

**RAMPAGE V
EDITION 10**

ASUS®

Motherboard

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Safety information

Electrical safety

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

Operation safety

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

About this guide

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

How this guide is organized

This guide contains the following parts:

1. Chapter 1: Product Introduction

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

2. Chapter 2: Basic Installation

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

3. Chapter 3: BIOS Setup

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

4. Chapter 4: RAID Support

This chapter describes the RAID configurations.

Where to find more information

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

1. ASUS website

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

2. Optional documentation

Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

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



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



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



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



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

Typography

Bold text

Indicates a menu or an item to select.

Italics

Used to emphasize a word or a phrase.

<Key>

Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.

Example: <Enter> means that you must press the Enter or Return key.

<Key1> + <Key2> + <Key3>

If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).

RAMPAGE V EDITION 10 specifications summary

CPU	<p>New Intel® Core™ i7 X-Series Processors on LGA 2011-v3 Socket Supports 14nm CPU Supports Intel® Turbo Boost Max Technology 3.0*</p> <p>* The support of these features depends on the CPU types.</p>
Chipset	Intel® X99 Chipset
Memory	<p>8 x DIMM, max. 128GB, DDR4 3333(O.C.)*/3300(O.C.)*/3200(O.C.)*/3000(O.C.)*/2800(O.C.)*/2666(O.C.)*/2400(O.C.)*/2133 MHz, non-ECC, un-buffered memory Quad channel memory architecture Supports Intel® Extreme Memory Profile (XMP)</p> <p>* Hyper DIMM support is subject to the physical characteristics of individual CPUs. Please refer to Memory QVL (Qualified Vendors List) for details.</p>
Expansion Slots	<p>4 x PCIe 3.0 x16 slots (supports x16, x16/x16, x16/x8/x8, x16/x8/x8/x8 or x8/x8/x8/x8 mode with 40-LANE CPU; x16, x16/x8 or x8/x8/x8 mode with 28-LANE CPU)* [CPU] 1 x PCIe 2.0 x4 slot** [PCH] 1 x PCIe 2.0 x1 slot [PCH]</p> <p>40-LANE CPU:</p> <ul style="list-style-type: none"> - In 4-Way configuration, if the PCIe16/X8_1 is used in x16 mode, both U.2 and M.2 ports will be disabled. <p>28-LANE CPU:</p> <ul style="list-style-type: none"> - In 3-Way configuration, U.2 port will be disabled. - By default, U.2 port is disabled for other configurations. To activate it, please go to BIOS > Advanced > Onboard Device Configuration > PCIeX8_2 PCIeX8_4 and U.2 M.2 Configuration. <p>* The PCIeX8_4 slot shares bandwidth with M.2 and U.2.</p> <p>** The PCIe4_1 slot shares bandwidth with front USB3_34 ports and back USB3.1_EC1_EA2 ports. If a X2 device is connected to the PCIe4_1 slot, the front USB3_34 ports will be disabled. If a X4 or higher device is connected to the PCIe4_1 slot, both front USB3_34 and back USB3.1_EC1_EA2 ports will be disabled.</p>
Multi-GPU Technology	<p>Supports NVIDIA® 4-Way/3-Way/Quad-GPU SLI® Technology* Supports AMD® 4-Way/3-Way/Quad-GPU CrossFireX™ Technology*</p> <p>* 28-LANE CPUs can only support up to 3-Way SLI®/3-Way CrossFireX™.</p>

(continued on the next page)

RAMPAGE V EDITION 10 specifications summary

Storage	<p>New Intel® Core™ i7 Processors:</p> <ul style="list-style-type: none"> - 1 x M.2 PCIe 3.0 x4 Socket 3 with M Key, type 2260/2280/22110 (supports PCIe storage device only)* - 1 x U.2 port (support PCIe 3.0 x4 NVM Express storage)* <p>Intel® X99 Chipset with RAID 0, 1, 5, 10 and Intel Rapid Storage Technology 14 support**:</p> <ul style="list-style-type: none"> - 10 x SATA 6Gb/s ports - Supports Intel® Smart Response Technology*** <p>* These ports share bandwidth with PCIEX8_4 slot.</p> <p>** Windows® 10 32-bit does not support RAID.</p> <p>*** These functions will work depending on the CPU installed.</p>
LAN	<p>Gigabit Intel® LAN connection - 802.3az Energy Efficient Ethernet (EEE) appliance:</p> <ul style="list-style-type: none"> - Intel® I218-V Gigabit LAN- Dual interconnect between the integrated Media Access Controller (MAC) and physical layer (PHY) - Intel® I211-AT Gigabit LAN controller <p>Anti-surge LANGuard ROG GameFirst Technology</p>
Wireless / Bluetooth	<p>Wi-Fi 802.11 a/b/g/n/ac support 3x3 dual frequency band 2.4/5 GHz Up to 1300Mbps transfer speed Bluetooth v4.0</p>
USB	<p>Intel® X99 Chipset - supports ASUS USB 3.1 Boost:</p> <ul style="list-style-type: none"> - 4 x USB 3.0 ports (4 ports at mid-board)* - 6 x USB 2.0 ports (2 ports at back panel [black], 4 ports at mid-board)** <p>ASMedia® USB 3.1 Controller - support ASUS USB 3.1 Boost:</p> <ul style="list-style-type: none"> - 4 x USB 3.1 ports (2 x Type-A [red] and 2 x Type-C ports [black] at back panel)* <p>ASMedia® USB 3.0 controller - supports ASUS USB 3.1 Boost:</p> <ul style="list-style-type: none"> - 4 x USB 3.0 ports (at back panel [blue]) <p>* Front USB3_34 ports and back USB3.1_EC1_EA2 ports share bandwidth with PCIEX4_1 slot. If a X2 device is connected to the PCIEx4_1 slot, the front USB3_34 ports will be disabled. If a X4 or higher device is connected to the PCIEx4_1 slot, both front USB3_34 and back USB3.1_EC1_EA2</p> <p>** 2 x USB2.0 ports at mid-board share with ROG extension (ROG_EXT) port</p>

(continued on the next page)

RAMPAGE V EDITION 10 specifications summary

Audio	SupremeFX 8-Channel High Definition Audio CODEC: <ul style="list-style-type: none">- SupremeFX Shielding Technology- Dual Headphone Amplifiers- Jack-detection, Multi-streaming, and Front Panel Jack-retasking- Optical S/PDIF out port at back panel Audio Features: <ul style="list-style-type: none">- Sonic Radar II- Sonic Studio II- DTS connect
ROG Exclusive Features	Extreme Engine Digi+ <ul style="list-style-type: none">- MicroFine Alloy Choke- IR3555 PowerStage®- 10K Black Metallic Capacitors OC Zone <ul style="list-style-type: none">- ReTry button- Safe Boot button- LN2 Mode header- Slow Mode switch- Start button- Reset button- Probel- PCIe x16 lane switch- DRAM channel switches ROG RAMCache ROG RAMDisk AURA KeyBot II <ul style="list-style-type: none">- One-click overclocking- X.M.P.- DirectKey- CLr CMOS- Power On UEFI BIOS features: <ul style="list-style-type: none">- Extreme Tweaker- Tweakers' Paradise- ROG SSD Secure Erase- GPU.DIMM Post- O.C. Profile- Graphics Card Information Preview

(continued on the next page)

RAMPAGE V EDITION 10 specifications summary

Special Features	<p>ASUS Dual Intelligent Processors 5</p> <ul style="list-style-type: none">- 5-Way Optimization tuning key perfectly consolidates TPU, EPU, DIGI+ Power Control, Fan Xpert 3, and Turbo App <p>ASUS Wi-Fi GO! Module</p> <ul style="list-style-type: none">- Wi-Fi 3x3 802.11 a/b/g/n/ac and Bluetooth v4.0 <p>Media Streamer</p> <ul style="list-style-type: none">- Pipe music or movies from your PC to a smart TV, your entertainment goes wherever you go!- Media Streamer app for portable smartphone/tablet, supporting iOS 7 & Android 4.0 systems <p>HyStream</p> <ul style="list-style-type: none">- Stream Android/iOS/Windows devices' screen on your PC screen.* <p>ASUS Exclusive Features:</p> <ul style="list-style-type: none">- AI Suite 3- USB 3.1 Boost- AI Charger+- Push Notice <p>ASUS EZ DIY</p> <ul style="list-style-type: none">- USB BIOS Flashback- ASUS CrashFree BIOS 3- ASUS EZ Flash 3- ASUS C.P.R.(CPU Parameter Recall)- MemOK! <p>ASUS Q-Design</p> <ul style="list-style-type: none">- ASUS Q-Code- ASUS Q-Connector- ASUS Q-LED (CPU, DRAM, VGA, and Boot Device LED)- ASUS Q-Slot- ASUS Q-DIMM <p>* Contact your device vendor for supporting information.</p>
Back Panel I/O Ports	<ul style="list-style-type: none">1 x Clear CMOS button1 x BIOS Flashback button4 x USB 3.0 ports [blue]4 x USB 3.1 ports (2 x Type-C [black] and 2 x Type-A [red])2 x Anti-surge LAN (RJ45) ports1 x ASUS Wi-Fi GO! module (Wi-Fi 3x3 802.11 a/b/g/n/ac and Bluetooth v4.0)1 x PS/2 keyboard/mouse combo port2 x USB 2.0 ports [black]1 x Optical S/PDIF out5 x Audio jacks

(continued on the next page)

RAMPAGE V EDITION 10 specifications summary

<p>Internal I/O Connectors</p>	<p>2 x USB 3.0 connector support additional 4 USB 3.0 ports 2 x USB 2.0 connectors support additional 4 USB 2.0 ports [one connector via ROG_EXT header] 10 x SATA 6Gb/s connectors 1 x U.2 port 1 x M.2 PCIe 3.0 x4 Socket 3 with M Key, type 2260/2280/22110 (supports PCIe storage device only)* 1 x ROG extension (ROG_EXT) header 1 x 4-Pin CPU fan connector 1 x 4-Pin CPU_OPT fan connector 1 x 4-Pin H_AMP fan connector 3 x 4-Pin Chassis fan connectors 1 x 4-pin Water pump connector 1 x 5-pin EXT_FAN (Extension Fan) connector 1 x Thermal sensor connector 1 x 24-pin EATX power connector 1 x 8-pin EATX 12V power connector 1 x 4-pin EATX 12V power connector 1 x EZ Plug connector 9 x Probel Measurement Points 1 x Power-on button 1 x Reset button 1 x Safe Boot button 1 x ReTry button 1 x LN2 mode jumper 1 x Slow mode switch 1 x DRAM channel switch 1 x PCIe x16 lane switch 1 x MemOK! button 1 x SLI/CFX switch 1 x BIOS Switch button 1 x System panel connector 1 x Aura RGB Strip Header 1 x TPM connector 1 x Front panel audio connector (AAFP) 1 x Thunderbolt header</p>
<p>BIOS Features</p>	<p>128 Mb Flash ROM, UEFI AMI BIOS, PnP, WfM2.0, SM BIOS 3.0, ACPI 5.0, Multi-language BIOS, ASUS EZ Flash 3, CrashFree BIOS 3, F11 EZ Tuning Wizard, F6 Qfan Control, F3 My Favorites, Quick Note, Last Modified log, F12 PrintScreen, and ASUS DRAM SPD (Serial Presence Detect) memory information.</p>
<p>Manageability</p>	<p>WfM 2.0, WOL by PME, PXE</p>

(continued on the next page)

RAMPAGE V EDITION 10 specifications summary

Software	Drivers ROG GameFirst Technology ROG RAMDisk ROG RAMCache ROG CPU-Z ROG Mem TweakIt AURA Kaspersky® Anti-Virus ASUS WebStorage ASUS Utilities
Operating Systems Support	Windows® 10 / Windows® 8.1 / Windows® 7
Form Factor	Extended ATX Form Factor, 12"x 10.7" (30.5cm x 27.2cm)



Specifications are subject to change without notice.

SupremeFX Hi-Fi specifications summary

Hardware	<p>1 x ESS ES9018K2M SABRE DAC 2 x LM4562 Op amps 1 x TPA6120A2 Headphone amp 1 x Cirrus Logic CS5361 5 x RC4580 Op amps</p>
Headphone Output Performance	<p>Supported formats: Up to 32-bit/384kHz and DSD 64/128* Output (32Ohms): 4.8VRMS (720mW RMS per channel) Output (600Ohms): 6.8VRMS (77mW RMS per channel) THD+N @ 1K (-3dB): -104dB (<0.0007%) Signal to Noise Ratio (A-weighted): -121.1dB Crosstalk: -98dB</p> <p>* Sample rates greater than 32-bit/96kHz are only supported when high speed mode is enabled.</p>
Rear I/O Ports	<p>POWER : 1 x 6-pin PCIe power connector SIGNAL : 1 x USB 2.0 header</p>
Front I/O Ports	<p>1 x Volume control knob 1 x 6.3mm headphone jack* 1 x 3.5mm headphone jack* 1 x 3.5mm mic/line in jack</p> <p>* Only one of these jacks will be active at a given time</p>
Dimensions	<p>5.25" ODD drive bay Form Factor (14.5 x 4.2x 14cm [W x H x D])*</p> <p>* The face of this device is designed to be flush with a standard drive bay with the knob extending 1cm</p>

Package contents

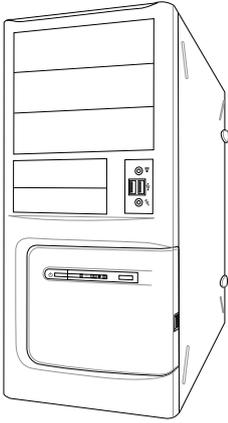
Check your motherboard package for the following items.

Motherboard	ROG RAMPAGE V EDITION 10
Cables	5 x 2-in-1 SATA 6.0 Gb/s signal cables 1 x 4-Way SLI® bridge 1 x 3-Way SLI® bridge 1 x SLI® bridge 1 x 3-in-1 thermistor cables 1 x Wafer cable 1 x Cable for SupremeFX Hi-Fi 1 x AURA cable
Accessories	1 x ASUS 3T3R dual band Wi-Fi moving antennas (Wi-Fi 802.11a/b/g/n/ac compliant) 1 x FAN Extension Card 1 x Q-Connector Kit 2 x ROG coaster 1 x ROG fan label 1 x ROG cable label set 1 x M.2 screws kit 1 x Bracket for FAN Extension Card 1 x CPU Installation Tool for Broadwell processors 1 x CPU Installation Tool for Haswell processors 1 x I/O frame
Application drive	USB drive with utilities and drivers
Documentation	User guide

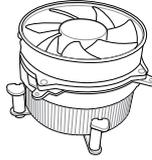


If any of the above items is damaged or missing, contact your retailer.

Installation tools and components



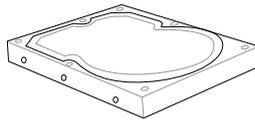
PC chassis



Intel® LGA2011-v3 compatible CPU Fan



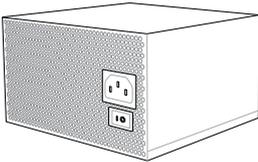
Intel® LGA2011-v3 CPU



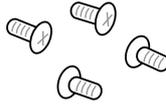
SATA hard disk drive



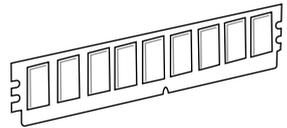
Phillips (cross) screwdriver



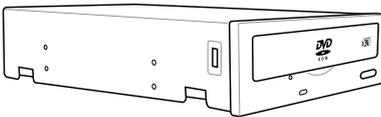
Power supply unit



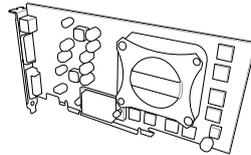
1 bag of screws



DIMM



SATA optical disc drive (optional)



Graphics card



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

Product Introduction

1

1.1 Motherboard overview

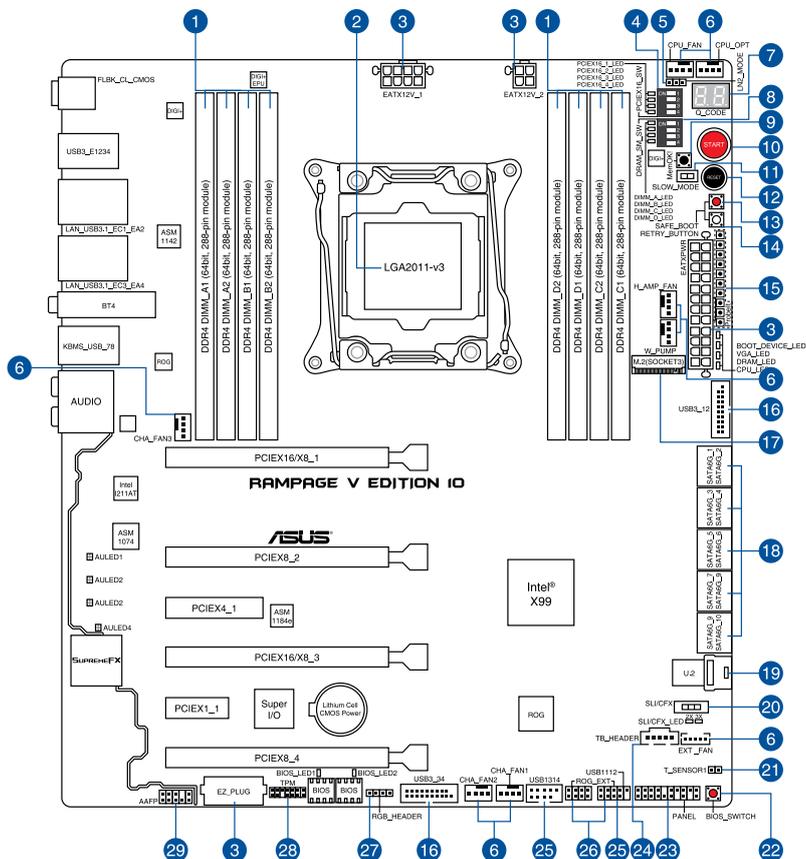
1.1.1 Before you proceed

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.
-

1.1.2 Motherboard layout



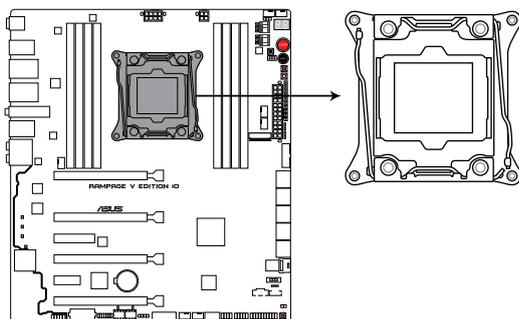
Refer to [1.1.9 Internal connectors](#) and [2.3.1 Rear I/O Connection](#) sections for more information about the internal connectors and rear panel connectors.

Layout contents

Connectors/Jumpers/Buttons and switches/Slots		Page
1.	DDR4 DIMM slots	1-5
2.	LGA2011-v3 CPU socket	1-4
3.	ATX power connectors (24-pin EATXPWR; 8-pin EATX12V_1; 4-pin EATX12V_2; 4-pin EZ_PLUG)	1-33
4.	PCIe x16 Lane switch (PCIEX16_SW)	1-13
5.	LN2 Mode jumper (3-pin LN2_MODE)	1-24
6.	CPU, CPU optional, high amp, water pump, extension and chassis fan connectors (4-pin CPU_FAN; 4-pin CPU_OPT; 4-pin H_AMP_FAN; 4-pin W_PUMP; 5-pin EXT_FAN; 4-pin CHA_FAN1-3)	1-32
7.	Q-Code LED (Q_CODE1)	1-18
8.	DRAM Lane switch (DRAM_SM_SW)	1-13
9.	MemOK! button (MemOK!)	1-10
10.	Power-on (START) button	1-9
11.	Slow Mode Switch (SLOW_MODE)	1-14
12.	RESET button	1-9
13.	Safe Boot button (SAFE_BOOT)	1-12
14.	ReTry button (RETRY_BUTTON)	1-11
15.	Probelt	1-36
16.	USB 3.0 connector (20-1 pin USB3_12; USB3_34)	1-27
17.	M.2 (SOCKET3)	1-30
18.	Intel® X99 Serial ATA 6 Gb/s connectors (7-pin SATA6G_1-10)	1-25
19.	U.2 connector (U.2)	1-35
20.	SLI/CFX switch (SLI/CFX)	1-12
21.	Thermal sensor cable connector (2-pin T_SENSOR1)	1-26
22.	BIOS Switch button (BIOS_SWITCH)	1-11
23.	System panel connector (20-3 pin PANEL)	1-34
24.	Thunderbolt header (5-pin TB_HEADER)	1-29
25.	USB 2.0 connector (10-1 pin USB1112, USB1314)	1-28
26.	ROG Extension connector (18-1 pin ROG_EXT)	1-26
27.	RGB header (4-pin RGB_HEADER)	1-31
28.	TPM connector (14-1 pin TPM)	1-29
29.	Front panel audio connector (10-1 pin AAFP)	1-30

1.1.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA2011-v3 socket designed for New Intel® Core™ i7 X-Series Processors on LGA 2011-v3 socket.



RAMPAGE V EDITION 10 CPU LGA2011-v3 Socket



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



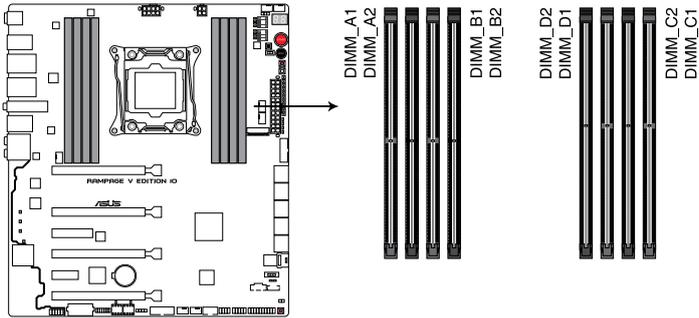
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if 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-v3 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.
-

1.1.4 System memory

The motherboard comes with eight (8) Double Data Rate 4 (DDR4) Dual Inline Memory Module (DIMM) slots.

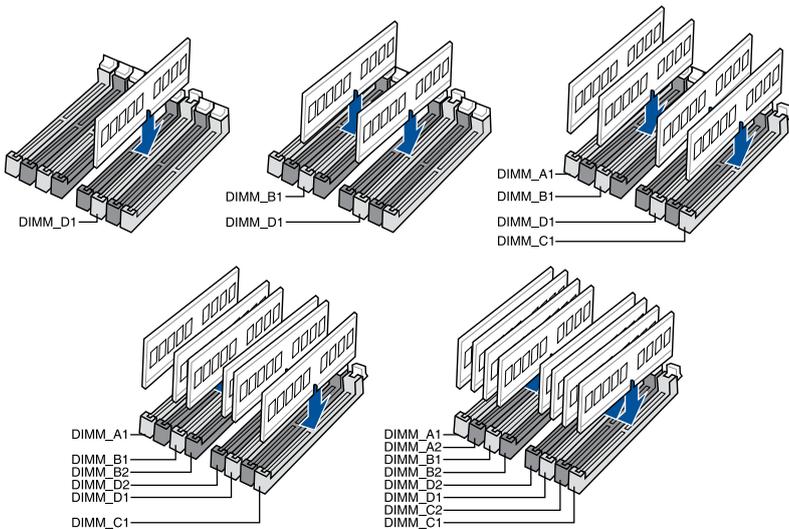


A DDR4 module is notched differently from a DDR3 or DDR2 module. DO NOT install a DDR3 or DDR2 memory module to the DDR4 slot.



RAMPAGE V EDITION 10 288-pin DDR4 DIMM socket

Recommended memory configurations



Memory configurations

You may install 1 GB, 2 GB, 4 GB, 8 GB and 16 GB unbuffered and non-ECC DDR4 DIMMs into the DIMM sockets.



- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- According to Intel® CPU spec, DIMM voltage below 1.65 V is recommended to protect the CPU.
- 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>.
- The design of the DIMM fan may vary. Ensure that the DIMM fan fits to the motherboard.

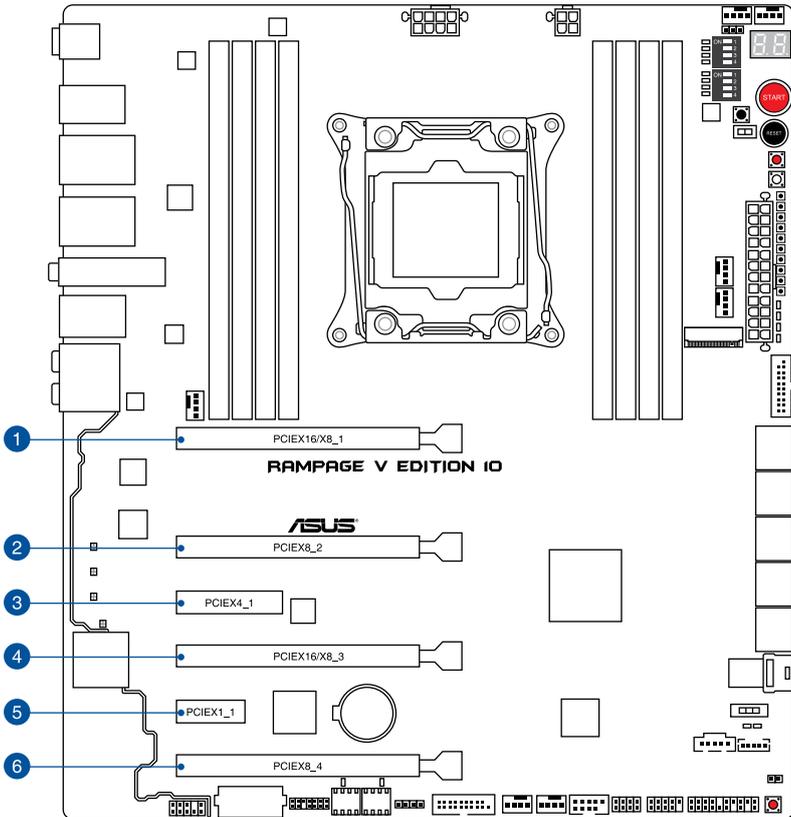


- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value. To operate at the vendor-marked or at a higher frequency, refer to section 3.5 **Extreme Tweaker** menu for manual memory frequency adjustment.
- For system stability, use a more efficient memory cooling system to support a full memory load (4 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.
- ASUS exclusively provides hyper DIMM support function.
- Hyper DIMM support is subject to the physical characteristics of individual CPUs. Load the X.M.P. or D.O.C.P. settings in the BIOS for the hyper DIMM support.
- Visit the ASUS website for the latest QVL.

1.1.5 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/x8_1 slot
2	PCIe 3.0 x8_2 slot
3	PCIe 2.0 x4_1 slot
4	PCIe 3.0 x16/x8_3 slot
5	PCIe 2.0 x1_1 slot
6	PCIe 3.0 x8_4 slot



- We recommend that you provide sufficient power when running CrossFireX™ or SLI® mode.
- While running at four heavy loaded VGA cards, ensure to plug in the 4-pin extra PCIe power supply for stability.

Refer to the following configuration table for installation.

PCIe 3.0 operating mode for 40 lanes CPU

Slot #	Single VGA	SLI/CFX	3-way SLI/CFX	4-way SLI/CFX	
PCIEX16/X8_1	x16	x16	x16	x16	x8
PCIEX8_2	—	—	x8	x8	x8
PCIEX16/X8_3	—	x16	x8	x8	x8
PCIEX8_4	—	—	—	x8	x8

PCIe 3.0 operating mode for 28 lanes CPU

Slot #	Single VGA	SLI/CFX	3-way SLI/CFX
PCIEX16/X8_1	x16	x8	x8
PCIEX8_2	—	—	x8
PCIEX16/X8_3	—	x8	x8



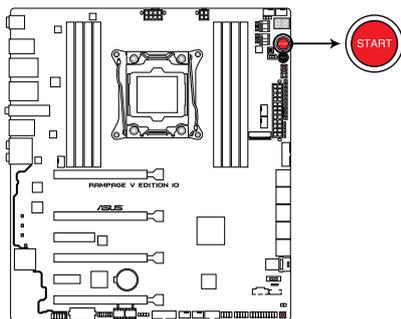
- The PCIEX8_4 slot shares bandwidth with M.2 and U.2 ports.
- 40-LANE CPU: In 4-Way configuration, if the PCIEX16/X8_1 is used in x16 mode, both M.2 and U.2 ports will be disabled.
- 28-LANE CPU:
 - In 3-Way configuration, U.2 port will be disabled.
 - By default, U.2 port is disabled for other configurations. To activate it, please go to **BIOS > Advanced > Onboard Device Configuration > PCIEX8_2 PCIEX8_4 and U.2 M.2 Configuration**.

1.1.6 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

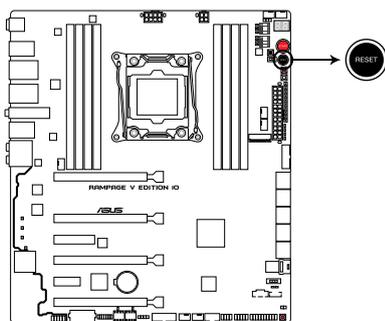
The motherboard comes with a power-on button that allows you to power up or wake up the system. The button also lights up when the system is plugged to a power source indicating that you should shut down the system and unplug the power cable before removing or installing any motherboard component.



RAMPAGE V EDITION 10 Power on button

2. RESET button

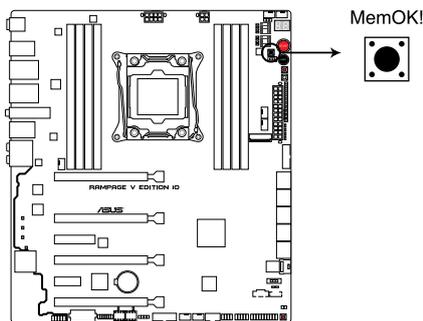
Press the Reset button to reboot the system.



RAMPAGE V EDITION 10 Reset button

3. MemOK! button (MemOK!)

Installing DIMMs that are not compatible with the motherboard may cause system boot failure. If the system fails to boot during POST stage and the DRAM_LED near the MemOK! button lights continuously, press the MemOK! button until the DRAM_LED starts blinking. System will begin automatic memory compatibility tuning and reboot for successful boot.



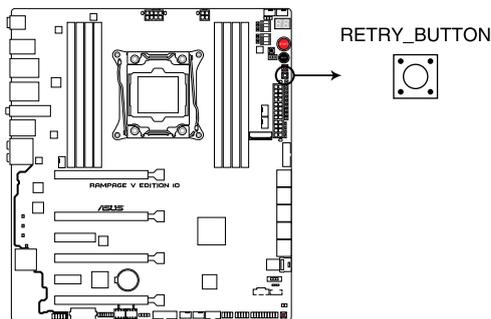
RAMPAGE V EDITION 10 MemOK! button



- Refer to the **1.1.7 Onboard LEDs** section for the exact location of the DRAM_LED.
- The DRAM_LED also lights up when the DIMM is not properly installed. Turn off the system and reinstall the DIMM before using the MemOK! function.
- The MemOK! button does not function under Windows® OS environment.
- During the tuning process, the system loads and tests failsafe memory settings. It takes about 30 seconds for the system to test one set of failsafe settings. If the test fails, the system reboots and test the next set of failsafe settings. The blinking speed of the DRAM_LED increases, indicating different test processes.
- Due to memory tuning requirement, the system automatically reboots when each timing set is tested. If the installed DIMMs still fail to boot after the tuning process is completed, the DRAM_LED lights continuously. Replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) at www.asus.com.
- If you turn off the computer and replace DIMMs during the tuning process, the system continues memory tuning after turning on the computer. To stop memory tuning, turn off the computer and unplug the power cord for about 5–10 seconds.
- If your system fails to boot up due to BIOS overlocking, press the MemOK! button to boot and load the BIOS default settings. A message will appear during POST to remind you that the BIOS has been restored to its default settings.
- We recommend that you download and update to the latest BIOS version from www.asus.com after using the MemOK! function.

4. ReTry button (RETRY_BUTTON)

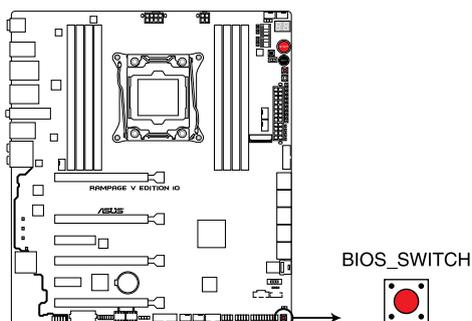
The ReTry button is specially designed for overclockers and is most useful during the booting process where the Reset button is rendered useless. When pressed, it forces the system to reboot while retaining the same settings to be retried in quick succession to achieve a successful POST.



RAMPAGE V EDITION 10 RETRY_BUTTON

5. BIOS Switch button (BIOS_SWITCH)

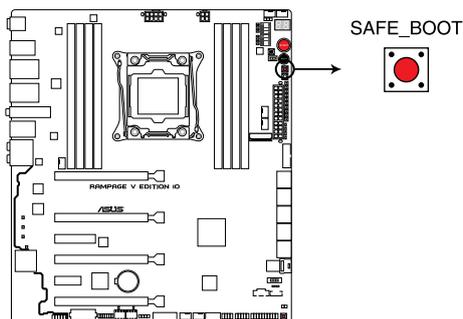
The motherboard comes with two BIOS. Press the BIOS button to switch BIOS and load different BIOS settings. The nearby BIOS LEDs indicate the currently selected BIOS.



RAMPAGE V EDITION 10 BIOS_SWITCH button

6. Safe Boot button (SAFE_BOOT)

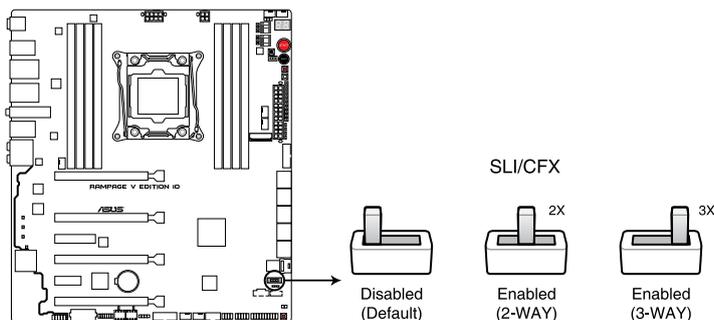
The Safe Boot button can be pressed anytime to force the system to reboot into the BIOS safe mode. This button temporarily applies safe settings to the BIOS while retaining any overclocked settings allowing you to modify the settings causing boot failure. Use this button when overclocking or tweaking the settings of your system.



RAMPAGE V EDITION 10 SAFE_BOOT button

7. SLI/CFX switch (SLI/CFX)

This switch allows you to determine the slots for 2-WAY or 3-WAY graphics card installation. When enabled, the PCIe LEDs near the slots light up, telling you to install the graphics cards to the specific slots.



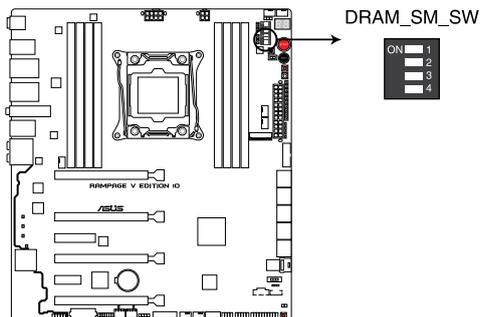
RAMPAGE V EDITION 10 SLI/CFX switch



- The LEDs below the SLI/CFX switch and near the PCIe slots light up when the SLI/CFX switch is enabled. Refer to section 1.1.7 **Onboard LEDs** for the exact location of the SLI/CFX and PCIe LEDs.
- After adjusting PCIe bandwidth in the BIOS, shut down the system for the PCIe LEDs to update the lighting effect.

8. DRAM Lane switch (DRAM_SM_SW)

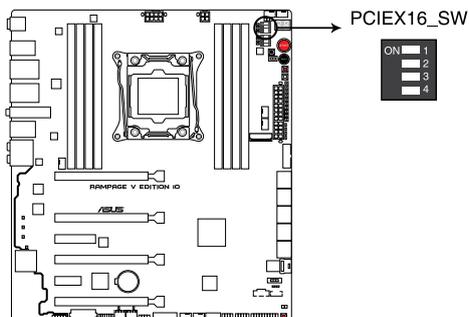
These slide switches allows you to enable and disable the corresponding DIMM slots. When one of the installed DIMMs is out of order, you can use the slide switch to find out the faulty one without removing the DIMMS.



RAMPAGE V EDITION 10 DRAM_SM_SW

9. PCIe x16 Lane switch (PCIEX16_SW)

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.

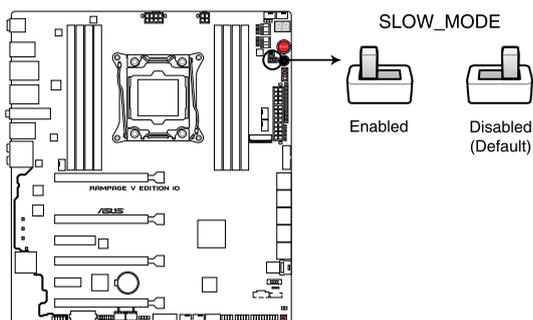


RAMPAGE V EDITION 10 PCIe x16 Lane switch

10. Slow Mode Switch (SLOW_MODE)

Slow Mode Switch is employed during LN2 benching. Some processors have a small optimum temperature range to run at their highest frequency. Temperatures that fall outside this band may yield instability. For example, a processor may need to operate at -80°C under load and only 75°C when idle to maintain stability at 5.8GHz.

At lower frequencies, the CPU's temperature tolerance increases. It will however remain stable at lower 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 overcome this, simply flip the switch over to decrease the processor frequency. Switching over to Slow-Mode during critical moments when Temperature/Max Frequency alignment is off-sync can prevent a lot of crashes, even when trying to boot into the OS at cold temperatures.

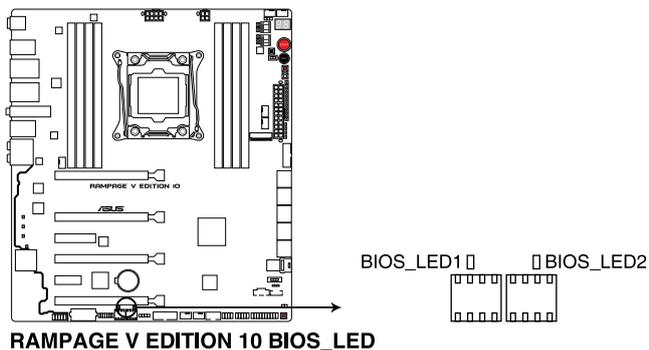


RAMPAGE V EDITION 10 Slow Mode switch

1.1.7 Onboard LEDs

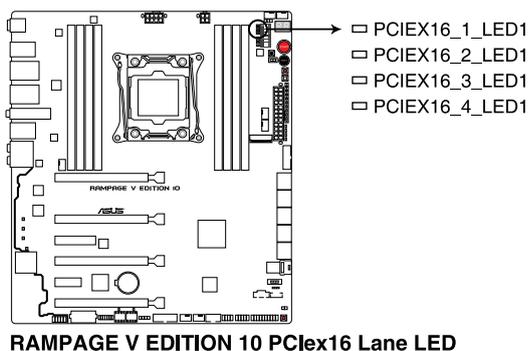
1. BIOS LEDs (BIOS_LED1-2)

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.



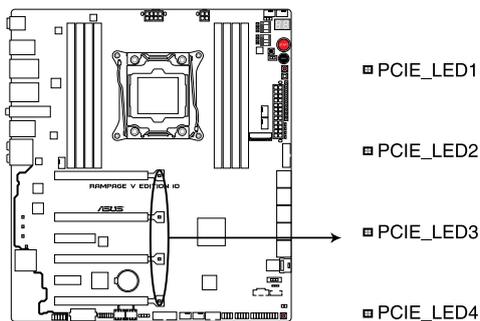
2. PCIe16 lane LED indicator (PCIEX16_1_LED1; PCIEX16_2_LED1; PCIEX16_3_LED1; PCIEX16_4_LED1)

Indicates the PCIe lane used.



3. PCIE LEDs (PCIE_LED1-4)

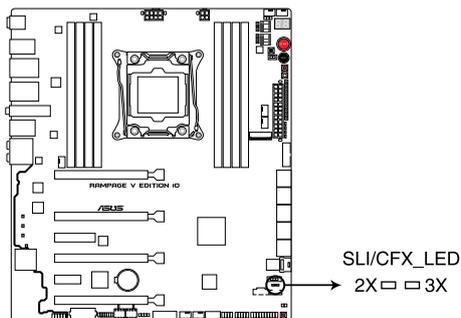
The PCIE LEDs light up to indicate which PCIE slots to use when SLI/CFX switch is enabled.



RAMPAGE V EDITION 10 PCIE LEDs

4. SLI/CFX LED (SLI/CFX_LED)

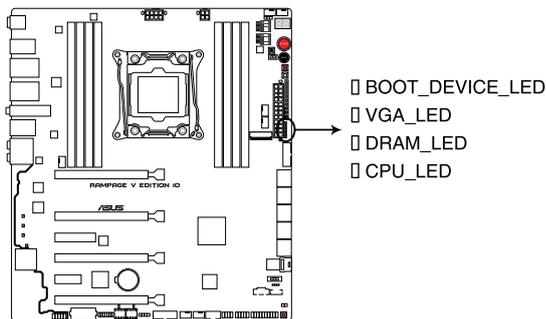
The SLI/CFX LEDs light up when SLI/CFX switch is enabled.



RAMPAGE V EDITION 10 SLI/CFX_LED

5. Q LEDs (BOOT_DEVICE_LED; VGA_LED; DRAM_LED; CPU_LED)

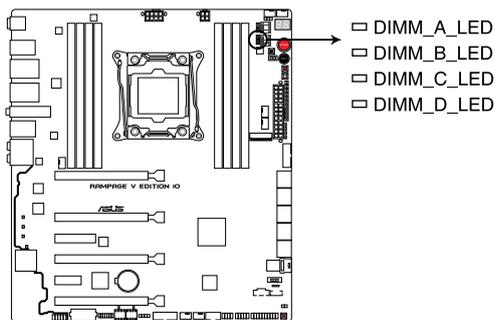
Q LEDs check key components (CPU, DRAM, VGA card, and boot devices) in sequence during motherboard booting process. If an error is found, the corresponding LED will continue lighting until the problem is solved. This user-friendly design provides an intuitive way to locate the root-cause of the problem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



**RAMPAGE V EDITION 10 CPU/ DRAM/
BOOT_DEVICE/ VGA LED**

6. DIMM LED (DIMM_A_LED; DIMM_B_LED; DIMM_C_LED; DIMM_D_LED)

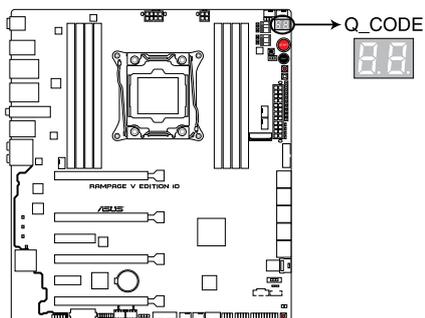
The DIMM LED indicates when the corresponding memory channel is enabled.



RAMPAGE V EDITION 10 DIMM LED

7. Q-Code LED (Q_CODE1)

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 V EDITION 10 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
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

(continued on the next page)

Q-Code table

Code	Description
59	CPU micro-code is not found or micro-code update is failed
5A	Internal CPU error
5B	Reset PPI is not available
5C – 5F	Reserved for future AMI error codes
E0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL)
E1	S3 Boot Script execution
E2	Video repost
E3	OS S3 wake vector call
E4 – E7	Reserved for future AMI progress codes
E8	S3 Resume Failed
E9	S3 Resume PPI not Found
EA	S3 Resume Boot Script Error
EB	S3 OS Wake Error
EC – EF	Reserved for future AMI error codes
F0	Recovery condition triggered by firmware (Auto recovery)
F1	Recovery condition triggered by user (Forced recovery)
F2	Recovery process started
F3	Recovery firmware image is found
F4	Recovery firmware image is loaded
F5 – F7	Reserved for future AMI progress codes
F8	Recovery PPI is not available
F9	Recovery capsule is not found
FA	Invalid recovery capsule
FB – FF	Reserved for future AMI error codes
60	DXE Core is started
61	NVRAM initialization
62	Installation of the PCH Runtime Services
63 – 67	CPU DXE initialization is started
68	PCI host bridge initialization
69	System Agent DXE initialization is started
6A	System Agent DXE SMM initialization is started

(continued on the next page)

Q-Code table

Code	Description
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
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

(continued on the next page)

Q-Code table

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

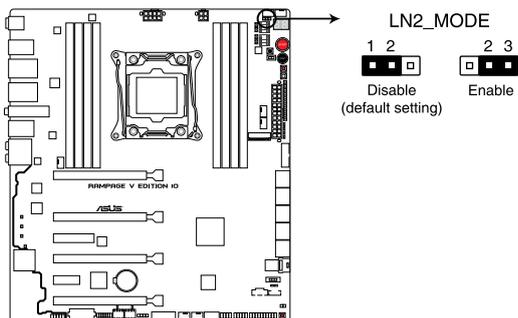
ACPI/ASL Checkpoints

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.

1.1.8 Jumper

1. LN2 Mode jumper (3-pin LN2_MODE)

With LN2 mode activated, the ROG motherboard is optimized to remedy the cold-boot bug during POST and help the system boot successfully.



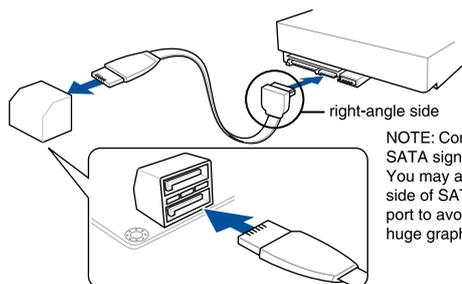
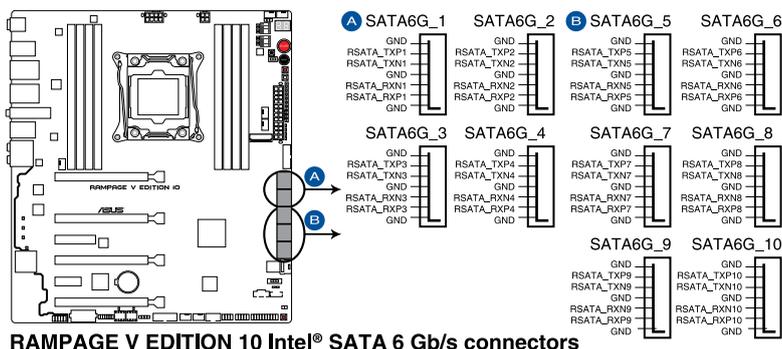
RAMPAGE V EDITION 10 LN2_MODE setting

1.1.9 Internal connectors

1. Intel® X99 Serial ATA 6 Gb/s connectors (7-pin SATA6G_1-10)

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

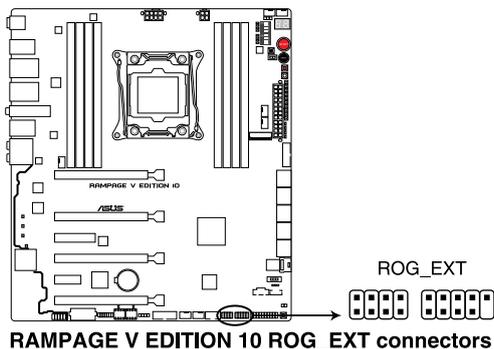
If you installed Serial ATA hard disk drives, you can create a RAID 0, 1, 5, and 10 configuration with the Intel® Rapid Storage Technology through the onboard Intel® X99 chipset.



- These connectors are set to **[AHCI Mode]** by default. If you intend to create a Serial ATA RAID array using these connectors, set the SATA Mode item in the BIOS to **[RAID Mode]**. Refer to the **PCH Storage Configuration** section for details.
- Before creating a RAID array, refer to **4.1 RAID configurations** section or the manual bundled in the motherboard support USB drive.

2. ROG Extension connector (18-1 pin ROG_EXT)

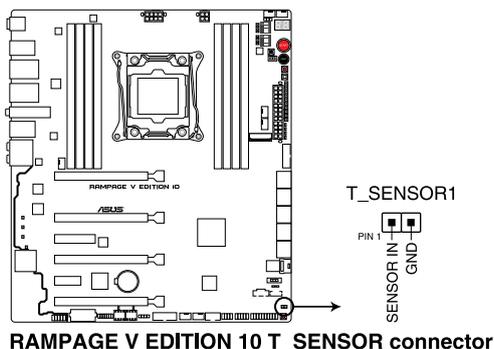
This connector is for the OC Panel I/II, Front Base, and other ROG devices.



- The Front Base is purchased separately.
- Visit www.asus.com for more information about the OC Panel and Front Base.

3. Thermal sensor cable connector (2-pin T_SENSOR1)

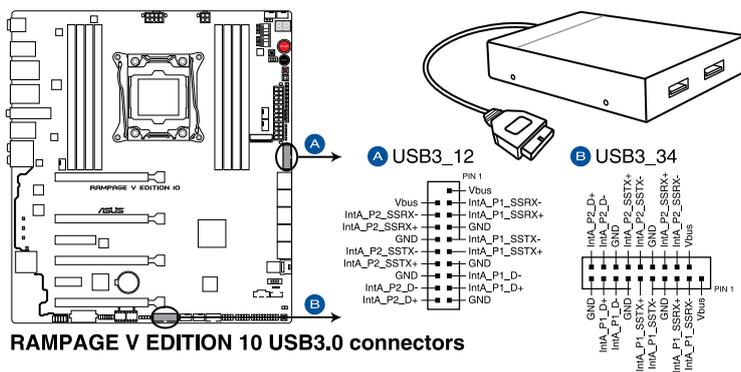
This connector is for the thermistor cable that monitors the temperature of the devices and the critical components inside the motherboard. Connect the thermistor cable and place the sensor on the device or the motherboard's component to detect its temperature.



To monitor the temperature at the BIOS, go to **BIOS>Monitor>Temperature Monitor**.

4. USB 3.0 connector (20-1 pin USB_12, USB_34)

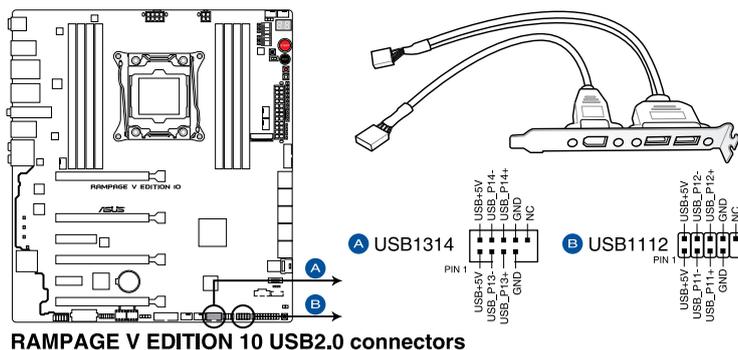
This connector allows you to connect a USB 3.0 module for additional USB 3.0 front or rear panel ports. With an installed USB 3.0 module, you can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5 Gbps, faster charging time for USB-chargable devices, optimized power efficiency,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



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

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



RAMPAGE V EDITION 10 USB2.0 connectors



DO NOT connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



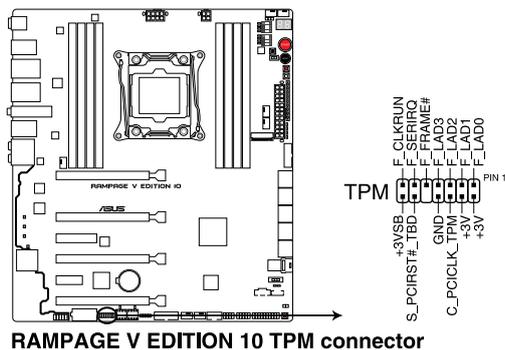
You can connect the front panel USB cable to the ASUS Q-Connector (USB) first, and then install the Q-Connector (USB) to the USB connector onboard if your chassis supports front panel USB ports.



- The USB 2.0 module is purchased separately.
- 1 x USB 2.0 port (USB1112) at mid-board shares with ROG extension (ROG_EXT) port.

6. TPM connector (14-1 pin TPM)

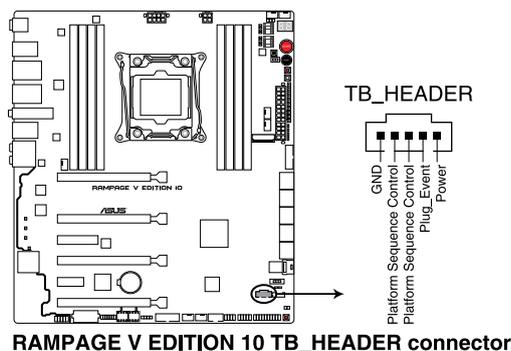
This connector supports a Trusted Platform Module (TPM) system, which securely stores keys, digital certificates, passwords and data. A TPM system also helps enhance network security, protect digital identities, and ensures platform integrity.



The TPM module is purchased separately.

7. Thunderbolt header (5-pin TB_HEADER)

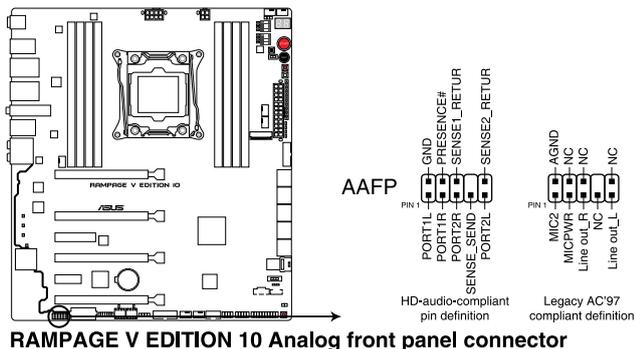
This connector is for the add-on Thunderbolt I/O card that supports Intel's Thunderbolt Technology, allowing you to connect up to six Thunderbolt-enabled devices and a DisplayPort-enabled display in a daisy-chain configuration.



The add-on Thunderbolt I/O card and Thunderbolt cables are purchased separately.

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

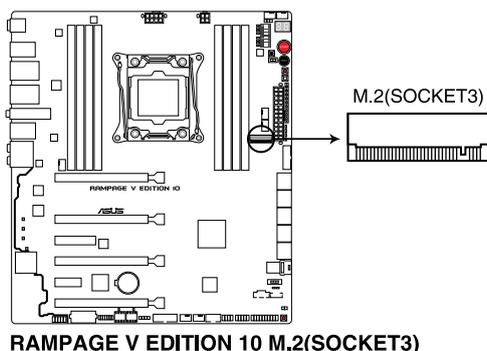
This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC'97 audio standard. Connect one end of the front panel audio I/O module cable to this connector.



- We recommend that you connect a high-definition front panel audio module to this connector to take advantage of the motherboard's high-definition audio capability.
- If you want to connect a high-definition or an AC'97 front panel audio module to this connector, set the Front Panel Type item in the BIOS setup to **[HD]** or **[AC97]**.

9. M.2 (SOCKET3)

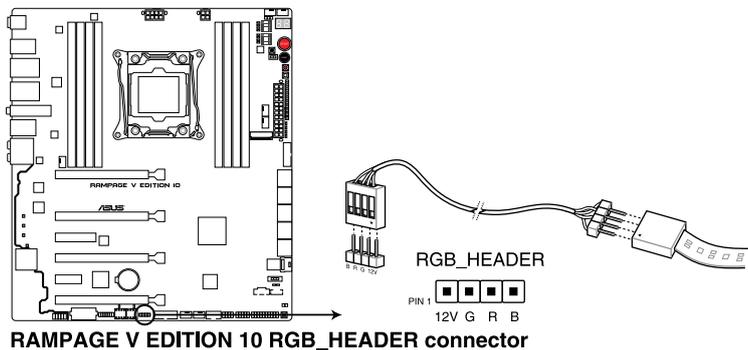
The M.2 (Socket 3) with M Key supports type 2260 (22mm x 60mm), 2280 (22mm x 80mm), and 22110 (22mm x 110mm) PCIe interface storage devices.



- The PCIEX8_4 slot shares bandwidth with M.2 and U.2.
- The M.2 (NGFF) SSD module is purchased separately.

10. RGB header (4-pin RGB_HEADER)

This connector is for RGB LED strips.



The RGB header supports 5050 RGB multi-color LED strips (12V/G/R/B), with a maximum power rating of 2A (12V), and no longer than 2 m.



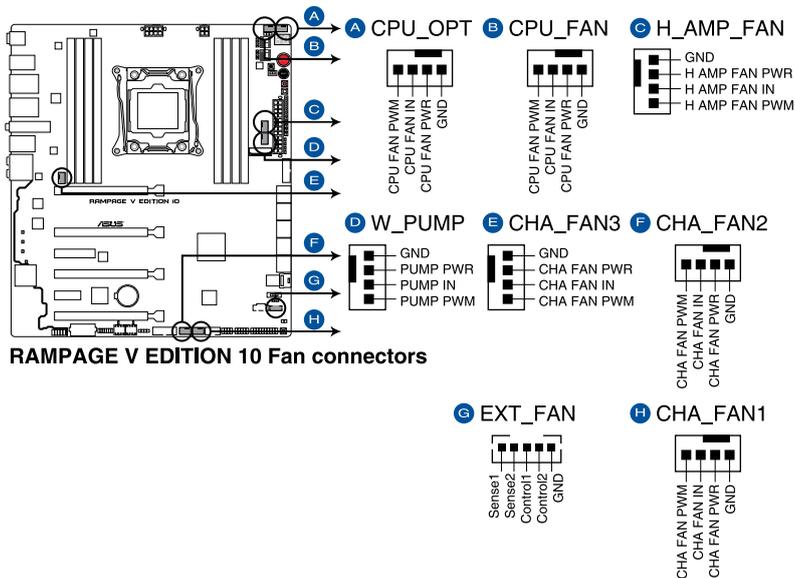
Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, or components.



- Actual lighting and color will vary with LED strip.
- If your LED strip does not light up, check if the RGB LED extension cable and the RGB LED strip is connected in the correct orientation, and the 12V connector is aligned with the 12V header on the motherboard.
- The LED strip will only light up under the operating system.

11. CPU, CPU optional, high amp, water pump, extension and chassis fan connectors (4-pin CPU_FAN; 4-pin CPU_OPT; 4-pin H_AMP_FAN; 4-pin W_PUMP; 5-pin EXT_FAN; 4-pin CHA_FAN1-3)

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



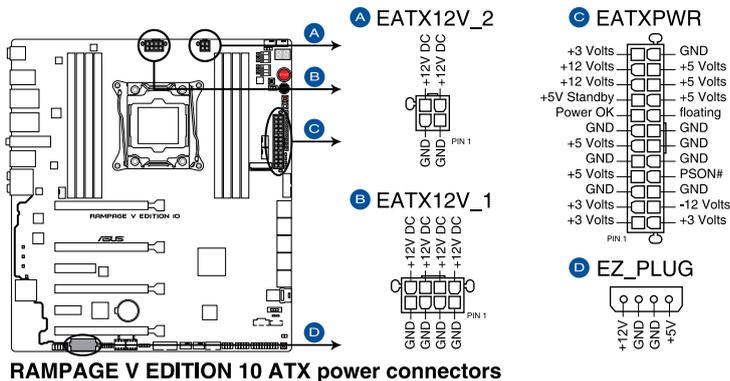
DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!



The CPU_FAN connector supports the CPU fan of maximum 1A (12 W) fan power.

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

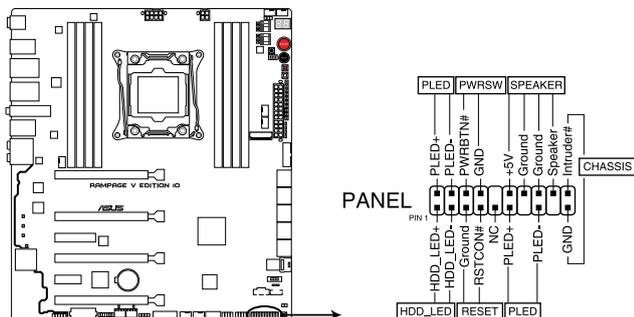
These connectors are for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.



- 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 when you install multiple graphics cards.
- Use of a PSU with 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 at least 1000W of output power to ensure system stability.

13. System panel connector (20-3 pin PANEL)

This connector supports several chassis-mounted functions.



RAMPAGE V EDITION 10 System panel connector

- **System power LED (2-pin or 3-1 pin PLED)**

The 2-pin or 3-1 pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

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

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

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

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

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

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

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

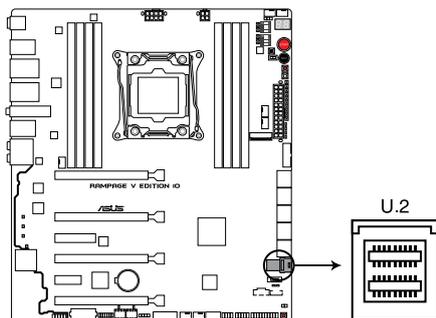
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

- **Chassis intrusion connector (2-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.

14. U.2 connector (U.2_1-2)

This motherboard comes with a U.2 connector which supports PCIe 3.0 x4 NVM Express storage.



RAMPAGE V EDITION 10 U.2 connector

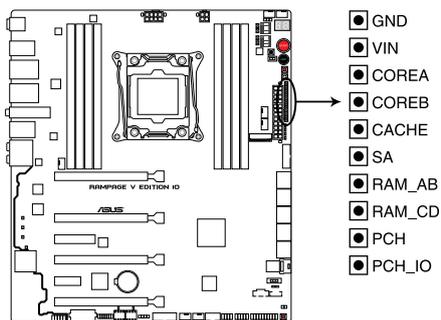


The PCIEX8_4 slot shares bandwidth with M.2 and U.2.

1.1.10 Probelts

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

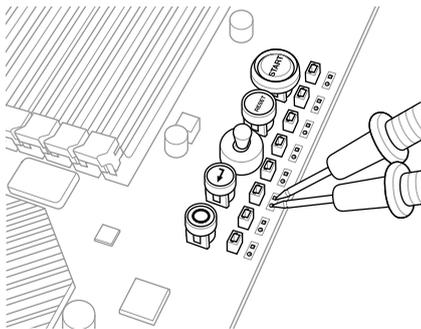
See the illustration below to locate the respective Probelts points.



RAMPAGE V EDITION 10 Probelts

Using Probelts

You can connect the multimeter 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

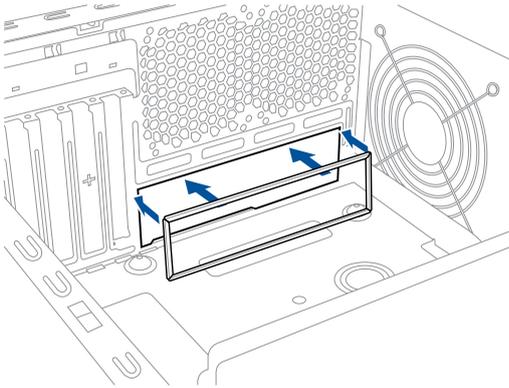
2.1 Building your PC system

2.1.1 Motherboard installation

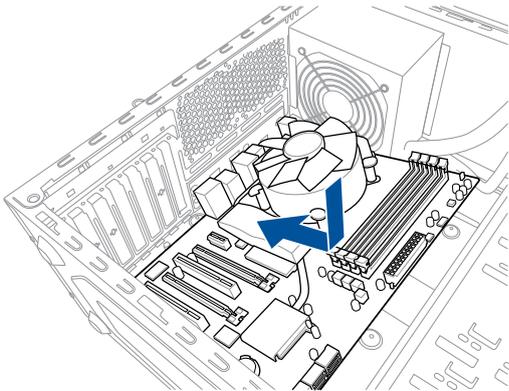


The diagrams in this section are for reference only. The motherboard layout may vary with models, but the installation steps are the same for all models.

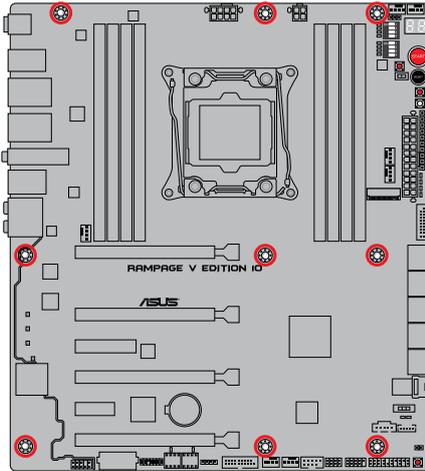
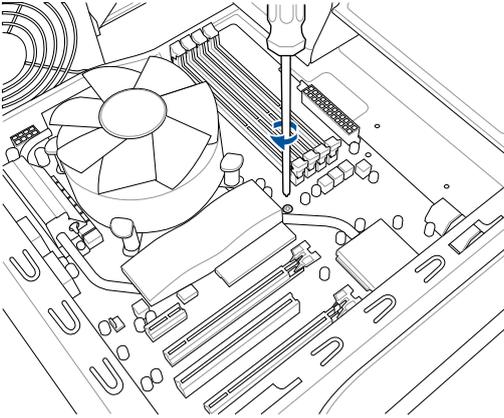
1. Install the I/O frame to the chassis rear I/O panel.



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



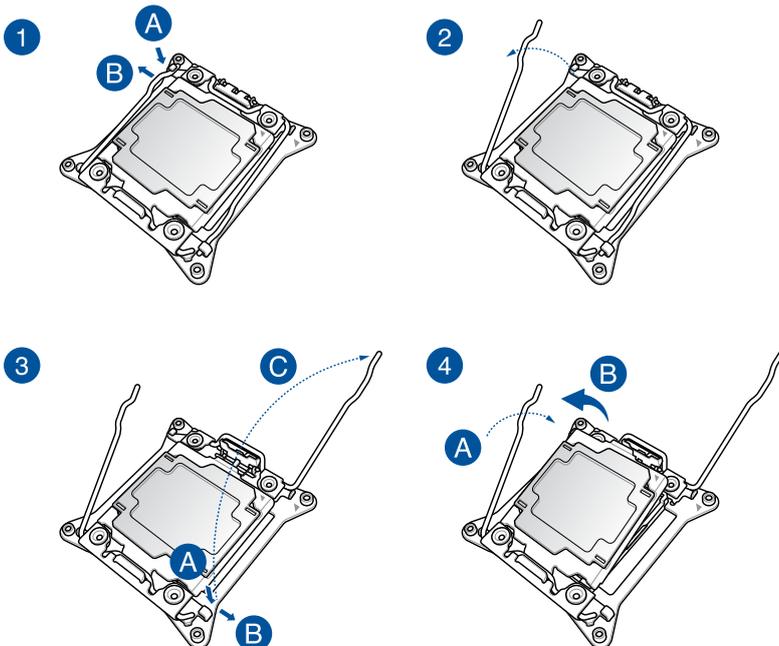
DO NOT overtighten the screws! Doing so can damage the motherboard.

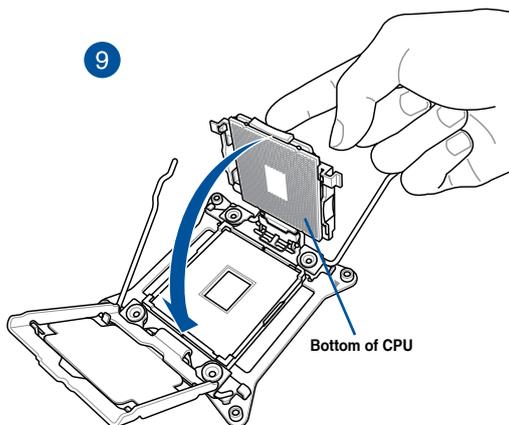
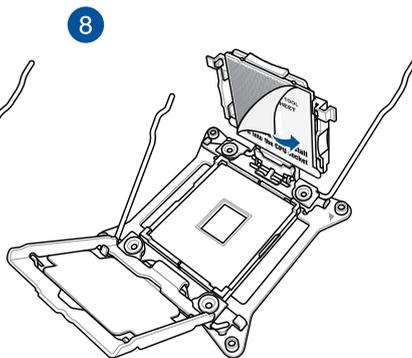
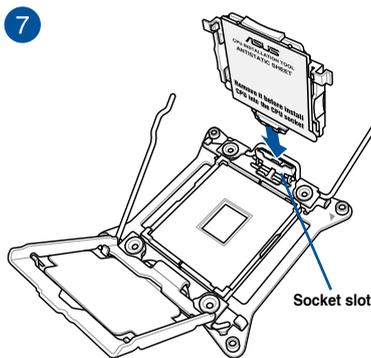
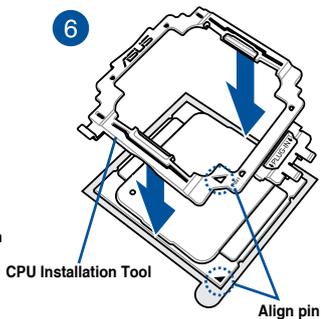
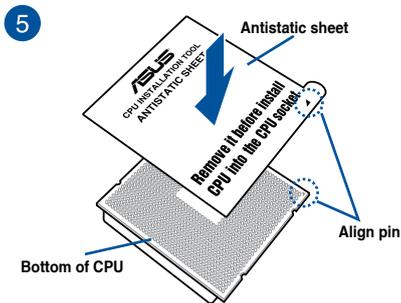
2.1.2 CPU installation

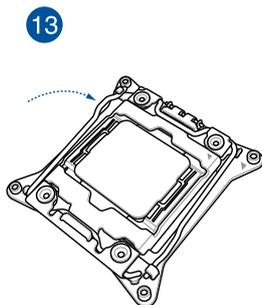
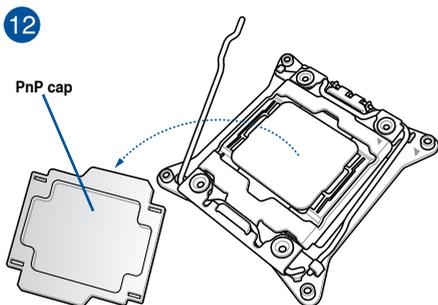
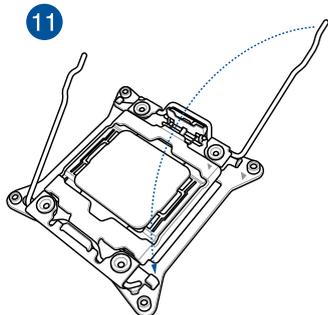
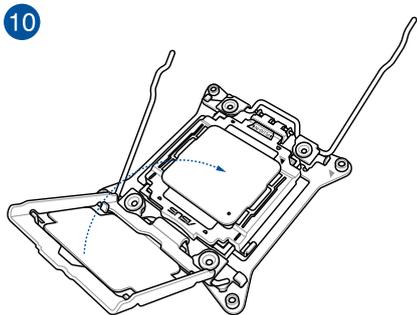


- Please note the order in opening/ closing the double latch. Follow the instructions printed on the metal sealing hatch or the illustrations shown below in this manual. The plastic cap will pop up automatically once the CPU is in place and the hatch properly sealed down.
- The illustrations are for reference only.
- The CPU Installation Tool is only compatible on ASUS motherboards with an Intel® LGA2011-V3 socket.
- Ensure that the CPU is firmly clicked into place before installing it into the CPU socket or socket slot.
- Use the CPU Installation Tool for installing the CPU only. DO NOT damage or bend the CPU Installation Tool.
- Always firmly hold both sides of the CPU Installation Tool when installing, removing, or picking up the CPU Installation Tool.
- Ensure to use a soft stable surface when installing the CPU to the CPU Installation Tool to prevent CPU damage.
- ASUS will not cover damages resulting from incorrect CPU installation/removal, incorrect CPU orientation/placement, or other damages resulting from negligence by the user.

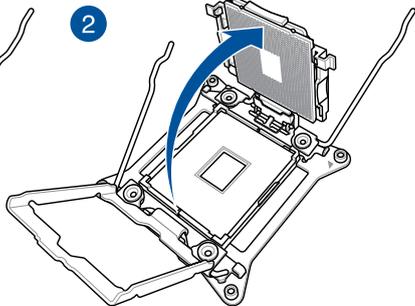
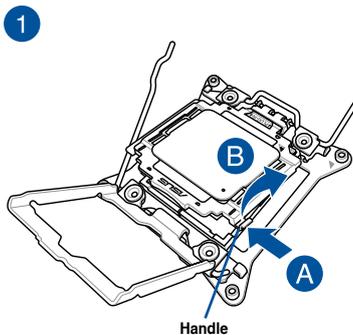
Installing CPU



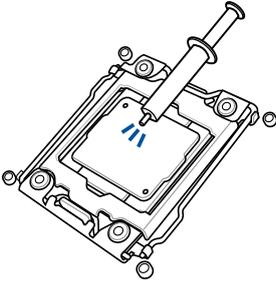




Removing CPU

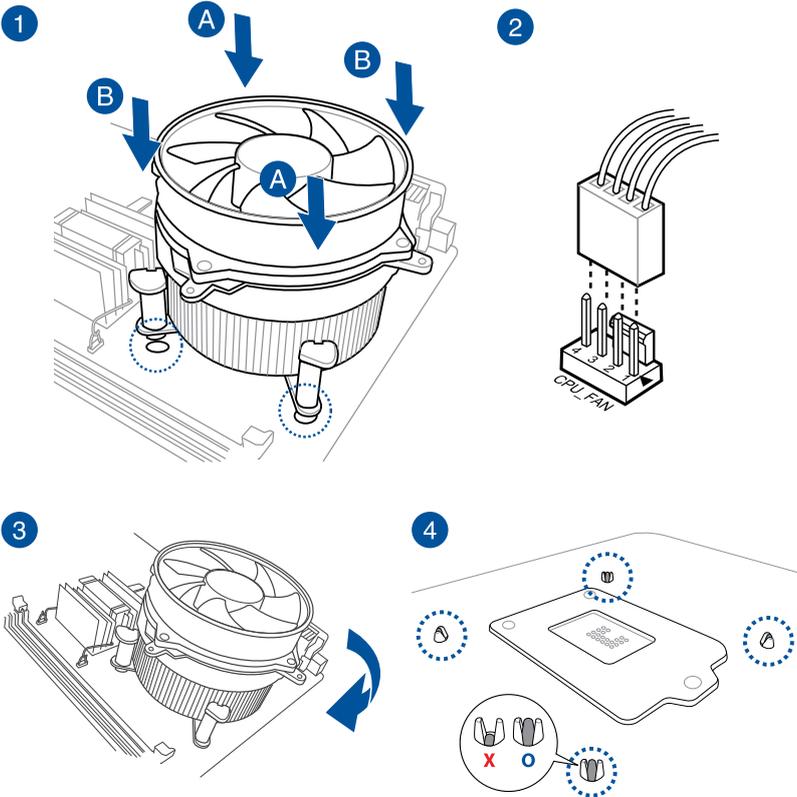


2.1.3 CPU heatsink and fan assembly installation

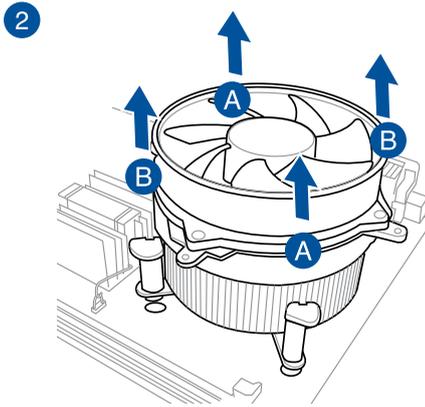
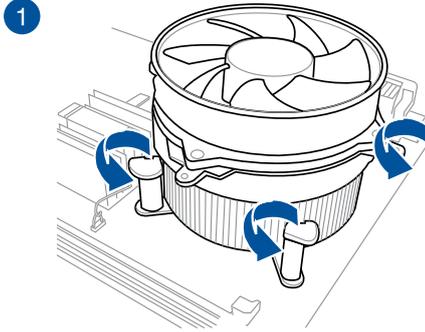


Apply the thermal interface material to the CPU heatsink and CPU before you install the heatsink and fan, if necessary.

Installing the CPU heatsink and fan assembly

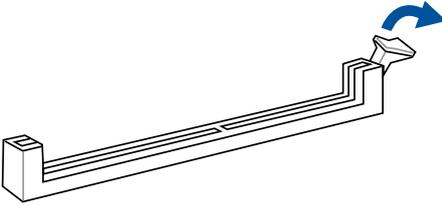


Uninstalling the CPU heatsink and fan assembly

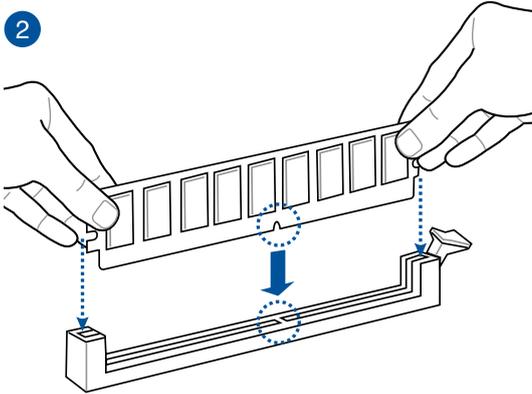


2.1.4 DIMM installation

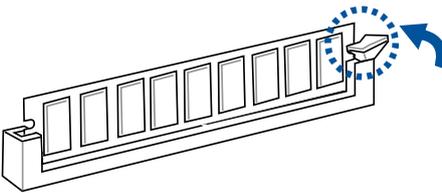
1



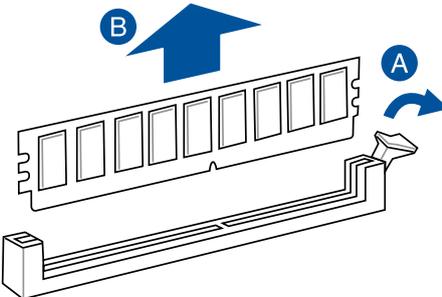
2



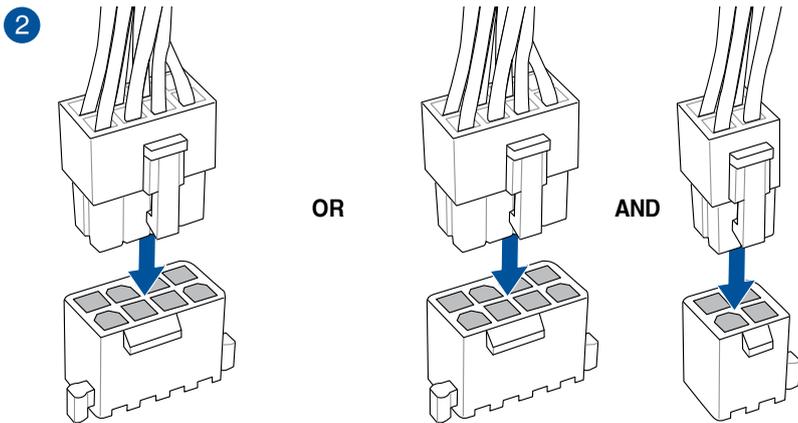
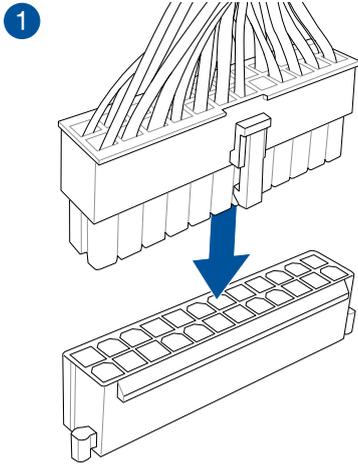
3



To remove a DIMM

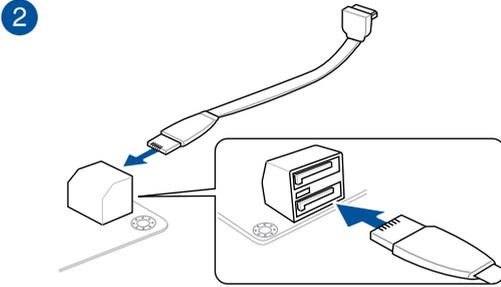
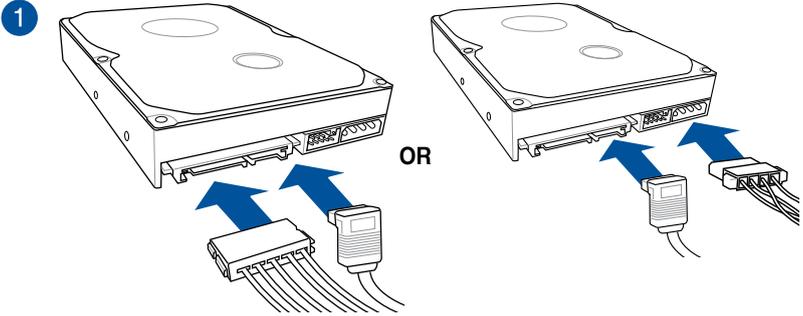


2.1.5 ATX power connection



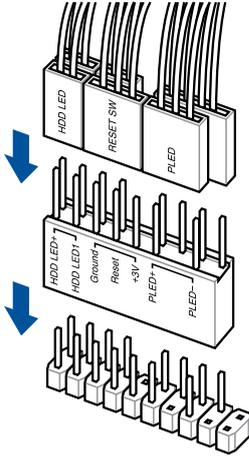
- DO NOT connect the 4-pin power plug only, the motherboard may overheat under heavy usage.
- Ensure to connect the 8-pin power plug, or connect both the 8-pin and 4-pin power plugs.

2.1.6 SATA device connection

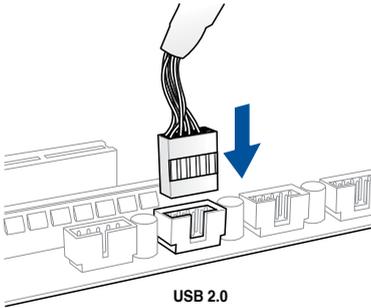


2.1.7 Front I/O connector

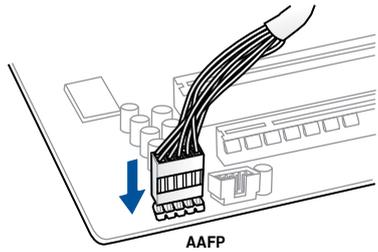
To install ASUS Q-Connector



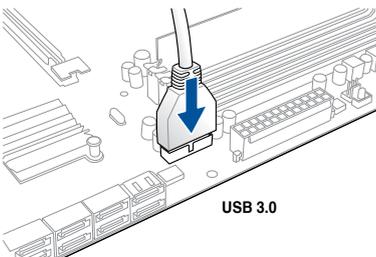
To install USB 2.0 connector



To install front panel audio connector

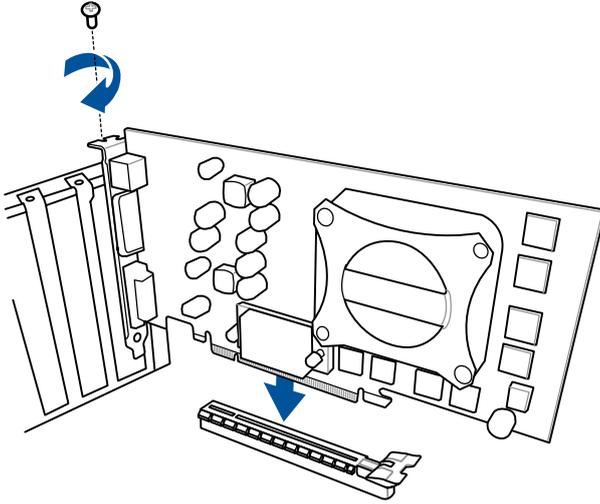


To install USB 3.0 connector

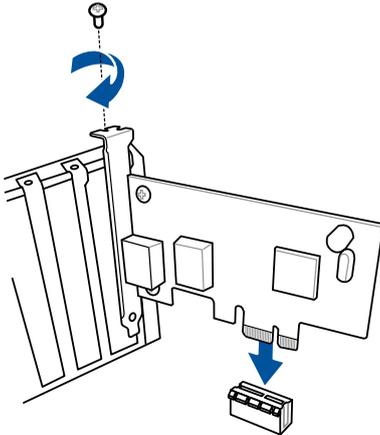


2.1.8 Expansion card installation

To install PCIe x16 cards



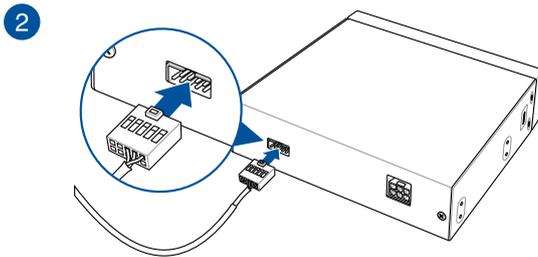
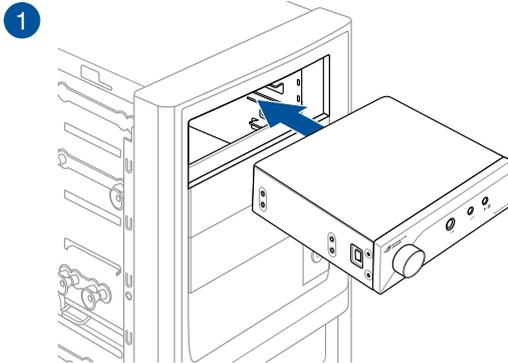
To install PCIe x1 cards



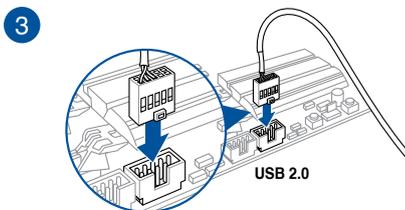
2.1.9 SupremeFX Hi-Fi installation

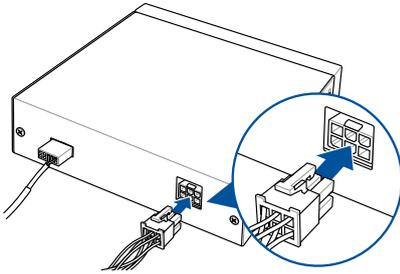


- Unplug the power cord from the wall socket before touching any component.
- Before you install or remove any component, ensure that the power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, or components.



Using the bundled USB 2.0 connector cable to connect your SupremeFX Hi-Fi panel is the best way to use your SupremeFX Hi-Fi panel.

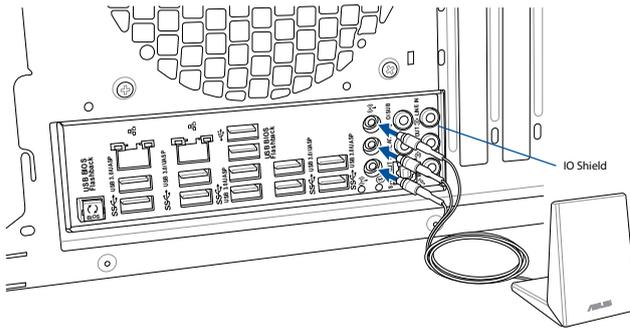




2.1.10 Wi-Fi antenna installation

Installing the ASUS 3T3R dual band W-Fi antenna

Connect the bundled ASUS 3T3R dual band Wi-Fi antenna connector to the Wi-Fi ports at the back of the chassis.



- Ensure that the ASUS 3T3R dual band Wi-Fi antenna is securely installed to the Wi-Fi ports.
- Ensure to install the Bluetooth driver before installing the Wi-Fi GO! software.
- Ensure that the antenna is at least 20 cm away from all persons.



The illustration above is for reference only. The I/O port layout may vary with models, but the Wi-Fi antenna installation procedure is the same for all models.

2.2 BIOS update utility

USB BIOS Flashback

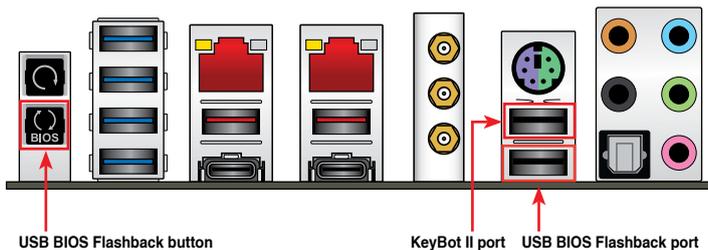
USB BIOS Flashback allows you to easily update the BIOS without entering the existing BIOS or operating system. Simply insert a USB storage device to the USB port, press the USB BIOS Flashback button for three seconds, and the BIOS is updated automatically.

To use USB BIOS Flashback:

1. Download the latest BIOS file from the ASUS website.
2. Extract and rename the BIOS image file to **R5E10.CAP**.
3. Copy **R5E10.CAP** to the root directory of your USB storage device.
4. Turn off the system and connect the USB storage device to the USB BIOS Flashback port.
5. Press the USB BIOS Flashback button for 3 seconds until the BIOS_LED1 or BIOS_LED2 flashes.



A flashing light indicates that the BIOS Flashback function is enabled. The light goes out when the process of updating the BIOS is complete.



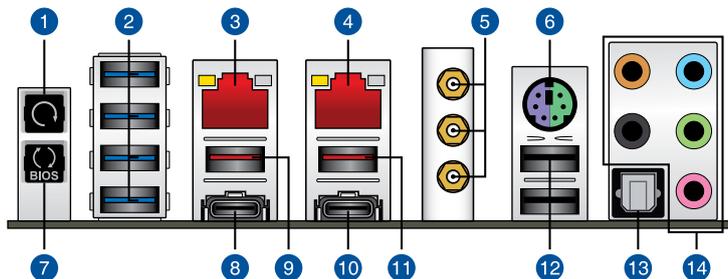
- For more BIOS update utilities in BIOS setup, refer to the section Updating BIOS in Chapter 3.
- Connect your USB keyboard on the KeyBot II port if you want to use the KeyBot feature.



Updating BIOS may have risks. If the BIOS program is damaged during the process and results to the system's failure to boot up, please contact your local ASUS Service Center.

2.3 Motherboard rear and audio connections

2.3.1 Rear I/O connection



Rear panel connectors

1.	Clear CMOS button
2.	ASMedia® USB 3.0 ports E1234. Supports USB 3.0 Boost.
3.	Intel® LAN (RJ-45) port*
4.	Intel® LAN (RJ-45) port*
5.	Wi-Fi 802.11 a/b/g/n/ac, Bluetooth V4.0
6.	PS/2 Keyboard/Mouse combo port
7.	USB BIOS Flashback button
8.	ASMedia® USB 3.1 Type-C port EC1. Supports USB 3.1 Boost.
9.	ASMedia® USB 3.1 Type-A port EA2. Supports USB 3.1 Boost.
10.	ASMedia® USB 3.1 Type-C port EC3. Supports USB 3.1 Boost.
11.	ASMedia® USB 3.1 Type-A port EA4. Supports USB 3.1 Boost.
12.	Intel® USB 2.0 ports 7 and 8. Upper port supports the KeyBot II feature, and lower port supports USB BIOS Flashback function.
13.	Optical S/PDIF OUT port
14.	Audio I/O ports**

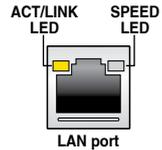
* and **: Refer to the tables on the next page for LAN port LEDs, and audio port definitions.



- Due to USB 3.0 controller limitation, USB 3.0 devices can only be used under Windows® 7 and after the USB 3.0 driver installation.
- USB 3.0 devices can only be used as data storage only.
- We strongly recommend that you connect USB 3.0 devices to USB 3.0 ports for faster and better performance for your USB 3.0 devices.
- Due to the design of the Intel chipset, all USB devices connected to the USB 2.0 and USB 3.0 ports are controlled by the xHCI controller. Some legacy USB devices must update their firmware for better compatibility.

* 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		

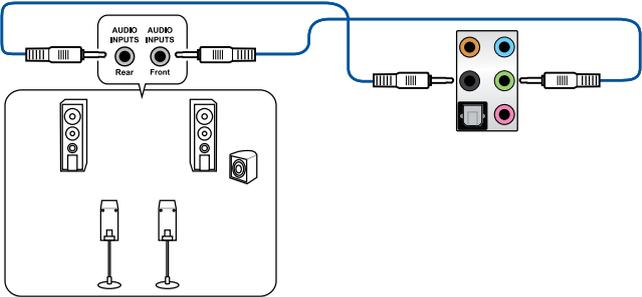


You can disable the LAN controllers in BIOS. Due to hardware design, the LAN1 port's LEDs may continue to blink even when disabled.

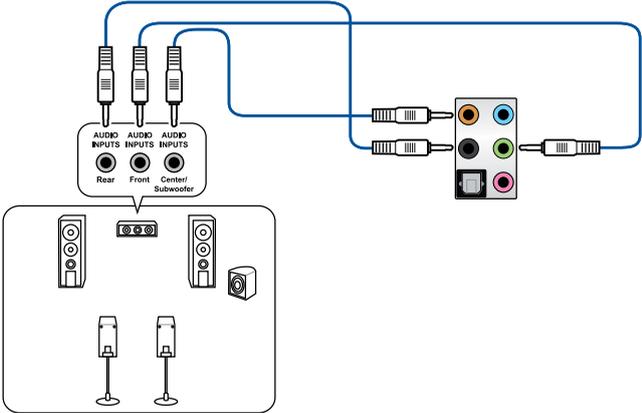
** Audio 2.1, 4.1, 5.1 or 7.1-channel configuration

Port	Headset 2.1-channel	4.1-channel	5.1-channel	7.1-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/Sub woofer	Center/Sub woofer
Black	–	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out

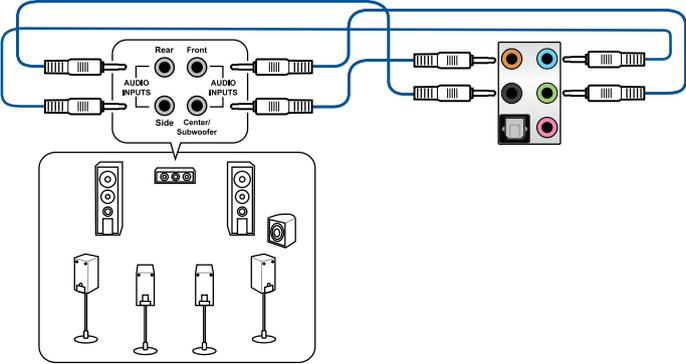
Connect to 4.1 channel Speakers



Connect to 5.1 channel Speakers

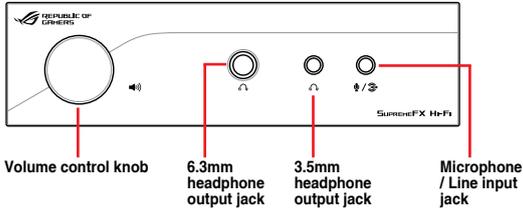


Connect to 7.1 channel Speakers



2.3.3 SupremeFX Hi-Fi Audio I/O connections

Audio I/O ports

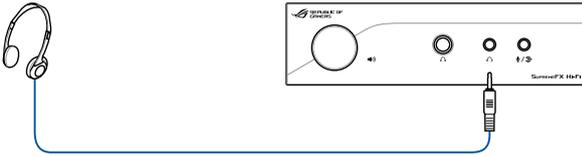


The volume will be set at the minimal level upon first installation. Please slowly adjust the volume to a comfortable level after plugging in a headphone.

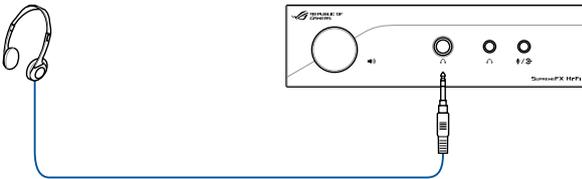


Ensure to always run the impedance detect function before playback every time you switch headphones to avoid damage to your headphones.

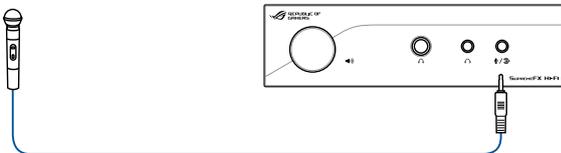
Connect to 3.5mm headphones



Connect to 6.3mm headphones



Connect to microphone



2.4 Starting up for the first time

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

The system then runs the power-on self tests (POST). While the tests are running, the BIOS beeps (refer to the BIOS beep codes table) or additional messages may 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. Hold down the <Delete> key during power on to enter the BIOS Setup. Follow the instructions in Chapter 3.

2.5 Turning off the computer

While the system is ON, press the power button for less than four seconds to put the system to 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

3.1 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 **R5E10.CAP** for this motherboard.

3.2 BIOS setup program

Use the BIOS Setup to update the BIOS or configure its parameters. The BIOS screen includes navigation keys and a brief on-screen tip to help 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>, the computer continues to boot normally.

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press <Ctrl>+<Alt>+<Delete> simultaneously.
- Press the reset button on the system chassis.
- Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the previous options.

After doing either of the three options, press <Delete> key to enter BIOS.



-
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
 - Ensure that a USB mouse is connected to your motherboard if you want to use the mouse to control the BIOS setup program.
 - If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu or press hotkey <F5>. See section 3.10 **Exit Menu** for details.
 - If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See section 2.3.1 **Rear I/O connection** for location of the Clear CMOS button to clear RTC RAM.
 - The BIOS setup program does not support bluetooth devices.
-



Please visit ASUS website for the detailed BIOS content manual.

BIOS menu screen

The BIOS Setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. You can change modes from **Setup Mode** in Boot menu or by pressing the <F7> hotkey.

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, select **Advanced Mode** or press the <F7> hotkey for the advanced BIOS settings.



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

Displays the system properties of the selected mode. Click < > to switch EZ System Tuning modes

Displays the CPU/motherboard temperature, CPU voltage output, CPU/chassis/power fan speed, and SATA information

Selects the display language of the BIOS setup program

Creates storage RAID and configures system overclocking

Enables or disables the Intel Rapid Storage Technology

Displays the CPU Fan's speed. Click the button to manually tune the fans

Loads optimized default settings

Saves the changes and resets the system

Click to go to Advanced mode

Search on the FAQ

Click to display boot devices

Selects the boot device priority



The boot device options vary depending on the devices you 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 switch from EZ Mode to Advanced Mode, click **Advanced Mode(F7)** or press the <F7> hotkey.

The screenshot shows the UEFI BIOS Utility in Advanced Mode. The interface includes a menu bar at the top with options like Language, MyFavorite(F3), Qfan Control(F6), EZ Tuning Wizard(F11), and Quick Note(F9). A scroll bar and Hot Keys are also visible. The main area displays various configuration fields such as LN2 Mode, Target CPU Turbo-Mode Frequency (3200MHz), Target DRAM Frequency (2133MHz), and Target Cache Frequency (2500MHz). There are sections for Overclocking Presets, AI Overclock Tuner (set to Auto), and ASUS MultiCore Enhancement. The CPU Core Ratio section shows 1-Core Ratio Limit, 2-Core Ratio Limit, 3-Core Ratio Limit, and 4-Core Ratio Limit, all set to Auto. A Hardware Monitor section on the right displays CPU Frequency (3100 MHz), Temperature (37°C), BCLK (100.0 MHz), Core Voltage (1.123 V), Ratio (31x), Memory Frequency (2133 MHz), Vol_L_CHAB (1.200 V), Capacity (4096 MB), Vol_L_CHCD (1.203 V), and Voltage (+12V, +5V, +3.3V, 3.280 V). A sub-menu item 'CPU Core Ratio' is highlighted. A general help message is shown at the bottom: '[Manual]: When the manual mode is selected, the BCLK(base clock) frequency can be assigned manually. [XMP]: When the XMP(extreme memory profile) mode is selected, the BCLK frequency and memory parameters will be optimized automatically.' The bottom of the screen shows 'Last Modified', 'EzMode(F7)', and 'Search on FAQ'. Labels with red lines point to these various elements.

Displays the CPU temperature, CPU, and memory voltage output

Menu bar

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

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

Menu items

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

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

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>.

Language

This button above the menu bar contains the languages that you can select for your BIOS. Click this button to select the language that you want to display in your BIOS screen.

MyFavorite(F3)

This button above the menu bar shows all BIOS items in a Tree Map setup. Select frequently-used BIOS settings and save it to MyFavorite menu.



Refer to section **3.3 My Favorites** for more information.

Qfan Control(F6)

This button above the menu bar displays the current settings of your fans. Use this button to manually tweak the fans to your desired settings.



Refer to section **3.2.3 QFan Control** for more information.

EZ Tuning Wizard(F11)

This button above the menu bar allows you to view and tweak the overclocking settings of your system. It also allows you to change the motherboard's SATA mode from AHCI to RAID mode.



Refer to section **3.2.4 EZ Tuning Wizard** for more information.

Search on FAQ

Move your mouse over this button to show a QR code, scan this QR code on your mobile device to connect to the BIOS FAQ web page of the ASUS support website. You can also scan the following QR code:



Quick Note (F9)

This button above the menu bar allows you to key in 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.

Hot keys

This button above the menu bar contains the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

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.

General help

At the bottom of the menu screen is a brief description of the selected item. Use the <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.

Last Modified button

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

3.2.3 QFan Control

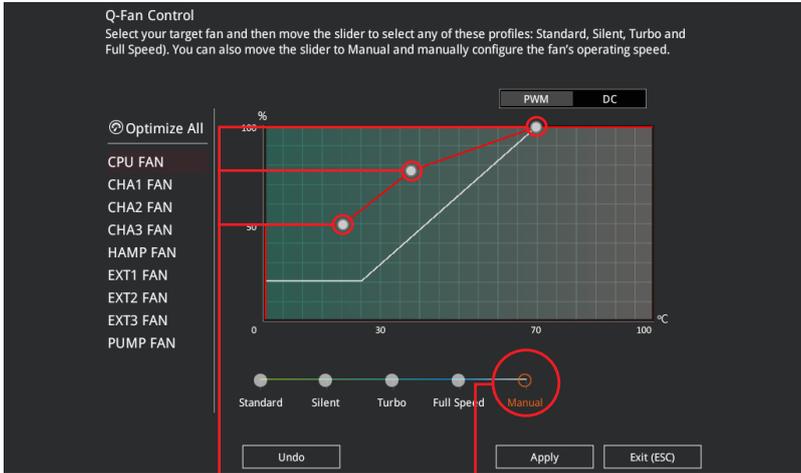
The QFan Control allows you to set a fan profile or manually configure the operating speed of your CPU and chassis fans.

The screenshot shows the QFan Control interface with the following elements and annotations:

- Q-Fan Control** header with instructions: "Select your target fan and then move the slider to select any of these profiles: Standard, Silent, Turbo and Full Speed). You can also move the slider to Manual and manually configure the fan's operating speed."
- Mode Selection:** "PWM" and "DC" buttons. An annotation "Click to activate DC Mode" points to the "DC" button.
- Profile List:** A list of fans: CPU FAN, CHA1 FAN, CHA2 FAN, CHA3 FAN, HAMP FAN, EXT1 FAN, EXT2 FAN, EXT3 FAN, PUMP FAN. An annotation "Click to select a fan to be configured" points to this list.
- Graph:** A line graph showing fan speed (%) vs temperature (°C). The y-axis ranges from 0 to 100, and the x-axis from 0 to 100. A red line shows a profile that is flat at ~25% until 30°C, then rises to ~75% at 70°C, and finally reaches 100% at 100°C.
- Profile Selection:** Radio buttons for "Standard", "Silent", "Turbo", "Full Speed", and "Manual". An annotation "Click to activate PWM Mode" points to the "Standard" button.
- Buttons:** "Undo", "Apply", and "Exit (ESC)". Annotations include: "Click to undo the changes" (pointing to "Undo"), "Click to apply the fan setting" (pointing to "Apply"), "Click to go back to main menu" (pointing to "Exit (ESC)"), and "Select to manually configure your fans" (pointing to "Manual").
- Additional Annotation:** "Select a profile to apply to your fans" points to the "Standard" radio button.

Configuring fans manually

Select **Manual** from the list of profiles to manually configure your fans' operating speed.



Speed points

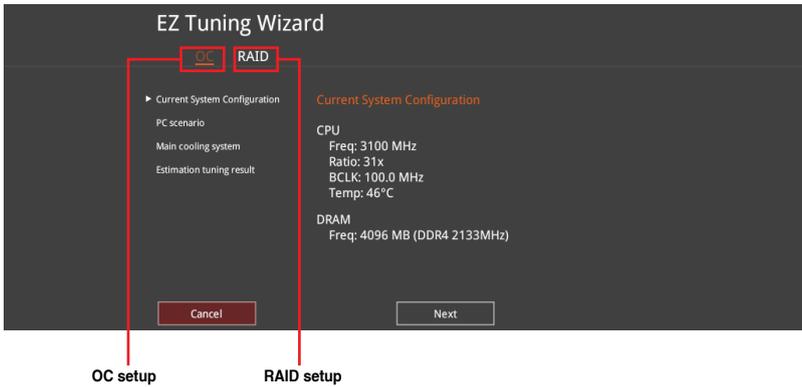
Select to manually
configure your fans

To configure your fans:

1. Select the fan that you want to configure and to view its current status.
2. Click and drag the speed points to adjust the fans' operating speed.
3. Click **Apply** to save the changes then click **Exit (ESC)**.

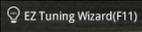
3.2.4 EZ Tuning Wizard

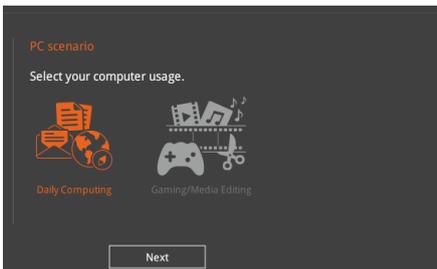
EZ Tuning Wizard allows you to easily overclock your CPU and DRAM, computer usage, and CPU fan to their best settings. You can also set RAID in your system using this feature.



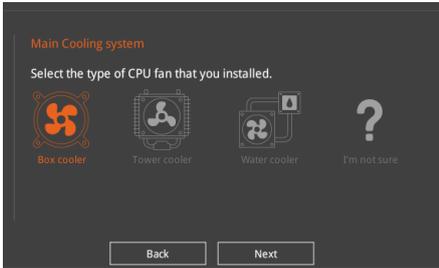
OC Tuning

To start OC Tuning:

1. Press <F11> on your keyboard or click  from the BIOS screen to open EZ Tuning Wizard screen.
2. Click **OC** then click **Next**.
3. Select a PC scenario **Daily Computing** or **Gaming/Media Editing**, then click **Next**.



4. Select a Main Cooling System **BOX cooler**, **Tower cooler**, **Water cooler**, or **I'm not sure**, then click **Next**.



5. After selecting the Main Cooling System, click **Next** then click **Yes** to start the OC Tuning.

Creating RAID

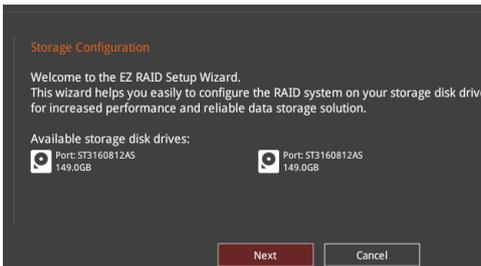
To create RAID:

1. Press <F11> on your keyboard or click **EZ Tuning Wizard(F11)** from the BIOS screen to open EZ Tuning Wizard screen.
2. Click **RAID** then click **Next**.

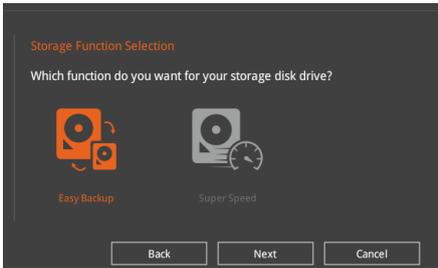


- Ensure that your HDDs have no existing RAID volumes.
- Ensure to connect your HDDs to Intel® SATA connectors.

3. Check the available storage disk drives, then click **Next**.



4. Select the type of storage for your RAID, **Easy Backup** or **Super Speed**, then click **Next**.



- a. For Easy Backup, click **Next** then select from **Easy Backup (RAID 1)** or **Easy Backup (RAID 10)**.



You can only select Easy Backup (RAID 10) if you connect four (4) HDDs.

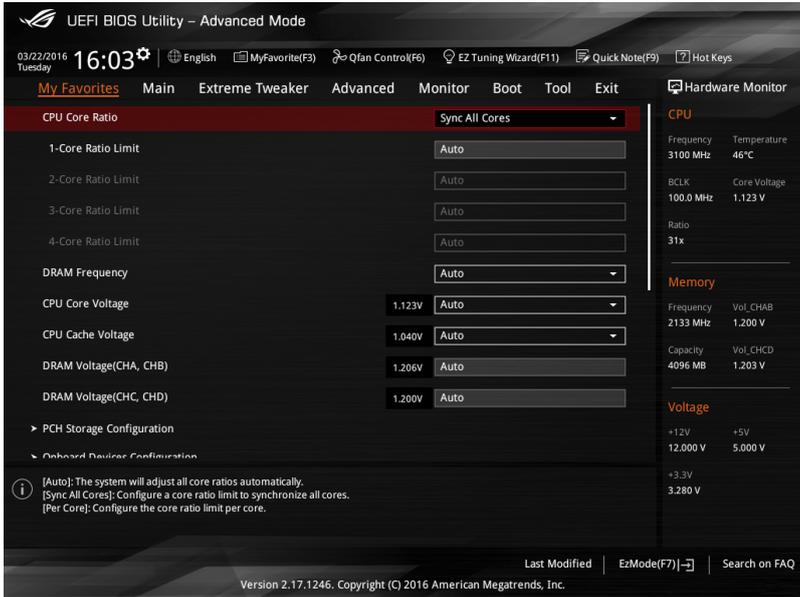
- b. For Super Speed, click **Next** then select from **Super Speed (RAID 0)** or **Super Speed (RAID 5)**.



5. After selecting the type of RAID, click **Next** then click **Yes** to continue the RAID setup.
6. After the RAID setup is done, click **Yes** to exit the setup then click **OK** to reset your system.

3.3 My Favorites

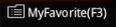
My Favorites is your personal space where you can easily save and access your favorite BIOS items.

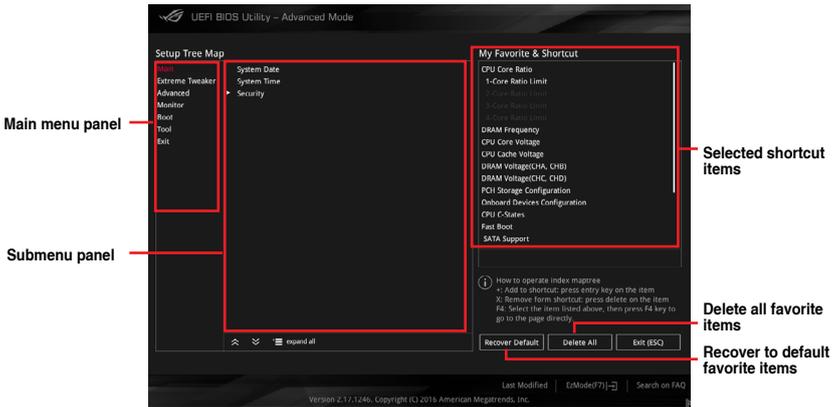


My Favorites comes with several performance, power saving, and fast boot related items by default. You can personalize this screen by adding or removing items.

Adding items to My Favorites

To add frequently-used BIOS items to My Favorites:

1. Press <F3> on your keyboard or click  to open Setup Tree Map screen.
2. On the Setup Tree Map screen, select the BIOS items that you want to save in My Favorites screen.



3. Select an item from main menu panel, then click the submenu that you want to save as favorite from the submenu panel and click  or press <Enter> on your keyboard.



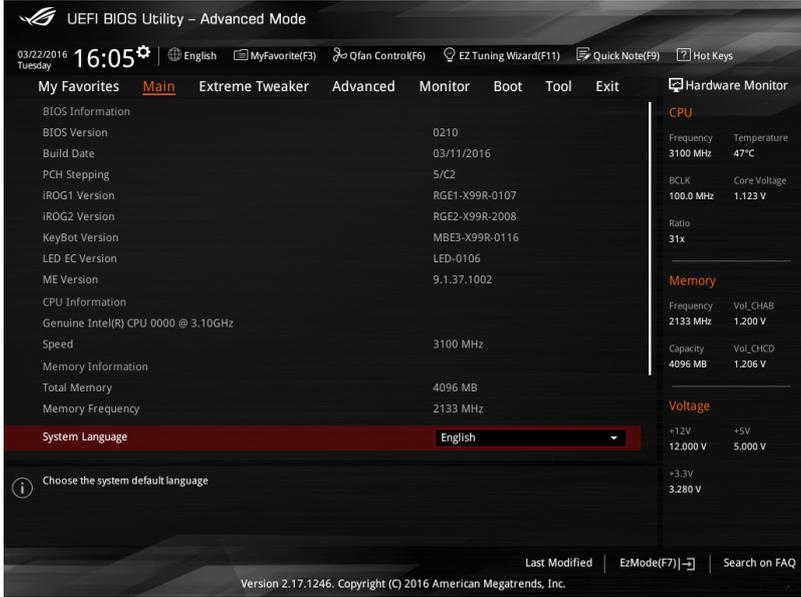
You cannot add the following items to My Favorite items:

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

4. Click **Exit (ESC)** or press <Esc> key to close Setup Tree Map screen.
5. Go to **My Favorites** menu to view the saved BIOS items.

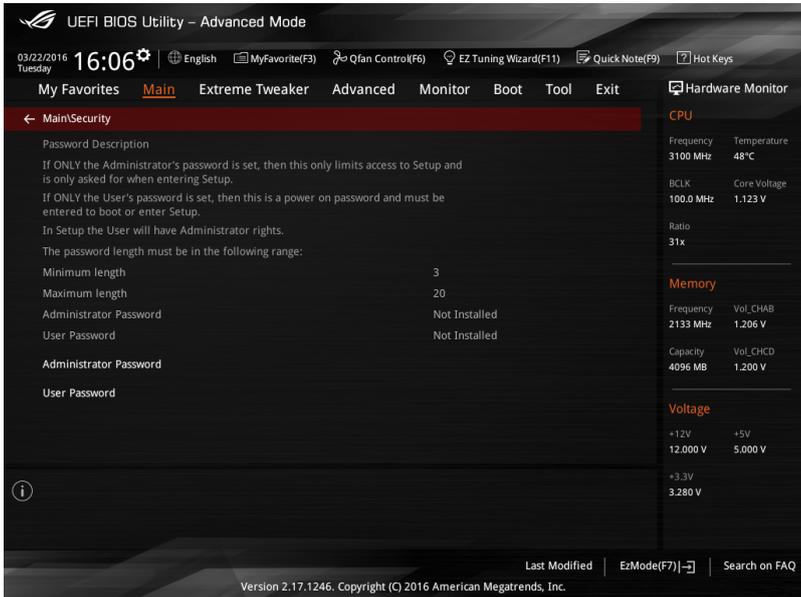
3.4 Main menu

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



Security

The Security menu items allow you to change the system security settings.



UEFI BIOS Utility – Advanced Mode

03/22/2016 16:06 Tuesday English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Quick Note(F9) Hot Keys

My Favorites **Main** Extreme Tweaker Advanced Monitor Boot Tool Exit Hardware Monitor

← Main/Security

Password Description

If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.

If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup.

In Setup the User will have Administrator rights.

The password length must be in the following range:

Minimum length	3
Maximum length	20
Administrator Password	Not Installed
User Password	Not Installed

Administrator Password

User Password

CPU

Frequency	3100 MHz	Temperature	48°C
BCLK	100.0 MHz	Core Voltage	1.123 V
Ratio	31x		

Memory

Frequency	2133 MHz	Vol_CHAB	1.206 V
Capacity	4096 MB	Vol_CHCD	1.200 V

Voltage

+12V	+5V
12.000 V	5.000 V
+3.3V	
3.280 V	

Last Modified | EzMode(F7) | Search on FAQ

Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.



- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See section 2.3.1 Rear I/O connection for location of the Clear CMOS button to clear RTC RAM.
- 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]**.

3.5 Extreme Tweaker menu

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

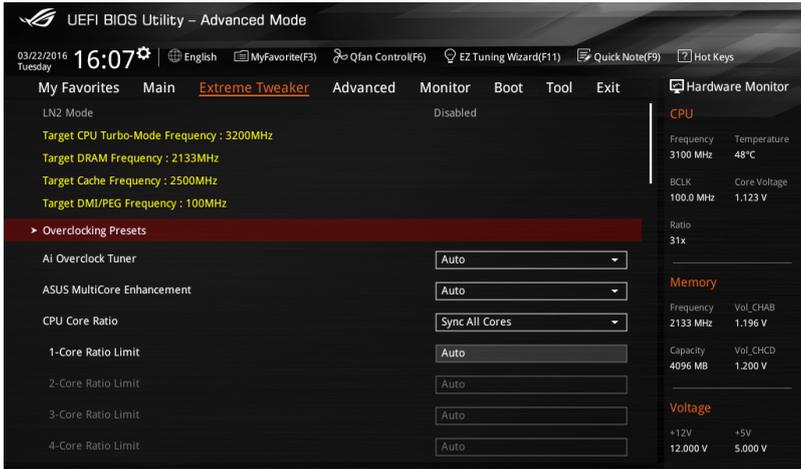


Be cautious when changing the settings of the Extreme Tweaker menu items. Incorrect field values can cause the system to malfunction



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.



Ai Overclock Tuner

Allows you to select the CPU overclocking options to achieve the desired CPU internal frequency. 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.



When the Ai Overclock Tuner is set to [Manual] or [XMP], the following items appear.

BCLK Frequency

This item allows you to set the BCLK (base clock) frequency to enhance the system performance. Use the <+> or <-> to adjust the value. The values range from 40.0 MHz to 500.0 MHz.



We recommend you to set the value based on the CPU specification, as high BCLK frequencies may damage the CPU permanently.



When Ai Overclock Tuner is set to [XMP], the XMP mode supported by the installed memory module is displayed.

ASUS MultiCore Enhancement

[Auto] This item allows you to maximize the overclocking performance optimized by ASUS core ratio settings.

[Disabled] This item allows you to set to default core ratio settings.

CPU Core Ratio

This item allows you to set the CPU core ratio limit per core or synchronize automatically to all cores.

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

BCLK Frequency : DRAM Frequency Ratio

[Auto] The BCLK frequency to DRAM frequency ratio will be set to the optimized setting.

[100:133] The BCLK frequency to DRAM frequency ratio will be set to 100:133.

[100:100] The BCLK frequency to DRAM frequency ratio will be set to 100:100.

DRAM Frequency

This item allows you to set the memory operating frequency. The configurable options vary with the BCLK (base clock) frequency setting. Select the auto mode to apply the optimized setting.

Configuration options: [Auto] [DDR4-800MHz] - [DDR4-4000MHz]

TPU

This item allows you to automatically overclock the CPU and DRAM frequencies and voltage for an enhanced system performance.

[Keep Current Settings] Keep the current settings without changing anything.

[TPU I] Applies air cooling overclocking conditions.

[TPU II] Applies water cooling overclocking conditions.



Ensure to use water cooling device before selecting [TPU II].

EPU Power Saving Mode

The ASUS EPU (Energy Processing Unit) sets the CPU in its minimum power consumption settings. Enable this item to set lower CPU core/cache voltage and achieve the best energy saving condition.

Configuration options: [Disabled] [Enabled]

Internal CPU Power Management

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

Enhanced Intel SpeedStep Technology

Allows the operating system to dynamically adjust the processor voltage and cores frequency to decrease the average power consumption and decrease average heat production.

Configuration options: [Disabled] [Enabled]

Turbo Mode

Allows you to enable your processor cores to run faster than the base operating frequency when it is below power, current and specification limit.

Configuration options: [Disabled] [Enabled]

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.

UEFI BIOS Utility – Advanced Mode

03/23/2016 10:04 Wednesday

English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Quick Note(F9) Hot Keys

My Favorites Main Extreme Tweaker **Advanced** Monitor Boot Tool Exit Hardware Monitor

CPU Configuration

- > PCH Configuration
- > PCH Storage Configuration
- > System Agent Configuration
- > USB Configuration
- > Platform Misc Configuration
- > Onboard Devices Configuration
- > APM Configuration
- > Network Stack Configuration
- > ROG Effects
- > HDD/SSD SMART Information

CPU Configuration Parameters

CPU	
Frequency	Temperature
3100 MHz	46°C
BCLK	Core Voltage
100.0 MHz	1.123 V
Ratio	
31x	
Memory	
Frequency	VoL_CHAB
2133 MHz	1.200 V
Capacity	VoL_CHCD
4096 MB	1.200 V
Voltage	
+12V	+5V
12.000 V	5.000 V
+3.3V	
3.280 V	

Last Modified | EzMode(F7) | Search on FAQ

Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.

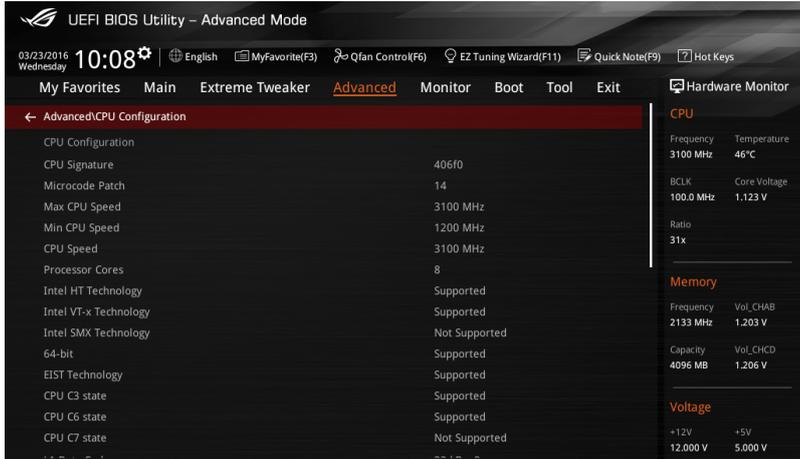
3.6.1 CPU Configuration

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.

Scroll down to display other BIOS items.



Hyper-threading[ALL]

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

Configuration options: [Disabled] [Enabled]

CPU Power Management Configuration

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

Enhanced Intel SpeedStep Technology

This item allows your system to adjust the CPU's voltage and cores frequency, resulting in decreased power consumption and heat production.

[Disabled] The CPU runs at its default speed.

[Enabled] The system controls the CPU speed.

Turbo Mode

This item allows you to automatically set the CPU cores to run faster than the base operating frequency when it is below the operating power, current and temperature specification limit.

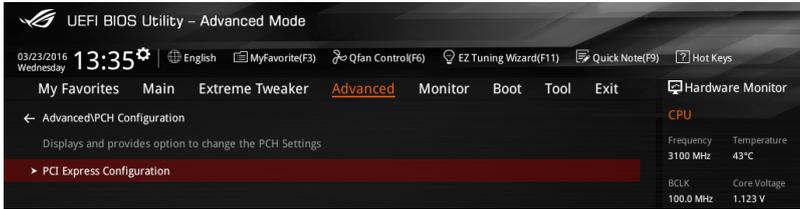
Configuration options: [Disabled] [Enabled]

CPU C-States

This item allows you to set the power saving of the CPU states.

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

3.6.2 PCH Configuration



PCI Express Configuration

This item allows you to configure the PCI Express slots.

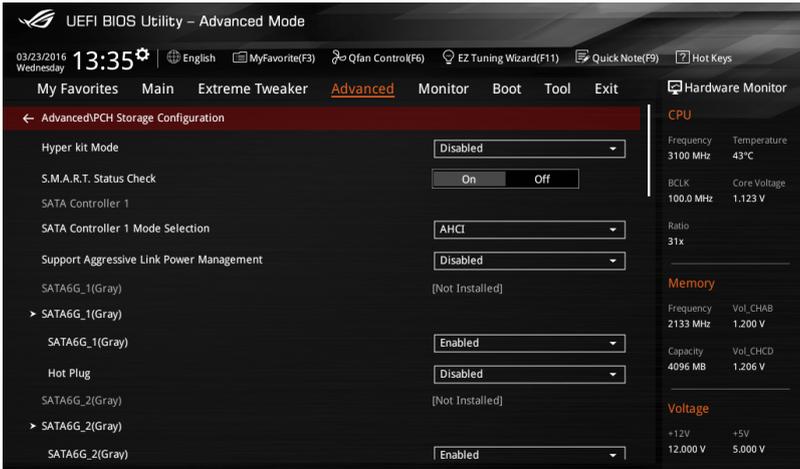
PCIEX4_1 Speed

This item allows your system to automatically select the PCI Express port speed. Configuration options: [Auto] [Gen1] [Gen2]

3.6.3 PCH Storage Configuration

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

Scroll down to display the other BIOS items.



S.M.A.R.T. Status Check

SMART (Self-Monitoring, Analysis and Reporting Technology) is a monitoring system that shows a warning message during POST (Power-On Self Test) when an error occurs in the hard disks.

Configuration options: [On] [Off]

SATA Controller(s)

SATA Controller(s) Mode Selection

This item allows you to set the SATA configuration.

- [Disabled] Disable the SATA function.
- [IDE] Use SATA hard disk as Parallel ATA storage devices
- [AHCI] Set to [AHCI] when you want the SATA hard disk drives to use the AHCI (Advanced Host Controller Interface). The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.
- [RAID] Set to [RAID] when you want to create a RAID configuration from the SATA hard disk drives.

SATA6G_1(Gray) - SATA6G_10(Gray)

SATA6G_7(Gray) - SATA6G_10(Gray)

This item allows you to enable or disable the selected SATA port.

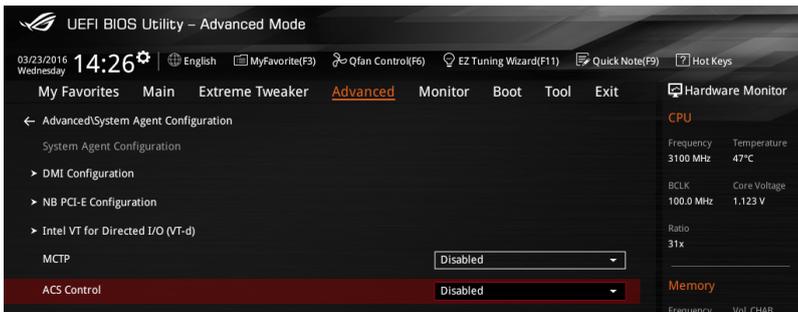
Configuration options: [Disabled] [Enabled]

Hot Plug

These items appear only when the SATA Mode Selection is set to [AHCI] and allows you to enable or disable SATA Hot Plug Support.

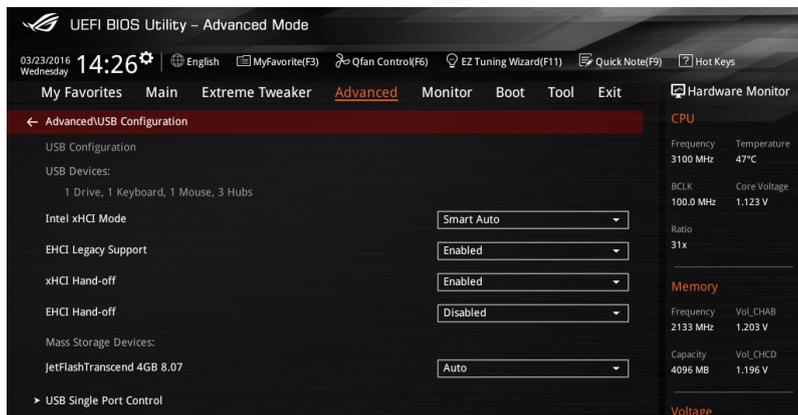
Configuration options: [Disabled] [Enabled]

3.6.4 System Agent (SA) Configuration



3.6.5 USB Configuration

The items in this menu allow you to change the USB-related features.



The **Mass Storage Devices** item will only appear when a USB device is detected.

USB Single Port Control

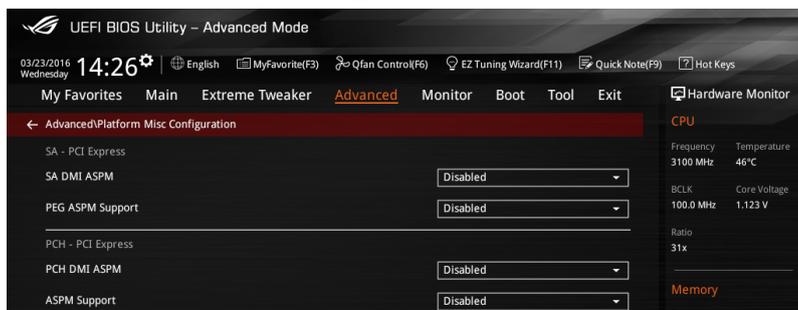
This item allows you to enable or disable the individual USB ports.



Refer to section 1.1.2 **Motherboard layout** for the location of the USB ports.

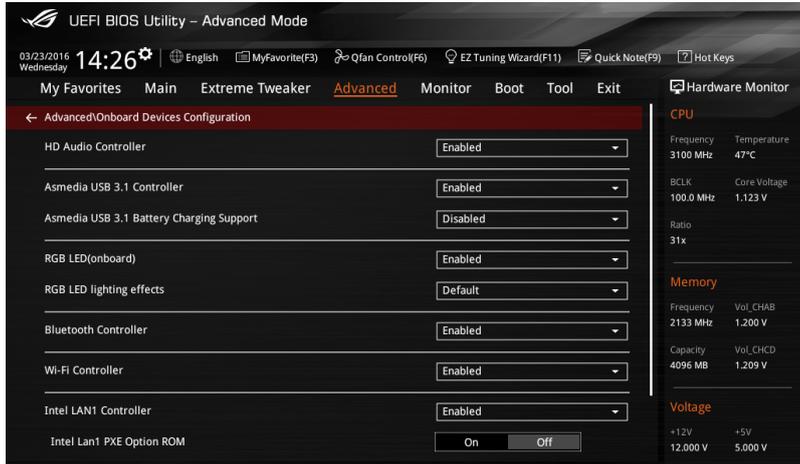
3.6.6 Platform Misc Configuration

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



3.6.7 Onboard Devices Configuration

Scroll down to view the other BIOS items.



HD Audio Controller

[Disabled] HDA will be unconditionally disabled

[Enabled] HDA will be unconditionally enabled

Asmedia USB 3.1 Controller

This item allows you to disable or enable the ASMedia USB 3.1 controller.

Configuration options: [Disabled] [Enabled]

Asmedia USB 3.1 Battery Charging Support

This item allows you to disable or enable the ASMedia USB 3.1 battery charging support.

Configuration options: [Disabled] [Enabled]

RGB LED(onboard)

[Disabled] LEDs will not light up.

[Enabled] LEDs will always light up at the S0(Working), S3(Sleep), and S5(Soft off)

RGB LED lighting effects

This item allows you to set the RGB LED lighting effects.

Configuration options: [Default] [Auto] [Static] [Breathing] [Strobing] [Color Cycle]



- When the power is completely removed from your motherboard (G3 state), the RGB LED lighting effect will revert to the default setting the next time the motherboard is powered on.
- The following item appears only when you set the RGB LED lighting effects to [Static], [Breathing], or [Strobing].

RGB LED lighting color

This item allows you to set the RGB LED lighting colors.

Bluetooth Controller

This item allows you to enable or disable the Bluetooth Controller.

Configuration options: [Disabled] [Enabled]

Wi-Fi Controller

This item allows you to enable or disable the Wi-Fi Controller.

Configuration options: [Disabled] [Enabled]

Intel LAN1 Controller

This item allows you to enable or disable the GbE Controller.

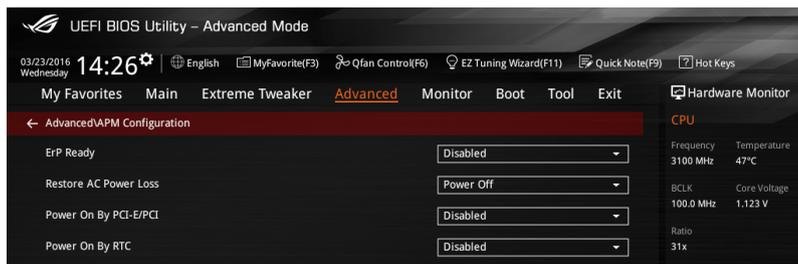
Configuration options: [Disabled] [Enabled]

Intel LAN2 Controller

This item allows you to enable or disable the Intel LAN2 Controller.

Configuration options: [Disabled] [Enabled]

3.6.8 APM Configuration

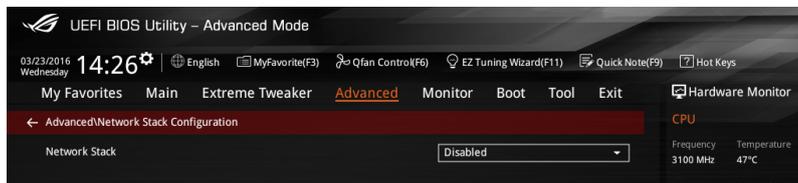


ErP Ready

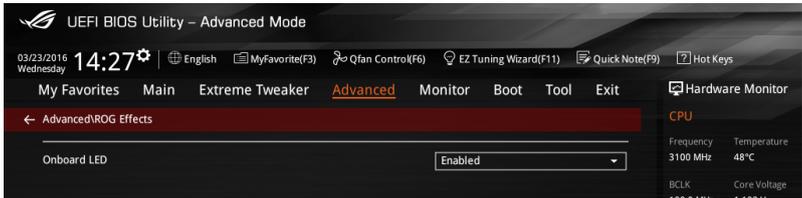
Allows you to switch off some power at S4/S5 to get the system ready for ErP requirement. When set to [Enabled], all other PME options will be switched off.

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

3.6.9 Network Stack Configuration

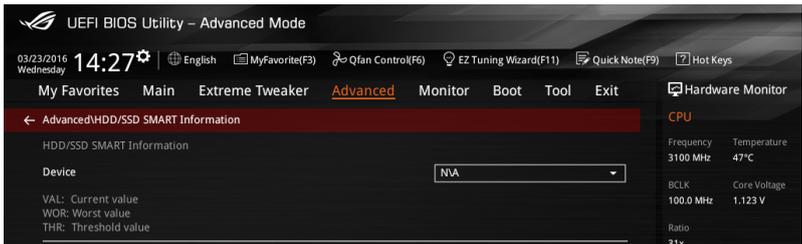


3.6.10 ROG Effects



3.6.11 HDD/SDD SMART Information

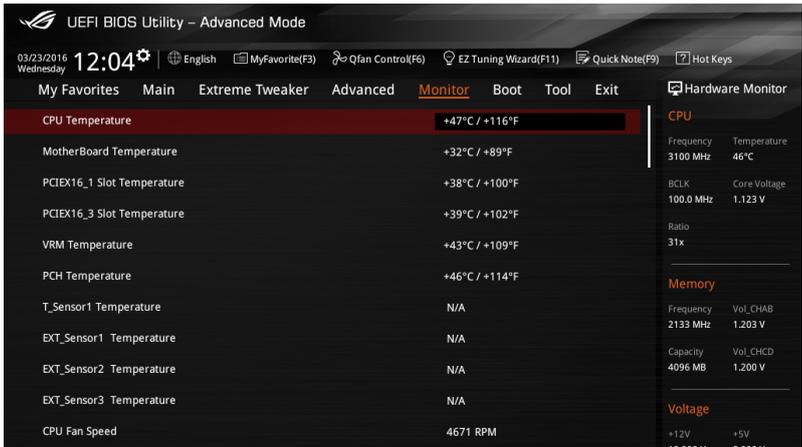
This menu displays the SMART information of the connected devices.



3.7 Monitor menu

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

Scroll down to display other BIOS items.



Optimize All

This item will automatically detect the lowest speed and configure the minimum duty cycle for each fan.

Water Pump Control

- [Disabled] Disable the Water Pump control feature.
- [Auto] Detect the type of Water Pump installed and automatically switches the mode control.
- [DC mode] Enable the Water Pump control in DC mode for 3-pin Water Pump.
- [PWM mode] Enable the Water Pump control in PWM mode for 4-pin Water Pump.

HAMP Fan Control

- [Disabled] Disable the HAMP Fan control.
- [Auto] Detect the type of HAMP fan installed and automatically switches the mode control.
- [DC mode] Enable the HAMP Fan control feature in DC mode for 3-pin chassis fan.
- [PWM mode] Enable the HAMP Fan control feature in PWM mode for 4-pin chassis fan.

3.8 Boot menu

The Boot menu items allow you to change the system boot options. Scroll down to display the other BIOS items.

UEFI BIOS Utility – Advanced Mode

03/23/2016 16:33 Wednesday English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Quick Note(F9) Hot Keys

My Favorites Main Extreme Tweaker Advanced Monitor Boot **Tool** Exit Hardware Monitor

← ToolASUS Overlocking Profile

Overlocking Profile

Profile 1 status:	Not assigned
Profile 2 status:	Not assigned
Profile 3 status:	Not assigned
Profile 4 status:	Not assigned
Profile 5 status:	Not assigned
Profile 6 status:	Not assigned
Profile 7 status:	Not assigned
Profile 8 status:	Not assigned

Load Profile

The last loaded profile: N/A

Load from Profile: 1

Profile Setting

Profile Name

CPU

Frequency	Temperature
3100 MHz	47°C
BCLK	Core Voltage
100.0 MHz	1.123 V
Ratio	
31x	

Memory

Frequency	Vol_CHAB
2133 MHz	1.203 V
Capacity	Vol_CHCD
4096 MB	1.200 V

Voltage

+12V	+5V
12,000 V	5,000 V

Fast Boot

- [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]**.

Next Boot after AC Power Loss

- [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 (DRCT)

- [Disabled] The system will only turn on or off when the reset button is pressed.
- [Enabled] Allow the system to turn on and go to the BIOS Setup directly when the reset button is pressed. Connect the 2-pin connector of the chassis reset button cable to the onboard DRCT header to support this function.

Setup Mode

- [Advanced Mode] This item allows you to go to Advanced Mode of the BIOS after POST.
- [EZ Mode] This item allows you to go to EZ Mode of the BIOS after POST.

CSM (Compatibility Support Module)

This item 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

- [Auto] The system automatically detects the bootable devices and the add-on devices for CSM support.
- [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 Windows® secure update and secure boot.



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

Boot Devices Control

This item allows you to select the devices boot-up mode by the devices specification.

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

Boot from Network Devices

This item allows you to select the type of the onboard LAN controllers and installed LAN cards.

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

Boot from Storage Devices

This item allows you to select the type of storage devices that will run first during the system boot.

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

Boot from PCI-E/PCI Expansion Devices

This item allows you to select the type of PCI-E/PCI expansion devices that will run first during the system boot.

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

Secure Boot

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

Boot Option Priorities

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.



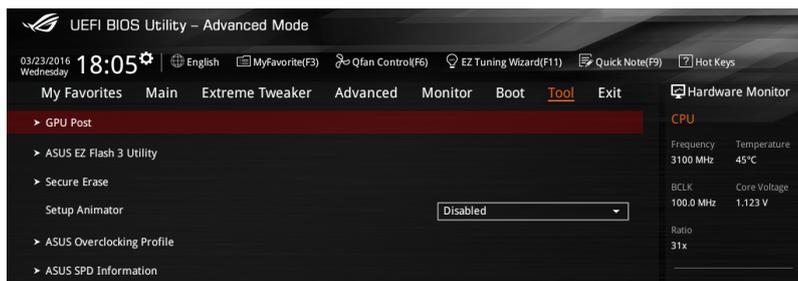
- To access Windows® OS in Safe Mode, press <F8> after POST (Windows® 8 not supported).
- To select the boot device during system startup, press <F8> when the ASUS Logo appears.

Boot Override

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

3.9 Tool menu

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



Setup Animator

This item allows you to enable or disable Setup Animator.

Configuration options: [Enabled] [Disabled]

3.9.1 GPU Post

This item shows the installed graphics cards in the motherboard. It also suggests the configuration of graphic cards in the motherboard for the best performance.

3.9.2 ASUS EZ Flash 3 Utility

Allows you to run ASUS EZ Flash 3. When you press <Enter>, a confirmation message appears. Use the Left/Right arrow key to select between [via Storage Devices(s)] or [via Internet], then press <Enter> to confirm your choice.



For more details, refer to section 3.11.2 **ASUS EZ Flash 3 utility**.

3.9.3 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 > PCH Storage Configuration > AHCI**.

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

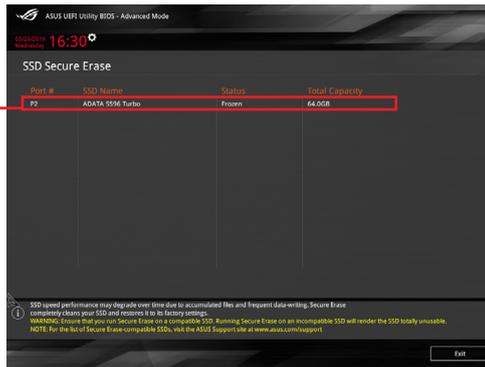


Check the ASUS support site for a full list of SSDs tested with Secure Erase. The drive may become unstable if you run Secure Erase on an incompatible SSD.



- 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 **1.1.2 Motherboard layout** of this manual.

Displays the available SSDs

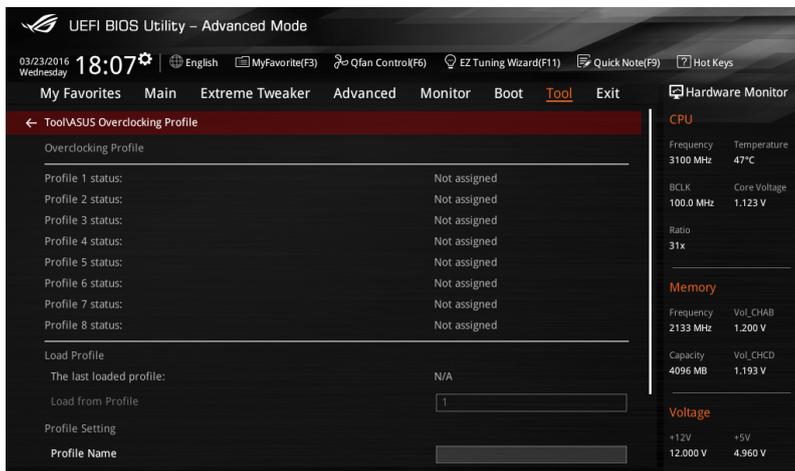


Status definition:

- **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.

3.9.4 ASUS Overclocking Profile

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



Load from Profile

This item 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

This item allows you to key in a profile name.

Save to Profile

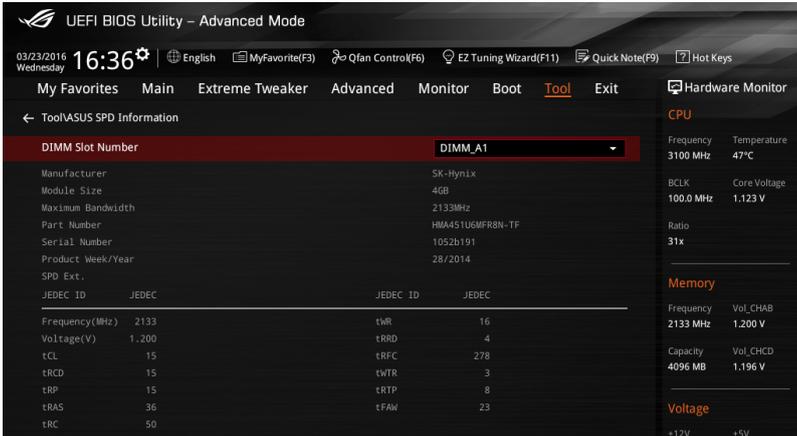
This item allows you to save the current BIOS settings to the BIOS Flash, and create a profile. Key in a profile number from one to eight, press <Enter>, and then select **Yes**.

Load/Save Profile from/to USB Drive

This item allows you to load or save profile from your USB drive, load and save profile to your USB drive.

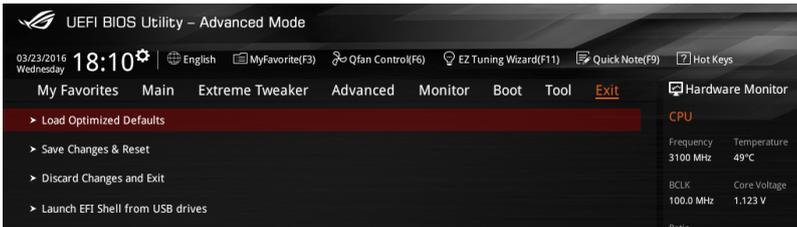
3.9.5 ASUS SPD Information

Allows you to view the DRAM SPD information.



3.10 Exit menu

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



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.

Launch EFI Shell from USB devices

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

3.11 Updating BIOS

The ASUS website publishes the latest BIOS versions to provide enhancements on system stability, compatibility, and 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 to system's failure to boot. Carefully follow the instructions in this chapter to update your BIOS when necessary.



Visit <http://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 3: Updates the BIOS using a USB flash drive.
3. ASUS CrashFree BIOS 3: Restores the BIOS using the motherboard support USB drive when the BIOS file fails or gets corrupted.

3.11.1 EZ Update

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



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

3.11.2 ASUS EZ Flash 3 Utility

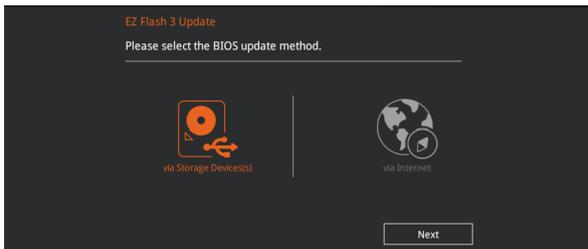
ASUS EZ Flash 3 Utility allows you to update the BIOS without having to use a bootable floppy disk or an OS-based utility.



Updating through the Internet varies per region and Internet conditions. Check your local Internet connection before updating through the Internet.

To update the BIOS by USB:

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 3 Utility** and press <Enter>.
3. Select **via Storage Device(s)**.



4. Press <Tab> to switch to the Drive field.
5. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, and then press <Enter>.
6. Press <Tab> to switch to the Folder Info field.
7. Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.





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



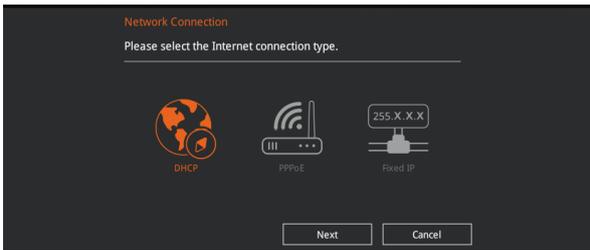
Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the Load Optimized Defaults item under the Exit menu. See section 3.10 **Exit Menu** for details.

To update the BIOS by Internet:

1. Enter the **Advanced Mode** of the BIOS setup program. Go to the **Tool** menu to select **ASUS EZ Flash 3 Utility** and press <Enter>.
2. Select **via Internet**.



3. Press the Left/Right arrow keys to select an Internet connection method, and then press <Enter>



4. Follow the onscreen instructions to complete the update.
5. Reboot the system when the update process is done.



Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the Load Optimized Defaults item under the Exit menu. See section 3.10 **Exit Menu** for details.

3.11.3 ASUS CrashFree BIOS 3

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



The BIOS file in the motherboard support USB drive 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 <https://www.asus.com/support/> 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 USB drive, or a 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 the ASUS EZ Flash 3 Utility 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!

RAID support

5



Windows® 10 32-bit does not support RAID.

4.1 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 **4.2 Creating a RAID driver disk** for details.

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

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

4.1.2 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.

4.1.3 Intel® Rapid Storage Technology in UEFI BIOS

To enter the Intel® Rapid Storage Technology in UEFI BIOS:

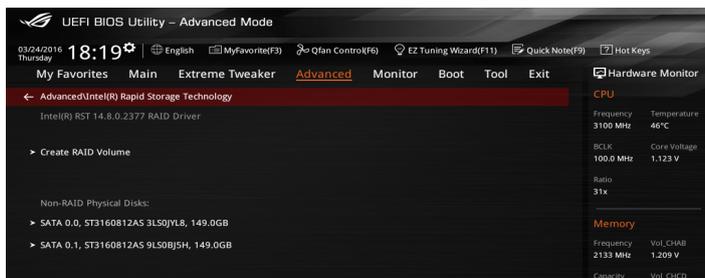
1. Enter the BIOS Setup during POST.
2. Go to the **Advanced** menu > **PCH Storage Configuration**, then press <Enter>.
3. Set the SATA Controller Mode Selection item to **[RAID Mode]**.
4. Go to the **Boot** menu > **CSM (Compatibility Support Module)** > **Launch CSM**, then set the item to **[Disabled]**.
5. Save your changes and exit the BIOS Setup, then enter the BIOS Setup again.
6. Go to the **Advanced** menu > **Intel(R) Rapid Storage Technology**, then press <Enter> to display the Intel® Rapid Storage Technology menu.



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



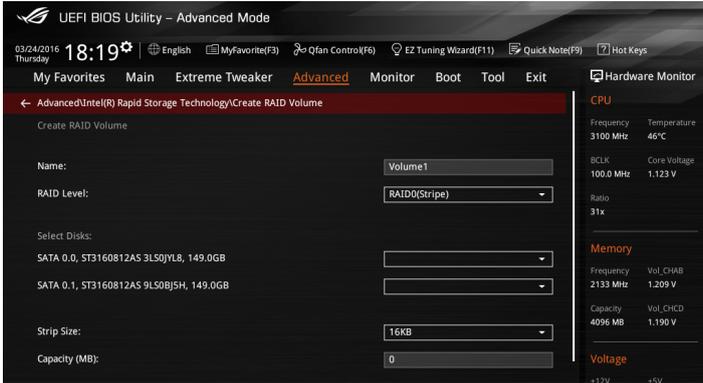
Due to chipset limitation, when SATA ports are set to RAID mode, all SATA ports run at RAID mode together.



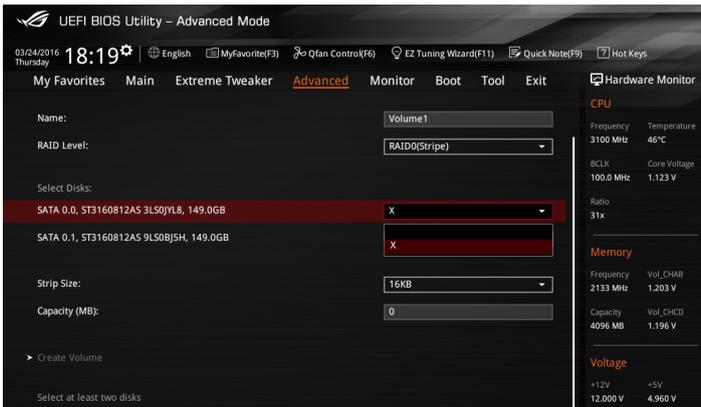
Creating a RAID set

To create a RAID set:

1. From the Intel® Rapid Storage Technology menu, select **Create RAID Volume** and press <Enter>. The following screen appears:



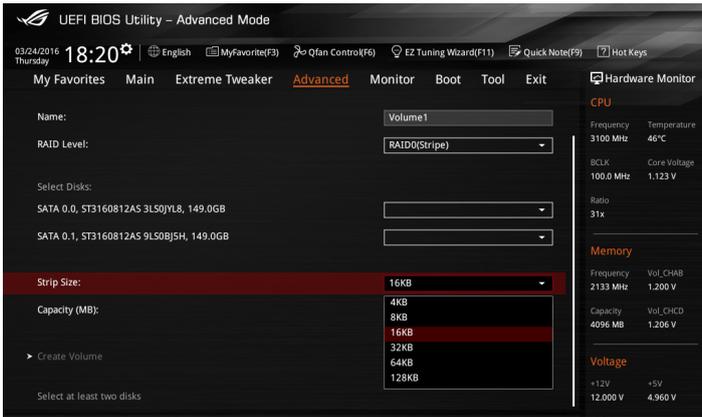
2. When the Name item is selected, enter a name for the RAID set and press <Enter>.
3. When the RAID Level item is selected, press <Enter> to select the RAID level to create, and then press <Enter>.
4. Under Select Disks, press <Enter> and select **X** for the disks you want to include in the RAID set.



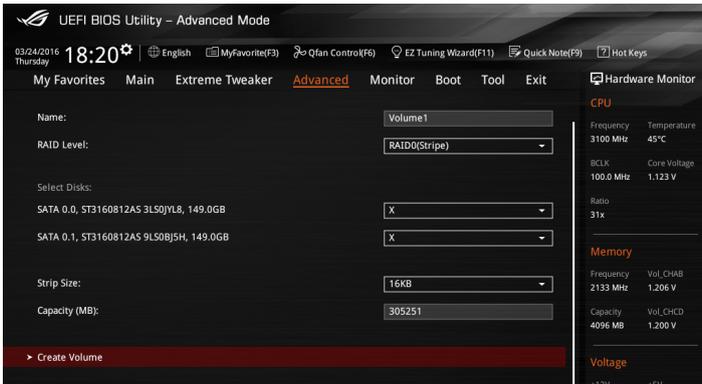
5. When the Strip Size item is selected, press <Enter> to select strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4 KB to 128 KB. The following are typical values:
 - RAID 0: 128 KB
 - RAID 10: 64 KB
 - RAID 5: 64 KB



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



6. When the **Capacity (MB)** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.
7. When the **Create Volume** item is selected, press <Enter> to create the RAID volume and return to the Intel® Rapid Storage Technology menu.



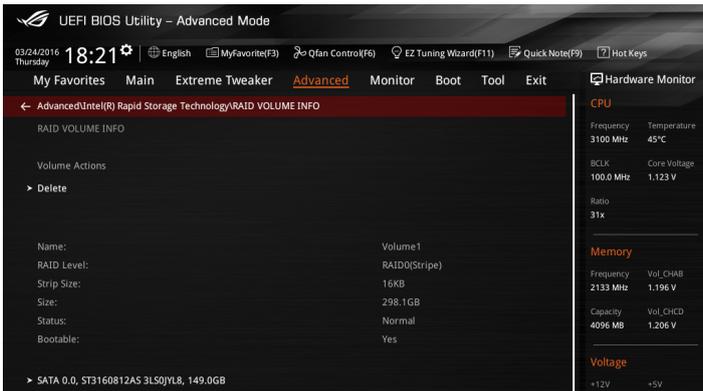
Deleting a RAID set



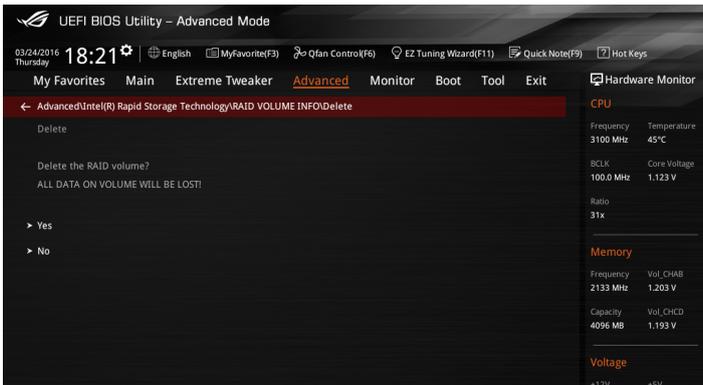
Be cautious when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the Intel® Rapid Storage Technology menu, select the RAID volume you want to delete and press <Enter>. The following screen appears:



2. When the **Delete** item is selected, press <Enter>, then select **Yes** to delete the RAID volume and return to the Intel® Rapid Storage Technology menu, or select **No** to cancel.



4.1.4 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 - v10.5.1.1070
Copyright(C) 2003-14 Intel Corporation. All Rights Reserved.

[ MAIN MENU ]

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

[ DISK/VOLUME INFORMATION ]

RAID Volumes:
None defined.

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

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

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



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

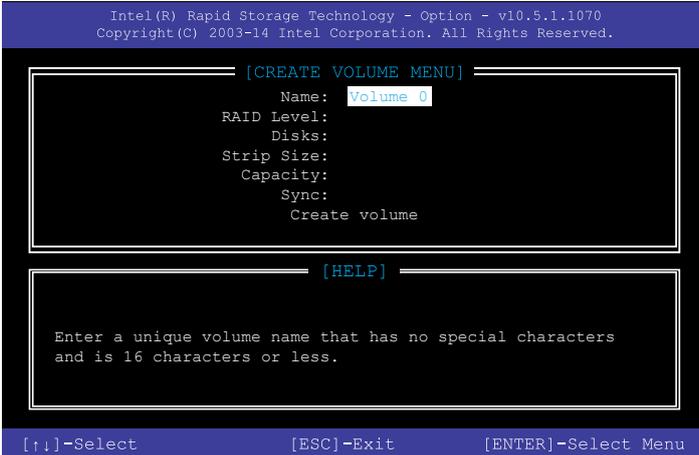


The utility supports maximum four hard disk drives for RAID configuration.

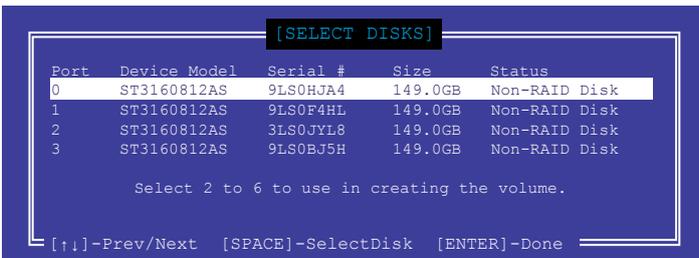
Creating a RAID set

To create a RAID set:

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



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



5. Use the up/down arrow key to select a drive, and then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.
6. Use the up/down arrow key to select the strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip 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 strip size for server systems, and a higher strip size for multimedia computer systems used mainly for audio and video editing.

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

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

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

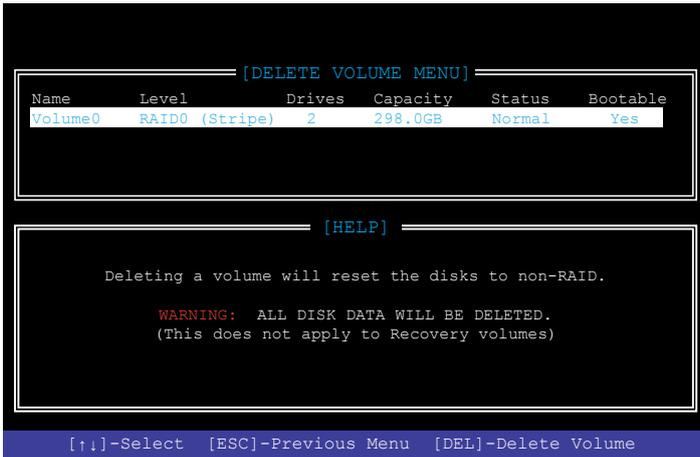
Deleting a RAID set



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

To delete a RAID set:

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



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



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:



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

4.2 Creating a RAID driver disk

4.2.1 Creating a RAID driver disk in Windows®

To install the RAID driver for Windows® OS:

1. During the OS installation, click **Load Driver** to allow you to select the installation media containing the RAID driver.
2. Insert the support USB drive with RAID driver into the USB port, 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.



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

Appendix

Notices

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IC: Canadian Compliance Statement

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

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

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

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

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

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

VCCI: Japan Compliance Statement

Class B ITE

この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用す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。

VCCI-B

KC: Korea Warning Statement

B급 기기 (가정용 방송통신기자재)

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

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

REACH

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



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



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

ASUS Recycling/Takeback Services

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

RF Equipment Notices

CE: European Community Compliance Statement

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

Wireless Radio Use

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

Exposure to Radio Frequency Energy

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

FCC Bluetooth Wireless Compliance

The antenna used with this transmitter must not be co-located 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

無線設備の警告聲明

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

於 5.25GHz 至 5.35GHz 區域內操作之
無線設備的警告聲明

工作頻率 5.250 ~ 5.350GHz 該頻段限於室內使用。

Japan RF Equipment Statement

屋外での使用について

本製品は、5GHz帯域での通信に対応しています。電波法の定めにより5.2GHz、5.3GHz帯域の電波は屋外で使用が禁じられています。

法律および規制遵守

本製品は電波法及びこれに基づく命令の定めるところに従い使用してください。日本国外では、その国の法律または規制により、本製品の使用ができないことがあります。このような国では、本製品を運用した結果、罰せられることがあります。当社は一切責任を負いかねますのでご了承ください。

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Warranty

ASUS warrants the Product to be free from defects in workmanship and materials for the Warranty Period. The Warranty does not cover bundled accessories, which were delivered together with the Product such as: USB, cables, I/O shield, bag, mouse etc. If the Product fails during normal and proper use within the Warranty Period, ASUS, at its discretion, within maximum 45 days, will repair or replace the defective parts of the Product, or the Product itself, with new or reconditioned parts or products that are functionally equivalent or superior to those originally supplied.

English ASUSTeK Computer Inc. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1995/5/EC. Full text of EU declaration of conformity available at: www.asus.com/support

This device may be operated in the countries listed below:

Français ASUSTeK Computer Inc. déclare par la présente que cet appareil est conforme aux critères essentiels et autres clauses pertinentes de la directive 1995/5/CE. La déclaration de conformité de l'UE peut être téléchargée à partir du site Internet suivant: www.asus.com/support.

Cet appareil peut être utilisé dans les pays de la liste ci-dessous:

Deutsch ASUSTeK Computer Inc. erklärt hiermit, dass dieses Gerät mit den wesentlichen Anforderungen und anderen relevanten Bestimmungen der Richtlinie 1995/5/EG übereinstimmt. Der gesamte Text der EU-Konformitätserklärung ist verfügbar unter: www.asus.com/support

Dieses Gerät darf in den unten aufgeführten Ländern betrieben werden:

Italiano ASUSTeK Computer Inc. con la presente dichiara che questo dispositivo è conforme ai requisiti essenziali e alle altre disposizioni pertinenti con la direttiva 1995/5/CE. Il testo completo della dichiarazione di conformità UE è disponibile all'indirizzo: www.asus.com/support

Questo dispositivo può essere utilizzato nei paesi elencati qui di seguito:

Русский Компания ASUS заявляет, что это устройство соответствует основным требованиям и другим соответствующим условиям европейской директивы 1995/5/EC. Подробную информацию, пожалуйста, смотрите на www.asus.com/support

Это устройство может работать в странах, которые приведены ниже:

Български С настоящото ASUSTeK Computer Inc. декларира, че това устройство е в съответствие със съществените изисквания и другите приложими постановления на Директива 1995/5/ЕО. Пълният текст на декларацията за съответствие на ЕС е достъпен на адрес: www.asus.com/support

Устройството може да се използва във всички страни, посочени по-долу:

Hrvatski ASUSTeK Computer Inc. ovim izjavijuje da je ovaj uređaj sukladan s bitnim zahtjevima i ostalim odgovarajućim odredbama direktive 1995/5/EZ. Cijeli tekst EU izjave o sukladnosti dostupan je na: www.asus.com/support

Ovaj uređaj može se koristiti u dolje navedenim zemljama:

Čeština Společnost ASUSTeK Computer Inc. tímto prohlašuje, že toto zařízení splňuje základní požadavky a další příslušná ustanovení směrnice 1995/5/EC. Plné znění prohlášení o shodě EU je k dispozici na adrese: www.asus.com/support

Toto zařízení lze používat v níže uvedených zemích:

Dansk ASUSTeK Computer Inc. erklærer hermed, at denne enhed er i overensstemmelse med hovedkravene og andre relevante bestemmelser i direktivet 1995/5/EC. Hele EU-overensstemmelseserklæringen kan findes på: www.asus.com/support

Denne enhed kan bruges i landene, der står på listen nedenfor:

Nederlands ASUSTeK Computer Inc. verklaart hierbij dat dit apparaat voldoet aan de essentiële vereisten en andere relevante bepalingen van de verwante richtlijn 1995/5/EG. De volledige tekst van de EU-verklaring van conformiteit is beschikbaar op: www.asus.com/support

Dit apparaat kan worden gebruikt in de hieronder vermelde landen:

Eesti Käesolevaga kinnitab ASUSTeK Computer Inc. et see seade vastab Direktiivi 1995/5/EK asjakohaste direktiivide oluliste nõuetele ja teiste asjassepuutuvatele sätetele. EL vastusdeklaratsioonit täielik tekst on saadaval järgmisel aadressil: www.asus.com/support

Seda seadet võib kasutada alldoodud riikides:

Suomi ASUSTeK Computer Inc. ilmoittaa täten, että tämä laite on EY-direktiivin 1995/5/olellaisten vaatimusten ja muiden tästä koskevien säästöjen mukainen. EU-yhdenmukaisuusilmoituksen koko teksti on luettavissa osoitteessa: www.asus.com/support

Tätä laitetta voidaan käyttää alla luetelluissa maissa:

Ελληνικά Με το παρόν η ASUSTeK Computer Inc. δηλώνει ότι αυτή η συσκευή συμμορφώνεται με τις θεμελιώδεις απαιτήσεις και άλλες σχετικές διατάξεις της Οδηγίας 1995/5/ΕΕ. Το πλήρες κείμενο της δήλωσης συμμορφότητας είναι διαθέσιμο στη διεύθυνση: www.asus.com/support

Αυτή η συσκευή μπορεί να λειτουργήσει στις χώρες που αναφέρονται στη λίστα που ακολουθεί:

Magyar Az ASUSTeK Computer Inc. ezennel kijelenti, hogy ez az eszköz megfelel az 1995/5/EK Irányelv lényeges követelményeinek és egyéb vonatkozó rendelkezésének. Az EU megfeleléségi nyilatkozat teljes szövege innen letölthető: www.asus.com/support

Az eszköz az alább felsorolt országokban működhető:

Latviski „ASUSTeK Computer Inc.” šiuo tvirtina, ka šis ierenginis atitinka pagrindinius reikalavimus ir kitas svarbias Direktyvos 1995/5 EB nuostatas. Visą ES atitikties deklaracijos tekstą galima rasti: www.asus.com/support

Šo ierici var lietot tālak norādītājās valstīs:

Lietuvių ASUSTeK Computer Inc. ar šio paziņo, ka šī ierīce atbilst Direktīvas 1995/5/EK būtiskajām prasībām un citiem citiem saistošajiem nosacījumiem. Pilns ES atbilstības paziņojuma teksts pieejams šeit: www.asus.com/support

Šī ierīcinj galima naudoti toliau išvardytose šalyse:

Norsk ASUSTeK Computer Inc. erklærer herved at denne enheten er i samsvar med hovedsaklige krav og andre relevante foreskrifter i direktivet 1995/5/EF. Fullstendig tekst for EU-samsvarserklæring finnes på: www.asus.com/support

Enheten kan brukes i landene under:

Polski Firma ASUSTeK Computer Inc. niniejszym oświadcza, że urządzenie to jest zgodne z zasadniczymi wymogami i innymi właściwymi postanowieniami dyrektywy 1995/5/WE. Pełny tekst deklaracji zgodności UE jest dostępny pod adresem: www.asus.com/support

Urządzenie to może być używane w wymienionych poniżej krajach:

Português A ASUSTeK Computer Inc. declara que este dispositivo está em conformidade com os requisitos essenciais e outras disposições relevantes da Diretiva 1995/5/CE. Texto integral da declaração da UE disponível em: www.asus.com/support

Este dispositivo pode ser utilizado nos países indicados abaixo:

Română ASUSTeK Computer Inc. declară că acest dispozitiv se conformează cerințelor esențiale și altor prevederi relevante ale Directivei 1995/5/CE. Textul complet al declarației de conformitate a Uniunii Europene se găsește la: www.asus.com/support

Puteți utiliza acest dispozitiv în țările următoare:

Srpski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj u saglasnosti sa osnovnim zahtevima i drugim relevantnim odredbama Direktive 1995/5/EC. Pun tekst EU deklaracije o usaglasnosti je dostupan da adresi: www.asus.com/support

Ovaj uređaj može da se koristi u državama navedenim ispod:

Slovensky Spoločnosť ASUSTeK Computer Inc. týmto vyhlasuje, že toto zariadenie vyhovuje základným požiadavkám a ostatým príslušným ustanoveniam smernice 1995/5/ES. Celý text vyhlásenia o zhode pre štáty EU je dostupný na adrese: www.asus.com/support

Toto zariadenie môže byť prevádzkované v dolu uvedených krajinách:

Slovensčina ASUSTeK Computer Inc. izjavlja, da je ta naprava skladna z bistvenimi zahtevami in drugimi ustreznimi določbami Direktive 1995/5/ES. Celotno besedilo EU-izjave o skladnosti je na voljo na spletnem mestu: www.asus.com/support

To napravo je mogoče uporabljati v spodaj navedenih državah:

Español Por la presente, ASUSTeK Computer Inc. declara que este dispositivo cumple los requisitos básicos y otras disposiciones pertinentes de la directiva 1995/5/EC. El texto completo de la declaración de la UE de conformidad está disponible en: www.asus.com/support

Este dispositivo se puede utilizar en los países enumerados a continuación:

Svenska ASUSTeK Computer Inc. förklarar härmed att denna enhet överensstämmer med de grundläggande kraven och andra relevanta föreskrifter i direktiv 1995/5/EG. Fulltext av EU-försäkran om överensstämmelse finns på: www.asus.com/support

Denna enhet kan användas i följande länder:

Українська ASUSTeK Computer Inc. заявляє, що цей пристрій відповідає основним вимогам та іншим відповідним положенням Директиви 1995/5/EC. Повний текст декларації відповідності стандартам ЄС доступний на: www.asus.com/support

Цей пристрій можна експлуатувати у країнах зі списку нижче:

Türkçe ASUSTeK Computer Inc., bu aygıtın temel gereksinimlerle ve 1995/5/EC Yönergesinin diğer ilgili kullarıyla uyumlu olduğunu beyan eder. AB uygunluk bildiriminin tam metni şu adreste bulunabilir: www.asus.com/support

Bu aygıt aşağıda listelenen ülkelere çalıştırılabilir:

Bosanski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj uskladen sa bitnim zahtjevima i ostalim odgovarajućim odredbama direktive 1995/5/EC. Cijeli tekst EU izjave o uskladnosti dostupan je na: www.asus.com/support

Ovaj uređaj može se koristiti u dolje navedenim zemljama:

AT	BE	BG	CH	CY	CZ	DE	DK
EE	ES	FI	FR	GB	GR	HU	IE
IT	IS	LI	LT	LU	LV	MT	NL
NO	PL	PT	RO	SE	SI	SK	TR

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Online support <http://qr.asus.com/techserv>

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Fax +1-510-608-4555
Web site <http://www.asus.com/us/>

Technical Support

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Telephone +1-812-282-2787
Online support <http://qr.asus.com/techserv>

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Web site <http://www.asus.com/de>
Online contact <http://eu-rma.asus.com/sales>

Technical Support

Telephone +49-2102-5789555
Support Fax +49-2102-959911
Online support <http://qr.asus.com/techserv>

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 V EDITION 10

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

A handwritten signature in blue ink, appearing to read 'Steve Chang', written over a horizontal line.

Signature :

Date : APR. 25, 2016

Ver. 140331

