WRX90 AI TOP

User's Manual

Rev. 101

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- For detailed product information, carefully read the User's Manual.
- For quick set-up of the product, refer to the Quick Installation Guide on GIGABYTE's website.
  https://download.gigabyte.com/FileList/Manual/mb_manual_quick-guide_amd-trx.pdf?m=sw

For product-related information, check on our website at: https://www.gigabyte.com

Identifying Your Motherboard Revision

The revision number on your motherboard looks like this: "REV: X.X." For example, "REV: 1.0" means the revision of the motherboard is 1.0. Check your motherboard revision before updating motherboard BIOS, drivers, or when looking for technical information.

Example:

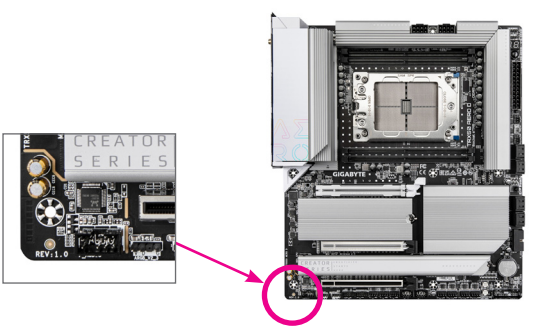


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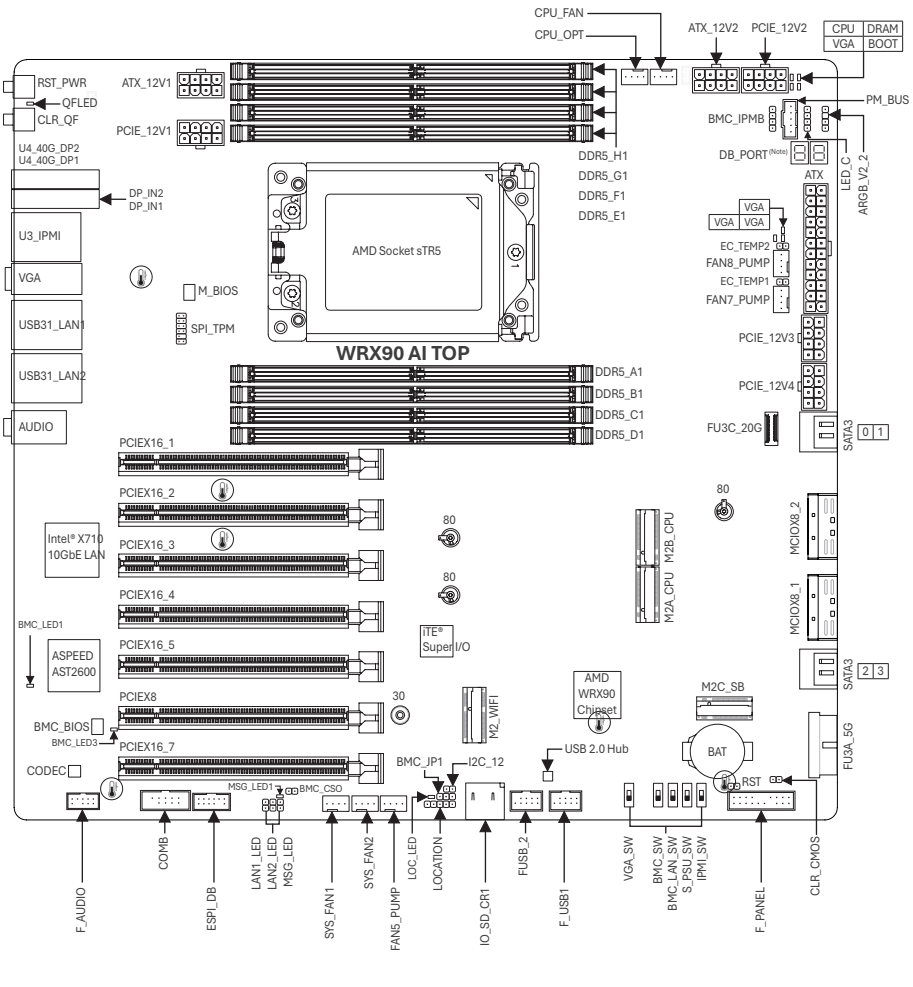
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Chapter 1 Product Introduction

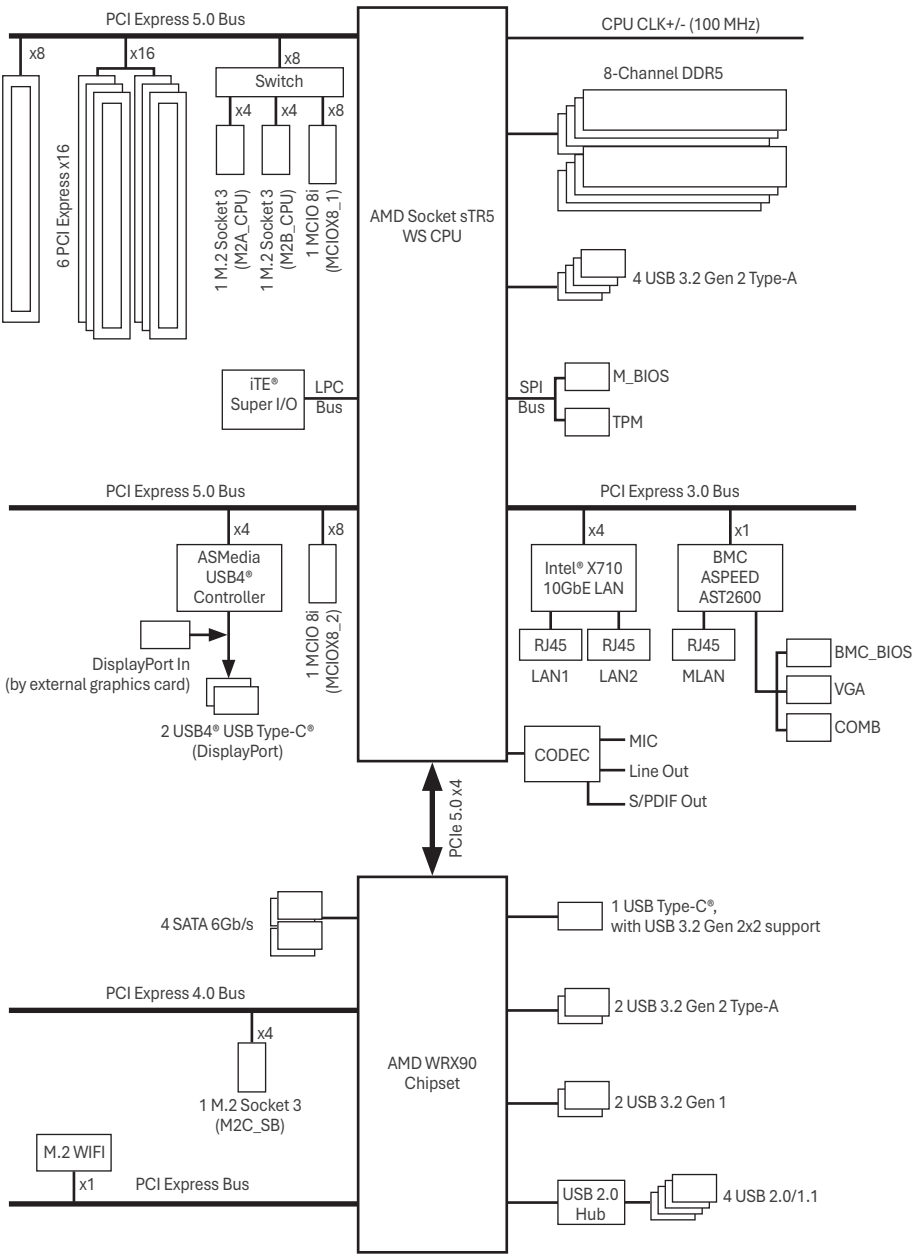
1-1 Motherboard Layout



Temperature sensor

(Note) For debug code information, please refer to the "Debug LED Codes" pages.

1-2 Motherboard Block Diagram



1-3 Box Contents

- ☑ WRX90 AI TOP motherboard
- ☑ User's Manual
- ☑ Quick Installation Guide
- ☑ Four SATA cables
- ☑ Two thermistor cables
- ☑ One G Connector
- ☑ One Dual 24-pin ATX power supply adapter cable
- ☑ Two DisplayPort In cables

* The box contents above are for reference only and the actual items shall depend on the product package you obtain. The box contents are subject to change without notice.

Chapter 2 Hardware Installation

2-1 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.

2-2 Product Specifications

CPU	◆ AMD Socket sTR5, support for: AMD Ryzen™ Threadripper™ PRO 9000-WX processors/ AMD Ryzen™ Threadripper™ PRO 7000-WX processors (Go to GIGABYTE's website for the latest CPU support list.)
Chipset	◆ AMD WRX90
Memory	◆ Support for DDR5 ECC Registered memory modules (RDIMM/RDIMM-3DS) ◆ 8 x DDR5 DIMM sockets supporting up to 2 TB of system memory ◆ Octa-channel memory architecture ◆ Support for AMD EXtended Profiles for Overclocking (AMD EXPO™) and Extreme Memory Profile (XMP) memory modules (The CPU and memory configuration may affect the supported memory types, data rate (speed), and number of DRAM modules, please refer to "Memory Support List" on GIGABYTE's website for more information.)
Onboard Graphics	◆ 1 x AST2600 D-Sub port ◆ 2 x USB4® USB Type-C® ports, supporting Type-C and DisplayPort video outputs and a maximum resolution of 3840x2160@240 Hz * Support for DisplayPort 1.4 version and HDR. ** Graphics specifications may vary depending on graphics card support.
Audio	◆ Realtek® ALC1220 CODEC * The back panel line out jack supports DSD audio. ◆ High Definition Audio ◆ 2/4/5.1/7.1-channel * You can change the functionality of an audio jack using the audio software. To configure 7.1-channel audio, access the audio software for audio settings. ◆ Support for S/PDIF Out
LAN	◆ Intel® X710 Dual 10GbE network controller (10 Gbps/5 Gbps/2.5 Gbps/1 Gbps/100 Mbps) ◆ Integrated AST2600 BMC and Realtek® 1GbE network controller (1 Gbps/100 Mbps)
Expansion Slots	◆ 6 x PCI Express x16 slots, integrated in the CPU, supporting PCIe 5.0 and running at x16 (PCIEX16_1/PCIEX16_2/PCIEX16_3/PCIEX16_4/PCIEX16_5/PCIEX16_7) * The PCIEX16 slot can only support a graphics card or an NVMe SSD. If only one graphics card is to be installed, be sure to install it in the PCIEX16_1 slot. ◆ 1 x PCI Express x16 slot, integrated in the CPU, supporting PCIe 5.0 and running at x8 (PCIEX8) ◆ 1 x M.2 Socket 1 connector for the wireless communication module (M2_WIFI)

Storage Interface	◆ 1 x MCIO 8i connector (MCIOX8_1), integrated in the CPU, supporting PCIe 5.0 x4/x2 SSDs * The MCIOX8_1 connector shares bandwidth with both the M2A_CPU and M2B_CPU connectors. The MCIOX8_1 connector is unavailable when a device is installed in either the M2A_CPU or M2B_CPU connector. ◆ 1 x MCIO 8i connector (MCIOX8_2), integrated in the CPU, supporting SATA and PCIe 5.0 x4/x2 SSDs * This connector supports PCIe by default. To enable other options, please navigate to the "BIOS Setup" page of GIGABYTE's website ◆ 2 x M.2 connectors (M2A_CPU/M2B_CPU), integrated in the CPU, supporting Socket 3, M key, type 2280 PCIe 5.0 x4/x2 SSDs ◆ 1 x M.2 connector (M2C_SB), integrated in the Chipset, supporting Socket 3, M key, type 2280 PCIe 4.0 x4/x2 SSDs ◆ 4 x SATA 6Gb/s connectors ◆ RAID 0, RAID 1, RAID 5, and RAID 10 support for NVMe SSD storage devices ◆ RAID 0, RAID 1, RAID 5, and RAID 10 support for SATA storage devices
USB	◆ CPU: - 4 x USB 3.2 Gen 2 Type-A ports (red) on the back panel ◆ CPU+ASMedia USB4® controller: - 2 x USB4® USB Type-C® ports on the back panel ◆ Chipset: - 1 x USB Type-C® port with USB 3.2 Gen 2x2 support, available through the internal USB header - 2 x USB 3.2 Gen 2 Type-A ports (red) on the back panel - 2 x USB 3.2 Gen 1 ports available through the internal USB header ◆ Chipset+USB 2.0 Hub: - 4 x USB 2.0/1.1 ports available through the internal USB headers
Internal Connectors	◆ 1 x 24-pin ATX main power connector ◆ 2 x 8-pin ATX 12V power connectors ◆ 4 x PCIe power connectors ◆ 1 x CPU fan header ◆ 1 x CPU fan/water cooling pump header ◆ 2 x system fan headers ◆ 3 x system fan/water cooling pump headers ◆ 1 x addressable RGB Gen2 LED strip header ◆ 1 x RGB LED strip header ◆ 2 x MCIO 8i connectors ◆ 3 x M.2 Socket 3 connectors ◆ 1 x M.2 Socket 1 connector ◆ 4 x SATA 6Gb/s connectors ◆ 1 x USB Type-C® header, with USB 3.2 Gen 2x2 support ◆ 1 x USB 3.2 Gen 1 header ◆ 2 x USB 2.0/1.1 headers ◆ 1 x front panel header ◆ 1 x front panel audio header ◆ 1 x Trusted Platform Module header (For the GC-TPM2.0 SPI V2 module only)

Internal Connectors	◆ 1 x serial port header ◆ 2 x temperature sensor headers ◆ 1 x reset jumper ◆ 1 x Clear CMOS jumper
BMC Connectors	◆ 1 x microSD card slot (IO_SD_CR1) ◆ 1 x PMBus connector (PM_BUS) ◆ 2 x LAN LED headers (LAN1_LED/LAN2_LED) ◆ 1 x MSG LED header (MSG_LED) ◆ 1 x MSG LED (MSG_LED1) ◆ 2 x BMC status LEDs (BMC_LED1/BMC_LED3) ◆ 1 x IPMB header (BMC_IPMB) ◆ 1 x Chassis intrusion header (BMC CSO) ◆ 1 x I2C_12 header (I2C_12) ◆ 1 x Location LED header (LOCATION) ◆ 1 x Location LED (LOC_LED) ◆ 1 x VGA switch (VGA_SW) ◆ 1 x BMC switch (BMC_SW) ◆ 1 x BMC LAN switch (BMC_LAN_SW) ◆ 1 x PSU switch (S_PSU_SW) ◆ 1 x IPMI switch (IPMI_SW)
Back Panel Connectors	◆ 1 x reset button ◆ 1 x power button ◆ 1 x Clear CMOS button ◆ 1 x Q-Flash Plus button ◆ 2 x USB4® USB Type-C® ports (DisplayPort) ◆ 2 x Mini-DisplayPort In ports ◆ 1 x Server management LAN port ◆ 6 x USB 3.2 Gen 2 Type-A ports (red) ◆ 1 x Dedicated BMC VGA port ◆ 2 x RJ-45 ports ◆ 2 x audio jacks ◆ 1 x optical S/PDIF Out connector
I/O Controller	◆ iTE® I/O Controller Chip
Hardware Monitor	◆ Voltage detection ◆ Temperature detection ◆ Fan speed detection ◆ Water cooling flow rate detection ◆ Fan fail warning ◆ Fan speed control * Whether the fan (pump) speed control function is supported will depend on the fan (pump) you install.
BIOS	◆ 1 x 256 Mbit flash ◆ Use of licensed AMI UEFI BIOS ◆ PnP 1.0a, DMI 2.7, WfM 2.0, SM BIOS 2.7, ACPI 5.0

Unique Features	◆	Support for GIGABYTE Control Center (GCC) * Available applications in GCC may vary by motherboard model. Supported functions of each application may also vary depending on motherboard specifications. ◆ Support for Q-Flash ◆ Support for Q-Flash Plus ◆ Support for native BMC software functionality ◆ Support for AI TOP Utility * AI TOP Utility is only supported on the Ubuntu operating system.
Bundled Software	◆	Norton® Internet Security (OEM version)
Operating System	◆	Support for Ubuntu 24.04 LTS ◆ Support for Windows 11 64-bit (Go to GIGABYTE's website for operating system support information.)
Form Factor	◆	E-ATX Form Factor; 30.5cm x 33.0cm

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

☞ Please visit the **SERVICE/SUPPORT\Utility** page on GIGABYTE's website to download the latest version of apps.
https://www.gigabyte.com/Support/Utility/Motherboard?m=ut

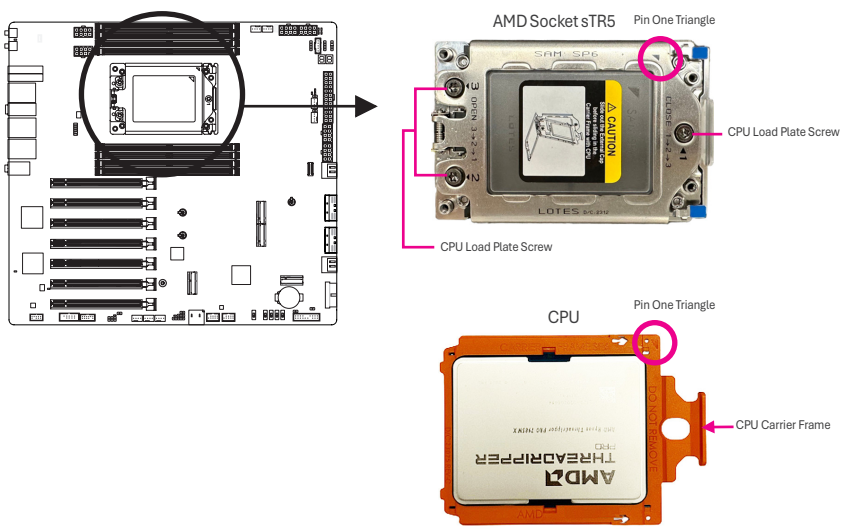
2-3 Installing the CPU and CPU Cooler

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.

A. Note the CPU Orientation

Note the pin one markings on the motherboard's CPU socket and the CPU.



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.

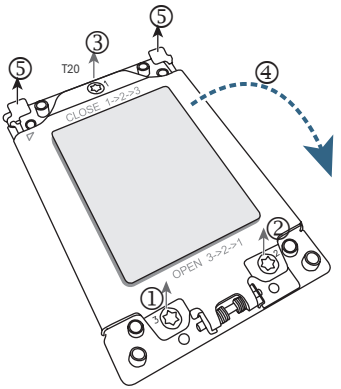
Please visit GIGABYTE's website for details on hardware installation.
https://www.gigabyte.com/WebPage/210/quick-guide.html?m=sw

B. Installing the CPU

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

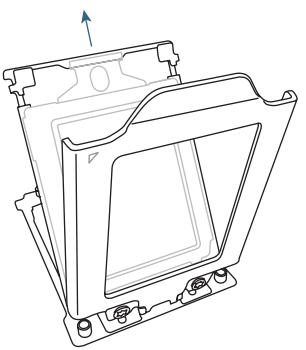
❶

Use a T20 star screwdriver to loosen the three screws marked as 1, 2, 3 on the CPU metal load plate. (To open the CPU metal load plate, loosen the screws in 3>2>1 sequence). Gently lift the load plate to its fully open position and 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.



❷

Use one hand to hold the rail frame and the other to slide the CPU socket cap out of the rail frame.

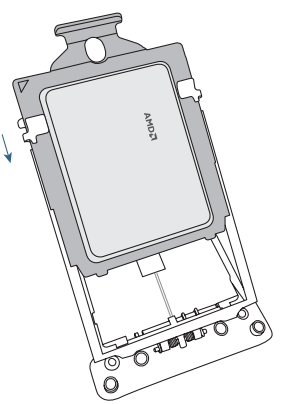


❸

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

Ensure that the edges of the CPU carrier frame are correctly installed on the rails.

Finally, fasten the screws on the CPU metal load plate. (To secure the CPU metal load plate, tighten the screws in a 1-2-3 sequence.)

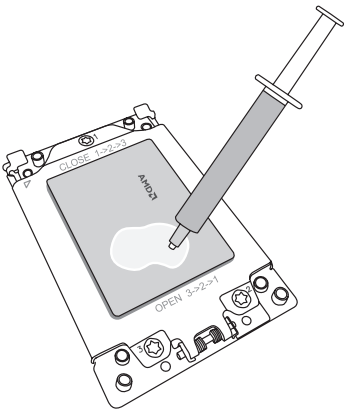


C. Installing the CPU Cooler

Be sure to install the CPU cooler after installing the CPU. (Actual installation process may differ depending the CPU cooler to be used. Refer to the user's manual for your CPU cooler.)

❶

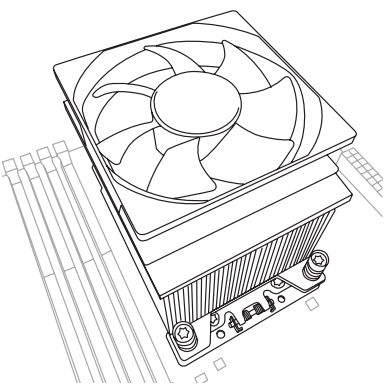
Apply an even and thin layer of thermal grease on the surface of the installed CPU.



❷

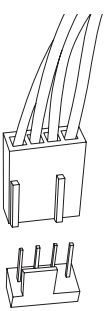
Place the cooler atop the CPU, aligning the four mounting screws with the mounting holes around the CPU socket. (Note that the spacing between the upper two screws is not the same as that between the lower two screws; please make sure to align the screws correctly.)

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.



❸

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



CPU_FAN

2-4 Installing the Memory

Read the following guidelines before you begin to install the memory:

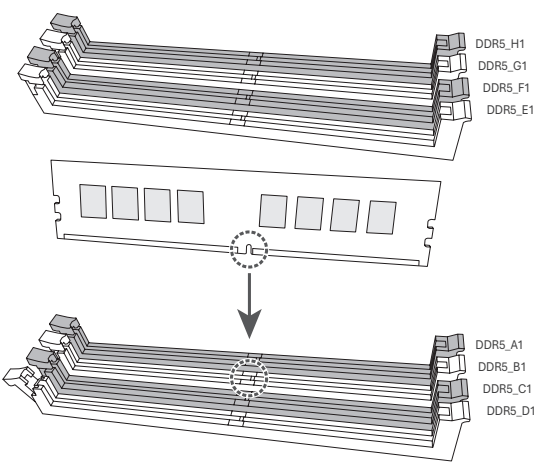
- Make sure that the motherboard supports the memory. It is recommended that memory of the same capacity, brand, speed, and chips be used. (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.)
- Always turn off the computer and unplug the power cord from the power outlet 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.
- To maintain stable memory operation, add additional cooling as needed based on system requirements.

Octa-channel Memory Configuration

This motherboard provides eight memory sockets and supports Octa-Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory. Enabling the 8-Channel memory mode will result in an eightfold increase in the original memory bandwidth.

The eight memory sockets are divided into eight channels:

- Channel A: DDR5_A1
- Channel B: DDR5_B1
- Channel C: DDR5_C1
- Channel D: DDR5_D1
- Channel E: DDR5_E1
- Channel F: DDR5_F1
- Channel G: DDR5_G1
- Channel H: DDR5_H1



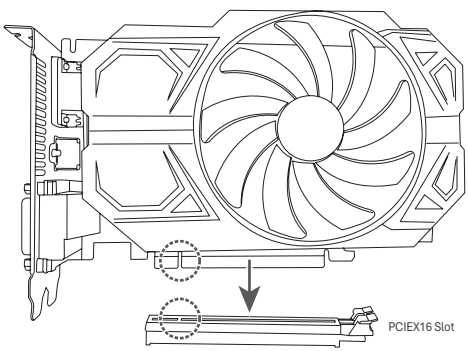
2-5 Installing an Expansion Card

Read the following guidelines before you begin to install an expansion card:

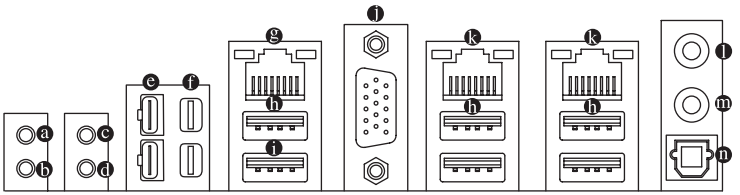
- Make sure the motherboard supports the expansion card. Carefully read the manual that came with your expansion card.
- Always turn off the computer and unplug the power cord from the power outlet before installing an expansion card to prevent hardware damage.

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 that the expansion card is fully seated in its 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.



2-6 Back Panel Connectors



a Reset Button

The reset button is used to restart the system.

The reset button provides you with several functions to use. To remap the button to perform different tasks, please navigate to the "BIOS Setup" page of GIGABYTE's website and search for "RST (MULTIKEY)" for more information.

b Power Button

The power button is used to turn the system power on or off.

c 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 (please navigate to the "BIOS Setup" page of GIGABYTE's website for more information).

d Q-Flash Plus Button (Note 1)

Q-Flash Plus allows you to update the BIOS when your system is off (S5 shutdown state). Save the latest BIOS on a USB thumb drive and plug it into the dedicated port, and then you can now flash the BIOS automatically by simply pressing the Q-Flash Plus button. The QFLED will flash when the BIOS matching and flashing activities start and will stop flashing when the main BIOS flashing is complete.

e USB4® USB Type-C® Port (DisplayPort (Note 2))

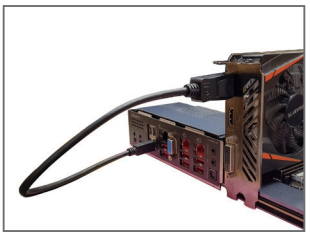
This port supports standard USB4® USB Type-C® and DisplayPort display output (Note 2). You can connect a USB4® USB Type-C® monitor to this port or use an adapter cable to connect a standard DisplayPort monitor. The maximum supported resolution is 3840x2160@240 Hz when using a DisplayPort monitor, but the actual resolutions supported are dependent on the monitor being used. Also, the connector features a reversible design, supports the USB4® specification, and is compatible with the USB 3.2 series (Gen 2x2/Gen 2/Gen 1) and USB 2.0 specifications. You can use this port for USB devices, too.

(Note 1) To enable the Q-Flash Plus function, please navigate to the "Unique Features" page of GIGABYTE's website for more information.

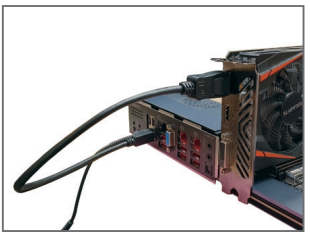
(Note 2) Graphics specifications may vary depending on graphics card support.

ⓕ Mini-DisplayPort In Port

The DisplayPort In port offers video outputs to the motherboard. Refer to the pictures below and the ⓒ USB4® USB Type-C® port (DisplayPort) for more information.



Step 1:
Connect the included DisplayPort cable (or Mini-DisplayPort cable) from the graphics card to the DisplayPort In port on the back panel.

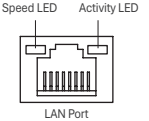


Step 2:
Then connect the USB Type-C® or DisplayPort devices to ⓒ USB4® USB Type-C® port (DisplayPort) to complete.

For USB Type-C® or DisplayPort monitor(s), if you connect the DisplayPort/Mini-DisplayPort cable to the upper DisplayPort In port, you must connect the monitor's cable to the first USB4® USB Type-C® port (the one near the Clear CMOS Button). If you connect the cable to the lower DisplayPort In port, you must connect the monitor's cable to the second USB4® USB Type-C® port (the one near the Q-Flash Plus Button).

ⓖ Server Management LAN Port

This network port is used to connect to the BMC controller, allowing administrators to perform remote monitoring, system configuration, and power management via IPMI or Web interface without entering the operating system. It supports a maximum transmission rate of 1 Gbps. The following describes the states of the LAN port LEDs.



Speed LED:

State	Description
Orange	1 Gbps data rate
Green	100 Mbps data rate
Off	10 Mbps data rate

Activity LED:

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

ⓗ USB 3.2 Gen 2 Type-A Port (Red)

The USB 3.2 Gen 2 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.

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

The USB 3.2 Gen 2 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 1), make sure to insert the USB flash drive into this port first.

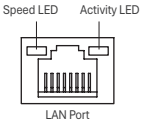
ⓙ Dedicated BMC VGA Port

This D-Sub connector is independently driven by the BMC and is dedicated to server management and maintenance. It allows administrators to directly access the POST screen, BIOS settings, and the BMC remote management interface without entering the operating system.

- 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.

ⓚ RJ-45 LAN Port

The LAN port provides an Internet connection with data rates of up to 10 Gbps. 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

Activity LED:

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

ⓛ Line Out/Front Speaker Out

The line out jack.

ⓜ Mic In/Rear Speaker Out

The Mic in jack.

ⓝ 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.

Audio Jack Configurations:

Jack	Headphone/ 2-channel	4-channel	5.1-channel	7.1-channel
ⓛ Line Out/Front Speaker Out	✔	✔	✔	✔
ⓜ Mic In/Rear Speaker Out		✔	✔	✔
Front Panel Line Out/Side Speaker Out				✔
Front Panel Mic In/Center/Subwoofer Speaker Out			✔	✔

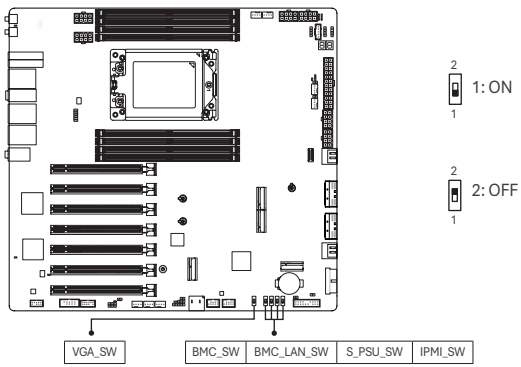
You can change the functionality of an audio jack using the audio software. To configure 7.1-channel audio, access the audio software for audio settings.

☞ Please visit GIGABYTE's website for details on configuring the audio software.
https://www.gigabyte.com/WebPage/698/realtek1220-audio.html

2-7 Switches and LEDs

System switches

This motherboard is equipped with several switches used to adjust hardware functions and management settings. All switches are set to the ON position by default.



- **VGA_SW (VGA Switch)**

  Controls whether to use the integrated BMC VGA display output. When set to ON, the POST/BIOS screen is output through the BMC VGA port; when set to OFF, the POST/BIOS screen is output through the discrete graphics card.

- **BMC_SW (BMC Switch)**

  Used to enable or disable BMC functions. When BMC_SW is set to OFF, the BMC VGA port will be disabled regardless of the VGA_SW status.

- **BMC_LAN_SW (BMC LAN Switch)**

  Controls whether the BMC uses a dedicated server management LAN port. Once enabled, remote system management can be performed via this dedicated management port.

- **S_PSU_SW (Power Supply Switch)**

  Enables the Smart PSU function for communication with PMBus-supported smart power supplies to monitor input power, output power, temperature, and efficiency information.

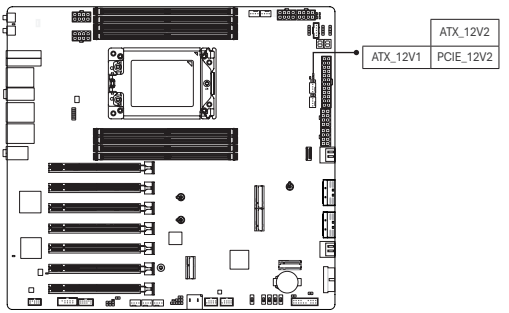
- **IPMI_SW (IPMI Switch)**

  Enables or disables the IPMI (Intelligent Platform Management Interface) function. Once enabled, management operations such as remote power control, KVM, hardware monitoring, and event logging can be performed via the BMC.

Before changing any of the above switch settings, ensure that the ATX power is turned off or the power cord is completely unplugged.

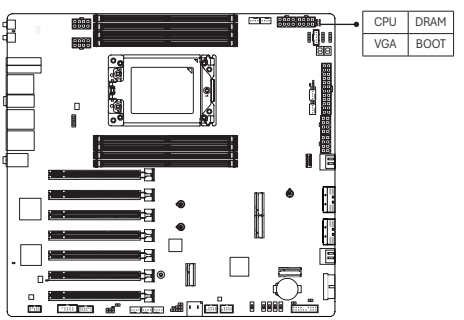
Power LEDs

This motherboard is equipped with three power LEDs to monitor the power status of the corresponding power connectors. When an LED is lit, it indicates that the corresponding power connector is receiving power properly.



Status LEDs

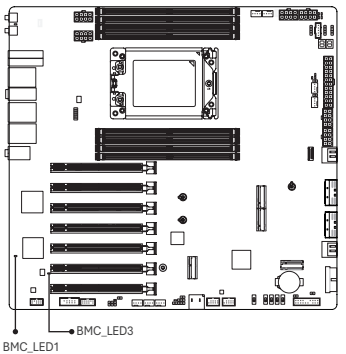
The status LEDs show whether the CPU, memory, graphics card, and operating system are working properly after system power-on. If the CPU/DRAM/VGA LED is on, that means the corresponding device is not working normally; if the BOOT LED is on, that means you haven't entered the operating system yet.



CPU: CPU status LED
DRAM: Memory status LED
VGA: Graphics card status LED
BOOT: Operating system status LED

BMC Status LEDs

These LEDs are used to display the BMC operational status or abnormalities.



BMC_LED1:

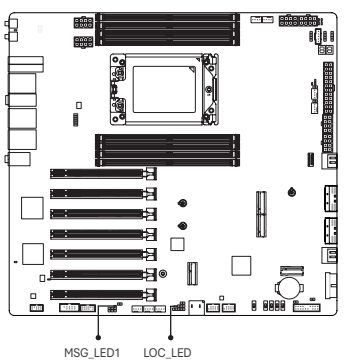
State	Description
On	BMC abnormal / disabled

BMC_LED3:

State	Description
On	BMC disabled
Blinking	BMC operating

MSG LED / Location LED

These LEDs are centrally controlled by the BMC. The MSG LED (MSG_LED1) is used to display system status or alarms, while the Location LED (LOC_LED) is used to quickly identify the physical location of the motherboard in a multi-server environment.



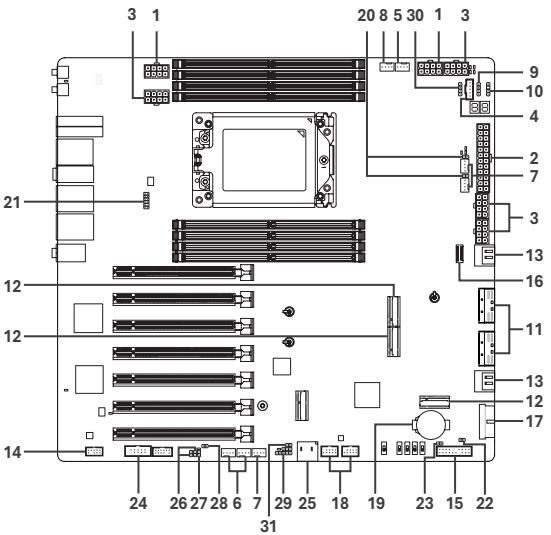
MSG_LED1:

State	Description
On	System warning

LOC_LED:

State	Description
On	Location indication

2-8 Internal Connectors



1) ATX_12V1/ATX_12V2	17) FU3A_5G
2) ATX	18) F_USB1/FUSB_2
3) PCIE_12V1/PCIE_12V2/PCIE_12V3/PCIE_12V4	19) BAT
4) PM_BUS	20) EC_TEMP1/EC_TEMP2
5) CPU_FAN	21) SPI_TPM
6) SYS_FAN1/SYS_FAN2	22) CLR_CMOS
7) FAN5_PUMP/FAN7_PUMP/FAN8_PUMP	23) RST
8) CPU_OPT	24) COMB
9) LED_C	25) IO_SD_CR1
10) ARGB_V2_2	26) LAN1_LED/LAN2_LED
11) MCIOX8_1/MCIOX8_2	27) MSG_LED
12) M2A_CPU/M2B_CPU/M2C_SB	28) BMC_CSO
13) SATA3 0/1/2/3	29) LOCATION
14) F_AUDIO	30) BMC_IPMB
15) F_PANEL	31) I2C_12
16) FU3C_20G	

Read the following guidelines before connecting external devices:

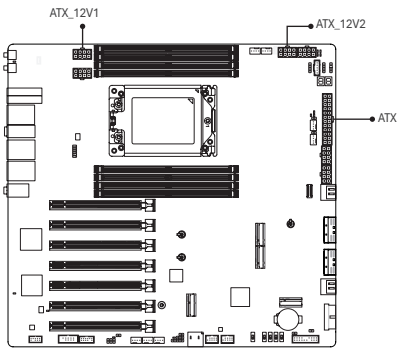
- First make sure your devices are compliant with the connectors you wish to connect.
- Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.
- After installing the device and before turning on the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

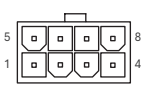
1/2)ATX_12V1/ATX_12V2/ATX (2x4 12V Power Connectors and 2x12 Main Power Connector)

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 connectors (ATX_12V1/ATX_12V2) 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 to use a power supply with 1200W or greater when installing one graphics card; when installing two or more graphics cards, it is recommended to use a power supply with 1600W or greater to provide sufficient power. If a power supply that does not provide the required power is used, it can result in an unstable or unbootable system.

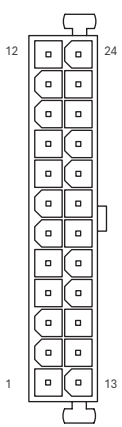




ATX_12V1/ATX_12V2

ATX_12V1/ATX_12V2:

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



ATX

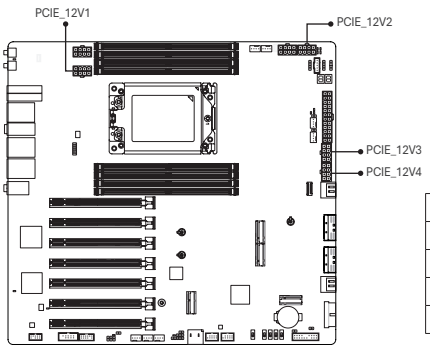
ATX:

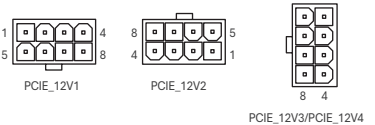
Pin No.	Definition	Pin No.	Definition
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON (soft On/Off)
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power Good	20	NC
9	5VSB (stand by +5V)	21	+5V
10	+12V	22	+5V
11	+12V (Only for 2x12-pin ATX)	23	+5V (Only for 2x12-pin ATX)
12	3.3V (Only for 2x12-pin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

3) PCIE_12V1/PCIE_12V2/PCIE_12V3/PCIE_12V4 (PCIe Power Connectors)

The power connectors provide auxiliary power to the onboard PCI Express x16 slots. When two or more graphics cards are installed, we recommend connecting the power supply cables to the connectors to ensure system stability.

When installing two power supplies, make sure to connect the included dual 24-pin ATX power supply adapter cable to the ATX connector on the motherboard, and then plug the other two ends into the main and secondary power supplies. Ensure that both power supplies are of the same brand and model.



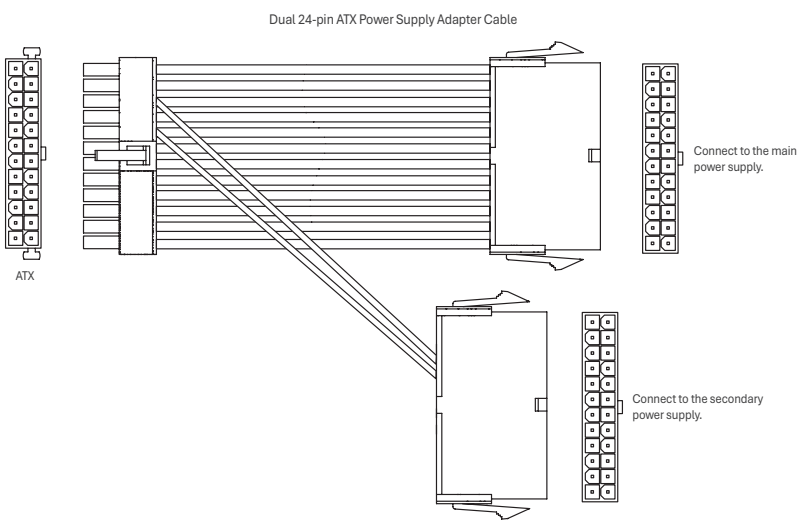


Pin No.	Definition	Pin No.	Definition
1	+12V	5	GND
2	+12V	6	GND
3	+12V	7	GND
4	GND	8	GND

* Power Connector Configurations:

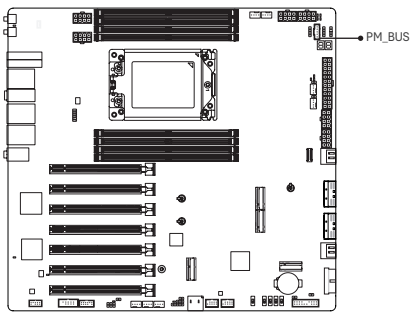
	ATX	ATX_12V1	ATX_12V2	PCIE_12V1	PCIE_12V2	PCIE_12V3	PCIE_12V4
1 Power supply	✔	✔	✔	--	--	✔	✔
2 Power supplies	✔	✔	✔	✔	✔	✔	✔

(" ✔ "=Connected, "- -"=Not Connected)



4) PM_BUS (PMBus Connector)

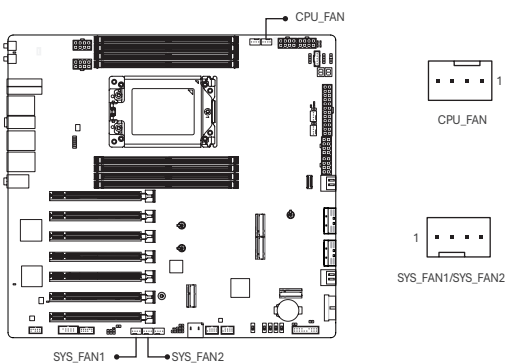
This connector is used to connect a Smart PSU that supports the PMBus protocol, allowing the system to monitor critical data such as input/output power, voltage, current, temperature, and energy efficiency of the power supply in real time.



Pin No.	Definition
1	SCL
2	SDA
3	ALT
4	GND
5	VCC3

5/6)CPU_FAN/SYS_FAN1/SYS_FAN2 (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 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.

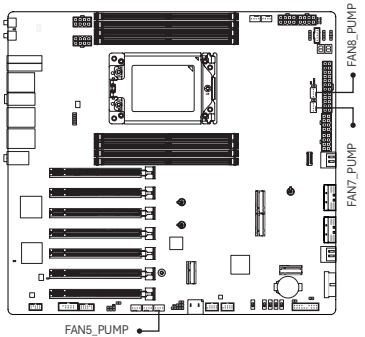


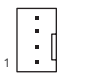
Pin No.	Definition
1	GND
2	Voltage Speed Control
3	Sense
4	PWM Speed Control

- 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.

7) FAN5_PUMP/FAN7_PUMP/FAN8_PUMP (System Fan/Water Cooling Pump Headers)

The fan/pump 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. For optimum heat dissipation, it is recommended that a system fan be installed inside the chassis. The header also provides speed control for a water cooling pump. Please navigate to the "BIOS Setup" page of GIGABYTE's website and search for "Smart Fan 6" for more information.



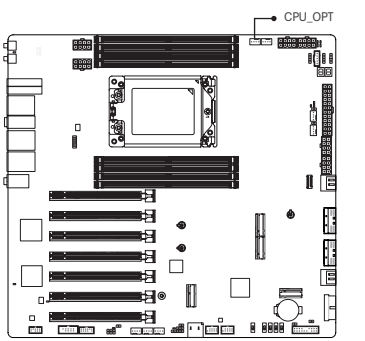




Pin No.	Definition
1	GND
2	Voltage Speed Control
3	Sense
4	PWM Speed Control

8) CPU_OPT (CPU Fan/Water Cooling Pump Header)

The fan/pump 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.





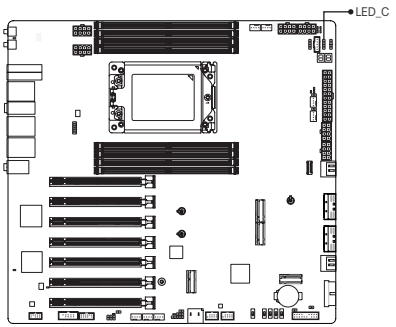
Pin No.	Definition
1	GND
2	Voltage Speed Control
3	Sense
4	PWM Speed Control

Connector	CPU_FAN	SYS_FAN1/2	FAN5/7/8_PUMP	CPU_OPT
Maximum Current	2A	2A	2A	2A
Maximum Power	24W	24W	24W	24W

- 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.

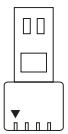
9) LED_C (RGB LED Strip Header)

The header 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



RGB LED Strip

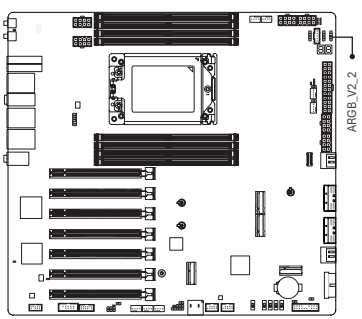


12V

Connect your RGB 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 (12V) of this header. Incorrect connection may lead to the damage of the LED strip.

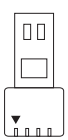
10) ARGB_V2_2 (Addressable RGB Gen2 LED Strip Header)

The header can be used to connect a standard 5050 addressable RGB Gen2 LED strip, with maximum power rating of 3A (5V) and maximum number of 256 LEDs.





Pin No.	Definition
1	V (5V)
2	Data
3	No Pin
4	GND



Addressable RGB Gen2 LED Strip



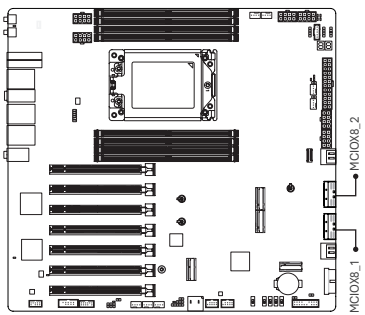
Connect your addressable RGB Gen2 LED strip to the header. The power pin (marked with a triangle on the plug) of the LED strip must be connected to Pin 1 of the addressable LED strip header. Incorrect connection may lead to the damage of the LED strip.

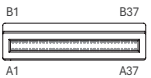
For how to turn on/off the lights of the LED strip, please navigate to the "Unique Features" page of GIGABYTE's website.

- To avoid abnormal LED behavior, do not connect addressable RGB Gen1 LED strips and addressable RGB Gen2 LED strips to the same header at the same time.
- Before installing or removing 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) MCIOX8_1/MCIOX8_2 (MCIO 8i Connectors)

These connectors support data transfer over PCIe 5.0 x8 lanes. Each connector can connect two NVMe SSDs or other PCIe devices. MCIO connectors can be used to create a RAID array; however, PCIe SSDs cannot be used to create a RAID set together with SATA hard drives. Please navigate to the "Configuring a RAID Set" page of GIGABYTE's website for instructions on configuring a RAID array.





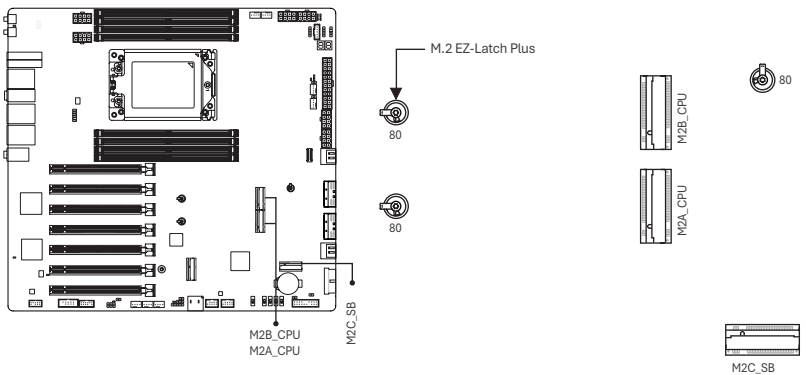
* Types of SSDs supported by each MCIO 8i connector:

	MCIO x8	MCIO x4	SATA SSD
MCIOX8_1	✔	✔	✕
MCIOX8_2	✔	✔	✔

Pin No.	Definition	Pin No.	Definition	Pin No.	Definition	Pin No.	Definition
A1	GND	A21	RXN4	B1	GND	B21	TXN4
A2	RXP0	A22	GND	B2	TXP0	B22	GND
A3	RXN0	A23	RXP5	B3	TXN0	B23	TXP5
A4	GND	A24	RXN5	B4	GND	B24	TXN5
A5	RXP1	A25	GND	B5	TXP1	B25	GND
A6	RXN1	A26	BP_TYPEB	B6	TXN1	B26	SCL1
A7	GND	A27	WAKE_B-	B7	GND	B27	SDA1
A8	BP_TYPEA	A28	GND	B8	SCL0	B28	GND
A9	WAKE_A-	A29	CLKBP	B9	SDA0	B29	PERSTB-
A10	GND	A30	CLKBN	B10	GND	B30	PRESNTB-
A11	CLKAP	A31	GND	B11	PERSTA-	B31	GND
A12	CLKAN	A32	RXP6	B12	PRSNTA-	B32	TXP6
A13	GND	A33	RXN6	B13	GND	B33	TXN6
A14	RXP2	A34	GND	B14	TXP2	B34	GND
A15	RXN2	A35	RXP7	B15	TXN2	B35	TXP7
A16	GND	A36	RXN7	B16	GND	B36	TXN7
A17	RXP3	A37	GND	B17	TXP3	B37	GND
A18	RXN3	G3	GND	B18	TXN3	G1	GND
A19	GND	G4	GND	B19	GND	G2	GND
A20	RXP4			B20	TXP4		

12) M2A_CPU/M2B_CPU/M2C_SB (M.2 Socket 3 Connectors)

There are two types of M.2 SSDs: M.2 SATA SSDs and M.2 PCIe SSDs. This motherboard only supports M.2 PCIe SSDs. M.2 connectors can be used to create a RAID array; however, M.2 PCIe SSDs cannot be used to create a RAID set together with SATA hard drives. Please navigate to the "Configuring a RAID Set" page of GIGABYTE's website 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: Use a screwdriver to loosen the screw and remove the heatsink.

Step 2: Remove the protective film from the thermal pad on the M.2 connector. Insert the M.2 SSD into the M.2 connector at an angle.

Step 3: Press down on the front end of the M.2 SSD and make sure the M.2 SSD is secured by the clip. Remove the protective film from the thermal pad on the bottom of the heatsink. Then replace the heatsink and secure it to the original hole.

* Types of M.2 SSDs supported by each M.2 connector:

	M.2 PCIe x4 SSD	M.2 PCIe x2 SSD	M.2 SATA SSD
M2A_CPU	✔	✔	✕
M2B_CPU	✔	✔	✕
M2C_SB	✔	✔	✕

☞ Please visit GIGABYTE's website for details on using M.2 EZ-Latch Plus.

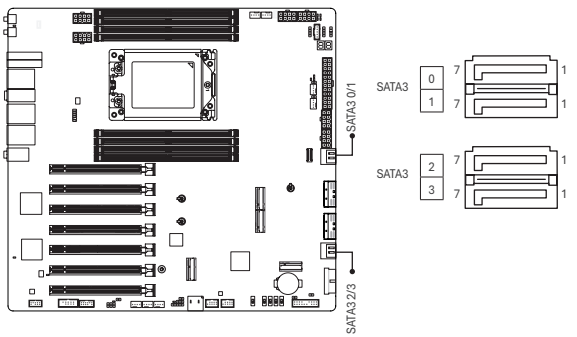
M.2 SSD installation with M.2 EZ-Latch Plus: https://www.gigabyte.com/WebPage/920/M2-latchplus.html

M.2 SSD removal with M.2 EZ-Latch Plus: https://www.gigabyte.com/WebPage/921/removeM2.html

* Motherboard heatsink design may vary by model.

13) SATA3 0/1/2/3 (SATA 6Gb/s Connectors)

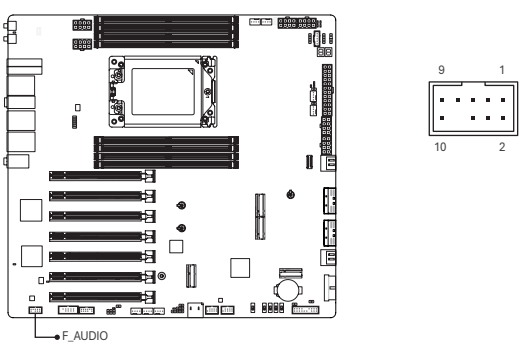
The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s and SATA 1.5Gb/s standard. Each SATA connector supports a single SATA device. The SATA connectors support RAID 0, RAID 1, RAID 5, and RAID 10. Please navigate to the "Configuring a RAID Set" page of GIGABYTE's website for instructions on configuring a RAID array.



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

14) 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.

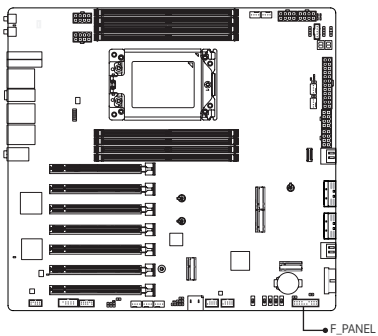


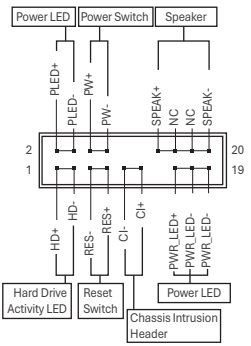
Pin No.	Definition
1	MIC L
2	GND
3	MIC R
4	NC
5	Head Phone R
6	MIC Detection
7	SENSE_SEND
8	No Pin
9	Head Phone L
10	Head Phone Detection

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.

15) F_PANEL (Front Panel Header)

Connect the power switch, reset switch, speaker, chassis intrusion switch/sensor and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.





- **PLED/PWR_LED** (Power LED):

System Status	LED
S0	On
S3/S4/S5	Off

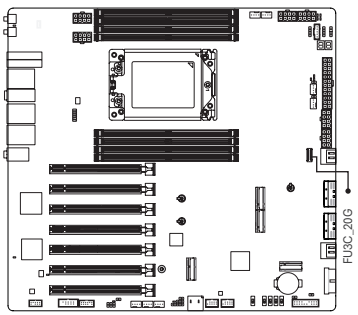
Connects to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S3/S4 sleep state or powered off (S5).

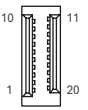
- **PW** (Power Switch):
  Connects to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch (please navigate to the "BIOS Setup" page of GIGABYTE's website and search for "Soft-Off by PWR-BTTN" for more information).
- **SPEAK** (Speaker):
  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):
  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):
  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):
  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**: 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) FU3C_20G (USB Type-C® Header, with USB 3.2 Gen 2x2 Support)

The header conforms to USB 3.2 Gen 2x2 specification and can provide one USB port.

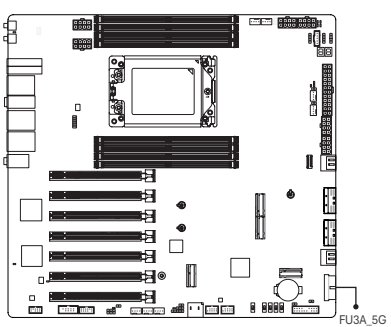


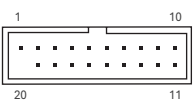


Pin No.	Definition	Pin No.	Definition
1	VBUS	11	VBUS
2	TX1+	12	TX2+
3	TX1-	13	TX2-
4	GND	14	GND
5	RX1+	15	RX2+
6	RX1-	16	RX2-
7	VBUS	17	GND
8	CC1	18	D-
9	SBU1	19	D+
10	SBU2	20	CC2

17) FU3A_5G (USB 3.2 Gen 1 Header)

The header conforms 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.



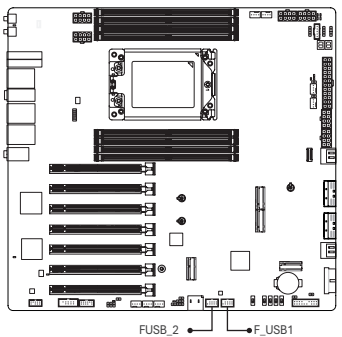


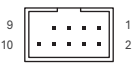
Pin No.	Definition	Pin No.	Definition
1	VBUS	11	D2+
2	SSRX1-	12	D2-
3	SSRX1+	13	GND
4	GND	14	SSTX2+
5	SSTX1-	15	SSTX2-
6	SSTX1+	16	GND
7	GND	17	SSRX2+
8	D1-	18	SSRX2-
9	D1+	19	VBUS
10	NC	20	No Pin

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

18) F_USB1/FUSB_2 (USB 2.0/1.1 Headers)

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.



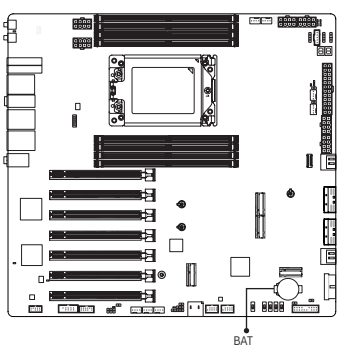


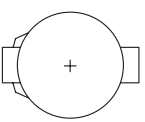
Pin No.	Definition
1	Power (5V)
2	Power (5V)
3	USB DX-
4	USB DY-
5	USB DX+
6	USB DY+
7	GND
8	GND
9	No Pin
10	NC

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.

19) 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.





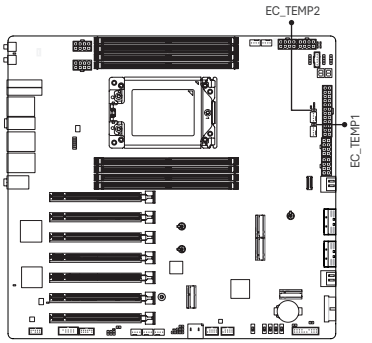
You may clear the CMOS values by removing the battery:

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.

20) EC_TEMP1/EC_TEMP2 (Temperature Sensor Headers)

Connect the thermistor cables to the headers for temperature detection.

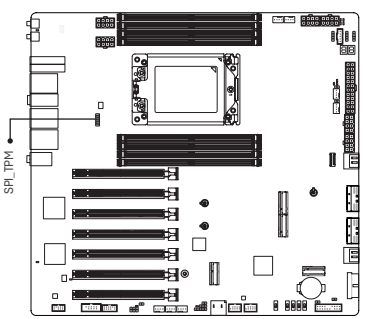


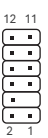


Pin No.	Definition
1	SENSOR IN
2	GND

21) SPI_TPM (Trusted Platform Module Header)

You may connect an SPI TPM (Trusted Platform Module) to this header.

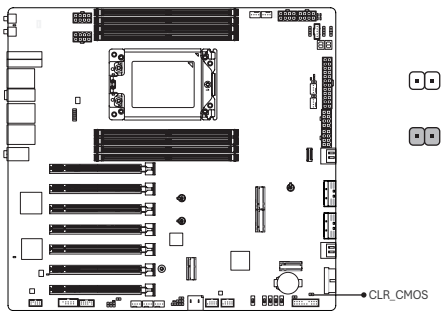




Pin No.	Definition
1	Data Output
2	Power (1.8V)
3	No Pin
4	NC
5	Data Input
6	CLK
7	Chip Select
8	GND
9	IRQ
10	NC
11	NC
12	RST

22) CLR_CMOS (Clear CMOS Jumper)

Use this jumper to clear the BIOS configuration and reset the CMOS values to factory defaults. To clear the CMOS values, use a metal object like a screwdriver to touch the two pins for a few seconds.



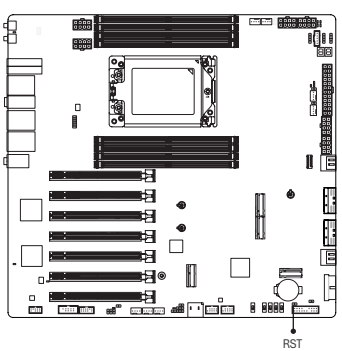
Open: Normal

Short: Clear CMOS Values

- Always turn off your computer and unplug the power cord from the power outlet before clearing the CMOS values.
- After system restart, go to BIOS Setup to load factory defaults (select Load Optimized Defaults) or manually configure the BIOS settings (please navigate to the "BIOS Setup" page of GIGABYTE's website for more information).

23) RST (Reset Jumper)

The reset jumper can connect 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.



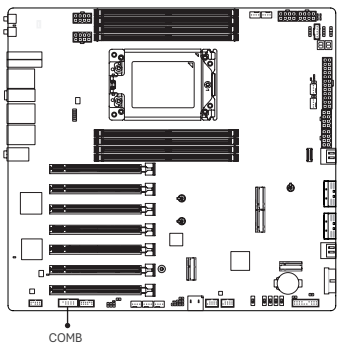
1

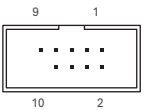
Pin No.	Definition
1	Reset
2	GND

The reset jumper provides you with several functions to use. To remap the button to perform different tasks, please navigate to the "BIOS Setup" page of GIGABYTE's website and search for "RST_SW (MULTIKEY)" for more information.

24) COMB (Serial Port Header)

The COM header can provide one serial port via an optional COM port cable. This header is for data transfer only and does not support hardware device connection.

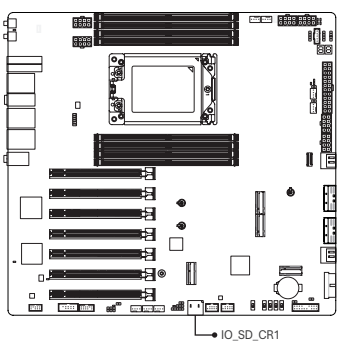




Pin No.	Definition
1	NDCD-
2	NSIN
3	NSOUT
4	NDTR-
5	GND
6	NDSR-
7	NRTS-
8	NCTS-
9	NRI-
10	No Pin

25) IO_SD_CR1 (microSD Card Slot)

The microSD slot supports V2.00 (SDHC) and V3.00 (SDXC) memory cards for storing BMC Event Logs. Before installing or removing the memory card, please turn off all power, including redundant power supplies. After completing the installation or removal, restart the system.

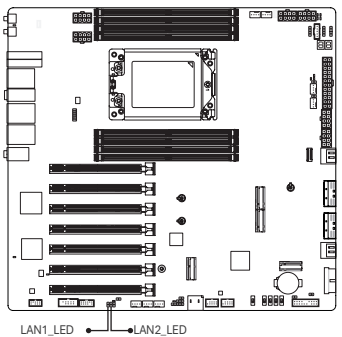




- Please use a compatible memory card to avoid data loss or hardware damage.
- This slot only supports BMC functions and is not accessible by the operating system.

26) LAN1_LED/LAN2_LED (LAN LED Headers)

These headers are used to connect external LEDs to display the connectivity status of the corresponding LAN ports. The corresponding LED will light up when the network cable is connected.

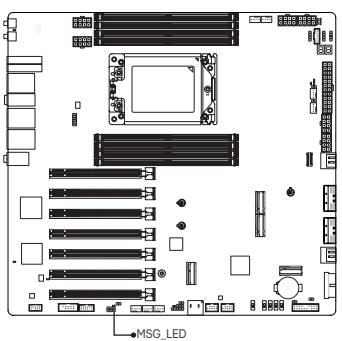




Pin No.	Definition
1	LAN_LED+
2	LAN_LED-

27) MSG_LED (MSG LED Header)

This header is used to connect an external LED to indicate the system message status. This LED is controlled by the BMC.

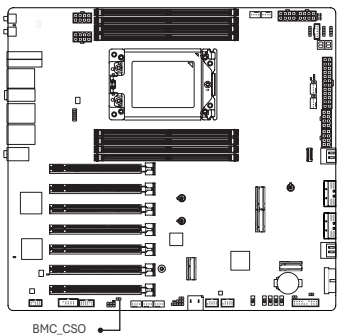




Pin No.	Definition
1	MSG_LED+
2	MSG_LED-

28) BMC_CSO (Chassis Intrusion Header)

Connect the chassis intrusion switch to this header to enable the BMC chassis intrusion monitoring function.

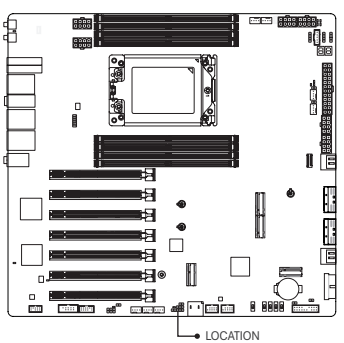




Pin No.	Definition
1	BMC_CSO+
2	BMC_CSO-

29) LOCATION (Location Button Header)

This header allows you to connect the locator button and locator LED on the front panel. Pressing the locator button activates the system identification function, causing the LED to light up to help identify the physical location of the host. Note: The button must be held for more than one second to ensure that the signal is triggered and the LED is lit.

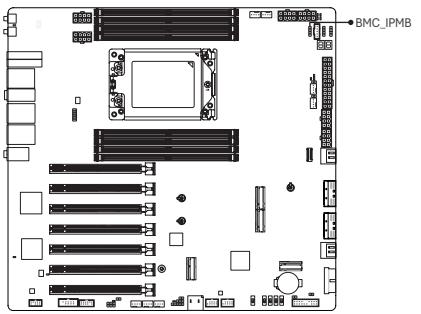




Pin No.	Definition
1	LOC_LED+
2	LOC_LED-
3	NC
4	LOC_BTN+
5	LOC_BTN-

30) BMC_IPMB (BMC IPMB Interface)

This header is used to establish communication between the BMC and other system management devices.

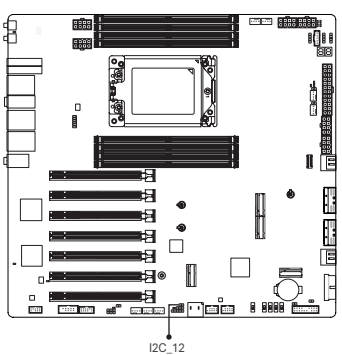




Pin No.	Definition
1	IPMB_DAT
2	GND
3	IPMB_CLK
4	VCC

31) I2C_12

This header allows you to connect a communication interface, providing serial communication between the system management controller and peripheral devices.





Pin No.	Definition
1	I2C_12+
2	I2C_12-

Chapter 3 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 Q-Flash Plus utility.

- Q-Flash allows the user to quickly and easily upgrade or back up BIOS without entering the operating system.
- Q-Flash Plus allows you to update the BIOS when your system is off (S5 shutdown state). Save the latest BIOS on a USB thumb drive and plug it into the dedicated port, and then you can now flash the BIOS automatically by simply pressing the Q-Flash Plus button.

For instructions on using the Q-Flash and Q-Flash Plus utilities, please navigate to the "Unique Features" page of GIGABYTE's website and search for "BIOS Update Utilities."

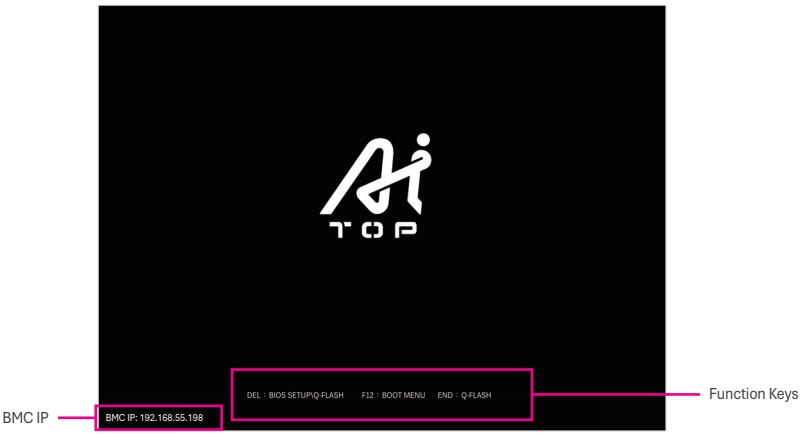


- Because BIOS flashing is potentially risky, if you do not encounter problems using the current version of BIOS, it is recommended that you not flash the BIOS. To flash the BIOS, do it with caution. Inadequate BIOS flashing may result in system malfunction.
- It is recommended that you not alter the 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 introductions of the battery/clear CMOS jumper/button in Chapter 2 or navigate to the "BIOS Setup" page of GIGABYTE's website and search for "Load Optimized Defaults" for how to clear the CMOS values.

☞ Please visit GIGABYTE's website for details on configuring BIOS Setup.
https://www.gigabyte.com/WebPage/1140/amd-wrx90-bios.html

Startup Screen:

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



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.

BMC IP:

Displays the random IP address of the motherboard. You can also view this setting in the BIOS under "Server Mgmt > BMC network configuration > Station IP address".

Chapter 4 Installing the Operating System and Drivers

4-1 Operating System Installation

With the correct BIOS settings, you are ready to install the operating system.

As some operating systems already include RAID driver, you do not need to install separate RAID driver during the Windows installation process. After the operating system is installed, we recommend that you install all required drivers from the GIGABYTE Control Center to ensure system performance and compatibility. If the operating system to be installed requires that you provide additional RAID driver during the OS installation process, please refer to the steps below:

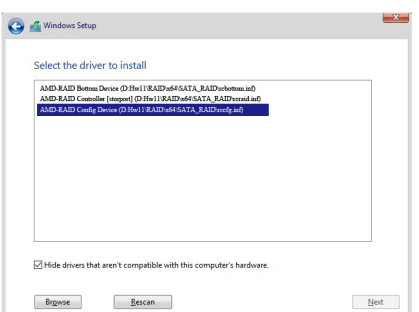
Step 1:
Go to GIGABYTE's website, browse to the motherboard model's web page, download the AMD RAID Preinstall Driver file on the **Support\Download\SATA RAID/AHCI** page, unzip the file and copy the files to your USB thumb drive.

Step 2:
Boot from the Windows setup disc and perform standard OS installation steps. When the screen requesting you to load the driver appears, select **Browse**.

Step 3:
Insert the USB thumb drive and then browse to the location of the drivers. Follow the on-screen instructions to install the following three drivers in order.

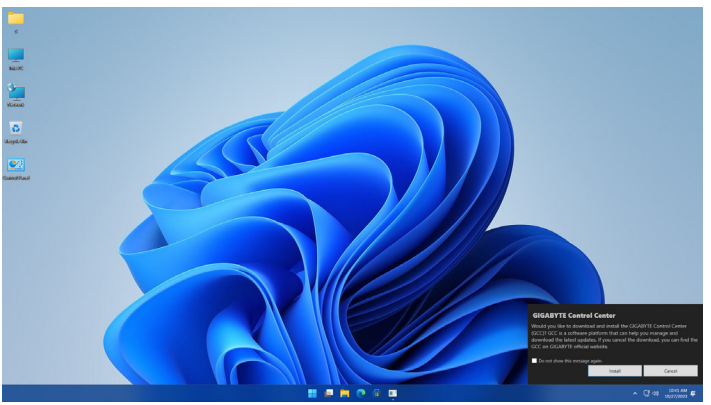
① **AMD-RAID Bottom Device**
② **AMD-RAID Controller**
③ **AMD-RAID Config Device**

Finally, continue the OS installation.

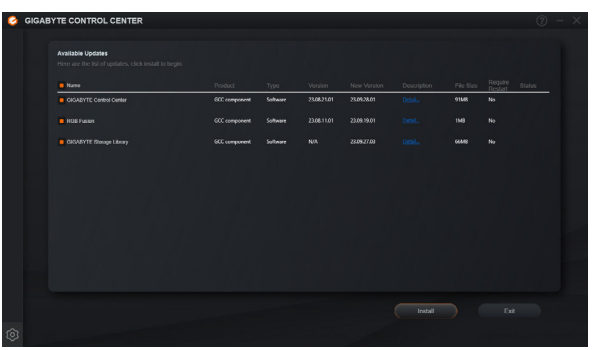


4-2 Drivers Installation

After you install the operating system, a dialog box will appear on the bottom-right corner of the desktop asking if you want to download and install the drivers and GIGABYTE applications via GIGABYTE Control Center (GCC). Click **Install** to proceed with the installation. (In BIOS Setup, make sure **Settings\IO Ports\ Gigabyte Utilities Downloader Configuration\Gigabyte Utilities Downloader** is set to **Enabled**.)



When the EULA (End User License Agreement) dialog box appears, press <Accept> to install GIGABYTE Control Center (GCC). On the GIGABYTE CONTROL CENTER screen, select the drivers and applications you want to install and click **Install**.

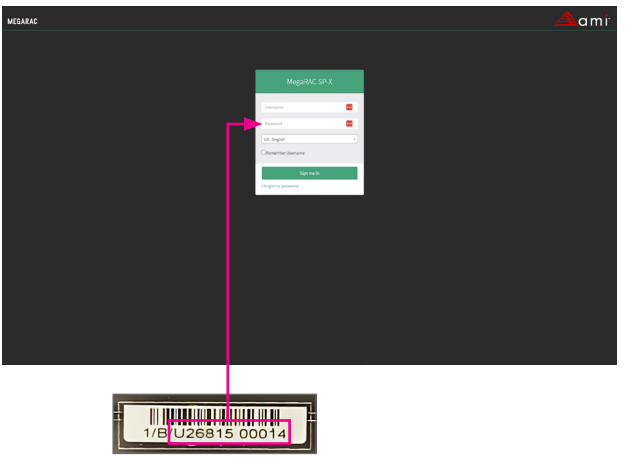


Before the installation, make sure the system is connected to the Internet.

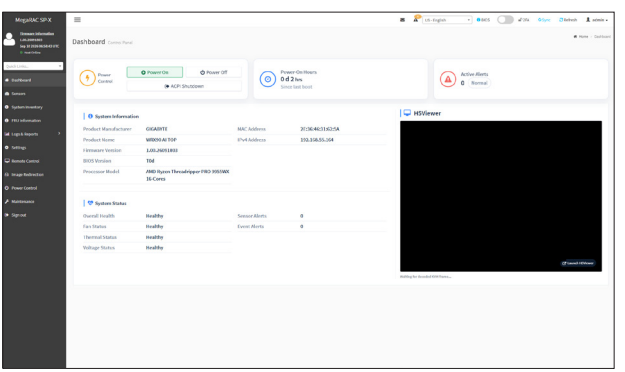
- Please visit GIGABYTE's website for more software information.
  https://www.gigabyte.com/WebPage/1139/amd-wrx90-app.html
- Please visit GIGABYTE's website for more troubleshooting information.
  https://www.gigabyte.com/WebPage/351/faq.html

4-3 AMI MegaRAC SP-X

Enter the BMC IP address in a web browser to access the login page. The default username is **admin**. The default password consists of the 11 alphanumeric characters following the second forward slash (/) on the SFIS label (do not include spaces when entering). Please locate the SFIS label on the motherboard to obtain the password.



Once logged in, you can view various system information.



Chapter 5 Appendix

5-1 Configuring a RAID Set

RAID Levels

	RAID 0	RAID 1	RAID 5	RAID 10
Minimum Number of Hard Drives	≥2	2	≥3	4
Array Capacity	Number of hard drives * Size of the smallest drive	Size of the smallest drive	(Number of hard drives -1) * Size of the smallest drive	(Number of hard drives/2) * Size of the smallest drive
Fault Tolerance	No	Yes	Yes	Yes

Before you begin, please prepare the following items:

This motherboard supports RAID 0, RAID 1, RAID 5, and RAID 10. Prepare the correct number of hard drives as indicated in the table above before configuring a RAID array.

- SATA hard drives or SSDs. To ensure optimal performance, it is recommended that you use two hard drives with identical model and capacity.
- Windows setup disc.
- An Internet connected computer.
- A USB thumb drive.

An M.2 PCIe SSD cannot be used to set up a RAID set either with an M.2 SATA SSD or a SATA hard drive.

☞ Please visit GIGABYTE's website for details on configuring a RAID array.
https://www.gigabyte.com/WebPage/1141/amd-wrx90-raid.html

5-2 Debug LED Codes

Regular Boot

Code	Description
10	PEI Core is started.
11	Pre-memory CPU initialization is started.
12~14	Reserved.
15	Pre-memory North-Bridge initialization is started.
16~18	Reserved.
19	Pre-memory South-Bridge initialization is started.
1A~2A	Reserved.
2B~2F	Memory initialization.
31	Memory installed.
32~36	CPU PEI initialization.
37~3A	IOH PEI initialization.
3B~3E	PCH PEI initialization.
3F~4F	Reserved.
60	DXE Core is started.
61	NVRAM initialization.
62	Installation of the PCH runtime services.
63~67	CPU DXE initialization is started.
68	PCI host bridge initialization is started.
69	IOH DXE initialization.
6A	IOH SMM initialization.
6B~6F	Reserved.
70	PCH DXE initialization.
71	PCH SMM initialization.
72	PCH devices initialization.
73~77	PCH DXE initialization (PCH module specific).
78	ACPI Core initialization.
79	CSM initialization is started.
7A~7F	Reserved for AMI use.
80~8F	Reserved for OEM use (OEM DXE initialization codes).
90	Phase transfer to BDS (Boot Device Selection) from DXE.
91	Issue event to connect drivers.

Code	Description
92	PCI Bus initialization is started.
93	PCI Bus hot plug initialization.
94	PCI Bus enumeration for detecting how many resources are requested.
95	Check PCI device requested resources.
96	Assign PCI device resources.
97	Console Output devices connect (ex. Monitor is lighted).
98	Console input devices connect (ex. PS2/USB keyboard/mouse are activated).
99	Super IO initialization.
9A	USB initialization is started.
9B	Issue reset during USB initialization process.
9C	Detect and install all currently connected USB devices.
9D	Activated all currently connected USB devices.
9E~9F	Reserved.
A0	IDE initialization is started.
A1	Issue reset during IDE initialization process.
A2	Detect and install all currently connected IDE devices.
A3	Activated all currently connected IDE devices.
A4	SCSI initialization is started.
A5	Issue reset during SCSI initialization process.
A6	Detect and install all currently connected SCSI devices.
A7	Activated all currently connected SCSI devices.
A8	Verify password if needed.
A9	BIOS Setup is started.
AA	Reserved.
AB	Wait user command in BIOS Setup.
AC	Reserved.
AD	Issue Ready To Boot event for OS Boot.
AE	Boot to Legacy OS.
AF	Exit Boot Services.
B0	Runtime AP installation begins.
B1	Runtime AP installation ends.
B2	Legacy Option ROM initialization.
B3	System reset if needed.

Code	Description
B4	USB device hot plug-in.
B5	PCI device hot plug.
B6	Clean-up of NVRAM.
B7	Reconfigure NVRAM settings.
B8~BF	Reserved.
C0~CF	Reserved.

S3 Resume

Code	Description
E0	S3 Resume is stared (called from DXE IPL).
E1	Fill boot script data for S3 resume.
E2	Initializes VGA for S3 resume.
E3	OS S3 wake vector call.

Recovery

Code	Description
F0	Recovery mode will be triggered due to invalid firmware volume detection.
F1	Recovery mode will be triggered by user decision.
F2	Recovery is started.
F3	Recovery firmware image is found.
F4	Recovery firmware image is loaded.
F5~F7	Reserved for future AMI progress codes.

Error

Code	Description
50~55	Memory initialization error occurs.
56	Invalid CPU type or speed.
57	CPU mismatch.
58	CPU self test failed or possible CPU cache error.
59	CPU micro-code is not found or micro-code update is failed.
5A	Internal CPU error.
5B	Reset PPI is failed.
5C~5F	Reserved.
D0	CPU initialization error.
D1	IOH initialization error.

Code	Description
D2	PCH initialization error.
D3	Some of the Architectural Protocols are not available.
D4	PCI resource allocation error. Out of Resources.
D5	No Space for Legacy Option ROM initialization.
D6	No Console Output Devices are found.
D7	No Console Input Devices are found.
D8	It is an invalid password.
D9~DA	Can't load Boot Option.
DB	Flash update is failed.
DC	Reset protocol is failed.
DE~DF	Reserved.
E8	S3 resume is failed.
E9	S3 Resume PPI is not found.
EA	S3 Resume Boot Script is invalid.
EB	S3 OS Wake call is failed.
EC~EF	Reserved.
F8	Recovery PPI is invalid.
F9	Recovery capsule is not found.
FA	Invalid recovery capsule.
FB~FF	Reserved.

Regulatory Notices

United States of America, Federal Communications Commission Statement

Supplier's Declaration of Conformity
47 CFR § 2.1077 Compliance Information

Product Name: **Motherboard**
Trade Name: **GIGABYTE**
Model Number: **WRX90 AI TOP**

Responsible Party – U.S. Contact Information: **G.B.T. Inc.**
Address: 17358 Railroad street, City Of Industry, CA91748
Tel.: 1-626-854-9338
Internet contact information: https://www.gigabyte.com

FCC Compliance Statement:
This device complies with Part 15 of the FCC Rules, Subpart B, Unintentional Radiators.
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 manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Canadian Department of Communications Statement
This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications. This class B digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

European Union (EU) CE Declaration of Conformity
This device complies with the following directives: Electromagnetic Compatibility Directive 2014/30/EU, Low-voltage Directive 2014/35/EU, RoHS directive (recast) 2011/65/EU & the 2015/863 Statement. This product has been tested and found to comply with all essential requirements of the Directives.

European Union (EU) RoHS (recast) Directive 2011/65/EU & the European Commission Delegated Directive (EU) 2015/863 Statement
GIGABYTE prohibits the intentional addition of hazardous substances (Pb, Hg, Cd, Cr^{6+}, PBB, PBDE, DEHP, BBP, DBP, and DIBP), except for uses permitted under applicable RoHS exemptions. Incidental presence of these substances shall comply with the applicable maximum concentration values (MCVs) specified in Directive 2011/65/EU, as amended by Directive (EU) 2015/863.

European Union (EU) Community Waste Electrical & Electronic Equipment (WEEE) Directive Statement
GIGABYTE will fulfill the national laws as interpreted from the 2012/19/EU WEEE (Waste Electrical and Electronic Equipment) (recast) directive. The WEEE Directive specifies the treatment, collection, recycling and disposal of electric and electronic devices and their components. Under the Directive, used equipment must be marked, collected separately, and disposed of properly.

WEEE Symbol Statement



The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, the device should be taken to the waste collection centers for activation of the treatment, collection, recycling and disposal procedure.



For more information about where you can drop off your waste equipment for recycling, please contact your local government office, your household waste disposal service or where you purchased the product for details of environmentally safe recycling.

Battery Information
European Union—Disposal and recycling information
GIGABYTE Recycling Program (available in some regions)



This symbol indicates that this product and/or battery should not be disposed of with household waste. You must use the public collection system to return, recycle, or treat them in compliance with the local regulations.

End of Life Directives-Recycling



The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, the device should be taken to the waste collection centers for activation of the treatment, collection, recycling and disposal procedure.

For any support regarding the EU General Product Safety Regulation (GPSR), please contact Giga-Byte Technology B.V. Steenoven 24, 5626 DK Eindhoven, Netherlands. Email: EU.grp@gigabyte.com

Déclaration de Conformité aux Directives de l'Union européenne (UE)
Cet appareil portant la marque CE est conforme aux directives de l'UE suivantes: directive Compatibilité Electromagnétique 2014/30/UE, directive Basse Tension 2014/35/UE et directive RoHS II 2011/65/UE. La conformité à ces directives est évaluée sur la base des normes européennes harmonisées applicables.

European Union (EU) CE-Konformitätserklärung
Dieses Produkte mit CE-Kennzeichnung erfüllen folgenden EU-Richtlinien: EMV-Richtlinie 2014/30/EU, Niederspannungsrichtlinie 2014/30/EU und RoHS-Richtlinie 2011/65/EU erfüllt. Die Konformität mit diesen Richtlinien wird unter Verwendung der entsprechenden Standards zurEuropäischen Normierung beurteilt.

CE declaração de conformidade
Este produto com a marcação CE estão em conformidade com das seguintes Diretivas UE: Diretiva Baixa Tensão 2014/35/EU; Diretiva CEM 2014/30/EU; Diretiva RSP 2011/65/UE. A conformidade com estas diretivas é verificada utilizando as normas europeias harmonizadas.

CE Declaración de conformidad
Este producto que llevan la marca CE cumplen con las siguientes Directivas de la Unión Europea: Directiva EMC (2014/30/EU), Directiva de bajo voltaje (2014/35/EU), Directiva RoHS (recast) (2011/65/EU). El cumplimiento de estas directivas se evalúa mediante las normas europeas armonizadas.

Dichiarazione di conformità CE
Questo prodotto è conforme alle seguenti direttive: Direttiva sulla compatibilità elettromagnetica 2014/30/UE, Direttiva sulla bassa tensione 2014/35/UE, Direttiva RoHS (rifusione) 2011/65/UE. Questo prodotto è stato testato e trovato conforme a tutti i requisiti essenziali delle Direttive.



D33006
RoHS



廢電池請回收

請勿將電池當作一般垃圾棄置。

⚠ WARNING

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH of CHILDREN**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.



- Battery type: CR2032, voltage rating: +3VDC.
- Non-rechargeable batteries are not to be recharged.
- Remove and immediately recycle or dispose of used batteries, batteries from equipment not used for an extended period of time according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Do not force discharge, recharge, disassemble, heat above (manufacturer's specified temperature rating) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- For treatment information, call a local poison control center.
- The product contains non-replaceable batteries.
- For service person only:
  CAUTION: Risk of fire explosion if the battery is replaced by an incorrect type. Replace the battery only with the same type.
  警告 : 若置換不同型式之電池有起火或爆炸風險。
- à l'attention du personnel de maintenance :
  ATTENTION: Risque d'incendie et d'explosion en cas de remplacement de la batterie par un modèle incorrect. Remplacez la batterie uniquement par une batterie de même type.



Contact Us

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- **GIGABYTE eSupport**

  To submit a technical or non-technical (Sales/Marketing) question, please link to:
  https://esupport.gigabyte.com

