M4A78-HTPC
Series

Motherboard

E4642

Second Edition V2
April 2009

Contents

Contents

Contents

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.

> 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.

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.

REACH

Complying with the REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulatory framework, we published the chemical substances in our products at ASUS REACH website at http://green.asus.com/english/REACH.htm.

> **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.

> **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.

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: **afudos /iM4A78HT.ROM**

M4A78-HTPC specifications summary

CPU	AMD® Phenom™ X4 / Phenom™ X3 / Athlon™ X2 / Athlon™ / Sempron™ processors (socket AM2+/AM2) Supports AM3 Phenom™ II / Athlon™ X4/ Athlon™ X3 / Athlon™ X2 AMD® 45nm CPU support AMD Cool'n'Quiet™ Technology
Chipset	AMD® 780G / SB700
System bus	Up to 5200 MT/s; HyperTransport™ 3.0 interface for AM3 / AM2+ CPU 2000 / 1600 MT/s for AM2 CPU

Memory	Dual-channel memory architecture
	  - 4 x 240-pin DIMM sockets support unbuffered ECC / non-ECC DDR2 1066* / 800 / 667 MHz memory modules
	  - Supports up to 16GB system memory
	* Due to AMD® CPU limitation, DDR2 1066 is supported by AM3 / AM2+ CPUs for one DIMM per channel only. Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors Lists).
	** 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.

VGA	Integrated ATI Radeon™ HD 3200 GPU
	  - Supports HDMI™ Technology with max. resolution up to 1920 x 1200 (1080P)
	  - Supports Dual-link DVI with max. resolution up to 2560 x 1600 @ 60Hz
	  - Supports D-Sub with max. resolution up to 2560 x 1440 @ 75Hz for 16:9 format
	  - Hybrid CrossFireX™ support
	    HDMI / DVI / D-Sub support (Dual independent displays support with HDMI / DVI and D-Sub)
	  - Supports Microsoft® DirectX 10, OpenGL 2.0, Pixel Shader 4.0
	  - Hardware Decode Acceleration for H.264, VC-1, and MPEG-2
	  - Maximum shared memory of 256MB

Expansion Slots	1 x PCIe 2.0 x16 slot 2 x PCIe x1 slots 1 x PCI 2.2 slot

M4A78-HTPC specifications summary

Storage	1 x Ultra DMA 133/100/66 for up to 2 PATA devices 5 x SATA 3.0 Gb/s ports with RAID 0, 1 and 10 support 1 x External SATA 3.0 Gb/s port * Due to Window® XP/Vista™ limitation, the RAID array with the total capacity over 2TB cannot be set as a boot disk. A RAID array over 2TB can only be set as a data disk only.
LAN	Atheros® L1E Gigabit LAN controller featuring AI NET 2
High Definition Audio	10-channel High Definition Audio CODEC - Supports Jack-Detection and Multi-Streaming - Optical/Coaxial S/PDIF Out ports at back I/O - 2-channel gold-plated RCA output at back I/O - DTS Surround Sensation UltraPC - ASUS Noise Filter
USB	10 x USB 2.0 /1.1 ports (6 ports at midboard; 4 ports at back panel)
AI Lifestyle Unique Features	**ASUS Power Solution:** - ASUS 4+1 Phase Power Design **ASUS Absolute Pitch Hi-Fi** **ASUS Quiet Thermal Solution:** - ASUS Tranquil Mode (AM3/AM2+ CPUs only) - ASUS Fanless Design: heatsink solution **ASUS Express Gate** **ASUS Home Theater Gate** **ASUS Crystal Sound** - ASUS Noise Filter **ASUS EZ DIY** - ASUS Q-Connector - ASUS CrashFree BIOS 3 - ASUS EZ Flash 2
Other Features	ASUS MyLogo 2™

M4A78-HTPC specifications summary

ASUS Exclusive Overclocking Features	**Precision Tweaker:** - vCore: Adjustable CPU voltage at 50mv increment **SFS (Stepless Frequency Selection):** - FSB tuning from 200MHz up to 550MHz at 1MHz increment - GPU tuning from 500MHz up to 999MHz - PCIe frequency tuning from 100MHz up to 150MHz at 1MHz increment **Overclocking protection:** - ASUS C.P.R. (CPU Parameter Recall)
Rear panel I/O ports	1 x S/PDIF Out port (Coaxial) 1 x S/PDIF Out port (Optical) 2-channel RCA audio output ports 1 x HDMI Out port 1 x D-Sub Out port 1 x DVI Out port 1 x LAN (RJ-45) port 4 x USB 2.0/1.1 ports 1 x External SATA port 8-channel audio I/O ports
Internal I/O connectors	3 x USB connectors support 6 USB ports 1 x IDE connector 5 x SATA connectors 1 x CPU Fan connector 2 x Chassis Fan connector 1 x Power Fan connector 1 x Front panel audio connector 1 x S/PDIF Out Header 1 x CD audio in 1 x 24-pin ATX Power connector 1 x 4-pin ATX 12V Power connector 1 x 4-pin Audio Power connector 1 x System Panel (Q-Connector)

M4A78-HTPC specifications summary

BIOS features	8 Mb Flash ROM, AMI BIOS, PnP, DMI 2.0, WfM2.0, SM BIOS 2.5, ACPI 2.0, ASUS EZ Flash 2
Support DVD contents	Drivers ASUS Express Gate ASUS Home Theater Gate ASUS PC Probe II ASUS Update Anti-Virus Utility (OEM version)
Form factor	ATX form factor: 9.6 in x 9.6 in (24.4 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® M4A78-HTPC 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 M4A78-HTPC motherboard
Cables	1 x Ultra DMA 133/100/66 cable
	1 x Serial ATA signal cable
Accessories	1 x I/O shield
	1 x 2 in 1 Q-connector (USB and system panel; Retail version only)
	1 x Remote controller (RC Edition only)
	1 x IR receiver (RC Edition 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.

AMD® 780G chipset

The AMD 780G Northbridge is the latest AMD chipset designed for both HT1.0 and 5200MT/s HyperTransport™ 3.0 (HT 3.0) interface speed and external graphics in PCI Express 2.0 standard. It features the integrated ATI RV610-based graphics and fully Directx 10.0 compliant.

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 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.

AMD® Hybrid CrossFireX Technology

Hybrid CrossFireX Technology is a unique multi-GPU technology combining the onboard GPU and the discrete graphics card together to enhance 3D graphics performance.

> Visit www.amd.com for the Hybrid CrossfireX selected GPUs.

1.3.2   Innovative ASUS features

ASUS Power Solution

ASUS 4+1 Phase Power Design

To fully unleash the next-generation AM3 CPU's potential, ASUS M4A78-HTPC motherboard has adopted a brand-new 4-phase VRM power design. It delivers high power efficiency and supreme overclocking ability. Furthermore, high quality power components can effective lower system temperature to ensure longer component lifespan. ASUS M4A78-HTPC also features an extra 1-phase power for integrated memory/HT controller to provide independent power to vital components.

ASUS HTPC Features

Absolute Pitch Hi-Fi

The independent audio power supply, which is an unprecedented design on motherboards, effectively reduces electrical noise and ensures the purity of sounds. Its gold-plated RCA stereo audio connectors are compatible with amplifiers and do not require any additional connectors, making it easy and simple to connect your PC to your home theater speakers.

• For better sound quality, connect a power plug to the 4-pin audio power connector. Refer to page 1-26 for details.

• If you intend to use the RCA audio output function in Windows® Vista™ OS, set the **RCA Audio** item in the BIOS to [Enabled]. Refer to page 2-15 for details.

ASUS Tranquil Mode

The revolutionary ASUS Tranquil Mode effectively reduces fan speeds, which lower the CPU power usage while increasing energy efficiency. With the reduction in fan speeds, the noise also decreases, thus providing you with the perfect environment to enjoy watching movies or playing music.

ASUS Tranquil Mode is supported by AM3/AM2+ CPU only.

ASUS Home Theater Gate

The ASUS Home Theater Gate, specially designed for the HTPC series, allows you to easily and quickly launch media applications to enjoy your music and movies.

For RC Edition: Use the bundled remote controller to launch the ASUS Home Theater Gate and start media applications.

ASUS Unique Features

ASUS Express Gate

Express Gate is an ASUS exclusive OS, which lets you instantly access the Internet and key applications before entering Windows®.

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.

SB_PWR

ON
Standy Power

OFF
Powered Off

M4A78-HTPC Onboard LED
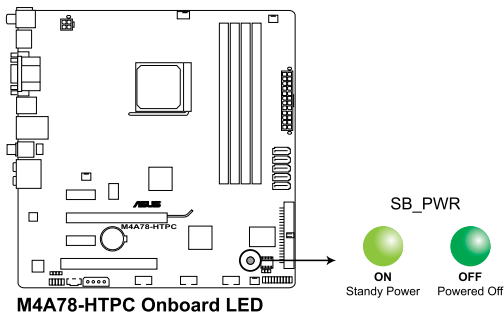
1.5   Motherboard overview

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 eight 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.

Place this side towards the rear of the chassis.

M4A78-HTPC

1.5.3 Motherboard layout

SPDIF_O12
ATX12V
HDMI
DVI
VGA
SOCKET AM2
CPU_FAN
PWR_FAN
ESATA_USB34
LAN1_USB12
DDR2 DIMM_A1 (64bit, 240-pin module)
DDR2 DIMM_B1 (64bit, 240-pin module)
DDR2 DIMM_A2 (64bit, 240-pin module)
DDR2 DIMM_B2 (64bit, 240-pin module)
EATXPWR
RCA_OUT
AUDIO
CHA_FAN1
AMD 780G
PCIEX1_1
/ASUS
PCIEX16_1
M4A78-HTPC
PCIEX1_2
Lithium Cell CMOS Power
AMD SB700
Super I/O
SATA5
SATA4
SATA3
SATA2
SATA1
PRI_IDE
SB_PWR
BIOS
CLRTC
PANEL
SPDIF_OUT
CD
AUDIO_PWR
AAFP
USB56
USB78
USB910
CHA_FAN2

1.5.4 Layout contents

Connectors/Jumpers/Slots	Page
1. ATX power connectors (24-pin EATXPWR, 4-pin ATX12V)	1-22
2. CPU socket AM2+/AM2	1-7
3. CPU, Chassis and Power Fan connectors (4-pin CPU_FAN, 3-pin CHA_FAN1–2, 3-pin PWR_FAN)	1-21
4. DDR2 DIMM slots	1-10
5. Serial ATA connectors (7-pin SATA1-5)	1-24
6. IDE connector (40-1 pin PRI_IDE)	1-23
7. Onboard LED (SB_PWR)	1-4
8. Clear RTC RAM (CLRTC)	1-17
9. System panel connector (10-1 pin PANEL)	1-25
10. USB connectors (10-1 pin USB56, USB78, USB910)	1-26
11. Audio power connector (4-pin AUDIO_PWR)	1-26
12. Optical drive audio in connector (4-pin CD)	1-27
13. Front panel audio connector (10-1 pin AAFP)	1-28
14. Digital audio connector (4-1 pin SPDIF_OUT)	1-27

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.
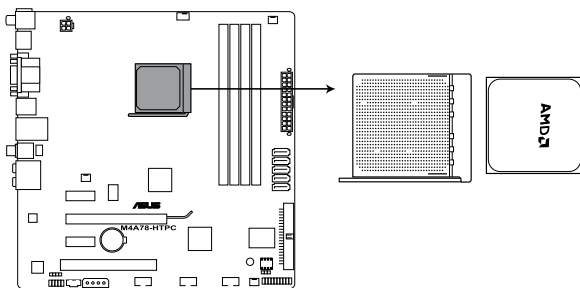
M4A78-HTPC CPU socket AM2+/AM2

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

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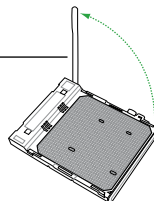
> Ensure that the socket lever is lifted up to 90°–100° angle, otherwise the CPU will not fit in completely.

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!

Small triangle

Gold triangle
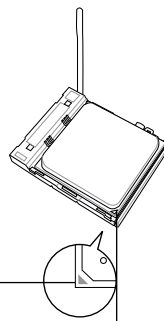
5. When the CPU is in place, push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.

6. 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 the heatsink and fan** for instructions.

7. Connect the CPU fan cable to the CPU_FAN connector on the motherboard.
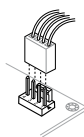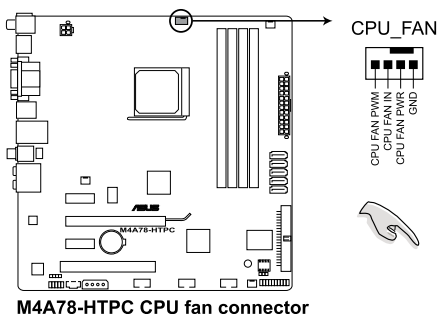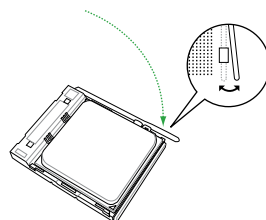
CPU_FAN

CPU FAN PWM
CPU FAN IN
CPU FAN PWR
GND

M4A78-HTPC 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:

1. 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.

CPU Fan

CPU Heatsink

Retention bracket

Retention Module Base

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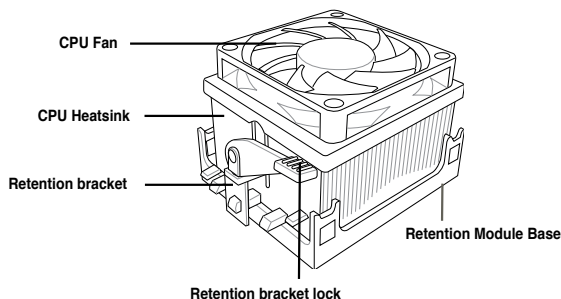
Your boxed CPU heatsink and fan assembly should come with installation instructions for the CPU, heatsink, and the retention mechanism. If the instructions in this section do not match the CPU documentation, follow the latter.

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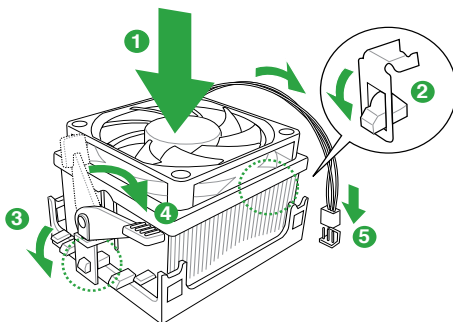
3.   Align the other end of the retention bracket to the retention module base. A clicking sound denotes that the retention bracket is in place.

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.

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

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:
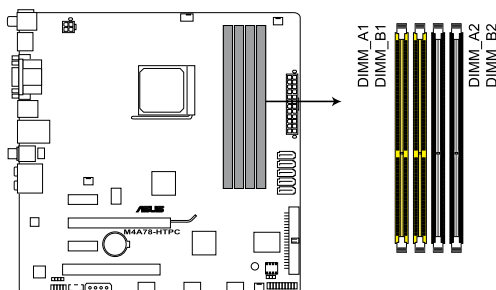
M4A78-HTPC 240-pin DDR2 DIMM sockets

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 Mb chips or less. (Memory chip capacity counts in Megabit, 8 Megabit/Mb=1 Megabyte/MB.)

- • 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.

M4A78-HTPC 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*
Apacer	BoxP/N:CH.02GAF.C0KK2 (78.0AG9S.9KF)	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15		•	•	•
Apacer	BoxP/N:CH.04GAF.F0KK2 (78.AAGAL.9KF)	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15			•	•
CORSAIR	BoxP/N:TWIN2X4096-8500C5DF (CM2X2048-8500C5D)(EPP)	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	2.1	•		•
Crucial	BL12864AA106A.8FE5(EPP)	1024MB	SS	N/A	Heat-Sink Package	5-5-5-15	2.0			•
G.SKILL	F2-8500CL5S-1GBPK	1024MB	DS	N/A	Heat-Sink Package	5-5-5-15	2.0-2.1	•	•	•
G.SKILL	F2-8500CL5D-2GBPK	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	2.0-2.1	•		•
G.SKILL	F2-8500CL5D-4GBPK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	2.0-2.1	•	•	•
GEIL	GB22GB8500C5DC	2048MB(Kit of 2)	SS	GEIL	GL2L128M88BA25AB	5-5-5-15	2.2-2.4			•
GEIL	GE22GB1066C5DC	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	5-5-5-15	2.2-2.4			•
GEIL	GE24GB1066C5QC	4096MB(Kitof4)	SS	N/A	Heat-Sink Package	5-5-5-15	2.2-2.4	•		•
GEIL	GE24GB1066C5DC	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	2.2-2.4	•		•
GEIL	GB24GB8500C5QC	4096MB(Kitof4)	DS	GEIL	GL2L128M88BA25AB	5-5-5-15	2.2-2.4			•
Hynix	HYMP564U64FP8-G7	512MB	SS	HYNIX	HY5PS12821FFP-G7	7				•
Hynix	HYMP 512U64FP8-G7	1024MB	DS	HYNIX	HY5PS12821FFP-G7	7-7-7-12				•
KINGMAX	KLED48F-A8KI5-EPA	1024MB	DS	KINGMAX	KKA8FEIBF-HJK-18A					•
KINGSTON	KHX8500D2/ 512	512MB	SS		Heat-Sink Package				•	•
KINGSTON	KHX8500D2K2/1G	1024MB(Kit of 2)	SS	N/A	Heat-Sink Package		2.2		•	•
KINGSTON	KHX8500D2K2/1GN(EPP)	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	800-5-5-5-18	2.2			•
KINGSTON	KHX8500D2/1G	1024MB	DS	N/A	Heat-Sink Package		2.2			•
KINGSTON	KVR1066D2N7/1G	1024MB	DS	ELPIDA	E5108AJBG-1J-E	1066-5-5-5-15	1.8	•		•
KINGSTON	KHX8500D2K2/2G	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package		2.2	•		•
MICRON	MT8HTF12864AY-1GAE1	1024MB	SS	MICRON	D9JKH	7			•	•
MICRON	MT16HTF25664AY-1GAE1	2048MB	DS	MICRON	D9JKH	7		•		•
SAMSUNG	M378T2953GZ3-CF8	1024MB	DS	SAMSUNG	K4T51083QG	7				•
Transcend	TX1066QLU-2GK	2048MB(Kit of 2)	SS	ELPIDA	Heat-Sink Package	5		•		•
Transcend	TX1066QLU-4GK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5		•	•	•
BUFFALO	FSX1066D2C-1G	1024MB	DS	N/A	Heat-Sink Package	5-5-5-15 (800-5-5-5-15)				•
BUFFALO	FSX1066D2C-K4G	2048MB	DS	N/A	Heat-Sink Package	5-5-5-15		•	•	•
Elixir	M2Y1G64TU8HC4B-BD	1024MB	DS	Elixir	N2TU 51280CE-BD	6			•	•
Kingbox	N/A	1024MB	DS	MICRON	7YDI2		1.8	•	•	•
Mushkin	996612	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	2.1			•
Mushkin	996619	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	2.0-2.1	•		•
Patriot	PVS24G8500ELK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15 (1066-5-5-5-15)	2.1	•		

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*
Apacer	78.91G9I.9K5	512MB	SS	APACER	AM4B5708JQJS8E	5		•	•	
Apacer	78.01GA0.9K5	1024MB	SS	APACER	AM4B5808CQJS8E	5		•	•	•
Apacer	78.01GA0.9L5	1024MB	SS	Apacer	AM4B5808FEWS8E	5(800-5-5-5-18)		•	•	•
Apacer	78.A1GA0.9K4	2048MB	DS	APACER	AM4B5808CQJS8E	5		•	•	•
Apacer	78.A1GA0.9L4	2048MB	DS	Apacer	AM4B5808FEWS8E	5(800-5-5-5-18)		•	•	•
CORSAIR	CM2X1024-6400C4	1024MB	SS	N/A	Heat-Sink Package	4	1.9	•	•	•
CORSAIR	BoxP/N:TWIN2X4096-6400C4DHX (CM2X2048-6400C4DHX)Ver1.1	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	4-4-4-12	2.10	•	•	•
CORSAIR	BoxP/N:TWIN2X4096-6400C5 (CM2X2048-6400C5)Ver3.1	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-18	1.80	•	•	•
CORSAIR	BoxP/N:TWIN2X4096-6400C5DHX (CM2X2048-6400C5DHX)Ver4.1	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-18	1.80	•	•	•
Crucial	BL12864AA80A.8FE5(EPP)	1024MB	SS	N/A	Heat-Sink Package	4-4-4-12	2.0	•	•	•
Crucial	BL25664AA80A.16FE5(EPP)	2048MB	DS	N/A	Heat-Sink Package	4-4-4-12	2.0	•	•	•
G.SKILL	F2-6400CL5D-1GBNQ	1024MB(Kit of 2)	SS	N/A	Heat-Sink Package	5-5-5-15	1.8-2.0	•	•	•
G.SKILL	F2-6400CL4D-2GBPK	1024MB	DS		Heat-Sink Package	4		•	•	•
G.SKILL	F2-6400PHU2-2GBNR	1024MB	DS		Heat-Sink Package	5		•	•	•
G.SKILL	F2-6400CL4D-4GBPK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	4	2.0-2.1	•	•	•
G.SKILL	F2-6400CL5D-4GBPQ	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5	1.8-1.9	•	•	•
G.SKILL	F2-6400CL6D-4GBMQ	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	6	1.8-1.9	•	•	•
G.SKILL	F2-6400CL6D-8GBMQ	8192MB(Kit of 2)	DS	N/A	Heat-Sink Package	6-6-6-18	1.8	•	•	•
GEIL	GB22GB6400C4DC	2048MB(Kit of 2)	DS	GEIL	GL2L64M088BA30EB	4-4-4-12	2.0	•	•	•
GEIL	GB22GB6400C5DC	2048MB(Kit of 2)	DS	GEIL	GL2L64M088BA30EB	5-5-5-15	1.8	•		
GEIL	GE22GB800C4DC	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package	4-4-4-12	2.0	•	•	•
GEIL	GE22GB800C5DC	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	1.8	•	•	•
GEIL	GX22GB6400DC	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	1.8	•	•	•
GEIL	GX22GB6400UDC	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package	4-4-4-12	2.1	•	•	•
GEIL	GX22GB6400C4USC	2048MB	DS	N/A	Heat-Sink Package			•	•	•
GEIL	GX22GB6400LX	2048MB	DS	N/A	Heat-Sink Package	5-5-5-15		•	•	•
GEIL	GB24GB6400C4DC	4096MB(Kit of 2)	DS	GEIL	GL2L128M88BA25AB	4-4-4-12	2.0	•	•	•
GEIL	GB24GB6400C5DC	4096MB(Kit of 2)	DS	GEIL	GL2L128M88BA25AB	5-5-5-15	1.8	•	•	•
GEIL	GB24GB6400C5QC	4096MB(Kit of 2)	DS	GEIL	GL2L64M088BA30EB	5-5-5-15	1.8	•	•	•
GEIL	GE24GB800C4DC	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	4-4-4-12	2.0	•	•	•
GEIL	GE24GB800C5DC	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	1.8	•	•	•
GEIL	GX24GB6400DC	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	1.8	•	•	•
GEIL	GB24GB6400C4QC	4096MB(Kitof4)	DS	GEIL	GL2L64M088BA30EB	4-4-4-12	2.0	•	•	•
GEIL	GE24GB800C4QC	4096MB(Kitof4)	DS	N/A	Heat-Sink Package	4-4-4-12	2.0	•	•	•
GEIL	GE24GB800C5QC	4096MB(Kitof4)	DS	N/A	Heat-Sink Package	5-5-5-15	1.8	•	•	•
GEIL	GB28GB6400C4QC	8192MB(Kitof4)	DS	GEIL	GL2L128M88BA25AB	4-4-4-12	2.0	•	•	•
GEIL	GB28GB6400C5QC	8192MB(Kitof4)	DS	GEIL	GL2L128M88BA25AB	5-5-5-15	1.8	•	•	•
GEIL	GE28GB800C4QC	8192MB(Kitof4)	DS	N/A	Heat-Sink Package	4-4-4-12	2.0	•	•	•
GEIL	GE28GB800C5QC	8192MB(Kitof4)	DS	N/A	Heat-Sink Package	5-5-5-15	1.8	•	•	•
Hynix	HYMP564U64CP8-S5	512MB	SS	HYNIX	HY5PS12821CFP-S5	5	1.8	•	•	•
Hynix	HYMP112U64CP8-S6	1024MB	SS	HYNIX	HY5PS1G831CFP-S6	6		•	•	•
Hynix	HYMP 512U64CP8-S5	1024MB	DS		HY5PS12821CFP-S5	5		•	•	•
KINGMAX	KLDC28F-A8KI5	512MB	SS	KINGMAX	KKA8FEIBF-HJK-25A			•	•	•
KINGMAX	KLDD48F-ABKI5	1024MB	DS	KINGMAX	KKA8FEIBF-HJK-25A			•	•	•
KINGMAX	KLDE88F-B8KB5	2048MB	DS	KINGMAX	KKB8FFBXF-CFA-25A			•	•	•
KINGSTON	KVR800D2N5/ 512	512MB	SS	ELPIDA	E5108AJBG-8E-E		1.8	•	•	•
KINGSTON	KVR800D2N6/ 512	512MB	SS	ELPIDA	E5108AJBG-8E-E		1.8	•	•	•
KINGSTON	KHX6400D2LLK2/1GN(EPP)	1024MB(Kit of 2)	SS	N/A	Heat-Sink Package	4	2.0	•	•	•
KINGSTON	KVR800D2N5/1G	1024MB	SS	KINGSTON	D1288TEFCGL25U	800-5-5-5-18	1.8	•	•	
KINGSTON	KVR800D2N5/1G	1024MB	SS	KINGSTON	D1288TPFCGL25U	800-5-5-5-15	1.8	•	•	
KINGSTON	KHX6400D2LL/1G	1024MB	DS	N/A	Heat-Sink Package	4	2.0	•	•	•
KINGSTON	KVR800D2N6/1G	1024MB	DS	ELPIDA	E5108AJBG-8E-E		1.8	•	•	•
KINGSTON	KHX6400D2LLK2/2GN(EPP)	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package				•	
KINGSTON	KHX6400D2/2G	2048MB	DS	N/A	Heat-Sink Package		2.0	•	•	•

DDR2-800MHz capability (continued)

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)		
								A*	B*	C*
KINGSTON	KVR800D2N6/4G	4096MB	DS	ELPIDA	E2108ABSE-8G-E			•	•	•
NANYA	NT 512T64U88B0BY-25C	512MB	SS		NT5TU64M8BE-25C	5		•	•	•
NANYA	NT1GT64U8HB0BY-25C	1024MB	DS		NT5TU64M8BE-25C	5		•	•	•
NANYA	NT1GT64U8HCOBY-25D	1024MB	DS	NANYA	NT5TU64M8CE-25D			•	•	•
NANYA	NT2GT64U8HC0BY-AC	2048MB	DS	NANYA	NT5TU128M8CE-AC	5		•	•	•
OCZ	OCZ2G8001G	1024MB	DS	N/A	Heat-Sink Package	5	1.8	•	•	•
OCZ	OCZ2G8002GK	1024MB	DS		Heat-Sink Package	5		•		
OCZ	OCZ2T8002GK(EPP)	1024MB	DS	N/A	Heat-Sink Package	5	1.8	•	•	•
OCZ	OCZ2FX800C32GK	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package	3-4-4(800-5-5-5-15)	2.35	•	•	•
OCZ	OCZ2P8004GK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-4-4	1.8	•	•	•
OCZ	OCZ2G8008GK	8192MB(Kit of 2)	DS	N/A	Heat-Sink Package	5	1.80	•	•	•
OCZ	OCZ2VU80016GQ	8192MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-6-6(800-5-5-5-15)	1.8	•	•	•
PSC	AL7E8G73F-8E1	1024MB	SS	PSC	P3R1GE3FGF850MAC19	5(800-5-5-18)		•	•	•
PSC	AL8E8F73C-8E1	2048MB	DS	PSC	A3R1GE3CFF734MAA0E	5		•	•	•
PSC	AL8E8G73F-8E1	2048MB	DS	PSC	P3R1GE3FGF850MAC19	5(800-5-5-18)		•	•	•
SAMSUNG	M378T6553GZS-CF7	512MB	SS	SAMSUNG	K4T51083QG	6		•	•	•
SAMSUNG	M378T2863QZS-CF7	1024MB	SS	SAMSUNG	K4T1G084QQ	6		•	•	•
SAMSUNG	M391T2863QZ3-CF7	1024MB	DS	SAMSUNG	K4T1G084QQ(ECC)	6		•	•	•
SAMSUNG	M378T2953GZ3-CF7	1024MB	DS	SAMSUNG	K4T51083QG	6		•	•	•
SAMSUNG	M378T5663QZ3-CF7	2048MB	DS	SAMSUNG	K4T1G084QQ(ECC)	6		•	•	•
SAMSUNG	M391T5663QZ3-CF7	2048MB	DS	SAMSUNG	K4T1G084QQ	6		•	•	•
SAMSUNG	M378T5263AZ3-CF7	4096MB	DS	SAMSUNG	K4T2G084QA-HCF7	6		•	•	•
Super Talent	T800UA12C4	512MB	SS		Heat-Sink Package			•	•	•
Super Talent	T800UB1GC4	1024MB	DS		Heat-Sink Package			•	•	•
Transcend	JM800QLU-1G	1024MB	SS	Transcend	TQ243ECF8	5		•	•	•
Transcend	TS128MLQ64V8U	1024MB	SS	ELPIDA	E1108ACBG-8E-E	5		•	•	•
Transcend	JM800QLU-2G	2048MB	DS	Transcend	TQ243PCF8	5		•	•	•
Transcend	TS256MLQ64V8U	2048MB	DS	ELPIDA	E1108ACBG-8E-E	5		•	•	•
Transcend	TS256MLQ72V8U	2048MB	DS	ELPIDA	E1108ACBG-8E-E(ECC)	5		•	•	•
Asint	SLY2128M8-JGE	1024MB	SS	Asint	DDRII1208-GE				•	
Asint	SLZ2128M8-JGE	2048MB	DS	Asint	DDRII1208-GE			•	•	•
CENTURY	28V2H8	512MB	SS	HYNIX	HY5PS12821BFP-S5			•	•	
CENTURY	28VOH8	1024MB	DS	HYNIX	HY5PS12821BFP-S5			•	•	
Elixir	M2Y1G64TU88D4B-AC	1024MB	SS	Elixir	N2TU1G80DE-AC	5		•	•	•
Elixir	M2Y1G64TU8HB0B-25C	1024MB	DS	Elixir	N2TU 51280BE-25C	5	1.8	•	•	•
Elixir	M2Y2G64TU8HD4B-AC	2048MB	DS	Elixir	N2TU1G80DE-AC	5		•	•	•
Kingbox	N/A	2048MB	DS	Kingbox	EPD2128082200E-3	800-5-5-5-15		•	•	•
Kingbox	N/A	2048MB	DS	MICRON	D9HNL			•	•	•
Kingbox	N/A	2048MB	DS	KINGBOX	EPD2128082200E-3			•	•	•
Mushkin	XP2-6400	1024MB	SS		Heat-Sink Package	4		•	•	•
Oci	04701G16CZ5D2A	1024MB	DS	Jnfinity	64M8PC6400	5		•	•	•
Patriot	PSD2 51280081	512MB	SS	PATRIOT	PM64M8D2BU-25EC			•	•	•
Patriot	PSD21G8002	1024MB	DS	PATRIOT	PM64M8D2BU-25PAC	5		•	•	•
Patriot	PSD22GB002	2048MB	DS	PATRIOT	PM128M8D2BU-25KC	5		•	•	•
Patriot	PDC24G6400LLK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	4-4-4-12	2.2	•	•	•
Silicon Power	SP001GBLRU800S02	1024MB	SS	S-POWER	10YR9N3	5(5-5-5-15)		•	•	•
Silicon Power	SP002GBLRU800S02	2048MB	DS	S-POWER	10YR9N3	5(5-5-5-15)		•		
UMAX	D48002GP1-73BEB	2048MB	DS	UMAX	U2S24D30TP-8E	800-5-5-5-15		•	•	•

DDR2-667MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)		
								A*	B*	C*
Apacer	78.91G92.9K5	512MB	SS	APACER	AM4B5708JQJS7E	5		•	•	•
Apacer	78.01G9O.9K5	1024MB	SS	APACER	AM4B5808CQJS7E	5		•	•	•
Apacer	78.A1G9O.9K4	2048MB	DS	APACER	AM4B5808CQJS7E	5		•	•	•
CORSAIR	VS 512MB667D2	512MB	SS	N/A	64M8CFEG	N/A	N/A	•	•	•
CORSAIR	VS1GB667D2	1024MB	DS	N/A	64M8CFEG	N/A	N/A	•	•	•
ELPIDA	EBE51UD8AEFA-6E-E	512MB	SS	ELPIDA	E5108AE-6E-E	5	1.7-1.9	•	•	•
G.SKILL	F2-5400PHU2-2GBNT	2048MB(Kit of 2)	DS	G.Skill	D264M8GCF	5-5-5-15	1.8	•	•	•
G.SKILL	F2-5300CL5D-4GBMQ	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	1.8-1.9	•	•	•
GEIL	GX21GB5300SX	1024MB	DS	N/A	Heat-Sink Package			•	•	•
GEIL	GX22GB5300LX	2048MB	DS	N/A	Heat-Sink Package	5-5-5-15		•	•	•
GEIL	GX24GB5300LDC	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	5-5-5-15	1.8	•	•	•
Hynix	HYMP112U64CP8-Y5	1024MB	SS	HYNIX	HY5PS1G831CFP-Y5	5		•	•	•
Hynix	HYMP 512U64CP8-Y5	1024MB	DS	HYNIX	HY5PS12821CFP-Y5	5	1.8	•	•	•
KINGSTON	KVR667D2N5/ 512	512MB	SS	KINGSTON	D6408TR7CGL25U	667-5-5-5-15	1.8	•	•	•
KINGSTON	KVR667D2N5/2G	2048MB	DS	SAMSUNG	K4T1G084QE	667-5-5-5-15	1.8	•	•	•
KINGSTON	KVR667/D2N5/1G	1024MB	DS	ELPIDA	E5108AJBG-6E-E	667-5-5-5-15	1.8	•	•	•
KINGSTON	KVR667D2E5/1G	1024MB	DS	ELPIDA	E5108AGBG-6E-E(ECC)		1.8	•	•	•
KINGSTON	KVR667D2E5/2G	2048MB	DS	MICRON	D9HNL(ECC)		1.8	•	•	•
KINGSTON	KVR667D2N5/2G	2048MB	DS	KINGSTON	D1288TPFCGL25U	667-5-5-5-15	1.8	•	•	•
NANYA	NT 512T64U88B0BY-3C	512MB	SS	NANYA	NT5TU64M8BE-3C	5	1.8	•	•	•
NANYA	NT2GT64U8HB0JY-3C	2048MB	DS		NT5TU128M8BJ-3C	5		•	•	•
OCZ	OCZ26671024V	1024MB	SS	Ramos	RC1GT084CA0-53EC	5	1.8		•	•
SAMSUNG	M378T6553EZS-CE6	512MB	SS	SAMSUNG	K4T51083QE	5		•	•	•
SAMSUNG	M378T2953EZ3-CE6	1024MB	DS	SAMSUNG	K4T51083QE	5		•	•	•
SAMSUNG	M378T5263AZ3-CE6	4096MB	DS	SAMSUNG	K4T2G084QA-HCE6	5		•	•	•
Super Talent	T6UA 512C5	512MB	SS	N/A	Heat-Sink Package	5	1.8	•	•	•
Super Talent	T6UB1GC5	1024MB	DS	N/A	Heat-Sink Package	5	1.8	•	•	•
TwinMOS	8D-23JK5M2ETP	512MB	SS	TwinMOS	TMM6208G8M30C	5	1.8	•	•	•
Asint	SLX264M8-J6E	512MB	SS	Asint	DDRII6408-6E			•	•	•
Asint	SLY2128M8-J6E	1024MB	SS	Asint	DDRII1208-6E			•	•	•
CENTURY	26V2H8	512MB	SS	HYNIX	HY5PS12821CFP-Y5	5	1.85	•	•	•
CENTURY	26VOH8	1024MB	DS	HYNIX	HY5PS12821CFP-Y5	5	1.85	•	•	•
Dynet	DNHM5U 512C8FE-A6	512MB	SS	Dynet	DN5HS82CFE-A6			•		
Kingbox	N/A	1024MB	SS	KINGBOX	EPD2128082200E-4			•	•	•
Kingbox	N/A	1024MB	DS	KINGBOX	EPD264082200E-4		1.8	•	•	•
Kingbox	N/A	1024MB	DS	KINGBOX	EPD264082200N-4			•	•	•
MDT	M 512-667-8	512MB	SS	MDT	18D 51280D-30648	4	1.8	•	•	•
MDT	M924-667-16	1024MB	DS		18D 51280D-30646E	4		•	•	
MDT	M924-667-16A	1024MB	DS	MDT	18D 51200D-30646	4	1.8	•	•	•
Patriot	PSD21G6672	1024MB	DS	PATRIOT	PM64M8D2BU-3PAC	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.

DDR2 DIMM notch

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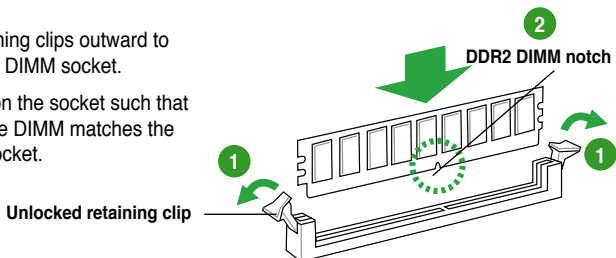
✍ A DDR2 DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.

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

Locked Retaining Clip
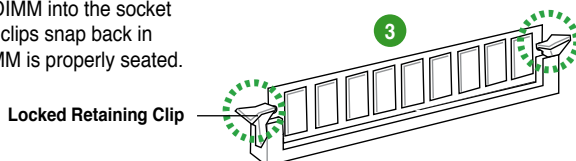
1.7.4   Removing a DIMM

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.
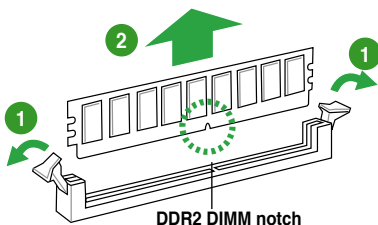
2.   Remove the DIMM from the socket.

DDR2 DIMM notch

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 slot

The PCI slot supports 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 2.0 x16 slot

This motherboard supports a PCI Express 2.0 x16 graphics card that complies with the PCI Express specifications.

1.9 Jumpers

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.

M4A78-HTPC Clear RTC RAM

CLRTC

1 2   2 3

Normal (Default)   Clear RTC
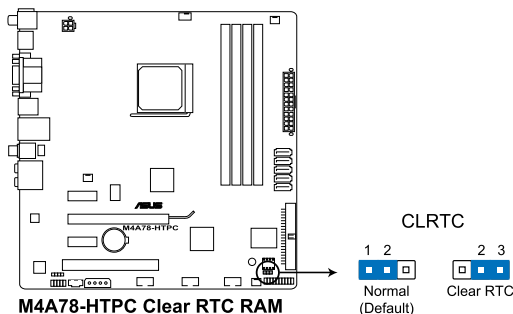
To erase the RTC RAM

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.

1.10 Connectors

1.10.1 Rear panel connectors
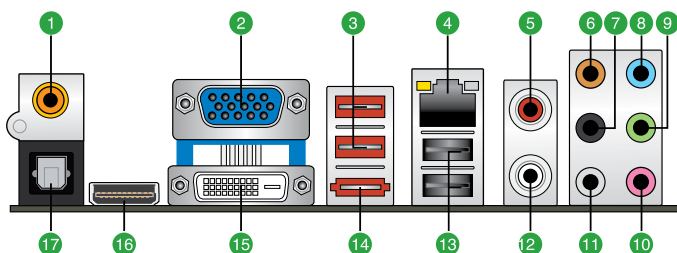
1. **Coaxial S/PDIF Out port.** This port connects an external audio output device via an coaxial S/PDIF cable.

2. **Video Graphics Adapter (VGA) port** This 15-pin port is for a VGA monitor or other VGA-compatible devices.

3. **USB 2.0 ports 3 and 4.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

4. **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)

Left LED   Right LED

LAN port
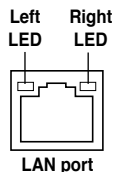
5. **RCA Out port (right-channel).** This port connects a receiver or a TV via an RCA cable.

6. **Center/Subwoofer port (orange).** This port connects the center/subwoofer speakers.

7. **Rear Speaker Out port (black).** This port connects the rear speakers in a 4-channel, 6-channel, or 8-channel audio configuration.

8. **Line In port (light blue).** This port connects the tape, CD, DVD player, or other audio sources.

9. **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.

10. **Microphone port (pink).** This port connects a microphone.

11. **Side Speaker Out port (gray).** This port connects the side speakers in an 8-channel audio configuration.

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

Audio 2, 4, 6, or 8-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

12. **RCA Out port (left-channel).** This port connects a receiver or a TV via an RCA cable.

13. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

> • For RC edition, connect the IR receiver to USB 2.0 port 1 or 2 which supports with power-on function.
>
> • To disable the power-on function for USB 2.0 port 1 or 2, set the **Power on from USB12** item to [Disabled] in the BIOS. When the **Power on from USB12** item is set to [Enabled], connecting/disconnecting the USB devices to/from these two ports will power on the system. Refer to page 2-17 for details.

14. **External SATA port.** This port connects an external Serial ATA hard disk drive.

> • The external SATA port supports external Serial ATA 3.0 Gb/s devices. Longer cables support higher power requirements to deliver signal up to two meters away, and enables improved hot-swap function.
>
> • Before using the External SATA port, ensure to set the **OnChip SATA Type** in the BIOS settings to [AHCI] and install the AHCI driver.

> DO NOT insert a different connector to this port.

15. **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.

16. **HDMI Out port.** This port is for a high-definition multimedia interface (HDMI) connector.

17. **Optical S/PDIF Out port.** This port connects an external audio output device via an optical S/PDIF cable.

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 4400+
DIMM	DDR2 800 (1GB or higher)
BIOS setup	Frame Buffer Size--256MB or higher
Playback software	CyberLink® PowerDVD 7.3

File format	Best resolution	
	Windows XP	Windows Vista
Non-protected clips	1920 x 1080p	1920 x 1080p
HD-DVD	1920 x 1080p	1280 x 1080p
Blu-Ray	1280 x 1080p	1280 x 1080p

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 **AMD Chipset Driver** from the motherboard support DVD.

2. Right-click the desktop and select **ATI CATALYST(R) Control Center**.

3. From the **Graphics Settings** tree, expand **DTV (HDMI™) 1**.

4. Click **Scaling Options**.

5. Move the **Underscan/Overscan** slider to adjust the overall size of the display on the HDMI™ DTV.
   Using this slider increases or decreases any black borders that may be visible around the outside of the display.
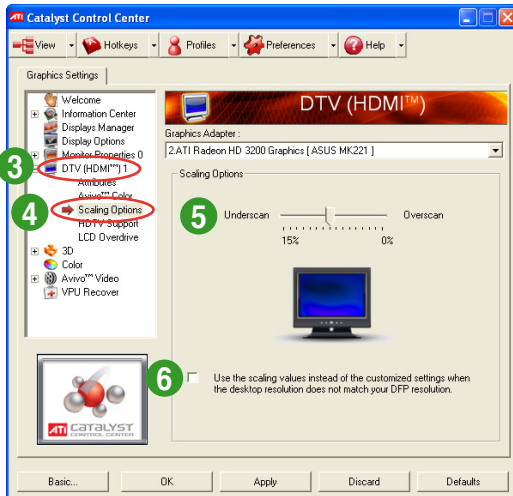
6. To ensure that forcing a custom display mode through the ATI Displays Manager does not create conflicting resolutions, select the **Use the scaling values instead of the customized settings when the desktop resolution does not match your DFP resolution** check box.

> The **Scaling Options** function of the **DTV (HDMI™) 1** item in the ATI CATALYST Control Center is adjustable only when you are using an HDTV compliance resolution such as 480i, 720i, or 1080i.

1.10.2 Internal connectors

1. **CPU, Chassis and Power Fan connectors (4-pin CPU_FAN, 3-pin CHA_FAN1–2, 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.

M4A78-HTPC Fan connectors
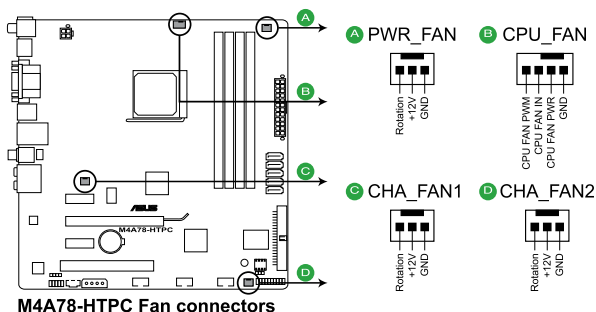
> 🖉 Only the CPU_FAN and CHA_FAN1–2 connectors support the ASUS Q FAN 2 feature.

2. 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.

M4A78-HTPC ATX power connectors
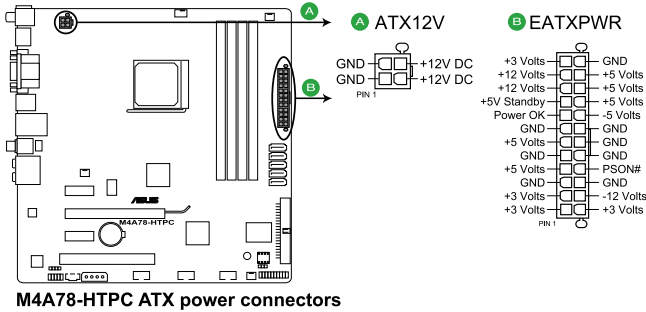
- We recommend that you use an ATX 12 V Specification 2.0-compliant power supply unit (PSU) with a minimum of 300 W power rating. This PSU type has 24-pin and 4-pin power plugs.

- 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.

3.   **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:

PRI_IDE

PIN1

NOTE: IDE ribbon cable is marked with a red, white, or black strip on one side, match this to PIN 1.

M4A78-HTPC IDE connector
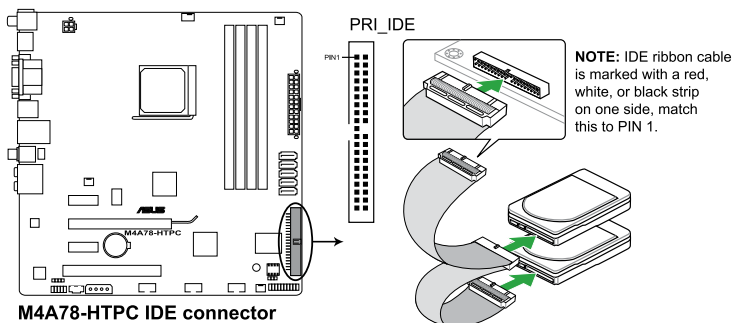
	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
	Slave	Slave	

• 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.

4. Serial ATA connectors (7-pin SATA1-5)

These connectors are for the Serial ATA signal cables for Serial ATA 3Gb/s hard disk and optical disk drives. The Serial ATA 3Gb/s is backward compatible with Serial ATA 1.5Gb/s specification. The data transfer rate of the Serial ATA 3Gb/s is faster than the standard parallel ATA with 133 MB/s (Ultra DMA133). If you install Serial ATA hard disk drives, you can create a RAID 0, RAID 1 or RAID 10 configuration through the onboard SB700 chipset.

M4A78-HTPC SATA connectors
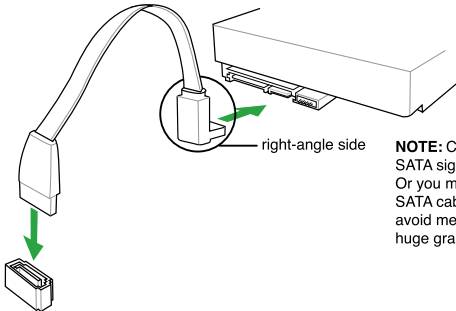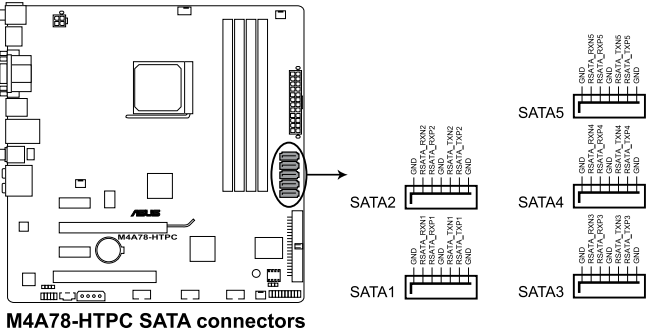
right-angle side

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.

Important note on Serial ATA

Install Windows® XP Service Pack 2 or later version before using Serial ATA.

- For detailed instructions on how to configure RAID 0, RAID 1 and RAID 10, refer to the RAID manual in the support DVD.

- If you intend to create a Serial ATA RAID set using these connectors, set the **OnChip SATA Type** item in the BIOS to **[RAID]**. See page 2-8 for details.

5. System panel connector (10-1 pin PANEL)

This connector supports several chassis-mounted functions.
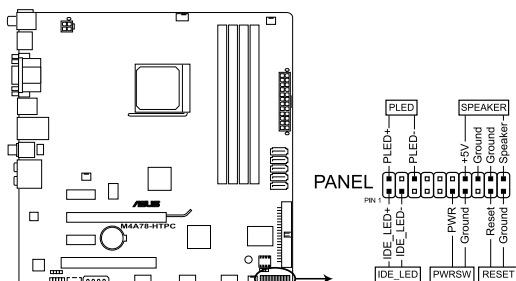
M4A78-HTPC System panel connector

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

  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 IDE_LED)**

  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.

- **System warning speaker (4-pin SPEAKER)**

  This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **ATX power button/soft-off button (2-pin PWRSR)**

  This 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.

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

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.

M4A78-HTPC USB2.0 connectors
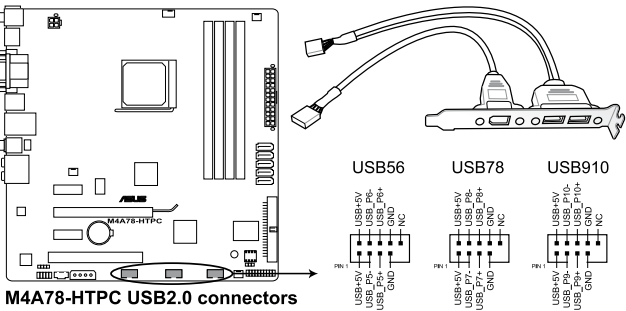
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

The USB 2.0 module is purchased separately.

7.   Audio power connector (4-pin Audio_PWR)

This connector is for a 4-pin power plug from a power supply. Connect a power plug to this audio power connector for better sound quality.

AUDIO_PWR

M4A78-HTPC Audio power connector
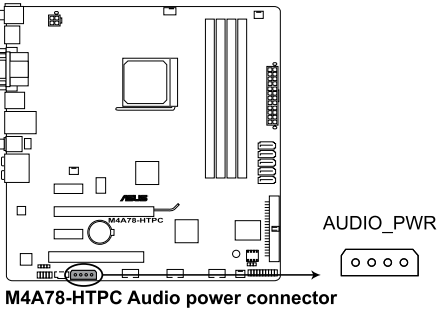
Do not share the same power cable with other devices to reduce the electronic interruption.

8. 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.

CD

Left Audio Channel
GND
GND
Right Audio Channel

M4A78-HTPC Internal audio connector
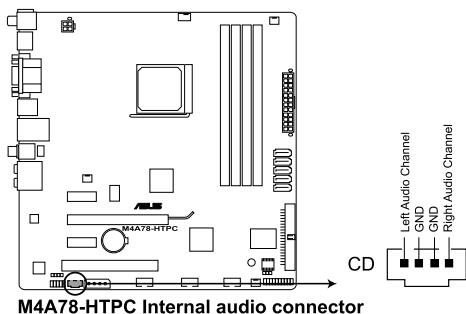
9. Digital audio connector (4-1 pin SPDIF_OUT)

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

SPDIF_OUT

+5V
SPDIFOUT
GND

M4A78-HTPC Digital audio connector
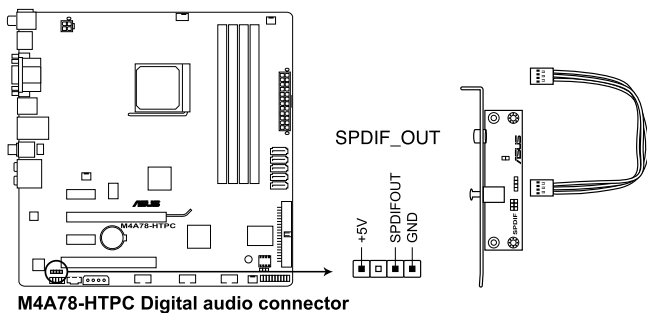
The S/PDIF module is purchased separately.

10. 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.

M4A78-HTPC Analog front panel connector
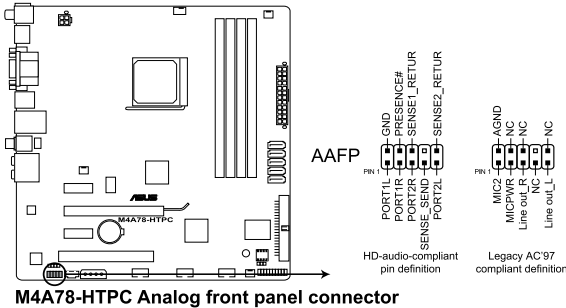
• We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard high-definition audio capability.

• 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]. 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)

You can use the ASUS Q-Connector to connect/disconnect chassis front panel cables in a few steps. Refer to the instructions below 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, then match them to the respective front panel cable labels.

    The labels of the front panel cables may differ from chassis made by different manufacturers.
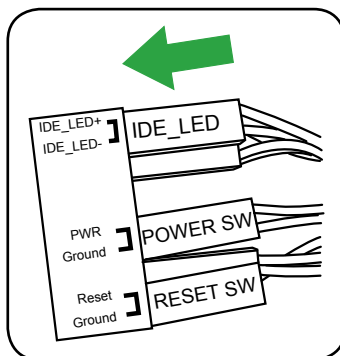
2. Install the ASUS Q-Connector to the system panel connector, making sure the orientation matches the labels on the motherboard.
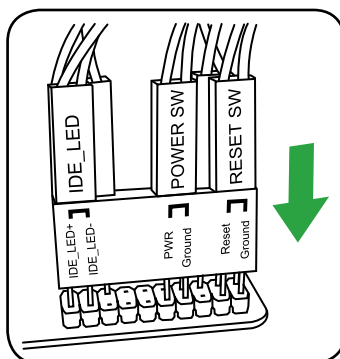
3. The front panel functions are now enabled. The figure shows the Q-Connector properly installed on the motherboard.
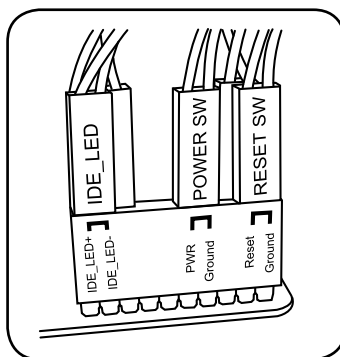
1.11   Software support

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 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.

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 on the next page is used for reference only.
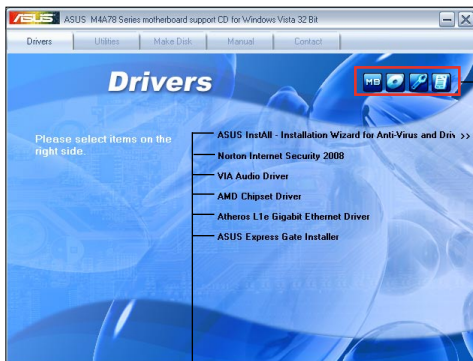
**Click an icon to
display Support DVD/
motherboard information**

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.

1.11.3   ASUS Home Theater Gate

The ASUS Home Theater Gate, specially designed for the HTPC series, allows you to easily and quickly launch media applications to enjoy your music and movies. With the bundled remote controller, you can launch the ASUS Home Theater Gate and start media applications with just one touch.

Launching Home Theater Gate

1.   Install Home Theater Gate from the motherboard support DVD.

2.   To launch Home Theater Gate ,click **Start > All Programs > ASUS > ASUS Home Theater Gate > ASUS Home Theater Gate v1.xx.xx**. The Home Theater Gate main window appears.

Home Theater Gate main window

Click to minimize the Home Theater Gate window. Click the Home Theater Gate icon in the Windows® notification area to restore the window

Click to return to the previous page

Click to close the Home Theater Gate window

Click to return to the main window

Allows you to view photos

Allows you to playback videos

Allows you to create your music playlists

Allows you to configure the Silent Mode, Media Path Settings, Internet Radio Settings, and Favorite Music

Allows you to playback videos

Supported type

Resolution	Normal display under 1024 x 600 – 1920 x 1080
Music	mp3, midi, wav, wma and cda
Video	avi, mp4, mpeg, rmvb, wmv, rm, mov, asf, mpg, vob and dat
Photo	bmp, dib, gif, jpg, jpeg, png, tif, tiff
DTS	Windows® Vista™ OS (HDMI and analog out only)
Video player	Windows® Media Player, PowerDVD 8 (Cyberlink), WinDVD 9 (Corel/InterVideo), KMPlayer, Media Player Classic and RealPlayer
Music player	Windows® Media Player, Winamp, KMPlayer, RealPlayer, iTunes

Visit the ASUS website at http://support.asus.com/download/download. aspx?SLanguage=en-us for the latest supported type.

Using the remote controller (RC Edition only)

Use the remote controller to launch the ASUS Home Theater Gate and start media applications.

Connect the IR receiver to the USB 2.0 port 1 or 2 before using the remote controller.

Power on/off*	Mute
	Play/Pause
Fast rewind	Fast forward
Stop	
Previous track	Next track
Volume up	Volume down
OK	Scroll up
Scroll left	Scroll right
	Scroll down
Main window	Previous page
Switch windows	Full screen
Internet Radio**	Silent mode
Music***	DTS on/off
	Launch Home Theater Gate/Minimize Home Theater Gate window
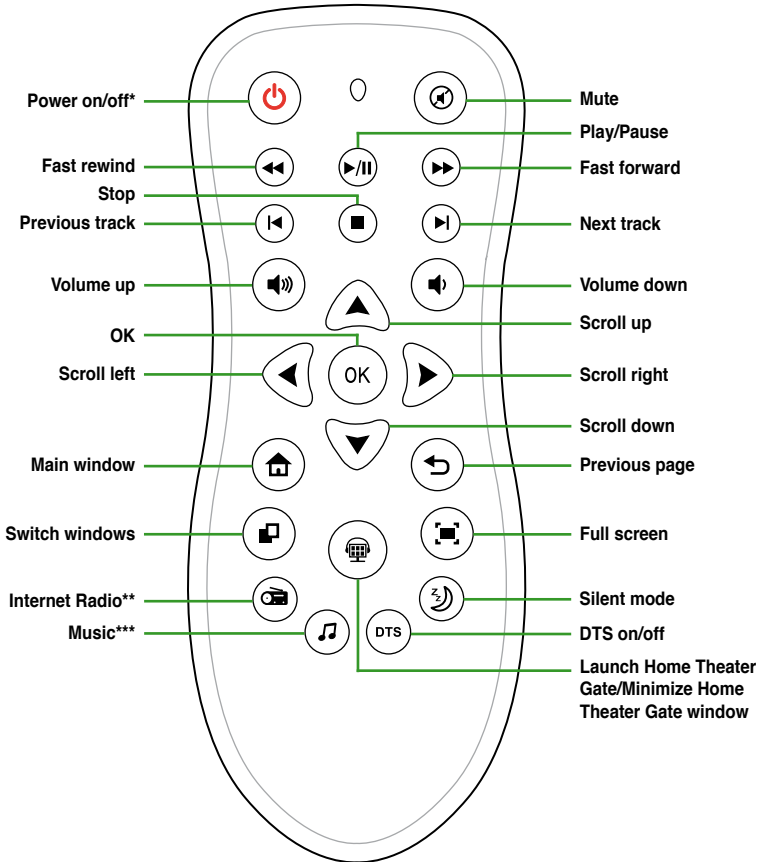
* This button follows the behavior of the system sleep button. Actual behavior of the system sleep button can be customized in Windows® Control Panel > Power Options.

** Set up the internet radio channel 1 to 7 before using the Internet Radio.

*** Set the Favorite Music in the Settings or Music mode first.

Chapter 2

BIOS information

2.1 Managing and updating your BIOS

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

2.1.1 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.

## 2.1.2	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.

Before you start using this utility, download the latest BIOS from the ASUS website at www.asus.com.

To update the BIOS using EZ Flash 2:

1.	Insert the USB flash disk that contains the latest BIOS file to the USB port, and then launch EZ Flash 2 in any of these two ways:

•	Press <Alt> + <F2> during POST to display the following.

•	Enter the BIOS setup program. Go to the **Tools** menu to select **EZ Flash 2** and press <Enter> to enable it.a.

```
             ASUSTek EZ Flash 2 BIOS ROM Utility V3.34
    FLASH TYPE: MXIC 25L8005
    ┌─ Current ROM ──────────────┐  ┌─ Update ROM ──────────────┐
    │  BOARD: M4A78-HTPC         │  │  BOARD: Unknown           │
    │  VER: 0205                 │  │  VER: Unknown             │
    │  DATE: 02/25/2009          │  │  DATE: Unknown            │
    └────────────────────────────┘  └───────────────────────────┘
    PATH: A:\

    │  A:                        │
    │                            │
    │                            │
    │                            │
    │                            │
    │                            │
    │                            │

    ┌─ Note ──────────────────────────────────────────────────┐
    │  [Enter] Select or Load    [Tab] Switch    [V] Drive Info │
    │  [Up/Down/Home/End] Move    [B] Backup      [Esc] Exit     │
    └──────────────────────────────────────────────────────────┘
```
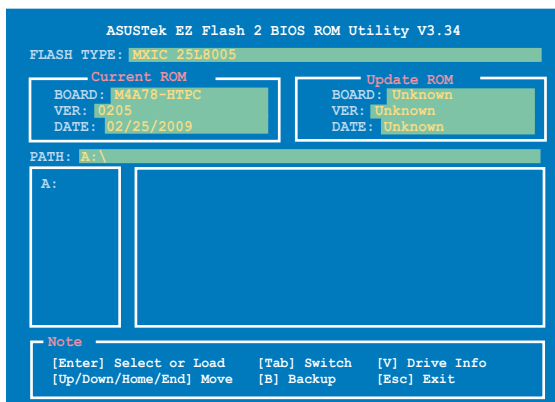
2.	Press <Tab> to switch between drives until the correct BIOS file is found. When the correct BIOS file is found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when done.

•	This function can support devices such as a USB flash 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!

Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit menu. See section **2.9 Exit Menu** for details.

2.1.3   ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 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 USB flash drive 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 and save it to a USB flash drive.

Recovering the BIOS

To recover the BIOS:

1.   Turn on the system.

2.   Insert the motherboard support DVD to the optical drive, or the USB flash drive containing the BIOS file to the USB port.

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 updating 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 to download the latest BIOS file for this motherboard.

2.2.1 BIOS menu screen

Menu items   Menu bar   Configuration fields   General help

```
                        BIOS SETUP UTILITY
  Main      Advanced    Power    Boot    Tools     Exit

  System Time              [10:17:30]            Use [ENTER], [TAB]
  System Date              [Tue 03/10/2009]      or [SHIFT-TAB] to
  Language                 [English]             select a field.

 ▶ SATA 1                  :[Not Detected]       Use [+] or [-] to
 ▶ SATA 3                  :[Not Detected]       configure system Time.
 ▶ SATA1                   :[Not Detected]
 ▶ SATA2                   :[Not Detected]
 ▶ SATA3                   :[Not Detected]
 ▶ SATA4                   :[Not Detected]
 ▶ SATA5                   :[Not Detected]
 ▶ ESATA                   :[Not Detected]       ←→   Select Screen
 ▶ SATA Configuration                            ↑↓   Select Item
                                                 +-   Change Field
 ▶ System Information                            Tab  Select Field
                                                 F1   General Help
                                                 F10  Save and Exit
                                                 ESC  Exit

       v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```

Submenu items   Navigation keys

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
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 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.
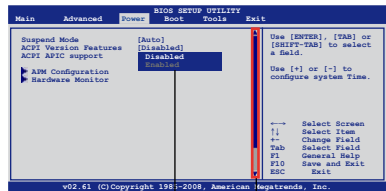
Scroll bar

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     Advanced     Power      Boot     Tools      Exit

   System Time               [10:17:30]             Use [ENTER], [TAB]
   System Date               [Tue 03/10/2009]       or [SHIFT-TAB] to
   Language                  [English]              select a field.

   ▶  SATA 1                 :[Not Detected]        Use [+] or [-] to
   ▶  SATA 3                 :[Not Detected]        configure system Time.
   ▶  SATA1                  :[Not Detected]
   ▶  SATA2                  :[Not Detected]
   ▶  SATA3                  :[Not Detected]
   ▶  SATA4                  :[Not Detected]
   ▶  SATA5                  :[Not Detected]
   ▶  ESATA                  :[Not Detected]        ←→    Select Screen
   ▶  SATA Configuration                            ↑↓    Select Item
                                                    +-    Change Field
   ▶  System Information                            Tab   Select Field
                                                    F1    General Help
                                                    F10   Save and Exit
                                                    ESC   Exit

         v02.61 (C)Copyright 1985-2008, 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   Language [English]

Allows you to select the display language for the BIOS setup screen.
Configuration options: [Chinese(BIG5)] [Chinese(GB)] [Français] [German] [English]

2.3.4   SATA 1/SATA 3

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]

2.3.5   SATA 1–5/ESATA

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.

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]

> This item appears in **SATA5** and **ESATA** only.

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 Configuration

This menu allows you to configure the SATA devices.

OnChip SATA Channel [Enabled]

Enables or disables the OnChip SATA Channel.
Configuration options: [Enabled] [Disabled]

OnChip SATA Type [IDE]

This item appears only when you set the **OnChip SATA Channel** item to [Enabled] and
allows you to select the SATA type. Configuration options: [IDE] [RAID] [AHCI]

- If you want the Serial ATA hard disk drives to use the Advanced Host Controller Interface (AHCI), set this item to [AHCI]. 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 [AHCI] in BIOS, only SATA ports 1–4 can be detected in BIOS. Ensure to install the AHCI driver to detect and use SATA ports 1–5 and ESTA port in AHCI mode under OS.

- If you want to create a RAID 0, RAID 1, and RAID 10 configuration from the Serial ATA hard disk drives, set this item to [RAID].

2.3.7 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 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    Advanced    Power    Boot    Tools    Exit
┌─────────────────────────────────────────┬──────────────────────────────┐
│ ▶  JumperFree Configuration              │  Adjust System               │
│ ▶  CPU Configuration                     │  Frequency/Voltage etc.      │
│ ▶  Chipset                               │                              │
│ ▶  Onboard Devices Configuration         │                              │
│ ▶  PCIPnP                                │                              │
│ ▶  USB Configuration                     │                              │
│                                          │                              │
│                                          │                              │
│                                          │                              │
│                                          │  ←→   Select Screen          │
│                                          │  ↑↓   Select Item            │
│                                          │  Enter Go to Sub Screen      │
│                                          │  F1   General Help           │
│                                          │  F10  Save and Exit          │
│                                          │  ESC  Exit                   │
└─────────────────────────────────────────┴──────────────────────────────┘
        v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```
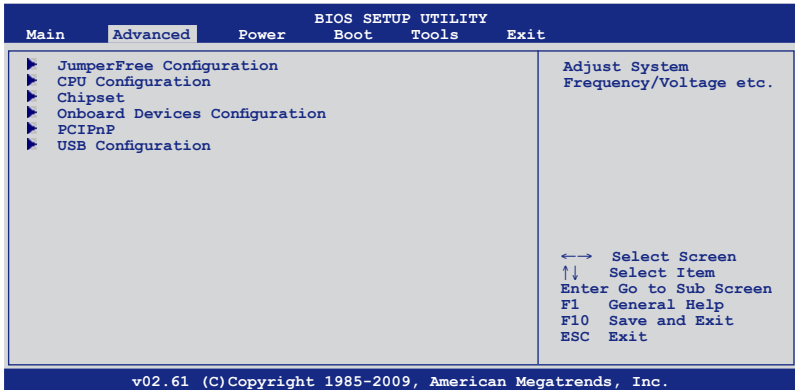
2.4.1 JumperFree Configuration

The items in this menu allows you to configure overclocking-related items.

CPU OverClocking [Auto]

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

> ##### *CPU/HT Reference Clock (MHz) [xxx]*
> This item appears only when you set the **CPU OverClocking** item to [Manual] and allows you to manually set the CPU/HT Reference clock. Use the <+> and <-> keys to adjust the value. You can also type the desired value using the numeric keypad. The values range from 200 to 550.

Overclock Options [Auto]

This item appears only when you set the **CPU OverClocking** item to [Overclock Profile] and allows you to adjust the overclock percentage.
Configuration options: [Auto] [Overclock 2%] [Overclock 5%] [Overclock 8%] [Overclock 10%]

GPU OverClocking [Auto]

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

> ##### *GPU Engine Clock [xxx]*
> This item appears only when you set the **GPU OverClocking** item to [Manual] and allows you to manually set the GPU engine clock. Use the <+> and <-> keys to adjust the value. You can also type the desired value using the numeric keypad. The values range from 500 to 999.

PCIE OverClocking [Auto]

Allows selection of PCIE overclocking options. Configuration options: [Auto] [Manual]

PCIE Clock [xxx]

This item appears only when you set the **PCIE OverClocking** item to [Manual] and allows you to manually set the PCIE frequency. Use the <+> and <-> keys to adjust the value. You can also type the desired value using the numeric keypad. The values range from 100 to 150.

Processor Frequency Multiplier [Auto]

Allows you to adjust the ratio between CPU Core Clock and FSB Frequency.
Configuration options: [Auto] [x8.0 1600 MHz] [x8.5 1700 MHz] [x9.0 1800 MHz] [x9.5 1900 MHz] [x10.0 2000 MHz] [x10.5 2100 MHz] [x11.0 2200 MHz] [x11.5 2300 MHz]

Processor Voltage [Auto]

Allows you to set the CPU VCore voltage.
Configuration options: [Auto] [+ 50mv] [+ 100mv] [- 100mv]

Processor-NB Voltage [Auto]

Allows you to set the voltage between the CPU and Northbridge.
Configuration options: [Auto] [+ 50mv] [+ 100mv] [- 100mv]

Hyper Transport Speed [Auto]

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

Hyper Transport Width [Auto]

Allows you to set the CPU-Northbridge HyperTransport link width.
Configuration options: [Auto] [4 Bit] [8 Bit] [16 Bit]

Memory Clock Mode [Auto]

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

Memclock Value [xxx]

This item appears only when you set the **Memory Clock Mode** item to [Manual] and allows you to manually set the DRAM frequency.
Configuration options: [667MHz] [800MHz] [1067MHz]

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].

CAS Latency (CL) [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]

tWTR [Auto]

Specifies the write to read delay when accessing the same DIMM.
Configuration options: [1 CLK] [2 CLK] [3 CLK] [Auto]

tRFC0 [Auto]

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

tRFC1 [Auto]

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

tRFC2 [Auto]

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

tRFC3 [Auto]

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

Memory OverVoltage [Auto]

Allows you to set the DRAM voltage.
Configuration options: [Auto] [0mv] [+ 100mv] [+ 200mv] [+ 300mv]

Chipset OverVoltage [Auto]

Allows you to set the DRAM voltage.
Configuration options: [Auto] [+ 50mv] [+ 100mv] [+ 150mv]

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] or [Both].

DCT0:CKE drive strength [Auto]

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

DCT0:CS/ODT drive strength [Auto]

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

DCT0:Address/Command drive str [Auto]

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

DCT0:MEMCLK drive strength [Auto]

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

DCT0:Data drive strength [Auto]

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

DCT0:DQS drive strength [Auto]

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

DCT0:Processor on-die terminat [Auto]

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

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

DCT1:CKE drive strength [Auto]

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

DCT1:CS/ODT drive strength [Auto]

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

DCT1:Address/Command drive str [Auto]

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

DCT1:MEMCLK drive strength [Auto]

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

DCT1:Data drive strength [Auto]

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

DCT1:DQS drive strength [Auto]

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

DCT1:Processor on-die terminat [Auto]

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

2.4.2 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]

CPU Prefetching [Enabled]

Allows you to enable or disable CPU prefetching.
Configuration options: [Enabled] [Disabled]

C1E Configuration [Auto]

Allows you to enable or disable the Enhanced Halt State support.
Configuration options: [Auto] [Disabled]

2.4.3   Chipset

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

NorthBridge Configuration

Memory Configuration

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

Channel Interleaving [Disabled]
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]]

Enable Clock to All DIMMs [Disabled]
Allows you to enable the unused clocks to all DIMMs even if the memory slots are not populated. 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] [Always]

Power Down Enable [Enabled]
Allows you to enable or disable the DDR power down mode.
Configuration options: [Disabled] [Enabled]

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 [Enabled]

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 [Enabled]

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 [Enabled]

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]

Alternate VID [Auto]

Allows you to speciffy the alternate VID while in low power states Use the <+> and <-> keys to adjust the value.

Internal Graphics

This menu allows you to change the onboard graphics configuration settings. Select an item then press <Enter> to display the sub-menu.

Primary Display Adapter [PCI-E]

Allows you to select the graphics controller to use as the primary boot device.
Configuration options: [PCI-E] [PCI] [Onboard]

UMA Frame Buffer Size [Auto]

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

Surround View [Auto]

If you set the PCI Express device as the primary display and enable this item, you may use the internal graphics as the secondary display. Configuration options: [Disabled] [Auto]

CPU Spread Spectrum [Enabled]

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

PCIE Spread Spectrum [Enabled]

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

2.4.4   Onboard Devices Configuration

HD Audio Controller [Enabled]

Allows you to enable or disable the HD Audio controller.
Configuration options: [Disabled] [Enabled]

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]

RCA Audio [Disabled]

Allows you to enable or disable the RCA audio output controller under Windows® Vista™ OS. Under Windows® XP, RCA audio output is always set to [Disabled].
Configuration options: [Disabled] [Enabled]

Onboard LAN Controller [Enabled]

Allows you to enable or disable the onboard LAN. Configuration options: [Enabled] [Disabled]

Onboard LAN Boot ROM [Disabled]

Allows you to enable or disable the onboard LAN Boot ROM.
Configuration options: [Disabled] [Enabled]

2.4.5   PCIPnP

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

Plug And Play O/S [No]

When set to [No], BIOS configures all the devices in the system. 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. Configuration options: [No] [Yes]

2.4.6   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 [Enable]

Allows you to enable or disable the USB Functions. Configuration options: [Enabled] [Disabled]

USB 2.0 Controller [Enable]

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]

2.5   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      Advanced    Power    Boot    Tools     Exit

    Suspend Mode              [Auto]            Select the ACPI state
    ACPI 2.0 Support          [Disabled]        used for System
    ACPI APIC support         [Enabled]         Suspend.

  ▶  APM Configuration
  ▶  Hardware Monitor




                                                ←→   Select Screen
                                                ↑↓   Select Item
                                                +-   Change Option
                                                F1   General Help
                                                F10  Save and Exit
                                                ESC  Exit

          v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```
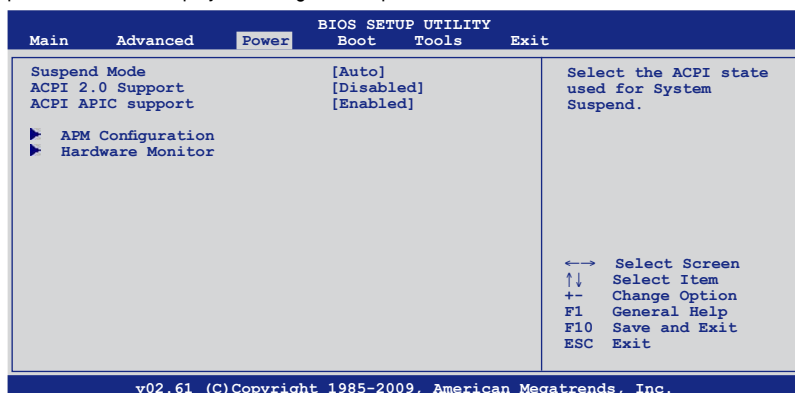
2.5.1   Suspend Mode [Auto]

Allows you to select the Advanced Configuration and Power Interface (ACPI) state to be used
for system suspend.

[S1(POS) Only] - Enables the system to enter the ACPI S1 (Power on Suspend) sleep state.
In S1 sleep state, the system appears suspended and stays in a low power
mode. The system can be resumed at any time.

[S3 Only] - Enables the system to enter the ACPI S3 (Suspend to RAM) sleep state (default).
In S3 sleep state, the system appears to be off and consumes less power than in
the S1 state. When signaled by a wake-up device or event, the system resumes
to its working state exactly where it was left off.

[Auto] - Detected by OS.

2.5.2   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]

2.5.3   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]

2.5.4   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 PCI/PCIE devices [Disabled]

Allows you to enable or sisable the PCI/PCIE devices to generate a wake event.
Configuration options: [Disabled] [Enabled]

Power On By USB 12 [Disabled]

Allows you to enable or disable the USB devices connected to USB port 1 or 2 to generate a wake event. 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]

Power LED [On]

Allows you to turn on or off the standby power LED. Configuration options: [On] [Off]

Audio PWR Reminder [Enabled]

When the system detects that no power cable is plugged in the audio power connector, a reminder will appear during POST. This item allows you to enable or disable this function.
Configuration options: [Enabled] [Disabled]

2.5.5   Hardware Monitor

CPU/MB Temperature [xxxºC/xxxºF]

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 / Chassis Fan 2 / 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

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 [Enabled]

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 [Enabled]

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]

2.6 Boot menu

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

```
                          BIOS SETUP UTILITY
   Main      Advanced      Power      Boot    Tools      Exit

    Boot Settings                              Specifies the Boot
                                               Device Priority
  ▶  Boot Device Priority                      sequence.

  ▶  Boot Settings Configuration
  ▶  Security                                  A virtual floppy disk
                                               drive (Floppy Drive B:
                                               ) may appear when you
                                               set the CD-ROM drive
                                               as the first boot
                                               device.


                                               ←→    Select Screen
                                               ↑↓    Select Item
                                               Enter Go to Sub Screen
                                               F1    General Help
                                               F10   Save and Exit
                                               ESC   Exit

       v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```

2.6.1 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: [Removable Dev.] [Hard Drive] [ATAPI CD-ROM] [Disabled]

2.6.2 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]

2.6.3 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 Jumper**s 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.
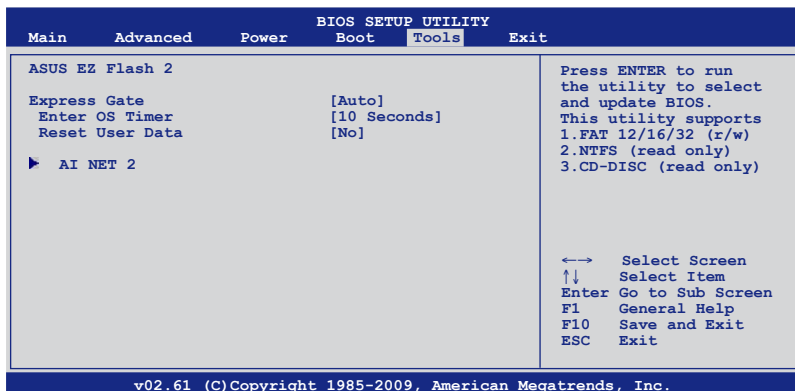
Clear User Password

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]

2.7   Tools menu

```
                          BIOS SETUP UTILITY
  Main     Advanced     Power     Boot     Tools     Exit
┌──────────────────────────────────────────────────────────────────────┐
│  ASUS EZ Flash 2                                  Press ENTER to run   │
│                                                   the utility to select│
│  Express Gate              [Auto]                 and update BIOS.     │
│   Enter OS Timer           [10 Seconds]           This utility supports│
│   Reset User Data          [No]                   1.FAT 12/16/32 (r/w) │
│                                                   2.NTFS (read only)   │
│  ▶  AI NET 2                                      3.CD-DISC (read only)│
│                                                                        │
│                                                                        │
│                                                                        │
│                                                   ←→    Select Screen  │
│                                                   ↑↓    Select Item    │
│                                                   Enter Go to Sub Screen│
│                                                   F1    General Help   │
│                                                   F10   Save and Exit  │
│                                                   ESC   Exit           │
└──────────────────────────────────────────────────────────────────────┘
       v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```

2.7.1   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.

2.7.2   Express Gate [Auto]

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: [Auto] [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.
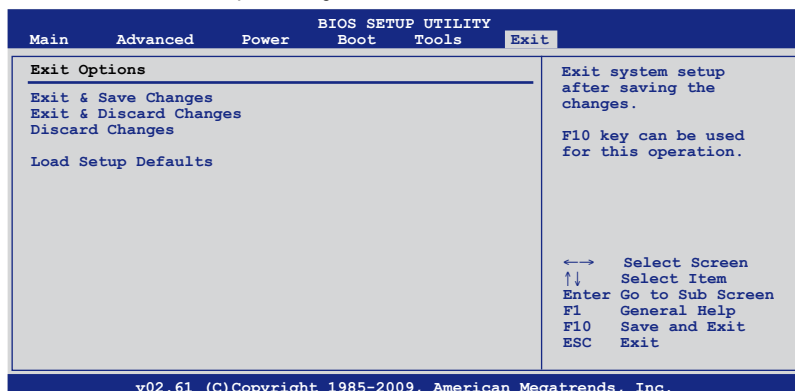
2.7.3   AI NET 2

Check Atheros LAN cable [Disabled]

Enables or disables checking of the Atheros LAN cable during the Power-On Self-Test (POST). Configuration options: [Disabled] [Enabled]

2.8   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.

```
                          BIOS SETUP UTILITY
   Main     Advanced     Power     Boot    Tools    Exit

   Exit Options                                Exit system setup
                                               after saving the
   Exit & Save Changes                         changes.
   Exit & Discard Changes
   Discard Changes                             F10 key can be used
                                               for this operation.
   Load Setup Defaults




                                               ←→   Select Screen
                                               ↑↓   Select Item
                                               Enter Go to Sub Screen
                                               F1   General Help
                                               F10  Save and Exit
                                               ESC  Exit

       v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.
```

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.