

**ROG
MAXIMUS XI
HERO**

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.
- Your motherboard should only be used in environments with ambient temperatures between 0°C and 40°C.

About this guide

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

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product Introduction**
This chapter describes the features of the motherboard and the new technology it supports. It includes description of the switches, jumpers, and connectors on the motherboard.
- **Chapter 2: Basic Installation**
This chapter lists the hardware setup procedures that you have to perform when installing system components.
- **Chapter 3: BIOS Setup**
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.
- **Chapter 4: 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 (+).

ROG MAXIMUS XI HERO specifications summary

CPU	<p>Socket 1151 for 9th / 8th Gen Intel® Core™, Pentium® Gold and Celeron® processors</p> <p>Supports 14nm CPU</p> <p>Supports Intel® Turbo Boost Technology 2.0*</p> <p>* Intel® Turbo Boost Technology 2.0 support depends on the CPU type.</p>
Chipset	<p>Intel® Z390 Chipset</p>
Memory	<p>4 x DIMM, max. 64GB, DDR4 4400+(O.C.)* / 4266(O.C.)* / 4133(O.C.)* / 4000(O.C.)* / 3866(O.C.)* / 3733(O.C.)* / 3600(O.C.)* / 3466(O.C.)* / 3400(O.C.)* / 3333(O.C.)* / 3300(O.C.)* / 3200(O.C.)* / 3000(O.C.)* / 2800(O.C.)* / 2666 / 2400 / 2133 MHz, non-ECC, un-buffered memory</p> <p>Dual Channel Memory Architecture</p> <p>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>Socket 1151 for 9th / 8th Gen Intel® Core™, Pentium® Gold and Celeron® processors</p> <p>2 x PCIe 3.0 x16 slots (@x16 or x8/x8, x8/x4+x4)</p> <p>Intel® Z390 Chipset</p> <p>1 x PCIe 3.0 x16 slot (max. at x4 mode)*</p> <p>3 x PCIe 3.0 x1 slots</p> <p>* The PCIe x16_3 slot shares bandwidth with SATA6G_5 and SATA6G_6. The PCIe x16_3 runs x2 mode by default.</p>
Graphic	<p>Integrated Graphics Processor - Intel® UHD Graphics support</p> <p>Multi-VGA output support: HDMI/DisplayPort</p> <ul style="list-style-type: none"> - Supports DisplayPort 1.2 with max. resolution 4096 x 2304@60Hz - Supports HDMI 1.4b with max. resolution 4096 x 2160@30Hz
Multi-GPU support	<p>Supports NVIDIA® 2-Way/Quad-GPU SLI™ Technology</p> <p>Supports AMD® 3-Way/Quad-GPU CrossFireX™ Technology</p>

(continued on the next page)

ROG MAXIMUS XI HERO specifications summary

Storage	<p>Intel® Z390 Chipset with RAID 0, 1, 5, 10, and Intel Rapid Storage Technology support</p> <ul style="list-style-type: none">- 1 x M.2_1 Socket 3 with M Key, type 2242/2260/2280 (supports PCIe 3.0 x 4 and SATA modes)*- 1 x M.2_2 Socket 3 with M Key, type 2242/2260/2280/22110 (supports PCIe 3.0 x 4 mode)- 6 x SATA 6Gb/s ports- Intel® Optane Memory Ready <p>* When the M.2_1 Socket 3 is operating in SATA mode, SATA6G_2 port will be disabled.</p>
LAN	<p>Intel® I219-V Gigabit LAN - Dual interconnect between the integrated Media Access Controller (MAC) and physical layer (PHY)</p> <p>Anti-surge LANGuard</p> <p>ROG GameFirst V Technology</p>
Audio	<p>ROG SupremeFX S1220 8-Channel High Definition Audio CODEC</p> <ul style="list-style-type: none">- ESS® ES9023P High Definition DAC- High quality 120 dB SNR stereo playback output and 113 dB SNR recording input- Impedance sense for front and rear headphone outputs- Jack-detection, Multi-streaming, and Front Panel Jack-retasking- SupremeFX Shielding Technology- Supports up to 32-Bit/192kHz playback*- Optical S/PDIF out port at back panel <p>Audio Features:</p> <ul style="list-style-type: none">- Sonic Studio III + Sonic Studio Link- Sonic Radar III <p>* Due to limitations in HDA bandwidth, 32-Bit/192 kHz is not supported for 8-Channel audio.</p>

(continued on the next page)

ROG MAXIMUS XI HERO specifications summary

USB	Intel® Z390 Chipset <ul style="list-style-type: none">- 4 x USB 3.1 Gen 1 ports (2 ports at back panel [blue], 2 ports at mid-board)- 6 x USB 2.0 ports (2 ports at back panel [black], 4 ports at mid-board)- 4 x USB 3.1 Gen 2 ports (3 Type-A [red] and 1 Type-C [black] at back panel)- 1 x USB 3.1 Gen 2 front panel connector
ROG Exclusive Features	Extreme Engine Digi+ <ul style="list-style-type: none">- MicroFine Alloy Choke- NexFET MOSFETs- 10K Black Metallic Capacitors Start Button Retry Button Extreme Tweaker ROG Exclusive Software <ul style="list-style-type: none">- Mem Tweakit- RAMCache III- RAMDisk- CPU-Z- GameFirst V- Sonic Studio III + Sonic Studio Link- Sonic Radar III

(continued on the next page)

ROG MAXIMUS XI HERO specifications summary

<p>Special Features</p>	<p>AURA</p> <ul style="list-style-type: none"> - Aura Lighting Control - Aura RGB Strip Headers - Aura Addressable Strip Headers - Aura Lighting Effects Synchronization with compatible ASUS ROG devices <p>ASUS Dual Intelligent Processors 5</p> <ul style="list-style-type: none"> - 5-Way Optimization tuning perfectly consolidates TPU Insight, EPU Guidance, DIGI+ Power Control, Fan Xpert 4, and Turbo App <p>ASUS Exclusive Features</p> <ul style="list-style-type: none"> - MemOK! II - OptiMem II - Pre-mounted I/O shield - AI Suite 3 - USB BIOS Flashback - ASUS CrashFree BIOS 3 - ASUS EZ Flash 3 - ASUS C.P.R.(CPU Parameter Recall) - Ai Charger - BUPDATER - Armoury Crate - ASUS NODE: hardware control interface - BIOS Flashback Button - Clear CMOS Button - Reset Button <p>ASUS Q-Design</p> <ul style="list-style-type: none"> - Q-Code - Q-Connector - Q-LED (CPU[red], DRAM[yellow], VGA[white], Boot Device LED[green]) - Q-DIMM
<p>Back I/O ports</p>	<ul style="list-style-type: none"> 1 x Clear CMOS Button 1 x BIOS Flashback Button 1 x HDMI 1.4b 1 x DisplayPort 1.2 2 x USB 2.0 ports [black] 2 x USB 3.1 Gen 1 ports [blue] 1 x Anti-surge LAN (RJ45) port 4 x USB 3.1 Gen 2 ports (3 x Type-A [red] and 1 x Type-C) 1 x Optical S/PDIF out 1 x PS/2 keyboard/mouse combo port 5 x Gold-plated audio jacks

(continued on the next page)

ROG MAXIMUS XI HERO specifications summary

Internal I/O Ports

- 2 x AURA Addressable strip headers
- 2 x AURA RGB strip headers
- 1 x USB 3.1 Gen 1 header supports additional 2 USB 3.1 Gen 1 ports
- 2 x USB 2.0 headers support additional 4 USB 2.0 ports
- 1 x USB 3.1 Gen 2 front panel connector
- 1 x M.2_1 Socket 3 with M Key, type 2242/2260/2280 (supports PCIe 3.0 x4 and SATA modes)
- 1 x M.2_2 Socket 3 with M Key, type 2242/2260/2280/22110 (supports PCIe 3.0 x4 mode)
- 1 x TPM connector
- 6 x SATA 6Gb/s ports
- 1 x 4-pin CPU_FAN connector
- 1 x 4-pin CPU_OPT fan connector
- 3 x 4-pin Chasis fan connectors
- 1 x 4-pin AIO_PUMP connector
- 1 x 4-pin H_AMP fan connector
- 1 x 4-pin W_PUMP+ connector
- 1 x 5-pin EXT_FAN connector
- 1 x 2-pin W_IN connector
- 1 x 2-pin W_OUT connector
- 1 x 3-pin W_FLOW connector
- 1 x T_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 Front panel audio connector (AAFP)
- 1 x MemOK!_II switch
- 1 x Reset button
- 1 x Retry button
- 1 x System panel connector
- 1 x Start button
- 1 x NODE connector

(continued on the next page)

ROG MAXIMUS XI HERO specifications summary

BIOS	1 x 128 Mb Flash ROM, UEFI AMI BIOS, PnP, DMI3.0, SM BIOS 3.1, ACPI 6.1
Manageability	WOL, PXE
Software	WinRAR Overwolf Kaspersky® Anti-Virus DAEMON Tools Software
Operating System Support	Windows® 10 64-bit
Form Factor	ATX Form Factor, 12" x 9.6" (30.5 cm x 24.4 cm)



Specifications are subject to change without notice. Please refer to the ASUS website for the latest specifications.

Package contents

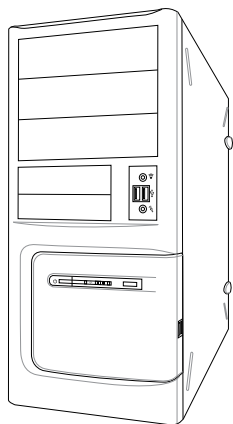
Check your motherboard package for the following items.

Motherboard	1 x ROG MAXIMUS XI HERO motherboard
Cables	2 x 2-in-1 SATA 6Gb/s cables
	1 x Extension Cable for RGB strips
	1 x Extension Cable for RGB Addressable strips
Accessories	1 x SLI™ HB bridge (2-way-M)
	1 x Q-Connector
	1 x ROG Coaster
	1 x M.2 screws package
	1 x ROG Thank you card
	1 x ROG sticker
Application DVD	1 x ROG motherboard support DVD
Documentation	1 x User guide

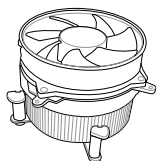


If any of the above items is damaged or missing, contact your retailer.

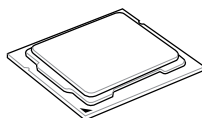
Installation tools and components



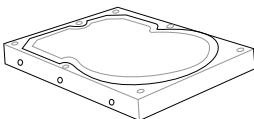
PC chassis



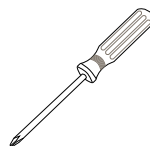
Intel® LGA1151 compatible CPU Fan



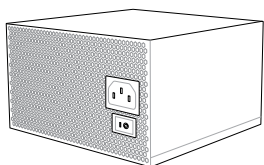
Intel® LGA1151 CPU



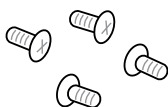
SATA hard disk drive



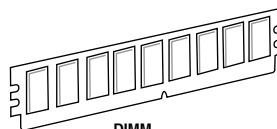
Phillips (cross) screwdriver



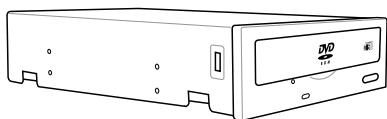
Power supply unit



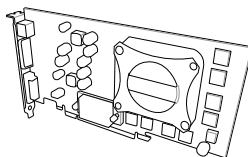
1 bag of screws



DIMM



SATA optical disc drive (optional)



Graphics card (optional)



M.2 SSD module (optional)



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

Product Introduction

1

1.1 Motherboard overview

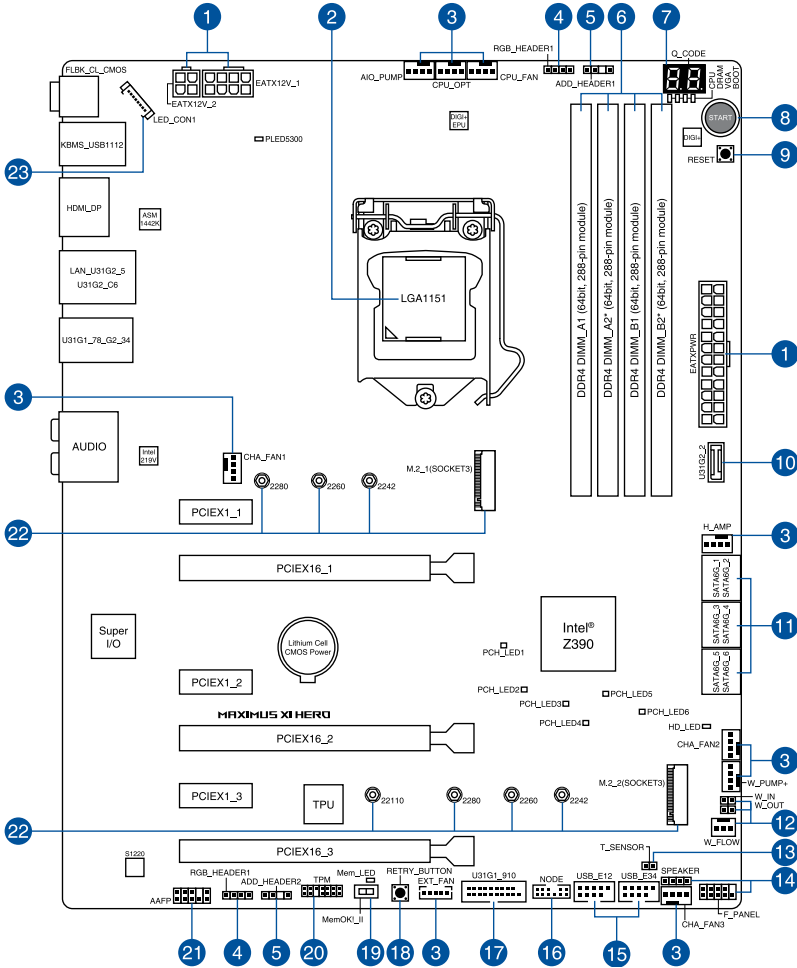
1.1.1 Before you proceed

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



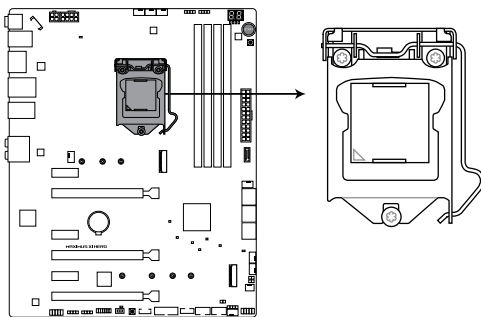
Refer to **1.1.8 Internal connectors** and **2.3.1 Rear I/O connection** for more information about rear panel connectors and internal connectors.

Layout contents

Connectors/Jumpers/Buttons and switches/Slots	Page
1. ATX power connectors (24-pin EATXPWR; 8-pin EATX12V_1; 4-pin EATX12V_2)	1-20
2. LGA1151 CPU Socket	1-4
3. Fan and pump connectors (4-pin CPU_FAN; 4-pin CPU_OPT; 4-pin H_AMP; 5-pin EXT_FAN; 4-pin W_PUMP+; 4-pin AIO_PUMP; 4-pin CHA_FAN1-3)	1-18
4. AURA RGB headers (4-pin RGB_HEADER1-2)	1-23
5. Addressable RGB headers (4-1 pin ADD_HEADER1-2)	1-24
6. DDR4 DIMM slots	1-5
7. Q-Code LED	1-13
8. Power-on button (START)	1-9
9. RESET button (RESET)	1-9
10. USB 3.1 Gen 2 front panel connector (U31G2_2)	1-15
11. Intel® Z390 Serial ATA 6 Gb/s connectors (7-pin SATA6G_12; SATA6G_34; SATA6G_56)	1-14
12. Water in, water out, and water flow connectors (2-pin W_IN; 2-pin W_OUT; 3-pin W_FLOW)	1-22
13. Thermal sensor connector (2-pin T_SENSOR)	1-17
14. System panel connectors (10-1 pin F_PANEL; 4-pin SPEAKER)	1-21
15. USB 2.0 connectors (10-1 pin USB_E12; USB_E34)	1-17
16. Node connector (12-1 pin NODE)	1-19
17. USB 3.1 Gen 1 connector (20-1 pin U31G1_910)	1-16
18. ReTry button (RETRY_BUTTON)	1-11
19. MemOK! II switch (MemOK! II)	1-10
20. TPM connector (14-1 pin TPM)	1-19
21. Front panel audio connector (10-1 pin AAFP)	1-15
22. M.2 sockets (M.2_1 (Socket 3); M.2_2 (Socket 3))	1-25
23. LED connector (8-pin LED_CON1)	1-22

1.1.3 Central Processing Unit (CPU)

This motherboard supports Socket 1151 for 9th / 8th Gen Intel® Core™, Pentium® Gold and Celeron® processors, with memory and PCI Express controllers integrated to support dual-channel (4 DIMM) DDR4 memory and 16 PCI Express 3.0/2.0 lanes.



ROG MAXIMUS XI HERO CPU LGA1151



Ensure that you install the correct CPU designed for LGA1151 socket only. DO NOT install a CPU designed for LGA1150, LGA1155, and LGA1156 sockets in the LGA1151 socket.



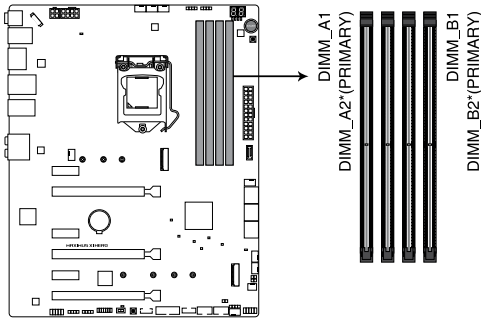
- Ensure that all power cables are unplugged before installing the CPU.
 - Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard 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 LGA1151 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 four Double Data Rate 4 (DDR4) Dual Inline Memory Modules (DIMM) slots.

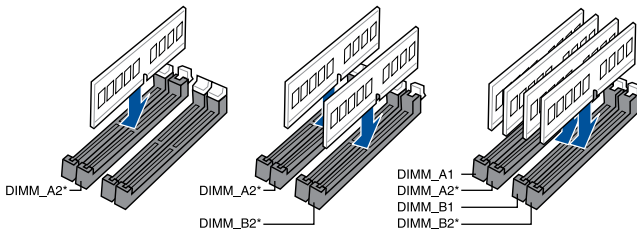


A DDR4 module is notched differently from a DDR, DDR2, or DDR3 module. DO NOT install a DDR, DDR2, or DDR3 memory module to the DDR4 slot.



ROG MAXIMUS XI HERO 288-pin DDR4 DIMM socket

Recommended memory configurations



Memory configurations

You may install 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.
 - This motherboard does not support DIMMs made up of 512 Mb (64 MB) chips or less (Memory chip capacity counts in Megabit, 8 Megabit/Mb = 1 Megabyte/MB).
-

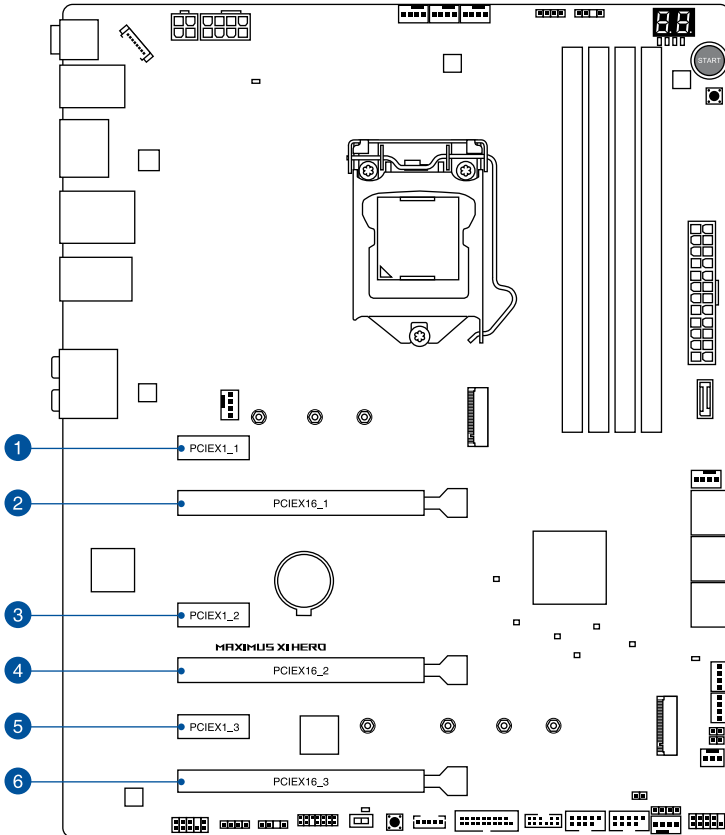


-
- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.
 - For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs) or overclocking condition.
 - 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.
 - Visit the ASUS website for the latest QVL.
-

1.1.5 Expansion slots



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



Slot No.	Slot Description
1	PCIe 3.0 x1_1 slot
2	PCIe 3.0 x16_1 slot
3	PCIe 3.0 x1_2 slot
4	PCIe 3.0 x16_2 slot
5	PCIe 3.0 x1_3 slot
6	PCIe 3.0 x16_3 slot

VGA Configuration	PCIe operating mode	
	PCIe 3.0 x16_1	PCIe 3.0 x16_2
Single VGA/PCIe card	x16 (Recommend for single VGA)	N/A
Dual VGA/PCIe card	x8	x8

PCIe Lane	PCIe operating mode	
	Auto mode	x4 mode
PCIe_x16_3	x2	x4 (Shares bandwidth with SATA6G_5 and SATA6G_6)



- We recommend that you provide sufficient power when running CrossFireX™ or SLI® mode.
- Connect a chassis fan to the motherboard connector labeled CHA_FAN1-3 when using multiple graphics cards for better thermal environment.



The PCIEX16_1 slot switches to x8 mode when PCIEX16_2 slot is occupied.

Hyper M.2 X16 series card configuration	PCI Express 3.0 operating mode	
	PCIEX16_1	PCIEX16_2
2 Intel® SSD on CPU support	-	x4+x4
3 Intel® SSD on CPU support	x8+x4+x4	-



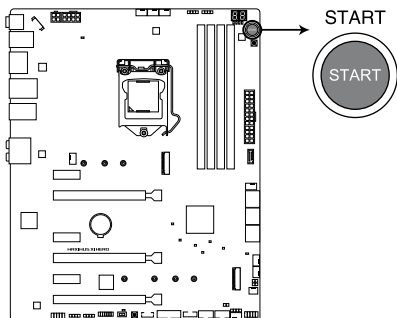
- Hyper M.2 X16 series card is purchased separately.
- Enable the Hyper M.2 X16 series card under BIOS settings.

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 button (START)

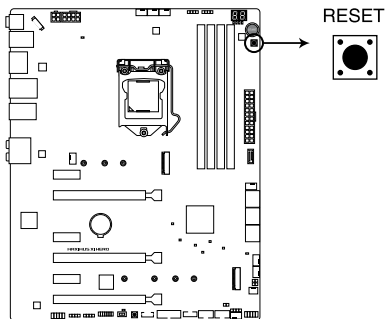
The motherboard comes with a power-on button that allows you to power up or wake up the system. The button also lights up when the system is plugged to a power source indicating that you should shut down the system and unplug the power cable before removing or installing any motherboard component.



ROG MAXIMUS XI HERO Power on button

2. RESET button (RESET)

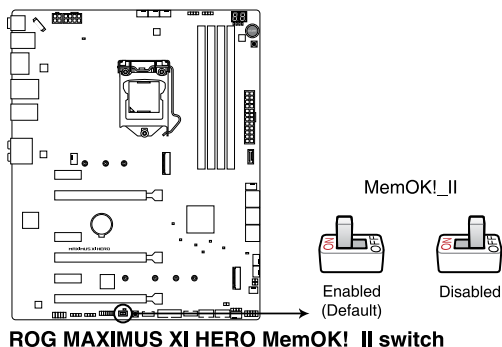
Press the reset button to reboot the system.



ROG MAXIMUS XI HERO Reset button

3. MemOK! II switch (MemOK!_II)

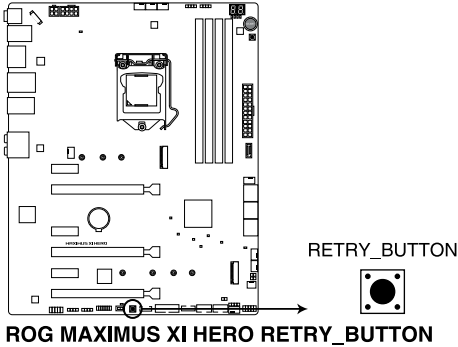
Installing DIMMs that are not compatible with the motherboard may cause system boot failure. The switch is enabled by default, allowing memory re-training when the motherboard is unresponsive due to memory problems. The Mem_LED will light up while re-training, and turn off when the re-training is complete.



- Refer to section 1.1.7 **Onboard LEDs** for the exact location of the Mem_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! II function.
- The MemOK! II switch does not function under Windows® OS environment.
- During the tuning process, the system loads and tests pretest profiles. It takes about 30 seconds for the system to test one set of profiles. If the test fails, the system reboots and tests the next set of profiles. The system will reboot multiple times when training, once the system has completed the training process the Mem_LED will turn off, please refrain from doing anything before the Mem_LED turns off.
- Due to memory tuning requirement, the system automatically reboots when each profile is tested. If the installed DIMMs still fail to boot after the whole tuning process, and the Mem_LED is turned off, please refer to the Q-code LED and Q-code table for more details on the error.
- 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, then set the MemOK! II switch to disabled.
- Ensure to replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) at www.asus.com.
- We recommend that you download and update to the latest BIOS version from www.asus.com after using the MemOK! II function.

4. ReTry button (RETRY_BUTTON)

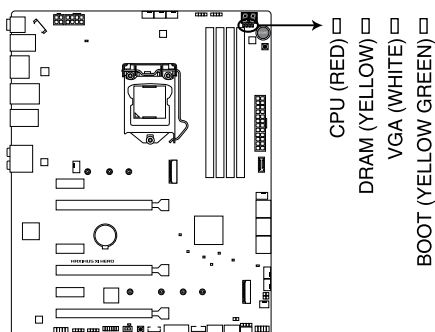
The ReTry button is specially designed for overclockers and is most useful during the booting process where the Reset button is rendered useless. When pressed, it forces the system to reboot while retaining the same settings to be retried in quick succession to achieve a successful POST.



1.1.7 Onboard LEDs

1. Q LEDs (BOOT_LED, VGA_LED, DRAM_LED, CPU_LED)

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



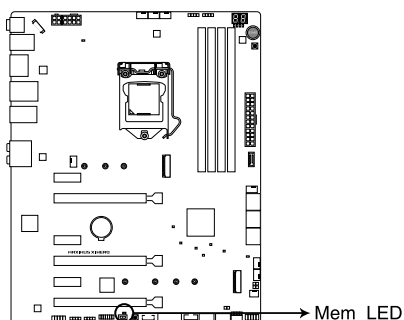
ROG MAXIMUS XI HERO CPU/ DRAM/ BOOT_DEVICE/ VGA LED



The Q LEDs provide the most probable cause of an error code as a starting point for troubleshooting. The actual cause may vary from case to case.

2. Memory LED (Mem_LED)

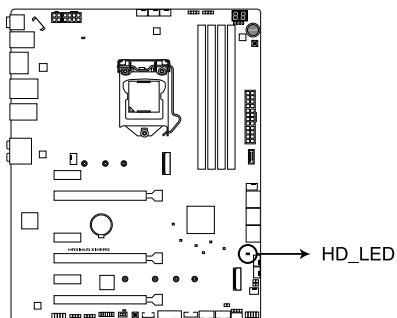
The Mem_LED will light up and remain lit while the MemOK! II function is in use. When the re-training is complete, the Mem_LED will turn off.



ROG MAXIMUS XI HERO Mem_LED

3. Hard Disk LED (HD_LED)

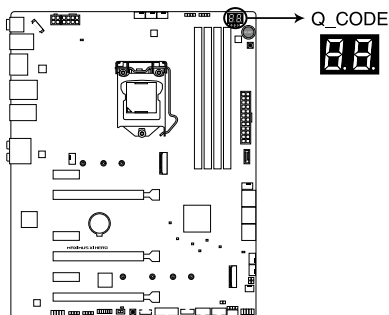
The Hard Disk LED is designed to indicate the hard disk activity. It blinks when data is being written into or read from the hard disk drive. The LED does not light up when there is no hard disk drive connected to the motherboard or when the hard disk drive does not function.



ROG MAXIMUS XI HERO Hard Disk LED

4. Q-Code LED

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 following page for details.



ROG MAXIMUS XI HERO Q-Code LED



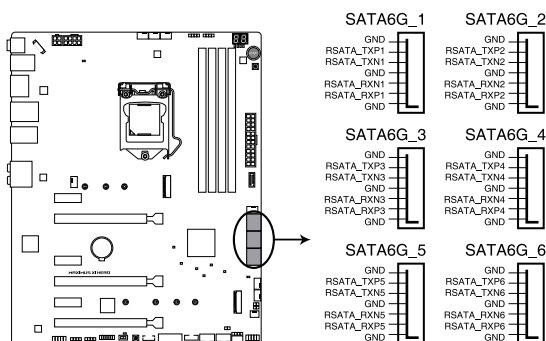
- The Q-Code LED provides the most probable cause of an error code as a starting point for troubleshooting. The actual cause may vary from case to case.
- Please refer to the Q-Code table in the **Appendix** section for more details.

1.1.8 Internal connectors

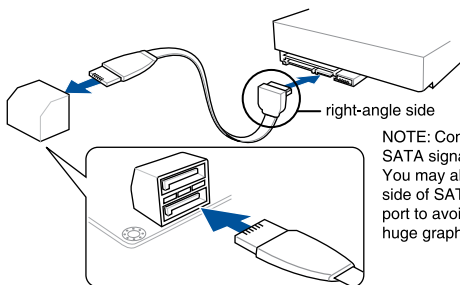
1. Intel® Z390 Serial ATA 6 Gb/s connectors (7-pin SATA6G_12; SATA6G_34; SATA6G_56)

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® Z390 chipset.



ROG MAXIMUS XI HERO Intel® SATA 6 Gb/s connectors



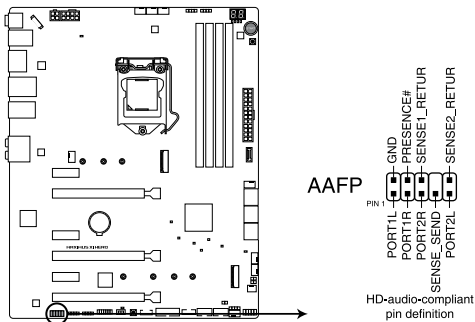
NOTE: Connect the right-angle side of SATA signal cable to SATA device. You may also connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.



- These connectors are set to **[AHCI]** by default. If you intend to create a Serial ATA RAID set using these connectors, set the SATA Mode Selection item in the BIOS to **[Intel RST Premium With Intel Optane System Acceleration (RAID)]**.
- For more information on configuring your RAID sets, please refer to the **RAID Configuration Guide** which you can find at <https://www.asus.com/support>.

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

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



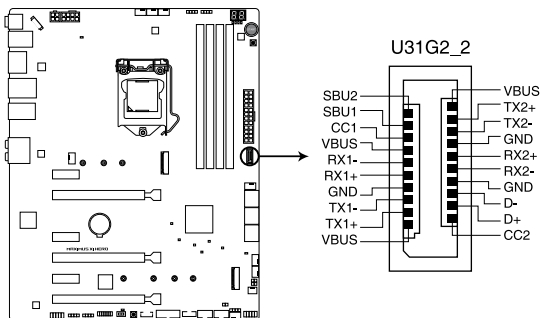
ROG MAXIMUS XI HERO Analog front panel connector



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

3. USB 3.1 Gen 2 front panel connector (U31G2_2)

This connector allows you to connect a USB 3.1 Gen 2 module for additional USB 3.1 Gen 2 ports. The latest USB 3.1 Gen 2 connectivity provides data transfer speeds of up to 10 Gbps.



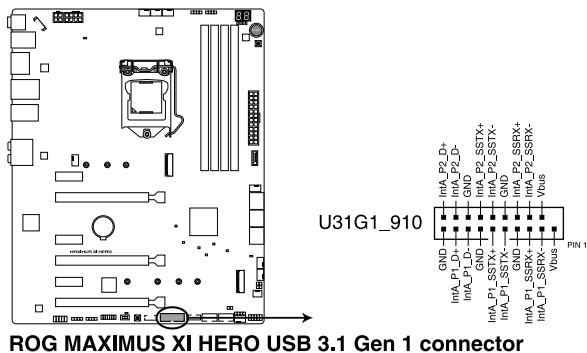
ROG MAXIMUS XI HERO USB 3.1 Gen 2 front panel connector



The USB 3.1 Gen 2 module is purchased separately.

4. USB 3.1 Gen 1 connector (20-pin U31G1_910)

This connector allows you to connect a USB 3.1 Gen 1 module for additional USB 3.1 Gen 1 front or rear panel ports. With an installed USB 3.1 Gen 1 module, you can enjoy all the benefits of USB 3.1 Gen 1 including faster data transfer speeds of up to 5 Gb/s, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.



ROG MAXIMUS XI HERO USB 3.1 Gen 1 connector



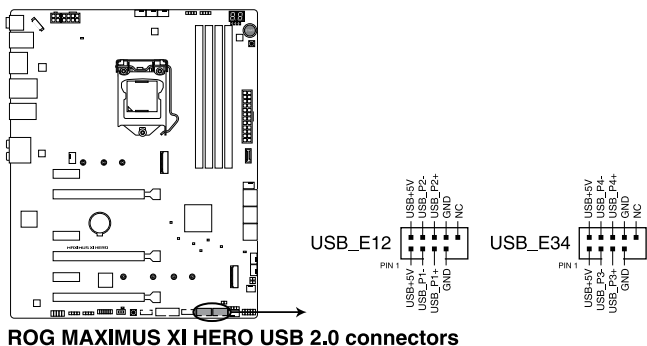
The USB 3.1 Gen 1 module is purchased separately.



The plugged USB 3.1 Gen 1 device may run on xHCI or EHCI mode depending on the operating system's setting.

5. USB 2.0 connectors (10-1 pin USB_E12; USB_E34)

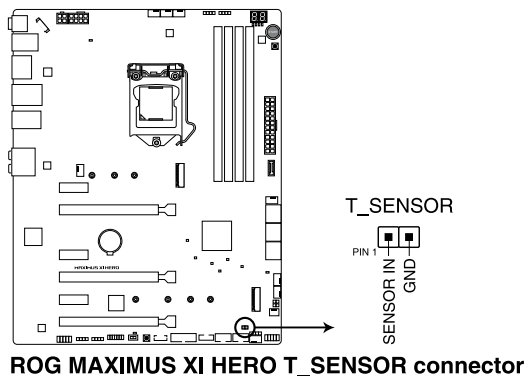
These connectors are for the USB 2.0 ports. Connect the USB module cable to this connector, then install the module to a slot opening at the back of the system chassis. This USB connector complies with USB 2.0 specification that supports up to 480 MBps connection speed.



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

6. Thermal sensor connector (2-pin T_SENSOR)

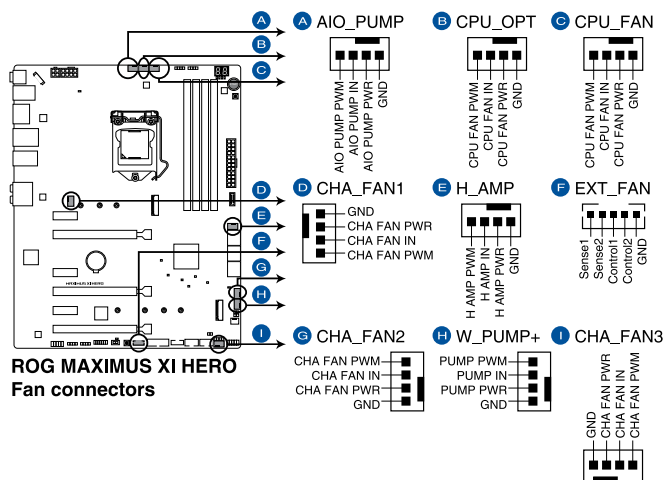
This connector is for the thermistor cable that allows you to monitor the temperature of your motherboard's critical components and connected devices.



7. Fan and pump connectors (4-pin CPU_FAN; 4-pin CPU_OPT; 4-pin H_AMP; 5-pin EXT_FAN; 4-pin W_PUMP+; 4-pin AIO_PUMP; 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.

The EXT_FAN connector is only for the fan extension card. For more details on the fan extension card, please refer to the **To install Fan Extension Card** section in this guide.



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

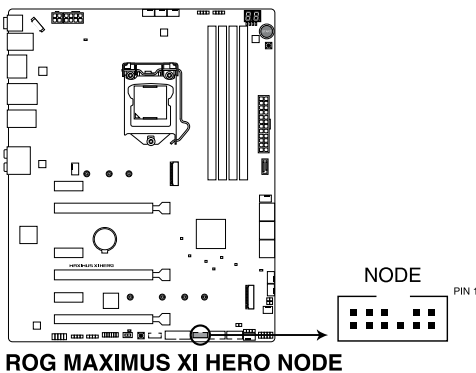


- The FAN Extension card is purchased separately.
- W_PUMP+ function support depends on water cooling device.
- For better Q-Fan functions, we recommend using 4-pin PWM fans when you connect powerful fans (1A or above) onto the H_AMP connector.

Header	Max. Current	Max. Power	Default Speed	Shared Control
CPU_FAN	1A	12W	Q-Fan Controlled	A
CPU_OPT	1A	12W	Q-Fan Controlled	A
CHA_FAN1	1A	12W	Q-Fan Controlled	-
CHA_FAN2	1A	12W	Q-Fan Controlled	-
CHA_FAN3	1A	12W	Q-Fan Controlled	-
AIO_PUMP	1A	12W	Full-Speed	-
W_PUMP+	3A	36W	Full-Speed	-
H_AMP	3A	36W	Q-Fan Controlled	-

8. Node connector (12-1 pin NODE)

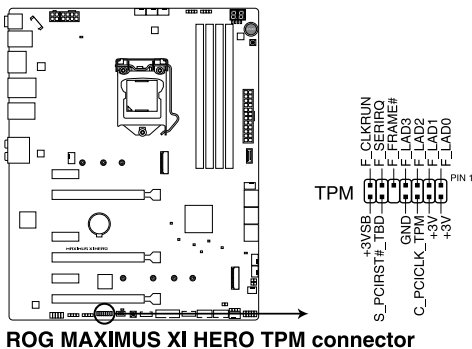
This connector allow you to connect a compatible PSU or control a compatible fan extension card.



Visit www.asus.com for more information about the devices and the latest compatibility list.

9. TPM connector (14-1 pin TPM)

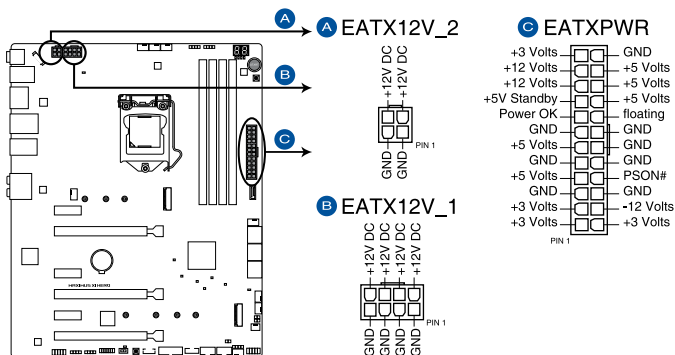
This connector supports a Trusted Platform Module (TPM) system, which securely stores keys, digital certificates, passwords and data. A TPM system also helps enhance network security, protect digital identities, and ensures platform integrity.



The TPM module is purchased separately.

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

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



ROG MAXIMUS XI HERO ATX power connectors



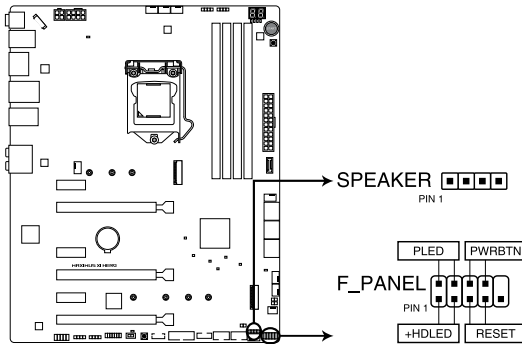
- DO NOT connect the 4-pin power plug only, the motherboard may overheat under heavy usage.
- Ensure to connect the 8-pin power plug, or connect both the 8-pin and 4-pin power plugs.



- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12V Specification 2.0 (or later version) and provides a minimum power of 350 W.
- We recommend that you use a PSU with a higher power output when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- If you want to use two or more high-end PCIe x16 cards, use a PSU with 1000W power or above to ensure the system stability.

11. System panel connectors (10-1 pin F_PANEL; 4-pin SPEAKER)

These connectors supports several chassis-mounted functions.



ROG MAXIMUS XI HERO SPEAKER & F_PANEL connectors

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

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

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

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

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

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

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

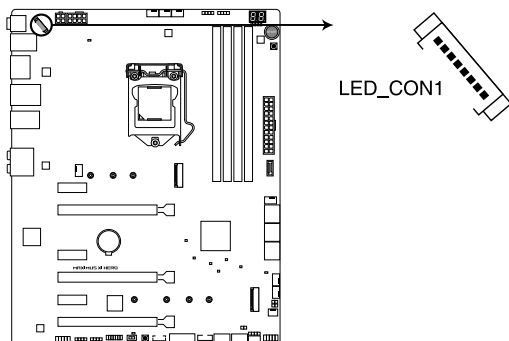
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power button for more than four seconds while the system is ON turns the system OFF.

- **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.

12. LED connector (8-pin LED_CON1)

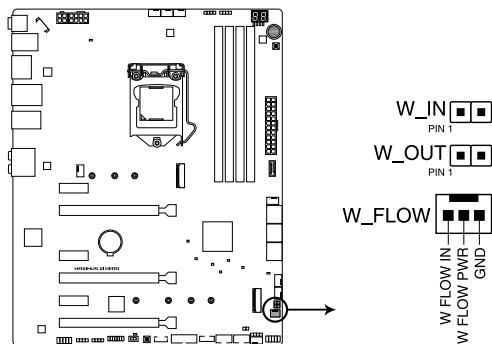
This LED connector is for connecting LED strips on your back I/O cover.



ROG MAXIMUS XI HERO LED_CON1

13. Water in, water out, and water flow connectors (2-pin W_IN; 2-pin W_OUT; 3-pin W_FLOW)

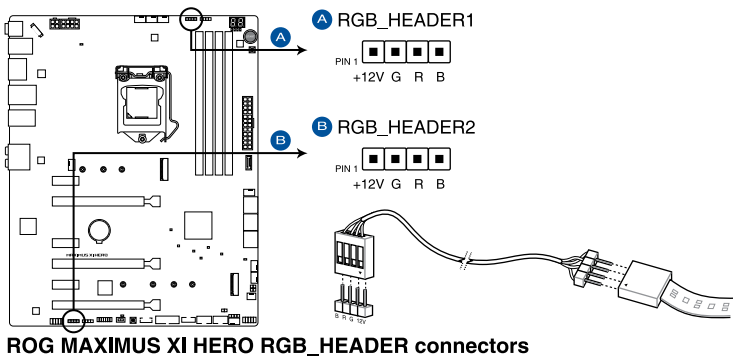
These connectors allow you to connect sensors to monitor the temperature and flow rate of your liquid cooling system. You can manually adjust the fans and water pump to optimize the thermal efficiency of your liquid cooling system.



ROG MAXIMUS XI HERO W_IN, W_OUT & W_Flow

14. AURA RGB headers (4-pin RGB_HEADER1-2)

These connectors are for RGB LED strips.



ROG MAXIMUS XI HERO RGB_HEADER connectors



The RGB header supports 5050 RGB multi-color LED strips (12V/G/R/B), with a maximum power rating of 3A (12V), and no longer than 3 m.



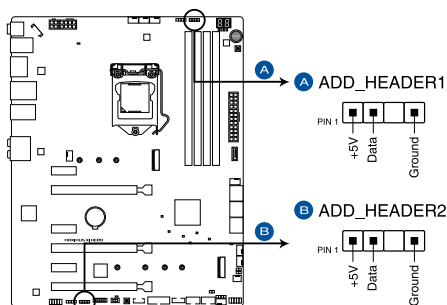
Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, or components.



- Actual lighting and color will vary with LED strips.
- 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 when the system is operating.
- The LED strips are purchased separately.

15. Addressable RGB headers (4-1 pin ADD_HEADER1-2)

These connectors are for individually addressable RGB WS2812B LED strips or WS2812B based LED strips.



ROG MAXIMUS XI HERO ADD headers



The addressable RGB header supports WS2812B addressable RGB LED strips (5V/Data/Ground), with a maximum power rating of 3A (5V) and a maximum of 120 LEDs.



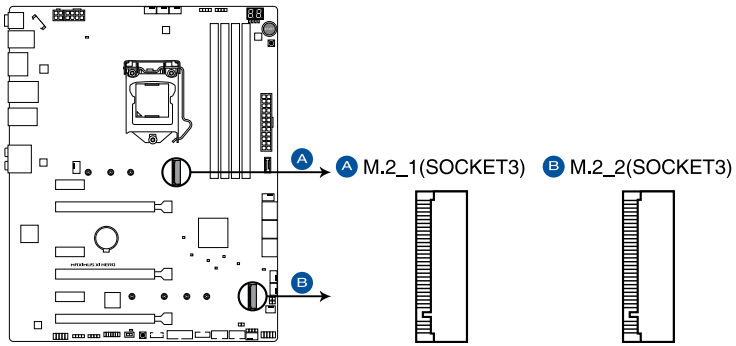
Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, or components.



- Actual lighting and color will vary with LED strip.
- If your LED strip does not light up, check if the addressable RGB LED strip is connected in the correct orientation, and the 5V connector is aligned with the 5V header on the motherboard.
- The addressable RGB LED strip will only light up under the operating system.
- The addressable RGB LED strip is purchased separately.

16. M.2 sockets (M.2_1 (Socket 3); M.2_2 (Socket 3))

These sockets allow you to install M.2 SSD modules.



ROG MAXIMUS XI HERO M.2 sockets



- M.2_1 socket supports PCIe 3.0 x4 and SATA mode M Key design and type 2242 / 2260 / 2280 PCIe and SATA storage devices.
- M.2_2 socket supports PCIe 3.0 x4 M Key design and type 2242 / 2260 / 2280 / 22110 PCIe storage devices.
- These sockets support IRST (Intel® Rapid Storage Technology).



- When the M.2_1(Socket 3) is operating in SATA mode, SATA port 2 (SATA6G_2) will be disabled.
- The M.2 SSD module is purchased separately.

Basic Installation

2

2.1 Building your PC system

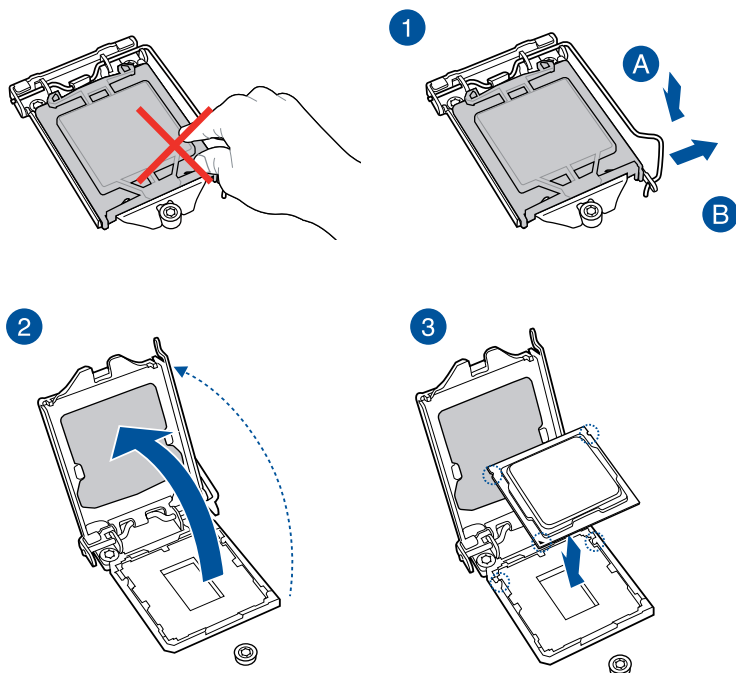


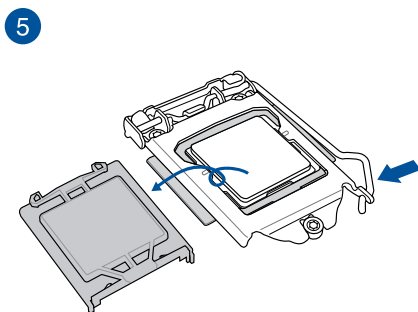
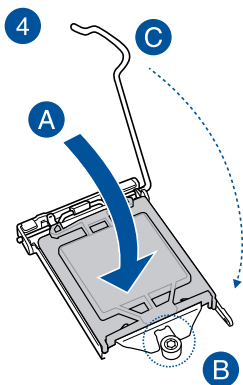
The diagrams in this section are for reference only. The motherboard layout may vary with models, but the installation steps are the same for all models.

2.1.1 CPU installation

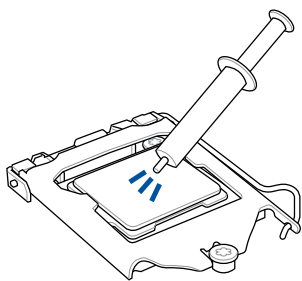


- Ensure that you install the correct CPU designed for LGA1151 socket only. **DO NOT** install a CPU designed for LGA1155 and LGA1156 sockets on the LGA1151 socket.
- ASUS will not cover damages resulting from incorrect CPU installation/removal, incorrect CPU orientation/placement, or other damages resulting from negligence by the user.



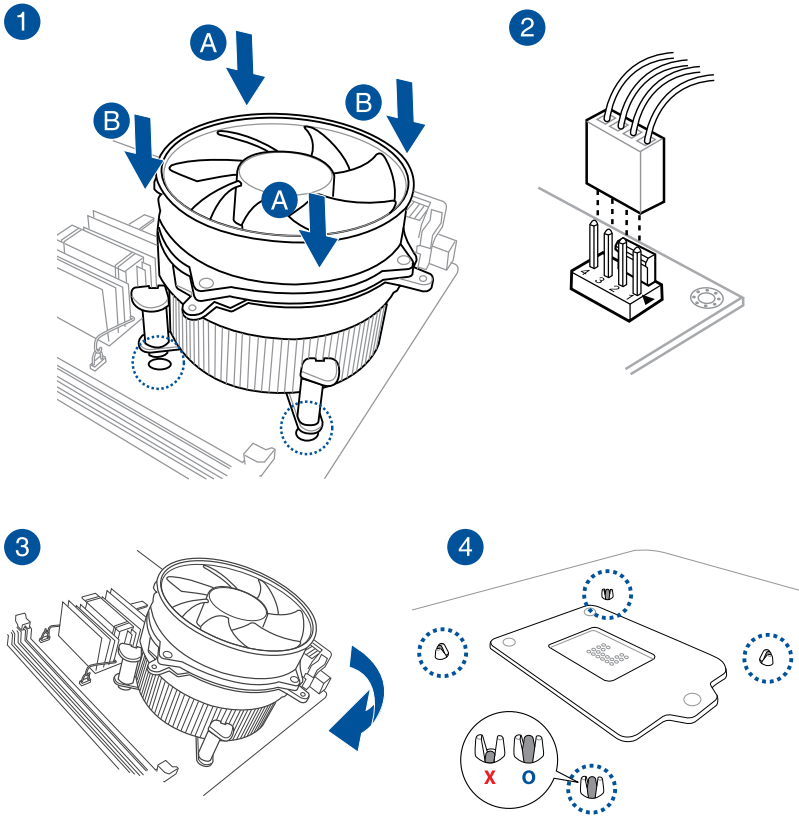


2.1.2 Cooling system installation



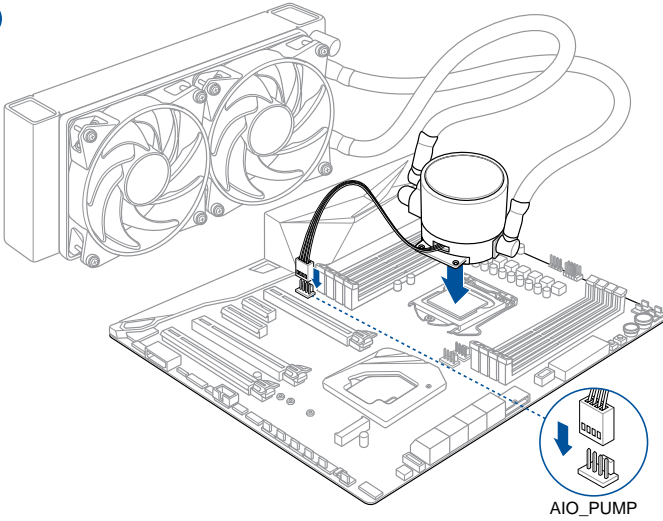
Apply Thermal Interface Material to the CPU cooling system and CPU before you install the cooling system, if necessary.

To install a CPU heatsink and fan assembly

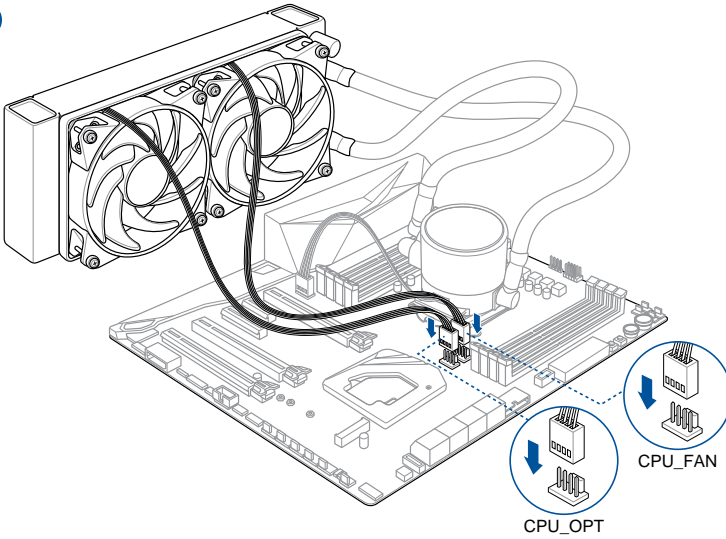


To install an AIO cooler

1

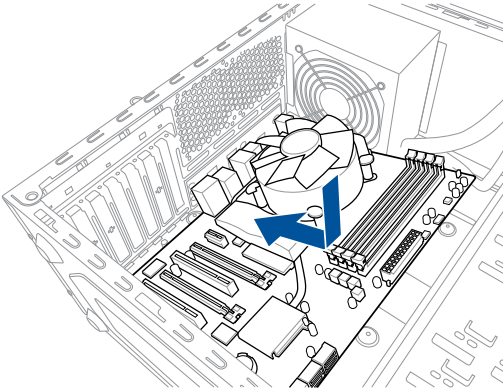


2

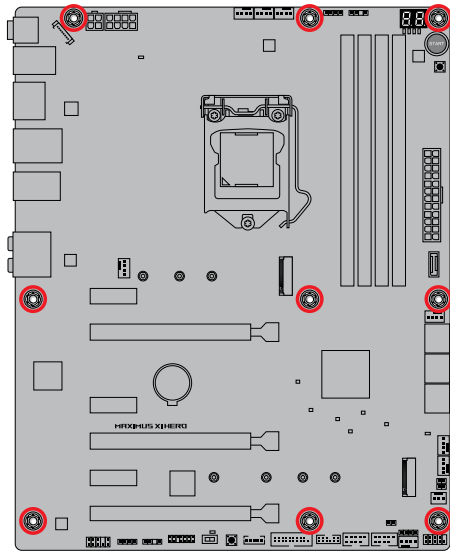
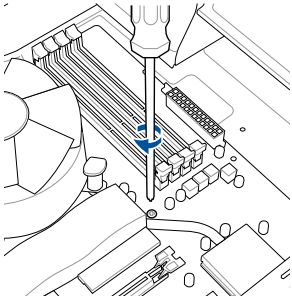


2.1.3 Motherboard installation

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



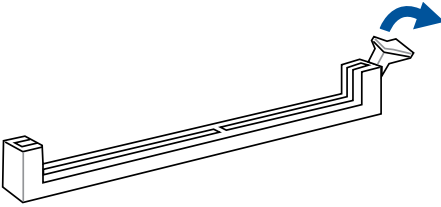
2. Place nine (9) screws into the holes indicated by circles to secure the motherboard to the chassis.



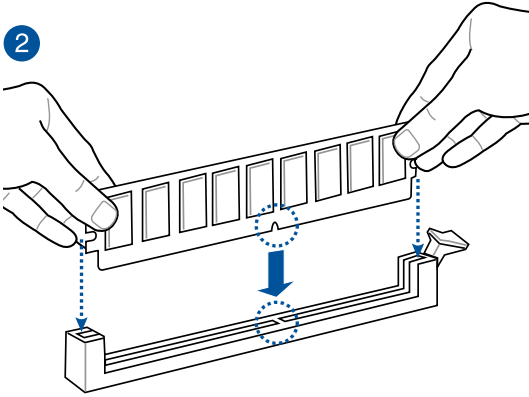
DO NOT over tighten the screws! Doing so can damage the motherboard.

2.1.4 DIMM installation

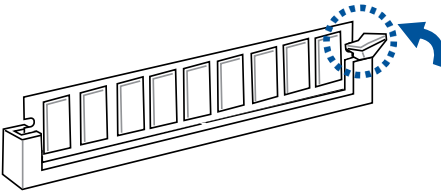
1



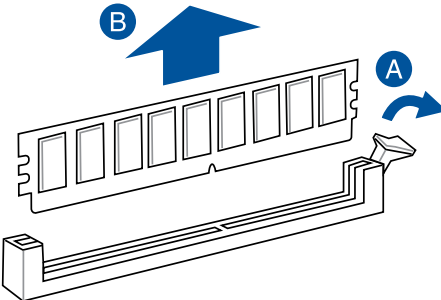
2



3

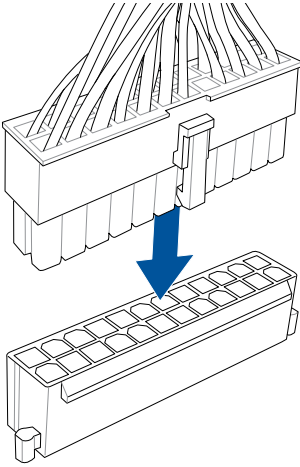


To remove a DIMM

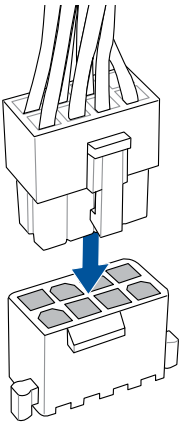


2.1.5 ATX power connection

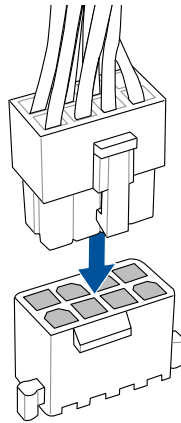
1



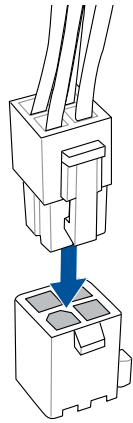
2



OR

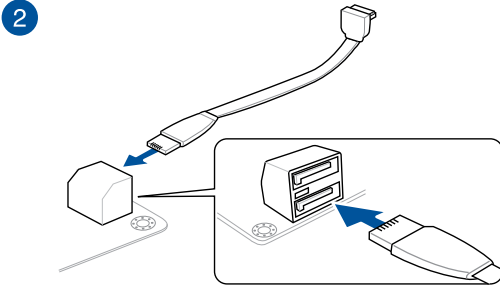
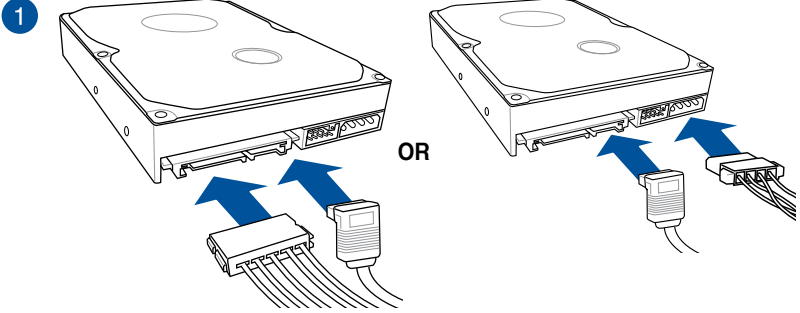


AND

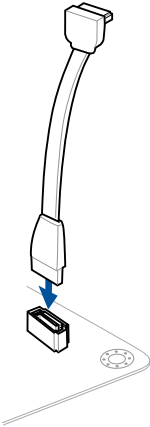


- DO NOT connect the 4-pin power plug only, the motherboard may overheat under heavy usage.
- Ensure to connect the 8-pin power plug, or connect both the 8-pin and 4-pin power plugs.

2.1.6 SATA device connection

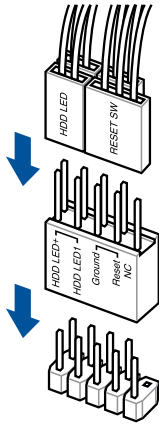


OR

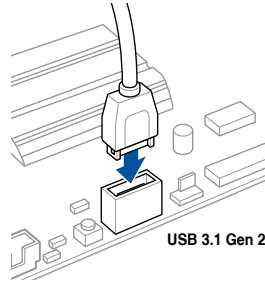


2.1.7 Front I/O connector

To install ASUS Q-Connector

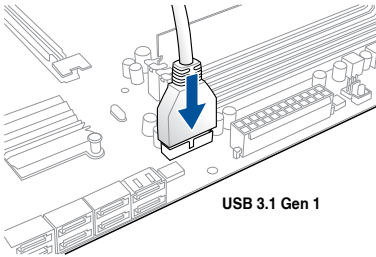


To install USB 3.1 Gen 2 connector

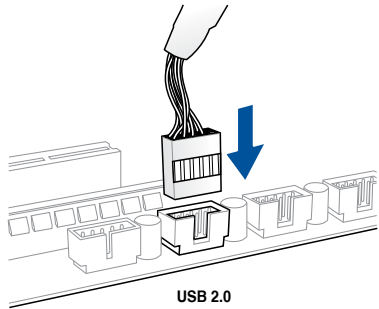


This connector will only fit in one orientation. Push the connector until it clicks into place.

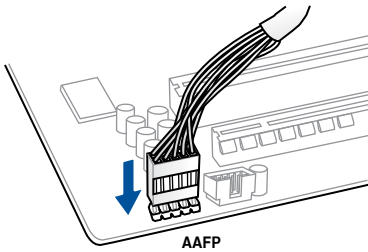
To install USB 3.1 Gen 1 connector



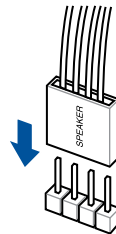
To install USB 2.0 connector



To install front panel audio connector

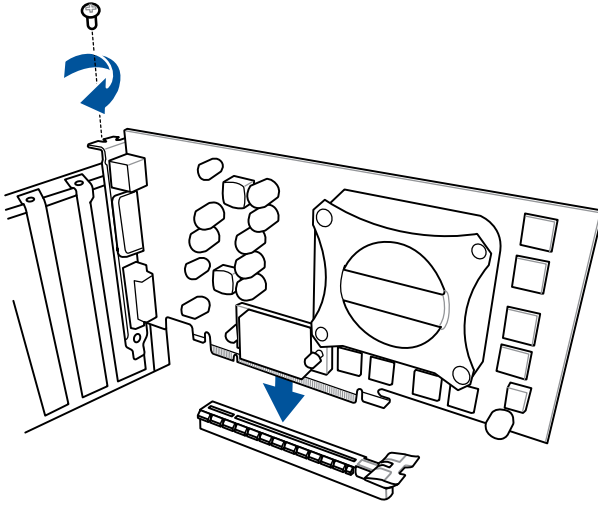


To install system speaker connector

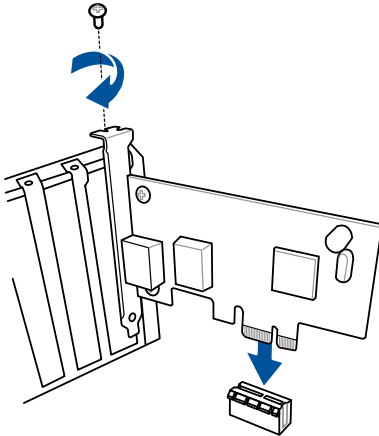


2.1.8 Expansion card installation

To install PCIe x16 cards

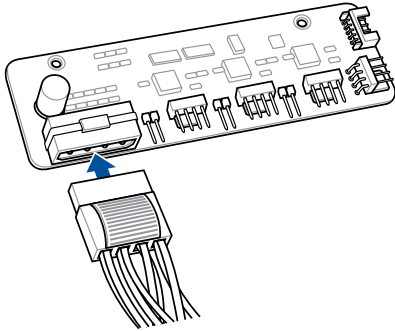


To install PCIe x1 cards

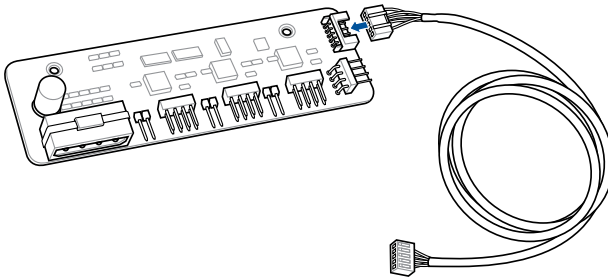


To install FAN EXTENSION CARD

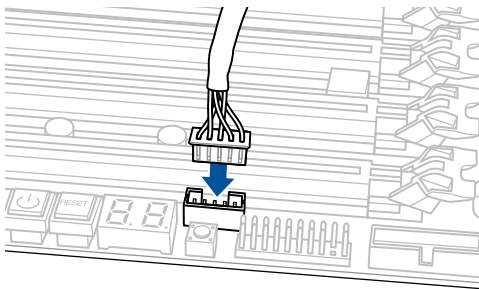
1



2



3

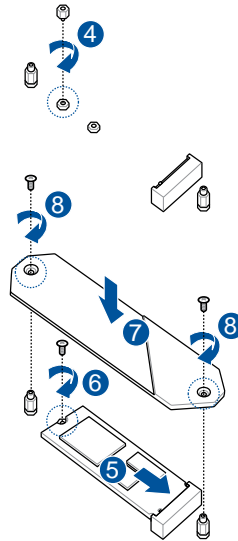
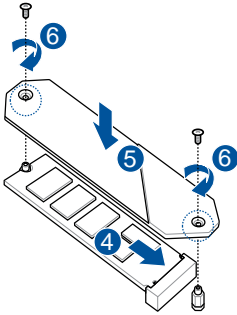
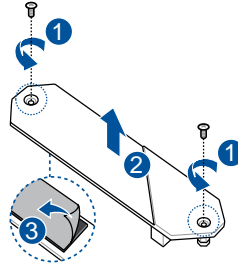
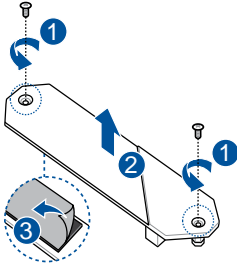


- The illustrations in this section are for reference only. The motherboard layout may vary with models, but the installation steps are the same for all models.
- The FAN Extension card is purchased separately.

2.1.9 M.2 installation

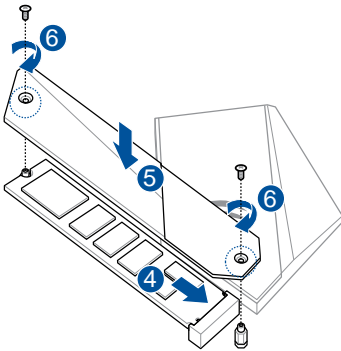
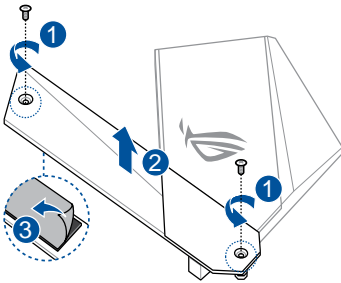
For type 2280 M.2 on M.2_1 socket

For type 2242 / 2260 M.2 on M.2_1 socket

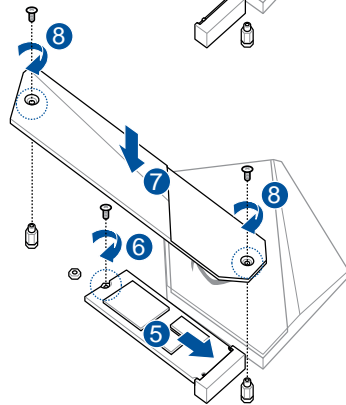
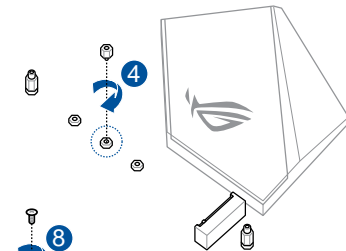
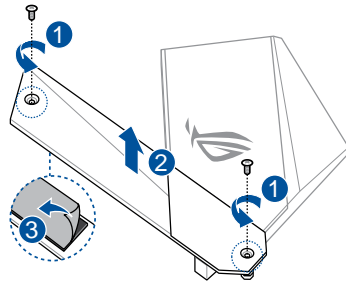


The M.2 is purchased separately.

For type 22110 M.2 on M.2_2 socket



For type 2242 / 2260 / 2280 M.2 on M.2_2 socket



The M.2 is purchased separately.

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.

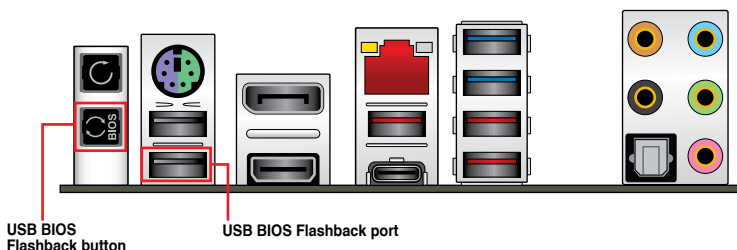
To use USB BIOS Flashback:

1. Insert a USB storage device to the USB Flashback port.



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

2. Visit <https://www.asus.com/support/> and download the latest BIOS version for this motherboard.
3. Rename the file as **M11H.CAP**, then copy it to your USB storage device.
4. Shut down your computer.
5. Press the BIOS Flashback button for three seconds until the Flashback LED blinks three times, indicating that the BIOS Flashback function is enabled.



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



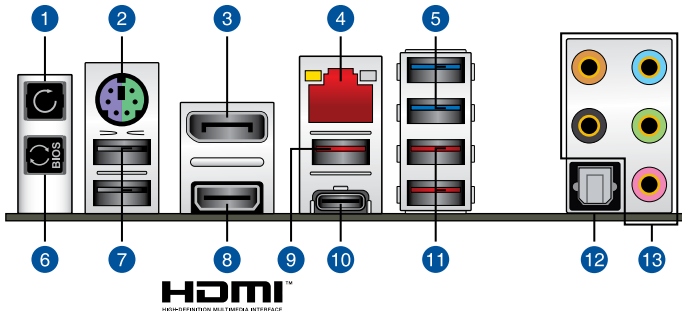
For more BIOS update utilities in BIOS setup, refer to the section **3.11 Updating BIOS** in Chapter 3.



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

2.3 Motherboard rear and audio connections

2.3.1 Rear I/O connection



Rear panel connectors

1.	Clear CMOS button (CLR_CMOS). Press this button to clear the BIOS setup information only when the systems hangs due to overclocking.
2.	PS/2 mouse/keyboard combo port
3.	DisplayPort
4.	LAN (RJ-45) port*
5.	USB 3.1 Gen 1 ports 7 and 8
6.	USB BIOS Flashback button
7.	USB 2.0 Type-A ports 11 and 12. Bottom port supports the USB BIOS Flashback.
8.	HDMI port
9.	USB 3.1 Gen 2 Type-A port 5
10.	USB 3.1 Gen 2 Type-C™ port C6
11.	USB 3.1 Gen 2 Type-A ports 3 and 4
12.	Optical S/PDIF OUT port
13.	Audio I/O ports**

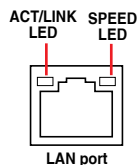
* and **: Refer to the tables on the next page for LAN port LEDs, and audio port definitions.



- USB 3.1 Gen 1/Gen 2 devices can only be used as data storage only.
- We strongly recommend that you connect your devices to ports with matching data transfer rate. Please connect your USB 3.1 Gen 1 devices to USB 3.1 Gen 1 ports and your USB 3.1 Gen 2 devices to USB 3.1 Gen 2 ports for faster and better performance for your devices.
- Due to the design of the Intel chipset, all USB devices connected to the USB 3.1 Gen 1 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
BLINKING	Data activity	GREEN	1 Gbps connection

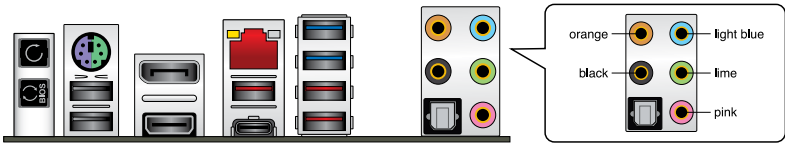


**** Audio 2, 4, 5.1 or 7.1-channel configuration**

Port	Headset 2-channel	4-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

2.3.2 Audio I/O connections

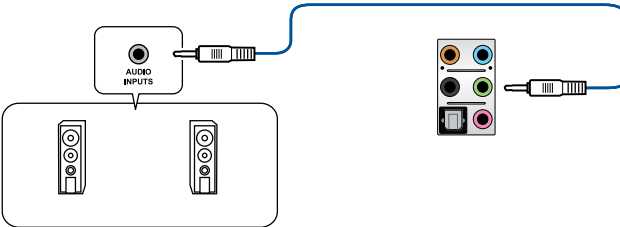
Audio I/O ports



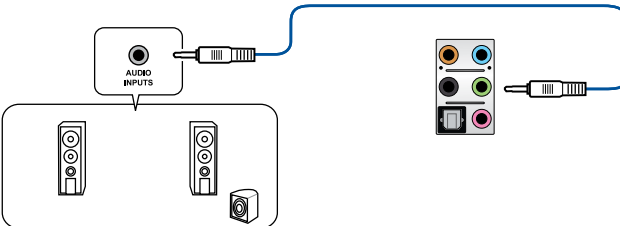
Connect to Headphone and Mic



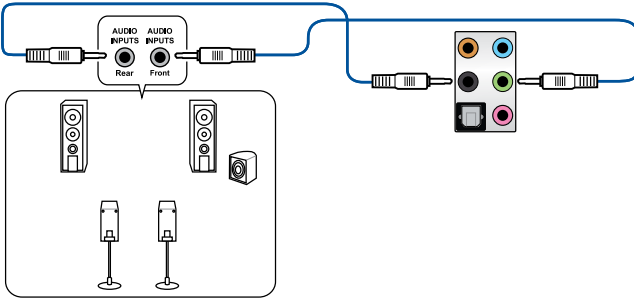
Connect to Stereo Speakers



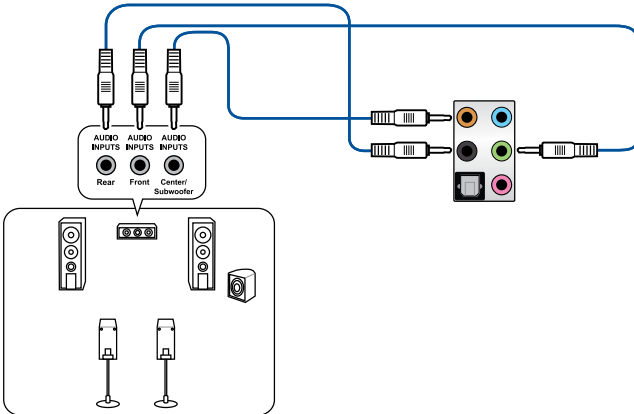
Connect to 2-channel Speakers



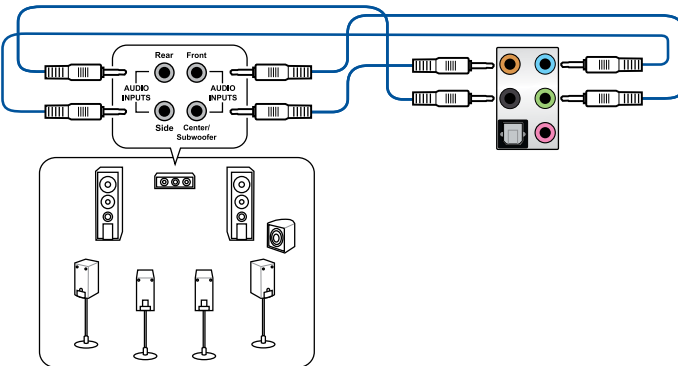
Connect to 4-channel Speakers



Connect to 5.1-channel Speakers



Connect to 7.1-channel Speakers



2.4 Starting up for the first time

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

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

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

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

2.5 Turning off the computer

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

BIOS Setup

3

3.1 Knowing BIOS



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

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

- An error message appears on the screen during the system bootup and requests you to run the BIOS Setup.
- You have installed a new system component that requires further BIOS settings or update.



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



- When downloading or updating the BIOS file, rename it as **M11H.CAP** for this motherboard.
 - BIOS settings and options may vary due to different BIOS release versions. Please refer to the latest BIOS version for settings and options.
-

3.2 BIOS setup program

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

Entering BIOS at startup

To enter BIOS Setup at startup, press <Delete> or <F2> during the Power-On Self Test (POST). If you do not press <Delete> or <F2>, POST continues with its routines.

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

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

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 1.1.6 **Onboard buttons and switches** for information on how to erase the RTC RAM via the Clear CMOS button.
 - The BIOS setup program does not support the Bluetooth devices.
-



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 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.



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

The screenshot shows the ASUS UEFI BIOS Advanced Mode interface. The top bar includes the date and time (08/13/2018, 12:33), language (English), and various utility shortcuts (MyFavorite(F3), Qfan Control(F6), AI OC Guide(F11), Search(F9), AURA ON/OFF(F4)). The main menu includes My Favorites, Main, Extreme Tweaker (selected), Advanced, Monitor, Boot, Tool, and Exit. The Extreme Tweaker section is expanded to show settings for LN2 Mode, Target CPU Turbo-Mode Frequency (3600MHz), Target DRAM Frequency (2133MHz), Target Cache Frequency (3300MHz), Ai Overclock Tuner (Auto), ASUS MultiCore Enhancement (Auto), SVID Behavior (XMP I), CPU Core Ratio (Auto), DRAM Odd Ratio Mode (Enabled), DRAM Frequency (Auto), Xtreme Tweaking (Disabled), and CPU SVID Support (Auto). A scroll bar is visible on the right side. The Hardware Monitor section on the right displays CPU/Memory status (Frequency: 3600 MHz, Temperature: 31°C, BCLK: 100.00 MHz, Core Voltage: 1.083 V, Ratio: 36x, DRAM Freq: 2133 MHz, DRAM Volt.: 1.200 V, Capacity: 4096 MB) and Prediction (Sil Quality: 70%, Cooler: 119 pts). The bottom bar contains menu items (Last Modified, EZ Tuning Wizard, EzMode(F7), Hot Keys, Search on FAQ), general help, last modified settings, go back to EZ Mode, hot keys, and search on the FAQ. A note at the bottom explains manual mode settings for BCLK, XMP I, and XMP II.

Configuration fields
Pop-up Menu
Menu bar Language MyFavorite(F3) Qfan Control(F6) AI OC Guide(F11) Search(F9) AURA ON/OFF(F4)
Scroll bar

Menu items General help Last modified settings Go back to EZ Mode Hot Keys Search on the FAQ
EZ Tuning Wizard
Search on the FAQ
Displays a quick overview of the system status and prediction

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.

My Favorites(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 MyFavorites menu.



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

Q-Fan 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.

AI OC Guide(F11)

This button above the menu bar allows you to view the descriptions of AI overclocking and enable it.



-
- Refer to section **3.2.4 AI OC Guide** for more information.
 - This function is only enabled when using an unlocked CPU.
-

Search (F9)

This button allows you to search for BIOS items by entering its name, enter the item name to find the related item listing.

AURA (F4)

This button allows you to turn the RGB LED lighting or functional LED on or off.

[All On]: All LEDs (Aura or Functional) will be enabled.

[Aura Only]: Aura LEDs will be enabled and functional LEDs will be disabled.

[Aura Off]: Aura LEDs will be disabled, however functional LEDs will still be enabled.

[Stealth Mode]: All LEDs (Aura and Functional) will be disabled.

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:



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 <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.

Hot keys

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

EZ Tuning Wizard

This button above the menu bar allows you to view and configure the RAID settings of your system.



Refer to section **3.2.5 EZ Tuning Wizard** for more information.

Last Modified button

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

3.2.2 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.



To switch from Advanced Mode to EZ Mode, click **EZ Mode(F7)** or press the <F7> hotkey.

Displays a quick overview of the system status

Displays the system properties of the selected mode. Click < or > to switch modes

EZ Tuning Wizard

Selects the display language of the BIOS setup program

AI OC Guide(F11) **Search(F9)** **AURA ON/OFF(F4)**

Information
 08/13/2018 Monday 19:34* English EZ Tuning Wizard AI OC Guide(F11) Search(F9) AURA ON/OFF(F4)
 ROG MAXIMUS XI HERO BIOS Ver. 0214
 Intel(R) Core(TM) i7-8700K CPU @ 3.70GHz
 Speed: 3700 MHz
 Memory: 4096 MB (DDR4 2133MHz)

CPU Temperature 33°C

CPU Core Voltage 0.959 V

Motherboard Temperature 31°C

AI Overclocking
 Click the icon below to enable the AI Overclocking feature. This feature can only be enabled when using an unlocked CPU.

DRAM Status
 DIMM_A1: N/A
 DIMM_A2: AVEXIR 4096MB 2133MHz
 DIMM_B1: N/A
 DIMM_B2: N/A

Storage Information
 AHCI:
 SATA6G_4: ST10000DM0004-1ZC101 (10000.8GB)
 USB:
 SMI USB Flash Disk 1100 (8.1GB)

X.M.P.
 Disabled Disabled

FAN Profile
 CPU FAN 527 RPM
 CHA1 FAN N/A
 CHA2 FAN N/A
 RAD1 FAN N/A
 RAD2 FAN N/A
 CPU OPT FAN N/A
 EXT FAN1 N/A
 EXT FAN2 N/A

Intel Rapid Storage Technology
 On Off

CPU FAN
 Graph showing fan speed vs temperature. QFan Control button.

Boot Priority
 Choose one and drag the items. Switch all
 Windows Boot Manager (SATA6G_4: ST10000DM0004-1ZC101) (10000.8GB)
 UEFI: SMI USB Flash Disk 1100, Partition 1 (8.1GB)

Default(F5) **Save & Exit(F10)** **Advanced Mode(F7)** **Search on FAQ**

Enables or disables the SATA RAID mode for 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

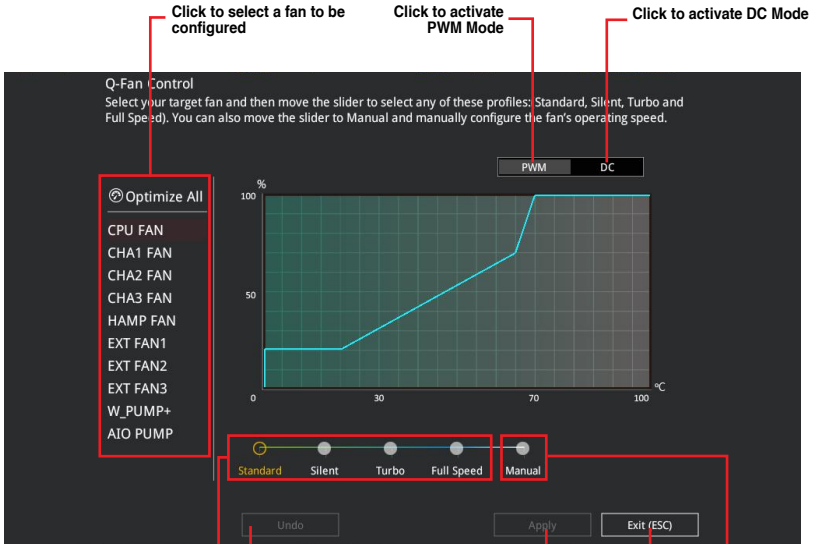
Selects the boot device priority



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

3.2.3 Q-Fan Control

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

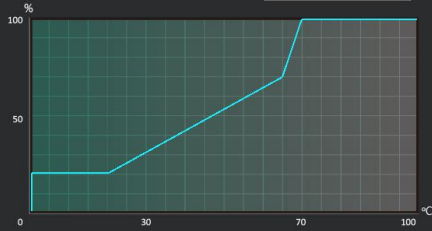


Click to select a fan to be configured

Click to activate PWM Mode

Click to activate DC Mode

- Optimize All
- CPU FAN
- CHA1 FAN
- CHA2 FAN
- CHA3 FAN
- HAMP FAN
- EXT FAN1
- EXT FAN2
- EXT FAN3
- W_PUMP+
- AIO PUMP



- Standard
- Silent
- Turbo
- Full Speed
- Manual

Undo

Apply

Exit (ESC)

Select a profile to apply to your fans

Click to undo the changes

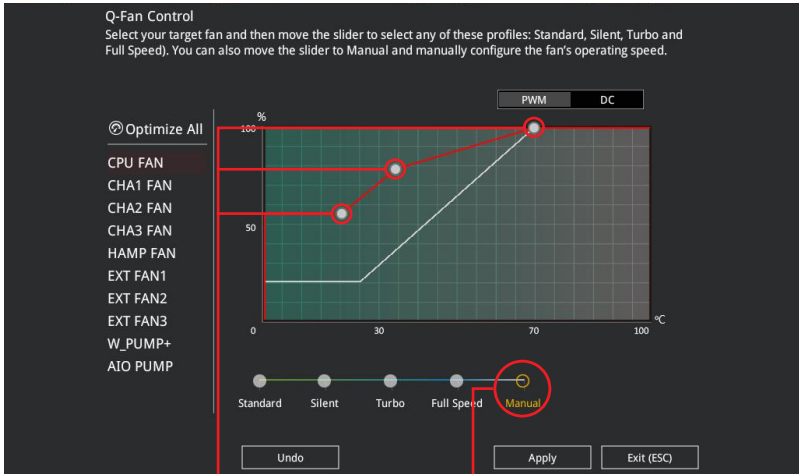
Click to apply the fan setting

Click to go back to main menu

Select to manually configure your fans

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 AI OC Guide



- The screenshot shown in this section is for reference purposes only, and may not exactly match what you see on your screen.
- This function is only enabled when using an unlocked CPU.

The AI OC Guide allows you to enable the Ai Overclocking feature, or view a quick guide of the Ai Overclocking feature which highlights the recommended setup procedure and descriptions of the AI Overclocking.

Clicking on **Enable AI** will enable Ai Overclocking.

AI Overclocking Guide

To establish an overclock via the AI Overclocking utility, please follow these steps:

1. Load UEFI defaults by pressing F5, then press F10, and select save and reboot.
2. Enter the operating system and run Cinebench or your preferred workload/stress test.
3. After the test has been run for the desired time, reboot the system, and then enter UEFI.
4. Set the Core Ratio function to 'AI Optimized'. The motherboard will proceed to adjust the overclocking settings according to the cooler score (in-depth details provided later in the guide).
5. Save by pressing F10, and reboot the system.
6. Enter the operating system and rerun your preferred stress test. If the system is stable, no further changes are required. Please note that the CPU frequency applied by the AI Overclocking utility is based upon Prime 95 26.6 (non-AIX) stability. This is due to limitations of the AIX Offset parameter and also because CPU overclocking margins are limited when running AIX workloads. However, we recognize some users run software that contain AIX code, so we have included AIX-related CPU voltage and frequency guidelines within the AI Overclocking monitoring pane of UEFI; please refer to the "MAX V-req" and "Max AIX Stable Frequency" values, and manually set to CPU Vcore and the CPU ratio accordingly. And, if using Adaptive Vcore mode, please check the recommended loadline values within the AI Feature menu and then apply the highest displayed value to the "CPU load-line calibration" setting within the External DIG+ Power Control section.
7. By default, the AI Overclocking feature caters for environmental temperature changes, so it may alter the CPU frequency when you reboot the system. There is no need to make adjustments unless you would like to lock the overclock to a preferred frequency. If you prefer to disable the temperature tracking feature, simply set the Cooler Score setting to 'stop training' within the AI Features menu.

Note: Provided you don't swap/change the processor, any parameter adjustments applied by the AI overclocking feature are due to cooler efficiency score changes.

After following these steps, if you'd like to make manual adjustments, please read the remainder of this guide for a detailed breakdown of each function of AI Overclocking. In fact, it's wise to read the entire guide before you start because it provides valuable insights related to how the utility works.

[Previous](#) [Next](#) [Enable AI](#) [Cancel](#)

Quick guide topics

Click to view the previous topic in the quick guide

Click to view the next topic in the quick guide

Click to enable AI Overclocking

Click to go back to main menu

3.2.5 EZ Tuning Wizard

EZ Tuning Wizard allows you to easily set RAID in your system using this feature.

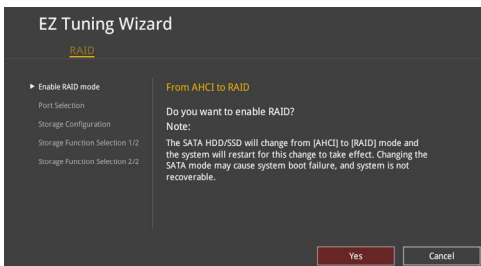
Creating RAID

To create RAID:

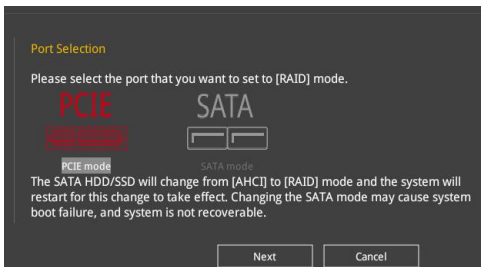
1. Click **EZ Tuning Wizard** from the BIOS screen to open EZ Tuning Wizard screen.
2. Click **Yes** to enable RAID.



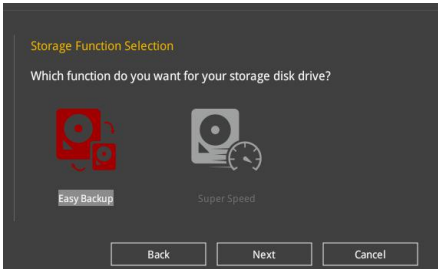
- Ensure that your HDDs have no existing RAID volumes.
- Ensure to connect your HDDs to Intel® SATA connectors.



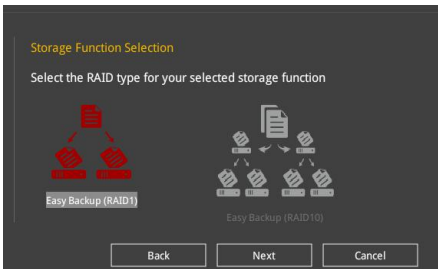
3. Select the port that you want to set to [RAID] mode, **PCIe** or **SATA**, then click **Next**.



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

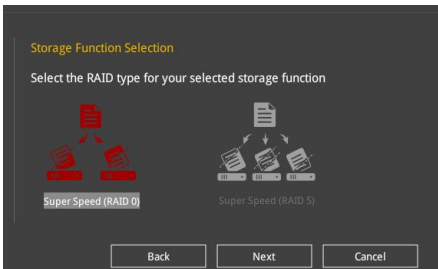


- a. For Easy Backup, click **Next** then select from **Easy Backup (RAID 1)** or **Easy Backup (RAID 10)**.



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

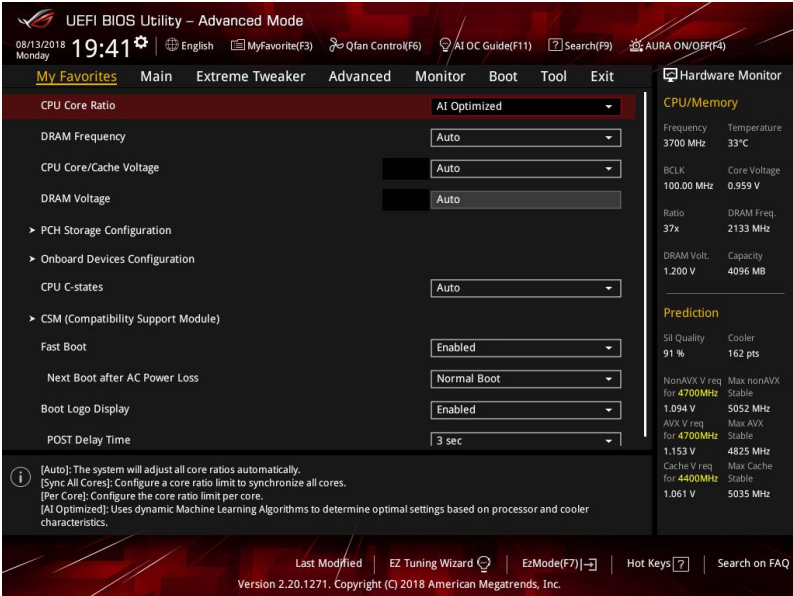
- b. For Super Speed, click **Next** then select from **Super Speed (RAID 0)** or **Super Speed (RAID 5)**.



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.

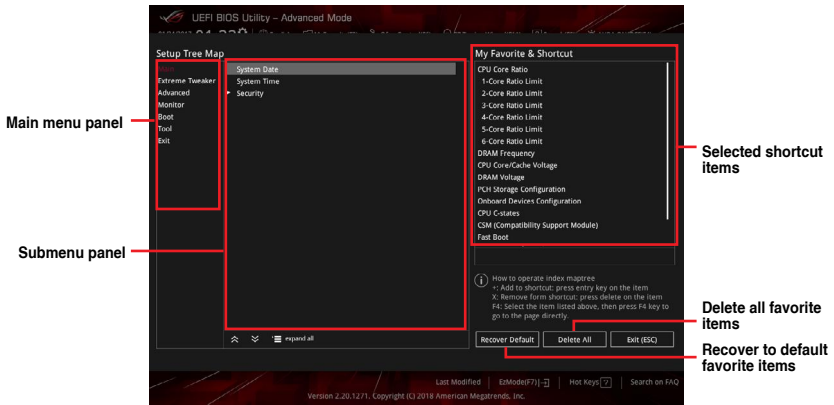


My Favorites comes with several performance, power saving, and fast boot related items by default. You can personalize this screen by adding or removing items.

Adding items to My Favorites

To add BIOS items:

1. Press <F3> on your keyboard or click **MyFavorites(F3)** from the BIOS screen 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.



- 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 information on how to erase the RTC RAM via the Clear CMOS button.
- The Administrator or User Password items on top of the screen show the default **[Not Installed]**. After you set a password, these items show **[Installed]**.

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.

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. |
| [XMP I] | If you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology, choose this item to load the DIMM's default XMP memory timings (CL, TRCD, TRP, TRAS) with BCLK frequency and other memory parameters optimized by ASUS. |
| [XMP II] | If you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology, choose this item to load the DIMM's complete default XMP profile. |



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



The following item appears only when you set the Ai Overclocking Tuner to **[XMP I]**, **[XMP II]**, or **[Manual]**.

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.



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

ASUS MultiCore Enhancement

[Auto] This item allows you to maximize the overlocking 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 ratios.

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



The **[AI Optimized]** item appears only when you use an unlocked CPU.

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] - [DDR4-8533MHz]

Internal CPU Power Management

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

Intel(R) SpeedStep(tm)

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: [Auto] [Enabled] [Disabled]

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.

3.6.1 Platform Misc Configuration

The items in this menu allow you to change the ASPM for PCH and SA PCI Express.

3.6.2 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.

CPU Power Management Configuration

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

Intel(R) SpeedStep(tm)

This item allows more than two frequency to be supported.

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

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: [Enabled] [Disabled]

CPU C-States

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

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

3.6.3 System Agent (SA) Configuration

The items in this menu allow you to adjust the Link Speed for PEG Port and Multi-Monitor.

3.6.4 PCH Configuration

The items in this menu allow you to adjust the PCH PCI Express speed.

PCI Express Configuration

This item allows you to configure the PCI Express slots.

PCIe Speed

This item allows your system to automatically select the PCI Express port speed.

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

3.6.5 PCH Storage Configuration

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

SATA Controller(s)

This item allows you to enable or disable the SATA Device.

Configuration options: [Enabled] [Disabled]

SATA Mode Selection

This item allows you to set the SATA configuration.

[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.

[Intel RST Premium With
Intel Optane System
Acceleration(RAID)]

Set to [Intel RST Premium With Intel Optane System Acceleration(RAID)] when you want to create a RAID configuration from the SATA hard disk drives.

SMART Self Test

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]

SATA6G_1(Black) - SATA6G_6(Black)

SATA6G_1(Black) - SATA6G_6(Black)

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]

3.6.6 PCH-FW Configuration

This item allows you to configure the firmware TPM.

3.6.7 ROG Effects

The items in this menu allow you to configure the LEDs on your motherboard and the functions for the Q-Code LED.

Onboard LED

This item allows you to enable all the onboard LEDs.

Configuration options: [Enabled] [Disabled]

Q-Code LED Function

[Auto] Automatically display POST (Power-On Self-Test) code and CPU temperature on Q-Code LED.

[POST Code Only] Show POST (Power-On Self-Test) code on Q-Code LED.

3.6.8 Onboard Devices Configuration

The items in this menu allow you to switch between PCIe Lanes and configure onboard devices.

HD Audio

This item allows you to enable or disable the High Definition Audio.

Configuration options: [Disabled] [Enabled]

M.2_1 Configuration

[Auto] Auto-detects the M.2 device mode. If a SATA device is detected, SATA6G_2 will be disabled.

[SATA mode] Only supports M.2 SATA devices. Please note that SATA6G_2 port cannot be used in this mode.

[PCIe mode] Only supports M.2 PCIe devices.

PCIEX16_3 Bandwidth

[X2] Run at X2 mode with SATA6G_56 enabled.

[X4] Run at X4 mode for higher performance with SATA6G_56 disabled.

LED lighting

When system is in working state

This item allows you to turn the RGB LED lighting on or off when the system is in the working state.

Configuration options: [On] [Off]

When system is in sleep, hibernate or soft off states

This item allows you to turn the RGB LED lighting on or off when the system is in the sleep, hibernate or soft off states.

Configuration options: [On] [Off]

Intel LAN Controller

This item allows you to enable or disable the Intel LAN controller.

Configuration options: [Disabled] [Enabled]

3.6.9 APM Configuration

The items in this menu allow you to set system wake and sleep settings.

ErP Ready

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

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

3.6.10 PCI Subsystem Settings

SR-IOV Support [Disabled]

This option enables or disables Single Root IO Virtualization Support if the system has SR-IOV capable PCIe devices.

Configuration options: [Disabled] [Enabled]

3.6.11 USB Configuration

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



The **Mass Storage Devices** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

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.

3.6.12 Network Stack Configuration

The items in this menu allow you to configure Ipv4 / Ipv6 PXE support.

3.6.13 NVMe Configuration

This menu displays the NVMe controller and Drive information of the connected devices.

3.6.14 HDD/SSD SMART Information

The items in this menu display the SMART information of the connected devices.



NVM Express devices do not support SMART information.

3.7 Monitor menu

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

Q-fan Configuration

Qfan Tuning

Click this item to automatically detect the lowest speed and configure the minimum duty cycle for each fan.

W_PUMP+ Control/AIO PUMP Control

- | | |
|------------|--|
| [Disabled] | Disable the Water Pump control feature. |
| [Auto] | Detects the type of water pump installed and automatically switches the control modes. |
| [DC mode] | Enable the Water Pump control in DC mode for 3-pin chassis fan. |
| [PWM mode] | Enable the Water Pump control in PWM mode for 4-pin chassis fan. |

3.8 Boot menu

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

Boot Configuration

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. |

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

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

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



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

Boot Device Control

This item allows you to select the type of devices that you want to boot.

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

Boot from Network Devices

This item allows you to select the type of network devices that you want to launch.

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

Boot from Storage Devices

This item allows you to select the type of storage devices that you want to launch.

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 you want to launch.

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 Tool 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 the Setup animator.

Configuration options: [Enabled] [Disabled]

3.9.1 ASUS EZ Flash 3 Utility

This item 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 [Yes] or [No], then press <Enter> to confirm your choice.



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

3.9.2 ASUS Secure Erase

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



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

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



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

Displays the available SSDs

Port #	SSD Name	Status	Total Capacity
P2	ADATA SX96 Turbo	Frozen	64.0GB



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 ASUS Secure Erase.
- **Locked.** SSDs might be locked if the ASUS 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 ASUS Secure Erase.

3.9.3 ASUS User Profile

This item allows you to save and load multiple BIOS settings profiles.

Load 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.

3.9.4 ROG OC Panel H-Key Configure

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

Load Default

This item allows you to load the default values of the CPU Core Voltage, VCCSA Voltage, BCLK Frequency, CPU ratio, and Cache ratio.

Save Above Settings

This item allows you to save the new values of the CPU Core Voltage, VCCSA Voltage, BCLK Frequency, CPU ratio, and Cache ratio.

Load from profile

This item allows you to load the previous values of the CPU Core Voltage, VCCSA Voltage, BCLK Frequency, CPU ratio, and Cache ratio.

3.9.5 ASUS SPD Information

This item allows you to view the DRAM SPD information.

3.9.6 Graphics Card Information

This item displays the information about the graphics card installed in your system.

GPU Post

This item displays the information and recommended configuration for the PCIe slots that the graphics card is installed in your system.



This feature is only supported on selected ASUS graphics cards.

Bus Interface

This item allows you to select the bus interface.

Configuration options: [PCIEX16_1]

3.10 Exit menu

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

Load Optimized Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **OK** 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 **OK** to save changes and exit.

Discard Changes and 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 drives

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

3.11 Updating BIOS

The ASUS website publishes the latest BIOS versions to provide enhancements on system stability, compatibility, 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 DVD or a USB flash 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 DVD that comes with the motherboard package.
-

3.11.2 ASUS EZ Flash 3

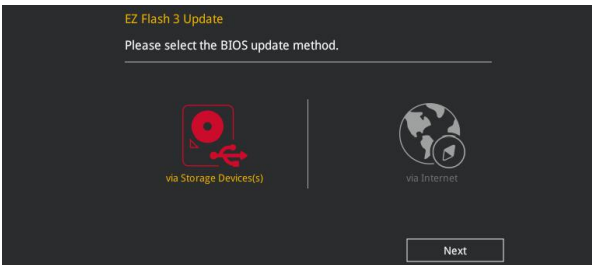
ASUS EZ Flash 3 allows you to download and update to the latest BIOS through the Internet without having to use a bootable floppy disk or an OS-based utility.



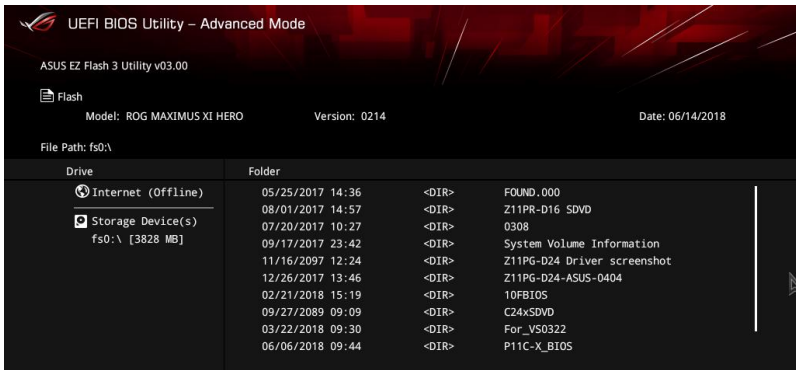
Updating through the Internet varies per region and Internet conditions. Check your local Internet connection before updating through the Internet.

To update the BIOS by USB:

1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **ASUS EZ Flash Utility** and press <Enter>.
2. Insert the USB flash disk that contains the latest BIOS file to the USB port.
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.





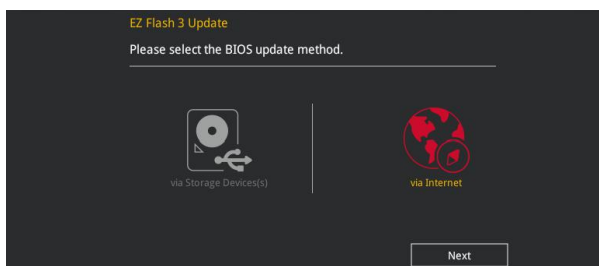
- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!



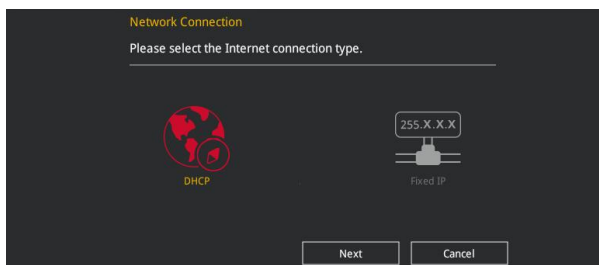
Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the Load Optimized Defaults item under the Exit menu. See section **3.10 Exit Menu** for details.

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 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 DVD or a USB flash drive that contains the BIOS file.



The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at <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 DVD to the optical drive, or the USB flash drive containing the BIOS file to the USB port.
3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and enters ASUS EZ Flash 3 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

4

4.1 RAID configurations

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



For more information on configuring your RAID sets, please refer to the **RAID Configuration Guide** which you can find at <https://www.asus.com/support>.

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

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

Appendix

Q-Code table

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

(continued on the next page)

Q-Code table

Code	Description
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
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

(continued on the next page)

Q-Code table

Code	Description
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
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

(continued on the next page)

Q-Code table

Code	Description
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 AML 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.

Notices

FCC Compliance Information

Responsible Party: Asus Computer International
Address: 48720 Kato Rd., Fremont, CA 94538, USA
Phone / Fax No: (510)739-3777 / (510)608-4555

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.

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 the 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 into 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.

Compliance Statement of Innovation, Science and Economic Development Canada (ISED)

This device complies with Innovation, Science and Economic Development Canada licence 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.

CAN ICES-3(B)/NMB-3(B)

Déclaration de conformité de Innovation, Sciences et Développement économique Canada (ISED)

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CAN ICES-3(B)/NMB-3(B)

VCCI: Japan Compliance Statement

Class B ITE

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取扱説明書に従って正しい取り扱いをして下さい。

VCCI-B

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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.

Regional notice for California



WARNING

Cancer and Reproductive Harm -
www.P65Warnings.ca.gov

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