OPEN — Industry Standard, Flexible Architecture

GREEN — Less Heat, Less Power Consumption

STABLE — Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation

Motherboard

EPC621D8A

User Manual

English

Copyright Notice:

Disclaimer:

FC

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

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

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

Contents

Chapter 1 Introduction

Thank you for purchasing ASRock Rack *EPC621D8A* 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 EPC621D8A Motherboard
  (ATX Form Factor: 12.0-in x 9.6-in, 30.5 cm x 24.4 cm)
- Support CD
- User Manual
- 4 x SATA3 cables (50cm)
- 2 x SATA3 cables (60cm)
- 1 x Mini SAS HD to 4 SATA Cable (6G)
- 2 x Screws for M.2 Sockets
- 1 x I/O Shield
- 1 x CPU Non-Fabric Carrier

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

English

1.2 Specifications

EPC621D8A	
MB Physical Status	
Form Factor	ATX
Dimension	12" x 9.6" (30.5 cm x 24.4 cm)
Processor System	
CPU	Intel® Xeon® Scalable Processors (Max 205W)
Socket	Single Socket P (3647)
Chipset	Intel® C621
System Memory	
Capacity	8 DIMM slots
Type	- Six Channel Memory Technology - Support DDR4 2666/2400 RDIMM & LR DIMM
Voltage	1.2V
Expansion Slot	
PCIe 3.0 x 16	2 slots (Slot4: share with slot3, x16/x8, Slot6: share with Slot5, x16/x8)
PCIe 3.0 x 8	3 slots (Slot2: x8, Slot3: share with Slot3, x0/x8, Slot5: share with slot6, x0/x8)
PCIe 3.0 x 4	1 slot
Storage	
SATA Controller	Intel® C621 : 13x SATA3 (including 1 SATA DOM port and 2 M.2 ports)
Ethernet	
Interface	1000 Mbps
LAN Controller	4 x RJ45 by Marvell 88E1543 for 4 ports GbE
Management	
BMC Controller	ASPEED AST2500
IPMI Dedicated GLAN	1 x Realtek RTL8211E for dedicated management GLAN
Features	- Watch Dog - NMI
Gracphics	
Controller	ASPEED AST2500
VRAM	DDR4 256MB
Audio	
Audio code	Realtek ALC1150

Rear Panel I/O	
VGA Port	1 x D-Sub
Serial Port	1 x COM port
USB 3.0 Port	4
LAN Port	- 4+1(IPMI) RJ45 Gigabit Ethernet LAN port
	- LAN Ports with LED (ACT/LINK LED and SPEED LED)
Audio Jack	3 hole
Internal Connector	
Auxiliary Panel Header	1 (includes chassis intrusion, location button & LED, front LAN LED)
TPM Header	1
IPMB Header	1
Fan Header	1x CPU Fan, 4x System Fans (3 front, 1 rear)
ATX Power	1 (24-pin) + 1 (8-pin)
USB 3.0 Header	2 (support 4 ports USB 3.0)
M.2	2 (up to 2280, SATA and PCIe x1)
Type A USB 3.0 Port	1
SATA DOM	1
System BIOS	
BIOS Type	32MB AMI UEFI Legal BIOS
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	Microsoft® Windows®
	- Windows 10 (64 bit)
	- Server 2012 R2 (64 bit)
	- Server 2016 (64 bit)
	Linux®
	- CentOS 6.8 (64 bit) / 7. 2 (64 bit)
	- SUSE Enterprise Linux Server 11 SP4 (64 bit) /12 SP1 (64 bit)
	- FreeBSD 11 (64 bit)
	- Fedora Core 24 (64 bit)
	- Ubuntu 16.04/15.10 (64 bit)
	- RedHat Enterprise Linux Server 6.8 (64 bit) / 7.2 (64 bit)
	Virtual:
	- VMWare ESXi 6.0
	* Please refer to our website for the latest OS support list.
Environment	
Temperature	Operation temperature: 10°C ~ 35°C / Non operation temperature: -40°C ~ 70°C

NOTE: Please refer to our website for the latest specifications.

⚠ *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 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 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

24.4cm (9.6 in)

30.5cm (12.0 in)

REAR_FAN1 PSU_SMB1

ATXPWR1

CMOS Battery

FRNT_FAN1

IPMI_LAN

USB 3.0
T: USB 2
B: USB1

DDR4_C1 (64 bit, 288-pin module)

DDR4_B1 (64 bit, 288-pin module)

VGA1 COM1

DDR4_A1 (64 bit, 288-pin module)

DDR4_A2 (64 bit, 288-pin module)

LAN1 LAN2

CPU1

LAN3 LAN4

UID1

USB 3.0
T: USB3_2
B: USB3_1

CPU1_FAN1

DDR4_D2 (64 bit, 288-pin module)

DDR4_D1 (64 bit, 288-pin module)

DDR4_E1 (64 bit, 288-pin module)

DDR4_F1 (64 bit, 288-pin module)

ASRock Rack

EPC621D8A

ATX12V1

BIOS ROM

PCIE6

PCIE5

RoHS

PCIE4

Intel C621

BMC

PCIE3

PCIE2

M2_1

M2_2

PCIE1

RAID_1

HD_AUDIO1

USB3_9

English

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No.	Description
1	ATX Power Connector (ATXPWR1)
2	Rear Fan Connector (REAR_FAN1)
3	PSU SMBus (PSU_SMB1)
4	CPU PECI Jumper (PECI1)
5	PMBUS Mode Jumper (PMBUS_SEL_ALT1)
6	Chassis ID0 Jumper (CHASSIS_ID0)
7	Chassis ID1 Jumper (CHASSIS_ID1)
8	Chassis ID2 Jumper (CHASSIS_ID2)
9	PMBUS Mode Jumper (PMBUS_SEL_CLK1)
10	Non Maskable Interrupt Button (NMI_BTN1)
11	Front Fan Connector (FRNT_FAN1)
12	Support NVDIMM Jumer (AEP_1)
13	3 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1, DDR4_C1, Blue)
14	1 x 288-pin DDR4 DIMM Slot (DDR4_A2, White)
15	1 x 288-pin DDR4 DIMM Slot (DDR4_D2, White)
16	3 x 288-pin DDR4 DIMM Slots (DDR4_D1, DDR4_E1, DDR4_F1, Blue)
17	ATX 12V Power Connector (ATX12V1)
18	Support NVDIMM Jumer (AEP_2)
19	Front Fan Connector (FRNT_FAN2)
20	SATA SGPIO Connector (SSATA_SGPIO1)
21	SATA2 Connector (SSATA_1)
22	SATA2 Connector (SSATA_0)
23	SATA2 Connector (SSATA_3)
24	SATA2 Connector (SSATA_2)
25	SATA2 Connector (SSATA_5)
26	SATA2 Connector (SSATA_4)
27	SATA DOM Power Jumper (SATAPWR1)
28	MINI-SAS HD Connector (SATA_0_3)
29	SATA SGPIO Connector (SATA_SGPIO1)
30	SATA SGPIO Connector (SATA_SGPIO2)
31	Front Fan Connector (FRNT_FAN3)
32	Vertical Type A USB 3.0 (USB3_9)
33	SATA3 DOM Connector (SATA_4), Red

No.	Description
34	USB 3.0 Header (USB3_5_6)
35	USB 3.0 Header (USB3_7_8)
36	System Panel Header (PANEL1)
37	Intelligent Platform Management Bus header (IPMB_1)
38	BMC SMBus Header (BMC_SMB_1)
39	TPM Header (TPM1)
40	Auxiliary Panel Header (AUX_PANEL1)
41	Speaker Header (SPEAKER1)
42	Thermal Sensor header (TR1)
43	Front Panel Audio Header (HD_AUDIO1)
44	Virtual RAID On CPU Header (RAID_1)
45	CPU Fan Connector (CPU1_FAN1)
46	Front LAN LED Connector (FRONT_LED_LAN34)
47	PMBUS Mode Jumper (PMBUS_SEL_DAT1)

1.5 Onboard LED Indicators
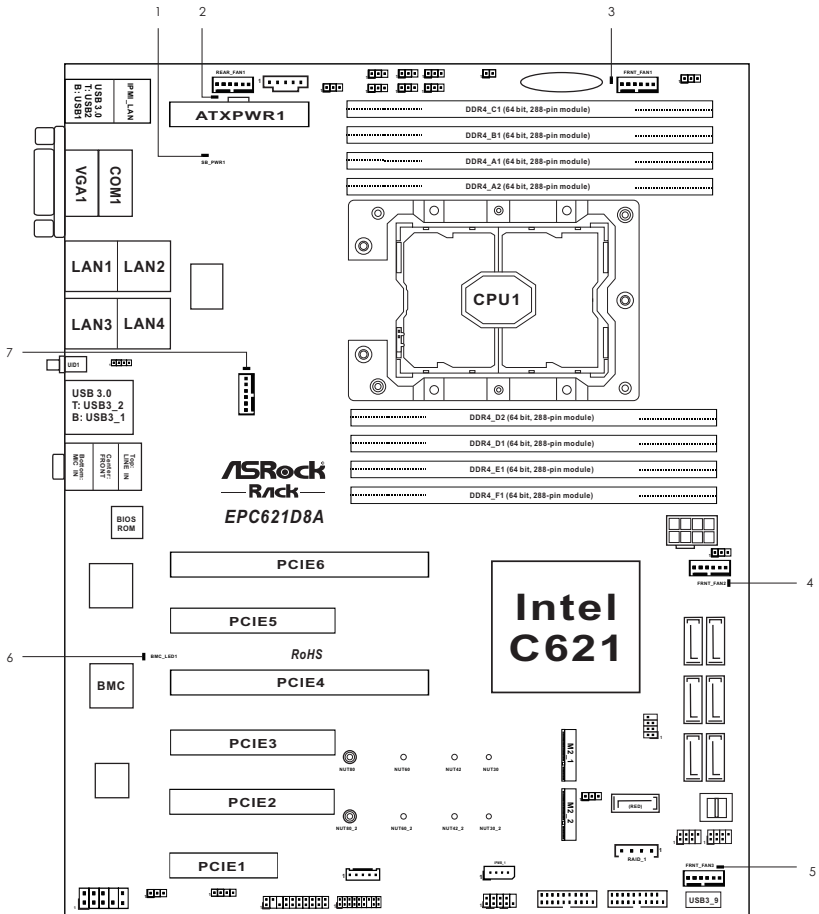
No.	Status	Description
1	Green	STB PWR ready
2	Amber	REAR_FAN1 failed
3	Amber	FRNT_FAN1 failed
4	Amber	FRNT_FAN2 failed
5	Amber	FRNT_FAN3 failed
6	Green	BMC heartbeat LED
7	Amber	CPU1_FAN1 failed

1.6 I/O Panel
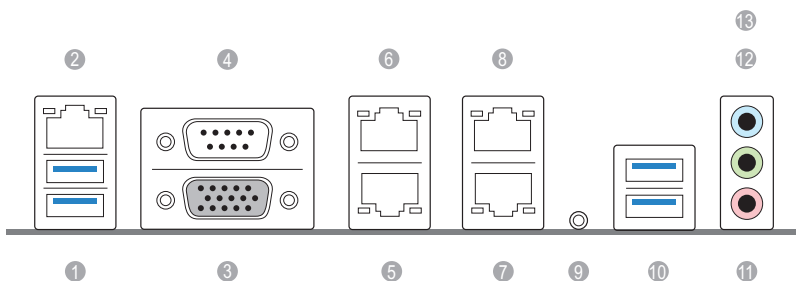
No.	Description	No.	Description
1	LAN RJ-45 Port (IPMI_LAN)**	8	LAN RJ-45 Port (LAN4)*
2	USB 3.0 Ports (USB3_1_2)	9	UID Switch (UID1)
3	VGA Port (VGA1)	10	USB 3.0 Ports (USB3_3_4)
4	Serial Port (COM1)	11	Line In (Light Blue)
5	LAN RJ-45 Port (LAN1)*	12	Front Speaker (Lime)
6	LAN RJ-45 Port (LAN2)*	13	Microphone (Pink)
7	LAN RJ-45 Port (LAN3)*		

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.

ACT/LINK LED
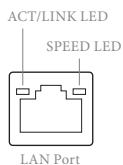
SPEED LED

LAN Port

Dedicated IPMI LAN Port LED Indications

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

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

ACT/SPEED LED
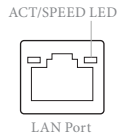
LAN Port

LAN Port (LAN1, LAN2, LAN3, LAN4) LED Indications

Activity / Speed LED	
Status	Description
Off	No Link
Solid Green	Link Up (1Gbps connection)
Blinking Green	Data Activity

1.7 Block Diagram

EPC621D8A
Block Diagram
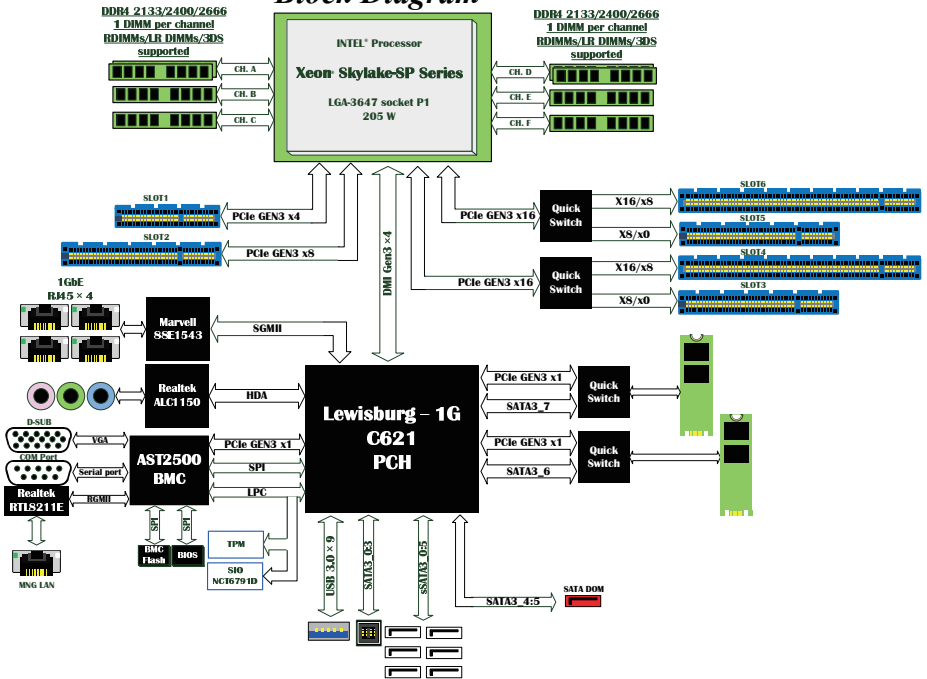
Chapter 2 Installation

This is an ATX form factor (12" x 9.6", 30.5 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.

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.

> ⚠️ *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.*

English

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2.3 Installing the CPU and Heatsink

1. *Before you insert the 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.*
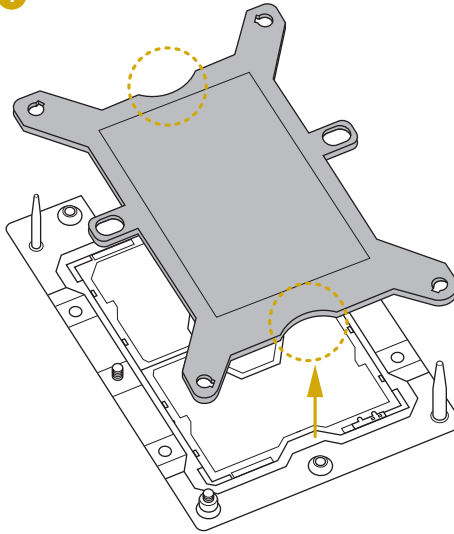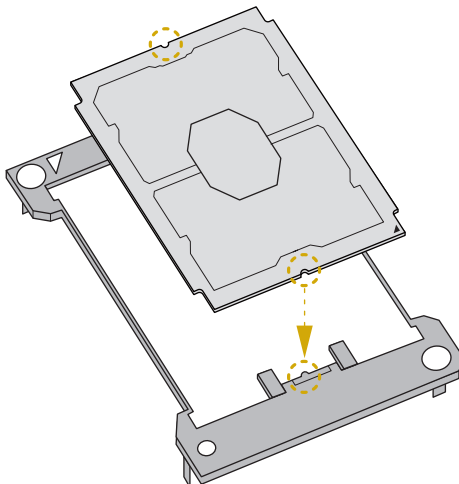
1. Before you installed the heatsink, you need to spray thermal interface material between the CPU and the heatsink to improve heat dissipation.
2. Illustration in this documentation are examples only. Heatsink or fan cooler type may differ.

3

180°

4

6

6-1

Tighten the two
Corner Plunger
to 12 IN.LB.
Two turns at a time.

Tighten the two
Middle Nuts to
12 IN.LB.
Two turns at a time.

6-3

6-4

6-2

7

English

17
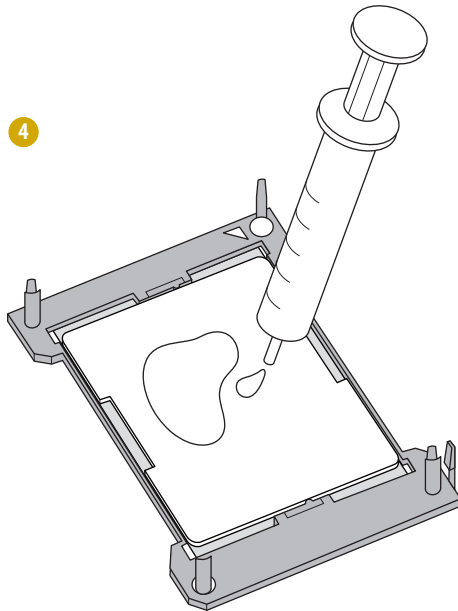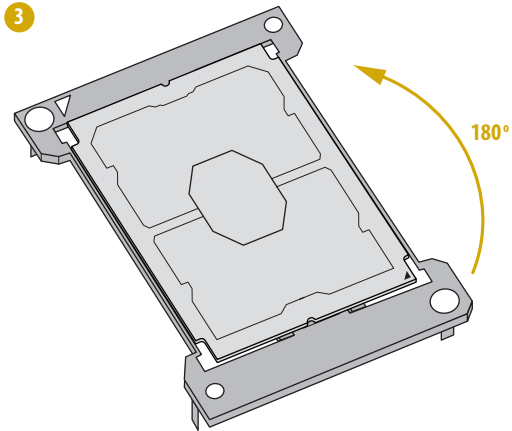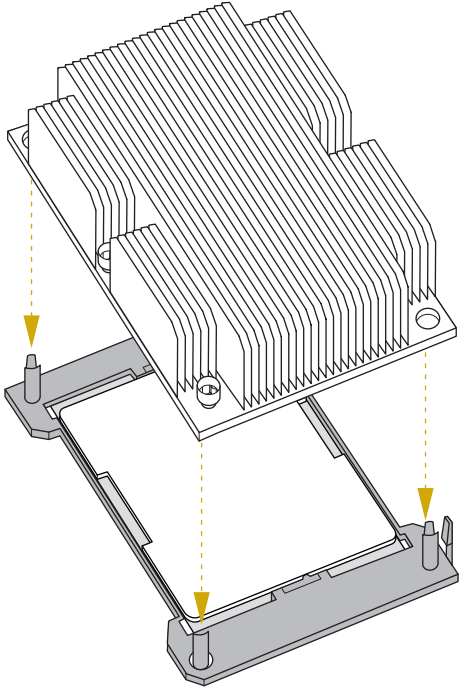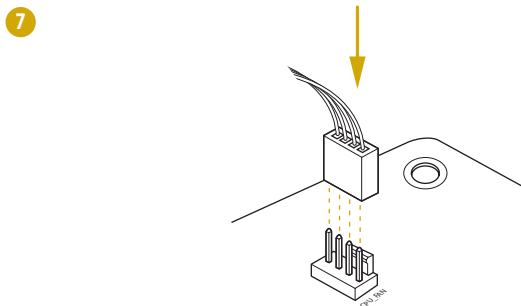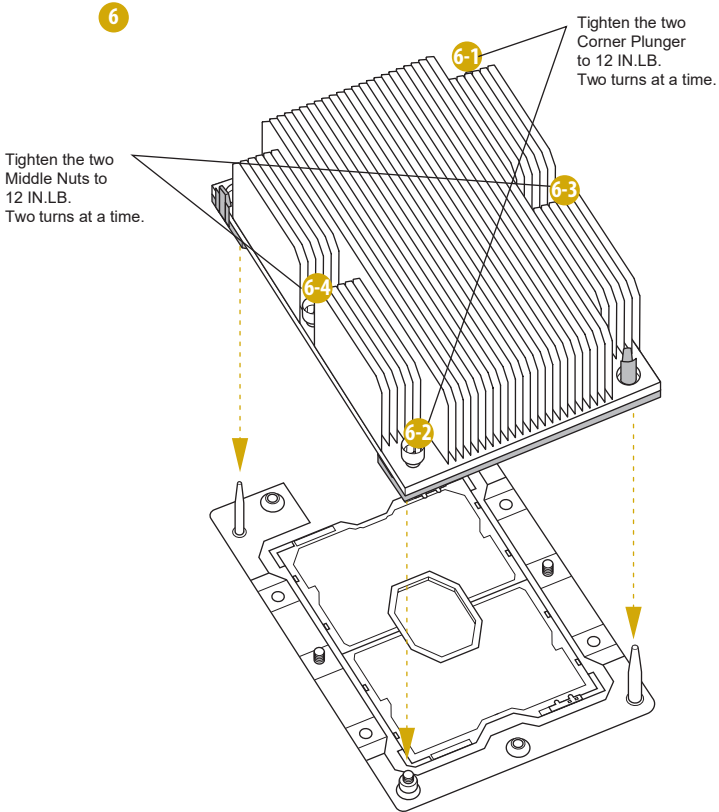
2.4 Installation of Memory Modules (DIMM)

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

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

	CPU1							
	A1	A2	B1	C1	D1	D2	E1	F1
1 DIMM	#							
2 DIMMS	#				#			
4 DIMMS	#	#			#	#		
8 DIMMS	#	#	#	#	#	#	#	#

Dual Channel Memory Configuration

Priority	DDR4_A1	DDR4_A2	DDR4_D1	DDR4_D2
1	Populated		Populated	
2		Populated		Populated

⚠️
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 six channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR4 DIMM pairs.*
3. *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
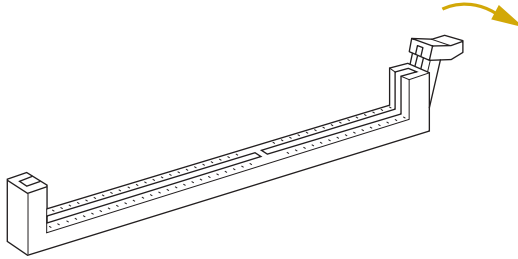
2
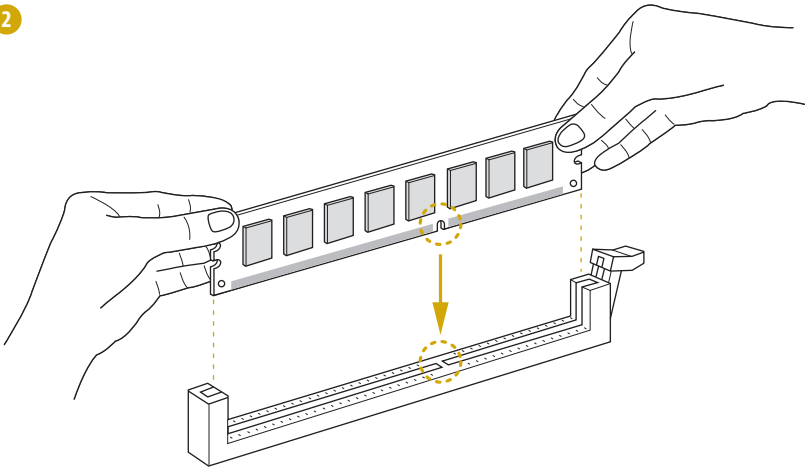
3
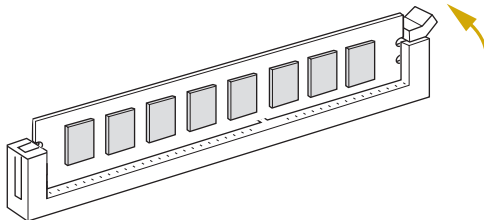
The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

English

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2.5 Expansion Slots (PCI Express Slots)

There are 6 PCI Express slots on this motherboard.

PCIE slot:
PCIE1 (PCIE 2.0 x4, from CPU1) is used for PCI Express x4 lane width graphics cards.
PCIE2, PCIE3 and PCIE5 (PCIE 3.0 x8 slot, from CPU1) are used for PCI Express x8 lane width graphics cards.
PCIE4 and PCIE6 (PCIE 3.0 x16 slot, from CPU1) are used for PCI Express x16 lane width graphics cards.

Slot	Generation	Mechnical	Eletrical	Source
PCIE 1	3.0	x4	x4	CPU1
PCIE 2	3.0	x8	x8	CPU1
PCIE 3	3.0	x8	x8	CPU1
PCIE 4	3.0	x16	x16	CPU1
PCIE 5	3.0	x8	x8	CPU1
PCIE 6	3.0	x16	x16	CPU1

PCI Express Slot Configuration

No.	PCIE 3	PCIE 4
Single Graphics Card		x16
Two Graphics Cards	x8	x8

No.	PCIE 5	PCIE 6
Single Graphics Card		x16
Two Graphics 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.

2.6 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.

Short   Open
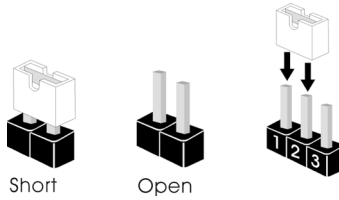
NVDIMM Support Jumpers
(3-pin AEP_1)
(see p.6, No. 12)
(3-pin AEP_2)
(see p.6, No. 18)

1_2

Not support NVDIMM

2_3

Support NVDIMM

PMBUS Mode Jumper
(3-pin PMBUS_SEL_CLK1)
(see p.6, No. 9)
(3-pin PMBUS_SEL_DAT1)
(see p.6, No. 47)
(3-pin PMBUS_SEL_ALT1)
(see p.6, No. 5)

1_2

PMBus connected to BMC
(Default)

2_3

PMBus connected to PCH

English

Chassis ID0 Jumper (3-pin CHASSIS_ID0) (see p.6, No. 6)	**1_2** ●●○	**1_2** ●●○
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (see p.6, No. 7)	**1_2** ●●○	**1_2** ●●○
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (see p.6, No. 8)	**1_2** ●●○	**2_3** ○●●
	Board Level SKU (Default)	Reserved for system level use

Chassis ID0 Jumper (3-pin CHASSIS_ID0) (see p.6, No. 6)	**1_2** ●●○	**1_2** ●●○
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (see p.6, No. 7)	**2_3** ○●●	**2_3** ○●●
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (see p.6, No. 8)	**2_3** ○●●	**1_2** ●●○
	Reserved for system level use	Reserved for system level use

Chassis ID0 Jumper (3-pin CHASSIS_ID0) (see p.6, No. 6)	**2_3** ○●●	**2_3** ○●●
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (see p.6, No. 7)	**1_2** ●●○	**1_2** ●●○
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (see p.6, No. 8)	**1_2** ●●○	**2_3** ○●●
	Reserved for system level use	Reserved for system level use

Chassis ID0 Jumper (3-pin CHASSIS_ID0) (see p.6, No. 6)	**2_3** ○●●	**2_3** ○●●
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (see p.6, No. 7)	**2_3** ○●●	**2_3** ○●●
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (see p.6, No. 8)	**1_2** ●●○	**2_3** ○●●
	Reserved for system level use	Reserved for system level use

CPU PECI Mode Jumper (3-pin PECI1) (see p.6, No. 4)	**1_2** CPU PECI connect to PCH	**2_3** CPU PECI connect to BMC (Default)
SATA DOM Power Jumper (3-pin SATAPWR1) (see p.6, No. 27)	**1_2** SATA DOM (SATA_4) requires 5V power supply	**2_3** SATA DOM (SATA_4) 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 (SATAPWR1/SATAPWR2) 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 (SATAPWR1) 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/SATAPWR2) may cause damage to the motherboard or your SATA DOM.

2.7 Onboard Headers and Connectors

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

System Panel Header
(9-pin PANEL1)
(see p.6, No. 36)

PLED+
PLED-
PWRBTN#
GND

1

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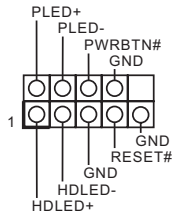
Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

🔍 *PWRBTN (Power Switch):*
Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.

RESET (Reset Switch):
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

PLED (System Power LED):
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. 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. 40)

A

SMB_Alert
SMB_CLK
GND
SMB_DATA
+3VSB
LAN1_LINK
LED_PWR
LED_PWR
LAN2_LINK

B

1

+5VSB

CASEOPEN
GND
LOCATORLED1+
LOCATORLED1-
LOCATORBTN#
GND
LOCATORLED2-
LOCATORLED2+

C

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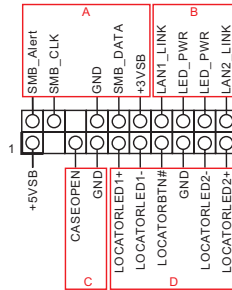
This header supports multiple functions on the front panel, including the front panel SMB, internet status indicator and chassis intrusion pin.

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 (6-pin LOCATOR)
This header is for the locator switch and LED on the front panel.

Serial ATA3 Connectors
(SSATA_0)
(see p.6, No. 22)
(SSATA_1)
(see p.6, No. 21)
(SSATA_2)
(see p.6, No. 24)
(SSATA_3)
(see p.6, No. 23)
(SSATA_4)
(see p.6, No. 26)
(SSATA_5)
(see p.6, No. 25)

SSATA_1
SSATA_0
SSATA_3
SSATA_2
SSATA_5
SSATA_4
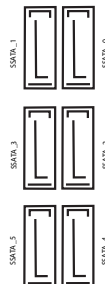
These four SATA3 connectors support SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.

Serial ATA3 DOM
Connector
(SATA_4)
(see p.6, No. 33)

(RED)

SATA_4
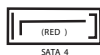
The SATA3 DOM connector
supports both a SATA DOM
(Disk-On-Module) and a SATA
data cable for internal storage
device.

Mini-SAS HD Connector
(SATA_0_3)
(see p.6, No. 28)

SATA_0_3

The connector supports
MiniSAS-to-SATA
data cables for internal
storage devices with up
to 6.0 Gb/s data transfer
rate.

USB 3.0 Connector
(USB3_9)
(see p.6, No. 32)

USB 3.0 Headers
(19-pin USB3_5_6)
(see p.6, No. 34)
(19-pin USB3_7_8)
(see p.6, No. 35)

IntA_PA_D+
IntA_PA_D-
GND
IntA_PA_SSTX+
IntA_PA_SSTX-
GND
IntA_PA_SSRX+
IntA_PA_SSRX-
Vbus

1

Vbus
IntA_PB_SSRX-
IntA_PB_SSRX+
GND
IntA_PB_SSTX-
IntA_PBA_SSTX+
GND
IntA_PB_D-
IntA_PB_D+
Dummy
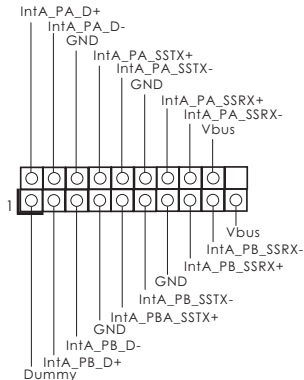
Besides four default USB 3.0
ports on the I/O panel, there
is one USB 3.0 header on this
motherboard. Each USB 3.0
header can support two USB
3.0 ports.

Front Panel Audio Header
(9-pin HD_AUDIO1)
(see p.6, No. 43)

GND
PRESENCE#
MIC_RET
OUT_RET

OUT2_L
J_SENSE
OUT2_R
MIC2_R
MIC2_L

1
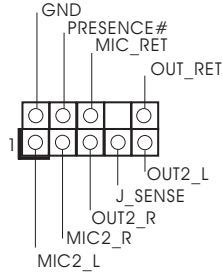
This is an interface for the front panel audio cable that allows convenient connection and control of audio devices.

1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instruction in our manual and chassis manual to install your system.

2. If you use AC'97 audio panel, please install it to the front panel audio header as below:

A. Connect Mic_IN (MIC) to MIC2_L.
B. Connect Audio_R (RIN) to OUT2_R and Audio_L (LIN) to OUT2_L.
C. Connect Ground (GND) to Ground (GND).
D. MIC_RET and OUT_RET are for HD audio panel only. You don't need to connect them for AC'97 audio panel.

Chassis Speaker Header
(4-pin SPEAKER1)
(see p.6, No. 41)

DUMMY SPEAKER
1
+5V   DUMMY
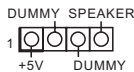
Please connect the chassis speaker to this header.

Baseboard Management Controller SMBus Header
(5-pin BMC_SMB_1)
(see p.6, No. 38)

BMC_SMB_PRESENT_1_N
Power
BMC_SMBCLK
GND
BMC_SMBDATA
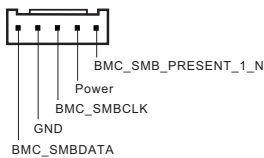
The header is used for the SM BUS devices.

CPU Fan Connector
(4-pin CPU1_FAN1)
(see p.6, No. 45)

NC — 6
SENSOR — 5
FAN_SPEED_CONTROL — 4
FAN_SPEED — 3
FAN_VOLTAGE — 2
GND — 1
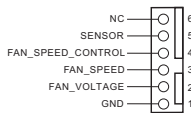
This motherboard provides a 6-Pin CPU fan (Quiet Fan) connector. If you plan to connect a 3-Pin CPU fan, please connect it to Pin 1-3.

English

27

Front and Rear Fan
Connectors
(4-pin FRNT_FAN1)
(see p.6, No. 11)
(4-pin FRNT_FAN2)
(see p.6, No. 19)
(4-pin FRNT_FAN3)
(see p.6, No. 31)
(4-pin REAR_FAN1)
(see p.6, No. 2)

NC
SENSOR
FAN_SPEED_CONTROL
FAN_SPEED
FAN_VOLTAGE
GND

1 2 3 4 5 6
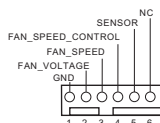
Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control.

ATX Power Connector
(24-pin ATXPWR1)
(see p.6, No. 1)

GND
5V
5V
5V
N/A
GND
GND
GND
PSON#
GND
-12V
3V

24   13

12   1

3V
12V
12V
5VSB
PWROK_PS
GND
5V
GND
5V
GND
3V
3V
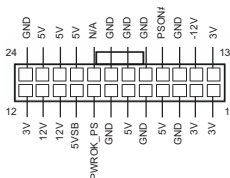
This motherboard provides a 24-pin ATX power connector. To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13.

ATX 12V Power
Connector
(8-pin ATX12V1)
(see p.6, No. 17)

GND

1   4

5   8

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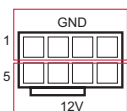
This motherboard provides a 8-pin ATX 12V power connector.

TPM Header
(17-pin TPM1)
(see p.6, No. 39)

SMB_CLK_MAIN
SMB_DATA_MAIN
LAD2_L
LAD1_L
GND
SERIRQ#
S_PWRDWN#
F_CLKRUN#

GND

1

CK_33M_TPM
LFRAME#_L
TPM_RST#
LAD3_L
+3V
LAD0_L
+3VSB
GND
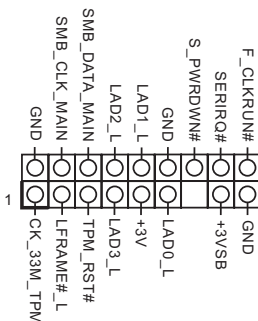
This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

Serial General Purpose Input/Output Headers
(7-pin SATA_SGPIO1)
(see p.6, No. 29)
(7-pin SATA_SGPIO2)
(see p.6, No. 30)

SCLOCK
SLOAD
GND

1

SDATAOUT
GND
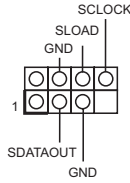
These headers support Serial Link interface for onboard SATA connections.

(7-pin SSATA_SGPIO1)
(see p.6, No. 20)

SCLOCK
SLOAD
GND

GND
SDATAOUT

1
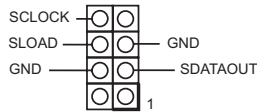
PSU SMBus
(PSU_SMB1)
(see p.6, No. 3)

ALERT
SMBCLK   +3V

1

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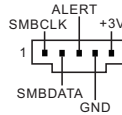
PSU SMBus monitors the status of the power supply, fan and system temperature.

Non Maskable Interrupt Button Header
(NMI_BTN1)
(see p.6, No. 10)

GND

1

CONTROL
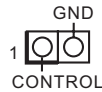
Please connect a NMI device to this header.

Intelligent Platform Management Bus header
(4-pin IPMB_1)
(see p.6, No. 37)

IPMB_SDA
IPMB_SCL
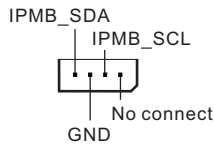
No connect
GND

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.

Thermal Sensor Header
(3-pin TR1)
(see p.6, No. 42)

TR1   TR1

1

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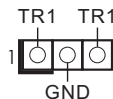
Please connect the thermal sensor cable to either pin 1-2 or pin 2-3 and the other end to the device which you wish to monitor its temperature.

English

Front LAN LED Header
(FRONT_LED_LAN34)
(see p.6, No. 46)

1 [OOOO]

LAN4_LINK
LED_PWR
LED_PWR
LAN3_LINK
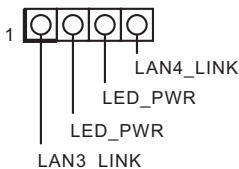
This 4-pin connector is used for the front LAN status indicator.

Virtual RAID On CPU
Header
(4-pin RAID_1)
(see p.6, No. 44)

1 [OOOO]

VROC RAID KEY
GND
+3VSB
GND
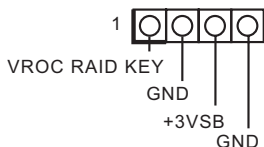
This connector supports Intel® Virtual RAID on CPU and NVME/AHCI RAID on CPU PCIE.

With the introduction of the Intel VROC product, there are three modes of operation:

SKU	HW key required	Key features
Pass-thru	Not needed	• Pass-thru only (no RAID) • LED Management • Hot Plug Support • RAID 0 support for Intel Fultondale NVMe SSDs
Standard	VROCSTANMOD	• Pass-thru SKU features • RAID 0, 1, 10
Premium	VROCPREMMOD	• Standard SKU features • RAID 5
ISS	VROCISSDMOD	• RAID 5 Write Hole Closure

*Only Intel SSDs are supported.

*For further details on VROC, please refer to the official information released by Intel.

2.8 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 (UID1) | | 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. |

2.9 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.

English

2.10 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 Ultra M.2 Socket (M2_1/M2_2) supports a M.2 SATA3 6.0 Gb/s module or a M.2 PCI Express module up to Gen 3 x1 (8Gb/s).

Installing the M.2_SSD (NGFF) Module
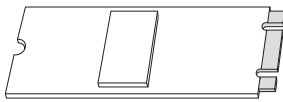
Step 1

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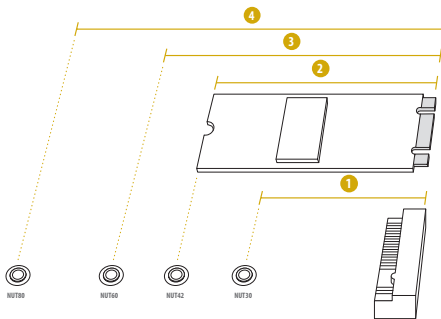
Step 2

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	NUT30	NUT42	NUT60	NUT80
PCB Length	3cm	4.2cm	6cm	8cm
Module Type	Type 2230	Type 2242	Type2260	Type 2280

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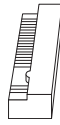
Move the standoff based on the module type and length.
The standoff is placed at the nut location D by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.

NUT80   NUT60   NUT42   NUT30

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.

NUT80   NUT60   NUT42   NUT30
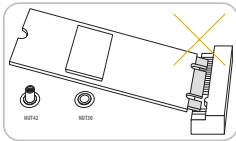
Step 5

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.

NUT42   NUT30

NUT80   NUT60   NUT42   NUT30
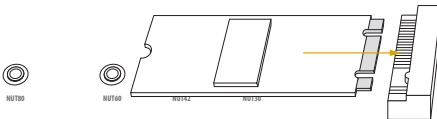
Step 6
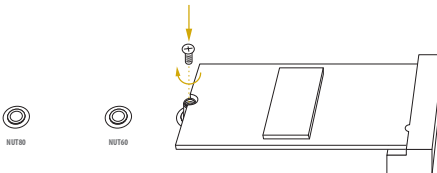
Tighten the screw with a screwdriver to secure the module into place. Please do not overtighten the screw as this might damage the module.

NUT80   NUT60

English

33

Chapter 3 UEFI Setup Utility

3.1 Introduction

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

If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <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
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
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.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Main  Advanced  Security  Boot  Event Logs  Server Mgmt  Exit

  UEFI Version      : EPC621D8A L0.13          Set the Date. Use Tab to
  BMC Version       : 0.02.00                  switch between Date elements.
                                               Default Ranges:
  Processor Type    : Intel(R) Xeon(R) Gold 6150 CPU @ 2.70GH  Year: 2005-2099
                      z                        Months: 1-12
  Processor Speed   : 2700MHz                  Days: dependent on month
  Microcode Update  : 50654/02000022
  L1 Cache Size     : 64KB
  L2 Cache Size     : 1024KB
  L3 Cache Size     : 25344KB

  Total Memory      :  16GB
  DDR4_A1           : DDR4-2666 DRx8 16GB R-DIMM
  DDR4_A2           : None
  DDR4_B1           : None                     ↔: Select Screen
  DDR4_C1           : None                     ↑↓: Select Item
  DDR4_D1           : None                     Enter: Select
  DDR4_D2           : None                     +/-: Change Option
  DDR4_E1           : None                     F1: General Help
  DDR4_F1           : None                     F7: Discard Changes
  System Date                  [Fri 07/21/2017]  F9: Load UEFI Defaults
  System Time                  [00:13:46]       F10: Save and Exit
                                               ESC: Exit




                Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
```

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, Runtime Error Logging, Intel ME Configuration, Intel® VMD technology, Intel(R) Virtual RAID on CPU and Instant Flash.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
         Main  Advanced  Security  Boot  Event Logs  Server Mgmt  Exit

      ▶ CPU Configuration                                   ▲  CPU Configuration Parameters
      ▶ DRAM Configuration
      ▶ Chipset Configuration
      ▶ Storage Configuration
      ▶ NVMe Configuration
      ▶ ACPI Configuration
      ▶ USB Configuration
      ▶ Super IO Configuration
      ▶ Serial Port Console Redirection
      ▶ H/W Monitor
      ▶ Runtime Error Logging
      ▶ Intel ME Configuration

        User Profile 1: Empty                                  ↔: Select Screen
        User Profile 2: Empty                                  ↑↓: Select Item
        User Profile 3: Empty                                  Enter: Select
        User Profile 4: Empty                                  +/-: Change Option
        User Profile 5: Empty                                  F1: General Help
      ▶ Save User Default                                      F7: Discard Changes
      ▶ Load User Default                                      F9: Load UEFI Defaults
                                                               F10: Save and Exit
      ▶ Intel® VMD technology                                  ESC: Exit
      ▶ Intel(R) Virtual RAID on CPU

        UEFI Update Utility                                 ▼

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```

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.*

English

3.3.1 CPU Configuration

```
            Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
       Advanced

 Intel SpeedStep Technology           [Enabled]              Intel SpeedStep technology
 Intel Turbo Boost Technology         [Enabled]              allows processors to switch
 Long Duration Power Limit            Auto                   between multiple frequencies
 Long Duration Maintained             [1s]                   and voltage points for better
 Short Duration Power Limit           Auto                   power saving and heat
 Intel Hyper Threading Technology     [Enabled]              dissipation.
 Active Processor 1 Cores             [All]                  CPU turbo ratio can be fixed
                                                             when Intel SpeedStep
 No-Execute Memory Protection         [Enabled]              Technology set Disabled and
 Enable Intel TXT Support             [Disabled]             Intel Turbo Boost Technology
 Intel Virtualization Technology      [Enabled]              set Enabled.
 Enable SMX                           [Disabled]
 Hardware Prefetcher                  [Enabled]
 Adjacent Cache Line Prefetch         [Enabled]              ↔: Select Screen
                                                             ↑↓: Select Item
  Package C State Support             [Auto]                 Enter: Select
  CPU C6 State Support                [Enabled]              +/-: Change Option
  Enhanced Halt State(C1E)            [Auto]                 F1: General Help
 Hardware P-States                    [Native Mode]          F7: Discard Changes
 AES-NI                               [Enabled]              F9: Load UEFI Defaults
 CPU Thermal Throttling               [Enabled]              F10: Save and Exit
                                                             ESC: Exit



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```

Intel SpeedStep Technology

Intel SpeedStep technology allows processors to switch between multiple frequencies and voltage points for better power saving and heat dissipation. CPU turbo ratio can be fixed when Intel SpeedStep Technology set Disabled and Intel Turbo Boost Technology set Enabled.

> ⚠️ *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

Intel Turbo Boost Technology enables the processor to run above its base operating frequency when the operating system requests the highest performance state.

Long Duration Power Limit

Configure Package Power Limit 1 in watts. When the limit is exceeded, the CPU ratio will be lowered after a period of time. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

Long Duration Maintained

Configure the period of time until the CPU ratio is lowered when the Long Duration Power

Limit is exceeded.

Short Duration Power Limit

Configure Package Power Limit 2 in watts. When the limit is exceeded, the CPU ratio will be lowered immediately. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

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 1 Cores

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

No-Execute Memory Protection

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

Enable Intel TXT Support

Enables Intel Trusted Execution Technology Configuration.

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.

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.

Package C State Support

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

CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

English

Enhanced Halt State(C1E)

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

Hardware P-States

Disable: Hardware chooses a P-state based on OS Request (Legacy P-States)

Native Mode: Hardware chooses a P-state based on OS guidance

Out of Band Mode: Hardware autonomously chooses a P-state (no OS guidance)

AES-NI

Use this item to enable or disable AES-NI support.

CPU Thermal Throttling

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

3.3.2 DRAM Configuration

```
                    Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
         Advanced

 Enforce POR                          [Auto]                 Enforce POR - Enforces Plan Of
 DRAM Frequency                       [Auto]                 Record restrictions for DDR4
 Numa                                 [Enabled]              frequency and voltage
                                                             programming. Disable -
 ECC Support                          [Auto]                 Disables this feature. Auto -
 Channel Interleaving                 [Auto]                 Sets it to the MRC default
 Rank Interleaving                    [Auto]                 setting; current default is
 Mirror Mode                          [Disabled]             Enable.
 Memory Rank Sparing                  [Disabled]


                                                             ↔: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Option
                                                             F1: General Help
                                                             F7: Discard Changes
                                                             F9: Load UEFI Defaults
                                                             F10: Save and Exit
                                                             ESC: Exit



                    Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.          34
```

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.

Numa

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

ECC Support

Use this item to enable or disable DDR ECC Support.

Channel Interleaving

Select to configure Channel Interleaving settings.

Rank Interleaving

Select to configure Rank Interleaving settings.

Mirror Mode

Mirror Mode will set entire 1LM/2LM memory in system to be mirrored, consequently reducing the memory capacity by half. Mirror Enable will disable XPT Prefetch.

Memory Rank Sparing

Enable or disable Memory Rank Sparing.

3.3.3 Chipset Configuration

```
                    Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced

    MMCFG Base                          [2G]                      ▲  Select MMCFG Base
    MMIO High Base                      [3T]
    MMIO High Size                      [1024G]
    Above 4G Decoding                   [Enabled]
    Primary Graphics Adapter            [PCI Express]
    Onboard VGA                         [Auto]
    OnBoard LAN                         [Enabled]
    VT-d                                [Enabled]


    PCIE1 Link Width                    [x4]
    PCIE1 Link Speed                    [Auto]
    PCIE1 ASPM Support                  [L1 Only]
                                                                  ↔: Select Screen
    PCIE2 Link Width                    [x8]                      ↑↓: Select Item
    PCIE2 Link Speed                    [Auto]                    Enter: Select
    PCIE2 ASPM Support                  [L1 Only]                 +/-: Change Option
                                                                  F1: General Help
    PCIE3/PCIE4 Link Width              [Auto]                    F7: Discard Changes
    PCIE3/PCIE4 Link Speed              [Auto]                    F9: Load UEFI Defaults
    PCIE3/PCIE4 ASPM Support            [L1 Only]                 F10: Save and Exit
                                                                  ESC: Exit
    PCIE5/PCIE6 Link Width              [Auto]
    PCIE5/PCIE6 Link Speed              [Auto]
    PCIE5/PCIE6 ASPM Support            [L1 Only]                 ▼

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```

MMCFG Base

Use this item to select MMCFG Base.

MMIO High Base

Use this item to select MMIO High Base.

MMIO High Size

Use this item to select MMIO High Size.

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).

Primary Graphics Adapter

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

If no PCI Express graphics card is installed, [Onboard VGA] is the default graphics adapter. There is no screen on monitor even if a HDMI display is connected. Select [Onboard Hdmi] instead to use HDMI as output source.

Onboard VGA

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

This item is not available when the Primary Graphic Adapter is set to [Onboard VGA] or [Onboard Hdmi] .

English

Onboard LAN

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

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.

PCIE1 Link Width

This allows you to select PCIE1 Link Width. The default value is [x4].

PCIE1 Link Speed

This allows you to select PCIE1 Link Speed. The default value is [Auto].

PCIE1 ASPM Support

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

PCIE2 Link Width

This allows you to select PCIE2 Link Width. The default value is [x8].

PCIE2 Link Speed

This allows you to select PCIE2 Link Speed. The default value is [Auto].

PCIE2 ASPM Support

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

PCIE3/PCIE4 Link Width

This allows you to select PCIE3/PCIE4 Link Width. The default value is [Auto].

PCIE3/PCIE4 Link Speed

This allows you to select PCIE3/PCIE4 Link Speed. The default value is [Auto].

PCIE3/PCIE4 ASPM Support

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

PCIE5/PCIE6 Link Width

This allows you to select PCIE5/PCIE6 Link Width. The default value is [Auto].

PCIE5/PCIE6 Link Speed

This allows you to select PCIE5/PCIE6 Link Speed. The default value is [Auto].

PCIE5/PCIE6 ASPM Support

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

SR-IOV Support

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

Restore on AC/Power Loss

Select the power state after a power failure. If [Power Off] is selected, the power will remain off when the power recovers. If [Power On] is selected, the system will start to boot up when the power recovers.

Onboard HD Audio

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

Front Panel

This allows you to select the front panel type.

3.3.4 Storage Configuration
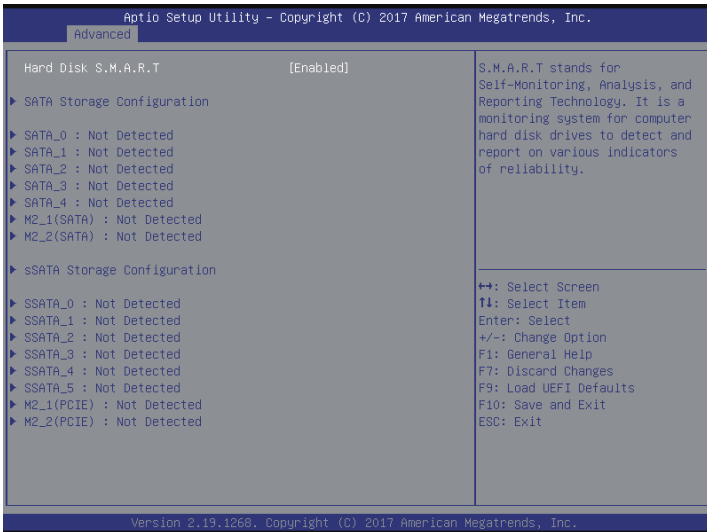
Hard Disk S.M.A.R.T.

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

SATA Controller

Use this item to enable or disable SATA Controllers.

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.

SSATA Storage Configuration

SSATA Controller

Use this item to enable or disable SATA Controllers.

SSATA Mode Selection

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

SSATA Aggressive Link Power Management

Use this item to enable or disable SALP.

3.3.5 NVME Configuration

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced

    NVMe controller and Drive information

    Bus:4 Dev:0 Func:0                    SAMSUNG MZVPV256HDGL-...
    Nvme Size                             256.0GB




                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Option
                                                        F1: General Help
                                                        F7: Discard Changes
                                                        F9: Load UEFI Defaults
                                                        F10: Save and Exit
                                                        ESC: Exit



                Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
```
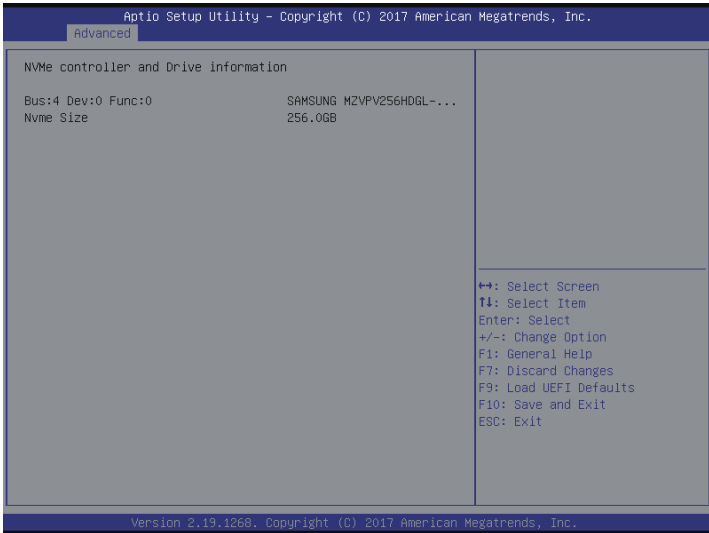
The NVMe Configuration displays the NVMe controller and Drive information.

3.3.6 ACPI Configuration

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Advanced

  Suspend to RAM                      [Auto]                    It is recommended to select
  High Precision Timer                [Enabled]                 auto for ACPI S3 power saving.

  PCIE Devices Power On               [Disabled]
  Ring-In Power On                    [Disabled]
  RTC Alarm Power On                  [By OS]
  USB Keyboard/Remote Power On        [Disabled]
  USB Mouse Power On                  [Disabled]



                                                                →←: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Option
                                                                F1: General Help
                                                                F7: Discard Changes
                                                                F9: Load UEFI Defaults
                                                                F10: Save and Exit
                                                                ESC: Exit



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```

Suspend to RAM

Select disable for ACPI suspend type S1. It is recommended to select auto for ACPI S3 power saving.

High Precision Timer

Use this item to enable or disable the High Precision Event Timer.

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.

USB Keyboard/Remote Power On

Allow the system to be waked up by an USB keyboard or remote controller.

USB Mouse Power On

Allow the system to be waked up by an USB mouse.

3.3.7 USB Configuration

```
         Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Advanced

 Legacy USB Support              [Enabled]          Enable or disable Legacy OS
                                                    Support for USB 2.0 devices.
                                                    If you encounter USB
                                                    compatibility issues it is
                                                    recommended to disable legacy
                                                    USB support. Select UEFI Setup
                                                    Only to support USB devices
                                                    under the UEFI setup and
                                                    Windows/Linux operating
                                                    systems only.


                                                    ↔: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Option
                                                    F1: General Help
                                                    F7: Discard Changes
                                                    F9: Load UEFI Defaults
                                                    F10: Save and Exit
                                                    ESC: Exit



         Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
```

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

```
                  Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
     Advanced

     AST2500 Super IO Configuration                          Set Parameters of COM1

     Super IO Chip                    AST2500
   ▶ Serial Port 1 Configuration
   ▶ SOL Configuration




                                                            ↔: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Option
                                                            F1: General Help
                                                            F7: Discard Changes
                                                            F9: Load UEFI Defaults
                                                            F10: Save and Exit
                                                            ESC: Exit

                  Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
```

Serial Port 1 Configuration

Use this item to set parameters of Serial Port 1 (COM1).

Serial Port

Use this item to enable or disable the serial port.

Change Settings

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

SOL Configuration

Use this item to set SOL configuration.

SOL Port

Use this item to enable or disable the SOL port.

Change Settings

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

3.3.9 Serial Port Console Redirection
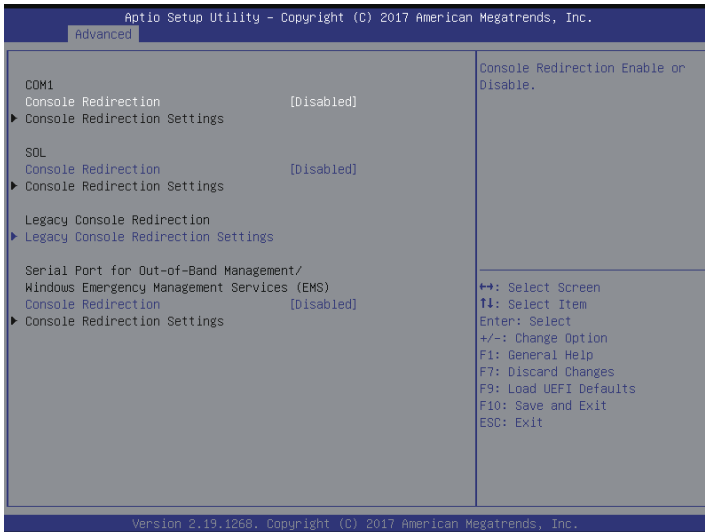
```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
          Advanced

          COM1                                              Console Redirection Enable or
          Console Redirection             [Disabled]        Disable.
        ▶ Console Redirection Settings

          SOL
          Console Redirection             [Disabled]
        ▶ Console Redirection Settings

          Legacy Console Redirection
        ▶ Legacy Console Redirection Settings

          Serial Port for Out-of-Band Management/
          Windows Emergency Management Services (EMS)       ↔: Select Screen
          Console Redirection             [Disabled]        ↑↓: Select Item
        ▶ Console Redirection Settings                      Enter: Select
                                                            +/-: Change Option
                                                            F1: General Help
                                                            F7: Discard Changes
                                                            F9: Load UEFI Defaults
                                                            F10: Save and Exit
                                                            ESC: Exit

                  Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
```

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. Both computers should hhave the same or compatible settings.

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

English

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 [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
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
Microsof t 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

3.3.10 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.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
          Advanced

   3VSB                          : +3.36 V        ▲ Watch Dog Timer
   5VSB                          : +4.98 V
   CPU1                          : +1.76 V
   VCCM ABC                      : +1.21 V
   VCCM DEF                      : +1.21 V
   CORE_PCH                      : +1.00 V
   1.05_PCH                      : +1.04 V
   1.80_PCH                      : +1.81 V
   BAT                           : +3.02 V
   3V                            : +3.34 V
   5V                            : +5.07 V
   12V                           : +12.1 V
   MB Temp                       : N/A
   Card side Temp                : N/A             ↔: Select Screen
   TR1 Temp                      : N/A             ↑↓: Select Item
   CPU1 Temp                     : 49.0 °C         Enter: Select
   PCH Temp                      : N/A             +/-: Change Option
   DDR4_A Temp                   : N/A             F1: General Help
   DDR4_B Temp                   : N/A             F7: Discard Changes
   DDR4_C Temp                   : N/A             F9: Load UEFI Defaults
   DDR4_D Temp                   : 41.0 °C         F10: Save and Exit
   DDR4_E Temp                   : N/A             ESC: Exit
   DDR4_F Temp                   : N/A
   CPU1_FAN1_1                   : 4900 RPM
   FRNT_FAN1_1                   : N/A            ▼

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```

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].

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.

Watch Dog Timer

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

3.3.11 Runtime Error Logging

```
                  Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
            Advanced

 WHEA Support                          [Enabled]              Enable or disable Windows
                                                             Hardware Error Architecture.
 System Error                          [Enabled]
 S/W Error Injection Support           [Disabled]
 Memory Error                          [Enabled]
  Correctable Error Threshold          ff

 PCIE Corrected Error Enable           [Enabled]
  PCIE Corrected Error Threshold       1
 PCIE  Uncorrected Error Enable        [Enabled]
 PCIE  Fatal Error Enable              [Enabled]

                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Option
                                                             F1: General Help
                                                             F7: Discard Changes
                                                             F9: Load UEFI Defaults
                                                             F10: Save and Exit
                                                             ESC: Exit

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```

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

Memory enabling and logging setup option.

Correctable Error Threshold

Correctable Error Threshold (0 - 0x7FFF) used for sparing, tagging, and leaky bucket.

PCIE Corrected Error Enable

Use this item to enable or disable PCIe Correctable errors.

PCIE Corrected Error Threshold

PCIE Correctable Error Threshold (0x01-0xFF) used for sparing, tagging, and leaky bucket.

PCIE Uncorrected Error Enable

Use this item to enable or disable PCIe Uncorrectable errors.

PCIE Fatal Error Enable

Use this item to enable or disable PCIe Ftal errors.

3.3.12 Intel ME Configuration

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
         Advanced

     ME Version                    11.20.0.1302
     ME FW State                   Operational



                                                      ↔: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Option
                                                      F1: General Help
                                                      F7: Discard Changes
                                                      F9: Load UEFI Defaults
                                                      F10: Save and Exit
                                                      ESC: Exit



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```
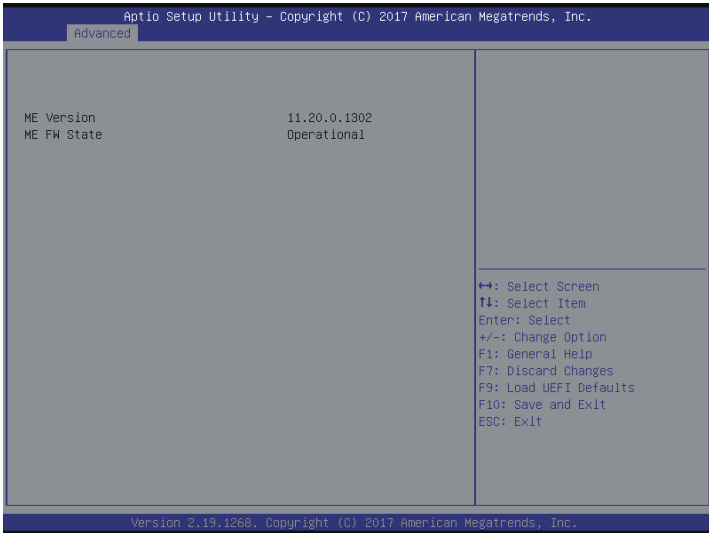
ME Subsystem screen displays the Intel ME Subsystem Configuration information, such as Operational Firmware Version and Firmware State.

3.3.13 Intel® VMD technology

```
            Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
      Advanced

   Intel® VMD technology
   -------------------------------------------------

 ▶ Intel® VMD for Volume Management Device on Socket 1

                                                      ↔: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Option
                                                      F1: General Help
                                                      F7: Discard Changes
                                                      F9: Load UEFI Defaults
                                                      F10: Save and Exit
                                                      ESC: Exit

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```
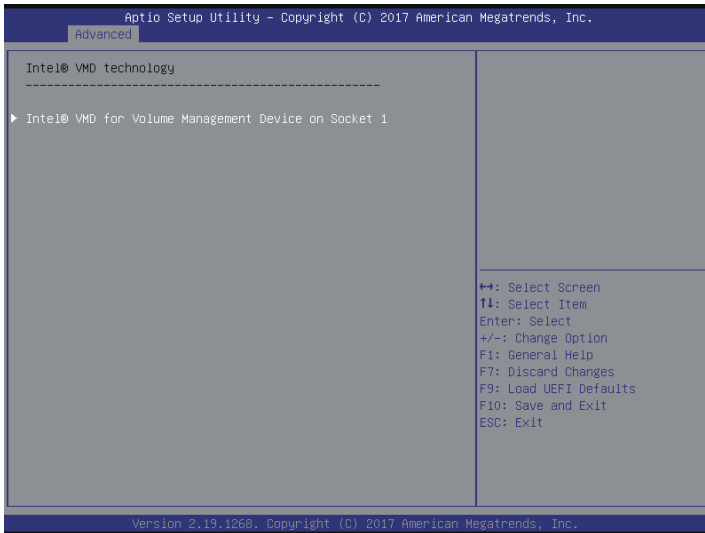
Press <Enter> to bring up the Intel(R) VMD for Volume Management Device Configuration menu.

Intel(R) VMD for Volume Management Device on Socket 1

Intel(R) VMD for Volume Management Device Technology

Use this item to enable or disable Intel(R) Volume Management Device Technology in this Stack.
When [Enabled], users are allowed to configure the options below.

VMD port 1A

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

VMD port 1C

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

VMD port 1D

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

Hot Plug Capable

Enable/Disable Hot Plug for PCIe Root Ports 1A-1D.

Intel(R) VMD for Volume Management Device Technology

Use this item to enable or disable Intel(R) Volume Management Device Technology in this Stack.
When [Enabled], users are allowed to configure the options below.

VMD port 2A

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

VMD port 2B

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

VMD port 2C

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

VMD port 2D

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

Hot Plug Capable

Enable/Disable Hot Plug for PCIe Root Ports 2A-2D.

Intel(R) VMD for Volume Management Device Technology

Use this item to enable or disable Intel(R) Volume Management Device Technology in this Stack.
When [Enabled], users are allowed to configure the options below.

VMD port 3A

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

VMD port 3B

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

VMD port 3C

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

VMD port 3D

Use this item to enable or disable Intel(R) Volume Management Device Technology on specific root port.

Hot Plug Capable

Use this item to enable or disable Hot Plug for PCIe Root Ports 3A-3D.

3.3.14 Intel® Virtual RAID on CPU

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Advanced

   Intel(R) VROC with VMD Technology 5.2.0.1029            Select to see more information
   Upgrade key: VROC in pass-thru mode                     about the Intel VMD Controllers

   No RAID volumes on the system

   Intel VROC Managed Controllers:
 ▶ All Intel VMD Controllers

                                                           ←→: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Option
                                                           F1: General Help
                                                           F7: Discard Changes
                                                           F9: Load UEFI Defaults
                                                           F10: Save and Exit
                                                           ESC: Exit

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```

Intel VROC Managed Volumes (Available after the RAID has been created.)

Select to see more information about the RAID Volume.

All Intel VMD Controllers

Select to see more information about the Intel VMD Controllers.

```
                 Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced

   All Intel VMD Controllers                              This page allows you to create
                                                          a RAID volume
 ▶ Create RAID Volume


   Non-RAID Physical Disks:
 ▶ Slot 89, B/D/F: 1/0/0, CPU0, VMD0 Port 0x3, INTEL SSDPE2...
 ▶ Slot 90, B/D/F: 2/0/0, CPU0, VMD0 Port 0x3, INTEL SSDPE2...




                                                          ↔: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Option
                                                          F1: General Help
                                                          F7: Discard Changes
                                                          F9: Load UEFI Defaults
                                                          F10: Save and Exit
                                                          ESC: Exit


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```

Create RAID Volume

This page allows you to create a RAID volume.

Non-RAID Physical Disks (Available when no RAID is created.)

Select to see more information about the disk.

RAID Volumes (Available after the RAID has been created.)

Select to see more information about the RAID Volume.

Volume Actions

Delete

Select to delete the created RAID.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
         Advanced

    Create RAID Volume                                          Enter a unique volume name
                                                                that has no special characters
    Name:                             Volume0                   and is 16 characters or less.
    RAID Level:                       [RAID0(Stripe)]
    Enable RAID spanned over VMD Contr  [ ]

    Select Disks:
    Slot 89, B/D/F: 1/0/0, CPU0, VMD0    [ ]
    Slot 90, B/D/F: 2/0/0, CPU0, VMD0    [ ]

    Strip Size:                       [128KB]
    Capacity (MB):                    0
                                                                →←: Select Screen
  ▶ Create Volume                                               ↑↓: Select Item
                                                                Enter: Select
    Select at least two disks                                   +/-: Change Option
                                                                F1: General Help
                                                                F7: Discard Changes
                                                                F9: Load UEFI Defaults
                                                                F10: Save and Exit
                                                                ESC: Exit


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```

Name

Enter an unique volume name that has no special characters and is 16 charaters or less.

RAID Level

Select RAID Level.

Enable RAID spanned over VMD Controllers

Select [X] to enable RAID spanned over VMD Controllers.

Select Disks

Select [X] to select disks.

Strip Size

Select strip size.

Capacity (MB)

Determine the capacity in MB.

Create Volume

Select to start creating RAID immediately. (Available after selecting at least two disks.)

3.3.15 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 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.
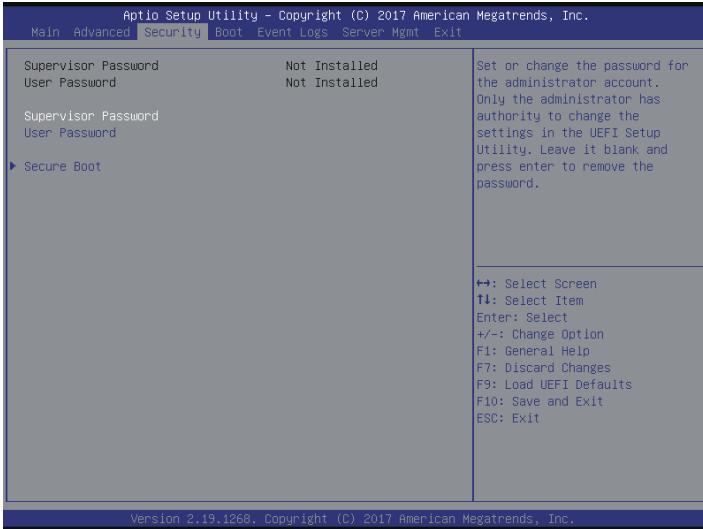
Supervisor Password

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].

Secure Boot Mode

Enable to support Windows 8 or later versions Secure Boot.

3.4.1 Key Management

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

```
Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Security

  Provision Factory Defaults          [Disabled]            Allow to provision factory
                                                            default Secure Boot keys when
▶ Install default Secure Boot keys                          System is in Setup Mode
▶ Enroll Efi Image
▶ Save all Secure Boot variables

  Secure Boot variable |  Size| Keys#| Key Source
▶ Platform Key(PK)     |     0|     0| No Key
▶ Key Exchange Keys    |     0|     0| No Key
▶ Authorized Signatures|     0|     0| No Key
▶ Forbidden  Signatures|     0|     0| No Key
▶ Authorized TimeStamps|     0|     0| No Key
▶ OsRecovery Signatures|     0|     0| No Key
                                                            ↔: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Option
                                                            F1: General Help
                                                            F7: Discard Changes
                                                            F9: Load UEFI Defaults
                                                            F10: Save and Exit
                                                            ESC: Exit


         Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
```

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:

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

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:

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 TimeStamps

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

OsRecovery 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

English

3.5 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.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
            Main  Advanced  Security  Boot  Event Logs  Server Mgmt  Exit

            Boot Option Priorities                                         Sets the system boot order
            Boot Option #1                          [UEFI: Built-in EFI ...]

            Boot option filter                      [UEFI and Legacy]


            Boot From Onboard LAN                    [Disabled]

            Setup Prompt Timeout                     1
            Bootup Num-Lock                          [On]
            Boot Beep                                [Disabled]
            Full Screen Logo                         [Enabled]
              AddOn ROM Display                      [Enabled]
                                                                          ←→: Select Screen
          ▶ CSM(Compatibility Support Module)                             ↑↓: Select Item
                                                                          Enter: Select
                                                                          +/-: Change Option
                                                                          F1: General Help
                                                                          F7: Discard Changes
                                                                          F9: Load UEFI Defaults
                                                                          F10: Save and Exit
                                                                          ESC: Exit




                    Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
```

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.

Boot Beep

Select whether the Boot Beep should be turned on or off when the system boots up. Please note that a buzzer is needed.

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].

English

3.5.1 CSM Parameters

```
           Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                              Boot

    CSM                                [Custom]              Enable to launch the
    Launch Other Network OpROM Policy  [Legacy only]         Compatibility Support Module.
    Launch Other Storage OpROM Policy  [Legacy only]         If you are using Windows 8 or
    Launch Video OpROM Policy          [Legacy only]         later versions 64-bit UEFI and
                                                             all of your devices support
    PCIE1 Slot OpROM                   [Auto]                UEFI, you may also disable CSM
    PCIE2 Slot OpROM                   [Auto]                for faster boot speed.
    PCIE3/PCIE4 Slot OpROM             [Auto]
    PCIE5/PCIE6 Slot OpROM             [Auto]
    PCIE M.2_1  Slot OpROM             [Auto]
    PCIE M.2_2  Slot OpROM             [Auto]
                                                             ↔: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Option
                                                             F1: General Help
                                                             F7: Discard Changes
                                                             F9: Load UEFI Defaults
                                                             F10: Save and Exit
                                                             ESC: Exit



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```

CSM

Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test. If you are using Windows 10 64-bit 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.

Launch Other Network 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 Other 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 Slot OpROM

This option controls Legacy/UEFI ROMs priority.

PCIE2 Slot OpROM

This option controls Legacy/UEFI ROMs priority.

PCIE3/PCIE4 Slot OpROM

This option controls Legacy/UEFI ROMs priority.

PCIE5/PCIE6 Slot OpROM

This option controls Legacy/UEFI ROMs priority.

PCIE M.2_1 Slot OpROM

This option controls Legacy/UEFI ROMs priority.

PCIE M.2_2 Slot OpROM

This option controls Legacy/UEFI ROMs priority.

3.6 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.*

3.7 Server Mgmt

```
                    Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
            Main  Advanced  Security  Boot  Event Logs  Server Mgmt  Exit

        BMC Self Test Status                   PASSED                    Wait For BMC response for
        Wait For BMC                           [Enabled]                 specified time out. In
      ▶ System Event Log                                                 PILOTII, BMC starts at the
      ▶ BMC Network Configuration                                        same time when BIOS starts
                                                                         during AC power ON. It takes
                                                                         around 30 seconds to
                                                                         initialize Host to BMC
                                                                         interfaces.



                                                                         ↔: Select Screen
                                                                         ↑↓: Select Item
                                                                         Enter: Select
                                                                         +/-: Change Option
                                                                         F1: General Help
                                                                         F7: Discard Changes
                                                                         F9: Load UEFI Defaults
                                                                         F10: Save and Exit
                                                                         ESC: Exit




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```

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.

3.7.1 System Event Log

```
             Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                                    Server Mgmt

   Enabling/Disabling Options                          Change this to enable or
   SEL Components                   [Enabled]          disable all features of System
                                                       Event Logging during boot.
   Erasing Settings
   Erase SEL                        [No]
   When SEL is Full                 [Do Nothing]

   Custom EFI Logging Options
   Log EFI Status Codes             [Error code]

   NOTE: All values changed here do not take effect
         until computer is restarted.
                                                       ↔: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/−: Change Option
                                                       F1: General Help
                                                       F7: Discard Changes
                                                       F9: Load UEFI Defaults
                                                       F10: Save and Exit
                                                       ESC: Exit




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```

SEL Components

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

Erase SEL

Use this to choose options for earsing 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.

English

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3.7.2 BMC Network Configuration

```
                  Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                                          Server Mgmt

   BMC Network Configuration                                    When "Manual Setting IPMI LAN
                                                                Configuration" is set to
   Lan channel (Failover)                                       default "No", the IP address
   Manual setting IPMI LAN               [No]                   will follow DHCP.
   Configuration address source          [DHCP]
   Station IP address                    0.0.0.0                If you would like to set it as
   Current subnet mask                   0.0.0.0                Static IP, please toggle the
   Current MAC address                   d0-50-99-e1-77-45      settings to "Yes", and the
   Current router IP address             0.0.0.0                changes for IPMI LAN
                                                                configuration will take place
                                                                after rebooting.


                                                                ↔: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Option
                                                                F1: General Help
                                                                F7: Discard Changes
                                                                F9: Load UEFI Defaults
                                                                F10: Save and Exit
                                                                ESC: Exit



                   Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
```
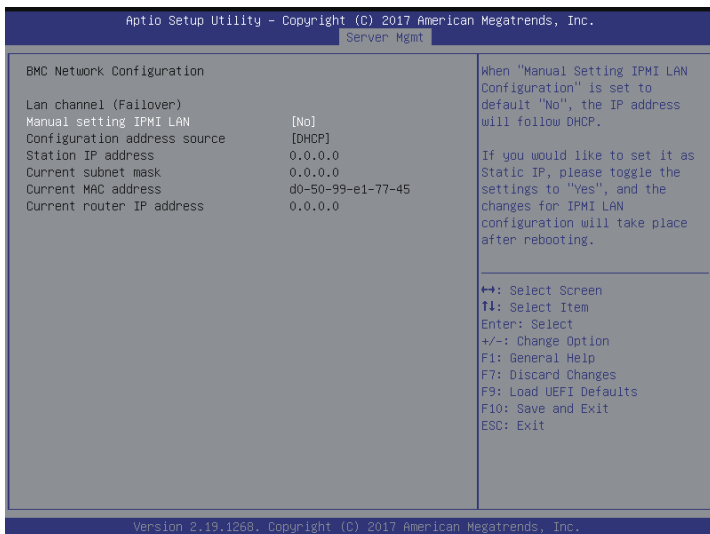
Lan Channel (Failover)

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

3.8 Exit Screen

```
            Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
     Main  Advanced  Security  Boot  Event Logs  Server Mgmt  Exit

    Save Changes and Exit                         Exit system setup after saving
    Discard Changes and Exit                      the changes.
    Discard Changes
    Load UEFI Defaults                            F10 key can be used for this
                                                  operation.
    Boot Override

    UEFI: Built-in EFI Shell




                                                  ↔: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Option
                                                  F1: General Help
                                                  F7: Discard Changes
                                                  F9: Load UEFI Defaults
                                                  F10: Save and Exit
                                                  ESC: Exit



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```

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® 10 / Server 2012 R2 / 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.

English

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 DDR3 1600/1333/1066 non ECC, unbuffered 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 adaquate and stable power.

Other problems...

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

English

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/

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.