P9D WS

Motherboard

E8141

First Edition
May 2013

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

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

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

Safety information

Electrical safety

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

Operation safety

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

About this guide

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

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**

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

- **Chapter 2: 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>

P9D WS specifications summary

CPU	LGA1150 socket for 4th Gen Intel® Core™ i3 processors LGA1150 socket for Intel® Xeon® E3-1200/ 12x5 v3 series processor Supports 22nm CPU * Supports Intel® Turbo Boost technology 2.0. ** Refer to www.asus.com for Intel® CPU support list.
Chipset	Intel® C226 Chipset
Memory	4 x DIMMs, max. 32GB, DDR3 1600 / 1333 MHz, ECC non-ECC, un-buffered memory Dual-channel architecture Supports Intel® Extreme Memory Profile (XMP) **Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors Lidts)
Expansion slots	1 x PCIe 3.0 x16 (at x16 or x8) 1 x PCIe 3.0 x16 (at x8 or x4) 1 x PCIe 3.0 x16 (at x4) 1 x PCIe 2.0 x16 (at x4) 1 x PCIe 2.0 x1 (at x1) 2 x PCI
Graphic	Integrated Graphics Processor Multi-VGA output support: DVI-I/HDMI/Displayport ports Supports DVI with max. resolution 1920 x 1200 at 60Hz Supports HDMI with max. resolution 4096 x 2160 at 24Hz Supports Displayport with max. resolution 3200 x 2000 at 60Hz Maximum shared memory of 1GB Supports Intel® HD Graphics, InTru™ 3D, Quick Sync Video, Clear Video HD Technology, Insider™
Multi-GPU support	Supports ATI® Quad-GPU CrossFireX™ Technology

Storage	Intel® C226 Chipset:
	   - 6 x SATA 6.0 Gb/s ports(yellow)
	   - Intel® Rapid Storage Technology supports RAID 0, 1, 5, and 10

LAN	2*Intel® i210 GbE LAN - Support teaming function

USB	Intel® C226 Chipset:
	   - 4 x USB 3.0/ 2.0 ports (2 ports at mid-board, 2 ports at back panel)
	   - 9 x USB 2.0/ 1.0 ports (5 ports at mid-board, 4 ports at back panel)

1394	1 x IEEE 1394a ports (1 port at min-board)

Audio	Realtek® ALC892 8-channel High Definition Audio CODEC
	   - BD audio layer content protection
	   - Supports Jack-Detection, Multi-streaming and Front Panel Jack-Retasking
	   - Optical S/PDIF out ports at back I/O

(continued on the next page)

P9D WS specifications summary

ASUS Unique Features	**ASUS Power Design**
	  - 8+2 Phase Power Design
	ASUS EPU
	  - EPU, EPU Switch
	ASUS Exclusive Features
	  - USB 3.0 Boost
	  - Network iControl
	  - MemOK!
	  - AI Suite III
	  - Anti Surge
	  - ASUS EFI BIOS EZ Mode featuring friendly graphics user interface
	ASUS Quiet Thermal Solution:
	  - ASUS Fanless Design: Heat-sink solution
	  - ASUS Fan Xpert II
	ASUS EZ DIY:
	  - ASUS Q-Connector
	  - ASUS CrashFree BIOS 3
	  - ASUS EZ Flash Utility

Workstation Unique Features	ASUS Dr. Power 4 PCIe x 16 slots G.P. Diagnosis Card bundled Quick Gate: 1 vertical USB 2.0 on board
Back Panel I/O Ports	1 x PS/2 KB/MS port 1 x S/PDIF Out (Optical) 1 x HDMI port 1 x Display port 4 x USB 2.0/ 1.1 ports 2 x USB 3.0/ 2.0 ports 2 x LAN Connector 1 x DVI-I port 1 x USB BIOS Flashback switch 6 x Audio jacks
BIOS features	64 Mb Flash ROM, UEFI AMI BIOS, PnP, DMI2.0, WfM2.0, SM BIOS 2.6, ACPI 2.0a, Multi-language BIOS, ASUS EZ Flash Utility, ASUS CrashFree BIOS 3
Manageability	WfM 2.0, DMI 2.0, WOL by PME, WOR by PME, PXE

(continued on the next page)

P9D WS specifications summary

Internal I/O connectors	1 x USB 3.0/2.0 connector supports additional 2 USB ports (19-pin)
	2 x USB 2.0/1.1 connectors support additional 2 USB ports
	1 x USB 2.0/1.1 vertical ports
	24-pin ATX Power connector
	8-pin ATX +12V Power connector
	CPU Fan with PWM control
	Chassis fan1 with Q-fan control
	Chassis fan2 with Q-fan control
	Chassis fan3 with Q-fan control
	Chassis fan4 with Q-fan control
	AAFP connector
	1 x COM port connector
	1 x TPM header
	1 x 1394a connector
	1 x Chassis intrusion header
	1 x LTP1 header
	1 x S/PDIF Out header
	1 x MemOK! Button
	6 x Serial ATA 6Gb/s ports
	20-pin front panel connector
OS	Win8 32/ 64 bit, Win7 32/ 64 bit
Form factor	ATX Form Factor, 12in x 9.6in (30.5cm x 24.5cm)

*Specifications are subject to change without notice.

Chapter 1

1.1   Welcome!
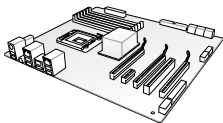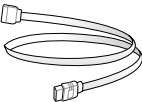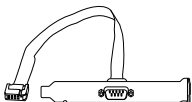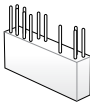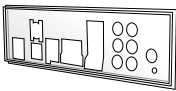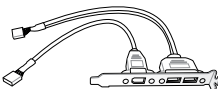
Thank you for buying an ASUS® P9D WS motherboard!

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.

ASUS P9D WS motherboard	**User manual**	**Support DVD**
6 x Serial ATA 6.0 Gb/s cables	**1 x COM port cable with bracket**	**1 x 2-in-1 ASUS Q-Connector kit**
1 x ASUS Q-Shield	**2 USB ports + 1394a cable with bracket**	

> •   If any of the above items is damaged or missing, contact your retailer.
>
> •   The illustrated items above are for reference only. Actual product specifications may vary with different models.

1.3　Special features

1.3.1　Product highlights

Green ASUS

This motherboard complies with the European Union's Energy-related Products (ErP) requirements, which requires products to meet certain energy efficiency criteria for energy consumption. This in in keeping with ASUS' vision of creating environment-friendly and energy-efficient products to reduce a product's carbon footprint and reduce its environmental impact.

LGA1150 socket for Intel® 4th Generation Core™ i3 and Xeon® E3-1200 v3 processors

This motherboard supports the latest Intel® fourth Core**™ i3 and Xeon**® E3-1200 v3 processors in the LGA1150 package, with memory and PCI Express controllers integrated to support 2-channel (4 DIMM) DDR3 memory and 16 PCI Express 3.0 lanes. This provides great graphics performance. Intel® 4th generation Core**™ i3 and Xeon**® E3-1200 v3 processors are among the most powerful and energy efficient CPUs in the world.

C226

The Intel® C226 Chipset is the latest single-chipset design that supports the new socket 1150 Intel® Core™ i3 4th generation processors,and Intel® Xeon® E3-1200 v3 server processors. It improves performance by utilizing serial point-to-point links, allowing for increased bandwidth and stability. Additionally, the C226 comes with 6 SATA 6Gb/s ports for faster data retrieval, doubling the bandwidth of current bus systems. Moreover, Intel® C226 Chipset also supports iGPU function.

PCI Express® 3.0

PCI Express® 3.0 (PCIe 3.0) is the latest PCI Express bus standard that provides twice the performance and speed of PCIe 2.0. It provides an optimal graphics performance, unprecedented data speed, and seamless transition with its complete backward compatibility to PCIe 1.0/2.0 devices.

Dual-Channel DDR3 1600/ 1333 support

This motherboard supports the dual-channel DDR3 architecture that features the data transfer rates of DDR3 1600/1333 MHz to boost the system's performance, and to meet the higher bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications.

Native SATA 6Gb/s Support

With its Intel® C226 Chipset, this motherboard natively supports the next generation Seria ATA (SATA) storage interface, delivering up to 6.0 Gb/s data transfer rates. It provides enhanced scalability, faster data retrieval, and twice the bandwidth of current bus systems.

Complete USB 3.0 Integration

This motherboard offers you the strategic USB 3.0 accessibility for both the front and rear panels, allowing you to experience the convenience of the latest plug & play connectivity solution at speed up to ten times faster than USB 2.0.

GPU Boost

GPU Boost accelerates the integrated GPU for extreme graphics performance, facilitates flexible frequency adjustments, and easily delivers stable system-level upgrades for every use.

EPU

EPU (Energy Processing Unit), the world's first real-time system power-saving chip, automatically detects the current system load and intelligently moderates power usage. It offers a total system-wide energy optimization, reduces fan noise, and extends the components' lifespan.

1.3.2   ASUS Workstation Exclusive Features

Built-in Dual Intel® Server Class Gigabit LAN

For more reliable networking, the P9D 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® i210 chipset has certification of VMware to support virtualization technology.

Multi CPU and Memory support

The motherboard provides dual use for CPU and memory,which support Intel Xeon® E3-1200 v3 series server processors and 4th Core™ i3 desktop processors.Users can choose DDR3 un-buffered non-ECC memory which is widely available in the PC market, or more stable and reliable DDR3 un-buffered ECC memory.P9D WS provides you flexible options on CPU and memory to meet diverse needs.

CUDA parallel computing power support

The motherboard will achieve outstanding and dependable performance in the role of a Personal Supercomputer when working in tangent with discrete CUDA technology°Xproviding unprecedented return on investment. Users can count on up to 4 Tesla cards with Haswell CPU which is built with on-board graphic chipset, that are plugged into P9D WS for intensive parallel computing on tons of data, which delivers nearly 4 teraflops of performance. It is the best choice to work as a personal supercomputer on your desk instead of a computer cluster in a room.

Quick Gate

Quick Gate is a vertical USB connector on the motherboard that allows you to install USB devices directly without any messy cables and stops important data storage devices from breaking off unexpectedly. This revolutionary and unique design offers a convenient and safe way to install data and applications on your system.

Diagnosis LED

Diag. LED offers an intuitive way to locate the root problems in seconds. It checks these key components in sequence during bootup --- CPU, memory, graphics card, and hard drive. If an error is found, the critical component's LED stays lit up until the problem is solved.

G.P. Diagnosis Card (Bundled)

The bundled G.P. Diagnosis card double-checks the system quickly provides precise information everytime you turn on your computer.

3 Independent Displays

Without extra VGA card needed, the P9D WS gives users ability to multitask on up to three independent displays through DisplayPort, HDMI and DVI-I connectors.

ASUS Doctor Power

ASUS Doctor Power is an ensemble of LEDs, switches, and application that automatically detects and diagnoses related issues regarding your power supply unit (PSU). It generally allows you to monitor the health of your PSU and provide notification or warning messages to prevent any sudden system shutdown or failure due to insufficient supply of power to your system.

1.3.3   ASUS features

MemOK!

MemOK!, the remarkable memory rescue tool, allows you to simply press a button to patch memory issues, ensure memory boot compatibility, determine fail-safe settings, and dramatically improve the system's bootup.

Faster USB 3.0 Transmission with UASP

New ASUS USB 3.0 Boost technology supports UASP (USB Attached SCSI Protocol), the latest USB 3.0 standard. With the USB 3.0 Boost technology, a USB device's transmission speed is significantly increased up to 170%, adding to an already impressive fast USB 3.0 transfer speed. ASUS software automatically accelerates data speeds for compatible USB 3.0 peripherals without the need for any user interaction.

ASUS Quiet Thermal Solution

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

ASUS Fanless Design—Heat-sink solution

The crystal-shaped heatsink features 0-dB thermal solution that offers users a noiseless PC environment. Not only the beautiful shape upgrades the visual enjoyment for motherboard users, but also the heatsink design lowers the temperature of the chipset and power phase area through high efficient heat-exchange. Combined with usability and aesthetics, the ASUS crystal-shaped heatsink will give users an extremely silent and cooling experience with the elegant appearance!

Fan Xpert

ASUS Fan Xpert intelligently allows you to adjust both the CPU and chassis fan speeds based on different ambient temperatures and attain a quiet and cool computing environment.

ASUS EZ DIY

ASUS UEFI BIOS(EZ Mode)

ASUS UEFI BIOS, a UEFI compliant architecture, offers the first mouse-controlled intuitive graphical BIOS interface that goes beyond the traditional keyboard-only BIOS controls, providing you with more flexibility, convenience, and easy to navigate EFI BIOS than the traditional BIOS versions. It offers you with dual selectable modes and native support for hard drives larger than 2.2 TB.

ASUS UEFI BIOS includes the following new features:

* F12 BIOS snapshot hotkey

* F3 Shortcut for most accessed information

* ASUS DRAM SPD (Serial Presence Detect) information detecting faulty DIMMs, and helping with difficult POST situations

ASUS Q-Design

ASUS Q-Design enhances your DIY experience. All of Q-LED, Q-DIMM, and Q-Slot design speed up and simplify the DIY process!

ASUS Q-Connector

ASUS Q-Connector is a unique adapter that allows you to easily connect or disconnect the chassis front panel cables to one module, eliminating the hassle of plugging one cable at a time and making the connection quick and accurate.

ASUS EZ Flash 2

ASUS EZ Flash 2 is a user-friendly utility that allows you to update the BIOS without using a bootable floppy disk or an OS-based utility.

ASUS CrashFree BIOS 3

ASUS CrashFree BIOS 3 allows you to restore a corrupted BIOS file from a USB storage device containing the BIOS file.

IEEE 1394a interface

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

S/PDIF-out on Back I/O Port

This motherboard provides the coaxial and optical S/PDIF out ports for convenient connectivity to external home theater audio systems and for high-quality digital audio experience.

ASUS Crystal Sound

8 Channel Audio Codec

The onboard 8-channel HD audio (High Definition Audio, previously codenamed Azalia) CODEC enables high-quality Absolute Pitch 192khz/24bit audio output, true BD lossless sound, jack-sensing feature, retasking functions, and multi-streaming technology.

Chapter 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.

- Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, to avoid damaging them due to static electricity.

- Hold components by the edges to avoid touching the ICs on them.

- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.

- Before you install or remove any component, 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, or components.

2.2 Motherboard overview

2.2.1 Motherboard layout
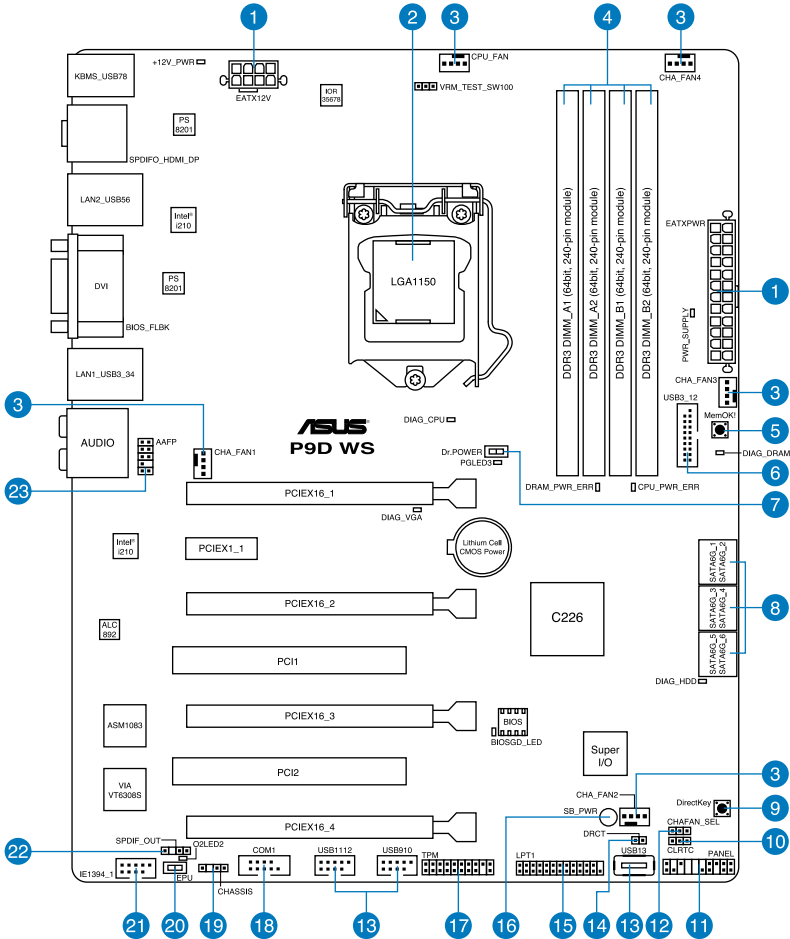
Refer to **2.2.8 Internal connectors** and **2.3.10 Rear panel connection** for more information about rear panel connectors and internal connectors.

Layout contents

Connectors/Jumpers/Switches/Slots	Page
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23. Front panel audio connector (10-1 pin AAFP)	2-23

Chapter 2

2.2.2 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1150 socket designed for the Intel® 4th Generation Core™ i3 desktop Processors and Intel® Xeon® E3-1200/ 12x5 v3 series Server/ Workstation Processors.
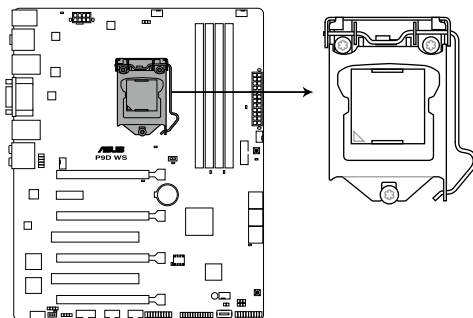
P9D WS CPU LGA1150

Ensure that all power cables are unplugged before installing the CPU.

- Ensure that all power cables are unplugged before installing the CPU.

- Ensure that you install the correct CPU designed for LGA1150 only. DO NOT install a CPU designed for LGA1155 and LGA1156 sockets on the LGA1150 socket.

- Upon purchase of the motherboard, ensure 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 LGA1150 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.

2.2.3 System memory

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

> A DDR3 module is notched differently from a DDR or DDR2 module. DO NOT install a DDR or DDR2 memory module to the DDR3 slot.
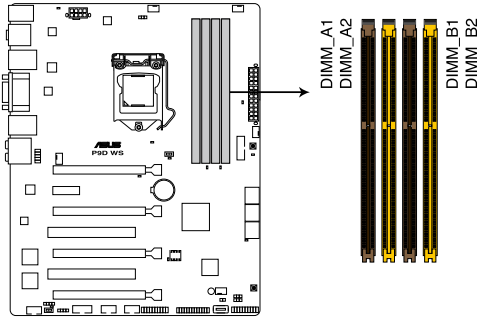
P9D WS 240-pin DDR3 DIMM socket

Recommended memory configurations
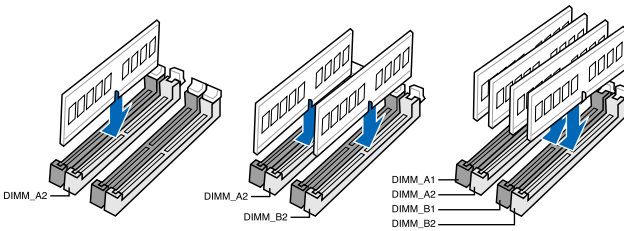
Memory configurations

You may install 1GB, 2GB, 4GB, 8GB unbuffered ECC or non-ECC DDR3 DIMMs into the DIMM sockets depending on the installed CPU.

- • You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.

- • According to Intel CPU spec, DIMM voltage below 1.5V is recommended to protect the CPU.

- • The max. 32GB memory capacity can be supported with DIMMs of 8GB.

- • 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 512Mb (64MB) chips or less (Memory chip capacity counts in Megabit, 8 Megabit/Mb = 1 Megabyte/MB).

For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs) or overclocking condition.

P9D WS Motherboard Qualified Vendors Lists (QVL)

- • ASUS exclusively provides hyper DIMM support function.

- • Hyper DIMM support is subject to the physical characteristics of individual CPUs. Load the X.M.P. or D.O.C.P. settings in the BIOS for the hyper DIMM support.

- • Visit the ASUS website for the latest QVL.

P9D WS Motherboard Qualified Vendors Lists (QVL)

DDR3 1600 MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional) 2	4
A-DATA	AD3U1600C2G11	2GB	SS	MICRON	D9PFJ	11-11-11-28	-	•	•
A-DATA	AD3U1600C4G11	4GB	DS	MICRON	D9PFJ	11-11-11-28	-	•	•
A-DATA	AD3U1600W4G11	4GB	SS	A-DATA	3WCD-1211A	11-11-11-28	-	•	•
A-DATA	AD3U1600W8G11	8GB	DS	A-DATA	3WCD-1211A	11-11-11-28	-	•	•
A-DATA	AX3U1600GW8G9(XMP)	16GB (2x 8GB)	DS	-	-	9-9-9-24	1.5	•	•
A-DATA	AX3U1600W8G11	16GB (2x 8GB)	DS	-	-	9-11-9-27	1.5	•	•
A-DATA	AXDU1600GW8G9B(XMP)	16GB (2x 8GB)	DS	-	-	9-11-9-27	1.65	•	•
AMD	AE32G1609U1-U	2GB	SS	AMD	23EY4587MB6H	-	1.5	•	•
AMD	AE34G1609U2-U	4GB	DS	AMD	23EY4587MB6H	-	1.5	•	•
AMD	AP38G1608U2K(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-28	1.65	•	•
Apacer	78.B1GE3.9L10C	4GB	DS	Apacer	AM5D5908DEQSCK	-	1.65	•	•
Apacer	78.B1GET.9K00C	4GB	SS	Apacer	AM5D6008BQQSCK	11-11-11-28	-	•	•
Apacer	78.C1GET.9K10C	8GB	DS	Apacer	AM5D6008BQQSCK	11-11-11-31	-	•	•
Apacer	AHU04GFA60C9Q3R(XMP)	4GB	DS	-	-	11-11-11-28	-	•	•
Asint	SLA302G08-EGJ1C(XMP)	4GB	DS	Asint	302G08-GG1C	9-9-9-27	-	•	•
Asint	SLA302G08-EGJ1C(XMP)	4GB	DS	Asint	302G08-GJ1C	9-9-9-27	-	•	•
Asint	SLA302G08-EGN1C	4GB	DS	ASint	302G08-GN1C	-	-	•	•
Asint	SLA304G08-ENG1B	4GB	SS	Asint	304G08-GN1B	9-11-11-28	-	•	•
Asint	SLB304G08-EGJ1B(XMP)	8GB	DS	-	-	9-9-9-27	-	•	•
Asint	SLB304G08-EGN1B	8GB	DS	ASint	304G08-GN1B	-	-	•	•
Asint	SLZ302G08-EGN1C	2GB	SS	ASint	302G08-GN1C	-	-	•	•
Asint	SLZ3128M8-EGJ1D(XMP)	2GB	DS	Asint	3128M8-GJ1D	-	-	•	•
CORSAIR	CMD16GX3M2A1600C9 (Ver8.21)(XMP)	16GB (2x 8GB)	DS	-	-	9-9-9-24	1.5	•	
CORSAIR	CMD8GX3M2A1600C8 (Ver5.12)(XMP)	8GB (2x 4GB)	DS	-	-	1600 8-8-8-24	1.5	•	
CORSAIR	CMD8GX3M2A1600C9 (Ver2.12)(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	•	
CORSAIR	CMG4GX3M2A1600C6	4GB (2x 2GB)	DS	-	-	6-6-6-18	1.65	•	•
CORSAIR	CML16GX3M4X1600C8(Ver 2.12)(XMP)	16GB (4x 4GB)	DS	-	-	Heat-Sink Package	1.5	•	
CORSAIR	CMP6GX3M3A1600C8(XMP)	6GB (3x 2GB)	DS	-	-	8-8-8-24	1.65	•	•
CORSAIR	CMP6GX3M3A1600C8(XMP)	6GB (3x 2GB)	DS	-	-	8-8-8-24	1.65	•	•
CORSAIR	CMX6GX3M3C1600C7(XMP)	6GB (3x 2GB)	DS	-	-	7-8-7-20	1.65	•	•
CORSAIR	CMX8GX3M2A1600C9 (Ver3.19)(XMP)	8GB (2x 4GB)	SS	-	-	9-9-9-24	1.65	•	•
CORSAIR	CMZ16GX3M2A1600C10 (Ver.3.24)(XMP)	16GB (2x 8GB)	DS	-	-	10-10-10-27	1.5	•	•
CORSAIR	CMZ16GX3M4A1600C9 (XMP)	16GB (4x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
CORSAIR	CMZ32GX3M4X1600C10 (Ver2.2)(XMP)	32GB (4x 8GB)	DS	-	-	10-10-10-27	1.5	•	•
CORSAIR	CMZ8GX3M2A1600C8(XMP)	8GB (2x 4GB)	DS	-	-	8-8-8-24	1.5	•	•
CORSAIR	CMZ8GX3M4X1600C9 (Ver 2.12)(XMP)	8GB (4x 2GB)	SS	-	-	9-9-9-24	1.5	•	•
CORSAIR	HX3X12G1600C9 (XMP)	12GB (6x 2GB)	DS	-	-	9-9-9-24	1.6	•	•
Crucial	BL12864BN1608.8FF (XMP)	2GB (2x 1GB)	SS	-	-	8-8-8-24	1.65	•	•
Crucial	BLT4G3D1608DT1TX0.16FM (XMP)	4GB	DS	-	-	8-8-8-24	1.5	•	•
EK Memory	EKM324L28BP8-I16 (XMP)	4GB (2x 2GB)	DS	-	-	9	-	•	•
EK Memory	EKM324L28BP8-I16 (XMP)	4GB (2x 2GB)	DS	-	-	9	-	•	•
Elixir	M2X2G64CB88G7N-DG (XMP)	2GB	SS	Elixir	N2CB2G80GN-DG	9-9-9-28	-	•	•
Elixir	M2X4G64CB8HG5N-DG (XMP)	4GB	DS	Elixir	N2CB2G80GN-DG	9-9-9-28	-	•	•
Elixir	M2X8G64CB8HB5N-DG (XMP)	8GB	DS	Elixir	N2CB4G80BN-DG	9-9-9-28	1.5	•	•

P9D WS Motherboard Qualified Vendors Lists (QVL)

DDR3 1600 MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)	
								2	4
G.SKILL	F3-12800CL7D-8GBRH (XMP)	8GB (2x 4GB)	DS	-	-	7-8-7-24	1.6	•	•
G.SKILL	F3-12800CL7Q-16GBXH (XMP)	16GB (4x 4GB)	DS	-	-	7-8-7-24	1.6	•	•
G.SKILL	F3-12800CL8D-8GBECO (XMP)	8GB (2x4GB)	DS	-	-	8-8-8-24	1.35	•	
G.SKILL	F3-12800CL9D-8GBRL(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
G.SKILL	F3-12800CL9D-8GBSR2(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.25	•	•
G.SKILL	F3-12800CL9Q-16GBXL(XMP)	16GB (4x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
G.Skill	F3-12800CL9Q-16GBZL(XMP)	16GB (4x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
G.SKILL	F3-1600C9Q-32GXM(XMP)	32GB (4x 8GB)	DS	-	-	-	1.5	•	•
GEIL	GET316GB1600C9QC(XMP)	16GB (4x 4GB)	DS	-	-	9-9-9-28	1.6	•	•
GEIL	GUP34GB1600C7DC(XMP)	4GB (2x 2GB)	DS	-	-	7-7-7-24	1.6	•	•
GoodRam	GR1600D364L9/2G	2GB	DS	GoodRam	GF1008KC-JN	-	-	•	•
KINGMAX	FLGE85F-C8KL9A(XMP)	2GB	SS	KINGMAX	N/A	9-9-9-28	-	•	•
KINGMAX	FLGF65F-C8KL9A(XMP)	4GB	DS	KINGMAX	N/A	9-9-9-28	-	•	•
KINGSTON	KHX16009CD3K2/8GX(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-27	1.65	•	•
KINGSTON	KHX1600C9D3B1/4G(XMP)	4GB	SS	-	-	9-9-9-27	1.65	•	•
KINGSTON	KHX1600C9D3K3/12GX(XMP)	12GB (3x 4GB)	DS	-	-	9	1.65	•	
KINGSTON	KHX1600C9D3K3/6GX(XMP)	6GB (3x 2GB)	DS	-	-	9	1.65	•	•
KINGSTON	KHX1600C9D3K6/6GX(XMP)	6GB (3x 2GB)	DS	-	-	9	1.65	•	•
KINGSTON	KHX1600C9D3K4/16GX(XMP)	16GB (4x 4GB)	DS	-	-	9-9-9-24	1.65	•	•
KINGSTON	KHX1600C9D3K6/24GX(XMP)	24GB (6x 4GB)	DS	-	-	9	1.65	•	
KINGSTON	KHX1600C9D3K8/32GX(XMP)	32GB (8x 4GB)	DS	-	-	9-9-9-27	1.65	•	
KINGSTON	KHX1600C9D3LK2/8GX(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.35	•	
KINGSTON	KHX1600C9D3P1K2/8G	8GB (2x 4GB)	DS	-	-	9	1.5	•	•
KINGSTON	KHX16C10B1K2/16X(XMP)	16GB (2x 8GB)	DS	-	-	-	1.5	•	•
KINGSTON	KHX16C9P1K2/16	16GB (2x 8GB)	DS	-	-	-	1.5	•	•
KINGSTON	KVR16N11/4	4G	DS	Hynix	H5TQ2G83CFRPBC	-	1.5	•	•
KINGTIGER	KTG2G1600PG3(XMP)	2GB	DS	-	-	-	-	•	•
MICRON	MT16JTF1G64AZ-1G6D1	8GB	DS	MICRON	D9PBC	-	1.5	•	•
Micron	MT16JTF1G64AZ-1G6E1	8GB	DS	Micron	D9QBJ	-	-	•	•
MICRON	MT16KTF51264AZ-1G6M1	4GB	DS	MICRON	D9PFJ	-	-	•	•
Micron	MT8JTF51264AZ-1G6E1	4GB	SS	Micron	D9QBJ	-	-	•	•
MICRON	MT8KTF25664AZ-1G6M1	2GB	SS	MICRON	D9PFJ	-	-	•	•
Mushkin	996805(XMP)	4GB (2x 2GB)	DS	-	-	6-8-6-24	1.65	•	
Mushkin	998805(XMP)	6GB (3x 2GB)	DS	-	-	6-8-6-24	1.65	•	
OCZ	OCZ3BE1600C8LV4GK	4GB (2x 2GB)	DS	-	-	8-8-8	1.65	•	
Patriot	PGD316G1600ELK(XMP)	16GB (2x 8GB)	DS	-	-	-	1.65	•	•
Patriot	PGD316G1600ELK(XMP)	16GB (2x 8GB)	DS	-	-	9-9-9-24	1.5	•	•
Patriot	PGD38G1600ELK(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.65	•	•
Patriot	PGD38G1600ELK(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
Patriot	PGS34G1600LLKA2	4GB (2x 2GB)	DS	-	-	8-8-8-24	1.7	•	•
Patriot	PV38G160C9KRD(XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
Patriot	PVV38G1600LLK(XMP)	8GB (2x 4GB)	DS	-	-	8-9-8-24	1.65	•	•
Patriot	PX7312G1600LLK(XMP)	12GB (3x 4GB)	DS	-	-	8-9-8-24	1.65	•	•
Patriot	PXD38G1600LLK(XMP)	8GB (2x4GB)	DS	-	-	1600 8-9-8-24	1.65	•	•
PSC	AL9F8L93B-GN2E	4GB	SS	PSC	A3P4GF3BLF	-	-	•	•
PSC	ALAF8L93B-GN2E	8GB	DS	PSC	A3P4GF3BLF	-	-	•	•
SanMax	SMD-4G68HP-16KZ	4GB	DS	Hynix	H5TQ2G83BFRPBC	-	1.5	•	•

P9D WS Motherboard Qualified Vendors Lists (QVL)

DDR3 1600 MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)	
								2	4
SanMax	SMD-4G68NG-16KK	4GB	DS	ELPIDA	J2108BDBG-GN-F	-	-	•	•
Silicon Power	SP002GBLTU160V02(XMP)	2GB	SS	S-POWER	20YT5NG	9-11-11-28	1.5	•	•
Silicon Power	SP004GBLTU160V02(XMP)	4GB	DS	S-POWER	20YT5NG	9-9-9-24	1.5	•	•
Team	TXD34096M1600HC9-D(XMP)	4GB	DS	Hynix	H5TC2G83BFRH9A	9-9-9-24	1.5	•	•
Transcend	JM1600KLH-8G(626633)	8GB	DS	Transcend	TK963EBF3	-	-	•	•
Transcend	TS1GLK64V6H(620945)	8GB	DS	SAMSUNG	K4B4G0846B	-	-	•	•
Transcend	TS1GLK64W6H	8GB	DS	SAMSUNG	K4B4G0846B	11-11-11-28-1	-	•	•
Transcend	TS512MLK64W6H	4GB	SS	SAMSUNG	K4B4G0846B	11-11-11-28-2	-	•	•

P9D WS Motherboard Qualified Vendors Lists (QVL)

DDR3 1333 MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)	
								2	4
ACTICA	ACT1GHU64B8F1333S	1GB	SS	SAMSUNG	K4B1G0846F	-	-	•	•
ACTICA	ACT1GHU72C8G1333S	1GB	SS	SAMSUNG	K4B1G0846F(ECC)	-	-	•	•
ACTICA	ACT2GHU64B8G1333M	2GB	DS	Micron	D9KPT	-	-	•	•
ACTICA	ACT2GHU72D8G1333M	2GB	DS	Micron	D9KPT(ECC)	-	-	•	•
ACTICA	ACT2GHU72D8G1333S	2GB	DS	SAMSUNG	K4B1G0846F(ECC)	-	-	•	•
ACTICA	ACT4GHU64B8H1333H	4GB	DS	Hynix	H5TQ2G83AFR	-	-	•	•
ACTICA	ACT4GHU72D8H1333H	4GB	DS	Hynix	H5TQ2G83AFR(ECC)	-	-	•	•
AMD	AE32G1339U1-U	2GB	SS	AMD	23EY4587MB3H	-	1.5	•	•
AMD	AE34G1339U2-U	4GB	DS	AMD	23EY4587MB3H	-	1.5	•	•
Apacer	78.A1GC6.9L1	2GB	DS	Apacer	AM5D5808FEQSBG	9	-	•	•
Apacer	78.B1GDE.9L10C	4GB	DS	Apacer	AM5D5908CEHSBG	9	-	•	•
Asint	SLA302G08-EDJ1C	2GB	SS	ASint	302G08-DJ1C	-	-	•	•
Asint	SLA304G08-EDJ1B	4GB	SS	Asint	304G08-DJ1B	9-10-10-26	-	•	•
Asint	SLB304G08-EDJ1B	8GB	DS	Asint	304G08-DJ1B	9-9-9-24	-	•	•
Asint	SLZ302G08-EDJ1C	4GB	DS	ASint	302G08-DJ1C	-	-	•	•
ATP	AQ12M72E8BKH9S	4GB	DS	SAMSUNG	K4B2G0846C(ECC)	-	-	•	•
BUFFALO	D3U1333-1G	1GB	SS	Elpida	J1108BFBG-DJ-F	-	-	•	•
BUFFALO	D3U1333-2G	2GB	DS	Elpida	J1108BFBG-DJ-F	-	-	•	•
BUFFALO	D3U1333-4G	4GB	DS	NANYA	NT5CB256M8BN-CG	-	-	•	•
CORSAIR	CMV4GX3M2A1333C9	4GB (2x 2GB)	SS	-	N/A	9-9-9-24	-	•	•
CORSAIR	CMV8GX3M2A1333C9	8GB (2x 4GB)	DS	-	N/A	9-9-9-24	-	•	•
CORSAIR	CMX8GX3M1A1333C9 (Ver2.2)	8GB	DS	-	-	9-9-9-24	1.5	•	
CORSAIR	CMX8GX3M1A1333C9 (Ver3.23)	8GB	DS	-	-	9-9-9-24	1.5	•	
CORSAIR	CMX8GX3M2A1333C9 (XMP)	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
CORSAIR	TW3X4G1333C9A	4GB (2x 2GB)	DS	-	-	9-9-9-24	1.5	•	•
EK Memory	EKM324L28BP8-I13	4GB (2x 2GB)	DS	-	-	9	-	•	•
G.SKILL	F3-10600CL9D-4GBNT	4GB (2x 2GB)	DS	G.SKILL	D3 128M8CE9 2GB	9-9-9-24	1.5	•	
G.SKILL	F3-10666CL9D-8GBRL	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
G.SKILL	F3-10666CL9D-8GBRL	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	•	•

P9D WS Motherboard Qualified Vendors Lists (QVL)

DDR3 1333 MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)	
								2	4
G.SKILL	F3-10666CL9D-8GBXL	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
GEIL	GET316GB1333C9QC	16GB (4x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
GEIL	GG34GB1333C9DC	4GB (2x 2GB)	DS	GEIL	GL1L128M88BA115FW	9-9-9-24	1.3	•	•
GEIL	GG34GB1333C9DC	4GB (2x 2GB)	DS	GEIL	GL1L128M88BA15B	9-9-9-24	1.3	•	•
GEIL	GVP34GB1333C9DC	4GB (2x 2GB)	DS	-	-	9-9-9-24	1.5	•	•
GEIL	GVP38GB1333C9DC	8GB (2x 4GB)	DS	-	-	9-9-9-24	1.5	•	•
GoodRam	GR1333D364L9/2G	2GB	DS	Qimonda	IDSH1G-03A1F1C-13H	-	-	•	•
Hynix	HMT125U6TFR8A-H9	2GB	DS	Hynix	H5TC1G83TFR	-	-	•	•
INNODISK	M3UN-2GHJBC09	2GB	SS	Hynix	H5TQ2G83CFRH9C	9-9-9-24	-	•	•
INNODISK	M3UN-4GHJAC09	4GB	DS	Hynix	H5TQ2G83CFRH9C	9-9-9-24	-	•	•
KINGMAX	FLFE85F-B8KL9	2GB	DS	KINGMAX	KFB8FNLXL-BNF-15A	-	-	•	•
KINGMAX	FLFE85F-C8KL9	2GB	SS	KINGMAX	KFC8FNLBF-GXX-12A	-	-	•	•
KINGMAX	FLFE85F-C8KL9	2GB	SS	KINGMAX	KFC8FNLXF-DXX-15A	-	-	•	•
KINGMAX	FLFE85F-C8KM9	2GB	SS	Kingmax	KFC8FNMXF-BXX-15A	-	-	•	•
KINGMAX	FLFF65F-C8KL9	4GB	DS	KINGMAX	KFC8FNLXF-DXX-15A	-	-	•	•
KINGMAX	FLFF65F-C8KM9	4GB	DS	Kingmax	KFC8FNMXF-BXX-15A	-	-	•	•
KINGSTON	KVR1333D3E9S/4G	4GB	DS	Elpida	J2108ECSE-DJ-F	9	1.5	•	•
KINGSTON	KVR1333D3N9H/4G	4GB	DS	ELPIDA	J2108BDBG-GN-F	-	1.5	•	•
KINGSTON	KVR1333D3N9H/8G	8GB	DS	ELPIDA	J4208EASE-DJ-F	9-9-9-24	1.5	•	•
KINGSTON	KVR13N9S8H/4	4GB	SS	ELPIDA	J4208BBBG-GN-F	-	1.5	•	•
KINGTIGER	F10DA2T1680	2GB	DS	KINGTIGER	KTG1333PS1208NST-C9	-	-	•	•
KINGTIGER	KTG2G1333PG3	2GB	DS	-	-	-	-	•	•
Mach Xtreme	MXD3U133316GQ	16GB (4x 4GB)	DS	-	-	-	-	•	•
Mach Xtreme	MXD3V13332GS	2GB	SS	Mach Xtreme	C2S46D30-D313	-	-	•	•
MICRON	MT8JTF25664AZ-1G4M1	2GB	SS	MICRON	D9PFJ	-	-	•	•
OCZ	OCZ3G1333LV4GK	4GB (2x 2GB)	DS	-	-	9-9-9	1.65	•	
OCZ	OCZ3G1333LV8GK	8GB (2x 4GB)	DS	-	-	9-9-9	1.65	•	
OCZ	OCZ3G1333LV8GK	8GB (2x 4GB)	DS	-	-	9-9-9	1.65	•	
OCZ	OCZ3RPR1333C9LV8GK	8GB (2x 4GB)	DS	-	-	9-9-9	1.65	•	
Patriot	PG38G1333EL (XMP)	8GB	DS	-	-	-	1.5	•	•
Patriot	PGD316G1333ELK (XMP)	16GB (2x 8GB)	DS	-	-	9-9-9-24	1.5	•	•
Patriot	PSD32G13332	2GB	DS	Prtriot	PM128M8D3BU-15	9	-	•	•
RiDATA	C304627CB1AG22Fe	2GB	DS	RiDATA	C304627CB1AG22Fe	9	-	•	•
RiDATA	E304459CB1AG32Cf	4GB	DS	RiDATA	E304459CB1AG32Cf	9	-	•	•
SAMSUNG	M378B5273CH0-CH9	4GB	DS	SAMSUNG	K4B2G0846C	-	-	•	•
Silicon Power	SP001GBLTE133S01	1GB	SS	NANYA	NT5CB128M8AN-CG	-	-	•	•
Silicon Power	SP001GBLTU133S02	1GB	SS	S-POWER	10YT3E5	9	-	•	•
Silicon Power	SP002GBLTU133V02	2GB	SS	S-POWER	20YT3NG	9-9-9-24	-	•	•
Silicon Power	SP004GBLTU133V02	4GB	DS	S-POWER	20YT3NG	9-9-9-24	-	•	•
Team	TED34096M1333HC9	4GB	DS	Team	T3D2568LT-13	-	-	•	•
Transcend	JM1333KLH-8G(623654)	8GB	DS	Transcend	TK963EBF3	-	-	•	•
Transcend	TS1GLK64V3H(620053)	8GB	DS	MICRON	D9QBJ	-	-	•	•

2.2.4 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.
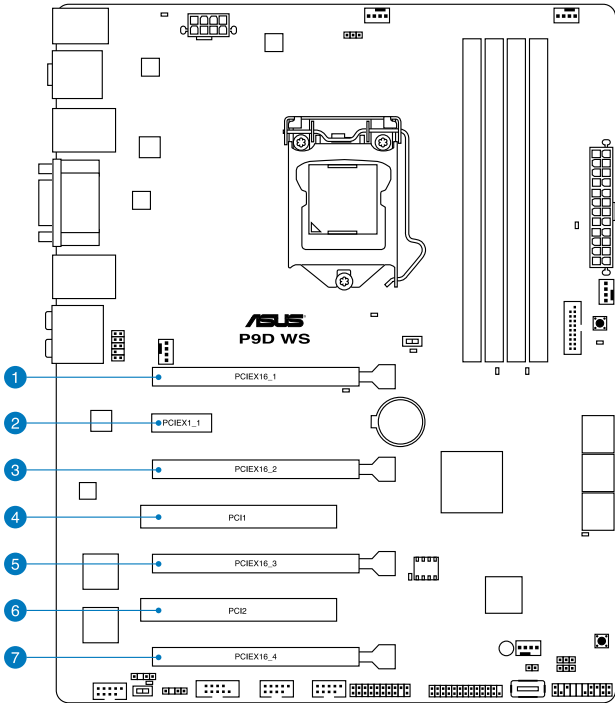
Slot No.	Slot Description
1	PCIe 3.0 x16_1 slot (single at x16 or dual at x8/x8 mode)
2	PCIe 2.0 x1_1 slot
3	PCIe 3.0 x16_2 slot (single at x8 or dual at x4/x4 mode)
4	PCI1 slot
5	PCIe 3.0 x16_3 slot (x4 mode)
6	PCI2 slot
7	PCIe 2.0 x16_4 slot (x4 mode)

PCIE x16_1 auto turn to x8 when PCIE x16_2 and PCIE x16_3 occupied; PCIE x16_2 auto turn to x4 when PCIE x16_3 occupied.

Standard Interrupt assignments

IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable Interrupt
4	12	Communications Port (COM1)
5	13	IRQ Holder for PCI Steering
6	14	Reserved
7	15	Reserved
8	3	System CMOS/Real Time Clock
9	4	IRQ Holder for PCI Steering
10	5	IRQ Holder for PCI Steering
11	6	IRQ Holder for PCI Steering
12	7	Reserved
13	8	Numeric Data Processor
14	9	Primary IDE Channel

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	–	–	–	–	–	–	–
PCIEx1_1	–	shared	–	–	–	–	–	–
PCI1	–	shared	–	–	–	–	–	–
PCI2	–	–	shared	–	–	–	–	–
VIA1394	–	–	–	shared	–	–	–	–
USB3.0	–	–	–	–	–	shared	–	–
LAN1 (I210)	–	–	shared	–	–	–	–	–
LAN2 (I210)	–	–	–	–	–	shared	–	–
SATA Controller 1	–	–	–	–	shared	–	–	–
SATA Controller 2	–	–	–	–	shared	–	–	–
USB 2.0 Controller 1	–	–	–	–	–	–	–	shared
USB 2.0 Controller 2	–	–	–	–	shared	–	–	–
HD Audio	–	–	–	–	–	–	shared	–

2.2.5 Onboard buttons and switches

Onboard buttons and switches enhance overclocking and gaming performance when working on a bare or open-case system.

1. EPU switch

Turning this switch to **Enable** will automatically detect the current PC loadings and intelligently moderate the power consumption.

For ensuring the system performance, turn the switch setting to **Enable** when the system is powered off.

P9D WS EPU switch
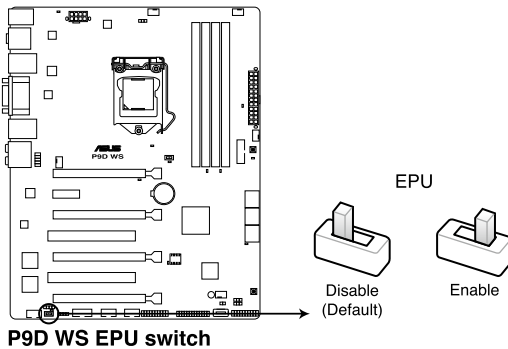
2. ASUS Dr. POWER switch

This switch allows you to enable or disable the ASUS Dr. Power feature. Install the bundled ASUS Dr. Power Utility then enable this switch to allow the system to display notification messages in your Windows screen if a problem is detected with your power supply unit (PSU).

P9D WS Dr.POWER switch
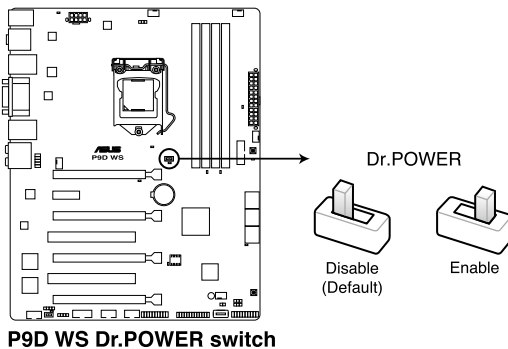
3. DirectKey button

This feature allows your system to go to the BIOS Setup program with the press of a button. With DirectKey, you can enter the BIOS anytime without having to press the <Del> key during POST. It also allows you to turn on or turn off your system and conveniently enter the BIOS during boot-up.

DirectKey

P9D WS DirectKey button
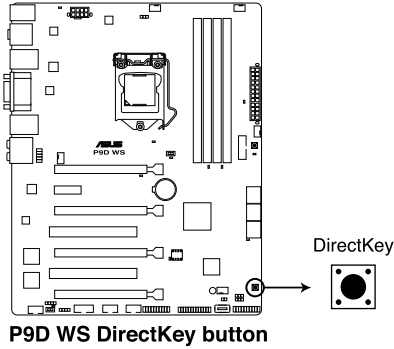
Ensure to save your data before using the DirectKey button.

- When the system is on and you press the DirectKey button, your system will shut down. Press the DirectKey button again or the Power-on button to reboot and enter the BIOS directly.

- Turn off your system using the power-on button to allow your system to go through POST (without entering the BIOS) when you reboot your system.

- Refer to section **3.8 Boot Menu** for details about setting the DirectKey default function.

Chapter 2

4. MemOK! button

When you install DIMMs that are not compatible with the motherboard, this may cause the system boot failure, and the DIAG_DRAM near the MemOK switch lights continuously. Simply press the MemOK button until the DIAG_DRAM starts blinking to patch memory compatibility issues and ensure the system's successful bootup.
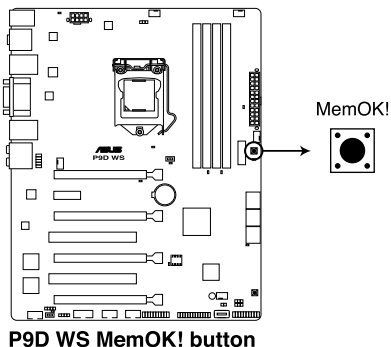
P9D WS MemOK! button

- Refer to section **2.2.6 Onboard LEDs** for the exact location of the DIAG_DRAM.

- The DIAG_DRAM also lights when the DIMM is not properly installed. Turn off the system and reinstall the DIMM before using the MemOK! function.

- The MemOK! button does not function under Windows™ OS environment.

- During the tuning process, the system loads and tests failsafe memory settings. It takes about 30 seconds for the system to test one set of failsafe settings. If the test fails, the system reboots and test the next set of failsafe settings. The blinking speed of the DIAG_DRAM increases, indicating different test processes.

- Due to memory tuning requirement, the system automatically reboots when each timing set is tested. If the installed DIMMs still fail to boot after the whole tuning process, the DIAG_DRAM lights continuously. Replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) in this user manual or on the ASUS website at www.asus.com.

- If you turn off the computer and replace DIMMs during the tuning process, the system continues memory tuning after turning on the computer. To stop memory tuning, turn off the computer and unplug the power cord for about 5–10 seconds.

- If your system fails to boot up due to BIOS overclocking, press the MemOK! button to boot and load the BIOS default settings. A message will appear during POST reminding you that the BIOS has been restored to its default settings.

- We recommend that you download and update to the latest BIOS version from the ASUS website at www.asus.com after using the MemOK! function.

2.2.6   Onboard LEDs

1.   POST State LEDs

The POST State LEDs indicate the status of these key components during POST (Power-on-Self Test): CPU, memory modules, VGA card, and hard disk drive. If an error is found, the critical component's LED stays lit up until the problem is solved.

→ DIAG_CPU

→ DIAG_VGA

→ DIAG_HDD
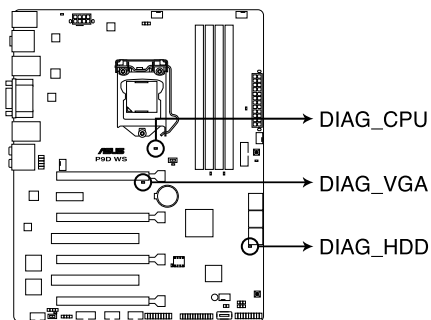
P9D WS DIAG_CPU/ VGA/ HDD LED

2.   EPU LED

The EPU LED lights up when the EPU switch is turned to **Enable**.

→ OLED2
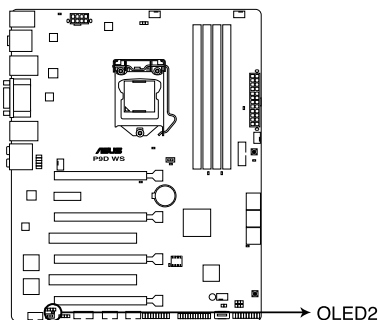
P9D WS EPU LED

3. **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.

SB_PWR

ON
Standby Power

OFF
Powered Off
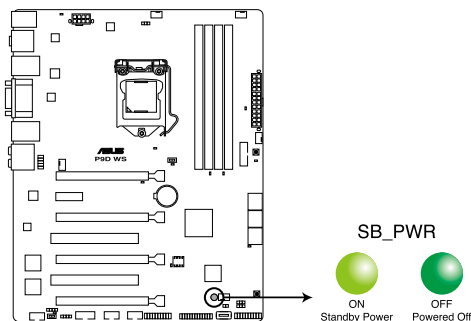
P9D WS Onboard LED

4. **DIAG_DRAM**

   The DIAG_DRAM lights up when the installed DIMMs incompatible with the motherboard or improperly installed. When using the MemOK! switch for automatic memory compatibility tuning, the DIAG_DRAM will blink.
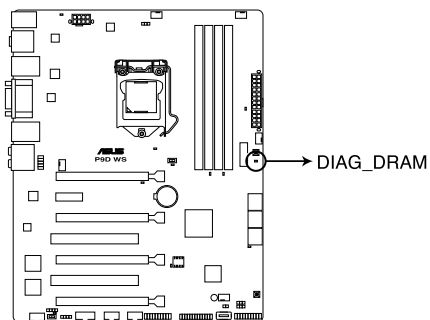
DIAG_DRAM

P9D WS DIAG_DRAM LED

5. **PWR_SUPPLY LED**

   The ASUS Dr. Power LED near EATX PWR connector lights up when the ASUS Dr. Power switch setting is turned to Enable and the power supply unit failed.
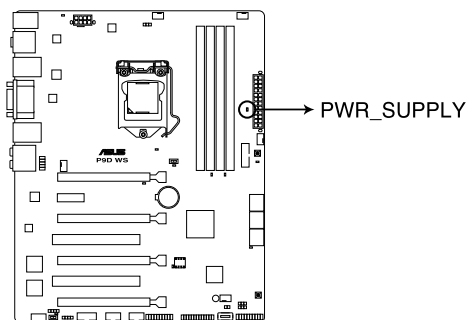
→ PWR_SUPPLY

P9D WS PWR_SUPPLY LED

6. **PGLED3 LED**

   The ASUS Dr. Power LED near the ASUS Dr. Power switch lights up when the ASUS Dr. Power switch is turned to enable.
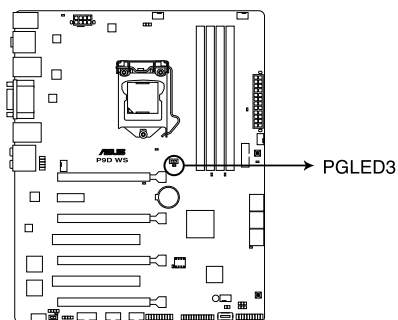
→ PGLED3

P9D WS PGLED3

7. **+12V_PWR LED**

The ASUS Dr. Power LED near EATX12V connector lights up when the ASUS Dr. Power switch setting is turned to enable and there is no power detected going into the processor.
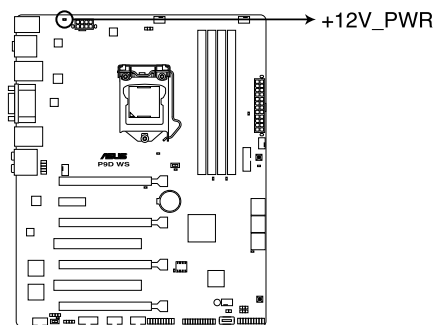
P9D WS +12V_PWR LED

8. **CPU warning LED (CPU_PWR_ERR)**

The CPU warning LEDs light up to indicate an impending failure of the corresponding CPU.
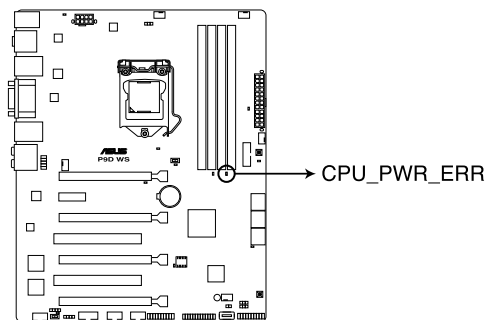
P9D WS CPU_PWR_ERR LED

9.   **DIMM warning LED (DRAM_PWR_ERR)**

The DIMM warning LEDs light up to indicate an impending failure of the corresponding DIMMs.
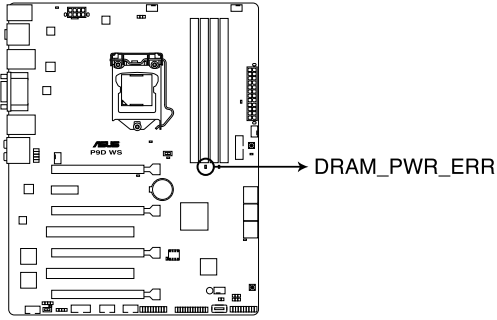
DRAM_PWR_ERR

P9D WS DRAM_PWR_ERR LED

2.2.7   Jumper

1.   Clear RTC RAM (3-pin 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.

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.

CLRTC

Normal
(Default)

Clear RTC

P9D WS Clear RTC RAM
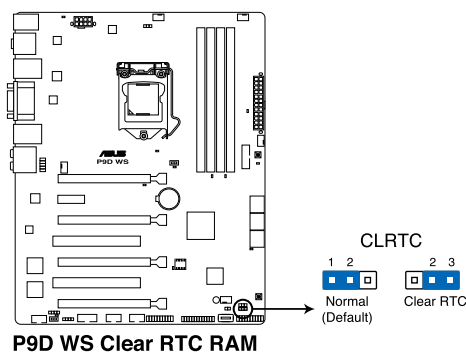
Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

•   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.   **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.
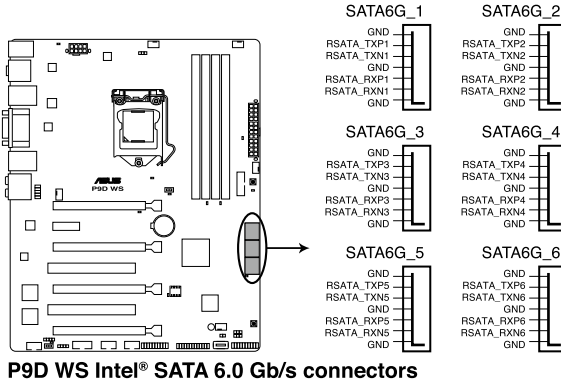
CHAFAN_SEL

3-Pin DC FAN
(Default)

4-Pin PWM FAN

P9D WS CHAFAN setting
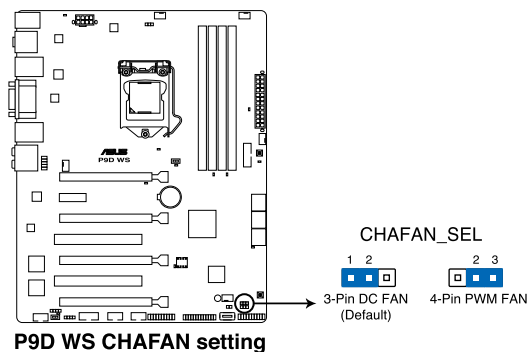
•   If you use a 4-pin fan but set the jumper to pin 1-2, the fan you installed may not work.

•   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.

2.2.8   Internal connectors

1.   Intel® C226 Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_1-6 [yellow])

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

SATA6G_1   SATA6G_2

GND   GND
RSATA_TXP1   RSATA_TXP2
RSATA_TXN1   RSATA_TXN2
GND   GND
RSATA_RXP1   RSATA_RXP2
RSATA_RXN1   RSATA_RXN2
GND   GND

SATA6G_3   SATA6G_4

GND   GND
RSATA_TXP3   RSATA_TXP4
RSATA_TXN3   RSATA_TXN4
GND   GND
RSATA_RXP3   RSATA_RXP4
RSATA_RXN3   RSATA_RXN4
GND   GND

SATA6G_5   SATA6G_6

GND   GND
RSATA_TXP5   RSATA_TXP6
RSATA_TXN5   RSATA_TXN6
GND   GND
RSATA_RXP5   RSATA_RXP6
RSATA_RXN5   RSATA_RXN6
GND   GND

P9D WS Intel® SATA 6.0 Gb/s connectors
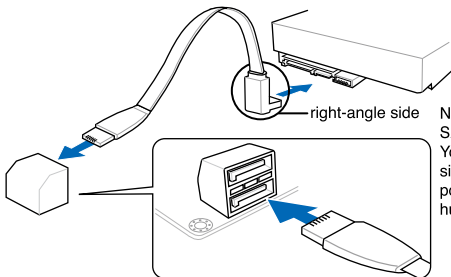
right-angle side   NOTE: Connect the right-angle side of SATA signal cable to SATA device. You may also connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.

- These connectors are set to [AHCI Mode] by default. If you intend to create a Serial ATA RAID set using these connectors, set the **SATA Mode** item in the BIOS to [RAID Mode]. Refer to section **3.5.4 SATA Configuration** for details.

- Before creating a RAID set, refer to section **4.5 RAID configurations** or the manual bundled in the motherboard support DVD.

- When using NCQ, set the **SATA Mode** in the BIOS to [AHCI Mode]. Refer to section **3.5.4 SATA Configuration** for details.

- 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.

2. **USB 2.0 connectors**
   (Type A: 10-1 pin USB910/ USB1112; Type B: USB13)

   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.
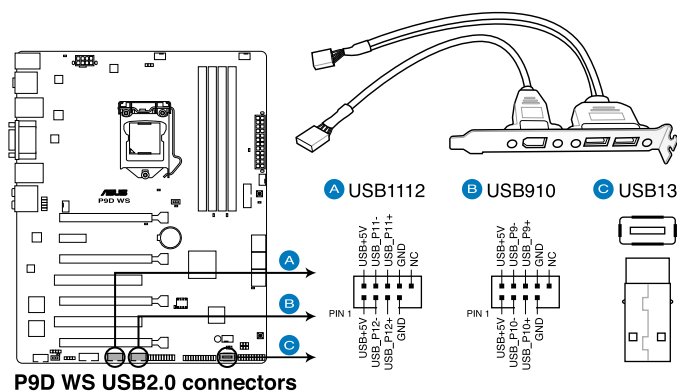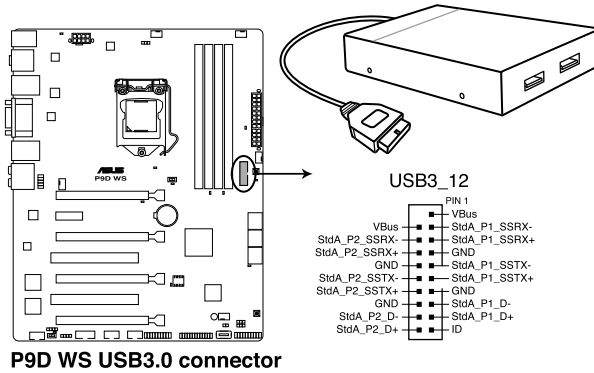

P9D WS USB2.0 connectors

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

You can connect the front panel USB cable to the ASUS Q-Connector (USB, blue) first, and then install the Q-Connector (USB) to the USB connector onboard if your chassis supports front panel USB ports.

3. USB 3.0 connector (20-1 pin USB3_12)

These connectors allow you to connect a USB 3.0 module for additional USB 3.0 front or rear panel ports. With an installed USB 3.0 module, you can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5Gbps, faster charging time for USB-chargeable devices, optimized power efficiency and backward compatibility with USB 2.0.

USB3_12

P9D WS USB3.0 connector

The USB 3.0 module is purchased separately.

4. Parallel port connector (26-1 pin LPT1)

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

LPT1
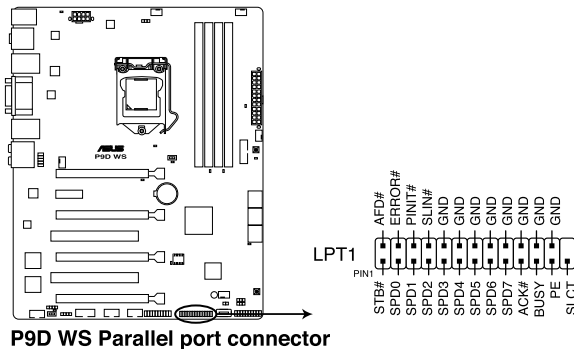
P9D WS Parallel port connector

5.   **IEEE 1394a port connector (10-1 pin IE1394_1)**

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.

P9D WS IEEE 1394 connector
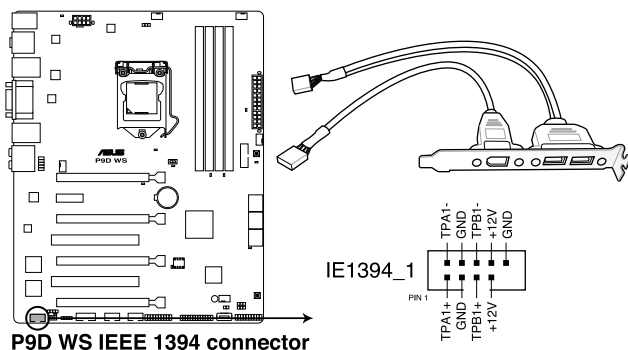
Never connect a USB cable to the IEEE 1394a connector. Doing so will damage the motherboard!

The IEEE 1394a module is purchased separately.

6.   **Digital audio connector (4-1 pin SPDIF_OUT)**

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port. Connect the S/PDIF Out module cable to this connector, then install the module to a slot opening at the back of the system chassis.

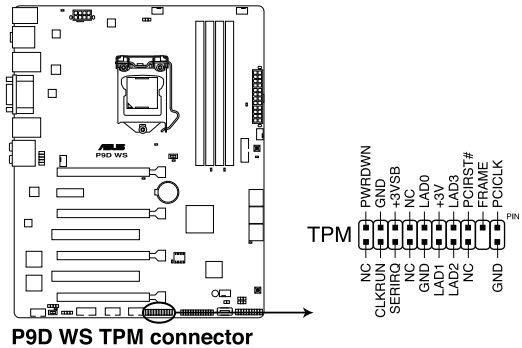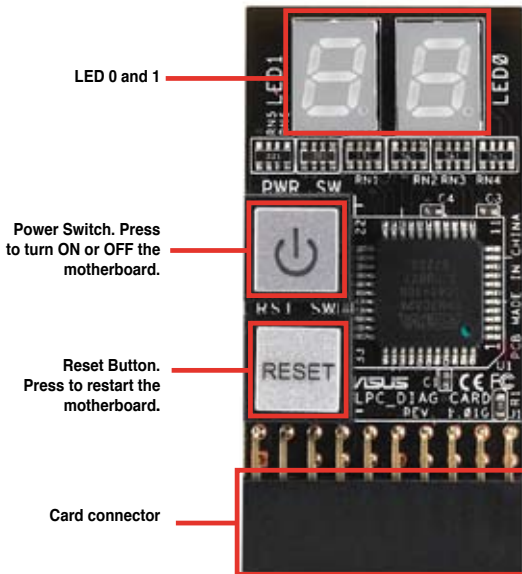**P9D WS Digital audio connector**
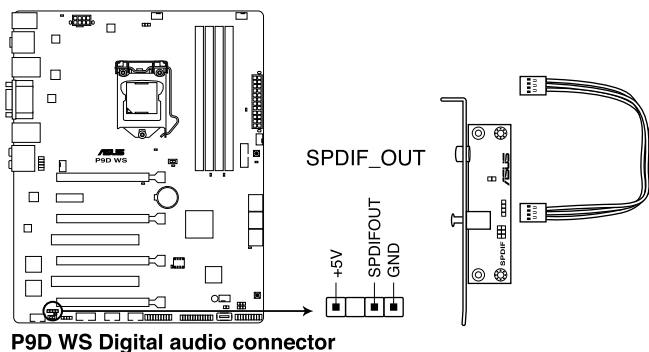
The S/PDIF module is purchased separately.

7. **CPU, chassis, and power fan connectors**
   (4-pin CPU_FAN, 4-pin CHA_FAN1-4)

   Connect the fan cables to the fan connectors on the motherboard, ensuring that the black wire of each cable matches the ground pin of the connector.

P9D WS Fan connectors
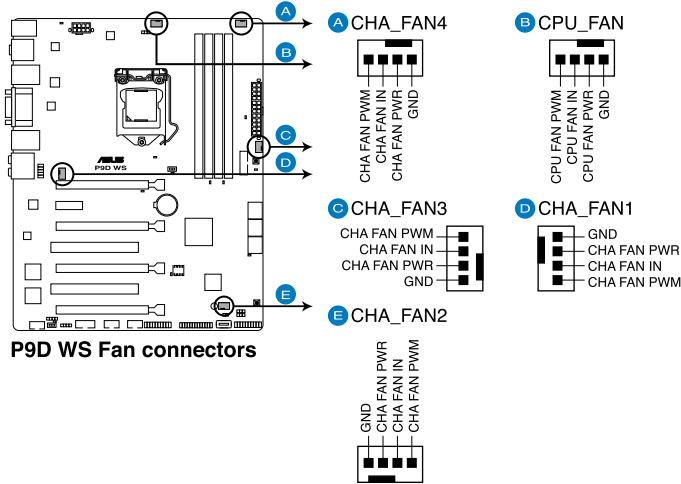
Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!

- The CPU_FAN connector supports the CPU fan of maximum 2A (24 W) fan power.

- If you install two VGA cards, we recommend that you plug the rear chassis fan cable to the motherboard connector labeled CHA_FAN1, CHA_FAN2, CHA_FAN3 for better thermal environment.

8. 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.

AAFP

PIN 1

PORT1L — GND
PORT1R — PRESENCE#
PORT2R — SENSE1_RETU
SENSE_SEND
PORT2L — SENSE2_RETU

HD-audio-compliant pin definition

PIN 1

MIC2 — AGND
MICPWR — NC
Line out_R — NC
NC
Line out_L — NC

Legacy AC'97 compliant definition
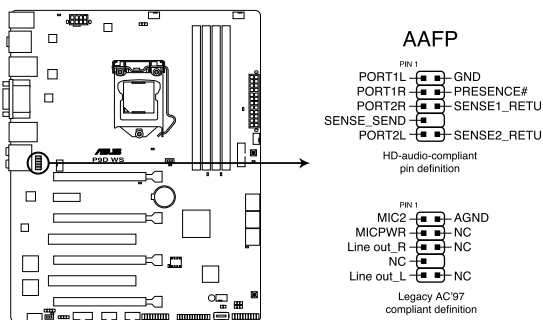
P9D WS Analog front panel connector

- • 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, set the Front Panel Type item in the BIOS setup to [HD]; if you want to connect an AC'97 front panel audio module to this connector, set the item to [AC97]. By default, this connector is set to [HD].

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

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

PIN 1 COM1
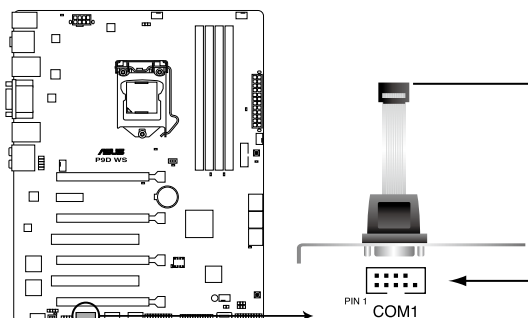
P9D WS Serial port (COM1) connector

The COM module is purchased separately.

10. 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. This connector can also serve for G.P. Diagnosis card installtion.


P9D WS TPM connector

G.P. Diagnosis card layout

LED 0 and 1

Power Switch. Press to turn ON or OFF the motherboard.

Reset Button. Press to restart the motherboard.

Card connector

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.

2.   With the LEDs of the diagnosis card facing to the PCIe slots, align the card connector with the TPM connector and press firmly until the card sits on the connector completely.
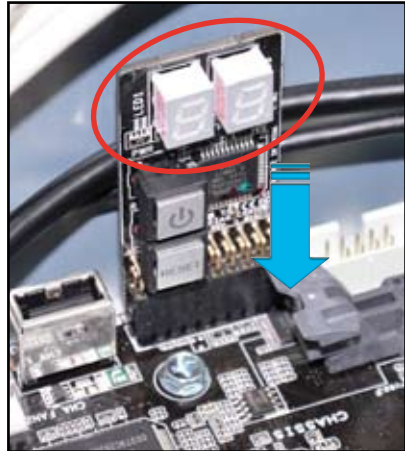
Code table for G.P. Diagnosis card

15, 19	Initiate chip	AC	OS in PIC mode
E0	Check and wake up system	AA	OS in APIC mode
2B-2F	Prepare system for memory detection and sizing	A0	Leave BIOS and pass control to OS
32	Early CPU initiation	01	S1
34	Wake up AP	03	S3
98	Detect PS2 mouse/keyboard	04	S4
97	Initiate VGA BIOS	05	S5
9A-9D	USB initiation	10	Resume from S1
A2	Detect SATA	30	Resume from S3
B2	Initiate option ROM	40	Resume from S4

11. Direct Connector (2-pin DRCT)

This connector is for the chassis-mounted button that supports the DirectKey function. Connect the button cable that supports DirectKey, from the chassis to this connector on the motherboard.

DRCT

DRCT
GND

PIN 1

P9D WS DRCT connector
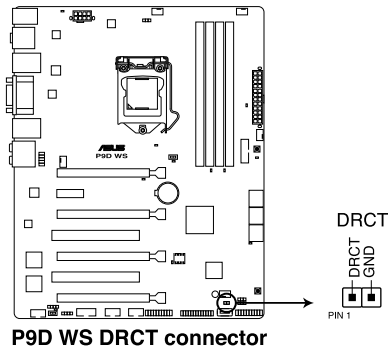
Ensure that your chassis comes with the extra button cable that supports the DirectKey feature. Refer to the technical documentation that came with the chassis for details.

12. 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.

CHASSIS

+5VSB_MB
Chassis Signal
GND

P9D WS Chassis intrusion connector
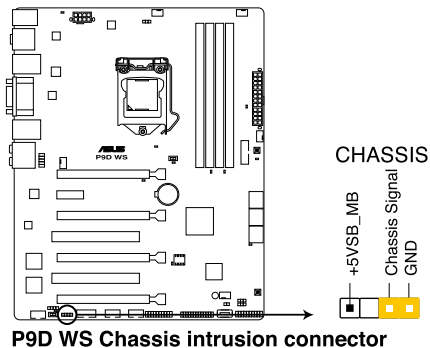
13.   ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)

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.

P9D WS ATX power connectors
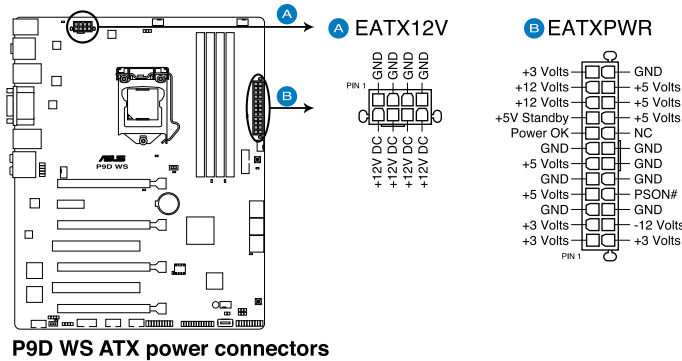
- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 350 W.

- 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 1000W power or above to ensure the system stability.

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

This connector supports several chassis-mounted functions.
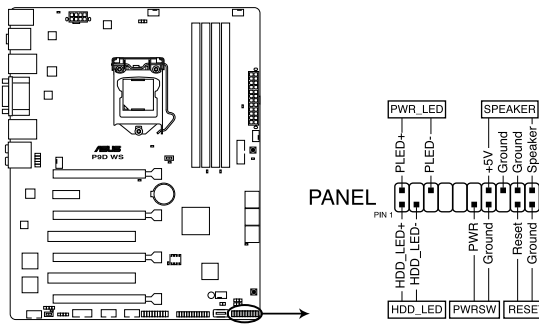
P9D WS System panel connector

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

    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 HDD_LED)**

    This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The HDD 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.

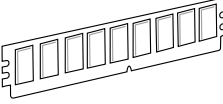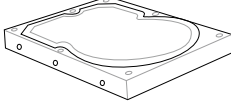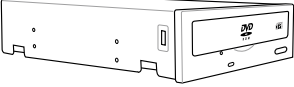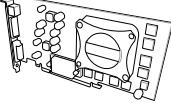- **ATX power button/soft-off button (2-pin PWRSW)**
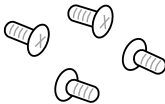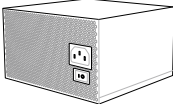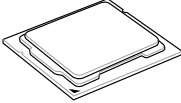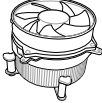
    This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **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.

2.3 Building your computer system

2.3.1 Additional tools and components to build a PC system

1 bag of screws	**Philips (cross) screwdriver**
PC chassis	**Power supply unit**
Intel LGA 1150 CPU	**Intel LGA 1150 compatible CPU Fan**
DIMM	**SATA hard disk drive**
SATA optical disc drive (optional)	**Graphics card (optional)**

The tools and components in the table above are not included in the motherboard package.

2.3.2 CPU installation
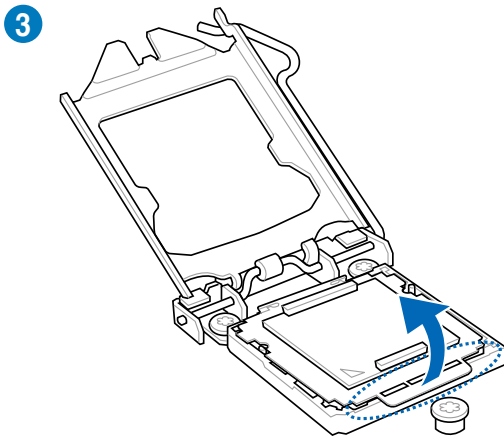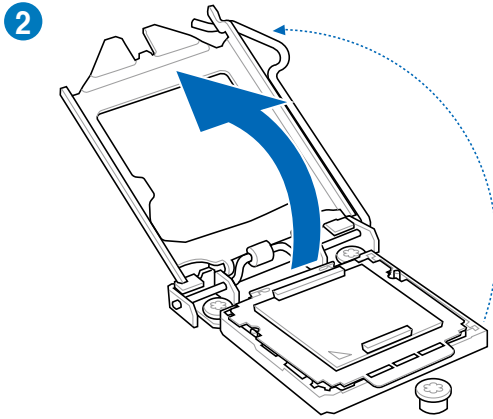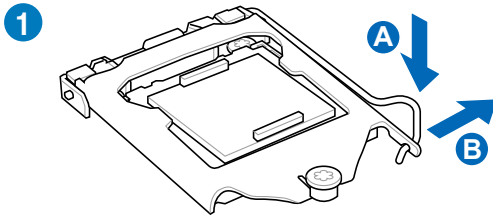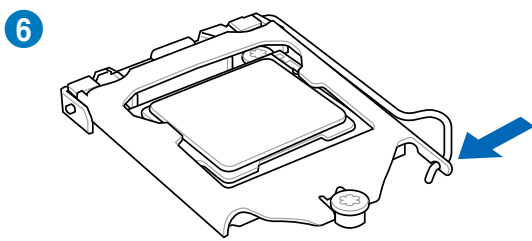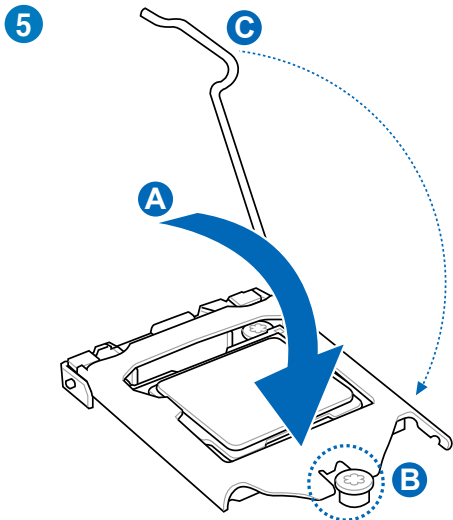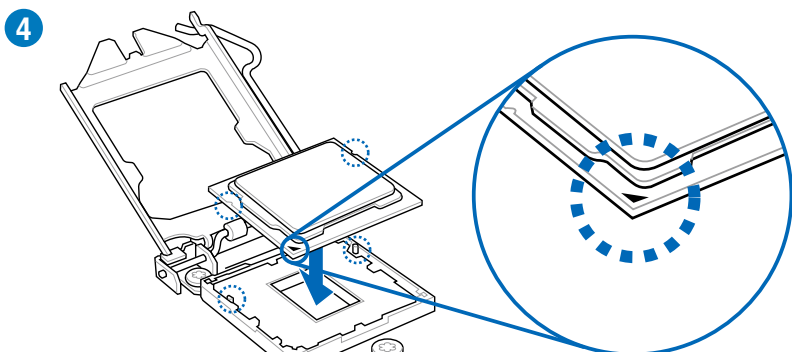
2.3.3   CPU heatsink and fan assembly installation
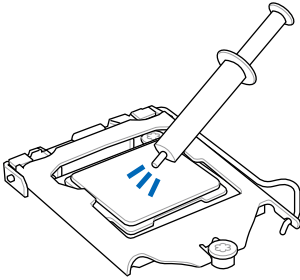
> ⚠ Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan if necessary.

To install the CPU heatsink and fan assembly

To uninstall the CPU heatsink and fan assembly

Chapter 2: Hardware information
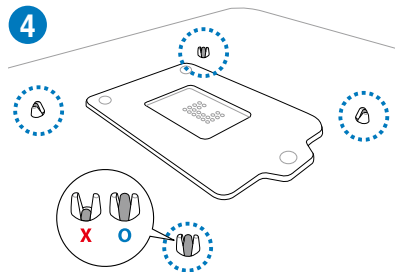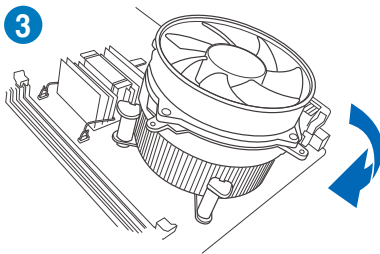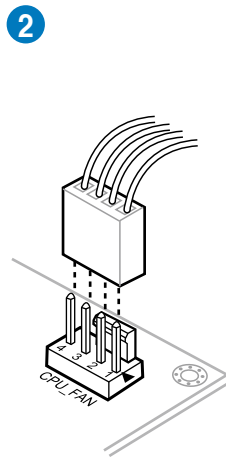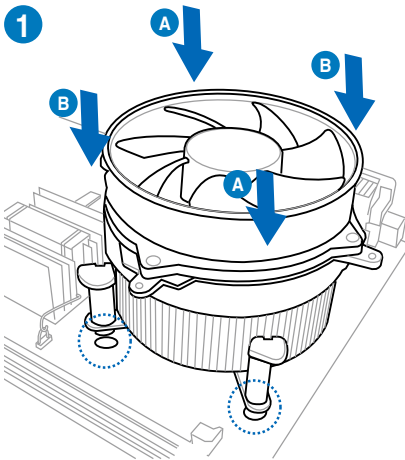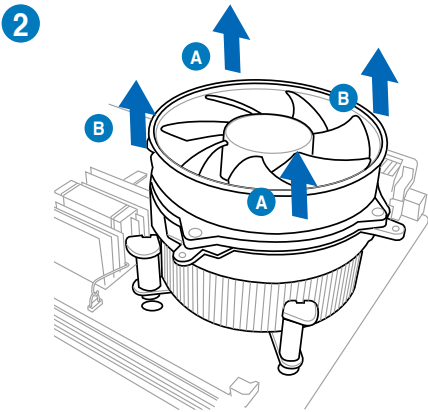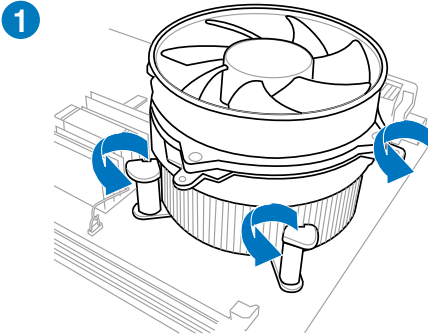
2.3.4   DIMM installation
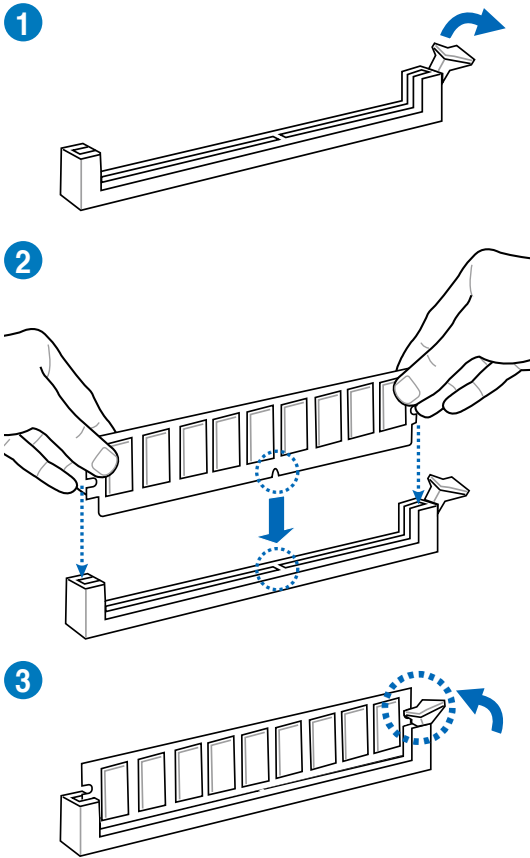
To remove a DIMM
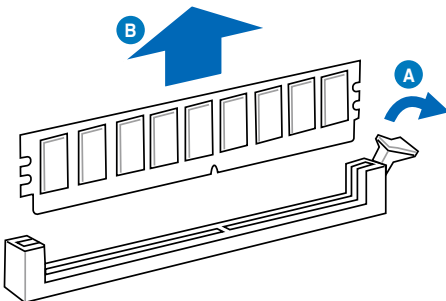
2.3.5   Motherboard installation
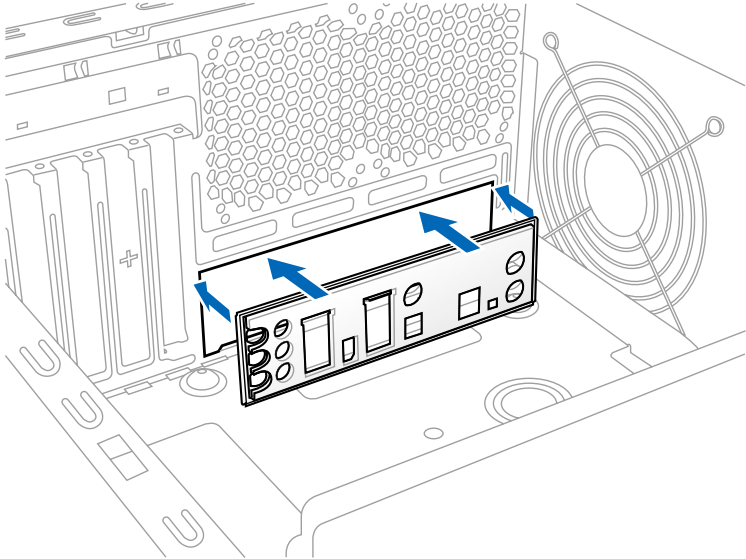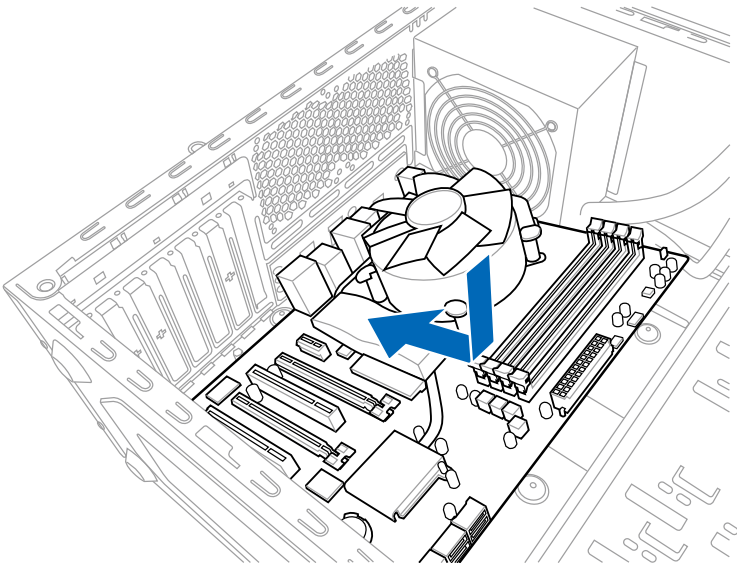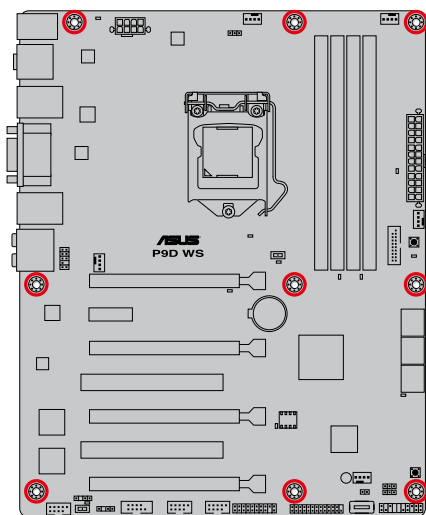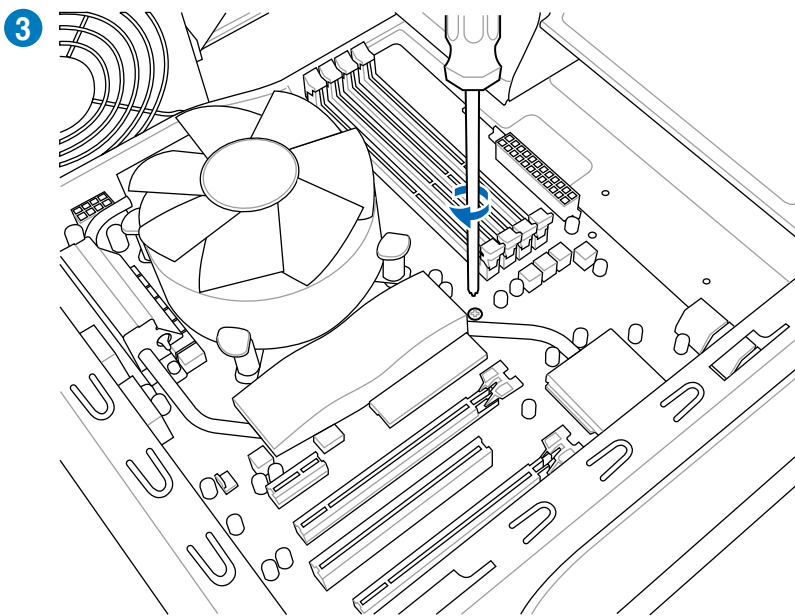
DO NOT overtighten the screws! Doing so can damage the motherboard.

2.3.6 ATX Power connection

OR
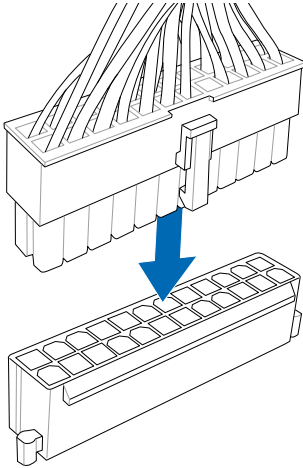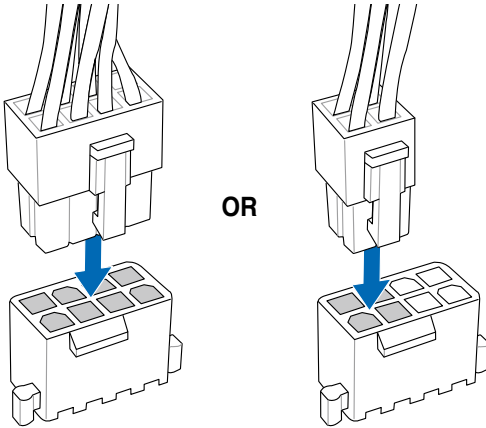
2.3.7 SATA device connection

OR

OR
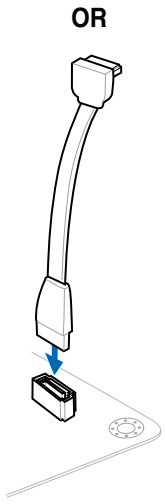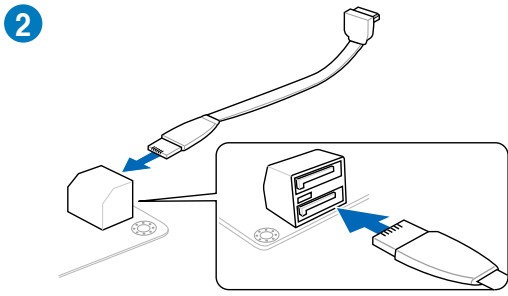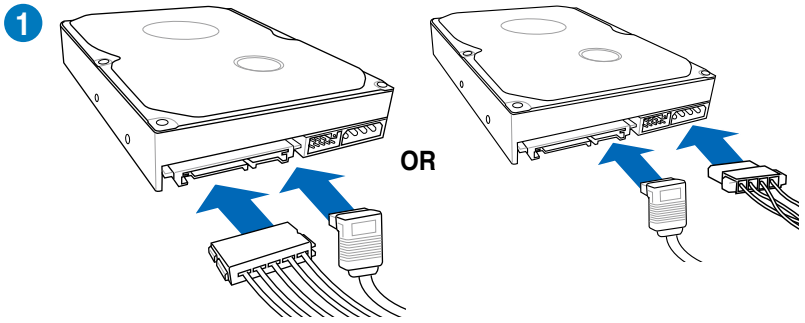
2.3.8 Front I/O Connector

To install ASUS Q-Connector
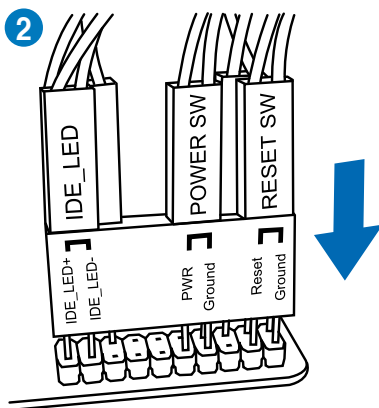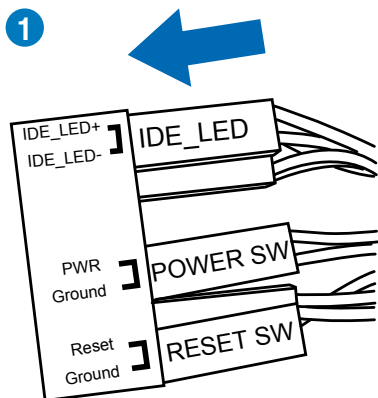
To install USB 2.0 Connector

USB 2.0
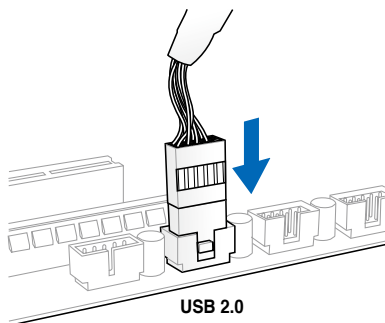
To install front panel audio connector

AAFP
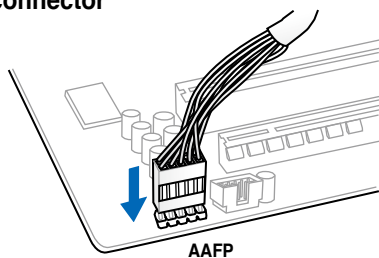
To install USB 3.0 Connector

USB 3.0
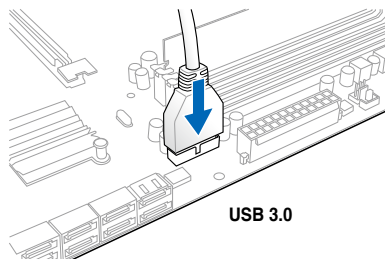
2.3.9   Expansion Card installation

To install PCIe x16 cards
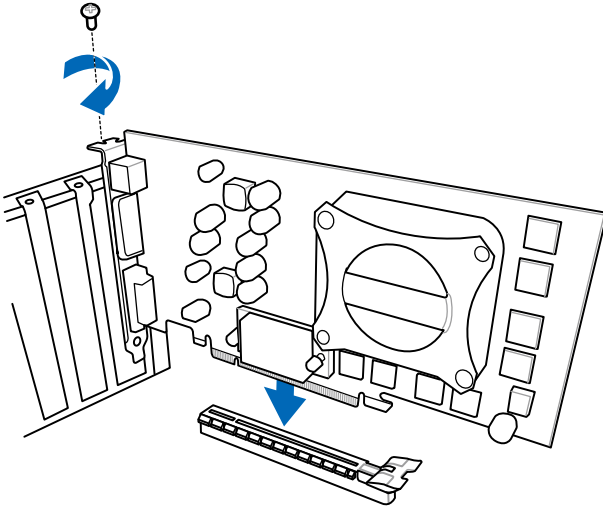
To install PCIe x1 cards   **To install PCI cards**
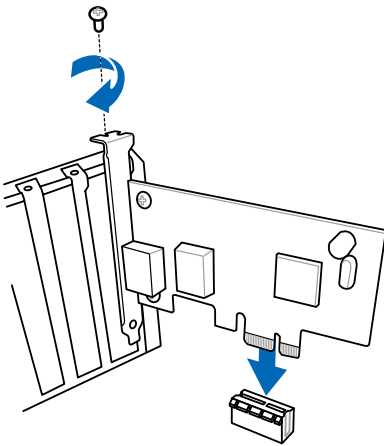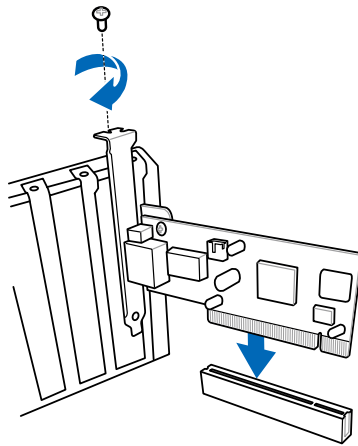
2.3.10 BIOS update utility

USB BIOS Flashback

USB BIOS Flashback allows you to easily update the BIOS without entering the existing BIOS or operating system. Simply insert a USB storage device to the USB port, press the USB BIOS Flashback button for three seconds, and the BIOS is updated automatically.

To use USB BIOS Flashback:

1. Place the bundled support DVD to the optical drive and install the USB BIOS Flashback Wizard. Follow the onscreen instructions to complete the installation.

2. Insert the USB storage device to the USB Flashback port.

> We recommend you to use a USB 2.0 storage device to save the latest BIOS version for better compatibility and stability.

3. Launch the USB BIOS Flashback Wizard to automatically download the latest BIOS version.

4. Press the BIOS Flashback button for three seconds until a flashing light appears, which indicates that the BIOS Flashback function is enabled.

5. Wait until the light goes out, indicating that the BIOS updating process is completed.

USB BIOS Flashback button   **USB BIOS Flashback port**
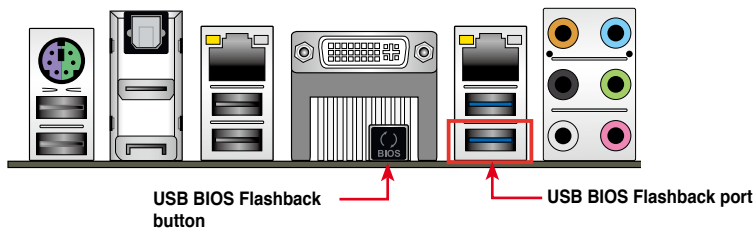
> For more BIOS update utilities in BIOS setup, refer to the section **3.11 Updating BIOS** in Chapter 3.

> • Do not unplug portable disk, power system, or press the CLR_CMOS button while BIOS update is ongoing, otherwise update will be interrupted. In case of interruption, please follow the steps again.
>
> • If the light flashes for five seconds and turns into a solid light, this means that the BIOS Flashback is not operating properly. This may be caused by improper installation of the USB storage device and filename/file format error. If this scenario happens, please restart the system to turn off the light.
>
> • Updating BIOS may have risks. If the BIOS program is damaged during the process and results to the system's failure to boot up, please contact your local ASUS Service Center.

2.3.11   Rear panel connection
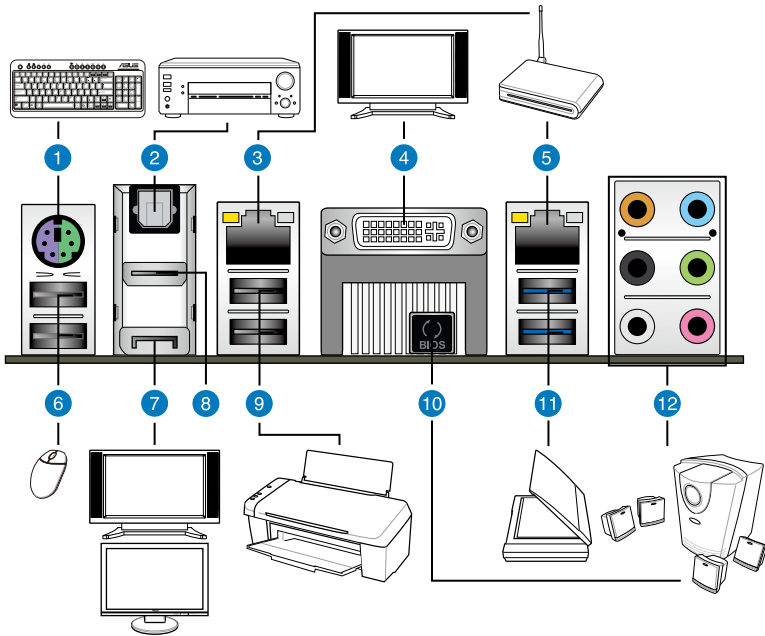
Rear panel connectors	
1. PS/2 mouse and keyboard port	7. **DisplayPort**
2. **Optical S/PDIF Out port**	8. **HDMI port**
3. LAN (RJ-45) port 2*	9. USB 2.0 ports 5 and 6
4. DVI port	10. **USB BIOS Flashback button**
5. LAN (RJ-45) port 1*	11. USB 3.0 ports 3 and 4
6. USB 2.0 ports 7 and 8	12. Audio I/O ports**

*and **: Refer to the tables on the next page for LAN port and audio port definitions.

- Due to USB 3.0 controller limitation, USB 3.0 devices can only be used under Windows® OS environment and after the USB 3.0 driver installation.

- USB 3.0 devices can only be used as data storage only.

- We strongly recommend that you connect USB 3.0 devices to USB 3.0 ports for faster and better performance for your USB 3.0 devices.

* 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

ACT/LINK SPEED
LED   LED

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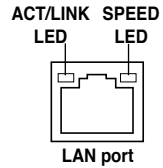
**Audio 2, 4, 6, or 8-channel configuration

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

2.3.12   Audio I/O connections

Audio I/O ports
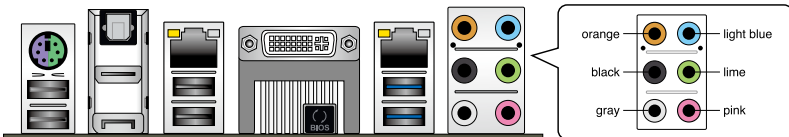
Connect to Headphone and Mic
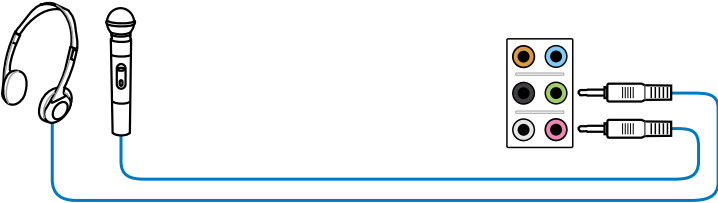
Connect to Stereo Speakers
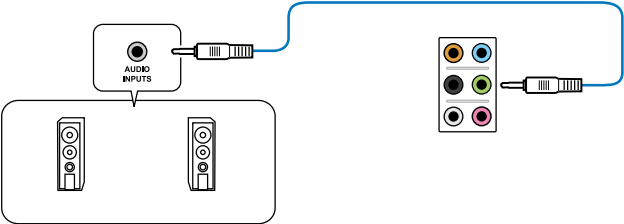
Connect to 2.1 channel Speakers
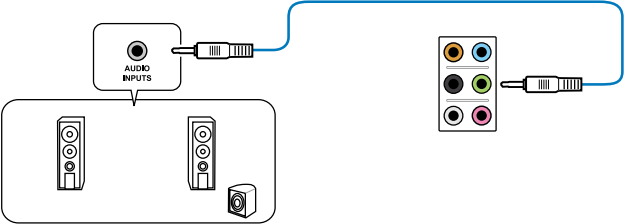
Connect to 4.1 channel Speakers
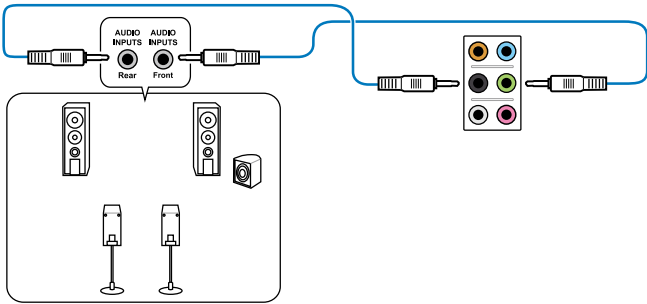
Connect to 5.1 channel Speakers
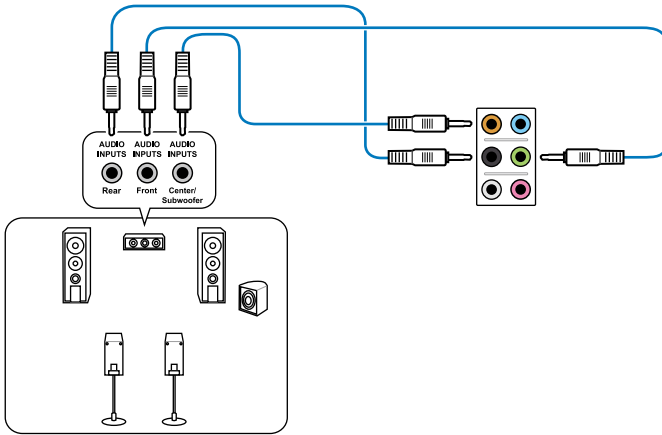
Connect to 7.1 channel Speakers
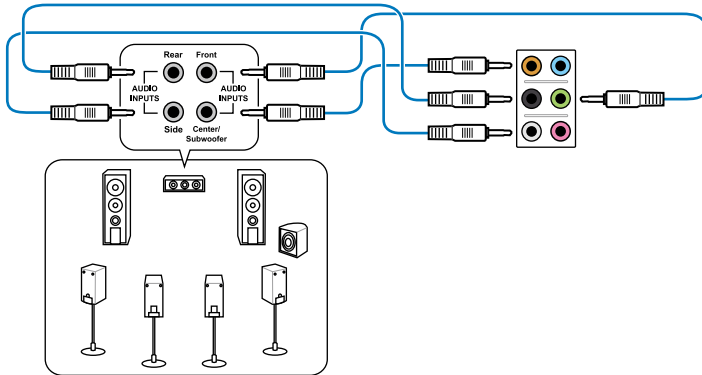
2.4   Starting up for the first time

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.

2.5   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.

Chapter 2

Chapter 3

3.1   Knowing BIOS

The new ASUS UEFI BIOS is a Unified Extensible Interface that complies with UEFI architecture, offering a user-friendly interface that goes beyond the traditional keyboard-only BIOS controls to enable a more flexible and convenient mouse input. You can easily navigate the new UEFI BIOS with the same smoothness as your operating system. The term "BIOS" in this user manual refers to "UEFI BIOS" unless otherwise specified.

BIOS (Basic Input and Output System) stores system hardware settings such as storage device configuration, overclocking settings, advanced power management, and boot device configuration that are needed for system startup in the motherboard CMOS. In normal circumstances, the default BIOS settings apply to most conditions to ensure optimal performance. **DO NOT change the default BIOS settings** except in the following circumstances:

- An error message appears on the screen during the system bootup and requests you to run the BIOS Setup.

- You have installed a new system component that requires further BIOS settings or update.

Inappropriate BIOS settings may result to instability or boot failure. **We strongly recommend that you change the BIOS settings only with the help of a trained service personnel**.

When downloading or updating the BIOS file, rename it as **P9DWS.CAP** for this motherboard.

3.2 BIOS setup program

Use the BIOS Setup to update the BIOS or configure its parameters. The BIOS screen include navigation keys and brief onscreen help to guide you in using the BIOS Setup program.

Entering BIOS at startup

To enter BIOS Setup at startup:

- Press <Delete> during the Power-On Self Test (POST). If you do not press <Delete>, POST continues with its routines.

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press <Ctrl>+<Alt>+<Delete> simultaneously.

- Press the reset button on the system chassis.

- Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the first two options.

- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

- Ensure that a USB mouse is connected to your motherboard if you want to use the mouse to control the BIOS setup program.

- If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu or press hotkey **<F5>**. See section **3.9 Exit Menu** for details.

- If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See section **1.2.6 Onboard buttons and switches** for information on how to erase the RTC RAM via the Clear CMOS button.

- The BIOS setup program does not support the bluetooth devices.

BIOS menu screen

The BIOS Setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. You can change modes from the **Exit** menu or from the **Exit/Advanced Mode** screen.

3.2.1 EZ Mode

By default, the EZ Mode screen appears when you enter the BIOS setup program. The EZ Mode provides you an overview of the basic system information, and allows you to select the display language, system performance mode and boot device priority. To access the Advanced Mode, click **Exit/Advanced Mode**, then select **Advanced Mode** or press <F7> hot key for the advanced BIOS settings.

> The default screen for entering the BIOS setup program can be changed. Refer to the **Setup Mode** item in section **3.7 Boot menu** for details.

Displays the CPU/motherboard temperature, CPU/5V/3.3V/12V voltage output, CPU/chassis/power fan speed

Selects the display language of the BIOS setup program

Exits the BIOS setup program without saving the changes, saves the changes and resets the system, or enters the Advanced Mode

Displays the selected shortcut items

Displays the Advanced mode menus

Selects the boot device priority

Loads optimized default settings

Selects the boot device priority

Displays the system properties of the selected mode on the right hand side

> • The boot device options vary depending on the devices you installed to the system.
>
> • The **Boot Menu(F8)** button is available only when the boot device is installed to the system.

3.2.2 Advanced Mode

The Advanced Mode provides advanced options for experienced end-users to configure the BIOS settings. The figure below shows an example of the Advanced Mode. Refer to the following sections for the detailed configurations.

To access the Advanced Mode, click **Exit**, then select **Advanced Mode** or press **F7** hotkey.

Menu bar

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

My Favorites	For saving the frequently-used system settings and configuration.
Main	For changing the basic system configuration
Ai Tweaker	For changing the overclocking settings
Advanced	For changing the advanced system settings
Monitor	For displaying the system temperature, power status, and changing the fan settings.
Boot	For changing the system boot configuration
Tool	For configuring options for special functions
Exit	For selecting the exit options and loading default settings

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 (Ai Tweaker, Advanced, Monitor, Boot, Tool, and Exit) on the menu bar have their respective menu items.

Back button

This button appears when entering a submenu. Press <Esc> or use the USB mouse to click this button to return to the previous menu screen.

Submenu items

A greater than sign (>) before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

Pop-up window

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

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.

Navigation keys

At the bottom right corner of the menu screen are the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

> If you delete all shortcut items from the F3: Shortcut list, the default shortcut items will reappear after your next startup.

General help

At the top right corner of the menu screen is a brief description of the selected item. Use <F12> key to capture the BIOS screen and save it to the removable storage device.

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 highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

Quick Note button

This button allows you to enter notes of the activities that you have done in BIOS.

> •   The Quick Note function does not support the following keyboard functions: delete, cut, copy and paste.
>
> •   You can only use the alphanumeric characters to enter your notes.

Last Modified button

This button shows the items that you last modified and saved in BIOS Setup.

3.3 My Favorites

MyFavorites is your personal space where you can easily save and access your favorite BIOS items.

Adding items to My Favorites

To add frequently-used BIOS items to My Favorites:

1. Use the arrow keys to select an item that you want to add. When using a mouse, hover the pointer to the item.

2. Press <F4> on your keyboard or right-click on your mouse to add the item to My Favorites page.

You cannot add the following items to My Favorites:

- Items with submenu options

- User-configurable items such as language and boot device order

- Configuration items such as Memory SPD Information, system time and date

3.4 Main menu

The Main menu screen appears when you enter the Advanced Mode of the BIOS Setup program. The Main menu provides you an overview of the basic system information, and allows you to set the system date, time, language, and security settings.
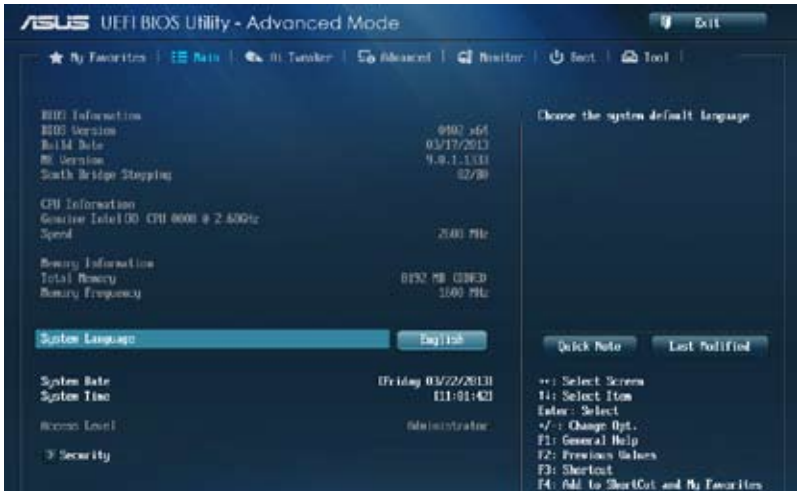
Security

The Security menu items allow you to change the system security settings.
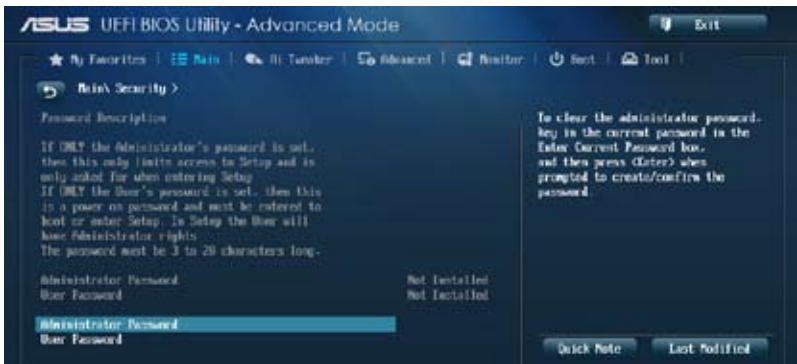
• If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See section **1.2.6 Onboard buttons and switches** for information on how to erase the RTC RAM via the Clear CMOS button.

• The Administrator or User Password items on top of the screen show the default **[Not Installed]**. After you set a password, these items show **[Installed]**.

Administrator Password

If you have set an administrator password, we recommend that you enter the administrator password for accessing the system. Otherwise, you might be able to see or change only selected fields in the BIOS setup program.

To set an administrator password:

1.   Select the **Administrator Password** item and press <Enter>.

2.   From the **Create New Password** box, key in a password, then press <Enter>.

3.   Confirm the password when prompted.

To change an administrator password:

1.   Select the **Administrator Password** item and press <Enter>.

2.   From the **Enter Current Password** box, key in the current password, then press <Enter>.

3.   From the **Create New Password** box, key in a new password, then press <Enter>.

4.   Confirm the password when prompted.

To clear the administrator password, follow the same steps as in changing an administrator password, but press <Enter> when prompted to create/confirm the password. After you clear the password, the **Administrator Password** item on top of the screen shows **Not Installed**.

User Password

If you have set a user password, you must enter the user password for accessing the system. 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 **User Password** item and press <Enter>.

2.   From the **Create New Password** box, key in a password, then press <Enter>.

3.   Confirm the password when prompted.

To change a user password:

1.   Select the **User Password** item and press <Enter>.

2.   From the **Enter Current Password** box, key in the current password, then press <Enter>.

3.   From the **Create New Password** box, key in a new password, then press <Enter>.

4.   Confirm the password when prompted.

To clear the user password, follow the same steps as in changing a user password, but press <Enter> when prompted to create/confirm the password. After you clear the password, the **User Password** item on top of the screen shows **Not Installed**.

3.5   Ai Tweaker menu

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

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

The configuration options for this section vary depending on the CPU and DIMM model you installed on the motherboard.

Scroll down to display other BIOS items.

Ai Overclock Tuner [Auto]

Allows you to select the CPU overclocking options to achieve the desired CPU internal frequency. Select any of these preset overclocking configuration options:

[Auto]   Loads the optimal settings for the system.

[X.M.P.]   Allows your system to automatically optimize the CPU ratio, BCLK frequency, and memory parameters. If you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology, select this item to set the profiles supported by your memory modules for optimizing the system performance.

> The following item appears only when you set the Ai Overclocking Tuner to **[X.M.P.]**.

eXtreme Memory Profile

Allows you to select the X.M.P. mode supported by your memory module.

Configuration options: [Profile #1] [Profile #2]

ASUS MultiCore Enhancement [Enabled]

[Enabled]   Default set to **[Enabled]** for maximum performance under XMP/Manual/ User-defined memory frequency mode.

[Disabled]   Allows you to set to default core ratio settings.

CPU Core Ratio [Auto]

Allows you to set the CPU ratio and synchronize automatically either per core or all cores.

Configuration options: [Auto] [Sync All Cores] [Per Core]

> When the CPU Core Ratio is set to **[Per Core]**, the following item appears:
>
> ### *1-Core Ratio Limit [Auto]*
> Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 1-Core Limit value that must be higher than or equal to the 2-Core Ratio Limit.
>
> ### *2-Core Ratio Limit [Auto]*
> Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 2-Core Limit value that must be higher than or equal to the 3-Core Ratio Limit.

> If you assign a value for 2-Core Ratio Limit, do not set the 1-Core Ratio Limit to **[Auto]**.

> ### *3-Core Ratio Limit [Auto]*
> Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 3-Core Limit value that must be higher than or equal to the 4-Core Ratio Limit.

> If you assign a value for 3-Core Ratio Limit, do not set the 1-Core Ratio Limit and 2-Core Ratio Limit to **[Auto]**.

4-Core Ratio Limit [Auto]
Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 4-Core Limit value that must be higher than or equal to the 3-Core Ratio Limit.

> ⚠ If you assign a value for 4-Core Ratio Limit, do not set the 1-Core Ratio Limit, 2-Core Ratio Limit, and 3-Core Ratio to **[Auto]**.

Min CPU Cache Ratio [Auto]

Allows you to set the minimum possible ratio on the Uncore part of the processor. Use the <+> or <-> keys to adjust the value. The values depend on the CPU installed.

Max CPU Cache Ratio [Auto]

Allows you to set the maximum possible ratio on the Uncore part of the processor. Use the <+> or <-> keys to adjust the value. The values depend on the CPU installed.

Memory Frequency [Auto]

Allows you to set the memory operating frequency. The configuration options vary with the BCLK/PCIE Frequency item settings.

CPU Graphics Max. Ratio [Auto]

Allows you to optimize the CPU Graphics Ratio depending on the system loading. Use the <+> or <-> keys to adjust the value.

EPU Power Saving Mode [Disabled]

Allows you to enable or disable the EPU power saving function.

Configuration options: [Disabled] [Enabled]

DRAM Timing Control

The subitems in this menu allow you to set the DRAM timing control features. Use the <+> or <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.

> ⚠ Changing the values in this menu may cause the system to become unstable! If this happens, revert to the default settings.

Primary Timings

DRAM CAS# Latency [Auto]
Configuration options: [Auto] [1] – [31]

DRAM RAS# to CAS# Delay [Auto]
Configuration options: [Auto] [1] – [31]

DRAM RAS# PRE Time [Auto]
Configuration options: [Auto] [1] – [31]

DRAM RAS# ACT Time [Auto]
Configuration options: [Auto] [1] – [63]

DRAM Command Rate [Auto]
Configuration options: [Auto] [1] – [3]

Secondary Timings

DRAM RAS# to RAS# Delay [Auto]
Configuration options: [Auto] [1] – [15]

DRAM REF Cycle Time [Auto]
Configuration options: [Auto] [1] – [511]

DRAM Refresh Interval [Auto]
Configuration options: [Auto] [1] – [65535]

DRAM WRITE Recovery Time [Auto]
Configuration options: [Auto] [1] – [16]

DRAM READ to PRE Time [Auto]
Configuration options: [Auto] [1] – [15]

DRAM FOUR ACT WIN Time [Auto]
Configuration options: [Auto] [1] – [255]

DRAM WRITE to READ Delay [Auto]
Configuration options: [Auto] [1] – [15]

DRAM CKE Minimum pulse width [Auto]
Configuration options: [Auto] [1] – [15]

DRAM CAS# Write Latency [Auto]
Configuration options: [Auto] [1] – [31]

RTL IOL control

DRAM RTL initial Value [Auto]
Configuration options: [Auto] [1] - [63]

DRAM RTL (CHA_R0D0) [Auto]
Configuration options: [Auto] [1] - [63]

DRAM RTL (CHA_R0D1) [Auto]
Configuration options: [Auto] [1] - [63]

DRAM RTL (CHA_R1D0) [Auto]
Configuration options: [Auto] [1] - [63]

DRAM RTL (CHA_R1D1) [Auto]
Configuration options: [Auto] [1] - [63]

DRAM RTL (CHB_R0D0) [Auto]
Configuration options: [Auto] [1] - [63]

DRAM RTL (CHB_R0D1) [Auto]
Configuration options: [Auto] [1] - [63]

DRAM RTL (CHB_R1D0) [Auto]
Configuration options: [Auto] [1] - [63]

DRAM RTL (CHB_R1D1) [Auto]
Configuration options: [Auto] [1] - [63]

DRAM IO-L (CHA_R0D0) [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHA_R0D1) [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHA_R1D0 [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHA_R1D1 [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHB_R0D0 [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHB_R0D1) [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHB_R1D0 [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHB_R1D1 [Auto]
Configuration options: [Auto] [1] - [15]

Third Timings

tRDRD [Auto]
Configuration options: [Auto] [1] – [7]

tRDRD_dr [Auto]
Configuration options: [Auto] [1] – [15]

tRDRD_dd [Auto]
Configuration options: [Auto] [1] – [15]

tWRRD [Auto]
Configuration options: [Auto] [1] – [63]

tWRRD_dr [Auto]

Configuration options: [Auto] [1] – [15]

tWRRD_dd [Auto]

Configuration options: [Auto] [1] – [15]

tWRWR [Auto]

Configuration options: [Auto] [1] – [7]

tWRWR_dr [Auto]

Configuration options: [Auto] [1] – [15]

tWRWR_dd [Auto]

Configuration options: [Auto] [1] – [15]

Dec_WRD [Auto]

Configuration options: [Auto] [0] – [1]

tRDWR [Auto]

Configuration options: [Auto] [1] – [31]

tRDWR_dr [Auto]

Configuration options: [Auto] [1] – [31]

tRDWR_dd [Auto]

Configuration options: [Auto] [1] – [31]

MISC

MRC Fast Boot [Auto]

Allows you to enable, disable or automatically set the MRC fast boot.
Configuration options: [Auto] [Enable] [Disable]

DRAM CLK Period [Auto]

Configuration options: [Auto] [1] – [14]

Channel A DIMM Control [Enable Bot...]

Configuration options: [Enable Both DIMMS] [Disable DIMM0] [Disable DIMM1]
[Disable Both DIMMS]

Channel B DIMM Control [Enable Bot...]

Configuration options: [Enable Both DIMMS] [Disable DIMM0] [Disable DIMM1]
[Disable Both DIMMS]

Scrambler Setting [Optimized ...]

Allows you to set the optimized scrambler setting for stability.
Configuration options: [Optimized (ASUS)] [Default (MRC)]

DIGI+ Power Control

CPU Load-Line Calibration [Auto]

Load-line is defined by Intel® VRM specification and affects CPU power voltage. The CPU working voltage will decrease proportionally to CPU loading. Higher load-line calibration could get higher voltage and good overclocking performance, but increases the CPU and VRM thermal conditions.
Select from Level 1 to Level 8 to adjust CPU power voltage from 0% to 100%.

The actual performance boost may vary depending on your CPU specification.

DO NOT remove the thermal module. The thermal conditions should be monitored.

CPU Voltage Frequency [Auto]

Frequency switching affects the VRM transient response and the thermal component conditions. Higher frequency gets quicker transient response.
Configuration options: [Auto] [Manual]

DO NOT remove the thermal module when setting this item to **[Manual Mode]**. The thermal conditions should be monitored.

The following item appears only when you set the CPU Voltage Frequency to **[Manual]**.

CPU Fixed Frequency [500]
This item allows you to set a fixed CPU Voltage frequency. Use the <+> or <-> keys to adjust the value. The values range from 300kHz to 500kHz with a 50kHz interval.

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CPU Power Phase Control [Auto]

Allows you to set the power phase control of the CPU.
Configuration options: [Auto] [Standard] [Optimized] [Extreme] [Manual Adjustment]

DO NOT remove the thermal module when setting this item to **[Extreme]** and **[Manual Adjustment]**. The thermal conditions should be monitored.

The following item appears only when you set the CPU Power Phase Control to **[Manual Adjustment]**.

Manual Adjustment [Fast]
Allows you to set a faster phase response for the CPU to increase system performance or to slower phase response to decrease DRAM power efficiency.

Configuration options: [Ultra Fast] [Fast] [Medium] [Regular]

CPU Power Duty Control [T.Probe]

DIGI + VRM Duty Control adjusts the current of every VRM phase and the thermal conditions of every phase component.

[T. Probe]   Select to maintain the VRM thermal balance.
[Extreme]   Select to maintain the current VRM balance.

DO NOT remove the thermal module. The thermal conditions should be monitored.

CPU Current Capability [Auto]

DIGI+ VRM CPU Current Capability provides wider total power range for overclocking. A higher value setting gets higher VRM power consumption delivery and extends the overclocking frequency range simultaneously.
Configuration options: [Auto] [100%] [110%] [120%] [130%] [140%]

Choose a higher value when overclocking, or under a high CPU loading for extra power support.

CPU Power Thermal Control [120]

A higher temperature brings a wider CPU power thermal range and extends the overclocking tolerance to enlarge the O.C. potential. Use the <+> or <-> keys to adjust the value. The values depend on the CPU installed.

DO NOT remove the thermal module. The thermal conditions should be monitored.

DRAM Current Capability [100%]

A higher value brings a wider total power range, and extends the overclocking range simultaneously.
Configuration options: [100%] [110%] [120%] [130%] [140%]

DRAM Voltage Frequency [Auto]

Allows you to adjust the DRAM switching frequency. Assign a fixed high DRAM frequency to increase the O.C. range, or a low DRAM frequency for a better system stability.
Configuration options: [Auto] [Manual]

> The following item appears only when you set set the DRAM Frequency Mode item to **[Manual]**.

DRAM Fixed Frequency Mode [500]
Allows you to set a fixed DRAM frequency to increase the overclocking range or a low DRAM frequency for better system stability. Use the <+> or <-> keys to adjust the value. The values range from 400kHz to 500kHz with a 50kHz interval.

DRAM Power Phase Control [Standard]

[Standard]	Allows you to set the Standard mode.
[Optimized]	Allows you to set the ASUS optimized phase tuning profile.
[Extreme]	Allows you to set the full phase mode.
[Manual Adjustment]	Allows you to adjust the DRAM Power Phase Control manually.

> The following item appears only when you set the CPU Power Phase Control to **[Manual Adjustment]**.

Manual Adjustment [Fast]
Allows you to set a faster phase response for the DRAM to increase system performance or to slower phase response to decrease DRAM power efficiency.

Configuration options: [Ultra Fast] [Fast] [Medium] [Regular]

CPU Power Management
The subitems in this menu allow you to set the CPU ratio and their features.

Enhanced Intel SpeedStep Technology [Enabled]

Allows the operating system to dynamically adjust the processor voltage and cores frequency, resulting to a decreased average power consumption and decreased average heat production.
Configuration options: [Disabled] [Enabled]

Turbo Mode [Enabled]

Allows you to enable your core processor's speed to run faster than the base operating frequency when it is below operating power, current and temperature specification limit.
Configuration options: [Disabled] [Enabled]

> The following items appear only when you set the Turbo Mode to **[Enabled]**.

Turbo Mode Parameters

Long Duration Package Power Limit [Auto]
Allows you to limit the Turbo Ratio's time duration that exceeds the TDP (Thermal Design Power) for maximum performance. Use the <+> or <-> keys to adjust the value. The values range from 1W t0 4096W.

Package Power Time Window [Auto]
Also known as Power Limit 1, and allows you to maintain the time window for Turbo Ratio over TDP (Thermal Design Power). Use the <+> or <-> keys to adjust the value. The values range from 1 to 127 in seconds.

Short Duration Package Power Limit [Auto]
Also known as Power Limit 2, and allows you to provide rapid protection when the package power exceeds the Power Limit 1. Use the <+> or <-> keys to adjust the value. The values range from 1W t0 4096W.

CPU Integrated VR Current Limit [Auto]
Allows you to set a higher current limit to prevent frequency and power throttling when overclocking. Use the <+> or <-> keys to adjust the value. The values range from 0.125 to 1023.875 with a 0.125 interval.

CPU Internal Power Switching Frequency

Frequency Tuning Mode [Auto]

Allows you to increase or decrease the switching frequency of the internal regulator. Decrease to help consume less power or increase to help votlage stability. When this item is set to **[+]** or **[-]**, the Frequency Tuning Offset appears and allows you to set its value from 0% to 6%.

CPU Internal Power Fault Control

Thermal Feedback [Auto]

Allows your system to take precautionary actions to be taken by the CPU when the thermal conditions of the external regulator exceeds the threshold.
Configuration options: [Auto] [Disabled] [Enabled]

CPU Integrated VR Fault Management [Auto]

Disable this item to prevent tripping the Fully Integrated Voltage Regulator when doing over-voltage. We recommend you to disable this item when overclocking.
Configuration options: [Auto] [Disabled] [Enabled]

CPU Internal Power Configuration

CPU Integrated VR Efficiency Management [Auto]

Allows you to improve power saving when the processor is in low power state. Disable to make the Fully Integrated Voltage Regulator work in high performance at all times.
Configuration options: [Auto] [High Performance] [Balanced]

Power Decay Mode [Auto]

Allows your system to improve the power saving mode on the Fully Integrated Voltage Regulator as the processor goes into low current state.
Configuration options: [Auto] [Disabled] [Enabled]

Idle Power-in Response [Auto]

Allows you to set the slew rate for the Fully Integrated Voltage Regulator as it enters manual override mode.
Configuration options: [Auto] [Regular] [Fast]

Idle Power-out Response [Auto]

Allows you to set the slew rate for the Fully Integrated Voltage Regulator as it exits manual override mode.
Configuration options: [Auto] [Regular] [Fast]

Power Current Slope [Auto]

Allows you to set the gradient of the high-speed active phase current balance during load transients to eliminate current imbalance that can result from a load current oscillating near the switching frequency.
Configuration options: [Auto] [LEVEL 4] [LEVEL 3] [LEVEL 2] [LEVEL 1] [LEVEL 0] [LEVEL -1] [LEVEL -2] [LEVEL -3] [LEVEL -4]

Power Current Offset [Auto]

Allows you to increase or decrease the output current sensed by the CPU. It finds the balance between optimal regulating while staying below the current threshold.
Configuration options: [Auto] [100%] [87.5%] [75.0%] [62.5%] [50.0%] [37.5%] [25.0%] [12.5%] [0%] [-12.5%] [-25.0%] [-37.5%] [-50.0%] [-62.5%] [-75.0%] [-87.5%] [-100%]

Power Fast Ramp Response [Auto]

Allows you to increase to enhance the response of the voltage regulator during the load transient.
Configuration options: [Auto] [0.00] - [1.50]

CPU Internal Power Saving Control

Power Saving Level 1 Threshold [Auto]

Lower value provides sufficient overclocking tolerance to enlarge the overclocking potential. Higher value provides better power-saving condition.Use <+> or <-> key to adjust the value. The values range from 0A to 80A at 1Amp increment.

Power Saving Level 2 Threshold [Auto]

Lower value provides sufficient overclocking tolerance to enlarge the overclocking potential. Higher value provides better power-saving condition.Use <+> or <-> key to adjust the value. The values range from 0A to 50A at 1Amp increment.

Power Saving Level 3 Threshold [Auto]

Lower value provides sufficient overclocking tolerance to enlarge the overclocking potential. Higher value provides better power-saving condition.Use <+> or <-> key to adjust the value. The values range from 0A to 30A at 1Amp increment.

Chapter 3

CPU Core Voltage [Auto]

Allows you to configure the amount of voltage fed to the cores of the processor. Increase the amount of voltage when increasing core frequency.

Configuration options: [Auto] [Manual Mode] [Offset Mode] [Adaptive Mode]

- • The **Adaptive Mode** option appears only if you are using an Intel® Core™ i3 series processors.
- • The following item appears only when you set the CPU Core Voltage to **[Manual]**.

CPU Core Voltage Override [Auto]

Allows you to set the CPU Core Voltage override. Use the <+> or <-> keys to adjust the value, The values range from 0.001V to 1.920V with a 0.001V interval.

The following items appear only when you set the CPU Core Voltage to **[Offset Mode]**.

Offset Mode Sign [+]

[+]   To offset the voltage by a positive value.

[–]   To offset the voltage by a negative value.

CPU Core Voltage Offset

Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.

CPU Cache Voltage [Auto]

Allows you to configure the amount of voltage fed to the uncore of the processor including its cache. Increase the voltage when increasing Ring frequency.

Configuration options: [Auto] [Manual Mode] [Offset Mode] [Adaptive Mode]

- • The **Adaptive Mode** option appears only if you are using an Intel® Core™ i3 series processors.
- • The following item appears only when you set the CPU Cache Voltage to **[Manual Mode]**.

CPU Cache Voltage Override [Auto]

Allows you to set the CPU Cache Voltage override. Use the <+> or <-> keys to adjust the value, The values range from 0.001V to 1.920V with a 0.001V interval.

The following items appear only when you set the CPU Core Voltage to **[Offset Mode]**.

Offset Mode Sign [+]

[+]   To offset the voltage by a positive value.

[–]   To offset the voltage by a negative value.

CPU Cache Voltage Offset

Allows you to set the CPU cache voltage offset. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.

CPU Graphics Voltage [Auto]

Allows you to configure the amount of voltage fed to the onboard graphics unit on the processor. Increase the amount of voltage when increasing iGPU frequency.

Configuration options: [Auto] [Manual Mode] [Offset Mode] [Adaptive Mode]

The following item appears only when you set the CPU Core Voltage to **[Manual]**.

CPU Graphics Voltage Override [Auto]

Allows you to set the CPU Graphics Voltage override. Use the <+> or <-> keys to adjust the value, The values range from 0.001V to 1.920V with a 0.001V interval.

The following items appear only when you set the CPU Core Voltage to **[Offset Mode]** or **[Adaptive Mode]**.

Offset Mode Sign [+]

[+]   To offset the voltage by a positive value.

[–]   To offset the voltage by a negative value.

CPU Graphics Voltage Offset
Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.

The following item appears only when you set the CPU Core Voltage to **[Adaptive Mode]**.

Additional Turbo Mode CPU Graphics Voltage [Auto]
This item allows you to add voltage for Turbo Mode CPU Graphics. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 1.920V with a 0.001V interval.

Chapter 3

CPU System Agent Voltage Offset Mode Sign [+]

[+]   To offset the voltage by a positive value.

[–]   To offset the voltage by a negative value.

CPU System Agent Voltage Offset [Auto]

Allows you to configure the amount of voltage fed to the system agent of the processor including its PCIe controller and power control unit. Increase the amount of voltage when increasing DRAM frequency. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.

CPU Analog I/O Voltage Offset Mode Sign [+]

[+]   To offset the voltage by a positive value.

[–]   To offset the voltage by a negative value.

CPU Analog I/O Voltage Offset [Auto]

Allows you to configure the amount of voltage fed to the analog portion of the I/O on the processor. Increase the amount of voltage when increasing DRAM frequency. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.

CPU Digital I/O Voltage Offset Mode Sign [+]

[+]   To offset the voltage by a positive value.

[–]   To offset the voltage by a negative value.

CPU Digital I/O Voltage Offset [Auto]

Allows you to configure the amount of voltage fed to the digital portion of the I/O on the processor. Increase the amount of voltage when increasing DRAM frequency. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.

CPU Input Voltage [Auto]

Allows you to set an input voltage for the processor by the external voltage regulator. By default, this item takes the standard value of the installed CPU. You can use the <+> or <-> keys to adjust the value. The values range from 0.800V to 2.40V with a 0.010V interval.

DRAM Voltage [Auto]

Allows you to set the DRAM voltage. You can use the <+> or <-> keys to adjust the value. The values range from 1.20V to 1.80V with a 0.005V interval.

According to Intel® CPU specifications, DIMMs with voltage requirement over 1.65V may damage the CPU permanently. We recommend that you install the DIMMs with the voltage requirement below 1.65V.

DRAM CTRL REF Voltage [Auto]

This item is the DRAM reference voltage for the control lines from the memory bus. You can use the <+> or <-> keys to adjust the value. The values range from 0.3950x to 0.6300x with a 0.0050x interval.

DRAM DATA REF Voltage on CHA [Auto]

This item is the DRAM reference voltage for the data lines on Channels A and B. You can use the <+> or <-> keys to adjust the value. The values range from 0.395x to 0.630x with a 0.005x interval.

DRAM DATA REF Voltage on CHB [Auto]

This item is the DRAM reference voltage for the data lines on Channels A and B. You can use the <+> or <-> keys to adjust the value. The values range from 0.395x to 0.630x with a 0.005x interval.

CPU Spread Spectrum [Auto]

[Auto]   Automatic configuration.

[Disabled]   Disable CPU Clock Spectrum.

[Enabled]   Enable CPU Clock Spectrum.

3.6   Advanced menu

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

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

3.6.1 CPU Configuration

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

> The items in this menu may vary based on the CPU installed.

Intel Adaptive Thermal Monitor [Enabled]

[Enabled]   Enables the overheated CPU to throttle its clock speed to cool down.

[Disabled]   Disables the CPU thermal monitor function.

Hyper-threading [Enabled]

The Intel Hyper-Threading Technology allows a hyper-threading processor to appear as two logical processors to the operating system, allowing the operating system to schedule two threads or processes simultaneously.

[Enabled]   Two threads per activated core are enabled.

[Disabled]   Only one thread per activated core is enabled.

> This Item apears only if you installed a CPU that supports the Intel Hyper-threading technology.

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Active Processor Cores [All]

Allows you to choose the number of CPU cores to activate in each processor package.

Configuration options: [All] [1] [2] [3]

Limit CPUID Maximum [Disabled]

[Enabled]   Allows legacy operating systems to boot even without support for CPUs with extended CPUID functions.

[Disabled]   Disables this function.

Execute Disable Bit [Enabled]

[Enabled]   Enables the No-Execution Page Protection Technology.

[Disabled]   Forces the XD feature flag to always return to zero (0).

Intel Virtualization Technology [Disabled]

[Enabled]   Allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

[Disabled]   Disables this function.

Hardware Prefetcher [Enabled]

[Enabled]   Allows a hardware platform to automatically analyze the requirements and prefetch data and codes for the CPU.

[Disabled]   Disables this function.

Adjacent Cache Line Prefetch [Enabled]

[Enabled]   Allows a hardware platform to perform adjacent cache line prefetching.

[Disabled]   Disables this function.

Boot performance mode [Max Non-Turbo Performance]

Allows you to select the boot performance before entering the OS.

Configuration options: [Max Non-Turbo Performance] [Max Battery] [Turbo Performance]

Dynamic Storage Accelerator [Disabled]

Allows you to enable or disable Dynamic Storage Accelerator for C state configuration.

Configuration options: [Enabled] [Disabled]

CPU Power Management Configuration

This item allows you to manage and configure the CPU's power.

Enhanced Intel SpeedStep Technology [Enabled]

Allows your system to adjust the processor's voltage and cores frequency, resulting in decreased power consumption and heat production.

[Disabled]   The CPU runs at its default speed.

[Enabled]   The system controls the CPU speed.

Turbo Mode [Enabled]

Allows you to set the processor cores to run faster than the base frequency when operating below power, current and temperature specification limit.
Configuration options: [Enabled] [Disabled]

CPU C States [Auto]

Allows you to enable or disable the CPU C states.
Configuration options: [Auto] [Enabled] [Disabled]

The following items appear only when you set the CPU C States to **[Enabled]**.

Enhanced C1 state [Enabled]
Allows your processor to reduce power when the system is in idle mode.

Configuration options: [Enabled] [Disabled]

CPU C3 Report [Enabled]
Allows you to disable or enable the CPU C3 report to the operating system.

Configuration options: [Enabled] [Disabled]

CPU C6 Report [Enabled]
Allows you to disable or enable the CPU C6 report to the operating system.

Configuration options: [Enabled] [Disabled]

C6 Latency [Short]
Allows you to set the duration of C6 latency for C6 state.

Configuration options: [Short] [Long]

CPU C7 Report [CPU C7s]
Allows you to disable or enable the CPU C7 report to the operating system.

Configuration options: [Disabled] [CPU C7] [CPU C7s]

C7 Latency [Long]
Allows you to set the duration of C7 latency for C7 state.

Configuration options: [Short] [Long]

Package C State Support [Auto]
Allows you to set the a C-state according to the following configuration options: [Auto] [Enabled] [C0/C1] [C2] [C3] [C6] [CPU C7] [CPU C7s]

Chapter 3

3.6.2 PCH Configuration
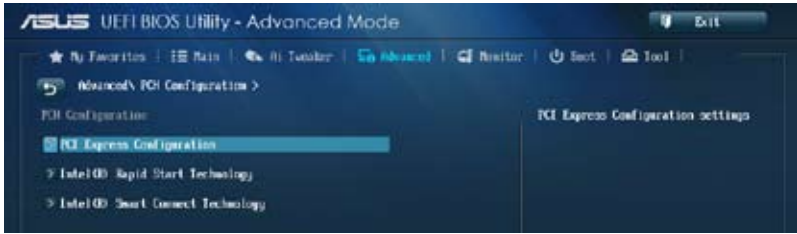
PCI Express Configuration

Allows you to configure the PCI Express slots.

DMI Link ASPM Control [Auto]

Allows you to control the ASPM (Active State Power Management) on both Northbridge side and Southbridge side of the DMI Link.
Configuration options: [Disabled] [Enabled] [Auto]

ASPM Support [Disabled]

Allows you to set the ASPM level.
Configuration options: [Disabled] [Auto] [L0s] [L1] [L0sL1]

PCIe Speed [Auto]

Allows you to select the PCI Express port speed.
Configuration options: [Auto] [Gen1] [Gen2]

Intel Rapid Start Technology [Disabled]

Allows you to enable or disable Intel® Rapid Start Technology.

Configuration options: [Enabled] [Disabled]

The following items appear only when you set the Intel® Rapid Start Technology to **[Enabled]**.

Entry on S3 RTC Wake [Enabled]

The system automatically wakes up and set to Rapid Start Technology S3 mode.
Configuration options: [Enabled] [Disabled

Entry After [0]
Allows you to set the RTC wake-up timer at S3 entry. The time ranges from 0 minute (immediately) to 120 minutes.

Active Page Threshold Support [Enabled]

The system automatically goes into sleep mode when the partition size is not enough for the Intel® Rapid Start Technology to work.
Configuration options: [Enabled] [Disabled]

Active Memory Threshold [0]
Key in the value for the additional partition size for Rapid Start Technology to work.

Ensure that the caching partition size is larger than the total memory size.

Hybrid Hard Disk Support [Disabled]
Allows you to enable or disable the hybrid hard disk support.
Configuration options: [Enabled] [Disabled]

Intel Smart Connect Technology [Disabled]
Allow you to enable or disable the Intel® Smart Connect Technology.

Configuration options: [Enabled] [Disabled]

3.6.3   SATA Configuration
While entering Setup, the BIOS automatically detects the presence of SATA devices. The SATA Port items show **Not Present** if no SATA device is installed to the corresponding SATA port.

Scroll down to display the other BIOS items.

SATA Mode Selection [AHCI]

Allows you to set the SATA configuration.

[Disabled]   Disables the SATA function.

[IDE]   Set to [IDE Mode] when you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices.

[AHCI]   Set to [AHCI Mode] when you want the SATA hard disk drives to use the AHCI (Advanced Host Controller Interface). 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.

[RAID]   Set to [RAID Mode] when you want to create a RAID configuration from the SATA hard disk drives.

Aggressive LPM Support [Auto]

Allows you to enable the PCH to aggressively enter link power state.

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

S.M.A.R.T. Status Check [Enabled]

S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) is a monitor system. When read/write of your hard disk errors occur, this feature allows the hard disk to report warning messages during the POST. Configuration options: [Enabled] [Disabled]

Port 1-6 [Enabled] (SATA6G_1 - SATA6G_6 [Yellow])

Allows you to enabled/disabled the SATA Port 1-6.

Configuration options: [Disabled] [Enabled]

Hot Plug [Disabled] (SATA6G_1 - SATA6G_6 [Yellow])

These items appear only when you set the SATA Mode Selection item to [AHCI] or [RAID], and allow you to enable/disable SATA Hot Plug Support.

Configuration options: [Disabled] [Enabled]

3.6.4   System Agent Configuration
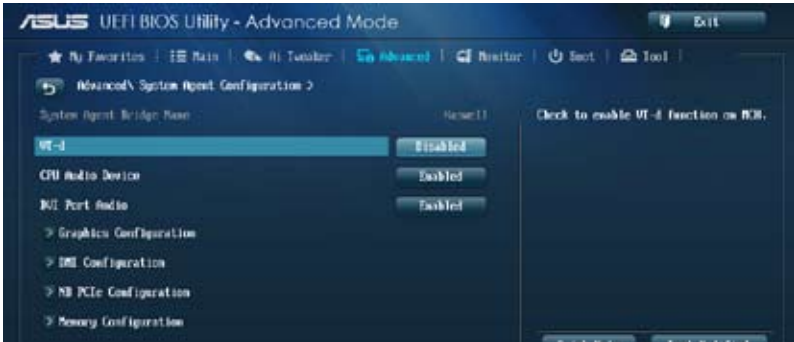
VT-d [Disabled]

Allows you to enable virtualization technology function on memory control hub.

[Enabled]   Enables the function.

[Disabled]   Disables this function.

> This item will appear only if the CPU supports virtualization technology function.

CPU Audio Devices [Enabled]

Allows you to enable or disable CPU SA Audio devices.

Configuration options: [Enabled] [Disabled]

DVI Port Audio [Enabled]

Allows you to enable or disable DVI port Audio.

Configuration options: [Enabled] [Disabled]

Graphics Configuration

Allows you to select a primary display from iGPU, and PCIe graphical devices.

iGPU Multi-Monitor [Disabled]

Allows you to enable the iGPU Multi-Monitor. The iGPU shared system memory size will be fixed at 64MB.
Configuration options: [Disabled] [Enabled]

DMI Configuration

Allows you to control various DMI (Desktop Management Interface) functions.

DMI Gen 2 [Auto]

Allows you to enable or disable DMI Gen 2.
Configuration options: [Auto] [Enabled] [Disabled]

NB PCIe Configuration

Allows you to configure the NB PCI Express settings.

PCIEx16_1/2/3 Link Speed [Auto]

Allows you to configure the PCIEx16 speed.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

DMI Link ASPM Control [Auto]

Allows you to enable or disable the control of Active State Power Management on SA side of the DMI Link.
Configuration options: [Auto] [Disabled] [L0s] [L1] [L0sL1]

PEG - ASPM [Disabled]

Allows you to control ASPM support for the PEG device.
Configuration options: [Disabled] [Auto] [ASPM L0s] [ASPM L1] [ASPM L0sL1]

Memory Configuration

Allows you to configure the memory configuration parameters.

ECC Support [Enabled]

Allows you to enable or disable the DDR Ecc support.
Configuration options: [Enabled] [Disabled]

Memory Scrambler [Enabled]

Allows you to enable or disable the Memory Scrambler support.
Configuration options: [Enabled] [Disabled]

Memory Remap [Enabled]

Allows you to enable remapping the memory above 4GB.
Configuration options: [Enabled] [Disabled]

3.6.5 USB Configuration

The items in this menu allow you to change the USB-related features.
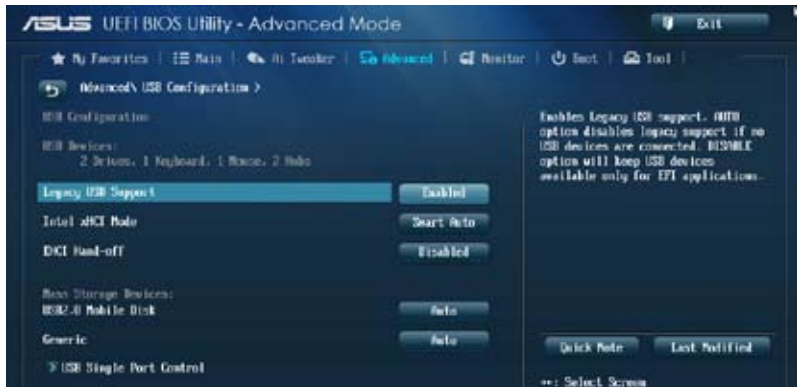
The **USB Devices** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

Legacy USB Support [Enabled]

[Enabled]   Enables the support for USB devices on legacy operating systems (OS).

[Disabled]   The USB devices can be used only for the BIOS setup program. It cannot be recognized in boot devices list.

[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.

Intel xHCI Mode [Smart Auto]

[Auto]   Keeps the last operation of xHCI controller in OS during bootup.

[Smart Auto]   Enables the operation of xHCI controller.

[Enabled]   Enables the xHCI controller.

[Disabled]   Disables the xHCI controller.

EHCI Hand-off [Disabled]

[Enabled]   Enables the support for operating systems without an EHCI hand-off feature.

[Disabled]   Disables the EHCI Hand-off support.

USB Single Port Control

Allows you to enable or disable the individual USB port.

Refer to section **1.2.2 Motherboard layout** for the location of the USB ports.

3.6.6 Platform Misc Configuration

The items in this menu allow you to configure the platform-related features.

PCI Express Native Power Management [Disabled]

Allows you to enhance the power saving feature of PCI Express and perform ASPM operations in the operating system.

Configuration options: [Disabled] [Enabled]

The following item appears only when you set the PCI Express Native Power Management to **[Enabled]**.

Native ASPM [Disabled]

[Enabled]   Vista controls the ASPM support for the device.

[Disabled]   BIOS controls the ASPM support for the device.

3.6.7 Onboard Devices Configuration

Scroll down to view the other BIOS items.

HD Audio Controller [Enabled]

[Enabled]   Enables the High Definition Audio Controller.

[Disabled]   Disables the controller.

> The following items appear only when you set the HD Audio Controller to **[Enabled]**.

Front Panel Type [HD]

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.

[HD]   Sets the front panel audio connector (AAFP) mode to high definition audio.

[AC97]   Sets the front panel audio connector (AAFP) mode to legacy AC'97

SPDIF Out Type [SPDIF]

[SPDIF]   Sets to an SPDIF audio output.

[HDMI]   Sets to an HDMI audio output.

VIA 1394 Controller [Enabled]

[Disabled]   Disables the controller.

[Enabled]   Enables the onboard IEEE 1394a controller.

Intel LAN1 Controller [Enabled]

[Enabled]   Enables the Intel® LAN1 controller.

[Disabled]   Disables the Intel® LAN1 controller.

Intel LAN1 OPROM [Disabled]

This item appears only when you set the previous item to [Enabled] and allows you to enable or disable the PXE OptionRom of the Intel LAN1 controller.
Configuration options: [Enabled] [Disabled]

Intel LAN2 Controller [Enabled]

[Enabled]   Enables the Intel® LAN2 controller.

[Disabled]   Disables the Intel® LAN2 controller.

Intel LAN2 OPROM [Disabled]

This item appears only when you set the previous item to [Enabled] and allows you to enable or disable the PXE OptionRom of the Intel LAN1 controller.
Configuration options: [Enabled] [Disabled]

Serial Port Configuration

The sub-items in this menu allow you to set the serial port configuration.

> This item only functions if there is a serial port (COM1) connector on the motherboard.

Serial Port [Enabled]

Allows you to enable or disable the serial port (COM).
Configuration options: [Enabled] [Disabled]

Change Settings [IO=3F8h; IRQ=4]

Allows you to select the Serial Port base address.
Configuration options: [IO=3F8h; IRQ=4] [IO=2F8h; IRQ=3] [IO=3E8h; IRQ=4] [IO=2E8h; IRQ=3]

Parallel Port Configuration

The sub-items in this menu allow you to set the parallel port configuration.

Parallel Port [Enabled]

Allows you to enable or disable the parallel port (LPT/LPTE).
Configuration options: [Enabled] [Disabled]

Change Settings [Auto]

Allows you to select an optimal setting for the super IO device.
Configuration options: [Auto] [IO=378h; IRQ=5]
[IO=378h: IRQ=5, 6, 7, 10, 11, 12] [IO=278h; IRQ=5, 6, 7, 10, 11, 12]
[IO=3BCh; IRQ=5, 6, 7, 10, 11, 12]

Device Mode [STD Printer Mode]

Allows you to select the printer port mode.
Configuration options: [STD Printer mode] [SPP Mode] [EPP-1.9 and SPP Mode] [EPP-1.7 and SPP Mode] [ECP Mode] [ECP and EPP 1.9 Mode] [ECP and EPP 1.7 Mode]

3.6.8 APM

ErP Ready [Disabled]

Allows you to switch off some power at S4+S5 or S5 to get the system ready for ErP requirement. When set to **[Enabled]**, all other PME options will be switched off.

Configuration options: [Disabled] [Enabled (S4+S5)] [Enabled (S5)]

Restore AC Power Loss [Power Off]

[Power On]	The system goes into ON state after an AC power loss.
[Power Off]	The system goes into OFF state after an AC power loss.
[Last State]	The system goes into either OFF or ON state, whatever the system state was before the AC power loss.

Power On By PS/2 Keyboard [Disabled]

[Disabled]	Disables the Power On by a PS/2 keyboard.
[Space Bar]	Sets the Space Bar on the PS/2 keyboard to turn on the system.
[Ctrl-Esc]	Sets the Ctrl+Esc key on the PS/2 keyboard to turn on the system.
[Power Key]	Sets Power key 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.

Power On By PCIE/PCI [Disabled]

[Disabled]	Disables the PCIE/PCI devices to generate a wake-on-LAN feature of the Intel®/LAN device or other installed PCIE LAN devices.
[Enabled]	Enables the PCIE/PCI devices to generate a wake-on-LAN feature of the Intel®/LAN device or other installed PCIE LAN devices.

Power On By Ring [Disabled]

[Disabled]	Disables Wake-On-Ring from generating a wake event.
[Enabled]	Enables Wake-On-Ring to generate a wake event.

Power On By RTC [Disabled]

[Disabled]	Disables RTC to generate a wake event.
[Enabled]	When set to **[Enabled]**, the items **RTC Alarm Date (Days)** and **Hour/Minute/Second** will become user-configurable with set values.

3.6.9   Network Stack

Network Stack [Disable]

This item allows user to disable or enable the UEFI network stack.

Configuration options: [Disable] [Enable]

> The following item appears only when you set the Network Stack to **[Enabled]**.

Ipv4/Ipv6 PXE Support [Enabled]

Allows you to enable or disable the Ipv4/Ipv6 PXE boot option.
Configuration options: [Disabled] [Enabled]

3.7 Monitor menu

The Monitor menu displays the system temperature/power status, and allows you to change the fan settings.

Scroll down to display the other BIOS items.

CPU Temperature / MB Temperature [xxxºC/xxxºF]

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

CPU Fan Speed [xxxx RPM] or [Ignore] / [N/A], CPU OPT Speed [xxxx RPM] or [Ignore] / [N/A], Chassis Fan 1/4 Speed [xxxx RPM] or [Ignore] / [N/A]

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

CPU core 0-3 Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage

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

Chapter 3

CPU Q-Fan Control [Enabled]

Allows you to set the CPU Q-Fan operating mode.

| [Enabled] | Enables the CPU Q-Fan control feature. |
| [Disabled] | Disables the CPU Q-Fan control feature. |

The following items appear only when you set the CPU Q-Fan Control to **[Enabled]**.

CPU Fan Speed Low Limit [300 RPM]

Allows you to set the low limit warning for CPU Fan speed.
Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

CPU Fan Profile [Silent]

Allows you to set the appropriate performance level of the CPU fan.

[Standard]	Set to make the CPU fan adjust automatically depending on the CPU temperature.
[Silent]	Set to minimize the fan speed for quiet CPU fan operation.
[Turbo]	Set to achieve maximum CPU fan speed.
[Manual]	Set to assign the detailed fan speed control parameters.

The following items appear only when you set the CPU Fan Profile to **[Manual]**.

CPU Upper Temperature [70]
Use the <+> or <-> keys to adjust the upper limit of the CPU temperature. The values range from 20ºC to 75ºC.

CPU Fan Max. Duty Cycle(%) [100]
Use the <+> or <-> keys to adjust the maximum CPU fan duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the CPU fan will operate at the maximum duty cycle.

CPU Lower Temperature [20]
Use the <+> or <-> keys to adjust the lower limit of the CPU temperature. Displays the lower limit of the CPU temperature.

CPU Fan Min. Duty Cycle(%) [20]
Use the <+> or <-> keys to adjust the minimum CPU fan duty cycle. The values range from 0% to 100%. When the CPU temperature is under 40ºC, the CPU fan will operate at the minimum duty cycle.

Chassis Q-Fan Control 1/4 [Enabled]

| [Disabled] | Disables the Chassis Q-Fan control feature. |
| [Enabled] | Enables the Chassis Q-Fan control feature. |

The following items appear only when you set the Chassis Q-Fan Control 1/4 to **[Enabled]**.

Chassis Fan Speed Low Limit 1/4 [300 RPM]

This item appears only when you enable the Chassis Q-Fan Control feature and allows you to disable or set the chassis fan warning speed.

Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

Chassis Fan 1/4 Profile [Silent]

This item appears only when you enable the Chassis Q-Fan Control feature. It allows you to set the appropriate performance level of the chassis fan.

[Standard]   Set to make the chassis fan adjust automatically depending on the chassis temperature.

[Silent]   Set to minimize the fan speed for quiet chassis fan operation.

[Turbo]   Set to achieve maximum chassis fan speed.

[Manual]   Set to assign detailed fan speed control parameters.

The following items appear only when you set the Chassis Fan Profile to **[Manual]**.

Chassis Upper Temperature 1/4 [70]
Use the <+> or <-> keys to adjust the upper limit of the CPU temperature. The values range from 40ºC to 75ºC.

Chassis Fan Max. Duty Cycle(%) 1/4 [100]
Use the <+> or <-> keys to adjust the maximum chassis fan duty cycle. The values range from 60% to 100%. When the chassis temperature reaches the upper limit, the chassis fan will operate at the maximum duty cycle.

Chassis Lower Temperature 1/4 [40]
Use the <+> or <-> keys to adjust the lower limit of the CPU temperature. Displays the lower limit of the CPU temperature.

CPU Fan Min. Duty Cycle(%) 1/4 [60]
Use the <+> or <-> keys to adjust the minimum chassis fan duty cycle. The values range from 60% to 100%. When the chassis temperature is under 40ºC, the chassis fan will operate at the minimum duty cycle.

Anti Surge Support [Enabled]

This item allows you to enable or disable the Anti Surge function.

Configuration options: [Disabled] [Enabled]

Dr. Power Policy [Standard]

Allows user to select standard or aggressive policy of Dr. Power settings.

Configuration options: [Standard] [Aggressive]

The **Dr. Power Policy** BIOS item appears only if the ASUS Dr. POWER switch is Enabled. Refer to page 2-13 for details.

3.8 Boot menu

The Boot menu items allow you to change the system boot options.

Boot Configuration

Fast Boot [Enabled]

[Disabled]   Allows your system to go back to its normal boot speed.

[Enabled]   Allows your system to accelerate the boot speed.

> The following items appear only when you set the Fast Boot to **[Enabled]**.

USB Support [Partial In...]

[Disabled]	All USB devices will not be available until OS boot up for a fastest POST time.
[Full Initialization]	All USB devices will be available during POST. This process will extend the POST time.
[Partial Initialization]	For a faster POST time, only USB ports with keyboard and mouse connections will be detected.

PS/2 Keyboard and Mouse Support [Auto]

Select any of these settings when PS/2 keyboard and mouse are installed. These settings only apply when Fast Boot is enabled.

[Auto]	For a faster POST time, PS/2 devices will only be available when the system boots up or rebooted when the PS/2 devices have not been reconnected or changed. If you disconnect or change PS/2 devices before restarting the system, PS/2 devices will not be available and BIOS setup program will not be accessible via PS/2 devices.
[Full Initialization]	For full system control, PS/2 devices will be available during POST at any circumstances. This process will extend POST time.
[Disabled]	For the fastest POST time, all PS/2 devices will not be available until your computer enters the operating system.

Network Stack Driver Support [Disabled]

[Disabled]	Select to skip the network stack driver from loading during POST.
[Enabled]	Select to load the network stack driver during POST.

Next Boot after AC Power Loss [Normal Boot]

[Normal Boot]	Returns to normal boot on the next boot after an AC power loss.
[Fast Boot]	Accelerates the boot speed on the next boot after an AC power loss.

HW Fast Boot [Disabled]

Allows the system to enable or disable the HW Fast Boot.

Configuration options: [Disabled] [Enabled]

DirectKey Enable [Go to BIOS...]

[Disabled]	Disables the DirectKey button. The system will only power on or off when you press the DirectKey button.
[Go to BIOS Setup]	Allows the system to power on and go to the BIOS Setup directly when you press the DirectKey button.

Boot Logo Display [Enabled]

[Enabled]	Enables the full screen boot logo display during POST.
[Disabled]	Disables the full screen boot logo display during POST.

Boot Logo Size Control [Auto]

[Auto]	Automatically adjusts for Windows® requirements.
[Full Screen]	Maximizes the boot logo size.

Post Delay Time [3 sec]

This item appears only when you set the Full Screen Logo item to **[Enabled]**. This item allows you to select a desired additional POST waiting time to easily enter the BIOS Setup. You can only execute the POST delay time during normal boot. The values range from 0 to 10 seconds.

> This feature will only work when set under normal boot.

Bootup NumLock State [On]

[On]   Set the power-on state of the NumLock to **[On]**.

[Off]   Set the power-on state of the NumLock to **[Off]**.

Wait For 'F1' If Error [Enabled]

[Disabled] Disables the function.

[Enabled]   The system waits for the <F1> key to be pressed when error occurs.

Option ROM Messages [Force BIOS]

[Force BIOS]   The third-party ROM messages will be displayed during the boot sequence.

[Keep Current] The third-party ROM messages will be displayed only if the third-party manufacturer had set the add-on device to do so.

Interrupt 19 Capture [Disabled]

Allows you to trap Interrupt 19 by the option ROMs.

Configuration options: [Disabled] [Enabled]

Setup Mode [EZ Mode]

[Advanced Mode]   Allows you to go to Advanced Mode of the BIOS after POST.

[EZ Mode]   Allows you to go to EZ Mode of the BIOS after POST.

CSM (Compatibility Support Module)

Allows you to configure the CSM (Compatibility Support Module) items to fully support the various VGA, bootable devices and add-on devices for better compatibility.

Launch CSM [Enabled]

[Auto]   The system automatically detects the bootable devices and the add-on devices.

[Enabled]   For better compatibility, enable the CSM to fully support the non-UEFI driver add-on devices or the Windows® UEFI mode.

[Disabled] Disable the CSM to fully support the non-UEFI driver add-on devices or the Windows® UEFI mode.

> The following items appear only when you set the Launch CSM to **[Enabled]**.

Boot Devices Control [UEFI and Legacy OpROM]

Allows you to select the type of devices that you want to boot.

Configuration options: [UEFI and Legacy OpROM] [Legacy OpROM only] [UEFI only]

Boot from Network Devices [Legacy OpROM first]

Allows you to select the type of network devices that you want to launch.

Configuration options: [Legacy OpROM first] [UEFI driver first] [Ignore]

Boot from Storage Devices [Legacy OpROM first]

Allows you to select the type of storage devices that you want to launch.

Configuration options: [Both, Legacy OpROM first] [Both, UEFI first] [Legacy OpROM first] [UEFI driver first] [Ignore]

Boot from PCIe/PCI Expansion Devices [Legacy OpROM first]

Allows you to select the type of PCIe/PCI expansion devices that you want to launch.

Configuration options: [Legacy OpROM first] [UEFI driver first]

Secure Boot

Allows you to configure the Windows® Secure Boot settings and manage its keys to protect the system from unauthorized access and malwares during POST.

OS Type [Windows UEFI mode]

[Windows UEFI Mode]	Allows you to select your installed operating system. Execute the Microsoft® Secure Boot check. Only select this option when booting on Windows® UEFI mode or other Microsoft® Secure Boot compliant OS.
[Other OS]	Get the optimized function when booting on Windows® non-UEFI mode, Windows® Vista/ Windows® XP, or other Microsoft® Secure Boot non compliant OS. Microsoft® Secure Boot only supports Windows® UEFI mode.

> The following item appears only when you set the OS Type to **[Windows UEFI mode]**.

Key Management

This item appears only when you set OS Type to **[Windows UEFI Mode]**. It allows you to manage the Secure Boot keys.

Clear Secure Boot keys

This item appears only when you load the default Secure Boot keys. This item allows you to clear all default Secure Boot keys.

Save Secure Boot Keys

Allows you to save the PK (Platform Keys) to a USB storage device.

PK Management

The Platform Key (PK) locks and secures the firmware from any permissible changes. The system verifies the PK before your system enters the OS.

Delete PK
Allows you to delete the PK from your system. Once the PK is deleted, all the system's Secure Boot keys will not be active.

Configuration options: [Yes] [No]

Load PK from File
Allows you to load the downloaded PK from a USB storage device.

Configuration options: [Yes] [No]

The PK file must be formatted as a UEFI variable structure with time-based authenticated variable.

KEK Management

The KEK (Key-exchange Key or Key Enrollment Key) manages the Signature database (db) and Revoked Signature database (dbx).

Key-exchange Key (KEK) refers to Microsoft® Secure Boot Key-Enrollment Key (KEK).

Delete the KEK
Allows you to delete the KEK from your system.

Configuration options: [Yes] [No]

Load KEK from File
Allows you to load the downloaded KEK from a USB storage device.

Configuration options: [Yes] [No]

Append KEK from File
Allows you to load the additional KEK from a storage device for an additional db and dbx loaded management.

Configuration options: [Yes] [No]

The KEK file must be formatted as a UEFI variable structure with time-based authenticated variable.

DB Management

The db (Authorized Signature database) lists the signers or images of UEFI applications, operating system loaders, and UEFI drivers that you can load on the single computer.

Delete the db
Allows you to delete the db file from your system.

Configuration options: [Yes] [No]

Load db from File
Allows you to load the downloaded db from a USB storage device.

Configuration options: [Yes] [No]

Append db from File
Allows you to load the additional db from a storage device so that more images can be loaded securely.

Configuration options: [Yes] [No]

The db file must be formatted as a UEFI variable structure with time-based authenticated variable.

DBX Management

The dbx (Revoked Signature database) lists the forbidden images of db items that are no longer trusted and cannot be loaded.

Delete the dbx
Allows you to delete the dbx file from your system.

Configuration options: [Yes] [No]

Load dbx from File
Allows you to load the downloaded dbx from a USB storage device.

Configuration options: [Yes] [No]

Append dbx from File
Allows you to load the additional dbx from a storage device so that more db's images cannot be loaded.

Configuration options: [Yes] [No]

The dbx file must be formatted as a UEFI variable structure with time-based authenticated variable.

Boot Option Priorities

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.

- To access Windows® OS in Safe Mode, press <F8 > after POST (Windows® 8 not supported).

- To select the boot device during system startup, press <F8> when ASUS Logo appears.

Boot Override

These items displays the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Click an item to start booting from the selected device.

3.9 Tools menu

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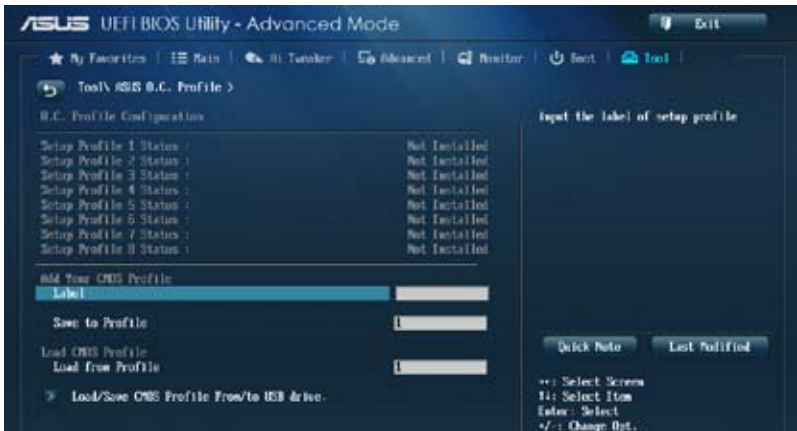

3.9.1 ASUS EZ Flash 2 Utility

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.

> For more details, refer to section **3.11.2 ASUS EZ Flash 2**.

3.9.2 ASUS O.C. Profile

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

> The Setup Profile Status items show **Not Installed** if no profile is created.

Label

Allows you to key in a label of the setup profile.

Save to Profile

Allows you to save the current BIOS settings to the BIOS Flash, and create a profile. Key in a profile number from one to eight, press <Enter>, and then select **Yes**.

Load from Profile

Allows you to load the previous BIOS settings saved in the BIOS Flash. Key in the profile number that saved your BIOS settings, press <Enter>, and then select **Yes**.

> • 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.

3.9.3   ASUS SPD Information

Allows you to view the DRAM SPD information.

3.10 Exit menu

The Exit menu items allow you to load the optimal default values for the BIOS items, and save or discard your changes to the BIOS items. You can access the EZ Mode from the Exit menu.

Load Optimized 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 Yes to load the default values.

Save Changes & Reset

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved. When you select this option or if you press <F10>, a confirmation window appears. Select **Yes** to save changes and exit.

Discard Changes & Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

ASUS EZ Mode

This option allows you to enter the EZ Mode screen.

Launch EFI Shell from filesystem device

This option allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices.

3.11 Updating BIOS

The ASUS website publishes the latest BIOS versions to provide enhancements on system stability, compatibility, or performance. However, BIOS updating is potentially risky. If there is no problem using the current version of BIOS, DO NOT manually update the BIOS. Inappropriate BIOS updating may result in the system's failure to boot. Carefully follow the instructions of this chapter to update your BIOS if necessary.

> Visit the ASUS website at www.asus.com to download the latest BIOS file for this motherboard.

The following utilities allow you to manage and update the motherboard BIOS setup program.

1. EZ 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: Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.

4. ASUS BIOS Updater: Updates and back ups the BIOS in DOS environment using the motherboard support DVD and a USB flash disk drive.

3.11.1 EZ Update

The EZ Update is a utility that allows you to update the motherboard BIOS in Windows® environment.

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

3.11.2   ASUS EZ Flash 2

ASUS EZ Flash 2 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 disk that contains the latest BIOS file to the USB port.

2.   Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select ASUS EZ Flash Utility and press <Enter> to enable it.
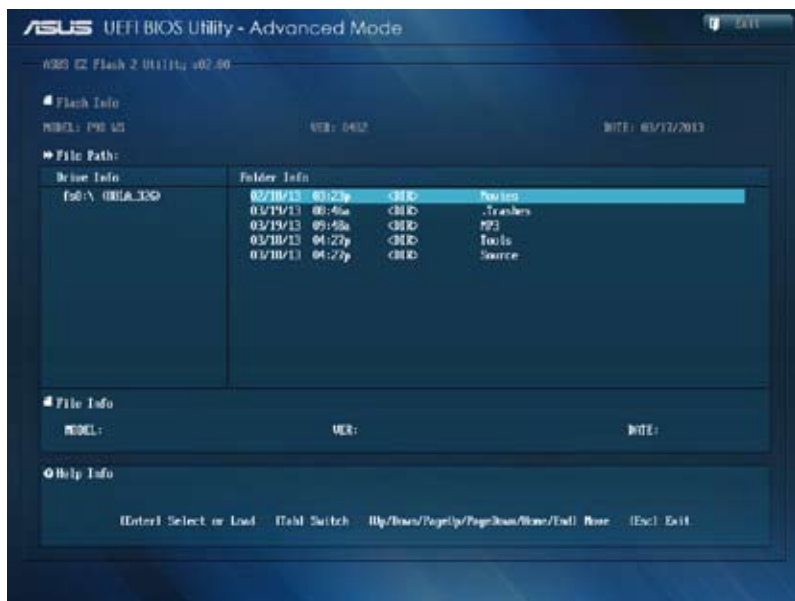
3.   Press <Tab> to switch to the Drive field.

4.   Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, and then press <Enter>.

5.   Press <Tab> to switch to the Folder Info field.

6.   Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.

- • This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.

- • DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

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

3.11.3   ASUS CrashFree BIOS 3

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 http://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 enters ASUS EZ Flash 2 automatically.

4. The system requires you to enter BIOS Setup to recover the BIOS setting. To ensure system compatibility and stability, we recommend that you press <F5> to load default BIOS values.

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

Chapter 3

3.11.4 ASUS BIOS Updater

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

> The succeeding utility screens are for reference only. The actual utility screen displays may not be same as shown.

Before updating BIOS

1. Prepare the motherboard support DVD and a USB flash drive in FAT32/16 format and single partition.

2. Download the latest BIOS file and BIOS Updater from the ASUS website at http://support.asus.com and save them on the USB flash drive.
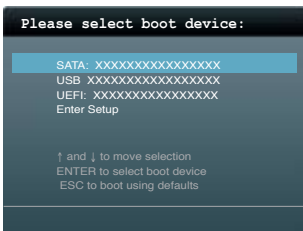
> •   NTFS is not supported under DOS environment. Do not save the BIOS file and BIOS Updater to a hard disk drive or USB flash drive in NTFS format.
>
> •   Do not save the BIOS file to a floppy disk due to low disk capacity.

3. Turn off the computer and disconnect all SATA hard disk drives (optional).

Booting the system in DOS environment

1. Insert the USB flash drive with the latest BIOS file and BIOS Updater to the USB port.

2. Boot your computer. When the ASUS Logo appears, press <F8> to show the BIOS Boot Device Select Menu. Insert the support DVD into the optical drive and select the optical drive as the boot device.

```
    Please select boot device:

        SATA: XXXXXXXXXXXXXXX
        USB  XXXXXXXXXXXXXXX
        UEFI: XXXXXXXXXXXXXXX
        Enter Setup

        ↑ and ↓ to move selection
        ENTER to select boot device
        ESC to boot using defaults
```

3.   When the Make Disk menu appears, select the FreeDOS command prompt item by
      pressing the item number.

4.   At the FreeDOS prompt, type d: and press <Enter> to switch the disk from Drive C
      (optical drive) to Drive D (USB flash drive).

```
Welcome to FreeDOS (http://www.freedos.org)!
C:\>d:
D:\>
```
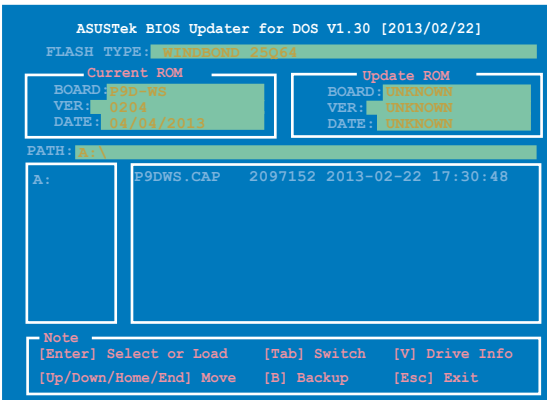
Updating the BIOS file

To update the BIOS file using BIOS Updater:

1.   At the FreeDOS prompt, type bupdater /pc /g and press <Enter>.

```
D:\>bupdater /pc /g
```

2.   The BIOS Updater screen appears as below.

```
      ASUSTek BIOS Updater for DOS V1.30 [2013/02/22]
   FLASH TYPE: WINBOND 25Q64
      ─ Current ROM ─                    ─ Update ROM ─
    BOARD: P9D-WS                      BOARD: UNKNOWN
    VER:   0204                        VER:   UNKNOWN
    DATE:  04/04/2013                  DATE:  UNKNOWN
  PATH: A:\
  A:            P9DWS.CAP    2097152 2013-02-22 17:30:48




   ─ Note ─
   [Enter] Select or Load      [Tab] Switch    [V] Drive Info
   [Up/Down/Home/End] Move    [B] Backup       [Esc] Exit
```

3.   Press <Tab> to switch between screen fields and use the <Up/Down/Home/End> keys
      to select the BIOS file and press <Enter>. BIOS Updater checks the selected BIOS file
      and prompts you to confirm BIOS update.

```
      Are you sure to update BIOS?
               Yes    No
```

4.   Select Yes and press <Enter>. When BIOS update is done, press <ESC> to exit BIOS Updater. Restart your computer.

DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

•   For BIOS Updater version 1.3 or later, the utility automatically exits to the DOS prompt after updating BIOS.

•   Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** BIOS menu. See Chaper 3 of your motherboard user manual for details.

•   Ensure to connect all SATA hard disk drives after updating the BIOS file if you have disconnected them.

Chapter 4

4.1 Installing an operating system

✎ • This motherboard supports Windows® 7 32/64-bit and Windows® 8 32/64-bit operating systems (OS).

• Motherboard settings and hardware options vary. The setup procedures presented in this chapter are for reference only. Refer to Windows® operating system documentation for detailed information.

4.2 Support DVD information

✎ 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.

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

The AHCI/RAID Driver menu contains the RAID/AHCI driver disk.

The Manual menu contains the list of supplementary user manuals. Click an item to open the folder of the user manual.

The Utilities menu shows the applications and other software that the motherboard supports.

Click the Contact tab to display the ASUS contact information.

Click an icon to display DVD/ motherboard information

Click an item to install

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

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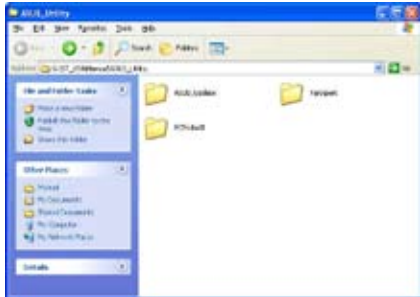
The software manual files are in Portable Document Format (PDF). Install the Adobe® Acrobat® Reader from the **Utilities** tab before opening the files.

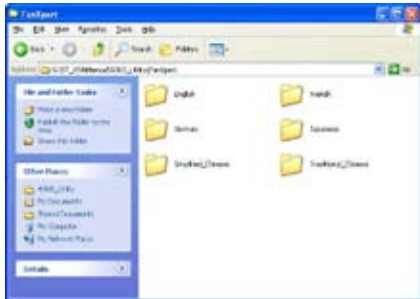To read about your motherboard's utility guide:

1. Click **Manual** tab **> ASUS Motherboard Utility Guide**.

2. From the **Manual** folder, open the folder of the software manual that you wish to read.

3. Some software manuals are provided in different languages. Open the language's folder to view 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 3

AI Suite 3 is an all-in-one interface that integrates several ASUS utilities and allows you to launch and operate these utilities simultaneously.

Installing AI Suite 3

To install AI Suite 3 on your computer:

1. Place the support DVD to the optical drive. The **Special** tab appears if your computer has enabled the Autorun feature.

2. Click **Utilities** tab **> AI Suite 3**.

3. Follow the onscreen instructions to complete the installation.

4. After the AI Suite 3 is installed, restart your computer.

Using AI Suite 3

You can launch the AI Suite 3 for the following Windows® operating systems:
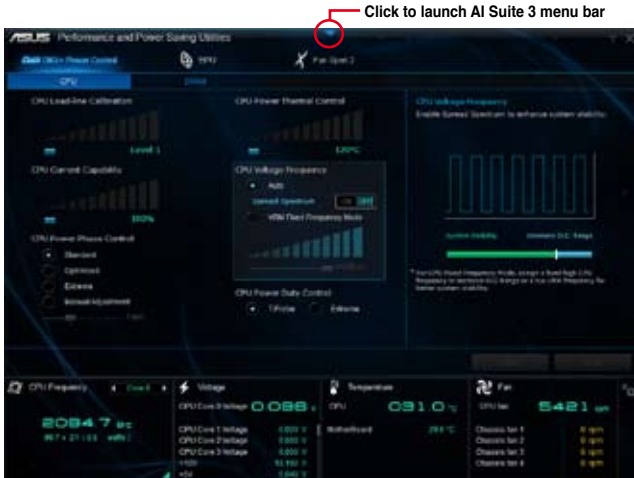
• For Windows® 7, click ◆ on the notification area.

• For Windows® 8, click the AI Suite 3 app from the Start Screen.

When launched, the main screen of the AI Suite 3 appears. To go to the AI Suite 3 main menu bar, click ▼ on the top edge of the screen.

The main screen of the AI Suite 3 is for reference only and vary with models.

Main screen

Click to launch AI Suite 3 menu bar

AI Suite 3 main menu bar

DIGI+VRM   Fan Xpert 2   EZ Update   System
                                        Information

EPU   USB 3.0 Boost   Network   USB BIOS   USB Charger+
                        iControl   Flashback

- • The screeshots of AI Suite 3 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.

Chapter 4

4.3.2 DIGI+ VRM

DIGI+ Power Control utility allows you to adjust the CPU and DRAM power settings for an optimum system efficiency, overall system stability and performance.

Adjusting the CPU power

Click or tap to undo the changes

Click or tap to apply the changes

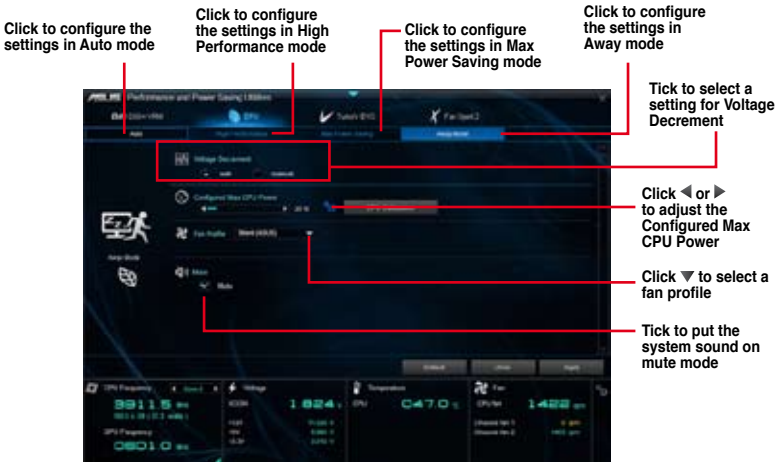|	
1	**CPU Load-line Calibration** CPU Load-line Calibration adjusts the voltage range and controls the system temperature. Higher load-line calibration could get higher voltage and good overclocking performance but increases the CPU and VRM thermal conditions.
2	**CPU Current Capability** CPU Current Capability provides wider total power range for overclocking. A higher value setting gets higher VRM power consumption delivery.
3	**CPU Power Phase Control** CPU Power Phase Control allows you to get more transient and better thermal performance by increasing the phase number under heavy system loading. To increase VRM efficiency, reduce the phase number under light system loading. *** The system automatically sets the default to [Extreme] when using the Intel® iGPU.**
4	**CPU Power Thermal Control** A higher temperature brings a wider CPU power thermal range, and extends the overclocking tolerance to enlarge overclocking potential.
5	**CPU Voltage Frequency** CPU Voltage Frequency affects the VRM transient response and thermal components. Higher VRM frequency gets quicker transient response.
6	**CPU Power Duty Control** CPU Power Duty Control allows to balance the CPU load based on the temperature or on the current system load.

Adjusting the DRAM power

Click or tap to undo the changes

Click or tap to apply the changes
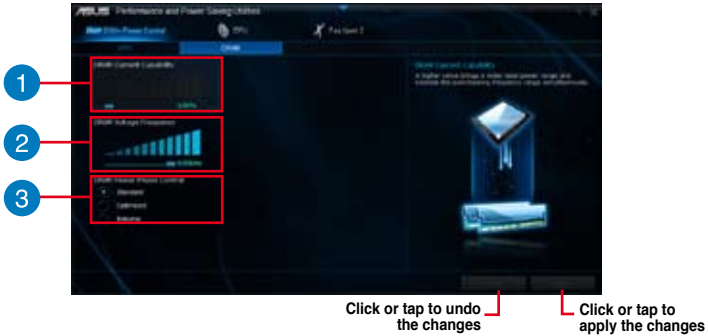
1	**DRAM Current Capability** A higher value brings a wider total power range and extends the overclocking frequency range simultaneously.
2	**DRAM Voltage Frequency** Allows you to adjust the DRAM switching frequency for system stability or to increase OC range.
3	**DRAM Power Phase Control** Select **Extreme** for full phase mode to increase system performance or select **Optimized** for ASUS optimized phase tuning profile to increase DRAM power efficiency.

4.3.3 EPU

EPU is an enery-saving utility that allows you to adjust the CPU, GPU, and Fan Control settings to their power-saving conditions.

To launch EPU, click **EPU** on the AI Suite 3 main menu bar.

Click to configure the settings in Auto mode

Click to configure the settings in High Performance mode

Click to configure the settings in Max Power Saving mode

Click to configure the settings in Away mode

Tick to select a setting for Voltage Decrement

Click ◄ or ► to adjust the Configured Max CPU Power

Click ▼ to select a fan profile

Tick to put the system sound on mute mode

> • When you enable Configured Max CPU Power for advanced energy saving condition, the CPU frequency may display 800 MHz in the Windows® OS information of your computer. However, the true CPU frequency varies depending on the wattage that you manually set. You can adjust the CPU wattage from the lowest base to your preferred default value.
>
> • Configured Max CPU Power may decrease the total power delivery to the CPU and affects the CPU performance under system heavy load. To restore your system to its default settings, reboot your computer.

4.3.4   Fan Xpert 2

Fan Xpert 2 automatically detects and tweaks the fan speeds, and provides you with optimized fan settings based on the fans' specifications and positions.

To launch Fan Xpert 2, click **Fan Xpert 2** on the AI Suite 3 main menu bar.

Click a screen to select the type of fan that you want to customize

Click to switch between CPU and chassis fan screens

Click to maximize the fan speed

Click to set best customized setting for your fan

Click to set the fan's speed to silent mode

Click to set the balanced configuration between the fan's noise level and speed

Click to increase the fan's speed for a high cooling capability

ASUS Mini Bar

Appears after clicking Fan Tuning for the first time. Click options to select EPU mode.

Customizing the fan settings

Smart Mode

Smart Mode allows you to customize the fans' rotation speeds and responsiveness based on your system's temperature.

Click and drag to set the fan's rotation speed

Click and drag the sliders to adjust the fan's responsiveness

Click to undo the changes

Click to go back to the previous screen

Click to switch between the CPU and chassis fan screens

Click to apply the changes

RPM Mode

RPM Mode allows you to set the fan speed when the CPU temperature is below 75ºC.

Click and drag to adjust the fan's speed

Click to go back to the previous screen

Click to switch between the CPU and chassis fan screens

• When the CPU temperature reaches 75º C, the fan will automatically run at full speed to protect the CPU.

• For motherboard models without the CPU fan detection latch, only 4-pin CPU fans are controllable in Fan Xpert 2.

• The Fan Xpert 2 may not be able to detect the fan speed if your fan is installed with an external control kit for rotation speed.

• Fan Xpert 2 does not support 2-pin fans. If you install a 2-pin fan, it can only run at its full speed.

• If the CPU or chassis fans have been changed, the Fan Auto Tuning process should be repeated.

DO NOT remove your fan during the Fan Auto Tuning process.

4.3.5 USB 3.0 Boost

USB 3.0 Boost technology supports UASP (USB Attached SCSI Protocol) that automatically speeds up the transfer rates of your USB storage devices.

To launch USB 3.0 Boost, click **USB 3.0 Boost** on the AI Suite 3 main menu bar.

Using USB 3.0 Boost

1.   Connect a USB 3.0 device to the USB 3.0 port.

2.   From the USB 3.0 Boost screen, click to select a USB device.

3.   To enable UASP on your USB device, click **UASP.** To revert to its normal transfer rate, click **Normal**.
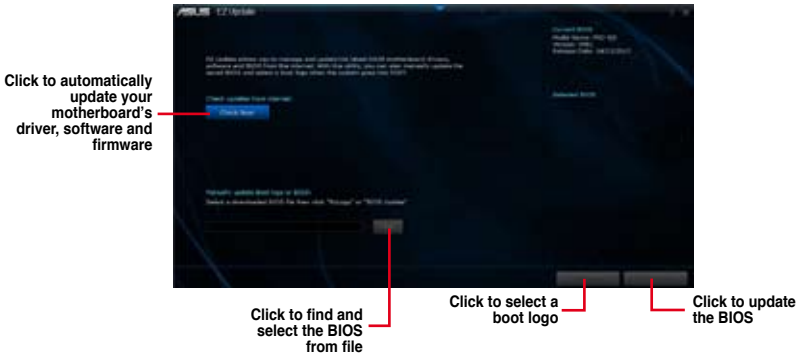

Click to enable the USB device's normal data transfer rate

Click to enable UASP or Turbo Mode to the USB device for a faster data transfer rate

Click to select a USB device

•   Visit the ASUS website at www.asus.com for detailed software configuration.

•   Use the USB 3.0 devices for high performance. The data transfer speed varies with USB devices.

4.3.6 EZ Update

EZ Update is a utility that allows you to automatically update your motherboard's softwares, drivers and the BIOS version easily. With this utlity, you can also manually update the saved BIOS and select a boot logo when the system goes into POST.

To launch EZ Update, click **EZ Update** on the AI Suite 3 main menu bar.

Click to automatically update your motherboard's driver, software and firmware

Click to find and select the BIOS from file

Click to select a boot logo

Click to update the BIOS

4.3.7 Network iControl

Network iControl is a one-stop setup network control center that allows you to manage your network bandwidth and set the bandwidth priority for your running programs.
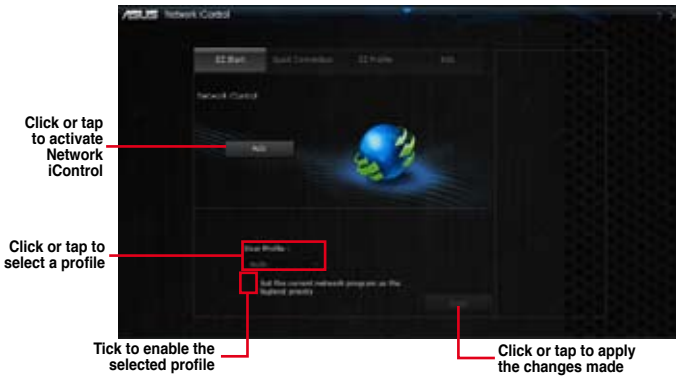
Launching Network iControl

To launch Network iControl, click or tap the ▼ on the top edge of the AI Suite 3 main menu, then select **Network iControl**.
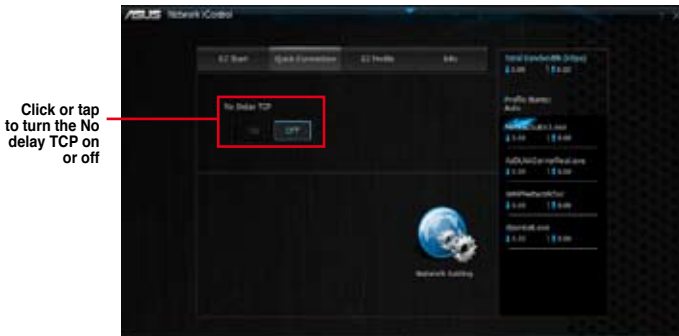
> • Ensure to install the LAN drivers before using this utility.
>
> • Network iControl can only support the onboard LAN.

EZ Start screen

Click or tap to activate Network iControl

Click or tap to select a profile

Tick to enable the selected profile

Click or tap to apply the changes made

Quick Connection screen

Click or tap to turn the No delay TCP on or off

EZ Profile screen

Click or tap to save the profile settings or rename the profile

Click or tap to select a network profile

Click or tap to set the program as High, Normal, or Low priority

Select a program from this list and click ▲ to add to your network profile

Tick to assign a schedule of your network programs to avoid network congestions

4.3.8   System Information

This utility allows you get the detailed information of the motherboard, CPU, and memory settings.

To launch System Information, click **System Information** on the AI Suite 3 main menu bar.

Viewing the motherboard information

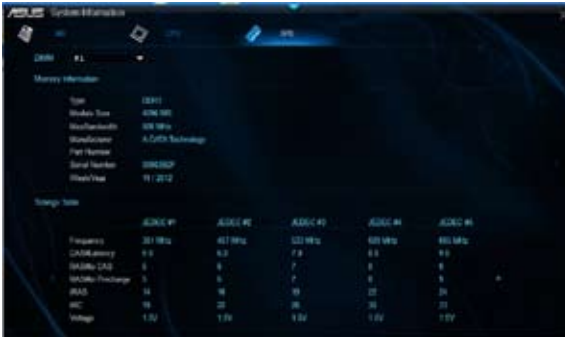From the System Information screen, click **MB** tab to view the motherboard's information.

Viewing the CPU information

From the System Information screen, click **CPU** tab to view the processor's information.

Viewing the SPD information

From the System Information screen, click **SPD** tab to view the memory's information.

4.3.9 USB BIOS Flashback

USB BIOS Flashback allows you to check and save the latest BIOS version to a USB storage device. Use this utility to quickly check for the latest available BIOS and set a schedule to when you can download for a newer version.

To launch USB BIOS Flashback, click **USB BIOS Flashback** on the AI Suite 3 main menu bar.

Current BIOS information

Set a schedule for the BIOS Update download

Click to check for a new BIOS update available for download

Click to cancel the download schedule setting

Click to apply the download schedule setting

Scheduling the BIOS download

1. In the Download Setting field, tick **Schedule (days)** then select the number of days for the BIOS download schedule.

2. Click **Apply** to save the BIOS download schedule. Click **Cancel** to cancel the download schedule.

Downloading the updated BIOS

> Before you start downloading, ensure that you have installed the USB storage device to your computer's USB port that supports USB BIOS Flashback. Refer to section **2.3.1 Rear I/O connection** of your user manual for more details.

To download the updated BIOS:

1. From the USB BIOS Flashback screen, click **Check for New BIOS Update** to check for the latest BIOS version.

    Wait for the system to check the latest BIOS version.

2. After the utility detects a new BIOS, click ▼ from the Save to: field, select the USB flash drive, then click **Download**.

3. After the download is complete, click **OK**.

Chapter 4

4.3.10 USB Charger+

USB Charger+ allows you to quick-charge your portable USB devices even if your computer is off, in sleep mode or hibernate mode.

> The USB Charger+ will not work if the ErP-ready item in the BIOS is enabled.

Launching USB Charger+

To launch USB Charger+, click ▼ on the top edge of the screen, then click **USB Charger+** on the AI Suite 3 main menu bar.

USB Charger+ screen

Indicates that the connected USB device is in charging mode

Click to select the type of USB device that you wish to charge when the system is off

Click to detect the connected USB device

Click to fast-charge your USB device

Click to stop charging your USB device

Click to apply the settings

Click to discard the settings

> Ensure to connect your USB device into the USB port that supports this utility. Refer to section **2.3.1 Rear I/O connection** of your user manual for more details.

4.3.11 Audio configurations

The Realtek® audio CODEC provides 8-channel audio capability to deliver the ultimate audio experience on your computer. The software provides Jack-Sensing 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.
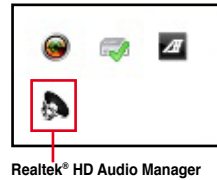
Realtek® HD Audio Manager

A. Realtek® HD Audio Manager with DTS UltraPC II for Windows® 8 / Windows® 7 / Windows® Vista

Configuration option tabs (vary with the audio devices connected)

Advanced settings

Set default device button

Control settings panel

Analog and digital connector status

This version of Realtek HD Audio Manager supports Intel® 8 Series motherboards and other selected models.

B. Realtek® HD Audio Manager with DTS UltraPC II for Windows® 8 / Windows® 7 / Windows® Vista

To display Quick Volume Adjustment Bar, click ⬜ from the taskbar then click 🔊 .
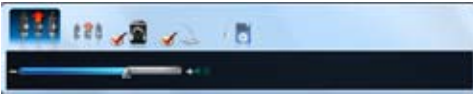
To launch Realtek® HD Audio Manager, click ⬜ from the taskbar then double-click 🔊 .

Configuration option tabs (vary with the audio devices connected)

Device advanced settings

Information button

Control settings

Click to exit

Click to minimize

Click to set default device

Click to set default communication device

Connector settings

Analog and digital connector status

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

• **Due to Intel®** 226 does not support Windows® Vista, Realtek® HD Audio driver is only supported on Windows® 7 and Windows® 8.

• **To play Blu-Ray™ disc, make sure to use an HDCP compliant monitor.**

Chapter 4

Chapter 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).

- 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**.
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 two 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 1 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.
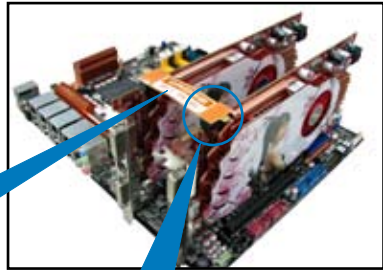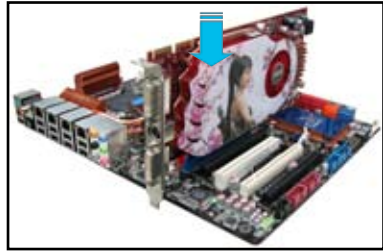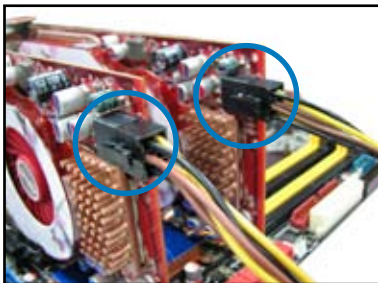
CrossFireX bridge (bundled with graphics cards)

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 three CrossFireX™ graphics cards

1. Prepare three CrossFireX-ready graphics cards.

2. Insert the three graphics card into the PCIEX16 slots. If your motherboard has more
    than three PCIEX16 slots, refer to Chapter 1 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 two
    CrossFireX bridge connectors to the
    goldfingers on each graphics card.
    Ensure that the connectors are firmly in
    place.
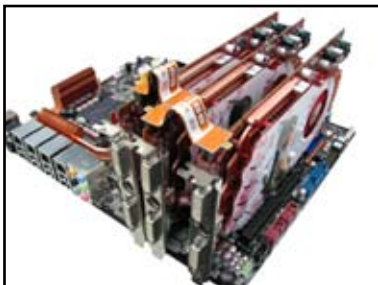

5. Connect three independent auxiliary
    power sources from the power supply to
    the three graphics cards separately.

6. Connect a VGA or a DVI cable to the
    graphics card.
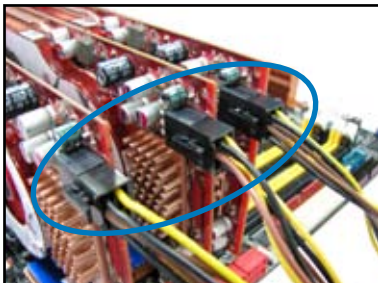
5.1.5   Installing four CrossFireX™ graphics cards

1.   Prepare four CrossFireX-ready graphics cards.

2.   Insert the four graphics card into the PCIEX16 slots. Refer to Chapter 1 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 four CrossFireX bridge connectors to the goldfingers on each graphics card. Ensure that the connectors are firmly in place.

5.   Connect four independent auxiliary power sources from the power supply to the four graphics cards separately.

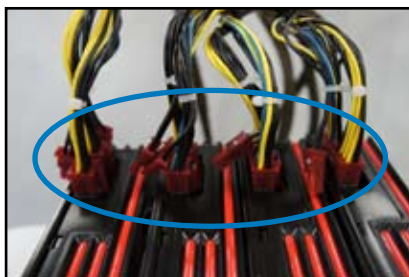6.   Connect a VGA or a DVI cable to the graphics card.

5.1.6   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 AMD® CrossFireX™ technology. Download the latest driver from the AMD website (www.amd.com).

5.1.7   Enabling the AMD® CrossFireX™ technology

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

Launching the AMD Catalyst Control Center

To launch the AMD Catalyst Control Center:

1.   Right-click on the Windows® desktop and select **Catalyst Control Center**.

2.   Click **Catalyst Control Center** to configure the displays and settings of your AMD graphic cards.
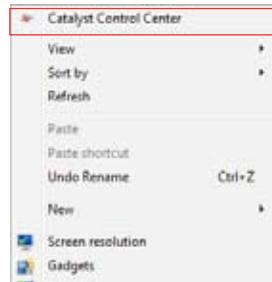
Enabling Dual CrossFireX technology

1.   In the Catalyst Control Center window, click **Performance > AMD CrossFireX™**.

2.   Select **Enable CrossFireX™**.

3.   Select a GPU combination from the drop-down list.

4.   Click **Apply** to save and activate the GPU settings made.
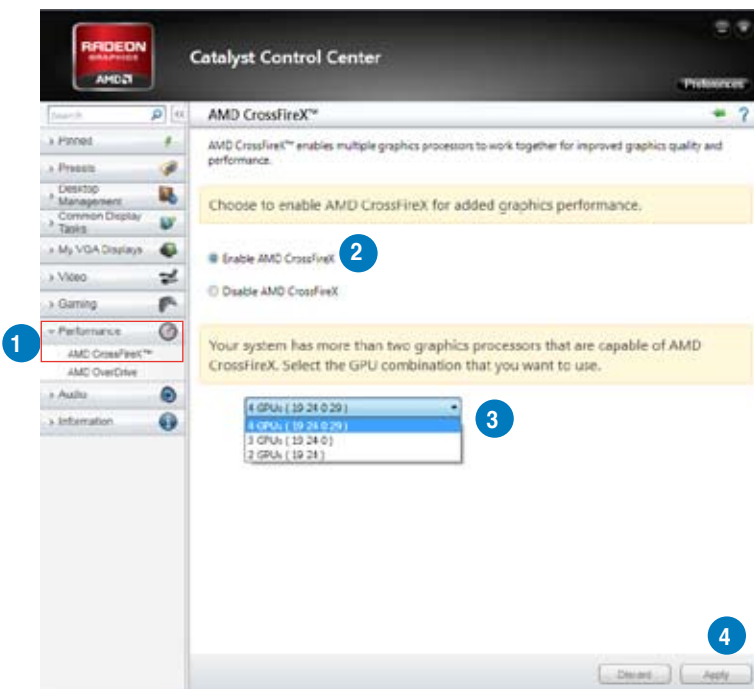
ASUS contact information

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Online contact   www.asus.de/sales

Technical Support
Telephone   +49-1805-010923*
Support Fax   +49-2102-9599-11
Online support   support.asus.com

* EUR 0.14/minute from a German fixed landline; EUR 0.42/minute from a mobile phone.

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 : P9D WS

Conforms to the following specifications:

☒ FCC Part 15, Subpart B, Unintentional 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 : _____ Apr. 29, 2013

Ver. 120601

EC Declaration of Conformity

We, the undersigned,

Manufacturer:	ASUSTek COMPUTER INC.
Address, City:	4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN
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 :	P9D WS

conform with the essential requirements of the following directives:

☒2004/108/EC-EMC Directive

☒ EN 55022:2010	☒ EN 55024:2010
☐ EN 61000-3-2:2006+A2:2009	☐ EN 61000-3-3:2008
☒ EN 55013:2001+A1:2003+A2:2006	☐ EN 55020:2007+A11:2011

☐1999/5/EC-R &TTE Directive

☐ EN 300 328 V1.7.1(2006-10)	☐ EN 301 489-1 V1.9.2(2011-09)
☐ EN 300 440-1 V1.6.1(2010-08)	☐ EN 301 489-3 V1.4.1(2002-08)
☐ EN 300 440-2 V1.4.1(2010-08)	☐ EN 301 489-4 V1.4.1(2009-05)
☐ EN 301 511 V9.0.2(2003-03)	☐ EN 301 489-7 V1.3.1(2005-11)
☐ EN 301 908-1 V5.2.1(2011-05)	☐ EN 301 489-9 V1.4.1(2007-11)
☐ EN 301 908-2 V5.2.1(2011-07)	☐ EN 301 489-17 V2.1.1(2009-05)
☐ EN 301 893 V1.6.1(2011-11)	☐ EN 301 489-24 V1.5.1(2010-09)
☐ 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 62479:2010	☐ EN 301 357-2 V1.4.1(2008-11)
☐ EN 50385:2002	☐ EN 302 291-1 V1.1.1(2005-07)
☐ EN 62311:2008	☐ EN 302 291-2 V1.1.1(2005-07)

☒2006/95/EC-LVD Directive

☒ EN 60950-1 / A12:2011	☐ EN 60065:2002 / A12:2011

☐2009/125/EC-ErP Directive

☐ Regulation (EC) No. 1275/2008	☐ Regulation (EC) No. 278/2009
☐ Regulation (EC) No. 642/2009	

☒2011/65/EU-RoHS Directive Ver. 130208

☒CE marking

(EC conformity marking)

CE

Declaration Date: 29/04/2013

Year to begin affixing CE marking:2013

Position : **CEO**

Name : **Jerry Shen**

Signature : _____