6E1	5	*	*	*	*
PSC	A3R1GE3CFF734MAA0J	1024MB	SS	PSC	AL7E8F73C-6E1	5	*	*	*	*
PSC	A3R12E3JFF717B9A01	1024MB	DS	PSC	AL6E8E63J-6E1	5	*	*	*	*
Qimonda	HYB18T	512MB	SS	Qimonda	HYS64164000EU-3S-B2		*	*	*	*
Qimonda	512B00B2F3SFSS28171	1024MB	DS	Qimonda	HYS64T128020EU-3S-B2		*	*	*	*
Qimonda	HYB18T	1024MB	DS	Qimonda	HYS64T128020EU-3S-B2		*	*	*	*
Qimonda	512B00B2F3SFSS28171	1024MB	DS	Qimonda	HYS64T128020EU-3S-B2		*	*	*	*
Samsung	KAT2G094QA-HCE66	4096MB	DS	Samsung	M378T5263A23-CE6		*	*	*	*
Super Talent	PG 64M8-900 0750	1024MB	DS	Super Talent	T667U1B1V	5	*	*	*	*
Transcend	E5108AJBG-6E-E	1024MB	DS	Elipida	JM667QLJ-1G	5	*	*	*	*
AENEON	AET93R300B 0634	512MB	SS	AENEON	AET660UD00-30DB97X	5	*	*	*	*
AENEON	AET193R300B 0639	1024MB	DS	AENEON	AET1760UD00-30DB97X	5	*	*	*	*
AENEON	AET103R300B 0730	2048MB	DS	AENEON	AET860UD00-30DB908X	5	*	*	*	*
Asint	DDR16408-6E	512MB	SS	Asint	SLX264M8-J6E		*	*	*	*
ASINT	DDR111208-6E 8115	1024MB	SS	ASINT	SLY2128M8-J6E		*	*	*	*
Century	NT5TU64M8AE-3C	512MB	SS	Nanya	CENTURY 512MB		*	*	*	*
Century	HY5PS12821AF-P-Y5	1024MB	DS	Hynix	CENTURY 1G		*	*	*	*
ELIXIR	M2TU 51280AE-3C717095P28F	1024MB	DS	elixir	M2Y1G64TU8HA2B-3C	5	1.7-1.9	*	*	*
Elixir	N2TU 51280BE-3C639009W1CF	1024MB	DS	Elixir	M2Y1G64TU8HB0B-3C	5	*	*	*	*
KINGBOX	EPD264082200-4	512MB	SS	KINGBOX	512MB 667MHz		*	*	*	*
Leadmax	HY5PS12821CFP-Y5 C 702AA	1024MB	DS	Hynix	LRMP 51216A8-Y5	5	*	*	*	*
MDT	18D 51201D-30726E	512MB	DS	MDT	DDR11 512 PC667	4	*	*	*	*
MDT	18D 51280D-30646E	1024MB	DS	MDT	MDT 1024MB	4	*	*	*	*
TAKEMS	MS18T 51280-3S0627D	512MB	SS	takeMS	TMS51B264C081-665AP	5	*	*	*	*
TAKEMS	MS18T 51280-3	512MB	SS	takeMS	TMS51B264C081-665QI	5	*	*	*	*
TAKEMS	MS18T 51280-3SP0717A	1024MB	DS	takeMS	TMS1GB264C081-665AP	5	*	*	*	*
UMAX	U2S12030YP-6E	1024MB	DS	UMAX	D46701GP3-63BJU		*	*	*	*
UMAX	U2S24D30TP-6E	2048MB	DS	UMAX	D46702GP0-73BCU	5	*	*	*	*



**Side(s): SS - Single-sided DS - Double-sided**

### DIMM support:

- **A\*:** Supports one module inserted into either slot as Single-channel memory configuration.
- **B\*:** Supports two modules inserted into either the yellow slots or the black slots as one pair of Dual-channel memory configuration.
- **C\*:** Supports four modules inserted into both the yellow slots and the black slots as two pairs of Dual-channel memory configuration.



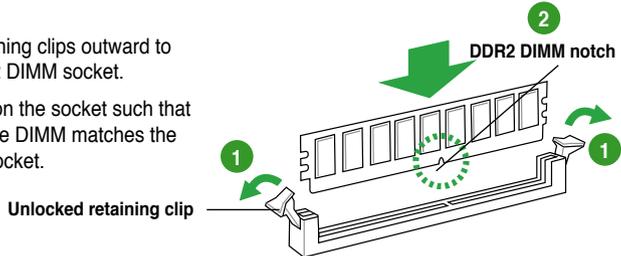
Visit the ASUS website for the latest QVL.

### 1.7.3 Installing a DIMM



Unplug the power supply before adding or removing DIMMs or other system components. Failure to do so can cause severe damage to both the motherboard and the components.

1. Press the retaining clips outward to unlock a DDR2 DIMM socket.
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.



A DDR2 DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.

3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



### 1.7.4 Removing a DIMM

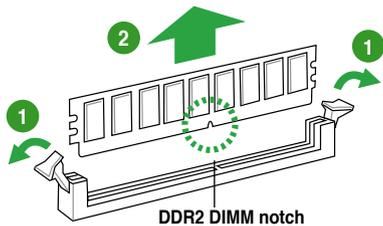
To remove a DIMM:

1. Simultaneously press the retaining clips outward to unlock the DIMM.



Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

2. Remove the DIMM from the socket.



## 1.8 Expansion slots

In the future, you may need to install expansion cards. The following sub-sections describe the slots and the expansion cards that they support.



---

Unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

---

### 1.8.1 Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

### 1.8.2 Configuring an expansion card

After installing the expansion card, configure it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 2 for information on BIOS setup.
2. Assign an IRQ to the card.
3. Install the software drivers for the expansion card.



---

When using PCI cards on shared slots, ensure that the drivers support "Share IRQ" or that the cards do not need IRQ assignments. Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable. Refer to the table on the next page for details.

---

### 1.8.3 PCI slots

The PCI slots support cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications.

### 1.8.4 PCI Express x1 slots

This motherboard supports PCI Express x1 network cards, SCSI cards, and other cards that comply with the PCI Express specifications.

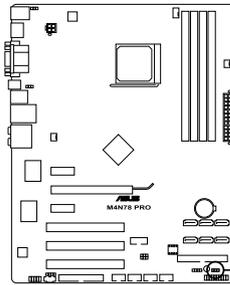
### 1.8.5 PCI Express x16 slot

This motherboard supports a PCI Express x16 graphics card that complies with the PCI Express specifications.

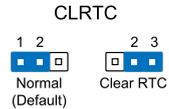
## 1.9 Jumpers

### 1. Clear RTC RAM (CLRTC)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.



**M4N78 PRO Clear RTC RAM**



To erase the RTC RAM

1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.



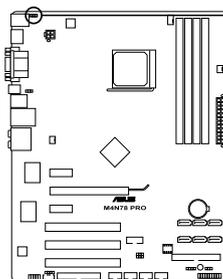
Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!



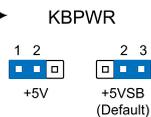
- If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.
- You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the C.P.R. (CPU Parameter Recall) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.
- Due to the chipset behavior, AC power off is required to enable C.P.R. function. You must turn off and on the power supply or unplug and plug the power cord before rebooting the system.

### 2. Keyboard power (3-pin KBPWR)

This jumper allows you to enable or disable the keyboard wake-up feature. Set this jumper to pins 2-3 (+5VSB) to wake up the computer by pressing a key on the keyboard (the default is the Space Bar). This feature requires an ATX power supply that can supply at least 1A on the +5VSB lead, and a corresponding setting in the BIOS.

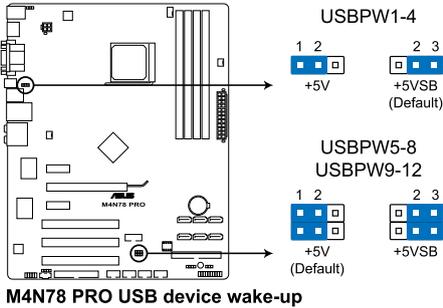


**M4N78 PRO Keyboard power setting**



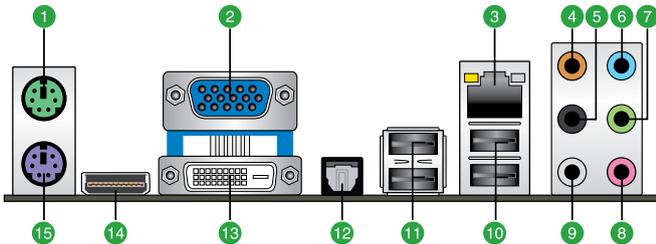
### 3. USB device wake-up (3-pin USBPW1-4, USBPW5-8, USBPW9-12)

Set these jumpers to +5V to wake up the computer from S1 sleep mode (CPU stopped, DRAM refreshed, system running in low power mode) using the connected USB devices. Set to +5VSB to wake up from S3 and S4 sleep modes (no power to CPU, DRAM in slow refresh, power supply in reduced power mode). The USBPW1-4 jumpers are for the rear USB ports. The USBPW5-8 and USBPW9-12 jumpers are for the internal USB connectors that you connect to additional USB ports.



## 1.10 Connectors

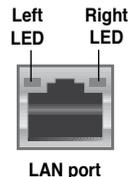
### 1.10.1 Rear panel connectors



- PS/2 mouse port.** This port is for a PS/2 mouse.
- Video Graphics Adapter (VGA) port** This 15-pin port is for a VGA monitor or other VGA-compatible devices.
- LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub.

### LAN port LED indications

Status	Left LED	Right LED
OFF	OFF	OFF
10 Mbps connection	Orange (blinking during data activity)	OFF
100 Mbps connection	OFF	Orange (blinking during data activity)
1 Gbps connection	OFF	Green (blinking during data activity)



4. **Center/Subwoofer port (orange).** This port connects the center/subwoofer speakers.
5. **Rear Speaker Out port (black).** This port connects the rear speakers in a 4-channel, 6-channel, or 8-channel audio configuration.
6. **Line In port (light blue).** This port connects the tape, CD, DVD player, or other audio sources.
7. **Line Out port (lime).** This port connects a headphone or a speaker. In 4-channel, 6-channel, and 8-channel configuration, the function of this port becomes Front Speaker Out.
8. **Microphone port (pink).** This port connects a microphone.
9. **Side Speaker Out port (gray).** This port connects the side speakers in an 8-channel audio configuration.



Refer to the audio configuration table below for the function of the audio ports in 2, 4, 6, or 8-channel configuration.

### Audio 2, 4, 6-channel configuration

Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Line In
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Orange	–	–	Center/Subwoofer	Center/Subwoofer
Black	–	Rear Speaker Out	Rear Speaker Ou	Rear Speaker Out
Gray	–	–	–	Side Speaker Out

10. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
11. **USB 2.0 ports 3 and 4.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
12. **Optical S/PDIF Out port.** This port connects an external audio output device via an optical S/PDIF cable.
13. **DVI-I Out port.** This port is for any DVI-I compatible device and are HDCP compliant, allowing playback of HD DVD, Blu-Ray and other protected content.
14. **HDMI Out port.** This port is for a high-definition multimedia interface (HDMI) connector.
15. **PS/2 keyboard port.** This port is for a PS/2 keyboard.

#### Dual display table

This table indicates whether the dual display you want to use is supported or not.

Dual display output	Support	Not support
DVI + D-Sub	•	
HDMI + D-Sub	•	
DVI + HDMI		•



- **Playback of HD DVD and Blu-Ray Discs**

For better playback quality, we suggest that you follow the system requirements in the suggested list below.

Suggested list	
CPU	AMD® Athlon 64 x2 5000+
DIMM	DDR2 800MHz 2GB
BIOS setup	Frame Buffer Size--256MB or higher
Playback software	CyberLink® PowerDVD 8.0 Ultra

- To play HD DVD or Blu-Ray Disc, ensure to use an HDCP compliant monitor.

### Troubleshooting on HDTV overscaling or underscaling:

If your desktop is extending beyond the viewable display area or the desktop or image is not filling the entire display area while using the onboard HDMI out port and the HDMI cable, you can resize the desktop appearing on your HDTV screen.

To resize your HDTV desktop:

1. Install **NVIDIA Chipset Driver Program** from the motherboard support DVD.
2. Right-click the desktop and select **NVIDIA Control Panel**.
3. Under **Video & Television**, select **Resize HDTV desktop**.
4. Select **Resize my desktop** and click **Resize Desktop**.
5. A full-screen adjustment tool appears. Use the scroll bar to resize the desktop to fit your display device. Click **OK** to exit.

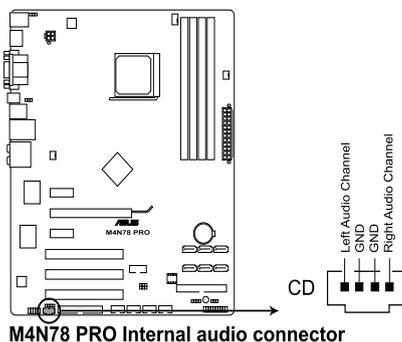


The **Resize my desktop** function in the NVIDIA Control Panel appears only when you are using an HDTV compliance resolution such as 480i, 720i, or 1080i.

### 1.10.2 Internal connectors

1. **Optical drive audio in connector (4-pin CD)**

This connector allows you to receive stereo audio input from sound sources such as a CD-ROM, TV tuner, or MPEG card.

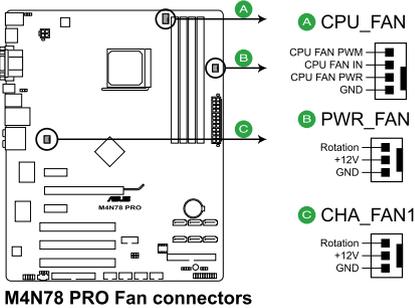


## 2. CPU, Chassis and Power Fan connectors (4-pin CPU\_FAN, 3-pin CHA\_FAN1, 3-pin PWR\_FAN)

The fan connectors support cooling fans of 350mA~740mA (8.88W max.) or a total of 1A~2.22A (26.64W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.



Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors.

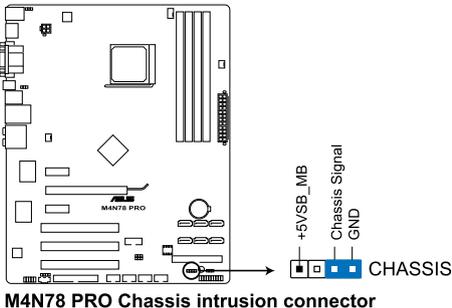


Only the CPU\_FAN and CHA\_FAN1 connectors support the ASUS Q FAN 2 feature.

## 3. Chassis intrusion connector (4-1 pin CHASSIS)

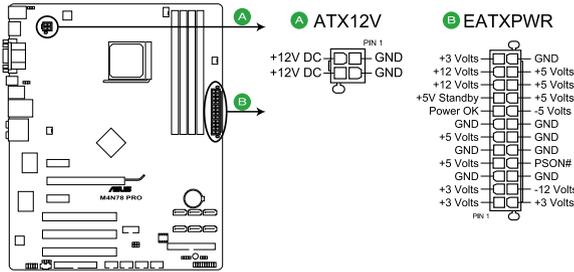
This connector is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal is then generated as a chassis intrusion event.

By default, the pins labeled “Chassis Signal” and “Ground” are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.



#### 4. ATX power connectors (24-pin EATXPWR, 4-pin ATX12V)

These connectors are for an ATX power supply. The plugs from the power supply are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.



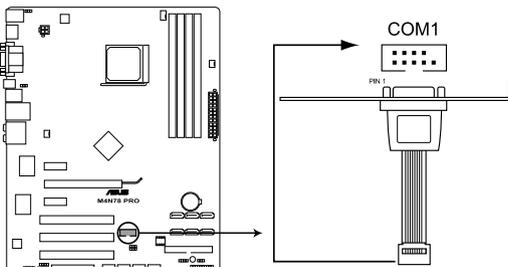
**M4N78 PRO ATX power connectors**



- We recommend that you use an ATX 12 V Specification 2.0-compliant power supply unit (PSU) with a minimum of 300 W power rating. This PSU type has 24-pin and 4-pin power plugs.
- If you intend to use a PSU with 20-pin and 4-pin power plugs, ensure that the 20-pin power plug can provide at least 15 A on +12 V and that the PSU has a minimum power rating of 300 W. The system may become unstable or may not boot up if the power is inadequate.
- Do not forget to connect the 4-pin ATX +12 V power plug. Otherwise, the system will not boot up.
- We recommend that you use a PSU with higher power output when configuring a system with more power-consuming devices or when you intend to install additional devices. The system may become unstable or may not boot up if the power is inadequate.
- If you are uncertain about the minimum power supply requirement for your system, refer to the Recommended Power Supply Wattage Calculator at <http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us> for details.

#### 5. Serial port connector (10-1 pin COM1)

The connector is for a serial (COM) port. Connect the serial port module cable to the connector, then install the module to a slot opening at the back of the system chassis.



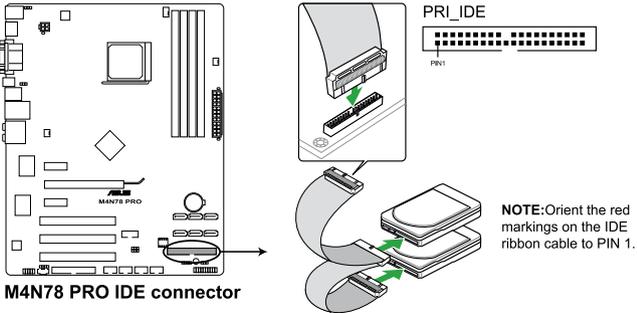
**M4N78 PRO Serial port (COM1) connector**



The serial port bracket (COM1) is purchased separately.

## 6. IDE connector (40-1 pin PRI\_IDE)

The onboard IDE connector is for Ultra DMA 133/100/66 signal cable. There are three connectors on each Ultra DMA 133 / 100 / 66 signal cable: blue, black, and gray. Connect the blue connector to the motherboard's IDE connector, then select one of the following modes to configure your devices:



	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
	Slave	Slave	



- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra DMA 133/100/66 IDE devices.



If any device jumper is set as "Cable-Select", ensure that all other device jumpers have the same setting.

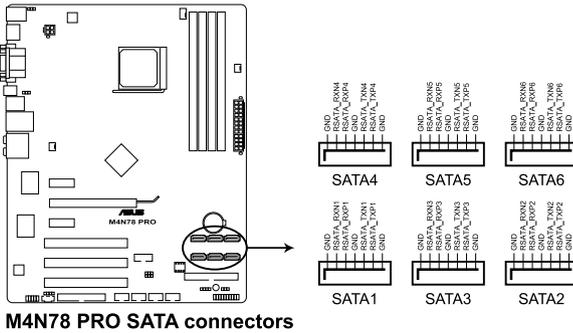
## 7. Serial ATA connectors (7-pin SATA1-6)

These connectors are for the Serial ATA signal cables for Serial ATA hard disk and optical disk drives.

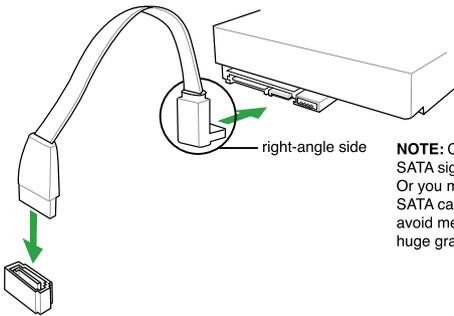
If you install SATA hard disk drives to the SATA1/2/3/4/5/6 connectors, you can create a RAID 0, RAID 1, RAID 5, RAID 10 and JBOD configuration through the onboard NVIDIA® GeForce 8300 controller.



- SATA1–4 connectors are set to [SATA Mode] by default. If you intend to create a Serial ATA RAID set using these connectors, set the **SATA Mode select** item in the BIOS to [RAID Mode].
- Before creating a RAID set, refer to the manual bundled in the motherboard support DVD.



**M4N78 PRO SATA connectors**



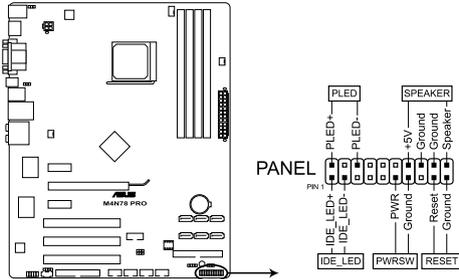
**NOTE:** Connect the right-angle side of SATA signal cable to SATA device. Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.



- SATA 5–6 connectors support AHCI mode and RAID mode only. Make sure to install the AHCI driver or RAID driver in the bundled support DVD before connecting devices to SATA 5–6 connectors. Otherwise, the devices will not work.
- Due to chipset limitation, when you set any of the SATA ports to RAID mode, all SATA ports run at RAID mode simultaneously.
- You must install the Windows® XP Service Pack 1 before using Serial ATA hard disk drives. The Serial ATA RAID feature (RAID 0 and RAID 1) is available only if you are using Windows® XP or later version.

## 8. System panel connector (10-1 pin PANEL)

This connector supports several chassis-mounted functions.



**M4N78 PRO System panel connector**

- **System power LED (2-pin PWRLED)**

This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Hard disk drive activity LED (2-pin HDLED)**

This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

- **Power/Soft-off button (2-pin PWRBTN)**

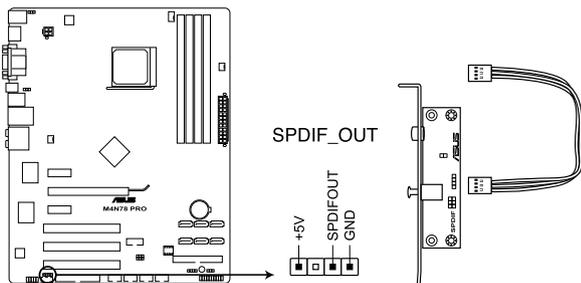
This 2-pin connector is for the system power button. Pressing the power button turns the system ON or puts the system in SLEEP or SOFT-OFF mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **Reset button (2-pin RESET)**

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

## 9. Digital audio connector (4-1 pin SPDIF\_OUT)

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) ports.



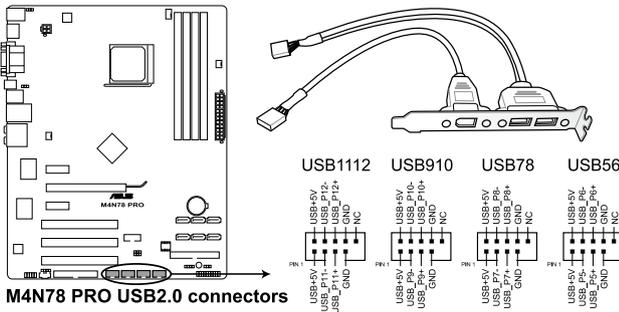
**M4N78 PRO Digital audio connector**



The S/PDIF module is purchased separately.

### 10. USB connectors (10-1 pin USB56, USB78, USB910, USB1112)

These connectors are for USB 2.0 ports. Connect the USB module cable to any of these connectors, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.



**M4N78 PRO USB2.0 connectors**



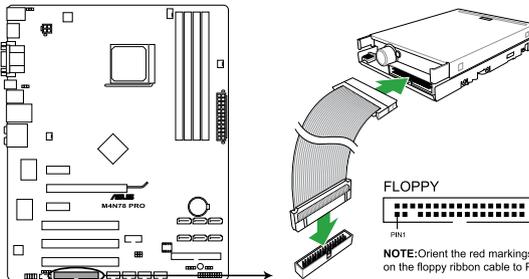
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



The USB 2.0 module is purchased separately.

### 11. Floppy disk drive connector (34-1 pin FLOPPY)

This connector is for a Floppy Disk Drive (FDD) signal cable. Insert one end of the cable to this connector, then connect the other end to the signal connector at the back of the floppy disk drive.



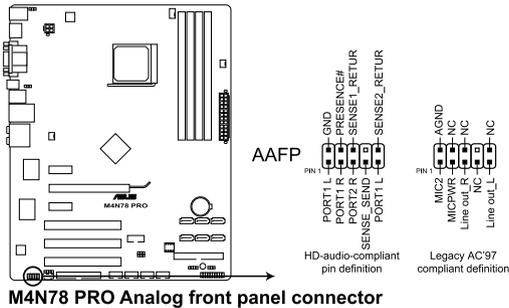
**M4N78 PRO Floppy disk drive connector**



- Pin 5 on the connector is removed to prevent incorrect cable connection when using an FDD cable with a covered Pin 5.
- The Floppy Disk Drive signal cable is purchased separately.

## 12. Front panel audio connector (10-1 pin AAFP)

This connector is for a chassis-mounted front panel audio I/O module that supports either High Definition Audio or AC'97 audio standard. Connect one end of the front panel audio I/O module cable to this connector.



- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard high-definition audio capability.
- If you want to connect a high-definition front panel audio module to this connector, ensure that the **Front Panel Select** item in the BIOS is set to [HD Audio]. If you want to connect an AC'97 front panel audio module to this connector, set the item to [AC97]. See page 2-20 for details.

## ASUS Q-Connector (system panel)

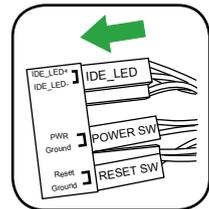
Use the ASUS Q-Connector to connect/disconnect the chassis front panel cables. Refer to the following instructions to install the ASUS Q-Connector.

1. Connect the front panel cables to the ASUS Q-Connector.

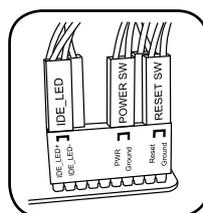
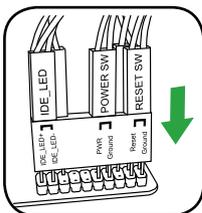
Refer to the labels on the Q-Connector to know the detailed pin definitions, and then match them to their respective front panel cable labels.



The labels on the front panel cables may vary depending on the chassis model.



2. Install the ASUS Q-Connector to the system panel connector, making sure the orientation matches the labels on the motherboard.
3. The front panel functions are now enabled. The figure shows the Q-Connector is properly installed on the motherboard.



# 1.11 Software support

## 1.11.1 Installing an operating system

This motherboard supports Windows® XP/Vista Operating Systems (OS). Always install the latest OS version and corresponding updates to maximize the features of your hardware.



- Motherboard settings and hardware options vary. Use the setup procedures presented in this chapter for reference only. Refer to your OS documentation for detailed information.
- Ensure that you install Windows® XP Service Pack 1 or later versions before installing the drivers for better compatibility and system stability.

## 1.11.2 Support DVD information

The Support DVD that comes with the motherboard package contains the drivers, software applications, and utilities that you can install to avail all motherboard features.



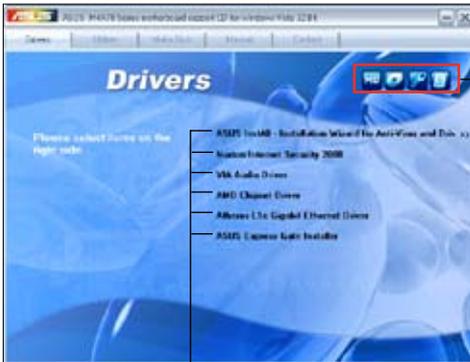
- The contents of the Support DVD are subject to change at any time without notice. Visit the ASUS website at [www.asus.com](http://www.asus.com) for updates.
- For detailed software instructions, see the **Manual** menu in the Support DVD or download the latest software manual from the ASUS website at [www.asus.com](http://www.asus.com).

### To run the Support DVD

Place the Support DVD to the optical drive. The DVD automatically displays the Drivers menu if Autorun is enabled in your computer.



The screen below is used for reference only.



Click an icon to display Support DVD/ motherboard information

Click an item to install



If Autorun is NOT enabled in your computer, browse the contents of the Support DVD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the DVD.

# Chapter 2

## BIOS setup

### 2.1 Managing and updating your BIOS

---



Save a copy of the original motherboard BIOS file to a bootable floppy disk or a USB flash disk in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the ASUS Update or AFUDOS utilities.

---

#### 2.1.1 Creating a bootable floppy disk

To create a bootable floppy disk

1. Insert a formatted, high density 1.44MB floppy disk to the floppy disk drive.
2. Follow the instructions based on your system environment.

##### ***DOS environment***

- a. At the DOS prompt, type `format A: /S` then press **<Enter>**.

##### ***Windows® XP environment***

- a. From the Windows® desktop, click **Start > My Computer**.
- b. Select the 3 1/2 Floppy Drive icon.
- c. Click **File** from the menu, then select **Format**. A **Format 3 1/2 Floppy** window appears.
- d. Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.

##### ***Windows® Vista environment***

- a. From the Windows® desktop, click  **> Computer**.
  - b. Right-click **Floppy Disk Drive** then click **Format** to display the **Format 3 1/2 Floppy** dialog box.
  - c. Select the **Create an MS-DOS startup disk** check box.
  - d. Click **Start**.
2. Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

## 2.1.2 ASUS Update utility

The ASUS Update is a utility that allows you to manage, save, and update the motherboard BIOS in Windows® environment.



- ASUS Update requires an Internet connection either through a network or an Internet Service Provider (ISP).
- This utility is available in the support DVD that comes with the motherboard package.

### Installing ASUS Update

To install ASUS Update:

1. Place the support DVD in the optical drive. The **Drivers** menu appears.
2. Click the **Utilities** tab, and then click **Install ASUS Update**.
3. Follow the onscreen instructions to complete the installation.



Quit all Windows® applications before you update the BIOS using this utility.

### Updating the BIOS

To update the BIOS:

1. From the Windows® desktop, click **Start > Programs > ASUS > ASUSUpdate > ASUSUpdate** to launch the ASUS Update utility.
2. From the dropdown list, select any of the updating process:

#### Updating from the Internet

- a. Select **Update BIOS from the Internet**, and then click **Next**.
- b. Select the ASUS FTP site nearest you to avoid network traffic, or click **Auto Select**, and then click **Next**.
- c. From the FTP site, select the BIOS version that you wish to download, and then click **Next**.



The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.

#### Updating from a BIOS file

- a. Select **Update BIOS from a file**, and then click **Next**.
  - b. Locate the BIOS file from the **Open** window, and then click **Open**.
3. Follow the onscreen instructions to complete the updating process.

### 2.1.3 ASUS EZ Flash 2 utility

The ASUS EZ Flash 2 feature allows you to update the BIOS without having to use a bootable floppy disk or a DOS-based utility.

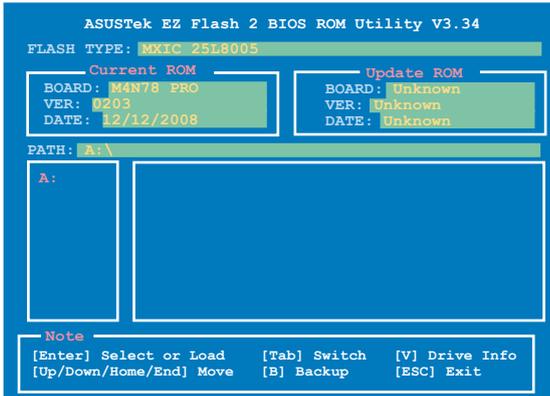


Download the latest BIOS file from the ASUS website at [www.asus.com](http://www.asus.com).

To update the BIOS using EZ Flash 2:

1. Insert the floppy/USB flash disk that contains the latest BIOS file to the floppy disk drive or the USB port, then launch EZ Flash 2. You can launch EZ Flash 2 in two ways.

- a. Press **<Alt> + <F2>** during POST to display the following:



- b. Enter the BIOS setup program. Go to the **Tools** menu to select **EZ Flash 2** and press **<Enter>** to enable it.  
Press **<Tab>** to switch between drives until the correct BIOS file is found.
4. When the correct BIOS file is found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when done.



- This function can support devices such as USB flash disk, or floppy disk with **FAT 32/16** format and single partition only.
- Do not shut down or reset the system while updating the BIOS to prevent system boot failure!

## 2.1.4 AFUDOS utility

The AFUDOS utility allows you to update the BIOS file in DOS environment using a bootable floppy disk. This utility also allows you to copy the current BIOS file that you can use as backup when the BIOS fails or gets corrupted during the updating process.



- Ensure that you prepare two floppy disks: the bootable floppy disk and the floppy disk containing the AFUDOS utility and the latest BIOS file.
- Ensure that the floppy disk is not write-protected and has at least 1072KB to save the AFUDOS and BIOS files.
- The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

### Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

1. Insert the bootable floppy disk into the floppy disk drive to boot the system in DOS mode.
2. Replace the bootable floppy disk and insert the floppy disk that contains the AFUDOS utility and the latest BIOS file.



- Obtain the AFUDOS utility (afudos.exe) from the bundled support DVD and the latest BIOS file from the ASUS website at [www.asus.com](http://www.asus.com).
- We recommend that you write the BIOS filename on a piece of paper. You will need to key in the exact BIOS filename at the DOS prompt later.

3. At the DOS prompt, key in `afudos /i [filename]` where [filename] is the BIOS file in the floppy disk.

```
A:\>afudos /iM4N78PRO.ROM
```

Press <Enter>.



Do not shut down or reset the system while updating the BIOS to prevent system boot failure!

4. The utility returns to the DOS prompt after the BIOS updating process is completed. Reboot the system from the hard disk drive.

## 2.1.5 ASUS CrashFree BIOS 2 utility

The ASUS CrashFree BIOS 2 utility is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can restore a corrupted BIOS file using the motherboard support DVD or a floppy disk that contains the BIOS file.



---

The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at [support.asus.com](http://support.asus.com) and save it to a floppy disk.

---

### Recovering the BIOS

To recover the BIOS

1. Turn on the system.
2. Insert the motherboard support DVD to the optical drive, or the floppy disk containing the BIOS file to the floppy disk drive.
3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.
4. Turn off the system after the utility completes the updating process and power on again.
5. The system requires you to enter BIOS Setup to recover BIOS setting. To ensure system compatibility and stability, we recommend that you press <F2> to load default BIOS values.



---

**DO NOT** shut down or reset the system while recovering the BIOS! Doing so can cause system boot failure!

---

## 2.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section 2.1 **Managing and updating your BIOS**.

Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to "Run Setup". This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the firmware chip.

The firmware chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press **<Del>** during the Power-On Self-Test (POST) to enter the Setup utility. Otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, reboot the system by doing any of the following procedures:

- Restart using the OS standard shut-down procedure.
- Press **<Ctrl>+<Alt>+<Del>** simultaneously.
- Press the reset button on the system chassis.
- Press the power button to turn the system off then back on.



Using the power button, reset button, or the **<Ctrl>+<Alt>+<Del>** keys to force reset from a running operating system can cause damage to your data or system. We recommend to always shut-down the system properly from the operating system.

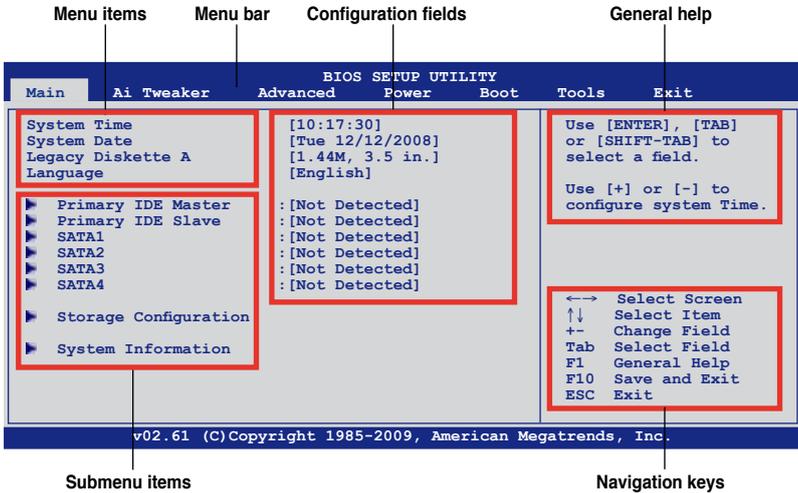
---

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various submenus and make your selections from the available options using the navigation keys.



- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setups Default** item under the Exit Menu. See section 2.9 **Exit Menu**.
  - The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
  - Visit the ASUS website at [www.asus.com](http://www.asus.com) to download the latest BIOS file for this motherboard.
-

## 2.2.1 BIOS menu screen



## 2.2.2 Menu bar

The menu bar on top of the screen has the following main items:

- Main** For changing the basic system configuration
- Ai Tweaker** For changing the overclocking settings
- Advanced** For changing the advanced system settings
- Power** For changing the advanced power management (APM) configuration
- Boot** For changing the system boot configuration
- Tools** For changing the system tools configuration
- Exit** For selecting the exit options and loading default settings

To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.



- The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website at [www.asus.com](http://www.asus.com) to download the latest BIOS information.

### 2.2.3 Navigation keys

At the bottom right corner of a menu screen are the navigation keys for that particular menu. Use the navigation keys to select items in the menu and change the settings.



Some of the navigation keys differ from one screen to another.

### 2.2.4 Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting Main shows the Main menu items.

The other items (Advanced, Power, Boot, Tools, and Exit) on the menu bar have their respective menu items.

### 2.2.5 Submenu items

A solid triangle before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

### 2.2.6 Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to **2.2.8 Pop-up window**.

### 2.2.7 General help

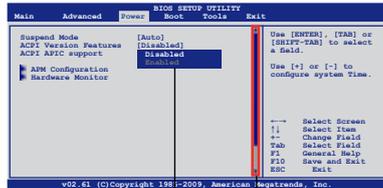
At the top right corner of the menu screen is a brief description of the selected item.

### 2.2.8 Pop-up window

Select a menu item then press <Enter> to display a pop-up window with the configuration options for that item.

### 2.2.9 Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the <Up> / <Down> arrow keys or <Page Up> / <Page Down> keys to display the other items on the screen.



Scroll bar  
Pop-up window

## 2.3 Main menu

When you enter the BIOS Setup program, the **Main** menu screen appears, giving you an overview of the basic system information.



Refer to section **2.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.

BIOS SETUP UTILITY			
Main	Ai Tweaker	Advanced Power Boot Tools Exit	
System Time	[10:17:30]	Use [ENTER], [TAB] or [SHIFT-TAB] to select a field.	
System Date	[Tue 12/12/2008]		
Legacy Diskette A	[1.44M, 3.5 in.]	Use [+] or [-] to configure system Time.	
Language	[English]		
▶ Primary IDE Master	: [Not Detected]	←→ Select Screen ↑↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit	
▶ Primary IDE Slave	: [Not Detected]		
▶▶ SATA1	: [Not Detected]		
▶▶ SATA2	: [Not Detected]		
▶▶ SATA3	: [Not Detected]		
▶▶ SATA4	: [Not Detected]		
▶ Storage Configuration			
▶ System Information			
v02.61 (C) Copyright 1985-2009, American Megatrends, Inc.			

### 2.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

### 2.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

### 2.3.3 Legacy Diskette A [1.44M, 3.5 in.]

Sets the type of floppy drive installed.

Configuration options: [Disabled] [360K, 5.25 in.] [1.2M , 5.25 in.] [720K , 3.5 in.] [1.44M, 3.5 in.] [2.88M, 3.5 in.]

### 2.3.4 Language [English]

Allows you to set the language.

### 2.3.5 Primary IDE Master/Slave

While entering Setup, the BIOS automatically detects the presence of IDE devices. There is a separate submenu for each IDE device. Select a device item then press <Enter> to display the IDE device information.

The BIOS automatically detects the values opposite the dimmed items (Device, Vendor, Size, LBA Mode, Block Mode, PIO Mode, Async DMA, Ultra DMA, and SMART monitoring). These values are not user-configurable. These items show Not Detected if no IDE device is installed in the system.

### **Type [Auto]**

Selects the type of IDE drive. Setting to [Auto] allows automatic selection of the appropriate IDE device type. Select [CDROM] if you are specifically configuring a CD-ROM drive. Select [ARMD] (ATAPI Removable Media Device) if your device is either a ZIP, LS-120, or MO drive. Configuration options: [Not Installed] [Auto] [CDROM] [ARMD]

### **LBA/Large Mode [Auto]**

Enables or disables the LBA mode. Setting to [Auto] enables the LBA mode if the device supports this mode, and if the device was not previously formatted with LBA mode disabled. Configuration options: [Disabled] [Auto]

### **Block (Multi-Sector Transfer) M [Auto]**

Enables or disables data multi-sectors transfers. When set to [Auto], the data transfer from and to the device occurs multiple sectors at a time if the device supports multi-sector transfer feature. When set to [Disabled], the data transfer from and to the device occurs one sector at a time.

Configuration options: [Disabled] [Auto]

### **PIO Mode [Auto]**

Selects the PIO mode.

Configuration options: [Auto] [0] [1] [2] [3] [4]

### **DMA Mode [Auto]**

Selects the DMA mode.

Configuration options: [Auto]

### **SMART Monitoring [Auto]**

Sets the Smart Monitoring, Analysis, and Reporting Technology.

Configuration options: [Auto] [Disabled] [Enabled]

### **32Bit Data Transfer [Enabled]**

Enables or disables 32-bit data transfer.

Configuration options: [Disabled] [Enabled]

## **2.3.6 SATA 1–4**

While entering Setup, the BIOS automatically detects the presence of Serial ATA devices.

There is a separate submenu for each SATA device. Select a device item then press <Enter> to display the SATA device information.

The BIOS automatically detects the values opposite the dimmed items (Device, Vendor, Size, LBA Mode, Block Mode, PIO Mode, Async DMA, Ultra DMA, and SMART monitoring). These values are not user-configurable. These items show Not Detected if no Serial ATA device is installed in the system.

### **LBA/Large Mode [Auto]**

Enables or disables the LBA mode. Setting to [Auto] enables the LBA mode if the device supports this mode, and if the device was not previously formatted with LBA mode disabled.

Configuration options: [Disabled] [Auto]

### **Block (Multi-sector Transfer) M [Auto]**

Enables or disables data multi-sectors transfers. When set to [Auto], the data transfer from and to the device occurs multiple sectors at a time if the device supports multi-sector transfer feature. When set to [Disabled], the data transfer from and to the device occurs one sector at a time.

Configuration options: [Disabled] [Auto]

### **PIO Mode [Auto]**

Selects the PIO mode.

Configuration options: [Auto] [0] [1] [2] [3] [4]

### **DMA Mode [Auto]**

Selects the DMA mode.

Configuration options: [Auto]

### **SMART Monitoring [Auto]**

Sets the Smart Monitoring, Analysis, and Reporting Technology.

Configuration options: [Auto] [Disabled] [Enabled]

### **32Bit Data Transfer [Enabled]**

Enables or disables 32-bit data transfer.

Configuration options: [Disabled] [Enabled]

## **2.3.7 Storage Configuration**

This menu allows you to configure the SATA devices.

### **Onboard PCI IDE Controller [Enabled]**

Enables or disables the onboard integrated IDE controller.

Configuration options: [Enabled] [Disabled]

### **OnChip S-ATA Channel [Enabled]**

Enables or disables the OnChip SATA Channel.

Configuration options: [Enabled] [Disabled]

### **SATA Mode Select [SATA Mode]**

Allows you to select the SATA type.

Configuration options: [SATA Mode] [RAID Mode] [AHCI Mode]



- If you want the Serial ATA hard disk drives to use the Advanced Host Controller Interface (AHCI), set this item to [AHCI Mode]. The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.
- When SATA is configured as [SATA Mode] in BIOS, only SATA port 1-4 can be detected. Ensure to install the AHCI driver to detect and use SATA port 5-6 in AHCI mode under OS.
- If you want to create a RAID 0, RAID 1, RAID 5, and RAID 10 configuration from the Serial ATA hard disk drives, set this item to [RAID Mode].

### 2.3.8 System Information

This menu gives you an overview of the general system specifications. The BIOS automatically detects the items in this menu.

#### BIOS Information

Displays the auto-detected BIOS information.

#### Processor

Displays the auto-detected CPU specification.

#### System Memory

Displays the auto-detected system memory.

## 2.4 Ai Tweaker menu

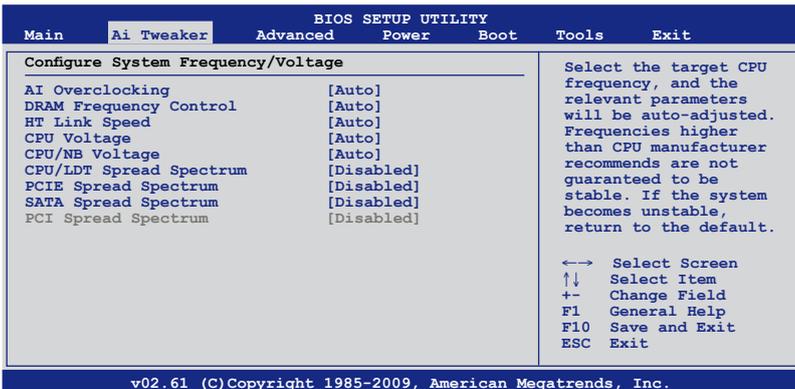
The Ai Tweaker menu items allow you to configure overclocking-related items.



Take caution when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction.



The default values of the following items vary depending on the CPU and memory modules you install on the motherboard.



### 2.4.1 AI Overclocking [Auto]

Allows selection of CPU overclocking options to achieve desired CPU internal frequency. Configuration options: [Manual] [Auto]



The following three (3) items appear only when you set the **Ai Overclocking** item to [Manual].

## **CPU Ratio [Auto]**

Allows you to set the ratio between the CPU Core Clock and the FSB Frequency. Use <+> and <-> to adjust the ratio. The valid value ranges vary according to your CPU model.

## **FSB Frequency [200]**

Displays the frequency sent by the clock generator to the system bus and PCI bus. Use the <+> and <-> keys to adjust the FSB frequency. You can also type the desired FSB frequency using the numeric keypad. The values range from 200 to 600.

## **PCIe Frequency [100]**

Use the <+> and <-> keys to adjust the PCIe frequency. You can also type the desired PCIe frequency using the numeric keypad. The values range from 100 to 200.

## **2.4.2 DRAM Frequency Control [Auto]**

Allows you to select the DRAM frequency control method.  
Configuration options: [Auto] [Manual]

### **DRAM Frequency [667MHz]**

This item appears only when you set the **Dram Frequency Control** item to [Manual] and allows you to manually set the DRAM frequency.  
Configuration options: [667MHz] [800MHz] [1066MHz]

### **CPU/NB Frequency [Auto]**

This item appears only when you set the **AI Overclocking** item to [Manual] and allows selection of the CPU frequency.  
Configuration options: [Auto] [800MHz] [1000MHz] [1200MHz] [1400MHz] [1600MHz] [1800MHz]

## **2.4.3 HT Link Speed [Auto]**

Allows you to set the CPU-Northbridge HyperTransport link speed.  
Configuration options: [Auto] [200 MHz] [400 MHz] [600 MHz] [800 MHz] [1 GHz] [1.2 GHz] [1.4 GHz] [1.6 GHz] [1.8 GHz]

## **Memory Configuration**

This item appears only when you set the **AI Overclocking** item to [Manual] and allows you to change the advanced memory settings.

### ***Bank Interleaving [Auto]***

Allows you to enable or disable the bank memory interleaving.  
Configuration options: [Disabled] [Auto]

### ***Channel Interleaving [Auto]***

Allows you to set the channel interleaving mode.  
Configuration options: [Disabled] [Address bits 6] [Address bits 12] [XOR of Address bits [20:16, 6] [XOR of Address bits [20:16, 9]] [Auto]

### ***Enable Clock to All DIMMs [Disabled]***

Allows you to enable or disable unused clocks to all the DIMMs.  
Configuration options: [Disabled] [Enabled]

### ***MemClk Tristate C3/ATLVID [Disabled]***

Allows you to enable or disable MemClk Tri-Stating during C3 and Alt VID.

Configuration options: [Disabled] [Enabled]

**Memory Hole Remapping [Enabled]**

Allows you to enable or disable memory remapping around memory hole.

Configuration options: [Disabled] [Enabled]

**DCT Unganged Mode [Auto]**

Allows selection of the unganged DRAM mode.

Configuration options: [Auto] [Enabled] [Disabled]

**Power Down Enable [Enabled]**

Allows you to enable or disable the DDR power down mode.

Configuration options: [Disabled] [Enabled]

**Power Down Mode [Channel]**

Appears only when you enable the **Power Down Enable** item.

Configuration options: [Channel] [Chip Select]

## DRAM Timing Configuration

This item appears only when you set the **AI Overclocking** item to [Manual] and allows you to change the advanced DRAM timing settings.



---

The configuration options for some of the following items vary depending on the DIMMs you install on the motherboard.

---

**DRAM Command Rate [Auto]**

Allows selection of the DRAM command rate.

Configuration options: [Auto] [1T] [2T]

**DRAM Timing Mode [Auto]**

Allows selection of the DRAM Timing Mode.

Configuration options: [Auto] [Both]



---

The following sub-items appear only when you set the **DRAM Timing Mode** item to [Both].

---

**DCT0 1st Information: 5-5-5-3(5)-15-19-5-3**

**TCL [Auto]**

Configuration options: [Auto] [3 CLK] [4 CLK] [5 CLK] [6 CLK] [7 CLK DH\_Only]

**TRCD [Auto]**

Configuration options: [3 CLK] [4 CLK] [5 CLK] [6 CLK] [Auto]

**TRP [Auto]**

Configuration options: [3 CLK] [4 CLK] [5 CLK] [6 CLK] [Auto]

**TRTP [Auto]**

Configuration options: [Auto] [2-4 CLK] [3-5 CLK]

**TRAS [Auto]**

Configuration options: [5 CLK] [6 CLK] – [17 CLK] [18 CLK] [Auto]

**TRC [Auto]**

Configuration options: [11 CLK] [12 CLK] – [25 CLK] [26 CLK] [Auto]

**TWR [Auto]**

Configuration options: [Auto] [3 CLK] [4 CLK] [5 CLK] [6 CLK]

**TRRD [Auto]**

Configuration options: [2 CLK] [3 CLK] [4 CLK] [5 CLK] [Auto]

**DCT0 2nd Information: 7-105-75****TWTR [Auto]**

Specifies the write to read delay when accessing the same DIMM.

Configuration options: [1 CLK] [2 CLK] [3 CLK] [Auto]

**TRFC0/TRFC1 [Auto]**

Configuration options: [Auto] [75ns] [105ns] [127.5ns] [195ns] [327.5ns]

**DCT0/DCT1 Strength Config [Auto]**

Allows adjustments of the advanced DRAM strength parameters.

Configuration options: [Auto] [DCT 0] [DCT 1] [Both]




---

The following sub-items appear only when you set the **DCT0/DCT1 Strength Config** item to [DCT 0], [DCT 1] or [Both].

---

**DCT0:CKE drive strength. [Auto]****DCT1:CKE drive strength. [Auto]**

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

**DCT0:CS/ODT drive strength. [Auto]****DCT1:CS/ODT drive strength. [Auto]**

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

**DCT0:Address/Command drive strength. [Auto]****DCT1:Address/Command drive strength. [Auto]**

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

**DCT0:MEMCLK drive strength. [Auto]****DCT1:MEMCLK drive strength. [Auto]**

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

**DCT0:Data drive strength. [Auto]****DCT1:Data drive strength. [Auto]**

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

**DCT0:DQS drive strength. [Auto]****DCT1:DQS drive strength. [Auto]**

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

**DCT0:Processor on-die termination [Auto]****DCT1:Processor on-die termination [Auto]**

Configuration options: [Auto] [300 ohms +/- 20%] [150 ohms +/- 20%] [75 ohms +/- 20%]

**DQS Timing Configuration**

This item appears only when you set the **AI Overclocking** item to [Manual] and allows you to change the advanced DQS settings.

**DQS Timing User Controls [Auto]**

Allows adjustments of the advanced DQS parameters.

Configuration options: [Auto] [DCT 0] [DCT 1] [Both]

---



The following sub-items appear only when you set the **DQS Timing User Controls** item to [DCT 0], [DCT 1] or [Both].

---

#### **CKE Setup Time [Auto]**

Allows selection of the default setup time for the CKE pins versus MEMCLK.  
Configuration options: [Auto] [1/2 CLK] [1 CLK]

#### **CKE Fine Delay [00]**

Appears only when you set the **CKE Setup Time** item to [1/2 CLK] or [1 CLK]. Allows you to set how long the CKE pins are delayed from the default setup time. Type the desired values using the numeric keypad and press the <Enter> key. You can also use the <+> and <-> keys to adjust the value. The value ranges from 0 to 31.

#### **CS/ODT Setup Time [Auto]**

Allows selection of the default setup time for the CS/ODT pins versus MEMCLK.  
Configuration options: [Auto] [1/2 CLK] [1 CLK]

#### **CS/ODT Fine Delay [00]**

Appears only when you set the **CS/ODT Setup Time** item to [1/2 CLK] or [1 CLK]. Allows you to set how long the CS/ODT pins are delayed from the default setup time. Type the desired values using the numeric keypad and press the <Enter> key. You can also use the <+> and <-> keys to adjust the value. The value ranges from 0 to 31.

#### **Addr/Cmd Setup Time [Auto]**

Allows selection of the default setup time for the Addr/Cmd pins versus MEMCLK.  
Configuration options: [Auto] [1/2 CLK] [1 CLK]

#### **Addr/Cmd Fine Delay [00]**

Appears only when you set the **CKE Setup Time** item to [1/2 CLK] or [1 CLK]. Allows you to set how long the Addr/Cmd pins are delayed from the default setup time. Type the desired values using the numeric keypad and press the <Enter> key. You can also use the <+> and <-> keys to adjust the value. The value ranges from 0 to 31.

---



The following six (6) items are adjusted by typing the desired values using the numeric keypad and press the <Enter> key. You can also use the <+> and <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.

---

### **2.4.4 CPU Voltage [Auto]**

Allows you to set the CPU voltage.

### **2.4.5 CPU/NB Voltage [Auto]**

Allows you to set the voltage between the CPU and Northbridge.

---



The following four (4) items appear only when you set the **Ai Overclocking** item to [Manual].

---

### **2.4.6 CPU VDDA Voltage [Auto]**

Allows you to set the CPU VDDA voltage. The values range from 2.50V to 2.80V with a 0.10V interval.

### **2.4.7 DRAM Voltage [Auto]**

Allows you to set the DRAM voltage. The values range from 1.80V to 2.50V with a 0.10V interval.

### **2.4.8 HT Voltage [Auto]**

Allows you to set the HyperTransport voltage. The values range from 1.200V to 1.500V with a 0.10V interval.

### **2.4.9 NB Voltage [Auto]**

Allows you to set the NorthBridge voltage. The values range from 1.100V to 1.400V with a 0.10V interval.

### **2.4.10 CPU/LDT Spread Spectrum [Disabled]**

Set to [Disabled] to enhance CPU/LDT overclocking ability or [Enabled] for EMI control.  
Configuration options: [Disabled] [Enabled]

### **2.4.11 PCIE Spread Spectrum [Disabled]**

Configuration options: [Disabled] [Linear Down]

### **2.4.12 SATA Spread Spectrum [Disabled]**

Configuration options: [Disabled] [Linear Down]

### **2.4.13 PCI Spread Spectrum [Disabled]**

Configuration options: [Disabled] [Linear Down]

## 2.5 Advanced menu

The **Advanced** menu items allow you to change the settings for the CPU and other system devices.



Be cautious when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

BIOS SETUP UTILITY						
Main	Ai Tweaker	Advanced	Power	Boot	Tools	Exit
▶	CPU Configuration				Configure CPU.	
▶	Chipset					
▶	Onboard Devices Configuration					
▶	PCIePnP					
▶	USB Configuration					

### 2.5.1 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects.

#### **GART Error Reporting [Disabled]**

This option should remain disabled for the normal operation. The driver developer may enable it for testing purpose.

Configuration options: [Disabled] [Enabled]

#### **Microcode Updation [Enabled]**

Allows you to enable or disable the microcode updation.

Configuration options: [Disabled] [Enabled]

#### **Secure Virtual Machine Mode [Enabled]**

Allows you to enable or disable the AMD Secure Virtual Machine mode (SVM).

Configuration options: [Disabled] [Enabled]

#### **Cool'n'Quiet [Enabled]**

Enables or disables the AMD Cool'n'Quiet function.

Configuration options: [Disabled] [Enabled]

#### **ACPI SRAT Table [Enabled]**

Enables or disables the building of ACPI SRAT table.

Configuration options: [Disabled] [Enabled]

#### **CPU Prefetching [Enabled]**

Allows you to enable or disable CPU prefetching.

Configuration options: [Enabled] [Disabled]

#### **AMD Live! [Disabled]**

Enables or disables the AMD Live! technology support.

Configuration options: [Disabled] [Enabled]

#### **C1E Support [Disabled]**

Allows you to enable or disable the Enhanced Halt State support.

Configuration options: [Disabled] [Enable]

## **NVIDIA Core Calibration [Disabled]**

Setting this item to [All Cores] or [Per Core] will enhance the processor's overclocking ability. Configuration options: [Disabled] [Auto] [All Cores] [Per Cores]

## **2.5.2 Chipset**

The **Chipset** menu allows you to change the advanced chipset settings. Select an item then press <Enter> to display the submenu.

### ***NorthBridge Configuration***

#### **ECC Configuration**

##### ***ECC Mode [Disabled]***

Disables or sets the DRAM ECC mode that allows the hardware to report and correct memory errors. Set this item to [Basic], [Good], or [Max] to allow ECC mode auto-adjustment. Set this item to [Super] to adjust the **DRAM BG Scrub** sub-item manually. You may also adjust all sub-items by setting this item to [User].

Configuration options: [Disabled] [Basic] [Good] [Super] [Max] [User]

##### **DRAM ECC Enable [Disabled]**

Set this item to [Enabled] to allow hardware to report and correct memory errors automatically, maintaining system integrity.

Configuration options: [Disabled] [Enabled]

##### **DRAM SCRUB REDIRECT [Disabled]**

Enables or disables the DRAM SCRUB REDIRECT feature that allows the system to correct the DRAM ECC errors immediately when they occur.

Configuration options: [Disabled] [Enabled]

##### **4-Bit ECC Mode [Disabled]**

Enables or disables the ECC chip kill feature.

Configuration options: [Disabled] [Enabled]

##### **DRAM BG SCRUB [Disabled]**

Disables or sets the DRAM BG Scrub.

Configuration options: [Disabled] [40ns] [80ns] [160ns] [320ns] [640ns] [1.28us] [2.56us] [5.12us] [10.2us] [20.5us] [41.0us] [81.9us] [163.8us] [327.7us] [655.4us] [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

##### **Data Cache BG Scrub [Disabled]**

Disables or sets the Data Cache BG Scrub. This item allows the L1 Data Cache RAM to be corrected when idle.

Configuration options: [Disabled] [40ns] [80ns] [160ns] [320ns] [640ns] [1.28us] [2.56us] [5.12us] [10.2us] [20.5us] [41.0us] [81.9us] [163.8us] [327.7us] [655.4us] [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

##### **L2/L3 Cache BG Scrub [Disabled]**

Disables or sets the L2/L3 Cache BG Scrub. This item allows the L2/L3 Data Cache RAM to be corrected when idle.

Configuration options: [Disabled] [40ns] [80ns] [160ns] [320ns] [640ns] [1.28us] [2.56us] [5.12us] [10.2us] [20.5us] [41.0us] [81.9us] [163.8us] [327.7us] [655.4us] [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

## **SouthBridge Configuration**

### **Hybrid SLI Support [Disabled]**

Allows you to enable or disable the NVIDIA Hybrid SLI technology. This item is not user-configurable when no external graphics card is installed.

Configuration options: [Disabled] [Auto]

### **Hybrid SLI Mode [mGPU Auto]**

Allows you to select the Hybrid SLI mode.

Configuration options: [mGPU Auto] [mGPU always enable]

### **iGPU Frame Buffer Detect [Disabled]**

Configuration options: [Disabled] [Auto]

### **Hybrid SLI Frame buffer size [256MB]**

This item becomes user-configurable when you set the **iGPU Frame Buffer Detect** item to [Disabled] and allows you to set the frame buffer size for the onboard GPU.

Configuration options: [32MB] [64MB] [128MB] [256MB] [512MB] [Disabled]

### **Primary Graphics Adapter [PCIe VGA Card First]**

Allows you to select which graphics controller to use as the primary boot device.

Configuration options: [PCI VGA Card First] [Internal VGA First] [PCIe VGA Card First]

### **PCIe training [Gen2 if supported]**

Configuration options: [Only Gen1] [Gen2 if supported]

## **2.5.3 Onboard Devices Configuration**

### **Onboard LAN [Auto]**

Allows you to enable or disable the onboard LAN.

Configuration options: [Auto] [Disabled]

#### ***Onboard LAN Boot ROM [Disabled]***

Allows you to enable or disable the onboard LAN Boot ROM.

Configuration options: [Disabled] [Enabled]

### **HD Audio Device [Internal codec + External codec]**

Allows you to configure the HD Audio controller.

Configuration options: [Disabled] [Internal codec + External codec] [Internal codec] [External codec]

### **Front Panel Select [HD Audio]**

Allows you to set the front panel audio connector (AAFP) mode to legacy AC'97 or high-definition audio depending on the audio standard that the front panel audio module supports.

Configuration options: [AC97] [HD Audio]

### **Serial Port1 Address [3F8/IRQ4]**

Allows you to select the Serial Port1 base address.

Configuration options: [Disabled] [3F8/IRQ4] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3]

## 2.5.4 PCIPnP

The PCIPnP menu items allow you to change the advanced settings for PCI/PnP devices.

### Plug And Play O/S [No]

When set to [Yes] and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot. When set to [No], BIOS configures all the devices in the system.

## 2.5.5 USB Configuration

The items in this menu allows you to change the USB-related features. Select an item then press <Enter> to display the configuration options.



The **Module Version** and **USB Devices Enabled** items show the auto-detected values. If no USB device is detected, the item shows **None**.

### USB Functions [Enabled]

Allows you to enable or disable the USB Functions.

Configuration options: [Enabled] [Disabled]

### USB 2.0 Controller [Enabled]

Allows you to enable or disable the USB 2.0 controller.

Configuration options: [Enabled] [Disabled]

### Legacy USB Support [Auto]

Allows you to enable or disable support for USB devices on legacy operating systems (OS). Setting to Auto allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled.

Configuration options: [Disabled] [Enabled] [Auto]

### USB 2.0 Controller Mode [HiSpeed]

Allows you to configure the USB 2.0 controller in HiSpeed (480 Mbps) or Full Speed (12 Mbps). Configuration options: [FullSpeed] [HiSpeed]

### USB Mass Storage Device Configuration



The USB Mass Storage Device Configuration item appears only when there are installed USB devices.

#### ***USB Mass Storage Reset Delay [20 Sec]***

Allows you to select the number of seconds POST waits for the USB mass storage device after the start unit command. The message "No USB mass storage device detected" appears if none is installed in the system.

Configuration options: [10 Sec] [20 Sec] [30 Sec] [40 Sec]

#### **Emulation Type [Auto]**

If set to [Auto], USB devices of less than 530MB will be emulated as Floppy, and the remaining drives as hard drives. The [Force FDD] option can be used to force a HDD formatted drive to boot as FDD, ex. ZIP drive.

Configuration options: [Auto] [Floppy] [Forced FDD] [Hard Disk] [CDROM]

## 2.6 Power menu

The **Power** menu items allow you to change the settings for the Advanced Configuration and Power Interface (ACPI) and the Advanced Power Management (APM). Select an item then press **<Enter>** to display the configuration options.

BIOS SETUP UTILITY						
Main	Ai Tweaker	Advanced	Power	Boot	Tools	Exit
Suspend Mode		[Auto]		Select the ACPI state used for System Suspend.		
ACPI 2.0 Support		[Disabled]				
ACPI APIC support		[Enabled]				
▶ APM Configuration						
▶ Hardware Monitor						

### 2.6.1 Suspend Mode [Auto]

Allows you to select the Advanced Configuration and Power Interface (ACPI) state to be used for system suspend. Configuration options: [S1 (POS) Only] [S3 Only] [Auto]

### 2.6.2 ACPI 2.0 Support [Disabled]

Allows you to add more tables for Advanced Configuration and Power Interface (ACPI) 2.0 specifications. Configuration options: [Disabled] [Enabled]

### 2.6.3 ACPI APIC Support [Enabled]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) support in the Application-Specific Integrated Circuit (ASIC). When set to **Enabled**, the ACPI APIC table pointer is included in the RSDT pointer list.

Configuration options: [Disabled] [Enabled]

### 2.6.4 APM Configuration

#### Restore on AC Power Loss [Power Off]

When set to **Power Off**, the system goes into off state after an AC power loss. When set to **Power On**, the system goes on after an AC power loss.

Configuration options: [Power On] [Power Off] [Last State]

#### Power On By PME [Disabled]

Allows you to enable or disable the PME to wake up from S5 by PCI devices.

Configuration options: [Disabled] [Enabled]

#### Power On By Ring [Disabled]

Enable or disable RI to generate a wake event. Configuration options: [Disabled] [Enabled]

#### Power On By PS/2 Keyboard [Disabled]

Allows you to disable the Power On by PS/2 keyboard function or set specific keys on the PS/2 keyboard to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Configuration options: [Disabled] [Space Bar] [Power Key] [Ctrl-Esc]

#### Power On By PS/2 Mouse [Disabled]

Allows you to enable or disable the Power On by PS/2 mouse function.

Configuration options: [Disabled] [Enabled]

## Power On By RTC Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake event. When this item is set to [Enabled], the items **RTC Alarm Date** and **RTC Alarm Time** appear with set values.  
Configuration options: [Disabled] [Enabled]

## 2.6.5 Hardware Monitor

### CPU/MB Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the motherboard and CPU temperatures. Select [Ignored] if you do not wish to display the detected temperatures.

### CPU Fan / Chassis Fan / Power Fan Speed [xxxxRPM] or [Ignored]

The onboard hardware monitor automatically detects and displays the CPU, chassis, and power fan speed in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows **N/A**. Select [Ignored] if you do not wish to display the detected speed.

### VCORE / 3.3V / 5V / 12V Voltage [x.xxxV]

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select **Ignored** if you do not wish to display the detected voltage output.

### CPU Q-Fan Function [Disabled]

Allows you to enable or disable the CPU Q-Fan feature that smartly adjusts the fan speeds for more efficient system operation. Configuration options: [Disabled] [Enabled]

### Select Fan Type: [PWM Fan]

This item appears only when you set the CPU Q-Fan Function item to [Enabled] and allows you to select the CPU fan type you installed on the motherboard.

Configuration options: [PWM Fan] [DC Fan]



- If you install a PWM (4-pin) fan but set this item to [DC Fan], the fan you installed may not work.
- If you install a DC (3-pin) fan but set this item to [PWM Fan], the CPU Q-Fan function will not work, and the fan you install will always run at full speed.

### CPU Q-Fan Mode [Silent]

Allows you to set the appropriate performance level of the CPU Q-Fan. When set to [Optimal], the CPU fan automatically adjusts depending on the CPU temperature. Set this item to [Silent] to minimize fan speed for quiet CPU fan operation, or [Performance] to achieve the maximum CPU fan speed. Configuration options: [Performance] [Optimal] [Silent]

### Chassis Q-Fan Function [Disabled]

Allows you to enable or disable the chassis Q-Fan feature that smartly adjusts the fan speeds for more efficient system operation. Configuration options: [Disabled] [Enabled]

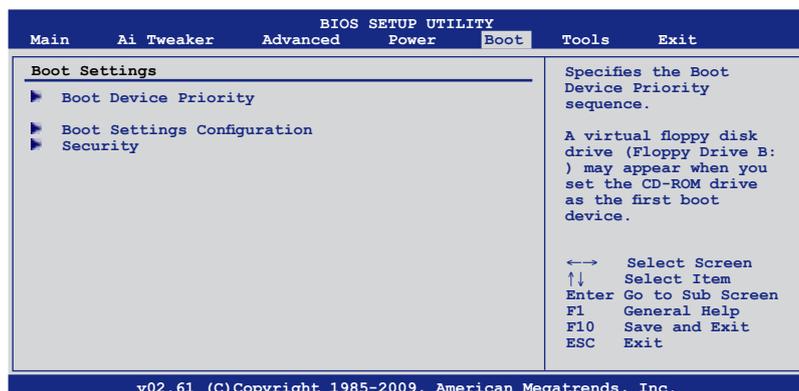
### Chassis Q-Fan Mode [Silent]

Allows you to set the appropriate performance level of the Chassis Q-Fan. When set to [Optimal], the Chassis fan automatically adjusts depending on the Chassis temperature. Set this item to [Silent] to minimize fan speed for quiet Chassis fan operation, or [Performance] to achieve the maximum Chassis fan speed.

Configuration options: [Performance] [Optimal] [Silent]

## 2.7 Boot menu

The **Boot** menu items allow you to change the system boot options. Select an item then press **<Enter>** to display the submenu.



### 2.7.1 Boot Device Priority

#### 1st ~ xxth Boot Device

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

Configuration options: [1st FLOPPY DRIVE] [Hard Drive] [ATAPI CD-ROM] [Disabled]

### 2.7.2 Boot Settings Configuration

#### Quick Boot [Enabled]

Enabling this item allows the BIOS to skip some power on self tests (POST) while booting to decrease the time needed to boot the system. When set to **[Disabled]**, BIOS performs all the POST items.

Configuration options: [Disabled] [Enabled]

#### Full Screen Logo [Enabled]

This allows you to enable or disable the full screen logo display feature.

Configuration options: [Disabled] [Enabled]



Set this item to **[Enabled]** to use the ASUS MyLogo 2™ feature.

#### AddOn ROM Display Mode [Force BIOS]

Sets the display mode for option ROM.

Configuration options: [Force BIOS] [Keep Current]

#### Bootup Num-Lock [On]

Allows you to select the power-on state for the NumLock.

Configuration options: [Off] [On]

#### Wait for 'F1' If Error [Enabled]

When set to [Enabled], the system waits for the F1 key to be pressed when error occurs.

Configuration options: [Disabled] [Enabled]

## Hit 'DEL' Message Display [Enabled]

When set to [Enabled], the system displays the message **Press DEL to run Setup** during POST.

Configuration options: [Disabled] [Enabled]

### 2.7.3 Security

The Security menu items allow you to change the system security settings. Select an item then press <Enter> to display the configuration options.

#### Change Supervisor Password

Select this item to set or change the supervisor password. The Supervisor Password item on top of the screen shows the default Not Installed. After you set a password, this item shows Installed.

To set a Supervisor Password

1. Select the Change Supervisor Password item and press <Enter>.
2. From the password box, type a password composed of at least six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted.

The message "Password Installed" appears after you successfully set your password. To change the supervisor password, follow the same steps as in setting a supervisor password.

To clear the supervisor password, select the Change Supervisor Password then press <Enter>. The message "Password Uninstalled" appears.



---

If you forget your BIOS password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section 1.9 Jumpers for information on how to erase the RTC RAM.

---

After you have set a supervisor password, the other items appear to allow you to change other security settings.

#### User Access Level [Full Access]

This item allows you to select the access restriction to the Setup items.

Configuration options: [No Access] [View Only] [Limited] [Full Access]

**No Access** prevents user access to the Setup utility.

**View Only** allows access but does not allow change to any field.

**Limited** allows changes only to selected fields, such as Date and Time.

**Full Access** allows viewing and changing all the fields in the Setup utility.

#### Change User Password

Select this item to set or change the user password. The User Password item on top of the screen shows the default Not Installed. After you set a password, this item shows Installed.

To set a User Password:

1. Select the Change User Password item and press <Enter>.
2. On the password box that appears, type a password composed of at least six letters and/or numbers, then press <Enter>.

3. Confirm the password when prompted.

The message "Password Installed" appears after you set your password successfully. To change the user password, follow the same steps as in setting a user password.

### Clear User Password

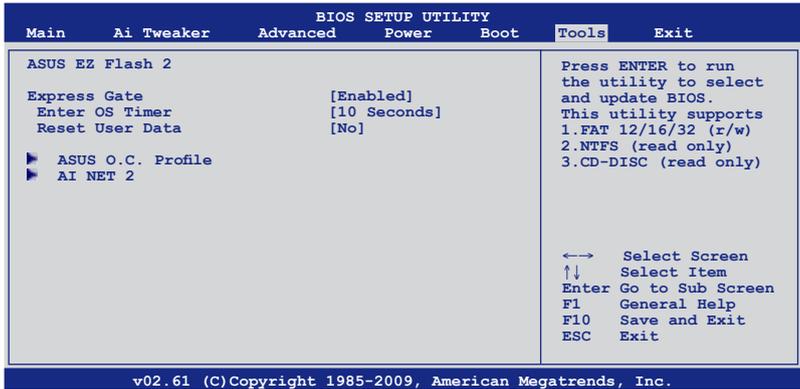
Select this item to clear the user password.

### Password Check [Setup]

When set to [Setup], BIOS checks for user password when accessing the Setup utility. When set to [Always], BIOS checks for user password both when accessing Setup and booting the system.

Configuration options: [Setup] [Always]

## 2.8 Tools menu



### 2.8.1 ASUS EZ Flash 2

Allows you to run ASUS EZ Flash 2. When you press <OK>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <OK> to confirm your choice.

### 2.8.2 Express Gate [Enabled]

Allows you to enable or disable the ASUS Express Gate feature. The ASUS Express Gate feature is a unique instant-on environment that provides quick access to the Internet browser and Skype.

Configuration options: [Enabled] [Disabled]

### Enter OS Timer [10 Seconds]

Sets countdown duration that the system waits at the Express Gate's first screen before starting Windows or other installed OS. Choose [Prompt User] to stay at the first screen of Express Gate for user action.

Configuration options: [Prompt User] [1 second] [3 seconds] [5 seconds] [10 seconds] [15 seconds] [20 seconds] [30 seconds]

## Reset User Data [No]

Allows you to clear Express Gate's user data.

Configuration options: [No] [Reset]

When setting this item to [Reset], make sure to save the setting to the BIOS so that the user data will be cleared the next time you enter the Express Gate. User data includes the Express Gate's settings as well as any personal information stored by the web browser (bookmarks, cookies, browsing history, etc.). This is useful in the rare case where corrupt settings prevent the Express Gate environment from launching properly.



---

The first time wizard will run again when you enter the Express Gate environment after clearing its settings.

---

## 2.8.3 ASUS O.C. Profile

This item allows you to store or load multiple BIOS settings.

### Add Your CMOS Profile.

Allows you to save the current BIOS file to the BIOS Flash. In the **Name** sub-item, type your profile name and press <Enter>, and then choose a profile number to save your CMOS settings in the **Save To** sub-item. You can save eight (8) CMOS profiles.

### Load CMOS Profile.

Allows you to load the previous BIOS settings saved in the BIOS Flash. Press <Enter>, and choose a profile to load.

### Start O.C. Profile

Allows you to run the utility to save and load CMOS. Press <Enter> to run the utility.



- This function can support devices such as a USB flash disk or a floppy disk with FAT 32/16 format and single partition only.
  - DO NOT shut down or reset the system while updating the BIOS to prevent the system boot failure!
  - Suggest only to update the BIOS file coming from the same memory/CPU configuration and BIOS version.
  - Only the "xxx.CMO" file can be loaded.
- 

## 2.8.4 AI NET 2

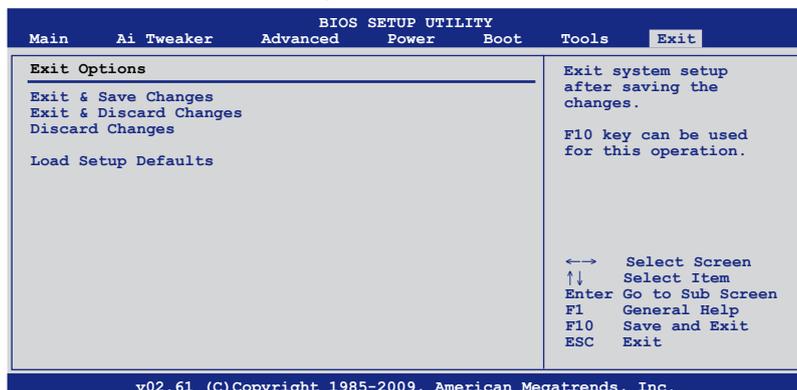
### Check Marvell Phy LAN cable [Disabled]

Enables or disables checking of the Marvell LAN cable during the Power-On Self-Test (POST).

Configuration options: [Disabled] [Enabled]

## 2.9 Exit menu

The Exit menu items allow you to load the optimal or failsafe default values for the BIOS items, and save or discard your changes to the BIOS items.



Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

### Exit & Save Changes

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. An onboard backup battery sustains the CMOS RAM so it stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select **OK** to save changes and exit.



If you attempt to exit the Setup program without saving your changes, the program prompts you with a message asking if you want to save your changes before exiting. Press <Enter> to save the changes while exiting.

### Exit & Discard Changes

Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than System Date, System Time, and Password, the BIOS asks for a confirmation before exiting.

### Discard Changes

This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select **OK** to discard any changes and load the previously saved values.

### Load Setup Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **OK** to load default values. Select **Exit & Save Changes** or make other changes before saving the values to the non-volatile RAM.