GA-Z77MX-D3H TH

User's Manual

Rev. 1101

12ME-Z77MX3T-1101R

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-Z77MX-D3H TH**

conforms with the essential requirements of the following directives:

☒ **2004/108/EC EMC Directive:**

☒ Conduction & Radiated Emissions:	EN55022:2006+A1:2007
☒ Immunity:	EN55024:1998+A1:2001+A2:2003
☒ Power-line harmonics:	EN61000-3-2:2006
☒ Power-line flicker:	EN61000-3-3:2008

☒ **2006/95/EC LVD Directive**

☒ Safety:	EN60950-1:2006+A11:2009

☒ **2011/65/EU RoHS Directive**

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

☒ **CE marking**

CE (EC conformity marking)

Signature: Timmy Huang

(Stamp) Date: Jul. 26, 2012 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-Z77MX-D3H TH

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: Jul. 26, 2012

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Documentation Classifications

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

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

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

Identifying Your Motherboard Revision

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

Example:

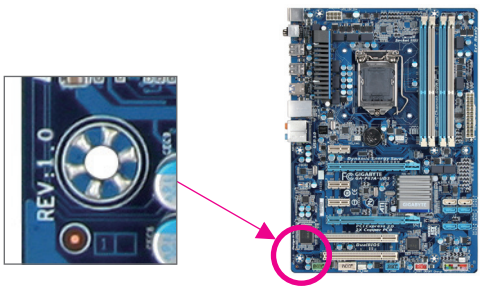


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Box Contents

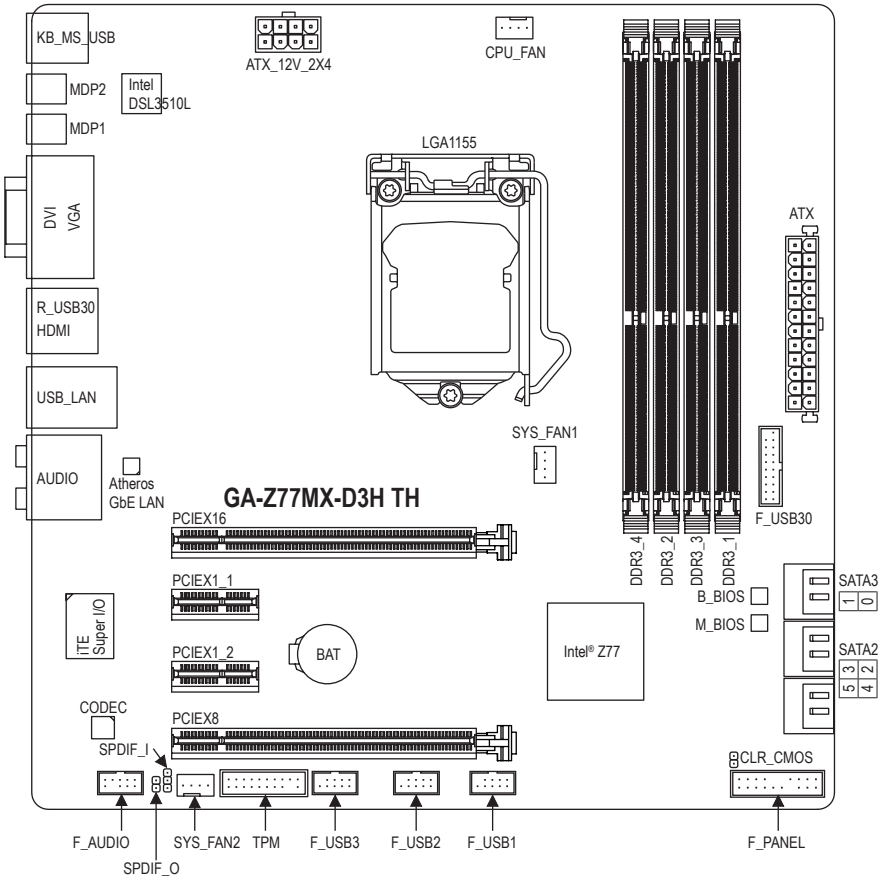
- ☑ GA-Z77MX-D3H TH motherboard
- ☑ Motherboard driver disk
- ☑ User's Manual
- ☑ Quick Installation Guide
- ☑ Four SATA 6Gb/s cables
- ☑ I/O Shield
- ☑ One 2-Way SLI bridge connector

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.

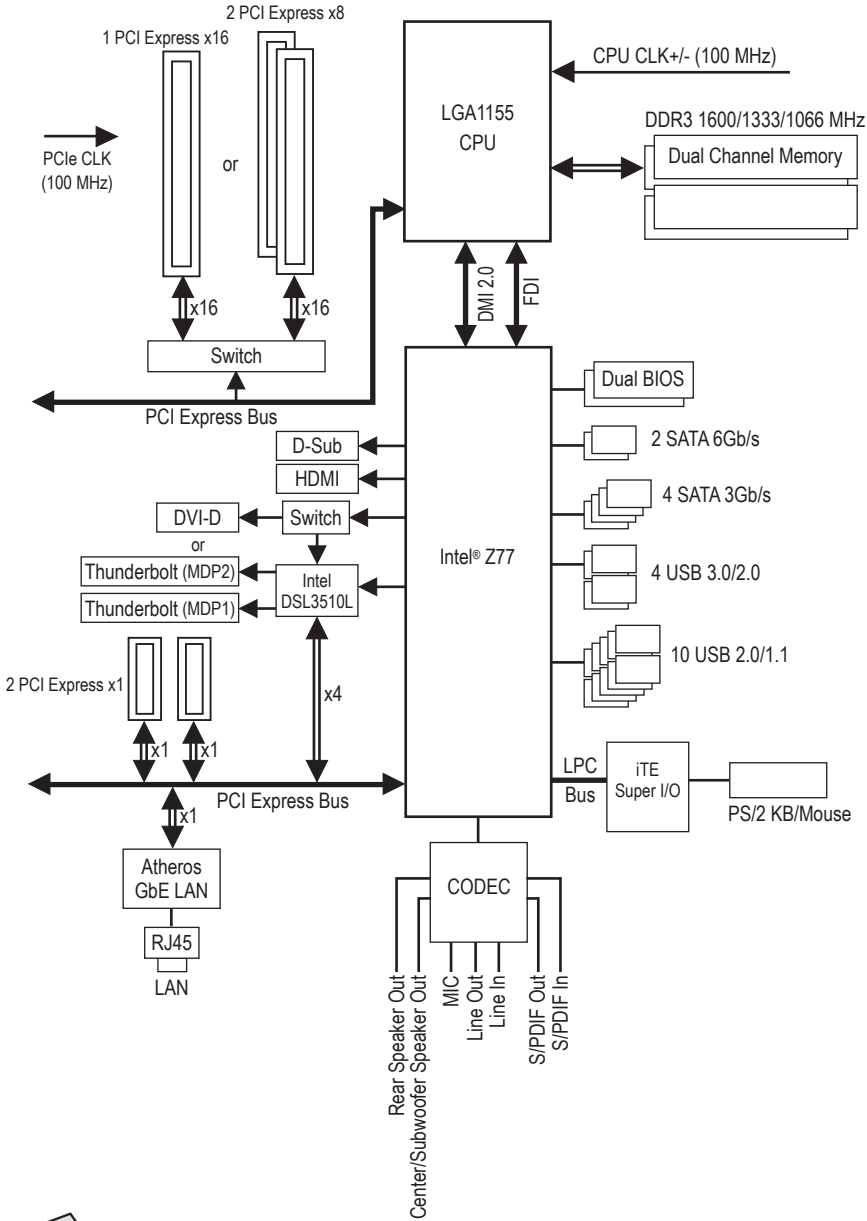
Optional Items

- ☐ 2-port USB 2.0 bracket (Part No. 12CR1-1UB030-6*R)
- ☐ eSATA bracket (Part No. 12CF1-3SATPW-4*R)
- ☐ 3.5" Front Panel with 2 USB 3.0/2.0 ports (Part No. 12CR1-FPX582-0*R)
- ☐ S/PDIF in cable (Part No. 12CR1-1SPDIN-1*R)
- ☐ HDMI-to-DVI adapter (Part No. 12CT2-HDMI01-1*R)

GA-Z77MX-D3H TH Motherboard Layout



GA-Z77MX-D3H TH Motherboard Block Diagram



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

Chapter 1 Hardware Installation

1-1 Installation Precautions

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

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

1-2 Product Specifications

CPU	◆ Support for Intel® Core™ i7 processors/Intel® Core™ i5 processors/ Intel® Core™ i3 processors/Intel® Pentium® processors/ Intel® Celeron® processors in the LGA1155 package (Go to GIGABYTE's website for the latest CPU support list.) ◆ L3 cache varies with CPU
Chipset	◆ Intel® Z77 Express Chipset
Memory	◆ 4 x 1.5V DDR3 DIM sockets supporting up to 32 GB of system memory * Due to a Windows 32-bit operating system limitation, when more than 4 GB of physical memory is installed, the actual memory size displayed will be less than the size of the physical memory installed. ◆ Dual channel memory architecture ◆ Support for DDR3 1600/1333/1066 MHz memory modules ◆ Support for non-ECC memory modules ◆ Support for Extreme Memory Profile (XMP) memory modules (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.)
Onboard Graphics	◆ Integrated Graphics Processor: - 1 x D-Sub port - 1 x DVI-D port, supporting a maximum resolution of 1920x1200 * The DVI-D port does not support D-Sub connection by adapter. * Simultaneous output for DVI-D and the MDP2 Thunderbolt port is not supported. - 1 x HDMI port, supporting a maximum resolution of 1920x1200 ◆ Intel DSL3510L chip: - 2 x Thunderbolt ports (MDP1/MDP2) for Mini-DisplayPort and Thunderbolt monitor(s), supporting a maximum resolution of 2560x1600. * If a monitor is connected to the DVI-D port, the MDP2 Thunderbolt port can support Thunderbolt storage device(s) only. * Because of the limited I/O resources of the PC architecture, the number of Thunderbolt devices that can be used is dependent on the number of the PCI Express and PCI devices being installed. (Refer to Chapter 1-7, "Back Panel Connectors," and Chapter 2, "Peripherals\Intel(R) Thunderbolt" for more information.)
Audio	◆ VIA VT2021 codec ◆ High Definition Audio ◆ 2/4/5.1/7.1-channel ◆ Support for S/PDIF In/Out
LAN	◆ 1 x Atheros GbE LAN chip (10/100/1000 Mbit)
Expansion Slots	◆ 1 x PCI Express x16 slot, running at x16 (PCIEX16) * For optimum performance, if only one PCI Express graphics card is to be installed, be sure to install it in the PCIEX16 slot. ◆ 1 x PCI Express x16 slot, running at x8 (PCIEX8) (The PCIEX16 and PCIEX8 slots conform to PCI Express 3.0 standard.) * Whether PCI Express 3.0 is supported depends on CPU and graphics card compatibility. * The PCIEX8 slot shares bandwidth with the PCIEX16 slot. When the PCIEX8 slot is populated, the PCIEX16 slot will operate at up to x8 mode. ◆ 2 x PCI Express x1 slots (All PCI Express x1 slots conform to PCI Express 2.0 standard.)

Multi-Graphics Technology	◆	Support for AMD CrossFire™/NVIDIA SLI technology
Storage Interface	◆	Chipset: - 2 x SATA 6Gb/s connectors (SATA3 0/1) supporting up to 2 SATA 6Gb/s devices - 4 x SATA 3Gb/s connectors (SATA2 2~5) supporting up to 4 SATA 3Gb/s devices - Support for RAID 0, RAID 1, RAID 5, and RAID 10 * When a RAID set is built across the SATA 6Gb/s and SATA 3Gb/s channels, the system performance of the RAID set may vary depending on the devices being connected.
USB	◆	Chipset: - Up to 4 USB 3.0/2.0 ports (2 ports on the back panel, 2 ports available through the internal USB header) * In Windows XP, the Intel USB 3.0 ports can support up to USB 2.0 transfer speed. - Up to 10 USB 2.0/1.1 ports (4 ports on the back panel, 6 ports available through the internal USB headers)
Thunderbolt	◆	Intel DSL3510L chip: - 2 Thunderbolt ports on the back panel
Internal Connectors	◆	1 x 24-pin ATX main power connector ◆ 1 x 8-pin ATX 12V power connector ◆ 2 x SATA 6Gb/s connectors ◆ 4 x SATA 3Gb/s connectors ◆ 1 x CPU fan header ◆ 2 x system fan headers ◆ 1 x front panel header ◆ 1 x front panel audio header ◆ 1 x S/PDIF Out header ◆ 1 x S/PDIF In header ◆ 1 x USB 3.0/2.0 header ◆ 3 x USB 2.0/1.1 headers ◆ 1 x Clear CMOS jumper ◆ 1 x Trusted Platform Module (TPM) header
Back Panel Connectors	◆	1 x PS/2 keyboard/mouse port ◆ 2 x Thunderbolt ports ◆ 1 x D-Sub port ◆ 1 x DVI-D port ◆ 1 x HDMI port ◆ 2 x USB 3.0/2.0 ports ◆ 4 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	◆	iTE I/O Controller Chip
Hardware Monitor	◆	System voltage detection
	◆	CPU/System temperature detection
	◆	CPU/System fan speed detection
	◆	CPU overheating warning
	◆	CPU/System fan fail warning
	◆	CPU/System fan speed control * Whether the CPU/system fan speed control function is supported will depend on the CPU/system cooler you install.
BIOS	◆	2 x 64 Mbit flash
	◆	Use of licensed AMI EFI BIOS
	◆	Support for DualBIOS™
	◆	PnP 1.0a, DMI 2.0, SM BIOS 2.6, ACPI 2.0a
Unique Features	◆	Support for @BIOS
	◆	Support for Q-Flash
	◆	Support for Xpress Install
	◆	Support for EasyTune * Available functions in EasyTune may differ by motherboard model.
	◆	Support for Smart Recovery 2
	◆	Support for Auto Green
	◆	Support for ON/OFF Charge
	◆	Support for Q-Share
	◆	Support for 3D Power
	◆	Support for EZ Setup
Bundled Software	◆	Norton Internet Security (OEM version)
	◆	Intel® Rapid Start Technology
	◆	Intel® Smart Connect Technology
	◆	Intel® Smart Response Technology
	◆	LucidLogix Virtu MVP * Make sure the monitor cable has been connected to the integrated graphics port on the back panel.
Operating System	◆	Support for Microsoft® Windows 8/7/XP
Form Factor	◆	Micro ATX Form Factor; 24.4cm x 24.4cm

* GIGABYTE reserves the right to make any changes to the product specifications and product-related information without prior notice.
* Please visit the **Support & Downloads\Utility** page on GIGABYTE's website to check the supported operating system(s) for the software listed in the "Unique Features" and "Bundled Software" columns.

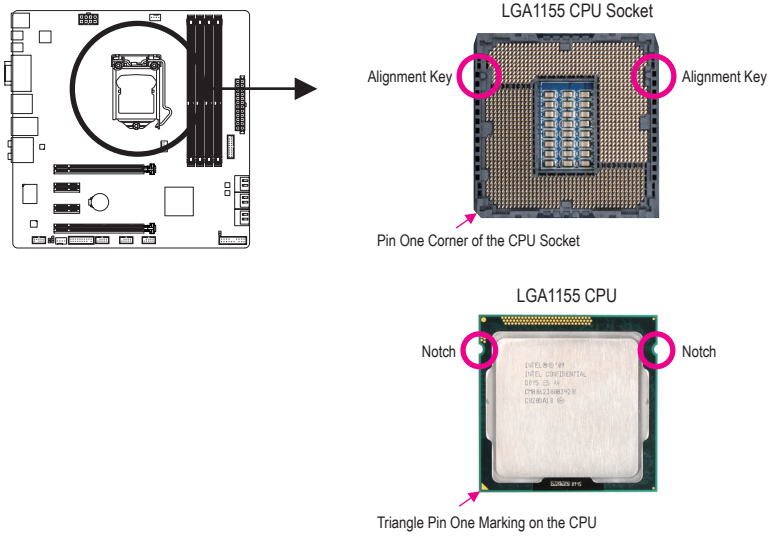
1-3 Installing the CPU and CPU Cooler

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

- Make sure that the motherboard supports the CPU.
  (Go to GIGABYTE's website for the latest CPU support list.)
- Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.
- Locate the pin one of the CPU. The CPU cannot be inserted if oriented incorrectly. (Or you may locate the notches on both sides of the CPU and alignment keys on the CPU socket.)
- Apply an even and thin layer of thermal grease on the surface of the CPU.
- Do not turn on the computer if the CPU cooler is not installed, otherwise overheating and damage of the CPU may occur.
- Set the CPU host frequency in accordance with the CPU specifications. It is not recommended that the system bus frequency be set beyond hardware specifications since it does not meet the standard requirements for the peripherals. If you wish to set the frequency beyond the standard specifications, please do so according to your hardware specifications including the CPU, graphics card, memory, hard drive, etc.

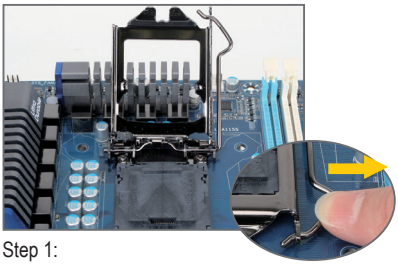
1-3-1 Installing the CPU

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

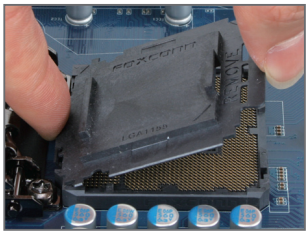


B. Follow the steps below to correctly install the CPU into the motherboard CPU socket.

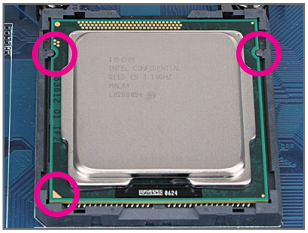
Before installing the CPU, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the CPU.



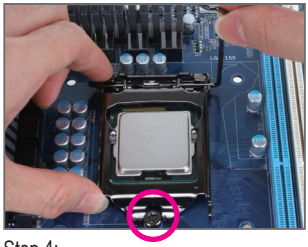
Step 1:
Gently press the CPU socket lever handle down and away from the socket with your finger. Then completely lift the CPU socket lever and the metal load plate will be lifted as well.



Step 2:
Remove the CPU socket cover as shown. Hold your index finger down on the rear grip of the socket cover and use your thumb to lift up the front edge (next to the "REMOVE" mark) and then remove the cover. (DO NOT touch socket contacts. To protect the CPU socket, always replace the protective socket cover when the CPU is not installed.)



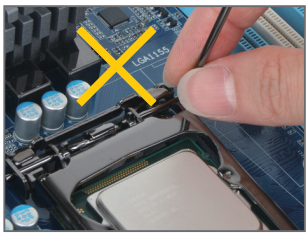
Step 3:
Hold the CPU with your thumb and index fingers. Align the CPU pin one marking (triangle) with the pin one corner of the CPU socket (or you may align the CPU notches with the socket alignment keys) and gently insert the CPU into position.



Step 4:
Once the CPU is properly inserted, use one hand to hold the socket lever and use the other to lightly replace the load plate. When replacing the load plate, make sure the front end of the load plate is under the shoulder screw.



Step 5:
Push the CPU socket lever back into its locked position.



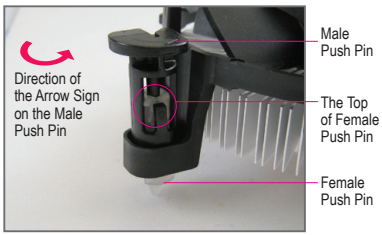
NOTE:
Hold the CPU socket lever by the handle, not the lever base portion.

1-3-2 Installing the CPU Cooler

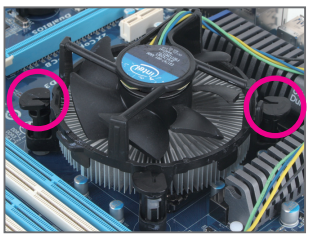
Follow the steps below to correctly install the CPU cooler on the motherboard. (The following procedure uses Intel® boxed cooler as the example cooler.)



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



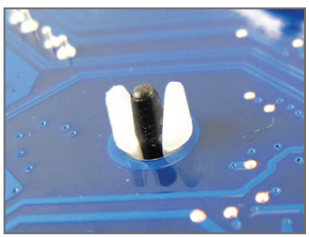
Step 2:
Before installing the cooler, note the direction of the arrow sign on the male push pin. (Turning the push pin along the direction of arrow is to remove the cooler, on the contrary, is to install.)



Step 3:
Place the cooler atop the CPU, aligning the four push pins through the pin holes on the motherboard. Push down on the push pins diagonally.



Step 4:
You should hear a "click" when pushing down each push pin. Check that the Male and Female push pins are joined closely. (Refer to your CPU cooler installation manual for instructions on installing the cooler.)



Step 5:
After the installation, check the back of the motherboard. If the push pin is inserted as the picture above shows, the installation is complete.



Step 6:
Finally, attach the power connector of the CPU cooler to the CPU fan header (CPU_FAN) on the motherboard.

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

1-4 Installing the Memory

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

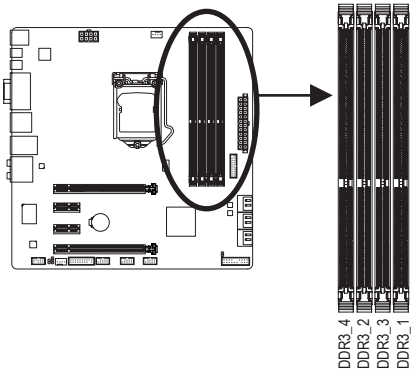
- Make sure that the motherboard supports the memory. It is recommended that memory of the same capacity, brand, speed, and chips be used.
  (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.)
- Always turn off the computer and unplug the power cord from the power outlet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

1-4-1 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 A: DDR3_2, DDR3_4
- Channel B: DDR3_1, DDR3_3



Dual Channel Memory Configurations Table

	DDR3_4	DDR3_2	DDR3_3	DDR3_1
Two Modules	- -	DS/SS	- -	DS/SS
	DS/SS	- -	DS/SS	- -
Four Modules	DS/SS	DS/SS	DS/SS	DS/SS

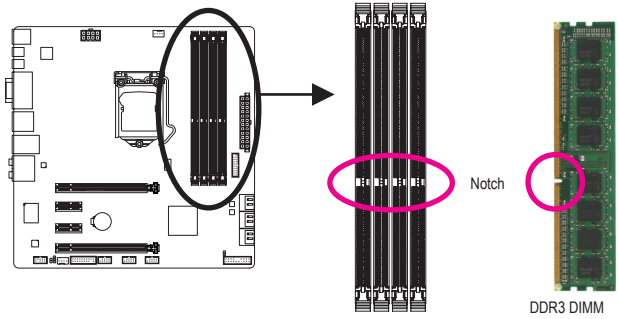
(SS=Single-Sided, DS=Double-Sided, "- -"=No Memory)

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

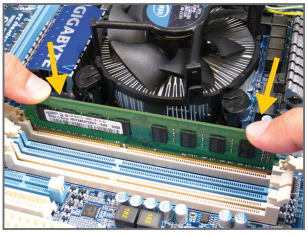
1. Dual Channel mode cannot be enabled if only one DDR3 memory module is installed.
2. When enabling Dual Channel mode with two or four memory modules, it is recommended that memory of the same capacity, brand, speed, and chips be used and installed in the same colored DDR3 sockets. For optimum performance, when enabling Dual Channel mode with two memory modules, we recommend that you install them in the DDR3_1 and DDR3_2 sockets.

1-4-2 Installing a Memory

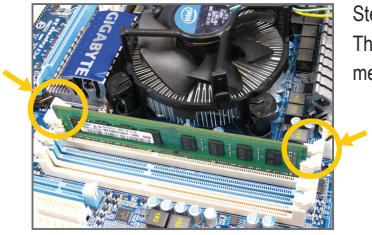
Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module.
DDR3 and DDR2 DIMMs are not compatible to each other or DDR DIMMs. Be sure to install DDR3 DIMMs on this motherboard.



A DDR3 memory module has a notch, so it can only fit in one direction. Follow the steps below to correctly install your memory modules in the memory sockets.



Step 1:
Note the orientation of the memory module. Spread the retaining clips at both ends of the memory socket. Place the memory module on the socket. As indicated in the picture on the left, place your fingers on the top edge of the memory, push down on the memory and insert it vertically into the memory socket.

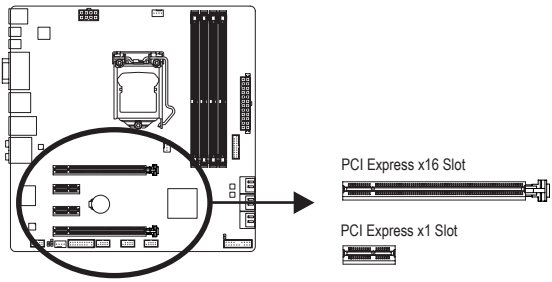


Step 2:
The clips at both ends of the socket will snap into place when the memory module is securely inserted.

1-5 Installing an Expansion Card

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

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



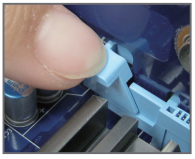
Follow the steps below to correctly install your expansion card in the expansion slot.

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

Example: Installing and Removing a PCI Express Graphics Card:



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



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

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

A. System Requirements

- Windows 7 or Windows XP operating system
- A CrossFire/SLI-supported motherboard with two PCI Express x16 slots and correct driver
- Two CrossFire/SLI-ready graphics cards of identical brand and chip and correct driver
- CrossFire (Note)/SLI bridge connector
- A power supply with sufficient power is recommended (Refer to the manual of your graphics cards for the power requirement)

B. Connecting the Graphics Cards

Step 1:

Observe the steps in "1-5 Installing an Expansion Card" and install CrossFire/SLI graphics cards on the PCIEX16 and PCIEX8 slots.

Step 2:

Insert the CrossFire (Note)/SLI bridge connectors in the CrossFire/SLI gold edge connectors on top of the cards.

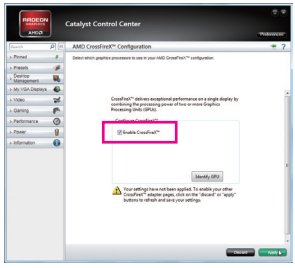
Step 3:

Plug the display cable into the graphics card on the PCIEX16 slot.

C. Configuring the Graphics Card Driver

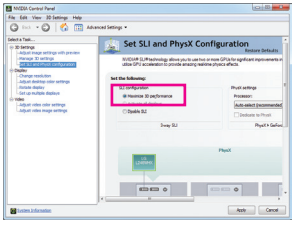
C-1. To Enable CrossFire Function

After installing the graphics card driver in the operating system, go to the **Catalyst Control Center**. Browse to **Performance\AMD CrossFire™ Configuration** and ensure the **Enable CrossFire™** check box is selected. Then click **Apply**.



C-2. To Enable SLI Function

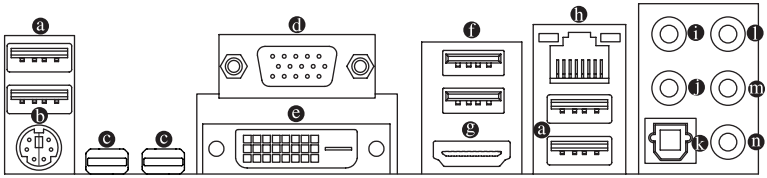
After installing the graphics card driver in the operating system, go to the **NVIDIA Control Panel**. Browse to the **Set SLI and Physx Configuration** screen and ensure **Maximize 3D performance** is enabled.



(Note) The bridge connector(s) may be needed or not depending on your graphics cards.

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

1-7 Back Panel Connectors



a USB 2.0/1.1 Port

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

b PS/2 Keyboard/Mouse Port

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

c Thunderbolt Port (Note 1)

Use this port for Thunderbolt devices or Mini-DisplayPort monitors. Because of the limited I/O resources of the PC architecture, the number of Thunderbolt devices that can be used is dependent on the number of the PCI Express and PCI devices being installed. Each Thunderbolt port can daisy chain about three devices. To connect more Thunderbolt devices, adjust the **Reserved IO for Thunderbolt** setting under **Peripherals\Intel(R) Thunderbolt** in BIOS Setup. (Refer to Chapter 2, "Peripherals\Intel(R) Thunderbolt" for more information.)

The two Thunderbolt ports support two DisplayPort monitors in total. The two DisplayPort monitors that are daisy chained to the same port must be separated by a Thunderbolt device. The maximum supported resolution is 2560x1600, but the actual resolutions supported are dependent on the monitor being used.

After installing the DisplayPort device, make sure the default device for sound playback is the DisplayPort device. (The item name may differ from operating system. For example, in Windows 7, go to Start>Control Panel>Hardware and Sound>Sound>Playback and set the DisplayPort device as the default playback device. Refer to the HDMI settings information on the previous page for the configuration dialog box.)

d D-Sub Port

The D-Sub port supports a 15-pin D-Sub connector. Connect a monitor that supports D-Sub connection to this port.

e DVI-D Port (Note 2)

The DVI-D port conforms to the DVI-D specification and supports a maximum resolution of 1920x1200 (the actual resolutions supported depend on the monitor being used). Connect a monitor that supports DVI-D connection to this port.

f USB 3.0/2.0 Port

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

g HDMI Port

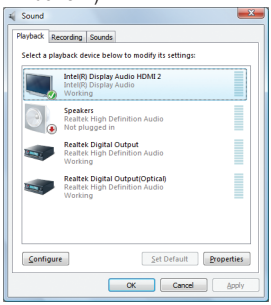
The HDMI port is HDCP compliant and supports Dolby True HD and DTS HD Master Audio formats. It also supports up to 192KHz/24bit 8-channel LPCM audio output. You can use this port to connect your HDMI-supported monitor. The maximum supported resolution is 1920x1200, but the actual resolutions supported are dependent on the monitor being used.

(Note 1) Simultaneous output for DVI-D and the MDP2 Thunderbolt port is not supported. If a monitor is connected to the DVI-D port, the MDP2 Thunderbolt port can support Thunderbolt storage device(s) only.

(Note 2) The DVI-D port does not support D-Sub connection by adapter.

- 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.

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. The screenshot below is from Windows 7.)



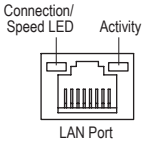
In Windows 7, select Start>Control Panel>Hardware and Sound>Sound>Playback, set Intel(R) Display Audio to the default playback device.

Dual Display Configurations for the Onboard Graphics:

This motherboard provides four video output ports: D-Sub, DVI-D, HDMI, and Thunderbolt. Dual monitor confgurations are supported in operating system environment only, but not during the BIOS Setup or POST process.

ⓗ 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

ⓘ Center/Subwoofer Speaker Out Jack (Orange)

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

ⓙ Rear Speaker Out Jack (Black)

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

ⓚ Optical S/PDIF Out Connector

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

ⓛ Line In Jack (Blue)

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

ⓜ Line Out Jack (Green)

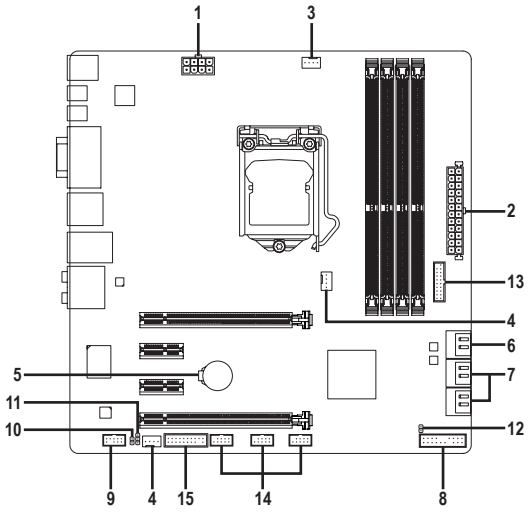
The default line out jack. Use this audio jack for a headphone or 2-channel speaker. This jack can be used to connect front speakers in a 4/5.1/7.1-channel audio configuration.

ⓝ Mic In Jack (Pink)

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

The audio jacks can be reconfigured to perform different functions via the audio software. If you install a Side Speaker, you need to retask other audio jack to be Side Speaker out. Only microphones still MUST be connected to the default Mic in jack. Refer to the instructions on setting up a 2/4/5.1/7.1-channel audio configuration in Chapter 5, "Configuring 2/4/5.1/7.1-Channel Audio."

1-8 Internal Connectors



1)	ATX_12V_2X4	9)	F_AUDIO
2)	ATX	10)	SPDIF_O
3)	CPU_FAN	11)	SPDIF_I
4)	SYS_FAN1/2	12)	CLR_CMOS
5)	BAT	13)	F_USB30
6)	SATA3 0/1	14)	F_USB1/F_USB2/F_USB3
7)	SATA2 2/3/4/5	15)	TPM
8)	F_PANEL		

Read the following guidelines before connecting external devices:

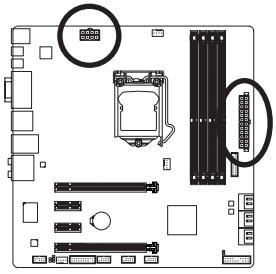
- First make sure your devices are compliant with the connectors you wish to connect.
- Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.
- After installing the device and before turning on the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

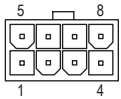
1/2) ATX_12V_2X4/ATX (2x4 12V Power Connector and 2x12 Main Power Connector)

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

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

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

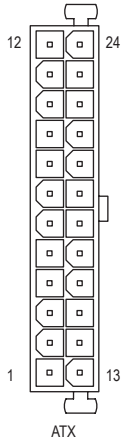




ATX_12V_2X4

ATX_12V_2X4:

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



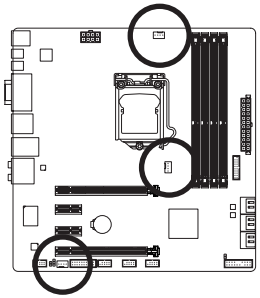
ATX

ATX:

Pin No.	Definition	Pin No.	Definition
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON (soft On/Off)
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power Good	20	-5V
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) CPU_FAN/SYS_FAN1/SYS_FAN2 (Fan Headers)

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





CPU_FAN



SYS_FAN1



SYS_FAN2

CPU_FAN:

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

SYS_FAN1:

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

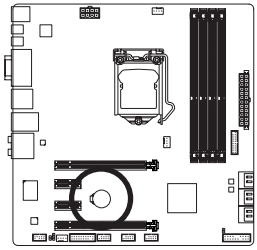
SYS_FAN2:

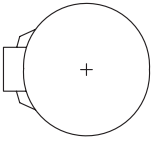
Pin No.	Definition
1	GND
2	+12V
3	Sense
4	Speed Control

- 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.

5) 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.





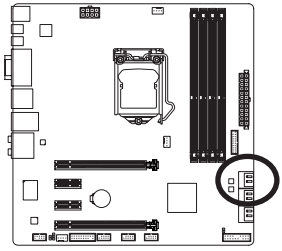
You may clear the CMOS values by removing the battery:

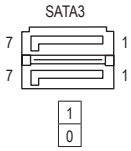
1. Turn off your computer and unplug the power cord.
2. Gently remove the battery from the battery holder and wait for one minute. (Or use a metal object like a screwdriver to touch the positive and negative terminals of the battery holder, making them short for 5 seconds.)
3. Replace the battery.
4.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

6) SATA3 0/1 (SATA 6Gb/s Connectors, Controlled by Intel Z77 Chipset)

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 SATA3 0/1 connectors support RAID 0 and RAID 1. RAID 5 and RAID 10 can be implemented on the two connectors with the SATA2 2/3/4/5 connector (Note). Refer to Chapter 5, "Configuring SATA Hard Drive(s)," for instructions on configuring a RAID array.

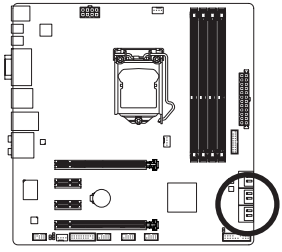


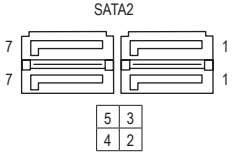


Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

7) SATA2 2/3/4/5 (SATA 3Gb/s Connectors, Controlled by Intel Z77 Chipset)

The SATA connectors conform to SATA 3Gb/s standard and are compatible with SATA 1.5Gb/s standard. Each SATA connector supports a single SATA device. The Intel Z77 Chipset supports RAID 0, RAID 1, RAID 5, and RAID 10. Refer to Chapter 5, "Configuring SATA Hard Drive(s)," for instructions on configuring a RAID array.





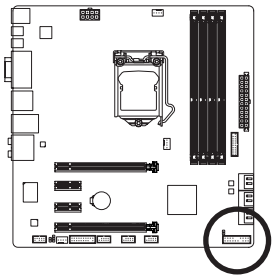
Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

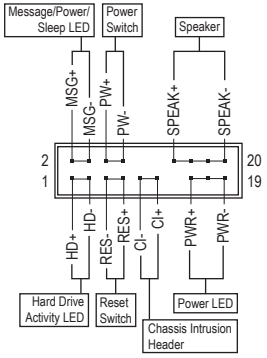
- A RAID 0 or RAID 1 configuration requires at least two hard drives. If more than two hard drives are to be used, the total number of hard drives must be an even number.
- A RAID 5 configuration requires at least three hard drives. (The total number of hard drives does not have to be an even number.)
- A RAID 10 configuration requires four hard drives.

(Note) When a RAID set is built across the SATA 6Gb/s and SATA 3Gb/s channels, the system performance of the RAID set may vary depending on the devices being connected.

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.





- **MSG/PWR** (Message/Power/Sleep LED, Yellow/Purple):

System Status	LED
S0	On
S3/S4/S5	Off

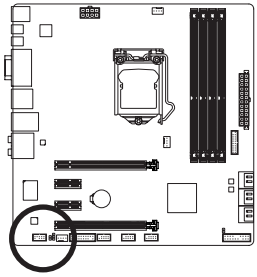
Connects to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S3/S4 sleep state or powered off (S5).

- **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.

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

For AC'97 Front Panel Audio:

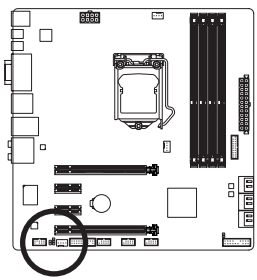
Pin No.	Definition
1	MIC
2	GND
3	MIC Power
4	NC
5	Line Out (R)
6	NC
7	NC
8	No Pin
9	Line Out (L)
10	NC

- The front panel audio header supports HD audio by default. If your chassis provides an AC'97 front panel audio module, refer to the instructions on how to activate AC'97 functionality via the audio software in Chapter 5, "Configuring 2/4/5.1/7.1-Channel Audio."
- Audio signals will be present on both of the front and back panel audio connections simultaneously. If you want to mute the back panel audio (only supported when using an HD front panel audio module), refer to Chapter 5, "Configuring 2/4/5.1/7.1-Channel Audio."
- 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.

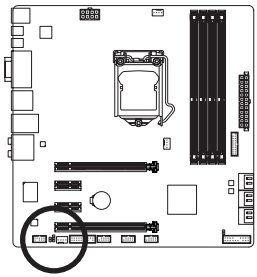




Pin No.	Definition
1	SPDIFO
2	GND

11) SPDIF_I (S/PDIF In Header)

This header supports digital S/PDIF In and can connect to an audio device that supports digital audio out via an optional S/PDIF In cable. For purchasing the optional S/PDIF In cable, please contact the local dealer.



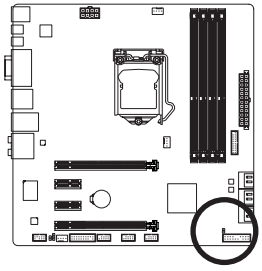


1

Pin No.	Definition
1	Power
2	SPDIFI
2	GND

12) CLR_CMOS (Clear CMOS Jumper)

Use this jumper to clear the CMOS values (e.g. date information and BIOS configurations) 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

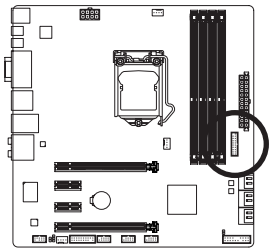


Short: Clear CMOS Values

- 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).

13) F_USB30 (USB 3.0/2.0 Header)

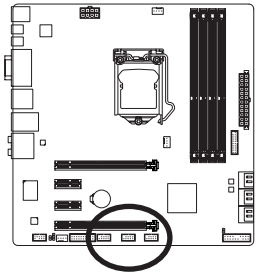
The header conforms to USB 3.0/2.0 specification and can provide two USB ports. For purchasing the optional 3.5" front panel that provides two USB 3.0/2.0 ports, please contact the local dealer.



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

14) 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.

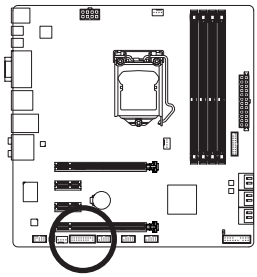


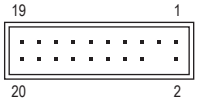
Pin No.	Definition
1	Power (5V)
2	Power (5V)
3	USB DX-
4	USB DY-
5	USB DX+
6	USB DY+
7	GND
8	GND
9	No Pin
10	NC

- 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.

15) 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	ID
5	LRESET	15	SB3V
6	NC	16	SERIRQ
7	LAD3	17	GND
8	LAD2	18	NC
9	VCC3	19	NC
10	LAD1	20	SUSCLK

Chapter 2 BIOS Setup

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

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

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

To upgrade the BIOS, use either the GIGABYTE Q-Flash or @BIOS utility.

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

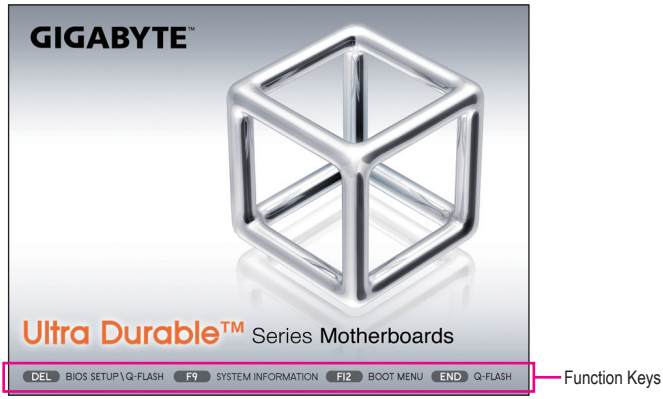
For instructions on using the Q-Flash and @BIOS utilities, refer to Chapter 4, "BIOS Update Utilities."



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



Function Keys:

<DEL>: BIOS SETUP\Q-FLASH

Press the <Delete> key to enter BIOS Setup or to access the Q-Flash utility in BIOS Setup.

<F9>: SYSTEM INFORMATION

Press the <F9> key to display your system information.

<F12>: BOOT MENU

Boot Menu allows you to set the first boot device without entering BIOS Setup. In Boot Menu, use the up arrow key <↑> or the down arrow key <↓> to select the first boot device, then press <Enter> to accept. The system will boot from the device immediately.

Note: The setting in Boot Menu is effective for one time only. After system restart, the device boot order will still be based on BIOS Setup settings.

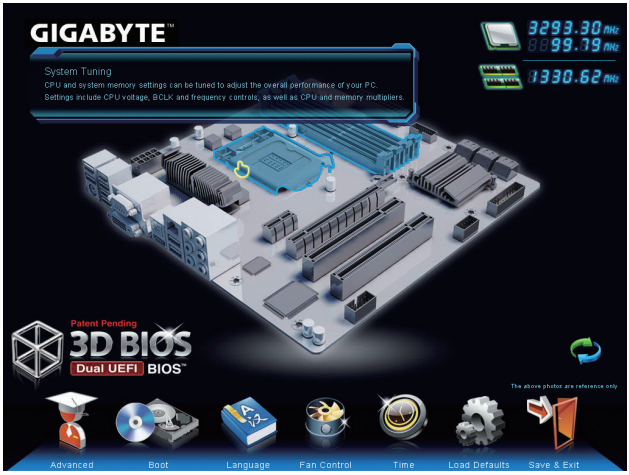
<END>: Q-FLASH

Press the <End> key to access the Q-Flash utility directly without having to enter BIOS Setup first.

2-2 The Main Menu

A. The 3D BIOS Screen (Default)

On GIGABYTE's uniquely designed 3D BIOS screen, you can use your mouse to move through the motherboard image and click to enter the function menu in each area for quick configuration. For example, pass your mouse arrow over the CPU and memory sockets and enter the **System Tuning** menu to configure CPU/memory frequency, memory timings, and voltage settings. For more detailed configuration items, you can click the function menu icons at the bottom of the screen or press <F1> to switch to the main menu of the BIOS Setup program. (If a mouse is not connected, the 3D BIOS screen will automatically switch to the main menu of the BIOS Setup Program.)



B. The Main Menu of the BIOS Setup Program

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.

(Sample BIOS Version: F4c)



BIOS Setup Program Function Keys

<←><→>	Move the selection bar to select a setup menu
<↑><↓>	Move the selection bar to select an configuration item on a menu
<Enter>	Execute command or enter a menu
<+>/<Page Up>	Increase the numeric value or make changes
<->/<Page Down>	Decrease the numeric value or make changes
<F1>	Switch to 3D BIOS screen
<F5>	Restore the previous BIOS settings for the current submenus
<F7>	Load the Optimized BIOS default settings for the current submenus
<F8>	Access the Q-Flash utility
<F9>	Display system information
<F10>	Save all the changes and exit the BIOS Setup program
<F12>	Capture the current screen as an image and save it to your USB drive
<Esc>	Main Menu: Exit the BIOS Setup program Submenus: Exit current submenu

BIOS Setup Menus

- **M.I.T.**
  Use this menu to configure the clock, frequency, and voltages of your CPU and memory, etc. Or check the system/CPU temperatures, voltages, and fan speeds.
- **System**
  Use this menu to configure the default language used by the BIOS and system time and date. This menu also displays information on the devices connected to the SATA ports.
- **BIOS Features**
  Use this menu to configure the device boot order, advanced features available on the CPU, and the primary display adapter.
- **Peripherals**
  Use this menu to configure all peripheral devices, such as SATA, USB, integrated audio, and integrated LAN, etc.
- **Power Management**
  Use this menu to configure all the power-saving functions.
- **Save & Exit**
  Save all the changes made in the BIOS Setup program to the CMOS and exit BIOS Setup. You can save the current BIOS settings to a profile or load optimized defaults for optimal-performance system operations.



- 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.

2-3 M.I.T.



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.)



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

M.I.T. Current Status

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

Advanced Frequency Settings



CPU/PCIe Base Clock

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

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

Processor Graphics Clock

Allows you to set the onboard graphics clock. The adjustable range is from 400 MHz to 3200 MHz. (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.

Internal CPU PLL Overvoltage

Enabled allows CPU PLL voltage to operate at a higher value. **Disabled** allows CPU PLL voltage to operate at default value. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

Intel(R) Turbo Boost Technology (Note)

Allows you to determine whether to enable the Intel CPU Turbo Boost technology. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

Turbo Ratio (1-Core Active~4-Core Active) (Note)

Allows you to set the CPU Turbo ratios for different number of active cores. **Auto** sets the CPU Turbo ratios according to the CPU specifications. (Default: Auto)

Turbo Power Limit (Watts)

Allows you to set a power limit for CPU Turbo mode. When the CPU power consumption exceeds the specified power limit, the CPU will automatically reduce the core frequency in order to reduce the power. **Auto** sets the power limit according to the CPU specifications. (Default: Auto)

Core Current Limit (Amps)

Allows you to set a current limit for CPU Turbo mode. When the CPU current exceeds the specified current limit, the CPU will automatically reduce the core frequency in order to reduce the current. **Auto** sets the power limit according to the CPU specifications. (Default: Auto)

CPU Core Enabled (Note)

Allows you to determine whether to enable all CPU cores. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

(Note) This item is present only when you install a CPU that supports this feature. For more information about Intel CPUs' unique features, please visit Intel's website.

☞ **Hyper-Threading Technology** (Note 1)

Allows you to determine whether to enable multi-threading technology when using an Intel CPU that supports this function. This feature only works for operating systems that support multi-processor mode. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

☞ **CPU Enhanced Halt (C1E)** (Note 1)

Enables or disables Intel CPU Enhanced Halt (C1E) function, a CPU power-saving function in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

☞ **C3/C6 State Support** (Note 1)

Allows you to determine whether to let the CPU enter C3/C6 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C3/C6 state is a more enhanced power-saving state than C1. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

☞ **CPU Thermal Monitor** (Note 1)

Enables or disables Intel CPU 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: Auto)

☞ **CPU EIST Function** (Note 1)

Enables or disables Enhanced Intel SpeedStep Technology (EIST). Depending on CPU loading, Intel EIST technology can dynamically and effectively lower the CPU voltage and core frequency to decrease average power consumption and heat production. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

☞ **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)**

The first memory frequency value is the normal operating frequency of the memory being used; the second is the memory frequency that is automatically adjusted according to the **System Memory Multiplier** settings.

(Note 1) This item is present only when you install a CPU that supports this feature. For more information about Intel CPUs' unique features, please visit Intel's website.

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

Advanced Memory Settings



Extreme Memory Profile (X.M.P.) (Note), System Memory Multiplier, Memory Frequency(MHz)

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

Performance Enhance

Allows the system to operate at three different performance levels.

- Normal — Lets the system operate at its basic performance level.
- Turbo — Lets the system operate at its good performance level. (Default)
- Extreme — Lets the system operate at its best performance level.

DRAM Timing Selectable

Quick and **Expert** allows the **Channel Interleaving**, **Rank Interleaving**, and 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**, this item will display as **1.50V**. When **Extreme Memory Profile (X.M.P.)** is set to **Profile1** or **Profile2**, this item will display the value based on 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) This item is present only when you install a CPU and a memory module that support 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



3D Power Control



PWM Phase Control

Allows you to automatically change the PWM phase according to the CPU load. The power-saving levels are (from lowest to highest): eXm Perf (Extreme Performance), High Perf (High Performance), Perf (Performance), Balanced, Mid PWR (Mid Power), and Lite PWR (Light Power). **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

Vcore Voltage Response

Allows you to configure the response time for Vcore changes using preset levels.

- Auto — Lets BIOS automatically configure this setting. (Default)
- Standard~Fast — Selects Standard or Fast which represents different levels of the response time for Vcore changes.

Vcore Loadline Calibration

Allows you to set the Load-Line Calibration level for the Vcore. The levels are (from highest to lowest): Extreme, Turbo, High, Medium, Low, and Standard. Selecting a higher level keeps the Vcore more consistent with what is set in BIOS under heavy load. **Auto** lets the BIOS automatically configure this setting and sets the voltage following Intel's specifications. (Default: Auto)

GFX Voltage Loadline Calibration

Allows you to set the Load-Line Calibration level for the GFX voltage. The levels are (from highest to lowest): High, Medium, Low, and Standard. Selecting a higher level keeps the GFX voltage more consistent with what is set in BIOS under heavy load. **Auto** lets the BIOS automatically configure this setting and sets the voltage following Intel's specifications. (Default: Auto)

Vcore Protection

Allows you to set the voltage limit on the Vcore for over-voltage protection. The adjustable range is from 150.0mV to 300.0mV. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

☞ **Vcore Current Protection**

Allows you to set the over-current protection level for the Vcore.

- ⏩ Auto — Lets BIOS automatically configure this setting. (Default)
- ⏩ Standard~Extreme — Selects Standard, Low, Medium, High, Turbo, or Extreme which represents different level of over-current protection for the Vcore.

☞ **GFX Current Protection**

Allows you to set the over-current protection level for the GFX voltage.

- ⏩ Auto — Lets BIOS automatically configure this setting. (Default)
- ⏩ Standard~Extreme — Selects Standard, Medium, High, Turbo, or Extreme which represents different level of over-current protection for the GFX voltage.

☞ **Vcore PWM Thermal Protection**

Allows you to set the PWM thermal protection threshold for the Vcore area. Options are 130.0°C and 135.0°C. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

▶ CPU Core Voltage Control

This section provides CPU voltage control options.

▶ DRAM Voltage Control

This section provides memory voltage control options.

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/+12V**

Displays the current system voltages.

☞ **CPU/System Temperature**

Displays current CPU/system temperature.

☞ **CPU/System Fan Speed**

Displays current CPU/system fan speeds.

☞ **CPU Warning Temperature**

Sets the warning threshold for CPU temperature. When CPU 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 Fan Fail Warning**

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

☞ **CPU Fan Speed Control**

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

- Normal — Allows the CPU fan to run at different speeds according to the CPU temperature. You can adjust the fan speed with EasyTune based on your system requirements. (Default)
- Silent — Allows the CPU fan to run at slow speeds.
- Manual — Allows you to control the CPU fan speed under the **Slope PWM** item.
- Disabled — Allows the CPU 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 system fan speed control function for the system fan connected to the SYS_FAN1 connector and adjust the fan speed.

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

☞ **2nd System Fan Speed Control (SYS_FAN2 Connector)**

Allows you to determine whether to enable the system fan speed control function for the system fan connected to the SYS_FAN2 connector and adjust the fan speed.

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

☞ **Slope PWM**

Allows you to control the system fan speed. This item is configurable only when **2nd System Fan Speed Control** is set to **Manual**. Options are: 0.75 PWM value /°C ~ 2.50 PWM value /°C.

Miscellaneous Settings



PEG - Gen X

Allows you to set the operation mode of the PCI Express slots to Gen 1, Gen 2, or Gen 3. Actual operation mode is subject to the hardware specification of each slot. For example, the PCI Express x1 slots can support up to Gen 2 mode only. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

Legacy BenchMark Enhancement

Allows you to determine whether to enhance some legacy benchmark performance. (Default: Disabled)

2-4 System



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 13:0:0. 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 Intel Z77 Chipset. You can enable/disable each SATA port or enable/disable the hot plug capability.

2-5 BIOS Features



Boot Option Priorities

Specifies the overall boot order from the available devices. For example, you can set hard drive as the first priority **(Boot Option #1)** and DVD ROM drive as the second priority **(Boot Option #2)**. The list only displays the device with the highest priority for a specific type. For example, only hard drive defined as the first priority on the **Hard Drive BBS Priorities** submenu will be presented here.

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 **Set Supervisor/User Password** item in the BIOS Main Menu.

- 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)

☞ **Limit CPUID Maximum** (Note)

Allows you to determine whether to limit CPUID maximum value. Set this item to **Disabled** for Windows XP operating system; set this item to **Enabled** for legacy operating system such as Windows NT4.0. (Default: Disabled)

☞ **Execute Disable Bit** (Note)

Enables or disables Intel Execute Disable Bit function. This function may enhance protection for the computer, reducing exposure to viruses and malicious buffer overflow attacks when working with its supporting software and system. (Default: Enabled)

☞ **Intel Virtualization Technology** (Note)

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: Disabled)

☞ **VT-d** (Note)

Enables or disables Intel Virtualization Technology for Directed I/O. (Default: Enabled)

☞ **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 Link)

☞ **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) This item is present only when you install a CPU that supports this feature. For more information about Intel CPUs' unique features, please visit Intel's website.

2-6 Peripherals





SATA Controller(s)

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

SATA Mode Selection

Enables or disables RAID for the SATA controllers integrated in the Intel Z77 Chipset or configures the SATA controllers to AHCI mode.

- 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)

xHCI Pre-Boot Driver

- Enabled — The USB 3.0 ports are routed to the xHCI controller before booting to OS. (Default)
- Disabled — The USB 3.0 ports are routed to the EHCI controller before booting to OS.

If you want to set **xHCI Mode** below to **Smart Auto**, set this item to **Enabled**; when this item is set to **Disabled**, **xHCI Mode** will be automatically set to Auto.

xHCI Mode

Allows you to determine the operating mode for the xHCI controller in OS.

- Smart Auto — This mode is available only when the BIOS supports the xHCI controller in the pre-boot environment. This mode is similar to **Auto**, but it adds the capability to route the ports to xHCI or EHCI according to setting used in previous boots (for non-G3 boot) in the pre-boot environment. This allows the use of USB 3.0 devices prior to OS boot. xHCI controller enabling and rerouting should follow the steps in **Auto**, when previous boot routs ports to EHCI. Note: This is the recommended mode when BIOS has xHCI pre-boot support.
- Auto — BIOS routes the sharable ports to EHCI controller. Then it uses ACPI protocols to provide an option to enable the xHCI controller and reroute the sharable ports. Note: This is the recommended mode when BIOS does NOT have xHCI pre-boot support. (Default)
- Enabled — All shared ports are eventually routed to the xHCI controller during the BIOS boot process. If BIOS does not have pre-boot support for the xHCI controller, it should initially route the sharable ports to the EHCI controller and then prior to OS boot it should route the ports to xHCI controller. Note: OS has to provide support for the xHCI controller in this mode. If the OS does not provide support, all sharable ports won't work.
- Disabled — The USB 3.0 ports are routed to the EHCI controller and the xHCI controller is turned off. All USB 3.0 devices function as High Speed devices regardless of xHCI software support/availability. If this item is set to **Disabled**, the **HS Port #1/2/3/4 Switchable** and **xHCI Streams** items below will become unconfigurable.

HS Port #1 Switchable~HS Port #4 Switchable

- Enabled — Corresponding USB 3.0 port is routed to xHCI. The USB 3.0 device attached on this port with Super-Speed capability is visible to xHCI controller. (Default)
- Disabled — Corresponding USB 3.0 port is routed to EHCI. The USB 3.0 device attached on this port with Super-Speed capability will function as High-Speed.

xHCI Streams

Enables or disables multi-stream data transfer. Note: For Windows 7 USB 3.0 Streams support, devices may require UASP class driver updates from UASP driver vendors to be fully compatible with Intel USB 3.0 Streams Support. (Default: Enabled)

USB2.0 Controller

Enables or disables the integrated USB 2.0/1.1 controller. (Default: Enabled)

Audio Controller

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**.

Init Display First

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

- Auto Lets BIOS automatically configure this setting. (Default)
- IGFX Sets the onboard graphics as the first display.
- PEG Sets the PCI Express graphics card on the PCIEX16 slot as the first display.

Internal Graphics

Enables or disables the onboard graphics function. (Default: Auto)

Internal Graphics Memory Size

Allows you to set the onboard graphics memory size. Options are: 32M~1024M. (Default: 64M)

DVMT Total Memory Size

Allows you to allocate the DVMT memory size of the onboard graphics. Options are: 128M, 256M, MAX. (Default: MAX)

Intel(R) Rapid Start Technology

Enables or disables Intel Rapid Start Technology. This item is configurable only when an SSD is installed. (Default: Disabled)

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.

Trusted Computing

TPM SUPPORT

Enables or disables Trusted Platform Module (TPM). Set this item to **Enable** when a TPM device is installed. (Default: Disable)

OnBoard LAN Controller#1

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**.

Intel(R) Thunderbolt



Wake From Thunderbolt Devices

Allows the system to be turned on by wake-up event from Thunderbolt device(s). (Default: Enabled)
Note: To use this function, you need an ATX power supply providing at least 1A on the +5VSB lead.

Reserved IO for Thunderbolt

Specifies how many I/O resources are to be reserved for Thunderbolt devices. Options are: 4K~48K. (Default: 20K)
When set to **20K**, each Thunderbolt port can daisy chain about three Thunderbolt devices. A greater value allows more Thunderbolt devices to be used. Each Thunderbolt port supports up to six devices (Note).

Intel(R) Smart Connect Technology

ISCT Configuration

Enables or disables Intel Smart Connect Technology. (Default: Disabled)

(Note) Because of the limited I/O resources of the PC architecture, the number of Thunderbolt devices that can be used is dependent on the number of the PCI Express and PCI devices being installed. If a PCI Express graphics card is installed, we recommend that you set **Reserved IO for Thunderbolt** to **40K** or less.

2-7 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.

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

High Precision Event Timer (Note)

Enables or disables High Precision Event Timer (HPET) for Windows 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.

Internal Graphics Standby Mode

Allows you to determine whether to let the onboard graphics enter standby mode to decrease power consumption. (Default: Enabled)

Internal Graphics Deep Standby Mode

Allows you to determine whether to let the onboard graphics enter deeper standby mode. (Default: Enabled)

☞ 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.

(Note) Supported on Windows 7 operating system only.

2-8 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/USB/FDD** 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/USB/FDD** 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)

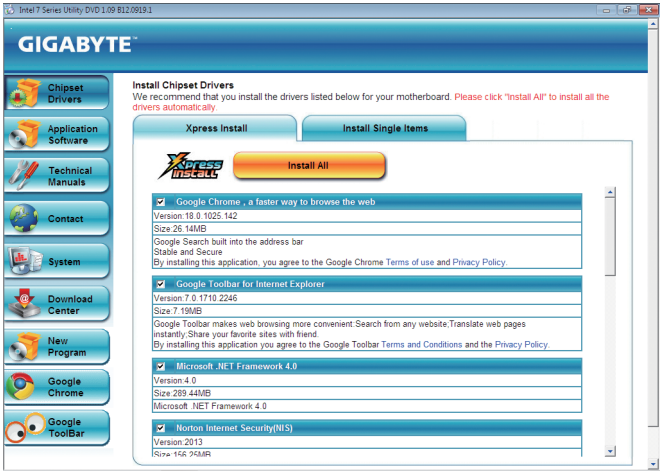
Chapter 3 Drivers Installation

- Before installing the drivers, first install the operating system.
- After installing the operating system, insert the motherboard driver disk into your optical drive. The driver Autorun screen is automatically displayed which looks like that shown in the screen shot below. (If the driver Autorun screen does not appear automatically, go to My Computer, double-click the optical drive and execute the **Run**.exe program.)

3-1 Installing Chipset Drivers



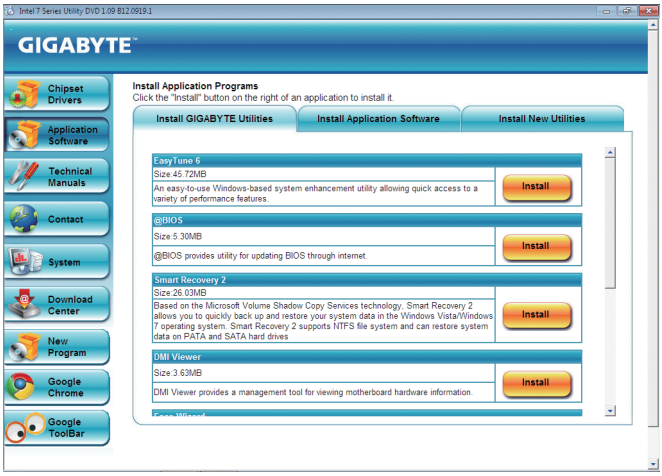
After inserting the driver disk, "Xpress Install" will automatically scan your system and then list all the drivers that are recommended to install. You can click the **Install All** button and "Xpress Install" will install all the recommended drivers. Or click **Install Single Items** to manually select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



- Please ignore the popup dialog box(es) (e.g. the **Found New Hardware Wizard**) displayed when "Xpress Install" is installing the drivers. Failure to do so may affect the driver installation.
- Some device drivers will restart your system automatically during the driver installation. After the system restart, "Xpress Install" will continue to install other drivers.
- After "Xpress Install" installs all of the drivers, a dialog box will appear asking whether to install new GIGABYTE utilities. Click **Yes** to automatically install the utilities. Or click **No** if you want to manually select the utilities to install on the **Application Software** page later.
- For USB 2.0 driver support under the Windows XP operating system, please install the Windows XP Service Pack 1 or later. After installing the SP1 (or later), if a question mark still exists in **Universal Serial Bus Controller** in **Device Manager**, please remove the question mark (by right-clicking your mouse and select **Uninstall**) and restart the system. (The system will then autodetect and install the USB 2.0 driver.)

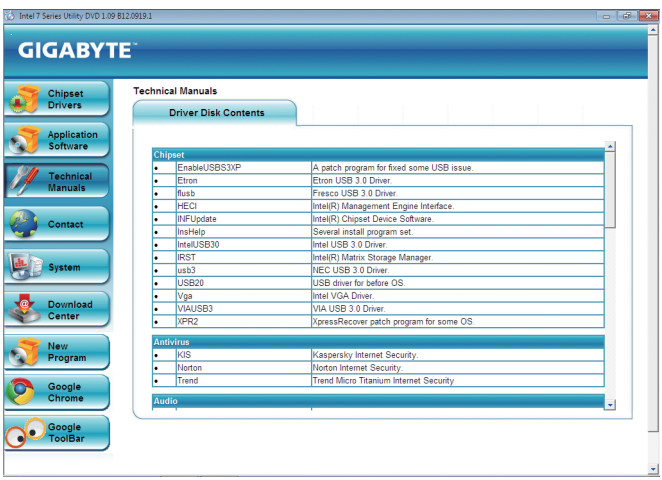
3-2 Application Software

This page displays all the utilities and applications that GIGABYTE develops and some free software. You can click the **Install** button on the right of an item to install it.



3-3 Technical Manuals

This page provides the content descriptions for this driver disk.



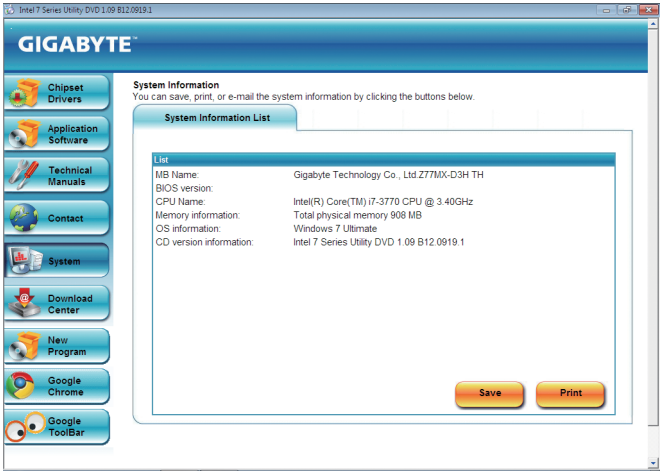
3-4 Contact

For the detailed contact information of the GIGABYTE Taiwan headquarter or worldwide branch offices, click the URL on this page to link to the GIGABYTE website.



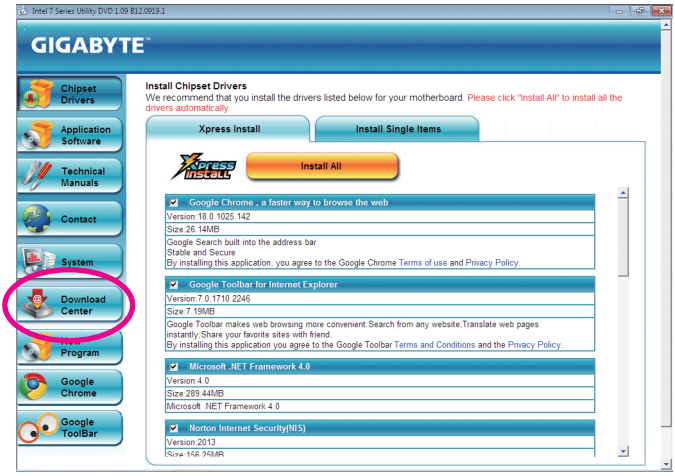
3-5 System

This page provides the basic system information.



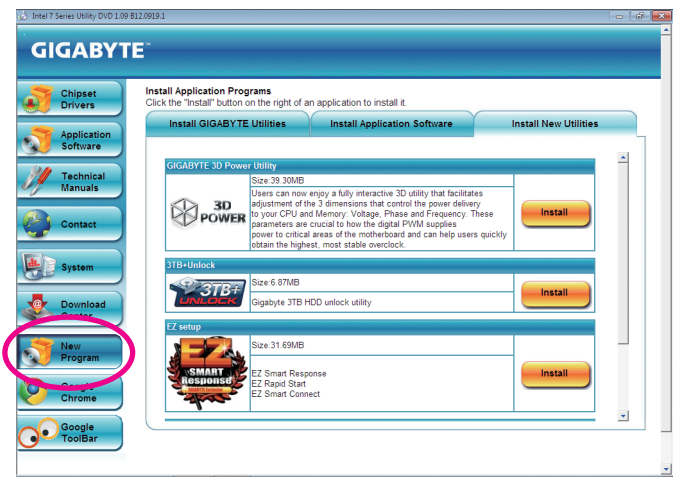
3-6 Download Center

To update the BIOS, drivers, or applications, click the **Download Center** button to link to the GIGABYTE website. The latest version of the BIOS, drivers, or applications will be displayed.



3-7 New Program

This page provides a quick link to GIGABYTE's lately developed utilities for users to install. You can click the **Install** button on the right of an item to install it.



Chapter 4 Unique Features

4-1 BIOS Update Utilities

GIGABYTE motherboards provide two unique BIOS update tools, Q-Flash™ and @BIOS™. GIGABYTE Q-Flash and @BIOS are easy-to-use and allow you to update the BIOS without the need to enter MS-DOS mode. Additionally, this motherboard features the DualBIOS™ design, which enhances protection for the safety and stability of your computer by adding one more physical BIOS chip.

What is DualBIOS™?

Motherboards that support DualBIOS have two BIOS onboard, a main BIOS and a backup BIOS. Normally, the system works on the main BIOS. However, if the main BIOS is corrupted or damaged, the backup BIOS will take over on the next system boot and copy the BIOS file to the main BIOS to ensure normal system operation. For the sake of system safety, users cannot update the backup BIOS manually.

What is Q-Flash™?

With Q-Flash you can update the system BIOS without having to enter operating systems like MS-DOS or Window first. Embedded in the BIOS, the Q-Flash tool frees you from the hassles of going through complicated BIOS flashing process.

What is @BIOS™?

@BIOS allows you to update the system BIOS while in the Windows environment. @BIOS will download the latest BIOS file from the nearest @BIOS server site and update the BIOS.

4-1-1 Updating the BIOS with the Q-Flash Utility

A. Before You Begin

1. From GIGABYTE's website, download the latest compressed BIOS update file that matches your motherboard model.
2. Extract the file and save the new BIOS file (e.g. Z77MXD3HTH.F1) to your USB flash drive or hard drive. Note: The USB flash drive or hard drive must use FAT32/16/12 file system.
3. Restart the system. During the POST, press the <End> key to enter Q-Flash. Note: You can access Q-Flash by either pressing the <End> key during the POST or pressing the <F8> key in BIOS Setup. However, if the BIOS update file is saved to a hard drive in RAID/AHCI mode or a hard drive attached to an independent SATA controller, use the <End> key during the POST to access Q-Flash.

Because BIOS flashing is potentially risky, please do it with caution. Inadequate BIOS flashing may result in system malfunction.

B. Updating the BIOS

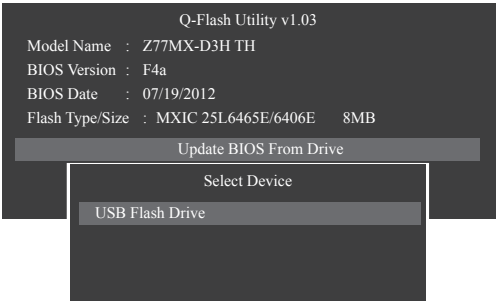
In the main menu of Q-Flash, use the keyboard or mouse to select an item to execute. When updating the BIOS, choose the location where the BIOS file is saved. The following procedure assumes that you save the BIOS file to a USB flash drive.

Step 1:

1. Insert the USB flash drive containing the BIOS file into the computer. In the main menu of Q-Flash, select **Update BIOS From Drive**.

   - The **Save BIOS to Drive** option allows you to save the current BIOS file.
   - Q-Flash only supports USB flash drive or hard drives using FAT32/16/12 file system.
   - If the BIOS update file is saved to a hard drive in RAID/AHCI mode or a hard drive attached to an independent SATA controller, use the <End> key during the POST to access Q-Flash.

2. Select **USB Flash Drive**.



3. Select the BIOS update file.

   Make sure the BIOS update file matches your motherboard model.

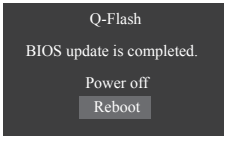
Step 2:

The process of the system reading the BIOS file from the USB flash drive is displayed on the screen. When the message "Are you sure to update BIOS?" appears, select **Yes** to begin the BIOS update. The monitor will display the update process.

- **Do not turn off or restart the system when the system is reading/updating the BIOS.**
- **Do not remove the USB flash drive or hard drive when the system is updating the BIOS.**

Step 3:

When the update process is complete, select **Reboot** to reboot the system.



Step 4:

During the POST, press <Delete> to enter BIOS Setup. Select **Load Optimized Defaults** on the **Save & Exit** screen and press <Enter> to load BIOS defaults. System will re-detect all peripheral devices after a BIOS update, so we recommend that you reload BIOS defaults.



Select **Yes** to load BIOS defaults

Step 5:

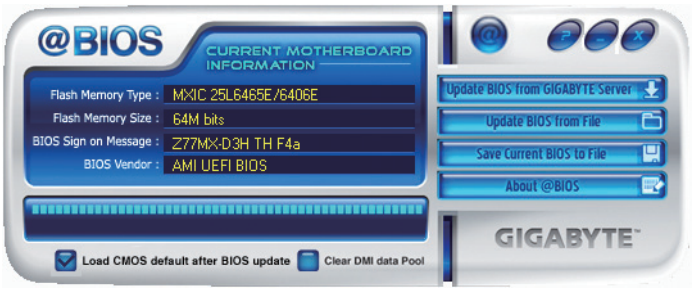
Select **Save & Exit Setup** and press <Enter>. And then select **Yes** to save settings to CMOS and exit BIOS Setup. The procedure is complete after the system restarts.

4-1-2 Updating the BIOS with the @BIOS Utility

A. Before You Begin

1. In Windows, close all applications and TSR (Terminate and Stay Resident) programs. This helps prevent unexpected failures when performing a BIOS update.
2. During the BIOS update process, ensure the Internet connection is stable and do NOT interrupt the Internet connection (for example, avoid a power loss or switching off the Internet). Failure to do so may result in a corrupted BIOS or a system that is unable to start.
3. Do not use the G.O.M. (GIGABYTE Online Management) function when using @BIOS.
4. GIGABYTE product warranty does not cover any BIOS damage or system failure resulting from an inadequate BIOS flashing.

B. Using @BIOS



1. Update BIOS from GIGABYTE Server **Update the BIOS Using the Internet Update Function:**

   Click **Update BIOS from GIGABYTE Server**, select the @BIOS server site closest to your location and then download the BIOS file that matches your motherboard model. Follow the on-screen instructions to complete.

   If the BIOS update file for your motherboard is not present on the @BIOS server site, please manually download the BIOS update file from GIGABYTE's website and follow the instructions in "Update the BIOS without Using the Internet Update Function" below.

2. Update BIOS from File **Update the BIOS without Using the Internet Update Function:**

   Click **Update BIOS from File**, then select the location where you save the BIOS update file obtained from the Internet or through other source. Follow the on-screen instructions to complete.

3. Save Current BIOS to File **Save the Current BIOS File:**

   Click **Save Current BIOS to File** to save the current BIOS file.

4. Load CMOS default after BIOS update **Load BIOS Defaults after BIOS Update:**

   Select the **Load CMOS default after BIOS update** check box and then the system will automatically load BIOS defaults after BIOS update and after the system restarts.

C. After Updating the BIOS

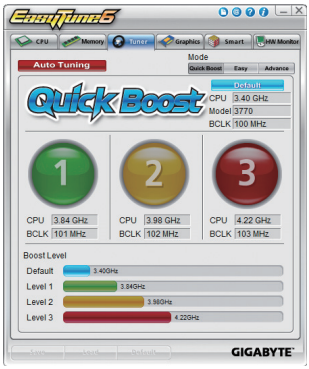
Restart your system after updating the BIOS.

Make sure that the BIOS file to be flashed matches your motherboard model. Updating the BIOS with an incorrect BIOS file could cause your system not to boot.

4-2 EasyTune 6

GIGABYTE's EasyTune 6 is a simple and easy-to-use interface that allows users to fine-tune their system settings or do overclock/overvoltage in Windows environment. The user-friendly EasyTune 6 interface also includes tabbed pages for CPU and memory information, letting users read their system-related information without the need to install additional software.

The EasyTune 6 Interface



Tabs Information

Tab	Function
CPU	The **CPU** tab provides information on the installed CPU and motherboard.
Memory	The **Memory** tab provides information on the installed memory module(s). You can select memory module on a specific slot to see its information.
Tuner	The **Tuner** tab allows you to change memory settings and voltages. • **Quick Boost mode** provides you with 3 levels of CPU frequency/base clock to choose to achieve desired system performance. After making changes in **Quick Boost mode** or clicking **Default** to restore to default values, be sure to restart your system for these changes to take effect. • **Easy mode** provides information on CPU/memory. • **Advanced mode** allows you to individually change system clock settings and voltages settings using the sliders. • **Save** allows you to save the current settings to a new profile (.txt file). • **Load** allows you to load previous settings from a profile. After making changes in **Easy mode/Advanced mode**, be sure to click **Set** for these changes to take effect or click **Default** to restore to default values. The Auto Tuning button automatically provides you with the fastest and most stable frequency to enhance system performance.
Graphics	The **Graphics** tab allows you to change the core clock and memory clock for your AMD or NVIDIA graphics card.
Smart	The **Smart** tab allows you to specify a Smart Fan mode. Smart Fan Advanced mode allows the fan speed to be changed linearly based on the temperature thresholds you set.
HW Monitor	The **HW Monitor** tab allows you to monitor hardware temperature, voltage and fan speed and set temperature/fan speed alarm. You can choose the alert sound from the buzzer or use your own sound file (.wav file).

Available functions in EasyTune 6 may differ by motherboard model. Grayed-out area(s) indicates that the item is not configurable or the function is not supported.

Incorrectly doing overclock/overvoltage may result in damage to the hardware components such as CPU, chipset, and memory and reduce the useful life of these components. Before you do the overclock/overvoltage, make sure that you fully know each function of EasyTune 6, or system instability or other unexpected results may occur.

4-3 Q-Share

Q-Share is an easy and convenient data sharing tool. After configuring your LAN connection settings and Q-Share, you are able to share your data with computers on the same network, making full use of Internet resources.



Directions for using Q-Share

After installing Q-Share from the motherboard driver disk, go to Start>All Programs>GIGABYTE>Q-Share.exe to launch the Q-Share tool. Find the **Q-Share** icon in the notification area and right-click on this icon to configure the data sharing settings.

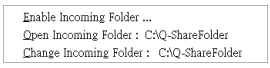


Figure 1. Data Sharing Disabled



Figure 2. Data Sharing Enabled

Options Descriptions

Option	Description
Connect ...	Displays the computers with data sharing enabled
Enable Incoming Folder ...	Enables data sharing
Disable Incoming Folder ...	Disables data sharing
Open Incoming Folder : C:\Q-ShareFolder	Accesses the shared data folder
Change Incoming Folder : C:\Q-ShareFolder	Changes the data folder to be shared (Note)
Update Q-Share ...	Updates Q-Share online
About Q-Share ...	Displays the current Q-Share version
Exit...	Exits Q-Share

(Note) This option is available only when data sharing is NOT enabled.

4-4 Smart Recovery 2

Smart Recovery 2 allows you to back up a partition as an image file every hour. You can use these images to restore your system or files when needed.



The Smart Recovery 2 main menu:

Button	Function
Settings	Allows you to select the source and destination partition
Backup Now	Allows you to perform the backup immediately
File Recovery...	Allows you to recover your files from the backup image
System Recovery...	Allows you to recover your system from the backup image

- Supported operating systems: Windows 7 and Vista.
- Smart Recovery 2 only supports NTFS file system.
- You need to select the destination partition in Settings the first time you use Smart Recovery 2.
- The **Backup Now** button will be available only after you log in Windows for ten minutes.

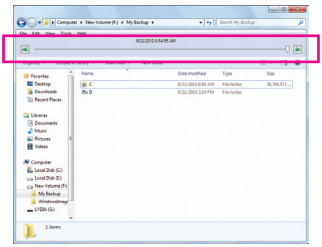


Creating a backup:

Click the **Settings** button on the main menu. In the **Settings** dialog box, select the source partition and destination partition and click **OK**. The initial backup will start after 10 minutes and regular backup will be performed hourly. Note: By default, all partitions on the system drive are selected as the backup source. The backup destination cannot be on the same partition as the backup source.

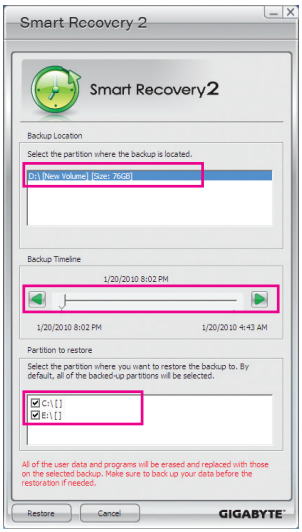
Saving the the backup to a network location:

If you want to save the backup to a network location, select **Browse network location**. Make sure your computer and the computer where you want to save the backup are in the same domain. Choose the network location where you want to store the backup and enter the user name and password. Follow the on-screen instructions to complete.



Recovering a file:

Click the **File Recovery** button on the main menu. Use the time slider on the top of the popped out window to select a previous backup time. The right pane will display the backed-up partitions in the backup destination (in the **My Backup** folder). Browse to the file you want and copy it.



Recovering your system with Smart Recovery 2 (Windows 7 only):

Steps:

1. Click the **System Recovery** button on the main menu.
2. Select the location where your backup is saved.
3. Use the time slider to select a time point.
4. Select a partition backup created on the selected time point and click **Restore**.
5. Confirm whether to restart your system to proceed with the restore immediately or later. Once you respond "Yes" the system will restart to the Windows recovery environment. Follow the onscreen instructions to restore your system.

- For Windows Vista, refer to the steps below to use the original Windows installation disk for system recovery.
- All of your files and programs will be deleted and replaced with those on the selected backup. If needed, be sure to make a copy of your data before the restore.

Recovering your system using the original Windows installation disk:

In case Windows or your hard drive has serious errors, use the original Windows installation disk for system recovery.

Steps:

1. Restart your computer to boot from the original Windows installation disk.
2. When the Windows installation screen appears, select your language and click **Next**.
3. Select **Repair your computer**.
4. Select **Restore your computer using a system image that you created earlier** and then click **Next**.
5. Select the backup you want to use and then follow the on-screen instructions to complete.

For further instructions, refer to the Help file of Smart Recovery 2.

4-5 eXtreme Hard Drive (X.H.D)

With GIGABYTE eXtreme Hard Drive (X.H.D) (Note 1), users can quickly configure a RAID-ready system for RAID 0 when a new SATA drive is added. For a RAID 0 array that already exists, users also can use X.H.D to easily add a hard drive into the array to expand its capacity. All with a simple click of a button, X.H.D helps to enhance your hard drive read/write performance without the need for complex and time-consuming configurations. The following procedure details the steps to set up a RAID-ready system and configure it for RAID 0.

A. Setting Up a RAID-Ready System

Step 1: Configure the system BIOS
Enter the system BIOS Setup program to enable RAID for the Intel SATA controllers.

Step 2: Install the RAID driver and operating system
The X.H.D utility supports Windows 7/XP. Before installing the operating system, you have to load the SATA controller driver first. Without the driver, the hard drive may not be recognized during the Windows setup process. (For more details, refer to Chapter 5, "Installing the SATA RAID/AHCI Driver and Operating System.")

Step 3: Install the motherboard drivers and the X.H.D utiltiy
After installing the operating system, insert the motherboard driver disk. You can click the **Xpress Install All** button to automatically install all motherboard drivers, including the X.H.D utility. Or you can go to the **Application Software** screen to individually install the X.H.D utility later.

B. Using GIGABYTE eXtreme Hard Drive (X.H.D)



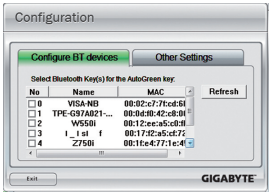
Instructions (Note 2):
Before launching X.H.D, make sure the newly added harddrive has equal or greater capacity than the RAID-ready system drive. (To add a new hard drive into a RAID 0 array that's been created earlier, make sure the new drive is greater than or equal to the biggest drive in the array.)

1. Auto **To automatically set up a RAID 0 array:**
   Click **Auto** to automatically and quickly set up a RAID 0 array.
2. Manual **To manually set up a RAID array (Note 3):**
   Click **Manual** to access the Intel Rapid Storage Technology, with which you can build a RAID 0, RAID 1, or other supported RAID array depending on your needs and hardware components.
3. Cancel **Exits the X.H.D utility:**
   Click **Cancel** to exit the X.H.D utility.

(Note 1) The X.H.D utility only supports the SATA controllers integrated in the Intel Chipset.
(Note 2) It is recommended that before you run the X.H.D utility, back up all of your data to avoid risk of hardware damage or lost of data.
(Note 3) If you manually build a non-RAID 0 array, you'll not be able to automatically set up a RAID 0 array later using the **Auto** function.

4-6 Auto Green

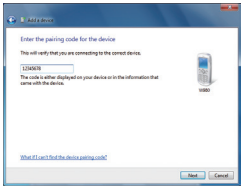
Auto Green is an easy-to-use tool that provides users with simple options to enable system power savings via a Bluetooth cell phone. When the phone is out of the range of the computer's Bluetooth receiver, the system will enter the specified power saving mode.



The Configuration dialog box:

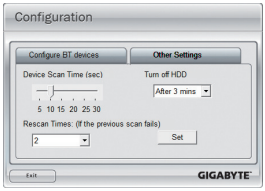
First, you have to set your Bluetooth cell phone as a portable key. On the Auto Green main menu, click **Configure** and then click **Configure BT devices**. Select the Bluetooth cell phone that you want to use as the portable key (Note 1). (If the screen doesn't display your Bluetooth cell phone, click **Refresh** to let Auto Green re-detect the device.)

Before creating a Bluetooth cell phone key, make sure your motherboard has a Bluetooth receiver and you have turned on the search and Bluetooth functions on your phone.



Configuring the Bluetooth cell phone key:

After you select a cell phone, the **Add device** as shown on the left will appear. Enter a passkey (8~16 digits recommended) which will be used for pairing with the cell phone. Then enter the same passkey on your cell phone.



Configuring other Bluetooth settings:

On the **Other Settings** tab, you can set how much time it takes to scan your Bluetooth cell phone key, how many times to rescan the key to make sure it is in range of your computer, and when to turn off the hard drive if the system energy saving state lasts over the predetermined period of time. After completing the settings, click **Set** for the settings to take effect and then click **Exit** to quit.

- Device Scan Time (sec.):
  Set the length of time Auto Green scans your Bluetooth cell phone key, ranging from 5 to 30 seconds in 5-second increment. Auto Green searches for the key based on the length of time you set.
- Rescan Times:
  Set how many times Auto Green will rescan your Bluetooth cell phone key if it does not detect it, ranging from 2 to 5 times. Auto Green will keep rescanning according to the times you set. When the times limit is reached and your Bluetooth cell phone key is still not detected, the system will enter the selected energy saving mode.
- Turn off HD:
  Set when to turn off the hard drive. If the system inactivity time exceeds the specified time limit, the hard drive will be turned off.



Selecting a system energy saving mode:

Depending on your needs, select a system power saving mode on the Auto Green main menu and click **Save** to save the settings.

Button	Description
Standby	Enters Power on Suspend mode
Suspend	Enters Suspend to RAM mode
Disable	Disables this function

The Bluetooth dongle included in the motherboard package (Note 2) allows you to wake up the system from Suspend to RAM mode without the need to press the power button first.

(Note 1) If your cell phone has been configured as the Auto Green key, you'll not be able to use it to connect to other Bluetooth device(s) when Auto Green is enabled.

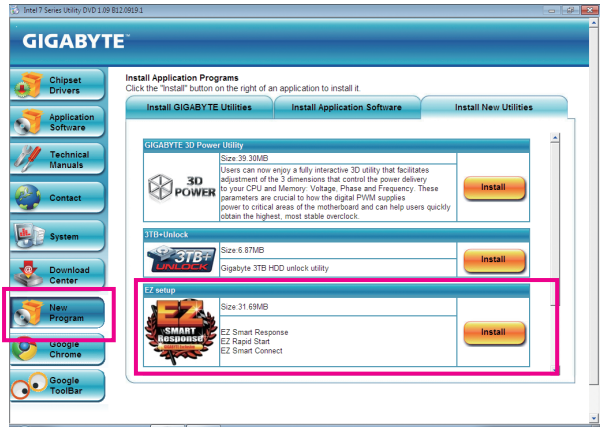
(Note 2) Whether the Bluetooth dongle is included depends on the motherboard models. Before installing the Bluetooth dongle, be sure to turn off other Bluetooth receiver on your computer.

4-7 EZ Setup

EZ Setup consists of the EZ Smart Response (Note), EZ Rapid Start, and EZ Smart Connect utilities. The EZ Setup application frees you from complicated installation and configuration process and allows you to use the application with ease.

Installing EZ Setup

After inserting the GIGABYTE motherboard driver disk, click **Express Install** to install all motherboard drivers. After completion, go to the **New Program** menu and click **Install** on the right of the EZ Setup application to install it.



Launching EZ Setup

Step 1:

While in the operating system, go to **Start\All Programs\GIGABYTE** and select **EZ Setup**. (Figure 1)

Step 2:

Select the utilities you wish to install and click **Setup** to begin the installation. (Figure 2)

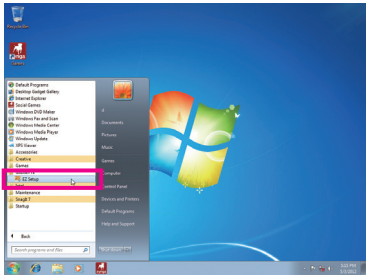


Figure 1

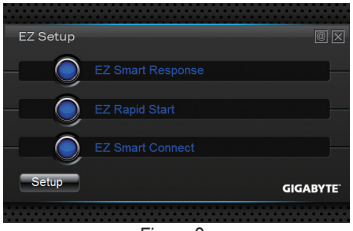


Figure 2

- For detailed configurations, please refer to Intel's documentation.
- During the installation process, the system will configure the BIOS settings and install required drivers. The system may restart automatically a few times.

(Note) Not supported on the Intel B75 Chipset.

4-7-1 Installing EZ Smart Response

A. System Requirements

1. An Intel Chipset-based motherboard supporting this feature (Note 1)
2. An Intel Core series processor
3. RAID enabled for the Intel SATA controllers in BIOS Setup
4. A conventional SATA disk and an SSD (Note 2)
5. Windows 7 with SP1 (Note 3)

If you have installed the operating system before configuring the Smart Response Technology, all original data on the hard disk will be lost once you enable RAID mode. It is recommended that you back up the hard disk before enabling the Smart Response Technology.

B. Installation

Step 1:

Select **EZ Smart Response** and click **Setup**. (Figure 1)

Step 2:

A warning message indicating that the system will be forced to RAID mode will appear. (Note 4) Select **Yes** and the system will restart. (Figure 2)

Step 3:

After the system restarts, it will install the Intel Raid Storage Technology driver automatically. The system will restart again after the driver installation.

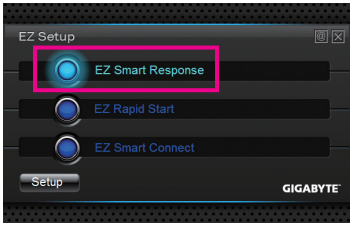


Figure 1

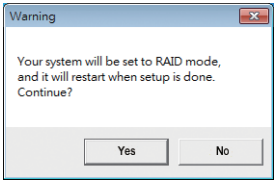
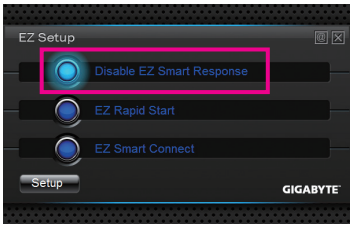


Figure 2

C. Disabling EZ Smart Response



To disable EZ Smart Response, select **Disable EZ Smart Response** and click **Setup**.

(Note 1) Not supported on the Intel B75 Chipset.

(Note 2) The SSD works as a cache of the hard disk. The maximum cache memory size is 64 GB. If you use an SSD larger than 64 GB, the space beyond 64 GB can still be used for storing your data.

(Note 3) The operating system must be installed to the SATA disk.

(Note 4) Regardless of the BIOS settings, be it IDE or AHCI mode, the system will be forced to RAID mode.

4-7-2 Installing EZ Rapid Start

A. System Requirements

1. Intel Rapid Start Technology enabled in BIOS Setup
2. Windows 7 with SP1
3. An SSD with size larger than the total system memory
4. AHCI/RAID mode supported (please note if the SSD has been assigned as a member of a RAID array, it cannot be used to set up Intel Rapid Start store partition); IDE mode not supported

B. Installation

Step 1:

Select **EZ Rapid Start** and click **Setup**. (Figure 1)

Step 2:

A warning message indicating the system will be forced to RAID mode will appear. (Note) Select **Yes** and the system will restart and automatically enable Intel Rapid Start Technology in the BIOS Setup. (Figure 2)

Step 3:

After the system restarts, it will install the Intel Raid Start Technology Manager driver automatically. The system will restart again after the driver installation.

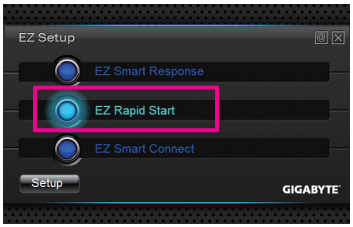


Figure 1

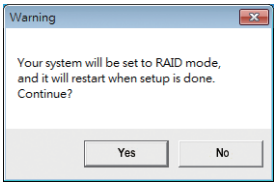
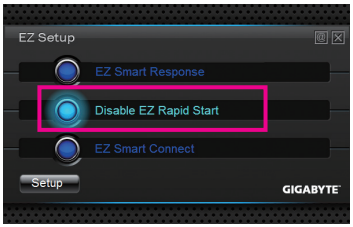


Figure 2

C. Disabling EZ Rapid Start



To disable EZ Rapid Start, select **Disable EZ Rapid Start** and click **Setup**.

- The default compressed space is the system memory size plus 2 GB. For example, if the system memory size is 8 GB, the default compressed space is 8 GB plus 2 GB, so the SSD capacity will decrease by 10 GB. If EZ Rapid Start is disabled, the decreased 10 GB will be returned to the SSD.
- If you want to upgrade your system memory, disable EZ Rapid Start first and re-install it to ensure it can work normally.

(Note) On an Intel Z77/H77 Chipset motherboard, the Intel SATA controllers will be forced to RAID mode if they are set to IDE mode. On an Intel B75 Chipset motherboard, the Intel SATA controllers will be forced to AHCI mode if they are set to IDE mode.

4-7-3 Installing EZ Smart Connect

A. System Requirements

1. Intel Smart Connect Technology enabled in BIOS Setup
2. Windows 7 with SP1
3. Normal network connection
4. Programs added to the White List must be enabled

B. Installation

Step 1:

Select **EZ Smart Connect** and click **Setup**. Then restart your system. The system will restart and automatically enable Intel Smart Connect Technology in the BIOS Setup. (Figure 1)

Step 2:

Launch EZ Setup again, select **EZ Smart Connect**, and then click **Setup**. Follow the on-screen instructions to install the Intel Smart Connect Technology driver (Figure 2). Restart your system after the driver installation.



Figure 1

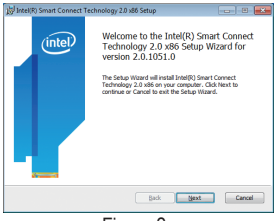


Figure 2

C. Configuring EZ Smart Connect

Select **Config** (Figure 3) and add new programs to the White Program list (Note) (Figure 4). Then click **OK** and restart the system.

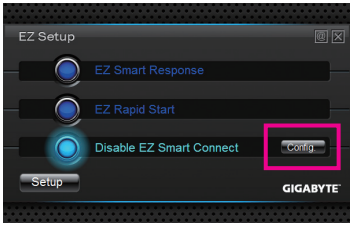


Figure 3

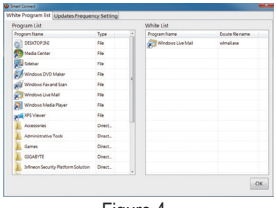
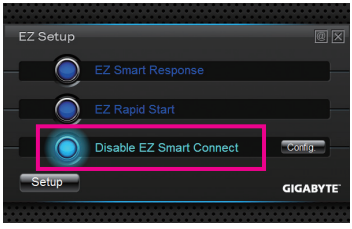


Figure 4

D. Disabling EZ Smart Connect



To disable EZ Smart Connect, select **Disable EZ Smart Connect** and click **Setup**.

(Note) This feature works best with programs designed to work automatically with the Internet to obtain their data such as Microsoft Outlook®, Microsoft Windows Live™ Mail, and Seesmic®.

Chapter 5 Appendix

5-1 Configuring SATA Hard Drive(s)

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

To configure SATA hard drive(s), follow the steps below:

A. Install SATA hard drive(s) in your computer.
B. Configure SATA controller mode in BIOS Setup.
C. Configure a RAID array in RAID BIOS. (Note 1)
D. Install the SATA RAID/AHCI driver and operating system. (Note 2)

Before you begin

Please prepare:

- At least two SATA hard drives (to ensure optimal performance, it is recommended that you use two hard drives with identical model and capacity). If you do not want to create RAID, you may prepare only one hard drive.
- Windows 7/XP setup disk.
- Motherboard driver disk.
- A USB floppy disk drive (needed during Windows XP installation)
- An empty formatted floppy disk (needed during Windows XP installation)

5-1-1 Configuring SATA Controllers

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

Attach one end of the SATA signal cable to the rear of the SATA hard drive and the other end to available SATA port (Note 3) on the motherboard. Then connect the power connector from your power supply to the hard drive.

(Note 1) Skip this step if you do not want to create RAID array on the SATA controller.
(Note 2) Required when the SATA controller is set to AHCI or RAID mode.
(Note 3) When a RAID set is built across the SATA 6Gb/s and SATA 3Gb/s channels, the system performance of the RAID set may vary depending on the devices being connected.

B. Configuring SATA controller mode in BIOS Setup

Make sure to configure the SATA controller mode correctly in system BIOS Setup.

Step 1:

Turn on your computer and press <Delete> to enter BIOS Setup during the POST (Power-On Self-Test). To create RAID, set **SATA Mode Selection** under the **Peripherals** menu to **RAID** (Figure 1). If you do not want to create RAID, set this item to **IDE** or **AHCI**.



Figure 1

Step 2:

Save changes and exit BIOS Setup.

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. Configuring a RAID array in RAID BIOS

Enter the RAID BIOS setup utility to configure a RAID array. Skip this step and proceed with the installation of Windows operating system for a non-RAID configuration.

Step 1:

After the POST memory test begins and before the operating system boot begins, look for a message which says "Press <Ctrl-I> to enter Configuration Utility" (Figure 2). Press <Ctrl> + <I> to enter the RAID Configuration Utility.

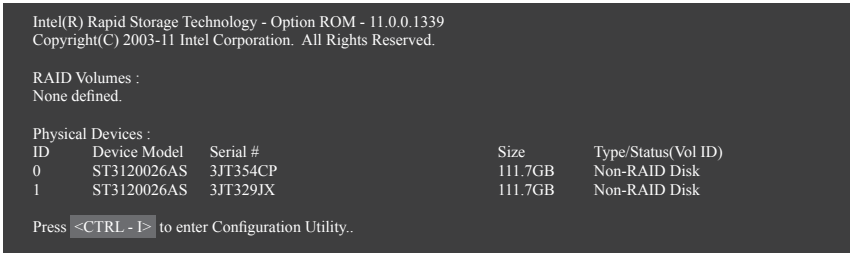


Figure 2

Step 2:

After you press <Ctrl> + <I>, the **MAIN MENU** screen will appear (Figure 3).

Create RAID Volume

If you want to create a RAID array, select **Create RAID Volume** in **MAIN MENU** and press <Enter>.

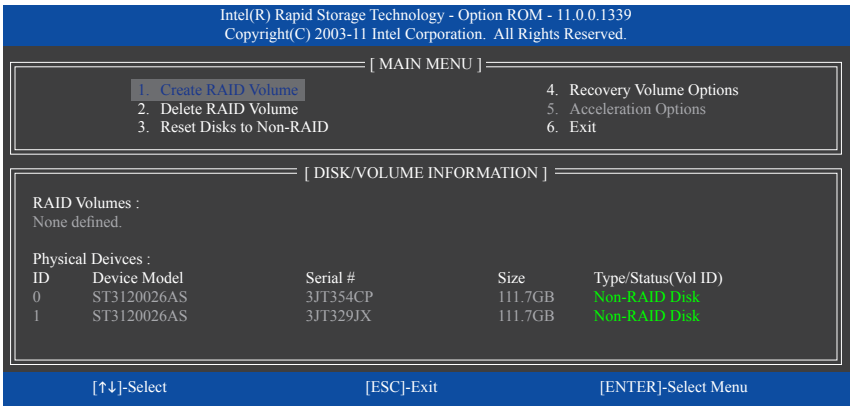


Figure 3

Step 3:

After entering the **CREATE VOLUME MENU** screen, enter a volume name with 1~16 letters (letters cannot be special characters) under the **Name** item and press <Enter>. Then, select a RAID level (Figure 4). RAID levels supported include RAID 0, RAID 1, RAID 10, and RAID 5 (the selections available depend on the number of the hard drives being installed). Press <Enter> to proceed.

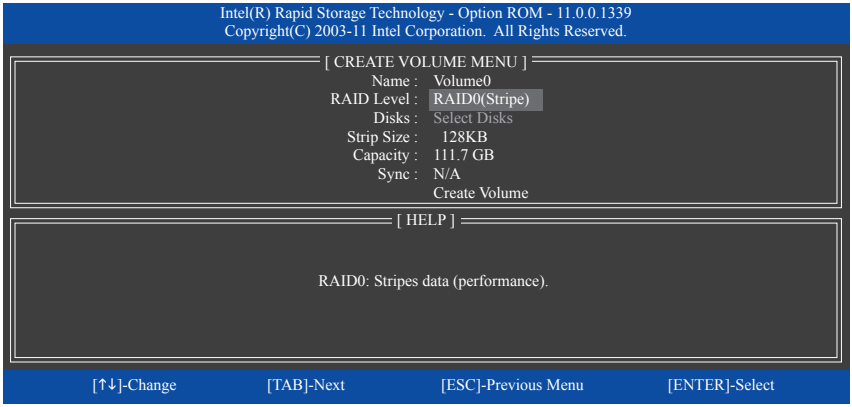


Figure 4

Step 4:

Under **Disks** item, select the hard drives to be included in the RAID array. If only two hard drives are installed, they will be automatically assigned to the array. Set the stripe block size (Figure 5) if necessary. The stripe block size can be set from 4 KB to 128 KB. Once you have selected the stripe block size, press <Enter>.

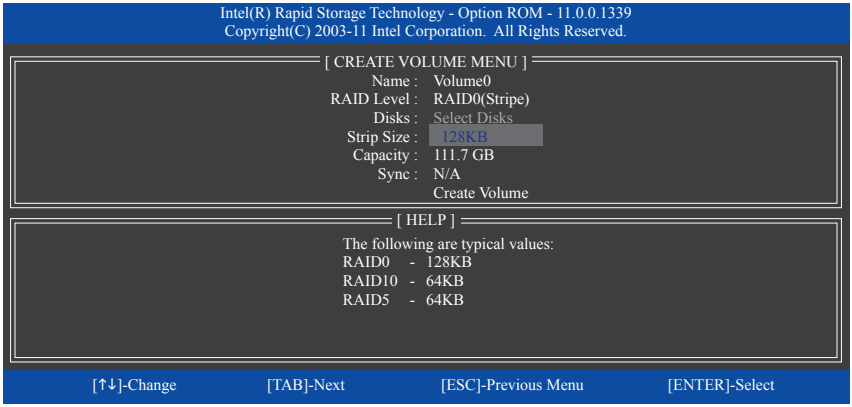


Figure 5

Step 5:

Enter the array capacity and press <Enter>. Finally press <Enter> on the **Create Volume** item to begin creating the RAID array. When prompted to confirm whether to create this volume, press <Y> to confirm or <N> to cancel (Figure 6).

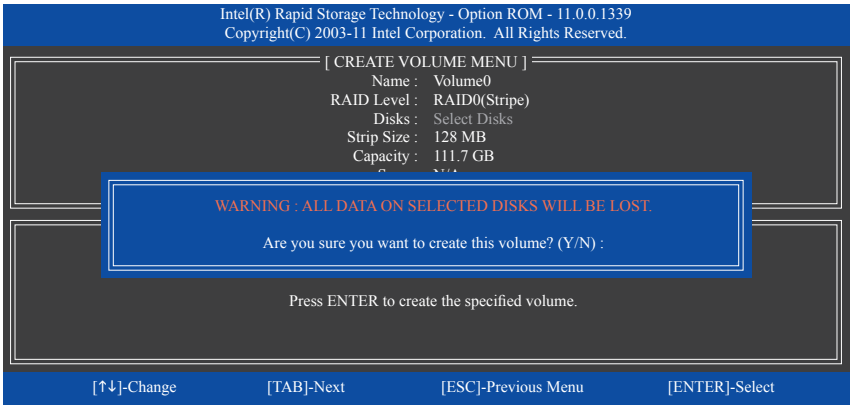


Figure 6

When completed, you can see detailed information about the RAID array in the **DISK/VOLUME INFORMATION** section, including the RAID level, stripe block size, array name, and array capacity, etc. (Figure 7)

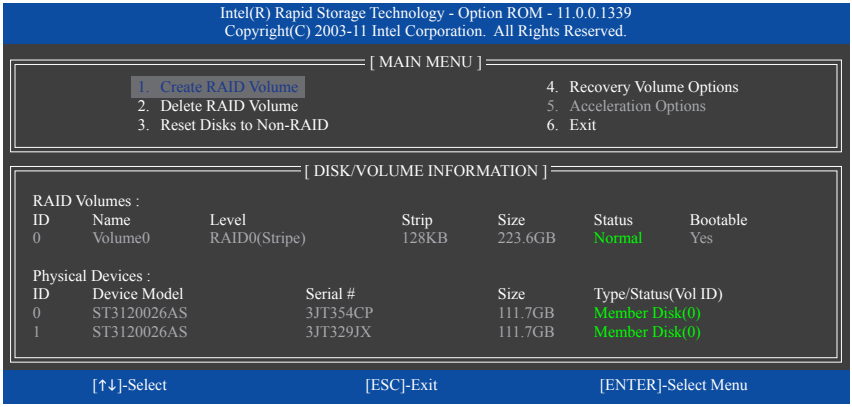


Figure 7

To exit the RAID BIOS utility, press <Esc> or select **6. Exit** in **MAIN MENU**.

Now, you can proceed to install the SATA RAID/AHCI driver and operating system.

Recovery Volume Options

Intel Rapid Recover Technology provides data protection by allowing users to easily restore data and system operation using a designated recovery drive. With the Rapid Recovery Technology, which employs RAID 1 functionality, users can copy the data from the master drive to the recovery drive; if needed, the data on the recovery drive can be restored back to the master drive.

Before you begin:

- The recovery drive must have equal or greater capacity than the master drive.
- A recovery volume can be created with two hard drives only. A recovery volume and a RAID array cannot co-exist in the system at the same time, that is, if you have already created a recovery volume, you are unable to create a RAID array.
- By default, only the master drive can be viewed in the operating system; the recovery drive is hidden.

Step 1:

Select **Create RAID Volume** in **MAIN MENU** and press <Enter> (Figure 8).

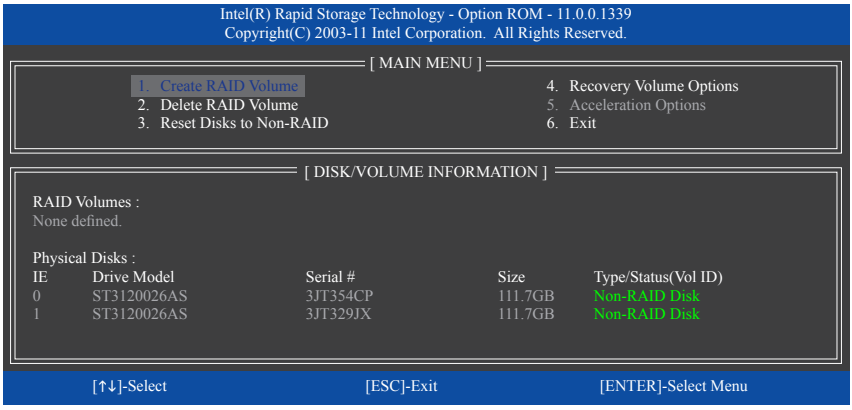


Figure 8

Step 2:

After entering the volume name, select **Recovery** under the **RAID Level** item and press <Enter> (Figure 9).

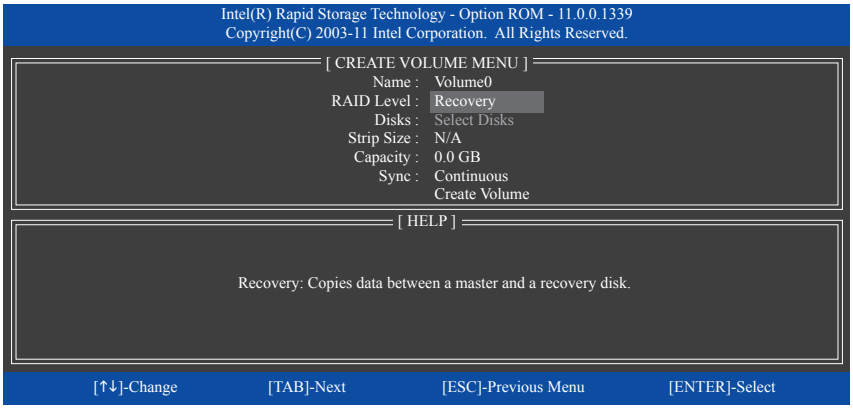


Figure 9

Step 3:

Press <Enter> under the **Select Disks** item. In the **SELECT DISKS** box, press <Tab> on the hard drive you want to use for the master drive and press <Space> on the hard drive you want to use for the recovery drive. (Make sure the recovery drive has equal or larger capacity than the master drive.) Then press <Enter> to confirm (Figure 10).

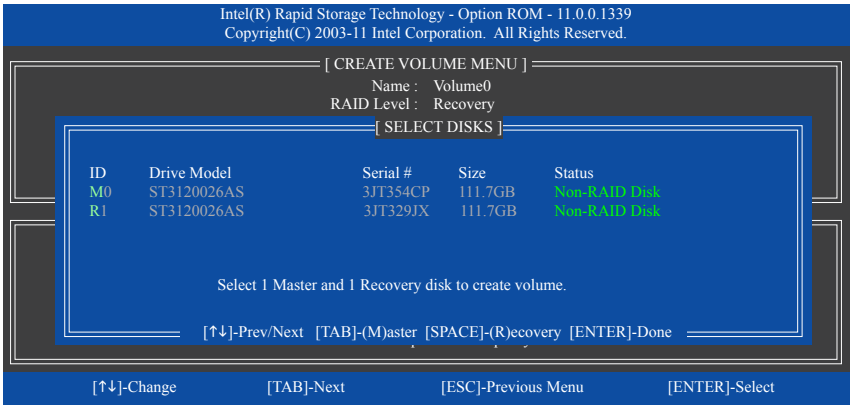


Figure 10

Step 4:

Under **Sync**, select **Continuous** or **On Request** (Figure 11). When set to **Continuous**, changes made to the data on the master drive will be automatically and continuously copied to the recovery drive when both hard drives are installed in the system. **On Request** allows users to update data from the master drive to the recovery drive manually using the Intel Rapid Storage Technology utility in the operating system. **On Request** also allows users to restore the master drive to a previous state.

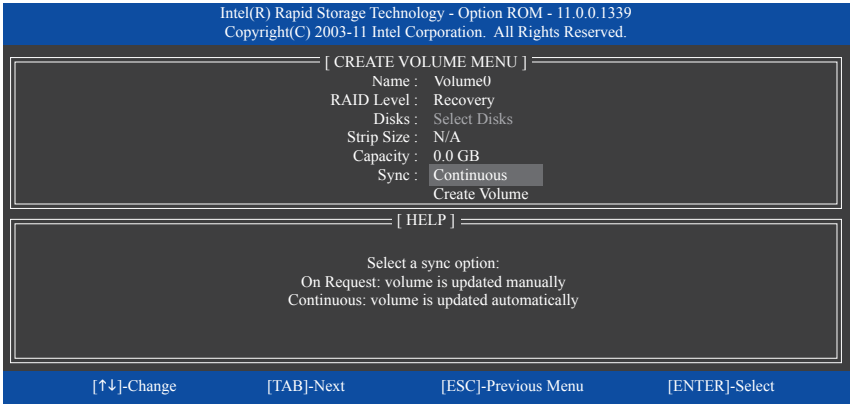


Figure 11

Step 5:

Finally press <Enter> on the **Create Volume** item to begin creating the Recovery Volume and follow the on-screen instructions to complete.

Delete RAID Volume

To delete a RAID array, select **Delete RAID Volume** in **MAIN MENU** and press <Enter>. In the **DELETE VOLUME MENU** section, use the up or down arrow key to select the array to be deleted and press <Delete>. When prompted to confirm your selection (Figure 12), press <Y> to confirm or <N> to abort.

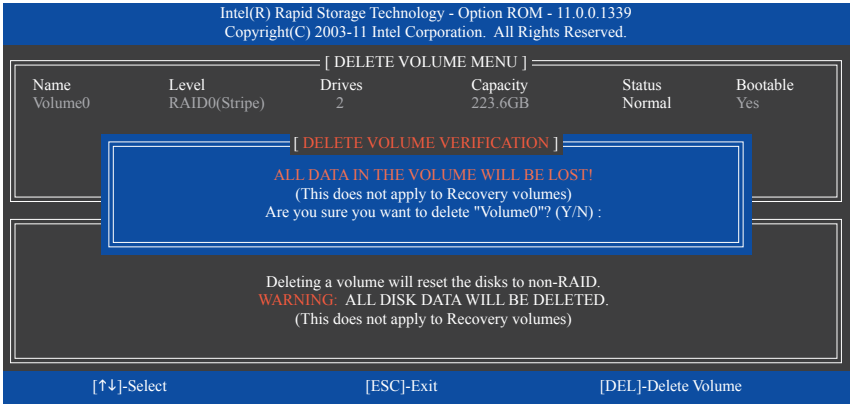


Figure 12

Acceleration Options

This option allows you to view the status of your accelerated drive/volume (Figure 13) created using the Intel IRST utility. In case you are unable to run the Intel IRST utility due to an application error or operating system issue, you will need to remove acceleration or manually enable synchronization (Maximized mode only) using this option in the RAID ROM utility.

Steps:

Select **Acceleration Options** in **MAIN MENU** and press <Enter>.

To remove the acceleration, select the accelerated drive/volume, press <R>, and press <Y> to confirm.

To synchronize data from the cache device to the accelerated drive/volume, press <S> and press <Y> to confirm.

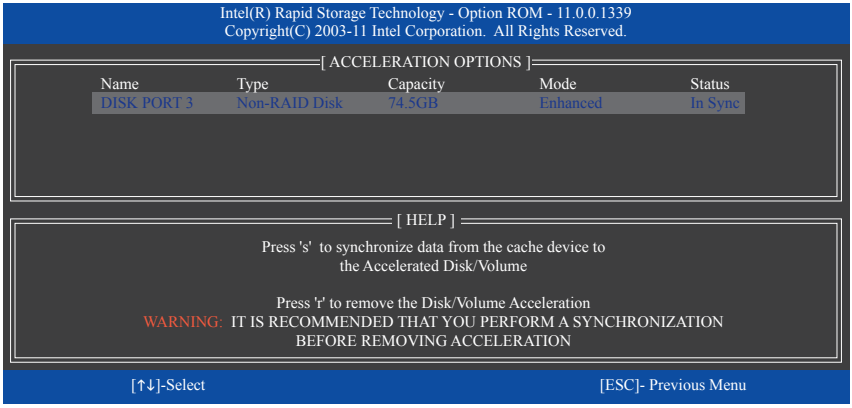


Figure 13

5-1-2 Installing the SATA RAID/AHCI Driver and Operating System

With the correct BIOS settings, you are ready to install Windows 7/XP.

A. Installing Windows 7

As Windows 7 already include Intel SATA RAID/AHCI driver, you do not need to install separate RAID/AHCI driver during the Windows installation process. After the operating system is installed, we recommend that you install all required drivers from the motherboard driver disk using "Xpress Install" to ensure system performance and compatibility.

B. Installing Windows XP

Before installing Windows XP, connect a USB floppy disk drive to your computer first because you need to install the SATA RAID/AHCI driver from a floppy disk that contains the driver during the OS installation. Without the driver, the hard drive(s) may not be recognized during the Windows setup process. First, copy the driver from the motherboard driver disk to a floppy disk. Refer to the methods below.

Method A:

For the Intel Z77, copy all files in the **\BootDrv\iRST\32Bit** folder to your floppy disk. To install Windows 64-Bit, copy the files in the **64Bit** folder.

Method B:

Steps:

1: Use an alternative system and insert the motherboard driver disk.

2: From your optical drive folder, double click the **Menu.exe** file in the **BootDrv** folder. A Command Prompt window will open similar to that in Figure 1.

3: Insert the blank formatted disk (if you're using a USB floppy disk drive, make sure it is designated as drive A). Select the controller driver by pressing the corresponding letter from the menu and press <Enter>. For example, from the menu in Figure 1,

- For the Intel Z77, select **8) Intel Rapid Storage driver for 32bit system** for Windows XP 32-bit operating system.

Your system will then automatically copy the driver files to the floppy disk. Press any key to exit when finished.

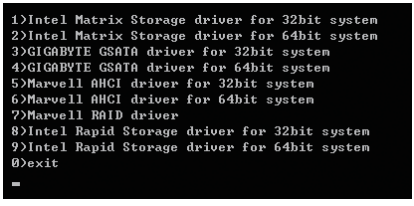


Figure 1

Refer to the following for installing the driver during the Windows setup process.

Step 1:

Restart your system to boot from the Windows XP setup disk and press <F6> as soon as you see the message "Press F6 if you need to install a 3rd party SCSI or RAID driver." A screen will then appear asking you to specify an additional SCSI adapter. Press <S>.

Step 2:

Insert the floppy disk containing the SATA RAID/AHCI driver and press <Enter>. Then a controller menu similar to that in Figure 3 will appear. Select **Intel(R) Desktop/Workstation/Server Express Chipset SATA RAID Controller** and press <Enter>. For AHCI mode, use the up arrow key on the keyboard to scroll to the **Intel(R) Desktop/Workstation/Server Express Chipset SATA AHCI Controller** item and press <Enter>.

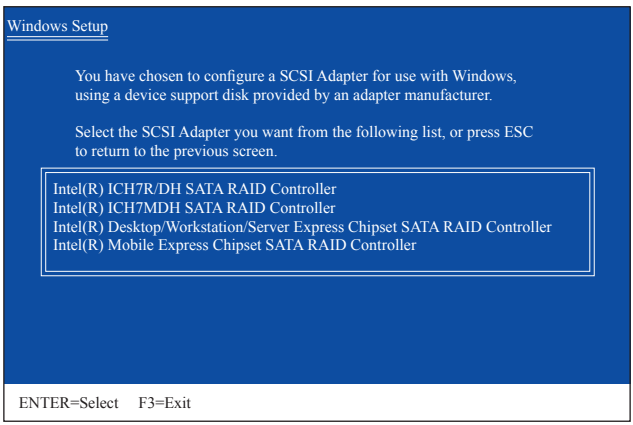


Figure 2

Step 3:

On the next screen, press <Enter> to continue the driver installation. After the driver installation, you can proceed with the Windows XP installation.

C. Rebuilding an Array

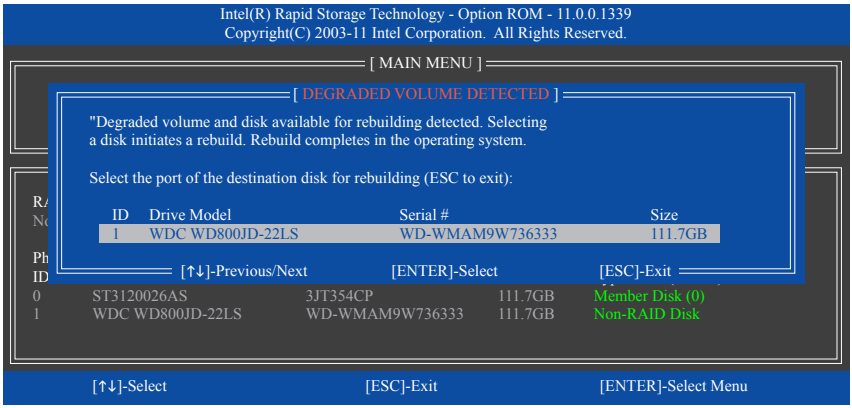
Rebuilding is the process of restoring data to a hard drive from other drives in the array. Rebuilding applies only to fault-tolerant arrays such as RAID 1, RAID 5 or RAID 10 arrays. The procedures below assume a new drive is added to replace a failed drive to rebuild a RAID 1 array. (Note: The new drive must have equal or greater capacity than the old one.)

Turn off your computer and replace the failed hard drive with a new one. Restart your computer.

- **Enabling Automatic Rebuild**

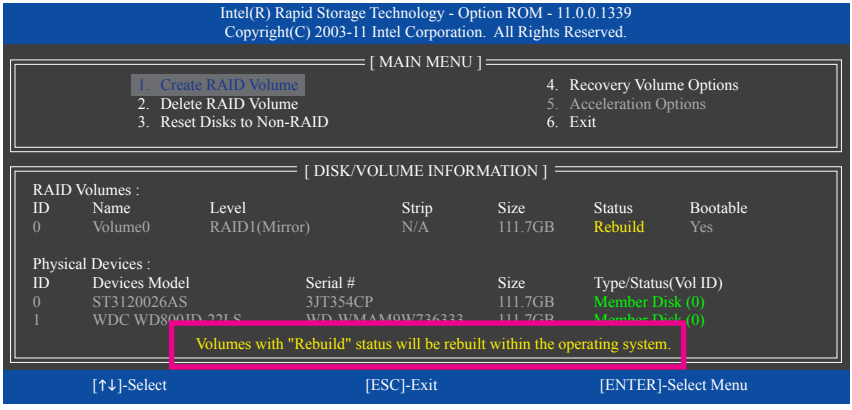
Step 1:

When the message "Press <Ctrl-I> to enter Configuration Utility" appears, press <Ctrl> + <I> to enter the RAID Configuration Utility. The following screen appears after you enter the RAID Configuration Utility.



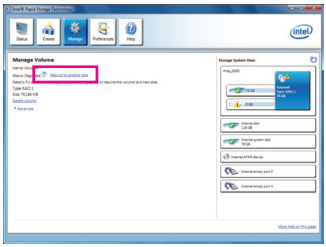
Step 2:

Select the new hard drive to add into the array to be rebuilt and press <Enter>. The following screen appears, indicating that an automatic rebuild will be performed after you enter the operating system (look for the **Intel Rapid Storage Technology** icon in the notification area, which will show that a RAID volume is being rebuilt). If you do not enable automatic rebuild on this stage, you have to manually rebuild the array in the operating system (see the next page for more details).



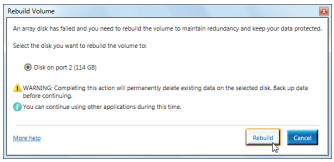
- **Performing the Rebuild in the Operating System**

While in the operating system, make sure the chipset driver has been installed from the motherboard driver disk. Then launch the Intel Rapid Storage Technology utility from **All Programs** in the **Start** menu.



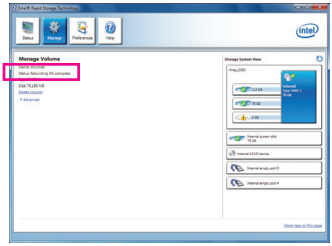
Step 1:

Go to the **Manage** menu and click **Rebuild to another disk in Manage Volume**.

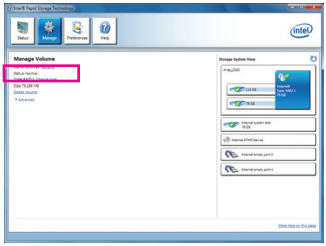


Step 2:

Select a new drive to rebuild the RAID and click **Rebuild**.



The **Status** item on the left of the screen displays the rebuild progress.



Step 3:

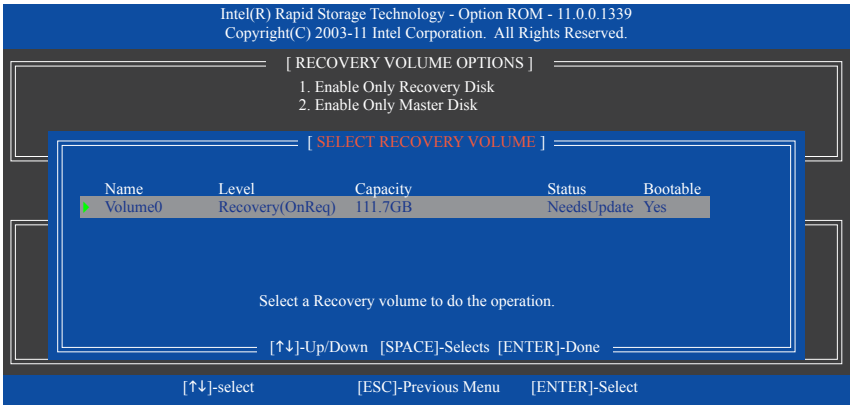
After the RAID 1 volume rebuilding, the **Status** will display as **Normal**.

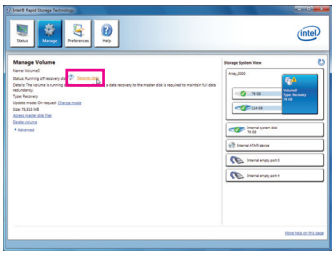
- **Restoring the Master Drive to a Previous State (for Recovery Volume only)**

When two hard drives are set to Recovery Volume in Update on Request mode, you can restore the master drive data to the last backup state when needed. For example, in case the master drive detects a virus, you can restore the recovery drive data to the master drive.

Step 1:

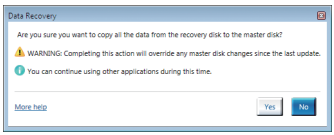
Select **4. Recovery Volume Options** in the **MAIN MENU** of the Intel RAID Configuration Utility. On the **RECOVERY VOLUMES OPTIONS** menu, select **Enable Only Recovery Disk** to show the recovery drive in the operating system. Follow the on-screen instructions to complete and exit the RAID Configuration Utility.





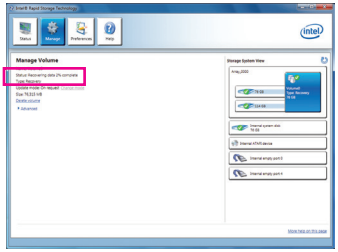
Step 2:

Go to the **Manage** menu of the Intel Rapid Storage Technology utility and click **Recover data** in **Manage Volume**.

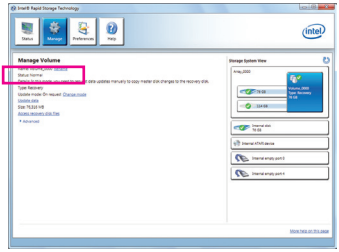


Step 3:

Click **Yes** to begin the data recovery.



The **Status** item on the left of the screen displays the rebuild progress.



Step 4:

After the recovery volume is completed, the **Status** will display as **Normal**.

5-2 Configuring Audio Input and Output

5-2-1 Configuring 2/4/5.1/7.1-Channel Audio

The motherboard provides five audio jacks on the back panel which support 2/4/5.1/7.1-channel (Note) audio. The picture to the right shows the default audio jack assignments.



The integrated HD (High Definition) audio provides jack retasking capability that allows the user to change the function for each jack through the audio driver.

For example, in a 4-channel audio configuration, if a Rear speaker is plugged into the default Center/Subwoofer speaker out jack, you can retask the Center/Subwoofer speaker out jack to be Rear speaker out.

- To install a microphone, connect your microphone to the Mic in jack and manually configure the jack for microphone functionality.
- To configure 7.1-channel audio, you must plug Side speaker into the Line In jack.
- Audio signals will be present on both of the front and back panel audio connections simultaneously. If you want to mute the back panel audio (only supported when using an HD front panel audio module), refer to instructions on the next page.

High Definition Audio (HD Audio)

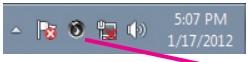
HD Audio includes multiple high quality digital-to-analog converters (DACs) and features multistreaming capabilities that allow multiple audio streams (in and out) to be simultaneously processed. For example, users can listen to MP3 music, have an Internet chat, make a telephone call over the Internet, and etc. all at the same time.

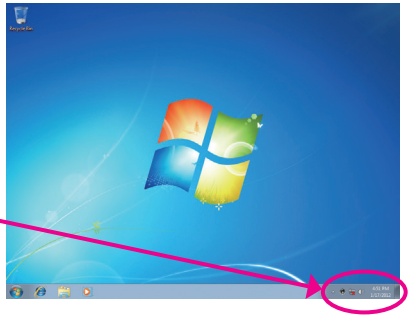
A. Configuring Speakers

(The following instructions use Windows 7 as the example operating system.)

Step 1:

After installing the audio driver, the **VIA HD Audio Deck** icon will appear in the notification area. Click the icon to access the **VIA HD Audio Deck**.





(Note) 2/4/5.1/7.1-Channel Audio Configurations:

Refer to the following for multi-channel speaker configurations.

- 2-channel audio: Headphone or Line out.
- 4-channel audio: Front speaker out and Rear speaker out.
- 5.1-channel audio: Front speaker out, Rear speaker out, and Center/Subwoofer speaker out.
- 7.1-channel audio: Front speaker out, Rear speaker out, Center/Subwoofer speaker out, and Side speaker out.

Step 2:

Connect an audio device to an audio jack. The **Please select a function** dialog box appears. Select the device according to the type of device you connect. Then click **OK**.



Step 3:

Go to the **Speaker** screen. On the **Speaker Setting and Test** tab, select **2**, **4**, **6**, or **8**-channel speaker according to the type of speaker configuration you wish to set up. Then the speaker setup is completed.

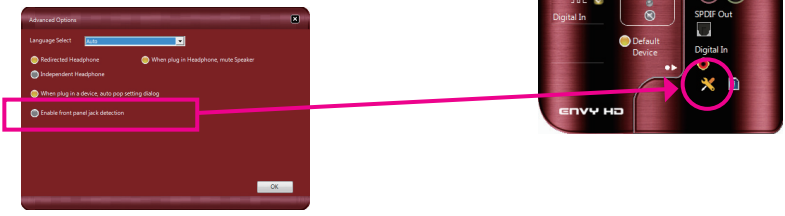


B. Configuring Sound Effect

You can configure an audio environment on the **Environmental Modeling** tab.

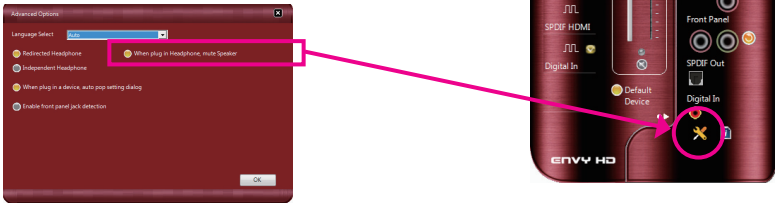
C. Activating an AC'97 Front Panel Audio Module

If your chassis provides an AC'97 front panel audio module, to activate the AC'97 functionality, click the **Advanced Options** icon on the bottom right corner to open the **Advanced Options** dialog box. Do not select the **Enable front panel jack detection** check box. Click **OK** to complete.



D. Muting the Back Panel Audio (For HD Audio Only)

Click the **Advanced Options** icon on the bottom right corner to open the **Advanced Options** dialog box. Select the **When plug in Headphone, mute Speaker** check box. Click **OK** to complete.



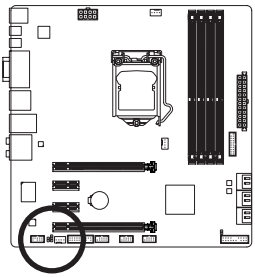
5-2-2 Configuring S/PDIF In/Out

A. S/PDIF In

The S/PDIF In cable (optional) allows you to input digital audio signals to the computer for audio processing.

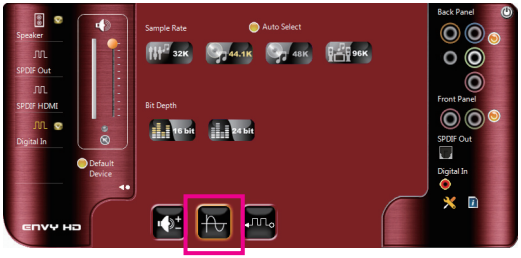
1. Connecting a S/PDIF In Cable:

Connect a S/PDIF in cable to the SPDIF_IN header on the motherboard as shown below.



2. Configuring S/PDIF In:

On the **Digital In** screen, click the **Default Format** tab and then select the sample rate and bit depth. Click **OK** to complete.

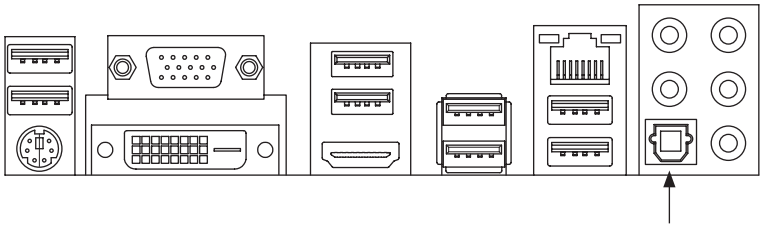


B. S/PDIF Out

The S/PDIF Out jack can transmit audio signals to an external decoder for decoding to get the best audio quality.

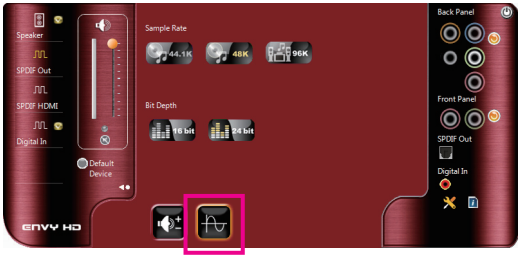
1. Connecting a S/PDIF Out Cable:

Connect a S/PDIF optical cable to the corresponding S/PDIF out connector as shown below and an external decoder for transmitting the S/PDIF digital audio signals.



2. Configuring S/PDIF Out:

On the **SPDIF Out** screen (Note), click the **Default Format** tab and then select the sample rate and bit depth. Click **OK** to complete.

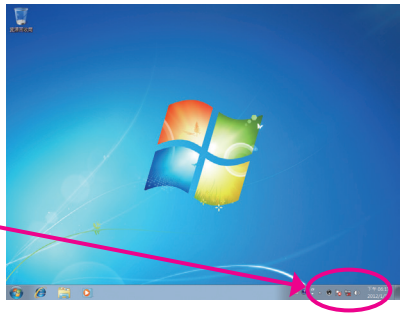


(Note) Enter the **SPDIF Out** screen to configure further settings if you use the S/PDIF Out connector(s) on the back panel for digital audio output or enter the **SPDIF HDMI** screen if you use the internal S/PDIF Out connector (SPDIF_O) for digital audio output.

5-2-3 Configuring Microphone Recording

Step 1:
After installing the audio driver, the **VIA HD Audio Deck** icon will appear in the notification area. Click the icon to access the **VIA HD Audio Deck**.

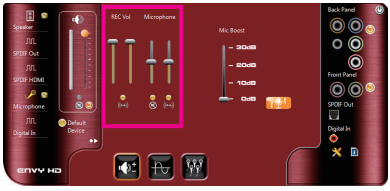




Step 2:
Connect your microphone to the Mic in jack (pink) on the back panel or the Mic in jack (pink) on the front panel. Then configure the jack for microphone functionality.
Note: The microphone functions on the front panel and back panel cannot be used at the same time.



Step 3:
Go to the **Microphone** screen. Do not mute the recording volume (**REC Vol**), or you'll not be able to record the sound. To hear the sound being recorded during the recording process, do not mute the microphone volume (**Microphone**). It is recommended that you set the volumes at a middle level.

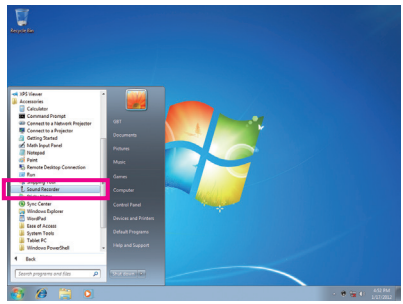


Step 4:
To raise the recording and playback volume for the microphone, use the slider on the right to set the microphone boost level.



Step 5:

After completing the settings above, click **Start**, point to **All Programs**, point to **Accessories**, and then click **Sound Recorder** to begin the sound recording.

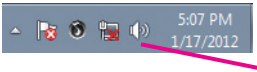


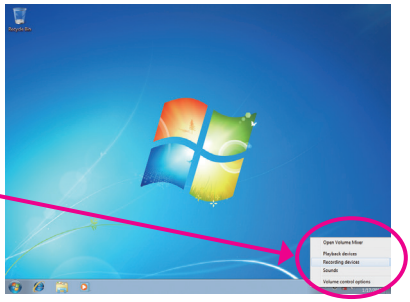
* Enabling Stereo Mix

If the **VIA HD Audio Deck** does not display the recording device you wish to use, refer to the steps below. The following steps explain how to enable Stereo Mix (which may be needed when you want to record sound from your computer).

Step 1:

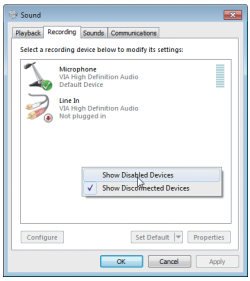
Locate the  icon in the notification area and right-click on this icon. Select **Recording Devices**.





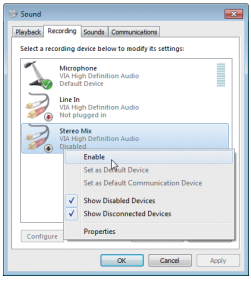
Step 2:

On the **Recording** tab, right-click on an empty space and select **Show Disabled Devices**.



Step 3:

When the **Stereo Mix** item appears, right-click on this item and select **Enable**. Then set it as the default device.

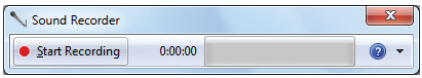


Step 4:

Now you can access the **VIA HD Audio Deck** to configure **Stereo Mix** and use **Sound Recorder** to record the sound.



5-2-4 Using the Sound Recorder



A. Recording Sound

1. Make sure you have connected the sound input device (e.g. microphone) to the computer.
2. To record the audio, click the **Start Recording** button Start Recording.
3. To stop recording audio, click the **Stop Recording** button Stop Recording.

Be sure to save the recorded audio file upon completion.

B. Playing the Recorded Sound

You can play your recording in a digital media player program that supports your audio file format.

5-3 Troubleshooting

5-3-1 Frequently Asked Questions

To read more FAQs for your motherboard, please go to the **Support & Downloads\FAQ** page on GIGABYTE's website.

Q: Why is the light of my keyboard/optical mouse still on after the computer shuts down?

A: Some motherboards provide a small amount of standby power after the computer shuts down and that's why the light is still on.

Q: How do I clear the CMOS values?

A: For motherboards that have a Clear CMOS button, press this button to clear the CMOS values (before doing this, please turn off the computer and unplug the power cord). For motherboards that have a Clear CMOS jumper, refer to the instructions in Chapter 1 to short the jumper to clear the CMOS values. If your board doesn't have this jumper/button, refer to the instructions on the motherboard battery in Chapter 1. You can temporarily remove the battery from the battery holder to stop supplying power to the CMOS, which will clear the CMOS values after about one minute.

Q: Why do I still get a weak sound even though I have turned my speaker to the maximum volume?

A: Make sure your speaker is equipped with an internal amplifier. If not, try a speaker with power/amplifier.

Q: Why cannot I install the onboard HD audio driver successfully? (For Windows XP only)

A: Step 1: First, make sure Service Pack 1 or Service Pack 2 has been installed (check in My Computer > Properties > General > System). If not, please update it from Microsoft's website. Then make sure the Microsoft UAA Bus Driver for High Definition Audio has been installed successfully (check in My Computer > Properties > Hardware > Device Manager > System Devices).

Step 2: Check if **Audio Device on High Definition Audio Bus** or **Unknown device** is present in **Device Manager** or **Sound, video, and game controllers**. If yes, please disable this device. (If not, skip this step.)

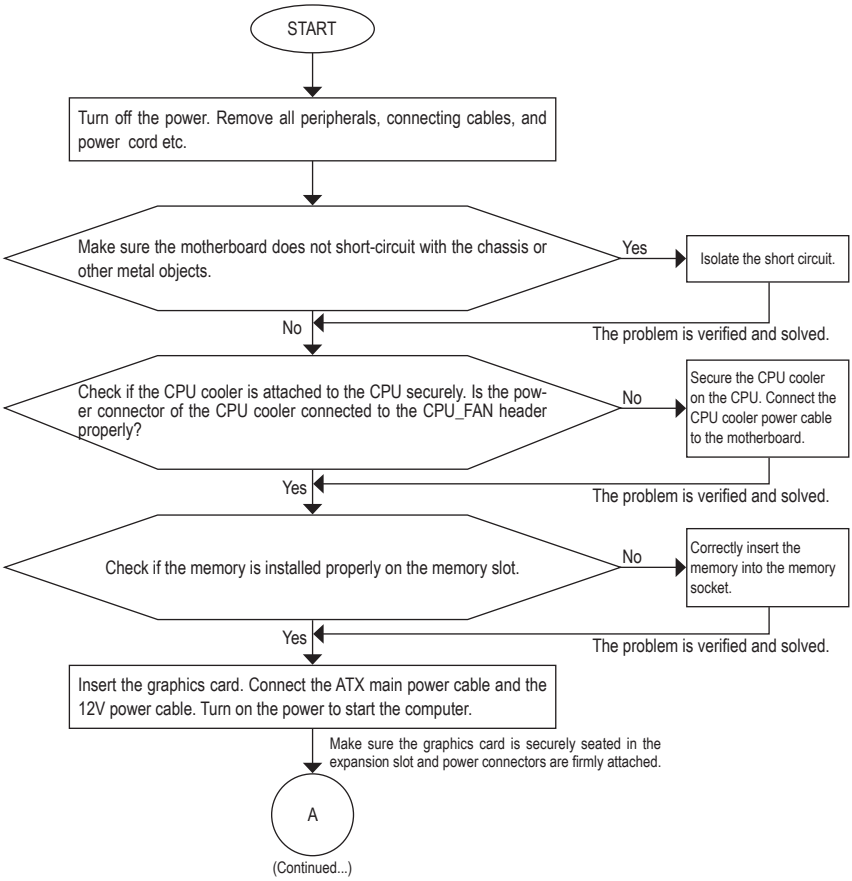
Step 3: Then go back to My Computer > Properties > Hardware > Device Manager > System devices and right-click on **Microsoft UAA Bus Driver for High Definition Audio** and select **Disable** and **Uninstall**.

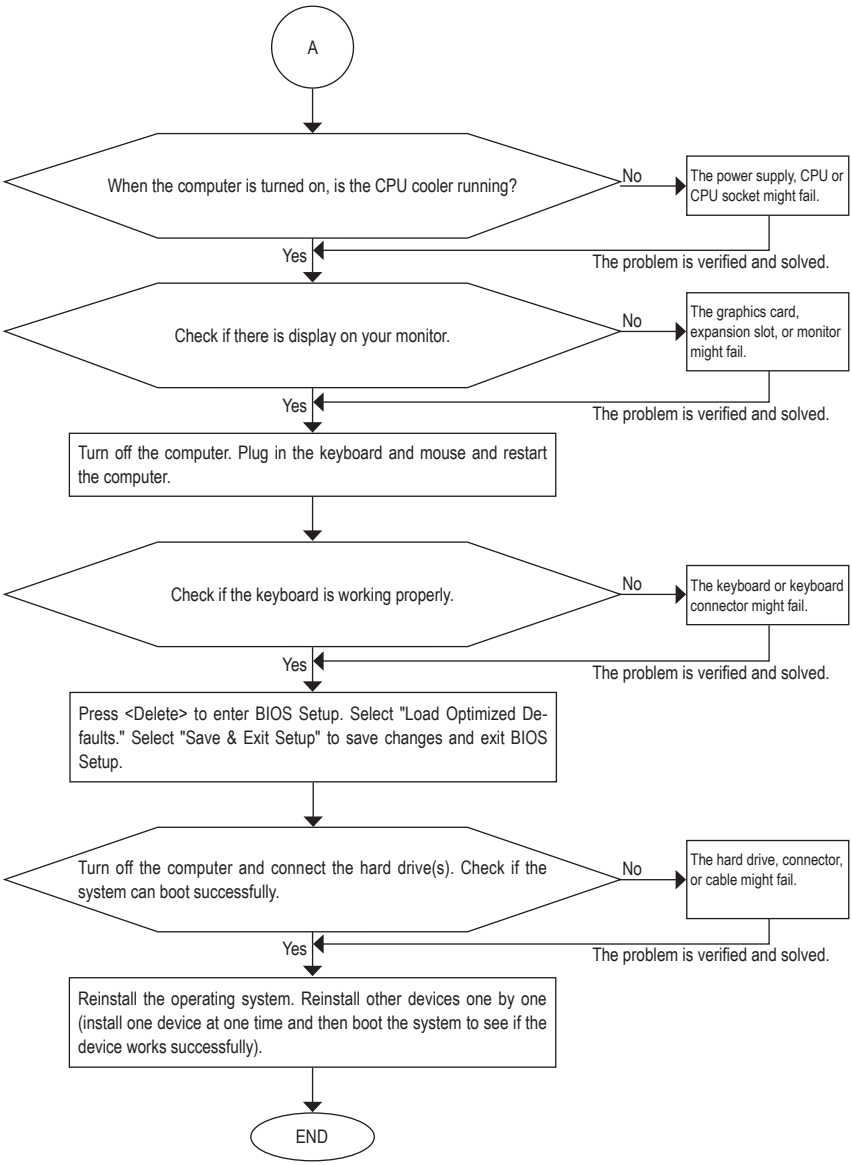
Step 4: In **Device Manager**, right-click on the computer name and select **Scan for hardware changes**. When the **Add New Hardware Wizard** appears, click **Cancel**. Then install the onboard HD audio driver from the motherboard driver disk or download the audio driver from GIGABYTE's website to install.

For more details, go to the **Support & Downloads\FAQ** page on our website and search for "onboard HD audio driver."

5-3-2 Troubleshooting Procedure

If you encounter any troubles during system startup, follow the troubleshooting procedure below to solve the problem.





If the procedure above is unable to solve your problem, contact the place of purchase or local dealer for help. Or go to the **Support & Downloads\Technical Support** page to submit your question. Our customer service staff will reply you as soon as possible.

5-3-3 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 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.



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You may go to the GIGABYTE website, select your language in the language list on the top right corner of the website.

- **GIGABYTE Global Service System**



To submit a technical or non-technical (Sales/Marketing) question, please link to:
http://ggts.gigabyte.com.tw
Then select your language to enter the system.