



PHANTOM®
GAMING

ASRock®

PHANTOM GAMING
Z790 RIPTIDE **WiFi**

User Manual

Contact Information

If you need to contact ASRock or want to know more about ASRock, you're welcome to visit ASRock's website at <http://www.asrock.com>; or you may contact your dealer for further information. For technical questions, please submit a support request form at <https://event.asrock.com/tsd.asp>

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Contents

Chapter 1 Introduction	1
1.1 Package Contents	1
1.2 Specifications	2
1.3 Motherboard Layout	7
1.4 I/O Panel	10
1.5 Block Diagram	12
1.6 802.11be Wi-Fi 7 Module and ASRock WiFi 2.4/5/6 GHz Antenna	13
Chapter 2 Installation	14
2.1 Installing the CPU	15
2.2 Installing the CPU Fan and Heatsink	17
2.3 Installing Memory Modules (DIMM)	18
2.4 Connecting the Front Panel Header	20
2.5 Installing the Motherboard	21
2.6 Installing SATA Drives	22
2.7 Installing a Graphics Card	24
2.8 Connecting Peripheral Devices	26
2.9 Connecting the Power Connectors	27
2.10 Power On	28
2.11 Jumpers Setup	29
2.12 Onboard Headers and Connectors	30
2.13 Post Status Checker	43

2.14	M.2 SSD Card Installation Guide (M2_GEN5)	44
2.15	M.2 SSD Card Installation Guide (M2_1 and M2_2)	47
2.16	M.2 SSD Card Installation Guide (M2_3 and M2_4)	50
2.17	Change Screen Brightness for eDP in Windows®	53

Chapter 1 Introduction

Thank you for purchasing ASRock Z790 Riptide WiFi motherboard, a reliable motherboard produced under ASRock's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock's commitment to quality and endurance.



Because the motherboard specifications and the BIOS software might be updated, the content of this documentation will be subject to change without notice. In case any modifications of this documentation occur, the updated version will be available on ASRock's website without further notice. If you require technical support related to this motherboard, please visit our website for specific information about the model you are using. You may find the latest VGA cards and CPU support list on ASRock's website as well. ASRock website <http://www.asrock.com>.

1.1 Package Contents

- ASRock Z790 Riptide WiFi Motherboard (ATX Form Factor)
- ASRock Z790 Riptide WiFi User Manual
- 2 x Serial ATA (SATA) Data Cables (Optional)
- 1 x ASRock WiFi 2.4/5/6 GHz Antenna (Optional)
- 1 x ARGB Splitter Cable (Optional)
- 1 x Thermistor Cable (Optional)

1.2 Specifications

- Platform**
- ATX Form Factor
 - 8 Layer PCB

- CPU**
- Supports 14th, 13th & 12th Gen Intel® Core™ Processors (LGA1700)
 - Supports Intel® Hybrid Technology
 - Supports Intel® Turbo Boost Max 3.0 Technology
 - Supports Intel® Thermal Velocity Boost (TVB)
 - Supports Intel® Adaptive Boost Technology (ABT)

- Chipset**
- Intel® Z790

- Memory**
- Dual Channel DDR5 Memory Technology
 - 4 x DDR5 DIMM Slots
 - Supports DDR5 non-ECC, un-buffered memory up to 8000+(OC)*
 - Max. capacity of system memory: 192GB
 - Supports Intel® Extreme Memory Profile (XMP) 3.0
- * Please refer to Memory Support List on ASRock's website for more information. (<http://www.asrock.com/>)

- Expansion Slot**
- CPU:
- 1 x PCIe 5.0 x16 Slot (PCIE1), supports x16 mode*
- Chipset:
- 1 x PCIe 4.0 x16 Slot (PCIE2), supports x4 mode*
 - 1 x PCIe 3.0 x1 Slot (PCIE3)*
 - 1 x M.2 Socket (Key E), supports type 2230 WiFi/BT PCIe WiFi module and Intel® CNVio/CNVio2 (Integrated WiFi/BT)

* Supports NVMe SSD as boot disks

* If M.2_GEN5 is occupied, PCIE1 will downgrade to x8 mode.

- Supports AMD CrossFire™

Graphics

- Intel® UHD Graphics Built-in Visuals and the VGA outputs can be supported only with processors which are GPU integrated.
- Intel® X^c Graphics Architecture (Gen 12)
- 1 x eDP 1.4, supports max. resolution up to Full HD 60Hz
- 1 x HDMI 2.1 TMDS Compatible, supports HDCP 2.3 and max. resolution up to 4K 60Hz
- 1 x DisplayPort 1.4 with DSC (compressed), supports HDCP 2.3 and max. resolution up to 8K 60Hz / 5K 120Hz

Audio

- 7.1 CH HD Audio with Content Protection (Realtek ALC1220 Audio Codec)
- Impedance Sensing on Rear Out port
- Individual PCB Layers for R/L Audio Channel
- Nahimic Audio

LAN

- 2.5 Gigabit LAN 10/100/1000/2500 Mb/s
- Killer® E3100G
- Supports Killer LAN Software

Wireless LAN

- 802.11be 2x2 Wi-Fi 7 Module
- Supports IEEE 802.11a/b/g/n/ac/ax/be
- Supports 2.4GHz/5GHz/6GHz* frequency band
- Supports 320MHz channel bandwidth with 6GHz* frequency band

* Wi-Fi 7 (6GHz band) will be supported by Microsoft® Windows® 11. The availability will depend on the different regulation status of each country and region. It will be activated (for supported countries) through Windows Update and software updates once available.

* A 6GHz compatible router is required for 7 functionality.

- 1 antenna to support 2 (Transmit) x 2 (Receive) diversity technology
- Supports Bluetooth 5.4**

** Bluetooth® Audio Offload (HFP, A2DP, and LE Audio) is not supported.

- Supports MU-MIMO

USB

- 1 x USB 3.2 Gen2x2 Type-C (Front)
- 2 x USB 3.2 Gen2 Type-A (Rear)
- 1 x USB 3.2 Gen1 Type-C (Rear)
- 6 x USB 3.2 Gen1 Type-A (4 Rear, 2 Front)
- 6 x USB 2.0 (2 Rear, 4 Front)

* All USB ports support ESD Protection

Rear Panel

I/O

- 2 x Antenna Mounting Points
- 1 x HDMI Port
- 1 x DisplayPort 1.4
- 2 x USB 3.2 Gen2 Type-A Ports (10 Gb/s)
- 1 x USB 3.2 Gen1 Type-C Port
- 4 x USB 3.2 Gen1 Type-A Ports (USB32_56 are Lightning Gaming Ports.)
- 2 x USB 2.0 Ports
- 1 x RJ-45 LAN Port
- HD Audio Jacks: Line in / Front Speaker / Microphone

Storage

CPU:

- 1 x Blazing M.2 Socket (M2_GEN5, Key M), supports type 2280 PCIe Gen5x4 (128 Gb/s) mode*
- 1 x Hyper M.2 Socket (M2_1, Key M), supports type 2260/2280 PCIe Gen4x4 (64 Gb/s) mode*

Chipset:

- 1 x Hyper M.2 Socket (M2_2, Key M), supports type 2260/2280 PCIe Gen4x4 (64 Gb/s) mode*
- 1 x Hyper M.2 Socket (M2_3, Key M), supports type 2260/2280 PCIe Gen4x4 (64 Gb/s) mode*
- 1 x Hyper M.2 Socket (M2_4, Key M), supports type 2260/2280 PCIe Gen4x4 (64 Gb/s) mode*
- 8 x SATA3 6.0 Gb/s Connectors

* Supports Intel® Volume Management Device (VMD)

* Supports NVMe SSD as boot disks

* If M2_GEN5 is occupied, PCIe1 will downgrade to x8 mode.

RAID

- Supports RAID 0, RAID 1, RAID 5 and RAID 10 for SATA storage devices
- Supports RAID 0, RAID 1, RAID 5 and RAID 10 for M.2 NVMe storage devices

Connector

- 1 x eDP Signal Connector
- 1 x Thermistor Cable Header
- 1 x SPI TPM Header
- 1 x Power LED and Speaker Header
- 1 x RGB LED Header*
- 3 x Addressable LED Headers**
- 1 x CPU Fan Connector (4-pin)***
- 1 x CPU/Water Pump Fan Connector (4-pin) (Smart Fan Speed Control)****
- 1 x Chassis Fan Connector (4-pin)*****
- 4 x Chassis/Water Pump Fan Connectors (4-pin) (Smart Fan Speed Control)*****
- 1 x 24 pin ATX Power Connector
- 2 x 8 pin 12V Power Connectors (Hi-Density Power Connector)
- 1 x Front Panel Audio Connector
- 1 x Thunderbolt AIC Connector (5-pin) (Supports ASRock Thunderbolt 4 AIC Card)
- 2 x USB 2.0 Headers (Support 4 USB 2.0 ports)
- 1 x USB 3.2 Gen1 Header (Supports 2 USB 3.2 Gen1 ports)
- 1 x Front Panel Type C USB 3.2 Gen2x2 Header (20 Gb/s)

* Supports in total up to 12V/3A, 36W LED Strip

** Support in total up to 5V/3A, 15W LED Strip

*** CPU_FAN1 supports the fan power up to 1A (12W).

**** CPU_FAN2/WP supports the fan power up to 2A (24W).

***** CHA_FAN5 supports the fan power up to 1A (12W).

***** CHA_FAN1~4/WP support the fan power up to 2A (24W).

***** CPU_FAN2/WP and CHA_FAN1~4/WP can auto detect if 3-pin or 4-pin fan is in use.

**BIOS
Feature**

- AMI UEFI Legal BIOS with GUI support

OS

- Microsoft® Windows® 10 64-bit / 11 64-bit

**Certifica-
tions**

- FCC, CE
- ErP/EuP ready (ErP/EuP ready power supply is required)

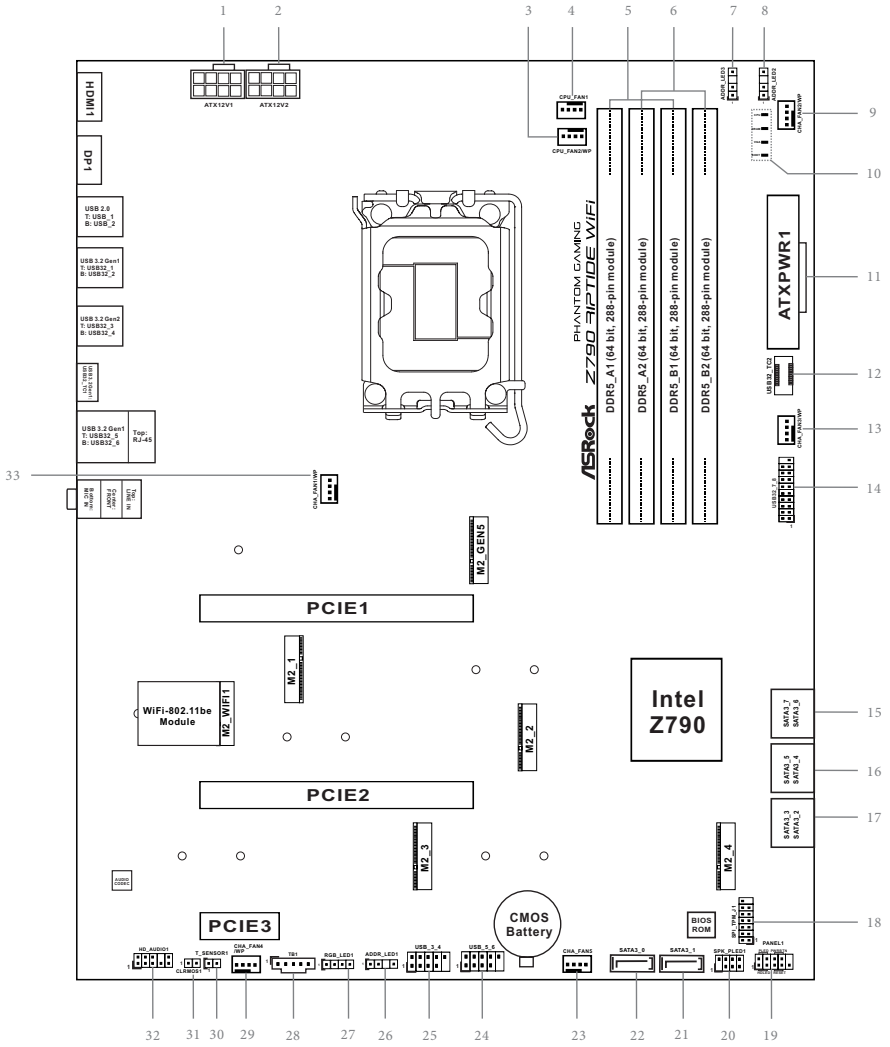
* For detailed product information, please visit our website: <http://www.asrock.com>



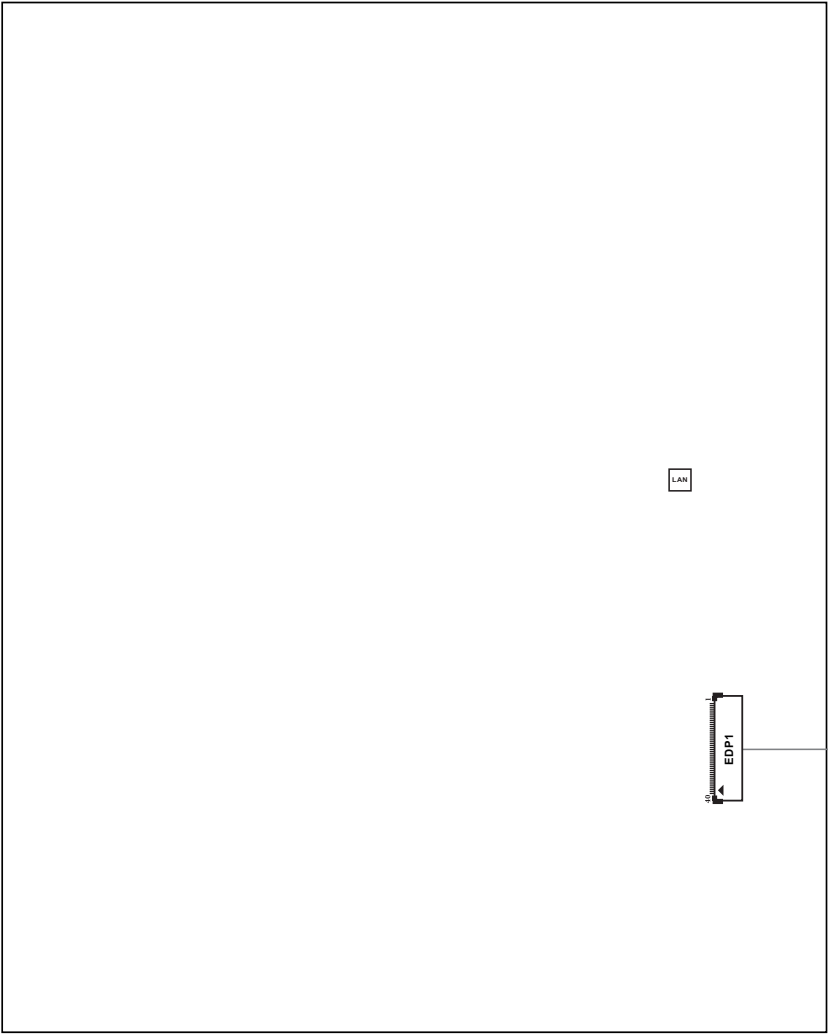
Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of your system. It should be done at your own risk and expense. We are not responsible for possible damage caused by overclocking.

1.3 Motherboard Layout

Top Side View

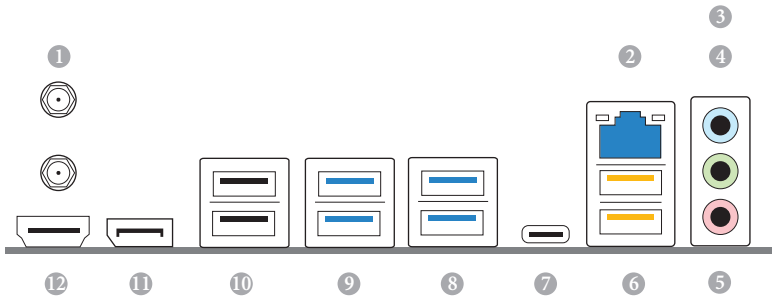


Back Side View



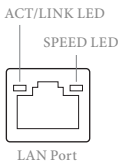
No.	Description
1	ATX 12V Power Connector (ATX12V1)
2	ATX 12V Power Connector (ATX12V2)
3	CPU/Water Pump Fan Connector (CPU_FAN2/WP)
4	CPU Fan Connector (CPU_FAN1)
5	2 x 288-pin DDR5 DIMM Slots (DDR5_A1, DDR5_B1)
6	2 x 288-pin DDR5 DIMM Slots (DDR5_A2, DDR5_B2)
7	Addressable LED Header (ADDR_LED3)
8	Addressable LED Header (ADDR_LED2)
9	Chassis/Water Pump Fan Connector (CHA_FAN2/WP)
10	Post Status Checker (PSC)
11	ATX Power Connector (ATXPWR1)
12	Front Panel Type C USB 3.2 Gen2x2 Header (USB32_TC2)
13	Chassis/Water Pump Fan Connector (CHA_FAN3/WP)
14	USB 3.2 Gen1 Header (USB32_7_8)
15	SATA3 Connectors (SATA3_6)(Lower), (SATA3_7)(Upper)
16	SATA3 Connectors (SATA3_4)(Lower), (SATA3_5)(Upper)
17	SATA3 Connectors (SATA3_2)(Lower), (SATA3_3)(Upper)
18	SPI TPM Header (SPI_TPM_J1)
19	System Panel Header (PANEL1)
20	Power LED and Speaker Header (SPK_PLED1)
21	SATA3 Connector (SATA3_1)
22	SATA3 Connector (SATA3_0)
23	Chassis Fan Connector (CHA_FAN5)
24	USB 2.0 Header (USB_5_6)
25	USB 2.0 Header (USB_3_4)
26	Addressable LED Header (ADDR_LED1)
27	RGB LED Header (RGB_LED1)
28	5-pin Thunderbolt AIC Connector (TB1)
29	Chassis/Water Pump Fan Connector (CHA_FAN4/WP)
30	Thermistor Cable Header (T_SENSOR1)
31	Clear CMOS Jumper (CLRMOS1)
32	Front Panel Audio Header (HD_AUDIO1)
33	Chassis/Water Pump Fan Connector (CHA_FAN1/WP)
34	eDP Signal Connector (EDP1)

1.4 I/O Panel



No.	Description	No.	Description
1	Antenna Ports	7	USB 3.2 Gen1 Type-C Port (USB32_TC1)
2	2.5G LAN RJ-45 Port*	8	USB 3.2 Gen2 Ports (USB32_34)
3	Line In (Light Blue)**	9	USB 3.2 Gen1 Ports (USB32_12)
4	Front Speaker (Lime)**	10	USB 2.0 Ports (USB_12)
5	Microphone (Pink)**	11	DisplayPort 1.4
6	USB 3.2 Gen1 Ports (USB32_56)***	12	HDMI Port

* There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.



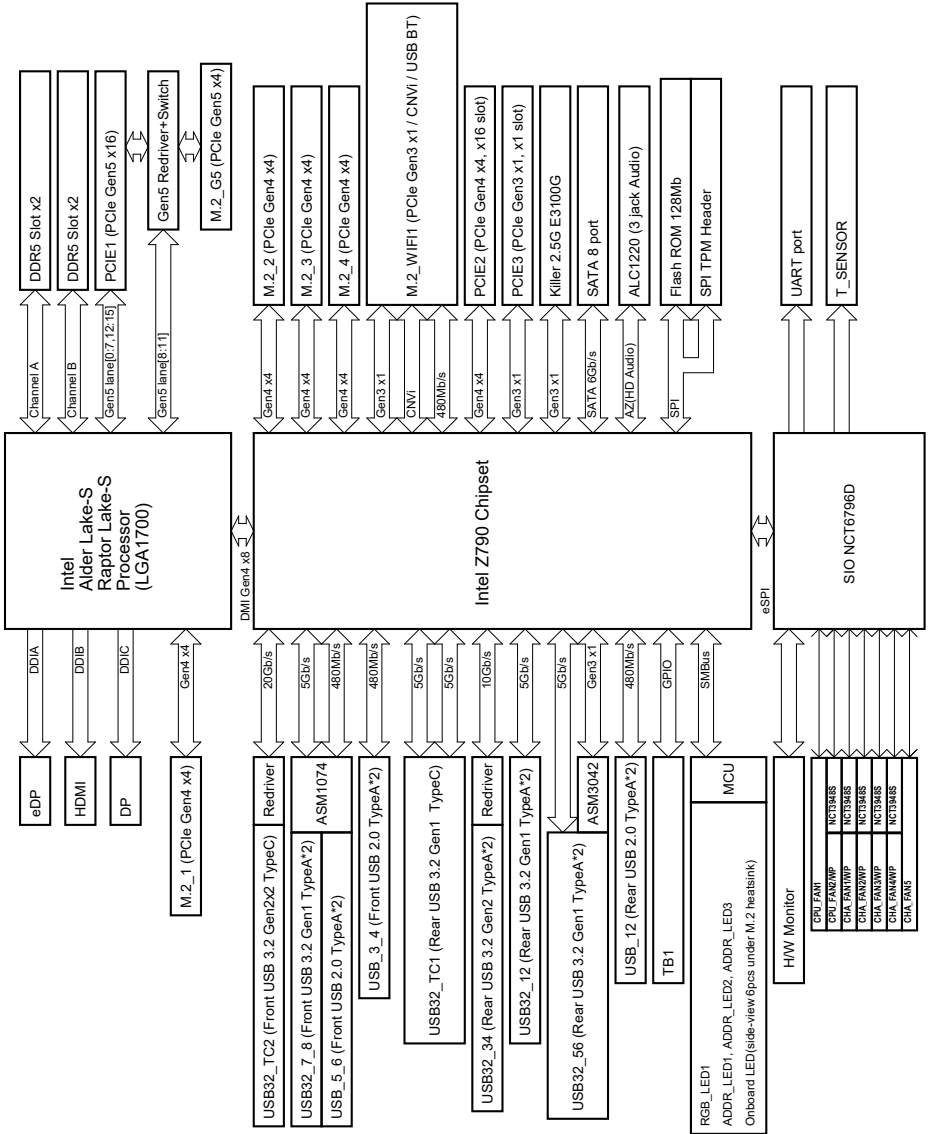
Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Blinking	Data Activity	Orange	100Mbps/1Gbps connection
On	Link	Green	2.5Gbps connection

**** Function of the Audio Ports in 7.1-channel Configuration:**

Port	Function
Light Blue (Rear panel)	Rear Speaker Out
Lime (Rear panel)	Front Speaker Out
Pink (Rear panel)	Central /Subwoofer Speaker Out
Lime (Front panel)	Side Speaker Out

***** USB32_56 are Lightning Gaming Ports.**

1.5 Block Diagram



1.6 802.11be Wi-Fi 7 Module and ASRock WiFi 2.4/5/6 GHz Antenna

802.11be Wi-Fi 7 + BT Module

This motherboard comes with an exclusive 802.11 a/b/g/n/ac/ax/be Wi-Fi 7 + BT v5.4 module that offers support for 802.11 a/b/g/n/ac/ax/be Wi-Fi 7 connectivity standards and Bluetooth v5.4. Wi-Fi 7 + BT module is an easy-to-use wireless local area network (WLAN) adapter to support Wi-Fi 7 + BT. Bluetooth v5.4 standard features Smart Ready technology that adds a whole new class of functionality into the mobile devices.

* The transmission speed may vary according to the environment.

* Wi-Fi 7 (6GHz band) will be supported by Microsoft® Windows® 11. The availability will depend on the different regulation status of each country and region. It will be activated (for supported countries) through Windows Update and software updates once available.

* A 6GHz compatible router is required for 7 functionality.

Chapter 2 Installation

This is an ATX form factor motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

Pre-installation Precautions

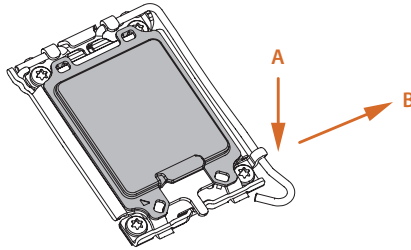
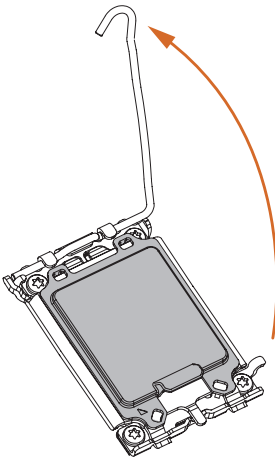
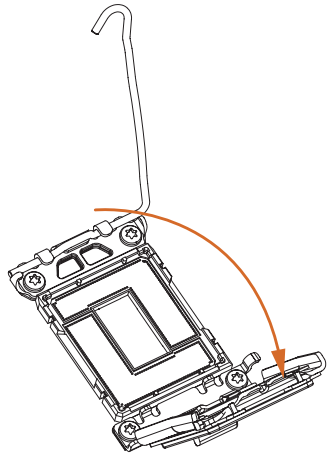
Take note of the following precautions before you install motherboard components or change any motherboard settings.

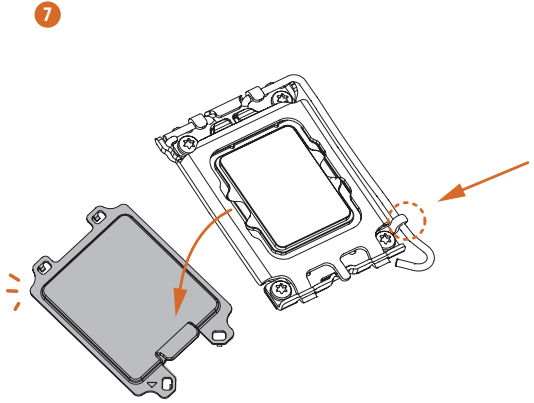
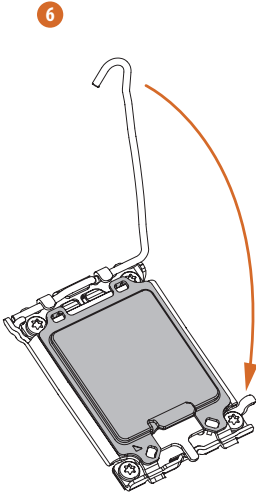
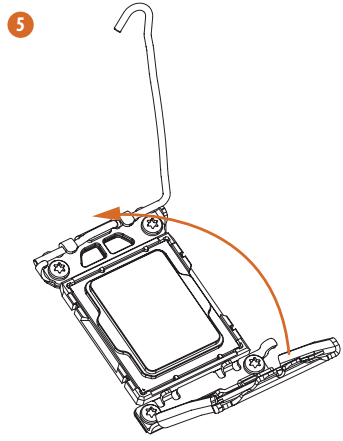
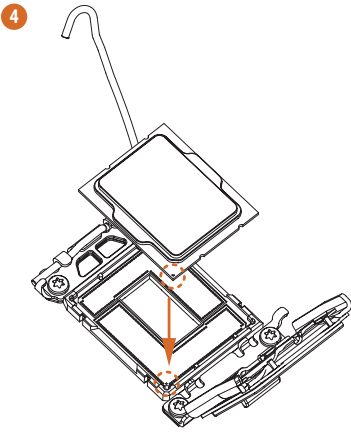
- Make sure to unplug the power cord before installing or removing the motherboard components. Failure to do so may cause physical injuries and damages to motherboard components.
- In order to avoid damage from static electricity to the motherboard's components, NEVER place your motherboard directly on a carpet. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle the components.
- Hold components by the edges and do not touch the ICs.
- Whenever you uninstall any components, place them on a grounded anti-static pad or in the bag that comes with the components.
- When placing screws to secure the motherboard to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard.

2.1 Installing the CPU



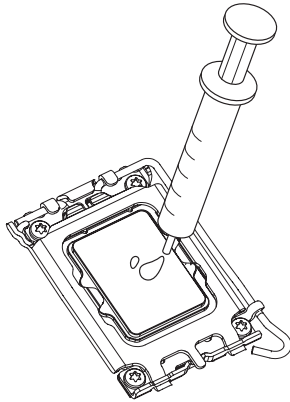
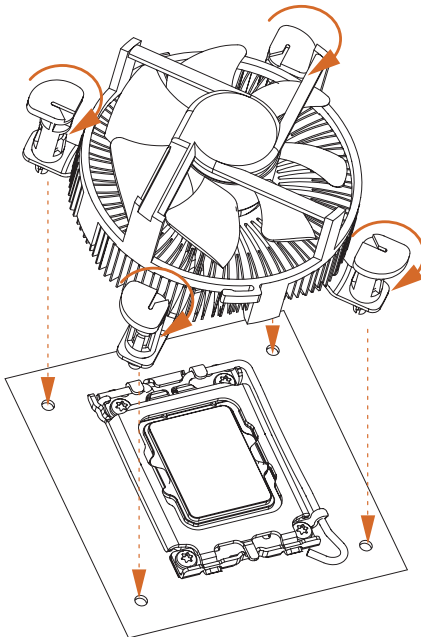
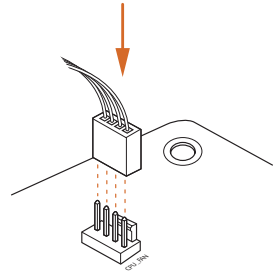
1. Before you insert the 1700-Pin CPU into the socket, please check if the **PnP cap** is on the socket, if the CPU surface is unclean, or if there are any **bent pins** in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all power cables before installing the CPU.

1**2****3**



Please save and replace the cover if the processor is removed. The cover must be placed if you wish to return the motherboard for after service.

2.2 Installing the CPU Fan and Heatsink

**1****2**

2.3 Installing Memory Modules (DIMM)

This motherboard provides four 288-pin DDR5 (Double Data Rate 5) DIMM slots, and supports Dual Channel Memory Technology.



1. For dual channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR5 DIMM pairs.
2. It is unable to activate Dual Channel Memory Technology with only one or three memory module installed.
3. It is not allowed to install a DDR, DDR2, DDR3 or DDR4 memory module into a DDR5 slot; otherwise, this motherboard and DIMM may be damaged.
4. The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

Recommended Memory Configuration

1 DIMM



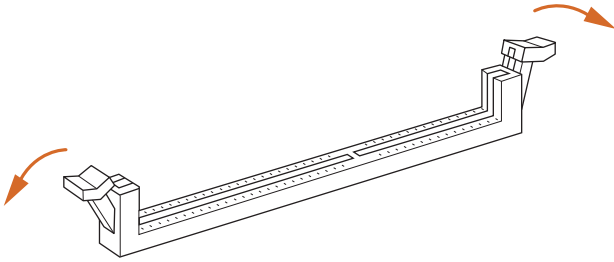
2 DIMMs



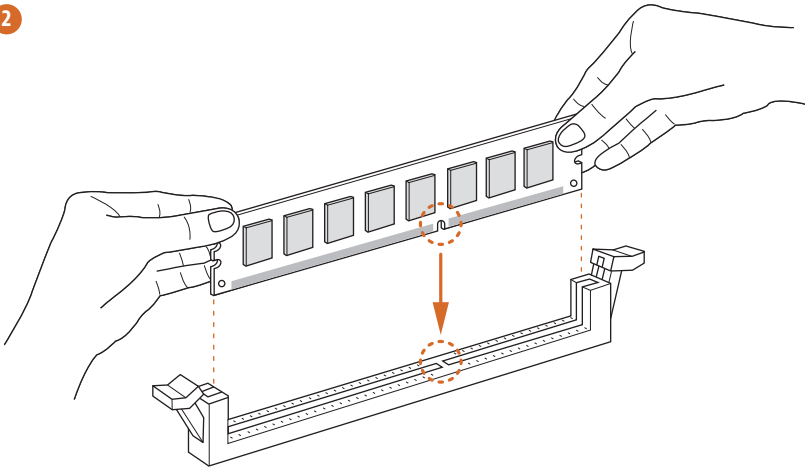
4 DIMMs



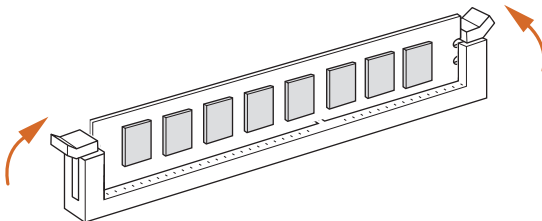
1



2

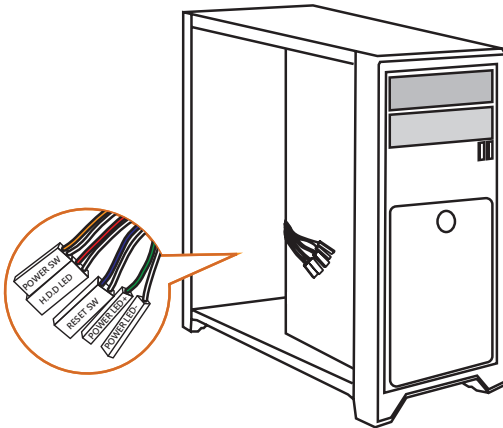


3

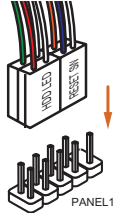


2.4 Connecting the Front Panel Header

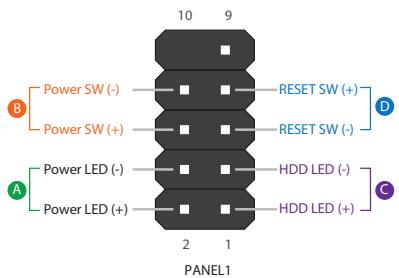
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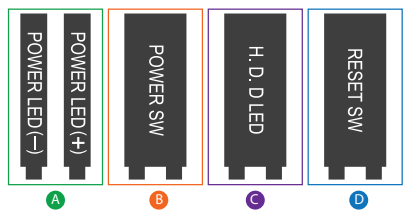
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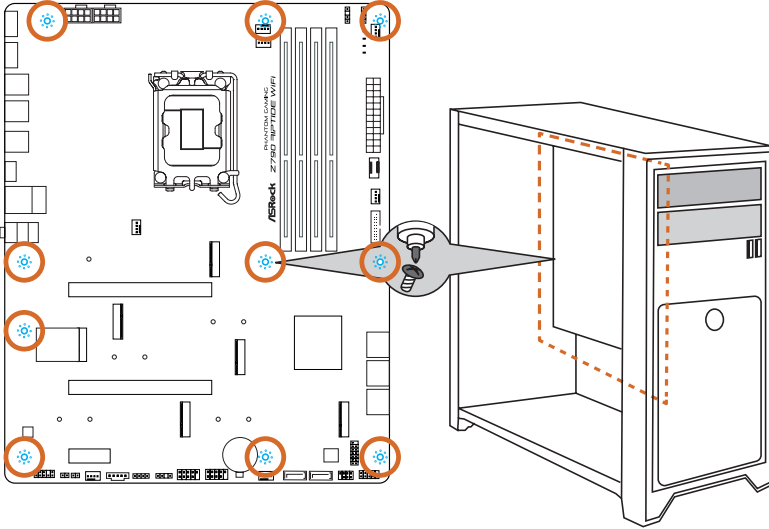
System Panel Header



Front Panel Wires

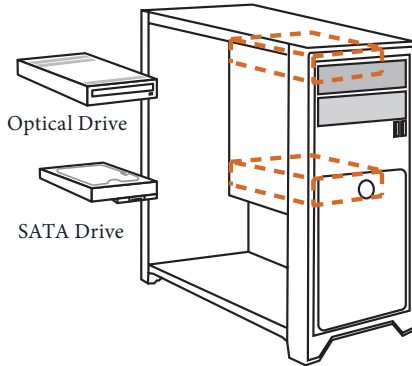


2.5 Installing the Motherboard

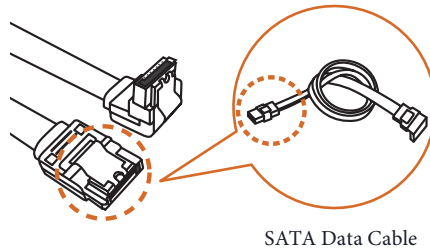


2.6 Installing SATA Drives

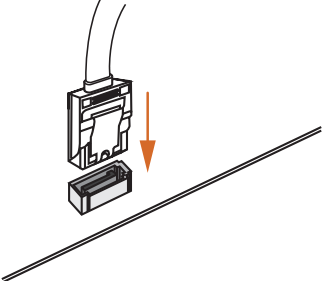
1



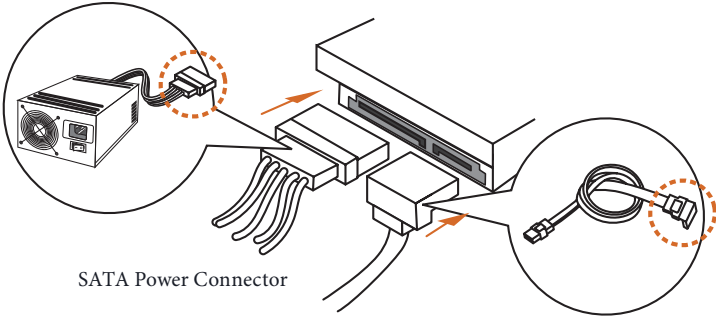
2



3



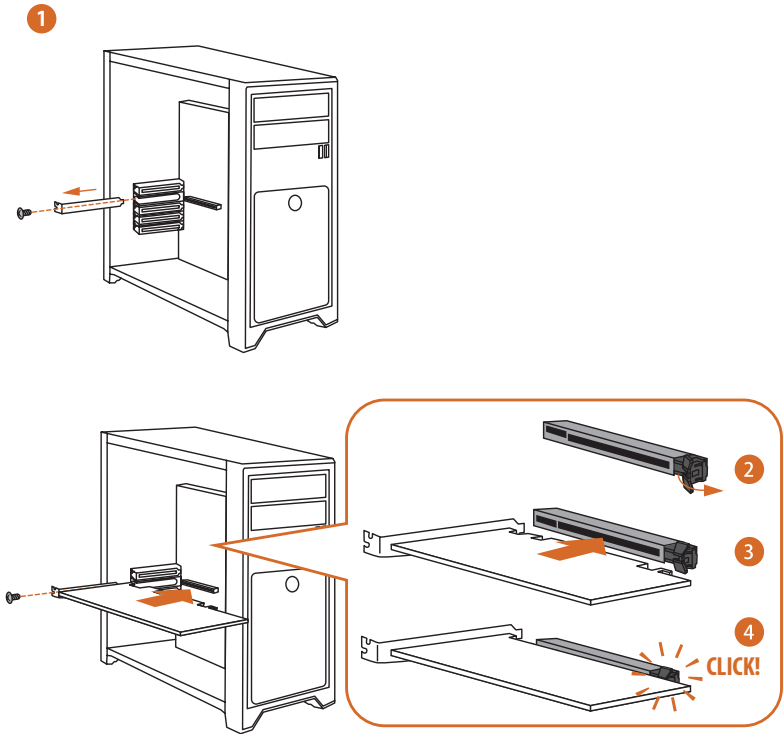
4



SATA Power Connector

SATA Data Connector

2.7 Installing a Graphics Card



Expansion Slots (PCIe Slots)

There are 3 PCI Express slots on the motherboard.



Before installing an expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

PCIe slots:

PCIe1 (PCIe 5.0 x16 slot) is used for PCIe x16 lane width graphics cards.

PCIe2 (PCIe 4.0 x16 slot) is used for PCIe x4 lane width graphics cards.

PCIe3 (PCIe 3.0 x1 slot) is used for PCIe x1 lane width cards.

* If M.2_GEN5 is occupied, PCIe1 will downgrade to x8 mode.

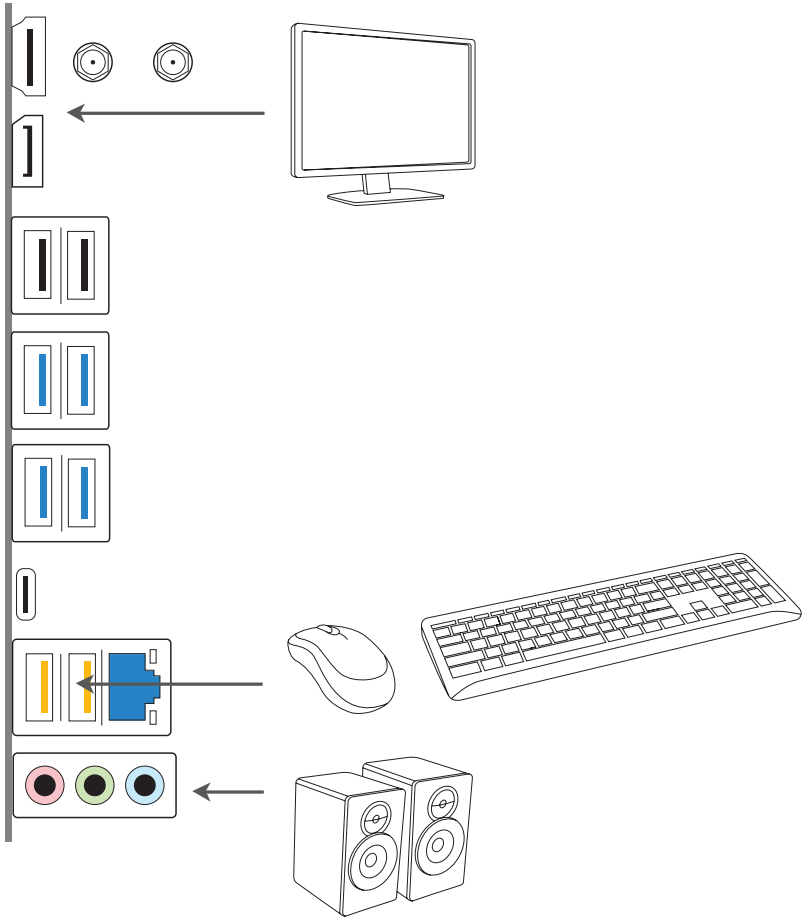
PCIe Slot Configurations

	PCIe1	PCIe2
Single Graphics Card	Gen5x16	N/A
Two Graphics Cards in CrossFire™ Mode	Gen5x16	Gen4x4

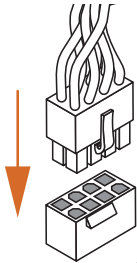
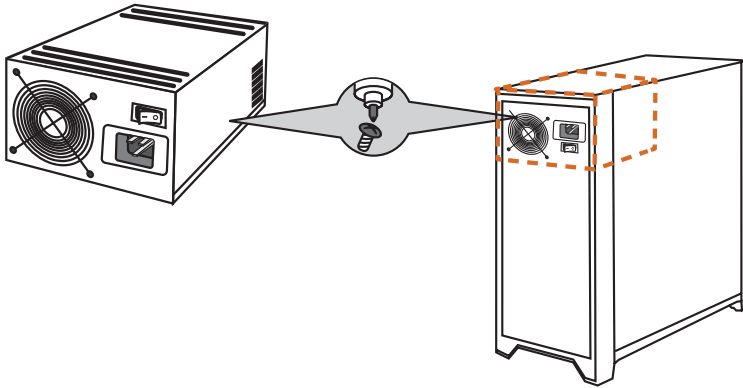


For a better thermal environment, please connect a chassis fan to the motherboard's chassis fan connectors (CHA_FAN1~4/WP and CHA_FAN5) when using multiple graphics cards.

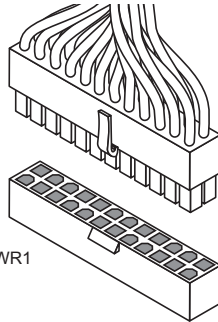
2.8 Connecting Peripheral Devices



2.9 Connecting the Power Connectors

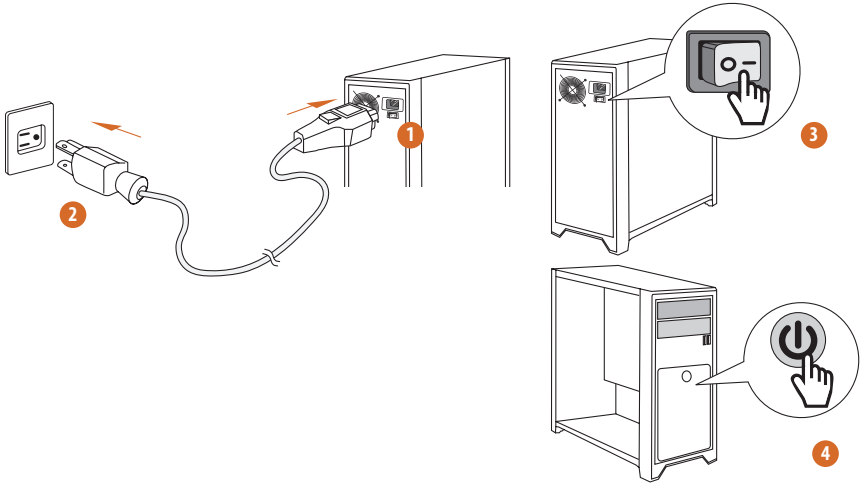


ATX12V1



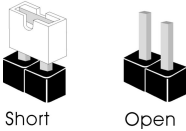
ATXPWR1

2.10 Power On



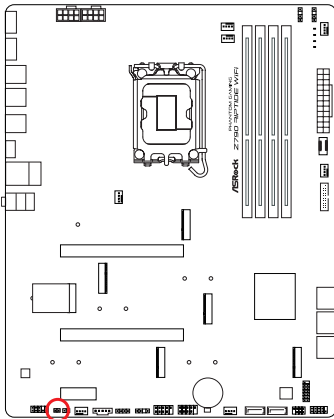
2.11 Jumpers Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is “Short”. If no jumper cap is placed on the pins, the jumper is “Open”.



Clear CMOS Jumper
(CLRMOSE1) (see p.7, No. 31)

CLRMOSE1 allows you to clear the data in CMOS. The data in CMOS includes system setup information such as system password, date, time, and system setup parameters. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord, then use a jumper cap to short the pins on CLRMOSE1 for 3 seconds. Please remember to remove the jumper cap after clearing the CMOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action.



CLRMOSE1



2-pin Jumper

Short: Clear CMOS

Open: Default

2.12 Onboard Headers and Connectors

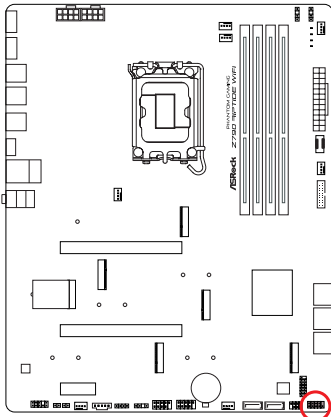


Onboard headers and connectors are **NOT** jumpers. Do **NOT** place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard.

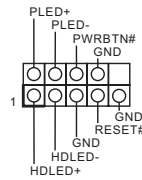
System Panel Header

(9-pin PANEL1) (see p.7, No. 19)

Connect the power button, reset button and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.



PANEL1



PWRBTN (Power Button):

Connect to the power button on the chassis front panel. You may configure the way to turn off your system using the power button.

RESET (Reset Button):

Connect to the reset button on the chassis front panel. Press the reset button to restart the computer if the computer freezes and fails to perform a normal restart.

PLED (System Power LED):

Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).

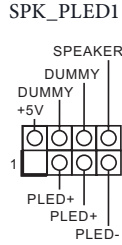
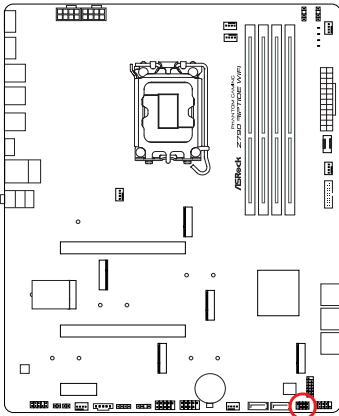
HDLED (Hard Drive Activity LED):

Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

The front panel design may differ by chassis. A front panel module mainly consists of power button, reset button, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

Power LED and Speaker Header
(7-pin SPK_PLED1) (see p.7, No. 20)

Please connect the chassis power LED and the chassis speaker to this header.



Serial ATA3 Connectors

Vertical:

(SATA3_0) (see p.7, No. 22)

(SATA3_1) (see p.7, No. 21)

Right Angle:

(SATA3_2) (see p.7, No. 17) (Lower)

(SATA3_3) (see p.7, No. 17) (Upper)

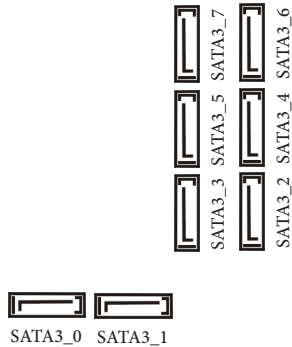
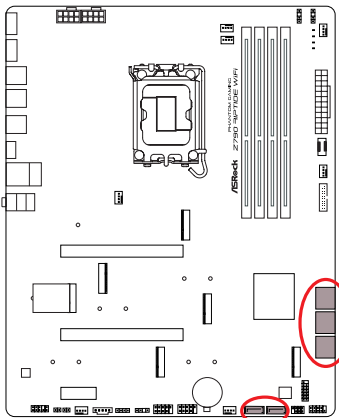
(SATA3_4) (see p.7, No. 16) (Lower)

(SATA3_5) (see p.7, No. 16) (Upper)

(SATA3_6) (see p.7, No. 15) (Lower)

(SATA3_7) (see p.7, No. 15) (Upper)

These eight SATA3 connectors support SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.

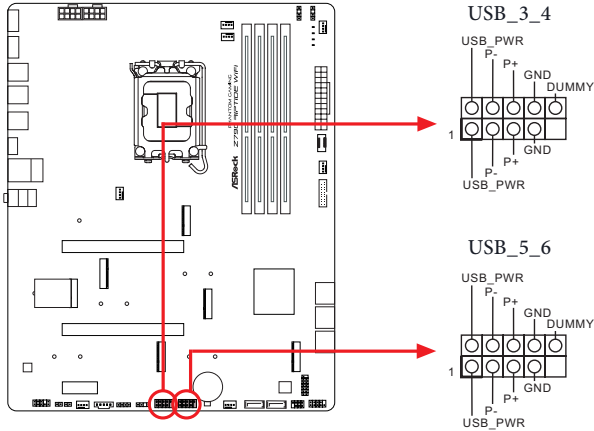


USB 2.0 Headers

(9-pin USB_3_4) (see p.7, No. 25)

(9-pin USB_5_6) (see p.7, No. 24)

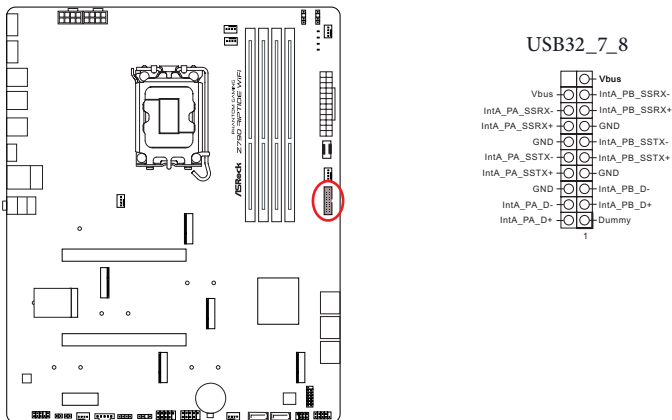
There are two headers on this motherboard. Each USB 2.0 header can support two ports.



USB 3.2 Gen1 Header

(19-pin USB32_7_8) (see p.7, No. 14)

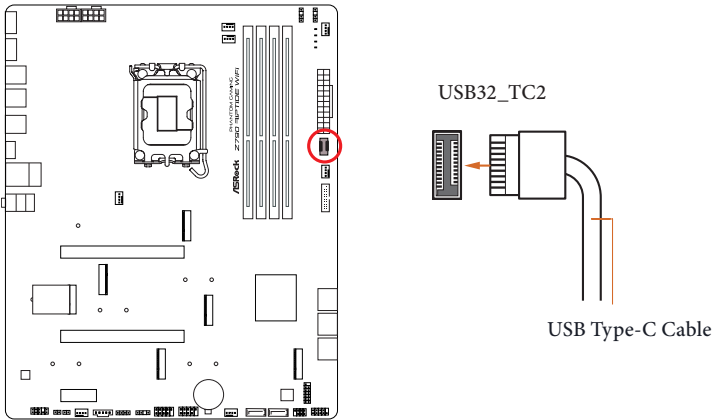
There is one header on this motherboard. This USB 3.2 Gen1 header can support two ports.



Front Panel Type C USB 3.2 Gen2x2 Header

(20-pin USB32_TC2) (see p.7, No. 12)

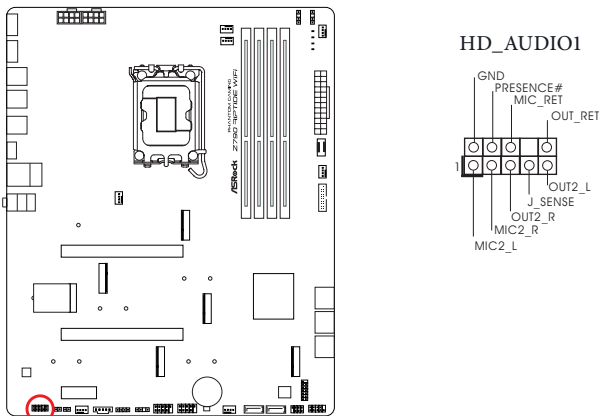
There is one Front Panel Type C USB 3.2 Gen2x2 Header on this motherboard. This header is used for connecting a USB 3.2 Gen2x2 module for additional USB 3.2 Gen2x2 ports.



Front Panel Audio Header

(9-pin HD_AUDIO1) (see p.7, No. 32)

This header is for connecting audio devices to the front audio panel.

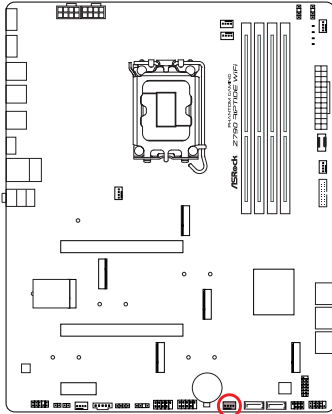


High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instructions in our manual and chassis manual to install your system.

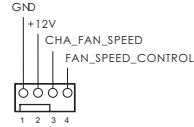
Chassis Fan Connector

(4-pin CHA_FAN5) (see p.7, No. 23)

Please connect fan cables to the fan connector and match the black wire to the ground pin.



CHA_FAN5



Chassis/Water Pump Fan Connectors

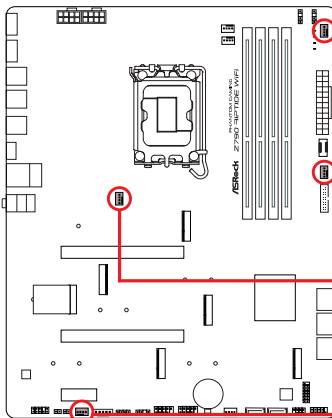
(4-pin CHA_FAN1/WP) (see p.7, No. 33)

(4-pin CHA_FAN2/WP) (see p.7, No. 9)

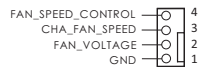
(4-pin CHA_FAN3/WP) (see p.7, No. 13)

(4-pin CHA_FAN4/WP) (see p.7, No. 29)

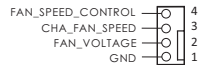
This motherboard provides four 4-Pin water cooling chassis fan connectors. If you plan to connect a 3-Pin chassis water cooler fan, please connect it to Pin 1-3.



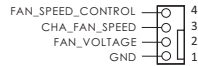
CHA_FAN2/WP



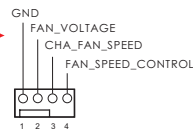
CHA_FAN3/WP



CHA_FAN1/WP

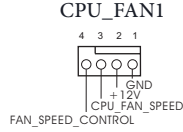
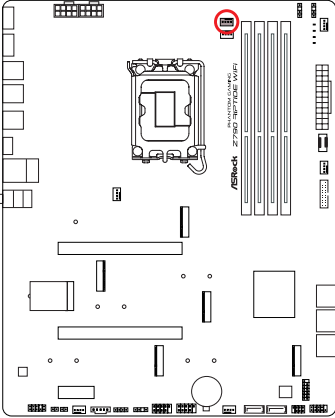


CHA_FAN4/WP



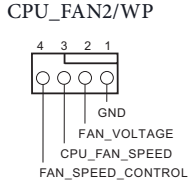
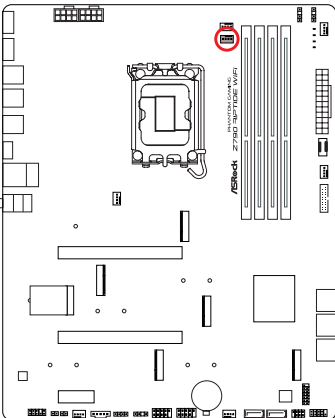
CPU Fan Connector
(4-pin CPU_FAN1) (see p.7, No. 4)

This motherboard provides a 4-Pin CPU fan (Quiet Fan) connector. If you plan to connect a 3-Pin CPU fan, please connect it to Pin 1-3.



CPU/Water Pump Fan Connector
(4-pin CPU_FAN2/WP) (see p.7, No. 3)

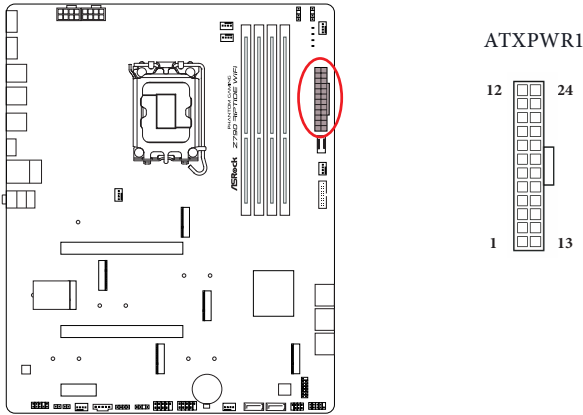
This motherboard provides a 4-Pin water cooling CPU fan connector. If you plan to connect a 3-Pin CPU water cooler fan, please connect it to Pin 1-3.



ATX Power Connector

(24-pin ATXPWR1) (see p.7, No. 11)

This motherboard provides a 24-pin ATX power connector. To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13.



ATX 12V Power Connectors

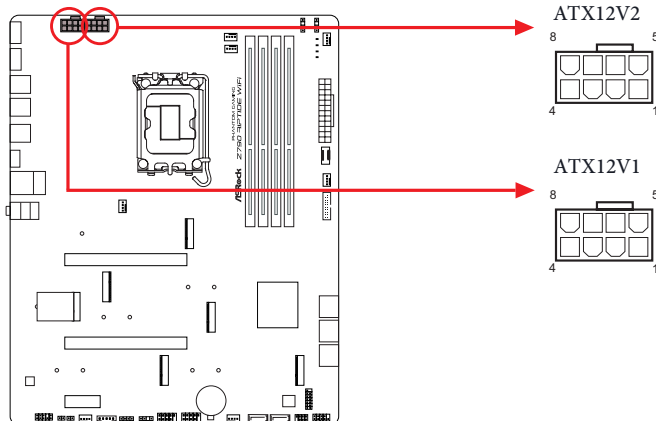
(8-pin ATX12V1) (see p.7, No. 1)

(8-pin ATX12V2) (see p.7, No. 2)

This motherboard provides two 8-pin ATX 12V power connectors. To use a 4-pin ATX power supply, please plug it along Pin 1 and Pin 5.

*Connecting an ATX 12V 8-pin cable to ATX12V2 is optional.

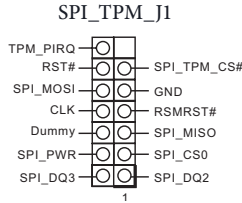
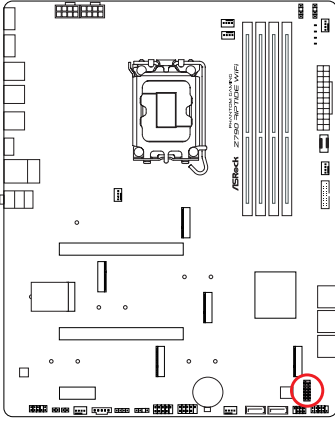
***Warning: Please make sure that the power cable connected is for the CPU and not the graphics card. Do not plug the PCIe power cable to this connector.**



SPI TPM Header

(13-pin SPI_TPM_J1) (see p.7, No. 18)

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

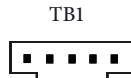
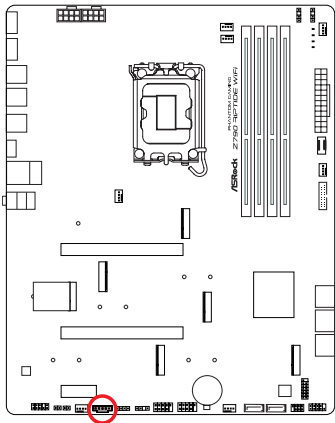


Thunderbolt AIC Connector

(5-pin TB1) (see p.7, No. 28)

Please connect a Thunderbolt™ add-in card (AIC) to the Thunderbolt AIC connector via the GPIO cable.

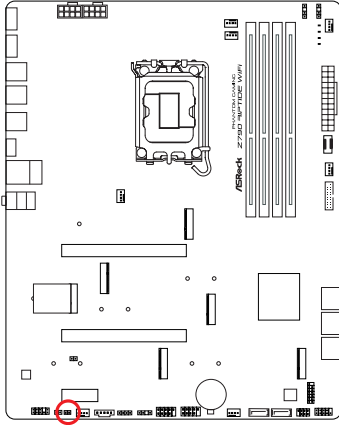
*Please install the Thunderbolt™ AIC card to PCIE2 (default slot).



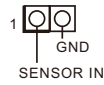
Thermistor Cable Header

(4-pin T_SENSOR1) (see p.7, No. 30)

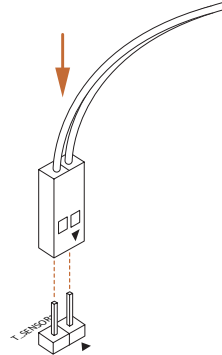
The Thermistor Cable Header is used to connect thermistor cable to monitor the temperature of the critical components. Plug the thermistor cable that comes with the package to this header, and then attach the sensor end to the component to detect its temperature.



T_SENSOR1



Connect your Thermistor Cable to the **Thermistor Cable Header (T_SENSOR1)** on the motherboard.



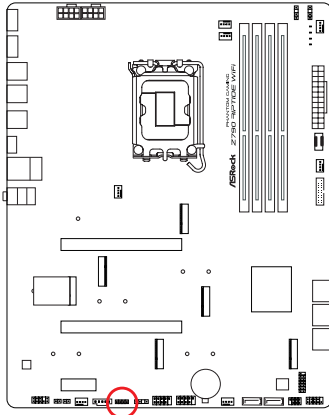
RGB LED Header

(4-pin RGB_LED1) (see p.7, No. 27)

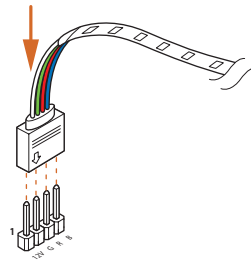
This RGB header is used to connect RGB LED extension cable which allow users to choose from various LED lighting effects.

*The RGB LED extension cable is purchased separately.

Caution: Never install the RGB LED cable in the wrong orientation; otherwise, the cable may be damaged.



Connect your RGB LED strip to the **RGB LED Header (RGB_LED1)** on the motherboard.



1. Never install the RGB LED cable in the wrong orientation; otherwise, the cable may be damaged.
2. Before installing or removing your RGB LED cable, please power off your system and unplug the power cord from the power supply. Failure to do so may cause damages to motherboard components.



1. Please note that the RGB LED strips do not come with the package.
2. The RGB LED header supports standard 5050 RGB LED strip (12V/G/R/B), with a maximum power rating of 3A (12V) and length within 2 meters.

Addressable LED Headers

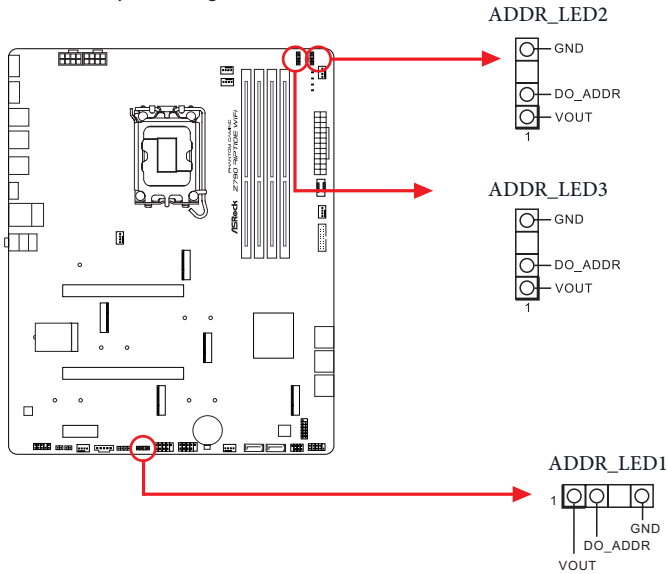
(3-pin ADDR_LED1) (see p.7, No. 26)

(3-pin ADDR_LED2) (see p.7, No. 8)

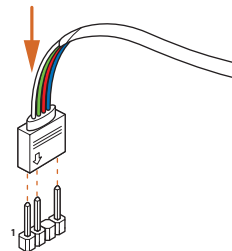
(3-pin ADDR_LED3) (see p.7, No. 7)

These headers are used to connect Addressable LED extension cables which allow users to choose from various LED lighting effects.

Caution: Never install the Addressable LED cable in the wrong orientation; otherwise, the cable may be damaged.



Connect your Addressable RGB LED strips to the Addressable LED Headers (ADDR_LED1 / ADDR_LED2 / ADDR_LED3) on the motherboard.





1. *Never install the Addressable LED cable in the wrong orientation; otherwise, the cable may be damaged.*
2. *Before installing or removing your Addressable LED cable, please power off your system and unplug the power cord from the power supply. Failure to do so may cause damages to motherboard components.*



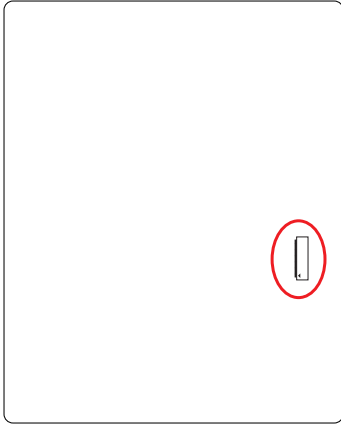
1. *Please note that the Addressable LED strips do not come with the package.*
2. *The Addressable LED header supports WS2812B addressable RGB LED strip (5V/Data/GND), with a maximum power rating of 3A (5V) and length within 2 meters.*

eDP Signal Connector

(40-pin EDP1) (see p.8, No. 34)

This connector on the bottom side of the motherboard is for an LCD monitor that supports an internal embedded DisplayPort (eDP).

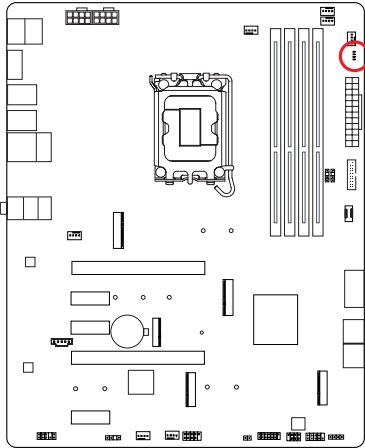
*Please refer to page 54 for further instructions on how to adjust the brightness.



PIN	SIGNAL
1	N/A
2	LCD_BLT_VCC
3	LCD_BLT_VCC
4	LCD_BLT_VCC
5	LCD_BLT_VCC
6	N/A
7	N/A
8	eDP_VARY_BL
9	eDP_BLON
10	BKT_GND
11	BKT_GND
12	BKT_GND
13	BKT_GND
14	eDP_HPD_CON
15	PNL_GND
16	PNL_GND
17	PNL_GND
18	PNL_GND
19	N/A
20	+LVDD
21	+LVDD
22	+LVDD
23	+LVDD
24	GND
25	eDP_AUX#_CON
26	eDP_AUX_CON
27	GND
28	eDP_TX0_CON
29	eDP_TX#0_CON
30	GND
31	eDP_TX1_CON
32	eDP_TX#1_CON
33	GND
34	N/A
35	N/A
36	GND
37	N/A
38	N/A
39	GND
40	N/A

2.13 Post Status Checker

Post Status Checker (PSC) diagnoses the computer when users power on the machine. It emits a red light to indicate whether the CPU, memory, VGA or storage is dysfunctional. The lights go off if the four mentioned above are functioning normally.



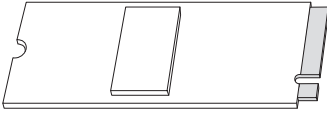
CPU ■
DRAM ■
VGA ■
BOOT ■

2.14 M.2 SSD Card Installation Guide (M2_GEN5)

The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Blazing M.2 Socket (M2_GEN5, Key M) supports type 2280 PCIe Gen5x4 (128 Gb/s) mode.

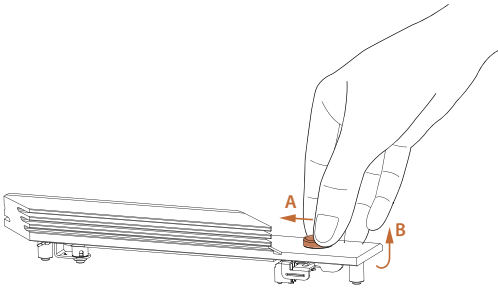
* If M.2_GEN5 is occupied, PCIE1 will downgrade to x8 mode.

Installing the M.2 SSD Card



Step 1

Prepare a M.2 SSD card.



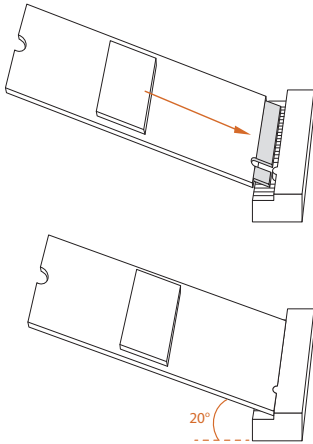
Step 2

Push and hold the button on the M.2 heatsink (A). Then lift the heatsink up off the motherboard (B).

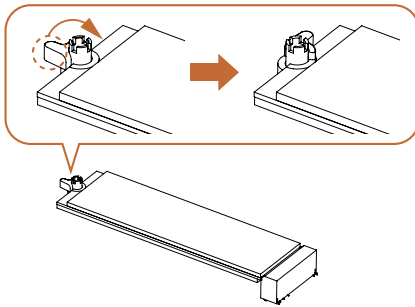
*Please remove the protective films on the bottom side of the M.2 heatsink before you install a M.2 SSD card.

Step 3

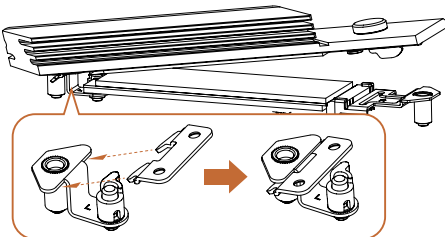
Align and gently insert the M.2 SSD card into the M.2 slot. Please be aware that the M.2 SSD card only fits in one orientation.

**Step 4**

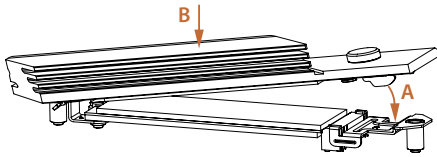
Ensure that the notch at the end of the M.2 SSD card aligns with the nut. Then secure the M.2 SSD card by turning the nut lock clockwise to its locked position.

**Step 5**

Hook the tab of the M.2 heatsink back onto the standoff.

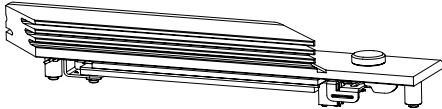


Step 6



Move the M.2 heatsink in the direction shown (A) and press it down (B).

Step 7



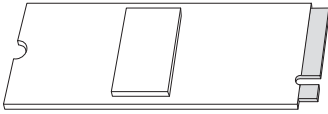
Complete.

For the latest updates of M.2 SSD card support list, please visit our website for details:
<http://www.asrock.com>

2.15 M.2 SSD Card Installation Guide (M2_1 and M2_2)

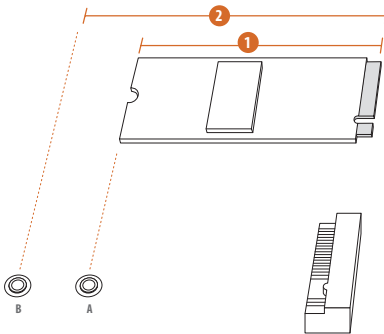
The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Hyper M.2 Sockets (M2_1 and M2_2, Key M) support type 2260/2280 PCIe Gen4x4 (64 Gb/s) mode.

Installing the M.2 SSD Card



Step 1

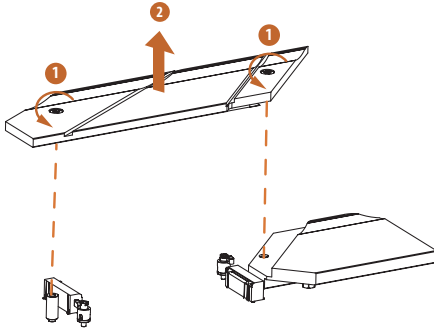
Prepare a M.2 SSD card.



Step 2

Depending on the PCB type and length of your M.2 SSD card, find the corresponding nut location to be used.

No.	1	2
Nut Location	A	B
PCB Length	6cm	8cm
Module Type	Type2260	Type 2280



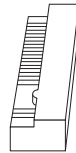
Step 3

Before installing a M.2 SSD card, please loosen the screws to remove the M.2 heatsink.

*Please remove the protective films on the bottom side of the M.2 heatsink before you install a M.2 SSD card.

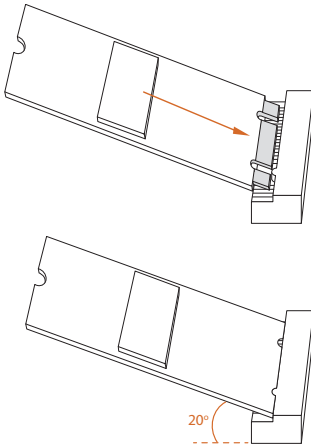


Step 4



Peel off the yellow protective film on the nut A. Remove the lock nut on the nut B with a screwdriver, and tighten it into the nut A.

Skip Step 4 if your M.2 SSD card is Type 2280.

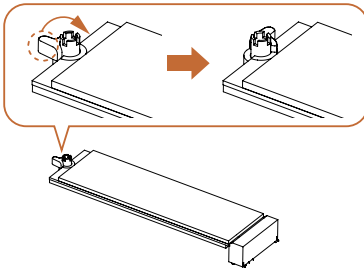


Step 5

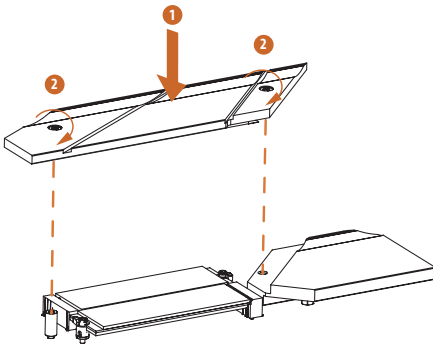
Align and gently insert the M.2 SSD card into the M.2 slot. Please be aware that the M.2 SSD card only fits in one orientation.

Step 6

Ensure that the notch at the end of the M.2 SSD card aligns with the nut. Then secure the M.2 SSD card by turning the nut lock clockwise to its locked position.

**Step 7**

Tighten the screw with a screwdriver to secure the M.2 heatsink into place. Please do not overtighten the screw as this might damage the M.2 heatsink.



For the latest updates of M.2 SSD card support list, please visit our website for details:
<http://www.asrock.com>

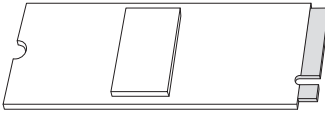
2.16 M.2 SSD Card Installation Guide (M2_3 and M2_4)

The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Hyper M.2 Sockets (M2_3 and M2_4, Key M) support type 2260/2280 PCIe Gen4x4 (64 Gb/s) mode.

Installing the M.2 SSD Card

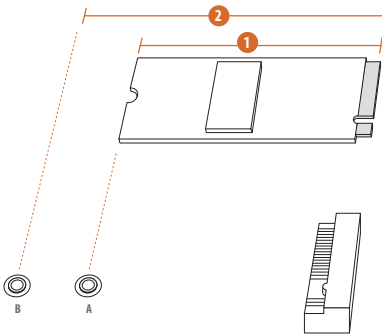
Step 1

Prepare a M.2 SSD card.

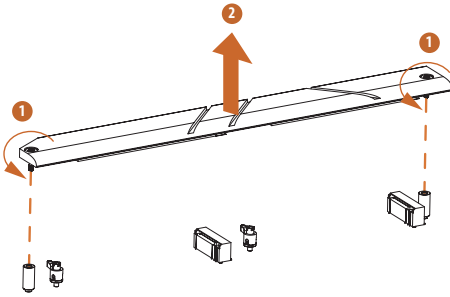


Step 2

Depending on the PCB type and length of your M.2 SSD card, find the corresponding nut location to be used.

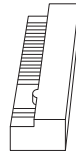


No.	1	2
Nut Location	A	B
PCB Length	6cm	8cm
Module Type	Type2260	Type 2280

**Step 3**

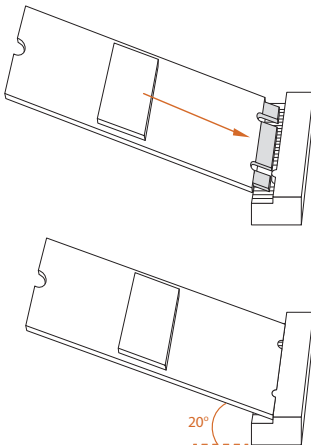
Before installing a M.2 SSD card, please loosen the screws to remove the M.2 heatsink.

*Please remove the protective films on the bottom side of the M.2 heatsink before you install a M.2 SSD card.

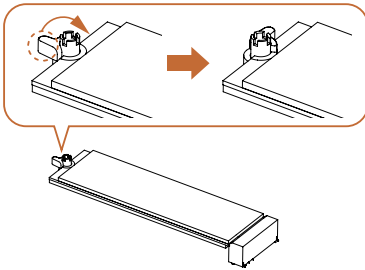
**Step 4**

Peel off the yellow protective film on the nut A. Remove the lock nut on the nut B with a screwdriver, and tighten it into the nut A.

Skip Step 4 if your M.2 SSD card is Type 2280.

**Step 5**

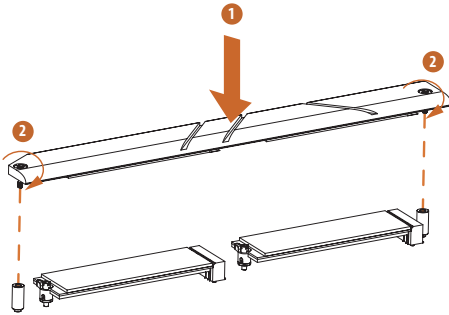
Align and gently insert the M.2 SSD card into the M.2 slot. Please be aware that the M.2 SSD card only fits in one orientation.



Step 6

Ensure that the notch at the end of the M.2 SSD card aligns with the nut. Then secure the M.2 SSD card by turning the nut lock clockwise to its locked position.

Skip Step 7 if your M.2 SSD card is Type 2260.



Step 7

Tighten the screw with a screwdriver to secure the M.2 heatsink into place. Please do not overtighten the screw as this might damage the M.2 heatsink.

For the latest updates of M.2 SSD card support list, please visit our website for details:
<http://www.asrock.com>

2.17 Change Screen Brightness for eDP in Windows®

This section explains how to change screen brightness in Windows® when you use an eDP panel.

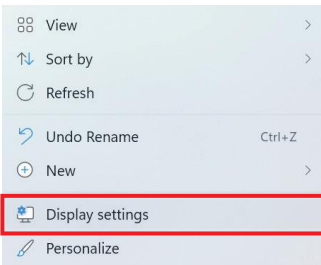


The following is a setup example for Windows® 11. Setup procedures may vary from different operating systems.

Setup Guide

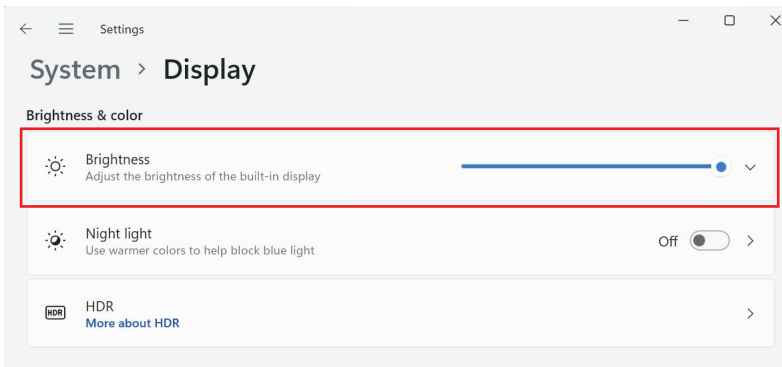
Step 1

Right click on desktop. Select **Display settings**.



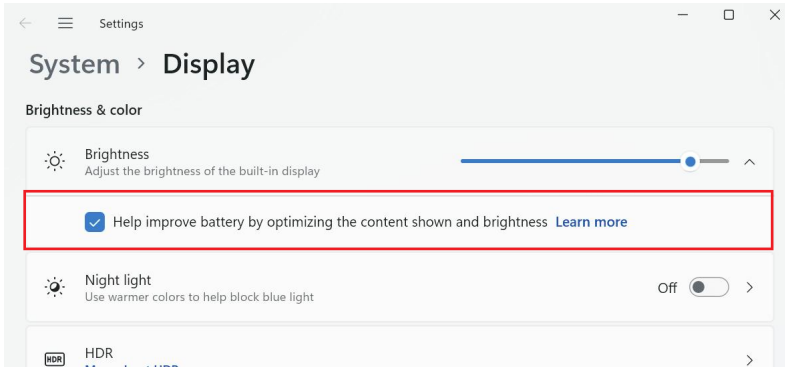
Step 2

In **System** > **Display**, select **Brightness**. Move the slider to fine-tune the brightness level.



Step 3

You might also see another check box displayed: **Help improve battery by optimizing the content shown and brightness**. Select the check box to turn on the content adaptive brightness control if needed.



Version 1.0

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

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

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

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

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CALIFORNIA, USA ONLY

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“Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate”

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CE Warning

This device complies with directive 2014/53/EU issued by the Commission of the European Community.

This equipment complies with EU radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.