OPEN
Industry Standard, Flexible Architecture

GREEN
Less Heat, Less Power Consumption

STABLE
Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

WC422D8A-2T
WC422D8A-2T/U

User Manual

English

Version 1.0
Published November 2019

Copyright Notice:

Disclaimer:

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

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

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

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.
"Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate"

ASRock Rack's Website: www.ASRockRack.com

Contact Information

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

ASRock Rack Incorporation

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

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

Contents

Chapter 1 Introduction

Thank you for purchasing ASRock Rack ***WC422D8A-2T / WC422D8A-2T/U*** 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 WC422D8A-2T / WC422D8A-2T/U Motherboard (ATX Form Factor: 12.0-in x 9.6-in, 30.5 cm x 24.4 cm)
- Support CD
- Quick Installation Guide
- 1 x I/O Shield
- 1 x SATA3 Cable (60cm)
- 2 x Screws for M.2 Sockets

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

English

1.2 Specifications

WC422D8A-2T / WC422D8A-2T/U	
MB Physical Status	
Form Factor	ATX
Dimension	12.0-in x 9.6-in (30.5 cm x 24.4 cm)
Processor System	
CPU	Intel® Skylake-W Processors
Socket	Single Socket R4(LGA 2066)
Chipset	Intel® C422
System Memory	
Capacity	- 8 x 288-pin DDR4 DIMM slots - Support up to 256GB RDIMM (32GB w/ 8Gb DRAM) - Support up to 512GB LRDIMM (64GB w/ 8Gb DRAM)
Type	- Quad Channel DDR4 memory technology - Supports DDR4 RDIMM, and LRDIMM
DIMM Size Per DIMM	- Four Channel DDR4 memory technology - R DIMM: 4GB, 8GB, 16GB, 32GB - LR DIMM: 4GB, 8GB, 16GB, 32GB, 64GB
DIMM Frequency	- R DIMM: 2666/2400/2133/1866/1600MHz - LR DIMM: 2666/2400/2133/1866/1600MHz
Voltage	1.2V
Expansion Slot	
PCIe 3.0 x16	Slot4: Gen3 x16 link, auto switch to x8 link if Slot3 is occupied. Slot6: Gen3 x16 link, auto switch to x8 link if Slot5 is occupied.
PCIe 3.0 x8	**WC422D8A-2T/U:** Slot3: Gen3 x8 link Slot5: Gen3 x8 link **WC422D8A-2T:** Slot1: Gen3 x8 link Slot3: Gen3 x8 link Slot5: Gen3 x8 link
M.2	2 (2230/2242/2260/2280/22110, support PCIE(x4)/SATA 3)
Storage	
SATA Controller	8 x SATA3 6Gb/s (SATA 0-6 SATA Conn, SATA7 by SATA DOM/M.2), support RAID 0, 1, 5, 10
additional SATA controller	88SE9172: 2x SATA3 6Gb/s (mSATA0-1 by SATA conn)
OCuLink for U.2	**WC422D8A-2T/U:** 4 Oculink (from CPU) **WC422D8A-2T:** 2 Oculink (from CPU)
Ethernet	
Interface	10000M/ 1000M/ 100Mbps

LAN	- 2 x RJ45 GLAN by Intel® X550 - Supports Wake-On-LAN - Supports Energy Efficient Ethernet 802.3az - Supports Dual LAN with Teaming function - Supports PXE - LAN1 Supports NCSI
Management	
BMC Controller	ASPEED AST2500 : IPMI (Intelligent Platform Management Interface) 2.0 with Ikvm and vMedia support
IPMI Dedicated GLAN	1 x Realtek RTL8211E for dedicated management GLAN
Features	NMI
Graphics	
Controller	ASPEED AST2500
VRAM	DDR4 4GB
Audio	
Audio Codec	Realtek ALC892
Rear Panel I/O	
PS/2 KB/mouse	1
VGA Port	1 x D-Sub
USB 3.0 Port	4
USB 3.1 Port	2 (1 type A, 1 type C)
LAN Port	- 2 x RJ45 Gigabit Ethernet LAN ports - 1 x RJ45 Dedicated IPMI LAN port - LAN Ports with LED (ACT/LINK LED and SPEED LED)
Audio	1(5+1 jack)
Internal Connector	
Auxiliary Panel Header	1 (includes chassis intrusion, location button & LED, and front LAN LED)
VGA Header	1
COM Header	1
SATA DOM	1
TR1	1
TPM Header	1
IPMB Header	1
PMBus Header	1
BMC SMBus Header	1
Fan Header	6 x 6-pin Fans (1CPU/5 system)
ATX power	1x (24-pin) + 1x (8-pin)
Type A USB 3.0 Port	1
USB 3.0 Header	1 (supports 2 USB3.0 ports)
USB 2.0 Header	1 (supports 2 USB2.0 ports)

ClearCMOS	1 (header)
NMI Button	1
SGPIO	2
Front Panel	1
Buzzer	1
NVME support	**WC422D8A-2T/U:** 4 Oculink (from CPU) **WC422D8A-2T:** 2 Oculink (from CPU)
80 Debug Port LED	1
Speaker	1
VROC	1
PWR_SMB	1
OH/FanFail LED	1 (Fan Fail LED only)
System BIOS	
BIOS Type	128Mb AMI UEFI Legal BIOS
BIOS Features	- Plug and Play (PnP) - ACPI 2.0 Compliance Wake Up Events - SMBIOS 2.8.0 Support - ASRock Rack Instant Flash
Hardware Monitor	
Temperature	-CPU Temperature Sensing -System Temperature Sensing -Card side Temperature Sensing -System TR Temperature Sensing
Fan	- CPU/Front Fan Tachometer - CPU Quiet Fan (Allow CPU Fan Speed Auto-Adjust by CPU Temperature) - CPU/Front Fan Multi-Speed Control
Voltage	Voltage Monitoring: Vcore, VCCSA, VCCIO, VCCMAB, VCCMCD, 3v, 5v, 12v, 1.05V_PCH, 1.05V_PCH_PHY, +BAT, 3VSB, 5VSB, 5V_Dual, 5V_Dual2
Support OS	
OS	Microsoft® Windows® - Windows 10 (64 bit) Linux® - RedHat Enterprise Linux Server 6.9 (64 bit) / 7.3 (64 bit) / 7.6 (64 bit) - SUSE Enterprise Linux Server 11 SP4 (64 bit) / 12 SP2 (64 bit) / 12 SP4 (64 bit) - Ubuntu 16.04 (64 bit) / 16.10 (64 bit)

	Virtual - VMWare® Workstation 12 - Citrix XenServer 7.5 - Win hyper-V Server 2016 ** Please refer to our website for the latest OS support list.* ** On Ubuntu 16.04 (64bit) system, Intel Raid mode only supports UEFI BOOT.*
Environment	
Temperature	Operation temperature: 10°C ~ 35°C / Non operation temperature: -40°C ~ 70°C
GPU Support	
Technology	- Supports NVIDIA® 4-Way SLI™ Technology - Supports AMD Quad-GPU CrossFireX™ Technology

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.

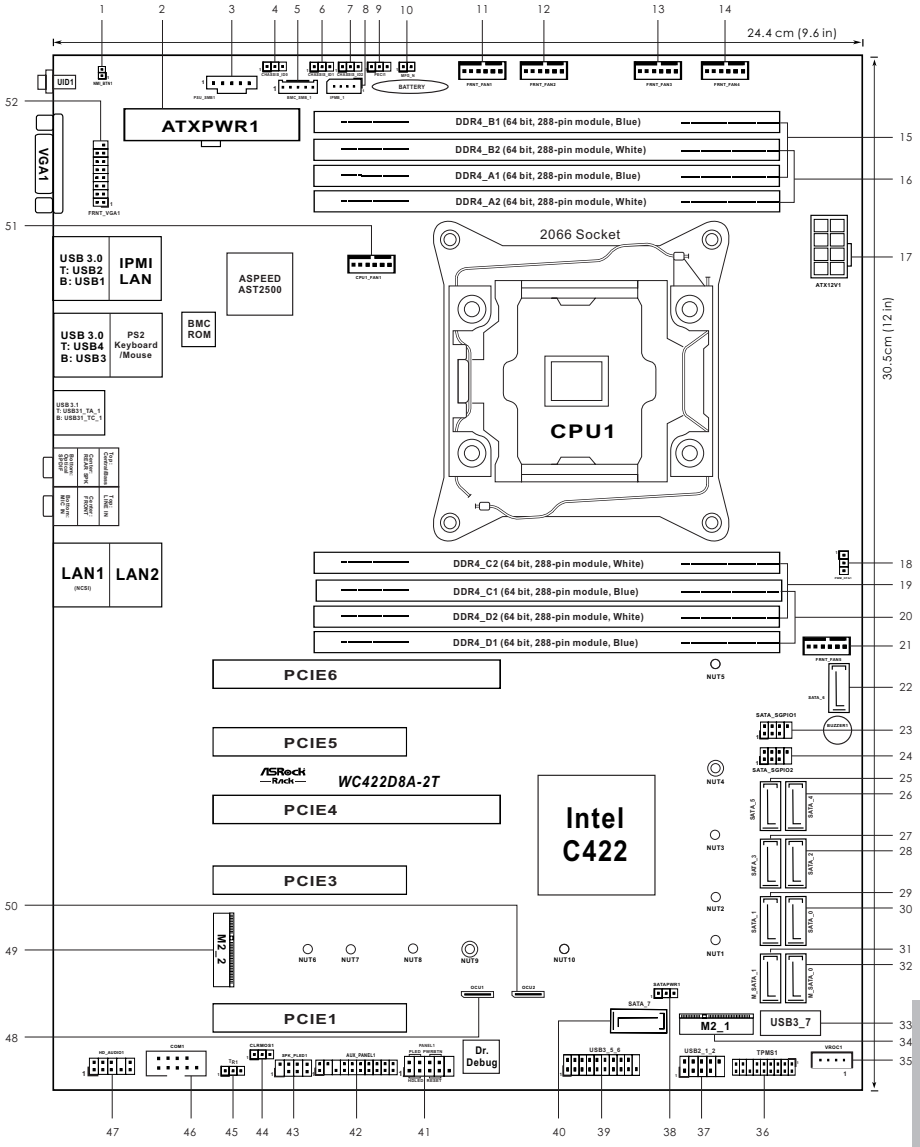
If you install Intel® LAN or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If you install the drivers only, it will pass the WHQL tests.

1.3 Unique Features

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

1.4 Motherboard Layout

WC422D8A-2T



No.	Description
1	Non Maskable Interrupt Button (NMI_BTN1)
2	ATX Power Connector (ATXPWR1)
3	PSU SMBus Header (PSU_SMB1)
4	Chassis ID0 Jumper (CHASSIS_ID0)
5	BMC SMBus Header (BMC_SMB_1)
6	Chassis ID1 Jumper (CHASSIS_ID1)
7	Chassis ID2 Jumper (CHASSIS_ID2)
8	Intelligent Platform Management Bus Header (IPMB_1)
9	CPU PECI Mode Jumper (PECI1)
10	Enable/Disable BMC Jumper (MFG_N)
11	Front Fan Connector (FRNT_FAN1)
12	Front Fan Connector (FRNT_FAN2)
13	Front Fan Connector (FRNT_FAN3)
14	Front Fan Connector (FRNT_FAN4)
15	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1, Blue)*
16	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2, White)*
17	ATX 12V Power Connector (ATX12V1)
18	PWM Configuration Header (PWM_CFG1)
19	2 x 288-pin DDR4 DIMM Slots (DDR4_C2, DDR4_D2, White)*
20	2 x 288-pin DDR4 DIMM Slots (DDR4_C1, DDR4_D1, Blue)*
21	Front Fan Connector (FRNT_FAN5)
22	SATA3 Connector (SATA_6)
23	SATA SGPIO Connector (SATA_SGPIO1)
24	SATA SGPIO Connector (SATA_SGPIO2)
25	SATA3 Connector (SATA_5)
26	SATA3 Connector (SATA_4)
27	SATA3 Connector (SATA_3)
28	SATA3 Connector (SATA_2)
29	SATA3 Connector (SATA_1)
30	SATA3 Connector (SATA_0)
31	SATA3 Connector (M_SATA_1)**
32	SATA3 Connector (M_SATA_0)**
33	Vertical Type A USB 3.0 (USB3_7)**

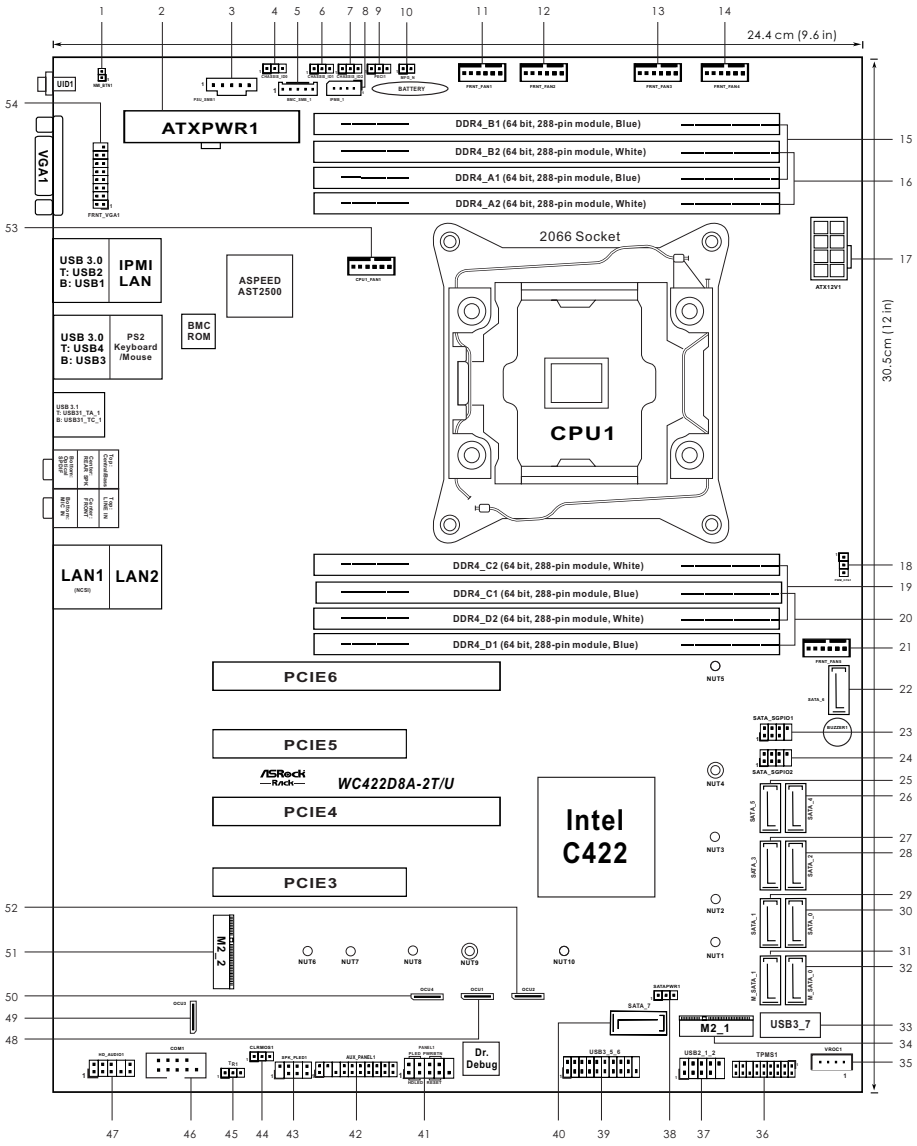
No.	Description
34	M.2 Socket (M2_1) (Type 2230/2242/2260/2280/22110)***
35	Virtual RAID On CPU Header (VROC1)
36	TPM Header (TPMS1)
37	USB 2.0 Header (USB2_1_2)
38	SATADOM Power Jumper (SATAPWR1)
39	USB 3.0 Header (USB3_5_6)
40	SATA3 DOM Connector (SATA_7)
41	System Panel Header (PANEL1)
42	Auxiliary Panel Header (AUX_PANEL1)
43	Power LED and Speaker Header (SPK_PLED1)
44	Clear CMOS Jumper (CLRMOS1)
45	Thermal Sensor Header (TR1)
46	COM Port Header (COM1)
47	Front Panel Audio Header (HD_AUDIO1)
48	OCULink x4 Connector (OCU1)
49	M.2 Socket (M2_2) (Type 2230/2242/2260/2280/22110)***
50	OCULink x4 Connector (OCU2)
51	CPU Fan Connector (CPU1_FAN1)
52	Front VGA Header (FRNT_VGA1)

**For DIMM installation and configuration instructions, please see p.24 (Installation of Memory Modules (DIMM)) for more details.*

***By default, USB3_7 supports a USB 2.0 device and both M_SATA_0 and M_SATA_1 are enabled. To enable USB3_7 to support a USB 3.0 device, please go to the BIOS Settings: BIOS Menu > Advanced > USB Configuration > USB3_7 Select. Please note that if USB3_7 supports a USB 3.0 device, M_SATA_0 and M_SATA_1 are disabled.*

**** If M2_1 is occupied by a SATA-type M.2 device, SATA_7 will be disabled.*

WC422D8A-2T/U



No.	Description
1	Non Maskable Interrupt Button (NMI_BTN1)
2	ATX Power Connector (ATXPWR1)
3	PSU SMBus Header (PSU_SMB1)
4	Chassis ID0 Jumper (CHASSIS_ID0)
5	BMC SMBus Header (BMC_SMB_1)
6	Chassis ID1 Jumper (CHASSIS_ID1)
7	Chassis ID2 Jumper (CHASSIS_ID2)
8	Intelligent Platform Management Bus Header (IPMB_1)
9	CPU PECI Mode Jumper (PECI1)
10	Enable/Disable BMC Jumper (MFG_N)
11	Front Fan Connector (FRNT_FAN1)
12	Front Fan Connector (FRNT_FAN2)
13	Front Fan Connector (FRNT_FAN3)
14	Front Fan Connector (FRNT_FAN4)
15	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1, Blue)*
16	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2, White)*
17	ATX 12V Power Connector (ATX12V1)
18	PWM Configuration Header (PWM_CFG1)
19	2 x 288-pin DDR4 DIMM Slots (DDR4_C2, DDR4_D2, White)*
20	2 x 288-pin DDR4 DIMM Slots (DDR4_C1, DDR4_D1, Blue)*
21	Front Fan Connector (FRNT_FAN5)
22	SATA3 Connector (SATA_6)
23	SATA SGPIO Connector (SATA_SGPIO1)
24	SATA SGPIO Connector (SATA_SGPIO2)
25	SATA3 Connector (SATA_5)
26	SATA3 Connector (SATA_4)
27	SATA3 Connector (SATA_3)
28	SATA3 Connector (SATA_2)
29	SATA3 Connector (SATA_1)
30	SATA3 Connector (SATA_0)
31	SATA3 Connector (M_SATA_1)**
32	SATA3 Connector (M_SATA_0)**
33	Vertical Type A USB 3.0 (USB3_7)**

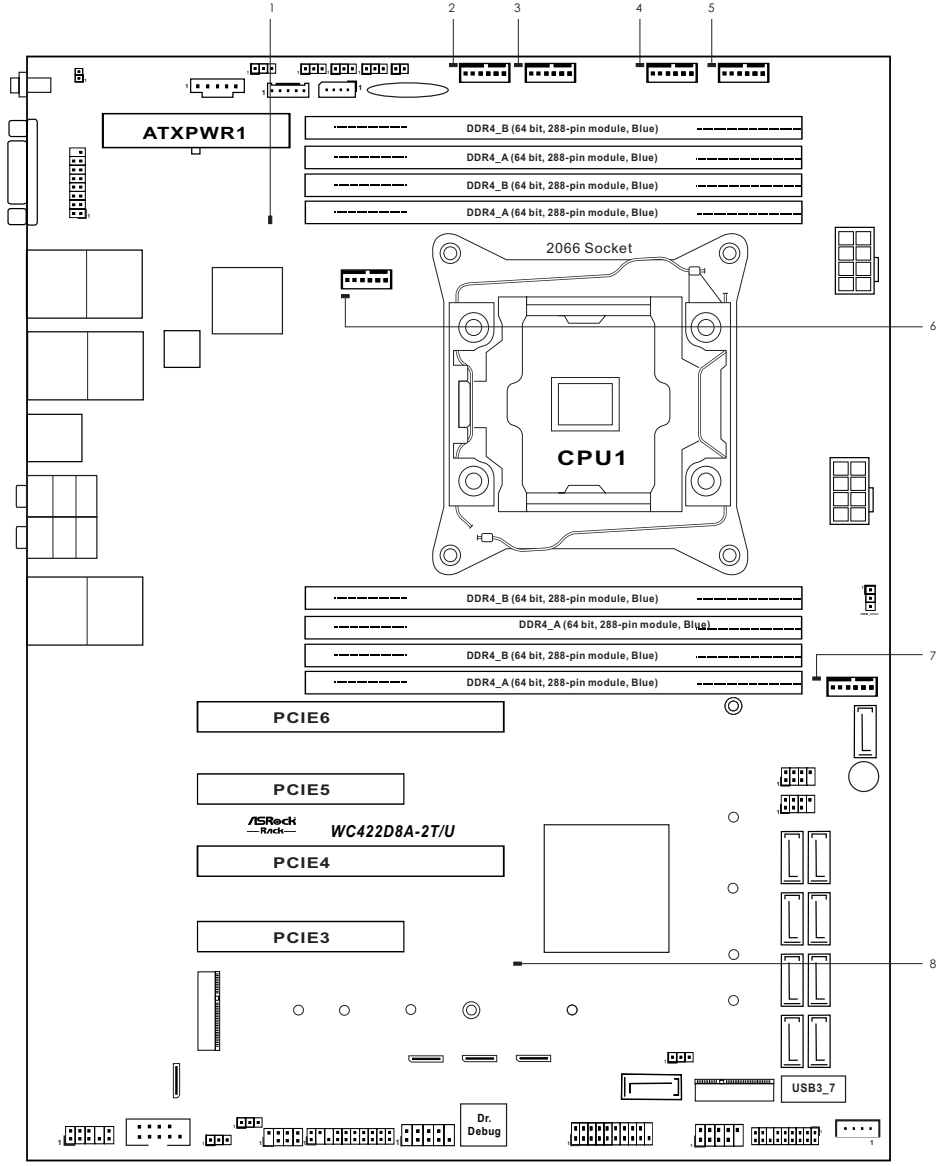
No.	Description
34	M.2 Socket (M2_1) (Type 2230/2242/2260/2280/22110)***
35	Virtual RAID On CPU Header (VROC1)
36	TPM Header (TPMS1)
37	USB 2.0 Header (USB2_1_2)
38	SATADOM Power Jumper (SATAPWR1)
39	USB 3.0 Header (USB3_5_6)
40	SATA3 DOM Connector (SATA_7)
41	System Panel Header (PANEL1)
42	Auxiliary Panel Header (AUX_PANEL1)
43	Power LED and Speaker Header (SPK_PLED1)
44	Clear CMOS Jumper (CLRMOS1)
45	Thermal Sensor Header (TR1)
46	COM Port Header (COM1)
47	Front Panel Audio Header (HD_AUDIO1)
48	OCULink x4 Connector (OCU1)
49	OCULink x4 Connector (OCU3)
50	OCULink x4 Connector (OCU4)
51	M.2 Socket (M2_2) (Type 2230/2242/2260/2280/22110)***
52	OCULink x4 Connector (OCU2)
53	CPU Fan Connector (CPU1_FAN1)
54	Front VGA Header (FRNT_VGA1)

**For DIMM installation and configuration instructions, please see p.24 (Installation of Memory Modules (DIMM)) for more details.*

***By default, USB3_7 supports a USB 2.0 device and both M_SATA_0 and M_SATA_1 are enabled. To enable USB3_7 to support a USB 3.0 device, please go to the BIOS Settings: BIOS Menu > Advanced > USB Configuration > USB3_7 Select. Please note that if USB3_7 supports a USB 3.0 device, M_SATA_0 and M_SATA_1 are disabled.*

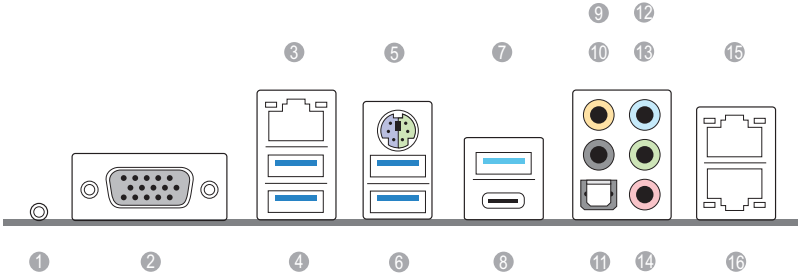
**** If M2_1 is occupied by a SATA-type M.2 device, SATA_7 will be disabled.*

1.5 Onboard LED Indicators



No.	Item	Status	Description
1	BMC_LED1	Green	BMC heartbeat LED
2	FFAN_LED1	Amber	FRNT_FAN1 failed*
3	FFAN_LED2	Amber	FRNT_FAN2 failed*
4	FFAN_LED3	Amber	FRNT_FAN3 failed*
5	FFAN_LED4	Amber	FRNT_FAN4 failed*
6	CPU_FAN_LED1	Amber	CPU1_FAN1 failed*
7	FFAN_LED5	Amber	FRNT_FAN5 failed*
8	SB_PWR1	Green	STB PWR ready

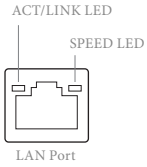
1.6 I/O Panel



No.	Description	No.	Description
1	UID Button (UID1)	9	Central / Bass (Orange)
2	VGA Port (VGA1)	10	Rear Speaker (Black)
3	LAN RJ-45 Port (IPMI_LAN)*	11	Optical SPDIF Out Port
4	USB 3.0 Ports (USB3_1_2)	12	Line In (Light Blue)
5	PS/2 Mouse/Keyboard Port	13	Front Speaker (Lime)***
6	USB 3.0 Ports (USB3_3_4)	14	Microphone (Pink)
7	USB 3.1 Type-A Port (USB31_TA_1)	15	10G LAN RJ-45 Port (LAN2)**
8	USB 3.1 Type-C Port (USB31_TC_1)	16	10G LAN RJ-45 Port (LAN1)**

LAN Port LED Indications

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

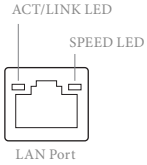


Dedicated IPMI LAN Port LED Indications

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

English

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



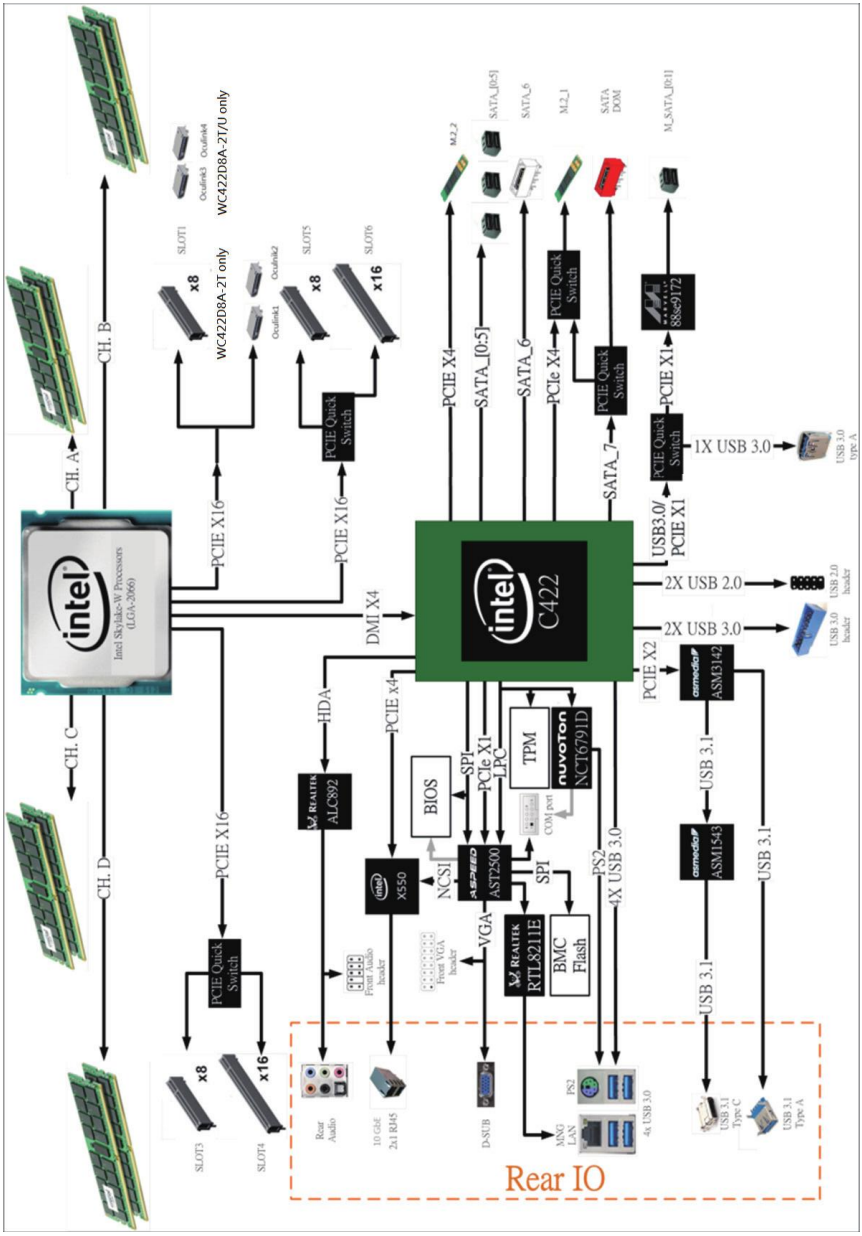
10G LAN Port (LAN1, LAN2) LED Indications

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

**** If you use a 2-channel speaker, please connect the speaker's plug into "Front Speaker Jack". See the table below for connection details in accordance with the type of speaker you use.*

Audio Output Channels	Front Speaker (No. 13)	Rear Speaker (No. 10)	Central / Bass (No. 9)	Line In (No. 12)
2	V	--	--	--
4	V	V	--	--
6	V	V	V	--
8	V	V	V	V

1.7 Block Diagram



Chapter 2 Installation

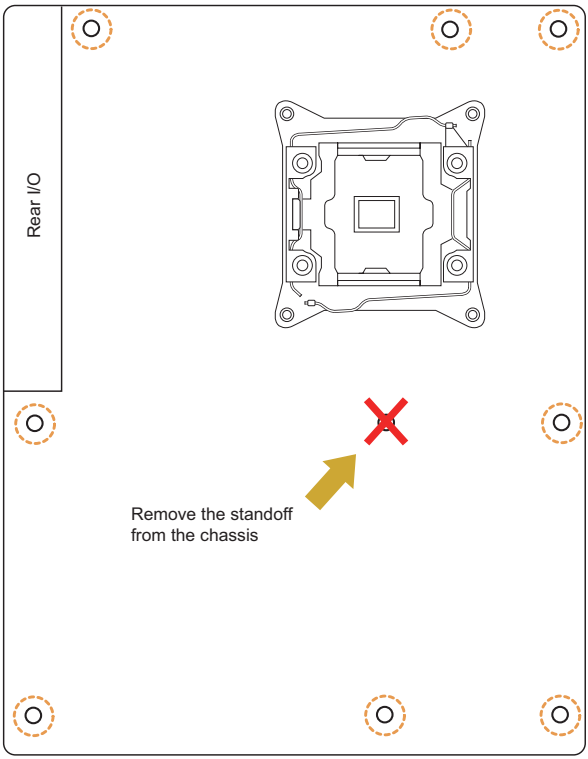
This is an ATX form factor (12" x 9.6", 30.5 cm x 24.4 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

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.

Attention! Before installing this motherboard, be sure to unscrew and remove the standoff at the marked location, under the motherboard, from the chassis, in order to avoid electrical short circuit and damage to your motherboard.



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

2.2 Pre-installation Precautions

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

1. Unplug the power cord from the wall socket before touching any components.
2. To avoid damaging the motherboard's components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle the components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever you uninstall any component, place it on a grounded anti-static pad or in the bag that comes with the component.
5. When placing screws into the screw holes to secure the motherboard to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard.

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

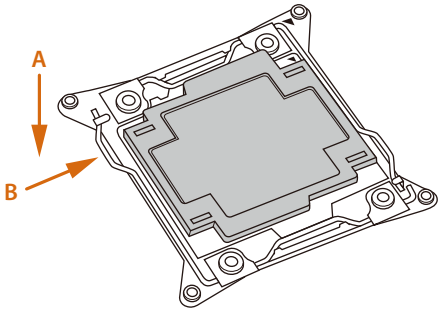
2.3 Installing the CPU

1. *Before you insert the* **2066***-Pin CPU into the socket, please check if the* ***PnP cap*** *is on the socket, if the CPU surface is unclean, or if there are any* ***bent pins*** *in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.*
2. *Unplug all power cables before installing the CPU.*

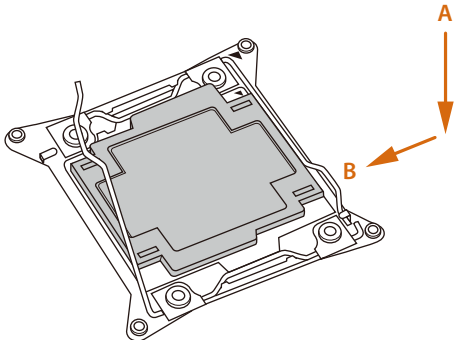
CAUTION:

Please note that C422 platform is only compatible with the **LGA 2066 socket**, which is incompatible with the LGA 2011-3 socket.

1

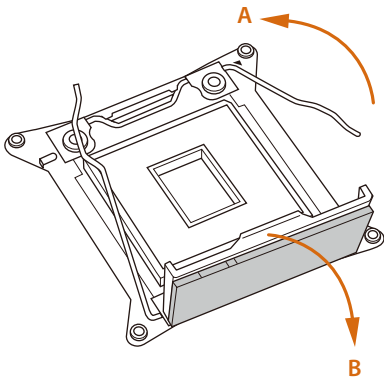


2

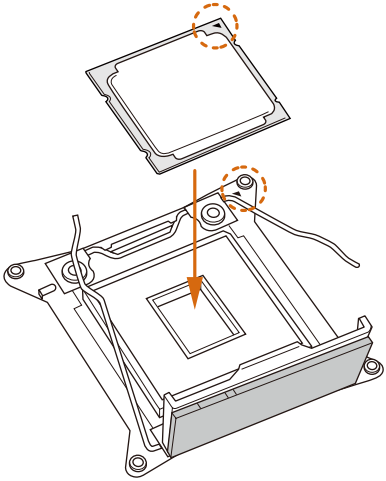


English

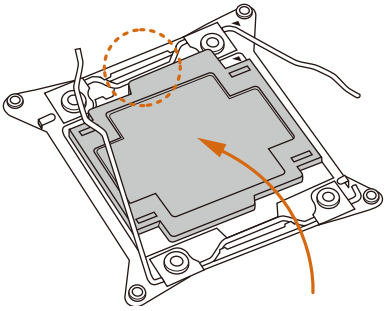
3



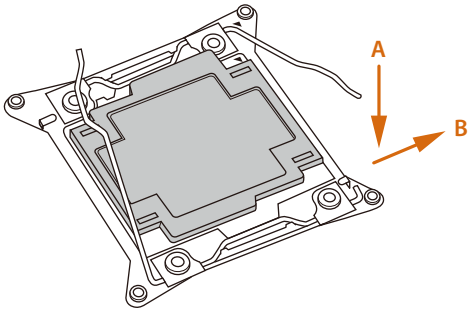
4



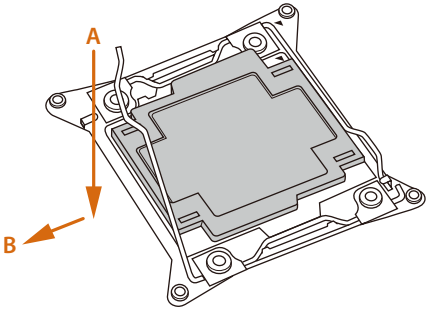
5



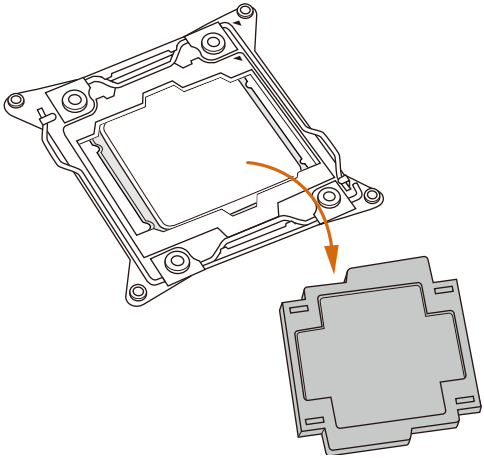
6



7

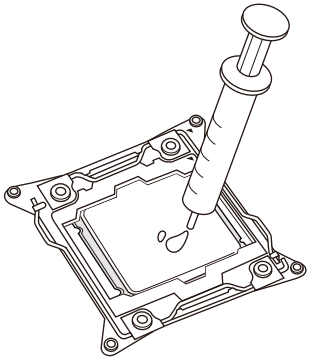


8

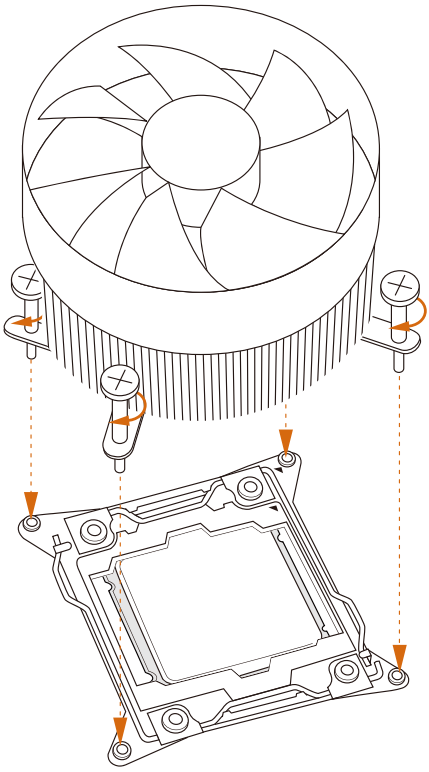


Please save and replace the cover if the processor is removed. The cover must be placed if you wish to return the motherboard for after service.

2.4 Installing the CPU Fan and Heatsink



1



2.5 Installation of Memory Modules (DIMM)

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

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 quad channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR4 DIMMs.*
3. *It is required to install four memory modules to activate Quad Channel Memory Technology.*

Quad Channel Memory Configuration

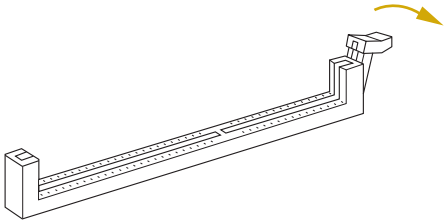
Priority	DDR4_A1 (Blue)	DDR4_A2 (White)	DDR4_B1 (Blue)	DDR4_B2 (White)
1	Populated		Populated	
2	Populated	Populated	Populated	Populated

Priority	DDR4_C1 (Blue)	DDR4_C2 (White)	DDR4_D1 (Blue)	DDR4_D2 (White)
1	Populated		Populated	
2	Populated	Populated	Populated	Populated

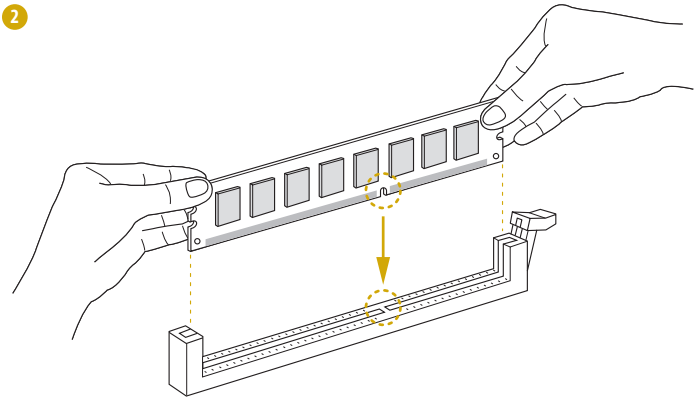
**Since installing three memory modules is NOT supported on this motherboard, we suggest not using this configuration.*

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

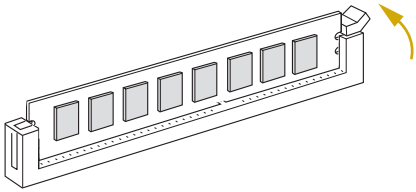
1



2



3



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

2.6 Expansion Slots (PCI Express Slots)

There are 5 PCI Express slots on this motherboard.

PCIE slot:

PCIE1 (PCIE 3.0 x8 slot) is used for PCI Express x8 lane width cards.*
PCIE3 (PCIE 3.0 x8 slot) is used for PCI Express x8 lane width cards.
PCIE4 (PCIE 3.0 x16 slot) is used for PCI Express x16 lane width cards.
PCIE5 (PCIE 3.0 x8 slot) is used for PCI Express x8 lane width cards.
PCIE6 (PCIE 3.0 x16 slot) is used for PCI Express x16 lane width cards.

**PCIE1 is supported for WC422D8A-2T only.*

Slot	Generation	Mechanical	Electrical	Source
PCIE6	3.0	x16	x16	CPU 1
PCIE5	3.0	x8	x8	CPU 1
PCIE4	3.0	x16	x16	CPU 1
PCIE3	3.0	x8	x8	CPU 1
PCIE1*	3.0	x8	x8	CPU 1

PCI Express Slot Configuration

	PCIE 5	PCIE 6
Single PCIE Card	x0	x16
Two PCIE Cards	x8	x8

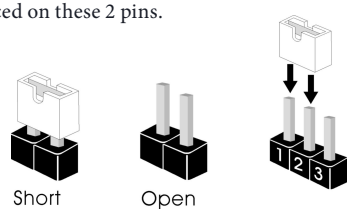
	PCIE 3	PCIE 4
Single PCIE Card	x0	x16
Two PCIE Cards	x8	x8

Installing an expansion card

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

2.7 Jumper Setup

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



Clear CMOS Jumper (CLRMOS1)	1_2  Default	2_3  Clear CMOS

CLRMOS1 allows you to clear the data in CMOS. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin2 and pin3 on CLRMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. Please be noted that the password, date, time, and user default profile will be cleared only if the CMOS battery is removed.

SATA DOM Power Jumper (3-pin SATAPWR1)	1_2  SATA DOM (SATA_7) requires 5V power supply	2_3  SATA DOM (SATA_7) 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) from pins 2-3 (default) to pins 1-2.
If the connected SATA DOM does NOT require 5V power supply, there is no need to change the default jumper setting of the SATA DOM Power Jumper (pins 2-3).
Warning! Incorrect setting of the SATA DOM Power Jumper (SATAPWR1) may cause damage to the motherboard or your SATA DOM.

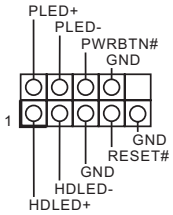
Chassis ID0 Jumper (3-pin CHASSIS_ID0) Chassis ID1 Jumper (3-pin CHASSIS_ID1) Chassis ID2 Jumper (3-pin CHASSIS_ID2)	   Board Level SKU (Default)	   Reserved for system level use
Chassis ID0 Jumper (3-pin CHASSIS_ID0) Chassis ID1 Jumper (3-pin CHASSIS_ID1) Chassis ID2 Jumper (3-pin CHASSIS_ID2)	   Reserved for system level use	   Reserved for system level use
Chassis ID0 Jumper (3-pin CHASSIS_ID0) Chassis ID1 Jumper (3-pin CHASSIS_ID1) Chassis ID2 Jumper (3-pin CHASSIS_ID2)	   Reserved for system level use	   Reserved for system level use
CPU PECI Mode Jumper (3-pin PECI1)	 CPU PECI connect to PCH	 CPU PECI connect to BMC (Default)

Enable/Disable BMC Jumper (2-pin MFG_N)	 Normal Mode (Default) BMC Enabled	 BMC Disabled

2.8 Onboard Headers and Connectors

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

System Panel Header
(9-pin PANEL1)



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

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

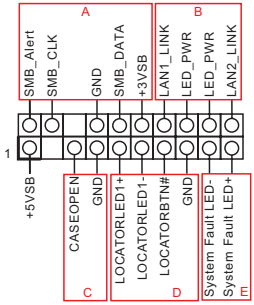
RESET (Reset Switch):
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

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

HDLED (Hard Drive Activity LED):
Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

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

Auxiliary Panel Header
(18-pin AUX_PANEL1)



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

A. Front panel SMBus connecting pin (6-1 pin FPSMB)
This header allows you to connect SMBus (System Management Bus) equipment. It can be used for communication between peripheral equipment in the system, which has slower transmission rates, and power management equipment.

B. Internet status indicator (2-pin LAN1_LED, LAN2_LED)
These two 2-pin headers allow you to use the Gigabit internet indicator cable to connect to the LAN status indicator. When this indicator flickers, it means that the internet is properly connected.

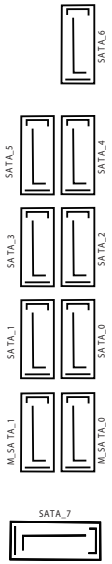
C. Chassis intrusion pin (2-pin CHASSIS)
This header is provided for host computer chassis with chassis intrusion detection designs. In addition, it must also work with external detection equipment, such as a chassis intrusion detection sensor or a microswitch. When this function is activated, if any chassis component movement occurs, the sensor will immediately detect it and send a signal to this header, and the system will then record this chassis intrusion event. The default setting is set to the CASEOPEN and GND pin; this function is off.

D. Locator LED (4-pin LOCATOR)
This header is for the locator switch and LED on the front panel.

E. System Fault LED (2-pin LOCATOR)
This header is for the Fault LED on the system.

Serial ATA3 Connectors
(SATA_0)
(SATA_1)
(SATA_2)
(SATA_3)
(SATA_4)
(SATA_5)
(SATA_6)
(SATA_7)

(M_SATA_0)
(M_SATA_1)

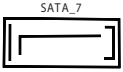


These ten SATA3 connectors support SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.

**By default, USB3_7 supports a USB 2.0 device and both M_SATA_0 and M_SATA_1 are enabled.*

**To enable USB3_7 to support a USB 3.0 device, please go to the BIOS Settings: BIOS Menu > Advanced > USB Configuration > USB3_7 Select. If USB3_7 supports a USB 3.0 device, M_SATA_0 and M_SATA_1 are disabled.*

Serial ATA3 DOM Connector
(SATA_7)



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

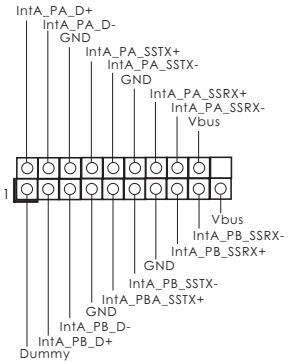
** If M2_1 is occupied by a SATA-type M.2 device, SATA_7 will be disabled.*

USB 3.0 Connector
(USB3_7)
(see p.7, No.33)

**By default, USB3_7 supports a USB 2.0 device and both M_SATA_0 and M_SATA_1 are enabled.*

**To enable USB3_7 to support a USB 3.0 device, please go to the BIOS Settings: BIOS Menu > Advanced > USB Configuration > USB3_7 Select. If USB3_7 supports a USB 3.0 device, M_SATA_0 and M_SATA_1 are disabled.*

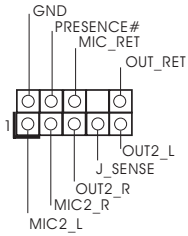
USB 3.0 Header
(19-pin USB3_5_6)



Besides four default USB 3.0 ports on the I/O panel, there is one USB 3.0 header on this motherboard. This USB 3.0 header can support two USB 3.0 ports.

English

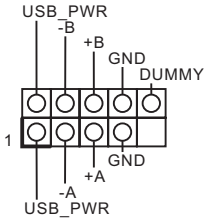
Front Panel Audio Header
(9-pin HD_AUDIO1)



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

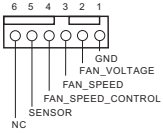
1. *High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instructions in our manual and chassis manual to install your system.*
2. *If you use an AC'97 audio panel, please install it to the front panel audio header by the steps below:*
   A. Connect Mic_IN (MIC) to MIC2_L.
   B. Connect Audio_R (RIN) to OUT2_R and Audio_L (LIN) to OUT2_L.
   C. Connect Ground (GND) to Ground (GND).
   D. MIC_RET and OUT_RET are for the HD audio panel only. You don't need to connect them for the AC'97 audio panel.
   E. To activate the front mic, go to the "FrontMic" Tab in the Realtek Control panel and adjust "Recording Volume".

USB 2.0 Header
(9-pin USB2_1_2)



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

CPU Fan Connector
(6-pin CPU1_FAN1)

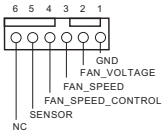


This motherboard provides one 6-Pin CPU fan (Quiet Fan) connectors. If you plan to connect a 3-Pin CPU fan, please connect it to Pin 1-3.

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

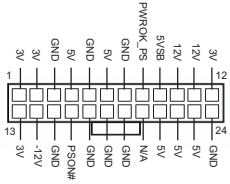
English

Front Fan Connectors
(6-pin FRNT_FAN1)
(6-pin FRNT_FAN2)
(6-pin FRNT_FAN3)
(6-pin FRNT_FAN4)
(6-pin FRNT_FAN5)



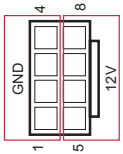
Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control.

ATX Power Connector
(24-pin ATXPWR1)



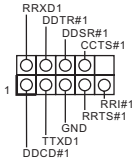
This motherboard provides a 24-pin ATX power connector. To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13.

ATX 12V Power Connector
(8-pin ATX12V1)



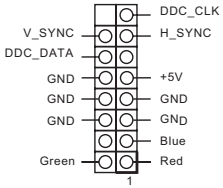
This motherboard provides one 8-pin ATX 12V power connector.

Serial Port Header
(9-pin COM1)



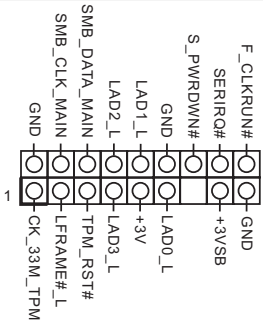
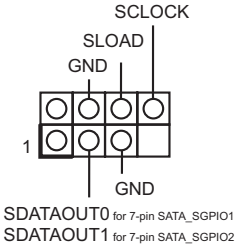
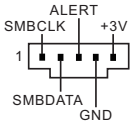
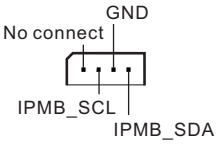
This COM1 header supports a serial port module.

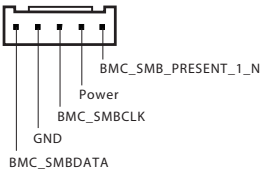
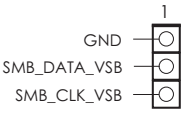
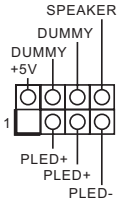
Front VGA Header
(15-pin FRNT_VGA1)

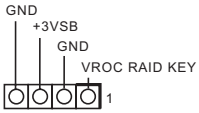


Please connect either end of VGA_2X8 cable to VGA header.

English

TPM Header (17-pin TPMS1)		This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.
Serial General Purpose Input/Output Headers (7-pin SATA_SGPIO1) (7-pin SATA_SGPIO2)		This header supports Serial Link interface for onboard SATA connections.
PSU SMBus Header (PSU_SMB1)		PSU SMBus monitors the status of the power supply, fan and system temperature.
Non Maskable Interrupt Button Header (NMI_BTN1)		Please connect a NMI device to this header.
Intelligent Platform Management Bus header (4-pin IPMB_1)		This 4-pin connector is used to provide a cabled base-board or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.

Baseboard Management Controller SMBus Header (5-pin BMC_SMB_1)		This header is used for the SM BUS devices.
Thermal Sensor Header (3-pin TR1)		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.
PWM Configuration Header (3-pin PWM_CFG1)		This header is used for PWM configurations.
Power LED and Speaker Header (7-pin SPK_PLED1)		Please connect the chassis power LED and the chassis speaker to this header.

Virtual RAID On CPU Header (4-pin VROC1)		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:

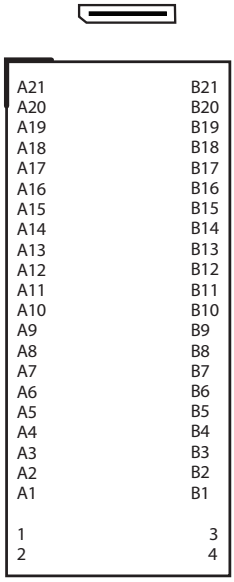
SKU	HW key required	Key features
Pass-thru	Not needed	• Pass-thru only (no RAID) • LED Management • Hot Plug Support • RAID 0 support for Intel Fultondale NVMe SSDs
Standard	VROCSTANMOD	• Pass-thru SKU features • RAID 0, 1, 10
Premium	VROCPREMMOD	• Standard SKU features • RAID 5 • RAID 5 Write Hole Closure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

*Only Intel SSDs are supported.

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

OCuLink Connectors
(OCU1)
(OCU2)

WC422D8A-2T/U only:
(OCU3)
(OCU4)



Please connect a PCIE SSD to this connector.

OCU#

Pin	Definition	Pin	Definition
1	N/A	3	GND
2	N/A	4	GND
A1	N/A	B1	N/A
A2	GND	B2	GND
A3	OCU#_RX_DP0	B3	OCU_TX_DP0
A4	OCU#_RX_DN0	B4	OCU_TX_DN0
A5	GND	B5	GND
A6	OCU#_RX_DP1	B6	OCU_TX_DP1
A7	OCU#_RX_DN1	B7	OCU_TX_DN1
A8	GND	B8	GND
A9	GPP_A19	B9	PCH_OCU1_SCL
A10	WAKE#	B10	PCH_OCU1_SDA
A11	GND	B11	GND
A12	CLK_OCU_1	B12	OCU#_PERST_BUF_N
A13	CLK_OCU_1#	B13	OCU#_B13_PRSNT_N
A14	GND	B14	GND
A15	OCU#_RX_DP2	B15	OCU_TX_DP2
A16	OCU#_RX_DN2	B16	OCU_TX_DN2
A17	GND	B17	GND
A18	OCU#_RX_DP3	B18	OCU_TX_DP3
A19	OCU#_RX_DN3	B19	OCU_TX_DN3
A20	GND	B20	GND
A21	N/A	B21	N/A

2.9 Dr. Debug

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

Code	Description
0x10	PEI_CORE_STARTED
0x11	PEI_CAR_CPU_INIT
0x15	PEI_CAR_NB_INIT
0x19	PEI_CAR_SB_INIT
0x31	PEI_MEMORY_INSTALLED
0x32	PEI_CPU_INIT
0x33	PEI_CPU_CACHE_INIT
0x34	PEI_CPU_AP_INIT
0x35	PEI_CPU_BSP_SELECT
0x36	PEI_CPU_SMM_INIT
0x37	PEI_MEM_NB_INIT
0x3B	PEI_MEM_SB_INIT
0x4F	PEI_DXE_IPL_STARTED
0x60	DXE_CORE_STARTED
0x61	DXE_NVRAM_INIT
0x62	DXE_SBRUN_INIT

0x63	DXE_CPU_INIT
0x68	DXE_NB_HB_INIT
0x69	DXE_NB_INIT
0x6A	DXE_NB_SMM_INIT
0x70	DXE_SB_INIT
0x71	DXE_SB_SMM_INIT
0x72	DXE_SB_DEVICES_INIT
0x78	DXE_ACPI_INIT
0x79	DXE_CSM_INIT
0x90	DXE_BDS_STARTED
0x91	DXE_BDS_CONNECT_DRIVERS
0x92	DXE_PCI_BUS_BEGIN
0x93	DXE_PCI_BUS_HPC_INIT
0x94	DXE_PCI_BUS_ENUM
0x95	DXE_PCI_BUS_REQUEST_RESOURCES
0x96	DXE_PCI_BUS_ASSIGN_RESOURCES
0x97	DXE_CON_OUT_CONNECT
0x98	DXE_CON_IN_CONNECT

0x99	DXE_SIO_INIT
0x9A	DXE_USB_BEGIN
0x9B	DXE_USB_RESET
0x9C	DXE_USB_DETECT
0x9D	DXE_USB_ENABLE
0xA0	DXE_IDE_BEGIN
0xA1	DXE_IDE_RESET
0xA2	DXE_IDE_DETECT
0xA3	DXE_IDE_ENABLE
0xA4	DXE_SCSI_BEGIN
0xA5	DXE_SCSI_RESET
0xA6	DXE_SCSI_DETECT
0xA7	DXE_SCSI_ENABLE
0xA8	DXE_SETUP_VERIFYING_PASSWORD
0xA9	DXE_SETUP_START
0xAB	DXE_SETUP_INPUT_WAIT
0xAD	DXE_READY_TO_BOOT
0xAE	DXE_LEGACY_BOOT

0xAF	DXE_EXIT_BOOT_SERVICES
0xB0	RT_SET_VIRTUAL_ADDRESS_MAP_BEGIN
0xB1	RT_SET_VIRTUAL_ADDRESS_MAP_END
0xB2	DXE_LEGACY_OPROM_INIT
0xB3	DXE_RESET_SYSTEM
0xB4	DXE_USB_HOTPLUG
0xB5	DXE_PCI_BUS_HOTPLUG
0xB6	DXE_NVRAM_CLEANUP
0xB7	DXE_CONFIGURATION_RESET
0xF0	PEI_RECOVERY_AUTO
0xF1	PEI_RECOVERY_USER
0xF2	PEI_RECOVERY_STARTED
0xF3	PEI_RECOVERY_CAPSULE_FOUND
0xF4	PEI_RECOVERY_CAPSULE_LOADED
0xE0	PEI_S3_STARTED
0xE1	PEI_S3_BOOT_SCRIPT
0xE2	PEI_S3_VIDEO_REPOST

0xE3	PEI_S3_OS_WAKE
0x50	PEI_MEMORY_INVALID_TYPE
0x53	PEI_MEMORY_NOT_DETECTED
0x55	PEI_MEMORY_NOT_INSTALLED
0x57	PEI_CPU_MISMATCH
0x58	PEI_CPU_SELF_TEST_FAILED
0x59	PEI_CPU_NO_MICROCODE
0x5A	PEI_CPU_ERROR
0x5B	PEI_RESET_NOT_AVAILABLE
0xD0	DXE_CPU_ERROR
0xD1	DXE_NB_ERROR
0xD2	DXE_SB_ERROR
0xD3	DXE_ARCH_PROTOCOL_NOT_AVAILABLE
0xD4	DXE_PCI_BUS_OUT_OF_RESOURCES
0xD5	DXE_LEGACY_OPROM_NO_SPACE
0xD6	DXE_NO_CON_OUT
0xD7	DXE_NO_CON_IN

0xD8	DXE_INVALID_PASSWORD
0xD9	DXE_BOOT_OPTION_LOAD_ERROR
0xDA	DXE_BOOT_OPTION_FAILED
0xDB	DXE_FLASH_UPDATE_FAILED
0xDC	DXE_RESET_NOT_AVAILABLE
0xE8	PEI_MEMORY_S3_RESUME_FAILED
0xE9	PEI_S3_RESUME_PPI_NOT_FOUND
0xEA	PEI_S3_BOOT_SCRIPT_ERROR
0xEB	PEI_S3_OS_WAKE_ERROR

2.10 Unit Identification purpose LED/Switch

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

Unit Identification purpose LED/Switch (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.

2.11 Driver Installation Guide

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

2.12 Dual LAN and Teaming Operation Guide

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

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

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

Step 1

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

Step 2

Click the **Settings** tab.

Step 3

Click the **Modify Team** button.

Step 4

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

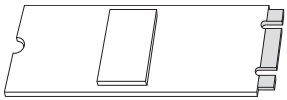
If you do not specify a preferred primary adapter, the software will choose an adapter of the highest capability (model and speed) to act as the default primary. If a failover occurs, another adapter becomes the primary. The adapter will, however, rejoin the team as a non-primary.

2.13 M.2_SSD (NGFF) Module Installation Guide

The M.2, also known as the Next Generation Form Factor (NGFF), is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The M.2 Sockets (M2_1 / M2_1) support M.2 SATA3 6.0 Gb/s module and M.2 PCI Express module up to Gen3 x4 (16 Gb/s).

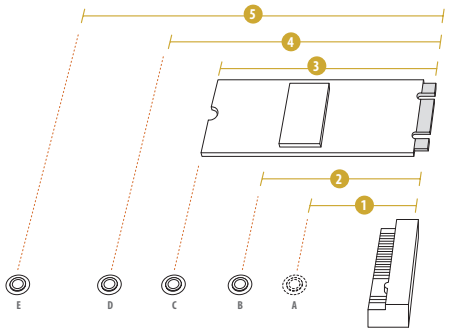
** If M2_1 is occupied by a SATA-type M.2 device, SATA_7 will be disabled.*

Installing the M.2_SSD (NGFF) Module



Step 1

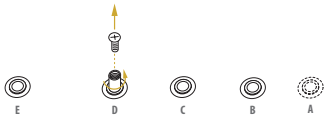
Prepare a M.2_SSD (NGFF) module and the screw.

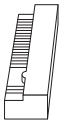


Step 2

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

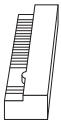
No.	1	2	3	4	5
Nut Location	A	B	C	D	E
PCB Length	3cm	4.2cm	6cm	8cm	11cm
Module Type	Type2230	Type 2242	Type2260	Type 2280	Type 22110





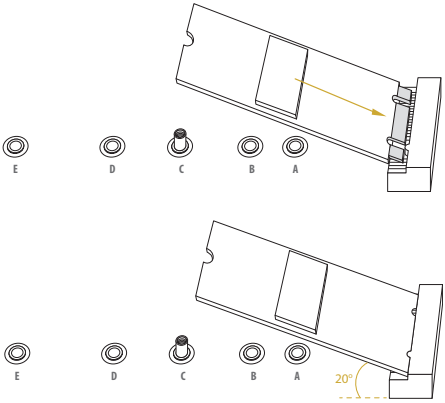
Step 3

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



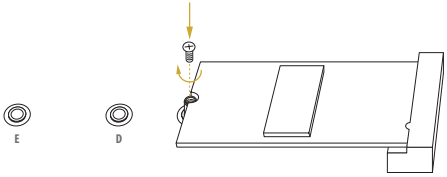
Step 4

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



Step 5

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



Step 6

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

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
Server Mgmt	To manage the server
Event Logs	For event log configuration
Exit	To exit the current screen or the UEFI SETUP UTILITY

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

English

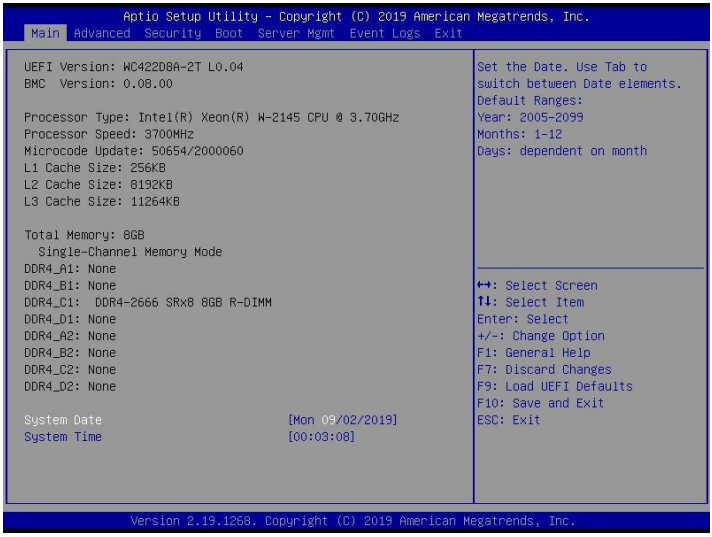
3.1.2 Navigation Keys

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.

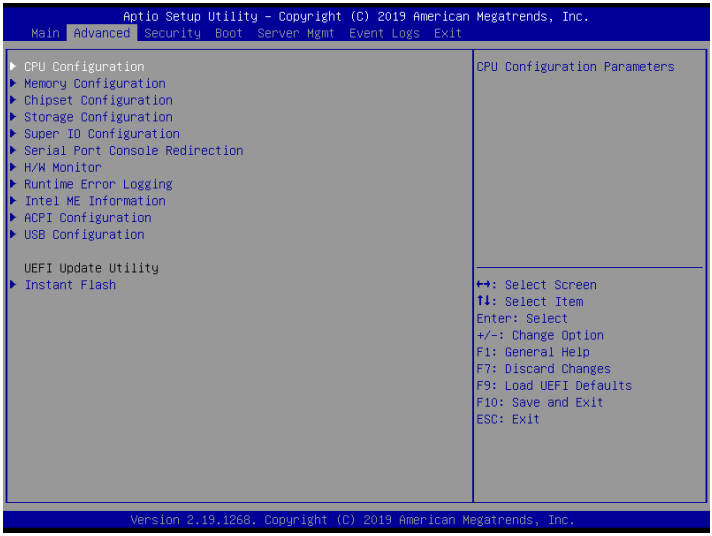


All screenshots in this document are provided for reference only, and may be different by models. Here is the example of X299 WS/IPMI interface.

English

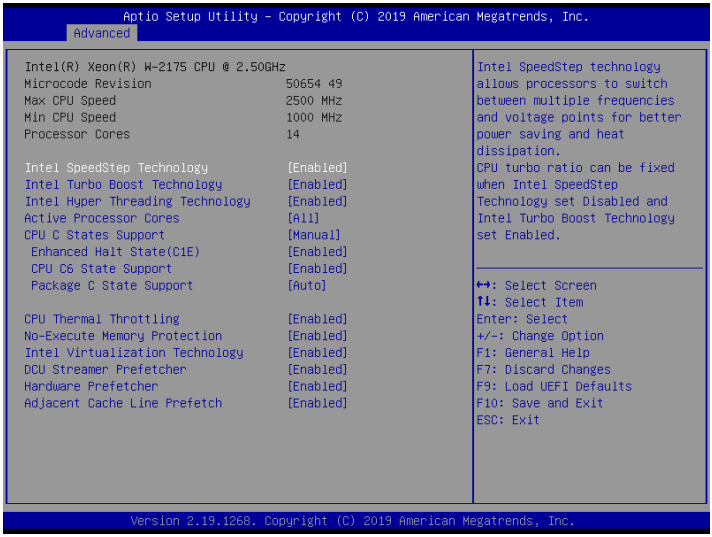
3.3 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Memory Configuration, Chipset Configuration, Storage Configuration, Super IO Configuration, Serial Port Console Redirection, H/W Monitor, Runtime Error Logging, Intel ME Information, ACPI Configuration, USB Configuration and Instant Flash.



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

3.3.1 CPU Configuration



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.

Intel Hyper Threading Technology

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

Active Processor Cores

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

CPU C States Support

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

Enhanced Halt State(C1E)

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

CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

Package C State Support

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

Processor Hot Modes

When a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor.

CPU Thermal Throttling

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

No-Execute Memory Protection

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

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.

DCU Streamer Prefetcher

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

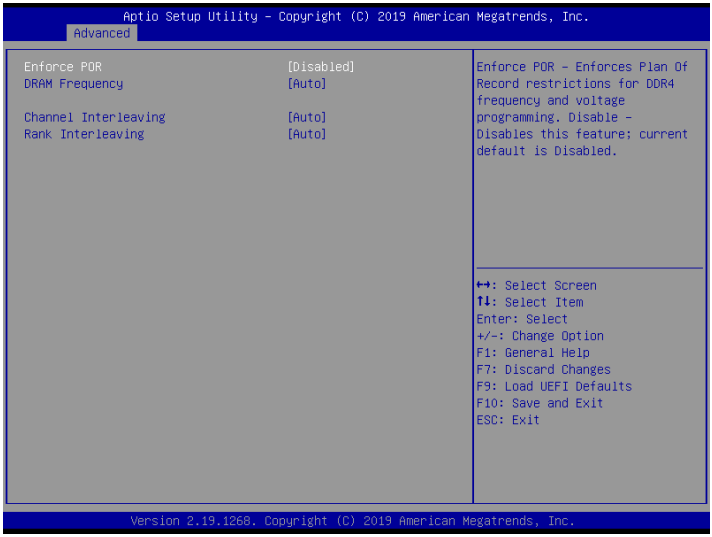
Hardware Prefetcher

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.

3.3.2 Memory Configuration



Enforce POR

Enforce POR - Enforces Plan Of Record restrictions for DDR4 frequency and voltage programming.
Disable - Disables this feature.
Auto - Sets it to the MRC default setting: current default is Enable.

DRAM Frequency

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

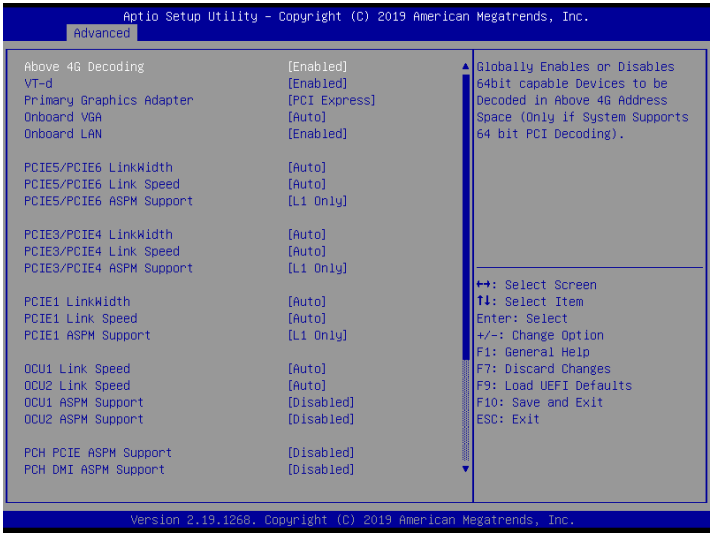
Channel Interleaving

Select to configure Channel Interleaving settings.

Rank Interleaving

Select to configure Rank Interleaving settings.

3.3.3 Chipset Configuration



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).

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.

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

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

Onboard LAN

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

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 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 downstream devices.

PCIE1 Link Width

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

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 downstream devices.

OCU1 Link Speed

This allows you to select OCU1 Link Speed. The default value is [Auto].'

OCU2 Link Speed

This allows you to select OCU2 Link Speed. The default value is [Auto].

OCU1 ASPM Support

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

OCU2 ASPM Support

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

PCH DMI ASPM Support

This option enables/disables the ASPM support for all PCH DMI devices.

Onboard Debug Port LED

Enable/Disable the onboard Dr. Debug LED.

Onboard HD Audio

Use this item to automatically enable or disable onboard HD audio. Set to Auto to enable onboard HD audio and automatically disable it when a sound card is installed.

Front Panel

Use this item to set front panel HD audio to Auto or Disabled.

PS2 Y-Cable

Enable the PS2 Y-Cable or set this option to Auto.

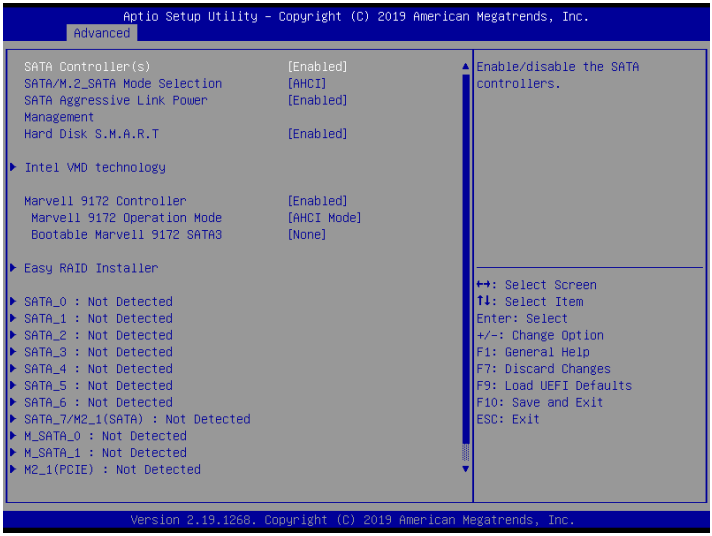
Restore AC Power Loss

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.

Restore AC Power Current State

This allows you to restore AC Power Current State.

3.3.4 Storage Configuration



SATA Controller(s)

Use this item to enable or disable SATA Controllers.

SATA/M.2_SATA Mode Selection

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

SATA Aggressive Link Power Management

Use this item to enable or disable SALP.

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].

Intel VMD Technology

Marvell 9172Controller

Enable or disable Marvell 9172 Controller.

Marvell 9172 Operation Mode

This item is for M_SATA ports. Use this to select Marvell SATA operation mode. Configuration options: [IDE Mode], [AHCI Mode] and [RAID Mode]. The default value is

[AHCI Mode]. Press <Ctrl-M> to enter RAID ROM during UEFI POST process.

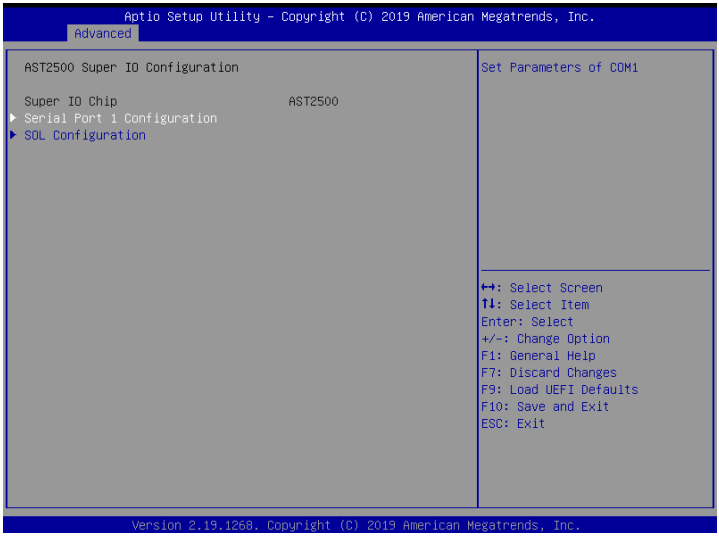
Bootable Marvell 9172 SATA3

We recommend to use Intel SATA ports (Port 0~5) for your bootable devices. This will minimize your boot time and get the best performance. If you still want to boot from Marvell SATA3 controller, please set this item to [Yes]

Easy RAID Installer

Easy RAID Installer helps you to copy the RAID driver from a support CD to your USB storage device. After copying the driver, please change the SATA mode to RAID, then you can start installing operating system in RAID mode.

3.3.5 Super IO Configuration



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 parameters of SOL.

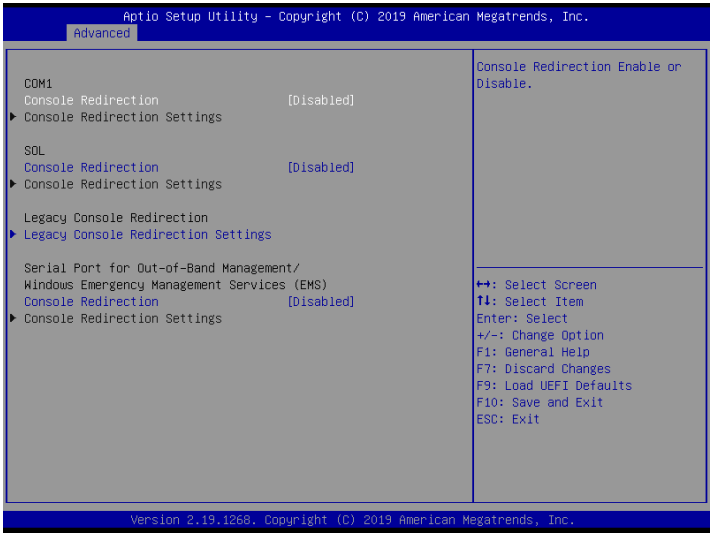
SOL Port

Use this item to set parameters of SOL.

Change Settings

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

3.3.6 Serial Port Console Redirection



COM1/SOL

Console Redirection

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

Console Redirection Settings

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

Terminal Type

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

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

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

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

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

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

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

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

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

Resolution 100x31
Use this item to enable or disable extended terminal resolution support.

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

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

Redirection After BIOS POST
If the [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].

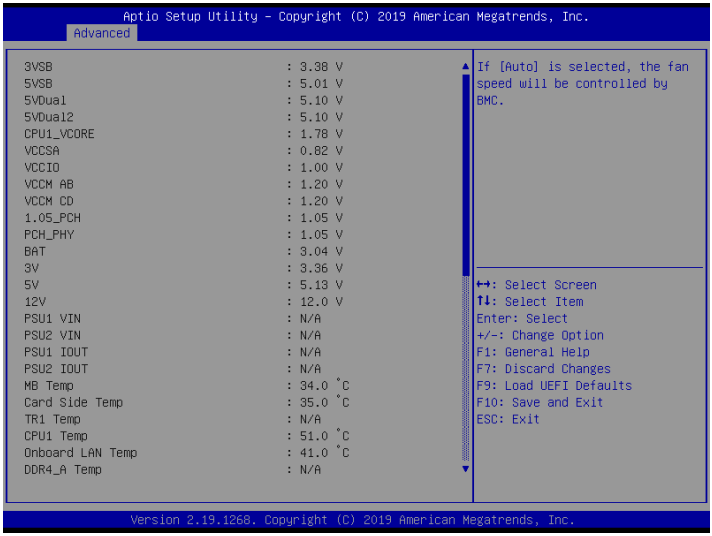
Data Bits

Parity

Stop Bits

3.3.7 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.



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].

FRNT_FAN1

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

FRNT_FAN2

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

FRNT_FAN3

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

FRNT_FAN4

This allows you to set the front fan 4's speed. The default value is [Smart Fan].

FRNT_FAN5

This allows you to set the front fan 5'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

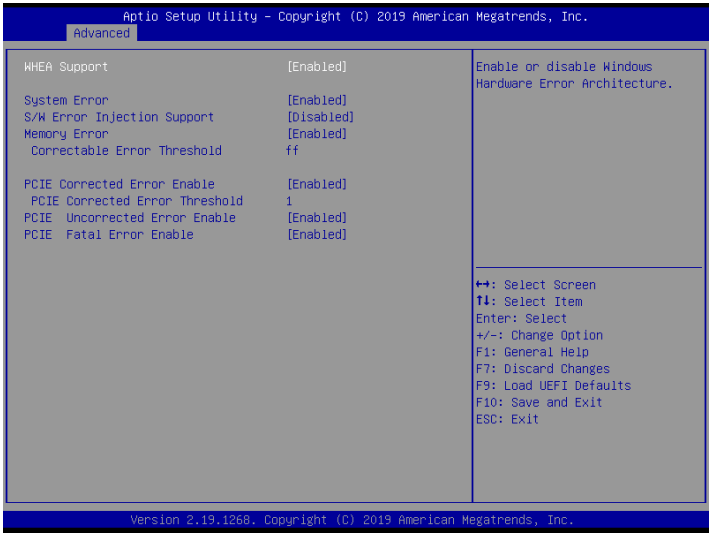
Smart Fan Temp x (x means 1 to 11 stage)

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]..

3.3.8 Runtime Error Logging



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.

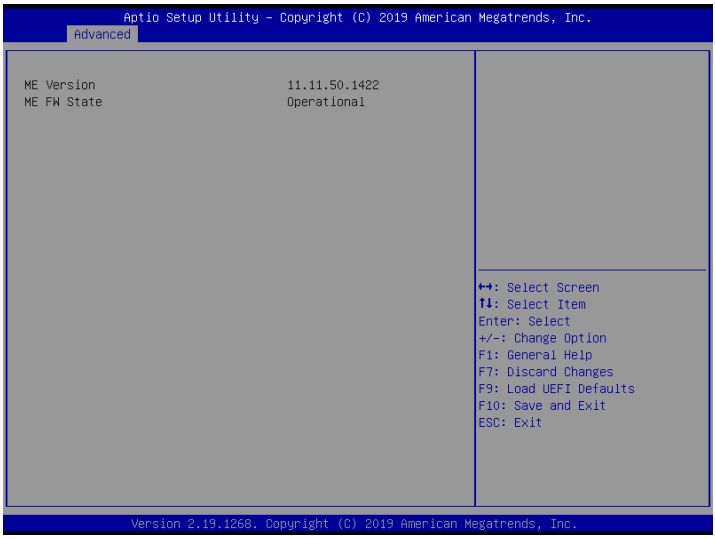
PCIE Uncorrected Error Enable

Use this item to enable or disable PCIe Uncorrectable errors.

PCIE Fatal Error Enable

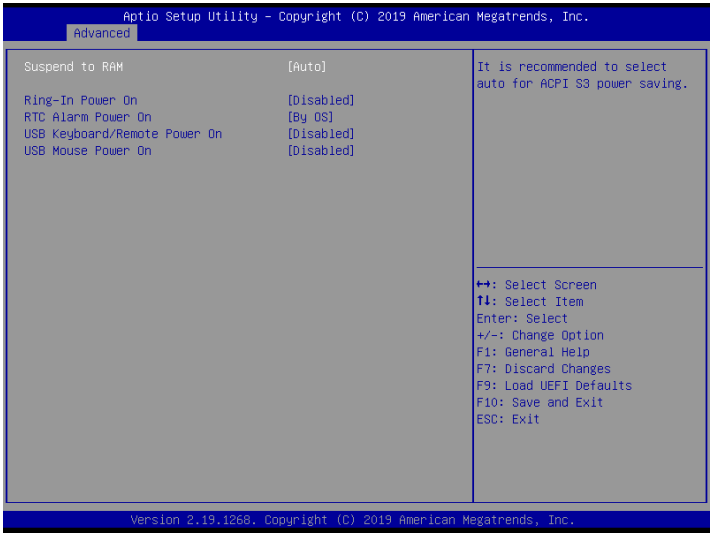
Use this item to enable or disable PCIe Ftal errors.

3.3.9 Intel ME Configuration



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

3.3.10 ACPI Configuration



Suspend to RAM

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

Ring-In Power On

Allow the system to be waked up by onboard COM port modem Ring-In signals.

RTC Alarm Power On

Allow the system to be waked up by the real time clock alarm. Set it to By OS to let it be handled by your operating 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.

3.3.11 USB Configuration

Legacy USB Support

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.

PS/2 Simulator

Enable PS/2 Simulator. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.

USB 3_7 Select

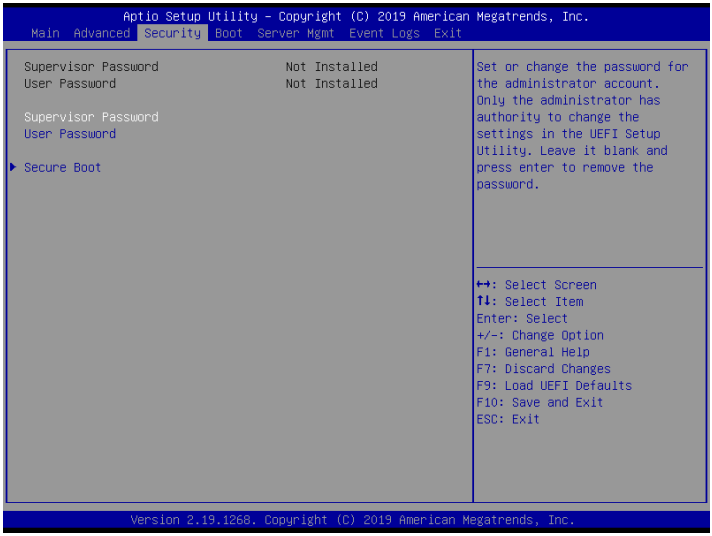
Select as USB3.0 port7 enabled or Select as M_SATA_0_1 enabled.

3.3.12 Instant Flash

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

3.4 Security

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



Supervisor Password

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

User Password

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

Secure Boot

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

Secure Boot Mode

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

Clear Secure Boot keys

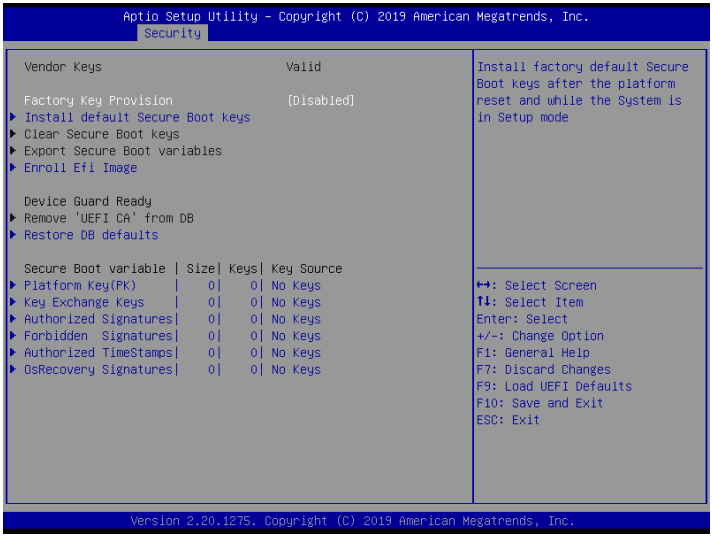
Force System to Setup Mode - clear all Secure Boot Variables. Change takes effect after reboot.

Install Default Secure Boot Keys

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

3.4.1 Key Management

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



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).

Export Secure Boot Variables

Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device.

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

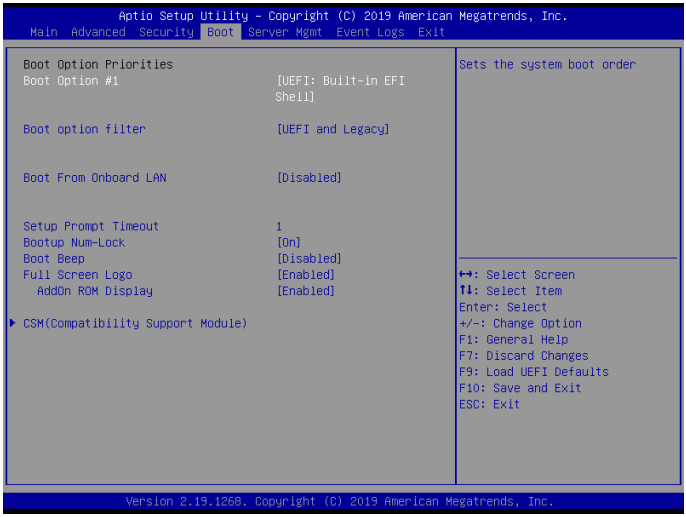
2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed, Test

3.5 Boot Screen

This section displays the available devices on your system for you to configure the boot settings and the boot priority.



Boot Option #1

Use this item to set the system boot order.

Boot Option Filter

This option controls Legacy/UEFI ROMs priority.

Boot From Onboard LAN

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

Setup Prompt Timeout

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

Bootup Num-Lock

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

Full Screen Logo

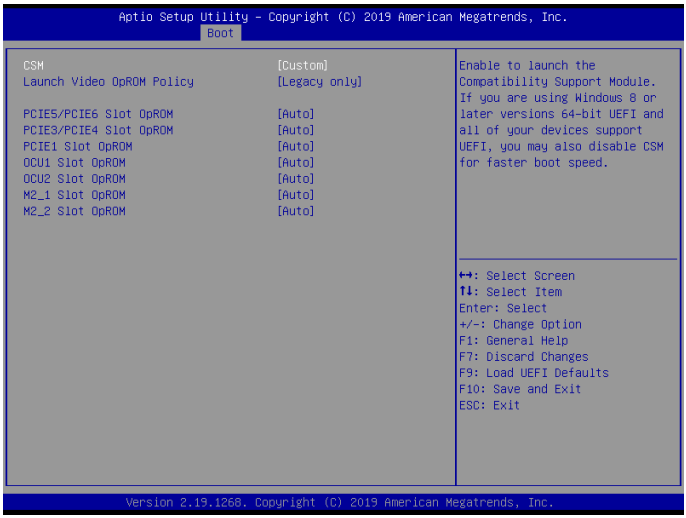
Use this item to enable or disable OEM Logo. The default value is [Enabled].

AddOn ROM Display

Enable AddOn ROM Display to see the AddOn ROM messages or configure the

AddOn ROM if you've enabled Full Screen Logo. Disable for faster boot speed.

CSM (Compatibility Support Module)



CSM

Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test.

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.

PCIE5/PCIE6 Slot OpROM

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

PCIE3/PCIE4 Slot OpROM

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

PCIE1 Slot OpROM

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

OCU1 Slot OpROM

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

OCU2 Slot OpROM

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

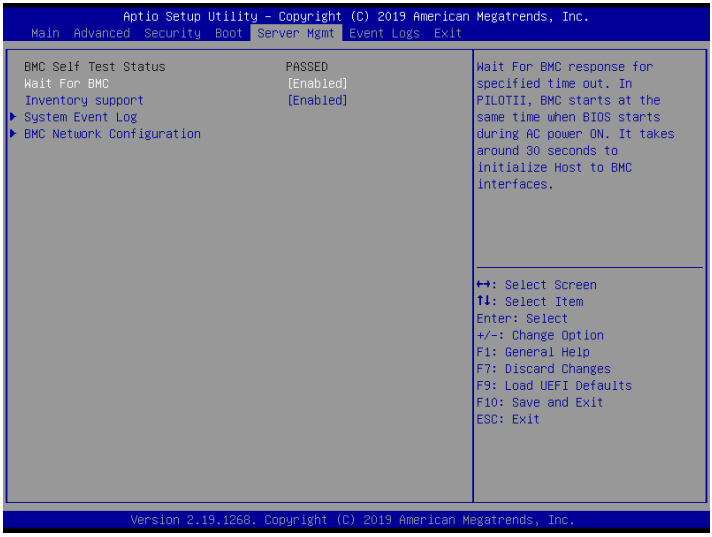
M2_1 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

M2_2 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

3.6 Server Mgmt



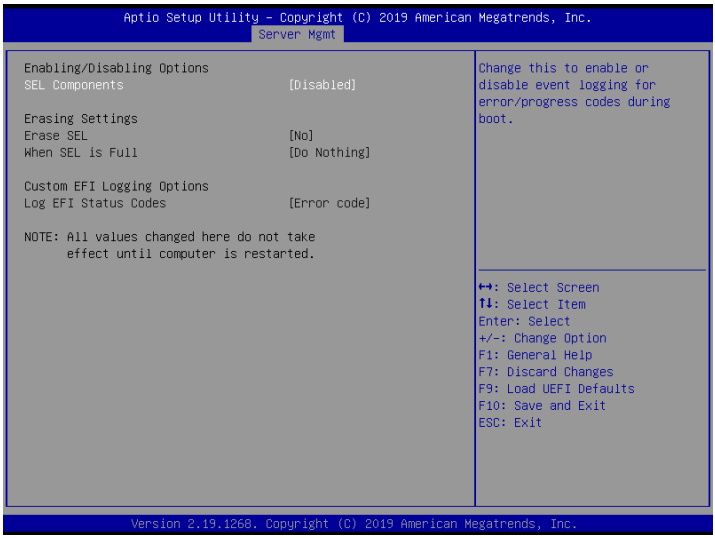
Wait For BMC

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

Inventory support

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

3.6.1 System Event Log



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.

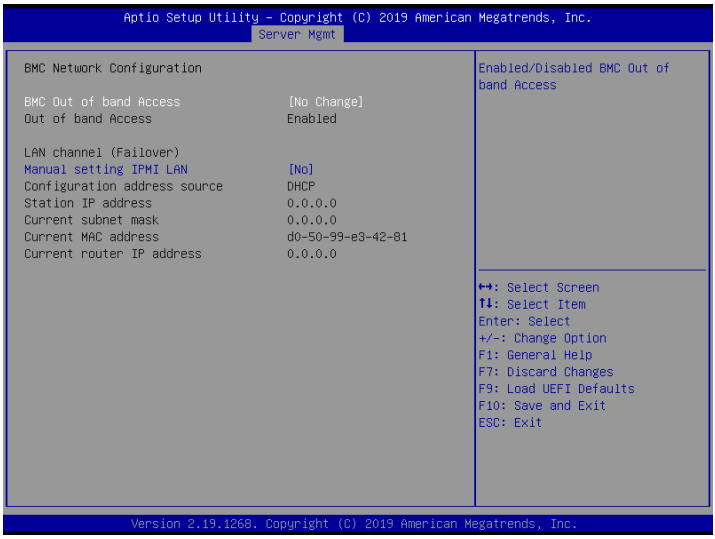
When SEL is Full

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.

3.6.2 BMC Network Configuration



BMC Out of Band Access

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

Lan Channel (Failover)

Manual Setting IPMI LAN

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

Configuration Address Source

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

Static: Manually enter the IP Address, Subnet Mask and Gateway Address in the BIOS for BMC LAN channel configuration.
DHCP: IP address, Subnet Mask and Gateway Address are automatically assigned by the network's DHCP server.

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

The default login information for the IPMI web interface is:
Username: admin
Password: admin

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

VLAN

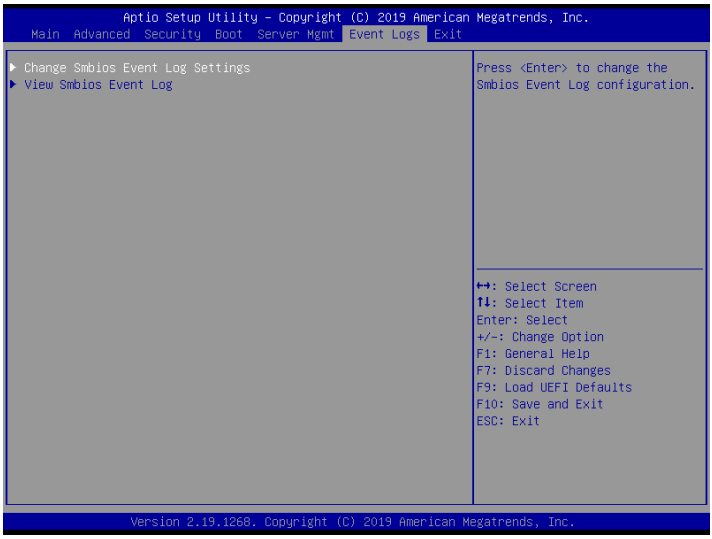
Enabled/Disabled Virtual Local Area Network.

BMC Tools

Load BMC Default Settings

Use this item to load BMC default settings.

3.7 Event Logs



Change Smbios Event Log Settings

This allows you to configure the Smbios Event Log Settings.

When entering the item, you will see the followings:

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

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

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

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

MECI (Multiple Event Count Increment)
Use this item to enter the increment value for the multiple event counter. The valid range is from 1 to 255.

METW (Multiple Event Time Window)
Use this item to specify the number of minutes which must pass between duplicate log

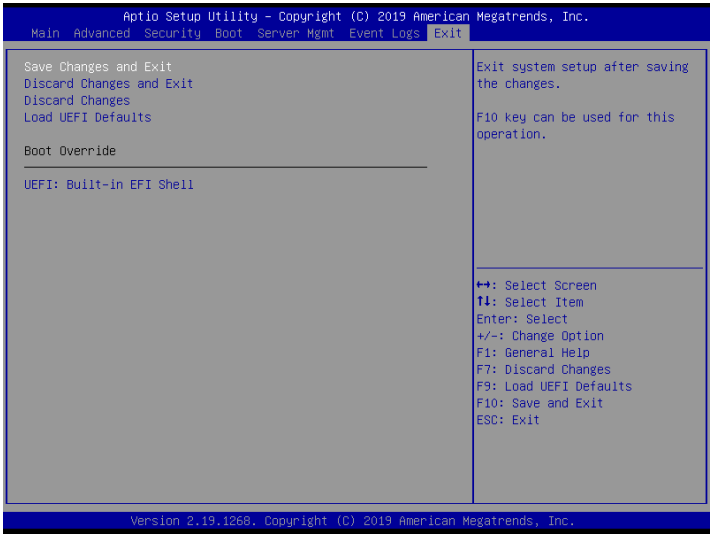
entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.

View Smbios Event Log

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

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

3.8 Exit Screen



Save Changes and Exit

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

Discard Changes and Exit

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

Discard Changes

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

Load UEFI Defaults

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

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® /Linux® compliant. Because motherboard settings and hardware options vary, use the setup procedures in this chapter for general reference only. Refer to your OS documentation for more information.

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

4.2 Support CD Information

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

4.2.1 Running The Support CD

To begin using the support CD, insert the CD into your CD-ROM drive. The CD automatically displays the Main Menu if "AUTORUN" is enabled in your computer. If the Main Menu does not appear automatically, locate and double click on the file "ASRSetup.exe" from the root folder in the Support CD to display the menu.

4.2.2 Drivers Menu

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

4.2.3 Utilities Menu

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

4.2.4 Contact Information

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

Chapter 5 Troubleshooting

5.1 Troubleshooting Procedures

Follow the procedures below to troubleshoot your system.

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

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

If there is no power...

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

If there is no video...

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

If there are memory errors...

1. Verify that the DIMM modules are properly seated in the slots.
2. Use recommended DDR4 R/LR 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

5.2 Technical Support Procedures

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

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

You may contact ASRock Rack's technical support at:
http://www.asrockrack.com/support/tsd.asp

5.3 Returning Merchandise for Service

For warranty service, the receipt or a copy of your invoice marked with the date of purchase is required. By calling your vendor or going to our RMA website (http://event.asrockrack.com/tsd.asp) you may obtain a Returned Merchandise Authorization (RMA) number.
The RMA number should be displayed on the outside of the shipping carton which is mailed prepaid or hand-carried when you return the motherboard to the manufacturer. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

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

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