RAMPAGE IV BLACK EDITION

Motherboard

E8670
First Edition
October 2013

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Contents

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 websites**

    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 (+).

RAMPAGE IV BLACK EDITION specifications summary

CPU	Intel® Core™ i7 Processors for LGA 2011 socket Support 22nm CPU Intel® Turbo Boost Technology 2.0 *** Refer to www.asus.com for Intel CPU support list.** **** The Intel® Turbo Boost Technology 2.0 support depends on the CPU types.**
Chipset	Intel® X79 Express Chipset
Memory	8 x DIMM, max. 64GB, DDR3 2800(O.C.)/2666(O.C.)/2400(O.C.)/2133(O.C.)/1866/1600/1333/1066 MHz, non-ECC, un-buffered memory Supports Intel® Extreme Memory Profile (XMP) *** Hyper DIMM support is subject to the physical characteristics of individual CPUs.** **** Due to CPU behavior, DDR3 2200/2000/1800 MHz memory module will run at DDR3 2133/1866/1600 MHz frequency as default.** ***** Please refer to Memory QVL (Qualified Vendors List) for details.**
Expansion Slots	4 x PCIe3.0 x16 slots, support x16; x16/x16; x16/x8/x16 and x16/x8/x8/x8 configurations 2 x PCIe2.0 x1 slots *** This motherboard is ready to support PCIe 3.0 SPEC. Functions will be available when using PCIe 3.0-compliant devices. Please refer to www.asus.com for updated details.**
Multi-GPU Technology	4-Way/ 3-Way/ Quad-GPU NVIDIA® SLI™ Technology AMD CrossFireX™ Technology
Storage	**Intel® X79 Express Chipset:** - 2 x SATA 6.0 Gb/s ports (gray) - 4 x SATA 3.0 Gb/s ports (black) - Intel® Rapid Storage Technology supports RAID 0, 1, 5, and 10 **ASMedia® SATA 6.0 Gb/s controller:** - 2 x External SATA 6.0 Gb/s ports - 4 x SATA 6.0 Gb/s ports (gray)
LAN	Intel® Gigabit Ethernet LAN
SupremeFX High Definition Audio	**ROG SupremeFX Black 8-Channel High Definition Audio CODEC** - SupremeFX Shielding Technology: Red Line PCB shielding, PCB dedicated audio layer and EMI protection cover - Cirrus Logic® CS4398 DAC: 120dB SNR, -107dB THD+N (Max. 192kHz/ 24-bit) - Texas Instruments® TPA6120A2 600ohm headphone amplifier - WIMA® film capacitors - ELNA® premium audio capacitors - NEC TOKIN UC2 audio relay - High-fidelity audio operational amplifiers (OP-AMPs) - Differential circuit design - Content protection for full bitrate lossless DVD Audio, Blu-ray DVD, and HD-DVD audio content playback - Jack-detection and multi-streaming - Optical S/PDIF out port at back panel - Sonic Radar - DTS Connect

(continued on the next page)

Wireless	Wi-Fi 802.11 a/b/g/n/ac supports dual band frequency 2.4/5 GHz Bluetooth V4.0
USB	**Intel® X79 Chipset:** - 10 x USB 2.0/1.1 ports (6 ports at mid-board*, 3 ports at back panel, 1 port reserved for ROG Connect) * **2 x USB2.0 ports at mid-board shares with ROG extension (ROG_EXT) port.** **ASMedia® USB 3.0 SuperSpeed USB HUB Controller:** - 8 x USB 3.0/2.0 ports (6 at back panel, 2 at mid-board)
ROG Exclusive Features	**ROG Extreme OC kit** - Slow Mode - LN2 Mode - PCIe x16 Lane switch - EZ Plug **ROG Connect** - RC Poster - RC Remote - RC Diagram **ROG Extreme Engine Digi+ III** - 8 phase CPU power - 3 phase VCCSA power - 2+2 phase DRAM power - NexFET™ Power Block MOSFET - 60A chokes - 10K Black Metallic Capacitors **UEFI BIOS features** - ROG BIOS Print - GPU.DIMM Post - Extreme Tweaker - Tweakers' Paradise (CPU/Memory/PCH) - ROG SSD Secure Erase - O.C. Profile - ROG Pulse **CPU Level Up** **ProbeIt** **ROG RAMDisk**

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Special Features	**ASUS Dual Intelligent Processors 4** - 4-Way Optimization Tuning Key, consolidating DIGI+ Power Control, TPU, EPU, and Fan Xpert 2 **ASUS Wi-Fi GO!** **Overclocking Protection** - COP EX (Component Overheat Protection - EX) - ASUS C.P.R.(CPU Parameter Recall) **ASUS Exclusive Features** - MemOK! - Onboard Switches: Power/Reset/Clr CMOS (at rear) - AI Suite 3 - USB 3.0 Boost - USB Charger+ - AI Charger+ - Disk Unlocker **ASUS EZ DIY** - USB BIOS Flashback - ASUS CrashFree BIOS 3 - ASUS EZ Flash 2 **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
Back Panel I/O Ports	1 x PS/2 keyboard/mouse combo port 1 x Clear CMOS button 1 x ROG Connect button 2 x External SATA 6.0 Gb/s ports 1 x LAN (RJ45) port 6 x USB 3.0/2.0 Ports (blue) 4 x USB 2.0/1.1 ports (1 port also for ROG Connect) 1 x ASUS Wi-Fi GO! module (Wi-Fi 802.11 a/b/g/n/ac and Bluetooth v4.0) 1 x Optical S/PDIF out 5 x Audio jacks

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Internal I/O Connectors	1 x USB 3.0 connectors supports additional 2 USB 3.0 ports 3 x USB 2.0 connectors supports additional 6 USB 2.0 ports [one connector via ROG_EXT header] 6 x SATA 6.0 Gb/s connectors (gray) 4 x SATA 3.0 Gb/s connectors (black) 1 x ROG extension (ROG_EXT) header 8 x 4-pin Fan connectors: 2 x CPU / 3 x Chassis / 3 x Optional 11 x ProbeIt Measurement points 3 x Thermal sensor connectors 1 x SPDIF_Out header 1 x 24-pin EATX Power connector 1 x 8-pin ATX 12V Power connector 1 x 4-pin ATX 12V power connector 1 x LN2 Mode header 1 x Slow Mode switch 1 x START (Power On) button 1 x RESET button 1 x EZ Plug connector(s) (4-pin Molex power connector) 1 x MemOK! button 1 x BIOS Switch button 1 x Audio front panel (AAFP) 1 x System panel connector 1 x TPM connector 1 x DirectKey button 1 x DRCT (DirectKey) header
BIOS Features	2 x 64Mb UEFI AMI BIOS, PnP, DMI2.7, WfM2.0, SM BIOS 2.7, ACPI5.0a Multi-Language BIOS
Manageability	WfM2.0, DMI2.7, WOL by PME, PXE
Software	**Support DVD** - Drivers and Applications - Daemon Tool Pro Standard - Kaspersky Anti-Virus - ROG CPU-Z - ROG Mem TweakIt - ROG RAMDisk - ASUS Utilities - ASUS WebStorage
Operating Systems Support	Windows® 7, Windows® 8 , Windows® 8.1
Form Factor	Extended ATX Form Factor, 12-inch x 10.7-inch (30.5cm x 27.2 cm)

*Specifications are subject to change without notice.

OC Panel specifications summary

Display	2.6-inch LCM
Features	Pure hardware-based overclocking support
	Boot debug POST code
	Intuitive tuning in two OC modes - EXTREME Mode for subzero OC benching - NORMAL Mode for in-chassis usage
	Seamless integration with CPU Level Up at one-click OC button
	Real-time control and display CPU fan speed, temperature, BCLK and RATIO
	Adjustable system voltages, frequencies on-the-fly
	Stylish design with 90 plus-degree-tilt movable faceplate (EXTREME Mode)
	FanSpeed Control button - Standard/Silent/Turbo mode
	Four (4) additional 4-pin fan headers
	LCM backlight on/off
	ROG exclusive features - VGA Hotwire - Subzero Sense - Slow Mode - Pause Switch - VGA SMB header - ProbeIt
I/O Ports	POWER : 1 x SATA power connector ROG_EXT port : 1 x 18-1 pin data connection port FAN : 4 x 4-pin extra Fan connectors
Power	Voltage : +12V, +5V, +5VSB Power consumption : 5A
Installation Requirements	1 x 5.25-inch drive bay required for NORMAL Mode installation 1 x SATA power cable from system power supply
Compatibility	RAMPAGE IV BLACK EDITION and other motherboards with ROG_EXT port ***Visit the ASUS website at www.asus.com for the latest motherboard support/compatibility lists.** ****Please install the latest utility/firmware (ROG Connect Plus) for better compatibility.** *****Update the motherboard BIOS to the latest version for better compatibility with OC Panel.**

Package contents

Check your motherboard package for the following items.

Motherboard	ROG RAMPAGE IV BLACK EDITION
Cables	1 x ROG Connect cable
	2 x 2-in-1 SATA 3.0 Gb/s signal cables
	3 x 2-in-1 SATA 6.0 Gb/s signal cables
	1 x SLI® cable
	1 x CrossFire™ cable
Accessories	1 x I/O Shield
	OC Panel Kit - 1 x OC Panel - 1 x OC Panel 5.25-inch drive bay metal case - 1 x OC Panel cable - 1 x set of screws
	1 x 2T2R dual-band Wi-Fi moving antennas
	1 x ROG Magnet
	1 x 2-in-1 ASUS Q-Connector Kit
	1 x 12-in-1 ROG Cable label
	1 x X-Socket pad
	1 x 4-WAY SLI® bridge
	1 x 3-WAY SLI® bridge
Application DVD	ROG motherboard support DVD
Documentation	User's manual

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

Installation tools and components
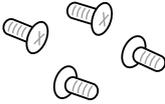
1 set of screws	**Philips (cross) screwdriver**
PC chassis	**Power supply unit**
Intel LGA 2011 CPU	**Intel LGA 2011 compatible CPU Fan**
DDR3 DIMM	**SATA hard disk drive**
Graphics card	**SATA optical disc drive (optional)**
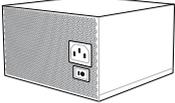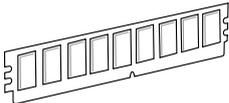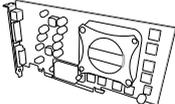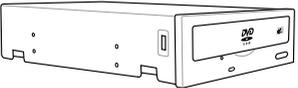
The tools and components in the table above are not included in the motherboard package.

Product introduction

1

1.1 Special features

1.1.1 Product highlights

LGA2011 socket for Intel® Core™ i7 processor family

This motherboard supports Intel® Core™ i7 processor family in the LGA2011 package and supports both the Sandy Bridge-E and the Ivy Bridge-E processors. 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 the 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/4-way/Quad-GPU SLI™ and 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.)/ 2666 (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.)/ 2666(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   ROG Unique Gaming Features

SupremeFX Black

SupremeFX Black delivers premium audio quality without a separate audio card. SupremeFX Shielding Technology using physical PCB isolation, grounding separation, and EMI cover shielding combined with premium components such as ELNA audio capacitors and German-made WIMA Film capacitors result in audiophile level audio performance. Lossless audio quality is ensured thanks to a new front-panel headphone DAC that delivers up to 120dB SNR. Enhanced with a 600 Ohm headphone amplifier, every sound detail is boosted to maximum clarity and audibility.

Sonic Radar

Sonic awareness can make or break online combat, so we've developed a stealthy overlay that shows you what opponents and teammates are up to. Gunshots, footsteps, and call outs appear with precise directioning on the on-screen radar, which gives you the advantage of better intelligence and avoiding sneaky opponent surprises. Even snipers can't get away that easy! Plus, it integrates Enhancer, which has four pre-set equalizer bands optimized to FPS games you can select to best-suit your gameplay preferences, leading to games that always sound better, clearer, and more real.

GameFirst II

Offering powerful, yet easy-to-use network control, ROG GameFirst II with cFos Traffic Shaping technology is revamped with a more intuitive ROG user interface. Featuring both an exclusive EZ Mode for beginners to setup and Advanced Mode for professional users to tweak, it means whatever your PC does in the background; your fragging will always come first!

Intel Gigabit LAN

The LAN solution from Intel has been long known to have a better throughput, lower CPU utilization as well as better stability. With the Intel Gigabit LAN solutions onboard, the ultimate network experience can therefore be delivered to its users like never before.

1.1.3   ROG exclusive features

Extreme Engine Digi+ III

Extreme Engine Digi+ III offers you a hardcore power delivery for a challenging and extreme gaming enjoyment. It utilizes the best components such as NexFET™ Power Block MOSFETs, 60A chokes, and super-premium 10K black metallic solid state capacitors. The NexFET™ Power Block MOSFETs combine great durability and up to 90% efficiency under normal operation. 60A chokes can handle as much as 60A of power, which is twice that of generic chokes. Super-premium 10K Black Metallic solid state capacitors are forged for overclocking and the most extreme demands, lasting up to five times longer than generic capacitors with 20% wider temperature tolerance.

iROG

The iROG is a special IC that fully maximizes ROG's unique functions, providing you with full control of your motherboard at any stage. It greatly increases your overclocking enjoyment, and offers you with advanced system control and management features purely at a hardware level.

RAMDisk

RAMDisk reserves part of system memory and turns it into actual storage, so you can place favorite app and game cache files in it to enjoy high-speed RAM performance while accessing them. Plus, this extends SSD lifespan and keeps your main storage optimized for really important tasks, and you get auto data backup and restore.

> **NOTE:** RAMDisk only supports 64-bit operating systems.

CPU Level Up

With ROG's CPU Level Up, overclocking has never been so easy, or cost-free. Simply select the processor that you want to overclock to, and the motherboard will do the rest.

ROG Connect

ROG Connect allows you to monitor the status of your desktop PC and tweak its parameters in real-time via a notebook. ROG Connect links your main system to a notebook through a USB cable, allowing you to view real-time POST code and hardware status readouts on your notebook, as well as make on-the-fly parameter adjustments at a purely hardware level.

Chapter 1

GPU.DIMM Post

GPU.DIMM Post enables you to catch potential problems even before you enter the OS, saving you valuable time in detecting component failure under extreme conditions. With GPU. DIMM Post, quickly and easily check your graphic cards, memory modules' statuses in the BIOS, and overclocking settings.

BIOS Print

ROG offers a whole new UEFI BIOS feature to handle the demands of an overclocking experience. The motherboard features ROG BIOS Print that allows you to easily share your BIOS settings to others with the press of a button.

ProbeIt

This motherboard consists of eleven (11) ProbeIt measurement points that helps you detect your system's current voltage. With the use of a multimeter device, these points can help measure your system's important system voltages.

Extreme Tweaker

Extreme Tweaker is the one stop shop to fine-tune your system to optimal performance. With Extreme Tweaker, you can adjust the system settings such as frequency, over-voltage, memory timing, and more.

Loadline Calibration

Maintaining ample voltage support for the CPU is critical during overclocking. The Loadline Calibration ensures stable and optimal CPU voltage under heavy loading. It helps overclockers enjoy the motherboard's ultimate OC capabilities and benchmark scores.

OC Panel

Overclocking made easier than ever! No more messing with the BIOS, OS, or software utilities. OC Panel is the next step in dedicated direct tweaking. It works inside the case or as an external console, and features normal mode with info covering CPU temp, ratio, base clock, and CPU fan speed. With one press of the CPU Level Up button you can instantly apply custom profiles designed by the world's leading overclockers, while FanSpeed Control modifies blower RPMs. In extreme mode, some of the most commonly used voltage tuning settings are offered, along with Subzero Sense and VGA Hotwire, giving you field access to super-cool liquid thermal temp readings and streamlined hardware-level GPU overvolting.

1.1.4   ASUS special features

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 fan speed control, voltage and sensor readings. This all-in-one software offers diverse and ease to use functions, with no need to switch back and forth between different utilities.

USB BIOS FlashBack

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

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 HDTV devices, remotely control and access your computer using your mobile device, and easily transfer files between your computer and mobile 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 an HDTV device.
*   **Remote Desktop:** Allows you to view your computer's desktop and remotely operate your computer in real-time from your mobile device.
*   **Remote Keyboard and Mouse:** Allows you to use your mobile device's touch panel as a remote keyboard and mouse for your computer.
*   **Smart Motion Control:** Allows you to remotely control your computer using your mobile device's customized gestures.
*   **File Transfer:** Allows you to transfer files between your computer and mobile device.
*   **Capture and Send:** Allows you to take screenshots and send them to a mobile device.

1.1.5   ROG rich-bundled software

Kaspersky® Anti-Virus

Kaspersky® Anti-Virus Personal offers premium antivirus protection for individual users and home offices. It is based on advanced antivirus technologies. The product incorporates the Kaspersky® Anti-Virus engine, which is renowned for malicious program detection rates that are among the industry's highest.

DAEMON Tools Pro Standard

DAEMON Tools Pro offers essential functionality to backup CD, DVD and Blu-ray discs. It converts optical media into virtual discs and emulates devices to work with the virtual copies. DAEMON Tools Pro organizes data, music, video, and photo collections on a PC, notebook, or netbook.

ROG CPU-Z

ROG CPU-Z, authorized by Intel's CPU Identification (CPUID), is a customized ROG utility that allows you to gather information about your system's main components. It gives you the current information and status of your CPU, motherboard, memory, and other main components. Get that ROG look of reporting your system's current information with ROG CPU-Z.

MemTweakIt

MemTweakIt is a DRAM efficiency tool that allows you to fine-tune your DRAM in real time and allows you to post and share your DRAM configuration scores to the ROG website.

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 mult-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.

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

KBMS_USB12
DIGI+ EPU
ROG_CON / CLR_CMOS
USB34_U3_E12
ES6_12_U3_E34
ASM 1061
LAN_USB3_E56
BT4
AUDIO
CHA_FAN3
ASM 1074
Intel 82579V
ASM 1042
Lithium Cell CMOS Power
PCIE_X16_1
ASUS
PCIE_X8_2
RAMPAGE IV BLACK EDITION
ASM 1042
PCIEX1_1
PCIE_X16/X8_3
PCIEX1_2
ASM 1184
iROG
PCIE_X8_4
SPDIF_OUT
AAFP
EZ_PLUG
TPM
USB56
USB78
OPT_TEMP2
OPT_FAN2
CHA_FAN2
DirectKey
CHASSIS
BIOS_SWITCH
ROG_EXT
USB910
BIOS2_LED
PANEL
DRCT

EATX12V_1
EATX12V_2
CPU_FAN
CPU_OPT
OPT_TEMP1
Q_CODE
CPU_FREQ
OPT_FAN3
SLOW_MODE
START
MemOK!
MEMORY_LED
PCIEX16_3SW
RESET
GND VCCORE VSA
VTT PCH_1.1 PCH_1.5 DRAM_AB DRAM_CD GND
BOOT_DEVICE_LED VGA_LED DRAM_LED CPU_LED
OPT_FAN1
OPT_TEMP3
EATXPWR
VTTDDR_CD VTTDDR_AB PCH_G VTTCPU_G
CHA_FAN1
USB3_E78
ASM 1042
HD_LED
Super I/O
SATA3G_1 SATA3G_2
SATA3G_3 SATA3G_4
SATA6G_1 SATA6G_2
Intel X79
ASM 1061
SATA6G_E1 SATA6G_E2
SATA6G_E3 SATA6G_E4
ASM 1061
BIOS1_LED
BIOS1 BIOS2

DDR3 DIMM_A1 (64bit, 240-pin module)
DDR3 DIMM_A2 (64bit, 240-pin module)
DDR3 DIMM_B1 (64bit, 240-pin module)
DDR3 DIMM_B2 (64bit, 240-pin module)
LGA2011
DDR3 DIMM_D2 (64bit, 240-pin module)
DDR3 DIMM_D1 (64bit, 240-pin module)
DDR3 DIMM_C2 (64bit, 240-pin module)
DDR3 DIMM_C1 (64bit, 240-pin module)

Refer to section **1.2.9 Internal connectors** and the section about the **Rear I/O Connection** on **Chapter 2** for more information about the internal connectors and rear panel connectors.

Layout contents

Chapter 1

1.2.3   Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA2011 socket designed for Intel® Core™ i7 Processor Family for the LGA 2011 socket.
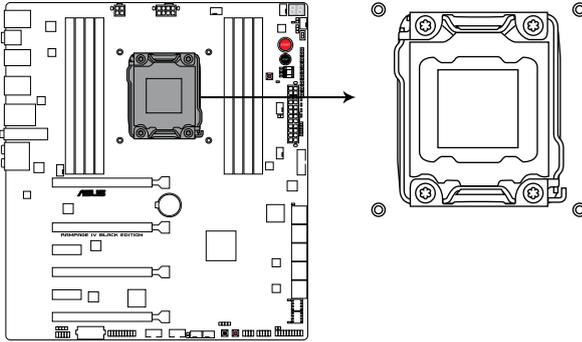
RAMPAGE IV BLACK EDITION CPU LGA2011

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 four Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) slots.

> ⚠️ A DDR3 module is notched differently from a DDR or DDR2 module. DO NOT install a DDR or DDR2 memory module to the DDR3 slot.
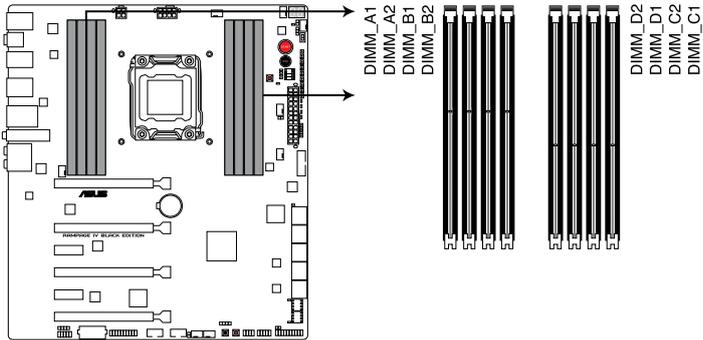
RAMPAGE IV BLACK EDITION 240-pin DDR3 DIMM sockets

DIMM_A1
DIMM_A2
DIMM_B1
DIMM_B2

DIMM_D2
DIMM_D1
DIMM_C2
DIMM_C1

Recommended memory configurations

DIMM_D1

DIMM_B1
DIMM_D1

DIMM_A1
DIMM_B1
DIMM_D1
DIMM_C1

DIMM_A1
DIMM_B1
DIMM_B2
DIMM_D2
DIMM_D1
DIMM_C1

DIMM_A1
DIMM_A2
DIMM_B1
DIMM_B2
DIMM_D2
DIMM_D1
DIMM_C2
DIMM_C1
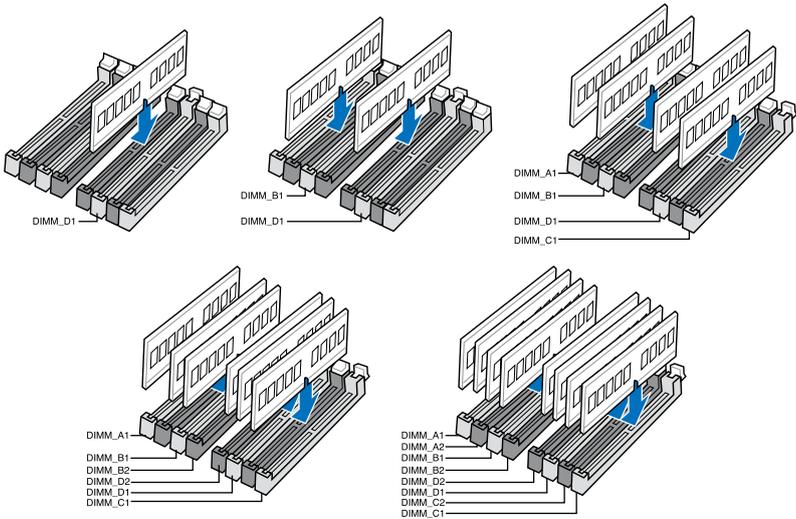
Memory configurations

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 **3.4 Extreme 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.

RAMPAGE IV BLACK EDITION Motherboard Qualified Vendors List (QVL)

DDR3 2800 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
CORSAIR	CMD16GX3M4A2800C12	16GB (4x4GB)	DS	-	-	12-14-14-36	1.65	•			
CORSAIR	CMD16GX3M4A2800C11	16GB (4x4GB)	DS	-	-	11-14-14-35	1.65	•			
G.SKILL	F3-2800C12Q-32GTXDG	32GB (4x8GB)	DS	-	-	12-14-14-35	1.65	•			
G.SKILL	F3-2800C11Q-16GTXDG	16GB (4x4GB)	DS	-	-	11-14-14-35	1.65	•			
ADATA	AX3U2800GW8G12-DG2	32GB (4x8GB)	DS	-	-	12-14-14-36	1.65	•			
ADATA	AX3U2800GW4G12-DG2	16GB (4x4GB)	SS	-	-	12-14-14-36	1.65	•			
AVEXIR	AVD3U28001204G-4CI	16GB (4x4GB)	DS	-	-	12-14-14-35	1.65	•			

DDR3 2666 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
CORSAIR	CMD16GX3M4A2666C10	16GB (4x4GB)	DS	-	-	10-12-12-31	1.65	•			
G.SKILL	F3-2666C10Q-16GTXD	16GB (4x4GB)	DS	-	-	10-12-12-31	1.65	•			
Team	TXD38G2666HC11CBK	32GB (4x8GB)	DS	-	-	11-13-13-35	1.65	•			

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.BAGFL.AFD0C(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	CMY16GX3M2A2400C10A (Ver4.21)(XMP)	16GB (8x2GB)	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	•	•	•	
G.SKILL	F3-19200CL10Q2-64GBZHD (XMP)	64GB (8x8GB)	DS	-	-	10-12-12-31	1.65	•	•	•	
G.SKILL	F3-2400C11Q-32GXM (XMP)	32GB (4x8GB)	DS	-	-	11-13-13-31	1.65	•	•	•	
G.SKILL	F3-19200CL10Q-32GBZHD (XMP)	32GB (4x8GB)	DS	-	-	10-12-12-31	1.65	•			

Chapter 1

DDR3 2400 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
G.SKILL	F3-19200CL11Q-16GBZHD (XMP)	16GB (4x4GB)	DS	-	-	11-11-11-31	1.65	•			
G.SKILL	F3-19200CL9D-4GBPIS (XMP)	4G (2x2G)	DS	-	-	9-11-9-28	1.65	•			
G.SKILL	F3-19200CL9Q-16GBZMD (XMP)	16GB (4x4GB)	DS	-	-	9-11-11-31	1.65	•	•		
GEIL	GET34GB2400C9DC (XMP)	4GB (2x2GB)	DS	-	-	9-11-9-27	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	•	•		
KINGSTON	KHX2400C11D3K4/8GX (XMP)	8GB (4x2GB)	SS	-	-	11-13-11-30	1.65	•	•		
KINGSTON	KHX24C11K4/16X (XMP)	16GB (4x4GB)	DS	-	-	11-13-13-30	1.65		•		
KINGSTON	KHX24C11T2K2/8X (XMP)	8GB (2x4GB)	DS	-	-	-	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	•	•		
Mushkin	997122R (XMP)	16GB (2x8GB)	DS	-	-	2400-10-12-12-28	1.65	•	•		
Silicon Power	SP004GXLYU240NSA (XMP)	4GB	SS	-	-	2400-11-13-13-32	-	•	•		
Team	TXD34G2400HC10QBK (XMP)	8GB (2x4GB)	DS	-	-	10-12-12-31	1.65	•	•		
Transcend	TX2400KLN-8GK (XMP)	8GB (2x4GB)	DS	-	-	2400-11-12-11-29	1.6	•	•	•	

DDR3 2133 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
Apacer	78.BAGE4.AFD0C(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	-		•		
Apacer	AHU04GFB33CAQ3R(XMP)	4GB	DS	-	-	11-13-13-31	-		•		
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	CMZ8GX3M2A2133C11R (Ver4.21)(XMP)	8GB (2x4GB)	DS	-	-	11-11-11-27	1.5		•		
G.SKILL	F3-17000CL11Q2-64GBZLD(XMP)	64GB (8x8GB)	DS	-	-	11-11-11-30	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		•		
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		•		
Team	TLD34G2133HC11ABK(XMP)	8GB (2x4GB)	DS	-	-	11-11-11-31	1.65		•		
Team	TLD38G2133HC11ABK(XMP)	16GB (2x8GB)	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
AEXEA	AXA3ES4GK2000LG28V (XMP)	4GB (2x2GB)	DS	-	-	-	1.65	•			•
Asint	SLA302G08-ML2HB (XMP)	4GB	DS	Hynix	H5TQ2G83BFRH9C	9-9-9-27	-		•		•
GEIL	GUP34GB2000C9DC (XMP)	4GB (2x2GB)	DS	-	-	9-9-9-28	1.65	•			•

Chapter 1

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	AX3U1866XW8G10(XMP)	16GB (2x8GB)	DS	-	-	10-11-10-30	1.5				•
CORSAIR	CMD16GX3M4A1866C9 (Ver4.13)(XMP)	16GB (4x4GB)	DS	-	-	9-10-9-27	1.5		•		
CORSAIR	CMD16GX3M4A1866C9 (Ver8.16)(XMP)	16GB (4x4GB)	DS	-	-	9-10-9-27	1.5		•		•
CORSAIR	CMD32GX3M4A1866C9 (Ver3.24)(XMP)	32GB (4x8GB)	DS	-	-	9-10-9-27	1.5		•		•
CORSAIR	CMD8GX3M2A1866C9 (Ver4.13)(XMP)	8GB (2x4GB)	DS	-	-	-	1.5		•		
CORSAIR	CMT32GX3M4X1866C9 (Ver3.23)(XMP)	32GB (4x8GB)	DS	-	-	9-10-9-27	1.5		•		
CORSAIR	CMY16GX3M2A1866C9 (Ver 4.21)(XMP)	16GB (2x8GB)	DS	-	-	9-10-9-27	1.5		•		•
CORSAIR	CMY8GX3M2A1866C9 (Ver3.24)(XMP)	8GB (2x4GB)	DS	-	-	9-10-9-27	1.5		•		
CORSAIR	CMZ16GX3M2A1866C10 (Ver5.29)(XMP)	16GB (2x8GB)	DS	-	-	10-11-10-30	1.5		•		
CORSAIR	CMZ32GX3M4X1866C10 (Ver3.23)(XMP)	32GB (4x8GB)	DS	-	-	10-11-10-27	1.5		•		
CORSAIR	CMZ8GX3M2A1866C9G (Ver5.12)(XMP)	8GB (2x4GB)	DS	-	-	1866 9-10-9-27	1.5		•		•
Crucial	BLE8G3D1869DE1TX0.16FED(XMP)	16GB (2x8GB)	DS	-	-	1866-9-9-9-27	1.5		•		
Crucial	BLE4G3D1869DE1XT0.16FMD(XMP)	4GB	DS	-	-	9-9-9-27	1.5		•		
G.SKILL	F3-14900CL10Q2-64GBZLD(XMP)	64GB (8x8GB)	DS	-	-	10-11-10-30	1.5		•		
G.SKILL	F3-14900CL10Q-32GBZL(XMP)	32GB (4x8GB)	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-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	F3-14900CL9Q-8GBFLD(XMP)	8GB (2xGB)	DS	-	-	9-9-9-24	1.6		•		
G.SKILL	F3-1866C9Q-32GXM (XMP)	32GB (4xGB)	DS	-	-	9-10-9-28	1.5		•		•
KINGSTON	KHX1866C9D3K2/8GX (XMP)	8GB (2xGB)	DS	-	-	-	1.65		•		•
Team	TED34GM1866C13BK	4GB	DS	Hynix	H5TC2G83EFR	13-13-13-32	1.5		•		•
Team	TED38GM1866C13BK	8GB	DS	Hynix	H5TQ4G83AFR	13-13-13-32	1.5		•		•
Team	TLD34G1866HC9KBK (XMP)	8GB (2xGB)	DS	-	-	9-11-9-27	1.5		•		•
Team	TLD38G1866HC10SBK (XMP)	16GB (2x8GB)	DS	-	-	10-11-10-30	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	AD3U1600W4G11	4GB	SS	A-DATA	3WCD-1211A	11-11-11-28	-		•		
A-DATA	AD3U1600W8G11	8GB	DS	A-DATA	3WCD-1211A	11-11-11-28	-		•		
A-DATA	AX3U1600W8G11	16GB (2x8GB)	DS	-	-	9-11-9-27	1.5		•		•
AMD	AE32G1609U1-U	2GB	SS	AMD	23EY4587MB6H	-	1.5		•		
AMD	AE34G1609U2-U	4GB	DS	AMD	23EY4587MB6H	-	1.5		•		
AMD	AP38G1608U2K(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-28	1.65		•		
Apacer	78.B1GE3.9L10C	4GB	DS	Apacer	AM5D5908DEQSCK	-	1.65		•		
Apacer	78.B1GET.9K00C	4GB	SS	Apacer	AM5D6008BQQSCK	11-11-11-28	-		•		
Apacer	AHU04GFA60C9Q3R (XMP)	4GB	DS	-	-	11-11-11-28	-		•		
Apacer	AHU08GFA60CBT3R (XMP)	8GB	DS	-	-	9-9-9-24	-		•		
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	SLA304G08-ENG1B	4GB	SS	Asint	304G08-GN1B	9-11-11-28	-		•		
Asint	SLB304G08-EGJ1B (XMP)	8GB	DS	-	-	9-9-9-27	-		•		
Asint	SLB304G08-EGN1B	8GB	DS	ASint	304G08-GN1B	-	-				•
Asint	SLZ302G08-EGN1C	2GB	SS	ASint	302G08-GN1C	-	-		•		
AVEXIR	AVD3U16000904G-2CW(XMP)	8GB (2x4GB)	DS	-	-	11-11-11-28	1.5				•
CORSAIR	CMD8GX3M2A1600C8 (Ver5.12)(XMP)	8GB (2x4GB)	DS	-	-	1600 8-8-8-24	1.5		•		
CORSAIR	CMD8GX3M2A1600C9 (Ver2.12)(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.5		•		
CORSAIR	CML16GX3M2A1600C10 (Ver2.21)(XMP)	16GB (2x8GB)	DS	-	-	10-10-10-27	1.5		•		
CORSAIR	CML8GX3M2A1600C9 (Ver7.12)(XMP)	8GB (2x4GB)	DS	-	-	9-9-9- 24	1.5		•		
CORSAIR	CMV8GX3M1A1600C11	8GB	DS	-	-	11-11-11-30	-		•		
CORSAIR	CMX8GX3M2A1600C9 (Ver3.19)(XMP)	8GB (2x4GB)	SS	-	-	9-9-9-24	1.65		•		
CORSAIR	CMZ16GX3M2A1600C10 (Ver.3.24)(XMP)	16GB (2x8GB)	DS	-	-	10-10-10-27	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
CORSAIR	CMZ16GX3M4A1600C9 (XMP)	16GB (4x4GB)	DS	-	-	9-9-9-24	1.5	•			
CORSAIR	CMZ16GX3M4X1600C9 (Ver8.16)(XMP)	16GB (4x4GB)	DS	-	-	1600-9-9-9-24	1.5	•			•
CORSAIR	CMZ32GX3M4X1600C10 (Ver2.2)(XMP)	32GB (4x8GB)	DS	-	-	10-10-10-27	1.5	•			•
CORSAIR	CMZ8GX3M2A1600C8 (XMP)	8GB (2x4GB)	DS	-	-	8-8-8-24	1.5	•			
Crucial	BLS4G3D1609DS1S00.16FMR(XMP)	4GB	DS	-	-	1600-9-9-9-24	1.5	•			
Crucial	BLT4G3D1608DT1TX0.16FM(XMP)	4GB	DS	-	-	8-8-8-24	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	-		•		•
G.SKILL	F3-12800CL9D-8GBSR2(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.25	•			
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	•			•
GEIL	GUP34GB1600C7DC (XMP)	4GB (2x2GB)	DS	-	-	7-7-7-24	1.6	•			
KINGMAX	FLGE85F-C8KL9A (XMP)	2GB	SS	KINGMAX	N/A	9-9-9-28	-				•
KINGMAX	FLGF65F-C8KL9A (XMP)	4GB	DS	KINGMAX	N/A	9-9-9-28	-		•		
KINGSTON	KHX16009CD3K2/8GX (XMP)	8GB (2x4GB)	DS	-	-	9-9-9-27	1.65	•			
KINGSTON	KHX1600C9D3B1/4G (XMP)	4GB	SS	-	-	9-9-9-27	1.65	•			
KINGSTON	KHX1600C9D3K3/12GX(XMP)	12GB (3x4GB)	DS	-	-	9	1.65	•			
KINGSTON	KHX1600C9D3K3/6GX(XMP)	6GB (3x2GB)	DS	-	-	9	1.65	•			
KINGSTON	KHX1600C9D3K4/16GX(XMP)	16GB (4x4GB)	DS	-	-	9-9-9-24	1.65	•			•
KINGSTON	KHX1600C9D3K6/24GX(XMP)	24GB (6x4GB)	DS	-	-	9	1.65	•			
KINGSTON	KHX1600C9D3LK2/8GX(XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.35	•			
KINGSTON	KHX1600C9D3P1K2/8G	8GB (2x4GB)	DS	-	-	9	1.5	•			
KINGSTON	KHX16C10B1K2/16X(XMP)	16GB (2x8GB)	DS	-	-	-	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
KINGSTON	KHX16C9K2/16	16GB (2x8GB)	DS	-	-	1333-9-9-9-24	1.5	•			
KINGSTON	KHX16C9P1K2/16	16GB (2x8GB)	DS	-	-	-	1.5	•			
KINGSTON	KVR16N11/4	4GB	DS	KINGSTON	D2568JPUCPGGBU	11-11-11-28-1	-		•		
KINGSTON	KVR16N11/4	4G	DS	Hynix	H5TQ2G83CFRPBC	-	1.5	•			
Micron	MT16JTF1G64AZ-1G6E1	8GB	DS	Micron	D9QBJ	-	-			•	•
Micron	MT8JTF51264AZ-1G6E1	4GB	SS	Micron	D9QBJ	-	-			•	•
Micron	MT8KTF25664AZ-1G6M1	2GB	SS	MICRON	D9PFJ	-	-			•	
Patriot	PV316G160C9K(XMP)	16GB (2x8GB)	SS	-	-	1600-9-9-9-24	1.5	•			
Patriot	PV316G160C9K(XMP)	16GB (2x8GB)	SS	-	-	1600-9-9-9-24	1.5	•			
SanMax	SMD-4G28N1P-16KM	4GB	SS	ELPIDA	J4208BBBG-GN-F	1600	-		•		•
SanMax	SMD-4G68HP-16KZ	4GB	DS	Hynix	H5TQ2G83BFRPBC	-	1.5		•		•
SanMax	SMD-4G68NG-16KK	4GB	DS	ELPIDA	J2108BDBG-GN-F	-	-		•		•
SanMax	SMD-8G28NP-16KM	8GB	DS	ELPIDA	J4208BBBG-GN-F	1600	-		•		•
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	TED34GM1600C11BK	4GB	DS	Hynix	H5TC2G83EFR	11-11-11-28	1.5		•		•
Team	TED38GM1600C11BK	8GB	DS	Hynix	H5TQ4G83AFR	11-11-11-28	1.5		•		•
Team	TLD34G1600HC9BK (XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.5		•		•
Team	TLD38G1600HC9BK (XMP)	16GB (2x8GB)	DS	-	-	9-9-9-24	1.5	•			
Team	TXD34096M1600HC9-D(XMP)	4GB	DS	Hynix	H5TC2G83BFRH9A	9-9-9-24	1.5	•			
Transcend	TS1GLK64V6H(620945)	8GB	DS	SAMSUNG	K4B4G0846B	-	-		•		
Transcend	TS1GLK64W6H	8GB	DS	SAMSUNG	K4B4G0846B	11-11-11-28-1	-		•		

Chapter 1

DDR3 1333 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
AMD	AE32G1339U1-U	2GB	SS	AMD	23EY4587MB3H	-	1.5	•			
AMD	AE34G1339U2-U	4GB	DS	AMD	23EY4587MB3H	-	1.5	•			
Apacer	78.B1GDE.9L10C	4GB	DS	Apacer	AM5D5908CEHSBG	9	-	•		•	•
Asint	SLA302G08-EDJ1C	2GB	SS	ASint	302G08-DJ1C	-	-	•			
Asint	SLA304G08-EDJ1B	4GB	SS	Asint	304G08-DJ1B	9-10-10-26	-	•			
Asint	SLB304G08-EDJ1B	8GB	DS	Asint	304G08-DJ1B	9-9-9-24	-	•			
BUFFALO	D3U1333-1G	1GB	SS	Elpida	J1108BFBG-DJ-F	-	-	•			
BUFFALO	D3U1333-2G	2GB	DS	Elpida	J1108BFBG-DJ-F		-	•			
BUFFALO	D3U1333-4G	4GB	DS	NANYA	NT5CB256M8BN-CG		-	•			
CORSAIR	CMV8GX3M1A1333C9	8GB	DS	-	-	9-9-9-24	-	•			
CORSAIR	CMV8GX3M2A1333C9	8GB (2x4GB)	DS	-	N/A	9-9-9-24	-	•			
CORSAIR	CMX8GX3M2A1333C9 (XMP)	8GB (2x4GB)	DS	-	-	9-9-9-24	1.5	•			
G.SKILL	F3-10666CL9D-8GBXL	8GB (2x4GB)	DS	-	-	9-9-9-24	1.5	•		•	•
GEIL	GVP34GB1333C9DC	4GB (2x2GB)	DS	-	-	9-9-9-24	1.5	•			
INNODISK	M3UN-2GHJBC09	2GB	SS	Hynix	H5TQ2G83CFRH9C	9-9-9-24	-	•		•	•
INNODISK	M3UN-4GHJAC09	4GB	DS	Hynix	H5TQ2G83CFRH9C	9-9-9-24	-	•		•	•
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	KVR1333D3E9S/4G	4GB	DS	Elpida	J2108ECSE-DJ-F	9	1.5	•			
KINGSTON	KVR1333D3N9H/4G	4GB	DS	ELPIDA	J2108BDBG-GN-F	-	1.5	•			
KINGSTON	KVR13N9S8H/4	4GB	SS	ELPIDA	J4208BBBG-GN-F	-	1.5	•			
Mach Xtreme	MXD3U133316GQ	16GB (4x4GB)	DS	-	-	-	-	•			
Mach Xtreme	MXD3V13332GS	2GB	SS	Mach Xtreme	C2S46D30-D313	-	-	•		•	•
MICRON	MT8JTF25664AZ-1G4M1	2GB	SS	MICRON	D9PFJ	-	-	•		•	•
Patriot	PSD32G13332	2GB	DS	Prtriot	PM128M8D3BU-15	9	-	•			
RiDATA	C304627CB1AG22Fe	2GB	DS	RiDATA	C304627CB1AG22Fe	9	-	•			
RiDATA	E304459CB1AG32Cf	4GB	DS	RiDATA	E304459CB1AG32Cf	9	-	•			

(Continued on the next page)

DDR3 1333 MHz capacity

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)			
								2	4	6	8
Silicon Power	SP001GBLTU133S02	1GB	SS	S-POWER	10YT3E5	9	-	•			•
Silicon Power	SP004GBLTU133V02	4GB	DS	S-POWER	20YT3NG	9-9-9-24	-	•			
Team	TED34096M1333HC9	4GB	DS	Team	T3D2568LT-13	-	-	•			
Team	TED34GM1333C9BK	4GB	DS	Hynix	H5TQ2GB83CFR	9-9-9-24	1.5	•			•
Team	TED38GM1333C9BK	8GB	DS	Hynix	H5TQ4G83AFR	9-9-9-24	1.5	•			•
Transcend	JM1333KLH-8G(623654)	8GB	DS	Transcend	TK963EBF3	-	-	•			

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.

Chapter 1

1.2.5 Expansion slots

⚠️ Ensure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.
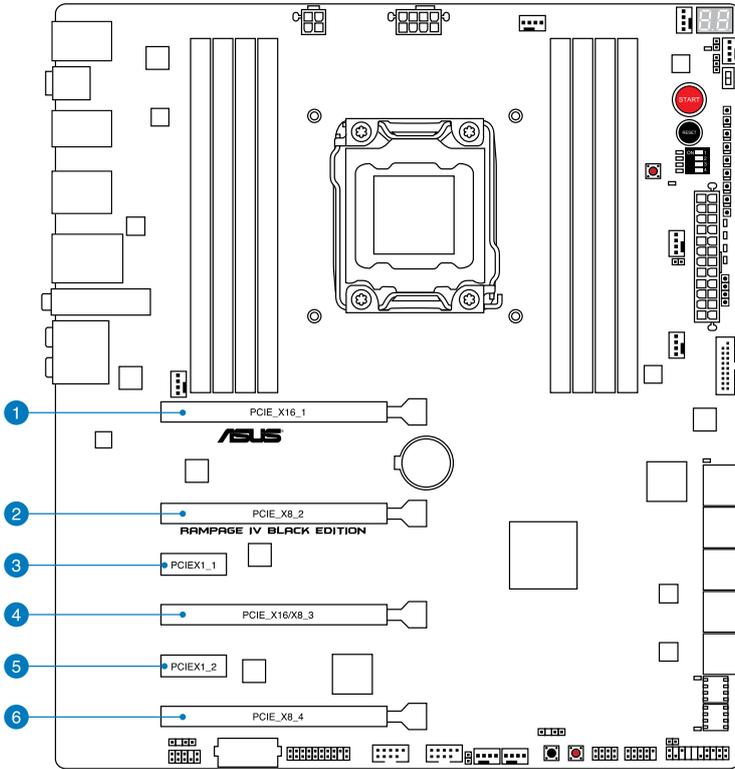
Slot No.	Slot Description
1	PCIe 3.0 x16_1 slot
2	PCIe 3.0 x8_2 slot
3	PCIe 2.0 x1_1 slot
4	PCIe 3.0 x16/8_3 slot
5	PCIe 2.0 x1_2 slot
6	PCIe 3.0 x8_4 slot

- Refer to the following configuration table for installation.

PCIe x16 Slot #	Single VGA	SLI/CF	3 way SLI/CFX	Quad SLI/CFX
1	x16	x16	x16	x16
2	—	—	x8	x8
4	—	x16	x16	x8
6	—	—	—	x8

- We recommend that you provide sufficient power when running CrossFireX™ or SLI mode.

- While running at heavy loaded four VGA cards, ensure to plug in the 6-pin extra PCIe power supply for stability.

- Connect a chassis fan to the motherboard connector labeled CHA_FAN1/CHA_FAN2/ CHA_FAN3 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_X8_2	shared	-	-	-	-	-	-	-
PCIE_X16/X8_3	shared	-	-	-	-	-	-	-
PCIE_X8_4	shared	-	-	-	-	-	-	-
PCIE_X1_1	shared	-	-	-	-	-	-	-
ASM USB3#1	-	shared	-	-	-	-	-	-
ASM USB3#2	shared	-	-	-	-	-	-	-
ASM SATA6#1	-	shared	-	-	-	-	-	-
ASM SATA6#2	-	-	-	shared	-	-	-	-
Intel LAN 82579V	-	-	shared	-	-	-	-	-
On Chip USB1	-	-	-	-	-	-	-	shared
On Chip USB2	-	-	-	-	-	shared	-	-
HD Audio	-	-	-	-	-	-	shared	-
On Chip SATA	-	-	-	-	shared	-	-	-

Chapter 1

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 (START) 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.
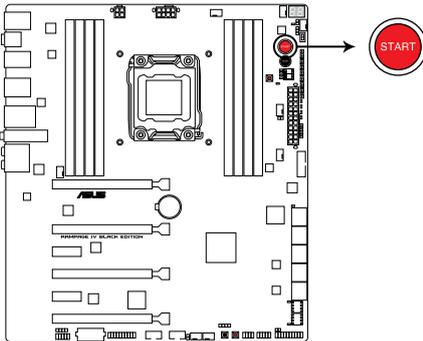
RAMPAGE IV BLACK EDITION Power on button

2. **Reset button**

   Press the Reset button to reboot the system.
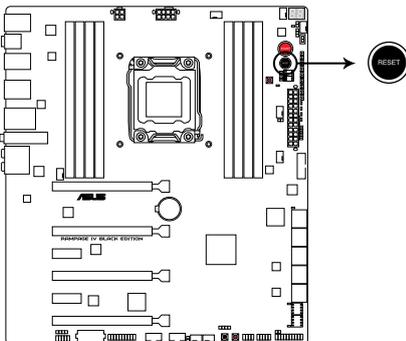
RAMPAGE IV BLACK EDITION Reset button

3.   **MemOK! button**

Installing DIMMs that are not compatible with the motherboard may cause system boot failure. One indicator is the DRAM_LED lighting continuously.

Press and hold the MemOK! button to initiate the memory compatibility tuning process that can help lead to a successful boot.
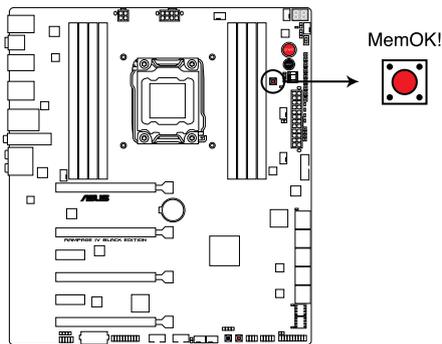
MemOK!

RAMPAGE IV BLACK EDITION MemOK! button

- Refer to section **1.2.7 Onboard LEDs** for the exact location of the MEMOK_LED.

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

- The DRAM_LED is one of the LEDs in the Q LEDs that helps check key components during the motherboard booting process. See section **1.2.7 Onboard LEDs** for the exact location of the DRAM_LED.

- 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 MEMOK_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 overclocking, press the MemOK! switch 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.

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


DirectKey

RAMPAGE IV BLACK EDITION DirectKey button
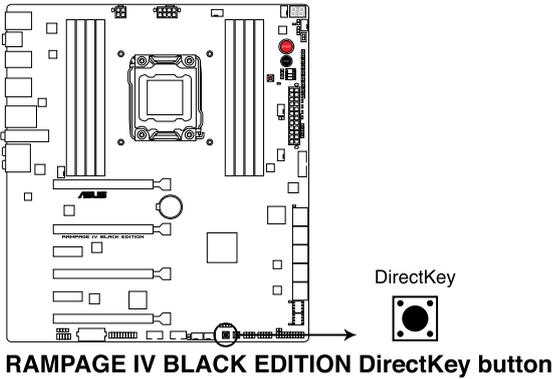
Ensure to save your data before using the DirectKey button.

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

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

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

5. **BIOS Switch button**

   The motherboard comes with two BIOS. Press the BIOS button to switch BIOS and load different BIOS settings. The nearby BIOS LEDs indicate the BIOS you are using.
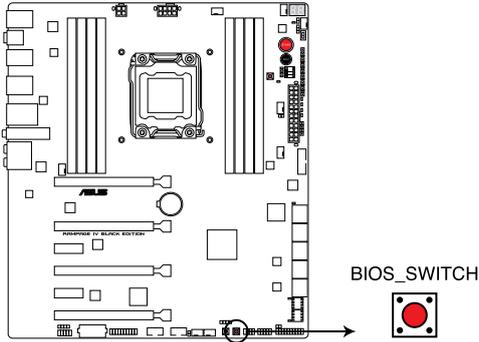
BIOS_SWITCH

RAMPAGE IV BLACK EDITION BIOS Switch button

6. **PCIe x16 Lane switch**

   These slide switches allows you to enable and disable the corresponding PCIe x16 slots. When one of the installed PCIe x16 cards is out of order, you can use the slide switch to find out the faulty one without removing the cards.

PCIEX16_SW

ON 1
    2
    3
    4
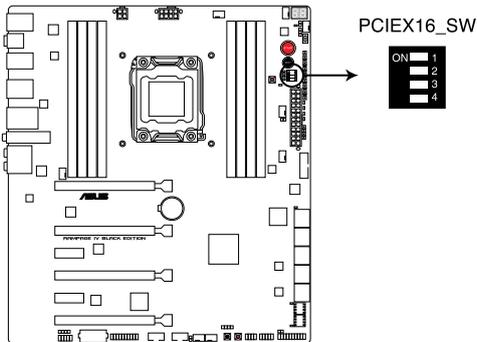
RAMPAGE IV BLACK EDITION PCIex16 Lane switch

Chapter 1

7. **Slow Mode Switch**

Slow Mode Switch is employed during LN2 benching. Some processors have a small optimum temperature range to run at their highest frequency. Warmer or colder yields instability at this frequency. For example, a certain processor may need -80˚C loaded in order to run 5.8GHz, which means about -75˚C idle in order to stay stable at 5.8GHz.

Going colder or warmer crashes. It will however remain stable at slower frequencies at much colder or warmer temperatures. Once it comes out of a heavy load while transitioning over to a light load, when the temperature does not warm fast enough, it may crash. To over-come this simply flip the switch over to "slow" the processor instantaneously. Switching over to Slow-Mode during critical moments when Temperature/Max Frequency alignment is off-synch saves you a lot of crashes, even when trying to boot into the OS at cold temperatures.

SLOW_MODE

Disable
(Default)

Enable
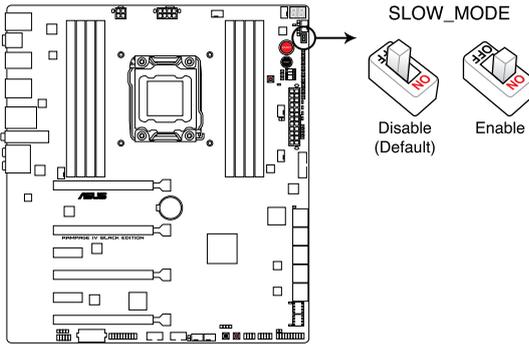
RAMPAGE IV BLACK EDITION Slow Mode switch

1.2.7   Onboard LEDs

1.   Hard Disk LED

The hard disk LED is designed to indicate the hard disk activity. It blinks when data is being written into or read from the hard disk drive. The LED does not light up when there is no hard disk drive connected to the motherboard or when the hard disk drive does not function.

HD_LED
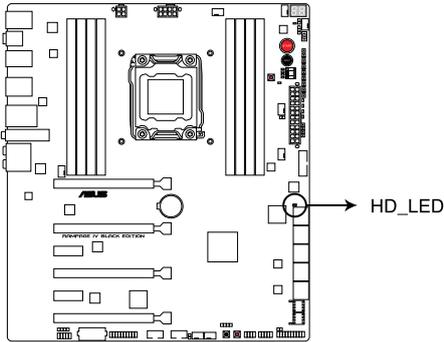
RAMPAGE IV BLACK EDITION Hard Disk LED

2.   BIOS LED

The BIOS LEDs help indicate the BIOS activity. Press the BIOS button to switch between BIOS1 and BIOS2 and the LED lights up when the corresponding BIOS is in use.

BIOS1_LED

BIOS2_LED
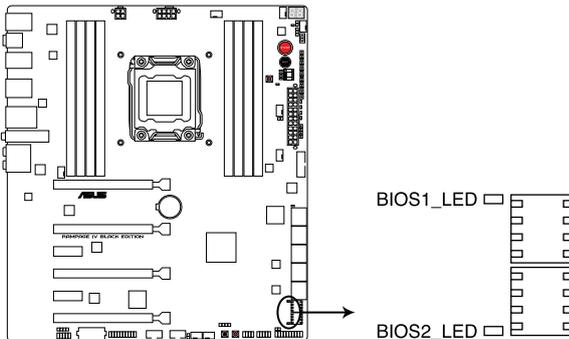
RAMPAGE IV BLACK EDITION BIOS_LED

3. **MemOK! LED**

   Blinking: Indicates that MemOK! is enabled before POST.
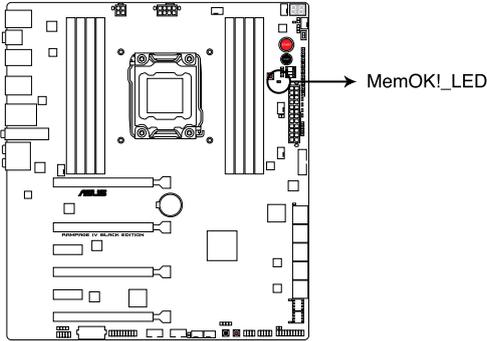
   RAMPAGE IV BLACK EDITION MemOK! LED

4. **Q LED**

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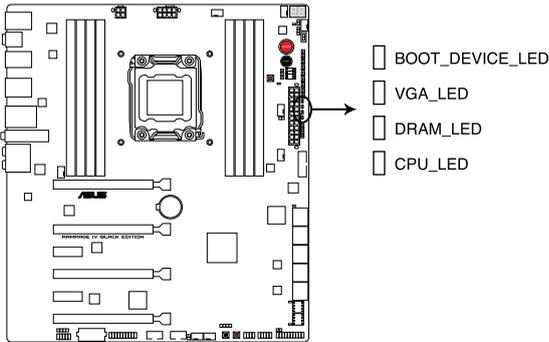

   RAMPAGE IV BLACK EDITION CPU/ DRAM/ VGA/ BOOT_DEVICE LED

   For more information about the MEMOK_LED and DRAM_LED, see the MemOK! button on section **1.2.6 Onboard buttons and switches**.

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5.   **Power LED**

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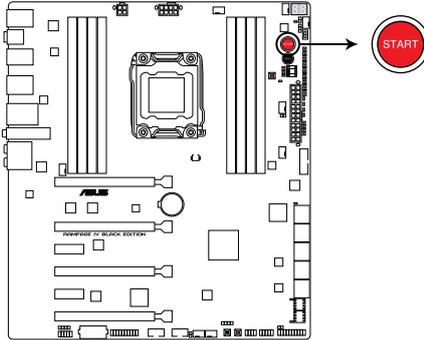
RAMPAGE IV BLACK EDITION Power LED

6.   **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.
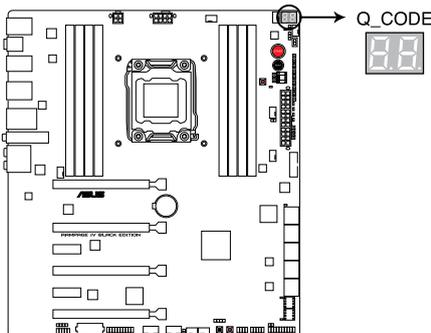
RAMPAGE IV BLACK EDITION Q-Code LED

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

Chapter 1: Product introduction

Chapter 1

Q-Code table

Code	Description
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 stared (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
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

Chapter 1

Q-Code table

Code	Description
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)

Chapter 1

Q-Code table

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

(continued on the next page)

Chapter 1

Q-Code table

Code	Description
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

Code	Description
0x01	System is entering S1 sleep state
0x02	System is entering S2 sleep state
0x03	System is entering S3 sleep state
0x04	System is entering S4 sleep state
0x05	System is entering S5 sleep state
0x10	System is waking up from the S1 sleep state
0x20	System is waking up from the S2 sleep state
0x30	System is waking up from the S3 sleep state
0x40	System is waking up from the S4 sleep state
0xAC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

Chapter 1

1.2.8   Jumper

1.   LN2 Mode jumper (3-pin LN2)

With LN2 mode activated, the ROG motherboard is optimized to remedy the cold-boot bug during POST at an extremely low temperature and help the system boot successfully.
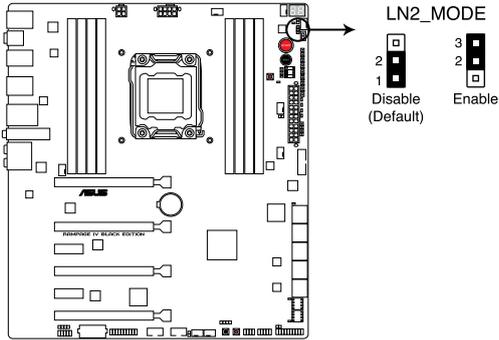
**RAMPAGE IV BLACK EDITION LN2_MODE**

1.2.9 Internal connectors

1.   Intel® X79 Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_1; SATA6G_2 [gray])

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

SATA6G_1

GND
RSATA_TXP1
RSATA_TXN1
GND
RSATA_RXP1
RSATA_RXN1
GND

SATA6G_2

GND
RSATA_TXP2
RSATA_TXN2
GND
RSATA_RXP2
RSATA_RXN2
GND
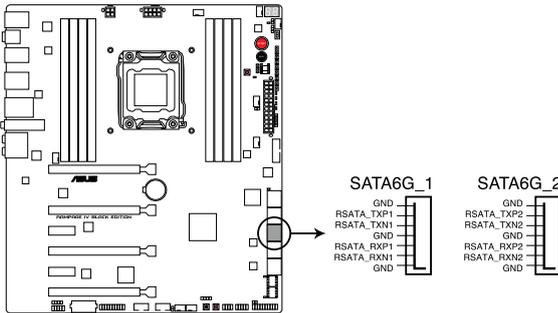
RAMPAGE IV BLACK EDITION Intel® SATA 6 Gb/s connectors
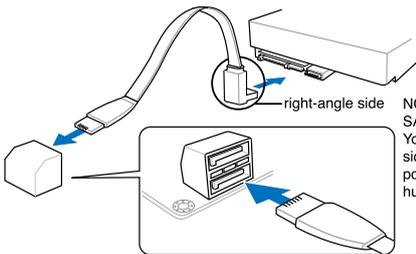
right-angle side

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

- These connectors are set to [**AHCI Mode**] by default. If you intend to create a Serial ATA RAID set using these connectors, set the SATA Mode item in the BIOS to [**RAID Mode**]. Refer to section **3.6.5 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. **Intel® X79 Serial ATA 3.0 Gb/s connectors (7-pin SATA3G_1; SATA3G_2; SATA3G_3; SATA3G_4 [black])**

These connectors connect to Serial ATA 3.0 Gb/s hard disk drives and optical disc drives via Serial ATA 3.0 Gb/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.
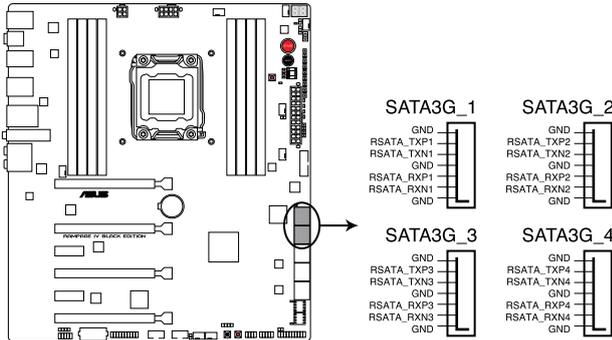
RAMPAGE IV BLACK EDITION Intel® SATA 3 Gb/s connectors

- 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 **3.6.5 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.

3. **ASMedia® Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_E1; SATA6G_E2; SATA6G_E3; SATA6G_E4 [gray])**

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

SATA6G_E1

GND
RSATA_TXP1
RSATA_TXN1
GND
RSATA_RXP1
RSATA_RXN1
GND

SATA6G_E2

GND
RSATA_TXP2
RSATA_TXN2
GND
RSATA_RXP2
RSATA_RXN2
GND

SATA6G_E3

GND
RSATA_TXP3
RSATA_TXN3
GND
RSATA_RXP3
RSATA_RXN3
GND

SATA6G_E4

GND
RSATA_TXP4
RSATA_TXN4
GND
RSATA_RXP4
RSATA_RXN4
GND
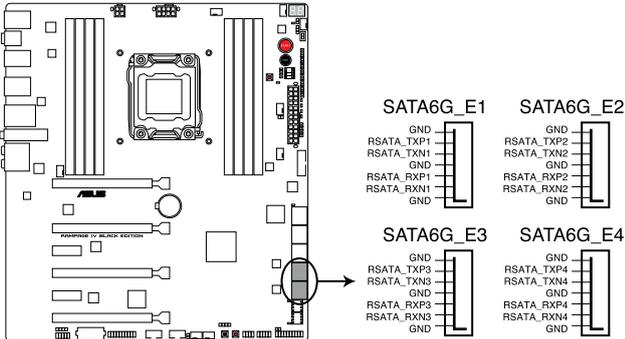
RAMPAGE IV BLACK EDITION ASMedia® SATA 6 Gb/s connectors

- ASMedia storage controller can only support AHCI mode.

- These SATA ports are for data drives only.

4. USB 3.0 connector (20-1 pin USB3_E78)

This connector is for the additional USB 3.0 ports, and complies with the USB 3.0 specificaton that supports up to 4.8Gbps connection speed. If the USB 3.0 front panel cable is available from your system chassis, with this USB 3.0 connector, you can have a front panel USB 3.0 solution.

USB3_E78

PIN 1
Vbus — IntA_P1_SSRX-
IntA_P2_SSRX- — IntA_P1_SSRX+
IntA_P2_SSRX+ — GND
GND — IntA_P1_SSTX-
IntA_P2_SSTX- — IntA_P1_SSTX+
IntA_P2_SSTX+ — GND
GND — IntA_P1_D-
IntA_P2_D- — IntA_P1_D+
IntA_P2_D+ — ID
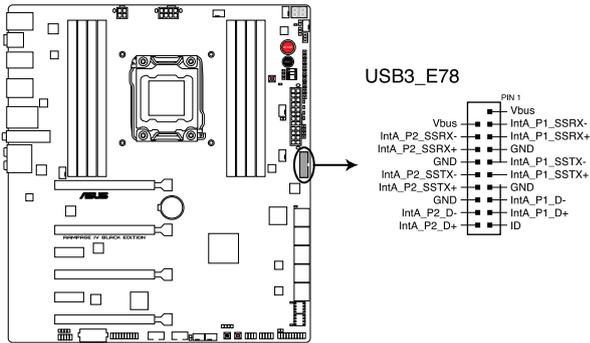
RAMPAGE IV BLACK EDITION USB3.0 connector

- The USB 3.0 module is purchased separately.
- These connectors are based on xHCI specification. We recommend you to install the related driver to fully use the USB 3.0 ports under Windows® 7.

5. Thermal sensor cable connectors (2-pin OPT_TEMP1; OPT_TEMP2; OPT_TEMP3)

These connectors are for temperature monitoring. Connect the thermal sensor cables to these connectors and place the other ends to the devices which you want to monitor temperature. The optional fans 1, 2, and 3 can work with the temperature sensors for a better cooling effect.

A OPT_TEMP2
Temperature
Ground

B OPT_TEMP3
Temperature
Ground

C OPT_TEMP1
Temperature
Ground
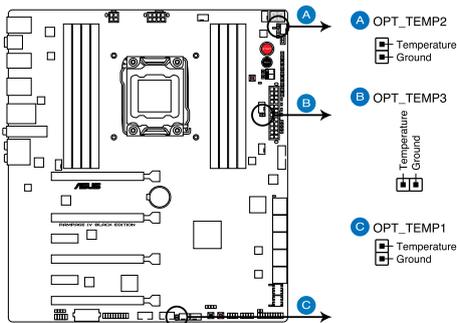
RAMPAGE IV BLACK EDITION Thermal sensor cable connectors

Enable **OPT FAN1/ OPT FAN2/ OPT FAN3 overheat protection** in BIOS if you connect thermal sensor cables to these connectors.

- Thermal sensor cables or thermistors are purchased separately.
- To monitor the temperature at the BIOS, go to BIOS>Monitor>Temperature Monitor.

6. **USB 2.0 connectors (10-1 pin USB56; USB78; USB910)**

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

RAMPAGE IV BLACK EDITION USB2.0 connector
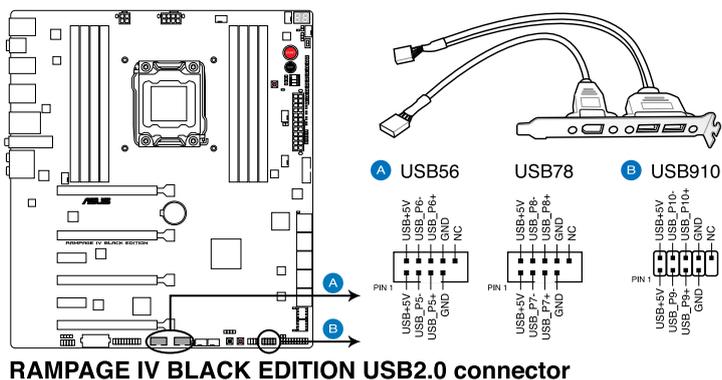
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

You can connect the front panel USB cable to the ASUS Q-Connector (USB) 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.

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

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port(s). 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.
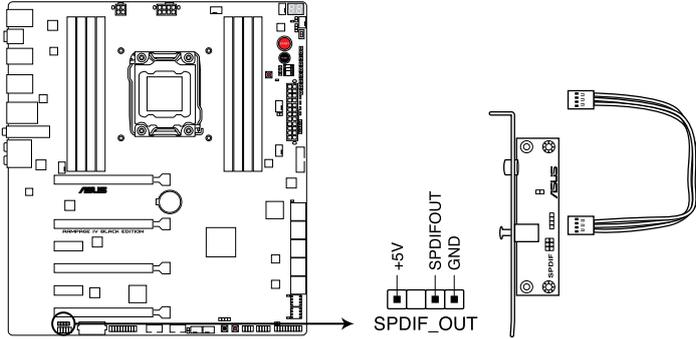
RAMPAGE IV BLACK EDITION Digital audio connector

The S/PDIF module is purchased separately.

8. **CPU, chassis, and power fan connectors (4-pin CPU_FAN; 4-pin CPU_OPT; 4-pin CHA_FAN1/ CHA_FAN2/ CHA_FAN3; 4-pin OPT_FAN1/ OPT_FAN2 / OPT_FAN3)**

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.
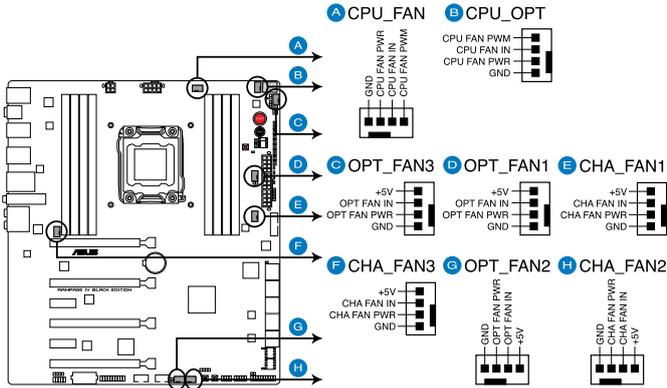
RAMPAGE IV BLACK EDITION Fan connectors

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

- The CPU_FAN connector supports the CPU fan of maximum 1A (12 W) fan power.
- If you install two VGA cards, we recommend that you plug the rear chassis fan cable to the motherboard connector labeled CHA_FAN1, CHA_FAN2 or CHA_FAN3 for better thermal environment.

9. 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.
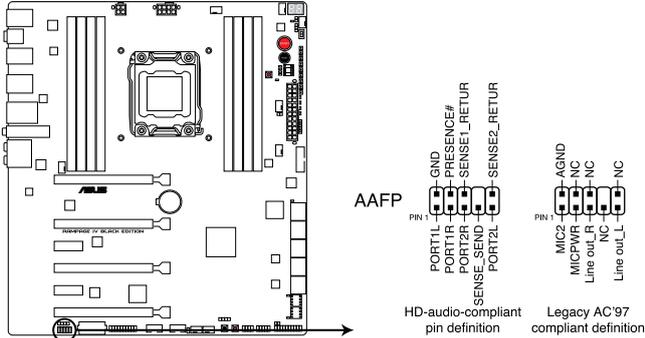

RAMPAGE IV BLACK EDITION Analog front panel connector

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

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

10. **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.
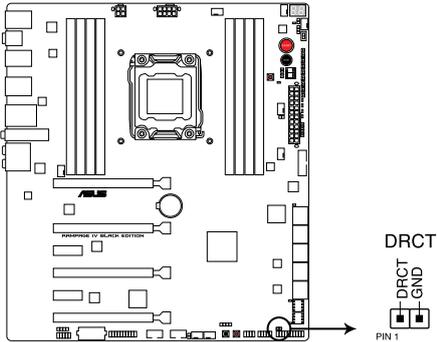

RAMPAGE IV BLACK EDITION DRCT connector

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

11. **ROG Extension - ROG_EXT connector (18-1 pin ROG_EXT)**

This connector is for the OC Panel and other ROG accessories supporting the ROG_EXT connector. The OC Panel allows you to perform overclocking without going to the BIOS settings, loading the OS, or using overclocking software utilities.
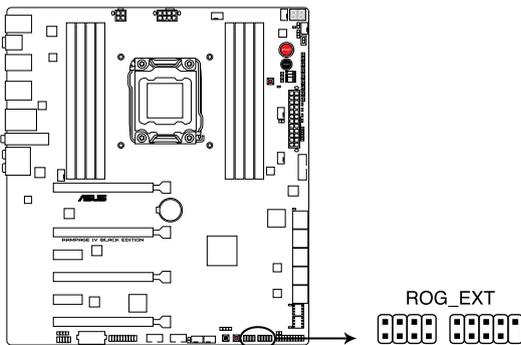
RAMPAGE IV BLACK EDITION OC PANEL connectors

12. TPM connector (20-1 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 the network security, protects digital identities, and ensures platform integrity.
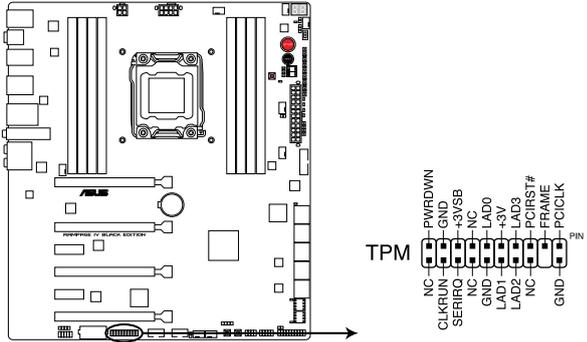
RAMPAGE IV BLACK EDITION TPM connector

13. 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.
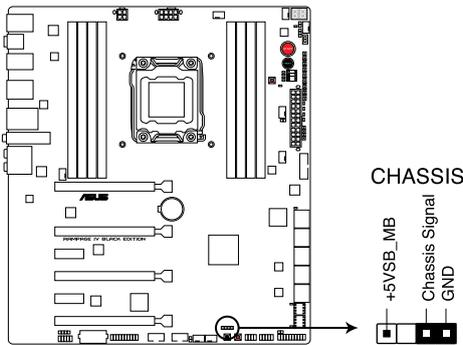
RAMPAGE IV BLACK EDITION Chassis intrusion connector

14. ATX power connectors (24-pin EATXPWR; 4-pin EATX12V_1; 4-pin EZ_PLUG; 8-pin EATX12V_2)

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.


RAMPAGE IV BLACK EDITION ATX power connectors
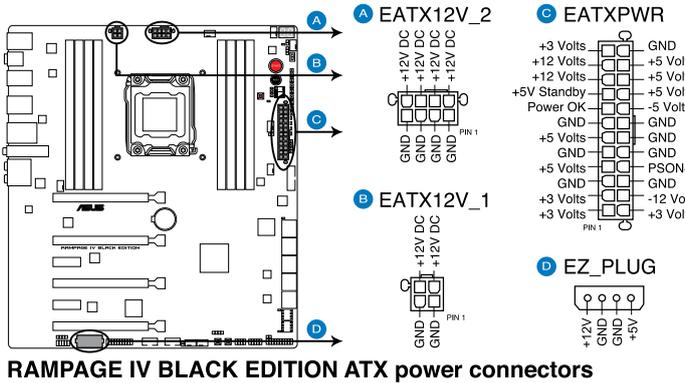
• For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 450 W.

• Do not forget to connect the 4-pin/8-pin EATX12 V power plug; otherwise, the system will not boot.

• Connect the 4-pin EZ_PLUG power plugs to ensure sufficient power supply when you install multiple graphics cards.

• Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.

• If you 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.

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

This connector supports several chassis-mounted functions.
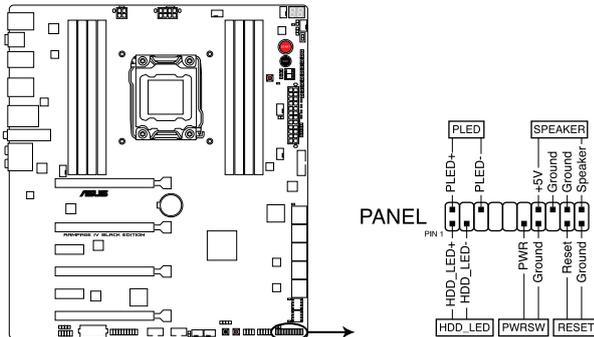
RAMPAGE IV BLACK EDITION System panel connector

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

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

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

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

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

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

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

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

- **Reset button (2-pin RESET)**

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

1.2.10   ProbeIt

The ROG ProbeIt allows you to detect your system's current voltage and OC settings. Use a multimeter to measure the ProbeIt points even during overclocking.

See the illustration below to locate the respective ProbeIt points.

A — GND
VCORE
VSA
VTT
PCH_1.1
PCH_1.5
DRAM_AB
DRAM_CD
GND

B — VTTDDR_CD
VTTDDR_AB
PCH_G
VTTCPU_G
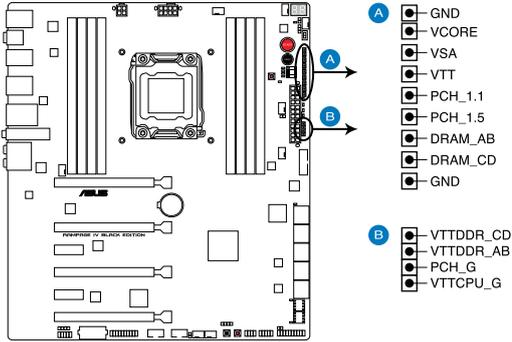
RAMPAGE IV BLACK EDITION ProbeIt

Using ProbeIt

You may connect the multitester to the motherboard as shown on the following figure.
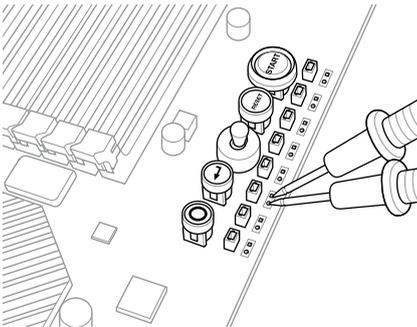
The illustration above are for reference only, the actual motherboard layout and measure points location may differ by models.

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.
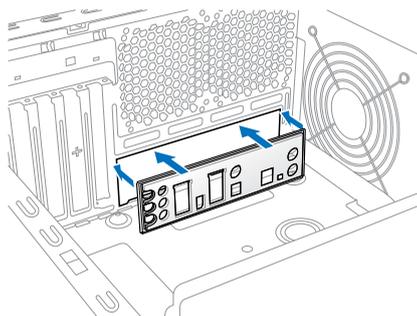
2.   Place the motherboard into the chassis, ensuring that its rear I/O ports are aligned to the chassis' rear I/O panel.
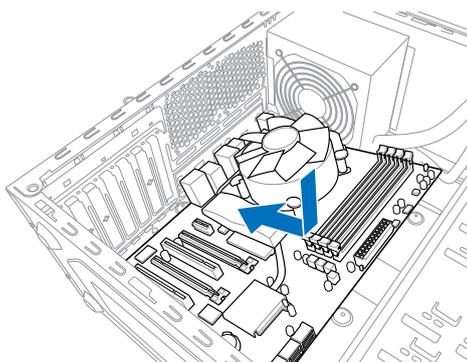
3.   Place nine screws into the holes indicated by circles to secure the motherboard to the chassis.
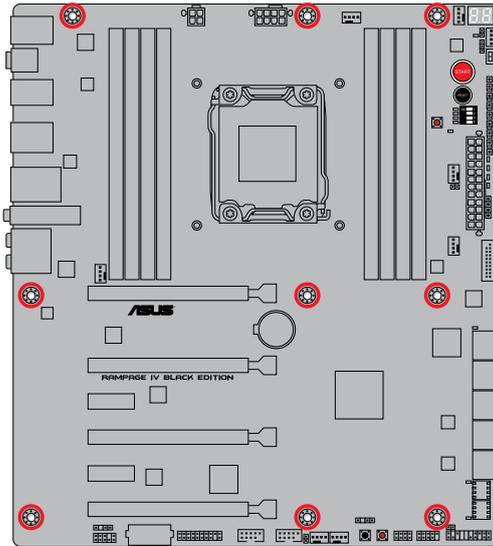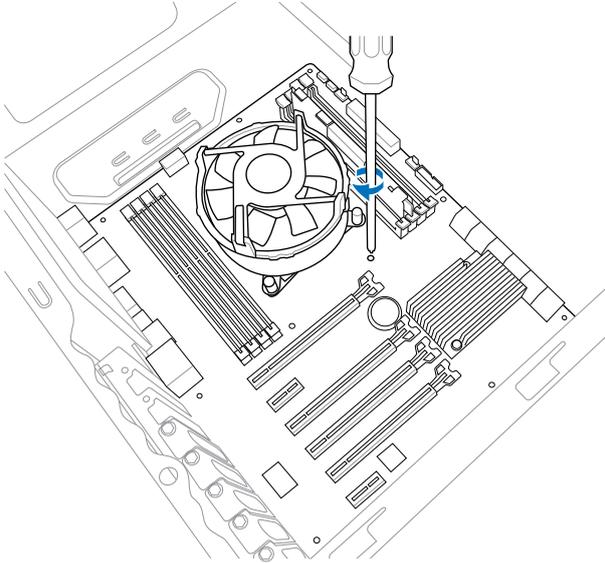
DO NOT overtighten the screws! Doing so can damage the motherboard.

2.1.2   CPU installation

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

5

Triangle mark

Triangle mark

6

7

B

A

8

9

B

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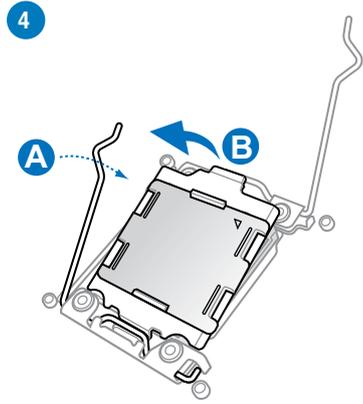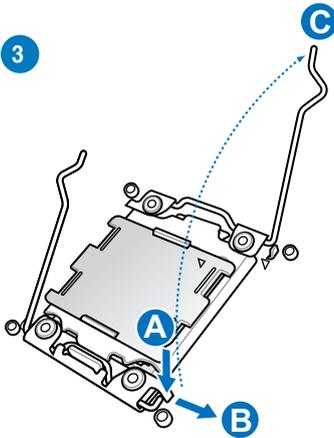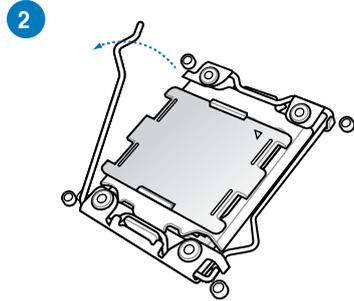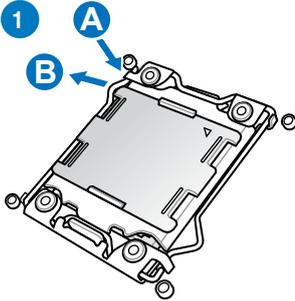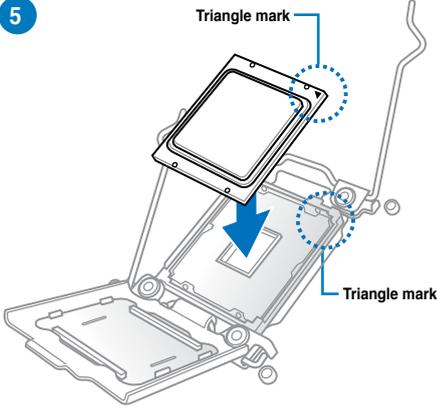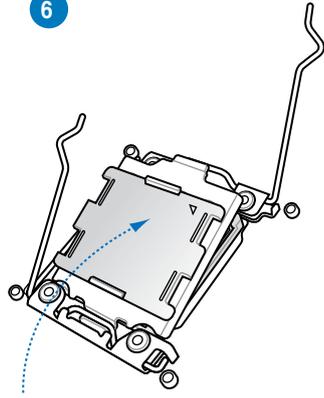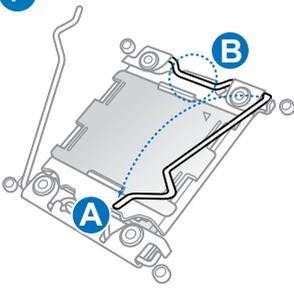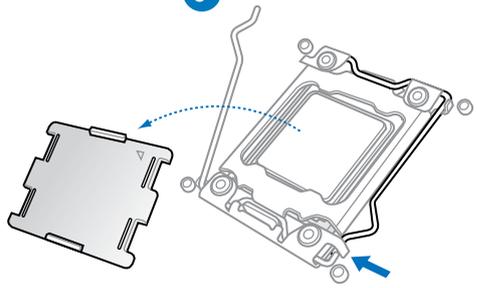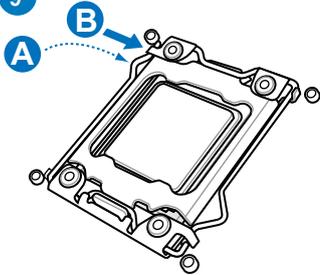
2.1.3   CPU heatsink and fan assembly installation
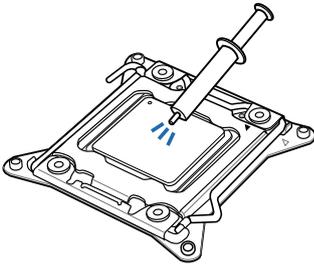
Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan, if necessary.

To install the CPU heatsink and fan assembly

1

B

A

A

B

2

CPU_FAN
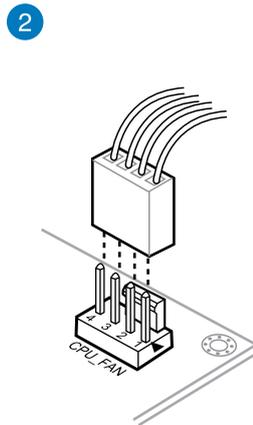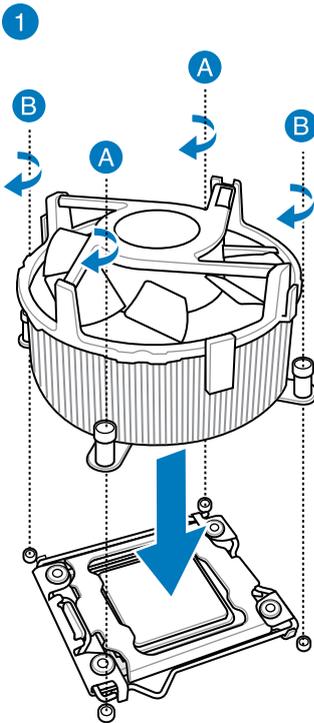
To replace the LGA2011 CPU pad (X-Socket)

- The X-Socket is a unique ROG feature that allows user to use their LGA 1366 cooler on the LGA 2011 motherboard.

- For the detailed QVL list, visit http://event.asus.com/2011/rog/X-Socket/.

Chapter 2
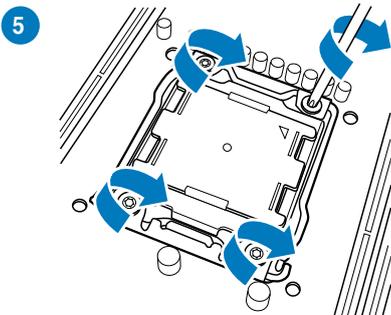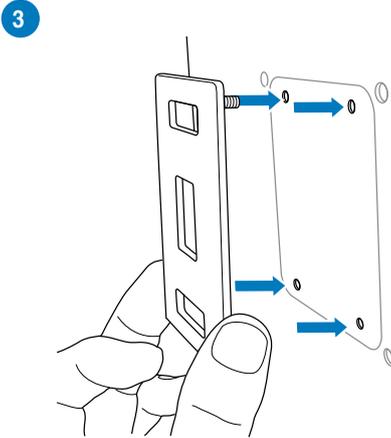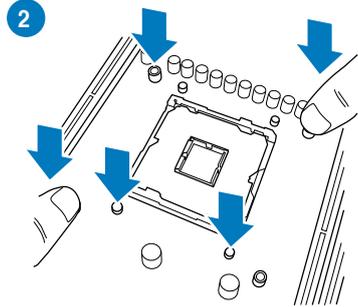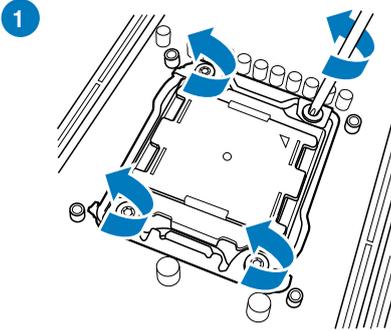
2.1.4   DIMM installation
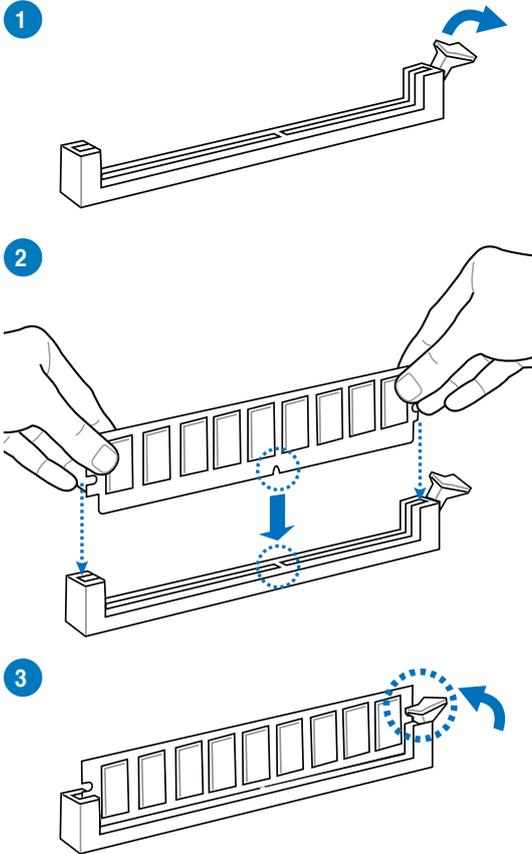
To remove a DIMM
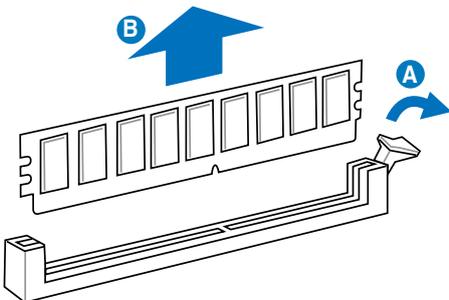
2.1.5 ATX Power connection

OR   OR
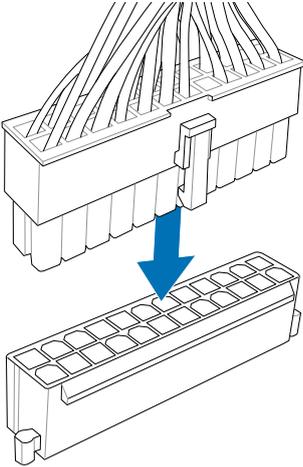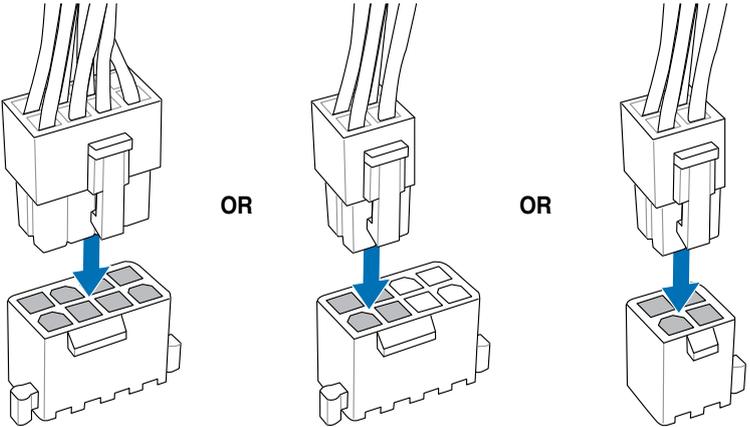
2.1.6   SATA device connection

OR
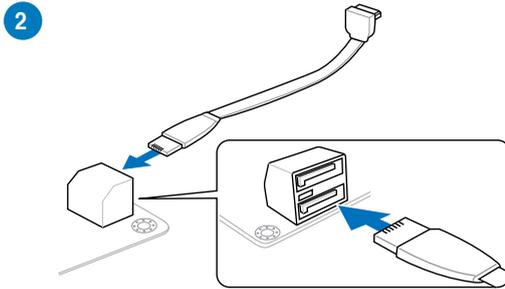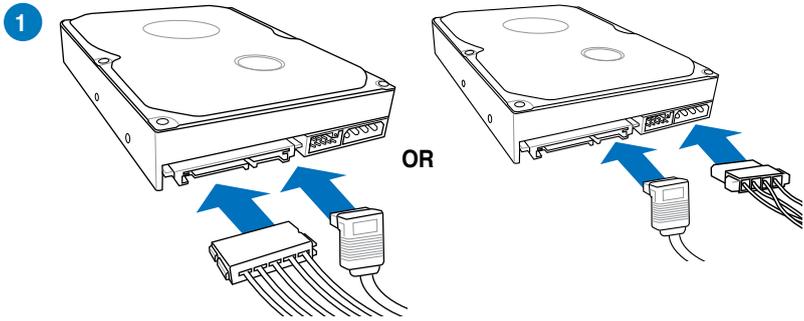
2.1.7   Front I/O Connector

To install ASUS Q-Connector
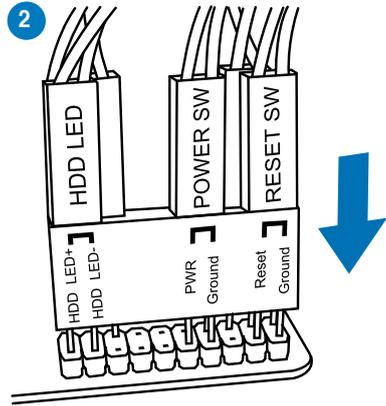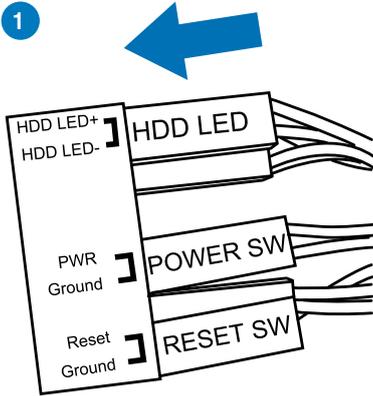
To install USB 2.0 connector

USB 2.0
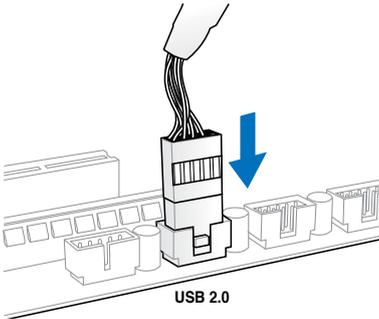
To install front panel audio connector

AAFP
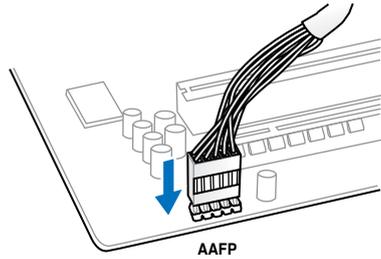
To install USB 3.0 connector

USB 3.0
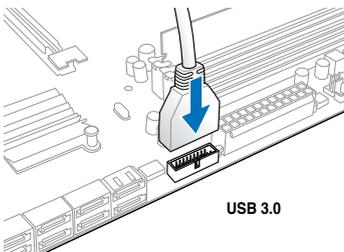
2.1.8   Expansion Card installation

To install PCIe x16 cards
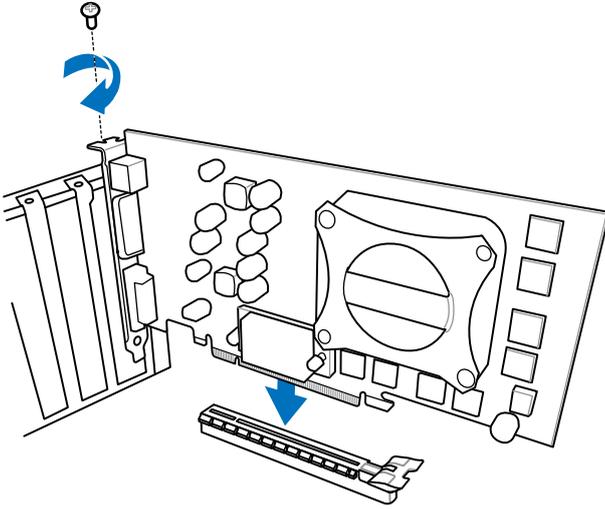
To install PCIe x1 cards
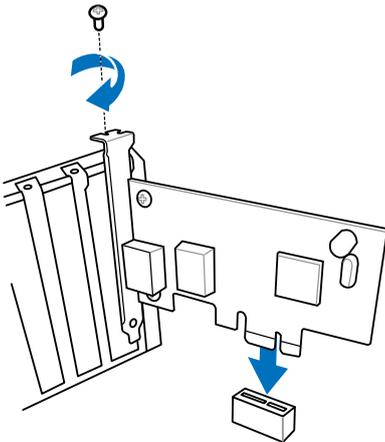
2.1.9   Wi-Fi antenna installation

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.

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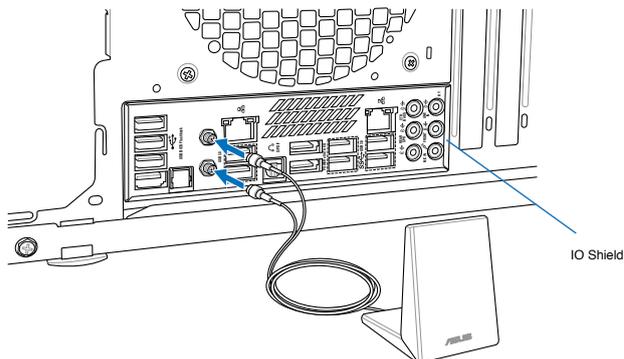
> • Ensure that the ASUS 2T2R dual band Wi-Fi antenna is securely installed to the Wi-Fi ports.
>
> • Ensure to install the Bluetooth and Wi-Fi driver before installing the Wi-Fi GO! software.

Chapter 2

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 specially allocated for the USB BIOS Flashback feature then press the ROG Connect button for three seconds. The BIOS will be updated automatically.

To use USB BIOS Flashback:

1.   Download the latest BIOS file from the ASUS website

2.   Extract and rename the BIOS image file to **R4BE.CAP**.

3.   Copy **R4BE.CAP** to the root directory of the USB flash disk drive.

4.   Turn off the system and insert the USB storage device to the ROG Connect port.

5.   Press the ROG Connect button and release when a flashing light appears, which indicates that the BIOS Flashback function is enabled.

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

ROG Connect button ———————— **USB BIOS Flashback/ ROG Connect port**
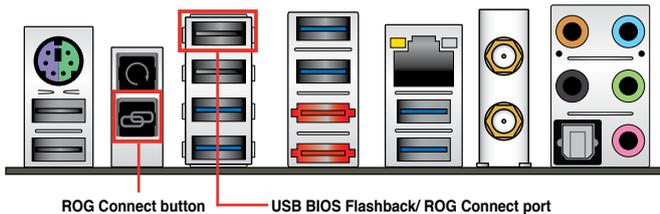
For more BIOS update utilities in BIOS setup, refer to the section **Updating BIOS** in Chapter 3.

- •   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.

- •   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.

Chapter 2

2.3 Motherboard rear and audio connections

2.3.1 Rear I/O connection
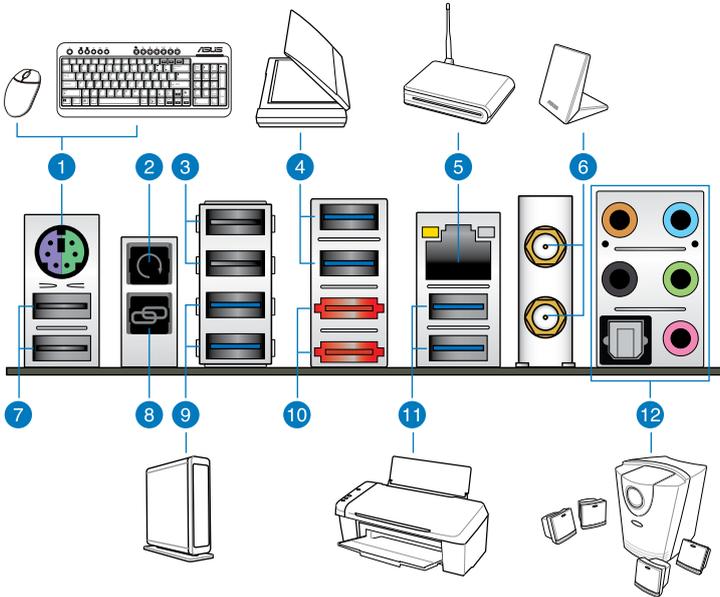
Rear panel connectors
1. PS/2 mouse and keyboard port
2. Clear CMOS button
3. USB 2.0 ports 3 and 4 (The ROG Connect port is the port on top.)
4. USB 3.0 ports 3 and 4
5. Intel® LAN (RJ-45) port**
6. Wi-Fi 802.11 a/b/g/n/ac Bluetooth V4.0*
7. USB 2.0 ports 1 and 2
8. ROG Connect button
9. USB 3.0 ports 1 and 2
10. External SATA 6.0 Gb/s ports 1 and 2
11. USB 3.0 ports 5 and 6
12. Audio I/O ports with Optical S/PDIF Out port***

*, **, 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 LED   **Bluetooth LED**

Wi-Fi 802.11 a/b/g/n/ac, Bluetooth v4.0/3.0 + HS
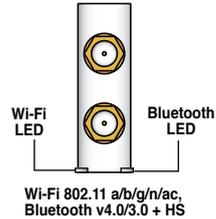
*   The Bluetooth word mark and logos are owned by Bluetooth SIG, Inc. and any use of such mark by ASUSTeK Computer Inc. is under license. Other trademarks and trade names are those of their respective owners.

** 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		

ACT/LINK LED   **SPEED LED**

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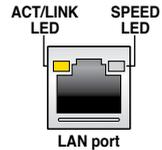
** Audio 2, 4, 6 or 8-channel configuration

Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Side Speaker Out
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

orange
black

light blue
lime
pink
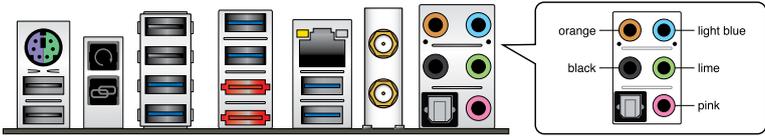
Connect to Headphone and Mic

Connect to Stereo Speakers

AUDIO
INPUTS
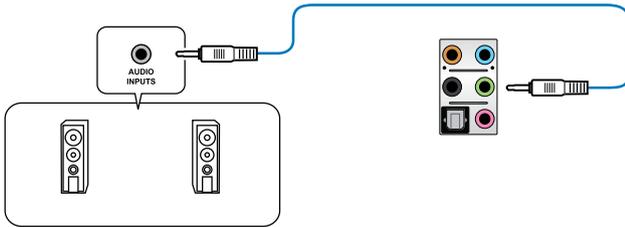
Connect to 2.1 channel Speakers

AUDIO
INPUTS
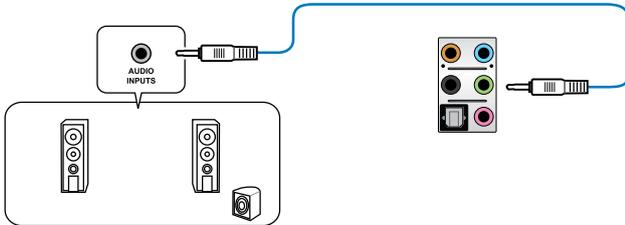
Connect to 4.1 channel Speakers
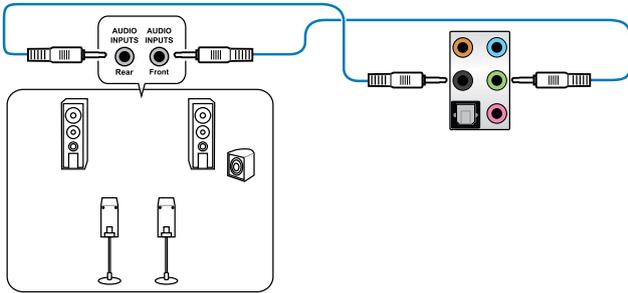
Connect to 5.1 channel Speakers
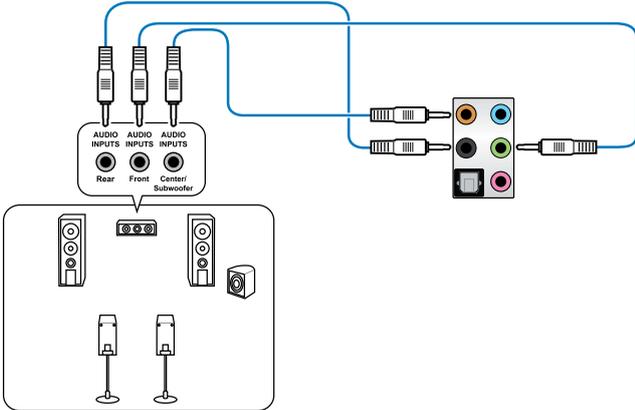
Connect to 7.1 channel Speakers

Chapter 2
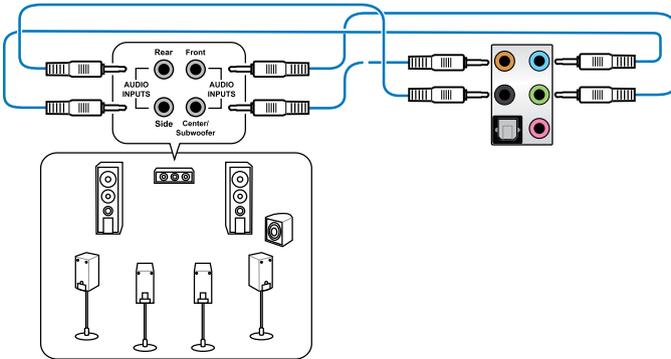
2.4 OC Panel

The OC Panel is a device that allows you to perform overclocking without the need to go to the BIOS settings or use software utilities. You can setup the OC Panel in an available 5.25-inch drive bay on your computer chassis (Normal Mode) or as an external handheld console on an "open-air" OC test bench (Extreme Mode.)

These modes are further explained in the succeeding subsections.

> • Ensure that your system has adequate cooling designed for overclocking before using the OC Panel.
>
> • Ensure to update your OC Panel's firmware. Visit www.asus.com for the latest firmware and updates about the OC Panel.
>
> • Ensure that you have installed ROG Connect Plus driver for the NORMAL Mode of the OC Panel.
>
> • When updating the OC Panel firmware, you have to disable the USB XHCI function in BIOS. To do this, click **Advanced > USB Configuration > Intel xHCI Mode** then set Intel xHCI Mode to **[Disabled]**.

2.4.1 OC Panel Overview

Normal/Extreme Mode Switch
CPU Level Up
LCM Power Button
FanSpeed Control button

Start Button
Value up Button
Left Arrow button
Clear button
Fan connectors 1,2
VGA hotwire connectors
VGA hotwire

OK button
Right Arrow button
Reset button
Value Down button
Fan connectors 3,4
Pause/Slow Mode

Subzero Sense connector

OC Panel cover
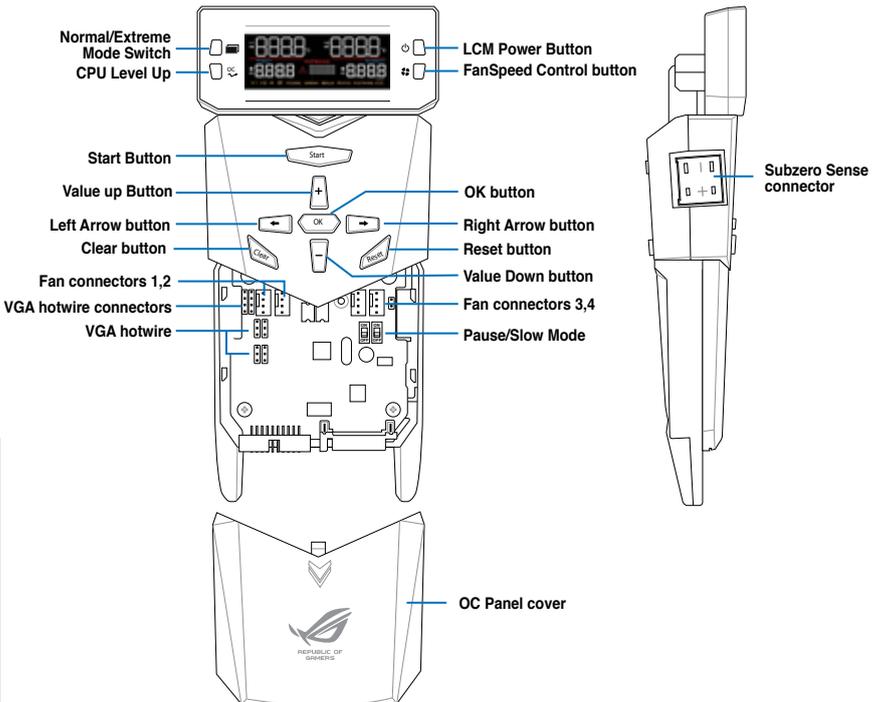
OC Panel LCM Display in Normal Mode

CPU Temperature

CPU Fan Speed

CPU

RPM

NORMAL

BCLK

RATIO

O.C FAN SPEED

BCLK

Warning

FanSpeed Control

RATIO

CPU Level Up

Information Display
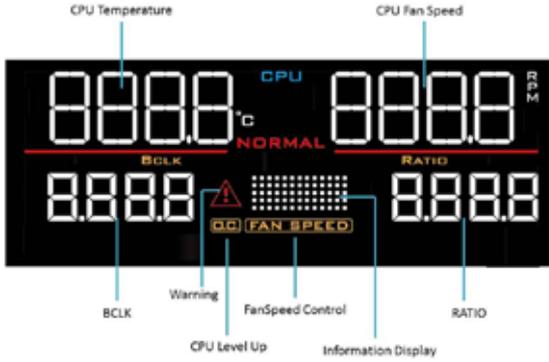
OC Panel LCM Display in Extreme Mode

Subzero Sense 1

Subzero Sense 2

T1

T2

TARGET

EXTREME

CURRENT

V1 V2 H P VCORE DRAM BCLK RATIO HOTWIRE

123
456

VTT CPU

Hotkey

Vcore

DRAM _CD

BCLK

RATIO

VGA Hotwire

DRAM_AB

Pause

Warning

Target Value

Information Display

Current Value
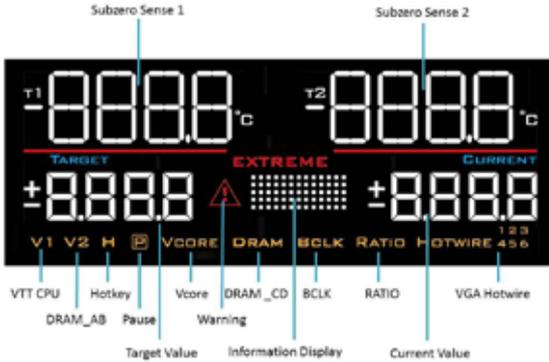
2.4.2 Setting up your OC Panel in Normal Mode

Ensure that you have installed ROG Connect Plus driver for the NORMAL Mode of the OC Panel.

The OC Panel in Normal Mode mainly provides easy access buttons for increasing your CPU's frequency level, adjusting fan speeds and customizing overclocking profiles. It also displays vital information about your computer's CPU temperature, ratio, base clock, CPU fan speed (RPM).

To set up your OC Panel in Normal Mode:

1. Tilt the OC Panel LCM display until it is perpendicular to the body of OC Panel.
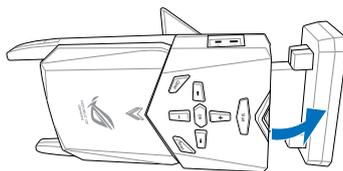
2. Get the bundled OC Panel 5.25-inch drive bay metal case and set of two (2) screws.

3. Align and insert the OC Panel into the OC Panel 5.25-inch drive bay metal case.
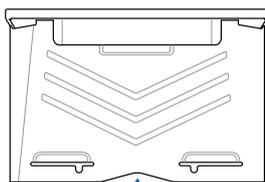
    The OC Panel fits in one orientation only. If it does not fit, try reversing it.
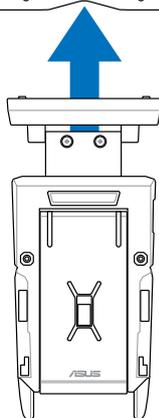
4.	Secure the OC Panel to the OC Panel 5.25-inch drive bay metal case with the two (2) screws.
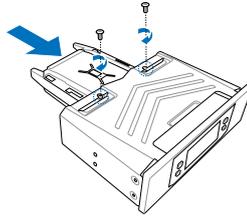
> Ensure that the OC Panel fits snugly into the OC Panel 5.25-inch drive bay metal case.

5.	Shut down your computer.

6.	Open your computer chassis and remove the front cover of an available 5.25-inch drive bay.

7.	Align and insert the OC Panel and the OC Panel 5.25-inch drive bay metal case assembly into the drive bay.

8.	Secure the OC Panel and the OC Panel 5.25-inch drive bay metal case assembly into the drive bay with four (4) screws.

9.	Connect the OC Panel data cable (A) and a SATA Power cable (B) to the OC Panel.
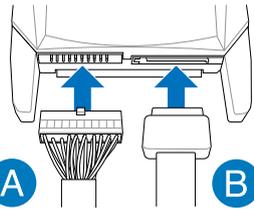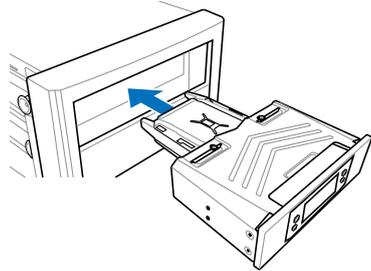
10.	Locate the ROG_EXT connector on the motherboard and connect the OC Panel cable.
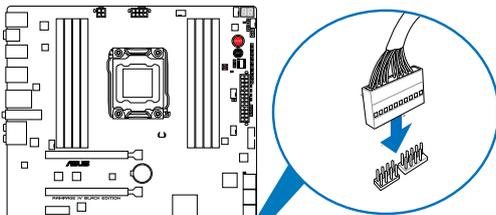
RAMPAGE IV BLACK EDITION OC PANEL connectors

11.	Boot your computer.

12.	Press the OC Panel LCM Power button to turn on the OC Panel LCM display.

2.4.3 Setting up your OC Panel in Extreme Mode

The OC Panel in Extreme Mode is setup with an open chassis system or "open-air" OC test bed assembly and enjoyed as a handheld console to perform overclocking and voltage tuning.

When in Extreme Mode, you can enjoy more features including Subzero Sense and VGA Hotwire. It also comes with some of the most commonly used voltage tuning presets that are preconfigured for your convenience and optimum overclocking experience.

To setup the OC Panel in Extreme Mode:

1. Shut down your computer.

2. Connect the OC Panel cable (A) and a
    SATA Power cable (B) to the OC Panel.
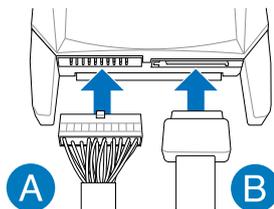
3. Locate the ROG_EXT connector on the
    motherboard and connect the OC Panel
    cable.

ROG_EXT

RAMPAGE IV BLACK EDITION OC PANEL connectors
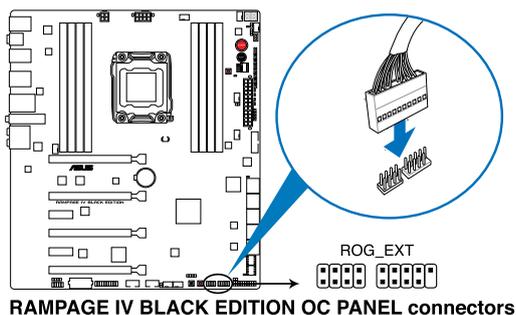
4. Boot your computer.

5. Press the OC Panel power button to turn on the OC Panel LCM display.

2.5   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

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

2.6   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 **R4BE.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 DirectKey button on the motherboard. You can perform this option if the DirectKey item is enabled in BIOS Setup. See the section about **Boot Menu** on **Chapter 3** for more information in enabling the DirectKey function in BIOS.

•   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 previous 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 the section about **Exit menu** on **Chapter 3** for more information.

-    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 the section about **Rear I/O Connection** on **Chapter 2** for information on how to erase the RTC RAM via the Clear CMOS button.

-    The BIOS setup program does not support 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

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. For more information, see the **Setup Mode** item of the **Boot menu** section on **Chapter 3**.

Selects the display language of the
BIOS setup program

Click to display all fan
speeds if available

Displays the CPU
temperature and CPU
voltage output

Displays the installed
DIMMs

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

Displays the shortcut
items

Normal mode

Displays the Advanced
mode menus

SATA
Information

Selects the boot device priority

Power Saving mode

ASUS Optimal
mode

Boot Menu

Loads optimized default settings

Displays the system properties of the
selected mode

- The boot device options vary depending on the devices you installed to the system.

- The **Boot Menu (F8)** button is available only when the boot device is installed to the system.

3.2.2 Advanced Mode

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

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

Submenu items   Menu bar   Configuration fields   General help

Menu items   Pop-up window   Scroll bar   Navigation keys
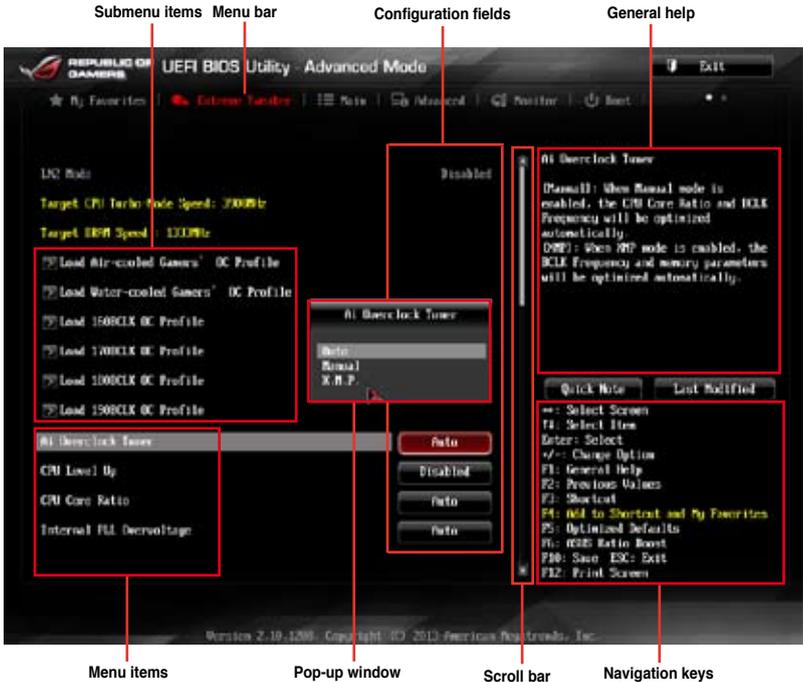
Menu bar

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

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

Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting **Main** shows the Main menu items.

The other items (My Favorites, Extreme Tweaker, Advanced, Monitor, Boot, Tool, and Exit) on the menu bar have their respective menu items.

Back button

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

Submenu items

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

Pop-up window

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

Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/Down arrow keys or <Page Up> / <Page Down> keys to display the other items on the screen.

Navigation keys

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

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

General help

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

Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

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

Quick Note button

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

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

Last Modified button

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

3.3 My Favorites

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

Adding items to My Favorites

To add frequently-used BIOS items to My Favorites:

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

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

> You cannot add the following items to My Favorites:
>
> • Items with submenu options
>
> • User-configurable items such as language and boot device order
>
> • Configuration items such as Memory SPD Information, system time and date

3.4 Extreme Tweaker menu

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

> ⚠️ Be cautious when changing the settings of the Extreme 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.

Load Air-cooled Gamer's OC Profile/ Load Water-cooled Gamer's OC Profile
Load 160BCLK OC Profile/ Load 170BCLK OC Profile/
Load 180BCLK OC Profile/ Load 190BCLK OC Profile

Select any of these preset overclocking profiles to load your preferred overclocking option.

> 🖊 The profiles appearing on the BIOS screen may vary depending on the CPU installed on your motherboard.

Chapter 3

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 individually set overclocking parameters.

[X.M.P.]　　　If you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology, choose this item to set the profiles supported by your memory modules for optimizing the system performance.

> The [X.M.P.] configuration option appears only when you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology.

CPU Level Up [Disabled]

Allows you to select a CPU level, and the related parameters will be automatically adjusted according to the selected CPU level.
Configuration options: [Disabled] [Auto] [4.800G] [4.600G] [4.400G]

> The configuration option and its values may vary depending on the CPU installed on your motherboard.

CPU Core Ratio [Auto]

Allows you to set the CPU ratio and sync automatically, per core or all cores.

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

> When the CPU Core Ratio is set to **[Sync All Cores]**, the following item appears.

1-Core Ratio Limit [Auto]

Allows you to set the 1-Core Ratio Limit.
[Auto]　　　Select to apply the CPU default Turbo Ratio setting.
[Manual]　　Select to manually assign a value for the 1-Core Ratio limit. The values of 2-core, 3-core, 4-core, 5-core, and 6-core ratio limits will be automatically set to be lower than or equal to the value of the 1-core Ratio limit.

> When the CPU Core Ratio is set to **[Per Core]**, the following item appears:

1-Core Ratio Limit [Auto]

Allows you to set the 1-Core Ratio Limit.
[Auto]　　　Select to apply the CPU default Turbo Ratio setting.
[Manual]　　Select to manually assign a 1-Core Ratio Limit value that is higher than or equal to the 2-Core Ratio Limit.

2-Core Ratio Limit [Auto]

Allows you to set the 2-Core Ratio Limit.
[Auto]　　　Select to apply the CPU default Turbo Ratio setting.
[Manual]　　Select to manually assign a 2-Core Ratio Limit value that is higher than or equal to the 3-Core Ratio Limit. 1-Core Limit must not be set to [Auto].

3-Core Ratio Limit [Auto]

Allows you to set the 3-Core Ratio Limit.

[Auto]   Select to apply the CPU default Turbo Ratio setting.
[Manual]   Select to manually assign a 3-Core Ratio Limit value that is higher
               han or equal to the 4-Core Ratio Limit. 1-Core/2-Core Ratio Limit must
               not be set to [Auto].

4-Core Ratio Limit [Auto]

Allows you to set the 4 Core Ratio Limit

[Auto]   Select to apply the CPU default Turbo Ratio setting
[Manual]   Select to manually assign a 4-Core Ratio Limit value that is higher
               than or equal to the 3-Core Ratio Limit. 1-Core/2-Core/3-Core Limit
               must not be set to [Auto].

5-Core Ratio Limit [Auto]

Allows you to set the 5-Core Ratio Limit.

[Auto]   Select to apply the CPU default Turbo Ratio setting.
[Manual]   Select to manually assign a 5-Core Ratio Limit value that is higher
               han or equal to the 4-Core Ratio Limit. 1-Core/2-Core/3-Core/4-Core
               Ratio Limit must not be set to [Auto].

6-Core Ratio Limit [Auto]

Allows you to set the 6 Core Ratio Limit

[Auto]   Select to apply the CPU default Turbo Ratio setting
[Manual]   Select to manually assign a 6-Core Ratio Limit value that is higher
               than or equal to the 5-Core Ratio Limit. 1-Core/2-Core/3-Core /
               4-Core/5-Core Limit must not be set to [Auto].

Internal PLL Overvoltage [Auto]

Allows you to enable the internal PLL voltage for K-SKU CPUs to get the extreme overclocking capability.

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

DRAM Frequency [Auto]

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

Xtreme Tweaking [Disabled]

Allows you to enable or disable Xtreme Tweaking that helps improve some benchmark performance.

Configuration options: [Enabled] [Disabled]

EPU Power Saving Mode [Disabled]

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

Configuration options: [Disabled] [Enabled]

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

EPU Setting [Auto]

Allows you to select the EPU power saving function.

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

DRAM Timing Control

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

Memory Presets

This item allows you to select and load a memory preset or timing profile from a redefined list. The configurations of the memory presets are provided by the ROG OC expert team. Users can load the profiles before performing overclocking or DRAM tweaking.

Rampage Tweak [Auto]

This item allows you to choose the mode that is supported by Rampage Tweak when you want to fine tune the DRAM of the system. Mode 1 helps you with the DRAM performance, Mode 2 helps you in overclocking and system performance, and Mode 3 is suitable for Ivy Biridge-E.

[Auto]   Automatically selects the mode.

[Mode 1]   Memory compatibility.

[Mode 2]   Overclocking and performance.

[Mode 3]   Ivy Bridge-E compatability

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

Primary Timings

DRAM CAS# Latency [Auto]

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

DRAM RAS# to CAS# Delay [Auto]

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

DRAM RAS# PRE Time [Auto]

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

DRAM RAS# ACT Time [Auto]

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

DRAM Command Rate [Auto]

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

Latency Boundary [Auto]

This item allows can help improve performance overcloking if enabled.
Configuration Options: [Auto] [Nearer] [Further] [Furthest]

Secondary Timings

DRAM RAS# to RAS# Delay [Auto]

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

DRAM REF Cycle Time [Auto]

Configuration options: [Auto] [1] – [511]

DRAM Refresh Interval [Auto]

Configuration options: [Auto] [1] – [32767]

DRAM WRITE Recovery Time [Auto]

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

DRAM READ to PRE Time [Auto]

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

DRAM FOUR ACT WIN Time [Auto]

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

DRAM WRITE to READ Delay [Auto]

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

DRAM CKE Minimum Pulse width [Auto]

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

DRAM Write Latency [Auto]

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

Third Timings

tRRDR [Auto]

Configuration options: [Auto] [0 DRAM Clock] – [7 DRAM Clock]

tRRDD [Auto]

Configuration options: [Auto] [0 DRAM Clock] – [7 DRAM Clock]

tWWDR [Auto]

Configuration options: [Auto] [0 DRAM Clock] – [7 DRAM Clock]

tWWDD [Auto]

Configuration options: [Auto] [0 DRAM Clock] – [7 DRAM Clock]

tRWDR [Auto]

Configuration options: [Auto] [0 DRAM Clock] – [15 DRAM Clock]

tRWDD [Auto]

Configuration options: [Auto] [0 DRAM Clock] – [15 DRAM Clock]

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Third Timings

tWRDR [Auto]
Configuration options: [Auto] [0 DRAM Clock] – [7 DRAM Clock]

tWRDD [Auto]
Configuration options: [Auto] [0 DRAM Clock] – [7 DRAM Clock]

tRWSR [Auto]
Configuration options: [Auto] [0 DRAM Clock] – [15 DRAM Clock]

tCCD [Auto]
Configuration options: [Auto] [0 DRAM Clock] – [7 DRAM Clock]

tCCDWR [Auto]
Configuration options: [Auto] [0 DRAM Clock] – [7 DRAM Clock]

Latency Timings

DRAM RTL (CHA/CHB/CHC/CHD D0/D1 R0/R1) [Auto]
Configuration options: [Auto] [Advance 2/4/6/8/10/12/14 Clock] [Normal]
[Delay 2/4/6/8/10/12/14 Clock]

DRAM IOL (CHA/CHB/CHC/CHD D0/D1 R0/R1) [Auto]
Configuration options: [Auto] [Advance 1 - 14 Clock] [Normal] [Delay 1 - 14 Clock]

Misc
DRAM CLK Period [Auto]
Configuration options: [Auto] [1] – [10]
DRAM Alignment [Optimized]
Configuration options: [Optimized] [Standard]
DRAM Training [Auto]
Configuration options: [Auto] [Ignore] [Enabled]
Enhanced Training (CHA/CHB/CHC/CHD) [Auto]
Configuration options: [Auto] [Disabled] [Enabled]
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] [Disabled]
DRAM Swizzling Bit 0 / Bit 1 [Auto]
Configuration options: [Auto] [Disabled] [Enabled]
RAW MHz Aid [Auto]
Configuration options: [Auto] [Disabled] [Enabled]

DIGI+ Power Control

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

CPU Vcore

CPU Load-Line Calibration [Auto]

CPU Load-line is defined by Intel VRM spec and affects CPU voltage. The CPU working voltage will decrease proportionally to CPU loading. Higher load-line calibration would get higher voltage and better overclocking performance, but increase the CPU and VRM thermal. This item allows you to adjust the voltage range from the following percentages to boost the system performance: 0% (Regular), 25% (Medium), 50% (High), 75% (Ultra High) and 100% (Extreme).
Configuration options: [Auto] [Regular] [Medium] [High] [Ultra High] [Extreme]

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

CPU Current Capability [Auto]

This item provides wider total power range for overclocking. A higher value brings a wider total power range and extends the overclocking frequency range simultaneously.
Configuration options: [Auto] [100%] [110%] [120%] [130%] [140%] [150%] [160%] [170%] [180%] [Disabled]

CPU Voltage Frequency [Auto]

Switching frequency will affect the transient response and component thermal. Higher frequency gets quicker transient response.
Configuration options: [Auto] [Manual]

VRM Over Temperature Protection [Auto]

This item allows you to enable or disable the VRM over temperature protection.
Configuration options: [Auto] [Disabled]

CPU Power Duty Control [T.Probe]

[T.Probe]   Maintains the VRM thermal balance.

[Extreme]   Maintains the VRM current balance.

Vcore MOS volt. Control [Auto]

Configuration options: [Auto] [6V] [6.5V] [7V] [7.5V] [8V] [8.5V] [9V] [9.5V] [10V]

CPU Power Phase Control [Auto]

Phase number is the number of working VRM phase. Increasing phase number under heavy system loading to get more transient and better thermal performance. Reducing phase number under light system loading to increase VRM efficiency

[Standard]   Proceeds phase control depending on the CPU loading.

[Optimized]   Loads the ASUS optimized phase tuning profile.

[Extreme]   Proceeds the full phase mode.

[Manual Adjustment]   Allows manual adjustment.

CPU Spread Spectrum [Disabled]

Allows you to enable or disable CPU Spread Spectrum that enhances system stability.
Configuration Options: [Disabled] [Enabled]

Current Inrush Inertia [Auto]

When enabled, helps reduce inrush current at the expense of slightly lower voltage under load.
Configuration Options: [Auto] [Disabled] [Enabled]

CPU VCore Bootup Voltage [Auto]

This item controls the voltage for CPU at initial boot. Set to higher value for better overclocking. The values range from 0.800V to 1.700V with a 0.005V interval.

CPU VSA

VCCSA Load-line calibration [Auto]

The behavior of the DRAM controller is decided by VCCSA Load-Line. Set to a higher value for system performance, or to a lower value for better thermal solution.
Configuration options: [Auto] [Regular] [High] [Extreme]

VCCSA Current Capability [100%]

Allows you to set the VCCSA current capability. A higher value brings wider total DRAM controller power range and extends the overclocking frequency range simultaneously.
Configuration options: [100%] [110%] [120%] [130%]

VCCSA Fixed Frequency [300]

The values range from 300kHz to 600kHz with a 50kHz interval.

CPU VSA Bootup Voltage [Auto]

This item controls the voltage for CPU VSA at initial boot. Set higher value for better overclockability. The values range from 0.800V to 1.990V with a 0.005V interval.

Chapter 3

CPU VTT

CPU VTT Switching Freq [Auto]

This item allows you to switch the frequency of VTT power. Set 1.3x for cleaner power.
Configuration options: [Auto] [1x] [1.3x]

CPU VTT Over-Current Protection [Auto]

This item allows you to enable or disable the CPU VTT over-current protection. Set to
[Disabled] to remove over-current protection on VTT power.
Configuration options: [Auto] [Enabled] [Disabled]

DRAM Voltage

DRAM-AB/DRAM-CD Current Capability [100%]

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

DRAM-AB/DRAM-CD Voltage Frequency [Auto]

This item allows you to adjust the DRAM switching frequency. Assign a fixed high
DRAM frequency to increase O.C range or a lower DRAM frequency for better system
stability. Configuration options: [Auto] [manual]

DRAM-AB/DRAM-CD Power Phase control [Standard]

[Standard]   Allows you to set to the standard phase tuning profile.

[Optimized] Allows you to set ASUS optimized phase tuning profile.

[Extreme]   Allows you to set the Full phase mode.

PCH 1.1V

PCH 1.1v Switching Freq. [Auto]

This item allows you to switch the frequency of PCH power. Set 1.3x for cleaner power.
Configuration options: [Auto] [1x] [1.3x]

CPU Performace Settings

Enhanced Intel SpeedStep Technology [Auto]

Allows you to enable or disable the Enhanced Intel® SpeedStep Technology.

[Auto]   Automatically selects the function.

[Disabled] Disables this function.

[Enabled]   The operating system dynamically adjusts the processor voltage and core frequency which may result in decreased average consumption and decreased average heat production.

Turbo Mode [Enabled]

[Disabled] Disables this function.

[Enabled]   Allows processor cores to run faster than marked frequency in specific condition.

Turbo Mode Parameters

Power Limit Control [Auto]

This item appears only when you set the **CPU Ratio** item to [Auto] and the **Turbo Mode** item to [Enabled]. Leave this item at [Auto] for best overclocking or set to [Enabled] to customize settings. Configuration options: [Auto] [Enabled]

> The following items appear only when you set the **Turbo Mode** items to [Enabled] and **Power Limit Control** item to [Enabled].

Long Duration Power Limit [Auto]
Use the <+> and <-> keys to adjust the value.

Long Duration Maintained [Auto]
Use the <+> and <-> keys to adjust the value.

Short Duration Power Limit [Auto]
Use the <+> and <-> keys to adjust the value.

Additional Turbo Voltage [Auto]
Use the <+> and <-> keys to adjust the value.

CPU Core Current Limit [Auto]
Use the <+> and <-> keys to adjust the value.

GPU/DIMM Post

GPU Post

The **GPU Post** sub-menu allows you to view the information of individual PCI Express slots.

PCIe Lane Simulator

The **PCIe Lane Simulator** item allows you to simulate PCIe lane arrangement.

DIMM Post

The **DIMM Post** sub-menu allows you to view the information of installed DIMMs.

Extreme OV [Disabled]

This item is set to [Disabled] by default to protect the CPU from being overheated. Set this item to [Enabled] to choose a higher voltage to overclock, but doing so might decrease CPU life. Configuration options: [Disabled] [Enabled]

BCLK Skew [Auto]

Reduce the value to improve BCLK margin.
Configuration options: [Auto] [-5] – [+3]

CPU VCORE Voltage [Manual Mode]

[Manual Mode]   Allows you to set a fixed CPU voltage.

[Offset Mode]   Allows you to set the Offset voltage.

> This item appears only when you set the **CPU VCORE Voltage** item to [Manual Mode]

CPU VCORE Manual Voltage [Auto]

This item allows you to set a fixed CPU voltage. The values range from 0.800V to 2.100V with a 0.005V interval.

> This item appears only when you set the **CPU VCORE Voltage** item to [Offset Mode].

Offset Mode Sign [+]

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

CPU VCORE Offset Voltage [Auto]

This item allows you to set the Offset voltage. The values range from 0.005V to 0.635V with a 0.005V interval.

VTT CPU Voltage [Auto]

Allows you to set the VTT CPU voltage. The values range from 0.8000V to 1.7000V with a 0.00625V interval.

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

2nd VTTCPU Voltage [Auto]

Allows you to set the second VTTCPU voltage. The values range from 0.80642V to 1.70538V with an increment of 0.00661V.

CPU VCCSA Voltage [Manual Mode]

[Manual Mode]   Allows you to set a fixed CPU voltage.

[Offset Mode]   Allows you to set the Offset voltage.

> This item appears only when you set the CPU VCCSA Voltage item to [Manual Mode]

CPU VCCSA Manual Voltage [Auto]

This item allows you to set a fixed CPU voltage. The values range from 0.800V to 1.700V with a 0.005V interval.

> This item appears only when you set the CPU VCCSA Voltage item to [Offset Mode].

Offset Mode Sign [+]

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

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

CPU VCCSA Offset Voltage [Auto]

This item allows you to set the Offset voltage. The values range from 0.005V to 0.635V with a 0.005V interval.

DRAM Voltage (CHA, CHB) [Auto]

Allows you to set the DRAM voltage for DRAM channel A and B. The values range from 1.20V to 2.30V with a 0.005V interval.

DRAM Voltage (CHC, CHD) [Auto]

Allows you to set the DRAM voltage for DRAM channel C and D. The values range from 1.20V to 2.30V with a 0.005V interval.

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

CPU PLL Voltage [Auto]

Allows you to set the CPU PLL voltage. The values range from 1.2500V to 2.5000V with a 0.00625V interval.

PCH 1.1v Voltage [Auto]

Allows you to set the 1.1v Platform Controller Hub voltage. The values range from 0.8000V to 1.6000V with a 0.00625V interval.

Initial PLL Termination Voltage [Auto]

PLL Termination Voltage set before Memory Sizing.

Eventual PLL Termination Voltage [Auto]

PLL Termination Voltage set before entering OS.

VTTDDR Voltage (CHA, CHB) [Auto]

Allows you to set the VTTDDR voltage for DRAM channel A and B. The values range from 0.6250V to 1.1000V with a 0.00625V interval.

VTTDDR Voltage (CHC, CHD) [Auto]

Allows you to set the VTTDDR voltage for DRAM channel C and D. The values range from 0.6250V to 1.1000V with a 0.00625V interval.

CPU PLL Termination [Auto]

[Auto]   Automatically selects the mode.

[Disabled]   Disables this function.

[Enabled]   Helps overclocking.

CPU Spread Spectrum [Auto]

[Auto]   Automatically selects the mode.

[Disabled]   Enhances the BCLK overclocking ability.

[Enabled]   Sets to [Enabled] for EMI control.

PCIE Spread Spectrum [Auto]

[Auto]   Automatically selects the mode.

[Disabled]   Enhances the PCIE overclocking ability.

[Enabled]   Sets to [Enabled] for EMI control.

BCLK REcovery [Enabled]

Allows you to enable or disable BCLK Recovery.

CPU Tweakers' Paradise

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

PCIE CLK Skew [Auto]

Linearly related to BCLK Skew. Default is 0 and can reduce when CPU is colder.
Configuration options: [Auto] [-1 to -63] - [+1 to +63]

PCIE I/O Skew [Auto]

Linearly related to CPU I/O Drive Strength Skew. Default is 0 and can increase when CPU is colder.
Configuration options: [Auto] [-1 to -63] - [+1 to +63]

CPU I/O Drive Strenght [Auto]

Linearly related to CPU I/O Skew. Default is 0 and can increase when CPU is colder.
Configuration options: [Auto] [-1 t0 -63] - [+1 to +63]

Chapter 3

Memory Tweakers' Paradise

IMC AB Signal 1 / Signal 2 / Signal 3 [Auto]

Configuration options: [-126] – [-1] [Auto] [+1] – [+32]

IMC CD Signal 1 / Signal 2 / Signal 3 [Auto]

Configuration options: [-126] – [-1] [Auto] [+1] – [+32]

DRAM CTRL REF Voltage on (CHA) / (CHB) / (CHC) / (CHD) [Auto]

The values range from 0.38500x to 0.61500x with a 0.0050x interval.

DRAM DATA REF Voltage on (CHA) / (CHB) / (CHC) / (CHD) [Auto]

The values range from 0.38500x to 0.61500x with a 0.0050x interval.

DRAM Read REF Voltage (CHA) / (CHB)/ (CHC) / (CHD) [Auto]

The values range from 0.38500x to 0.61500x with a 0.0050x interval.

PCH Chipset Tweakers' Paradise

PCH 1.5v Voltage [Auto]

The values range from 1.2000V to 2.3000V with a 0.00625V interval.

PCH 1.1VG Voltage [Auto]

The values range from 0.80642V to 1.60623V with a 0.00661V interval.

PCH DMI Strength [Auto]

Configuration options: [-96] – [-1] [Auto] [+1] – [+96]

PCH DMI Skew [Auto]

Configuration options: [-96] – [-1] [Auto] [+1] – [+96]

Chapter 3

3.5 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.
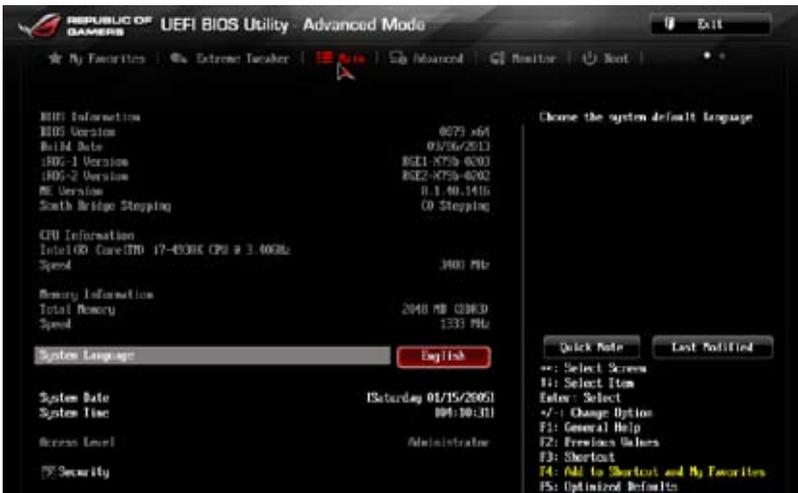
Security

The Security menu items allow you to change the system security settings.
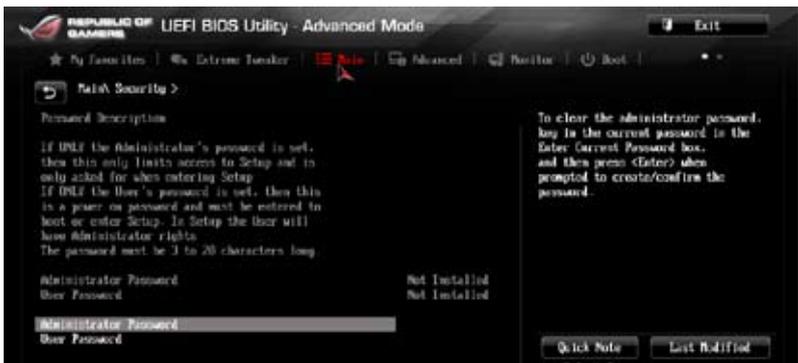
- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See the section about **Rear I/O Connection** on **Chapter 3** for information on how to erase the RTC RAM via the Clear CMOS button.

- 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**.

3.6   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]

Allows a hyper-threading processor to appear as two logical processors, allowing the operating system to schedule two threads or processes simultaneously.

[Enabled]   Two threads per activated core.

[Disabled]   One thread 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]

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

[Disabled]   Disables this function.

Execute Disable Bit [Enabled]

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

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

Intel® Virtualization Technology [Disabled]

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

[Disabled]   Disables this function.

CPU Power Management Configuration

Enhanced Intel SpeedStep Technology [Auto]

This item allows you to enable or disable the Enhanced Intel SpeedStep Technology that helps decrease average power consumption and decrease average heat production.
Configuration options: [Auto] [Disabled] [Enabled]

Turbo Mode [Enabled]

This item allows you to enable or disable the Turbo Mode that helps processors to run faster the the base operating frequency if it is operating below power, current, and temperature specification limit.
Configuration options: [Disabled] [Enabled]

CPU C states [Auto]

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

The following items only appears when you set the CPU C states to [Enabled].

CPU C1E [Enabled]

Configuration options: [Disabled] [Enabled]

CPU C3 Report [Disabled]

Configuration options: [Disabled] [Enabled]

CPU C6 Report [Enabled]

Configuration options: [Disabled] [Enabled]

Package C State limit [Auto]

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

Chapter 3

3.6.2 System Agent Configuration
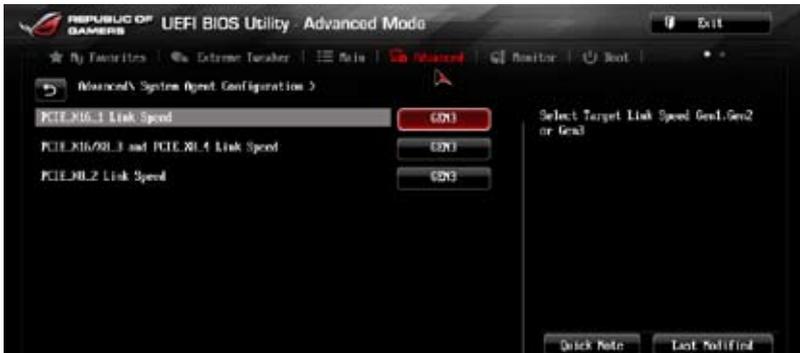
PCIE_X16_1 / PCIE_X16/8_3 and PCIE_X8_4 / PCIE_X8_2 Link Speed [GEN3]

Allows you to select the target link speed.

Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

3.6.3 PCH Configuration

High Precision Timer [Enabled]

Allows you to enable or disable 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 on the corresponding SATA port.

Scroll down to display the other BIOS items.

SATA Mode [AHCI Mode]

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.

To rename the Intel SATA port, click on the item then key-in your desired name.

The following two items appear only when you set the **SATA Mode** item to [IDE Mode].

Serial-ATA Controller 0 [Enabled]

Allows you to enabled/disabled the Serial-ATA Controller 0.
Configuration options: [Disabled] [Enabled] [Compatible]

Serial-ATA Controller 1 [Enabled]

Allows you to enabled/disabled the Serial-ATA Controller 1.
Configuration options: [Disabled] [Enabled]

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]

These items allows 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]

[Disabled]	Disables the function.
[Enabled]	Enables the support for USB 3.0 devices on legacy operating systems (OS).

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 the **Motherboard layout** on **Chapter 1** for the location of the USB ports.

Chapter 3

3.6.6 Onboard Devices Configuration

Scroll down to view the other BIOS items.

Azalia HD Audio [Enabled]

[Disabled]   Disables the controller.

[Enabled]   Enables the High Definition Audio Controller.

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

Front Panel Type [HD]

Allows you to set the front panel audio connector (AAFP) mode to legacy AC97 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 AC97

SPDIF Out Type [SPDIF]

[SPDIF]   Sets to [SPDIF] for SPDIF audio output.

[HDMI]   Sets to [HDMI] for HDMI audio output.

Bluetooth Controller [Enabled]

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

Wi-Fi Controller [Enabled]

Allows you to enable or disable the Wi-Fi controller.
Configuration options: [Enabled] [Disabled]

Intel LAN Controller [Enabled]

[Enabled]   Enables the GbE controller.
[Disabled]   Disables the controller.

Intel PXE OPROM [Disabled]

This item appears only when you set the Intel LAN Controller to [Enabled]. It allows you
to enable or disable the PXE OptionRom of the Intel LAN's controller.
Configuration options: [Enabled] [Disabled]

Asmedia USB 3.0 Controller (USB3_E12 USB3_E34) / (USB3_E78) / (USB3_E56) [Enabled]

Allows you to select the ASMedia USB 3.0 controller operating mode.

[Disabled]   Disables the controller.
[Enabled]   Enables the controller.

Hot-plug [Disabled]

[Disabled]   Disables the hot-plug support.
[Enabled]   Enables the hot-plug support.

Asmedia USB 3.0 Battery Charging Support [Disabled]

This item allows user to enable/disable the USB charging support of the Asmedia USB 3.0
controller. Configuration options: [Disabled] [Enabled]

ASM1061 Storage Controller (SATA6G_E12) / (SATA6G_E34) / (ES6_12) [Enabled]

Allows you to enable or disable the ASM1061 storage controller.
Configuration options: [Disabled] [IDE Mode] [AHCI Mode]

> If you want to use the full function of the ASM1061 storage controller like theAHCI, we
> recommend that you set this item to [AHCI Mode] and install the **ASM1061 Controller
> Driver** from the motherboard support DVD.

Hot-plug [Disabled]

[Disabled]   Disables the hot-plug support.
[Enabled]   Enables the hot-plug support.

Chapter 3

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 [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
                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)]

Chapter 3

3.6.8 Network Stack

Network Stack [Disabled]

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

Configuration options: [Disabled] [Enabled]

> The following items appear 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 specify the wait time to press ESC key to abort the PXE boot.

3.6.9 ROG Effects

ROG Pulse [Enabled]

This item allows the animation of the ROG Logo on the upper left corner of the BIOS UEFI screen when set to [Enabled].

Configuration options: [Disabled] [Enabled]

SupremeFX Lighting LED [Enabled]

Allows you to enable ot disable the LED for SupremeFX application.

Configuration options: [Disabled] [Enabled]

Chapter 3

3.7 Monitor menu

The Monitor menu displays the system temperature/power status, and allows you to change the fan settings.
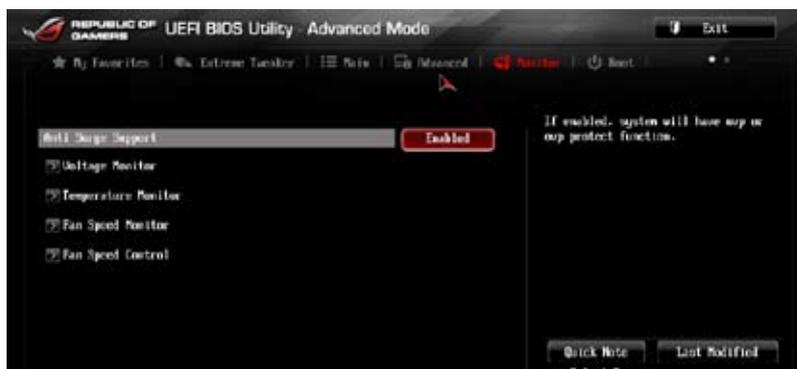
Anti Surge Support [Enabled]

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

Configuration options: [Disabled] [Enabled]

Voltage Monitor

CPU Voltage; 3.3V Voltage; 5V Voltage; 12V Voltage ; VTT CPU Voltage; CPU VCCSA Voltage; CPU PLL Voltage; DRAM AB Voltage; DRAM CD Voltage; PCH 1.1 Voltage; PCH 1.5 Voltage; 2nd VTTCPU Voltage

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Press <Enter> and select [Ignore] if you do not wish to display the detected temperatures.

Temperature Monitor

CPU Temperature; MB Temperature; PCH Temperature; PCH Overheat Protection*; OPT1/OPT2/OPT3 Temperature; OPT TEMP1/TEMP2/TEMP3 [xxxºC/xxxºF]

The onboard hardware monitor automatically detects and displays the CPU, and motherboard. Press <Enter> and select [Ignore] if you do not wish to display the detected temperatures.

> ⚠ The PCH Overheat Protection on PCH/OPT1/OPT2/OPT3 shuts down the system when temperature reaches user-specified values.

Fan Speed Monitor

CPU FAN Speed; CPU OPT Speed; Chassis FAN 1/FAN 2/FAN 3 Speed; Opt FAN 1/FAN 2/FAN 3 Speed [xxxxRPM] or [Ignored] / [N/A]

The onboard hardware monitor automatically detects and displays the CPU fan, chassis fan, and optional fan speed in rotations per minute (RPM). If any of the fans is not connected to the motherboard, the field shows [N/A]. These items are not user-configurable. Press <Enter> and select [Ignore] if you do not wish to display the detected temperatures.

Fan Speed Control

CPU Q-Fan Control [Auto]

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

[Disabled]	Disables the CPU Q-Fan control feature.
[Advance Mode]	Detect 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.

CPU Fan Speed Low Limit [600 RPM]

Allows you to disable or set the CPU fan warning 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 <+> and <-> keys to adjust the upper limit of the CPU temperature. The values range from 20ºC to 75ºC.

CPU Fan Max. Duty Cycle(%) [100]

Use the <+> and <-> keys to adjust the maximum CPU fan duty cycle. The values range from 40% 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(%) [40]

Use the <+> and <-> keys to adjust the minimum CPU fan duty cycle. The values range from 40% to 100%. When the CPU temperature is under its CPU lower temperature setting, the CPU fan will operate at the minimum duty cycle.

Chassis Q-Fan Control 1-3 [Disabled]

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

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

Chassis Fan Speed Low Limit 1-3 [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 Profile [Standard]

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

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

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

[Turbo]   Sets to [Turbo] to achieve maximum chassis fan speed.

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

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

Chassis Upper Temperature [70]

Use the <+> and <-> keys to adjust the upper limit of the chassis temperature. The values range from 40ºC to 75ºC.

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

Chassis Lower Temperature [40]

Displays the lower limit of the chassis temperature.

Chassis Fan Min. Duty Cycle(%) [60]

Use the <+> and <-> keys to adjust the minimum chassis fan duty cycle. The values range from 60% to 100%. When the chassis temperature is under 40ºC, the chassis fan will operate at the minimum duty cycle.

OPTFAN 1/ OPTFAN 2/ OPTFAN 3 Control [Disabled]

Allows you to disable or set the optional fans' warning speeds.

Configuration options: [Disabled] [Duty Mode] [Profile Mode] [User Mode]

> The following items appear only when you set **OPTFAN 1/ OPTFAN 2 / OPTFAN 3** to **[Duty Model]**.

OPTFAN 1/ OPTFAN 2/ OPTFAN 3 Duty

Allows you to set the optional fans' speed duty percentagea.
Configuration options: [50%] [60%] [70%] [80%] [90%]

Profile Mode

Allows you to set the optional fans' profiles.

Configuration options: [Performance] [Optional] [Silent]

The following four items appear only when you set OPTFAN 1/ OPTFAN 2/ OPTFAN 3 to **[Profile Model].**

OPT Fan 1/2/3 Profile

Allows you to set the optional fans' profiles.
Configuration options: [Performance] [Optional] [Silent]

User Mode

Allows you to set the optional fan's speed temperature.

OPT1-3 Low Speed Temp [25%]

Allows you to set the optional fans' low speed temperature.
Configuration options: [25%] [30%] [35%] [40%]

OPT1-3 Full Speed Temp [60%]

Allows you to set the optional fans' full speed temperature.
Configuration options: [60%] [70%] [80%] [90%]

Chapter 3

3.8 Boot menu

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

Scroll down to display the other BIOS items.

Fast Boot [Disabled]

[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 [All Devices]

[All Devices]   All devices connected to SATA ports will be available duting POST.

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

[Boot Drive Only]   Only boot drive connected to SATA ports will be 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.

P/2 Keyboard and Mouse Support [Auto]

Allows you to disable or have full system control of the PS/2 devices' availability during POST.
Configuration options: [Disabled] [Full Initialization] [Auto]

Network Stack Driver Support [Disabled]

Tis item allows you to enable or disable the Network Stack Driver Support function.
Configuration options: [Disabled] [Enabled]

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]	Auto adjusts the Boot Logo size for Windows requirements.
[Full Screen]	Maximizes the Boot Logo size.
[Disabled]	Hides the boot logo during POST.

> The following items appears only when you set the Boot Logo Display item to **[Auto]** or **[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 will only work when set under normal boot.

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

POST Report [5 sec]

This item allows you to select a desired POST report waiting time.
Configuration options: [1 sec] - [2 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 forced to display 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 [Advanced Mode]

[Advanced Mode]   Sets Advanced Mode as the default screen for entering the BIOS
                          setup program.

[EZ Mode]   Sets EZ Mode as the default screen for entering the BIOS setup
                          program.

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 when you set the Launch CSM to **[Enabled]**.

Boot Device Control [UEFI and L...]
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 OPR...]
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 OPR...]
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 Expansion Devices [Legacy OPR...]
Allows you to select the type of PCIe/PCI expansion devices that you want to launch.
Configuration options: [Legacy OPROM first] [UEFI driver first]

Secure Boot

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

OS Type [Windows UEFI mode]

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

Key Management

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

Clear Secure Boot keys
Allows you to all the Secure Boot keys, Platform key (PK), Key-exchange Key (KEK), Signature database (db), and Revoked Signatures (dbx) previously applied. All the Secure Boot keys' state will change from Loaded mode to Unloaded mode. The settings are applied after the reboot or at the next reboot.

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

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, do any of the following:

  - Press <F5> when ASUS Logo appears.

  - Press <F8> after POST.

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

Boot Override

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

3.9 Tools menu

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

3.9.1 ASUS EZ Flash 2 Utility

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

For more information, see section **3.11.1 ASUS EZ Flash 2**.

3.9.2   ROG SSD Secure Erase

SSD speeds may lower over time as with any storage medium due to data processing. Secure Erase completely and safely cleans your SSD, restoring it to factory performance levels.

> Secure Erase is only available in AHCI mode. Ensure to set the SATA mode to AHCI. Click **Advanced > SATA Configuration > AHCI**.

To launch ROG SSD Secure Erase, click **Tool > ROG SSD Secure Erase** on the Advanced mode menu.

> Check the ASUS support site for a full list of SSDs tested with Secure Erase. The drive may become unstable if you run Secure Erase on an incompatible SSD.

> •   The time to erase the contents of your SSD may take a while depending on its size. Do not turn off the system during the process.
>
> •   Secure Erase is only supported on Intel SATA port. For more information about Intel SATA ports, refer to section 1.2.9 of this manual.

Displays the available SSDs

Click to start the SSD Secure Erase

> **Status definition:**
>
> **Frozen**   The frozen state is the result of a BIOS protective measure. The BIOS guards drives that do not have password protection by freezing them prior to booting. If the drive is frozen, a power off or hard reset of your PC must be performed to proceed with the Secure Erase.
>
> **Locked**   SSDs might be locked if the Secure Erase process is either incomplete or was stopped. This may be due to a third party software that uses a different password defined by ASUS. You have to unlock the SSD in the software before proceeding with Secure Erase.

Chapter 3

3.9.3 ASUS SPD Information

Allows you to view the DRAM SPD information.

DIMM Slot Number

Allows you to view the information about the installed DIMMS when selected.

3.9.4 ASUS Overclocking Profile

This item allows you to store or load multiple BIOS settings.
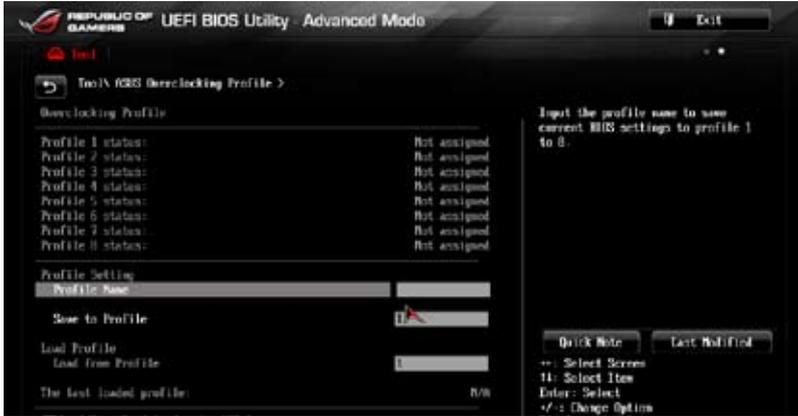
> The **O.C. Profile Configuration** items show **Not Installed** if no profile is created.

Profile Name

Allows you to input the 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. Profile Name

Load/Save Profile from/to USB Drive

Allows you to load or save a profile from a USB.

3.9.5   BIOS Flashback

Allows you select copy and boot from either BIOS1 or BIOS2.

Force BIOS1/BIOS2 Boot

Select [Yes] to force the boot using BIOS2.

COPY BIOS1/BIOS2 to BIOS2/BIOS1

Select [Yes] to copy the content of BIOS1 to BIOS2.

3.9.6   ROG OC Panel H-Key Configure

The ROG OC Panel H-Key Configure allows you to input and save values on the CPU core voltage, CPU input voltage, BCLK Frequency, and CPU ratio in the UEFI BIOS. The saved values can be synchronized to a compatible OC Panel device and these values can be applied to the motherboard using the OC Panel without going to the BIOS menu.

BCLK Frequency [Auto]

This item allows you to input values to the Base Clock (BCLK) Frequency that ranges from 80 MHz to 300 MHz.

CPU Ratio [Auto]

This item allows you to the adjust the CPU ratio. The CPU ratio may vary according to the model of the processor.

CPU Voltage [Auto]

This item allows you to configure the amount of Voltage fed to the processor cores and cache. You can use <+> or <-> key to raise or reduce the voltage by an increment of 0.005V. The minimum voltage is 0.800V and the maximum voltage is 2.260V.

Load Default

This item allows you reset the values of the BCLK Frequency, CPU Ratio, and CPU Voltage to **[Auto]**.

Save Above Settings

This item allows you to save the new values of the BCLK Frequency, CPU Ratio, and CPU Voltage.

Load from profile

This item allows you to load the previous values of the BCLK Frequency, CPU Ratio, and CPU Voltage.

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.

Chapter 3

3.11   Updating BIOS

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

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

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

1.   EZ Update: Updates the BIOS in Windows® environment.

2.   ASUS EZ Flash 2: Updates the BIOS using a USB flash drive.

3.   ASUS CrashFree BIOS 3: Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.

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

3.11.1 ASUS EZ Flash 2

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

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

To update the BIOS using EZ Flash 2:

1. Insert the USB flash disk that contains the latest BIOS file to the USB port.

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

3. Press <Tab> to switch to the Drive field.

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

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

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

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

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

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

3.11.2   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 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!

3.11.3 ASUS BIOS Updater

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

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

Before updating BIOS

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

2. Download the latest BIOS file and BIOS Updater from the ASUS website at http://support.asus.com and save them on the USB flash drive.

> • NTFS is not supported under DOS environment. Do not save the BIOS file and BIOS Updater to a hard disk drive or USB flash drive in NTFS format.
>
> • Do not save the BIOS file to a floppy disk due to low disk capacity.

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

Booting the system in DOS environment

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

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

```
Please select boot device:

  SATA:  XXXXXXXXXXXXXXX
  USB  XXXXXXXXXXXXXXX
  UEFI: XXXXXXXXXXXXXXX
  Enter Setup


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

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

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

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

Updating the BIOS file

To update the BIOS file using BIOS Updater:

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

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

2.   The BIOS Updater screen appears as below.

```
        ASUSTek BIOS Updater for DOS V1.30 [2012/05/22]
    FLASH TYPE: MXIC 25L3065A
        ─── Current ROM ───              ─── Update ROM ───
  BOARD: RAMPAGE IV BLACK EDITION   BOARD: Unknown
  VER:   0204                       VER:   Unknown
  DATE:  01/01/2012                 DATE:  Unknown
  PATH: A:\
  A:            R4BE.CAP   2097152 2013-03-20 17:30:48




  ─ Note ─
  [Enter] Select or Load    [Tab] Switch    [V] Drive Info
  [Up/Down/Home/End] Move   [B] Backup      [Esc] Exit
```
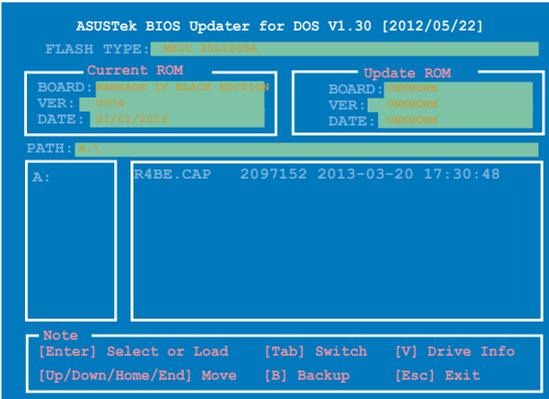
3.   Press <Tab> to switch between screen fields and use the <Up/Down/Home/End> keys to select the BIOS file and press <Enter>. BIOS Updater checks the selected BIOS file and prompts you to confirm BIOS update.

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

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

5. 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 **Chaper 3 BIOS setup** of your motherboard user manual for details.
>
> • Ensure to connect all SATA hard disk drives after updating the BIOS file if you have disconnected them.

Chapter 3

Software support

4

4.1 Installing an operating system

* This motherboard supports Windows® 8/ Windows® 8.1 32/64-bit and Windows® 7 32/64-bit operating systems (OS).

* Motherboard settings and hardware options vary. Use the setup procedures presented in this chapter for reference only. Refer to your OS documentation for detailed information.

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

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

The Video menu contains ROG related videos.

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

Click the Contact tab to display the ASUS contact information.

Click an icon to display DVD/ motherboard information

Click an item to install

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.
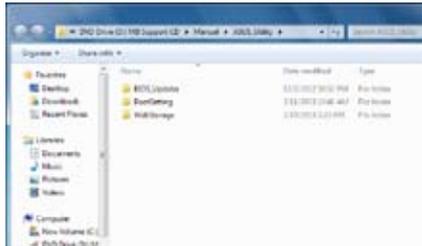
3.   Some software manuals are provided in different languages. Open the language's folder to view the software manual.
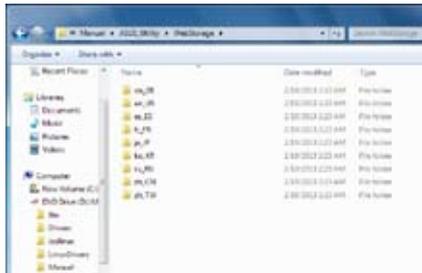
The screenshots in this section are for reference only. The actual software manuals containing in the support DVD vary by models.

Chapter 4

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 or Windows® 8 / 8.1 OS.

- To install the Wi-Fi-enabled features of AI Suite 3, ensure that you install the Wi-Fi module and its latest driver from the bundled support DVD. To do this, go to **Drivers** tab **> ASUS Bluetooth 4.0 Wi-Fi Driver** and follow the succeeding onscreen instructions.

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 / 8.1 OS

1. Place the Support DVD into the optical drive then follow the onscreen instructions.

2. From the **ASUS motherboard support DVD** main menu, select the **Utilities** tab and click or tap **AI Suite 3**.

3. Follow the succeeding onscreen instructions.

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

    a. Go to the Start screen then click or tap the **Desktop** app.

    b. From the taskbar, click or tap **File Explorer** [icon] then select your DVD drive and double-click or tap 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 3 in Windows® 7 by clicking [icon] on the Notification area.

Windows® 8 / 8.1 OS

To launch AI Suite 3 in Windows® 8/ 8.1, 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.

Included in the AI Suite 3 main menu is a quick-access menu bar that allows you to swiftly launch any of the integrated ASUS utilities. Click or tap the ▼ on the top-edge of menu to launch the menu bar.

Click to launch AI Suite 3 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

4-Way Optimization   Ai Charger+   EZ Update   USB BIOS Flashback

USB 3.0 Boost   System Information   Wi-Fi GO!   Wi-Fi Engine
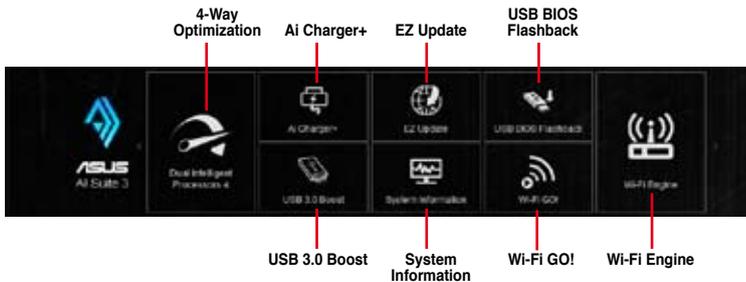
> • Some functions in the AI Suite 3 main menu in this user manual may vary depending on the motherboard model.
>
> • Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.4.1   Dual Intelligent Processors 4 with 4-Way Optimization

Dual Intelligent Processors 4 with 4-Way Optimization 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

Click or tap to optimize your fans

Select an advanced power saving mode

Click or tap this 4-Way Optimization button to auto-detect and tune the best settings for your system

Click or tap to view the 4-Way Optimization report

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 / 8.1 OS, click or tap **Desktop** app to monitor the auto-tuning process after every system reboot.

Chapter 4

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, CPU Ratio, and CPU Cache 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 **Extreme Tweaker menu** in the BIOS chapter of your motherboard user manual for details.
>
> • The CPU Frequency bars show the status of the CPU cores, which vary with your CPU model.

CPU Strap

Drag the slider to adjust the CPU Strap's BCLK (base clock) frequency

Click to apply CPU Strap settings

Click to cancel the CPU Strap settings

Click to apply the adjustments

Click to undo the adjustments

Click to load the saved profile

Click to save the adjustment into a 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 Voltage Decrement setting

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 apply the default settings

Click or tap to undo the adjustments

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 Voltage
Decrement setting

Tick to enable
Away Mode

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

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

Away Mode

Tick to select Voltage Decrement setting

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

Chapter 4
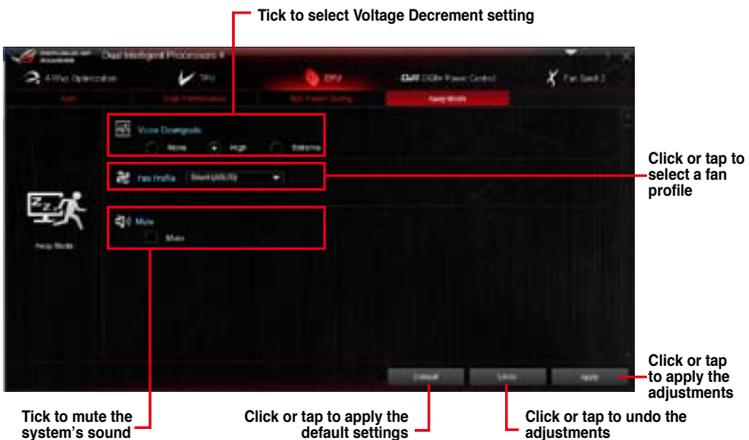
DIGI+ Power Control

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

Click or tap to switch between screens

Click or tap to undo the changes

Click or tap to apply the changes

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 frequence range simultaneously.

3 **VCCSA Load-line Calibration**
The VCCSA Load-line determines the behavior fo the DRAM Controller. Set to a higher value for an overall system performance, or to a lower value for a better thermal solution.

4 **VCCSA Fixed Frequency**
When set to a higher value, this item brings wider total DRAM Controller power range and extends the overclocking frequency range simultaneously.

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

6 **CPU Power Phase Control**
Allows you to select between **Standard, Optimized, Extreme,** and **Manual Adjustment** modes. The modes allows you to either increase system performance or increase the DRAM power efficiency.

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Click or tap to switch between screens   **Click or tap to undo the changes**   **Click or tap to apply the changes**

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

    When **Auto** is selected, you have an option to enable CPU Spread Spectrum that helps enhance system stability.

    When **CPU Fixed Frequency** is selected, you can assign a CPU frequency to increase the overclocking range. .

8   **VRM Over Temperature Protection**
    VRM Over Temperature Protection protects the motherboard from overheating.

    It is recommended to set VRM Over Temperature Protection to [Auto].

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

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Adjusting the DRAM Power

Click or tap to undo
the changes

Click or tap to
apply the changes
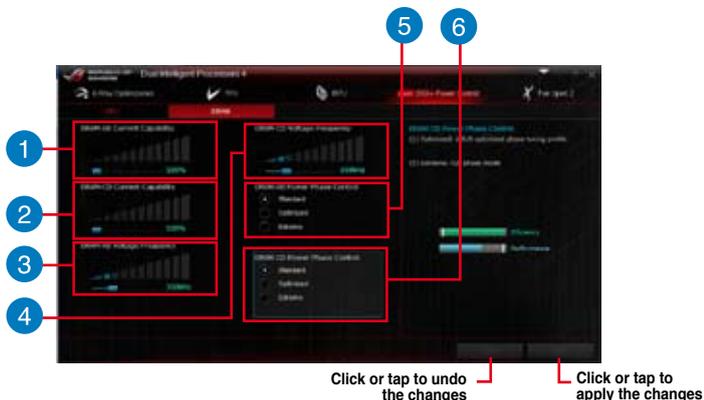
1. **DRAM-AB Current Capability**
   Higher value to DRAM slots A and B brings a wider total power range and extends the overclocking frequency range simultaneously.

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.

Chapter 4

Fan Xpert 2

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

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 switch between fan screens

Click or tap to load a profile

Click or tap to save the settings into a profile

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 undo the changes

Click or tap to apply the changes

Click or tap to go back to the previous screen

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

Chapter 4

RPM Mode

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

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

Click or tap to go back to the previous screen

Click or tap to switch between the CPU and chassis fan screens
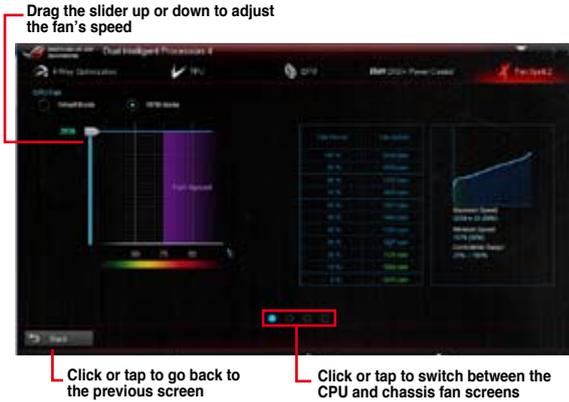
> • When the CPU temperature reaches 75º C, the fan automatically runs at full speed to protect the CPU.
>
> • Fan Xpert 2 may not be able to detect the fan speed if you install the fan with an external control kit for rotation speed.
>
> • Fan Xpert 2 only supports fans with 4-pin and 3-pin connectors. 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　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+ 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.

4.4.3   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 ⬇ on the right edge of the AI Suite 3 main menu, then select **Wi-Fi Engine**.

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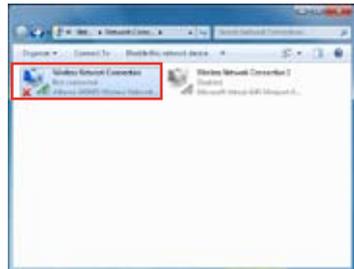
3.   From the list of available networks, select a network that you want to connect to.
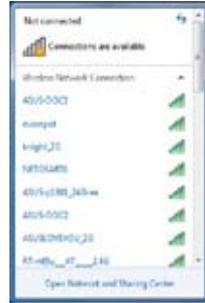
Using the AP Mode

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.

Key in a network name

Key in your password

Key in your password for confirmation

Click or tap to disable AP mode

Click or tap to enable AP mode

Click or tap to go back to previous screen

Click or tap to select a network
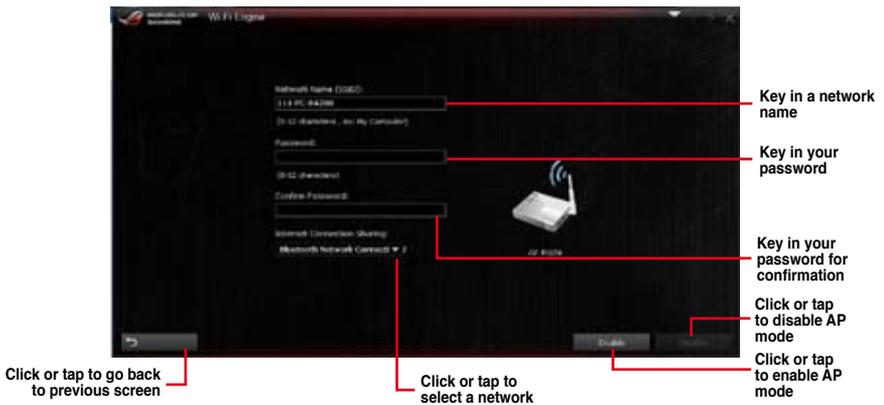
•   In this mode, the Internet Connection Sharing may depend on the Bluetooth/Internet device's driver support.

•   Due to Windows® 8 / 8.1 limitation, it may take one to two minutes to set up the AP mode for the first time.

4.4.4   Wi-Fi GO!

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

System requirements

System requirements	PC	Smart device
OS	Windows® 7/Windows® 8/ Windows® 8.1	Android 2.3 or later versions iOS5 or later versions
Utilities	ASUS AI Suite 3	ASUS Wi-Fi GO! & NFC Remote

- • For your Android smart device, download the ASUS Wi-Fi GO! & NFC Remote from Google Play. For your iOS smart device, download the ASUS Wi-Fi GO! & NFC Remote from App store.

- • The screenshots used in this section are for reference only and may vary from the actual software you are using. Refer to the ASUS support site (http://support.asus.com) for updated documentations on this motherboard.

- • Ensure that all Wi-Fi enabled devices using the Wi-Fi GO! utility must be in the same local area network (LAN).

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

Smart device supported screen resolutions

Wi-Fi GO! & NFC Remote supports the following screen resolutions of your 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 (1280x800) 1024 x 768 1280 x 768	1536 x 1152 1920 x 1152 1920 x 1200	2048 x 1536 2560 x 1536 2560 x 1600

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!**

Click or tap to set a password

Wi-Fi GO! menu

- 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 [icon] 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 [icon] Wi-Fi GO! & NFC Remote 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

Cloud GO! Remote Desktop Media Streaming Hub

File Transfer

Smart Sensor Control

Capture & Send

Remote
Keyboard &
Mouse
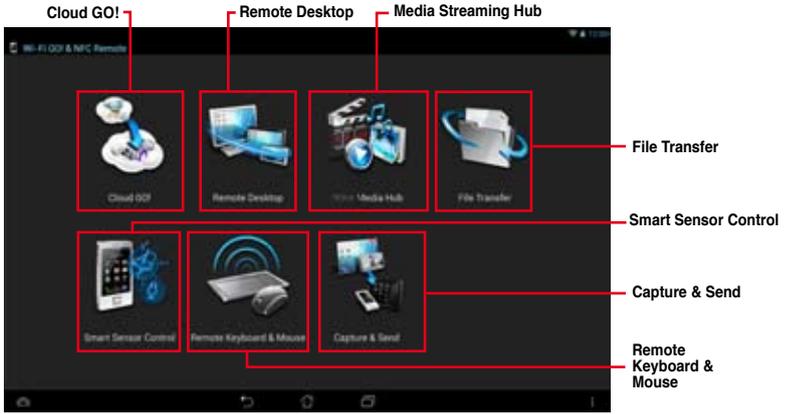
The screenshots are for reference only and vary with the type of smart device.

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.

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Click or tap a specific icon to move, upload, rename, create folder, download, delete or refresh your cloud contents
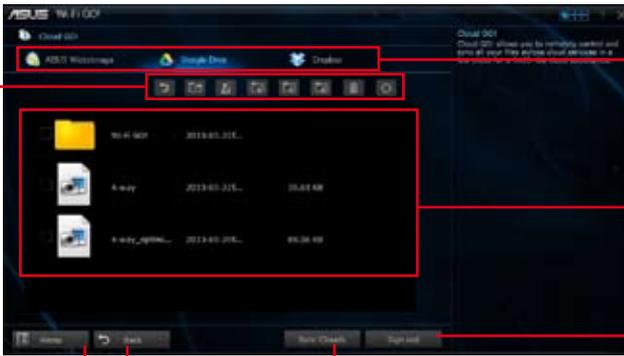
Click or tap to open a cloud storage account

Tick to select contents

Click or tap to sign out

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 synchronize your files to other cloud accounts or create a back up to your local drive

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.

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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.

Tap to open cloud storage accounts

Tap a specific icon to move, upload, rename, create folder, download, delete or refresh your cloud contents

Tick to select contents

Tap to sync your files to other cloud accounts or create a backup to your local drive

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 / 8.1

Tap to view the cursor

Tap to launch the Charms bar

Tap to launch the smart device's keypad

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 device/display 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 HDTV display as a receiver, ensure to enable the Media Streaming setting.

Using Media Streaming Hub in your computer

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

Click or tap to refresh media files

Tick to select source location

Click or tap to select media type

Click or tap to select a receiver

Click or tap to add or delete files

Click or tap a media file to play

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

Click or tap to go back to the previous screen

Displays the target receiver and media file in play

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 ▢.

2.   Click or tap **Add** then search the files that you want to add.

3.   Click or tap **OK**.
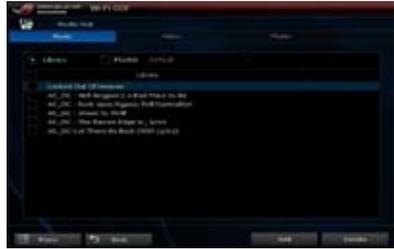
Deleting media files

To delete media files:

1.   From the **Music**, **Video**, or **Photo** screen, click or tap ▢.

2.   Tick the files that you want to delete, then click or tap **Delete**.

3.   Click or tap **OK**.
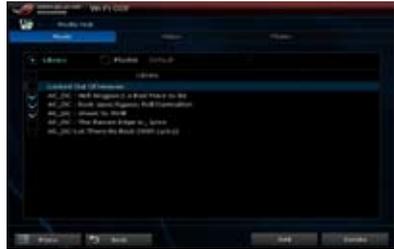
Using Media Streaming Hub in your smart device

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

Tap to select playlist   **Tap to select media type**

Tap to select a receiver

Chapter 4
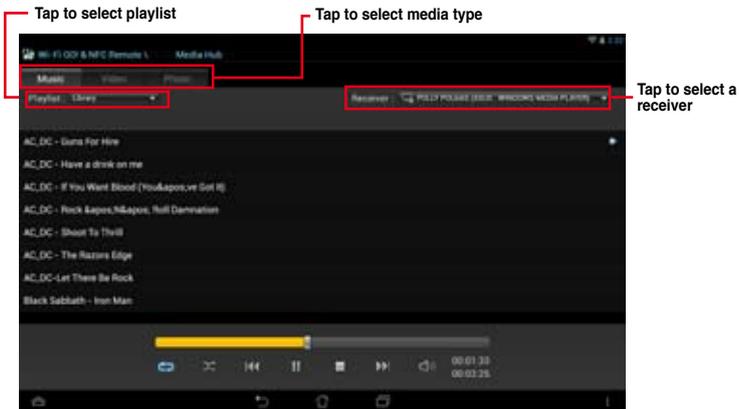
File Transfer

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

> • iOS smart devices can only send files.
>
> • Android smart devices can send and receive files.

> 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!/ Remote 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**.
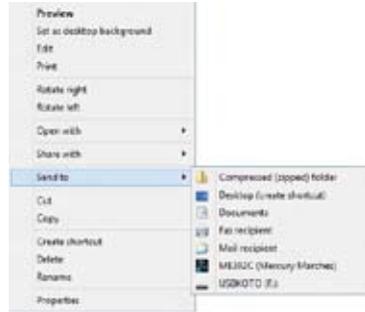
- If you are using an iOS smart device, you can only receive files in PNG, BMP, JPG, GIF, and TIFF formats.

- 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 / 8.1

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

Click or tap to take pictures with your smart device

Click or tap to record videos with your smart device

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

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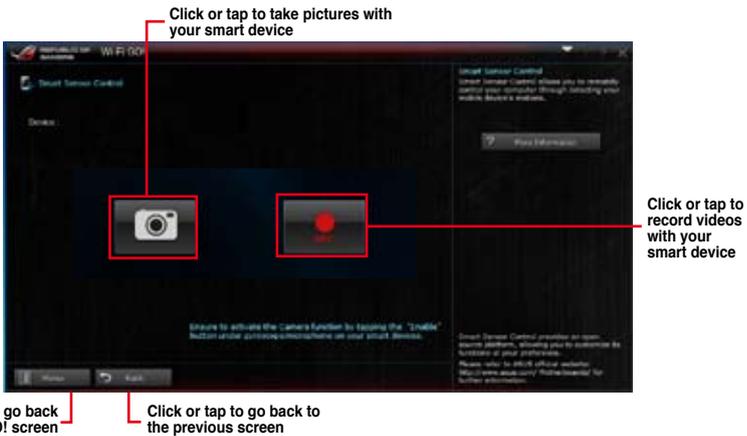
> • Your smart device must have a camera to support this feature.
>
> • Ensure to enable the gyroscope or microphone feature in your smart device to enable the camera and video recorder features in your computer. To do this, tap **Smart Sensor Control** then tap **Enable** on either the gyroscope or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

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The Smart Sensor Control in Windows® 8 / 8.1 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 enable the gyroscope function

Tap to select voice quality

Tap to enable virtual microphone 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.

Select actions for each movement gesture

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

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

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 apply and save the settings as a profile

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

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**.
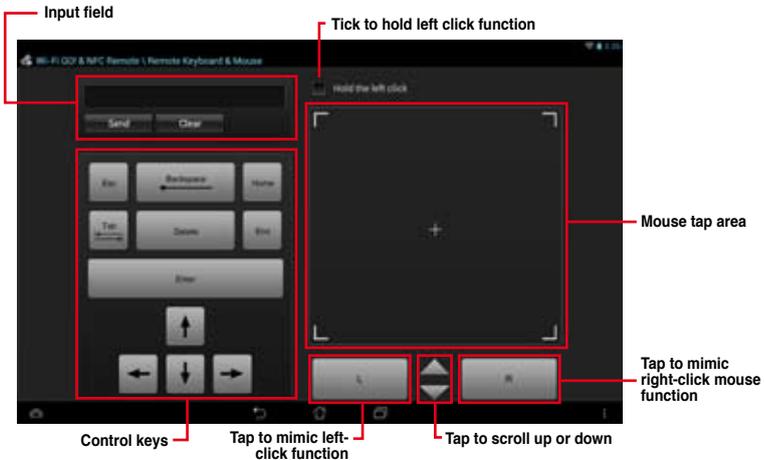
Input field

Tick to hold left click function

Mouse tap area

Tap to mimic right-click mouse function

Control keys

Tap to mimic left-click function

Tap to scroll up or down

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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**.

Assign a hot key for capture range

Tick to select the capture range

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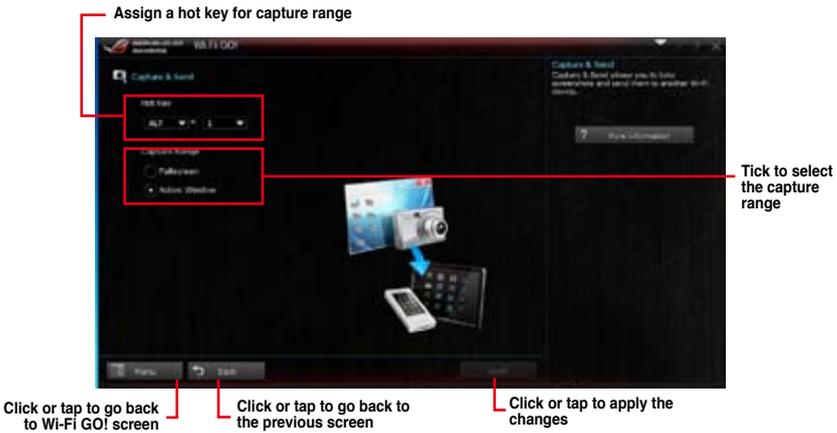
3.   Capture the screenshot using the configured hot key, then tap **OK**.

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.

4.4.5 USB 3.0 Boost

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

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

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

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

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

USB 3.0 Boost

Click or tap to detect the connected USB device

Click or tap to fast-charge your USB device

Click or tap to stop charging your USB device

Click or tap to apply the settings

Click or tap to disregard the settings

Indicates that the connected USB device is in charging mode

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

---

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.

4.4.6 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 **Rear I/O connection** of your 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.
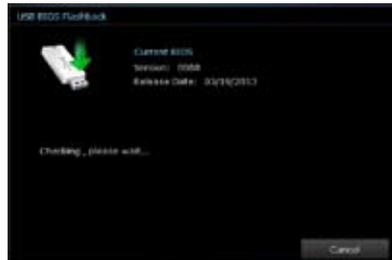
2.   After the utility detects a new BIOS, click or tap ▼ from the **Save to:** field, select the USB flash drive, then click or tap **Download**.
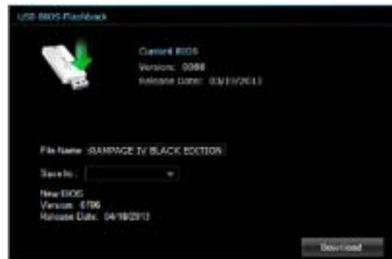
3.   After the download is complete, click or tap **OK**.

4.4.7   EZ Update

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

With this utlity, 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

Click or tap to automatically update your motherboard driver, software and firmware

Click or tap to search and select the BIOS file   **Click or tap to select a boot logo**   **Click or tap to update the BIOS**
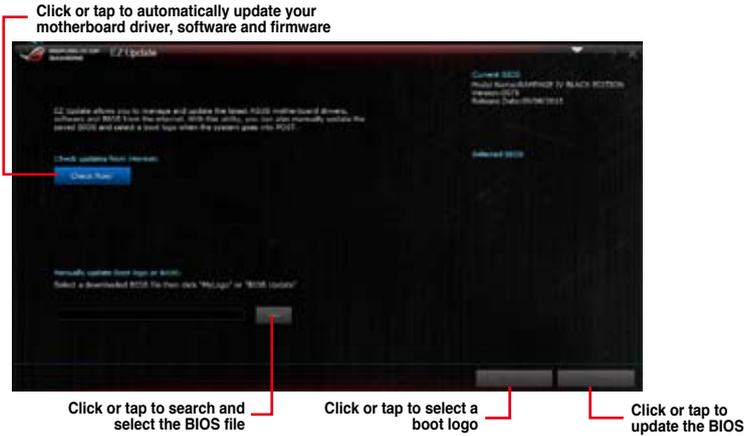
Manually update the BIOS and selecting a boot logo

Click or tap to search an image file for your boot logo

Click or tap to proceed the updating BIOS and boot logo

Click or tap to go back to EZ Update main screen
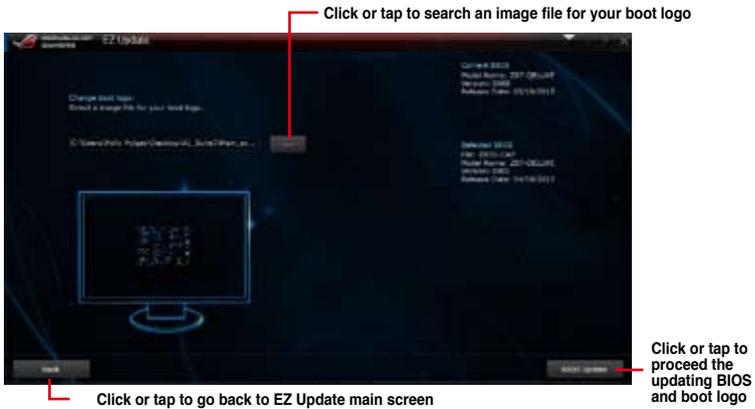
After you click or tap **BIOS Update** button, click or tap **Flash** to update the BIOS and upload the boot logo in your system.

4.4.8 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.

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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

Realtek® HD Audio Manager for Windows® 8/ Windows 8.1 / Windows® 7

Configuration option tabs (vary with the audio devices connected)

Advanced settings

Set default device

Control settings panel

Analog and digital connector status

4.6 ROG Connect

ROG Connect allows you to monitor and adjust the local PC through your remote PC.

Setting up USB connection between your local and remote PC

- Install ROG Connect on the remote PC from the provided Support DVD before using ROG Connect.

- ROG Connect must work with ROG Connect software to avail full function. Ensure that you install ROG Connect on your local PC from the provided Support DVD before using ROG Connect.

1. Connect the provided ROG Connect cable to the local PC and the remote PC.

2. Press the ROG Connect Button and it will light up into a stable glow.

3. Double-click the RC TweakIt shortcut on the remote PC to activate the function
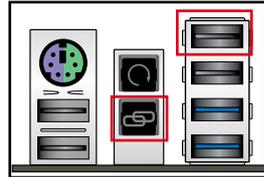
Using RC TweakIt

To use the RC TweakIt

1. Use the sliders and buttons to monitor or adjust your local PC.

2.   Click Function to display more options.

RC Poster

RC Poster shows the status of the local system during the POST. You can switch the display mode between String and Code.

RC Remote

RC Remote allows you to operate your local system through the ROG Connect cable.

RC Diagram

RC Diagram allows you to monitor and record your local system status.

4.7　MemTweakIt

MemTweakIt allows you to adjust the timing of your installed memory. It also allows you to save, validate and post your configuration on the ROG website depending on your DRAM Efficency Score.

The timings and functions may vary depending on the CPU and chipset installed on your motherboard.

To use MemTweakIt:

1.　Double-click ![icon] on the desktop.

2.　Click the dropdown lists of your selected timings and select a timing value.

3.　Click **Apply** to save and apply your configuration. Your **DRAM Efficiency Score** will be shown in **General** section.

A wrong configuration of the DRAM timings may result to an unstable system. Restart your system if needed.

4.   Click **About** tab and click **REPUBLIC OF GAMERS** to access ROG official website.

Click **About** tab and click **REPUBLIC OF GAMERS** to access ROG official website.

Click **OK** to exit MemTweakIt.

5.   Click **OK** to exit MemTweakIt.

Validating and saving your MemTweakIt settings

To validate and save your configuration online:

1.   Launch MemTweakIt and click **Validate**.

2.   In **Online Mode**, key in your ASUS account ID and password, and click **Submit**.

Your configuration will be displayed in MemTweakIt webpage.

3.   Click **OK** to close the **Validation** window.

To validate and save your configuration manually:

1. Launch MemTweakIt and click **Validate**.

2. In **Manual Mode**, click **Save Configuration File**.

3. Key in a file name for your configuration file and click **Save**.

4. Click **validation webpage**.

5. In **MemTweakIt - Validation File Upload** window, key in your ASUS account ID and password.

6. Click **Browse,** locate the saved .cvf file, and click **Open**.

7. Click **Submit**.

Your configuration will be displayed in MemTweakIt webpage.

4.8 ROG RAMDisk

RAMDisk is a data-storage software that reserves a part of your system's memory and turns it into a high-speed virtual drive where you can store cache files and game apps for instant access. The ROG RAMDisk also allows you to automatically backup, update, and restore files.

RAMDisk only supports 64-bit OS.

The following folders are not suitable for RAMDisk optimization. Moving them into the RAMDisk might negatively affectm the performance of your system.

- **Swap file/Page file:** The swap file is a permanent storage space used as the virtual memory expansion of the system memory. Moving the swap file into the RAM Disk simply defects the whole purpose of having it and may affect your system's performance.

- **Startup folders:** Since RAMDisk loads during boot up together with the contents of the Junction folders, changing the location of the startup folders may cause system error and disable loading your RAMDisk.

To launch RAMDisk, click [ ] .

Creating/Deleting a RAMDisk drive

Your RAMDisk drive allows you to place your favorite applications and files into RAM so you can utilize your RAM speed for better read/write performance. The files that are stored inside the RAMDisk are automatically backed up every time your PC is turned off.

The startup time may take a while, depending on the size of your RAMDisk drive.

To create RAMDisk drives:

Click to create RAMDisk drives

Click the drop-down arrow to choose a drive name for your RAMDisk

Move the slider to the right to set the size allocation

Click Add to finish creaing the RAMDIsk drive

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To delete an existing RAMDisk drive:

Click to delete the existing RAMDisk drive.
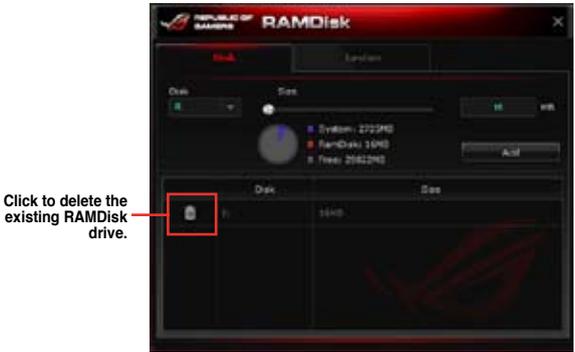
Creating/Deleting a Junction Point

A junction point creates a link that remaps the original contents into the RAMDisk, enabling access to the desired application or data to be done purely within the original file location.

Click the drop-down arrow to select your RAMDisk drive and its available storage space.

Click to delete the existing junction point.

Select the Junction tab to create your junction point

Click Browse to select where to create a junction point.

Click Add to finish adding the new junction point.

Synchronizing backup files

After creating a junction point, RAMDisk automatically creates a backup folder in the file's original location. Use RAMDisk to manually synchronize updates with these backup files.

Click Synchronize to update your files

4.9 Sonic Radar

Sonic Radar is a head-up display (HUD) designed for First Person Shooting (FPS) games, that shows the precise direction and intensity of where a sound is coming from. In-game sound including gunshots, footprints, voice call-outs, or even a ticking bomb, is visualized as radar signals on the Sonic Radar display - this provides you the advantage to know potential threats and act accordingly.

Sonic Radar also features a sound enhancer that amplifies a desired frequency band and minimizes ambient noise to help make the sound more clear.

> • Sonic Radar is automatically installed when you install the Realtek Audio drivers for your ROG motherboard with SupremeFX.
>
> • To disable Sonic Radar, righ click on the Sonic Radar icon ⬤ then select **Disable Sonic Radar**.

4.9.1 Main menu

To launch Sonic Radar, go to the Desktop then click **Start** > **All Programs** > **Sonic Radar** >

Sonic Radar or go to the taskbar then double-click ⬤ .

Click to exit

Click to minimize window

Click to show software information

Sonic Radar display

Shows the intensity and direction of where a sound is coming from. An identical display can be seen on your in-game screen.

Game Detection

Click to enable or disable automatic loading of optimum game preset depending on detected type of game launched.

Advance Settings

Click to configure the smoothness, opacity and position of Sonic Radar Display. Also, click if you wish to configure the shortcut keys.

Game Presets

Click to select optimal preset for your FPS game.

Radar Selection

Click items to select which type of threat to show on the Sonic Radar Display

Click to show or hide the Game presets

Sonic Radar in-game

Sonic Radar display

Radar signals indicate where sound is coming from

- The screen shot is for reference only and can vary depending on the game you are playing.

- All rights of the FPS game Battlefield 3 is reserved to EA Digital Illusions CE AB and Electronic Arts.

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4.9.2   Game presets and Radar Selection

The optimized game presets and radar selection sound enhancers provide the most conducive settings that enhances your point of view while playing FPS games.

Click to select a game preset.

Click to select the threat to enhance.

The Radar Selection options vary per Game Preset selected.

Radar Selection options

Icon	Type of threat and description
	Enhance sound coming from all potential threats.
	Enhance sound coming from footsteps.
	Enhance sound from voice call-outs.
	Enhance sound from gunshots.
	Enhance sound from ticking bomb.
	Full range setting.
	Bass range setting.
	Mid range setting.
	High range setting.

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4.9.3 Advanced Settings

Click [⚙] from the Sonic Radar main menu to show the Advanced Settings panel.

Smoothness and opacity

Allows you to adjust the texture and transparency of the Sonic Radar display.

Move the respective sliders to adjust the smoothness and opacity.
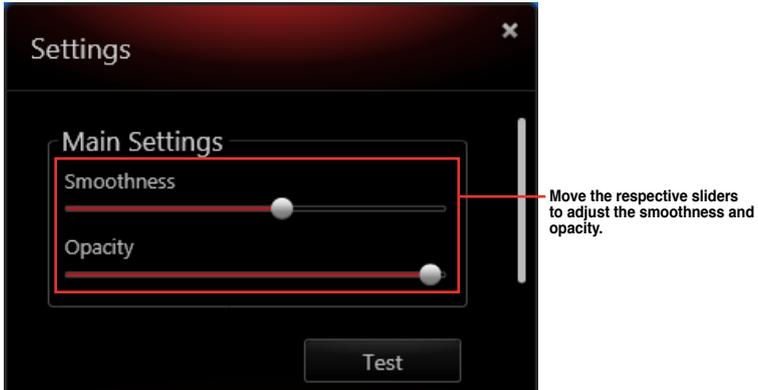
Radar position

Allows you to set a convenient position for the Sonic Radar display, anywhere on your in-game screen.

Click to position the Sonic Radar display.

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Shortcut keys

Your gaming experience is further enhanced with a set of default shortcut keys that allows you to perform tasks faster and easier without exiting the game.

Click to configure shortcut key tasks and key combinations.

Move scroll bar to show more items and options.

Click Ok to implement settings or Cancel to disregard changes.
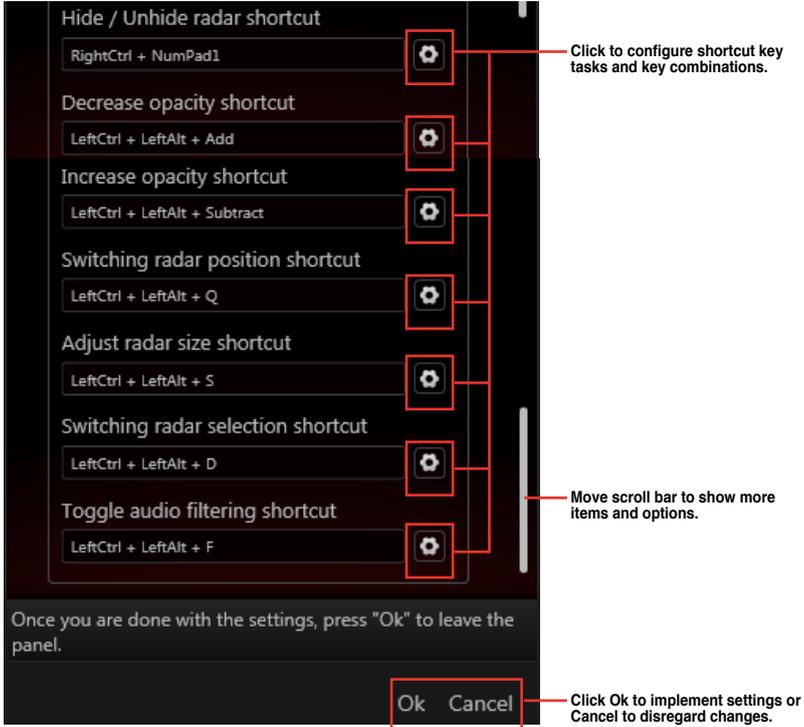
Default shortcut key	Function and description
<Right Ctrl> + Numeric Pad <0>	Hide/show the Sonic Radar display.
<Left Ctrl> + <Left Alt> + <+>	Decrease Sonic Radar display opacity.
<Left Ctrl> + <Left Alt> + <->	Increase Sonic Radar display opacity.
<Left Ctrl> + <Left Alt> + <Q>	Move Sonic Radar to any of nine (9) available positions on your in-game screen.
<Left Ctrl> + <Left Alt> + <S>	Adjust the Sonic Radar display size.
<Left Ctrl> + <Left Alt> + <D>	Set available Radar Selection depending on your game preset.
<Left Ctrl> + <Left Alt> + <F>	Enables or disables the sound enhancer.

Chapter 4

4.10 GameFirst II

GameFirst II, a traffic shaping solution, improves the Internet latency while maintaining a high transfer rate, and reduces delays during data transfers or playing online games. It allows you to set programs' priorities and increase the bandwidth of your currently running games or programs.

GameFirst II attaches itself to Windows network stack to perform packet inspection, which is useful to online gamers and VOIP users.

To launch GameFirst, click **Start > All Programs > ASUS > ROG GameFirst II**.

4.10.1 Using EZ Mode

Click to open the Advanced Mode

Network adapter information

Click to view the programs under these utilities

Click to delete the program from the list

Adjust the slider to set the priority

Current connection and bandwidth usage status

> • GameFirst II only works in Windows® operating systems.
>
> • GameFirst II is powered by cFosSpeed software.
>
> • cFosSpeed prioritizes the programs listed in GameFirst II.

4.10.2 Using Advanced Mode
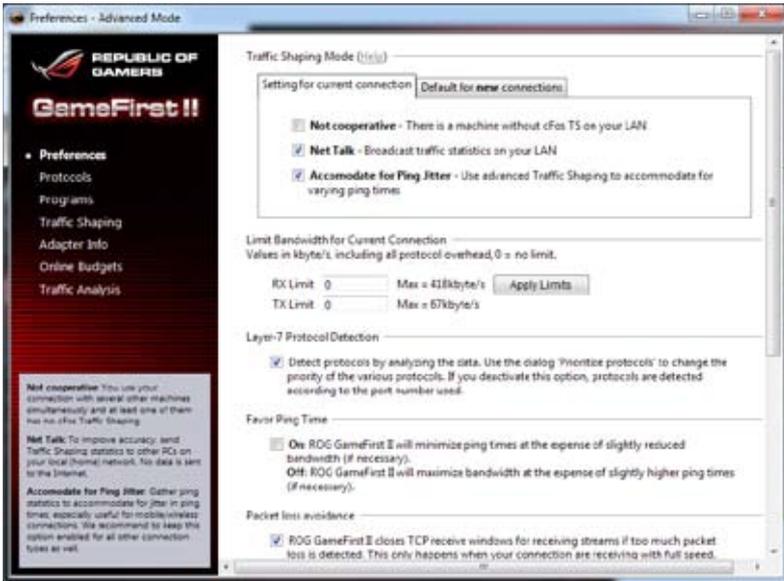
Select any of the following settings to configure the priorities of your programs and network devices.

- **Preferences**: Allows you to control the network's traffic to optimize the program's performance, favor ping time, activate firewall, and avoid packet loss.

- **Protocols**: Allows you to set priority to the program's protocol and enter a transmission limit.

- **Programs:** Allows you to set priority to the programs.

- **Traffic Shaping**: Allows you to set priority to the network adapter and its protocol to reduce delay during data transfer, and speeds up the internet access.

- **Adapter Info**: Allows you to view the information of the adapters in your computer.

- **Online Budgets**: Allows you to set an online budget time to your network adapters.

- **Traffic Analysis**: Allows you to assign protocols and programs in one set.

RAID support

5

5.1   RAID configurations

The motherboard comes with the Intel® Rapid Storage Technology that supports RAID 0, RAID 1, RAID 10, and RAID 5 configuration.

*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.

Chapter 5

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:

```
        Intel(R) Rapid Storage Technology - Option ROM - v10.5.1.1070
        Copyright(C) 2003-10 Intel Corporation.  All Rights Reserved.
                            [ CREATE VOLUME MENU ]
                                    Name:  Volume0
                            RAID Level:
                                  Disks:
                             Strip Size:
                               Capacity:
                                   Sync:
                              Create volume

                                 [ HELP ]



            Enter a unique volume name that has no special characters and is
            16 characters or less.




[↑↓]-Select                    [ESC]-Exit              [ENTER]-Select Menu
```
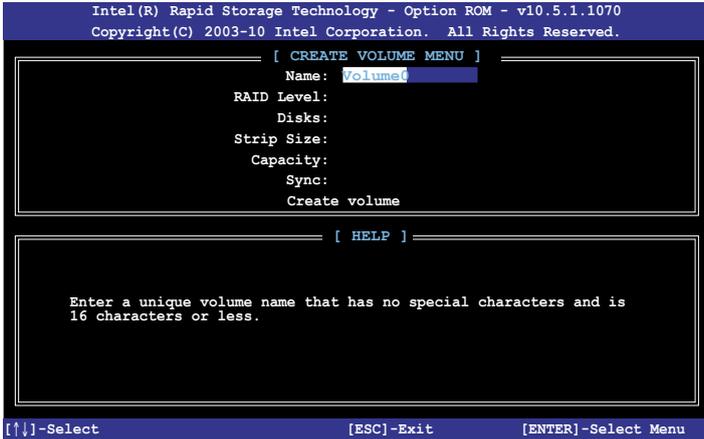
2. Enter a name for the RAID set and press <Enter>.

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:

```
                         [ SELECT DISKS ]
    Port Drive Model       Serial #          Size   Status
    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 2 to 6 disks to use in creating the volume.
    [↑↓]-Prev/Next [SPACE]-SelectDisk [ENTER]-Done
```
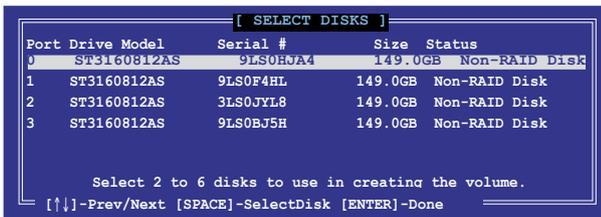
5.	Use the up/down arrow key to select a drive, and then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.

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.

Chapter 5

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 <Del>. 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**, and then press <Enter>. The following
      warning message appears:

```
                        [ CONFIRM EXIT ]
              Are you sure you want to exit? (Y/N):
```

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 <Del> during POST to enter the BIOS setup utility.

3. Set the optical drive as the primary boot device.

4. Insert the support DVD into the optical drive.

5. Save changes and exit BIOS.

6. When the Make Disk menu appears, press <1> to create a RAID driver disk.

7. Insert a formatted floppy disk into the USB floppy disk drive, then press <Enter>.

8. Follow the succeeding screen instructions to complete the process.

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 **Make Disk** menu, and then click **Intel AHCI/RAID Driver Disk** to create a RAID driver disk.

5. Select **USB floppy disk drive** as the destination disk.

6. Follow the succeeding screen instructions to complete the process.

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

5.2.3 Installing the RAID driver during Windows® OS installation

To install the RAID driver for Windows® 7 or later OS:

1. During the OS installation, click **Load Driver** to allow you to select the installation media containing the RAID driver.

2. Insert the USB flash drive with RAID driver into the USB port or the support DVD into the optical drive, and then click **Browse**.

3. Click the name of the device you've inserted, go to **Drivers** > **RAID**, and then select the RAID driver for the corresponding OS version. Click **OK**.

4. Follow the succeeding screen instructions to complete the installation.

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

Chapter 5

Chapter 5

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.

Cut 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.

Appendices

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電通信。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.

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Support Fax   +49-2102-959911
Online support   http://support.asus.com/techserv/techserv.aspx

Appendices

Appendices

EC Declaration of Conformity

Ver. 130816

We, the undersigned,

Manufacturer:	ASUSTeK COMPUTER INC.
Address, City:	4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN
Country:	TAIWAN
Authorized representative in Europe:	ASUS COMPUTER GmbH
Address, City:	HARKORT STR. 21-23, 40880 RATINGEN
Country:	GERMANY

declare the following apparatus:

Product name :	Motherboard
Model name :	RAMPAGE IV BLACK EDITION

conform with the essential requirements of the following directives:

☒**2004/108/EC-EMC Directive**
☒ EN 55022:2010+AC:2011　　☒ EN 55024:2010
☐ EN 61000-3-2:2006+A2:2009　☒ EN 61000-3-3:2008
☒ EN 55013:2001+A1:2003+A2:2006　☐ EN 55020:2007+A11:2011

☒**1999/5/EC-R &TTE Directive**
☒ EN 300 328 V1.7.1(2006-10)　　☒ EN 301 489-1 V1.9.2(2011-09)
☐ EN 300 440-1 V1.6.1(2010-08)　☐ EN 301 489-3 V1.4.1(2002-08)
☐ EN 300 440-2 V1.4.1(2010-08)　☐ EN 301 489-4 V1.4.1(2009-05)
☐ EN 301 511 V9.0.2(2003-03)　　☐ EN 301 489-7 V1.3.1(2005-11)
☐ EN 301 908-1 V5.2.1(2011-05)　☐ EN 301 489-9 V1.4.1(2007-11)
☐ EN 301 908-2 V5.2.1(2011-07)　☒ EN 301 489-17 V2.2.1(2012-09)
☒ EN 301 893 V1.6.1(2011-11)　　☐ EN 301 489-24 V1.5.1(2010-09)
☐ EN 302 544-2 V1.1.1(2009-01)　☐ EN 302 326-2 V1.2.2(2007-06)
☐ EN 302 623 V1.1.1(2009-01)　　☐ EN 302 326-3 V1.3.1(2007-09)
☐ EN 50360:2001　　　　　　　☐ EN 301 357-2 V1.4.1(2008-11)
☐ EN 62479:2010　　　　　　　☐ EN 302 291-1 V1.1.1(2005-07)
☐ EN 50385:2002　　　　　　　☐ EN 302 291-2 V1.1.1(2005-07)
☐ EN 62311:2008

☒**2006/95/EC-LVD Directive**
☒ EN 60950-1 / A12:2011　　　☐ EN 60065:2002 / A12:2011

☐**2009/125/EC-ErP Directive**
☐ Regulation (EC) No. 1275/2008　☐ Regulation (EC) No. 278/2009
☐ Regulation (EC) No. 642/2009　☐ Regulation (EC) No. 617/2013

☒**2011/65/EU-RoHS Directive**
☒**CE marking**

(EC conformity marking)

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

Signature : _____

Declaration Date: 14/10/2013
Year to begin affixing CE marking:2013

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 : RAMPAGE IV BLACK EDITION

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 : _____ Oct. 14, 2013

Ver. 120601

EC Declaration of Conformity

We, the undersigned,

Manufacturer:	ASUSTeK COMPUTER INC.
Address, City:	4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN
Country:	TAIWAN
Authorized representative in Europe:	ASUS COMPUTER GmbH
Address, City:	HARKORT STR. 21-23, 40880 RATINGEN
Country:	GERMANY

declare the following apparatus:

Product name :	Motherboard OC accessory
Model name :	OC Panel

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
☒ EN 55024:2010
☒ EN 61000-3-3:2008
☒ EN 55020:2007+A11:2011

☐1999/5/EC-R &TTE Directive
☐ EN 300 328 V1.7.1(2006-10)
☐ EN 300 440-1 V1.6.1(2010-08)
☐ EN 300 440-2 V1.4.1(2010-08)
☐ EN 301 511 V9.0.2(2003-03)
☐ EN 301 908-1 V5.2.1(2011-05)
☐ EN 301 908-2 V5.2.1(2011-07)
☐ EN 301 893 V1.6.1(2011-11)
☐ EN 302 544-2 V1.1.1(2009-01)
☐ EN 302 623 V1.1.1(2009-01)
☐ EN 50360:2001
☐ EN 62479:2010
☐ EN 50385:2002
☐ EN 62311:2008
☐ EN 301 489-1 V1.9.2(2011-09)
☐ EN 301 489-3 V1.4.1(2002-08)
☐ EN 301 489-4 V1.4.1(2009-05)
☐ EN 301 489-7 V1.3.1(2005-11)
☐ EN 301 489-9 V1.4.1(2007-11)
☐ EN 301 489-17 V2.1.1(2009-05)
☐ EN 301 489-24 V1.5.1(2010-09)
☐ EN 302 326-2 V1.2.2(2007-06)
☐ EN 302 326-3 V1.3.1(2007-09)
☐ EN 301 357-2 V1.4.1(2008-11)
☐ EN 302 291-1 V1.1.1(2005-07)
☐ EN 302 291-2 V1.1.1(2005-07)

☒2006/95/EC-LVD Directive
☒ EN 60950-1 / A12:2011
☐ EN 60065:2002 / A12:2011

☐2009/125/EC-ErP Directive
☐ Regulation (EC) No. 1275/2008
☐ Regulation (EC) No. 642/2009
☐ Regulation (EC) No. 278/2009

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

☒CE marking

(EC conformity marking)

CE

Position : CEO
Name : Jerry Shen

Signature : _____

Declaration Date: 16/04/2013
Year to begin affixing CE marking:2013

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

FC

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 OC accessory**

Model Number : **OC Panel**

Conforms to the following specifications:

☒ FCC Part 15, Subpart B, Unintentional Radiators

Supplementary Information:

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

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

Signature : _____

Date :   _____**Apr. 16, 2013**_____

Ver. 120601

Appendices

Appendices