

ASRock®

**H510M-H2 / M.2 SE**

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 H510M-H2/M.2 SE 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 H510M-H2/M.2 SE Motherboard (Micro ATX Form Factor)
- ASRock H510M-H2/M.2 SE User Manual
- 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** • Micro ATX Form Factor

**CPU** • Supports 10<sup>th</sup> Gen & 11<sup>th</sup> Gen Intel® Core™ Processors (LGA1200)  
• Supports Intel® Turbo Boost Max 3.0 Technology

**Chipset** • Intel® H470

**Memory** • Dual Channel DDR4 Memory Technology  
• 2 x DDR4 DIMM Slots  
• Supports DDR4 3200/2933/2800/2666/2400/2133 non-ECC, un-buffered memory\*  
• Supports ECC UDIMM memory modules (operate in non-ECC mode)  
• Max. capacity of system memory: 64GB  
• Supports Intel® Extreme Memory Profile (XMP) 2.0  
• 15µ Gold Contact in DIMM Slots  
\* 11<sup>th</sup> Gen Intel® Core™ (i9/i7/i5) support DDR4 3200 natively; Core™ (i3), Pentium® and Celeron® support DDR4 2666 natively.  
\* 10<sup>th</sup> Gen Intel® Core™ (i9/i7) support DDR4 2933 natively; Core™ (i5/i3), Pentium® and Celeron® support DDR4 2666 natively.  
\* Please refer to Memory Support List on ASRock's website for more information. (<http://www.asrock.com/>)

**Expansion Slot** **Intel® 11<sup>th</sup> Gen & 10<sup>th</sup> Gen Processors:**  
• 1 x PCIe 4.0 x16 Slot (PCIe1)\*  
Intel® 11<sup>th</sup> Gen Processors support PCIe 4.0 x16  
Intel® 10<sup>th</sup> Gen Processors support PCIe 3.0 x16

**Intel® H470 Chipset:**

• 1 x PCIe 3.0 x1 Slot (PCIe2)\*

\* 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.  
• Graphics specifications may vary between CPU types.

- 2 x HDMI  
Intel® 11<sup>th</sup> Gen Processors support HDMI 2.0, HDCP 2.3 and max. resolution up to 4K 60Hz  
Intel® 10<sup>th</sup> Gen Processors support HDMI 1.4, HDCP 2.3 and max. resolution up to 4K 30Hz

**Audio**

- 7.1 CH HD Audio (Realtek ALC897 Audio Codec)

**LAN**

- Gigabit LAN 10/100/1000 Mb/s
- Realtek 8111H

**USB**

- 6 x USB 3.2 Gen1 (4 Rear, 2 Front)
- 6 x USB 2.0 (2 Rear, 4 Front)
- \* All USB ports support ESD Protection

**Rear Panel I/O**

- 1 x PS/2 Mouse/Keyboard Port
- 2 x HDMI Ports
- 2 x USB 2.0 Ports
- 4 x USB 3.2 Gen1 Ports
- 1 x RJ-45 LAN Port
- HD Audio Jacks: Line in / Front Speaker / Microphone

**Storage**

- Chipset:
- 1 x Ultra M.2 Socket (M2\_1, Key M), supports type 2260/2280 SATA3 6.0 Gb/s & PCIe Gen3x4 (32 Gb/s) modes\*
  - 4 x SATA3 6.0 Gb/s Connectors
- \* Supports Intel® Optane™ Technology  
\* Supports NVMe SSD as boot disks

**RAID**

- Supports RAID 0, RAID 1, RAID 5 and RAID 10 for SATA storage devices

**Connector**

- 1 x SPI TPM Header
- 1 x Chassis Intrusion and Speaker Header
- 1 x CPU Fan Connector (4-pin)\*
- 2 x Chassis/Water Pump Fan Connectors (4-pin) (Smart Fan Speed Control)\*\*
- 1 x 24 pin ATX Power Connector

- 1 x 8 pin 12V Power Connector
  - 1 x Front Panel Audio Connector
  - 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)
- \* CPU\_FAN1 supports the fan power up to 1A (12W).  
 \*\* CHA\_FAN1~2/WP support the fan power up to 2A (24W).  
 \*\* CHA\_FAN1~2/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**

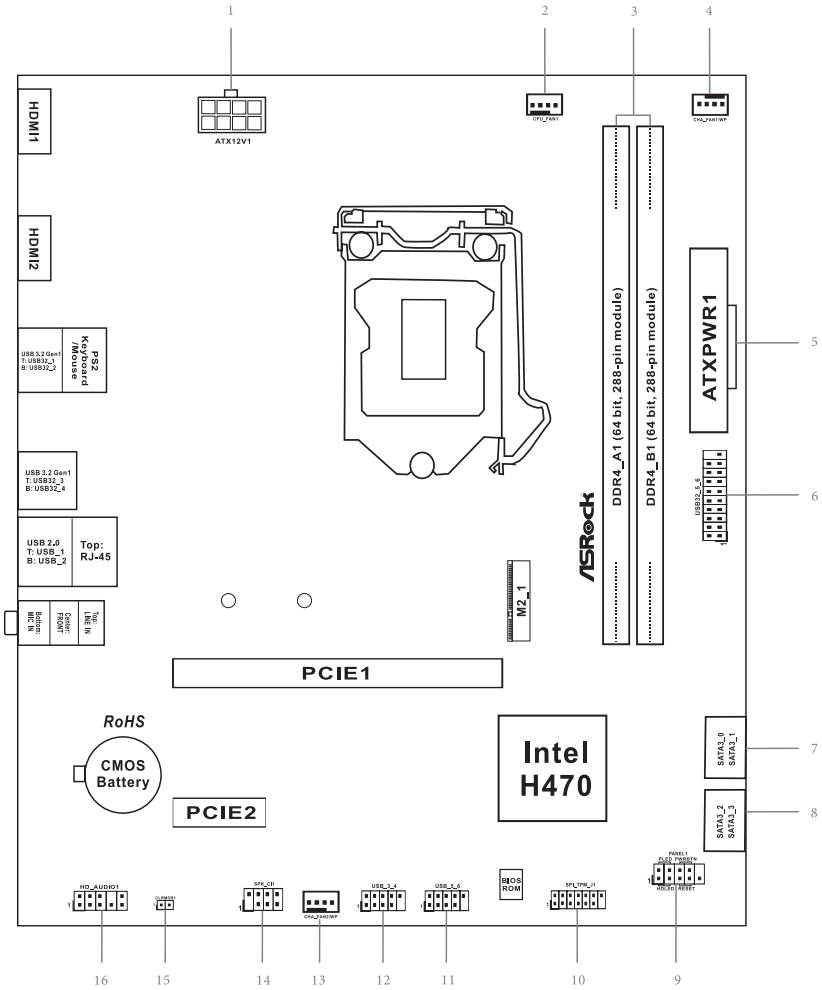
- FCC, CE
- ErP/EuP ready (ErP/EuP ready power supply is required)

\* 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.*

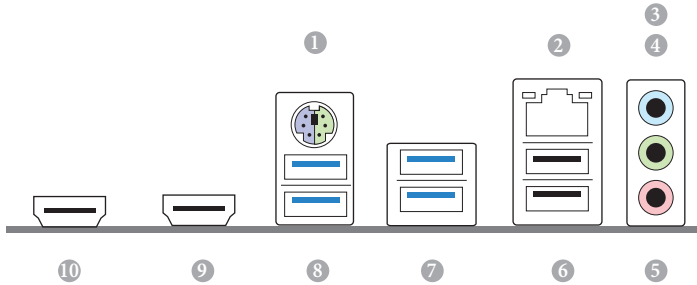
### 1.3 Motherboard Layout





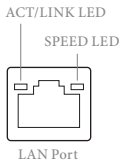
No.	Description
1	ATX 12V Power Connector (ATX12V1)
2	CPU Fan Connector (CPU_FAN1)
3	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1)
4	Chassis/Water Pump Fan Connector (CHA_FAN1/WP)
5	ATX Power Connector (ATXPWR1)
6	USB 3.2 Gen1 Header (USB32_5_6)
7	SATA3 Connectors (SATA3_0)(Upper), (SATA3_1)(Lower)
8	SATA3 Connectors (SATA3_2)(Upper), (SATA3_3)(Lower)
9	System Panel Header (PANEL1)
10	SPI TPM Header (SPI_TPM_J1)
11	USB 2.0 Header (USB_5_6)
12	USB 2.0 Header (USB_3_4)
13	Chassis/Water Pump Fan Connector (CHA_FAN2/WP)
14	Chassis Intrusion and Speaker Header (SPK_C11)
15	Clear CMOS Jumper (CLRMOS1)
16	Front Panel Audio Header (HD_AUDIO1)

## 1.4 I/O Panel



No.	Description	No.	Description
1	PS/2 Mouse/Keyboard Port	6	USB 2.0 Ports (USB_12)
2	LAN RJ-45 Port*	7	USB 3.2 Gen1 Type-A Ports (USB32_34)
3	Line In (Light Blue)**	8	USB 3.2 Gen1 Type-A Ports (USB32_12)
4	Front Speaker (Lime)**	9	HDMI Port
5	Microphone (Pink)**	10	HDMI Port

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

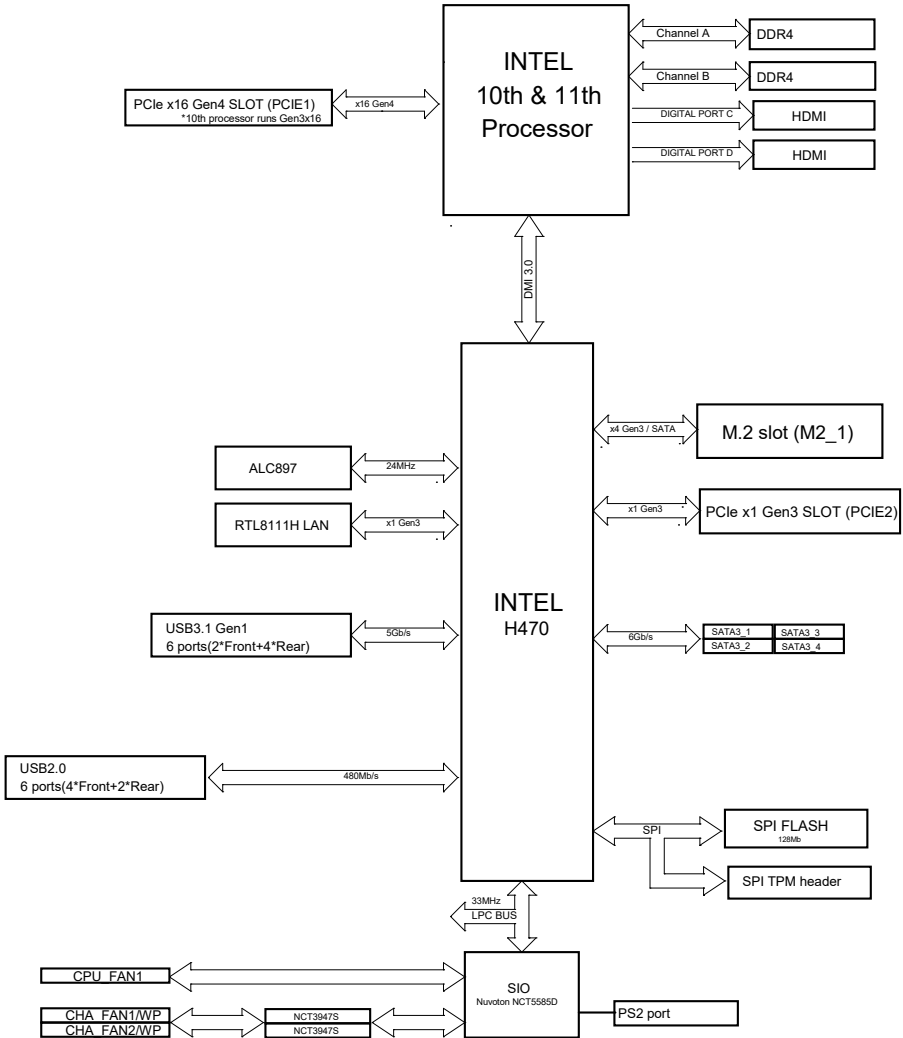


Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Blinking	Data Activity	Orange	100Mbps connection
On	Link	Green	1Gbps connection

\*\* 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 a Micro 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.

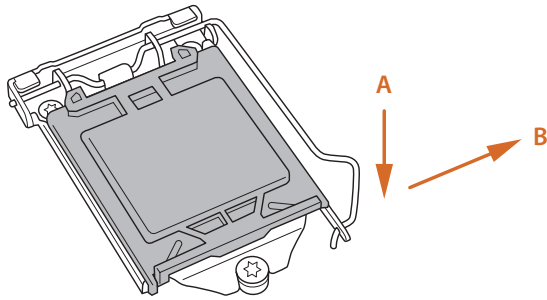
- Make sure to unplug the power cord before installing or removing the motherboard components. Failure to do so may cause physical injuries and damages to motherboard components.
- In order to avoid damage from static electricity to the motherboard's components, NEVER place your motherboard directly 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

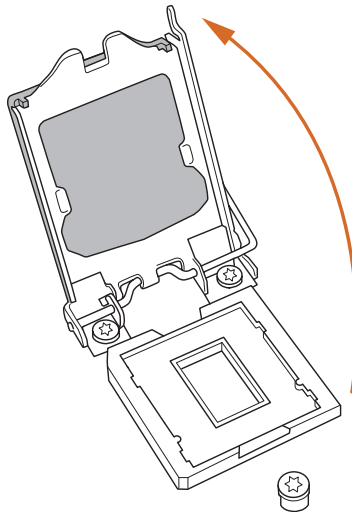


1. Before you insert the 1200-Pin CPU into the socket, please check if the **PnP cap** is on the socket, if the CPU surface is unclean, or if there are any **bent pins** in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all power cables before installing the CPU.

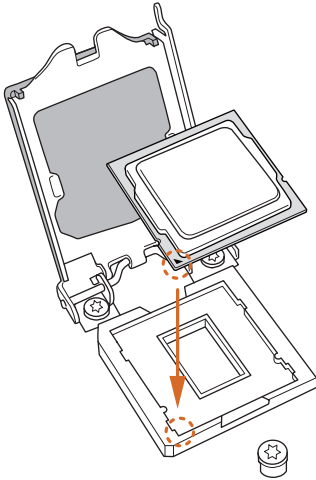
1



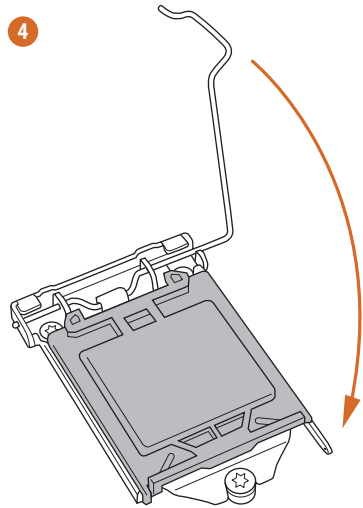
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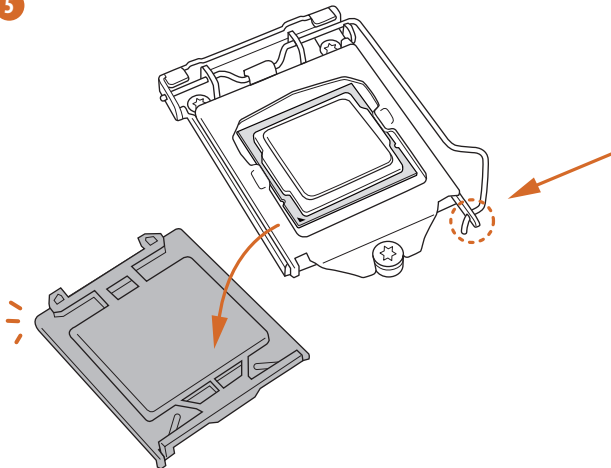
3



4

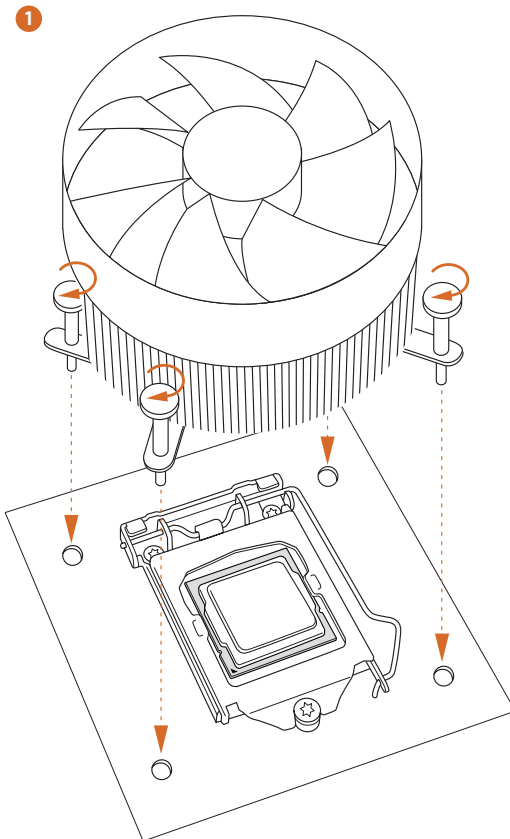
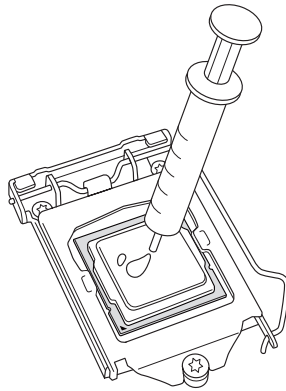


5



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



## 2.3 Installing Memory Modules (DIMM)

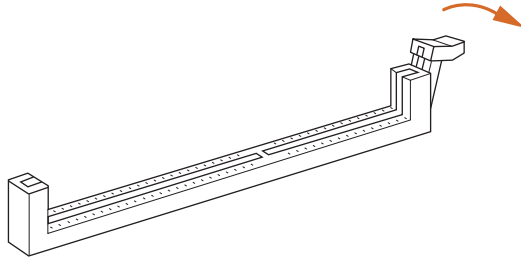
This motherboard provides two 288-pin DDR4 (Double Data Rate 4) DIMM slots, and supports Dual Channel Memory Technology.



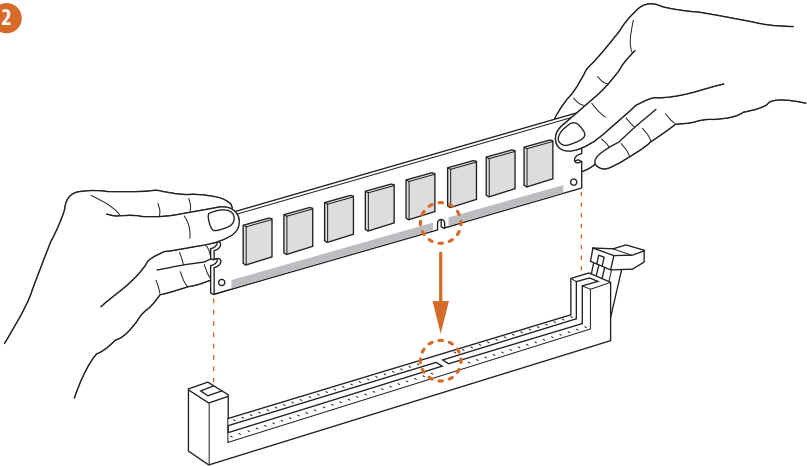
1. For dual channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR4 DIMM pairs.
2. It is unable to activate Dual Channel Memory Technology with only one memory module installed.
3. It is not allowed to install a DDR, DDR2 or DDR3 memory module into a DDR4 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.



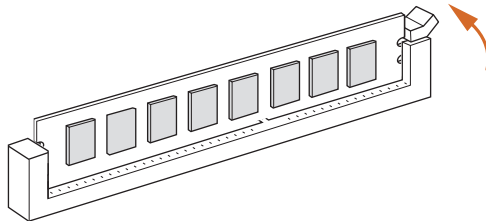
1



2

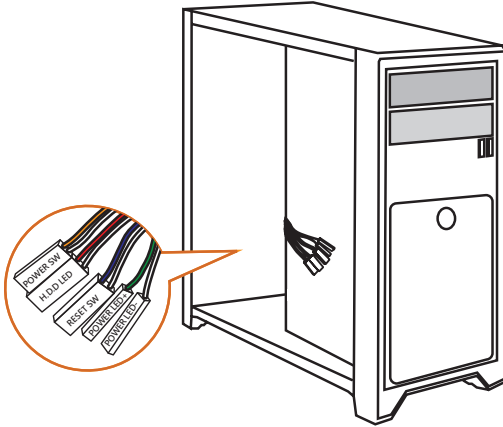


3

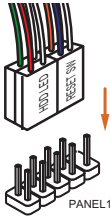


## 2.4 Connecting the Front Panel Header

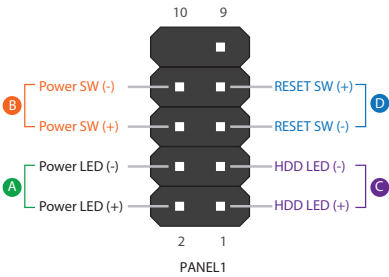
1



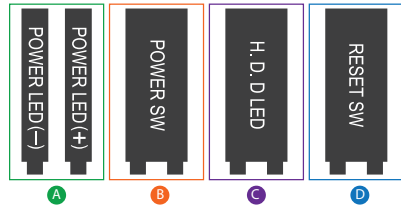
2



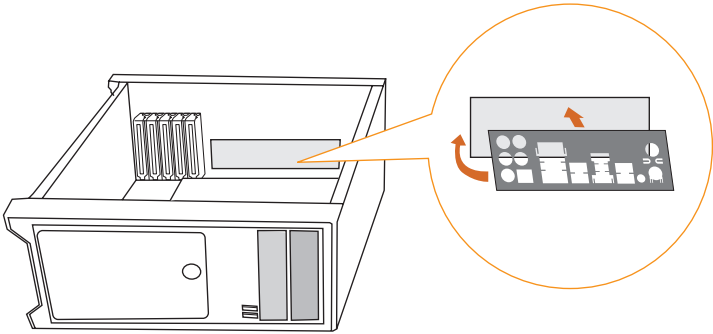
System Panel Header



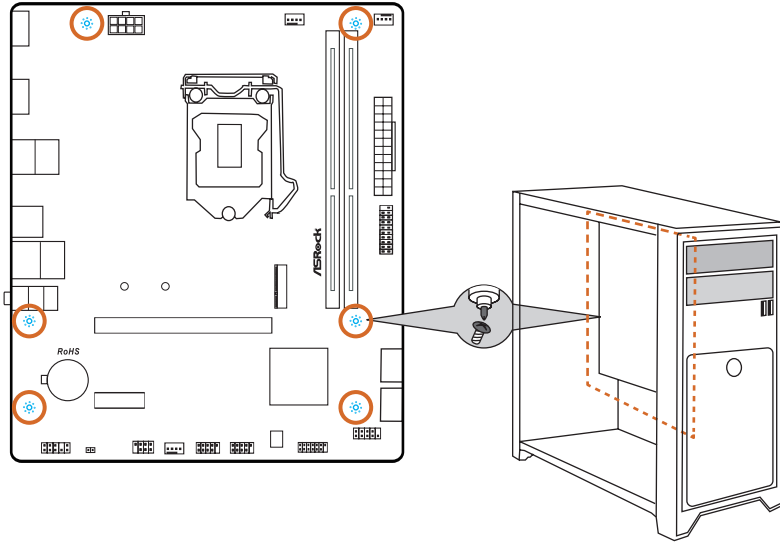
Front Panel Wires



## 2.5 Installing the I/O Panel Shield

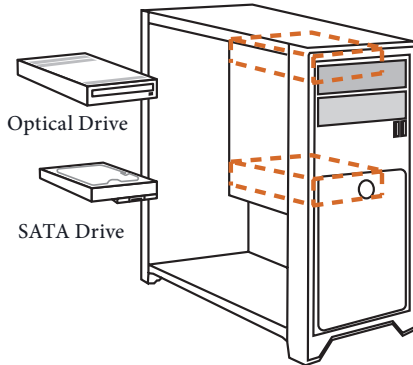


## 2.6 Installing the Motherboard

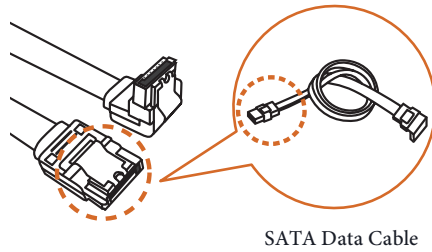


## 2.7 Installing SATA Drives

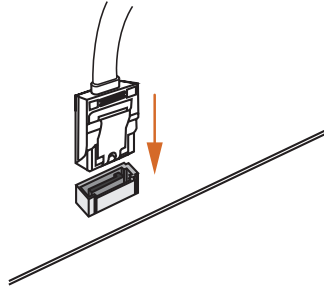
1



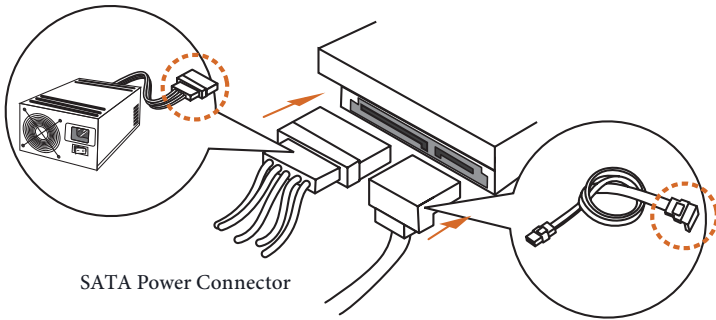
2



3



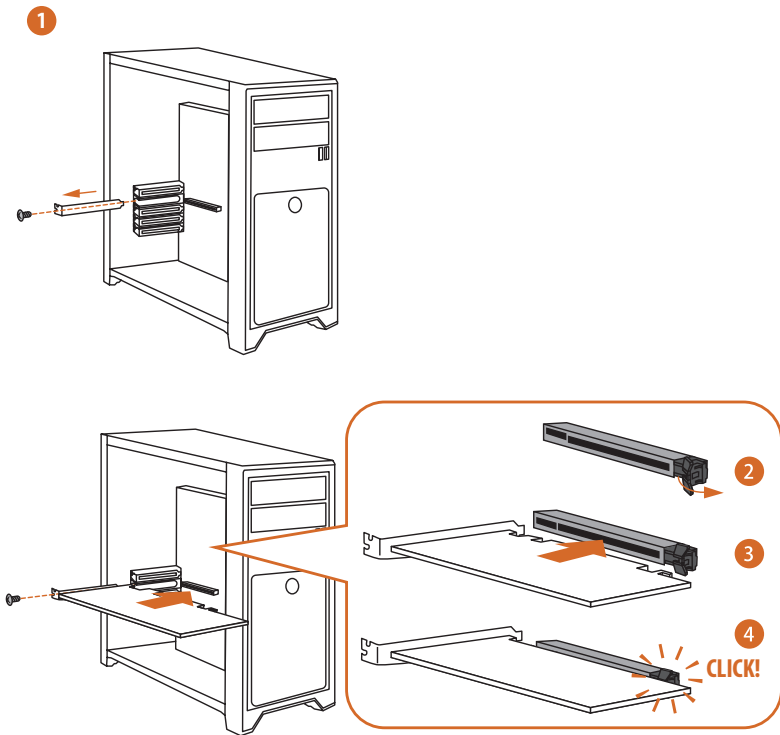
4



SATA Power Connector

SATA Data Connector

## 2.8 Installing a Graphics Card



## Expansion Slots (PCIe Slots)

There are 2 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.*

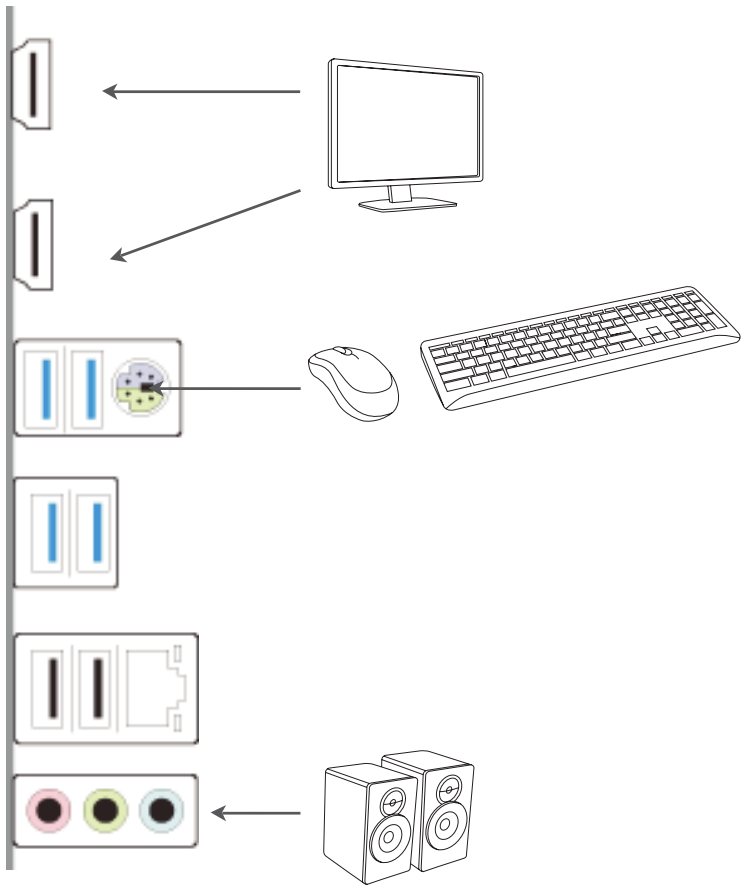
### **PCIe slots:**

PCIE1 (PCIe 4.0 x16 slot) is used for PCIe x16 lane width graphics cards.

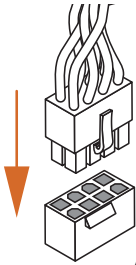
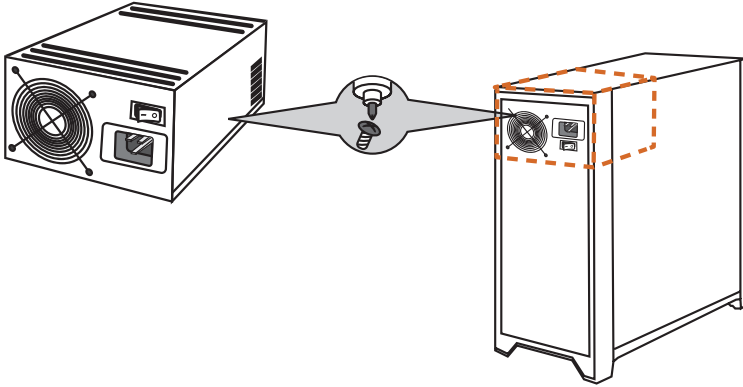
PCIE2 (PCIe 3.0 x1 slot) is used for PCIe x1 lane width cards.



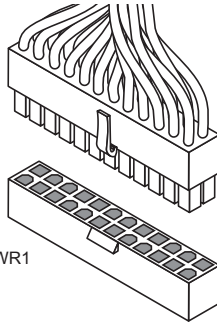
## 2.9 Connecting Peripheral Devices



## 2.10 Connecting the Power Connectors

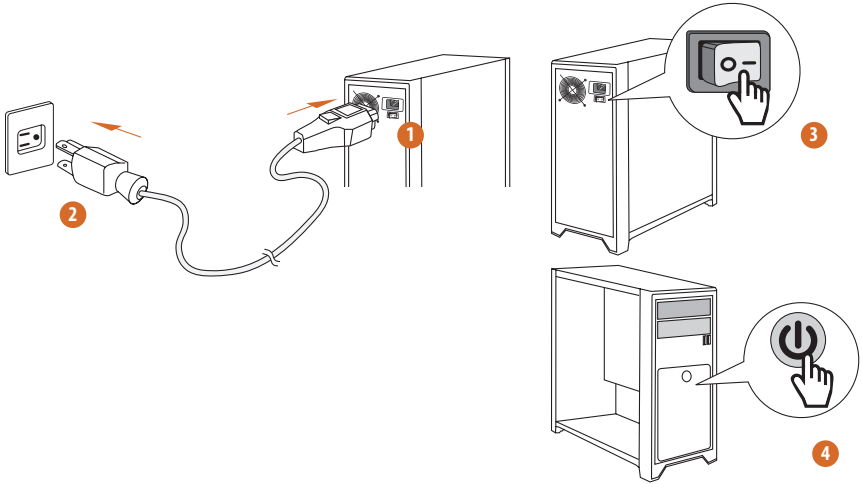


ATX12V1



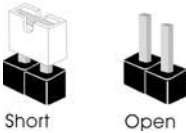
ATXPWR1

## 2.11 Power On



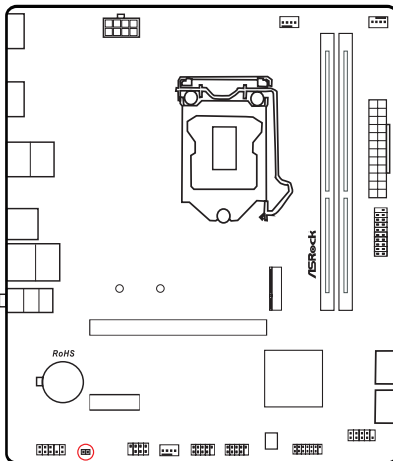
## 2.12 Jumpers Setup

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  
(CLRMOSE1) (see p.5, No. 15)

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

## 2.13 Onboard Headers and Connectors

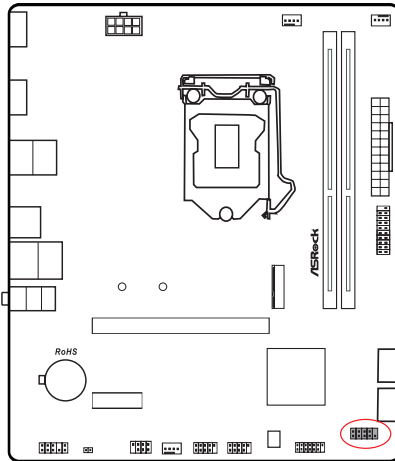


Onboard headers and connectors are **NOT** jumpers. Do **NOT** place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard.

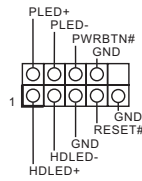
### System Panel Header

(9-pin PANEL1) (see p.5, No. 9)

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):**

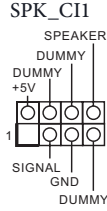
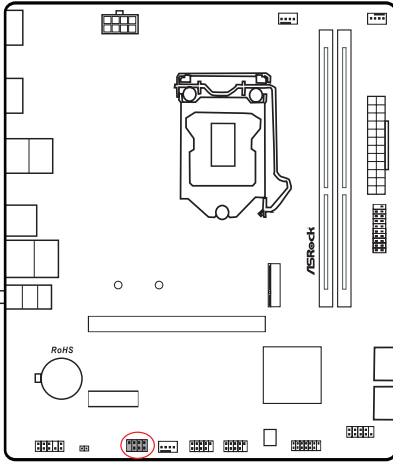
Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

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.

Chassis Intrusion and Speaker Header

(7-pin SPK\_CI1) (see p.5, No. 14)

Please connect the chassis intrusion and the chassis speaker to this header.



Serial ATA3 Connectors

Right Angle:

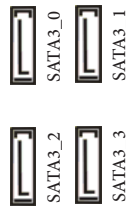
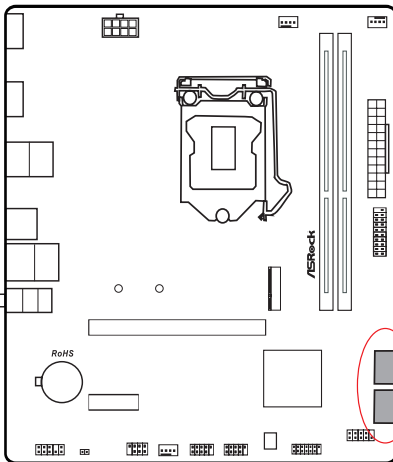
(SATA3\_0) (see p.5, No. 7) (Upper)

(SATA3\_1) (see p.5, No. 7) (Lower)

(SATA3\_2) (see p.5, No. 8) (Upper)

(SATA3\_3) (see p.5, No. 8) (Lower)

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

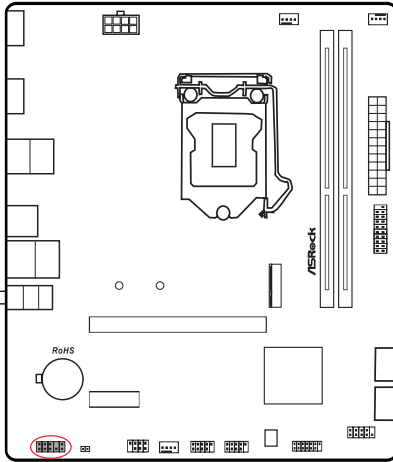




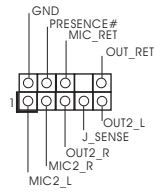
### Front Panel Audio Header


(9-pin HD\_AUDIO1) (see p.5, No. 16)

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



#### HD\_AUDIO1



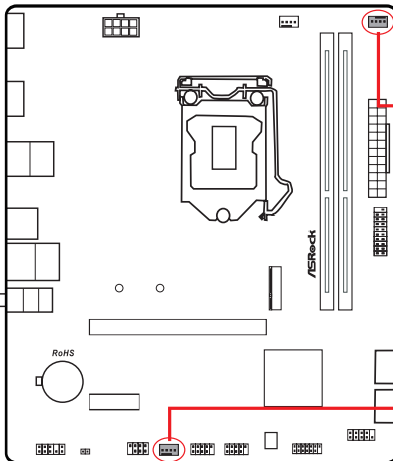
 High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instructions in our manual and chassis manual to install your system.

### Chassis/Water Pump Fan Connectors

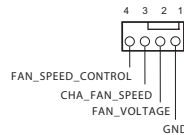
(4-pin CHA\_FAN1/WP) (see p.5, No. 4)

(4-pin CHA\_FAN2/WP) (see p.5, No. 13)

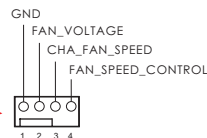
This motherboard provides two 4-Pin water cooling chassis fan connectors. If you plan to connect a 3-Pin chassis water cooler fan, please connect it to Pin 1-3.



#### CHA\_FAN1/WP



#### CHA\_FAN2/WP

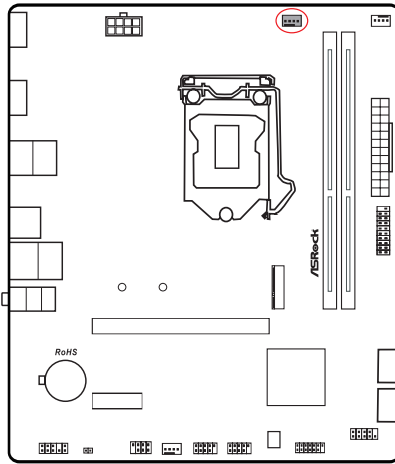




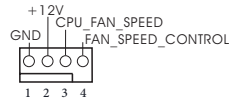
### CPU Fan Connector

(4-pin CPU\_FAN1) (see p.5, No. 2)

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.



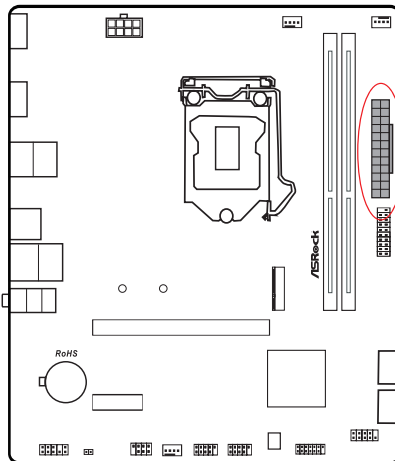
CPU\_FAN1



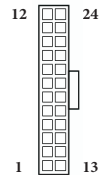
### ATX Power Connector

(24-pin ATXPWR1) (see p.5, No. 5)

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

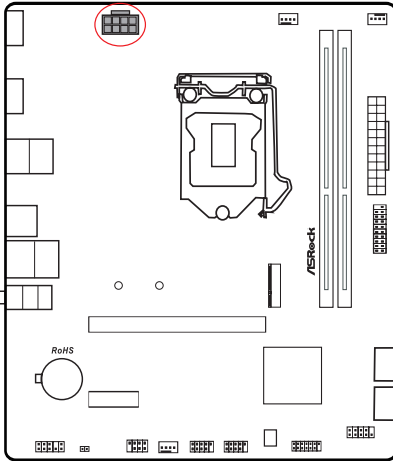


ATX 12V Power Connector

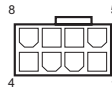
(8-pin ATX12V1) (see p.5, No. 1)

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

**\*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.**



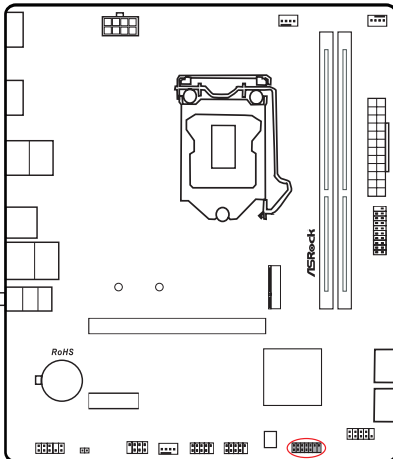
ATX12V1



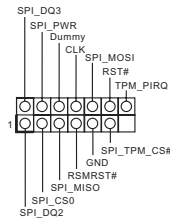
SPI TPM Header

(13-pin SPI\_TPM\_J1) (see p.5, No. 10)

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.



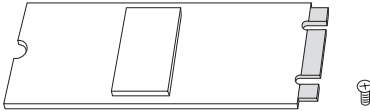
SPI\_TPM\_J1



## 2.14 M.2 SSD Module Installation Guide (M2\_1)

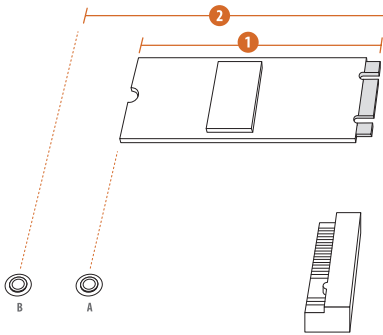
The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Ultra M.2 Socket (M2\_1, Key M) supports type 2260/2280 SATA3 6.0 Gb/s & PCIe Gen3x4 (32 Gb/s) modes.

### Installing the M.2 SSD Module



#### Step 1

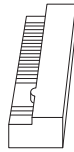
Prepare a M.2 SSD module and the screw.



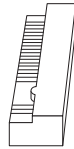
#### Step 2

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

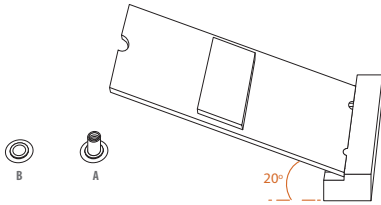
No.	1	2
Nut Location	A	B
PCB Length	6cm	8cm
Module Type	Type 2260	Type 2280

**Step 3**

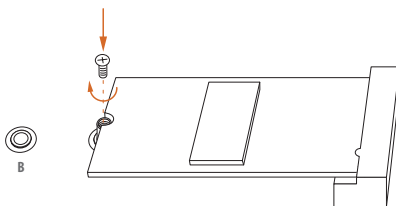
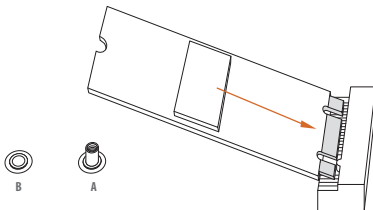
Move the standoff based on the module type and length. The standoff is placed at the nut location B by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.

**Step 4**

Peel off the yellow protective film on the nut to be used. Hand tighten the standoff into the desired nut location on the motherboard.

**Step 5**

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

**Step 6**

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

Version 1.0

Published August 2023

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- (2) this device must accept any interference received, including interference that may cause undesired operation.

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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.

## CALIFORNIA, USA ONLY

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](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)”

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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.