GA-X99-SOC Force

User's Manual

Rev. 1002

12ME-X99SOCF-1002R

For more product details, please visit GIGABYTE's website.

To reduce the impacts on global warming, the packaging materials of this product are recyclable and reusable. GIGABYTE works with you to protect the environment.

Declaration of Conformity

We, Manufacturer/Importer,

G.B.T. Technology Trading GMbH

Address: **Bullenkoppel 16, 22047 Hamburg, Germany**

Declare that the product

Product Type: **Motherboard**

Product Name: **GA-X99-SOC Force**

conforms with the essential requirements of the following directives:

☒ **2004/108/EC EMC Directive:**

☒ Conduction & Radiated Emissions:	EN 55022:2010
☒ Immunity:	EN 55024:2010
☒ Power-line harmonics:	EN 61000-3-2:2006+A2:2009
☒ Power-line flicker:	EN 61000-3-3:2008

☒ **2006/95/EC LVD Directive**

☒ Safety:	EN60950-1:2006+A12:2011

☒ **2011/65/EU RoHS Directive**

☒ Restriction of use of certain substances in electronic equipment:	This product does not contain any of the restricted substances listed in Annex II, in concentrations and applications banned by the directive.

☒ **CE marking**

CE

Signature: Timmy Huang

(Stamp) Date: Aug. 22, 2014 Name: Timmy Huang

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2.1077(a)

FC

Responsible Party Name: G.B.T. INC. (U.S.A.)

Address: 17358 Railroad Street
City of Industry, CA 91748

Phone/Fax No: (626) 854-9338/ (626) 854-9326

hereby declares that the product

Product Name: Motherboard

Model Number: GA-X99-SOC Force

Conforms to the following specifications:

FCC Part 15, Subpart B, Section 15.107(a) and Section 15.109 (a),Class B Digital Device

Supplementary Information:

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

Representative Person's Name: ERIC LU

Signature: Eric Lu

Date: Aug. 22, 2014

Copyright

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Documentation Classifications

In order to assist in the use of this product, GIGABYTE provides the following types of documentations:

- For quick set-up of the product, read the Quick Installation Guide included with the product.
- For detailed product information, carefully read the User's Manual.

For product-related information, check on our website at: http://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:

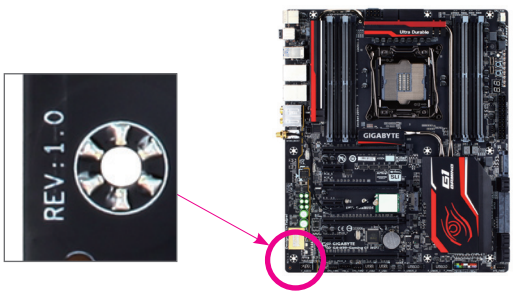


Table of Contents

Box Contents

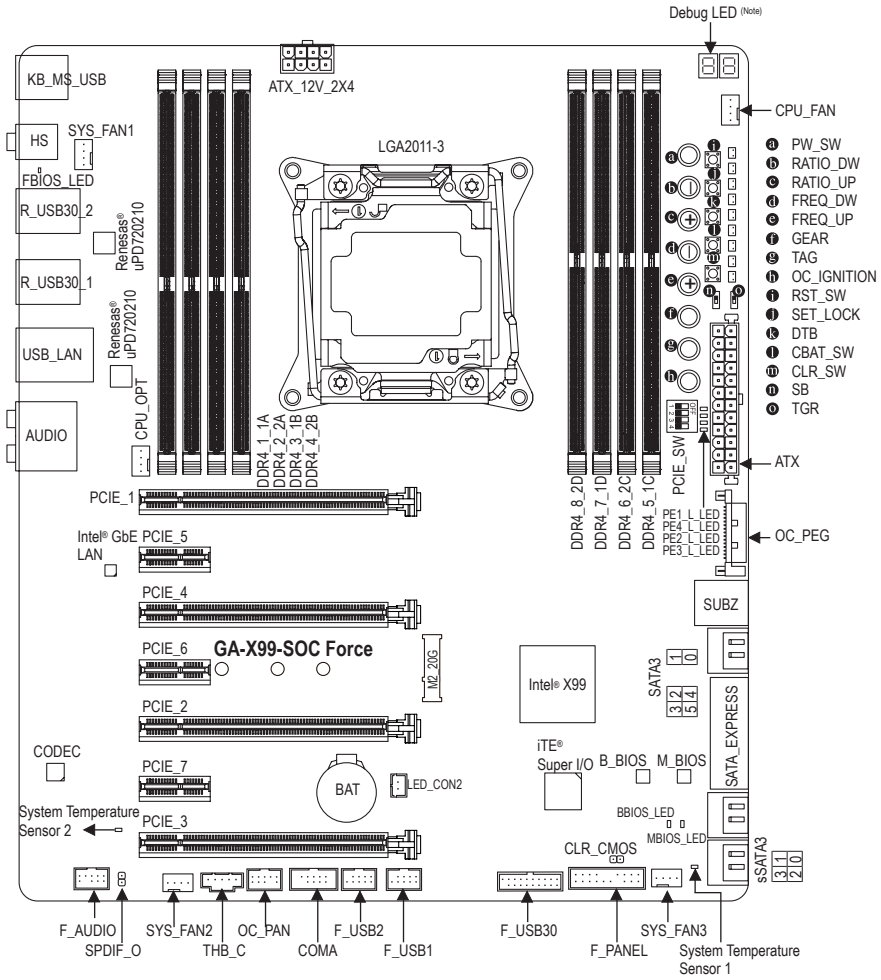
- ☑ GA-X99-SOC Force motherboard
- ☑ Motherboard driver disk
- ☑ User's Manual
- ☑ Quick Installation Guide
- ☑ Six SATA cables
- ☑ I/O Shield
- ☑ One 2-Way SLI bridge connector
- ☑ Two 3-Way SLI bridge connectors (GC-3SLI-X99 and GC-3SLI)
- ☑ One 4-Way SLI bridge connector
- ☑ One 2-Way CrossFire bridge connector
- ☑ Eight voltage measurement cables
- ☑ One 1 to 3 power cable (2x4 ATX 12V)
- ☑ One OC Brace

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.

Optional Items

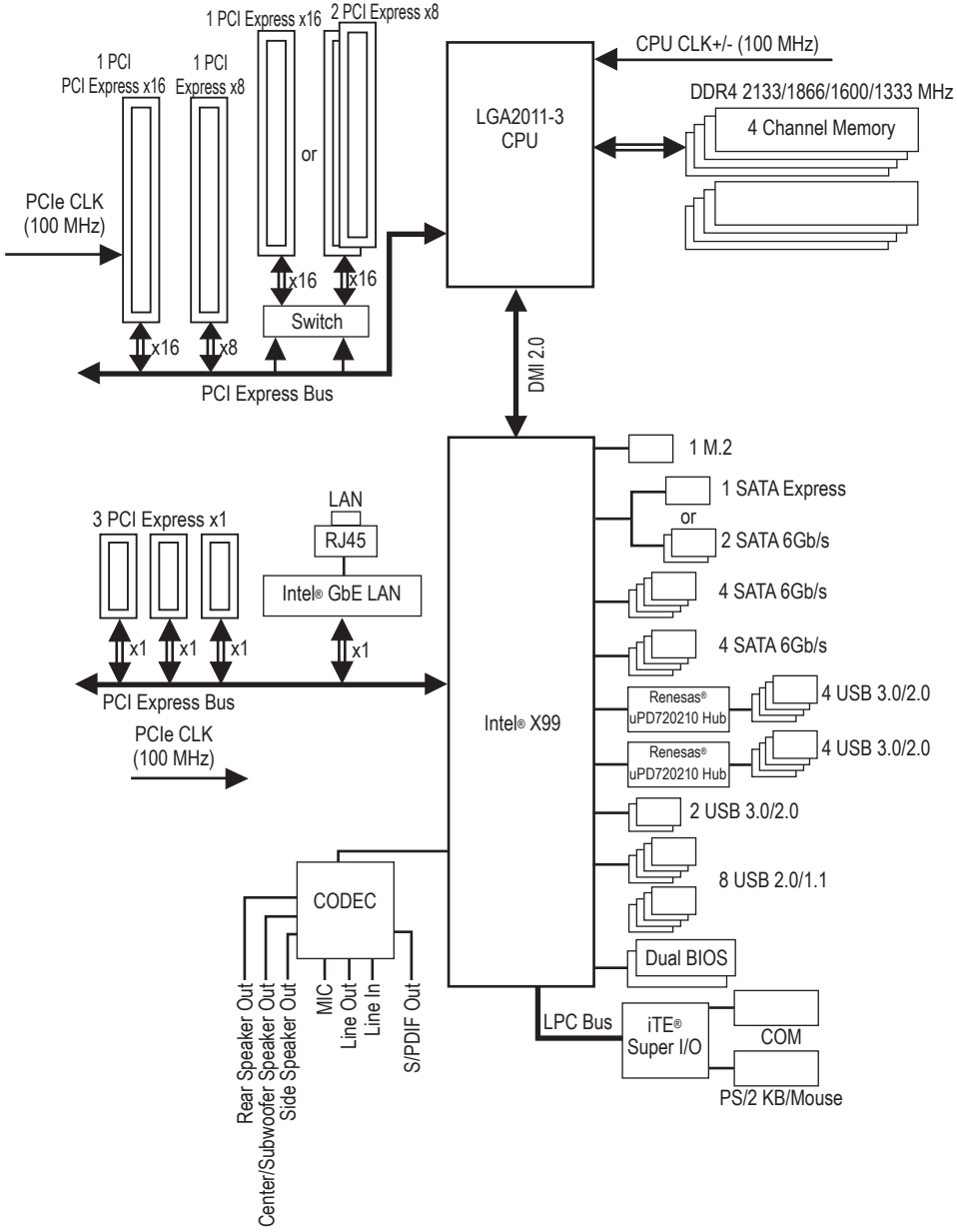
- ☐ 2-port USB 2.0 bracket (Part No. 12CR1-1UB030-6*R)
- ☐ eSATA bracket (Part No. 12CF1-3SATPW-4*R)
- ☐ 3.5" Front Panel with 2 USB 3.0/2.0 ports (Part No. 12CR1-FPX582-2*R)
- ☐ COM port cable (Part No. 12CF1-1CM001-3*R)

GA-X99-SOC Force Motherboard Layout



(Note) For debug code information, please refer to Chapter 6.

GA-X99-SOC Force Motherboard Block Diagram



For detailed product information/limitation(s), refer to "1-2 Product Specifications."

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 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 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.

1-2 Product Specifications

CPU	◆ Support for Intel® Core™ i7 processors in the LGA2011-3 package (Go to GIGABYTE's website for the latest CPU support list.) ◆ L3 cache varies with CPU
Chipset	◆ Intel® X99 Express Chipset
Memory	◆ 8 x DDR4 DIMM sockets supporting up to 128 GB of system memory * Due to a Windows 32-bit operating system limitation, when more than 4 GB of physical memory is installed, the actual memory size displayed will be less than the size of the physical memory installed. ◆ 4 channel memory architecture ◆ Support for DDR4 2133/1866/1600/1333 MHz memory modules ◆ Support for non-ECC memory modules ◆ Support for Extreme Memory Profile (XMP) memory modules ◆ Support for RDIMM 1Rx8 memory modules (operates in non-ECC mode) (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.)
Audio	◆ Realtek® ALC1150 codec ◆ High Definition Audio ◆ 2/4/5.1/7.1-channel ◆ Support for S/PDIF Out
LAN	◆ Intel® GbE LAN chip (10/100/1000 Mbit)
Expansion Slots	◆ 2 x PCI Express x16 slots, running at x16 (PCIE_1, PCIE_2) * For optimum performance, if only one PCI Express graphics card is to be installed, be sure to install it in the PCIE_1 slot; if you are installing two PCI Express graphics cards, it is recommended that you install them in the PCIE_1 and PCIE_2 slots. ◆ 2 x PCI Express x16 slots, running at x8 (PCIE_3, PCIE_4) * The PCIE_4 slot shares bandwidth with the PCIE_1 slot. When the PCIE_4 slot is populated, the PCIE_1 slot will operate at up to x8 mode. * When an i7-5820K CPU is installed, the PCIE_2 slot operates at up to x8 mode and the PCIE_3 operates at up to x4 mode. (All PCI Express x16 slots conform to PCI Express 3.0 standard.) ◆ 3 x PCI Express x1 slots (All PCI Express x1 slots conform to PCI Express 2.0 standard.)
Multi-Graphics Technology	◆ Support for 4-Way/3-Way/2-Way AMD CrossFire™/NVIDIA® SLI™ technology * The 4-Way NVIDIA® SLI™ configuration is not supported when an i7-5820K CPU is installed. To set up a 3-Way SLI configuration, refer to "1-6 Setting up AMD CrossFire™/ NVIDIA® SLI™ Configuration."
Storage Interface	◆ Chipset: - 1 x M.2 Socket 3 connector (M2_20G) * Support for M.2 PCIe SSDs only. - 1 x SATA Express connector - 6 x SATA 6Gb/s connectors (SATA3 0~5) - Support for RAID 0, RAID 1, RAID 5, and RAID 10 * Only AHCI mode is supported when an M.2 PCIe SSD or a SATA Express device is installed. (M2_20G and SATA Express connectors can only be used one at a time. The SATA Express connector becomes unavailable when an M.2 SSD is installed, but the SATA3 4/5 connectors are still functional.)

Storage Interface		- 4 x SATA 6Gb/s connectors (sSATA3 0~3), supporting IDE and AHCI modes only (An operating system installed on the SATA3 0~5 connectors cannot be used on the sSATA3 0~3 connectors.)
USB	◆	Chipset: - 2 x USB 3.0/2.0 ports available through the internal USB header - 8 x USB 2.0/1.1 ports (4 ports on the back panel, 4 ports available through the internal USB headers)
	◆	Chipset + 2 Renesas® uPD720210 USB 3.0 Hubs: - 8 x USB 3.0/2.0 ports on the back panel
Internal Connectors	◆	1 x 24-pin ATX main power connector
	◆	1 x 8-pin ATX 12V power connector
	◆	1 x OC PEG Power Connector
	◆	1 x SATA Express connector
	◆	1 x M.2 Socket 3 connector
	◆	10 x SATA 6Gb/s connectors
	◆	1 x CPU fan header
	◆	1 x water cooling fan header (CPU_OPT)
	◆	3 x system fan headers
	◆	1 x heatsink LED power connector
	◆	1 x Thunderbolt add-in card connector
	◆	1 x OC Panel connector (for future expansion)
	◆	1 x front panel header
	◆	1 x front panel audio header
	◆	1 x S/PDIF Out header
	◆	1 x USB 3.0/2.0 header
	◆	2 x USB 2.0/1.1 headers
	◆	1 x serial port header
	◆	1 x Clear CMOS jumper
	◆	1 x power button
	◆	1 x reset button
	◆	1 x Clear CMOS button
	◆	1 x Gear button
	◆	1 x OC Tag button
	◆	1 x OC Trigger switch
	◆	1 x CPU BCLK Down button
	◆	1 x CPU BCLK Up button
	◆	1 x CPU Ratio Down button
	◆	1 x CPU Ratio Up button
	◆	1 x Settings Lock button
	◆	1 x Direct to BIOS button
	◆	1 x OC PCIe switch
	◆	1 x OC Ignition button
	◆	1 x Clear Battery button
	◆	1 x DualBIOS switch
	◆	1 x onboard voltage measurement module
	◆	Temp sensor ports
Back Panel Connectors	◆	4 x USB 2.0/1.1 ports
	◆	1 x PS/2 keyboard/mouse port
	◆	1 x CPU overclocking button
	◆	1 x BIOS switch button
	◆	1 x Clear CMOS button

Back Panel Connectors	◆ 8 x USB 3.0/2.0 ports ◆ 1 x RJ-45 port ◆ 1 x optical S/PDIF Out connector ◆ 5 x audio jacks (Center/Subwoofer Speaker Out, Rear Speaker Out, Line In, Line Out, Mic In)
I/O Controller	◆ iTE I/O Controller Chip
Hardware Monitor	◆ System voltage detection ◆ CPU/System/Chipset temperature detection ◆ CPU/CPU OPT/System fan speed detection ◆ CPU/System/Chipset overheating warning ◆ CPU/CPU OPT/System fan fail warning ◆ CPU/CPU OPT/System fan speed control * Whether the fan speed control function is supported will depend on the cooler you install.
BIOS	◆ 2 x 128 Mbit flash ◆ Use of licensed AMI UEFI BIOS ◆ Support for DualBIOS™ ◆ Support for Q-Flash Plus ◆ 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 differ by motherboard model. Supported functions of each application may also differ depending on motherboard specifications. - @BIOS - Ambient LED - EasyTune - EZ Setup - Fast Boot - Cloud Station - ON/OFF Charge - Smart TimeLock - Smart Recovery 2 - System Information Viewer - USB Blocker - V-Tuner ◆ Support for Q-Flash ◆ Support for Smart Switch ◆ Support for Xpress Install
Bundled Software	◆ Norton® Internet Security (OEM version) ◆ Intel® Smart Response Technology ◆ cFosSpeed
Operating System	◆ Support for Windows 8.1/8/7
Form Factor	◆ E-ATX Form Factor; 30.5cm x 26.4cm

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

* Please visit the **Support & Downloads\Utility** page on GIGABYTE's website to check the supported operating system(s) for the software listed in the "Unique Features" and "Bundled Software" columns.

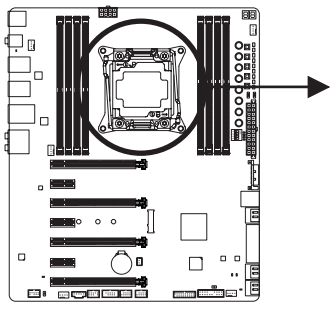
1-3 Installing the CPU and CPU Cooler

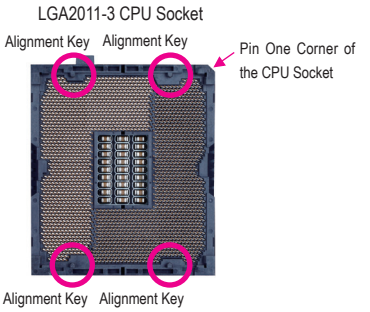
Read the following guidelines before you begin to install the CPU:

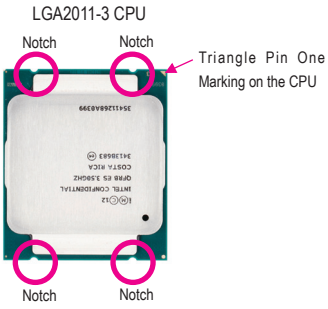
- Make sure that the motherboard supports the CPU.
  (Go to GIGABYTE's website for the latest CPU support list.)
- Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.
- Locate the pin one of the CPU. The CPU cannot be inserted if oriented incorrectly. (Or you may locate the notches on both sides of the CPU and alignment keys on the CPU socket.)
- 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

A. Locate the alignment keys on the motherboard CPU socket and the notches on the CPU.

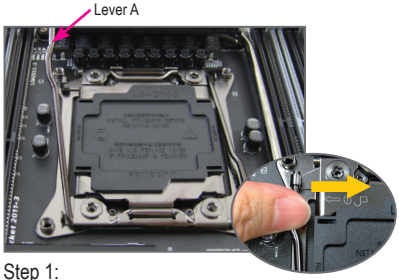




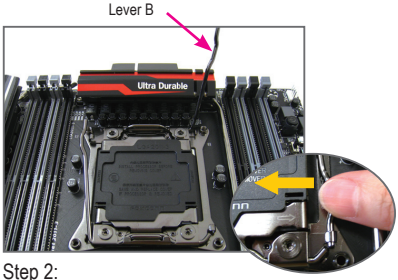


B. Follow the steps below to correctly install the CPU into the motherboard CPU socket.

- **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 protective plastic cover unless the CPU is inserted into the CPU socket. Save the cover properly and replace it if the CPU is removed.**

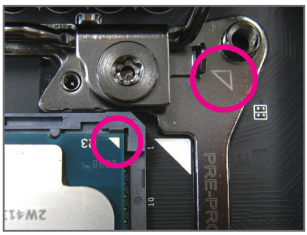


Step 1:
Push the lever closest to the "unlock" mark "🔓" (below referred as lever A) down and away from the socket to release it.



Step 2:
Push the lever closest to the "lock" mark "🔒" (below referred as lever B) down and away from the socket. Then lift the lever.

Step 3:
Gently press lever A to allow the load plate to rise. Open the load plate. Note: DO NOT touch the socket contacts after the load plate is opened.



Step 4:
Hold the CPU with your thumb and index fingers. Align the CPU pin one mark (triangle) with the triangle mark on metal socket frame and carefully insert the CPU into the socket vertically.

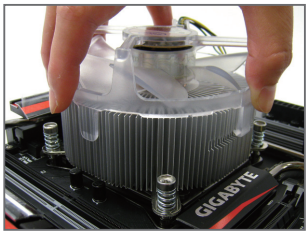
Step 5:
Once the CPU is properly inserted, carefully replace the load plate. Then secure lever B under its retention tab.

Step 6:
Finally, secure lever A under its retention tab to complete the installation of the CPU. Then carefully remove the plastic cover. Save it properly and always replace it when the CPU is not installed.

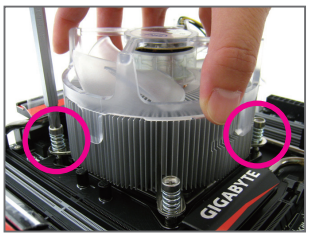
1-3-2 Installing the CPU Cooler

Refer to the steps below to correctly install the CPU cooler on the motherboard. (Actual installation process may differ depending the CPU cooler to be used. Refer to the user's manual for your CPU cooler.)

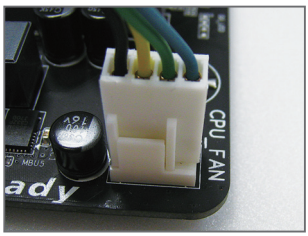
Step 1:
Apply an even and thin layer of thermal grease on the surface of the installed CPU.



Step 2:
Place the cooler atop the CPU, aligning the four mounting screws with the mounting holes on the ILM.



Step 3:
Use one hand to hold the cooler and the other to tighten the screws in a diagonal sequence with a screw driver. 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

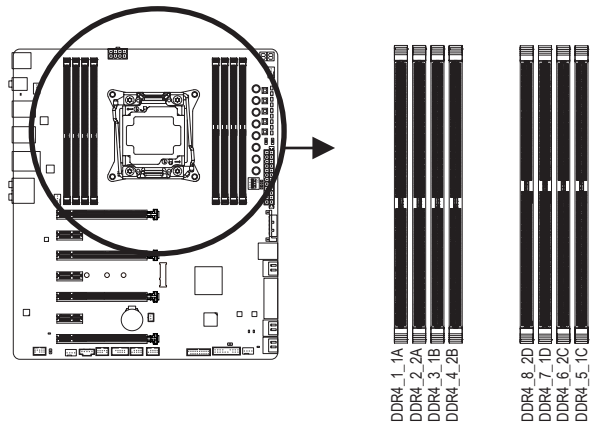
Read the following guidelines before you begin to install the memory:

- 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 4 Channel Memory Configuration

This motherboard provides eight DDR4 memory sockets and supports 4 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_1_1A, DDR4_2_2A
- Channel B: DDR4_3_1B, DDR4_4_2B
- Channel C: DDR4_5_1C, DDR4_6_2C
- Channel D: DDR4_7_1D, DDR4_8_2D



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

	DDR4_1_1A	DDR4_2_2A	DDR4_3_1B	DDR4_4_2B	DDR4_8_2D	DDR4_7_1D	DDR4_6_2C	DDR4_5_1C
1 Module	- -	- -	●	- -	- -	- -	- -	- -
2 Modules	- -	- -	●	- -	- -	●	- -	- -
4 Modules	●	- -	●	- -	- -	●	- -	●
6 Modules	●	- -	●	●	●	●	- -	●
8 Modules	●	●	●	●	●	●	●	●

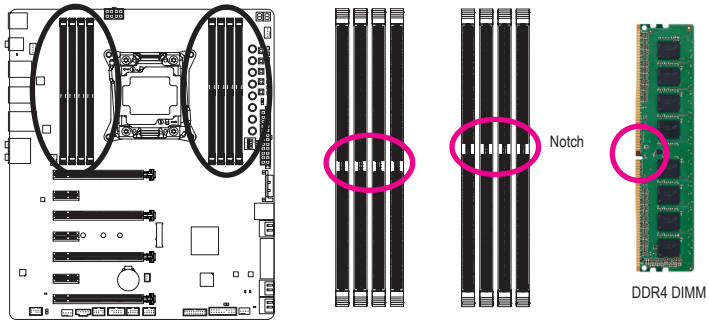
Note 1: When installing the memory, make sure to begin with the first socket of each channel, such as DDR4_1_1A, DDR4_3_1B, DDR4_5_1C, and DDR4_7_1D.

Note 2: If you are using a RDIMM memory, make sure it is a 1Rx8 one.

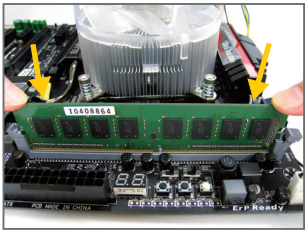
Note 3: To ensure memory compatibility, we do not recommend that you install RDIMM and UDIMM memory at the same time.

1-4-2 Installing a Memory

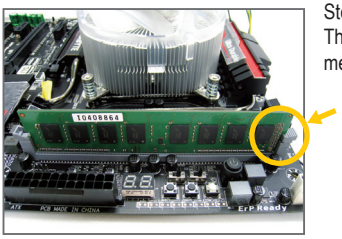
Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module. DDR4 and DDR3 DIMMs are not compatible to each other or DDR2 DIMMs. Be sure to install DDR4 DIMMs on this motherboard.



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.

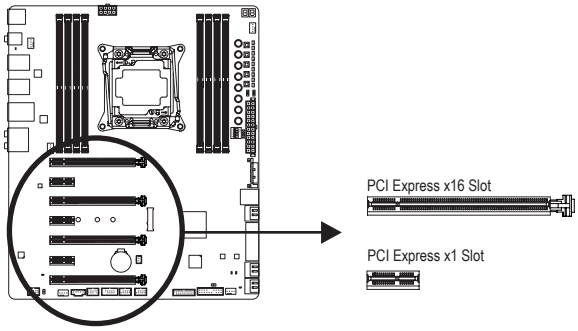


Step 2:
The clip at the right end of the socket will snap into place when the memory module is securely inserted.

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.



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.

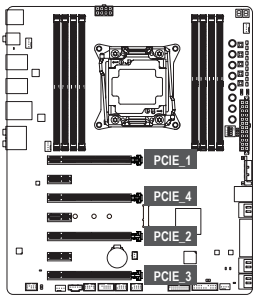
1-6 Setting up AMD CrossFire™/NVIDIA® SLI™ Configuration

A. System Requirements

- Windows 8.1/8/7 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 (Current GPUs that support 3-Way/4-Way CrossFire technology include the ATI Radeon™ HD 3800, HD 4800, HD 5800 series, and AMD Radeon™ HD 6800, HD 6900, HD 7800, and HD 7900 series. Current GPUs that support 3-Way/4-Way SLI technology include the NVIDIA 8800 GTX, 8800 Ultra, 9800 GTX, GTX 260, GTX 280, GTX 470, GTX 480, GTX 570, GTX 580, GTX 590, and GTX 600 series.) For the latest GPU support information, please refer to the AMD/NVIDIA® website.) (Note 1)
- CrossFire (Note 2)/SLI bridge connectors
- A power supply with sufficient power is recommended (Note 3) (Refer to the manual of your graphics cards for the power requirement)

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 PCIE_1 slot.



▸▸ Refer to the table below when an i7-5960X or i7-5930K CPU is installed:

	1 Graphics Card	2 Graphics Cards	3 Graphics Cards	4 Graphics Cards
PCIE_1	●	●	●	●
PCIE_4	- -	- -	- -	●
PCIE_2	- -	●	●	●
PCIE_3	- -	- -	●	●

To set up a 3-Way SLI configuration, use the GC-3SLI-X99 bridge connector.

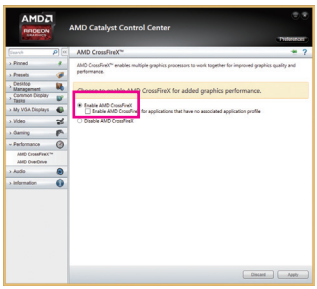
▸▸ Refer to the table below for setting up a 3-Way SLI configuration with an i7-5820K CPU. Make sure to use the GC-3SLI bridge connector.

	1 Graphics Card	2 Graphics Cards	3 Graphics Cards
PCIE_1	●	●	●
PCIE_4	- -	- -	●
PCIE_2	- -	●	●
PCIE_3	- -	- -	- -

C. Configuring the Graphics Card Driver

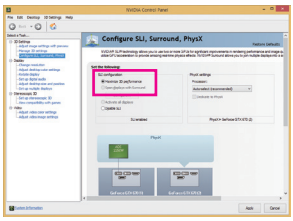
C-1. To Enable CrossFire Function

After installing the graphics card driver in the operating system, go to the **AMD Catalyst Control Center**. Browse to **Performance\ AMD CrossFireX™** and ensure the **Enable AMD CrossFireX** check box is selected. If your system has more than two CrossFire cards, select the GPU combination you want to use and click **Apply**. (Available combination options are dependent on the number of graphics cards.)



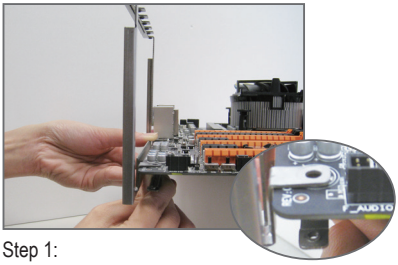
C-2. To Enable SLI Function

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.

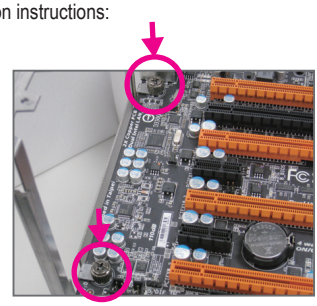


D. Installing the OC Brace (Note 4)

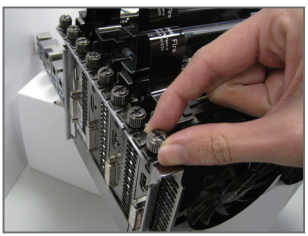
OC Brace allows extreme overclockers and system testers to safely install up to four graphics cards in an open case or test bed without risking PCIe slot damage or preventing cards not showing up in the OS due to poor contact with PCIe slot. Refer to the following installation instructions:



Step 1:
As shown, align the screw holes in the OC Brace and back plate with the screw holes near the PCIe slots on the motherboard.



Step 2:
Fasten the two included thumb screws (starting from the screw hole near the back panel audio connectors).

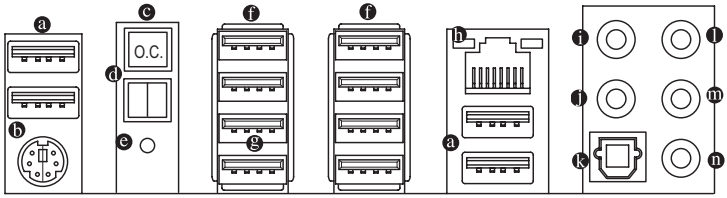


Step 3:
After installing the graphics cards, use the included thumb screws to secure the metal brackets of the graphics cards to the OC Brace.

(Note 1) The 4-Way SLI configuration is not supported when an i7-5820K CPU is installed.
(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.
(Note 4) The components received may vary in appearance from the products illustrated.

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



a USB 2.0/1.1 Port

The USB port supports the USB 2.0/1.1 specification. Use this port for USB devices such as a USB keyboard/mouse, USB printer, USB flash drive and etc.

b PS/2 Keyboard/Mouse Port

Use this port to connect a PS/2 mouse or keyboard.

c CPU Overclocking Button

Press this button to overclock your CPU. To return to the defaults, press this button again.

d BIOS Switch Button

The button allows users to easily select a different BIOS for boot up or overclocking, helping to reduce BIOS failure during overclocking. Press the button to switch between the main BIOS and backup BIOS. The green LED indicates the main BIOS is active and the blue LED indicates the backup BIOS is active.

e 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.

f USB 3.0/2.0 Port

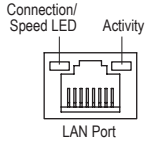
The USB 3.0 port supports the USB 3.0 specification and is compatible to the USB 2.0/1.1 specification. Use this port for USB devices such as a USB keyboard/mouse, USB printer, USB flash drive and etc.

g USB 3.0/2.0 Port (White)

The USB 3.0 port supports the USB 3.0 specification and is compatible to the USB 2.0/1.1 specification. Use this port for USB devices such as a USB keyboard/mouse, USB printer, USB flash drive and etc. Before using Q-Flash Plus, make sure to insert the USB flash drive into this port first.

h RJ-45 LAN Port

The Gigabit Ethernet LAN port provides Internet connection at up to 1 Gbps data rate. The following describes the states of the LAN port LEDs.



Connection/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
On	No data transmission or receiving is occurring

i Center/Subwoofer Speaker Out Jack (Orange)

Use this audio jack to connect center/subwoofer speakers in a 5.1/7.1-channel audio configuration.

j Rear Speaker Out Jack (Black)

This jack can be used to connect front speakers in a 4/5.1/7.1-channel audio configuration.

- 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.

ⓚ 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.

ⓛ Line In Jack (Blue)

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

ⓜ Line Out Jack (Green)

The line out jack. This jack supports audio amplifying function. For better sound quality, it is recommended that you connect your headphone/speaker to this jack (actual effects may vary by the device being used). Use this audio jack for a headphone or 2-channel speaker. This jack can be used to connect front speakers in a 4/5.1/7.1-channel audio configuration.

ⓝ Mic In Jack (Pink)

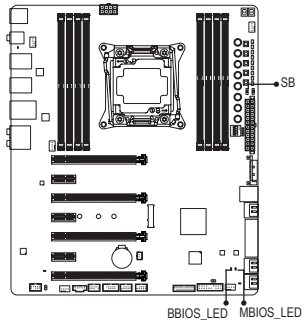
The Mic in jack. Microphones must be connected to this jack.

The audio jacks can be reconfigured to perform different functions via the audio software (supported functions may vary based on hardware specification). If you install a Side Speaker, you need to retask other audio jack to be Side Speaker out. Only microphones still MUST be connected to the default Mic in jack. Refer to the instructions on setting up a 2/4/5.1/7.1-channel audio configuration in Chapter 6, "Configuring 2/4/5.1/7.1-Channel Audio."

1-8 Onboard Buttons, Switches and LEDs

DualBIOS Switch and BIOS LEDs

The DualBIOS switch (SB) allows enabling or disabling of the Dual BIOS function. The LED indicator (MBIOS_LED/BBIOS_LED) shows which BIOS is active.



DualBIOS Switch:

SB

1: Dual BIOS

2: Single BIOS

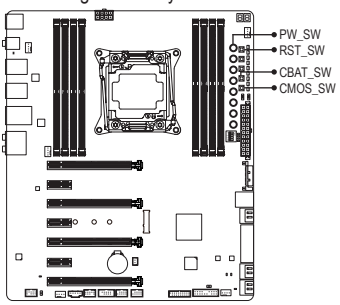
BIOS LED Indicators:

MBIOS_LED (The main BIOS is active)

BBIOS_LED (The backup BIOS is active)

Quick Buttons

This motherboard has four quick buttons: Power, Reset, Clear CMOS, and Clear Battery. 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. Use this button to clear the BIOS configuration and reset the CMOS values to factory defaults when needed. The Clear Battery button has the same function as removing the battery from the motherboard.

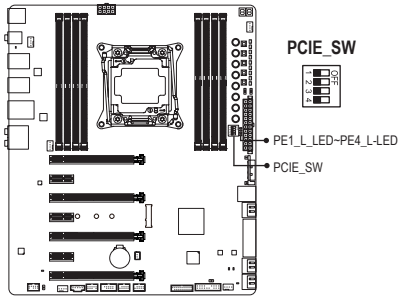


PW_SW: Power Button
RST_SW: Reset Button
CMOS_SW: Clear CMOS Button
CBAT_SW：Clear Battery Button

- Always turn off your computer and unplug the power cord from the power outlet before using the clear CMOS button.
- Always turn off the power of the power supply before using the clear battery button. After pressing this button, make sure to wait for five minutes before you turn on the computer.
- Do not use the clear CMOS or clear battery 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).

OC PCIe Switch and PCIe Slot LED Indicators

The OC PCIe switch allows you to manually turn off specific PCI Express slot(s) (except for the PCI Express x1 slot) without physical removal. The PCIe slot LED indicators display whether an expansion card is functioning normally in a specific PCIe slot; if yes, the light will be on.

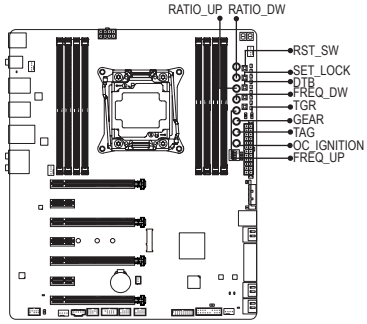


Slot	DIP Setting			
	DIP 1	DIP 2	DIP 3	DIP 4
Disabling PCIE_1	OFF	ON	ON	ON
Disabling PCIE_4	ON	OFF	ON	ON
Disabling PCIE_2	ON	ON	OFF	ON
Disabling PCIE_3	ON	ON	ON	OFF

LED	Slot
PE1_L_LED	PCIE_1
PE4_L_LED	PCIE_4
PE2_L_LED	PCIE_2
PE3_L_LED	PCIE_3

OC Buttons

GIGABYTE's unique OC buttons help enthusiasts and overclockers not only get the most performance from their hardware, but also the absolute most enjoyable OC experience with features like overclocking the CPU in real-time, automatically loading the most optimized overclocking configuration for the processor and memory, and loading users' customized settings, etc.



CPU Ratio Down Button (RATIO_DW):
Lowers the CPU ratio.

CPU Ratio Up Button (RATIO_UP):
Raises the CPU ratio.

CPU BCLK Down Button (FREQ_DW):
Lowers the CPU base clock.

CPU BCLK Up Button (FREQ_UP):
Raises the CPU base clock.

Gear Button
Changes BCLK stepping to 0.1 MHz or 1 MHz.

OC Ignition button (OC_IGNITION):
The OC Ignition feature maintains power to your motherboard and connected components while the system is shut down. After pressing this button, be sure to press the power button to take effect.

OC Tag button (TAG):
This button allows users to load their customized settings (using the Save to Tag profile created in BIOS Setup) so you can apply your custom settings after clearing CMOS.

Settings Lock button (SET_LOCK):
The GIGABYTE settings lock button allows the system to automatically remember your last successful settings, even after clearing CMOS. With one touch, the Settings Lock button can quickly revert to the previous good settings; a very useful tool for overclockers tuning their BIOS to perfection. Note: This function is not available when ErP is enabled.

Direct to BIOS button (DTB):
This button helps users more easily to directly enter the BIOS at any time before rebooting the system. (Pressing this button during the POST process allows you to immediately enter BIOS Setup. Enter BIOS Setup directly on next boot if the button is pressed after the POST process.)

OC Trigger switch (TGR):
This switch allows the overclockers to jump between low and extremely high frequencies in an instant. After remaining at a low frequency during system boot and OS optimization, the overclocker can then engage the Trigger Switch to instantly hit the target frequency, save their score submission, grab a screen shot, and watch the records tumble.

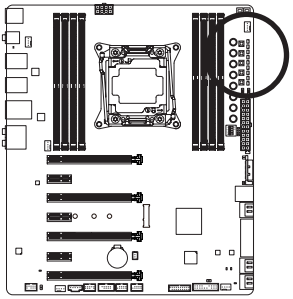

1: Target frequency set in BIOS Setup or other overclocking application.


2: Safe frequency (using the lowest CPU ratio, which may vary by CPU)


Before using the overclocking buttons, make sure to load the optimized defaults in BIOS Setup to return the BIOS settings to factory defaults.

Onboard Voltage Measurement Module

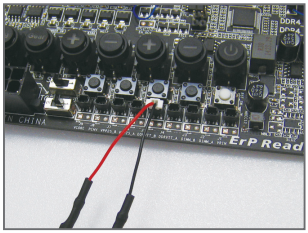
Use a multimeter to measure the following motherboard voltages. You can employ one of the following two ways to measure component voltages.



Pin 1 — VRIN
Pin 1 — DIMM_A
Pin 1 — DIMM_B
Pin 1 — DDRVTT_A
Pin 1 — DDRVTT_B
Pin 1 — VPP25_A
Pin 1 — VPP25_B
Pin 1 — PCHV
Pin 1 — RESV

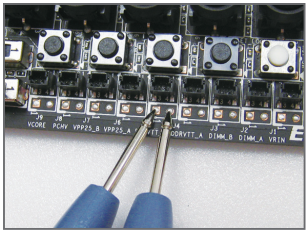
Pin No.	Definition
1	Power
2	GND

Method I (Using the included voltage measurement cable):



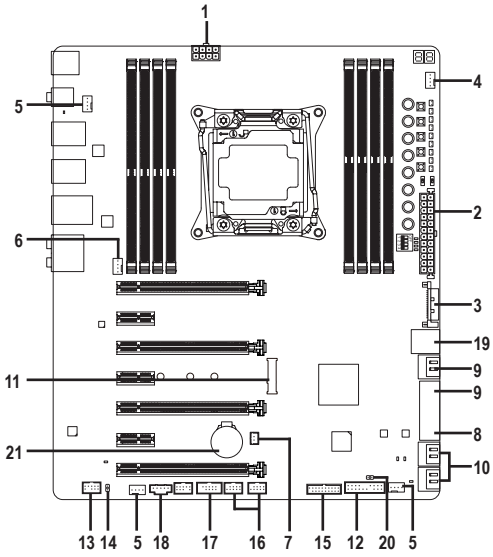
Steps:
Connect the included voltage measurement cable to a voltage measurement header and your multimeter as shown. Please note the red wire is the positive and must be connected to the pin 1 (Power).

Method II (Connecting the multimeter directly):



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_2X4	12)	F_PANEL
2)	ATX	13)	F_AUDIO
3)	OC_PEG	14)	SPDIF_O
4)	CPU_FAN	15)	F_USB30
5)	SYS_FAN1/2/3	16)	F_USB1/F_USB2
6)	CPU_OPT	17)	COMA
7)	LED_CON2	18)	THB_C
8)	SATA_EXPRESS	19)	SUBZ
9)	SATA3 0/1/2/3/4/5	20)	CLR_CMOS
10)	sSATA3 0/1/2/3	21)	BAT
11)	M2_20G		

Read the following guidelines before connecting external devices:

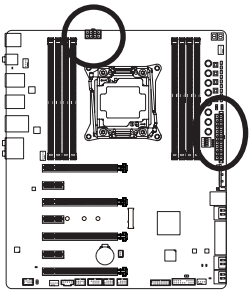
- First make sure your devices are compliant with the connectors you wish to connect.
- Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.
- After installing the device and before turning on the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

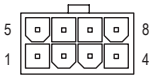
1/2) ATX_12V_2X4/ATX (2x4 12V Power Connector and 2x12 Main Power Connector)

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.

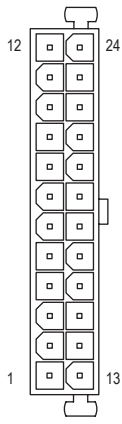




ATX_12V_2X4

ATX_12V_2X4:

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

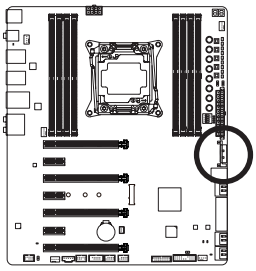
ATX:

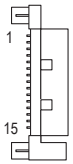
Pin No.	Definition	Pin No.	Definition
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON (soft On/Off)
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power Good	20	NC
9	5VSB (stand by +5V)	21	+5V
10	+12V	22	+5V
11	+12V (Only for 2x12-pin ATX)	23	+5V (Only for 2x12-pin ATX)
12	3.3V (Only for 2x12-pin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

When you overclock the CPU, make sure to connect one end of the included 1 to 3 power cable to the ATX_12V_2X4 power connector and the other three to the power supply to ensure the system is provided with enough power.

3) OC_PEG (PCIe Power Connector)

The power connector provide auxiliary power to the onboard PCI Express x16 slots. When two or more graphics cards are installed, we recommend that you connect the SATA power cable(s) from the power supply to the OC_PEG connector to ensure system stability.

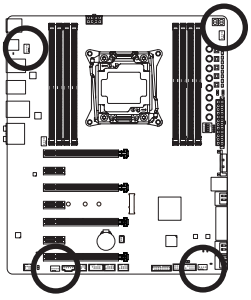




Pin No.	Definition
1	NC
2	NC
3	NC
4	GND
5	GND
6	GND
7	VCC
8	VCC
9	VCC
10	GND
11	GND
12	GND
13	+12V
14	+12V
15	+12V

4/5) CPU_FAN/SYS_FAN1/2/3 (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.



CPU_FAN:

Pin No.	Definition
1	GND
2	+12V
3	Sense
4	Speed Control

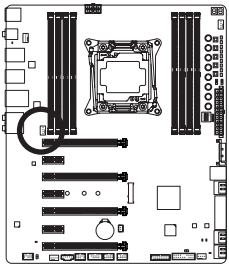
SYS_FAN1/2/3:

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

- 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) CPU_OPT (Water Cooling CPU Fan Header)

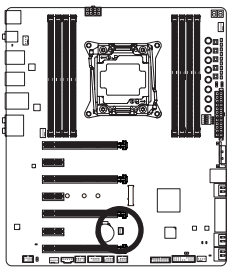
The fan header is 4-pin and possesses a foolproof insertion design. When connecting a fan cable, be sure to connect it in the correct orientation (the black connector wire is the ground wire). The speed control function requires the use of a fan with fan speed control design.



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

7) LED_CON2 (Heatsink LED Power Connector)

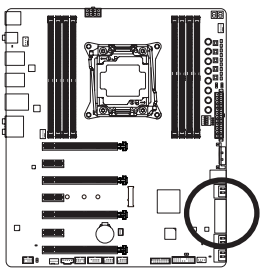
The power connector provides power to the LEDs on the Chipset heatsink.

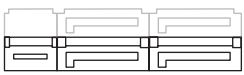


Pin No.	Definition
1	VCC
2	GND

8) SATA_EXPRESS (SATA Express Connector)

The SATA Express connector supports a single SATA Express device.





M2_20G and SATA Express connectors can only be used one at a time. The SATA Express connector becomes unavailable when an M.2 SSD is installed, but the SATA3 4/5 connectors are still functional.