

**TUF GAMING  
B460-PLUS**

**ASUS**  
**Motherboard**

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## Chapter 1          Product Introduction

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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 components, 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 be exposed to moisture.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.
- Your motherboard should only be used in environments with ambient temperatures between 0°C and 40°C.

## 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. It includes descriptions of the switches, jumpers, and connectors on the motherboard.

- **Chapter 2: BIOS Information**

This chapter tells how to boot into the BIOS, and upgrade BIOS using the EZ Flash Utility.

## Where to find more information

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

1. **ASUS website**

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.



**CAUTION:** Information to prevent damage to the components and injuries to yourself 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.

# Package contents

Check your motherboard package for the following items.

|                 |                                            |
|-----------------|--------------------------------------------|
| Motherboard     | 1 x TUF GAMING B460-PLUS motherboard       |
| Cables          | 2 x SATA 6Gb/s cables                      |
|                 | 1 x I/O Shield                             |
| Miscellaneous   | 1 x M.2 SSD screw package (2-in-1 package) |
|                 | 1 x TUF Gaming sticker                     |
| Application DVD | 1 x Support DVD                            |
| Documentation   | 1 x TUF Certification card                 |
|                 | 1 x User manual                            |



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

## TUF GAMING B460-PLUS specifications summary

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CPU               | Intel® Socket LGA1200 for 10 <sup>th</sup> Gen Intel® Core™, Pentium® Gold and Celeron® Processors*<br>Supports Intel® 14nm CPU<br>Supports Intel® Turbo Boost Technology 2.0 and Intel® Turbo Boost Max Technology 3.0**<br><br>*Refer to <a href="http://www.asus.com">www.asus.com</a> for CPU support list.<br>**Intel® Turbo Boost Max Technology 3.0 support depends on the CPU types.                                                                                     |
| Chipset           | Intel® B460 Chipset                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Memory            | 4 x DIMM, Max. 128GB, DDR4 2933/2800/2666/2400/2133 MHz Non-ECC, Un-buffered Memory*<br><br>Dual Channel Memory Architecture<br>Intel® Extreme Memory Profile (XMP)<br>ASUS OptiMem<br><br>*For 10 <sup>th</sup> Gen Intel® processors, only Core™ i9/i7 CPUs support 2933/2800/2666/2400/2133 natively, others will run at the maximum transfer rate of DDR4 2666MHz.<br>*Refer to <a href="http://www.asus.com">www.asus.com</a> for the Memory QVL (Qualified Vendors Lists). |
| Graphics          | 1 x DisplayPort 1.4*<br>1 x HDMI™ 1.4b<br><br>*Graphics specifications may vary between CPU types.<br>*Support DisplayPort 1.4 with max. resolution of 4096 x 2304 @60Hz. Refer to <a href="http://www.intel.com">www.intel.com</a> for any update.                                                                                                                                                                                                                              |
| Expansion Slots   | Intel® 10 <sup>th</sup> Gen Processors<br>1 x PCIe 3.0 x16 slot (supports x16 mode)<br>Intel® B460 Chipset<br>1 x PCIe 3.0 x16 slot (max. at x4 mode)<br>3 x PCIe 3.0 x1 slots                                                                                                                                                                                                                                                                                                   |
| Multi-GPU Support | Supports AMD® 2-Way CrossFireX™ Technology                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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# TUF GAMING B460-PLUS specifications summary

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage              | <p>Total supports 2 x M.2 slots and 6 x SATA 6Gb/s ports</p> <p>Intel® B460 Chipset</p> <p>M.2_1 slot (Key M), type 2242/2260/2280 (supports PCIe 3.0 x4 &amp; SATA modes*)</p> <p>M.2_2 slot (Key M), type 2242/2260/2280/22110 (supports PCIe 3.0 x4 mode)</p> <p>6 x SATA 6Gb/s ports</p> <p>Intel® Rapid Storage Technology supports SATA Raid 0,1,5,10 and PCIe Raid 0,1</p> <p>Intel® Optane™ Memory Ready**</p> <p>*M.2_1 shares bandwidth with SATA6G_1. When M.2_1 runs in SATA mode, SATA6G_1 will be disabled.</p> <p>** Only the M.2_2 socket can support Intel® Optane™ memory.</p> |
| Ethernet             | <p>1 x Intel® I219V 1Gb Ethernet</p> <p>ASUS Turbo LAN</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| USB                  | <p><b>Rear USB (Total 6 ports)</b></p> <p>6 x USB 3.2 Gen 1 ports (6 x Type-A)</p> <p><b>Front USB (Total 6 ports)</b></p> <p>1 x USB 3.2 Gen 1 header supports additional 2 USB 3.2 Gen 1 ports</p> <p>2 x USB 2.0 headers support additional 4 USB 2.0 ports</p>                                                                                                                                                                                                                                                                                                                               |
| Audio                | <p><b>Realtek ALC S1200A 7.1-Channel High Definition Audio CODEC</b></p> <ul style="list-style-type: none"><li>- Supports Jack detection, Multi-streaming, Front Panel Jack-retasking</li><li>- Supports up to 24-Bit/192 kHz playback</li><li>- Premium Japanese audio capacitors</li><li>- Audio Shielding</li><li>- Dedicated audio PCB layers</li><li>- DTS Custom for TUF GAMING Headphone</li></ul>                                                                                                                                                                                        |
| Back Panel I/O Ports | <p>6 x USB 3.2 Gen 1 ports (6 x Type-A)</p> <p>1 x DisplayPort</p> <p>1 x HDMI™ port</p> <p>1 x Intel® I219V 1Gb Ethernet port</p> <p>6 x Audio jacks</p> <p>1 x PS/2 Keyboard/Mouse combo port</p>                                                                                                                                                                                                                                                                                                                                                                                              |

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# TUF GAMING B460-PLUS specifications summary

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Internal I/O Connectors | <p><b>Fan and cooling related</b></p> <p>1 x 4-pin CPU Fan header</p> <p>1 x 4-pin CPU OPT Fan header</p> <p>2 x 4-pin Chassis Fan headers</p> <p>1 x 4-pin AIO Pump header</p> <p><b>Power related</b></p> <p>1 x 24-pin Main Power connector</p> <p>1 x 8-pin +12V Power connector</p> <p><b>Storage related</b></p> <p>2 x M.2 slots (Key M)</p> <p>6 x SATA 6Gb/s ports</p> <p><b>USB</b></p> <p>1 x USB 3.2 Gen 1 header supports additional 2 USB 3.2 Gen 1 ports</p> <p>2 x USB 2.0 headers support additional 4 USB 2.0 ports</p> <p><b>Miscellaneous</b></p> <p>2 x AURA RGB headers</p> <p>1 x Clear CMOS header</p> <p>1 x COM Port header</p> <p>1 x Front Panel Audio header (AAFP)</p> <p>1 x 20-3 pin System Panel header with Chassis intrude function</p>                              |
| Special Features        | <p><b>ASUS TUF PROTECTION</b></p> <ul style="list-style-type: none"><li>- ASUS DIGI+ VRM</li><li>- ASUS Enhanced DRAM Overcurrent Protection</li><li>- ASUS ESD Guards</li><li>- ASUS Overvoltage Protection</li><li>- ASUS SafeSlot Core+</li><li>- ASUS Stainless-Steel Back I/O</li></ul> <p><b>ASUS Q-Design</b></p> <ul style="list-style-type: none"><li>- ASUS Q-DIMM</li><li>- ASUS Q-Slot</li><li>- ASUS Q-LED (CPU [red], DRAM [yellow], VGA [white], Boot Device [yellow green])</li></ul> <p><b>ASUS Thermal Solution</b></p> <ul style="list-style-type: none"><li>- Aluminum heatsink design</li></ul> <p><b>ASUS EZ DIY</b></p> <ul style="list-style-type: none"><li>- Box Headers</li></ul> <p><b>AURA Sync</b></p> <ul style="list-style-type: none"><li>- AURA RGB headers</li></ul> |

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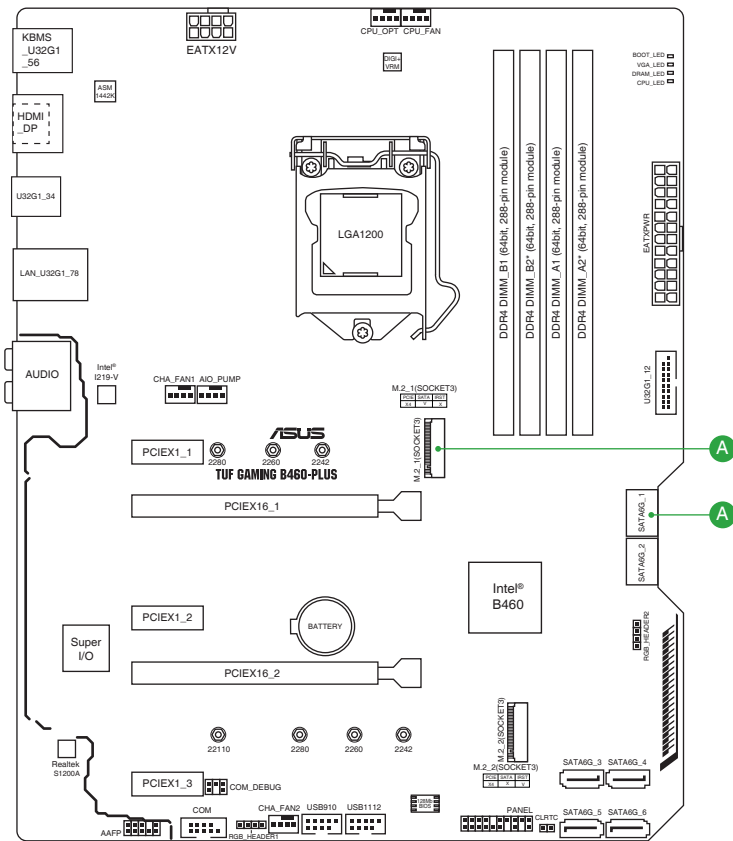
# TUF GAMING B460-PLUS specifications summary

|                   |                                                                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Software Features | <b>ASUS Exclusive Software</b>                                                                                                                 |
|                   | Armoury Crate <ul style="list-style-type: none"><li>- Aura Sync</li></ul>                                                                      |
|                   | AI Suite 3 <ul style="list-style-type: none"><li>- Performance And Power Saving Utility</li></ul>                                              |
|                   | EPU                                                                                                                                            |
|                   | Digi+ VRM                                                                                                                                      |
|                   | Fan Xpert 4                                                                                                                                    |
|                   | - EZ update                                                                                                                                    |
|                   | - PC Cleaner                                                                                                                                   |
|                   | - System Information                                                                                                                           |
|                   | AI Charger                                                                                                                                     |
|                   | ASUS Turbo LAN                                                                                                                                 |
|                   | DTS Custom for GAMING Headsets                                                                                                                 |
|                   | Norton Anti-virus software (Free Trial for 60 days)                                                                                            |
|                   | DAEMON Tools                                                                                                                                   |
|                   | Google Chrome Browser & Google Toolbar                                                                                                         |
|                   | TUF GAMING CPU-Z                                                                                                                               |
|                   | WinRAR                                                                                                                                         |
|                   | <b>UEFI BIOS</b>                                                                                                                               |
|                   | ASUS EZ DIY <ul style="list-style-type: none"><li>- ASUS CrashFree BIOS 3</li><li>- ASUS EZ Flash 3</li><li>- ASUS UEFI BIOS EZ Mode</li></ul> |
| BIOS              | 128 Mb Flash ROM, UEFI AMI BIOS                                                                                                                |
| Manageability     | WOL by PME, PXE                                                                                                                                |
| Operating System  | Windows 10 - 64 bit                                                                                                                            |
| Form Factor       | ATX Form Factor                                                                                                                                |
|                   | 12 inch x 9.6 inch ( 30.5 cm x 24.4 cm )                                                                                                       |



Specifications are subject to change without notice. Refer to the ASUS website for the latest specifications.

# Connectors with shared bandwidth



| Configuration |          | 1              | 2             |
|---------------|----------|----------------|---------------|
| A             | M.2_1    | x4 (PCIe mode) | V (SATA mode) |
|               | SATA6G_1 | V              | -             |



M.2\_1 shares bandwidth with SATA6G\_1.

# Product Introduction

# 1

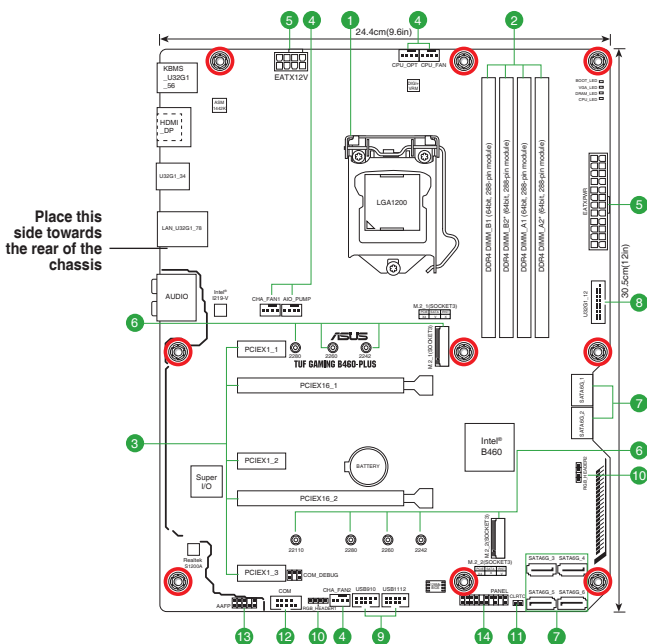
## 1.1 Before you proceed

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.
- 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.

## 1.2 Motherboard overview



Unplug the power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components.

## 1.2.1 Layout contents

### 1. CPU socket

The motherboard comes with a surface mount Intel® Socket LGA1200 designed for 10<sup>th</sup> Gen Intel® Core™, Pentium® Gold and Celeron® Processors.



For more details, refer to **Central Processing Unit (CPU)**.

### 2. DDR4 DIMM slots

The motherboard comes with Dual Inline Memory Modules (DIMM) slots designed for DDR4 (Double Data Rate 4) memory modules.



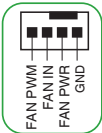
For more details, refer to **System memory**.

### 3. Expansion slots

This motherboard supports two PCIe x16 graphics cards and three PCIe 3.0 x1 network cards, SCSI cards and other cards that comply with the PCI Express specification.

### 4. Fan headers

The Fan headers allow you to connect fans to cool the system.



| Header   | Max. Current | Max. Power | Default Speed    | Shared Control |
|----------|--------------|------------|------------------|----------------|
| CPU_FAN  | 1A           | 12W        | Q-Fan Controlled | A              |
| CPU_OPT  | 1A           | 12W        | Q-Fan Controlled | A              |
| CHA_FAN1 | 1A           | 12W        | Q-Fan Controlled | -              |
| CHA_FAN2 | 1A           | 12W        | Q-Fan Controlled | -              |
| AIO_PUMP | 1A           | 12W        | Full-Speed       | -              |

### 5. Power connectors

These Power connectors allow you to connect your motherboard to a power supply. The power supply plugs are designed to fit in only one orientation. Find the proper orientation and push down firmly until the power supply plugs are fully inserted.



Ensure to connect the 8-pin power plug.



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 350 W.



- We recommend that you use a PSU with a higher power output when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- If you are uncertain about the minimum power supply requirement for your system, we recommend you to refer to online resources for Power Supply Wattage Calculator.
- If you want to use two or more high-end PCI Express x16 cards, use a PSU with 1000W power or above to ensure the system stability.

## 6. M.2 Slots (Key M)

The M.2 slots allow you to install M.2 devices such as M.2 SSD modules.



- M.2\_1 slot (Key M), type 2242/2260/2280 (supports PCIe 3.0 x4 & SATA modes).
- M.2\_2 slot (Key M), type 2242/2260/2280/22110 (supports PCIe 3.0 x4 mode)
- Intel® Rapid Storage Technology supports SATA Raid 0,1,5,10 and PCIe Raid 0,1.
- M.2\_1 shares bandwidth with SATA6G\_1. When M.2\_1 runs in SATA mode, SATA6G\_1 will be disabled.
- Only the M.2\_2 socket can support Intel® Optane™ memory.

## 7. SATA 6Gb/s ports

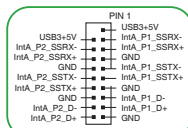
The SATA 6Gb/s ports allow you to connect SATA devices such as optical disc drives and hard disk drives via a SATA cable.

## 8. USB 3.2 Gen 1 header

The USB 3.2 Gen 1 header allows you to connect a USB 3.2 Gen 1 module for additional USB 3.2 Gen 1 ports. The USB 3.2 Gen 1 header provides data transfer speeds of up to 5 Gb/s.



The USB 3.2 Gen 1 module is purchased separately.



## 9. USB 2.0 headers

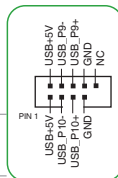
The USB 2.0 headers allow you to connect a USB module for additional USB 2.0 ports. The USB 2.0 headers provide data transfer speeds of up to 480 Mb/s.



DO NOT connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



The USB 2.0 module is purchased separately.



## 10. AURA RGB headers

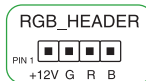
The RGB headers allow you to connect RGB LED strips.



The RGB headers support 5050 RGB multi-color LED strips (12V/G/R/B), with a maximum power rating of 3A (12V), and no longer than 3 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.





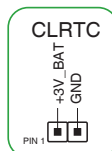
- Actual lighting and color will vary with LED strip.
- If your LED strip does not light up, check if the RGB LED extension cable and the RGB LED strip are connected in the correct orientation, and the 12V connector is aligned with the 12V header on the motherboard.
- The LED strip will only light up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

## 11. Clear CMOS header

This header 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:

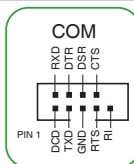
1. Turn OFF the computer and unplug the power cord.
2. Use a metal object such as a screwdriver to short the two pins.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.



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.

## 12. COM Port header

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

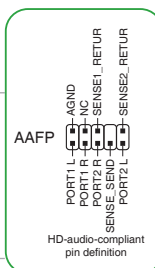


## 13. Front panel audio header

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



- We recommend that you connect a high-definition front panel audio module to this header to avail of the motherboard's high-definition audio capability.
- If you want to connect a high-definition front panel audio module to this header, set the Front Panel Type item in the BIOS setup to [HD Audio]. By default, this header is set to [HD Audio].



#### 14. 20-3 pin System Panel header with Chassis intrude function

This header supports several chassis-mounted functions.

- **System power LED (4-pin PLED)**

This 4-pin header is for the system power LED. Connect the chassis power LED cable to this header. 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 header is for the HDD Activity LED. Connect the HDD Activity LED cable to this header. 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 header 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 PWRSW)**

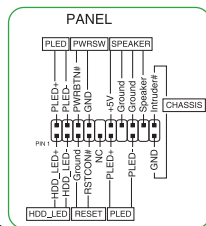
This header is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the operating system settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

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

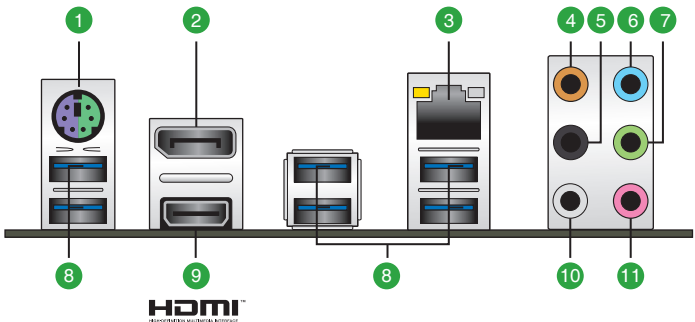
This 2-pin header is for the chassis-mounted reset button for system reboot without turning off the system power.

- **Chassis intrusion header (2-pin CHASSIS)**

This header is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this header. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal is then generated as a chassis intrusion event.



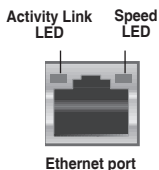
## 1.2.2 Rear panel connectors



1. **PS/2 keyboard/mouse combo port.** This port is for a PS/2 mouse or keyboard.
2. **DisplayPort.** This port is for a DisplayPort-compatible device.
3. **Ethernet port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the Ethernet port LED indications.

### Ethernet 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 |           |                    |



4. **Center / Subwoofer port (orange).** This port connects the center/subwoofer speakers.
5. **Rear Speaker Out port (black).** This port connects the rear speakers in a 4 channel, 5.1 channel, or 7.1 channel audio configuration.
6. **Line In port (light blue).** This port connects the tape, CD, DVD player, or other audio sources.
7. **Line Out port (lime).** This port connects a headphone or a speaker. In 4-channel, 5.1-channel, and 7.1-channel configurations, the function of this port becomes Front Speaker Out.
8. **USB 3.2 Gen 1 (up to 5Gbps) ports.** These 9-pin Universal Serial Bus (USB) ports connect to USB 3.2 Gen 1 devices.
9. **HDMI™ port.** This port is for a High-Definition Multimedia Interface (HDMI™) connector, and is HDCP compliant allowing playback of HD DVD, Blu-ray, and other protected content.



10. **Side Speaker Out port (gray).** This port connects to the side speakers in an 7.1-channel audio configuration.

11. **Microphone port (pink).** This port connects a microphone.



Refer to the audio configuration table for the function of the audio ports in 2, 4, 5.1, or 7.1-channel configuration.

### Audio 2, 4, 5.1 or 7.1-channel configuration

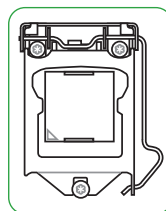
| Port       | Headset 2-channel | 4-channel         | 5.1-channel       | 7.1-channel       |
|------------|-------------------|-------------------|-------------------|-------------------|
| Light Blue | Line In           | Line In           | Line In           | Line In           |
| Lime       | Line 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  |
| Gray       | —                 | —                 | —                 | Side Speaker Out  |

## 1.3 Central Processing Unit (CPU)

This motherboard comes with a surface mount Intel® Socket LGA1200 designed for 10<sup>th</sup> Gen Intel® Core™, Pentium® Gold and Celeron® Processors.

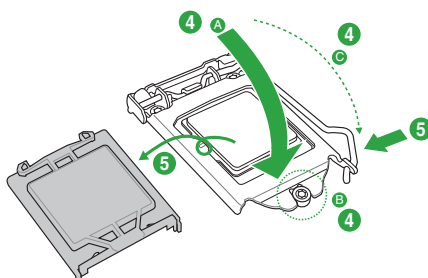
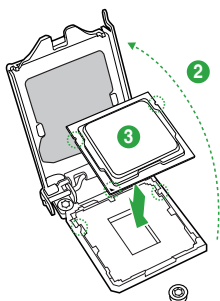
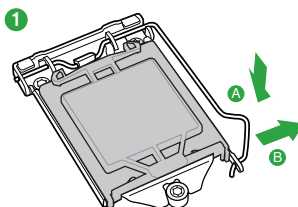
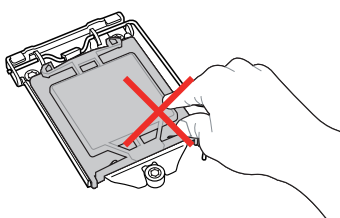


Unplug all power cables before installing the CPU.



- Ensure that you install the correct CPU designed for the LGA1200 socket only. DO NOT install a CPU designed for LGA1150, LGA1151, LGA1155 and LGA1156 sockets on the LGA1200 socket.
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1200 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.
- The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU.

### Installing the CPU



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

# 1.4 System memory

This motherboard comes with four Double Data Rate 4 (DDR4) Dual Inline Memory Module (DIMM) sockets. The figure illustrates the location of the DDR4 DIMM sockets:



| Channel   | Sockets            |
|-----------|--------------------|
| Channel A | DIMM_A1 & DIMM_A2* |
| Channel B | DIMM_B1 & DIMM_B2* |

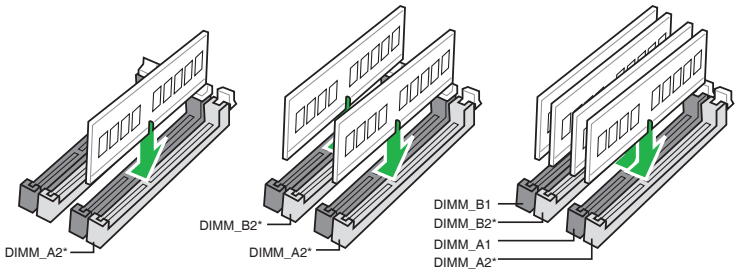


- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- Always install DIMMs with the same CAS latency. 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.
- For 10<sup>th</sup> Gen Intel® processors, only Core™ i9/i7 CPUs support 2933/2800/2666/2400/2133 natively, others will run at the maximum transfer rate of DDR4 2666MHz.
- A DDR4 memory 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.



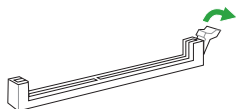
- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.
- For system stability, use a more efficient memory cooling system to support a full memory load.
- Refer to [www.asus.com](http://www.asus.com) for the latest Memory QVL (Qualified Vendors Lists).

## Recommended memory configurations

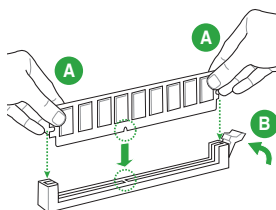


## Installing a DIMM

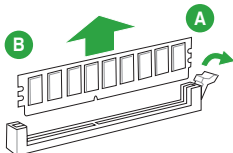
1



2



## To remove a DIMM



# BIOS Information

# 2

## 2.1 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 to 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 **TGB460PS.CAP** for this motherboard.
- BIOS settings and options may vary due to different BIOS release versions. Please refer to the latest BIOS version for settings and options.



For more information on BIOS configurations, please refer to <https://www.asus.com/support>, or download the BIOS manual by scanning the QR code.



## 2.2 BIOS setup program

Use the BIOS Setup to update the BIOS or configure its parameters. The BIOS screens 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.



- 
- 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>.
  - If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value.
  - The BIOS setup program does not support Bluetooth devices.
- 

### 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.

## 2.3 ASUS EZ Flash 3

The ASUS EZ Flash 3 feature allows you to update the BIOS without using an OS-based utility.



---

Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu or press hotkey **<F5>**.

---

### To update the BIOS by USB:



- 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!
- 

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

## 2.4 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.



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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.

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### 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!

---



# Appendix

## Notices

### FCC Compliance Information

Responsible Party: Asus Computer International

Address: 48720 Kato Rd., Fremont, CA 94538, USA

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

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

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

## Compliance Statement of Innovation, Science and Economic Development Canada (ISED)

This device complies with Innovation, Science and Economic Development Canada licence 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.

CAN ICES-3(B)/NMB-3(B)

## Déclaration de conformité de Innovation, Sciences et Développement économique Canada (ISED)

Le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-3(B)/NMB-3(B)

## VCCI: Japan Compliance Statement

### Class B ITE

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取扱説明書に従って正しい取り扱いをして下さい。

V C C I - B

## KC: Korea Warning Statement

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

Please refer to <http://csr.asus.com/Compliance.htm> for information disclosure based on regulation requirements ASUS is complied with:

### EU REACH and Article 33

Complying with the REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulatory framework, we published the chemical substances in our products at ASUS REACH website at <http://csr.asus.com/english/REACH.htm>.

### EU RoHS

This product complies with the EU RoHS Directive. For more details, see <http://csr.asus.com/english/article.aspx?id=35>

### India RoHS

This product complies with the “India E-Waste (Management) Rules, 2016” and prohibits use of lead, mercury, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) in concentrations exceeding 0.1% by weight in homogenous materials and 0.01% by weight in homogenous materials for cadmium, except for the exemptions listed in Schedule II of the Rule.

### Vietnam RoHS

ASUS products sold in Vietnam, on or after September 23, 2011, meet the requirements of the Vietnam Circular 30/2011/TT-BCT.

Các sản phẩm ASUS bán tại Việt Nam, vào ngày 23 tháng 9 năm 2011 trở về sau, đều phải đáp ứng các yêu cầu của Thông tư 30/2011/TT-BCT của Việt Nam.

### Turkey RoHS

AEEE Yönetmeliğine Uygundur

## ASUS Recycling/Takeback Services

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.



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



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.

## Regional notice for California



### WARNING

Cancer and Reproductive Harm -  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

**English** ASUSTeK Computer Inc. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related Directives. Full text of EU declaration of conformity is available at: [www.asus.com/support](http://www.asus.com/support)

**Français** ASUSTeK Computer Inc. déclare par la présente que cet appareil est conforme aux critères essentiels et autres clauses pertinentes des directives concernées. La déclaration de conformité de l'UE peut être téléchargée à partir du site Internet suivant : [www.asus.com/support](http://www.asus.com/support)

**Deutsch** ASUSTeK Computer Inc. erklärt hiermit, dass dieses Gerät mit den wesentlichen Anforderungen und anderen relevanten Bestimmungen der zugehörigen Richtlinien übereinstimmt. Der gesamte Text der EU-Konformitätserklärung ist verfügbar unter: [www.asus.com/support](http://www.asus.com/support)

**Italiano** ASUSTeK Computer Inc. con la presente dichiara che questo dispositivo è conforme ai requisiti essenziali e alle altre disposizioni pertinenti con le direttive correlate. Il testo completo della dichiarazione di conformità UE è disponibile all'indirizzo: [www.asus.com/support](http://www.asus.com/support)

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**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)

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**Türkçe** ASUSTeK Computer Inc., bu aygıtın temel gereksinimlerle ve ilişkili Yönergelerin diğer ilgili koşullarıyla uyumlu olduğunu beyan eder. AB uygunluk bildiriminin 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)

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