Pro WS W480-ACE

Motherboard

E16814
Revised Edition V3
May 2020

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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.
- 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 description of the switches, jumpers, and connectors on the motherboard.

- **Chapter 2: Basic Installation**

  This chapter lists the hardware setup procedures that you have to perform when installing system components.

- **Chapter 3: BIOS and RAID Support**

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

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 (www.asus.com) provides updated information on ASUS hardware and software products.

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.

Pro WS W480-ACE specifications summary

CPU	Intel® Socket LGA 1200 for Xeon® W-1200, 10th Gen Intel® Core™, Pentium® Gold and Celeron® processors* Supports Intel® 14 nm CPU Supports Intel® Turbo Boost Technology 2.0 and Turbo Boost Max Technology 3.0** *** Refer to www.asus.com for CPU support list.** **** Intel® Turbo Boost Max Technology 3.0 support depends on the CPU types.**
Chipset	Intel® W480 Chipset
Memory	4 x DIMM, Max. 128GB, DDR4 4600(O.C)* / 4500(O.C)* / 4400(O.C) / 4266(O.C.) / 4133(O.C.) / 4000(O.C.) / 3866(O.C.) / 3733(O.C.) / 3600(O.C.) / 3466(O.C.) / 3400(O.C.)* / 3333(O.C.) / 3200(O.C.) / 3000(O.C.)* / 2933(O.C.) / 2800(O.C.) / 2666 / 2400 / 2133 MHz ECC, Un-buffered Memory** Dual Channel Memory Architecture Supports Intel® Extreme Memory Profile (XMP) OptiMem II *** Intel® Xeon® W-1200 and non-K processors may not support some memory frequencies.** **** 10th Gen Intel® Core™ i9/i7 CPUs support 2933/2800/2666/2400/2133 natively. refer to www.asus.com for the Memory QVL (Qualified Vendors Lists).**
Graphics	1 x DisplayPort 1.4 from CPU* 1 x HDMI™ 1.4b 2 x Thunderbolt™ 3 ports (USB Type-C®) supports DisplayPort 1.4 and Thunderbolt™ video outputs from an add-on graphics card** *** Output at TBT(U32G2)_EC1, the USB Type-C® port near HDMI™, requires a USB-C® to DisplayPort adapter cable.** *** Support DisplayPort 1.4 with max. resolution of 4096 x 2304 @60Hz. Please refer to www.intel.com for any update.** **** Resolution depends on graphics cards' resolution.** ***** Graphics specifications may vary between CPU types.**
Expansion Slots	**Intel® 10th Gen processors*** 2 x PCIe 3.0 x16 slots (support x16, x8/x8, x8/x4+x4, x8+x4+x4/x0 modes) **Intel® W480 Chipset** 1 x PCIe 3.0 x16 slot (supports x4 mode)** 2 x PCIe 3.0 x1 slots *** Support PCIe bifurcation for RAID on CPU function.** **** PCIe 3.0 x4 will be switched from Thunderbolt™ 3 to PCIEX16_3 if the slot is populated; by then Thunderbolt™ 3 will have no output.**
Multi-GPU support	Supports AMD 3-Way/2-Way CrossFireX™ Technology

(continued on the next page)

Pro WS W480-ACE specifications summary

Storage	**Total supports 2 x M.2 slots and 6 x SATA 6Gb/s ports** **Intel® W480 Chipset** M.2_1 slot (Key M), type 2242/2260/2280/22110 (supports PCIe 3.0 x4 & SATA modes)* M.2_2 slot (Key M), type 2242/2260/2280/22110 (supports PCIe 3.0 x4 & SATA modes)** 6 x SATA 6Gb/s ports Intel® Rapid Storage Technology supports Raid 0,1,5,10 Intel® Optane™ Memory Ready *** When M.2_1 is operating in SATA mode, SATA6G_2 will be disabled.** **** M.2_2 runs at PCIe 3.0 x2 by default and shares bandwidth with SATA6G_56. When M.2_2 runs at PCIe 3.0 x4 or is populated by H10, SATA6G_56 will be disabled.**
Ethernet	1 x Intel® I225-LM Ethernet 1 x Realtek® RTL8117 1Gb Ethernet
USB	**Rear USB (Total 8 ports)** 2 x USB 3.2 Gen 2 ports (2 x USB Type-C®) from Intel® Thunderbolt™ 3 Controller 4 x USB 3.2 Gen 2 ports (4 x Type-A) 2 x USB 3.2 Gen 1 ports (2 x Type-A) **Front USB (Total 7 ports)** 1 x USB 3.2 Gen 1 front panel connector (supports USB Type-C®) 1 x USB 3.2 Gen 1 header supports additional 2 USB 3.2 Gen 1 ports 2 x USB 2.0 headers support additional 4 USB 2.0 ports
Audio	**Realtek® S1220A 8-Channel High Definition Audio CODEC** - Impedance sense for front and rear headphone outputs - Internal audio Amplifier to enhance the highest quality sound for headphone and speakers - Supports: Jack-detection, Multi-streaming, Front Panel Jack-retasking - High quality 120 dB SNR stereo playback output and 113 dB SNR recording input (Line-in) - Supports up to 32-Bit/192kHz playback* **Audio Features:** - Power pre-regulator reduces power input noise to ensure consistent performance - Rear optical S/PDIF out port - Premium Japanese audio capacitors - Audio Shielding - Dedicated audio PCB layers - Audio cover - Unique de-pop circuit *** Due to limitations in HDA bandwidth, 32-Bit/192kHz is not supported for 8-Channel audio.**

(continued on the next page)

Pro WS W480-ACE specifications summary

Back Panel I/O Ports	2 x Thunderbolt™ 3 USB Type-C® ports 4 x USB 3.2 Gen 2 ports (4 x Type-A) 2 x USB 3.2 Gen 1 ports (2 x Type-A) 2 x DisplayPort IN ports for Thunderbolt™ 3* 1 x HDMI™ port 1 x Intel® I225-LM Ethernet port 1 x Realtek® RTL8117 1Gb Ethernet port 5 x Audio jacks 1 x Optical S/PDIF out port *** Please refer to the user manual for more details about DisplayPort input and output settings**
Internal I/O connectors	**Fan and cooling related** 1 x 4-pin CPU Fan header 1 x 4-pin CPU OPT Fan header 1 x 4-pin AIO Pump header 3 x 4-pin Chassis Fan headers **Power related** 1 x 24-pin Main Power connector 1 x 8-pin +12V Power connector **Storage related** 2 x M.2 slots (Key M) 6 x SATA 6Gb/s ports **USB** 1 x USB 3.2 Gen 1 Front Panel connector (supports USB Type-C®) 1 x USB 3.2 Gen 1 header supports additional 2 USB 3.2 Gen 1 ports 2 x USB 2.0 headers support additional 4 USB 2.0 ports **Miscellaneous** 1 x Clear CMOS header 1 x Chassis Intrude header 1 x COM Port header 1 x Front Panel Audio header (AAFP) 1 x System Panel header 1 x Thermal Sensor header 1 x RTL8117 Reset Password header 1 x FlexKey header* *** Shares pins with Reset header**

(continued on the next page)

Pro WS W480-ACE specifications summary

Special Features	**Extreme Engine Digi+** - 5K Black Metallic Capacitors - ON-semi NCP302045 **ASUS 5X PROTECTION III** - ASUS DIGI+ VRM (- Digital power design with Dr. MOS) - ASUS Enhanced DRAM Overcurrent Protection - ASUS ESD Guards - ASUS LANGuard - ASUS Overvoltage Protection - ASUS SafeSlot Core - ASUS Stainless-Steel Back I/O **ASUS Q-Design** - ASUS Q-DIMM - ASUS Q-LED (CPU [red], DRAM [yellow], VGA [white], Boot Device [yellow green]) - ASUS Q-Slot **ASUS Thermal Solution** - Aluminum M.2 Heatsink - Aluminum heatsink design **ASUS EZ DIY** - Procool II - SafeSlot **Out-of-band Management** - BIOS Update Indicator LED - LAN Initialization Indicator LED
Software Features	**ASUS Exclusive Software** Armoury Crate AI Suite 3: - Performance and Power Saving Utility TPU EPU Digi+ VRM Fan Xpert 4 Turbo app - EZ update

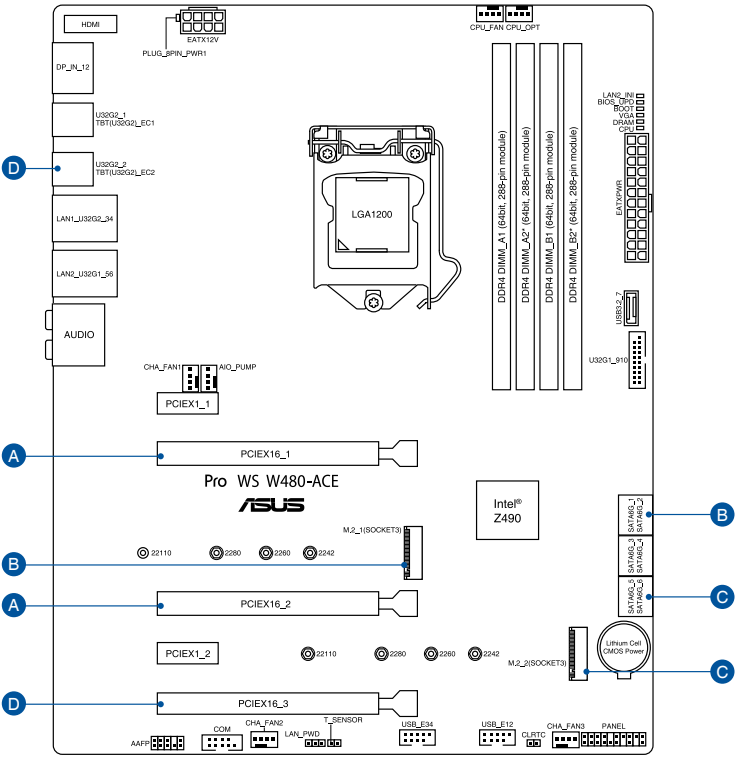
(continued on the next page)

Pro WS W480-ACE specifications summary

Software Features	IT Management software supported - ASUS Control Center Express(ACCE) AI Charger ASUS Turbo LAN WinRAR **UEFI BIOS** ASUS EZ DIY - ASUS CrashFree BIOS 3 - ASUS EZ Flash 3 - ASUS UEFI BIOS EZ Mode FlexKey
BIOS	192 (128+64) 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. Please refer to the ASUS website for the latest specifications.

Connectors with shared bandwidth



Configuration		1	2
A	PCIEX16_1	x16	x8
	PCIEX16_2	-	x8

Configuration		1	2
B	M.2_1	x4	SATA mode
	SATA_2	V	-

Configuration		1	2	3
C	M.2_2	x2	x4	SATA mode
	SATA_56	V	-	V

Configuration		1	2
D	PCIEX16_3	x4	-
	Thunderbolt™ 3	-	V

- When M.2_1 is operating in SATA mode, SATA6G_2 will be disabled.
- M.2_2 runs at PCIe 3.0 x2 by default and shares bandwidth with SATA6G_56. When M.2_2 runs at PCIe 3.0 x4 or is populated by H10, SATA6G_56 will be disabled.
- PCIEX16_3 shares bandwidth with Thunderbolt™ 3. Thunderbolt™ 3 will be disabled if PCIEX16_3 is populated.

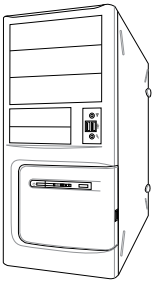
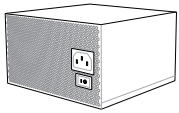
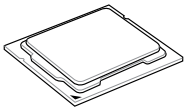
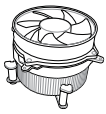
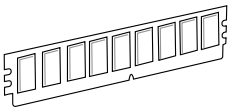
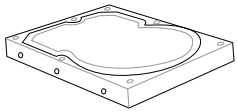
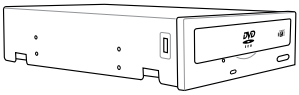
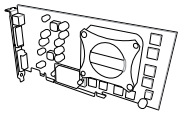
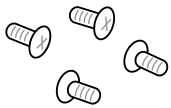
Package contents

Check your motherboard package for the following items.

Motherboard	1 x Pro WS W480-ACE motherboard
Cables	4 x SATA 6Gb/s cables 1 x DP to DP cable for Thunderbolt™ 3
Miscellaneous	1 x I/O Shield 1 x M.2 Rubber Package 1 x M.2 SSD screw packages 1 x Fan bracket
Installation Media	1 x Support DVD
Documentation	1 x User manual 1 x ACC Express Activation Key Card

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

Installation tools and components

	
	Phillips (cross) screwdriver
	
PC chassis	Power supply unit
	
Intel® LGA 1200 CPU	Intel® LGA 1200 compatible CPU Fan
	
DDR4 DIMM	SATA hard disk drive
	
SATA optical disc drive (optional)	Graphics card (optional)
	
M.2 SSD module (optional)	1 Bag of screws

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

Product Introduction

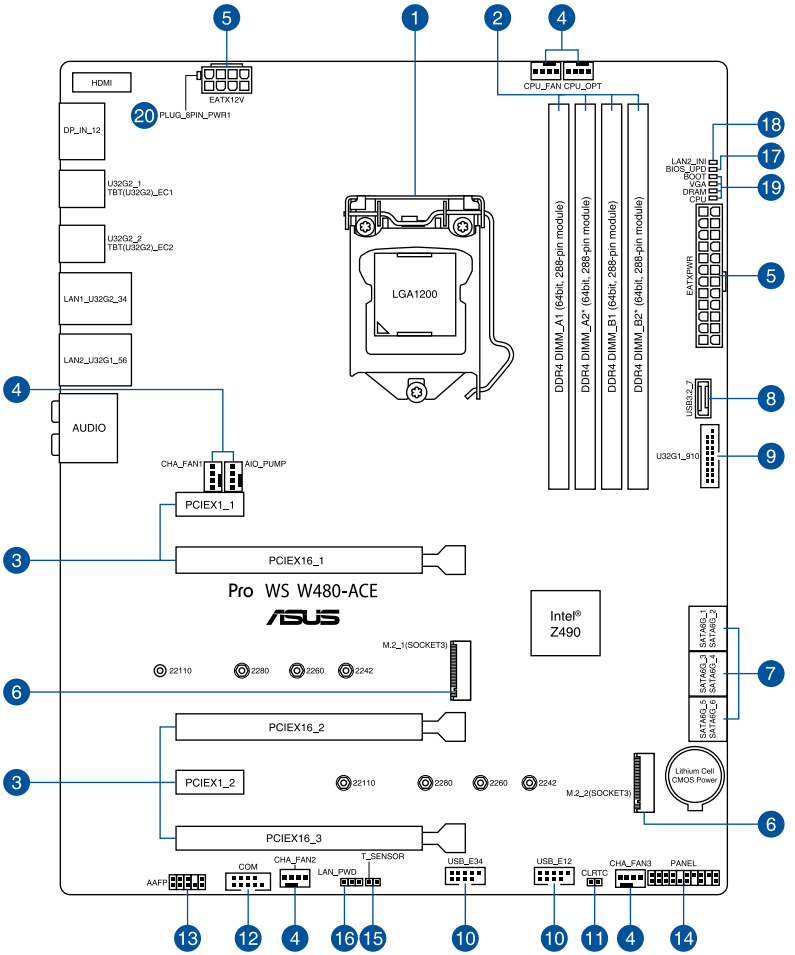
1

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.
- 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.

1.2 Motherboard layout



Layout contents	Page
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7. SATA 6GB/s port	1-12
8. USB 3.2 Gen 1 Front Panel connector	1-13
9. USB 3.2 Gen 1 header	1-14
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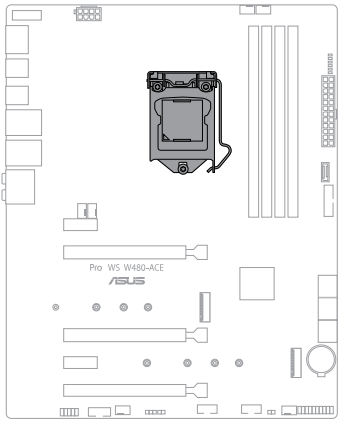
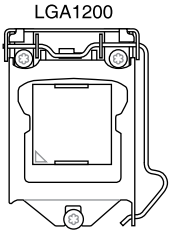
11. Clear CMOS header	1-16
12. COM Port connector	1-17
13. Front Panel Audio header	1-18
14. System Panel header	1-19
15. Thermal Sensor header	1-20
16. RTL8117 Reset Password header	1-21
17. BIOS Update Indicator LED	1-22
18. LAN Initialization Indicator LED	1-22
19. Q-LEDs	1-23
20. 8-pin Power Plug LED	1-23

1. CPU socket

The motherboard comes with a LGA1200 socket designed for Xeon® W-1200, 10th Gen Intel® Core™, Pentium® Gold and Celeron® processors*



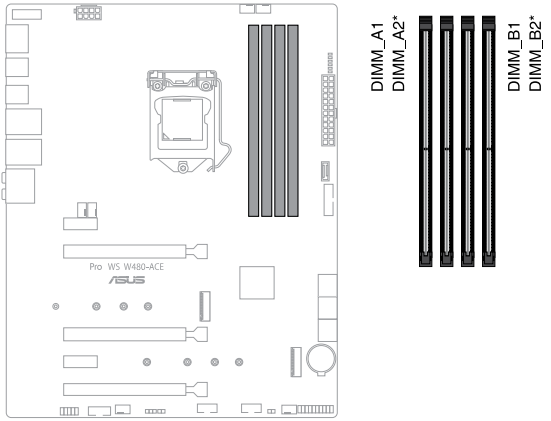


- Ensure that you install the correct CPU designed for LGA1200 socket only. DO NOT install a CPU designed for other sockets on the LGA1200 socket.
- The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU.
- Ensure that all power cables are unplugged before installing the CPU.
- 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. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- 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.

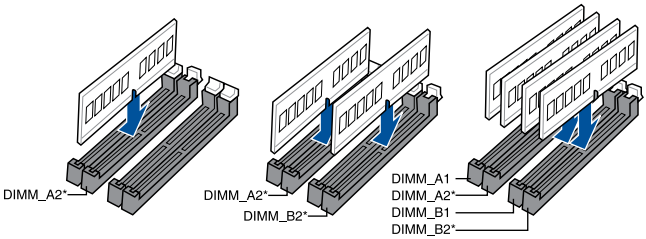
2. DIMM slots

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

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.



Recommended memory configurations



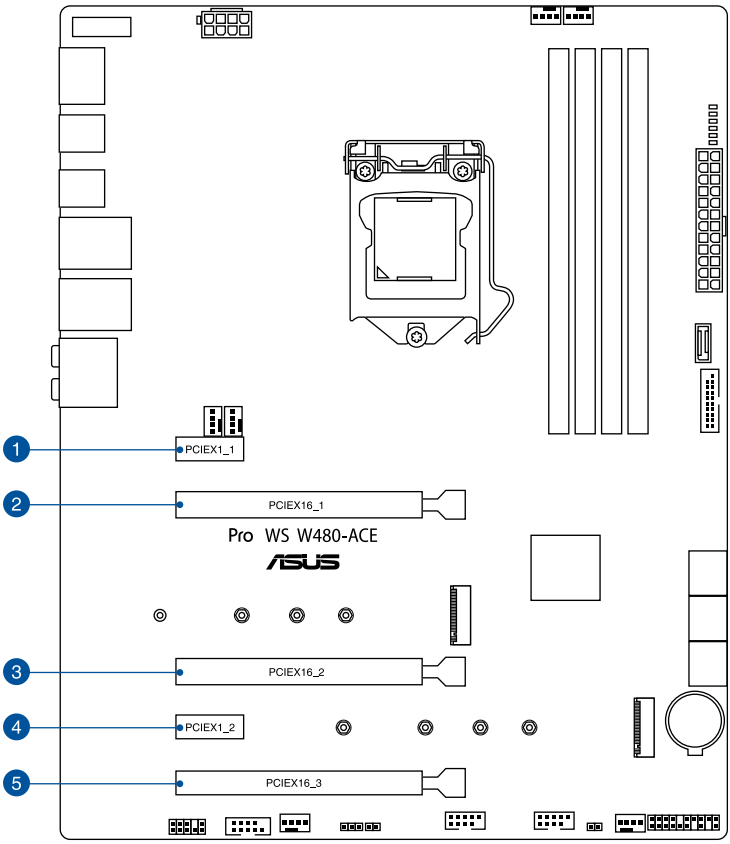
Memory configurations

You may install 4 GB, 8 GB, 16 GB, and 32 GB unbuffered and ECC DDR4 DIMMs into the DIMM sockets.

- 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 or overclocking condition.
- Always install the DIMMS with the same CAS Latency. For an optimum compatibility, we recommend that you install memory modules of the same version or data code (D/C) from the same vendor. Check with the vendor to get the correct memory modules.
- Visit the ASUS website for the latest QVL.

3. 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.



Please refer to the following tables for the recommended VGA configuration and Hyper M.2 configuration.

Recommended VGA configuration

Slot Description		Single VGA	Dual VGA	Triple VGA
2.	PCIe 3.0 x16_1	x16	x8	x8
3.	PCIe 3.0 x16_2	-	x8	x8
5.	PCIe 3.0 x16_3	-	-	x4

- We recommend that you provide sufficient power when running CrossFireX™ mode.
- Ensure to connect the 8-pin power plug when running CrossFireX™ mode.
- Connect a chassis fan to the chassis fan connectors when using multiple graphics cards for better thermal environment.

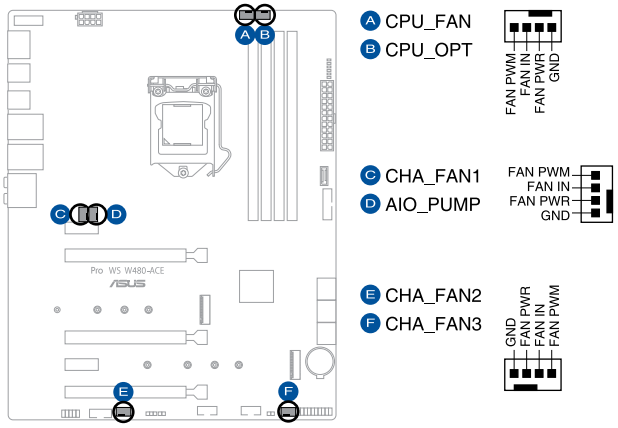
Hyper M.2 X16 series card configuration

Slot Description		Up to 2 Intel® SSD on CPU support	Up to 3 Intel® SSD on CPU support
2.	PCIe 3.0 x16_1	-	x8+x4+x4
3.	PCIe 3.0 x16_2	x4+x4	-

- Hyper M.2 X16 series card sold separately.
- When using up to 2 Intel® SSD on CPU support on PCIe 3.0 x16_2, PCIe 3.0 x16_1 will run at x8.
- When using up to 3 intel® SSD on CPU support, PCIe 3.0 x16_2 will be disabled. If you wish to connect a display, we suggest using the internal VGA, or installing a VGA card to PCIe x16_3, which will run at x4.
- Enable the Hyper M.2 X16 series card under BIOS settings.

4. Fan and Pump headers

The Fan and Pump headers allow you to connect fans or pumps to cool the system.



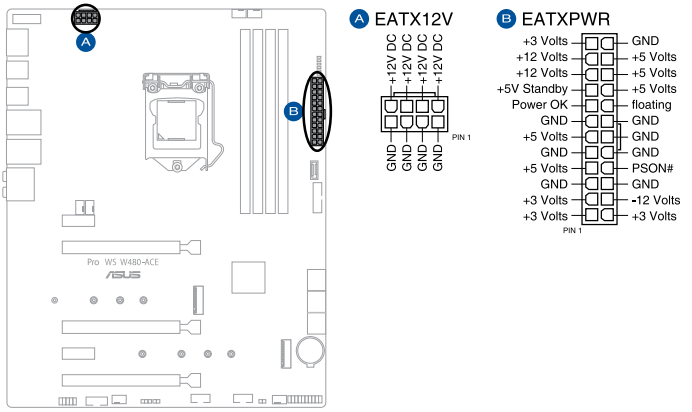
- DO NOT forget to connect the fan cables to the fan headers. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan headers!
- Ensure the cable is fully inserted into the header.

For water cooling kits, connect the pump connector to the **AIO_PUMP** header.

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	-
CHA_FAN3	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.

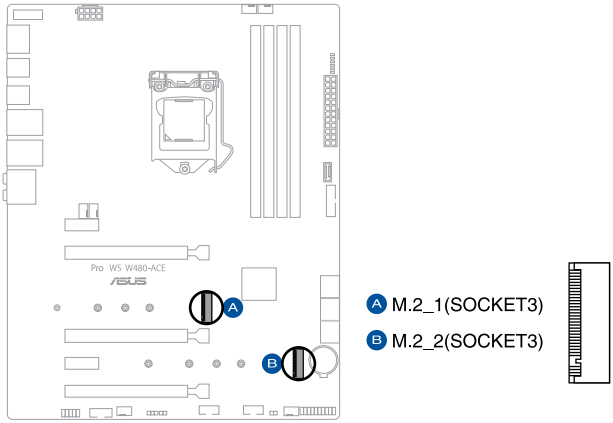


Ensure to connect the 8-pin power plug.

- 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 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 slot

The M.2 slot allows you to install M.2 SSD modules.

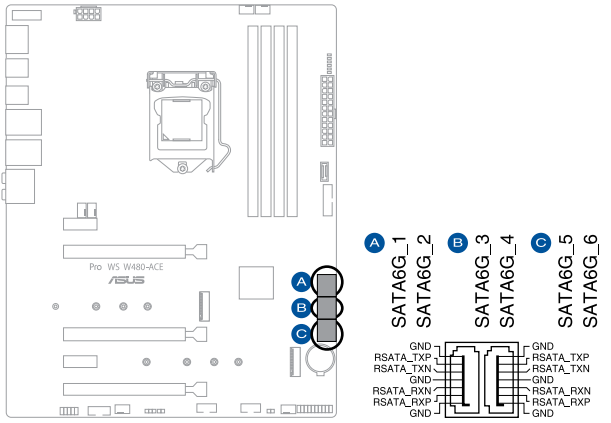


- M.2_1 slot supports PCIe 3.0 x4 and SATA mode Key M design and type 2242 / 2260/ 2280 / 22110 storage devices.
- M.2_2 slot supports PCIe 3.0 x4 and SATA mode Key M design and type 2242 / 2260 / 2280 / 22110 storage devices.
- When M.2_1 is operating in SATA mode, SATA6G_2 will be disabled.
- M.2_2 runs at PCIe 3.0 x2 by default and shares bandwidth with SATA6G_56. When M.2_2 runs at PCIe 3.0 x4 or is populated by H10, SATA6G_56 will be disabled.
- M.2 slots supports IRST (Intel® Rapid Storage Technology).

The M.2 SSD module is purchased separately.

7. SATA 6Gb/s ports

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

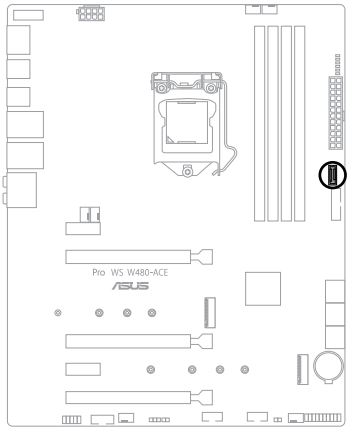


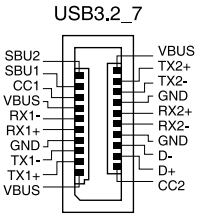
If you installed SATA storage devices, you can create a RAID 0, 1, 5, and 10 configuration with the Intel® Rapid Storage Technology through the onboard Intel® W480 chipset.

- The slots are set to **[AHCI]** by default. If you intend to create a SATA RAID set using these connectors, set the SATA Mode item in the BIOS to **[Intel RST Premium with Intel Optane System Acceleration (RAID)]**.
- When M.2_1 is operating in PCIe mode, SATA6G_2 will be disabled.
- M.2_2 shares bandwidth with SATA6G_56. When M.2_2 is in x4 speed and populated, SATA6G_56 will be disabled. When M.2_2 is in x2 speed and populated, SATA6G_56 will be enabled.
- Before creating a RAID set, refer to the **RAID Configuration Guide**. You can download the **RAID Configuration Guide** from the ASUS website.

8. USB 3.2 Gen 1 Front Panel connector

The USB 3.2 Gen 1 connector 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 connector provides data transfer speeds of up to 5 Gb/s.

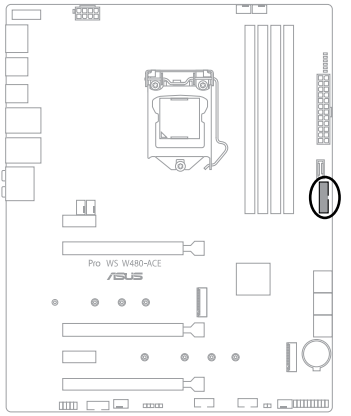




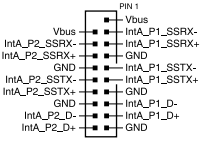
- The USB 3.2 Gen 1 module is purchased separately.
- For the list of compatible devices, please visit the ASUS website for the latest QVL.

9. 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.



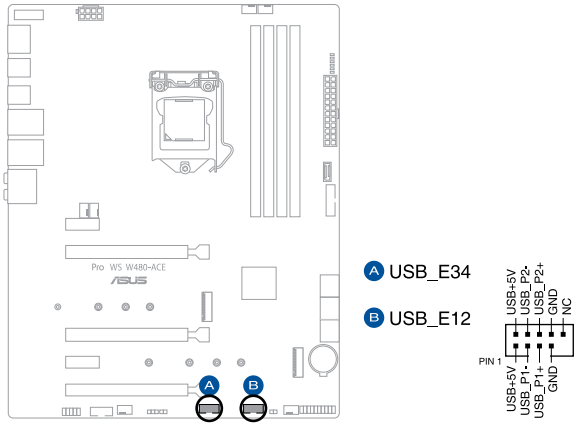
U32G1_910



The USB 3.2 Gen 1 module is purchased separately.

10. USB 2.0 header

The USB 2.0 header allows you to connect a USB module for additional USB 2.0 ports. The USB 2.0 header provides data transfer speeds of up to 480 MB/s connection speed.

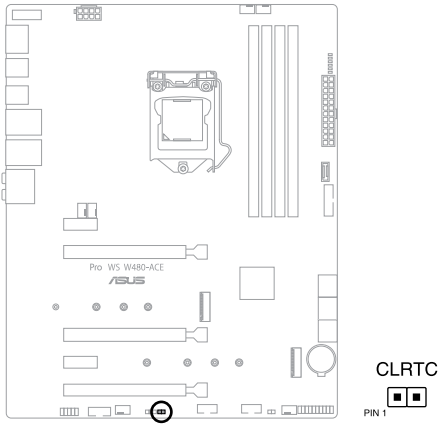


DO NOT connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

The USB 2.0 module is purchased separately.

11. Clear CMOS header

The Clear CMOS header allows you to clear the Real Time Clock (RTC) RAM in the CMOS, which contains the date, time, system passwords, and system setup parameters.



To erase the RTC RAM:

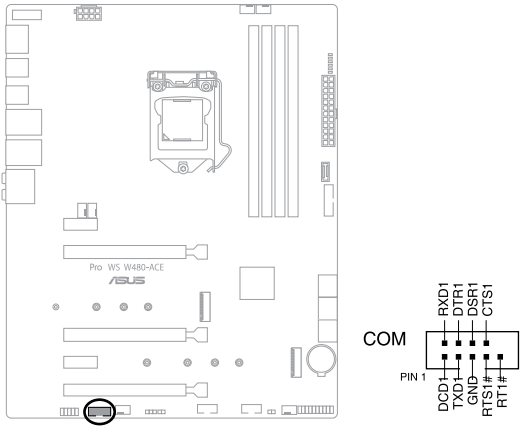
1. Turn OFF the computer and unplug the power cord.
2. Short-circuit pin 1-2 with a metal object or jumper cap for about 5-10 seconds.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

DO NOT short-circuit the pins except when clearing the RTC RAM. Short-circuiting or placing a jumper cap will cause system boot failure!

If the steps above do not help, remove the onboard button cell battery and move the jumper again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the button cell battery.

12. COM Port connector

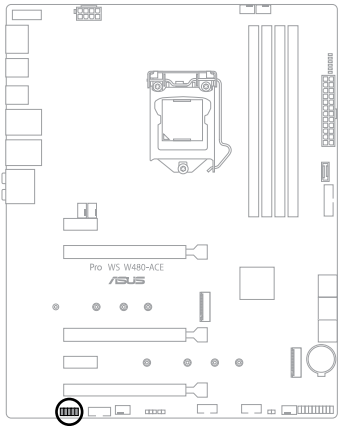
The COM (Serial) Port connector allows you to connect a COM port module. Connect the COM port module cable to this connector, then install the module to a slot opening on the system chassis.

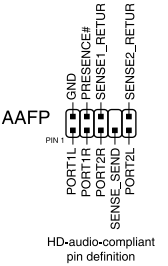


The COM port module is purchased separately.

13. Front Panel Audio header

The front panel audio header 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 header.

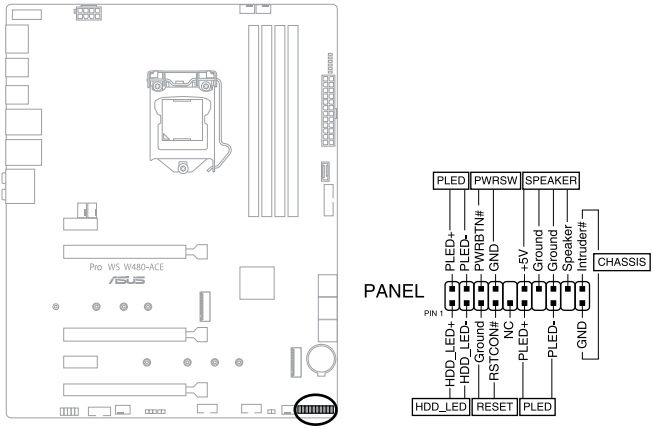




We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.

14. System Panel header

The System Panel header supports several chassis-mounted functions.



- **System Power LED header (PLED)**

  The 2-pin header allows you to connect the System Power LED. The System Power LED lights up when the system is connected to a power source, or when you turn on the system power, and blinks when the system is in sleep mode.

- **Storage Device Activity LED header (HDD_LED)**

  The 2-pin header allows you to connect the Storage Device Activity LED. The Storage Device Activity LED lights up or blinks when data is read from or written to the storage device or storage device add-on card.

- **System Warning Speaker header (SPEAKER)**

  The 4-pin header allows you to connect the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **Power Button/Soft-off Button header (PWRSW)**

  The 3-1 pin header allows you to connect the system power button. Press the power button to power up the system, or put the system into sleep or soft-off mode (depending on the operating system settings).

- **Reset button header (RESET)**

  The 2-pin header allows you to connect the chassis-mounted reset button. Press the reset button to reboot the system. You may also set this header to other functions.

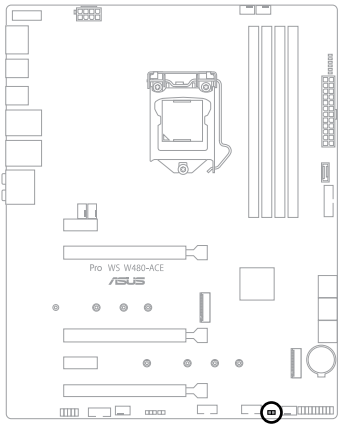
This header is set to **[Reset]** by default. You can assign a different function to this header in the BIOS settings.

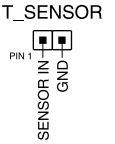
- **Chassis intrusion connector (CHASSIS)**

  The 2-pin connector allows you to connect the chassis-mounted intrusion detection sensor or switch. The chassis intrusion sensor or switch sends a high-level signal to the connector when a chassis component is removed or replaced, the signal is then generated as a chassis intrusion event.

15. Thermal Sensor header

The Thermal Sensor header allows you to connect a sensor to monitor the temperature of the devices and the critical components inside the motherboard. Connect the thermal sensor and place it on the device or the motherboard's component to detect its temperature.

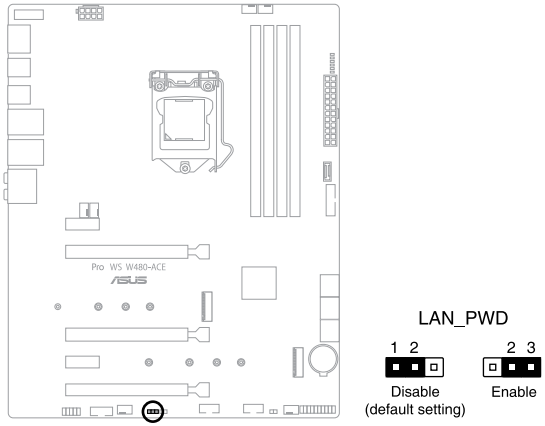




The thermal sensor is purchased separately.

16. RTL8117 Reset Password header

The RTL8117 Reset Password header allows you to clear the LAN password.



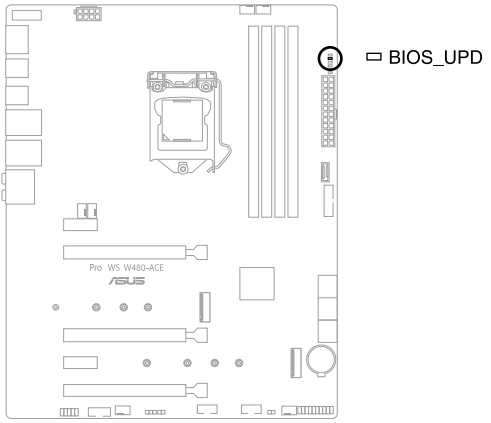
To erase the LAN password:

1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5-10 seconds, then move the cap back to pins 1-2.
3. Plug the power cord and turn ON the computer.

DO NOT short-circuit the pins except when clearing the LAN password. Short-circuiting or placing a jumper cap will cause system boot failure!

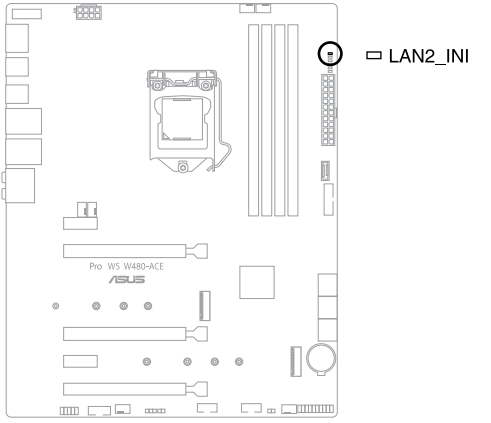
17. BIOS Update Indicator LED

The BIOS Update Indicator LED lights up when the BIOS is being updated remotely via RTL8117, once the update is completed the LED will turn off.



18. LAN Initialization Indicator LED

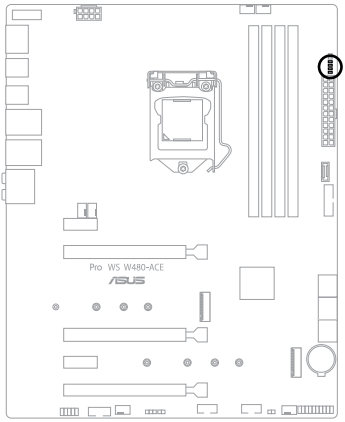
The LAN Initialization Indicator LED lights up when your system changes states from Mechanical Off (G3) to Soft Off (S5) and the RTL8117 starts the initialization process. Please wait until the light turns off before powering on your system.



If you power on the motherboard while the LED is lit up, a message will appear asking you to wait until initialization is completed. Once the initialization is completed, your system should restart automatically.

19. Q-LEDs

The Q-LEDs check key components (CPU, DRAM, VGA, and booting devices) during the motherboard booting process. If an error is found, the critical component's LED stays lit up until the problem is solved.

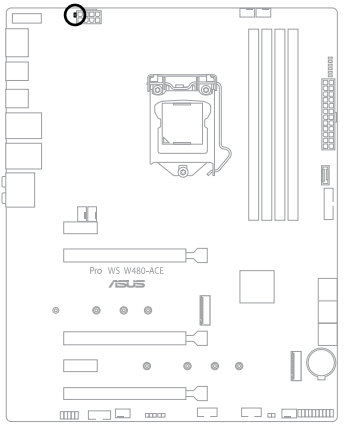


- BOOT (YELLOW GREEN)
- VGA (WHITE)
- DRAM (YELLOW)
- CPU (RED)

The Q-LEDs provide the most probable cause of an error code as a starting point for troubleshooting. The actual cause may vary from case to case.

20. 8-pin Power Plug LED

The 8-pin Power Plug LED lights up to indicate that the 8-pin power plug is not connected.



- PLUG_8PIN_PWR1

Basic Installation

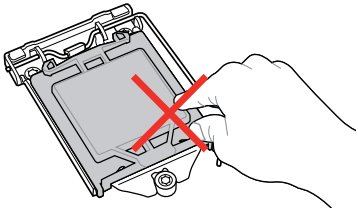
2

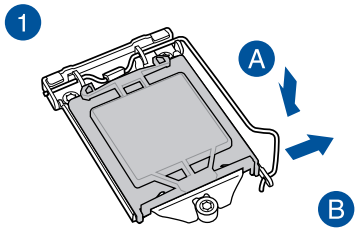
2.1 Building your PC system

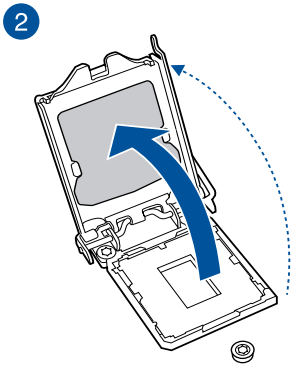
The diagrams in this section are for reference only. The motherboard layout may vary with models, but the installation steps are the same for all models.

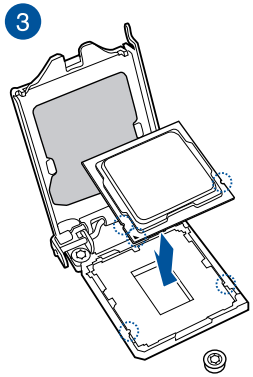
2.1.1 CPU installation

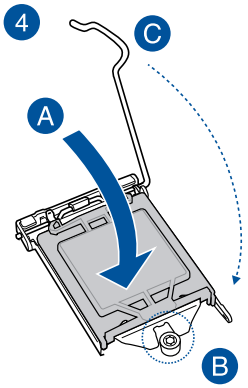
- Ensure that you install the correct CPU designed for LGA1200 socket only. DO NOT install a CPU designed for LGA1155, LGA1156, and LGA1151 sockets on the LGA1200 socket.
- ASUS will not cover damages resulting from incorrect CPU installation/removal, incorrect CPU orientation/placement, or other damages resulting from negligence by the user.

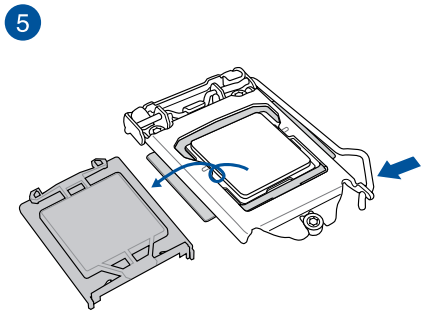




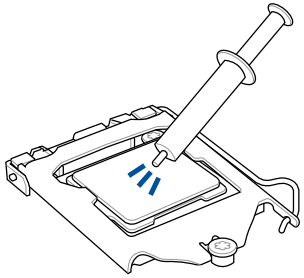





4
C
A
B

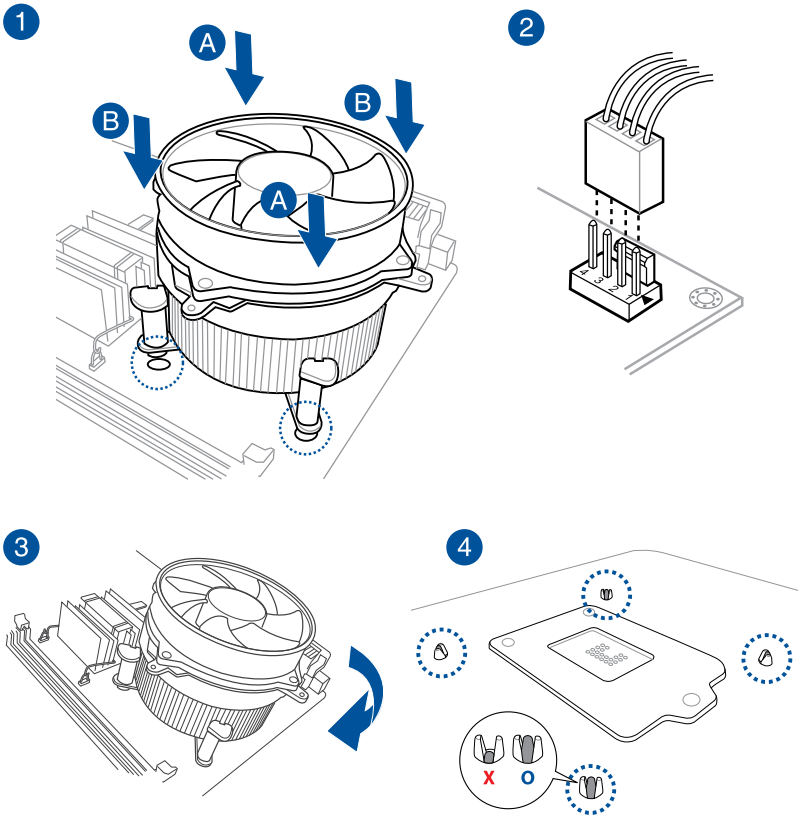

5

2.1.2 Cooling system installation



Apply Thermal Interface Material to the CPU cooling system and CPU before you install the cooling system, if necessary.

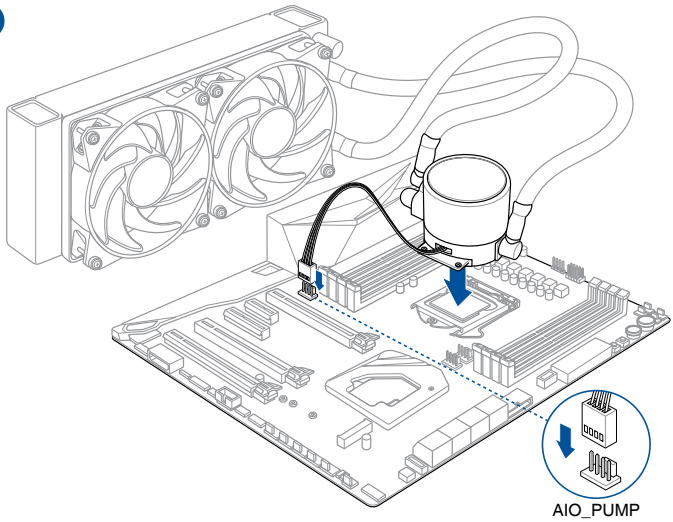
To install a CPU heatsink and fan assembly



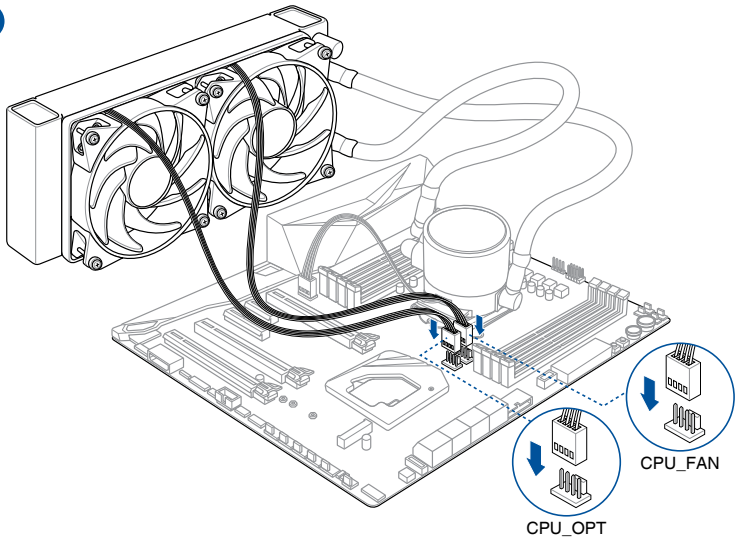
To install an AIO cooler

If you wish to install an AIO cooler, we recommend installing the AIO cooler after installing the motherboard into the chassis.

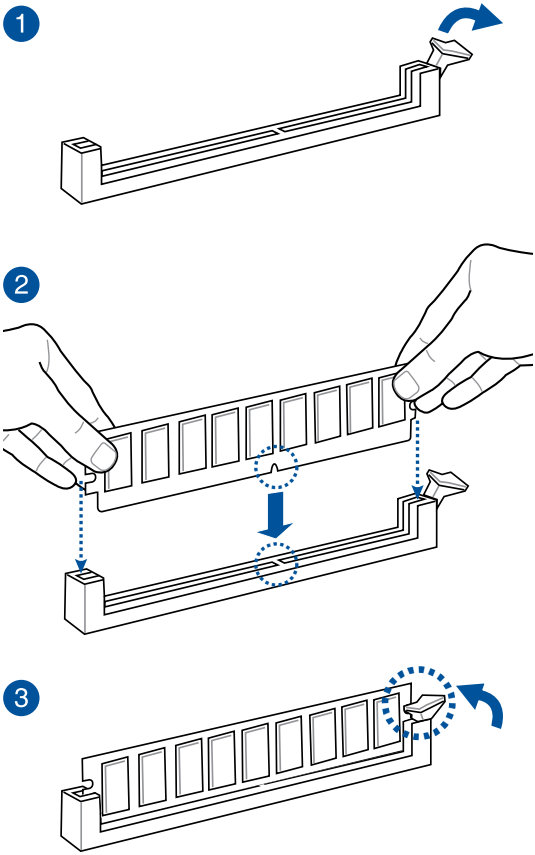
1



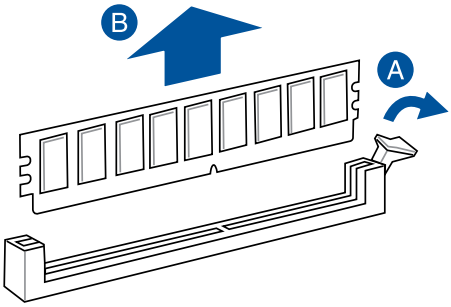
2



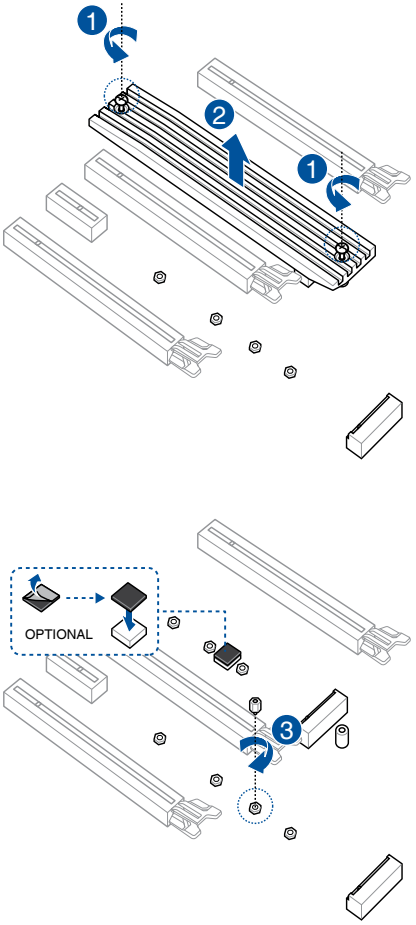
2.1.3 DIMM installation



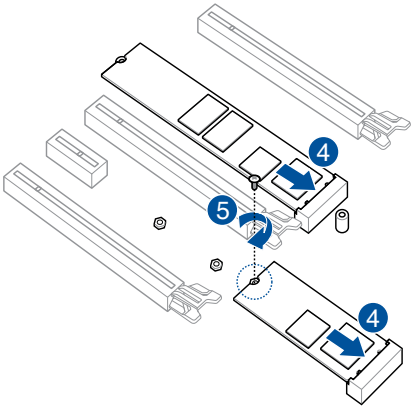
To remove a DIMM

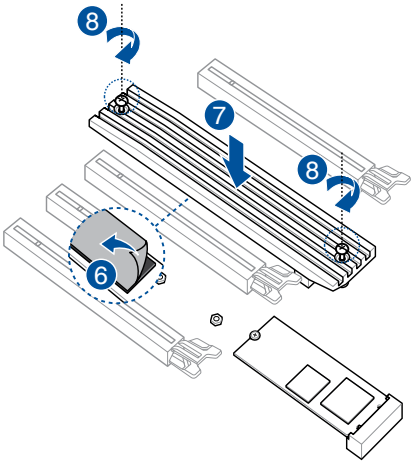


2.1.4 M.2 installation



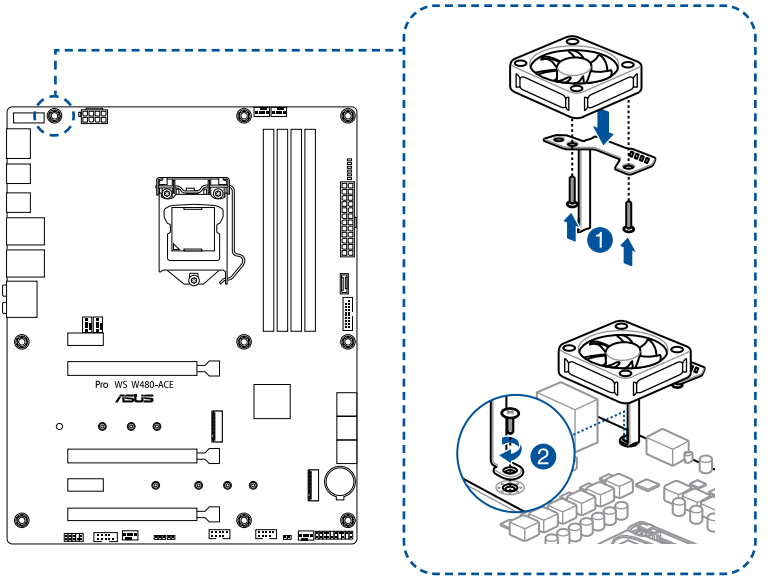
- The M.2 rubber pad is optional for when installing a single sided M.2 storage device. Ensure to install the bundled M.2 rubber pad before installing your single sided M.2 storage device.
- DO NOT install the bundled M.2 rubber pads when installing a double-sided M.2 storage device. The rubber pad installed by default is compatible with double sided M.2 storage devices.





The M.2 is purchased separately.

2.1.5 Fan bracket installation

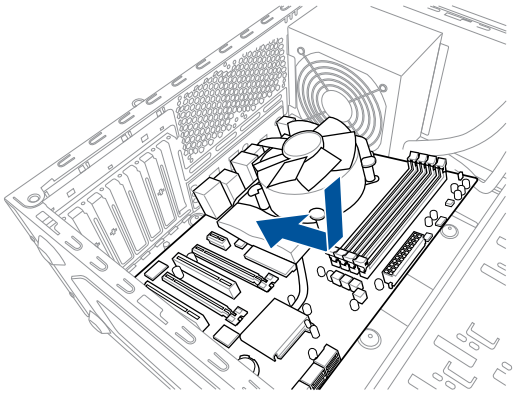


When using high performance settings whilst overclocking, ensure to install the fan holder for additional fan(s).

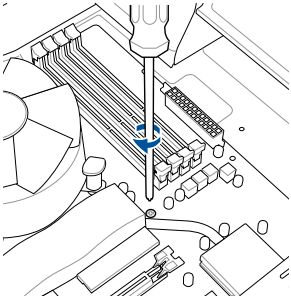
- You may install 12V (1A, 12W), 40mm x 40mm fans or 50mm x 50mm fans.
- Ensure to the use the bundled screws that came with your fans.
- Fans are purchased separately.

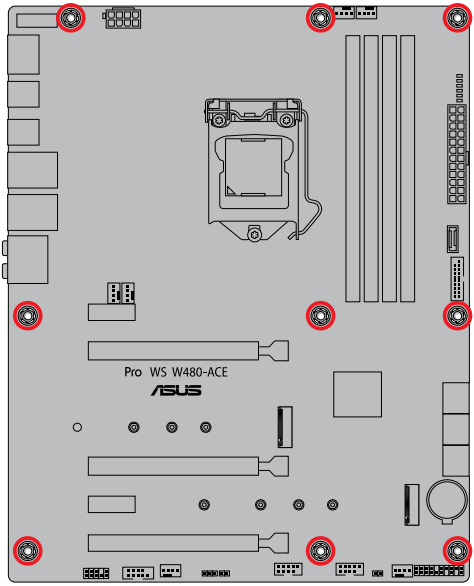
2.1.6 Motherboard installation

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



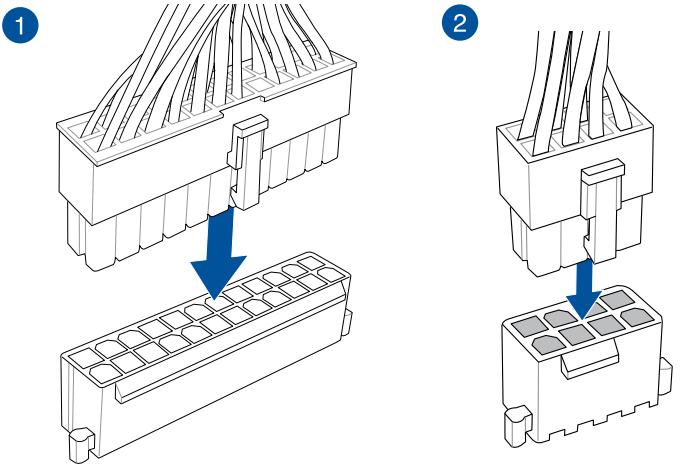
2. Place nine (9) screws into the holes indicated by circles to secure the motherboard to the chassis.





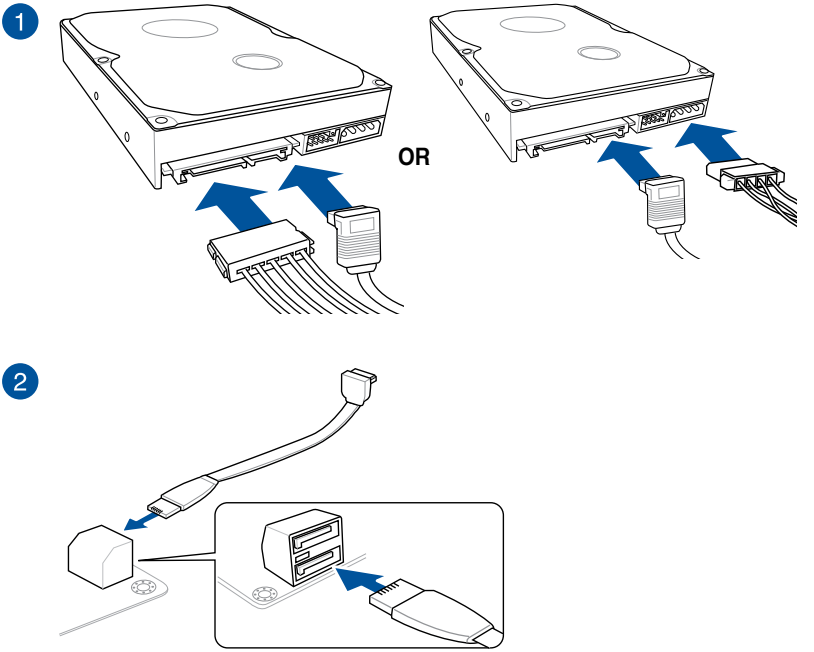
DO NOT over tighten the screws! Doing so can damage the motherboard.

2.1.7 ATX power connection



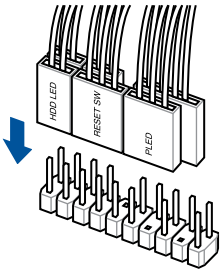
Ensure to connect the 8-pin power plug.

2.1.8 SATA device connection

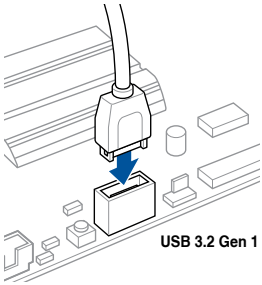


2.1.9 Front I/O connector

To install front panel connector

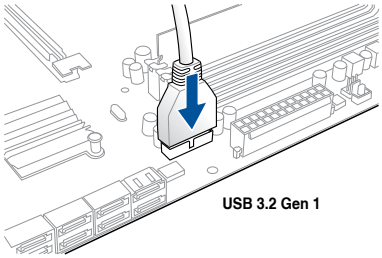


To install USB 3.2 Gen 1 connector

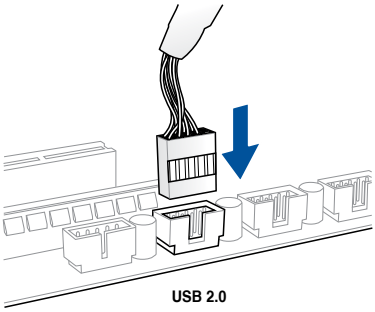


This connector will only fit in one orientation. Push the connector until it clicks into place.

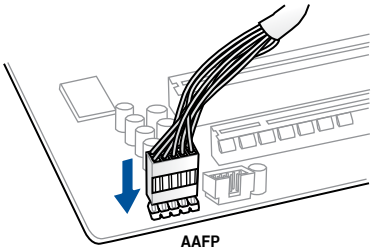
To install USB 3.2 Gen 1 connector



To install USB 2.0 connector

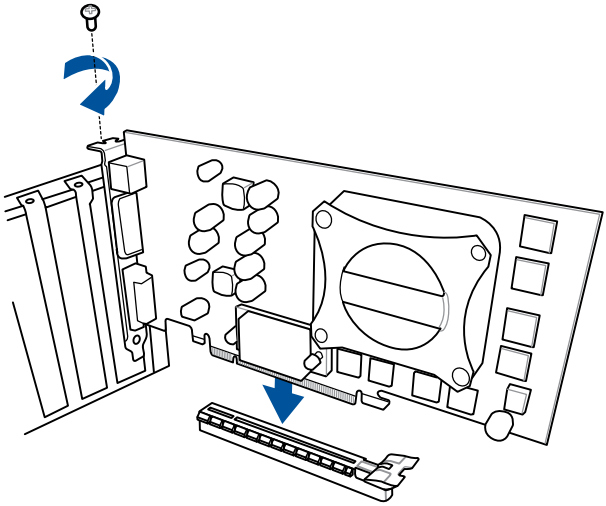


To install front panel audio connector

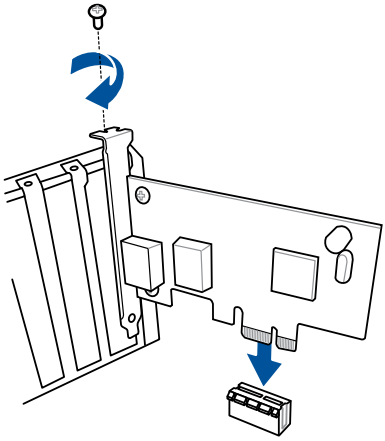


2.1.10 Expansion card installation

To install PCIe x16 cards



To install PCIe x1 cards

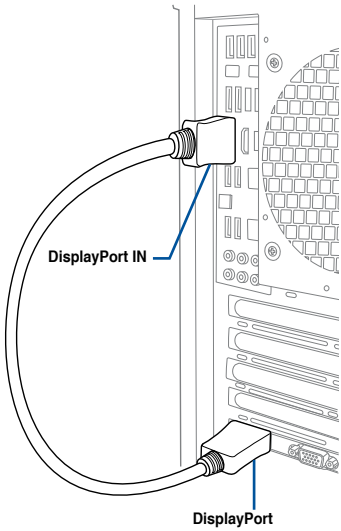


2.1.11 Thunderbolt™ 3 monitor connection

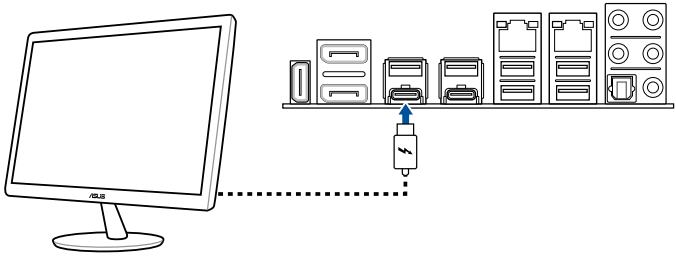
Refer to the **Thunderbolt™ 3 card and DisplayPort configuration** section on the next page for more details on the configurations available using the DP IN and Thunderbolt™ 3 USB Type-C® ports.

1. Connect the bundled ASUS DisplayPort cable to the DisplayPort on a discrete graphic card and to the DisplayPort IN port on the motherboard.

Refer to section **Rear I/O connection** for the location of the DisplayPort IN port.



2. Connect the Thunderbolt™ 3 cable to the Thunderbolt™ 3 USB Type-C® port (USB Type-C® EC1) on the motherboard and to the Thunderbolt™ 3 USB Type-C® port on a monitor.



- The Thunderbolt™ 3 cable is not bundled with the motherboard package. Use the Thunderbolt™ cable that came with your Thunderbolt-enabled device when connecting to the Thunderbolt™ 3 USB Type-C® port on your motherboard.
- You can connect a USB Type-C® to Thunderbolt™ adapter, then connect the Thunderbolt™ cable from your Thunderbolt-enabled device to the Thunderbolt™ 3 USB Type-C® port on the motherboard.
- Thunderbolt™ 3 USB Type-C® port is backward compatible with the previous Thunderbolt™ technology.

Thunderbolt™ 3 card and DisplayPort configuration

DO NOT hot swap the **DisplayPort IN 1**, **DisplayPort IN 2**, **USB Type-C® 1**, and **USB Type-C® 2** ports when your motherboard is powered on.

If you have a CPU with integrated graphics and wish to only use a single Thunderbolt™ output with DisplayPort 1.4, we recommend you connect the external graphics card to the **DisplayPort IN 1** port and connect the Thunderbolt™ compatible display to the **USB Type-C® 1** port for optimal performance.

The tables below will list the different Thunderbolt™ 3 card and DisplayPort configurations for different scenarios where an expansion card is inserted into the PCIEX16_3 slot and where no expansion card is inserted in the PCIEX16_3 slot.

PCIEX16_3 is occupied with an expansion card:

1. DisplayPort IN input to USB Type-C® output (Using a CPU with integrated graphics)

		USB Type-C® 1 output	USB Type-C® 2 output	Details
A	DP-IN 1 no input DP-IN 2 no input	V	-	Only USB Type-C® 1 has output using the standard DP 1.2 of CPU integrated graphics.
B	DP-IN 1 no input DP-IN 2 with input	V	V	USB Type-C® 1 outputs using the standard DP 1.2 of CPU integrated graphics. USB Type-C® 2 output standard depends on the external graphics.
C	DP-IN 1 with input DP-IN 2 no input	V	-	Only USB Type-C® 1 has output. Output standard depends on external graphics card.
D	DP-IN 1 with input DP-IN 2 with input	V	V	Both USB Type-C® 1 and USB Type-C® 2 output standards depend on the external graphics card

2. DisplayPort IN input to USB Type-C® output (Using a CPU without integrated graphics)

		USB Type-C® 1 output	USB Type-C® 2 output	Details
A	DP-IN 1 no input	-	-	Not supported
	DP-IN 2 no input			
B	DP-IN 1 no input	-	V	Only USB Type-C® 2 has output. Output standard depends on external graphics card.
	DP-IN 2 with input			
C	DP-IN 1 with input	V	-	Only USB Type-C® 1 has output. Output standard depends on external graphics card.
	DP-IN 2 no input			
D	DP-IN 1 with input	V	V	Both USB Type-C® 1 and USB Type-C® 2 output standards depend on the external graphics card
	DP-IN 2 with input			

3. Thunderbolt™ USB Type-C® output (Using a CPU with/without integrated graphics)

		USB Type-C® 1 output	USB Type-C® 2 output	Details
A	DP-IN 1 no input	-	-	Not supported
	DP-IN 2 no input			
B	DP-IN 1 no input	-	-	Not supported
	DP-IN 2 with input			
C	DP-IN 1 with input	-	-	Not supported
	DP-IN 2 no input			
D	DP-IN 1 with input	-	-	Not supported
	DP-IN 2 with input			

PCIEX16_3 is not occupied with an expansion card:

1. DisplayPort IN input to USB Type-C® output (Using a CPU with integrated graphics)

		USB Type-C® 1 output	USB Type-C® 2 output	Details
A	DP-IN 1 no input DP-IN 2 no input	V	-	Only USB Type-C® 1 has output using the standard DP 1.2 of CPU integrated graphics.
B	DP-IN 1 no input DP-IN 2 with input	V	V	USB Type-C® 1 outputs using the standard DP 1.2 of CPU integrated graphics. USB Type-C® 2 output standard depends on the external graphics.
C	DP-IN 1 with input DP-IN 2 no input	V	-	Only USB Type-C® 1 has output. Output standard depends on external graphics card.
D	DP-IN 1 with input DP-IN 2 with input	V	V	Both USB Type-C® 1 and USB Type-C® 2 output standards depend on the external graphics card

2. DisplayPort IN input to USB Type-C® output (Using a CPU without integrated graphics)

		USB Type-C® 1 output	USB Type-C® 2 output	Details
A	DP-IN 1 no input DP-IN 2 no input	-	-	Not supported
B	DP-IN 1 no input DP-IN 2 with input	-	V	Only USB Type-C® 2 has output. Output standard depends on external graphics card.
C	DP-IN 1 with input DP-IN 2 no input	V	-	Only USB Type-C® 1 has output. Output standard depends on external graphics card.
D	DP-IN 1 with input DP-IN 2 with input	V	V	Both USB Type-C® 1 and USB Type-C® 2 output standards depend on the external graphics card

3. Thunderbolt™ USB Type-C® output (Using a CPU with integrated graphics)

- We recommend using configuration A when you are using 1 output and you do not have an external graphics card.
- We recommend using configuration C when you are using 1 output and you have an external graphics card.

		USB Type-C® 1 output	USB Type-C® 2 output	Details
A	DP-IN 1 no input	V	-	Only USB Type-C® 1 can output via Thunderbolt™. Output standard depends on integrated graphics.
	DP-IN 2 no input			
B	DP-IN 1 no input	V	V	USB Type-C® 1 can output via Thunderbolt™. Output standard depends on integrated graphics.
	DP-IN 2 with input			USB Type-C® 2 can output via Thunderbolt™. Output standard depends on external graphics card.
C	DP-IN 1 with input	V	-	Only USB Type-C® 1 can output via Thunderbolt™. Output standard depends on external graphics card.
	DP-IN 2 no input			
D	DP-IN 1 with input	V	V	Both USB Type-C® 1 and USB Type-C® 2 output via Thunderbolt™. Output standard depend on the external graphics card
	DP-IN 2 with input			

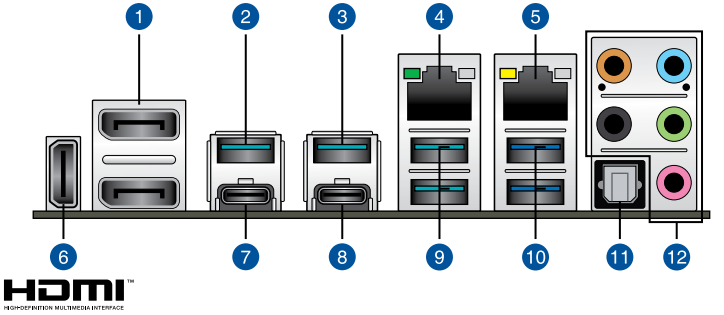
4. Thunderbolt™ USB Type-C® output (Using a CPU without integrated graphics)

We recommend using configuration C when you are using 1 output.

		USB Type-C® 1 output	USB Type-C® 2 output	Details
A	DP-IN 1 no input	-	-	Not supported
	DP-IN 2 no input			
B	DP-IN 1 no input	-	-	Not supported
	DP-IN 2 with input			
C	DP-IN 1 with input	V	-	Only USB Type-C® 1 can output via Thunderbolt™. Output standard depends on external graphics card.
	DP-IN 2 no input			
D	DP-IN 1 with input	V	V	Both USB Type-C® 1 and USB Type-C® 2 output via Thunderbolt™. Output standard depend on the external graphics card
	DP-IN 2 with input			

2.2 Motherboard rear and audio connections

2.2.1 Rear I/O connection



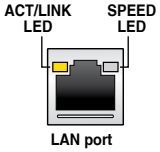
Rear panel connectors	
1.	DisplayPort IN port for Thunderbolt™ 3
2.	USB 3.2 Gen 2 Type-A port 1
3.	USB 3.2 Gen 2 Type-A port 2
4.	Intel® I225-LM Ethernet port
5.	Realtek® RTL8117 1Gb Ethernet port*
6.	HDMI™ port
7.	USB 3.2 Gen 2 Type-C port EC1 from Intel® Thunderbolt™ 3 Controller
8.	USB 3.2 Gen 2 Type-C port EC2 from Intel® Thunderbolt™ 3 Controller
9.	USB 3.2 Gen 2 Type-A ports 3 and 4
10.	USB 3.2 Gen 1 Type-A ports 5 and 6
11.	Optical S/PDIF OUT port
12.	Audio jacks**

*** and ** : Refer to the tables on the next page for LAN port LEDs, and audio port definitions.**

- We strongly recommend that you connect your devices to ports with matching data transfer rate. Please connect your USB 3.2 Gen 1 devices to USB 3.2 Gen 1 ports and your USB 3.2 Gen 2 devices to USB 3.2 Gen 2 ports for faster and better performance for your devices.
- Due to the design of the Intel chipset, all USB devices connected to the USB 3.2 Gen 1 ports are controlled by the xHCI controller. Some legacy USB devices must update their firmware for better compatibility.

*** Realtek® RTL8117 1Gb Ethernet port LED indications**

Activity Link LED		Speed LED	
Status	Description	Status	Description
Off	No link	Off	10 Mbps connection
Orange (Blinking)	Data activity	Orange	100 Mbps connection
		Green	1 Gbps connection

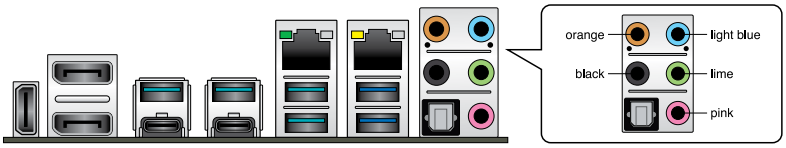


**** Audio 2, 4, 5.1 or 7.1-channel configuration**

Port	Headset 2-channel	4-channel	5.1-channel	7.1-channel
Light Blue	Line In	Line In	Line In	Side Speaker Out
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Orange	–	–	Center/Sub woofer	Center/Sub woofer
Black	–	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out

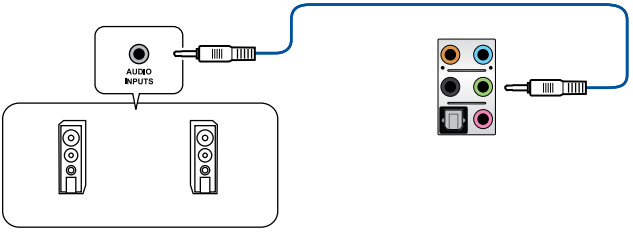
2.2.2 Audio I/O connections

Audio I/O ports

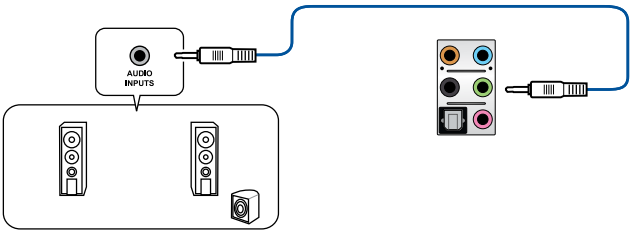


Connect to Headphone and Mic

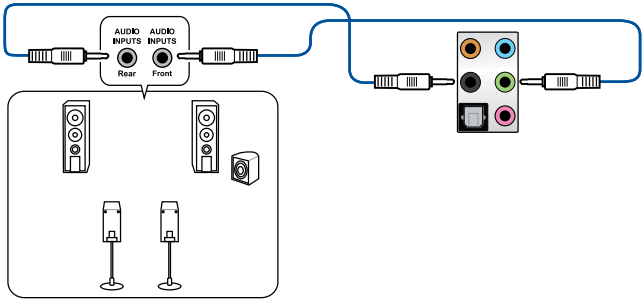
Connect to Stereo Speakers



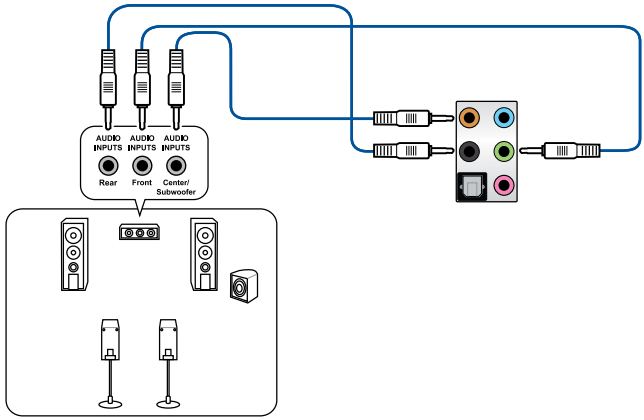
Connect to 2-channel Speakers



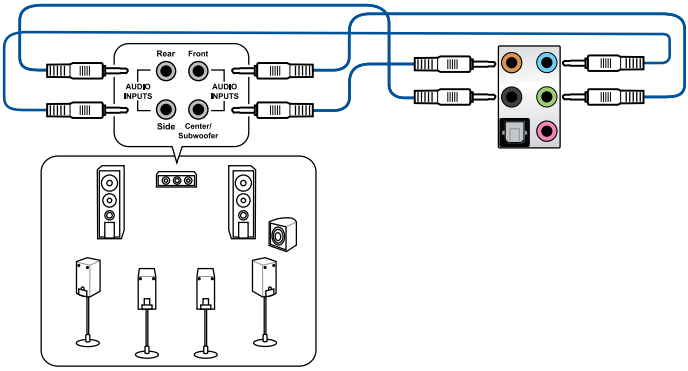
Connect to 4-channel Speakers



Connect to 5.1-channel Speakers



Connect to 7.1-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 storage 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 Quick boot set to disabled 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

7. 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 and RAID Support 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 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 **PWWA.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.

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.

- 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.

3.3 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 USB drive that comes with the motherboard package.

3.4 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:

- 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. Press <Tab> to switch to the **Drive** field.
4. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, and then press <Enter>.
5. Press <Tab> to switch to the **Folder** field.
6. 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.

3.5 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!

3.6 RAID configurations

The motherboard comes with the Intel® Rapid Storage Technology that supports RAID 0, RAID 1, RAID 5 and RAID 10 configuration.

For more information on configuring your RAID sets, please refer to the **RAID Configuration Guide** which you can find at https://www.asus.com/support, or by scanning the QR code.

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 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

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.

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。

ＶＣＣＩ－Ｂ

KC: Korea Warning Statement

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Google™ License Terms

Declaration of compliance for product environmental regulation

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 năm2011 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

Appendix

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

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

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

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

Русский Компания ASUS заявляет, что это устройство соответствует основным требованиям и другим соответствующим условиям соответствующих директив. Подробную информацию, пожалуйста, смотрите на www.asus.com/support

Български С настоящото ASUSTeK Computer Inc. декларира, че това устройство е в съответствие със съществените изисквания и другите приложими постановления на свързаните директиви. Пълният текст на декларацията за съответствие на ЕС е достъпна на адрес: www.asus.com/support

Hrvatski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj sukladan s bitnim zahtjevima i ostalim odgovarajućim odredbama vezanih direktiva. Cijeli tekst EU izjave o sukladnosti dostupan je na: www.asus.com/support

Čeština Společnost ASUSTeK Computer Inc. tímto prohlašuje, že toto zařízení splňuje základní požadavky a další příslušná ustanovení souvisejících směrnic. Plné znění prohlášení o shodě EU je k dispozici na adrese: www.asus.com/support

Dansk ASUSTeK Computer Inc. erklærer hermed, at denne enhed er i overensstemmelse med hovedkravene og andre relevante bestemmelser i de relaterede direktiver. Hele EU-overensstemmelseserklæringen kan findes på: www.asus.com/support

Nederlands ASUSTeK Computer Inc. verklaart hierbij dat dit apparaat voldoet aan de essentiële vereisten en andere relevante bepalingen van de verwante richtlijnen. De volledige tekst van de EU-verklaring van conformiteit is beschikbaar op: www.asus.com/support

Eesti Käesolevaga kinnitab ASUSTeK Computer Inc, et see seade vastab asjakohaste direktiivide oluliste nõuetele ja teistele asjassepuutuvatele sätetele. EL vastavusdeklaratsiooni täielik tekst on saadaval järgmisel aadressil: www.asus.com/support

Suomi ASUSTeK Computer Inc. ilmoittaa täten, että tämä laite on asiaankuuluvien direktiivien olennaisten vaatimusten ja muiden tätä koskevien säädösten mukainen. EU-yhdenmukaisuusilmoituksen koko teksti on luettavissa osoitteessa: www.asus.com/support

Ελληνικά Με το παρόν, η AsusTek Computer Inc. δηλώνει ότι αυτή η συσκευή συμμορφώνεται με τις θεμελιώδεις απαιτήσεις και άλλες σχετικές διατάξεις των Οδηγιών της ΕΕ. Το πλήρες κείμενο της δήλωσης συμβατότητας είναι διαθέσιμο στη διεύθυνση: www.asus.com/support

Magyar Az ASUSTeK Computer Inc. ezennel kijelenti, hogy ez az eszköz megfelel a kapcsolódó Irányelvek lényeges követelményeinek és egyéb vonatkozó rendelkezéseinek. Az EU megfelelőségi nyilatkozat teljes szövege innen letölthető: www.asus.com/support

Latviski ASUSTeK Computer Inc. ar šo paziņo, ka šī ierīce atbilst saistīto Direktīvu būtiskajām prasībām un citiem citiem saistošajiem nosacījumiem. Pilns ES atbilstības paziņojuma teksts pieejams šeit: www.asus.com/support

Lietuvių „ASUSTeK Computer Inc." šiuo tvirtina, kad šis įrenginys atitinka pagrindinius reikalavimus ir kitas svarbias susijusių direktyvų nuostatas. Visą ES atitikties deklaracijos tekstą galima rasti: www.asus.com/support

Norsk ASUSTeK Computer Inc. erklærer herved at denne enheten er i samsvar med hovedsaklige krav og andre relevante forskrifter i relaterte direktiver. Fullstendig tekst for EU-samsvarserklæringen finnes på: www.asus.com/support

Polski Firma ASUSTeK Computer Inc. niniejszym oświadcza, że urządzenie to jest zgodne z zasadniczymi wymogami i innymi właściwymi postanowieniami powiązanych dyrektyw. Pełny tekst deklaracji zgodności UE jest dostępny pod adresem: www.asus.com/support

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

Română ASUSTeK Computer Inc. declară că acest dispozitiv se conformează cerinţelor esenţiale şi altor prevederi relevante ale directivelor conexe. Textul complet al declaraţiei de conformitate a Uniunii Europene se găseşte la: www.asus.com/support

Srpski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj u saglasnosti sa osnovnim zahtevima i drugim relevantnim odredbama povezanih Direktiva. Pun tekst EU deklaracije o usaglašenosti je dostupan da adresi: 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

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

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

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

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

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

Bosanski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj usklađen sa bitnim zahtjevima i ostalim odgovarajućim odredbama vezanih direktiva. Cijeli tekst EU izjave o usklađenosti dostupan je na: www.asus.com/support

ASUS contact information

ASUSTeK COMPUTER INC.

Address	1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Telephone	+886-2-2894-3447
Fax	+886-2-2890-7798
Web site	https://www.asus.com

Technical Support

Telephone	+86-21-38429911
Online support	https://qr.asus.com/techserv

ASUS COMPUTER INTERNATIONAL (America)

Address	48720 Kato Rd., Fremont, CA 94538, USA
Telephone	+1-510-739-3777
Fax	+1-510-608-4555
Web site	https://www.asus.com/us/

Technical Support

Support fax	+1-812-284-0883
Telephone	+1-812-282-2787
Online support	https://qr.asus.com/techserv

ASUS COMPUTER GmbH (Germany and Austria)

Address	Harkortstrasse 21-23, 40880 Ratingen, Germany
Web site	https://www.asus.com/de
Online contact	https://www.asus.com/support/Product/ContactUs/Services/questionform/?lang=de-de

Technical Support

Telephone (DE)	+49-2102-5789557
Telephone (AT)	+43-1360-2775461
Online support	https://www.asus.com/de/support