Motherboard Installation Guide

Motherboard

E23368
Revised Edition V7
March 2024

Copyright © 2024 ASUSTeK COMPUTER INC. All Rights Reserved.

No part of this manual, including the products and software described in it, may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form or by any means, except documentation kept by the purchaser for backup purposes, without the express written permission of ASUSTeK COMPUTER INC. (“ASUS”).

Product warranty or service will not be extended if: (1) the product is repaired, modified or altered, unless such repair, modification of alteration is authorized in writing by ASUS; or (2) the serial number of the product is defaced or missing.

ASUS PROVIDES THIS MANUAL “AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL ASUS, ITS DIRECTORS, OFFICERS, EMPLOYEES OR AGENTS BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING DAMAGES FOR LOSS OF PROFITS, LOSS OF BUSINESS, LOSS OF USE OR DATA, INTERRUPTION OF BUSINESS AND THE LIKE), EVEN IF ASUS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES ARISING FROM ANY DEFECT OR ERROR IN THIS MANUAL OR PRODUCT.

SPECIFICATIONS AND INFORMATION CONTAINED IN THIS MANUAL ARE FURNISHED FOR INFORMATIONAL USE ONLY, AND ARE SUBJECT TO CHANGE AT ANY TIME WITHOUT NOTICE, AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY ASUS. ASUS ASSUMES NO RESPONSIBILITY OR LIABILITY FOR ANY ERRORS OR INACCURACIES THAT MAY APPEAR IN THIS MANUAL, INCLUDING THE PRODUCTS AND SOFTWARE DESCRIBED IN IT.

Products and corporate names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies, and are used only for identification or explanation and to the owners’ benefit, without intent to infringe.

Contents

Safety information **5**

Chapter 1: Quick Start

1.1 Installing the CPU **6**

1.1.1 Intel® LGA2066 socket 6

1.1.2 Intel® LGA1700 socket 8

1.1.3 Intel® LGA1200 socket 10

1.1.4 Intel® LGA1151 socket 11

1.1.5 AMD AM5 socket 12

1.1.6 AMD AM4 socket 13

1.1.7 AMD Socket TR4, Socket sTRX4, Socket sWRX8, and Socket sTR5 14

1.2 Installing the CPU and heatsink **16**

1.2.1 Intel® LGA3647 socket 16

1.2.2 Intel® LGA4677 socket 17

1.3 Cooling system installation **18**

1.3.1 To install Intel-certified heatsinks 19

1.3.2 To install AMD-certified heatsinks 21

1.3.3 To install an AIO cooler 23

1.4 DIMM installation **24**

1.5 M.2 module installation **26**

1.6 Additional cooling kit installation **31**

1.7 Motherboard installation **32**

1.8 Installing the power supply unit **34**

1.9 Installing an expansion card **35**

1.10 Installing disk drives **44**

1.10.1 SATA optical disk drive 44

1.10.2 SATA hard disk drive 45

1.10.3 NVMe drive 46

1.11 M.2 Wi-Fi module and antenna installation **47**

1.11.1 M.2 Wi-Fi Module 47

1.11.2 Wi-Fi moving antenna 48

1.11.3 ASUS WiFi Q-Antenna installation 49

1.12 Front I/O connector **50**

1.13 Connecting the ATX power **53**

1.14 List of peripheral devices and accessories **54**

1.15 Audio I/O connections **55**

1.16 Starting up for the first time **64**

1.17 Turning off the computer **65**

Contents

Chapter 2: Motherboard Overview

2.1 Onboard buttons and switches 66

2.2 Jumpers 69

2.3 Onboard LEDs 70

2.4 Onboard connectors 72

Chapter 3: Manage/update BIOS

3.1 Updating BIOS 80

3.1.1 ASUS EZ Flash 3 81

3.1.2 ASUS CrashFree BIOS 3 82

Chapter 4: Troubleshooting

4.1 Troubleshooting for Motherboard DIY 83

4.1.1 Basic troubleshooting 83

4.2 Other common issues 85

4.2.1 Failure to boot-up; No screen display 86

4.2.2 Failure to enter the operating system 86

Chapter 5: Computer care tips

5.1 Proper care of your PC 87

5.2 Basic knowledge 87

5.3 Usage knowledge 87

5.4 Tips 87

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

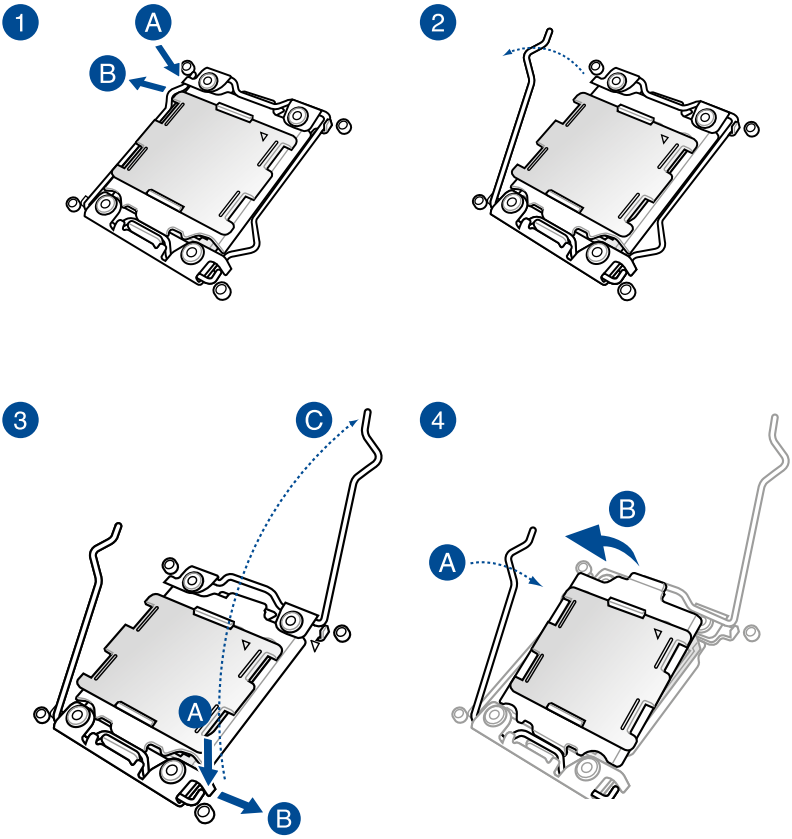
- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, ensure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short 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.

Chapter 1: Quick Start

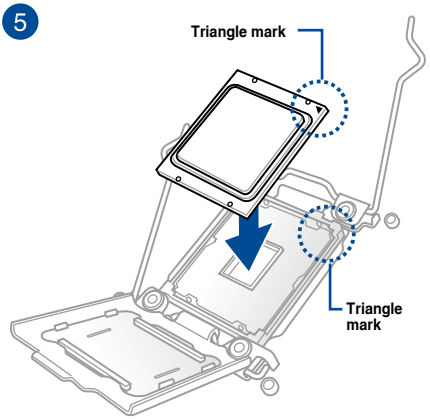
1.1 Installing the CPU

1.1.1 Intel® LGA2066 socket

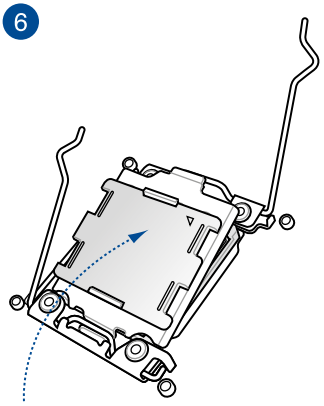
- Please note the order in opening/closing the double latch. Follow the instructions printed on the metal sealing hatch or the illustrations shown below in this guide. The plastic cap will pop up automatically once the CPU is in place and the hatch properly sealed down.
- Ensure that all power cables are unplugged before installing the CPU.



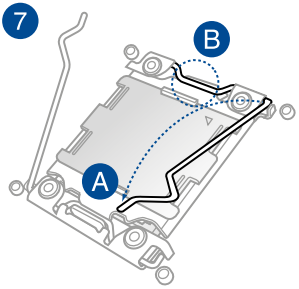
5



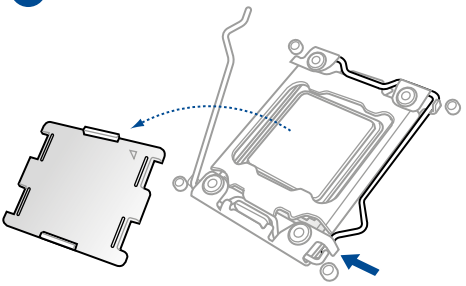
6



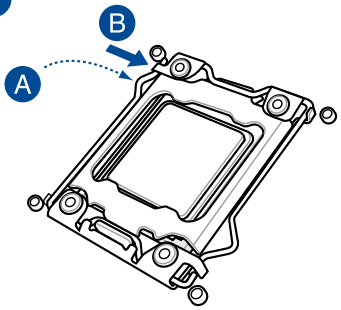
7



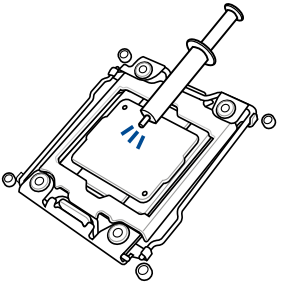
8



9



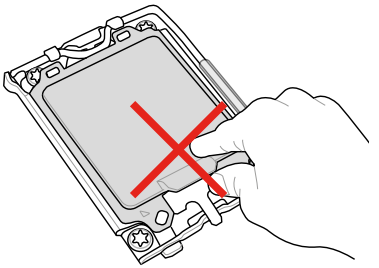
10

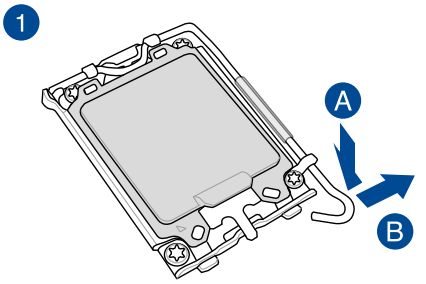


Some heatsinks come with pre-applied thermal paste. If so, skip this step.

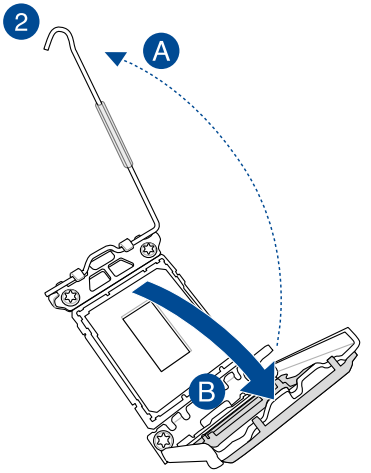
1.1.2 Intel® LGA1700 socket

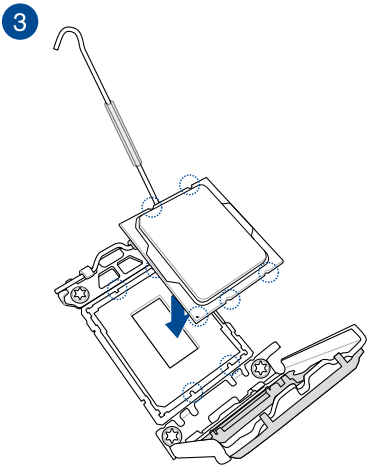
Ensure that all power cables are unplugged before installing the CPU.



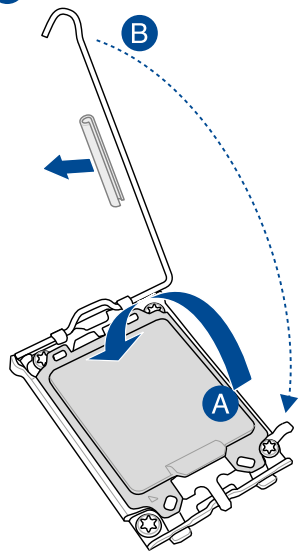


Take caution when lifting the load lever, ensure to hold onto the load lever when releasing the load lever. Letting go of the load lever immediately after releasing it may cause the load lever to spring back and cause damage to your motherboard.

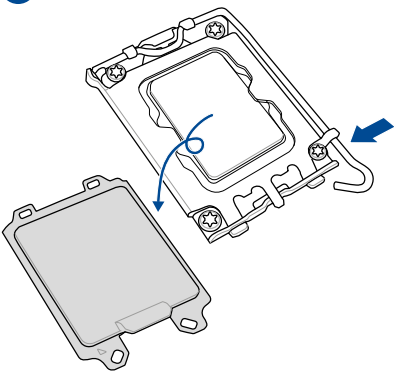




4

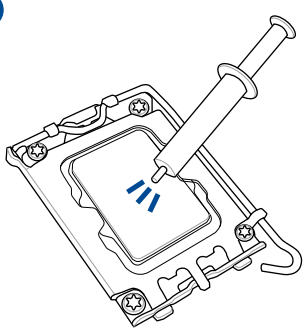


5



Ensure to remove the CPU socket lever protector on the lever latch before locking the lever latch under the retention tab. Failure to do so may cause damages to your system when installing the cooling system.

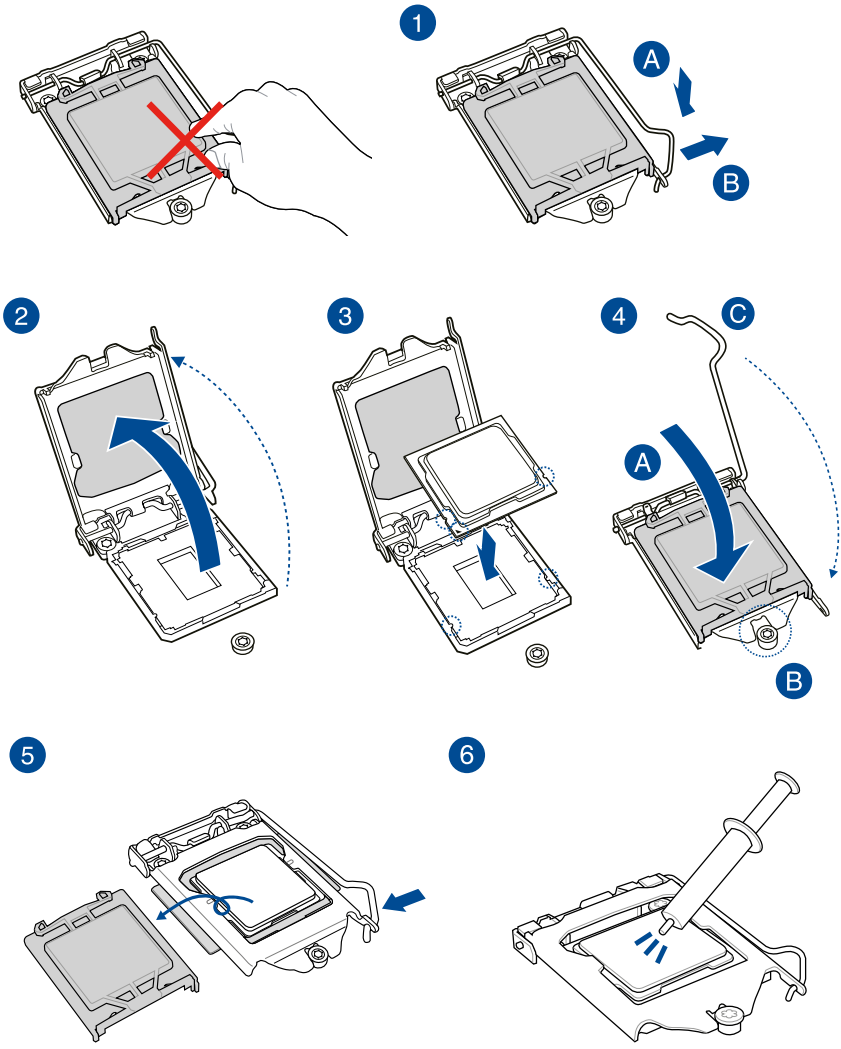
6



Some heatsinks come with pre-applied thermal paste. If so, skip this step.

1.1.3 Intel® LGA1200 socket

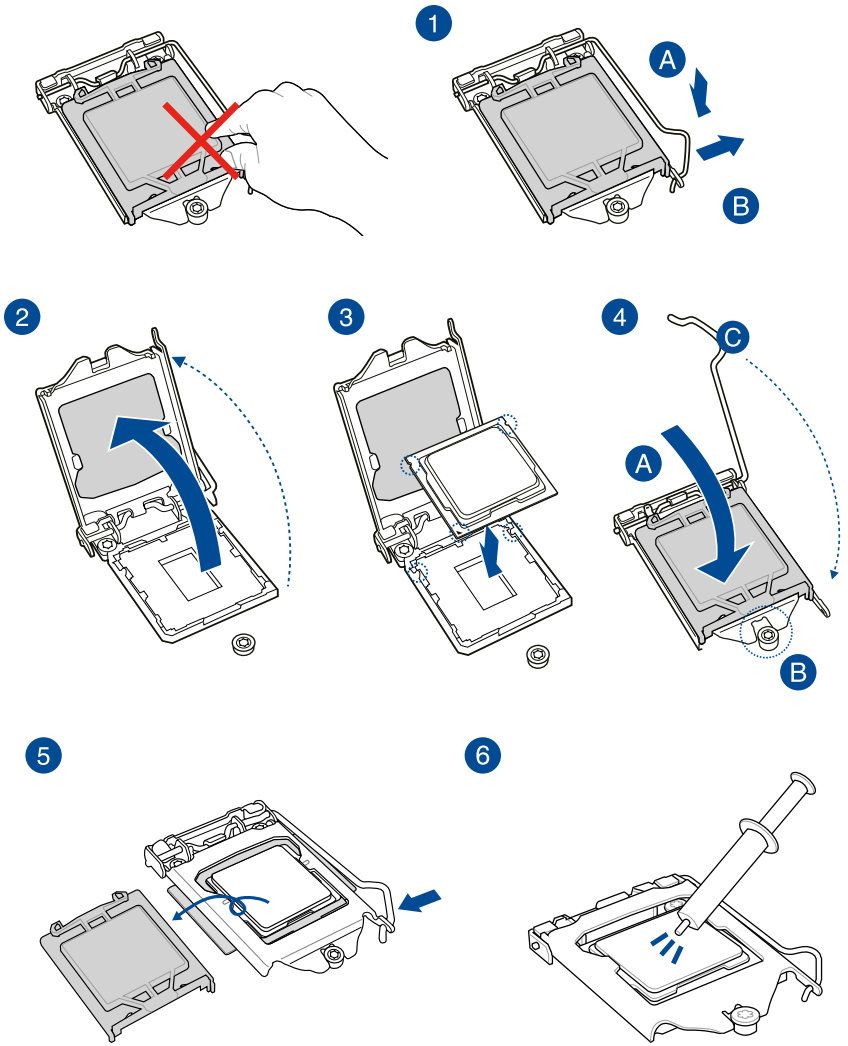
Ensure that all power cables are unplugged before installing the CPU.



Some heatsinks come with pre-applied thermal paste. If so, skip this step.

1.1.4 Intel® LGA1151 socket

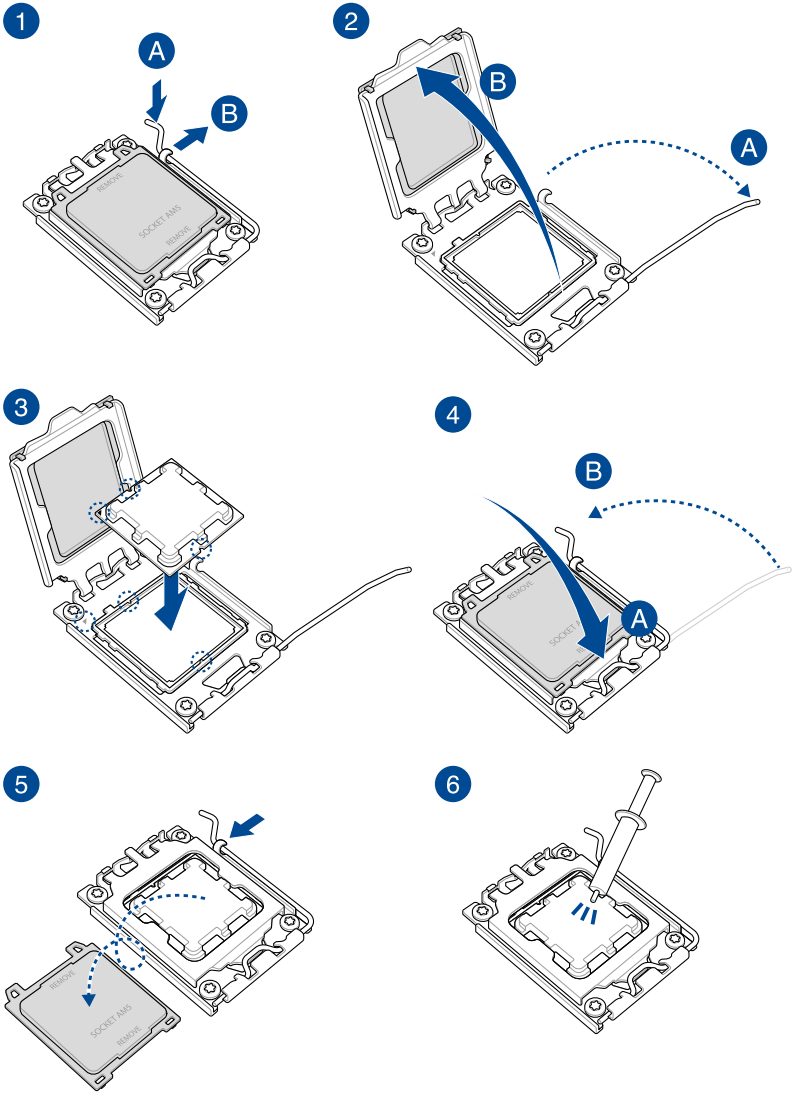
Ensure that all power cables are unplugged before installing the CPU.



Some heatsinks come with pre-applied thermal paste. If so, skip this step.

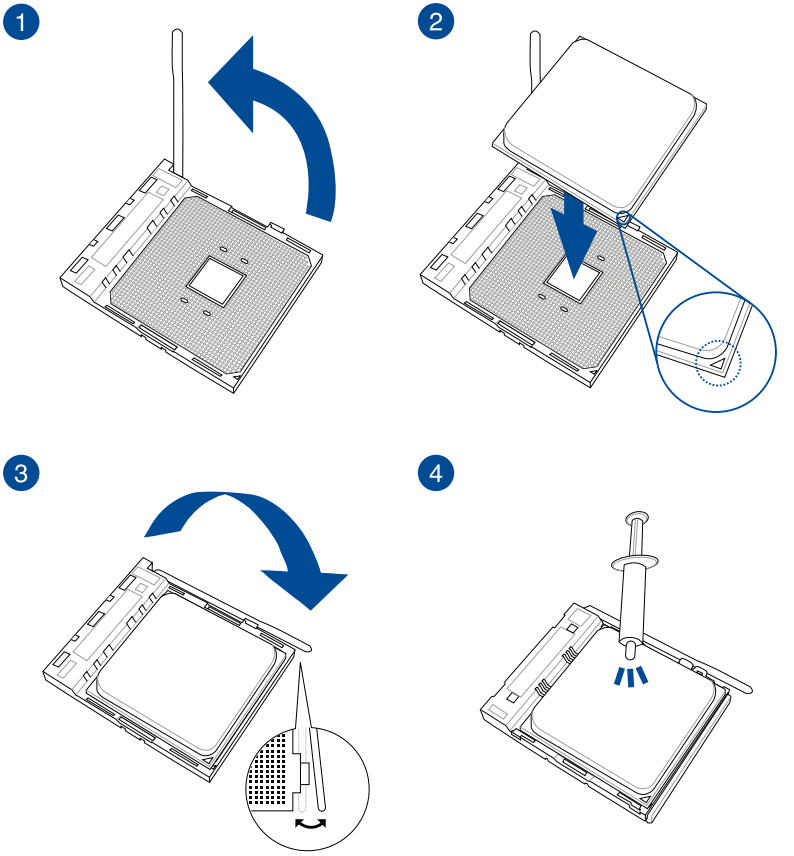
1.1.5 AMD AM5 socket

- Ensure that you use a CPU designed for the AM5 socket. The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the pins and damaging the CPU
- Ensure that all power cables are unplugged before installing the CPU.



1.1.6 AMD AM4 socket

- Ensure that you use a CPU designed for the AM4 socket. The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the pins and damaging the CPU
- Ensure that all power cables are unplugged before installing the CPU.

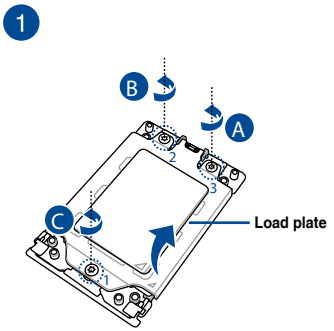


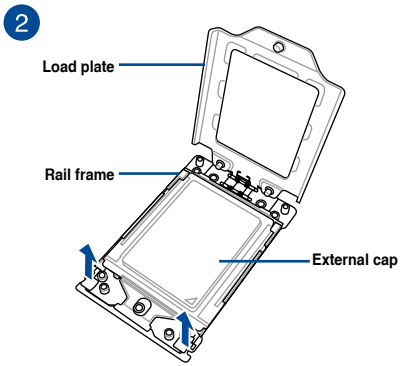
Some heatsinks come with pre-applied thermal paste. If so, skip this step.

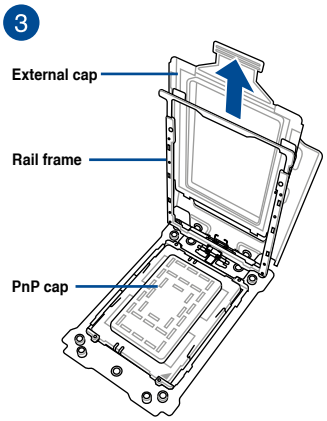
1.1.7 AMD Socket TR4, Socket sTRX4, Socket sWRX8, and Socket sTR5

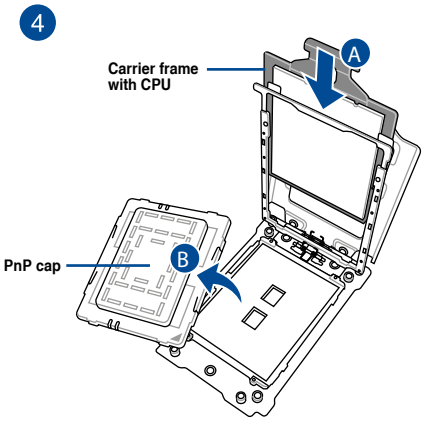
- The AMD Socket TR4 is compatible with AMD Socket TR4 processors. Ensure you use a CPU designed for the Socket TR4. The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!
- The AMD Socket sTRX4 is compatible with 3rd Gen AMD Ryzen™ Threadripper™ Desktop Processors. Ensure you use a CPU designed for the Socket sTRX4. The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!
- The AMD Socket sWRX8 is compatible with AMD Ryzen™ Threadripper™ PRO Series Processors. Ensure you use a CPU designed for the Socket sWRX8. The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!
- The AMD Socket sTR5 is compatible with AMD Ryzen™ Threadripper™ PRO 7000 WX-Series and Ryzen™ Threadripper™ 7000 Series Processors. Ensure you use a CPU designed for the Socket sTR5. The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!
- Ensure that all power cables are unplugged before installing the CPU.

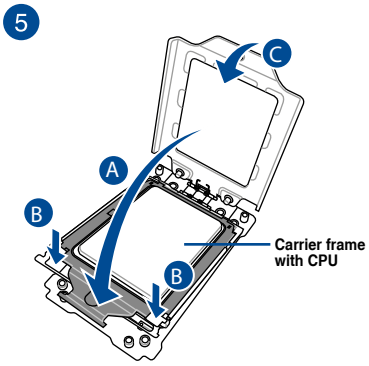
If a screwdriver is bundled, ensure to use the bundled screwdriver.

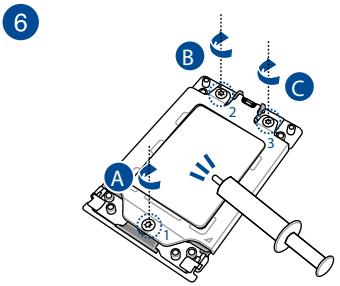










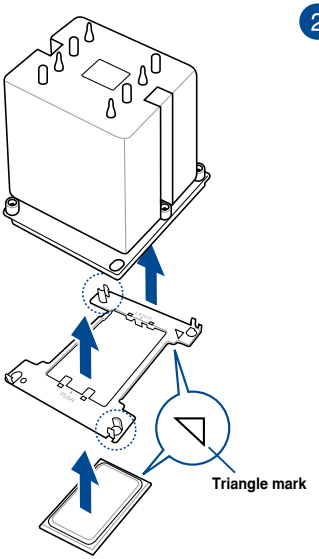


- The load plate screws are Torx T20 models. A torque value of 12 inch-lbf is recommended.
- Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan if necessary.

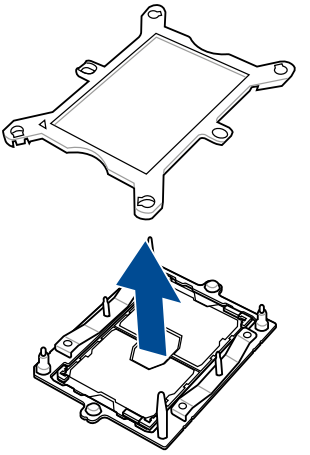
1.2 Installing the CPU and heatsink

1.2.1 Intel® LGA3647 socket

1

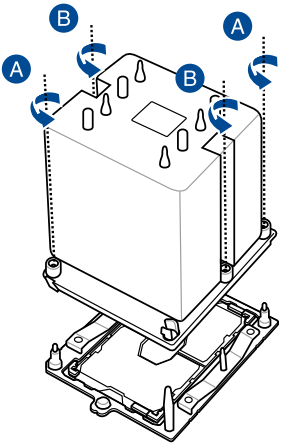


2



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

3



The CPU and heatsink assembly fits in only one correct orientation. DO NOT force the CPU and heatsink assembly into the socket to prevent damaging the CPU pins on the socket.

The heatsink screws are T30 models. A torque value of 12 inch-lbf is recommended.

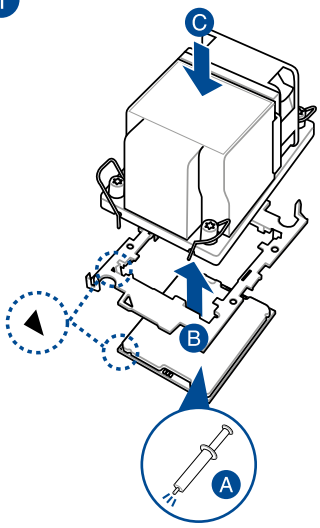
1.2.2 Intel® LGA4677 socket

- The CPU carrier is different for different CPUs, ensure to use the appropriate CPU carrier with the corresponding CPU. Failure to do so may cause damages to the CPU and CPU carrier. The carrier model is printed on the carrier, please refer to the following table for the CPU and the corresponding carrier to use.

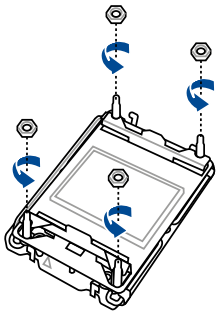
CPU	Spec	Carrier
XCC	112L	E1A
MCC	64L	E1B

- Ensure that you install the correct CPU designed for LGA4677 socket only. DO NOT install a CPU designed for other sockets.

1

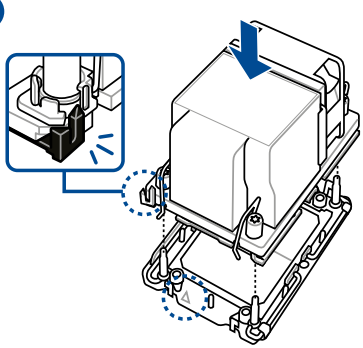


2

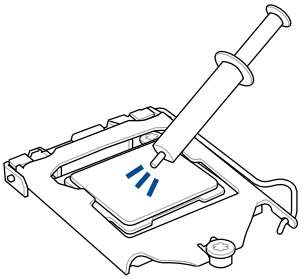


Keep the removed nuts in a safe place to prevent them from being misplaced or falling on the motherboard. Failure to do so may cause damages to your motherboard.

3



1.3 Cooling system installation



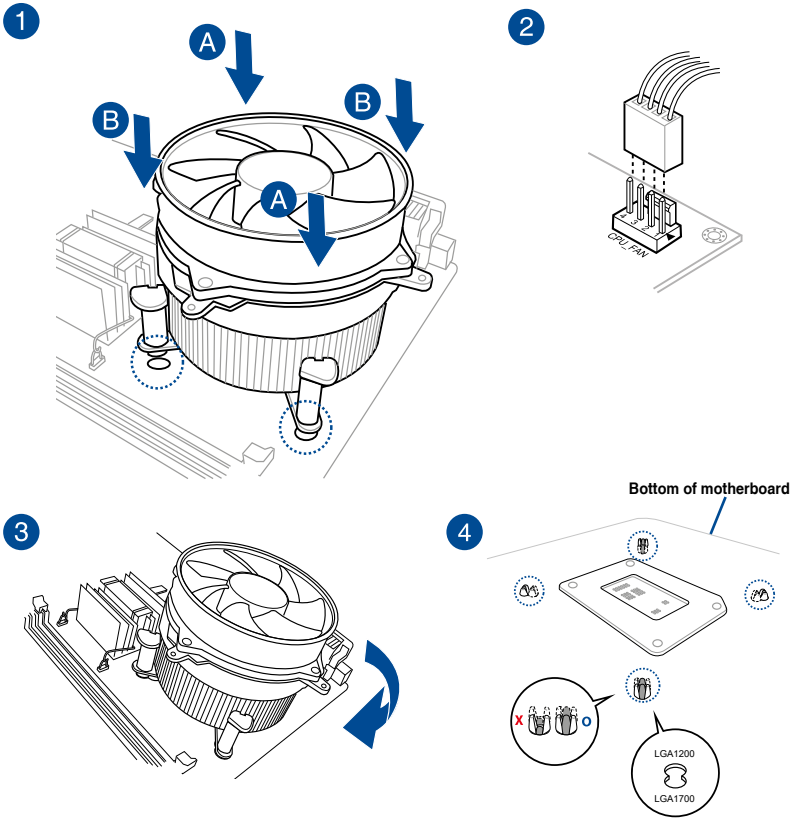
- Apply Thermal Interface Material to the CPU cooling system and CPU before you install the cooling system, if necessary.
- Ensure to remove the CPU socket lever protector on the lever latch before installing the cooling system to an ASUS Intel® 600 or 700 series motherboard, failure to do so may cause damages to your system.

The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately, and seek professional medical help.

To prevent contaminating the paste, DO NOT spread the paste with your finger directly.

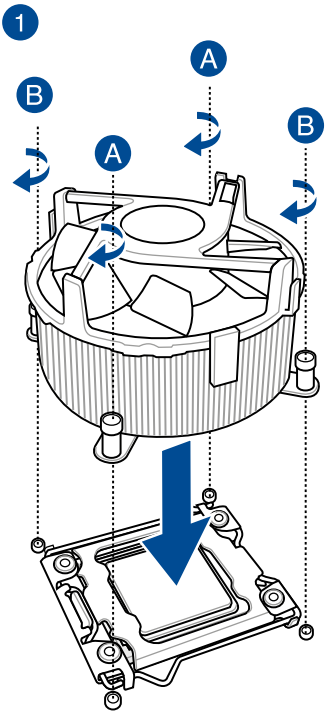
1.3.1 To install Intel-certified heatsinks

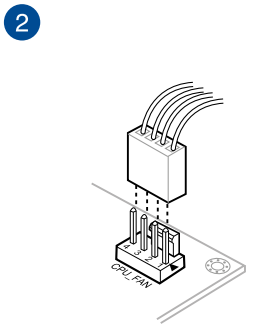
Type 1



The illustrations above are for reference only, please ensure to use a cooling system that is compatible with your motherboard. We strongly advise you consult with your cooling system vendor on the compatibility and functionality of the cooling system and ASUS motherboard.

Type 2

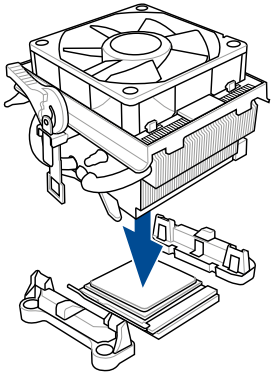




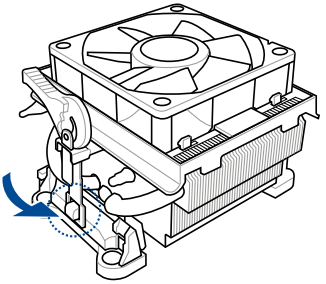
1.3.2 To install AMD-certified heatsinks

Type 1

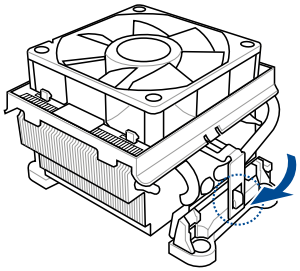
1



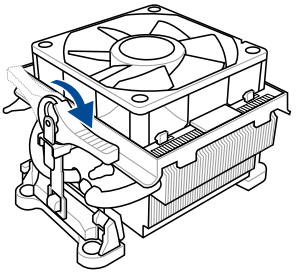
2



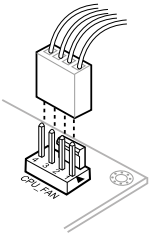
3



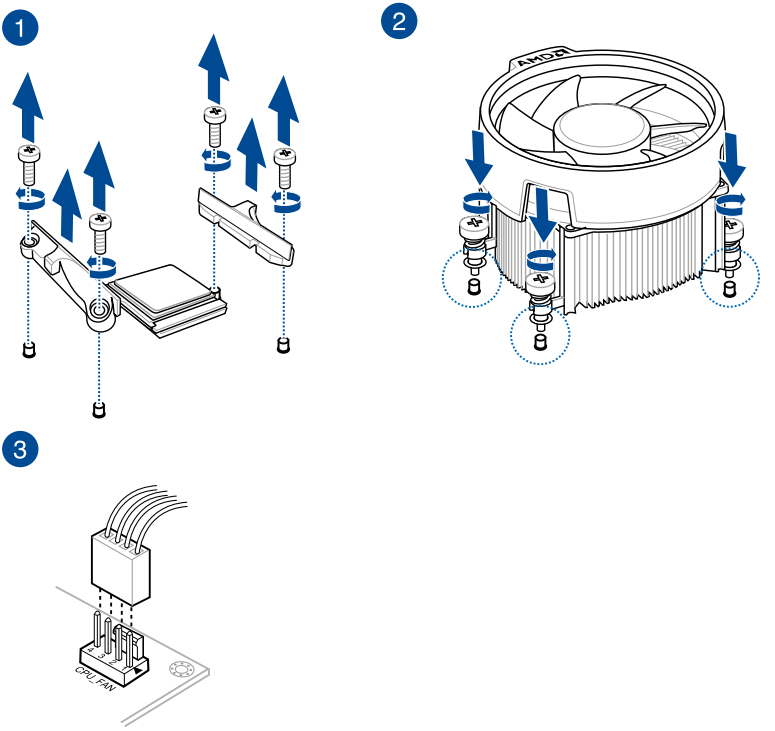
4



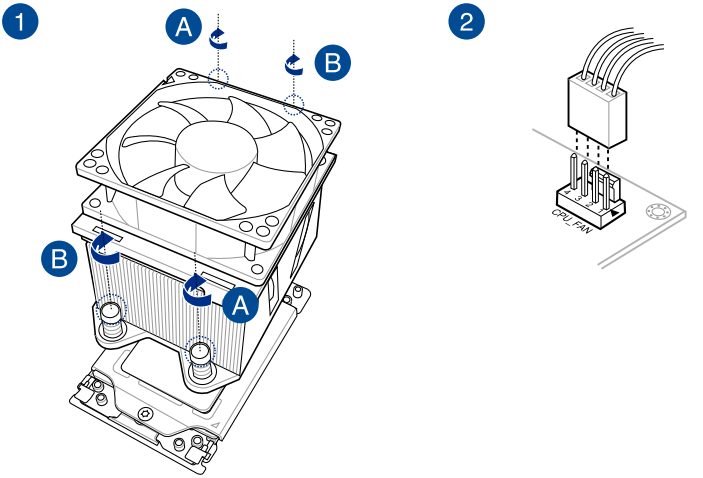
5



Type 2



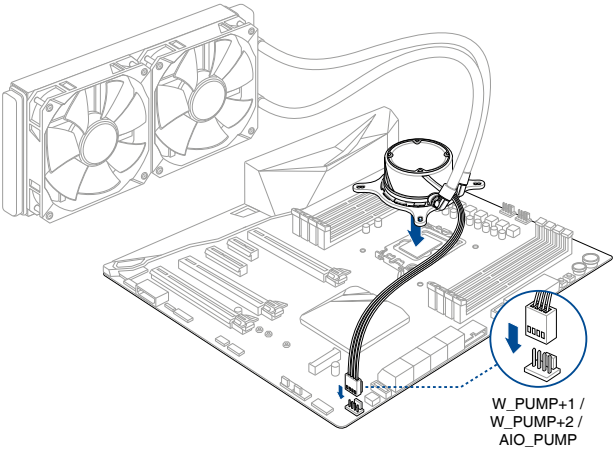
SocketTR4, Socket sTRX4, Socket sWRX80, and Socket sTR5



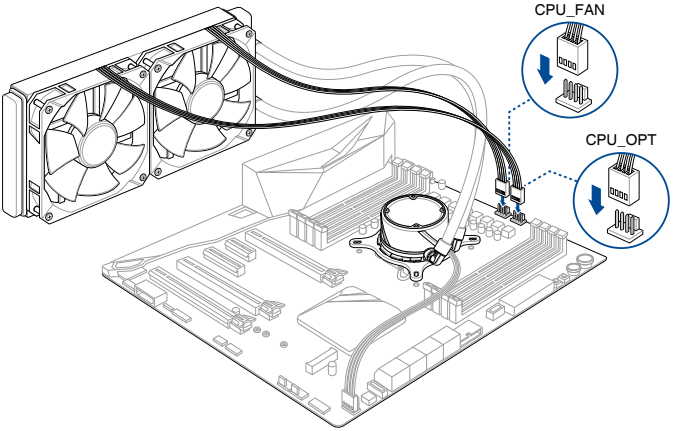
1.3.3 To install an AIO cooler

The illustrations above are for reference only, please ensure to use a cooling system that is compatible with your motherboard. We strongly advise you consult with your cooling system vendor on the compatibility and functionality of the cooling system and ASUS motherboard.

1



2

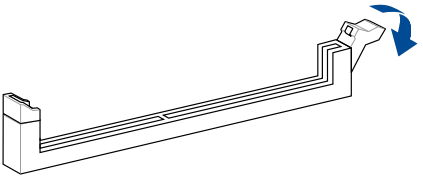


1.4 DIMM installation

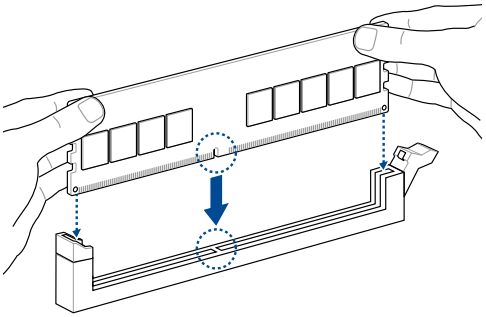
- A DDR4 module is notched differently from a DDR, DDR2, or DDR3 module. DO NOT install a DDR, DDR2, or DDR3 memory module to the DDR4 slot.
- A DDR5 module is notched differently from a DDR, DDR2, DDR3, or DDR4 module. DO NOT install a DDR, DDR2, DDR3, or DDR4 memory module to the DDR5 slot.

On selected motherboards, the DRAM LED will detect if the memory modules have been installed in the recommended memory configuration slots as well as if the memory modules have been properly installed and seated in the memory slots once the motherboard is connected to a power supply. After the motherboard has been powered on, the DRAM LED will return to the original error checking procedure, regardless of the LED status prior to powering on. Please refer to your motherboard user guide to check if this feature is present on your motherboard.

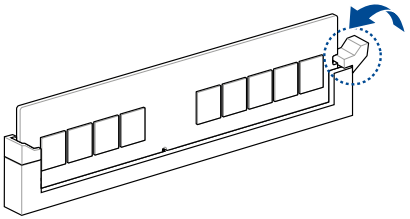
1



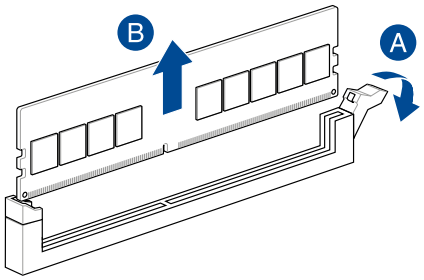
2



3



To remove a DIMM



1.5 M.2 module installation

Some motherboards may require you to remove the heatsink before installing the M.2 module. Refer to the motherboard user guide for more details on removing the heatsink.

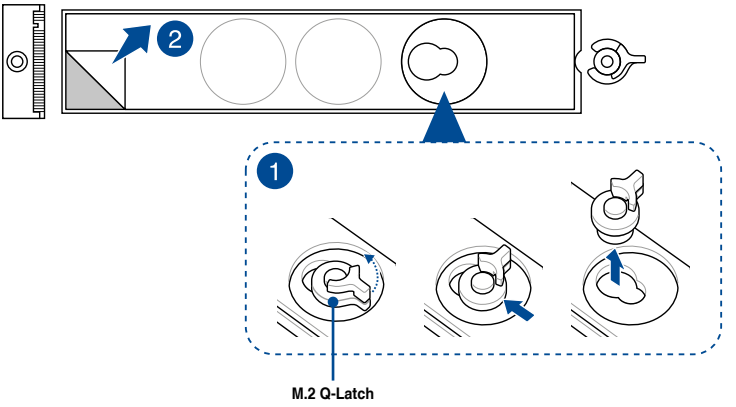
- The illustrations only show the installation steps for a 22110 M.2 slot, the steps are the same for the other M.2 slots and are for reference only, please refer to your motherboard user guide for the actual installation steps.
- Use a Phillips screwdriver when removing or installing the screws or screw stands mentioned in this section.
- If the thermal pad on the M.2 heatsink becomes damaged, we recommend replacing it with the bundled thermal pad or a thermal pad with a thickness of 1.25mm.
- Supported M.2 type varies per motherboard.

M.2 with backplate and M.2 Q-Latch

1. (optional) If required, remove the pre-installed M.2 Q-Latch at the 2280 length screw hole by rotating the handle counterclockwise then pushing it towards the M.2 slot and removing it from the latch hole.

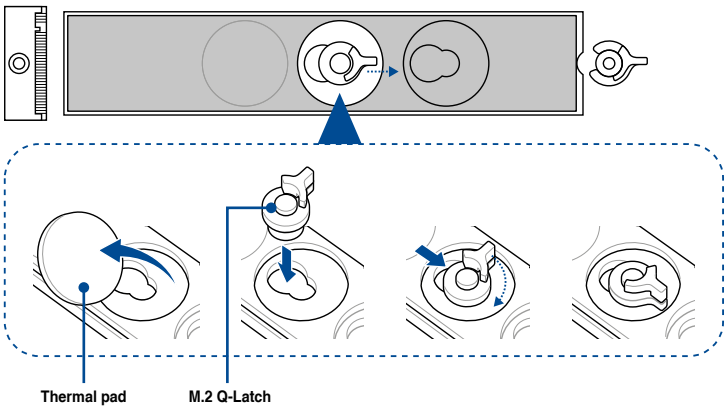
Only follow this step if a removable M.2 Q-Latch is pre-installed at the 2280 length screw hole and can be removed.

2. Remove the plastic film from the thermal pad.



3. (optional) Remove the thermal pad of the M.2 length screw hole you wish to install your M.2 module to, then install the M.2 Q-Latch.

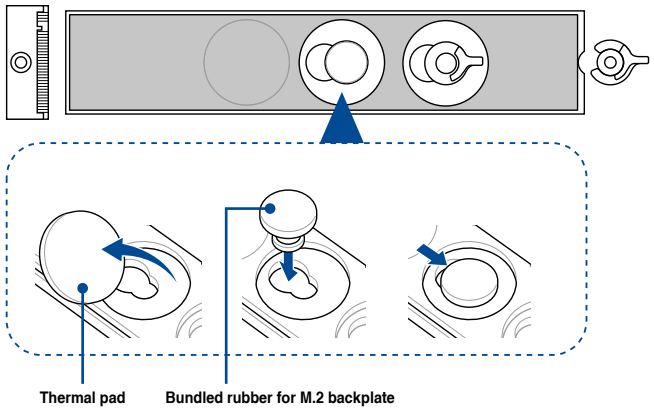
You can use a bundled M.2 Q-Latch or a pre-installed removable M.2 Q-Latch.



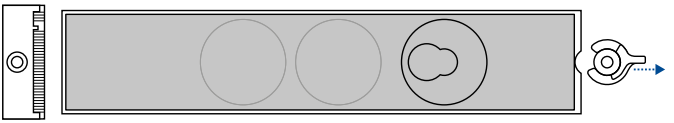
4. (optional) Remove the thermal pad of the 2260 or 2242 M.2 length screw hole and install the bundled rubber for M.2 backplate if you are installing a single sided M.2 module. DO NOT install the bundled rubber for M.2 backplate when installing a double-sided M.2 module.

Only follow this step when installing a 22110, 2280, or 2260 length M.2 module and when the rubber for M.2 backplate comes bundled with your motherboard package. Install the bundled rubber for M.2 backplate to

a. 2260 M.2 length screw hole when installing a 22110 or 2280 length M.2 module
b. 2242 M.2 length screw hole when installing a 2260 length M.2 module.



5. Rotate and adjust the M.2 Q-Latch so that the handle points away from the M.2 slot.

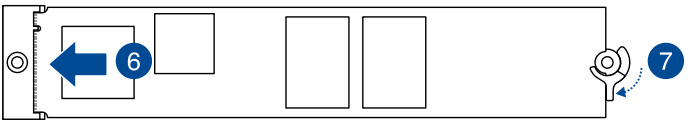


6. Install your M.2 module to the M.2 slot.

Ensure that there is nothing obstructing your M.2 module when installing the M.2 module to the M.2 slot.

7. Rotate the M.2 Q-Latch clockwise to secure the M.2 module in place.

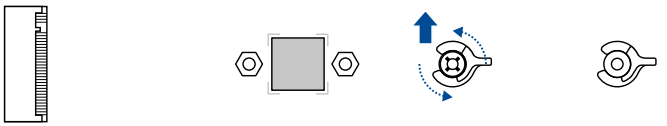
If you are installing a double-sided M.2 module that comes pre-installed with a heatsink and are having difficulty securing the M.2 module in place with the M.2 Q-Latch, please remove the M.2 module, then remove the entire thermal pad from the M.2 backplate and follow steps 7 to 9 to reinstall the M.2 module.



M.2 with no backplate and M.2 Q-Latch

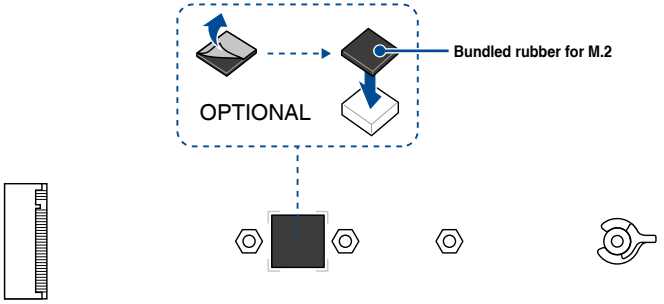
1. (optional) If required, remove the pre-installed removable M.2 Q-Latch screw at the 2280 length screw hole.

Only follow this step if a removable M.2 Q-Latch screw is pre-installed at the 2280 length screw hole and can be removed.



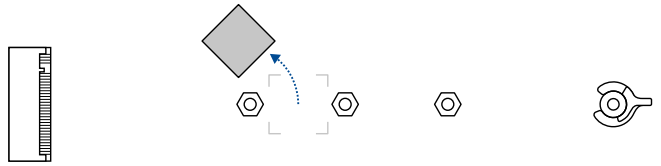
2. (optional) Install the bundled rubber for M.2 if you are installing a single sided M.2 module. DO NOT install the bundled rubber for M.2 when installing a double-sided M.2 module. The rubber installed by default is compatible with double sided M.2 modules.

Only follow this step if installing a 22110 or 2280 length M.2 and when the rubber for M.2 module comes bundled with your motherboard package.



OR remove the M.2 rubber.

Only follow this step if installing a 2242 length M.2 module and the M.2 slot has an M.2 rubber pre-installed.



3. (optional) Install the M.2 Q-Latch to the M.2 length screw hole you wish to install your M.2 module to.

You can use a bundled M.2 Q-Latch screw or a pre-installed removable M.2 Q-Latch screw.

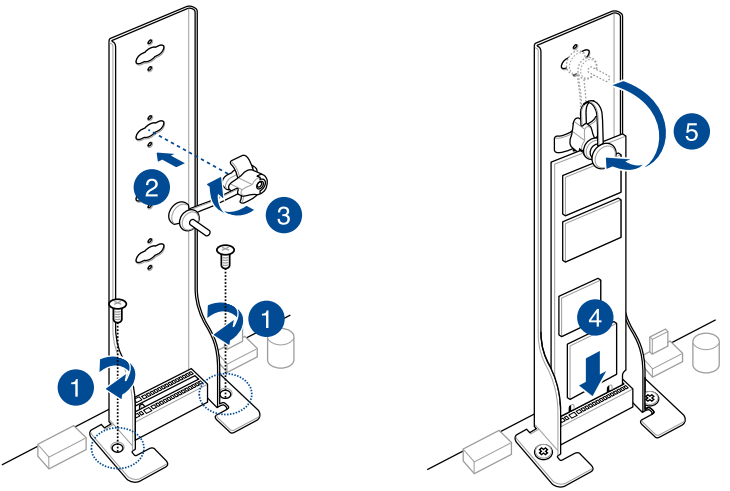
4. Rotate and adjust the M.2 Q-Latch so that the handle points away from the M.2 slot.

5. Install your M.2 module to the M.2 slot.

Ensure that there is nothing obstructing your M.2 module when installing the M.2 module to the M.2 slot.

6. Rotate the M.2 Q-Latch clockwise to secure the M.2 module in place.

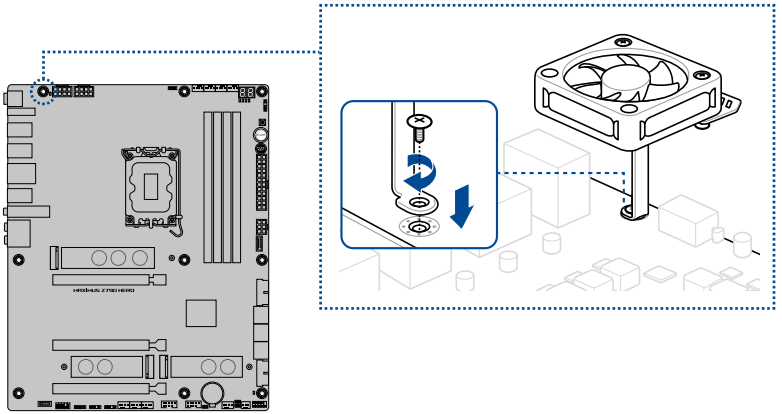
Vertical M.2 slot



1.6 Additional cooling kit installation

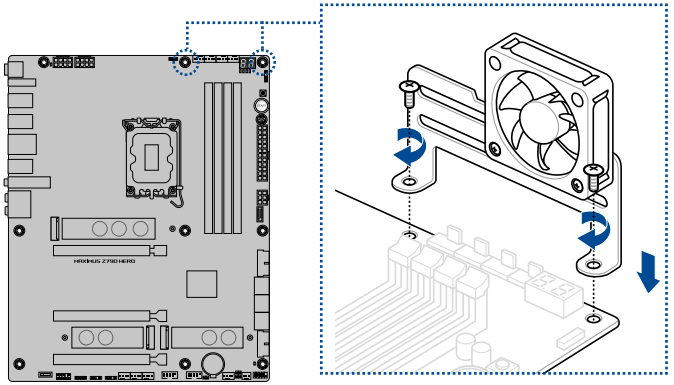
To install the VRM fan holder

You may install a fan onto the fan holder if you require additional cooling for your motherboard. For more information on fan compatibility and dimensions, please refer to your motherboard's user guide.



To install the DDR5 fan holder

You may install a fan onto the fan holder if you require additional cooling for your motherboard. For more information on fan compatibility and dimensions, please refer to your motherboard's user guide.



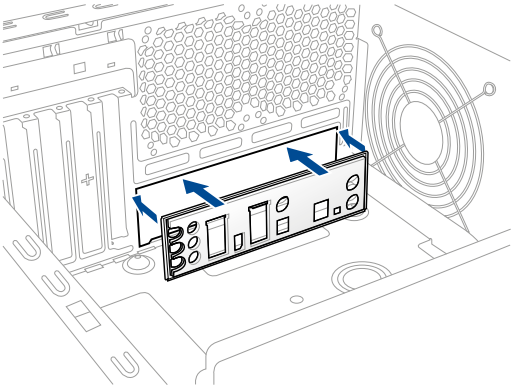
1.7 Motherboard installation

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.

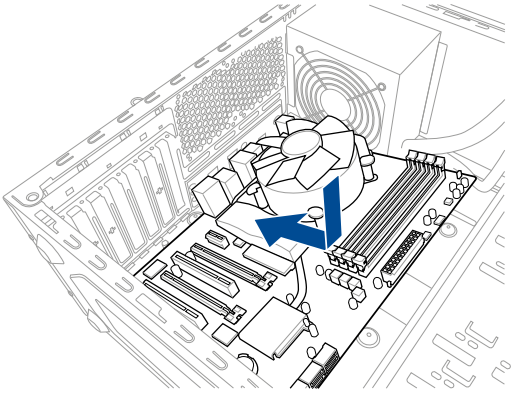
1. (on selected models) Install the bundled I/O Shield to the chassis rear I/O panel.

Only install the I/O Shield if your motherboard does not have a pre-installed I/O shield.

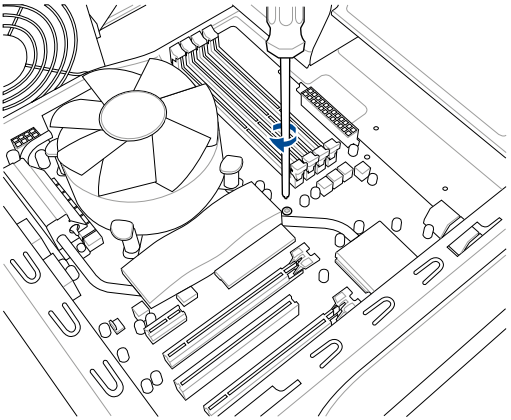
Some sharp edges and points might cause physical injury. We recommend you put on cut or puncture resistant gloves before motherboard and I/O shield installation.



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



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



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

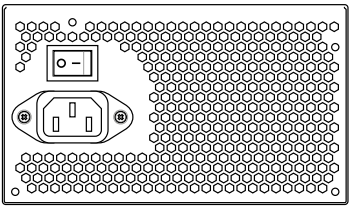
1.8 Installing the power supply unit

There are two kinds of commonly-used power supply units. One is with Active Power Factor Correction (PFC) and the other with passive PFC.

1. Select a power supply unit.

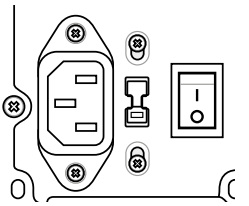
Power supply with active PFC:

Active PFC automatically corrects the AC input voltage.

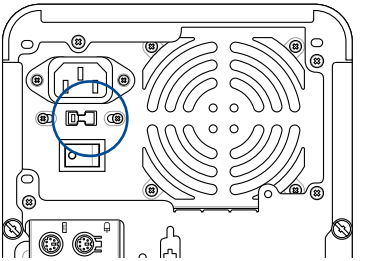


Power supply with passive PFC:

Passive PFC requires user to manually adjust the AC input voltage.



2. If you are using a power supply with passive PFC, adjust to the correct AC input voltage in your area.



Failure to adjust the power supply to the correct AC input voltage will seriously damage the system.

Use power supply units with safety certification only. Using unstable power supply units can damage your motherboard and other components. Refer to the user guide for power supply units that meet the motherboard requirements.

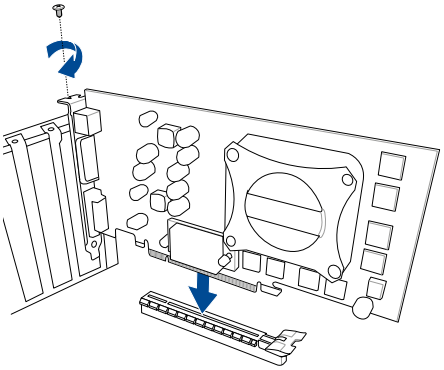
1.9 Installing an expansion card

To install an expansion card:

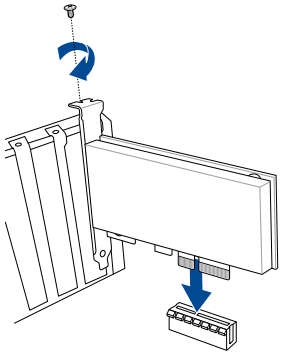
1. Remove the metal slot cover opposite the expansion card slot where you wish to install an expansion card.
2. Install the expansion card and ensure that it is properly seated on the slot.
3. Screw to secure the card on the slot.
4. Repeat the previous steps to install another expansion card.

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.

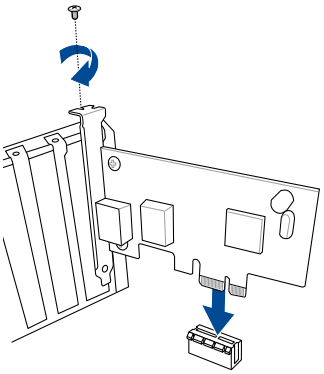
To install PCIe x16 card



To install PCIe x4 card



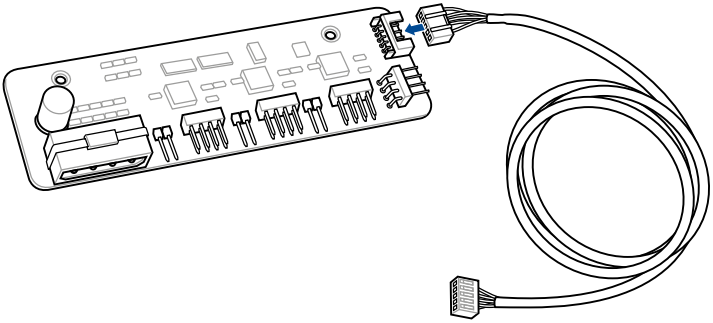
To install PCIe x1 card



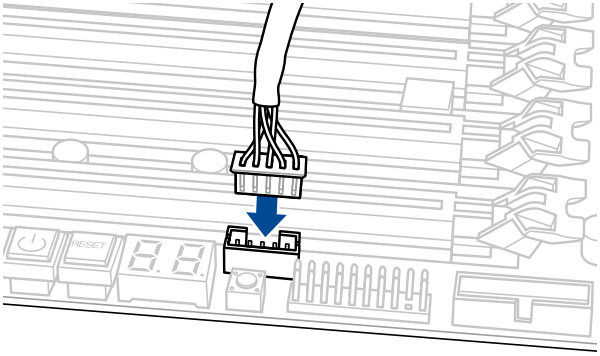
- Refer to the card documentation for the card configuration details, and to the motherboard user guide in case you need to configure any jumpers after installing the expansion card.
- Refer to the motherboard user guide for the instructions of the expansion card signal cable connection.

To install a Fan Extension Card

1



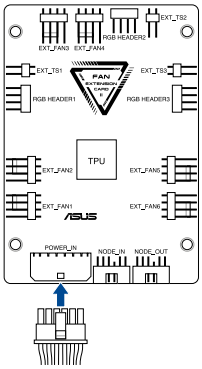
2



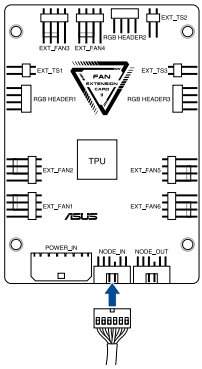
The FAN Extension card is purchased separately.

To install FAN EXTENSION CARD II

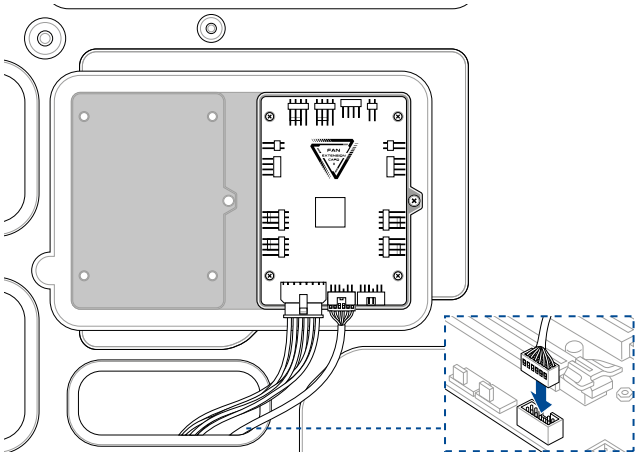
1



2

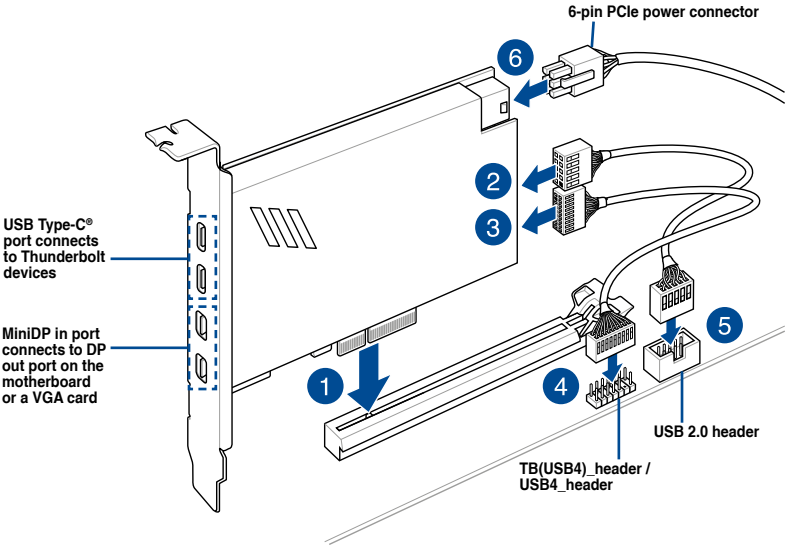


3



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

To install Thunderbolt™ series card / USB4 PCIE GEN4 card



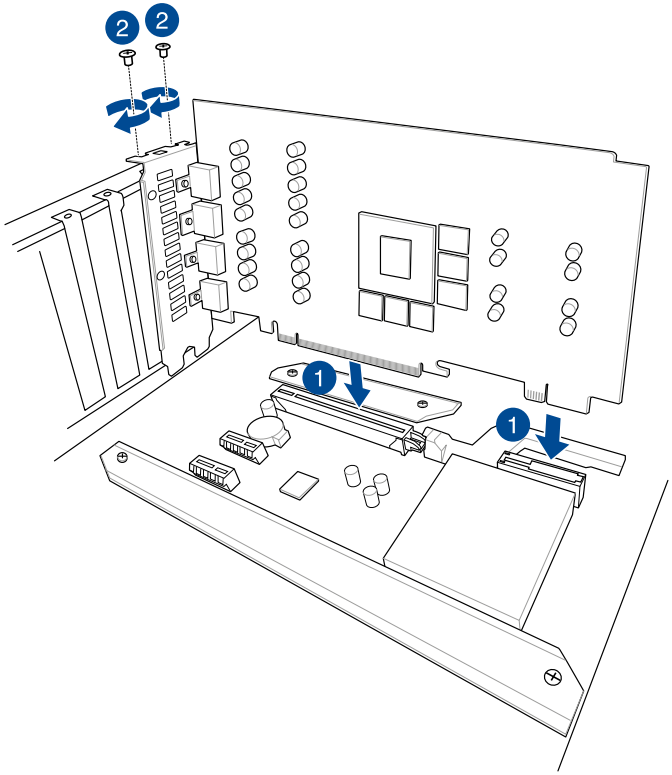
Ensure to install the Thunderbolt™ series card / USB4 PCIE GEN4 card to a PCIe slot from PCH.

- Step 6 is optional, please connect a 6-pin PCIe power connector when you wish to use the USB Type-C® port Thunderbolt™ quick charge feature to charge a 5V or more device.
- The TypeC_1 port can support up to 20V devices, and the TypeC_2 port can support up to 9V devices when the 6-pin PCIe power connector is connected.
- The 14-1 pin header may differ between motherboards. The 14-1 pin header may be TB(USB4)_header on some motherboards and on some it may be USB4_header. Please refer to your motherboard user guide for more information.
- Please visit the official website of your purchased Thunderbolt™ card for more details on compatibility.

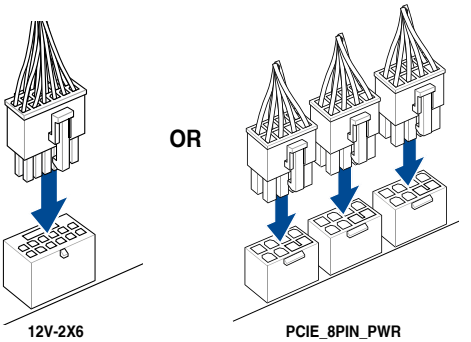
PCIe High Power Connector graphics card installation

The illustrations in this section are for reference only. The motherboard and graphics card may vary between models, but the installation steps remain the same.

1. Install the golden fingers of the PCIe High Power Connector graphics card into the PCIe X16 slot and the GC_HPWR Power Output slot at the same time, and ensure the golden fingers are fully inserted into the slots.
2. Secure the PCIe High Power Connector graphics card to the chassis using the appropriate amount of screws.



3. Select to connect the PSU to either
   a. the 12V-2X6 power connector or
   b. the PCIE_8PIN power connectors
   of the motherboard's GC_HPWR Power connectors. These connectors are located on the bottom of the motherboard.



- Only connect either the 12V-2X6 connector or the PCIE_8PIN_PWR connectors. Do not connect both power connectors at the same time.
- If you choose to connect the PCIE_8PIN_PWR connectors, connect all the PCIE_8PIN_PWR connectors to ensure sufficient power is supplied to the PCIe High Power Connector graphics card. The PCIe High Power Connector graphics card may become unstable or may not boot up if the power is inadequate.
- A PCIE_8PIN to 12-2X6 adapter cable is not supported on this motherboard.

Ensure the power connectors are properly connected to the motherboard GC_HPWR Power connectors.

4. Check the GC_HPWR Power Plug LEDs to make sure the GC_HPWR Power connectors have been properly connected. You may refer to the following LED table for more information on the GC_HPWR Power connectors connection status.

The GC_HPWR Power Plug LEDs will only function when a PCIe High Power Connector graphics card is installed. The GC_HPWR Power Plug LEDs will not light up if a standard graphics card is installed, or if no graphics card is installed.

Connection status		Power connected, powered off	Power connected, powered on
1	Motherboard 12V-2X6 or PCIE_8PIN_PWR power connectors not properly connected.	LEDs corresponding to the power connectors not properly connected light up.	LEDs of the power connectors not properly connected stay lit up and the graphics card cannot be powered on. Make sure the power connectors are properly connected.
2	Motherboard 12V-2X6 power connector properly connected.	• 12V-2X6_LED is turned off. • PCIE_8PIN_LED1~3 light up.	All LEDs turn off indicating the graphics card can power on normally.
3	Motherboard PCIE_8PIN_ PWR power connectors properly connected.	• PCIE_8PIN_LED1~3 are turned off. • 12V-2X6_LED lights up.	All LEDs turn off indicating the graphics card can power on normally.

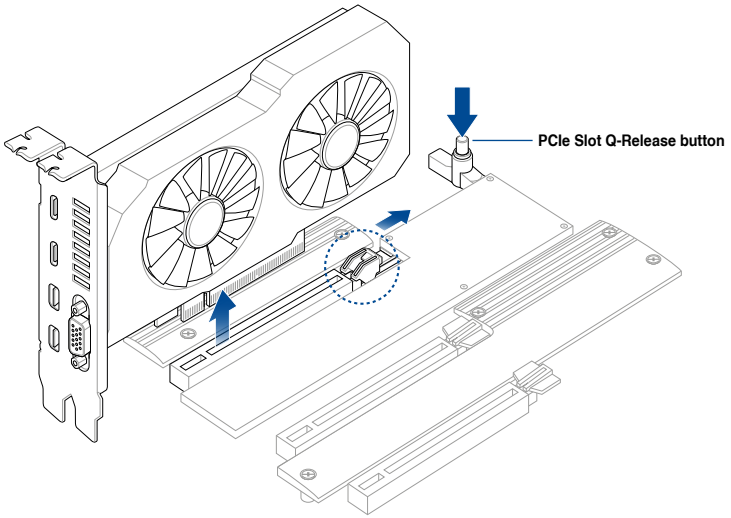
Using the PCIe Slot Q-Release

The PCIEX16 slot may come with a PCIe Slot Q-Release button allowing you to easily remove an expansion card installed to this PCIe slot, even when the expansion card may be blocking the PCIe push-latch, such as a graphics card.

To release an expansion card using the PCIe Slot Q-Release:

Press the PCIe Slot Q-Release button with one hand whilst slightly lifting the expansion card with the other hand. This should release the expansion card so that you can remove it with ease.

The illustration below is for reference only. The motherboard and PCIe Slot Q-Release button may differ between models, but the steps for using the PCIe Slot Q-Release remain the same.



Using the Q-Release Slim PCIe slot

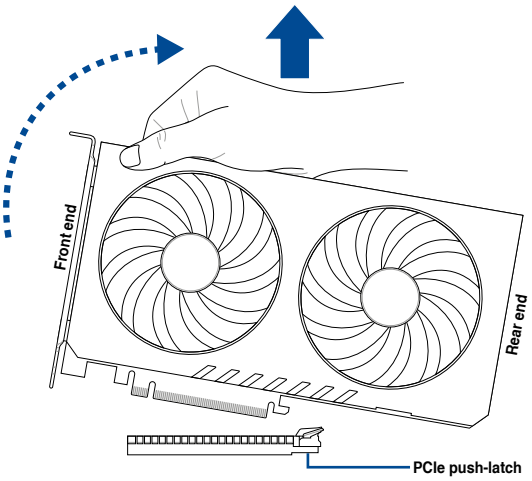
The PCIe slots on this motherboard feature the Q-Release slim feature allowing you to easily remove an expansion card installed to this PCIe slot, even when the expansion card may be blocking the PCIe push-latch, such as a graphics card. You may also remove an expansion card by pushing down on the PCIe push-latch.

To release an expansion card on a Q-Release Slim PCIe slot:

Pull the front end of the expansion card upwards, this should release the expansion card from the Q-Release Slim PCIe slot, allowing you to remove the expansion card from the Q-Release Slim PCIe slot.

The illustration below is for reference only. The motherboard and Q-Release Slim PCIe slot may differ between models, but the steps for using the Q-Release Slim PCIe slot remain the same.

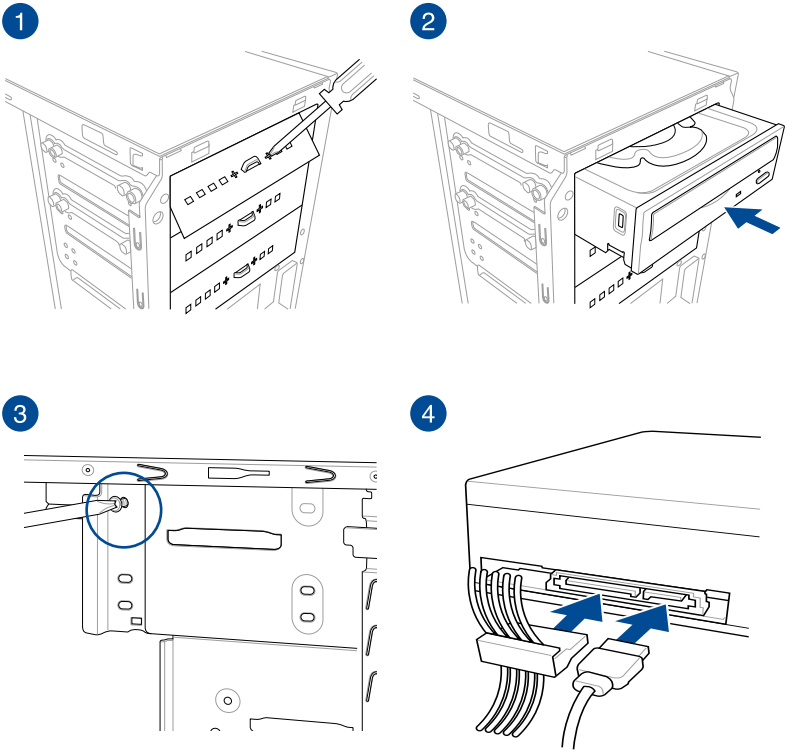
Do not try to remove the expansion card by pulling the rear end of the expansion card upwards without pushing down on the PCIe push-latch first. Doing so with excessive force may cause damages to the motherboard.



1.10 Installing disk drives

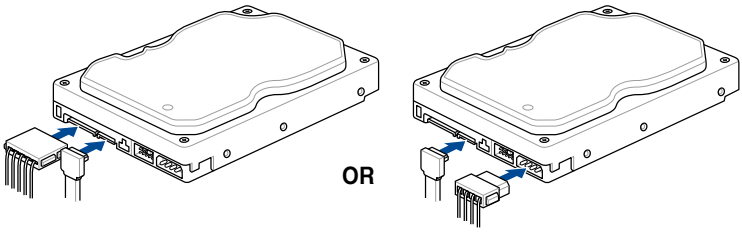
The illustrations in this section are for reference only. The chassis may vary with models, but the installation steps are the same for all models.

1.10.1 SATA optical disk drive

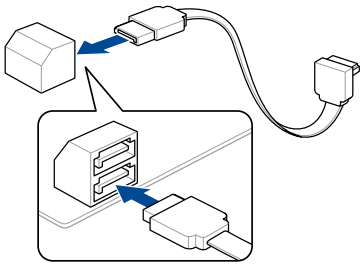


1.10.2 SATA hard disk drive

1

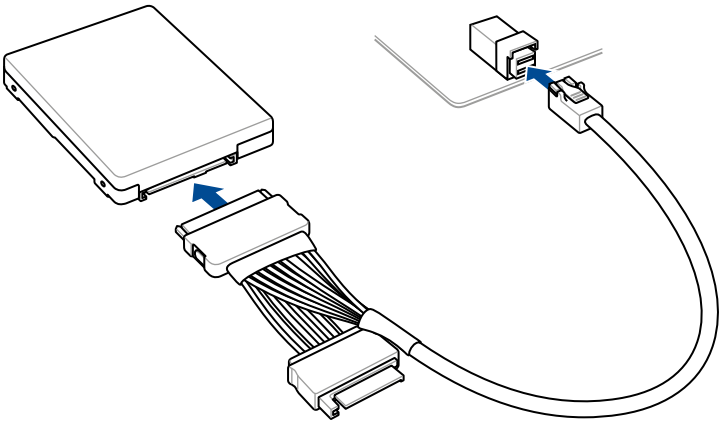


2



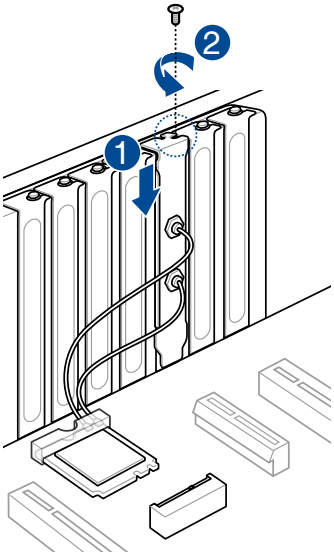
OR

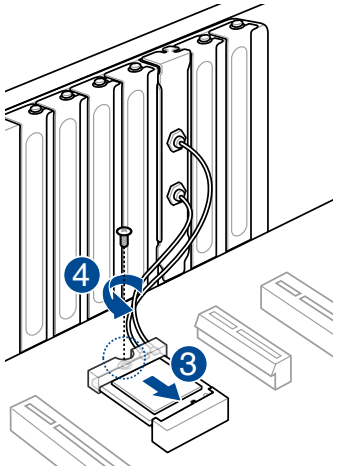
1.10.3 NVMe drive

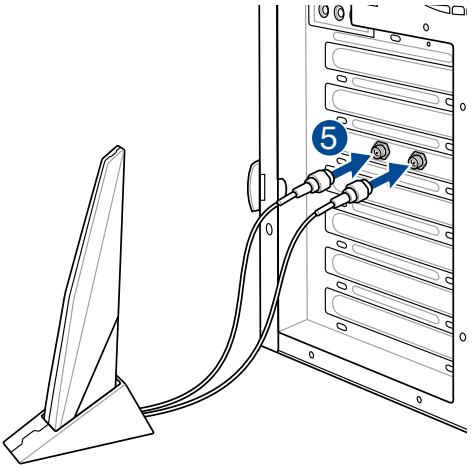


1.11 M.2 Wi-Fi module and antenna installation

1.11.1 M.2 Wi-Fi Module





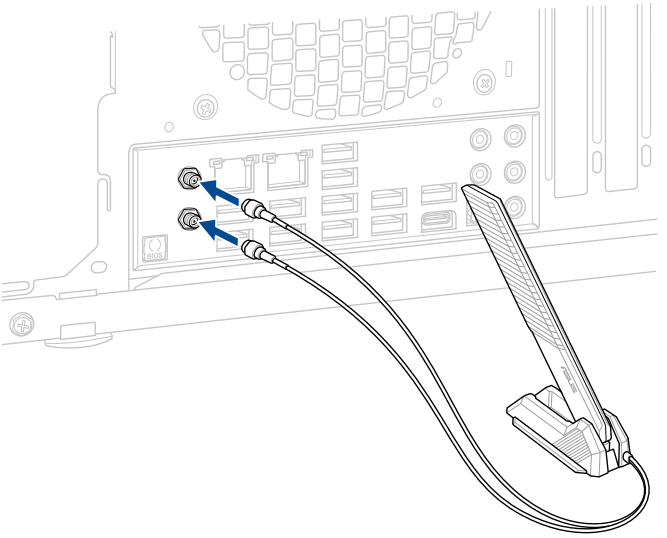


- Ensure that the ASUS 2x2 dual band Wi-Fi antenna is securely installed to the Wi-Fi ports.
- Ensure that the antenna is at least 20 cm away from all persons.

- The illustration to the left is for reference only. The I/O port layout may vary with models, but the Wi-Fi antenna installation procedure is the same for all models.
- The M.2 Wi-Fi module and antenna are purchased separately.

1.11.2 Wi-Fi moving antenna

Connect the bundled ASUS Wi-Fi moving antenna connector to the Wi-Fi ports at the back of the chassis.



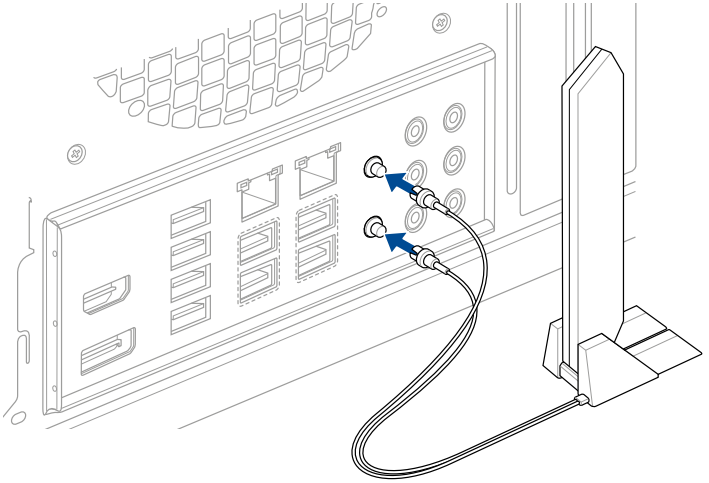
- Ensure that the ASUS Wi-Fi moving antenna is securely installed to the Wi-Fi ports.
- Ensure that the antenna is at least 20 cm away from all persons.

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

1.11.3 ASUS WiFi Q-Antenna installation

Installing the ASUS WiFi Q-Antenna

Connect the bundled ASUS WiFi Q-Antenna connector to the Wi-Fi ports at the back of the chassis.



- Ensure to hold tightly onto the connector when removing the antenna connector from the Wi-Fi ports, and refrain from attempting to remove the antenna connector from the Wi-Fi ports by pulling on the antenna connector cable.
- The antenna can only be extended to a right angle (90°). Do not force the antenna into an angle more than 90°, doing so may cause damages to the ASUS WiFi Q-Antenna.

- Ensure that the ASUS WiFi Q-Antenna is securely installed to the Wi-Fi ports.
- Ensure that the antenna is at least 20 cm away from all persons.

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

Using ASUS WiFi Q-Antenna functions

The ASUS WiFi Q-Antenna features a Direction Finder and Fast Check function, you can learn more about these feature and how to use them in the **ASUS WiFi Q-Antenna** tab in Armoury Crate.

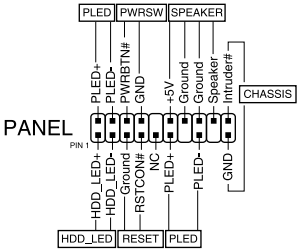
The ASUS WiFi Q-Antenna function in Armoury Crate is only supported on the bundled antenna and Wi-Fi module.

1.12 Front I/O connector

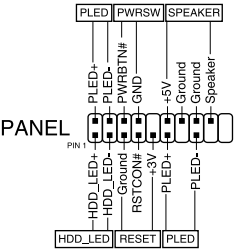
Front panel connector pins

- RESET (Reset Switch)
- PLED (Power LED)
- PWRSW / PWRBTN (Power Switch)
- SPEAKER (Speaker Connector)
- CHASSIS (Chassis intrusion)
- HDD_LED / HDLED (Hard disk drive activity LED)

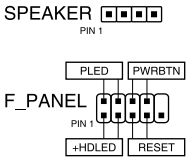
20-3 pin front panel connector



20-5 pin front panel connector



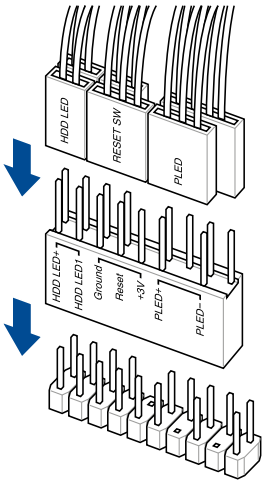
10-1 pin front panel connector and 4-pin speaker connector



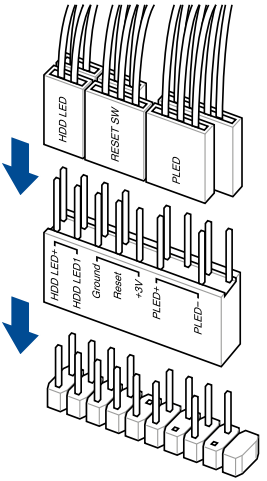
- The front panel cables of your chassis may differ with models or designs. Connect these connectors to the motherboard according to the label.
- If the LEDs do not light up and the pin location is correct, you might have mistaken the ground pins with the signal pins. Usually the white wire stands for the ground pins and the color-coded wire for the signal pins.
- The SPEAKER, RESET and PWRSW front panel cables have no specific orientation, while PLED cables do. Connect the cable PIN1 to the connector PIN1 on the motherboard.
- The front panel connector varies with your motherboard model, refer to the user guide for more details.

To install ASUS Q-Connector

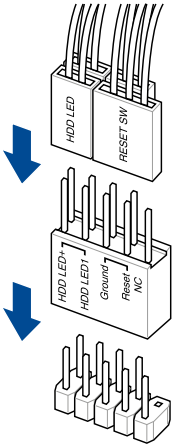
20-3 pin front panel connector



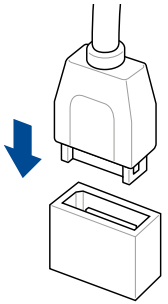
20-5 pin front panel connector



10-1 pin front panel connector

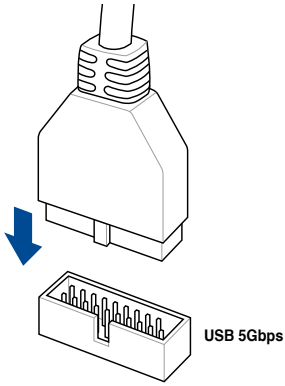


To install USB 20Gbps Type-C®, USB 10Gbps Type-C®, or USB 5Gbps Type-C® connector

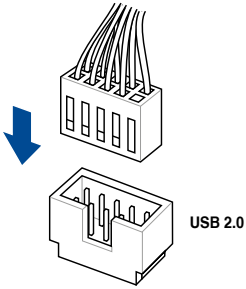


This connector will only fit in one orientation. Push the connector until it clicks into place.

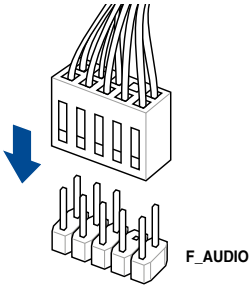
To install USB 5Gbps connector



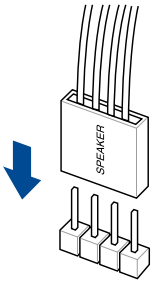
To install USB 2.0 connector



To install front panel audio connector



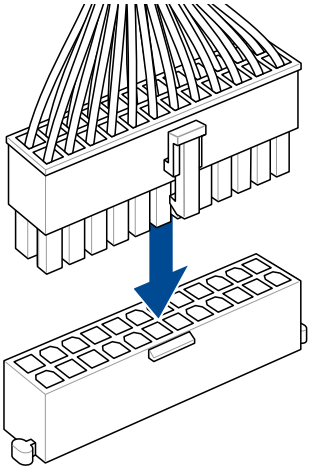
To install system speaker connector



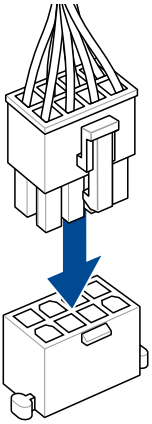
1.13 Connecting the ATX power

The ATX power connectors can fit in only one orientation. Use the side clip to hook the connectors to the motherboard. DO NOT force the male power connectors into the female counterparts on the motherboard.

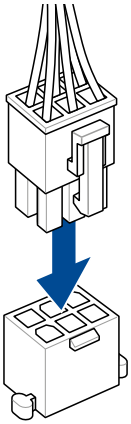
24-pin Main Power connector



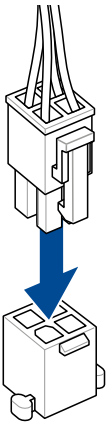
8-pin +12V Power connector / 8-pin PCIe Power connector



6-pin PCIe Graphics Card connector

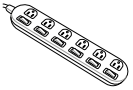
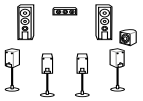


4-pin +12V Power connector



1.14 List of peripheral devices and accessories

Refer to the following list for the rear I/O port, and the peripheral devices and accessories.

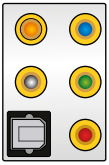
1. AC Power plug + power extension cord 
2. PS/2 keyboard port + keyboard
3. S/PDIF out port + speaker system
4. USB port + USB devices
5. Audio I/O port + speaker system 
6. PS/2 mouse port + mouse
7. LAN (RJ45) port + modem
8. DVI / HDMI™ / DP / VGA port + LCD monitor
9. Serial port + Printer

The rear I/O connectors may vary with models. Refer to the motherboard user guide for details.

1.15 Audio I/O connections

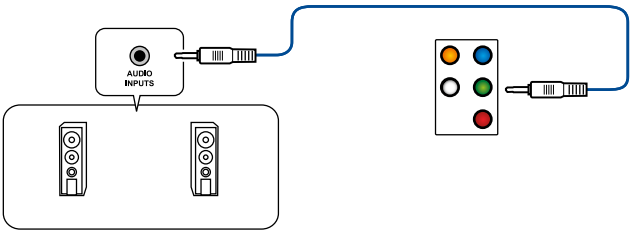
The audio I/O ports may vary with models. Refer to the motherboard user guide for details.

LED-illuminated 5-port audio jacks (Variation 1)

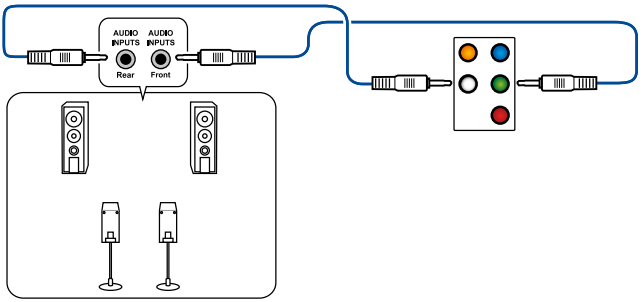


Connect to Headphone and Mic

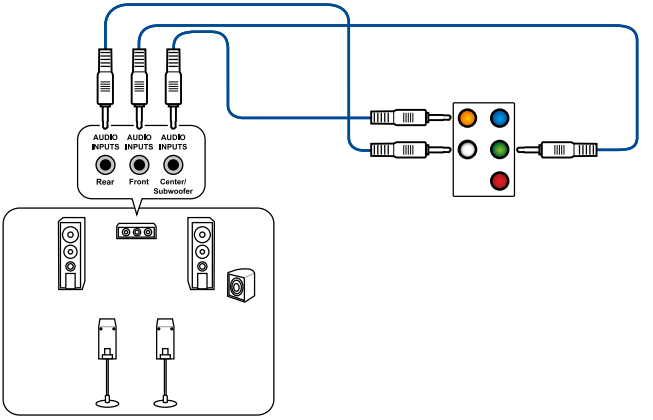
Connect to 2-channel Speakers



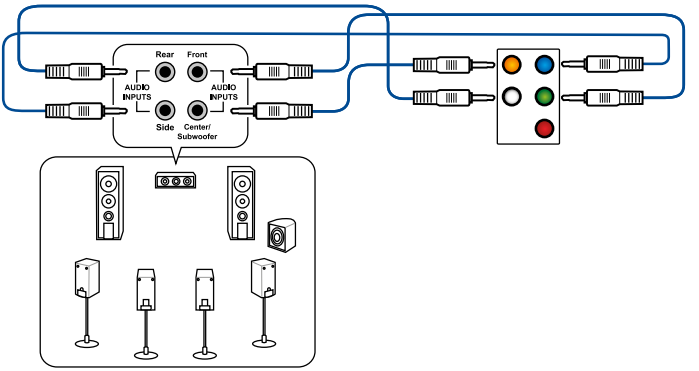
Connect to 4-channel Speakers



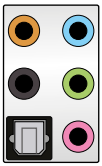
Connect to 5.1-channel Speakers



Connect to 7.1-channel Speakers

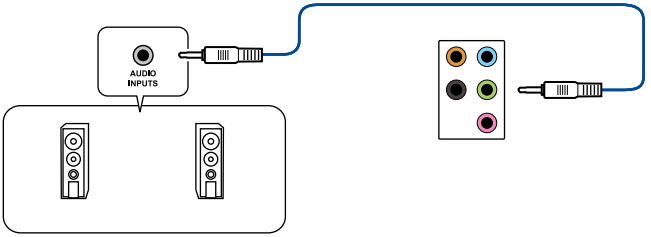


Non-LED 5-port audio jacks (Variation 2)

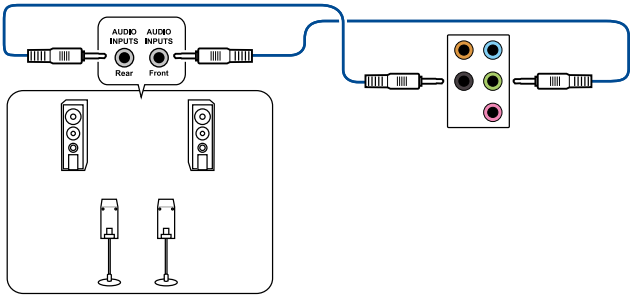


Connect to Headphone and Mic

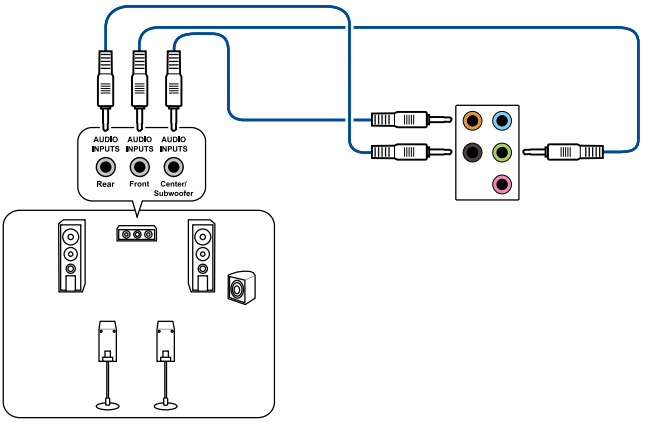
Connect to 2-channel Speakers



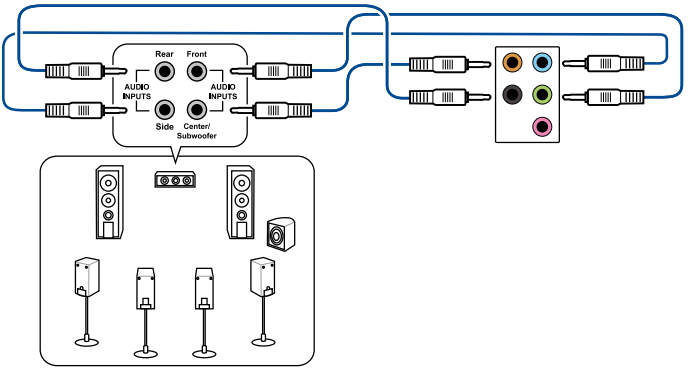
Connect to 4-channel Speakers



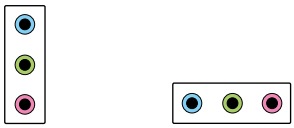
Connect to 5.1-channel Speakers



Connect to 7.1-channel Speakers



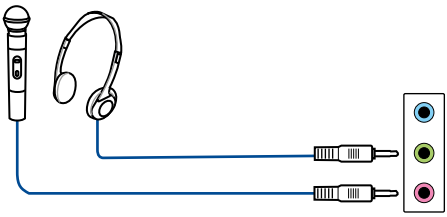
3-port audio jacks (Variation 3)



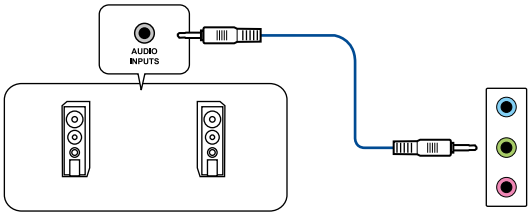
Vertical Horizontal

The audio jacks are connected to the same color ports regardless of whether the audio ports are horizontal or vertical.

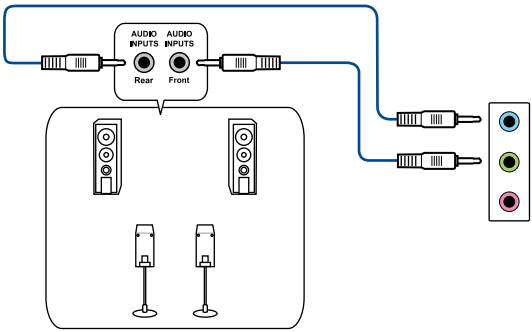
Connect to Headphone and Mic



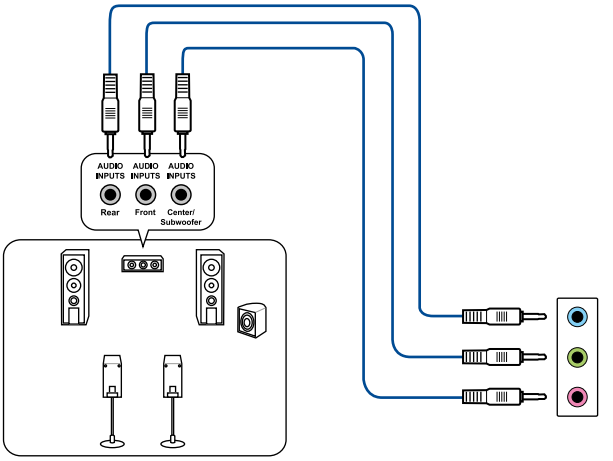
Connect to 2-channel Speakers



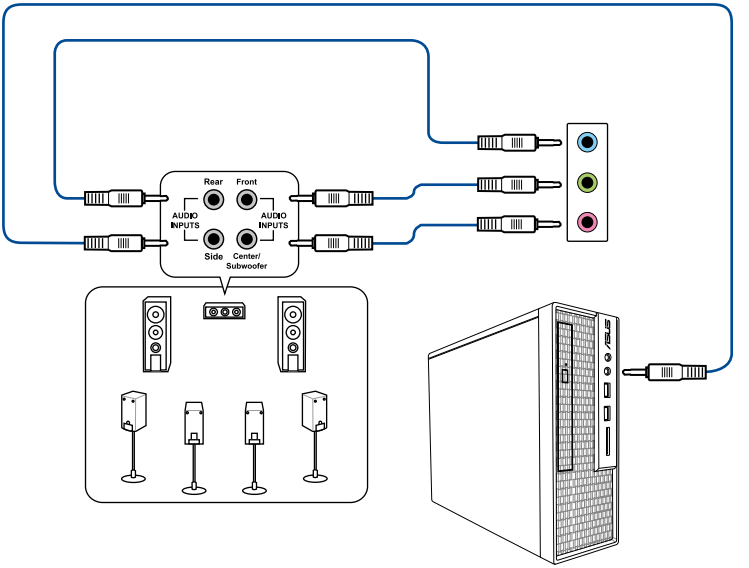
Connect to 4-channel Speakers



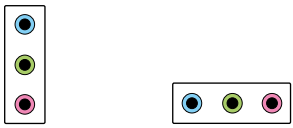
Connect to 5.1-channel Speakers



Connect to 7.1-channel Speakers



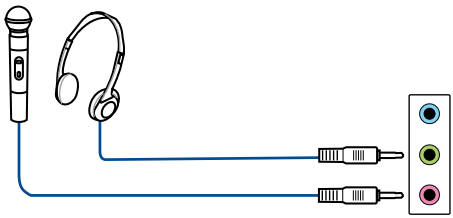
3-port audio jacks (Variation 4)



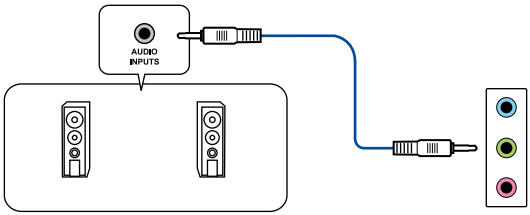
Vertical Horizontal

The audio jacks are connected to the same color ports regardless of whether the audio ports are horizontal or vertical.

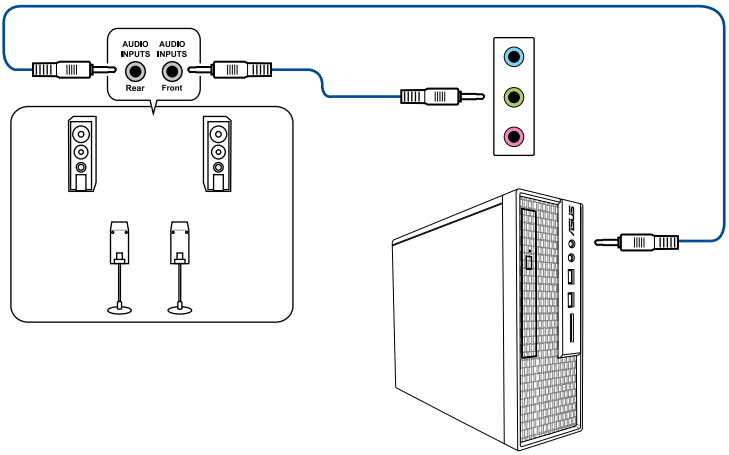
Connect to Headphone and Mic



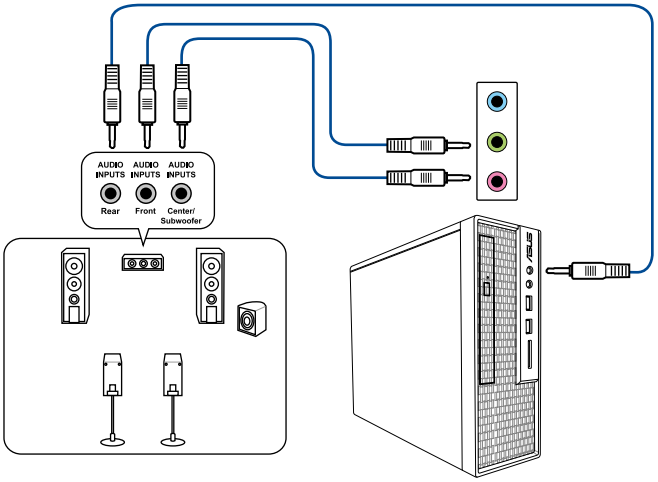
Connect to 2-channel Speakers



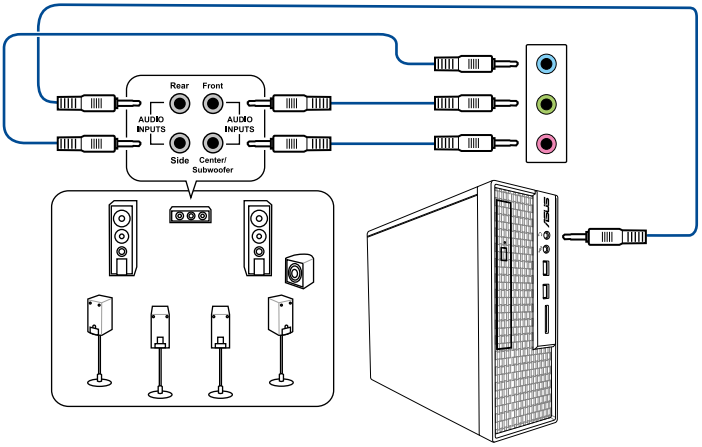
Connect to 4-channel Speakers



Connect to 5.1-channel Speakers



Connect to 7.1-channel Speakers



1.16 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 storage 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; BIOS beeps only on selected motherboards with the SPEAKER header) 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. For more details on the BIOS options, please refer to the motherboard user guide.

Troubleshooting

Issue	Action
• Cannot turn on the computer • Power LED is not lit. • Power supply fan is not working.	• Ensure the power cord is connected correctly. • Ensure the power connectors are installed firmly on the motherboard.
The computer is on but the monitor is black.	• Ensure the monitor power is on and the VGA cable is connected correctly. • Adjust the monitor brightness and contrast. • Shut down the computer and remove the power cord. Check whether the VGA card is installed firmly.
No memory detected	• Ensure the memory module is correct. • Ensure the DIMMS are firmly seated on the DIMM socket. • Ensure the memory module is from the qualified vedor list. Refer to the ASUS website for the QVL.
Hard/optical disk drive error (not recognized or detected)	• Ensure the jumper setting is correct. (Master/Slave) • Check the BIOS configuration about hard/optical disk drive. • Ensure the device cables are firmly attached. • Ensure the device drivers are installed.

1.17 Turning off the computer

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

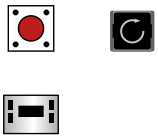
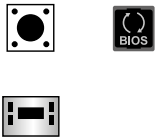
Chapter 2: Motherboard Overview

The diagrams in this section are for reference only. For more details on the layout of your motherboard, please refer to the motherboard user guide.

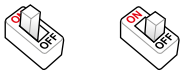
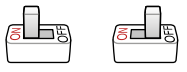
2.1 Onboard buttons and switches

Items	Name	Description
PWR_SW START	Power-on button (With LED)	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.
START	Power-on button (Without LED)	The motherboard comes with a power-on button that allows you to power up or wake up the system. The Power LED 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. Please refer to your motherboard's user guide for the exact location of the power LED.
RST_SW RESET RESET	Reset button	Press the reset button to reboot the system.
FLEXKEY	FlexKey button (Reset)	Press the FlexKey button to reboot the system. You may also configure the button and assign a quick access feature such as activating Safe Boot or turning Aura lighting on or off to the button.

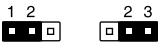
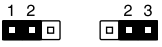
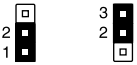
(continued on the next page)

Items	Name	Description
SAFE_BOOT	Safe Boot button	The Safe Boot button can be pressed anytime to force the system to reboot into the BIOS safe mode. This button temporarily applies safe settings to the BIOS while retaining any overclocked settings allowing you to modify the settings causing boot failure. Use this button when overclocking or tweaking the settings of your system.
CLR_CMOS 	Clear CMOS button	Press this button to clear the BIOS setup information only when the systems hangs due to overclocking.
BIOS_FLBK 	BIOS FlashBack™ button	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 then press the BIOS FlashBack™ button for three seconds to automatically update the BIOS.
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.
BIOS_SWITCH	BIOS Switch button	The motherboard comes with two BIOS chips. Press the BIOS button to switch BIOS and load different BIOS settings. The nearby BIOS_LEDs indicate the currently selected BIOS.
PAUSE Enabled Disabled	Pause switch	The pause switch allows you to freeze the cooling system at a hardware level, thus allowing you to adjust your system settings under heavy overclocking.

(continued on the next page)

Items	Name	Description
SLOW_MODE  Enabled Disabled	Slow Mode switch	Slow Mode Switch is employed during LN2 benching. The system may crash due to the CPU being unstable when using extreme overclocking, enabling slow mode will decrease the processor frequency and stabilize the system, allowing overclockers to keep track of their overclocking data.
RSVD  Enabled Disabled	RSVD switch	The RSVD switch is reserved for ASUS-authorized technicians only.
PCIEX16_SW	PCIe x16 Lane switch	These slide switches allows you to enable and disable the corresponding PCIe x16 slots. When one of the installed PCIe x16 cards is out of order, you can use the slide switch to find the faulty one without removing the cards.

2.2 Jumpers

Items	Name	Description
CLRTC	Clear RTC RAM jumper	This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.
LN2_MODE 	LN2 Mode jumper	With LN2 mode activated, the ROG motherboard is optimized to remedy the cold-boot bug during POST and help the system boot successfully.
CPU_OV 	CPU Over Voltage jumper	The CPU Over Voltage jumper allows you to set a higher CPU voltage for a flexible overclocking system, depending on the type of the installed CPU. To gain more CPU voltage setting, insert the jumper to pins 2-3. To go back to its default CPU voltage setting, insert the jumper to pins 1-2.
80_LIGHT 	80 light jumper	This jumper allows you to enable or disable the onboard Q-CODE LED.

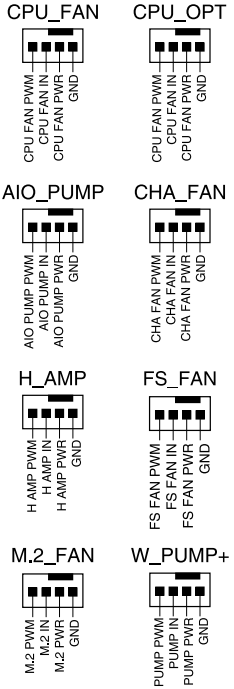
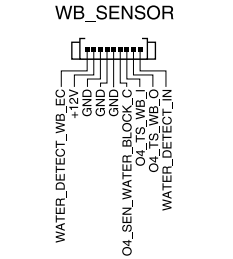
2.3 Onboard LEDs

Items	Name	Description
Q_CODE	Q-Code LED	The Q-Code LED design provides you with a 2-digit error code that displays the system status. • The Q-Code 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. • Please refer to the Q-Code table in the **Appendix** section of your motherboard user guide for more details.
QLED BOOT VGA DRAM CPU	Q LED (CPU, DRAM, VGA, BOOT)	Q LED checks 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. On selected motherboards, the DRAM LED will detect if the memory modules have been installed in the recommended memory configuration slots as well as if the memory modules have been properly installed and seated in the memory slots once the motherboard is connected to a power supply. After the motherboard has been powered on, the DRAM LED will return to the original error checking procedure, regardless of the LED status prior to powering on. Please refer to your motherboard user guide to check if this feature is present on your motherboard.
C_DET_CPU C_DRAM C_PCIE	Condensation detection LEDs	These LEDs will light up when water condensation is detected on the corresponding critical key components (CPU, DRAM, and PCIe). This user-friendly design helps you quickly identify possible damages caused by condensation.

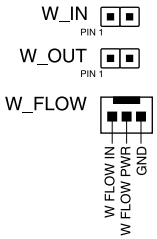
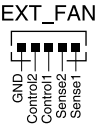
(continued on the next page)

Items	Name	Description
DIMM_B_LED DIMM_A_LED DIMM_C_LED DIMM_D_LED	DIMM LEDs	The DIMM LED indicates when the corresponding memory channel is enabled.
BIOS_LED1 BIOS_LED2	BIOS LEDs	The BIOS LEDs help indicate the BIOS activity. Press the BIOS button to switch between BIOS1 and BIOS2 and the LED lights up when the corresponding BIOS is in use.
HD_LED	Hard Disk LED	The Hard Disk LED is designed to indicate the hard disk activity. It blinks when data is being written into or read from the hard disk drive. The LED does not light up when there is no hard disk drive connected to the motherboard or when the hard disk drive does not function.
CPU_STATUS Red (not ready)	CPU status LED	This LED will indicate the current status of your CPU. A red light indicates that the CPU is not ready to boot, and the LED will turn off once the problem is solved. This user-friendly design helps you quickly identify whether your CPU is ready to boot or not.
12V-2X6_LED	GC_HPWR Power Plug LEDs	The GC_HPWR Power Plug LEDs will indicate the connection status of the GC_HPWR Power connectors. The GC_HPWR Power Plug LEDs will only function when a PCIe High Power Connector graphics card is installed. The GC_HPWR Power Plug LEDs will not light up if a standard graphics card is installed, or if no graphics card is installed.

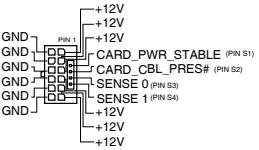
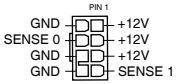
2.4 Onboard connectors

Items	Name	Description
	Fan and Pump headers	Connect the fan cables to the fan headers on the motherboard, ensuring that the black wire of each cable matches the ground pin of the header. For some motherboards the CPU_FAN or CPU_OPT header must be connected. Please refer to your motherboard user guide for more information.
	Water Block header	The Water Block header allows you to connect sensors to monitor the temperature, flow rate, and water leak signals of your third party monoblocks. You can manually adjust the fans and water pump to optimize the thermal efficiency of your third party monoblocks.

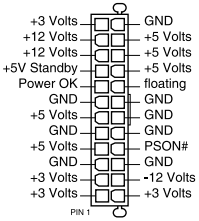
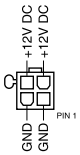
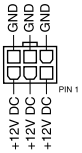
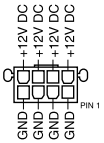
(continued on the next page)

Items	Name	Description
	Liquid Cooling System headers	These headers 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.
	HS Fan header	The HS Fan header is for connecting the HS Fan on the integrated heatsink.
	Chipset Fan header	This header is for connecting the chipset fan on the integrated heatsink.
	Fan Extension Card header	The Fan Extension Card header allows you to install an fan extension card. For more details on the fan extension card, please refer to the To install FAN EXTENSION CARD section in this guide.

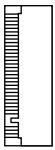
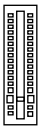
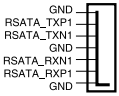
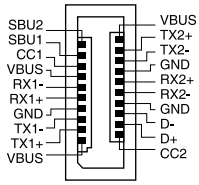
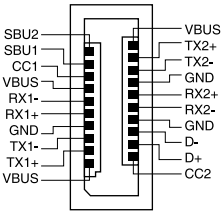
(continued on the next page)

Items	Name	Description
12V-2X6  PCIE_8PIN_PWR  	GC_HPWR Power connectors	These Power connectors allow you to connect your motherboard to a power supply to provide power input through the GC_HPWR Power Output slot to a PCIe High Power Connector graphics card. The power supply plugs are designed to fit in only one orientation, find the proper orientation and push down firmly until the power supply plugs are fully inserted. • Only connect either the 12V-2X6 connector or the PCIE_8PIN_PWR connectors. Do not connect both power connectors at the same time. • If you choose to connect the PCIE_8PIN_PWR connectors, connect all the PCIE_8PIN_PWR connectors to ensure sufficient power is supplied to the PCIe High Power Connector graphics card. The PCIe High Power Connector graphics card may become unstable or may not boot up if the power is inadequate. • A PCIE_8PIN to 12-2X6 adapter cable is not supported on this motherboard.

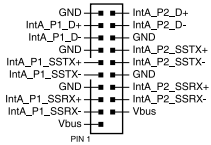
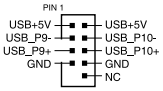
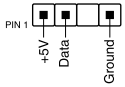
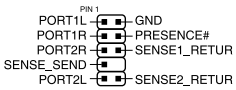
(continued on the next page)

Items	Name	Description
ATXPWR (24-PIN)  ATX_12V (4-PIN)  PCIE_PWR (6-PIN)  PCIE_8PIN_PWR (8-PIN)  EZ_PLUG 	Power connectors	These connectors are for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit. For ROG models the **PCIE_8PIN_PWR** connector provides support up to DC 20V/3A 60W PD3.0 fast charging technology support for the USB 20Gbps Type-C® Front Panel connector.

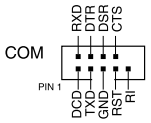
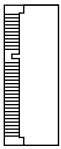
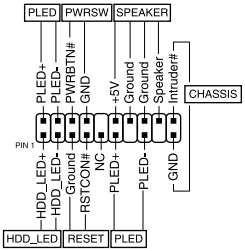
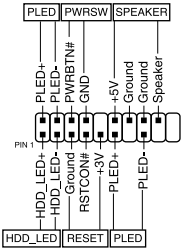
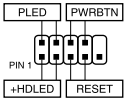
(continued on the next page)

Items	Name	Description
M.2_1(SOCKET3)  M.2_2(SOCKET3) (Vertical) 	M.2 slots	This slot allows you to install an M.2 SSD module.
SATA6G_1 	SATA 6 Gb/s ports	These ports connect to SATA 6 Gb/s hard disk drives via SATA 6 Gb/s signal cables.
U.2 	U.2 port	This motherboard comes with a U.2 port which supports PCIe 3.0 x4 NVM Express storage, or 4 SATA devices if SATA mode is available.
U20G_C 	USB 20Gbps Type-C® Front Panel connector	This connector allows you to connect a USB 20Gbps Type-C® module for an additional USB 20Gbps Type-C® port on the front panel. The USB 20Gbps Type-C® connector provides data transfer speeds of up to 20 Gb/s.
U10G_C 	USB 10Gbps Type-C® Front Panel connector	This connector allows you to connect a allows you to connect a USB 10Gbps Type-C® module for an additional USB 10Gbps Type-C® port on the front panel. The 10Gbps Type-C® connector provides data transfer speeds of up to 10 Gb/s.

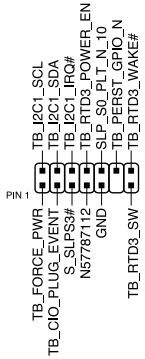
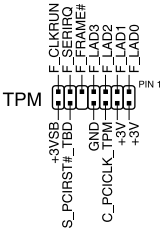
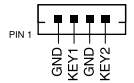
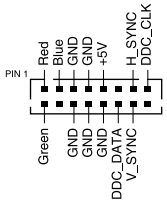
(continued on the next page)

Items	Name	Description
U5G 	USB 5Gbps header	This header allows you to connect a USB 5Gbps module for additional USB 5Gbps front or rear panel ports. With an installed USB 5Gbps module, you can enjoy all the benefits of USB 5Gbps including faster data transfer speeds of up to 5 Gbps, faster charging time for USB-chargeable devices, and optimized power efficiency.
USB910 	USB 2.0 header	These headers are for USB 2.0 ports. Connect the USB module cable to any of these headers, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 MBps connection speed.
ADD GEN2_1 	Addressable Gen2 LED header	This header is for individually addressable RGB WS2812B LED strips (5V/Data/Ground), with a maximum power rating of 3A (5V) and a maximum of 60 LEDs, or WS2812B based LED strips.
RGB_HEADER 	AURA RGB header	This header is for RGB LED strips. The RGB connector 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. The maximum power rating and strip lengths may vary by models, please refer to the motherboard user guide for more details.
F_AUDIO 	Front panel audio header	This header is for a chassis-mounted front panel audio I/O module that supports HD Audio. Connect one end of the front panel audio I/O module cable to this header.

(continued on the next page)

Items	Name	Description
	Serial port header	This header is for a serial (COM) port. Connect the serial port module cable to this header, then install the module to a slot opening at the back of the system chassis.
M.2(WIFI) 	M.2 Wi-Fi slot	The M.2 Wi-Fi slot allows you to install an M.2 Wi-Fi module (E-key, type 2230).
PANEL (20-3 PIN)  PANEL (20-5 PIN)  PANEL (10-1 PIN) and  SPEAKER (4-PIN) 	System Panel header	The System Panel header supports several chassis-mounted functions.

(continued on the next page)

Items	Name	Description
TB(USB4)_HEADER / USB4_HEADER 	Thunderbolt header / USB4 header	This header is for the add-on Thunderbolt I/O card / USB4 PCIE GEN4 that supports Intel's Thunderbolt Technology, allowing you to connect up to six Thunderbolt-enabled devices and a DisplayPort-enabled display in a daisy-chain configuration. This 14-1 pin header may differ between motherboards. The 14-1 pin header may be TB(USB4)_header on some motherboards and on some it may be USB4_header. Please refer to your motherboard user guide for more information.
T_SENSOR	Thermal sensor header	This header is for the thermistor cable that monitors the temperature of the devices and the critical components inside the motherboard. Connect the thermistor cable and place the sensor on the device or the motherboard's component to detect its temperature.
	TPM header	This header supports a TPM module, which securely stores keys, digital certificates, passwords and data. A TPM system also helps enhance network security, protect digital identities, and ensures platform integrity.
VROC_HW_KEY 	VROC_HW_KEY header	This header allows you to connect a KEY module to enable CPU RAID functions with Intel® CPU RSTe.
VGA_HEADER 	VGA header	The VGA header allows you to connect a display for BMC Remote Management.

Chapter 3: Manage/update BIOS

3.1 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.

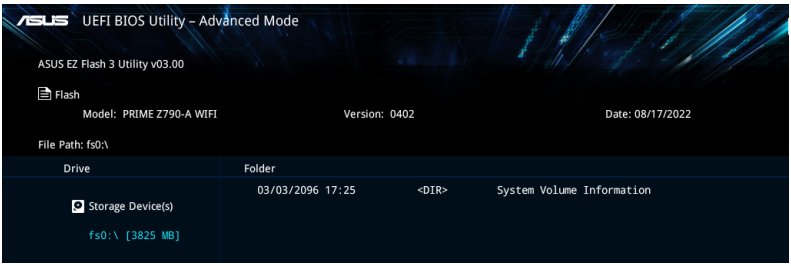
1. ASUS EZ Flash 3: Updates the BIOS using a USB flash drive.
2. ASUS CrashFree BIOS 3: Restores the BIOS using a USB flash drive when the BIOS file fails or gets corrupted.

3.1.1 ASUS EZ Flash 3

ASUS EZ Flash 3 allows you to download and update to the latest BIOS using a USB drive.

To update the BIOS:

1. Insert the USB flash drive that contains the latest BIOS file to a USB port.
2. Enter the Advanced Mode of the BIOS setup program. Go to the **Tool** menu to select **ASUS EZ Flash 3 Utility** and press <Enter>.
3. Press Left arrow key to switch to the Drive field.
4. Press the Up/Down arrow keys to find the USB flash drive that contains the latest BIOS, and then press <Enter>.
5. Press Right arrow key to switch to the Folder Info field.
6. Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.



3.1.2 ASUS CrashFree BIOS 3

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

Make sure to download the latest BIOS 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 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!

Chapter 4: Troubleshooting

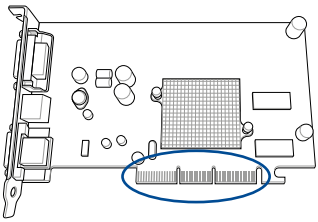
4.1 Troubleshooting for Motherboard DIY

After assembling your own computer, you might encounter troubles when starting it up. This chapter provides answers to some common questions about your PC before entering the operating system.

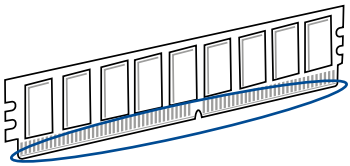
4.1.1 Basic troubleshooting

A. Bad connection

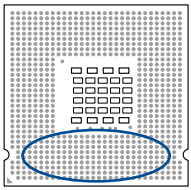
1. Ensure there is no contaminants on the gold contact or the pins.
2. Use a cotton bud or an eraser and gently rub the gold contact. Remember to brush away the eraser crumbs.



VGA card gold contact



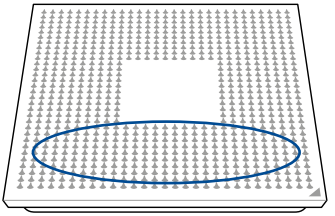
DIMM gold contact



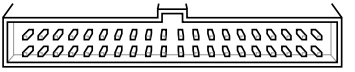
CPU gold contact points

Handle the card or the CPU by its edges and DO NOT touch the gold contact. Static electricity will seriously damage the device.

3. Ensure there are no broken or bent pins on your connector pins or CPU pins. A broken and/or bent pin will cause the component to malfunction. Contact your retailer for further support.



AMD CPU gold pins

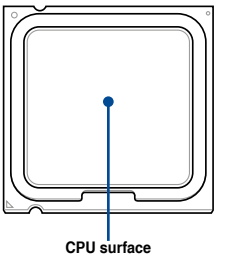


Connector pins

If the broken or bended pins are caused after the purchase, your retailer may ask for repair charge. Sometimes the broken or bended pins are NOT REPAIRABLE.

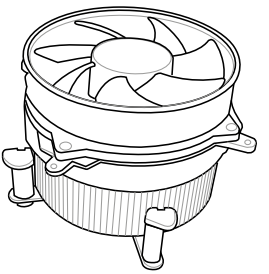
B. CPU overheating

1. Wipe CPU surface clean with a clean cloth. Apply several drops of thermal paste to the exposed area of the CPU that the heatsink will be in contact with. Ensure that it is spread in an even thin layer.



CPU surface

2. Ensure there are no contaminants on the heatsink and fan.



3. Follow the instructions of the heatsink and fan manufacturers to ensure your heatsink and fan are functioning properly. Contaminants may slow down fan rotation speed and cause the CPU to overheat.

4.2 Other common issues

- When removing devices from the system, ensure all the power cables are unplugged.
- All the error messages will be displayed on screen during the Power-On Self-Test (POST).
- If there are BIOS beeps, refer to section *Starting up for the first time* for details.
- Go over the checklist table below to check for other issues.

	Check Items			
	Screen display	**Heatsink and fan**	**BIOS beeps**	**Error messages**
No screen display	No	Stop	No	N/A
	No	Running	No	N/A
	No	Running	Yes	N//A
Failure to enter OS	Yes	Running	Yes	Yes
	Yes	Running	No	Yes
	Yes	Running	No	No

If the problem has been fixed but a new problem emerges, go over the checklist again. If the problem persists, contact your retailer or ASUS technical support team for further help.

4.2.1 Failure to boot-up; No screen display

Most boot-up failure and no screen display result from device defection or incorrect installation. Follow the instructions below to fix the problem:

1. Ensure that all the power cables are attached, including the system and the monitor.
2. Determine if the problem comes from expansion devices.
    - Remove all the expansion card and devices. Use only motherboard, monitor, VGA card, memory modules, power supply unit, heatsink and fan, keyboard, and mouse to reboot the system.
    - If the system is working normally, it is one of the expansion devices that causes the problem. Reinstall the expansion devices you removed back to the system one by one to find out which device is defective.
3. Determine if the problem comes from the basic system components.
    - If you have some spare components, you can replace the components in turn to locate the defective component in the order of “memory module, CPU, motherboard, hard/optical disk drive, keyboard/mouse.”

When you locate the defective component, contact your device retailer for service.

4.2.2 Failure to enter the operating system

1. If the problem emerges after you add a new hardware component, remove the newly added hardware component and reboot the system. If the system is working normally without the hardware component, the hardware component may be defective or incompatible with the system. Contact the device retailer for help.
2. If the problem emerges after you install a software or driver, follow the instructions below to fix the problem.
    a. Enter the operating system in safe mode and remove the software or driver.
    b. Contact the operating system company for further support.
    c. If the previous instructions fail to fix the problem, you may need to reformat your hard disk drive and reinstall a new operating system.
3. If the problem emerges after you change the BIOS settings, reboot and enter the BIOS to load the setup defaults. Refer to the motherboard user guide for details.
4. If the problem comes from a computer virus or a corrupt file, follow the instructions below to fix the problem:
    a. Enter the operating system in safe mode and do a full system virus scan using an anti-virus application.
    b. Contact the operating system company for further support.
    c. If the previous instructions fail to fix the problem, you may need to reformat your hard disk drive and reinstall a new operating system.

Chapter 5: Computer care tips

5.1 Proper care of your PC

Your personal computer is like other home appliances. Keep your computer away from humidity, direct sun, and static electricity source. You should not move the computer when it is turned on in case of damage. Internal dust will affect the operating disk drive and contribute to overheating problems which will cause the computer to crash or damage the components.

5.2 Basic knowledge

1. Encase your computer with dust cover when not in use.
2. When using your computer, do not put anything on the monitor to block the ventilation holes. Excessive heat will cause the monitor to malfunction.
3. Do not place the computer close to a wall, and ensure to leave some space for heat dissipation. Overheating will cause the system to crash.
4. Place the computer on a stable surface.
5. Keep the computer away from areas of extreme temperature. 5°C to 30°C is the ideal ambient temperature. You may use an air conditioner or a electric fan for better heat dissipation.

5.3 Usage knowledge

1. Turn on and shut down your computer regularly. If your computer needs to be on for a long time, use a better system/CPU cooling system and a sustainable power supply unit.
2. A sudden power failure will damage the hard disk drive. When the power supply is unstable, adding an uninterruptible power supply to your computer is recommended.
3. Perform regular virus scans, anti-virus database updates, and defragment disks regularly, to ensure your computer's stability.
4. Ensure your computer's operating system is updated with the latest update.
5. Clean your computer regularly. (Unplug all the power cords before cleaning)
    - Disconnect and remove the motherboard and hard/optical disk drives, then clean them with canned air or a soft brush.
    - Remove dust and hair debris on the power supply unit with an anti-static vacuum.

5.4 Tips

1. If your computer will not be used for a long time, put some desiccant moisture absorbers in the chassis to prevent humidity damage.
2. In some hot and humid climatic areas, it is recommended to turn on your computer every other week. Doing so may help prevent humidity damage.