

**ROG STRIX  
B350-F  
GAMING**

**ASUS®**

**Motherboard**

E12721  
First Edition  
March 2017

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# Safety information

## Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Ensure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

## Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, ensure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

## About this guide

This user guide contains the information you need when installing and configuring the motherboard.

## How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product Introduction**  
This chapter describes the features of the motherboard and the new technology it supports.
- **Chapter 2: Basic Installation**  
This chapter lists the hardware setup procedures that you have to perform when installing system components.

- **Chapter 3: BIOS Setup**  
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.
- **Chapter 4: RAID Support**  
This chapter describes the RAID configurations.

## Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. **ASUS websites**  
The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.
2. **Optional documentation**  
Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

## Conventions used in this guide

To ensure that you perform certain tasks properly, take note of the following symbols used throughout this manual.



**DANGER/WARNING:** Information to prevent injury to yourself when trying to complete a task.



**CAUTION:** Information to prevent damage to the components when trying to complete a task.



**IMPORTANT:** Instructions that you **MUST** follow to complete a task.



**NOTE:** Tips and additional information to help you complete a task.

## Typography

**Bold text**

Indicates a menu or an item to select.

*Italics*

Used to emphasize a word or a phrase.

<Key>

Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.

Example: <Enter> means that you must press the Enter or Return key.

<Key1> + <Key2> + <Key3>

If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).

## ROG STRIX B350-F GAMING specifications summary

|                   |  |
|-------------------|--|
| CPU               | <p>AMD AM4 Socket for AMD Ryzen™/7th Generation A-series/Athlon™ Processors*</p> <p>Supports AM4 Socket 14 nm CPU</p> <p>Supports CPU up to 8 cores</p> <p>* Refer to <a href="http://www.asus.com">www.asus.com</a> for CPU support list.</p>   |
| Chipset           | AMD® B350  |
| Memory            | <p><b>AMD Ryzen™ Processors</b></p> <p>4 x DIMM, Max. 64GB, DDR4 3200(O.C.)/2933(O.C.)/2666/2400/2133 MHz ECC and Non-ECC, Un-buffered Memory*</p> <p><b>AMD 7th Generation A-series/Athlon™ Processors</b></p> <p>4 x DIMM, Max. 64GB, DDR4 2400/2133 MHz Non-ECC, Un-buffered Memory</p> <p>Dual Channel Memory Architecture</p> <p>* Due to AMD Ryzen™ Processor limitation, More than DDR4-2666 is supported by one DIMM per channel only.</p> <p>* Hyper DIMM support is subject to the physical characteristics of individual CPUs.</p> <p>* Refer to <a href="http://www.asus.com">www.asus.com</a> for the latest Memory QVL(Qualified Vendors List).</p>  |
| Multi-GPU support | Supports AMD® CrossFireX™ Technology   |
| Expansion slots   | <p><b>AMD Ryzen™ Processors</b></p> <p>2 x PCIe 3.0 x16 slots (supports x16 or x8/x4)</p> <p><b>AMD 7th Generation A-series/Athlon™ Processors</b></p> <p>1 x PCIe 3.0 x16 slot (supports x8)</p> <p><b>AMD B350 Chipset</b></p> <p>1 x PCIe 2.0 x16 slot (max at x4 mode)*</p> <p>3 x PCIe 2.0 x1 slots</p> <p>* PCIe16_3 slot shares bandwidth with PCIeX1_1 and PCIeX1_3.</p>   |
| Graphics          | <p>Integrated AMD Radeon™ R Series Graphics in the 7th Generation A-series APU</p> <p>Multi-VGA output support: HDMI and DisplayPort ports</p> <ul style="list-style-type: none"> <li>- Supports HDMI 1.4b with maximum resolution of 4096 x 2160 @24Hz / 2560 x 1600 @60Hz</li> <li>- Supports DisplayPort 1.2 with maximum resolution of 4096 x 2160 @60Hz</li> <li>- Maximum shared memory of 2048 MB</li> </ul>  |
| Storage           | <p><b>AMD B350 Chipset:</b></p> <ul style="list-style-type: none"> <li>- 4 x SATA 6Gb/s port(s) (gray) with Raid 0, 1, 10 support</li> </ul> <p><b>AMD Ryzen™/7th Generation A-series/Athlon™ Processors:</b></p> <ul style="list-style-type: none"> <li>- 2 x SATA 6Gb/s port(s) (gray)</li> </ul> <p><b>AMD Ryzen™ Processors:</b></p> <ul style="list-style-type: none"> <li>- 1 x M.2 Socket 3 with M Key, type 2242/2260/2280/22110 storage devices support (SATA and PCIe 3.0 x4 mode)*</li> </ul> <p><b>AMD 7th Generation A-series/Athlon™ Processors:</b></p> <ul style="list-style-type: none"> <li>- 1 x M.2 Socket 3 with M Key, type 2242/2260/2280/22110 storage devices support (SATA and PCIe 3.0 x2 mode)*</li> </ul> <p>* When a SATA mode M.2 device is installed, the M.2 Socket shares bandwidth with the SATA6G_5/6 ports.</p> |

(continued on the next page)

## ROG STRIX B350-F GAMING specifications summary

|                        |  |
|------------------------|--|
| LAN                    | <p>Intel® I211-AT, 1 x Gigabit LAN Controller<br/>         Anti-surge LANGuard<br/>         ROG GameFirst technology</p>   |
| Audio                  | <p><b>ROG SupremeFX S1220A 8-Channel High Definition Audio CODEC</b></p> <ul style="list-style-type: none"> <li>- Supports up to 32-Bit/192kHz playback*</li> <li>- Impedance sense for front and rear panel headphone outputs</li> <li>- High quality 120dB SNR stereo playback output and 113dB SNR recording input</li> <li>- SupremeFX Shielding Technology</li> <li>- Dual Headphone Amplifiers</li> <li>- Jack-detection, Multi-streaming, and Front Panel Jack-retasking</li> <li>- Optical S/PDIF out port at back panel</li> </ul> <p><b>Audio Features :</b></p> <ul style="list-style-type: none"> <li>- Sonic Radar III</li> <li>- Sonic Studio III</li> </ul> <p>* Due to limitations in HDA bandwidth, 32-bit/192kHz is not supported for 8-Channel audio.</p> |
| USB                    | <p><b>AMD Ryzen™/7th Generation A-series/Athlon™ Processors :</b></p> <ul style="list-style-type: none"> <li>- 4 x USB 3.0 port(s) (4 at back panel, blue)</li> </ul> <p><b>AMD B350 Chipset :</b></p> <ul style="list-style-type: none"> <li>- 2 x USB 3.1 port(s) (2 at back panel, red)</li> </ul> <p><b>AMD B350 Chipset :</b></p> <ul style="list-style-type: none"> <li>- 2 x USB 3.0 port(s) (2 at mid-board)</li> </ul> <p><b>AMD B350 Chipset :</b></p> <ul style="list-style-type: none"> <li>- 6 x USB 2.0 port(s) (2 at back panel, black, 4 at mid-board)</li> </ul>  |
| ROG Exclusive Features | <p>RAMCache II<br/>         ROG GameFirst IV*<br/>         ROG Overwolf<br/>         ROG Clone Drive<br/>         ROG CPU-Z</p> <p>* ROG GameFirst IV is only available for Windows® 10 64-bit.</p>  |
| ASUS Special Features  | <p><b>Performance Optimization</b></p> <p><b>5-Way Optimization</b></p> <ul style="list-style-type: none"> <li>- Whole system optimization with a single click! Perfectly consolidates better CPU performance, power saving, digital power control, system cooling and app usages.</li> </ul> <p><b>DIGI+ VRM</b></p> <p><b>EPU</b></p> <ul style="list-style-type: none"> <li>- EPU</li> </ul> <p><b>TPU</b></p> <ul style="list-style-type: none"> <li>- Auto Tuning, TurboV, GPU Boost</li> </ul> <p><b>Fan Xpert 4</b></p> <ul style="list-style-type: none"> <li>- featuring Fan Auto Tuning function and multiple thermistors selection for optimized system cooling control</li> </ul>  |

(continued on the next page)



# ROG STRIX B350-F GAMING specifications summary

|                                       |  |
|---------------------------------------|--|
| <p><b>ASUS Special Features</b></p>   | <p><b>ASUS EZ DIY</b></p> <ul style="list-style-type: none"> <li>- ASUS CrashFree BIOS 3</li> <li>- ASUS EZ Flash 3</li> </ul> <p><b>ASUS Q-Design</b></p> <ul style="list-style-type: none"> <li>- Q-Shield</li> <li>- Q-LED (CPU, DRAM, VGA, Boot Device LED)</li> <li>- Q-Slot</li> <li>- Q-DIMM</li> </ul> <p><b>Gamer's Guardian</b></p> <ul style="list-style-type: none"> <li>- SafeSlot</li> <li>- DIGI+ VRM</li> <li>- DRAM Overcurrent Protection</li> <li>- ESD Guards on LAN, Audio, and USB3.0/2.0 ports</li> <li>- Highly Durable Components</li> <li>- Stainless Steel Back I/O</li> </ul> <p><b>ASUS Exclusive Features</b></p> <ul style="list-style-type: none"> <li>- AURA Lighting Control</li> <li>- AI Suite 3</li> <li>- AI Charger</li> </ul>  |
| <p><b>Back panel I/O ports</b></p>    | <p>1 x DisplayPort<br/>         1 x HDMI<br/>         1 x LAN (RJ45) port<br/>         2 x USB 3.1 ports (Type-A)<br/>         4 x USB 3.0 ports<br/>         2 x USB 2.0 ports<br/>         1 x Optical S/PDIF out<br/>         5 x Audio jack(s)</p>   |
| <p><b>Internal I/O connectors</b></p> | <p>1 x CPU fan connector (4-pin)<br/>         1 x CPU OPT fan connector (4-pin)<br/>         3 x Chassis Fan connectors (4-pin)<br/>         1 x AIO Pump Header (1 x 4-pin)<br/>         1 x System panel header<br/>         1 x Front panel audio connector (AAFP)<br/>         1 x USB 3.0 connector supports additional 2 USB 3.0 ports<br/>         2 x USB 2.0 connectors support additional 4 USB 2.0 ports<br/>         1 x 8-pin EATX 12V Power connector<br/>         1 x 24-pin EATX Power connector<br/>         1 x 14-1 pin TPM connector<br/>         1 x Clear CMOS/RTC (2-pin)<br/>         1 x T Sensor (2-pin)<br/>         2 x RGB headers<br/>         1 x M.2_1 Socket 3 with M key, type 2242/2260/2280/22110 storage devices support (both SATA &amp; PCIe 3.0 x 4 modes)<br/>         6 x SATA 6Gb/s connectors<br/>         1 x COM connector</p> |

*(continued on the next page)*

## ROG STRIX B350-F GAMING specifications summary

|                                 |   |
|---------------------------------|---|
| <b>BIOS</b>                     | 128 Mb Flash ROM, UEFI AMI BIOS, PnP, WfM2.0, SM BIOS 3.0 ACPI 6.1, Multi-language BIOS, ASUS EZ Flash 3, CrashFree BIOS 3, F11 EZ Tuning Wizard, F6 Qfan Control, F3 My Favorites, Last Modified log, F12 PrintScreen, and ASUS DRAM SPD (Serial Presence Detect) memory information |
| <b>Manageability</b>            | WfM 2.0, DMI 3.0, WOL by PME, PXE   |
| <b>Support DVD</b>              | Drivers<br>ASUS utilities<br>ASUS EZ Update<br>Anti-virus software (OEM version)  |
| <b>Operating system support</b> | Windows® 10 (64-bit)  |
| <b>Form factor</b>              | ATX Form Factor, 12"x 9.6" (30.5cm x 24.4cm)  |



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Specifications are subject to change without notice.

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# Package contents

Check your motherboard package for the following items.

---

|                        |   |
|------------------------|---|
| <b>Motherboard</b>     | ROG STRIX B350-F GAMING   |
| <b>Cables</b>          | 4 x SATA 6Gb/s cables<br>1 x Cable for RGB Header (80cm 1 x 4-pin)  |
| <b>Accessories</b>     | 1 x I/O Shield<br>1 x M.2 Screw package<br>1 x ROG cable label<br>1 x ROG Coaster<br>1 x Strix sticker<br>1 x Cable tie black |
| <b>Application DVD</b> | Support DVD   |
| <b>Documentation</b>   | User manual   |

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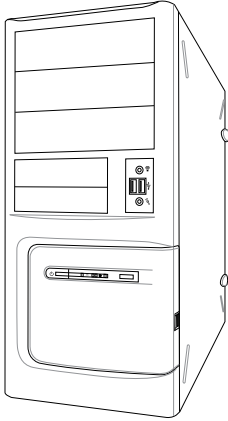


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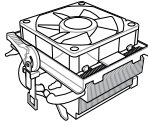
If any of the above items is damaged or missing, contact your retailer.

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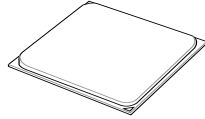
# Installation tools and components



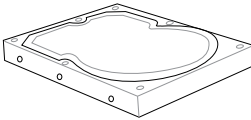
PC chassis



AMD AM4 compatible CPU Fan



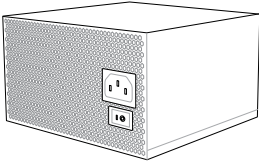
AMD AM4 CPU



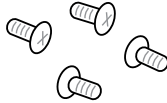
SATA hard disk drive



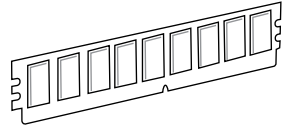
Phillips (cross) screwdriver



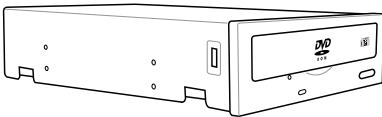
Power supply unit



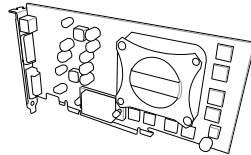
1 bag of screws



DIMM



SATA optical disc drive (optional)



Graphics card



---

The tools and components listed above are not included in the motherboard package.

---

# Product Introduction

# 1

## 1.1 Motherboard overview

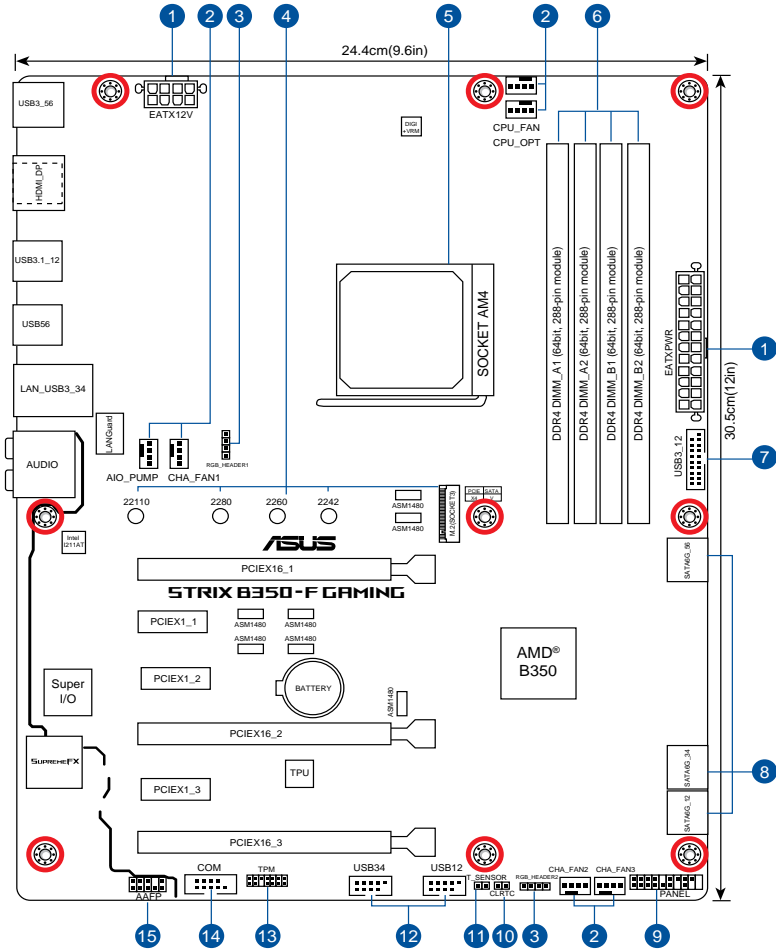
### 1.1.1 Before you proceed

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



- 
- Unplug the power cord from the wall socket before touching any component.
  - Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, to avoid damaging them due to static electricity.
  - Hold components by the edges to avoid touching the ICs on them.
  - Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
  - Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, or components.
-

## 1.1.2 Motherboard layout



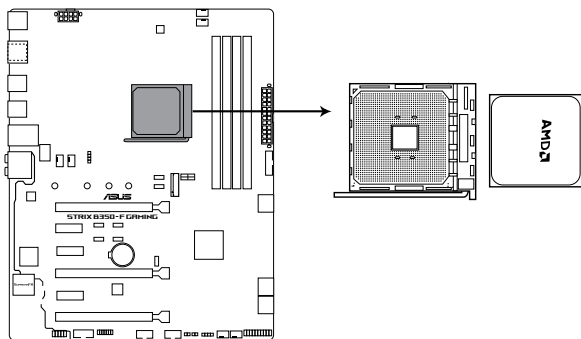
Refer to **1.1.7 Internal connectors** and **2.2.1 Rear I/O connection** for more information about rear panel connectors and internal connectors.

## Layout contents

| Connectors/Jumpers/Slots/LED |   | Page |
|------------------------------|---|------|
| 1.                           | ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)  | 1-11 |
| 2.                           | CPU, CPU optional, AIO pump, and chassis fan connectors (4-pin CPU_FAN, 4-pin CPU_OPT, 4-pin AIO_PUMP, 4-pin CHA_FAN) | 1-12 |
| 3.                           | RGB headers (4-pin RGB_HEADER1/2)   | 1-10 |
| 4.                           | M.2 (Socket 3)  | 1-16 |
| 5.                           | AM4 socket  | 1-4  |
| 6.                           | DDR4 DIMM slots   | 1-5  |
| 7.                           | USB 3.0 connector (20-1 pin USB3_12)  | 1-14 |
| 8.                           | AMD® Serial ATA 6.0Gb/s connector (SATA6G_1~6 )   | 1-15 |
| 9.                           | System panel connector (20-5 pin PANEL)   | 1-17 |
| 10.                          | Clear RTC RAM (2-pin CLRTC)   | 1-9  |
| 11.                          | Thermal sensor connector (2-pin T_SENSOR)   | 1-16 |
| 12.                          | USB 2.0 connectors (10-1 pin USB12, USB34)  | 1-14 |
| 13.                          | TPM connector (14-1 pin TPM)  | 1-13 |
| 14.                          | Serial port connector (10-1 pin COM)  | 1-12 |
| 15.                          | Front panel audio connector (10-1 pin AAFP)   | 1-13 |

### 1.1.3 Central Processing Unit (CPU)

This motherboard comes with an AMD AM4 socket designed for AMD® Ryzen™/7th Generation A-series/Athlon™ up to 8-core processors.



**ROG STRIX B350-F GAMING CPU socket AM4**



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The AM4 socket has a different pinout from the AM3+/AM2+/AM2 socket. Ensure that you use a CPU designed for the AM4 socket. The CPU fits in only one correct orientation. **DO NOT** force the CPU into the socket to prevent bending the pins and damaging the CPU!

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

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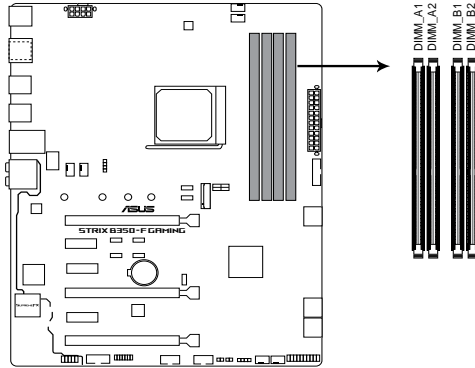


## 1.1.4 System memory

The motherboard comes with four DDR4 (Double Data Rate 4) Dual Inline Memory Modules (DIMM) slots.

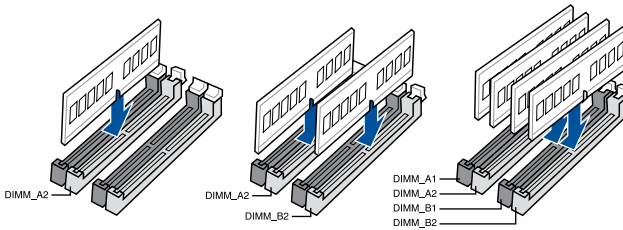


A DDR4 module is notched differently from a DDR, DDR2, or DDR3 module. DO NOT install a DDR, DDR2, or DDR3 memory module to the DDR4 slot.



**ROG STRIX B350-F GAMING  
288-pin DDR4 DIMM sockets**

### Recommended memory configurations



## Memory configurations

You may install 1GB, 2GB, 4GB, 8GB and 16 GB unbuffered ECC and non-ECC DDR4 DIMMs into the DIMM sockets.

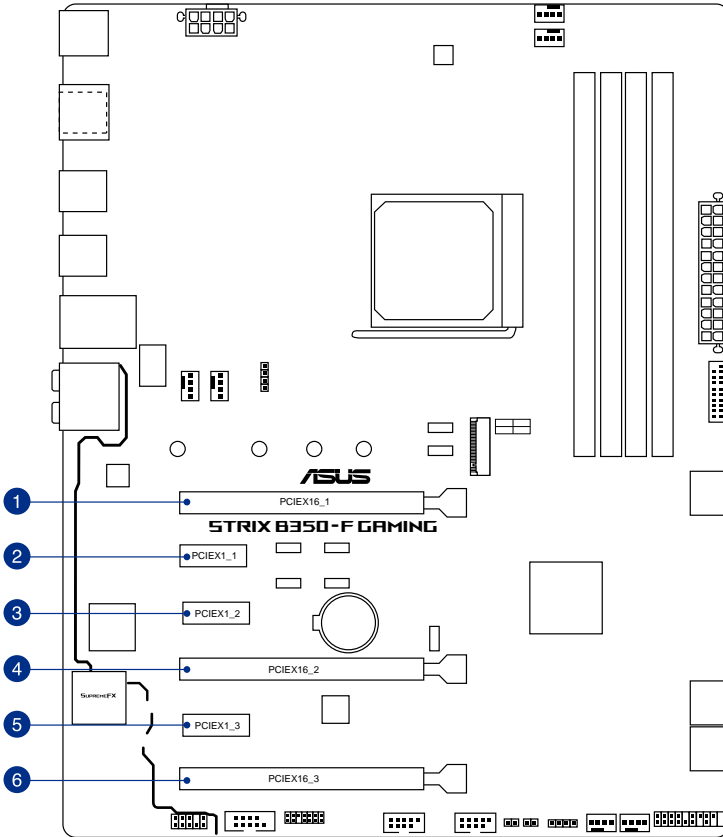


- 
- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
  - Always install DIMMs with the same CAS latency. For optimal compatibility, we recommend that you install memory modules of the same version or date code (D/C) from the same vendor. Check with the retailer to get the correct memory modules.
  - Install a 64-bit Windows® OS if you want to install 4GB or more on the motherboard.
  - This motherboard does not support DIMMs made up of 512 megabits (Mb) chips or less.
-

## 1.1.5 Expansion slots



Unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.



| Slot No. | Expansion slot      |
|----------|---------------------|
| 1        | PCIe 3.0 x16_1 slot |
| 2        | PCIe 2.0 x1_1 slot  |
| 3        | PCIe 2.0 x1_2 slot  |
| 4        | PCIe 3.0 x16_2 slot |
| 5        | PCIe 2.0 x1_3 slot  |
| 6        | PCIe 2.0 x16 slot   |

## IRQ assignments for this motherboard

- **For AMD AM4 A-series/Athlon™ Series processors**

|                                     | A      | B      | C      | D      | E | F | G      | H |
|-------------------------------------|--------|--------|--------|--------|---|---|--------|---|
| PCIe X 16_1                         | -      | -      | -      | shared | - | - | -      | - |
| PCIe X 16_3                         | shared | -      | -      | -      | - | - | -      | - |
| PCIe X 1_1                          | -      | -      | shared | -      | - | - | -      | - |
| PCIe X 1_2                          | -      | shared | -      | -      | - | - | -      | - |
| PCIe X 1_3                          | -      | -      | -      | shared | - | - | -      | - |
| M.2                                 | -      | -      | -      | shared | - | - | -      | - |
| APU USB3.0 XHCI Controller          | -      | -      | shared | -      | - | - | -      | - |
| AMD Promonotry Chip XHCI Controller | shared | -      | -      | -      | - | - | -      | - |
| SATA Controller                     | -      | shared | -      | -      | - | - | -      | - |
| HD Audio Controller                 | -      | -      | -      | -      | - | - | shared | - |
| Intel LAN                           | shared | -      | -      | -      | - | - | -      | - |

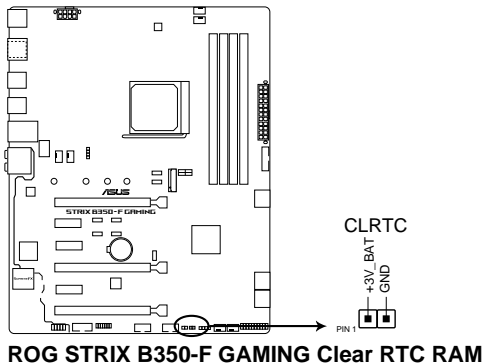
- **For Ryzen™ processors**

|                                     | A      | B      | C      | D      | E | F | G      | H      |
|-------------------------------------|--------|--------|--------|--------|---|---|--------|--------|
| PCIe X 16_1                         | -      | -      | -      | -      | - | - | shared | -      |
| PCIe X 16_2                         | -      | -      | shared | -      | - | - | -      | -      |
| PCIe X 16_3                         | shared | -      | -      | -      | - | - | -      | -      |
| PCIe X 1_1                          | -      | -      | shared | -      | - | - | -      | -      |
| PCIe X 1_2                          | -      | shared | -      | -      | - | - | -      | -      |
| PCIe X 1_3                          | -      | -      | -      | shared | - | - | -      | -      |
| M.2                                 | shared | -      | -      | -      | - | - | -      | -      |
| APU USB3.0 XHCI Controller          | -      | -      | -      | -      | - | - | -      | shared |
| AMD Promonotry Chip XHCI Controller | shared | -      | -      | -      | - | - | -      | -      |
| SATA Controller                     | -      | shared | -      | -      | - | - | -      | -      |
| Intel LAN                           | shared | -      | -      | -      | - | - | -      | -      |

## 1.1.6 Jumpers

### 1. Clear RTC RAM jumper (2-pin CLRRTC)

This jumper allows you to clear the CMOS RTC RAM data of the system setup information such as date, time, and system passwords.



To erase the RTC RAM:

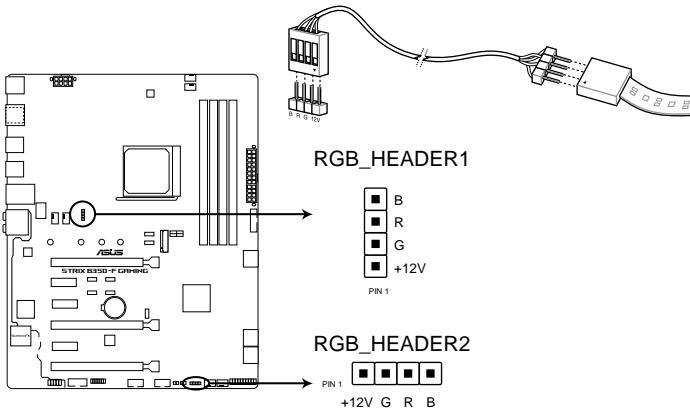
1. Turn OFF the computer and unplug the power cord.
2. Use a metal object such as a screwdriver to short the two pins.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.



If the steps above do not help, remove the onboard battery and short the two pins again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.

## 2. RGB headers (4-pin RGB\_HEADER1/2)

These headers are for RGB LED strips.



### ROG STRIX B350-F GAMING RGB HEADERS



The RGB header supports 5050 RGB multi-color LED strips (12V/G/R/B), with a maximum power rating of 2A (12V), and no longer than 2 m.



Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, or components.

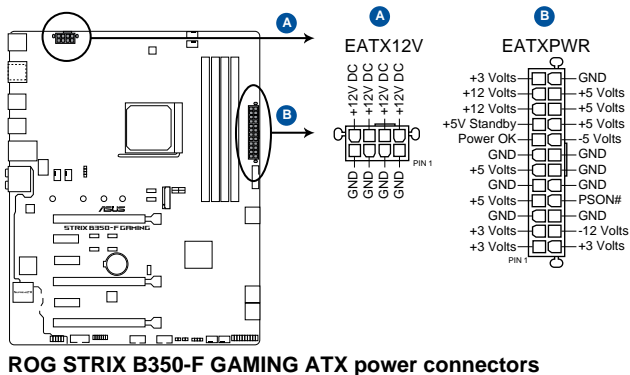


- Actual lighting and color will vary with LED strip.
- If your LED strip does not light up, check if the RGB LED extension cable and the RGB LED strip is connected in the correct orientation, and the 12V connector is aligned with the 12V header on the motherboard.
- The LED strip will only light up when the system is operating.
- The LED strips are purchased separately.

## 1.1.7 Internal connectors

### 1. ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)

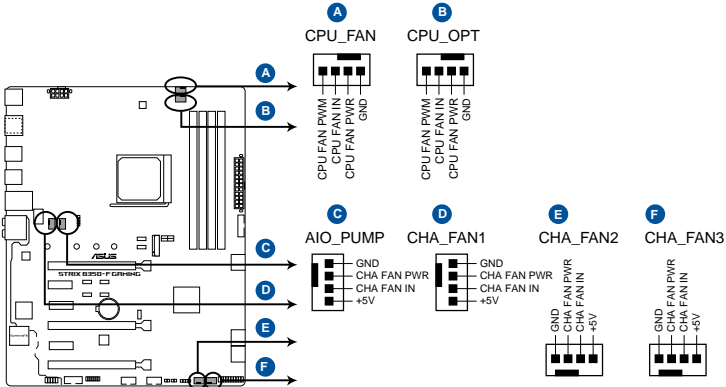
These connectors are for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.



- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12V specification 2.0 (or later version) and provides a minimum power of 350W
- We recommend that you use a PSU with higher power output when configuring a system with more power-consuming devices or when you intend to install additional devices. The system may become unstable or may not boot up if the power is inadequate.

## 2. CPU, CPU optional, AIO pump, and chassis fan connectors (4-pin CPU\_FAN, 4-pin CPU\_OPT, 4-Pin AIO\_PUMP, 4-pin CHA\_FAN)

Connect the fan cables to the fan connectors on the motherboard, ensuring that the black wire of each cable matches the ground pin of the connector.



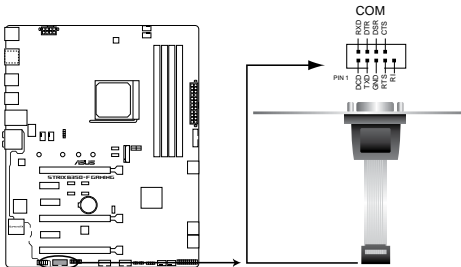
**ROG STRIX B350-F GAMING Fan connectors**



DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors! The CPU\_FAN connector supports a CPU fan of maximum 1A (12 W) fan power.

## 3. Serial port connector (10-1 pin COM)

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.



**ROG STRIX B350-F GAMING Serial port (COM) connector**

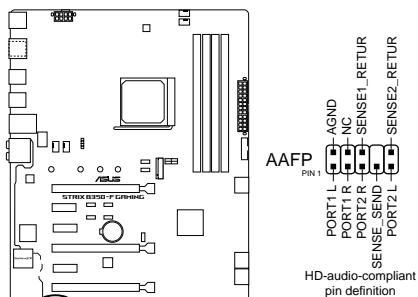


The COM module is purchased separately.



#### 4. Front panel audio connector (10-1 pin AAFP)

This connector is for a chassis-mounted front panel audio I/O module that supports HD Audio. Connect one end of the front panel audio I/O module cable to this connector.



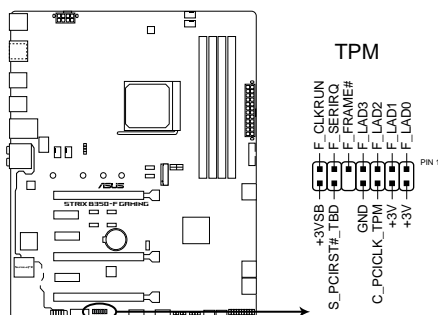
**ROG STRIX B350-F GAMING Analog front panel connector**



We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.

#### 5. TPM connector (14-1 pin TPM)

This connector supports a 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.



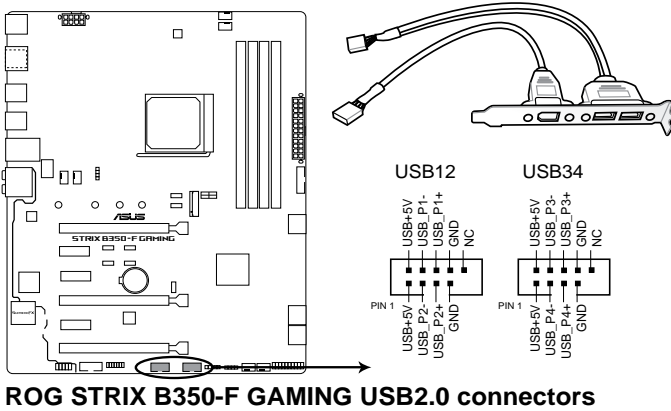
**ROG STRIX B350-F GAMING TPM connector**



The TPM module is purchased separately.

## 6. USB 2.0 connector (10-1 pin USB12, USB34)

These connectors are for USB 2.0 ports. Connect the USB module cable to any of these connectors, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specifications and support up to 480Mbps connection speed.



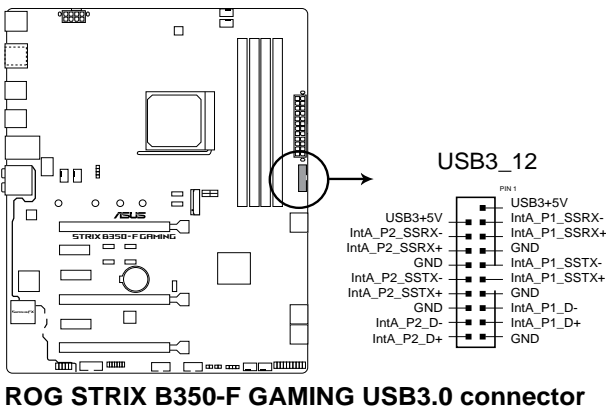
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



The USB 2.0 module is purchased separately.

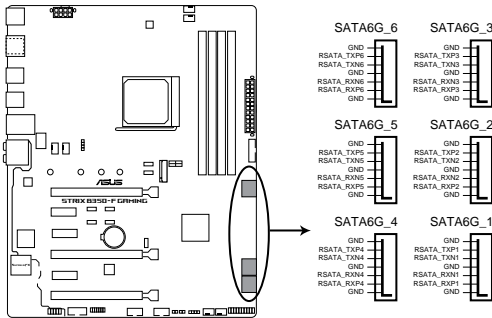
## 7. USB 3.0 connector (20-1 pin USB3\_12)

This connector allows you to connect a USB 3.0 module for additional USB 3.0 front or rear panel ports. With an installed USB 3.0 module, you can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5Gbps, faster charging time for USB-chargeable devices, optimized power efficiency and backward compatibility with USB 2.0.

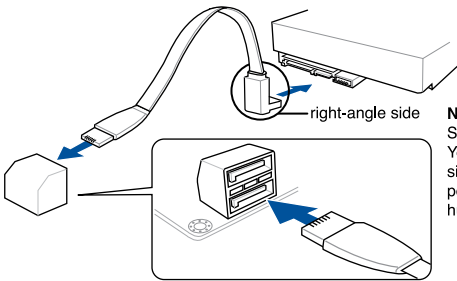


## 8. AMD® Serial ATA 6.0Gb/s connectors (7-pin SATA6G\_1~6)

These connectors connect to Serial ATA 6.0 Gb/s hard disk drives via Serial ATA 6.0 Gb/s signal cables.



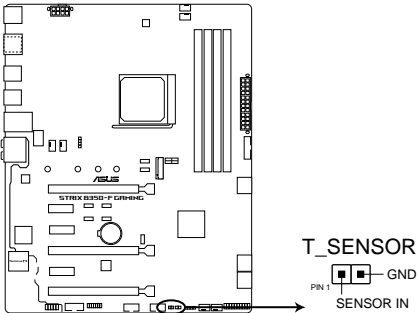
**ROG STRIX B350-F GAMING SATA 6.0Gb/s connectors**



**NOTE:** Connect the right-angle side of SATA signal cable to SATA device. You may also connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.

## 9. Thermal sensor connector (2-pin T\_SENSOR)

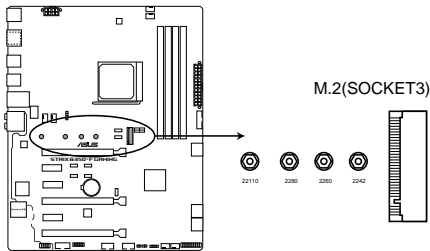
This connector is for the thermistor cable that monitors the temperature of the devices and the critical components inside the motherboard. Connect the thermistor cable and place the sensor on the device or the motherboard's component to detect its temperature.



**ROG STRIX B350-F GAMING T\_SENSOR connector**

## 10. M.2 (Socket 3)

This socket allows you to install M.2 SSD modules.



**ROG STRIX B350-F GAMING M.2(SOCKET3)**



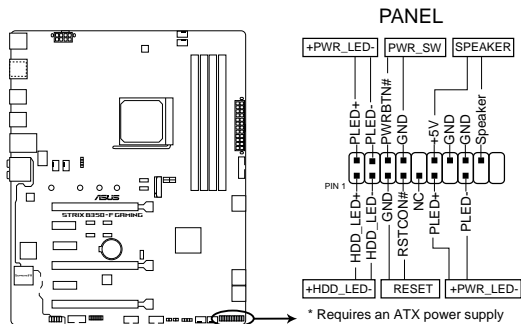
- For AMD Ryzen™ Processors, the M.2(SOCKET3) supports PCIe 3.0 x 4 and SATA mode M key design and type 2242/2260/2280/22110 storage devices
- For AMD 7th Generation A-series/Athlon™ Processors, the M.2(SOCKET3) supports PCIe 3.0 x 2 and SATA mode M key design and type 2242/2260/2280/22110 storage devices



The M.2 SSD module is purchased separately.

## 11. System panel connector (20-5 pin PANEL)

This connector supports several chassis-mounted functions.



**ROG STRIX B350-F GAMING System panel connector**

- **System power LED (4-pin +PWR\_LED-)**

This 4-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Hard disk drive activity LED (2-pin +HDD\_LED-)**

This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The HDD LED lights up or flashes when data is read from or written to the HDD.

- **System warning speaker (4-pin SPEAKER)**

This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **ATX power button/soft-off button (2-pin PWR\_SW)**

This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **Reset button (2-pin RESET)**

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.



# Basic Installation

# 2

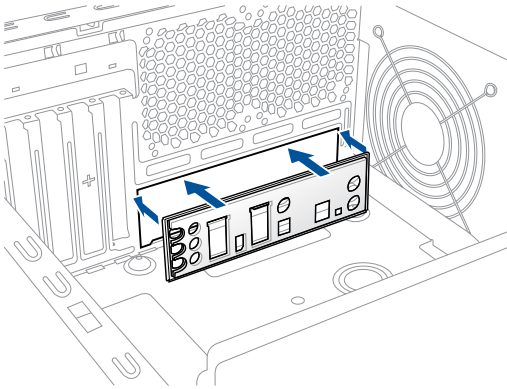
## 2.1 Building your PC system



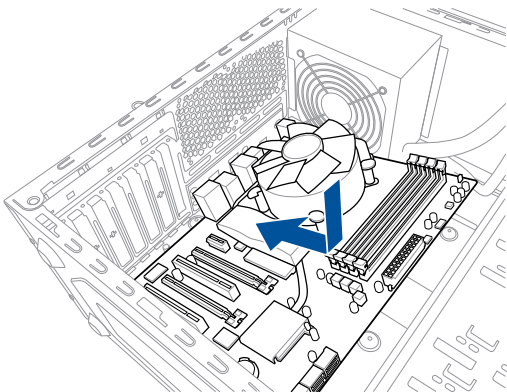
The diagrams in this section are for reference only. The motherboard layout may vary with models, but the installation steps are the same for all models.

### 2.1.1 Motherboard installation

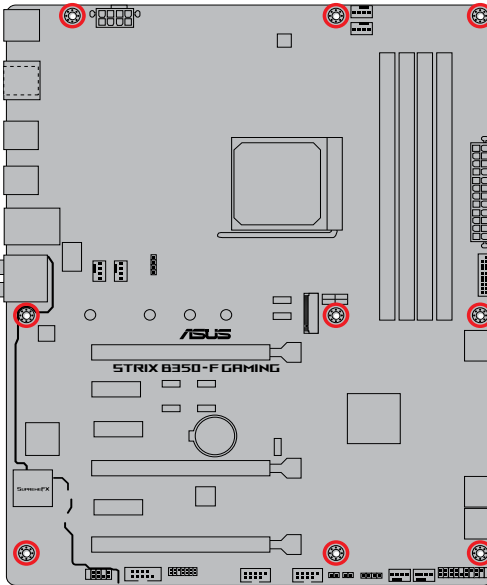
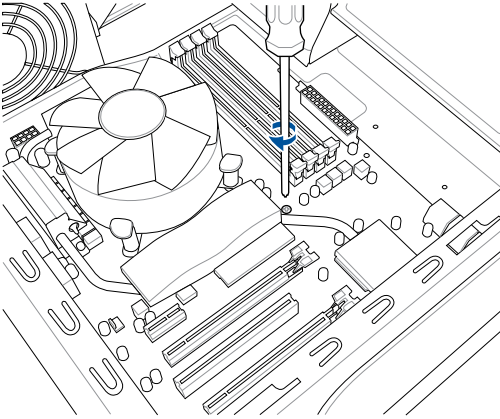
1. Install the ASUS I/O Shield to the chassis rear I/O panel.



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



3. Place nine (9) screws into the holes indicated by circles to secure the motherboard to the chassis.



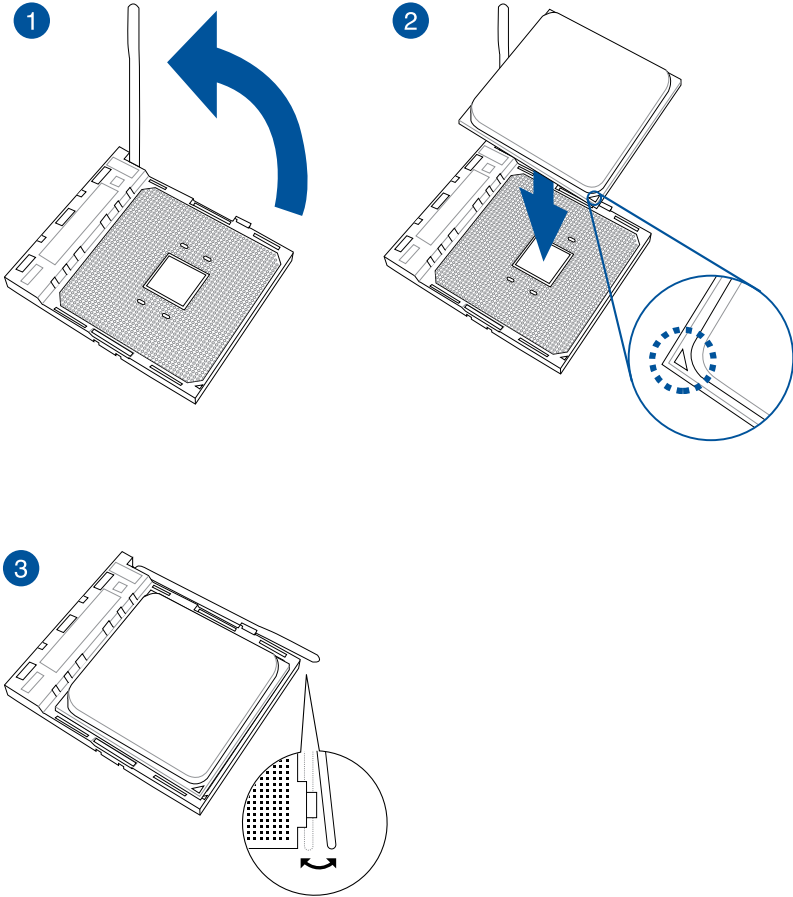
DO NOT overtighten the screws! Doing so can damage the motherboard.



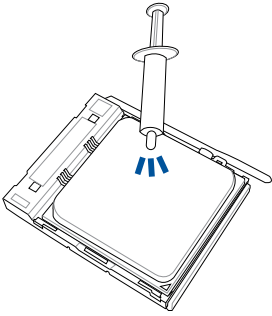
## 2.1.2 CPU installation



The AM4 socket is compatible with AMD AM4 processors. Ensure that you use a CPU designed for the AM4 socket. The CPU fits in only one correct orientation. **DO NOT** force the CPU into the socket to prevent bending the pins and damaging the CPU!



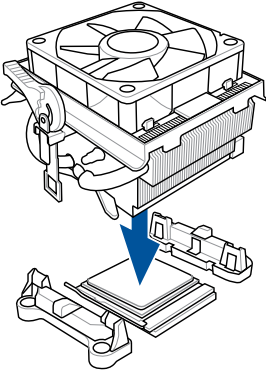
## 2.1.3 CPU heatsink and fan assembly installation



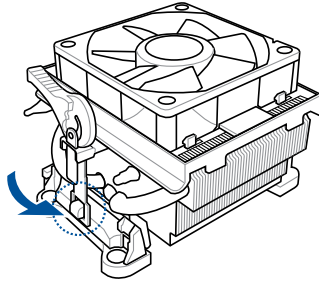
Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan, if necessary.

### To install the CPU heatsink and fan assembly

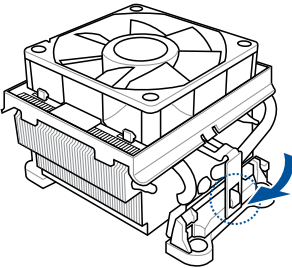
1



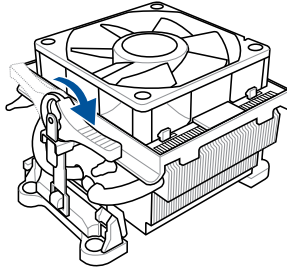
2



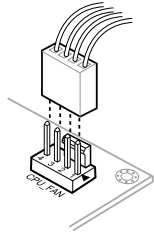
3



4

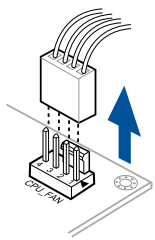


5

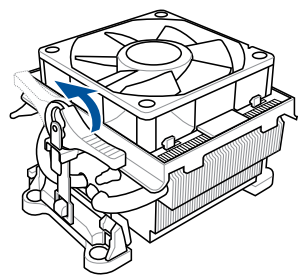


To uninstall the CPU heatsink and fan assembly

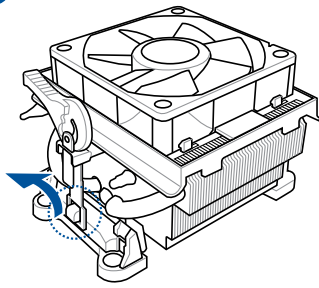
1



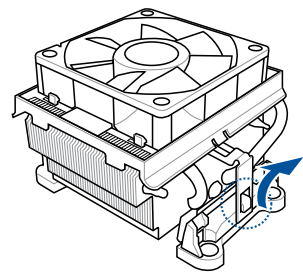
2



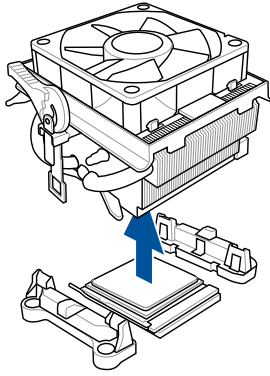
3



4

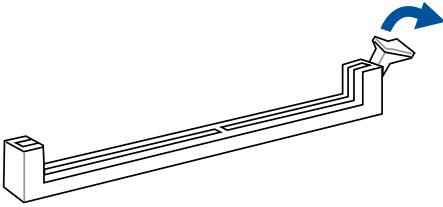


5

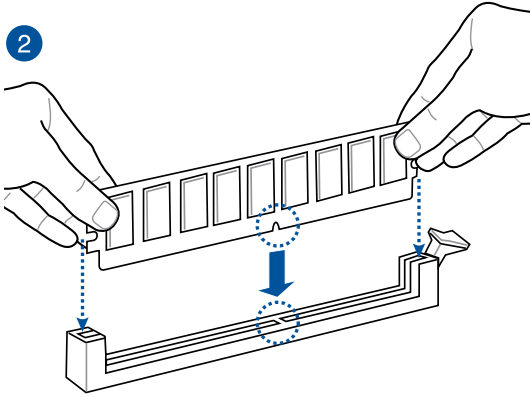


## 2.1.4 DIMM installation

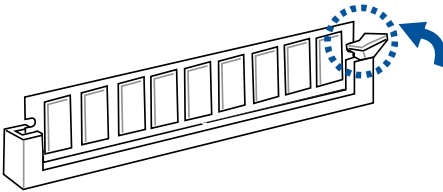
1



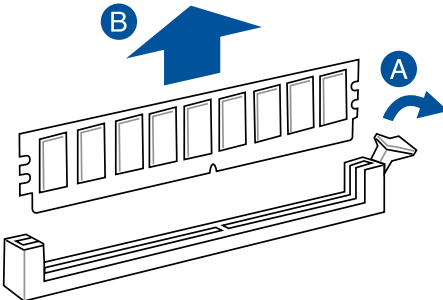
2



3

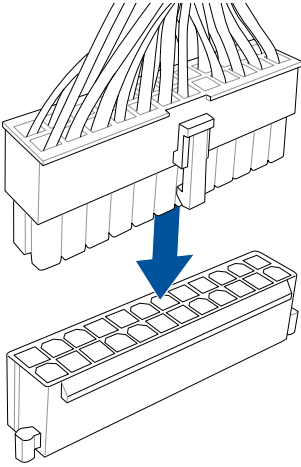


To remove a DIMM

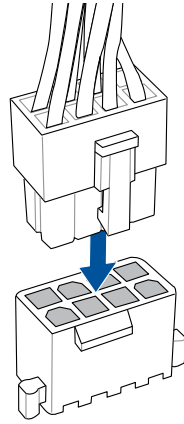


## 2.1.5 ATX power connection

1

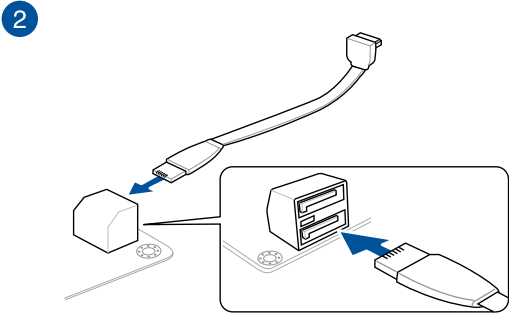
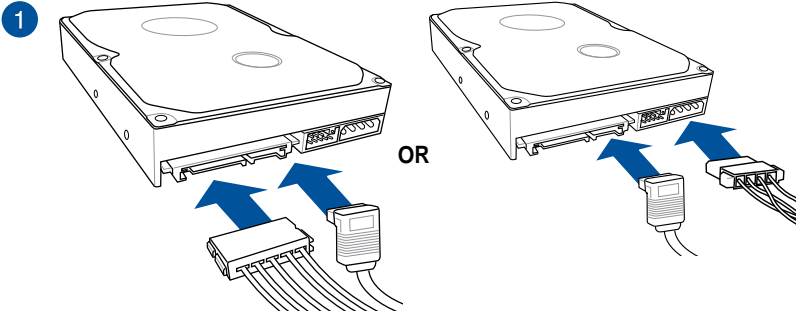


2



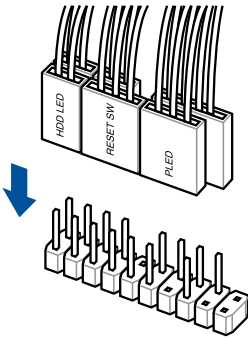
Ensure to connect the 8-pin power plug.

## 2.1.6 SATA device connection

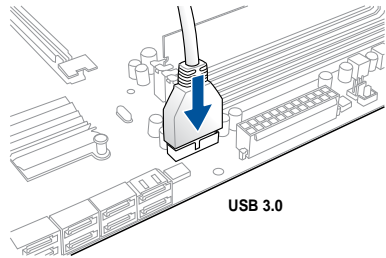


## 2.1.7 Front I/O connector

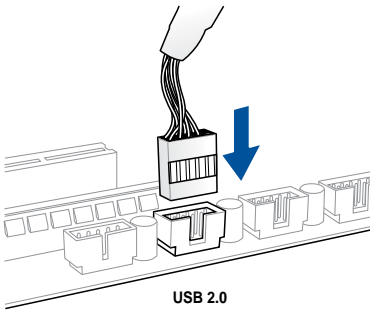
To install front panel connector



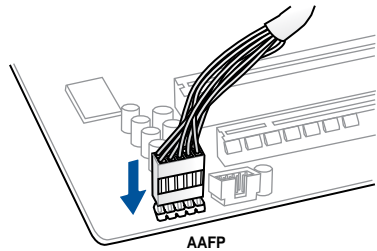
To install USB 3.0 connector



To install USB 2.0 connector

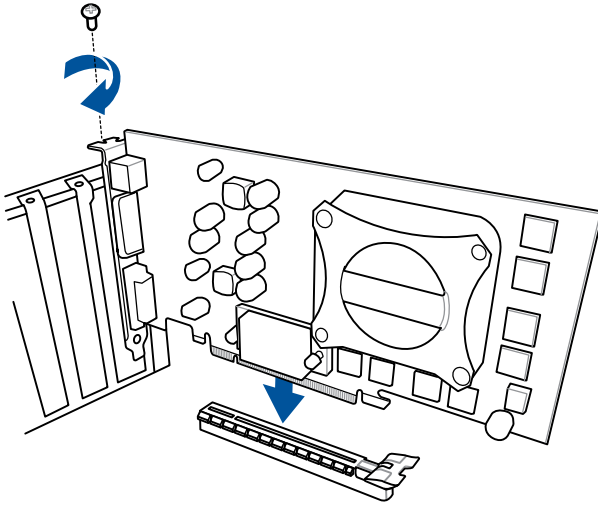


To install front panel audio connector

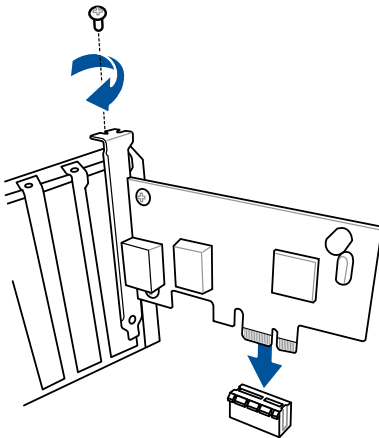


## 2.1.8 Expansion card installation

To install PCIe x16 cards

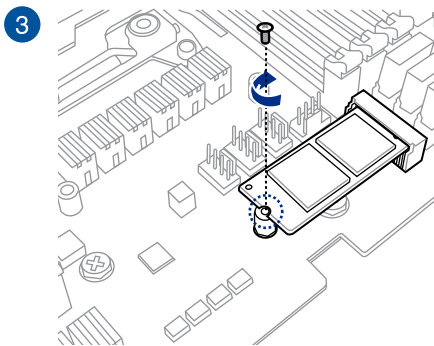
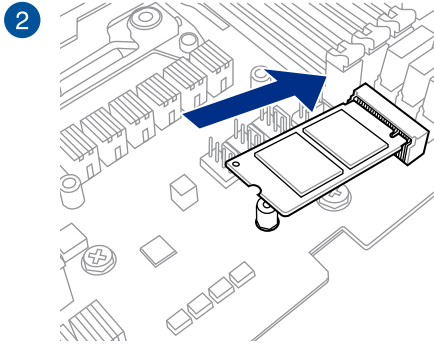
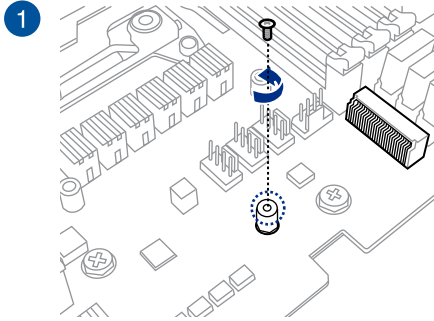


To install PCIe x1 cards



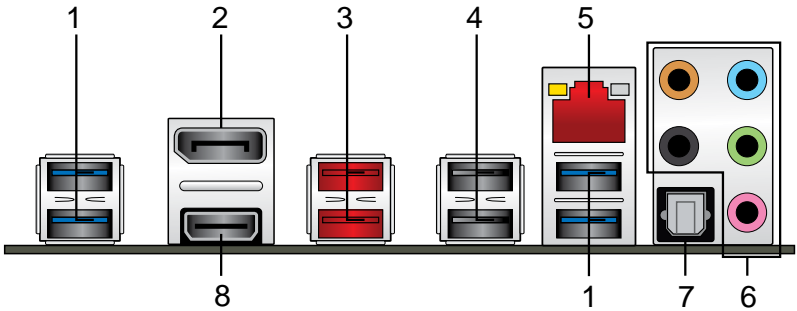


## 2.1.9 M.2 installation



## 2.2 Motherboard rear and audio connections

### 2.2.1 Rear I/O connection

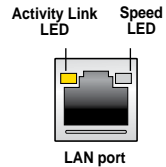


| Rear panel connectors |                            |
|-----------------------|----------------------------|
| 1. USB 3.0 ports      | 5. LAN (RJ45) port*        |
| 2. DisplayPort        | 6. Audio I/O ports**       |
| 3. USB 3.1 ports      | 7. Optical S/PDIF Out port |
| 4. USB 2.0 ports      | 8. HDMI port               |

\* and \*\*: Refer to the tables for LAN port LEDs and audio port definitions.

#### \*LAN port LED indications

| Activity/Link LED             |                               | Speed LED |                    |
|-------------------------------|-------------------------------|-----------|--------------------|
| Status                        | Description                   | Status    | Description        |
| Off                           | No link                       | OFF       | 10Mbps connection  |
| Orange                        | Linked                        | ORANGE    | 100Mbps connection |
| Orange (Blinking)             | Data activity                 | GREEN     | 1Gbps connection   |
| Orange (Blinking then steady) | Ready to wake up from S5 mode |           |                    |

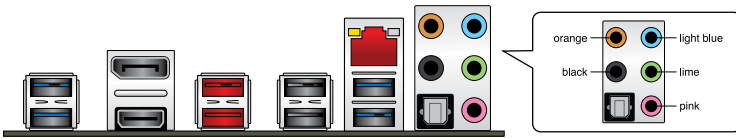


#### \*\* Audio 2, 4, 6, or 8-channel configuration

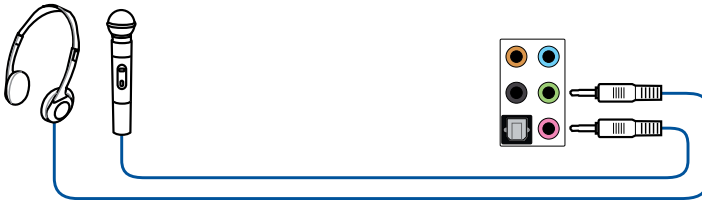
| Port       | Headset 2-channel | 4-channel         | 6-channel         | 8-channel         |
|------------|-------------------|-------------------|-------------------|-------------------|
| Light Blue | Line In           | Line In           | Line In           | Side Speaker      |
| Lime       | Line Out          | Front Speaker Out | Front Speaker Out | Front Speaker Out |
| Pink       | Mic In            | Mic In            | Mic In            | Mic In            |
| Orange     | –                 | –                 | Center/Subwoofer  | Center/Subwoofer  |
| Black      | –                 | Rear Speaker Out  | Rear Speaker Out  | Rear Speaker Out  |

## 2.2.2 Audio I/O connections

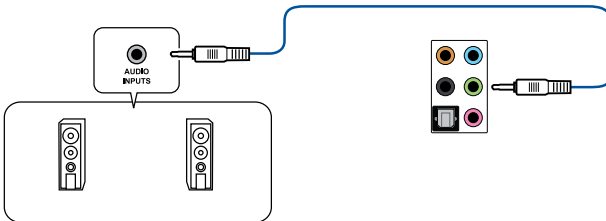
### Audio I/O ports



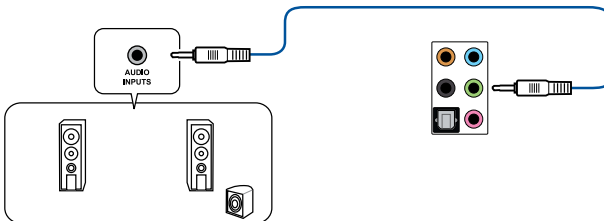
### Connect to Headphone and Mic



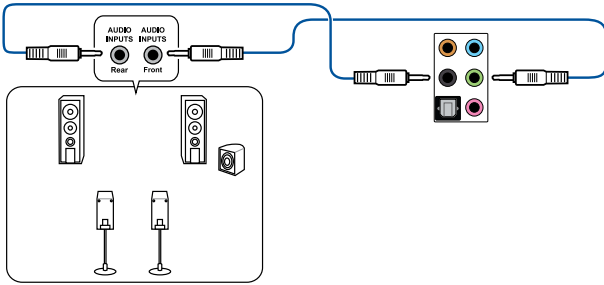
### Connect to Stereo Speakers



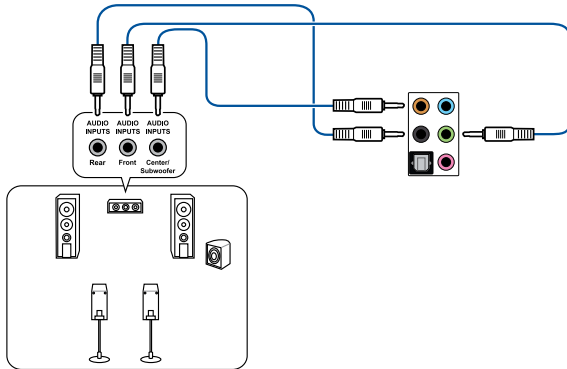
### Connect to 2 channel Speakers



## Connect to 4 channel Speakers

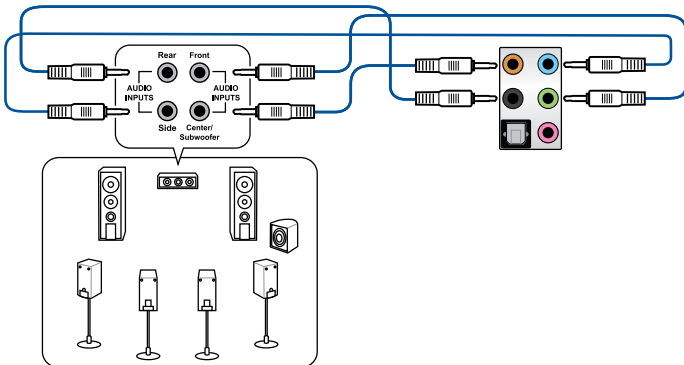


## Connect to 6 channel Speakers



If you are using Windows® 10 platform, use only the light blue audio port for Side Speaker Out in a 6-channel configuration.

## Connect to 8 channel Speakers



## 2.3 Starting up for the first time

1. After making all the connections, replace the system case cover.
2. Ensure that all switches are off.
3. Connect the power cord to the power connector at the back of the system chassis.
4. Connect the power cord to a power outlet that is equipped with a surge protector.
5. Turn on the devices in the following order:
  - a. Monitor
  - b. External SCSI devices (starting with the last device on the chain)
  - c. System power
6. After applying power, the system power LED on the system front panel case lights up. For systems with ATX power supplies, the system LED lights up when you press the ATX power button. If your monitor complies with the “green” standards or if it has a “power standby” feature, the monitor LED may light up or change from orange to green after the system LED turns on.

The system then runs the power-on self tests (POST). While the tests are running, the BIOS beeps (refer to the BIOS beep codes table) or additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turned on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

| BIOS Beep   | Description  |
|---|--|
| One short beep  | VGA detected<br>Quick boot set to disabled<br>No keyboard detected |
| One continuous beep followed by two short beeps then a pause (repeated) | No memory detected   |
| One continuous beep followed by three short beeps                       | No VGA detected  |
| One continuous beep followed by four short beeps                        | Hardware component failure   |

- At power on, hold down the <Delete> key to enter the BIOS Setup. Follow the instructions in Chapter 3.

## 2.4 Turning off the computer

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

# BIOS Setup

# 3

## 3.1 Knowing BIOS

---



The new ASUS UEFI BIOS is a Unified Extensible Interface that complies with UEFI architecture, offering a user-friendly interface that goes beyond the traditional keyboard-only BIOS controls to enable a more flexible and convenient mouse input. You can easily navigate the new UEFI BIOS with the same smoothness as your operating system. The term “BIOS” in this user manual refers to “UEFI BIOS” unless otherwise specified.

---

BIOS (Basic Input and Output System) stores system hardware settings such as storage device configuration, overclocking settings, advanced power management, and boot device configuration that are needed for system startup in the motherboard CMOS. In normal circumstances, the default BIOS settings apply to most conditions to ensure optimal performance. **DO NOT change the default BIOS settings** except in the following circumstances:

- An error message appears on the screen during the system bootup and requests you to run the BIOS Setup.
- You have installed a new system component that requires further BIOS settings or update.



Inappropriate BIOS settings may result in instability or boot failure. **We strongly recommend that you change the BIOS settings only with the help of a trained service personnel.**

---



When downloading or updating the BIOS file, rename it as **RSB350FG.CAP** for this motherboard.

---

## 3.2 BIOS setup program

Use the BIOS Setup to update the BIOS or configure its parameters. The BIOS screen include navigation keys and brief onscreen help to guide you in using the BIOS Setup program.

### Entering BIOS at startup

To enter BIOS Setup at startup, press <Delete> or <F2> during the Power-On Self Test (POST). If you do not press <Delete> or <F2>, POST continues with its routines.

### Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press <Ctrl>+<Alt>+<Delete> simultaneously.
- Press the reset button on the system chassis.
- Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the first two options.

After doing either of the three options, press <Delete> key to enter BIOS.



- 
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
  - Ensure that a USB mouse is connected to your motherboard if you want to use the mouse to control the BIOS setup program.
  - If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu or press hotkey <F5>. See section 3.10 **Exit Menu** for details.
  - If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See section 1.1.6 **Jumpers** for information on how to erase the RTC RAM via the Clear CMOS jumper.
  - The BIOS setup program does not support the Bluetooth devices.
- 



---

Please visit ASUS website for the detailed BIOS content manual.

---

### BIOS menu screen

The BIOS Setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. You can change modes from **Setup Mode** in **Boot menu** or by pressing the <F7> hotkey.



### 3.2.1 Advanced Mode

By default, the Advanced Mode screen appears when you enter the BIOS setup program. The Advanced Mode provides advanced options for experienced end-users to configure the BIOS settings. The figure below shows an example of the Advanced Mode. Refer to the following sections for the detailed configurations. To access the EZ Mode, click **EzMode(F7)** or press <F7>.



The default screen for entering the BIOS setup program can be changed. Refer to the **Setup Mode** item in section **Boot menu** for details.

The screenshot shows the BIOS Advanced Mode interface. At the top, it displays 'UEFI BIOS Utility - Advanced Mode' and the date '01/04/2017 Wednesday 22:04'. The main menu includes 'My Favorites', 'Main', 'Ai Tweaker', 'Advanced', 'Monitor', 'Boot', 'Tool', and 'Exit'. The 'Ai Tweaker' menu is expanded, showing options like 'AI Overclock Tuner', 'Memory Frequency', 'APU Multiplier', 'EPU Power Saving Mode', 'TPU', 'DRAM Timing Control', 'TDP Configuration', 'DIGI+ VRM', 'VDDCR CPU Voltage', 'VDDCR SOC Voltage', and 'VDDCR SOC Voltage'. A 'Hardware Monitor' panel on the right shows CPU and Memory status. Annotations with red lines point to various elements: 'Menu items' (top bar), 'Menu bar' (top left), 'Language' (top left), 'MyFavorite(F3)', 'Qfan Control(F6)', 'EZ Tuning Wizard(F11)', 'Hot Keys' (top right), 'Scroll bar' (top right), 'Submenu items' (left side), 'General help' (bottom left), 'Configuration fields' (middle), 'Pop-up Menu' (middle), 'Last modified settings' (bottom), 'Go back to EZ Mode' (bottom right), and 'Search on the FAQ' (bottom right). A 'Pop-up Menu' is shown for 'VDDCR CPU Voltage' with options: 'Auto', 'Manual', 'Offset mode'. The 'Hardware Monitor' shows CPU Frequency at 3100 MHz, Temperature at 42°C, APU Freq at 100.0 MHz, Ratio at 31x, Core Voltage at 1.231 V, Memory Frequency at 2133 MHz, Voltage at 1.200 V, and Capacity at 8192 MB. The Voltage section shows +12V at 12.164 V, +5V at 5.177 V, +3.3V at 3.379 V, and +3.3V at 3.379 V. The bottom status bar includes 'Version 2.17.1246. Copyright (C) 2017 American Megatrends, Inc.', 'Last Modified', 'EzMode(F7)', and 'Search on FAQ'.

## Menu bar

The menu bar on top of the screen has the following main items:

|                     |   |
|---------------------|---|
| <b>My Favorites</b> | For saving the frequently-used system settings and configuration.                   |
| <b>Main</b>         | For changing the basic system configuration   |
| <b>Ai Tweaker</b>   | For changing the overclocking settings  |
| <b>Advanced</b>     | For changing the advanced system settings   |
| <b>Monitor</b>      | For displaying the system temperature, power status, and changing the fan settings. |
| <b>Boot</b>         | For changing the system boot configuration  |
| <b>Tool</b>         | For configuring options for special functions                                       |
| <b>Exit</b>         | For selecting the exit options and loading default settings                         |

## Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting **Main** shows the Main menu items.

The other items (My Favorites, Ai Tweaker, Advanced, Monitor, Boot, Tool, and Exit) on the menu bar have their respective menu items.

## Submenu items

A greater than sign (>) before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

## Language

This button above the menu bar contains the languages that you can select for your BIOS. Click this button to select the language that you want to display in your BIOS screen.

## My Favorites(F3)

This button above the menu bar shows all BIOS items in a Tree Map setup. Select frequently-used BIOS settings and save it to MyFavorites menu.



---

Refer to section 3.3 **My Favorites** for more information.

---

## Q-Fan Control(F6)

This button above the menu bar displays the current settings of your fans. Use this button to manually tweak the fans to your desired settings.



---

Refer to section 3.2.3 **QFan Control** for more information.

---

## EZ Tuning Wizard(F11)

This button above the menu bar allows you to view and tweak the overclocking settings of your system. It also allows you to change the motherboard's SATA mode from AHCI to RAID mode.



---

Refer to section 3.2.4 **EZ Tuning Wizard** for more information.

---

## Search on FAQ

Move your mouse over this button to show a QR code, scan this QR code on your mobile device to connect to the BIOS FAQ web page of the ASUS support website. You can also scan the following QR code:



## Hot keys

This button above the menu bar contains the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

## Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/Down arrow keys or <Page Up> / <Page Down> keys to display the other items on the screen.

## General help

At the bottom of the menu screen is a brief description of the selected item. Use <F12> key to capture the BIOS screen and save it to the removable storage device.

## Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

A configurable field is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

## Last Modified button

This button shows the items that you last modified and saved in BIOS Setup.

### 3.2.2 EZ Mode

The EZ Mode provides you an overview of the basic system information, and allows you to select the display language, system performance, mode and boot device priority.



To switch from Advanced Mode to EZ Mode, click **EZ Mode(F7)** or press the <F7> hotkey.

**Displays the system properties of the selected mode. Click < or > to switch EZ System Tuning modes**

**Displays the CPU/motherboard temperature, CPU voltage output, CPU/chassis fan speed, and SATA information**

**Selects the display language of the BIOS setup program**

**Creates storage RAID and configures system overclocking**

**Displays the CPU Fan's speed. Click the button to manually tune the fans**

**Saves the changes and resets the system**

**Clicks to go to Advanced mode**

**Searches on the FAQ**

**Clicks to display boot devices**

**Selects the boot device priority**

**Loads optimized default settings**

**Searches on the FAQ**

**Displays the CPU Fan's speed. Click the button to manually tune the fans**

**Searches on the FAQ**

**Clicks to display boot devices**

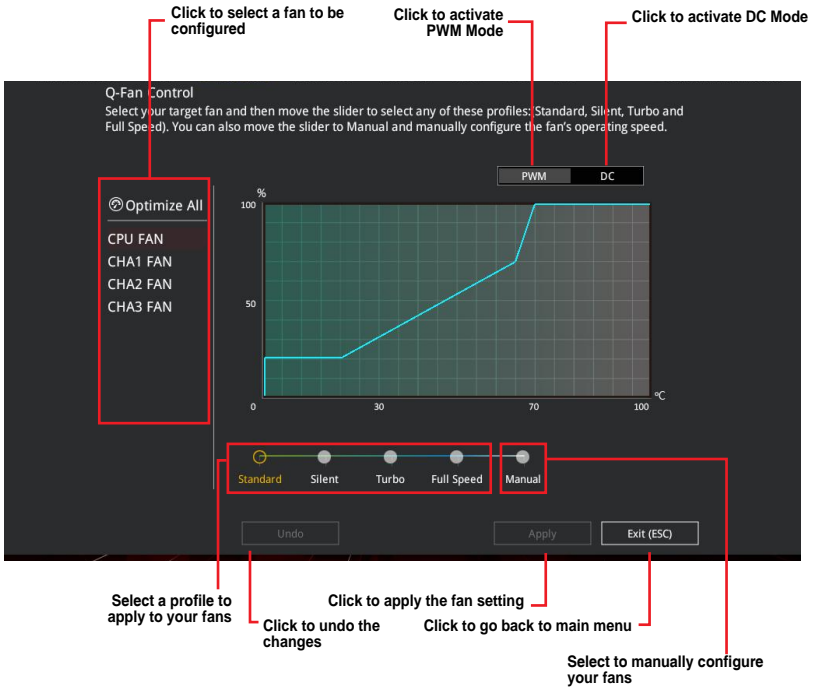
**Selects the boot device priority**



The boot device options vary depending on the devices you installed to the system.

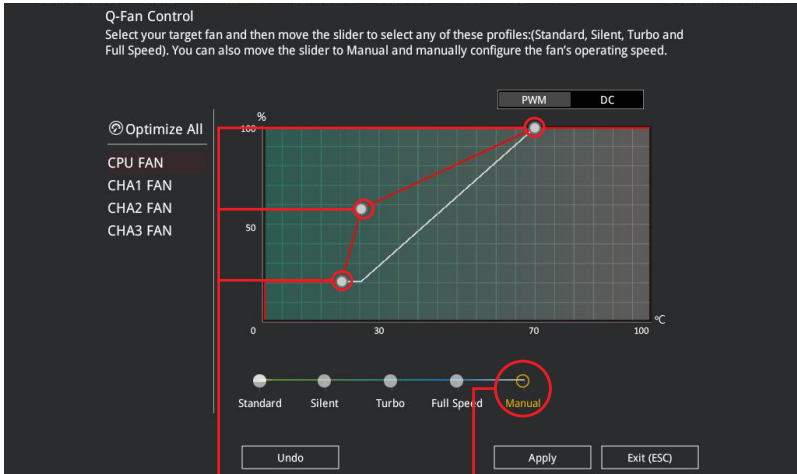
### 3.2.3 QFan Control

The QFan Control allows you to set a fan profile or manually configure the operating speed of your CPU and chassis fans.



## Configuring fans manually

Select **Manual** from the list of profiles to manually configure your fans' operating speed.



Speed points

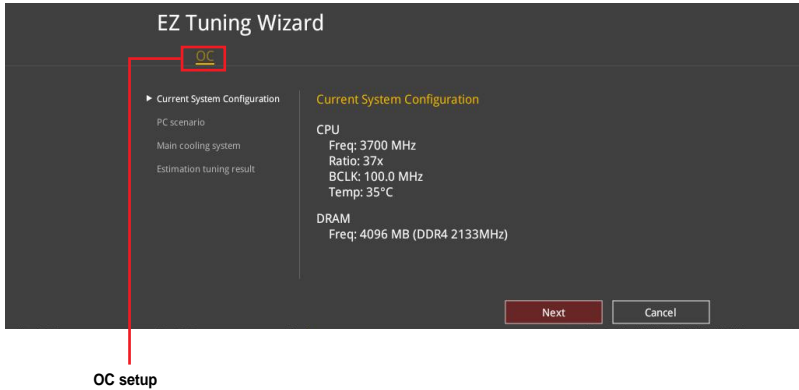
Select to manually  
configure your fans

To configure your fans:

1. Select the fan that you want to configure and to view its current status.
2. Click and drag the speed points to adjust the fans' operating speed.
3. Click **Apply** to save the changes then click **Exit (ESC)**.

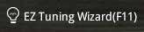
### 3.2.4 EZ Tuning Wizard

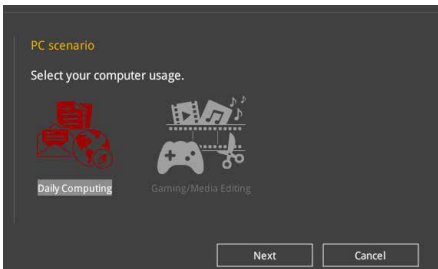
EZ Tuning Wizard allows you to easily overclock your CPU and DRAM, computer usage, and CPU fan to their best settings.



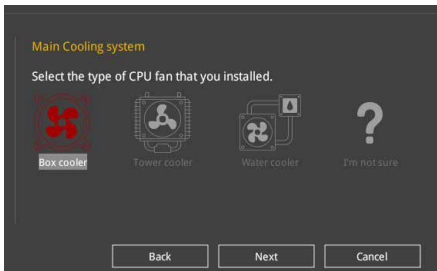
#### OC Tuning

To start OC Tuning:

1. Press <F11> on your keyboard or click  from the BIOS screen to open EZ Tuning Wizard screen.
2. Click **OC** then click **Next**.
3. Select a PC scenario **Daily Computing** or **Gaming/Media Editing**, then click **Next**.



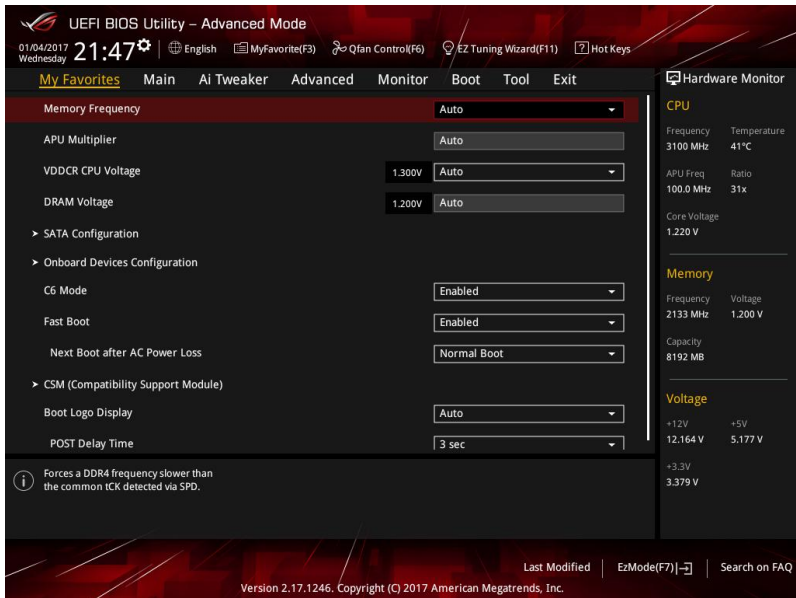
4. Select a Main Cooling System **BOX cooler**, **Tower cooler**, **Water cooler**, or **I'm not sure**, then click **Next**.



5. After selecting the Main Cooling System, click **Next** then click **Yes** to start the OC Tuning.

### 3.3 My Favorites

My Favorites is your personal space where you can easily save and access your favorite BIOS items.




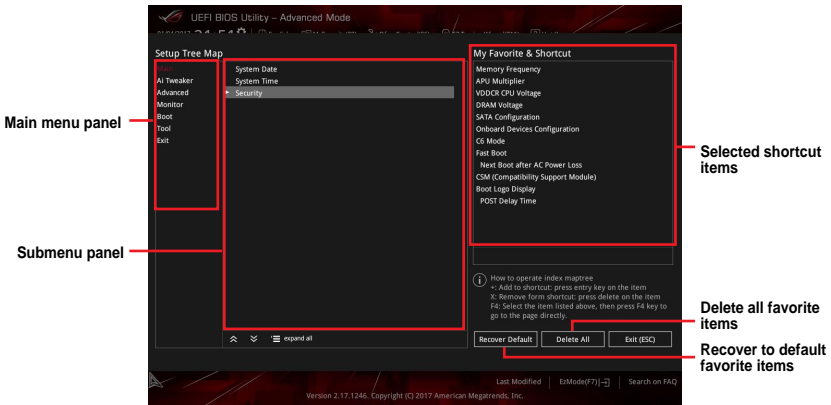
My Favorites comes with several performance, power saving, and fast boot related items by default. You can personalize this screen by adding or removing items.




## Adding items to My Favorites

To add BIOS items:

1. Press <F3> on your keyboard or click  (F3)MyFavorite from the BIOS screen to open Setup Tree Map screen.
2. On the Setup Tree Map screen, select the BIOS items that you want to save in My Favorites screen.



3. Select an item from main menu panel, then click the submenu that you want to save as favorite from the submenu panel and click  or press <Enter> on your keyboard.



You cannot add the following items to My Favorite items:

- Items with submenu options
- User-managed items such as language and boot order
- Configuration items such as Memory SPD Information, system time and date.

4. Click **Exit (ESC)** or press <Esc> key to close Setup Tree Map screen.
5. Go to My Favorites menu to view the saved BIOS items.

## 3.4 Main menu

The Main menu screen appears when you enter the Advanced Mode of the BIOS Setup program. The Main menu provides you an overview of the basic system information, and allows you to set the system date, time, language, and security settings.

### Security

The Security menu items allow you to change the system security settings.



- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See section 1.1.6 Jumpers for information on how to erase the RTC RAM via the Clear CMOS button.
- The Administrator or User Password items on top of the screen show the default **[Not Installed]**. After you set a password, these items show **[Installed]**.

## 3.5 Ai Tweaker menu

The Ai Tweaker menu items allow you to configure overclocking-related items.



Be cautious when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction



The configuration options for this section vary depending on the CPU and DIMM model you installed on the motherboard.

### Ai Overclock Tuner

This item allows you to select the CPU overclocking options to achieve the desired CPU internal frequency. Select any of these preset overclocking configuration options:

- [Auto]                      Loads the optimal settings for the system automatically.  
[Manual]                    Allows you to assign the BCLK (base clock) frequency manually.

### Memory Frequency

This item allows you to set the memory operating frequency. The configurable options vary with the BCLK (base clock) frequency setting. Select the auto mode to apply the optimized setting.

Configuration options: [Auto] [DDR4-1333MHz] - [DDR4-3200MHz]



Selecting a very high memory frequency may cause the system to become unstable! If this happens, revert to the default setting.

## EPU Power Saving Mode

The ASUS EPU (Energy Processing Unit) sets the CPU in its minimum power consumption settings. Enable this item to set lower CPU core/cache voltage and achieve the best energy saving condition.

Configuration options: [Disabled] [Enabled]

## TPU

This item allows you to automatically overclock the CPU and DRAM frequencies and voltage for an enhanced system performance.

[Keep Current Settings]    Keep the current settings without changing anything.

[TPU I]    Applies air cooling overclocking conditions.

[TPU II]    Applies water cooling overclocking conditions.



---

Ensure to use water cooling device before selecting [TPU II].

---

## 3.6 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.



---

Be cautious when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

---

### 3.6.1 AMD fTPM Configuration

The items in this menu allow you to configure the TPM settings.

### 3.6.2 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects.



---

The items shown in submenu may be different due to the CPU you installed.

---

## PSS Support

This item allows you enable or disable the generation of ACPI\_PPC, \_PSS, and \_PCT objects.

Configuration options: [Disabled] [Enabled]

## NX Mode

This item allows you enable or disable no-execute page protection function.

Configuration options: [Disabled] [Enabled]

## SVM Mode

This item allows you enable or disable CPU Virtualization.

Configuration options: [Disabled] [Enabled]

### SMT Mode

This item allows you enable simultaneous multithreading.

Configuration options: [Auto] [Disabled]

### Core Leveling Mode

This item allows you to change the number of compute unit in the system.

Configuration options: [Automatic mode] [Two core per processor] [Four core per processor]  
[Six core per processor]

## 3.6.3 SATA Configuration

While entering Setup, the BIOS automatically detects the presence of SATA devices. The SATA Port items show **Not Present** if no SATA device is installed to the corresponding SATA port.

### Hyper Kit Mode

Disables this option for M.2 devices. Enables this option for ASUS Hyper Kit card.

Configuration options: [Disabled] [Enabled]

### SATA Port Enable

This item allows you to enable or disable the SATA Device.

Configuration options: [Disabled] [Enabled]

### SATA Mode

This item allows you to set the SATA configuration.

- [AHCI] Set to [AHCI] when you want the SATA hard disk drives to use the AHCI (Advanced Host Controller Interface). The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.
- [RAID] Set to [RAID] when you want to create a RAID configuration from the SATA hard disk drives.

### SMART Self Test

S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) is a monitoring system that shows a warning message during POST (Power-on Self Test) when an error occurs in the hard disks.

Configuration options: [On] [Off]

### SATA6G\_1~6(Gray)

Allow you to enable/disable the SATA6G\_1~6 port. Configuration options: [Disabled]  
[Enabled]

## Hot Plug

These items allow you to enable/disable SATA Hot Plug Support. Configuration options: [Disabled] [Enabled]

## 3.6.4 Onboard Devices Configuration

The items in this menu allow you to switch between PCIe Lanes and configure onboard devices.

### HD Audio Controller

This item allows you to use the Azalia High Definition Audio Controller

Configuration options: [Disabled] [Enabled]

### PCIEX16\_3 4X-2X Switch

This item allows you to set the PCIEX16\_3 Mode.

Configuration options: [Auto] [2X] [4X]

### RGB LED Lighting

[On] The LEDs and RGB header(s) will always light up at the S0(Working), S3(Sleep), S4(Hibernate), and S5(Soft off) states, but not light up at any state when the ErP Ready item is enabled.

[Off] The LEDs and RGB header(s) will not light up.

### In Sleep, hibernate and soft off states

[On] LEDs will light up in S3(sleep), S4(hibernate) and S5(soft off)states.

[Off] LEDs will not light up in S3(sleep), S4(hibernate) and S5(soft off)states.

### Intel LAN Controller

This item allows you to enable or disable the Intel LAN controllers.

Configuration options: [On] [Off]

### Intel LAN OPROM

This item allows you to enable or disable the Intel PXE OPROM.

Configuration options: [On] [Off]

### Charging USB devices in Power State S5

This item allows you to charge USB devices even when the system is at Power State S5.

Configuration options: [Disabled] [Enable]

### Serial Port Configuration

The sub-items in this menu allow you to set the serial port configuration.

#### Serial Port

Allows you to enable or disable the serial port (COM).Configuration options: [On] [Off]

## Change Settings

This item appears only when you set the **Serial Port** to [On] and allows you to select the Serial Port base address. Configuration options: [IO=3F8h; IRQ=4] [IO=2F8h; IRQ=3] [IO=3E8h; IRQ=4] [IO=2E8h; IRQ=3]

### 3.6.5 APM Configuration

#### ErP Ready

Allows BIOS to switch off some power at S5 to get the system ready for ErP requirement. When set to [Enabled], all other PME options will be switched off. Configuration options: [Enable(S4+S5)] [Enable(S5)] [Disabled]

#### Restore AC Power Loss

- [Power On] The system goes into on state after an AC power loss.
- [Power Off] The system goes into off state after an AC power loss.
- [Last State] The system goes into either off or on state, whatever the system state was before the AC power loss.

#### Power On By PCI-E

This item allows you to enable or disable the Wake-on-LAN function of the onboard LAN controller or other installed PCIe LAN cards. Configuration options: [Disabled] [Enabled]

#### Power On By Ring

- [Disabled] Disables Ring to generate a wake event.
- [Enabled] Enables Ring to generate a wake event.

#### Power On By RTC

This item allows you to enable or disable the RTC (Real-Time Clock) to generate a wake event and configure the RTC alarm date. When enabled, you can set the days, hours, minutes, or seconds to schedule an RTC alarm date. Configuration options: [Disabled] [Enabled]

### 3.6.6 Network Stack Configuration

The items in this menu allow you to configure Ipv4 / Ipv6 PXE support.

### 3.6.7 HDD/SSD SMART Information

This menu displays the SMART information of the connected devices.

### 3.6.8 USB Configuration

The items in this menu allow you to change the USB-related features.



---

The **USB Devices** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

---

## USB Single Port Control

This item allows you to enable or disable the individual USB ports.



---

Refer to section **1.1.2 Motherboard layout** for the location of the USB ports.

---

## 3.7 Monitor menu

The Monitor menu displays the system temperature/power status, and allows you to change the fan settings.

### Q-Fan Configuration

The subitems in this menu allow you to configure the Q-Fan features.

#### Qfan Tuning

Click this item to automatically detect the lowest speed and configure the minimum duty cycle for each fan.

## 3.8 Boot menu

The Boot menu items allow you to change the system boot options.

### Fast Boot

[Enabled] Select to accelerate the boot speed.

[Disabled] Select to go back to normal boot speed.



---

The following item appears only when you set **Fast Boot** to [Enabled].

---

### Next Boot after AC Power Loss

[Normal Boot] Returns to normal boot on the next boot after AC power loss.

[Fast Boot] Accelerates the boot speed on the next boot after AC power loss.

## Boot Configuration

### Setup Mode

[Advanced Mode] This item allows you to go to Advanced Mode of the BIOS after POST.

[EZ Mode] This item allows you to go to EZ Mode of the BIOS after POST.

## CSM (Compatibility Support Module)

Allows you to configure the CSM (Compatibility Support Module) items to fully support the various VGA, bootable devices and add-on devices for better compatibility.

### Launch CSM

- |            |   |
|------------|---|
| [Auto]     | The system automatically detects the bootable devices and the add-on devices.   |
| [Enabled]  | For better compatibility, enable the CSM to fully support the non-UEFI driver add-on devices or the Windows® UEFI mode. |
| [Disabled] | Disable the CSM to fully support the Windows® Security Update and Security Boot.  |



---

The following four items appear when you set Launch CSM to [Enabled].

---

### Boot Device Control [UEFI and Legacy OPROM]

Allows you to select the type of devices that you want to boot up.

Configuration options: [UEFI and Legacy OPROM] [Legacy OPROM only] [UEFI only]

### Boot from Network Devices [Legacy only]

Allows you to select the type of network devices that you want to launch.

Configuration options: [Ignore] [Legacy only] [UEFI driver first]

### Boot from Storage Devices [Legacy Only]

Allows you to select the type of storage devices that you want to launch.

Configuration options: [Ignore] [Legacy only] [UEFI driver first]

### Boot from PCI-E Expansion Devices

Allows you to select the type of PCI-E expansion devices that you want to launch.

Configuration options: [Legacy only] [UEFI driver first]

## Secure Boot

Allows you to configure the Windows® Secure Boot settings and manage its keys to protect the system from unauthorized access and malwares during POST.

## Boot Option Priorities

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.



- To access Windows® OS in Safe Mode, press <F8> after POST (Windows® 8 not supported).
  - To select the boot device during system startup, press <F8> when the ASUS Logo appears.
-



## Boot Override

These items display the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Click an item to start booting from the selected device.

### 3.9 Tool menu

The Tool menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.

#### 3.9.1 ASUS EZ Flash 3 Utility

This item allows you to run ASUS EZ Flash 3. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice.



For more details, refer to section 3.11.2 **ASUS EZ Flash 3**.

#### 3.9.2 Secure Erase

SSD speeds may lower over time as with any storage medium due to data processing. Secure Erase completely and safely cleans your SSD, restoring it to factory performance levels.



Secure Erase is only supported on AHCI mode. Ensure that SATA Mode is set to AHCI. Click **Advanced>PCH Storage Configuration>SATA Mode Selection>AHCI**.

To launch Secure Erase, click **Tool > Secure Erase** on the Advanced mode menu.



Check the ASUS support site for a full list of SSDs tested with Secure Erase. The drive may become unstable if you run Secure Erase on an incompatible SSD.



The time to erase the contents of your SSD may take a while depending on its size. Do not turn off the system during the process.

Displays the available SSDs

| SSD Secure Erase |                  |        |                |
|------------------|------------------|--------|----------------|
| Port #           | SSD Name         | Status | Total Capacity |
| P2               | ADATA 5556 Turbo | Frozen | 64.0GB         |



#### Status definition:

- **Frozen.** The frozen state is the result of a BIOS protective measure. The BIOS guards drives that do not have password protection by freezing them prior to booting. If the drive is frozen, a power off or hard reset of your PC must be performed to proceed with the Secure Erase.
- **Locked.** SSDs might be locked if the Secure Erase process is either incomplete or was stopped. This may be due to a third party software that uses a different password defined by ASUS. You have to unlock the SSD in the software before proceeding with Secure Erase.

### 3.9.3 ASUS Overclocking Profile

This item allows you to store or load multiple BIOS settings.

#### Load from Profile

This item allows you to load the previous BIOS settings saved in the BIOS Flash. Key in the profile number that saved your BIOS settings, press <Enter>, and then select **Yes**.



- DO NOT shut down or reset the system while updating the BIOS to prevent the system boot failure!
- We recommend that you update the BIOS file only coming from the same memory/CPU configuration and BIOS version.

#### Profile Name

This item allows you to key in a profile name.

#### Save to Profile

This item allows you to save the current BIOS settings to the BIOS Flash, and create a profile. Key in a profile number from one to eight, press <Enter>, and then select **Yes**.

#### Load/Save Profile from/to USB Drive

This item allows you to load or save profile from your USB drive, load and save profile to your USB drive.

### 3.9.4 ASUS SPD Information

This item allows you to view the DRAM SPD information.

### 3.9.5 Graphics Card Information

This item displays the information about the graphics card installed in your system.

#### GPU Post

This item displays the information and recommended configuration for the PCIE slots that the graphics card is installed in your system.



This feature is only supported on selected ASUS graphics cards.

## 3.10 Exit menu

The Exit menu items allow you to load the optimal default values for the BIOS items, and save or discard your changes to the BIOS items. You can access the EZ Mode from the Exit menu.

### Load Optimized Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **OK** to load the default values.

### Save Changes & Reset

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved. When you select this option or if you press <F10>, a confirmation window appears. Select **OK** to save changes and exit.

### Discard Changes Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

### Launch EFI Shell from USB drives

This item allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices.

## 3.11 Updating BIOS

The ASUS website publishes the latest BIOS versions to provide enhancements on system stability, compatibility, and performance. However, BIOS updating is potentially risky. If there is no problem using the current version of BIOS, DO NOT manually update the BIOS. Inappropriate BIOS updating may result in system's failure to boot. Carefully follow the instructions in this chapter to update your BIOS when necessary.




---

Visit <http://www.asus.com> to download the latest BIOS file for this motherboard.

---

The following utilities allow you to manage and update the motherboard BIOS setup program.

1. EZ Update: Updates the BIOS in Windows® environment.
2. ASUS EZ Flash 3: Updates the BIOS using a USB flash drive.
3. ASUS CrashFree BIOS 3: Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.

### 3.11.1 EZ Update

The EZ Update is a utility that allows you to update the motherboard BIOS in Windows® environment.



- 
- EZ Update requires an Internet connection either through a network or an ISP (Internet Service Provider).
  - This utility is available in the support DVD that comes with the motherboard package.
-

### 3.11.2 ASUS EZ Flash 3

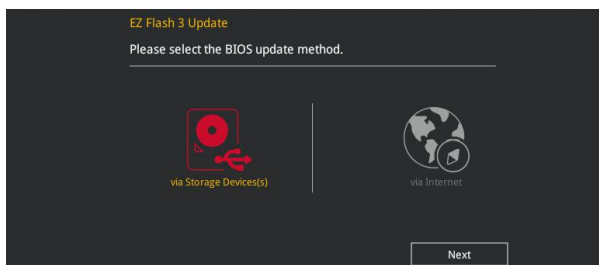
ASUS EZ Flash 3 allows you to download and update to the latest BIOS through the Internet without having to use a bootable floppy disk or an OS-based utility.



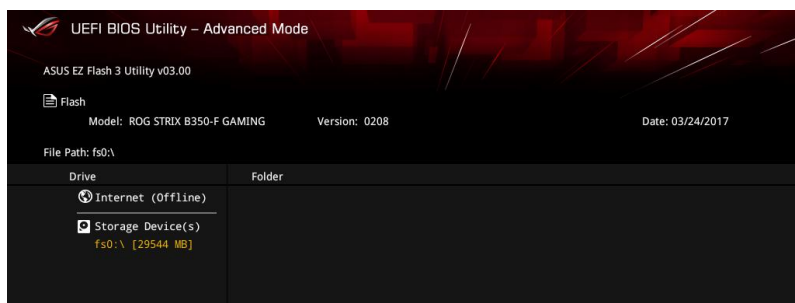
Updating through the Internet varies per region and Internet conditions. Check your local Internet connection before updating through the Internet.

#### To update the BIOS by USB:

1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **ASUS EZ Flash Utility** and press <Enter>.
2. Insert the USB flash disk that contains the latest BIOS file to the USB port.
3. Select **via Storage Devices**.



4. Press <Tab> to switch to the Drive field.
5. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, and then press <Enter>.
6. Press <Tab> to switch to the Folder Info field.
7. Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.





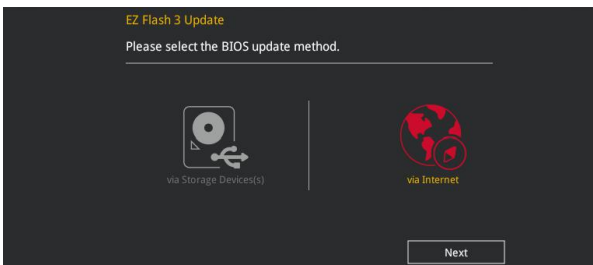
- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!



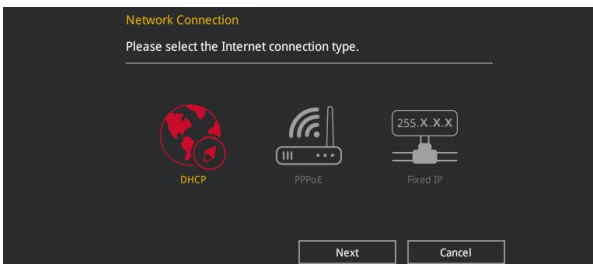
Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the Load Optimized Defaults item under the Exit menu. See section 3.10 Exit Menu for details.

### To update the BIOS by Internet:

1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **ASUS EZ Flash Utility** and press <Enter>.
2. Select **via Internet**.



3. Press the Left/Right arrow keys to select an Internet connection method, and then press <Enter>.



4. Follow the onscreen instructions to complete the update.
5. Reboot the system when the update process is done.



Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the Load Optimized Defaults item under the Exit menu. See section 3.10 Exit Menu for details.

### 3.11.3 ASUS CrashFree BIOS 3

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



---

The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at <https://www.asus.com/support/> and save it to a USB flash drive.

---

#### Recovering the BIOS

##### To recover the BIOS:

1. Turn on the system.
2. Insert the motherboard support DVD to the optical drive, or the USB flash drive containing the BIOS file to the USB port.
3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and enters ASUS EZ Flash 3 automatically.
4. The system requires you to enter BIOS Setup to recover the BIOS setting. To ensure system compatibility and stability, we recommend that you press <F5> to load default BIOS values.



---

**DO NOT** shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!

---

# RAID Support

# 4

## 4.1 RAID configurations

The motherboard supports RAID 0, RAID 1, and RAID 10 solution.



---

If you want to install a Windows® operating system to a hard disk drive included in a RAID set, you have to create a RAID driver disk and load the RAID driver during OS installation. Refer to section **4.2 Creating a RAID driver disk** for details.

---

### 4.1.1 RAID definitions

**RAID 0 (Data striping)** optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

**RAID 1 (Data mirroring)** copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

**RAID 10** is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

## 4.1.2 Installing Serial ATA hard disks

The motherboard supports Serial ATA hard disk drives. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

### To install the SATA hard disks for a RAID configuration:

1. Install the SATA hard disks into the drive bays.
2. Connect the SATA signal cables.
3. Connect a SATA power cable to the power connector on each drive.

## 4.2 Creating a RAID driver disk

### 4.2.1 Creating a RAID driver disk in Windows®

#### To install the RAID driver for Windows® OS:

1. During the OS installation, click **Load Driver** to allow you to select the installation media containing the RAID driver.
2. Insert the support USB drive with RAID driver into the USB port, and then click **Browse**.
3. Click the name of the device you've inserted, go to **Drivers > RAID**, and then select the RAID driver for the corresponding OS version. Click **OK**.
4. Follow the succeeding screen instructions to complete the installation.



---

To set up a Windows® UEFI operating system under RAID mode, ensure to load the UEFI driver for your optical drive.

---



# Appendix

## Notices

### Federal Communications Commission Statement

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

- This device may not cause harmful interference.
- 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 manufacturer's 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 to 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.



---

The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

---

## IC: Canadian Compliance Statement

Complies with the Canadian ICES-003 Class B specifications. This device complies with RSS 210 of Industry Canada. This Class B device meets all the requirements of the Canadian interference-causing equipment regulations.

This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

## Déclaration de conformité d'Industrie Canada

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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## Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

## VCCI: Japan Compliance Statement

### Class B ITE

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DO NOT throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

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ASUS recycling and takeback programs come from our commitment to the highest standards for protecting our environment. We believe in providing solutions for you to be able to responsibly recycle our products, batteries, other components as well as the packaging materials. Please go to <http://csr.asus.com/english/Takeback.htm> for detailed recycling information in different regions.

## Regional notice for California

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**Português** A ASUSTeK Computer Inc. declara que este dispositivo está em conformidade com os requisitos essenciais e outras disposições relevantes das Diretivas relacionadas. Texto integral da declaração da UE disponível em: [www.asus.com/support](http://www.asus.com/support)

**Română** ASUSTeK Computer Inc. declară că acest dispozitiv se conformează cerințelor esențiale și altor prevederi relevante ale directivelor conexe. Textul complet al declarației de conformitate a Uniunii Europene se găsește la: [www.asus.com/support](http://www.asus.com/support)

**Srpski** ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj u saglasnosti sa osnovnim zahtevima i drugim relevantnijim odredbama povezanih Direktiva. Pun tekst EU deklaracije o usaglasjenosti je dostupan da adres: [www.asus.com/support](http://www.asus.com/support)

**Slovensky** Spoločnosť ASUSTeK Computer Inc. týmto vyhlasuje, že toto zariadenie vyhovuje základným požiadavkám a ostatým príslušným ustanoveniam príslušných smerníc. Celý text vyhlásenia o zhode pre štáty EÚ je dostupný na adrese: [www.asus.com/support](http://www.asus.com/support)

**Slovenščina** ASUSTeK Computer Inc. izjavlja, da je ta naprava skladna z bistvenimi zahtevami in drugimi ustreznimi določbami povezanih direktiv. Celotno besedilo EU-izjave o skladnosti je na voljo na spletnem mestu: [www.asus.com/support](http://www.asus.com/support)

**Español** Por la presente, ASUSTeK Computer Inc. declara que este dispositivo cumple los requisitos básicos y otras disposiciones pertinentes de las directivas relacionadas. El texto completo de la declaración de la UE de conformidad está disponible en: [www.asus.com/support](http://www.asus.com/support)

**Svenska** ASUSTeK Computer Inc. förklarar härmed att denna enhet överensstämmer med de grundläggande kraven och andra relevanta föreskrifter i relaterade direktiv. Fulltext av EU-försäkran om överensstämmelse finns på: [www.asus.com/support](http://www.asus.com/support)

**Українська** ASUSTeK Computer Inc. заявляє, що цей пристрій відповідає основним вимогам та іншим відповідним положенням відповідних Директив. Повний текст декларації відповідності стандартам ЄС доступний на: [www.asus.com/support](http://www.asus.com/support)

**Türkçe** ASUSTeK Computer Inc., bu aygıtın temel gereksinimlerle ve ilişkili Yönergelerin diğer ilgili kullarıyla uyumlu olduğunu beyan eder. AB uyuşluk bildirimini tam metni şu adreste bulunabilir: [www.asus.com/support](http://www.asus.com/support)

**Bosanski** ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj uskladen sa bitnim zahtjevima i ostalim odgovarajućim odredbama vezanih direktiva. Cijeli tekst EU izjave o uskladenosti dostupan je na: [www.asus.com/support](http://www.asus.com/support)

## ASUS contact information

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# DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)



**Responsible Party Name:** **Asus Computer International**

**Address:** **800 Corporate Way, Fremont, CA 94539.**

**Phone/Fax No:** **(510)739-3777/(510)608-4555**

hereby declares that the product

**Product Name : Motherboard**

**Model Number : ROG STRIX B350-F GAMING**

Conforms to the following specifications:

FCC Part 15, Subpart B, Unintentional Radiators

## **Supplementary Information:**

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.

Representative Person's Name : Steve Chang / President

A handwritten signature in blue ink that reads "Steve Chang". The signature is written in a cursive style and is placed over a light blue rectangular background.

Signature :

Date : Apr. 24, 2016

Ver. 140331