

GA-Q87M-MK

User's Manual

Rev. 1101

12ME-Q87MMK-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-Q87M-MK

conforms with the essential requirements of the following directives:

☒ 2004/108/EC EMC Directive:

<input checked="" type="checkbox"/> Conduction & Radiated Emissions:	EN 55022:2010
<input checked="" type="checkbox"/> Immunity:	EN 55024:2010
<input checked="" type="checkbox"/> Power-line harmonics:	EN 61000-3-2:2006+A2:2009
<input checked="" type="checkbox"/> Power-line flicker:	EN 61000-3-3:2008

☒ 2006/95/EC LVD Directive

<input checked="" type="checkbox"/> Safety:	EN60950-1:2006+A12:2011
---	-------------------------

☒ 2011/65/EU RoHS Directive

<input checked="" type="checkbox"/> Restriction of use of certain substances in electronic equipment:	This product does not contain any of the restricted substances listed in Annex II, in concentrations and applications banned by the directive.
---	--

☒ CE marking



(EC conformity marking)

Signature: Timmy Huang

(stamp)

Date: Aug. 8, 2013

Name: Timmy Huang

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2.1077(a)



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

Address: 17358 Railroad Street

City of Industry, CA 91748

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

hereby declares that the product

Product Name: Motherboard

Model Number: GA-Q87M-MK

Conforms to the following specifications:

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

Supplementary Information:

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

Representative Person's Name: ERIC LU

Signature: Eric Lu

Date: Aug. 8, 2013

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■ In order to assist in the use of this product, carefully read the User's Manual.

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

Identifying Your Motherboard Revision

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

Example:

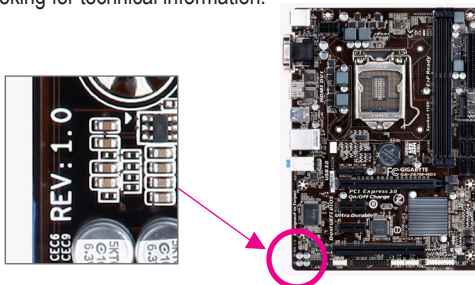
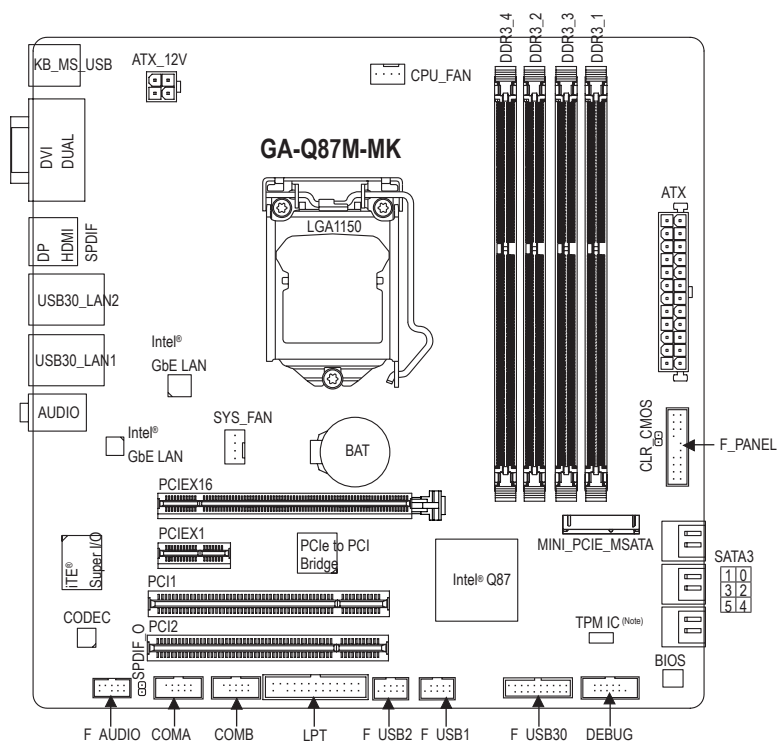


Table of Contents

GA-Q87M-MK Motherboard Layout	4
GA-Q87M-MK Motherboard Block Diagram	5
 Chapter 1 Hardware Installation	 6
1-1 Installation Precautions	6
1-2 Product Specifications	7
1-3 Installing the CPU	9
1-4 Installing the Memory	10
1-5 Installing an Expansion Card	10
1-6 Back Panel Connectors	10
1-7 Internal Connectors	12
 Chapter 2 BIOS Setup	 18
2-1 Startup Screen	18
2-2 M.I.T.	19
2-3 System Information	23
2-4 BIOS Features	24
2-5 Peripherals	27
2-6 Power Management	30
2-7 Save & Exit	31
 Chapter 3 Appendix	 32
3-1 Configuring SATA Hard Drive(s)	32
3-2 Drivers Installation	34
 Regulatory Statements	 35
Contact Us	36

GA-Q87M-MK Motherboard Layout



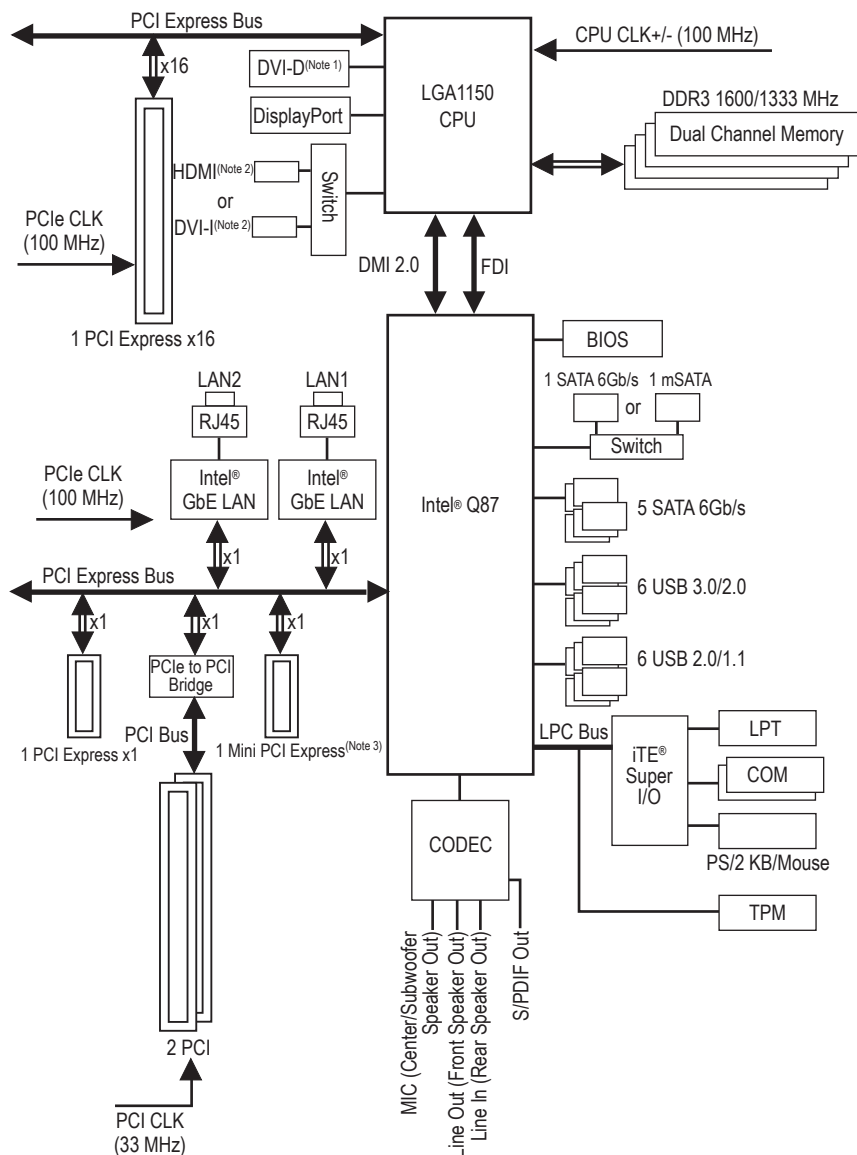
Box Contents

- ☒ GA-Q87M-MK motherboard
- ☒ Motherboard driver disk
- ☒ User's Manual
- ☒ Two SATA cables
- ☒ I/O Shield

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

(Note) Whether this feature is supported depends on the product being received.

GA-Q87M-MK Motherboard Block Diagram



(Note 1) The DVI-D port does not support D-Sub connection by adapter.

(Note 2) Simultaneous output for DVI-I and HDMI is not supported. However, DVI-I can still be converted to D-Sub by adapter if HDMI is connected.

(Note 3) Mini PCIe and mSATA interfaces share the same connector.








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	<ul style="list-style-type: none"> Support for Intel® Core™ i7 processors/Intel® Core™ i5 processors/Intel® Core™ i3 processors/Intel® Pentium® processors/Intel® Celeron® processors in the LGA1150 package (Go to GIGABYTE's website for the latest CPU support list.) L3 cache varies with CPU
 Chipset	<ul style="list-style-type: none"> Intel® Q87 Express Chipset
 Memory	<ul style="list-style-type: none"> 4 x 1.5V DDR3 DIMM sockets supporting up to 32 GB of system memory <ul style="list-style-type: none"> Due to a Windows 32-bit operating system limitation, when more than 4 GB of physical memory is installed, the actual memory size displayed will be less than the size of the physical memory installed. Dual channel memory architecture Support for DDR3 1600/1333 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	<ul style="list-style-type: none"> Integrated Graphics Processor: <ul style="list-style-type: none"> 1 x DVI-I port, supporting a maximum resolution of 1920x1200 <ul style="list-style-type: none"> Simultaneous output for DVI-I and HDMI is not supported. However, DVI-I can still be converted to D-Sub by adapter if HDMI is connected. 1 x DVI-D port, supporting a maximum resolution of 1920x1200 <ul style="list-style-type: none"> The DVI-D port does not support D-Sub connection by adapter. 1 x HDMI port, supporting a maximum resolution of 4096x2160 <ul style="list-style-type: none"> Simultaneous output for DVI-I and HDMI is not supported. However, DVI-I can still be converted to D-Sub by adapter if HDMI is connected. Support for HDMI 1.4a version. 1 x DisplayPort, supporting a maximum resolution of 3840x2160 <ul style="list-style-type: none"> The DisplayPort does not support other types of display connections by adapter. Support for DisplayPort 1.2 version. Maximum shared memory of 1 GB
 Audio	<ul style="list-style-type: none"> Realtek® ALC887 codec High Definition Audio 2/4/5.1/7.1-channel <ul style="list-style-type: none"> To configure 7.1-channel audio, you have to use an HD front panel audio module and enable the multi-channel audio feature through the audio driver. Support for S/PDIF Out
 LAN	<ul style="list-style-type: none"> Two Intel® GbE LAN chips (10/100/1000 Mbit) Support for Teaming Support for Intel® vPro™ (USB30_LAN1) <ul style="list-style-type: none"> The Intel® vPro™ function and Teaming function cannot be used at the same time.
 Expansion Slots	<ul style="list-style-type: none"> 1 x PCI Express x16 slot, running at x16 (The PCI Express x16 slot conforms to PCI Express 3.0 standard.) <ul style="list-style-type: none"> For optimum performance, if only one PCI Express graphics card is to be installed, be sure to install it in the PCIEX16 slot. 1 x PCI Express x1 slot (The PCI Express x1 slot conforms to PCI Express 2.0 standard.) 1 x Mini PCI Express x1 slot <ul style="list-style-type: none"> Mini PCIe and mSATA interfaces share the same connector. 2 x PCI slots

	Storage Interface	<ul style="list-style-type: none"> ♦ Chipset: <ul style="list-style-type: none"> - 6 x SATA 6Gb/s connectors (SATA3 0~SATA3 5) <ul style="list-style-type: none"> * The SATA3 5 connector will become unavailable when the mSATA connector is installed with a solid state drive. - Support for RAID 0, RAID 1, RAID 5, and RAID 10
	USB	<ul style="list-style-type: none"> ♦ Chipset: <ul style="list-style-type: none"> - 6 USB 3.0/2.0 ports (4 ports on the back panel, 2 ports available through the internal USB header) - 6 USB 2.0/1.1 ports (2 ports on the back panel, 4 ports available through the internal USB headers)
	Internal Connectors	<ul style="list-style-type: none"> ♦ 1 x 24-pin ATX main power connector ♦ 1 x 4-pin ATX 12V power connector ♦ 6 x SATA 6Gb/s connectors ♦ 1 x mSATA connector <ul style="list-style-type: none"> * Mini PCIe and mSATA interfaces share the same connector. ♦ 1 x CPU fan header ♦ 1 x system fan header ♦ 1 x front panel header ♦ 1 x front panel audio header ♦ 1 x S/PDIF Out header ♦ 1 x USB 3.0/2.0 header ♦ 2 x USB 2.0/1.1 headers ♦ 2 x serial port headers ♦ 1 x parallel port header ♦ 1 x debug card header ♦ 1 x Clear CMOS jumper
	Back Panel Connectors	<ul style="list-style-type: none"> ♦ 1 x PS/2 keyboard/mouse port ♦ 1 x DVI-I port ♦ 1 x DVI-D port ♦ 1 x optical S/PDIF Out connector ♦ 1 x HDMI port ♦ 1 x DisplayPort ♦ 4 x USB 3.0/2.0 ports ♦ 2 x USB 2.0/1.1 ports ♦ 2 x RJ-45 ports ♦ 3 x audio jacks (Line In, Line Out, Mic In)
	I/O Controller	<ul style="list-style-type: none"> ♦ iTE® I/O Controller Chip
	Hardware Monitor	<ul style="list-style-type: none"> ♦ System voltage detection ♦ CPU/System temperature detection ♦ CPU/System fan speed detection ♦ CPU/System overheating warning ♦ CPU/System fan fail warning ♦ CPU/System fan speed control <ul style="list-style-type: none"> * Whether the fan speed control function is supported will depend on the cooler you install.
	BIOS	<ul style="list-style-type: none"> ♦ 1 x 64 Mbit flash ♦ Use of licensed AMI EFI BIOS ♦ PnP 1.0a, DMI 2.0, SM BIOS 2.6, ACPI 2.0a

 Unique Features	<ul style="list-style-type: none"> Support for Xpress Install Support for APP Center <ul style="list-style-type: none"> * Available applications in APP Center may differ by motherboard model. Supported functions of each application may also differ depending on motherboard specifications. - EZ Setup - USB Blocker Support for ON/OFF Charge
 Bundled Software	<ul style="list-style-type: none"> Norton® Internet Security (OEM version) Intel® Rapid Start Technology Intel® Smart Connect Technology Intel® Small Business Advantage Intel® Smart Response Technology
 Operating System	<ul style="list-style-type: none"> Support for Windows 8.1/8/7 <ul style="list-style-type: none"> * If you plan to install Windows 8.1, please download the latest drivers from GIGABYTE's website.
 Form Factor	<ul style="list-style-type: none"> 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

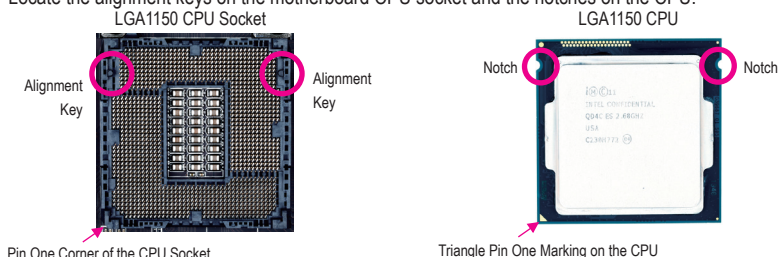


Read the following guidelines before you begin to install the CPU:

- 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.

Installing the CPU

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



Do not remove the CPU socket cover before inserting the CPU. It may pop off from the load plate automatically during the process of re-engaging the lever after you insert the CPU.

1-4 Installing the Memory



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

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

Dual Channel Memory Configuration

This motherboard provides four DDR3 memory sockets and supports Dual Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory. Enabling Dual Channel memory mode will double the original memory bandwidth.

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

▶▶ Channel A: DDR3_2, DDR3_4

▶▶ Channel B: DDR3_1, DDR3_3

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.

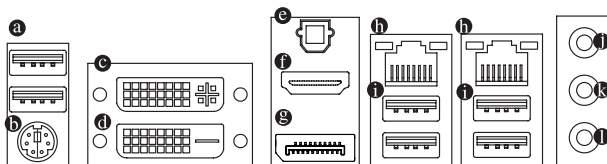
1-5 Installing an Expansion Card



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

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

1-6 Back Panel Connectors



d 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 DVI-I Port (Note)

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

(Note) Simultaneous output for DVI-I and HDMI is not supported. However, DVI-I can still be converted to D-Sub by adapter if HDMI is connected.

❶ DVI-D Port (Note 1)

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.

❷ 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.

❸ HDMI Port (Note 2)



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 4096x2160, but the actual resolutions supported are dependent on the monitor being used.

❹ DisplayPort Port (Note 3)

DisplayPort delivers high quality digital imaging and audio, supporting bi-directional audio transmission. DisplayPort can support both DPCP and HDCP content protection mechanisms. You can use this port to connect your DisplayPort-supported monitor. The DisplayPort Technology can support a maximum resolution of 3840x2160 but the actual resolutions supported depend on the monitor being used.



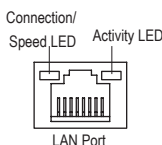
After installing the DisplayPort or HDMI device, make sure to set the default sound playback device to DisplayPort or HDMI.

Triple-Display Configurations for the Onboard Graphics:

Triple-display configurations are supported after you install motherboard drivers in OS. Only dual-display configurations are supported during the BIOS Setup or POST process.

❶ RJ-45 LAN Port

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



Connection/Speed LED:

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

Activity LED:

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

❶ 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.

❶ Line In Jack (Blue)

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

❷ 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.

❸ Mic In Jack (Pink)

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

(Note 1) The DVI-D port does not support D-Sub connection by adapter.

(Note 2) Simultaneous output for DVI-I and HDMI is not supported. However, DVI-I can still be converted to D-Sub by adapter if HDMI is connected.

(Note 3) The DisplayPort does not support other types of display connections by adapter.

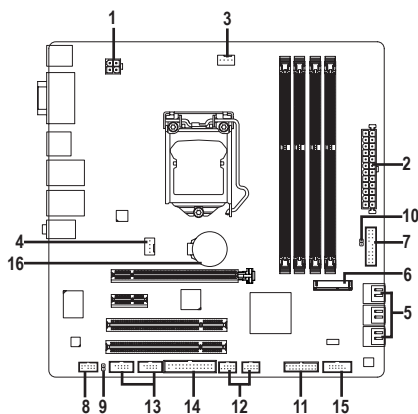


To configure 7.1-channel audio, you have to use an HD front panel audio module and enable the multi-channel audio feature through the audio driver.



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

1-7 Internal Connectors



1)	ATX_12V	9)	SPDIF_O
2)	ATX	10)	CLR_CMOS
3)	CPU_FAN	11)	F_USB30
4)	SYS_FAN	12)	F_USB1/F_USB2
5)	SATA3 0/1/2/3/4/5	13)	COMA/COMB
6)	MINI_PCIE_MSATA	14)	LPT
7)	F_PANEL	15)	DEBUG
8)	F_AUDIO	16)	BAT



Read the following guidelines before connecting external devices:

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

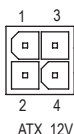
1/2) ATX_12V/ATX (2x2 12V Power Connector and 2x12 Main Power Connector)

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

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

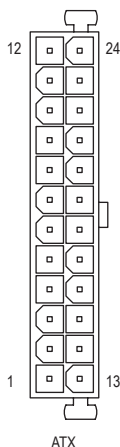


To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system.



ATX_12V:

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

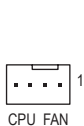


ATX:

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

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



CPU_FAN:

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



SYS_FAN:

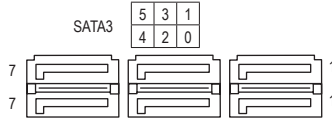
Pin No.	Definition
1	GND
2	+12V/Speed Control
3	Sense
4	VCC



- Be sure to connect fan cables to the fan headers to prevent your CPU and system from overheating. Overheating may result in damage to the CPU or the system may hang.
- These fan headers are not configuration jumper blocks. Do not place a jumper cap on the headers.

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

The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s and SATA 1.5Gb/s standard. Each SATA connector supports a single SATA device. The Intel® Q87 Chipset supports RAID 0, RAID 1, RAID 5, and RAID 10. Refer to Chapter 3, "Configuring SATA Hard Drive(s)," for instructions on configuring a RAID array.



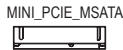
Pin No.	Definition	Pin No.	Definition
1	GND	5	RXN
2	TXP	6	RXP
3	TXN	7	GND
4	GND		



- 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.

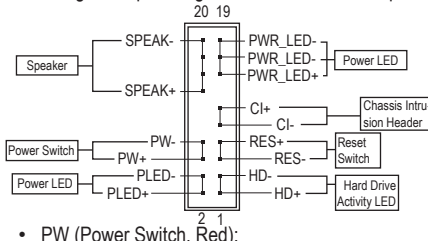
6) MINI_PCIE_MSATA (Mini PCIe and mSATA interfaces share the same connector)

Selects whether to install a mini PCIe card or a solid-state drive. The mSATA connector conforms to SATA 6Gb/s standard and can connect to a single solid-state drive. When the mSATA connector is installed with a solid-state drive, the SATA3 5 connector will become unavailable. There is not such limitation if you select to install a mini PCIe card.



7) F_PANEL (Front Panel Header)

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



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

System Status	LED
S0	On
S3/S4/S5	Off

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

- PW (Power Switch, Red):
Connects to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch (refer to Chapter 2, "BIOS Setup," "Power Management," for more information).
- SPEAK (Speaker, Orange):
Connects to the speaker on the chassis front panel. The system reports system startup status by issuing a beep code. One single short beep will be heard if no problem is detected at system startup.
- HD (Hard Drive Activity LED, Blue):
Connects to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.
- RES (Reset Switch, Green):
Connects to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.
- CI (Chassis Intrusion Header, Gray):
Connects to the chassis intrusion switch/sensor on the chassis that can detect if the chassis cover has been removed. This function requires a chassis with a chassis intrusion switch/sensor.



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.

8) 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.
- Audio signals will be present on both of the front and back panel audio connections simultaneously.
- Some chassis provide a front panel audio module that has separated connectors on each wire instead of a single plug. For information about connecting the front panel audio module that has different wire assignments, please contact the chassis manufacturer.

9) 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

10) CLR_CMOS (Clear CMOS Jumper)

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



Open: Normal



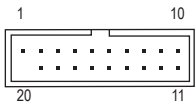
Short: Clear CMOS Values



- Always turn off your computer and unplug the power cord from the power outlet before clearing the CMOS values.
- After system restart, go to BIOS Setup to load factory defaults (select Load Optimized Defaults) or manually configure the BIOS settings (refer to Chapter 2, "BIOS Setup," for BIOS configurations).

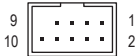
11) F_USB30 (USB 3.0/2.0 Header)

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

12) F_USB1/F_USB2 (USB 2.0/1.1 Headers)

The headers conform to USB 2.0/1.1 specification. Each USB header can provide two USB ports via an optional USB bracket. For purchasing the optional USB bracket, please contact the local dealer.

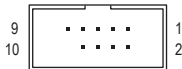
	Pin No.	Definition	Pin No.	Definition
	1	Power (5V)	6	USB DY+
	2	Power (5V)	7	GND
	3	USB DX-	8	GND
	4	USB DY-	9	No Pin
	5	USB DX+	10	NC



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

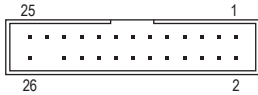
13) COMA/COMB (Serial Port Headers)

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

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

14) LPT (Parallel Port Header)

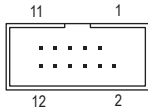
The LPT header can provide one parallel port via an optional LPT port cable. For purchasing the optional LPT port cable, please contact the local dealer.



Pin No.	Definition	Pin No.	Definition	Pin No.	Definition
1	STB-	10	GND	19	ACK-
2	AFD-	11	PD4	20	GND
3	PD0	12	GND	21	BUSY
4	ERR-	13	PD5	22	GND
5	PD1	14	GND	23	PE
6	INIT-	15	PD6	24	No Pin
7	PD2	16	GND	25	SLCT
8	SLIN-	17	PD7	26	GND
9	PD3	18	GND		

15) DEBUG (Debug Card Header) (Note)

This header can connect a debug card.

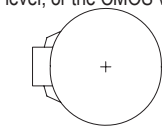


Pin No.	Definition	Pin No.	Definition
1	No Pin	7	LAD3
2	GND	8	-LFRAME
3	VCC3	9	-PFMRST
4	LAD0	10	DB CLK
5	LAD1	11	DB_P_SENSOR
6	LAD2	12	NC

16) 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.

(Note) Whether this feature is supported depends on the product being received.

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.



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

2-1 Startup Screen

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

(Sample BIOS Version: D16a)



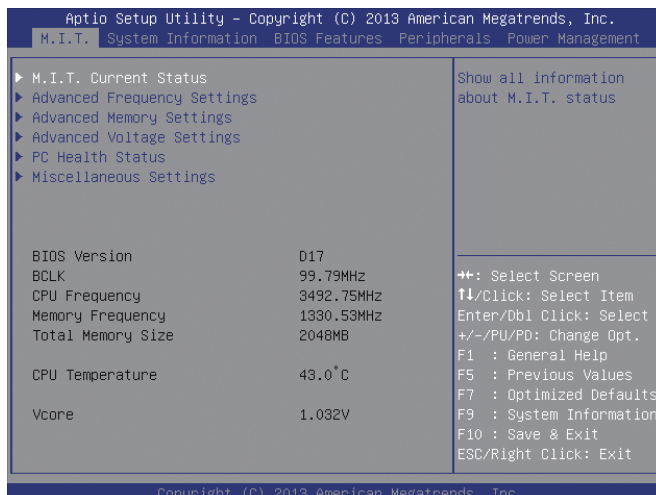
Function Keys

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



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

2-2 M.I.T.



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



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

▶ M.I.T. Current Status

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

▶ Advanced Frequency Settings

☞ Performance Upgrade (Note)

Provides you with five different overclocking configurations. Options are: 20% Upgrade, 40% Upgrade, 60% Upgrade, 80% Upgrade, 100% Upgrade. (Default: Auto)

☞ Processor Graphics Clock

Allows you to set the onboard graphics clock. The adjustable range is from 400 MHz to 4000 MHz. (Default: Auto)

☞ CPU Upgrade (Note)

Allows you to set the CPU frequency. Options may vary depending on the CPU being used. (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 Settings

☞ CPU Clock Ratio, CPU Frequency

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

(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.

- ☞ **K OC** ^(Note)
Allows for increased performance by using certain CPUs. (Default: Auto)
- ☞ **CPU PLL Selection**
Allows you to set the CPU PLL. Auto lets the BIOS automatically configure this setting. (Default: Auto)
- ☞ **Filter PLL Level**
Allows you to set the Filter PLL. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)
- ☞ **Uncore Ratio**
Allows you to set the CPU Uncore ratio. The adjustable range is dependent on the CPU being used.
- ☞ **Uncore Frequency**
Displays the current CPU Uncore frequency.
- ☞ **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)
- ☞ **No. of CPU Cores Enabled** ^(Note)
Allows you to select the number of CPU cores to enable in an Intel® multi-core CPU (the number of CPU cores may vary by CPU). Auto lets the BIOS automatically configure this setting. (Default: Auto)
- ☞ **Hyper-Threading Technology** ^(Note)
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)
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 State Support** ^(Note)
Allows you to determine whether to let the CPU enter C3 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 state is a more enhanced power-saving state than C1. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)
- ☞ **C6/C7 State Support** ^(Note)
Allows you to determine whether to let the CPU enter C6/C7 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 C6/C7 state is a more enhanced power-saving state than C3. **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.

☞ **CPU Thermal Monitor** ^(Note1)

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

☞ **CPU EIST Function** ^(Note1)

Enables or disables Enhanced Intel® Speed Step 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.)** ^(Note2)

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 ^(Note2) 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.

▶ **Advanced Memory Settings**

☞ **Extreme Memory Profile (X.M.P.)** ^(Note2), **System Memory Multiplier**, **Memory Frequency(MHz)**

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

☞ **Memory Enhancement Settings**

Provides three different memory performance enhancement settings: Normal (basic performance), Enhanced Stability, and Enhanced Performance. (Default: Normal)

☞ **Memory Timing Mode**

Manual and **Advanced Manual** allows the **Channel Interleaving**, **Rank Interleaving**, and memory timing settings below to be configurable. Options are: Auto (default), Manual, Advanced Manual.

☞ **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.

☞ **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)

(Note1) 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.

(Note2) 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. This sub-menu provides memory timing settings for each channel of memory. The respective timing setting screens are configurable only when **Memory Timing Mode** is set to **Manual** or **Advanced Manual**. Note: Your system may become unstable or fail to boot after you make changes on the memory timings. If this occurs, please reset the board to default values by loading optimized defaults or clearing the CMOS values.

► Advanced Voltage Settings

This section provides CPU 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/CPU VRIN/DRAM Voltage/+3.3V/+5V/+12V/CPU VAXG

Displays the current system voltages.

CPU/System Temperature

Displays current CPU/system temperature.

CPU/System Fan Speed

Displays current CPU/system fan speeds.

CPU/System Temperature Warning

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

CPU/System Fan Fail Warning

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

CPU Fan Speed Control

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

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

Fan Speed Percentage

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.

System Fan Speed Control

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

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

☞ **Fan Speed Percentage**

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

▶ **Miscellaneous Settings**

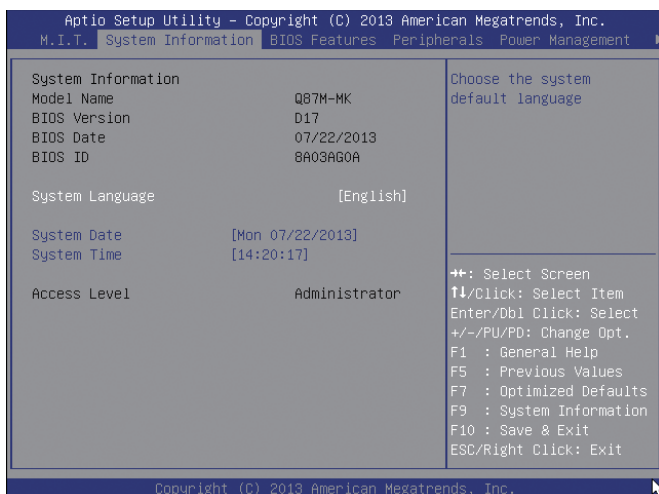
☞ **PCIe Slot Configuration**

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)

☞ **3DMark01 Boost**

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

2-3 System Information



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

☞ **System Language**

Selects the default language used by the BIOS.

☞ **System Date**

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

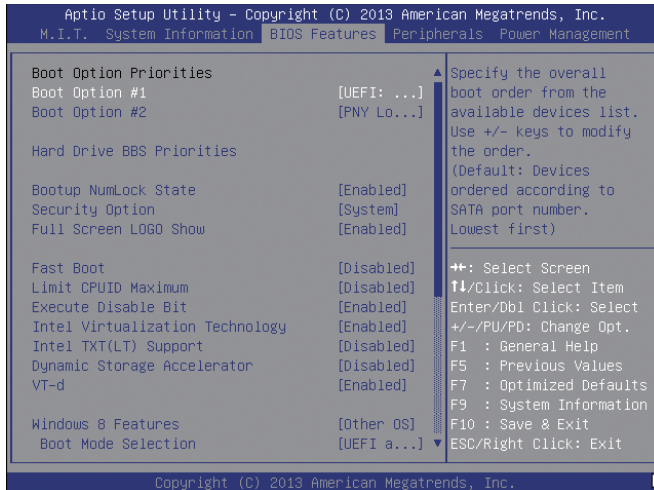
☞ **System Time**

Sets the system time. The time format is hour, minute, and second. For example, 1 p.m. is 13:0:0. 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.

2-4 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 **Administrator Password/User Password** item.

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

➤ Full Screen LOGO Show

Allows you to determine whether to display the GIGABYTE Logo at system startup. **Disabled** skips the GIGABYTE Logo when the system starts up. (Default: Enabled)

☞ **Fast Boot**

Enables or disables Fast Boot to shorten the OS boot process. **Ultra Fast** provides the fastest bootup speed. (Default: Disabled)

☞ **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: Enabled)

☞ **Intel TXT(LT) Support** ^(Note)

Enables or disables Intel® **Trusted Execution Technology** (Intel® TXT). Intel® Trusted Execution Technology provides a hardware-based security foundation. (Default: Disabled)

☞ **Dynamic Storage Accelerator**

Enables or disables Intel® Dynamic Storage Accelerator. When enabled, the hard drive I/O performance will be adjusted according to hard drive load. (Default: Disabled)

☞ **VT-d** ^(Note)

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

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)

☞ **Windows 8 Features**

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

☞ **CSM Support**

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

‣ Always Enables UEFI CSM. (Default)

‣ Never Disables UEFI CSM and supports UEFI BIOS boot process only.

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

☞ **Boot Mode Selection**

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

‣ UEFI and Legacy Allows booting from operating systems that support legacy option ROM or UEFI option ROM. (Default)

‣ Legacy only Allows booting from operating systems that only support legacy option ROM.

‣ UEFI only Allows booting from operating systems that only support UEFI option ROM.

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

☞ **LAN PXE Boot Option ROM**

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

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

(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.

☞ **Storage Boot Option Control**

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

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

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

☞ **Other PCI Device ROM Priority**

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

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

☞ **Network stack**

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

☞ **IPv4 PXE Support**

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

☞ **IPv6 PXE Support**

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

☞ **Administrator Password**

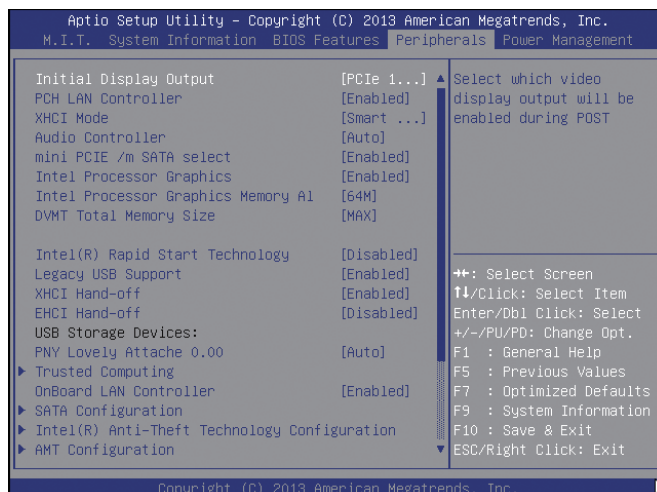
Allows you to configure an administrator password. Press <Enter> on this item, type the password, and then press <Enter>. You will be requested to confirm the password. Type the password again and press <Enter>. You must enter the administrator password (or user password) at system startup and when entering 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.

2-5 Peripherals



Initial Display First

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

- » IGFX Sets the onboard graphics as the first display.
- » PCIe 1 Slot Sets the graphics card on the PCIEX16 slot as the first display. (Default)
- » PCI Sets the graphics card on the PCI slot as the first display.

PCH LAN Controller

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

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

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 routes ports to EHCI. Note: This is the recommended mode when BIOS has xHCI pre-boot support. (Default)
- » 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.
- » 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.
- » Manual Allows you to determine whether to rout the USB 3.0 ports to the xHCI or EHCI controller before booting to OS, and also provides you with options to manually rout each USB 3.0/2.0 port to xHCI or EHCI.

🔊 **Audio Controller**

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

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

🔌 **mini PCIE/mSATA Select**

Selects whether to let the system enable mSATA or mini PCIe depending on the device connected or force mSATA to always enabled. (Default: Auto)

🖥️ **Intel Processor Graphics**

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

🖥️ **Intel Processor Graphics Memory Allocation**

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. (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)

🖥️ **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**

🔊 **Security Device Support**

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

🔊 **OnBoard LAN Controller**

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

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

▶ **SATA Configuration**

🔊 **Integrated SATA Controller.**

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

☞ **SATA Mode Selection**

Enables or disables RAID for the SATA controllers integrated in the 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)

▶ **Serial ATA Port 0/1/2/3/4/5**

☞ **Port 0/1/2/3/4/5**

Enables or disables each SATA port. (Default: Enabled)

☞ **Hot plug**

Enables or disable the hot plug capability for each SATA port. (Default: Disabled)

☞ **External SATA**

Enables or disables support for external SATA devices. (Default: Disabled)

▶ **Intel(R) Anti-Theft Technology Configuration**

This section allows you to enable/disable **Intel® Anti-Theft Technology** (Intel® AT), a hardware-based anti-theft protection solution, and provides you with related configuration options.

▶ **AMT Configuration**

This section allows you to enable/disable **Intel® Active Management Technology** (Intel® AMT) for remote computer management on hardware level and provides you with further configuration options.

▶ **Super IO Configuration**

This section provides information on the super I/O chip and allows you to configure the serial port and parallel port.

☞ **Serial Port A/B**

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

☞ **Parallel Port**

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

☞ **Device Mode**

This item is configurable only when **Parallel Port** is set to **Enabled**. It allows you to select an operating mode for the onboard parallel (LPT) port. Options are: Standard Parallel Port Mode (Default), EPP Mode (Enhanced Parallel Port), ECP Mode (Extended Capabilities Port), EPP Mode & ECP Mode.

▶ **Intel(R) Smart Connect Technology**

☞ **ISCT Support**

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

▶ **Serial Port Console Redirection**

This section allows you to enable/disable serial port console redirection for remote server management through a serial port.

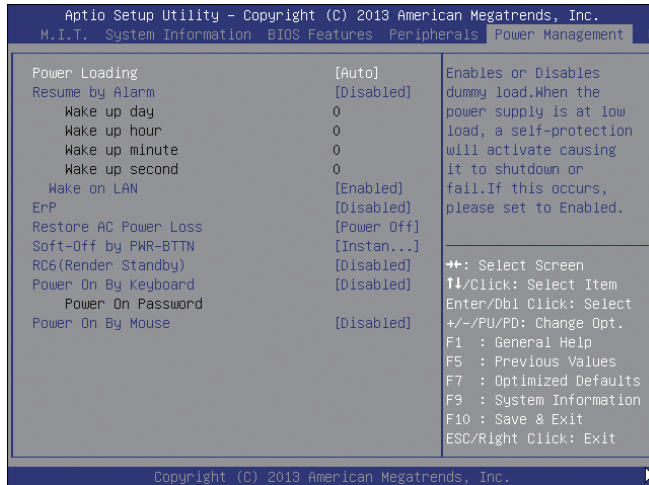
▶ **Intel(R) Ethernet Network Connection**

This sub-menu provides information on LAN configuration and related configuration options.

▶ **Intel(R) Ethernet Network Connection**

This sub-menu provides information on LAN configuration and related configuration options.

2-6 Power Management



Power Loading

Enables or disables dummy load. When the power supply is at low load, a self-protection will activate causing it to shutdown or fail. If this occurs, please set to **Enabled**. **Auto** lets the BIOS automatically configure this setting. (Default: Auto)

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.

Wake on LAN

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

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.

Restore AC Power Loss

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

» Last State The system returns to its last known awake state upon the return of the AC power.

» Power On The system is turned on upon the return of the AC power.

» Power Off The system stays off upon the return of the AC power. (Default)

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.

☞ RC6(Render Standby)

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

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

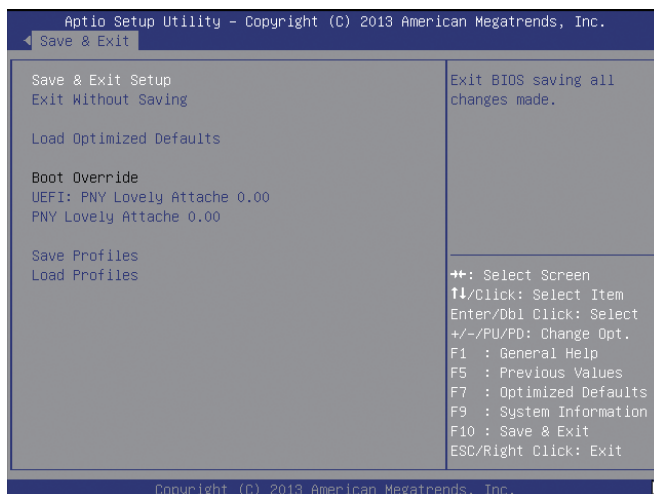
☞ Power On By Mouse

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.

2-7 Save & Exit



☞ Save & Exit Setup

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

✎ **Exit Without Saving**

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

✎ **Load Optimized Defaults**

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

✎ **Boot Override**

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

✎ **Save Profiles**

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

3-1 Configuring SATA Hard Drive(s)

Before you begin

- 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 8/7 setup disk.
- Motherboard driver disk.
- A USB thumb drive

Configuring the Onboard SATA Controller

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 on the motherboard. Then connect the power connector from your power supply to the hard drive.

B. Configuring SATA controller mode in BIOS Setup

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

Steps:

1. Turn on your computer and press <Delete> to enter BIOS Setup during the POST (Power-On Self-Test). Go to **Peripherals\SATA Configuration**, make sure **SATA Controllers** is enabled. To create RAID, set **SATA Mode Selection** to **RAID**. If you do not want to create RAID, set this item to **IDE** or **AHCI**. Turn on your computer and press <Delete> to enter BIOS Setup during the POST (Power-On Self-Test). Ensure **OnChip SATA Channel** is enabled under **Peripherals**. Set **OnChip SATA Type** to **RAID**.
2. If you want to configure UEFI RAID, follow the steps in "C-1." To enter the legacy RAID ROM, save the settings and exit BIOS Setup. Refer to "C-2" for more information.



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

C-1. UEFI RAID Configuration

This mode supports Windows 8 64-bit installation only.

Step:

1. In BIOS Setup, go to **BIOS Features** and set **OS Type** to **Windows 8** and **CSM Support** to **Never**. Save the changes and exit BIOS Setup.
2. After the system reboot, enter BIOS Setup again. Then enter the **Peripherals\Intel(R) Rapid Storage Technology** sub-menu.
3. On the **Intel(R) Rapid Storage Technology** menu, press <Enter> on **Create RAID Volume** to enter the **Create RAID Volume** 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. 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). Next, use the down arrow key to move to **Select Disks**.
4. Under **Select Disks** item, select the hard drives to be included in the RAID array. Press the <Space> key on the hard drives to be selected (selected hard drives are marked with "X"). Then set the stripe block size. The stripe block size can be set from 4 KB to 128 KB. Once you have selected the stripe block size, set the volume capacity.
5. After setting the capacity, move to **Create Volume** and press <Enter> to begin.
6. After completing, you'll be brought back to the **Intel(R) Rapid Storage Technology** screen. Under **RAID Volumes** you can see the new RAID volume. To see more detailed information, press <Enter> on the volume to check for information on RAID level, stripe block size, array name, and array capacity, etc.

C-2. Configuring Legacy RAID ROM

Enter the Intel® legacy 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". Press <Ctrl> + <I> to enter the RAID Configuration Utility.
2. After you press <Ctrl> + <I>, the **MAIN MENU** screen will appear. If you want to create a RAID array, select **Create RAID Volume** in **MAIN MENU** and press <Enter>.
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. 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.
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 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>.
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.
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. To exit the RAID BIOS utility, press <Esc> or select **6. Exit** in **MAIN MENU**.

Making a SATA RAID/AHCI Driver Diskette

With the correct BIOS settings, you are ready to install Windows 8/7.

Installing Windows 8/7

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. To install Windows 8, refer to the steps below:


Step:

1. Copy the **IRST** folder under **BootDrv** in the driver disk to your USB thumb drive.
2. Boot from the Windows 8 setup disk and perform standard OS installation steps. When the screen requesting you to load the driver appears, select **Browse**.
3. Insert the USB thumb drive and then browse to the location of the driver. The locations of the drivers are as follows:
Windows 32-bit: \IRST\32Bit
Windows 64-bit: \IRST\64Bit
4. When a screen as shown, select **Intel(R) Desktop/Workstation/Server Express Chipset SATA RAID Controller** and click **Next** to load the driver and continue the OS installation

3-2 Drivers Installation



- Before installing the drivers, first install the operating system. (The following instructions use Windows 8 as the example operating system.)
- After installing the operating system, insert the motherboard driver disk into your optical drive. Click on the message "Tap to choose what happens with this disc" on the top-right corner of the screen and select "Run **Run.exe**." (Or go to My Computer, double-click the optical drive and execute the **Run.exe** program.)

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

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- ◆ 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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