

P5AD2-E

ASUS[®]

Motherboard

E2332

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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.

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.
- Make sure 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, make sure 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.



This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste.

Please check local regulations for disposal of electronic products.

About this guide

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

How this guide is organized

This user 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: Hardware information**
This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the switches, jumpers, and connectors on the motherboard.
- **Chapter 3: BIOS setup**
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.
- **Chapter 4: Software support**
This chapter describes the contents of the support CD that comes with the motherboard package.
- **Appendix: CPU features**
The Appendix describes the CPU features and technologies that the motherboard supports.

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.

Conventions used in this guide

To make sure 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.

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 /i[filename]
```

```
afudos /iP5GD2.ROM
```

P5AD2-E specifications summary

CPU	LGA775 socket for Intel® Pentium® 4/Celeron processor Compatible with Intel® PCG 04A and 04B processors Supports Intel® Enhanced Memory 64Technology (EM64T) Supports Enhanced Intel SpeedStep® Technology (EIST) (Note: Due to chipset limitation, P5AD2-E doesn't support Intel Dual-core CPU or 65nm CPU)
Chipset	Northbridge: Intel® 925XE Memory Controller Hub (MCH) Southbridge: Intel® ICH6
Front Side Bus	1066/800/533 MHz
Memory	Dual-channel memory architecture 4 x 240-pin DIMM sockets support unbuffered non-ECC DDR2-711 (FSB 1066)/DDR2-600 (FSB 800)/ DDR2-533 (FSB 1066/800) MHz memory modules Up to 4 GB system memory Native DDR2-711/600 support
Expansion slots	1 x PCI Express x16 slot 2 x PCI Express x1 slots 3 x PCI slots
Storage	Intel® ICH6 South Bridge supports: - 1 x Ultra DMA 100/66/33 hard disk - 4 x Serial ATA hard disks
High Definition Audio	Intel® High Definition Audio (HD Audio) C-Media CMI9880L 7.1-channel audio CODEC
LAN	Marvell® 88E8053 PCI Express™ Gigabit LAN controller Supports Marvell® Virtual Cable Tester technology Supports AI NET2
USB	Supports up to 8 USB 2.0 ports
Overclocking features	ASUS AI Overclocking ASUS NOS (Non-delay Overclocking System) ASUS C.P.R. (CPU Parameter Recall) Adjustable CPU, memory, and PCI Express voltages Stepless Frequency Selection (SFS) from 100 MHz up to 400 MHz at 1 MHz increment Adjustable FSB/DDR2 frequencies with fixed PCI/PCI-E frequencies

(continued on the next page)

P5AD2-E specifications summary

Special features	EZ Flash ASUS Q-Fan2 ASUS CrashFree BIOS 2 ASUS MyLogo2
BIOS features	4 MB Flash ROM, AMI BIOS, PnP, DMI2.0, SM BIOS 2.3, WfM2.0
Manageability	DMI2.0, WfM2.0, PXE, RPL, WOL by PME, WOR by PME
Rear panel	1 x Parallel port 1 x S/PDIF Out port 1 x LAN (RJ-45) port 4 x USB 2.0 ports 1 x PS/2 keyboard port (purple) 1 x PS/2 mouse port (green) 8-channel audio ports
Internal connectors	1 x Floppy disk drive connector 1 x CPU fan connector 1 x Power fan connector 2 x Chassis fan connector 1 x CD audio-in connector 1 x Front panel Audio connector 2 x USB 2.0 connectors support additional 4 USB 2.0 ports 1 x COM connector 1 x GAME/MIDI port connector Chassis intrusion connector 24-pin ATX Power connector 4-pin ATX 12V Power connector System panel connector
Power Requirement	ATX power supply (with 24-pin and 4-pin 12 V plugs) ATX 12V 2.0 compliant
Form Factor	ATX form factor: 12 in x 9.6 in (30.5 cm x 24.4 cm)
Support CD contents	Device drivers ASUS PC Probe ASUS Update Anti-virus software (OEM version) ASUS AI Booster ASUS Screensaver Microsoft® DirectX 9.0C Adobe Acrobat Reader

*Specifications are subject to change without notice.

This chapter describes the motherboard features and the new technologies it supports.

Product introduction



Chapter summary



1.1	Welcome!	1-1
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1.1 Welcome!

Thank you for buying an ASUS® P5AD2-E 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 P5AD2-E motherboard
Cables	1 x Serial ATA signal cables 1 x Serial ATA power cables 1 x Ultra DMA/133 cables 1 X Floppy disk drive cable
Accessories	I/O shield
Application CDs	ASUS motherboard support CD
Documentation	User guide



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

1.3 Special features

1.3.1 Product highlights

Latest processor technology

The motherboard comes with a 775-pin surface mount Land Grid Array (LGA) socket designed for the Intel® Pentium® 4 processor in the 775-land package. The motherboard supports the Intel® Pentium® 4 processor with 1066/800/533 MHz Front Side Bus (FSB). The motherboard also supports the Intel® Hyper-Threading Technology and is fully compatible with Intel® 04B and 04A processors. See page 2-6 for details.

Intel® EM64T

The motherboard supports Intel® Pentium® 4 CPUs with the Intel® EM64T (Extended Memory 64 Technology). The Intel® EM64T feature allows your computer to run on 64-bit operating systems and access larger amounts of system memory for faster and more efficient computing. See the Appendix for details.

Enhanced Intel SpeedStep® Technology (EIST)

The Enhanced Intel SpeedStep® Technology (EIST) intelligently manages the CPU resources by automatically adjusting the CPU voltage and core frequency depending on the CPU loading and system speed or power requirement. See page 3-26 and the Appendix for details.

Intel® 925XE chipset

The Intel® 925XE Memory Controller Hub (MCH) and the ICH6 I/O controller hub provide the vital interfaces for the motherboard. The MCH supports the Intel® Performance Accelerating Technology (PAT) that boosts system performance. The MCH also provides the processor, dual-channel memory, and PCI Express interfaces.

The Intel® ICH6 Southbridge represents the sixth generation I/O controller hub that provides the interface for the storage, I/O, PCI Express, and 8-channel high definition audio interfaces.

DDR2 memory support

The motherboard supports DDR2 memory which features data transfer rates of 711 MHz (FSB 1066), 600 MHz (FSB 800), or 533 MHz (FSB 1066/800) to meet the higher bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications. The dual-channel DDR2 architecture doubles the bandwidth of your system memory to boost system performance, eliminating bottlenecks with peak bandwidths of up to 8.5 GB/s. See pages 2-14 to 2-17 for details.

Serial ATA technology



The motherboard supports the Serial ATA technology through the Serial ATA interfaces and the Intel® ICH6. The SATA specification allows for thinner, more flexible cables with lower pin count, reduced voltage requirement, and up to 150 MB/s data transfer rate. See pages 2-25 for details.

PCI Express™ interface



The motherboard fully supports PCI Express, the latest I/O interconnect technology that speeds up the PCI bus. PCI Express features point-to-point serial interconnections between devices and allows higher clockspeeds by carrying data in packets. This high speed interface is software compatible with existing PCI specifications. See page 2-19 for details.

8-channel high definition audio



Onboard is the C-Media CMI9880L 7.1-channel audio CODEC. This CODEC is fully-compliant with Intel® High Definition Audio standard (192 KHz, 24-bit audio). With the CODEC, 8-channel audio ports, and S/PDIF interfaces, you can connect your computer to home theater decoders to produce crystal-clear digital audio.

The CMI9880L CODEC comes with a software application that features jack detection to monitor the plugging status of each jack, impedance sensing to determine audio device classes, and pre-defined equalization for various audio devices. See pages 2-22 to 2-23, and page 4-11 for details.

S/PDIF digital sound ready



The motherboard supports the S/PDIF technology through the S/PDIF interfaces on the rear panel. The S/PDIF technology turns your computer into a high-end entertainment system with digital connectivity to powerful audio and speaker systems. See page 2-23 for details.

Gigabit LAN solution



The motherboard comes with a Gigabit LAN controller to provide a total solution for your networking needs. The Gigabit LAN controller uses the PCI Express interface to provide faster data bandwidth for your Internet, LAN, and file sharing requirements. See page 2-22 for details.

Temperature, fan, and voltage monitoring

The CPU temperature is monitored by the ASIC (integrated in the Winbond Super I/O) to prevent overheating and damage. The system fan rotations per minute (RPM) is monitored for timely failure detection. The ASIC monitors the voltage levels to ensure stable supply of current for critical components. See page 3-36 for details.

1.3.2 ASUS AI Proactive features



AI NOS™ (Non-Delay Overclocking System)



ASUS Non-delay Overclocking System™ (NOS) is a technology that auto-detects the CPU loading and dynamically overclocks the CPU speed only when needed. See page 3-22 for details.

AI NET2



AI NET2 is a BIOS-based diagnostic tool that detects and reports Ethernet cable faults and shorts. With this utility, you can easily monitor the condition of the Ethernet cable connected to the LAN (RJ-45) port. During the bootup process, AI NET2 immediately diagnoses the LAN cable and reports shorts and faults up to 100 meters at 1 meter accuracy. See pages 3-23 and 4-10 for details.

1.3.3 Innovative ASUS features

ASUS Hyper Path 2 technology



The ASUS Hyper Path 2 technology optimizes the full potential of the Intel® chipset by shortening the latency time between the CPU and the system memory. Enabling Hyper Path 2 on systems with the Intel® PAT improves memory performance without affecting system stability. See the Appendix for details.

Native DDR2-711/600 support



This motherboard offers native DDR2-711/600 memory support to ensure superior system performance. With current processors supporting 1066/800 MHz FSB, DDR2-711/600 provides the fastest solution for eliminating system bottlenecks when running system-intensive applications. See pages 2-14 to 2-15, and 3-20 to 3-21 for details.

CrashFree BIOS 2

This feature allows you to restore the original BIOS data from the support CD in case when the BIOS codes and data are corrupted. This protection eliminates the need to buy a replacement ROM chip. See page 3-5 for details.

ASUS Q-Fan 2 technology

The ASUS Q-Fan 2 technology smartly adjusts the fan speeds according to the system loading to ensure quiet, cool, and efficient operation. See pages 3-36 to 3-37 for details.

ASUS MyLogo2™

This new feature present in the motherboard allows you to personalize and add style to your system with customizable boot logos. See page 4-8 for details.

This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the jumpers and connectors on the motherboard.

Hardware information



Chapter summary



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2.1 Before you proceed

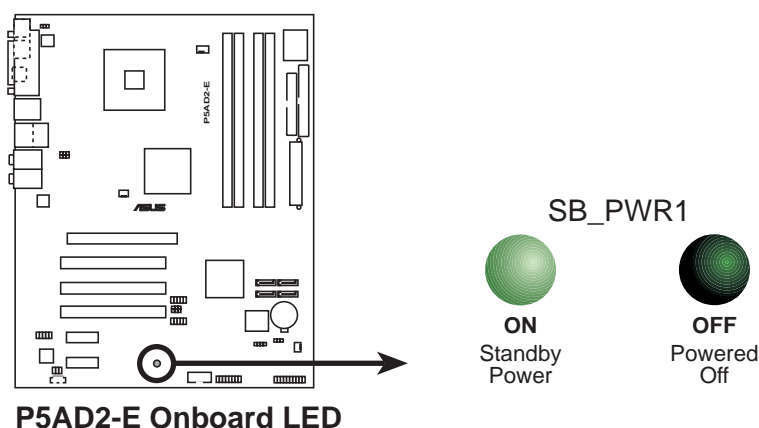
Take note of the following precautions before you install motherboard components or change any motherboard settings.



- Unplug the power cord from the wall socket before touching any component.
- Use a grounded wrist strap or touch a safely grounded object or to a metal object, such as the power supply case, before handling components 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, ensure that the ATX power supply is switched off or the power cord is detached from the power supply.** Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

Onboard LED

The motherboard comes with a standby power LED. The green LED 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.



2.2 Motherboard overview

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.



Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components.

2.2.1 Placement direction

When installing the motherboard, make sure 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.

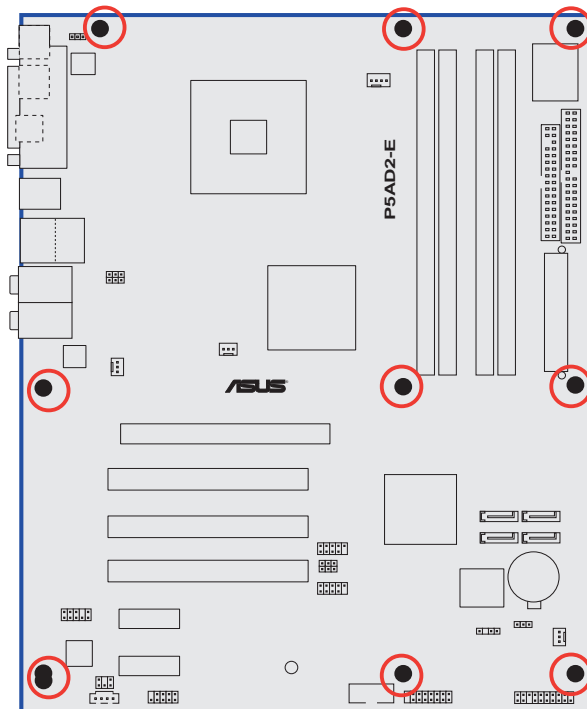
2.2.2 Screw holes

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

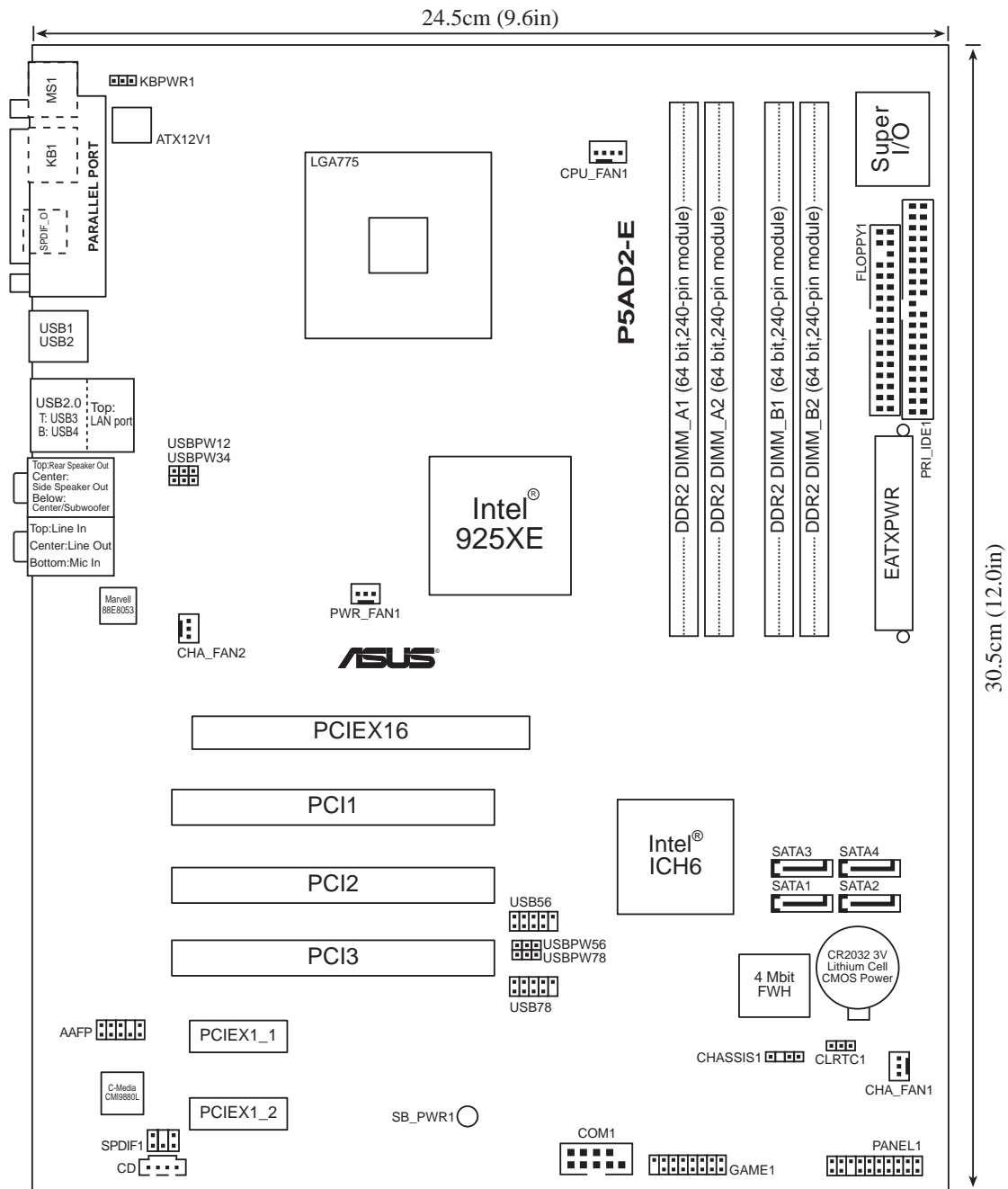


Do not overtighten the screws! Doing so can damage the motherboard.

Place this side towards
the rear of the chassis



2.2.3 Motherboard layout



2.2.4 Layout contents

Slots		Page
1.	DDR2 DIMM slots	2-13
2.	PCI slots	2-17
3.	PCI Express slot	2-19

Jumpers		Page
1.	Clear RTC RAM (3-pin CLRTC1)	2-20
2.	USB Device wake-up (3-pin USBPW12, USBPW34, USBPW56, USBPW78)	2-21
3.	Keyboard power (3-pin KBPWR1)	2-21

Rear panel connectors		Page
1.	Parallel port	2-22
2.	LAN (RJ-45) port	2-22
3.	Rear Speaker Out port (gray)	2-22
4.	Side Speaker Out port (black)	2-22
5.	Line In port (light blue)	2-22
6.	Line Out port (lime)	2-22
7.	Microphone port (pink)	2-23
8.	Center/Subwoofer port (yellow orange)	2-23
9.	USB 2.0 ports 3 and 4	2-23
10.	USB 2.0 ports 1 and 2	2-23
11.	Coaxial S/PDIF Out port	2-23
12.	PS/2 keyboard port (purple)	2-23
13.	PS/2 mouse port (green)	2-23

Internal connectors		Page
1.	Floppy disk drive connector (34-1 pin FLOPPY)	2-24
2.	Primary IDE connector (40-1 pin PRI_IDE1)	2-24
3.	Serial ATA connectors (7-pin SATA1 [red], SATA2 [red], SATA3 [black], SATA4 [black])	2-25
4.	Optical drive audio connector (4-pin CD)	2-26
5.	Front panel audio connector (10-1 pin AAFP)	2-26
6.	USB connectors (10-1 pin USB56, USB78)	2-27
7.	Serial port connector (10-1 pin COM1)	2-27
8.	GAME/MIDI port connector (16-1 pin GAME1)	2-28
9.	Chassis intrusion connector (4-1 pin CHASSIS1)	2-28
10.	CPU, Chassis, and Power Fan connectors (3-pin CPU_FAN1, PWR_FAN1, CHA_FAN1, CHA_FAN2)	2-29
11.	ATX power connectors (24-pin EATXPWR1, 4-pin ATX12V1)	2-30
12.	System panel connector (20-pin PANEL1)	2-31
	System power LED (Green 3-pin PLED)	
	Hard disk drive activity LED (Red 2-pin IDE_LED)	
	System warning speaker (Orange 4-pin SPEAKER)	
	ATX power button/soft-off button (Yellow 2-pin PWRSW)	
	Reset button (Blue 2-pin RESET)	

2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Pentium® 4 processor in the 775-land package.

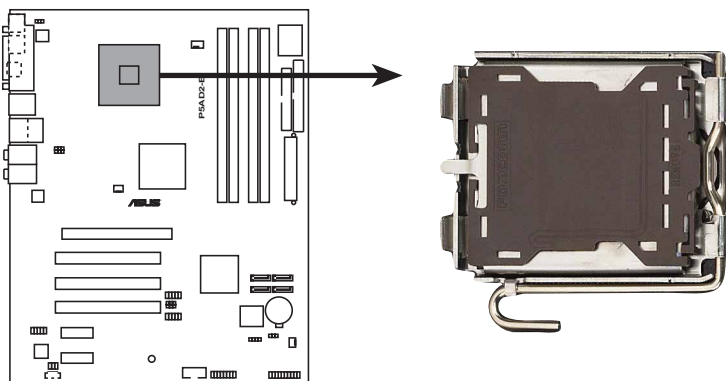


- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA775 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.3.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

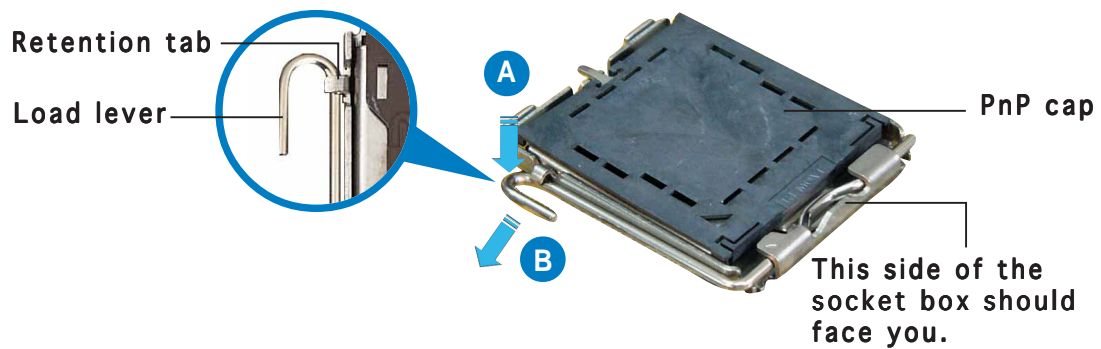


P5AD2-E Socket 775



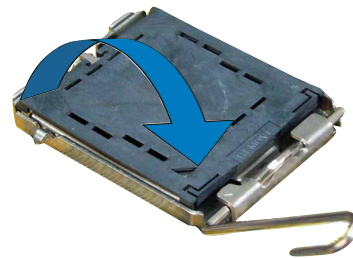
Before installing the CPU, make sure that the cam box is facing towards you and the load lever is on your left.

2. Press the load lever with your thumb (A), then move it to the left (B) until it is released from the retention tab.

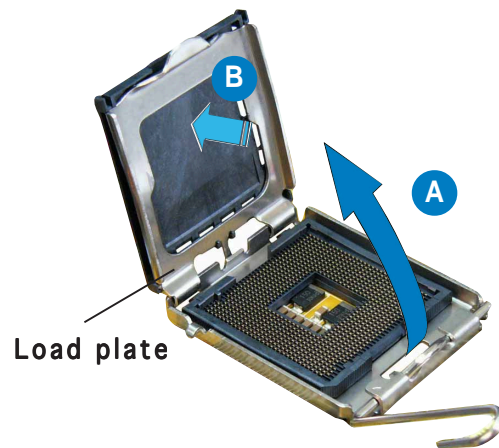


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

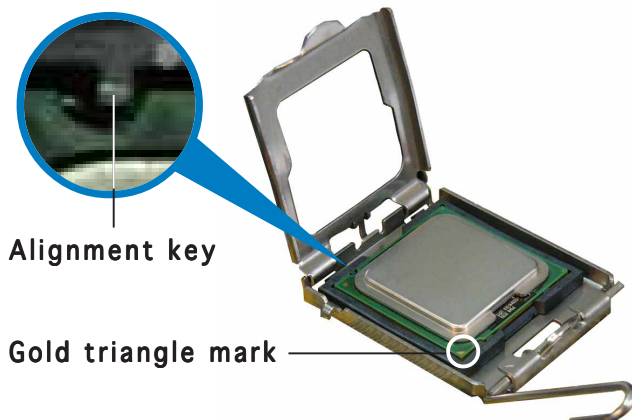
3. Lift the load lever in the direction of the arrow to a 135° angle.



4. Lift the load plate with your thumb and forefinger to a 100° angle (A), then push the PnP cap from the load plate window to remove (B).



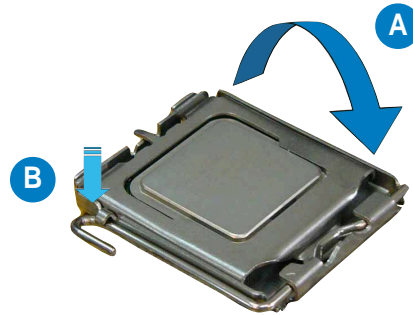
5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch.





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

6. Close the load plate (A), then push the load lever (B) until it snaps into the retention tab.



The motherboard supports Intel® Pentium® 4 LGA775 processors with the Intel® Enhanced Memory 64 Technology (EM64T), Enhanced Intel SpeedStep® Technology (EIST), and Hyper-Threading Technology. Refer to the Appendix for more information on these CPU features.

2.3.2 Installing the CPU heatsink and fan

The Intel® Pentium® 4 LGA775 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.



- When you buy a boxed Intel® Pentium® 4 processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel®-certified multi-directional heatsink and fan.
- Your Intel® Pentium® 4 LGA775 heatsink and fan assembly comes in a push-pin design and requires no tool to install.
- If you purchased a separate CPU heatsink and fan assembly, make sure that you have properly applied Thermal Interface Material to the CPU heatsink or CPU before you install the heatsink and fan assembly.



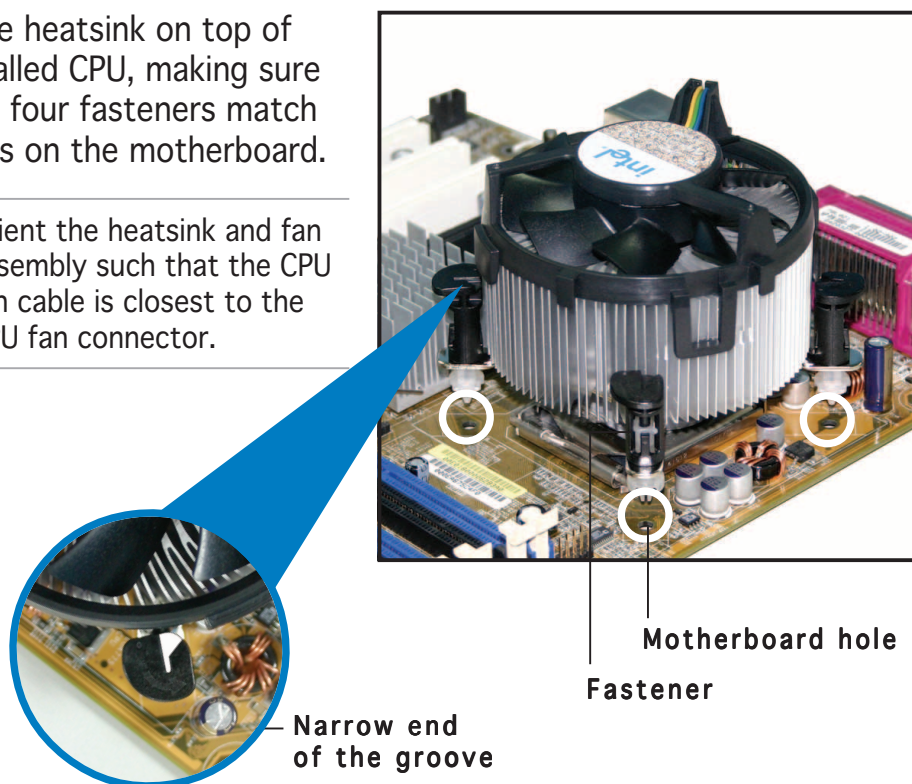
Make sure that you have installed the motherboard to the chassis before you install the CPU fan and heatsink assembly.

To install the CPU heatsink and fan:

1. Place the heatsink on top of the installed CPU, making sure that the four fasteners match the holes on the motherboard.

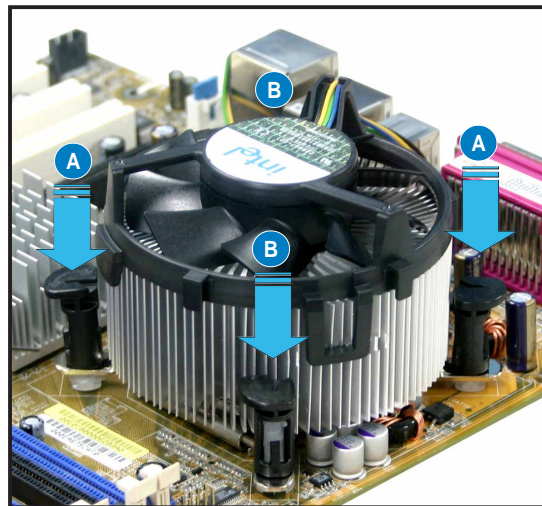
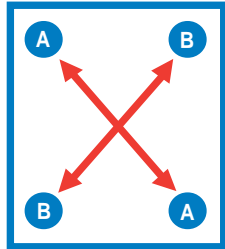


Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

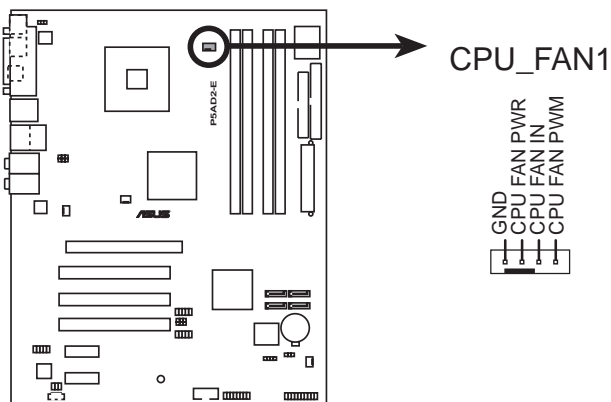


Make sure to orient each fastener with the narrow end of the groove pointing outward. (The photo shows the groove shaded for emphasis.)

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.



3. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN1.



P5AD2-E CPU fan connector

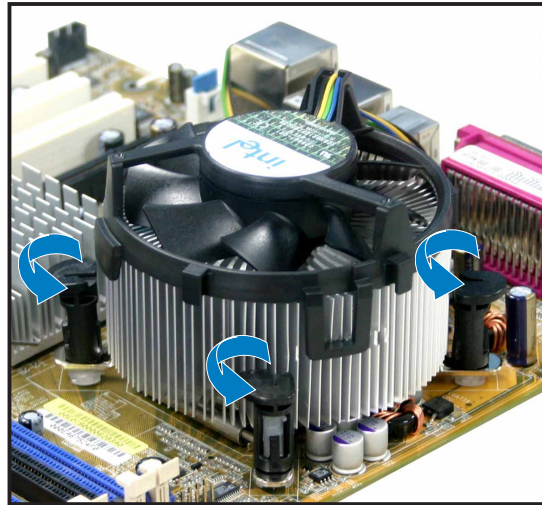


Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

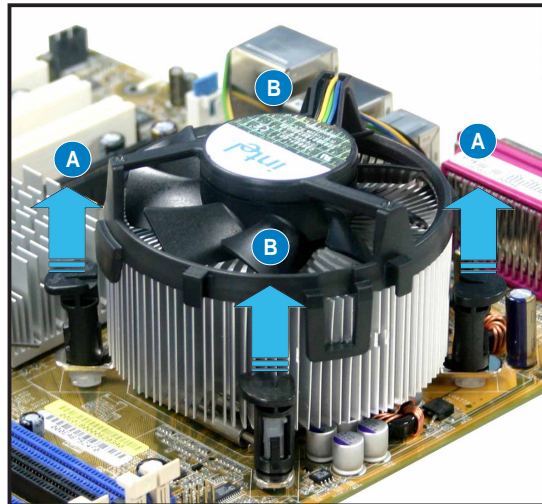
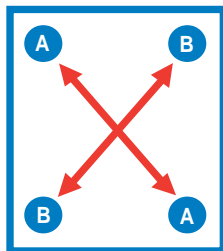
2.3.3 Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

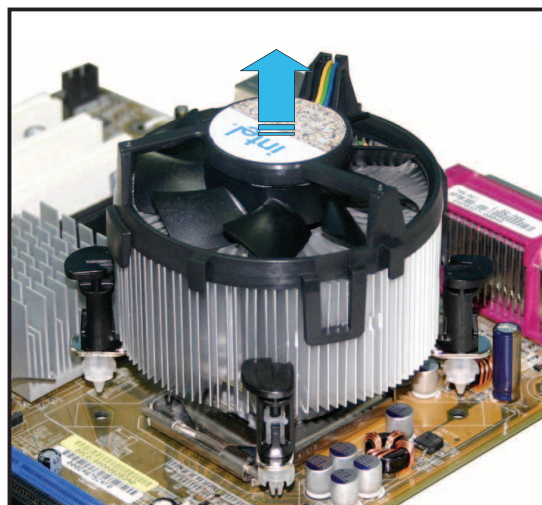
1. Disconnect the CPU fan cable from the connector on the motherboard.
2. Rotate each fastener counterclockwise.



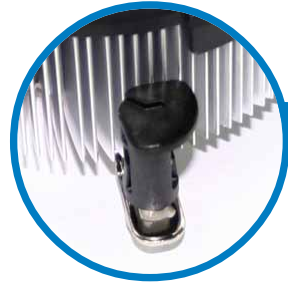
3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.



4. Carefully remove the heatsink and fan assembly from the motherboard.



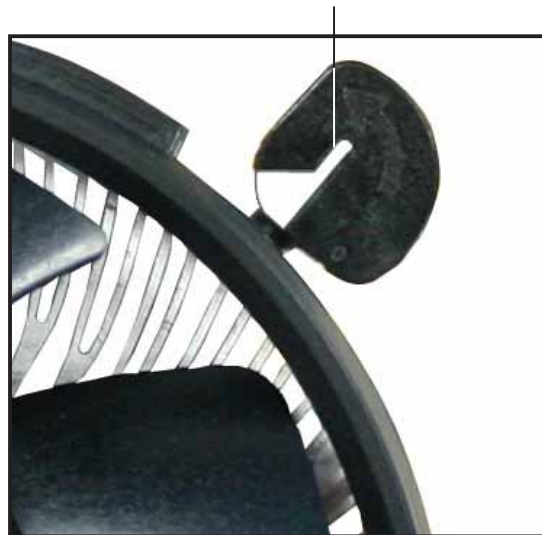
5. Rotate each fastener clockwise to ensure correct orientation when reinstalling.



Narrow end of the groove



The narrow end of the groove should point outward after resetting. (The photo shows the groove shaded for emphasis.)



Refer to the documentation in the boxed or stand-alone CPU fan package for detailed information on CPU fan installation.

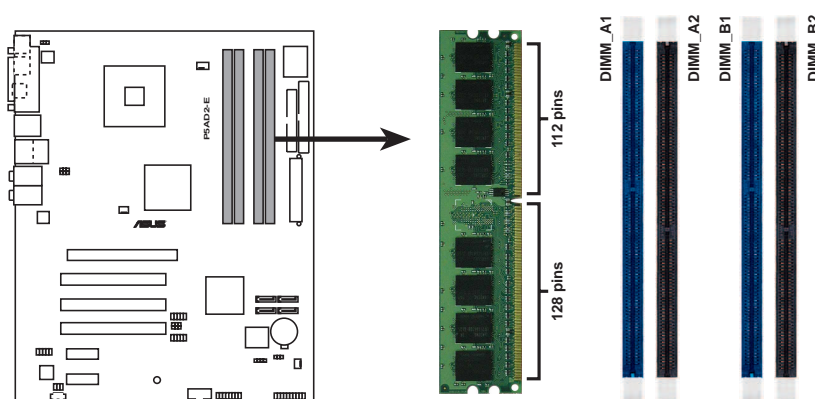
2.4 System memory

2.4.1 Overview

The motherboard comes with four 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:



P5AD2-E DDR2 DIMM sockets

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

2.4.2 Memory configurations

You may install 256 MB, 512 MB and 1 GB unbuffered non-ECC DDR2 DIMMs into the DIMM sockets.



- For dual-channel configuration, the total size of memory module(s) installed per channel must be the same (DIMM_A1 + DIMM_A2 = DIMM_B1 + DIMM_B2).
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor. Refer to the DDR2 Qualified Vendors List on the next page for details.
- Due to chipset resource allocation, the system may detect less than 4 GB system memory when you installed four 1 GB DDR2 memory modules.
- This motherboard does not support memory modules made up of 128 Mb chips or double sided x16 memory modules.

Qualified Vendors Lists

DDR2-700/667 with 711 MHz (FSB 1066) capability*

DDR2		Vendor	Model	Brand	Side(s)	Component	DIMM support		
Type	Size						A	B	C
700	256 MB	ELPIDA	EBE25UC8AAFV-DF-E	N/A	SS	E2508AA-DF-E	•	•	•
667	512 MB	SAMSUNG	M378T6453FGN-CE6	SAMSUNG	DS	K4T56083QF-GCE6	•	•	•
667	512 MB	SAMSUNG	M378T6453FGO-CE6	SAMSUNG	DS	K4T56083QF-GCE6	•	•	•
667	256 MB	Infineon	HYS64T32001HU-3-A	Infineon	SS	HYB18T256800AF3	•	•	•
667	256 MB	Crucial	BL3264AA664.8FB	N/A	SS	N/A	•	•	•
667	512 MB	MICRON	MT16HTF6464AY-667B3	N/A	DS	4SB42D9CZM	•	•	•

* ASUS has tested and overclocked these memory modules to 711 MHz. ASUS, however, does not guarantee that these memory modules will run at the same speed on your system.

DDR2-700/675/667/533 with 600 MHz (FSB 800) capability

DDR2		Vendor	Model	Brand	Side(s)	Component	DIMM support		
Type	Size						A	B	C
700	256 MB	ELPIDA	EBE25UC8AAFV-DF-E	N/A	SS	E2508AA-DF-E	•	•	•
700	512 MB	ELPIDA	EBE25UC8AAFV-DF-E	N/A	DS	E2508AA-DF-E	•	•	•
675	512 MB	CORSAIR	CM2X512-5400C4PRO	N/A	DS	N/A	•	•	•
667	512 MB	SAMSUNG	M378T6453FGN-CE6	SAMSUNG	DS	K4T56083QF-GCE6	•	•	•
667	512 MB	SAMSUNG	M378T6453FGO-CE6	SAMSUNG	DS	K4T56083QF-GCE6	•	•	•
667	256 MB	Infineon	HYS64T32001HU-3-A	Infineon	SS	HYB18T256800AF3	•	•	•
667	256 MB	Crucial	BL3264AA664.8FB	N/A	SS	N/A	•	•	•
667	512 MB	MICRON	MT16HTF6464AY-667B3	MICRON	DS	4SB42D9CZM	•	•	•
533	512 MB	SAMSUNG	M378T6553BGO-CD5	SAMSUNG	SS	K4T51083QB-GCD5	•	•	•
533	1024 MB	SAMSUNG	M378T2953BGO-CD5	SAMSUNG	DS	K4T51083QB-GCD5	•	•	•
533	256 MB	SAMSUNG	M378T3253FGO-CD5	SAMSUNG	SS	K4T56083QF-GCD5	•	•	•
533	512 MB	SAMSUNG	M378T6453FGO-CD5	SAMSUNG	DS	K4T56083QF-GCD5	•	•	•
533	512 MB	Infineon	HYS64T64000GU-3.7-A	Infineon	SS	HYB18T512800AC37	•	•	•
533	256 MB	Infineon	HYS64T32000HU-3.7-A	Infineon	SS	HYB18T512160AF-3.7	•	•	•
533	1024 MB	Infineon	HYS64T128020HU-3.7-A	Infineon	DS	HYB18T512800AF37	•	•	•
533	512 MB	CORSAIR	CM2X512-4200	N/A	DS	N/A	•	•	•
533	1024 MB	MICRON	MT16HTF12864AY-53EA1	MICRON	DS	4JAIID9CRZ	•	•	•
533	512 MB	MICRON	MT16HTF6464AY-53EB2	MICRON	DS	4FBIID9CHM	•	•	•
533	1024 MB	MICRON	MT16HTF12864AY-53EA1	MICRON	DS	4MAIID9CRZ	•	•	•
533	256 MB	Kingston	KVR533D2N4/256	Infineon	SS	HYB18T512160AC-3.7	•	•	•
533	512 MB	Kingston	KVR533D2N4/512	ELPIDA	SS	E5108AB-5C-E	•	•	•
533	512 MB	ELPIDA	EBE51UD8ABFA-5C-E	ELPIDA	DS	E5108AB-5C-E	•	•	•
533	1024 MB	ELPIDA	EBE11UD8ABFA-5C-E	ELPIDA	DS	E5108AB-5C-E	•	•	•

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

DIMM support:

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



Visit the ASUS website for the latest DDR2-711 MHz (FSB 1066)/DDR2-600 MHz (FSB 800)/DDR2-533 MHz (FSB 1066/800) Qualified Vendors List.

DDR2-533

Size	Vendor	Model	Brand	Side(s)	Component	DIMM support		
						A	B	C
256 MB	ELPIDA	EBE25UC8AAFV-DF-E	N/A	SS	E2508AA-DF-E	•	•	•
512 MB	SAMSUNG	M378T6553BG0-CD5	SAMSUNG	SS	K4T51083QB-GCD5	•	•	•
1024 MB	SAMSUNG	M378T2953BG0-CD5	SAMSUNG	DS	K4T51083QB-GCD5	•	•	•
256 MB	SAMSUNG	M378T3253FG0-CD5	SAMSUNG	SS	K4T56083QF-GCD5	•	•	•
512 MB	SAMSUNG	M378T6453FG0-CD5	SAMSUNG	DS	K4T56083QF-GCD5	•	•	•
512 MB	Infineon	HYS64T64000GU-3.7-A	Infineon	SS	HYB18T512800AC37	•	•	•
512 MB	CORSAIR	CM2X512-4200	N/A	DS	N/A	•	•	•
512 MB	MICRON	MT16HTF6464AG-53EB2	MICRON	DS	4FBII9BQM	•	•	•
1024 MB	MICRON	MT16HTF12864AY-53EA1	MICRON	DS	4JAIID9CRZ	•	•	•
256 MB	MICRON	MT8HTF3264AY-53EB3	MICRON	SS	4FBII9CHM	•	•	•
512 MB	MICRON	MT16HTF6464AY-53EB2	MICRON	DS	4FBII9CHM	•	•	•
1024 MB	MICRON	MT16HTF12864AY-53EA1	MICRON	DS	4MAIID9CRZ	•	•	•
1024 MB	Kingston	KVR533D2N4/1G	ELPIDA	DS	E5108AB-5C-E	•	•	•
512 MB	Kingston	KVR533D2N4/512	ELPIDA	SS	E5108AB-5C-E	•	•	•
512 MB	Hynix	HYMP564U648-C4	N/A	SS	HY5PS12821F-C4	•	•	•
1024 MB	Hynix	HYMP512U648-C4	N/A	DS	HY5PS12821F-C4	•	•	•
1024 MB	Hynix	HYMP512U648-C4	N/A	DS	HY5PS12821FP-C4	•	•	•
512 MB	ELPIDA	EBE51UD8ABFA-5C	ELPIDA	DS	E5108AB-5C-E	•	•	•
512 MB	ELPIDA	EBE51UD8ABFA-5C-E	ELPIDA	DS	E5108AB-5C-E	•	•	•
1024 MB	ELPIDA	EBE11UD8ABFA-5C-E	ELPIDA	DS	E5108AB-5C-E	•	•	•
512 MB	KINGMAX	KLBC28K-38MP4	N/A	DS	4IBIID9BQM	•	•	•
256 MB	KINGMAX	KLBB68K-38MP4	N/A	SS	4KBII9BQM	•	•	•
1024 MB	KINGMAX	KLBD48K-A8MP4	MICRON	DS	4MAIID9CRZ	•	•	•
512 MB	KINGMAX	KLBC28K-A8EP4	ELPIDA	SS	E5108AB-5C-E	•	•	•
512 MB	TwinMOS	8D-22JB5-K2T	SAMSUNG	SS	K4T51083QB-GCD5	•	•	•
512 MB	Apacer	78.91066.460	SAMSUNG	SS	K4T51083QB-GCD5	•	•	•
1024 MB	Apacer	78.01066.460	SAMSUNG	DS	K4T51083QB-GCD5	•	•	•
1024 MB	Apacer	78.01066.110	Infineon	DS	HYB18T512800AC37	•	•	•
256 MB	BRAIN POWER	BS212-1-256M-MIC-533	N/A	SS	4CBII9BQT	•	•	•
512 MB	BRAIN POWER	BS213-1-512M-MIC-533	N/A	DS	4CBII9BQT	•	•	•
512 MB	Geil	GX2 1GB4200DC	N/A	SS	N/A	•	•	•
256 MB	NANYA	NT256T64UH4A0F-37B	NANYA	SS	NT5TU32M16AF-37B	•	•	•
512 MB	NANYA	NT512T64U88A0F-37B	NANYA	SS	NT5TU64M8AF-37B	•	•	•
512 MB	elixir	M2U51264TU88A0F-37B	N/A	SS	N2TU51280AF-3C	•	•	•
512 MB	A-DATA	M2OAD2G3H3110A1B0E	A-DATA	SS	AD29608A8A-375D	•	•	•
256 MB	Ballistix	BL3264AA53V.8FB	N/A	SS	N/A	•	•	•
512 MB	Ballistix	BL6464AA53V.16FB	N/A	DS	N/A	•	•	•

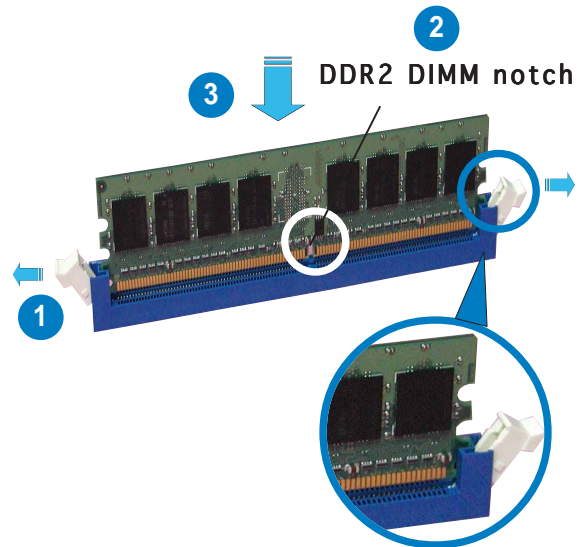
2.4.3 Installing a DIMM



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.

To install a DIMM:

1. Unlock a DIMM socket by pressing the retaining clips outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.
3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



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.
- The DDR2 DIMM sockets do not support DDR DIMMs. DO not install DDR DIMMs to the DDR2 DIMM sockets.

2.4.4 Removing a DIMM

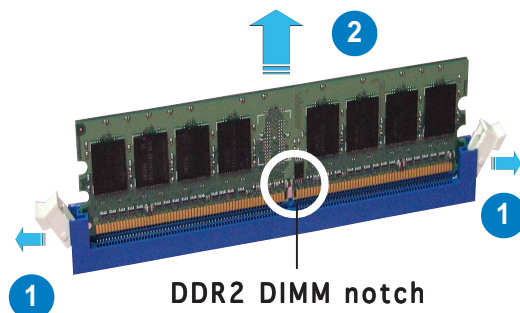
Follow these steps to remove a DIMM.

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.



2.5 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.



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

2.5.1 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.

2.5.2 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 3 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the tables on the next page.
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.

2.5.3 Interrupt assignments

Standard interrupt assignments

IRQ	Priority	Standard Function
0	1	System Timer
1	2	Keyboard Controller
2	—	Re-direct to IRQ#9
3	11	Communications Port (COM2)*
4	12	Communications Port (COM1)*
5	13	IRQ holder for PCI steering*
6	14	Floppy Disk Controller
7	15	Printer Port (LPT1)*
8	3	System CMOS/Real Time Clock
9	4	IRQ holder for PCI steering*
10	5	IRQ holder for PCI steering*
11	6	IRQ holder for PCI steering*
12	7	PS/2 Compatible Mouse Port*
13	8	Numeric Data Processor
14	9	Primary IDE Channel
15	10	Secondary IDE Channel

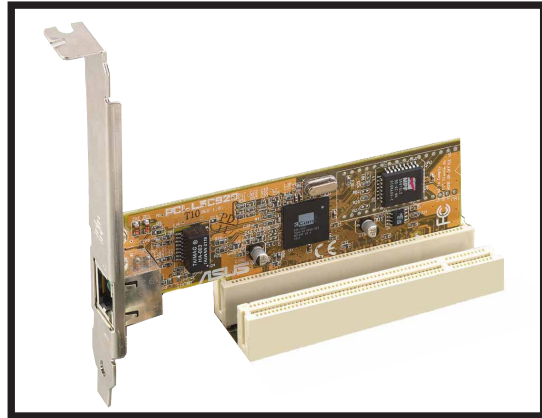
* These IRQs are usually available for ISA or PCI devices.

IRQ assignments for this motherboard

	A	B	C	D	E	F	G	H
PCI slot 1	—	—	—	—	—	—	used	—
PCI slot 2	—	—	—	—	—	shared	—	—
PCI slot 3	—	shared	—	—	—	—	—	—
PCI E x16 slot	shared	—	—	—	—	—	—	—
PCI E x1 slot 1	shared	—	—	—	—	—	—	—
PCI E x1 slot 2	—	—	—	shared	—	—	—	—
Onboard USB controller 1	shared	—	—	—	—	—	—	—
Onboard USB controller 2	—	shared	—	—	—	—	—	—
Onboard USB controller 3	—	—	used	—	—	—	—	—
Onboard USB controller 4	—	—	—	shared	—	—	—	—
Onboard USB 2.0 controller	shared	—	—	—	—	—	—	—
Onboard IDE port	shared	—	—	—	—	—	—	—
Onboard SATA port	—	shared	—	—	—	—	—	—
Onboard Azalia audio	shared	—	—	—	—	—	—	—
Onboard LAN1	—	shared	—	—	—	—	—	—

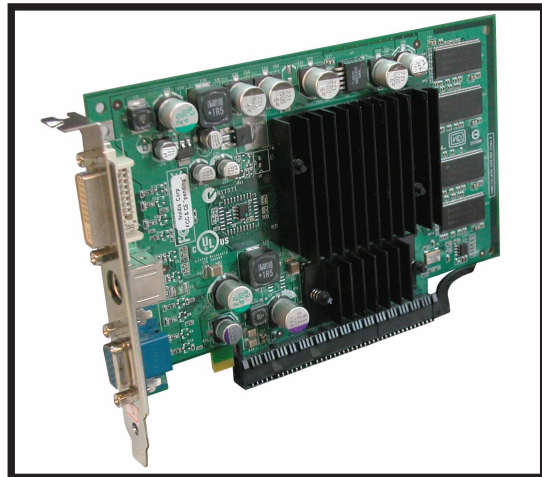
2.5.4 PCI slots

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



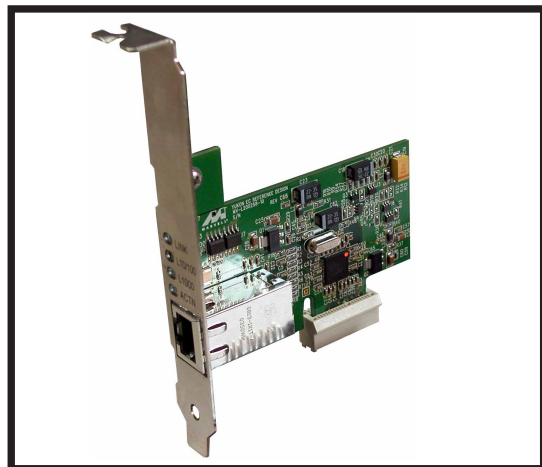
2.5.5 PCI Express x16 slot

This motherboard supports PCI Express x16 graphic cards that comply with the PCI Express specifications. The following figure shows a graphics card installed on the PCI Express x16 slot.



2.5.6 PCI Express x1 slot

This motherboard supports PCI Express x1 network cards, SCSI cards and other cards that comply with the PCI Express specifications. The following figure shows a network card installed on the PCI Express x1 slot.



2.6 Jumpers

1. Clear RTC RAM (CLRTC1)

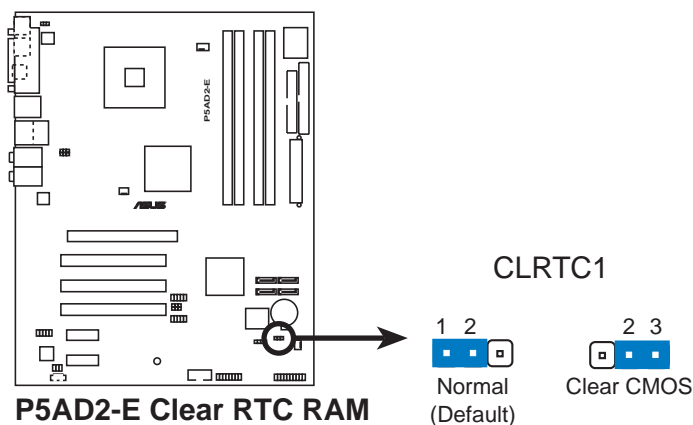
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Remove the onboard battery.
3. 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.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.
6. Hold down the 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!

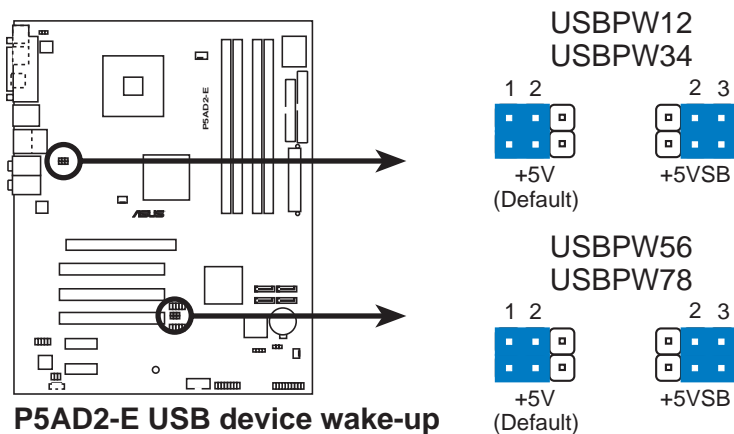


You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the C.P.R. (CPU Parameter Recall) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.

2. USB device wake-up jumpers (3-pin USBPW12, USBPW34, USBPW56, USBPW78)

Set these jumpers to +5V to wake up the computer from S1 sleep mode (CPU stopped, DRAM refreshed, system running in low power mode) using the connected USB devices. Set to +5VSB to wake up from S3 and S4 sleep modes (no power to CPU, DRAM in slow refresh, power supply in reduced power mode).

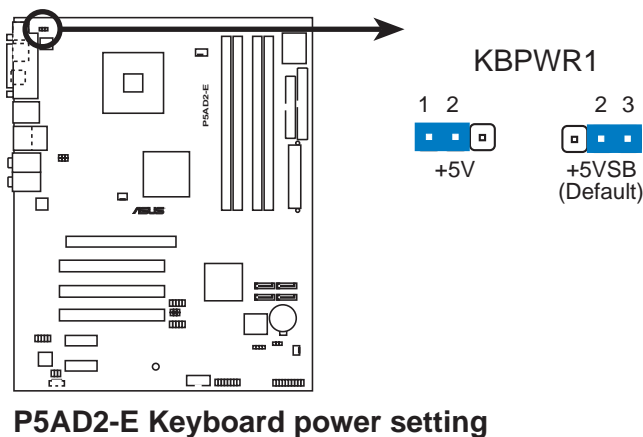
The USBPW12 and USBPW34 jumpers are for the rear USB ports. The USBPW56 and USBPW78 jumpers are for the internal USB connectors that you can connect to additional USB ports.



- The USB device wake-up feature requires a power supply that can provide 500mA on the +5VSB lead for each USB port; otherwise, the system would not power up.
- The total current consumed must NOT exceed the power supply capability (+5VSB) whether under normal condition or in sleep mode.

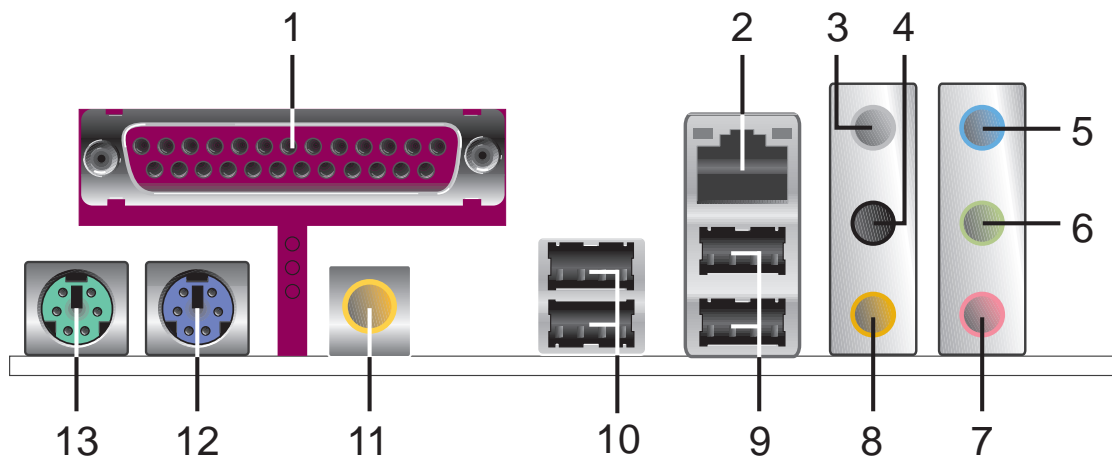
3. Keyboard power (3-pin KBPWR1)

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



2.7 Connectors

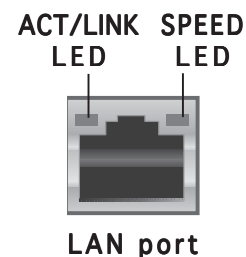
2.7.1 Rear panel connectors



1. **Parallel port.** This 25-pin port connects a parallel printer, a scanner, or other devices.
2. **LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

LAN port LED indications

ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection



3. **Rear Speaker Out port (gray).** This port connects the rear speakers on a 4-channel, 6-channel, or 8-channel audio configuration.
4. **Side Speaker Out port (black).** This port connects the side speakers in an 8-channel audio configuration.
5. **Line In port (light blue).** This port connects a tape, CD, DVD player, or other audio sources.
6. **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.



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

7. **Microphone port (pink).** This port connects a microphone.
8. **Center/Subwoofer port (yellow orange).** This port connects the center/subwoofer speakers.



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

Audio 2, 4, 6, or 8-channel configuration

Port	2-channel (Headset)	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
Gray	—	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out
Black	—	—	—	Side Speaker Out
Yellow Orange	—	—	Center/Subwoofer	Center/Subwoofer

9. **USB 2.0 ports 3 and 4.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
10. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
11. **Coaxial S/PDIF Out port.** This port connects an external audio output device via a coaxial S/PDIF cable.
12. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.
13. **PS/2 mouse port (green).** This port is for a PS/2 mouse.

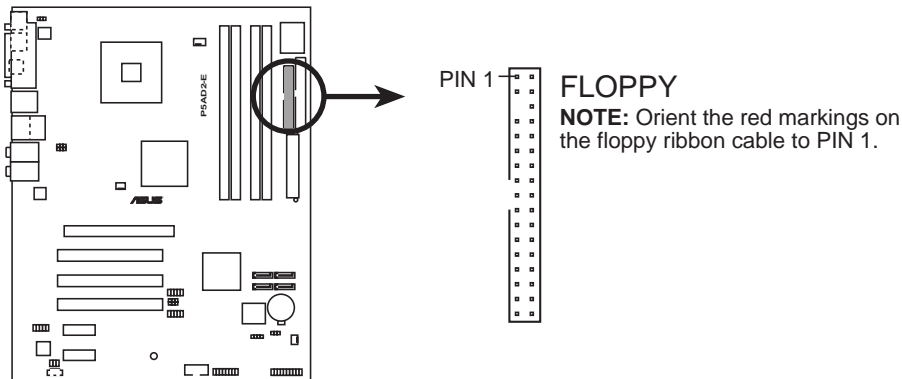
2.7.2 Internal connectors

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

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



Pin 5 on the connector is removed to prevent incorrect cable connection when using a FDD cable with a covered Pin 5.



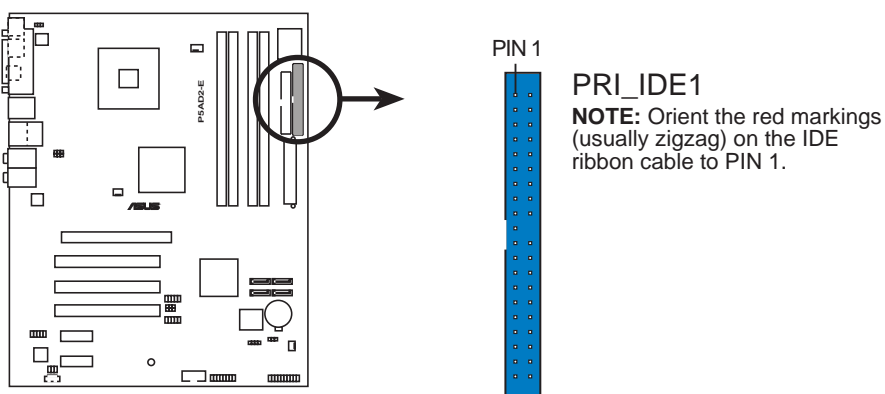
P5AD2-E Floppy disk drive connector

2. Primary IDE connector (40-1 pin PRI_IDE1)

This connector is for an Ultra DMA 100/66 signal cable. The Ultra DMA 100/66 signal cable has three connectors: a blue connector for the primary IDE connector on the motherboard, a black connector for an Ultra DMA 100/66 IDE slave device (optical drive/hard disk drive), and a gray connector for an Ultra DMA 100/66 IDE master device (hard disk drive). If you install two hard disk drives, you must configure the second drive as a slave device by setting its jumper accordingly. Refer to the hard disk documentation for the jumper settings.



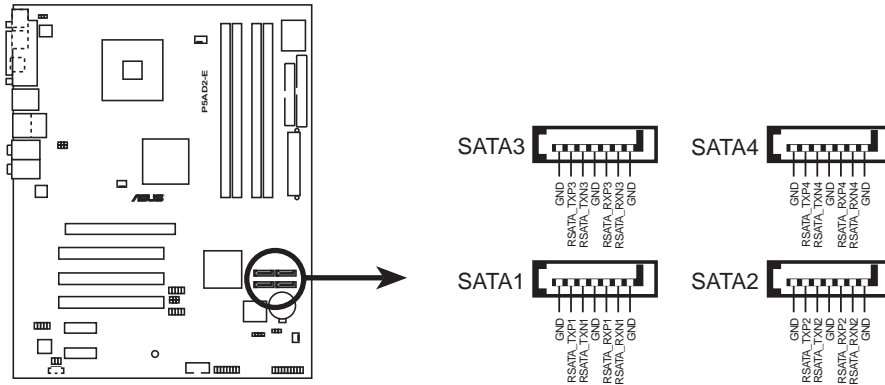
- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra DMA 100/66 IDE devices.



P5AD2-E IDE connector

3. Serial ATA connectors (7-pin SATA1 [red], SATA2 [red], SATA3 [black], SATA4 [black])

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



P5AD2-E SATA connectors



Important notes on Serial ATA

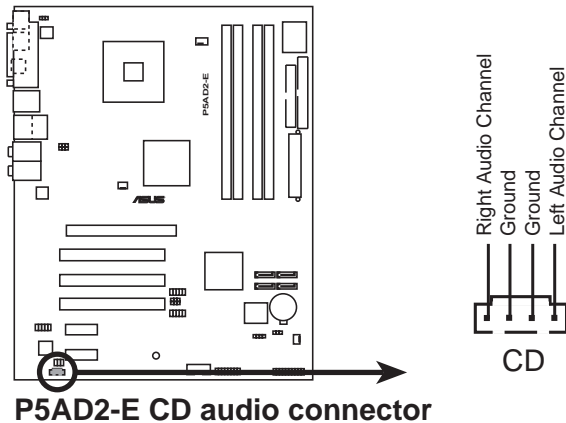
- You must install Windows® 2000 Service Pack 4 or the Windows® XP Service Pack 1 before using Serial ATA hard disk drives.
- When using the connectors in **Standard IDE** mode, connect the primary (boot) hard disk drive to the SATA1 or SATA2 connector. Refer to the table on the next page for the recommended SATA hard disk drive connections.

Serial ATA hard disk drive connection

Connector	Color	Setting	Use
SATA1/SATA2	Red	Master	Boot disk
SATA3/SATA4	Black	Slave	Data disk

4. Optical drive audio connector (4-pin CD)

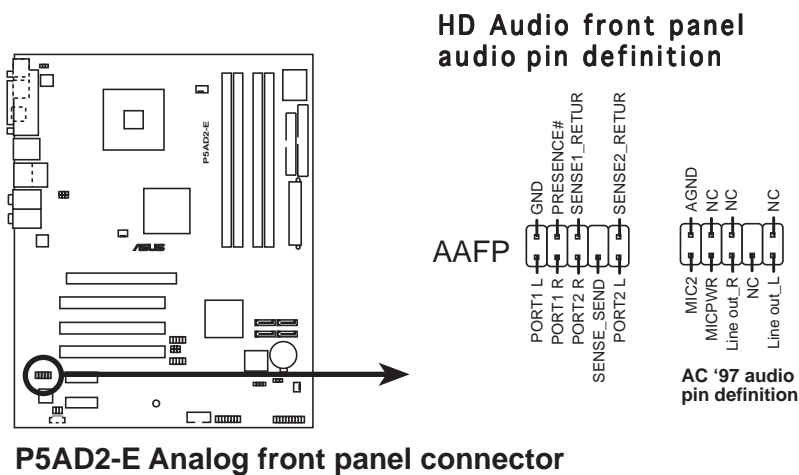
This connector is for the 4-pin audio cable that connects to the audio connector at the back of the optical drive.



Enable the CD-IN function in the audio utility when using this connector.

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

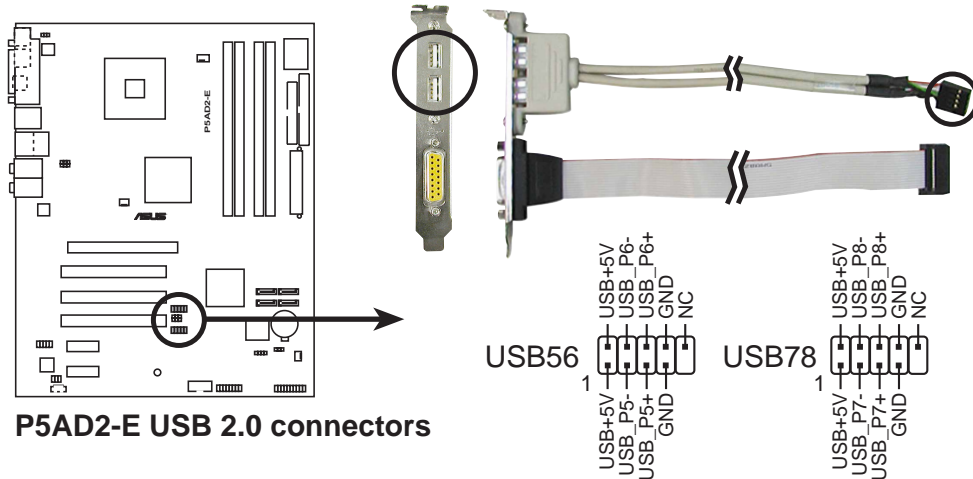
This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC'97 audio standard.



- It is recommended that you connect a high-definition front panel audio module to this connector to avail the motherboard high-definition audio capability.
- By default, this connector is set to legacy AC'97 audio. If you want to connect a high-definition front panel audio module to this connector, set the **Front Panel Support Type** item in the BIOS Setup to [HD Audio]. See page 3-29 for details.

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

These connectors are for USB 2.0 ports. Connect the USB/GAME 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.



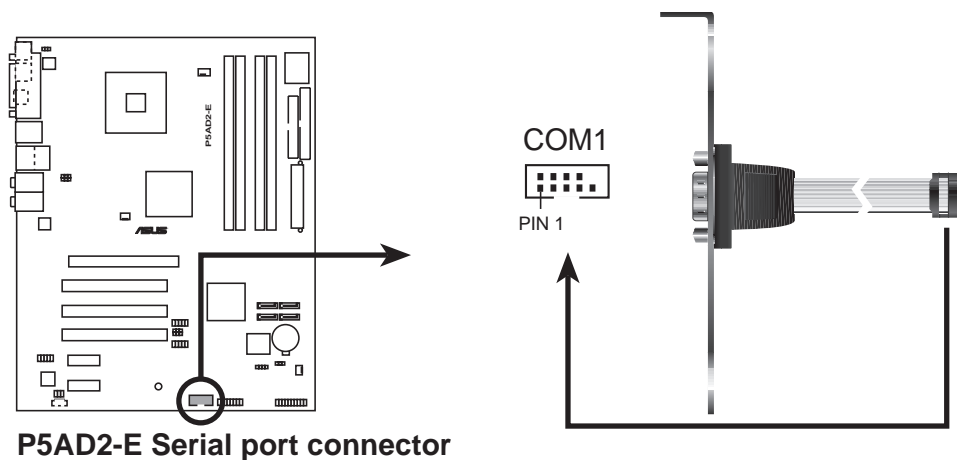
Never connect a **1394 cable** to the USB connectors. Doing so will damage the motherboard!



The USB cable is purchased separately.

7. Serial port connector (10-1 pin COM1)

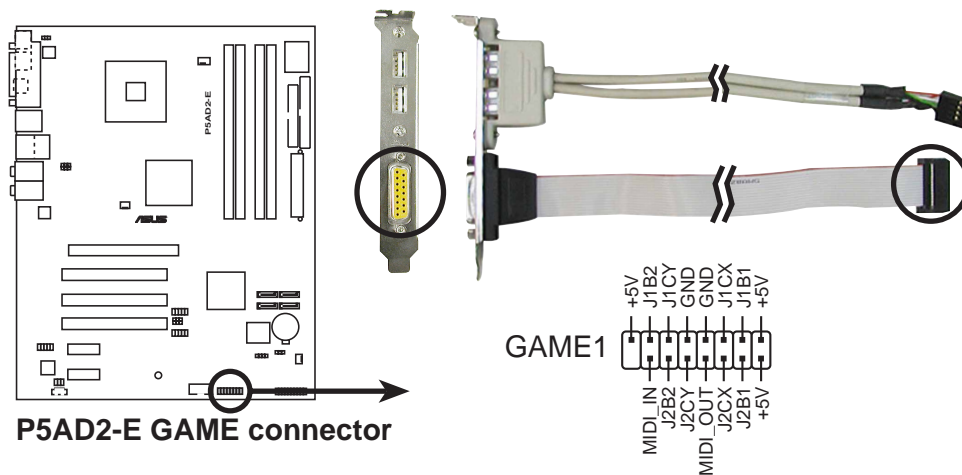
This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.



The serial port cable is purchased separately.

8. GAME/MIDI port connector (16-1 pin GAME1)

This connector is for a GAME/MIDI port. Connect the USB/GAME module cable to this connector, then install the module to a slot opening at the back of the system chassis. The GAME/MIDI port connects a joystick or game pad for playing games, and MIDI devices for playing or editing audio files.

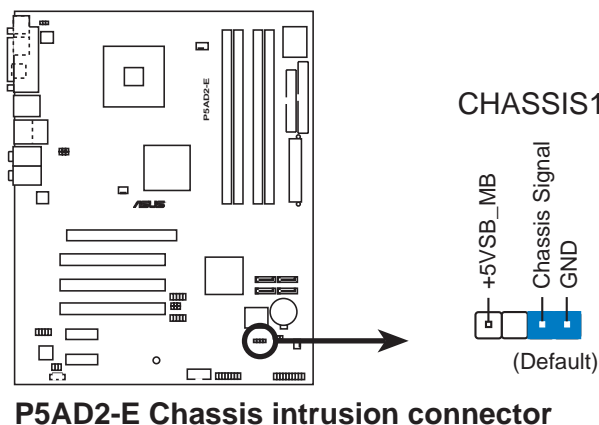


The GAME/MIDI cable is purchased separately.

9. Chassis intrusion connector (4-1 pin CHASSIS1)

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

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

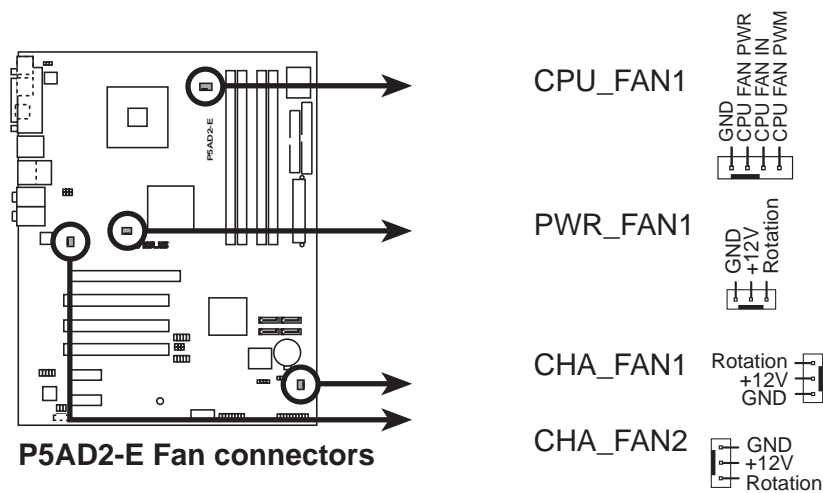


10. CPU, Chassis, and Power Fan connectors (3-pin CPU_FAN1, PWR_FAN1, CHA_FAN1, CHA_FAN2)

The fan connectors support cooling fans of 350 mA ~ 2000 mA (24 W max.) or a total of 1 A ~ 3.48 A (41.76 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.



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



Only the CPU_FAN1 and CHA_FAN1 connectors support the ASUS Q-Fan 2 feature.

1.1. ATX power connectors (24-pin EATXPWR1, 4-pin ATX12V1)

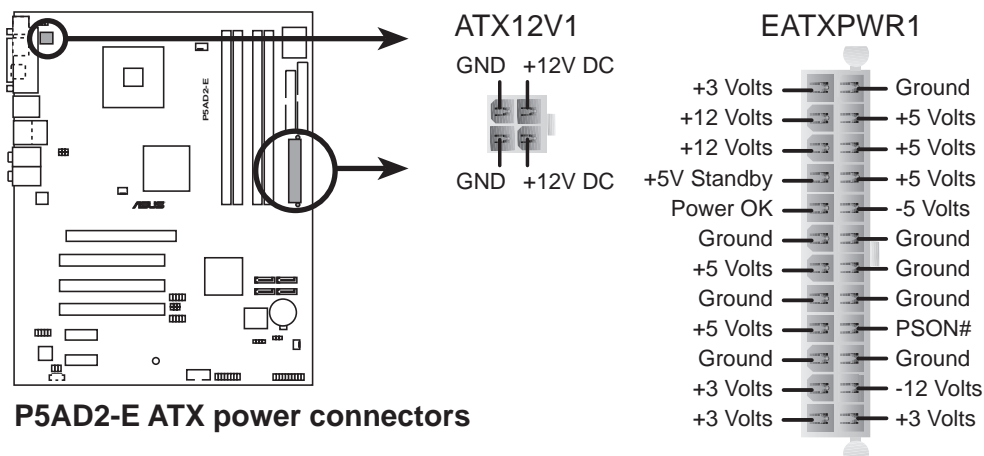
These connectors are for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.



- Use of an ATX 12 V Specification 2.0 -compliant power supply unit (PSU) that provides a minimum power of 350 W is recommended for a fully-configured system.
- Do not forget to connect the 4-pin ATX +12 V power plug; otherwise, the system will not boot up.
- Use of a PSU with a higher power output is recommended when configuring a system with more power consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- When using an ATX 12 V PSU with a 20-pin power plug, make sure that it can provide at least 15 A on the +12 V lead, and a minimum power of 350 W. Use of an ATX 12 V PSU with a 20-pin power plug is not recommended.
- The ATX 12 V Specification 2.0-compliant (350 W) PSU has been tested to support the motherboard power requirements with the following configuration:

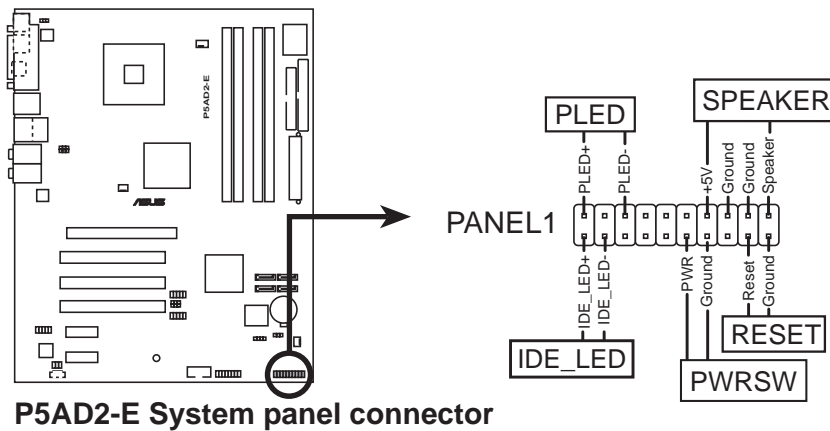
CPU	:	Intel® Pentium® 4 3.6 GHz
Memory	:	512 MB DDR2 (x 4)
Graphics card	:	PCI Express x16 Nvidia NV6600
Parallel ATA devices:	:	IDE hard disk drive (x 1)
Serial ATA device	:	SATA hard disk drive
Optical drives	:	CD-ROM (x 1)
SCSI devices	:	SCSI card and SCSI hard disk drive

- You must install a PSU with a higher power rating if you intend to install additional devices.



12. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.



P5AD2-E System panel connector



The system panel connector is color-coded for easy connection. Refer to the connector description below for details.

- **System power LED (Green 3-pin PLED)**
This 3-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 (Red 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 (Orange 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 (Yellow 2-pin PWRSW)**
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 (Blue 2-pin RESET)**
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

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

BIOS setup **3**

Chapter summary

3

3.1	Managing and updating your BIOS	3-1
3.2	BIOS setup program	3-11
3.3	Main menu	3-14
3.4	Advanced menu	3-19
3.5	Power menu	3-33
3.6	Boot menu	3-38
3.7	Exit menu	3-43

3.1 Managing and updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup.

1. **ASUS AFUDOS** (Updates the BIOS in DOS mode using a bootable floppy disk.)
2. **ASUS CrashFree BIOS 2** (Updates the BIOS using a bootable floppy disk or the motherboard support CD when the BIOS file fails or gets corrupted.)
3. **ASUS EZ Flash** (Updates the BIOS in DOS mode using a floppy disk or the motherboard support CD.)
4. **ASUS Update** (Updates the BIOS in Windows® environment.)

Refer to the corresponding sections for details on these utilities.



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

3.1.1 Creating a bootable floppy disk

1. Do either one of the following to create a bootable floppy disk.

DOS environment

- a. Insert a 1.44MB floppy disk into the drive.
- b. At the DOS prompt, type **format A:/S** then press <Enter>.

Windows® XP environment

- a. Insert a 1.44 MB floppy disk to the floppy disk drive.
- b. Click **Start** from the Windows® desktop, then select **My Computer**.
- c. Select the 3 1/2 Floppy Drive icon.
- d. Click **File** from the menu, then select **Format**. A **Format 3 1/2 Floppy Disk** window appears.
- e. **Windows® XP users:** Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.

Windows® 2000 environment

To create a set of boot disks for Windows® 2000:

- a. Insert a formatted, high density 1.44 MB floppy disk into the drive.
 - b. Insert the Windows® 2000 CD to the optical drive.
 - c. Click **Start**, then select **Run**.
 - d. In the **Open** field, type `D:\bootdisk\makeboot a:` assuming that D is your optical drive letter.
 - e. Press <Enter>, then follow screen instructions to continue.
2. Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

3.1.2 AFUDOS utility

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

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:



-
- Make sure that the floppy disk is not write-protected and has at least 1.2 MB free space to save the file.
 - The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be same as shown.
-

1. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.
2. Boot the system in DOS mode, then at the prompt type:

```
afudos /o[filename]
```

where the [filename] is any user-assigned filename not more than eight alphanumeric characters for the main filename and three alphanumeric characters for the extension name.

```
A:\>afudos /oOLDBIOS1.rom
```

Main filename Extension name

3. Press <Enter>. The utility copies the current BIOS file to the floppy disk.

```
A:\>afudos /oOLDBIOS1.rom
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.
  Reading flash ..... done
  Write to file..... ok
A:\>
```

The utility returns to the DOS prompt after copying the current BIOS file.

Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

1. Visit the ASUS website (www.asus.com) and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable floppy disk.



Write the BIOS filename on a piece of paper. You need to type the exact BIOS filename at the DOS prompt.

2. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.
3. Boot the system in DOS mode, then at the prompt type:

```
afudos /i[filename]
```

where [filename] is the latest or the original BIOS file on the bootable floppy disk.

```
A:\>afudos /iP5AD2EB.rom
```

4. The utility verifies the file and starts updating the BIOS.

```
A:\>afudos /iP5AD2EB.rom
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

WARNING!! Do not turn off power during flash BIOS
Reading file ..... done
Reading flash ..... done

Advance Check .....
Erasing flash ..... done
Writing flash ..... 0x0008CC00 (9%)
```



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

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

```
A:\>afudos /iP5AD2E.rom
AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

WARNING!! Do not turn off power during flash BIOS
Reading file ..... done
Reading flash ..... done

Advance Check .....
Erasing flash ..... done
Writing flash ..... done
Verifying flash .... done

Please restart your computer

A:\>
```

3.1.3 ASUS CrashFree BIOS 2 utility

The ASUS CrashFree BIOS 2 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 update a corrupted BIOS file using the motherboard support CD or the floppy disk that contains the updated BIOS file.



- Prepare the motherboard support CD or the floppy disk containing the updated motherboard BIOS before using this utility.
- Make sure that you rename the original or updated BIOS file in the floppy disk to **P5AD2EB.ROM**.

Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

1. Turn on the system.
2. Insert the floppy disk with the original or updated BIOS file to the floppy disk drive.
3. The utility displays the following message and automatically checks the floppy disk for the original or updated BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...  
Checking for floppy...
```

When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...  
Checking for floppy...  
Floppy found!  
Reading file "P5AD2EB.ROM". Completed.  
Start flashing...
```



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

4. Restart the system after the utility completes the updating process.

Recovering the BIOS from the support CD

To recover the BIOS from the support CD:

1. Remove any floppy disk from the floppy disk drive, then turn on the system.
2. Insert the support CD to the optical drive.
3. The utility displays the following message and automatically checks the floppy disk for the original or updated BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
```

When no floppy disk is found, the utility automatically checks the optical drive for the original or updated BIOS file. The utility then updates the corrupted BIOS file.

```
Bad BIOS checksum. Starting BIOS recovery...
Checking for floppy...
Floppy not found!
Checking for CD-ROM...
CD-ROM found!
Reading file "P5AD2ED.ROM". Completed.
Start flashing...
```



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

4. Restart the system after the utility completes the updating process.



The recovered BIOS may not be the latest BIOS version for this motherboard. Visit the ASUS website (www.asus.com) to download the latest BIOS file.

3.1.4 ASUS EZ Flash utility

The ASUS EZ Flash feature allows you to update the BIOS without having to go through the long process of booting from a floppy disk and using a DOS-based utility. The EZ Flash utility is built-in the BIOS chip so it is accessible by pressing <Alt> + <F2> during the Power-On Self Tests (POST).

To update the BIOS using EZ Flash:

1. Visit the ASUS website (www.asus.com) to download the latest BIOS file for the motherboard and rename the same to **P5AD2EB.ROM**.
2. Save the BIOS file to a floppy disk, then restart the system.
3. Press <Alt> + <F2> during POST to display the following.

```
EZFlash starting BIOS update
Checking for floppy...
```

4. Insert the floppy disk that contains the BIOS file to the floppy disk drive. When the correct BIOS file is found, EZ Flash performs the BIOS update process and automatically reboots the system when done.

```
EZFlash starting BIOS update
Checking for floppy...
Floppy found!
Reading file "P5AD2EB.rom". Completed.
Start erasing.....|
Start programming...|
Flashed successfully. Rebooting.
```



- Do not shutdown or reset the system while updating the BIOS to prevent system boot failure!
- A “Floppy not found!” error message appears if there is no floppy disk in the drive. A “P5AD2EB.ROM not found!” error message appears if the correct BIOS file is not found in the floppy disk. Make sure that you rename the BIOS file to P5AD2EB.ROM.

3.1.5 ASUS Update utility

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

- Save the current BIOS file
- Download the latest BIOS file from the Internet
- Update the BIOS from an updated BIOS file
- Update the BIOS directly from the Internet, and
- View the BIOS version information.

This utility is available in the support CD that comes with the motherboard package.



ASUS Update requires an Internet connection either through a network or an Internet Service Provider (ISP).

Installing ASUS Update

To install ASUS Update:

1. Place the support CD in the optical drive. The **Drivers** menu appears.
2. Click the **Utilities** tab, then click **ASUS Update**. See page 4-3 for the **Utilities** screen menu.
3. The ASUS Update utility is copied to your system.

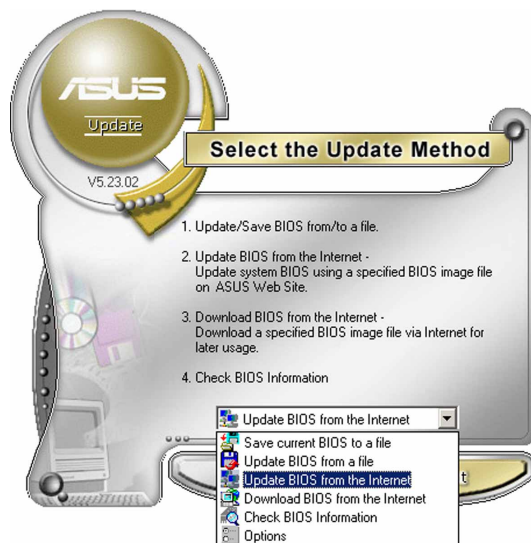
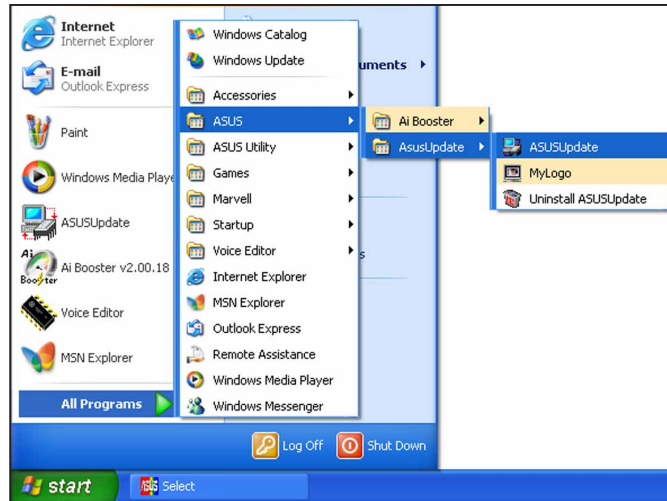


Quit all Windows® applications before you update the BIOS using this utility.

Updating the BIOS through the Internet

To update the BIOS through the Internet:

1. Launch the ASUS Update utility from the Windows® desktop by clicking **Start > Programs > ASUS > ASUSUpdate > ASUSUpdate**. The ASUS Update main window appears.



2. Select **Update BIOS from the Internet** option from the drop-down menu, then click **Next**.

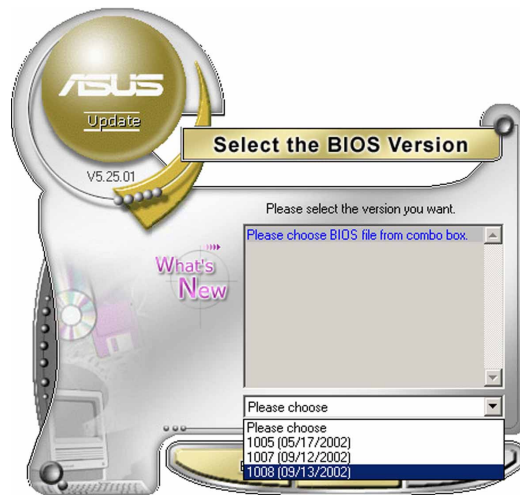


3. Select the ASUS FTP site nearest you to avoid network traffic, or click **Auto Select**. Click **Next**.

4. From the FTP site, select the BIOS version that you wish to download. Click Next.
5. Follow the screen instructions to complete the update process.



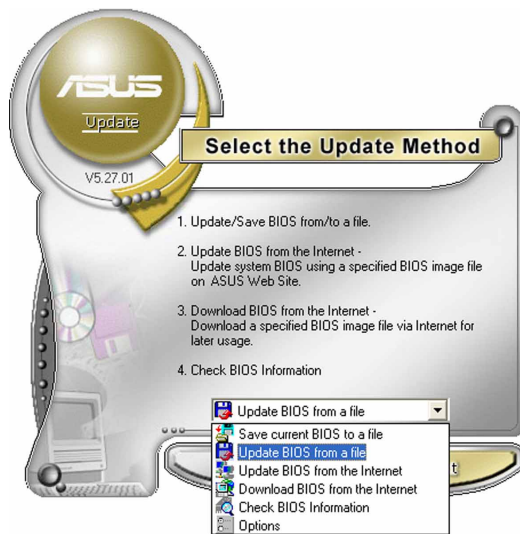
The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.



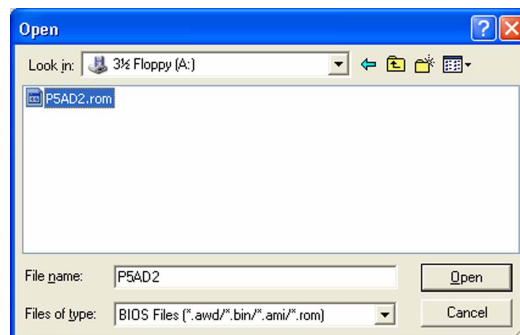
Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

1. Launch the ASUS Update utility from the Windows® desktop by clicking **Start > Programs > ASUS > ASUSUpdate > ASUSUpdate**. The ASUS Update main window appears.
2. Select **Update BIOS from a file** option from the drop-down menu, then click **Next**.



3. Locate the BIOS file from the **Open** window, then click **Save**.
4. Follow the screen instructions to complete the update process.



3.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section “3.1 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 hub.

The firmware hub 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 during the Power-On-Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

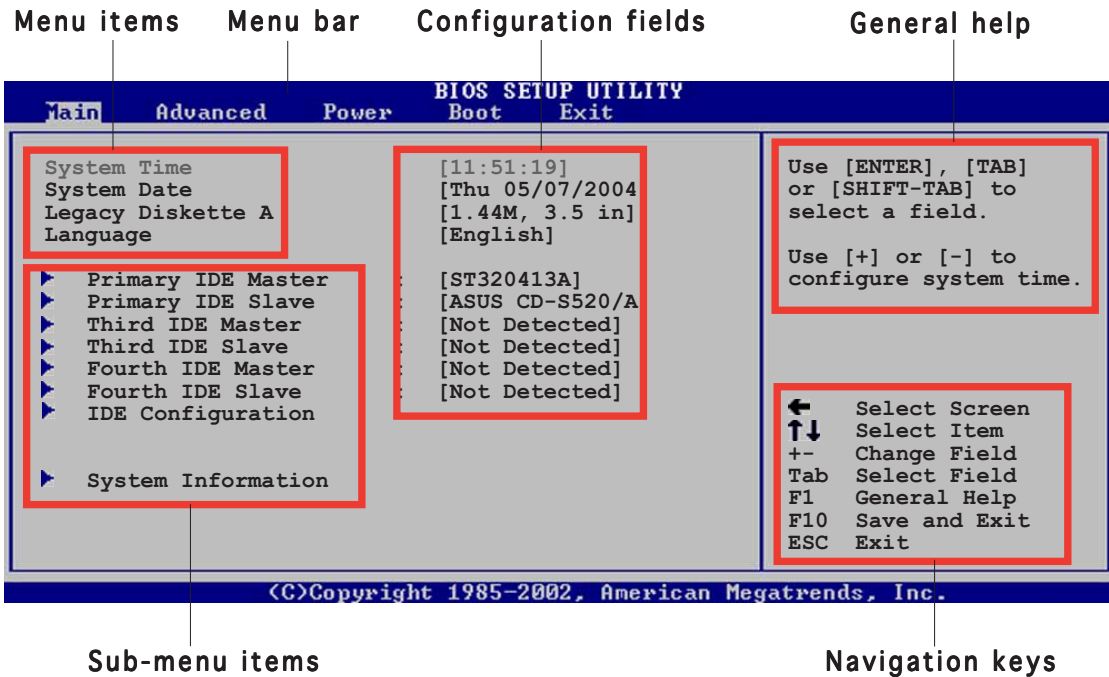
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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 sub-menus 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 Default Settings** item under the Exit Menu. See section “3.7 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 (www.asus.com) to download the latest BIOS file for this motherboard.
-

3.2.1 BIOS menu screen



3.2.2 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
- 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.

3.2.3 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.

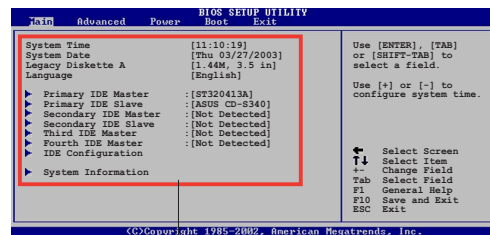


Some of the navigation keys differ from one screen to another.

3.2.4 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, and Exit) on the menu bar have their respective menu items.



Main menu items

3.2.5 Sub-menu items

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

3.2.6 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.

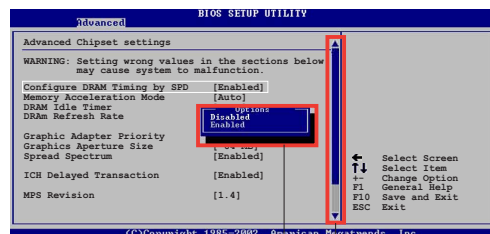
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to “3.2.7 Pop-up window.”

3.2.7 Pop-up window

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

3.2.8 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.



Pop-up window

Scroll bar

3.2.9 General help

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

3.3 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 “3.2.1 BIOS menu screen” for information on the menu screen items and how to navigate through them.

```
BIOS SETUP UTILITY
Main  Advanced  Power  Boot  Exit

System Time           [11:51:19]
System Date           [Thu 05/07/2004]
Legacy Diskette A    [1.44M, 3.5 in]
Language              [English]

▶ Primary IDE Master  : [ST320413A]
▶ Primary IDE Slave   : [ASUS CD-S520/A]
▶ Third IDE Master    : [Not Detected]
▶ Third IDE Slave     : [Not Detected]
▶ Fourth IDE Master   : [Not Detected]
▶ Fourth IDE Slave    : [Not Detected]
▶ IDE Configuration

▶ System Information

Use [ENTER], [TAB]
or [SHIFT-TAB] to
select a field.

Use [+] or [-] to
configure system time.

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

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```

3.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

3.3.2 System Date [Day xx/xx/xxxx]

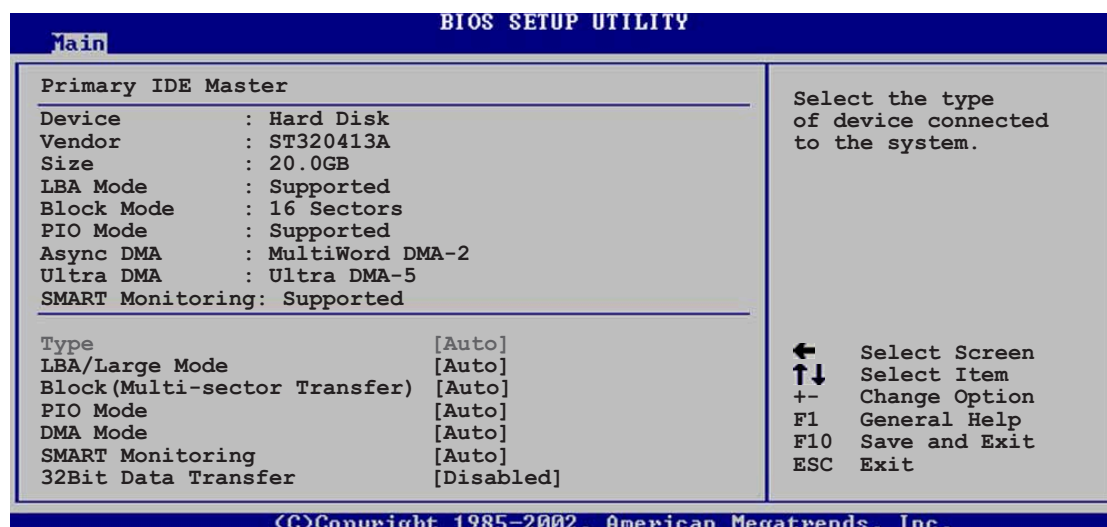
Allows you to set the system date.

3.3.3 Legacy Diskette A [1.44M, 3.5 in.]

Sets the type of floppy drive installed. Configuration options: [Disabled]
[360K, 5.25 in.] [1.2M, 5.25 in.] [720K, 3.5 in.] [1.44M, 3.5 in.]
[2.88M, 3.5 in.]

3.3.4 Primary, Third and Fourth IDE Master/Slave

The BIOS automatically detects the connected IDE devices. There is a separate sub-menu 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 N/A 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) [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]

SMART Monitoring [Auto]

Sets the Smart Monitoring, Analysis, and Reporting Technology.

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

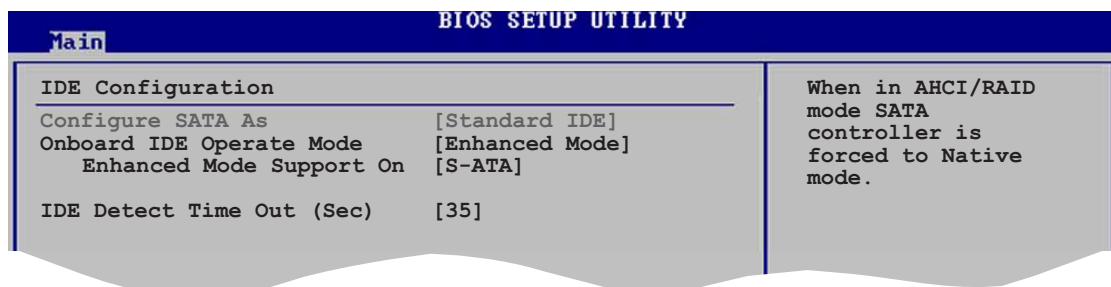
32Bit Data Transfer [Disabled]

Enables or disables 32-bit data transfer.

Configuration options: [Disabled] [Enabled]

3.3.5 IDE Configuration

The items in this menu allow you to set or change the configurations for the IDE devices installed in the system. Select an item then press <Enter> if you want to configure the item.



Configure SATA As [Standard IDE]

Sets the configuration for the Serial ATA connectors supported by the Southbridge chip.

If you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices, set this item to [Standard IDE].

If you want the Serial ATA hard disk drives to use the Advanced Host Controller Interface (AHCI), set this item to [AHCI]. For details on AHCI, go to:
www.intel.com/support/chipsets/imst/sb/CS-012304.htm
www.intel.com/support/chipsets/imst/sb/CS-012305.htm

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.

The SATA controller is set to Native mode when this item is set to [AHCI]

Onboard IDE Operate Mode [Enhanced Mode]

Allows selection of the IDE operation mode depending on the installed operating system (OS). Set to [Enhanced Mode] if you are using native OS including Windows® 2000/XP. Configuration options: [Disabled] [Compatible Mode] [Enhanced Mode]

Enhanced Mode Support On [S-ATA]

Allows you to use native OS on Serial ATA and Parallel ATA ports. It is recommend that you do not change the default setting for better OS compatibility. In this setting, you may use legacy OS on the Parallel ATA ports only if you do not install any Serial ATA device.

The P-ATA+S-ATA and P-ATA options are for advanced users only. If you set to any of these options and encountered problems, revert to the default setting **S-ATA**. Configuration options: [P-ATA+S-ATA] [S-ATA] [P-ATA]



The **Onboard IDE Operate Mode** and its sub-menu items appear only when the **Configure SATA As** item is set to [Standard IDE].

ALPE and ASP [Disabled]

Allows you to enable or disable the Aggressive Link Power Management (ALPE) and Aggressive Slumber/Partial (ASP) management features. Configuration options: [Disabled] [Enabled]

AHCI Port 3 Interlock Switch [Disabled]

Enables or disables the Advanced Host Controller Interface (AHCI) Port 3 interlock switch. Configuration options: [Disabled] [Enabled]



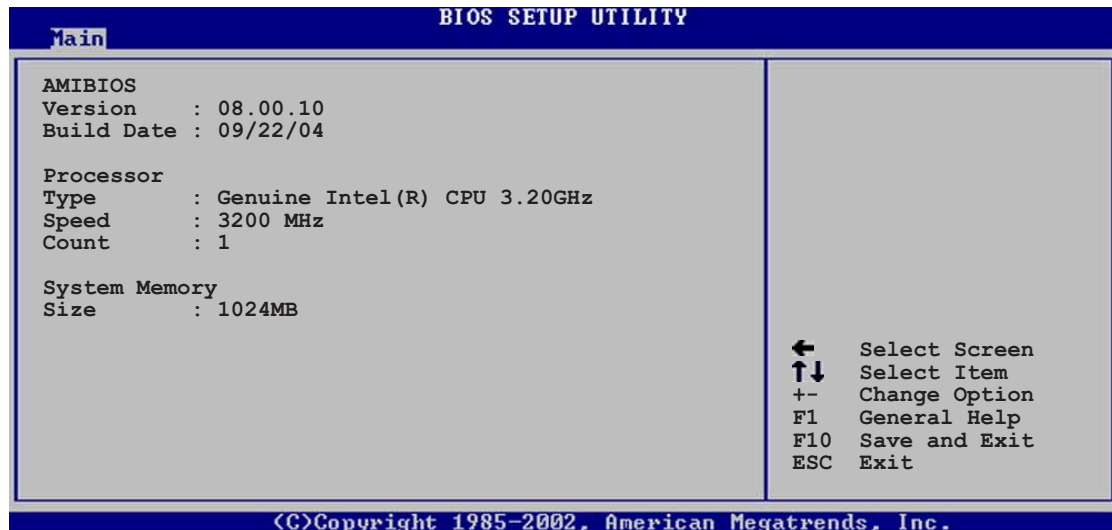
The **ALPE and ASP** and its sub-menu item appear only when the **Configure SATA As** item is set to [AHCI].

IDE Detect Time Out [35]

Selects the time out value for detecting ATA/ATAPI devices. Configuration options: [0] [5] [10] [15] [20] [25] [30] [35]

3.3.6 System Information

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



AMI BIOS

Displays the auto-detected BIOS information

Processor

Displays the auto-detected CPU specification

System Memory

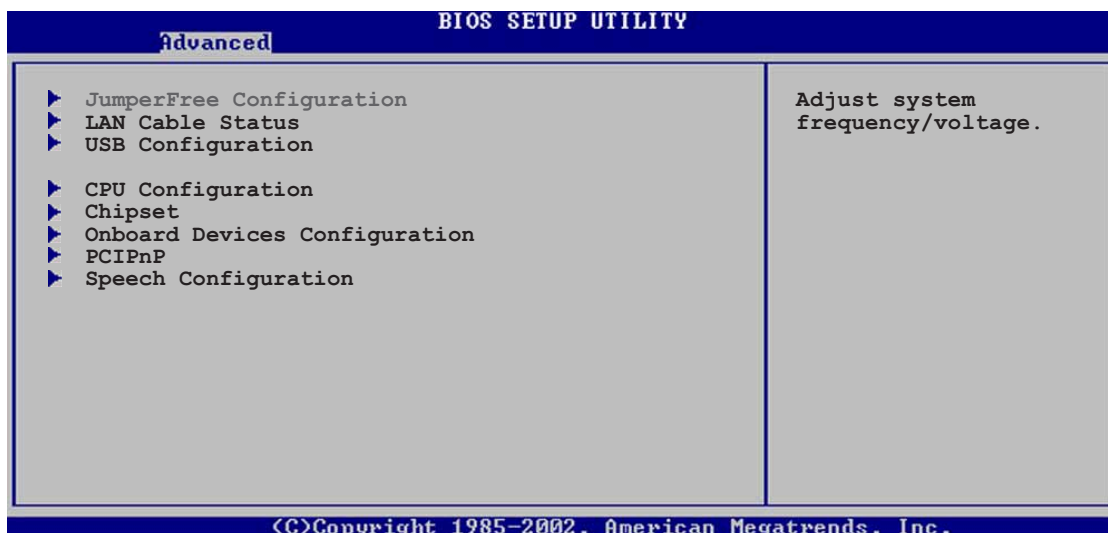
Displays the auto-detected system memory

3.4 Advanced menu

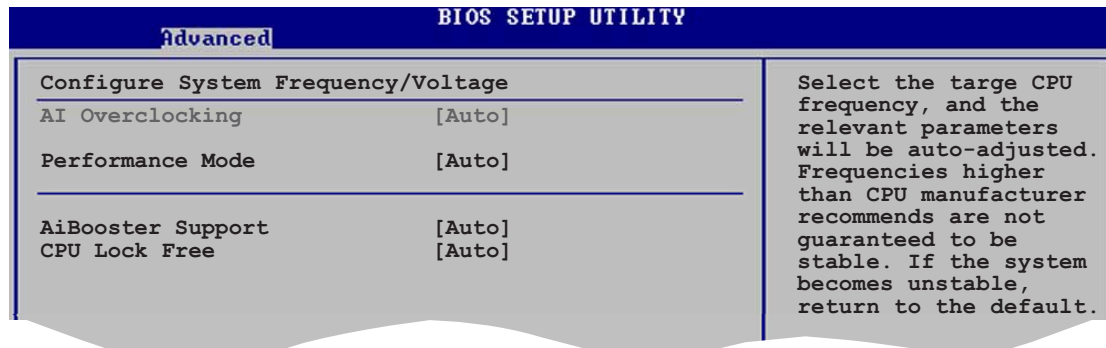
The Advanced menu items allow you to change the settings for the CPU and other system devices.



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



3.4.1 JumperFree Configuration



AI Overclocking [Auto]

Allows you to select the overclocking options to achieve the desired CPU internal frequency. Select either one of the preset overclocking configuration options.

Manual - allows you to individually set overclocking parameters.

Auto - loads the optimal settings for the system.

AI NOS - the ASUS AI Non-delay Overclocking System feature intelligently determines the system load and automatically boost the performance for the most demanding tasks.

Standard - loads the standard settings for the system.

Overclock Profile - loads overclocking profiles with optimal parameters for stability when overclocking.

Performance Mode [Auto]

Allows enhanced system performance. setting to [Turbo] may cause the system to become unstable. If this happens, revert to the default setting [Auto]. Configuration options: [Auto] [Standard] [Turbo]

AiBooster Support [Enabled]

Enables or disables the system support for the Ai Booster overclocking application. Refer to the Ai Booster help file for details.



The following item appears only when you install a CPU that supports the lock free feature. Only some latest CPUs support this feature.

CPU Lock Free [Auto]

Allows you to adjust the CPU multiplier to 14x. Setting this item to [Auto] allows the motherboard to automatically reduce the CPU multiplier value for more flexibility when increasing the external FSB.

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



The following item appears only when you set the **AI Overclocking** item to [Manual].

CPU Frequency [XXX]

Displays the frequency sent by the clock generator to the system bus and PCI bus. The value of this item is auto-detected by the BIOS. Use the <+> and <-> keys to adjust the CPU frequency. You can also type the desired CPU frequency using the numeric keypad. The values range from 100 to 400. Refer to the table below for the correct Front Side Bus and CPU External Frequency settings.

FSB/CPU External Frequency Synchronization

Front Side Bus	CPU External Frequency
FSB 1066	266 MHz
FSB 800	200 MHz

DRAM Frequency [Auto]

Allows you to set the DDR operating frequency.

Configuration options: [Auto] [400MHz] [533MHz] [600MHz] [711MHz]



Selecting a very high DRAM frequency may cause the system to become unstable! If this happens, revert to the default setting.



Set the DRAM frequency to 600 MHz if your system is running at FSB 800. Set the item to 711 MHz if your system is running at FSB 1066.

PCI Express Frequency [Auto]

Allows you to set the PCI Express frequency. This item is set to [Auto] by default. Configuration options: [Auto] [90]...[150]

PCI Clock Synchronization Mode [Auto]

Allows you to synchronize the PCI frequency with the PCI Express or CPU frequency. Configuration options: [To CPU] [33.33MHz] [Auto]

Spread Spectrum [Auto]

Allows you to enable or disable the clock generator spread spectrum. Configuration options: [Disabled] [Enabled] [Auto]



The following items also appear when the **AI Overclocking** item is set to [AI NOS].

Memory Voltage [Auto]

Allows you to select the DDR2 reference voltage. Configuration options: [Auto] [1.80V] [1.85V] [1.90V] [1.95V] [2.00V] [2.05V] [2.10V] [2.20V] [Auto]



Refer to the DDR2 documentation before adjusting the memory voltage. Setting a very high memory voltage may damage the memory module(s)!

Chipset Core Voltage [Auto]

Allows you to select the chipset core voltage. Configuration options: [Auto] [1.50V] [1.55V] [1.60V] [1.65V] [1.70V] [1.75V] [1.80V]



Setting a high chipset core voltage may damage the chipset!

CPU VCore Voltage [Auto]

Allows you to select the CPU VCore voltage. Configuration options: [Auto] [1.8000V] [1.7875V] [1.7750V] [1.7625V] [1.7500V] [1.7375V] [1.7250V] [1.7125V] [1.7000V] [1.6875V] [1.6750V] [1.6625V] [1.6500V] [1.6375V] [1.6250V] [1.6125V] [1.6000V] [1.5875V] [1.5750V] [1.5625V] [1.5500V] [1.5375V] [1.5250V] [1.5125V] [1.5000V] [1.4875V] [1.4750V] [1.4625V] [1.4500V] [1.4375V] [1.4250V] [1.4125V] [1.4000V] [1.3875V] [1.3750V] [1.3625V] [1.3500V] [1.3375V] [1.3250V] [1.3125V] [1.3000V] [1.2875V]



Refer to the CPU documentation before setting the CPU Vcore voltage. Setting a high Vcore voltage may damage the CPU!

FSB Termination Voltage [Auto]

Allows you to select the front side bus termination voltage.

Configuration options: [Auto] [1.20V] [1.25V] [1.30V] [1.40V]



The following item appears only when the **AI Overclocking** item is set to [Overclock Profile].

Overclock Options [Overclock 5%]

Allows you to overclock the CPU speed through the available preset values.

Configuration options: [Overclock 5%] [FSB888/DDR2-667]
[Overclock 10%] [FSB1000/DDR2-667]
[Overclock 15%] [FSB1200/DDR2-600]
[Overclock 20%] [FSB1200/DDR2-800]
[Overclock 30%] [FSB1333/DDR2-667]



The following item appears only when the **AI Overclocking** item is set to [AI NOS].

NOS Mode [Auto]

Sets the Non-Delay Overclocking System mode. Select either of the following configuration options:

Auto - loads the optimum sensitivity and overclocking percentage setting.

Standard - activates overclocking on a threshold between light and heavy CPU loading.

Sensitive - activates overclocking on a light CPU loading.

Heavy Load - activates overclocking on a heavy CPU loading.



The following items appear only when the **NOS Mode** item is set to [Standard], [Sensitive], or [Heavy].

Turbo NOS [Overclock XX%]

Allows you to set the overclock percentage for the selected NOS Mode.

Configuration options: [Overclock 3%] [Overclock 5%] [Overclock 7%]
[Overclock 10%] [Overclock 15%] [Overclock 20%] [Disabled]

Twin Turbo NOS [Disabled]

Allows you to disable or set the overclock percentage for the selected Turbo NOS.

Configuration options: [Disabled] [Overclock 5%]
[Overclock 7%] [Overclock 10%] [Overclock 15%] [Overclock 20%]
[Overclock 30%]

3.4.2 LAN Cable Status

This menu displays the status of the Local Area Network (LAN) cable connected to the LAN (RJ-45) port.

Advanced			BIOS SETUP UTILITY
POST Check LAN Cable		[Disabled]	Check LAN cable during POST.
LAN Cable Status			
Pair	Status	Length	
1-2	Normal	N/A	
3-6	Normal	N/A	
4-5	Normal	N/A	
7-8	Normal	N/A	
1-2	Normal	N/A	
3-6	Normal	N/A	
4-5	Normal	N/A	
7-8	Normal	N/A	

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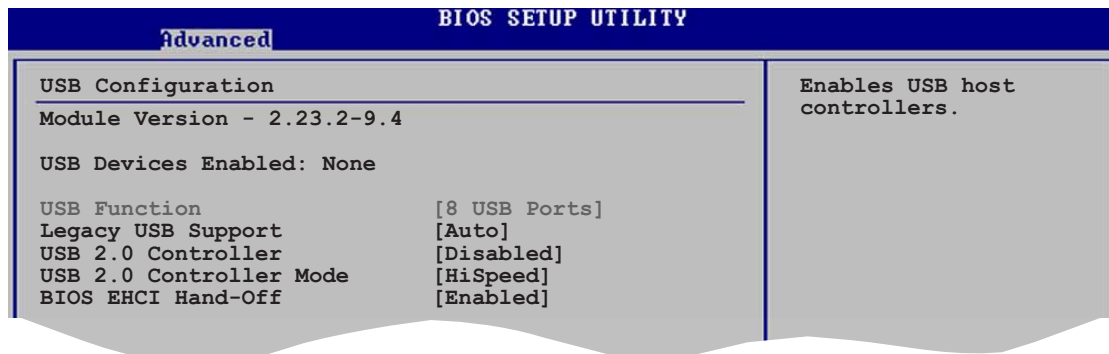
POST Check LAN Cable [Disabled]

Allows you to enable or disable LAN cable check during POST. When enabled, the menu reports the cable faults or shorts, and displays the point (length) where the fault or short is detected.

Configuration options: [Disabled] [Enabled]

3.4.3 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 Function [X USB Ports]

Allows the BIOS to auto-detect the number of USB ports in your system. Setting this item to [Disable] disables the USB function.

Configuration options: [Disabled] [2 USB Ports] [4 USB Ports] [6 USB Ports] [8 USB Ports]

Legacy USB Support [Auto]

Allows you to enable or disable support for legacy USB devices. 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 [Disabled]

Allows you to enable or disable the USB 2.0 controller.

Configuration options: [Enabled] [Disabled]

USB 2.0 Controller Mode [HiSpeed]

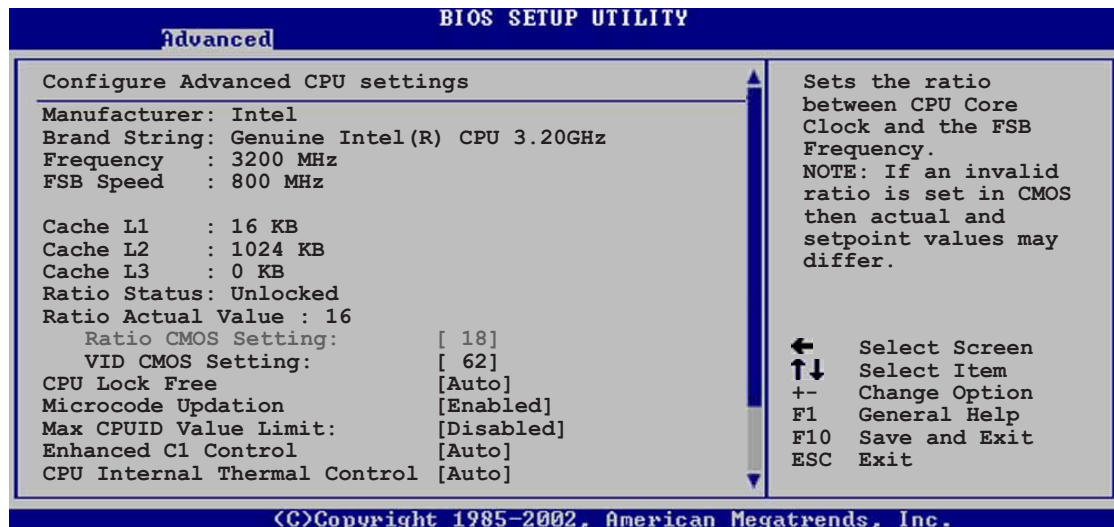
Allows you to set the USB 2.0 controller mode to HiSpeed (480 Mbps) or FullSpeed (12 Mbps). Configuration options: [FullSpeed] [HiSpeed]

BIOS EHCI Hand-Off [Enabled]

Allows you to enable support for operating systems without an EHCI hand-off feature. Configuration options: [Enabled] [Disabled]

3.4.4 CPU Configuration

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



Ratio CMOS Setting [8]

Sets the ratio between the CPU core clock and the Front Side Bus frequency. The BIOS auto-detects the default value of this item. Use the <+> or <-> keys to adjust the values. Configuration options: [8]...[28]



You can only adjust the **Ratio CMOS** if you installed an unlocked CPU. Refer to the CPU documentation for details.

VID CMOS Setting [62]

Allows you to set the VID CMOS setting at which the processor is to run. The BIOS auto-detects the default value of this item. Use the <+> or <-> keys to adjust the values.



The following item appears only when you install a CPU that supports the lock free feature. Only some latest CPUs support this feature.

CPU Lock Free [Auto]

Allows you to adjust the CPU multiplier to 14x. Setting this item to [Auto] allows the motherboard to automatically reduce the CPU multiplier value for more flexibility when increasing the external FSB.

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

Microcode Updation [Enabled]

Allows you to enable or disable the microcode updation.

Configuration options: [Disabled] [Enabled]

Max CPUID Value Limit [Disabled]

Setting this item to [Enabled] allows legacy operating systems to boot even without support for CPUs with extended CPUID functions.

Configuration options: [Disabled] [Enabled]

Enhanced C1 Control [Auto]

When set to [Auto], the BIOS automatically checks the CPU's capability to enable the C1E support. In C1E mode, the CPU power consumption is lower when idle. Configuration options: [Auto] [Disabled]

CPU Internal Thermal Control [Auto]

Allows you to disable or set to auto the CPU Internal Thermal Control function. Configuration options: [Auto] [Disabled]

Scroll down the screen to display the following items.

Hyper-Threading Technology [Enabled]

Allows you to enable or disable the processor Hyper-Threading Technology. Refer to the Appendix for more information on the Hyper-Threading Technology. Configuration options: [Disabled] [Enabled]



The following item appears only when you installed an Intel® Pentium® 4 CPU that supports the Enhanced Intel SpeedStep® Technology (EIST).

Intel(R) SpeedStep Technology [Automatic]

Allows you to use the Enhanced Intel SpeedStep® Technology. When set to [Automatic], you can adjust the system power settings in the operating system to use the EIST feature.

Set this item to [Maximum] or [Disabled] if you do not want to use the EIST. The CPU constantly operates at a lower internal frequency when you set this item to [Minimum].

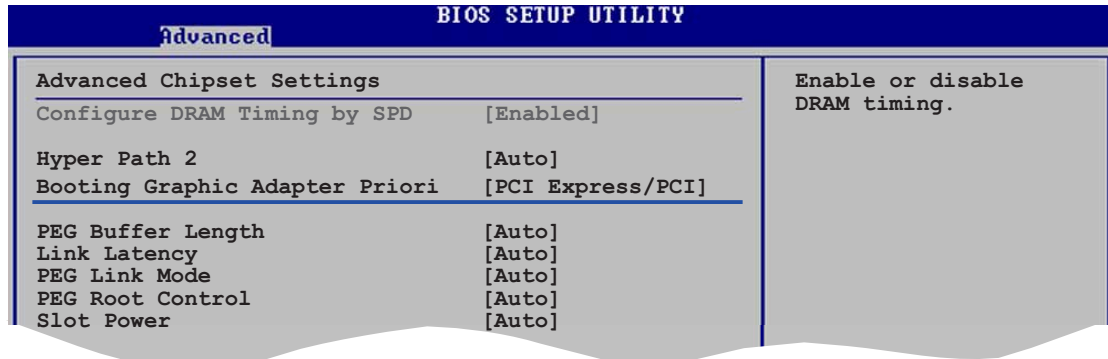
Configuration options: [Maximum] [Minimum] [Automatic] [Disabled]



-
- Refer to the Appendix for details on how to use the EIST feature.
 - The motherboard comes with a BIOS file that supports EIST.
-

3.4.5 Chipset

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



Advanced Chipset Settings

Configure DRAM Timing by SPD [Enabled]

When this item is enabled, the DRAM timing parameters are set according to the DRAM SPD (Serial Presence Detect). When disabled, you can manually set the DRAM timing parameters through the DRAM sub-items. The following sub-items appear when this item is Disabled.

Configuration options: [Disabled] [Enabled]

DRAM CAS# Latency [5 Clocks]

Controls the latency between the SDRAM read command and the time the data actually becomes available.

Configuration options: [5 Clocks] [4 Clocks] [3 Clocks]

DRAM RAS# Precharge [4 Clocks]

Controls the idle clocks after issuing a precharge command to the DDR SDRAM. Configuration options: [2 Clocks] [3 Clocks] [4 Clocks] [5 Clocks]

DRAM RAS# to CAS# Delay [4 Clocks]

Controls the latency between the DDR SDRAM active command and the read/write command. Configuration options: [2 Clocks] [3 Clocks] [4 Clocks] [5 Clocks]

DRAM RAS# Activate to Precharge Delay [15 Clocks]

Configuration options: [1 Clock]...[15 Clocks]

DRAM Write Recovery Time [4 Clocks]

Configuration options: [2 Clocks] [3 Clocks] [4 Clocks] [5 Clocks]

Hyper Path 2 [Auto]

Allows you to enable or disable the ASUS Hyper Path 2 feature.

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

Booting Graphic Adapter Priority [PCI Express/PCI]

Allows selection of the graphics controller to use as primary boot device.
Configuration options: [PCI Express/PCI] [PCI/PCI Express]

PEG Buffer Length [Auto]

Sets the length of the PCI Express graphics card buffer.
Configuration options: [Auto] [Long] [Short]

Link Latency [Auto]

Sets the PCI Express graphics card link latency.
Configuration options: [Auto] [Slow] [Normal]

PEG Link Mode [Auto]

Sets the PCI Express graphics link mode. Setting this item to [Auto] allows the motherboard to automatically adjust the PCI Express graphics link mode to the correct frequency based on the system configuration. Four additional settings are available for overclocking the PEG Link Mode.
Configuration options: [Auto] [Slow] [Normal] [Fast] [Faster]

PEG Root Control [Auto]

Allows you to enable, disable, or set to automatic the PCI Express graphics card root control. Configuration options: [Auto] [Disabled] [Enabled]

Slot Power [Auto]

Sets the PCI Express graphics card slot power.
Configuration options: [Auto] [Light] [Normal] [Heavy] [Heavier]

3.4.6 Onboard Devices Configuration

Advanced		BIOS SETUP UTILITY
Configure Win627EHF Super IO Chipset		Enable or disable High Definition Audio Controller.
HD Audio Controller	[Enabled]	
Front Panel Support Type	[AC97]	
Onboard PCIEX GbE LAN	[Enabled]	
LAN Option ROM	[Disabled]	
Serial Port1 Address	[3F8/IRQ4]	
Parallel Port Address	[378]	
Parallel Port Mode	[ECP]	
ECP Mode DMA Channel	[DMA3]	
Parallel Port IRQ	[IRQ7]	
Onboard Game/MIDI Port	[Disabled]	

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HD Audio Controller [Enabled]

Allows you to enable or disable the high-definition audio CODEC.
Configuration options: [Enabled] [Disabled]

Front Panel Support Type [AC97]

Allows you to set the front panel audio connector (AAAF) 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]

OnBoard PCIEX GbE LAN [Enabled]

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



The Gigabit LAN controller does not support S5 Wake-On-LAN function under DOS mode or Windows® Me.

LAN Option ROM [Disabled]

This item allows you to enable or disable the option ROM in the onboard LAN controller. This item appears only when the **Onboard PCIEX Gbe LAN** items are set to Enabled.
Configuration options: [Disabled] [Enabled]

Serial Port1 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.

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

Parallel Port Address [378]

Allows you to select the Parallel Port base addresses.

Configuration options: [Disabled] [378] [278] [3BC]

Parallel Port Mode [ECP]

Allows you to select the Parallel Port mode.

Configuration options: [Normal] [Bi-directional] [EPP] [ECP]

ECP Mode DMA Channel [DMA3]

Appears only when the Parallel Port Mode is set to [ECP]. This item allows you to set the Parallel Port ECP DMA.

Configuration options: [DMA0] [DMA1] [DMA3]

Parallel Port IRQ [IRQ7]

Configuration options: [IRQ5] [IRQ7]

Onboard Game/MIDI Port [Disabled]

Allows you to select the Game Port address or to disable the port.

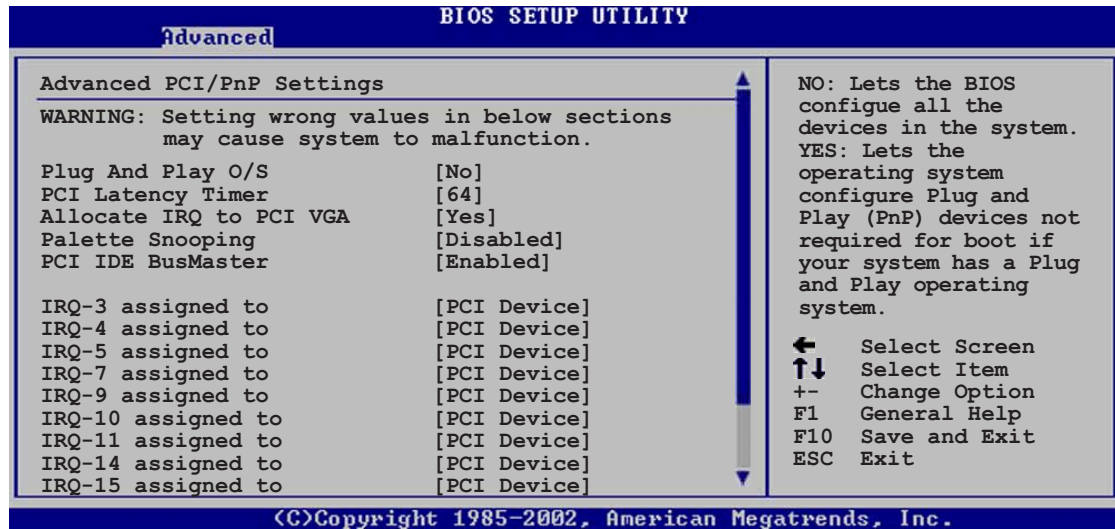
Configuration options: [Disabled] [200/300] [200/330] [208/300]
[208/330]

3.4.7 PCI PnP

The PCI PnP menu items allow you to change the advanced settings for PCI/PnP devices. The menu includes setting IRQ and DMA channel resources for either PCI/PnP or legacy ISA devices, and setting the memory size block for legacy ISA devices.



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



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]

PCI Latency Timer [64]

Allows you to select the value in units of PCI clocks for the PCI device latency timer register. Configuration options: [32] [64] [96] [128] [160] [192] [224] [248]

Allocate IRQ to PCI VGA [Yes]

When set to [Yes], BIOS assigns an IRQ to PCI VGA card if the card requests for an IRQ. When set to [No], BIOS does not assign an IRQ to the PCI VGA card even if requested. Configuration options: [No] [Yes]

Palette Snooping [Disabled]

When set to [Enabled], the palette snooping feature informs the PCI devices that an ISA graphics device is installed in the system so that the latter can function correctly. Configuration options: [Disabled] [Enabled]

PCI IDE BusMaster [Enabled]

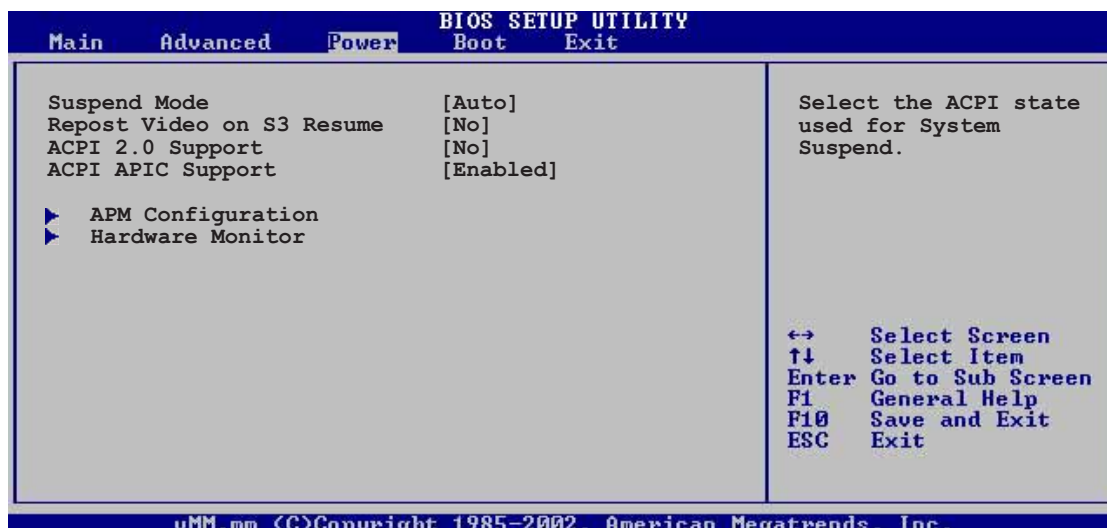
Allows BIOS to use PCI bus mastering when reading/writing to IDE devices.
Configuration options: [Disabled] [Enabled]

IRQ-xx assigned to [PCI Device]

When set to [PCI Device], the specific IRQ is free for use of PCI/PnP devices. When set to [Reserved], the IRQ is reserved for legacy ISA devices. Configuration options: [PCI Device] [Reserved]

3.5 Power menu

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



3.5.1 Suspend Mode [Auto]

Allows you to select the Advanced Configuration and Power Interface (ACPI) state to be used for system suspend. Setting this item to [Auto] allows the OS to select the ACPI state.

Configuration options: [S1 (POS) Only] [S3 Only] [Auto]

3.5.2 Repost Video on S3 Resume [No]

Determines whether to invoke VGA BIOS POST on S3/STR resume.

Configuration options: [No] [Yes]

3.5.3 ACPI 2.0 Support [No]

Allows you to add more tables for Advanced Configuration and Power Interface (ACPI) 2.0 specifications. Configuration options: [No] [Yes]

3.5.4 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]

3.5.5 APM Configuration

BIOS SETUP UTILITY	
Power	
APM Configuration	
Power Button Mode	[On/Off]
Restore on AC Power Loss	[Power Off]
Power On By RTC Alarm	[Disabled]
Power On By External Modems	[Disabled]
Power On By PCI Devices	[Disabled]
Power On By PS/2 Keyboard	[Disabled]
Keyboard Wakeup Password :	Not Installed
Power On By PS/2 Mouse	[Disabled]

Go into On/Off or Suspend when Power button is pressed.

Power Button Mode [On/Off]

Allows the system to go into On/Off mode or suspend mode when the power button is pressed. Configuration options: [On/Off] [Suspend]

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. When set to Last State, the system goes into either off or on state, whatever the system state was before the AC power loss. Configuration options: [Power Off] [Power On] [Last State]

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, RTC Alarm Hour, RTC Alarm Minute, and RTC Alarm Second appear with set values. Configuration options: [Disabled] [Enabled]

Power On By External Modems [Disabled]

Allows either settings of [Enabled] or [Disabled] for powering up the computer when the external modem receives a call while the computer is in Soft-off mode. Configuration options: [Disabled] [Enabled]



The computer cannot receive or transmit data until the computer and applications are fully running. Thus, connection cannot be made on the first try. Turning an external modem off and then back on while the computer is off causes an initialization string that turns the system power on.

Power On By PCI Devices [Disabled]

When set to [Enabled], this parameter allows you to turn on the system through a PCI LAN or modem card. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Enabled]

Power On By PS/2 Keyboard [Disabled]

Allows you to use specific keys on the keyboard to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Enabled]

Wakeup Password

This item appears only when the **Power On By PS/2 Keyboard** is set to [Enabled]. Select this item, then press <Enter> to set or change the keyboard wakeup password.

Keyboard Wakeup Password

Shows [**Not Installed**] if the **Wakeup Password** is disabled. After you have set a keyboard password, this item shows [**Installed**].

Power On By PS/2 Mouse [Disabled]

When set to [Enabled], this parameter allows you to use the PS/2 mouse to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Enabled]

3.5.6 Hardware Monitor

BIOS SETUP UTILITY	
Power	
Hardware Monitor	
CPU Temperature	[32.5°C/90.5°F]
MB Temperature	[36.0°C/96.5°F]
CPU Fan Speed	[3813 RPM]
CPU Q-Fan Control	[Disabled]
CPU Target Temperature	[53°C]
Chassis Fan1 Speed	[N/A]
Chassis Fan2 Speed	[N/A]
Power Fan Speed	[N/A]
VCORE Voltage	[1.320V]
3.3V Voltage	[3.345V]
5V Voltage	[5.094V]
12V Voltage	[11.880V]
	←→ Select Screen
	↑↓ Select Item
	+− Change Option
	F1 General Help
	F10 Save and Exit
	ESC Exit

vMM.mm <C>Copyright 1985-2002, American Megatrends, Inc.

CPU Temperature [xxx°C/xxx°F]

MB Temperature [xxx°C/xxx°F]

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

CPU Fan Speed [xxxxRPM] or [N/A] or [Ignored]

The onboard hardware monitor automatically detects and displays the CPU fan speed in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows N/A. Select [Ignore] from the item options to disable CPU fan speed monitoring.

CPU Q-Fan Control [Disabled]

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



The **CPU Q-Fan Mode**, **CPU Fan Ratio**, **CPU Target Temperature**, and **Chassis Q-Fan Control** items appear when you enable the **CPU Q-Fan Control** feature.

CPU Q-Fan Mode [PWM]

Allows you to select the type of CPU fan cable connected to the CPU fan connector. Set to [PWM] when using a 4-pin CPU fan cable. Set to [DC] when using a 3-pin CPU fan cable. Configuration options: [PWM] [DC]



Some CPU fans with a 4-pin cable do not comply with Intel®'s PWM fan specification. When using this type of CPU fan, you can not reduce the CPU fan speed even if you set the CPU Q-Fan Mode to [PWM].

CPU Fan Ratio [Auto]

Allows you to select the appropriate CPU fan speed ratio for the system. The default [Auto] automatically selects the fan speed ratio when operating a low CPU temperature. Select a higher ratio if you installed additional devices and the system requires more ventilation. Configuration options: [Auto] [90%] [80%] [70%] [60%]

CPU Target Temperature [xxx°C]

Allows you to set the CPU temperature threshold when the CPU fan speed is increased to lower the CPU temperature. The configuration options for this item depend on the recommended Intel® Fan Speed Control (FSC) temperature settings. The Intel® FSC provides target temperature options at ±15 °C with 3 °C interval.

Chassis Fan1 Speed [xxxxRPM] or [N/A] or [Ignored]

The onboard hardware monitor automatically detects and displays the chassis fan speed in rotations per minute (RPM). If the fan is not connected to the chassis, the specific field shows N/A. Select [Ignore] from the item options to disable chassis fan speed monitoring.

Chassis Q-Fan Control [Disabled]

Allows you to enable or disable the ASUS Q-Fan feature that smartly adjusts the chassis fan speeds for more efficient system operation. When enabled, the chassis fan ratio is the same with the selected CPU fan ratio. Configuration options: [Disabled] [Enabled]

Chassis Fan2 Speed [xxxxRPM] or [N/A] or [Ignored]

The onboard hardware monitor automatically detects and displays the chassis fan speed in rotations per minute (RPM). If the fan is not connected to the chassis, the specific field shows N/A. Select [Ignore] from the item options to disable chassis fan speed monitoring.

Power Fan Speed [xxxxRPM] or [N/A]

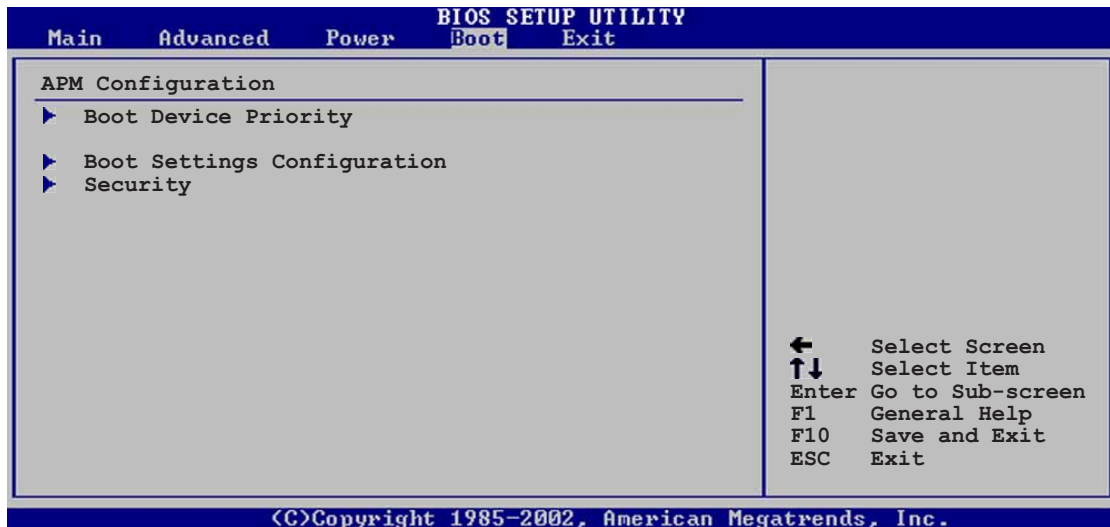
The onboard hardware monitor automatically detects and displays the power fan speed in rotations per minute (RPM). If the fan is not connected to the power fan connector, the specific field shows N/A.

VCORE Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage

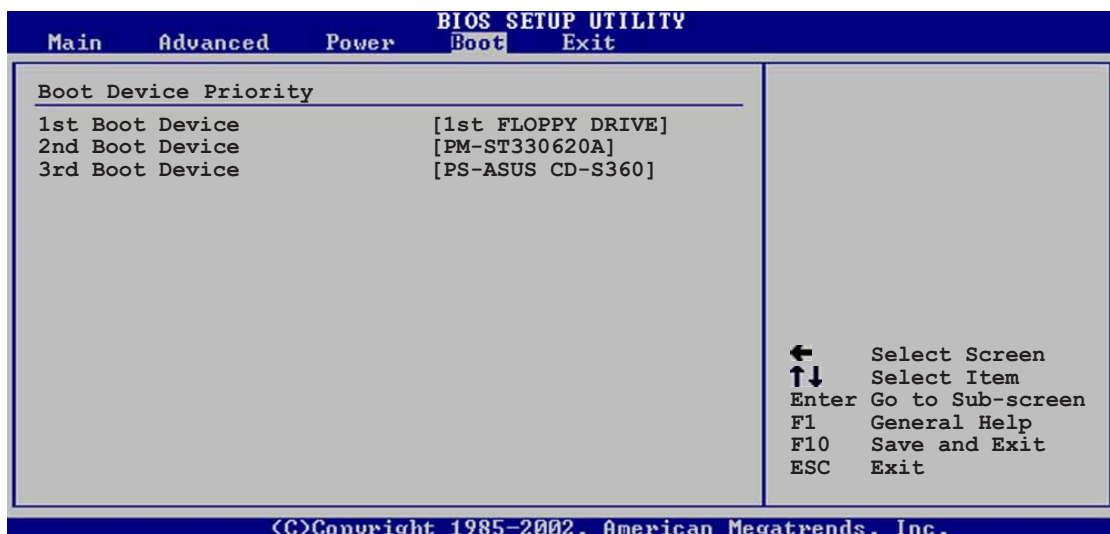
The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators.

3.6 Boot menu

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



3.6.1 Boot Device Priority



1st ~ xxth Boot Device [1st Floppy Drive]

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: [xxxxx Drive] [Disabled]

3.6.2 Boot Settings Configuration

BIOS SETUP UTILITY	
Boot	
Boot Settings Configuration	
Quick Boot	[Enabled]
Full Screen Logo	[Enabled]
AddOn ROM Display Mode	[Force BIOS]
Bootup Num-Lock	[On]
PS/2 Mouse Support	[Auto]
Wait For 'F1' If Error	[Enabled]
Hit 'DEL' Message Display	[Enabled]
Interrupt 19 Capture	[Disabled]

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

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]

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 MyLogo2™ feature.

Add On 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]

PS/2 Mouse Support [Auto]

Allows you to enable or disable support for PS/2 mouse.

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

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]

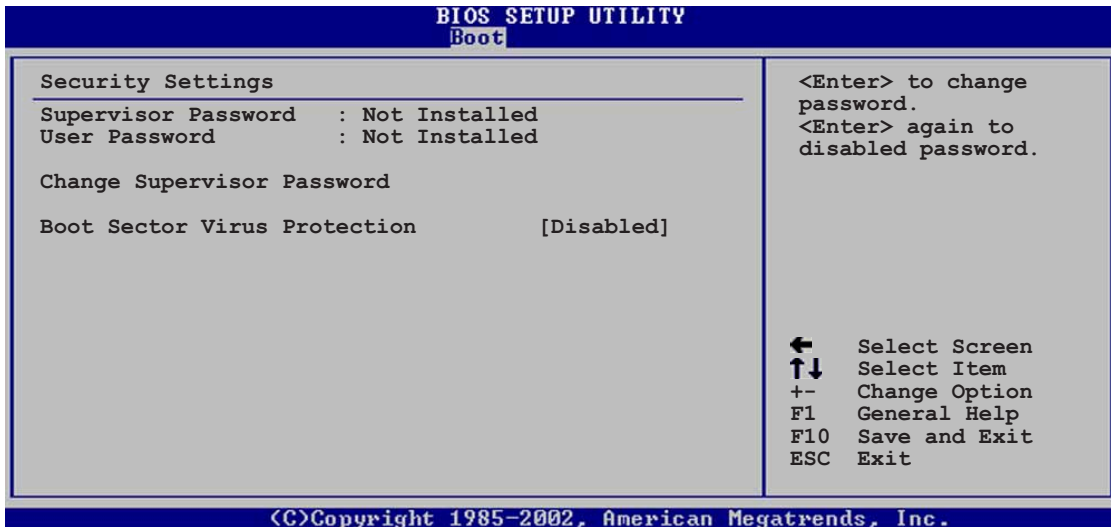
When set to Enabled, the system displays the message "Press DEL to run Setup" during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Disabled]

When set to [Enabled], this function allows the option ROMs to trap Interrupt 19. Configuration options: [Disabled] [Enabled]

3.6.3 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, then 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.

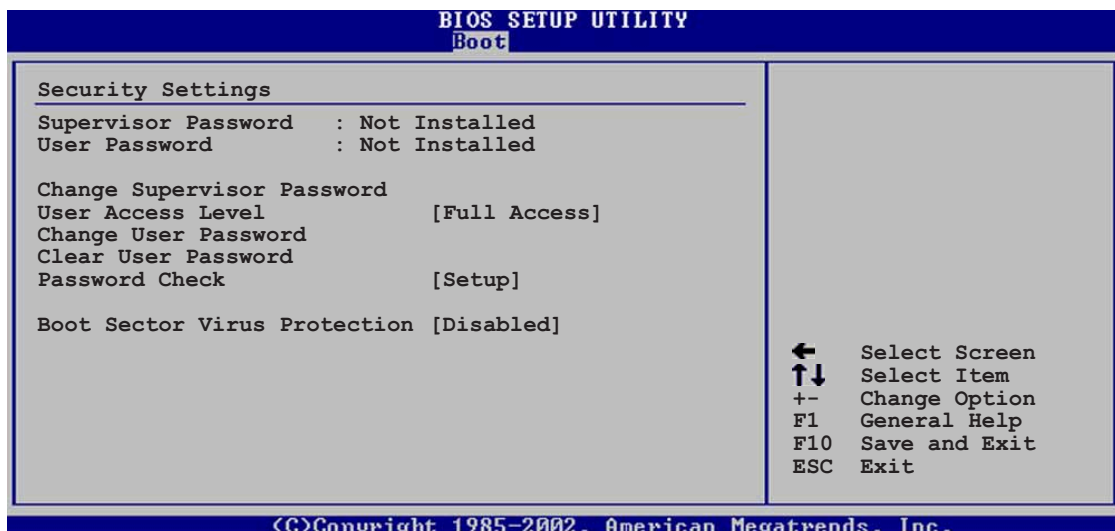
To change the supervisor password, follow the same steps as in setting a user password.

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 "2.6 Jumpers" for information on how to erase the RTC RAM.

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



User Access Level [Full Access]

This item allows you to select the access restriction to the Setup items. Configuration options: [No Access] [View Only] [Limited] [Full Access]

No Access prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password:

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

The message "Password Installed" appears after you set your password successfully.

To change the user password, follow the same steps as in setting a user password.

Clear User Password

Select this item to clear the user password.

Password Check [Setup]

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

Configuration options: [Setup] [Always]

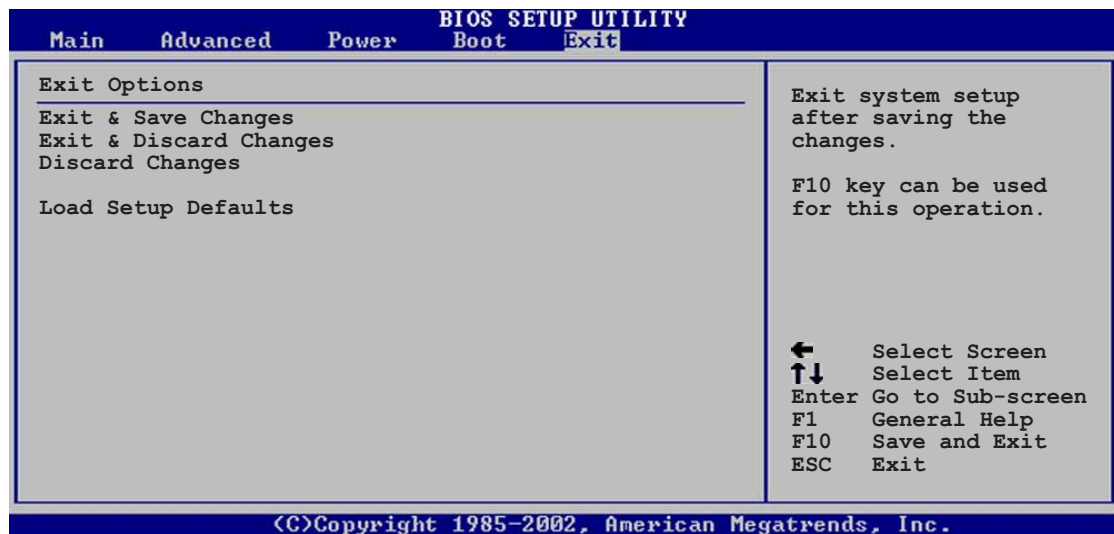
Boot Sector Virus Protection [Disabled]

Allows you to enable or disable the boot sector virus protection.

Configuration options: [Disabled] [Enabled]

3.7 Exit menu

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



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

Exit & Save Changes

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

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

Load Setup Defaults

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 **Yes** to load default values. Select **Exit & Save Changes** or make other changes before saving the values to the non-volatile RAM.

This chapter describes the contents of the support CD that comes with the motherboard package.

4 Software support

Chapter summary

4

4.1	Installing an operating system	4-1
4.2	Support CD information	4-1
4.3	Software information	4-8

4.1 Installing an operating system

This motherboard supports Windows® 2000/2003 Server/XP 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.
- Make sure that you install Windows® 2000 Service Pack 4 or the Windows® XP Service Pack 1 or later versions before installing the drivers for better compatibility and system stability.

4.2 Support CD information

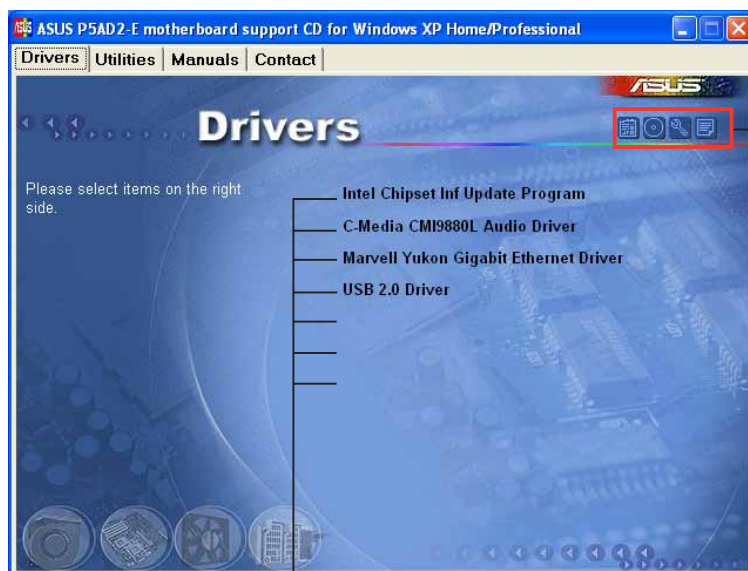
The support CD that came with the motherboard package contains the drivers, software applications, and utilities that you can install to avail all motherboard features.



The contents of the support CD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for updates.

4.2.1 Running the support CD

Place the support CD to the optical drive. The CD automatically displays the **Drivers** menu if Autorun is enabled in your computer.



Click an icon to display support CD/motherboard information

Click an item to install



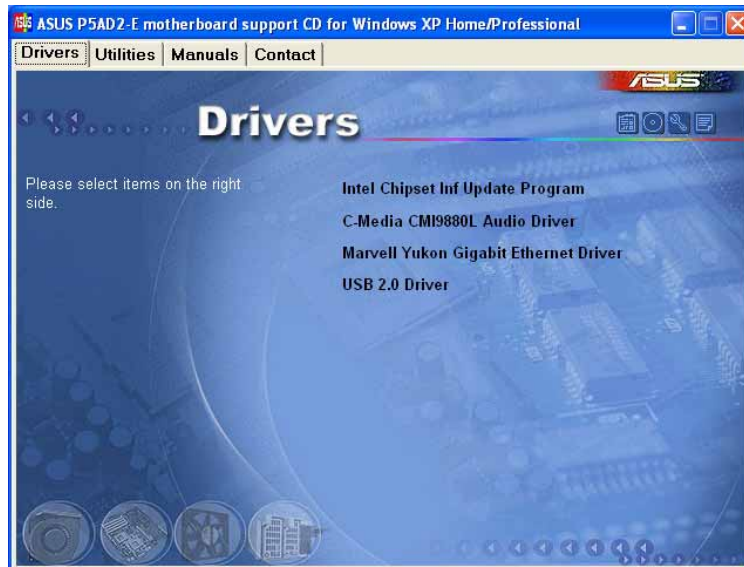
If **Autorun** is NOT enabled in your computer, browse the contents of the support CD to locate the file **ASSETUP.EXE** from the BIN folder. Double-click the **ASSETUP.EXE** to run the CD.

4.2.2 Drivers menu

The drivers menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to activate the devices.



The screen display and driver options vary under different operating system versions.



QFE Update

Installs the Quick Fix Engineering (QFE) driver updates.

Intel Chipset Inf Update Program

Installs the Intel® Chipset INF Update Program. This driver enables Plug-n-Play INF support for the Intel® chipset components on the motherboard. When installed to the target system, this driver provides the method for configuring the chipset components.

You can install this utility using three different modes: interactive, silent or unattended preload. Installing the driver in interactive mode requires user input during installation. User input is not required when installing the driver in silent or unattended preload modes. Refer to the online help or readme file that came with the utility for details.

C-MEDIA CMI9880L Audio Driver and Application

Installs the C-MEDIA® CMI9880L audio driver and application. See page 4-11 for details.

Marvell Yukon Gigabit Ethernet Driver

Installs the driver for the Marvell® Yukon 88E8053 PCI Express Gigabit LAN.

USB 2.0 Driver

Installs the USB 2.0 driver.

4.2.3 Utilities menu

The **Utilities** menu displays the software applications and utilities that the motherboard supports. Click on an item to install.



ASUS PC Probe

This smart utility monitors the fan speed, CPU temperature, and system voltages, and alerts you of any detected problems. This utility helps you keep your computer in healthy operating condition.

ASUS Update

The ASUS Update utility that allows you to update the motherboard BIOS in Windows® environment. This utility requires an Internet connection either through a network or an Internet Service Provider (ISP). See page 3-8 for details.

AI Booster

The ASUS AI Booster application allows you to overclock the CPU speed in Windows® environment.

Microsoft DirectX 9.0c

The Microsoft DirectX® 9.0c is a multimedia technology that enhances computer graphics and sounds. DirectX® improves the multimedia features of your computer so you can enjoy watching TV and movies, capturing videos, or playing games in your computer.

Anti-virus Utility

The anti-virus utility scans, identifies, and removes computer viruses. View the online help for detailed information.

ADOBE Acrobat Reader

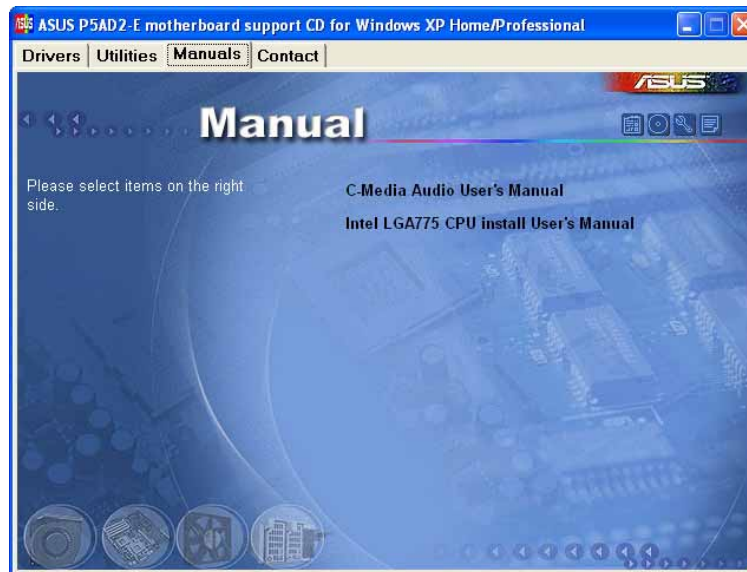
The Adobe Acrobat® Reader V5.0 is for opening, viewing, and printing documents in Portable Document Format (PDF).

ASUS Screen Saver

Bring life to your idle screen by installing the ASUS screen saver.

4.2.4 Manuals menu

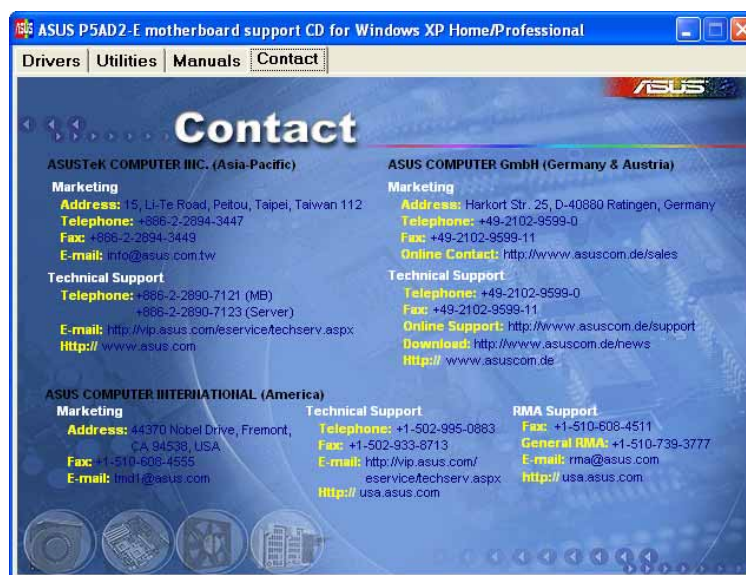
The **Manuals** menu contains the user manuals for third party components and applications.



Most user manual files are in Portable Document Format (PDF). Install the Adobe Acrobat Reader application from the **Utilities** tab before opening a user manual file.

4.2.5 Contact information

Click the **Contact** tab to display the ASUS contact information. You can also find this information on the inside front cover of this user guide.



4.2.6 Other information

The icons on the top right corner of the screen provide additional information on the motherboard and the contents of the support CD. Click an icon to display the specified information.

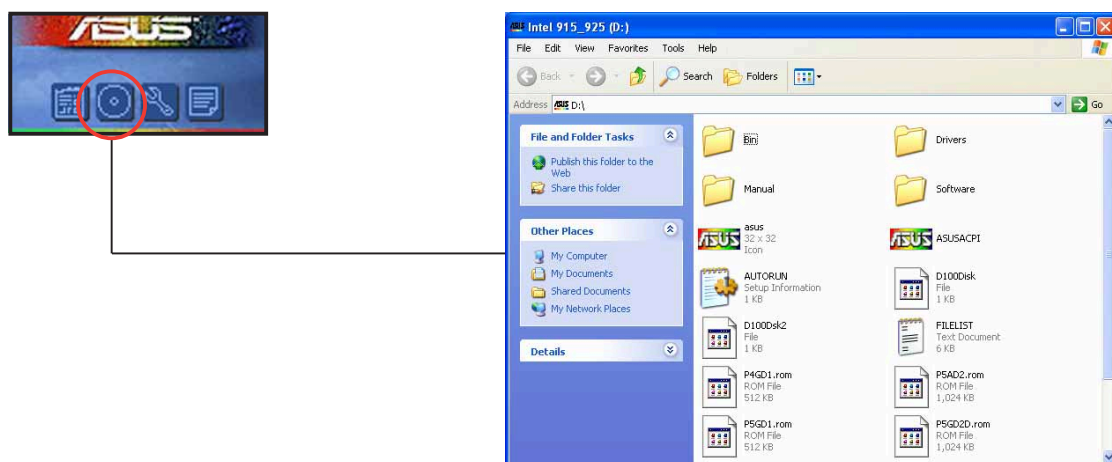
Motherboard Info

Displays the general specifications of the motherboard.



Browse this CD

Displays the contents of the support CD in graphical format.



Technical Support Form

Displays the ASUS Technical Support Request Form that you have to fill out when requesting technical support.



TECHSUPP - Notepad

ASUSTeK TECHNICAL SUPPORT REQUEST FORM DATE: _____

ORIGINATOR DESCRIPTION

COMPANY NAME : CONTACT NAME :
PHONE (AREA) : FAX # (AREA) :
EMAIL ADDRESS :

HARDWARE DESCRIPTION

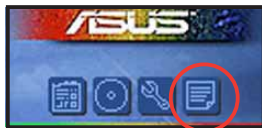
MOTHERBOARD : REVISION # : BIOS:#401A
CPU BRAND : SPEED(MHZ) :
DRAM BRAND : SPEED(MS) : SIZE(MB) :
CACHE BRAND : SPEED(NS) : SIZE(KB) :
HARD DISK : MODEL NAME : SIZE(MB) :
CDROM BRAND : MODEL NAME :
BACKUP BRAND : MODEL NAME :
OTHER STORAGE : MODEL NAME : SIZE(MB) :

ADD-IN CARD DESCRIPTION (MODEL NAME/VENDOR)

(E)ISA SLOT 1 :
(E)ISA SLOT 2 :
(E)ISA SLOT 3 :
(E)ISA SLOT 4 :

Filelist

Displays the contents of the support CD in text format.



FILELIST - Notepad

File list for the included support software for Intel 915/925 Series motherboard

=====

File Name	Description

--Drivers	
-Audio	
-Realtek	-Realtek ALC861 Audio driver V5.10.0.5024.(2000/XP/2003)
-CMI	-Cmedia CMI9880 Audio driver V5.12.01.0007.25(46) for windows 2000/XP
-Chipset	
-IAA	-Intel(R) Application Accelerator RAID edition v4.0.0.6211 for window
-Inf	-Intel(R) Grantsdale-G chipset software installation utility v6.0.0.1
-LAN	
-8052	
-Windows	-Marvell Yukon Gigabit Ethernet v7.6.1.0 for windows 2000/XP/2003.
-VCT	-Marvell VCT package v1.11 beta 01 for 2000/XP/2003.
-Linux	
	-Marvell Linux driver for kernel 2.6 and 2.4 v7.01.
	-Marvell Linux driver install package for kernel 2.4 v7.01.
-UNDI	
	-Marvell UNDI driver for EFI32 V2.01.
-Client_32	
	-Marvell Yukon Client 32 driver v7.02.
-ODI	
	-Marvell dos odi driver v7.03.
-Netware	
	-Marvell yukon Netware 4.0 Driver v7.02.
	-Marvell yukon Netware 5.1/6 driver v7.02.

4.3 Software information

Most of the applications in the support CD have wizards that will conveniently guide you through the installation. View the online help or readme file that came with the software application for more information.

4.3.1 ASUS MyLogo2™

The ASUS MyLogo2™ utility lets you customize the boot logo. The boot logo is the image that appears on screen during the Power-On-Self-Tests (POST). The ASUS MyLogo2™ is automatically installed when you install the **ASUS Update** utility from the support CD. See section “4.2.3 Utilities menu” for details.



- Before using the ASUS MyLogo2™, use the AFUDOS utility to make a copy of your original BIOS file, or obtain the latest BIOS version from the ASUS website. See section “3.1.2 AFUDOS utility”.
- Make sure that the BIOS item **Full Screen Logo** is set to [Enabled] if you wish to use ASUS MyLogo2. See section “3.6.2 Boot Settings Configuration”.
- You can create your own boot logo image in GIF, JPG, or BMP file formats.

To launch the ASUS MyLogo2™:

1. Launch the ASUS Update utility. Refer to section “3.1.5 ASUS Update utility” for details.
2. Select **Options** from the drop down menu, then click **Next**.
3. Check the option **Launch MyLogo to replace system boot logo before flashing BIOS**, then click **Next**.
4. Select **Update BIOS from a file** from the drop down menu, then click **Next**.
5. When prompted, locate the new BIOS file, then click **Next**. The ASUS MyLogo2 window appears.
6. From the left window pane, select the folder that contains the image you intend to use as your boot logo.



7. When the logo images appear on the right window pane, select an image to enlarge by clicking on it.



8. Adjust the boot image to your desired size by selecting a value on the **Ratio** box.



9. When the screen returns to the ASUS Update utility, flash the original BIOS to load the new boot logo.
10. After flashing the BIOS, restart the computer to display the new boot logo during POST.

4.3.2 AI NET2

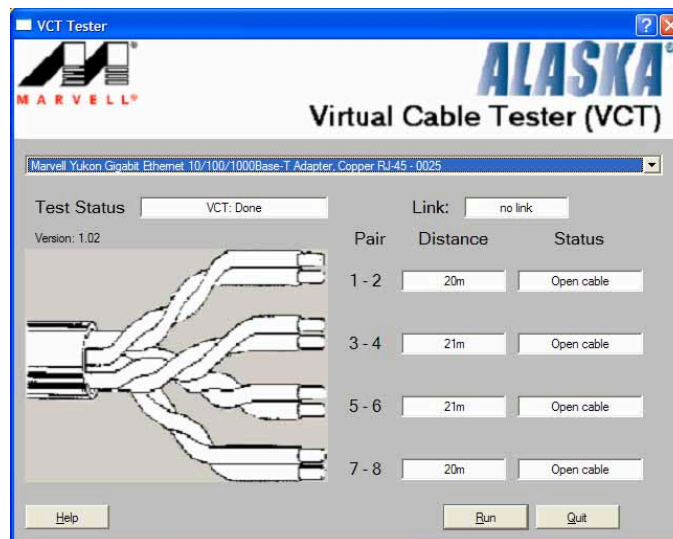
The AI NET2 features the Marvell® Virtual Cable Tester™ (VCT). VCT is a cable diagnostic utility that reports LAN cable faults and shorts using the Time Domain Reflectometry (TDR) technology. The VCT detects and reports open and shorted cables, impedance mismatches, pair swaps, pair polarity problems, and pair skew problems of up to 64 ns at one meter accuracy.

The VCT feature reduces networking and support costs through a highly manageable and controlled network system. This utility can be incorporated in the network systems software for ideal field support as well as development diagnostics.

Using the Virtual Cable Tester™

To use the the Marvell® Virtual Cable Tester™ utility:

1. Launch the VCT utility from the Windows® desktop by clicking **Start > All Programs > Marvell > Virtual Cable Tester**.
2. Click **Virtual Cable Tester** from the menu to display the screen below.



3. Click the **Run** button to perform a cable test.



- The VCT only runs on systems with Windows® XP or Windows® 2000 operating systems.
- The VCT utility only tests Ethernet cables connected to Gigabit LAN port(s).
- The **Run** button on the Virtual Cable Tester™ main window is disabled if no problem is detected on the LAN cable(s) connected to the LAN port(s).
- If you want the system to check the status of the LAN cable before entering the OS, enable the item **Post Check LAN Cable** in the BIOS Setup.

4.3.3 C-Media 3D audio configuration

The C-Media 3D Audio Configuration utility allows easy installation and set up of audio devices through a user-friendly interface. The utility is automatically installed when you install the C-Media CMI9880L audio driver and application from the motherboard support CD. Refer to section “4.2.2 Drivers menu.”

Launching the C-Media 3D Audio Configuration utility

Launch the C-Media 3D Audio Configuration utility by double clicking the C-Media icon on the Windows® taskbar.

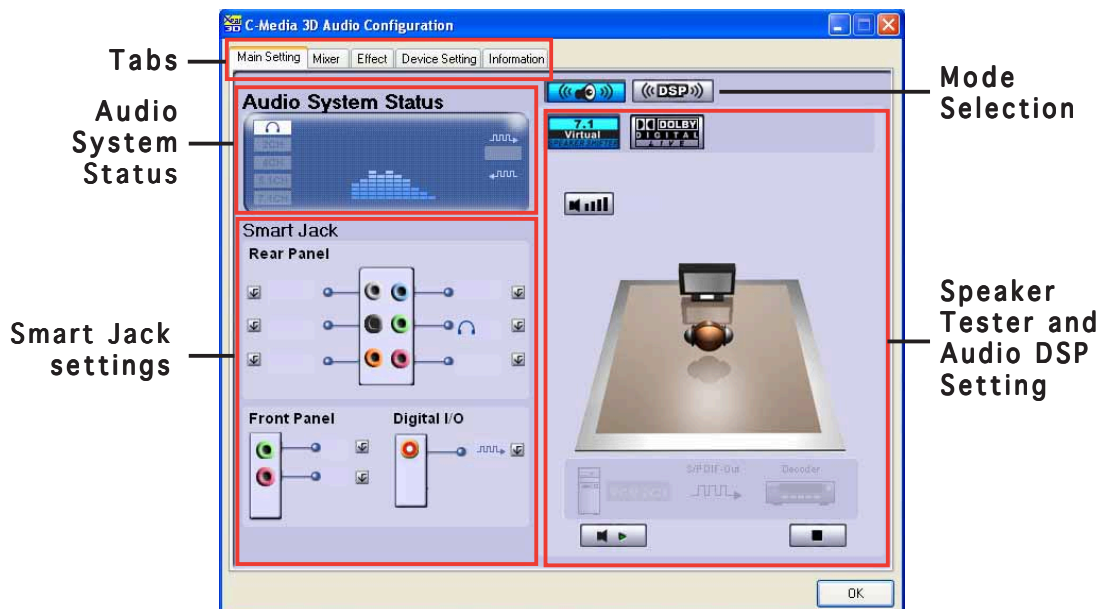


Using the C-Media 3D Audio Configuration utility


The C-Media 3D Audio Configuration interface has five tabs: Main Setting, Mixer, Effect, Device Setting, and Information. Click a tab to display the details.

Main Setting

The **Main Setting** tab allows you to check the audio system status, configure the audio ports, set the speaker and audio DSP modes, and test the speaker output.



Audio System Status. This section displays the output mode status, the real-time audio playback spectrum, and the digital I/O status. The number of speakers configured in the system determines the output mode status.

Smart Jack Setting. You can configure the function of the rear panel, front panel, and digital I/O audio ports from this section. Click the  Smart Jack setting button that corresponds to the port that you wish to configure.

Mode Selection. This section allows you to set the Speaker Tester or the Digital Signal Processing (DSP). Click the button to change the audio modes.

Speaker Tester and Audio DSP Setting. You can configure your speaker setup and the audio DSP settings in this section. Click the **Play** or the **Stop** button to listen to the speakers or click the **Volume** button to adjust the speakers' volume.

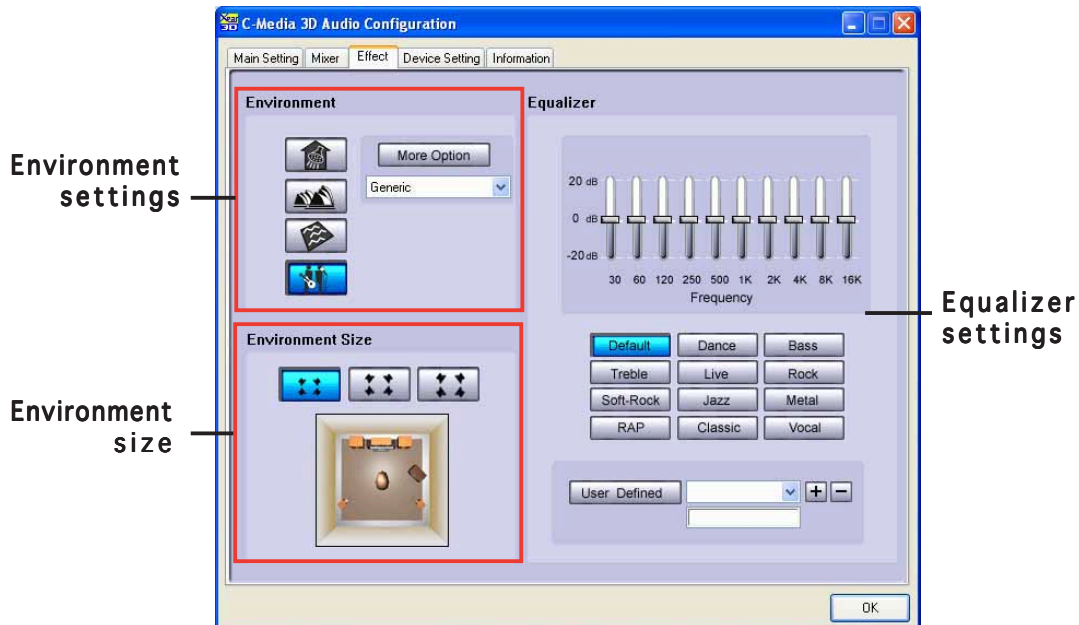
Mixer

The **Mixer** tab allows you to adjust the audio input and the recording output volume of devices connected to the system rear panel and front panel audio ports.



Effect

The **Effect** tab allows you to control the environment emulation, set the environment size, and adjust the equalizer settings.



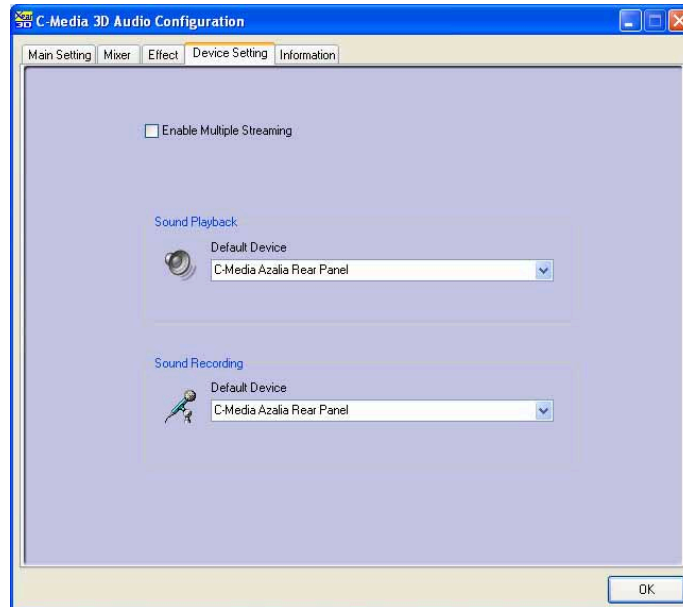
Environment. This section contains various pre-programmed environment emulations. There are four featured materials that emulate the bathroom, concert hall, underwater, and music pub environments. Click the corresponding button to set an environment emulation. To set other environment emulations, click the **More Option** list box.

Environment Size. This section allows you to select the size of your room for an appropriate audio output. There are three room size models provided for the environment size emulation. Click any of the environment size buttons to set.

Equalizer. The Equalizer section allows you to adjust the amplifier frequency. Use the 10-band equalizer to individually control the different frequency bands of your speaker system, or click a music style preset to load a pre-defined equalizer setting. Click the **User Defined** button to save or load your customized equalizer settings.

Device Setting

The **Device Setting** tab allows you to enable the audio CODEC multi-streaming feature, select a sound playback, and sound recording devices.



Information

The **Information** tab displays your 3D audio engine, audio CODEC, audio driver, audio controller, and DirectX information.



The Appendix describes the CPU features and technologies that the motherboard supports.

Appendix A CPU features

Chapter summary



A.1	Intel® EM64T	A-1
A.2	Enhanced Intel SpeedStep® Technology (EIST)	A-1
A.3	Intel® Hyper-Threading Technology	A-3

ASUS motherboard feature update

A.1 Intel® EM64T

The motherboard supports Intel® Pentium® 4 CPUs with the Intel® EM64T (Extended Memory 64 Technology). The Intel® EM64T feature allows your computer to run on 64-bit operating systems and access larger amounts of system memory for faster and more efficient computing.



The motherboard is fully compatible with Intel® LGA 775 processors running on 32-bit operating systems.

Using the Intel® EM64T feature

To use the Intel® EM64T feature:

1. Install an Intel® Pentium® 4 CPU that supports the Intel® EM64T.
2. Install a 64-bit operating system (Windows® XP Professional x64 Edition or Windows® Server 2003 x64 Edition).
3. Install the 64-bit drivers for the motherboard components and devices from the support CD.
4. Install the 64-bit drivers for expansion cards or add-on devices, if any.



Refer to the expansion card or add-on device(s) documentation, or visit the related website, to verify if the card/device supports a 64-bit system.

A.2 Enhanced Intel SpeedStep® Technology (EIST)

The Enhanced Intel SpeedStep® Technology (EIST) intelligently manages the CPU resources by automatically adjusting the CPU voltage and core frequency depending on the CPU loading and system speed/power requirement.

A.2.1 System requirements

- Intel® Pentium® 4 processor with EIST support
- BIOS file with EIST support
- Operating system with EIST support (Windows® XP SP2/Windows® Server 2003 SP1/Linux 2.6 kernel or later versions)

Using the EIST

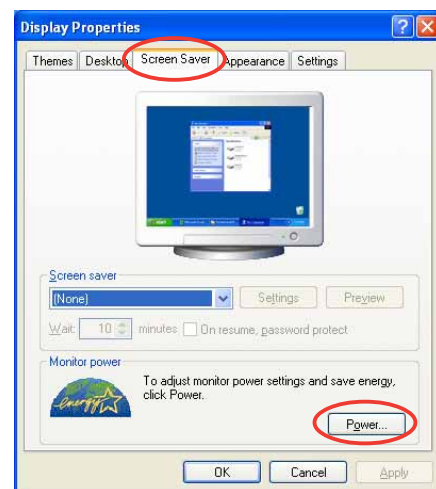
To use the EIST feature:


1. Turn on the computer, then enter the BIOS Setup.
2. Go to the **Advanced Menu**, highlight **CPU Configuration**, then press <Enter>.
3. Scroll down the options, select the **Intel(R) SpeedStep Technology** item, then press <Enter>. Refer to the BIOS screen on the next page.

A.2.2 Using the EIST

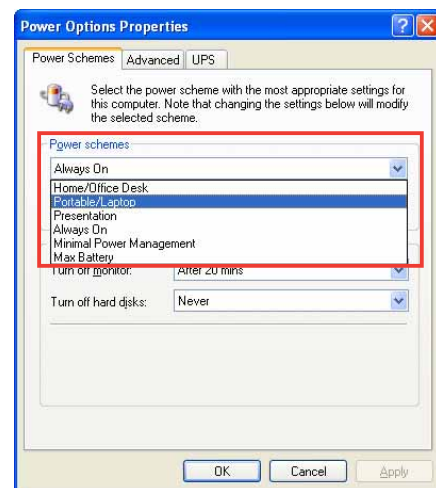
To use the EIST feature:

1. Turn on the computer, then enter the BIOS Setup.
2. Go to the **Advanced Menu**, highlight **CPU Configuration**, then press <Enter>.
3. Set the **Intel(R) SpeedStep Technology** item to [Automatic], then press <Enter>. See page 3-26 for details.
4. Press <F10> to save your changes and exit the BIOS setup.
5. After the computer restarts, right click on a blank space on the desktop, then select **Properties** from the pop-up menu.
6. When the **Display Properties** window appears, click the **Screen Saver** tab.
7. Click the **Power** button on the Monitor power section to open the **Power Options Properties** window.



8. On the **Power schemes** section, click , then select any option **except Home/Office Desktop or Always On**.
9. Click **Apply**, then click **OK**.
10. Close the **Display Properties** window.

After you adjust the power scheme, the CPU internal frequency slightly decreases when the CPU loading is low.



The screen displays and procedures may vary depending on the operating system.

A.3 Intel® Hyper-Threading Technology



- The motherboard supports Intel® Pentium® 4 LGA775 processors with Hyper-Threading Technology.
 - Hyper-Threading Technology is supported under Windows® XP/2003 Server and Linux 2.4.x (kernel) and later versions only. Under Linux, use the Hyper-Threading compiler to compile the code. If you are using any other operating systems, disable the Hyper-Threading Technology item in the BIOS to ensure system stability and performance.
 - Installing Windows® XP Service Pack 1 or later version is recommended.
 - Make sure to enable the Hyper-Threading Technology item in BIOS before installing a supported operating system.
 - For more information on Hyper-Threading Technology, visit www.intel.com/info/hyperthreading.
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Using the Hyper-Threading Technology

To use the Hyper-Threading Technology:

1. Install an Intel® Pentium® 4 CPU that supports Hyper-Threading Technology.
2. Power up the system and enter the BIOS Setup. Under the **Advanced Menu**, make sure that the item **Hyper-Threading Technology** is set to **Enabled**. See page 3-26 for details.
The BIOS item appears only if you installed a CPU that supports Hyper-Threading Technology.
3. Restart the computer.

