

ZOTAC[®]

INTEL[®] SERIES MOTHERBOARD



Designed for 4th Generation
Intel[®] Core[™] Processors

H87

H87-MATX SERIES MOTHERBOARD

USER'S MANUAL



Electronic Emission Notices

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with instructions contained in this manual, may cause harmful interference to radio and television communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- REORIENT OR RELOCATE THE RECEIVING ANTENNA
- INCREASE THE SEPARATION BETWEEN THE EQUIPMENT AND THE RECEIVER
- CONNECT THE EQUIPMENT INTO AN OUTLET ON A CIRCUIT DIFFERENT FROM THAT OF THE RECEIVER
- CONSULT THE DEALER OR AN EXPERIENCED AUDIO/TELEVISION TECHNICIAN

NOTE:

Connecting this device to peripheral devices that do not comply with Class B requirements, or using an unshielded peripheral data cable, could also result in harmful interference to radio or television reception.

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.

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Trademarks

All brand names, logos and registered trademarks mentioned are property of their respective owners.

CAUTION:

Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.

Table of Contents

Motherboard Specifications	4
Motherboard Layout	6
Hardware Installation	8
Safety Instructions	8
Preparing the Motherboard	9
Installing the CPU	9
Installing the CPU Fan	10
Installing Memory Modules	10
Installing the Motherboard	11
Installing the I/O Shield	11
Securing the Motherboard into the Chassis	11
Connecting Cables and Setting Switches	12
24-pin ATX Power Connector-PW1	13
4-pin ATX_12V power connector-PW2	13
COM Header-CN3 (Optional)	14
Front panel header-FP1	14
USB Headers-FP_U1/2/FP_USB3_1	15
Front Panel Audio Header-FP_S1	15
Serial-ATA (SATA) Connectors (SATA1~6)	16
Speaker Header-SPK1	16
Fan Connectors	16
Expansion Slots	17
Jumper Settings	18
Configuring the BIOS	19
Enter BIOS Setup	19
Main Menu	19
X-Setting Menu	20
Advanced Menu	21
Storage Configuration	21
CPU Configuration	22
USB Configuration	22
Display Configuration	23
PC Health Menu	23
CPU/SYS FAN Control Mode	23
PowerManage Menu	24
Boot Menu	25
Boot Configuration	25
Exit Menu	27
Save Changes and Exit	27

Discard Changes and Exit	27
Save Changes and Reset	27
Discard Changes and Reset	27
Save Changes	28
Discard Changes	28
Restore Defaults	28
Save as User Defaults	28
Restore User Defaults	28
Launch EFI Shell from filesystem device	28
Flash Update Procedure	28
Installing Drivers and Software	29
Drivers Installation	29
Realtek HD Audio Driver Setup	35
Getting Started	35
Digital Output	35
Speakers	37
Microphone	38
Line In	39
Device Advanced Settings	40
Connector Settings	40
Information	41
SATA RAID User Manual	42
Setting up the BIOS	42
Entering the RAID BIOS utility	43
Creating a RAID set	43
Deleting a RAID set	44
Intel Rapid Storage Technology	45
Introduction	45
Setting Intel Rapid Storage	45

Motherboard Specifications

☐ Chipset

- ❖ Intel H87 Chipset
- ❖ Intel Smart Response technology ready

☐ Size

- ❖ Micro ATX form factor of 7.04 X 9.6 inch

☐ Microprocessor support

- ❖ 4th Generation Intel Core processor ready (max TDP: 95W)
- ❖ LGA1150 socket

☐ Operating systems

- ❖ Windows 7 & Windows 8
- ❖ 32-bit and 64-bit support

☐ System Memory

- ❖ Dual Channel DDR3-1066/1333/1600 MHz
- ❖ Maximum memory size 16 GB

☐ USB 2.0 ports

- ❖ Six USB 2.0 ports (two ports on the back panel, four via pin headers)

☐ USB 3.0 ports

- ❖ Six USB 3.0 ports (four on the back panel, two via pin header)
- ❖ Fully backward compatible with USB 2.0 and 1.1 specifications

☐ Onboard Serial ATA ports

- ❖ Independent DMA operation on six ports
- ❖ Six SATA 6.0 Gb/s ports

☐ Onboard LAN

- ❖ Support Full Duplex flow control (IEEE802.3x)
- ❖ 10/100/1000 BASE-T IEEE 802.3 compliant
- ❖ Wake On LAN (WOL) power management support

☐ Audio

- ❖ 8 channel High Definition Audio (including one optical S/PDIF output port)
- ❖ Up to 192kHz sample rate
- ❖ One S/PDIF-out header onboard

❑ Onboard Graphics Features

- ❖ Intel HD Graphics ready
- ❖ One HDMI port, one DVI-I port and one Display port output support
- ❖ Support resolution up to 4K (4096x2304 @ 24Hz for HDMI and 3840x2160 @ 60Hz for Display port)

❑ PCI Express Interface

- ❖ PCI Express 3.0
- ❖ Wake up function capable
- ❖ Clock spread spectrum capability

❑ Expansion slots

- ❖ One PCI Express x16 slot
- ❖ Two PCI slots
- ❖ One PCI Express x1 slot

Motherboard Layout

Figure 1 shows the motherboard and Figure 2 shows the back panel connectors.

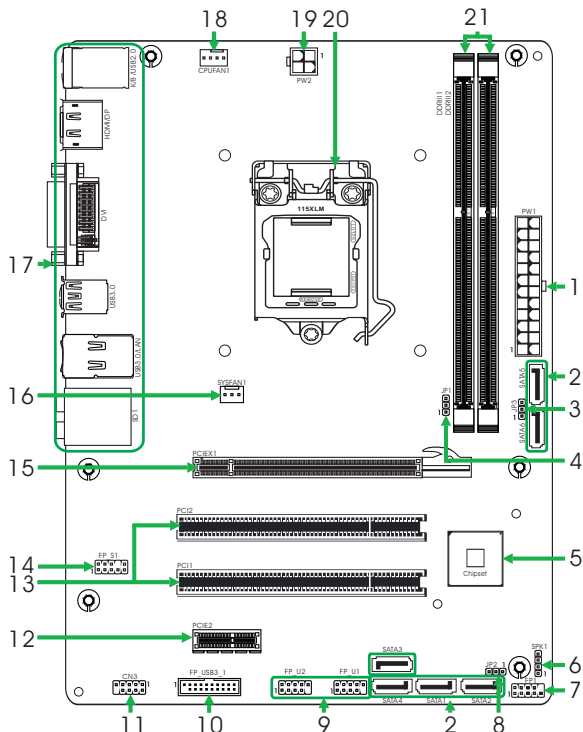
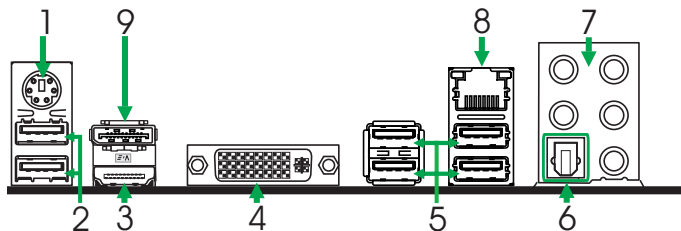


Figure 1

Figure 1. Board Layout

- | | |
|---|---------------------------------------|
| 1. 24-pin ATX Power Connector-PW1 | 12. PCI Express x1 Slot-PCIE2 |
| 2. Serial-ATA (SATA) Connectors (SATA1~6) | 13. PCI Slots-PCI1/2 |
| 3. ME Update Jumper-JP3 | 14. Front Panel Audio Header-FP_S1 |
| 4. Clear CMOS Jumper-JP1 | 15. PCI Express x16 Slot-PCIE1 |
| 5. Chipset | 16. SYS Fan Connector-SYSFAN1 |
| 6. Speaker Header-SPK1 | 17. Backpanel Connectors |
| 7. Front Panel Header-FP1 | 18. CPU Fan Connector-CPUFAN1 |
| 8. Clear RTC Jumper-JP2 | 19. 4-pin ATX_12V power connector-PW2 |
| 9. USB 2.0 Headers (FP_U1~FP_U2) | 20. CPU Socket |
| 10. USB 3.0 Header-FP_USB3_1 | 21. DDRIII DIMM Sockets-DDRIII1~2 |
| 11. COM Header-CN4 (Optional) | |

Figure 2. Backpanel connectors

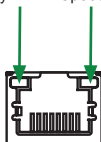


1. PS2 Keyboard/Mouse Port
2. USB 2.0 Ports
3. HDMI Port
4. DVI-I Port
5. USB 3.0 Ports
6. Optical SPDIF Output

7. Port	2-Channel	4-Channel	6-Channel	8-Channel
Blue	Line-In	Line-In	Line-In	Side Speaker Out
Green	Line-Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Black	—	—	Center/Subwoofer	Center/Subwoofer
Orange	—	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out

8. LAN port LED indicators

Activity LED Speed LED



Activity LED

Status	Description
Off	No link
Orange	Linked
Blinking	Data activity

Speed LED

Status	Description
Off	Speed: 10 Mbps
Green	Speed: 100 Mbps
Orange	Speed: 1000 Mbps

9. DisplayPort

Hardware Installation

This section will guide you through the installation of the motherboard. The topics covered in this section are:

- ☐ Preparing the motherboard
 - ❖ Installing the CPU
 - ❖ Installing the CPU fan
 - ❖ Installing Memory DIMMs
- ☐ Installing the motherboard
- ☐ Connecting cables and setting switches

Safety Instructions

To reduce the risk of fire, electric shock, and injury, always follow basic safety precautions.

Remember to remove power from your computer by disconnecting the AC main source before removing or installing any equipment from/to the computer chassis.

Preparing the Motherboard

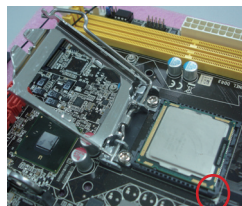
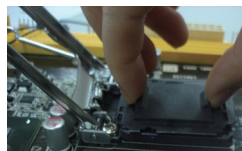
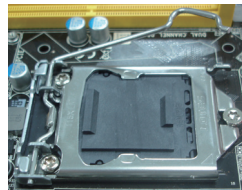
The motherboard shipped in the box does not contain a CPU or memory. You need to purchase them to complete this installation.

Installing the CPU

Be very careful when handling the CPU. Make sure not to bend or break any pins on the back. Hold the processor only by the edges and do not touch the bottom of the processor.

The following illustration shows CPU installation components

1. Unhook the socket lever by pushing down and away from the socket.
2. Lift the socket lever and the load plate to fully open position.
3. Use your thumb and forefinger to lift the cap up vertically.
 - Be careful not to touch the socket contacts.
4. Hold the processor with your thumb and forefinger. Insert the processor into the socket vertically.
 - Align the CPU pin 1 mark with the pin 1 corner of the CPU socket.
5. Make sure the CPU is fully seated, and then replace the load plate.
 - Be sure that the front end of the load plate is under the shoulder screw.
6. Secure the load lever to its locked location.

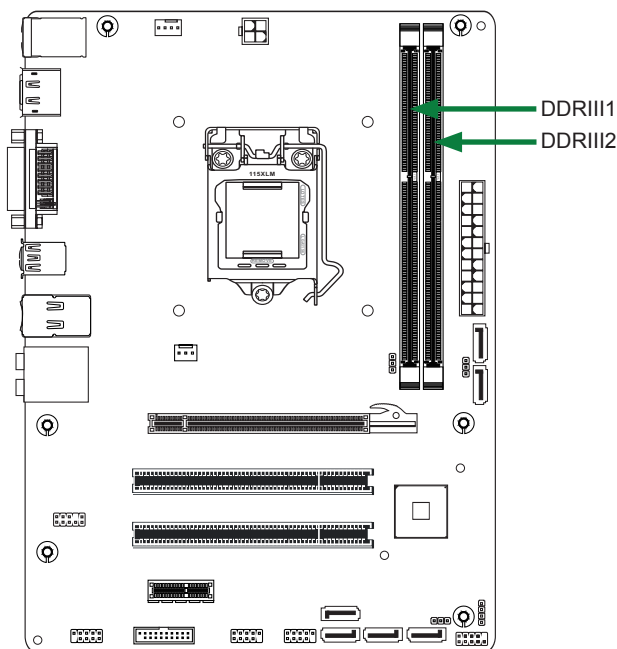


Installing the CPU Fan

There are many different fan types that can be used with this motherboard. Follow the instruction that came with your fan assembly. Make sure that the fan orientation is correct for your chassis type and fan assembly.

Installing Memory Modules

Your new motherboard has two 1.5V 240-pin slots for DDR3 memory. These slots support 1 GB/2 GB/4 GB/8 GB DDR3 devices. There must be at least one memory bank populated to ensure normal operation. Refer to the following recommendations to install memory modules.



Note that a memory module has a notch so it can only fit in one direction. Refer to the following procedure to install memory modules into the slots on the motherboard.

1. Unlock a DIMM slot by pressing the module clips outward.
2. Align the memory module to the DIMM slot, and insert the module vertically into the DIMM slot. The plastic clips at both sides of the DIMM slot automatically lock the DIMM into the connector.

Installing the Motherboard

The sequence of installing the motherboard into the chassis depends on the chassis you are using and if you are replacing an existing motherboard or working with an empty chassis. Determine if it would be easier to make all the connections prior to this step or to secure the motherboard and then make all the connections. It is normally easier to secure the motherboard first.

Use the following procedure to install the I/O shield and secure the motherboard into the chassis.

Note: Be sure that the CPU fan assembly has enough clearance for the chassis covers to lock into place and for the expansion cards. Also make sure the CPU Fan assembly is aligned with the vents on the covers.

Installing the I/O Shield

The motherboard kit comes with an I/O shield that is used to block radio frequency transmissions, protects internal components from dust and foreign objects, and promotes correct airflow within the chassis.

Before installing the motherboard, install the I/O shield from the inside of the chassis. Press the I/O shield into place and make sure it fits securely. If the I/O shield does not fit into the chassis, you will need to obtain the proper size from the chassis supplier.

Securing the Motherboard into the Chassis

Most computer chassis have a base with mounting studs or spacers to allow the motherboard to be secured to the chassis and help to prevent short circuits. If there are studs that do not align with a mounting hole on the motherboard, it is recommended that you remove that stud to prevent the possibility of a short circuit. In most cases, it is recommended to secure the motherboard with spacers.

1. Carefully place the motherboard onto the studs/spacers located inside the chassis.
2. Align the mounting holes with the studs/spacers.
3. Align the connectors to the I/O shield.
4. Ensure that the fan assembly is aligned with the chassis vents according to the fan assembly instruction.
5. Secure the motherboard with screws.

Connecting Cables and Setting Switches

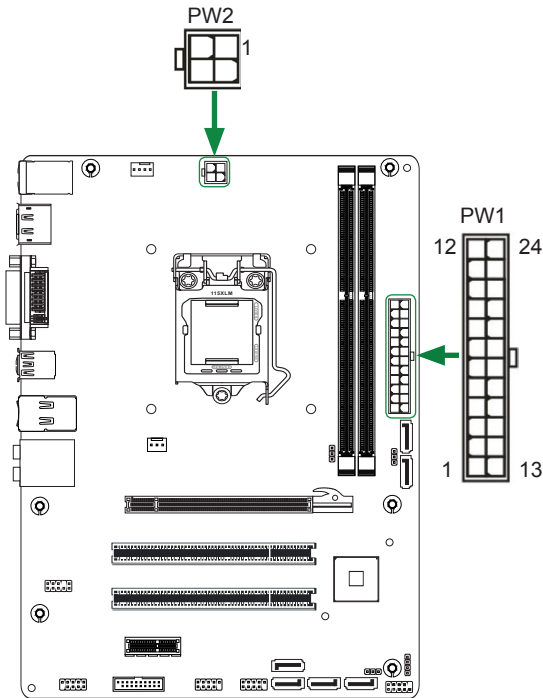
This section takes you through all the connectors and switch settings necessary on the motherboard. This will include:

- ☐ Power Connectors
 - ❖ 24-pin ATX Power Connector-PW1
 - ❖ 4-pin ATX_12V Power Connector-PW2
- ☐ Internal Headers/Connectors
 - ❖ COM Header-CN3 (Optional)
 - ❖ Front Panel Header-FP1
 - ❖ USB Headers (FP_U1/2/FP_USB3-1)
 - ❖ Front Panel Audio Header-FP_S1
 - ❖ Speaker Header-SPK1
- ☐ Serial-ATA (SATA) Connectors (SATA1~6)
- ☐ Fan Connectors
- ☐ Expansion Slots
- ☐ Jumper Settings

See Figure 1 to locate the connectors and jumpers referenced in the following procedure.

24-pin ATX Power Connector-PW1

PW1 is the main power supply connector. Make sure that the power supply cable and pins are properly aligned with the connector on the motherboard. Firmly plug the power supply cable into the connector and make sure it is secure.



PW1-Pin Definition

Pin	Signal	Pin	Signal
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWROK	20	-5V
9	+5V AUX	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

4-pin ATX 12V power connector-PW2

PW2, the 4-pin ATX 12V power connector, is used to provide power to the CPU. Align the pins to the connector and press firmly until seated.

PW2-Pin Definition

Pin	Signal
1	GND
2	GND
3	+12V
4	+12V

COM Header-CN3 (Optional)

CN3 - Pin Definition

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	Key

Front Panel Header-FP1

The front panel header on this motherboard is one connector used to connect the following four cables :

FP1-Pin Definition

Pin	Signal	Pin	Signal
1	HDD_LED+	2	PW_LED+
3	HDD_LED-	4	PW_LED-
5	GND	6	PWR_SW
7	RESET	8	GND
9	NC	10	KEY

☐ **PWRLED**

Attach the front panel power LED cable to these two pins of the connector. The Power LED indicates the system's status.

☐ **PWR SW**

Attach the power button cable from the case to these two pins. Pressing the power button on the front panel turns the system on and off rather than using the power supply button.

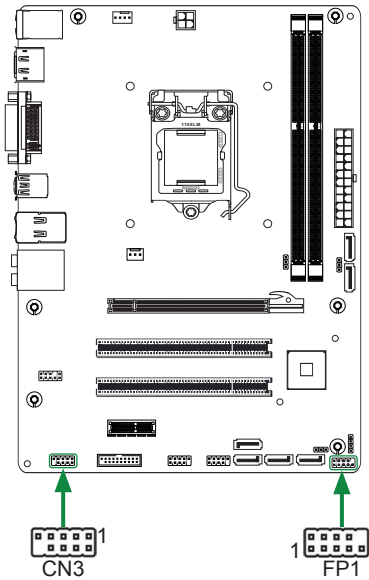
☐ **HDD LED**

Attach the hard disk drive indicator **LED** cable to these two pins. The HDD indicator **LED** indicates the activity status of the hard disks.

☐ **RST SW**

Attach the Reset switch cable from the front panel of the case to these two pins. The system restarts when the **RESET** switch is pressed.

***Note:** Some chassis do not have all four cables. Be sure to match the name on the connectors to the corresponding pins.*



USB Headers-FP_U1/2/FP_USB3_1

This motherboard contains two USB 2.0 and four USB 3.0 ports that are exposed on the rear panel of the chassis. The motherboard also contains two 10-pin internal USB 2.0 headers and one 20-pin USB 3.0 connector onboard.

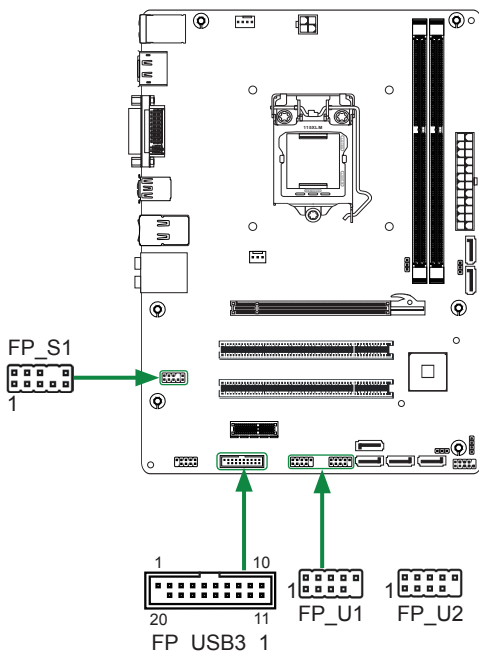
Note: Secure the bracket to either the front or rear panel of your chassis (not all chassis are equipped with the front panel option).

FP_U1~FP_U2-Pin Definition

PIN	Assignment	PIN	Assignment
1	VCC	2	VCC
3	USBP0-	4	USBP1-
5	USBP0+	6	USBP1+
7	GND	8	GND
9	KEY	10	NC

FP_USB3_1-Pin Definition

Pin	Signal	Pin	Signal
1	AVBUS	11	BD+
2	ASSRX-	12	BD-
3	ASSRX+	13	GND2
4	GND	14	BSSTX+
5	ASSTX-	15	BSSTX-
6	ASSTX+	16	GND3
7	GND1	17	BSSRX+
8	AD-	18	BSSRX-
9	AD+	19	BVBUS
10	NC	20	KEY



Front Panel Audio Header-FP_S1

The audio connector supports HD audio standard and provides two kinds of audio output choices: the Front Audio, the Rear Audio. The front Audio supports retasking function.

FP_S1-Pin Definition

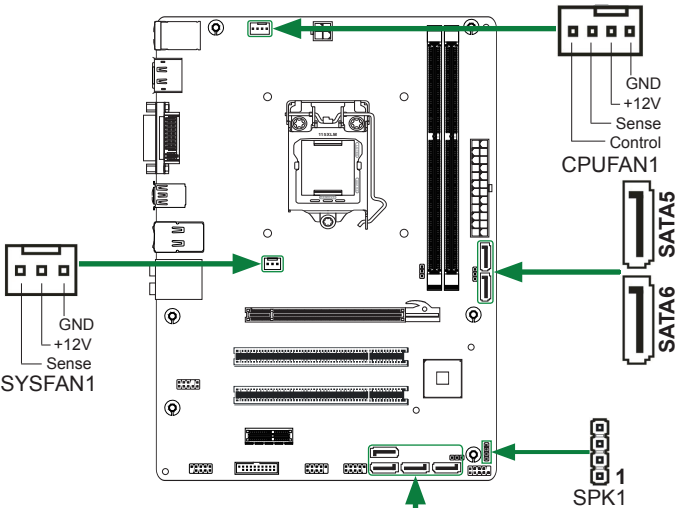
PIN	Assignment	PIN	Assignment
1	MIC2(L)	2	GND
3	MIC(R)	4	-ACZ-DET
5	Front Audio(R)	6	Reserved
7	FAVDIO-JD	8	Key(No pin)
9	Front Audio(L)	10	Reserved

Note:

In order to utilize the front audio header, your chassis must have front audio connector. Also please make sure the pin assignment on the cable is the same as the pin assignment on the mainboard header. To find out if the chassis you are buying supports a front audio connector, please contact your dealer.

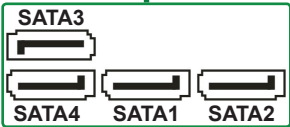
Serial-ATA (SATA) Connectors (SATA1~6)

The Serial ATA connector is used to connect the Serial ATA device to the motherboard. These connectors support the thin Serial ATA cables for primary storage devices. The motherboard incorporates six SATA III ports (SATA1~6) with maximum transfer rate up to 6.0 Gb/s each.



SATA-Pin Definition

Pin	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



Speaker Header-SPK1

SPK1-Pin Definition

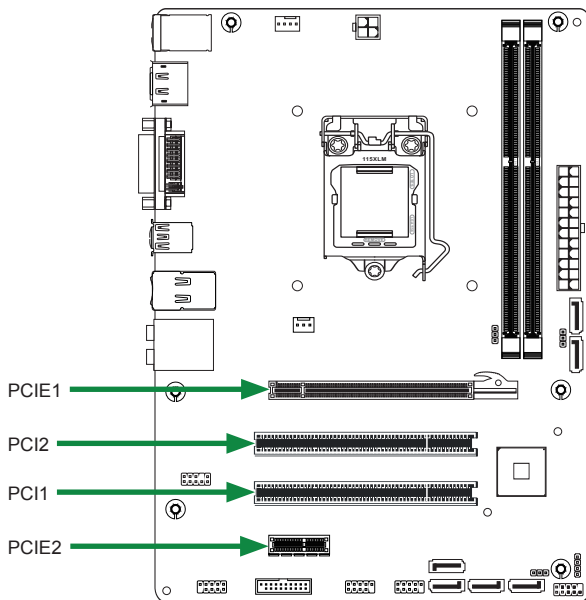
PIN	Assignment
1	VCC
2	NC
3	NC
4	SPK-

Fan Connectors

There are two fan connectors on the motherboard, including system fan connector-SYSFAN1 and CPU fan connector-CPUFAN1.

Expansion Slots

The motherboard contains three expansion slots, one PCIe x16 slot, one PCIe x1 slot and two PCI slots.



PCIe x16 Slot-PCIe1

There is one PCIe x16 slot reserved for graphics card. It is fully compliant with PCIe 3.0 specification.

PCI Slots-PCI1/2

The PCI slot supports cards such as a LAN card, USB card, SCSI card and other cards that comply with PCI specifications.





PCIe x1 Slot-PCIe2

There is one PCI Express x1 slot that is designed to accommodate less bandwidth intensive cards, such as a modem or LAN card.





Jumper Settings

This section explains how to configure the motherboard's hardware. Before using your computer, make sure all jumpers and DRAM modules are set correctly. Refer to this section whenever in doubt.





CMOS Clear Jumper-JP1

JP1	Selection
1   1-2*	Normal*
1   2-3	CMOS Clear

RTC Clear Jumper-JP2

JP2	Selection
1   1-2*	Normal*
1   2-3	RTC Clear

ME Update Jumper-JP3 (optional)

JP3	Selection
1   1-2*	Normal*
1   2-3	Intel Management Engine (ME) update

 Close  Open * = Default setting.

If you want to clear the system configuration, use the JP1 (Clear CMOS Jumper) to clear data.

Notice:

1. Be sure to save the CMOS setting when exit the CMOS.
2. If the CPU is frequency multiplier locked, no CPU speed change will be seen even if the frequency multiplier setting in CMOS setup is changed.

Configuring the BIOS

This section discusses how to change the system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

Enter BIOS Setup

The BIOS is the communication bridge between hardware and software. Correctly setting the BIOS parameters is critical to maintain optimal system performance.

Refer to the following procedure to verify/change BIOS settings.

1. Power on the computer.
2. Press the **Del** key when the following message briefly displays at the bottom of the screen during the Power On Self Test (POST).

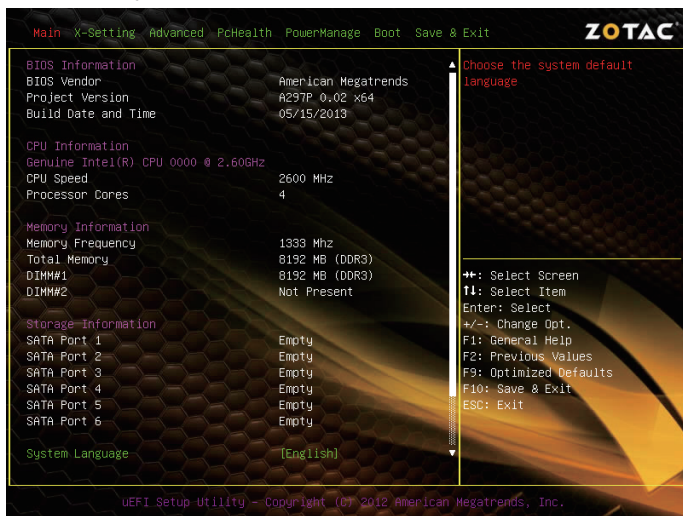
Pressing **Del** takes you to the BIOS Setup Utility.

Note: 1. We reserve the right to update the BIOS version presented in the manual. The BIOS pictures shown in this section are for reference only.

2. It is strongly recommended that you do not change the default BIOS settings. Changing some settings could damage your system.

Main Menu

This menu gives you an overview of the general system specifications. The BIOS automatically detects the items in this menu.



Note: Users please note that the data in gray is non-changeable, and the others are for selection.

☐ BIOS Information

Displays the auto-detected BIOS information.

☐ **CPU Information**

Displays the auto-detected CPU information.

☐ **Memory Information**

Displays the auto-detected memory information.

☐ **Storage Information**

Displays the auto-detected SATA port information.

☐ **System Date/Time**

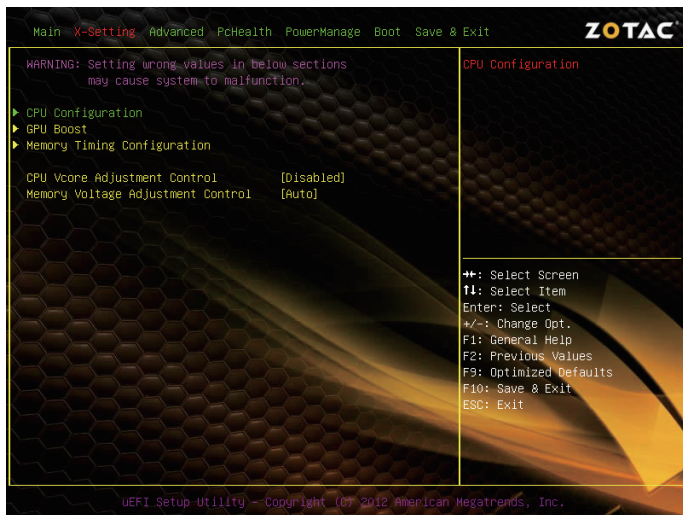
Allows you to set the system date/time.

☐ **System Language**

Choose the system default language.

X-Setting Menu

The X-Setting menu items show the settings of CPU, memory and so on. Press <enter> to display the configuration options:

☐ **CPU Configuration**

The items in this submenu show the CPU-related information that the BIOS automatically detects.

☐ **GPU Boost**

Use this item to adjust graphics configuration.

☐ **Memory Timing Configuration**

Use this item to adjust memory timing configuration.

☐ **CPU Vcore Adjustment Control**

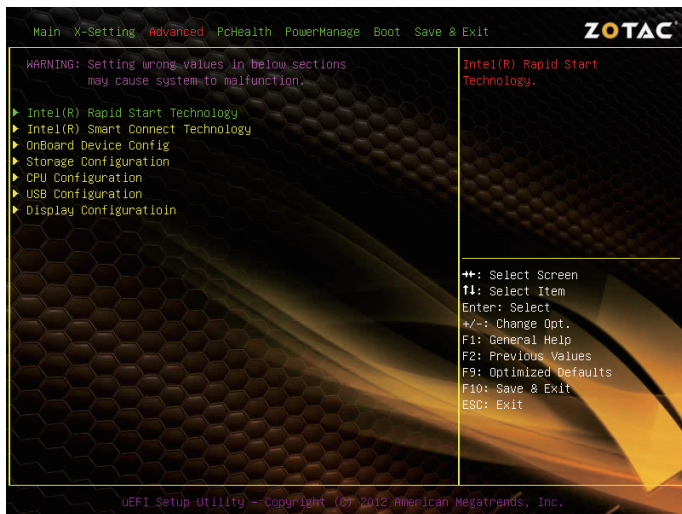
Use this item to adjust CPU Vcore.

☐ **Memory Voltage Adjustment Control**

Use this item to adjust memory voltage.

Advanced Menu

The Advanced menu items allow you to change the setting for the CPU and other system devices. Press <enter> to display the configuration options:



☐ Intel Rapid Start Technology

Use this item to enable or disable Intel Rapid Start Technology.

☐ Intel Smart Connect Technology

Use this item to enable or disable Intel Smart Connect Technology.

☐ OnBoard Device Config

Enter this submenu [Serial Port 0 Configuration] to set parameters of serial port0 (COMA).

Storage Configuration

The items in this menu allow you to set or change the storage configurations. Press <enter> to display the configuration options:

☐ SATA Controller(s)

Allows you to configure SATA controller.

☐ SATA Mode Selection

Allows you to choose SATA mode, including IDE Mode, AHCI Mode and RAID Mode.

CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects. Press <enter> to display the configuration options:

☐ **Active Processor Cores**

This item allows you to choose the number of the active processor cores. The default value is [All].

☐ **Overclocking lock**

Use this item to enable or disable Overclocking lock.

☐ **Limit CPUID Maximum**

Allows you to determine whether to limit CPUID maximum value.

☐ **Execute Disable Bit**

When disabled forces the XD feature flag to always return 0, defaults choose [Enable].

☐ **Intel Virtualization Technology**

Hardware Virtualization Technology enables processor feature for running multiple simultaneous virtual machines allowing specialized software applications to run in full isolation of each other.

☐ **Hardware Prefetcher**

Use this item to enable or disable hardware prefetcher (hardware prefetch mechanism).

☐ **Adjacent Cache Line Prefetch**

Use this item to enable or disable the adjacent cache line prefetch mode. If you disable this item, only one 64-bit line will be prefetched from the 128-bit section (including the required data). If you enable this item, two lines will be prefetched whether there is required data or not.

USB Configuration

The items in this menu allow you to change the USB-related features. Press <enter> to display the configuration options:

☐ **Legacy USB Support**

Allows you to enable or disable support for USB devices on legacy operating systems.

☐ **USB3.0 Support**

Allows you to enable or disable support for USB3.0 devices.

☐ **XHCI/EHCI Hand-Off**

Allows you to enable support for operating systems without an XHCI/EHCI hand-off feature.

☐ **USB Mass Storage Driver Support**

Enable or disable USB Mass Storage Driver Support function

☐ **USB transfer time-out**

Allows you to set USB transfer time-out.

☐ **Device reset time-out**

Allows you to set device reset time-out.

☐ **Device power-up delay**

Allows you to set device power-up delay.

Display Configuration

The items in this menu allow you to set display Configuration.

☐ Primary Display

Select the primary display, options: Auto/IGFX/PEG/PCI.

☐ Primary PEG

This item allows you to set primary PEG.

☐ Internal Graphics

This item allows you to configure the internal graphics.

☐ Aperture Size

This item allows you to set the aperture size, options: 64MB/128MB/256MB.

☐ DVMT Pre-Allocated

This item allows you to set DVMT pre-allocated size.

☐ DVMT Total Gfx Mem

This item allows you to set DVMT total Gfx mem size.

☐ Gfx Low Power Mode

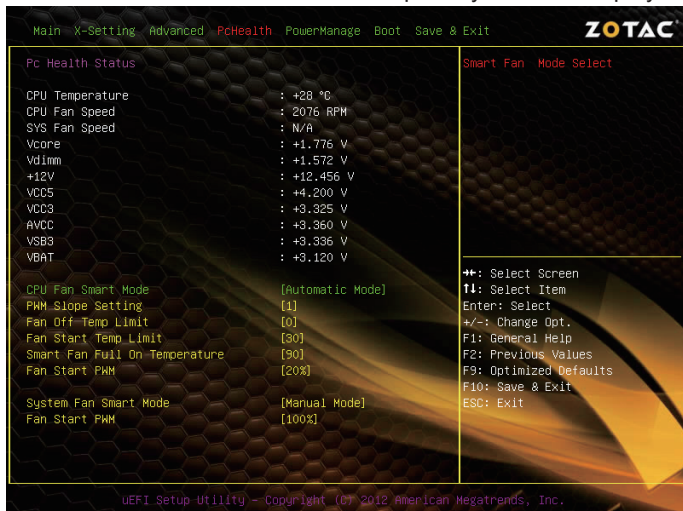
Enable or disable Gfx low power mode.

☐ Enable PEG

This item allows you to set PEG.

PC Health Menu

Select PC Health from the BIOS Setup Utility menu to display the System menu.



CPU/SYS FAN Smart Mode

This item allows you to set the CPU/system FAN mode.

PowerManage Menu

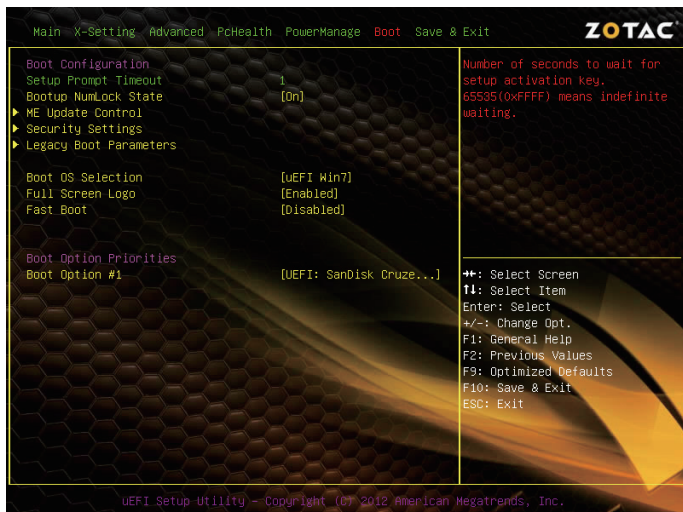
The items in this menu allow you to control the system power management. Press <Enter> to display the configuration options:



- ☐ **Enable Hibernation**
Enable or disable hibernation function.
- ☐ **ACPI Sleep State**
Select the highest ACPI sleep state, the system will enter when the SUSPEND button is pressed.
- ☐ **Lock Legacy Resources**
Enable or disable Lock Legacy Resources.
- ☐ **S3 Video Repost**
This item allows you to enable or disable Repost Video on S3 Resume function. The default setting is [Disabled].
- ☐ **DeepSleep(ErP Compliant) S5**
When enabled, wake up from S5 can only be done by power button.
- ☐ **Restore From AC Power Loss**
This item allows you to configure how the system board responds to a power failure.
- ☐ **Wake On Lan**
Enable or disable wake on LAN.
- ☐ **RTC Wakeup Setting**
Enable or disable Real-Time Clock wakeup setting.

Boot Menu

The Boot menu items allow you to change the system boot options. Press <enter> to display the configuration options:



Boot Configuration

The items allow you to configure Boot settings. Press <enter> To display the configuration options:

☐ Setup Prompt Timeout

This item shows the number of seconds to wait for setup activation key.

☐ Bootup NumLock State

Use this item to select the keyboard NumLock state: [On] or [Off].

☐ ME Update Control

The ME Update Control menu items allow you to change the ME settings. Press <enter> to display the configuration options:

✱ ME Debug Mode

Select this item to set or change the ME to debug mode.

☐ Security Settings

The security menu items allow you to change the system security settings. Press <enter> to display the configuration options:

✱ Administrator/User Password

Select this item to set or change the administrator/user password. The administrator/User Password item on top of the screen shows the default setting: [Not Installed]. After you set a password, this item shows [Installed].

To set an administrator/User Password:

1. Select the item [Administrator/User Password] and press <Enter>.
2. From the password box, type a password composed of at least six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted:

The message "Password Installed" appears after you successfully set your password.

To change the supervisor/user password, follow the same steps as setting a user password.

☐ **GateA20 Active**

When set to [Upon Request], GA20 can be disabled using BIOS services. When set to [Always], GA20 can not be disabled; this option is useful when any RT code is executed above 1MB.

☐ **Option ROM Messages**

Use this item to set display mode for Option.

☐ **Interrupt 19 Capture**

When set to [Enabled], this function allows the option ROMs to trap interrupt 19.

☐ **Boot OS Selection**

This item allows you to select Boot OS, options: [UEFI OS], [Legacy OS].

☐ **Full Screen Logo**

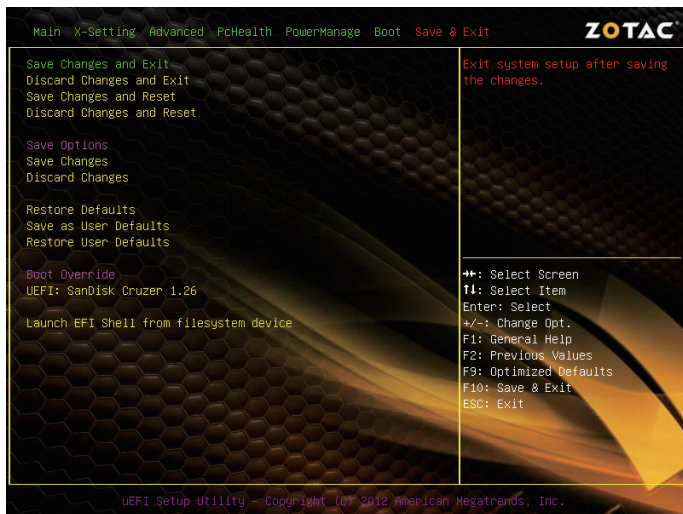
This item allows you to enable or disable full screen logo.

☐ **Fast Boot**

Enable or disable boot with initialization of a minimal set of devices required to launch active boot option.

Exit Menu

The exit menu items allow you to load the option or failsafe default values for the BIOS items, and save or discard your changes to the BIOS items. Press <enter> to display the sub-menu:



Save Changes and Exit

Select this item and press <Enter> to save the changes that you have made in the BIOS Setup and exit the BIOS Setup. When the dialog box [Save configuration and exit?] appears, select [Yes] to save and exit, or select [No] to return to the main menu.

Discard Changes and Exit

Select this option only if you do not want to save the changes that you have made to the setup program. If you made changes to fields other than system date, system time, and password, the BIOS asks for a confirmation before exiting.

Save Changes and Reset

Select this item and press <Enter> to reset the system after saving the changes. When the dialog box [Save configuration and reset?] appears, select [Yes] to save and reset, or select [No] to return to the main menu.

Discard Changes and Reset

Select this item and press <Enter> to reset system setup without saving any changes. When the dialog box [Reset without saving?] appears, select [Yes] to discard and reset, or select [No] to return to the main menu.

Save Changes

Select this item and press <Enter> to save the changes that you have made in the BIOS Setup and exit the BIOS Setup. When the dialog box [Save configuration?] appears, select [Yes] to save changes, or select [No] to return to the main menu.

Discard Changes

This option allows you to discard the selections you have made and restore the previously saved values. When the dialog box [Load Previous Values?] appears, select [Yes] to discard any change and load the previously saved values.

Restore Defaults

Use this item to restore/load default values for all the setup options.

Save as User Defaults

Use this item to save the changes as User Defaults.

Restore User Defaults

Use this item to restore the User Defaults to all the setup options.

Launch EFI Shell from filesystem device

Use this item to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

FLASH Update Procedure

The program EFUDOS.exe is included in the driver disk (X:\Utility\EFUDOS.exe). Please follow the recommended procedure to update the flash BIOS, as listed below.

(X: your driver disk letter).

1. Create a DOS-bootable floppy diskette. Copy the new BIOS file (just obtained or downloaded) and the utility program EFUDOS.exe to the diskette.
2. Allow the PC system to boot from the DOS diskette.
3. At the DOS prompt, type

EFUDOS XX.ROM /P /B /R /N /X <ENTER>

Note: XX (the BIOS file name) can be defined by users.

4. Wait until the flash-update is complete.
5. Restart the PC.

<p>Warning: - Do not turn off or RESET the computer during the flash process.</p> <p>- If you are not sure how to upgrade the BIOS, please take your computer to an Authorized Service Center and have a trained technician do the work for you.</p>

Installing Drivers and Software

Note:

1. *It is important to remember that before installing the driver disk that is shipped in the kit, you need to load your operating system. The motherboard supports Windows 7 32bit/64bit and Windows 8 32bit/64bit.*
2. *We reserve the right to update the driver version presented in the manual. The driver installation pictures shown in this section are for reference only.*

The kit comes with a driver disk that contains utility drivers and additional software.

The driver disk that has been shipped with your motherboard contains the following software and drivers:

- ☐ Intel Chipset Driver
- ☐ HDA Sound Driver
- ☐ Intel Graphics Driver
- ☐ Ethernet PCI-E Driver
- ☐ USB3.0 Controller Driver
- ☐ Intel Management Engine

Drivers Installation

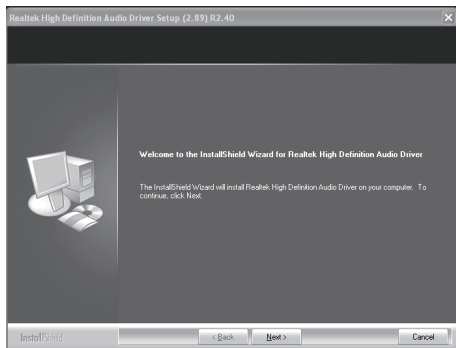
1. Insert the driver disk into the drive after loading your operating system, and then you can see the interface below.

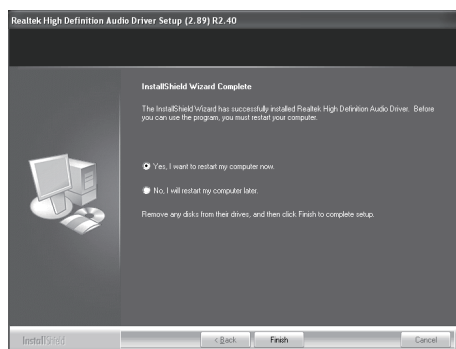


2. Left-click **Intel Chipset Driver**, begin loading

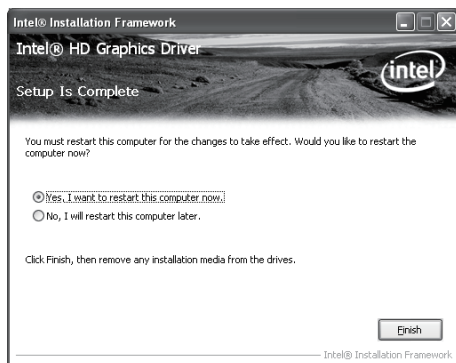
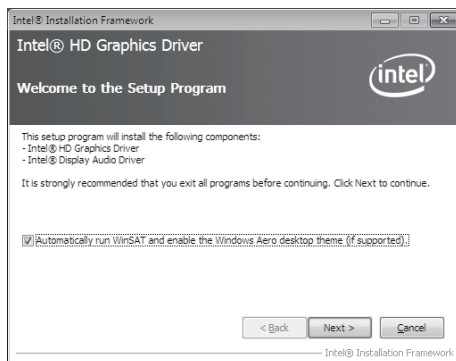


3. Left-click **HDA Sound Driver**, begin loading

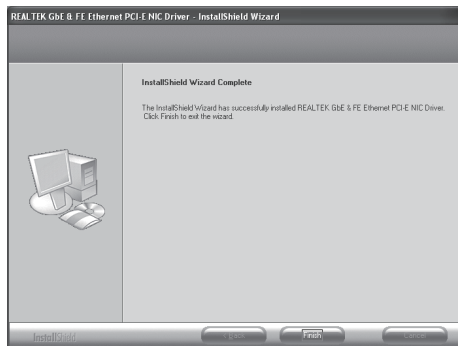
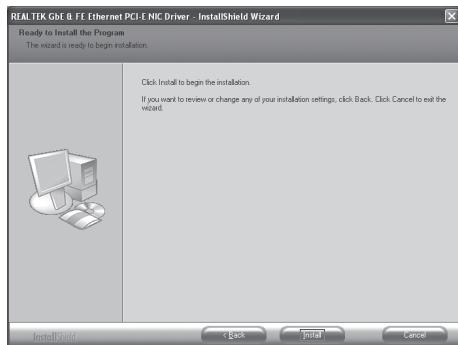
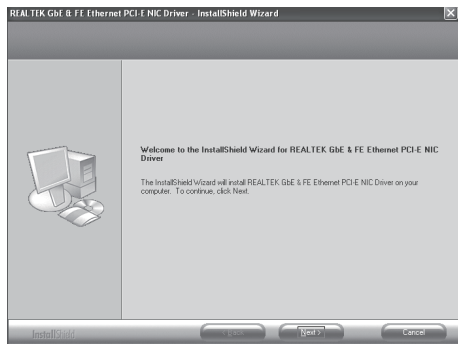


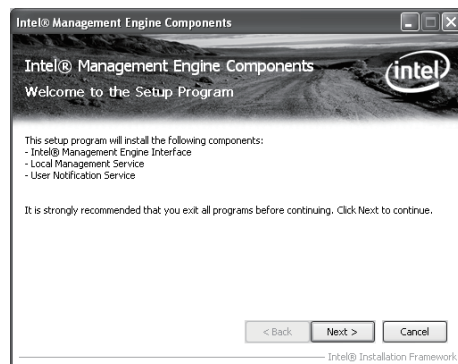


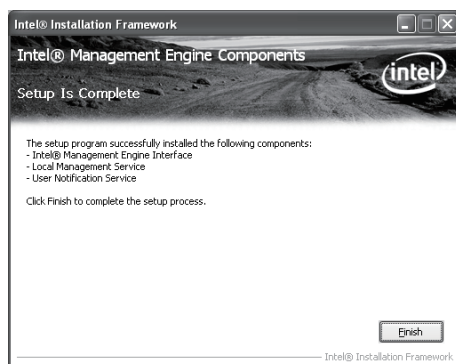
4. Left-click **Intel Graphics Driver**, begin loading



5. Left-click **Ethernet PCI-E Driver**, begin loading




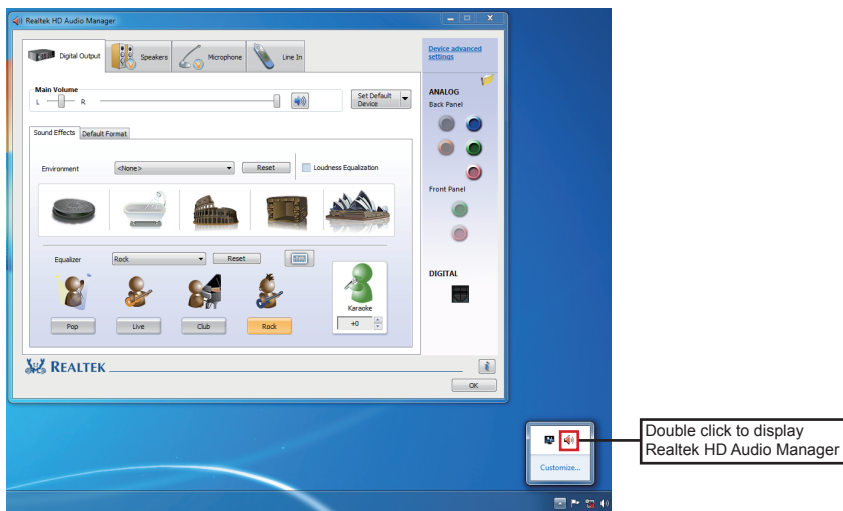
6. Left-click **USB3.0 Controller Driver**, begin loading7. Left-click **Intel Management Engine**, begin loading



Realtek HD Audio Driver Setup

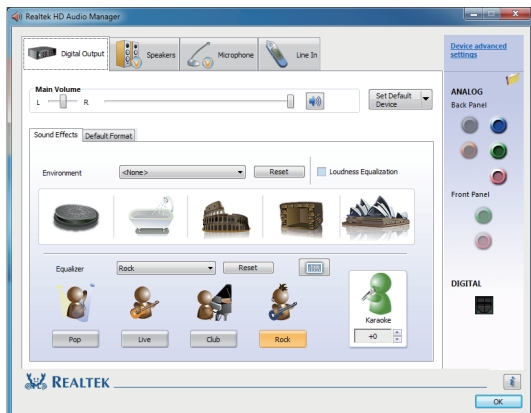
Getting Started

After Realtek HD Audio Driver being installed (insert the driver disk and follow the on-screen instructions), “Realtek HD Audio Manager” icon  will show in System tray as below. Double click the icon and the control panel will appear:



Digital Output


After clicking on the “Sound Effect” tab, 3 sections “Environment”, “Equalizer” and “Karaoke” are available for selection.



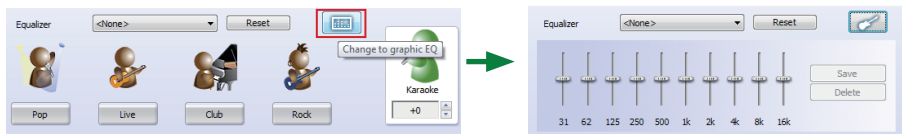
Environment Simulation

You will be able to enjoy different sound experience by pulling down the arrow, totally 23 kinds of sound effect will be shown for selection. Realtek HD Audio Sound Manager also provides five popular settings “Sewer pipe”, “Bathroom”, “Arena”, “Stone Room”, and “Auditorium” for quick enjoyment.

Equalizer Selection

Change to graphic EQ by clicking on the Equalizer icon . The Equalizer section allows you to create your own preferred settings by utilizing this tool.

In standard 10 bands of equalizer, ranging from 31Hz to 16kHz are available:



Frequently Used Equalizer Setting

Realtek recognizes the needs that you might have. By leveraging our long experience at audio field, Realtek HD Audio Sound Manager provides you certain optimized equalizer settings that are frequently used for your quick enjoyment.

How to Use

Other than the buttons “Pop” “Live” “Club” & “Rock” shown on the page, to pull down the arrow in “Others”, you will find more optimized settings available to you.

Karaoke Mode

Karaoke mode brings Karaoke fun back home by simply using the music you usually play, Karaoke mode can help you eliminate the vocal of the song or adjust the key to accommodate your range.

Vocal Cancellation: Single click on “Voice Cancellation”, the vocals of the songs will be erased, while the background music is still playing which lets you take over the vocal part.

Key Adjustment: Using “Up/Down Arrow” to find a key which better fits your vocal range.

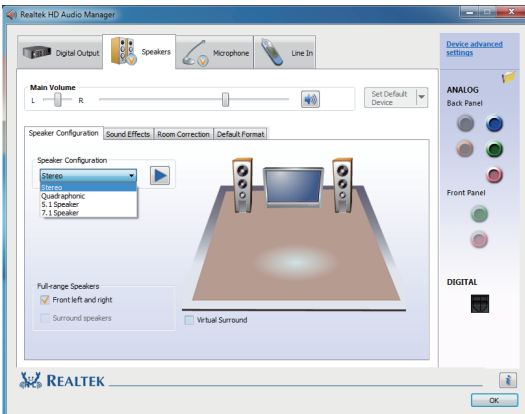
Speakers

Realtek HD Audio Manager frees you from default speaker settings. Speakers includes four tabs: Speaker Configuration, Sound Effects, Room Correction and Default Format.



Speaker Configuration

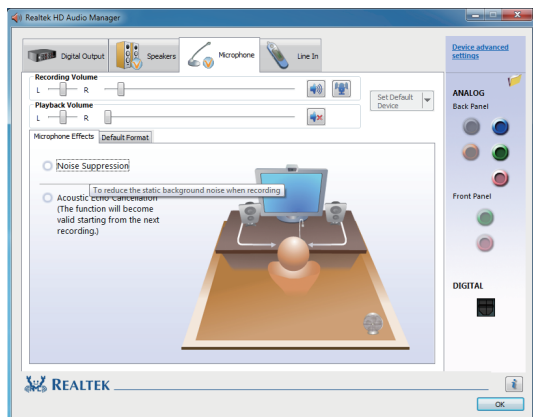
In this tab, you can choose speaker configuration: Stereo, Quadraphonic, 5.1 Speaker or 7.1 Speaker using "Up/Down Arrow".



Microphone

This page is designed to provide you better microphone/recording quality.

Below picture indicates both “Noise Suppression” & “Acoustic Echo Cancellation” are both enabled.



Noise Suppression

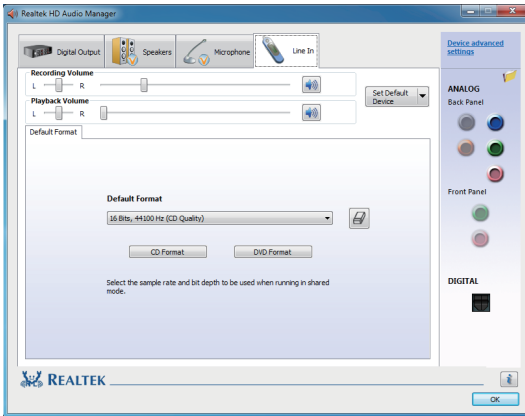
If you feel that the background noise, especially the sound generated from the fan inside PC, is too loud? Try “Noise Suppression”, which allows you to cut off and suppress disturbing noise.


Acoustic Echo Cancellation

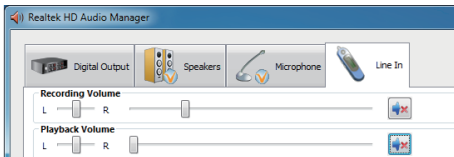
This function prevents playback sound from being recorded by microphone together with your sound. For example, you might have chance to use VOIP function through Internet with your friends. The voice of your friend will come out from speakers (playback). However, the voice of your friend might also be recorded into your microphone then go back to your friend through Internet. In that case, your friend will hear his/her own voice again. With AEC (Acoustic Echo Cancellation) enabled at your side, your friend can enjoy the benefit with less echo.

Line In

Realtek HD Audio Manager integrates “Volume Control” functions into the Line In page. This gives you the advantage to you to create your favorite sound effect in one single tool.

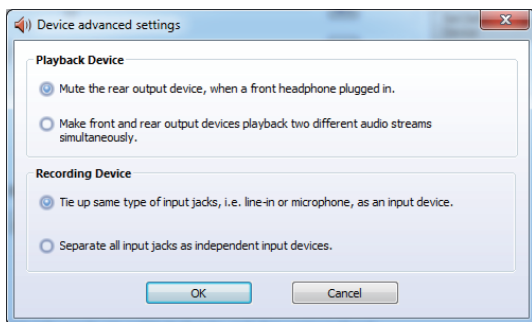
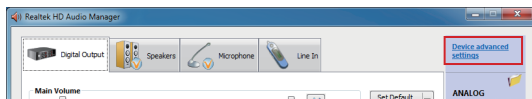


Single click on the volume icon , the Recording/Playback Volume will be changed to the mute mode.




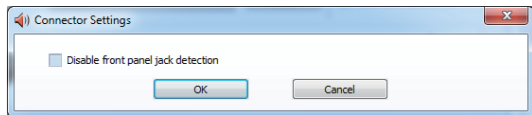
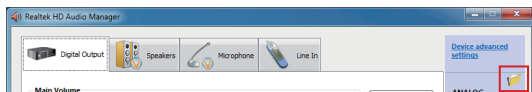
Device Advanced Settings

Click on "Device advanced settings" at the upper right corner of Realtek HD Audio Manager page, and you can set the playback device and recording device as below.




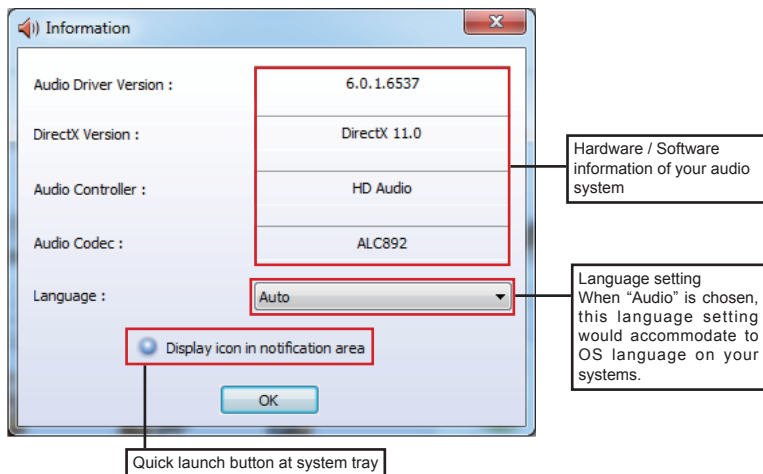
Connector Settings

Click on the icon  on the main page of Realtek HD Audio Manager, and the Connector Settings dialog will display. You can disable front panel jack detection. After changing the settings, click "OK" to confirm.



Information

Click on the icon  at the lower right corner of Realtek HD Audio Manager page, the Realtek HD Audio information will display.



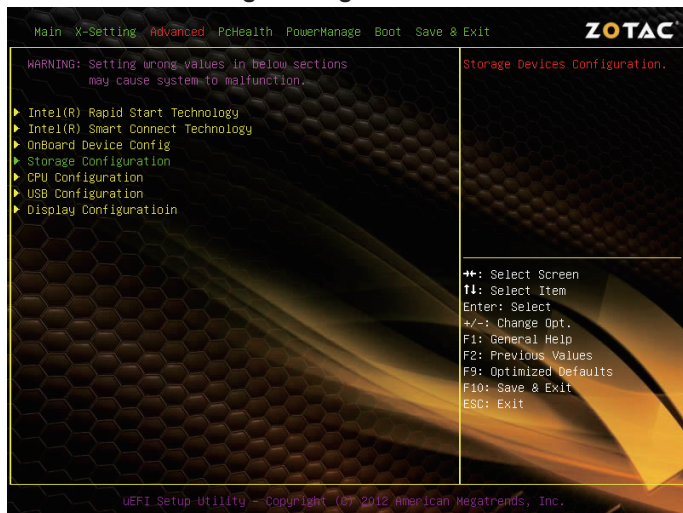
This section provides information about your current system audio device.

 The screenshots shown in this section are for Windows® 7 operating system.

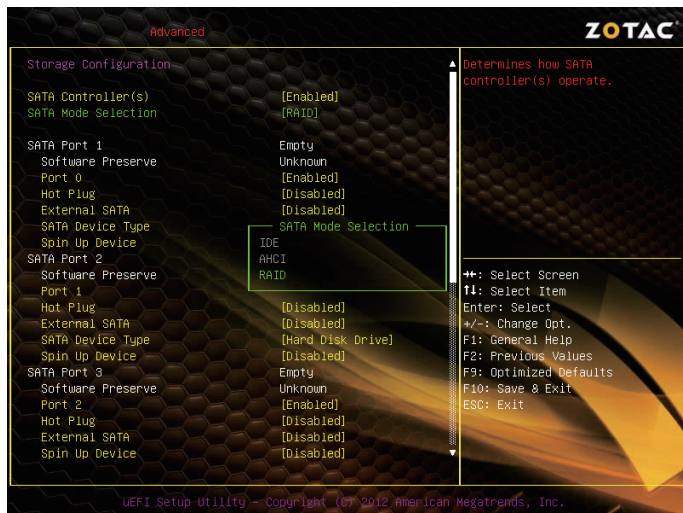
SATA RAID User Manual

Setting up the BIOS

1. Setting your computer, then press <Delete> to enter BIOS SETUP UTILITY.
2. Use the arrow key to select Advanced menu. When enter the Advanced menu, select the Item “Storage Configuration”.



3. Enter Storage Configuration > SATA Mode Selection, and enable the option “RAID”.



4. Enable the disks that you want to use as RAID disks.
5. Press F10 to save the configuration and exit. The PC reboots.

Entering the RAID BIOS utility

1. During POST, press <Ctrl-I> to enter the Intel(R) Rapid Storage Technology RAID BIOS menu.

```

Intel(R) Rapid Storage Technology - Option ROM - 10.0.0.1046
Copyright(C) 2003-10 Intel Corporation. All Rights Reserved.

RAID Volumes:
None defined.

Physical Devices:
Port Device Model Serial # Size Type/Status(Vol ID)
2 ST3250310AS 6UME5A04 232.8GB Non-RAID Disk
3 ST3250310AS 6RYLMX3X 232.8GB Non-RAID Disk
Press <Ctrl-I> to enter Configuration Utility..

```

2. The main Intel(R) Rapid Storage Technology RAID BIOS menu appears.
3. Use the arrow keys to move the color bar and navigate through the items.

```

Intel(R) Rapid Storage Technology - Option ROM - 10.0.0.1046
Copyright(C) 2003-10 Intel Corporation. All Rights Reserved.

[ MAIN MENU ]
1. Create RAID Volume 3. Reset Disks to Non-RAID
2. Delete RAID Volume 4. Recovery Volume Options
5. Exit

[ DISK/VOLUME INFORMATION ]

RAID Volumes:
None defined.

Physical Devices:
Port Device Model Serial # Size Type/Status(Vol ID)
2 ST3250310AS 6UME5A04 232.8GB Non-RAID Disk
3 ST3250310AS 6RYLMX3X 232.8GB Non-RAID Disk

[ F10]-Select [ESC]-Exit [ENTER]-Select Menu

```

Creating a RAID set

1. In the main Intel(R) Rapid Storage Technology RAID BIOS menu, highlight **Create RAID Volume** using the ↑ ↓ arrow key then press <Enter>.

```

[ MAIN MENU ]
1. Create RAID Volume 3. Reset Disks to Non-RAID
2. Delete RAID Volume 4. Recovery Volume Options
5. Exit

```

2. When the item **RAID Level** is highlighted, use the ↑ ↓ arrow key to select the RAID set that you want to create.

```

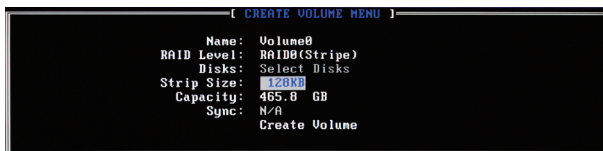
[ CREATE VOLUME MENU ]

Name: Volume0
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 465.6 GB
Sync: N/A
Create Volume

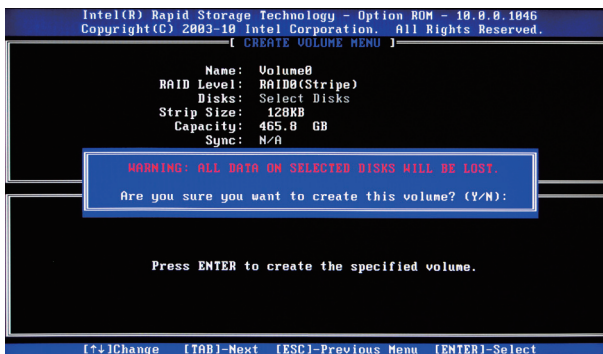
```

Note:

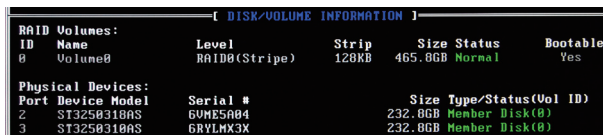
When more than two HDDs are installed in your computer, the Disks item will be selectable. Then users can select the HDD that you want to belong to the RAID set. Please be noticed that selecting a wrong disk will result in losing the original data of the HDD.



3. Press <Enter> to confirm the creation of the RAID set. A dialogue box appears to confirm the action. Press <Y> to confirm; otherwise, press <N>.



4. The following screen appears, displaying the relevant information about the RAID set you created.



Deleting a RAID set

1. In the main Intel Rapid Storage Technology RAID BIOS menu, highlight **Delete RAID Volume** using the ↑↓ arrow key then press <Enter>.



2. Use the space bar to select the RAID set you want to delete. Press the key to delete the set.

Intel Rapid Storage Technology


Introduction

Intel Rapid Storage Technology is a Windows-based application that provides improved performance and reliability for systems equipped with SATA disks for desktop, mobile, and server platforms. When using one or multiple SATA disks, you can take advantage of enhanced performance and lower power consumption. When using more than one disk, you can increase protection against data loss in the event of disk failure.

- Note:** 1. Please confirm that the driver: Intel Rapid Storage Technology has been installed completely before you set the following configuration.
2. There must be an SSD as cache volume to set Intel Rapid Storage.

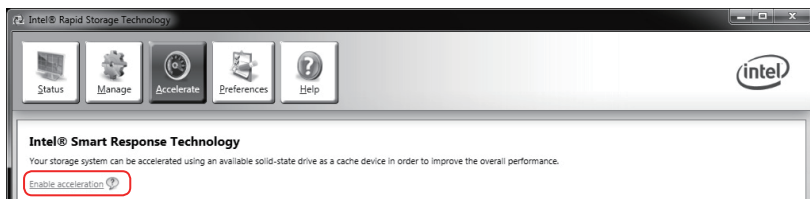
Setting Intel Rapid Storage

Follow the instructions below to set Intel Rapid Storage.

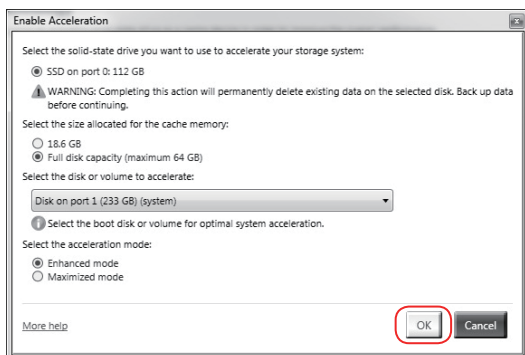
1. Click the icon  in the lower right corner of the desktop.



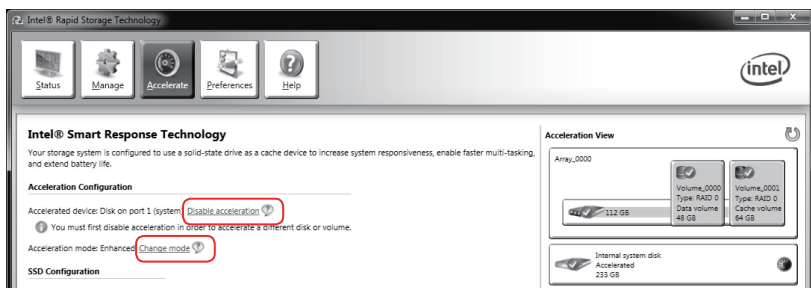
2. Enter the “**Accelerate**” menu, and click “**Enable acceleration**”.



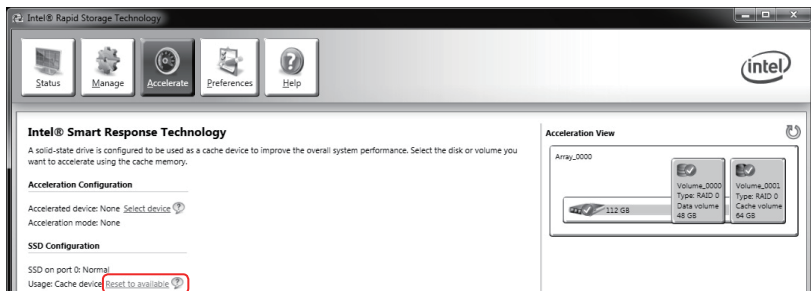
3. When the window **“Enable Acceleration”** displays, select the cache memory size and the acceleration mode, and click **“OK”** to accelerate the storage.



4. If you want to change the setting, click **“Disable acceleration”** to disable the acceleration, or click **“Change mode”** to change the acceleration mode.



5. If you want to reset cache to available, click **“Reset to available”**.



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