

X79-DELUXE

ASUS[®]

Motherboard

E8419
First Edition
August 2013

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Safety information

Electrical safety

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

Operation safety

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

1. **Chapter 1: Product introduction**

This chapter describes the features of the motherboard and the new technology it supports. It includes description of the switches, jumpers, and connectors on the motherboard.

2. **Chapter 2: Basic installation**

This chapter lists the hardware setup procedures that you have to perform when installing system components.

3. **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.

4. **Chapter 4: Software support**

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

5. **Chapter 5: RAID support**

This chapter describes the RAID configurations.

Where to find more information

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

1. **ASUS website**

The ASUS website (www.asus.com) provides updated information on ASUS hardware and software products.

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 (+).

X79-DELUXE specifications summary

CPU	<p>LGA2011 socket for the 2nd Generation Intel® Core™ i7 processor family</p> <p>Supports Intel® Turbo Boost Technology 2.0*</p> <p>* The Intel® Turbo Boost Technology 2.0 support depends on the CPU types.</p> <p>** Refer to www.asus.com for Intel® CPU support list.</p>
Chipset	Intel® X79 Express Chipset
Memory	<p>8 x DIMM, max. 64GB, DDR3 2800 (O.C.)* / 2400 (O.C.)* / 2133 (O.C.)* / 1866 / 1600 / 1333 / 1066 MHz, non-ECC, un-buffered memory</p> <p>Quad channel memory architecture</p> <p>Supports Intel® Extreme Memory Profile (XMP)</p> <p>* Due to CPU behavior, DDR3 2200/2000/1800 MHz memory modules runs at DDR3 2133/1866/1600 MHz frequency by default.</p> <p>** Hyper DIMM support is subject to the physical characteristics of individual CPUs. Please refer to Memory QVL (Qualified Vendors List) for details.</p> <p>*** Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors List).</p>
Expansion slots	<p>3 x PCI Express 3.0 x16 slots (dual at x16/x16; triple at x16/x8/x8 mode)</p> <p>1 x PCI Express 3.0 x1 slot (PCIe x16 at x4 mode)</p> <p>2 x PCI Express 2.0 x1 slots</p> <p>* This motherboard is ready to support PCIe 3.0 specification. Functions are available when using PCIe 3.0-compliant devices. Refer to www.asus.com for updated details.</p>
Multi-GPU support	<p>Supports NVIDIA® 3-Way SLI™ Technology</p> <p>Supports AMD® Quad-GPU CrossFireX™ Technology</p>
Storage	<p>Intel® X79 Express Chipset</p> <ul style="list-style-type: none"> - 2 x SATA 6Gb/s ports with RAID 0, 1, 5, and 10 support - 4 x SATA 3Gb/s ports with RAID 0, 1, 5, and 10 support <p>Marvell® 9230 SATA controllers</p> <ul style="list-style-type: none"> - 4 x SATA 6Gb/s ports <p>ASMedia® 1061 SATA 6Gb/s controller</p> <ul style="list-style-type: none"> - 2 x SATA 6Gb/s ports <p>ASMedia® 1061 SATA 6Gb/s controller</p> <ul style="list-style-type: none"> - 2 x Power eSATA 6Gb/s ports
LAN	<p>Dual Gigabit LAN controllers—802.3az Energy Efficient Ethernet (EEE) appliance</p> <ul style="list-style-type: none"> - Intel® 82579V Gigabit LAN - Dual interconnect between the integrated LAN controller and physical layer (PHY) - Realtek® 8111GR Gigabit LAN controller

(continued on the next page)

X79-DELUXE specifications summary

Wireless Data Network	Speedy Wi-Fi 802.11 a/b/g/n/ac supports dual frequency band 2.4/5 GHz ASUS Wi-Fi GO! Utility
Bluetooth	Bluetooth v4.0
Audio	Realtek® ALC1150 8-channel high definition audio CODEC <ul style="list-style-type: none"> - Absolute pitch 192khz/24bit True BD Lossless Sound - BD audio layer content protection - DTS UltraPC II - DTS Connect - Supports jack-detection, multi-streaming and front panel jack-retasking - Optical S/PDIF out ports at rear I/O
USB	Intel® X79 Chipset <ul style="list-style-type: none"> - 12 x USB 2.0/1.1 ports (8 ports at mid-board, 4 ports at rear panel) 3 x ASMedia® USB 3.0 controllers <ul style="list-style-type: none"> - 2 x USB 3.0/2.0 ports at mid-board for front panel support - 6 x USB 3.0/2.0 ports at rear panel with 1 additional ASMedia SuperSpeed USB hub controller
ASUS Exclusive Features	ASUS Dual Intelligent Processors 4 - 4-Way Optimization tuning key <ul style="list-style-type: none"> - 4-Way Optimization tuning key perfectly consolidates ASUS-exclusive DIGI+Power Control, TPU, EPU, and Fan Xpert 2 that quickly optimize the digital power setting, system performance, power saving and whole system cooling configuration with just a click. CPU Power <ul style="list-style-type: none"> - Industry leading digital 8+2-phase power design - ASUS CPU power utility DRAM Power <ul style="list-style-type: none"> - Industry leading digital 2+2-phase DRAM power design - ASUS DRAM power utility ASUS EPU <ul style="list-style-type: none"> - EPU, EPU switch ASUS TPU <ul style="list-style-type: none"> - Auto Tuning, TurboV, TPU switch ASUS Fan Xpert 2 <ul style="list-style-type: none"> - Featuring Fan Auto Tuning function for optimized speed control. ASUS Wi-Fi GO! <ul style="list-style-type: none"> - Wi-Fi GO! functions include Cloud GO!, Media Streaming Hub, Smart Sensor Control, Remote Desktop, Remote Keyboard & Mouse, File Transfer, Capture & Send - Wi-Fi GO! & NFC Remote for portable Smartphone/Tablet, supporting iOS and Android systems.

(continued on the next page)

X79-DELUXE specifications summary

ASUS Exclusive Features

- Wi-Fi Engine's Client and AP modes for network sharing and connection.

ASUS Exclusive Features:

- ASUS SSD Caching II
- Network iControl
- USB 3.0 Boost featuring speedy USB 3.0 transmission
- Ai Charger+
- Disk Unlocker
- AI Suite 3
- Anti Surge
- MemOK!

ASUS Quiet Thermal Solution:

- ASUS Fan Xpert 2 featuring Fan Auto Tuning function for optimized speed control
- ASUS Fanless Design: Heat-pipe solution

ASUS Q-Design

- ASUS Q-Code
- ASUS Q-Shield
- ASUS Q-LED (CPU, DRAM, VGA, Boot Device LED)
- ASUS Q-Slot
- ASUS Q-DIMM
- ASUS Q-Connector

ASUS EZ DIY

- ASUS USB BIOS Flashback with USB BIOS Flashback Wizard for EZ BIOS download scheduling
- ASUS UEFI BIOS EZ Mode
- ASUS O.C. Tuner
- ASUS CrashFree BIOS 3
- ASUS EZ Flash 2
- Multi-language BIOS

ASUS Exclusive Overclocking Features

Precision Tweaker 2

- vCore: Adjustable CPU Core voltage at 0.005V increment
- vTTCPU: Adjustable I/O Voltage at 0.00625V increment
- vCCSA: 180-step system agent voltage control
- vDRAM Bus: 158-step Memory voltage control
- vPCH: 96-step Chipset voltage control

SFS (Stepless Frequency Selection)

- BCLK/PCIE frequency tuning: under 110MHz up at 0.1MHz increment; from 110MHz to 150MHz at 0.125MHz increment; from 150MHz to 200MHz at 1.66MHz increment; above 200MHz at 0.25MHz increment.

Overclocking Protection

- ASUS C.P.R. (CPU Parameter Recall)

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X79-DELUXE specifications summary

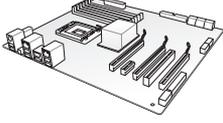
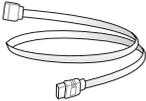
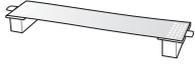
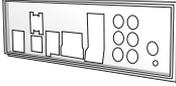
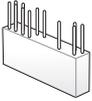
Rear Panel I/O Ports	<p>6 x USB 3.0/2.0 ports (blue) 4 x USB 2.0/1.1 ports (white port supports USB BIOS Flashback) 1 x USB BIOS Flashback button 2 x ASUS Wi-Fi GO! SMA antenna ports (2T2R) (Wi-Fi 802.11 a/b/g/n/ac and Bluetooth v4.0) 2 x LAN (RJ45) ports (1 x Intel® LAN) 1 x Optical S/PDIF Out port 2 x Power eSATA 6Gb/s port (green) 8-channel Audio I/O ports</p>
Internal I/O connectors	<p>1 x 19-pin USB 3.0/2.0 connector supports additional 2 USB ports 4 x USB 2.0/1.1 connectors support additional 8 USB ports 8 x SATA 6Gb/s connectors (2 x black; 6 x dark brown) 4 x SATA 3Gb/s connectors (black) 1 x 4-pin CPU Fan connector 1 x 4-pin CPU Optional Fan connector (CPU_OPT) 4 x 4-pin Chassis Fan connectors 1 x Power-on switch 1 x Reset switch 1 x TPM connector 1 x Chassis intrusion connector 1 x Front panel audio connector (AAFP) 1 x S/PDIF out header 1 x Clear CMOS button 1 x MemOK! button 1 x EPU switch 1 x TPU switch (with advanced two-stage adjustments) 1 x 24-pin EATX Power connector 1 x 8-pin EATX 12V Power connector System Panel (Q-Connector)</p>
BIOS features	<p>64 Mb Flash ROM, UEFI AMI BIOS, PnP, DMI 2.7, WfM 2.0, SM BIOS 2.7, ACPI 5.0, Multi-language BIOS, ASUS EZ Flash 2, ASUS CrashFree BIOS 3, My Favorites, Quick Note, Last Modified Log, F12 PrintScreen function, F3 Shortcut function, and ASUS DRAM SPD (Serial Presence Detect) memory information</p>
Manageability	<p>WfM 2.0, DMI 2.7, WOL by PME, PXE</p>
Support DVD contents	<p>Drivers ASUS Utilities EZ Update Anti-virus software (OEM version)</p>
Form factor	<p>ATX form factor: 12 in. x 9.6 in. (30.5 cm x 24.4 cm)</p>



Specifications are subject to change without notice.

Package contents

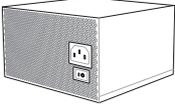
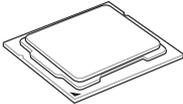
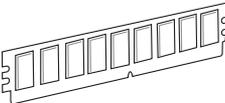
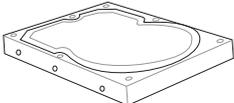
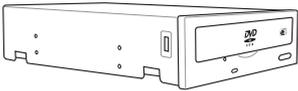
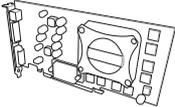
Check your motherboard package for the following items

		
ASUS X79-DELUXE motherboard	User manual	Support DVD
		
6 x Serial ATA 6Gb/s cables 4 x Serial ATA 3Gb/s cables	1 x ASUS SLI™ bridge connector	1 x ASUS 3-WAY SLI™ bridge connector
		
1 x ASUS Q-Shield	1 x 2-in-1 ASUS Q-Connector kit	1 x 2T2R dual-band Wi-Fi moving antennas (Wi-Fi 802.11a/b/g/n/ac compliant)



- 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.

Installation tools and components

	
<p>1 bag of screws</p>	<p>Phillips (cross) screwdriver</p>
	
<p>PC chassis</p>	<p>Power supply unit</p>
	
<p>Intel® LGA2011 CPU</p>	<p>Intel® LGA2011 compatible CPU Fan</p>
	
<p>DIMM</p>	<p>SATA hard disk drive</p>
	
<p>SATA optical disc drive (optional)</p>	<p>Graphics card</p>



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

Product introduction

1

1.1 Special features

1.1.1 Product highlights

LGA2011 socket for 2nd generation Intel® Core™ i7 processor family

This motherboard supports 2nd generation Intel® Core™ i7 processor family in the LGA2011 package. It provides great system performance with its quad-channel DDR3 memory slots, PCI Express 2.0/3.0 expansion slots, and level 3 (L3) cache sizes.

Intel® X79 Express Chipset

Intel® X79 Express Chipset is a single chipset that supports the LGA2011 socket for 2nd generation Intel® Core™ i7 processor family. It utilizes the serial point-to-point links, which increases bandwidth and enhances the system's performance.

PCIe 3.0 Ready

The PCI Express bus standard delivers improved encoding for twice the performance of current PCIe 2.0. Total bandwidth for a x16 link reaches a maximum of 32Gb/s, double the 16Gb/s of PCIe 2.0 in x16 mode. PCIe 3.0 provides you unprecedented data speeds, with the convenience and seamless transition offered by complete backward compatibility with PCIe 1.0 and PCIe 2.0 devices, and improves and optimizes graphics performance.

* This motherboard is ready to support PCIe 3.0 specification. Functions are available when using PCIe 3.0-compliant devices. Refer to www.asus.com for updated details.

3-Way SLI™ and Quad-GPU CrossFireX™ Support

This motherboard features the most powerful Intel® X79 platform that optimizes PCIe allocation in multi-GPU SLI and CrossFireX™ solution, giving you a brand-new gaming enjoyment.

Quad-Channel, 8 x DIMM DDR3 2800 (O.C.) / 2400(O.C.) / 2133(O.C.) / 1866 / 1600 / 1333 / 1066 MHz Support

The motherboard supports the quad-channel DDR3 memory that features data transfer rates of DDR3 2800(O.C.)/2400(O.C.)/2133(O.C.)/1866/1600/1333/1066 MHz to boost the system's performance, and to meet the higher bandwidth requirements of 3D graphics, multimedia and Internet applications.

* Due to CPU behavior, DDR3 2200 / 2000 / 1800MHz memory modules run at DDR3 2133/1866/1600MHz frequencies as default.

Extra SATA 6Gb/s support

The Intel® X79 Express Chipset natively supports the next-generation SATA (Serial ATA) interface, delivering up to 6Gb/s data transfer. ASUS provides extra 6Gb/s ports with enhanced scalability, faster data retrieval, and double the bandwidth of current bus systems.

8 DIMM Design

Support for up to 64GB of system memory with an 8-DIMM design on this motherboard provides you to fully use of modern 64-bit software, ideal for rendering detailed images or manipulating large files. It also allows you to set up big RAM disks and speed up frequently accessed programs, minimizing the impact of storage transfer delays while maximizing user benefit.

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 and play connectivity solution at speed up to ten times faster than USB 2.0.

1.1.2 Dual Intelligent Processors 4 with 4-Way Optimization

ASUS Dual Intelligent Processors 4 brings system control solution to a totally whole new level, combining TPU, EPU, DIGI+ Power Control and Fan Xpert 2 functions to push the system's performance to its optimal potential. It automatically pushes or reasonably balances the system's performance, power saving levels and fan settings via the user-friendly AI Suite 3 utility.

New DIGI+ Power Control

ASUS DIGI+ Power Control features the revolutionary and innovative digital VRM and DRAM Voltage controllers. These controllers offers ultra-precise memory and voltage tuning for optimal system efficiency, stability and performance.

TPU

TPU (Turbo Processing Unit), offers precise voltage control and advanced monitoring mechanisms through the Auto Tuning and TurboV functions in your ASUS AI Suite 3 utility.

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 component's lifespan.

ASUS Fan Xpert 2

ASUS Fan Xpert 2 provides customizable settings for a cooler and quieter computing environment. With its Fan Auto Tuning feature, ASUS Fan Xpert 2 automatically detects and tweaks all fan speeds, and provides you with optimized fan settings based on the fans' specifications and positions.

Auto Tuning

Achieve extreme yet stable overclocking results automatically with Auto Tuning! With built-in stability testing, Auto Tuning allows beginners to easily upgrade their CPU performance at no extra cost.

1.1.3 ASUS Exclusive Features

Wi-Fi GO!

ASUS Wi-Fi GO! leads the way to a more enjoyable home entertainment. With ASUS Wi-Fi GO!, you can wirelessly stream media files to DLNA devices, remotely control and access your computer using your smart device and easily transfer files between your computer and smart device.

Conveniently use and enjoy these ASUS Wi-Fi GO! functions:

- **Cloud GO!:** Allows you to control files and sync them all across cloud services in a few clicks.
- **Media Streaming Hub:** Allows you to stream media files to a DLNA-supported device.
- **Remote Desktop:** Allows you to view your computer's desktop and remotely operate your computer in real-time from your smart device.
- **Remote Keyboard & Mouse:** Allows you to use your smart device's touch panel as a remote keyboard and mouse for your computer.
- **Smart Sensor Control:** Allows you to remotely control your computer using your smart device's customized gestures.
- **File Transfer:** Allows you to transfer files between your computer and smart device.
- **Capture & Send:** Allows you to take screenshots and send them to a smart device.

USB 3.0 Boost

ASUS USB 3.0 Boost, which supports USB 3.0 standard UASP (USB Attached SCSI Protocol), significantly increases a USB device's transfer speed up to 170% faster than the already impressive USB 3.0 transfer speed. It automatically accelerates data speeds for compatible USB 3.0 peripherals without the need for any user interaction.

USB BIOS Flashback

USB BIOS Flashback offers a hassle-free updating solution for your ultimate convenience. Install a USB storage device containing the BIOS file, press the BIOS Flashback button for about three seconds, and the UEFI BIOS is automatically updated even without entering the existing BIOS or operating system. It also allows you to regularly check for UEFI BIOS updates, and download the latest BIOS automatically.

Network iControl

Network iControl is an intuitive one-step network control center that makes it easier for you to manage your bandwidth and allows you to set, monitor and schedule the bandwidth priorities for your network programs.

AI Suite 3

With its user-friendly interface, ASUS AI Suite 3 consolidates all the exclusive ASUS features into one simple-to-use software package. It allows you to supervise overclocking, energy management, fan speed control, voltage and sensor readings, and even interact with smart devices via Wi-Fi. This all-in-one software offers diverse and ease to use functions, with no need to switch back and forth between different utilities.

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.

ASUS SSD Caching II

ASUS SSD Caching II supports Marvell® HyperDuo Plus technology, allowing you to use SSDs (Solid State Drive) for multi-caching of frequently accessed programs and data. Install at least one HDD (Hard Disk Drive) and one or more SSDs to the Marvell® SATA ports for an SSD-like transfer speed.

1.1.4 ASUS Quiet Thermal Solution

ASUS Fanless Design - Heat-pipe solution

The stylish heatsink features a 0-dB thermal solution that offers you a noiseless PC environment. The heatsink design also lowers the temperature of the chipset and power phase area through high efficient heat-exchange. Combined with usability and aesthetics, the ASUS stylish heatsink will give you an extremely silent and cooling experience with its elegant appearance.

1.1.5 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 UEFI 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:

- New My Favorite function allows you to quickly access the frequently used items
- New Quick Note function allows you to take notes in the BIOS environment
- New log reminder allows you to view all your modified settings
- 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-shield

ASUS Q-Shield's special design makes it convenient and easy to install on your motherboard. With better electric conductivity, it ideally protects your motherboard against static electricity and shields it against EMI (Electronic Magnetic Interference).

ASUS Q-Design

ASUS Q-Design enhances your DIY experience. All of Q-Slot and Q-Shield design speed up and simplify the 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.

1.1.6 Other special features

DTS Connect

To get the most out of your audio entertainment across all formats and quality levels, DTS Connect combines two enabling technologies, DTS Neo:PC™ upmixes stereo sources (CDs, MP3s, WMAs, internet radio) into as many as 7.1 channels of incredible surround sound. Consumers can connect their PC to a home theater system. DTS Interactive is capable of performing multi-channel encoding of DTS bitstreams on personal computers, and sending encoded bitstreams out of a digital audio connection (such as S/PDIF or HDMI) designed to deliver audio to an external decoder.

DTS UltraPC II

DTS UltraPC II delivers a superior surround sound experience through your system's speakers and headphones while monitoring and balancing the loudness level difference between digital audio formats. It also enhances the audio settings through augmenting low and high frequencies of musical tones, restores compressed or re-mastered sounds, improves bass performance even without a subwoofer, and improves dialogues derived from DVD or Blu-ray Disc™.

ErP Ready

The motherboard is European Union's Energy-related Products (ErP) ready, and ErP requires products to meet certain energy efficiency requirement in regards to energy consumptions. This is in line with ASUS vision of creating environment-friendly and energy-efficient products through product design and innovation to reduce carbon footprint of the product and thus mitigate environmental impacts.

1.2 Motherboard overview

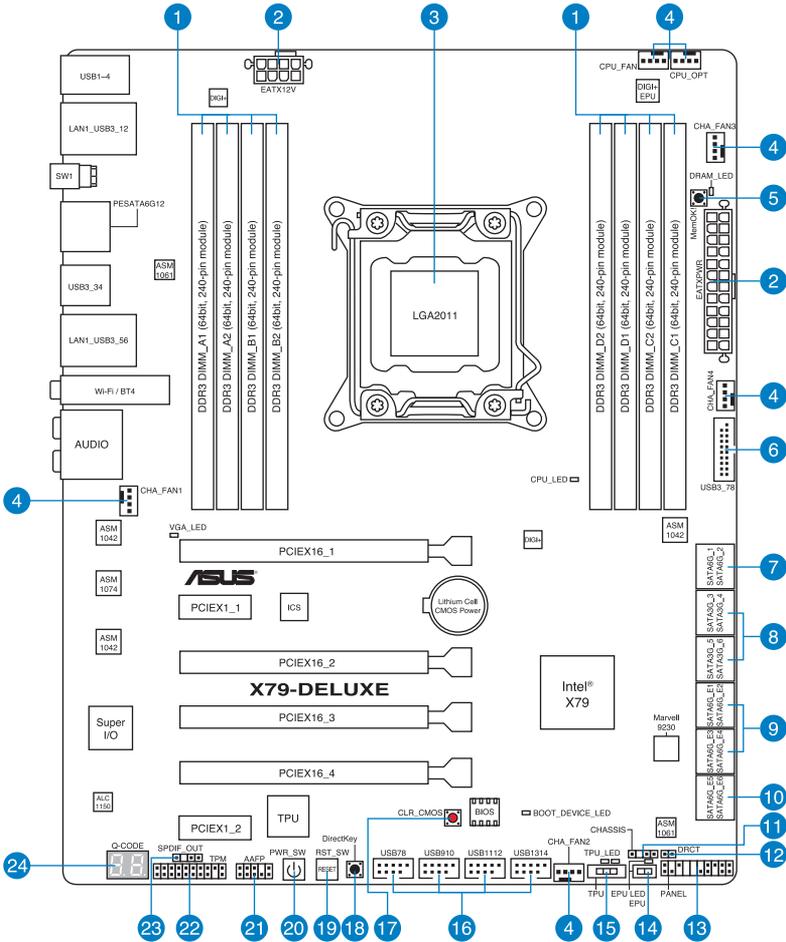
1.2.1 Before you proceed

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.
-

1.2.2 Motherboard layout



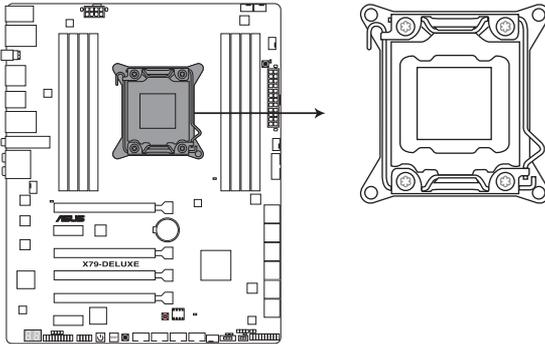
Refer to **1.2.8 Internal connectors** and **2.3.1 Rear I/O connection** for more information about rear panel connectors and internal connectors.

Layout contents

Connectors/Jumpers/Buttons and switches/Slots	Page
1. DDR3 DIMM slots	1-10
2. ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)	1-44
3. LGA2011 CPU socket	1-9
4. CPU, CPU optional, and chassis fan connectors (4-pin CPU_FAN, 4-pin CPU_OPT, 4-pin CHA_FAN1-4)	1-42
5. MemOK! button	1-25
6. USB 3.0 connector (20-1 pin USB3_78)	1-40
7. Intel® X79 Serial ATA 6Gb/s connectors (7-pin SATA6G_1/2 [black])	1-36
8. Intel® X79 Serial ATA 3Gb/s connectors (7-pin SATA3G_3/4; SATA3G_5/6 [black])	1-38
9. Marvell® Serial ATA 6Gb/s connectors (7-pin SATA6G_E12; SATA6G_E34 [dark brown])	1-37
10. ASMedia® Serial ATA 6Gb/s connectors (7-pin SATA6G_E56 [dark brown])	1-37
11. Chassis intrusion connector (4-1 pin CHASSIS)	1-39
12. DirectKey connector (2-pin DRCT)	1-46
13. System panel connector (20-8 pin PANEL)	1-45
14. EPU switch	1-28
15. TPU switch	1-27
16. USB 2.0 connectors (10-1 pin USB78; USB910; USB1112; USB1314)	1-41
17. Clear CMOS button (CLR_CMOS)	1-29
18. DirectKey button (DirectKey)	1-26
19. Reset button	1-24
20. Power-on button	1-24
21. Front panel audio connector (10-1 pin AAFP)	1-43
22. TPM connector (20-1 pin connector)	1-46
23. Digital audio connector (4-1 pin SPDIF_OUT)	1-39
24. Q-Code LEDs (LED1, LED2)	1-31

1.2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA2011 socket designed for the 2nd Generation Intel® Core™ i7 processor family.



X79-DELUXE CPU LGA2011



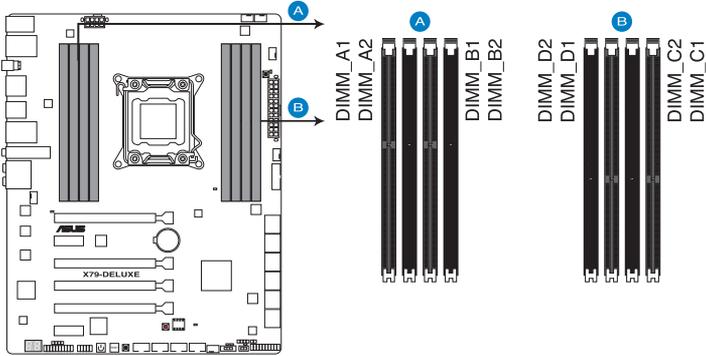
- Ensure that all power cables are unplugged before installing the CPU.
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard 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 LGA2011 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.

1.2.4 System memory

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

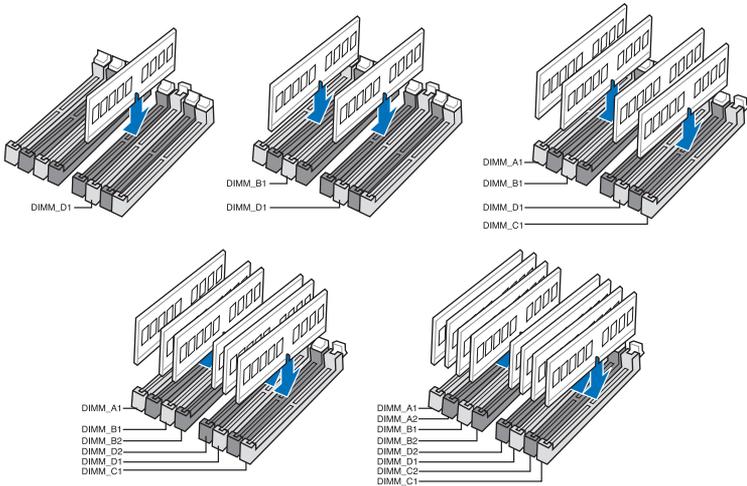


A DDR3 module is notched differently from a DDR or DDR2 module. DO NOT install a DDR or DDR2 memory module to the DDR3 slot.



X79-DELUXE 240-pin DDR3 DIMM socket

Recommended memory configurations



Memory configurations

You may install 2GB, 4GB and 8GB unbuffered and non-ECC DDR3 DIMMs into the DIMM sockets.



-
- You may install varying memory sizes in Channel A, Channel B, Channel C, and Channel D. 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 1.65V is recommended to protect the CPU.
 - Due to CPU behavior, DDR3 2200/2000/1800 MHz memory modules run at DDR3 2133/1866/1600 MHz frequency as default.
 - 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:
 - a) Use a maximum of 3GB system memory if you are using a 32-bit Windows® OS.
 - b) Install a 64-bit Windows® OS when you want to install 4GB or more on the motherboard.
 - c) 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).



-
- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value. To operate at the vendor-marked or at a higher frequency, refer to section **3.5 Ai Tweaker menu** for manual memory frequency adjustment.
 - For system stability, use a more efficient memory cooling system to support a full memory load (8 DIMMs) or overclocking condition.
 - Memory modules with memory frequency higher than 2133MHz and their corresponding timing or the loaded XMP profile is not the JEDEC memory standard. The stability and compatibility of the memory modules depend on the CPU's capabilities and other installed devices.
 - Always install the DIMMs with the same CAS Latency. For an optimum compatibility, we recommend that you install memory modules of the same version or data code (D/C) from the same vendor. Check with the vendor to get the correct memory modules.

X79-DELUXE Motherboard Qualified Vendors List (QVL)

DDR3 2400 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
A-DATA	AX3U2400GW8G11(XMP)	16GB (2x8GB)	DS	-	-	11-13-13-35	1.65	*	*	*	
Apacer	78.BAGFLAFD0C(XMP)	8GB (2x4GB)	DS	-	-	11-12-12-30	-	*			
Apacer	783BAGF3.AFD0C(XMP)	8GB (2x4GB)	DS	-	-	11-11-11-30	-	*	*		
CORSAIR	CMD16GX3M2A2400C10 (Ver4.21)(XMP)	16GB (2x8GB)	DS	-	-	10-12-12-31	1.65	*	*	*	
CORSAIR	CMY16GX3M2A2400C10R (Ver4.21)(XMP)	16GB (2x8GB)	DS	-	-	10-12-12-31	1.65	*	*	*	*
CORSAIR	CMZ16GX3M2A2400C10 (Ver4.21)	16GB (2x8GB)	DS	-	-	10-12-12-31	1.65	*	*	*	*
CORSAIR	CMZ16GX3M4A2400C9R (Ver4.13)(XMP)	16GB (4x4GB)	DS	-	-	2400-9-11-11-31	1.65	*	*	*	*
CORSAIR	CMY16GX3M2A2400C10A (Ver4.21)(XMP)	16GB (8x2GB)	DS	-	-	10-12-12-31	1.65	*	*	*	*
CORSAIR	CMD32GX3M4A2400C10 (Ver5.29)(XMP)	32GB (4x8GB)	DS	-	-	10-12-12-31	1.65	*	*	*	*
G.SKILL	F3-19200CL11Q-16GBZHD(XMP)	16GB (4x4GB)	DS	-	-	11-11-11-31	1.65	*	*	*	*
G.SKILL	F3-19200CL11Q-16GBZHD(XMP)	16GB (4x4GB)	DS	-	-	11-11-11-31	1.65	*	*	*	*
G.SKILL	F3-19200CL9Q-16GBZMD(XMP)	16GB (4x4GB)	DS	-	-	9-11-11-31	1.65	*	*	*	*
G.SKILL	F3-19200CL10Q-32GBZHD(XMP)	32GB (4x8GB)	DS	-	-	10-12-12-31	1.65	*	*	*	*
GEIL	GOC316GB2400C10QC(XMP)	16GB (4x4GB)	DS	-	-	10-11-11-30	1.65	*	*	*	*
GEIL	GOC316GB2400C11QC(XMP)	16GB (4x4GB)	DS	-	-	11-11-11-30	1.65	*	*	*	*
GEIL	GET34GB2400C9DC(XMP)	4GB (2x2GB)	DS	-	-	9-11-9-27	1.65				
Kingston	KHX2400C11D3K4/8GX(XMP)	8GB (4x2GB)	SS	-	-	11-13-11-30	1.65	*	*	*	
KINGSTON	KHX24C11T3K2/16X(XMP)	16GB (2x8GB)	DS	-	-	2400-11-13-13-32	1.65	*			
KINGSTON	KHX24C11K4/16X(XMP)	16GB (4x4GB)	DS	-	-	11-13-13-30	1.65	*	*	*	*
KINGSTON	KHX24C11T3K4(XMP)	16GB (4x4GB)	DS	-	-	2400-11-13-13-30	1.65		*		
KINGSTON	KHX24C11T3K4/32X(XMP)	32GB (4x8GB)	DS	-	-	9-9-9-24	1.65	*	*	*	*
KINGSTON	KHX24C11T2K2/8X(XMP)	8GB (2x4GB)	DS	-	-	-	1.65	*	*	*	*
Transcend	TX2400KLN-8GK(XMP)	8GB (2x4GB)	DS	-	-	2400-11-12-11-29	1.6				
G.SKILL	F3-2400C11Q-32GX(XMP)	32GB (4x8GB)	DS	-	-	11-13-13-31	1.65	*	*	*	*
Team	TXD38G2400HC10QB(XMP)	16GB (2x8GB)	DS	-	-	10-12-12-31	1.65	*	*	*	*
Team	TXD34G2400HC10QB(XMP)	8GB (2x4GB)	DS	-	-	10-12-12-31	1.65	*	*	*	*

DDR3 2200 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
GEIL	GET34GB2200C9DC(XMP)	4GB (2x2GB)	DS	-	-	9-10-9-28	1.65	*	*	*	
GEIL	GET38GB2200C9ADC(XMP)	8GB (2x4GB)	DS	-	-	9-11-9-28	1.65	*	*	*	

DDR3 2133 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
A-DATA	AX3U2133XW8G10(XMP)	16GB (2x8GB)	DS	-	-	10-11-11-30	1.65	*	*	*	
Apacer	AHU04GFB33CAQ3R(XMP)	4GB	DS	-	-	11-13-13-31	-	*	*		
Apacer	78_BAGE4.AFD0C(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	-	*	*		
CORSAIR	CMD16GX3M2A2133C9(Ver4.21)(XMP)	16GB (2x8GB)	DS	-	-	9-11-11-31	1.65	*	*	*	
CORSAIR	CMD32GX3M4A2133C9(Ver4.21)(XMP)	32GB (4x8GB)	DS	-	-	9-11-11-31	1.65	*	*	*	*
CORSAIR	CMD8GX3M2A2133C9(Ver1.5)(XMP)	8GB (2x4GB)	DS	-	-	9-11-10-27	1.5	*	*		
CORSAIR	CMD8GX3M2B2133C9(Ver5.12)(XMP)	8GB (2x4GB)	DS	-	-	9-11-11-31	1.65	*	*		
CORSAIR	CMY8GX3M2A2133C11R(Ver4.21)(XMP)	8GB (2x4GB)	DS	-	-	11-11-11-27	1.5	*	*	*	*
CORSAIR	CM28GX3M2A2133C11R(Ver4.21)(XMP)	8GB (2x4GB)	DS	-	-	11-11-11-27	1.5	*	*		
G.SKILL	F3-17000CL9Q-16GBXLD(XMP)	16GB (4x4GB)	DS	-	-	9-11-9-28	1.65	*	*	*	*
G.SKILL	F3-17000CL9Q-16GBZH(XMP)	16GB (4x4GB)	DS	-	-	9-11-10-28	1.65	*	*	*	*
G.SKILL	F3-2133C10Q-32GSR(XMP)	32GB (4x8GB)	DS	-	-	10-12-12-31	1.5	*	*	*	*
G.SKILL	F3-2133C11Q-32GZL(XMP)	32GB (4x8GB)	DS	-	-	11-11-11-31	1.5	*	*	*	*
G.SKILL	F3-17000CL11Q2-64GBZLD(XMP)	64GB (8x8GB)	DS	-	-	11-11-11-30	1.5	*	*	*	
KINGSTON	KHX2133C11D3K4/16GX(XMP)	16GB (4x4GB)	DS	-	-	11-12-11-30	1.65	*	*	*	*
KINGSTON	KHX21C11T3FK8/64X(XMP)	64GB (8x8GB)	DS	-	-	9-9-9-24	1.5	*	*	*	*
Transcend	TX2133KLN-16GK(XMP)	16GB (2x8GB)	DS	-	-	2133-10-11-10-27	1.6				*
Transcend	TX2133KLN-8GK(XMP)	8GB (2x4GB)	DS	-	-	2133-10-11-10-27	1.6				*
Team	TLD38G2133HC11ABK(XMP)	16GB (2x8GB)	DS	-	-	11-11-11-31	1.65	*	*	*	*
Team	TLD34G2133HC11ABK(XMP)	8GB (2x4GB)	DS	-	-	11-11-11-31	1.65	*	*	*	*

DDR3 2000 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
GEIL	GUP34GB2000C9DC (XMP)	4GB (2x2GB)	DS	-	-	9-9-9-28	1.65	*	*	*	*
AEXEA	AXA3ES4GK2000LG28 V(XMP)	4GB (2x2GB)	DS	-	-	-	1.65	*	*		
Asint	SLA302G08-ML2HB (XMP)	4GB	DS	Hynix	H5TQ2G8 3BFRH9C	9-9-9-27	-	*	*	*	*

DDR3 1866 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
A-DATA	AX3U1866XW8 G1 0(XMP)	16GB (2x8GB)	DS	-	-	10-11-10-30	1.5	*	*	*	*
CORSAIR	CMD16GX3M2 A1866C9 (Ver5.29)(XMP)	16GB (2x8GB)	DS	-	-	1866 9-9-9-27	1.5	*			
CORSAIR	CMY16GX3M2A 1866C9 (Ver 4.21)(XMP)	16GB (2x8GB)	DS	-	-	9-10-9-27	1.5	*	*	*	*
CORSAIR	CMZ16GX3M2A 1866C10 (Ver5.29)(XMP)	16GB (2x8GB)	DS	-	-	10-11-10-30	1.5	*	*		
CORSAIR	CMD16GX3M4 A1866C9 (Ver4.13)(XMP)	16GB (4x4GB)	DS	-	-	9-10-9-27	1.5	*			
CORSAIR	CMD16GX3M4 A1866C9 (Ver8.16)(XMP)	16GB (4x4GB)	DS	-	-	9-10-9-27	1.5	*	*		
CORSAIR	CMD32GX3M4 A1866C9 (Ver3.24)(XMP)	32GB (4x8GB)	DS	-	-	9-10-9-27	1.5	*	*	*	*
CORSAIR	CMT32GX3M4 X1866 C9(Ver3.23)(XMP)	32GB (4x8GB)	DS	-	-	9-10-9-27	1.5	*	*	*	*
CORSAIR	CMZ32GX3M4 X1866C10 (Ver3.23)(XMP)	32GB (4x8GB)	DS	-	-	10-11-10-27	1.5	*	*		
CORSAIR	CMZ32GX3M4X1 866C10(Ver3.23)(XMP)	32GB (4x8GB)	DS	-	-	10-11-10-27	1.5	*	*	*	*
CORSAIR	CMD8GX3M2A 1866C9 (Ver4.13)(XMP)	8GB (2x4GB)	DS	-	-	-	1.5	*	*	*	*
CORSAIR	CMD8GX3M2A 1866C9 (Ver5.12)(XMP)	8GB (2x4GB)	DS	-	-	9-10-9-27	1.5	*			
CORSAIR	CMD8GX3M2A 1866C9 (Ver8.16)(XMP)	8GB (2x4GB)	DS	-	-	9-10-9-27	1.5	*			
CORSAIR	CMY8GX3M2A 1866C9 (Ver3.24)(XMP)	8GB (2x4GB)	DS	-	-	9-10-9-27	1.5	*	*	*	*
CORSAIR	CMZ8GX3M2A 1866C9 (Ver8.16)(XMP)	8GB (2x4GB)	DS	-	-	9-10-9-27	1.5	*	*		
CORSAIR	CMZ8GX3M2A1 866 C9(XMP)	8GB (2x4GB)	DS	-	-	9-10-9-27	1.5	*			

(Continued on the next page)

DDR3 1866 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
CORSAIR	CMZ8GX3M2A1866C9G (Ver5.12)(XMP)	8GB (2x4GB)	DS	-	-	1866 9-10-9-27	1.5	*	*	*	*
Crucial	BLE4G3D1869DE1XTO.16FMD(XMP)	4GB	DS	-	-	9-9-9-27	1.5	*	*	*	*
G.SKILL	F3-14900CL9Q-16GBXL(XMP)	16GB (4x4GB)	DS	-	-	9-10-9-28	1.5	*	*	*	*
G.SKILL	F3-14900CL9Q-16GBZL(XMP)	16GB (4x4GB)	DS	-	-	9-10-9-28	1.5	*	*	*	*
G.SKILL	F3-14900CL9Q-16GBZL(XMP)	16GB (4x4GB)	DS	-	-	9-10-9-28	1.5	*	*	*	*
G.SKILL	F3-14900CL10Q-32GBZL(XMP)	32GB (4x8GB)	DS	-	-	10-11-10-30	1.5	*	*	*	*
G.SKILL	F3-1866C9Q-32GX(XMP)	32GB (4x8GB)	DS	-	-	9-10-9-28	1.5	*	*	*	*
G.SKILL	F3-14900CL10Q2-64GBZLD(XMP)	64GB (8x8GB)	DS	-	-	10-11-10-30	1.5	*	*	*	*
G.SKILL	F3-14900CL9D-8GBSR(XMP)	8GB (2x4GB)	DS	-	-	9-10-9-28	1.5	*	*	*	*
G.SKILL	F3-14900CL9Q-8GBFLD(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.6	*	*	*	*
KINGSTON	KHX1866C9D3K2/8GX(XMP)	8GB (2x4GB)	DS	-	-	-	1.65	*	*	*	*
Patriot	PXD34G1866ELK(XMP)	4GB (2x2GB)	SS	-	-	9-9-9-24	1.65	*	*	*	*
Patriot	PXD38G1866ELK(XMP)	8GB (2x4GB)	DS	-	-	9-11-9-27	1.65	*	*	*	*
Patriot	PXD38G1866ELK(XMP)	8GB (2x4GB)	DS	-	-	9-11-9-27	1.65	*	*	*	*
Patriot	PXD38G1866ELK(XMP)	8GB (2x4GB)	DS	-	-	1866 9-10-9-27	1.5	*	*	*	*
Team	TLD38G1866HC10SBK(XMP)	16GB (2x8GB)	DS	-	-	10-11-10-30	1.5	*	*	*	*
Team	TED34GM1866C13BK	4GB	DS	Hynix	H5TC2G83EFR	13-13-13-32	1.5	*	*	*	*
Team	TLD34G1866HC9KBK(XMP)	8GB (2x4GB)	DS	-	-	9-11-9-27	1.5	*	*	*	*
Team	TED38GM1866C13BK	8GB	DS	Hynix	H5TQ4G83AFR	13-13-13-32	1.5	*	*	*	*

DDR3 1600 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
A-DATA	AD3U1600C2G11	2GB	SS	MICRON	D9PFJ	11-11-11-28	-	*	*	*	
A-DATA	AD3U1600W4G11	4GB	SS	A-DATA	3WCD-1211A	11-11-11-28	-	*	*	*	
A-DATA	AX3U1600GW8G9(XMP)	16GB (2x8GB)	DS	-	-	9-9-9-24	1.5	*	*	*	
A-DATA	AX3U1600W8G11	16GB (2x8GB)	DS	-	-	9-11-9-27	1.5	*	*	*	
A-DATA	AD3U1600C4G11	4GB	DS	MICRON	D9PFJ	11-11-11-28	-	*	*	*	
A-DATA	AD3U1600W8G11	8GB	DS	A-DATA	3WCD-1211A	11-11-11-28	-	*	*	*	
Apacer	78.B1GET.9K00C	4GB	SS	Apacer	AM5D6008BQQSCK	11-11-11-28	-	*	*	*	
Apacer	78.B1GE3.9L10C	4GB	DS	Apacer	AM5D5908DEQSCK	-	1.65	*	*	*	
Apacer	AHU04GFA60C9Q3R(XMP)	4GB	DS	-	-	11-11-11-28	-	*	*	*	
Apacer	78.C1GET.9K10C	8GB	DS	Apacer	AM5D6008BQQSCK	11-11-11-31	-	*	*	*	
Apacer	AHU08GFA60CBT3R(XMP)	8GB	DS	-	-	9-9-9-24	-	*	*	*	
CORSAIR	CMX8GX3M2A1600C9 (Ver3.19)(XMP)	8GB (2x4GB)	SS	-	-	9-9-9-24	1.65	*	*	*	
CORSAIR	CMD16GX3M2A1600C9 (Ver8.21)(XMP)	16GB (2x8GB)	DS	-	-	9-9-9-24	1.5	*	*	*	
CORSAIR	CML16GX3M2A1600C10 (Ver2.21)(XMP)	16GB (2x8GB)	DS	-	-	10-10-10-27	1.5	*	*	*	
CORSAIR	CMZ16GX3M2A1600C10 (Ver.3.24)(XMP)	16GB (2x8GB)	DS	-	-	10-10-10-27	1.5	*	*	*	
CORSAIR	CMZ16GX3M4A1600C9(XMP)	16GB (4x4GB)	DS	-	-	9-9-9-24	1.5	*	*	*	
CORSAIR	CMZ32GX3M4X1600C10 (Ver2.2)(XMP)	32GB (4x8GB)	DS	-	-	10-10-10-27	1.5	*	*	*	
CORSAIR	CMZ4GX3M1A1600C9 (Ver8.16)(XMP)	4GB (1x4GB)	DS	-	-	9-9-9-24	1.5	*	*	*	
CORSAIR	CMZ8GX3M1A1600C10 (Ver3.23)(XMP)	8GB (1x8GB)	DS	-	-	10-10-10-27	1.5	*	*	*	
CORSAIR	CMZ8GX3M1A1600C10 (Ver8.21)(XMP)	8GB (1x8GB)	DS	-	-	10-10-10-27	1.5	*	*	*	
CORSAIR	CMD8GX3M2A1600C8 (Ver5.12)(XMP)	8GB (2x4GB)	DS	-	-	1600-8-8-24	1.5	*	*	*	
CORSAIR	CML8GX3M2A1600C9 (Ver7.12)(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.5	*	*	*	
CORSAIR	CMZ8GX3M2A1600C8(XMP)	8GB (2x4GB)	DS	-	-	8-8-8-24	1.5	*	*	*	
CORSAIR	CMZ8GX3M2A1600C9 (Ver8.16)(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.5	*	*	*	
CORSAIR	CMV8GX3M1A1600C11	8GB	DS	-	-	11-11-11-30	-	*	*	*	
Crucial	BLT4G3D1608DT1TX0.16FM(XMP)	4GB	DS	-	-	8-8-8-24	1.5	*	*	*	

(Continued on the next page)

DDR3 1600 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
G.SKILL	F3-12800CL9Q-16GBXL(XMP)	16GB (4x4GB)	DS	-	-	9-9-9-24	1.5	•	•		
G.SKILL	F3-12800CL9Q-16GBZL(XMP)	16GB (4x4GB)	DS	-	-	9-9-9-24	1.5	•	•	•	•
G.SKILL	F3-1600C9Q-32GXM(XMP)	32GB (4x8GB)	DS	-	-	-	1.5	•	•	•	•
G.SKILL	F3-12800CL9D-8GBSR2(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.25	•	•	•	•
GEIL	GUP34GB1600C7DC(XMP)	4GB (2x2GB)	DS	-	-	7-7-7-24	1.6	•	•		
KINGMAX	FLGE85F-C8KLA(XMP)	2GB	SS	KINGMAX	N/A	9-9-9-28	-	•	•	•	•
KINGMAX	FLGF65F-C8KLA(XMP)	4GB	DS	KINGMAX	N/A	9-9-9-28	-	•	•	•	•
KINGSTON	KHX1600C9D3B1/4G(XMP)	4GB	SS	-	-	9-9-9-27	1.65	•	•		
KINGSTON	KHX1600C9D3K3/12GX(XMP)	12GB (3x4GB)	DS	-	-	9	1.65	•	•		
KINGSTON	KHX16C10B1K2/16X(XMP)	16GB (2x8GB)	DS	-	-	-	1.5	•	•		
KINGSTON	KHX16C9K2/16	16GB (2x8GB)	DS	-	-	1333-9-9-9-24	1.5	•	•		
KINGSTON	KHX16C9P1K2/16	16GB (2x8GB)	DS	-	-	-	1.5	•	•		
KINGSTON	KHX1600C9D3K4/16GX(XMP)	16GB (4x4GB)	DS	-	-	9-9-9-24	1.65	•	•	•	•
KINGSTON	KHX1600C9D3K6/24GX(XMP)	24GB (6x4GB)	DS	-	-	9	1.65	•	•		
KINGSTON	KVR16N11/4	4GB	DS	KINGSTON	D2568JPU CPGGBU	11-11-11-28-1	-	•	•		
KINGSTON	KVR16N11/4	4G	DS	Hynix	HSTQ2G83 CFRPBC	-	1.5	•	•		
KINGSTON	KHX1600C9D3K3/6GX(XMP)	6GB (3x2GB)	DS	-	-	9	1.65	•	•	•	•
KINGSTON	KHX1600C9D3K3/6GX(XMP)	6GB (3x2GB)	DS	-	-	9	1.65	•	•	•	•
KINGSTON	KHX16009CD3K2/8GX(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-27	1.65	•	•		
KINGSTON	KHX1600C9D3LK2/8GX(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.35	•	•		
KINGSTON	KHX1600C9D3P1K2/8G	8GB (2x4GB)	DS	-	-	9	1.5	•	•	•	•
Micron	MT8JTF51264AZ-1G6E1	4GB	SS	Micron	D9QBJ	-	-	•	•	•	•
Micron	MT16JTF1G64AZ-1G6E1	8GB	DS	Micron	D9QBJ	-	-	•	•	•	•
Transcend	TSS12MLK64W6H	4GB	SS	SAMSUNG	K4B4G0846B	11-11-11-28-2	-	•	•	•	•
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	-	•	•	•	•

(Continued on the next page)

DDR3 1600 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
AMD	AE32G1609U1-U	2GB	SS	AMD	23EY4587MB6H	-	1.5	*	*	*	
Asint	SLZ302G08-EGN1C	2GB	SS	ASint	302G08-GN1C	-	-	*	*	*	
Asint	SLA304G08-ENG1B	4GB	SS	Asint	304G08-GN1B	9-11-11-28	-	*	*	*	
Asint	SLA302G08-EGG1C(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	SLB304G08-EGN1B	8GB	DS	ASint	304G08-GN1B	-	-	*	*	*	*
Asint	SLB304G08-EGJ1B(XMP)	8GB	DS	-	-	9-9-9-27	-	*	*	*	*
AVEXIR	AVD3U16000904G-2CW(XMP)	8GB (2x4GB)	DS	-	-	11-11-11-28	1.5	*	*	*	*
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	-	*	*	*	*
Patriot	PX7312G1600LLK(XMP)	12GB (3x4GB)	DS	-	-	8-9-8-24	1.65	*	*	*	
Patriot	PGD316G1600ELK(XMP)	16GB (2x8GB)	DS	-	-	-	1.65	*	*		
Patriot	PGD316G1600ELK(XMP)	16GB (2x8GB)	DS	-	-	9-9-9-24	1.5				
Patriot	PGD38G1600ELK(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.65	*	*	*	
Patriot	PGD38G1600ELK(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.5	*			
Patriot	PV38G1600C9KRD(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.5	*	*		
Patriot	PVV38G1600LLK(XMP)	8GB (2x4GB)	DS	-	-	8-9-8-24	1.65	*	*		
Patriot	PXD38G1600LLK(XMP)	8GB (2x4GB)	DS	-	-	1600 8-9-8-24	1.65	*	*		
SanMax	SMD-4G68HP-16KZ	4GB	DS	Hynix	H5TQ2G83BFRPBC	-	1.5	*	*	*	
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	*	*	*	*
Team	TED34GM1600C11BK	4GB	DS	Hynix	H5TC2G83 3EFR	11-11-11-28	1.5	*	*	*	
Team	TLD34G1600HC9BK(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.5	*	*	*	*
Team	TED38GM1600C11BK	8GB	DS	Hynix	H5TQ4G83AFR	11-11-11-28	1.5	*	*	*	

DDR3 1600 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
Apacer	78.B1GDE.9L10C	4GB	DS	Apacer	AM5D590 8CEHSBG	9	-	*	*	*	
CORSAIR	CMX16GX3M2A 1333C9 (Ver3.24)	16GB (2x8GB)	DS	-	-	9-9-9- 24	1.5	*	*	*	
CORSAIR	CMX4GX3M1A 1333C9 (Ver2.12)	4GB (1x4GB)	DS	-	-	9-9-9- 24	1.5	*	*	*	
CORSAIR	CMX4GX3M1A 1333C9 (Ver5.11)	4GB (1x4GB)	DS	-	-	9-9-9- 24	1.5	*	*	*	
CORSAIR	CMV8GX3M2A 1333C9	8GB (2x4GB)	DS	-	N/A	9-9-9- 24	-	*	*	*	
CORSAIR	CMX8GX3M2A 1333C9(XMP)	8GB (2x4GB)	DS	-	-	9-9-9- 24	1.5	*	*	*	
CORSAIR	CMX8GX3M1A 1333C9 (Ver2.2)	8GB	DS	-	-	9-9-9- 24	1.5	*	*	*	
CORSAIR	CMV8GX3M1A 1333C9	8GB	DS	-	-	9-9-9- 24	-	*	*	*	
G.SKILL	F3-10666CL9D- 8GBXL	8GB (2x4GB)	DS	-	-	9-9-9- 24	1.5	*	*	*	
GEIL	GG34GB13 33C9DC	4GB (2x2GB)	DS	GEIL	GL1L128M8 8BA15B	9-9-9- 24	1.3	*	*	*	
GEIL	GVP34GB13 33C9DC	4GB (2x2GB)	DS	-	-	9-9-9- 24	1.5	*	*	*	
GEIL	GVP38GB13 33C9DC	8GB (2x4GB)	DS	-	-	9-9-9- 24	1.5	*	*	*	
KINGMAX	FLFE85F-C8KL9	2GB	SS	KINGMAX	KFC8FNLBF- GXX-12A	-	-	*	*	*	
KINGMAX	FLFE85F-C8KL9	2GB	SS	KINGMAX	KFC8FNLXF- DXX-15A	-	-	*	*	*	
KINGMAX	FLFF65F-C8KL9	4GB	DS	KINGMAX	KFC8FNLXF- DXX-15A	-	-	*	*	*	
KINGSTON	KVR13N9S8H/4	4GB	SS	ELPIDA	J4208BBBG- GN-F	-	1.5	*	*	*	
KINGSTON	KVR1333D3E9S/ 4G	4GB	DS	Elpida	J2108ECSE- DJ-F	9	1.5	*	*	*	
KINGSTON	KVR1333D3N9H/ 4G	4GB	DS	ELPIDA	J2108BBBG- GN-F	-	1.5	*	*	*	
KINGSTON	KVR1333D3N9H/ 8G	8GB	DS	ELPIDA	J4208EASE- DJ-F	9-9-9- 24	1.5	*	*	*	
MICRON	MT8JTF25664AZ- 1G4M1	2GB	SS	MICRON	D9PFJ	-	-	*	*	*	
Transcend	JM1333KLLH- 8G(623654)	8GB	DS	Transcend	TK963EBF3	-	-	*	*	*	
Transcend	TS1GLK64V3 H(620053)	8GB	DS	MICRON	D9QBJ	-	-	*	*	*	
AMD	AE32G1339U1-U	2GB	SS	AMD	23EY4587MB3H	-	1.5	*	*	*	
AMD	AE34G1339U2-U	4GB	DS	AMD	23EY4587MB3H	-	1.5	*	*	*	
Asint	SLA302G08- EDJ1C	2GB	SS	ASint	302G08-DJ1C	-	-	*	*	*	
Asint	SLA304G08- EDJ1B	4GB	SS	Asint	304G08-DJ1B	9-10- 10-26	-	*	*	*	

(Continued on the next page)

DDR3 1600 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
Asint	SLZ302G08-EDJ1C	4GB	DS	Asint	302G08-DJ1C	-	-	*	*	*	
Asint	SLB304G08-EDJ1B	8GB	DS	Asint	304G08-DJ1B	9-9-9-24	-	*	*	*	
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	-	-	*	*	*	
INNODISK	M3UN-2GHJBC09	2GB	SS	Hynix	H5TQ2G83C FRH9C	9-9-9-24	-	*	*	*	
INNODISK	M3UN-4GHJAC09	4GB	DS	Hynix	H5TQ2G83CF RH9C	9-9-9-24	-	*	*	*	
Mach Xtreme	MXD3V13332GS	2GB	SS	Mach Xtreme	C2S46D30-D313	-	-	*	*	*	
Mach Xtreme	MXD3U133316GQ	16GB (4x4GB)	DS	-	-	-	-	*	*	*	
Patriot	PGD316G1333ELK(XMP)	16GB (2x8GB)	DS	-	-	9-9-9-24	1.5	*	*	*	*
Patriot	PSD32G13332	2GB	DS	Patriot	PM128M8D3 BU-15	9	-	*	*		
Patriot	PG38G1333EL(XMP)	8GB	DS	-	-	-	1.5	*	*	*	
RiDATA	C304627CB1A G22Fe	2GB	DS	RiDATA	C304627CB1 AG22Fe	9	-	*	*		
RiDATA	E304459CB1AG 32Cf	4GB	DS	RiDATA	E304459CB1 AG32Cf	9	-	*	*		
Silicon Power	SP001GBLTU1 33S02	1GB	SS	S-POWER	10YT3E5	9	-	*	*	*	
Silicon Power	SP002GBLTU1 33V02	2GB	SS	S-POWER	20YT3NG	9-9-9-24	-	*	*	*	
Team	TED34096M13 33HC9	4GB	DS	Team	T3D2568LT-13	-	-	*	*	*	



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

- 1 Supports one (1) module inserted into any slot as Single-channel memory configuration. We suggest that you install the module into D1 slot.
 - 2 Supports two (2) modules inserted into one pair of the dark gray slots or the black slots as one pair of dual-channel memory configuration. We suggest that you install the modules into slots B1 and D1 for better compatibility.
 - 4 Supports four (4) modules inserted into both the dark gray slots and black slots as two pairs of quad-channel memory configuration. We suggest that you install the modules into slots A1, B1, C1, and D1 for better compatibility.
 - 6 Supports six (6) modules inserted into four dark gray slots and two black slots as three pairs of quad-channel memory configuration. We suggest that you install the modules into slots A1, B1, B2, C1, D1, and D2 for better compatibility.
 - 8 Supports eight (8) modules inserted into all slots as fully-loaded quad-channel memory configurations.
-

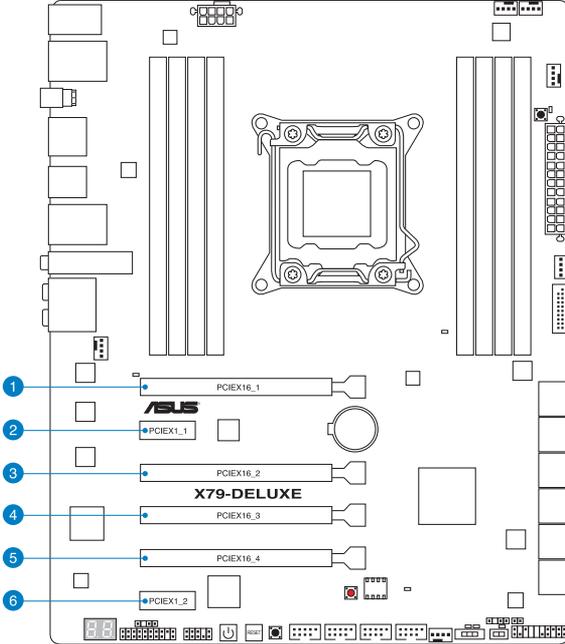


- ASUS exclusively provides hyper DIMM support function.
 - Hyper DIMM support is subject to the physical characteristics of individual CPUs. Load the X.M.P. or D.O.C.P. settings in the BIOS for the hyper DIMM support.
 - Visit the ASUS website for the latest QVL.
-

1.2.5 Expansion slots



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
2	PCIe 2.0 x1_1 slot
3	PCIe 3.0 x16_2 slot
4	PCIe 3.0 x16_3 slot (at x4 mode)
5	PCIe 3.0 x16_4 slot
6	PCIe 2.0 x1_2 slot

VGA configuration	PCIe Express 3.0 operating mode			
	PCIe x16_1	PCIe x16_2	PCIe x16_3	PCIe16_4
Single VGA/PCIe card	x16 (single VGA recommended)	N/A	N/A	N/A
Dual VGA/PCIe card	x16	N/A	N/A	x16
Triple VGA/PCIe card	x16	x8	N/A	x8



- We recommend that you provide sufficient power when running CrossFireX™ or SLI™ mode.
- Connect a chassis fan to the motherboard connector labeled CHA_FAN1-4 when using multiple graphics cards for better thermal environment.

IRQ assignments for this motherboard

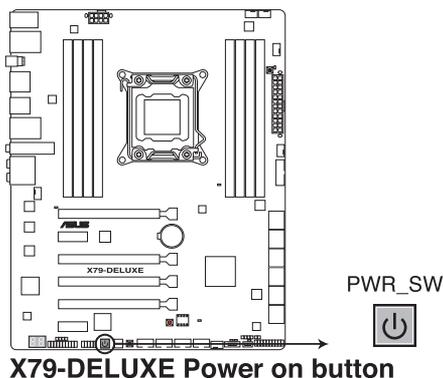
	A	B	C	D	E	F	G	H
PCIe x16_1	shared	-	-	-	-	-	-	-
PCIe x16_2	shared	-	-	-	-	-	-	-
PCIe x16_3	shared	-	-	-	-	-	-	-
PCIe x14_4	shared	-	-	-	-	-	-	-
PCIe x1_1	-	-	-	shared	-	-	-	-
PCIe x1_2	shared	-	-	-	-	-	-	-
SMBUS Controller	-	-	shared	-	-	-	-	-
Wi-Fi/Bluetooth 4.0	-	-	-	shared	-	-	-	-
Intel® SATA Controller 1	-	-	shared	-	-	-	-	-
Intel® SATA Controller 2	-	-	-	-	shared	-	-	-
Intel® LAN	-	-	shared	-	-	-	-	-
ASMedia SATA Controller 1	shared	-	-	-	-	-	-	-
ASMedia SATA Controller 2	-	-	-	shared	-	-	-	-
Marvell 9230 SATA Controller	shared	-	-	-	-	-	-	-
Intel® EHCI 1	-	-	-	-	-	-	-	shared
Intel® EHCI 2	-	-	-	-	-	-	-	shared
HD Audio	-	-	-	-	-	-	shared	-
ASMedia USB 3.0 Controller 1	shared	-	-	-	-	-	-	-
ASMedia USB 3.0 Controller 2	-	shared	-	-	-	-	-	-
ASMedia USB 3.0 Controller 3	-	-	shared	-	-	-	-	-
Realtek® LAN	-	shared	-	-	-	-	-	-

1.2.6 Onboard buttons and switches

Onboard buttons and switches allow you to fine-tune performance when working on a bare or open-case system. This is ideal for overclockers and gamers who continually change settings to enhance system performance.

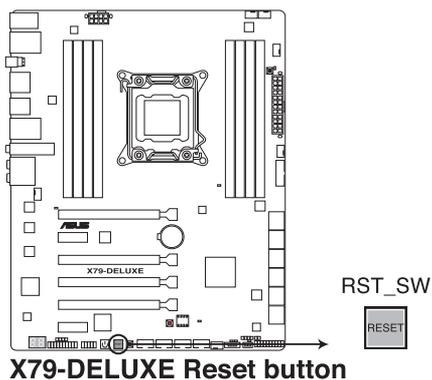
1. Power-on button

The motherboard comes with a power-on button that allows you to power up or wake up the system. The button also lights up when the system is plugged to a power source indicating that you should shut down the system and unplug the power cable before removing or installing any motherboard component.



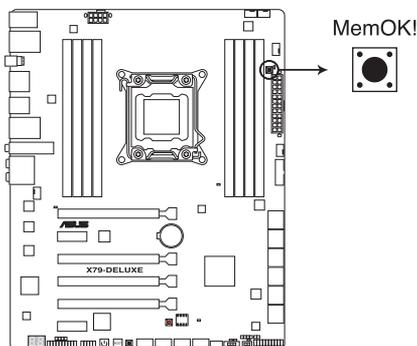
2. Reset button

Press the reset button to reboot the system.



3. MemOK! button

Installing DIMMs that are not compatible with the motherboard may cause system boot failure, and the DRAM_LED near the MemOK! button lights continuously. Press and hold the MemOK! button until the DRAM_LED starts blinking to begin automatic memory compatibility tuning for successful boot.



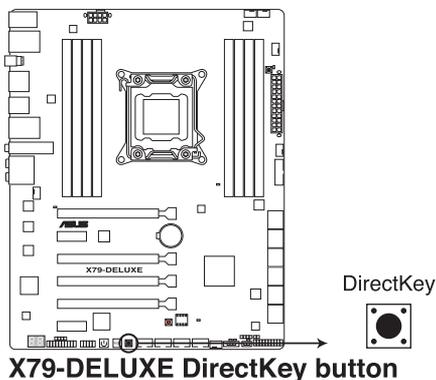
X79-DELUXE MemOK! button



- Refer to section **1.2.7 Onboard LEDs** for the exact location of the DRAM_LED.
- The DRAM_LED also lights up 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 DRAM_LED 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 DRAM_LED 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 overlocking, 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.

4. 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 <Delete> key during POST. It also allows you to turn on or turn off your system and conveniently enter the BIOS during boot-up.



Ensure to save your data before using the DirectKey button.



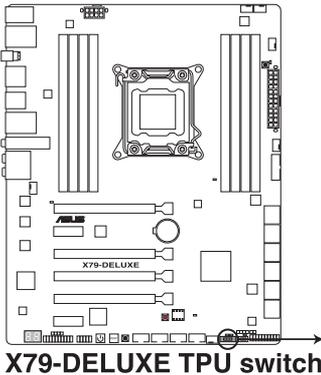
- When the system is on and you press the DirectKey button, your system will shut down. Press the DirectKey button again or the Power-on button to reboot and enter the BIOS directly.
 - Turn off your system using the power-on button to allow your system to go through POST (without entering the BIOS) when you reboot your system.
 - Refer to section **3.8 Boot Menu** for details about setting the DirectKey default function.
-

5. TPU switch

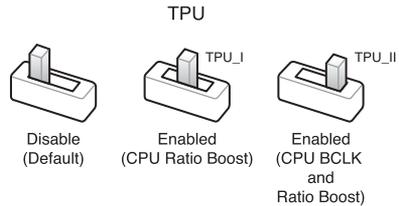
With its two-level adjustment functions, the TPU allows you to automatically adjust the CPU ratio and clock speed for an optimal system performance.



- Enable this switch when the system is powered off.
- When the TPU switch is set to Enabled (TPU_I: CPU Ratio Boost), the system automatically adjusts the CPU ratio for an enhanced performance.
- When the TPU switch is set to Enabled (TPU_II: CPU BCLK and Ratio Boost), the system automatically adjusts the base clock rate (BCLK) and the CPU ratio for a more enhanced performance.



X79-DELUXE TPU switch



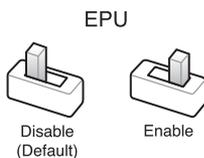
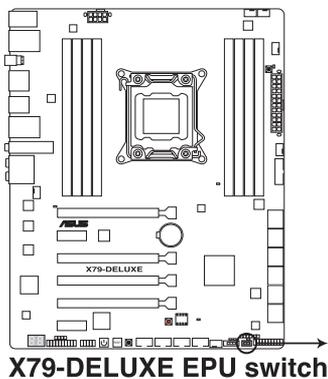
- The TPU LED (TPU_LED) near the TPU switch lights up when the TPU switch is enabled. Refer to section 1.2.7 **Onboard LEDs** for the exact location of the TPU LED.
- If you enable this switch under Windows® OS environment, the TPU function will be activated after the next system bootup.
- You may use the 4-Way Optimization and TPU feature in the AI Suite 3 application, adjust the BIOS setup program or enable the TPU switch at the same time. However, the system will use the last setting you have made.

6. EPU switch

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



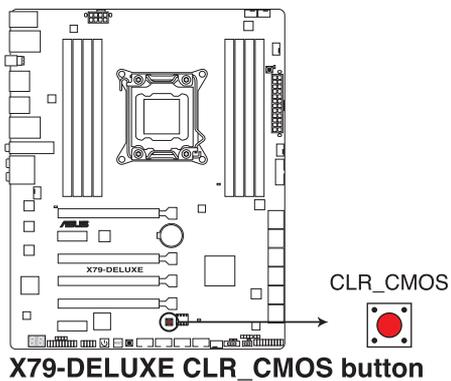
Enable this switch when the system is powered off.



- The EPU LED (OLED2) near the EPU switch lights up when the EPU switch is enabled. Refer to section 1.2.7 **Onboard LEDs** for the exact location of the EPU LED.
 - If you enable this switch under Windows® OS environment, the EPU function will be activated after the next system bootup.
 - You may change the EPU settings in the software application or BIOS setup program and enable the EPU function at the same time. However, the system will use the last setting you have made.
-

7. Clear CMOS button

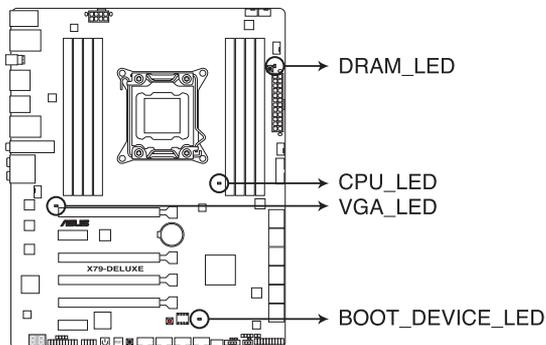
Press this button to clear the BIOS setup information only when the systems hangs due to overclocking.



1.2.7 Onboard LEDs

1. POST State LEDs

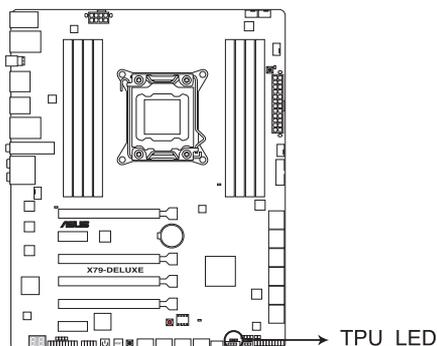
The POST State LEDs provide the status of these key components during POST (Power-On-Self Test): CPU, memory modules, VGA card, and hard disk drives. If an error is found, the critical component's LED stays lit up until the problem is solved.



**X79-DELUXE CPU/ DRAM/
BOOT_DEVICE/ VGA LED**

2. TPU LED

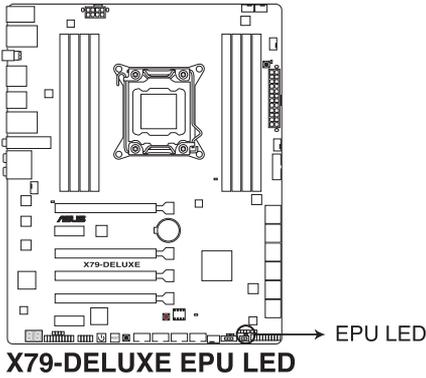
The TPU LED lights up when the TPU switch is enabled.



X79-DELUXE TPU LEDs

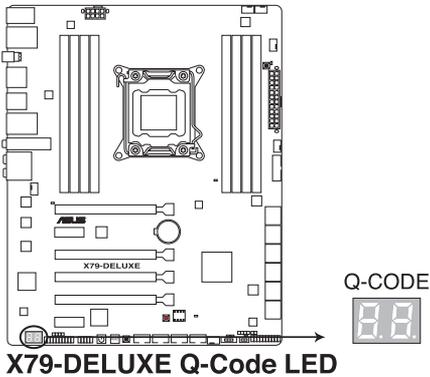
3. EPU LED

The EPU LED lights up when the EPU switch is enabled.



4. Q-Code LEDs

The Q-Code LED design provides you with a 2-digit error code that displays the system status. Refer to the Q-Code table on the next page for details.



Q-Code table

Code	Description
00	Not used
01	Power on. Reset type detection (soft/hard).
02	AP initialization before microcode loading
03	System Agent initialization before microcode loading
04	PCH initialization before microcode loading
06	Microcode loading
07	AP initialization after microcode loading
08	System Agent initialization after microcode loading
09	PCH initialization after microcode loading
0B	Cache initialization
0C – 0D	Reserved for future AMI SEC error codes
0E	Microcode not found
0F	Microcode not loaded
10	PEI Core is started
11 – 14	Pre-memory CPU initialization is started
15 – 18	Pre-memory System Agent initialization is started
19 – 1C	Pre-memory PCH initialization is started
2B – 2F	Memory initialization
30	Reserved for ASL (see ASL Status Codes section below)
31	Memory Installed
32 – 36	CPU post-memory initialization
37 – 3A	Post-Memory System Agent initialization is started
3B – 3E	Post-Memory PCH initialization is started
4F	DXE IPL is started
50 – 53	Memory initialization error. Invalid memory type or incompatible memory speed
54	Unspecified memory initialization error
55	Memory not installed
56	Invalid CPU type or Speed
57	CPU mismatch
58	CPU self test failed or possible CPU cache error
59	CPU micro-code is not found or micro-code update is failed
5A	Internal CPU error
5B	Reset PPI is not available
5C – 5F	Reserved for future AMI error codes
E0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL)
E1	S3 Boot Script execution
E2	Video repost
E3	OS S3 wake vector call
E4 – E7	Reserved for future AMI progress codes
E8	S3 Resume Failed

(continued on the next page)

Code	Description
E9	S3 Resume PPI not Found
EA	S3 Resume Boot Script Error
EB	S3 OS Wake Error
EC – EF	Reserved for future AMI error codes
F0	Recovery condition triggered by firmware (Auto recovery)
F1	Recovery condition triggered by user (Forced recovery)
F2	Recovery process started
F3	Recovery firmware image is found
F4	Recovery firmware image is loaded
F5 – F7	Reserved for future AMI progress codes
F8	Recovery PPI is not available
F9	Recovery capsule is not found
FA	Invalid recovery capsule
FB – FF	Reserved for future AMI error codes
60	DXE Core is started
61	NVRAM initialization
62	Installation of the PCH Runtime Services
63 – 67	CPU DXE initialization is started
68	PCI host bridge initialization
69	System Agent DXE initialization is started
6A	System Agent DXE SMM initialization is started
6B – 6F	System Agent DXE initialization (System Agent module specific)
70	PCH DXE initialization is started
71	PCH DXE SMM initialization is started
72	PCH devices initialization
73 – 77	PCH DXE Initialization (PCH module specific)
78	ACPI module initialization
79	CSM initialization
7A – 7F	Reserved for future AMI DXE codes
90	Boot Device Selection (BDS) phase is started
91	Driver connecting is started
92	PCI Bus initialization is started
93	PCI Bus Hot Plug Controller Initialization
94	PCI Bus Enumeration
95	PCI Bus Request Resources
96	PCI Bus Assign Resources
97	Console Output devices connect
98	Console input devices connect
99	Super IO Initialization
9A	USB initialization is started
9B	USB Reset

(continued on the next page)

Code	Description
9C	USB Detect
9D	USB Enable
9E – 9F	Reserved for future AMI codes
A0	IDE initialization is started
A1	IDE Reset
A2	IDE Detect
A3	IDE Enable
A4	SCSI initialization is started
A5	SCSI Reset
A6	SCSI Detect
A7	SCSI Enable
A8	Setup Verifying Password
A9	Start of Setup
AA	Reserved for ASL (see ASL Status Codes section below)
AB	Setup Input Wait
AC	Reserved for ASL (see ASL Status Codes section below)
AD	Ready To Boot event
AE	Legacy Boot event
AF	Exit Boot Services event
B0	Runtime Set Virtual Address MAP Begin
B1	Runtime Set Virtual Address MAP End
B2	Legacy Option ROM Initialization
B3	System Reset
B4	USB hot plug
B5	PCI bus hot plug
B6	Clean-up of NVRAM
B7	Configuration Reset (reset of NVRAM settings)
B8– BF	Reserved for future AMI codes
D0	CPU initialization error
D1	System Agent initialization error
D2	PCH initialization error
D3	Some of the Architectural Protocols are not available
D4	PCI resource allocation error. Out of Resources
D5	No Space for Legacy Option ROM
D6	No Console Output Devices are found
D7	No Console Input Devices are found
D8	Invalid password
D9	Error loading Boot Option (LoadImage returned error)
DA	Boot Option is failed (StartImage returned error)
DB	Flash update is failed
DC	Reset protocol is not available

ACPI/ASL Checkpoints (under OS)

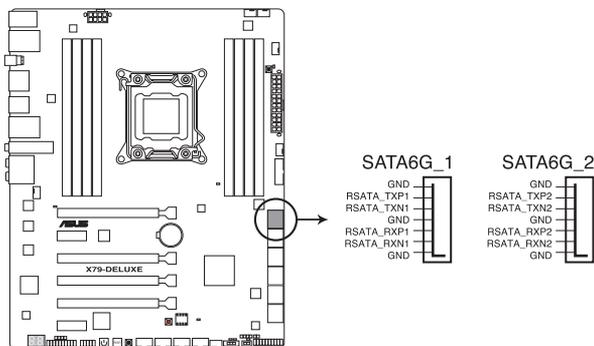
Code	Description
03	System is entering S3 sleep state
04	System is entering S4 sleep state
05	System is entering S5 sleep state
30	System is waking up from the S3 sleep state
40	System is waking up from the S4 sleep state
AC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
AA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

1.2.8 Internal connectors

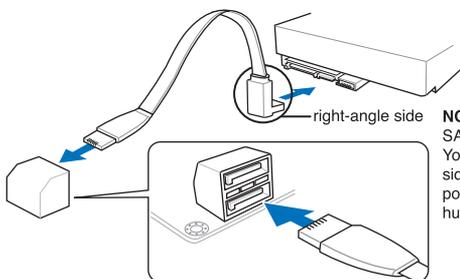
1. Intel® X79 Serial ATA 6Gb/s connectors (7-pin SATA6G_1/2 [black])

These connectors connect to Serial ATA 6Gb/s hard disk drives via Serial ATA 6Gb/s signal cables.

If you installed Serial ATA hard disk drives, you can create a RAID 0, 1, 5, and 10 configuration with the Intel® Rapid Storage Technology through the onboard Intel® X79 chipset.



X79-DELUXE Intel® SATA 6 Gb/s connectors



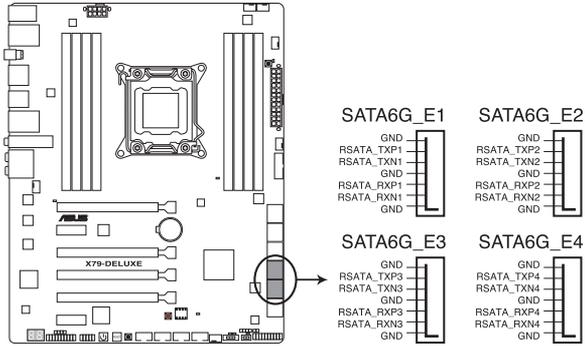
NOTE: Connect the right-angle side of SATA signal cable to SATA device. You may also connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.



- 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 **3.6.4 SATA Configuration** for details.
- Before creating a RAID set, refer to section **5.1 RAID configurations** or the manual bundled in the motherboard support DVD.

2. **Marvell® Serial ATA 6Gb/s connectors (7-pin SATA6G_E12; SATA6G_E34 [dark brown])**

These connectors connect to Serial ATA 6Gb/s hard disk drives via Serial ATA 6Gb/s signal cables.



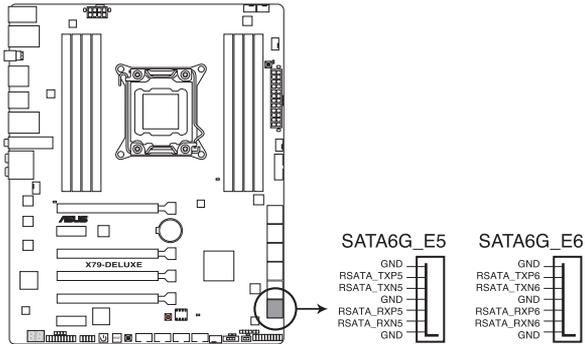
X79-DELUXE Marvell SATA 6.0 Gb/s connectors



These SATA ports are for data drives only.

3. **ASMedia® Serial ATA 6Gb/s connectors (7-pin SATA6G_E56 [dark brown])**

These connectors connect to Serial ATA 6Gb/s hard disk drives via Serial ATA 6Gb/s signal cables.



X79-DELUXE ASMedia® SATA 6.0 Gb/s connectors

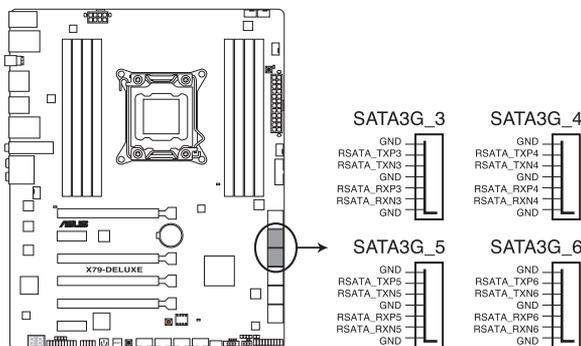


- ASMedia storage controller can only support AHCI mode.
- These SATA ports are for data drives only.

4. Intel® Serial ATA 3Gb/s connectors (7-pin SATA3G_3-6 [black])

These connectors connect to Serial ATA 3Gb/s hard disk drives and optical drives via Serial ATA 3Gb/s signal cables.

If you installed Serial ATA hard disk drives, you can create a RAID 0, 1, 5, and 10 configuration with the Intel® Rapid Storage Technology through the onboard Intel® X79 chipset.



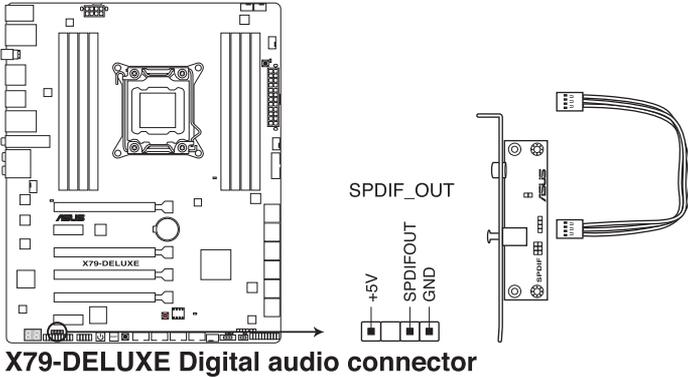
X79-DELUXE Intel® SATA 3 Gb/s connectors



- 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 3.6.4 **SATA Configuration** for details.
- Before creating a RAID set, refer to section 5.1 **RAID Configurations** or the user manual bundled in the support DVD.

5. **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.

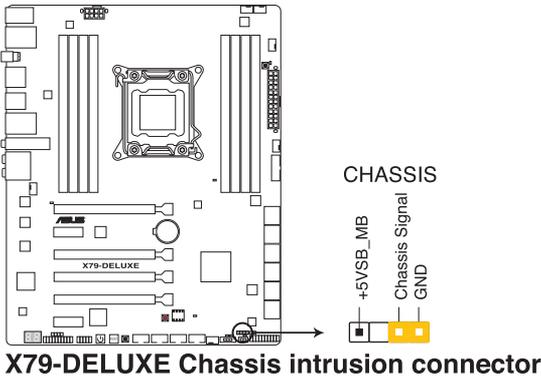


The S/PDIF module is purchased separately.

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

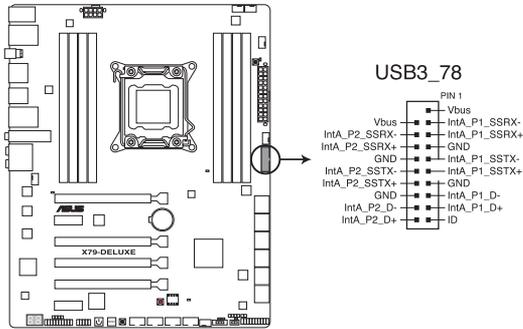
This connector is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal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

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



7. USB 3.0 connector (20-1 pin USB3_78)

This connector allows 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-chargable devices, optimized power efficiency, and backward compatibility with USB 2.0.



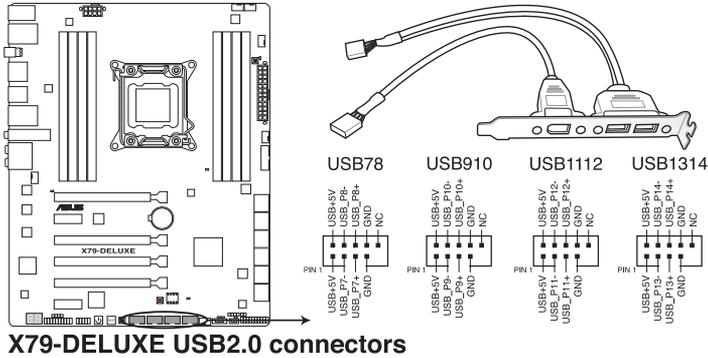
X79-DELUXE USB3.0 connector



The USB 3.0 module is purchased separately.

8. USB 2.0 connectors (10-1 pin USB78; USB910; USB1112; USB1314)

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 DRAFT v4Mb/s (Mbps) connection speed.



DO NOT 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) first, and then install the Q-Connector (USB) to the USB connector onboard if your chassis supports front panel USB ports.



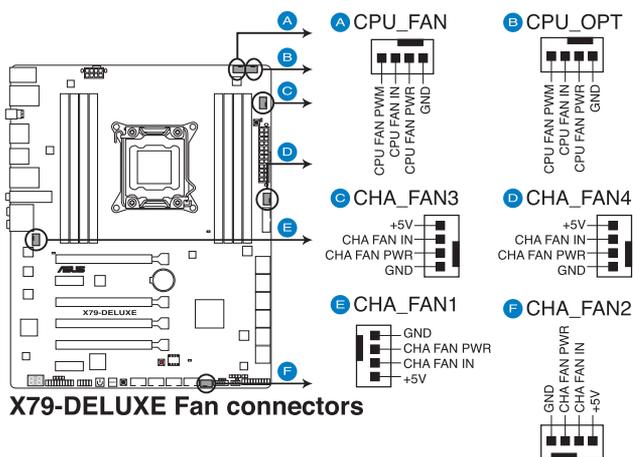
The USB 2.0 module is purchased separately.

9. CPU, CPU optional, and chassis fan connectors (4-pin CPU_FAN; 4-pin CPU_OPT; 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.



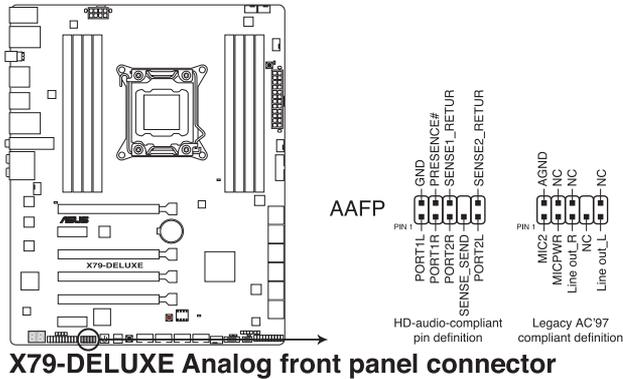
- DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!
- Ensure that the CPU fan cable is securely installed to the CPU fan connector.



- The CPU_FAN connector supports the CPU fan of maximum 1A (12 W) fan power.
- The CPU_FAN connector and CHA_FAN connectors support the ASUS FAN Xpert 2 feature.

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

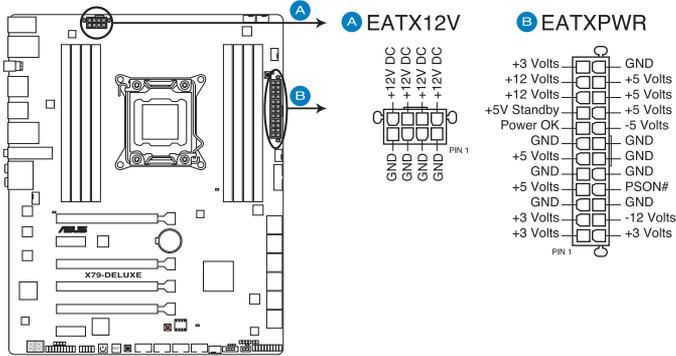
This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC'97 audio standard. Connect one end of the front panel audio I/O module cable to this connector.



- 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 or an AC'97 front panel audio module to this connector, set the Front Panel Type item in the BIOS setup to **[HD]** or **[AC97]**.

11. 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.



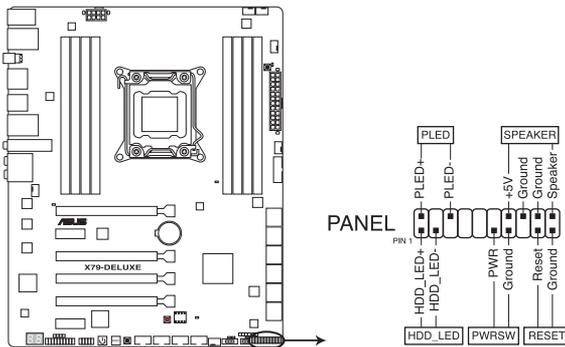
X79-DELUXE ATX power connectors



- 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 4-pin/8-pin EATX12 V power plug. Otherwise, the system will not boot.
- We recommend that you use a PSU with a higher power output 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 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.
- 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.

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

This connector supports several chassis-mounted functions.



X79-DELUXE System panel connector

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

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

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

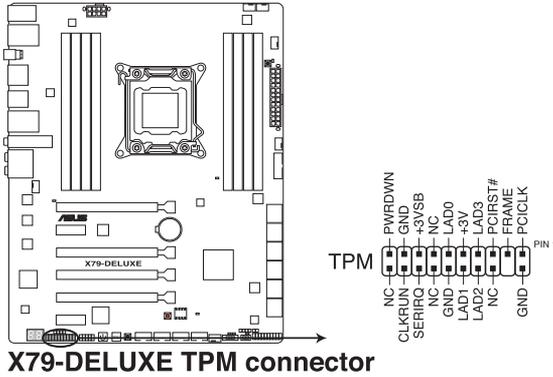
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the operating system settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **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.

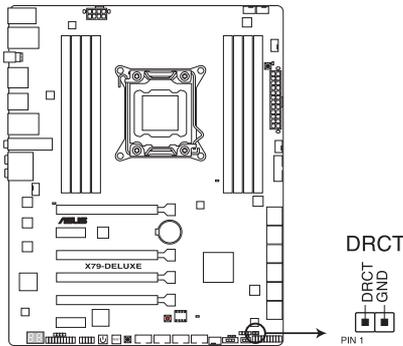
13. TPM connector (20-pin TPM)

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



14. DirectKey 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.



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.

Basic installation

2

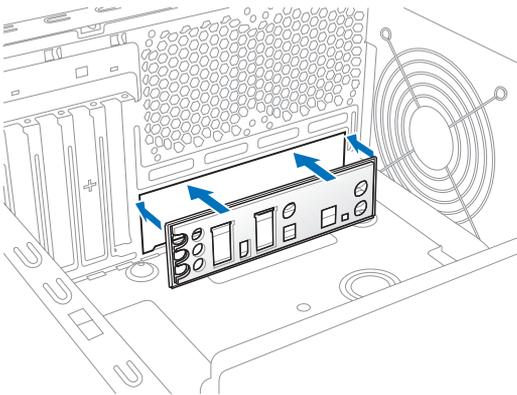
2.1 Building your PC system

2.1.1 Motherboard installation

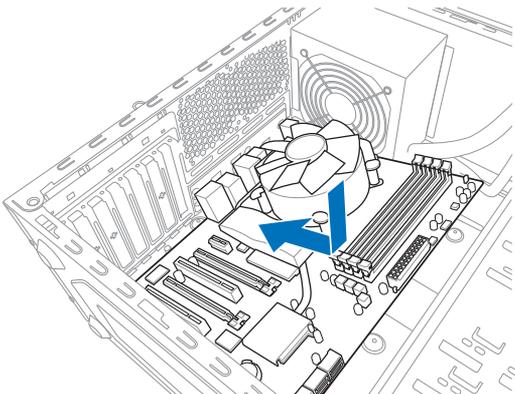


The diagrams in this section are for reference only. The motherboard layout may vary with models, but the installation steps are the same for all models.

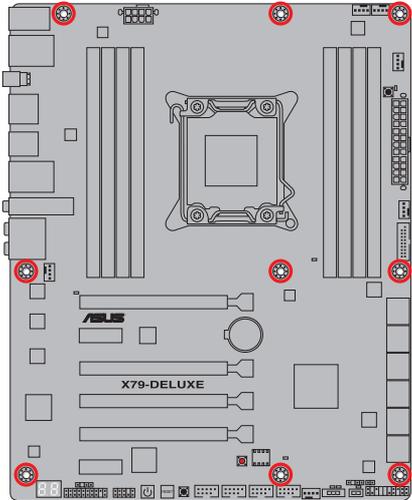
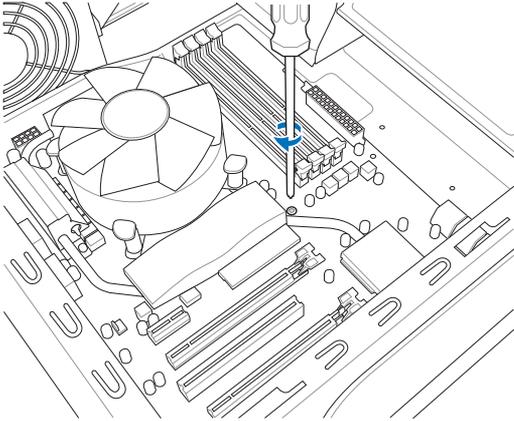
1. Install the ASUS Q-Shield to the chassis rear I/O panel.



2. Place the motherboard into the chassis, ensuring that its rear I/O ports are aligned to the chassis' rear I/O panel.



- 3. Place nine screws into the holes indicated by circles to secure the motherboard to the chassis.

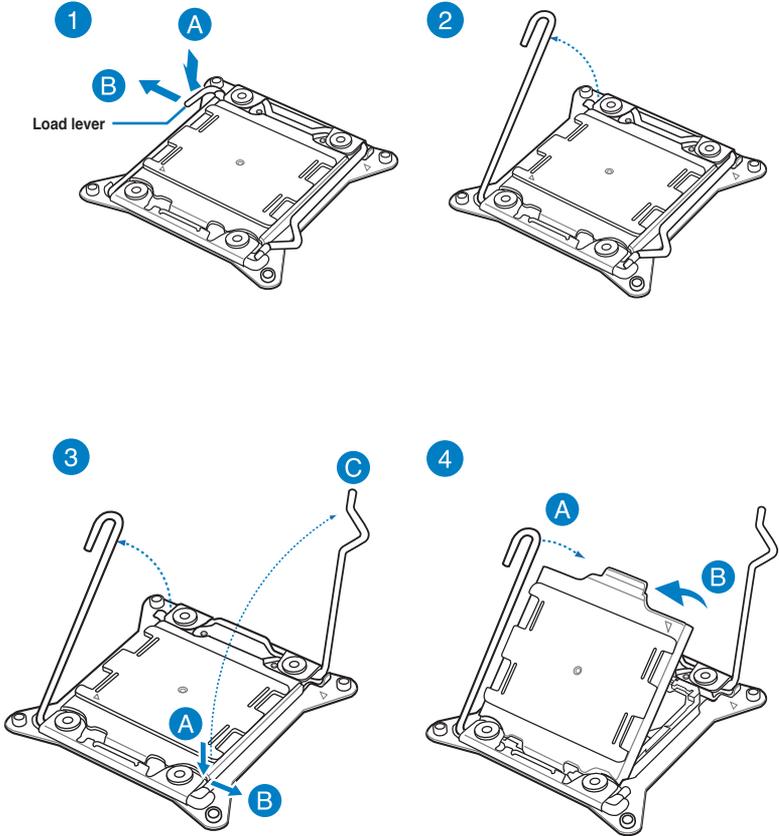


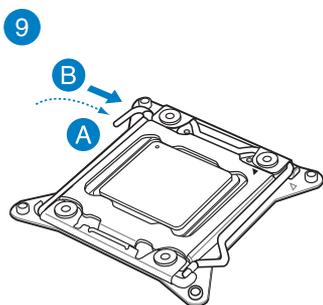
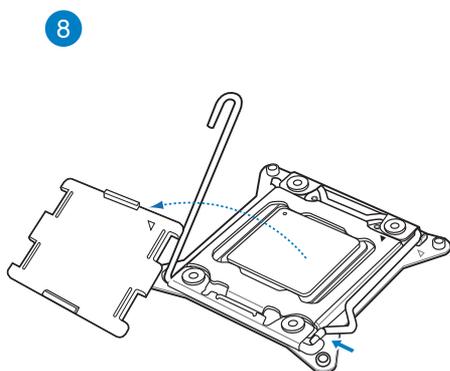
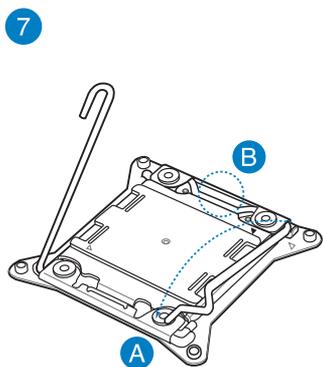
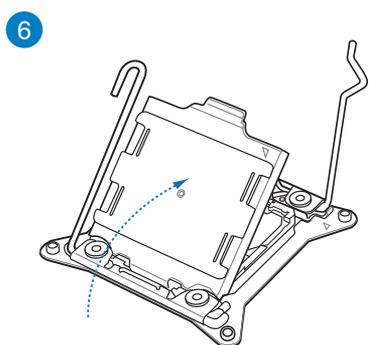
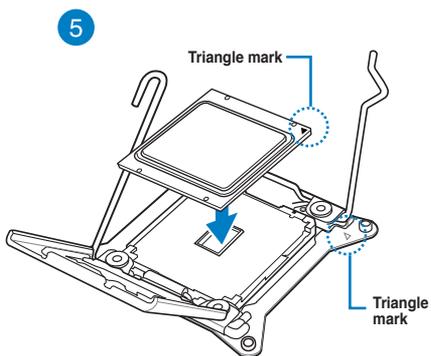
DO NOT overtighten the screws! Doing so can damage the motherboard.

2.1.2 CPU installation

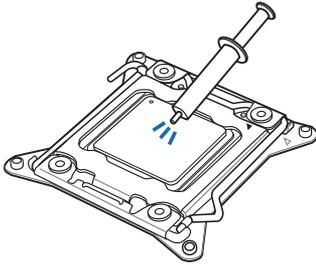


Take note of the order in opening and/or closing the double latch. Follow the instructions printed on the metal sealing hatch or the illustrations shown below in this manual. The plastic cap pops up automatically once the CPU is in place and the hatch is properly sealed down.



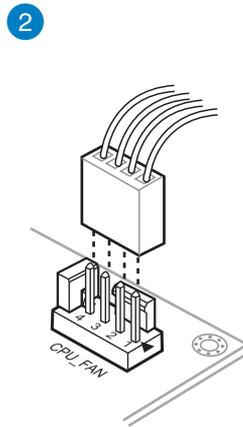
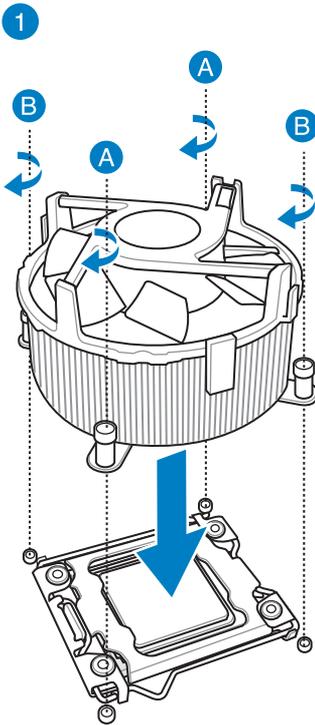


2.1.3 CPU heatsink and fan assembly installation

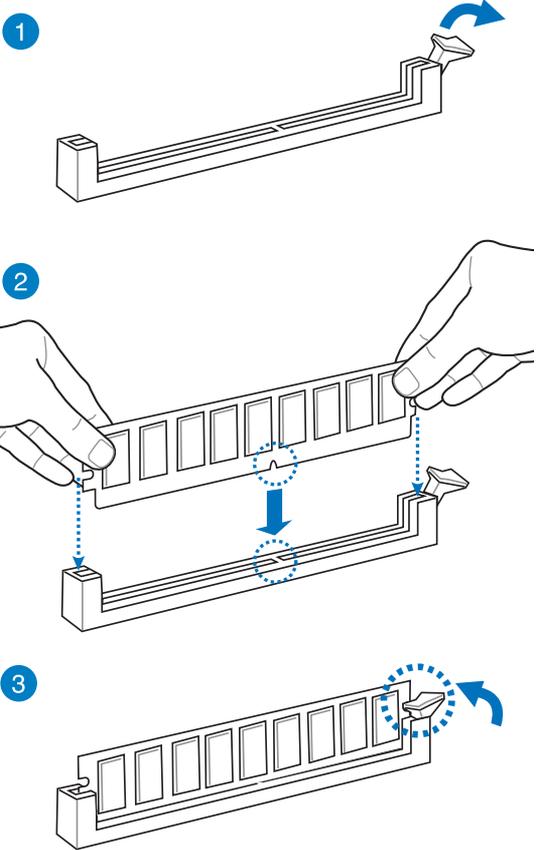


Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan, if necessary.

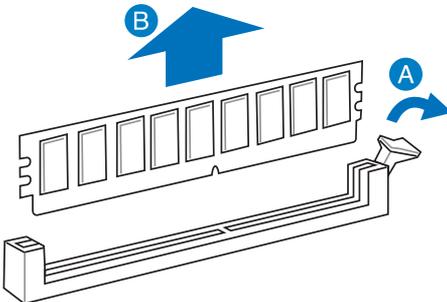
To install the CPU heatsink and fan assembly



2.1.4 DIMM installation

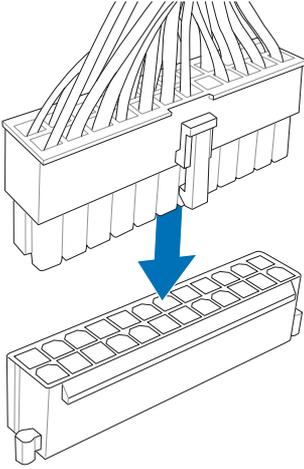


To remove a DIMM

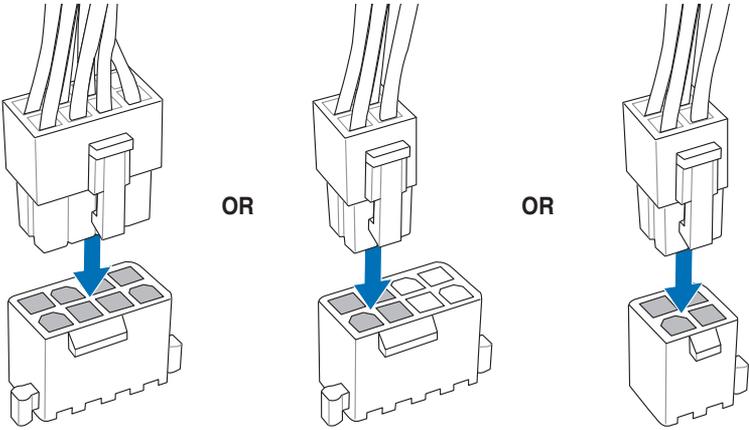


2.1.5 ATX Power connection

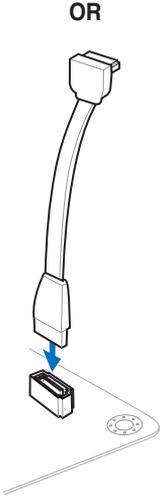
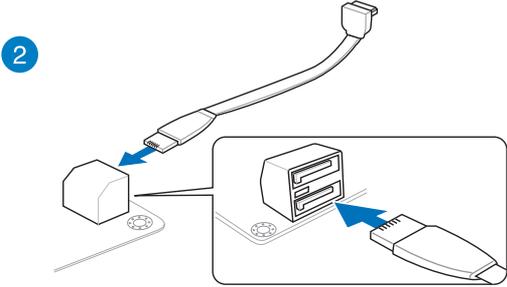
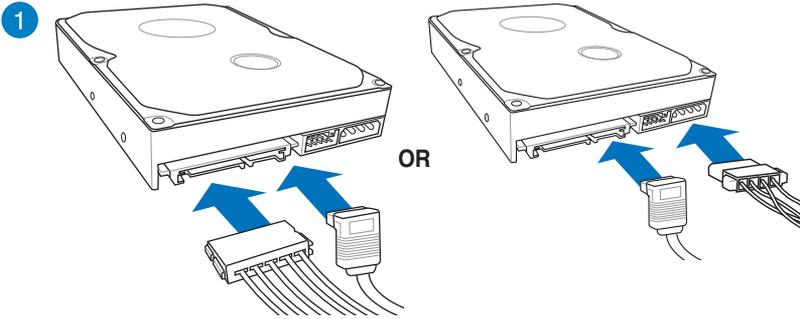
1



2

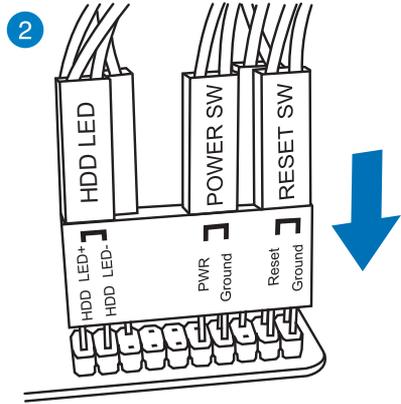
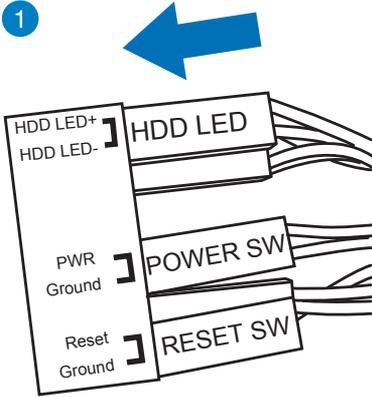


2.1.6 SATA device connection

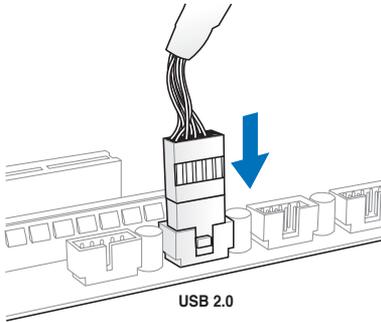


2.1.7 Front I/O Connector

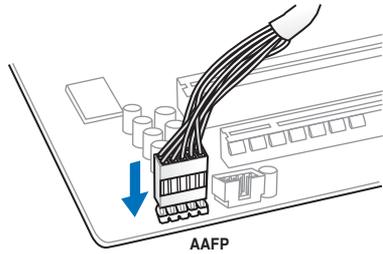
To install ASUS Q-Connector



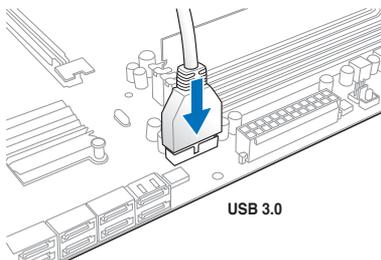
To install USB 2.0 connector



To install front panel audio connector

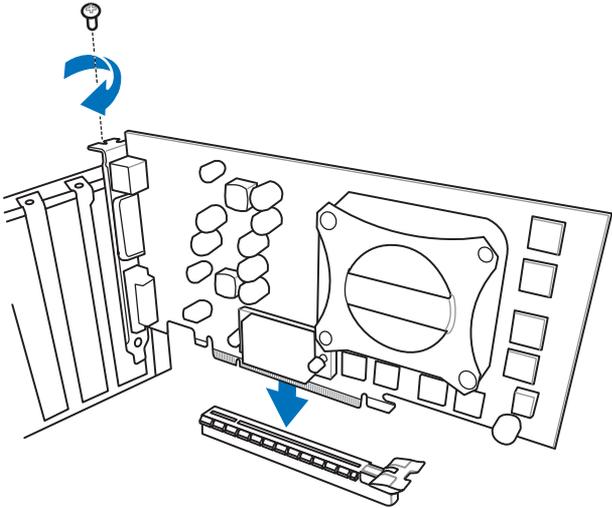


To install USB 3.0 connector

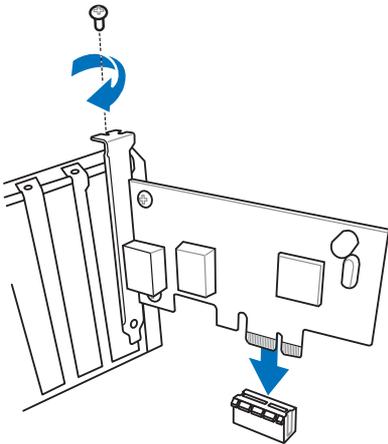


2.1.8 Expansion Card installation

To install PCIe x16 cards



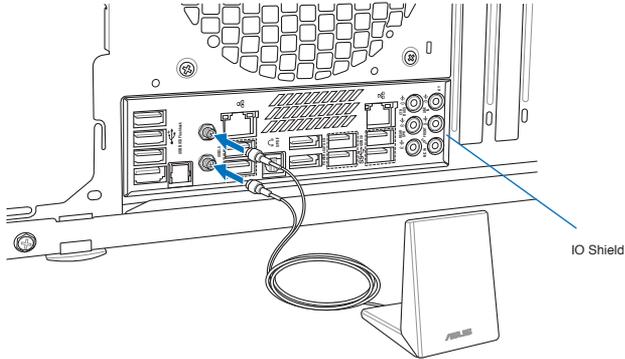
To install PCIe x1 cards



2.1.9 Wi-Fi antenna installation

Installing the ASUS 2T2R dual band W-Fi antenna

Connect the bundled ASUS 2T2R dual band Wi-Fi antenna connector to the Wi-Fi ports at the back of the chassis.



- Ensure that the ASUS 2T2R dual band Wi-Fi antenna is securely installed to the Wi-Fi ports.
- Ensure to install the Bluetooth driver before installing the Wi-Fi GO! software.

2.2 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.



When downloading or updating the BIOS file, rename it as **X79DLX.CAP** for this motherboard.

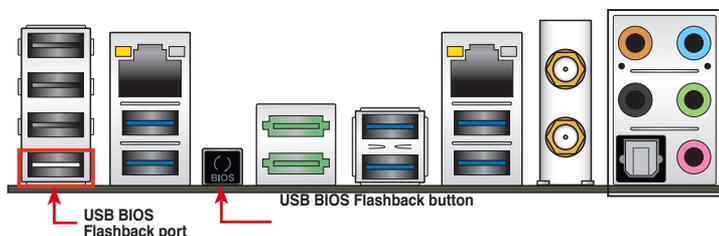
To use USB BIOS Flashback:

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.



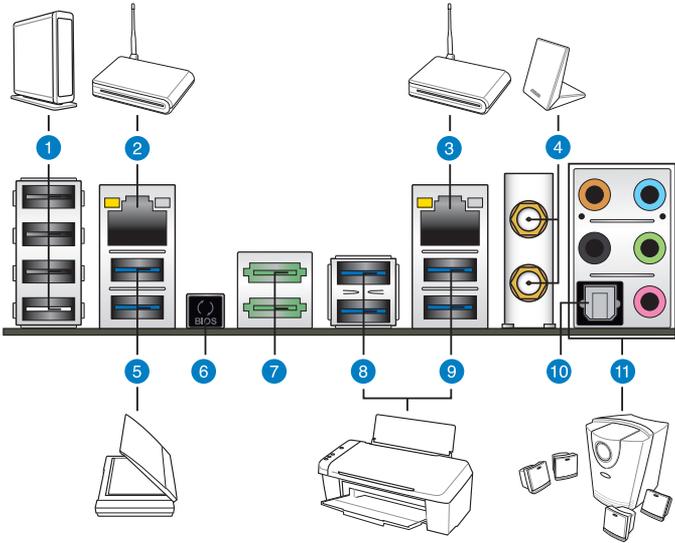
For more BIOS update utilities in BIOS setup, refer to the section **3.11 Updating BIOS** in Chapter 3.



- 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 Motherboard rear and audio connections

2.3.1 Rear I/O connection



Rear panel connectors

- | | |
|-----|---|
| 1. | USB 2.0 ports 1-4 |
| 2. | Intel® LAN (RJ-45) port** |
| 3. | Realtek® LAN (RJ-45) port** |
| 4. | Wi-Fi 802.11 a/b/g/n/ac Bluetooth V4.0* |
| 5. | USB 3.0 ports 1-2 |
| 6. | USB BIOS Flashback button |
| 7. | Power external SATA 6Gb/s ports 1-2 |
| 8. | USB 3.0 ports 3-4 |
| 9. | USB 3.0 ports 5-6 |
| 10. | Optical S/PDIF Out port |
| 11. | Audio I/O ports*** |

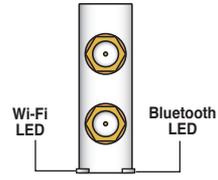
*, ** and ***: Refer to the tables on the next page for Bluetooth/Wi-Fi module LEDs, LAN port LEDs, and audio port definitions.



- 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.
- When using the external SATA port, ensure that you use a compatible connector.

*Bluetooth and Wi-Fi module LED indications

Wi-Fi LED		Bluetooth LED	
Status	Description	Status	Description
Off	No link	Off	No link
Green	Linked	Blue	Linked
		Blinking	Data activity

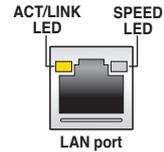


Wi-Fi 802.11 a/b/g/n/ac,
Bluetooth v4.0/3.0 + HS

* The Bluetooth word mark and logos are owned by Bluetooth SIG, Inc. and any use of such mark by ASUSTeK Computer Inc. is under license. Other trademarks and trade names are those of their respective owners.

** LAN ports LED indications

Activity Link LED		Speed LED	
Status	Description	Status	Description
Off	No link	Off	10 Mbps connection
Orange	Linked	Orange	100 Mbps connection
Orange (Blinking)	Data activity	Green	1 Gbps connection
Orange (Blinking then steady)	Ready to wake up from S5 mode		

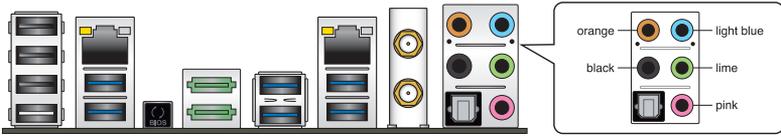


*** Audio 2, 4, 6, or 8-channel configuration

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

2.3.2 Audio I/O connections

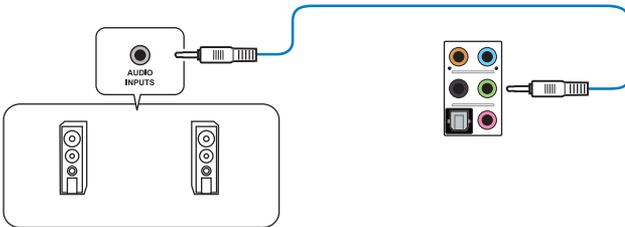
Audio I/O ports



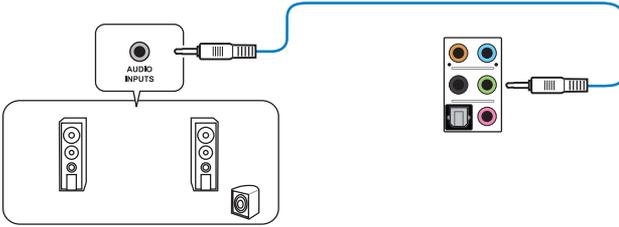
Connect to Headphone and Mic



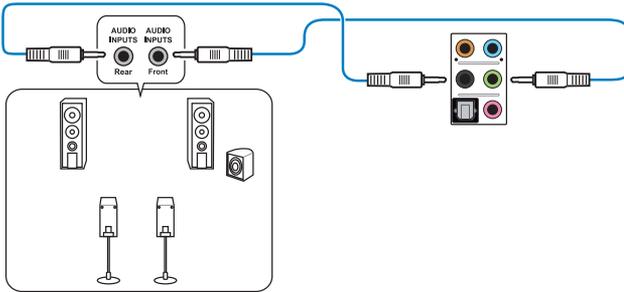
Connect to Stereo Speakers



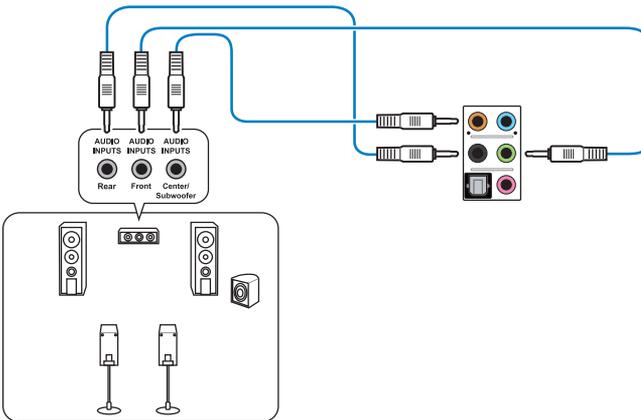
Connect to 2.1 channel Speakers



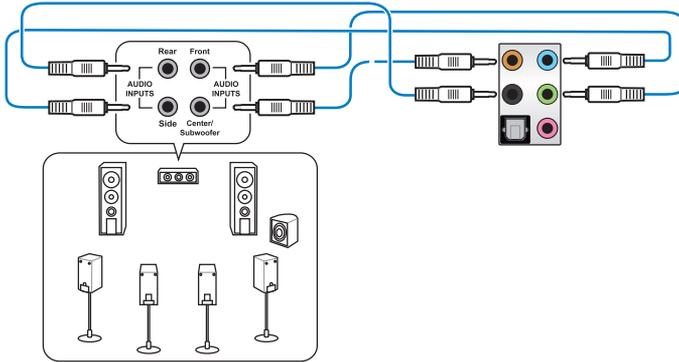
Connect to 4.1 channel Speakers



Connect to 5.1 channel Speakers



Connect to 7.1 channel Speakers



When the DTS UltraPC II function is enabled, ensure to connect the rear speaker to the gray port.

2.4 Starting up for the first time

1. After making all the connections, replace the system case cover.
2. Ensure 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 (POST). While the tests are running, the BIOS beeps (refer to the BIOS beep codes table) 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

- 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, press the power button for less than four seconds to put the system on sleep mode or soft-off mode, depending on the BIOS setting. Press the power switch for more than four seconds to let the system enter the soft-off mode regardless of the BIOS setting.

BIOS setup

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 **X79DLX.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 3.10 **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 3.8 **Boot menu** for details.

The screenshot shows the ASUS UEFI BIOS Utility - EZ Mode interface. The top bar includes the ASUS logo, the title 'UEFI BIOS Utility - EZ Mode', and an 'Exit/Advanced Mode' button. The main display area shows the time '15:27:02', date 'Monday [07/29/2013]', and system information for an X79-DELUXE motherboard, including BIOS Version 0210, CPU Type (Genuine Intel(R) CPU @ 3.20GHz), Speed (3200MHz), and Total Memory (4096MB DDR3 1333MHz). The interface is divided into several sections: 'CPU Information' (Temp: +134.6°F/+57.0°C, Voltage: 1.088V), 'DRAM Information' (DIMM_A1, DIMM_A2, DIMM_B1, DIMM_B2: N/A), and 'Fan' (CPU_FAN: 1065RPM, CPU_OPT_FAN: N/A, CHA_FAN1: N/A). Below these are 'System Performance' modes (Power Saving, Normal, ASUS Optimal, Performance, Energy Saving) and 'Boot Priority' (Use the mouse to drag or keyboard to navigate to decide the boot priority). At the bottom, there are buttons for 'Shortcut (F3)', 'Advanced Mode (F7)', 'SATA Information', 'Boot Menu (F8)', and 'Default (F5)'. Red boxes and lines highlight these elements with callouts: 'Displays the CPU/motherboard temperature, CPU/5V/3.3V/12V voltage output, CPU/chassis/power fan speed' (CPU/Fan info); 'Selects the display language of the BIOS setup program' (Language dropdown); 'Exits the BIOS setup program without saving the changes, saves the changes and resets the system, or enters the Advanced Mode' (Exit/Advanced Mode button); 'Displays the selected shortcut items' (Shortcut (F3) button); 'Displays the Advanced mode menus' (Advanced Mode (F7) button); 'Displays the connected SATA devices' (SATA Information button); 'Selects the boot device priority' (Boot Menu (F8) button); 'Loads optimized default settings' (Default (F5) button); 'Selects the boot device priority' (Boot Priority section); and 'Displays the system properties of the selected mode on the right hand side' (System Performance modes).



- 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.

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 (My Favorites, 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.



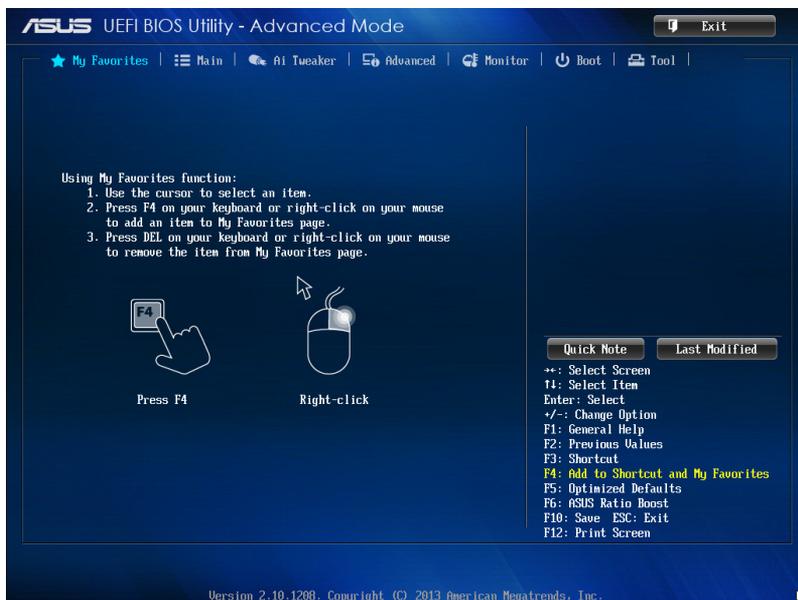
-
- The Quick Note function does not support the following keyboard functions: delete, cut, copy and paste.
 - You can only use the alphanumeric characters to enter your notes.
-

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.

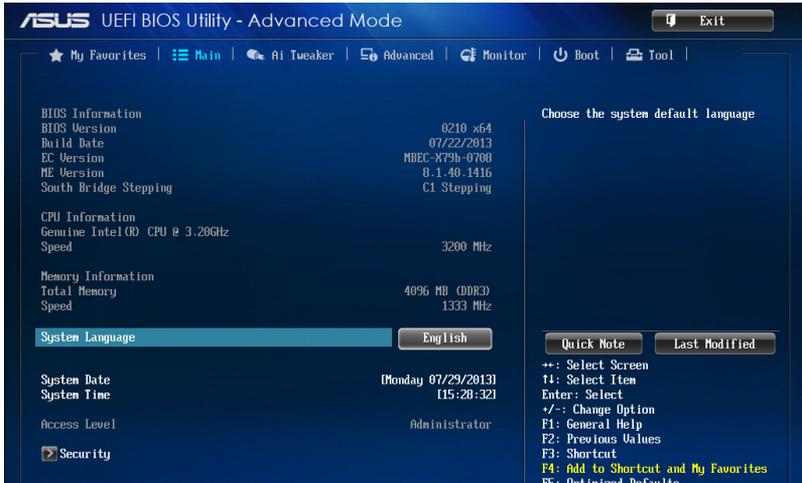


You cannot add the following items to My Favorite items:

- Items with submenu options
- User-managed items such as language and boot order
- Configuration items such as Memory SPD Information, system time and date.

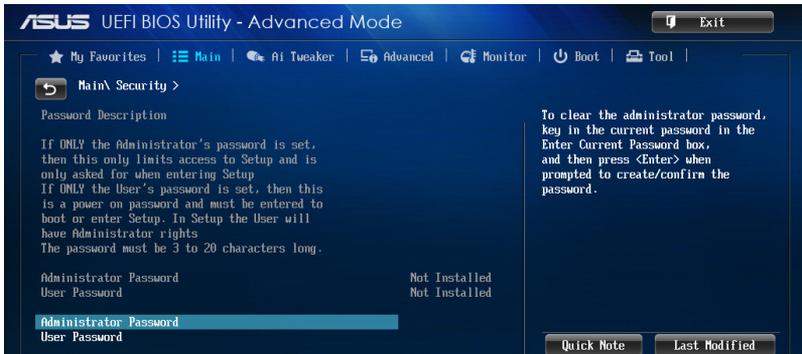
3.4 Main menu

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.

ASUS UEFI BIOS Utility - Advanced Mode

★ My Favorites | Main | **Ai Tweaker** | Advanced | Monitor | Boot | Tool | Exit

Target CPU Turbo-Mode Speed: 3700MHz
Target DRAM Speed: 1333MHz

Ai Overclock Tuner [Auto]
CPU Core Ratio [Auto]
DRAM Frequency [Auto]
OC Tuner [As Is]
EPU Power Saving Mode [Disabled]
▶ DRAM Timing Control
▶ DIGI+ Power Control
▶ CPU Performance Settings

Extreme Over-voltage [Disabled]
CPU UCDRE Voltage 1.080V [Offset Mode]
Offset Mode Sign []

Ai Overclock Tuner
[Manual]: When Manual mode is enabled, the CPU Core Ratio and BCLK Frequency will be optimized automatically.
[XMP]: When XMP mode is enabled, the BCLK Frequency and memory parameters will be optimized automatically.

Quick Note | Last Modified

++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F2: Previous Values
F3: Shortcut
F4: Add to Shortcut and My Favorites
F5: Optimized Defaults
F6: ASUS Ratio Boost
F10: Save ESC: Exit
F12: Print Screen

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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.
- [Manual] Allows you to automatically optimize the CPU ratio and BCLK frequency.
- [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 **[Manual]** or **[X.M.P.]**.

BCLK Frequency [Auto]

Allows you to set the BCLK (base clock) frequency to enhance the system performance. Use the <+> or <-> to adjust the value. The values range from 80.0MHz to 300.0MHz.

CPU Strap [Auto]

Allows you to select a strap close to your target BCLK (base clock) or leave it at **[Auto]** for the BIOS to upgrade.

Configuration options: [Auto] [100MHz] [125MHz] [166MHz] [250MHz]

ClockGen Full Reset [Enabled]

Enable this item for a better overclocking performance. Disable this item to skip system shutdown at BCLK frequency adjustments.

Configuration options: [Enabled] [Disabled]



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]

CPU Core Ratio [Sync All Cores]

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 items appear:

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]**.

5-Core Ratio Limit [Auto]

Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 5-Core Limit value.

6-Core Ratio Limit [Auto]

Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 6-Core Limit value.

DRAM Frequency [Auto]

Allows you to set the memory operating frequency.

Configuration options: [DDR3-800MHz] [DDR3-1066MHz] [DDR3-1333MHz] [DDR3-1600MHz] [DDR3-1866MHz] [DDR3-2133MHz] [DDR3-2400MHz] [DDR3-2666MHz]

OC Tuner [As Is]

Allows you to automatically overclock the CPU and DRAM frequency, and voltage for an enhanced system performance. It also accelerates rgw iGPU performance to the extreme depending on the integrated graphics loading.

Configuration options: [As Is] [Ratio First] [BCLK First]



Ensure that you installed an efficient CPU fan for CPU/iGPU loading before selecting either **[BCLK First]** or **[Ratio First]**. To keep the current overclocking tuner status, select **[As Is]**.

EPU Power Saving Mode [Disabled]

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

Configuration options: [Disabled] [Enabled]



The following item appears only when you set the EPU Power Saving Mode to **[Enabled]**.

EPU Setting [Auto]

Allows you to select a fixed setting for the EPU power saving mode.

Configuration options: [Auto] [Light Power Saving Mode] [Medium Power Saving Mode] [Max Power Saving Mode]

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] [3] – [15]

DRAM RAS# to CAS# Delay [Auto]

Configuration options: [Auto] [4] – [15]

DRAM RAS# PRE Time [Auto]

Configuration options: [Auto] [4] – [15]

DRAM RAS# ACT Time [Auto]

Configuration options: [Auto] [4] – [40]

DRAM Command Rate [Auto]

Configuration options: [Auto] [1] – [3]

Secondary Timings

DRAM RAS# to RAS# Delay [Auto]

Configuration options: [Auto] [4] – [7]

DRAM REF Cycle Time [Auto]

Configuration options: [Auto] [48] – [511]

DRAM WRITE Recovery Time [Auto]

Configuration options: [Auto] [5] – [31]

DRAM READ to PRE Time [Auto]

Configuration options: [Auto] [4] – [15]

DRAM FOUR ACT WIN Time [Auto]

Configuration options: [Auto] [16] – [63]

DRAM WRITE to READ Delay [Auto]

Configuration options: [Auto] [4] – [15]

DRAM Write Latency [Auto]

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

Third Timings

tRRDR [Auto]

Configuration options: [Auto] [0] - [7]

tRRDD [Auto]

Configuration options: [Auto] [0] - [7]

tWWDR [Auto]

Configuration options: [Auto] [0] - [7]

tWDD [Auto]

Configuration options: [Auto] [0] - [7]

tRWDR [Auto]

Configuration options: [Auto] [0] - [15]

tRWDD [Auto]

Configuration options: [Auto] [0] - [15]

tWRDR [Auto]

Configuration options: [Auto] [0] - [7]

tWRDD [Auto]

Configuration options: [Auto] [0] - [7]

tWRSR [Auto]

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

tCCD [Auto]

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

Latency Timings**DRAM RTL (CHA D0 R0; CHB D0 R0; CHC D0 R0; CHD D0 R0) [Auto]**

Configuration options: [Auto] [Advance 14 Clock] [Advance 12 Clock] [Advance 10 Clock] [Advance 8 Clock] [Advance 6 Clock] [Advance 4 Clock] [Advance 2 Clock] [Normal] [Delay 2 Clock] [Delay 4 Clock] [Delay 6 Clock] [Delay 8 Clock] [Delay 10 Clock] [Delay 12 Clock] [Delay 14 Clock]

DRAM IOL (CHA D0 R0; CHB D0 R0; CHC D0 R0; CHD D0 R0) [Auto]

Configuration options: [Auto] [Advance 1 Clock] - [Advance 14 Clock] [Normal] [Delay 1 Clock] - [Delay 14 Clock]

DRAM RTL (CHA D0 R1; CHB D0 R1; CHC D0 R1; CHD D0 R1) [Auto]

Configuration options: [Auto] [Advance 14 Clock] [Advance 12 Clock] [Advance 10 Clock] [Advance 8 Clock] [Advance 6 Clock] [Advance 4 Clock] [Advance 2 Clock] [Normal] [Delay 2 Clock] [Delay 4 Clock] [Delay 6 Clock] [Delay 8 Clock] [Delay 10 Clock] [Delay 12 Clock] [Delay 14 Clock]

DRAM IOL (CHA D0 R1; CHB D0 R1; CHC D0 R1; CHD D0 R1) [Auto] [Auto]

Configuration options: [Auto] [Advance 1 Clock] - [Advance 14 Clock] [Normal] [Delay 1 Clock] - [Delay 14 Clock]

DRAM RTL (CHA D0 R1; CHB D0 R1; CHC D0 R1; CHD D0 R1) [Auto] [Auto]

Configuration options: [Auto] [Advance 14 Clock] [Advance 12 Clock] [Advance 10 Clock] [Advance 8 Clock] [Advance 6 Clock] [Advance 4 Clock] [Advance 2 Clock] [Normal] [Delay 2 Clock] [Delay 4 Clock] [Delay 6 Clock] [Delay 8 Clock] [Delay 10 Clock] [Delay 12 Clock] [Delay 14 Clock]

DRAM IOL (CHA D1 R0; CHB D1 R0; CHC D1 R0; CHD D1 R0) [Auto]

Configuration options: [Auto] [Advance 1 Clock] - [Advance 14 Clock] [Normal] [Delay 1 Clock] - [Delay 14 Clock]

DRAM RTL (CHA D1 R1; CHB D1 R1; CHC D1 R1; CHD D1 R1) [Auto]

Configuration options: [Auto] [Advance 14 Clock] [Advance 12 Clock] [Advance 10 Clock] [Advance 8 Clock] [Advance 6 Clock] [Advance 4 Clock] [Advance 2 Clock] [Normal] [Delay 2 Clock] [Delay 4 Clock] [Delay 6 Clock] [Delay 8 Clock] [Delay 10 Clock] [Delay 12 Clock] [Delay 14 Clock]

DRAM IOL (CHA D1 R1; CHB D1 R1; CHC D1 R1; CHD D1 R1) [Auto]

Configuration options: [Auto] [Advance 1 Clock] - [Advance 14 Clock] [Normal] [Delay 1 Clock] - [Delay 14 Clock]

Misc.**DRAM CLK Period [Auto]**

Configuration options: [Auto] [1] – [8]

Enhanced Training (CHA; CHB; CHC; CHD) [Auto]

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

Receiver Slew [Auto]

Configuration options: [Auto] [Normal] [More]

Transmitter Slew [Auto]

Configuration options: [Auto] [Normal] [More]

MCH Recheck [Auto]

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

MRC Fast Warm Boot [Auto]

Configuration options: [Auto] [Disable]

DIGI+ Power Control

CPU Load-line Calibration [Auto]

Load-line is defined by Intel® specification and affects CPU power voltage. The CPU working voltage decreases proportionally to CPU loading. Higher load-line calibration could get higher voltage and good overclocking performance, but increases the CPU and VRM thermal conditions.

Configuration options [Auto] [Regular] [Medium] [High] [Ultra High] [Extreme]



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



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

CPU Current Capability [Auto]

This item provides a wider total power range for overclocking. A higher value setting gets higher power consumption delivery and extends the overclocking frequency range simultaneously.

Configuration options: [Auto] [100%] [110%] [120%] [130%] [140%]

CPU VCORE Boot Up Voltage [Auto]

This item allows you to set an initial boot voltage for the CPU. Set a higher value for better overclocking performance. Use the <+> or <-> keys to adjust the value. The values range from 0.800kHz to 1.7kHz with a 0.005kHz interval.

VCCSA Load-line Calibration [Auto]

The behavior of the DRAM Controller is decided by VCCSA load-line. Set a higher value to enhance system performance, or set a lower value for a better thermal solution.

Configuration options: [Auto] [Regular] [High] [Extreme]



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



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

VCCSA Current Capability [100%]

Set a higher value for a wider total DRAM controller power range and extends the overclocking frequency range simultaneously.

Configuration options: [100%] [110%] [120%] [130%]

CPU VCCSA Boot Up Voltage [Auto]

Set a higher value for a better overclocking performance of the VCCSA voltage at initial boot. Use the <+> or <-> keys to adjust the value. The values range from 0.800kHz to 1.7kHz with a 0.005kHz interval.

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]**. The thermal conditions should be monitored.



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

CPU Fixed Frequency [300]

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.



The following items appear only when you set the CPU Voltage Frequency to **[Auto]**.

VRM Spread Spectrum [Disabled]

Enable the VRM Spread Spectrum to enhance system stability.

Configuration options: [Disabled] [Enabled]

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 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]

DRAM-AB Current Capability [100%]

Set a higher value for a total power range of DRAM slots A and B, and extends the overclocking frequency range simultaneously.

Configuration options: [100%] [110%] [120%] [130%]

DRAM-AB Voltage Frequency [Auto]

Allows you to adjust the DRAM slots A and B switching frequencies. Assign a fixed high DRAM frequency to increase overclocking range or a low DRAM frequency for better system stability.



The following item appears only when setting this item to **[Manual]**.

DRAM-AB Fixed Frequency Mode [300]

Assign a fixed high DRAM frequencies of DRAM slots A and B 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 300kHz to 500kHz with a 50kHz interval.

DRAM-AB Power Phase Control [Standard]

- | | |
|-------------|--|
| [Standard] | Allows you to set the Auto mode. |
| [Optimized] | Allows you to set the ASUS optimized phase tuning profile. |
| [Extreme] | Allows you to set the full phase mode. |

DRAM-CD Current Capability [100%]

Set a higher value for a total power range of DRAM slots C and D, and extends the overclocking frequency range simultaneously.

Configuration options: [100%] [110%] [120%] [130%]

DRAM-CD Voltage Frequency [Auto]

Allows you to adjust the DRAM slots C and D switching frequencies. Assign a fixed high DRAM frequency to increase overclocking range or a low DRAM frequency for better system stability.



The following item appears only when setting this item to **[Manual]**.

DRAM-CD Fixed Frequency Mode [300]

Assign a fixed high DRAM frequencies of DRAM slots C and D 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 300kHz to 500kHz with a 50kHz interval.

DRAM-CD Power Phase Control [Standard]

- | | |
|-------------|--|
| [Standard] | Allows you to set the Auto mode. |
| [Optimized] | Allows you to set the ASUS optimized phase tuning profile. |
| [Extreme] | Allows you to set the full phase mode. |

CPU Performance Settings

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 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 to 32767W.

Long Duration Maintained [Auto]

This item indicates the time window for Turbo Ratio over TDP must be maintained. Use the <+> or <-> keys to adjust the value. The values range from 1W to 32W.

Short Duration 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 to 32767W.

Additional Turbo Voltage [Auto]

The maximum voltage applied to the CPU when you engaged the Turbo Boost. Use the <+> or <-> keys to adjust the value. The values range from 0.004W to 1.0000W with a .0004W interval.

CPU 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.

Extreme Over-voltage [Disabled]

Set this item to [Enabled] to allow a high-level voltage for the CPU to overclock. Set this item to [Disabled] to help protect the CPU from being burned due to over-voltage.

Configuration options: [Disabled] [Enabled]

CPU VCore Voltage [Offset Mode]

Allows you to configure the voltage amount for the processor's cores. Increase the voltage when setting a high Core Frequency value.

Configuration options: [Manual Mode] [Offset Mode]



The following item appears only when you set the CPU VCore Voltage to **[Manual Mode]** or **[Offset Mode]**.

CPU VCore Manual Voltage [Auto]

Allows you to manually set the CPU Core Voltage. Use the <+> or <-> keys to adjust the value. The values range from 0.800V to 1.700V with a 0.005V interval.



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

Offset Mode Sign [+]

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

CPU VCCSA Voltage [Offset Mode]

Allows you to configure the voltage amount for the processor's input/output, DMI, and PCI-E controllers.

Configuration options: **[Manual Mode]** **[Offset Mode]**



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

CPU VCCSA Manual Voltage [Auto]

Allows you to manually set the CPU VCCSA Voltage. Use the <+> or <-> keys to adjust the value. The values range from 0.800V to 1.700V with a 0.005V interval.



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

Offset Mode Sign [+]

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

DRAM Voltage (CHA, CHB) [Auto]

Allows you to provide power for the DRAMs located on the left side of your motherboard. Use the <+> or <-> keys to adjust the value. The values range from 1.200V to 1.990V with a 0.005V interval.

DRAM Voltage (CHC, CHD) [Auto]

Allows you to provide power for the DRAMs located on the right side of your motherboard. Use the <+> or <-> keys to adjust the value. The values range from 1.200V to 1.990V with a 0.005V interval.

CPU PLL Voltage [Auto]

Allows you to configure the voltage amount for the processor's phase locked loop (PLL). Use the <+> or <-> keys to adjust the value. The values range from 1.200V to 1.990V with a 0.005V interval.

VTTCPU Voltage [Auto]

Allows you to configure the voltage amount for the processor's cores and cache. Use the <+> or <-> keys to adjust the value. The values range from 1.05000V to 1.70000V with a 0.003125V interval.

PCH 1.1v Voltage [Auto]

Allows you to configure the voltage amount for the PCH chipset. Use the <+> or <-> keys to adjust the value. The values range from 1.10000V to 1.70000V with a 0.003125V interval.

PCH 1.5v Voltage [Auto]

Allows you to configure the voltage amount for the PCH chipset's I/O interface. Use the <+> or <-> keys to adjust the value. The values range from 1.50000V to 1.80000V with a 0.00625V interval.

VTTDDR Voltage (CHA, CHB) [Auto]

Allows you to configure the active termination voltage for the DRAM on channels A and B. Use the <+> or <-> keys to adjust the value. The values range from 1.62500V to 1.10000V with a 0.00625V interval.

VTTDDR Voltage (CHC, CHD) [Auto]

Allows you to configure the active termination voltage for the DRAM on channels C and D. Use the <+> or <-> keys to adjust the value. The values range from 1.62500V to 1.10000V with a 0.00625V interval.

DRAM CTRL REF Voltage on CHA [Auto]

Fraction of DRAM Voltage for referencing control on DRAM on Channel A. Use the <+> or <-> keys to adjust the value. The values range from 0.39500V to 0.63000V with a 0.00500V interval.

DRAM DATA REF Voltage on CHA [Auto]

Fraction of DRAM Voltage for referencing data on DRAM on Channel A. Use the <+> or <-> keys to adjust the value. The values range from 0.39500V to 0.63000V with a 0.00500V interval.

DRAM CTRL REF Voltage on CHB [Auto]

Fraction of DRAM Voltage for referencing control on DRAM on Channel B. Use the <+> or <-> keys to adjust the value. The values range from 0.39500V to 0.63000V with a 0.00500V interval.

DRAM DATA REF Voltage on CHB [Auto]

Fraction of DRAM Voltage for referencing data on DRAM on Channel B. Use the <+> or <-> keys to adjust the value. The values range from 0.39500V to 0.63000V with a 0.00500V interval.

DRAM CTRL REF Voltage on CHC [Auto]

Fraction of DRAM Voltage for referencing control on DRAM on Channel C. Use the <+> or <-> keys to adjust the value. The values range from 0.39500V to 0.63000V with a 0.00500V interval.

DRAM DATA REF Voltage on CHC [Auto]

Fraction of DRAM Voltage for referencing data on DRAM on Channel C. Use the <+> or <-> keys to adjust the value. The values range from 0.39500V to 0.63000V with a 0.00500V interval.

DRAM CTRL REF Voltage on CHD [Auto]

Fraction of DRAM Voltage for referencing control on DRAM on Channel D. Use the <+> or <-> keys to adjust the value. The values range from 0.39500V to 0.63000V with a 0.00500V interval.

DRAM DATA REF Voltage on CHD [Auto]

Fraction of DRAM Voltage for referencing data on DRAM on Channel D. Use the <+> or <-> keys to adjust the value. The values range from 0.39500V to 0.63000V with a 0.00500V interval.

DRAM READ REF Voltage on CHA [Auto]

Fraction of DRAM Voltage for CPU IMC to reference reads on DRAM on Channel A. Use the <+> or <-> keys to adjust the value. The values range from 0.38500V to 0.31500V with a 0.00500V interval.

DRAM READ REF Voltage on CHB [Auto]

Fraction of DRAM Voltage for CPU IMC to reference reads on DRAM on Channel B. Use the <+> or <-> keys to adjust the value. The values range from 0.38500V to 0.31500V with a 0.00500V interval.

DRAM READ REF Voltage on CHC [Auto]

Fraction of DRAM Voltage for CPU IMC to reference reads on DRAM on Channel C. Use the <+> or <-> keys to adjust the value. The values range from 0.38500V to 0.31500V with a 0.00500V interval.

DRAM READ REF Voltage on CHD [Auto]

Fraction of DRAM Voltage for CPU IMC to reference reads on DRAM on Channel D. Use the <+> or <-> keys to adjust the value. The values range from 0.38500V to 0.31500V with a 0.00500V interval.

CPU Spread Spectrum [Auto]

- [Auto] Automatic configuration.
- [Disabled] Enhances the BCLK overclocking ability.
- [Enabled] Sets to [Enabled] for EMI control.

PCIe Spread Spectrum [Auto]

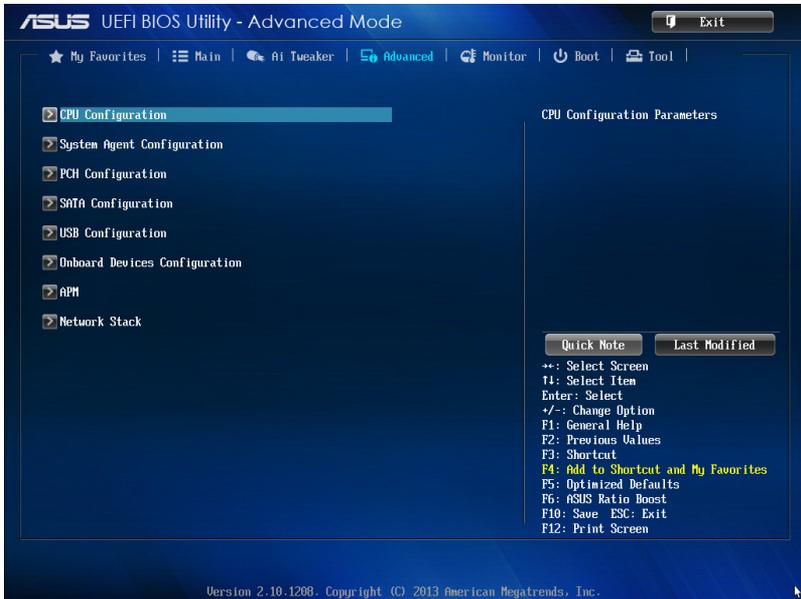
- [Auto] Automatic configuration.
- [Disabled] Enhances the PCIe overclocking ability.
- [Enabled] Sets to [Enabled] for PCIe control.

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.

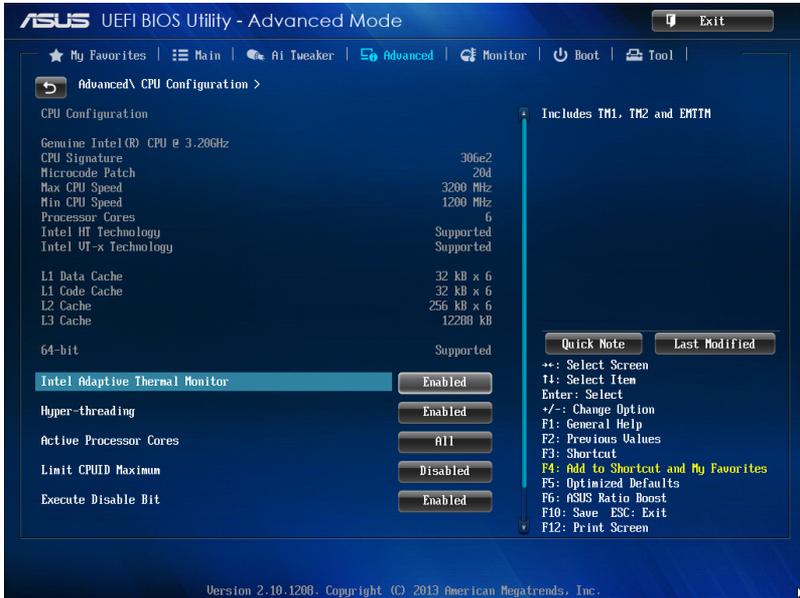


3.6.1 CPU Configuration

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]

- [Enabled] Allows the operating system to schedule two threads or processes simultaneously per activated core.
- [Disabled] Allows the operating system to schedule one per activated core.

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] [4] [5]

Limit CPUID Maximum [Disabled]

When set to [Enabled], this item allows the legacy OS to boot even without support for CPUs with extended CPUID functions.
Configuration options: [Enabled] [Disabled]

Execute Disable Bit [Enabled]

Execute Disable prevents certain classes of malicious buffer overflow attacks when combined with a supporting OS (SuSE Linux 9.2, RedHat Enterprise 3 Update 3).

Configuration options: [Disabled] [Enabled]

Intel Virtualization Technology [Enabled]

When set to **[Enabled]**, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Configuration options: [Disabled] [Enabled]

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 automatically 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 states [Auto]

Allows you to set the CPU states.

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



The following item appears only when you set the CPU states to **[Enabled]**.

CPU C1E [Enabled]

Allows you to enable or disable the C1E state.

Configuration options: [Enabled] [Disabled]

CPU C3 Report [Enabled]

Allows you to enable or disable the CPU C3 (ACPI C2) report to the operating system.

Configuration options: [Enabled] [Disabled]

CPU C6 Report [Enabled]

Allows you to enable or disable the CPU C6 (ACPI C3) report to the operating system.

Configuration options: [Enabled] [Disabled]

Package C State limit [Auto]

Allows you to set a state limit for package C.

Configuration options: [Auto] [C0] [C2] [C6] [C7] [No Limit]

3.6.2 System Agent Configuration



PCIEX16_1 Link Speed [GEN3]

Allows you to select a target link speed in this slot.

Configuration options: [GEN1] [GEN2] [GEN3]

PCIEX16_2/4 Link Speed [GEN3]

Allows you to select a target link speed in this slot.

Configuration options: [GEN1] [GEN2] [GEN3]

PCIEX16_3 Link Speed [GEN3]

Allows you to select a target link speed in this slot.

Configuration options: [GEN1] [GEN2] [GEN3]

3.6.3 PCH Configuration



High Precision Timer [Enabled]

Allows you to enable the High Precision Event Timer.

Configuration options: [Disabled] [Enabled]

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

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

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]

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

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]

3.6.5 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.

Legacy USB3.0 Support [Enabled]

Allows you to enable or disable the support for USB 3.0 devices.

Configuration options: [Disabled] [Enabled]

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 Per 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 Onboard Devices Configuration

Scroll down to view the other BIOS items.



Azalia HD Audio [Enabled]

[Enabled] Enables the Azalia Audio Controller.

[Disabled] Disables the controller.



The following items appear only when you set the Azalia 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.

Bluetooth Controller [Enabled]

[Enabled] Enables the onboard Bluetooth controller.

[Disabled] Disables the onboard Bluetooth controller.

Wi-Fi Controller [Enabled]

[Enabled] Enables the onboard Wi-Fi controller.

[Disabled] Disables the onboard Wi-Fi controller.

Intel LAN Controller [Enabled]

[Enabled] Enables the Intel® LAN controller.

[Disabled] Disables the Intel® LAN controller.



The following item appears only when you set the Intel LAN Controller to **[Enabled]**.

Intel PXE OPROM [Disabled]

Allows you to enable or disable the PXE OptionRom of the Intel® LAN controller.

Configuration options: [Enabled] [Disabled]

Realtek LAN Controller [Enabled]

[Enabled] Enables the Realtek® LAN controller.

[Disabled] Disables the Realtek® LAN controller.



The following item appears only when you set the Realtek LAN Controller to **[Enabled]**.

Realtek PXE OPROM [Disabled]

Allows you to enable or disable the PXE OptionRom of the Realtek® LAN controller.

Configuration options: [Enabled] [Disabled]

PCI Express X1_1 Slot Configuration [WiFi Mode]

[Auto] Allows your system to run at x1 link when an add-on card is installed.

[WiFi Mode] Disables the system to run at x1 link when WiFi mode is enabled.

PCI Express X1_2 Slot Configuration [eSATA Mode]

[Auto] Allows your system to run at x1 link when an add-on card is installed.

[eSATA mode] Disables the system to run at x1 link when eSATA mode is enabled.

ASMedia USB 3.0 Controller (Rear) [Enabled]

Allows you to enable the ASMedia® USB 3.0 controller of the rear panel of your system.

Configuration options: [Disabled] [Enabled]

ASMedia USB 3.0 Controller (Rear) [Front]

Allows you to enable the ASMedia® USB 3.0 controller of the front panel of your system.

Configuration options: [Disabled] [Enabled]

ASMedia USB 3.0 Battery Charging Support [Front]

Allows you to enable the ASMedia® USB 3.0 battery charging support of your system.

Configuration options: [Disabled] [Enabled]

Marvell Storage Controller [Enabled]

Allows you to enable the Marvell® Storage Controller.

Configuration options: [Disabled] [Enabled]



The followings item appear only when you set the Marvell LAN Controller to **[Enabled]**.

Marvell Storage OPROM [Enabled]

Allows you to enable or disable the Marvell Storage OptionRom.

Configuration options: [Enabled] [Disabled]

Marvell Storage Firmware Check and Update [Disabled]

Allows you to enable or disable the firmware checking and update of the Marvell® Storage controller.

Configuration options: [Enabled] [Disabled]

ASM1061 Storage Controller [Enabled]

Allows you to select the ASM1061 storage controller operating mode.

[Disabled] Disables the ASM1061 storage controller.

[Enabled] Enables the ASM1061 storage controller.

ASM1061_2 Storage Controller [Enabled]

Allows you to select the ASM1061 storage controller operating mode.

[Disabled] Disables the ASM1061_2 storage controller.

[Enabled] Enables the ASM1061_2 storage controller.

3.6.7 APM



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 PCIE/PCI [Disabled]

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

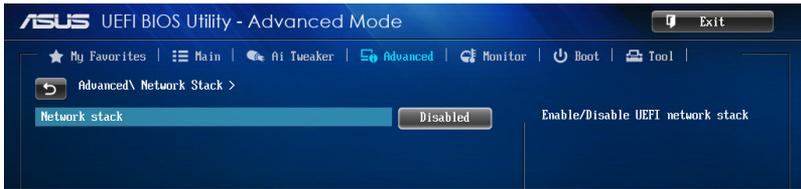
Power On By RTC [Disabled]

- [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.

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)]

3.6.8 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]

PXE boot wait time [0]

This item allows you to key in a waiting time in pressing ESC key to abort the PXE boot. Use the <+> or <-> keys to adjust the time (in seconds). The time ranges from 1 to 5 seconds.

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 [xxx°C/xxx°F]

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 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.

CPU Q-Fan Control [Auto]

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

[Advance Mode]	Detects the type of CPU fan installed and automatically switches the mode control. When a 3-pin CPU fan is installed, select this mode for the DC mode Q-Fan control.
[Auto]	Enables the CPU Q-Fan control feature in PWM mode for 4-pin CPU fan.
[Disabled]	Disables the Q-Fan control.



The following items appear only when you set the CPU Q-Fan Control to **[Advance Mode]** and **[Auto]**.

CPU Fan Speed Low Limit [600 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 [Standard]

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 20°C to 75°C.

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]

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 40°C, 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.

Chassis Fan Speed Low Limit 1/4 [600 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 [Standard]

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 40°C to 90°C.

Chassis Fan Max. Duty Cycle(%) 1/4 [100]

Use the <+> or <-> keys to adjust the maximum chassis fan duty cycle. The values range from 20% 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]

Displays the lower limit of the chassis 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 0% to 100%. When the chassis temperature is under 40°C, 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]

Chassis Intrude Detect Support [Disabled]

This item allows you to enable or disable the support for chassis intrusion detection. Enable this item to detect removal or replacement of chassis components.

Configuration options: [Disabled] [Enabled]

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]**.

SATA Support [Hard Drive...]

[All Devices] All devices connected to SATA ports are available during POST. This process extends the POST time.

[Hard Drive Only] Only hard drives connected to SATA ports are detected during POST.

[Boot Drive Only] Only boot drives connected to a SATA ports are detected during POST.

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.

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.

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 [Auto]

- [Auto] Sets the boot logo to display during POST.
[Full Screen] Sets the boot logo display in full screen during POST.
[Disabled] Disables the boot logo display during POST.



The following item appears only when you set the Boot Logo Display to **[Auto]** and **[Full Screen]**.

Post Delay Time [3 sec]

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 only works when set under normal boot.



The following items appear only when you set the Boot Logo Display to **[Disabled]**.

Post Report [5 sec]

This item allows you to select a desired POST report waiting time.
Configuration options: [1 sec] - [10 sec] [Until Press ESC]

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.

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]

- | | |
|---------------------|--|
| [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. 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.

Install Default Secure Boot keys

Allows you to immediately load the default Security Boot keys, Platform key (PK), Key-exchange Key (KEK), Signature database (db), and Revoked Signatures (dbx). When the default Secure boot keys are loaded, the PK state will change from Unloaded mode to loaded mode.

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.



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.

Append KEK from File

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



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.

Append db from File

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



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.

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.



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.



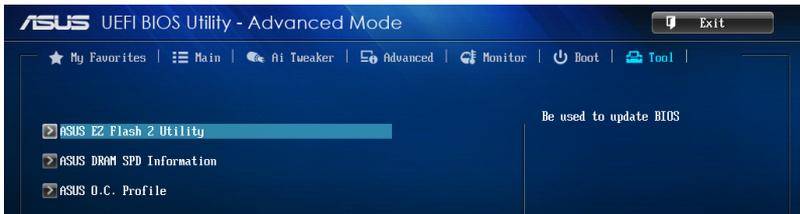
- To access Windows® OS in Safe Mode, press <F8 > after POST (Windows® 8 not supported).
 - To select the boot device during system startup, press <F8> when ASUS Logo appears.
-

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 Tool menu

The Tool 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

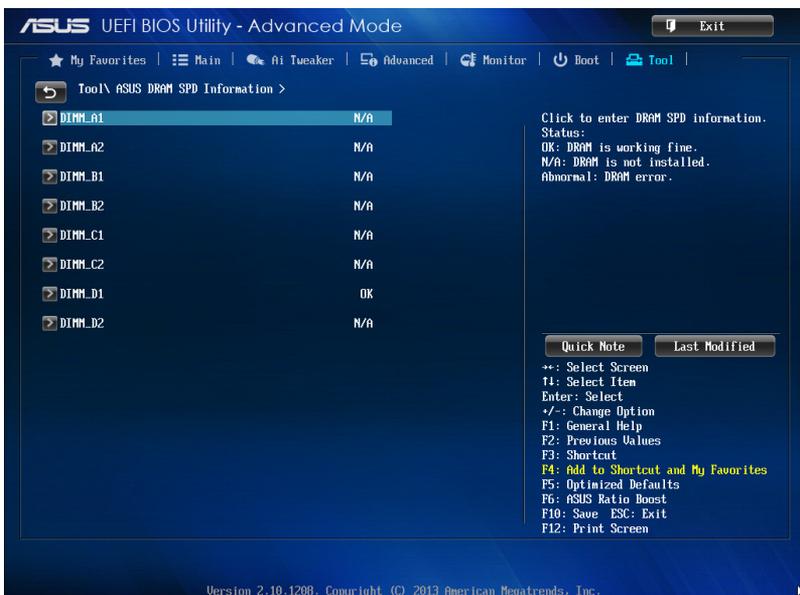
Allows you to run ASUS EZ Flash 2. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice.



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

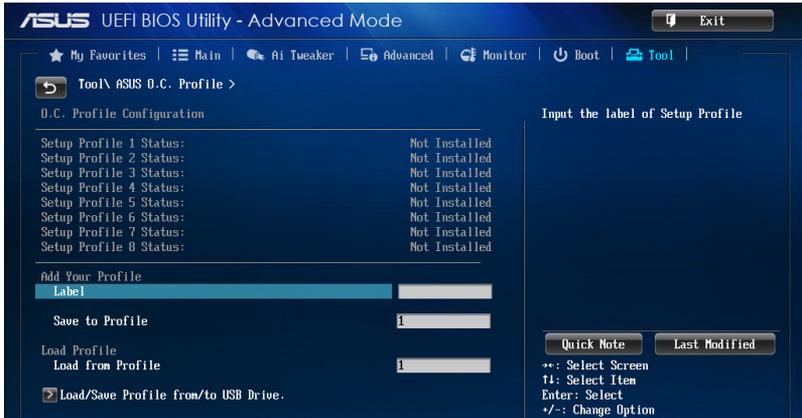
3.9.2 ASUS DRAM SPD Information

Allows you to view the DRAM SPD information.



3.9.3 ASUS O.C. Profile

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



Label

Allows you to input a label of the setup profiles.

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.

Load/Save Profile from/to USB Drive

Allows you to load or save profile from your USB drive, load and save profil to your USB drive.

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.



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

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 3.10 **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!

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.



- When the Make Disk menu appears, select the FreeDOS command prompt item by pressing the item number.
- 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:\>
```

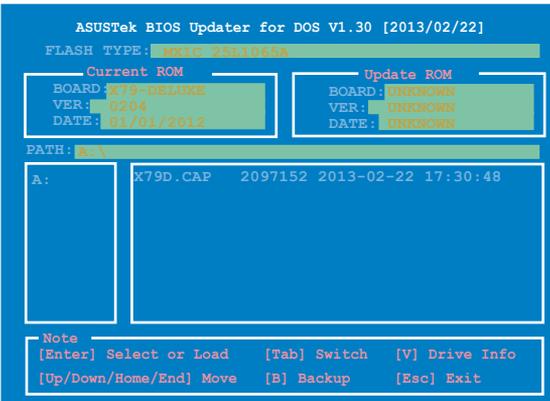
Updating the BIOS file

To update the BIOS file using BIOS Updater:

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

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

- The BIOS Updater screen appears as below.



- 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.



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 1.04 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 Chapter 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.
-

Software support

4

4.1 Installing an operating system



- This motherboard supports 32-bit/64-bit Windows® 7 and 32-bit/64-bit Windows® 8 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

.Ensure that you have an Administrator account before running the support DVD in Windows® 7 or Windows® 8 OS.

To run the support DVD:

1. Place the Support DVD into the optical drive.
2. In the **AutoPlay** dialog box, click **Run ASSETUP.EXE**.



If the **AutoPlay** dialog box does not appear, browse the contents of the support DVD and double-click or tap `\\bin\ASSETUP.EXE` to launch the **ASUS motherboard support DVD** main menu.

Support DVD main menu

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.

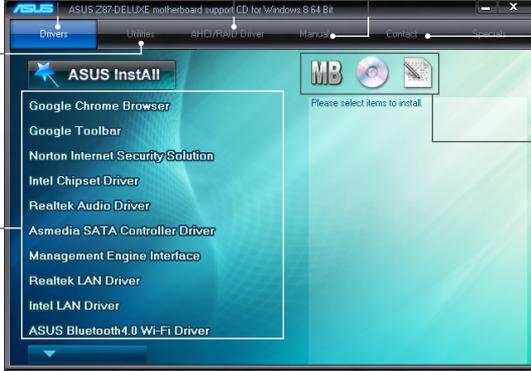
The Manual menu contains the list of supplementary user manuals. Click an item to open the folder of the user manual.

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

Click an item to install

Click the Contact tab to display the ASUS contact information.

Click an icon to display DVD/motherboard information



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.



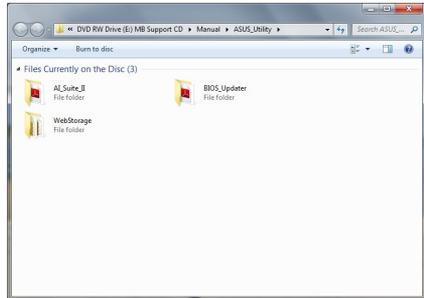
The software manual files are in Portable Document Format (PDF). Install the Adobe® Acrobat® Reader from the **Utilities** tab before opening the files.

To read about your motherboard's utility guide:

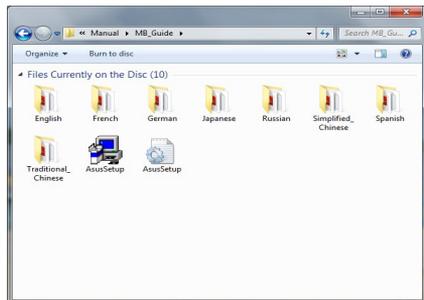
1. Click **Manual** tab > **ASUS Motherboard Utility Guide**.



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.

4.4 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



Ensure that you have an Administrator account before installing AI Suite 3 in Windows® 7 OS or Windows® 8 OS.

To install AI Suite 3 on your computer:

Windows® 7 OS

1. Place the Support DVD into the optical drive.
2. In the **AutoPlay** dialog box, click **Run ASSETUP.exe** then select the **Utilities** tab.



3. From the **Utilities** tab, click **AI Suite 3** then follow the succeeding onscreen instructions.

Windows® 8 OS

1. Place the Support DVD into the optical drive then follow onscreen instructions.
2. From the **ASUS motherboard support DVD** main menu, select the **Utilities** tab and click **AI Suite 3**.
3. Follow the succeeding onscreen instructions.

If the **ASUS motherboard support DVD** main menu did not appear, try the following:

- a. Go to the **Start Screen** then click or tap the **Desktop** app.
- b. On the lower left corner of the Desktop, click or tap **File Explorer**  then select your DVD drive and tap or double-click the **Setup** application.

Launching AI Suite 3

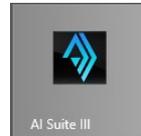
Windows® 7 OS

From the Desktop, click **Start > All Programs > ASUS > AI Suite 3 > AI Suite 3**.

You can also launch AI Suite in Windows® 7 by clicking  on the Notification area.

Windows® 8 OS

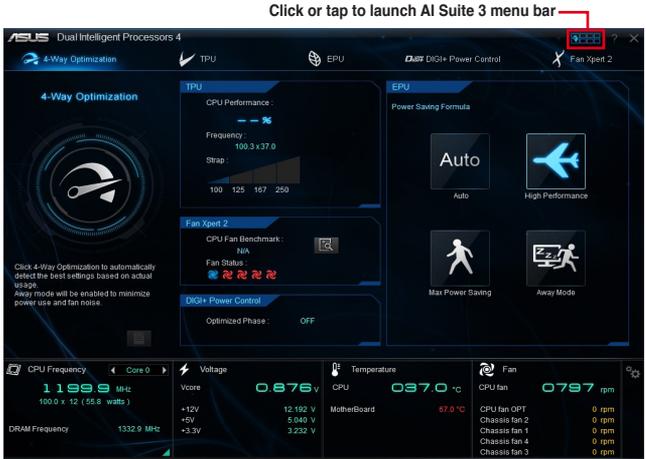
To launch AI Suite 3 in Windows® 8, tap the AI Suite 3 app on the Start Screen (or if you're using a mouse, click the AI Suite 3 app on the Start Screen).



AI Suite 3 Main menu

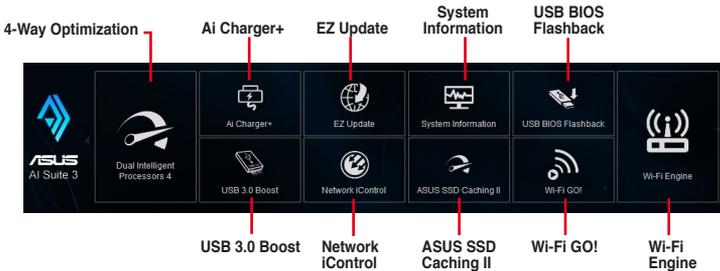
The AI Suite 3 main menu gives you easy-access controls and insight to what's going on with your computer - allowing you to optimize performance settings while at the same time ensuring system stability.

The AI Suite main menu includes a quick-access menu bar that allows you to swiftly launch any of the integrated ASUS utilities. Click or tap  on the top-right corner of the menu to launch the menu bar.



The AI Suite 3 screenshots in this section are for reference only and can vary depending on motherboard model.

AI Suite 3 main menu bar



- Some functions in the AI Suite 3 main menu in this user manual may vary depending on the motherboard model.
- Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

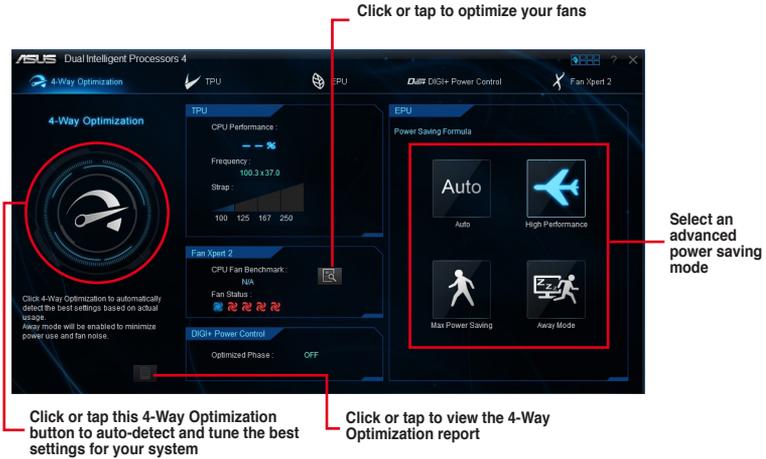
4.4.1 Dual Intelligent Processors 4 with 4-Way Optimization

Dual Intelligent Processors 4 comes with these five utilities in one interface: 4-Way Optimization, TurboV Processing Unit (TPU), Energy Processing Unit (EPU), DIGI+ Power Control, and Fan Xpert 2.

4-Way Optimization

The 4-Way Optimization utility allows you to automatically tweak the TPU, EPU, DIGI+ Power Control and Fan Xpert 2 to their optimal settings.

4-Way Optimization screen



DO NOT remove your fan during the tuning process.

Using 4-Way Optimization

Click or tap the 4-Way Optimization button then click or tap **Start** to auto-detect the best settings based on actual usage.



Click or tap to view more settings

Click or tap to go back to the 4-Way Optimization main screen

Click or tap to start auto-tuning



- The system may reboot two or three times during the auto-tuning process.
- For Windows® 8 OS, click or tap **Desktop** app to monitor the auto-tuning process after every system reboot.

TurboV Processing Unit (TPU)

TPU allows you to manually adjust the CPU frequency, CPU cache, core frequencies, DRAM frequency, and related voltages for an enhanced system stability and a performance boost.



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



For system stability, the TPU settings are not saved in the BIOS and are not loaded during system bootup. Save your overclocking settings as a TPU profile and manually load this profile after system bootup.

Using TPU

CPU Frequency

Tick to enable Group Tuning

Click or tap < or > to adjust the Base Clock Frequency and CPU Ratio

Click or tap < or > to select the number of cores to adjust

Scroll down then adjust the CPU voltages and DRAM voltages

Click or tap to load the saved profile

Click or tap to save the adjustment into a profile

Click or tap to undo the adjustments

Click or tap to apply the adjustments



- Set the CPU Core Ratio item in BIOS to **[Auto]** before using the CPU Frequency in TPU. Refer to section **3.5 Ai Tweaker** menu in the BIOS chapter of this user manual for details.
- The CPU Frequency bars show the status of the CPU cores, which vary with your CPU model.

CPU Strap

Click or tap ◀ or ▶ to adjust the CPU Strap's BCLK frequency

Click or tap to apply the changes

Click or tap to apply the adjustments

Click or tap to undo the adjustments

Click or tap to go back to CPU Frequency tab

Click or tap to save the adjustment into a profile

Click or tap to load the saved profile

Energy Processing Unit (EPU)

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

Using EPU

Auto

Tick to select Vcore downgrade

Tick to enable Away Mode and move the sliders to adjust monitor and system sleep time

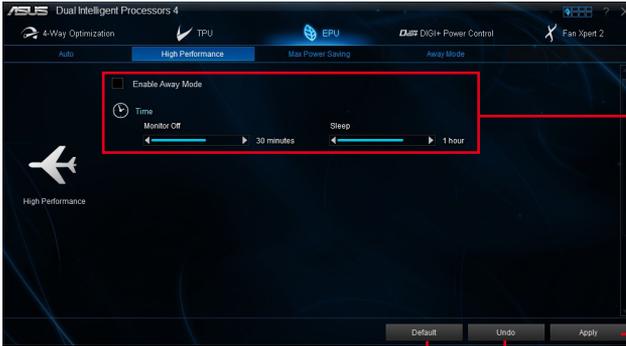
Click or tap to select a fan profile

Click or tap to apply the adjustments

Click or tap to undo the adjustments

Click or tap to apply the default settings

High Performance



Tick to enable Away Mode and move the sliders to adjust monitor and system sleep time

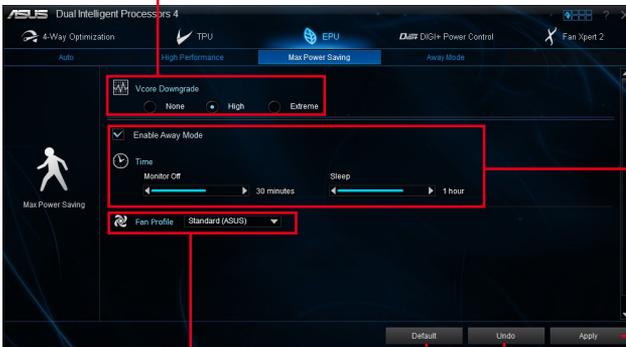
Click or tap to apply the adjustments

Click or tap to apply the default settings

Click or tap to undo the adjustments

Max Power Saving

Tick to select Vcore downgrade



Tick to enable Away Mode then move the sliders to adjust monitor and system sleep time

Click or tap to apply the adjustments

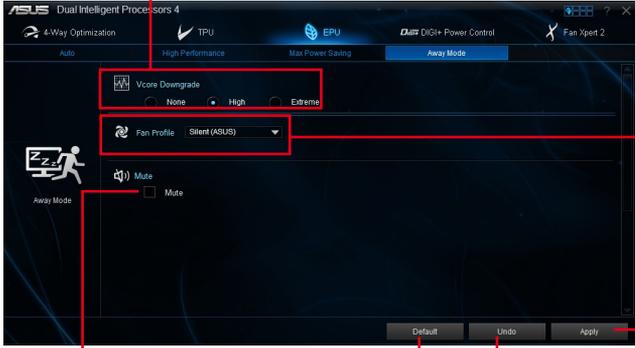
Click or tap to select a fan profile

Click or tap to apply the default settings

Click or tap to undo the adjustments

Away Mode

Tick to select Vcore downgrade



Click or tap to select a fan profile

Click or tap to apply the adjustments

Tick to mute the system's sound

Click or tap to apply the default settings

Click or tap to undo the adjustments

DIGI+ Power Control

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

Adjusting the CPU Power



1 CPU Load-line Calibration
It allows you to adjust the voltage range to control the CPU Load-line. Adjust to a high value for system performance or to a low value for power efficiency.

2 CPU Current Capability
CPU Current Capability provides a wider total power range for overclocking. A higher value brings a wider total power range and extends the overclocking frequency range simultaneously.

3 CPU Power Phase Control
Increase the phase number under a heavy system load to get more transient and better thermal performance. Reduce the phase number under a light system load to increase the VRM efficiency.

* The system automatically sets the default to [Extreme] when using the Intel® iGPU.

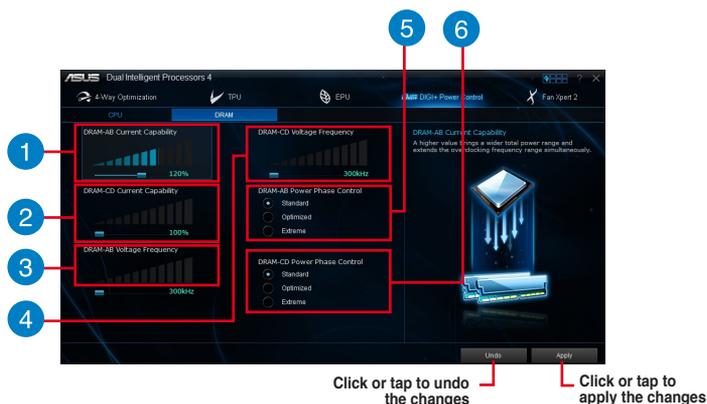
4 VCCSA Load-line Calibration
It allows you to adjust the behavior of the DRAM controller. Set to a higher value for an overall system performance, or to a lower value for a better thermal solution.

5 VCCSA Current Capability
VCCSA Current Capability provides a wider total DRAM Controller power range and extends the overclocking frequency range simultaneously.

6 CPU Voltage Frequency
CPU Voltage Frequency affects the VRM transient response and thermal conditions. Higher VRM frequency gets a quicker transient response.

7 CPU Power Duty Control
CPU Power Duty Control adjusts the current of every VRM phase and the thermal conditions of every phase component.

Adjusting the DRAM Power



- 1 DRAM-AB Current Capability**
Higher value to DRAM slots A and B brings a wider total power range and extends the overclocking frequency range simultaneously.
- 2 DRAM-CD Current Capability**
Higher value to DRAM slots C and D brings a wider total power range and extends the overclocking frequency range simultaneously.
- 3 DRAM-AB Voltage Frequency**
Allows you to adjust the DRAM switching frequency of DRAM slots A and B to stabilize the system or to increase the overclocking range.
- 4 DRAM-CD Voltage Frequency**
Allows you to adjust the DRAM switching frequency of DRAM slots C and D to stabilize the system or to increase the overclocking range.
- 5 DRAM-AB Power Phase Control**
For DRAM slots A or B, select **Extreme** for full phase mode to increase system performance or select **Optimized** for ASUS optimized phase tuning profile to increase the DRAM power efficiency.
- 6 DRAM-CD Power Phase Control**
For DRAM slots C or D, select **Extreme** for full phase mode to increase system performance or select **Optimized** for ASUS optimized phase tuning profile to increase the DRAM power efficiency.



- The actual performance boost may vary depending on your CPU specification.
- Ensure that the cooling modules are properly installed in your motherboard to monitor the thermal conditions.

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.

Using Fan Xpert 2

Click or tap to set the fan's speed to silent mode

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

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

Click or tap to maximize the fan speed

Click or tap to auto-tune the fans to their best settings

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

Click or tap to load a profile

Click or tap to save the settings into a profile

Click or tap to switch between fan screens



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

Customizing the fan settings

Smart Mode

Smart Mode allows you to customize the fans' rotation speeds and responses 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 response

Click or tap to go back to the previous screen

Click or tap to switch between the CPU and chassis fan screens

Click or tap to undo the changes

Click or tap to apply the changes

Fan Preset	Fan Speed
100 %	2061 rpm
90 %	1679 rpm
80 %	1416 rpm
70 %	1152 rpm
60 %	889 rpm
50 %	726 rpm
40 %	463 rpm
30 %	0 rpm
20 %	0 rpm
10 %	0 rpm
0 %	0 rpm

Minimum Speed: 2061 ± 4 (RPM)
 Maximum Speed: 2061 (RPM)
 Fan runs when power is higher than 500 RPM (44%)
 Control Range: 44% ~ 100%

RPM Mode

RPM Mode allows you to set the fan speed at its fixed value when the CPU temperature drops 75°C and below.

Drag the slider up or down to adjust the fan's speed

Fan Power	Fan Speed
100 %	2800 rpm
95 %	2500 rpm
90 %	2000 rpm
75 %	1647 rpm
65 %	1200 rpm
55 %	1071 rpm
45 %	1033 rpm
35 %	1073 rpm
25 %	1073 rpm
5 %	1073 rpm

Click or tap to go back to the previous screen

Click or tap to switch between the CPU and chassis fan screens

Click or tap to undo the changes

Click or tap to apply the changes



- When the CPU temperature reaches 75° C, the fan automatically runs at full speed to protect the CPU.
- Fan Xpert 2 may not be able to detect the fan speed if you install the fan with an external control kit for rotation speed.
- Fan Xpert 2 only supports fans with 4-pin and 3-pin connectors. If you install a 2-pin fan, it can only run at its full speed.
- If you change the CPU or chassis fans, you must repeat the Fan Auto Tuning process.

4.4.2 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.

Launching USB 3.0 Boost

To launch USB 3.0 Boost, click or tap  on the top-right corner of the AI Suite 3 main menu, then select **USB 3.0 Boost**.

Using the USB 3.0 Boost



Ensure to connect your USB 3.0 device to the USB 3.0 ports that support USB 3.0 Boost. Refer to section **Rear I/O connection** of your user manual for more details.



- USB 3.0 Boost automatically detects the USB 3.0 devices that support UASP. For a list of UASP-supported USB 3.0 devices, visit the ASUS website at www.asus.com.
- The data transfer speed varies with USB devices. For a higher data transfer performance, use a USB 3.0 device.

4.4.3 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 the BIOS download schedule.

Launching USB BIOS Flashback

To launch USB BIOS Flashback, click or tap  on the top-right corner of the AI Suite 3 main menu, then select **USB BIOS Flashback**.



USB BIOS Flashback is available only in selected motherboard models.

Using USB BIOS Flashback

Set a schedule for the BIOS Update download



Click or tap to check for a new BIOS update available for download

Click or tap to cancel the download schedule setting

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

Downloading the latest BIOS

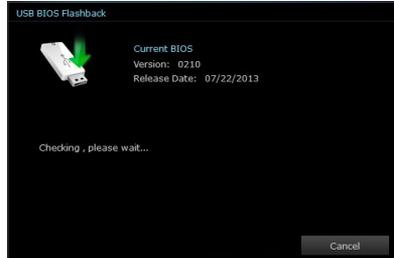


Before you start downloading, ensure that you have installed the USB storage device to your computer's USB port that supports USB BIOS Flashback. Refer to section **2.3.1 Rear I/O connection** of this user manual for more details.

To download the updated BIOS:

1. From the USB BIOS Flashback screen, click or tap **Check for New BIOS Update**.

Wait for the system to check the latest BIOS version.



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



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



4.4.4 Ai Charger+

Ai Charger+ allows you to fast-charge your portable BC 1.1* mobile devices on your computer's USB port three times faster than the standard USB devices**.

Launching Ai Charger+

To launch Ai Charger+, click or tap  on the top-right corner of the AI Suite 3 main menu, then select **Ai Charger+**.



Ai Charger+ is available only in selected motherboard models.

Ai Charger+ screen



Tick to enable or
disable Ai Charger+

Click or tap to apply
the selection



- * Check the manufacturer if your USB device is a Battery Charging Specification 1.1 (BC 1.1) compliant or compatible device.
 - ** Actual charging speeds may vary depending on the charging rate and specifications of your USB device.
 - To ensure normal charging function, disconnect and reconnect your USB device every time you enable or disable Ai Charger+.
 - Ai Charger+ does not support USB hubs, USB extension cables, and generic USB cables.
-

4.4.5 Wi-Fi Engine

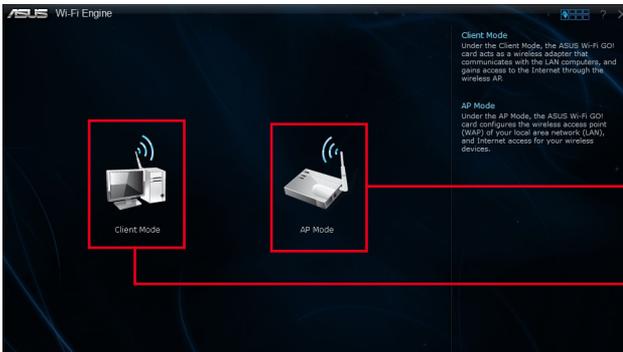
Wi-Fi Engine allows you to connect to a wireless network and set up your computer as an access point for Internet connection sharing among Wi-Fi enabled devices.

To use Wi-Fi Engine, click or tap the  on the top-right corner of the AI Suite 3 main menu, then select **Wi-Fi Engine**.



Wi-Fi Engine is available only in selected motherboard models.

Using Wi-Fi Engine



Click or tap to set up your computer as a wireless access point

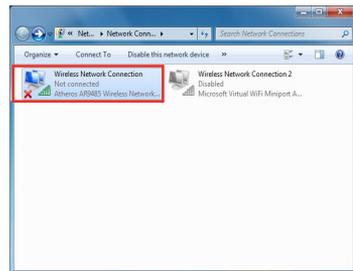
Click or tap to connect to a wireless access point

Using the Client Mode

The Client mode allows you to connect your system to a wireless network.

To use the client mode:

1. Click or tap **Client Mode** to launch Network Connections.
2. From the Network Connections window, select a network adapter.



3. From the list of available networks, select a network that you want to connect to.



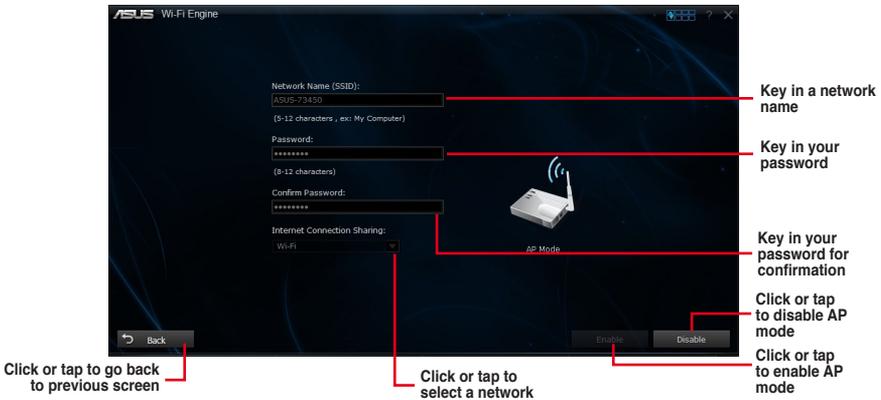
Some networks may require you to key in a password.



Using the AP Mode

The AP mode allows you to set your system as an access point for other wireless-enabled devices.

To use AP mode, click or tap **AP Mode** on the Wi-Fi Engine menu.



4.4.6 Wi-Fi GO!

Wi-Fi GO! is ASUS-exclusive Wi-Fi utility that allows you to wirelessly stream your media files to wireless devices, control your computer using your smart device, transfer files to your smart device, and provides access to your files stored in your cloud storage.



- Ensure that all Wi-Fi-enabled devices are in the same Wi-Fi network.
- The screenshots used in this section are for reference only and can appear from the actual software you are using. Refer to the ASUS Support site at (<http://support.asus.com>) for updated documentations on this motherboard.



The user interface of your smart device may vary with the operating system and the screen resolution.

Wi-Fi GO! System requirements

System requirements	PC	Smart device
OS	Windows® 7/Windows® 8	Android 2.3 or higher versions iOS5 or later versions
Utilities	ASUS AI Suite 3	ASUS Wi-Fi GO! & NFC Remote



If you're using an Android smart device, download the ASUS Wi-Fi GO! & NFC Remote from Google Play. If you're using an iOS smart device, download the ASUS Wi-Fi GO! & NFC Remote from Apple Store.

Launching Wi-Fi GO!

To launch Wi-Fi GO!, click or tap the  on the top-right corner of the AI Suite 3 main menu, then select **Wi-Fi GO!**





- To access the Wi-Fi GO! features in your smart device, refer to section **Wi-Fi GO! & NFC Remote** of this user manual for more details.
- To protect your Wi-Fi utility from other smart devices, click or tap  to set your password.
- Ensure that the ASUS AI Suite 3 utility is active when using Wi-Fi GO!.

Wi-Fi GO! & NFC Remote

Wi-Fi GO! & NFC Remote allows you to remotely control your computer using your smart device.

Smart device supported screen resolutions

Wi-Fi GO! & NFC Remote supports the following screen resolutions of smart devices:

Screen type	Low density (120 ldpi)	Medium density (160 mdpi)	High density (240 hdpi)	Extra high density (320 xhdpi)
Screen Resolution	1024 x 600	WXGA (1280 x 800)	1536 x 1152	2048 x 1536
		1024 x 768	1920 x 1152	2560 x 1536
		1280 x 768	1920 x 1200	2560 x 1600

Using Wi-Fi GO! & NFC Remote

To use the Wi-Fi GO! & NFC Remote:

1. Connect your smart device to the same Wi-Fi network as your computer.



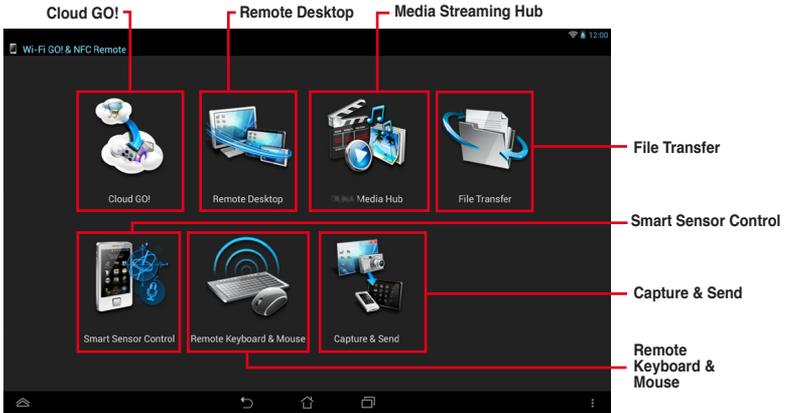
For details in connecting your smart device to a Wi-Fi network, refer to the user manual of your smart device.

2. Tap  then tap **Enter**.
3. Tap the computer that you want to connect with your smart device.

When done, the Wi-Fi GO! & NFC Remote interface appears on your smart device.



Wi-Fi GO! & NFC Remote interface



The screenshots are for reference only and vary with the type of smart device.

Cloud GO!

Cloud GO! allows you to control and sync your files across multiple cloud services such as ASUS WebStorage, GoogleDrive™, and DropBox®.



Ensure to set the correct system date and time of your computer and smart device when using Cloud GO!

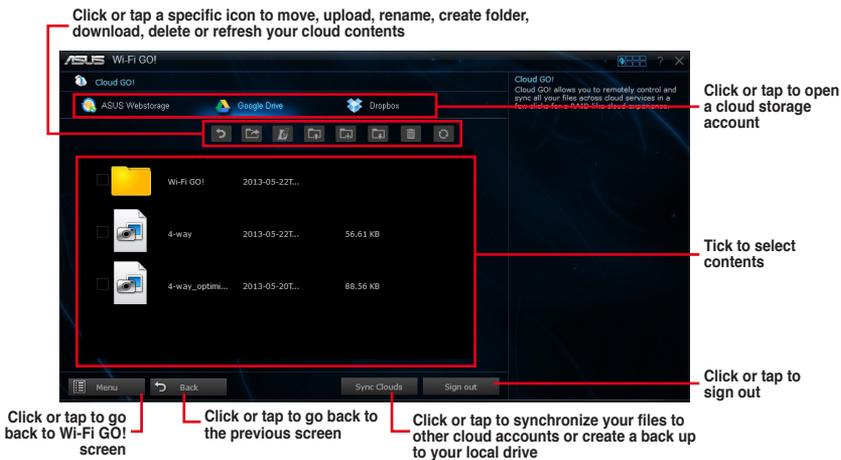
Using Cloud GO! in your computer

To use Cloud GO! in your computer:

1. Click or tap **Cloud GO!** > **Enter**.
2. Log in to your cloud accounts, then click or tap **Sign In**.



- To log in to your ASUS Webstorage account, key in your user name and password.
- To log in to your Google Drive™ or Dropbox® accounts, click or tap **Sign in**. Cloud GO! directs you to the Google Drive or Dropbox website to log in to your account.



Synchronizing cloud contents

To synchronize contents:

1. Tick the contents that you want to synchronize, then click or tap **Sync Clouds**.
2. Tick the cloud storage account then click or tap **OK**.



- Tick **Backup** if you want to save a backup in your computer.
- All synced files are stored in the Wi-Fi GO! folder.

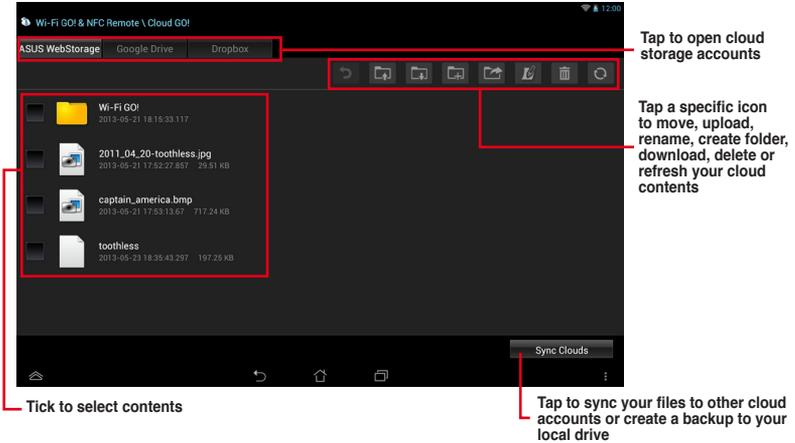


Using Cloud GO! in your smart device

To use Cloud GO! in your smart device, tap **Cloud GO! > Enter**.



You must log in to your computer first and tick **Remember me** to authorize access in your smart device.



Synchronizing cloud contents

To synchronize contents:

1. Tick the contents that you want to synchronize, then tap **Sync Clouds**.
2. Tick the cloud storage account then tap **OK**.



- Tick **Backup to PC** under (C:\MyFavorite) if you want to save a backup in your computer.
- Open the Wi-Fi GO! folder to view all synced files.



Remote Desktop

Remote Desktop allows you to remotely control your desktop in real-time using your smart device.

Using Remote Desktop

To use Remote Desktop:

1. On your smart device, tap **Remote Desktop > Enter**.
2. Wait for the smart device to connect with your computer.



To operate Remote Desktop in Windows® 7, you can select **Extended Mode** or **Main Screen Mode** in your smart device.

Remote Desktop interface for Windows® 8



Remote Desktop interface for Windows® 7



Tap to launch the smart device's keypad

Media Streaming Hub

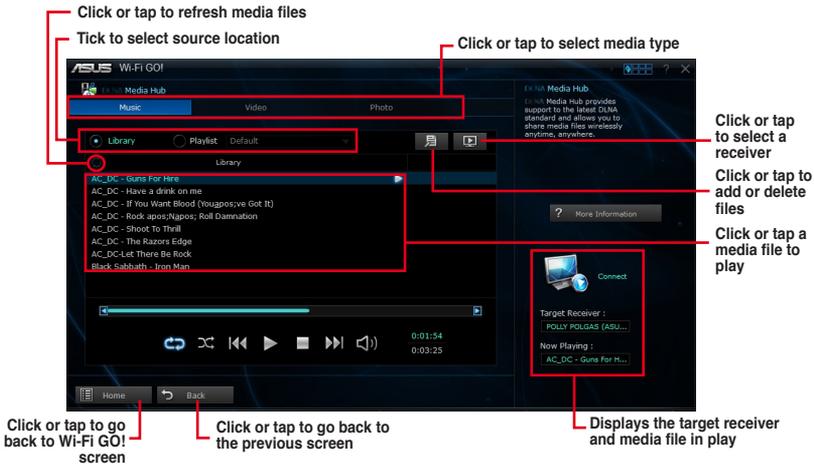
Media Streaming Hub allows you to stream media files to an HDTV and remotely control playback using your smart device.



- When using your computer as a receiver, ensure to launch the Windows Media Player, then enable the remote control settings of the Windows Media Player. To do this, click or tap **Stream** then tick the items **Allow remote control of my Player...** and **Automatically allow devices to play my media...**
- When using your high-definition display as a receiver (such as HDTV), ensure to enable the DLNA setting.

Using Media Streaming Hub in your computer

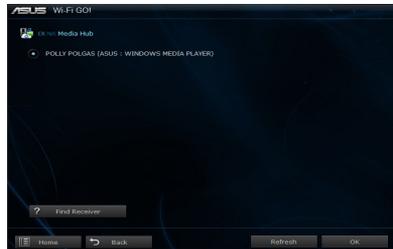
To use Media Streaming Hub in your computer, click or tap **Media Streaming Hub > Enter**.



Selecting a receiver

To select a receiver:

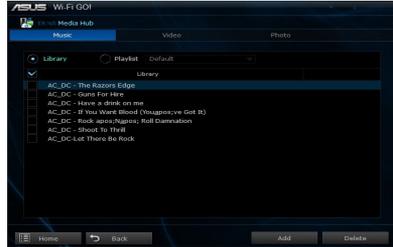
1. Click or tap .
2. Tick to select a receiver, then click or tap **OK**.



Adding media files

To add media files:

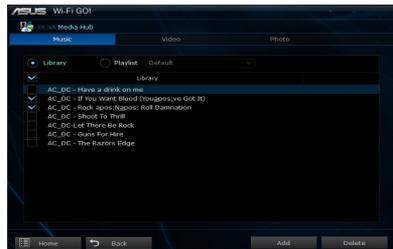
1. From the **Music**, **Video**, or **Photo** screen, click or tap **月**.
2. Click or tap **Add** then search the files that you want to add.
3. Click or tap **OK**.



Deleting media files

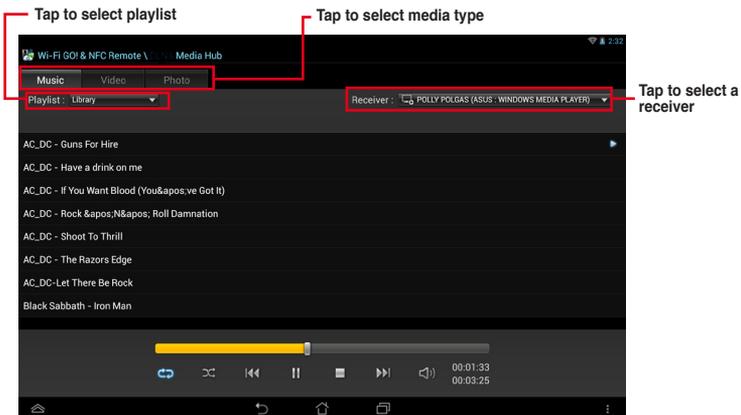
To delete media files:

1. From the **Music**, **Video**, or **Photo** screen, click or tap **月**.
2. Tick the files that you want to delete, then click or tap **Delete**.
3. Click or tap **OK**.



Using Media Streaming Hub in your smart device

To use Media Streaming Hub in your smart device, tap **Media Streaming Hub** > **Enter**.



File Transfer

File Transfer allows you to transfer files between your computer and your smart device.



To send files between your computer and smart device, ensure to enable the File Transfer function in your smart device.

Transferring files from computer to smart device

To transfer files from computer to smart device:

1. Click or tap **File Transfer > Enter**.
2. Click or tap **Setting** to select the destination for your transferred files.



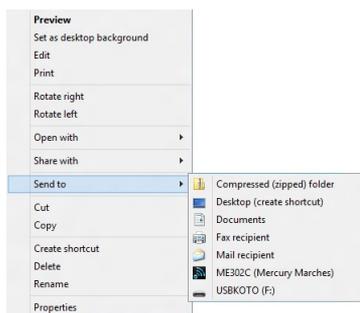
Click or tap browse to select the destination

Click or tap to go back to Wi-Fi GO! screen

Click or tap to go back to the previous screen

Click or tap to apply the changes

3. Right-click or long tap the file then select **Send to > [Device Name]**.
4. After the file transfer is complete, click or tap **OK**.

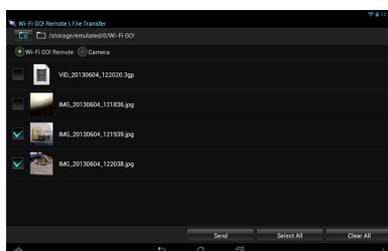


- If you are using an iOS smart device, you can only receive files in PNG, BMP, JPG, GIF, and TIFF formats.
- To receive files on your iOS device, go to **Settings > Privacy > Photos** then turn on the **Wi-Fi GO! & NFC Remote**.

Transferring files from smart device to computer

To transfer files from smart device to computer:

1. Tap **File Transfer > Enter**.
2. Tick the files that you want to send to your computer, then tap **Send**.



Smart Sensor Control

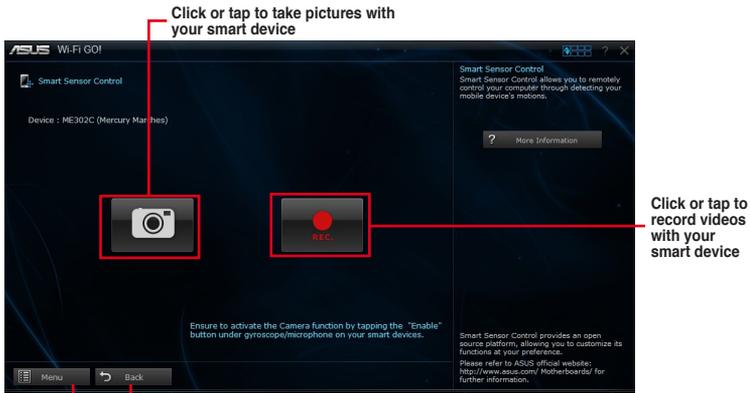
Smart Sensor Control allows you to remotely control your desktop by using your smart device's built-in sensors.



- The functions of Smart Sensor Control varies with your computer's operating system.
- For Windows® 7 OS, ensure to enable the Smart Sensor Control feature in your smart device. To do this, tap **Smart Sensor Control > Enable**.

Using Smart Sensor Control in Windows® 8

In your computer, click or tap **Smart Sensor Control > Camera**.



Click or tap to go back to Wi-Fi GO! screen

Click or tap to go back to the previous screen



- Your smart device must have a camera to support this feature.
- Ensure to enable the gyroscope or microphone feature in your smart device to enable the camera and video recorder features in your computer. To do this, tap **Smart Sensor Control** then tap **Enable** on either the gyroscope or microphone function.
- This feature is also supported in Windows® 7.

The Smart Sensor Control in Windows® 8 environment features the microphone function for voice chat and recording. It also has the gyroscope function that allows you to use your smart device as a remote control for gyroscope-enabled apps.

In your smart device, tap **Smart Sensor Control > Enable** on the virtual microphone or gyroscope functions.



Tap to select voice quality

Tap to enable virtual microphone function

Tap to enable the gyroscope function

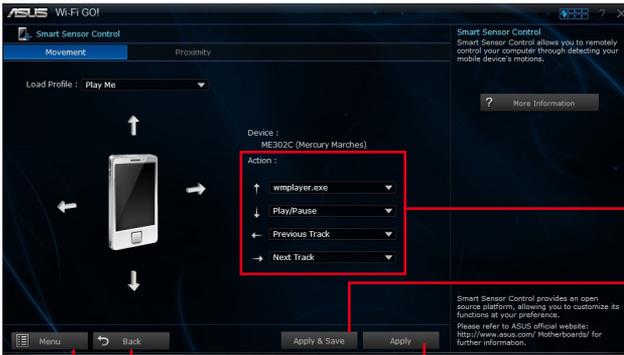
Using Smart Sensor Control in Windows® 7

To use Smart Sensor Control:

1. Click or tap **Smart Sensor Control > Setting**.
2. In the **Movement** tab, select an action from , , , and  dropdown fields.
3. To save the actions as a profile, click or tap **Apply & Save**. To apply the actions without saving as a profile, click or tap **Apply**.



You can also set the smart device's motion sensor sensitivity for a quicker response in your computer. To do this, tap **Smart Sensor Control > Setting** and set a sensitivity option.



Click or tap to go back to Wi-Fi GO! screen

Click or tap to go back to the previous screen

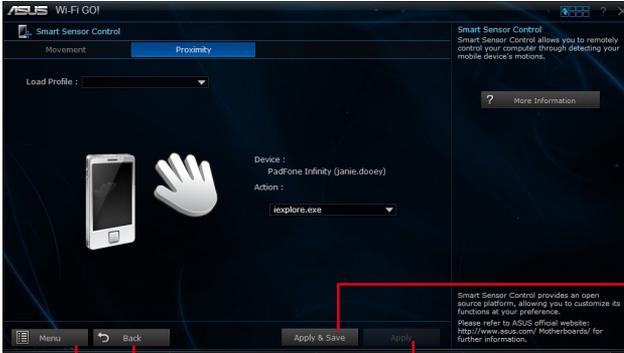
Click or tap to apply the settings

Select actions for each movement gesture
Click or tap to apply and save the settings as a profile

4. In the **Proximity** tab, select an action from the **Action:** field.
5. To save the action as a profile, click or tap **Apply & Save**. To apply the action without saving as a profile, click or tap **Apply**.



Your smart device must have a proximity sensor function to support this feature.



Click or tap to go back to Wi-Fi GO! screen

Click or tap to go back to the previous screen

Click or tap to apply the settings

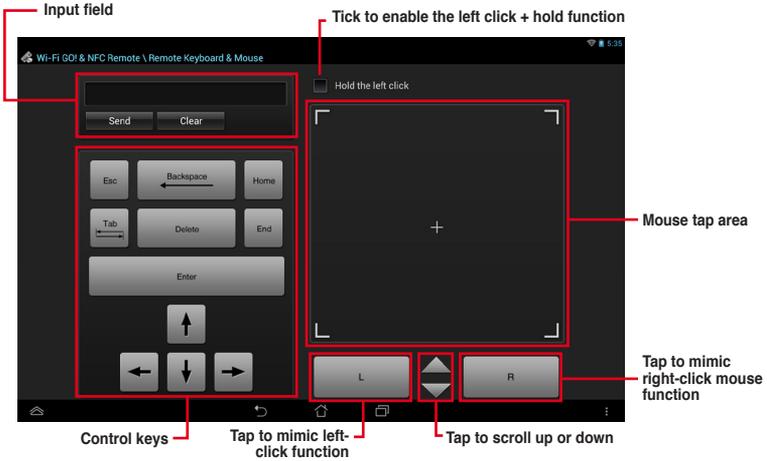
Click or tap to apply and save the settings as a profile

Remote Keyboard & Mouse

Remote Keyboard & Mouse allows you to use your smart device's touch panel as a remote keyboard and mouse for your computer.

Using Remote Keyboard & Mouse

To use Keyboard & Mouse, tap **Keyboard & Mouse** in your smart device then tap **Enter**.



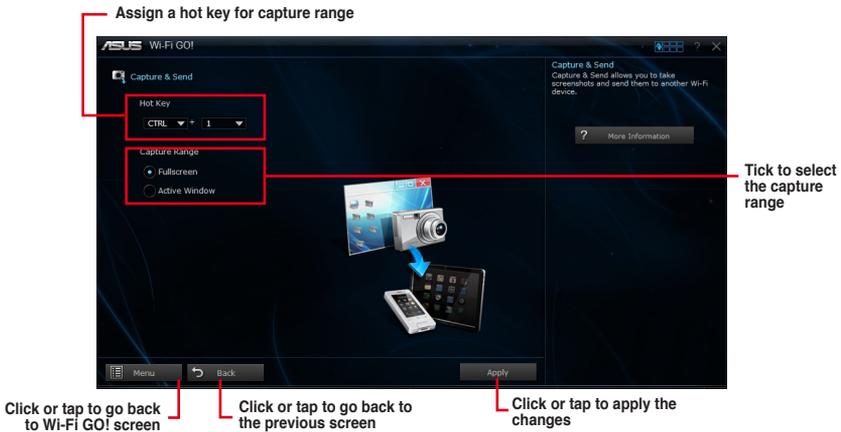
Capture & Send

Capture & Send allows you to take screenshots on your computer and send them to your smart device.

Using Capture & Send

To use Capture & Send:

1. On your computer, click or tap **Capture & Send > Setting**.
2. Assign a hot key and the capture range, then click or tap **Apply**.

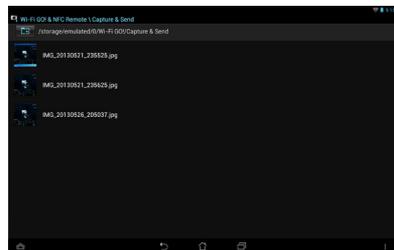


3. Capture the screenshot using the configured hot key, then tap **OK**.



Ensure to enable the Capture & Send feature in your smart device. To do this, tap **Capture & Send** then tap **Enable**.

4. In your smart device, tap **Capture & Send** then tap **Enter**.
5. Tap the file then select an app that you want to open the file with.



4.4.7 EZ Update

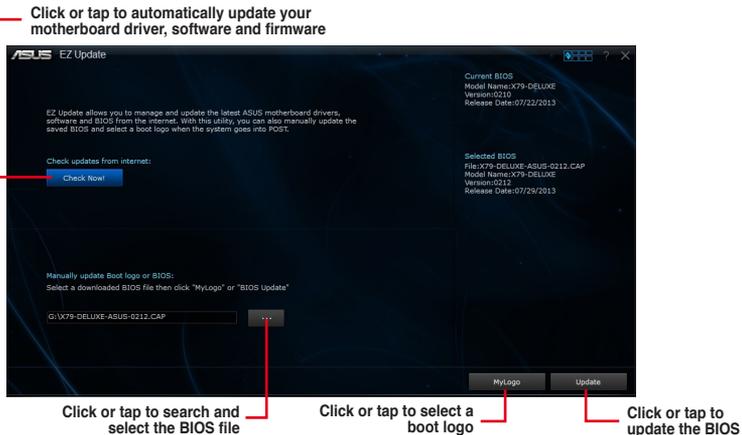
EZ Update is a utility that allows you to automatically update your motherboard's software, drivers and BIOS easily.

With this utility, you can also manually update the BIOS and select the boot logo that displays during POST.

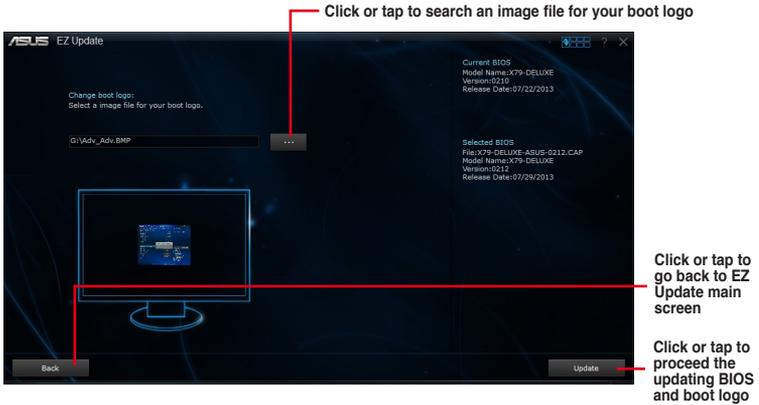
Launching EZ Update

To launch EZ Update, click or tap  on the top-right corner of the AI Suite 3 main menu, then select **EZ Update**.

Using EZ Update



Manually update the BIOS and selecting a boot logo



After you click or tap **BIOS Update** button, click or tap **Flash** to update the BIOS and upload the boot logo in your system.

4.4.8 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

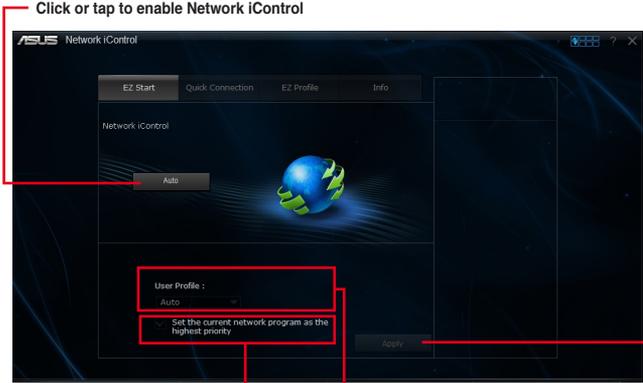
To launch Network iControl, click or tap  on the top-right corner of the AI Suite 3 main menu, then select **Network iControl**.



- Ensure to install the LAN drivers before using this utility.
- Network iControl only supports the onboard LAN.
- The **Quick Connection**, **EZ Profile**, and **Info** tabs are disabled when the Network iControl is off.

Using Network iControl

EZ Start screen



The screenshot shows the ASUS Network iControl interface. At the top, there are tabs for 'EZ Start', 'Quick Connection', 'EZ Profile', and 'Info'. The 'EZ Start' tab is active. In the center, there is a 'Network iControl' section with a 'Auto' button and a globe icon with green arrows. Below this, there is a 'User Profile' section with a dropdown menu set to 'Auto' and a checkbox labeled 'Set the current network program as the highest priority'. An 'Apply' button is located at the bottom right. Red lines and text boxes provide instructions: 'Click or tap to enable Network iControl' points to the 'Auto' button; 'Click or tap to select a profile' points to the 'User Profile' dropdown; 'Set the current network program as the highest priority' points to the checkbox; and 'Click or tap to apply the changes' points to the 'Apply' button.

Click or tap to enable Network iControl

Click or tap to select a profile

Set the current network program as the highest priority

Click or tap to apply the changes

Tick to set the current network program as the highest priority

Quick Connection screen

Click or tap to turn No Delay TCP on or off



EZ Profile screen

Click or tap to select a network profile

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



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

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

Select a program from this list then click or tap to add to your network profile

4.3.9 ASUS SSD Caching II

ASUS SSD Caching II uses installed SSDs for multi-caching of frequently accessed data or applications. It combines multiple SSDs' performance and hard-drive capacity to boost the system's overall performance.

Launching ASUS SSD Caching II

To launch ASUS SSD Caching II, click or tap  on the top-right corner of the AI Suite 3 main menu, then select **ASUS SSD Caching II**.

Using ASUS SSD Caching II



Before using ASUS SSD Caching II utility, ensure that your HDDs and SSDs are connected to the Marvell® SATA ports. Refer to **1.2 Motherboard layout** for the location of the Marvell® SATA ports.

Enabling the SSD Caching

Tick the SSDs to cache with the selected HDD



Click or tap the arrow keys that points to the HDD for caching

Disabling the SSD Caching



Click or tap this button to disable the caching

4.4.10 System Information

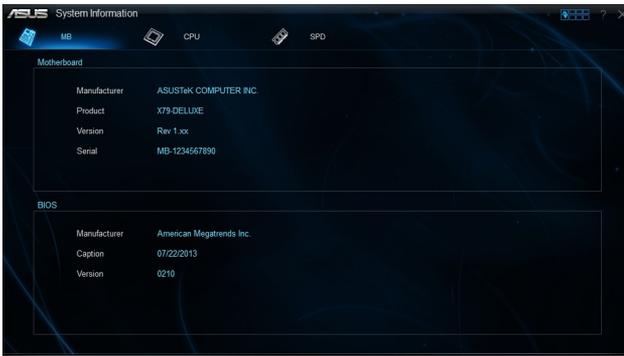
This utility allows you get the detailed information of the motherboard, CPU, and memory settings.

Launching the System Information

To launch System Information, click or tap  on the top-right corner of the AI Suite 3 main menu, then select **System Information**.

Viewing the motherboard information

Click or tap the **MB** tab to view the motherboard's information.



Viewing the CPU information

Click or tap the **CPU** tab to view the processor's information.



Viewing the SPD information

Click or tap the **SPD** tab to view the memory's information.



4.5 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



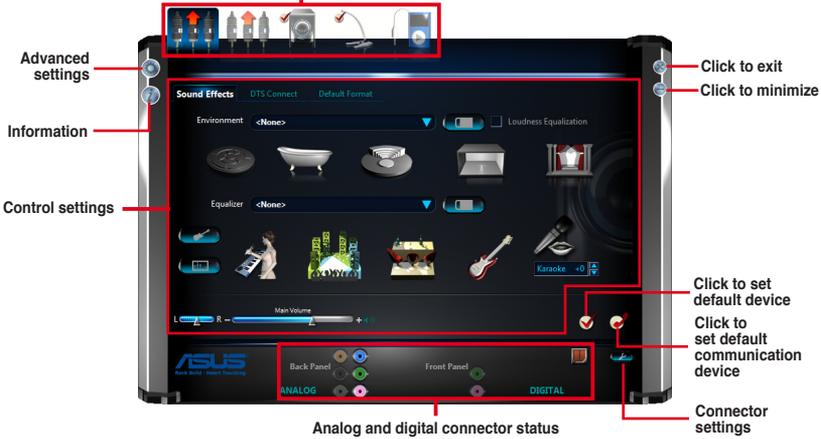
B. Realtek® HD Audio Manager with DTS UltraPC II for Windows® 8 / Windows® 7

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)



- Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.
- To play Blu-Ray™ disc, make sure to use an HDCP compliant monitor.

RAID support

5

5.1 RAID configurations

The motherboard supports the following SATA RAID solutions:

Intel® Rapid Storage Technology with RAID 0, RAID 1, RAID 10 and RAID 5 support.

Marvell® RAID utility with RAID 0 and RAID 1 support.



If you want to install a Windows® operating system to a hard disk drive included in a RAID set, you have to create a RAID driver disk and load the RAID driver during OS installation. Refer to section 5.2 **Creating a RAID driver disk** for details.

5.1.1 RAID definitions

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

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

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

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

5.1.2 Installing Serial ATA hard disks

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

To install the SATA hard disks for a RAID configuration:

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

5.1.3 Setting the RAID item in BIOS

You must enable the RAID function in the BIOS Setup before creating RAID sets using SATA HDDs. To do this:

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



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



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

5.1.4 Intel® Rapid Storage Technology Option ROM utility

To enter the Intel® Rapid Storage Technology Option ROM utility:

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

```
Intel(R) Rapid Storage Technology - Option ROM - v10.5.1.1070
Copyright(C) 2003-10 Intel Corporation. All Rights Reserved.

[ MAIN MENU ]
1. Create RAID Volume      4. Recovery Volume Options
2. Delete RAID Volume     5. Acceleration Options
3. Reset Disks to Non-RAID 6. Exit

[ DISK/VOLUME INFORMATION ]

RAID Volumes:
None defined.

Physical Devices:
Port Device Model      Serial #      Size  Type/Status (Vol ID)
0  ST3160812AS         9LS0HJA4    149.0GB Non-RAID Disk
1  ST3160812AS         9LS0F4HL    149.0GB Non-RAID Disk
2  ST3160812AS         3LS0JYL8    149.0GB Non-RAID Disk
3  ST3160812AS         9LS0BJ5H    149.0GB Non-RAID Disk

[↑↓]-Select      [ESC]-Exit      [ENTER]-Select Menu
```

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



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

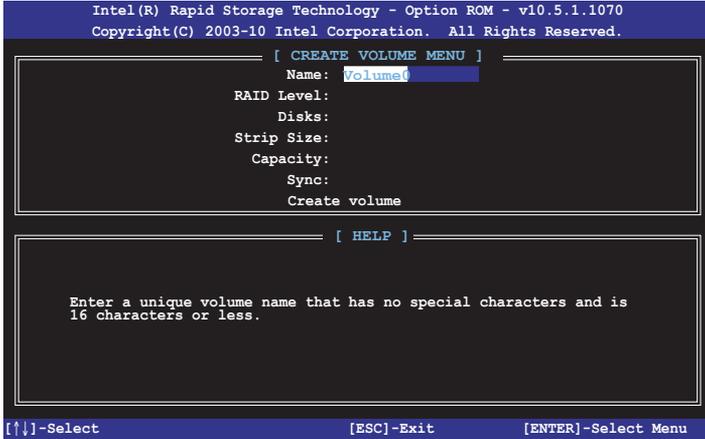


The utility supports maximum four hard disk drives for RAID configuration.

Creating a RAID set

To create a RAID set:

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



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



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



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

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

WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST
Are you sure you want to create this volume? (Y/N) :

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

Deleting a RAID set



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

To delete a RAID set:

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

```
[ DELETE VOLUME MENU ]
Name      Level      Drives  Capacity  Status  Bootable
Volume0   RAID0 (Stripe)  2       298.0GB   Normal  Yes

[ HELP ]

Deleting a volume will reset the disks to non-RAID.

WARNING: ALL DISK DATA WILL BE DELETED.
(This does not apply to Recovery volumes)

[↑/↓]-Select      [ESC]-Previous Menu  [DEL]-Delete Volume
```

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

```
[ DELETE VOLUME VERIFICATION ]

ALL DATA IN THE VOLUME WILL BE LOST!
(This does not apply to Recovery volumes)

Are you sure you want to delete volume "Volume0"? (Y/N):
```

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

Exiting the Intel® Rapid Storage Technology Option ROM utility

To exit the utility:

1. From the utility main menu, select **5. Exit**, then press <Enter>. The following warning message appears:



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

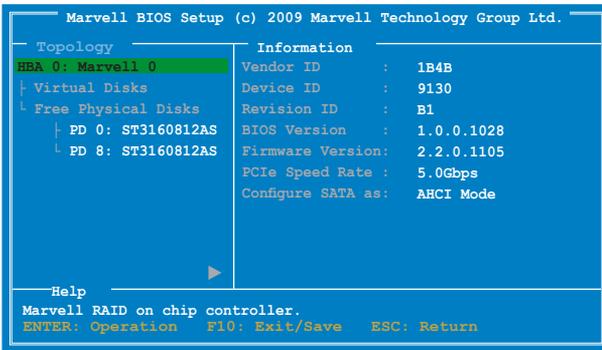
5.1.5 Marvell RAID utility

The onboard Marvell SATA 6.0 Gb/s controller allows you to create a RAID 0 or RAID 1 array using two SATA hard disk drives. Refer to the section **1.2 Motherboard overview** in your motherboard user manual for the exact location of the Marvell SATA 6.0 Gb/s connector.

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

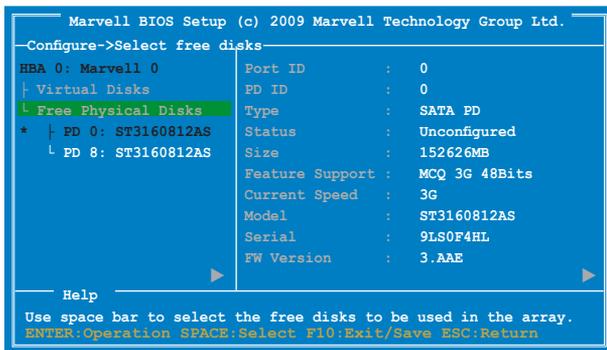


All existing data on the hard disk drives will be erased when creating or deleting a RAID array. Ensure that you have back up all your data in your hard disk drives before making any change to the drive status.

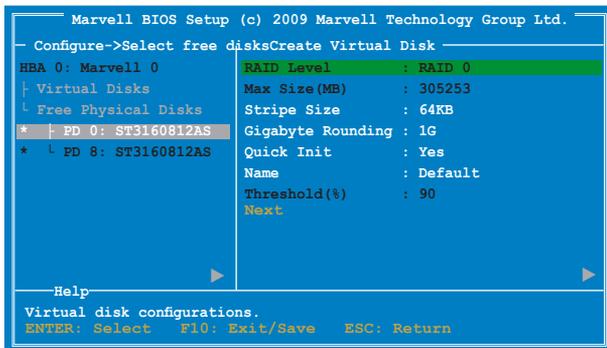


Create a RAID Array

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



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



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

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

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

Configuration options: [32K] [64K]

Gigabyte Rounding: In the event of a single physical disk failure in a RAID 1 virtual disk, Gigabyte Rounding allows the replacement physical disk to be of a size slightly smaller than the existing physical disk. The capacity of the rebuilt virtual disk equals to the size of the smaller physical disk included in the RAID 1 array. The configuration options represent the tolerance value of drive capacity difference.

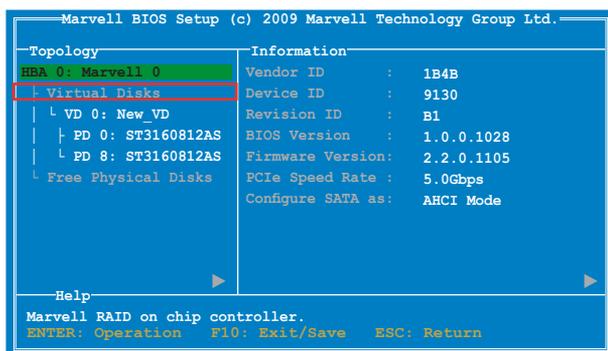
Configuration options: [None] [1G] [10G]

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

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



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



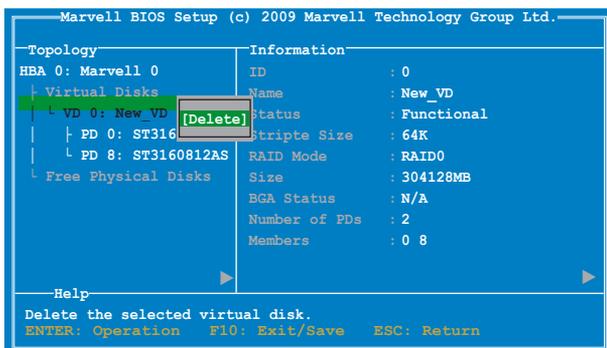
- Press <F10>. The following warning message appears:



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

Delete an existing RAID Array

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



- The following warning message appears:



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



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

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



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

5.2 Creating a RAID driver disk

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



The motherboard does not provide a floppy drive connector. You have to use a USB floppy disk drive when creating a SATA RAID driver disk.

5.2.1 Creating a RAID driver disk without entering the OS

To create a RAID driver disk without entering the OS:

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

5.2.2 Creating a RAID driver disk in Windows®

To create a RAID driver disk in Windows®:

1. Start Windows®.
2. Plug the USB floppy disk drive and insert a floppy disk.
3. Place the motherboard support DVD into the optical drive.
4. Go to the **Intel AHCI/RAID Driver** menu then click **Intel AHCI/RAID Driver path** to open the RAID driver folder.
5. Select **32bit** or **64bit** folder depending on your operating system. Copy the files of the selected folder to the root path of your USB floppy disk drive.



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

5.2.3 Installing the RAID driver during Windows® OS installation

To install the RAID driver for Windows® 7:

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



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



To set up a Windows® UEFI operating system under RAID mode, ensure to load the UEFI driver for your optical drive.

Appendices

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.
- 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.

IC: Canadian Compliance Statement

Complies with the Canadian ICES-003 Class B specifications. This device complies with RSS 210 of Industry Canada. This Class B device meets all the requirements of the Canadian interference-causing equipment regulations.

This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada. Cet appareil numérique de la Classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Cet appareil est conforme aux normes CNR exemptes de licence d'Industrie Canada. Le fonctionnement est soumis aux deux conditions suivantes :

- (1) cet appareil ne doit pas provoquer d'interférences et
- (2) cet appareil doit accepter toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité de l'appareil.

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.

VCCI: Japan Compliance Statement

VCCI Class B Statement

情報処理装置等電波障害自主規制について

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は家庭環境で使用されることを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

KC: Korea Warning Statement

B급 기기 (가정용 방송통신기자재)

이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

*당해 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다.

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.

ASUS Recycling/Takeback Services

ASUS recycling and takeback programs come from our commitment to the highest standards for protecting our environment. We believe in providing solutions for you to be able to responsibly recycle our products, batteries, other components as well as the packaging materials. Please go to <http://csr.asus.com/english/Takeback.htm> for detailed recycling information in different regions.

RF Equipment Notices

CE: European Community Compliance Statement

The equipment complies with the RF Exposure Requirement 1999/519/EC, Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0–300 GHz). This wireless device complies with the R&TTE Directive.

Wireless Radio Use

This device is restricted to indoor use when operating in the 5.15 to 5.25 GHz frequency band.

Exposure to Radio Frequency Energy

The radiated output power of the Wi-Fi technology is below the FCC radio frequency exposure limits. Nevertheless, it is advised to use the wireless equipment in such a manner that the potential for human contact during normal operation is minimized.

FCC Bluetooth Wireless Compliance

The antenna used with this transmitter must not be colocated or operated in conjunction with any other antenna or transmitter subject to the conditions of the FCC Grant.

Bluetooth Industry Canada Statement

This Class B device meets all requirements of the Canadian interference-causing equipment regulations.

Cet appareil numérique de la Class B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

NCC: Taiwan Wireless Statement

無線設備的警告聲明

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更射頻、加大功率或變更原設計之特性及功能。低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信指依電信法規定作業之無線通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

於 5.25GHz 至 5.35GHz 區域內操作之
無線設備的警告聲明

工作頻率 5.250 ~ 5.350GHz 該頻段限於室內使用。

Japan RF Equipment Statement

この製品は、周波数帯域5.15~5.35GHzで動作しているときは、屋内においてのみ使用可能です。

KC (RF Equipment)

대한민국 규정 및 준수

방통위고시에 따른 고지사항

해당 무선설비는 운용 중 전파혼신 가능성이 있음,

이 기기는 인명안전과 관련된 서비스에 사용할 수 없습니다.

ASUS contact information

ASUSTeK COMPUTER INC.

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Technical Support

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ASUS COMPUTER INTERNATIONAL (America)

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ASUS COMPUTER GmbH (Germany and Austria)

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Online contact	www.asus.de/sales

Technical Support

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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 : X79-DELUXE

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 : Aug. 13, 2013

Ver. 1.2(2001)

EC Declaration of Conformity



We, the undersigned,

Manufacturer: **ASUSTEK COMPUTER INC.**

Address, City: **4F, No. 150, LITE RIG, REITOU, 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 : **X79-DELUXE**

conform with the essential requirements of the following directives:

- 2004/108/EC-EMC Directive**
 - EN 55022:2010
 - EN 61000-3-2:2006+A2:2009
 - EN 55013:2001+A1:2003+A2:2006
- 1999/5/EC-R&TTE Directive**
 - EN 300 328 V1.7.1 (2006-10)
 - EN 300 440-2 V1.4 (2010-08)
 - EN 300 440-3 V1.4 (2010-08)
 - EN 301 511 V9.0.2 (2003-03)
 - EN 301 488-7 V1.3 (2005-11)
 - EN 301 908-1 V5.2 (2011-05)
 - EN 301 885 V1.1 (2011-07)
 - EN 301 885 V1.2 (2011-07)
 - EN 302 544-2 V1.1 (2009-01)
 - EN 302 693 V1.1 (2009-01)
 - EN 302 328-3 V1.3 (2007-09)
 - EN 302 328-2 V1.2 (2007-09)
 - EN 302 328-1 V1.1 (2007-09)
 - EN 62302:2010
 - EN 55085:2002
 - EN 62311:2008
- 2006/59/EC-LVD Directive**
 - EN 60950-1/A12:2011
 - EN 60950:2002/A12:2011

- 2009/25/EC-EP Directive**
 - Regulation (EC) No. 1275/2008
 - Regulation (EC) No. 642/2009
- 2011/65/EU-ROHS Directive**

Ver. 10/2008



(EC conformity marking)

Position : **CEO**
 Name : **Jerry Shen**

Signature :

Declaration Date: **13/08/2013**
 Year to begin affixing CE marking: **2013**