P6X58-E WS

Motherboard

E6383

First Edition
February 2011

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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.

REACH

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

Safety information

Electrical safety

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

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, ensure 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.

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

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

About this guide

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

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**

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

- **Chapter 2: 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 DVD that comes with the motherboard package and the software.

- **Chapter 5: Multiple GPU technology support**

  This chapter describes how to install and configure multiple ATI® CrossFireX™ and NVIDIA® SLI™ graphics cards.

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

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

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

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

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

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+Del>
`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: `BUPDATER /iP6X58EWS.ROM`

P6X58-E WS specifications summary

CPU	Intel® Socket 1366 Core™ i7 Processor Extreme Edition/ Core™ i7 Processor Intel® Scoket 1366 Xeon® W5500/3600/3500 Series Intel® Scoket 1366 Xeon® X5600/5500 Series Intel® Scoket 1366 Xeon® E5600/5500 Series Intel® Scoket 1366 Xeon® L5600/5500 Series Supports Intel® Dynamic Speed Technology *Refer to www.asus.com for Intel CPU support list
Chipset	Intel® X58 + ICH10R Nvidia NF200
System Bus	Up to 6.4 GT/s; Intel® QuickPath Interconnect
Memory	6 x DIMM, max. 24GB, DDR3 2000(O.C.)/ 1866(O.C.)/ 1800(O.C.)/ 1600(O.C.)/ 1333/ 1066 MHz, non-ECC/ ECC un-buffered memory Triple channel architecture Support Intel Extreme Memory Profile (XMP) * Due to Intel spec definition, DIMMs of DDR3-1800 or above are supported by specific CPU models only. *Please load X.M.P or D.O.C.P setting in BIOS for hyper DIMM (DDR3 1800MHz or above) support. **Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors Lists)
Expansion Slots	1 x PCIe 2.0 x16 (@ x16) 2 x PCIe 2.0 x16 (@ x16 or x8) 2 x PCIe 2.0 x16 (@ x8) 1 x PCIe x1 slot
Multi-GPU Technology	Supports NVIDIA® 3-Way Geforce SLI™ techonology Supports ATI® CrossFireX™ technology, up to Quad CrossFireX™
Storage	Intel ICH10R controller (supports Intel matrix storage tech.) - 6 x SATA 150/300 - Intel® Matrix Storage supporting SATA RAID 0, 1, 10, and 5 Marvell® 88SE9128 PCIe SATA6Gb/s controller: - 2 x SATA 6.0 Gb/s ports, supporting RAID 0 and 1
LAN	2 x Intel® 82574L GbE LAN - Support teaming function
USB	USB 3.0 controller - 2 x USB 3.0 ports (Blue, at back panel) Intel® X58 Chipset - 12 x USB 2.0 ports (6 ports at mid-board, 6 ports at back panel)

(continued on the next page)

P6X58-E WS specifications summary

1394	VIA VT6315N supports 2 x 1394a ports
Audio	Realtek ALC 889, 8 channels High Definition Audio CODEC - Multi-Streaming - Jack-Sensing - Front Panel Jack-Retasking - Coaxial / Optical S/PDIF out ports at back I/O - ASUS Noise-Filer
ASUS Unique Features	EPU - 6 Engine True 16+2 Phase Power Design Turbo V Fan Xpert Q-Shield Q-Connector Fanless Design: Heat-pipe solution My Logo 2 CrashFree BIOS 3 EZ Flash 2 C.P.R.(CPU Parameter Recall) SFS (Stepless Frequency Selection) O.C. Profile
Workstation Unique Features	5 PCIe x16 slots G.P. Diagnosis Card bundled ASUS SASsaby Cards support (PCIEx16_5 slot only) ASUS WS Diag. LED
BIOS Features	16Mb flash ROM, AMI BIOS, Green, PnP, DMI v2.0, Wfm2.0, ACPI v2.0a, SMBIOS v 2.4, WOL/WOR by PME, WOR by Ring, AI NET2, Chassis Intrusion
Manageability	BIOS flash utility under DOS AI Suite II ASUS Update ASUS PC Probe II Anti-Virus Software (OEM version) Adobe Acrobat Reader ver 8.0 Microsoft DirectX ver 9.0C
Back Panel I/O Ports	PS/2 KB/MS port 2 x RJ45 S/PDIF Out (Coaxial + Optical) 2 x USB 3.0/2.0 ports 6 x USB 2.0/1.1 ports 1 x 8-channel Audio I/O 1 x IEEE1394a
Form Factor	ATX Form Factor, 12"x 9.6" (30.5cm x 24.5cm)

***Specifications are subject to change without notice.**

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

1 Product introduction

Chapter summary

1

1.1 Welcome!

Thank you for buying an ASUS® P6X58-E WS 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 P6X58-E WS
I/O modules	1 x USB 2.0 (2 ports)
Cables	2 x Serial ATA 6.0 Gb/s cables 2 x Serial ATA 3.0 Gb/s power cables 4 x Serial ATA 3.0 Gb/s cables
Accessories	1 x ASUS Q-Shield (I/O shield) 1 x ASUS 2-in-1 Q-Connector Kit (Retail version only) 1 x G.P. Diagnosis Card (Retail version only) 1 x ASUS 2-Way SLI bridge connector 1 x ASUS 3-Way SLI bridge card
Application DVD	ASUS motherboard support DVD
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

Green ASUS

This motherboard and its packaging comply with the European Union's Restriction on the use of Hazardous Substances (RoHS). This is in line with the ASUS vision of creating environment-friendly and recyclable products/packagings to safeguard consumers' health while minimizing the impact on the environment.

Intel® Core™ i7 Processor Extreme Edition / Core™ i7 Processor / Xeon™ Processor support

This motherboard supports the latest Intel® Core™ i7 processors Extreme Edition / Core™ i7 processor / Xeon™ processors in LGA1366 package with integrated memory controller to support 3-channel (6 DIMMs) DDR3 memory. Supports Intel® QuickPath Interconnect (QPI) with a system bus of up to 6.4GT/s and a max bandwidth of up to 25.6GB/s. Intel® Core™ i7 / Xeon™ series processor is one of the most powerful and energy efficient CPUs in the world.

Intel® X58 Chipset

The Intel® X58 Express Chipset is the latest chipset designed to support latest Intel® Core™ i7 Processors and Intel's next generation system interconnect interface, Intel® QuickPath Interconnect (QPI), providing improved performance by utilizing serial point-to-point links, allowing increased bandwidth and stability. It also supports up to 36 PCI Express 2.0 lanes providing better graphics performance.

Triple-Channel DDR3 2000 (O.C.) /1866 (O.C.) / 1800 (O.C.) / 1600 (O.C.) / 1333 / 1066 support

The motherboard supports DDR3 memory that features data transfer rates of 2000 (O.C.) / 1866 (O.C.) / 1800(O.C.) / 1600 (O.C.) /1333 / 1066 MHz to meet the higher bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications. The triple-channel DDR3 architecture enlarges the bandwidth of your system memory to boost system performance.

PCIe 2.0

Double Speed; Double Bandwidth

This motherboard supports the latest PCIe 2.0 devices for double speed and bandwidth which enhances system performance.

3-Way SLI and Quad-GPU CrossFireX Support!

Flexible Multi-GPU solutions, Your Weapon of Choice!

The motherboard breaks the boundaries to bring you the multi-GPU choice of either SLI™ or CrossFireX. The motherboard features a dedicated graphics engine on the most powerful Intel X58 platform to optimize PCIe allocation in multiple GPU configurations. Expect a brand-new gaming style you've never experienced before!

True USB 3.0 Support

10X Faster Date Rates!

Experience ultra-fast data transfers at 4.8Gbps with USB 3.0—the latest connectivity standard. Built to connect easily with next generation components and peripherals, USB 3.0 transfers data 10X faster and is also backward compatible with USB 2.0 components.

True SATA 6Gb/s Support

Experience the Future of Storage!

Supporting next-generation Serial ATA (SATA) storage interface, this motherboard delivers up to 6.0Gb/s data transfer rates. Additionally, get enhanced scalability, faster data retrieval, double the bandwidth of current bus systems.

1.3.2 ASUS Unique features

ASUS TurboV

Feel the adrenaline rush of real-time OC—now a reality with the ASUS TurboV. This extreme OC tool lets you set new ambitions on the OC stage with an advanced and easy-to-use interface—allowing you to overclock without exiting or rebooting the OS. With micro adjustments of the CPU PLL, NB, NB-PCIe, and DRAM voltages in 0.02v intervals, there are no limits—only extreme results to break new OC records! See page 4-28 for details.

ASUS True 16+2 Phase Power Design

The breakthrough technology of 16+2 phase VRM design is bringing to the ASUS motherboards. 16+2 phase power design (16-phase to vCore; 2-phase to vDRAM/QPI controller inside CPU) can reach high power efficiency, dispel heat generated by VRM module effectively, and lower more temperature compared to other VRM solution. With the high quality power components such as low RDS (on) MOSFETs, Ferrite core chokes with lower hysteresis loss, and 100% Japan-made high quality conductive polymer capacitors, ASUS 16+2 phase VRM design also ensure longer component life, minimum power loss, and help to reach the superior overclocking score ever than before.

ASUS Workstation Features

ASUS Workstation features provide complete support to system maintenance and storage technology.

True @16 3-Way SLI

The Best Graphic Performance you EVER have

The True @16 PCI-E Gen2 3-Way SLI will present you the fastest and the most reliable graphic performance you ever have when you are engaged in Mechanical/Architecture/Interior/Aircraft/Audio/Video Design or when you are playing games in leisure time

Diag LED

Diag LED checks key components (CPU, DRAM, VGA card, and HDD) in sequence during motherboard booting process. If an error is found, the LED next to the error device will continue lighting until the problem is solved. This user-friendly design provides an intuitional way to locate the root problem within a second.

Built-in Dual Intel Server-Class Gigabit LAN

For more reliable networking, the P6X58-E WS features built-in dual Intel server-class Gigabit LAN. It uses lower CPU utilization, increasing throughput to achieve outstanding performance as well as better support for diverse operating systems.Besides,Intel® 82574L chipset has certification of VMware to support virtualization technology.

G.P. Diagnosis card

Bundled with P6X58-E WS motherboard (retail version), the G.P. Diagnosis card assists users in system checking by effortlessly and quickly providing precise system checks right after they switch on their PCs.

ASUS Power Saving Solution

ASUS Power Saving solution intelligently and automatically provides balanced computing power and energy consumption.

ASUS EPU

The new ASUS EPU—the world's first power saving engine, has been upgraded to a new 6 engine version, which provides total system power savings by detecting current PC loadings and intelligently moderating power in real-time. With auto phase switching for components (which includes the CPU, VGA card, memory, chipset, hard drives and CPU cooler / system fans), the EPU automatically provides the most appropriate power usage via intelligent acceleration and overclocking - helping save power and money.

ASUS Quiet Thermal Solution

ASUS Quiet Thermal solution makes system more stable and enhances the overclocking capability.

Fanless Design - Heat-pipe

The Heat Pipe design effectively directs the heat generated by the chipsets to the heatsink near the back IO ports, where it can be carried away by existing airflow from CPU fan or bundled optional fan. The purpose of the innovative heat pipe design on this motherboard is that the groundbreaking fanless design does not have lifetime problems as a chipset fan does. Furthermore, it provides options for users to install side-flow fan or passive cooler. The Heat Pipe design is the most reliable fanless thermal solution to date.

DO NOT uninstall the heat-pipe by yourself. Doing so may bend the tubing and affect the heat dissipation performance.

Fan Xpert

ASUS Fan Xpert intelligently allows users to adjust both the CPU and chassis fan speed according to different ambient temperature, which is caused by different climate conditions in different geographic regions and system loading. Built-in variety of useful profiles offer flexible controls of fan speed to achieve a quiet and cool environment.

ASUS Crystal Sound

This feature can enhance speech-centric applications like Skype, online game, video conference and recording.

Noise Filter

This feature detects repetitive and stationary noises (non-voice signals) like computer fans, air conditioners, and other background noises then eliminates it in the incoming audio stream while recording.

TPM Support

This motherboard supports the Trusted Platform Module (TPM), which provides you with enhanced data protection via high-level encryption/decryption and ensures platform integrity. The TPM meets the Windows® Vista BitLocker™ Drive Encryption hardware requirement for a more secure working environment.

The TPM module is purchased separately.

ASUS EZ DIY

ASUS EZ DIY feature collection provides you easy ways to install computer components, update the BIOS or back up your favorite settings.

ASUS Q-Design

ASUS Q-Slot enhances your DIY experience that speeds up and simplifies the DIY process!

ASUS Q-Shield

The specially designed ASUS Q-Shield provides conductivity to best protect your motherboard against static electricity damage and shields it against Electronic Magnetic Interference (EMI). Without the usual "fingers" present, this new design is convenient and safe to install.

ASUS Q-Connector

ASUS Q-Connector allows you to easily connect or disconnect the chassis front panel cables to the motherboard. This unique module eliminates the trouble of connecting the system panel cables one at a time and avoiding wrong cable connections.

ASUS O.C. Profile

The motherboard features the ASUS O.C. Profile that allows users to conveniently store or load multiple BIOS settings. The BIOS settings can be stored in the CMOS or a separate file, giving users freedom to share and distribute their favorite settings.

ASUS EZ Flash 2

EZ Flash 2 is a user-friendly BIOS update utility. Simply press the predefined hotkey to launch the utility and update the BIOS without entering the OS. Update your BIOS easily without preparing a bootable diskette or using an OS-based flash utility.

IEEE 1394a interface

IEEE 1394a interface provides high speed digital interface for audio/video appliances such as digital television, digital video camcorders, storage peripherals & other PC portable devices.

S/PDIF-out on Back I/O Port

This motherboard provides convenient connectivity to external home theater audio systems via coaxial and optical S/PDIF-out (SONY-PHILIPS Digital Interface) jacks. It allows to transfer digital audio without converting to analog format and keeps the best signal quality.

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.

2 Hardware information

Chapter summary

2

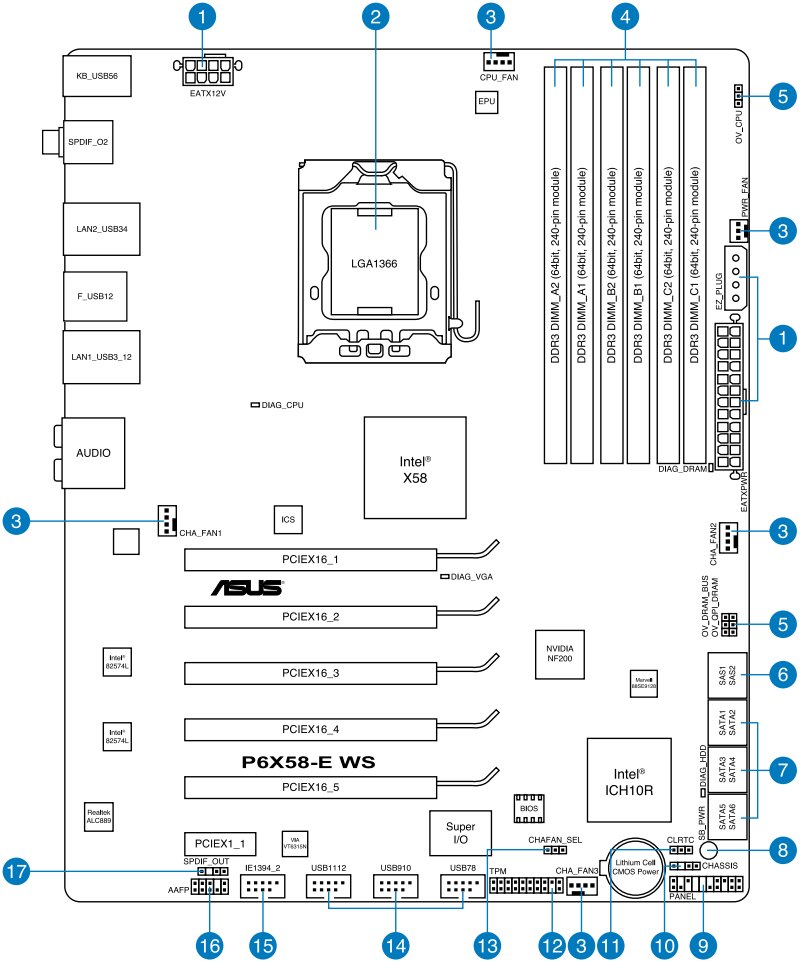
2.1 Before you proceed

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 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.

2.2 Motherboard overview

2.2.1 Motherboard layout



Refer to **2.8 Connectors** for more information about rear panel connectors and internal connectors.

2.2.2 Layout contents

Connectors/Jumpers/Slots		Page
1.	ATX power connectors (24-pin EATXPWR, 8-pin EATX12V, 4-pin EZ_PLUG)	2-37
2.	LGA1366 CPU Socket	2-6
3.	CPU, chassis and power fan connectors (4-pin CPU_FAN, 4-pin CHA_FAN1-3, 3-pin PWR_FAN)	2-34
4.	DDR3 DIMM slots	2-11
5.	CPU / DRAM Bus / QPI DRAM overvoltage settings (3-pin OV_CPU; 3-pin OV_DRAM_Bus; 3-pin OV_QPI_DRAM)	2-24
6.	Marvell® Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_E1-2 [gray])	2-32
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8.	Standby power LED (SB_PWR)	2-22
9.	System panel connector (20-8 pin PANEL)	2-39
10.	Chassis intrusion connector (4-1 pin CHASSIS)	2-35
11.	Clear RTC RAM (3-pin CLRTC)	2-23
12.	TPM connector (20-1 pin TPM)	2-30
13.	Chassis Fan control setting (3-pin CHAFAN_SEL)	2-25
14.	USB connectors (10-1 pin USB78, USB910, USB1112)	2-33
15.	IEEE 1394a port connector (10-1 pin IE1394_2)	2-36
16.	Front panel audio connector (10-1 pin AAFP)	2-38
17.	Digital audio connector (4-1 pin SPDIF_OUT)	3-38

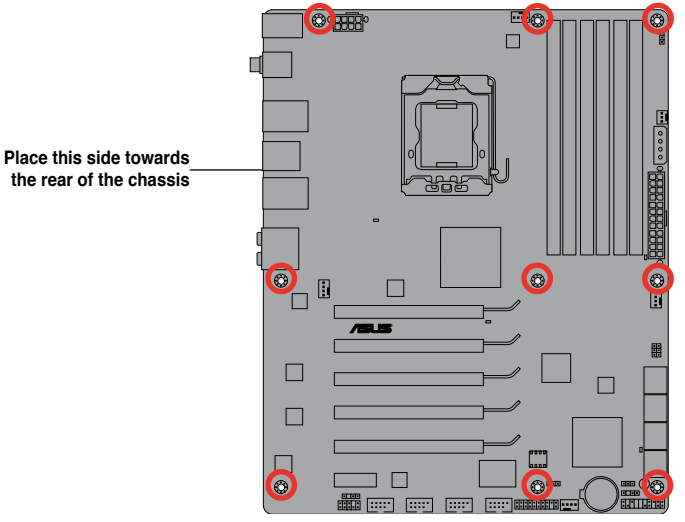
2.2.3 Placement direction

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.

2.2.4 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.



2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1366 socket designed for the Intel® Core™ i7 Processor Extreme Edition / Core™ i7 Processor.

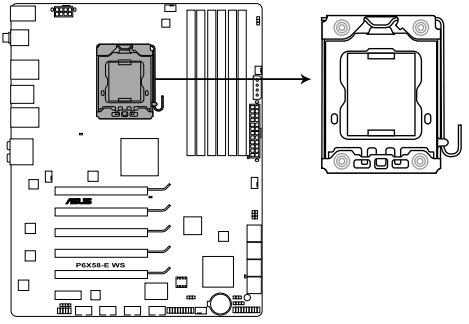
- Ensure that all power cables are unplugged before installing the CPU.
- Connect the chassis fan cable to the CPU_FAN connector to ensure system stability.

- 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 LGA1366 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:

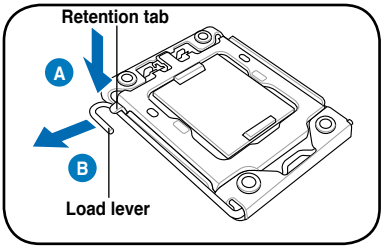
1. Locate the CPU socket on the motherboard.



P6X58-E WS CPU LGA1366 socket

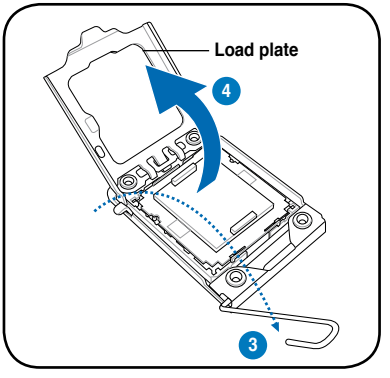
Before installing the CPU, make sure that the cam box is facing towards you and the load lever is on your left.

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

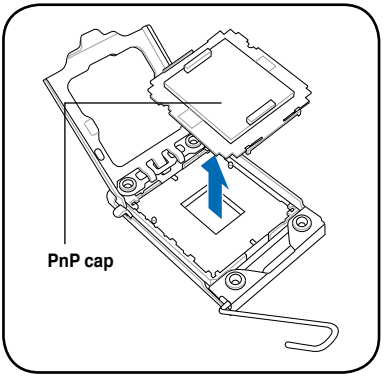


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

3. Lift the load lever in the direction of the arrow to a 135º angle.
4. Lift the load plate with your thumb and forefinger to a 100º angle.

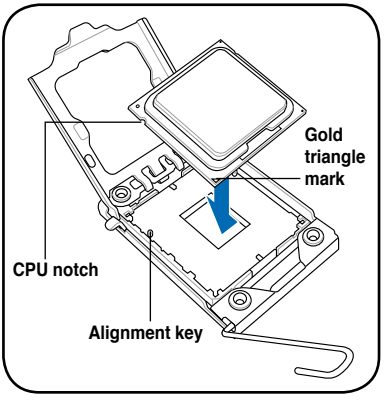


5. Remove the PnP cap from the CPU socket.

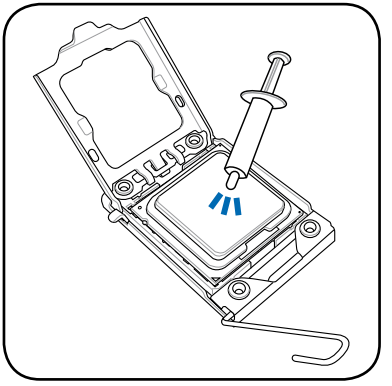


6. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket, and then fit the socket alignment key into the CPU notch.

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!



7. Apply several drops of thermal paste to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.

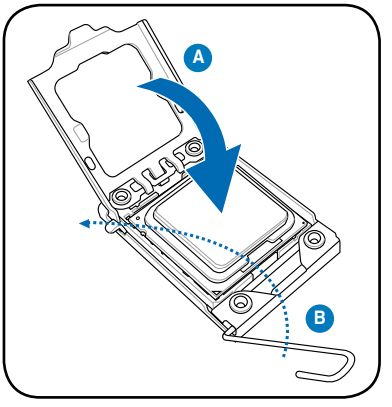


Some heatsinks come with pre-applied thermal paste. If so, skip this step.

The thermal paste is toxic and inedible. If it gets into your eyes or touches your skin, ensure to wash it off immediately and seek professional medical help.

To prevent contaminating the paste, DO NOT spread the paste with your finger directly.

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



2.3.2 Installing the CPU heatsink and fan

The Intel® LGA1366 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

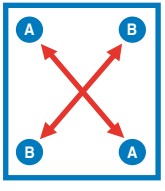
- When you buy a boxed Intel® processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel®-certified multi-directional heatsink and fan.
- Your Intel® LGA1366 heatsink and fan assembly comes in a push-pin design and requires no tool 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.

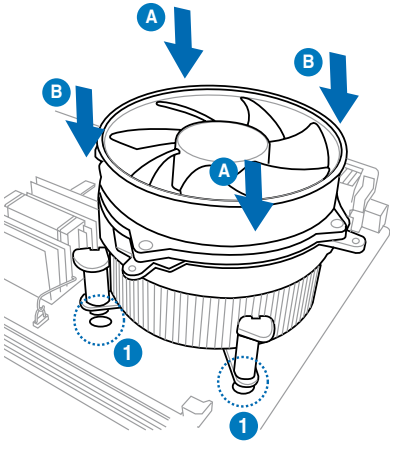
Make sure that you have installed the motherboard to the chassis before you install the CPU fan and heatsink assembly.

If you purchased a separate CPU heatsink and fan assembly, ensure that the Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.

To install the CPU heatsink and fan:

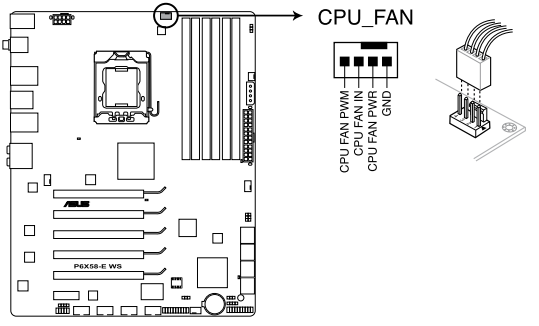
1. Place the heatsink on top of the installed CPU, making sure that the four fasteners match the holes on the motherboard.
2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.





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

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



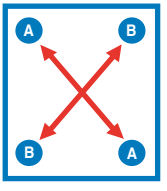
P6X58-E WS CPU fan connector

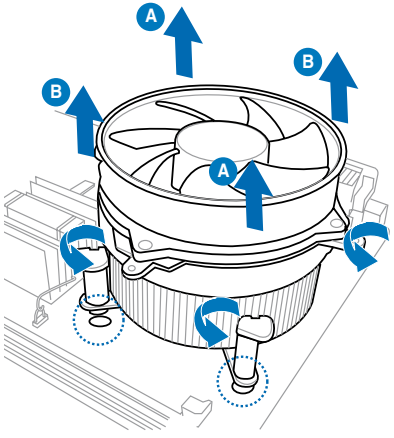
DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

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.

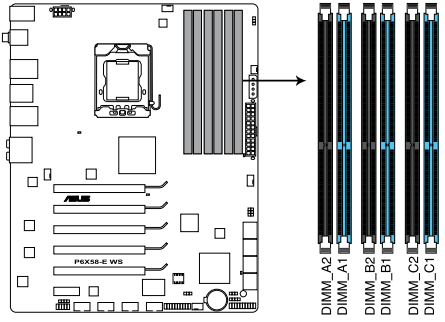
2.4 System memory

2.4.1 Overview

The motherboard comes with six Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets.

A DDR3 module has the same physical dimensions as a DDR2 DIMM but is notched differently to prevent installation on a DDR2 DIMM socket. DDR3 modules are developed for better performance with less power consumption.

The figure illustrates the location of the DDR3 DIMM sockets:



P6X58-E WS 240-pin DDR3 DIMM sockets

Channel	Sockets
Channel A	DIMM_A1 and DIMM_A2
Channel B	DIMM_B1 and DIMM_B2
Channel C	DIMM_C1 and DIMM_C2

Recommended memory configuration for better performance

Mode	Sockets					
	DIMM_A2	DIMM_A1	DIMM_B2	DIMM_B1	DIMM_C2	DIMM_C1
2 DIMMs	-	Populated	-	Populated	-	-
3 DIMMs	-	Populated	-	Populated	-	Populated
4 DIMMs	Populated	Populated	-	Populated	-	Populated
6 DIMMs	Populated	Populated	Populated	Populated	Populated	Populated

Due to Intel CPU spec definition, the system will not boot if only one DIMM is installed in DIMM slot A2, B2, or C2. Follow the table above for recommended memory configuration.

2.4.2 Memory configurations

You may install 1GB, 2GB and 4GB ECC or non-ECC, unbuffered DDR3 DIMMs into the DIMM sockets.

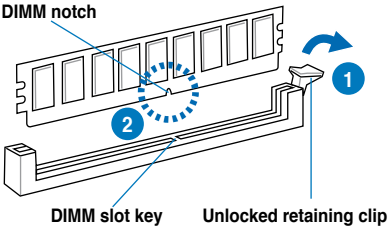
- You may install varying memory sizes in Channel A, Channel B and Channel C. The system maps the total size of the lower-sized channel for the dual-channel or triple-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- Due to Intel spec definition, X.M.P. DIMMs and DDR3-1600 are supported for one DIMM per channel only.
- According to Intel CPU spec, DIMMs with voltage requirement over 1.65V may damage the CPU permanently. We recommend you install the DIMMs with the voltage requirement below 1.65V.
- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor.
- Due to the memory address limitation on 32-bit Windows OS, when you install 4GB or more memory on the motherboard, the actual usable memory for the OS can be about 3GB or less. For effective use of memory, we recommend that you do any of the following:
  - Use a maximum of 3GB system memory if you are using a 32-bit Windows OS.
  - Install a 64-bit Windows OS when you want to install 4GB or more on the motherboard.
  For more details, refer to the Microsoft® support site at http://support.microsoft.com/kb/929605/en-us.
- This motherboard does not support DIMMs made up of 256 Mb (32MB) chips or less (Memory chip capacity counts in Megabit, 8 Megabit/Mb = 1 Megabyte/MB).

- The default memory operation frequency is dependent on its SPD. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.
- For system stability, use a more efficient memory cooling system to support a full memory load (6 DIMMs) or overclocking condition.

2.4.3 Installing a DIMM

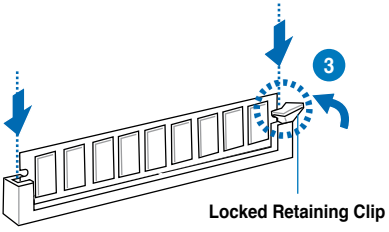
Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

1. Unlock a DIMM socket by pressing the retaining clip outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.



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

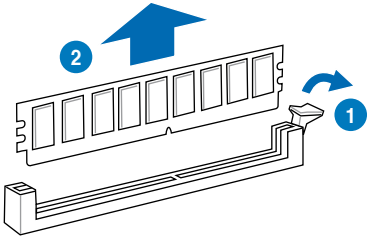
3. Hold the DIMM by both of its ends, then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place, and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.



Always insert the DIMM into the socket VERTICALLY to prevent DIMM notch damage.

2.4.4 Removing a DIMM

1. Press the retaining clip outward to unlock the DIMM.
2. Remove the DIMM from the socket.



P6X58-E WS Motherboard
Qualified Vendors Lists (QVL) DDR3-2000MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)			
								A*	B*	C*	D*
Crucial	BL12864BE2009.8SFB3(EPP)	2048MB	SS	N/A	Heat-Sink Package	9-9-9-28(1333-9-9-9-24)	2	V	V	V	
KINGSTON	KHX16000D3K2/2GN(EPP)	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package		2.0	V	V	V	
KINGSTON	KHX16000D3K3/3GX(XMP)	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	(1333-9-9-9-24)	1.65	V			
OCZ	OCZ3FXT20002GK	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	8	1.9	V			
Gingle	9CAASS37AZZ01D1	2048MB	DS	N/A	Heat-Sink Package	9-9-9-24		V			

P6X58-E WS Motherboard
Qualified Vendors Lists (QVL) DDR3-1866MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)			
								A*	B*	C*	D*
KINGSTON	KHX14900D3K3/3GX(XMP)	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	(1333-9-9-9-24)	1.65	V	V		
Super Talent	W1866UX2GB	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	8-8-8-24(1333-9-9-9-24)		V	V	V	V
Aeneon	AXH760UD10-18J(XMP)	1024MB	SS	N/A	Heat-Sink Package	10(1333-8-8-8-24)		V	V	V	V
Aeneon	AXH860UD20-18J(XMP)	2048MB	DS	N/A	Heat-Sink Package	10(1333-8-8-8-24)		V	V	V	V
Patriot	PVS32G1866LLK(XMP)	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	8-8-8-24(1066-7-7-7-20)	1.9	V	V	V	
Patriot	PVS32G1866LLK(XMP)	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	8-8-8-24(1866-8-8-8-24)	1.9	V	V	V	

P6X58-E WS Motherboard
Qualified Vendors Lists (QVL) DDR3-1800MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)			
								A*	B*	C*	D*
Apacer	BoxP/N:DH.02GAL.F7LK2 (78.0AGCB.BN0)	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	7-7-7-20		V			
CORSAIR	CM3X1024-1800C7DIN(XMP)	1024MB	SS	N/A	Heat-Sink Package	7		V			
CORSAIR	BoxP/N:TW3X4G1800C8DF (CM3X2G1800C8D)Ver4.1	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	8-8-8-24	1.80	V			
KINGSTON	KHX14400D3/1G	1024MB	SS	N/A	Heat-Sink Package		1.9	V			
KINGSTON	KHX14400D3K2/2GN(EPP)	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package		1.9	V	V	V	
KINGSTON	KHX14400D3K3/3GX(XMP)	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	(1333-9-9-9-24)	1.65	V			
OCZ	OCZ3P18002GK	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	8		V	V		
OCZ	OCZ3P18004GK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	8	1.9		V	V	
Transcend	TX1800KLU-2GK(XMP)	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	8		V	V		
Patriot	PVS32G1800LLKN(EPP)	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	8-8-8-20(1066-7-7-7-20)	1.9	V	V		

P6X58-E WS Motherboard
Qualified Vendors Lists (QVL) DDR3-1600MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)			
								A*	B*	C*	D*
A-DATA	AD31600E001GMU(XMP)	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	8-8-8-24(1333-9-9-9-24)	1.65-1.85	V	V	V	V
A-DATA	AD31600F002GMU(XMP)	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	7-7-7-20(1333-9-9-9-24)	1.75-1.85	V	V	V	V
CORSAIR	BoxP/N:TWIN3X2048-1600C7DHXIN (CM3X1024-1600C7DHXIN)(XMP) Ver3.1	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	7-7-7-20(1333-9-9-9-24)	1.80	V	V	V	V
CORSAIR	TR3X3G1600C8D(XMP)Ver2.1	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	8-8-8-24(1601-8-8-8-24)	1.65	V	V		
CORSAIR	TR3X3G1600C9(XMP)Ver1.1	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	9-9-9-24(1601-9-9-9-24)	1.65	V	V		
CORSAIR	BoxP/N:TW3X4G1600C9DHXNV (CM3X2G1600C9DHXNV)Ver4.1	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	(1333-9-9--9-24)	1.80	V	V	V	V
CORSAIR	BoxP/N:TWIN3X4096-1600C7DHXIN (CM3X2048-1600C7DHXIN)Ver3.1	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	(1601-7-7-7-20)	1.90	V	V	V	V
CORSAIR	TR3X6G1600C8D(XMP)Ver2.1	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	8-8-8-24(1601-8-8-8-24)	1.65		V	V	V
CORSAIR	TR3X6G1600C9(XMP)Ver2.1	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	9-9-9-24(1333-9-9-9-24)	1.65	V	V	V	V
Crucial	BL12864BA1608.8SFB(XMP)	1024MB	SS	N/A	Heat-Sink Package	(1601-8-8-8-24)	1.8	V	V	V	V
G.SKILL	F3-12800CL7D-2GBHZ	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	(1601-7-7-7-18)	1.9	V	V	V	
G.SKILL	F3-12800CL9D-2GBNQ	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	(1333-9-9-9-24)	1.6	V	V	V	V
G.SKILL	F3-12800CL7D-4GBPI	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	7-7-7-18(1333-9-9-9-24)	1.9	V	V	V	
KINGSTON	KHX12800D3LLK3/3GX(XMP)	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	(1333-9-9-9-24)	1.65	V	V	V	
KINGSTON	KHX12800D3K2/4G	4096MB(Kit of 2)	SS	N/A	Heat-Sink Package	(1066-7-7-7-20)	1.9	V	V	V	V
OCZ	OCZ3P1600EB1G	1024MB	SS	N/A	Heat-Sink Package	7-6-6-24(1333-7-7-7-20)		V			
OCZ	OCZ3T1600XM2GK(XMP)	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	(1601-8-8-8-28)		V	V	V	V
OCZ	OCZ3G1600LV3GK	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	8-8-8(1066-7-7-7-20)	1.65		V	V	
OCZ	OCZ3P1600EB4GK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	7-7-6(1333-7-7-7-20)	1.8	V	V	V	V
OCZ	OCZ3X16004GK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	7-7-7-20	1.9	V	V	V	V
OCZ	OCZ3G1600LV6GK	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	8-8-8(1066-7-7-7-20)	1.65	V	V		
Aeneon	AXH760UD10-16H	1024MB	SS	N/A	Heat-Sink Package	(1601-9-9-9-28)		V	V	V	V
Aeneon	AXH860UD20-16H	2048MB	DS	N/A	Heat-Sink Package	(1601-9-9-9-28)		V	V	V	V
Mushkin	996657	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	7-7-7-20		V	V	V	V
Patriot	PVT33G1600ELK	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	9-9-9-24(1066-7-7-7-20)	1.65	V	V	V	V
Patriot	PVS34G1600LLKN	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	7-7-7-20(1066-7-7-7-20)	2.0	V	V	V	V
Patriot	PVT36G1600ELK	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	9-9-9-24(1066-7-7-7-20)	1.65	V	V	V	V
Team	BoxP/N:TXD32048M1600HC7DC (TXD31024M1600HC7)	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	7-7-7-21(1333-8-8-824)	1.75-1.85	V	V	V	V

P6X58-E WS Motherboard
Qualified Vendors Lists (QVL) DDR3-1333MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)			
								A*	B*	C*	D*
A-DATA	AD31333E002G0U	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	7-7-7-20(1333-9-9-9-24)	1.65-1.85	V	V	V	V
CORSAIR	TR3X3G1333C9 (Ver2.1)	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	9-9-9-24(1333-9-9-9-24)	1.5	V	V	V	
CORSAIR	CM3X1024-1333C9DHX	1024MB	DS	N/A	Heat-Sink Package	(1333-9-9-9-24)	1.1	V	V	V	
CORSAIR	BoxP/N:TWIN3X2048-1333C9 (CM3X1024-1333C9)Ver1.1	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package	9-9-9-24(1066-7-7-7-20)	1.70	V	V	V	V
CORSAIR	BoxP/N:TW3X4G1333C9DHX (CM3X2048-1333C9DHX)Ver3.2	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	9-9-9-24(1066-7-7-7-20)	1.70	V	V		
CORSAIR	TR3X6G1333C9 (Ver2.1)	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	9-9-9-24(1333-9-9-9-24)	1.5	V	V	V	
Crucial	CT12864BA1339.8SFB	1024MB	SS	MICRON	D9GTS	(1333-9-9-9-24)		V	V	V	V
Crucial	CT12864BA1339.8SFD	1024MB	SS	MICRON	MT8JF12864AY-1G4D1	(1333-9-9-9-24)		V	V	V	V
Crucial	CT25664BA1339.16SFD	2048MB	DS	MICRON	D9JNM	(1333-9-9-9-24)		V	V	V	V
ELPIDA	EBJ11UD8BAFA-DG-E	1024MB	DS	ELPIDA	J5308BASE-DG-E	(1333-8-8-8-24)		V			
G.SKILL	F3-10600CL7D-2GBPI	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	(1337-7-7-7-18)	1.65	V	V	V	V
G.SKILL	F3-10600CL8D-2GBHK	2048MB(Kit of 2)	SS	N/A	Heat-Sink Package	(1337-8-8-8-22)	1.65	V	V	V	V
G.SKILL	F3-10600CL9D-2GBNQ	2048MB(Kit of 2)	DS	N/A	Heat-Sink Package	(1333-9-9-9-24)	1.5-1.65	V	V	V	V
KINGMAX	FLFD45F-B8EE9	1024MB	SS	ELPIDA	J1108BASE-DJ-E	(1333-9-9-9-24)		V	V	V	V
KINGSTON	KVR1333D3N9/1G	1024MB	SS	ELPIDA	J1108BASE-DJ-E	(1333-9-9-9-24)	1.5	V	V	V	V
KINGSTON	KVR1333D3N9/2G	2048MB	DS	ELPIDA	J1108BASE-DJ-E	(1333-9-9-9-24)	1.5	V	V	V	V
MICRON	MT8JTF12864AY-1G4BYES	1024MB	SS	MICRON	Z9HWR	(1333-9-9-9-24)		V	V		
MICRON	MT16JTF25664AY-1G4BYES	2048MB	DS	MICRON	Z9HWR	(1333-9-9-9-24)		V	V	V	V
OCZ	OCZ3RPX1333EB2GK	1024MB	SS	N/A	Heat-Sink Package	(1066-6-5-5-20)			V		
OCZ	OCZ3X13333GK	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	7-7-7(1066-6-6-6-16)	1.6	V	V		
OCZ	OCZ3P13332GK	1024MB	DS	N/A	Heat-Sink Package	7-7-7-20(1333-9-9-9-24)		V			
OCZ	OCZ3P13334GK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	7(1333-7-7-7-20)	1.8	V	V	V	V
OCZ	OCZ3RPX1333EB4GK	4096MB(Kit of 2)	DS	N/A	Heat-Sink Package	(1066-6-5-5)	1.85		V		
OCZ	OCZ3G1333LV6GK	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	9-9-9(1066-7-7-7-20)	1.65	V	V		
OCZ	OCZ3P1333LV6GK	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	7-7-7(1066-7-7-7-20)	1.65	V	V	V	V
Qimonda	IMSH2GU13A1F1C-13H	2048MB	DS	Qimonda	IDSH1G-03A1F1C-13H	9(1333-9-9-9-24)		V	V	V	V
SAMSUNG	M378B2873DZ1-CH9	1024MB	SS	SAMSUNG	K4B1G0846D	9(1333-9-9-9-24)		V	V	V	V
SAMSUNG	M391B2873DZ1-CH9	1024MB	SS	SAMSUNG	K4B1G0846D(ECC)	9(1333-9-9-9-24)		V	V	V	V
SAMSUNG	M378B5673DZ1-CH9	2048MB	DS	SAMSUNG	K4B1G0846D	9(1333-9-9-9-24)		V	V	V	V
SAMSUNG	M391B5673DZ1-CH9	2048MB	DS	SAMSUNG	K4B1G0846D(ECC)	9(1333-9-9-9-24)		V	V	V	V
Transcend	TS128MLK64V3U	1024MB	SS	SAMSUNG	K4B1G0846D	9(1333-9-9-9-24)		V	V	V	
Transcend	TS256MLK64V3U	2048MB	DS	SAMSUNG	K4B1G0846D	9(1333-9-9-9-24)		V	V	V	
Aeneon	AEH760UD00-13H	1024MB	DS	AENEON	AEH93R13H	(1333-9-9-9-24)		V	V	V	V
BUFFALO	FSX1333D3G-1G	1024MB	SS	N/A	Heat-Sink Package	(1066-7-7-7-20)		V	V	V	V
BUFFALO	FSX1333D3G-2G	2048MB	DS	N/A	Heat-Sink Package	(1066-7-7-7-20)		V	V	V	V
Elixir	M2F2G64CB8HA4N-CG	2048MB	DS	Elixir	N2CB1G80AN-CG	(1333-9-9-9-24)		V	V	V	V
Patriot	PDC32G1333LLK	1024MB	SS	PATRIOT	Heat-Sink Package	7(1337-7-7-7-20)	1.7	V	V	V	V
Patriot	PVT33G1333ELK	3072MB(Kit of 3)	SS	N/A	Heat-Sink Package	9-9-9-24(1066-7-7-7-20)	1.65	V	V	V	V
Patriot	PVT36G1333ELK	6144MB(Kit of 3)	DS	N/A	Heat-Sink Package	9-9-9-24(1066-7-7-7-20)	1.65	V	V	V	V

P6X58-E WS Motherboard
Qualified Vendors Lists (QVL) DDR3-1066MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing Dimm(Bios)	Voltage	DIMM socket support (Optional)			
								A*	B*	C*	D*
CORSAIR	CM3X1024-1066C7	1024MB	DS	N/A	Heat-Sink Package	7	1.1	V	V	V	
Crucial	CT12864BA1067.8SFB	1024MB	SS	MICRON	Z9HWQ	7		V	V	V	V
Crucial	CT12864BA1067.8SFD	1024MB	SS	MICRON	D9JNL	7		V	V	V	V
Crucial	CT25664BA1067.16SFD	2048MB	DS	MICRON	D9JNL	7		V	V	V	V
ELPIDA	EBJ11RD8BAFA-AE-E	1024MB	DS	ELPIDA	J5308BASE-AC-E(ECC)	7		V	V	V	V
ELPIDA	EBJ11UD8BAFA-AG-E	1024MB	DS	ELPIDA	J5308BASE-AC-E	8		V	V	V	
Hynix	HMT112U6AFP8C-G7N0	1024MB	SS	HYNIX	H5TQ1G83AFPG7C	7		V	V	V	V
Hynix	HYMT112U64ZNF8-G7	1024MB	SS	HYNIX	HY5TQ1G831ZNFP-G7	7		V	V	V	
Hynix	HMT125U6AFP8C-G7N0	2048MB	DS	HYNIX	H5TQ1G83AFPG7C	7		V	V	V	V
Hynix	HYMT125U64ZNF8-G7	2048MB	DS	HYNIX	HY5TQ1G831ZNFP-G7	7		V	V	V	
KINGSTON	KVR1066D3N7/1G	1024MB	DS	ELPIDA	J5308BASE-AC-E		1.5	V	V	V	V
KINGSTON	KVR1066D3N7/2G	2048MB	DS	SAMSUNG	K4B1G0846C-ZCF8		1.5	V	V	V	V
MICRON	MT8JTF12864AY-1G1D1	1024MB	SS	MICRON	7VD22	7		V	V	V	V
MICRON	MT16JTF25664AY-1G1D1	2048MB	DS	MICRON	7VD22	7		V	V	V	V
Qimonda	IMSH1GU03A1F1C-10F	1024MB	SS	Qimonda	IDSH1G-03A1F1C-10F	7		V	V	V	V
Qimonda	IMSH1GU03A1F1C-10G	1024MB	SS	Qimonda	IDSH1G-03A1F1C-10G	8		V	V	V	V
Qimonda	IMSH2GU13A1F1C-10F	2048MB	DS	Qimonda	IDSH1G-03A1F1C-10F	7		V	V	V	V
Qimonda	IMSH2GU13A1F1C-10G	2048MB	DS	Qimonda	IDSH1G-03A1F1C-10G	8		V	V	V	V
Aeneon	AEH760UD00-10FA98X	1024MB	DS	AENEON	AEH93R10F	7		V	V	V	V
Elixir	M2F2G64CB8HAN4-BE	2048MB	DS	Elixir	N2CB1G80AN-BE	7		V	V	V	V

Side(s): SS - Single-sided DS - Double-sided
DIMM support:

- **A***: Supports two (2) modules inserted into slots A1 and B1 as one pair of Dual-channel memory configuration.
- **B***: Supports three (3) modules inserted into the blue slots (A1, B1 and C1) as one set of Triple-channel memory configuration.
- **C***: Supports four (4) modules inserted into the blue slots (A1, B1 and C1) and the black slot A2 as one set of Triple-channel memory configuration.
- **D***: Supports six (6) modules inserted into both the blue slots and the black slots as two set of Triple-channel memory configuration.

Visit the ASUS website for the latest QVL.

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 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

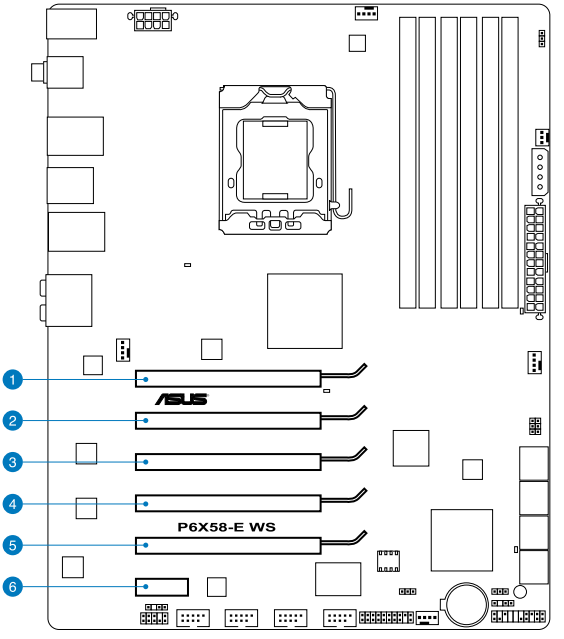
IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	–	Redirect to IRQ#9
4	12	Reserved
5	13	Reserved
6	14	Floppy Disk Controller
7	15	Reserved
8	3	System CMOS/Real Time Clock
9	4	Reserved
10	5	Reserved
11	6	Reserved
12	7	Reserved
13	8	Numeric Data Processor
14	9	Reserved

IRQ assignments for this motherboard

	A	B	C	D	E	F	G	H
PCIEx16_1	shared		–	–	–	–	–	–
PCIEx16_2	shared	–	–	–	–	–	–	–
PCIEx16_3	shared	–	–	–	–	–	–	–
PCIEx16_4	shared	–	–	–	–	–	–	–
PCIEx16_5	shared	–	–	–	–	–	–	–
PCIEx1_1	shared	–	–	–	–	–	–	–
LAN_1	–	shared	–	–	–	–	–	–
LAN_2	–	–	shared	–	–	–	–	–
USB2.0_1	–	–	–	–	–		–	shared
USB2.0_2	–	–	shared	–	–	–	–	–
SATA_1	–	–	shared	–	–	–	–	–
SATA_2	–	–	–	–	shared	–	–	–
USB3.0	shared	–	–	–	–	–	–	–
SATA6G	shared	–	–	–	–	–	–	–
1394	–	–	–	shared	–	–	–	–
Audio Azalia	–	–	–	–	–	–	shared	–

2.5.4 Expansion slots

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



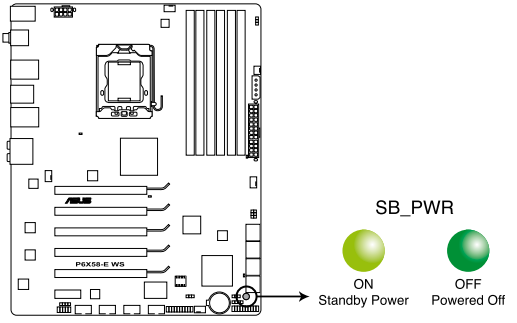
Slot No.	Slot Description
1	PCIe 2.0 x16_1 slot (x16 mode)
2	PCIe 2.0 x16_2 slot (x8 mode)
3	PCIe 2.0 x16_3 slot (single at x16 or dual at x8/x8 mode)
4	PCIe 2.0 x16_4 slot (x8 mode)
5	PCIe 2.0 x16_5 slot (single at x16 or dual at x8/x8 mode)
6	PCIe 1.0 x1_1 slot

- In single VGA card mode, use first the PCIe 2.0 x16_1 slot for a PCI Express x16 graphics card to get better performance.
- In CrossFireX™ mode, use the PCIe 2.0 x16_1 and PCIe 2.0 x16_3 (or PCIe 2.0 x16_5) slots for PCI Express x16 graphics carsds to get better performance.
- In 2-Way SLI™ mode, use the following slot combinations for PCI Express x16 graphics cards to get better performance:
  PCIe 2.0 x16_1 and PCIe 2.0 x16_3 slots
  PCIe 2.0 x16_3 and PCIe 2.0 x16_5 slots
  PCIe 2.0 x16_1 and PCIe 2.0 x16_5 slots
- In 3-Way SLI™ mode, use the PCIe 2.0 x16_1, PCIe 2.0 x16_3 and PCIe 2.0 x16_5 slots for PCI Express x16 graphics cards to get better performance.
- When using the PCIe 2.0 x16_1, PCIe 2.0 x16_3 and PCIe 2.0 x16_5 slots for 3-Way SLI™ mode, the three slots will work at x16 link while PCIe 2.0 x16_2 and PCIe 2.0 x16_4 slots are not occupied.
- We recommend that you provide sufficient power when running CrossFireX™ or SLI™ mode. See page 2-31 for details.
- Connect a chassis fan to the motherboard connector labeled CHA_FAN1/2/3 when using multiple graphics cards for better thermal environment. See page 2-29 for details.

2.6 Onboard LEDs

1. Standby power LED

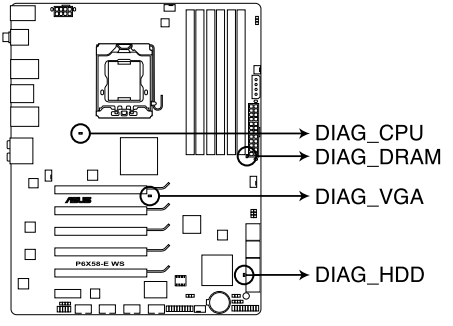
The motherboard comes with a standby power LED that lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows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



P6X58-E WS Onboard LED

2. POST State LEDs

POST State LEDs check key components (CPU, DRAM, VGA card, and HDD) in sequence during motherboard booting process. If an error is found, the LED next to the error device will continue lighting until the problem is solved. This user-friendly design provides an intuitive way to locate the root problem within seconds.



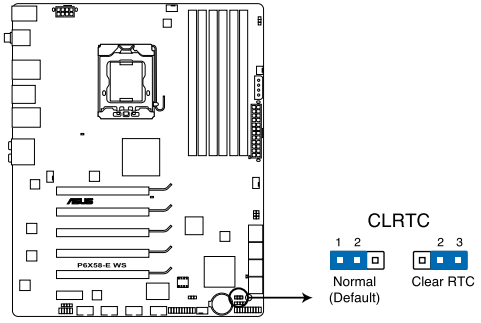
P6X58-E WS DIAG_DRAM/ CPU/ VGA/ HDD LED

You may disable the POST State LEDs in BIOS. Refer to section **3.7.2 Boot Setting Configuration** for details.

2.7 Jumpers

1. Clear RTC RAM (CLRTC)

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



P6X58-E WS Clear RTC RAM

To erase the RTC RAM

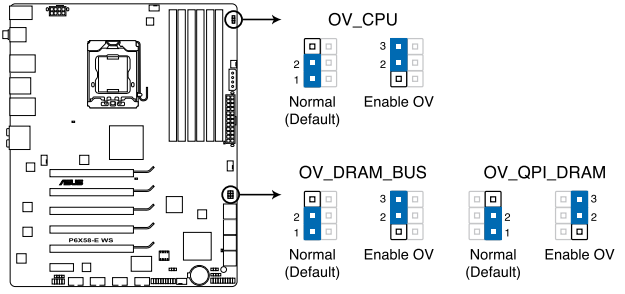
1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5–10 seconds, then move the cap back to pins 1-2.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and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

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

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

2. CPU / DRAM Bus / QPI DRAM overvoltage setting (3-pin OV_CPU, 3-pin OV_DRAM_BUS, 3-pin OV_QPI_DRAM)

These jumpers allow you to enable or disable the advanced CPU, DRAM Bus, and QPI DRAM overvoltage settings in BIOS. Read the following information before you change the jumper settings.



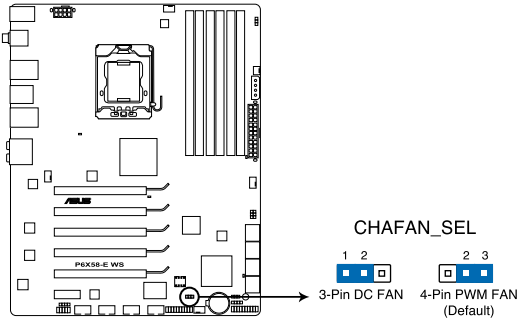
P6X58-E WS CPU/ DRAM BUS/QPI DRAM overvoltage settings

	OV_CPU	OV_DRAM_BUS	OV_QPI_DRAM
Pins 1-2 (Default)	up to 1.70V	up to 1.90V	up to 1.70V
Pins 2-3 (OV Enabled)	up to 1.9V	up to 2.46V	up to 1.9V

- Before you change the jumper settings for extra-high overvoltage ability, use the BIOS items first to adjust the desired CPU, DRAM, and QPI performance. Make sure your system functions well under the highest BIOS voltage settings before you change the setting of these three jumpers.
- DO NOT set the OV_CPU jumper to pins 2–3 when you install a new CPU and have not booted for the first time. Doing so may cause the system to halt. For system failure due to the wrong setting of the OV_CPU jumper, shut down the computer and move the cap back to pins 1–2.
- According to Intel CPU spec, DIMMs with voltage requirement over 1.65V may damage the CPU permanently. We recommend you install the DIMMs with the voltage requirement below 1.65V.
- The system may need a better cooling system (for example, a water-cooling system) to work stably under high voltage settings.

3. Chassis Fan control setting (3-pin CHAFAN_SEL)

These jumpers allow you to switch for fan pin selection. The CHAFAN_SEL jumper is for the front fans and rear fans control. Set to pins 1–2 when using 3-pin fans or pins 2–3 when using 4-pin fans.

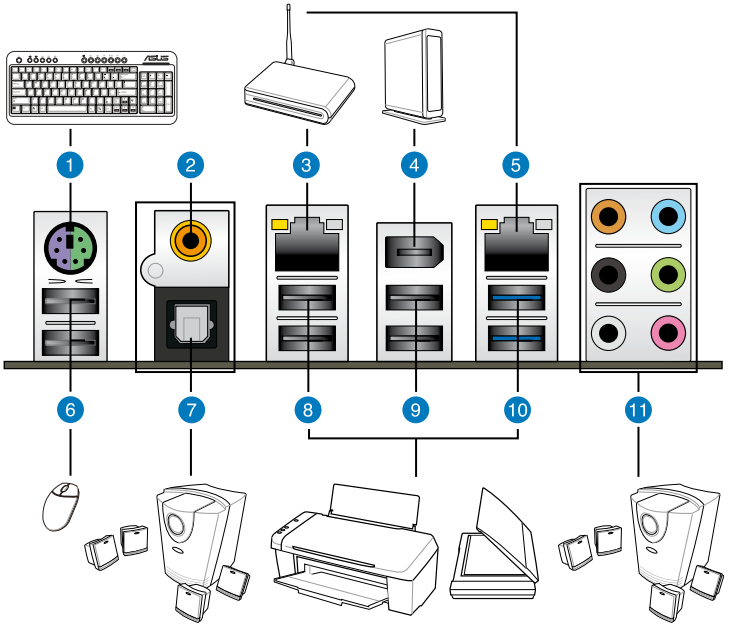


P6X58-E WS CHAFAN setting

- If you use a 4-pin fan but set the jumper to pin 1-2, the fan you installed may not work.
- If you use a 3-pin fan but set the jumper for a 4-pin fan, the fan control will not work and the fan you installed will always run at full speed.

2.8 Connectors

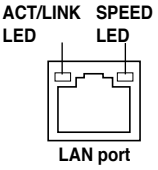
2.8.1 Rear panel connectors



Rear panel connectors	
1. PS/2 mouse/keyboard combo port	7. Optical S/PDIF Out port
2. Coaxial S/PDIF Out port	8. USB 2.0 ports 3 and 4
3. LAN2 (RJ-45) port*	9. USB 2.0 ports 1 and 2
4. IEEE 1394a port	10. USB 3.0 ports 1 and 2
5. LAN1 (RJ-45) port*	11. Audio I/O ports**
6. USB 2.0 ports 5 and 6	

*** LAN port LED indications**

Activity Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
ORANGE	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

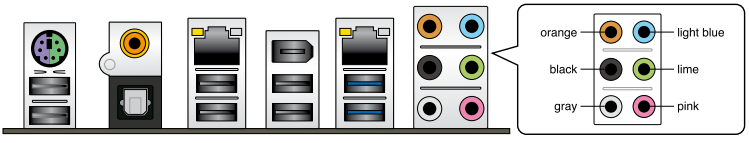


**** Audio 2, 4, 6, or 8-channel configuration**

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

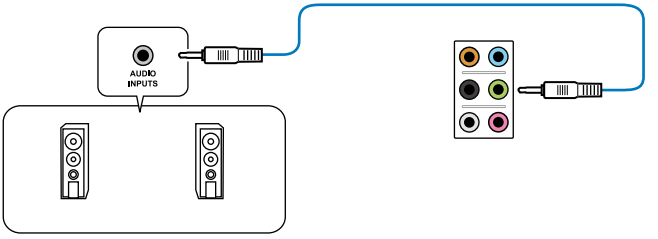
2.8.2 Audio I/O connections

Audio I/O ports

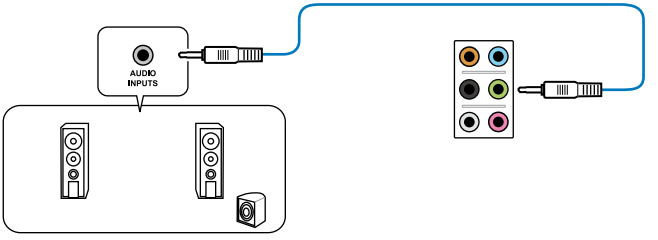


Connect to Headphone and Mic

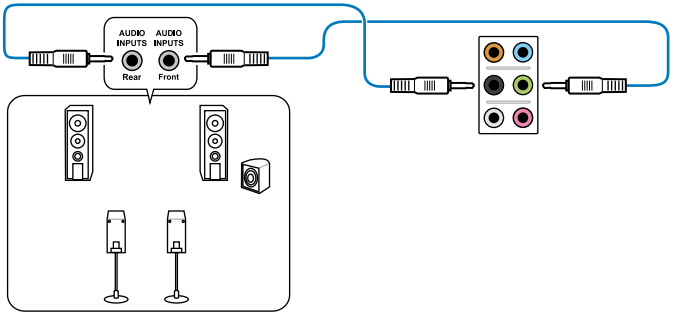
Connect to Stereo Speakers



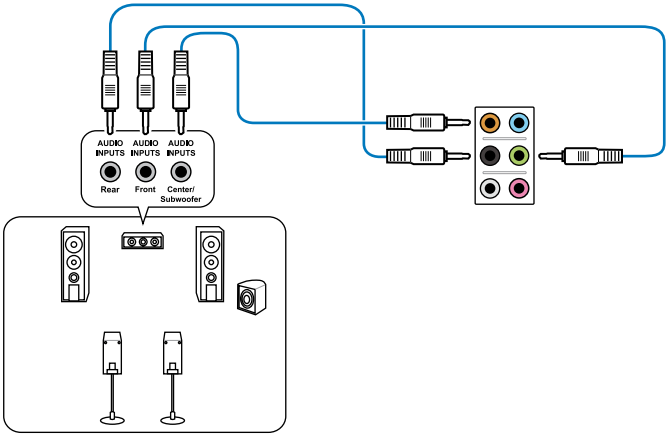
Connect to 2.1 channel Speakers



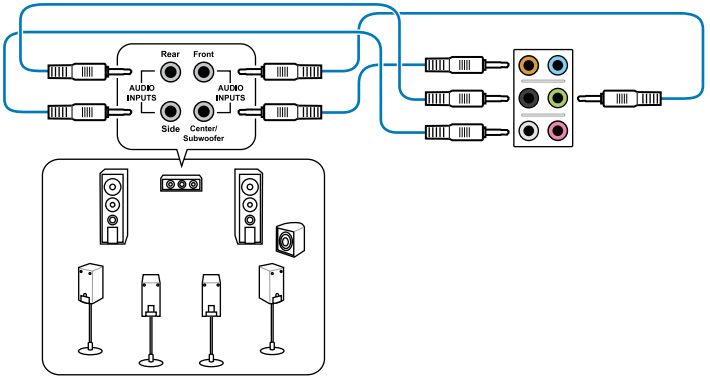
Connect to 4.1 channel Speakers



Connect to 5.1 channel Speakers



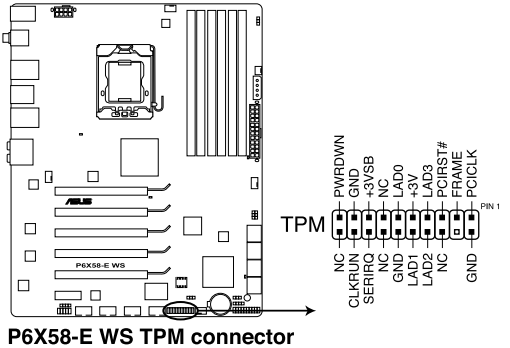
Connect to 7.1 channel Speakers



2.8.3 Internal connectors

1. TPM connector (20-1 pin TPM)

This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.



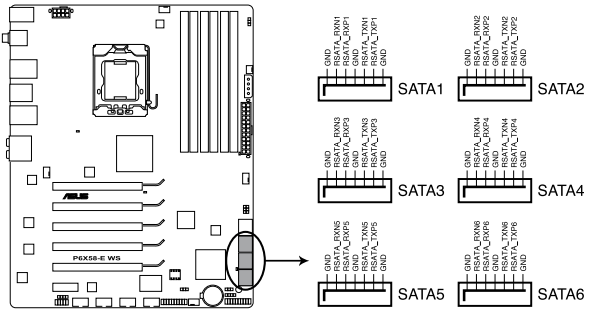
P6X58-E WS TPM connector

The TPM module is purchased separately.

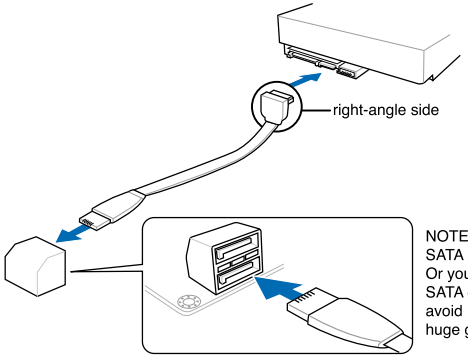
2. ICH10R Serial ATA connectors (7-pin SATA 1-6 [blue])

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

If you installed Serial ATA hard disk drives, you can create a RAID 0, 1, 5, and 10 configuration with the Intel® Matrix Storage Technology through the onboard Intel® ICH10R RAID controller.



P6X58-E WS SATA connectors

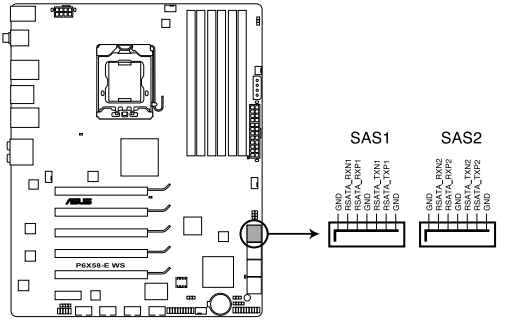


NOTE: Connect the right-angle side of SATA signal cable to SATA device. Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.

- These connectors are set to Standard IDE mode by default. In Standard IDE mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the **Configure SATA as** item in the BIOS to [RAID]. See section **3.3.5 Storage Configuration** for details.
- Before creating a RAID set, refer to section **4.4 RAID configurations** or the manual bundled in the motherboard support DVD.
- You must install the Windows® XP Service Pack 3 before using Serial ATA hard disk drives. The Serial ATA RAID feature (RAID 0, 1, 5, and 10) is available only if you are using Windows® XP SP3 or later version.
- When using hot-plug and NCQ, set the **Configure SATA as** in the BIOS to [AHCI]. See section **3.3.5 Storage Configuration** for details.

3. Marvell® Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_E1-2 [gray])

These connectors connect to Serial ATA 6.0 Gb/s hard disk drives via Serial ATA 6.0 Gb/s signal cables.

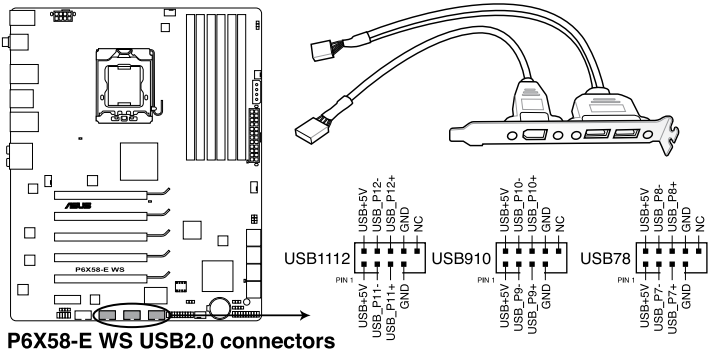


P6X58-E WS SAS connectors

- The SATA6G_E1/E2 (navy blue) connectors are for data drives only. ATAPI device is not supported.
- You must install Windows® XP Service Pack 3 or later versions before using Serial ATA hard disk drives.
- When using hot-plug and NCQ, set the **Marvell Storage Controller** item in the BIOS to [Enabled]. Refer to section **3.5.6 Onboard Devices Configuration** for details.
- Press <Ctrl> + <M> during POST to enter the Marvell RAID utility to create or delete a RAID configuration.
- If you want to install a Windows operating system to a RAID configuration created using the Marvell SATA controller, you have to create a RAID driver disk using the motherboard support DVD and load the driver during OS installation. For 32/64bit Windows XP OS, load first the **Marvell shared library** driver, and then load **Marvell 91xx SATA Controller Driver**. For Windows Vista / Windows 7 OS, load only the **Marvell 91xx SATA Controller Driver**.

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

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



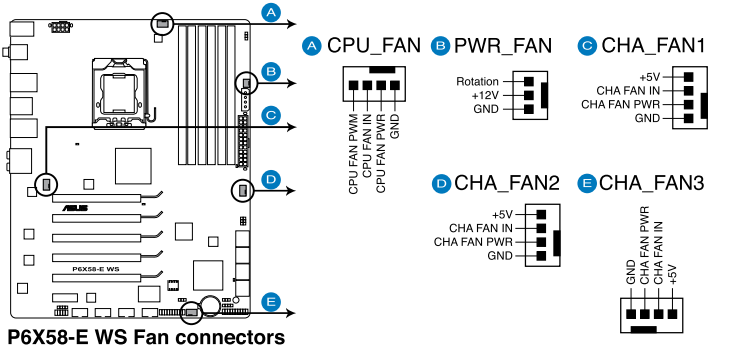
P6X58-E WS USB2.0 connectors

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

If your chassis suppots front panel USB ports, you can attach a front panel USB cable to these connectors. Connect the USB cable to ASUS Q-Connector (USB, blue) first, and then install the Q-Connector (USB) to the USB connector onboard.

5. CPU, chassis and power fan connectors (4-pin CPU_FAN, 4-pin CHA_FAN1-3, 3-pin PWR_FAN)

The fan connectors support cooling fans of 350 mA—2000 mA (24 W max.) or a total of 1 A—7 A (84 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.



P6X58-E WS Fan connectors

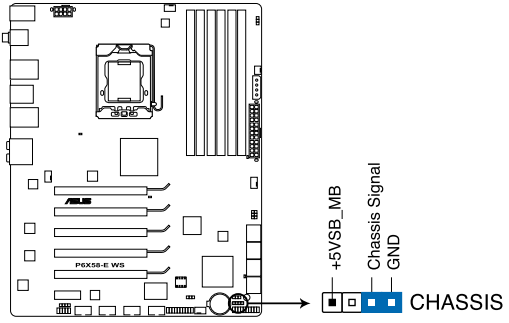
DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!

- Only the CPU-FAN and CHA-FAN 1—3 connectors support the ASUS Advanced Q-Fan feature.
- If you install two or more VGA cards, we recommend that you plug the rear chassis fan cable to the motherboard connector labled CHA_FAN2 or CHA_FAN3 for better thermal environment.

6. Chassis intrusion connector (4-1 pin CHASSIS)

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

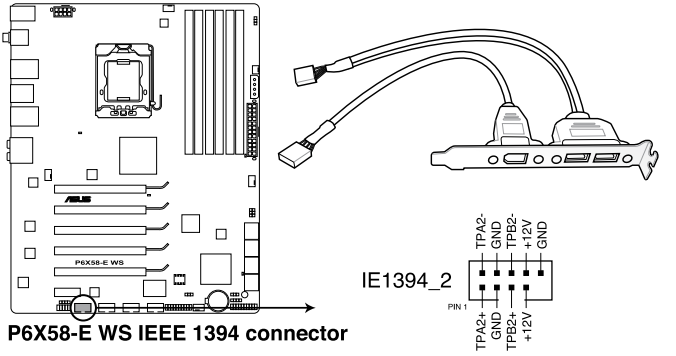
By default , the pin labeled “Chassis Signal” and “Ground” are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.



P6X58-E WS Chassis intrusion connector

7. IEEE 1394a port connector (10-1 pin IE1394_2)

This connector is for an IEEE 1394a port. Connect the IEEE 1394a module cable to this connector, then install the module to a slot opening at the back of the system chassis.



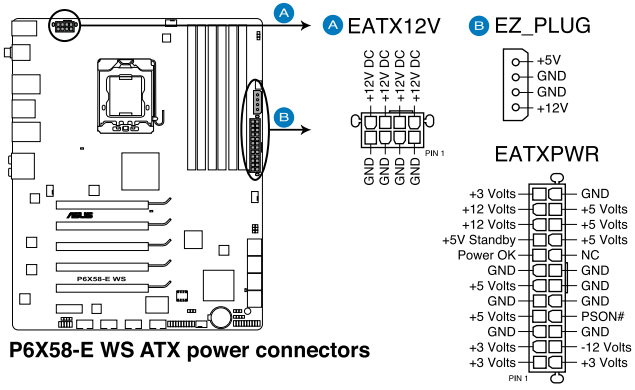
P6X58-E WS IEEE 1394 connector

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

The IEEE 1394a module is purchased separately.

8. ATX power connectors (24-pin EATXPWR, 8-pin EATX12V, 4-pin EZ_PLUG)

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.



P6X58-E WS ATX power connectors

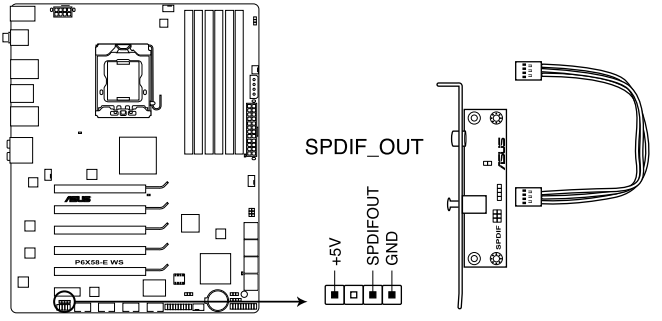
- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 600 W.
- Do not forget to connect the 8-pin EATX12 V power plug; otherwise, the system will not boot.
- Use of a PSU with 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.
- If you are uncertain about the minimum power supply requirement for your system, refer to the Recommended Power Supply Wattage Calculator at **http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us** for details.
- If you want to use two or more high-end PCI Express x16 cards, use a PSU with 1000 W power or above to ensure the system stability.

PSU suggested list

PSU suggested list
SilverStone ST1000
Seasonic SS-600HT
Thermaltake W0083RE
Thermaltake PUREPower-600AP
Silverstone SST-ST75ZF
EnerMAX EG701AX-VE (E)(24P)

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

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port(s). If you are using ASUS HDMI-equipped graphics card, connect the HDMI card to this connector with a S/PDIF out cable.

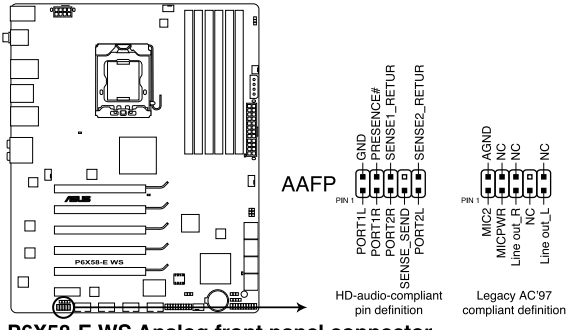


P6X58-E WS Digital audio connector

The S/PDIF out cable is purchased separately.

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

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

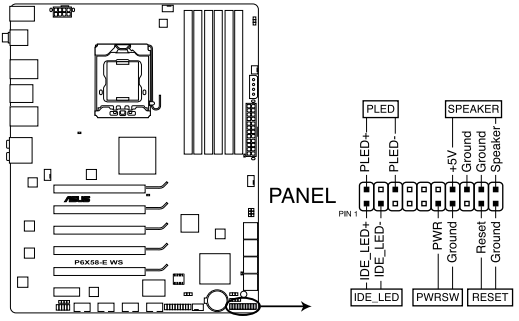


P6X58-E WS Analog front panel connector

- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.
- If you want to connect a high-definition front panel audio module to this connector, ensure that the **Front Panel Type** item in the BIOS is set to [HD Audio]. If you want to connect an AC' 97 front panel audio module to this connector, set the item to [AC97]. See page 3-25 or details.

11. System panel connector (20-8 pin PANEL)

This connector supports several chassis-mounted functions.



P6X58-E WS System panel connector

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

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

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

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

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

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

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

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

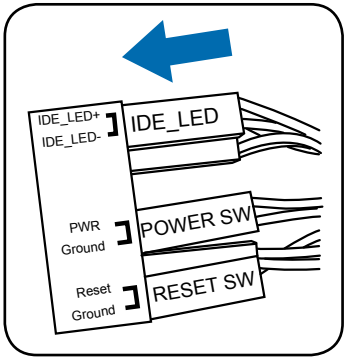
ASUS Q-Connector (system panel)

You can use the ASUS Q-Connector to connect/disconnect chassis front panel cables in a few steps. Refer to the instructions below to install the ASUS Q-Connector.

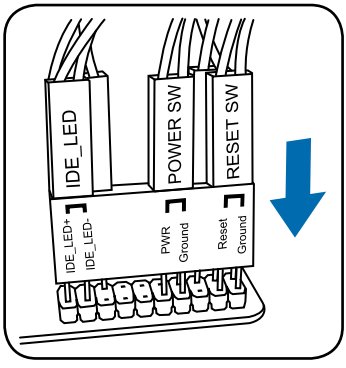
1. Connect the front panel cables to the ASUS Q-Connector.

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

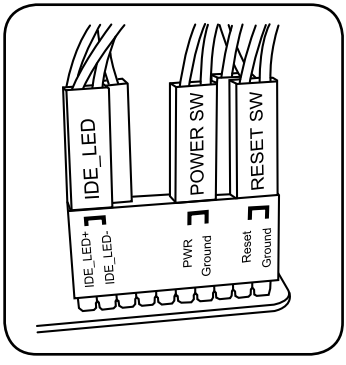
The labels on the front panel cables may vary depending on the chassis model.



2. Install the ASUS Q-Connector to the system panel connector, making sure the orientation matches the labels on the motherboard.

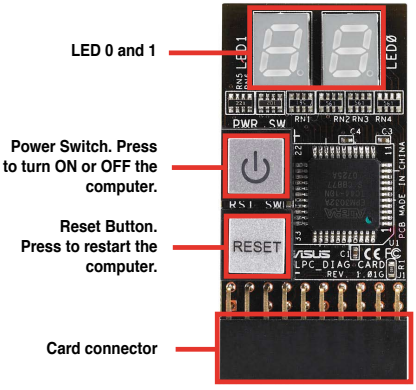


3. The front panel functions are now enabled. The figure shows the Q-Connector properly installed on the motherboard.



2.9 G.P. Diagnosis card installation

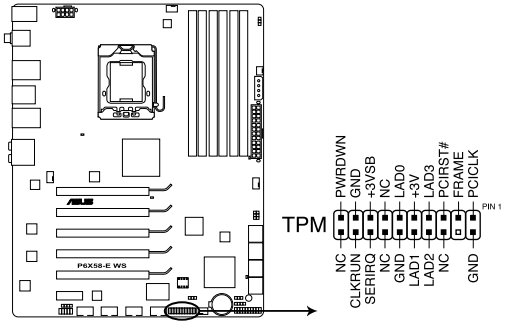
2.9.1 G.P. Diagnosis card layout



2.9.2 Installing G.P. Diagnosis card

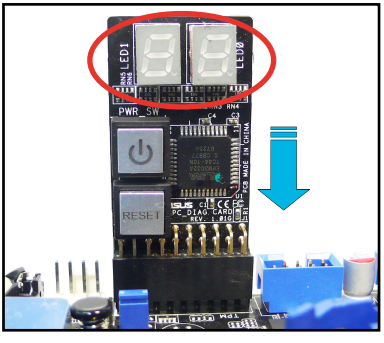
Ensure to turn off the power supply unit before installing the diagnosis card to avoid electrical shock hazard.

1. Locate the **TPM connector (20-1 pin TPM)** on the motherboard.



P6X58-E WS TPM connector

2. With the LEDs of the diagnosis card facing to the SATA ports, align the card connector with the TPM connector and press firmly until the card sits on the connector completely.



2.9.3 G.P. Diagnosis card check codes

D0	Initiate chip	75	Detect IDE
D1	Enable IO device for bootlock	78	Initiate option ROM
D2	Check and wake up system	85	Show post error
D3	Prepare system for memory detection and sizing	87	Enter BIOS setup
		A4	BIOS boot menu
D4	Memory test	AC	OS in PIC mode
D5	Copy BIOS from ROM to RAM	AA	OS in APIC mode
C0	Early CPU initiation	01	S1
C5	Wake up AP	03	S3
0A	Initiate KBC8042	04	S4
0B	Detect PS2 mouse	05	S5
0C	Detect PS2 keyboard	10	Resume from S1
2A	Initiate VGA BIOS	30	Resume from S3
38	USB initiation	40	Resume from S4
52	Detect System RAM	00	Leave BIOS and pass control to OS

2.10 Starting up for the first time

1. After making all the connections, replace the system case cover.
2. Be sure that all switches are off.
3. Connect the power cord to the power connector at the back of the system chassis.
4. Connect the power cord to a power outlet that is equipped with a surge protector.
5. Turn on the devices in the following order:
   a. Monitor
   b. External SCSI devices (starting with the last device on the chain)
   c. System power
6. After applying power, the system power LED on the system front panel case lights up. For systems with ATX power supplies, the system LED lights up when you press the ATX power button. If your monitor complies with the "green" standards or if it has a "power standby" feature, the monitor LED may light up or change from orange to green after the system LED turns on.

   The system then runs the power-on self tests or POST. While the tests are running, the BIOS beeps (refer to the BIOS beep codes table below) or additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turned on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

BIOS Beep	Description
One short beep	VGA detected Quick boot set to disabled No keyboard detected
One continuous beep followed by two short beeps then a pause (repeated)	No memory detected
One continuous beep followed by three short beeps	No VGA detected
One continuous beep followed by four short beeps	Hardware component failure

7. At power on, hold down the <Delete> key to enter the BIOS Setup. Follow the instructions in Chapter 3.

2.11 Turning off the computer

While the system is ON, pressing the power switch for less than four seconds puts the system on sleep mode or soft-off mode, depending on the BIOS setting. Pressing the power switch for more than four seconds lets the system enter the soft-off mode regardless of the BIOS setting. Refer to section **3.7 Power Menu** for details.

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

3 BIOS setup

Chapter summary

3

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 Update** (Updates the BIOS in Windows® environment.)
2. **ASUS EZ Flash 2:** Updates the BIOS using a USB flash drive.
3. **ASUS CrashFree BIOS 3 utility:** Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.

Refer to the corresponding sections for details on these utilities.

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

3.1.1 ASUS Update utility

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

This utility is available in the support DVD 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:

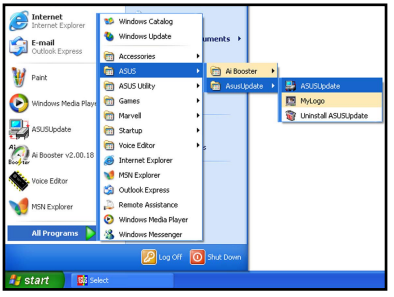
1. Place the support DVD in the optical drive.
2. From the **Main** menu, click the **Utilities** tab, and then click **Install ASUS Update VX.XX.XX**.
3. The ASUS Update utility is copied to your system.

Updating the BIOS through the Internet

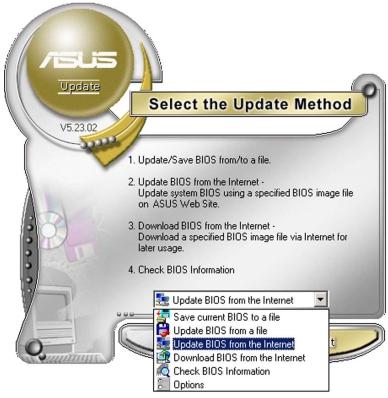
Quit all Windows® applications before you update the BIOS using this utility.

To update the BIOS through the Internet

1. From the Windows® desktop, click **Start > Programs > ASUS > ASUSUpdate > ASUSUpdate.** The ASUS Update main window appears.

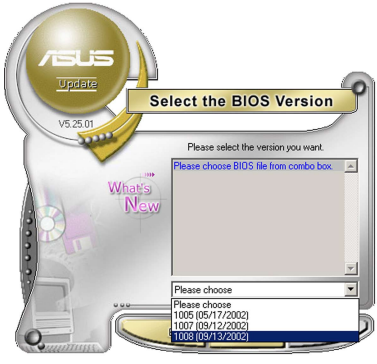


2. Select **Update BIOS from the Internet** from the drop-down menu, and then click **Next**.



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**.



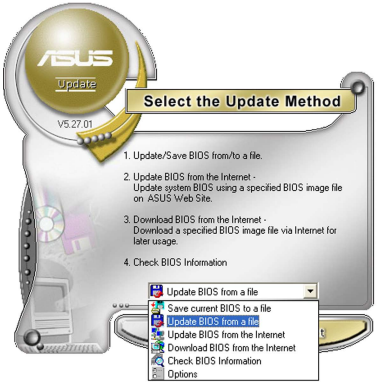
5. Follow the onscreen instructions to complete the update process.

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

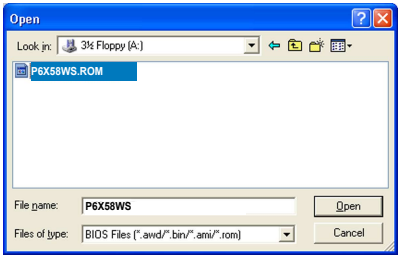
Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file

1. Fom the Windows® desktop, click **Start** > **Programs** > **ASUS** > **ASUSUpdate** > **ASUSUpdate**. The ASUS Update main window appears.
2. Select **Update BIOS from a file** from the dropdown menu, then click **Next**.



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



Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** menu. Refer to section **3.9 Exit Menu** for details.

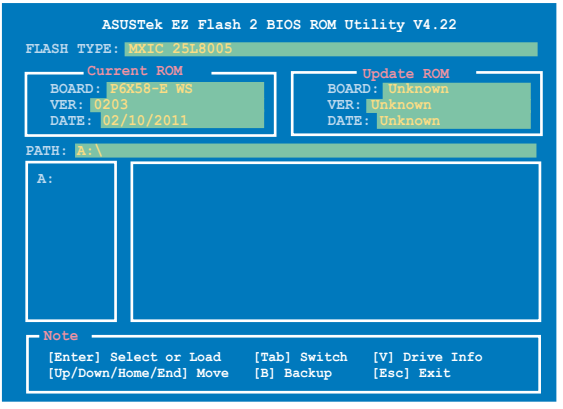
3.1.2 ASUS EZ Flash 2 utility

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

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

To update the BIOS using EZ Flash 2

1. Insert the USB flash drive that contains the latest BIOS file to the USB port, and then launch EZ Flash 2 in any of these two ways:
   - Press <Alt> + <F2> during POST to display the following.
   - Enter the BIOS setup program. Go to the **Tools** menu to select **EZ Flash 2** and press <Enter> to enable it.



2. Press <Tab> to switch between drives until the correct BIOS file is found. When found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when done.

- This function can support devices such as a USB flash drive with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** menu. Refer to section **3.9 Exit Menu** for details.

3.1.3 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 utility is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can restore a corrupted BIOS file using the motherboard support DVD or a USB flash drive that contains the BIOS file.

The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at support.asus.com and save it to a USB flash drive.

Recovering the BIOS

To recover the BIOS

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

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

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 chip.

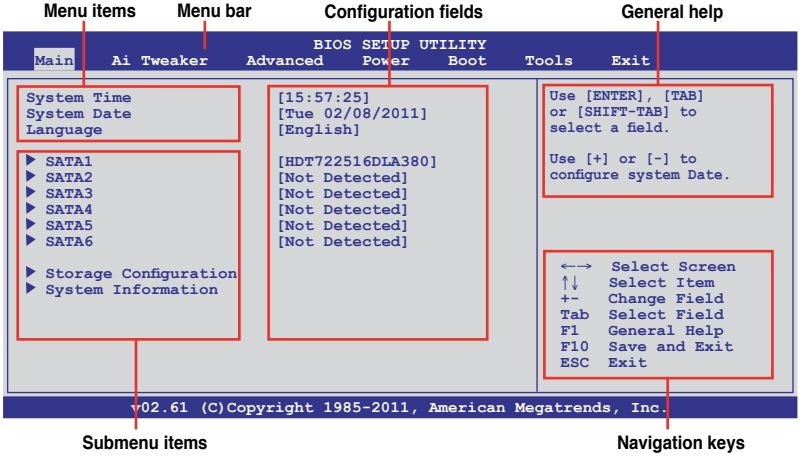
The firmware chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, 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 Setup Defaults** item under the Exit Menu. See section **3.9 Exit Menu**.
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website (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
Ai Tweaker	For changing the overclocking settings
Advanced	For changing the advanced system settings
Power	For changing the advanced power management (APM) configuration
Boot	For changing the system boot configuration
Tools	For configuring options for special functions
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.

The navigation keys may 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.

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.

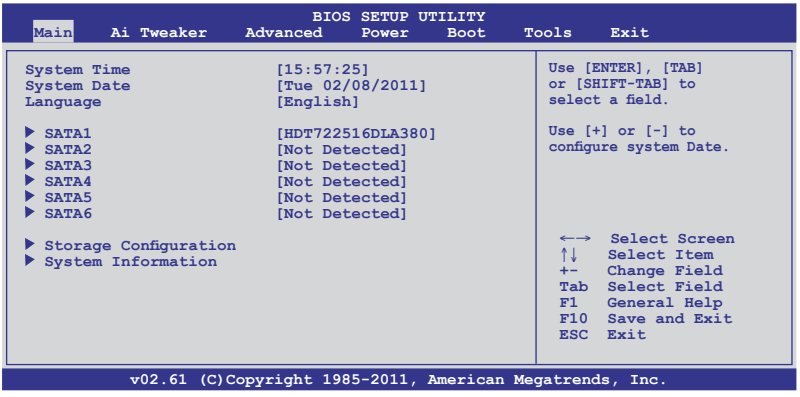
3.2.9 General help

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.



3.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

3.3.2 System Date [Day xx/xx/xxxx]

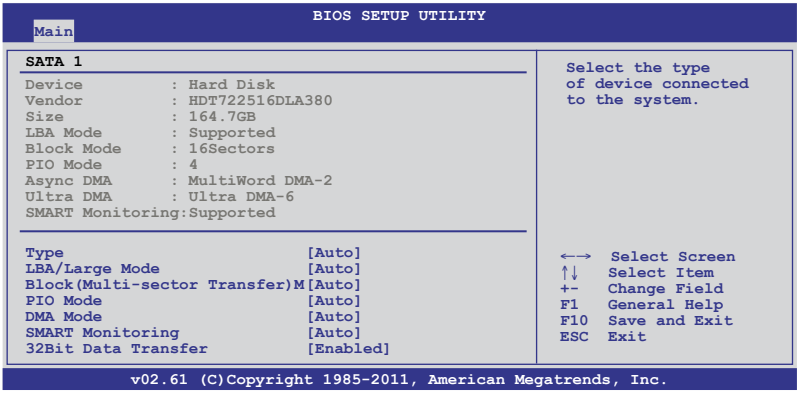
Allows you to set the system date.

3.3.3 Language [English]

Allows you to select the display language for the BIOS setup screen.
Configuration options: [繁體中文] [簡体中文] [日本語] [Français] [Deutsch] [English]

3.3.4 SATA 1-6

While entering Setup, the BIOS automatically detects the presence of Serial ATA devices. There is a separate sub-menu for each SATA device. Select a device item then press <Enter> to display the SATA device information.



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

Type [Auto]

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

LBA/Large Mode [Auto]

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

Block (Multi-Sector Transfer) M [Auto]

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

PIO Mode [Auto]

Allows you to select the data transfer mode.
Configuration options: [Auto] [0] [1] [2] [3] [4]

DMA Mode [Auto]

Selects the DMA mode.
Configuration options: [Auto] [SWDMA0] [SWDMA1] [SWDMA2] [MWDMA0] [MWDMA1] [MWDMA2] [UDMA0] [UDMA1] [UDMA2] [UDMA3] [UDMA4] [UDMA5]

SMART Monitoring [Auto]

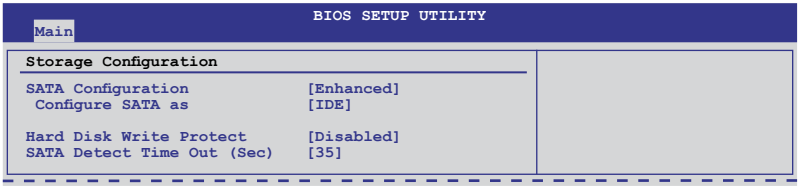
Sets the Self-Monitoring, Analysis, and Reporting Technology.
Configuration options: [Auto] [Disabled] [Enabled]

32Bit Data Transfer [Enabled]

Enables or disables 32-bit data transfer.
Configuration options: [Disabled] [Enabled]

3.3.5 Storage Configuration

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



SATA Configuration [Enhanced]

Configuration options: [Disabled] [Compatible] [Enhanced]

Configure SATA as [IDE]
Sets the configuration for the Serial ATA connectors supported by the Southbridge chip. Configuration options: [IDE] [RAID] [AHCI]

- If you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices, keep the default setting [IDE].
- If you want the Serial ATA hard disk drives to use the Advanced Host Controller Interface (AHCI), set this item to [AHCI]. The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.
- If you want to create a RAID 0, RAID 1, RAID 5, RAID 10, or the Intel® Matrix Storage Technology configuration from the Serial ATA hard disk drives, set this item to [RAID].

Hard Disk Write Protect [Disabled]

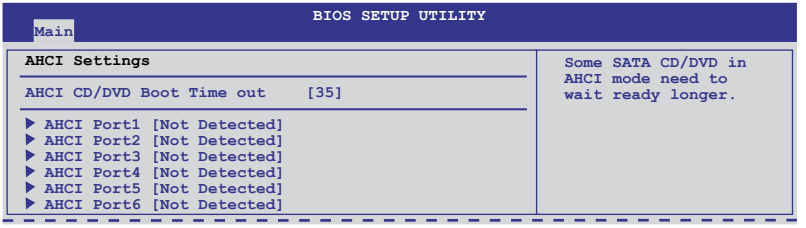
Disables or enables device write protection. This will be effective only if the device is accessed through BIOS.
Configuration option: [Disabled] [Enabled]

IDE Detect Time Out (Sec) [35]

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

3.3.6 AHCI Configuration

This menu is the section for AHCI configuration. It appears only when you set the item **Configure SATA as** from the sub-menu of **SATA Configuration** to [AHCI].



AHCI CD/DVD Boot Time out [35]

Selects the boot time out value for SATA CD/DVD devices in AHCI mode.
Congifuration options: [0] [5] [10] [15] [20] [25] [30] [35]

AHCI Port1–6 [XXXX]

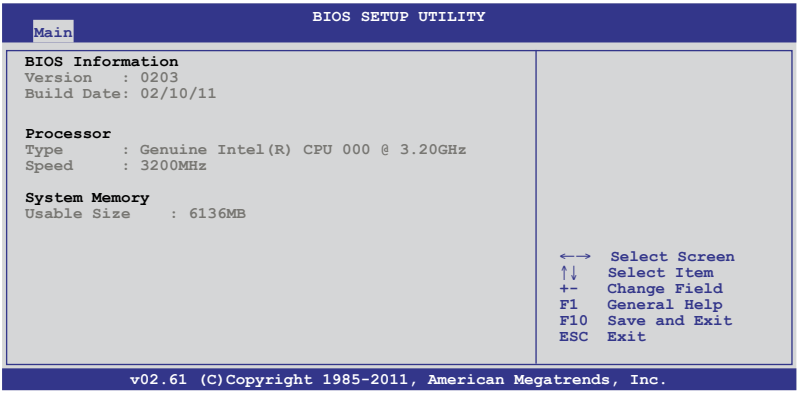
Displays the status of auto-detection of SATA devices.

SATA Port1 [Auto]
Allows you to select the type of device connected to the system.
Configuration options: [Auto] [Not Installed]

SMART Monitoring [Enabled]
Allows you to set the Self-Monitoring, Analysis and Reporting Technology.
Configration options: [Disabled] [Enabled]

3.3.7 System Information

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



Bios Information

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

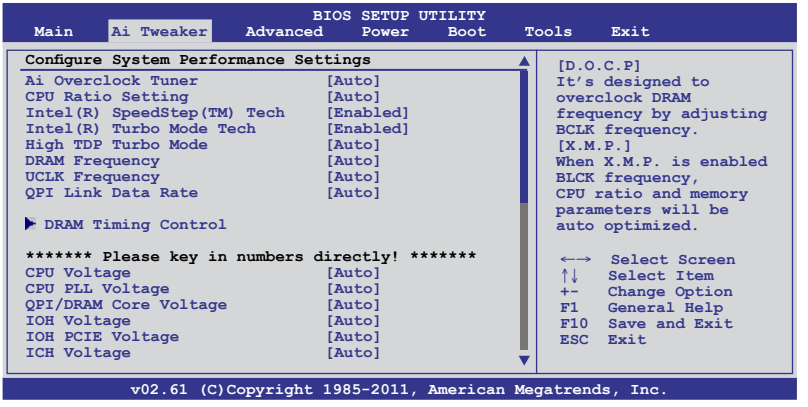
Displays the auto-detected system memory.

3.4 Ai Tweaker menu

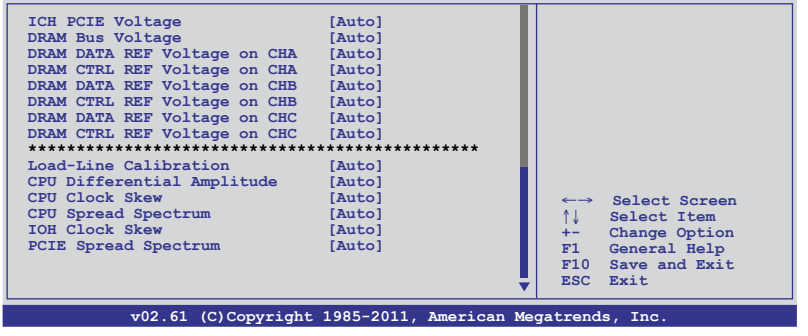
The Ai Tweaker menu items allow you to configure overclocking-related items.

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

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



Scroll down to display the following items:



3.4.1 Ai Overclock Tuner [Auto]

Allows selection of CPU overclocking options to achieve 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.
D.O.C.P	Overclocks DRAM frequency by adjusting BCLK frequency.
X.M.P.	If you install memory module(s) supporting the eXtreme Memory Profile (X.M.P.) Technology, choose this item to set the profile(s) supported by your memory module(s) for optimizing the system performance.

The configuration options for the following sub-item vary depending on the DIMMs you install on the motherboard.

DRAM O.C. Profile [DDR3-1339MHz]
This item appears only when you set the **Ai Overclock Tuner** item to [D.O.C.P.] and allows you to select a DRAM O.C. profile, which applies different settings to DRAM frequency, DRAM timing and DRAM voltage.

eXtreme Memory Profile [High Performance]
This item appears only when you set the **Ai Overclock Tuner** item to [X.M.P.] and allows you to select the X.M.P. mode supported by your memory module. Configuration options: [High Performance] [High Frequency]

To obtain the best performance of the X.M.P. DIMM or 1600MHz DIMM, install only one DIMM on each memory channel.

3.4.2 CPU Ratio Setting [Auto]

Allows you to adjust the ratio between CPU Core Clock and BCLK Frequency. Use the <+> and <-> keys to adjust the value.

3.4.3 Intel(R) SpeedStep(TM) Tech [Enabled]

When set to [Disabled], the CPU runs at its default speed. When set to [Enabled], the CPU speed is controlled by the operating system.
Configuration options: [Disabled] [Enabled]

3.4.4 Intel(R) Turbo Mode Tech [Enabled]

Turbo mode allows processor cores to run faster than marked frequency in specific condition. Configuration options: [Disabled] [Enabled]

3.4.5 High TDP Turbo Mode [Auto]

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

The following two items appear only when you set the **Ai Overclock Tuner** item to [Manual], [D.O.C.P.] or [X.M.P.].

3.4.6 BCLK Frequency [XXX]

Allows you to adjust the Internal Base Clock (BCLK). Use the <+> and <-> keys to adjust the value. You can also type the desired value using the numeric keypad. The values range from 100 to 500.

3.4.7 PCIE Frequency [XXX]

Allows you to set the PCI Express frequency. Use the <+> and <-> keys to adjust the PCIE frequency. The values range from 100 to 200.

3.4.8 DRAM Frequency [Auto]

Allows you to set the DDR3 operating frequency.
Configuration options: [Auto] [DDR3-1066MHz] [DDR3-1333MHz] [DDR3-1600MHz] [DDR3-1866MHz] [DDR3-2133MHz] [DDR3-2400MHz]

The **DRAM Frequency** configuration options vary with the **BCLK Frequency** item settings.

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

3.4.9 UCLK Frequency [Auto]

Allows you to set the Uncore Clock Ratio (UCLK).
Configuration options: [Auto] [1600MHz] [1733MHz] [1866MHz] [2000MHz] [2133MHz] [2266MHz] [2400MHz] [2533MHz] [2666MHz] [2800MHz] [2933MHz] [3066MHz] [3200MHz] [3333MHz] [3466MHz]

The **UCLK Frequency** configuration options vary with the **DRAM Frequency** item settings.

3.4.10 QPI Link Data Rate [Auto]

Allows you to set the QuickPath Interconnect (QPI) frequency.
Configuration options: [Auto] [4800MT/s] [5866MT/s] [6400MT/s]

3.4.11 DRAM Timing Control [Auto]

The items in this menu allow you to set the DRAM timing control features.

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

The following fourteen (14) items are adjusted by typing the desired values using the numeric keypad and press the <Enter> key. You can also use the <+> and <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.

3.4.12 CPU Voltage [Auto]

Allows you to set the CPU VCore voltage. The values range from 0.85000V to 2.10000V* with a 0.00625V interval.

- Refer to the CPU documentation before setting the CPU VCore voltage. Setting a high VCore voltage may damage the CPU permanently, and setting a low VCore voltage may make the system unstable.
- The value [2.10000V] of the CPU Voltage item is supported only if the **OV_CPU** jumper is enabled. Otherwise the maximum voltage supported is [1.70000V]. See **2. CPU / DRAM Bus / QPI DRAM overvoltage setting** on page 2-22 for details.

3.4.13 CPU PLL Voltage [Auto]

Allows you to set the CPU PLL voltage. The values range from 1.80V to 2.50V with a 0.02V interval.

3.4.14 QPI/DRAM Core Voltage [Auto]

Allows you to set the QPI/DRAM Core voltage. The values range from 1.20000V to 1.90000V* with a 0.00625V interval.

The value [1.90000V] of the **QPI/DRAM Core Voltage** item is supported only if the **OV_QPI_DRAM** jumper is enabled. Otherwise the maximum voltage supported is [1.70000V]. See **2. CPU / DRAM Bus / QPI DRAM overvoltage setting** on page 2-22 for details.

3.4.15 IOH Voltage [Auto]

Allows you to set the I/O Hub (IOH) voltage. The values range from 1.10V to 1.70V with a 0.02V interval.

3.4.16 IOH PCIE Voltage [Auto]

Allows you to set the IOH PCIE voltage. The values range from 1.50V to 2.76V with a 0.02V interval.

3.4.17 ICH Voltage [Auto]

Allows you to set the I/O Controller Hub (ICH) voltage. The values range from 1.10V to 1.40V with a 0.10V interval.

3.4.18 ICH PCIE Voltage [Auto]

Allows you to set the SB PCIE voltage. The values range from 1.50V to 1.80V with a 0.10V interval.

The highest value of the **ICH PCIE Voltage** item is limited by the **DRAM Bus Voltage** item.

3.4.19 DRAM Bus Voltage [Auto]

Allows you to set the DRAM voltage. The values range from 1.20V to 2.46V* with a 0.02V interval.

- The value [2.46V] of the **DRAM Bus Voltage** item is supported only if the **OV_DRAM_BUS** jumper is enabled, otherwise the maximum voltage supported is [1.90V]. See **CPU / DRAM Bus / QPI DRAM overvoltage setting** on page 2-22 for details.
- According to Intel CPU spec, DIMMs with voltage requirement over 1.65V may damage the CPU permanently. We recommend you install the DIMMs with the voltage requirement below 1.65V.
- The values of the **CPU Voltage**, **CPU PLL Voltage**, **QPI/DRAM Core Voltage**, **IOH Voltage**, **IOH PCIE Voltage**, **ICH Voltage**, **ICH PCIE Voltage**, and **DRAM Bus Voltage** items are labeled in different color, indicating the risk levels of high voltage settings. Refer to the table on the next page for details.
- The system may need better cooling system to work stably under high voltage settings.

	Blue	Yellow	Purple	Red
CPU Voltage	0.85000V–1.22500V	1.23125V–1.29375V	1.30000V–1.35000V	1.35625V 1.70000V
CPU PLL Voltage	1.80V–1.90V	1.92V–2.00V	2.02V–2.10V	2.12V–2.50V
QPI/DRAM Core Voltage	1.20000V–1.26875V	1.27500V–1.32500V	1.33125V–1.40000V	1.40625V–1.70000V
IOH Voltage	1.10V–1.18V	1.20V–1.24V	1.26V–1.30V	1.32V–1.70V
IOH PCIE Voltage	1.50V–1.58V	1.60V–1.66V	1.68V–1.74V	1.76V–2.76V
ICH Voltage	1.10V–1.20V	1.30V–1.40V	N/A	N/A
ICH PCIE Voltage	1.50V–1.60V	1.70V–1.80V	N/A	N/A
DRAM Bus Voltage	1.50V–1.64V	N/A	N/A	1.66V–2.46V

3.4.20 DRAM DATA REF Voltage on CHA/B/C [Auto]

Allows you to set the DRAM DATA Reference Voltage on Channel A/B/C. The values range from 0.395x to 0.630x with a 0.005x interval. Different ratio might enhance DRAM overclocking ability.

3.4.21 DRAM CTRL REF Voltage on CHA/B/C [Auto]

Allows you to set the DRAM Control Reference Voltage on Channel A/B/C. The values range from 0.395x to 0.630x with a 0.005x interval. Different ratio might enhance DRAM overclocking ability.

3.4.22 Load-Line Calibration [Auto]

Allows you to select the CPU Load-Line mode. Set to [Disabled] to follow Intel specifications, or to [Enabled] to improve CPU VDroop directly.
Configuration options: [Auto] [Disabled] [Enabled]

3.4.23 CPU Differential Amplitude [Auto]

Different AMP might enhance BCLK overclocking ability.
Configuration options: [Auto] [700mV] [800mV] [900mV] [1000mV]

3.4.24 CPU Clock Skew [Auto]

Adjusting this item may help enhancing BCLK overclocking ability. You may need to adjust the **IOH Clock Skew** item at the same time.
Configuration options: [Auto] [Normal] [Delay 100ps]–[Delay 1500ps]

3.4.25 CPU Spread Spectrum [Auto]

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

3.4.26 IOH Clock Skew [Auto]

Adjusting this item may help enhancing BCLK overclocking ability. You may need to adjust the **CPU Clock Skew** item at the same time.
Configuration options: [Auto] [Normal] [Delay 100ps]–[Delay 1500ps]

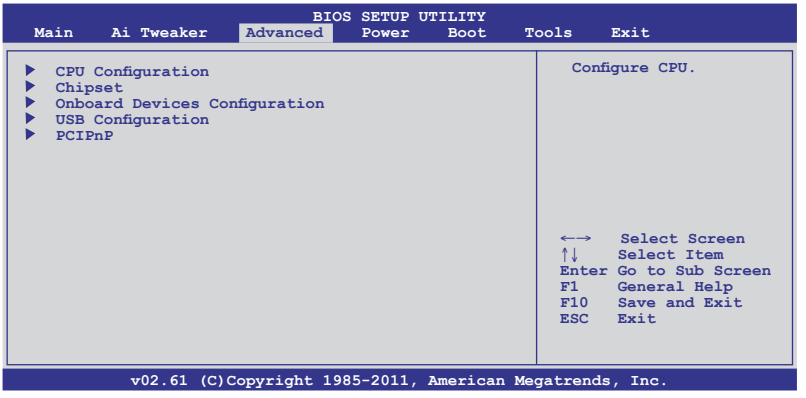
3.4.27 PCIE Spread Spectrum [Auto]

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

3.5 Advanced menu

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

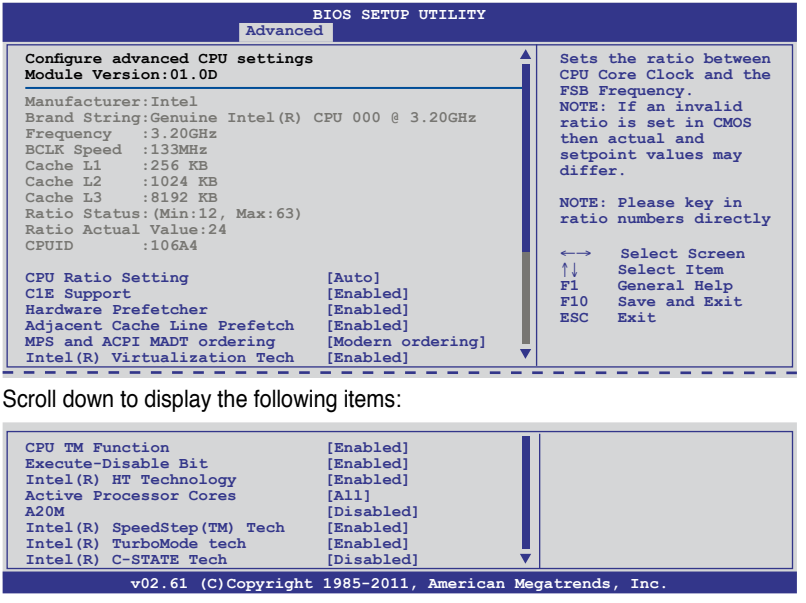
Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



3.5.1 CPU Configuration

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

The items shown in this screen may be different due to the CPU you installed.



Scroll down to display the following items:

CPU Ratio Setting [Auto]

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

C1E Support [Enabled]

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

Hardware Prefetcher [Enabled]

Allows you to enable or disable the Hardware Prefetcher function.
Configuration options: [Disabled] [Enabled]

Adjacent Cache Line Prefetch [Enabled]

Allows you to enable or disable the Adjacent Cache Line Prefetch function.
Configuration options: [Disabled] [Enabled]

MPS and ACPI MADT ordering [Modern ordering]

[Modern ordering] For Windows XP or later OSes.

[Legacy ordering] For Windows 2000 or earlier OSes.

Intel(R) Virtualization Tech [Enabled]

The Intel® Virtualization Technology allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems. Configuration options: [Disabled] [Enabled]

CPU TM Function [Enabled]

This function enables the overheated CPU to throttle the clock speed to cool down.
Configuration options: [Disabled] [Enabled]

Execute-Disable Bit [Enabled]

Allows you to enable or disable the No-Execution Page Protection Technology. Setting this item to [Disabled] forces the XD feature flag to always return to zero (0). Configuration options: [Disabled] [Enabled]

Intel(R) HT Technology [Enabled]

Allows you to enable or disable the Intel Hyper-Threading Technology function. When disabled, only one thread per activated core is enabled.
Configuration options: [Enabled] [Disabled]

Active Processor Cores [All]

Allows you to choose the number of CPU cores to activate in each processor package. Configuration options: [All] [1] [2]

A20M [Disabled]

Legacy OSes and APs may need A20M enabled.
Configuration options: [Disabled] [Enabled]

Intel(R) SpeedStep (TM) Tech [Enabled]

When set to [Disabled], the CPU runs at its default speed. When set to [Enabled], the CPU speed is controlled by the operating system.
Configuration options: [Disabled] [Enabled]

Intel(R) TurboMode tech [Enabled]

Turbo mode allows processor cores to run faster than marked frequency in specific condition. Configuration options: [Disabled] [Enabled]

Intel(R) C-STATE Tech [Disabled]

The Intel® C-State Technology allows the CPU to save more power under idle mode. Enable this item only when you install a C-State Technology-supported CPU. Configuration options: [Disabled] [Enabled]

C State package limit setting [Auto]

This item appears only when you set the **Intel(R) C-STATE Tech** item to [Enabled]. We recommend that you set this item to [Auto] for BIOS to automatically detect the C-State mode supported by your CPU. Configuration options: [Auto] [C1] [C3] [C6]

C1 Auto Demotion [Enabled]

This item appears only when you set the **Intel(R) C-STATE Tech** item to [Enabled].

[Enabled] When enabled, CPU will conditionally demote C3/C6/C7 requests to C1 based on uncore auto-demote information.

[Disabled] Disables this function.

C3 Auto Demotion [Enabled]

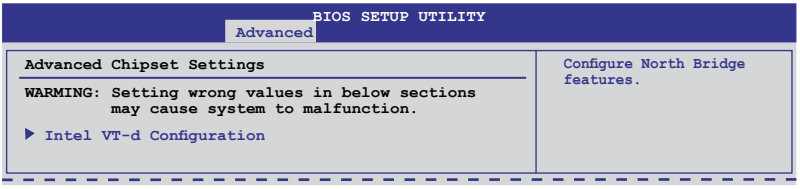
This item appears only when you set the **Intel(R) C-STATE Tech** item to [Enabled].

[Enabled] When enabled, CPU will conditionally demote C6/C7 requests to C3 based on uncore auto-demote information.

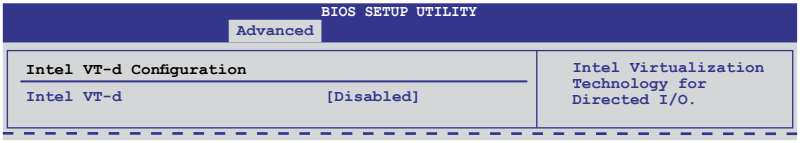
[Disabled] Disables this function.

3.5.2 Chipset

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



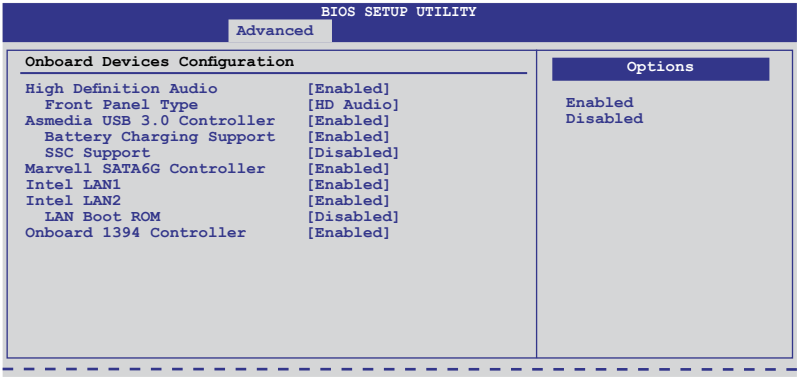
Intel VT-d Configuration



Intel VT-d [Disabled]

Allows you to enable or disable the Intel Virtualization Technology for Directed I/O. Configuration options: [Disabled] [Enabled]

3.5.3 Onboard Device Configuration



High Definition Audio [Enabled]

Allows you to enable or disable the High Definition Audio Controller.
Configuration options: [Enabled] [Disabled]

Front Panel Type [HD Audio]

Allows you to set the front panel audio connector (AAFP) mode to legacy AC'97 or high-definition audio depending on the audio standard that the front panel audio module supports. Configuration options: [AC97] [HD Audio]

Asmedia USB 3.0 Controller [Enabled]

Allows you to enable or disable the Asmedia USB 3.0 Controller.
Configuration options: [Enabled] [Disabled]

Battery Charging Support [Enabled]

This item appears only when you enable the previous item. Allows you to enable or disable the Asmedia USB 3.0 battery charging.
Configuration options: [Disabled] [Enabled]

SSC Support [Disabled]

This item appears only when you enable the previous item. Allows you to enable or disable the Asmedia USB 3.0 SSC.
Configuration options: [Disabled] [Enabled]

Marvell SATA6G Controller [Enabled]

Allows you to select the onboard Marvell SATA6G controller.

[Disabled] Disables the controller.

[Enabled] Enables the controller.

Intel LAN1/2 [Enabled]

Allows you to enable or disable the onboard Intel LAN port1/2.
Configuration options: [Enabled] [Disabled]

LAN Boot ROM [Disabled]
This item appears only when you enable the previous item.
Configuration options: [Disabled] [Enabled]

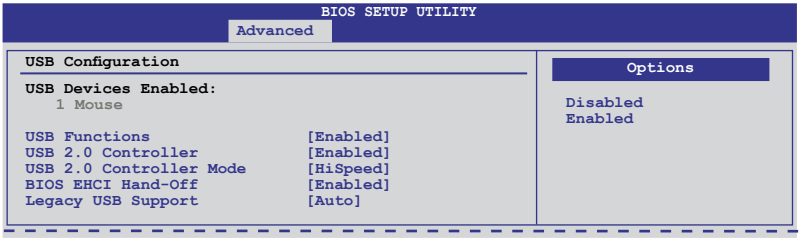
Onboard 1394 Controller [Enabled]

[Enabled] Enables the onboard IEEE 1394a controller.

[Disabled] Disables the controller.

3.5.4 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 **USB Devices Enabled** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

USB Functions [Enabled]

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

The following items appear only when you set **USB Functions** to [Enabled].

USB 2.0 Controller [Enabled]

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]

The **USB 2.0 Controller Mode** item appears only when you enable the **USB 2.0 Controller**.

BIOS EHCI Hand-off [Enabled]

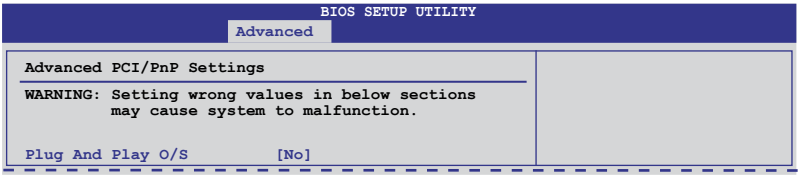
Allows you to enable the support for operating systems without an EHCI hand-off feature. Configuration options: [Disabled] [Enabled]

Legacy USB Support [Auto]

Allows you to enable or disable the 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]

3.5.5 PCIPnP

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

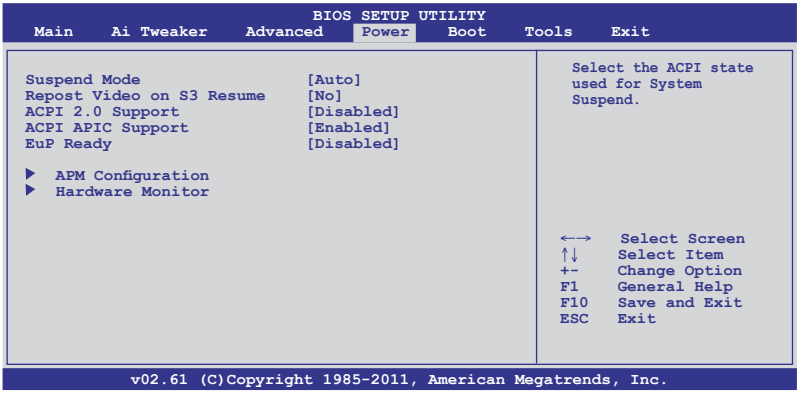


Plug And Play O/S [No]

When set to [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]

3.6 Power menu

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



3.6.1 Suspend Mode [Auto]

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

3.6.2 Repost Video on S3 Resume [No]

Determines whether to invoke VGA BIOS POST on S3/STR resume.
Configuration options: [No] [Yes]

3.6.3 ACPI 2.0 Support [Disabled]

Add additional tables as per ACPI 2.0 specifications.
Configuration options: [Disabled] [Enabled]

3.6.4 ACPI APIC Support [Enabled]

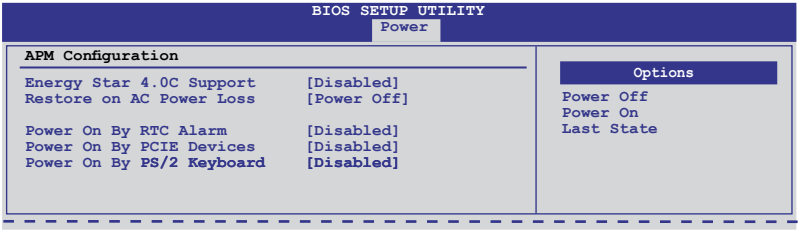
Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC). When set to [Enabled], the ACPI APIC table pointer is included in the RSDT pointer list.
Configuration options: [Disabled] [Enabled]

3.6.5 EuP Ready [Disabled]

[Disabled] Disables the Energy Using Products (EuP) Ready function.

[Enabled] Allows BIOS to switch off some power at S5 state to get system ready for the EuP requirement. When set to [Enabled], power for WOL, WO_USB, audio and onboard LEDs will be switched off at S5 state.

3.6.6 APM Configuration



Energy Star 4.0C Support [Disabled]

Allows you to enable or disable Energy Star 4.0C support.
Configuration options: [Disabled] [Enabled]

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 (Days)**/ **System Time** will become user-configurable with set values. Configuration options: [Disabled] [Enabled]

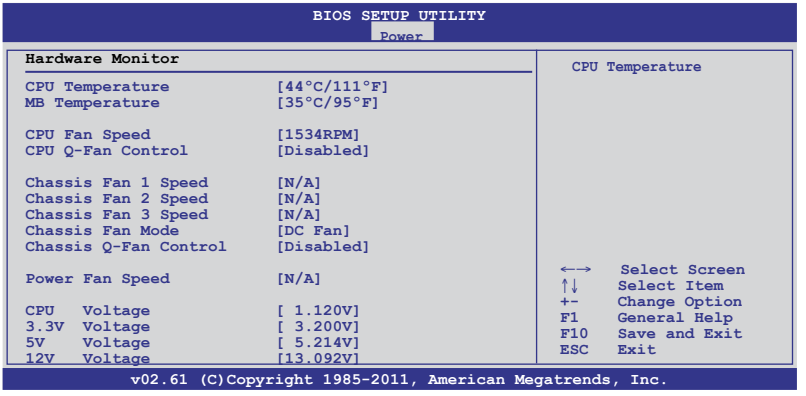
Power On By PCIE Devices [Disabled]

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

Power On By PS/2 Keyboard [Disabled]

Allows you to disable the Power On by PS/2 keyboard function or set specific keys on the PS/2 keyboard to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.
Configuration options: [Disabled] [Space Bar] [Ctrl-Esc] [Power Key]

3.6.7 Hardware Monitor



CPU Temperature [xxxºC/xxxºF]
MB Temperature [xxxºC/xxxºF]

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

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

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].

CPU Q-Fan Control [Disabled]

Allows you to enable or disable the CPU Q-fan control feature.
Configuration options: [Disabled] [Enabled]

The following item appears only when you enable the **CPU Q-Fan Control** item.

CPU Fan Profile [Standard]

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

Chassis Fan 1/2/3 Speed [xxxxRPM] or [Ignored] / [N/A]

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 motherboard, the field shows [N/A].

Chassis Fan Mode [DC Fan]

Allows you to select the Chassis fan mode.
Configuration options: [DC Fan] [PWM Fan]

Chassis Q-Fan Control [Disabled]

Allows you to enable or disable the Chassis Q-fan control feature.
Configuration options: [Disabled] [Enabled]

The following item appears only when you enable the **Chassis Q-Fan Control** item.

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

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

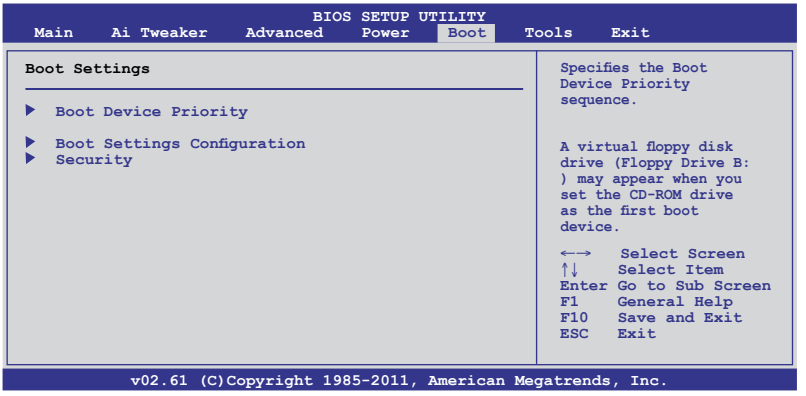
The onboard hardware monitor automatically detects and displays the power fan speed in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows [N/A].

CPU Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage

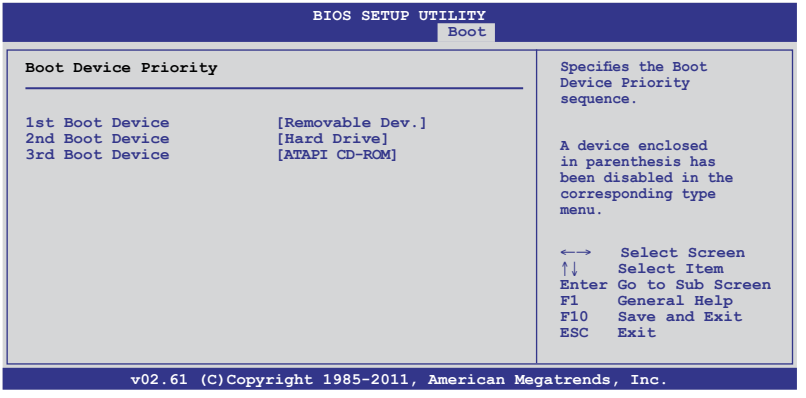
The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select [Ignored] if you do not want to detect this item.

3.7 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.



3.7.1 Boot Device Priority

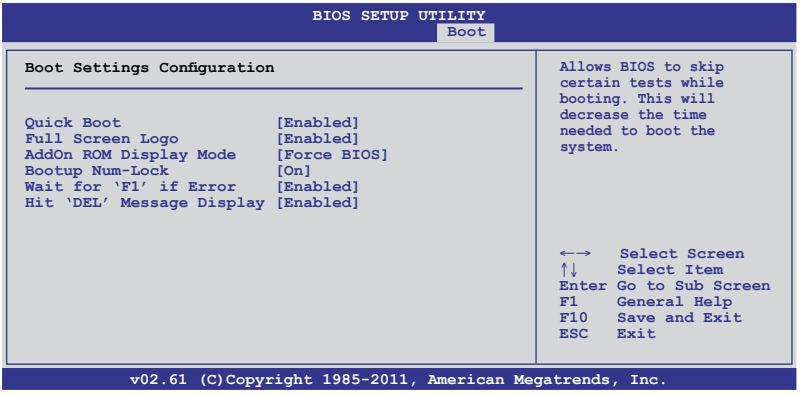


1st—xxth Boot Device [xxx Drive]

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

3.7.2 Boot Settings Configuration



Quick Boot [Enabled]

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

Full Screen Logo [Enabled]

This allows you to enable or disable the full screen logo display feature. Configuration options: [Disabled] [Enabled]

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

AddOn ROM Display Mode [Force BIOS]

Sets the display mode for option ROM.
Configuration options: [Force BIOS] [Keep Current]

Bootup Num-Lock [On]

Allows you to select the power-on state for the NumLock.
Configuration options: [Off] [On]

Wait for 'F1' If Error [Enabled]

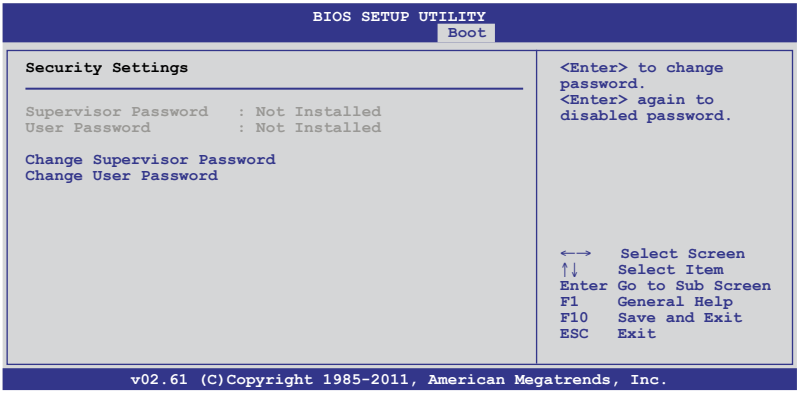
When set to [Enabled], the system waits for the <F1> key to be pressed when error occurs. Configuration options: [Disabled] [Enabled]

Hit 'DEL' Message Display [Enabled]

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

3.7.3 Security

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



Change Supervisor Password

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

To set a Supervisor Password:

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

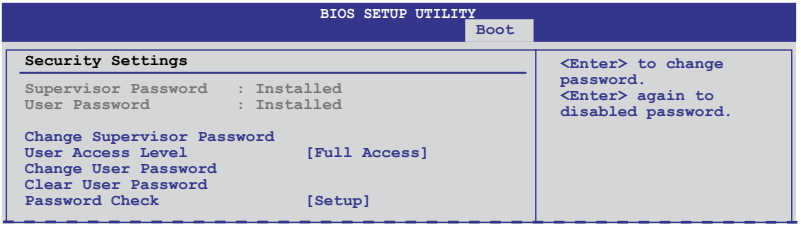
The message “Password Installed” appears after you successfully set your password.

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

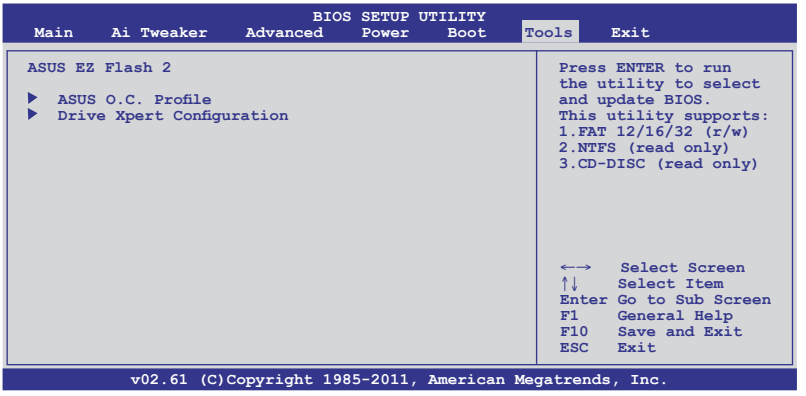
Select this item to clear the user password.

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]

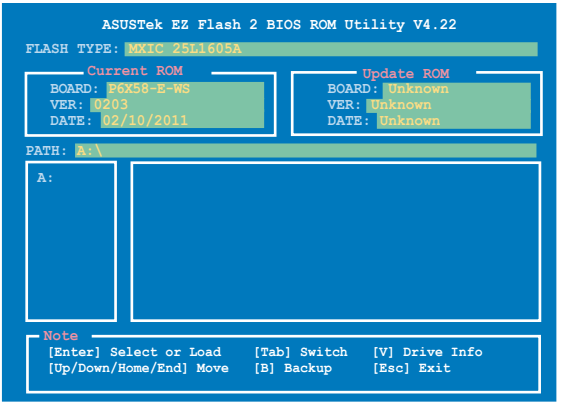
3.8 Tools menu

The Tools menu items allow you to configure options for special functions. Select an item then press <Enter> to display the sub-menu.



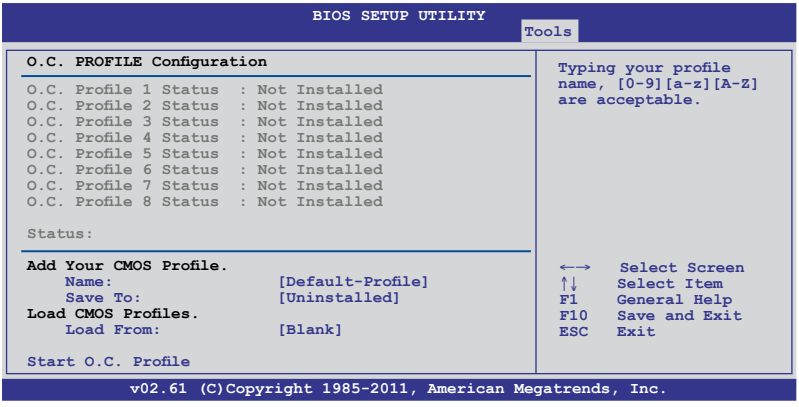
3.8.1 ASUS EZ Flash 2

Allows you to run ASUS EZ Flash 2. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice. Please refer to section 3.1.2 for details.



3.8.2 ASUS O.C. Profile

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



Add Your CMOS Profile

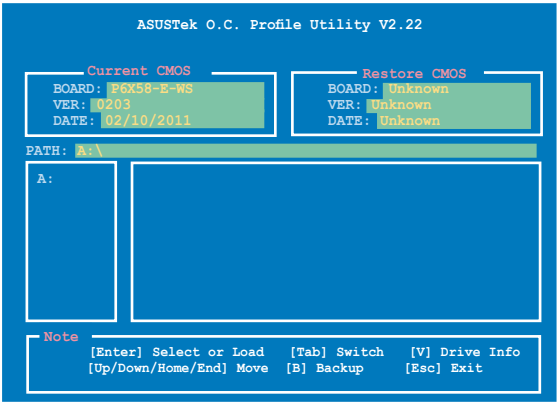
Allows you to save the current BIOS file to the BIOS Flash. In the Name sub-item, key in your profile name and press <Enter>, and then choose a profile number to save your CMOS settings in the **Save to** sub-item.

Load CMOS Profiles.

Allows you to load the previous BIOS settings saved in the BIOS Flash. Press <Enter> to load the file.

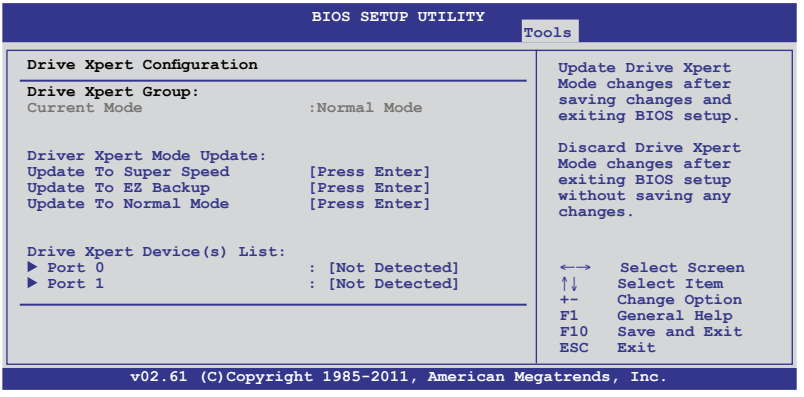
Start O.C. Profile

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



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

3.8.3 Drive Xpert Configuration



Update To Super Speed [Press Enter]

This item allows you to use **Super Speed** function. Plug two identical SATA hard drives in the SATA6G_E1 (gray, port 1) and SATA6G_E2 (gray, port 2) connectors on the motherboard and press the <Enter> key.

Update To EZ Backup [Press Enter]

This item allows you to use **EZ Backup** function. Plug two identical SATA hard drives in the SATA6G_E1 (gray, port 1) and SATA6G_E2 (gray, port 2) connectors on the motherboard and press the <Enter> key.

Update To Normal Mode [Press Enter]

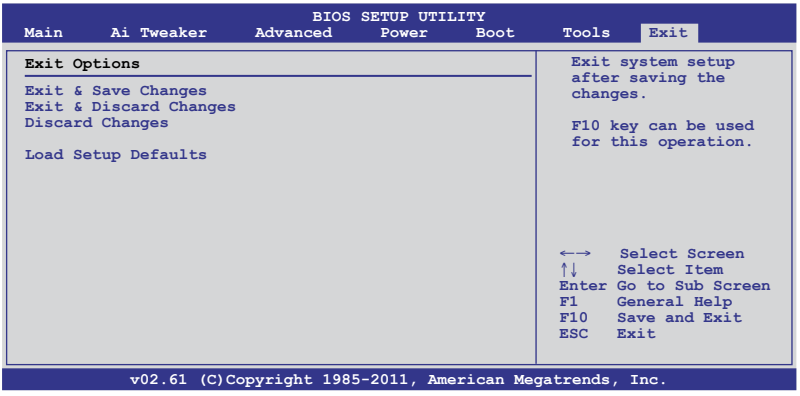
This item allows you to use the SATA6G_E1 (gray, port 1) and SATA6G_E2 (gray, port 2) connectors as normal SATA connectors.

Port 0/1 [XXXXX]

While entering BIOS setup, BIOS automatically detects the connected IDE/SATA devices. These items display the status of the detected IDE/SATA devices.

3.9 Exit menu

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



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

Exit & Save Changes

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

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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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

This chapter describes the contents of the support DVD that comes with the motherboard package and the software.

4 Software support

Chapter summary

4

4.1 Installing an operating system

This motherboard supports Windows® XP/ 64-bit XP/ Vista / 64-bit Vista / 7 / 64-bit 7 operating systems (OS). Always install the latest OS version and corresponding updates to maximize the features of your hardware.

- Motherboard settings and hardware options vary. Use the setup procedures presented in this chapter for reference only. Refer to your OS documentation for detailed information.
- Ensure that you install the Windows® XP Service Pack 3 or later versions before installing the drivers for better compatibility and system stability.

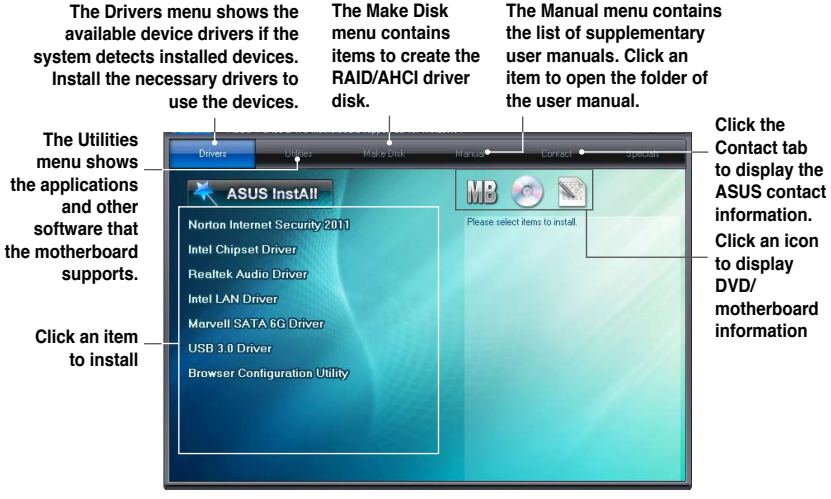
4.2 Support DVD information

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

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

4.2.1 Running the support DVD

Place the support DVD into the optical drive. The DVD automatically displays the Drivers menu if Autorun is enabled in your computer. Click each menu tab and select the items you want to install.



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

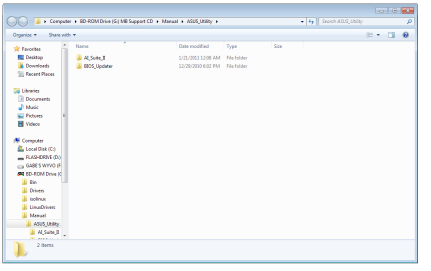
4.2.2 Obtaining the software manuals

The software manuals are included in the support DVD. Follow the instructions below to get the necessary software manuals.

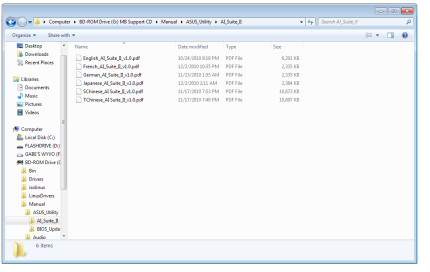
The software manual files are in Portable Document Format (PDF). Install the Adobe® Acrobat® Reader from the Utilities menu before opening the files.

1. Click the **Manual** tab. Click **ASUS Motherboard Utility Guide** from the manual list on the left.

2. The **Manual** folder of the support DVD appears. Double-click the folder of your selected software.



3. Some software manuals are provided in different languages. Double-click the language to show the software manual.



The screenshots in this section are for reference only. The actual software manuals containing in the support DVD vary by models.

4.3 Software information

Most of the applications in the support DVD 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 AI Suite II

AI Suite II is an all-in-one interface that integrates several ASUS utilities and allows users to launch and operate these utilities simultaneously.

Installing AI Suite II

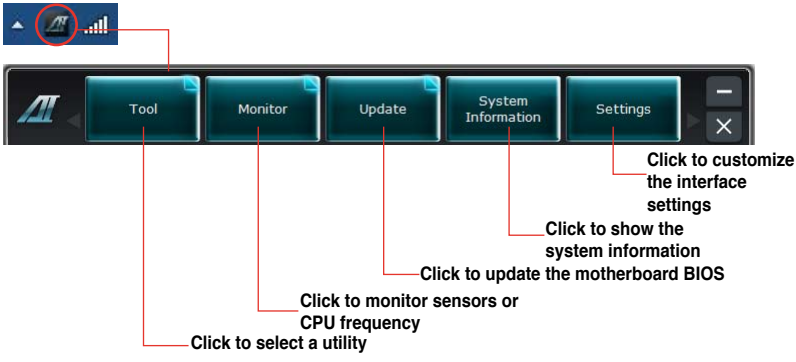
To install AI Suite II on your computer

1. Place the support DVD to the optical drive. The Drivers installation tab appears if your computer has enabled the Autorun feature.
2. Click the Utilities tab, then click **AI Suite II**.
3. Follow the onscreen instructions to complete installation.

Using AI Suite II

AI Suite II automatically starts when you enter the Windows® operating system (OS). The AI Suite II icon appears in the Windows® notification area. Click the icon to open the AI Suite II main menu bar.

Click each button to select and launch a utility, to monitor the system, to update the motherboard BIOS, to display the system information, and to customize the settings of AI Suite II.



- The applications in the Tool menu vary with models.
- The screeshots of AI Suite II in this user manual are for reference only. The actual screenshots vary with models.
- Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.3.2 TurboV EVO

ASUS TurboV EVO introduces **TurboV** that allows you to manually adjust the CPU frequency and related voltages as well as **Auto Tuning** function that offers automatic and easy overlocking and system level up. After installing AI Suite II from the motherboard support DVD, launch TurboV EVO by clicking **Tool > TurboV EVO** on the AI Suite II main menu bar.

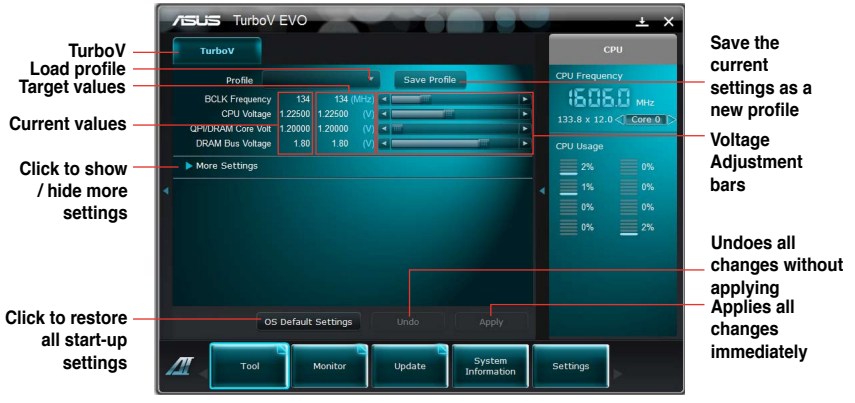
Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

TurboV

TurboV allows you to overclock the BCLK frequency, CPU voltage, IMC voltage, and DRAM Bus voltage in WIndows® environment and takes effect in real-time without exiting and rebooting the OS.

Refer to the CPU documentation before adjusting CPU voltage settings. Setting a high voltage may damage the CPU permanently, and setting a low voltage may make the system unstable.

For system stability, all changes made in **TurboV** will not be saved to BIOS settings and will not be kept on the next system boot. Use the **Save Profile** function to save your customized overclocking settings and manually load the profile after Windows starts.



For advanced overclock ability, adjust first the BIOS items, and then proceed more detailed adjustments in **More Settings**.

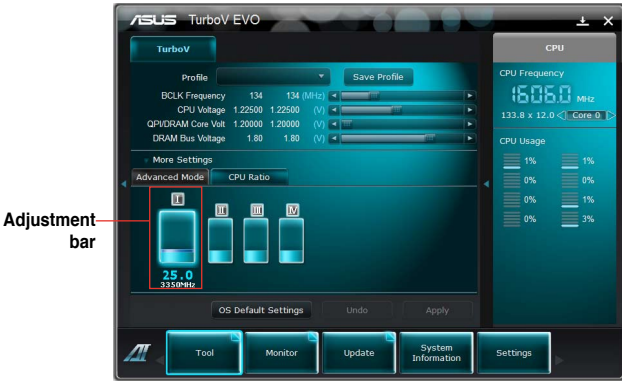
Using Advanced Mode

Click **More Settings**, and then click the **Advanced Mode** tab to adjust the advanced voltage settings.

CPU Ratio

Allows you to manually adjust the CPU ratio.

1. Click **More Settings**, and then click the **CPU Ratio** tab.
2. Drag the adjustment bar upwards or downwards to the desired value.



- Set the **CPU Ratio Setting** item in BIOS to [Auto] before using the CPU Ratio function in TurboV. Refer to Chapter 3 of your motherboard user manual for details.
- The CPU Ratio bars show the status of the CPU cores, which vary with your CPU model.

4.3.4 EPU

EPU is an energy-efficient tool that satisfies different computing needs. This utility provides several modes that you can select to save system power. Selecting Auto mode will have the system shift modes automatically according to current system status. You can also customize each mode by configuring settings like CPU frequency, GPU frequency, vCore Voltage, and Fan Control.

Launching EPU

After installing AI Suite II from the motherboard support DVD, launch EPU by clicking **Tool > EPU** on the AI Suite II main menu bar.

*• Select **From EPU Installation** to show the CO2 that has been reduced since you installed EPU.

*• Select **From the Last Reset** to show the total CO2 that has been reduced since you click the Clear button Clear.

• Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.3.5 FAN Xpert

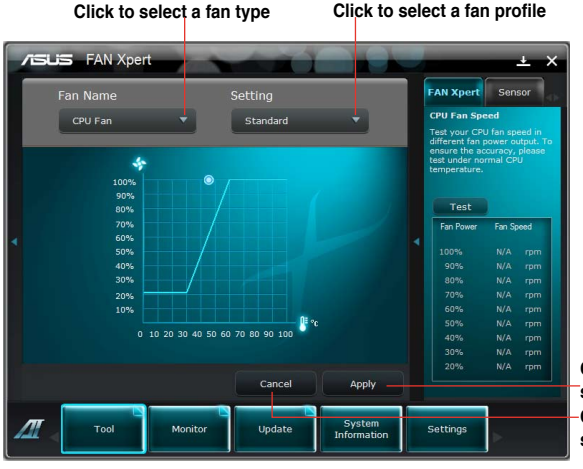
Fan Xpert intelligently allows you to adjust both the CPU and chassis fan speeds according to different ambient temperatures caused by different climate conditions in different geographic regions and your PC's system loading. The built-in variety of useful profiles offer flexible controls of fan speed to achieve a quiet and cool environment.

Launching FAN Xpert

After installing AI Suite II from the motherboard support DVD, launch FAN Xpert by clicking **Tool > Fan Xpert** on the AI Suite II main menu bar.

Using FAN Xpert

Click **Fan Name** to select a fan and then click **Setting** to select a preset mode for your selected fan.



Fan setting

- **Disable:** disables the **Fan Xpert** function.
- **Standard:** adjusts fan speed in a moderate pattern.
- **Silent:** minimizes fan speed for quiet fan operation.
- **Turbo:** maximizes the fan speed for the best cooling effect.
- **Intelligent:** automatically adjusts the CPU fan speed according to the ambient temperature.
- **Stable:** fixes the CPU fan speed to avoid noise caused by the unsteady fan rotation. However, the fan will speed up when the temperature exceeds 70°C.
- **User:** Allows you to configure the CPU fan profile under certain limitations.

Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.3.6 Probe II

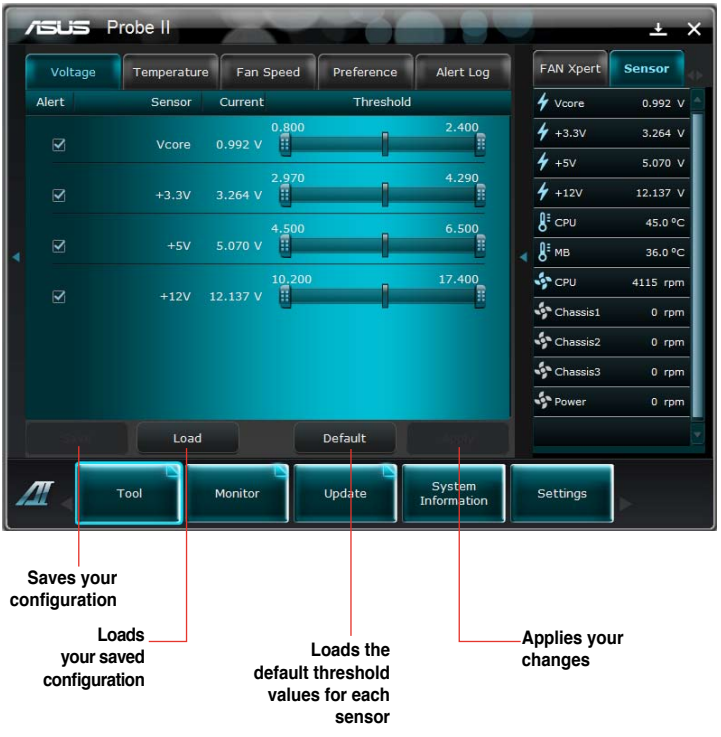
Probe II is a utility that monitors the computer's vital components, and detects and alerts you of any problem with these components. Probe II senses fan rotations, CPU temperature, and system voltages, among others. With this utility, you are assured that your computer is always at a healthy operating condition.

Launching Probe II

After installing AI Suite II from the motherboard support DVD, launch Probe II by clicking **Tool > Probe II** on the AI Suite II main menu bar.

Configuring Probe II

Click the **Voltage/Temperature/Fan Speed** tabs to activate the sensors or to adjust the sensor threshold values. The **Preference** tab allows you to customize the time interval of sensor alerts, or change the temperature unit.



Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.3.7 Sensor Recorder

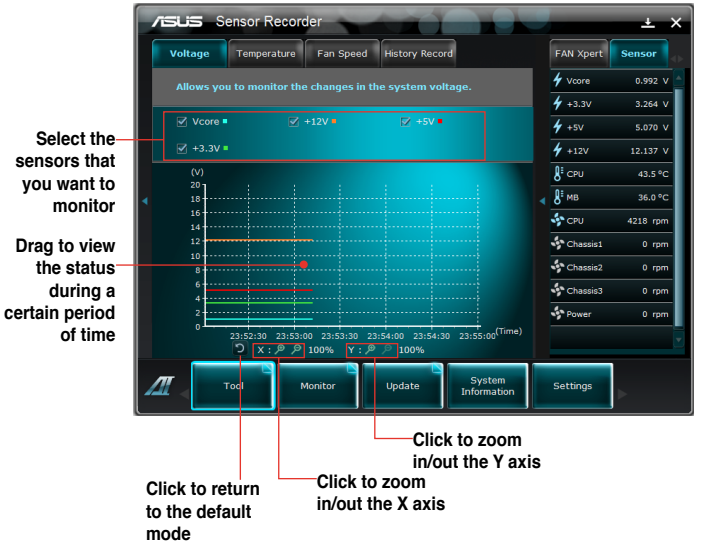
Sensor Recorder allows you to monitor the changes in the system voltage, temperature, and fan speed, as well as recording the changes.

Launching Sensor Recorder

After installing AI Suite II from the motherboard support DVD, click **Tool > Sensor Recorder** on the AI Suite II main menu bar to launch PC Probe II.

Configuring Sensor Recorder

Click the **Voltage/Temperature/Fan Speed** tabs and select the sensors that you want to monitor. The **History Record** tab allows you to record the changes in the sensors that you enable.



4.3.9 Audio configurations

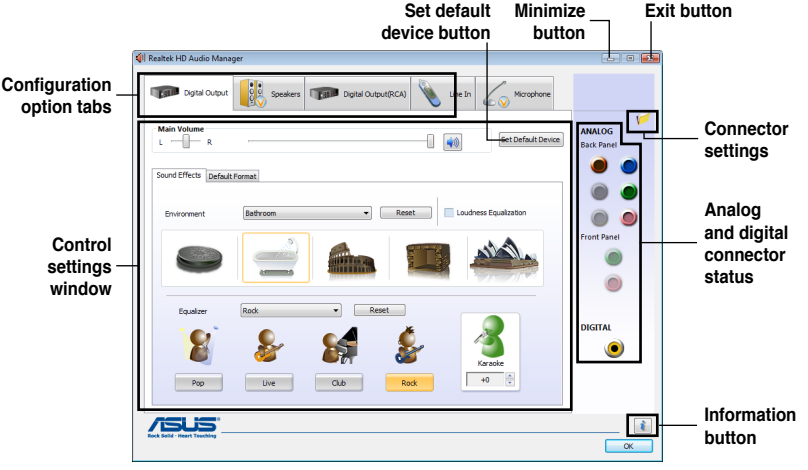
The Realtek® audio CODEC provides 8-channel audio capability to deliver the ultimate audio experience on your computer. The software provides Jack-Detection function, S/PDIF Out support, and interrupt capability. The CODEC also includes the Realtek® proprietary UAJ® (Universal Audio Jack) technology for all audio ports, eliminating cable connection errors and giving users plug and play convenience.

Follow the installation wizard to install the Realtek® Audio Driver from the support DVD that came with the motherboard package.

If the Realtek audio software is correctly installed, you will find the **Realtek HD Audio Manager** icon on the taskbar. Double-click on the icon to display the Realtek HD Audio Manager.

Realtek HD Audio Manager

A. Realtek HD Audio Manager for Windows® Vista™



B. Realtek HD Audio Manager for Windows XP

Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.4 RAID configurations

The motherboard supports the following SATA RAID solutions:

- **Intel® Matrix Storage Technology** with RAID 0, RAID 1, RAID 10 and RAID 5 support.
- **Mavell® RAID utility** with RAID 0 and RAID 1 support.

- You must install Windows® XP Service Pack 3 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP3 or later versions.
- Due to Windows® XP / Vista / 7 limitation, a RAID array with the total capacity over 2TB cannot be set as a boot disk. A RAID array over 2TB can only be set as a data disk only.
- If you want to install a Windows® operating system to a hard disk drive included in a RAID set, you have to create a RAID driver disk and load the RAID driver during OS installation. Refer to section **4.5 Creating a RAID driver disk** for details.

4.4.1 RAID definitions

RAID 0 (Data striping) optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

4.4.2 Installing Serial ATA hard disks

The motherboard supports Serial ATA hard disk drives. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for a RAID configuration:

1. Install the SATA hard disks into the drive bays.
2. Connect the SATA signal cables.
3. Connect a SATA power cable to the power connector on each drive.

4.4.3 Setting the RAID item in BIOS

You must enable the RAID function in the BIOS Setup before creating RAID set(s) using SATA HDDs. To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Main** menu > **Storage Configuration**, and then press <Enter>.
3. Set the **Configure SATA as** item to [RAID].
4. Save your changes, and then exit the BIOS Setup.

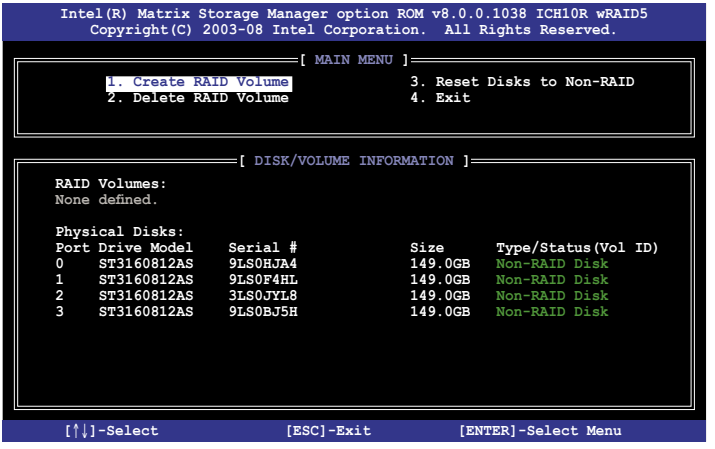
Refer to Chapter 3 for details on entering and navigating through the BIOS Setup.

Due to chipset limitation, when set any of SATA ports to RAID mode, all SATA ports run at RAID mode together.

4.4.4 Intel® Matrix Storage Manager option ROM utility

To enter the Intel® Matrix Storage Manager option ROM utility

1. Turn on the system.
2. During POST, press <Ctrl> + <I> to display the utility main menu.



The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.

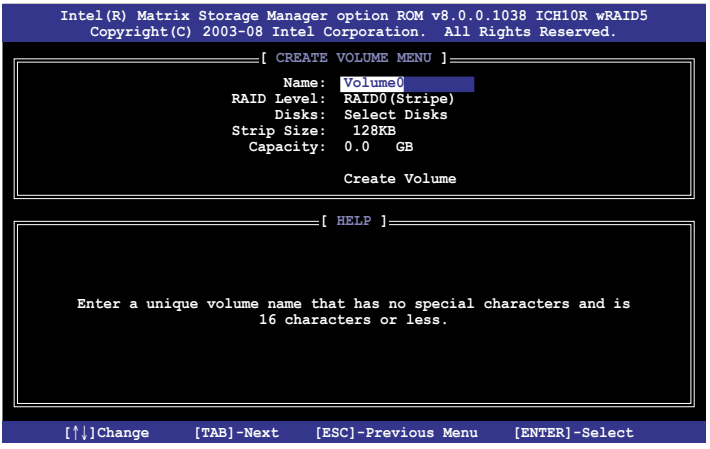
The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

The utility supports maximum four hard disk drives for RAID configuration.

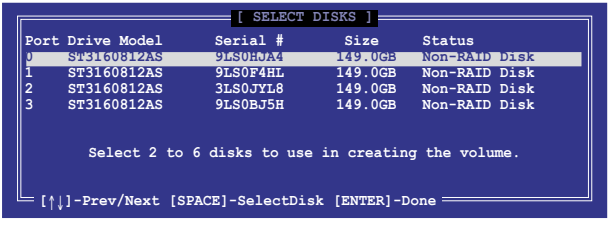
Creating a RAID volume

To create a RAID set

1. From the utility main menu, select **1. Create RAID Volume** and press <Enter>. The following screen appears.



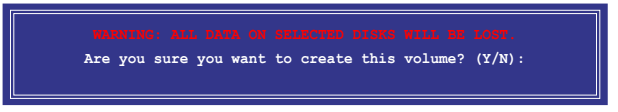
2. Enter a name for the RAID set and press <Enter>.
3. When the **RAID Level** item is selected, press the up/down arrow key to select a RAID mode to create, and then press <Enter>.
4. When the **Disks** item is selected, press <Enter> to select the hard disk drives you want to include in the RAID set. The **SELECT DISKS** screen appears.



5. Use the up/down arrow key to select a drive, and then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.
6. Use the up/down arrow key to select the stripe size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available stripe size values range from 4 KB to 128 KB. The following are typical values:
   RAID 0: 128KB
   RAID 10: 64KB
   RAID 5: 64KB

We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

7. When the **Capacity** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.
8. When the **Create Volume** item is selected, press <Enter>. The following warning message appears.



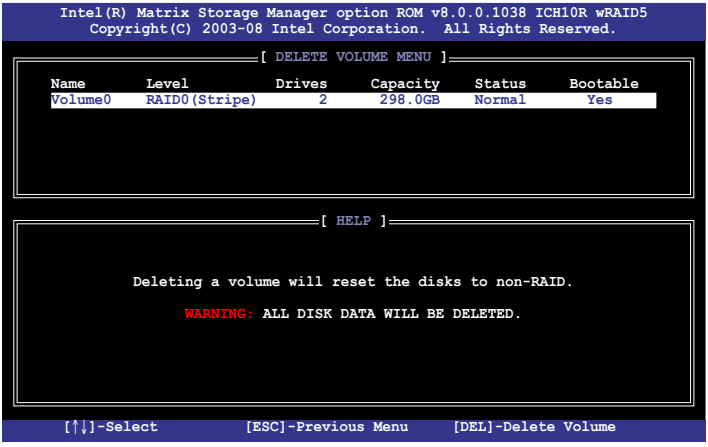
9. Press <Y> to create the RAID volume and return to the main menu, or <N> to go back to the **CREATE VOLUME** menu.

Deleting a RAID set

Take caution when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set

1. From the utility main menu, select **2. Delete RAID Volume** and press <Enter>. The following screen appears.



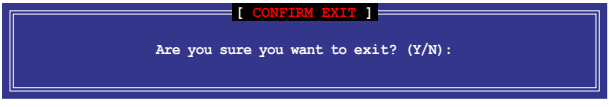
2. Use the up/down arrow key to select the RAID set you want to delete, and then press <Del>. The following warning message appears.

3. Press <Y> to delete the RAID set and return to the utility main menu, or press <N> to return to the **DELETE VOLUME** menu.

Exiting the Intel® Matrix Storage Manager

To exit the utility

1. From the utility main menu, select **4. Exit**, and then press <Enter>. The following warning message appears.



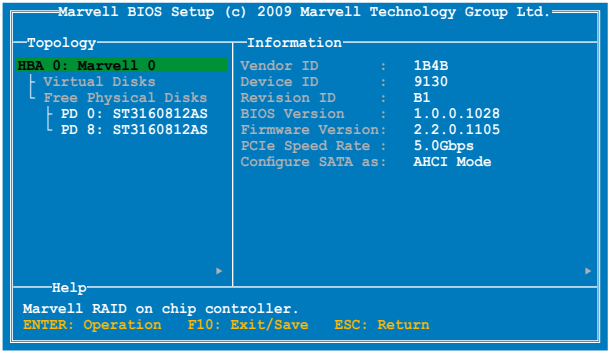
2. Press <Y> to exit or press <N> to return to the utility main menu.

4.4.5 Marvell RAID utility

The onboard Marvell SATA 6.0 Gb/s controller allows you to create a RAID 0 or RAID 1 array using two SATA hard disk drives. Refer to Chapter 2 of your motherboard user manual for the exact location of the Marvell SATA 6.0 Gb/s connector.

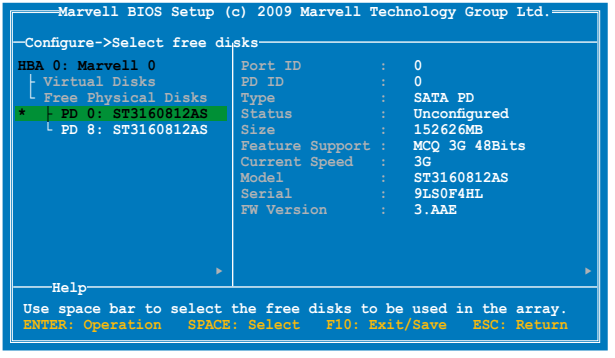
To enter the Marvell utility, press **<Ctrl>** + **<M>** during POST.

All exisiting data on the hard disk drives will be erased when creating or deleting a RAID array. Ensure that you have back up all your data in your hard disk drives before making any change to the drive status.

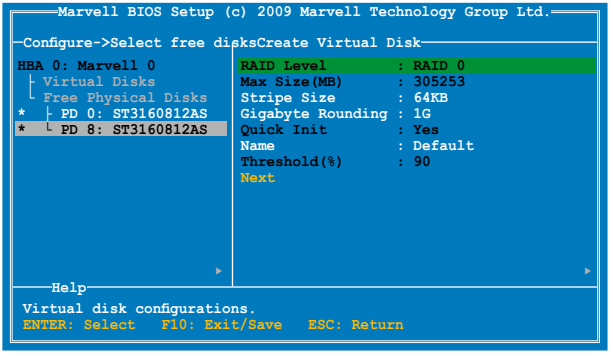


Create a RAID Array

1. Move the selection bar to **HBA 0: Marvell 0** and press <Enter>.
2. Select **Configuration Wizard** and press <Enter>.



3. Press <Space> to select the hard drives to be included in the RAID array. An asterisk (*) appears in front of the selected hard drive. After selecting all the drives needed for the RAID array, press <Enter> to continue.



4. Use the up or down arrow key to move the selection bar and press <Enter> to configure further RAID settings.

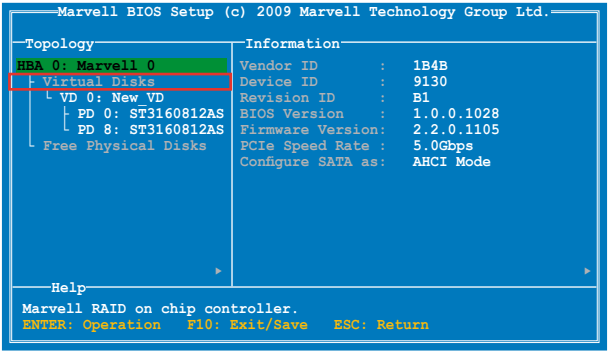
   RAID Level: Select a RAID Level. Configuration options: [RAID 0] [RAID 1]

   Stripe Size: Specifies the size of single data block on the virtual disk. In general, a larger stripe size is recommended for applications requiring large data transfers such as audio, video, and graphics. A smaller stripe size is better for applications with content in much smaller size, such as e-mails and documents.
   Configuration options: [32K] [64K]

   Name: Enter a name with 1–10 letters (no special characters) for the RAID array.

5. Move the selection bar to **Next** and press <Enter>. The following warning message appears:

   Press <Y> to create the RAID array, or press <N> to cancel. The new RAID array appears under Virtual Disks, as shown in the image below.

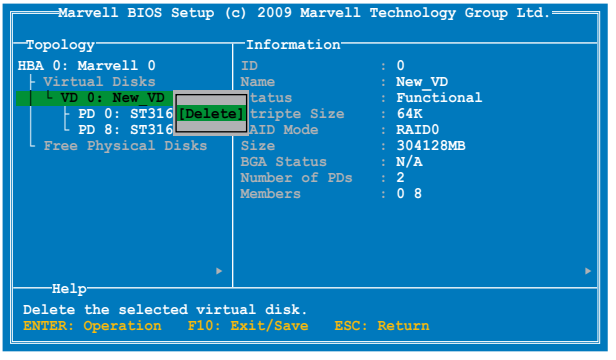


6. Press <F10>. The following warning message appears:

Press <Y> to save the RAID setting and exit the Marvell RAID utility.

Delete an existing RAID Array

1. Select the RAID array to delete and press <Enter>. Select **Delete** and press <Enter>.



2. The following warning message appears:

Press <Y> to delete the selected RAID array. The following warning message appears:

Press <Y> to delete the Master Boot Record (MBR) from the selected RAID array.

3. Press <F10>. The following warning message appears:

Press <Y> to save the RAID setting and exit the Marvell RAID utility.

4.5 Creating a RAID driver disk

A floppy disk with the RAID driver is required when installing a Windows® operating system on a hard disk drive that is included in a RAID set.

- **The motherboard does not provide a floppy drive connector.** You have to use a USB floppy disk drive when creating a **SATA** RAID driver disk.
- Windows® XP may not recognize the USB floppy disk drive due to Windows® XP limitation. To work around this OS limitation, refer to section **4.5.4 Using a USB floppy disk drive**.

4.5.1 Creating a RAID driver disk without entering the OS

To create a RAID driver disk without entering the OS:

1. Boot your computer.
2. Press <Del> during POST to enter the BIOS setup utility.
3. Set the optical drive as the primary boot device.
4. Insert the support DVD into the optical drive.
5. Save changes and exit BIOS.
6. When the **Make Disk** menu appears, press <1> to create a RAID driver disk.
7. Insert a formatted floppy disk into the USB floppy disk drive, then press <Enter>.
8. Follow the succeeding screen instructions to complete the process.

4.5.2 Creating a RAID driver disk in Windows®

To create a RAID driver disk in Windows®:

1. Start Windows®.
2. Plug the USB floppy disk drive and insert a floppy disk.
3. Place the motherboard support DVD into the optical drive.
4. Go to the **Make Disk** menu, and then click **Intel AHCI/RAID Driver Disk** to create a RAID driver disk.
5. Select USB floppy disk drive as the destination disk.
6. Follow the succeeding screen instructions to complete the process.

Write-protect the floppy disk to avoid a computer virus infection.

4.5.3 Installing the RAID driver during Windows® OS installation

To install the RAID driver in Windows® XP:

1. During the OS installation, the system prompts you to press the F6 key to install third-party SCSI or RAID driver.
2. Press <F6>, and then insert the floppy disk with RAID driver into the USB floppy disk drive.
3. When prompted to select the SCSI adapter to install, select the RAID driver for the corresponding OS version.
4. Follow the succeeding screen instructions to complete the installation.

To install the RAID driver for Windows® Vista or later OS:

1. During the OS installation, click **Load Driver** to allow you to select the installation media containing the RAID driver.
2. Insert the USB flash drive with RAID driver into the USB port or the support DVD into the optical drive, and then click **Browse**.
3. Click the name of the device you've inserted, go to **Drivers** > **RAID**, and then select the RAID driver for the corresponding OS version. Click **OK**.
4. Follow the succeeding screen instructions to complete the installation.

Before loading the RAID driver from a USB flash drive, you have to use another computer to copy the RAID driver from the support DVD to the USB flash drive.

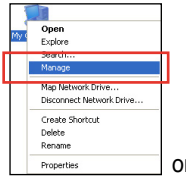
4.5.4 Using a USB floppy disk drive

Due to OS limitation, Windows® XP may not recognize the USB floppy disk drive when you install the RAID driver from a floppy disk during the OS installation.

To solve this issue, add the USB floppy disk drive's Vendor ID (VID) and Product ID (PID) to the floppy disk containing the RAID driver. Refer to the steps below:

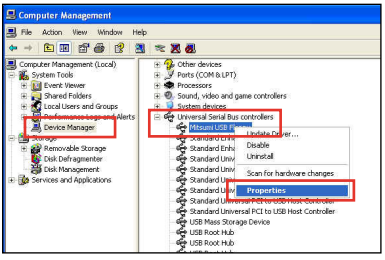
1. Using another computer, plug the USB floppy disk drive, and insert the floppy disk containing the RAID driver.

2. Right-click **My Computer** on the Windows® desktop or **start** menu, and then select **Manage** from the pop-up window.



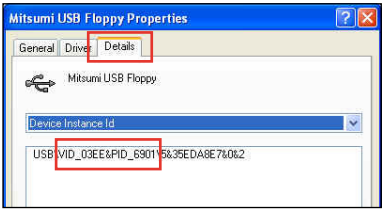
or

3. Select **Device Manager**. From the **Universal Serial Bus controllers**, right-click **xxxxxx USB Floppy**, and then select **Properties** from the pop-up window.



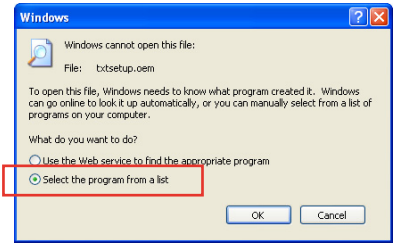
The name of the USB floppy disk drive varies with different vendors.

4. Click **Details** tab. The Vendor ID (VID) and Product ID (PID) are displayed.

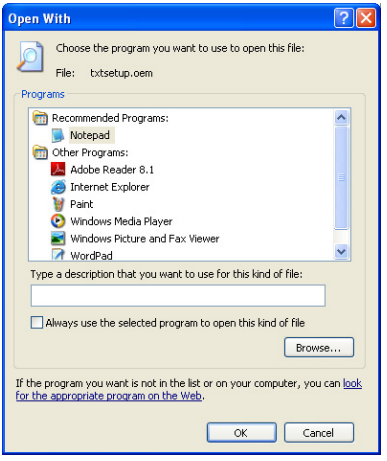


5. Browse the contents of the RAID driver disk to locate the file **txtsetup.oem**.

6. Double-click the file. A window appears, allowing you to select the program for opening the oem file.



7. Use Notepad to open the file.



8. Find the **[HardwareIds.scsi.iaAHCI_DesktopWorkstationServer]** and **[HardwareIds.scsi.iaStor_DesktopWorkstationServer]** sections in the **txtsetup.oem** file.
9. Type the following line to the bottom of the two sections:
id = "USB\VID_xxxx&PID_xxxx", "usbstor"

```
[HardwareIds.scsi.iaAHCI_DesktopWorkstationServer]
id= "PCI\VEN_8086&DEV_1C02&CC_0106","iaStor"
id= "USB\VID_03EE&PID_6901", "usbstor"

[HardwareIds.scsi.iaStor_DesktopWorkstationServer]
id= "PCI\VEN_8086&DEV_2822&CC_0104","iaStor"
id= "USB\VID_03EE&PID_6901", "usbstor"
```

Add the same line to both sections.

The VID and PID vary with different vendors.

10. Save and exit the file.

This chapter describes how to install and configure multiple ATI® CrossFireX™ and NVIDIA® SLI™ graphics cards.

5 Multiple GPU technology support

Chapter summary

5

5.1 ATI® CrossFireX™ technology

The motherboard supports the ATI® CrossFireX™ technology that allows you to install multi-graphics processing units (GPU) graphics cards. Follow the installation procedures in this section.

5.1.1 Requirements

- In CrossFireX mode, you should have two identical CrossFireX-ready graphics cards or one CrossFireX-ready dual-GPU graphics card that are ATI® certified.
- Ensure that your graphics card driver supports the ATI CrossFireX technology. Download the latest driver from the AMD website (www.amd.com).
- Ensure that your power supply unit (PSU) can provide at least the minimum power required by your system. See Chapter 2 for details.

- We recommend that you install additional chassis fans for better thermal environment.
- Visit the ATI Game website at http://game.amd.com for the latest certified graphics card and the supported 3D application list.

5.1.2 Before you begin

For ATI CrossFireX to work properly, you have to uninstall all existing graphics card drivers before installing ATI CrossFireX graphics cards to your system.

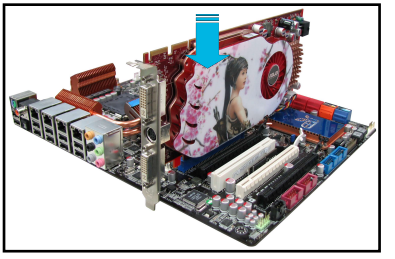
To uninstall existing graphics card drivers

1. Close all current applications.
2. For Windows XP, go to **Control Panel > Add/Remove Programs**.
   For Windows Vista, go to **Control Panel > Programs and Features**.
   For Windows 7, go to **Control Panel > Programs > Uninstall a program**.
3. Select your current graphics card driver/s.
4. For Windows XP, select **Add/Remove**.
   For Windows Vista, select **Uninstall**.
5. Turn off your computer.

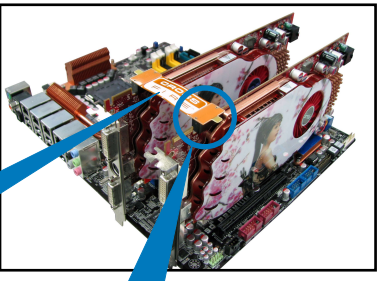
5.1.3 Installing CrossFireX graphics cards

The following pictures are for reference only. The graphics cards and the motherboard layout may vary with models, but the installation steps remain the same.

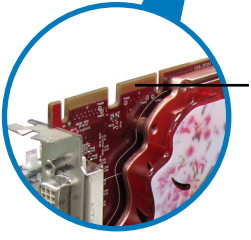
1. Prepare two CrossFireX-ready graphics cards.
2. Insert the two graphics card into the PCIEX16 slots. If your motherboard has more than two PCIEX16 slots, refer to Chapter 2 in this user manual for the locations of the PCIEX16 slots recommended for multi-graphics card installation.



3. Ensure that the cards are properly seated on the slots.
4. Align and firmly insert the CrossFireX bridge connector to the goldfingers on each graphics card. Ensure that the connector is firmly in place.

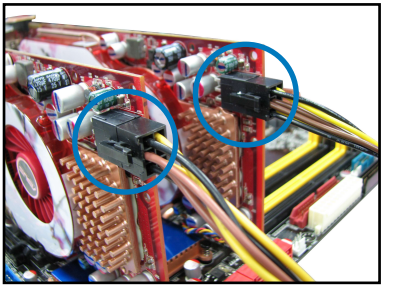


CrossFireX bridge



Goldfingers

5. Connect two independent auxiliary power sources from the power supply to the two graphics cards separately.
6. Connect a VGA or a DVI cable to the graphics card.



5.1.4 Installing the device drivers

Refer to the documentation that came with your graphics card package to install the device drivers.

Ensure that your PCI Express graphics card driver supports the ATI® CrossFireX™ technology. Download the latest driver from the AMD website at www.amd.com.

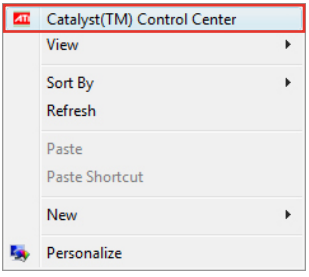
5.1.5 Enabling the ATI® CrossFireX™ technology

After installing your graphics cards and the device drivers, enable the CrossFireX™ feature through the ATI Catalyst™ Control Center in Windows environment.

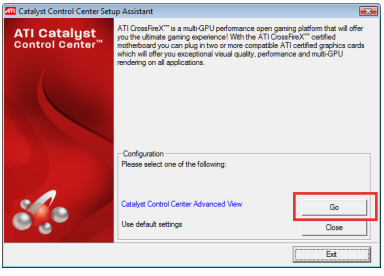
Launching the ATI Catalyst Control Center

To launch the ATI Catalyst Control Center

1. Right-click on the Windows® desktop and select **Catalyst(TM) Control Center**. You can also right-click the ATI icon in the Windows notification area and select **Cayalist Control Center**.

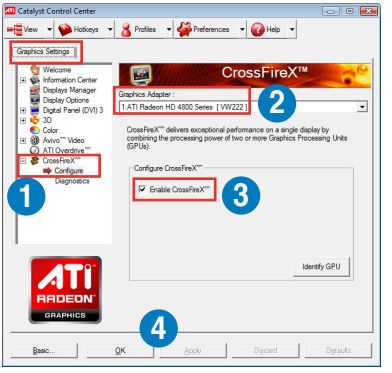


2. The **Catalyst Control Center Setup Assistant** appears when the system detects the existance of multi-graphics cards. Click **Go** to continue to the **Catalyst Control Center Advanced View** window.



Enabling Dual CrossFireX settings

1. In the Catalyst Control Center window, click **Graphics Settings > CrossFireX > Configure**.
2. From the Graphics Adapter list, select the graphics card to act as the display GPU.
3. Select **Enable CrossFireX**.
4. Click **Apply**, and then click **OK** to exit the window.



5.2 NVIDIA® SLI™ technology

The motherboard supports the NVIDIA® SLI™ (Scalable Link Interface) technology that allows you to install multi-graphics processing units (GPU) graphics cards. Follow the installation procedures in this section.

5.2.1 Requirements

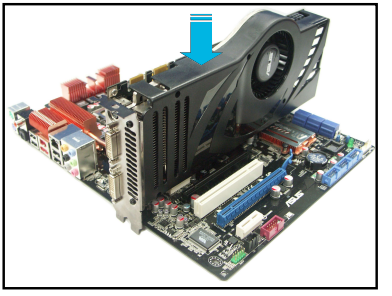
- In Dual SLI mode, you should have two identical SLI-ready graphics cards that are NVIDIA® certified.
- In Triple SLI mode, you should have three identical SLI-ready graphics cards that are NVIDIA® certified.
- Ensure that your graphics card driver supports the NVIDIA SLI technology. Download the latest driver from the NVIDIA website (www.nvidia.com).
- Ensure that your power supply unit (PSU) can provide at least the minimum power required by your system.

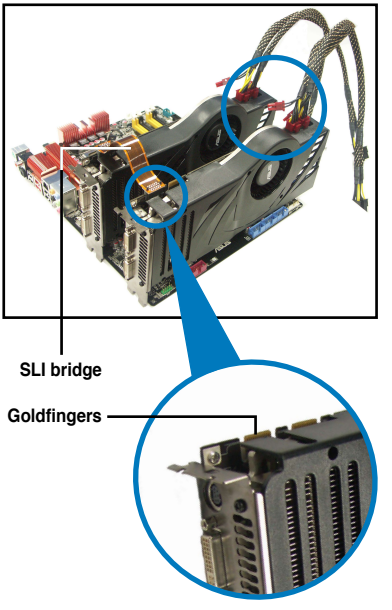
- We recommend that you install additional chassis fans for better thermal environment.
- The NVIDIA Triple SLI technology is supported by Windows® Vista™ operating system only.
- Visit the NVIDIA zone website at http://www.nzone.com for the latest certified graphics card and supported 3D application list.

5.2.2 Installing two SLI-ready graphics cards

The following pictures are for reference only. The graphics cards and the motherboard layout may vary with models, but the installation steps remain the same.

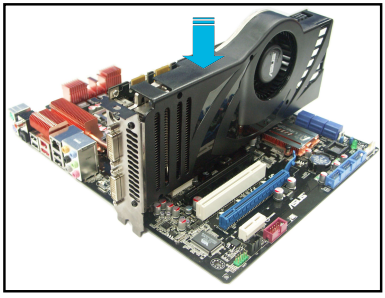
1. Prepare two SLI-ready graphics cards.
2. Insert the two graphics card into the PCIEX16 slots. If your motherboard has more than two PCIEX16 slots, refer to Chapter 2 in this user manual for the locations of the PCIEX16 slots recommended for multi-graphics card installation.
3. Ensure that the cards are properly seated on the slots.
4. Align and firmly insert the SLI bridge connector to the goldfingers on each graphics card. Ensure that the connector is firmly in place.
5. Connect two independent auxiliary power sources from the power supply to the two graphics cards separately.
6. Connect a VGA or a DVI cable to the graphics card.

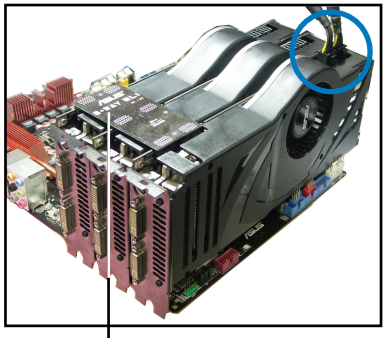




5.2.3 Installing three SLI-ready graphics cards

1. Prepare three SLI-ready graphics cards.
2. Insert the three graphics card into the PCIEX16 slots. If your motherboard has more than two PCIEX16 slots, refer to Chapter 2 in this user manual for the locations of the PCIEX16 slots recommended for multi-graphics card installation.
3. Ensure that the cards are properly seated on the slots.
4. Align and firmly insert the 3-Way SLI bridge connector to the goldfingers on each graphics card. Ensure that the connector is firmly in place.
5. Connect three independent auxiliary power sources from the power supply to the three graphics cards separately.
6. Connect a VGA or a DVI cable to the graphics card.





3-Way SLI bridge

5.2.4 Installing the device drivers

Refer to the documentation that came with your graphics card package to install the device drivers.

- Ensure that your PCI Express graphics card driver supports the NVIDIA® SLI™ technology. Download the latest driver from the NVIDIA website at www.nvidia.com.
- If you are using a Triple SLI system, ensure to install the NVIDIA® 3-way SLI driver under Windows® Vista™. The NVIDIA 3-way SLI technology is supported by Windows® Vista™ only.

5.2.5 Enabling the NVIDIA® SLI™ technology

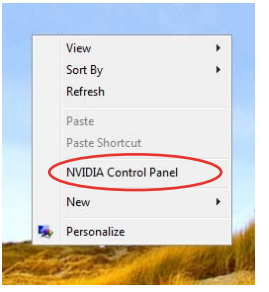
After installing your graphics cards and the device drivers, enable the SLI feature in NVIDIA® Control Panel under the Windows® Vista™ operating system.

Launching the NVIDIA Control Panel

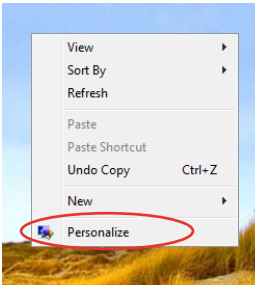
You can launch the NVIDIA Control Panel by the following two methods.

A. Right click on the empty space of the Windows® desktop and select **NVIDIA Control Panel**.

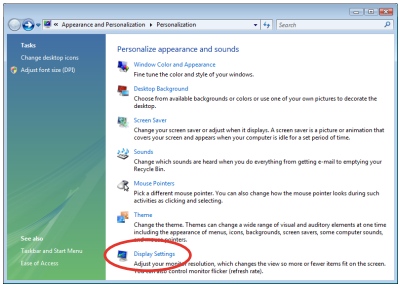
The NVIDIA Control Panel window appears (See Step B5 on page 5-10).



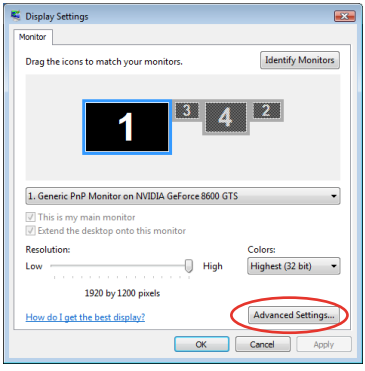
B1. If you cannot see the NVIDIA Control Panel item in step (A), select **Personalize**.



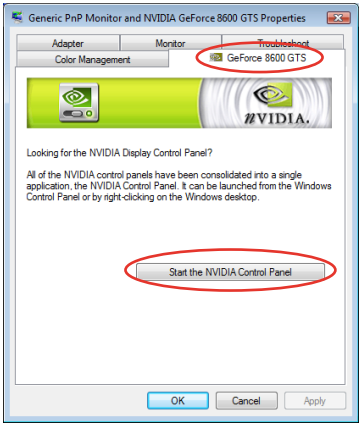
B2. From the **Personalization** window, select **Display Settings**.



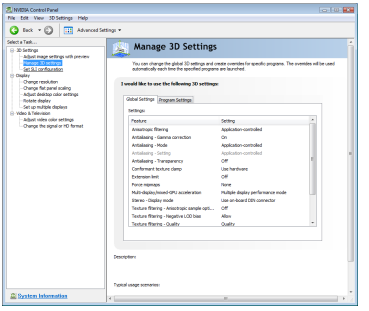
B3. From the Display Settings dialog box, click **Advanced Settings**.



B4. Select the NVIDIA GeForce tab, and then click **Start the NVIDIA Control Panel**.

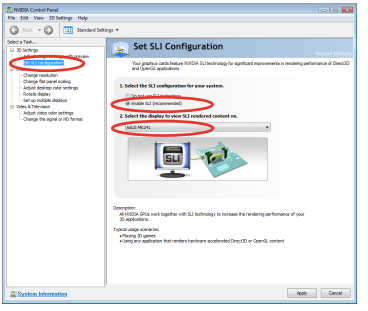


B5. The NVIDIA Control Panel window appears.



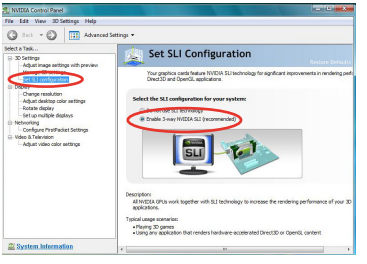
Enabling Dual SLI settings

From the NVIDIA Control Panel window, select **Set SLI Configuration**. Click **Enable SLI** and set the display for viewing SLI rendered content. When done, click **Apply**.



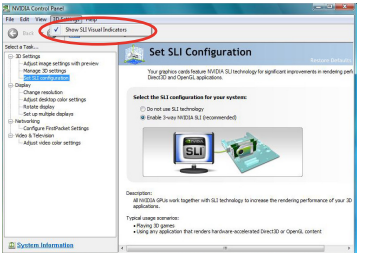
Enabling Triple SLI settings

1. From the NVIDIA Control Panel window, select **Set SLI Configuration**, and then click **Enable 3-way NVIDIA SLI**. When done, click **Apply**.



2. Select the **3D Settings** tab and enable the **Show SLI Visual Indicators** item.

   When this item is enabled, a green bar appears on the left side of the screen while 3D demonstrations are rendered, indicating the 3-way SLI status.



ASUS contact information

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Technical Support

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Online contact	http://www.asus.de/sales

Technical Support

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Support Fax	+49-2102-9599-11
Online support	http://support.asus.com/techserv/techserv.aspx

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

Responsible Party Name: **Asus Computer International**

Address: **800 Corporate Way, Fremont, CA 94539.**

Phone/Fax No: **(510)739-3777/(510)608-4555**

hereby declares that the product

Product Name : Motherboard

Model Number : P6X58-E WS

Conforms to the following specifications:

- ☒ FCC Part 15, Subpart B, Unintentional Radiators
- ☐ FCC Part 15, Subpart C, Intentional Radiators
- ☐ FCC Part 15, Subpart E, Intentional Radiators

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Representative Person's Name : **Steve Chang / President**

Signature :

Date : **Feb. 11, 2011**

Ver. 110101

EC Declaration of Conformity

We, the undersigned,

Manufacturer:	ASUSTek COMPUTER INC.
Address, City:	No. 150, LI-TE RD., PEITOU, TAIPEI 112, TAIWAN R.O.C.
Country:	TAIWAN
Authorized representative in Europe:	ASUS COMPUTER GmbH
Address, City:	HARKORT STR. 21-23, 40880 RATINGEN
Country:	GERMANY

declare the following apparatus:

Product name :	**Motherboard**
Model name :	**P6X58-E WS**

conform with the essential requirements of the following directives:

☒2004/108/EC-EMC Directive

☒ EN 55022:2006+A1:2007	☒ EN 55024:1998+A1:2001+A2:2003
☒ EN 61000-3-2:2006	☒ EN 61000-3-3:2008
☐ EN 55013:2001+A1:2003+A2:2006	☐ EN 55020:2007

☐1999/5/EC-R &TTE Directive

☐ EN 300 328 V1.7.1(2006-05)	☐ EN 301 489-1 V1.8.1(2008-04)
☐ EN 300 440-1 V1.4.1(2008-05)	☐ EN 301 489-3 V1.4.1(2002-08)
☐ EN 300 440-2 V1.2.1(2008-03)	☐ EN 301 489-4 V1.3.1(2002-08)
☐ EN 301 511 V9.0.2(2003-03)	☐ EN 301 489-7 V1.3.1(2005-11)
☐ EN 301 908-1 V3.2.1(2007-05)	☐ EN 301 489-9 V1.4.1(2007-11)
☐ EN 301 908-2 V3.2.1(2007-05)	☐ EN 301 489-17 V2.1.1(2009-05)
☐ EN 301 893 V1.4.1(2005-03)	☐ EN 301 489-24 V1.4.1(2007-09)
☐ EN 302 544-2 V1.1.1(2009-01)	☐ EN 302 326-2 V1.2.2(2007-06)
☐ EN 50360:2001	☐ EN 302 326-3 V1.3.1(2007-09)
☐ EN 50371:2002	☐ EN 301 357-2 V1.3.1(2006-05)
☐ EN 50385:2002	☐ EN 302 623 V1.1.1(2009-01)

☒2006/95/EC-LVD Directive

☐ EN 60950-1:2006	☐ EN 60065:2002+A1:2006+A11:2008
☒ EN 60950-1:2006+A11:2009	

☐2009/125/EC-ErP Directive

Regulation (EC) No. 1275/2008	Regulation (EC) No. 278/2009
☐ EN 62301:2005	☐ EN 62301:2005
Regulation (EC) No. 642/2009	
☐ EN 62301:2005	Ver. 110101

☒CE marking

(EC conformity marking)

Position : **CEO**

Name : **Jerry Shen**

Declaration Date: Feb. 11, 2011

Year to begin affixing CE marking:2011

Signature : _____