ASRock

B650M-CW

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 B650M-CW 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 B650M-CW Motherboard (Micro ATX Form Factor)
- 2 x Serial ATA (SATA) Data Cables (Optional)
- 2 x ASRock WiFi 2.4/5 GHz Antennas (Optional)
- 1 x I/O Panel Shield
- 3 x Screws for M.2 Sockets (Optional)
- 1 x Standoff for M.2 Socket (Optional)

1.2 Specifications

Platform	• Micro ATX Form Factor • 2oz Copper PCB
CPU	• Supports AMD Socket AM5 Ryzen™ 7000 Series Processors
Chipset	• AMD B650
Memory	• Dual Channel DDR5 Memory Technology • 4 x DDR5 DIMM Slots • Supports DDR5 ECC/non-ECC, un-buffered memory up to 6200+(OC)* • Max. capacity of system memory: 192GB • Supports Extreme Memory Profile (XMP) and EXTended Profiles for Overclocking (EXPO) memory modules * Please refer to Memory Support List on ASRock's website for more information. (http://www.asrock.com/)
Expansion Slot	CPU: • 1 x PCIe 4.0 x16 Slot (PCIE1), supports x16 mode* • 1 x PCIe 4.0 x16 Slot (PCIE4), supports x4 mode* Chipset: • 2 x PCIe 3.0 x16 Slots (PCIE2 and PCIE3), support x1 mode* • 1 x Vertical M.2 Socket (Key E), supports type 2230 WiFi/BT PCIe WiFi module * Supports NVMe SSD as boot disks • Supports AMD CrossFire™ • 15μ Gold Contact in VGA PCIe Slot (PCIE1)
Graphics	• Integrated AMD RDNA™ 2 graphics (Actual support may vary by CPU) • 1 x HDMI 2.1 TMDS/FRL 8G Compatible, supports HDR, HDCP 2.3 and max. resolution up to 4K 120Hz

Audio	• 7.1 CH HD Audio (Realtek ALC897 Audio Codec)
LAN	• Gigabit LAN 10/100/1000 Mb/s • Realtek RTL8111H
Wireless LAN	• 802.11ac WiFi Module • Supports IEEE 802.11a/b/g/n/ac • Supports Dual-Band (2.4/5 GHz) • Supports high speed wireless connections up to 433Mbps • Supports Bluetooth + High speed class II
USB	• 1 x USB 3.2 Gen2 Type-C (Rear) • 1 x USB 3.2 Gen2 Type-A (Rear) • 1 x USB 3.2 Gen1 Type-C (Front) • 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 Ports • 1 x HDMI Port • 1 x USB 3.2 Gen2 Type-A Port (10 Gb/s) (ReDriver) • 1 x USB 3.2 Gen2 Type-C Port (10 Gb/s) (ReDriver) • 2 x USB 3.2 Gen1 Ports (USB32_23 are Lightning Gaming 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
Storage	CPU: • 1 x Blazing M.2 Socket (M2_1, Key M), supports type 2260/2280 PCIe Gen5x4 (128 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 M.2 Socket (M2_3, Key M), supports type 2260/2280 SATA3 6.0 Gb/s & PCIe Gen3x2 (16 Gb/s) modes* • 4 x SATA3 6.0 Gb/s Connectors**

	* Supports NVMe SSD as boot disks ** M2_3 and SATA3_3_4 share lanes. If either one of them is in use, the other one will be disabled.
RAID	• Supports RAID 0, RAID 1 and RAID 10 for SATA storage devices • Supports RAID 0, RAID 1 and RAID 10 for M.2 NVMe storage devices* * Requires additional M.2 NVMe expansion cards to support RAID 10 ** M2_3 and SATA3_3_4 share lanes. If either one of them is in use, the other one will be disabled.
Connector	• 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)**** • 3 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 4 pin 12V 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) • 2 x USB 3.2 Gen1 Headers (Support 4 USB 3.2 Gen1 ports) • 1 x Front Panel Type C USB 3.2 Gen1 Header * 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_FAN1~3/WP support the fan power up to 2A (24W). ***** CPU_FAN2/WP and CHA_FAN1~3/WP can auto detect if 3-pin or 4-pin fan is in use.

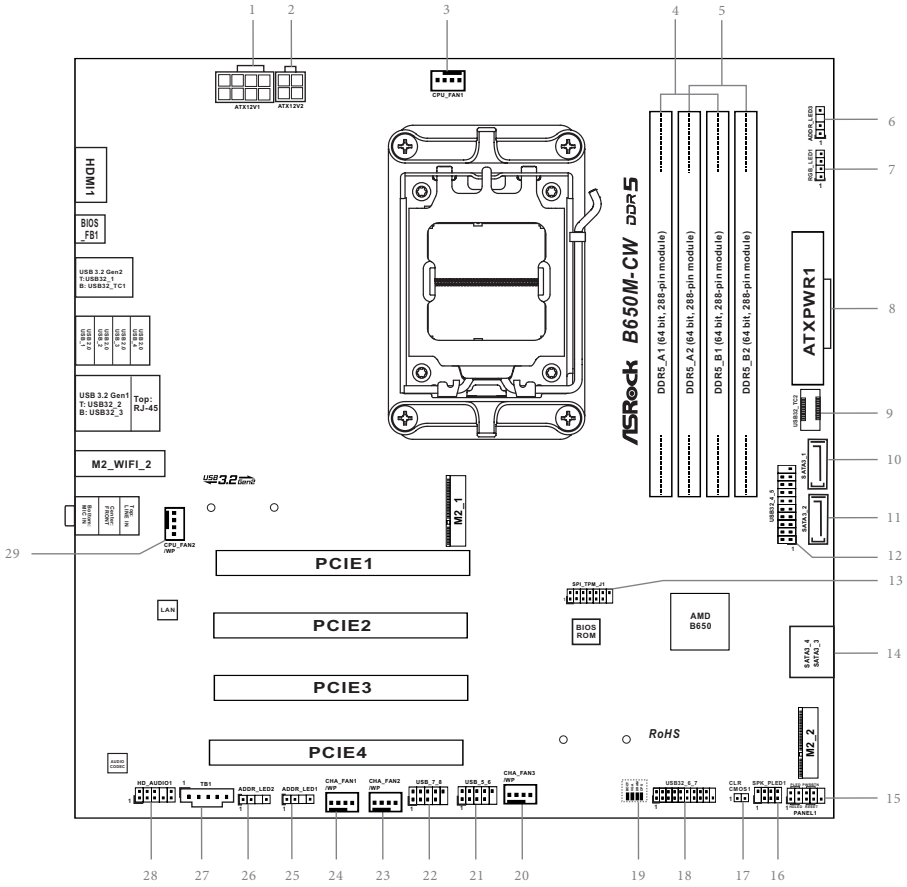
BIOS Feature	• AMI UEFI Legal BIOS with GUI support
OS	• Microsoft® Windows® 10 64-bit / 11 64-bit
Certifications	• FCC, CE • ErP/EuP ready (ErP/EuP ready power supply is required) • CEC Tier II ready

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

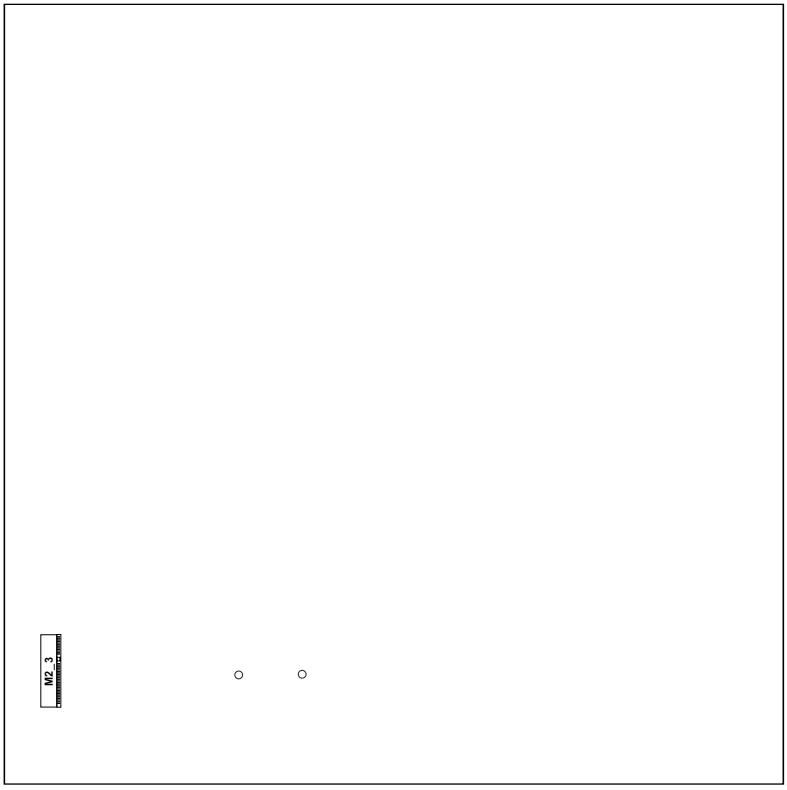
Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of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



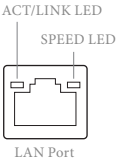
No.	Description
1	8 pin 12V Power Connector (ATX12V1)
2	4 pin 12V Power Connector (ATX12V2)
3	CPU Fan Connector (CPU_FAN1)
4	2 x 288-pin DDR5 DIMM Slots (DDR5_A1, DDR5_B1)
5	2 x 288-pin DDR5 DIMM Slots (DDR5_A2, DDR5_B2)
6	Addressable LED Header (ADDR_LED3)
7	RGB LED Header (RGB_LED1)
8	ATX Power Connector (ATXPWR1)
9	Front Panel Type C USB 3.2 Gen1 Header (USB32_TC2)
10	SATA3 Connector (SATA3_1)
11	SATA3 Connector (SATA3_2)
12	USB 3.2 Gen1 Header (USB32_4_5)
13	SPI TPM Header (SPI_TPM_J1)
14	SATA3 Connectors (SATA3_4)(Upper), (SATA3_3)(Lower)
15	System Panel Header (PANEL1)
16	Power LED and Speaker Header (SPK_PLED1)
17	Clear CMOS Jumper (CLRCMOS1)
18	USB 3.2 Gen1 Header (USB32_6_7)
19	Post Status Checker (PSC)
20	Chassis/Water Pump Fan Connector (CHA_FAN3/WP)
21	USB 2.0 Header (USB_5_6)
22	USB 2.0 Header (USB_7_8)
23	Chassis/Water Pump Fan Connector (CHA_FAN2/WP)
24	Chassis/Water Pump Fan Connector (CHA_FAN1/WP)
25	Addressable LED Header (ADDR_LED1)
26	Addressable LED Header (ADDR_LED2)
27	5-pin Thunderbolt AIC Connector (TB1)
28	Front Panel Audio Header (HD_AUDIO1)
29	CPU/Water Pump Fan Connector (CPU_FAN2/WP)

1.4 I/O Panel



No.	Description	No.	Description
1	2.5G LAN RJ-45 Port*	7	USB 2.0 Ports (USB_1234)
2	Line In (Light Blue)**	8	USB 3.2 Gen2 Type-A Port
3	Front Speaker (Lime)**		(USB32_1)
4	Microphone (Pink)**	9	USB 3.2 Gen2 Type-C Port
5	Antenna Ports		(USB32_TC1)
6	USB 3.2 Gen1 Type-A Ports	10	BIOS Flashback Button
	(USB32_23)***	11	HDMI Port

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



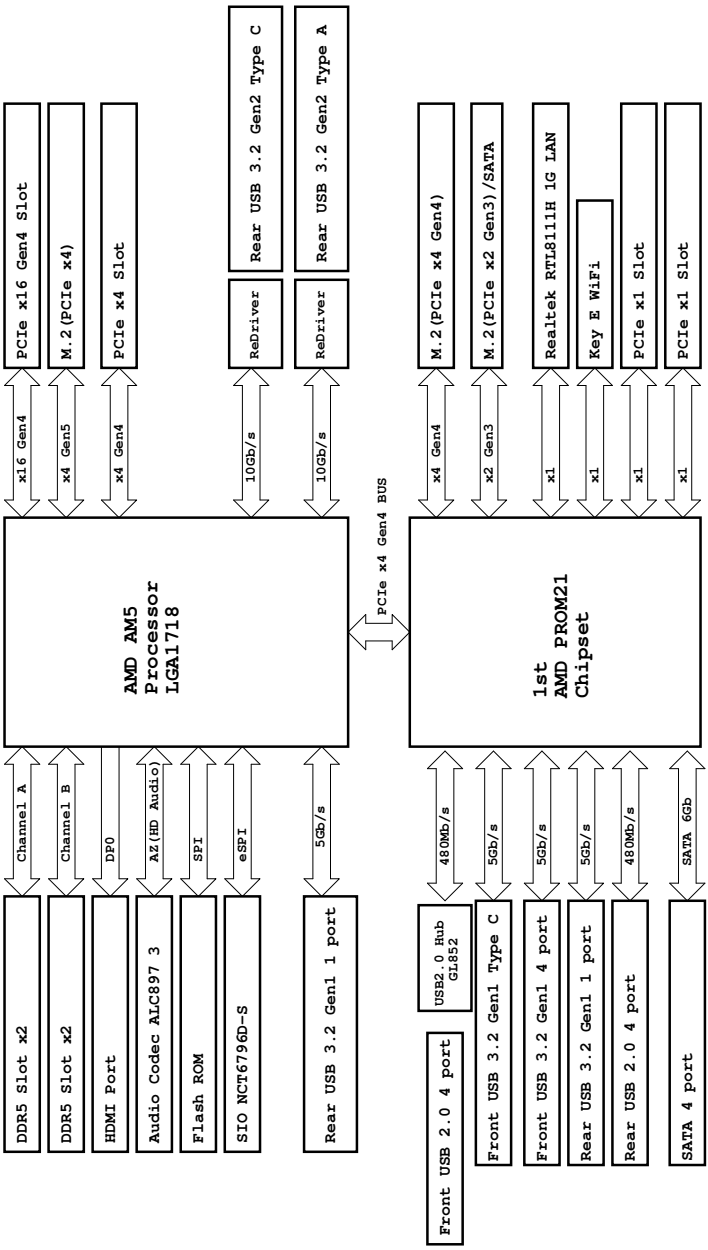
Activity / Link LED		Speed LED	
Status	**Description**	**Status**	**Description**
Off	No Link	Off	10Mbps connection
Blinking	Data Activity	Green	100Mbps connection
On	Link	Green	1Gbps connection

** ***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

*** *USB32_23 are the Lightning Gaming Ports.*

1.5 Block Diagram



1.6 WiFi-802.11ac Module and ASRock WiFi 2.4/5 GHz Antennas

WiFi-802.11ac + BT Module

This motherboard comes with an exclusive WiFi 802.11 a/b/g/n/ac + BT module that offers support for WiFi 802.11 a/b/g/n/ac connectivity standards and Bluetooth. WiFi + BT module is an easy-to-use wireless local area network (WLAN) adapter to support WiFi + BT. Bluetooth standard features Smart Ready technology that adds a whole new class of functionality into the mobile devices. BT also includes Low Energy Technology and ensures extraordinary low power consumption for PCs.

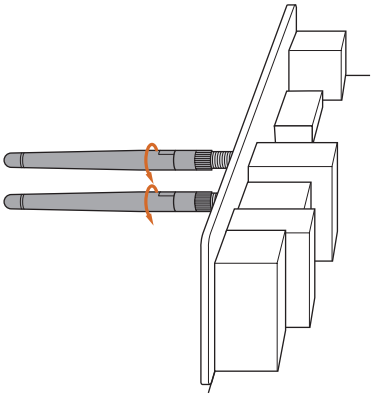
* The transmission speed may vary according to the environment.

WiFi Antennas Installation Guide



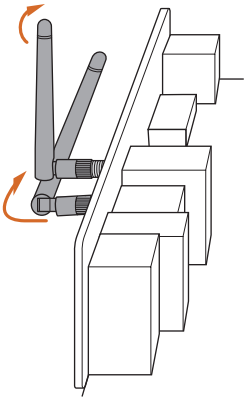
Step 1

Prepare the WiFi 2.4/5 GHz Antennas that come with the package.



Step 2

Connect the two WiFi 2.4/5 GHz Antennas to the antenna connectors. Turn the antenna clockwise until it is securely connected.



Step 3

Set the WiFi 2.4/5 GHz Antenna as shown in the illustration.

*You may need to adjust the direction of the antenna for a stronger signal.

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

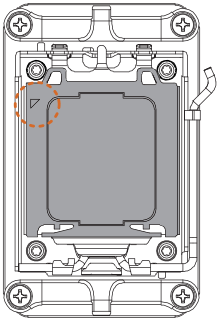
Take note of the following precautions before you install motherboard components or change any motherboard settings.

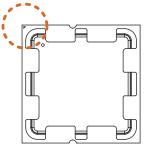
- Make sure to unplug the power cord before installing or removing the motherboard components. Failure to do so may cause physical injuries and damages to motherboard components.
- In order to avoid damage from static electricity to the motherboard's components, NEVER place your motherboard directly 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 1718-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.*

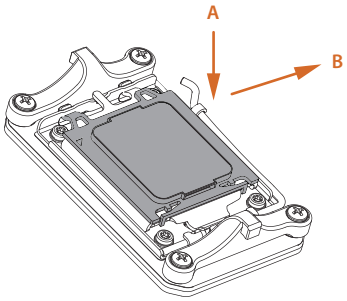
Tutorial Video



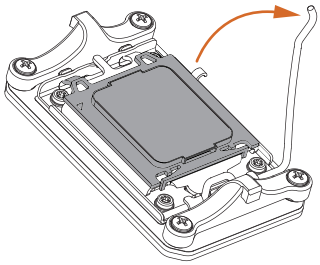


Turn your CPU to the correct orientation before opening the CPU socket cover.

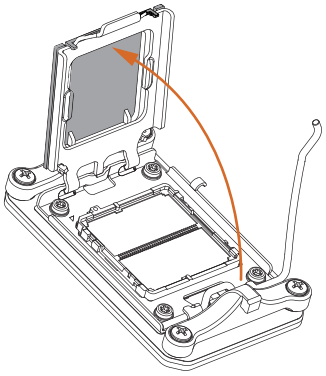
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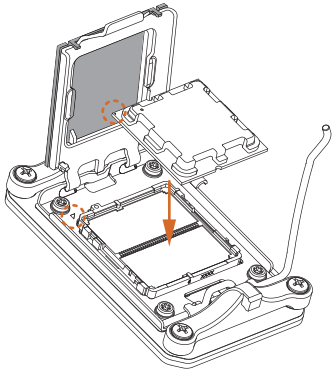
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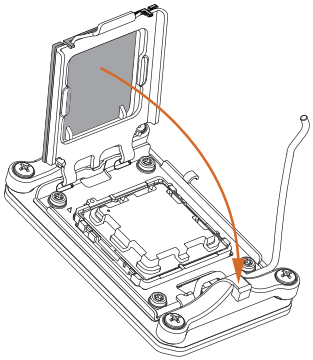


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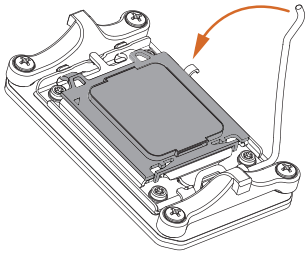


⚠ Carefully place the CPU in as flat as possible. Do not drop it.

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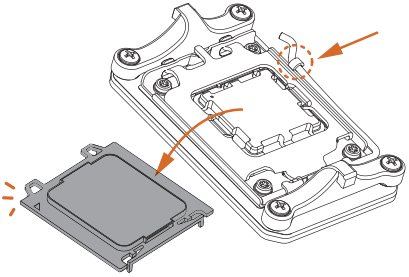


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⚠ Make sure the CPU is aligned with the socket before locking it into place.

7



⚠ Make sure the black cover plate is always in place until it pops off when closing the socket lever.

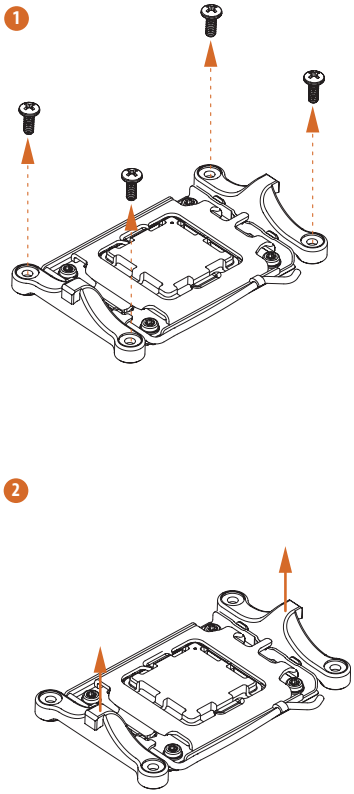
Please save the cover if the processor is removed. The cover must be placed if you wish to return the motherboard for after service.

2.2 Installing the CPU Fan and Heatsink

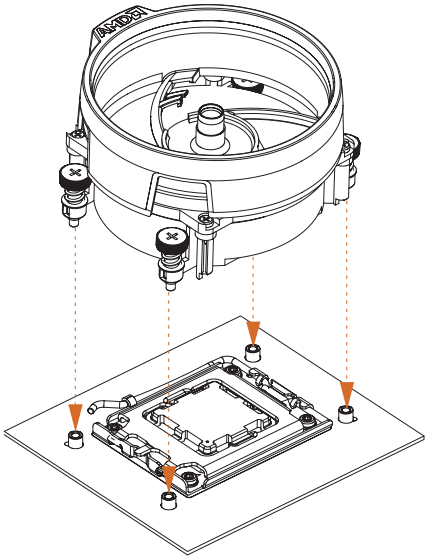
After you install the CPU into this motherboard, it is necessary to install a larger heatsink and cooling fan to dissipate heat. You also need to spray thermal grease between the CPU and the heatsink to improve heat dissipation. Make sure that the CPU and the heatsink are securely fastened and in good contact with each other.

Please turn off the power or remove the power cord before changing a CPU or heatsink.

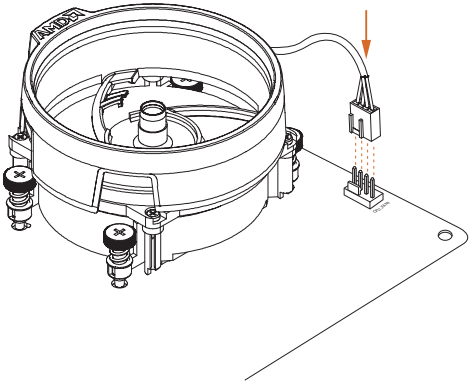
Installing the CPU Cooler (Type 1)



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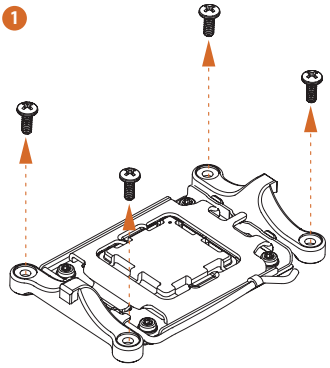


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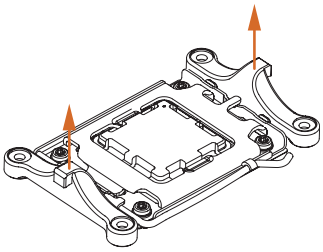


Installing the CPU Cooler (Type 2)

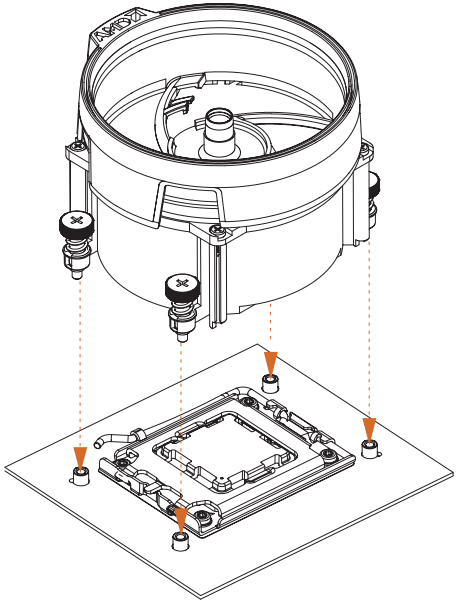
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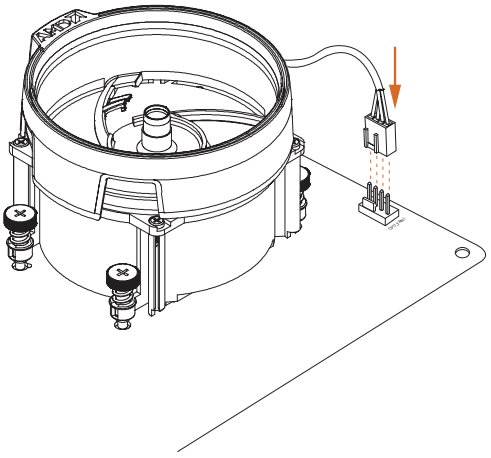
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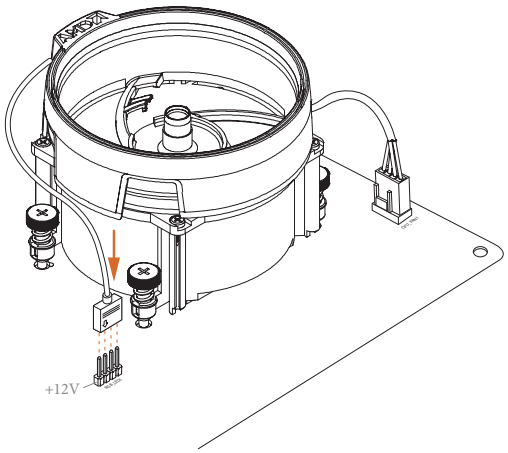
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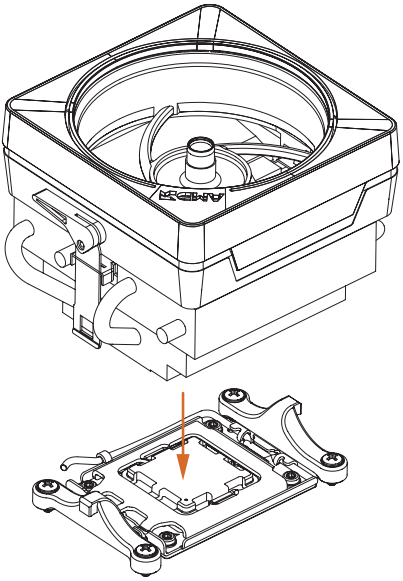
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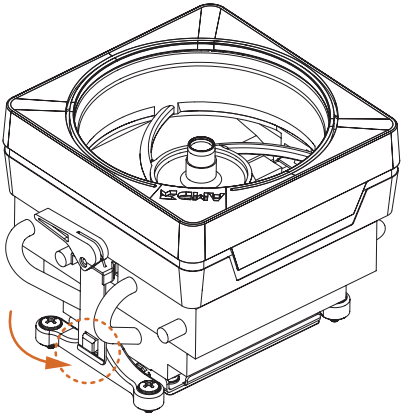
*The illustrations shown here are for reference purposes only and may not exactly match the model you purchase.

Installing the CPU Cooler (Type 3)

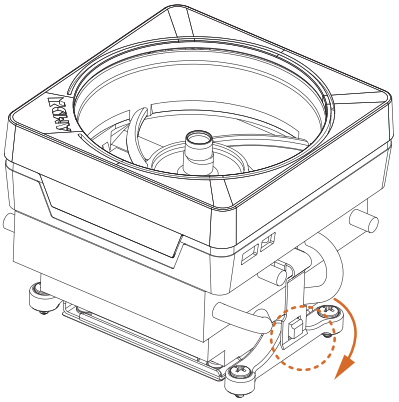
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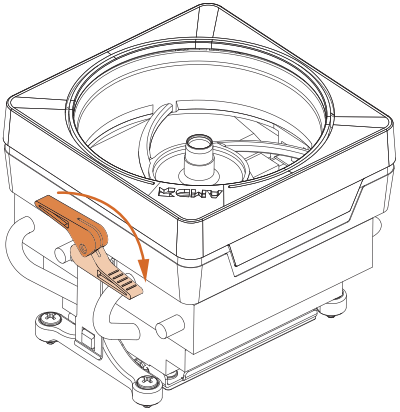
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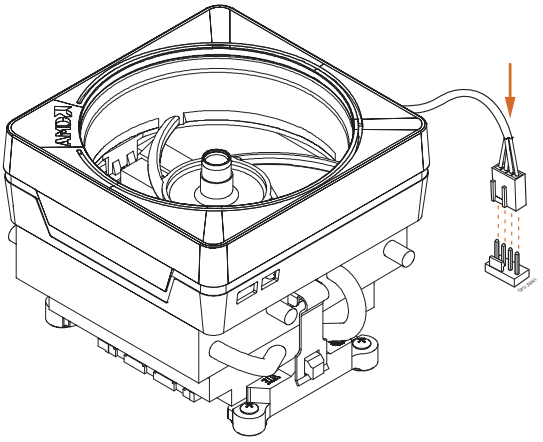
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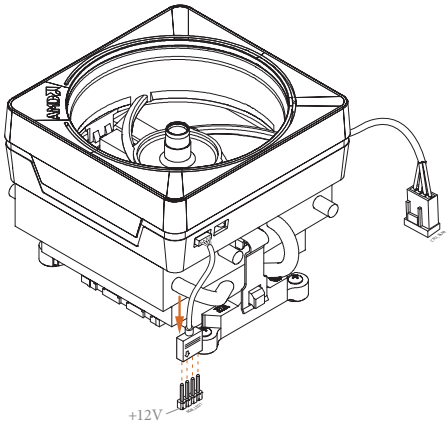
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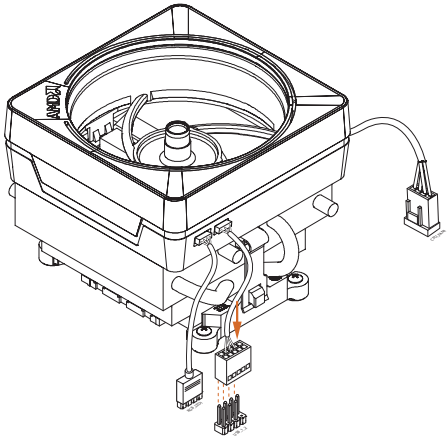
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6



or



Please note that only one cable should be used at a time in this step.
If you select RGB_LED1, please install ASRock utility "ASRock Polychrome SYNC".
If you select USB connector, please install AMD utility "SR3 Settings Software".

*The illustrations shown here are for reference purposes only and may not exactly match the model you purchase.

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

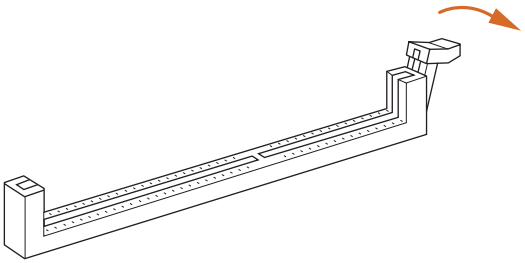
4 DIMMs

A1	A2	B1	B2
V	V	V	V

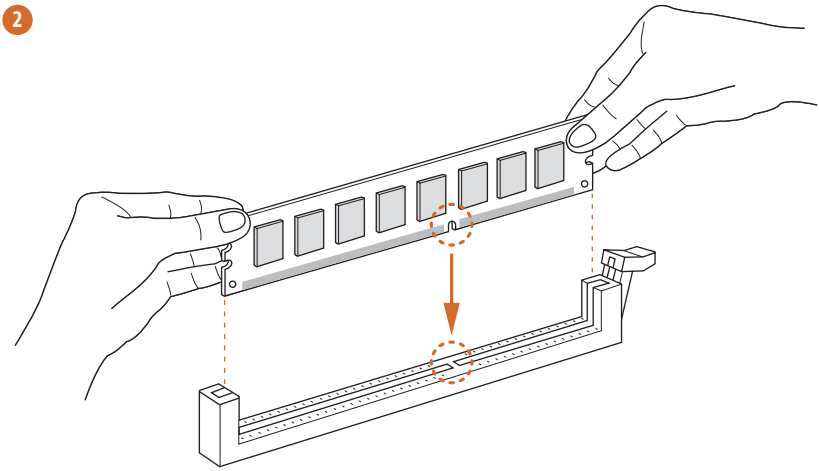
The first boot may take some time.
Please be patient and refer to the following table for booting time.
*It may vary by different setups.

Memory	1st boot after clear CMOS
2 x 16GB	90 sec
2 x 32GB	150 sec
4 x 16GB	170 sec
4 x 32GB	315 sec

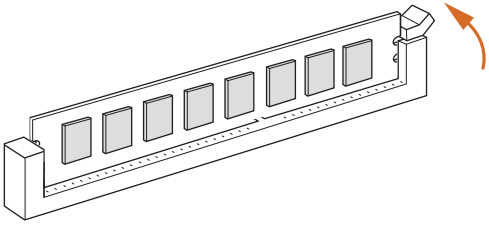
1



2

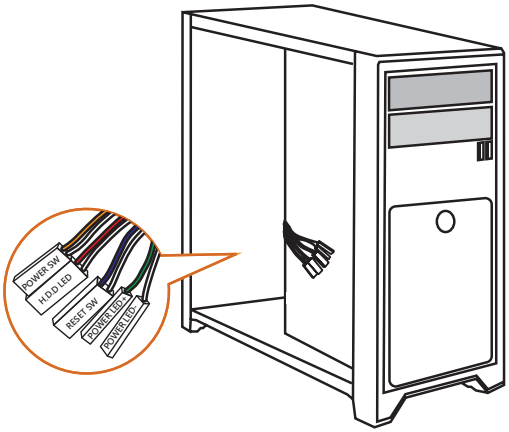


3

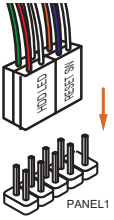


2.4 Connecting the Front Panel Header

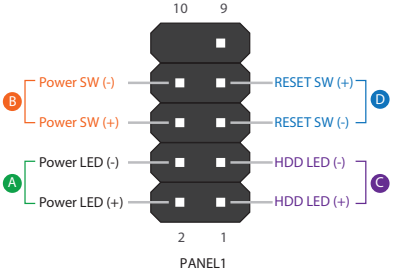
1



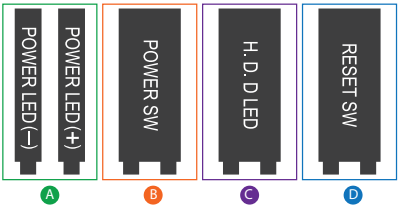
2



System Panel Header

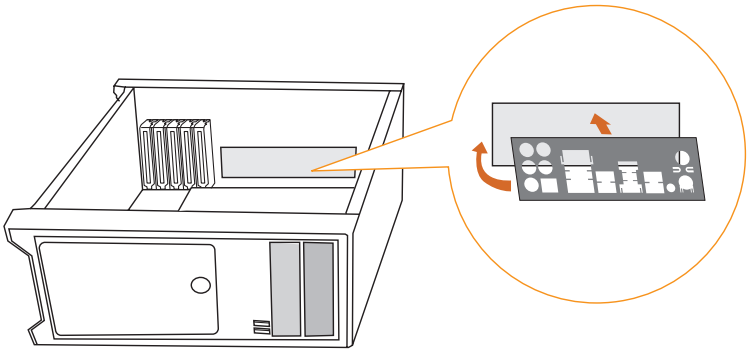


Front Panel Wires

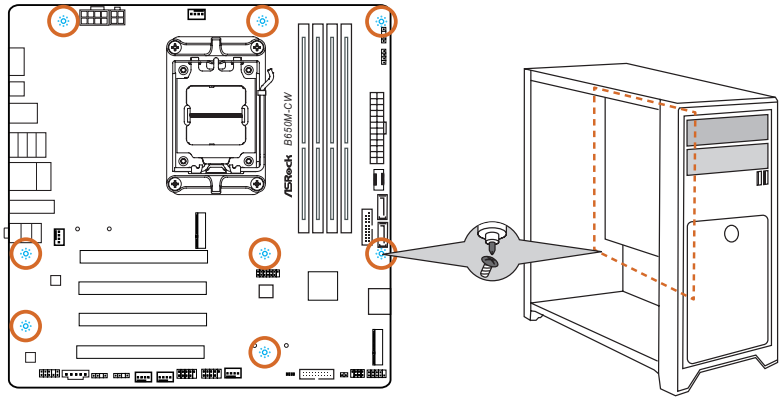


English

2.5 Installing the I/O Panel Shield

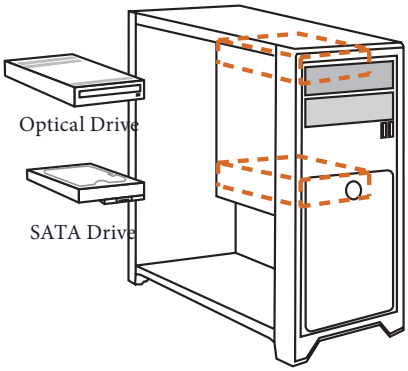


2.6 Installing the Motherboard

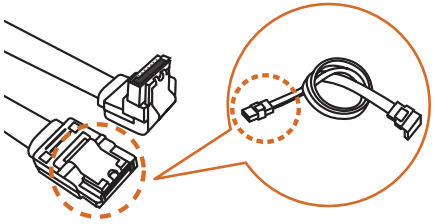


2.7 Installing SATA Drives

1

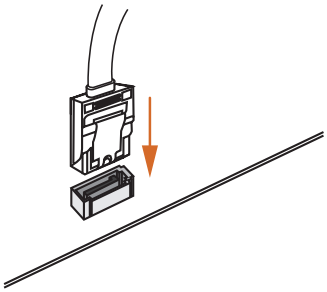


2

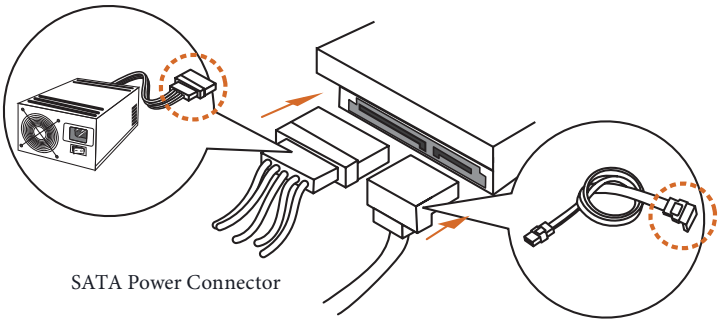


SATA Data Cable

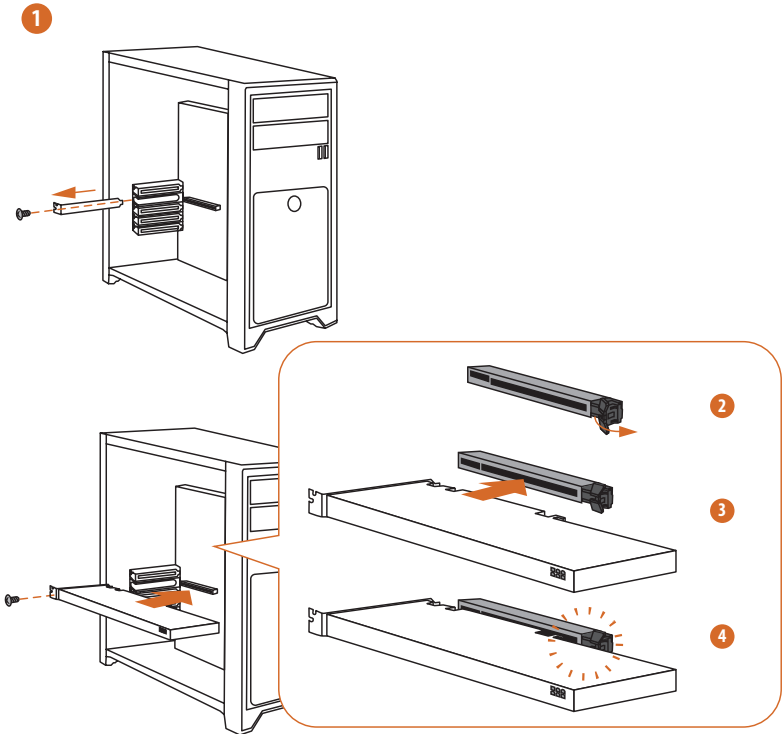
3



4



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:

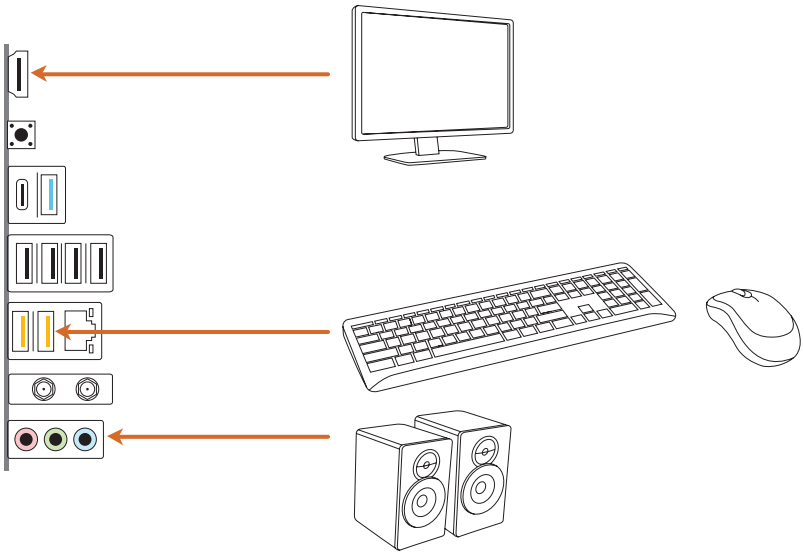
PCIE1 (PCIe 4.0 x16 slot) is used for PCIe x16 lane width graphics cards.
PCIE2 (PCIe 3.0 x16 slot) is used for PCIe x1 lane width cards.
PCIE3 (PCIe 3.0 x16 slot) is used for PCIe x1 lane width cards.
PCIE4 (PCIe 4.0 x16 slot) is used for PCIe x4 lane width graphics cards.

PCIe Slot Configurations

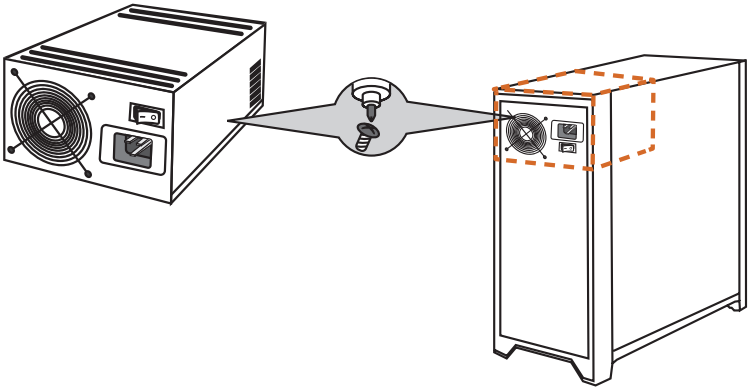
	PCIE1	PCIE4
Single Graphics Card	Gen4x16	N/A
Two Graphics Cards in CrossFire™ Mode	Gen4x16	Gen4x4

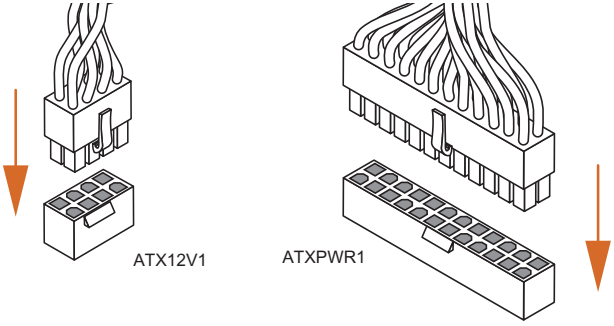
For a better thermal environment, please connect a chassis fan to the motherboard's chassis fan connector (CHA_FAN1~3/WP) when using multiple graphics cards.

2.9 Connecting Peripheral Devices

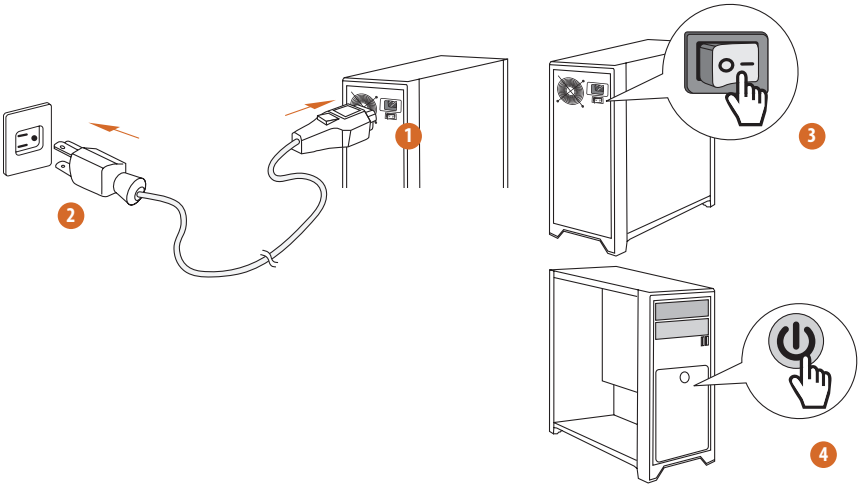


2.10 Connecting the Power Connectors



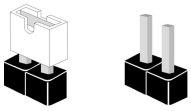


2.11 Power On



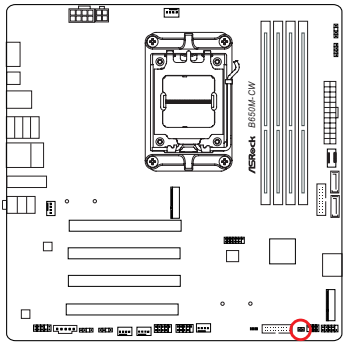
2.12 Jumpers Setup

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
(CLRCMOS1) (see p.6, No. 17)

CLRCMOS1 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 CLRCMOS1 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.



CLRCMOS1



2-pin Jumper

Short: Clear CMOS
Open: Default

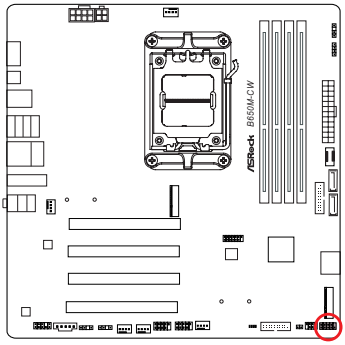
English

2.13 Onboard Headers and Connectors

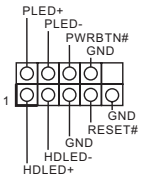
Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard.

System Panel Header
(9-pin PANEL1) (see p.6, No. 15)

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.

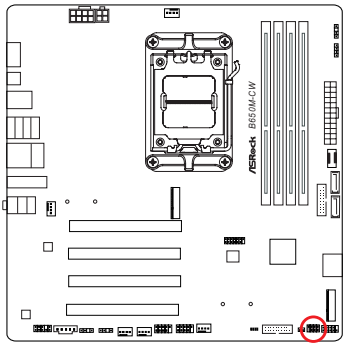
PLED (System Power LED):
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).

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.

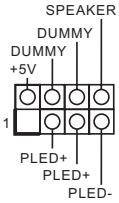
The front panel design may differ by chassis. A front panel module mainly consists of power button, reset button, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

Power LED and Speaker Header
(7-pin SPK_PLED1) (see p.6, No. 16)

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

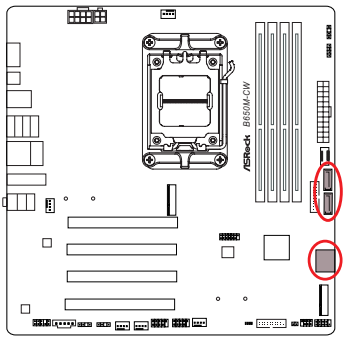


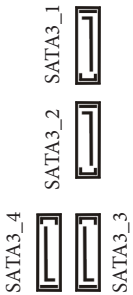
SPK_PLED1



Serial ATA3 Connectors
Vertical:
(SATA3_1) (see p.6, No. 10)
(SATA3_2) (see p.6, No. 11)
Right Angle:
(SATA3_3) (see p.6, No. 14)(Lower)
(SATA3_4) (see p.6, No. 14)(Upper)

These four SATA3 connectors support SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.
* M2_3 and SATA3_3_4 share lanes. If either one of them is in use, the other one will be disabled.

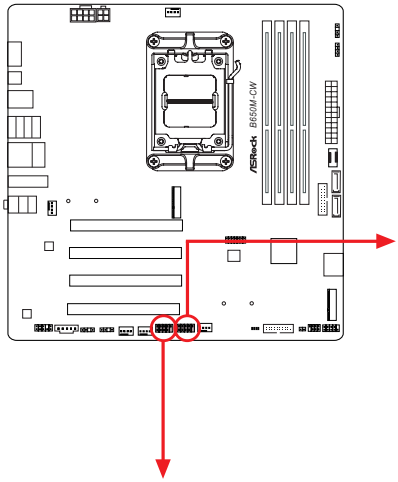




English

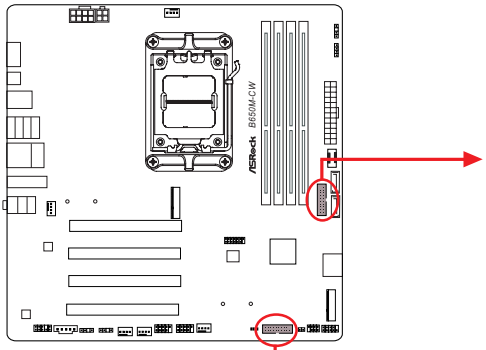
USB 2.0 Headers
(9-pin USB_5_6) (see p.6, No. 21)
(9-pin USB_7_8) (see p.6, No. 22)

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

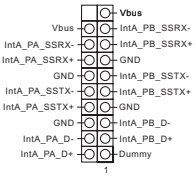


USB 3.2 Gen1 Headers
(19-pin USB32_4_5) (see p.6, No. 12)
(19-pin USB32_6_7) (see p.6, No. 18)

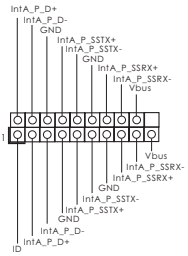
There are two headers on this motherboard. Each USB 3.2 Gen1 header can support two ports.



USB32_4_5



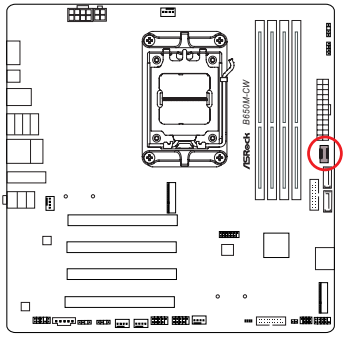
USB32_6_7



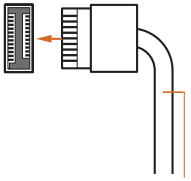
English

Front Panel Type C USB 3.2 Gen1 Header
(20-pin USB32_TC2) (see p.6, No. 9)

There is one Front Panel Type C USB 3.2 Gen1 Header on this motherboard. This header is used for connecting a USB 3.2 Gen1 module for additional USB 3.2 Gen1 ports.



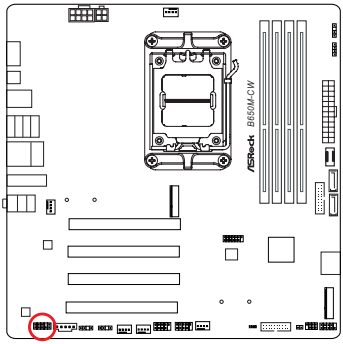
USB32_TC2



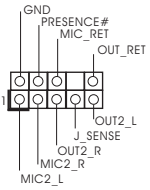
USB Type-C Cable

Front Panel Audio Header
(9-pin HD_AUDIO1) (see p.6, No. 28)

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



HD_AUDIO1

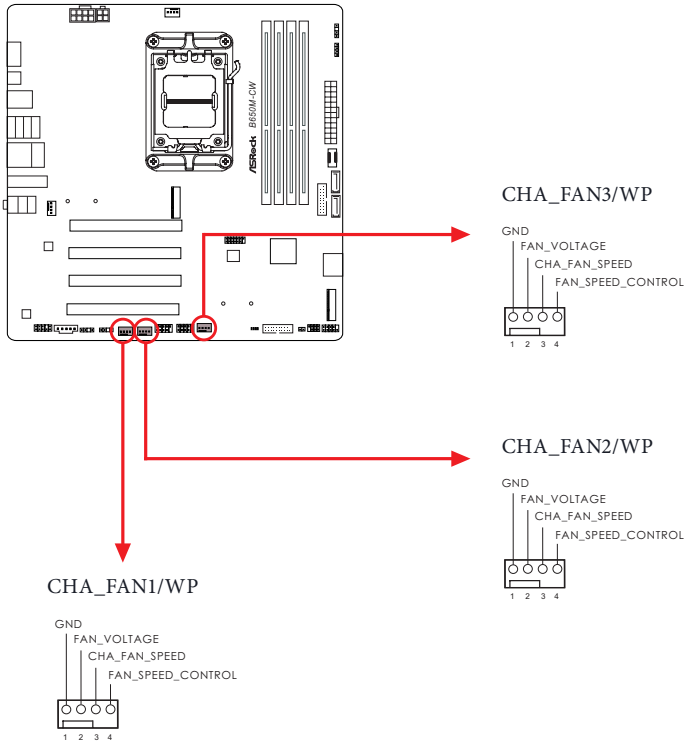


High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instructions in our manual and chassis manual to install your system.

English

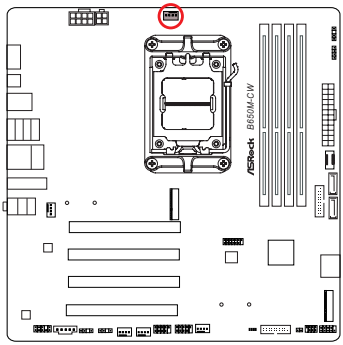
Chassis/Water Pump Fan Connectors
(4-pin CHA_FAN1/WP) (see p.6, No. 24)
(4-pin CHA_FAN2/WP) (see p.6, No. 23)
(4-pin CHA_FAN3/WP) (see p.6, No. 20)

This motherboard provides three 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.

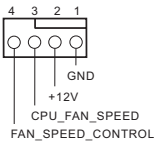


CPU Fan Connector
(4-pin CPU_FAN1) (see p.6, No. 3)

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.

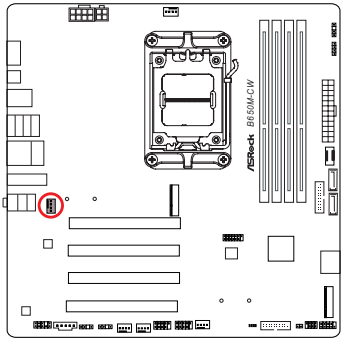


CPU_FAN1

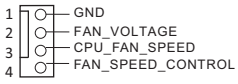


CPU/Water Pump Fan Connector
(4-pin CPU_FAN2/WP) (see p.6, No. 29)

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.



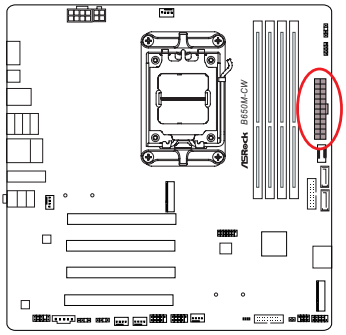
CPU_FAN2/WP

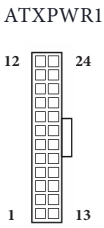


English

ATX Power Connector
(24-pin ATXPWR1) (see p.6, No. 8)

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.

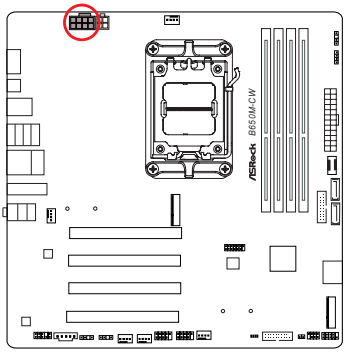


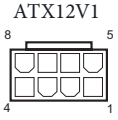


ATX 12V Power Connector
(8-pin ATX12V1) (see p.6, No. 1)

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.

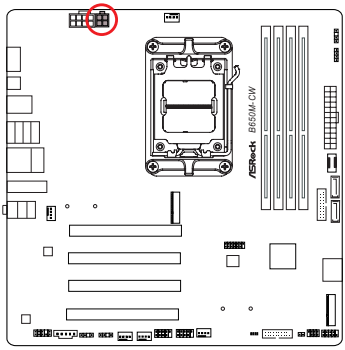
***Warning: Please make sure that the power cable connected is for the CPU and not the graphics card. Do not plug the PCIe power cable to this connector.**





ATX 12V Power Connector
(4-pin ATX12V2) (see p.6, No. 2)

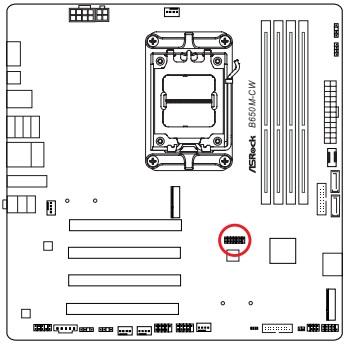
Please connect an ATX 12V power supply to this connector.
*The power supply plug fits into this connector in only one orientation.
*Connecting an ATX 12V 4-pin cable to ATX12V2 is optional.
*For advanced overclocking we suggest using this connector together with ATX12V1.



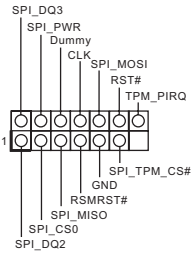
ATX12V2



SPI TPM Header
(13-pin SPI_TPM_J1) (see p.6, No. 13)
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.

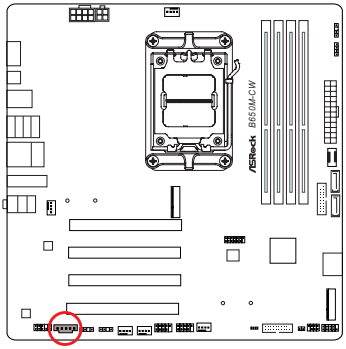


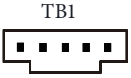
SPI_TPM_J1



English

Thunderbolt AIC Connector
(5-pin TB1) (see p.6, No. 27)
Please connect a Thunderbolt™ add-in card (AIC) to the Thunderbolt AIC connector via the GPIO cable.
*Please install the Thunderbolt™ AIC card to PCIE4 (default slot).
*For the Thunderbolt compatibility and limitation, please visit www.asrock.com.



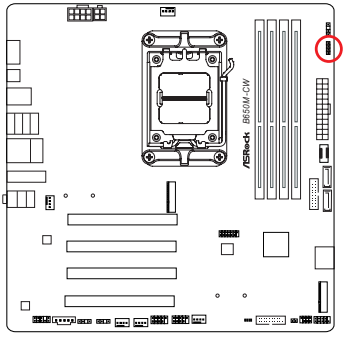


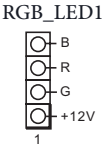
RGB LED Header

(4-pin RGB_LED1) (see p.6, No. 7)

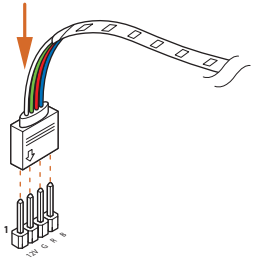
This RGB header is used to connect RGB LED extension cable which allow users to choose from various LED lighting effects.

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.

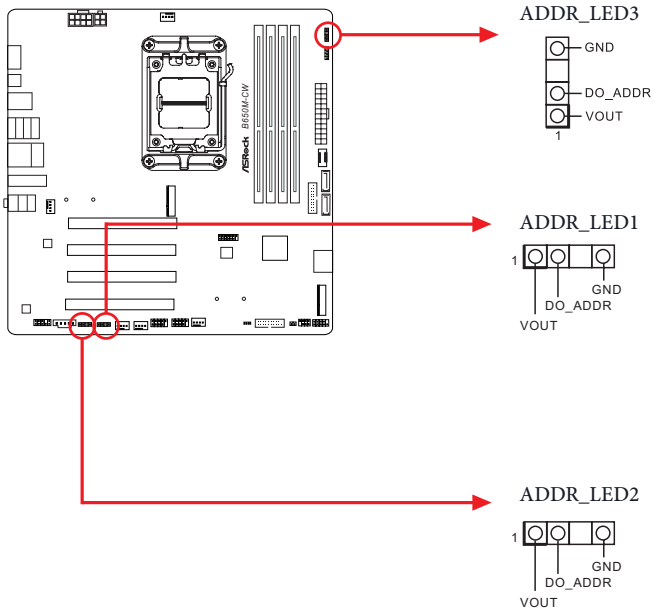


1. *Never install the RGB LED cable in the wrong orientation; otherwise, the cable may be damaged.*
2. *Before installing or removing your RGB LED cable, please power off your system and unplug the power cord from the power supply. Failure to do so may cause damages to motherboard components.*

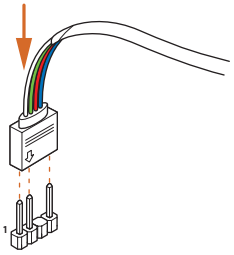
1. *Please note that the RGB LED strips do not come with the package.*
2. *The RGB LED header supports standard 5050 RGB LED strip (12V/G/R/B), with a maximum power rating of 3A (12V) and length within 2 meters.*

Addressable LED Headers
(3-pin ADDR_LED1) (see p.6, No. 25)
(3-pin ADDR_LED2) (see p.6, No. 26)
(3-pin ADDR_LED3) (see p.6, No. 6)
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

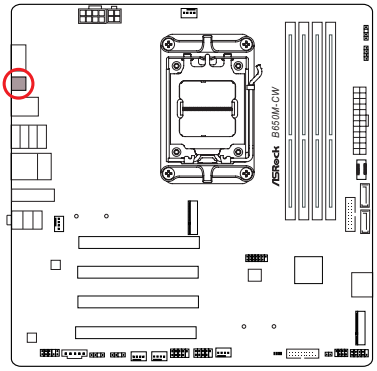
1. *Never install the Addressable LED cable in the wrong orientation; otherwise, the cable may be damaged.*
2. *Before installing or removing your Addressable LED cable, please power off your system and unplug the power cord from the power supply. Failure to do so may cause damages to motherboard components.*

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.*

2.14 Smart Button

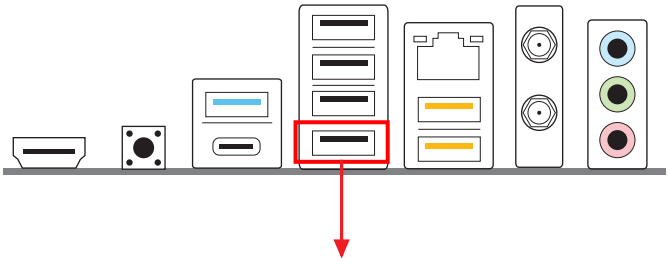
The motherboard has a smart button: BIOS Flashback Button, allowing users to flash the BIOS.

BIOS Flashback Button
(BIOS_FB1) (see p.9, No. 10)
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.

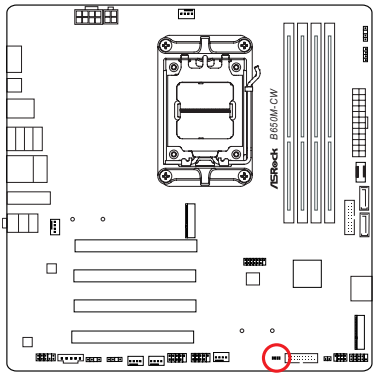
Before using the BIOS Flashback function, please suspend BitLocker and any encryption or security relying on the TPM. Make sure that you have already stored and backup-ed the recovery key. If the recovery key is missing while encryption is active, the data will stay encrypted and the system will not 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.

2.15 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.



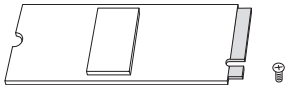


Tutorial Video

2.16 M.2 SSD Module Installation Guide (M2_1)

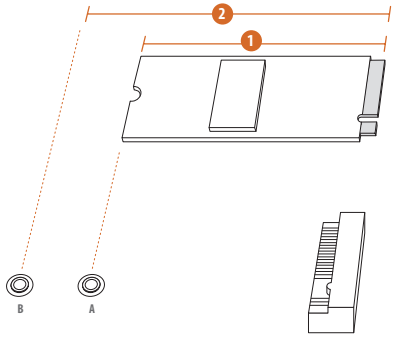
The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Blazing M.2 Socket (M2_1, Key M) supports type 2260/2280 PCIe Gen5x4 (128 Gb/s) mode.

Installing the M.2 SSD Module



Step 1

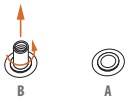
Prepare a M.2 SSD module and the screw.

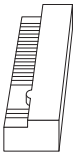


Step 2

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

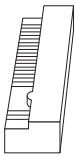




Step 3

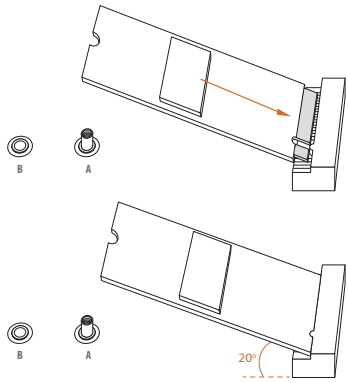
Move the standoff based on the module type and length.
The standoff is placed at the nut location B by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.





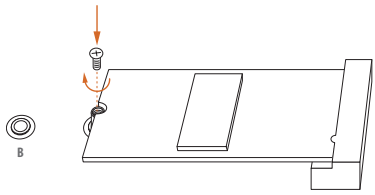
Step 4

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

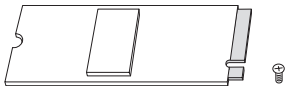
Tighten the screw with a screwdriver to secure the module into place. Please do not overtighten the screw as this might damage the module.

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

2.17 M.2 SSD Module Installation Guide (M2_2)

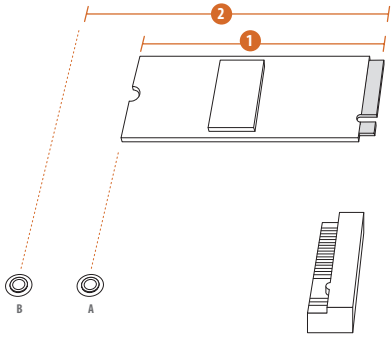
The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Hyper M.2 Socket (M2_2, Key M), supports type 2260/2280 PCIe Gen4x4 (64 Gb/s) mode.

Installing the M.2 SSD Module



Step 1

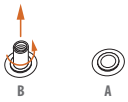
Prepare a M.2 SSD module and the screw.

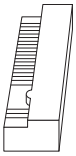


Step 2

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

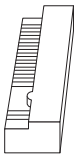




Step 3

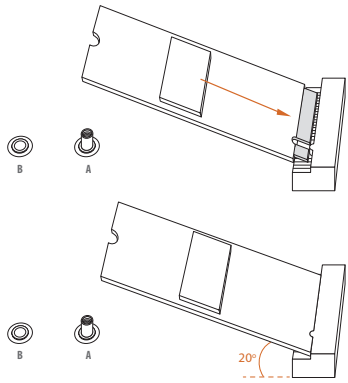
Move the standoff based on the module type and length.
The standoff is placed at the nut location B by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.





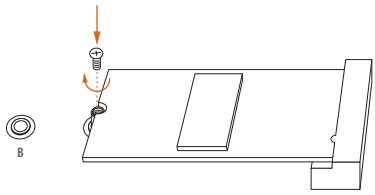
Step 4

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.

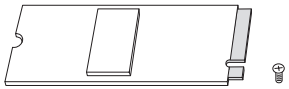
For the latest updates of M.2 SSD module support list, please visit our website for details: http://www.asrock.com

2.18 M.2 SSD Module Installation Guide (M2_3)

The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The M.2 Socket (M2_3, Key M) supports type 2260/2280 SATA3 6.0 Gb/s & PCIe Gen3x2 (16 Gb/s) modes.

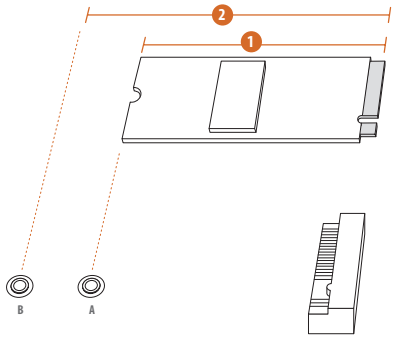
* M2_3 and SATA3_3_4 share lanes. If either one of them is in use, the other one will be disabled.

Installing the M.2 SSD Module



Step 1

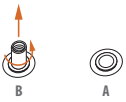
Prepare a M.2 SSD module and the screw.

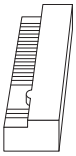


Step 2

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

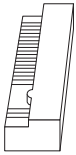




Step 3

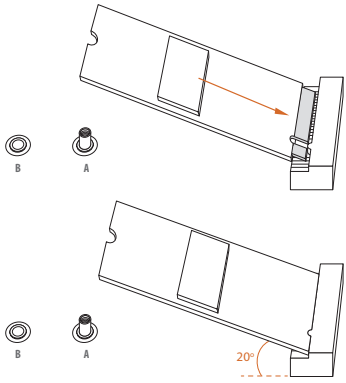
Move the standoff based on the module type and length.
The standoff is placed at the nut location B by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.





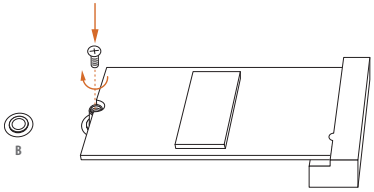
Step 4

Prepare the M.2 standoff that comes with the package, and hand tighten it into the nut A. Skip Step 4 if your M.2 SSD module is Type 2280.



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.

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

Version 1.0
Published April 2024

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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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HIGH-DEFINITION MULTIMEDIA INTERFACE

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.

⚠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.

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"

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UK CA

ASRock INC. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related UKCA Directives. Full text of UKCA declaration of conformity is available at: http://www.asrock.com

CE

ASRock INC. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related Directives. Full text of EU declaration of conformity is available at: http://www.asrock.com

ASRock follows the green design concept to design and manufacture our products, and makes sure that each stage of the product life cycle of ASRock product is in line with global environmental regulations. In addition, ASRock disclose the relevant information based on regulation requirements.

Please refer to https://www.asrock.com/general/about.asp?cat=Responsibility for information disclosure based on regulation requirements ASRock is complied with.



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.

Operations in the 5.15-5.35GHz band are restricted to indoor usage only.

	AT	BE	BG	CH	CY	CZ	DE
	DK	EE	EL	ES	FI	FR	HR
	HU	IE	IS	IT	LI	LT	LU
	LV	MT	NL	NO	PL	PT	RO
	SE	SI	SK	TR			

CE

Radio transmit power per transceiver type

Function	Frequency	Maximum Output Power (EIRP)
WiFi	2400-2483.5 MHz	18.5 + / -1.5 dbm
	5150-5250 MHz	21.5 + / -1.5 dbm
	5250-5350 MHz	18.5 + / -1.5 dbm (no TPC) 21.5 + / -1.5 dbm (TPC)
	5470-5725 MHz	25.5 + / -1.5 dbm (no TPC) 28.5 + / -1.5 dbm (TPC)
Bluetooth	2400-2483.5 MHz	8.5 + / -1.5 dbm

ASRock Incorporation
Contains Wi-Fi module with Bluetooth

Intel® Wi-Fi 3168
Model: 3168NGW

FCC ID : PD93168NG

IC : 1000M-3168NG

R 003-160024
T D160013003

CCAH17LP2970T4

5.15~5.35GHz indoor use only

ASRock Incorporation
Contains Wi-Fi 5 module with Bluetooth

AZUREWAVE WiFi 5 AW-CB515NF
Model: AW-CB515NF

FCC ID : TX2-RTL8821CE

IC : 6317A-RTL8821CE

R 201-163 301
T D16-0283 201

CCAF16LP2410T3

5.15~5.35GHz indoor use only