



Industry Standard, Flexible Architecture

OPEN

Less Heat, Less Power Consumption

GREEN

Robust Design, Quality Parts

STABLE

Stable and
Reliable Solution

Server/Workstation
Motherboard

E3C246D4U
E3C242D4U
C246M WS

User Manual

English



Version 1.0

Published July 2018

Copyright©2018 ASRock Rack Inc. All rights reserved.

Copyright Notice:

No part of this documentation may be reproduced, transcribed, transmitted, or translated in any language, in any form or by any means, except duplication of documentation by the purchaser for backup purpose, without written consent of ASRock Rack Inc.

Products and corporate names appearing in this documentation may or may not be registered trademarks or copyrights of their respective companies, and are used only for identification or explanation and to the owners' benefit, without intent to infringe.

Disclaimer:

Specifications and information contained in this documentation are furnished for informational use only and subject to change without notice, and should not be constructed as a commitment by ASRock Rack. ASRock Rack assumes no responsibility for any errors or omissions that may appear in this documentation.

With respect to the contents of this documentation, ASRock Rack does not provide warranty of any kind, either expressed or implied, including but not limited to the implied warranties or conditions of merchantability or fitness for a particular purpose.

In no event shall ASRock Rack, its directors, officers, employees, or agents be liable for any indirect, special, incidental, or consequential damages (including damages for loss of profits, loss of business, loss of data, interruption of business and the like), even if ASRock Rack has been advised of the possibility of such damages arising from any defect or error in the documentation or product.



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

CALIFORNIA, USA ONLY

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

“Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate”

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.

ASRock Rack Incorporation

6F., No.37, Sec. 2, Jhongyang S. Rd., Beitou District,

Taipei City 112, Taiwan (R.O.C.)

The terms HDMI® and HDMI High-Definition Multimedia Interface, and the HDMI logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.



Contents

Chapter 1 Introduction	1
1.1 Package Contents	1
1.2 Specifications	2
1.3 Unique Features	6
1.4 Motherboard Layout	7
1.5 Onboard LED Indicators	12
1.6 I/O Panel	14
1.7 Block Diagram	17
Chapter 2 Installation	20
2.1 Screw Holes	20
2.2 Pre-installation Precautions	20
2.3 Installing the CPU	21
2.4 Installing the CPU Fan and Heatsink	23
2.5 Installation of Memory Modules (DIMM)	24
2.6 Expansion Slots (PCI Express Slots)	26
2.7 Jumper Setup	27
2.8 Onboard Headers and Connectors	30
2.9 Dr. Debug	37
2.10 Unit Identification purpose LED/Switch	38
2.11 Driver Installation Guide	38
2.12 Dual LAN and Teaming Operation Guide	39
2.13 M.2_SSD (NGFF) Module Installation Guide	40

Chapter 3 UEFI Setup Utility	42
3.1 Introduction	42
3.1.1 UEFI Menu Bar	42
3.1.2 Navigation Keys	43
3.2 Main Screen	44
3.3 Advanced Screen	45
3.3.1 CPU Configuration	46
3.3.2 DRAM Configuration	49
3.3.3 Chipset Configuration	50
3.3.4 Storage Configuration	52
3.3.5 NVMe Configuration	53
3.3.6 ACPI Configuration	54
3.3.7 USB Configuration	55
3.3.8 Super IO Configuration	56
3.3.9 Serial Port Console Redirection	57
3.3.10 H/W Monitor	60
3.3.11 Intel SPS Configuration	62
3.3.12 Instant Flash	63
3.4 Server Mgmt	64
3.4.1 System Event Log	65
3.4.2 BMC Network Configuration	66
3.5 Security	68
3.5.1 Key Management	69
3.6 Boot Screen	71

3.6.1	CSM Parameters	73
3.7	Event Logs	75
3.8	Exit Screen	77
Chapter 4 Software Support		78
4.1	Install Operating System	78
4.2	Support CD Information	78
4.2.1	Running The Support CD	78
4.2.2	Drivers Menu	78
4.2.3	Utilities Menu	78
4.2.4	Contact Information	78
Chapter 5 Troubleshooting		79
5.1	Troubleshooting Procedures	79
5.2	Technical Support Procedures	81
5.3	Returning Merchandise for Service	81

Chapter 1 Introduction

Thank you for purchasing ASRock Rack **E3C246D4U / E3C242D4U / C246M WS** 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 E3C246D4U / E3C242D4U / C246M WS Motherboard
(mATX Form Factor: 9.6-in x 9.6-in, 24.4 cm x 24.4 cm)
- Support CD
- Quick Installation Guide
- 1 x SATA3 Cable (60cm)
- 1 x I/O Shield
- 1 x Screw for M.2 Socket



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

1.2 Specifications

E3C246D4U / E3C242D4U / C246M WS	
MB Physical Status	
Form Factor	mATX
Dimension	9.6" x 9.6" (24.4 cm x24.4 cm)
Processor System	
CPU	Supports Intel® Xeon® E-2100 Processors
Chipset	E3C246D4U / C246M WS: Intel® C246 E3C242D4U Intel® C242
System Memory	
Capacity	- 4 x 288-pin DDR4 DIMM slots - Support up to 64GB DDR4 ECC/non-ECC UDIMM
Type	- Dual Channel DDR4 memory technology - Supports DDR4 ECC/non-ECC UDIMM (client O.S only)
DIMM Size Per DIMM	ECC and non-EDD UDIMM : 16GB, 8GB, 4GB
DIMM Frequency	- Non-ECC UDIMM: 2666/2400/2133 MHz - ECC UDIMM: 2666/2400/2133 MHz
Expansion Slot	
PCIe 3.0 x16	Slot 6: Gen3 x16 link, auto switch to x8 link if Slot 4 is occupied
PCIe 3.0 x8	Slot 4: Gen3 x8 link
PCIe 3.0 x4	Slot 5: Gen3 x4 link
Storage	
SATA Controller	E3C246D4U / C246M WS: Intel® C246: 8x SATA3 6Gb/s (SATA0-7, SATA0 supports SATA DOM, and is shared with M.2(PCIe3.0(x4))/ SATA3), support RAID 0, 1, 5, 10 E3C242D4U: Intel® C242: 6x SATA3 6Gb/s (SATA0-5, SATA0 supports SATA DOM, and is shared with M.2(PCIe3.0(x2))/ SATA3), support RAID 0, 1, 5, 10
Audio	
Audio Codec	E3C246D4U / E3C242D4U: N/A C246M WS: ALC 892

Ethernet	
Interface	1000 /100 /10 Mbps
LAN	E3C246D4U / E3C242D4U: - 2 x RJ45 GLAN by Intel® i210 - 1 x RJ45 Dedicated IPMI LAN port C246M WS: - 2 x RJ45 GLAN by Intel® i210 + Intel® i219 - Supports Wake-On-LAN - Supports Energy Efficient Ethernet 802.3az - Supports Dual LAN with Teaming function - Supports PXE - LAN1 supports NCSI
Management	
BMC Controller	E3C246D4U / E3C242D4U: ASPEED AST2500 C246M WS: Intel vPro
IPMI Dedicated GLAN	E3C246D4U / E3C242D4U: 1 x Realtek RTL8211E for dedicated management GLAN C246M WS: N/A
Features	- Watch Dog - NMI
Graphics	
Controller	E3C246D4U / E3C242D4U: ASPEED AST2500 C246M WS: CPU pGFX
VRAM	E3C246D4U / E3C242D4U: DDR4 16MB C246M WS: N/A
Rear Panel I/O	
VGA Port	1 x D-Sub
USB 3.1 Port	E3C242D4U: 2 (Gen2), 2(Gen1) E3C246D4U / C246M WS: 4 (Gen2)
LAN Port	E3C246D4U / E3C242D4U: - 2 x RJ45 Gigabit Ethernet LAN ports - 1 x RJ45 Dedicated IPMI LAN port C246M WS: - 2 x RJ45 Gigabit Ethernet LAN ports - LAN Ports with LED (ACT/LINK LED and SPEED LED)

UID Button/ LED	<i>E3C246D4U</i> / <i>E3C242D4U</i> : 1 <i>C246M WS</i> : N/A
Serial port	1
HDMI	<i>E3C246D4U</i> / <i>E3C242D4U</i> : N/A <i>C246M WS</i> : 1
DisplayPort	<i>E3C246D4U</i> / <i>E3C242D4U</i> : N/A <i>C246M WS</i> : 1
Audio	<i>E3C246D4U</i> / <i>E3C242D4U</i> : N/A <i>C246M WS</i> : 3+SPDIF
Internal Connector	
Auxiliary Panel Header	1 (includes chassis intrusion, location button & LED, and front LAN LED)
SATA DOM	1 (shared with M.2)
TPM Header	1
IPMB Header	<i>E3C246D4U</i> / <i>E3C242D4U</i> : 1 <i>C246M WS</i> : N/A
80 Debug Port LED	<i>E3C242D4U</i> : N/A <i>E3C246D4U</i> / <i>C246M WS</i> : 1
Front Panel	1 (RST, PWRBTN, HDDLED, PWRLED)
Fan Header	6(1CPU/3Front/2Rear)
ATX Power	1x (24-pin) + 1x (8-pin)
Speaker	1(4pin)
TR1	1
Buzzer	1
USB 3.0 Header	1 (supports 2 USB 3.0 ports)
USB 2.0 Header	1 (supports 2 USB 2.0 ports)
M.2	<i>E3C242D4U</i> : (2230/2242/2260/2280, Supports PCIE3.0(X2)/SATA3) <i>E3C246D4U</i> / <i>C246M WS</i> : (2230/2242/2260/2280, Supports PCIE3.0(X4)/SATA3)
ME/SPS Recovery	<i>E3C246D4U</i> / <i>E3C242D4U</i> : 1 <i>C246M WS</i> : N/A
Clear CMOS	1 (short pin)
BMC_SMB1	<i>E3C246D4U</i> / <i>E3C242D4U</i> : 1 <i>C246M WS</i> : N/A
PSU_SMB1	<i>E3C246D4U</i> / <i>E3C242D4U</i> : 1 <i>C246M WS</i> : N/A
SGPIO	2
NMI Button Header	1
Audio Header	<i>E3C246D4U</i> / <i>E3C242D4U</i> : N/A <i>C246M WS</i> : 1

System BIOS	
BIOS Type	256 Mb AMI UEFI Legal BIOS
BIOS Features	- Plug and Play (PnP) - ACPI 2.0 Compliance Wake Up Events - SMBIOS 2.8.0 Support - ASRock Rack Instant Flash
Hardware Monitor	
Temperature	- CPU/PCH Temperature Sensing - MB/Card Side/TR1 Temperature Sensing
Fan	- CPU/Rear/Front Fan Tachometer - CPU Quiet Fan (Allow CPU Fan Speed Auto-Adjust by CPU Temperature) - CPU/Rear/Front Fan Multi-Speed Control
Voltage	E3C246D4U / E3C242D4U: Voltage Monitoring: +12V, +5V, +3.3V, CPU Vcore, VCCM, VPPM, VCCIO, VCCSA, VCCST_SFR, V1.0M, 3VSB, 5VSB, VBAT C246M WS: Voltage Monitoring: +12V, +5V, +3.3V, CPU Vcore, VCCM, VCCIO, VCCSA, VCCST_SFR, V1.0M, 3VSB
Support OS	
OS	Microsoft® Windows® E3C246D4U / E3C242D4U: - Server 2016 (64 bit) C246M WS: - Windows 10 (64 bit) Linux® - RedHat Enterprise Linux Server 6.9 (64 bit) / 7.4 (64 bit) - SUSE Enterprise Linux Server 11 SP4 (64 bit) / 12 SP3 (64 bit) - Ubuntu 15.10 (64 bit) / 16.04 (64 bit) <i>*Please refer to our website for the latest OS support list.</i>
Environment	
Temperature	Operation temperature: 10°C ~ 35°C / Non operation temperature: -40°C ~ 70°C



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.



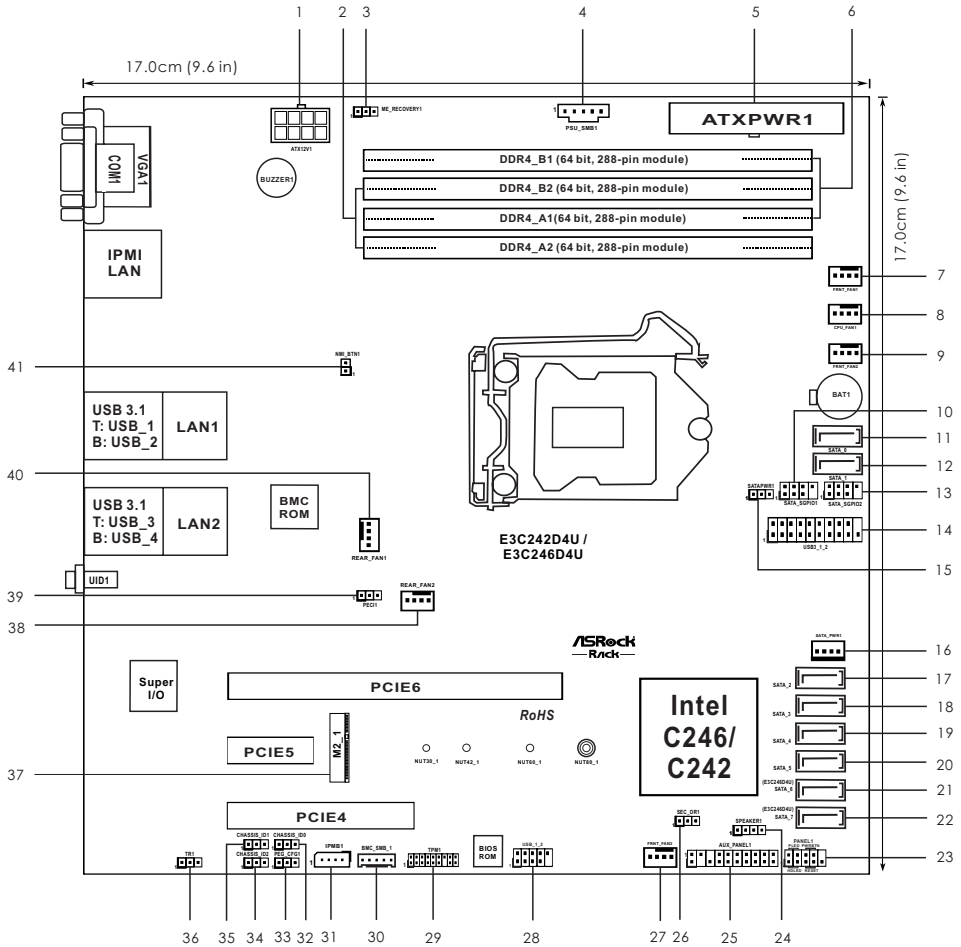
If you install Intel® LAN utility or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If you install the drivers only, it will pass the WHQL tests.

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

E3C246D4U / E3C242D4U

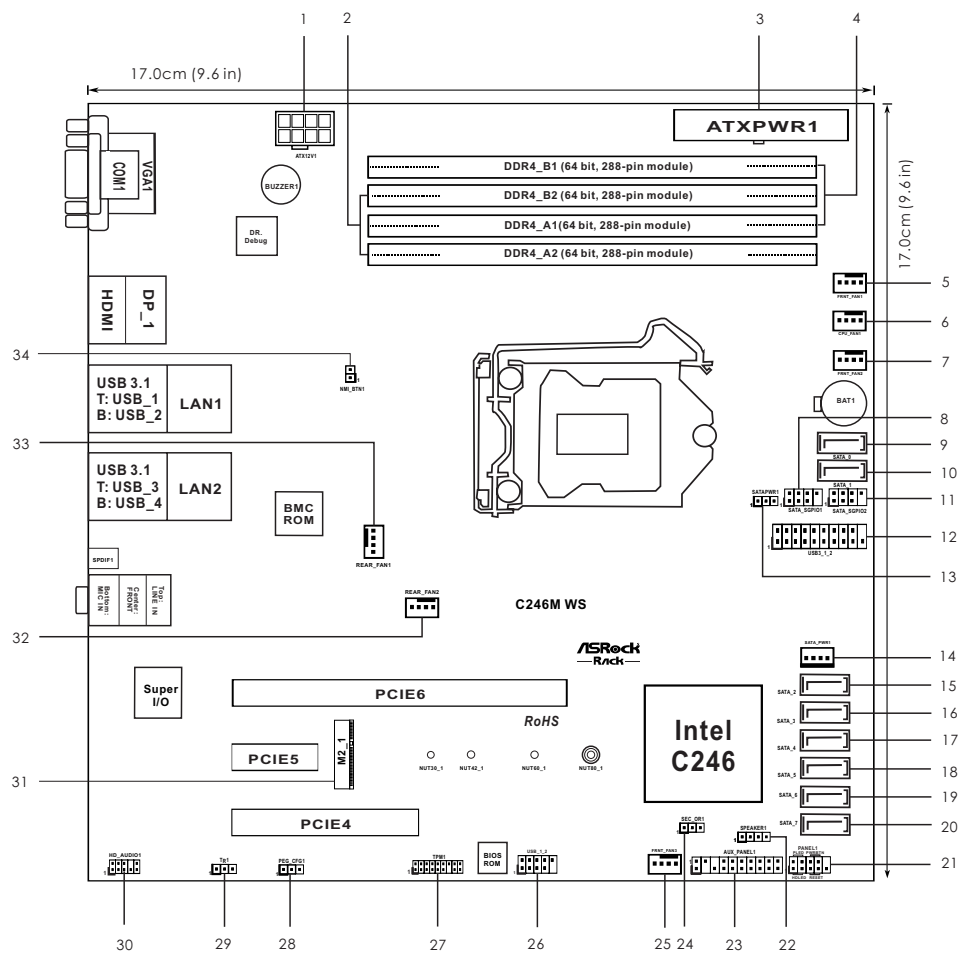


No.	Description
1	ATX 12V Power Connector (ATX12V1)
2	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2, White)
3	ME Recovery Jumper (ME_RECOVERY1)
4	PSU SMBus (PSU_SMB1)
5	ATX Power Connector (ATXPWR1)
6	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1, Blue)
7	Front Fan Connector (FRNT_FAN1)
8	CPU Fan Connector (CPU_FAN1)
9	Front Fan Connector (FRNT_FAN2)
10	SATA SGPIO Connector (SATA_SGPIO1)
11	SATA3 DOM Connector (SATA_0), Red
12	SATA3 Connector (SATA_1)
13	SATA SGPIO Connector (SATA_SGPIO2)
14	USB 3.0 Header (USB3_1_2)
15	SATA DOM Power Jumper (SATAPWR1)
16	SATA DOM Power Header (SATA_PWR1)
17	SATA3 Connector (SATA_2)
18	SATA3 Connector (SATA_3)
19	SATA3 Connector (SATA_4)
20	SATA3 Connector (SATA_5)
21	SATA3 Connector (SATA_6) <i>(for E3C246D4U only)</i>
22	SATA3 Connector (SATA_7) <i>(for E3C246D4U only)</i>
23	System Panel Header (PANEL1)
24	Speaker Header (SPEAKER1)
25	Auxiliary Panel Header (AUX_PANEL1)
26	Security Override Jumper (SEC_OR1)
27	Front Fan Connector (FRNT_FAN3)
28	USB 2.0 Header (USB_1_2)
29	TPM Header (TPM1)
30	BMC SMBus Header (BMC_SMB_1)
31	Intelligent Platform Management Bus Header (IPMB1)
32	Chassis ID0 Jumper (CHASSIS_ID0)
33	PCI Express Graphics Configuration Jumper (PEG_CFG1)

No.	Description
34	Chassis ID2 Jumper (CHASSIS_ID2)
35	Chassis ID1 Jumper (CHASSIS_ID1)
36	Thermal Sensor Header (TR1)
37	M.2 Socket (M2_1) (Type 2230/2242/2260/2280)*
38	Rear Fan Connector (REAR_FAN2)
39	CPU PECI Mode Jumper (PECI1)
40	Rear Fan Connector (REAR_FAN1)
41	Non Maskable Interrupt Button (NMI_BTN1)

**The M.2 slot (M2_1) is shared with the SATA_0 connector. When M2_1 is populated with a M.2 SATA3/PCIE3.0(x4 or x2) module, SATA_0 is disabled.*

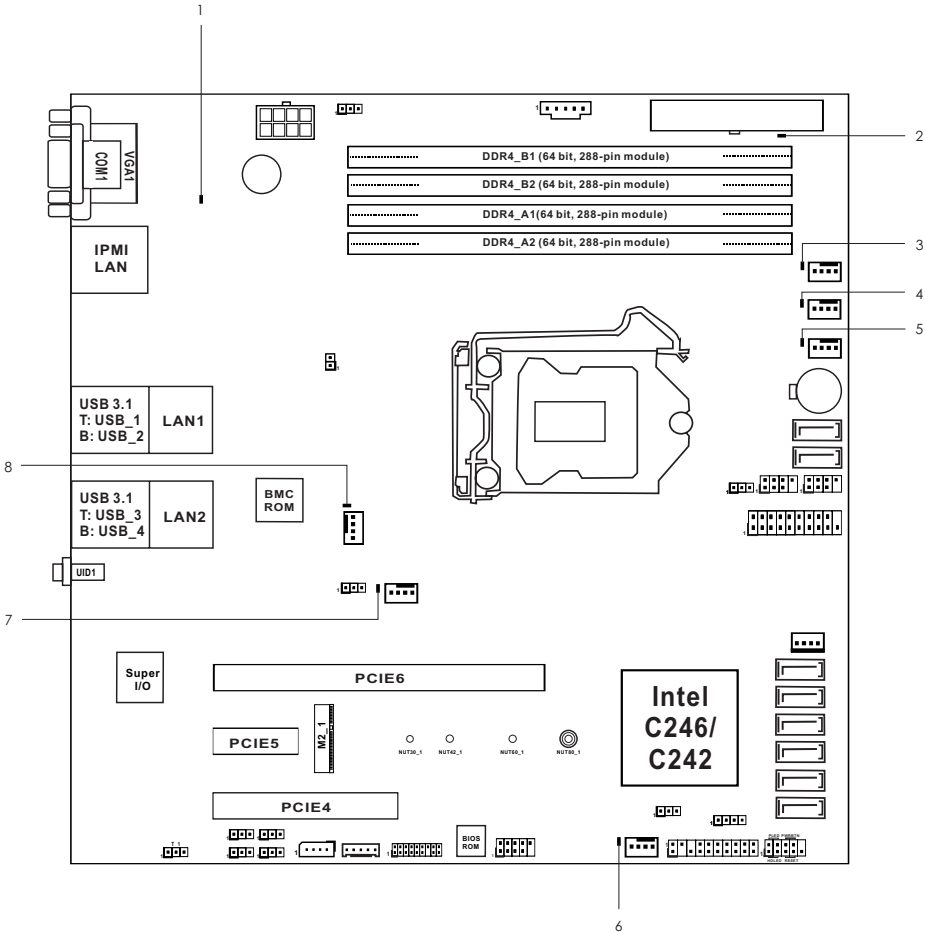
C246M WS



No.	Description
1	ATX 12V Power Connector (ATX12V1)
2	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2, White)
3	ATX Power Connector (ATXPWR1)
4	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1, Blue)
5	Front Fan Connector (FRNT_FAN1)
6	CPU Fan Connector (CPU_FAN1)
7	Front Fan Connector (FRNT_FAN2)
8	SATA SGPIO Connector (SATA_SGPIO1)
9	SATA3 DOM Connector (SATA_0), Red
10	SATA3 Connector (SATA_1)
11	SATA SGPIO Connector (SATA_SGPIO2)
12	USB 3.0 Header (USB3_1_2)
13	SATA DOM Power Jumper (SATAPWR1)
14	SATA DOM Power Header (SATA_PWR1)
15	SATA3 Connector (SATA_2)
16	SATA3 Connector (SATA_3)
17	SATA3 Connector (SATA_4)
18	SATA3 Connector (SATA_5)
19	SATA3 Connector (SATA_6) (for E3C246D4U / C246M WS only)
20	SATA3 Connector (SATA_7) (for E3C246D4U / C246M WS only)
21	System Panel Header (PANEL1)
22	Speaker Header (SPEAKER1)
23	Auxiliary Panel Header (AUX_PANEL1)
24	Security Override Jumper (SEC_OR1)
25	Front Fan Connector (FRNT_FAN3)
26	USB 2.0 Header (USB_1_2)
27	TPM Header (TPM1)
28	PCI Express Graphics Configuration Jumper (PEG_CFG1)
29	Thermal Sensor Header (TR1)
30	Front Panel Audio Header (HD_AUDIO1)
31	M.2 Socket (M2_1) (Type 2230/2242/2260/2280)*
32	Rear Fan Connector (REAR_FAN2)
33	Rear Fan Connector (REAR_FAN1)
34	Non Maskable Interrupt Button (NMI_BTN1)

*The M.2 slot (M2_1) is shared with the SATA_0 connector. When M2_1 is populated with a M.2 SATA3/PCIe3.0(x4 or x2) module, SATA_0 is disabled.

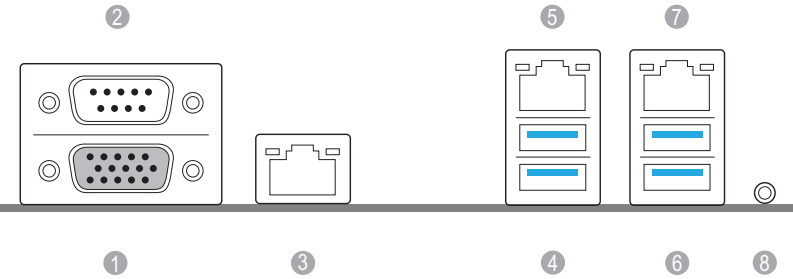
1.5 Onboard LED Indicators



No.	Item	Status	Description
1	BMC_LED1	Green	BMC heartbeat LED
2	SB_PWR1	Green	STB PWR ready
3	FRNT_FAN1_LED1	Amber	FRNT_FAN1 failed
4	CPU_FAN1_LED1	Amber	CPU_FAN1 failed
5	FRNT_FAN2_LED2	Amber	FRNT_FAN2 failed
6	FRNT_FAN3_LED3	Amber	FRNT_FAN3 failed
7	REAR_FAN2_LED2	Amber	REAR_FAN2 failed
8	REAR_FAN1_LED1	Amber	REAR_FAN1 failed

1.6 I/O Panel

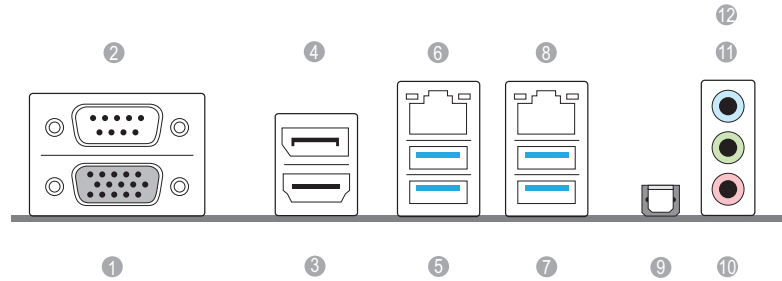
E3C242D4U / E3C246D4U



No.	Description	No.	Description
1	VGA Port (VGA1)	5	LAN RJ-45 Port (LAN1)**
2	Serial Port (COM1)		USB 3.1 Ports (USB31_3_4)
3	LAN RJ-45 Port (IPMI_LAN)*	6	E3C242D4U: Gen1
	USB 3.1 Ports (USB31_1_2)		E3C246D4U: Gen2
4	E3C242D4U: Gen2	7	LAN RJ-45 Port (LAN2)**
	E3C246D4U: Gen2	8	UID Switch (UID1)

Note: LAN1 supports NCSI.

C246M WS

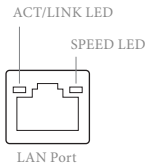


No.	Description	No.	Description
1	VGA Port (VGA1)	7	USB 3.1 Gen2 Ports (USB31_3_4)
2	Serial Port (COM1)	8	LAN RJ-45 Port (LAN2)**
3	HDMI Port	9	Optical SPDIF Out Port (SPDIF1)
4	DisplayPort	10	Microphone (Pink)***
5	USB 3.1 Gen2 Ports (USB31_1_2)	11	Front Speaker (Lime)***
6	LAN RJ-45 Port (LAN1)**	12	Line In (Light Blue)***

Note: LAN1 supports NCSI.

LAN Port LED Indications

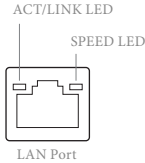
*There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.



Dedicated IPMI LAN Port LED Indications

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

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

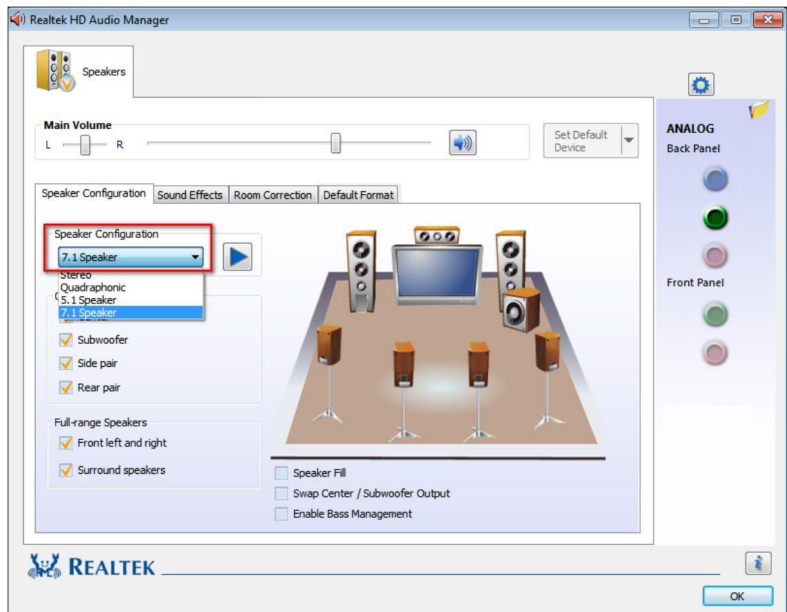


LAN Port LED Indications

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

*** To configure 7.1 CH HD Audio, it is required to use an HD front panel audio module and enable the multi-channel audio feature through the audio driver.

Please set Speaker Configuration to “7.1 Speaker” in the Realtek HD Audio Manager.

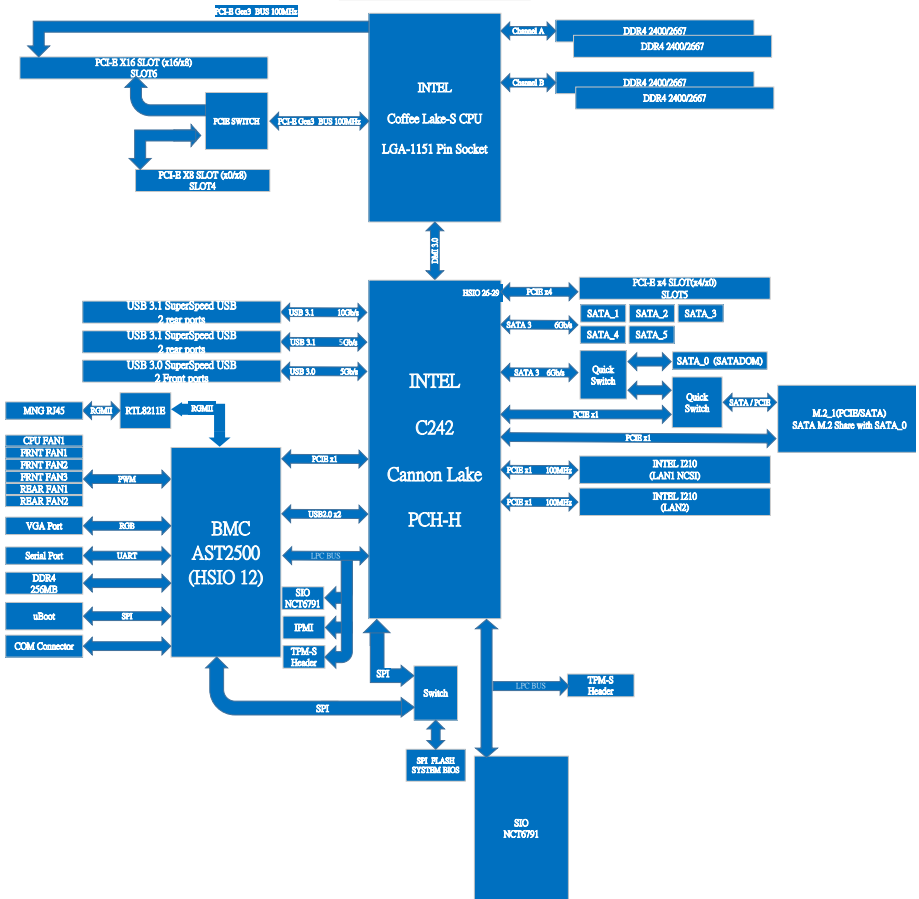


Function of the Audio Ports in 7.1-channel Configuration:

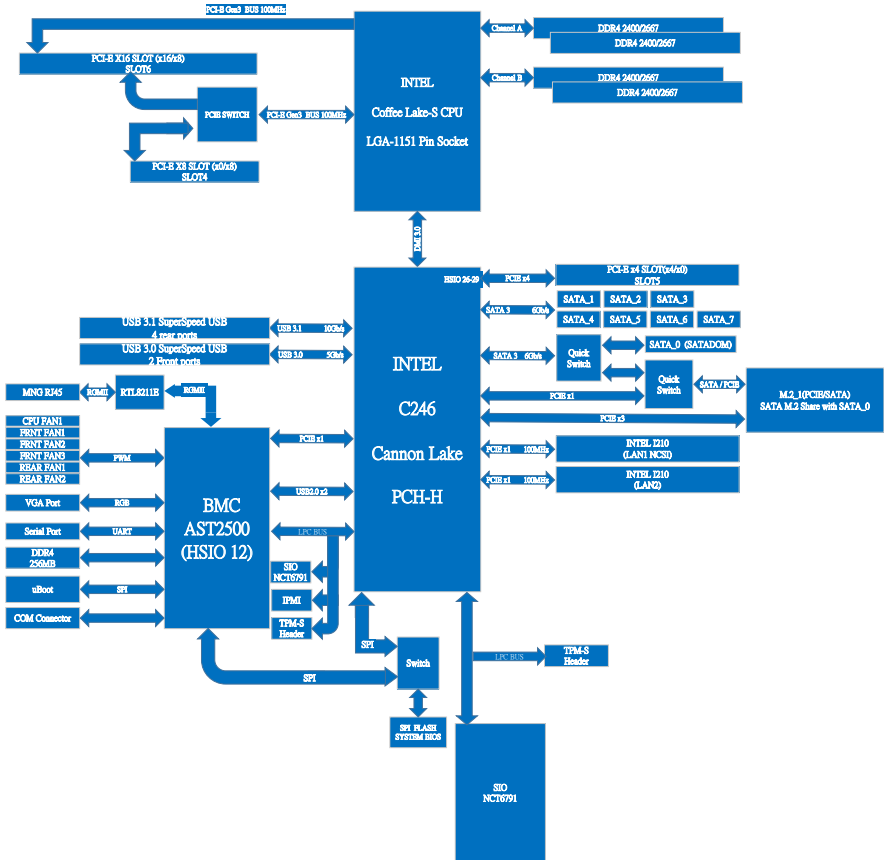
Port	Function
Light Blue (Rear panel)	Rear Speaker Out
Lime (Rear panel)	Front Speaker Out
Pink (Rear panel)	Central /Subwoofer Speaker Out
Lime (Front panel)	Side Speaker Out

1.7 Block Diagram

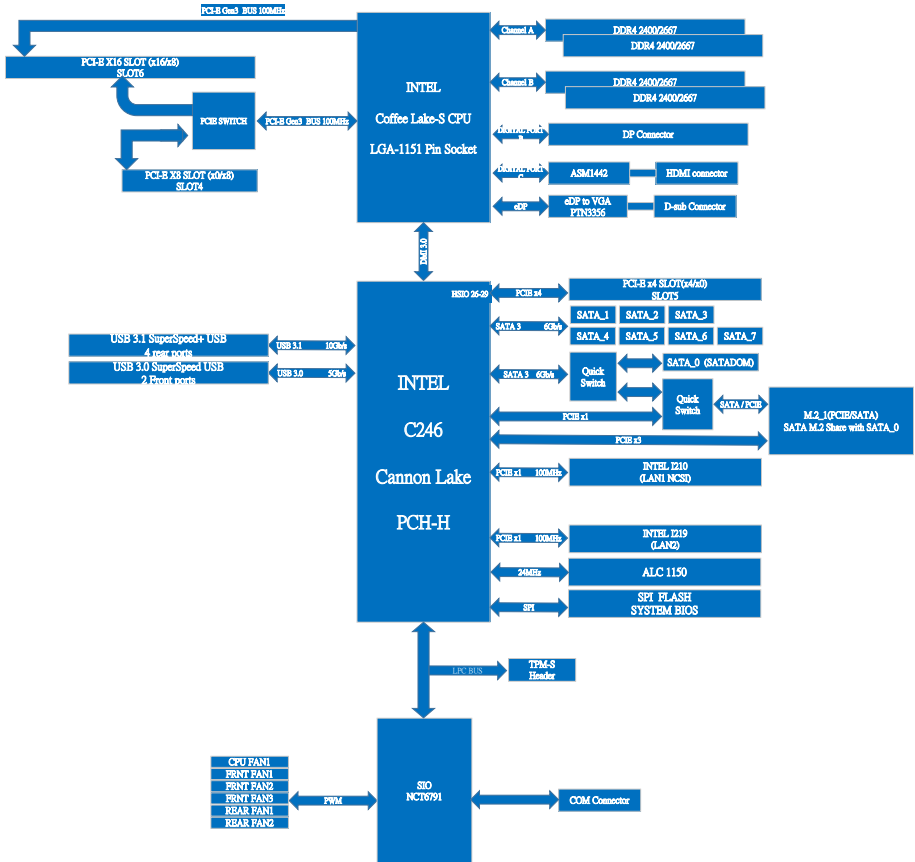
E3C242D4U



English



C246M WS



Chapter 2 Installation

This is a mATX form factor (9.6" x 9.6", 24.4 cm x 24.4 cm) 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 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

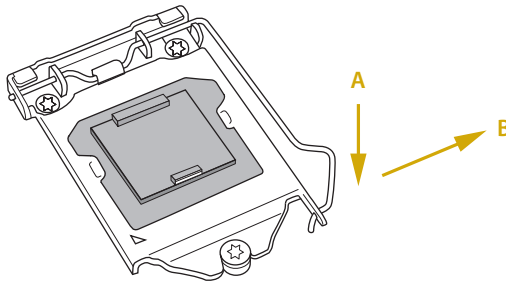


1. Before you insert the 1151-Pin CPU into the socket, please check if the PnP cap is on the socket, if the CPU surface is unclean, or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all power cables before installing the CPU.

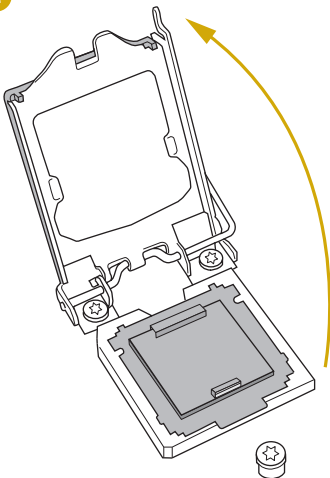


Illustrations in this User Manual are provided for reference only and may slightly differ from actual product appearances.

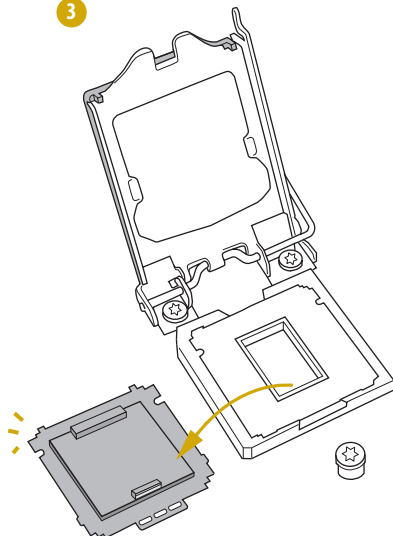
1

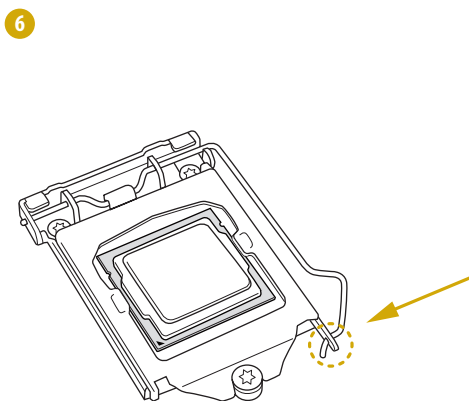
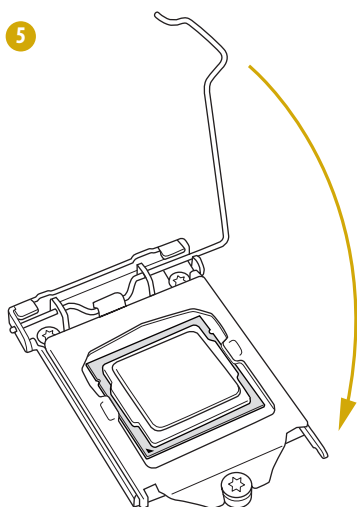
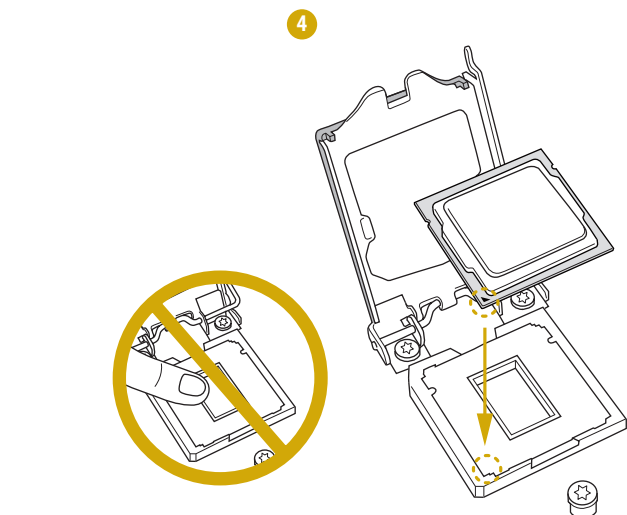


2



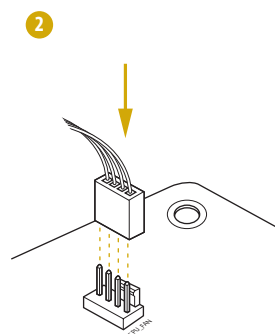
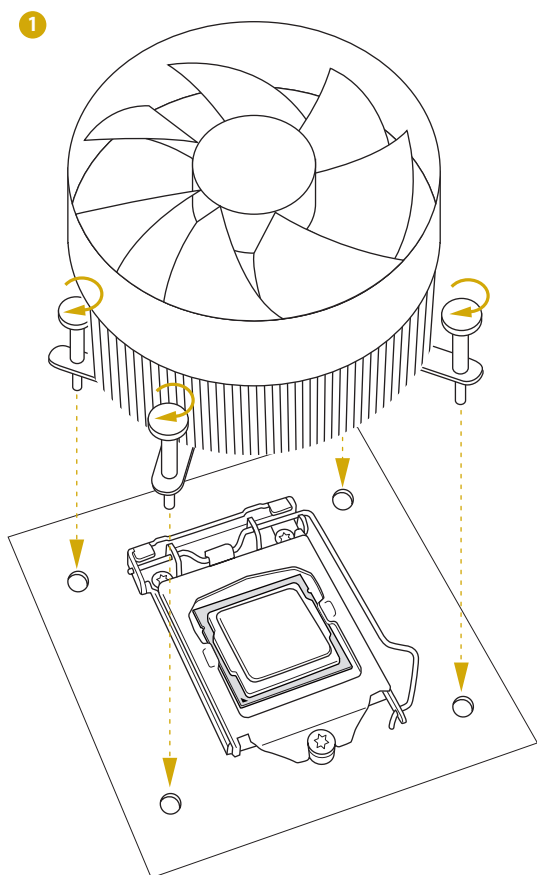
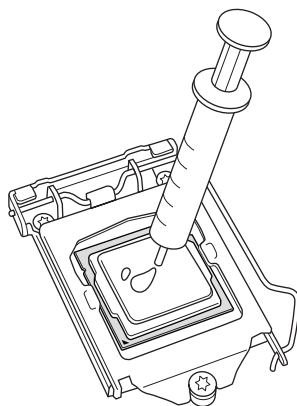
3





Please save and replace the cover if the processor is removed. The cover must be placed if you wish to return the motherboard for after service.

2.4 Installing the CPU Fan and Heatsink



2.5 Installation of Memory Modules (DIMM)

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



1. For dual channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR4 DIMM pairs.
2. It is unable to activate Dual Channel Memory Technology with only one or three memory module installed.
3. 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.

Memory Configuration

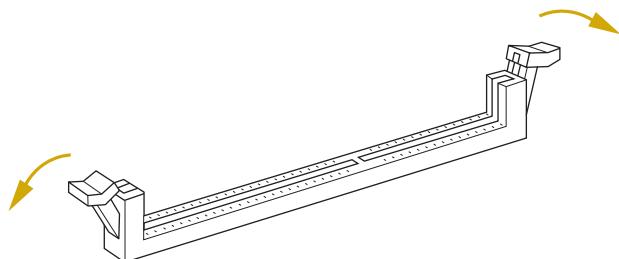
	DDR4_A2	DDR4_A1	DDR4_B2	DDR4_B1
1		Populated		
2				Populated
3	Populated	Populated		
4			Populated	Populated
5	Populated	Populated		Populated
6		Populated	Populated	Populated
7		Populated		Populated
8	Populated	Populated	Populated	Populated

**Number 7 and 8 are for Dual Channel Memory Configuration.*

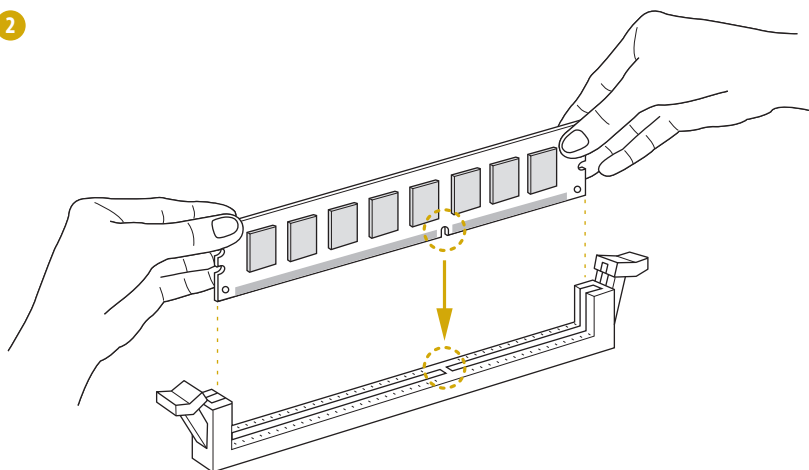


The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

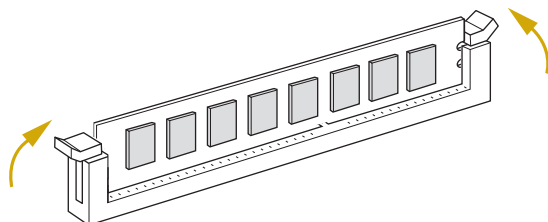
1



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.

2.6 Expansion Slots (PCI Express Slots)

There are 3 PCI Express slots on this motherboard.

PCIe slot:

PCIe4 (PCIe 3.0 x4 slot) is used for PCI Express x4 lane width cards.

PCIe5 (PCIe 3.0 x16 slot) is used for PCI Express x16 lane width cards.

PCIe6 (PCIe 3.0 x1 slot) is used for PCI Express x1 lane width cards.

Slot	Generation	Mechanical	Electrical	Source
PCIe 6	3.0	x16	x16	CPU
PCIe 5	3.0	x4	x4	PCH
PCIe 4	3.0	x8	x8	PCH

PCI Express Slot Configuration

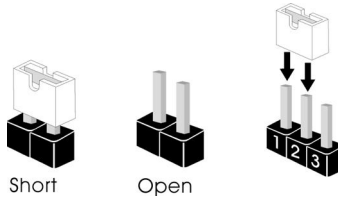
	PCIe 4	PCIe6
Single PCIe Card	x0	x16
Two PCIe Cards	x8	x8

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)
(for E3C246D4U / E3C242D4U only)



Normal Mode (Default)



ME force update

CPU PECI Mode Jumper
(3-pin PECI1)
(for E3C246D4U / E3C242D4U only)



CPU PECI connected to PCH



CPU PECI connected to BMC (Default)

PCI Express Graphics
Configuration Jumper
(3-pin PEG_CFG1)



Normal Mode (Default)



PCIE6 force @ x8 x8
(CPU Lanes x8 x8)

Security Override Jumper
(3-pin SEC_OR1)
(for E3C246D4U / E3C242D4U only)



Descriptor Security
Override



Not override (Default)

Chassis ID0 Jumper (3-pin CHASSIS_ID0) (see p.6, No. 32)	1_2 	1_2 
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (see p.6, No. 35)	1_2 	1_2 
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (see p.6, No. 34) <i>(for E3C246D4U / E3C242D4U only)</i>	1_2 	2_3 
	Board Level SKU (Default)	For 3U8G system, passive GPGPU

Chassis ID0 Jumper (3-pin CHASSIS_ID0) (see p.6, No. 32)	1_2 	1_2 
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (see p.6, No. 35)	2_3 	2_3 
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (see p.6, No. 34) <i>(for E3C246D4U / E3C242D4U only)</i>	2_3 	1_2 
	For 3U8G system, active GPGPU	Reserved for system level use

Chassis ID0 Jumper (3-pin CHASSIS_ID0) (see p.6, No. 32)	2_3 	2_3 
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (see p.6, No. 35)	1_2 	1_2 
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (see p.6, No. 34) <i>(for E3C246D4U / E3C242D4U only)</i>	1_2 	2_3 
	Reserved for system level use	Reserved for system level use

SATA DOM Power Jumper
(3-pin SATAPWR1)
(see p.6, No. 15)



SATA DOM (SATA_0)
requires 5V power supply



SATA DOM (SATA_0) does
NOT require 5V power supply
(Default)



Consult the documentation that comes with your SATA DOM and check whether or not Pin 7 requires 5V power supply.

If the connected SATA DOM requires 5V power supply, move the jumper caps placed on the SATA DOM Power Jumper (SATAPWR_SEL) from pins 2-3 (default) to pins 1-2.

If the connected SATA DOM does NOT require 5V power supply, connect the SATA DOM power cable to the SATA DOM power header (SATA_PWRI) and there is no need to change the default jumper setting of the SATA DOM Power Jumper (pins 2-3).

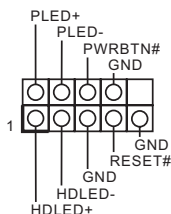
Warning! Incorrect setting of the SATA DOM Power Jumper (SATAPWR1) may cause damage to the motherboard or your SATA DOM.

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)



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):

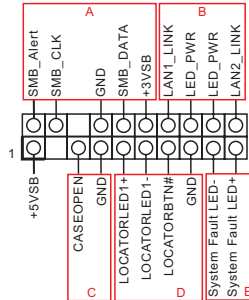
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S4 sleep state or powered off (S5).

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)



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_0)

(SATA_1)

(SATA_2)

(SATA_3)

(SATA_4)

(SATA_5)



These SATA3 connectors support SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.

**The M.2 slot (M2_1) is shared with the SATA_0 connector. When M2_1 is populated with a M.2 SATA3/PCIe3.0(x4 or x2) module, SATA_0 is disabled.*

E3C246D4U / C246M WS

only:

(SATA_6)

(SATA_7)

Serial ATA3 DOM

Connector

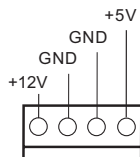
(SATA_0)



The SATA3 DOM connector supports both a SATA DOM (Disk-On-Module) and a SATA data cable for internal storage device.

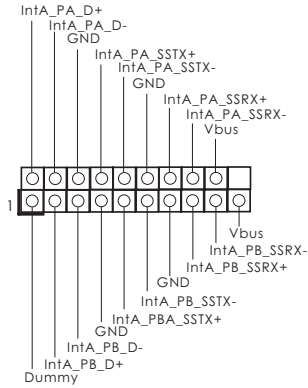
SATA Power Connector

(4-pin SATA_PWR1)



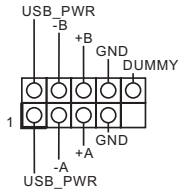
Please connect a SATA power cable to the SATA power connector.

USB 3.0 Header (19-pin USB3_1_2)



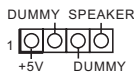
There is one USB 3.0 header on this motherboard. This USB 3.0 header can support two USB 3.0 ports.

USB 2.0 Header (9-pin USB_1_2)



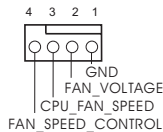
There is one USB 2.0 header on this motherboard. Each USB 2.0 header can support two ports.

Chassis Speaker Header (4-pin SPEAKER1)



Please connect the chassis speaker to this header.

CPU Fan Connector (4-pin CPU1_FAN1)



This motherboard provides one 4-Pin CPU fan (Quiet Fan) connectors. If you plan to connect a 3-Pin CPU fan, please connect it to Pin 1-3.

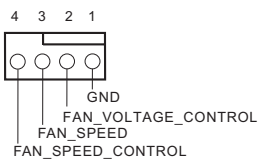
**For more details, please refer to the Cooler QVL list on the ASRock Rack website.*

Front and Rear Fan Connectors

(4-pin FRNT_FAN1)

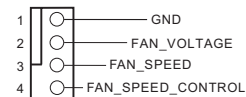
(4-pin FRNT_FAN2)

(4-pin FRNT_FAN3)

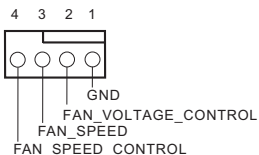


Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control.

(4-pin REAR_FAN1)

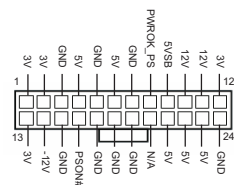


(4-pin REAR_FAN2)



ATX Power Connector

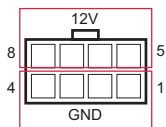
(24-pin ATXPWR1)



This motherboard provides a 24-pin ATX power connector. To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13.

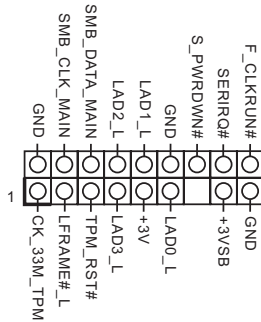
ATX 12V Power Connector

(8-pin ATX12V1)



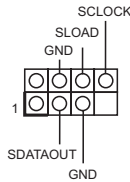
This motherboard provides one 8-pin ATX 12V power connector.

TPM Header
(17-pin TPM1)



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.

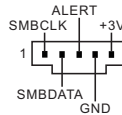
Serial General Purpose
Input/Output Headers
(7-pin SATA_SGPIO1)
(7-pin SATA_SGPIO2)



The headers support Serial Link interface for onboard SATA connections.

PSU SMBus
(PSU_SMB1)

(for E3C246D4U / E3C242D4U
only)



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

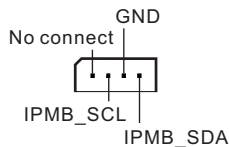
Non Maskable Interrupt
Button Header
(NMI_BTN1)



Please connect a NMI device to this header.

Intelligent Platform
Management Bus Header
(4-pin IPMB1)

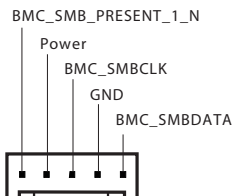
(for E3C246D4U / E3C242D4U
only)



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_SMB1)

(for E3C246D4U / E3C242D4U
only)



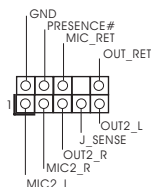
The header is used for the SM
BUS devices.

Thermal Sensor Header (3-pin TR1) (see p.6, No. 36)



Please connect the thermal
sensor cable to either pin 1-2
or pin 2-3 and the other end to
the device which you wish to
monitor its temperature.

Front Panel Audio Header (9-pin HD_AUDIO1) (for C246M WS only)



This header is for
connecting audio
devices to the front
audio panel.



1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instructions in our manual and chassis manual to install your system.
2. If you use an AC'97 audio panel, please install it to the front panel audio header by the steps 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 the HD audio panel only. You don't need to connect them for the AC'97 audio panel.
 - E. To activate the front mic, go to the "FrontMic" Tab in the Realtek Control panel and adjust "Recording Volume".

2.9 Dr. Debug

Dr. Debug is used to provide code information, which makes troubleshooting even easier. Please see the diagrams below for reading the Dr. Debug codes.

Code	Description
00	Please check if the CPU is installed correctly and then clear CMOS.
0d	Problem related to memory, VGA card or other devices. Please clear CMOS, re-install the memory and VGA card, and remove other USB, PCI devices.
01 - 54 (except 0d), 5A- 60	Problem related to memory. Please re-install the CPU and memory then clear CMOS. If the problem still exists, please install only one memory module or try using other memory modules.
55	The Memory could not be detected. Please re-install the memory and CPU. If the problem still exists, please install only one memory module or try using other memory modules.
61 - 91	Chipset initialization error. Please press reset or clear CMOS.
92 - 99	Problem related to PCI-E devices. Please re-install PCI-E devices or try installing them in other slots. If the problem still exists, please remove all PCI-E devices or try using another VGA card.
A0 - A7	Problem related to IDE or SATA devices. Please re-install IDE and SATA devices. If the problem still exists, please clear CMOS and try removing all SATA devices.
b0	Problem related to memory. Please re-install the CPU and memory. If the problem still exists, please install only one memory module or try using other memory modules.
b4	Problem related to USB devices. Please try removing all USB devices.
b7	Problem related to memory. Please re-install the CPU and memory then clear CMOS. If the problem still exists, please install only one memory module or try using other memory modules.
d6	The VGA could not be recognized. Please clear CMOS and try re-installing the VGA card. If the problem still exists, please try installing the VGA card in other slots or use other VGA cards.
d7	The Keyboard and mouse could not be recognized. Please try re-installing the keyboard and mouse.
d8	Invalid Password.
FF	Please check if the CPU is installed correctly and then clear CMOS.

2.10 Unit Identification purpose LED/Switch

With the UID button, You are able to locate the server you're working on from behind a rack of servers.

Unit Identification
purpose LED/Switch
(UID)\

*(for E3C246D4U / E3C242D4U
only)*



When the UID button on the front or rear panel is pressed, the front/rear UID blue LED indicator will be turned on. Press the UID button again to turn off the indicator.

2.11 Driver Installation Guide

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

2.12 Dual LAN and Teaming Operation Guide

Dual LAN with Teaming enabled on this motherboard allows two single connections to act as one single connection(s) 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.

2.13 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 (32Gb/s)(E3C246D4U) / Gen 3 x2 (10Gb/s)(E3C242D4U).

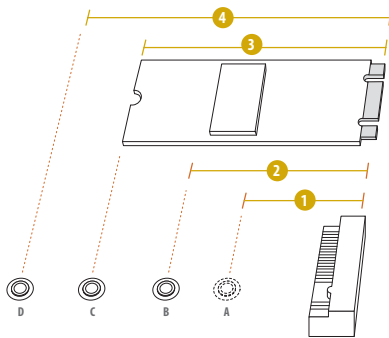
***The M.2 slot (M2_1) is shared with the SATA_0 connector. When M2_1 is populated with a M.2 SATA3/PCIE3.0(x4 or x2) module, SATA_0 is disabled.*

Installingg the M.2_SSD (NGFF) Module



Step 1

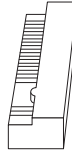
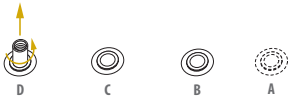
Prepare a M.2_SSD (NGFF) module and the screw.



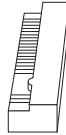
Step 2

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

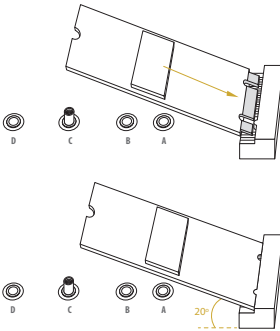
No.	1	2	3	4
Nut Location	A	B	C	D
PCB Length	3cm	4.2cm	6cm	8cm
Module Type	Type2230	Type 2242	Type2260	Type 2280

**Step 3**

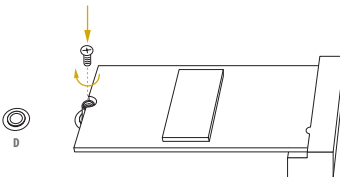
Move the standoff based on the module type and length. The standoff is placed at the nut location D by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.

**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
Boot	To set up the default system device to locate and load the Operating System
Security	To set up the security features
Event Logs	For event log configuration
Server Mgmt	To manage the server
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.

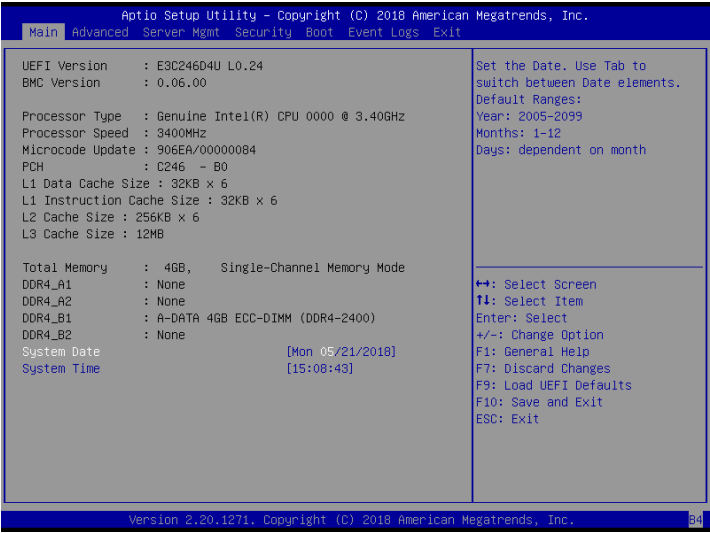
3.1.2 Navigation Keys

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

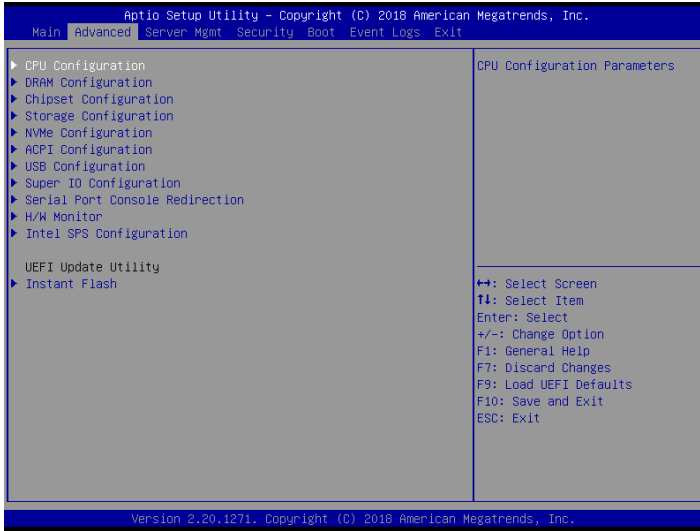
Once you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview. The Main screen provides system overview information and allows you to set the system time and date.



Note: The screenshots in this user manual are examples and for references only. The actual images may slightly vary depending on the model and the version you use.

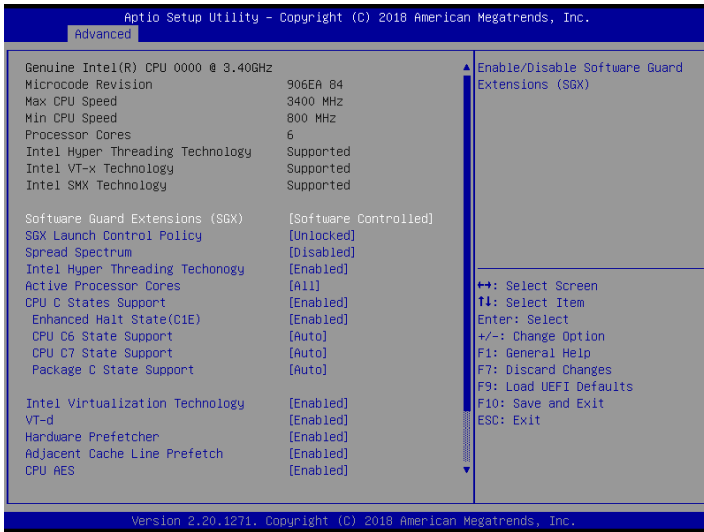
3.3 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, DRAM Configuration, Chipset Configuration, Storage Configuration, NVMe Configuration, ACPI Configuration, USB Configuration, Super IO Configuration, Serial Port Console Redirection, H/W Monitor, Intel SPS Configuration and Instant Flash.



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

3.3.1 CPU Configuration



Software Guard Extensions (SGX)

Use this item to enable or disable Software Controlled Software Guard Extensions (SGX).

SGX Launch Control Policy

Software Guard Extensions (SGX) Launch Control Policy. Options are:

Intel Locked - Select Intel's Launch Enclave.

Unlocked - Enable OS/VMM configuration of Launch Enclave.

Locked - Allow owner to configure Launch Enclave.

Spread Spectrum

Use this to enable and disable Spread Spectrum.

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.

Active Processor Cores

Select the number of cores to enable in each processor package.

CPU C States Support

Enable CPU C States Support for power saving. It is recommended to keep C3, C6 and C7 all enabled for better power saving.

Enhanced Halt State (C1E)

Enable Enhanced Halt State (C1E) for lower power consumption.

CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

CPU C7 State Support

Enable C7 deep sleep state for lower power consumption.

Package C State Support

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

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.

VT-d

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

Hardware Prefetcher

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

Adjacent Cache Line Prefetch

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

CPU AES

Use this to enable or disable CPU Advanced Encryption Standard instructions.

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]. 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 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 Mode Technology. Turbo Boost Mode allows processor cores to run faster than marked frequency in specific conditions. The default value is [Enabled].

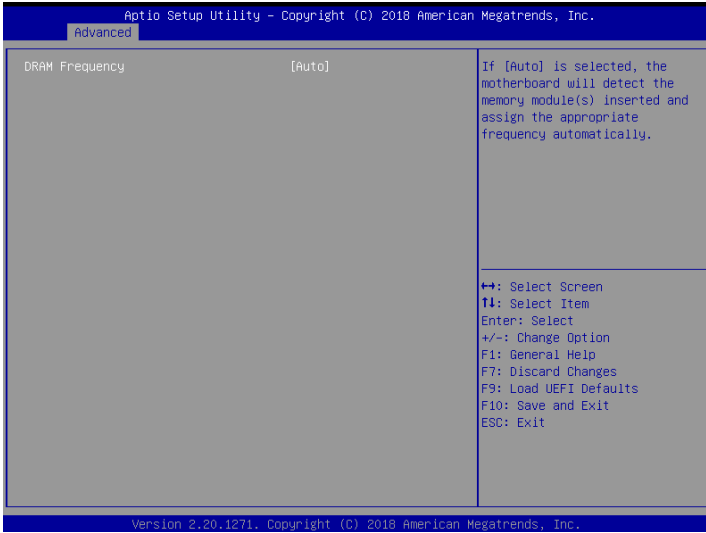
Enable Intel TXT Support

Enables Intel Trusted Execution Technology Configuration.

CPU Thermal Throttling

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

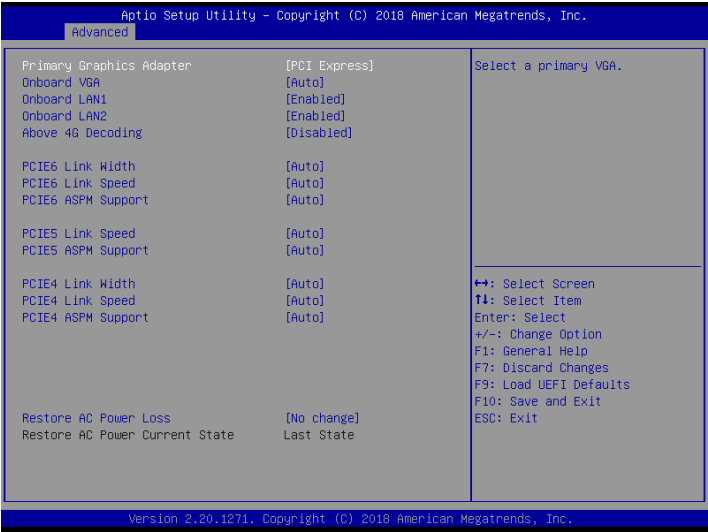
3.3.2 DRAM Configuration



DRAM Frequency

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

3.3.3 Chipset Configuration



Primary Graphics Adapter

If PCI Express graphics card is installed on the motherboard, you may use this option to select PCI Express or Onboard as the primary graphics adapter.

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 the Onboard LAN 1 feature.

Onboard LAN2

This allows you to enable or disable the Onboard LAN 2 feature.

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).

PCIe6 Link Width

This allows you to select PCIe1 Link Width. The default value is [Auto].

PCIe6 Link Speed

This allows you to select PCIe1 Link Speed. The default value is [Auto].

PCIe6 ASPM Support

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

PCIe5 Link Speed

This allows you to select PCIe1 Link Speed. The default value is [Auto].

PCIe5 ASPM Support

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

PCIe4 Link Width

This allows you to select PCIe1 Link Width. The default value is [Auto].

PCIe4 Link Speed

This allows you to select PCIe1 Link Speed. The default value is [Auto].

PCIe4 ASPM Support

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

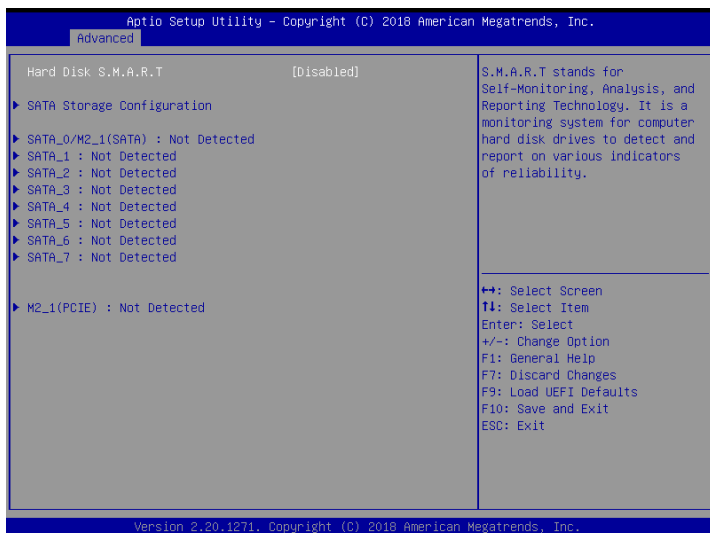
Onboard Debug Port LED

Enable/disable the onboard Debug LED.

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.

3.3.4 Storage Configuration



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].

SATA Storage Configuration

Use this item to enable or disable SATA Controllers.

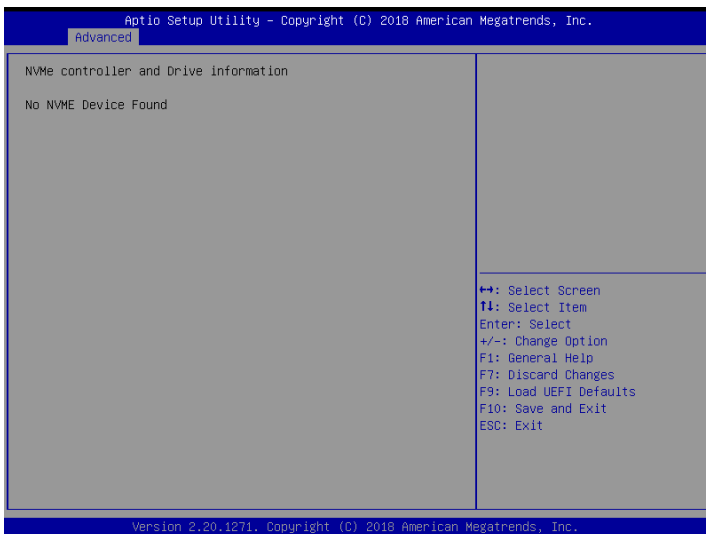
SATA/M.2_SATA Mode Selection

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 Aggressive Link Power Management

Use this item to enable or disable SALP.

3.3.5 NVMe Configuration



The NVMe Configuration displays the NVMe controller and Drive information.

3.3.6 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.

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.

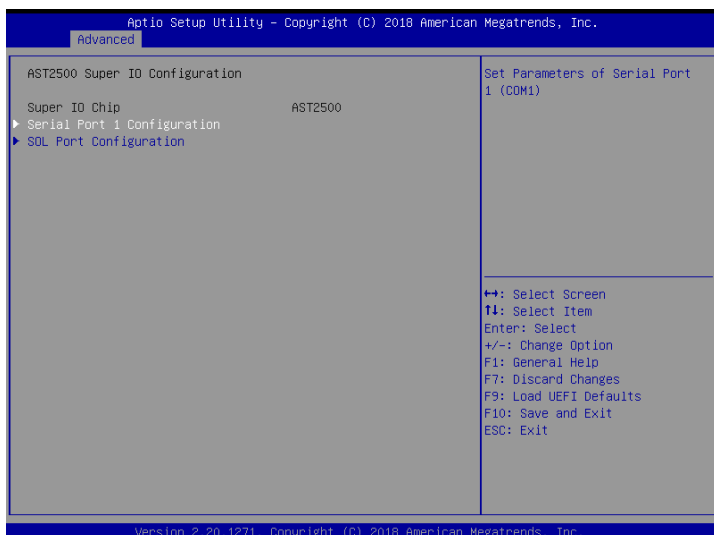
3.3.7 USB Configuration



Legacy USB Support

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

3.3.8 Super IO Configuration



Serial Port 1 Configuration

Use this item to configure the onboard 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 the onboard serial port.

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:

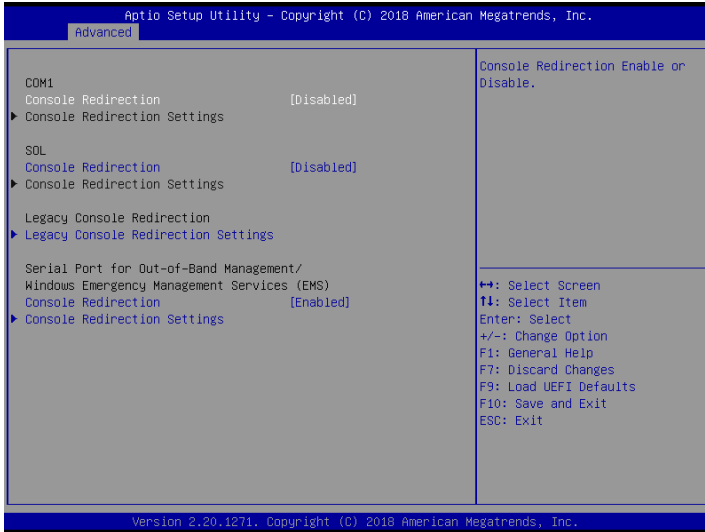
SOL Port

Use this item to enable or disable the SOL port.

SOL Port Address

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

3.3.9 Serial Port Console Redirection



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], [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 [LoadBooster] 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 option to configure Legacy Console Redirection Settings, and specify how your computer and the host computer to which you are connected exchange information.

Legacy Serial Redirection Port

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.

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].

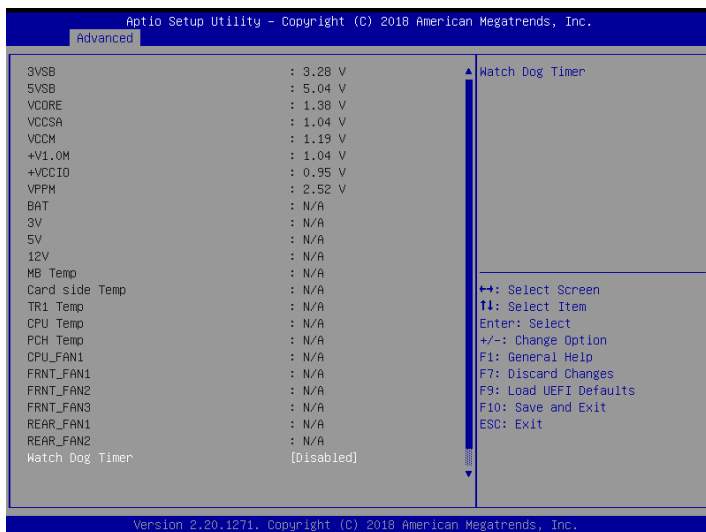
Data Bits

Parity

Stop Bits

3.3.10 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].

Fan Control

If [Auto] is selected, the fan speed will controlled by BMC.

If [Manual] is selected, configure the items below.

CPU1_FAN1

This allows you to set the CPU fan1's speed. The default value is [Smart Fan].

REAR_FAN 1

This allows you to set the rear fan 1's speed. The default value is [Smart Fan].

REAR_FAN 2

This allows you to set the rear fan 2's speed. The default value is [Smart Fan].

FRNT_FAN 1

This allows you to set the front fan 1's speed. The default value is [Smart Fan].

FRNT_FAN 2

This allows you to set the front fan 2's speed. The default value is [Smart Fan].

FRNT_FAN 3

This allows you to set the front fan 3's speed. The default value is [Smart Fan].

Smart Fan Control

This allows you to set the Smart fan's level speed.

Smart Fan Duty Control

Smart Fan Duty x (x means 1 to 11 stage)

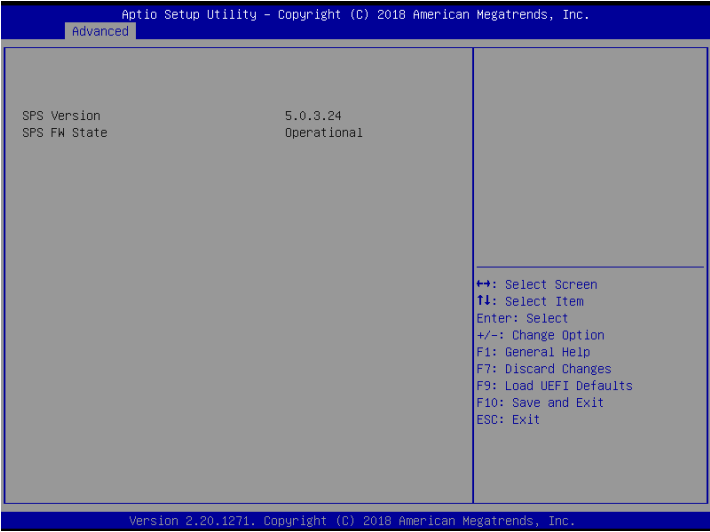
This allows you to set duty cycle for each stage.

Smart Fan Temp Control

Smart Fan Temp x (x means 1 to 11 stage)

This allows you to set temperature for each stage.

3.3.11 Intel SPS Configuration

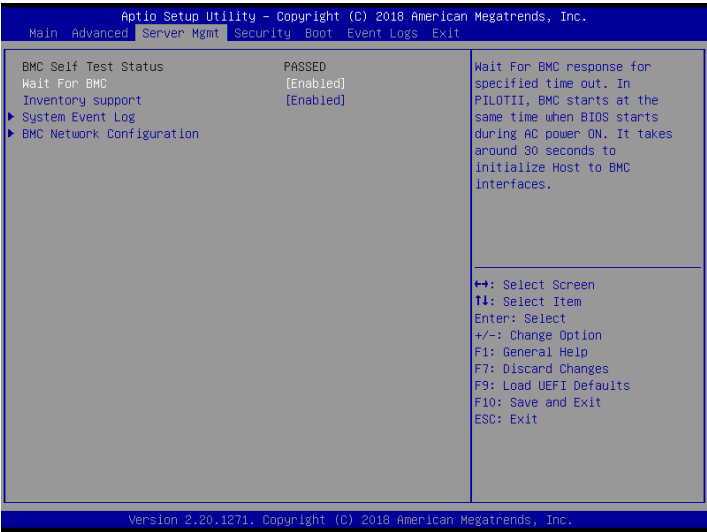


SPS screen displays the Intel SPS Configuration information, such as Operational Firmware Version and Firmware State.

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 Server Mgmt



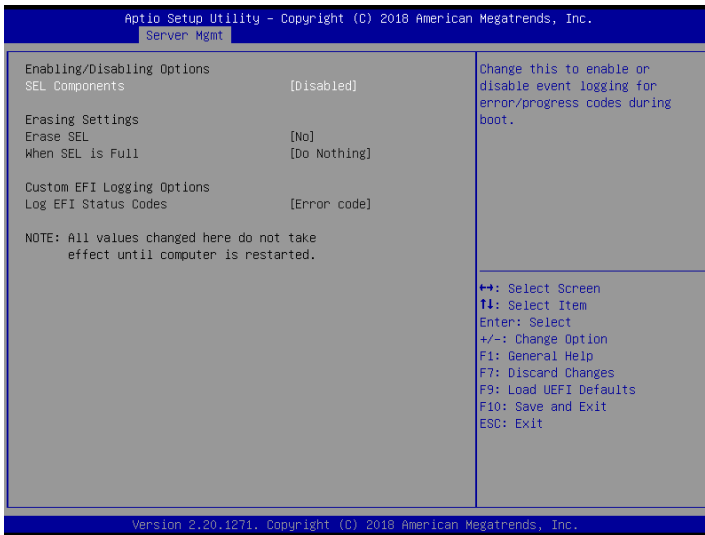
Wait For BMC

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.

Inventory support

Use this item to execute inventory function for system. It will take more time at system boot when it is enabled.

3.4.1 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.

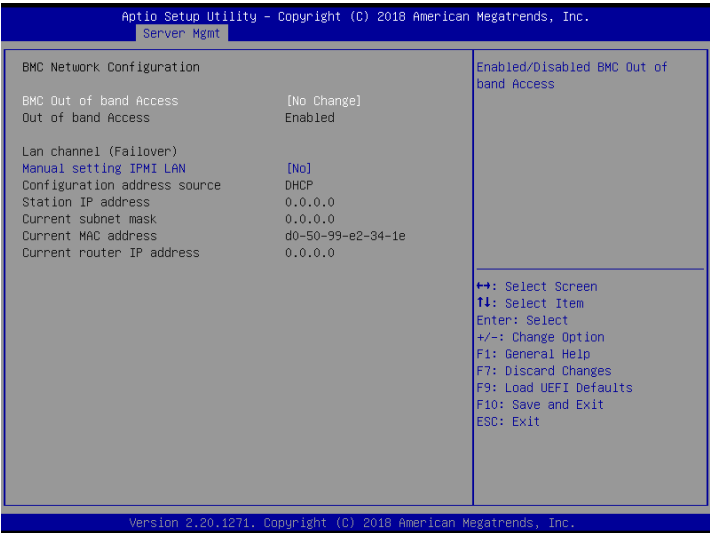
When SEL is Full

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.

3.4.2 BMC Network Configuration



BMC Out of Band Access

Use this item to enable or disable BMC Out of Band Access.

Lan Channel (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:

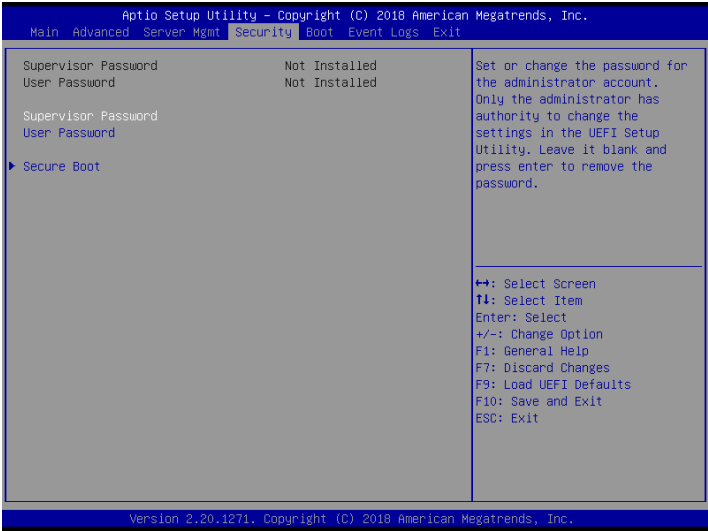
Username: admin

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>

3.5 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.

Secure Boot

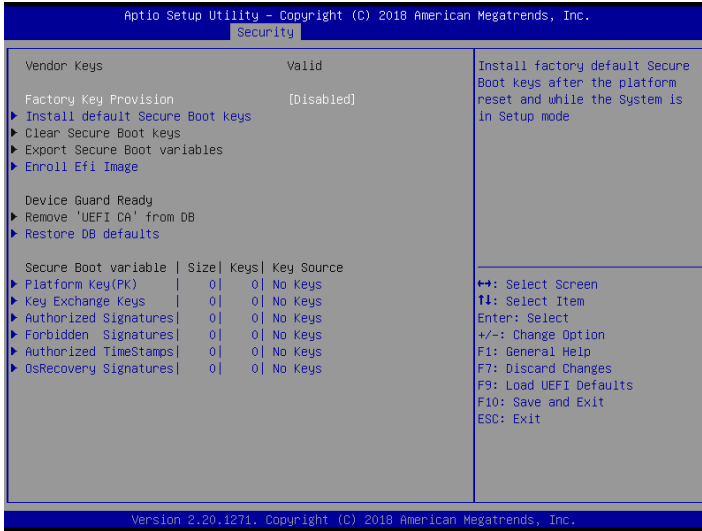
Use this to enable or disable Secure Boot Control. The default value is [Disabled]. Enable to support Windows Server 2012 R2 or later versions Secure Boot.

Secure Boot Mode

Secure Boot mode selector: Standard/Custom. In Custom mode Secure Boot Variables can be configured without authentication.

3.5.1 Key Management

In this section, expert users can modify Secure Boot Policy variables without full authentication.



Provision Factory Defaults

Allow to provision factory default Secure Boot keys when System is in Setup Mode.

Install Default Secure Boot Keys

Please install default secure boot keys if it's the first time you use secure boot.

Enroll Efi Image

Allow the image to run in Secure Boot mode. Enroll SHA256 hash of the binary into Authorized Signature Database (db).

Platform Key(PK)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

- EFI_SIGNATURE_LIST
- EFI_CERT_X509 (DER encoded)
- EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHA256, 384, 512

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed, Test

Key Exchange Keys

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER encoded)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHA256, 384, 512

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed, Test

Authorized Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER encoded)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHA256, 384, 512

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed, Test

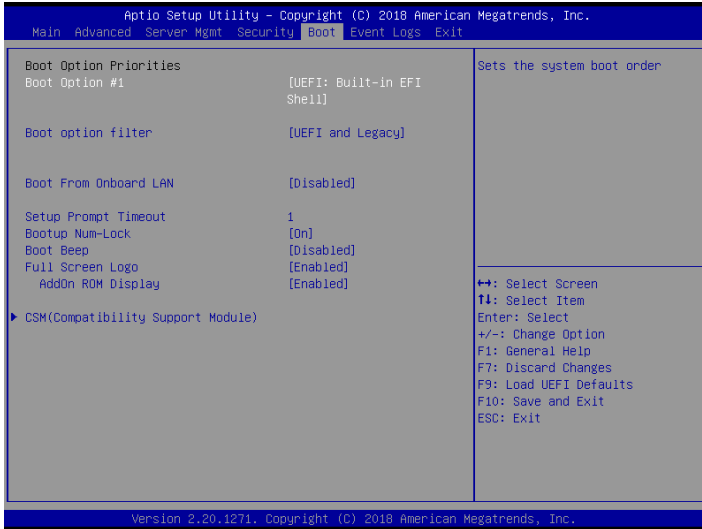
Forbidden Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

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.



Boot Option #1

Use this item to set the system boot order.

Boot Option Filter

This option controls Legacy/UEFI ROMs priority.

Boot From Onboard LAN

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

Setup Prompt Timeout

Configure the number of seconds to wait for the UEFI setup utility.

Bootup Num-Lock

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

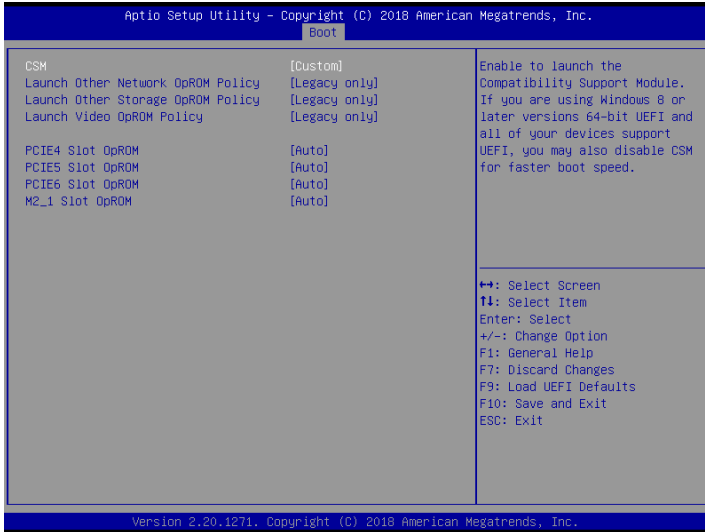
Full Screen Logo

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].

3.6.1 CSM Parameters



CSM

Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test. If you are using Windows Server 2012 R2 or later versions 64-bit UEFI and all of your devices support UEFI, you may also disable CSM for faster boot speed.

Launch PXE 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.

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.

Launch Video 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.

PCIE4 Slot OpROM

To select Slot Storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

PCIE5 Slot OpROM

To select Slot Storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

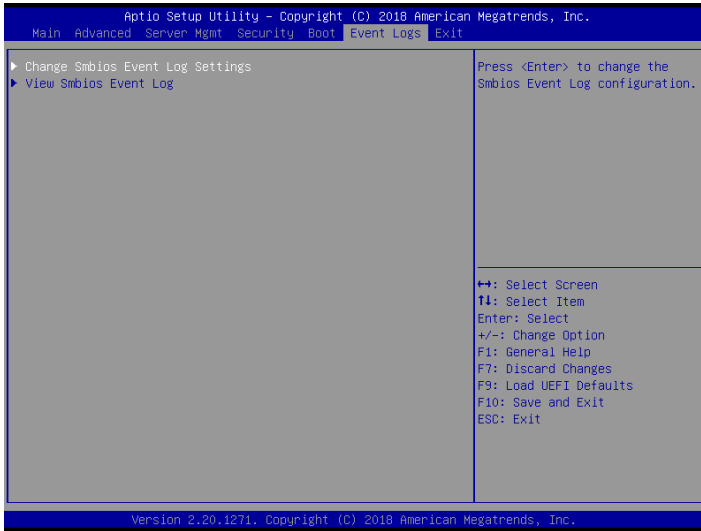
PCIE6 Slot OpROM

To select Slot Storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

M2_1 Slot OpROM

To select Slot Storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

3.7 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].

Log System Boot Event

Choose option to enable/disable logging of System boot event.

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.

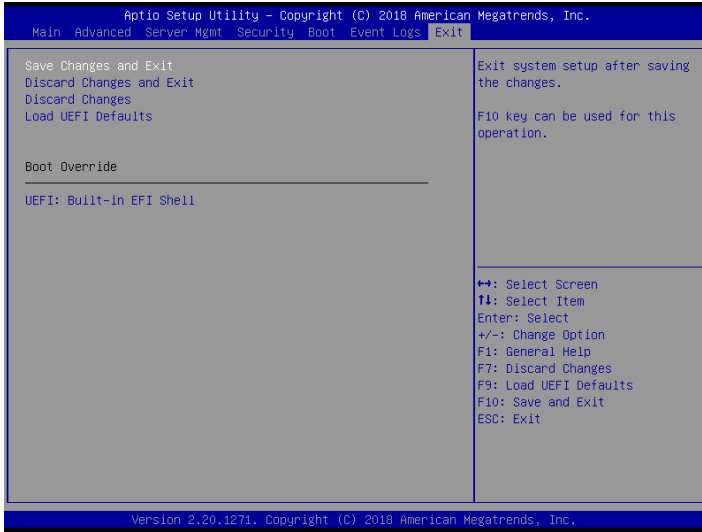
View Smbios Event Log

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



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

3.8 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.

Chapter 4 Software Support

4.1 Install Operating System

This motherboard supports various Microsoft® Windows® Server 2016 / 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 UDIMMs.
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 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.