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GREEN Less Heat, Less Power Consumption

STABLE Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

D2143D8UM2
D2123D8UM2

User Manual

English



Version 1.0

Published April 2019

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

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

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Contact Information

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

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Chapter 1 Introduction

Thank you for purchasing ASRock Rack **D2143D8UM2 / D2123D8UM2** 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 D2143D8UM2 / D2123D8UM2 Motherboard
(Micro-ATX Form Factor: 9.6-in x 9.6-in, 24.4 cm x 24.4 cm)
- Quick Installation Guide
- 1 x SATA3 Cable (60cm)
- 1 x MINISAS Cable(12G) (60cm)
- 1 x Screw for M.2 Socket



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

1.2 Specifications

D2143D8UM2 / D2123D8UM2	
MB Physical Status	
Form Factor	mATX
Dimension	9.6" x 9.6" (24.4 cm x 24.4 cm)
Processor System	
CPU	Supports Intel® Xeon® D-2100 Series Processors (Max. 110W) *D-2123IT: 60W / D-2143IT: 65W
Chipset	Soc
System Memory	
Capacity	- 8 x 288-pin DDR4 DIMM slots - Supports up to 512GB DDR4 R DIMM / LR DIMM
Type	- Quad Channel DDR4 memory technology - Supports DDR4 R DIMM / LR DIMM
Voltage	1.2V
DIMM Size Per DIMM	R/LR DIMM: 64GB, 32GB, 16GB, 8GB, 4GB
DIMM Frequency	- R DIMM: 2400/2133MHz - LR DIMM: 2400/2133MHz *D-2123IT: 2400/2133MHz / D-2143IT: 2133MHz
Expansion Slot	
PCIe 3.0 x 16	SLOT6: Gen3 x16 link, auto switch to x8 link if SLOT4 is occupied
PCIe 3.0 x 8	SLOT4: Gen3 x8 link
Storage	
SATA Controller	Intel® Xeon® D-2100: 12 x SATA3 6.0 Gb/s (8 ports form SFF-8643, 4 port from SATA 7-pin include 1 SATA DOM), support RAID 0, 1, 5, 10
Ethernet	
Interface	N/A, no onboard LAN, X722 (SoC integrated) <i>*Please use a mezzanine type LAN card (type A/B/C)</i>
LAN Controller	N/A
Management	
BMC Controller	ASPEED AST2500 : IPMI (Intelligent Platform Management Interface) 2.0 with ikvm, vMedia support
IPMI Dedicated GLAN	1 x Realtek RTL8211E for dedicated management LAN
Features	- Watch Dog - NMI
Graphics	
Controller	ASPEED AST2500
VRAM	256MB DDR4
Rear Panel I/O	
VGA Port	D-sub x 1

Lan Port	1 x RJ45 Dedicated IPMI LAN port
Serial Port	1
UID Button/ UID LED	1
Internal Connector	
COM Header	1
M.2	1 (2230/2242/2260/2280, PCIE(x4))
Auxiliary Panel Header	1 (include chassis intrusion, location button & LED, front LAN LED, event log LED)
TPM Header	1
IPMB Header	1
Fan Header	1x CPU Fan, 5x system Fan (4 front, 1 rear) (build in CPU active fansink)
ATX Power	1x (24-pin) + 1x (8-pin)
USB 3.1 Gen1 Header	1
ME Recovery	1
NMI Button	1
Speaker(4pin)	1
ClearCMOS	1
SMBus from BMC	1
PWR_SMB	1
System BIOS	
BIOS Type	256Mb AMI UEFI Legal BIOS
BIOS Features	<ul style="list-style-type: none"> - Plug and Play (PnP) - ACPI 1.1 Compliance Wake Up Events - SMBIOS 3.1 Support - ASRock Rack Instant Flash
Hardware Monitor	
Temperature	<ul style="list-style-type: none"> - CPU/PCH/DDR/LAN/Storage Temperature Sensing - MB/Card side/TR1 Temperature Sensing
Fan	<ul style="list-style-type: none"> - CPU/Rear/Front Fan Tachometer - CPU Quiet Fan (Allow Chassis Fan Speed Auto-Adjust by CPU Temperature) - CPU/Rear/Front Fan Multi-Speed Control
Voltage	Voltage Monitoring: +12V, +5V, +3.3V, CPU Vcore, DRAM, +1.1V, +1.0V, +BAT, 3VSB, 5VSB
Support OS	
OS	<p>Microsoft® Windows*:</p> <ul style="list-style-type: none"> - Server 2012 R2 (64 bit) - Server 2016 (64 bit) <p>Linux*:</p> <ul style="list-style-type: none"> - RedHat Enterprise Linux Server 6.8 (64bit) / 7.4 (64 bit) - CentOS 6.8 (64 bit) / 7.4 (64 bit)

	<ul style="list-style-type: none"> - SUSE Enterprise Linux Server 11 SP4 (64 bit) /12 SP3 (64 bit) - Ubuntu 16.04 (64 bit) /18.04 (64 bit) - Fedora 26 (64 bit) - FreeBSD 11.2 (64 bit) <p>Virtual:</p> <ul style="list-style-type: none"> - VMWare ESXi 6.5 u1 - Citrix XenServer 7.2 - Win hyper-V Server 2016 <p><i>*Please refer to our website for the latest OS support list.</i> <i>*On Ubuntu 16.04 (64 bit) / 18.04 (64 bit) system, Intel Raid mode only supports UEFI BOOT.</i></p>
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Environment	
Temperature	<p>Operation temperature: 10°C ~ 35°C /</p> <p>Non operation temperature: -40°C ~ 70°C</p> <p><i>*Install a CPU Fan when the airflow through the heatsink is below 2CFM.</i></p>



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

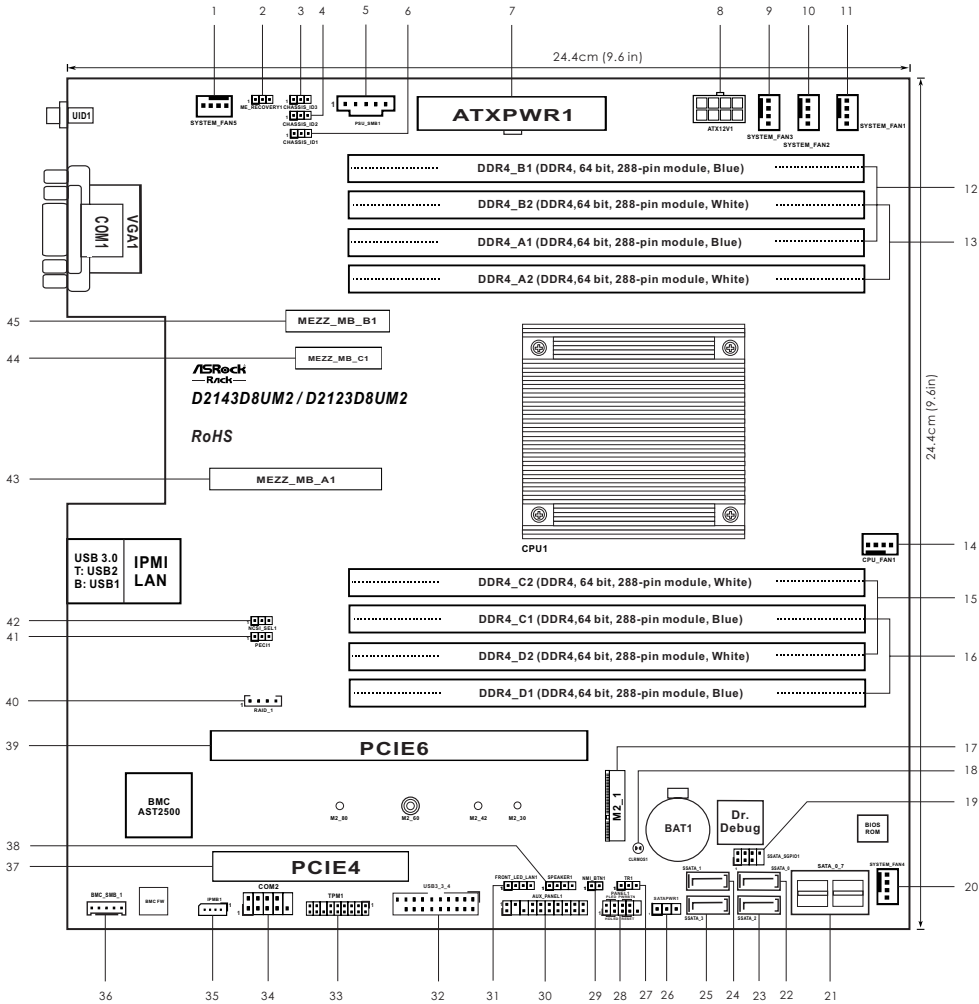


If you install Intel® LAN utility or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If you install the drivers only, it will pass the WHQL tests.

1.3 Unique Features

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

1.4 Motherboard Layout

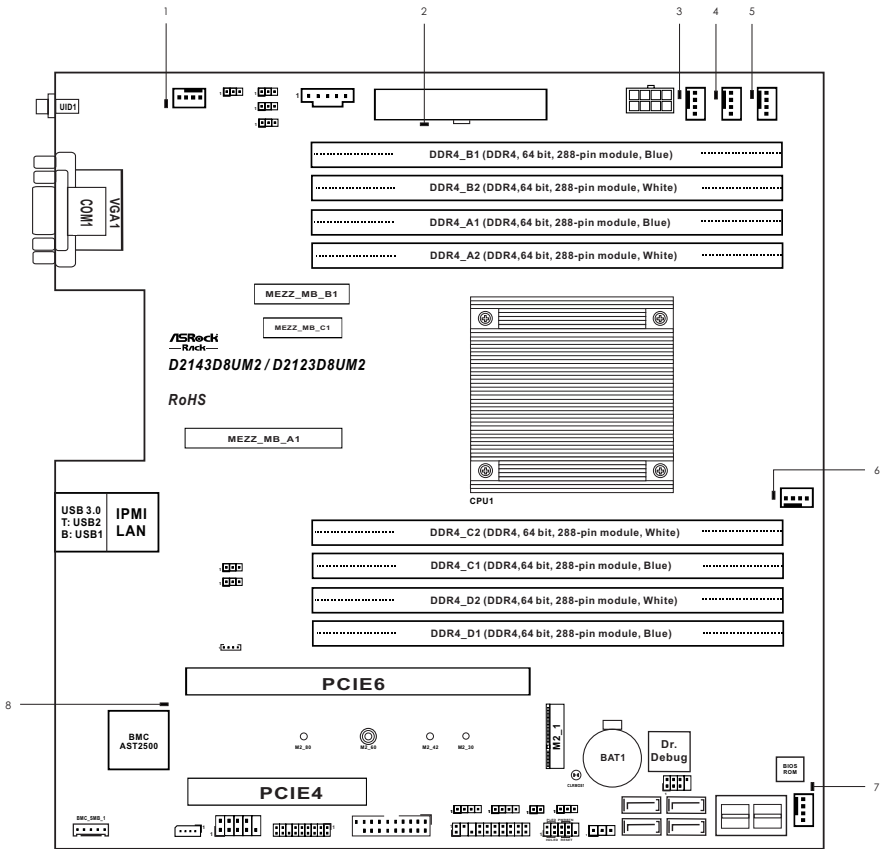


No.	Description
1	System Fan Connector (SYSTEM_FAN5)
2	ME Recovery Jumper (ME_RECOVERY1)
3	Chassis ID Jumper (CHASSIS_ID3)
4	Chassis ID Jumper (CHASSIS_ID2)
5	PSU SMBus (PSU_SMB1)
6	Chassis ID Jumper (CHASSIS_ID1)
7	ATX Power Connector (ATXPWR1)
8	ATX 12V Power Connector (ATX12V1)
9	System Fan Connector (SYSTEM_FAN3)
10	System Fan Connector (SYSTEM_FAN2)
11	System Fan Connector (SYSTEM_FAN1)
12	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1)
13	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2)
14	CPU Fan Connector (CPU_FAN1)
15	2 x 288-pin DDR4 DIMM Slots (DDR4_C2, DDR4_D2)
16	2 x 288-pin DDR4 DIMM Slots (DDR4_C1, DDR4_D1)
17	M.2 Socket (M2_1) (Type 2230/2242/2260/2280)
18	Clear CMOS Pad (CLRMO1)
19	SATA SGPIO Connector (SSATA_SGPIO1)
20	System Fan Connector (SYSTEM_FAN4)
21	MINI-SAS HD Connector (SATA_0_7)
22	SATA3 Connector (SSATA_0)
23	SATA3 Connector (SSATA_2)
24	SATA3 Connector (SSATA_1)
25	SATA DOM Connector (SSATA_3)
26	SATA DOM Power Jumper (SATAPWR1)
27	Thermal Sensor Header (TR1)
28	System Panel Header (PANEL1)
29	Non Maskable Interrupt Button (NMI_BTN1)
30	Auxiliary Panel Header (AUX_PANEL1)
31	Front LAN LED Connector (FRONT_LED_LAN1)
32	USB 3.1 Gen1 Header (USB3_3_4)
33	TPM Header (TPM1)

No.	Description
34	COM Port Header (COM2)
35	Intelligent Platform Management Bus header (IPMB1)
36	BMC SMB Header (BMC_SMB_1)
37	PCI Express 3.0 Card Slot 4 (PCIE4)
38	Speaker Header (SPEAKER1)
39	PCI Express 3.0 Card Slot 6 (PCIE6)
40	Virtual RAID On CPU Header (RAID_1)
41	CPU PECI Jumper (PECI1)
42	NCSI Mode Jumper (NCSI_SEL1)
43	Mezzanine Card Slot (MEZZ_MB_A1)*
44	Mezzanine Card Slot (MEZZ_MB_C1)*
45	Mezzanine Card Slot (MEZZ_MB_B1)*

**Please refer to "Appendix" for the information of the supported mezzanine cards and TPM modules.*

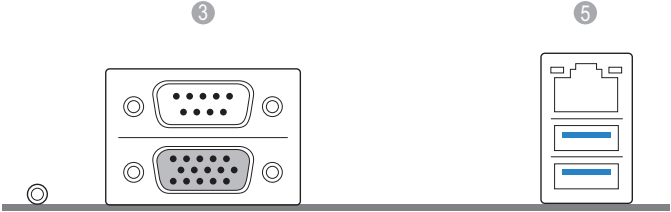
1.5 Onboard LED Indicators



No.	Item	Status	Description
1	SYS_FAN5_LED	Amber	SYSTEM_FAN5 failed
2	SB_PWR1	Green	STB PWR ready
3	SYS_FAN3_LED	Amber	SYSTEM_FAN3 failed
4	SYS_FAN2_LED	Amber	SYSTEM_FAN2 failed
5	SYS_FAN1_LED	Amber	SYSTEM_FAN1 failed
6	CPU_FAN_LED	Amber	CPU_FAN1 failed
7	SYS_FAN4_LED	Amber	SYSTEM_FAN4 failed
8	BMC_LED1	Green	BMC heartbeat LED

1.6 I/O Panel

3



5



1

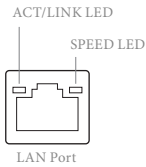
2

4

No.	Description	No.	Description
1	UID Switch (UID1)	4	USB 3.1 Gen1 Ports (USB3_1_2)
2	VGA Port (VGA1)	5	LAN RJ-45 Port (IPMI_LAN)*
3	COM Port (COM1)		

LAN Port LED Indications

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



ACT/LINK LED

SPEED LED

LAN Port

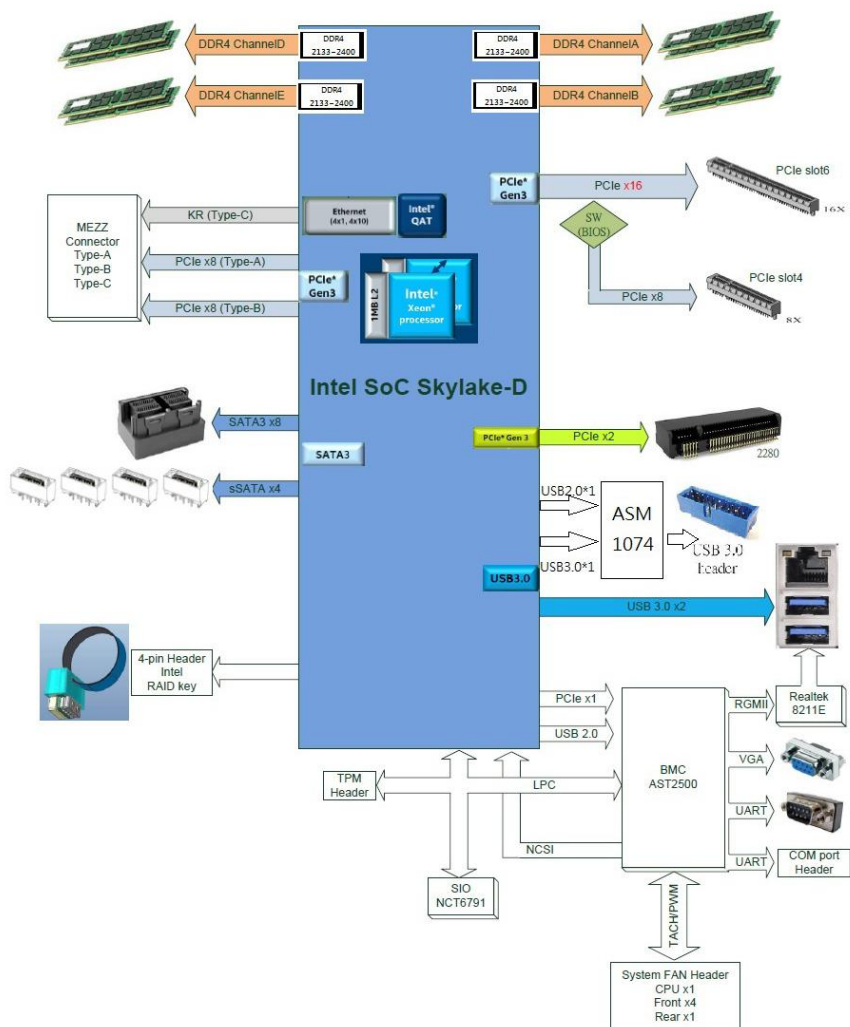
Dedicated IPMI LAN Port LED Indications

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

English

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1.7 Block Diagram



Chapter 2 Installation

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



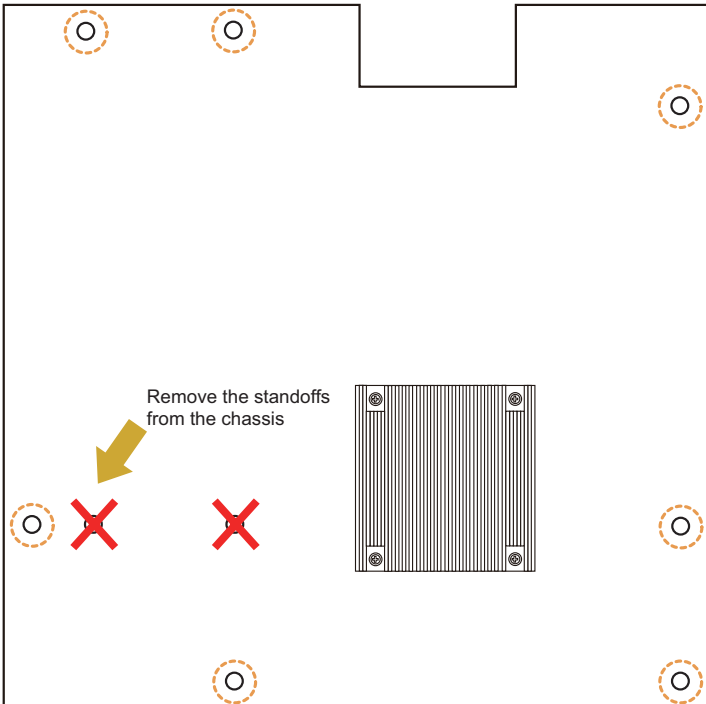
Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.

2.1 Screw Holes

Place screws into the holes indicated by circles to secure the motherboard to the chassis.



Attention! Before installing this motherboard, be sure to unscrew and remove the standoffs 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.

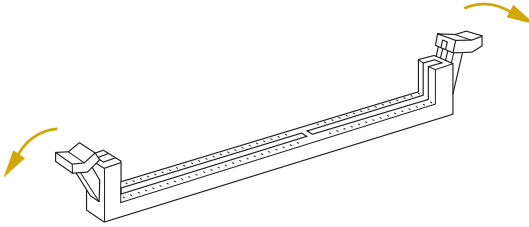


Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

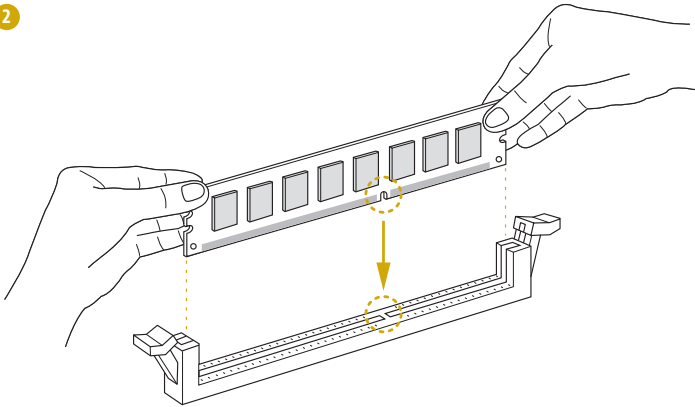
2.3 Installation of Memory Modules

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

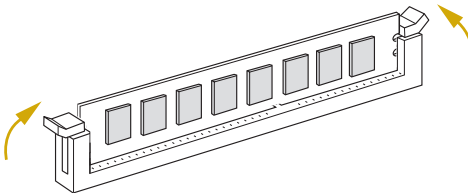
1



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.

2.4 Expansion Slot (PCI Express Slots)

There are 2 PCI Express slots on this motherboard.

PCIe slot:

PCIe4 (PCIe 3.0 x8 slot, from CPU1) is used for PCI Express x8 lane width cards.

PCIe6 (PCIe 3.0 x16 slot, from CPU1) is used for PCI Express x16 lane width cards.

Slot	Generation	Mechanical	Electrical	Source
PCIe4	3.0	x8	x8	CPU1
PCIe6	3.0	x16	x16	CPU1

PCIe Slot Configurations

The PCIe4 slot shares lanes with the PCIe6 slot. When the PCIe4 slot is populated, the PCIe6 slot will operate at up to x8 mode.

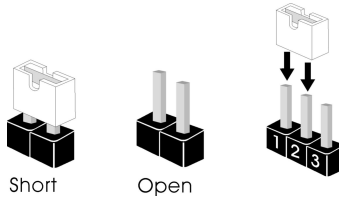
	PCIe4	PCIe6
Single PCIe Card	x0	x16
Two PCIe Cards	x8	x8

Installing an expansion card

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

2.5 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.



Chassis ID Jumpers (3-pin CHASSIS_ID1) (see p.6, No. 6) (3-pin CHASSIS_ID2) (see p.6, No. 4) (3-pin CHASSIS_ID3) (see p.6, No. 3)	1_2 	2_3
	Single Motherboard Indication (Default)	System Level
ME Recovery Jumper (3-pin ME_RECOVERY1) (see p.6, No. 2)	1_2 	2_3
	Normal Mode (Default)	ME Recovery Mode
CPU PECI Mode Jumper (3-pin PECI1) (see p.6, No. 41)	1_2 	2_3
	CPU PECI connect to PCH	CPU PECI connect to BMC (Default)
NCSI Mode Jumper (3-pin NCSI_SEL1) (see p.6, No. 42)	1_2 	2_3
	NCSI is set to onboard LAN1 (Default)	NCSI is set to Mezzanine Card

SATA DOM Power Jumper
(3-pin SATAPWR1)
(see p.6, No. 26)



SATA DOM (SSATA_3)
requires 5V power supply



SATA DOM (SSATA_3)
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, connect the SATA DOM power cable to the SATA DOM power header (SATAPWR1) and there is no need to change the default jumper setting of the SATA DOM Power Jumper (pins 2-3).

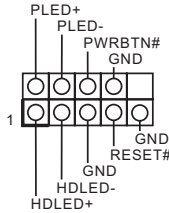
Warning! Incorrect setting of the SATA DOM Power Jumper (SATAPWR1) may cause damage to the motherboard or your SATA DOM.

2.6 Onboard Headers and Connectors



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

System Panel Header
(9-pin PANEL1)
(see p.6, No. 28)



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):

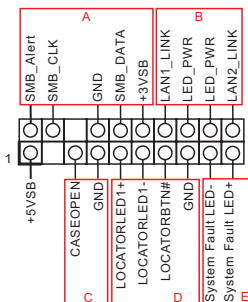
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S4 sleep state or powered off (S5).

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) (see p.6, No. 30)



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

(SSATA_0)

(see p.6, No. 22)

(SSATA_1)

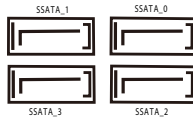
(see p.6, No. 24)

(SSATA_2)

(see p.6, No. 23)

(SSATA_3)

(see p.6, No. 25)



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

Serial ATA3 DOM

Connector

(SSATA_3)

(see p.6, No. 25)

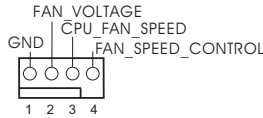


The SATA3 DOM connector supports both a SATA DOM (Disk-On-Module) and a SATA data cable for internal storage device.

CPU Fan Connectors

(4-pin CPU_FAN1)

(see p.6, No. 14)



This motherboard provides one 4-Pin CPU fan (Quiet Fan) connector. 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.*

System Connectors

(4-pin SYSTEM_FAN1)

(see p.6, No. 11)

(4-pin SYSTEM_FAN2)

(see p.6, No. 10)

(4-pin SYSTEM_FAN3)

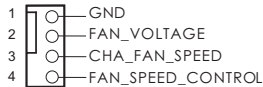
(see p.6, No. 9)

4-pin SYSTEM_FAN4)

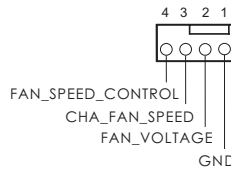
(see p.6, No. 20)

4-pin SYSTEM_FAN5)

(see p.6, No. 1)



Please connect a fan cable to the fan connector and match the black wire to the ground pin. All fans support Fan Control.



Clear CMOS Pads
(CLRMOS1)
(see p.6, No. 18)



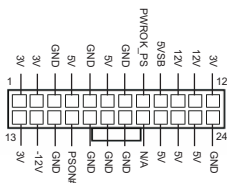
This allows you to clear the data in CMOS. To clear CMOS, take out the CMOS battery and short the Clear CMOS Pad.

Mini-SAS HD Connector
(SATA_0_7)
(see p.6, No. 21)



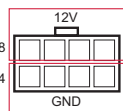
The connector supports MiniSAS-to-SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.

ATX Power Connector
(24-pin ATXPWR1)
(see p.6, No. 7)



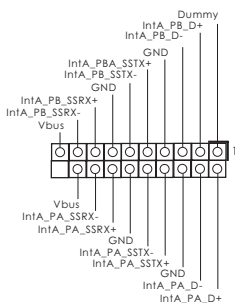
This motherboard provides a 24-pin ATX power connector. To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13.

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



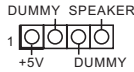
This motherboard provides two 8-pin ATX 12V power connectors.

USB 3.1 Gen1 Header
(19-pin USB3_3_4)
(see p.6, No. 32)



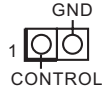
Besides two default USB 3.1 Gen1 ports on the I/O panel, there is one USB 3.1 Gen1 header on this motherboard. This USB 3.1 Gen1 header can support two USB 3.1 Gen1 ports.

Chassis Speaker Header
(4-pin SPEAKER1)
(see p.6, No. 38)



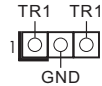
Please connect the chassis speaker to this header.

Non Maskable Interrupt
Button Header
(2-pin NMI_BTN1)
(see p.6, No. 29)



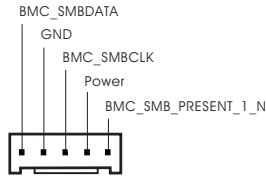
Please connect a NMI device to this header.

Thermal Sensor Header
(3-pin TR1)
(see p.6, No. 27)



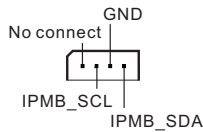
Please connect the thermal sensor cable to either pin 1-2 or pin 2-3 and the other end to the device which you wish to monitor its temperature.

Baseboard Management
Controller SMBus Header
(5-pin BMC_SMB_1)
(see p.6, No. 36)



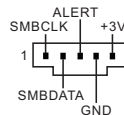
The header is used for the SMBUS devices.

Intelligent Platform
Management Bus Header
(4-pin IPMB1)
(see p.6, No. 35)



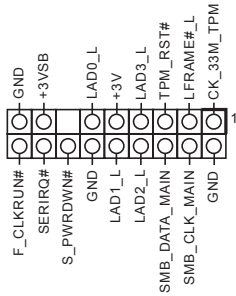
This 4-pin connector is used to provide a cabled base-board or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.

PSU SMBus Header
(5-pin PSU_SMB1)
(see p.6, No. 5)



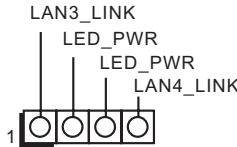
PSU SMBus monitors the status of the power supply, fan and system temperature.

TPM Header
(17-pin TPM1)
(see p.6, No. 33)



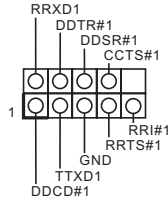
This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

Front LAN LED
Connector
(FRONT_LED_LAN1)
(see p.6, No. 31)



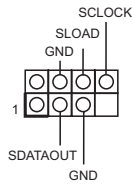
These 4-pin connectors are used for the front LAN status indicator.

Serial Port Header
(9-pin COM2)
(see p.6, No. 34)



This COM header supports a serial port module.

Serial General Purpose
Input/Output Header
(7-pin SSATA_SGPIO1)
(see p.6, No. 19)



This header supports Serial Link interface for onboard SATA connections.

2.7 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

2.8 LED/Switches

Unit Identification
purpose LED/Switch
(UID1)



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

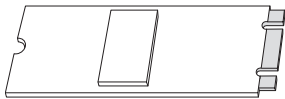
2.9 Driver Installation Guide

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

2.10 M.2_SSD (NGFF) Module Installation Guide

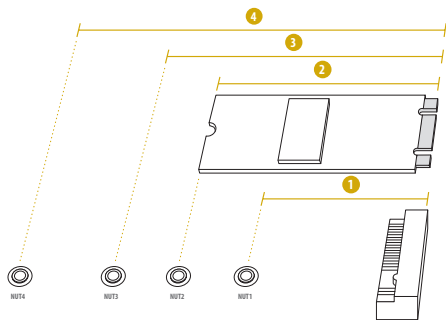
The M.2, also known as the Next Generation Form Factor (NGFF), is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Ultra M.2 Socket (M2_1) supports a M.2 PCI Express module up to Gen 3 x4 (6Gb/s).

Installing the M.2_SSD (NGFF) Module



Step 1

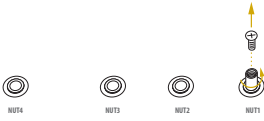
Prepare a M.2_SSD (NGFF) module and the screw.



Step 2

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

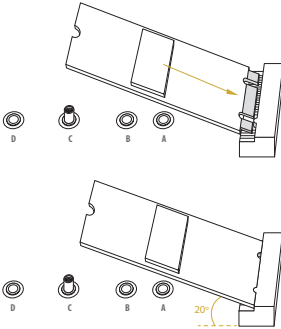
No.	1	2	3	4
Nut Location	NUT30	NUT42	NUT60	NUT80
PCB Length	3cm	4.2cm	6cm	8cm
Module Type	Type 2230	Type 2242	Type2260	Type 2280

Step 3

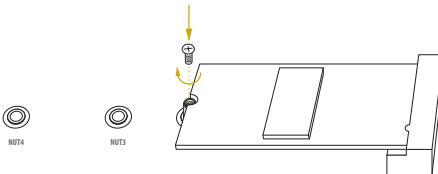
Move the standoff based on the module type and length. The standoff is placed at the nut location D by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.

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 during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY; otherwise, POST will continue with its test routines.

If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctrl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.



Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

3.1.1 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

Item	Description
Main	To set up the system time/date information
Advanced	To set up the advanced UEFI features
Security	To set up the security features
Boot	To set up the default system device to locate and load the Operating System
Event Logs	For event log configuration
Server Mgmt	To manage the server
Exit	To exit the current screen or the UEFI SETUP UTILITY

Use <←→> key or <→> key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen.

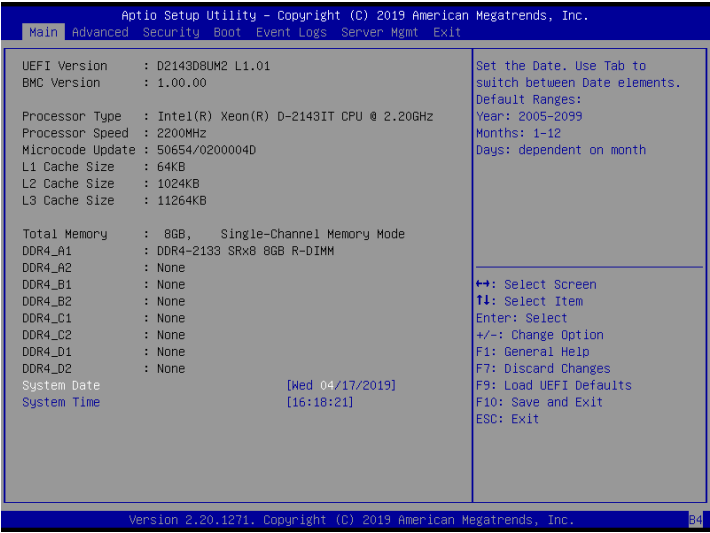
3.1.2 Navigation Keys

Please check the following table for the function description of each navigation key.

Navigation Key(s)	Function Description
← / →	Moves cursor left or right to select Screens
↑ / ↓	Moves cursor up or down to select items
+ / -	To change option for the selected items
<Tab>	Switch to next function
<Enter>	To bring up the selected screen
<PGUP>	Go to the previous page
<PGDN>	Go to the next page
<HOME>	Go to the top of the screen
<END>	Go to the bottom of the screen
<F1>	To display the General Help Screen
<F7>	Discard changes and exit the UEFI SETUP UTILITY
<F9>	Load optimal default values for all the settings
<F10>	Save changes and exit the UEFI SETUP UTILITY
<F12>	Print screen
<ESC>	Jump to the Exit Screen or exit the current screen

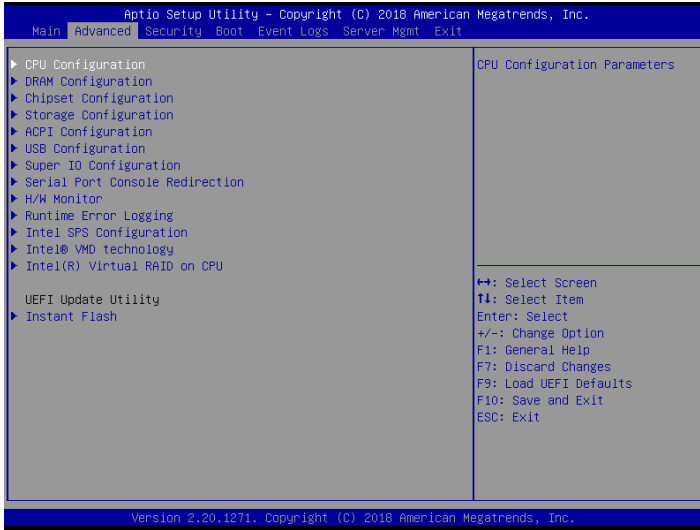
3.2 Main Screen

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



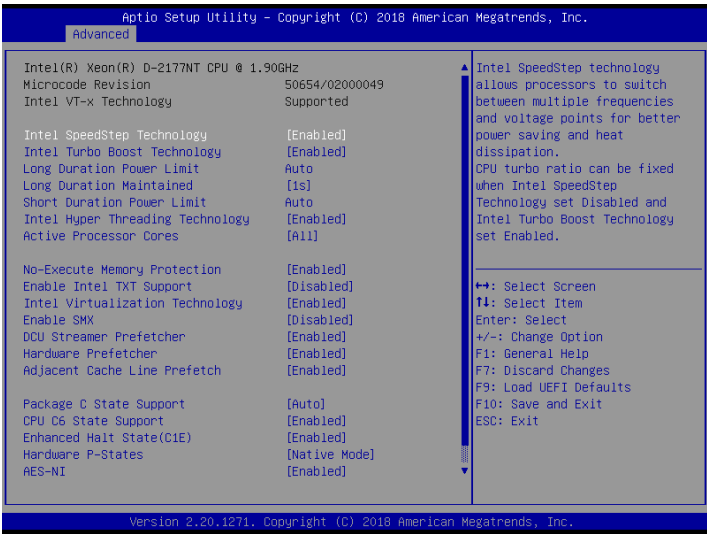
3.3 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, DRAM Configuration, Chipset Configuration, Storage Configuration, ACPI Configuration, USB Configuration, Super IO Configuration, Serial Port Console Redirection, H/W Monitor, Runtime Error Logging, Intel SPS Configuration, Intel(R) VMD Technology, Intel(R) Virtual RAID on CPU 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.

Long Duration Power Limit

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

Long Duration Maintained

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

Limit is exceeded.

Short Duration Power Limit

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

Intel Hyper Threading Technology

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

Active Processor Cores

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

No-Execute Memory Protection

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

Enable Intel TXT Support

Enables Intel Trusted Execution Technology Configuration.

Intel Virtualization Technology

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

Enable SMX

Use this item to enable Safer Mode Extensions.

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.

Package C State Support

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

CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

Enhanced Halt State(C1E)

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

Hardware P-States

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

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

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

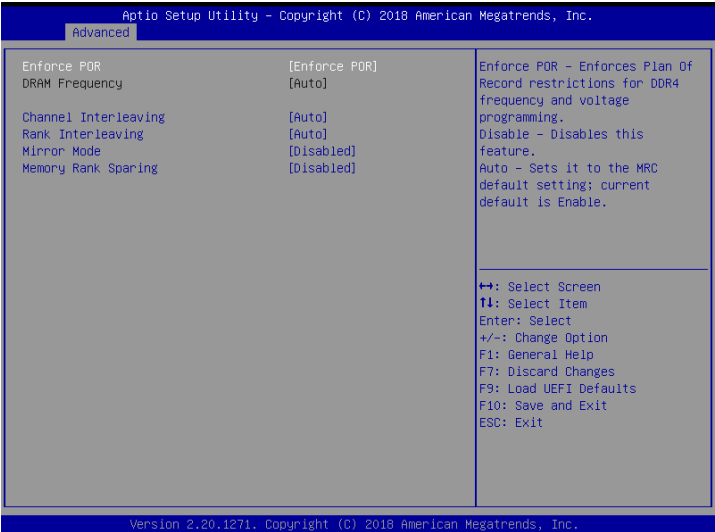
AES-NI

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

CPU Thermal Throttling

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

3.3.2 DRAM Configuration



Enforce POR

Enforce POR - Enforces Plan Of Record restrictions for DDR4 frequency and voltage programming.
Disable - Disables this feature.

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.

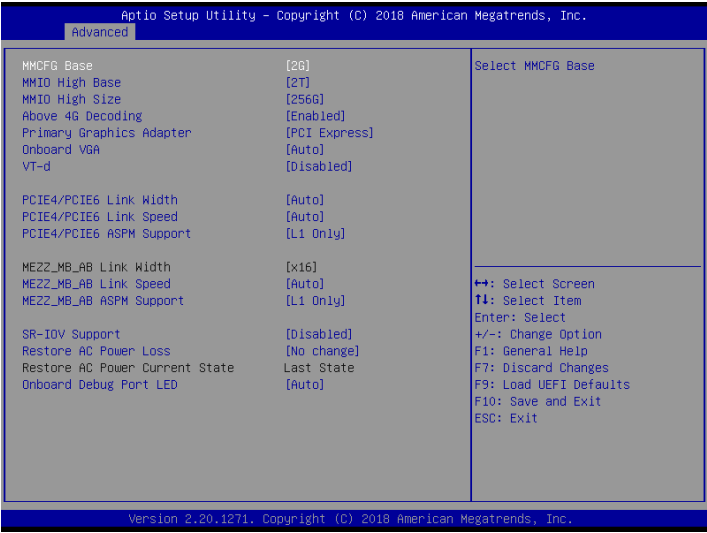
Mirror Mode

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

Memory Rank Sparing

Enable or disable Memory Rank Sparing.

3.3.3 Chipset Configuration



MMCFG Base

Use this item to select MMCFG Base.

MMIO High Base

Use this item to select MMIO High Base.

MMIO High Size

Use this item to select MMIO High Size.

Above 4G Decoding

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

Primary Graphics Adapter

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

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

Onboard VGA

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

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

VT-d

Intel(R) 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.

PCIE4/PCIE6 Link Width

This allows you to select PCIE4/PCIE6 Link Width. The default value is [Auto].

PCIE4/PCIE6 Link Speed

This allows you to select PCIE4/PCIE6 Link Speed. The default value is [Auto].

PCIE4/PCIE6 ASPM Support

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

MEZZ_MB_AB Link Width

This presents MEZZ_MB_AB Link Width. The default value is [x16].

MEZZ_MB_AB Link Speed

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

MEZZ_MB_AB ASPM Support

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

SR-IOV Support

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

Restore AC Power Loss

This allows you to set 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.

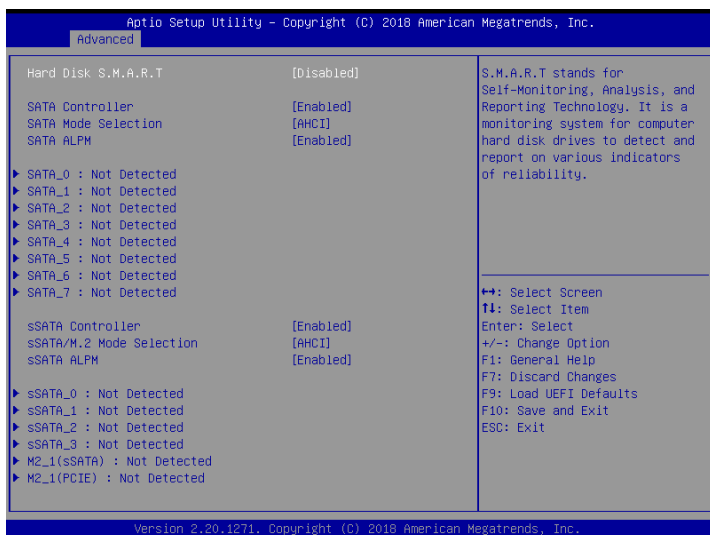
Restore AC Power Current State

This allows you to restore AC Power Current State.

Onboard Debug Port LED

Enable/disable the onboard Dr. Debug LED.

3.3.4 Storage Configuration



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

S.M.A.R.T stands for Self-Monitoring, Analysis, and Reporting Technology. It is a monitoring system for computer hard disk drives to detect and report on various indicators of reliability.

SATA Controller

Use this item to enable or disable SATA Controllers.

SATA Mode Selection

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

SATA ALPM

Use this item to enable or disable Support Aggressive Link Power Management.

SATA Port 0 / 1 / 2 / 3 / 4 / 5 / 6 / 7

Depending on how many SATA ports you have, you will see SATA_x (x means number) listed on the screen, with its status indicated as SATA device [(Model Name)] or [Not Detected].

sSATA Controller

Use this item to enable or disable sSATA Controllers.

sSATA/M.2_SATA Mode Selection

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

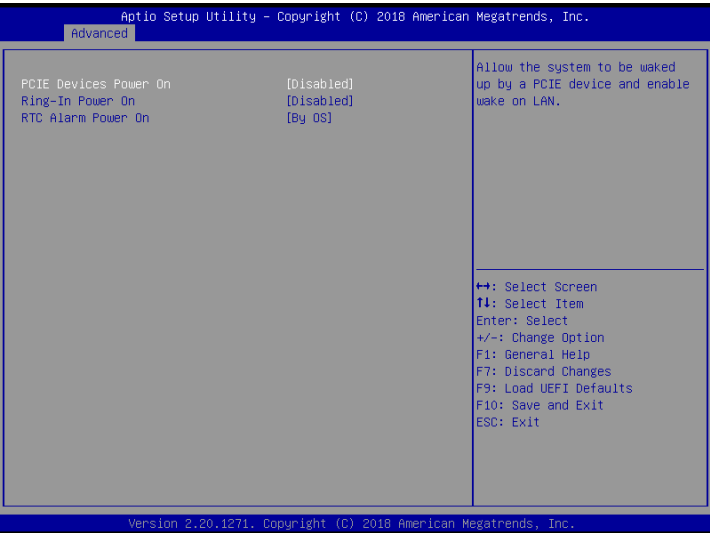
sSATA ALPM

Use this item to enable or disable Support Aggressive Link Power Management.

sSATA Port 0 / 1 / 2 / 3 / M2_1(sSATA) / M2_1(PCIe)

Depending on how many SATA ports you have, you will see sSATA_x (x means number) listed on the screen, with its status indicated as sSATA device [(Model Name)] or [Not Detected].

3.3.5 ACPI Configuration



PCIE Devices Power On

Allow the system to be waked up by a PCIE device and enable wake on LAN.

Ring-In Power On

Use this item to enable or disable Ring-In signals to turn on the system from the powersoft-off mode.

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.

3.3.6 USB Configuration

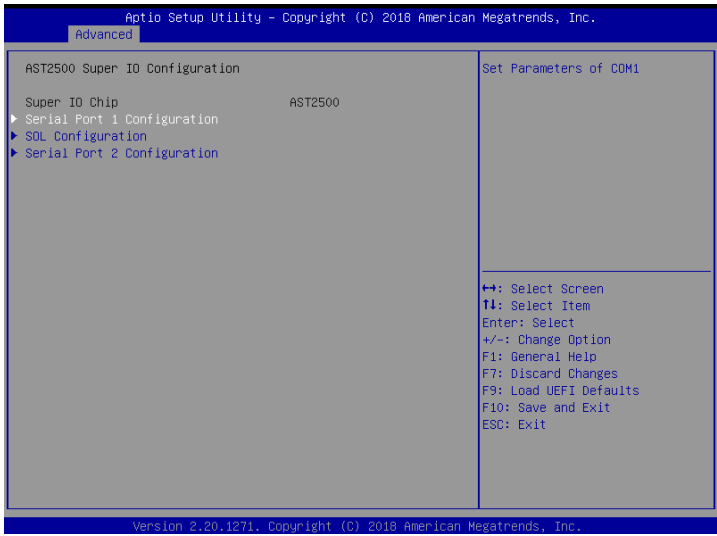


Legacy USB Support

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.

3.3.7 Super IO Configuration



Serial Port 1 Configuration

Use this item to set parameters of COM1.

Serial Port

Use this item to enable or disable the serial port (COM).

Change Settings

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

SOL Configuration

Use this item to set parameters of SOL.

Serial Port

Use this item to enable or disable the serial port (COM).

Change Settings

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

Serial Port 2 Configuration

Use this item to set parameters of COM2.

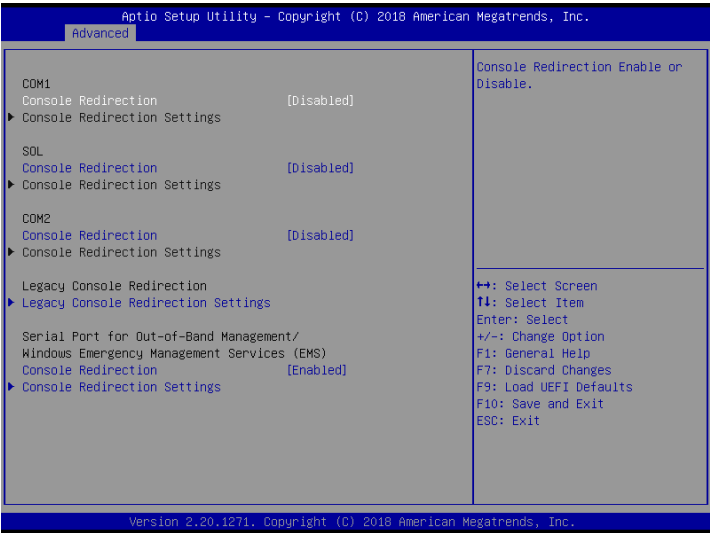
Serial Port

Use this item to enable or disable the serial port (COM).

Change Settings

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

3.3.8 Serial Port Console Redirection



COM 1 / SOL / COM2

Console Redirection

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

Console Redirection Settings

Use this option to configure Console Redirection Settings, and specify how your computer and the host computer to which you are connected exchange information. Both computers should have the same or compatible settings.

Terminal Type

Use this item to select the preferred terminal emulation type for out-of-band management.

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]. A parity bit can be sent with the data bits to detect some transmission errors. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.

Even: parity bit is 0 if the num of 1's in the data bits is even.

Odd: parity bit is 0 if num of 1's in the data bits is odd.

Mark: parity bit is always 1.

Space: Parity bit is always 0.

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.

Putty Keypad

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

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.

Redirection COM Port

Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

Resolution

On Legacy OS, the Number of Rows and Columns supported redirection.

Redirect After POST

When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

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

Console Redirection

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

Console Redirection Settings

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

Out-of-Band Mgmt Port

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

Terminal Type

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

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

Bits Per Second

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

Flow Control

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

CTS], and [Software Xon/Xoff].

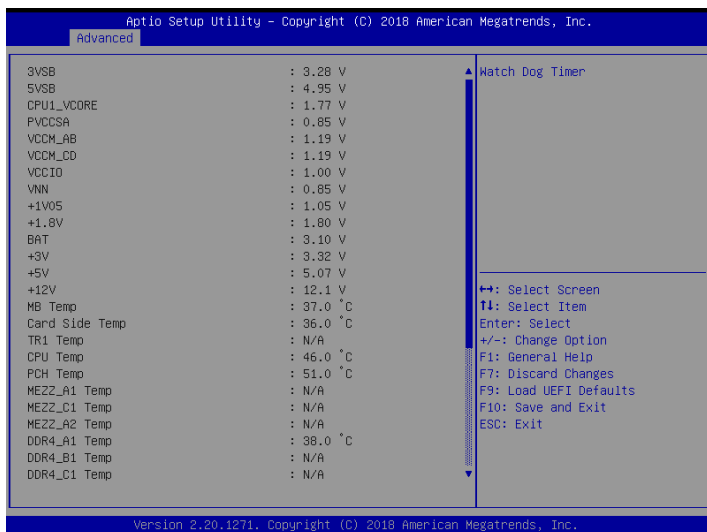
Data Bits

Parity

Stop Bits

3.3.9 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.

CPU_FAN1

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

SYSTEM_FAN1

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

SYSTEM_FAN2

This allows you to set the System fan2's speed. The default value is [Smart Fan].

SYSTEM_FAN3

This allows you to set the System fan3's speed. The default value is [Smart Fan].

SYSTEM_FAN4

This allows you to set the System fan4's speed. The default value is [Smart Fan].

SYSTEM_FAN5

This allows you to set the System fan5'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

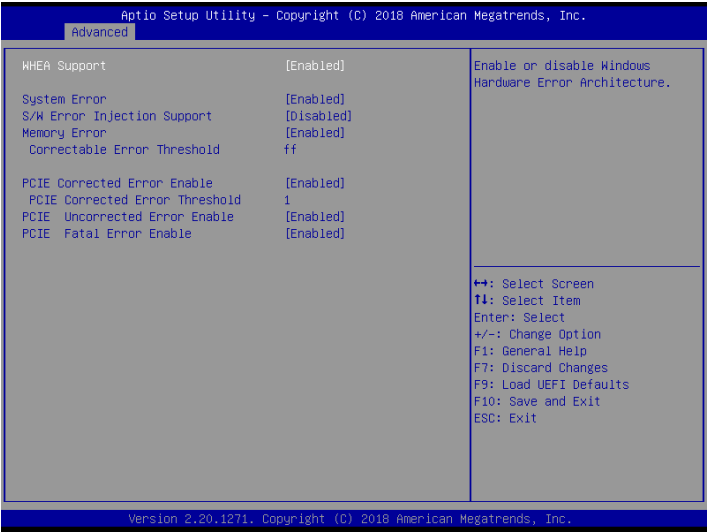
Smart Fan Temp x (x means 1 to 11 stage)

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].

3.3.10 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.

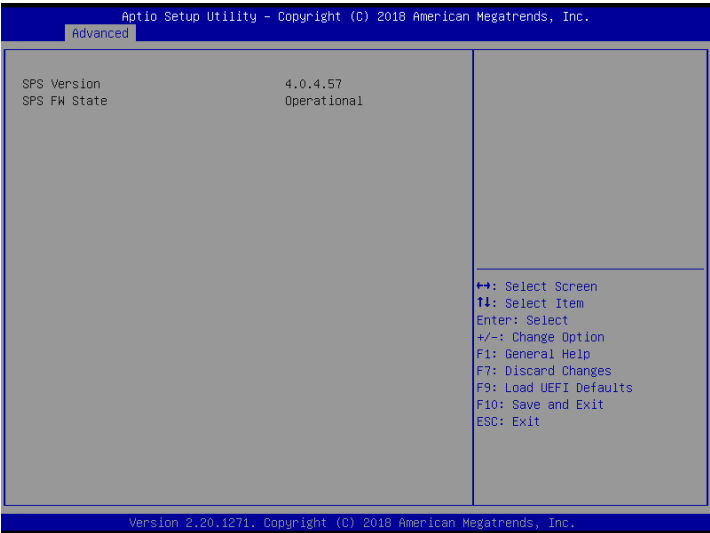
PCIe Uncorrected Error Enable

Use this item to enable or disable PCIe Uncorrectable errors.

PCIe Fatal Error Enable

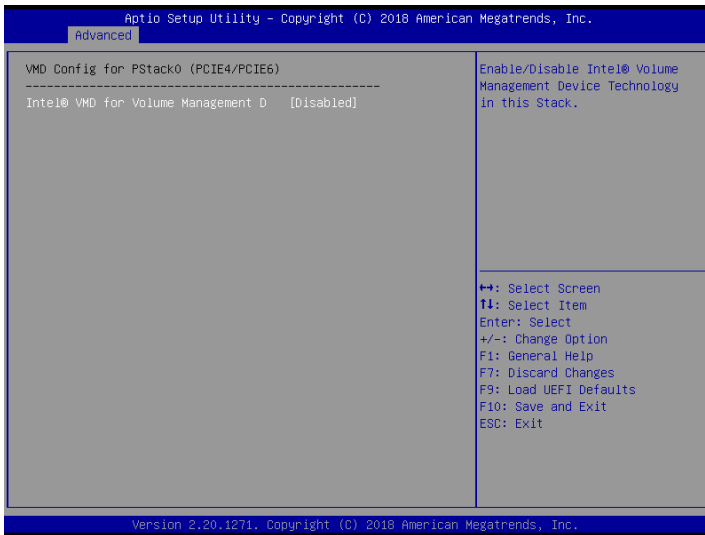
Use this item to enable or disable PCIe Fatal errors.

3.3.11 Intel SPS Configuration



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

3.3.12 Intel(R) VMD Technology



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

Intel(R) VMD for Volume Management Device Technology

Use this item to enable or disable Intel(R) Volume Management Device Technology in this Stack.

When [Enabled], users are allowed to configure the options below.

VMD port 1A

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

VMD port 1B

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

VMD port 1C

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

VMD port 1D

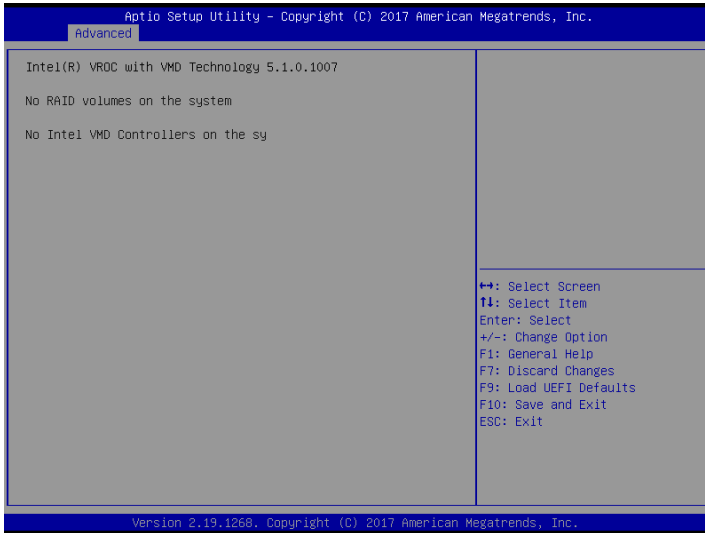
Use this item to enable or disable Intel(R) Volume Management Device Technology on

specific root port.

Hot Plug Capable

Use this item to enable or disable Hot Plug for PCIe Root Ports 1A-1D.

3.3.13 Intel(R) Virtual RAID on CPU



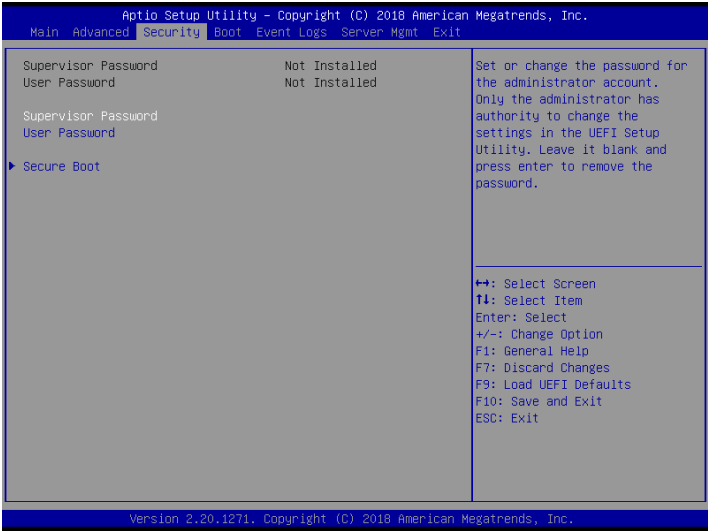
This formset allows the user to manage Intel(R) Virtual RAID on CPU.

3.3.14 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

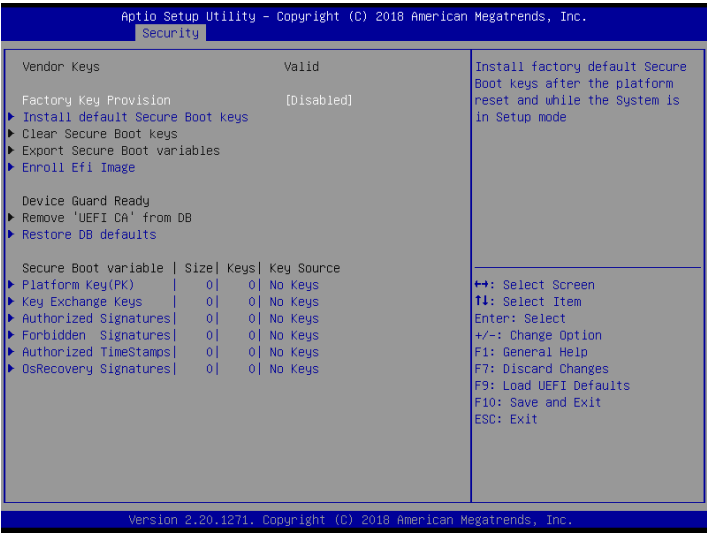
Use this to enable or disable Secure Boot Control. The default value is [Disabled]. Enable to support Windows Server 2012 R2 or later versions Secure Boot.

Secure Boot Mode

Secure Boot mode selector: Standard/Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

3.4.1 Key Management

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



Factory Key Provision

Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

Install Default Secure Boot Keys

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

Clear Secure Boot keys

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

Export Secure Boot variables

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

Enroll Efi Image

Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).

Remove 'UEFI CA' from DB

Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database (db).

Restore DB defaults

Restore DB variable to factory defaults.

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)
- c) EFI_CERT_RSA2048 (bin)
- d) EFI_CERT_SHA256, 384, 512

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, External, Mixed

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: Factory, External, Mixed

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: Factory, External, Mixed

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: Factory, External, Mixed

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: Factory, External, Mixed

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

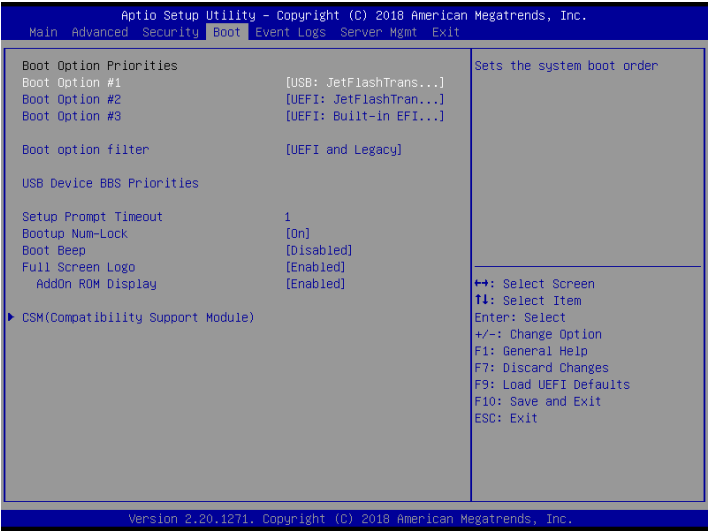
2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed, Test

3.5 Boot Screen

In this section, it will display the available devices on your system for you to configure the boot settings and the boot priority.



Boot Option #1

Use this item to set the system boot order.

Boot Option #2

Use this item to set the system boot order.

Boot Option #3

Use this item to set the system boot order.

Boot Option Filter

This option controls Legacy/UEFI ROMs priority.

USB Device BBS Priorities

This page will show only when system install USB Storage.

Setup Prompt Timeout

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

Bootup Num-Lock

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

Boot Beep

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

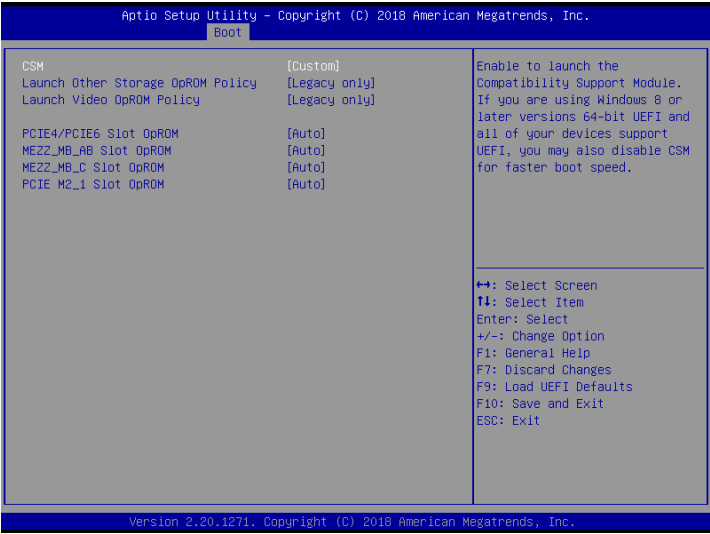
Full Screen Logo

Enable to display the boot logo or disable to show normal POST messages

AddOn ROM Display

Use this option to adjust AddOn ROM Display. If you enable the option “Full Screen Logo” but you want to see the AddOn ROM information when the system boots, please select [Enabled]. Configuration options: [Enabled] and [Disabled]. The default value is [Enabled].

3.5.1 CSM(Compatibility Support Module)



CSM

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

Launch PXE OPROM Policy

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

Launch Other Storage OpROM Policy

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

Launch Video OpROM Policy

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

PCIE4/PCIE6 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.)

Mezz_MB_AB 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.)

Mezz_MB_C 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.)

PCIE 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.)

3.6 Event Logs



Change Smbios Event Log Settings

This allows you to configure the Smbios Event Log Settings.

When entering the item, you will see the followings:

Smbios Event Log

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

Erase Event Log

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

When Log is Full

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

Log System Boot Event

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

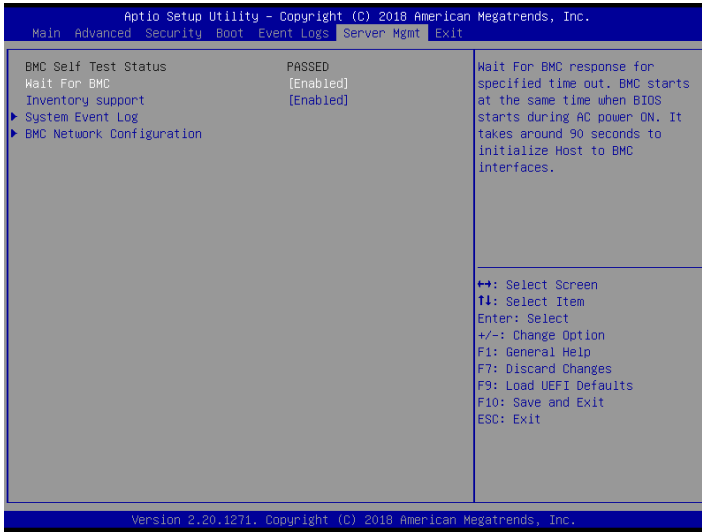
View Smbios Event Log

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



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

3.7 Server Mgmt



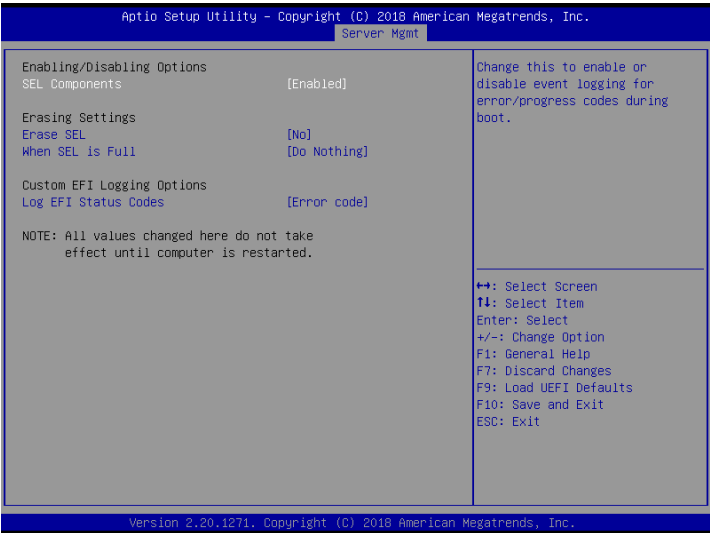
Wait For BMC

Wait For BMC response for specified time out. BMC starts at the same time when BIOS starts during AC power ON. It takes around 90 seconds to initialize Host to BMC interfaces.

Inventory Support

This will execute inventory function for system. Enabling this item will take some time at system boot.

3.7.1 System Event Log



SEL Components

Change this to enable or disable event logging for error/progress codes during boot.

Erase SEL

Use this to choose options for erasing SEL.

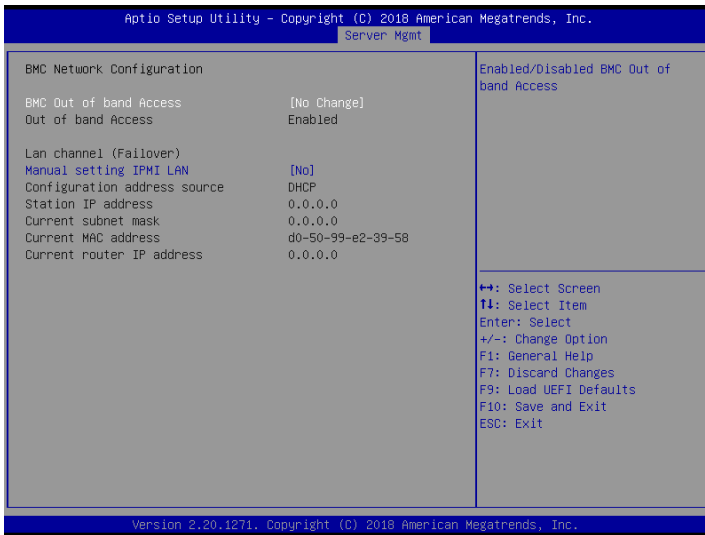
When SEL is Full

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

Log EFI Status Codes

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

3.7.2 BMC Network Configuration



BMC Out of Band Access

Enabled/Disabled BMC Out of band Access.

Lan Channel (Failover)

Manual Setting IPMI LAN

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

Configuration Address Source

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

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

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



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



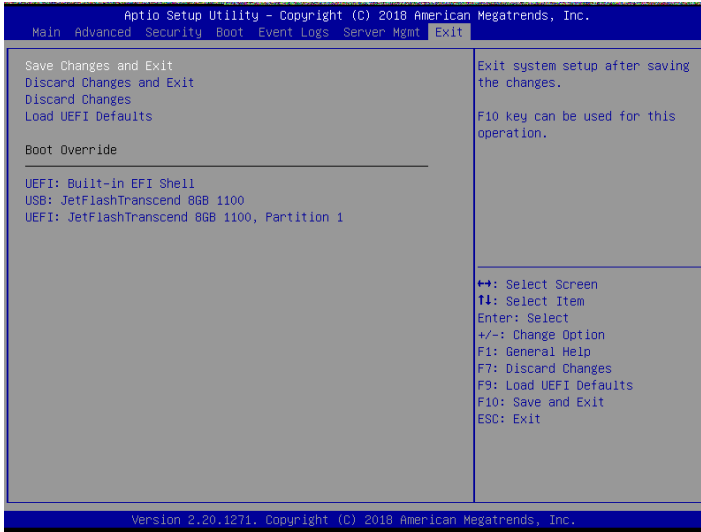
The default login information for the IPMI web interface is:

Username: admin

Password: admin

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

3.8 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® Server 2012 R2 / 2016 / Linux compliant. Because motherboard settings and hardware options vary, use the setup procedures in this chapter for general reference only. Refer to your OS documentation for more information.

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 RDIMM and LRDIMMs.
3. If you have installed more than one DIMM modules, they should be identical with the same brand, speed, size and chip-type.
4. Try inserting different DIMM modules into different slots to identify faulty ones.
5. Check the settings of the 115V/230V switch on the power supply.

Unable to save system setup configurations...

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

Other problems...

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

5.2 Technical Support Procedures

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

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

You may contact ASRock Rack's technical support at:

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

5.3 Returning Merchandise for Service

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

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

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

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

Appendix Mezzanine Card Support List

This motherboard supports the following ASRock Rack mezzanine cards.

Mezz Card Type	Mezz Slot Type	Model
LAN Card	Mezz Type A	M350
LAN Card	Mezz Type A	M350R
LAN Card	Mezz Type A	M540
LAN Card	Mezz Type A	M599
LAN Card	Mezz Type A	M599R (v2.0 or above)
LAN Card	Mezz Type A	M710
LAN Card	Mezz Type A	MX710R
LAN Card	Mezz Type A	MCX3
LAN Card	Mezz Type A	MCX4LX
Storage Card	Mezz Type A	M3008S
PHY Card	Mezz Type C	MP-557R2
PHY Card	Mezz Type C	MP-557R4
PHY Card	Mezz Type C	MP-1543R4
PHY Card	Mezz Type C	MP-4223R4
PHY Card	Mezz Type C	MP-4227R2

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

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

Appendix TPM Module Support List

This motherboard supports the following Trusted Platform Module (TPM) modules.

- Nuvoton Module (1.2)
- Nuvoton Module (2.0)
- Infineon Module (2.0)