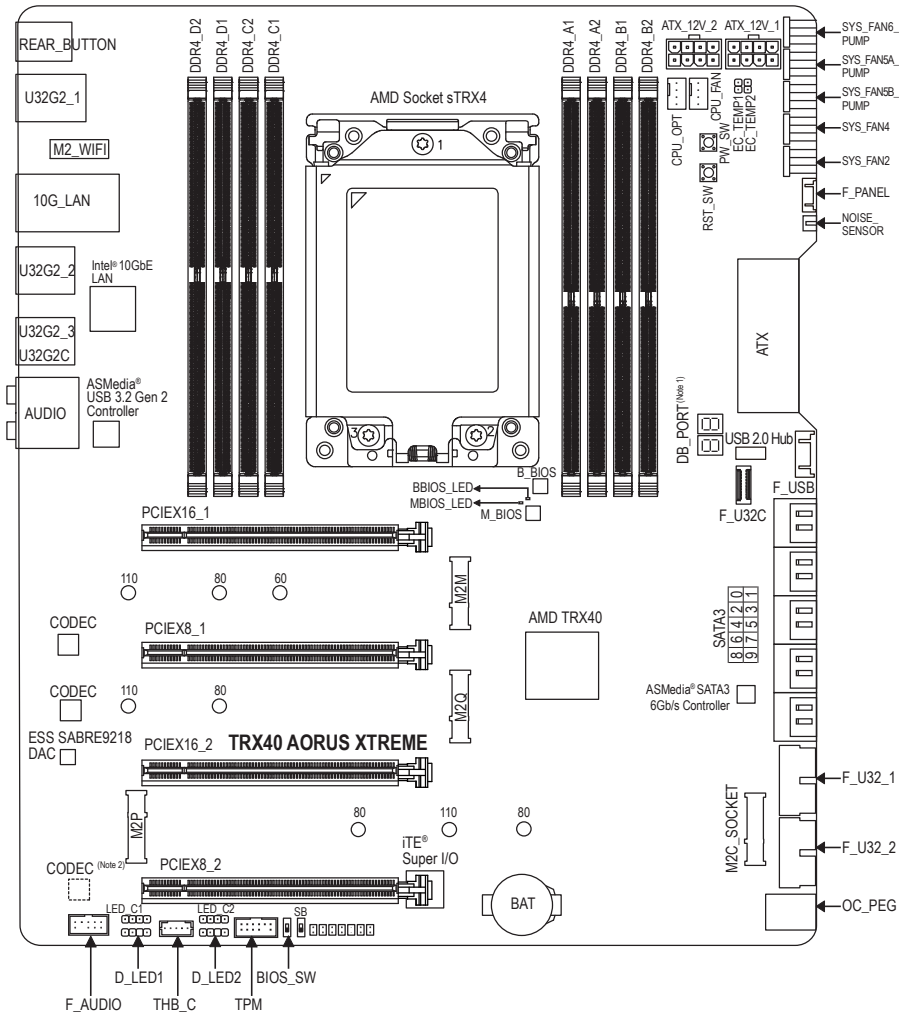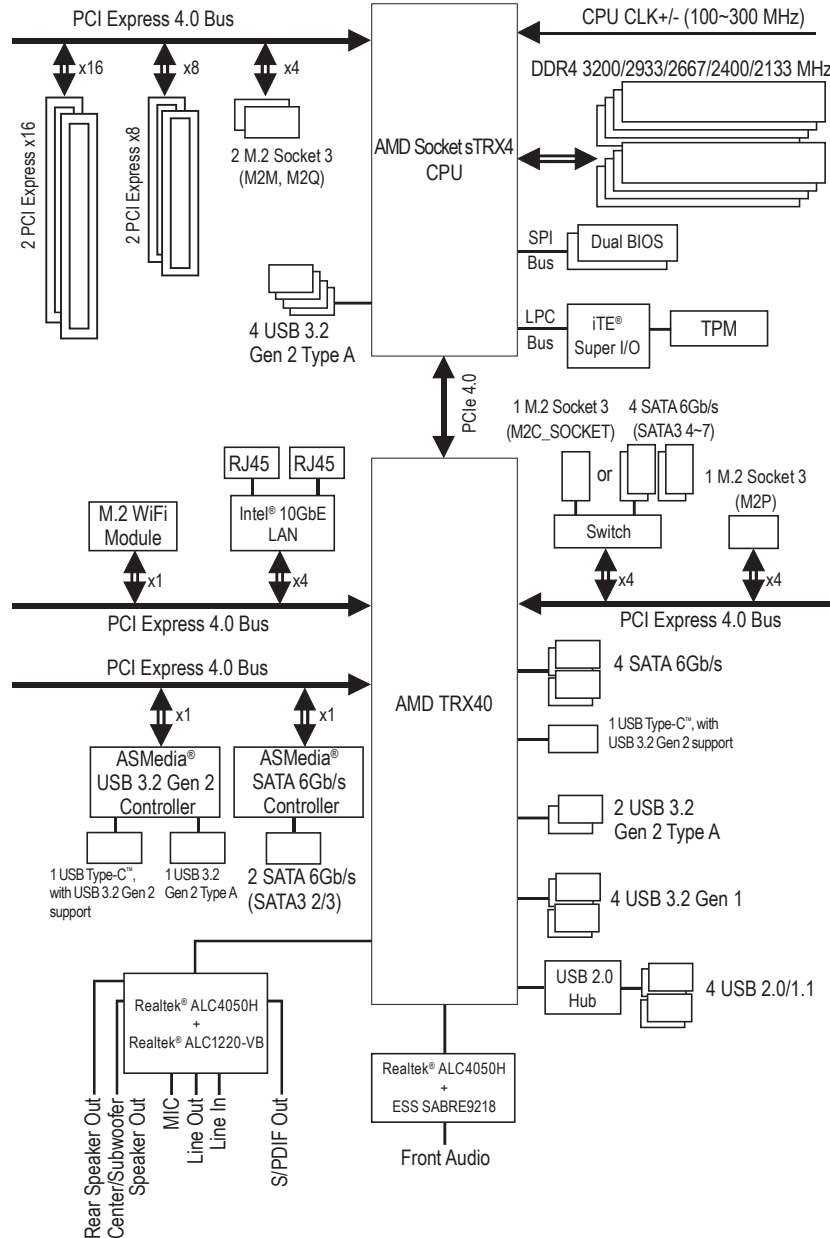# TRX40 AORUS XTREME Motherboard Layout

(Note 1) For debug code information, please refer to Chapter 6.
(Note 2) The chip is on the back of the motherboard.

TRX40 AORUS XTREME Motherboard Block Diagram

PCI Express 4.0 Bus

CPU CLK+/- (100~300 MHz)

x16   x8   x4

DDR4 3200/2933/2667/2400/2133 MHz

2 PCI Express x16

2 PCI Express x8

2 M.2 Socket 3
(M2M, M2Q)

AMD Socket sTRX4
CPU

SPI
Bus   Dual BIOS

4 USB 3.2
Gen 2 Type A

LPC
Bus   iTE®
Super I/O   TPM

PCIe 4.0

1 M.2 Socket 3
(M2C_SOCKET)   4 SATA 6Gb/s
(SATA3 4~7)

RJ45   RJ45

M.2 WiFi
Module   Intel® 10GbE
LAN   or   1 M.2 Socket 3
(M2P)

Switch

x1   x4   x4   x4

PCI Express 4.0 Bus   PCI Express 4.0 Bus

PCI Express 4.0 Bus

AMD TRX40   4 SATA 6Gb/s

x1   x1

1 USB Type-C™, with
USB 3.2 Gen 2 support

ASMedia®
USB 3.2 Gen 2
Controller   ASMedia®
SATA 6Gb/s
Controller   2 USB 3.2
Gen 2 Type A

4 USB 3.2 Gen 1

1 USB Type-C™,
with USB 3.2 Gen 2
support   1 USB 3.2
Gen 2 Type A   2 SATA 6Gb/s
(SATA3 2/3)

USB 2.0
Hub   4 USB 2.0/1.1

Realtek® ALC4050H
+
Realtek® ALC1220-VB

Realtek® ALC4050H
+
ESS SABRE9218

Rear Speaker Out
Center/Subwoofer Speaker Out
MIC
Line Out
Line In
S/PDIF Out

Front Audio

Chapter 1   Hardware Installation

1-1   Installation Precautions

The motherboard contains numerous delicate electronic circuits and components which can become damaged as a result of electrostatic discharge (ESD). Prior to installation, carefully read the user's manual and follow these procedures:

- Prior to installation, make sure the chassis is suitable for the motherboard.
- Prior to installation, do not remove or break motherboard S/N (Serial Number) sticker or warranty sticker provided by your dealer. These stickers are required for warranty validation.
- Always remove the AC power by unplugging the power cord from the power outlet before installing or removing the motherboard or other hardware components.
- When connecting hardware components to the internal connectors on the motherboard, make sure they are connected tightly and securely.
- When handling the motherboard, avoid touching any metal leads or connectors.
- It is best to wear an electrostatic discharge (ESD) wrist strap when handling electronic components such as a motherboard, CPU or memory. If you do not have an ESD wrist strap, keep your hands dry and first touch a metal object to eliminate static electricity.
- Prior to installing the motherboard, please have it on top of an antistatic pad or within an electrostatic shielding container.
- Before connecting or unplugging the power supply cable from the motherboard, make sure the power supply has been turned off.
- Before turning on the power, make sure the power supply voltage has been set according to the local voltage standard.
- Before using the product, please verify that all cables and power connectors of your hardware components are connected.
- To prevent damage to the motherboard, do not allow screws to come in contact with the motherboard circuit or its components.
- Make sure there are no leftover screws or metal components placed on the motherboard or within the computer casing.
- Do not place the computer system on an uneven surface.
- Do not place the computer system in a high-temperature or wet environment.
- Turning on the computer power during the installation process can lead to damage to system components as well as physical harm to the user.
- If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician.
- If you use an adapter, extension power cable, or power strip, ensure to consult with its installation and/or grounding instructions.

1-2 Product Specifications

CPU	◆ AMD Socket sTRX4:
	   - 3rd Generation AMD Ryzen™ Threadripper™ processors
	   (Go to GIGABYTE's website for the latest CPU support list.)

Chipset	◆ AMD TRX40
Memory	◆ 8 x DDR4 DIMM sockets supporting up to 256 GB (32 GB single DIMM capacity) of system memory ◆ Quad Channel memory architecture ◆ Support for DDR4 3200/2933/2667/2400/2133 MHz memory modules ◆ Support for ECC Un-buffered DIMM 1Rx8/2Rx8 memory modules ◆ Support for non-ECC Un-buffered DIMM 1Rx8/2Rx8/1Rx16 memory modules ◆ Support for Extreme Memory Profile (XMP) memory modules (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.)
Audio	◆ Realtek® ALC4050H codec+Realtek® ALC1220-VB codec (rear panel audio) ◆ Realtek® ALC4050H codec+ESS SABRE9218 DAC (front panel audio) ◆ Support for DTS:X® Ultra ◆ High Definition Audio ◆ 2/4/5.1/7.1-channel ◆ Support for S/PDIF Out
LAN	◆ Intel® 10GbE LAN chip (10 Gbit/5 Gbit/2.5 Gbit/1 Gbit/100 Mbit), supporting 2 RJ-45 ports

Wireless Communication Module	◆ Intel® Wi-Fi 6 AX200
	   - Wi-Fi 802.11a/b/g/n/ac/ax, supporting 2.4/5 GHz Dual-Band
	   - BLUETOOTH 5.0
	   - Support for 11ax 160MHz wireless standard and up to 2.4 Gbps data rate
	    * Actual data rate may vary depending on environment and equipment.

Expansion Slots	◆ 2 x PCI Express x16 slots, running at x16 (PCIEX16_1, PCIEX16_2) ◆ 2 x PCI Express x16 slots, running at x8 (PCIEX8_1, PCIEX8_2) (The PCIEX16 and PCIEX8 slots conform to PCI Express 4.0 standard.)
Multi-Graphics Technology	◆ Support for AMD Quad-GPU CrossFire™ and 4-Way/3-Way/2-Way AMD CrossFire™ technologies ◆ Support for NVIDIA® Quad-GPU SLI™ and 4-Way/3-Way/2-Way NVIDIA® SLI™ technologies

Storage Interface	◆ CPU:
	   - 1 x M.2 connector (Socket 3, M key, type 2260/2280/22110 SATA and PCIe 4.0 x4/x2 SSD support) (M2M)
	   - 1 x M.2 connector (Socket 3, M key, type 2280/22110 SATA and PCIe 4.0 x4/x2 SSD support) (M2Q)
	   Chipset:
	   - 1 x M.2 connector (Socket 3, M key, type 2280/22110 SATA and PCIe 4.0 x4/x2 SSD support) (M2P)
	   - 1 x M.2 connector (Socket 3, M key, type 2280 SATA and PCIe 4.0 x4/x2 SSD support) (M2C_SOCKET)
	   - 8 x SATA 6Gb/s connectors (SATA3 0~7)
	    * Refer to "1-9 Internal Connectors," for the installation notices for the M.2 and SATA connectors.
	◆ Support for RAID 0, RAID 1, and RAID 10

| | Storage Interface | ◆ | ASMedia® SATA 6Gb/s Controller: |
| | | | - 2 x SATA 6Gb/s connectors (SATA3 8, 9), supporting AHCI mode only |

	USB	◆	CPU:
			- 4 x USB 3.2 Gen 2 Type-A ports (red) on the back panel
		◆	Chipset:
			- 2 x USB 3.2 Gen 2 Type-A ports (red) on the back panel
			- 1 x USB Type-C™ port with USB 3.2 Gen 2 support, available through the internal USB header
			- 4 x USB 3.2 Gen 1 ports available through the internal USB headers
		◆	Chipset+1 USB 2.0 Hub:
			- 4 x USB 2.0/1.1 ports available through the internal USB headers (with the included front USB header extention cable)
		◆	Chipset+ASMedia® USB 3.2 Gen 2 Controller:
			- 1 x USB Type-C™ port on the back panel, with USB 3.2 Gen 2 support
			- 1 x USB 3.2 Gen 2 Type-A port (red) on the back panel

	Internal Connectors	◆	1 x 24-pin ATX main power connector
		◆	2 x 8-pin ATX 12V power connectors
		◆	1 x OC_PEG power connector
		◆	1 x CPU fan header
		◆	1 x water cooling CPU fan header
		◆	2 x system fan headers
		◆	3 x system fan/water cooling pump headers
		◆	2 x addressable LED strip headers
		◆	2 x RGB LED strip headers
		◆	4 x M.2 Socket 3 connectors
		◆	10 x SATA 6Gb/s connectors
		◆	1 x front panel header
		◆	1 x front panel audio header
		◆	1 x USB Type-C™ header, with USB 3.2 Gen 2 support
		◆	2 x USB 3.2 Gen 1 headers
		◆	1 x USB 2.0/1.1 header
		◆	1 x GIGABYTE add-in card connector
		◆	1 x noise detection header
		◆	1 x Trusted Platform Module (TPM) header (2x6 pin, for the GC-TPM2.0_S module only)
		◆	1 x power button
		◆	1 x reset button
		◆	2 x temperature sensor headers
		◆	2 x BIOS switches
		◆	Voltage Measurement Points

	Back Panel Connectors	◆	1 x Q-Flash Plus button
		◆	1 x Clear CMOS button
		◆	2 x SMA antenna connectors (2T2R)
		◆	1 x USB Type-C™ port, with USB 3.2 Gen 2 support
		◆	7 x USB 3.2 Gen 2 Type-A ports (red)
		◆	2 x RJ-45 ports
		◆	1 x optical S/PDIF Out connector
		◆	5 x audio jacks

I/O Controller	◆	iTE® I/O Controller Chip
Hardware Monitor	◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆	Voltage detection Temperature detection Fan speed detection Water cooling flow rate detection Overheating warning Fan fail warning Fan speed control * Whether the fan (pump) speed control function is supported will depend on the fan (pump) you install. Noise detection
BIOS	◆ ◆ ◆ ◆	2 x 128 Mbit flash Use of licensed AMI UEFI BIOS Support for DualBIOS™ PnP 1.0a, DMI 2.7, WfM 2.0, SM BIOS 2.7, ACPI 5.0

Unique Features	◆	Support for APP Center
		    * Available applications in APP Center may vary by motherboard model. Supported functions of each application may also vary depending on motherboard specifications.
		  - @BIOS
		  - AutoGreen
		  - Cloud Station
		  - EasyTune
		  - Fast Boot
		  - Game Boost
		  - RGB Fusion
		  - Smart Backup
		  - Smart Keyboard
		  - Smart Survey
		  - System Information Viewer
		  - USB Blocker
		  - USB TurboCharger

	◆ ◆ ◆	Support for Q-Flash Plus Support for Q-Flash Support for Xpress Install
Bundled Software	◆ ◆ ◆	Norton® Internet Security (OEM version) XSplit Gamecaster + Broadcaster (12 months license) cFosSpeed
Operating System	◆	Support for Windows 10 64-bit
Form Factor	◆	XL-ATX Form Factor; 32.5cm x 27.5cm

* GIGABYTE reserves the right to make any changes to the product specifications and product-related information without prior notice.

Please visit GIGABYTE's website for support lists of CPU, memory modules, SSDs, and M.2 devices.

Please visit the **Support\Utility List** page on GIGABYTE's website to download the latest version of apps.
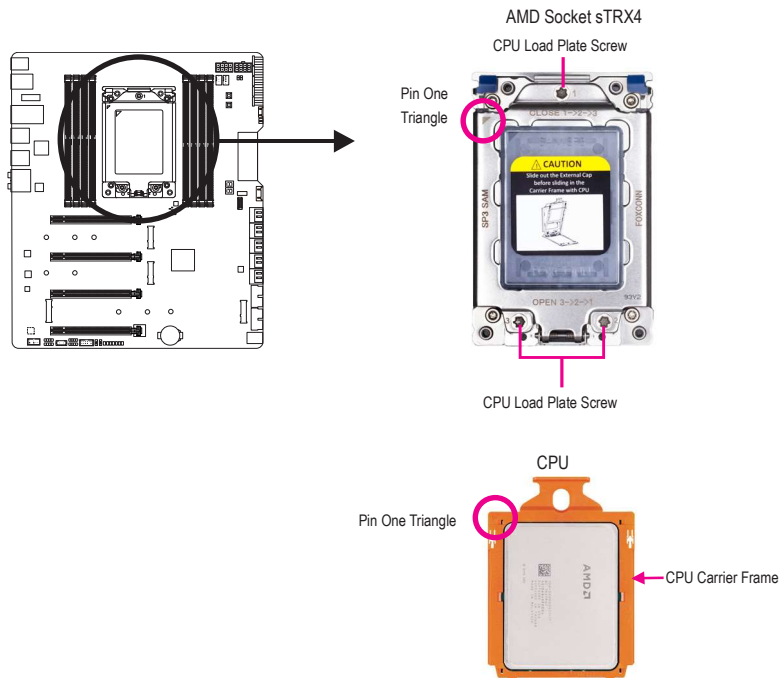
1-3 Installing the CPU and CPU Cooler

Read the following guidelines before you begin to install the CPU:
- Make sure that the motherboard supports the CPU.
  (Go to GIGABYTE's website for the latest CPU support list.)
- Prepare a T20 star screwdriver.
- Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.
- Apply an even and thin layer of thermal grease on the surface of the CPU.
- Do not turn on the computer if the CPU cooler is not installed, otherwise overheating and damage of the CPU may occur.
- Set the CPU host frequency in accordance with the CPU specifications. It is not recommended that the system bus frequency be set beyond hardware specifications since it does not meet the standard requirements for the peripherals. If you wish to set the frequency beyond the standard specifications, please do so according to your hardware specifications including the CPU, graphics card, memory, hard drive, etc.

1-3-1 Installing the CPU

AMD Socket sTRX4
CPU Load Plate Screw
Pin One Triangle
CPU Load Plate Screw

CPU
Pin One Triangle
CPU Carrier Frame

The CPU carrier frame must be slided into the CPU rail frame with the CPU. Do not remove the CPU from the CPU carrier frame.

Follow the steps below to correctly install the CPU into the motherboard CPU socket.

⚠ • Before installing the CPU, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the CPU.
   • To protect the socket contacts, do not remove the CPU socket cap unless the CPU is inserted into the CPU socket. Save the cap properly and always replace it when the CPU is removed.

Screw 1

Screw 3   Screw 2
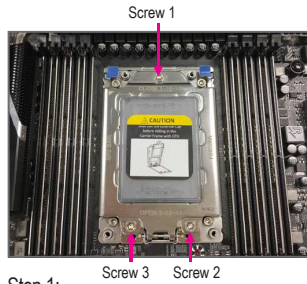
Step 1:
On the CPU metal load plate, there are three screws marked as 1, 2, 3. To loosen/tighten these screws, you need a T20 star screwdriver. The OPEN and CLOSE markings indicate in what order to loosen/tighten the screws.
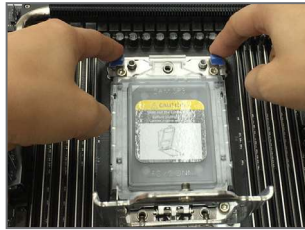To open the CPU metal load plate, loosen the screws in 3>2>1 sequence.
To close the CPU metal load plate, tighten the screws in 1>2>3 sequence.

Step 2:
To open the CPU metal load plate, start by loosening Screw 3, then Screw 2, and finally Screw 1. After all three screws are loosened, gently lift the load plate to its fully open position.

Step 3:
Use your fingers to pull up the tabs on the two sides of the CPU rail frame to release the CPU rail frame from the CPU socket. Then lift the rail frame.

Step 4:
Use one hand to hold the rail frame and the other to slide the external cap out of the rail frame.

Step 5:
Grasp the top portion of the CPU carrier frame and align the edges of the CPU carrier frame with the rails of the CPU rail frame. Then slide the carrier frame into the rails until the it stops sliding in.
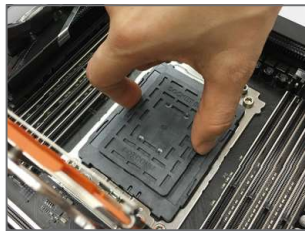

CPU Rail Frame Rails

Make sure the edges of the CPU carrier frame are installed correctly on the rails.

Step 6:
Push the carrier frame into place and you will hear a "click" sound when it is pushed to the bottom.

Warning! The CPU carrier frame cannot be placed outside the rails.

Step 7:
Remove the CPU socket cap.

Step 8:
After installing the CPU, use two fingers to push down on the upper portion of the sides of the CPU carrier frame to fasten the rail frame back to the CPU socket.


Step 9:
Close the metal load plate. With one finger pressing down on the load plate, begin tightening Screw 1 slightly. Then do the same to Screw 2 and Screw 3. Next, fully tighten the three screws. Make sure the motherboard is placed on a stable surface during the tightening process.

1-3-2　Installing the CPU Cooler

Refer to the steps below to correctly install the CPU cooler on the motherboard. Use a CPU cooler that is specifically designed to be able to cool an AMD Ryzen™ Threadripper™ processor or install a water cooling system to ensure proper heat dissipation and a stable system operation. (Actual installation process may differ depending the CPU cooler to be used. Refer to the user's manual for your CPU cooler.)

CPU Cooler Mounting Holes
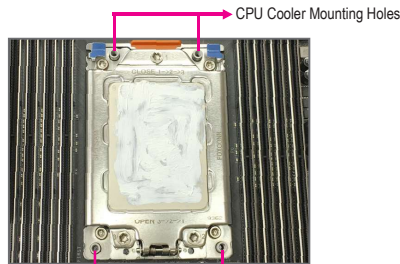
Step 1:
Apply an even and thin layer of thermal grease on the surface of the installed CPU.

CPU Cooler Mounting Holes
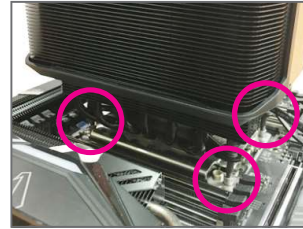
Step 2:
Place the cooler atop the CPU, aligning the four mounting screws with the mounting holes around the CPU socket. (Note that the spacing between the upper two screws is not the same as that between the lower two screws, please make sure to align the screws correctly).

Step 3:
Use one hand to hold the cooler and the other to tighten the screws in a diagonal sequence. Begin tightening a screw with a few turns and repeat with the screw diagonally opposite the one you just tightened. Then do the same to the other pair. Next, fully tighten the four screws.

Step 4:
Finally, attach the power connector of the CPU cooler to the CPU fan header (CPU_FAN) on the motherboard.

Use extreme care when removing the CPU cooler because the thermal grease/tape between the CPU cooler and CPU may adhere to the CPU. Inadequately removing the CPU cooler may damage the CPU.
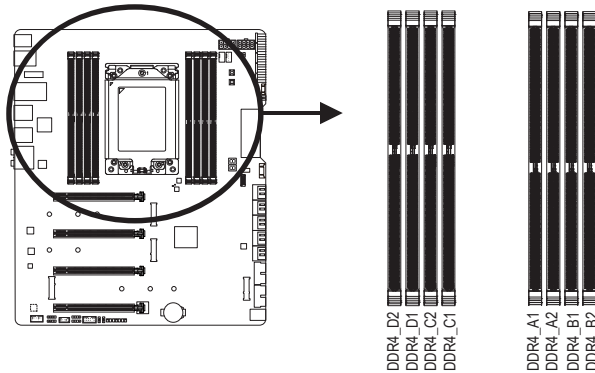
1-4 Installing the Memory

Read the following guidelines before you begin to install the memory:
- Make sure that the motherboard supports the memory. It is recommended that memory of the same capacity, brand, speed, and chips be used.
  (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.)
- Always turn off the computer and unplug the power cord from the power outlet before installing the memory to prevent hardware damage.
- Memory modules have a foolproof design. A memory module can be installed in only one direction. If you are unable to insert the memory, switch the direction.

1-4-1 Quad Channel Memory Configuration

This motherboard supports Quad Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory. The eight DDR4 memory sockets are divided into four channels and each channel has two memory sockets as following:

▶ Channel A: DDR4_A1, DDR4_A2
▶ Channel B: DDR4_B1, DDR4_B2
▶ Channel C: DDR4_C1, DDR4_C2
▶ Channel D: DDR4_D1, DDR4_D2

DDR4_D2 DDR4_D1 DDR4_C2 DDR4_C1   DDR4_A1 DDR4_A2 DDR4_B1 DDR4_B2

▶ Refer to the table below for memory installation according to the number of the memory modules you want to install:

	DDR4_D2	DDR4_D1	DDR4_C2	DDR4_C1	DDR4_A1	DDR4_A2	DDR4_B1	DDR4_B2
1 Module						✔		
2 Modules						✔		✔
4 Modules	✔		✔			✔		✔
6 Modules	✔	✔	✔			✔	✔	✔
8 Modules	✔	✔	✔	✔	✔	✔	✔	✔

✔ : Installed. Empty: Not Installed

Note: For optimum performance, it is recommended that memory of the same capacity, brand, speed, and chips be used. When installing the memory, make sure to begin with the second socket of each channel, such as DDR4_A2/DDR4_B2/DDR4_C2/DDR4_D2.

1-4-2　Installing a Memory

 Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module. DDR4 and DDR3 DIMMs are not compatible to each other or DDR2 DIMMs. Be sure to install DDR4 DIMMs on this motherboard.


Notch

DDR4 DIMM
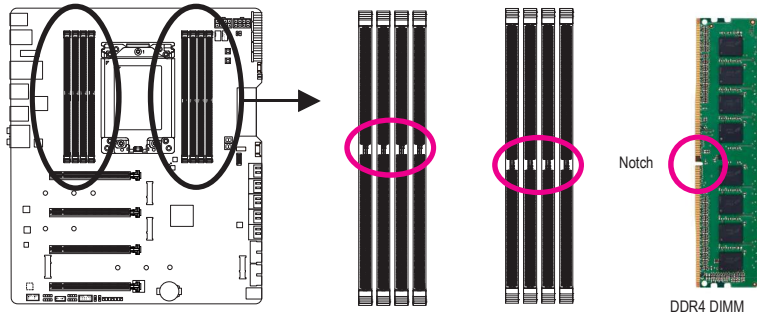
A DDR4 memory module has a notch, so it can only fit in one direction. Follow the steps below to correctly install your memory modules in the memory sockets.
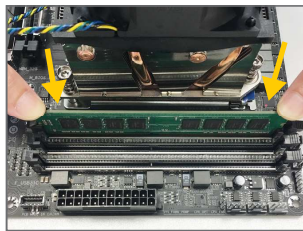
Step 1:
Note the orientation of the memory module. Spread the retaining clip at the right end of the memory socket. Place the memory module on the socket. As indicated in the picture on the left, place your fingers on the top edge of the memory, push down on the memory and insert it vertically into the memory socket.
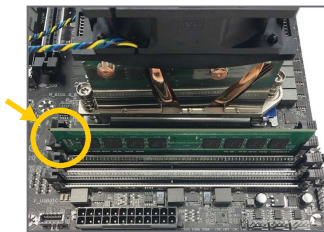

Step 2:
The clip at the right end of the socket will snap into place when the memory module is securely inserted.

1-5   Installing an Expansion Card

Read the following guidelines before you begin to install an expansion card:
*   Make sure the motherboard supports the expansion card. Carefully read the manual that came with your expansion card.
*   Always turn off the computer and unplug the power cord from the power outlet before installing an expansion card to prevent hardware damage.

PCI Express x16 Slot
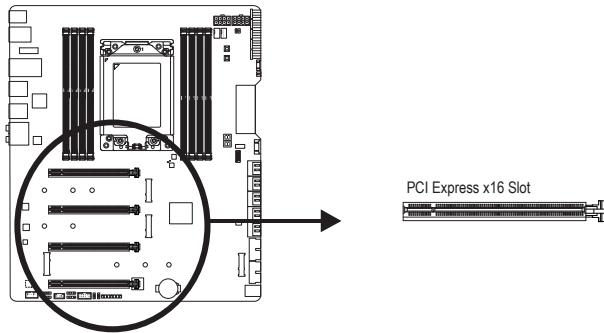
Follow the steps below to correctly install your expansion card in the expansion slot.
1. Locate an expansion slot that supports your card. Remove the metal slot cover from the chassis back panel.
2. Align the card with the slot, and press down on the card until it is fully seated in the slot.
3. Make sure the metal contacts on the card are completely inserted into the slot.
4. Secure the card's metal bracket to the chassis back panel with a screw.
5. After installing all expansion cards, replace the chassis cover(s).
6. Turn on your computer. If necessary, go to BIOS Setup to make any required BIOS changes for your expansion card(s).
7. Install the driver provided with the expansion card in your operating system.

Example: Installing and Removing a PCI Express Graphics Card:

*   Installing a Graphics Card:
    Gently push down on the top edge of the card until it is fully inserted into the PCI Express slot. Make sure the card is securely seated in the slot and does not rock.

*   Removing the Card:
    Gently push back on the lever on the slot and then lift the card straight out from the slot.

1-6   Setting up AMD CrossFire™/NVIDIA® SLI™ Configuration

A. System Requirements
- Windows 10 64-bit operating system
- A CrossFire/SLI-supported motherboard with two or more PCI Express x16 slots and correct driver
- CrossFire/SLI-ready graphics cards of identical brand and chip and correct driver
  (For the latest GPUs that support the 4-way/3-way CrossFire/SLI technology, please refer to the AMD/NVIDIA® website.) (Note 1)
- CrossFire (Note 2)/SLI bridge connectors
- A power supply with sufficient power is recommended (Refer to the manual of your graphics cards for the power requirement) (Note 3)

B. Connecting the Graphics Cards
Step 1:
Observe the steps in "1-5 Installing an Expansion Card" and install CrossFire/SLI graphics cards on the PCI Express x16 slots.
Step 2:
Insert the CrossFire (Note 2)/SLI bridge connectors in the CrossFire/SLI gold edge connectors on top of the cards.
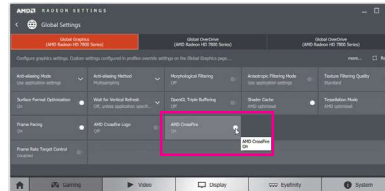Step 3:
Plug the display cable into the graphics card on the PCIEX16_1 slot.

C. Configuring the Graphics Card Driver

C-1. To Enable CrossFire Function
After installing the graphics card driver in the operating system, go to the **AMD RADEON SETTINGS** screen. Browse to **Gaming\Global Settings** and ensure **AMD CrossFire** is set to **On**.

C-2. To Enable SLI Function
After installing the graphics card driver in the operating system, go to the **NVIDIA Control Panel**. Browse to the **Configure SLI**, **Surround, PhysX** screen and ensure **Maximize 3D performance** is enabled.
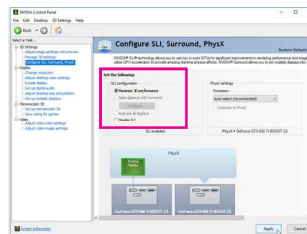
(Note 1)   When using dual core graphics cards, only 2-way is supported.
(Note 2)   The bridge connector(s) may be needed or not depending on your graphics cards.
(Note 3)   When two or more graphics cards are installed, we recommend that you connect the power cable from the power supply to the OC_PEG connector to ensure system stability.

Procedure and driver screen for enabling CrossFire/SLI technology may differ by graphics cards and driver version. Refer to the manual that came with your graphics cards for more information about enabling CrossFire/SLI technology.

1-7 Back Panel Connectors
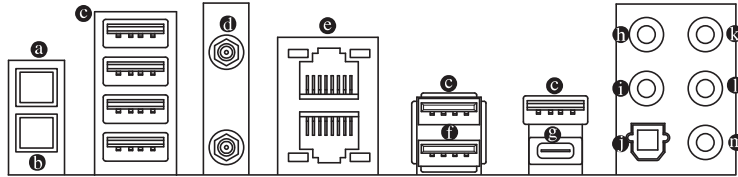
ⓐ Q-Flash Plus Button (Note)

This button allows you to update the BIOS when the power connector is connected but the system is not powered on.

ⓑ Clear CMOS Button

Use this button to clear the CMOS values (e.g. BIOS configuration) and reset the CMOS values to factory defaults when needed.

⚠ • Always turn off your computer and unplug the power cord from the power outlet before using the clear CMOS button.
• Do not use the clear CMOS button when the system is on, or the system may shutdown and data loss or damage may occur.
• After system restart, go to BIOS Setup to load factory defaults (select Load Optimized Defaults) or manually configure the BIOS settings (refer to Chapter 2, "BIOS Setup," for BIOS configurations).

ⓒ USB 3.2 Gen 2 Type-A Port (Red)

The USB 3.2 Gen 2 Type-A port supports the USB 3.2 Gen 2 specification and is compatible to the USB 3.2 Gen 1 and USB 2.0 specification. Use this port for USB devices.

ⓓ SMA Antenna Connectors (2T2R)

Use this connector to connect an antenna.

✎ Tighten the antenna cables to the antenna connectors and then move the antenna to a place where the signal is good.

ⓔ RJ-45 LAN Port

The Gigabit Ethernet LAN port provides Internet connection at up to 10 Gbps data rate. The following describes the states of the LAN port LEDs.

Speed LED:

State	Description
Green	10 Gbps data rate
Orange	5 Gbps/ 2.5 Gbps/ 1 Gbps/ 100 Mbps data rate

Connection/Activity LED:

State	Description
Blinking	Data transmission or receiving is occurring
On	No data transmission or receiving is occurring

ⓕ USB 3.2 Gen 2 Type-A Port (Red) (Q-Flash Plus Port)

The USB 3.2 Gen 2 Type-A port supports the USB 3.2 Gen 2 specification and is compatible to the USB 3.2 Gen 1 and USB 2.0 specification. Use this port for USB devices. Before using Q-Flash Plus (Note), make sure to insert the USB flash drive into this port first.

ⓖ USB Type-C™ Port

The reversible USB port supports the USB 3.2 Gen 2 specification and is compatible to the USB 3.2 Gen 1 and USB 2.0 specification. Use this port for USB devices.

(Note)   To enable Q-Flash Plus function, refer to Chapter 5, "Unique Features," for more information.

⓰ Center/Subwoofer Speaker Out

Use this audio jack to connect center/subwoofer speakers.

⓱ Rear Speaker Out

Use this audio jack to connect rear speakers.

⓲ Optical S/PDIF Out Connector

This connector provides digital audio out to an external audio system that supports digital optical audio. Before using this feature, ensure that your audio system provides an optical digital audio in connector.

⓳ Line In/Side Speaker Out

The line in jack. Use this audio jack for line in devices such as an optical drive, walkman, etc.

⓴ Line Out/Front Speaker Out

The line out jack.

ⓜ Mic In

The Mic in jack.

Audio Jack Configurations:

Jack	Headphone/ 2-channel	4-channel	5.1-channel	7.1-channel
⓰ Center/Subwoofer Speaker Out			✔	✔
⓱ Rear Speaker Out		✔	✔	✔
⓳ Line In/Side Speaker Out				✔
⓴ Line Out/Front Speaker Out	✔	✔	✔	✔
ⓜ Mic In				✔

If you want to install a Side Speaker, you need to retask the Line in jack to be Side Speaker out through the audio driver.

- When removing the cable connected to a back panel connector, first remove the cable from your device and then remove it from the motherboard.
- When removing the cable, pull it straight out from the connector. Do not rock it side to side to prevent an electrical short inside the cable connector.

1-8　Onboard Buttons, Switches, and LEDs

BIOS Switches and BIOS LED Indicators

The BIOS switch (BIOS_SW) allows users to easily select a different BIOS for boot up or overclocking, helping to reduce BIOS failure during overclocking. The SB switch allows for enabling or disabling of the Dual BIOS function. The LED indicator (MBIOS_LED/BBIOS_LED) shows which BIOS is active.
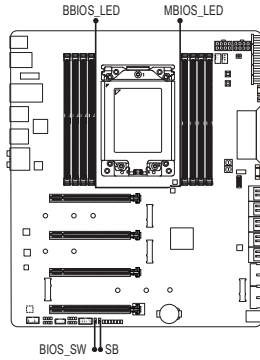
BIOS_SW

1: Main BIOS (Boot from the main BIOS)

2: Backup BIOS (Boot from the backup BIOS)

SB

1: Dual BIOS

2: Single BIOS

**BIOS LED Indicators:**

MBIOS_LED (The main BIOS is active)

BBIOS_LED (The backup BIOS is active)

⚠ Always turn off your computer and unplug the power cord from the power outlet before using the SB switch.

Quick Buttons

The power button and reset button allow users to quickly turn on/off or reset the computer in an open-case environment when they want to change hardware components or conduct hardware testing.
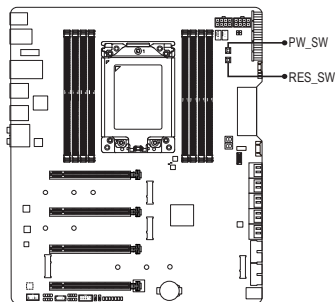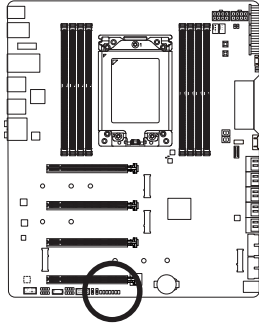

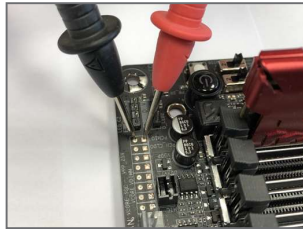**PW_SW:** Power Button
RST_SW: Reset Button

Voltage Measurement Points

Use a multimeter to measure the following motherboard voltages. You can employ following way to measure component voltages.

Pin 1 — VDIMM_CD
Pin 1 — VCORE
Pin 1 — PCHIC
Pin 1 — VDIMM_AB
Pin 1 — A_VDD18
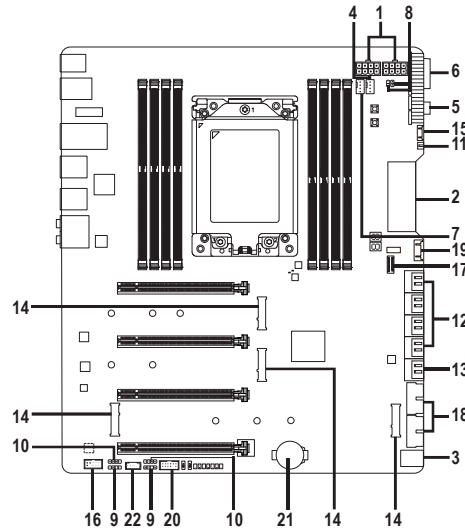Pin 1 — PCH_CLDO
Pin 1 — VCORE_SOC

Pin No.	Definition
1	power
2	GND

Steps:
Connect the red lead of the multimeter to the pin 1 (Power) of a voltage measurement point and the black lead to the pin 2 (ground).

1-9 Internal Connectors

1)	ATX_12V_1/ATX_12V_2	**12)**	SATA3 0/1/2/3/4/5/6/7
2)	ATX	**13)**	SATA3 8/9
3)	OC_PEG	**14)**	M2M/M2Q/M2P/M2C_SOCKET
4)	CPU_FAN	**15)**	F_PANEL
5)	SYS_FAN2/4	**16)**	F_AUDIO
6)	SYS_FAN5A/5B/6_PUMP	**17)**	F_U32C
7)	CPU_OPT	**18)**	F_U32_1/F_U32_2
8)	EC_TEMP1/EC_TEMP2	**19)**	F_USB
9)	D_LED1/D_LED2	**20)**	TPM
10)	LED_C1/LED_C2	**21)**	BAT
11)	NOISE_SENSOR	**22)**	THB_C

Read the following guidelines before connecting external devices:
- First make sure your devices are compliant with the connectors you wish to connect.
- Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.
- After installing the device and before turning on the computer, make sure the device cable has been securely attached to the connector on the motherboard.

1/2) ATX_12V_1/ATX_12V_2/ATX (2x4 12V Power Connectors and 2x12 Main Power Connector)

With the use of the power connector, the power supply can supply enough stable power to all the components on the motherboard. Before connecting the power connector, first make sure the power supply is turned off and all devices are properly installed. The power connector possesses a foolproof design. Connect the power supply cable to the power connector in the correct orientation.

The 12V power connector mainly supplies power to the CPU. If the 12V power connector is not connected, the computer will not start.

To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system.
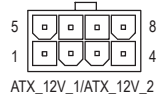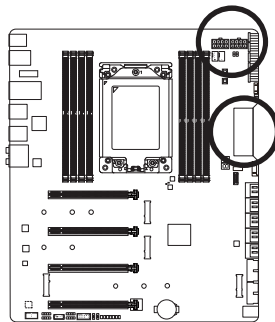
ATX_12V_1/ATX_12V_2:

Pin No.	Definition
1	GND (Only for 2x4-pin 12V)
2	GND (Only for 2x4-pin 12V)
3	GND
4	GND
5	+12V (Only for 2x4-pin 12V)
6	+12V (Only for 2x4-pin 12V)
7	+12V
8	+12V

ATX_12V_1/ATX_12V_2

ATX
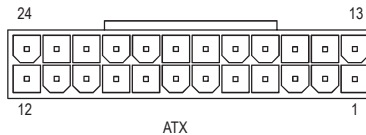
ATX:

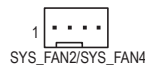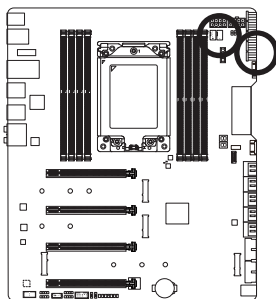| Pin No.	Definition	Pin No.	Definition
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON (soft On/Off)
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power Good	20	NC
9	5VSB (stand by +5V)	21	+5V
10	+12V	22	+5V
11	+12V (Only for 2x12-pin ATX)	23	+5V (Only for 2x12-pin ATX)
12	3.3V (Only for 2x12-pin ATX)	24	GND (Only for 2x12-pin ATX)

3) OC_PEG (PCIe Power Connector)

The power connector provides auxiliary power to the onboard PCI Express x16 slots. When two or more graphics cards are installed, we recommend that you connect the power cables from the power supply to the connectors to ensure system stability.
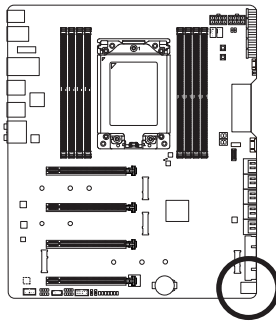
Pin No.	Definition
1	+12V
2	+12V
3	+12V
4	GND
5	GND
6	GND

4/5) CPU_FAN/SYS_FAN2/SYS_FAN4 (Fan Headers)

All fan headers on this motherboard are 4-pin. Most fan headers possess a foolproof insertion design. When connecting a fan cable, be sure to connect it in the correct orientation (the black connector wire is the ground wire). The motherboard supports CPU fan speed control, which requires the use of a CPU fan with fan speed control design. For optimum heat dissipation, it is recommended that a system fan be installed inside the chassis.
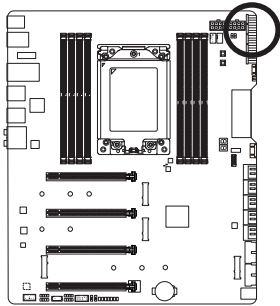
CPU_FAN

SYS_FAN2/SYS_FAN4

Pin No.	Definition
1	GND
2	Voltage Speed Control
3	Sense
4	PWM Speed Control

⚠ • Be sure to connect fan cables to the fan headers to prevent your CPU and system from overheating. Overheating may result in damage to the CPU or the system may hang.
• These fan headers are not configuration jumper blocks. Do not place a jumper cap on the headers.

6) SYS_FAN5A_PUMP/SYS_FAN5B_PUMP/SYS_FAN6_PUMP (System Fan/Water Cooling Pump Headers)

The fan/pump headers are 4-pin and possess a foolproof insertion design. When connecting a fan cable, be sure to connect it in the correct orientation (the black connector wire is the ground wire). The speed control function requires the use of a fan with fan speed control design. For optimum heat dissipation, it is recommended that a system fan be installed inside the chassis. The headers also provide speed control for a water cooling pump, refer to Chapter 2, "BIOS Setup," "Settings\Smart Fan 5," for more information.

Pin No.	Definition
1	GND
2	Voltage Speed Control
3	Sense
4	PWM Speed Control

7) CPU_OPT (Water Cooling CPU Fan Header)

The fan header is 4-pin and possesses a foolproof insertion design. Most fan headers possess a foolproof insertion design. When connecting a fan cable, be sure to connect it in the correct orientation (the black connector wire is the ground wire). The speed control function requires the use of a fan with fan speed control design.
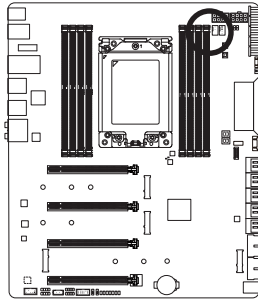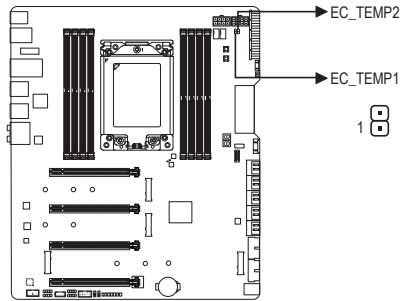

Pin No.	Definition
1	GND
2	Voltage Speed Control
3	Sense
4	PWM Speed Control

- Be sure to connect fan cables to the fan headers to prevent your CPU and system from overheating. Overheating may result in damage to the CPU or the system may hang.
- These fan headers are not configuration jumper blocks. Do not place a jumper cap on the headers.
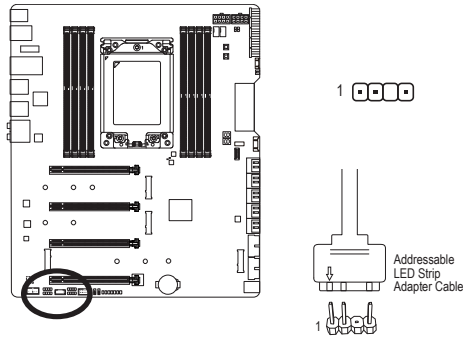
8) EC_TEMP1/EC_TEMP2 (Temperature Sensor Headers)

Connect the thermistor cables to the headers for temperature detection.

Pin No.	Definition
1	SENSOR IN
2	GND

9) D_LED1/D_LED2 (Addressable LED Strip Headers)

The headers can be used to connect a standard 5050 addressable LED strip, with maximum power rating of 5A (5V) and maximum number of 1000 LEDs.

Pin No.	Definition
1	V(5V)
2	D
3	No Pin
4	G

Connect your addressable LED strip to the header. The power pin (marked with a triangle on the plug) of the LED strip must be connected to Pin 1 of the addressable LED strip header. Incorrect connection may lead to the damage of the LED strip.
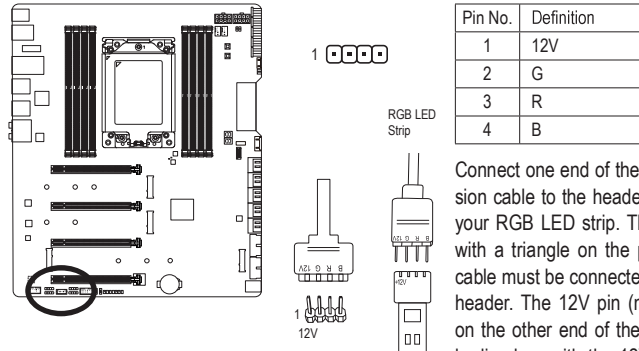
For how to turn on/off the lights of the LED strip, refer to the instructions on in Chapter 5, "Unique Features," "APP Center\RGB Fusion."

Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.

10) LED_C1/LED_C2 (RGB LED Strip Headers)

The headers can be used to connect a standard 5050 RGB LED strip (12V/G/R/B), with maximum power rating of 2A (12V) and maximum length of 2m.

| Pin No.	Definition
1	12V
2	G
3	R
4	B

Connect one end of the RGB LED strip extension cable to the header and the other end to your RGB LED strip. The black wire (marked with a triangle on the plug) of the extension cable must be connected to Pin 1 (12V) of this header. The 12V pin (marked with an arrow) on the other end of the extension cable must be lined up with the 12V of the LED strip. Be careful with the connection orientation of the LED strip; incorrect connection may lead to the damage of the LED strip.

For how to turn on/off the lights of the LED strip, refer to the instructions on in Chapter 5, "Unique Features," "APP Center\RGB Fusion."

Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.

11) NOISE_SENSOR (Noise Detection Header)

This header can be used to connect a noise detection cable to detect the noise inside the case.

| Pin No.	Definition
1	Noise detection
2	GND
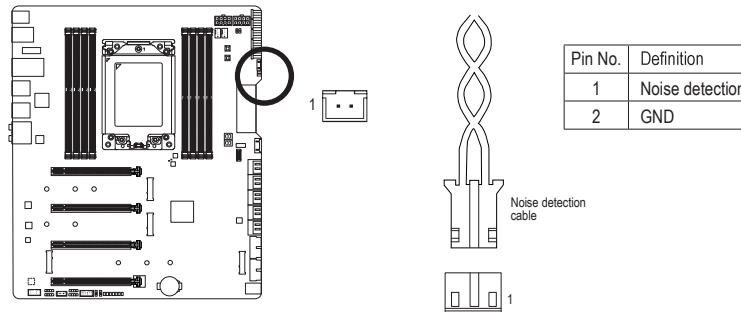
For more information on the noise detection function, refer to the instructions in Chapter 5, "Unique Features," "APP Center\System Information Viewer."

Before connecting the cable to the header, make sure to remove the jumper cap; re-place the jumper cap if the header is not in use.

12) SATA3 0/1/2/3/4/5/6/7 (SATA 6Gb/s Connectors)

The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s and SATA 1.5Gb/s standard. Each SATA connector supports a single SATA device. The AMD Chipset supports RAID 0, RAID 1, and RAID 10. Refer to Chapter 3, "Configuring a RAID Set," for instructions on configuring a RAID array.

Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND
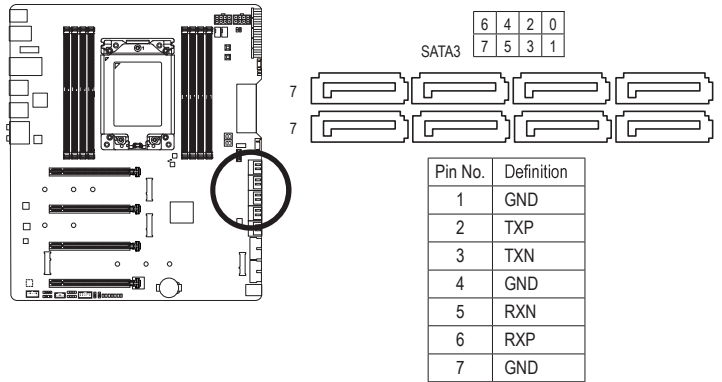
To enable hot-plugging for the SATA ports, refer to Chapter 2, "BIOS Setup," "Settings\IO Ports\ SATA Configuration," for more information.

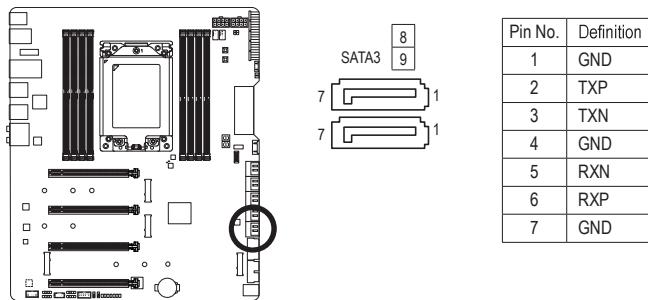**13) SATA3 8/9 (SATA 6Gb/s Connectors, Controlled by ASMedia® SATA 6Gb/s Controller)**

The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s and SATA 1.5Gb/s standard. Each SATA connector supports a single SATA device.

Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

**14) M2M/M2Q/M2P/M2C_SOCKET (M.2 Socket 3 Connectors)**

The M.2 connectors support M.2 SATA SSDs and M.2 PCIe SSDs and support RAID configuration. Please note that an M.2 PCIe SSD cannot be used to create a RAID set with an M.2 SSD or a SATA hard drive. Refer to Chapter 3, "Configuring a RAID Set," for instructions on configuring a RAID array.
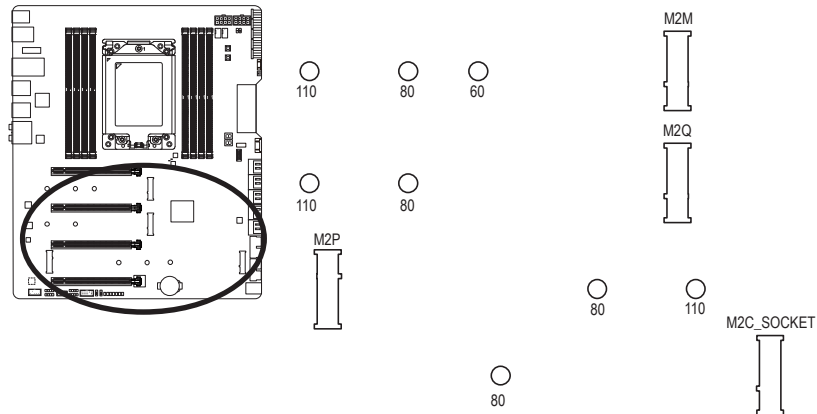
Follow the steps below to correctly install an M.2 SSD in the M.2 connector.
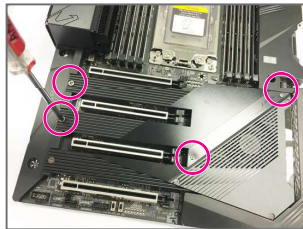
Step 1:
Get a screw and a standoff from the included M.2 screw and standoff packs. If you want to install the M.2 SSD in the M2M or M2Q connector, use a screwdriver to unfasten the four screws from the heatsink as indicated in the picture above and then remove the heatsink.
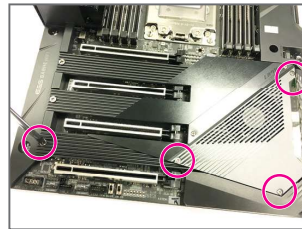
Step 2:
If you want to install the M.2 SSD in the M2P or M2C_SOCKET connector, use a screwdriver to unfasten the four screws from the heatsink as indicated in the picture above and then remove the heatsink.

Step 3:
Locate the proper mounting hole for the M.2 SSD to be installed and then tighten the standoff first. Insert the M.2 SSD into the M.2 connector at an angle. Press the M.2 SSD down and then secure it with the screw. Replace the heatsink and secure it to the original hole.

- Select the proper hole for the M.2 SSD to be installed and refasten the screw and standoff.
- Make sure to remove the protective film from the bottom of the heatsink before replacing the heatsink.

Installation Notices for the M.2 and SATA Connectors:

Due to the limited number of lanes provided by the Chipset, the availability of the SATA connectors may be affected by the type of device installed in the M2C_SOCKET. The M2C_SOCKET connector shares bandwidth with the SATA3 4, 5, 6, 7 connectors. Refer to the following table for details.

• M2C_SOCKET

Type of M.2 SSD Connector	SATA3 0	SATA3 1	SATA3 4	SATA3 5	SATA3 6	SATA3 7
M.2 SATA SSD	✔	✔	✘	✘	✔	✔
M.2 PCIe SSD	✔	✔	✘	✘	✘	✘
No M.2 SSD Installed	✔	✔	✔	✔	✔	✔

✔ : Available, ✘ : Not available

15) F_PANEL (Front Panel Header)

Connect one end of the front panel extension cable to this header and connect the power switch, reset switch, speaker, chassis intrusion switch/sensor and system status indicator on the chassis front panel to the other end. Note the positive and negative pins before connecting the cables.

Front panel extension cable
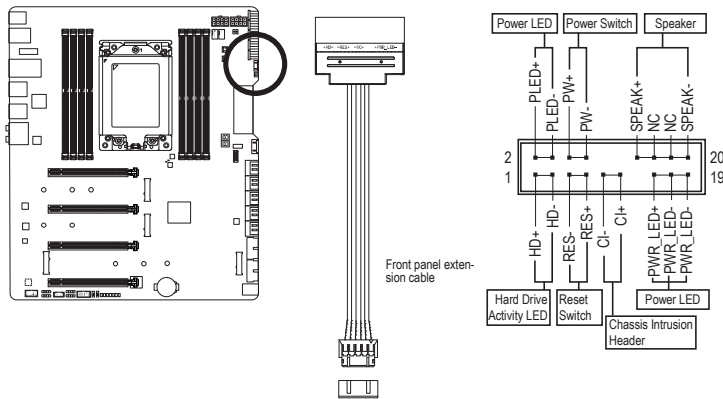
- **PLED/PWR_LED** (Power LED, Yellow/Purple):

System Status	LED
S0	On
S3/S4/S5	Off

Connects to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S3/ S4 sleep state or powered off (S5).

- **PW** (Power Switch, Red):
Connects to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch (refer to Chapter 2, "BIOS Setup," "Settings\Platform Power," for more information).

- **SPEAK** (Speaker, Orange):
Connects to the speaker on the chassis front panel. The system reports system startup status by issuing a beep code. One single short beep will be heard if no problem is detected at system startup.

- **HD** (Hard Drive Activity LED, Blue):
Connects to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

- **RES** (Reset Switch, Green):
Connects to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

- **CI** (Chassis Intrusion Header, Gray):
Connects to the chassis intrusion switch/sensor on the chassis that can detect if the chassis cover has been removed. This function requires a chassis with a chassis intrusion switch/sensor.

- **NC** (Orange): No Connection.

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

16) F_AUDIO (Front Panel Audio Header)

The front panel audio header supports High Definition audio (HD). You may connect your chassis front panel audio module to this header. Make sure the wire assignments of the module connector match the pin assignments of the motherboard header. Incorrect connection between the module connector and the motherboard header will make the device unable to work or even damage it.
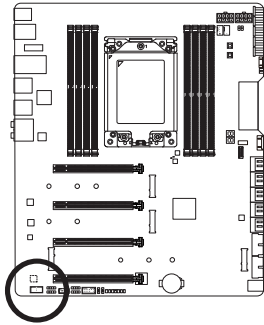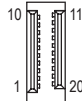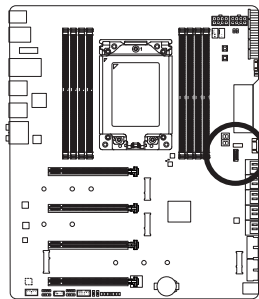
Pin No.	Definition
1	MIC2_L
2	GND
3	MIC2_R
4	NC
5	LINE2_R
6	Sense
7	FAUDIO_JD
8	No Pin
9	LINE2_L
10	Sense

Some chassis provide a front panel audio module that has separated connectors on each wire instead of a single plug. For information about connecting the front panel audio module that has different wire assignments, please contact the chassis manufacturer.

**17) F_U32C (USB Type-C™ Header with USB 3.2 Gen 2 Support)**

The header conforms to USB 3.2 Gen 2 specification and can provide one USB port.

Pin No.	Definition	Pin No.	Definition
1	VBUS	11	VBUS
2	TX1+	12	TX2+
3	TX1-	13	TX2-
4	GND	14	GND
5	RX1+	15	RX2+
6	RX1-	16	RX2-
7	VBUS	17	GND
8	CC1	18	D-
9	NC	19	D+
10	NC	20	CC2

18) F_U32_1/F_U32_20 (USB 3.2 Gen 1 Headers)

The headers conform to USB 3.2 Gen 1 and USB 2.0 specification and can provide two USB ports. For purchasing the optional 3.5" front panel that provides two USB 3.2 Gen 1 ports, please contact the local dealer.
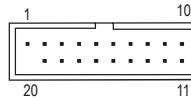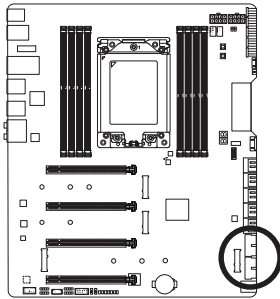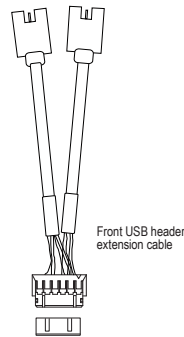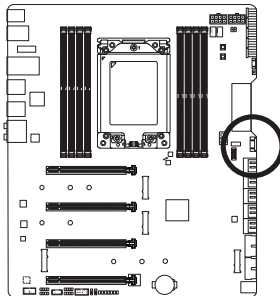

Pin No.	Definition	Pin No.	Definition
1	VBUS	11	D2+
2	SSRX1-	12	D2-
3	SSRX1+	13	GND
4	GND	14	SSTX2+
5	SSTX1-	15	SSTX2-
6	SSTX1+	16	GND
7	GND	17	SSRX2+
8	D1-	18	SSRX2-
9	D1+	19	VBUS
10	NC	20	No Pin

Prior to installing the USB front panel, be sure to turn off your computer and unplug the power cord from the power outlet to prevent damage to the USB front panel.

19) F_USB (USB 2.0/1.1 Headers)

Connect one end of the front USB header extension cable to this header and the other ends to two USB brackets. The headers conform to USB 2.0/1.1 specification. Each USB header can provide two USB ports via an optional USB bracket. For purchasing the optional USB bracket, please contact the local dealer.


Front USB header extension cable

Pin No.	Definition
1	Power (5V)
2	Power (5V)
3	USB DX-
4	USB DY-
5	USB DX+
6	USB DY+
7	GND
8	GND
9	No Pin
10	NC

• Only the USB ports routed to the F_U32_1 connector support USB TurboCharger. Enabling this function requires software support. The maximum power output of this connector may vary depending on the power management mechanism for the USB cable and charging device used. For more information on USB TurboCharger, refer to the instructions in Chapter 5, "Unique Features."
• Do not plug the IEEE 1394 bracket (2x5-pin) cable into the USB 2.0/1.1 header.
• Prior to installing the USB bracket, be sure to turn off your computer and unplug the power cord from the power outlet to prevent damage to the USB bracket.

20) TPM (Trusted Platform Module Header)

You may connect a TPM (Trusted Platform Module) to this header.
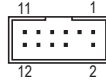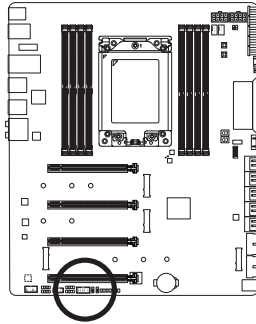
Pin No.	Definition
1	LAD0
2	VCC3
3	LAD1
4	No Pin
5	LAD2
6	LCLK
7	LAD3
8	GND
9	LFRAME
10	NC
11	SERIRQ
12	LRESET

21) BAT (Battery)

The battery provides power to keep the values (such as BIOS configurations, date, and time information) in the CMOS when the computer is turned off. Replace the battery when the battery voltage drops to a low level, or the CMOS values may not be accurate or may be lost.
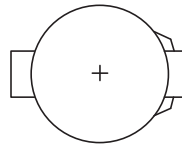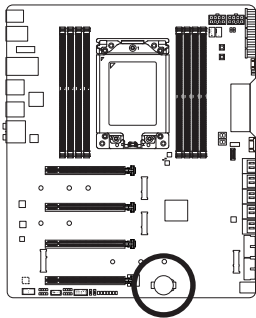
You may clear the CMOS values by removing the battery:
1. Turn off your computer and unplug the power cord.
2. Gently remove the battery from the battery holder and wait for one minute. (Or use a metal object like a screwdriver to touch the positive and negative terminals of the battery holder, making them short for 5 seconds.)
3. Replace the battery.
4. Plug in the power cord and restart your computer.

- Always turn off your computer and unplug the power cord before replacing the battery.
- Replace the battery with an equivalent one. Damage to your devices may occur if the battery is replaced with an incorrect model.
- Contact the place of purchase or local dealer if you are not able to replace the battery by yourself or uncertain about the battery model.
- When installing the battery, note the orientation of the positive side (+) and the negative side (-) of the battery (the positive side should face up).
- Used batteries must be handled in accordance with local environmental regulations.

22) THB_C (GIGABYTE Add-in Card Connector)

This connector is for a GIGABYTE add-in card.

1 [· · · · · ·]
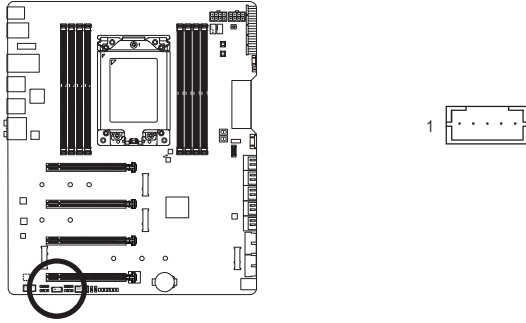
Chapter 2   BIOS Setup

BIOS (Basic Input and Output System) records hardware parameters of the system in the CMOS on the motherboard. Its major functions include conducting the Power-On Self-Test (POST) during system startup, saving system parameters and loading operating system, etc. BIOS includes a BIOS Setup program that allows the user to modify basic system configuration settings or to activate certain system features.

When the power is turned off, the battery on the motherboard supplies the necessary power to the CMOS to keep the configuration values in the CMOS.

To access the BIOS Setup program, press the <Delete> key during the POST when the power is turned on.

To upgrade the BIOS, use either the GIGABYTE Q-Flash or @BIOS utility.
•   Q-Flash allows the user to quickly and easily upgrade or back up BIOS without entering the operating system.
•   @BIOS is a Windows-based utility that searches and downloads the latest version of BIOS from the Internet and updates the BIOS.
For instructions on using the Q-Flash and @BIOS utilities, refer to Chapter 5, "BIOS Update Utilities."

• Because BIOS flashing is potentially risky, if you do not encounter problems using the current version of BIOS, it is recommended that you not flash the BIOS. To flash the BIOS, do it with caution. Inadequate BIOS flashing may result in system malfunction.
• It is recommended that you not alter the default settings (unless you need to) to prevent system instability or other unexpected results. Inadequately altering the settings may result in system's failure to boot. If this occurs, try to clear the CMOS values and reset the board to default values. (Refer to the "Load Optimized Defaults" section in this chapter or introductions of the battery or the clear CMOS button in Chapter 1 for how to clear the CMOS values.)

2-1   Startup Screen

The following startup Logo screen will appear when the computer boots.

DEL：BIOS SETUP\Q-FLASH   F12：BOOT MENU   END：Q-FLASH ──── Function Keys
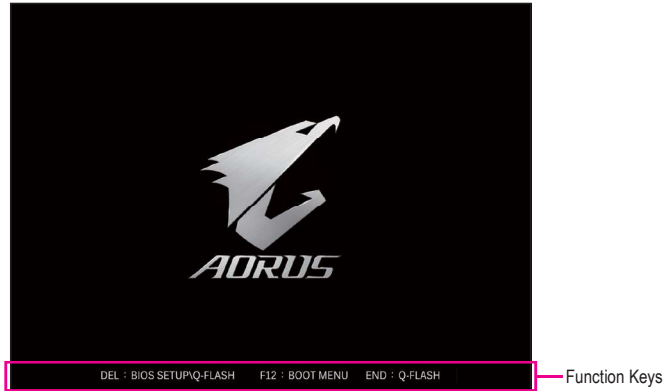
Function Keys:
<DEL>: BIOS SETUP\Q-FLASH
   Press the <Delete> key to enter BIOS Setup or to access the Q-Flash utility in BIOS Setup.
<F12>: BOOT MENU
   Boot Menu allows you to set the first boot device without entering BIOS Setup. In Boot Menu, use the up
   arrow key <↑> or the down arrow key <↓> to select the first boot device, then press <Enter> to accept.
   The system will boot from the device immediately.
   Note: The setting in Boot Menu is effective for one time only. After system restart, the device boot order
   will still be based on BIOS Setup settings.
<END>: Q-FLASH
   Press the <End> key to access the Q-Flash utility directly without having to enter BIOS Setup first.

2-2 The Main Menu

Advanced Mode

The Advanced Mode provides detailed BIOS settings. You can press the arrow keys on your keyboard to move among the items and press <Enter> to accept or enter a sub-menu. Or you can use your mouse to select the item you want.

(Sample BIOS Version: T0d)

Setup Menus

Configuration Items

System Time

Hardware Information

Option Description   Current Settings   Quick Access Bar allows you to quickly move to the General Help, Easy Mode, Smart Fan 5, or Q-Flash screen.

Advanced Mode Function Keys

<←><→>	Move the selection bar to select a setup menu
<↑><↓>	Move the selection bar to select an configuration item on a menu
<Enter>/Double Click	Execute command or enter a menu
<+>/<Page Up>	Increase the numeric value or make changes
<->/<Page Down>	Decrease the numeric value or make changes
<F1>	Show descriptions of the function keys
<F2>	Switch to Easy Mode
<F3>	Save the current BIOS settings to a profile
<F4>	Load the BIOS settings from a profile created before
<F5>	Restore the previous BIOS settings for the current submenus
<F6>	Display the Smart Fan 5 screen
<F7>	Load the Optimized BIOS default settings for the current submenus
<F8>	Access the Q-Flash utility
<F10>	Save all the changes and exit the BIOS Setup program
<F11>	Switch to the Favorites submenu
<F12>	Capture the current screen as an image and save it to your USB drive
<Insert>	Add or remove a favorite option
<Ctrl>+<S>	Display information on the installed memory
<Esc>	Main Menu: Exit the BIOS Setup program
	Submenus: Exit current submenu

B. Easy Mode

Easy Mode allows users to quickly view their current system information or to make adjustments for optimum performance. In Easy Mode, you can use your mouse to move through configuration items. The Advanced Mode provides detailed BIOS settings.
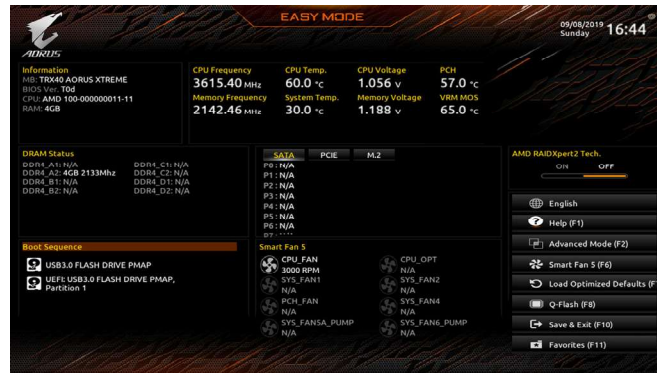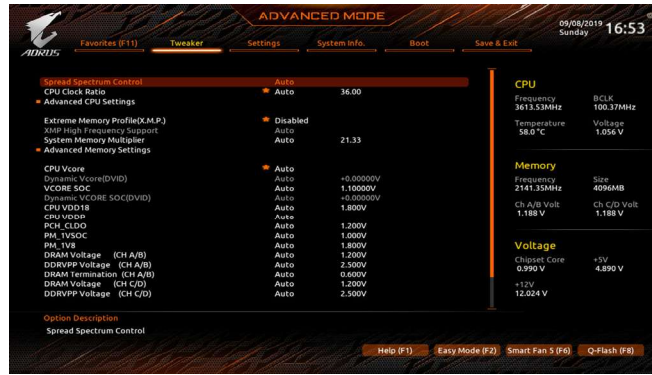
2-3   Favorites (F11)
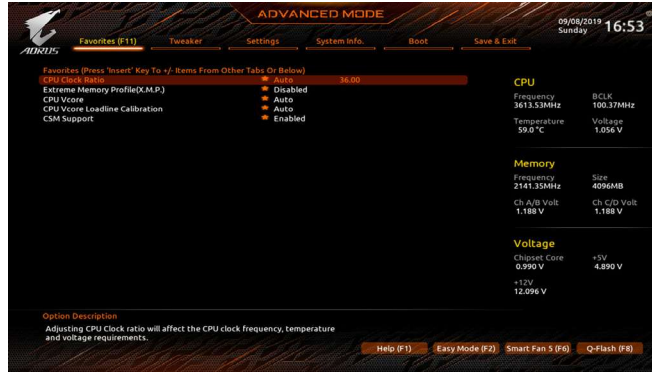
Set your frequently used options as your favorites and use the <F11> key to quickly switch to the page where all of your favorite options are located. To add or remove a favorite option, go to its original page and press <Insert> on the option. The option is marked with a star sign if set as a "favorite."

2-4 Tweaker

⚠️ Whether the system will work stably with the overclock/overvoltage settings you made is dependent on your overall system configurations. Incorrectly doing overclock/overvoltage may result in damage to CPU, chipset, or memory and reduce the useful life of these components. This page is for advanced users only and we recommend you not to alter the default settings to prevent system instability or other unexpected results. (Inadequately altering the settings may result in system's failure to boot. If this occurs, clear the CMOS values and reset the board to default values.)

☞ **CPU Clock Control**

Allows you to manually set the CPU base clock in 0.01 MHz increments. (Default: Auto)

Important: It is highly recommended that the CPU frequency be set in accordance with the CPU specifications.
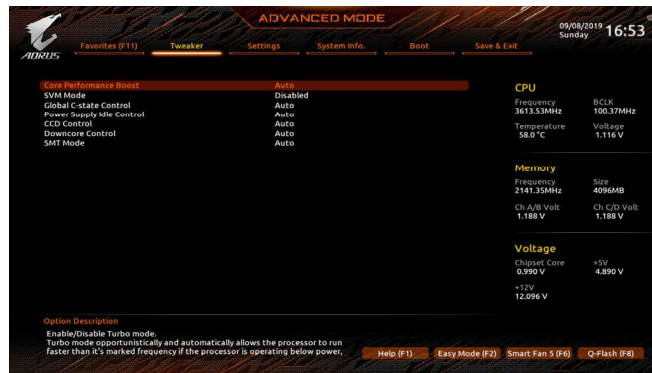
☞ **Spread Spectrum Control**

Enables or disables CPU/PCIe Spread Spectrum. (Default: Auto)

☞ **CPU Clock Ratio**

Allows you to alter the clock ratio for the installed CPU. The adjustable range is dependent on the CPU being installed.

■ **Advanced CPU Settings**

☞ **Core Performance Boost**

Allows you to determine whether to enable the Core Performance Boost (CPB) technology, a CPU performance-boost technology. (Default: Auto)

- **SVM Mode**
  Virtualization enhanced by Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple virtual systems. (Default: Disabled)

- **Global C-state Control**
  Allows you to determine whether to let the CPU enter C states. When enabled, the CPU core frequency will be reduced during system halt state to decrease power consumption. (Default: Auto)

- **Power Supply Idle Control**
  Enables or disables Package C6 State.
  ▶ Typical Current Idle   Disables this function.
  ▶ Low Current Idle   Enables this function.
  ▶ Auto   Lets the BIOS automatically configure this setting. (Default)

- **CCD Control**
  Sets the number of CCDs to be used. (Default: Auto)

- **Downcore Control**
  Allows you to select the number of CPU cores to enable (the number of CPU cores may vary by CPU). (Default: Auto)

- **SMT Mode**
  Allows you to enable or disable the CPU Simultaneous Multi-Threading technology. (Default: Auto)

- **Extreme Memory Profile (X.M.P.)** (Note)
  Allows the BIOS to read the SPD data on XMP memory module(s) to enhance memory performance when enabled.
  ▶ Disabled   Disables this function. (Default)
  ▶ Profile1   Uses Profile 1 settings.
  ▶ Profile2 (Note)   Uses Profile 2 settings.

- **XMP High Frequency Support** (Note)
  Allows you to select the compatibility level for high-frequency memory. This item is configurable only when **Extreme Memory Profile (X.M.P.)** is set to **Profile1** or **Profile2**. (Default: Auto)

- **System Memory Multiplier**
  Allows you to set the system memory multiplier. **Auto** sets memory multiplier according to memory SPD data. (Default: Auto)

(Note)   This item is present only when you install a CPU and a memory module that support this feature.

■ **Advanced Memory Settings**
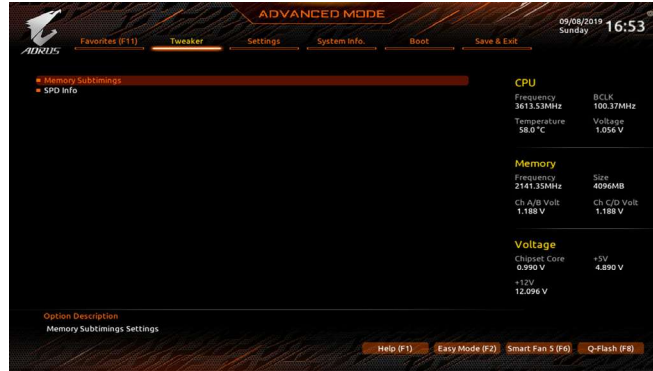
■ **Memory Subtimings**

▼ **Standard Timing Control, Advanced Timing Control, CAD Bus Setup Timing, CAD Bus Drive Strength, Data Bus Configuration**

These sections provide memory timing settings. The respective timing setting screens are configurable only when **Memory Timing Mode** is set to **Manual**. Note: Your system may become unstable or fail to boot after you make changes on the memory timings. If this occurs, please reset the board to default values by loading optimized defaults or clearing the CMOS values.

■ **SPD Info**

Displays information on the installed memory.

☞ **CPU Vcore/Dynamic Vcore(DVID)/VCORE SOC/Dynamic VCORE SOC(DVID)/CPU VDD18/CPU VDDP/PCH_CLDO/PM_1VSOC/PM_1V8/DRAM Voltage (CH A/B)/DDRVPP Voltage (CH A/B)/DRAM Termination (CH A/B)/DRAM Voltage (CH C/D)/DRAM Termination (CH C/D)**

These items allow you to adjust the CPU Vcore and memory voltages.

■ **CPU/VRM Settings**

This submenu allows you to configure Load-Line Calibration level, over-voltage protection level, over-current protection level, and PWM phases.

2-5 Settings
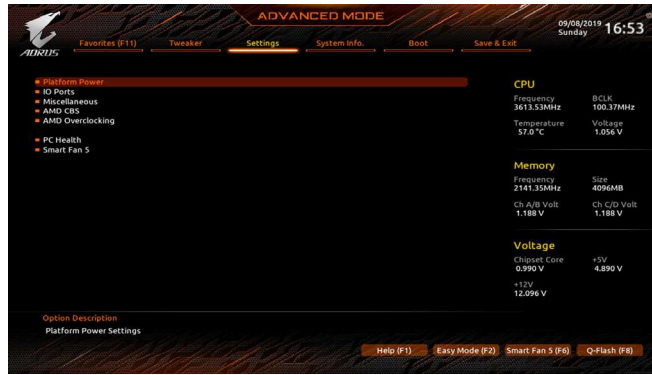
■ **Platform Power**
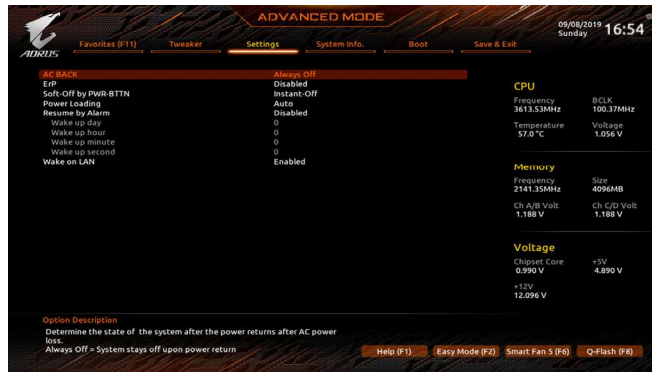
⟳ **AC BACK**

Determines the state of the system after the return of power from an AC power loss.

  ▶▶ Memory   The system returns to its last known awake state upon the return of the AC power.
  ▶▶ Always On   The system is turned on upon the return of the AC power.
  ▶▶ Always Off   The system stays off upon the return of the AC power. (Default)

⟳ **ErP**

Determines whether to let the system consume least power in S5 (shutdown) state. (Default: Disabled)

Note: When this item is set to **Enabled**, the following functions will become unavailable: Resume by Alarm, power on by mouse, and power on by keyboard.

⟳ **Soft-Off by PWR-BTTN**

Configures the way to turn off the computer in MS-DOS mode using the power button.

  ▶▶ Instant-Off   Press the power button and then the system will be turned off instantly. (Default)
  ▶▶ Delay 4 Sec.   Press and hold the power button for 4 seconds to turn off the system. If the power button is pressed for less than 4 seconds, the system will enter suspend mode.

Power Loading

Enables or disables dummy load. When the power supply is at low load, a self-protection will activate causing it to shutdown or fail. If this occurs, please set to **Enabled**. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

 Resume by Alarm

Determines whether to power on the system at a desired time. (Default: Disabled)
If enabled, set the date and time as following:
▸▸ Wake up day: Turn on the system at a specific time on each day or on a specific day in a month.
▸▸ Wake up hour/minute/second: Set the time at which the system will be powered on automatically.
Note: When using this function, avoid inadequate shutdown from the operating system or removal of the AC power, or the settings may not be effective.

 Wake on LAN

Enables or disables the wake on LAN function. (Default: Enabled)

▪ **IO Ports**
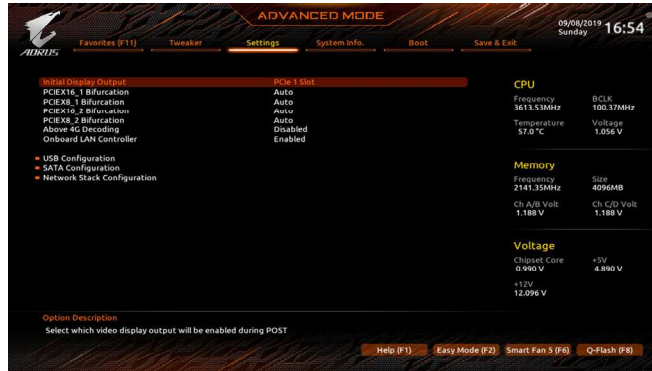
 Initial Display Output

Specifies the first initiation of the monitor display from the installed PCI Express graphics card.
▸ PCIe 1 Slot   Sets the graphics card on the PCIEX16_1 slot as the first display. (Default)
▸ PCIe 2 Slot   Sets the graphics card on the PCIEX8_1 slot as the first display.
▸ PCIe 3 Slot   Sets the graphics card on the PCIEX16_2 slot as the first display.
▸ PCIe 4 Slot   Sets the graphics card on the PCIEX8_2 slot as the first display.

 PCIEX16_1 Bifurcation

Allows you to determine how the bandwidth of the PCIEX16_1 slot is divided. Options: Auto, x16, x4x4x4x4. (Default: Auto)

 PCIEX8_1 Bifurcation

Allows you to determine how the bandwidth of the PCIEX8_1 slot is divided. Options: Auto, x8, x4x4. (Default: Auto)

 PCIEX16_2 Bifurcation

Allows you to determine how the bandwidth of the PCIEX16_2 slot is divided. Options: Auto, x16, x4x4x4x4. (Default: Auto)