PRO SERIES

ASRock

Z890 PRO-A

MOTHERBOARD

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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Chapter 1 Introduction

Thank you for purchasing ASRock Z890 Pro-A 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 Z890 Pro-A Motherboard (ATX Form Factor)
- 1 x I/O Shield
- 2 x Serial ATA (SATA) Data Cables (Optional)
- 1 x Screw for M.2 Socket (Optional)

1.2 Specifications

Platform	• ATX Form Factor • 2oz Copper PCB
CPU	• Supports Intel® Core™ Ultra Processors (Series 2) (LGA1851RL-ILM) • Supports Intel® Hybrid Technology • Supports Intel® Turbo Boost Max 3.0 Technology • Supports Intel® Thermal Velocity Boost (TVB) • Supports Intel® Adaptive Boost Technology (ABT) • Integrated NPU for dedicated AI acceleration
Chipset	• Intel® Z890
Memory	• Dual Channel DDR5 Memory Technology • 4 x DDR5 DIMM Slots • Supports DDR5 non-ECC, un-buffered memory up to 9066+(OC)* • Max. capacity of system memory: 256GB • Supports Intel® Extreme Memory Profile (XMP) 3.0x * 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: • 2 x PCIe 4.0 x4 Slots (PCIE3 and PCIE4), support x4 mode* • 1 x PCIe 4.0 x1 Slot (PCIE2)* • 1 x M.2 Socket (Key E), supports type 2230 WiFi/BT PCIe WiFi module and Intel® CNVio/CNVio2 (Integrated WiFi/BT) * PCIE1 supports PCIe riser cards to extend one x16 slot to x8/x8 or x8/x4/x4 slots. * Supports NVMe SSD as boot disks

Graphics	• Intel® UHD Graphics Built-in Visuals and the VGA outputs can be supported only with processors which are GPU integrated. • Intel® Xe LPG Graphics Architecture • 1 x HDMI 2.1 TMDS/FRL 8G Compatible, supports HDR, HDCP 2.3 and max. resolution up to 4K 120Hz • 1 x DisplayPort 1.4 with DSC (compressed), supports HDCP 2.3 and max. resolution up to 8K 60Hz / 5K 120Hz • 1 x Intel® Thunderbolt™ 4, supports HDCP 2.3 and max. resolution up to 8K 60Hz / 5K 120Hz* * Supports two 4K displays or one 8K display * Only the CPU's embedded graphics can be displayed through Thunderbolt ports. If you want to display to a Thunderbolt monitor, please use CPU models with embedded graphics.
Audio	• 7.1 CH HD Audio (Realtek ALC897 Audio Codec)
LAN	• 2.5 Gigabit LAN 10/100/1000/2500 Mb/s • Dragon RTL8125BG • Supports Dragon 2.5G LAN Software - Smart Auto Adjust Bandwidth Control - Visual User Friendly UI - Visual Network Usage Statistics - Optimized Default Setting for Game, Browser, and Streaming Modes - User Customized Priority Control
USB	CPU: • 1 x Thunderbolt™ 4 Type-C (Rear) • 1 x USB 3.2 Gen2x2 Type-C (Rear) Chipset: • 1 x USB 3.2 Gen2x2 Type-C (Front) • 1 x USB 3.2 Gen2 Type-A (Rear) • 6 x USB 3.2 Gen1 (2 Rear, 4 Front) • 8 x USB 2.0 (4 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
- 1 x Thunderbolt™ 4 Type-C Port (40 Gb/s for USB4 protocol; 40Gb/s for Thunderbolt protocol)*
- 1 x USB 3.2 Gen2x2 Type-C Port (20 Gb/s)
- 1 x USB 3.2 Gen2 Type-A Port (10 Gb/s)
- 2 x USB 3.2 Gen1 Ports
- 4 x USB 2.0 Ports
- 1 x RJ-45 LAN Port
- 1 x BIOS Flashback Button
- HD Audio Jacks: Line in / Front Speaker / Microphone

* Supports USB PD 3.0 up to 5V@3A (15W) charging

Storage

CPU:

- 1 x Blazing M.2 Socket (M2_1, Key M), supports type 2280 PCIe Gen5x4 (128 Gb/s) mode*
- 1 x Hyper M.2 Socket (M2_2, Key M), supports type 2280 PCIe Gen4x4 (64 Gb/s) mode*
-

Chipset:

- 1 x Hyper M.2 Socket (M2_3, Key M), supports type 2280 PCIe Gen4x4 (64 Gb/s) mode*
- 1 x Hyper M.2 Socket (M2_4, Key M), supports type 2230/2242/2260/2280 SATA3 6.0 Gb/s & PCIe Gen4x4 (64 Gb/s) modes*
- 4 x SATA3 6.0 Gb/s Connectors

* Supports Intel® Volume Management Device (VMD)

* Supports NVMe SSD as boot disks

RAID

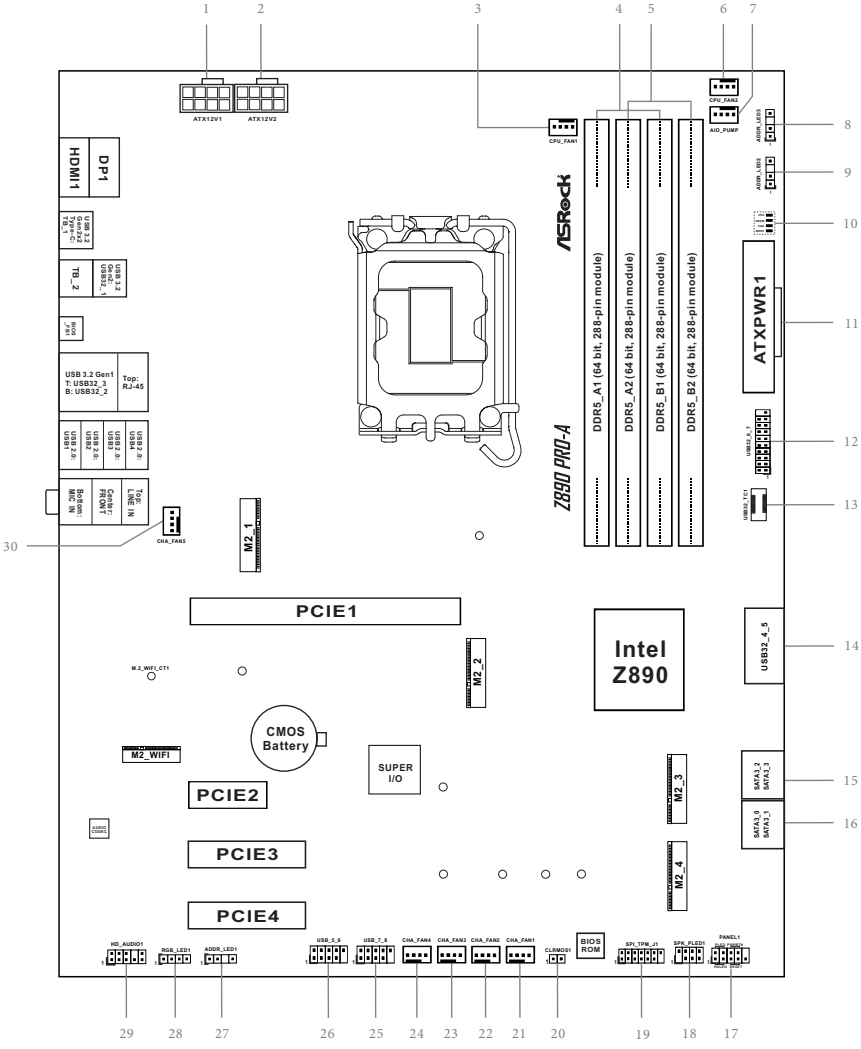
- Supports RAID 0, RAID 1, RAID 5 and RAID 10 for SATA storage devices
- Supports RAID 0, RAID 1, RAID 5 and RAID 10 for M.2 NVMe storage devices

Connector	• 1 x SPI TPM Header • 1 x Power LED and Speaker Header • 1 x RGB LED Header* • 3 x Addressable LED Headers** • 2 x CPU Fan Connectors (4-pin) (Smart Fan Speed Control)*** • 5 x Chassis Fan Connectors (4-pin) (Smart Fan Speed Control)*** • 1 x AIO Pump Fan Connector (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 • 2 x USB 2.0 Headers (Support 4 USB 2.0 ports) • 2 x USB 3.2 Gen1 Headers (Support 4 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, CHA_FAN1~5 and AIO_PUMP support the fan power up to 3A (36W). *** CPU_FAN2, CHA_FAN1~5 and AIO_PUMP 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® 11 64-bit
Certifications	• FCC, CE • ErP/EuP ready (ErP/EuP ready power supply is required)

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

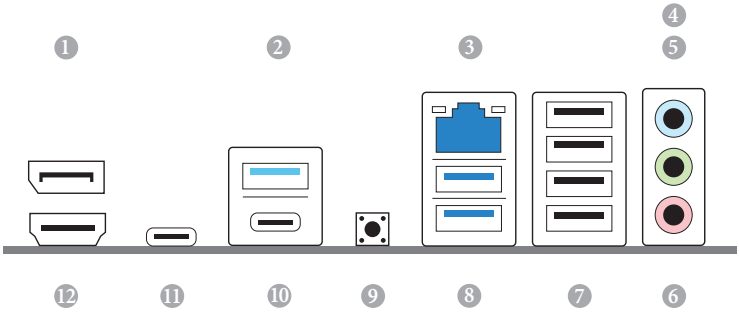
Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of 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



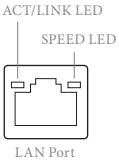
No.	Description
1	ATX 12V Power Connector (ATX12V1)
2	ATX 12V Power Connector (ATX12V2)
3	CPU Fan Connector (CPU_FAN1)
4	2 x 288-pin DDR5 DIMM Slots (DDR5_A1, DDR5_B1)
5	2 x 288-pin DDR5 DIMM Slots (DDR5_A2, DDR5_B2)
6	CPU Fan Connector (CPU_FAN2)
7	AIO Pump Fan Connector (AIO_PUMP)
8	Addressable LED Header (ADDR_LED3)
9	Addressable LED Header (ADDR_LED2)
10	Post Status Checker (PSC)
11	ATX Power Connector (ATXPWR1)
12	USB 3.2 Gen1 Header (USB32_6_7)
13	Front Panel Type C USB 3.2 Gen2x2 Header (USB32_TC1)
14	USB 3.2 Gen1 Header (USB32_4_5)
15	SATA3 Connectors (SATA3_2)(Upper), (SATA3_3)(Lower)
16	SATA3 Connectors (SATA3_0)(Upper), (SATA3_1)(Lower)
17	System Panel Header (PANEL1)
18	Power LED and Speaker Header (SPK_PLED1)
19	SPI TPM Header (SPI_TPM_J1)
20	Clear CMOS Jumper (CLRMOS1)
21	Chassis Fan Connector (CHA_FAN1)
22	Chassis Fan Connector (CHA_FAN2)
23	Chassis Fan Connector (CHA_FAN3)
24	Chassis Fan Connector (CHA_FAN4)
25	USB 2.0 Header (USB_7_8)
26	USB 2.0 Header (USB_5_6)
27	Addressable LED Header (ADDR_LED1)
28	RGB LED Header (RGB_LED1)
29	Front Panel Audio Header (HD_AUDIO1)
30	Chassis Fan Connector (CHA_FAN5)

1.4 I/O Panel



No.	Description	No.	Description
1	DisplayPort 1.4	7	USB 2.0 Ports (USB_1234)
2	USB 3.2 Gen2 Port (USB32_1)	8	USB 3.2 Gen1 Ports (USB32_23)
3	2.5G LAN RJ-45 Port*	9	BIOS Flashback Button
4	Line In (Light Blue)**	10	Thunderbolt™ 4 Type-C Port (TB_2)
5	Front Speaker (Lime)**	11	USB 3.2 Gen2x2 Type-C Port (TB_1)
6	Microphone (Pink)**	12	HDMI Port

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

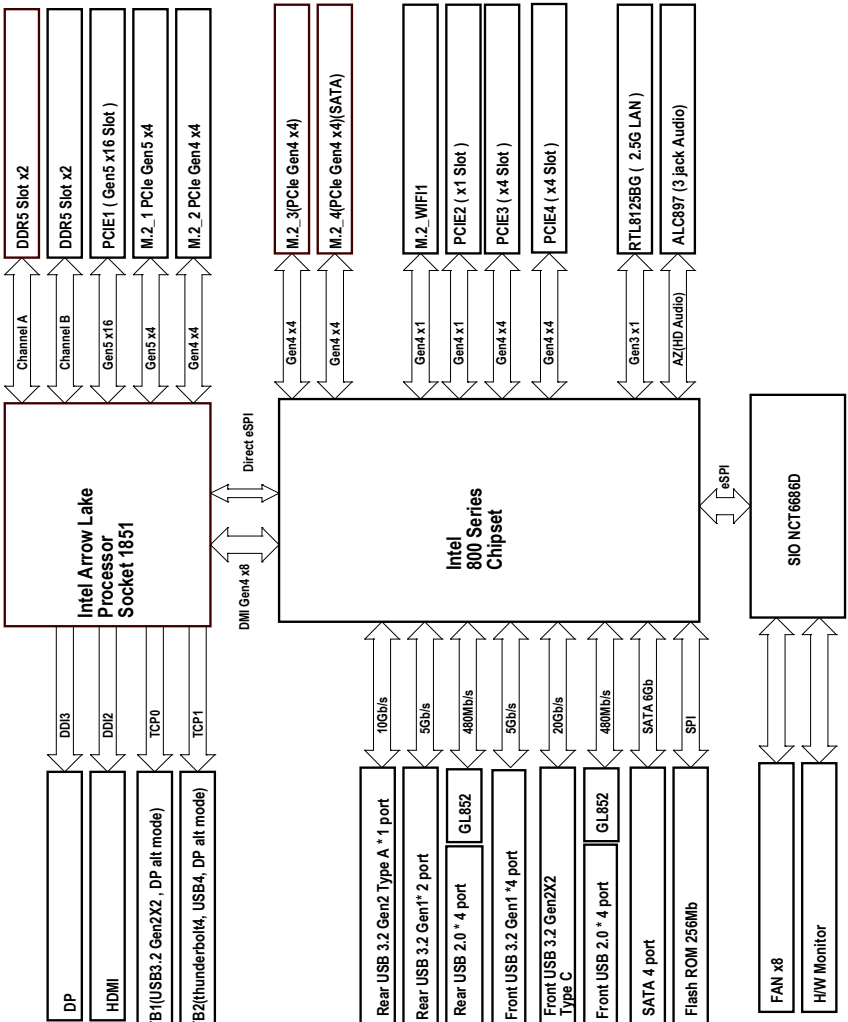


Activity / Link LED		Speed LED	
Status	**Description**	**Status**	**Description**
Off	No Link	Off	10Mbps connection
Blinking	Data Activity	Orange	100Mbps/1Gbps connection
On	Link	Green	2.5Gbps connection

*** **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

1.5 Block Diagram



Chapter 2 Installation

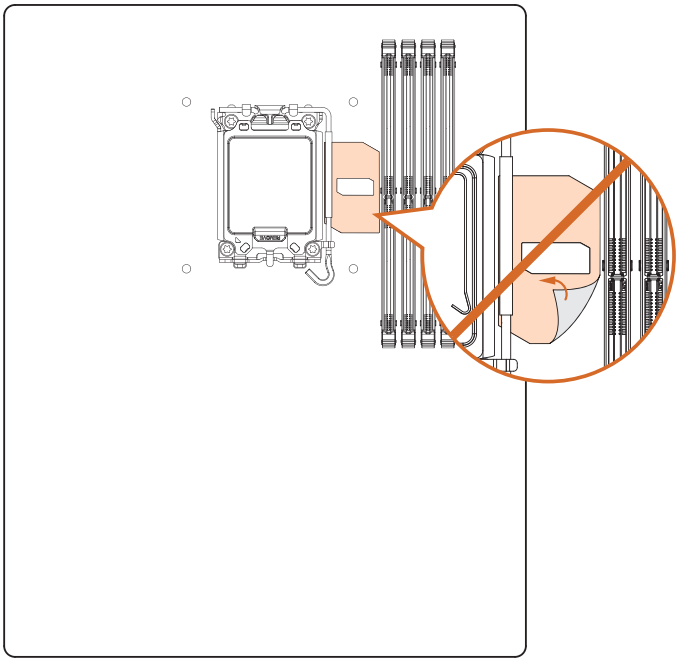
This is an ATX form factor motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

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.

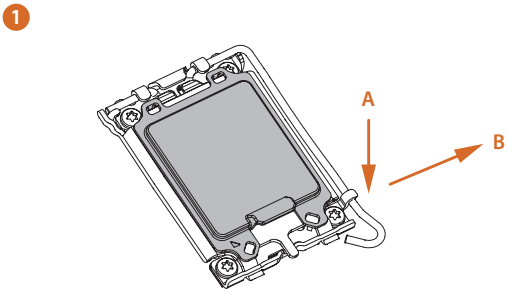
DO NOT remove this Memory OC Shield (patent pending) from the motherboard. Removing this may affect memory overclocking performance and stability.

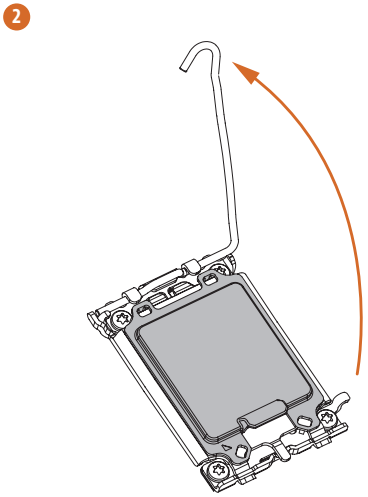


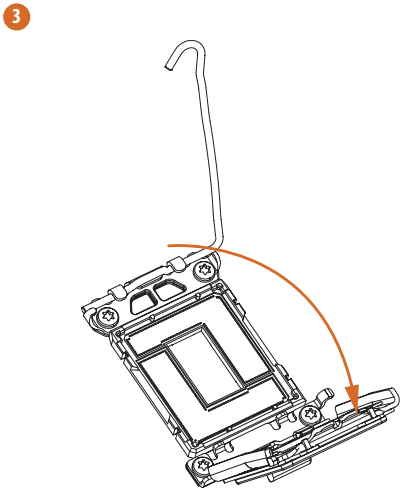
The illustration shown here is for reference only and may not be an exact representation of your motherboard's layout.

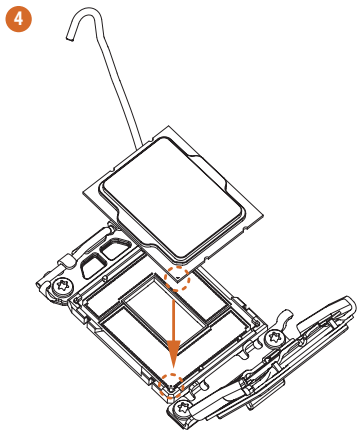
2.1 Installing the CPU

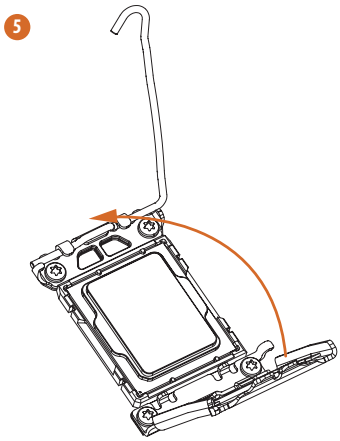
1. *Before you insert the 1851-Pin CPU into the socket, please check if the **PnP cap** is on the socket, if the CPU surface is unclean, or if there are any **bent pins** in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.*
2. *Unplug all power cables before installing the CPU to prevent hardware damage.*
3. *Use the CPU cooler with a minimum of 35lb of static compressive load for the LGA1851 RL-ILM (Reduced Load Independent Loading Mechanism) socket.*

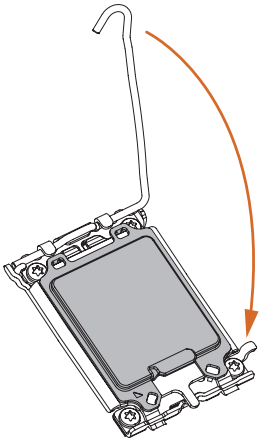


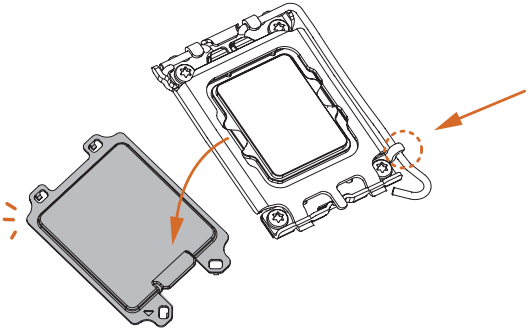






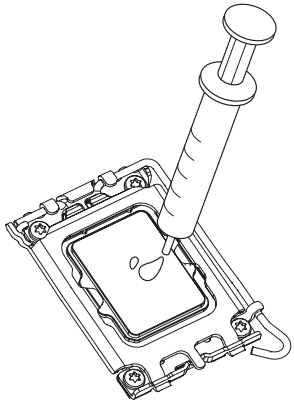






Please save and replace the cover if the processor is removed. The cover must be placed if you wish to return the motherboard for after service.

2.2 Installing the CPU Fan and Heatsink



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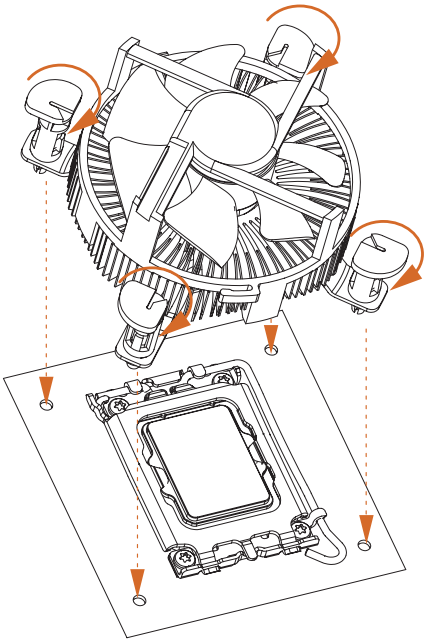

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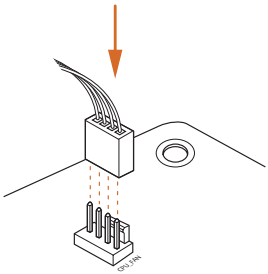


2.3 Installing Memory Modules (DIMM)

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

A1	A2	B1	B2
			V

2 DIMMs

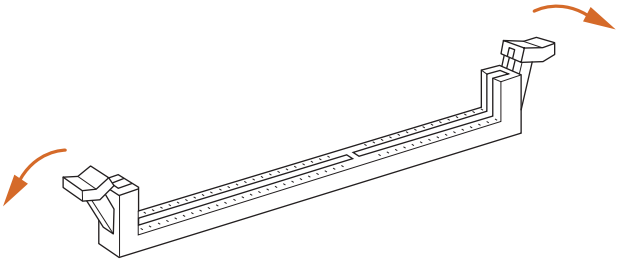
A1	A2	B1	B2
	V		V

4 DIMMs

A1	A2	B1	B2
V	V	V	V

English

1



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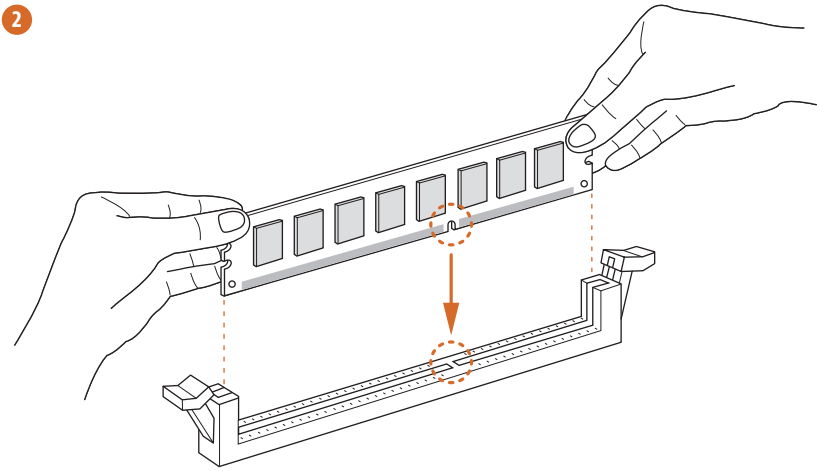

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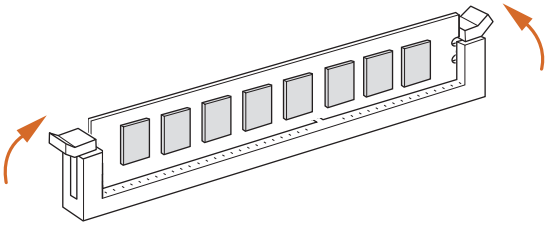
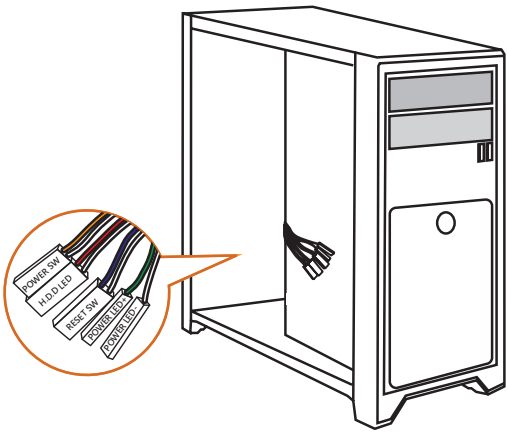


2.4 Connecting the Front Panel Header

1



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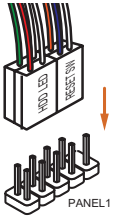
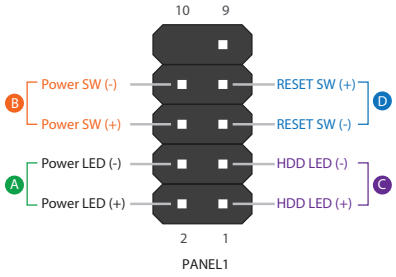
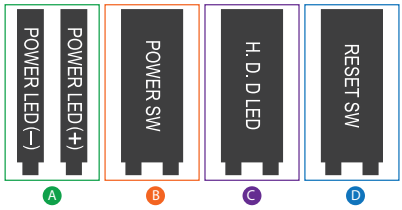


System Panel Header

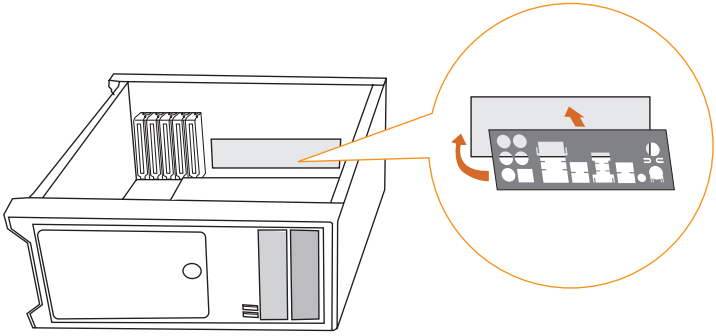


Front Panel Wires

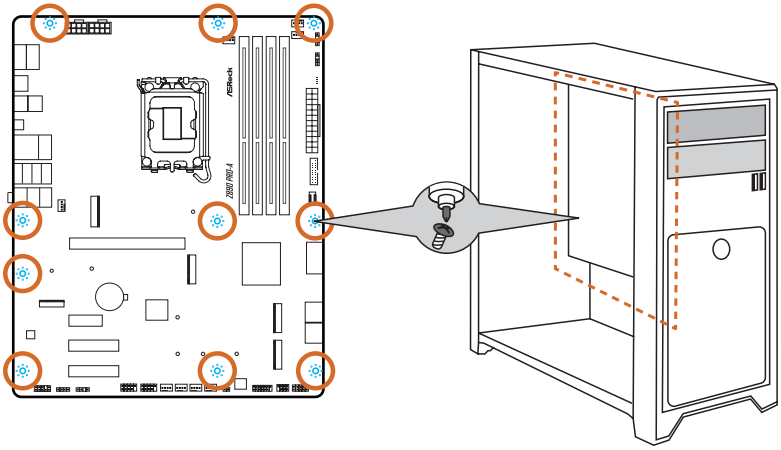


English

2.5 Installing the I/O Panel Shield

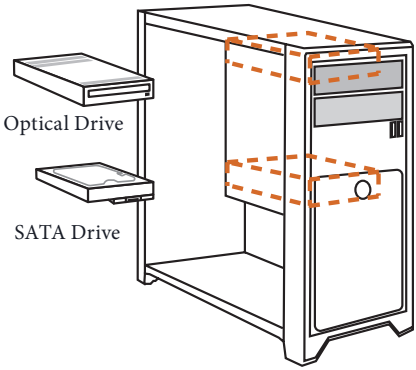


2.6 Installing the Motherboard



2.7 Installing SATA Drives

1



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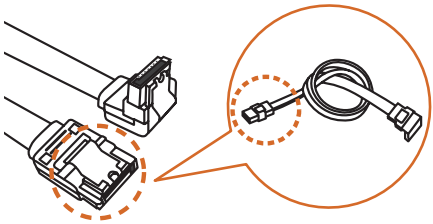

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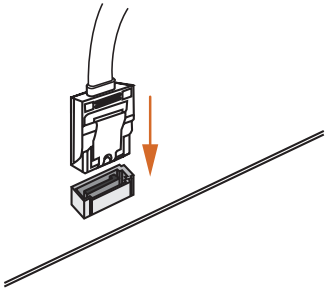

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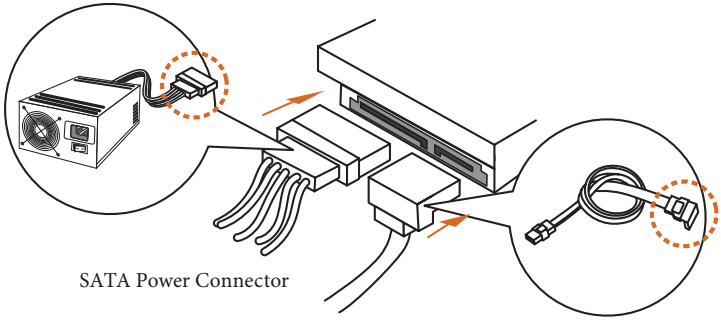
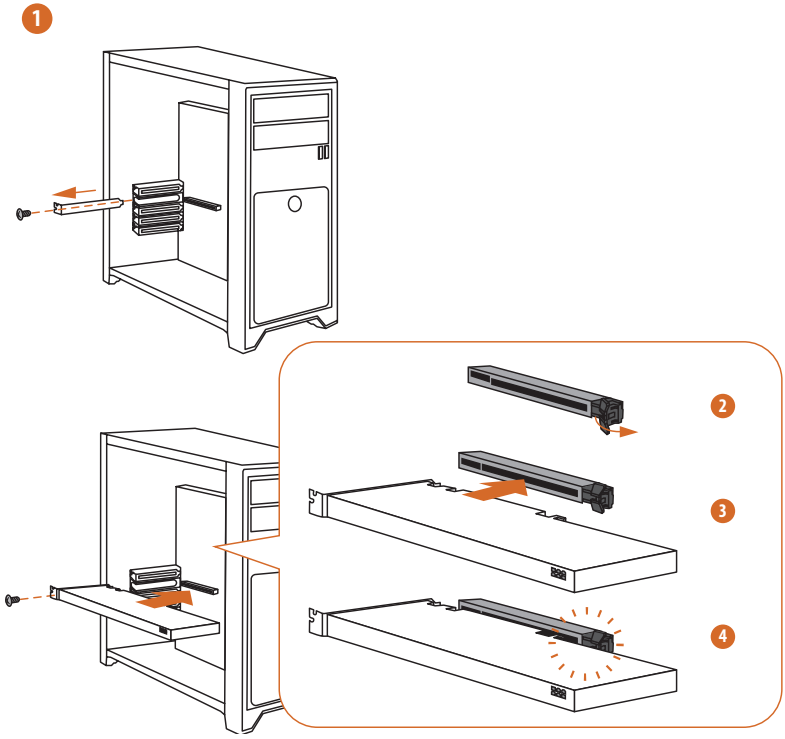


2.8 Installing a Graphics Card



Expansion Slots (PCIe Slots)

There are 4 PCI Express slots on the motherboard.

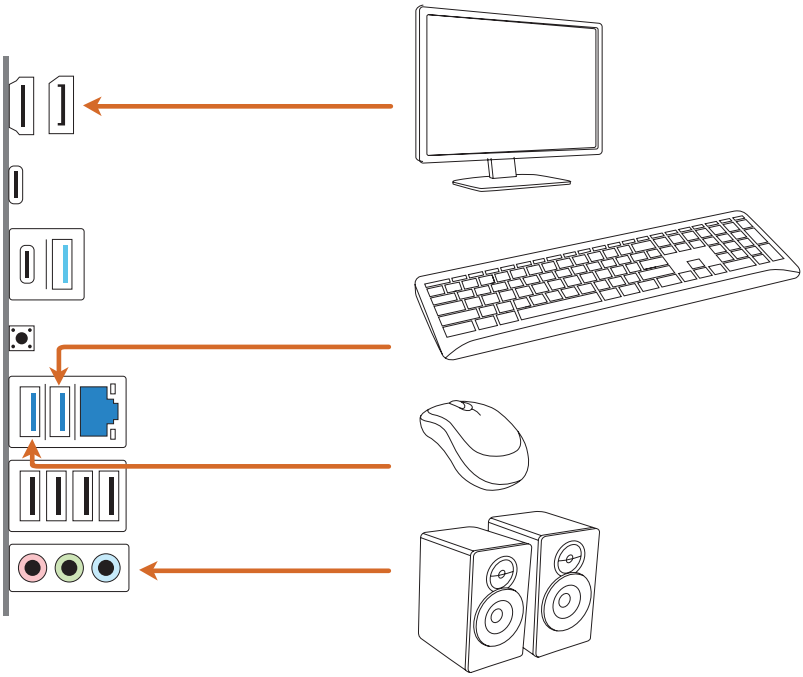
Before installing an expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

PCIe slots:

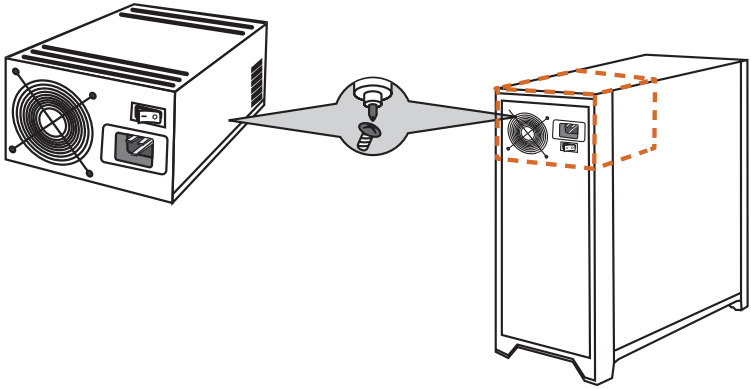
PCIE1 (PCIe 5.0 x16 slot) is used for PCIe x16 lane width graphics cards.
PCIE2 (PCIe 4.0 x1 slot) is used for PCIe x1 lane width cards.
PCIE3 (PCIe 4.0 x4 slot) is used for PCIe x4 lane width graphics cards.
PCIE4 (PCIe 4.0 x4 slot) is used for PCIe x4 lane width graphics cards.

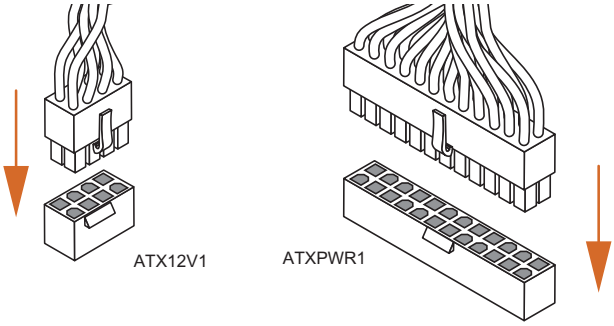
* PCIE1 supports PCIe riser cards to extend one x16 slot to x8/x8 or x8/x4/x4 slots.

2.9 Connecting Peripheral Devices

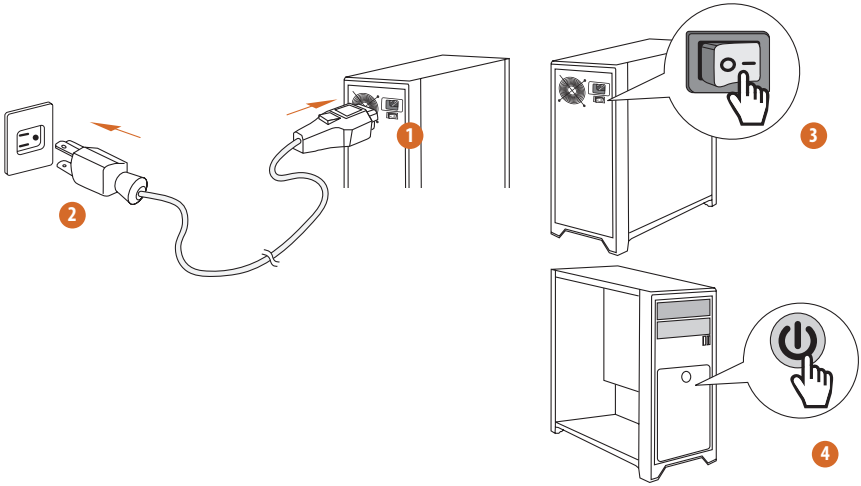


2.10 Connecting the Power Connectors



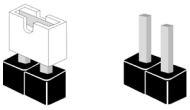


2.11 Power On



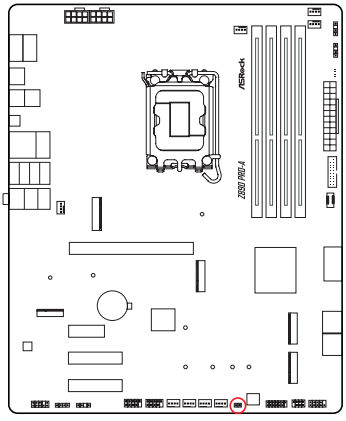
2.12 Jumpers Setup

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
(CLRMOS1) (see p.6, No. 20)

CLRMOS1 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 CLRMOS1 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.



CLRMOS1

2-pin Jumper

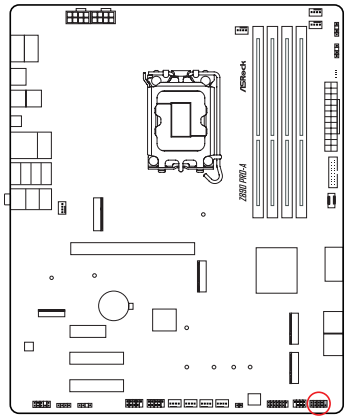
Short: Clear CMOS
Open: Default

2.13 Onboard Headers and Connectors

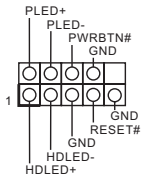
Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard.

System Panel Header
(9-pin PANEL1) (see p.6, No. 17)

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.

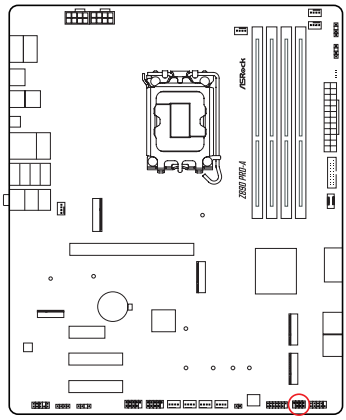
PLED (System Power LED):
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).

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.

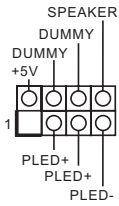
The front panel design may differ by chassis. A front panel module mainly consists of power button, reset button, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

Power LED and Speaker Header
(7-pin SPK_PLED1) (see p.6, No. 18)

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



SPK_PLED1



Serial ATA3 Connectors

Right Angle:

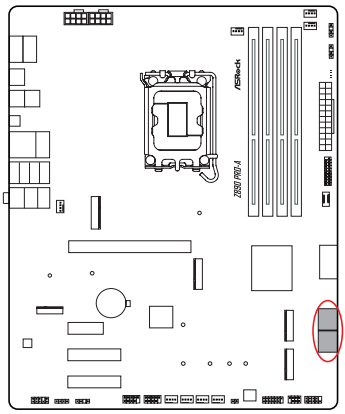
(SATA3_0) (see p.6, No. 16)(Upper)

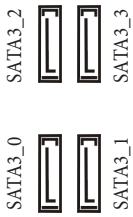
(SATA3_1) (see p.6, No. 16)(Lower)

(SATA3_2) (see p.6, No. 15)(Upper)

(SATA3_3) (see p.6, No. 15)(Lower)

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



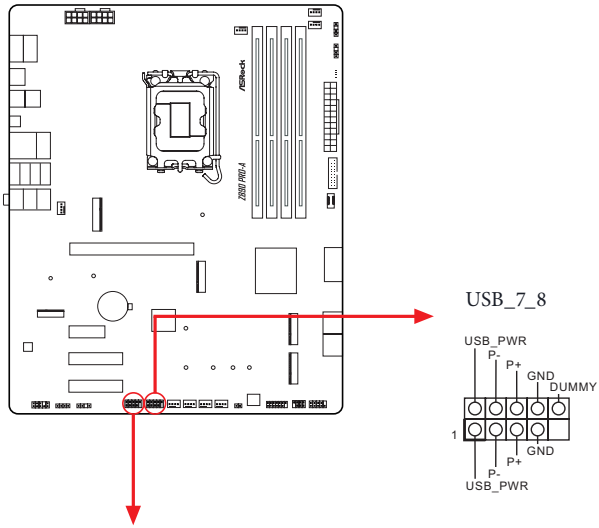


USB 2.0 Headers

(9-pin USB_5_6) (see p.6, No. 26)

(9-pin USB_7_8) (see p.6, No. 25)

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



USB 3.2 Gen1 Headers

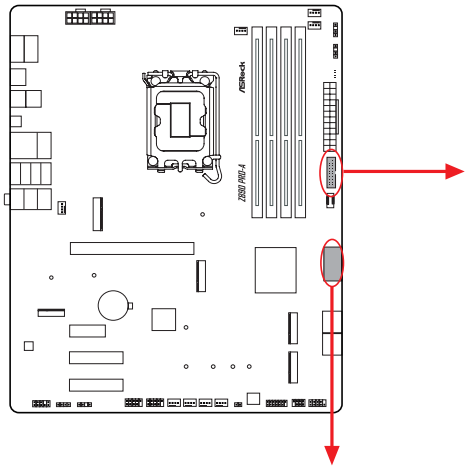
Right Angle:

(19-pin USB32_4_5) (see p.6, No. 14)

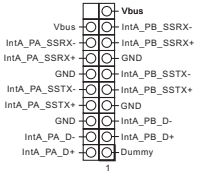
Vertical:

(19-pin USB32_6_7) (see p.6, No. 12)

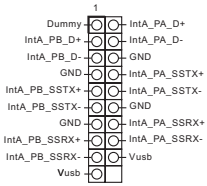
There are two headers on this motherboard. Each USB 3.2 Gen1 header can support two ports.



USB32_6_7



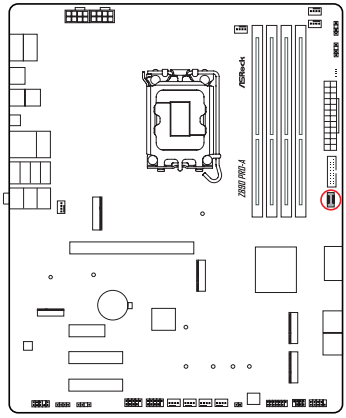
USB32_4_5

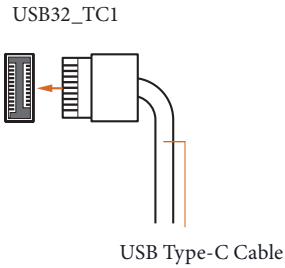


English

Front Panel Type C USB 3.2 Gen2x2 Header
(20-pin USB32_TC1) (see p.6, No. 13)

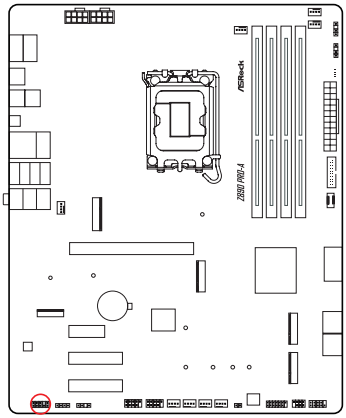
There is one Front Panel Type C USB 3.2 Gen2x2 Header on this motherboard. This header is used for connecting a USB 3.2 Gen2x2 module for additional USB 3.2 Gen2x2 ports.



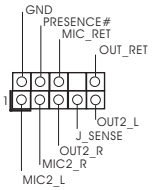


Front Panel Audio Header
(9-pin HD_AUDIO1) (see p.6, No. 29)

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



HD_AUDIO1



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.

English

Chassis Fan Connectors

(4-pin CHA_FAN1) (see p.6, No. 21)

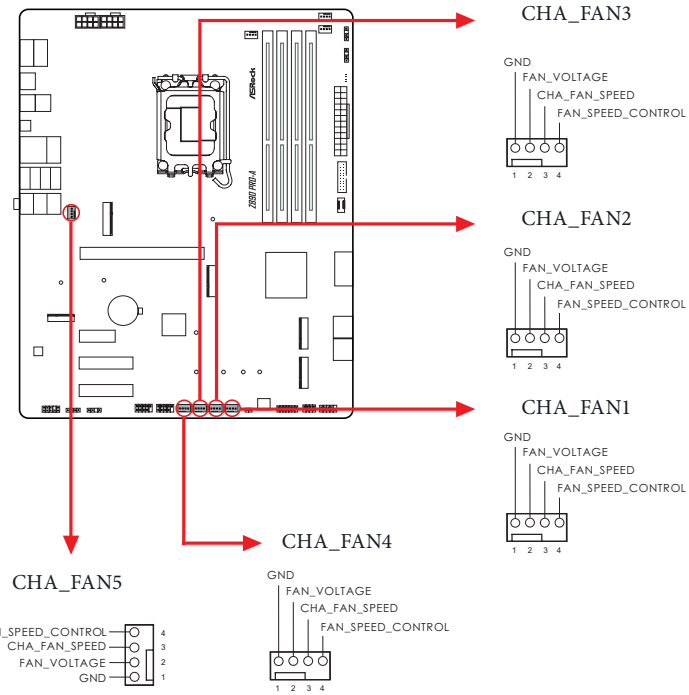
(4-pin CHA_FAN2) (see p.6, No. 22)

(4-pin CHA_FAN3) (see p.6, No. 23)

(4-pin CHA_FAN4) (see p.6, No. 24)

(4-pin CHA_FAN5) (see p.6, No. 30)

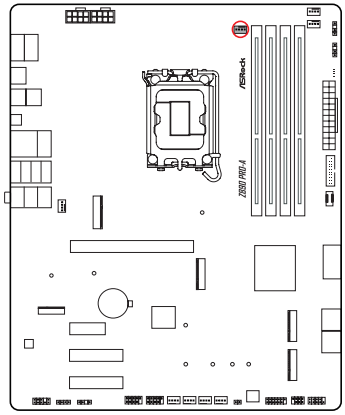
These headers allow you to connect Case or Radiator fans. If you plan to connect a 3-pin fan, please connect it to Pin 1-3.



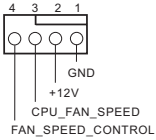
English

CPU Fan Connector
(4-pin CPU_FAN1) (see p.6, No. 3)

This header allows you to connect CPU fan. If you plan to connect a 3-pin fan, please connect it to Pin 1-3.

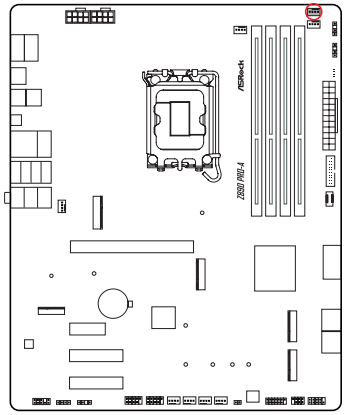


CPU_FAN1

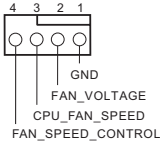


CPU Fan Connector
(4-pin CPU_FAN2) (see p.6, No. 6)

This header allows you to connect CPU fan or Water Pump. If you plan to connect a 3-pin fan, please connect it to Pin 1-3.



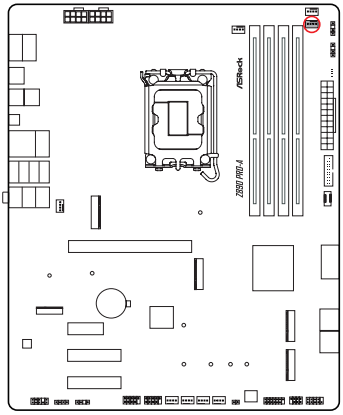
CPU_FAN2



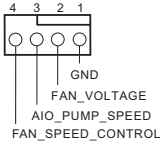
English

AIO Pump Fan Connector
(4-pin AIO_PUMP) (see p.6, No. 7)

This header allows you to connect AIO (All-in-One) pump or fan. If you plan to connect a 3-pin AIO cooler fan, please connect it to Pin 1-3.

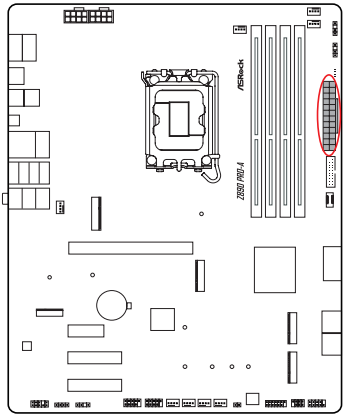


AIO_PUMP

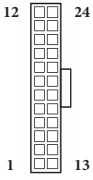


ATX Power Connector
(24-pin ATXPWR1) (see p.6, No. 11)

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.



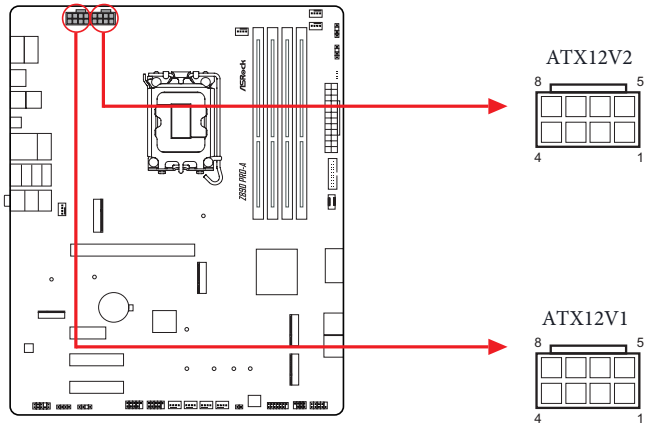
ATXPWR1



English

ATX 12V Power Connectors
(8-pin ATX12V1) (see p.6, No. 1)
(8-pin ATX12V2) (see p.6, No. 2)

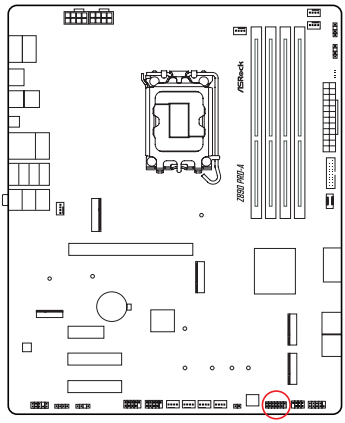
This motherboard provides two 8-pin ATX 12V power connectors. To use a 4-pin ATX power supply, please plug it along Pin 1 and Pin 5.
*Connecting an ATX 12V 8-pin cable to ATX12V2 is optional.
***Warning: Please make sure that the power cable connected is for the CPU and not the graphics card. Do not plug the PCIe power cable to this connector.**



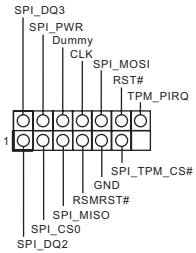
SPI TPM Header

(13-pin SPI_TPM_J1) (see p.6, No. 19)

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.



SPI_TPM_J1

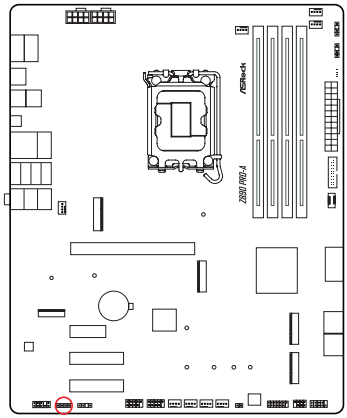


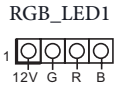
RGB LED Header

(4-pin RGB_LED1) (see p.6, No. 28)

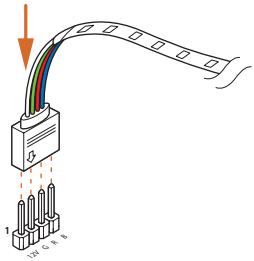
This RGB header is used to connect RGB LED extension cable which allow users to choose from various LED lighting effects.

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





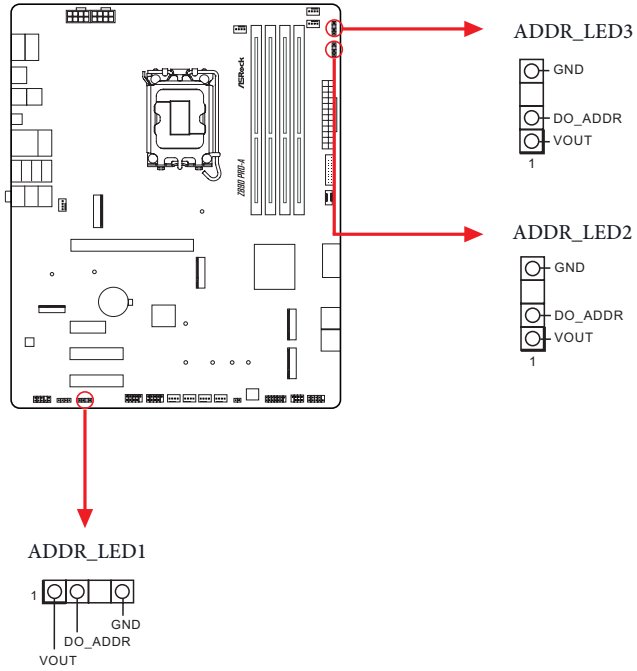
Connect your RGB LED strip to the **RGB LED Header (RGB_LED1)** on the motherboard.



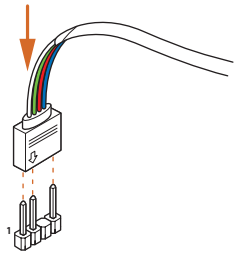
1. *Never install the RGB LED cable in the wrong orientation; otherwise, the cable may be damaged.*
2. *Before installing or removing your RGB LED cable, please power off your system and unplug the power cord from the power supply. Failure to do so may cause damages to motherboard components.*

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.6, No. 27)
(3-pin ADDR_LED2) (see p.6, No. 9)
(3-pin ADDR_LED3) (see p.6, No. 8)
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.



English

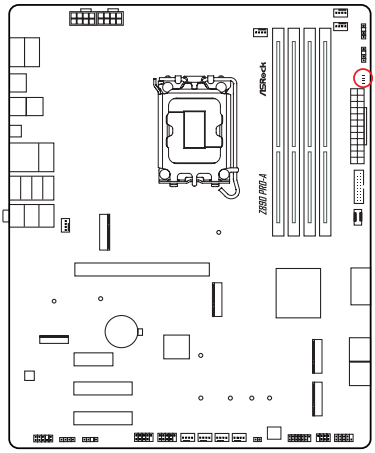
1. *Never install the Addressable LED cable in the wrong orientation; otherwise, the cable may be damaged.*
2. *Before installing or removing your Addressable LED cable, please power off your system and unplug the power cord from the power supply. Failure to do so may cause damages to motherboard components.*

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.*

2.13 Post Status Checker

Post Status Checker (PSC) diagnoses the computer when users power on the machine. The LEDs light up to show what component is running into an issue. They emit red, yellow, white and yellow-green lights to indicate, respectively, the CPU, memory, VGA and storage are not detected or fail. They will remain lit until the issue is fixed. The lights go off if the four mentioned above are functioning normally.

Component	LED Indicator	Status
CPU	Solid Red	indicates CPU is dysfunctional.
DRAM	Solid Yellow	indicates DRAM is dysfunctional.
VGA	Solid White	indicates GPU is dysfunctional.
BOOT	Solid Yellow-Green	indicates boot device is dysfunctional.

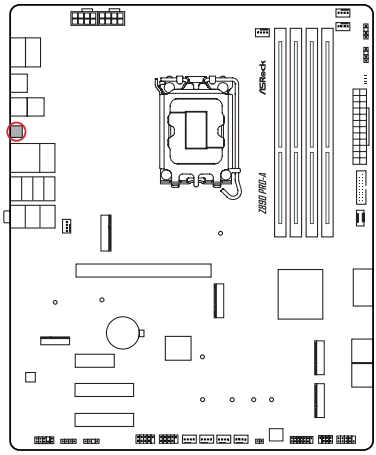


CPU
DRAM
VGA
BOOT

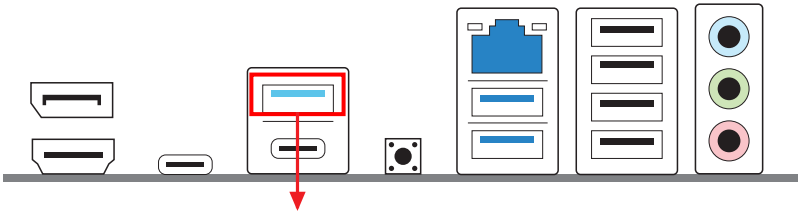
2.15 Smart Button

The motherboard has one smart switch: BIOS Flashback Button, allowing users to flash the BIOS.

BIOS Flashback Button
(BIOS_FB1) (see p.9, No. 9)
BIOS Flashback Button allows users to flash the BIOS.



BIOS_FB1



USB BIOS Flashback port

ASRock BIOS Flashback feature allows you to update BIOS without powering on the system, even without CPU.

Before using the BIOS Flashback function, please suspend BitLocker and any encryption or security relying on the TPM. Make sure that you have already stored and backup-ed the recovery key. If the recovery key is missing while encryption is active, the data will stay encrypted and the system will not boot into the operating system. It is recommended to disable fTPM before updating the BIOS. Otherwise an unpredictable failure may occur.

To use the USB BIOS Flashback function, Please follow the steps below.

1. Download the latest BIOS file from ASRock's website : http://www.asrock.com.
2. Copy the BIOS file to your USB flash drive. Please make sure the file system of your USB flash drive must be FAT32.
3. Extract BIOS file from the zip file.
4. Rename the file to "**creative.rom**" and save it to the root directory of X: USB flash drive.
5. Plug the 24-pin power connector to the motherboard. Then turn on the power supply's AC switch.
   *There is no need to power on the system.
6. Then plug your USB drive to the USB BIOS Flashback port.
7. Press the BIOS Flashback Switch for about three seconds. Then the LED starts to blink.
8. Wait until the LED stops blinking, indicating that BIOS flashing has been completed.
   *If the LED light turns solid green, this means that the BIOS Flashback is not operating properly. Please make sure that you plug the USB drive to the USB BIOS Flashback port.
   **If the LED does not light up at all, then please disconnect power from the system and remove/disconnect the CMOS battery from the motherboard for several minutes. Reconnect power and battery and try again.
9. After BIOS flashing is complete, turn off the PC power supply for about two minutes.
10. Then turn on the PC power supply again and now you can press the power button to power on the system.

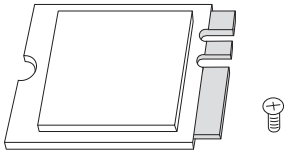
2.16 M.2 WiFi/BT PCIe WiFi Module and Intel® CNVi (Integrated WiFi/BT) Installation Guide

The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The M.2 Socket (Key E) supports type 2230 WiFi/BT PCIe WiFi module and Intel® CNVi (Integrated WiFi/BT).

* The M.2 socket does not support SATA M.2 SSDs.

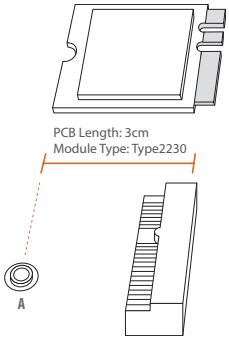
Before you install Intel® Integrated Connectivity (CNVi) module, be sure to turn off the AC power.

Installing the WiFi/BT module or Intel® CNVi (Integrated WiFi/BT)



Step 1

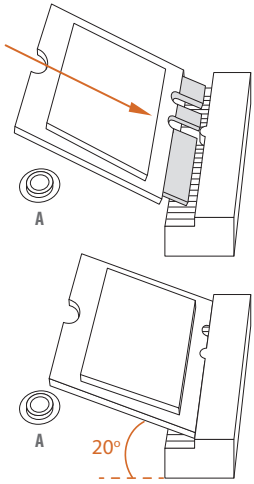
Prepare a type 2230 WiFi/BT PCIe WiFi module or Intel® CNVi (Integrated WiFi/BT) and the screw.



Step 2

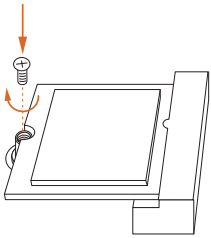
Find the nut location to be used.

English



Step 3

Gently insert the WiFi/BT module or Intel® CNVi (Integrated WiFi/BT) into the M.2 slot. Please be aware that the module only fits in one orientation.



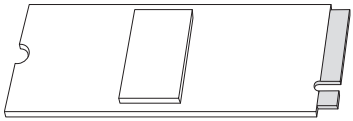
Step 4

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

2.17 M.2 SSD Installation Guide (M2_1)

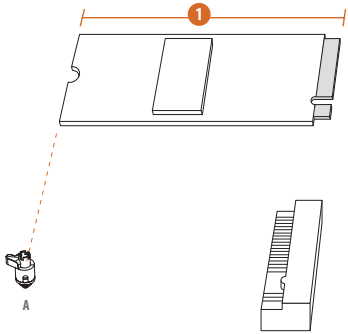
The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Blazing M.2 Socket (M2_1, Key M) supports type 2280 PCIe Gen5x4 (128 Gb/s) mode.

Installing the M.2 SSD



Step 1

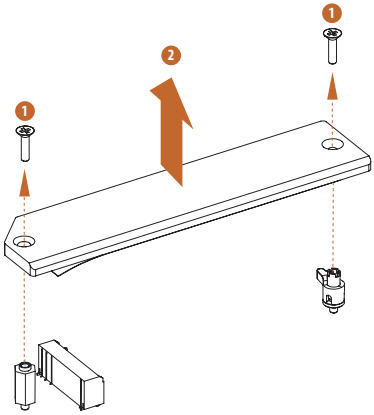
Prepare a M.2 SSD.



Step 2

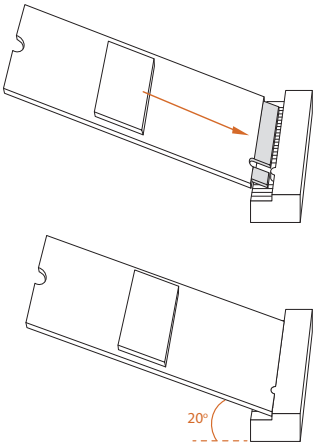
Depending on the PCB type and length of your M.2 SSD, find the corresponding nut location to be used.

No.	1
Nut Location	A
PCB Length	8cm
Module Type	Type 2280



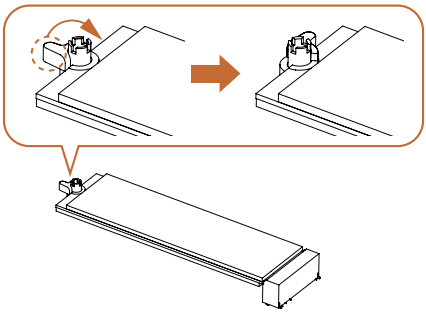
Step 3

Before installing a M.2 SSD, 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.



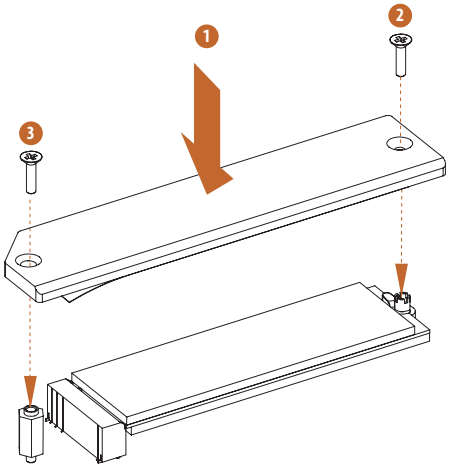
Step 4

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



Step 5

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



Step 6

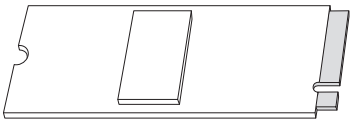
Tighten the screws with a screwdriver to secure the M.2 SSD and M.2 heatsink into place in the order shown. Tighten screw opposite the M.2 connector first (2), and then tighten the one next to the M.2 connector (3).
*Please do not overtighten the screw as this might damage the M.2 SSD and M.2 heatsink.

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

2.18 M.2 SSD Installation Guide (M2_2 and M2_3)

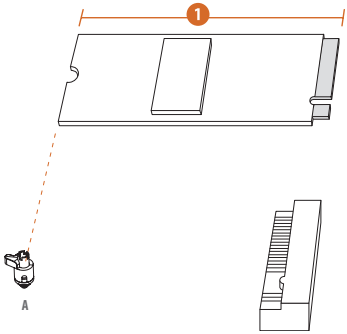
The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Hyper M.2 Socket (M2_2 , Key M) supports type 2280 PCIe Gen4x4 (64 Gb/s) mode. The Hyper M.2 Socket (M2_3 , Key M) supports type 2280 PCIe Gen4x4 (64 Gb/s) mode.

Installing the M.2 SSD



Step 1

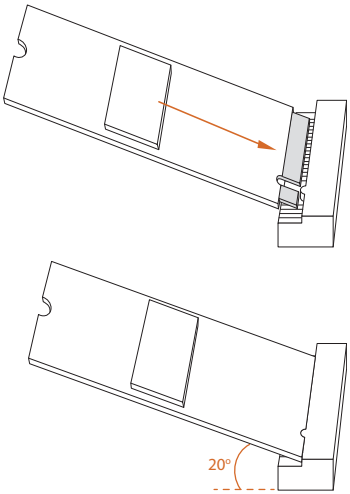
Prepare a M.2 SSD.



Step 2

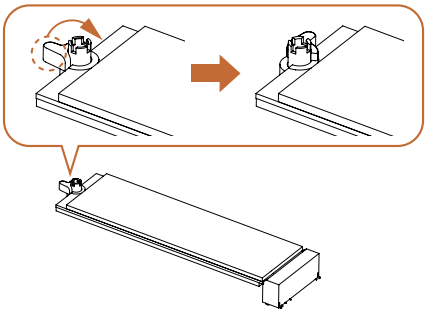
Depending on the PCB type and length of your M.2 SSD, find the corresponding nut location to be used.

No.	1
Nut Location	A
PCB Length	8cm
Module Type	Type 2280



Step 3

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



Step 4

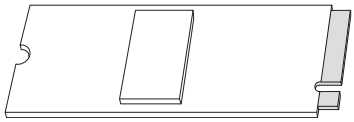
Ensure that the notch at the end of the M.2 SSD aligns with the nut. Then secure the M.2 SSD by turning the nut lock clockwise to its locked position.

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

2.19 M.2 SSD Installation Guide (M2_4)

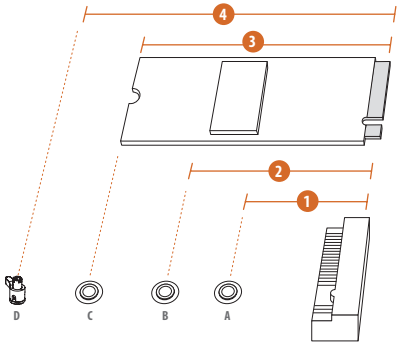
The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Hyper M.2 Socket (M2_4 , Key M) supports type2230/2242/2260/2280 SATA3 6.0 Gb/s & PCIe Gen4x4 (64 Gb/s) modes.

Installing the M.2 SSD



Step 1

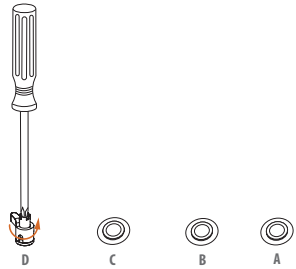
Prepare a M.2 SSD.

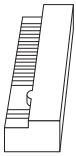


Step 2

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

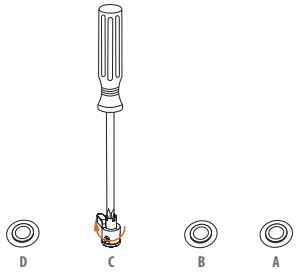
No.	1	2	3	4
Nut Location	A	B	C	D
PCB Length	3cm	4.2cm	6cm	8cm
Module Type	Type 2230	Type 2242	Type 2260	Type 2280

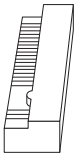




Step 3

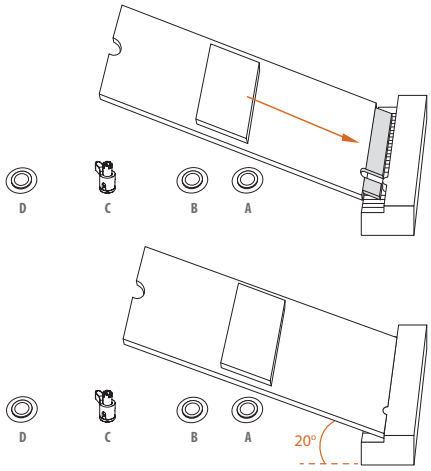
Use a screwsriver to remove the standoff.
Skip Step 3 if your M.2 SSD is Type 2280.





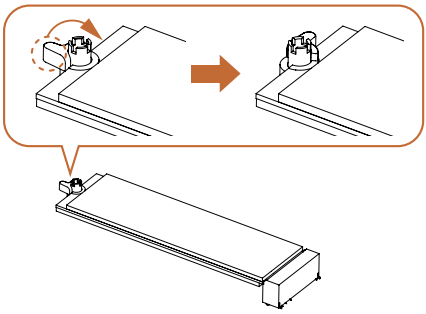
Step 4

Peel off the yellow protective film on the nut to be used. Tighten the standoff into the desired nut location on the motherboard with a screwdriver.
Skip Step 3 if your M.2 SSD is Type 2280.



Step 5

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



Step 6

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

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

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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.

Button Battery Safety Notice

⚠WARNING

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH of CHILDREN**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.

- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Battery type: CR2032
- Battery voltage: 3V
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above (manufacturer's specified temperature rating) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- This product contains an irreplaceable battery.
- This icon indicates that a swallowed button battery can cause serious injury or death. Please keep batteries out of sight or reach of children.

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The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.

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

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WARNING: Cancer and Reproductive Harm
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CE

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UKCA Conformity

UK
CA

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WARNING

THIS PRODUCT CONTAINS A BUTTOON BATTERY
If swallowed, a button battery can cause serious injury or death.
Please keep batteries out of sight or reach of children.

Proper Disposal

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

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