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Server/Workstation

Motherboard

OCP-C612HM

User Manual

English



Version 1.1

Published October 2016

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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 www.dtsc.ca.gov/hazardouswaste/perchlorate”

ASRock Rack's Website: www.ASRockRack.com

Contact Information

If you need to contact ASRock Rack or want to know more about ASRock Rack, you're welcome to visit ASRock Rack's website at www.ASRockRack.com; or you may contact your dealer for further information.

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Chapter 1 Introduction

Thank you for purchasing ASRock Rack **OCP-C612HM** motherboard, a reliable motherboard produced under ASRock Rack's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock Rack's commitment to quality and endurance.

In this manual, chapter 1 and 2 contains introduction of the motherboard and step-by-step guide to the hardware installation. Chapter 3 and 4 contains 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 Rack website without further notice. You may find the latest memory and CPU support lists on ASRock Rack website as well. ASRock Rack's Website: www.ASRockRack.com

*If you require technical support related to this motherboard, please visit our website for specific information about the model you are using.
<http://www.asrockrack.com/support/>*

1.1 Package Contents

- ASRock Rack OCP-C612HM Motherboard
(Half Form Factor: 6.5-in x 20-in, 16.5 cm x 50.8 cm)
- Support CD
- User Manual



If any items are missing or appear damaged, contact your authorized dealer.

1.2 Specifications

OCP-C612HM	
MB Physical Status	
Form Factor	Half Width(OCP Blade)
Dimension	6.5" x 20" (16.5 cm x 50.8 cm)
Processor System	
CPU	Supports Intel® Xeon® E5-2600 v3/v4 Series Processors
Socket	Dual Socket R3 (LGA2011) <i>*Please use a narrow type CPU Cooler</i>
Chipset	Intel® C612
System Memory	
Capacity	16 x 288-pin DDR4 DIMM slots (support NVDIMM)
Type	<ul style="list-style-type: none"> - Dual Channel DDR4 memory technology - Support RDIMM, LRDIMM - Support DDR4 speeds of 1600/1866/2133/2400* - Support NVDIMM on all DIMM slots. - Up to maximum 1024 GB with 64GB DIMMs
Voltage	1.2V
DIMM Sizes	RDIMM: 32GB, 16GB, 8GB, 4GB LRDIMM: 64GB, 32GB
Expansion Slot	
PCIe 3.0 x 24	1 slot (supports ASRock Rack OCP-RB only)
Storage	
SATA Controller	Intel® C612 : 10x SATA3 (2 MiniSAS, 2 SATA, 1 to MSATA*), support RAID 0/1/10 w/ Intel RSTe 4.0 <i>*The M.2 slot is shared with the SATA_4 connector.</i>
Ethernet	
Interface	1000 /100 /10 Mbps
LAN	<ul style="list-style-type: none"> - 2 x RJ45 by Intel® i210 - Supports Wake-On-LAN - Supports Energy Efficient Ethernet 802.3az - Supports Dual LAN with Teaming function* - Supports PXE - LAN1 supports NCSI
Mezzanine	x8 PCIe Gen3
Management	
BMC Controller	ASPEED AST2400
IPMI Dedicated GLAN	1 x Realtek RTL8211E for dedicated management GLAN
Features	<ul style="list-style-type: none"> - Watch Dog - NMI

Graphics	
Controller	ASPEED AST1400/2400
VRAM	DDR3 16MB
Rear Panel I/O	
USB 3.0 Port	1
LAN Port	RJ45 : 2 x RJ45 by Intel® i210 LAN Ports with LED (ACT/LINK LED and SPEED LED)
Internal Connector	
TPM header (type A)	1
TPM header (type B)	1
IPMB header	1
Fan header	2 x System Fans (6-pin)
IPMI header	1
VGA header	1
Type A USB2.0	1
Mezzanine	Yes
System BIOS	
BIOS Type	128Mb AMI UEFI Legal BIOS with GUI support
BIOS Features	- Plug and Play (PnP) - ACPI 2.0 Compliance Wake Up Events - SMBIOS 2.8 Support - ASRock Rack Instant Flash
Hardware Monitor	
Temperature	- CPU Temperature Sensing - System Temperature Sensing
Fan	- CPU/Rear/Front Fan Tachometer - CPU Quiet Fan (Allow Chassis Fan Speed Auto-Adjust by CPU Temperature) - CPU/Rear/Front Fan Multi-Speed Control
Voltage	Voltage Monitoring: +12V, +5V, +3.3V, CPU Vcore, DRAM, 1.05V_PCH, +BAT, 3VSB, 5VSB

Support OS	
OS	<p>Microsoft® Windows®</p> <ul style="list-style-type: none"> - Server 2008 R2 SP1 (64 bit) - Server 2012 (64 bit) - Server 2012 R2 (64 bit) <p>Linux®</p> <ul style="list-style-type: none"> - CentOS 6.6 (32 / 64 bit) / 7.0 (64 bit) (only supports AHCI mode) - SUSE Enterprise Linux Server 11 SP3 (32 / 64 bit) / 12 (64 bit) - FreeBSD 10.1 (32 / 64 bit) - Fedora Core 22 (64 bit) - Ubuntu 14.04/14.10 (64 bit) - RedHat Enterprise Linux Server 6.6 (32 / 64 bit) / 7.0 (64 bit) <p>Virtual:</p> <ul style="list-style-type: none"> - VMWare ESXi 5.5/ ESXi 6.0 <p>* Please refer to our website for the latest OS support list.</p>
Environment	
Temperature	<p>Operation temperature: 10°C ~ 35°C /</p> <p>Non operation temperature: -40°C ~ 70°C</p>



This motherboard supports Wake from on Board LAN. To use this function, please make sure that the "Wake on Magic Packet from power off state" is enabled in Device Manager > Intel® Ethernet Connection > Power Management. And the "PCI Devices Power On" is enabled in UEFI SETUP UTILITY > Advanced > ACPI Configuration. After that, onboard LAN1&2 can wake up S5 under OS.

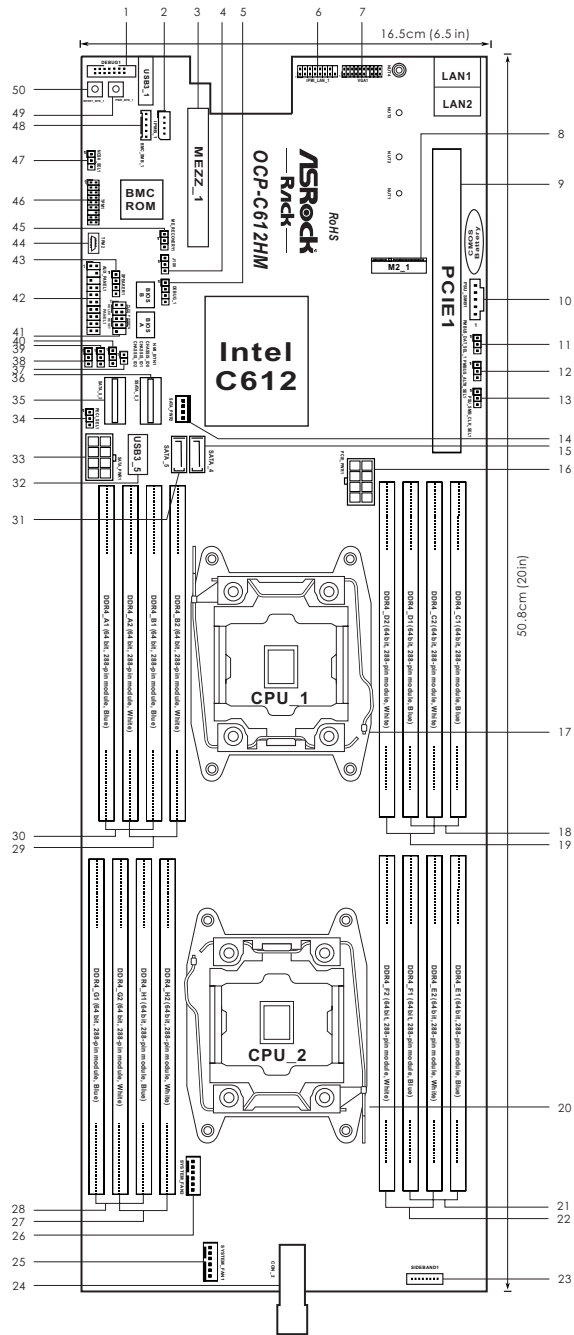


If you install Intel® LAN utility or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If you install the drivers only, it will pass the WHQL tests.

1.3 Unique Features

ASRock Rack 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 Rack 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.

1.4 Motherboard Layout



No.	Description
1	Debug Connector (DEBUG1)
2	Intelligent Platform Management Bus header (IPMB1)
3	Mezzanine Card Slot (MEZZ_1)
4	Descriptor Security Override Jumper (J100)
5	Debug Header (DEBUG_1)
6	IPMI LAN Header (IPMI_LAN_1)
7	VGA Header (VGA1)
8	M.2 Slot (M2_1)*
9	PCI Express 3.0 x24 Slot (PCIE1) (supports ASRock Rack OCP-RB only)
10	PSU SMBus (PSU_SMB1)
11	PMBus Mode Jumper (PMBUS_DAT_SEL1)
12	PMBus Mode Jumper (PMBUS_ALT_SEL1)
13	PMBus Mode Jumper (PMBUS_CLK_SEL1)
14	SATA Power Header (SATA_PWR2)
15	SATA3 Connector (SATA_4)*
16	PCIE Card Power Connector (PCIE_PWR1)**
17	LGA 2011 CPU Socket R3 (Narrow ILM) (CPU_1)
18	2 x 288-pin DDR4 DIMM Slots (DDR4_C1, DDR4_D1, Blue)***
19	2 x 288-pin DDR4 DIMM Slots (DDR4_C2, DDR4_D2, White)***
20	LGA 2011 CPU Socket R3 (Narrow ILM) (CPU_2)
21	2 x 288-pin DDR4 DIMM Slots (DDR4_E1, DDR4_F1, Blue)***
22	2 x 288-pin DDR4 DIMM Slots (DDR4_E2, DDR4_F2, White)***
23	Sideband Connector (SIDEBAND1)
24	Midplane Board Connector (CON_3)
25	System Fan Connector (SYSTEM_FAN1)
26	System Fan Connector (SYSTEM_FAN2)
27	2 x 288-pin DDR4 DIMM Slots (DDR4_H2, DDR4_G2, White)***
28	2 x 288-pin DDR4 DIMM Slots (DDR4_H1, DDR4_G1, Blue)***
29	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2, Blue)***
30	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1, White)***
31	SATA3 Connector (SATA_5)
32	Vertical Type A USB 3.0 (USB3_5)
33	SATA Power Connector (SATA_PWR1)

No.	Description
34	CPU PECI Mode Jumper (PECI_SEL1)
35	Mini-SAS Connector (SATA_0_3)
36	Mini-SAS Connector (SSATA_0_3)****
37	Non Maskable Interrupt Button (NMI_BTN1)
38	Chassis ID0 Jumper (CHASSIS_ID2)
39	Chassis ID1 Jumper (CHASSIS_ID1)
40	Chassis ID2 Jumper (CHASSIS_ID0)
41	System Panel Header (PANEL1)
42	Auxiliary Panel Header (AUX_PANEL1)
43	Speaker Header (SPEAKER1)
44	TPM Connector (TPM2)
45	ME Recovery Jumper (ME_RECOVERY1)
46	TPM Header (TPM1)
47	NCSI Mode Jumper (NCSI_SEL1)
48	BMC SMBus Header (BMC_SMB_1)
49	Power Switch (PWR_PWR_1)
50	Reset Switch (RESET_BTN_1)

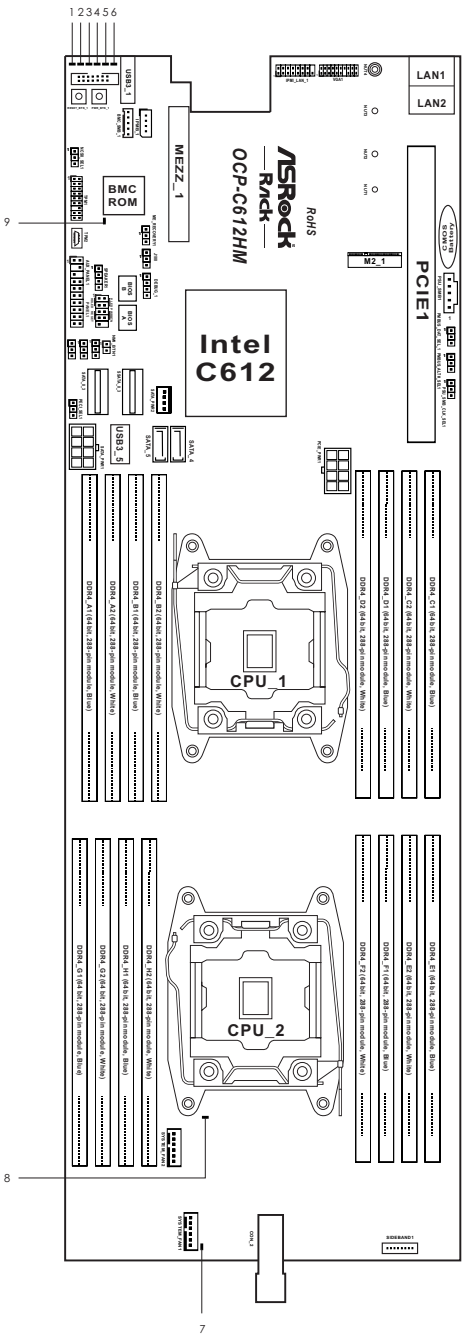
*The M.2 slot (M2_1) is shared with the SATA_4 connector. When M2_1 is populated with a M.2 SATA3 module, SATA_4 is disabled.

**PCIe1 slot only supports low profile PCIe cards.

***For DIMM installation and configuration instructions, please see p.20 (Installation of Memory Modules (DIMM)) for more details.

**** The first "S" of the "SSATA" means "secondary". SATA is managed by the first controller. SSATA is managed by the secondary controller.

1.5 Onboard LED Indicators



No.	Item	Status	Description
1	UART_0	Green	Indicates UART Channel number's binary code
2	UART_1	Green	Indicates UART Channel number's binary code
3	ERR_LED	Yellow	Error occurs
4	HDD_LED	Green	HDD access
5	PWR_LED (Power LED & Chassis Identification LED)	Solid Blue	Power on; Chassis identify off
		Off	Power off; Chassis identify off
		Blinking Blue (LED on for 0.1sec, off for 0.9sec, and loop)	Power off; Chassis identify on
		Blinking Blue (LED on for 0.9sec, off for 0.1sec, and loop)	Power on; Chassis identify on
6	SB_PWR1	Green	STB PWR ready
7	FAN_LED1	Amber	SYSTEM_FAN1 failed
8	FAN_LED2	Amber	SYSTEM_FAN2 failed
9	BMC_LED1	Green	BMC heartbeat LED

1.6 I/O Panel

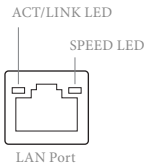


No.	Description	No.	Description
1	LAN RJ-45 Port (LAN1)*	2	LAN RJ-45 Port (LAN2)*
3	USB 3.0 Port (USB3_1)		

Note: LAN1 supports NCSI.

LAN Port LED Indications

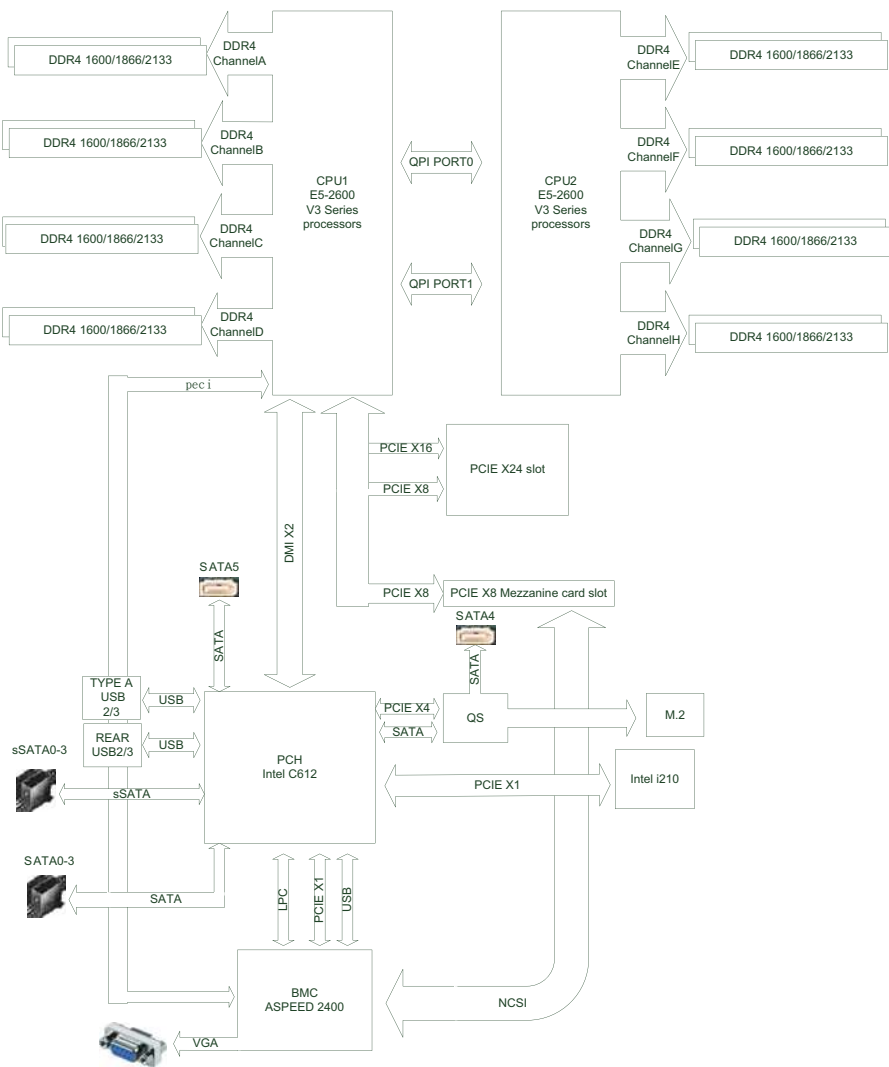
*There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.



LAN Port LED Indications

Speed LED		Activity / Link LED	
Status	Description	Status	Description
Off	10Mbps connection or no link	Off	No Link
Yellow	100Mbps connection	Blinking Green	Data Activity
Green	1Gbps connection	On	Link

1.7 Block Diagram



Chapter 2 Installation

This is a half form factor (6.5" x 20", 16.5 cm x 50.8 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

EP2C612 Series are dual socket motherboards that supports Intel® Xeon® E5-2600 v3 Series Processors. Please install a primary processor (BootStrap Processor) into "CPU1" socket and then install a non-Primary Processor (Application Processors) into "CPU2" socket. *For a single CPU, please install it into "CPU1" socket (framed by a square).



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 components.
2. To avoid damaging the motherboard's 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 the components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever you uninstall any component, place it on a grounded anti-static pad or in the bag that comes with the component.
5. When placing screws into the screw holes to secure the motherboard to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard.



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 Installing the CPU



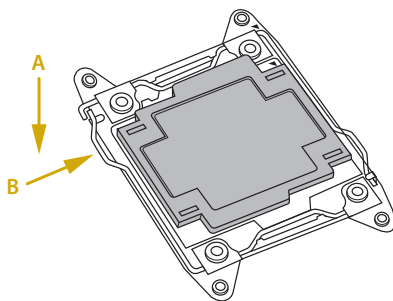
1. Before you insert the 2011-3-Pin CPU into the socket, please check if the PnP cap is on the socket, if the CPU surface is unclean, or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all power cables before installing the CPU.

CAUTION:

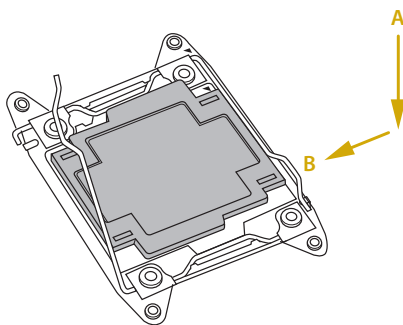
Please note that C612 platform is only compatible with the LGA 2011-3 socket, which is incompatible with the LGA 2011 socket

Socket Type: Narrow ILM Socket

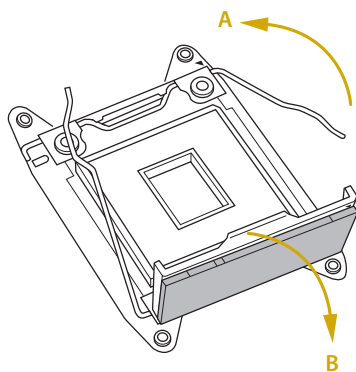
1



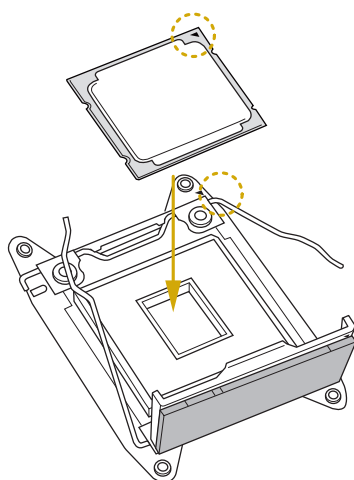
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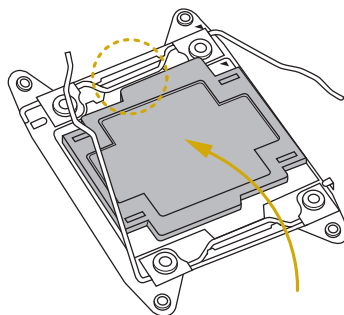
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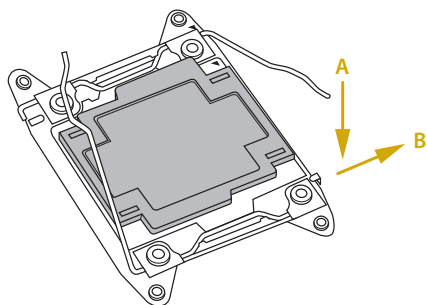
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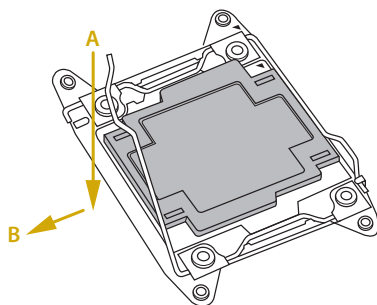
5



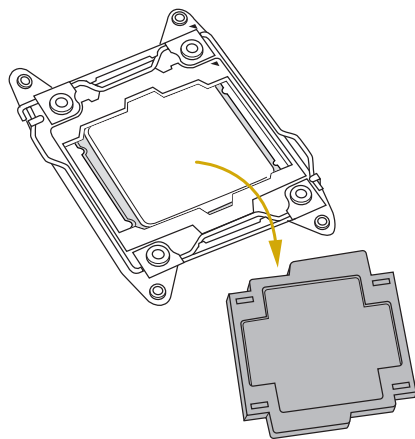
6



7



8

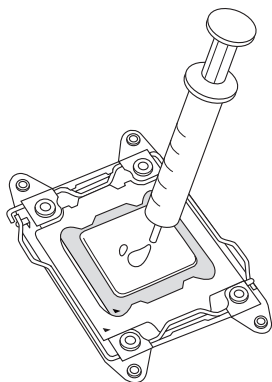
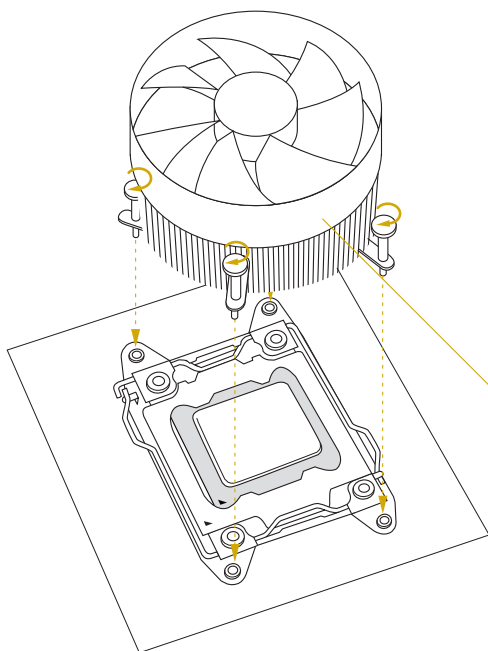
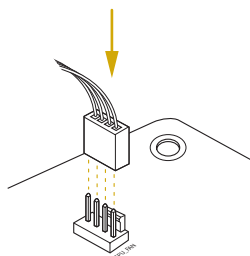


The cover must be placed if returning the motherboard for after service.

2.4 Installing the CPU Fan and Heatsink



Before you installed the heatsink, you need to spray thermal interface material between the CPU and the heatsink to improve heat dissipation.

**1****2**

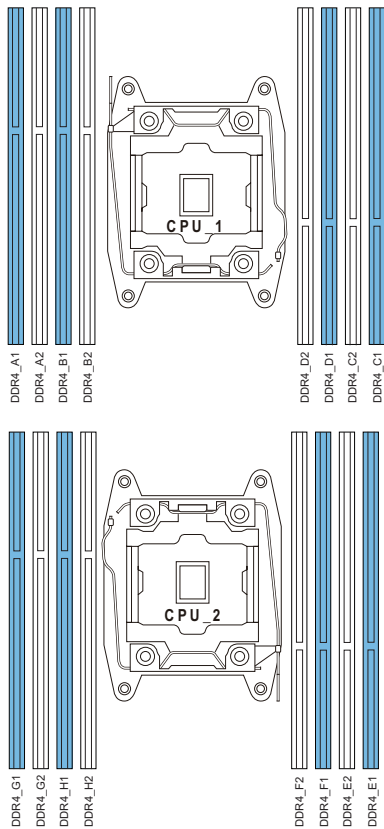
CPU fan for narrow ILM socket

*Support an active or passive heatsink

2.5 Installation of Memory Modules (DIMM)

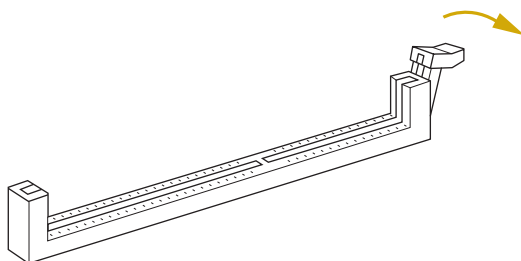
This motherboard provides sixteen 288-pin DDR4 (Double Data Rate 4) DIMM slots in two groups, and supports Dual Channel Memory Technology.

Capacity	CPU1	CPU2
256GB / 512GB	DDR4_A1, B1, C1, D1 (Blue) DDR4_A2, B2, C2, D2 (White)	DDR4_E1, F1, G1, H1 (Blue) DDR4_E2, F2, G2, H2 (White)

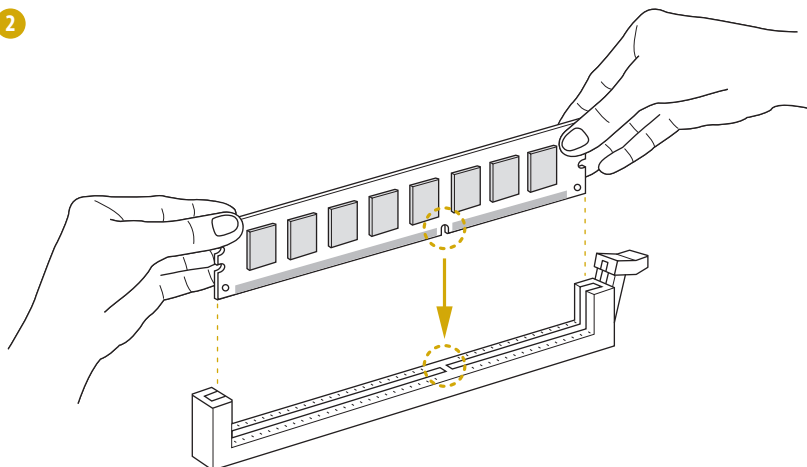


1. It is not allowed to install a DDR, DDR2 or DDR3 memory module into a DDR4 slot; otherwise, this motherboard and DIMM may be damaged.
2. For dual channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR4 DIMM pairs.
3. It is unable to activate Dual Channel Memory Technology with only one or three memory module installed.
4. Some DDR4 1GB double-sided DIMMs with 16 chips may not work on this motherboard. It is not recommended to install them on this motherboard.

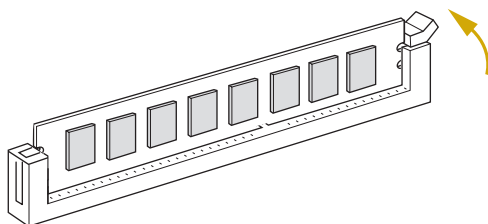
1



2



3



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.

Recommended Memory Configurations

A single memory module should be installed in the BLUE socket.

If you install only one CPU (CPU1) on the motherboard, make sure to install DIMMs into DDR4_A, DDR4_B, DDR4_C, or DDR4_D slot(s).

1 CPU Configuration

	CPU1							
	A1	A2	B1	B2	C1	C2	D1	D2
1 DIMM	#							
2 DIMMS	#							
4 DIMMS	#		#		#		#	
8 DIMMS	#	#	#	#	#	#	#	#

2 CPU Configuration

	CPU1							
	A1	A2	B1	B2	C1	C2	D1	D2
1 DIMM	#							
2 DIMMS	#							
4 DIMMS	#		#					
8 DIMMS	#		#		#		#	
12 DIMMS	#	#	#	#	#	#	#	#
16 DIMMS	#	#	#	#	#	#	#	#

	CPU2							
	E1	E2	F1	F2	G1	G2	H1	H2
1 DIMM								
2 DIMMS	#							
4 DIMMS	#		#					
8 DIMMS	#		#		#		#	
12 DIMMS	#		#		#		#	
16 DIMMS	#	#	#	#	#	#	#	#

2.6 Expansion Slot (PCI Express Slot)

There is 1 PCI Express slot on this motherboard.

PCIE slot:

PCIE1 (PCIE 3.0 x24 slot, from CPU1) is used for PCI Express x24 lane width cards (supports ASRock Rack OCP-RB only).

**Only support low profile PCIE cards*

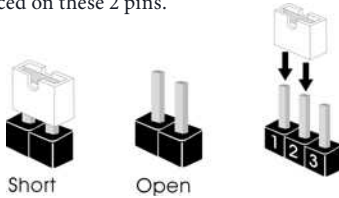
Slot	Generation	Mechanical	Electrical	Source
PCIE 1	3.0	x24	x24	CPU1

Installing an expansion card

- Step 1. Before installing an 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 Jumper Setup

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



ME Recovery Jumper (3-pin ME_RECOVERY1) (see p.6, No. 45)	1_2 	2_3 
	Normal Mode (Default)	ME Recovery Mode
NCSI Mode Jumper (3-pin NCSI_SEL1) (see p.6, No. 47)	1_2 	2_3 
	NCSI is set to onboard LAN1 (Default)	NCSI is set to Mezzanine Card
Descriptor Security Over-ride Jumper (3-pin J100) (see p.6, No. 4)	1_2 	2_3 
	Descriptor Security Over-ride	Not Override (Default)
CPU PECI Mode Jumper (3-pin PECI_SEL1) (see p.6, No. 34)	1_2 	2_3 
	CPU PECI connect to PCH	CPU PECI connect to BMC (Default)
PMBUS Mode Jumper (3-pin PMBUS_SEL_ALT1) (see p.6, No. 12) (3-pin PMBUS_SEL_DAT1) (see p.6, No. 11) (3-pin PMBUS_SEL_CLK1) (see p.6, No. 13)	1_2 	2_3 
	PMBus loads the data via BMC chip (Default)	PMBus loads the data via PCH chip

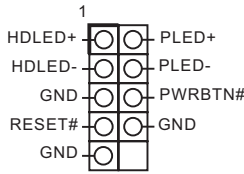
Chassis ID0 Jumper (3-pin CHASSIS_ID0) (see p.6, No. 40)		
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (see p.6, No. 39)		
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (see p.6, No. 38)		
	Board Level SKU (Default) (OCPC612HM)	For OCP3-6S system
Chassis ID0 Jumper (3-pin CHASSIS_ID0) (see p.6, No. 40)		
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (see p.6, No. 39)		
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (see p.6, No. 38)	 Reserved for system level use	 For OCP3-1L system
Chassis ID0 Jumper (3-pin CHASSIS_ID0) (see p.6, No. 40)		
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (see p.6, No. 39)		
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (see p.6, No. 38)	 Reserved for system level use	 Reserved for system level use

2.8 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 to the motherboard.

System Panel Header
(9-pin PANEL1)
(see p.6, No. 40)



Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments. Particularly 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):

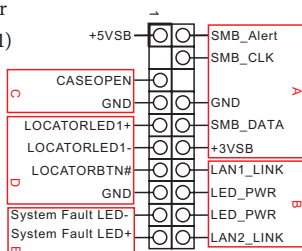
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S4 sleep state or powered off (S5).

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.

Auxiliary Panel Header (18-pin AUX PANEL_1) (see p.6, No. 42)



This header supports multiple functions on the front panel, including the front panel SMB, internet status indicator and chassis intrusion pin.



A. Front panel SMBus connecting pin (6-1 pin FPSMB)

This header allows you to connect SMBus (System Management Bus) equipment. It can be used for communication between peripheral equipment in the system, which has slower transmission rates, and power management equipment.

B. Internet status indicator (2-pin LAN1_LED, LAN2_LED)

These two 2-pin headers allow you to use the Gigabit internet indicator cable to connect to the LAN status indicator. When this indicator flickers, it means that the internet is properly connected.

C. Chassis intrusion pin (2-pin CHASSIS)

This header is provided for host computer chassis with chassis intrusion detection designs. In addition, it must also work with external detection equipment, such as a chassis intrusion detection sensor or a microswitch. When this function is activated, if any chassis component movement occurs, the sensor will immediately detect it and send a signal to this header, and the system will then record this chassis intrusion event. The default setting is set to the CASEOPEN and GND pin; this function is off.

D. Locator LED (4-pin LOCATOR)

This header is for the locator switch and LED on the front panel.

E. System Fault LED (2-pin LOCATOR)

This header is for the Fault LED on the system.

Serial ATA3 Connectors

(SATA_4)
(see p.6, No. 15)
(SATA_5)
(see p.6, No. 31)



These two 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.

*The M.2 slot (M2_1) is shared with the SATA_4 connector. When M2_1 is populated with a M.2 SATA3 module, SATA_4 is disabled.

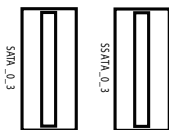
Mini SAS Connectors

(SATA_0_3)

(see p.6, No. 35)

(SSATA_0_3)

(see p.6, No. 36)



This Mini SAS connectors support SAS/SATA data cables for internal storage devices. The current SAS3/SATA3 interface allows up to 12.0 Gb/s data transfer rate. For connecting SAS HDDs, please contact SAS data cable dealers.

USB 3.0 Connector

(USB3_5)

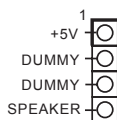
(see p.6, No. 32)



Chassis Speaker Header

(4-pin SPEAKER1)

(see p.6, No. 43)



Please connect the chassis speaker to this header.

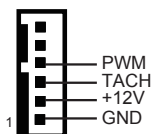
System Fan Connectors

(6-pin CPU_FAN1)

(see p.6, No. 25)

(6-pin CPU_FAN1)

(see p.6, No. 26)

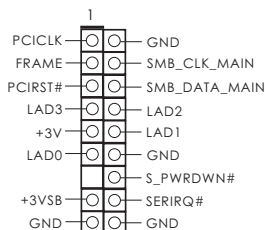


This motherboard provides two 6-Pin system fan connectors.

TPM Header

(17-pin TPM1)

(see p.6, No. 46)



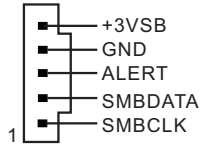
This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

TPM Connector
(TPM2)
(see p.6, No. 44)



This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

PSU SMBus
(PSU_SMB1)
(see p.6, No. 10)



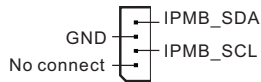
PSU SMBus monitors the status of the power supply, fan and system temperature.

Non Maskable Interrupt
Button Header
(NMI_BTN1)
(see p.6, No. 37)



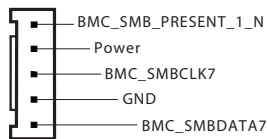
Please connect a NMI device to this header.

Intelligent Platform
Management Bus header
(4-pin IPMB1)
(see p.6, No. 2)



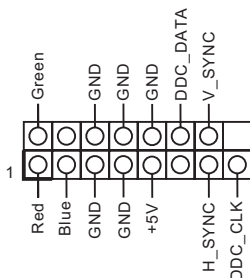
This 4-pin connector is used to provide a cabled base-board or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.

Baseboard Management
Controller SMBus Header
(5-pin BMC_SMB_1)
(see p.6, No. 48)



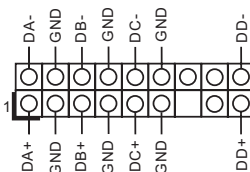
This header is used for the SMBUS devices.

VGA Header
(15-pin VGA1)
(see p.6, No. 7)

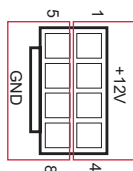


Please connect either end of VGA_2X8 cable to VGA header.

IPMI LAN Header
(17-pin IPMI_LAN_1)
(see p.6, No. 6)

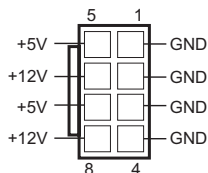


PCIe Card Power Connector
(8-pin PCIE_PWR1)
(see p.6, No. 16)



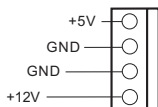
Connect one end of the power cable to this PCIe power connector and the other end to the power connector on the riser card.

SATA Power Connector
(8-pin SATA_PWR1)
(see p.6, No. 33)



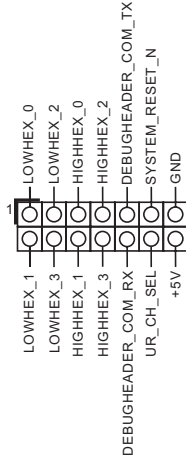
Connect one end of the power cable to this SATA power connector and the other end to the power connector on the mezzanine card.

SATA Power Connector
(4-pin SATA_PWR2)
(see p.6, No. 14)



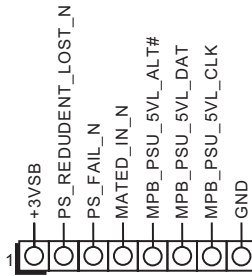
Please connect a SATA power cable.

Debug Connector
(14-pin DEBUG1)
(see p.6, No. 1)



The connector is used for
debug purpose.

Sideband Connector
(8-pin SIDEBAND1)
(see p.6, No. 23)



Please connect a sideband
cable to this connector.

2.9 Smart Switches

The motherboard has two smart switches: Power Switch and Reset Switch, allowing users to quickly turn on/off the system and reset the system.

Power Switch
(PWR_BTN1)
(see p.6, No. 49)



Power Switch allows users to quickly turn on/off the system.

Reset Switch
(RESET_BTN1)
(see p.6, No. 50)



Reset Switch allows users to quickly reset the system.

2.10 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 top to bottom to install those required drivers. Therefore, the drivers you install can work properly.

2.11 Dual LAN and Teaming Operation Guide

Dual LAN with Teaming enabled on this motherboard allows two single connections to act as one single connection for twice the transmission bandwidth, making data transmission more effective and improving the quality of transmission of distant images. Fault tolerance on the dual LAN network prevents network downtime by transferring the workload from a failed port to a working port.



The speed of transmission is subject to the actual network environment or status even with Teaming enabled.

Before setting up Teaming, please make sure whether your Switch (or Router) supports Teaming (IEEE 802.3ad Link Aggregation). You can specify a preferred adapter in Intel PROSet. Under normal conditions, the Primary adapter handles all non-TCP/IP traffic. The Secondary adapter will receive fallback traffic if the primary fails. If the Preferred Primary adapter fails, but is later restored to an active status, control is automatically switched back to the Preferred Primary adapter.

Step 1

From **Device Manager**, open the properties of a team.

Step 2

Click the **Settings** tab.

Step 3

Click the **Modify Team** button.

Step 4

Select the adapter you want to be the primary adapter and click the **Set Primary** button.

If you do not specify a preferred primary adapter, the software will choose an adapter of the highest capability (model and speed) to act as the default primary. If a failover occurs, another adapter becomes the primary. The adapter will, however, rejoin the team as a non-primary.

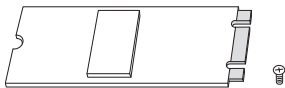
2.12 M.2_SSD (NGFF) Module Installation Guide

The M.2, also known as the Next Generation Form Factor (NGFF), is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The M.2_SSD (NGFF) Socket 3 can accommodate either a M.2 SATA3 6.0 Gb/s module or a M.2 PCI Express module up to Gen 3 x4 (32 Gb/s).

*The M.2_SSD (NGFF) Socket 3 supports SSD drives. Please note that the WiFi or other non-SSD M.2 modules are not supported.

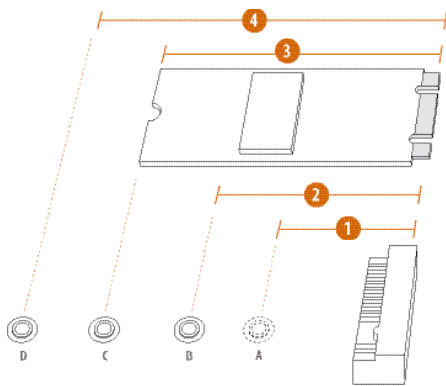
The M.2 slot (M2_1) is shared with the SATA_4 connector. When M2_1 is populated with a M.2 SATA3 module, SATA_4 is disabled.

Installing the M.2_SSD (NGFF) Module



Step 1

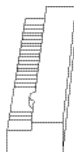
Prepare a M.2_SSD (NGFF) module and the screw.



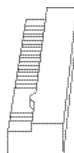
Step 2

Depending on the PCB type and length of your M.2_SSD (NGFF) module, find the corresponding nut location to be used.

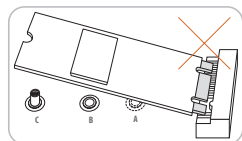
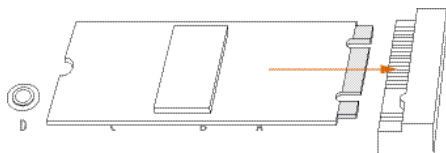
No.	1	2	3	4
Nut Location	A	B	C	D
PCB Length	3cm	4.2cm	6cm	8cm
Module Type	Type2230	Type 2242	Type2260	Type 2280

Step 3

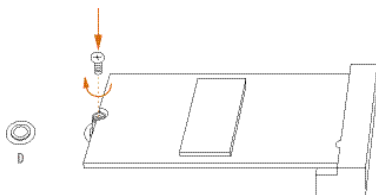
Move the standoff based on the module type and length. The standoff is placed at the nut location D by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.

Step 4

Peel off the yellow protective film on the nut to be used. Hand tighten the standoff into the desired nut location on the motherboard.

Step 5

Align and gently insert the M.2 (NGFF) SSD module into the M.2 slot. Please be aware that the M.2 (NGFF) SSD module only fits in one orientation.

Step 6

Tighten the screw with a screwdriver to secure the module into place. Please do not overtighten the screw as this might damage the module.

For the latest updates of M.2_SSD (NFGG) module support list, please visit our website for details: <http://www.asrockrack.com>

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 <Ctrl> + <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:

Item	Description
Main	To set up the system time/date information
Advanced	To set up the advanced UEFI features
IntelRCSetup	For Intel CPU and chipset settings
Server Mgmt	To manage the server
Security	To set up the security features
Boot	To set up the default system device to locate and load the Operating System
Event Logs	For event log configuration
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.

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

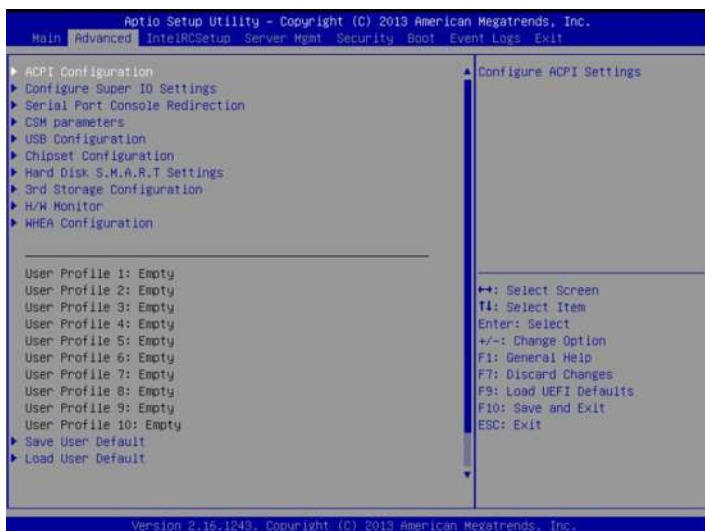
3.2 Main Screen

Once you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview. The Main screen provides system overview information and allows you to set the system time and date.



3.3 Advanced Screen

In this section, you may set the configurations for the following items: ACPI Configuration, Configure Super IO Settings, Serial Port Console Redirection, CSM Parameters, Trusted Computing, USB Configuration, Chipset Configuration, Hard Disk S.M.A.R.T Settings, 3rd Storage Configuration, H/W Monitor, WHEA Configuration and Instant Flash.



Save User Default

Type a profile name and press enter to save your settings as user default.

Load User Default

Load previously saved user defaults.



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

3.3.1 ACPI Configuration



PCIE Devices Power On

Use this item to enable or disable PCIE devices 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.

3.3.2 Configure Super IO Settings



Super IO Configuration

Serial Port 1 Configuration

Use this item to set parameters of serial port 1.

Select and enter the "Serial Port 1 Configuration" and you will see the followings:

Serial Port

Use this item to enable or disable Serial Port (COM)

Serial Port Address

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

SOL Configuration

Use this item to set parameters of SOL.

Select and enter the "SOL Configuration" and you will see the followings:

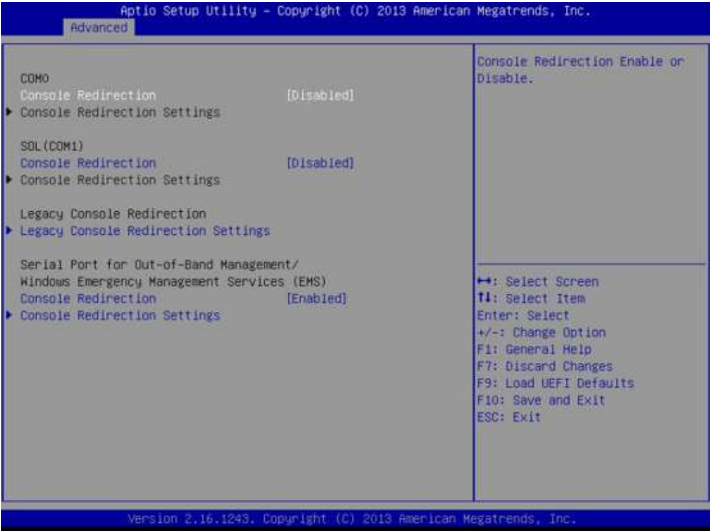
SOL Port

Use this item to enable or disable SOL Port.

Serial Port Address

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

3.3.3 Serial Port Console Redirection



COM0 / SOL(COM1)

Console Redirection

Use this option to enable or disable Console Redirection. If this item is set to Enabled, you can select a COM Port to be used for Console Redirection.

Console Redirection Settings

Use this option to configure Console Redirection Settings, and specify how your computer and the host computer to which you are connected exchange information.

Terminal Type

Use this item to select the preferred terminal emulation type for out-of-band management. It is recommended to select [VT-UTF8].

Option	Description
VT100	ASCII character set
VT100+	Extended VT100 that supports color and function keys
VT-UTF8	UTF8 encoding is used to map Unicode chars onto 1 or more bytes
ANSI	Extended ASCII character set

Bits Per Second

Use this item to select the serial port transmission speed. The speed used in the host computer and the client computer must be the same. Long or noisy lines may require lower transmission speed. The options include [9600], [19200], [38400], [57600] and [115200].

Data Bits

Use this item to set the data transmission size. The options include [7] and [8] (Bits).

Parity

Use this item to select the parity bit. The options include [None], [Even], [Odd], [Mark] and [Space].

Stop Bits

The item indicates the end of a serial data packet. The standard setting is [1] Stop Bit. Select [2] Stop Bits for slower devices.

Flow Control

Use this item to set the flow control to prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to restart the flow. Hardware flow uses two wires to send start/stop signals. The options include [None] and [Hardware RTS/CTS].

VT-UTF8 Combo Key Support

Use this item to enable or disable the VT-UTF8 Combo Key Support for ANSI/VT100 terminals.

Recorder Mode

Use this item to enable or disable Recorder Mode to capture terminal data and send it as text messages.

Resolution 100x31

Use this item to enable or disable extended terminal resolution support.

Legacy OS Redirection Resolution

Use this item to select the number of rows and columns used in legacy OS redirection.

Putty Keypad

Use this item to select Function Key and Keypad on Putty.

Redirection After BIOS POST

If the [BootLoader] is selected, legacy console redirection is disabled before booting to legacy OS. If [Always Enabled] is selected, legacy console redirection is enabled for legacy OS. The default value is [Always Enabled].

Legacy Console Redirection

Legacy Console Redirection Settings

Use this item to select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

Console Redirection

Use this option to enable or disable Console Redirection. If this item is set to Enabled, you can select a COM Port to be used for Console Redirection.

Console Redirection Settings

Use this option to configure Console Redirection Settings, and specify how your computer and the host computer to which you are connected exchange information.

Out-of-Band Mgmt Port

Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.

Terminal Type

Use this item to select the preferred terminal emulation type for out-of-band management. It is recommended to select [VT-UTF8].

Option	Description
VT100	ASCII character set
VT100+	Extended VT100 that supports color and function keys
VT-UTF8	UTF8 encoding is used to map Unicode chars onto 1 or more bytes
ANSI	Extended ASCII character set

Bits Per Second

Use this item to select the serial port transmission speed. The speed used in the host computer and the client computer must be the same. Long or noisy lines may require lower transmission speed. The options include [9600], [19200], [57600] and [115200].

Flow Control

Use this item to set the flow control to prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to restart the flow. Hardware flow uses two wires to send start/stop signals. The options include [None], [Hardware RTS/CTS], and [Software Xon/Xoff].

Data Bits

Parity

Stop Bits

3.3.4 CSM Configuration



Launch Storage OpROM Policy

Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.

PCIE1 x8 Slot OpROM

Use this option to select PCIE1 x8 Storage and Network Option ROM policy.

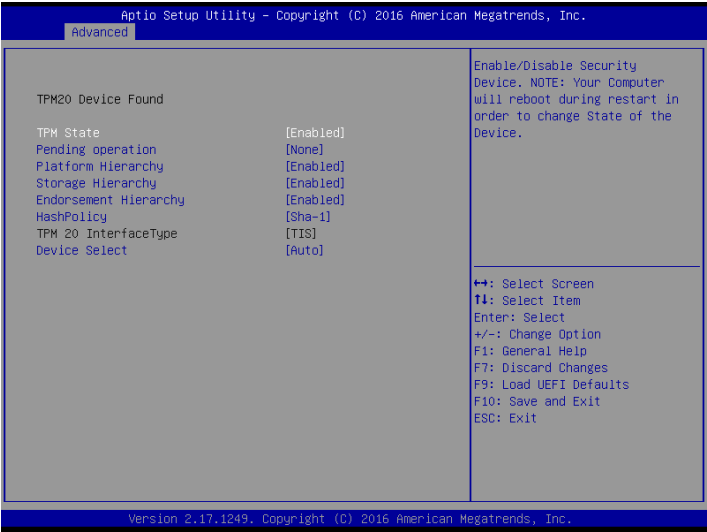
PCIE1 x16 Slot OpROM

Use this option to select PCIE1 x16 Storage and Network Option ROM policy.

MEZZ_1 Slot OpROM

Use this option to select MEZZ_1 Slot Option ROM policy.

3.3.5 Trusted Computing



NOTE: Options vary depending on the version of your connected TPM module. Here is an example of TPM2.0.

TPM State

Use this item to enable or disable Security Device.

NOTE: Your computer will reboot during restart in order to change State of the Device.

Pending Operation

Schedule an Operation for the Security Device.

NOTE: Your computer will reboot during restart in order to change State of the Device.

Platform Hierarchy

Use this item to enable or disable Platform Hierarchy.

Storage Hierarchy

Use this item to enable or disable Storage Hierarchy.

Endorsement Hierarchy

Use this item to enable or disable Endorsement Hierarchy.

Hash Policy

Select the Hash policy to use. SHA-2 is most secure but might not be supported by all Operating Systems.

Device Select

TPM 1.2 will restrict support to TPM 1.2 devices; TPM 2.0 will restrict support to TPM 2.0 devices; Auto will support both with the default set to TPM 2.0 devices. If TPM 2.0 devices are not found, TPM 1.2 devices will be enumerated.

3.3.6 USB Configuration



Intel USB3.0 Mode

Use this item to select the mode of operation of Intel USB 3.0 controller. Configuration options: [Enabled], [Disabled], [Auto] and [Smart Auto]. If [Auto] is selected, all USB ports work as USB3.0 after boot to OS. If [Smart Auto] is selected, all USB ports work as USB3.0 after boot to OS and work as USB2.0 in deep sleep stages.

Legacy USB 3.0 Support

Use this option to enable or disable legacy support for USB devices. The default value is [Enabled].

3.3.7 Chipset Configuration



Primary Graphics Adapter

Use this item to select the type and primary VGA in case of multiple video controllers.

Onboard VGA

Use this to enable or disable the Onboard VGA function. The default value is [Auto].

Onboard LAN1

This allows you to enable or disable both the Onboard LAN1 features.

Onboard LAN2

This allows you to enable or disable both the Onboard LAN2 features.

Above 4G Decoding

Enable or disable 64bit capable Devices to be decoded in Above 4G Address Space (only if the system supports 64 bit PCI decoding).

SR-IOV Support

If system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support.

MMIO High Base

Use this item to select MMIO High Base.

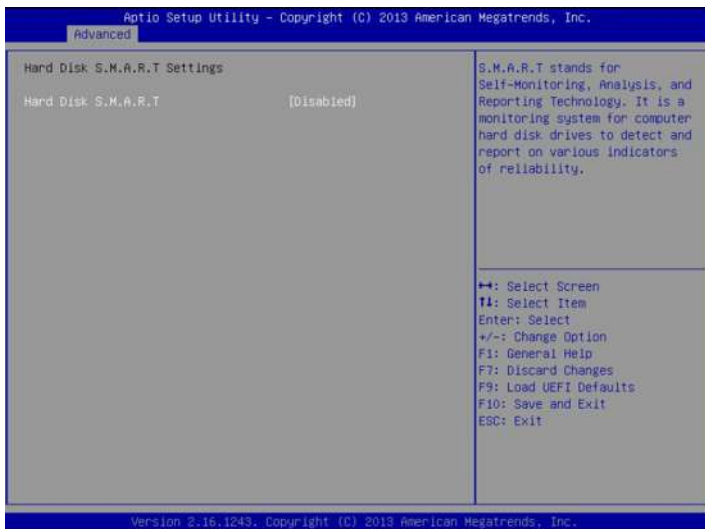
MMIO High Size

Use this item to select MMIO High Size.

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. If [Last State] is selected, it will recover to the state before AC/power loss.

3.3.8 Hard Disk S.M.A.R.T Settings



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].

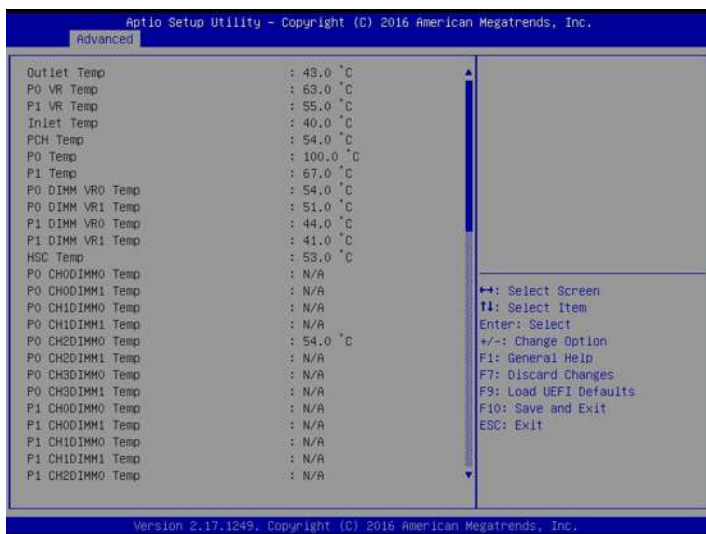
3.3.9 3rd Storage Configuration



In this section, you may set the configurations for the supported 3rd storage device.

3.3.10 H/W Monitor

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.



Watch Dog Timer

This allows you to enable or disable the Watch Dog Timer. The default value is [Disabled].

3.3.11 WHEA Configuration



WHEA Support

Use this item to enable or disable Windows Hardware Error Architecture.

System Error

Use this item to enable or disable System Error feature. When it is set to [Enabled], you can configure Memory Error and PCIE Error log features.

S/W Error Injection Support

When it is set to [Enabled], S/W Error Injection is supported by unlocking MSR Ox790 .

Memory Error

Use this item to enable or disable Memory Error log feature.

Correctable Error Threshold

Correctable Error Threshold is used for sparing, tagging, and leaky bucket.

Memory ECC Log Threshold

Use this item to set memory ECC Log Threshold.

SMI QPI Lane Failover

Use this item to enable or disable SMI when clock/data failover is set.

PCIE Error

Use this item to enable or disable PCIE Error log feature.

Corrected Error Enable

Use this item to enable or disable PCIe Correctable errors.

Uncorrected Error Enable

Use this item to enable or disable PCIe Uncorrectable errors.

Fatal Error Enable

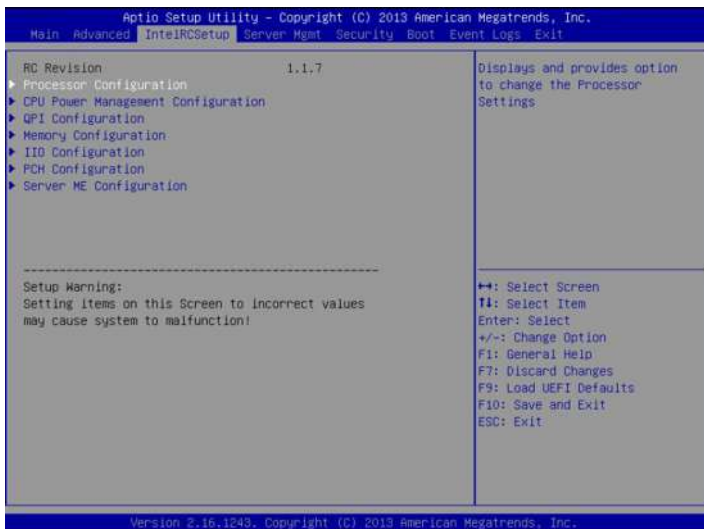
Use this item to enable or disable PCIe Ftal errors.

3.3.12 Instant Flash

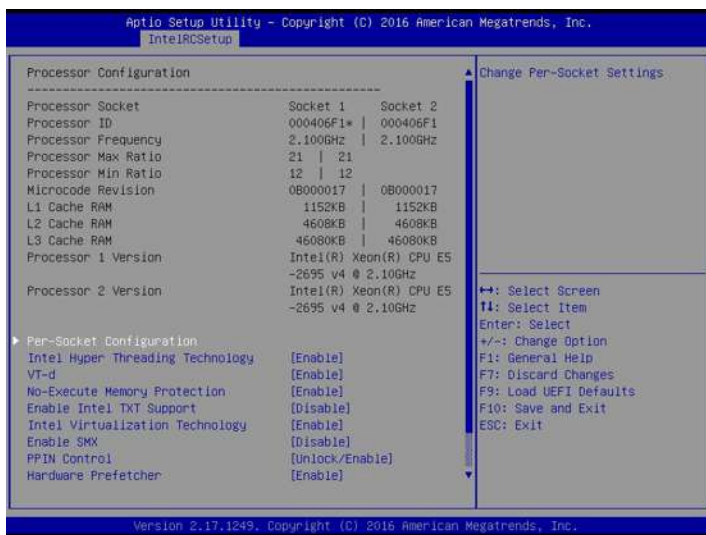
Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update system UEFI without entering operating systems first like MS-DOS or Windows. Just save the new UEFI file to your USB flash drive, floppy disk or hard drive and launch this tool, then you 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.

3.4 IntelRCSetup

In this section, you may set the configurations for the following items: Processor Configuration, CPU Power Management Configuration, QPI Configuration, Memory Configuration, IIO Configuration, PCH Configuration and Server ME Configuration.



3.4.1 Processor Configuration



Per-Socket Configuration

Change Per-Socket Settings.

CPU Socket 1 Configuration

Active Processor Cores

Enter the number of cores to be enabled. 0 means all cores.

CPU Socket 2 Configuration

Active Processor Cores

Enter the number of cores to be enabled. 0 means all cores.

Intel Hyper Threading Technology

Intel Hyper Threading Technology allows multiple threads to run on each core, so that the overall performance on threaded software is improved.

VT-d

Intel® Virtualization Technology for Directed I/O helps your virtual machine monitor better utilize hardware by improving application compatibility and reliability, and providing additional levels of manageability, security, isolation, and I/O performance.

No-Execute Memory Protection

Processors with No-Execution Memory Protection Technology may prevent certain classes of malicious buffer overflow attacks.

Enable Intel TXT Support

Enable Intel Trusted Execution Technology configuration. Please disable "EX DFX Features" when TXT is enabled.

Intel Virtualization Technology

Intel Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions, so that one computer system can function as multiple virtual systems.

Enable SMX

Use this item to enable Safer Mode Extensions.

PPIN Control

Use this item to unlock and Enable/Disable PPIN Control.

Hardware Prefetcher

Automatically prefetch data and code for the processor. Enable for better performance.

Adjacent Cache Prefetch

Automatically prefetch the subsequent cache line while retrieving the currently requested cache line. Enable for better performance.

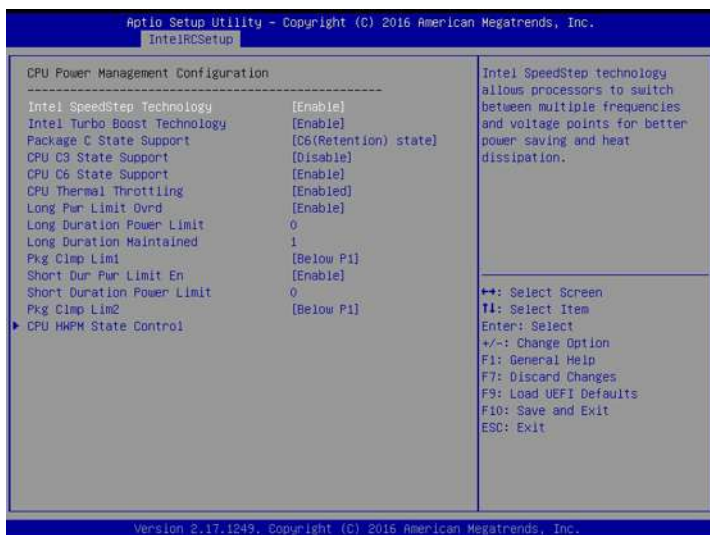
DCU Streamer Prefetcher

DCU streamer prefetcher is an L1 data cache prefetcher (MSR 1A4h [2]).

DCU IP Prefetcher

DCU IP prefetcher is an L1 data cache prefetcher (MSR 1A4h [3]).

3.4.2 CPU Power Management Configuration



Intel SpeedStep Technology

Intel SpeedStep technology is Intel's new power saving technology. Processors can switch between multiple frequencies and voltage points to enable power saving. The default value is [Enabled]. Configuration options: [Enabled] and [Disabled]. If you install Windows® Vista™ / 7 / 8 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(R) SpeedStep technology.



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

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 conditions. The default value is [Enabled].

Package C State Support

Enable CPU, PCIe, Memory, Graphics C State Support for power saving.

CPU C3 State Support

Enable C3 sleep state for lower power consumption.

CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

CPU Thermal Throttling

Enable CPU internal thermal control mechanisms to keep the CPU from overheating.

Long Pwr Limit Ovr

Use this item to enable or disable Long Term Power Limit override. If this option is disabled, BIOS will program the default values for Long Term Power Limit Time Window.

Long Duration Power Limit

Turbo Mode Long Duration Power Limit (aka Power Limit 1) in Watts. The value may vary from 0 to Fused Valued. If the value is 0, the fused value will be programmed.

Long Duration Maintained

Long Duration Time Window (aka Power Limit 1 Time) value in seconds. The value may vary from 0 to 56.

Pkg Clmp Lim1

Pkg Clamping limit 1, allowing going below P1. O: PBBM limited between P1 and P0; 1: PBM can go below P1.

Short Dur Pwr Limit En

Use this item to enable or disable Short Duration Power Limit (aka Power Limit 2).

Short Duration Power Limit

Short Duration Power Limit (aka Power Limit 2) value in Watts. The value may vary from 0 to 32767. If the value is 0, BIOS will program this value as $125\% \times \text{TDP}$.

Pkg Clmp Lim2

Pkg Clamping limit 2, allowing going below P1. O: PBBM limited between P1 and P0; 1: PBM can go below P1.

CPU HWPM State Control

CPU HWPM State Control controls configuration sub menu, includes Native and 00B nd etc.

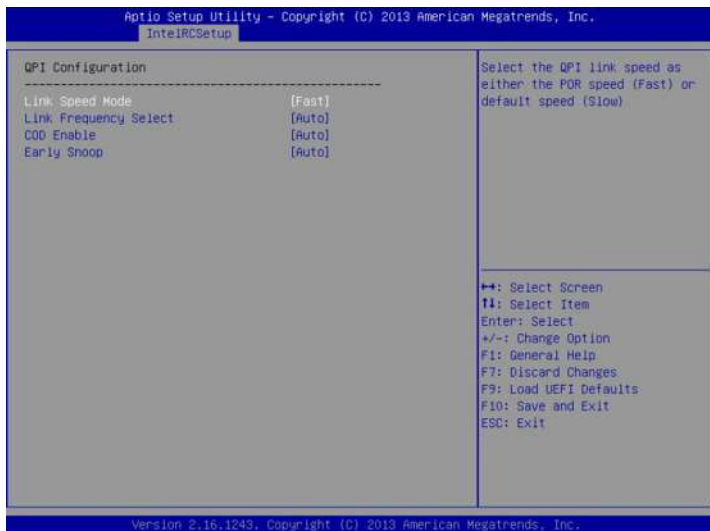
Enable CPU HWPM

Enable CPU HWPM for CPU for better Energy performance.

Enable CPU Autonomous Cstate

Enable CPU Autonomous Cstate which is CPU converts HALT instruction to MWAIT.

3.4.3 QPI Configuration



Link Speed Mode

Select the QPI link speed as either the POR speed (Fast) or default speed (Slow).

Link Frequency Select

Allows for selecting the QPI Link Frequency.

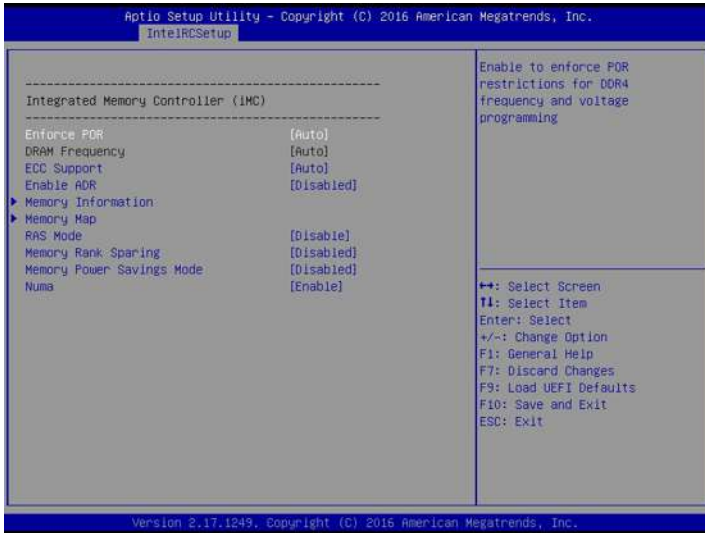
COD Enable

Use this item to enable or disable Cluster on Die.

Early Snoop

Use this item to configure Early Snoop.

3.4.4 Memory Configuration



Enforce POR

Enable to enforce POR restrictions for DDR4 frequency and voltage programming.

DRAM Frequency

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

ECC Support

Use this item to enable or disable DDR ECC Support.

Enable ADR

Use this item to enable the ADR.

Memory Information

Displays memory topology with DIMM population information.

Memory Map

Set memory mapping settings.

Channel Interleaving

Use this item to select Channel Interleaving setting.

Rank Interleaving

Use this item to select Rank Interleaving setting.

RAS Mode

Enable or disable RAS modes. Enabling Sparing and Mirroring is not supported. If enabled, Sparing will be selected.

Memory Rank Sparing

Enable or disable Memory Rank Sparing.

Memory Power Savings Mode

Use this item to configure CKE and related Memory Power Savings Features.

Numa

Use this item to enable or disable Non Uniform Memory Access (NUMA).

3.4.5 IIO Configuration



PCI-E x16 Slot Link Speed

This allows you to select PCI-E x16 port Link Speed. The default value is [Auto].

PCI-E x8 Slot Link Speed

This allows you to select PCI-E x8 port Link Speed. The default value is [Auto].

MEZZ_1 Slot Link Speed

This allows you to select MEZZ_1 Slot Link Speed. The default value is [Auto].

PCI-E ASPM (Global)

This option enables or disables the ASPM support for all downstream devices.

3.4.6 PCH Configuration



PCI-E ASPM Support (Global)

This option enables and disables the ASPM support for all downstream devices.

PCH sSATA Configuration

sSATA devices and settings

sSATA Controller

Use this item to enable or disable SATA Controller.

sSATA Mode Selection

Identify the SATA port is connected to Solid State Drive or Hard Disk Drive. Press <Ctrl+I> to enter RAID ROM during UEFI POST process.

sSATA AHCI LPM

Use this item to enable or disable Link Power Management.

sSATA Aggressive Link Power Mgmt

Use this item to enable or disable SALP.

sSATA_0 / 1 / 2 / 3

Hot Plug

Designates this port as Hot Pluggable.

External SATA

External SATA configuration.

Spin Up Device

If enabled for any of ports, Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.

sSATA Rx Setting

Adjust sSATA DTLE DATA Values (0-15).

sSATA Device Type

Identify the SATA port connected to Solid State Drive or Hard Disk Drive.

PCH SATA Configuration

SATA devices and settings

SATA Controller

Use this item to enable or disable SATA Controller.

SATA/M.2_SATA Mode Selection

Identify the SATA/M.2_SATA port is connected to Solid State Drive or Hard Disk Drive. Press <Ctrl+I> to enter RAID ROM during UEFI POST process.

SATA AHCI LPM

Use this item to enable or disable Link Power Management.

SATA Aggressive Link Power Mgmt

Use this item to enable or disable SALP.

SATA_0 / 1 / 2 / 3 / 4 / 5

Hot Plug

Designates this port as Hot Pluggable.

External SATA

External SATA configuration.

Spin Up Device

If enabled for any of ports, Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.

SATA Rx Setting

Adjust SATA DTLE DATA Values (0-15).

SATA Device Type

Identify the SATA port connected to Solid State Drive or Hard Disk Drive.

3.4.7 Server ME Configuration



Altitude

Use this item to select the system altitude above the sea level in meters.

Spread Spectrum

Use this item to select spread specturm mode.

3.5 Server Mgmt



Wait For BMC

Wait For BMC response for specified time out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize Host to BMC interfaces.

3.5.1 System Event Log



SEL Components

Change this to enable or disable all features of System Event Logging during boot.

Erase SEL

Use this to choose options for erasing SEL.

When SEL is Full

Use this to choose options for reactions to a full SEL.

Log EFI Status Codes

Use this item to disable the logging of EFI Status Codes or log only error code or only progress or both.

3.5.2 BMC Network Configuration



Lan Channel 1 (Failover)

Manual setting IPMI LAN

If [No] is selected, the IP address is assigned by DHCP. If you prefer using a static IP address, toggle to [Yes], and the changes take effect after the system reboots. The default value is [No].

Configuration Address Source

Select to configure BMC network parameters statically or dynamically (by BIOS or BMC). Configuration options: [Static] and [DHCP].

Static: Manually enter the IP Address, Subnet Mask and Gateway Address in the BIOS for BMC LAN channel configuration.

DHCP: IP address, Subnet Mask and Gateway Address are automatically assigned by the network's DHCP server.



When [DHCP] or [Static] is selected, do NOT modify the BMC network settings on the IPMI web page.



The default login information for the IPMI web interface is:

Username: admin

Password: admin



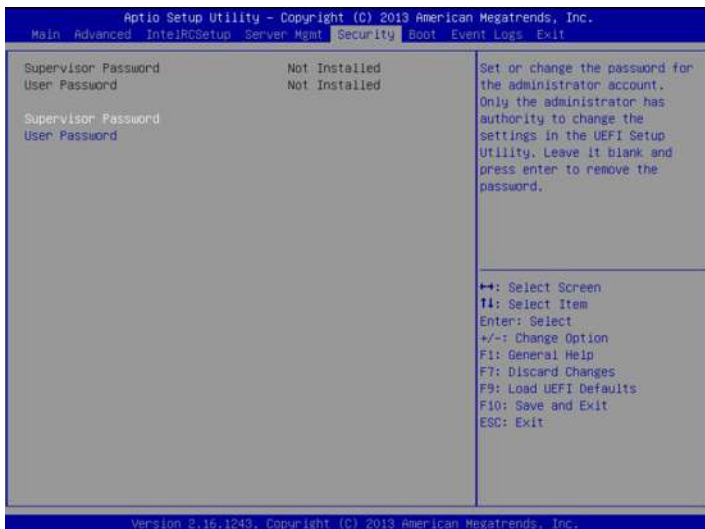
For more instructions on how to set up remote control environment and use the IPMI management platform, please refer to the IPMI Configuration User Guide or go to the Support website at: <http://www.asrockrack.com/support/ipmi.asp>

BMC Mac Backup Tool

Use this to restore BMC Mac from the backup.

3.6 Security

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



Supervisor Password

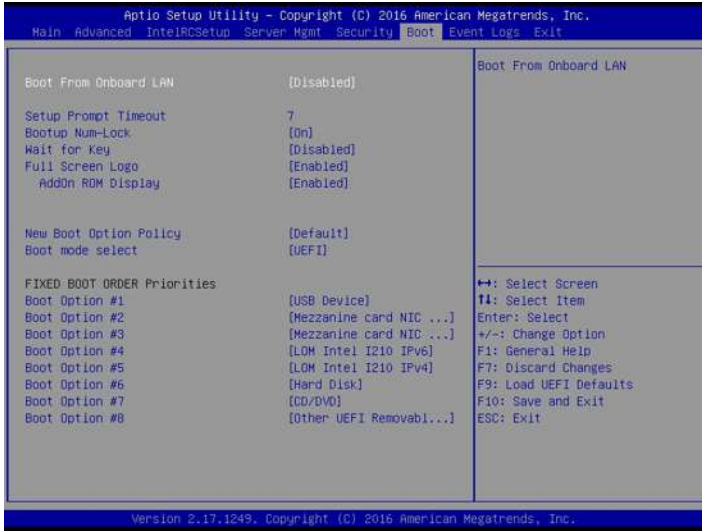
Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

User Password

Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

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.



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.

Wait for Key

Wait for keyboard input to continue for Warning message.

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].

New Boot Option Policy

Use this item to control the placement of newly detected UEFI boot options.

Boot Mode Select

Use this item to select boot mode LEGACY/UEFI.

When you select UEFI mode, you will see the followings.

Boot Option #1~8

Use this item to set the system boot order.

When you select LEGACY mode, you will see the followings.

Boot Option #1~5

Use this item to set the system boot order.

3.8 Event Logs



Change Smbios Event Log Settings

This allows you to configure the Smbios Event Log Settings.

When entering the item, you will see the followings:

Smbios Event Log

Use this item to enable or disable all features of the SMBIOS Event Logging during system boot.

Erase Event Log

The options include [No], [Yes, Next reset] and [Yes, Every reset]. If Yes is selected, all logged events will be erased.

When Log is Full

Use this item to choose options for reactions to a full Smbios Event Log. The options include [Do Nothing] and [Erase Immediately].

MECI (Multiple Event Count Increment)

Use this item to enter the increment value for the multiple event counter. The valid range is from 1 to 255.

METW (Multiple Event Time Window)

Use this item to specify the number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.

View Smbios Event Log

Press <Enter> to view the Smbios Event Log records.



All values changed here do not take effect until computer is restarted.

3.9 Exit Screen



Save Changes and Exit

When you select this option, the following message “Save configuration changes and exit setup?” will pop-out. Press <F10> key or select [Yes] to save the changes and exit the UEFI SETUP UTILITY.

Discard Changes and Exit

When you select this option, the following message “Discard changes and exit setup?” will pop-out. Press <ESC> key or select [Yes] to exit the UEFI SETUP UTILITY without saving any changes.

Discard Changes

When you select this option, the following message “Discard changes?” will pop-out. Press <F7> key or select [Yes] to discard all changes.

Load UEFI Defaults

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

Boot Override

These items displays the available devices. Select an item to start booting from the selected device.

Chapter 4 Software Support

4.1 Install Operating System

This motherboard supports various Microsoft® Windows® Server 2008 R2 SP1 / 2012 / 2012 R2 / Linux compliant. 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.

**Please download the Intel® SATA Floppy Image driver from the ASRock Rack's website (www.asrockrack.com) to your USB drive or simply install the SATA driver from the Support CD while installing OS in SATA RAID mode.*

4.2 Support CD Information

The Support CD that came with the motherboard contains necessary drivers and useful utilities that enhance the motherboard's 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 does not appear automatically, locate and double click on the file "ASRSetup.exe" from the root folder in the Support CD to display the menu.

4.2.2 Drivers Menu

The Drivers Menu shows the available device's 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 application softwares 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 Rack or want to know more about ASRock Rack, welcome to visit ASRock Rack's website at <http://www.ASRockRack.com>; or you may contact your dealer for further information.

Chapter 5 Troubleshooting

5.1 Troubleshooting Procedures

Follow the procedures below to troubleshoot your system.



Always unplug the power cord before adding, removing or changing any hardware components. Failure to do so may cause physical injuries to you and damages to motherboard components.

1. Disconnect the power cable and check whether the PWR LED is off.
2. Unplug all cables, connectors and remove all add-on cards from the motherboard.
Make sure that the jumpers are set to default settings.
3. Confirm that there are no short circuits between the motherboard and the chassis.
4. Install a CPU and fan on the motherboard, then connect the chassis speaker and power LED.

If there is no power...

1. Confirm that there are no short circuits between the motherboard and the chassis.
2. Make sure that the jumpers are set to default settings.
3. Check the settings of the 115V/230V switch on the power supply.
4. Verify if the battery on the motherboard provides ~3VDC. Install a new battery if it does not.

If there is no video...

1. Try replugging the monitor cables and power cord.
2. Check for memory errors.

If there are memory errors...

1. Verify that the DIMM modules are properly seated in the slots.
2. Use recommended DDR4 2133 R-DIMMs.
3. If you have installed more than one DIMM modules, they should be identical with the same brand, speed, size and chip-type.
4. Try inserting different DIMM modules into different slots to identify faulty ones.
5. Check the settings of the 115V/230V switch on the power supply.

Unable to save system setup configurations...

1. Verify if the battery on the motherboard provides ~3VDC. Install a new battery if it does not.
2. Confirm whether your power supply provides adequate and stable power.

Other problems...

1. Try searching keywords related to your problem on ASRock Rack's FAQ page:
<http://www.asrockrack.com/support>

5.2 Technical Support Procedures

If you have tried the troubleshooting procedures mentioned above and the problems are still unsolved, please contact ASRock Rack's technical support with the following information:

1. Your contact information
2. Model name, BIOS/BMC version and problem type.
3. System configuration.
4. Problem description.

You may contact ASRock Rack's technical support at:

<http://www.asrockrack.com/support/tsd.asp>

5.3 Returning Merchandise for Service

For warranty service, the receipt or a copy of your invoice marked with the date of purchase is required. By calling your vendor or going to our RMA website (<http://event.asrockrack.com/tsd.asp>) you may obtain a Returned Merchandise Authorization (RMA) number.

The RMA number should be displayed on the outside of the shipping carton which is mailed prepaid or hand-carried when you return the motherboard to the manufacturer. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

This warranty does not cover damages incurred in shipping or from failure due to alteration, misuse, abuse or improper maintenance of products.

Contact your distributor first for any product related problems during the warranty period.

Chapter 6 Net Framework Installation Guide

To let Intel® RSTe works properly, it is required to install Net Framework. Please follow the steps below to enable “.Net Framework” feature on Microsoft® Windows® Server 2008 R2.

6.1 Installing .Net Framework 3.5.1 (For Server 2008 R2)

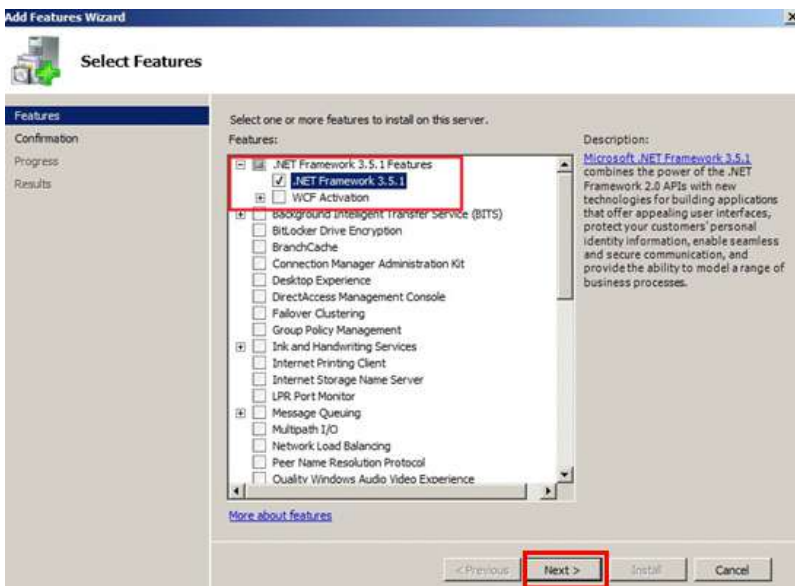
1. Double-click the Server Manager icon in the Windows system tray.



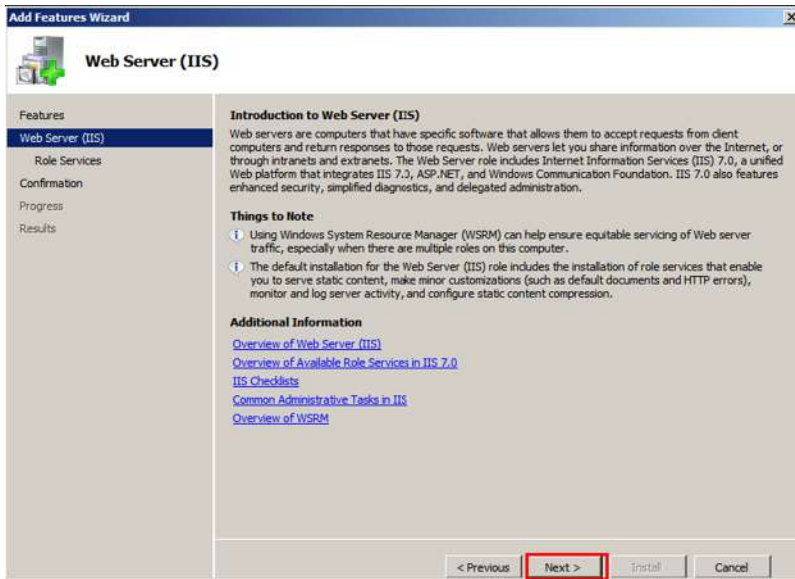
2. Click Add Features in the right hand pane.



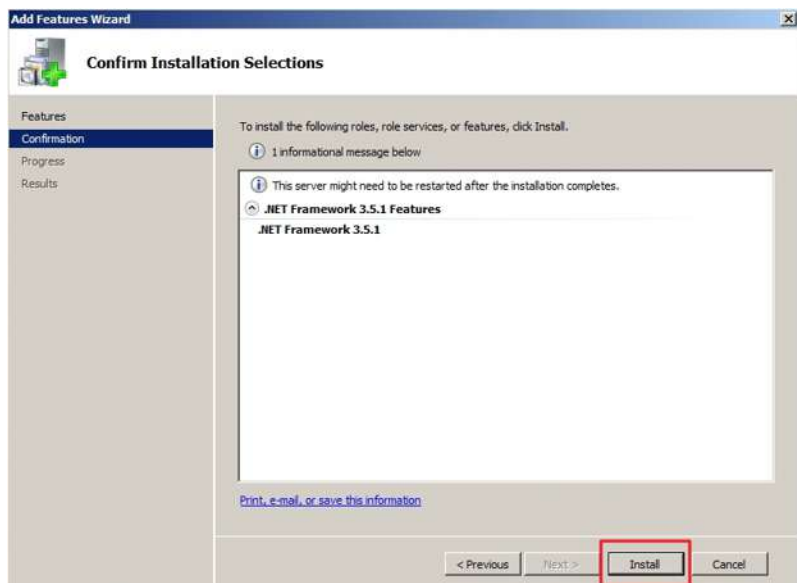
3. Check the box next to .Net Framework 3.5.1 and then click **Next**.



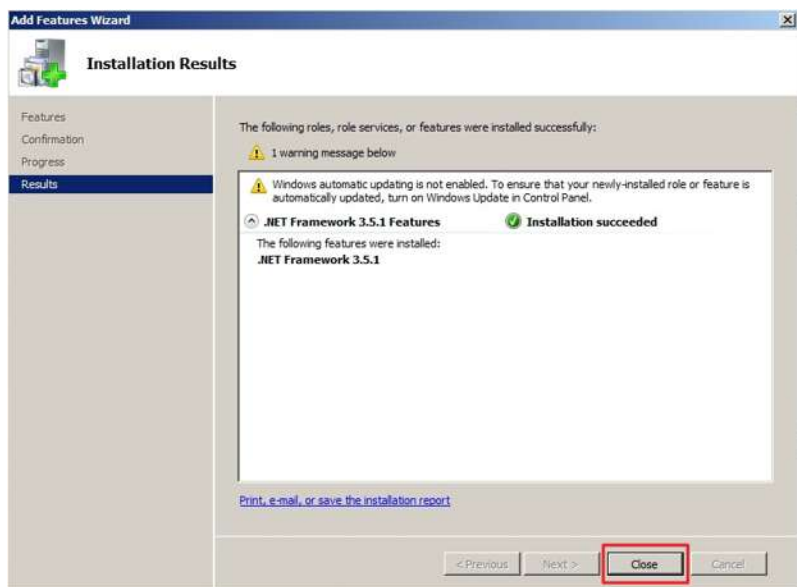
4. Click **Next** to continue.



5. Click **Install** to start installing .Net Framework 3.5.1.



6. After the installation completes, click **Close**.



Appendix Mezzanine Card Support List

This motherboard supports the following ASRock Rack mezzanine cards.

Mezz Card Type	Mezz Slot Type	Model
LAN Card	Mezz Type A	M350
LAN Card	Mezz Type A	M350R
LAN Card	Mezz Type A	M540
LAN Card	Mezz Type A	M599
LAN Card	Mezz Type A	M599R
LAN Card	Mezz Type A	M710
Storage Card	Mezz Type A	M3008S

**Please refer to our website for the latest support list.*

**Due to mechanical limits, use one type of the mezzanine card at a time.*