GA-SBC4100

User's Manual

Rev. 1001

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-SBC4100

conforms with the essential requirements of the following directives:

☒ **EMC Directive 2014/30/EU:**

☒ Conduction & Radiated Emissions:	EN 55032:2012+AC:2013
☒ Immunity:	EN 55024:2010+A1:2015
☒ Power-line harmonics:	EN 61000-3-2:2014
☒ Power-line flicker:	EN 61000-3-3:2013

☒ **Low Voltage Directive 2014/35/EU:**

☒ Safety:	EN60950-1:2006+A11:2009+A12:2011+A2:2013

☒ **RoHS Directive 2011/65/EU**

☒ 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: Apr. 5, 2019 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-SBC4100

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: Apr. 5, 2019

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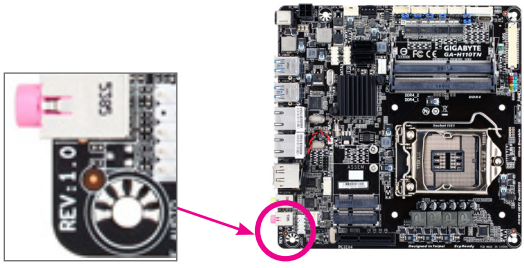
- In order to assist in the use of this product, carefully read the User's Manual.
- For product-related information, check on our website at: https://www.gigabyte.com

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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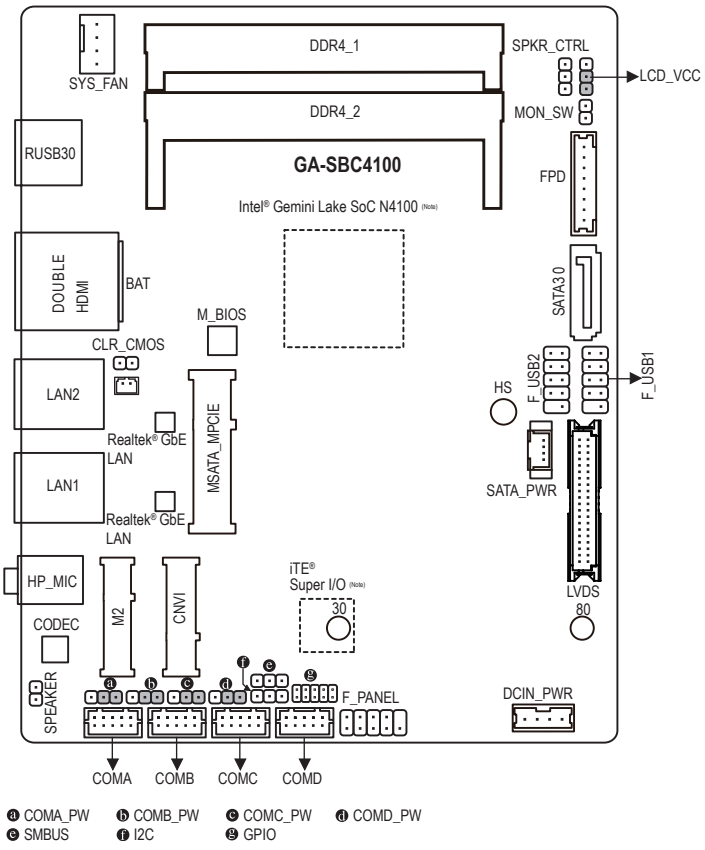
GA-SBC4100 Motherboard Layout



Box Contents

- ☑ GA-SBC4100 motherboard
- ☑ Motherboard driver disk
- ☑ Two SATA cables
- ☑ One heat spreader
- ☑ One SATA power cable
- ☑ One COM port cable
- ☑ One DC In power cable

* 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.

(Note) The chip is on the back of the motherboard.

Chapter 1 Hardware Installation

1-1 Installation Precautions

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

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

1-2 Product Specifications

CPU	◆ Built in with an Intel® Quad-Core Celeron® N4100 SoC (2.4 GHz) * Do not disassemble the onboard SoC and the heatsinks by yourself to avoid damage to these components. ◆ 4 MB Cache
Memory	◆ 2 x DDR4 SO-DIMM socket supporting up to 16 GB of system memory ◆ Support for DDR4 2400/2133 MHz memory modules (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.)
Onboard Graphics	◆ Integrated in the SoC: - 2 x HDMI ports, supporting a maximum resolution of 4096x2160@60 Hz * Support for HDMI 2.0 version, HDCP 2.2.
Audio	◆ Realtek® ALC255 codec ◆ High Definition Audio ◆ 2-channel
LAN	◆ 2 x Realtek® GbE LAN chips (10/100/1000 Mbit)
Expansion Slots	◆ 1 x M.2 Socket 1 connector for an Intel® wireless module (CNVI) ◆ 1 x full size Mini PCIe connector (MSATA_MPCIE) * The MINI_PCIE connector can also be used as an MSATA connector. (The Mini PCIe connector conforms to PCI Express 2.0 standard.)
Storage Interface	◆ Integrated in the SoC: - 1 x M.2 connector (Socket 3, M key, type 2280 PCIe x4/x2 SSD support) (M2) - 1 x SATA 6Gb/s connector - 1 x MSATA connector (MSATA_MPCIE)
USB	◆ Integrated in the SoC: - 2 x USB 3.1 Gen 1 ports on the back panel - 4 x USB 2.0/1.1 ports available through the internal USB headers
Internal Connectors	◆ 1 x DC-In power connector ◆ 1 x system fan header ◆ 1 x SATA 6Gb/s connector ◆ 1 x M.2 Socket 3 connector ◆ 1 x SATA power connector ◆ 1 x front panel header ◆ 2 x USB 2.0/1.1 headers ◆ 4 x serial port headers ◆ 4 x serial port power select jumpers ◆ 1 x GPIO header ◆ 1 x LVDS header ◆ 1 x LVDS drive voltage jumper (LCD_VCC) ◆ 1 x flat panel display header (FPD) ◆ 1 x flat panel display switch header (MON_SW)

Internal Connectors	◆ 1 x speaker header (SPEAKER) ◆ 1 x speaker control header (SPKR_CTRL) ◆ 1 x Clear CMOS jumper ◆ 1 x I2C jumper ◆ 1 x SMBUS jumper
Back Panel Connectors	◆ 2 x HDMI ports ◆ 2 x USB 3.1 Gen 1 ports ◆ 2 x RJ-45 ports ◆ 1 x audio jack (headphone and microphone combo jack)
I/O Controller	◆ iTE® I/O Controller Chip
Hardware Monitor	◆ System voltage detection ◆ Temperature detection ◆ Fan speed detection ◆ Fan speed control * Whether the fan speed control function is supported will depend on the cooler you install.
BIOS	◆ 1 x 128 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 Xpress Install ◆ Support for @BIOS ◆ Support for APP Center * Available applications in APP Center may vary by motherboard model. Supported functions of each application may also vary depending on motherboard specifications
Bundled Software	◆ Norton® Internet Security (OEM version)
Operating System	◆ Support for Windows 10 64-bit
Form Factor	◆ SBC Form Factor; 14.6cm x 10.2cm

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

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

Please visit the **Support\Utility List** page on GIGABYTE's website to download the latest version of apps.

1-3 Installing the 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.

Dual Channel Memory Configuration

This motherboard provides two memory sockets and supports Dual Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory. Enabling Dual Channel memory mode will double the original memory bandwidth.

The two memory sockets are divided into two channels and each channel has one memory socket as following:

- Channel A: DDR4_1
- Channel B: DDR4_2

Due to CPU limitations, read the following guidelines before installing the memory in Dual Channel mode.

1. Dual Channel mode cannot be enabled if only one memory module is installed.
2. When enabling Dual Channel mode with two memory modules, it is recommended that memory of the same capacity, brand, speed, and chips be used.

1-4 Installing an Expansion Card

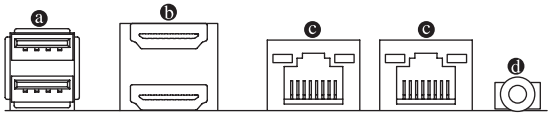
Read the following guidelines before you begin to install an expansion card:

- 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.

Do not disassemble the onboard SoC and the heatsink by yourself to avoid damage to these components.

Please visit GIGABYTE's website for details on hardware installation.

1-5 Back Panel Connectors



a USB 3.1 Gen 1 Port

The USB 3.1 Gen 1 port supports the USB 3.1 Gen 1 specification and is compatible to the USB 2.0 specification. Use this port for USB devices.

b HDMI Port

The HDMI port is HDCP compliant and supports Dolby TrueHD and DTS HD Master Audio formats. It also supports up to 192KHz/24bit 8-channel LPCM audio output. You can use this port to connect your HDMI-supported monitor. The maximum supported resolution is 4096x2160@60 Hz, but the actual resolutions supported are dependent on the monitor being used.

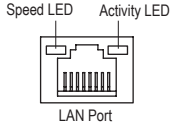
After installing the HDMI device, make sure to set the default sound playback device to HDMI. (The item name may differ depending on your operating system.)

Dual-Display Configurations for the Onboard Graphics:

Dual-display configurations are supported after you install motherboard drivers in OS.

c 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
Off	No data transmission or receiving is occurring

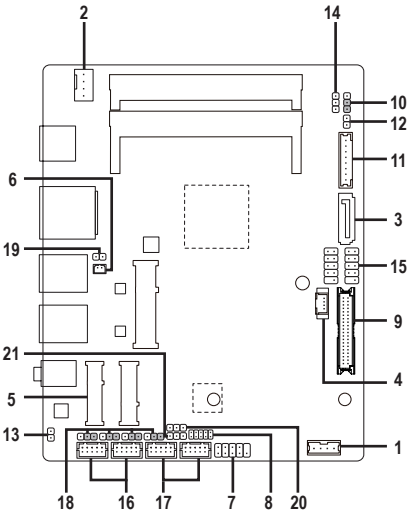
d HP MIC (Headphone and Microphone Combo Jack)

This jack is for connecting a headphone or microphone. You can connect a microphone, headphone or speaker to this jack.

- 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.

Please visit GIGABYTE's website for details on configuring the audio software.

1-6 Internal Connectors

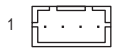


1)	DCIN_PWR	12)	MON_SW
2)	SYS_FAN	13)	SPEAKER
3)	SATA3	14)	SPKR_CTRL
4)	SATA_PWR	15)	F_USB1/F_USB2
5)	M2	16)	COMA/COMB
6)	BAT	17)	COMC/COMD
7)	F_PANEL	18)	COMA/B/C/D_PW
8)	GPIO	19)	CLR_CMOS
9)	LVDS	20)	SMBUS
10)	LCD_VCC	21)	I2C
11)	FPD		

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) DCIN_PWR (DC Power Connector, Input 9V ~ 36V)



Pin No.	Definition
1	GND
2	DC IN
3	DC IN
4	GND

2) SYS_FAN (Fan Header)

The fan header on this motherboard is 4-pin. The fan header 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. 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.

3) SATA3 (SATA 6Gb/s Connector)

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

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

4) SATA_PWR (SATA Power Connector)

The connector provides power to installed SATA devices.

Pin No.	Definition
1	GND
2	VCC
3	+12V
4	GND

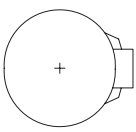
5) M2 (M.2 Socket 3 Connector)

The M.2 connector supports M.2 PCIe SSDs.

Follow the steps below to correctly install an M.2 SSD in the M.2 connector.
Step 1:
Use a screw driver to unfasten the screw and standoff from the motherboard.
Step 2:
Slide the M.2 SSD into the connector at an angle.
Step 3:
Press the M.2 SSD down and then secure it with the screw.

6) 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:

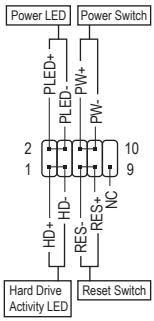
1. Turn off your computer and unplug the power cord.
2. Unplug the the battery cable from the battery cable header and wait for one minute.
3. Plug in the battery cable.
4. Plug in the power cord and restart your computer.

Pin No.	Definition
1 (+)	RTC Power
2 (-)	GND

- 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.
- Used batteries must be handled in accordance with local environmental regulations.

7) F_PANEL (Front Panel Header)

Connect the power switch, reset switch, 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** (Power LED, Yellow):

System Status	LED
S0	On
S3/S4/S5	Off

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

- **PW** (Power Switch, Red):
  Connects to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.
- **HD** (Hard Drive Activity LED, Blue):
  Connects to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.
- **RES** (Reset Switch, Green):
  Connects to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.
- **NC** (Purple):
  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 and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

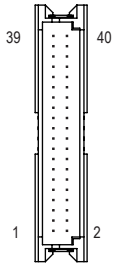
8) GPIO (GPIO Header)

Use this jumper to set the GPIO status to HIGH or LOW.

Pin No.	Definition	Pin No.	Definition
1	IO_GP70	6	IO_GP75
2	IO_GP71	7	IO_GP76
3	IO_GP72	8	IO_GP77
4	IO_GP73	9	GP_IN_OUT
5	IO_GP74	10	GND

9) LVDS (LVDS Header)

LVDS stands for Low-voltage differential signaling, which uses high-speed analog circuit techniques to provide multigigabit data transfers on copper interconnects and is a generic interface standard for high-speed data transmission.



Pin No.	Definition	Pin No.	Definition	Pin No.	Definition
1	LCD_VCC	15	-RXO3_C	29	CABLE_DET (Note)
2	LCD_VCC	16	+RXO3_C	30	-RXE3_C
3	VCC3	17	GND	31	+RXE3_C
4	NC	18	-RXECLKO_C	32	GND
5	NC	19	+RXECLKO_C	33	-RXECLKE_C
6	-RXO0_C	20	GND	34	+RXECLKE_C
7	+RXO0_C	21	-RXE0_C	35	GND
8	GND	22	+RXE0_C	36	SC_BKLT_EN
9	-RXO1_C	23	GND	37	SC_BKLT_CTL
10	+RXO1_C	24	-RXE1_C	38	FPD_PWR
11	GND	25	+RXE1_C	39	FPD_PWR
12	-RXO2_C	26	GND	40	FPD_PWR
13	+RXO2_C	27	-RXE2_C		
14	GND	28	+RXE2_C		

(Note) Connects to the ground pin of the LVDS.

10) LCD_VCC (LVDS Drive Voltage Jumper)

This jumper can be used to provide different screen voltage settings.

1-2 Close: Set to 3V. (Default)

2-3 Close: Set to 5V.

11) FPD (Flat Panel Display Header)

The FPD is a high-speed interface connecting the output of a video controller in a laptop computer, computer monitor or LCD television set to the display panel. Most laptops, LCD computer monitors and LCD TVs use this interface internally. The header conforms to FPD specification.

Pin No.	Definition
1	BKLT_EN
2	BKLT_PWM
3	BKLT_PWR
4	BKLT_PWR
5	BKLT_GND/Brightness_GND
6	BKLT_GND/Brightness_GND
7	Brightness_Up
8	Brightness_Down

12) MON_SW (Flat Panel Display Switch Header)

This header allows you to connect an on/off switch for the display.

Pin No.	Definition
1	Mon_SW
2	GND

13) SPEAKER (Speaker Header)

This header provides a 2W (4ohm) speaker on your AIO chassis.

Pin No.	Definition
1	SPK_LP
2	SPK_LN

14) SPKR_CTRL (Volume Control Header)

The header connects to the volume control button of the monitor to control the volume. This feature requires a software update to be enabled.

Pin No.	Definition
1	VOL_DW
2	GND
3	VOL_UP

15) F_USB1/F_USB2 (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	Pin No.	Definition
1	Power (5V)	6	USB DY+
2	Power (5V)	7	GND
3	USB DX-	8	GND
4	USB DY-	9	No Pin
5	USB DX+	10	NC

- Do not plug the IEEE 1394 bracket (2x5-pin) cable into the USB header.
- Prior to installing the USB bracket, be sure to turn off your computer and unplug the power cord from the power outlet to prevent damage to the USB bracket.

16) COMA/COMB (Serial Port Headers)

Each COM header can provide one serial port via an optional COM port cable. For purchasing the optional COM port cable, please contact the local dealer.

For RS232 Devices:

Pin No.	Definition
1	NDCD-
2	NDSR-
3	NSIN
4	NRTS-
5	NSOUT
6	NCTS-
7	NDTR-
8	12V_5V
9	GND
10	NC

17) COMC/COMD (Serial Port Headers)

Each COM header can provide one serial port via an optional COM port cable. For purchasing the optional COM port cable, please contact the local dealer. The two headers support RS232, RS422, and RS485 devices.

For RS232 Devices:

Pin No.	Definition
1	NDCD-
2	NDSR-
3	NSIN
4	NRTS-
5	NSOUT
6	NCTS-
7	NDTR-
8	+5V/+12V
9	GND
10	NC

For RS422 Devices:

Pin No.	Definition
1	TX(B)
2	NC
3	TX(A)
4	NC
5	RX(A)
6	NC
7	RX(B)
8	+5V/+12V
9	GND
10	NC

For RS485 Devices:

Pin No.	Definition
1	D-
2	NC
3	D+
4	NC
5	NC
6	NC
7	NC
8	+5V/+12V
9	GND
10	NC

18) COMA_PW/COMB_PW/COMC_PW/COMD_PW (Serial Port Header Power Select Jumpers)

The power select jumpers are used to select serial port power.

1-2 Close: Set to 12V.

2-3 Close: Set to 5V. (Default)

19) 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 (refer to Chapter 2, "BIOS Setup," for BIOS configurations).

20) SMBUS (System Management Bus)

This header provides the SMBUS signals.

Pin No.	Definition
1	SMB_CLK
2	SMB_DATA
3	GND

21) I2C (Inter-Integrated Circuit)

This header provides the I2C signals.

Pin No.	Definition
1	I2C_SCL
2	I2C_SDA
3	GND

Chapter 2 BIOS Setup

BIOS (Basic Input and Output System) records hardware parameters of the system in the CMOS on the motherboard. Its major functions include conducting the Power-On Self-Test (POST) during system startup, saving system parameters and loading operating system, etc. BIOS includes a BIOS Setup program that allows the user to modify basic system configuration settings or to activate certain system features.
When the power is turned off, the battery on the motherboard supplies the necessary power to the CMOS to keep the configuration values in the CMOS.
To access the BIOS Setup program, press the <Delete> key during the POST when the power is turned on.
To upgrade the BIOS, use either the GIGABYTE Q-Flash or @BIOS utility.

- Q-Flash allows the user to quickly and easily upgrade or back up BIOS without entering the operating system.
- @BIOS is a Windows-based utility that searches and downloads the latest version of BIOS from the Internet and updates the BIOS.

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

2-1 Startup Screen

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

2-2 Main

Once you enter the BIOS Setup program, the Main Menu (as shown below) appears on the screen. Use arrow keys to move among the items and press <Enter> to accept or enter a sub-menu.

Main Menu Help

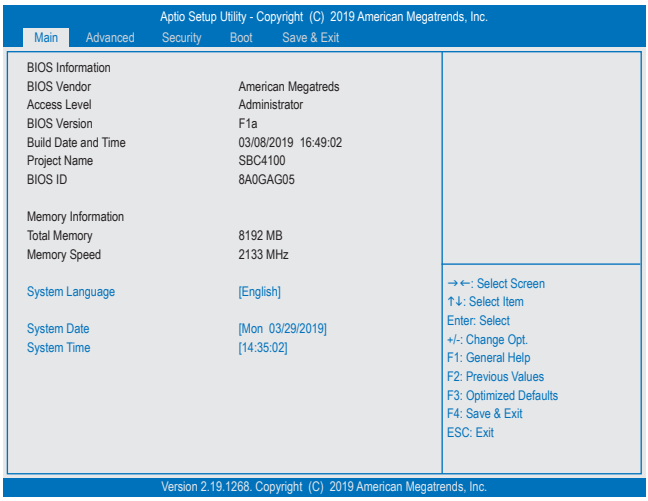
The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

Submenu Help

While in a submenu, press <F1> to display a help screen (General Help) of function keys available for the menu. Press <Esc> to exit the help screen. Help for each item is in the Item Help block on the right side of the submenu.

(Sample BIOS Version: F1a)

- When the system is not stable as usual, select the **Optimized Defaults** item to set your system to its defaults.
- The BIOS Setup menus described in this chapter are for reference only and may differ by BIOS version.



This section provides information on your motherboard model and BIOS version. You can also select the default language used by the BIOS and manually set the system time.

System Language

Selects the default language used by the BIOS.

System Date

Sets the system date. The date format is week (read-only), month, date, and year. Use <Tab> to switch between the Month, Date, and Year fields and use the <+> or <-> key to set the desired value.

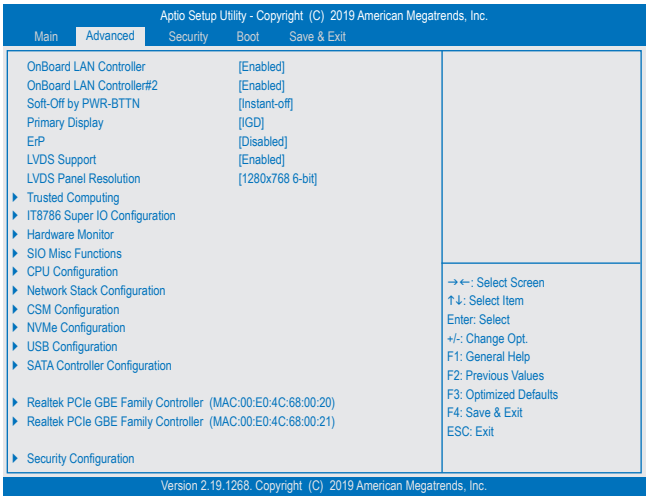
System Time

Sets the system time. The time format is hour, minute, and second. For example, 1 p.m. is 13:00:00. Use <Tab> to switch between the Hour, Minute, and Second fields and use the <+> or <-> key to set the desired value.

Access Level

Displays the current access level depending on the type of password protection used. (If no password is set, the default will display as **Administrator**.) The Administrator level allows you to make changes to all BIOS settings; the User level only allows you to make changes to certain BIOS settings but not all.

2-3 Advanced



OnBoard LAN Controller (LAN1)

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

If you wish to install a 3rd party add-in network card instead of using the onboard LAN, set this item to **Disabled**.

OnBoard LAN Controller#2 (LAN2)

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

If you wish to install a 3rd party add-in network card instead of using the onboard LAN, set this item to **Disabled**.

Soft-Off by PWR-BTTN

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

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

Primary Display

Specifies the first initiation of the monitor display from the installed PCI graphics card or the onboard graphics.

- IGD — Sets the onboard graphics as the first display. (Default)
- PCI — Sets the graphics card on the PCI Slot as the first display.

ErP

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

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

LVDS Support

Enables or disables the LVDS function. (Default: Enabled)

LVDS Panel Resolution

Allows you to set LVDS resolution and bit rate. (Default: 1280x768 6-bit)

Trusted Computing

Enables or disables Trusted Platform Module (TPM).

IT8786 Super IO Configuration
This section provides information on the super I/O chip and allows you to configure the parallel port.

Hardware Monitor

CPU Temperature/System Temperature
Displays current CPU/system temperature.

SYS_Fan Speed
Displays current SOC/system fan speeds.

VCCGI/VDDQ/+12V/VCC
Displays the current system voltages.

SIO Misc Functions

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

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

CPU Configuration

CPU Power Management

Active Processor Cores
Allows you to select the number of CPU cores to enable. (Default: Disabled)

Intel Virtualization Technology
Enables or disables Intel® Virtualization Technology. Virtualization enhanced by Intel® Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple virtual systems. (Default: Enabled)

VT-d
Enables or disables Intel® Virtualization Technology for Directed I/O. (Default: Disabled)

Thermal Monitor
Enables or disables Intel® Thermal Monitor function, a CPU overheating protection function. When enabled, the CPU core frequency and voltage will be reduced when the CPU is overheated. **Auto** lets the BIOS automatically configure this setting. (Default: Enabled)

Network Stack Configuration

Network Stack
Disables or enables booting from the network to install a GPT format OS, such as installing the OS from the Windows Deployment Services server. (Default: Disabled)

Ipv4 PXE Support
Enables or disables IPv4 PXE Support. This item is configurable only when **Network Stack** is enabled.

Ipv4 HTTP Support
Enables or disables HTTP boot support for IPv4. This item is configurable only when **Network Stack** is enabled.

Ipv6 PXE Support
Enables or disables IPv6 PXE Support. This item is configurable only when **Network Stack** is enabled.

Ipv6 HTTP Support
Enables or disables HTTP boot support for IPv6. This item is configurable only when **Network Stack** is enabled.

☞ PXE boot wait time

Allows you to configure how long to wait before you can press <Esc> to abort the PXE boot. This item is configurable only when **Network Stack** is enabled. (Default: 0)

☞ Media detect count

Allows you to set the number of times to check the presence of media. This item is configurable only when **Network Stack** is enabled. (Default: 1)

▶ CSM Configuration

☞ CSM Support

Enables or disables UEFI CSM (Compatibility Support Module) to support a legacy PC boot process.

- ⏩ Enabled — Enables UEFI CSM.
- ⏩ Disabled — Disables UEFI CSM and supports UEFI BIOS boot process only. (Default)

☞ Network

Allows you to select whether to enable the UEFI or legacy option ROM for the LAN controller.

- ⏩ Do not launch — Disables option ROM.
- ⏩ UEFI — Enables UEFI option ROM only. (Default)
- ⏩ Legacy — Enables legacy option ROM only.

This item is configurable only when **CSM Support** is set to **Enabled**.

☞ Storage

Allows you to select whether to enable the UEFI or legacy option ROM for the storage device controller.

- ⏩ Do not launch — Disables option ROM.
- ⏩ UEFI — Enables UEFI option ROM only. (Default)
- ⏩ Legacy — Enables legacy option ROM only.

This item is configurable only when **CSM Support** is set to **Enabled**.

☞ Video

Allows you to select whether to enable the UEFI or legacy option ROM for the graphics controller.

- ⏩ Do not launch — Disables option ROM.
- ⏩ UEFI — Enables UEFI option ROM only.
- ⏩ Legacy — Enables legacy option ROM only. (Default)

This item is configurable only when **CSM Support** is set to **Enabled**.

☞ Other PCI devices

Allows you to select whether to enable the UEFI or Legacy option ROM for the PCI device controller other than the LAN, storage device, and graphics controllers.

- ⏩ Do not launch — Disables option ROM.
- ⏩ UEFI — Enables UEFI option ROM only. (Default)
- ⏩ Legacy — Enables legacy option ROM only.

This item is configurable only when **CSM Support** is set to **Enabled**.

▶ NVMe Configuration

Displays information on your M.2 NVME PCIe SSD if installed.

▶ USB Configuration

☞ Onboard USB Feature

Enables or disables the onboard USB function. (Default: Enabled)

☞ Legacy USB Support

Allows USB keyboard/mouse to be used in MS-DOS. (Default: Enabled)

☞ **XHCI Hand-off**
Determines whether to enable XHCI Hand-off feature for an operating system without XHCI Hand-off support. (Default: Enabled)

☞ **USB Mass Storage Driver Support**
Enables or disables support for USB storage devices. (Default: Enabled)

☞ **USB Storage Devices**
Displays a list of connected USB mass storage devices. This item appears only when a USB storage device is installed.

▶ **SATA Controller Configuration**

☞ **Chipset SATA**
Enables or disables the integrated SATA controllers. (Default: Enabled)

☞ **SATA Mode Selection**
Allows you to decide whether to configure the SATA controller integrated in the Chipset to AHCI mode.

▸▸ AHCI Configures the SATA controllers to AHCI mode. Advanced Host Controller Interface (AHCI) is an interface specification that allows the storage driver to enable advanced Serial ATA features such as Native Command Queuing and hot plug. (Default)

☞ **Port 0**
Enables or disables the SATA port. (Default: Enabled)

☞ **SATA Port 1 Hot Plug Capability**
Enables or disable the hot plug capability for each SATA port. (Default: Disabled)

☞ **Configured as eSATA**
Enables or disables support for external SATA devices.

☞ **SATA Device Type**
Allows you to select the type of the SATA device. (Default: Hard Disk Drive)

▶ **Realtek PCIe GBE Family Controller (LAN1)**
This sub-menu provides information on LAN configuration and related configuration options.

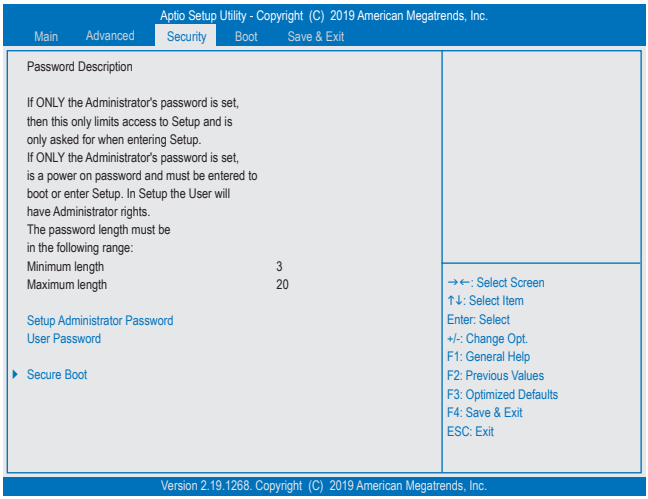
▶ **Realtek PCIe GBE Family Controller (LAN2)**
This sub-menu provides information on LAN configuration and related configuration options.

▶ **Security Configuration**

☞ **SW Guard Extensions (SGX)**
Enables or disables the Intel® Software Guard Extensions technology. This feature allows legal software to operate in a safe environment and protects the software against attacks from malicious software. The **Software Controlled** option allows you to enable or disable this feature with an Intel-provided application. (Default: Software Controlled)

☞ **Select Owner EPOCH input type**
Allows you to select the Owner EPOCH mode. (Default: No Change in Owner EPOCHs)

2-4 Security



☞ **Setup Administrator Password**
Allows you to configure an administrator password. Press <Enter> on this item, type the password, and then press <Enter>. You will be requested to confirm the password. Type the password again and press <Enter>. You must enter the administrator password (or user password) at system startup and when entering BIOS Setup. Differing from the user password, the administrator password allows you to make changes to all BIOS settings.

☞ **User Password**
Allows you to configure a user password. Press <Enter> on this item, type the password, and then press <Enter>. You will be requested to confirm the password. Type the password again and press <Enter>. You must enter the administrator password (or user password) at system startup and when entering BIOS Setup. However, the user password only allows you to make changes to certain BIOS settings but not all. To cancel the password, press <Enter> on the password item and when requested for the password, enter the correct one first. When prompted for a new password, press <Enter> without entering any password. Press <Enter> again when prompted to confirm.
NOTE: Before setting the User Password, be sure to set the Administrator Password first.

☞ **HDD Security Configuration**
Displays a list of connected hard drives and allows you to set a password for a specific hard drive. This item appears only when a hard drive is installed.

▶ **Secure Boot**

☞ **System Mode**
Displays the current system mode.

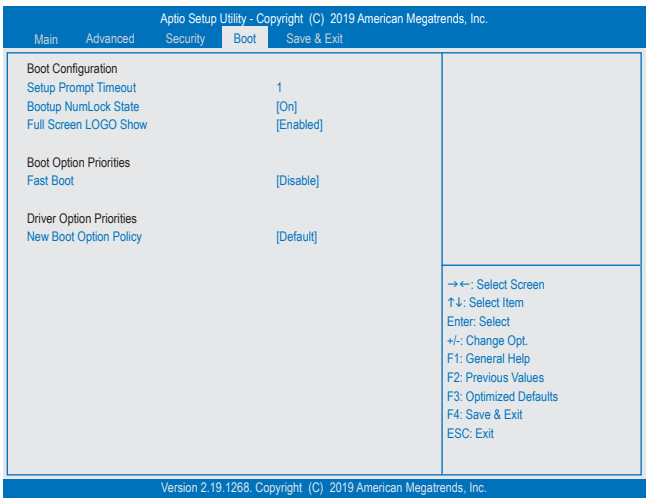
☞ **Vendor Keys**
Displays the vendor keys.

☞ **Secure Boot**
Displays the current secure boot state. (Default: Disabled)

☞ **Secure Boot Customization**
Allows you to configure the secure boot mode. (Default: Custom)

- **Restore Factory Keys**
  Revert to the factory default Secure Boot key. This item is configurable only when **Secure Boot Customizatio**n is set to **Custom**.
- **Reset To Setup Mode**
  Delete the previously saved Secure Boot key and revert to setup mode.
- **Key Management**
  This section provides you with configuration options for secure boot key management.

2-5 Boot



- **Setup Prompt Timeout**
  Allows you to configure the number of seconds to stay in BIOS setup prompt screen. (Default: 1)
- **Bootup NumLock State**
  Enables or disables Numlock feature on the numeric keypad of the keyboard after the POST. (Default: On)
- **Full Screen LOGO Show**
  Allows you to determine whether to display the GIGABYTE Logo at system startup. **Disabled** skips the GIGABYTE Logo when the system starts up. (Default: Enabled)

- **Boot Option Priorities #1/2**
  Specifies the overall boot order from the available devices.
  Removable storage devices that support GPT format will be prefixed with "UEFI:" string on the boot device list. To boot from an operating system that supports GPT partitioning, select the device prefixed with "UEFI:" string.
  Or if you want to install an operating system that supports GPT partitioning such as Windows 10 64-bit, select the optical drive that contains the Windows 10 64-bit installation disk and is prefixed with "UEFI:" string.

Hard Drive/CD/DVD ROM Drive/Floppy Drive/Network Device BBS Priorities

Specifies the boot order for a specific device type, such as hard drives, optical drives, floppy disk drives, and devices that support Boot from LAN function, etc. Press <Enter> on this item to enter the submenu that presents the devices of the same type that are connected. This item is present only if at least one device for this type is installed.

Fast Boot

Enables or disables Fast Boot to shorten the OS boot process. (Default: Disabled)

SATA Support

- All Sata Devices — All SATA devices are functional in the operating system and during the POST. (Default)
- Last Boot HDD Only — Except for the previous boot drive, all SATA devices are disabled before the OS boot process completes.

This item is configurable only when **Fast Boot** is set to **Enabled**.

VGA Support

Allows you to select which type of operating system to boot.

- Auto — Enables legacy option ROM only.
- EFI Driver — Enables EFI option ROM. (Default)

This item is configurable only when **Fast Boot** is set to **Enabled**.

USB Support

- Disable — All USB devices are disabled before the OS boot process completes.
- Full Initial — All USB devices are functional in the operating system and during the POST.
- Partial Initial — Part of the USB devices are disabled before the OS boot process completes. (Default)

This item is configurable only when **Fast Boot** is set to **Enabled**.

NetWork Stack Driver Support

- Disable — Disables booting from the network. (Default)
- Enable — Enables booting from the network.

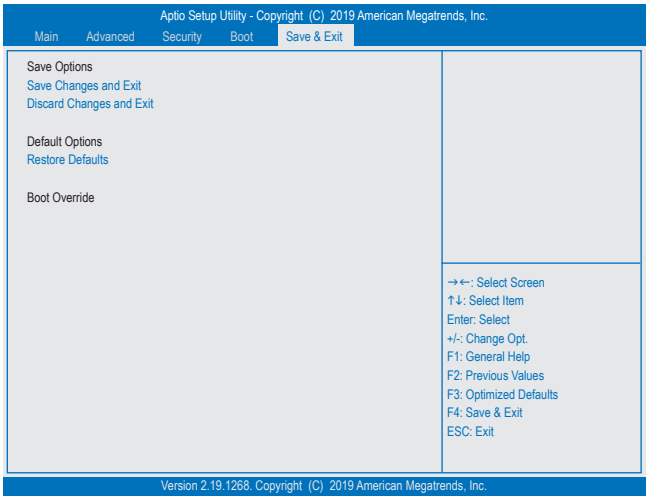
This item is configurable only when **Fast Boot** is set to **Enabled**.

New Boot Option Policy

Allows you to determine whether to change the boot order when a new device is added.

- Dedault — Keeps the previous boot order settings. (Default)
- Place First — Set the newly added device as the first boot device.
- Place Last — Set the newly added device as the last boot device.

2-6 Save & Exit



☞ **Save Changes and Exit**

Press <Enter> on this item and select **Yes**. This saves the changes to the CMOS and exits the BIOS Setup program. Select **No** or press <Esc> to return to the BIOS Setup Main Menu.

☞ **Discard Changes and Exit**

Press <Enter> on this item and select **Yes**. This exits the BIOS Setup without saving the changes made in BIOS Setup to the CMOS. Select **No** or press <Esc> to return to the BIOS Setup Main Menu.

☞ **Restore Defaults**

Press <Enter> on this item and select **Yes** to load the BIOS factory default settings. The BIOS defaults settings help the system to operate in optimum state. Always load the Optimized defaults after updating the BIOS or after clearing the CMOS values.

☞ **Boot Override**

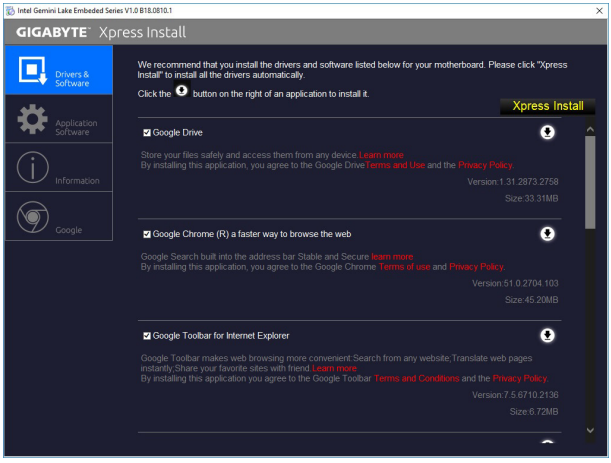
Allows you to select a device to boot immediately. Press <Enter> on the device you select and select **Yes** to confirm. Your system will restart automatically and boot from that device.

Chapter 3 Appendix

Drivers Installation

- Before installing the drivers, first install the operating system.
- After installing the operating system, insert the motherboard driver disk into your optical drive. Click on the message "Tap to choose what happens with this disc" on the top-right corner of the screen and select "Run **Run**.exe." (Or go to My Computer, double-click the optical drive and execute the Run.exe program.)

"Xpress Install" will automatically scan your system and then list all of the drivers that are recommended to install. You can click the **Xpress Install** button and "Xpress Install" will install all of the selected drivers. Or click the arrow icon to individually install the drivers you need.



Please visit GIGABYTE's website for more troubleshooting information.

Regulatory Statements

Regulatory Notices

This document must not be copied without our written permission, and the contents there of must not be imparted to a third party nor be used for any unauthorized purpose.
Contravention will be prosecuted. We believe that the information contained herein was accurate in all respects at the time of printing. GIGABYTE cannot, however, assume any responsibility for errors or omissions in this text. Also note that the information in this document is subject to change without notice and should not be construed as a commitment by GIGABYTE.

Our Commitment to Preserving the Environment

In addition to high-efficiency performance, all GIGABYTE motherboards fulfill European Union regulations for RoHS (Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment) and WEEE (Waste Electrical and Electronic Equipment) environmental directives, as well as most major worldwide safety requirements. To prevent releases of harmful substances into the environment and to maximize the use of our natural resources, GIGABYTE provides the following information on how you can responsibly recycle or reuse most of the materials in your "end of life" product.

Restriction of Hazardous Substances (RoHS) Directive Statement

GIGABYTE products have not intended to add and safe from hazardous substances (Cd, Pb, Hg, Cr+6, PBDE and PBB). The parts and components have been carefully selected to meet RoHS requirement. Moreover, we at GIGABYTE are continuing our efforts to develop products that do not use internationally banned toxic chemicals.

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) 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. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. 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.

- When your electrical or electronic equipment is no longer useful to you, "take it back" to your local or regional waste collection administration for recycling.
- If you need further assistance in recycling, reusing in your "end of life" product, you may contact us at the Customer Care number listed in your product's user's manual and we will be glad to help you with your effort.

Finally, we suggest that you practice other environmentally friendly actions by understanding and using the energy-saving features of this product (where applicable), recycling the inner and outer packaging (including shipping containers) this product was delivered in, and by disposing of or recycling used batteries properly. With your help, we can reduce the amount of natural resources needed to produce electrical and electronic equipment, minimize the use of landfills for the disposal of "end of life" products, and generally improve our quality of life by ensuring that potentially hazardous substances are not released into the environment and are disposed of properly.

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.

FCC Notice (U.S.A. Only)

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

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

Canada, Industry Canada (IC) Notices / Canada, avis d'Industry Canada (IC)

- This Class B digital apparatus complies with Canadian ICES-003 and RSS-210.
- Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
- Cet appareil numérique de classe B est conforme aux normes canadiennes ICES-003 et RSS-210.
- Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférence et (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

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