



E35LM1 R2.0

# User Manual

Version 1.0

Published October 2012

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- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

## CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.

“Perchlorate Material-special handling may apply, see

[www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)”

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# Chapter 1: Introduction

Thank you for purchasing ASRock **E35LM1 R2.0** motherboard, a reliable motherboard produced under ASRock's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock's commitment to quality and endurance.

In this manual, chapter 1 and 2 contain introduction of the motherboard and step-by-step guide to the hardware installation. Chapter 3 and 4 contain the configuration guide to BIOS setup and information of the Support CD.



Because the motherboard specifications and the BIOS software might be updated, the content of this manual will be subject to change without notice. In case any modifications of this manual occur, the updated version will be available on ASRock website without further notice. You may find the latest VGA cards and CPU support lists on ASRock website as well. ASRock website <http://www.asrock.com>

If you require technical support related to this motherboard, please visit our website for specific information about the model you are using. [www.asrock.com/support/index.asp](http://www.asrock.com/support/index.asp)

## 1.1 Package Contents

ASRock **E35LM1 R2.0** Motherboard (Mini-ITX Form Factor)

ASRock **E35LM1 R2.0** Quick Installation Guide

ASRock **E35LM1 R2.0** Support CD

2 x Serial ATA (SATA) Data Cables (Optional)

1 x I/O Panel Shield



### **ASRock Reminds You...**

To get better performance in Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit, it is recommended to set the BIOS option in Storage Configuration to AHCI mode.

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## 1.2 Specifications

<b>Platform</b>	- Mini-ITX Form Factor
<b>CPU</b>	- AMD Zacate E-240 APU - Supports AMD's Cool 'n' Quiet™ Technology - UMI 2.5 GT/s
<b>Chipset</b>	- AMD A50M Chipset
<b>Memory</b>	- 2 x DDR3 DIMM slots - Supports DDR3 1333(OC)/1066/800 non-ECC, un-buffered memory - Max. capacity of system memory: 16GB (see <b>CAUTION 1</b> )
<b>Expansion Slot</b>	- 1 x PCI Express 2.0 x16 slot (PCI-E1 @ x4 mode)
<b>Graphics</b>	- Integrated AMD Radeon HD 6310 graphics - DX11 class iGPU, Pixel Shader 5.0 - Max. shared memory 512MB - Supports D-Sub with max. resolution up to 2560x1600 @ 60Hz
<b>Audio</b>	- 5.1 CH HD Audio (Realtek ALC662 Audio Codec)
<b>LAN</b>	- PCI-E x1 Gigabit LAN 10/100/1000 Mb/s - Realtek RTL8111E - Supports Wake-On-LAN - Supports LAN Cable Detection - Supports Energy Efficient Ethernet 802.3az - Supports PXE
<b>Rear Panel I/O</b>	I/O Panel - 1 x PS/2 Keyboard/Mouse Port - 1 x VGA Port - 4 x Ready-to-Use USB 2.0 Ports - 1 x RJ-45 LAN Port with LED (ACT/LINK LED and SPEED LED) - HD Audio Jack: Line in / Front Speaker / Microphone
<b>SATA3</b>	- 4 x SATA3 6.0 Gb/s connectors, support NCQ, AHCI and "Hot Plug" functions
<b>Connector</b>	- 4 x SATA3 6.0Gb/s connectors - 1 x CIR header - 1 x COM port header - 1 x Chassis Intrusion header - 1 x CPU Fan connector (3-pin) - 2 x Chassis Fan connectors (1 x 4-pin, 1 x 3-pin) - 24 pin ATX power connector - Front panel audio connector

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	- 2 x USB 2.0 headers (support 4 USB 2.0 ports)
<b>BIOS Feature</b>	<ul style="list-style-type: none"> <li>- 32Mb AMI UEFI Legal BIOS with GUI support</li> <li>- Supports "Plug and Play"</li> <li>- ACPI 1.1 Compliance Wake Up Events</li> <li>- Supports jumperfree</li> <li>- SMBIOS 2.3.1 Support</li> <li>- DRAM, FCH, +1V, +1.8V Voltage Multi-adjustment</li> </ul>
<b>Support CD</b>	- Drivers, Utilities, AntiVirus Software (Trial Version), CyberLink MediaEspresso 6.5 Trial, ASRock MAGIX Multimedia Suite - OEM, Google Chrome Browser and Toolbar
<b>Hardware Monitor</b>	<ul style="list-style-type: none"> <li>- CPU Temperature Sensing</li> <li>- Chassis Temperature Sensing</li> <li>- CPU Fan Tachometer</li> <li>- Chassis Fan Tachometer</li> <li>- CPU Quiet Fan (Allow Chassis Fan Speed Auto-Adjust by CPU Temperature)</li> <li>- CPU/Chassis Fan Multi-Speed Control</li> <li>- CASE OPEN detection</li> <li>- Voltage Monitoring: +12V, +5V, +3.3V, CPU Vcore</li> </ul>
<b>OS</b>	- Microsoft® Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64-bit compliant (see <b>CAUTION 2</b> )
<b>Certifications</b>	<ul style="list-style-type: none"> <li>- FCC, CE, WHQL</li> <li>- ErP/EuP Ready (ErP/EuP ready power supply is required)</li> </ul>

\* For detailed product information, please visit our website: <http://www.asrock.com>

### **WARNING**

Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of your system. It should be done at your own risk and expense. We are not responsible for possible damage caused by overclocking.

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## ***CAUTION!***

1. Due to the operating system limitation, the actual memory size may be less than 4GB for the reservation for system usage under Windows® 8 / 7 / Vista™ / XP. For Windows® OS with 64-bit CPU, there is no such limitation.
2. ASRock XFast RAM is not supported by Microsoft® Windows® XP 64-bit.

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## 1.3 Unique Features

### **ASRock Instant Boot**

ASRock Instant Boot allows you to turn on your PC in just a few seconds, provides a much more efficient way to save energy, time, money, and improves system running speed for your system. It leverages the S3 and S4 ACPI features which normally enable the Sleep/Standby and Hibernation modes in Windows® to shorten boot up time. By calling S3 and S4 at specific timing during the shutdown and startup process, Instant Boot allows you to enter your Windows® desktop in a few seconds.

### **ASRock Instant Flash**

ASRock Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows you to update system BIOS without entering operating systems first like MS-DOS or Windows®. With this utility, you can press the <F6> key during the POST or the <F2> key to enter into the BIOS setup menu to access ASRock Instant Flash. Just launch this tool and save the new BIOS file to your USB flash drive, floppy disk or hard drive, then you can update your BIOS only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system.

### **ASRock APP Charger**

If you desire a faster, less restricted way of charging your Apple devices, such as iPhone/iPad/iPod Touch, ASRock has prepared a wonderful solution for you - ASRock APP Charger. Simply install the APP Charger driver, it makes your iPhone charge much quickly from your computer and up to 40% faster than before. ASRock APP Charger allows you to quickly charge many Apple devices simultaneously and even supports continuous charging when your PC enters into Standby mode (S1), Suspend to RAM (S3), hibernation mode (S4) or power off (S5). With APP Charger driver installed, you can easily enjoy the marvelous charging experience.

---

### **ASRock XFast USB**

ASRock XFast USB can boost USB storage device performance. The performance may depend on the properties of the device.

### **ASRock XFast LAN**

ASRock XFast LAN provides a faster internet access, which includes the benefits listed below. LAN Application Prioritization: You can configure your application's priority ideally and/or add new programs. Lower Latency in Game: After setting online game's priority higher, it can lower the latency in games. Traffic Shaping: You can watch Youtube HD videos and download simultaneously. Real-Time Analysis of Your Data: With the status window, you can easily recognize which data streams you are transferring currently.

### **ASRock XFast RAM**

ASRock XFast RAM fully utilizes the memory space that cannot be used under Windows® OS 32-bit CPU. ASRock XFast RAM shortens the loading time of previously visited websites, making web surfing faster than ever. And it also boosts the speed of Adobe Photoshop 5 times faster. Another advantage of ASRock XFast RAM is that it reduces the frequency of accessing your SSDs or HDDs in order to extend their lifespan.

### **ASRock Crashless BIOS**

ASRock Crashless BIOS allows users to update their BIOS without fear of failing. If power loss occurs during the BIOS update process, ASRock Crashless BIOS will automatically finish the BIOS update procedure after regaining power. Please note that BIOS files need to be placed in the root directory of your USB disk. Only USB2.0 ports support this feature.

### **ASRock OMG (Online Management Guard)**

Administrators are able to establish an internet curfew or restrict internet access at specified times via OMG. You may schedule the starting and ending hours of internet access granted to other users. In order to prevent users from bypassing OMG, guest accounts without permission to modify the system time are required.

---

### **ASRock Internet Flash**

ASRock Internet Flash searches for available UEFI firmware updates from our servers. In other words, the system can auto-detect the latest UEFI from our servers and flash them without entering Windows® OS. Please note that you must be running on a DHCP configured computer in order to enable this function.

### **ASRock UEFI System Browser**

ASRock UEFI system browser is a useful tool included in graphical UEFI. It can detect the devices and configurations that users are currently using in their PC. With the UEFI system browser, you can easily examine the current system configuration in UEFI setup.

### **ASRock Dehumidifier Function**

Users may prevent motherboard damages due to dampness by enabling "Dehumidifier Function". When enabling Dehumidifier Function, the computer will power on automatically to dehumidify the system after entering S4/S5 state.

### **ASRock Fast Boot**

With ASRock's exclusive Fast Boot technology, it takes less than 1.5 seconds to logon to Windows® 8 from a cold boot. No more waiting! The speedy boot will completely change your user experience and behavior.

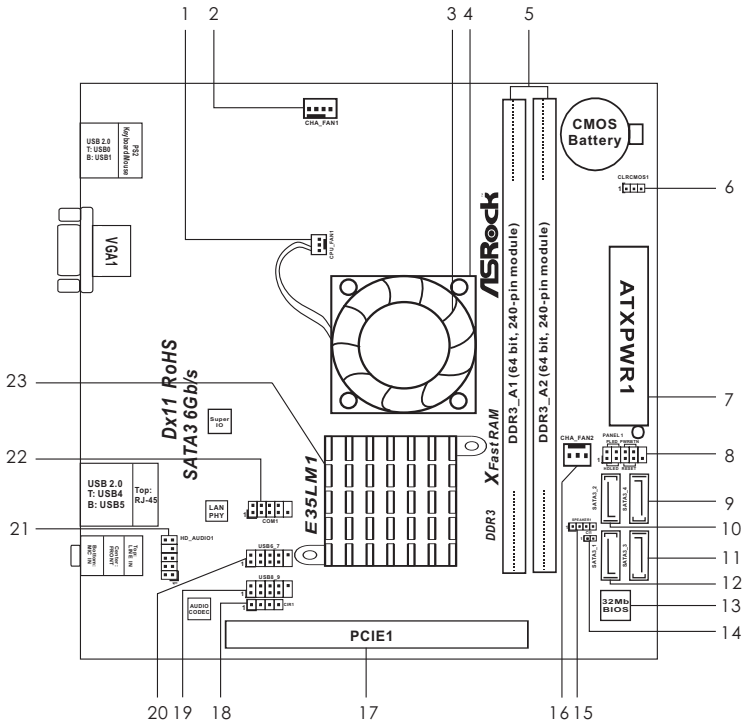
### **ASRock Restart to UEFI**

Windows® 8 brings the ultimate boot up experience. The lightning boot up speed makes it hard to access the UEFI setup. ASRock Restart to UEFI technology is designed for those requiring frequent UEFI access. It allows users to easily enter the UEFI automatically when turning on the PC next time. Just simply enable this function; the PC will be assured to access the UEFI directly in the very beginning.

### **ASRock Good Night LED**

ASRock Good Night LED technology can offer you a better environment by extinguishing the unessential LED. By enabling Good Night LED in BIOS, the Power / HDD / LAN LED will be switched off when system is on. Not only this, Good night LED will automatically switch off Power and Keyboard LED when the system enters into Standby / Hibernation mode as well.

## 1.4 Motherboard Layout



- |    |   |    |  |
|----|---|----|--|
| 1  | CPU Fan Connector (CPU_FAN1)                      | 12 | SATA3 Connector (SATA3_1)              |
| 2  | Chassis Fan Connector (CHA_FAN1)                  | 13 | 32Mb SPI Flash                         |
| 3  | CPU Fan   | 14 | Chassis Intrusion Header (CI1)         |
| 4  | CPU Heatsink                                      | 15 | Chassis Speaker Header (SPEAKER1)      |
| 5  | 2 x 240-pin DDR3 DIMM Slots<br>(DDR3_A1, DDR3_A2) | 16 | Chassis Fan Connector (CHA_FAN2)       |
| 6  | Clear CMOS Jumper (CLRCMOS1)                      | 17 | PCI Express 2.0 x16 Slot (PCIE1)       |
| 7  | ATX Power Connector (ATXPWR1)                     | 18 | Consumer Infrared Module Header (CIR1) |
| 8  | System Panel Header (PANEL1)                      | 19 | USB 2.0 Header (USB8_9)                |
| 9  | SATA3 Connector (SATA3_4)                         | 20 | USB 2.0 Header (USB6_7)                |
| 10 | SATA3 Connector (SATA3_2)                         | 21 | Front Panel Audio Header (HD_AUDIO1)   |
| 11 | SATA3 Connector (SATA3_3)                         | 22 | COM Port Header (COM1)                 |
|    |   | 23 | AMD A50M Chipset                       |

## 1.5 I/O Panel

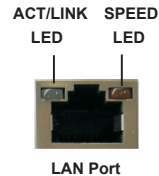


- |   |                           |
|---|---------------------------|
| 1 PS/2 Keyboard/Mouse Port (Purple/Green) | ** 5 Front Speaker (Lime) |
| 2 VGA Port                                | 6 Microphone (Pink)       |
| * 3 LAN RJ-45 Port                        | 7 USB 2.0 Ports (USB45)   |
| 4 Line In (Light Blue)                    | 8 USB 2.0 Ports (USB01)   |

\* There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.


### LAN Port LED Indications

Activity/Link LED		SPEED LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Blinking	Data Activity	Orange	100Mbps connection
On	Link	Green	1Gbps connection



\*\* To enable Multi-Streaming function, you need to connect a front panel audio cable to the front panel audio header. Please refer to below steps for the software setting of Multi-Streaming.

For Windows® XP:

After restarting your computer, you will find "Mixer" tool on your system. Please select "Mixer ToolBox" , click "Enable playback multi-streaming", and click "ok". Choose "2CH" or

"4CH" and then you are allowed to select "Realtek HDA Primary output" to use Rear Speaker and Front Speaker, or select "Realtek HDA Audio 2nd output" to use front panel audio. Then reboot your system.

For Windows® 8 / 7 / Vista™:

After restarting your computer, please double-click "Realtek HD Audio Manager" on the system tray. Set "Speaker Configuration" to "Quadraphonic" or "Stereo". Click "Device advanced settings", choose "Make front and rear output devices playbacks two different audio streams simultaneously", and click "ok". Then reboot your system.

---

## Chapter 2: Installation

This is a Mini-ITX form factor motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.



Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.

### 2.1 Screw Holes

Place screws into the holes indicated by circles to secure the motherboard to the chassis.



Do not over-tighten the screws! Doing so may damage the motherboard.

### 2.2 Pre-installation Precautions

Take note of the following precautions before you install motherboard components or change any motherboard settings.

1. Unplug the power cord from the wall socket before touching any component.
2. To avoid damaging the motherboard components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that comes with the component.



Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

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## 2.3 Installation of Memory Modules (DIMM)

**E35LM1 R2.0** motherboard provides two 240-pin DDR3 (Double Data Rate 3) DIMM slots.



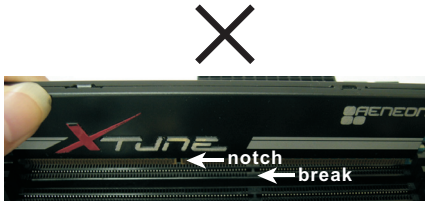
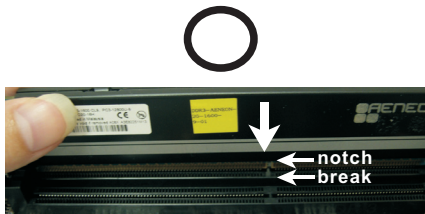
It is not allowed to install a DDR or DDR2 memory module into DDR3 slot; otherwise, this motherboard and DIMM may be damaged.

### Installing a DIMM



Please make sure to disconnect power supply before adding or removing DIMMs or the system components.

- Step 1. Unlock a DIMM slot by pressing the retaining clips outward.
- Step 2. Align a DIMM on the slot such that the notch on the DIMM matches the break on the slot.



The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

- Step 3. Firmly insert the DIMM into the slot until the retaining clips at both ends would snap back in place and the DIMM is properly seated.

---

## 2.4 Expansion Slot (PCI Express Slot)

There is 1 PCI Express slot on this motherboard.

**PCIe slot:**

PCIe1 (PCIe x16 slot) is used for PCI Express x4 lane width graphics cards.

### Installing an expansion card

- Step 1. Before installing the expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.
- Step 2. Remove the system unit cover (if your motherboard is already installed in a chassis).
- Step 3. Remove the bracket facing the slot that you intend to use. Keep the screws for later use.
- Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
- Step 5. Fasten the card to the chassis with screws.
- Step 6. Replace the system cover.

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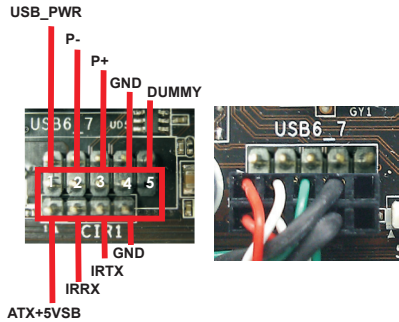
## 2.5 ASRock Smart Remote Installation Guide

ASRock Smart Remote is only used for ASRock motherboard with CIR header. Please refer to below procedures for the quick installation and usage of ASRock Smart Remote.

Step1. Find the CIR header located next to the USB 2.0 header on ASRock motherboard.



Step2. Connect the front USB cable to the USB 2.0 header (as below, pin 1-5) and the CIR header. Please make sure the wire assignments and the pin assignments are matched correctly.



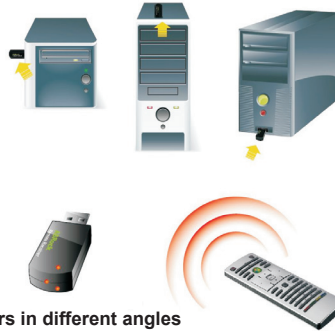
Step3. Install Multi-Angle CIR Receiver to the front USB port.

Step4. Boot up your system. Press <F2> or <Del> to enter BIOS Setup Utility. Make sure the option "CIR Controller" is setting at [Enabled]. (Advanced -> Super IO Configuration -> CIR Controller -> [Enabled])



If you cannot find this option, please shut down your system and install Multi-Angle CIR Receiver to the other front USB port then try again.

Step5. Enter Windows. Execute ASRock support CD and install CIR Driver. (It is listed at the bottom of driver list.)



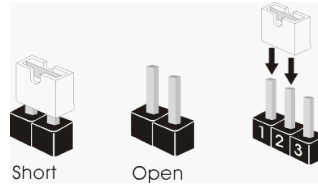
1. Only one of the front USB port can support CIR function. When the CIR function is enabled, the other port will remain USB function.
2. Multi-Angle CIR Receiver is used for front USB only. Please do not use the rear USB bracket to connect it on the rear panel. Multi-Angle CIR Receiver can receive the multi-direction infrared signals (top, down and front), which is compatible with most of the chassis on the market.
3. The Multi-Angle CIR Receiver does not support Hot-Plug function. Please install it before you boot the system.



\* ASRock Smart Remote is only supported by some of ASRock motherboards. Please refer to ASRock website for the motherboard support list: <http://www.asrock.com>

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## 2.6 Jumpers Setup

The illustration shows how jumpers are set up. When the jumper cap is placed on pins, the jumper is “Short”. If no jumper cap is placed on pins, the jumper is “Open”. The illustration shows a 3-pin jumper whose pin1 and pin2 are “Short” when jumper cap is placed on these 2 pins.



Jumper	Setting	Description
Clear CMOS Jumper (CLRCMOS1) (see p.12, No. 6)	 1_2 Default	 2_3 Clear CMOS

Note: CLRCMOS1 allows you to clear the data in CMOS. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin2 and pin3 on CLRCMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. Please be noted that the password, date, time, user default profile, 1394 GUID and MAC address will be cleared only if the CMOS battery is removed.



If you clear the CMOS, the case open may be detected. Please adjust the BIOS option “Clear Status” to clear the record of previous chassis intrusion status.

---

## 2.7 Onboard Headers and Connectors



Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage of the motherboard!

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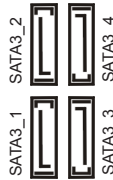
### Serial ATA3 Connectors

(SATA3\_1: see p.12, No. 12)

(SATA3\_2: see p.12, No. 10)

(SATA3\_3: see p.12, No. 11)

(SATA3\_4: see p.12, No. 9)



These four Serial ATA3 (SATA3) connectors support SATA data cables for internal storage devices. The current SATA3 interface allows up to 6.0 Gb/s data transfer rate.

---

### Serial ATA (SATA)

Data Cable

(Optional)



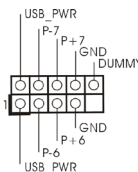
Either end of the SATA data cable can be connected to the SATA / SATA2 / SATA3 hard disk or the SATA2 / SATA3 connector on this motherboard.

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### USB 2.0 Headers

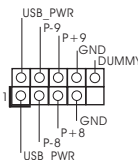
(9-pin USB6\_7)

(see p.12 No. 20)



(9-pin USB8\_9)

(see p.12 No. 19)



Besides four default USB 2.0 ports on the I/O panel, there are two USB 2.0 headers on this motherboard. Each USB 2.0 header can support two USB 2.0 ports.

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### Consumer Infrared Module Header

(4-pin CIR1)

(see p.12 No. 18)



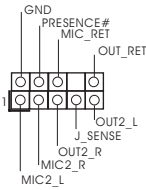
This header can be used to connect the remote controller receiver.

---

## Front Panel Audio Header

(9-pin HD\_AUDIO1)

(see p.12 No. 21)



This is an interface for front panel audio cable that allows convenient connection and control of audio devices.



1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instruction in our manual and chassis manual to install your system.
2. If you use AC'97 audio panel, please install it to the front panel audio header as below:
  - A. Connect Mic\_IN (MIC) to MIC2\_L.
  - B. Connect Audio\_R (RIN) to OUT2\_R and Audio\_L (LIN) to OUT2\_L.
  - C. Connect Ground (GND) to Ground (GND).
  - D. MIC\_RET and OUT\_RET are for HD audio panel only. You don't need to connect them for AC'97 audio panel.
  - E. To activate the front mic.

For Windows® XP / XP 64-bit OS:

Select "Mixer". Select "Recorder". Then click "FrontMic".

For Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS:

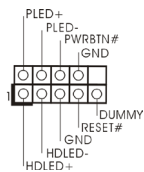
Go to the "FrontMic" Tab in the Realtek Control panel. Adjust "Recording Volume".

---

## System Panel Header

(9-pin PANEL1)

(see p.12 No. 8)



This header accommodates several system front panel functions.



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

### **PWRBTN (Power Switch):**

Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.

### **RESET (Reset Switch):**

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

---

**PLED (System Power LED):**

Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1 sleep state. The LED is off when the system is in S3/S4 sleep state or powered off (S5).

**HDLED (Hard Drive Activity LED):**

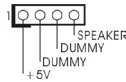
Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

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

---

**Chassis Speaker Header**

(4-pin SPEAKER 1)  
(see p.12 No. 15)

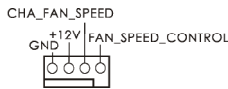


Please connect the chassis speaker to this header.

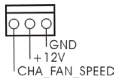
---

**Chassis Fan Connectors**

(4-pin CHA\_FAN1)  
(see p.12 No. 2)



(3-pin CHA\_FAN2)  
(see p.12 No. 16)



Please connect the fan cables to the fan connectors and match the black wire to the ground pin. CHA\_FAN2 supports fan speed control by fan power voltage.

---

**CPU Fan Connectors**

(3-pin CPU\_FAN1)  
(see p.12 No. 1)

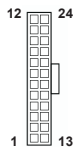


Please connect the CPU fan cable to the connector and match the black wire to the ground pin. CPU\_FAN1 supports fan speed control.

---

**ATX Power Connector**

(24-pin ATXPWR1)  
(see p.12 No. 7)



Please connect an ATX power supply to this connector.



Though this motherboard provides 24-pin ATX power connector, it can still work if you adopt a traditional 20-pin ATX power supply. To use the 20-pin ATX power supply, please plug your power supply along with Pin 1 and Pin 13.

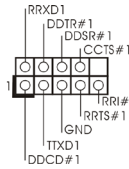


20-Pin ATX Power Supply Installation

### Serial port Header

(9-pin COM1)

(see p.12 No. 22)



This COM1 header supports a serial port module.

### Chassis Intrusion Header

(2-pin Cl1)

(see p.12 No. 14)



This motherboard supports CASE OPEN detection feature that detects if the chassis cover has been removed. This feature requires a chassis with chassis intrusion detection design.

---

## 2.8 Serial ATA3 (SATA3) Hard Disks Installation

This motherboard adopts AMD A50M chipset that supports Serial ATA3 (SATA3) hard disks. You may install SATA3 hard disks on this motherboard for internal storage devices. This section will guide you to install the SATA3 hard disks.

- STEP 1: Install the SATA3 hard disks into the drive bays of your chassis.
- STEP 2: Connect the SATA power cable to the SATA3 hard disk.
- STEP 3: Connect one end of the SATA data cable to the motherboard's SATA3 connector.
- STEP 4: Connect the other end of the SATA data cable to the SATA3 hard disk.

## 2.9 Hot Plug Function for SATA3 HDDs

This motherboard supports Hot Plug function for SATA3 in AHCI mode. AMD A50M chipset provides hardware support for Advanced Host controller Interface (AHCI), a new programming interface for SATA host controllers developed thru a joint industry effort.



### NOTE

#### What is Hot Plug Function?

If the SATA3 HDDs are NOT set for RAID configuration, it is called "Hot Plug" for the action to insert and remove the SATA3 HDDs while the system is still power-on and in working condition.

However, please note that it cannot perform Hot Plug if the OS has been installed into the SATA3 HDD.

---

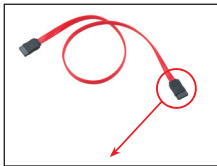
## 2.10 SATA3 HDD Hot Plug Feature and Operation Guide

This motherboard supports Hot Plug feature for SATA3 HDD in RAID / AHCI mode. Please read below operation guide of Hot Plug feature carefully. Before you process the SATA3 HDD Hot Plug, please check below cable accessories from the motherboard gift box pack.

A. 7-pin SATA data cable

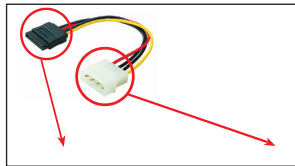
B. SATA power cable with SATA 15-pin power connector interface

A. SATA data cable (Red)



SATA 7-pin connector

B. SATA power cable



The SATA 15-pin power connector (Black) connect to SATA3 HDD

1x4-pin conventional power connector (White) connect to power supply

### Caution

1. Without SATA 15-pin power connector interface, the SATA3 Hot Plug cannot be processed.
2. Even some SATA3 HDDs provide both SATA 15-pin power connector and IDE 1x4-pin conventional power connector interfaces, the IDE 1x4-pin conventional power connector interface is definitely not able to support Hot Plug and will cause the HDD damage and data loss.

### Points of attention, before you process the Hot Plug:

1. Below operation procedure is designed only for our motherboard, which supports SATA3 HDD Hot Plug.
  - \* The SATA3 Hot Plug feature might not be supported by the chipset because of its limitation, the SATA3 Hot Plug support information of our motherboard is indicated in the product spec on our website: [www.asrock.com](http://www.asrock.com)
2. Make sure your SATA3 HDD can support Hot Plug function from your dealer or HDD user manual. The SATA3 HDD, which cannot support Hot Plug function, will be damaged under the Hot Plug operation.
3. Please make sure the SATA3 driver is installed into system properly. The latest SATA3 driver is available on our support website: [www.asrock.com](http://www.asrock.com)
4. Make sure to use the SATA power cable & data cable, which are from our motherboard package.
5. Please follow below instructions step by step to reduce the risk of HDD crash or data loss.

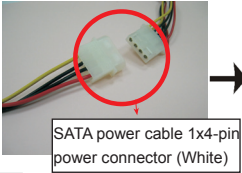
---

## How to Hot Plug a SATA3 HDD:

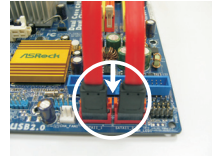
Points of attention, before you process the Hot Plug:

Please do follow below instruction sequence to process the Hot Plug, improper procedure will cause the SATA3 HDD damage and data loss.

**Step 1** Please connect SATA power cable 1x4-pin end (White) to the power supply 1x4-pin cable.



**Step 2** Connect SATA data cable to the motherboard's SATAII / SATA3 connector.



**Step 3** Connect SATA 15-pin power cable connector (Black) end to SATA3 HDD.



**Step 4** Connect SATA data cable to the SATA3 HDD.



## How to Hot Unplug a SATA3 HDD:

Points of attention, before you process the Hot Unplug:

Please do follow below instruction sequence to process the Hot Unplug, improper procedure will cause the SATA3 HDD damage and data loss.

**Step 1** Unplug SATA data cable from SATA3 HDD side.



**Step 2** Unplug SATA 15-pin power cable connector (Black) from SATA3 HDD side.



---

## 2.11 Driver Installation Guide

To install the drivers to your system, please insert the support CD to your optical drive first. Then, the drivers compatible to your system can be auto-detected and listed on the support CD driver page. Please follow the order from up to bottom side to install those required drivers. Therefore, the drivers you install can work properly.

## 2.12 Installing Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64-bit Without RAID Functions

If you want to install Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64-bit OS on your SATA3 HDDs without RAID functions, please follow below procedures according to the OS you install.

### 2.12.1 Installing Windows® XP / XP 64-bit Without RAID Functions

If you want to install Windows® XP / XP 64-bit OS on your SATA3 HDDs without RAID functions, please follow below steps.



AHCI mode is not supported under Windows® XP / XP 64-bit OS.

#### Using SATA3 HDDs without NCQ function

##### STEP 1: Set up UEFI.

- A. Enter UEFI SETUP UTILITY → Advanced screen → Storage Configuration.
- B. Set the option “SATA Mode” to [IDE].

##### STEP 2: Install Windows® XP / XP 64-bit OS on your system.

---

## 2.12.2 Installing Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit Without RAID Functions

If you want to install Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your SATA3 HDDs without RAID functions, please follow below steps.

### Using SATA3 HDDs with NCQ function

#### STEP 1: Set up UEFI.

- A. Enter UEFI SETUP UTILITY → Advanced screen → Storage Configuration.
- B. Set the option “SATA Mode” to [AHC].

**STEP 2: Install Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your system.**

### Using STA3 HDDs without NCQ function

#### STEP 1: Set up UEFI.

- A. Enter UEFI SETUP UTILITY → Advanced screen → Storage Configuration.
- B. Set the option “SATA Mode” to [IDE].

**STEP 2: Install Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your system.**

---

## Chapter 3: UEFI SETUP UTILITY

### 3.1 Introduction

This section explains how to use the UEFI SETUP UTILITY to configure your system. The UEFI chip on the motherboard stores the UEFI SETUP UTILITY. You may run the UEFI SETUP UTILITY when you start up the computer. Please press <F2> or <Del> during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY, otherwise, POST will continue with its test routines.

If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.



Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

#### 3.1.1 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

<b>Main</b>	To set up the system time/date information
<b>OC Tweaker</b>	To set up overclocking features
<b>Advanced</b>	To set up the advanced UEFI features
<b>Tool</b>	Useful tools
<b>H/W Monitor</b>	To display current hardware status
<b>Boot</b>	To set up the default system device to locate and load the Operating System
<b>Security</b>	To set up the security features
<b>Exit</b>	To exit the current screen or the UEFI SETUP UTILITY

Use <←> key or <→> key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

### 3.1.2 Navigation Keys

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

Navigation 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
<Tab>	Switch to next function
<Enter>	To bring up the selected screen
<PGUP>	Go to the previous page
<PGDN>	Go to the next page
<HOME>	Go to the top of the screen
<END>	Go to the bottom of the screen
<F1>	To display the General Help Screen
<F7>	Discard changes and exit the UEFI SETUP UTILITY
<F9>	Load optimal default values for all the settings
<F10>	Save changes and exit the UEFI SETUP UTILITY
<F12>	Print screen
<ESC>	Jump to the Exit Screen or exit the current screen

### 3.2 Main Screen

When you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview.



---

### 3.3 OC Tweaker Screen

In the OC Tweaker screen, you can set up overclocking features.



#### DRAM Timing Configuration

##### DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assigns appropriate frequency automatically.

##### DRAM Timing Control



##### Power Saving Mode

Use this to enable or disable Power Saving Mode. The default value is [Disabled].

##### Bank Interleaving

Interleaving allows memory accesses to be spread out over banks on the same node, or accross nodes, decreasing access contention.

---

**CAS# Latency (tCL)**

Use this item to change CAS# Latency (tCL) Auto/Manual setting. The default is [Auto].

**RAS# to CAS# Delay (tRCD)**

Use this item to change RAS# to CAS# Delay (tRCD) Auto/Manual setting. The default is [Auto].

**Row Precharge Time (tRP)**

Use this item to change Row Precharge Time (tRP) Auto/Manual setting. The default is [Auto].

**RAS# Active Time (tRAS)**

Use this item to change RAS# Active Time (tRAS) Auto/Manual setting. The default is [Auto].

**Command Rate (CR)**

Use this item to change Command Rate (CR) Auto/Manual setting. Min: 1N. Max: 2N. The default is [Auto].

**RAS# Cycle Time (tRC)**

Use this item to change RAS# Cycle Time (tRC) Auto/Manual setting. The default is [Auto].

**Write Recovery Time (tWR)**

Use this item to change Write Recovery Time (tWR) Auto/Manual setting. The default is [Auto].

**Refresh Cycle Time (tRFC)**

Use this item to change Refresh Cycle Time (tRFC) Auto/Manual setting. The default is [Auto].

**RAS to RAS Delay (tRRD)**

Use this item to change RAS to RAS Delay (tRRD) Auto/Manual setting. The default is [Auto].

**Write to Read Delay (tWTR)**

Use this item to change Write to Read Delay (tWTR) Auto/Manual setting. The default is [Auto].

**Read to Precharge (tRTP)**

Use this item to change Read to Precharge (tRTP) Auto/Manual setting. The default is [Auto].

**Four Activate Window (tFAW)**

Use this item to change Four Activate Window (tFAW) Auto/Manual setting. The default is [Auto].

---

## **Voltage Configuration**

### **DRAM Voltage**

Use this to select DRAM Voltage. The default value is [Auto].

### **FCH Voltage**

Use this to select FCH Voltage. The default value is [Auto].

### **+1.8V Voltage**

Use this to select +1.8V Voltage. The default value is [Auto].

### **+1V Voltage**

Use this to select +1V Voltage. The default value is [Auto].

---

### 3.4 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, North Bridge Configuration, South Bridge Configuration, Storage Configuration, Super IO Configuration, ACPI Configuration and USB Configuration.



Setting wrong values in this section may cause the system to malfunction.

---

### 3.4.1 CPU Configuration



#### Cool 'n' Quiet

Use this item to enable or disable AMD's Cool 'n' Quiet™ technology. The default value is [Enabled]. Configuration options: [Auto], [Enabled] and [Disabled]. If you install Windows® 8 / 7 / Vista™ and want to enable this function, please set this item to [Enabled]. Please note that enabling this function may reduce CPU voltage and memory frequency, and lead to system stability or compatibility issue with some memory modules or power supplies. Please set this item to [Disable] if above issue occurs.

#### SVM Mode

Use this to enable or disable SVM (Secure Virtual Machine) architecture. When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by AMD-V. Configuration options: [Enabled] and [Disabled]. The default value is [Enabled].

#### C6 Mode

Use this to enable or disable CPU C6 state. The default value is [Disabled].

---

## 3.4.2 North Bridge Configuration



### Primary Graphics Adapter

This item allows you to select the type of Primary VGA in case of multiple video controllers. The default value of this feature is [PCI Express].

Configuration options: [Onboard] and [PCI Express].

### Share Memory

This allows you to set onboard VGA share memory feature. The default value is [Auto].

---

### 3.4.3 South Bridge Configuration



#### Onboard HD Audio

Select [Enabled] or [Disabled] for the onboard HD Audio feature. The default value is [Enabled].

#### Front Panel

Select [Auto] or [Disabled] for the onboard HD Audio Front Panel.

#### Onboard LAN

This allows you to enable or disable the “Onboard LAN” feature.

#### Restore on AC/Power Loss

This allows you to set the power state after an unexpected AC/power loss. If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers.

#### Good Night LED

Use this item to enable or disable Power LED and LAN LED.

---

## 3.4.4 Storage Configuration



### SATA Controller

Use this to enable or disable SATA controller. The default value is [Enabled].

### SATA Mode

Use this to select SATA mode. Configuration options: [IDE Mode] and [AHCI Mode]. The default value is [AHCI Mode].



AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk performance but IDE mode does not have these advantages.

### SATA Aggressive Link Power Management

Use this item to configure SATA Aggressive Link Power Management.

### Hard Disk S.M.A.R.T.

Use this item to enable or disable the S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) feature. Configuration options: [Disabled] and [Enabled].

---

## 3.4.5 Super IO Configuration



### Serial Port

Use this item to enable or disable the onboard serial port.

### Serial Port Address

Use this item to set the address for the onboard serial port. Configuration options: [3F8h / IRQ4] and [3E8h / IRQ4].

### CIR Controller

Use this item to enable or disable CIR controller. The default value is [Disabled].

---

## 3.4.6 ACPI Configuration



### Suspend to RAM

Use this item to select whether to auto-detect or disable the Suspend-to-RAM feature. Select [Auto] will enable this feature if the OS supports it.

### Check Ready Bit

Use this item to enable or disable the feature Check Ready Bit.

### ACPI HPET Table

Use this item to enable or disable ACPI HPET Table. The default value is [Enabled]. Please set this option to [Enabled] if you plan to use this motherboard to submit Windows® certification.

### PS/2 Keyboard Power On

Use this item to enable or disable PS/2 keyboard to turn on the system from the power-soft-off mode.

### Onboard LAN Power On

Use this item to enable or disable Onboard LAN to turn on the system from the power-soft-off mode.

### Ring-In Power On

Use this item to enable or disable Ring-In signals to turn on the system from the power-soft-off mode.

### RTC Alarm Power On

Use this item to enable or disable RTC (Real Time Clock) to power on the system.

### USB Keyboard/Remote Power On

Use this item to enable or disable USB Keyboard/Remote to turn on the system from the power-soft-off mode.

### USB Mouse Power On

Use this item to enable or disable USB Mouse to turn on the system from the power-soft-off mode.

---

## **CSM**

Please disable CSM when you enable Fast Boot option. The default value is [Enabled].

---

## 3.4.7 USB Configuration



### USB 2.0 Controller

Use this item to enable or disable the use of USB 2.0 controller.

### Legacy USB Support

Use this option to select legacy support for USB devices. There are four configuration options: [Enabled], [Auto], [Disabled] and [UEFI Setup Only]. The default value is [Enabled]. Please refer to below descriptions for the details of these four options:

[Enabled] - Enables support for legacy USB.

[Auto] - Enables legacy support if USB devices are connected.

[Disabled] - USB devices are not allowed to use under legacy OS and UEFI setup when [Disabled] is selected. If you have USB compatibility issue, it is recommended to select [Disabled] to enter OS.

[UEFI Setup Only] - USB devices are allowed to use only under UEFI setup and Windows / Linux OS.

---

## 3.5 Tool



### System Browser

System Browser can let you easily check your current system configuration in UEFI setup.

### OMG(Online Management Guard)

Administrators are able to establish an internet curfew or restrict internet access at specified times via OMG. You may schedule the starting and ending hours of internet access granted to other users. In order to prevent users from bypassing OMG, guest accounts without permission to modify the system time are required.

### UEFI Update Utility

#### Instant Flash

Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update system UEFI without entering operating systems first like MS-DOS or Windows®. Just save the new UEFI file to your USB flash drive, floppy disk or hard drive and launch this tool, then you can update your UEFI only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If you execute Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update your UEFI, and reboot your system after the UEFI update process is completed.

#### Internet Flash

Internet Flash searches for available UEFI firmware updates from our servers. In other words, the system can auto-detect the latest UEFI from our servers and flash them without entering Windows OS. Please note that you must be running on a DHCP configured computer in order to

---

enable this function.

## Network Configuration



### Internet Setting

Use this item to set up the internet connection mode. Configuration options: [DHCP (Auto IP)] and [PPPOE].

### UEFI Download Server

Use this item to select UEFI firmware download server for Internet Flash. Configuration options: [Asia], [Europe], [USA] and [China].

### Dehumidifier Function

Users may prevent motherboard damages due to dampness by enabling "Dehumidifier Function". When enabling Dehumidifier Function, the computer will power on automatically to dehumidify the system after entering S4/S5 state.

#### Dehumidifier Period

This allows users to configure the period of time until the computer powers on and enables "Dehumidifier" after entering S4/S5 state.

#### Dehumidifier Duration

This allows users to configure the duration of the dehumidifying process before it returns to S4/S5 state.

#### Dehumidifier CPU Fan Setting

Use this setting to configure CPU fan speed while "Dehumidifier" is enabled.

### Would you like to save current setting user defaults?

In this option, you are allowed to load and save three user defaults according to your own requirements.

---

## 3.6 Hardware Health Event Monitoring Screen

In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



### CPU Fan Setting

This allows you to set the CPU fan speed. Configuration options: [Full On] and [Automatic Mode]. The default is value [Full On].

### Chassis Fan 1 Setting

This allows you to set the chassis fan 1 speed. Configuration options: [Full On] and [Manual Mode]. The default is value [Full On].

### Chassis Fan 2 Setting

This allows you to set the chassis fan 2 speed. Configuration options: [Full On] and [Manual Mode]. The default is value [Full On].

### Case Open Feature

This allows you to enable or disable case open detection feature. The default is value [Enabled].

#### Clear Status

This option appears only when the case open has been detected. Use this option to keep or clear the record of previous chassis intrusion status.

---

## 3.7 Boot Screen

In this section, it will display the available devices on your system for you to configure the boot settings and the boot priority.



### Fast Boot

Fast Boot minimizes your computer's boot time. There are three configuration options: [Disabled], [Fast] and [Ultra Fast]. The default value is [Disabled]. Please refer to below descriptions for the details of these three options:

[Disabled] - Disable Fast Boot.

[Fast] - The only restriction is you may not boot by using an USB flash drive.

[Ultra Fast] - There are a few restrictions.

1. Only supports Windows® 8 UEFI operating system.
2. You will not be able to enter BIOS Setup (Clear CMOS or run utility in Widows® to enter BIOS Setup).
3. If you are using an external graphics card, the VBIOS must support UEFI GOP in order to boot.

### Boot From Onboard LAN

Use this item to enable or disable the Boot From Onboard LAN feature.

### Setup Prompt Timeout

This shows the number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

### Bootup Num-Lock

If this item is set to [On], it will automatically activate the Numeric Lock function after boot-up.

---

### **Full Screen Logo**

Use this item to enable or disable OEM Logo. The default value is [Enabled].

### **AddOn ROM Display**

Use this option to adjust AddOn ROM Display. If you enable the option "Full Screen Logo" but you want to see the AddOn ROM information when the system boots, please select [Enabled]. Configuration options: [Enabled] and [Disabled]. The default value is [Enabled].

### **Boot Failure Guard**

Enable or disable the feature of Boot Failure Guard.

### **Boot Failure Guard Count**

Enable or disable the feature of Boot Failure Guard Count.

---

### 3.8 Security Screen

In this section, you may set or change the supervisor/user password for the system. For the user password, you may also clear it.



#### Secure Boot

Use this to enable or disable Secure Boot. The default value is [Disabled].

---

## 3.9 Exit Screen



### Save Changes and Exit

When you select this option, it will pop-out the following message, "Save configuration changes and exit setup?" Select [OK] to save the changes and exit the UEFI SETUP UTILITY.

### Discard Changes and Exit

When you select this option, it will pop-out the following message, "Discard changes and exit setup?" Select [OK] to exit the UEFI SETUP UTILITY without saving any changes.

### Discard Changes

When you select this option, it will pop-out the following message, "Discard changes?" Select [OK] to discard all changes.

### Load UEFI Defaults

Load UEFI default values for all the setup questions. F9 key can be used for this operation.

---

## **Chapter 4: Software Support**

### **4.1 Install Operating System**

This motherboard supports various Microsoft® Windows® operating systems: 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64-bit. Because motherboard settings and hardware options vary, use the setup procedures in this chapter for general reference only. Refer to your OS documentation for more information.

### **4.2 Support CD Information**

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

#### **4.2.1 Running The Support CD**

To begin using the support CD, insert the CD into your CD-ROM drive. The CD automatically displays the Main Menu if “AUTORUN” is enabled in your computer. If the Main Menu did not appear automatically, locate and double click on the file “ASSETUP.EXE” from the BIN folder in the Support CD to display the menus.

#### **4.2.2 Drivers Menu**

The Drivers Menu shows the available devices drivers if the system detects installed devices. Please install the necessary drivers to activate the devices.

#### **4.2.3 Utilities Menu**

The Utilities Menu shows the applications software that the motherboard supports. Click on a specific item then follow the installation wizard to install it.

#### **4.2.4 Contact Information**

If you need to contact ASRock or want to know more about ASRock, welcome to visit ASRock’s website at <http://www.asrock.com>; or you may contact your dealer for further information.

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## **Installing OS on a HDD Larger Than 2TB**

This motherboard is adopting UEFI BIOS that allows Windows® OS to be installed on a large size HDD (>2TB). Please follow below procedure to install the operating system.

1. Please make sure to use **Windows® Vista™ 64-bit (with SP1 or above), Windows® 7 64-bit** or **Windows® 8 64-bit**.
2. Press <F2> or <Delete> at system POST. Set **AHCI Mode** in UEFI Setup Utility > Advanced > Storage Configuration > SATA Mode.
3. Choose the item **“UEFI:xxx”** to boot in UEFI Setup Utility > Boot > Boot Option #1. (“xxx” is the device which contains your Windows® installation files. Normally it is an optical drive.) You can also press <F11> to launch boot menu at system POST and choose the item **“UEFI:xxx”** to boot.
4. Start Windows® installation.
5. If you install **Windows® 7 64-bit** OS, OS will be formatted by GPT (GUID Partition Table). Please install the hotfix file from Microsoft®:  
<http://support.microsoft.com/kb/979903>