

GA-990FX-Gaming

User's Manual

Rev. 1101

12ME-990FXGM-1101R



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: **Bu**enkoppel 16, 22047 Hamburg, Germany

Declare that the product

Product Type: **Motherboard**

Product Name: **GA-990FX-Gaming**

conforms with the essential requirements of the following directives:

EMC Directive 2004/108/EC (until 2016/04/19), 2014/30/EU (after 2016/04/20):

- | | |
|--|---------------------------|
| <input checked="" type="checkbox"/> Conduction & Radiated Emissions: | EN 55022:2010/AC2011 |
| <input checked="" type="checkbox"/> Immunity: | EN 55024:2010 |
| <input checked="" type="checkbox"/> Power-line harmonics: | EN 61000-3-2:2006+A2:2009 |
| <input checked="" type="checkbox"/> Power-line flicker: | EN 61000-3-3:2013 |

Low Voltage Directive 2006/95/EC (until 2016/04/19), 2014/35/EU (after 2016/04/20):

- | | |
|---|--|
| <input checked="" type="checkbox"/> Safety: | EN60950-1:2006+A11:2009+A12:2011+A2:2013 |
|---|--|

RoHS Directive 2011/65/EU

- | | |
|---|--|
| <input checked="" type="checkbox"/> 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



Signature: Timmy Huang

(stamp)

Date: Apr. 8, 2016

Name: Timmy Huang

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2.1077(a)



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-990FX-Gaming

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 interference received, including that may cause undesired operation.

Representative Person's Name: ERIC LU

Signature: Eric Lu

Date: Apr. 8, 2016

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- For quick set-up of the product, read the Quick Installation Guide included with the product.
- 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: <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:

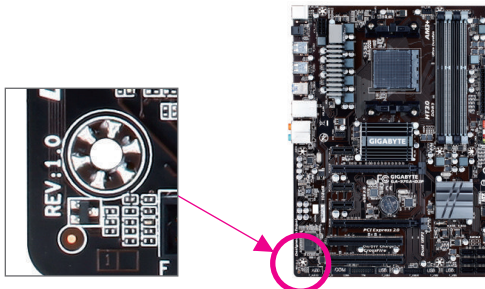
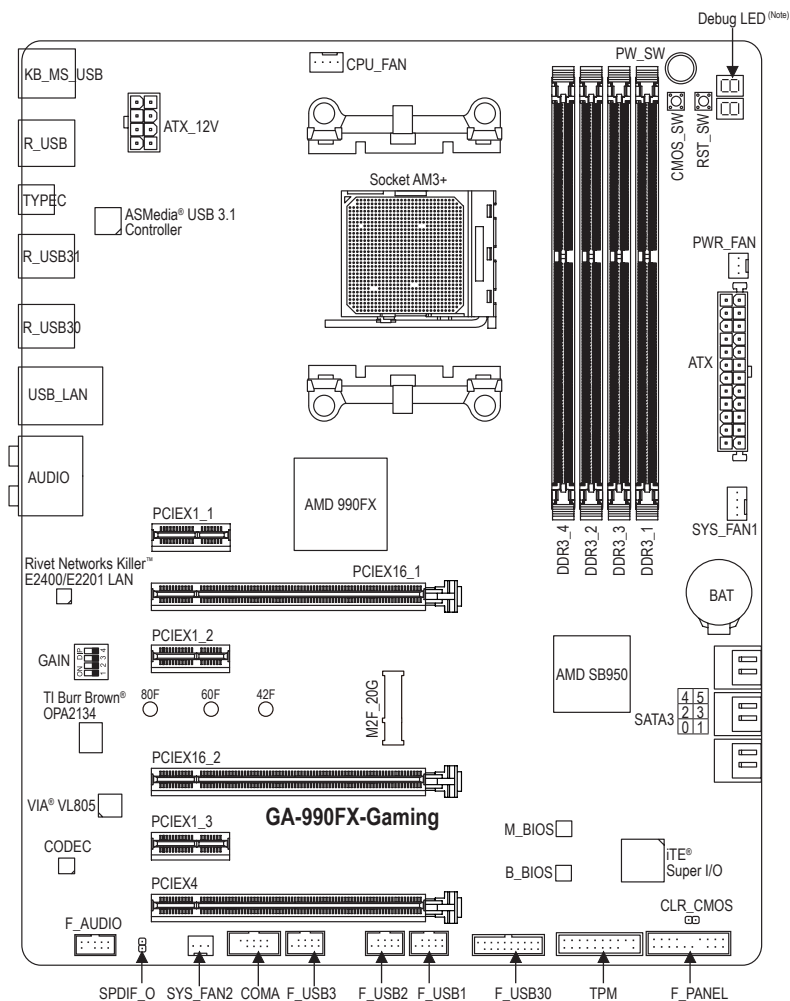


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GA-990FX-Gaming Motherboard Layout



Box Contents

- | | |
|---|--|
| <input checked="" type="checkbox"/> GA-990FX-Gaming motherboard | <input checked="" type="checkbox"/> Four SATA cables |
| <input checked="" type="checkbox"/> Motherboard driver disk | <input checked="" type="checkbox"/> I/O Shield |
| <input checked="" type="checkbox"/> User's Manual | <input checked="" type="checkbox"/> One 2-Way SLI bridge connector |
| <input checked="" type="checkbox"/> Quick Installation Guide | <input checked="" type="checkbox"/> One G Connector |

* 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) For debug code information, please refer to Chapter 3.










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	<ul style="list-style-type: none"> ◆ AM3+ Socket: <ul style="list-style-type: none"> - AMD AM3+ FX processor - AMD AM3 Phenom™ II processor/ AMD Athlon™ II processor (Go to GIGABYTE's website for the latest CPU support list.)
	HyperTransport Bus	<ul style="list-style-type: none"> ◆ HyperTransport™ 3.0 ◆ 5200 MT/s
	Chipset	<ul style="list-style-type: none"> ◆ North Bridge: AMD 990FX ◆ South Bridge: AMD SB950
	Memory	<ul style="list-style-type: none"> ◆ 4 x DDR3 DIMM sockets supporting up to 32 GB of system memory <ul style="list-style-type: none"> * 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. ◆ Dual channel memory architecture ◆ Support for DDR3 2000(O.C.)/1866/1600/1333/1066 MHz memory modules <ul style="list-style-type: none"> * To support a DDR3 1866 MHz (and above) memory, you must install an AM3+ CPU first. ◆ Support for Extreme Memory Profile (XMP) memory modules (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.)
	Audio	<ul style="list-style-type: none"> ◆ Realtek® ALC1150 codec ◆ TI Burr Brown® OPA2134 operational amplifier ◆ High Definition Audio ◆ 2/4/5.1/7.1-channel ◆ Support for S/PDIF Out
	LAN	<ul style="list-style-type: none"> ◆ Rivet Networks Killer™ E2400/E2201 LAN chip (10/100/1000 Mbit)
	Expansion Slots	<ul style="list-style-type: none"> ◆ 2 x PCI Express x16 slots, running at x16 (PCIEX16_1/PCIEX16_2) <ul style="list-style-type: none"> * For optimum performance, if only one PCI Express graphics card is to be installed, be sure to install it in the PCIEX16_1 slot; if you are installing two PCI Express graphics cards, it is recommended that you install them in the PCIEX16_1 and PCIEX16_2 slots. ◆ 1 x PCI Express x16 slot, running at x4 (PCIEX4) <ul style="list-style-type: none"> * The PCIEX4 slot shares bandwidth with the PCIEX1_3 slot. When PCIEX1_3 is populated with a PCI Express expansion card, the PCIEX4 slot will operate at up to x2 mode. ◆ 3 x PCI Express x1 slots (All of the PCI Express slots conform to PCI Express 2.0 standard.)
	Multi-Graphics Technology	<ul style="list-style-type: none"> ◆ Support for NVIDIA® Quad-GPU SLI™ and 2-Way NVIDIA® SLI™ technologies ◆ Support for AMD Quad-GPU CrossFireX™ and 2-Way AMD CrossFire™ technologies
	Storage Interface	<ul style="list-style-type: none"> ◆ South Bridge: <ul style="list-style-type: none"> - 1 x M.2 connector (Socket 3, M key, type 2242/2260/2280 SATA and PCIe x4/x2/x1 SSD support) - 6 x SATA 6Gb/s connectors - Support for RAID 0, RAID 1, RAID 5, RAID 10, and JBOD * Refer to "1-9 Internal Connectors." for the supported configurations with the M.2 and SATA connectors.

	USB	<ul style="list-style-type: none"> ◆ South Bridge: <ul style="list-style-type: none"> - 12 x USB 2.0/1.1 ports (6 ports on the back panel, 6 ports available through the internal USB headers) ◆ VIA® VL805 chip: <ul style="list-style-type: none"> - 4 x USB 3.0/2.0 ports (2 ports on the back panel, 2 ports available through the internal USB header) ◆ ASMedia® USB 3.1 Controller: <ul style="list-style-type: none"> - 1 x USB Type-C™ port on the back panel, with USB 3.1 support - 1 x USB 3.1 Type-A port (red) on the back panel
	Internal Connectors	<ul style="list-style-type: none"> ◆ 1 x 24-pin ATX main power connector ◆ 1 x 8-pin ATX 12V power connector ◆ 1 x M.2 Socket 3 connector ◆ 6 x SATA 6Gb/s connectors ◆ 1 x CPU fan header ◆ 2 x system fan headers ◆ 1 x power fan header ◆ 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 ◆ 3 x USB 2.0/1.1 headers ◆ 1 x Trusted Platform Module (TPM) header ◆ 1 x serial port header ◆ 1 x Clear CMOS jumper ◆ 1 x audio gain control switch ◆ 1 x power button ◆ 1 x reset button ◆ 1 x Clear CMOS button
	Back Panel Connectors	<ul style="list-style-type: none"> ◆ 1 x PS/2 keyboard/mouse port ◆ 1 x USB Type-C™ port, with USB 3.1 support ◆ 1 x USB 3.1 Type-A port (red) ◆ 2 x USB 3.0/2.0 ports ◆ 6 x USB 2.0/1.1 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	<ul style="list-style-type: none"> ◆ iTE® I/O Controller Chip
	Hardware Monitor	<ul style="list-style-type: none"> ◆ System voltage detection ◆ CPU/System temperature detection ◆ CPU/System/Power fan speed detection ◆ CPU overheating warning ◆ CPU/System/Power fan fail warning ◆ CPU/System fan speed control <p>* Whether the fan speed control function is supported will depend on the cooler you install.</p>

	BIOS	<ul style="list-style-type: none"> ◆ 2 x 32 Mbit flash ◆ Use of licensed AMI UEFI BIOS ◆ Support for DualBIOS™ ◆ PnP 1.0a, DMI 2.7, WfM 2.0, SM BIOS 2.7, ACPI 5.0
	Unique Features	<ul style="list-style-type: none"> ◆ Support for APP Center <ul style="list-style-type: none"> * Available applications in APP Center may vary by motherboard model. Supported functions of each application may also vary depending on motherboard specifications. - @BIOS - Ambient LED - Cloud Station - EasyTune - Game Controller - Smart TimeLock - Smart Recovery 2 - System Information Viewer - USB Blocker ◆ Support for Q-Flash ◆ Support for ON/OFF Charge ◆ Support for Smart Switch ◆ Support for Xpress Install
	Bundled Software	<ul style="list-style-type: none"> ◆ Norton® Internet Security (OEM version)
	Operating System	<ul style="list-style-type: none"> ◆ Support for Windows 10/8.1/7
	Form Factor	<ul style="list-style-type: none"> ◆ ATX Form Factor; 30.5cm x 24.4cm

* 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 **SupportUtility List** page on GIGABYTE's website to download the latest version of apps.

1-3 Installing the CPU

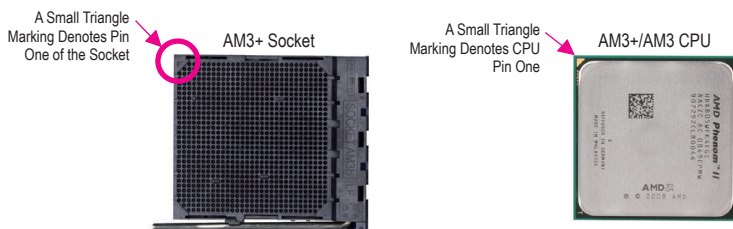


Read the following guidelines before you begin to install the CPU:

- 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.
- 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.

Installing the CPU

Locate the pin one (denoted by a small triangle) of the CPU socket and 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.

Dual Channel Memory Configuration

This motherboard provides four DDR3 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 four DDR3 memory sockets are divided into two channels and each channel has two memory sockets as following:

▶▶ Channel 0: DDR3_2, DDR3_4

▶▶ Channel 1: DDR3_1, DDR3_3



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

►► Dual Channel Memory Configurations Table:

	DDR3_4	DDR3_2	DDR3_3	DDR3_1
2 Modules	--	DS/SS	--	DS/SS
	DS/SS	--	DS/SS	--
4 Modules	DS/SS	DS/SS	DS/SS	DS/SS

(SS=Single-Sided, DS=Double-Sided, "--"=No Memory)

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 or four memory modules, it is recommended that memory of the same capacity, brand, speed, and chips be used and installed in the same colored sockets. For optimum performance, when enabling Dual Channel mode with two memory modules, we recommend that you install them in the DDR3_1 and DDR3_2 sockets.

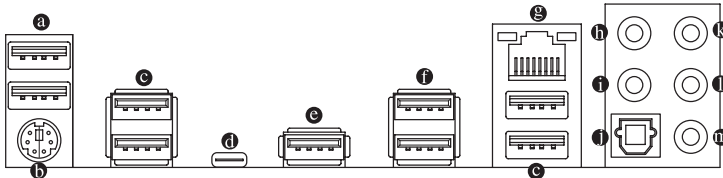
1-5 Installing an Expansion Card



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.

1-6 Back Panel Connectors



(a) USB 2.0/1.1 Port

The USB port supports the USB 2.0/1.1 specification. You can connect a USB DAC to this port or use this port for USB devices.

(b) PS/2 Keyboard/Mouse Port

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

(c) USB 2.0/1.1 Port

The USB port supports the USB 2.0/1.1 specification. Use this port for USB devices.

(d) USB Type-C™ Port

The reversible USB port supports the USB 3.1 specification and is compatible to the USB 3.0/2.0 specification. Use this port for USB devices.

(e) USB 3.1 Type-A Port (Red)

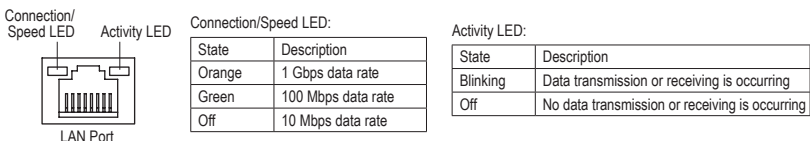
The USB 3.1 port supports the USB 3.1 specification and is compatible to the USB 3.0/2.0/1.1 specification. Use this port for USB devices.

(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.

⑨ 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.



⑩ Center/Subwoofer Speaker Out

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

⑪ Rear Speaker Out

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

⑫ 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.

⑬ Line In

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

⑭ Line Out

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.

⑮ Mic In

The Mic in jack.



If you want to install a Side Speaker, you need to retask either the Line in or Mic in jack to be Side Speaker out through the audio driver. Please visit GIGABYTE's website for more software information.



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

1-7 Onboard Buttons and Switch

Quick Buttons

This motherboard has 3 quick buttons: power button, reset button and clear CMOS button. 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.

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



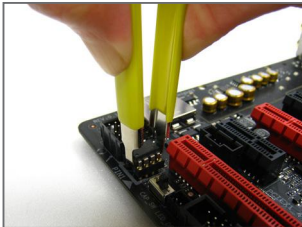
- Always turn off your computer and unplug the power cord from the power outlet before clearing the CMOS values.
- NOTE: Do not use the clear CMOS button when the system is on, or the system may shutdown and data loss or damage may occur.
- After system restart, go to BIOS Setup to load factory defaults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

Audio Gain Control Switch

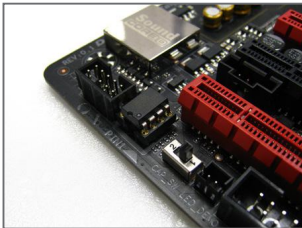
This switch allows for audio gain control for the line-out jack on the back panel. Please make sure all of the dips are set in the same position and are set according to your headphone specification (actual effects may vary by the device being used).

Gain Ratio	DIP Setting			
	DIP 1	DIP 2	DIP 3	DIP 4
2.5x	OFF	OFF	OFF	OFF
6x	ON	ON	ON	ON

1-8 Changing the Operational Amplifier



Step 1:
Use an IC extractor to carefully grip the IC's sides and extract it from the socket.

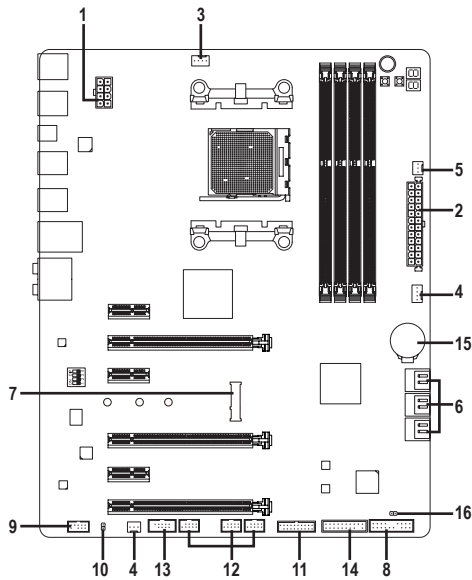


Step 2:
Align the notch on your OP chip with the notch on the socket and gently press the chip into the socket until seated.



For purchasing the IC extractor and OP Chip, please contact the local dealer.

1-9 Internal Connectors



1) ATX_12V	9) F_AUDIO
2) ATX	10) SPDIF_O
3) CPU_FAN	11) F_USB30
4) SYS_FAN1/2	12) F_USB1/F_USB2/F_USB3
5) PWR_FAN	13) COMA
6) SATA3 0/1/2/3/4/5	14) TPM
7) M2F_20G	15) BAT
8) F_PANEL	16) CLR_CMOS



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.

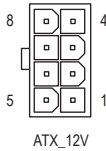
1/2) ATX_12V/ATX (2x4 12V Power Connector and 2x12 Main Power Connector)

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.

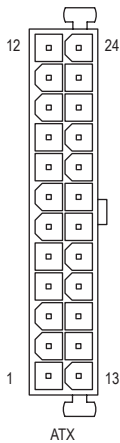


To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system.



ATX_12V:

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

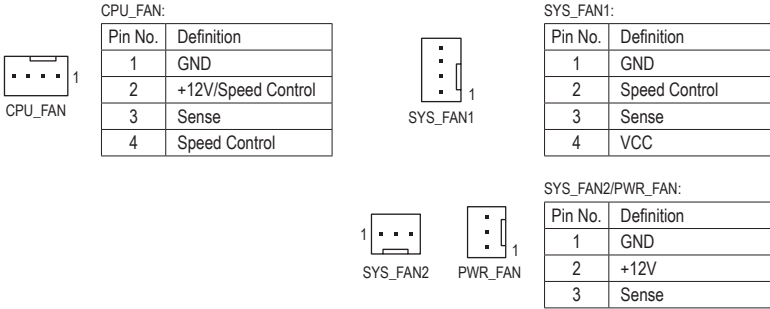


ATX:

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

3/4/5) CPU_FAN/SYS_FAN1/SYS_FAN2/PWR_FAN (Fan Headers)

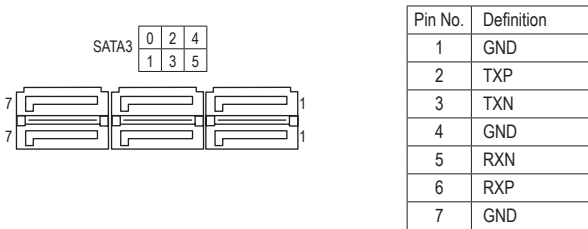
The motherboard has a 4-pin CPU fan header (CPU_FAN), a 4-pin (SYS_FAN1) and a 3-pin (SYS_FAN2) system fan headers, and a 3-pin power fan header (PWR_FAN). Most fan headers possess a foolproof insertion design. When connecting a fan cable, be sure to connect it in the correct orientation (the black connector 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.



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

The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s and SATA 1.5Gb/s standard. Each SATA connector supports a single SATA device. The AMD South Bridge supports RAID 0, RAID 1, RAID 5, RAID 10, and JBOD. Refer to Chapter 3, "Configuring a RAID Set," for instructions on configuring a RAID array.



To enable hot-plugging for the SATA ports, refer to Chapter 2, "BIOS Setup," "Peripherals\SB SATA Configuration," for more information.

7) M2F 20G (M.2 Socket 3 Connector)

The M.2 connector supports M.2 SATA SSDs and M.2 PCIe SSDs. It can support SATA RAID configuration through the AMD SB950 controller. Please note that an M.2 PCIe SSD cannot be used to create a RAID set with SATA drive(s). Refer to Chapter 3, "Configuring a RAID Set," for instructions on configuring a RAID array.



Follow the steps below to correctly install an M.2 SSD in the M.2 connector.

Step 1:

Use a screw driver to unfasten the screw and nut from the motherboard. Locate the proper mounting hole for the M.2 SSD to be installed and then screw the nut first.

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.



On the motherboard there are three length adjustment holes for the M.2 SSD. Select the proper hole for the M.2 SSD to be installed and refasten the screw and nut.

►► When installing different types of M.2 SSDs (including SATA SSDs, PCIe x4 SSDs, and PCIe x2 SSDs), be sure to refer to the supported configurations in the tables below according to the operating mode of your SATA controller (AHCI mode or RAID mode).

• AHCI/RAID mode:

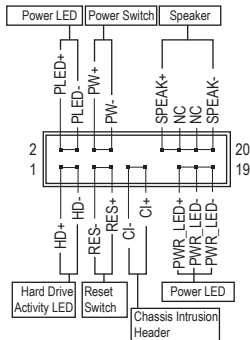
Connector Type of SSD	SATA3_0	SATA3_1	SATA3_2	SATA3_3	SATA3_4	SATA3_5
M.2 SATA SSD	✓	✓	✓	✓	✓	✗
M.2 PCIe x4 SSD <small>(Note)</small>	✓	✓	✓	✓	✓	✓
M.2 PCIe x2 SSD <small>(Note)</small>	✓	✓	✓	✓	✓	✓
No M.2 SSDs Installed	✓	✓	✓	✓	✓	✓

✓ : Supported, ✗: Not supported.

(Note) Please note that an M.2 PCIe SSD cannot be used to create a RAID set with SATA drive(s).

8) F_PANEL (Front Panel Header)

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



- **PLED/PWR_LED (Power LED, Yellow/Purple):**

System Status	LED
S0	On
S3/S4/S5	Off

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

- **PW (Power Switch, Red):**

Connects to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch (refer to Chapter 2, "BIOS Setup," "Power Management," for more information).

- **SPEAK (Speaker, Orange):**

Connects to the speaker on the chassis front panel. The system reports system startup status by issuing a beep code. One single short beep will be heard if no problem is detected at system startup.

- **HD (Hard Drive Activity LED, Blue):**

Connects to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

- **RES (Reset Switch, Green):**

Connects to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

- **CI (Chassis Intrusion Header, Gray):**

Connects to the chassis intrusion switch/sensor on the chassis that can detect if the chassis cover has been removed. This function requires a chassis with a chassis intrusion switch/sensor.

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



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

9) F_AUDIO (Front Panel Audio Header)

The front panel audio header supports Intel High Definition audio (HD) and AC'97 audio. You may connect your chassis front panel audio module to this header. Make sure the wire assignments of the module connector match the pin assignments of the motherboard header. Incorrect connection between the module connector and the motherboard header will make the device unable to work or even damage it.



For HD Front Panel Audio:

Pin No.	Definition	Pin No.	Definition
1	MIC2_L	6	Sense
2	GND	7	FAUDIO_JD
3	MIC2_R	8	No Pin
4	-ACZ_DET	9	LINE2_L
5	LINE2_R	10	Sense

For AC'97 Front Panel Audio:

Pin No.	Definition	Pin No.	Definition
1	MIC	6	NC
2	GND	7	NC
3	MIC Power	8	No Pin
4	NC	9	Line Out (L)
5	Line Out (R)	10	NC



- The front panel audio header supports HD audio by default.
- Audio signals will be present on both of the front and back panel audio connections simultaneously.
- Some chassis provide a front panel audio module that has separated connectors on each wire instead of a single plug. For information about connecting the front panel audio module that has different wire assignments, please contact the chassis manufacturer.

10) SPDIF_O (S/PDIF Out Header)

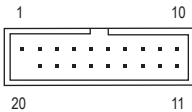
This header supports digital S/PDIF Out and connects a S/PDIF digital audio cable (provided by expansion cards) for digital audio output from your motherboard to certain expansion cards like graphics cards and sound cards. For example, some graphics cards may require you to use a S/PDIF digital audio cable for digital audio output from your motherboard to your graphics card if you wish to connect an HDMI display to the graphics card and have digital audio output from the HDMI display at the same time. For information about connecting the S/PDIF digital audio cable, carefully read the manual for your expansion card.



Pin No.	Definition
1	SPDIFO
2	GND

11) F_USB30 (USB 3.0/2.0 Header)

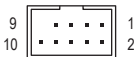
The header conforms to USB 3.0/2.0 specification and each header can provide two USB ports. For purchasing the optional 3.5" front panel that provides two USB 3.0/2.0 ports, please contact the local dealer.



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

12) F_USB1/F_USB2/F_USB3 (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.



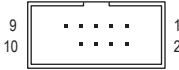
Pin No.	Definition	Pin No.	Definition
1	Power (5V)	6	USB DY+
2	Power (5V)	7	GND
3	USB DX-	8	GND
4	USB DY-	9	No Pin
5	USB DX+	10	NC



- Do not plug the IEEE 1394 bracket (2x5-pin) cable into the USB 2.0/1.1 header.
- Prior to installing the USB bracket, be sure to turn off your computer and unplug the power cord from the power outlet to prevent damage to the USB bracket.

13) COMA (Serial Port Header)

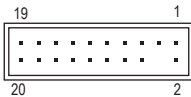
The COM header can provide one serial port via an optional COM port cable. For purchasing the optional COM port cable, please contact the local dealer.



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

14) TPM (Trusted Platform Module Header)

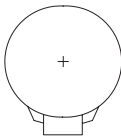
You may connect a TPM (Trusted Platform Module) to this header.



Pin No.	Definition	Pin No.	Definition
1	LCLK	11	LAD0
2	GND	12	GND
3	LFRAME	13	NC
4	No Pin	14	NC
5	LRESET	15	SB3V
6	NC	16	SERIRQ
7	LAD3	17	GND
8	LAD2	18	NC
9	VCC3	19	NC
10	LAD1	20	SUSCLK

15) BAT (Battery)

The battery provides power to keep the values (such as BIOS configurations, date, and time information) in the CMOS when the computer is turned off. Replace the battery when the battery voltage drops to a low level, or the CMOS values may not be accurate or may be lost.



You may clear the CMOS values by removing the battery:

1. Turn off your computer and unplug the power cord.
2. Gently remove the battery from the battery holder and wait for one minute. (Or use a metal object like a screwdriver to touch the positive and negative terminals of the battery holder, making them short for 5 seconds.)
3. Replace the battery.
4. Plug in the power cord and restart your computer.



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

16) 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).

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.
(Sample BIOS Version: E13)



On the main menu of the BIOS Setup program, press arrow keys to move among the items and press <Enter> to accept or enter a sub-menu. Or you can use your mouse to select the item you want.



- When the system is not stable as usual, select the **Load 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.

2-2 M.I.T.



This section provides information on the BIOS version, CPU base clock, CPU frequency, memory frequency, total memory size, CPU temperature and CPU voltage, etc.



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

▶ **M.I.T. Current Status**

This screen provides information on CPU/memory frequencies/parameters.

▶ **Advanced Frequency Settings**

☞ **BCLK Clock Control**

Allows you to manually set the CPU base clock in 1 MHz increments. (Default: Auto)

Important: It is highly recommended that the CPU frequency be set in accordance with the CPU specifications.

☞ **CPU NorthBridge Frequency**

Allows you to alter the North Bridge controller frequency for the installed CPU. The adjustable range is dependent on the CPU being installed.

☞ **HT Link Frequency**

Allows you to manually set the frequency for the HT Link between the CPU and chipset. The adjustable range is dependent on the CPU being installed. (Default: Auto)

☞ **CPU Clock Ratio**

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

☞ **CPU Frequency**

Displays the current operating CPU frequency.

▶ **Advanced CPU Core Features**

☞ **CPU Clock Ratio, CPU Frequency**

The settings above are synchronous to those under the same items on the **Advanced Frequency Settings** menu.

☞ **Core Performance Boost^(Note)**

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

☞ **CPB Ratio^(Note)**

Allows you alter the ratio for the CPB. The adjustable range is dependent on the CPU being installed. (Default: Auto)

☞ **CPU Unlock^(Note)**

Allows you to determine whether unlock hidden CPU cores. (Default: Disabled)

☞ **Cool & Quiet**

- ▶▶ Enabled Lets the AMD Cool'n'Quiet driver dynamically adjust the CPU clock and VID to reduce heat output from your computer and its power consumption. (Default)
- ▶▶ Disabled Disables this function.

☞ **C1E Support**

Allows you to determine whether to let the CPU enter C1 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. (Default: Enabled)

☞ **SVM**

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

☞ **CPU core Control^(Note)**

Allows you to determine whether to manually enable/disable CPU cores. **Automatic mode** allows the BIOS to enable all CPU cores (number of cores available depends on the CPU being used). (Default: Automatic mode)

(Note) This item is present only when you install a CPU that supports this feature.

- ☞ **Core C6 State** ^(Note 1)
 Allows you to determine whether to let the CPU enter C6 mode in system halt state. When enabled, the CPU core frequency will be reduced during system halt state to decrease power consumption. The C6 state is a more enhanced power-saving state than C1. (Default: Enabled)
- ☞ **HPC Mode** ^(Note 1)
 Allows you to determine whether to enable High Performance Computing (HPC) mode for the CPU. **Enabled** prevents the CPU frequency from being lowered during system halt state. (Default: Disabled)
- ☞ **APM (AMD Application Power Management)** ^(Note 1)

 - ▶▶ Enabled Dynamically monitors the power consumption of the CPU cores and automatically optimizes the CPU to its best performance level. (Default)
 - ▶▶ Disabled Disables this function.
- ☞ **Extreme Memory Profile (X.M.P.)** ^(Note 2)
 Allows the BIOS to read the SPD data on XMP memory module(s) to enhance memory performance when enabled.

 - ▶▶ Disabled Disables this function. (Default)
 - ▶▶ Profile1 Uses Profile 1 settings.
 - ▶▶ Profile2 ^(Note 2) Uses Profile 2 settings.
- ☞ **System Memory Multiplier**
 Allows you to set the system memory multiplier. **Auto** sets memory multiplier according to memory SPD data. (Default: Auto)
- ☞ **Memory Frequency (MHz)**
 This value is automatically adjusted according to the **BCLK Clock Control** and **System Memory Multiplier** settings.
- ▶ **Advanced Memory Settings**
- ☞ **Extreme Memory Profile (X.M.P.)** ^(Note 2), **System Memory Multiplier**, **Memory Frequency(MHz)**
 The settings above are synchronous to those under the same items on the **Advanced Frequency Settings** menu.
- ☞ **DRAM Timing Selectable**
Quick and **Expert** allows the memory timing settings below to be configurable. Options are: Auto (default), Quick, Expert.
- ☞ **Profile DDR Voltage**
 When using a non-XMP memory module or **Extreme Memory Profile (X.M.P.)** is set to **Disabled**, the value is displayed according to your memory specification. When **Extreme Memory Profile (X.M.P.)** is set to **Profile1** or **Profile2**, the value is displayed according to the SPD data on the XMP memory.
- ☞ **Profile VTT Voltage**
 The value displayed here is dependent on the CPU being used.
- ☞ **Channel Interleaving**
 Enables or disables memory channel interleaving. **Enabled** allows the system to simultaneously access different channels of the memory to increase memory performance and stability. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)
- ☞ **Rank Interleaving**
 Enables or disables memory rank interleaving. **Enabled** allows the system to simultaneously access different ranks of the memory to increase memory performance and stability. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

(Note 1) This item is present only when you install a CPU that supports this feature.

(Note 2) This item is present only when you install a memory module that supports this feature.

▶ Channel A/B Timing Settings

This sub-menu provides memory timing settings for each channel of memory. The respective timing setting screens are configurable only when **DRAM Timing Selectable** is set to **Quick** or **Expert**. Note: Your system may become unstable or fail to boot after you make changes on the memory timings. If this occurs, please reset the board to default values by loading optimized defaults or clearing the CMOS values.

▶ Advanced Voltage Settings

This sub-menu allows you to set CPU, chipset and memory voltages.

▶ PC Health Status

☞ Reset Case Open Status

- ▶ Disabled Keeps or clears the record of previous chassis intrusion status. (Default)
- ▶ Enabled Clears the record of previous chassis intrusion status and the **Case Open** field will show "No" at next boot.

☞ Case Open

Displays the detection status of the chassis intrusion detection device attached to the motherboard CI header. If the system chassis cover is removed, this field will show "Yes", otherwise it will show "No". To clear the chassis intrusion status record, set **Reset Case Open Status** to **Enabled**, save the settings to the CMOS, and then restart your system.

☞ CPU Vcore/Dram Voltage/+3.3V/+5V/+12V

Displays the current system voltages.

☞ CPU/System Temperature

Displays current CPU/system temperature.

☞ CPU/System/Power Fan Speed

Displays current CPU/system/power fan speed.

☞ CPU Warning Temperature

Sets the warning threshold for CPU temperature. When temperature exceeds the threshold, BIOS will emit warning sound. Options are: Disabled (default), 60°C/140°F, 70°C/158°F, 80°C/176°F, 90°C/194°F.

☞ CPU/System/Power Fan Fail Warning

Allows the system to emit warning sound if the fan is not connected or fails. Check the fan condition or fan connection when this occurs. (Default: Disabled)

☞ CPU Fan Control Mode

- ▶ Auto Lets the BIOS automatically detect the type of CPU fan installed and sets the optimal CPU fan control mode. (Default)
- ▶ Voltage Sets Voltage mode for a 3-pin CPU fan.
- ▶ PWM Sets PWM mode for a 4-pin CPU fan.

☞ CPU Fan Speed Control

Allows you to determine whether to enable the fan speed control function and adjust the fan speed.

- ▶ Normal Allows the fan to run at different speeds according to the CPU temperature. You can adjust the fan speed with System Information Viewer based on your system requirements. (Default)
- ▶ Silent Allows the fan to run at slow speeds.
- ▶ Manual Allows you to control the fan speed under the **Slope PWM** item.
- ▶ Disabled Allows the fan to run at full speeds.

☞ Slope PWM

Allows you to control the CPU fan speed. This item is configurable only when **CPU Fan Speed Control** is set to **Manual**. Options are: 0.75 PWM value /°C ~ 2.50 PWM value /°C.

☞ 1st System Fan Speed Control (SYS_FAN1 Connector)

Allows you to determine whether to enable the fan speed control function and adjust the fan speed.

- ▶ Normal Allows the fan to run at different speeds according to the system temperature. You can adjust the fan speed with System Information Viewer based on your system requirements. (Default)

- ▶ Silent Allows the fan to run at slow speeds.
- ▶ Manual Allows you to control the fan speed under the **Slope PWM** item.
- ▶ Disabled Allows the fan to run at full speeds.

☞ **Slope PWM**

Allows you to control the system fan speed. This item is configurable only when **1st System Fan Speed Control** is set to **Manual**. Options are: 0.75 PWM value /°C ~ 2.50 PWM value /°C.

2-3 System Information



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 <Enter> to switch between the Month, Date, and Year fields and use the <Page Up> or <Page Down> 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 <Enter> to switch between the Hour, Minute, and Second fields and use the <Page Up> or <Page Down> 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.

▶ **ATA Port Information**

This section provides information on the device connected to each SATA port controlled by AMD Chipset.

2-4 BIOS Features



☞ Boot Option Priorities

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 7 64-bit, select the optical drive that contains the Windows 7 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.

☞ Bootup NumLock State

Enables or disables Numlock feature on the numeric keypad of the keyboard after the POST. (Default: Enabled)

☞ Security Option

Specifies whether a password is required every time the system boots, or only when you enter BIOS Setup. After configuring this item, set the password(s) under the **Administrator Password/User Password** item.

- ▶▶ Setup A password is only required for entering the BIOS Setup program.
- ▶▶ System A password is required for booting the system and for entering the BIOS Setup program. (Default)

☞ 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)

☞ Windows 8 Features

Allows you to select the operating system to be installed. (Default: Other OS)

☞ **CSM Support**

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

- ▶▶ Always Enables UEFI CSM. (Default)
- ▶▶ Never Disables UEFI CSM and supports UEFI BIOS boot process only.

This item is configurable only when **Windows 8 Features** is set to **Windows 8** or **Windows 8 WHQL**.

☞ **Boot Mode Selection**

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

- ▶▶ UEFI and Legacy Allows booting from operating systems that support legacy option ROM or UEFI option ROM. (Default)
- ▶▶ Legacy Only Allows booting from operating systems that only support legacy Option ROM.
- ▶▶ UEFI Only Allows booting from operating systems that only support UEFI Option ROM.

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

☞ **LAN PXE Boot Option ROM**

Allows you to select whether to enable the legacy option ROM for the LAN controller. (Default: Disabled)

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

☞ **Storage Boot Option Control**

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

- ▶▶ Disabled Disables option ROM.
- ▶▶ Legacy Only Enables legacy option ROM only. (Default)
- ▶▶ UEFI Only Enables UEFI option ROM only.
- ▶▶ Legacy First Enables legacy option ROM first.
- ▶▶ UEFI First Enables UEFI option ROM first.

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

☞ **Other PCI Device ROM Priority**

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.

- ▶▶ Legacy OpROM Enables legacy option ROM only.
- ▶▶ UEFI OpROM Enables UEFI option ROM only. (Default)

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

☞ **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: Disable)

☞ **Ipv4 PXE Support**

Enables or disables IPv4 PXE Support. 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.

☞ **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.

2-5 Peripherals



Initial Display Output

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

- ▶▶ PCIe 1 Slot Sets the PCI Express graphics card on the PCIEX16_1 slot as the first display. (Default)
- ▶▶ PCIe 2 Slot Sets the PCI Express graphics card on the PCIEX16_2 slot as the first display.
- ▶▶ PCIe 3 Slot Sets the PCI Express graphics card on the PCIEX4 slot as the first display.

Audio LED

Enables or disables the onboard audio LED function.

- ▶▶ Off Disables this function.
- ▶▶ Still Mode The LEDs stay constantly on. (Default)
- ▶▶ Beat Mode The brightness of the LED changes according to the music rhythm.
- ▶▶ Pulse Mode The brightness of the LED changes slowly and smoothly like breath.

OnChip SATA Controller

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

OnChip SATA Type

Enables or disables RAID for the SATA controllers integrated in the Chipset or configures the SATA controllers to AHCI mode.

- ▶▶ Native IDE Configures the SATA controller to IDE mode.
- ▶▶ RAID Enables RAID for the SATA controller.
- ▶▶ 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)

- ☞ **OnChip SATA Port4/5 Type (SATA3 4/SATA3 5 connectors)**
 This option is configurable only when **OnChip SATA Type** is set to **RAID** or **AHCI**. Configures the operating mode of the integrated SATA3 4~SATA3 5 connectors.

 - ▶▶ As SATA Type The mode depends on the **OnChip SATA Type** settings.
 - ▶▶ IDE Configures the SATA3 4~SATA3 5 connectors to PATA mode. (Default)
- ☞ **HD Audio Azalia Device**
 Enables or disables the onboard audio function. (Default: Enabled)
 If you wish to install a 3rd party add-in audio card instead of using the onboard audio, set this item to **Disabled**.
- ☞ **USB DAC Power**
 Enables or disables the power for the USB DAC connector on the back panel. For a USB DAC that has independent power, set this item to **Disabled**. (Default: Enabled)
- ☞ **Onboard USB Device**
 Enables or disables the integrated USB controller. (Default: Enabled)
- ☞ **Onboard LAN Controller**
 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 USB3.0 Controller (VIA® VL805 USB Controller)**
 Enables or disables the VIA® VL805 USB controller. (Default: Enabled)
- ☞ **Onboard USB3.1 Controller (ASMedia® USB 3.1 Controller)**
 Enables or disables the ASMedia® USB 3.1 controller. (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)
- ☞ **EHCI Hand-off**
 Determines whether to enable EHCI Hand-off feature for an operating system without EHCI Hand-off support. (Default: Disabled)
- ☞ **Port 60/64 Emulation**
 Enables or disables emulation of I/O ports 64h and 60h. This should be enabled for full legacy support for USB keyboards/mice in MS-DOS or in operating system that does not natively support USB devices. (Default: Disabled)
- ☞ **USB Storage Devices**
 Displays a list of connected USB mass storage devices. This item appears only when a USB storage device is installed.
- ☞ **IOMMU Controller**
 Enables or disables AMD IOMMU support. (Default: Disabled)
- ▶ **SB SATA Configuration**

 - ☞ **SATA Hot Plug on PORT0~SATA Hot Plug on PORT5**
 Enables or disable the hot plug capability for each SATA port. (Default: Disabled)
 - ☞ **SATA Power on PORT0~SATA Power on PORT5**
 Enables or disables each SATA port. (Default: Enabled)

▶ Super IO Configuration

⊖ Serial Port A

Enables or disables the onboard serial port. (Default: Enabled)

▶ NVMe Configuration

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

2-6 Power Management



⊖ Resume by Alarm

Determines whether to power on the system at a desired time. (Default: Disabled)

If enabled, set the date and time as following:

▶▶ Wake up day: Turn on the system at a specific time on each day or on a specific day in a month.

▶▶ Wake up hour/minute/second: Set the time at which the system will be powered on automatically.

Note: When using this function, avoid inadequate shutdown from the operating system or removal of the AC power, or the settings may not be effective.

⊖ HPET Support

Enables or disables High Precision Event Timer (HPET) for Windows 10/8.1/7 operating system. (Default: Enabled)

⊖ 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.

⊖ 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)

⊖ Power On By Keyboard

Allows the system to be turned on by a PS/2 keyboard wake-up event.

Note: To use this function, you need an ATX power supply providing at least 1A on the +5VSB lead.

▶▶ Disabled Disables this function. (Default)

- ▶▶ Password Set a password with 1~5 characters to turn on the system.
- ▶▶ Keyboard 98 Press POWER button on the Windows 98 keyboard to turn on the system.
- ▶▶ Any key Press any key to turn on the system.

⊞ Power On Password

Set the password when **Power On By Keyboard** is set to **Password**.

Press <Enter> on this item and set a password with up to 5 characters and then press <Enter> to accept.

To turn on the system, enter the password and press <Enter>.

Note: To cancel the password, press <Enter> on this item. When prompted for the password, press <Enter> again without entering the password to clear the password settings.

⊞ Power On By Mouse

Allows the system to be turned on by a PS/2 mouse wake-up event.

Note: To use this function, you need an ATX power supply providing at least 1A on the +5VSB lead.

- ▶▶ Disabled Disables this function. (Default)
- ▶▶ Move Move the mouse to turn on the system.
- ▶▶ Double Click Double click on left button on the mouse to turn on the system.

⊞ 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, PME event wake up, power on by mouse, power on by keyboard, and wake on LAN.

2-7 Save & Exit



⊞ Save & Exit Setup

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.

⊞ Exit Without Saving

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.

☞ Load Optimized Defaults

Press <Enter> on this item and select **Yes** to load the optimal BIOS 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.

☞ Save Profiles

This function allows you to save the current BIOS settings to a profile. You can create up to 8 profiles and save as Setup Profile 1~ Setup Profile 8. Press <Enter> to complete. Or you can select **Select File in HDD/FDD/USB** to save the profile to your storage device.

☞ Load Profiles

If your system becomes unstable and you have loaded the BIOS default settings, you can use this function to load the BIOS settings from a profile created before, without the hassles of reconfiguring the BIOS settings. First select the profile you wish to load and then press <Enter> to complete. You can select **Select File in HDD/FDD/USB** to input the profile previously created from your storage device or load the profile automatically created by the BIOS, such as reverting the BIOS settings to the last settings that worked properly (last known good record).

Chapter 3 Appendix

3-1 Configuring a RAID Set

RAID Levels

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

Before you begin, please prepare the following items:

- At least two SATA hard drives or M.2 SSD ^(Note 1) (To ensure optimal performance, it is recommended that you use two hard drives with identical model and capacity). ^(Note 2)
- Windows setup disk.
- Motherboard driver disk.
- A USB thumb drive.

Configuring the Onboard SATA Controller

A. Installing SATA hard drive(s) in your computer

Connect the SATA signal cables to SATA hard drives and the SATA ports on the motherboard. Then connect the power connectors from your power supply to the hard drives. Or install your M.2 SSD in the M.2 connector on the motherboard.

(Note 1) Please note that an M.2 PCIe SSD cannot be used to create a RAID set with SATA drive(s).

(Note 2) Refer to Chapter 1, "Internal Connectors," "M.2 Socket 3 Connector," for the configuration tables of SATA hard drives and M.2 SSDs.

B. Configuring SATA controller mode in BIOS Setup

Make sure to configure the SATA controller mode correctly in system BIOS Setup. For the BIOS Setup menus, refer to Chapter 2, "BIOS Setup," "Peripherals."

Steps:

1. Turn on your computer and press <Delete> to enter BIOS Setup during the POST (Power-On Self-Test). Ensure **OnChip SATA Controller** is enabled under **Peripherals**. To enable RAID for the SATA3 0/1/2/3 connectors, set **OnChip SATA Type** to **RAID**. To enable RAID for the SATA3 4/SATA3 5 connectors, set **OnChip SATA Type** to **RAID** and set **OnChip SATA Port4/5 Type** to **As SATA Type**.
2. If you want to configure UEFI RAID, follow the steps in "C-1." To enter the legacy RAID ROM, save the settings and exit BIOS Setup. Refer to "C-2" for more information.



The BIOS Setup menus described in this section may differ from the exact settings for your motherboard. The actual BIOS Setup menu options you will see shall depend on the motherboard you have and the BIOS version.

C-1. UEFI RAID Configuration

Only Windows 10/8.1 64-bit supports UEFI RAID configuration.

Step 1:

In BIOS Setup, go to **BIOS Features** and set **Windows 8 Features** to **Windows 8** and **CSM Support** to **Never**. Save the changes and exit BIOS Setup.

Step 2:

Restart your computer and press <F12> to enter the boot device configuration menu. Use the up or down arrow key to select **UEFI: Built-in EFI Shell**. Press <Enter> to access. Follow the steps below and enter the commands to access the RAID setup utility.

1. Enter **drvcfg** at **Shell** and press <Enter>:

```
Shell> drvcfg
```

2. When **Drv [XX] Ctrl [XX] Lang [eng]** appears, enter the following commands at **Shell** again:

```
Shell> drvcfg -s XX XX
```

XXs are the values shown in the brackets after **Drv** and **Ctrl** above, which may vary by hard drives.

Then press <Enter> to enter the RAID setup utility.

Step 3:

The **Main Menu** is the first screen when you enter the BIOS RAID Setup utility. Use the up or down arrow key to select **Logical Drive Main Menu** and press <Enter>.

Step 4:

To create an array, press <Enter> on **Logical Drive Create Menu**.

Step 5:

Usable hard drives are listed on the **Logical Drive Create Menu**. Use the up or down arrow key to select the hard drive to be included in the array and press the <Space> key. The selected hard drives will be marked with **[X]**. Then move to **Basic Setting** and press <Enter>.

Step 6:

Use the up or down arrow key to move to and configure each required item in sequence.

After completing, press <Enter> on **Start To Create**. When the message "Are You Sure To Create Logical Drive?" appears, press <Enter> to begin creating the RAID array or <Esc> to cancel.

When completed, a message which says "Successful To Create Logical Drive" will appear. Press <Enter> to complete. Press <F10> to exit the RAID setup utility.

C-2. Configuring Legacy RAID ROM

Enter the RAID BIOS setup utility to configure a RAID array. Skip this step if you do not want to create RAID array on the SATA controller.

Steps:

After the POST memory test begins and before the operating system boot begins, look for a message which says "Press <Ctrl-F> to enter RAID Option ROM Utility". Press <Ctrl> + <F> to enter the RAID BIOS setup utility. To create a new array, press <2> to enter the **LD View Menu** window. To create an array, press <Ctrl+C> to access the **LD Define Menu**.

In the **LD Define Menu**, use the up or down arrow key to move to an item for further configuration.

Installing the SATA RAID/AHCI Driver and Operating System

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

Installing the Operating System

(The following instructions use Windows 8.1 as the example operating system.)

Step 1:

You need to install the SATA RAID/AHCI driver during the OS installation. Use an alternative system to copy the SATA RAID/AHCI driver from the motherboard driver disk to a USB flash drive. Copy the **Hw8** folder under **BootDrv** in the driver disk.

Step 2:

Boot from the Windows 8.1 setup disk and perform standard OS installation steps. When the screen requesting you to load the driver appears, select **Browse**.

Step 3:

Then browse to the USB flash drive and select the location of the driver. The locations of the drivers are as follows:

RAID driver for Windows 8.1 32-bit: Hw8\RAID\X86

RAID driver for Windows 8.1 64-bit: Hw8\RAID\X64

AHCI driver for Windows 8.1 32-bit: Hw8\AHCI\W8

AHCI driver for Windows 8.1 64-bit: Hw8\AHCI\W864A

For Windows 7, browse to the **Hw7** folder.

Step 4:

When a screen appears, select **AMD-RAID Controller** and click **Next** to load the driver and continue the OS installation.



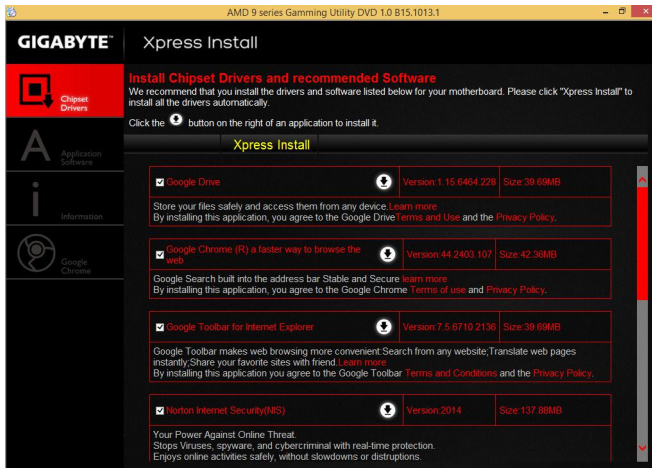
Please visit GIGABYTE's website for details on configuring a RAID array.

3-2 Drivers Installation



- Before installing the drivers, first install the operating system. (The following instructions use Windows 8.1 as the example 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.)

After inserting the driver disk, "Xpress Install" will automatically scan your system and then list all the drivers that are recommended to install. You can click the **Install All** button and "Xpress Install" will install all the recommended drivers. Or click **Install Single Items** to manually select the drivers you wish to install.



Please visit GIGABYTE's website for more software information.



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

3-3 Debug LED Codes

Regular Boot

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

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

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

S3 Resume

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

Recovery

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

Error

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

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

Regulatory Statements

Regulatory Notices

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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 2002/96/EC 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.

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.

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- ◆ 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.



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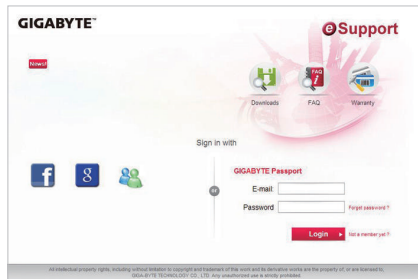
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