



H61M++

User Manual

Version 1.0

Published September 2014

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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.

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"Perchlorate Material-special handling may apply, see

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Chapter 1: Introduction

Thank you for purchasing ASRock **H61M++** 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

1.1 Package Contents

ASRock **H61M++** Motherboard (Micro ATX Form Factor)

ASRock **H61M++** Quick Installation Guide

ASRock **H61M++** Support CD

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

1 x I/O Panel Shield

1.2 Specifications

Platform	<ul style="list-style-type: none">- Micro ATX Form Factor- Solid Capacitor for CPU power- High Density Glass Fabric PCB
CPU	<ul style="list-style-type: none">- Supports 3rd and 2nd generation Intel® Core™ i7 / i5 / i3 / Xeon® / Pentium® / Celeron® in LGA1155 package- Supports Intel® Turbo Boost 2.0 Technology- Supports K-Series unlocked CPU- Supports Hyper-Threading Technology
Chipset	<ul style="list-style-type: none">- Intel® H61- Supports Intel® Rapid Start Technology and Smart Connect Technology
Memory	<ul style="list-style-type: none">- Dual Channel DDR3 Memory Technology- 2 x DDR3 DIMM slots- Supports DDR3 1333/1066 non-ECC, un-buffered memory (DDR3 1600 with Intel® Ivy Bridge CPU, DDR3 1333 with Intel® Sandy Bridge CPU)- Max. capacity of system memory: 16GB (see CAUTION 1)- Supports Intel® Extreme Memory Profile (XMP) 1.3 / 1.2 with Intel® Ivy Bridge CPU
Expansion Slot	<ul style="list-style-type: none">- 1 x PCI Express 3.0 x16 slot (blue @ x16 mode) * PCIE 3.0 is only supported with Intel® Ivy Bridge CPU. With Intel® Sandy Bridge CPU, it only supports PCIE 2.0.- 1 x PCI Express 2.0 x1 slot- 2 x PCI slots
Graphics	<ul style="list-style-type: none">* Intel® HD Graphics Built-in Visuals and the VGA outputs can be supported only with processors which are GPU integrated.- Supports Intel® HD Graphics Built-in Visuals: Intel® Quick Sync Video 2.0, Intel® InTru™ 3D, Intel® Clear Video HD Technology, Intel® Insider™, Intel® HD Graphics 2500/4000 with Intel® Ivy Bridge CPU- Supports Intel® HD Graphics Built-in Visuals: Intel® Quick Sync Video, Intel® InTru™ 3D, Intel® Clear Video HD Technology, Intel® HD Graphics 2000/3000, Intel® Advanced Vector Extensions (AVX) with Intel® Sandy Bridge CPU- Pixel Shader 5.0, DirectX 11 with Intel® Ivy Bridge CPU. Pixel Shader 4.1, DirectX 10.1 with Intel® Sandy Bridge CPU.

	<ul style="list-style-type: none"> - Max. shared memory 1760MB with Intel® Ivy Bridge CPU. Max. shared memory 1759MB with Intel® Sandy Bridge CPU. - Three graphics output options: D-Sub, DVI-D and HDMI - Supports HDMI with max. resolution up to 1920x1200 @ 60Hz - Supports DVI-D with max. resolution up to 1920x1200 @ 60Hz - Supports D-Sub with max. resolution up to 2048x1536 @ 75Hz - Supports Auto Lip Sync, Deep Color (12bpc), xvYCC and HBR (High Bit Rate Audio) with HDMI Port (Compliant HDMI monitor is required) (see CAUTION 2) - Supports HDCP with DVI-D and HDMI Ports - Supports Full HD 1080p Blu-ray (BD) playback with DVI-D and HDMI Ports
Audio	- 5.1 CH HD Audio (Realtek ALC662 Audio Codec)
LAN	<ul style="list-style-type: none"> - PCIE x1 Gigabit LAN 10/100/1000 Mb/s - Atheros® AR8151 - Supports Wake-On-LAN - Supports PXE
Rear Panel I/O	<ul style="list-style-type: none"> - 1 x PS/2 Mouse Port - 1 x PS/2 Keyboard Port - 1 x D-Sub Port - 1 x DVI-D Port - 1 x HDMI Port - 6 x USB 2.0 Ports - 1 x RJ-45 LAN Port with LED (ACT/LINK LED and SPEED LED) - HD Audio Jacks: Line in/Front Speaker/Microphone
Storage	- 4 x SATA2 3.0 Gb/s Connectors, support NCQ, AHCI and Hot Plug
Connector	<ul style="list-style-type: none"> - 1 x IR Header - 1 x CIR Header - 1 x Print Port Header - 1 x COM Port Header - 1 x CPU Fan Connector (4-pin) - 1 x Chassis Fan Connector (4-pin) - 1 x Power Fan Connector (3-pin) - 1 x 24 pin ATX Power Connector - 1 x 8 pin 12V Power Connector

	<ul style="list-style-type: none"> - 1 x Front Panel Audio Connector - 2 x USB 2.0 Headers (Support 4 USB 2.0 ports)
BIOS Feature	<ul style="list-style-type: none"> - 32Mb AMI UEFI Legal BIOS with GUI support - Supports "Plug and Play" - ACPI 1.1 Compliant wake up events - Supports jumperfree - SMBIOS 2.3.1 support - IGPU, DRAM, PCH, CPU PLL, VTT, VCCSA Voltage multi-adjustment
Hardware Monitor	<ul style="list-style-type: none"> - CPU/Chassis temperature sensing - CPU/Chassis/Power Fan Tachometer - CPU/Chassis Quiet Fan (Auto adjust chassis fan speed by CPU temperature) - CPU/Chassis Fan multi-speed control - Voltage monitoring: +12V, +5V, +3.3V, CPU Vcore
OS	<ul style="list-style-type: none"> - Microsoft® Windows® 8.1 32-bit / 8.1 64-bit / 8 32-bit / 8 64-bit / 7 32-bit / 7 64-bit / Vista™ 32-bit / Vista™ 64-bit / XP 32-bit / XP 64-bit
Certifications	<ul style="list-style-type: none"> - FCC, CE, WHQL - ErP/EuP Ready (ErP/EuP ready power supply is required)

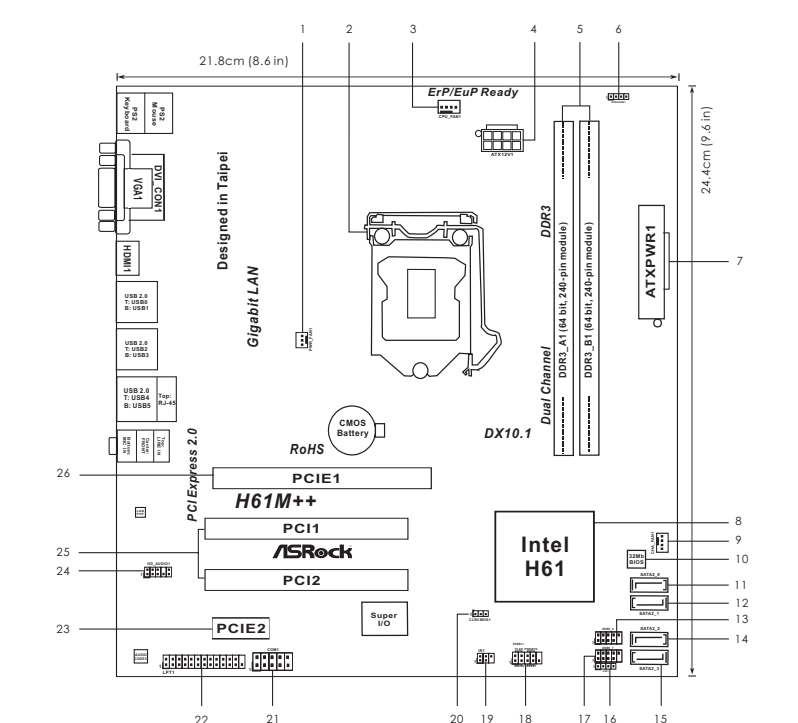
* For detailed product information, please visit our website: <http://www.asrock.com>

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.

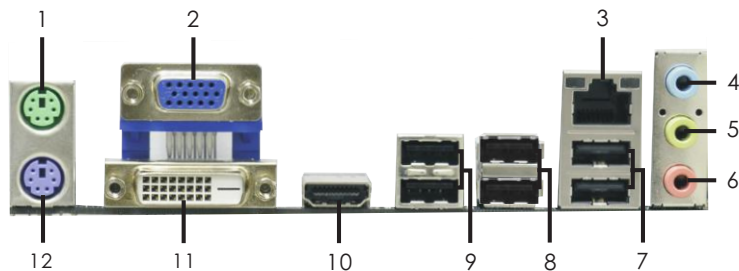
CAUTION!

1. Due to the operating system limitation, the actual memory size may be less than 4GB for the reservation for system usage under Windows® 8.1 / 8 / 7 / Vista™ / XP. For Windows® OS with 64-bit CPU, there is no such limitation. You can use ASRock XFast RAM to utilize the memory that Windows® cannot use.
2. xvYCC and Deep Color are only supported under Windows® 8.1 64-bit / 8.1 / 8 64-bit / 8 / 7 64-bit / 7. Deep Color mode will be enabled only if the display supports 12bpc in EDID. HBR is supported under Windows® 8.1 64-bit / 8.1 / 8 64-bit / 8 / 7 64-bit / 7 / Vista™ 64-bit / Vista™.



- | | | | |
|----|---|----|--|
| 1 | Power Fan Connector (PWR_FAN1) | 14 | SATA2 Connector (SATA2_2, Blue) |
| 2 | 1155-Pin CPU Socket | 15 | SATA2 Connector (SATA2_3, Blue) |
| 3 | CPU Fan Connector (CPU_FAN1) | 16 | Consumer Infrared Module Header (CIR1) |
| 4 | ATX 12V Power Connector (ATX12V1) | 17 | USB 2.0 Header (USB6_7, Blue) |
| 5 | 2 x 240-pin DDR3 DIMM Slots
(Dual Channel: DDR3_A1, DDR3_B1, Blue) | 18 | System Panel Header (PANEL1, White) |
| 6 | Chassis Speaker Header (SPEAKER 1, White) | 19 | Infrared Module Header (IR1) |
| 7 | ATX Power Connector (ATXPWR1) | 20 | Clear CMOS Jumper (CLRCMOS1) |
| 8 | Intel H61 Chipset | 21 | COM Port Header (COM1) |
| 9 | Chassis Fan Connector (CHA_FAN1) | 22 | Print Port Header (LPT1, White) |
| 10 | 32Mb SPI Flash | 23 | PCI Express 2.0 x1 Slot (PCIE2, White) |
| 11 | SATA2 Connector (SATA2_0, Blue) | 24 | Front Panel Audio Header
(HD_AUDIO1, White) |
| 12 | SATA2 Connector (SATA2_1, Blue) | 25 | PCI Slots (PCI1-2) |
| 13 | USB 2.0 Header (USB8_9, Blue) | 26 | PCI Express 3.0 x16 Slot (PCIE1, Blue) |

1.4 I/O Panel



- 1

PS/2 Mouse Port (Green)
- 2

D-Sub Port
- * 3

LAN RJ-45 Port
- 4

Line In (Light Blue)
- ** 5

Front Speaker (Lime)
- 6

Microphone (Pink)
- 7

USB 2.0 Ports (USB45)
- 8

USB 2.0 Ports (USB23)
- 9

USB 2.0 Ports (USB01)
- 10


HDMI Port
- 11

DVI-D Port
- 12


PS/2 Keyboard Port (Purple)

* 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		<div>ACT/LINK LED</div> <div>SPEED LED</div> <div></div> <div>LAN Port</div>
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® 8.1 / 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 Micro ATX 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.

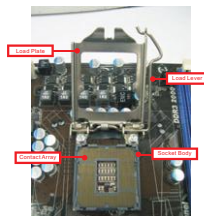
1. Unplug the power cord from the wall socket before touching any component.
2. To avoid damaging the motherboard components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before 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.

2.3 CPU Installation

For the installation of Intel 1155-Pin CPU, please follow the steps below.



1155-Pin Socket Overview



Before you insert the 1155-Pin CPU into the socket, please check if the CPU surface is unclean or if there is any bent pin on the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.

Step 1. Open the socket:

Step 1-1. Disengaging the lever by depressing down and out on the hook to clear retention tab.



Step 1-2. Rotate the load lever to fully open position at approximately 135 degrees.

Step 1-3. Rotate the load plate to fully open position at approximately 100 degrees.



Step 2. Remove PnP Cap (Pick and Place Cap).



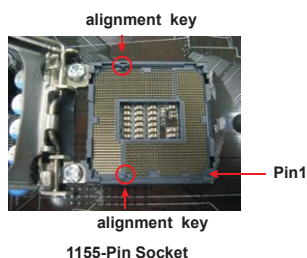
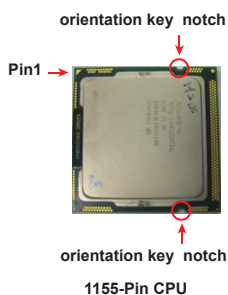
1. It is recommended to use the cap tab to handle and avoid kicking off the PnP cap.
2. This cap must be placed if returning the motherboard for after service.

Step 3. Insert the 1155-Pin CPU:

Step 3-1. Hold the CPU by the edge where is marked with black line.



Step 3-2. Orient the CPU with IHS (Integrated Heat Sink) up. Locate Pin1 and the two orientation key notches.



For proper inserting, please ensure to match the two orientation key notches of the CPU with the two alignment keys of the socket.

Step 3-3. Carefully place the CPU into the socket by using a purely vertical motion.

Step 3-4. Verify that the CPU is within the socket and properly mated to the orient keys.



Step 4. Close the socket:

Step 4-1. Rotate the load plate onto the IHS.

Step 4-2. While pressing down lightly on load plate, engage the load lever.

Step 4-3. Secure load lever with load plate tab under retention tab of load lever.



2.4 Installation of CPU Fan and Heatsink

This motherboard is equipped with 1155-Pin socket that supports Intel 1155-Pin CPU. Please adopt the type of heatsink and cooling fan compliant with Intel 1155-Pin CPU to dissipate heat. Before you installed the heatsink, you need to spray thermal interface material between the CPU and the heatsink to improve heat dissipation. Ensure that the CPU and the heatsink are securely fastened and in good contact with each other. Then connect the CPU fan to the CPU_FAN connector (CPU_FAN1, see page 10, No. 3).

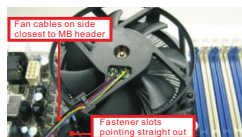
For proper installation, please kindly refer to the instruction manuals of your CPU fan and heatsink.

Below is an example to illustrate the installation of the heatsink for 1155-Pin CPU.

Step 1. Apply thermal interface material onto center of IHS on the socket surface.



Step 2. Place the heatsink onto the socket. Ensure fan cables are oriented on side closest to the CPU fan connector on the motherboard (CPU_FAN1, see page 10, No. 3).



Step 3. Align fasteners with the motherboard through-holes.

Step 4. Rotate the fastener clockwise, then press down on fastener caps with thumb to install and lock. Repeat with remaining fasteners.



If you press down the fasteners without rotating them clockwise, the heatsink cannot be secured on the motherboard.

Step 5. Connect fan header with the CPU fan connector on the motherboard.

Step 6. Secure excess cable with tie-wrap to ensure cable does not interfere with fan operation or contact other components.



Please be noticed that this motherboard supports Combo Cooler Option (C.C.O.), which provides the flexible option to adopt three different CPU cooler types, Socket LGA 775, LGA 1155 and LGA 1156. The white throughholes are for Socket LGA 1155/1156 CPU fan.



2.5 Installation of Memory Modules (DIMM)

This motherboard provides two 240-pin DDR3 (Double Data Rate 3) DIMM slots, and supports Dual Channel Memory Technology. For dual channel configuration, you always need to install two identical (the same brand, speed, size and chip-type) memory modules in the DDR3 DIMM slots to activate Dual Channel Memory Technology. Otherwise, it will operate at single channel mode.



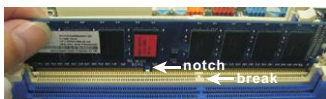
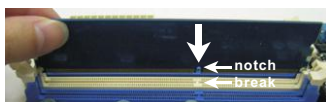
1. It is not allowed to install a DDR or DDR2 memory module into DDR3 slot; otherwise, this motherboard and DIMM may be damaged.
2. If you install only one memory module or two non-identical memory modules, it is unable to activate the Dual Channel Memory Technology.
3. Some DDR3 1GB double-sided DIMMs with 16 chips may not work on this motherboard. It is not recommended to install them on this motherboard.

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 fully snap back in place and the DIMM is properly seated.

2.6 Expansion Slots (PCI and PCI Express Slots)

There are 2 PCI slot and 2 PCI Express slots on this motherboard.

PCI slots: PCI slots are used to install expansion cards that have the 32-bit PCI interface.

PCIe slots:

PCIe1 (PCIe 3.0 x16 slot; Blue) is used for PCI Express x16 lane width graphics cards.

PCIe2 (PCIe 2.0 x1 slot; White) is used for PCI Express cards with x1 lane width cards, such as Gigabit LAN card, SATA2 card, etc.

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.

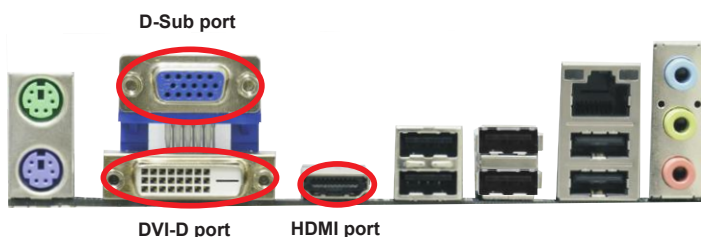
2.7 Dual Monitor and Surround Display Features

Dual Monitor Feature

This motherboard supports dual monitor feature. With the internal graphics output support (DVI-D, D-Sub and HDMI), you can easily enjoy the benefits of dual monitor feature without installing any add-on graphics card to this motherboard. This motherboard also provides independent display controllers for DVI-D, D-Sub and HDMI to support dual graphics output so that DVI-D, D-sub and HDMI can drive same or different display contents.

To enable dual monitor feature, please follow the below steps:

1. Connect DVI-D monitor cable to DVI-D port on the I/O panel, connect D-Sub monitor cable to D-Sub port on the I/O panel, or connect HDMI monitor cable to HDMI port on the I/O panel.



2. If you have installed onboard VGA driver from our support CD to your system already, you can freely enjoy the benefits of dual monitor function after your system boots. If you haven't installed onboard VGA driver yet, please install onboard VGA driver from our support CD to your system and restart your computer.



D-Sub, DVI-D and HDMI monitors cannot be enabled at the same time. You can only choose the combination: DVI-D + HDMI, DVI-D + D-Sub, or HDMI + D-Sub.

Surround Display Feature

This motherboard supports surround display upgrade. With the internal graphics output support (DVI-D, D-Sub and HDMI) and external add-on PCI Express graphics cards, you can easily enjoy the benefits of surround display feature.

Please refer to the following steps to set up a surround display environment:

1. Install the PCI Express graphics card on PCIE1 slot. Please refer to page 17 for proper expansion card installation procedures for details.
2. Connect DVI-D monitor cable to DVI-D port on the I/O panel, connect D-Sub monitor cable to D-Sub port on the I/O panel, or connect HDMI monitor cable to HDMI port on the I/O panel. Then connect other monitor cables to the corresponding connectors of the add-on PCI Express graphics card on PCIE1 slot.
3. Boot your system. Press <F2> or to enter UEFI setup. Enter "Onboard VGA Share Memory" option to adjust the memory capability to [32MB], [64MB], [128MB], [256MB] or [512MB] to enable the function of D-sub. Please make sure that the value you select is less than the total capability of the system memory. If you do not adjust the UEFI setup, the default value of "Onboard VGA Share Memory", [Auto], will disable D-Sub function when the add-on graphics card is inserted to this motherboard.
4. Install the onboard VGA driver and the add-on PCI Express graphics card driver to your system. If you have installed the drivers already, there is no need to install them again.
5. Set up a multi-monitor display.

For Windows® XP / XP 64-bit OS:

Right click the desktop, choose "Properties", and select the "Settings" tab so that you can adjust the parameters of the multi-monitor according to the steps below.

- A. Click the "Identify" button to display a large number on each monitor.
- B. Right-click the display icon in the Display Properties dialog that you wish to be your primary monitor, and then select "Primary". When you use multiple monitors with your card, one monitor will always be Primary, and all additional monitors will be designated as Secondary.
- C. Select the display icon identified by the number 2.
- D. Click "Extend my Windows desktop onto this monitor".
- E. Right-click the display icon and select "Attached", if necessary.
- F. Set the "Screen Resolution" and "Color Quality" as appropriate for the second monitor. Click "Apply" or "OK" to apply these new values.
- G. Repeat steps C through E for the diaplay icon identified by the number one, two, three and four.

For Windows® 8.1 / 8.1 64-bit / 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS:

- Right click the desktop, choose “Personalize”, and select the “Display Settings” tab so that you can adjust the parameters of the multi-monitor according to the steps below.
- A. Click the number “2” icon.
 - B. Click the items “This is my main monitor” and “Extend the desktop onto this monitor”.
 - C. Click “OK” to save your change.
 - D. Repeat steps A through C for the display icon identified by the number three and four.
6. Use Surround Display. Click and drag the display icons to positions representing the physical setup of your monitors that you would like to use. The placement of display icons determines how you move items from one monitor to another.



HDCP Function

HDCP function is supported on this motherboard. To use HDCP function with this motherboard, you need to adopt the monitor that supports HDCP function as well. Therefore, you can enjoy the superior display quality with high-definition HDCP encryption contents. Please refer to below instruction for more details about HDCP function.

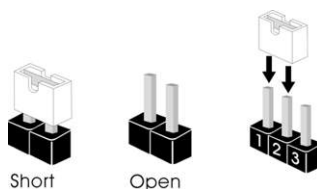
What is HDCP?



HDCP stands for High-Bandwidth Digital Content Protection, a specification developed by Intel® for protecting digital entertainment content that uses the DVI interface. HDCP is a copy protection scheme to eliminate the possibility of intercepting digital data midstream between the video source, or transmitter - such as a computer, DVD player or set-top box - and the digital display, or receiver - such as a monitor, television or projector. In other words, HDCP specification is designed to protect the integrity of content as it is being transmitted.

Products compatible with the HDCP scheme such as DVD players, satellite and cable HDTV set-top-boxes, as well as few entertainment PCs requires a secure connection to a compliant display. Due to the increase in manufacturers employing HDCP in their equipment, it is highly recommended that the HDTV or LCD monitor you purchase is compatible.

2.8 Jumpers Setup

The illustration shows how jumpers are setup. 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.10, No. 20)	 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.

2.9 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!

Serial ATAII Connectors

(SATA2_0: see p.10, No. 11)

(SATA2_1: see p.10, No. 12)

(SATA2_2: see p.10, No. 14)

(SATA2_3: see p.10, No. 15)



These four Serial ATAII (SATAII) connectors support SATA data cables for internal storage devices. The current SATAII interface allows up to 3.0 Gb/s data transfer rate.

Serial ATA (SATA) Data Cable (Optional)

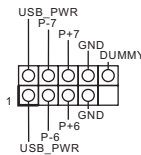


Either end of the SATA data cable can be connected to the SATA / SATAII hard disk or the SATAII connector on this motherboard.

USB 2.0 Headers

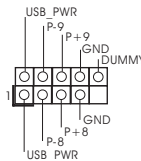
(9-pin USB6_7)

(see p.10 No. 17)



(9-pin USB8_9)

(see p.10 No. 13)

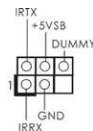


Besides six default USB 2.0 ports on the I/O panel, there are two USB 2.0 headers on this motherboard. Each USB 2.0 header can support two USB 2.0 ports.

Infrared Module Header

(5-pin IR1)

(see p.10 No. 19)



This header supports an optional wireless transmitting and receiving infrared module.

Consumer Infrared Module Header

(4-pin CIR1)

(see p.10 No. 16)

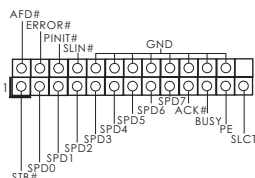


This header can be used to connect the remote controller receiver.

Print Port Header

(25-pin LPT1)

(see p.10 No. 22)

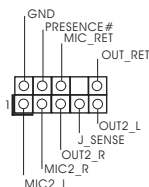


This is an interface for print port cable that allows convenient connection of printer devices.

Front Panel Audio Header

(9-pin HD_AUDIO1)

(see p.10 No. 24)



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

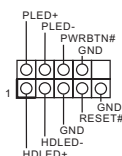


1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instruction in our manual and chassis manual to install your system.
2. If you use AC'97 audio panel, please install it to the front panel audio header as below:
 - 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® 8.1 / 8.1 64-bit / 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.10 No. 18)



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).

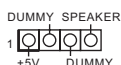
HDLED (Hard Drive Activity LED):

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

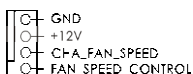
(4-pin SPEAKER 1)
(see p.10 No. 6)



Please connect the chassis speaker to this header.

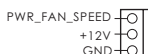
Chassis and Power Fan Connectors

(4-pin CHA_FAN1)
(see p.10 No. 9)



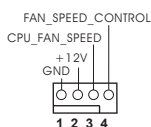
Please connect the fan cables to the fan connectors and match the black wire to the ground pin.

(3-pin PWR_FAN1)
(see p.10 No. 1)



CPU Fan Connectors

(4-pin CPU_FAN1)
(see p.10 No. 3)



Please connect the CPU fan cable to the connector and match the black wire to the ground pin.



Though this motherboard provides 4-Pin CPU fan (Quiet Fan) support, the 3-Pin CPU fan still can work successfully even without the fan speed control function. If you plan to connect the 3-Pin CPU fan to the CPU fan connector on this motherboard, please connect it to Pin 1-3.

Pin 1-3 Connected ←

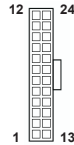
3-Pin Fan Installation



ATX Power Connector

(24-pin ATXPWR1)

(see p.10 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



ATX 12V Power Connector

(8-pin ATX12V1)

(see p.10 No. 4)



Please connect an ATX 12V power supply to this connector.



Though this motherboard provides 8-pin ATX 12V power connector, it can still work if you adopt a traditional 4-pin ATX 12V power supply. To use the 4-pin ATX power supply, please plug your power supply along with Pin 1 and Pin 5.

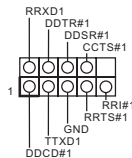
4-Pin ATX 12V Power Supply Installation



Serial port Header

(9-pin COM1)

(see p.10 No. 21)



This COM1 header supports a serial port module.

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 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:

Main	To set up the system time/date information
OC Tweaker	To set up overclocking features
Advanced	To set up the advanced UEFI features
H/W Monitor	To display current hardware status
Boot	To set up the default system device to locate and load the Operating System
Security	To set up the security features
Exit	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.

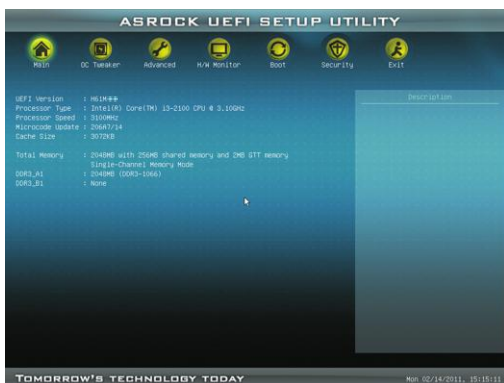
3.1.2 Navigation Keys

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
<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 UEFI SETUP UTILITY
<ESC>	To 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.



Load GPU EZ OC Setting

Use this item to load GPU EZ overclocking setting. Please note that overclocking may cause damage to your GPU and motherboard. It should be done at your own risk and expense.

CPU Ratio Setting

Use this item to change the ratio value of this motherboard.

GT Over Clock

Use this to enable or disable GT Over Clock by Internal Graphics Device. The default value is [Disabled].

Intel SpeedStep Technology

Intel SpeedStep technology is Intel's new power saving technology. Processor can switch between multiple frequency and voltage points to enable power savings. The default value is [Enabled]. Configuration options: [Enabled] and [Disabled]. If you install Windows® Vista™ / 7 / 8 / 8.1 and want to enable this function, please set this item to [Enabled]. This item will be hidden if the current CPU does not support Intel SpeedStep technology.



Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issue with some power supplies. Please set this item to [Disable] if above issue occurs.

Intel Turbo Boost Technology

Use this item to enable or disable Intel Turbo Boost Technology. Turbo Boost allows processor cores to run faster than marked frequency in specific condition. The default value is [Enabled].

Turbo Boost Power Limit

Use this item to adjust Turbo Boost power limit. Configuration options: [Auto] and [Manual]. The default value is [Auto].

Core Current Limit

Use this item to add voltage when CPU is in Turbo mode.

DRAM Timing Control

DRAM Frequency

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

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].

Write Recovery Time (tWR)

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

Refresh Cyle Time (tRFC)

Use this item to change Refresh Cyle 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].

Memory Power Down Mode

Use this item to adjust DDR power down mode. Configuration options: [Auto], [Slow] and [Fast]. The default value is [Auto].

ODT WR (CHA)

Use this item to change ODT WR (CHA) Auto/Manual setting. The default is [Auto].

ODT NOM (CHA)

Use this item to change ODT NOM (CHA) Auto/Manual setting. The default is [Auto].

ODT WR (CHB)

Use this item to change ODT WR (CHB) Auto/Manual setting. The default is [Auto].

ODT NOM (CHB)

Use this item to change ODT NOM (CHB) Auto/Manual setting. The default is [Auto].

Voltage Control**Power Saving Mode**

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

CPU Core Voltage Offset

Use this to select CPU Core Voltage Offset. The default value is [Auto].

IGPU Voltage Offset

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

DRAM Voltage

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

PCH Voltage

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

CPU PLL Voltage

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

VTT Voltage

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

VCCSA Voltage

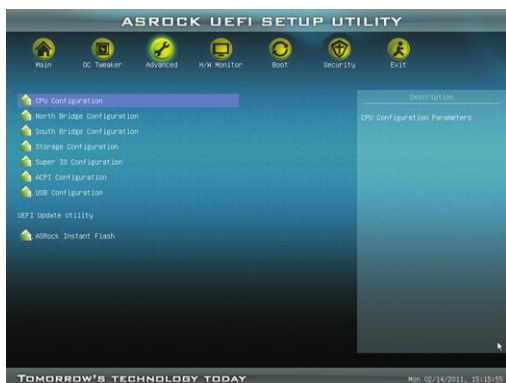
Use this to select VCCSA Voltage. The default value is [Auto].

User Default

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

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.

ASRock Instant Flash

ASRock 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 launch this tool and save the new UEFI file to your USB flash drive, floppy disk or hard drive, 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 ASRock 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 UEFI update process completes.

3.4.1 CPU Configuration



Intel Hyper Threading Technology

To enable this feature, it requires a computer system with an Intel processor that supports Hyper-Threading technology and an operating system that includes optimization for this technology, such as Microsoft® Windows® XP / Vista™ / 7 / 8 / 8.1. Set to [Enabled] if using Microsoft® Windows® XP, Vista™, 7, 8, 8.1 or Linux kernel version 2.4.18 or higher. This option will be hidden if the installed CPU does not support Hyper-Threading technology.

Active Processor Cores

Use this item to select the number of cores to enable in each processor package. Configuration options: [All], [1], [2] and [3]. The default value is [All].

Hardware Prefetcher

Use this item to turn on/off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch

Use this item to turn on/off prefetching of adjacent cache lines.

Enhance Halt State (C1E)

All processors support the Halt State (C1). The C1 state is supported through the native processor instructions HLT and MWAIT and requires no hardware support from the chipset. In the C1 power state, the processor maintains the context of the system caches.

CPU C3 State Support

Use this to enable or disable CPU C3 (ACPI C2) report to OS.

CPU C6 State Support

Use this to enable or disable CPU C6 (ACPI C3) report to OS.

Package C State Support

Selected option will program into C State package limit register. The default value is [Auto].

CPU Thermal Throttling

You may select [Enabled] to enable CPU internal thermal control mechanism to keep the CPU from overheated.

Intel Virtualization Technology

When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by Vanderpool Technology. This option will be hidden if the installed CPU does not support Intel Virtualization Technology.

No-Excute Memory Protection

No-Execution (NX) Memory Protection Technology is an enhancement to the IA-32 Intel Architecture. An IA-32 processor with "No Execute (NX) Memory Protection" can prevent data pages from being used by malicious software to execute code. This option will be hidden if the current CPU does not support No-Excute Memory Protection.

Local x2APIC

Use this to enable or disable Local x2APIC. The default value is [Disabled]. Please be noted that some OS do not support this function.

3.4.2 North Bridge Configuration



Low MMIO Align

Low MMIO resources align at 64MB/1024MB. The default value is [64MB].

VT-d

Use this to enable or disable Intel® VT-d technology (Intel® Virtualization Technology for Directed I/O). The default value of this feature is [Disabled].

Primary Graphics Adapter

This allows you to select the boot graphic adapter priority. Configuration options: [Onboard], [PCI] and [PCI Express]. The default value is [PCI Express].

Onboard VGA Share Memory

This allows you to set onboard VGA share memory feature. The default value is [Auto]. Configuration options: [Auto], [32MB], [64MB], [128MB], [256MB] and [512MB].

Render Standby

Use this to enable or disable Render Standby by Internal Graphics Device. The default value is [Enabled].

IGD Multi-Monitor

Use this to enable or disable IGD Multi-Monitor by Internal Graphics Device. The default value is [Disabled].

DVMT Mode Select

Use this option to adjust DVMT mode. The default value is [DVMT Mode]. DVMT (Dynamic Video Memory Technology) is an architecture that offers breakthrough performance for the motherboard through efficient memory utilization. In DVMT mode, the graphics driver allocates memory as needed for running graphics applications and is cooperatively using this memory with other system components. This item will not be used under Windows® Vista™ / 7 / 8 / 8.1 OS because the driver will intelligently detect physical memory available and allocate necessary video memory.

DVMT Memory

You are allowed to adjust the shared memory size in this item. Configuration options: [128MB], [256MB] and [Maximum]. The option [Maximum] only appears when you adopt the memory module with 1024MB or above.

3.4.3 South Bridge Configuration



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.

Deep Sx

Mobile platforms support Deep S4/S5 in DC only and desktop platforms support Deep S4/S5 in AC only. Configuration options: [Disabled], [Enabled in S5] and [Enabled in S4 and S5]. The default value is [Enabled in S5].

Onboard LAN

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

Onboard HD Audio

Select [Auto], [Enabled] or [Disabled] for the onboard HD Audio feature. If you select [Auto], the onboard HD Audio will be disabled when PCI Sound Card is plugged.

Front Panel

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

Onboard HDMI HD Audio

This allows you to enable or disable the “Onboard HDMI HD Audio” feature.

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® Vista™ certification.

3.4.4 Storage Configuration



SATA Mode

Use this to select SATA mode. Configuration options: [IDE Mode], [AHCI Mode] and [Disabled]. The default value is [IDE 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 Controller 0

Please select **[Compatible]** when you install legacy OS. If native OS (Windows® XP / Vista™ / 7 / 8 / 8.1) is installed, please select **[Enhanced]**.

SATA Controller 1

Use this item to enable or disable SATA Controller 1.

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: [3F8 / IRQ4] and [3E8 / IRQ4].

CIR Controller

Use this item to enable or disable the CIR controller.

Infrared Port

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

Infrared Port Address

Use this item to set the address for the onboard infrared port. Configuration options: [2F8 / IRQ3] and [2E8 / IRQ3].

Parallel Port

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

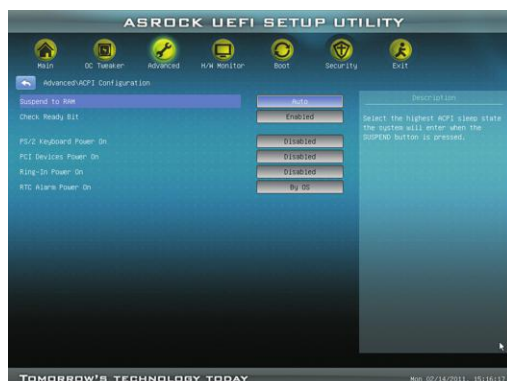
Device Mode

Use this item to change the Printer Port mode.

Change Settings

Use this item to select an optional setting for Super IO device.

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.

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.

PCI Devices Power On

Use this item to enable or disable PCI devices 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.

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 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 Setting

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

Over Temperature Protection

Use this item to enable or disable Over Temperature Protection. The default value is [Enabled].

3.6 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.



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 From Onboard LAN

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

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.

3.7 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.



3.8 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.

Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shell64.efi) from one of the available filesystem devices.

Chapter 4: Software Support

4.1 Install Operating System

This motherboard supports various Microsoft® Windows® operating systems: 8.1 / 8.1 64-bit / 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 "ASRSETUP.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.