



# User's Manual

**Sapphire Pure Black X58**

**PB-CI7S41X58**

**Intel X58/LGA1366 Series Mainboard**

## **TRADEMARK**

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These specifications are subject to change without notice.

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## Federal Communications Commission (FCC) Statement

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

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

 Note1: 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

Note2: 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 product.

Note3: To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables

## CE: Radiation of EN 55022 & Immunity of EN 55024

## Waste Electrical and Electronic Equipment (WEEE) Statement

To protect the global environment, this product must be sent to separate collection facilities for recovery and recycling.



### **DISPOSAL**

Do not dispose of this product as unsorted municipal waste. Collect such waste separately for special treatment.

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# **Chapter 1 Introduction**

## ***1-1 Mainboard Specifications***

### **CPU**

- Supports Intel® Core i7 series processor in the LGA1366 package

### **Chipset**

- Intel® X58 and ICH10R chipset

### **System Memory**

- Six 240-pin DDR3 SDRAM DIMM sockets
- Supports 1.5v DDR3-1066/1333+ DIMMs with triple channel architecture
- Supports x16 and x8 DIMMs, non-ECC, unbuffered DIMMs
- Supports up to 24GB system memory

### **USB Ports**

- Ten USB 2.0 ports (eight at rear panel, two onboard by header), supporting transfer speeds up to 480Mbps
- Two USB 3.0 ports (at rear panel) backwardly compatible with USB 2.0 supporting transfer speeds up to 4.8Gbps
- Supports wake-up from S1 and S3 modes

### **SATA Ports**

- Six SATA2 ports including one eSATA port, with 3Gb/s data transfer rate, supporting RAID 0, RAID 1, RAID 10 and RAID 5 from Intel® ICH10R.
- Two SATA3 ports with 6Gb/s data transfer rate, supporting RAID 0 and RAID 1 from Marvell® 88SE9128.

### **Onboard LAN**

- One Gigabit Ethernet from Marvell 88E8057 Gigabit controller

### **Bluetooth**

- Atheros AR3011 is a highly integrated, all-CMOS, single chip with Bluetooth® 2.1 + EDR supported

### **Onboard IEEE1394a (Firewire)**

- Two IEEE1394a ports (one at rear panel, one onboard by header) with 400 Mbps transfer rate

### **Onboard Audio**

- Supports 8-channel High-Definition audio
- Supports rear panel SPDIF, Coaxial output
- Supports Jack-detection function

### **Expansion Slots**

- Four PCI-Express x16 connectors
- Supports ATI®CrossFireX™ Technology
- One PCI slot

### **BIOS**

- 8Mb SPI Flash with AMI based BIOS
- Supports ACPI (Advanced Configuration and Power Interface)
- Supports dual BIOS, switched by on board jumpers

### **Form Factor**







- ATX form factor of 305mm x 245 mm

### **Operating systems:**

- Support Windows XP, Windows Vista and Windows 7 (32 and 64 bit)

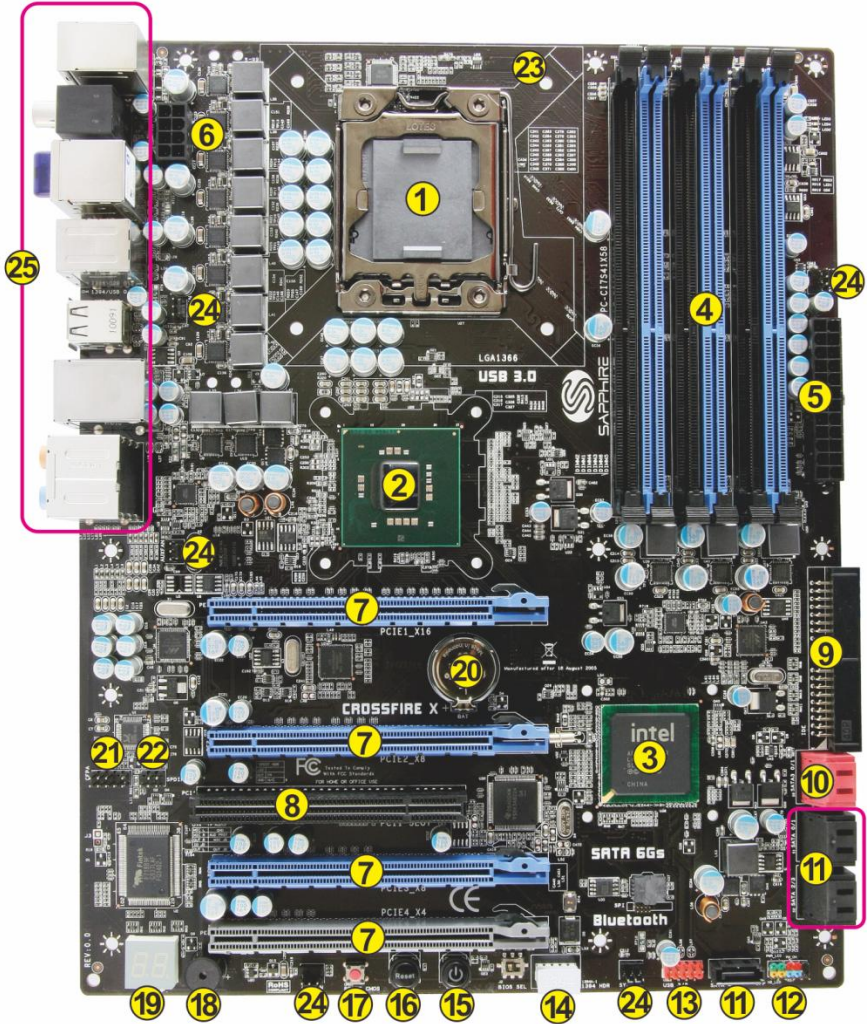
## 1-2 Package Contents

Your Sapphire Pure Black X58 mainboard comes with the following accessories.

1. Mainboard	2. Quick Installation Guide	3. Driver CD
		
4. I/O Shield	5. SATA Data Cable *6	6. IDE Cable
		

### 1-3 Mainboard Layout

The following figure shows the location of components on the mainboard. See Page 5 for the Key

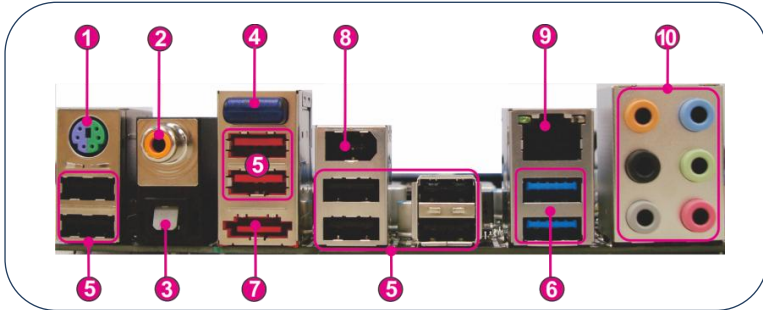




Item	Component description
1	CPU Socket 1366
2	Intel X58 Chipset
3	Intel ICH10R Chipset
4	DDR3 DIMM Slots 1-6
5	24-Pin ATX Power Connector
6	8-pin ATX_12V Power Connector
7	PCI-E x16 Slots1-4
8	PCI Slot
9	IDE Connector
10	SATA3 Connectors *2
11	SATA2 Connectors *5
12	Front Panel Header
13	USB Header
14	IEEE1394a Header
15	Power Button
16	Reset Button
17	Clear CMOS Button
18	PC Speaker
19	Debug LED Display
20	Mainboard Battery
21	Front Panel Audio Header
22	S/PDIF Header
23	CPU Fan Header
24	3-pin Fan Header *5
25	Back Panel Connectors (see next page for detail)

## I/O Back Panel

The I/O back panel for this mainboard is shown below. When installing the mainboard into the computer case, use the bundled I/O shield to protect this back panel.



1. PS/2 Keyboard/Mouse Port  
This connector is used for a keyboard or mouse. You can plug a PS/2 keyboard or mouse directly into this connector.
2. Coaxial S/PDIF-Out  
This SPDIF (Sony & Philips Digital Interconnect Format) connector is used for digital audio transmission to external speakers/amplifier through a coaxial cable.
3. Optical S/PDIF-Out  
This SPDIF (Sony & Philips Digital Interconnect Format) connector is used for digital audio transmission to external speakers/amplifier through an optical fiber cable.
4. Bluetooth  
Bluetooth wireless technology is an interface intended for wireless control/data communication
5. USB 2.0 Ports (Eight)  
The mainboard provides an OHCI (Open Host Controller Interface) Universal Serial Bus root for attaching USB devices such as a keyboard, mouse or other USB-compatible devices. Supports data transfer rates up to 480Mb/s.
6. USB 3.0 ports (two)  
USB 3.0 ports are backwardly compatible with USB 2.0 devices. Supports data transfer rates up to 4.8Gb/s (SuperSpeed).

7. ESATA Port

The ESATA (External SATA) port provides connection to ESATA hard drives.

8. IEEE1394a (Firewire) Port

The IEEE 1394 port provides connection to IEEE 1394 devices.

9. LAN Ports with LEDs

The mainboard provides one standard RJ-45 jack for connecting to a Local Area Network (LAN). Two LEDs are built into the RJ-45 LAN connector. These LEDs indicate the status of the LAN.



LED	LED Color	LED state	Indicates
A	Green	Off	LAN link is not established
		On	LAN link is established
		Blinking	LAN activity is occurring
B	N/A	Off	10 Mb/s data rate
	Green	On	100 Mb/s data rate
	Yellow	On	1000 Mb/s data rate

10. Audio Ports

This mainboard provides 2, 6, or 8channel audio. It is easy to differentiate between the audio functions by referring to the color of the jacks.

Ports	2 channel	6 channel	8 channel
Blue	Line-In	Line-In	Line-In
Lime	Line-Out	Front Stereo-Out	Front Stereo-Out
Pink	Min-In	Min-In	Min-In
Orange	--	Center/Subwoofer	Center/Subwoofer
Black	--	Rear Stereo-Out	Rear Stereo-Out
Gray	--	--	Side Stereo-Out

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## **Chapter 2 Installation**

### ***2-1 Before You Begin***

Please take note of all precautions before you install anything on to the mainboard or change any of the mainboard settings.

Turn off the power to your system and discharge your body's static electric charge by touching a grounded surface—for example, the metal surface of the power supply—before performing any hardware procedure.

The manufacturer assumes no liability for any damage, caused directly or indirectly, by improper installation of any components by unauthorized service personnel. If you do not feel comfortable performing the installation, consult a qualified computer technician.

Damage to system components, the mainboard, and injury to you may result if power is applied during installation.

### ***2-2 Installing the I/O Shield***

The mainboard comes complete with an I/O shield. When installed in the chassis, the shield blocks radio frequency transmissions, protects internal components from dust and foreign objects, and promotes correct airflow within the chassis.

Install the I/O shield before installing the mainboard in the chassis. Place the shield inside the chassis. Press the shield into place so that it fits tightly and securely. If the shield does not fit, obtain a properly sized shield from the chassis supplier.


### ***2-3 Securing to the Chassis***

When installing the mainboard, you have to secure the mainboard into the chassis by fastening with nine screws. Please refer to your chassis manual for instructions on installing.

## 2-4 Installing the CPU and Fan Heatsink

To install the CPU :-

1. Open the socket lever by pushing the lever down and away from the socket. Remove the protective socket cover from the socket. Do not touch the socket contacts.

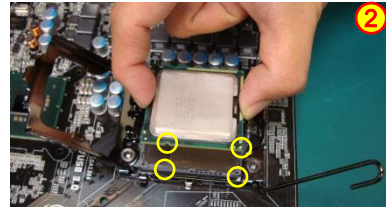
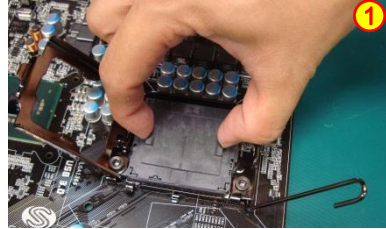
 Note: Do not discard the protective socketcover. Besuretoalways replace the cover unless the CPU is installed.

2. Align the CPU notches to the socket protrusions. Place CPU straight down without tilting or sliding it.

3. Close the load plate and engage the socket lever.

4. To install fan heatsink, align the holes on the mainboard. Press the four hooks down to fasten the cooler. You will hear a "click" upon full engagement. Gently rotate the cap clockwise 1/4 turn to fasten the heatsink onto the mainboard

5. Connect the 4-wire fan cable to the 4-pin CPUFAN header on the mainboard.



## 2-5 Installing System Memory

This mainboard has six 240-pin DIMM sockets for DDR3 memory. These slots support 1GB, 2GB and 4GB DDR3 DIMMs.

Make sure that you install memory modules of the same type and density in different channel DIMM slots for Triple-Channel/Dual-Channel mode.

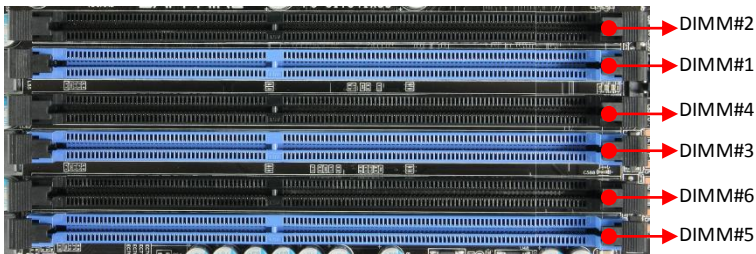
There must be at least one memory bank populated to ensure normal operation and always inset the memory module into the DIMM slot 1 first.

### Memory configurations:

Use the following the recommendations for installing memory.

- 1 DIMM (Single-Channel): install into DIMM slot 1.
- 2 DIMMs (Dual-Channel): install into DIMM slots 1 and 3.
- 3 DIMMs (Triple-Channel): install into DIMM slots 1, 3 and 5.
- 4 DIMMs (Triple-Channel): install into DIMM slots 1, 3, 5 and 2.
- 5 DIMMs (Triple-Channel): install into DIMM slots 1, 3, 5, 2 and 4.
- 6 DIMMs (Triple-Channel): install into DIMM slots 1, 3, 5, 2, 4 and 6.

DIMM Qty Location	1 DIMM (Single Channel)	2 DIMMs (Dual Channel)	3 DIMMs (Triple Channel)	4 DIMMs (Triple Channel)	5 DIMMs (Triple Channel)	6 DIMMs (Triple Channel)
DIMM#2	--	--	--	✓	✓	✓
DIMM#1	✓	✓	✓	✓	✓	✓
DIMM#4	--	--	--	--	✓	✓
DIMM#3	--	✓	✓	✓	✓	✓
DIMM#6	--	--	--	--	--	✓
DIMM#5	--	--	✓	✓	✓	✓



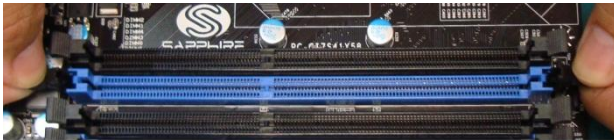
## Memory Installation:

DDR3 and DDR2 memory modules are physically different. Please only install DDR3 DIMMs in this mainboard.

To make sure you have the correct DIMM, check that all the notches line up with the DDR3 DIMM slot.

To install the DIMM, follow these steps:

1. Pull both clips on either side of the slot outwards. Align the DIMM module with the slot.

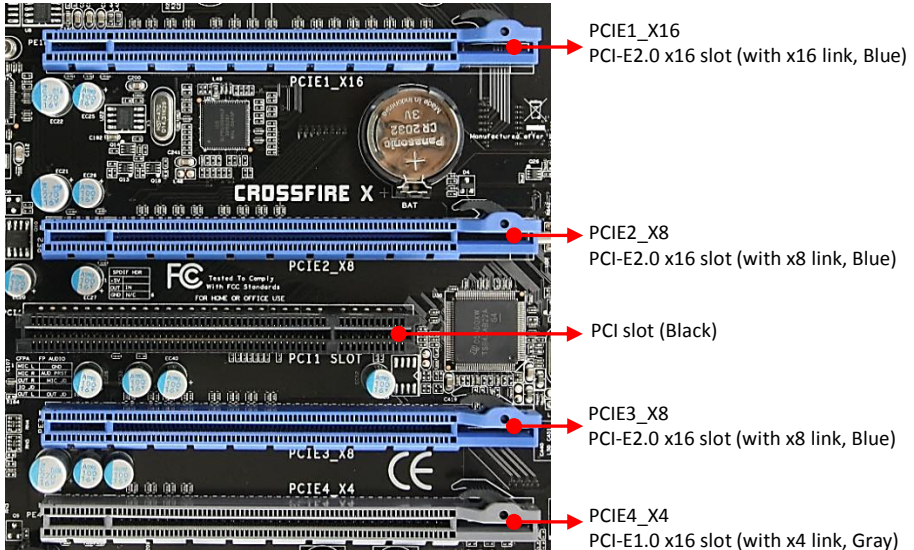


2. Press straight down until the plastic clips close and the module fits tightly into the DIMM slot.



## 2-6 Installing Expansion Cards

The mainboard provides four PCI Express 2.0 x16 slots and one PCI slot.



### PCI-E Slots

The design of this motherboard supports ATI CrossFireX™ multiple graphic card technology. Please refer to the location of slots and recommended configuration table for PCI-E operating mode to get the best performance possible.

Recommended configuration table			
Slot location VGA card	PCIE1_x16 (Blue)	PCIE2_x8 (Blue)	PCIE3_x8 (Blue)
1 VGA card	x16		
2 VGA cards	x16	x8	
3 VGA cards	x16	x8	x8

To install a PCI Express card:

1. Place the card in an available PCI Express slot and press down on the card until it is completely seated in the slot. If the card is not seated properly, it could cause a short across the pins.
2. Secure the card's metal bracket to the chassis back panel with a screw.



## PCI Slot

The one PCI slot provided supports a variety of expansion cards such as a LAN card, USB card, SCSI card and other cards that comply with PCI specifications. When installing a card into the PCI slot, be sure that it is fully seated. Secure the card's metal bracket to the chassis back panel.

## 2-7 Connecting Cables

This section takes you through all the necessary connections on the mainboard.

### Connecting Power Supply Cables

#### 24-pin ATX Power

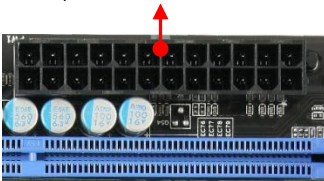
PW1 is the main power supply connector. Make sure that the power supply cable and pins are properly aligned with the connector on the mainboard. Firmly plug the power supply cable into the connector and make sure it is secure.

**Note:** If you'd like to use the 20-pin ATX power supply, please plug in your power supply cable aligned with pins 1 & 13. The 24-pin main power connector is backwardly compatible with ATX power supplies with 20-pin connectors.

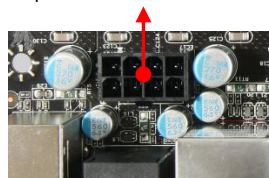
#### 8-pin ATX 12V Power

PW2, the 8-pin ATX 12V power connector, is used to provide power to the CPU. Align the power plug to the connector and press firmly until seated.

24-pin ATX Power connector



8-pin ATX Power connector

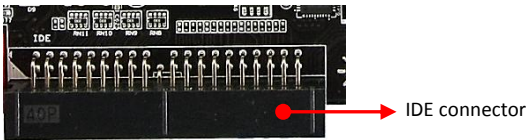


## Connecting IDE Cables

The IDE connector supports Ultra ATA 133/100 IDE hard/optical disk drives.

1. Connect one end of the cable (single connector) to the mainboard.
2. Connect another connector on the cable to the Ultra ATA master device.
3. Connect the other connector to a slave device

**Note:** If you install two hard/optical disk drives, you must configure the second drive as a slave device by setting its jumper accordingly. Refer to the disk drive documentation for the jumper settings.

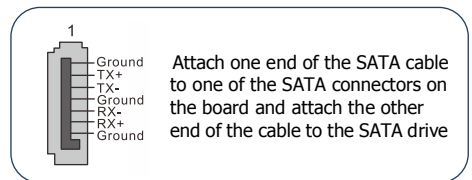
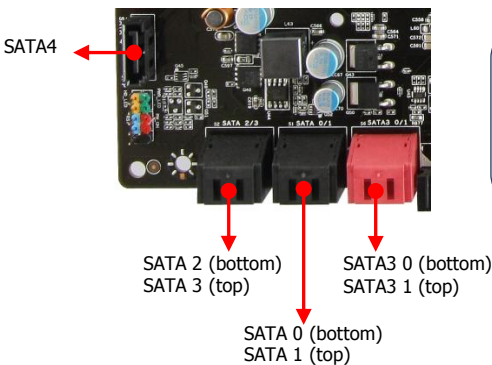


## Connecting Serial ATA (SATA) Cables

SATA cables support the Serial ATA protocol. Each cable can be used to connect one internal SATA drive to mainboard.

The SATA2 0~SATA2 4 connectors are controlled by the South Bridge Chipset and operate at a speed up to 3Gb/s.

The SATA3 0 and SATA3 1 connectors are SATA3 ports in red color and operate from the Marvell 9128 chipset at a transfer rate up to 6Gb/s.



## Connecting to the Internal Headers and Connectors

### Front Panel Header

The front panel header on this motherboard is one connector used to connect the front panel switches and LEDs.

#### ▶ PWR\_LED

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

System Status	Power LED indicates
On	The LED is on
Off	The LED is off
S1	The LED is on
S3	The LED will blink
S4	The LED is off

#### ▶ PW\_ON

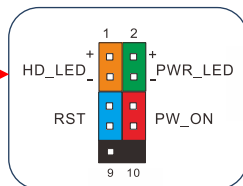
Attach the power button cable from the case to these two pins. Pressing the power button on the front panel turns the system on and off rather than using the onboard button.

#### ▶ HD\_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.

#### ▶ RESET

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.



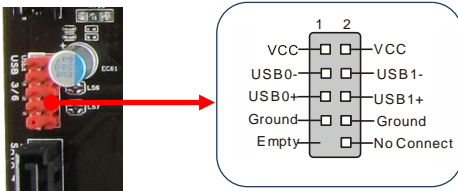
Header	Pin	Signal
HD_LED	1	HD_PWR
	3	HD Active
PWRLED	2	PWR LED+
	4	PWR LED-
RESET	5	Ground
	7	RST BTN
PWRSW	6	PWR BTN
	8	Ground
No Connect	9	+5V
Empty	10	Empty

## USB Header

This mainboard contains eight (8) USB 2.0 ports that are exposed on the rear panel of the chassis. This mainboard also contains one 10-pin internal header connectors onboard that can be used to connect an optional external bracket containing two (2) USB 2.0 ports.

Refer to the following steps:

1. Secure the bracket to either the front or rear panel of your chassis (not all chassis are equipped with the front panel option).
2. Connect the cable(s) to the USB 2.0header on the mainboard.



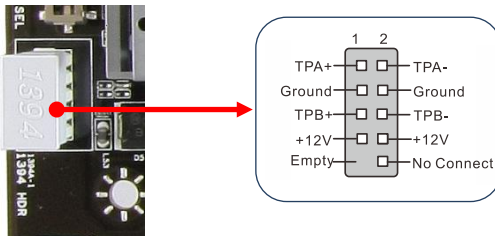
**Note:** Please do not connect a 1394 cable to USB connector, which will cause damage to the mainboard.

## 1394 Header

This header is used for IEEE1394 devices. There is a header cap on the 1394 header to prevent confusion with the USB header. If you do not require the additional external 1394 connections, you do not need to install them.

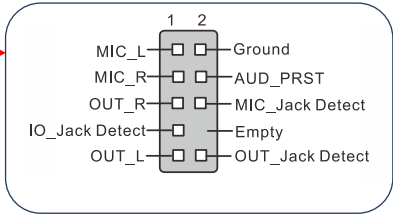
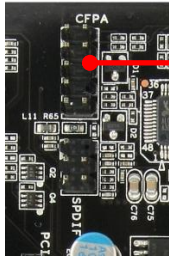
Refer to following steps:

1. Secure the bracket to either the front or rear panel of the system case (not all system cases are equipped with the front panel option).
2. Remove the header cap of 1394
3. Connect the end of the cable to the IEEE1394a headers on the mainboard.



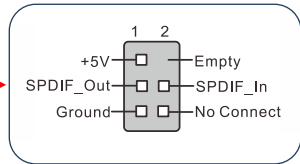
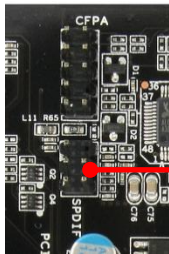
### CFPA Header

This header allows you to connect the front panel audio. The audio connector supports HD audio standard.



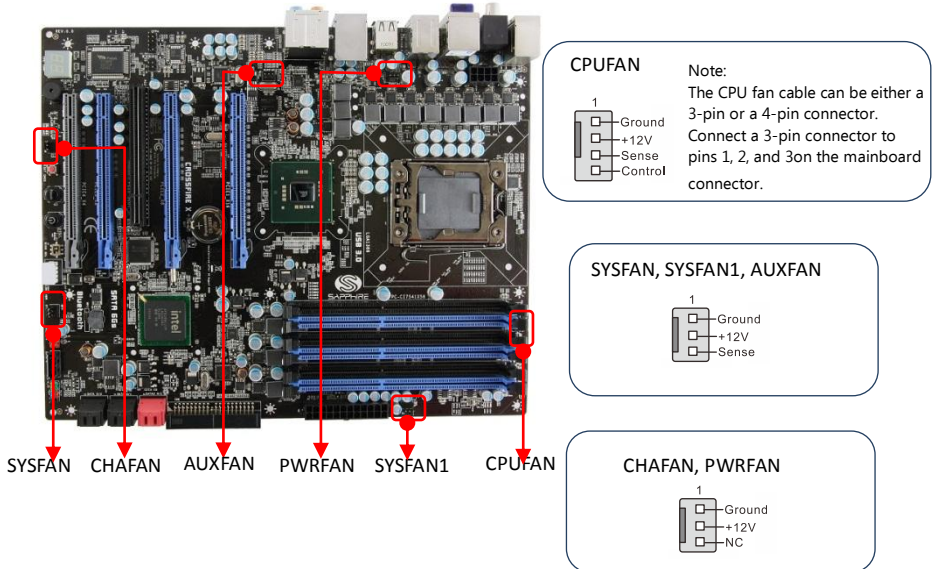
### S/PDIF Header

This header is used to connect S/PDIF (Sony & Philips Digital Interconnect Format) interface for digital audio transmission.



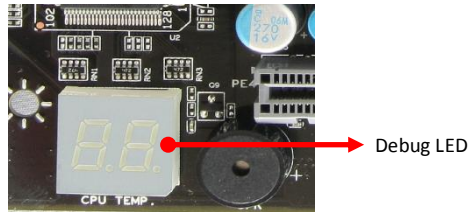
## Fan Header

There are six fan headers (CPUFAN, SYSFAN, SYSFAN1, PWRFAN, CHAFAN, AUXFAN) on the motherboard. Three of these fans (CPUFAN, PWRFAN, CHAFAN) can be speed detected/controlled and displayed in the Hardware Health Configuration section of the CMOS Setup. The fans are automatically turned off after the system enters S3, S4 or S5 mode.



## 2-8 Diagnostics LED

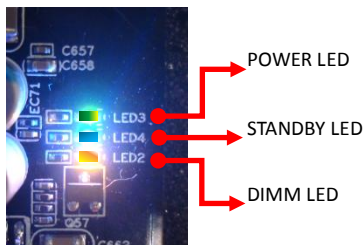
This mainboard provides a two-digit POST code to show why the system may be failing to boot. It is useful during a troubleshooting situation. This Debug LED will also display the current CPU temperature after the system has fully booted into the operating system.



## 2-9 LED Status Indicators

This mainboard provides three LEDs to indicate the system's status.

- POWER LED (LED3, Green): When the System is powered on: This LED is on.
- STANDBY LED (LED4, Blue): When the System is in Standby Mode: This LED is on. This LED will remain on as long as the motherboard is receiving constant power.
- DIMM LED (LED2, Yellow): When the Memory slot is functional: This LED is on.



## 2-10 Onboard Buttons

These onboard buttons include Clear CMOS, RESET and POWER, which allow you to easily clear the CMOS, reset the system and turn on/off the system.

### Clear CMOS Button

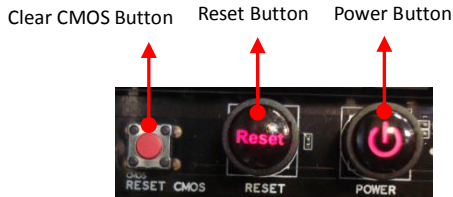
The mainboard uses the CMOS RAM to store some of the system configuration. The CMOS can be cleared by pressing the Clear CMOS button.

### Reset and Power Button

These onboard buttons allow you to easily turn on/off the system and allow for easy debugging and testing of the system during troubleshooting situations.

The Reset button with LED indicates the activity status of the hard disk drives and will blink accordingly.

The Power button with LED indicates the system's status. When the system is powered on, the LED blinks red.



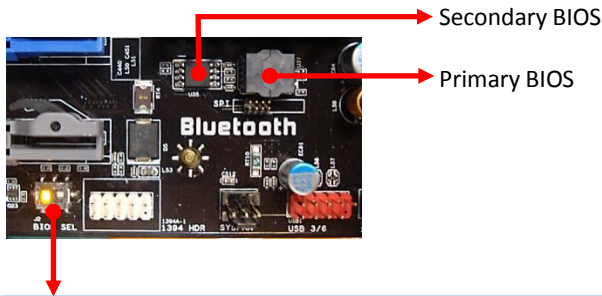



## 2-11 Dual BIOS Switched Jumper

This mainboard includes two onboard BIOS, (Primary and Secondary BIOS), to support the Dual BIOS functionality which is set by on board jumper. When the primary BIOS is corrupted or failed, you can use the secondary BIOS to take over on the next system boot to ensure normal system operation.

To enable the secondary BIOS, please refer to the following steps:

1. Turn off the system power.
2. Change the BIOS Select jumper from "P" to "S" position.
3. Turn on the system power.



**S**  **P** BIOS Select Jumper  
(When the Secondary BIOS is functional, the LED indicator is on.)

## **Chapter 3 Configuring the BIOS**

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.

### ***3-1 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.


Use the following procedure to change BIOS settings.

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

**Press F1 to continue, DEL to enter Setup.**

Pressing Del takes you to the BIOS CMOS Setup Utility.

 Note1: It is strongly recommended that you do not change the default BIOS settings. Changing some settings could damage your computer.

 Note2: The BIOS options in this manual are for reference only. BIOS screens in manuals are usually the first BIOS version when the board is released and may be different from your purchased motherboard. Users are welcome to download the latest BIOS version from our official website

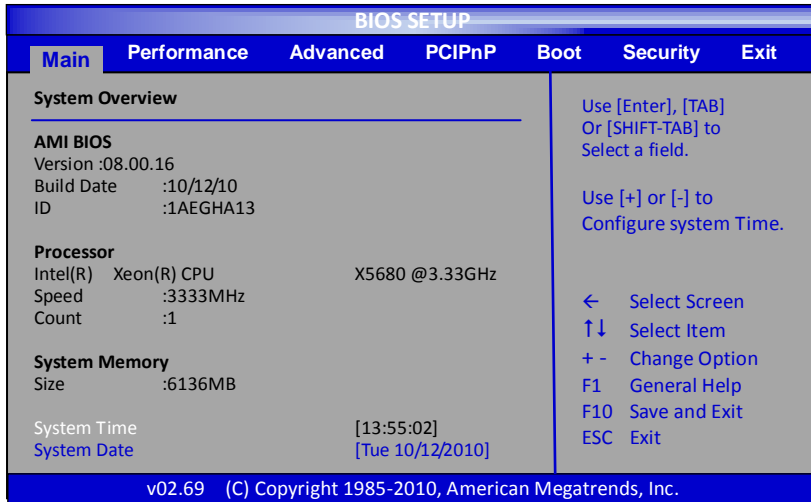
### **Control Keys**

Please check the following table for the function description of each Control key.

Control Key(s)	Function Description
← / →	Moves cursor left or right to select Screens
↑ / ↓	Moves cursor up or down to select items
+ / -	To change option for the selected items
<Enter>	To bring up the selected screen
<F1>	To display the General Help Screen
<F9>	To load optimal default values for all the settings
<F10>	To save changes and exit the BIOS SETUP UTILITY
<ESC>	To jump to the Exit Screen or exit the current screen

### 3-2 Main Menu

When entering the BIOS SETUP UTILITY, the main menu screen appears. This main menu includes the system overview and displays the basic system configuration, such as BIOS ID, CPU name, memory size and system date/time.



#### AMI BIOS

This item displays the current BIOS version, build date and ID information.

#### Processor

Current CPU name and speed information.

#### System Memory

Displays current system memory size.

#### System Time

Allows you to set the system time. The time format is <hour>:<minute>:<second>.

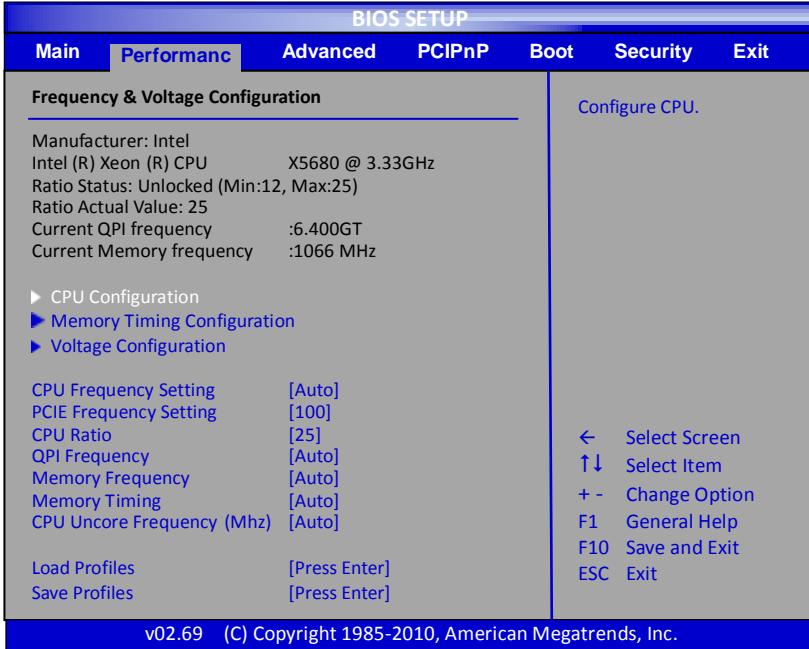
#### System Date

Allows you to set the system date. The format is <Day> <Month> <Date> <Year>.

- [Day] Weekday from Sun. to Sat., this is automatically displayed by BIOS.
- [Month] The month from 1 to 12.
- [Date] The date from 1 to 31 can be keyed by numeric function keys.
- [Year] The year can be adjusted by users.

## 3-3 Performance Menu

The Performance menu is used to configure the frequency and voltage for CPU and memory.



### CPU Frequency Setting

Allows you to select the CPU Frequency. The default is 0 by auto detection.

### PCIE Frequency Setting

Allows you to select the PCIE Frequency. The default is 0 by auto detection.

### CPU Ratio

Allows you to select the CPU Clock Ratio. Multiply CPU clock with this ratio, you can get the CPU speed. If the multiplier is locked, this option will be unavailable.

### QPI Frequency

Allows you to select the QPI Frequency.

Options: Auto, 4.800GT, 5.866GT, 6.400GT

### Memory Frequency

Allows you to select the Memory Frequency.

Options: Auto, Force DDR-800, Force DDR-1066, Force DDR-1333.

### **Memory Timing**

Allows you to select the Memory Timing.

Options: Auto, By DRAM Ratio, By DDR-800, By DDR-1067, By DDR-1333, By DDR-1600, By DDR-1867.

### **CPU Uncore Frequency (Mhz)**

Allows you to select the CPU Uncore Frequency, the Uncore clock must be at least 2x DRAM clock for overclocking.

### **Load Profiles**

Allows you to load the BIOS settings saved in the BIOS Flash. Press <Enter> to load the file.

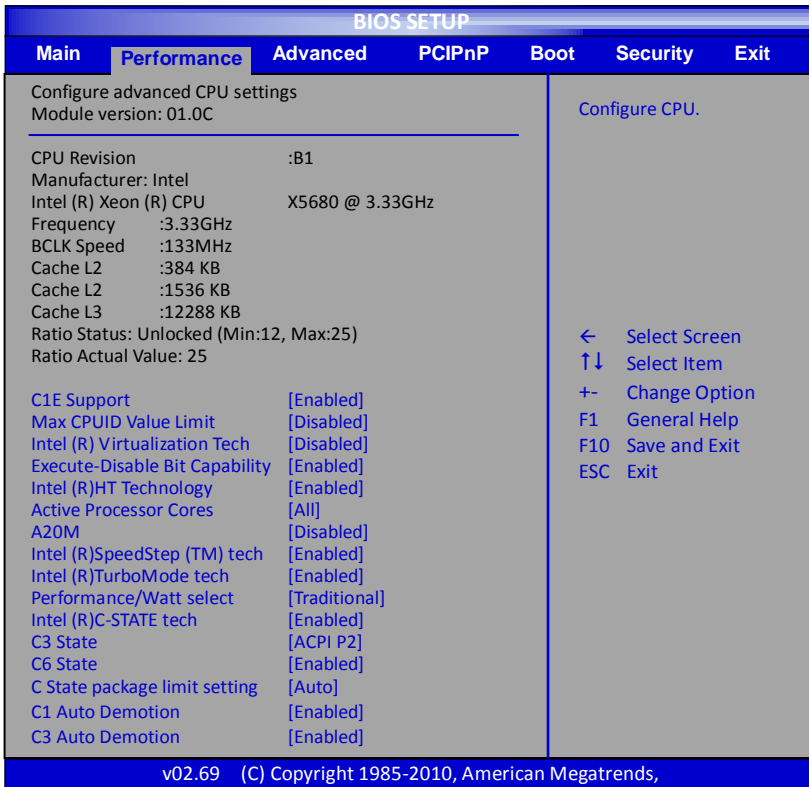
Options: Profile 1, Profile 2, Profile 3, Profile 4.

### **Save Profiles**

Allows you to save the current BIOS file to the BIOS Flash. Press <Enter> to choose a profile number to save your BIOS settings.

Options: Profile 1, Profile 2, Profile 3, Profile 4.

## ► CPU Configuration



### C1E Support

Allows you to select the lowest C state Enhanced supported.

Options: Enabled, Disabled

### Max CPUID Value Limit

We recommend leaving it disabled, unless you are using a very old OS or experiencing problems related to CPU identification/compatibility.

Options: Enabled, Disabled.

### Intel (R) Virtualization Tech

When this function is enabled, it allows a VMM (Virtual Machine Monitor) to utilize the additional hardware capabilities provided by Intel Virtualization Technology.

Options: Enabled, Disabled.

### **Execute-Disable Bit Capability**

When this function is disabled, it forces the XD feature flag to always return to zero (0).  
Options: Enabled, Disabled.

### **Intel (R) HT Technology**

Allows you to enable the Intel® HT (Hyper-Threading) Technology.  
Options: Enabled, Disabled.

### **Active Processor Cores**

This item is the number of cores to enable in each processor package. The  
Options: All, 1 and 2.

### **A20M**

This item may need to be enabled for Legacy OS and Applications.  
Options: Enabled, Disabled.

### **Intel (R) SpeedStep™ tech**

Enables the Intel® SpeedStep technology (EIST).  
Options: Enabled, Disabled.

### **Intel (R) TurboMode tech**

Enables the Intel® Turbo Mode technology. Turbo mode allows processor cores to run faster than marked frequency in specific condition.  
Options: Enabled, Disabled

### **Performance/Watt select**

Automated energy efficiency that scales energy usage to the workload to achieve optimal performance/watt.

### **Intel (R) C-STATE tech**

Enables the Intel® C-STATE technology, allowing the CPU to save more power under idle mode.  
Options: Enabled, Disabled.

### **C3 State**

Allows you to select C3 State for Nehalem processor.  
Options: ACPI C2, ACPI C3, Disabled.

### **C6 State**

Allows you to select C6 State for Nehalem processor.  
Options: Enabled, Disabled.

### **C State package limit setting**

We recommend that you set this item to Auto for BIOS to automatically detect the C-State mode supported by your CPU.  
Options: Auto, C1, C3, C6, C7.

### C1 Auto Demotion

When enabled, CPU will conditionally demote C3/C6/C7 requests to C1 based on uncore auto-demote information.

Options: Enabled, Disabled

### C3 Auto Demotion

When enabled, CPU will conditionally demote C6/C7 requests to C3 based on uncore auto-demote information.

Options: Enabled, Disabled

## ► Memory Timing Configuration

BIOS SETUP	
Main	Performance
<b>Memory Timing Configuration</b>	
	[New / Current]
tCL	[Auto (9)]
tRCD	[Auto (9)]
tRP	[Auto (9)]
tRAS	[Auto (24)]
tRFC	[Auto (74)]
Command Rate	[Auto (1)]
tWR	[Auto (10)]
tWTR	[Auto (5)]
tRRD	[Auto (4)]
tRTP	[Auto (5)]
tFAW	[Auto (20)]
Back-to-Back CAS Delay	[Auto (0)]
CHA Round Trip Latency	[Auto (57)]
CHB Round Trip Latency	[Auto (59)]
CHC Round Trip Latency	[Auto (60)]
	Minimum CAS Latency Time.
	0 by Auto detection Min=6, Max=15
	← Select Screen
	↑↓ Select Item
	+ - Change Option
	F1 General Help
	F10 Save and Exit
	ESC Exit
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### tCL

Set the CAS latency time.

Options: 6 ~ 15, 0 by auto detection.

### tRCD

Set the RAS to CAS Delay time for Read/Write commands to the same bank.

Options: 3 ~ 15, 0 by auto detection.

### tRP

Set the Row Precharge time. This is the Precharge-to-Active or Auto-to-Refresh of the same bank.

Options: 3 ~ 15, 0 by auto detection.



**tRAS**

Set the minimum RAS# active time.

Options: 9 ~ 63, 0 by auto detection.

**tRFC**

Set the minimum refresh recovery time.

Options: 15 ~ 255, 0 by auto detection.

**Command Rate**

Set the command timing setting on a per clock unit basis.

Options: Auto, 1 and 2, 0 by auto detection.

**tWR**

Set the tWR values.

Options: 3 ~ 11, 0 by auto detection.

**tWTR**

Set the tWTR values

Options: 4 ~ 31, 0 by auto detection.

**tRRD**

Set the tRRD values

Options: 4 ~ 15, 0 by auto detection.

**tRTP**

Set the tRTP values.

Options: 4 ~ 15, 0 by auto detection.

**tFAW**

Set the tFAW values

Options: 15 ~ 63, 0 by auto detection.

**Back-to-Back CAS Delay**

Set Back-to-Back CAS values.

Options: 3 ~ 31, 0 by auto detection.

**CHA/ CHB/ CHC Round Trip Latency**

Set Round Trip Latency values.

Options: 1 ~ 255, 0 by auto detection.

## ► VoltageConfiguration

BIOS SETUP						
Main	Performanc	Advanced	PCIPnP	Boot	Security	Exit
<b>Voltage Configuration</b>				Enabled Disabled		
Loadline Control		[Enabled 100%]				
CPU Thermal		[Enabled]				
Current CPU VCore	:	1.18750V				
CPU VCore	:	[Auto]				
Current DIMM Voltage	:	1.50V				
DIMM Voltage	:	[Auto]				
Current VTT	:	1.100V				
CPU VTT	:	[Auto]				
Current IOH VCore	:	1.100V				
IOH VCore	:	[Auto]				
Current QPI PLL	:	1.100V				
QPI PLL	:	[Auto]				
Current IOH/ICH IO Voltage	:	1.100V				
IOH/ICH IO Voltage	:	[Auto]				
Current CPU PLL VCore	:	1.800V				← Select Screen
CPU PLL VCore	:	[Auto]				↑↓ Select Item
Current ICH VCore	:	1.800V				+− Change Option
ICH VCore	:	1.800V				F1 General Help
DIMM DQ Vref	:	550mV				F10 Save and Exit
CPU PWM Frequency	:	[460KHz]				ESC Eit
DDR PWM Frequency	:	[250KHz]				
VTT PWM Frequency	:	[250KHz]				
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### Loadline Control

Loadline Control function is a safety measure to protect the CPU.

Enable 100%: To protect CPU from over voltage while overloading of current,

Disable: Allow CPU to overvoltage for large current loading,

Enabled 50%: For balanced performance and protection.

### CPU Thermal

Allows you to control the CPU thermal.

Options: Enabled, Disabled.

### Current CPU VCore

Displays the current CPU VCore voltage.

### CPU VCore

Allows you to adjust the CPU Vcore voltage.

Options available depend on CPU. We recommend that you select [Auto] as the default value.

### Current DIMM Voltage

Displays the current DIMM voltage.

### **DIMM Voltage**

Allows you to adjust the DIMM Slot voltage.

Options: 1.10V ~1.50V in 0.05V increments and 1.50V ~ 2.50V in 0.01V increments.

### **Current VTT**

Displays the current VTT voltage.

### **CPU VTT**

Allows you to adjust the CPU VTT voltage.

Options: 1.100V ~1.450V in 0.025V increments.

### **Current IOH VCore**

Displays the current Intel IOH chip voltage.

### **IOH VCore**

Allows you to adjust the IOH chip voltage.

Options: 1.100V ~1.240V in 0.01V increments.

### **Current QPI PLL**

Displays the current QPI PLL voltage.

### **QPI PLL**

Allows you to adjust the QPI PLL voltage.

Options: 1.100V ~1.450V in 0.025V increments.

### **Current IOH/ICH IO Voltage**

Displays the current the Intel IOH/ICH chip I/O voltage.

### **IOH/ICH IO Voltage**

Allows you to adjust the Intel IOH/ICH chip I/O voltage.

Options: 1.100V ~1.240V in 0.01V increments.

### **Current CPU PLL VCore**

Displays the current CPU PLL voltage.

### **CPU PLL VCore**

Allows you to adjust the CPU PLL voltage.

Options: 1.800V ~2.150V in 0.025V increments.

### **Current ICH VCore**

Displays the current Intel ICH chip voltage.

### **ICH VCore**

Allows you to adjust the Intel ICH chip voltage.

Options: 1.050V ~1.400V in 0.025V increments.

**DIMM DQ Vref**

Allows you to adjust the DIMM DQ reference voltage.

DQ Vref= DIMM voltage+Offset

Options: +480mV ~-490mV in 10mV increments

**CPU PWM Frequency**

Allows you to adjust the CPU PWM Frequency

Options: 380KHz, 460KHz, 520KHz, 580KHz, 770KHz, 870KHz, 950KHz, 1010KHz.

**DDR PWM Frequency**

Allows you to adjust the DDR PWM Frequency

Options:250KHz, 500KHz.

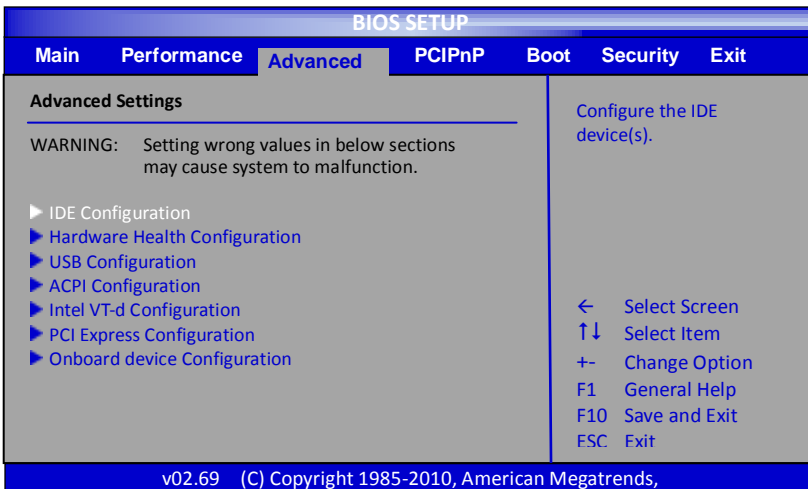
**VTT PWM Frequency**

Allows you to adjust the VTT PWM Frequency

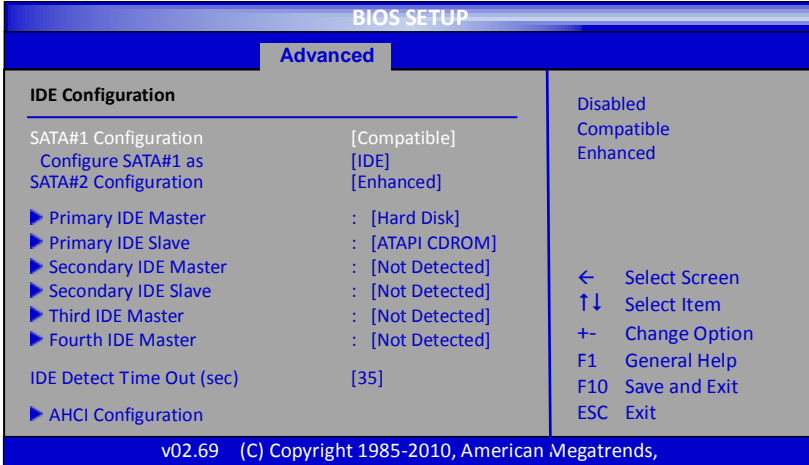
Options:250KHz, 500KHz.

## 3-4 Advanced Menu

This main menu is to set up onboard peripherals such as IDE, RAID, USB, LAN, and MAC control and to monitor the real-time system status of your PC, including temperature, voltages, and fan speed.



► **IDE Configuration**



**SATA#1 Configuration**

Allows you to set the SATA#1 configuration.

Options: Disabled, Compatible, Enhanced.

**Configure SATA#1 as**

Allows you to set the onboard Serial SATA mode. This item appears only when you set the "SATA#1 Configuration" to Compatible or Enhanced.

- IDE: Use the SATA hard disk drivers as Parallel ATA storage devices.
- RAID: Create a RAID 0, 1, 0+1, 5 configuration
- AHCI: Use the AHCI (Advanced Host Controller Interface) to enable advanced SATA features for improved performance with NCQ and Hot-plug features

**Note:**

To hot plug ESATA port on the rear panel, you will need to change 2 items in BIOS settings, please refer to the instructions below:

1. Set the "Configure SATA#1 as" item from "IDE" to "AHCI" setting.
2. The "Hot Plug" item appears, select "Enabled".

**SATA#2 Configuration**

Allows you set the SATA#2 Configuration.

Options: Disabled, Enhanced.

## Primary IDE Master/Primary IDE Slave/Secondary IDE Master/Secondary IDE Slave /Third IDE Master/Fourth IDE Master

Sets the IDE configuration for the device that you specify.

### IDE Detect Time Out (sec)

Selects the time out value for detecting IDE devices.

Options: 0, 5, 10, 15, 20, 25, 30, 35.

### AHCI Configuration

Allows you set the AHCI Configuration.

## ► Hardware Health Configuration

BIOS SETUP	
Advanced	
<b>Hardware Health Configuration</b>	
H/W Health Function	[Enabled]
CPU	: 40°C/104°F
VREG	: 44°C/114°F
System	: 34°C/93°F
CPU Fan Speed	: 2029 RPM
Power Fan Speed	: 1500 RPM
Chassis Fan Speed	: 2029 RPM
VCore	: 1.164 V
VDimm	: 1.505 V
VTT	: 1.259 V
NB	: 1.111 V
+5V	: 5.045 V
+12V	: 12.320 V
VCC3	: 3.312 V
3VSB	: 3.360 V
VBAT	: 3.216 V
CPU Fan Type	[PWM FAN (4 pin)]
CPU Fan Mode Setting	[SmartFan]
Temperature Limit of Highest	[050]
Temperature Limit of Lowest	[020]
Fan Highest setting	[100]
Fan Lowest setting	[050]
Power Fan Mode Setting	[SmartFan]
Temperature Limit of Highest	[050]
Temperature Limit of Lowest	[020]
Fan Highest setting	[100]
Fan Lowest setting	[050]
Chassis Fan Mode Setting	[SmartFan]
Temperature Limit of Highest	[050]
Temperature Limit of Lowest	[020]
Fan Highest setting	[100]
Fan Lowest setting	[050]
	← Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit
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**H/W Health Function**

Enables the onboard hardware monitor to automatically detect and display the CPU and mainboard temperatures.

Options: Enabled, Disabled.

**CPU / VREG / System**

Displays the current CPU, onboard regulator and system temperature.

**CPU /Power /Chassis Fan Speed**

Displays the current CPU, Power and Chassis Fan Speed

**VCORE/VDimm/VTT/NB/+5V/+12V/VCC3/VBAT**

The current voltages are automatically detected and displayed by the system.

**CPU Fan Type**

Allows you to select the CPU Fan type.

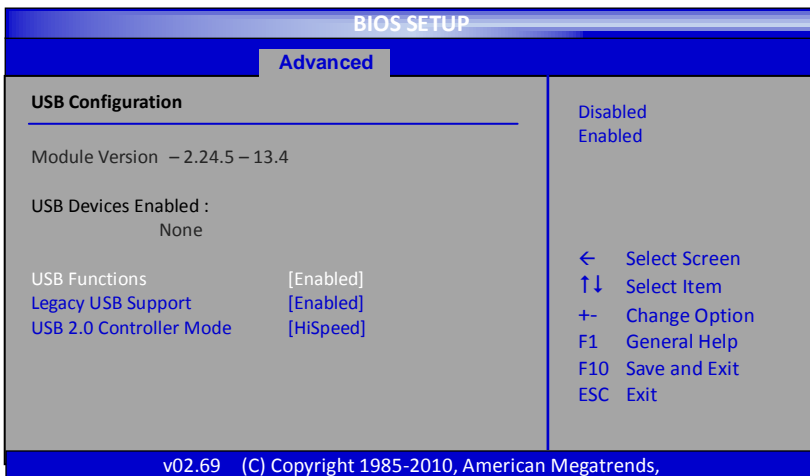
Options: PWM FAN (4 pin), PWM FAN (3 pin)

**CPU Fan Mode Setting**

This item controls the speed of the various fans on the motherboard. Choose [SmartFan] when you want the speed of the fans automatically controlled based on temperature. To set the fan speed to a constant rate, select [Manual] and then enter the speed from 0% to 100%.

Set the desired speed for the Power and Chassis fans from 0% to 100%. The system defaults to 100%.

► **USB Configuration**



**USB Functions**

Enables the USB controller.

Options: Enabled, Disabled.

**Legacy USB Support**

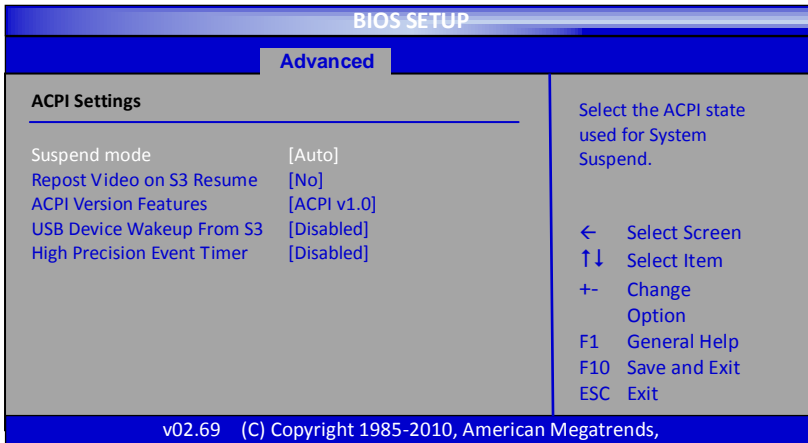
Allows you select legacy support for USB devices.

Options: Enabled, Disabled, Auto.

**USB 2.0 Controller Mode**

Allows you to configure the USB 2.0 Controller Mode.

Options: HiSpeed (480Mbps), FullSpeed (12Mbps)

**► ACPI Configuration****Suspend mode**

Selects the ACPI state used to suspend system.

Options: S1(POS), S3(STR), Auto.

**Repost Video on S3 Resume**

This item determines whether to invoke VGA BIOS POST on S3/STR resume.

Options: No, Yes.

**ACPI Version Features**

Selects the ACPI version. Enable RDSP pointers to 64-bit fixed system description tables.

Options: ACPI v1.0, ACPI v2.0, ACPI v3.0.



### USB Device Wakeup From S3

Allows a USB keyboard device to wake-up the system from S3 state.

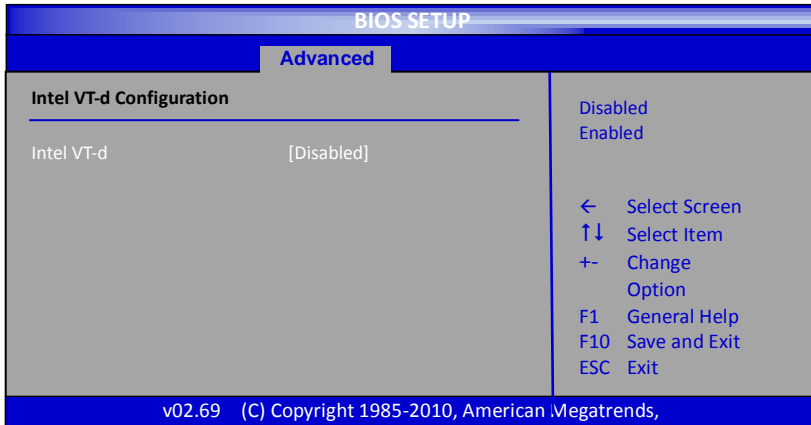
Options: Enabled, Disabled.

### High Precision Event Timer

Allows you to enable or disable the High Precision Event Timer.

Options: Enabled, Disabled.

## ► Intel VT-d Configuration

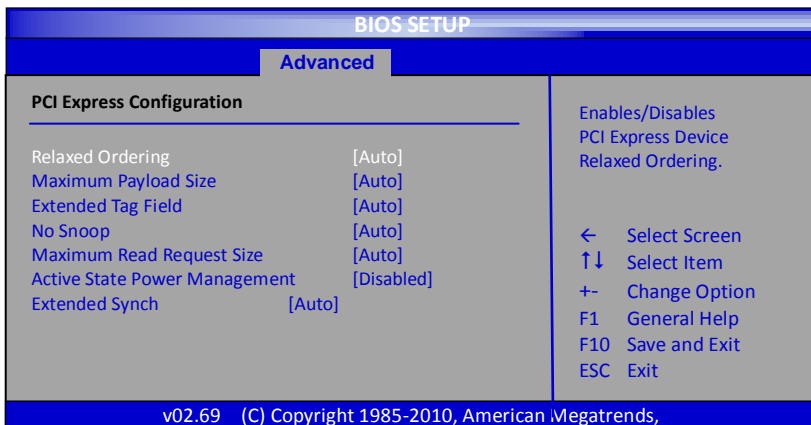


### Intel VT-d

Allows you enable or disable the Intel Virtualization Technology for directed I/O.

Options: Enabled, Disabled.

## ► PCI Express Configuration



**Relaxed Ordering**

Enables the PCI Express device Relaxed Ordering.

Options: Auto, Enabled, Disabled.

**Maximum Payload Size**

Sets the Maximum Payload size of PCI Express Device or allows the System BIOS to select the value.

Options: Auto, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, 4096 Bytes.

**Extended Tag Field**

Allows device to use 8-bit TAG field as a requester.

Options: Auto, Enabled, Disabled.

**No Snoop**

Enables the No Snoop function of PCI Express device.

Options: Auto, Enabled, Disabled.

**Maximum Read Request Size**

Sets the Maximum Read Request size of PCI Express Device or allows System BIOS to select the value.

Options: Auto, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, 4096 Bytes.

**Active State Power Management**

Enables PCI Express L0 and L1 link power states.

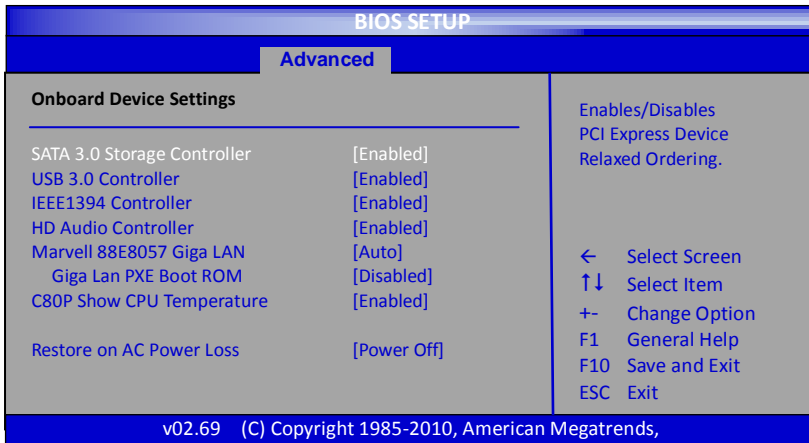
Options: Enabled, Disabled.

**Extended Synch**

Allows generation of Extended Synchronization patterns.

Options: Auto, Enabled, Disabled.

► **OnboardDevice Configuration**



**SATA 3.0 Storage Controller**

Enables the onboard SATA 3.0 Storage controller.

Options: Enabled, Disabled.

**USB 3.0 Controller**

Enables the onboard USB 3.0 controller.

Options: Enabled, Disabled.

**IEEE1394 Controller**

Enables the onboard IEEE1394 controller.

Options: Enabled, Disabled.

**HD Audio Controller**

Enables the onboard High Definition Audio controller.

Options: Enabled, Disabled.

**Marvell 88E8057 Giga LAN**

Enables the onboard Marvell GigaLan function for LAN.

Options: Auto, Enabled, Disabled

**Giga Lan PXE Boot ROM**

Enables the Giga Lan PXE Boot ROM.

Options: Enabled, Disabled

**C80P Show CPU Temperature**

Enables the onboard POST Port LED to display CPU temperature.

Options: Enabled, Disabled, Turn off LED.

## Restore on AC Power Loss

Enables your computer to automatically restart or return to its last operating status after power returns from a power failure.

Options: Power off, Power on, Last State.

## 3-5 PCI PnP Menu

The PCI PnP Menu is used to configure the PCI bus and Plug and Play (PnP) settings.

BIOS SETUP						
Main	Performance	Advanced	PCIPnP	Boo	Security	Exit
<b>Advanced PCI/PnP Settings</b>						
WARNING: Setting wrong values in below sections may cause system to malfunction.				ENABLED: BIOS uses PCI busmastering for reading/writing to IDE drives.		
PCI IDE BusMaster [Enabled]						
IRQ3			[Available]			
IRQ4			[Available]			
IRQ5			[Available]			
IRQ7			[Available]			
IRQ9			[Available]			
IRQ10			[Available]			
IRQ11			[Available]			
IRQ14			[Available]			
IRQ15			[Available]			
DMA Channel 0			[Available]	← Select Screen		
DMA Channel 1			[Available]	↑↓ Select Item		
DMA Channel 3			[Available]	+- Change Option		
DMA Channel 5			[Available]	F1 General Help		
DMA Channel 6			[Available]	F10 Save and Exit		
DMA Channel 7			[Available]	ESC Exit		
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### PCI IDE BusMaster

Enables PCI busmastering for reading/writing to IDE drives.

Options: Enabled, Disabled.

### IRQ3/4/5/7/9/10/11/14/15

This item is used to specify IRQ (interrupt request) available to be used by PCI/PnP devices, or select Reserved for Legacy ISA devices.

Options: Available, Reserved.

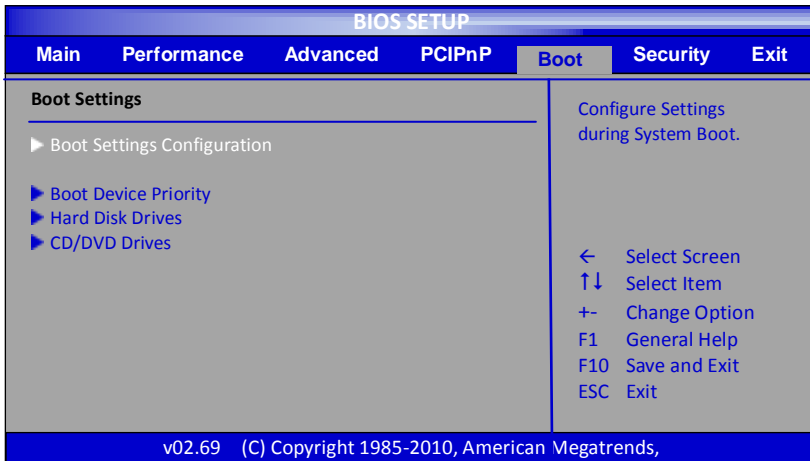
### DMA Channel 0/1/3/5/6/7

This item is used to specify DMA channel available to be used by PCI/PnP devices, or select Reserved for Legacy ISA devices.

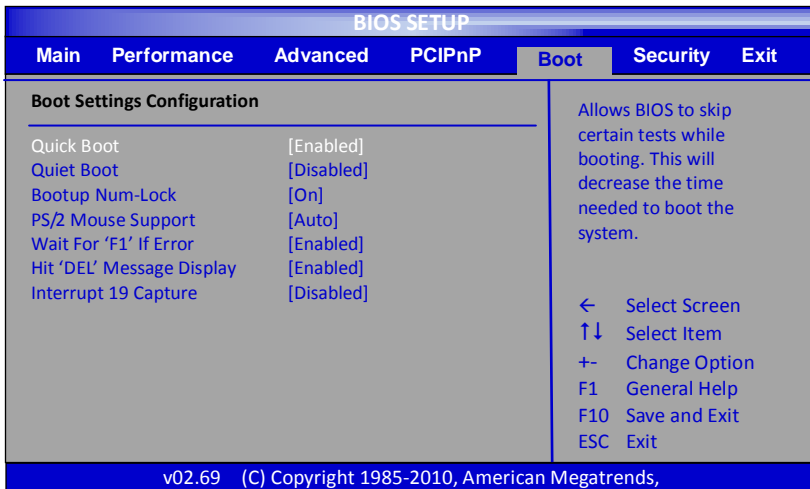
Options: Available, Reserved.

### 3-6 Boot Menu

The Boot menu is used to configure the boot settings and the boot priority.



#### ▶ Boot Settings Configuration



#### Quick Boot

This item allows BIOS to skip the POST (Power On Self Test) items while booting. This will decrease the time needed to boot the system.

Options: Enabled, Disabled.

**Quiet Boot**

Displays normal POST message. Select disable to display Logo instead of POST message.

Options: Enabled, Disabled.

**Bootup Num-Lock**

Selects power-on state for Num-Lock.

Options: On, Off.

**PS/2 Mouse Support**

Selects support for PS/2 mouse.

Options: Auto, Enabled, Disabled.

**Wait For 'F1' If Error**

Allows the system wait for the <F1> key to be pressed when error occurs.

Options: Enabled, Disabled.

**Hit 'DEL' Message Display**

Displays the message "Press DEL to run Setup" in POST time.

Options: Enabled, Disabled.

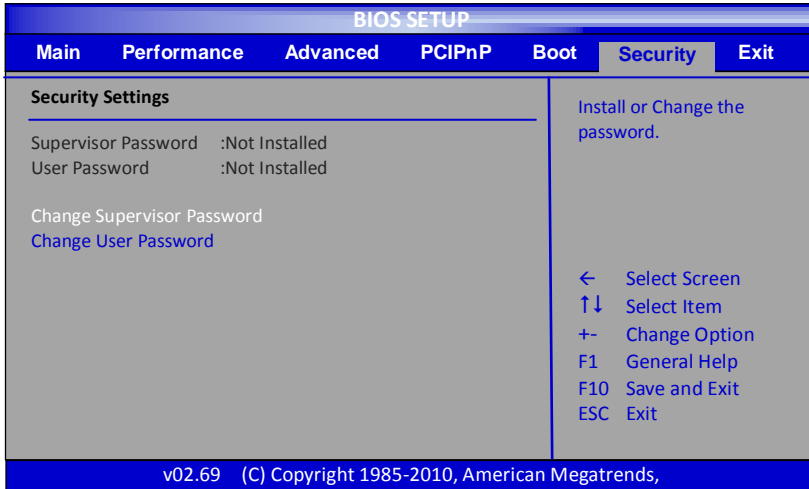
**Interrupt 19 Capture**

Allows the option ROMs to trap interrupt 19.

Options: Enabled, Disabled.

## 3-7 Security Menu

The Security menu allows you to change the system security settings.



### Change Supervisor Password

This item is used to set or change supervisor password.

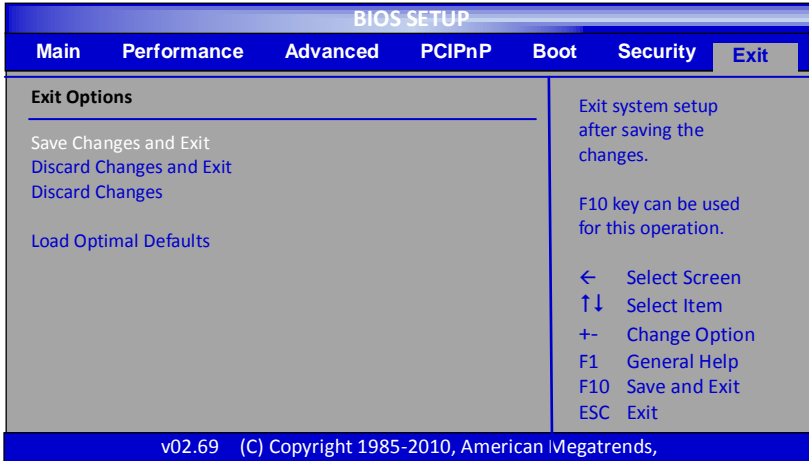
- To set a Supervisor Password:
  1. In the password box, key in a password number, then press <Enter>.
  2. Confirm the password when prompted.
  3. The message "Password Installed" appears after you successfully set your password.
- To change a Supervisor Password, following the same steps above to change your password.

### Change User Password

- To set a User Password:
  1. In the password box, key in a password number, then press <Enter>.
  2. Confirm the password when prompted.
  3. The message "Password Installed" appears after you successfully set your password.
- To change a User Password, following the same steps above to change your password.

## 3-8 Exit Menu

The Exit menu allows you to load the optimal default values for BIOS, and save or discard your changes to the BIOS items.



### Save Changes and Exit

Ensures the values you selected are saved to the CMOS RAM. When you select this option, a confirmation window appears. Select <OK> or <F10> to save changes and exit.

### Discard Changes and Exit

Selects this option if you do not want to save the change that you made to the BIOS SETUP UTILITY. Select <OK> or <ESC> to exit BIOS Setup without saving your modifications.

### Discard Changes

Allows you to discard the selection you made. Select <OK> or <F7> or to discard all changes.

### Load Optimal Defaults

The Optimal defaults are the factory settings of this motherboard. Always load the Optimal defaults after updating the BIOS or after clearing the CMOS values. Select <OK> or <F9> to load the defaults.



## Chapter 4 Driver Installation

After the operating system has been installed, you need to install drivers for this mainboard.


The support CD that came with the motherboard contains necessary drivers and useful utilities that enhance the motherboard features.

Insert the bundled driver CD into your optical drive and the main menu will be displayed on your PC screen. Click each item button and select the item you want to install.



The Mainboard Drivers item shows the available device drivers. Install the necessary drivers to use the devices.

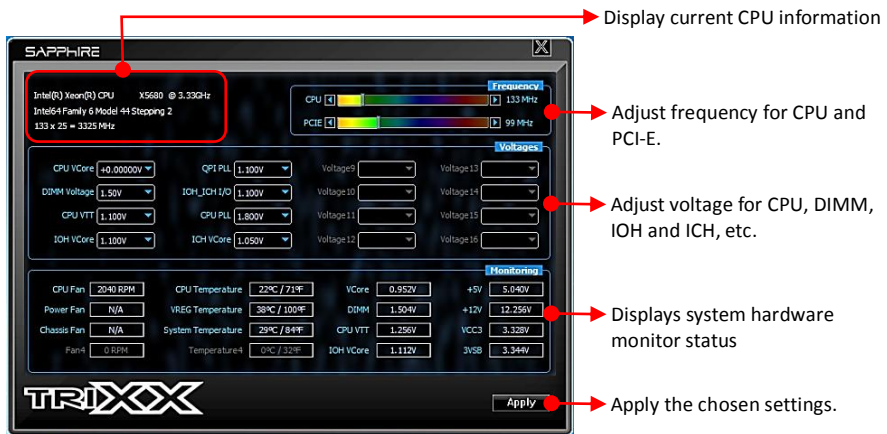


 Note : If Autorun function is not enabled in your computer, browse the contents of the support CD to locate the file SETUP.EXE, and click this file to run the CD.

## ► TRIXX Utility

TRIXX is a simple and easy-to-use utility that allows users to adjust system settings for overclocking in a Windows environment. The TRIXX utility includes three configurations for frequency, voltage and hardware monitoring.

To install TRIXX Utility, run it from the Sapphire Utility page from the bundled CD. A TRIXX Utility shortcut will be created on the Desktop.

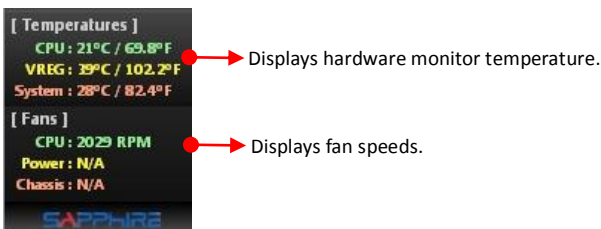


The screenshot shows the TRIXX Utility window with the following sections and annotations:

- Display current CPU information:** A red box highlights the CPU information: Intel(R) Xeon(R) CPU X5600 @ 3.33GHz, Intel(R) Family 6 Model 44 Stepping 2, 133 x 25 = 3325 MHz.
- Adjust frequency for CPU and PCI-E:** A red arrow points to the CPU frequency slider, which is currently set to 133 MHz.
- Adjust voltage for CPU, DIMM, IOH and ICH, etc.:** A red arrow points to the Voltage section, which includes dropdown menus for CPU VCore, DIMM Voltage, CPU VTT, IOH VCore, QPI PLL, IOH\_ICH\_I/O, CPU PLL, and various Voltage (9-16) settings.
- Displays system hardware monitor status:** A red arrow points to the Monitoring section, which displays various hardware metrics such as CPU Fan, Power Fan, Chassis Fan, CPU Temperature, VREG Temperature, System Temperature, VCore, DIMM, CPU VTT, VCC3, and IOH VCore.
- Apply the chosen settings:** A red arrow points to the Apply button at the bottom right of the window.

## ► Hardware monitor gadget

This Hardware monitor gadget directly appears in windows screen after TriXX installation is completed. It can be used to help keep track of temperatures of CPU, VREG, System and fan speed of CPU, Power and chassis.



The screenshot shows the Hardware monitor gadget with the following data and annotations:

- Displays hardware monitor temperature:** A red arrow points to the temperature readings: CPU: 21°C / 69.8°F, VREG: 39°C / 102.2°F, System: 28°C / 82.4°F.
- Displays fan speeds:** A red arrow points to the fan speed readings: CPU: 2029 RPM, Power: N/A, Chassis: N/A.

## **Chapter 5 AMI POST Code**

This chapter provides the AMI POST Codes List for the mainboard during the BIOS pre-boot process.

The POST Codes are displayed on the Debug LED readout located directly onboard the mainboard.

<b>Code</b>	<b>Description</b>
03	Initialize BIOS
04	Check Battery Power and CMOS
05	Initialize interrupt controlling hardware/vector table
06	Initialize system timer
07	Fixes CPU POST interface calling pointer
08	Primary initialization of CPU
C0	Secondary initialization of CPU
C1	Set up boot strap processor information
C2	Set up boot strap processor for POST
C5	Enumerate and set up application processors
C6	Re-enable cache for boot strap processor
C7	Early CPU initialization exit
0A	Initialize keyboard controller
0B	Detect Mouse
0C	Detect Keyboard
0E	Test input devices
13	Early POST initialization of chipset registers
20	Relocate System Management interrupt vector
24	Uncompress and initialize BIOS module
2A	Initialize devices primary
2C	Initialize devices secondary
2E	Initialize output devices
31	Allocate memory for ADM module
33	Initialize silent boot module

37	Display sign-on message
38	Initialize USB controller
39	Initialize DMAC-1 & DMAC-2
3A	Initialize real time clock
3B	Test system memory
3C	Initialization of chipset registers
40	Detect coprocessor
52	Update CMOS memory size
60	Initialize NUM-LOCK
75	Initialize Int-13
78	Initialize IPL devices
7C	Generate and write contents of ESCD
84	Log errors encountered
85	Display errors, if no display check monitor/video card
87	Execute BIOS setup if needed or requested
8C	Late POST initialization of chipset registers
8D	Build ACPI tables
8E	Program peripheral parameters
90	Initialize system management interrupt
A1	Prepare for system boot
A2	Initialize IRQ routing table
A4	Display boot option popup
A7	Display system configuration screen
A9	Wait for user input at configuration display
AA	Uninstall POST vector
AB	Prepare BBS for Int 19 boot
AC	End of POST initialization
B1	Save system context for ACPI
00	Pass control to OS
(can vary)	Show CPU Temp (if enabled)