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GREEN Less Heat, Less Power Consumption

STABLE Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

GNRD16QM3-NL

User Manual

English



Version 1.10

Published Jan. 2026

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WARNING



THIS PRODUCT CONTAINS A BUTTON BATTERY

If swallowed, a button battery can cause serious injury or death.

Please keep batteries out of sight or reach of children

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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"

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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.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



ASRock Rack INC. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related Directives. Full text of EU declaration of conformity is available at: <http://www.asrockrack.com>

ASRock Rack follows the green design concept to design and manufacture our products, and makes sure that each stage of the product life cycle of ASRock Rack product is in line with global environmental regulations. In addition, ASRock Rack disclose the relevant information based on regulation requirements.

Please refer to <https://www.asrockrack.com/general/about.asp?cat=Responsibility> for information disclosure based on regulation requirements ASRock Rack is complied with.



ASRock Rack INC. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related UKCA Directives. Full text of UKCA declaration of conformity is available at: <http://www.asrockrack.com>



DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

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Chapter 1 Introduction

Thank you for purchasing ASRock Rack **GNRD16QM3-NL** 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 Software Support.



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. Find the latest memory and CPU support lists on ASRock Rack website as well. ASRock Rack's Website: www.ASRockRack.com

*Please visit the website for specific information and technical support:
<http://www.asrockrack.com/support/>*

1.1 Package Contents

- ASRock Rack GNRD16QM3-NL Motherboard
(EEB Form Factor: 12" x 14", 30.48cm x 35.56cm)
- Quick Installation Guide
- 1 I/O Shield
- 2 Screws for M.2 Sockets
- 2 CPU Non-Fabric carriers (1xE2A, 1xE2B)



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

1.2 Specifications

GNRD16QM3-NL	
Physical Status	
Form Factor	EEB
Dimension	12" x 14" (30.48cm x 35.56cm)
Processor System	
CPU	Supports Intel® Xeon® 6700P-series, 6500P-series, and 6700E-series processors
Socket	1 Socket E2 (LGA4710)
Chipset	System on Chip
System Memory	
Supported DIMM Quantity	16 DIMM slots (2DPC)
Supported Type	DDR5 RDIMM DDR5 MRDIMM (1DPC only)
Max. Capacity per DIMM	RDIMM: 128GB MRDIMM: 64GB
Max. DIMM Frequency	RDIMM: 6400MT/s (1DPC), 5200MT/s (2DPC) MRDIMM: 8000MT/s (1DPC only)
Voltage	1.1V
<i>Note: Memory capacity, frequency, and voltage support are to be validated.</i>	
Other PCIe Expansion Connectors	
M.2	2 M-key (PCIe5.0 x2), supports 22110/2280 form factor
MCIO	8 MCIO (PCIe5.0 / CXL2.0 x8)
Ethernet	
OCP	1 OCP NIC3.0 (PCIe5.0)
Server Management	
BMC Controller	ASPEED AST2600: IPMI2.0 with iKVM and vMedia support
IPMI Dedicated GLAN	1 Realtek RTL8211F for dedicated management GLAN
Graphics	
Controller	ASPEED AST2600: 1 DB15 (VGA)
Rear I/O	
UID Button/LED	1 UID button w/ LED
Video Port	1 DB15 (VGA)
USB Port	2 Type-A (USB3.2 Gen1)
LAN Port	1 dedicated IPMI

Internal Connectors/Headers	
Power Connectors	1 (24-pin, ATX main power), 4 (8-pin, ATX 12V)
Auxiliary Panel Header	1 (18-pin): chassis intrusion, system fault LED, locate, SMBus
System Panel Header	1 (9-pin): power switch, reset switch, system power LED, HDD activity LED
VROC Header	1
COM Header	1 (9-pin)
Fan Headers	8 (6-pin)
NMI Header	1
TPM Header	1 (13-pin, SPI)
HSBP	1
SMBus Headers	2
PMbus Header	1
IPMB Header	1
Clear CMOS	1 (contact pads)
USB Header	1 (19-pin, 1 USB3.2 Gen1+1 USB2.0)
LED Indicators	
Standby Power LED	1 (3.3VSB)
80 Debug Port LED	1
Fan Fail LED	8
BMC Heartbeat LED	1
Other LEDs	1 CPLD Heartbeat LED, 1 SYS PWROK LED, 1 System Caterr LED
System BIOS	
Type	AMI 512Mb SPI Flash ROM
Features	Plug and Play, ACPI 4.0 and above compliance wake up events, SMBIOS 3.4 and above, ASRock Rack Instant Flash
Hardware Monitor	
Temperature	CPU, MB, Card Side, RAM Temperature Sensing
Fan	Fan Tachometer CPU Quiet Fan (Allow Chassis Fan Speed Auto-Adjust by CPU Temperature) Fan Multi-Speed Control
Voltage	1.8V_CPU +BAT, PVNN_CPU, 3.3V, 12V, 3.3VSB, 5VSB, 12V

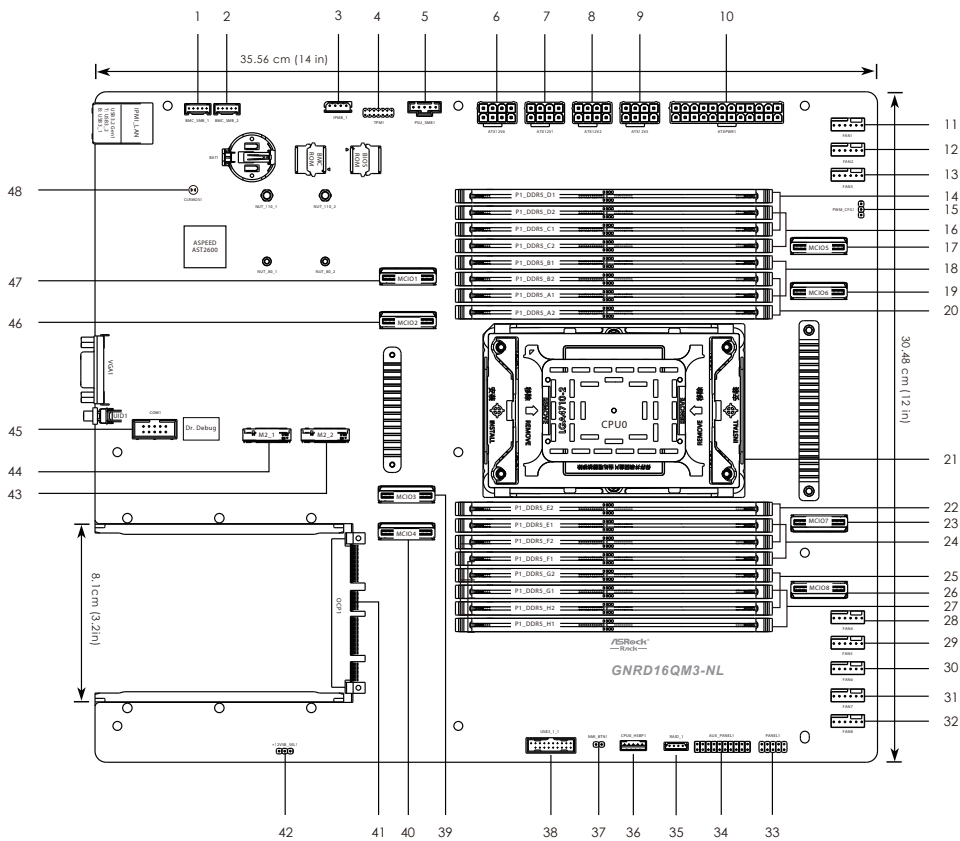
Support OS	
OS	Microsoft® Windows® - Server 2022 (64bit) - Server 2025 (64bit) Linux - Red Hat Enterprise Linux Server 9.4 (64 bit) / 10.0 (64bit) - SUSE Enterprise Linux Server 15 SP6 (64bit) - Ubuntu 24.04 (64bit) / 24.10 (64bit) / 25.04 (64bit) Hypervisor: - VMWare® ESXi / 8.0U3e <i>*Ubuntu/SUSE/VMware don't support Raid Mode</i> <i>*Please refer to the website for the latest OS support list.</i>
Environment	
Temperature	Operation temperature: 10°C ~ 35°C Non operation temperature: -40°C ~ 70°C
Humidity	Non operation humidity: 20% ~ 90% (Non condensing)

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

1.3 Unique Features

ASRock Rack Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows user to update system BIOS without entering operating systems first like MS-DOS or Windows*. With this utility, 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 the USB flash drive, floppy disk or hard drive, then update the 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

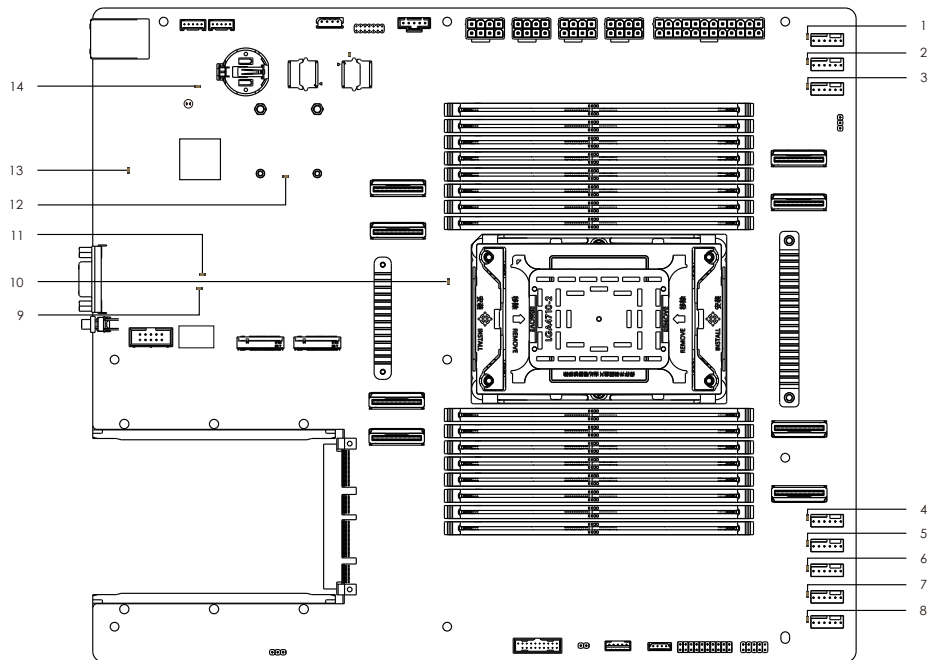


No.	Description
1	BMC SMBus Header (BMC_SMB_1)
2	BMC SMBus Header (BMC_SMB_2)
3	Intelligent Platform Management Bus Header (IPMB_1)
4	SPI TPM Header (TPM1)
5	PSU SMBus Header (PSU_SMB1)
6	ATX 12V Power Connector (ATX12V4)
7	ATX 12V Power Connector (ATX12V1)
8	ATX 12V Power Connector (ATX12V2)
9	ATX 12V Power Connector (ATX12V3)
10	ATX Power Connector (ATXPWR1)
11	System Fan Header (FAN1)
12	System Fan Header (FAN2)
13	System Fan Header (FAN3)
14	2 x 288-pin DDR5 DIMM Slots (P1_DDR5_C1, P1_DDR5_D1)*
15	PWM Configuration Header (PWM_CFG1)
16	2 x 288-pin DDR5 DIMM Slots (P1_DDR5_C2, P1_DDR5_D2)*
17	Mini Cool Edge IO Connector (MCIO5)
18	2 x 288-pin DDR5 DIMM Slots (P1_DDR5_A1, P1_DDR5_B1)*
19	Mini Cool Edge IO Connector (MCIO6)
20	2 x 288-pin DDR5 DIMM Slots (P1_DDR5_A2, P1_DDR5_B2)*
21	Socket E2 (LGA4710) (CPU0)
22	2 x 288-pin DDR5 DIMM Slots (P1_DDR5_E2, P1_DDR5_F2)*
23	Mini Cool Edge IO Connector (MCIO7)
24	2 x 288-pin DDR5 DIMM Slots (P1_DDR5_E1, P1_DDR5_F1)*
25	2 x 288-pin DDR5 DIMM Slots (P1_DDR5_G2, P1_DDR5_H2)*
26	Mini Cool Edge IO Connector (MCIO8)
27	2 x 288-pin DDR5 DIMM Slots (P1_DDR5_G1, P1_DDR5_H1)*
28	System Fan Header (FAN4)
29	System Fan Header (FAN5)
30	System Fan Header (FAN6)
31	System Fan Header (FAN7)
32	System Fan Header (FAN8)
33	System Panel Header (PANEL1)
34	Auxiliary Panel Header (AUX_PANEL1)

No.	Description
35	Virtual RAID On CPU Header (RAID_1)
36	Backplane PCI Express Hot-Plug Connector (CPU0_HSBP1)
37	Non Maskable Interrupt Button (NMI_BTN1)
38	USB 3.2 Gen1 Header (USB3_1_1)
39	Mini Cool Edge IO Connector (MCIO3)
40	Mini Cool Edge IO Connector (MCIO4)
41	OCN NIC3.0 Slot (OCN1)
42	OCN +12VSB Power Jumper (+12VSB_SEL1)
43	M.2 Socket (M2_2) (Type 2280/22110)
44	M.2 Socket (M2_1) (Type 2280/22110)
45	COM Port Header (COM1)
46	Mini Cool Edge IO Connector (MCIO2)
47	Mini Cool Edge IO Connector (MCIO1)
48	Clear CMOS Pad (CLRMOS1)

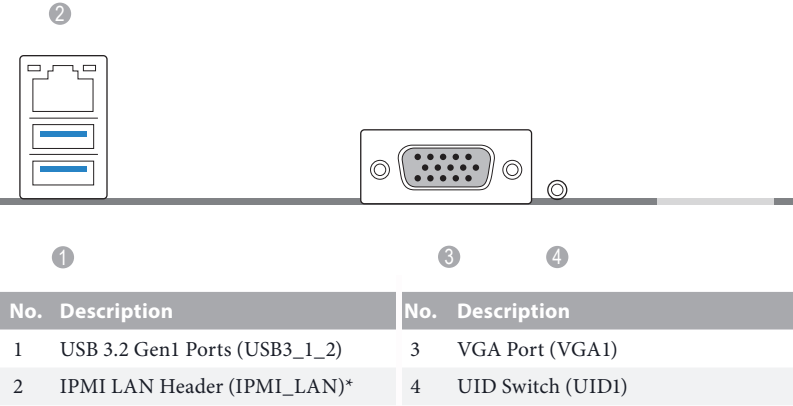
**For DIMM installation and configuration instructions, please see p.19 (Installing the Memory Modules (DIMM)) for more details.*

1.5 Onboard LED Indicators



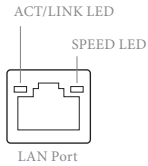
No.	Item	Status	Description
1	LED_FAN1	Red	FAN1 failed
2	LED_FAN2	Red	FAN2 failed
3	LED_FAN3	Red	FAN3 failed
4	LED_FAN4	Red	FAN4 failed
5	LED_FAN5	Red	FAN5 failed
6	LED_FAN6	Red	FAN6 failed
7	LED_FAN7	Red	FAN7 failed
8	LED_FAN8	Red	FAN8 failed
9	SB_PWR1	Green	STB PWR ready
10	LED_CATERR1	Red	CPU caterr failed
11	LED_SYS_PWROK1	Green	System PWR ready
12	LED_CPLD_HB1	Green	CPLD heartbeat LED
13	LED_SYSTEM_FAULT1	Yellow	Controlled by BMC
14	BLED1	Blinking four times and then off	Start initialization after AC power-on or BMC reset
		Blinking at 1Hz	BMC ready
		Steady on	Error
		Steady off	(The actual behavior depends on the state at the time of failure)
		Other frequency	

1.6 I/O Panel



LAN Port LED Indications

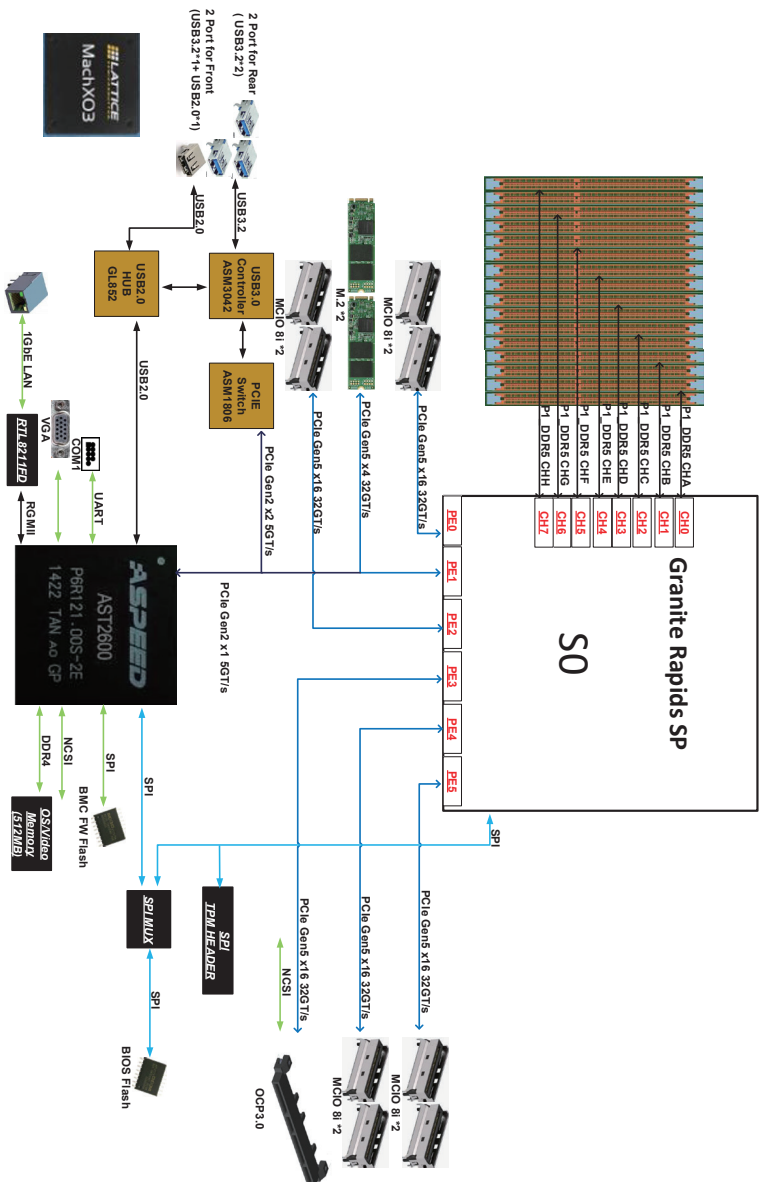
*There is an LED on both sides of IPMI LAN port. Please refer to the table below for the LAN port LED indications.



IPMI LAN Port LED Indications

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

1.7 Block Diagram



Chapter 2 Installation

This is a EEB form factor (12" x 14", 30.48cm x 35.56cm) motherboard. Before installing the motherboard, study the configuration of the chassis to ensure that the motherboard fits into it.



1. Ensure the motherboard battery is installed before unplugging the power cord or installing/removing the motherboard.
2. Before installing or removing any component, ensure that the power supply is 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.

2.1 Screw Holes

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



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

2.2 Pre-installation Precautions

Take note of the following precautions before installing 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 the motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before handling the components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever 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.

2.3 Installing the CPU and Heatsink

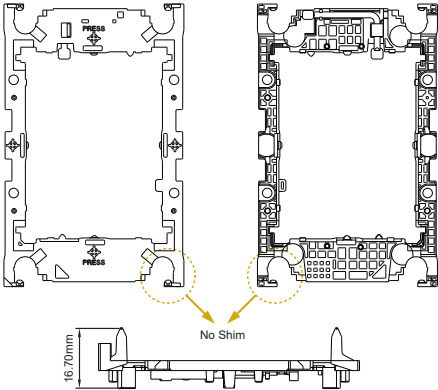


1. Unplug all power cables before installing the CPU.
2. Illustration in this documentation are examples only.

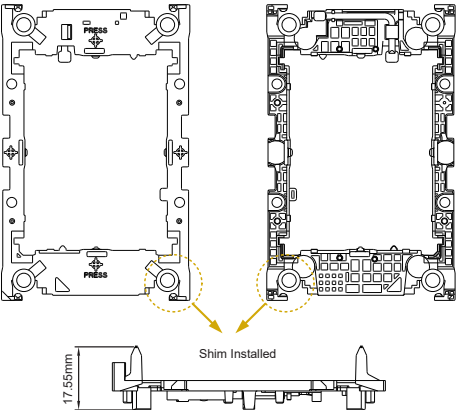
Carrier Used

Carrier Type	Xeon® SP XCC	Xeon® SP HCC/LCC/HDCC
Carrier Code	E2A	E2B
Shim	No	Yes
Carrier Height	16.70mm	17.55mm

XCC Carrier



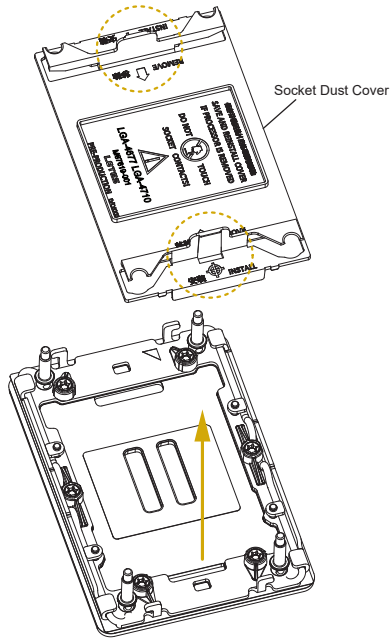
HCC/LCC/HDCC Carrier





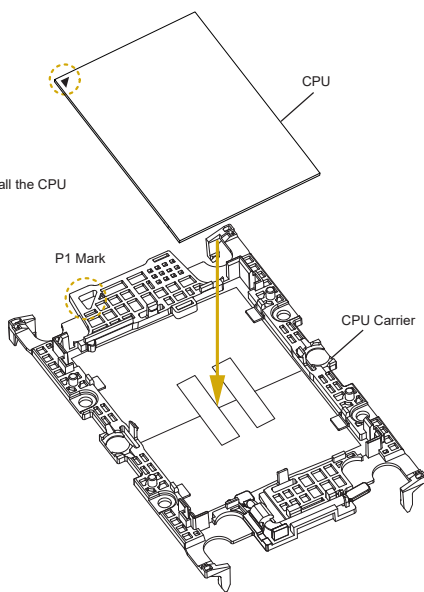
1. Before inserting the CPU into the socket, please check if the PnP cap is on the socket, if the CPU surface is unclean, or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all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

1

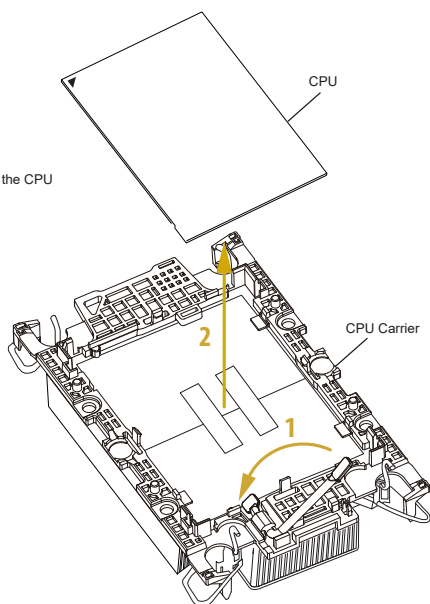


2

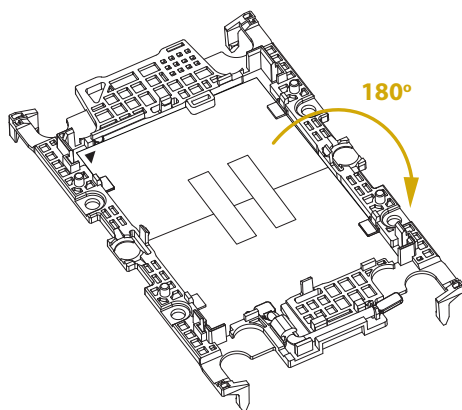
Installing CPU:
Align the Pin1 mark to install the CPU



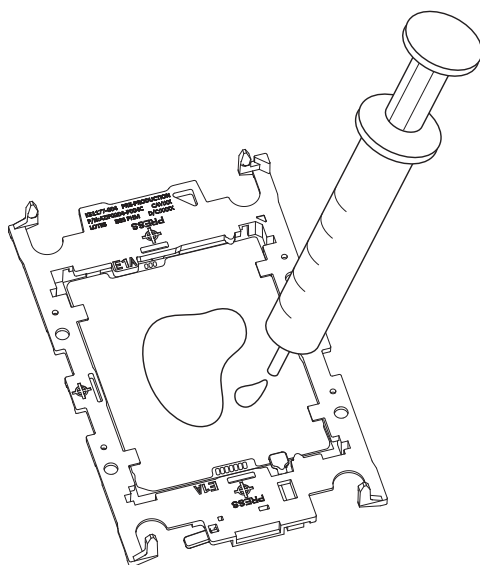
Removing CPU:
Press the lever to remove the CPU



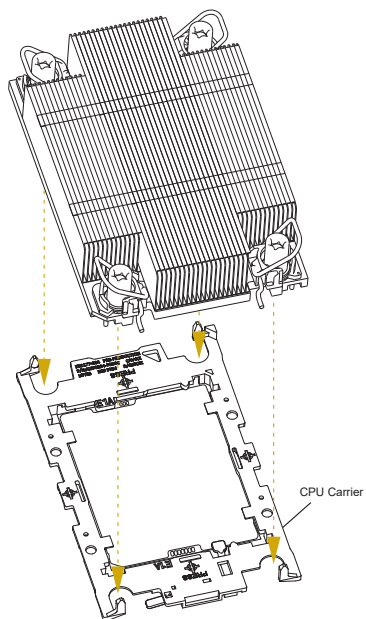
3



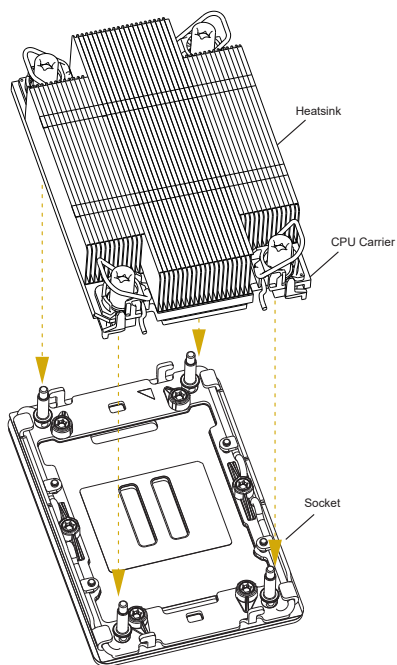
4



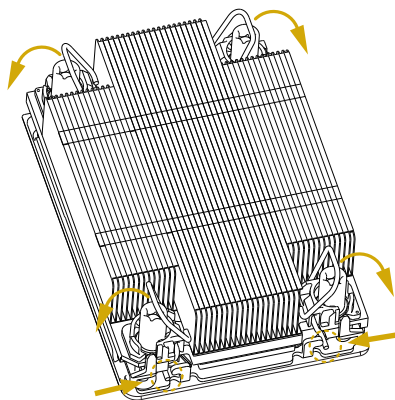
5



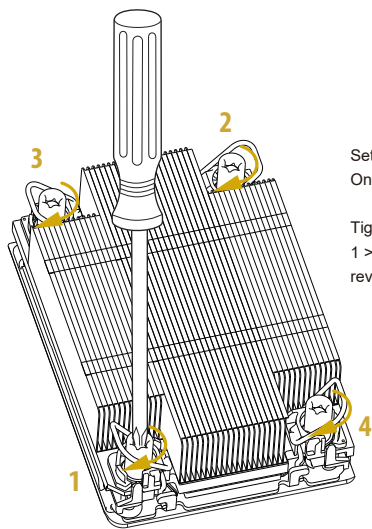
6



7



8



Set the torque wrench to 6-12 in-lb.
One fourth a turn each time.

Tighten the screws in a sequential order
 $1 > 2 > 3 > 4$. Loosen the screws in a
reverse order.

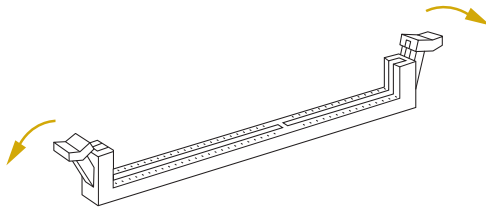
2.4 Installing the Memory Modules (DIMM)

This motherboard provides sixteen 288-pin DDR5 (Double Data Rate 5) DIMM slots in two groups, and supports Dual Channel Memory Technology.

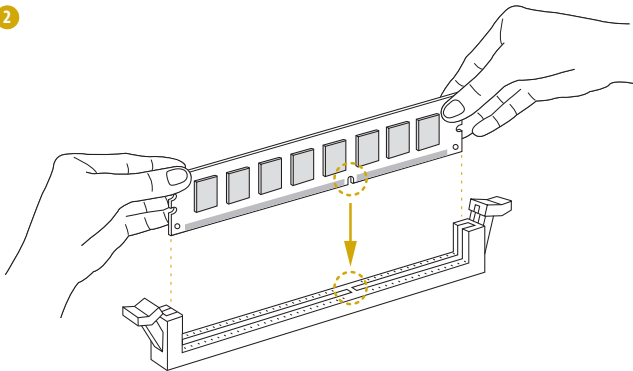


1. It is not allowed to install a DDR, DDR2, DDR3 or DDR4 memory module into a DDR5 slot; otherwise, this motherboard and DIMM may be damaged.
2. For dual channel configuration, it always needs to install identical (the same brand, speed, size and chip-type) DDR5 DIMM pairs.
3. It is unable to activate Dual Channel Memory Technology with only one or three memory module installed.

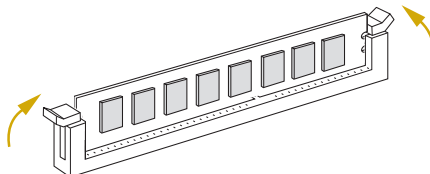
1



2



3



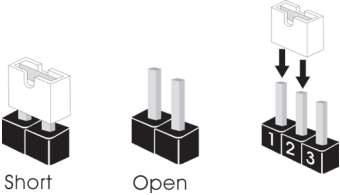
Recommended Memory Configurations

DIMM Slot		DIMM Number					
		1	4	4	8	8	16
CPU0	A1	V	V		V		V
	A2				V		V
	B1			V		V	V
	B2					V	V
	C1		V		V		V
	C2				V		V
	D1			V		V	V
	D2					V	V
	E1		V		V		V
	E2				V		V
	F1			V		V	V
	F2					V	V
	G1		V		V		V
	G2				V		V
	H1			V		V	V
	H2					V	V

The symbol V indicates the slot is populated.

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.



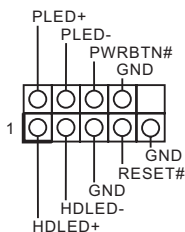
OCP +12VSB Power Jumper (3-pin +12VSB_SEL1) (see p.6, No. 42)	1_2	2_3
		
	Enable +12VSB for OCP3 PWR (Default)	Disable +12VSB for OCP3 PWR

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. 33)



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. Configure the way to turn off the 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):

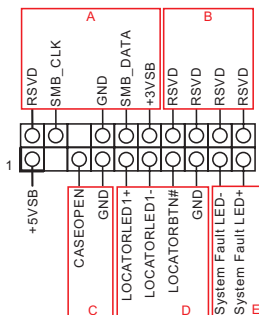
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S4 sleep state or powered off (S5).

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 the 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. 34)



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



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

This header allows user 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. Reserved pin (4-pin RSVD)

These 4-pin are reserved for specified resource or device using.

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.

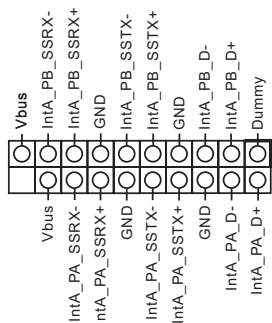
D. Locator LED (4-pin LOCATOR)

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

E. System Fault LED (2-pin SYSTEM STATUS)

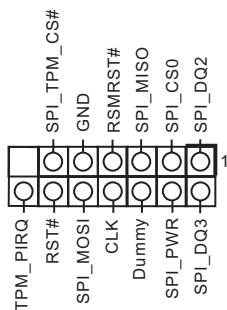
This header is for the Fault LED on the system.

USB 3.2 Gen1 Header
(19-pin USB3_1_1)
(see p.6, No. 38)



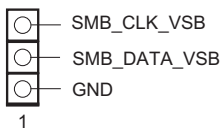
Besides two default USB 3.2 Gen1 ports on the I/O panel, there is one USB 3.2 Gen1 header on this motherboard. This USB 3.2 Gen1 header can support one USB 3.2 Gen1 and one USB2.0 ports.

SPI TPM Header
(13-pin TPM1)
(see p.6, No. 4)



This connector supports SPI 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.

PWM Configuration Header
(3-pin PWM_CFG1)
(see p.6, No.15)



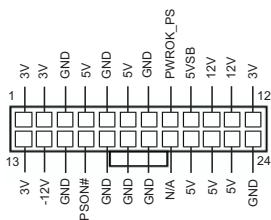
The header is used for PWM configurations.

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



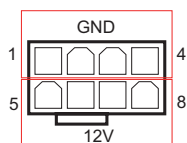
Please connect a NMI device to this header.

ATX Power Connector
(24-pin ATXPOWER1)
(see p.6, No. 10)



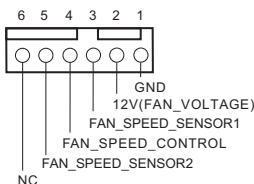
This motherboard provides a 24-pin ATX power connector.
To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13.

ATX Power Connectors
(8-pin ATX12V1)
(see p.6, No. 7)
(8-pin ATX12V2)
(see p.6, No. 8)
(8-pin ATX12V3)
(see p.6, No. 9)
(8-pin ATX12V4)
(see p.6, No. 7)



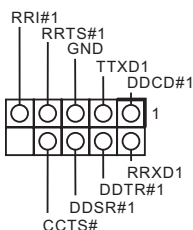
This motherboard provides four ATX power connectors.

System Fan Headers
(6-pin FAN1)
(see p.6, No. 11)
(6-pin FAN2)
(see p.6, No. 12)
(6-pin FAN3)
(see p.6, No. 13)
(6-pin FAN4)
(see p.6, No. 28)
(6-pin FAN5)
(see p.6, No. 29)
(6-pin FAN6)
(see p.6, No. 30)
(6-pin FAN7)
(see p.6, No. 31)
(6-pin FAN8)
(see p.6, No. 32)



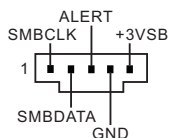
Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control. The fan max. current is 5A and the max. power is 60Watts.

COM Port Header
(9-pin COM1)
(see p.6, No. 45)



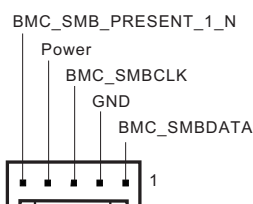
This COM header supports a serial port module.

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



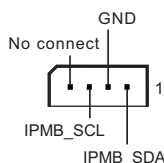
PSU SMBus monitors the status of the power supply, fan and system temperature.

BMC SMBus Headers
(5-pin BMC_SMB_1)
(see p.6, No. 1)
(5-pin BMC_SMB_2)
(see p.6, No. 2)



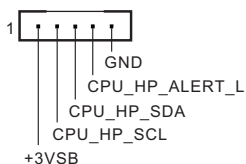
The header is used for the SM BUS devices.

Intelligent Platform
Management Bus Header
(4-pin IPMB_1)
(see p.6, No. 3)



This 4-pin connector is used to provide a cabled baseboard 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.

Backplane PCI Express
Hot-Plug Connectors
(5-pin CPU0_HSBP1)
(see p.6, No. 36)



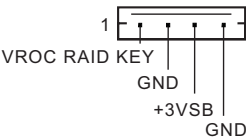
These headers are used for the hot plug feature of HDDs on the backplane.

Clear CMOS Pad
(CLRMOS1)
(see p.6, No. 48)



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

Virtual RAID On CPU
Header
(4-pin RAID_1)
(see p.7, No. 35)



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.

MCIO Connectors

(MCIO1)

(see p.6, No. 47)

(MCIO2)

(see p.6, No. 46)

(MCIO3)

(see p.6, No. 39)

(MCIO4)

(see p.6, No. 40)

(MCIO5)

(see p.6, No. 17)

(MCIO6)

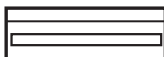
(see p.6, No. 19)

(MCIO7)

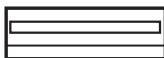
(see p.6, No. 23)

(MCIO8)

(see p.6, No. 26)



These connectors are used for the PCIE devices.



MCIO1 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	PE2_MCIO1_RX_DP8	B2	PE2_MCIO1_TX_DP8
A3	PE2_MCIO1_RX_DN8	B3	PE2_MCIO1_TX_DN8
A4	GND	B4	GND
A5	PE2_MCIO1_RX_DP9	B5	PE2_MCIO1_TX_DP9
A6	PE2_MCIO1_RX_DN9	B6	PE2_MCIO1_TX_DN9
A7	GND	B7	GND
A8	MCIO1_BP_TYPE	B8	MCIO_1_SCL1
A9	MCIO1_WAKE1	B9	MCIO_1_SDA1
A10	GND	B10	GND
A11	CLK_100M_MCIO1_1_DP	B11	RST_BUF_MCIO_1_PERST0_N
A12	CLK_100M_MCIO1_1_DN	B12	MCIO_1_PRSENT0_N
A13	GND	B13	GND
A14	PE2_MCIO1_RX_DP10	B14	PE2_MCIO1_TX_DP10
A15	PE2_MCIO1_RX_DN10	B15	PE2_MCIO1_TX_DN10
A16	GND	B16	GND
A17	PE2_MCIO1_RX_DP11	B17	PE2_MCIO1_TX_DP11
A18	PE2_MCIO1_RX_DN11	B18	PE2_MCIO1_TX_DN11
A19	GND	B19	GND
A20	PE2_MCIO1_RX_DP12	B20	PE2_MCIO1_TX_DP12
A21	PE2_MCIO1_RX_DN12	B21	PE2_MCIO1_TX_DN12
A22	GND	B22	GND
A23	PE2_MCIO1_RX_DP13	B23	PE2_MCIO1_TX_DP13
A24	PE2_MCIO1_RX_DN13	B24	PE2_MCIO1_TX_DN13
A25	GND	B25	GND
A26	N/A	B26	MCIO_1_SCL2
A27	MCIO1_WAKE2	B27	MCIO_1_SDA2
A28	GND	B28	GND
A29	CLK_100M_MCIO1_2_DP	B29	RST_BUF_MCIO_1_PERST1_N
A30	CLK_100M_MCIO1_2_DN	B30	MCIO_1_PRSENT1_N
A31	GND	B31	GND
A32	PE2_MCIO1_RX_DP14	B32	PE2_MCIO1_TX_DP14
A33	PE2_MCIO1_RX_DN14	B33	PE2_MCIO1_TX_DN14
A34	GND	B34	GND
A35	PE2_MCIO1_RX_DP15	B35	PE2_MCIO1_TX_DP15
A36	PE2_MCIO1_RX_DN15	B36	PE2_MCIO1_TX_DN15
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO2 Pin Definition

Pin	Definition	Pin	Definition
A1	GND	B1	GND
A2	PE2_MCIO2_RX_DP0	B2	PE2_MCIO2_TX_DP0
A3	PE2_MCIO2_RX_DN0	B3	PE2_MCIO2_TX_DN0
A4	GND	B4	GND
A5	PE2_MCIO2_RX_DP1	B5	PE2_MCIO2_TX_DP1
A6	PE2_MCIO2_RX_DN1	B6	PE2_MCIO2_TX_DN1
A7	GND	B7	GND
A8	MCIO2_BP_TYPE	B8	MCIO_2_SCL1
A9	MCIO2_WAKE1	B9	MCIO_2_SDA1
A10	GND	B10	GND
A11	CLK_100M_MCIO2_1_DP	B11	RST_BUF_MCIO_2_PERST0_N
A12	CLK_100M_MCIO2_1_DN	B12	MCIO_2_PRSENT0_N
A13	GND	B13	GND
A14	PE2_MCIO2_RX_DP2	B14	PE2_MCIO2_TX_DP2
A15	PE2_MCIO2_RX_DN2	B15	PE2_MCIO2_TX_DN2
A16	GND	B16	GND
A17	PE2_MCIO2_RX_DP3	B17	PE2_MCIO2_TX_DP3
A18	PE2_MCIO2_RX_DN3	B18	PE2_MCIO2_TX_DN3
A19	GND	B19	GND
A20	PE2_MCIO2_RX_DP4	B20	PE2_MCIO2_TX_DP4
A21	PE2_MCIO2_RX_DN4	B21	PE2_MCIO2_TX_DN4
A22	GND	B22	GND
A23	PE2_MCIO2_RX_DP5	B23	PE2_MCIO2_TX_DP5
A24	PE2_MCIO2_RX_DN5	B24	PE2_MCIO2_TX_DN5
A25	GND	B25	GND
A26	N/A	B26	MCIO_2_SCL2
A27	MCIO2_WAKE2	B27	MCIO_2_SDA2
A28	GND	B28	GND
A29	CLK_100M_MCIO2_2_DP	B29	RST_BUF_MCIO_2_PERST1_N
A30	CLK_100M_MCIO2_2_DN	B30	MCIO_2_PRSENT1_N
A31	GND	B31	GND
A32	PE2_MCIO2_RX_DP6	B32	PE2_MCIO2_TX_DP6
A33	PE2_MCIO2_RX_DN6	B33	PE2_MCIO2_TX_DN6
A34	GND	B34	GND
A35	PE2_MCIO2_RX_DP7	B35	PE2_MCIO2_TX_DP7
A36	PE2_MCIO2_RX_DN7	B36	PE2_MCIO2_TX_DN7
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO3 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	PE0_MCIO3_RX_DP0	B2	PE0_MCIO3_TX_DP0
A3	PE0_MCIO3_RX_DN0	B3	PE0_MCIO3_TX_DN0
A4	GND	B4	GND
A5	PE0_MCIO3_RX_DP1	B5	PE0_MCIO3_TX_DP1
A6	PE0_MCIO3_RX_DN1	B6	PE0_MCIO3_TX_DN1
A7	GND	B7	GND
A8	MCIO3_BP_TYPE	B8	MCIO_3_SCL1
A9	MCIO3_WAKE1	B9	MCIO_3_SDA1
A10	GND	B10	GND
A11	CLK_100M_MCIO3_1_DP	B11	RST_BUF_MCIO_3_PERST0_N
A12	CLK_100M_MCIO3_1_DN	B12	MCIO_3_PRSENT0_N
A13	GND	B13	GND
A14	PE0_MCIO3_RX_DP2	B14	PE0_MCIO3_TX_DP2
A15	PE0_MCIO3_RX_DN2	B15	PE0_MCIO3_TX_DN2
A16	GND	B16	GND
A17	PE0_MCIO3_RX_DP3	B17	PE0_MCIO3_TX_DP3
A18	PE0_MCIO3_RX_DN3	B18	PE0_MCIO3_TX_DN3
A19	GND	B19	GND
A20	PE0_MCIO3_RX_DP4	B20	PE0_MCIO3_TX_DP4
A21	PE0_MCIO3_RX_DN4	B21	PE0_MCIO3_TX_DN4
A22	GND	B22	GND
A23	PE0_MCIO3_RX_DP5	B23	PE0_MCIO3_TX_DP5
A24	PE0_MCIO3_RX_DN5	B24	PE0_MCIO3_TX_DN5
A25	GND	B25	GND
A26	N/A	B26	MCIO_3_SCL2
A27	MCIO3_WAKE2	B27	MCIO_3_SDA2
A28	GND	B28	GND
A29	CLK_100M_MCIO3_2_DP	B29	RST_BUF_MCIO_3_PERST1_N
A30	CLK_100M_MCIO3_2_DN	B30	MCIO_3_PRSENT1_N
A31	GND	B31	GND
A32	PE0_MCIO3_RX_DP6	B32	PE0_MCIO3_TX_DP6
A33	PE0_MCIO3_RX_DN6	B33	PE0_MCIO3_TX_DN6
A34	GND	B34	GND
A35	PE0_MCIO3_RX_DP7	B35	PE0_MCIO3_TX_DP7
A36	PE0_MCIO3_RX_DN7	B36	PE0_MCIO3_TX_DN7
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO4 Pin Definition

Pin	Definition	Pin	Definition
A1	GND	B1	GND
A2	PE0_MCIO4_RX_DP8	B2	PE0_MCIO4_TX_DP8
A3	PE0_MCIO4_RX_DN8	B3	PE0_MCIO4_TX_DN8
A4	GND	B4	GND
A5	PE0_MCIO4_RX_DP9	B5	PE0_MCIO4_TX_DP9
A6	PE0_MCIO4_RX_DN9	B6	PE0_MCIO4_TX_DN9
A7	GND	B7	GND
A8	MCIO4_BP_TYPE	B8	MCIO_4_SCL1
A9	MCIO4_WAKE1	B9	MCIO_4_SDA1
A10	GND	B10	GND
A11	CLK_100M_MCIO4_1_DP	B11	RST_BUF_MCIO_4_PERST0_N
A12	CLK_100M_MCIO4_1_DN	B12	MCIO_4_PRSENT0_N
A13	GND	B13	GND
A14	PE0_MCIO4_RX_DP10	B14	PE0_MCIO4_TX_DP10
A15	PE0_MCIO4_RX_DN10	B15	PE0_MCIO4_TX_DN10
A16	GND	B16	GND
A17	PE0_MCIO4_RX_DP11	B17	PE0_MCIO4_TX_DP11
A18	PE0_MCIO4_RX_DN11	B18	PE0_MCIO4_TX_DN11
A19	GND	B19	GND
A20	PE0_MCIO4_RX_DP12	B20	PE0_MCIO4_TX_DP12
A21	PE0_MCIO4_RX_DN12	B21	PE0_MCIO4_TX_DN12
A22	GND	B22	GND
A23	PE0_MCIO4_RX_DP13	B23	PE0_MCIO4_TX_DP13
A24	PE0_MCIO4_RX_DN13	B24	PE0_MCIO4_TX_DN13
A25	GND	B25	GND
A26	N/A	B26	MCIO_4_SCL2
A27	MCIO4_WAKE2	B27	MCIO_4_SDA2
A28	GND	B28	GND
A29	CLK_100M_MCIO4_2_DP	B29	RST_BUF_MCIO_4_PERST1_N
A30	CLK_100M_MCIO4_2_DN	B30	MCIO_4_PRSENT1_N
A31	GND	B31	GND
A32	PE0_MCIO4_RX_DP14	B32	PE0_MCIO4_TX_DP14
A33	PE0_MCIO4_RX_DN14	B33	PE0_MCIO4_TX_DN14
A34	GND	B34	GND
A35	PE0_MCIO4_RX_DP15	B35	PE0_MCIO4_TX_DP15
A36	PE0_MCIO4_RX_DN15	B36	PE0_MCIO4_TX_DN15
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO5 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	PE4_MCIO5_RX_DP0	B2	PE4_MCIO5_TX_DP0
A3	PE4_MCIO5_RX_DN0	B3	PE4_MCIO5_TX_DN0
A4	GND	B4	GND
A5	PE4_MCIO5_RX_DP1	B5	PE4_MCIO5_TX_DP1
A6	PE4_MCIO5_RX_DN1	B6	PE4_MCIO5_TX_DN1
A7	GND	B7	GND
A8	MCIO5_BP_TYPE	B8	MCIO_5_SCL1
A9	MCIO5_WAKE1	B9	MCIO_5_SDA1
A10	GND	B10	GND
A11	CLK_100M_MCIO5_1_DP	B11	RST_BUF_MCIO_5_PERST0_N
A12	CLK_100M_MCIO5_1_DN	B12	MCIO_5_PRSTNT0_N
A13	GND	B13	GND
A14	PE4_MCIO5_RX_DP2	B14	PE4_MCIO5_TX_DP2
A15	PE4_MCIO5_RX_DN2	B15	PE4_MCIO5_TX_DN2
A16	GND	B16	GND
A17	PE4_MCIO5_RX_DP3	B17	PE4_MCIO5_TX_DP3
A18	PE4_MCIO5_RX_DN3	B18	PE4_MCIO5_TX_DN3
A19	GND	B19	GND
A20	PE4_MCIO5_RX_DP4	B20	PE4_MCIO5_TX_DP4
A21	PE4_MCIO5_RX_DN4	B21	PE4_MCIO5_TX_DN4
A22	GND	B22	GND
A23	PE4_MCIO5_RX_DP5	B23	PE4_MCIO5_TX_DP5
A24	PE4_MCIO5_RX_DN5	B24	PE4_MCIO5_TX_DN5
A25	GND	B25	GND
A26	N/A	B26	MCIO_5_SCL2
A27	MCIO5_WAKE2	B27	MCIO_5_SDA2
A28	GND	B28	GND
A29	CLK_100M_MCIO5_2_DP	B29	RST_BUF_MCIO_5_PERST1_N
A30	CLK_100M_MCIO5_2_DN	B30	MCIO_5_PRSTNT1_N
A31	GND	B31	GND
A32	PE4_MCIO5_RX_DP6	B32	PE4_MCIO5_TX_DP6
A33	PE4_MCIO5_RX_DN6	B33	PE4_MCIO5_TX_DN6
A34	GND	B34	GND
A35	PE4_MCIO5_RX_DP7	B35	PE4_MCIO5_TX_DP7
A36	PE4_MCIO5_RX_DN7	B36	PE4_MCIO5_TX_DN7
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO6 Pin Definition

Pin	Definition	Pin	Definition
A1	GND	B1	GND
A2	PE4_MCIO6_RX_DP8	B2	PE4_MCIO6_TX_DP8
A3	PE4_MCIO6_RX_DN8	B3	PE4_MCIO6_TX_DN8
A4	GND	B4	GND
A5	PE4_MCIO6_RX_DP9	B5	PE4_MCIO6_TX_DP9
A6	PE4_MCIO6_RX_DN9	B6	PE4_MCIO6_TX_DN9
A7	GND	B7	GND
A8	MCIO6_BP_TYPE	B8	MCIO_6_SCL1
A9	MCIO6_WAKE1	B9	MCIO_6_SDA1
A10	GND	B10	GND
A11	CLK_100M_MCIO6_1_DP	B11	RST_BUF_MCIO6_6_PERST0_N
A12	CLK_100M_MCIO6_1_DN	B12	MCIO_6_PRSENT0_N
A13	GND	B13	GND
A14	PE4_MCIO6_RX_DP10	B14	PE4_MCIO6_TX_DP10
A15	PE4_MCIO6_RX_DN10	B15	PE4_MCIO6_TX_DN10
A16	GND	B16	GND
A17	PE4_MCIO6_RX_DP11	B17	PE4_MCIO6_TX_DP11
A18	PE4_MCIO6_RX_DN11	B18	PE4_MCIO6_TX_DN11
A19	GND	B19	GND
A20	PE4_MCIO6_RX_DP12	B20	PE4_MCIO6_TX_DP12
A21	PE4_MCIO6_RX_DN12	B21	PE4_MCIO6_TX_DN12
A22	GND	B22	GND
A23	PE4_MCIO6_RX_DP13	B23	PE4_MCIO6_TX_DP13
A24	PE4_MCIO6_RX_DN13	B24	PE4_MCIO6_TX_DN13
A25	GND	B25	GND
A26	N/A	B26	MCIO_6_SCL2
A27	MCIO6_WAKE2	B27	MCIO_6_SDA2
A28	GND	B28	GND
A29	CLK_100M_MCIO6_2_DP	B29	RST_BUF_MCIO6_6_PERST1_N
A30	CLK_100M_MCIO6_2_DN	B30	MCIO_6_PRSENT1_N
A31	GND	B31	GND
A32	PE4_MCIO6_RX_DP14	B32	PE4_MCIO6_TX_DP14
A33	PE4_MCIO6_RX_DN14	B33	PE4_MCIO6_TX_DN14
A34	GND	B34	GND
A35	PE4_MCIO6_RX_DP15	B35	PE4_MCIO6_TX_DP15
A36	PE4_MCIO6_RX_DN15	B36	PE4_MCIO6_TX_DN15
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO7 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	PE5_MCIO7_RX_DP15	B2	PE5_MCIO7_TX_DP15
A3	PE5_MCIO7_RX_DN15	B3	PE5_MCIO7_TX_DN15
A4	GND	B4	GND
A5	PE5_MCIO7_RX_DP14	B5	PE5_MCIO7_TX_DP14
A6	PE5_MCIO7_RX_DN14	B6	PE5_MCIO7_TX_DN14
A7	GND	B7	GND
A8	MCIO7_BP_TYPE	B8	MCIO7_SCL1
A9	MCIO7_WAKE1	B9	MCIO7_SDA1
A10	GND	B10	GND
A11	CLK_100M_MCIO7_1_DP	B11	RST_BUF_MCIO7_PERST0_N
A12	CLK_100M_MCIO7_1_DN	B12	MCIO7_PRSENT0_N
A13	GND	B13	GND
A14	PE5_MCIO7_RX_DP13	B14	PE5_MCIO7_TX_DP13
A15	PE5_MCIO7_RX_DN13	B15	PE5_MCIO7_TX_DN13
A16	GND	B16	GND
A17	PE5_MCIO7_RX_DP12	B17	PE5_MCIO7_TX_DP12
A18	PE5_MCIO7_RX_DN12	B18	PE5_MCIO7_TX_DN12
A19	GND	B19	GND
A20	PE5_MCIO7_RX_DP11	B20	PE5_MCIO7_TX_DP11
A21	PE5_MCIO7_RX_DN11	B21	PE5_MCIO7_TX_DN11
A22	GND	B22	GND
A23	PE5_MCIO7_RX_DP10	B23	PE5_MCIO7_TX_DP10
A24	PE5_MCIO7_RX_DN10	B24	PE5_MCIO7_TX_DN10
A25	GND	B25	GND
A26	N/A	B26	MCIO7_SCL2
A27	MCIO7_WAKE2	B27	MCIO7_SDA2
A28	GND	B28	GND
A29	CLK_100M_MCIO7_2_DP	B29	RST_BUF_MCIO7_PERST1_N
A30	CLK_100M_MCIO7_2_DN	B30	MCIO7_PRSENT1_N
A31	GND	B31	GND
A32	PE5_MCIO7_RX_DP9	B32	PE5_MCIO7_TX_DP9
A33	PE5_MCIO7_RX_DN9	B33	PE5_MCIO7_TX_DN9
A34	GND	B34	GND
A35	PE5_MCIO7_RX_DP8	B35	PE5_MCIO7_TX_DP8
A36	PE5_MCIO7_RX_DN8	B36	PE5_MCIO7_TX_DN8
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO8 Pin Definition

Pin	Definition	Pin	Definition
A1	GND	B1	GND
A2	PE5_MCIO8_RX_DP7	B2	PE5_MCIO8_TX_DP7
A3	PE5_MCIO8_RX_DN7	B3	PE5_MCIO8_TX_DN7
A4	GND	B4	GND
A5	PE5_MCIO8_RX_DP6	B5	PE5_MCIO8_TX_DP6
A6	PE5_MCIO8_RX_DN6	B6	PE5_MCIO8_TX_DN6
A7	GND	B7	GND
A8	MCIO8_BP_TYPE	B8	MCIO_8_SCL1
A9	MCIO8_WAKE1	B9	MCIO_8_SDA1
A10	GND	B10	GND
A11	CLK_100M_MCIO8_1_DP	B11	RST_BUF_MCIO_8_PERST0_N
A12	CLK_100M_MCIO8_1_DN	B12	MCIO_8_PRSENT0_N
A13	GND	B13	GND
A14	PE5_MCIO8_RX_DP5	B14	PE5_MCIO8_TX_DP5
A15	PE5_MCIO8_RX_DN5	B15	PE5_MCIO8_TX_DN5
A16	GND	B16	GND
A17	PE5_MCIO8_RX_DP4	B17	PE5_MCIO8_TX_DP4
A18	PE5_MCIO8_RX_DN4	B18	PE5_MCIO8_TX_DN4
A19	GND	B19	GND
A20	PE5_MCIO8_RX_DP3	B20	PE5_MCIO8_TX_DP3
A21	PE5_MCIO8_RX_DN3	B21	PE5_MCIO8_TX_DN3
A22	GND	B22	GND
A23	PE5_MCIO8_RX_DP2	B23	PE5_MCIO8_TX_DP2
A24	PE5_MCIO8_RX_DN2	B24	PE5_MCIO8_TX_DN2
A25	GND	B25	GND
A26	N/A	B26	MCIO_8_SCL2
A27	MCIO8_WAKE2	B27	MCIO_8_SDA2
A28	GND	B28	GND
A29	CLK_100M_MCIO8_2_DP	B29	RST_BUF_MCIO_8_PERST1_N
A30	CLK_100M_MCIO8_2_DN	B30	MCIO_8_PRSENT1_N
A31	GND	B31	GND
A32	PE5_MCIO8_RX_DP1	B32	PE5_MCIO8_TX_DP1
A33	PE5_MCIO8_RX_DN1	B33	PE5_MCIO8_TX_DN1
A34	GND	B34	GND
A35	PE5_MCIO8_RX_DP0	B35	PE5_MCIO8_TX_DP0
A36	PE5_MCIO8_RX_DN0	B36	PE5_MCIO8_TX_DN0
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

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_OPMOM_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 Identification purpose LED/Switch

Use the UID button to locate the server working on 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.

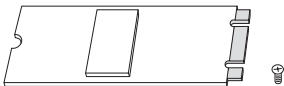


1. Press and hold the UID button for 4 seconds, BMC will trigger an external reset.
2. Press and hold the UID button for 10 seconds, BMC will reset and load default values.

2.9 M.2 SSD Module Installation Guide

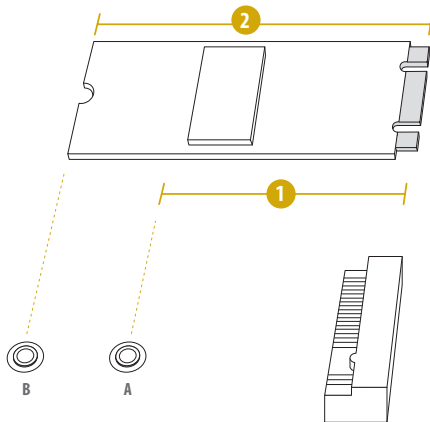
The Hyper M.2 Socket (M2_1/M2_2, Key M) supports type 22110/2280 M.2 PCI Express module up to Gen5 x2 (32GT/s x2).

Installing the M.2 SSD Module



Step 1

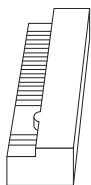
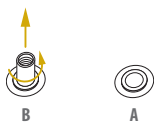
Prepare a M.2 SSD module and the screw.



Step 2

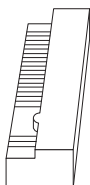
Depending on the PCB type and length of the M.2 SSD module, find the corresponding nut location to be used.

No.	1	2
Nut Location	A (NUT_80_1/2)	B (NUT_110_1/2)
PCB Length	8cm	11cm
Module Type	Type 2280	Type 22110



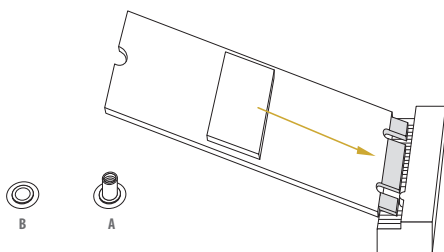
Step 3

Move the standoff based on the module type and length. Skip Step 3 and 4 and go straight to Step 5 if using the default nut. Otherwise, release the standoff by hand.



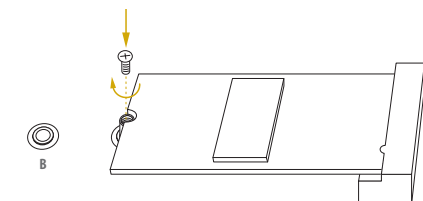
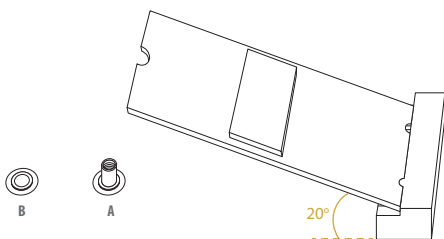
Step 4

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



Step 5

Align and gently insert the M.2 SSD module into the M.2 slot. Please be aware that the M.2 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 the system. The UEFI chip on the motherboard stores the UEFI SETUP UTILITY. Run the UEFI SETUP UTILITY when starting 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.

Restart the system by pressing <Ctrl> + <Alt> + <Delete> upon entering the UEFI SETUP UTILITY after POST, or by pressing the reset button on the system chassis. It can be 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.

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

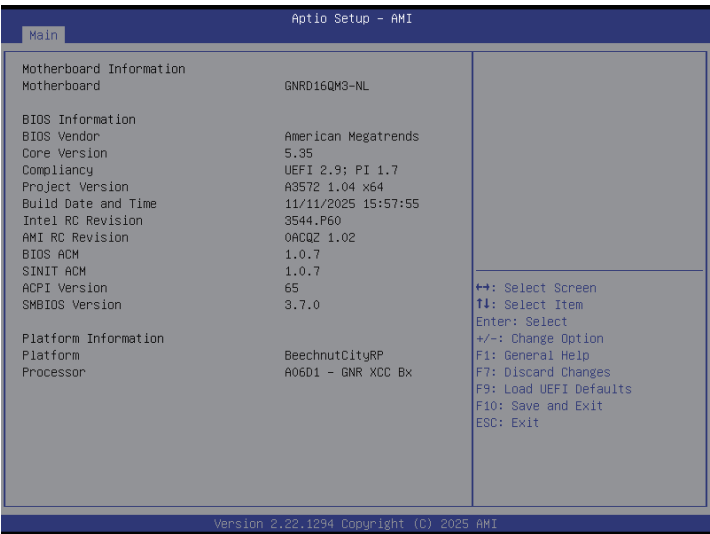
Once entering the UEFI SETUP UTILITY, the Main screen will appear and display the system overview. The Main screen provides system overview information and allows user to set the system time and date.



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

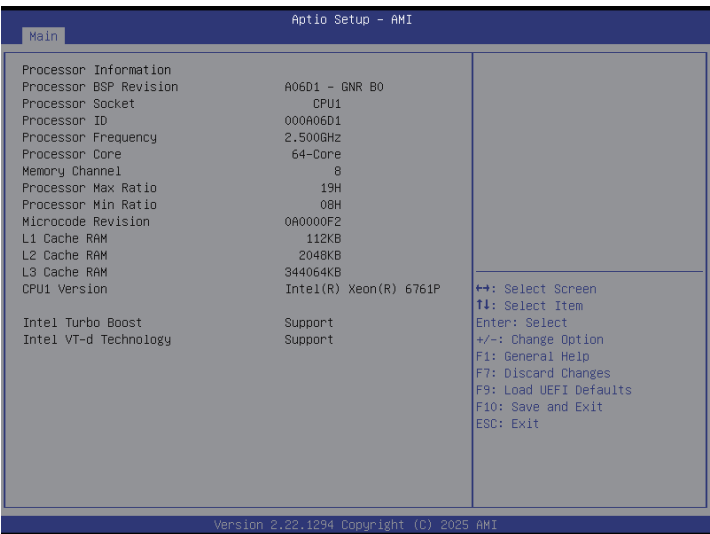
3.2.1 Mother Board Information

Press <Enter> to view the information of the motheboard.



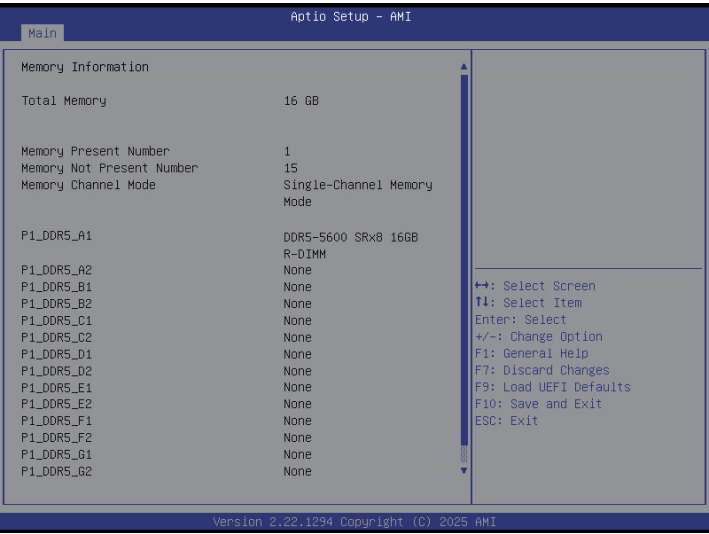
3.2.2 Processor Information

Press <Enter> to view the information of the processor.



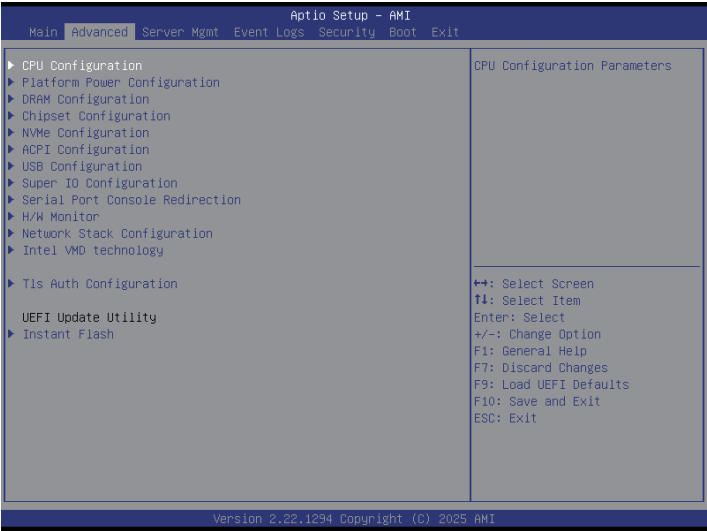
3.2.3 Memory Information

Press <Enter> to view the information of the memory.



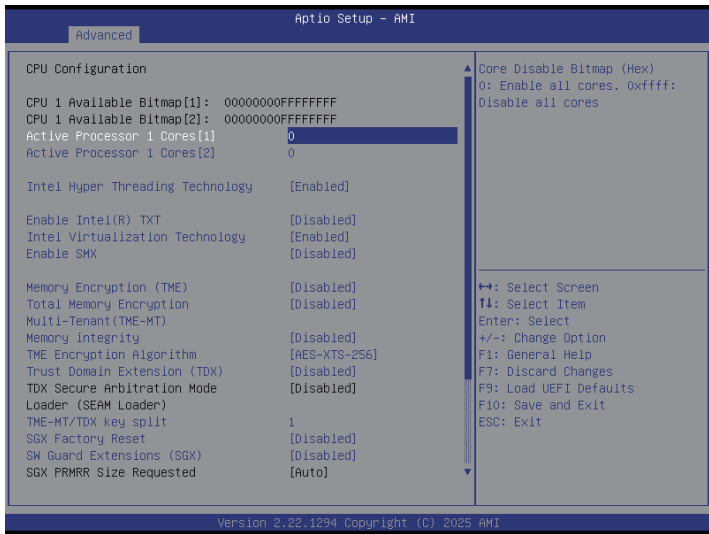
3.3 Advanced Screen

In this section, set the configurations for the following items: CPU Configuration, Platform Power Configuration, DRAM Configuration, Chipset Configuration, NVMe Configuration, ACPI Configuration, USB Configuration, Super IO Configuration, Serial Port Console Redirection, H/W Monitor, Network Stack Configuration, Intel VMD Technology, Tls Auth Configuration and Instant Flash.



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

3.3.1 CPU Configuration



Active Processor 1 Cores [1]

Core Disable Bitmap (Hex)

0: Enable all cores.

0xffff: Didable all cores.

Active Processor 1 Cores [2]

Core Disable Bitmap (Hex)

0: Enable all cores.

0xffff: Didable all cores.

Intel Hyper Threading Technology

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

Enable Intel(R) TXT

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.

Memory Encryption (TME)

Use this item to enable or disable Memory Encryption (TME).

Total Memory Encryption Multi-Tenant (TME-MT)

Use this item to enable or disable Total Memory Encryption-Multi-Tenant (TME-MT).
Can be enabled only if Socket Configuration -> Porcessor Configuration -> Limit CPU PA to 46 bits=Disable.

Memory Integrity

Use this item to enable or disable memory Integrity.

TME Encryption Algorithm

Use this item to select TME Encryption Algorithm.

Trust Domain Extension (TDX)

Use this item to enable or disable Trust Domain Extension (TDX).

TDX Secure Arbitration Mode Loader (SEAM Loader)

Use this item to enable or disable TDX Secure Arbitration Mode Loader (SEAM Loader).

TME-MT/TDX Key Split

Designate number of bits for TDX usage. The rest will be used by TME-MT.

SGX Factory Reset

Perform SGX Factory Reset, on subsequent boot: delete all registration data, if SGX enabled will force Initial Platform Establishment flow.

SW Guard Extensions (SGX)

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

SGX PRMRR Size Requested

Use this item to select the SGX PRMRR Size per domain.

SGX QoS

Use this item to enable or disable SGX Quality of Service.

Select Owner EPOCH Input Type

Each EPOCH is 64bit, keys value should be different than 0. After generating new epoch via 'Change to New Random Owner EPOCHs', the selection reverts back to 'Manual User Defined Owner EPOCHs'. In next boot keys will be hidden and state will be 'SGX Owner EPOCH activated'.

SGX Registration Server

Use this item to choose which server should be used for SGX registration.

Disable ACTM Launch

Use this item to disable ACTM Launch.

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.

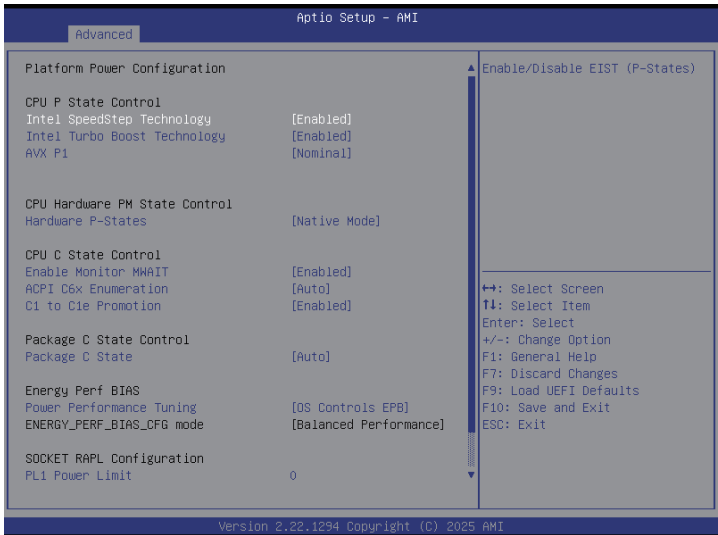
AES-NI

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

SNC

Use this item to enable or disable SNC mode. Configure this item to Disable, BIOS will enable UMA mode. Number of clusters is determined by BIOS based on detected SKU.

3.3.2 Platform Power 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.

AVX P1

Use this item to select AVX P1 level.

Hardware P-States

This item supports below selections:

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)

Enable Monitor MWAIT

Use this item to configure Monitor and MWAIT instructions whether Auto maps to enable.

ACPI C6x Enumeration

Auto: Maps to C6-P as ACPI C2.

Disable: Don't enumerate any C6 state in ACPI

C6 as ACPI C2/C3: Enumerate C6 as ACPI C2/C3 state. PkgC6 is not allowed.

C6-P as ACPI C2/C3: Enumerate C6-P as ACPI C2/C3 state. PkgC6 is allowed.

C1 to Cle Promotion

CPU will promote C1 request to Cle state.

Package C State

Package C State limit, the state Auto maps is program specific.

Power Performance Tuning

Use this item to decides which controls EFB.

OS Controls EPB: Specifies IA32_ENERGY_PERF_BIAS is used.

BIOS Controls EPB: Specifies ENERGY_PERF_BIAS_CONFIG is used.

PECI Controls EPB: Specifies PCS53 is used.

ENERGY_PERF_BIAS_CFG mode

Use this item to use input from ENERGY_PERF_BIAS_CONFIG mode selection. PERF/Balanced, Perf/Balanced or Power/Power.

PL1 Power Limit

Use this item to configure Package Power Limit 1 (PL1) in watts. PL1 Power Limit is in Watts and the value may vary from 0 to Fused Value. If the value is 0, the fused value will be programmed. A value greater than fused TDP value will not be programmed.

PL1 Time Window

PL1 value in seconds. The value may vary from 1 to 5. Indicates the time window over which TDP value should be maintained.

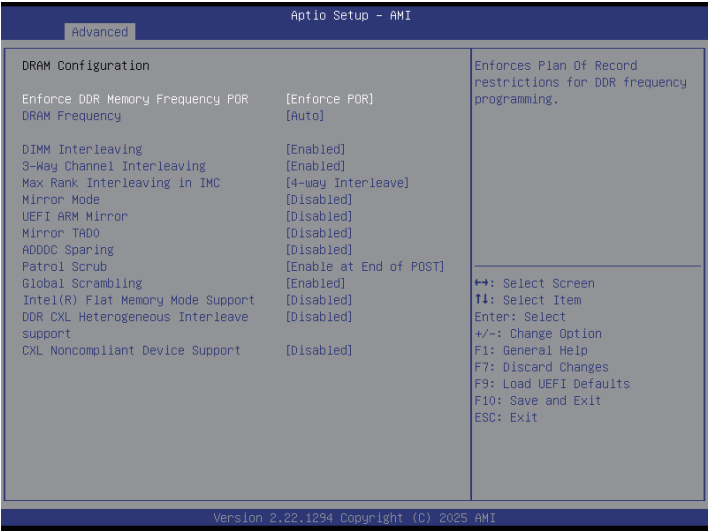
PL2 Power Limit

PL2 Power Limit in Watts. The value may vary from 0 to 120% Fused TDP Value. If the value is 0, BIOS programs 120% * Fused TDP value.

PL2 Time Window

PL2 value in seconds. The value may vary from 0.012 to 0.039. Indicates the time window over which TDP value should be maintained.

3.3.3 DRAM Configuration



Enforce DDR Memory Frequency POR

Select this time to enable or disable the Enforces Plan of Record restrictions for DDR frequency programming.

DRAM Frequency

Maximum Host DDR Memory Frequency Selections in MT/s. If the "AUTO" option has been selected, a frequency is chosen automatically based on the minimum tCK given by the SPD. If Enforce POR is disabled, user will be able to run at higher frequencies than the memory support (limited by processor support).

DIMM Interleaving

Enable this item to allow interleaving to be performed at the highest possible MC * Channel interleaving ways or disable it to enforce interleaving to only 1-way.

3-Way Channel Interleaving

Enable this item to allow 3-way channel interleaving or disable it to default to number of channels available per MC when DIMM interleaving is enabled.

Max Rank Interleaving in IMC

Use this item to configure the rank interleaving settings.

Mirror Mode

Full Mirror Mode will set entire 1LM memory in system to be mirrored, consequently reducing the memory capacity by half. Partial Mirror Mode will enable the required size of memory to be mirrored. If rank sparing is enabled partial mirroring will not take effect. Enabling any type of Mirror Mode will disable XPT Prefetch.

UEFI ARM Mirror

Imitate behavior of UEFI based Address Range Mirror with setup option.

Mirror TAD0

Enable Mirror on entire memory for TAD0.

ARM Mirror Percentage

Enter the percentage to be mirrored in basis points. Mirror options are 10%, 15%, 20%, 25%, 30%, 35%, 40%. 25% is represented 2500. Any other number entered will be rounded to nearest greater number, for ex. number > 2000 and <=2500 will be rounded to 2500. And any number >4000, will be rounded to 4000.

ADDDC Sparing

Enable or disable Memory Rank Sparing.

Patrol Scrub

Patrol Scrub is a background activity initiated by the processor to seek out and fix memory errors. The default value is [Enabled].

Global Scrambling

Enable - Enables global data scrambling.

Disable - Disables this feature.

Intel(R) Flat Memory Mode Support

Enable or disable Intel(R) Flat Memory Mode support.

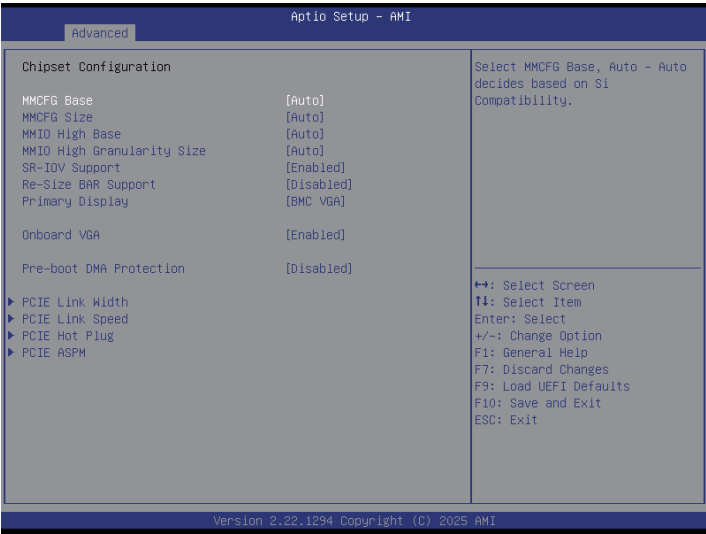
DDR CXL Heterogeneous Interleave support

Use this item to enable DDR CXL Heterogeneous Interleave support.

CXL Noncompliant Device Support

Enables DDR CXL Heterogeneous Interleave support.

3.3.4 Chipset Configuration



MMCFG Base

Use this item to select MMCFG Base. Auto-Auto decides based on Si compatibility.

MMCFG Size

Use this item to select MMCFG Size. Auto-Auto decides based on Si compatibility.

MMIO High Base

Use this item to select MMIO High Base.

MMIO High Granularity Size

Selects the allocation size used to assign mmioh resources. Per stack mmioh resource assignments are multiples of the granularity where 1 unit per stack is the default allocation.

SR-IOV Support

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

Re-Sized BAR Support

If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support.

Primary Display

Select which Graphics device as the Primary Display.

Onboard VGA

Use this to enable or disable the Onboard VGA function.

Pre-boot DMA Protection

Select this item to enable DMA Protection in Pre-boot Environment.

PCIe Link Width

This displays the PCIe Link Width.

MCIO4/MCIO3, MCIO2/MCIO1, MCIO6/MCIO5, MCIO8/MCIO7 Link Width

The MICO default value is [Auto]. Options: [Auto], [x4x4x4x4], [x4x4x4], [x8x4x4], [x8x8] and [x16].

PCIe Link Speed

This displays the PCIe Link Speed.

MCIO1/MCIO2/MCIO3/MCIO4/MCIO5/MCIO6/MCIO7/MCIO8 Link Speed

Select the Link Speed for MCIO. The default value is [Auto] - up to Gen5 (32GT/s).

M2_1/M2_1 Link Speed

Select the Link Speed for M.2. The default value is [Auto] - up to Gen5 (32GT/s).

OCPI Link Speed

Select the Link Speed for OCP. The default value is [Auto] - up to Gen5 (32GT/s).

PCIe Hot Plug

Select this item to configure PCIe Hot Plug.

MCIO1/MCIO2/MCIO3/MCIO4/MCIO5/MCIO6/MCIO7/MCIO8, M2_1/M2_2, OCPI Surprise Hot Plug

This option specifies if the link is considered Surprise Hot Plug capable.

PCIe ASPM

Select this item to disable ASPM support in all PCIe root ports.

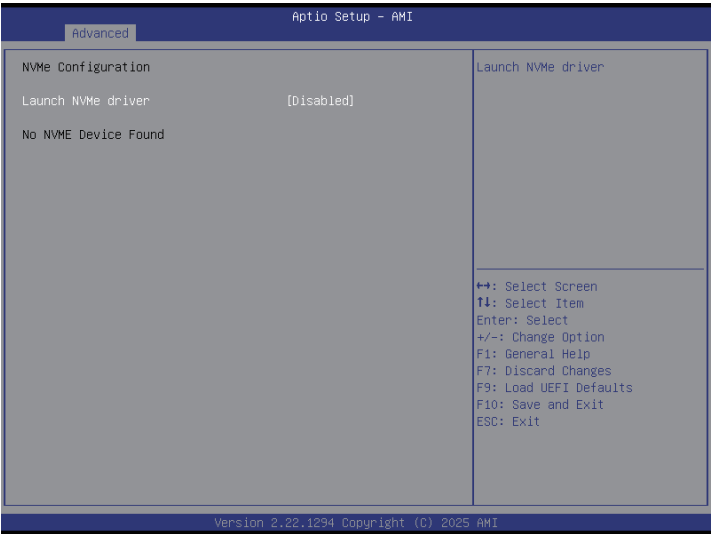
PCI-E ASPM Support (Global)

Select this item to disable ASPM Support for all PCIe root ports.

MCIO1/MCIO2/MCIO3/MCIO4/MCIO5/MCIO6/MCIO7/MCIO8, M2_1/M2_2, OCPI ASPM Support

Use this item to disable ASPM support in PCIe root port. The default value is [Auto].

3.3.5 NVMe Configuration

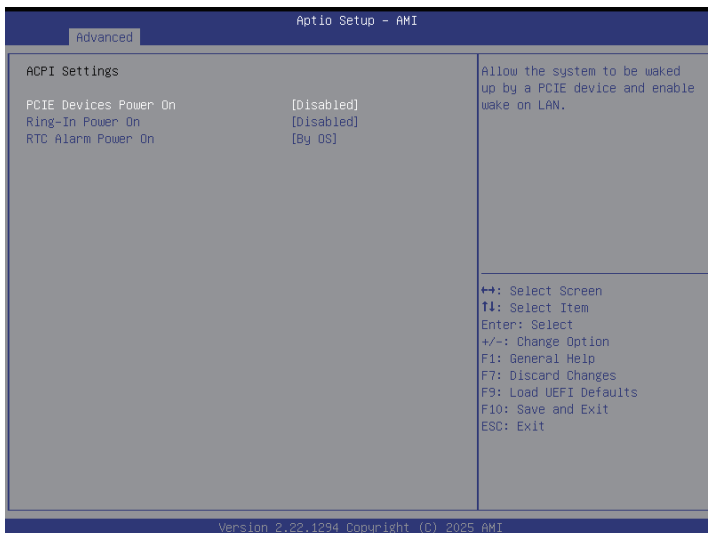


The NVMe Configuration displays the NVMe controller and Drive information.

Launch NVMe driver

Select this item to enable or disable launch NVMe driver.

3.3.6 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 power-soft-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 the operating system.

RTC Alarm Hour

Use this item to set Hour of RTC power on feature.

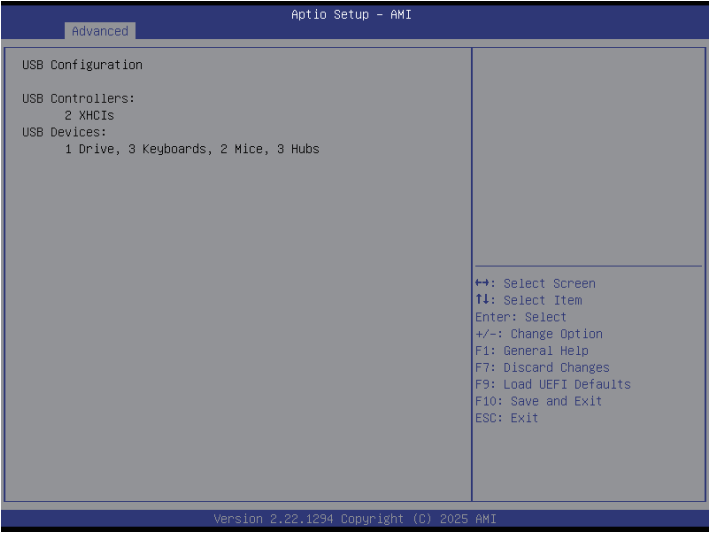
RTC Alarm Minute

Use this item to set Minute of RTC power on feature.

RTC Alarm Second

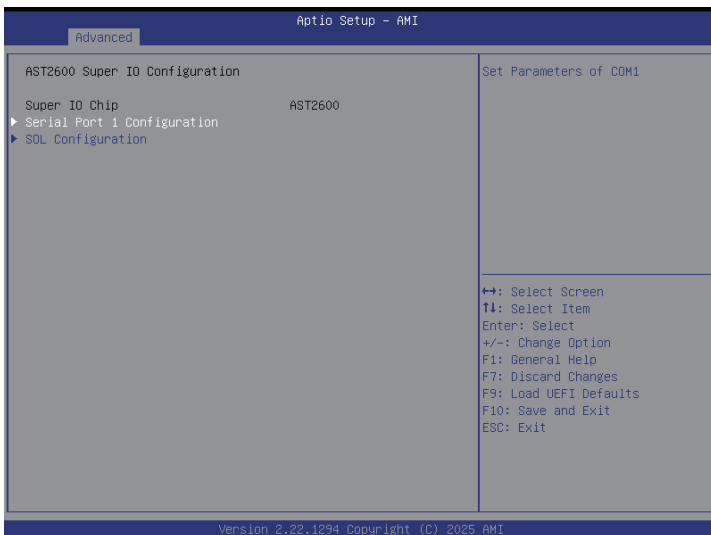
Use this item to set Second of RTC power on feature.

3.3.7 USB Configuration



The USB Configuration displays the USB Controllers and USB Devices informations.

3.3.8 Super IO Configuration



Serial Port 1 Configuration

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

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 Serial Port 2 (COMB).

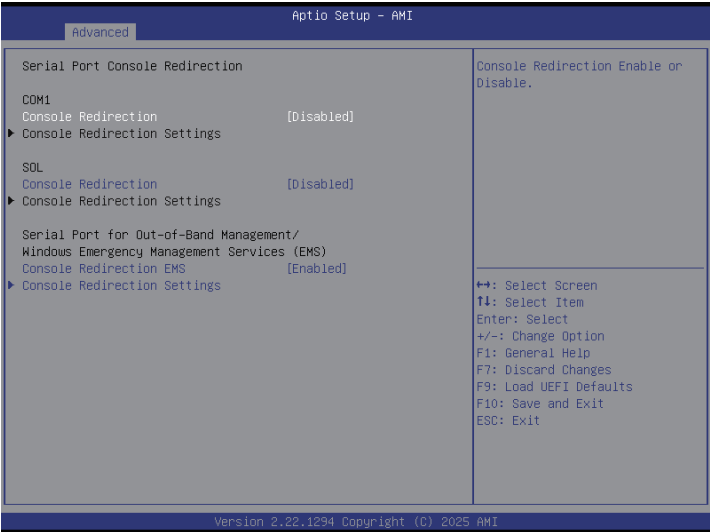
SOL Port

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.

3.3.9 Serial Port Console Redirection



COM1 / SOL

Console Redirection

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

Console Redirection Settings

Use this option to configure Console Redirection Settings, and specify how the host computer and the remote computer (which are be connected to) will exchange data. 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. It is recommended to select [VT-UTF8].

Option	Description
VT100	ASCII character set
VT100Plus	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.

Putty Keypad

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

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

Use this option to enable or disable Console Redirection. Set this item to Enabled to select a COM Port to be used for Console Redirection.

Console Redirection Settings

Use this option to configure Console Redirection Settings, and specify how the host computer and the remote computer (which are be connected to) will exchange data.

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 EMS

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 EMS

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 EMS

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].

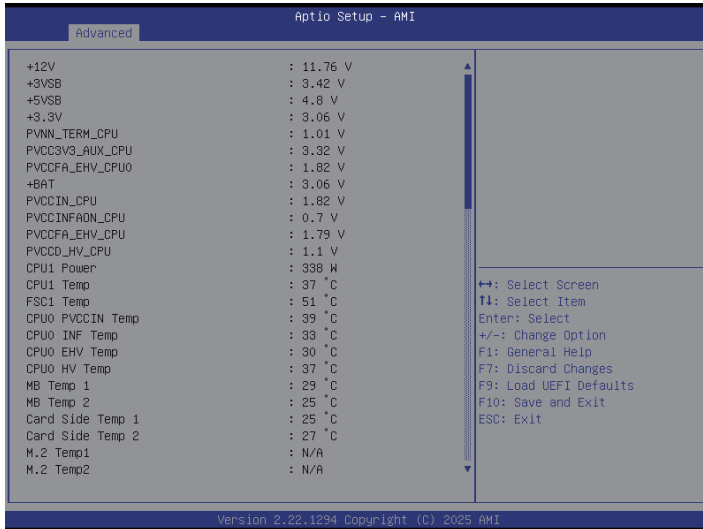
Data Bits EMS

Parity EMS

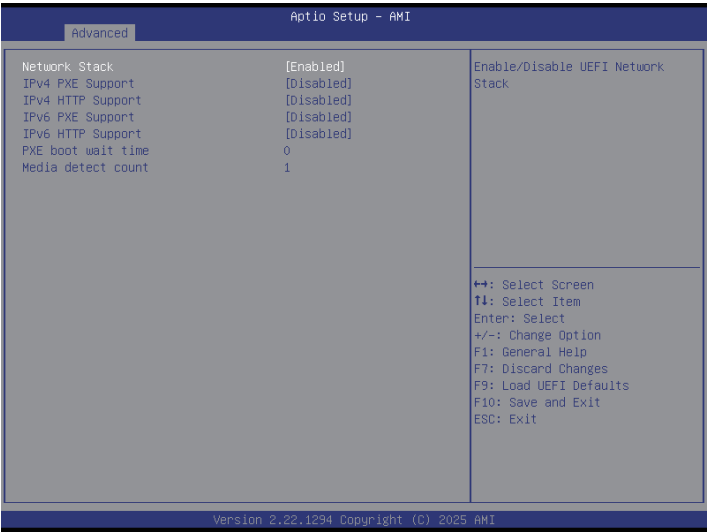
Stop Bits EMS

3.3.10 H/W Monitor

In this section, it allows to monitor the status of the hardware on the system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



3.3.11 Network Stack Configuration



Network Stack

Use this item to enable or disable UEFI Network Stack.

IPv4 PXE Support

Use this item to enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

IPv4 HTTP Support

Use this item to enable or disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

IPv6 PXE Support

Use this item to enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

IPv6 HTTP Support

Use this item to enable or disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

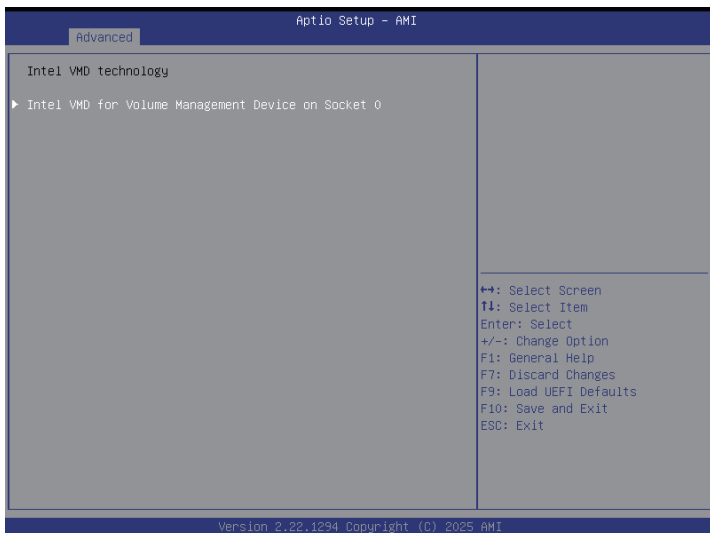
PXE boot wait time

Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

Media detect count

Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

3.3.12 Intel VMD technology



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

Intel VMD for Volume Management Device on Socket 0

VMD Config for Stack 0 (MCIO4/MCIO3), Stack 1 (M2_2/M2_1), Stack 2 (MCIO2/MCIO1), Stack 4 (MCIO6/MCIO5), Stack5 (MCIO8/MCIO7)

Enable/Disable VMD

Use this item to enable or disable Intel Volume Management Device Technology in the specified Stack.

When [Enabled], user can configure the options below.

VMD port X

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

3.3.13 Tls Auth Configuration



Server CA Configuration

Press <Enter> to configure Server CA.

Enroll Cert

Press <Enter> to enroll cert.

Delete Cert

Press <Enter> to delete cert.

Client Cert Configuration

Press <Enter> to configure Client Cert.

3.3.14 Instant Flash

Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows user to update system UEFI without entering operating systems first like MS-DOS or Windows[®]. Just save the new UEFI file to the USB flash drive, floppy disk or hard drive and launch this tool, then update the 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 executing Instant Flash utility, the utility shows the UEFI files and their respective information. Select the proper UEFI file to update the UEFI, and reboot the system after the UEFI update process is completed.

3.4 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 255 seconds to initialize Host to BMC interfaces.

FRB-2 Timer

Select this item to enable or disable FRB-2 timer (POST timer)

FRB-2 Timer Timeout

Select this item to define the FRB-2 Time Expiration between 1 to 30 value.

FRB-2 Timer Policy

Configure how the system should respond. If the FRB-2 Timer expires is disabled, this item is not available.

OS Watchdog Timer

Select this item to enable or disable OS Watchdog Timer. If enabled, starts a BIOS timer which can only be shut off by Management Software after the OS loads.

OS Wtd Timer Timeout

Configure the OS Boot Watchdog Timer Expiration between 1 to 30 min value. If the OS Boot Watchdog Timer is disabled, this item is not available.

OS Wtd Timer Policy

Configure how the system should respond if the OS Boot Watchdog Timer expires. If the OS Boot Watchdog Timer is disabled, this item is not available.

BMC Network Configuration

Select this item to configure BMC network parameters.

DNS Configuration

Use this to configure DNS parameters.

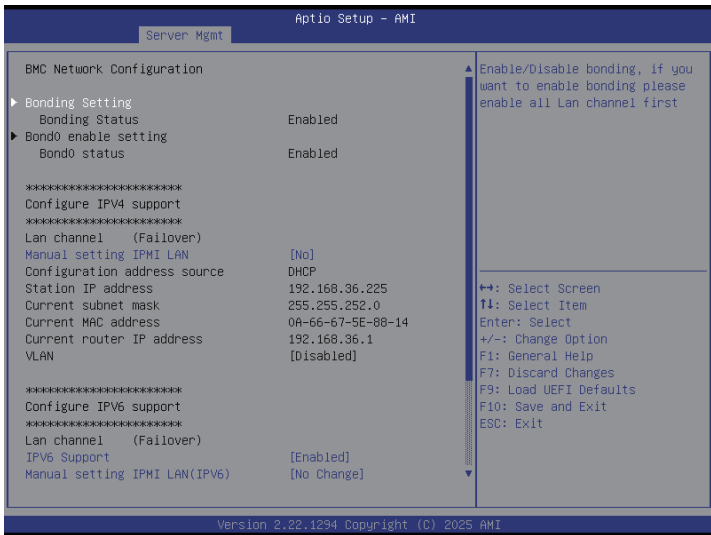
System Event Log

Press <Enter> to change the SEL event log configuration.

BMC Tools

Select this item to configure about KCS control, restore AC power loss and load BMC default settings.

3.4.1 BMC Network Configuration



Bonding Setting

Use this item to enable or disable bonding. Set this item to enable bonding please enable all Lan channel first.

Bond0 Enable Setting

Show the Bond0 status is enabled or disabled.

Manual Setting IPMI LAN

If [No] is selected, the IP address is assigned by DHCP. If 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.



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>

VLAN

Enabled/Disabled Virtual Local Area Network.

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

VLAN ID: Select this item to configure the VLAN ID setting, the Maximum value is 4094 and the Minimum value is 1.

VLAN Priority: Select this item to configure the VLAN Priority setting, the Maximum value is 7 and the Minimum value is 0.

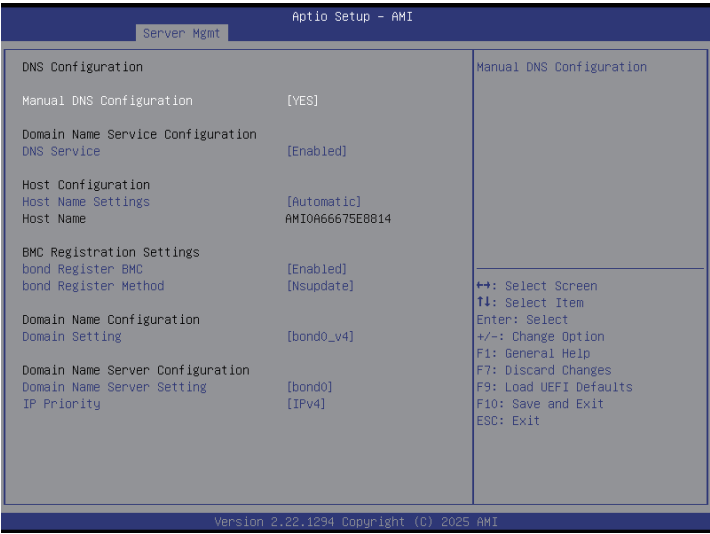
IPv6 Support

Enable or disable LAN1 IPv6 Support.

Manual Setting IPMI LAN (IPv6)

Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC). Unspecified option will not modify any BMC network parameters during BIOS phase.

3.4.2 DNS Configuration



Manual DNS Configuration

Select this item to manual configure DNS.

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

DNS Service

Select this item to enable or disable DNS Service Configuration.

Host Name Settings

Select this item to automatic or manual Host Name Settings.

Bond Register BMC

Use this item to enable or disable Bond Register BMC.

Bond Register Method

Use this item to configure Bond Register Method with Nsupdate or DHCP client FQDN/Hostname..

Domain Setting

This item supports Manual, Bond0_v4 and Bond0_v6 Domain Settings.

Domain Name Server Setting

Select this item to configure DNS Server Settings Manual or Bond0.

IP Priority

Select this item to configure IP Priority IPV4 or IPV6.

3.4.3 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.

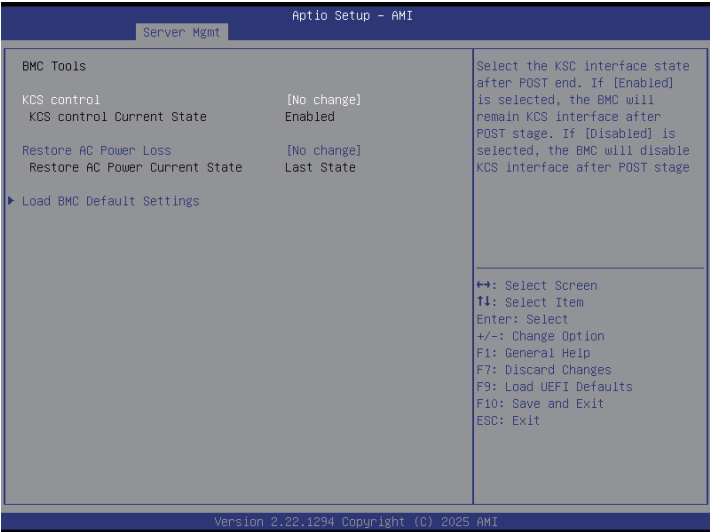
Log EFI Status Codes

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

PCIe Device Degrade Elog Support

Use this item to enable or disable PCIe Device Degrade Error Logging Support.

3.4.4 BMC Tools



KCS control

Select the KCS interface state after POST end. If [Enabled] is selected, the BMC will remain KCS interface after POST stage. If [Disabled] is selected, the BMC will disable KCS interface after POST stage.

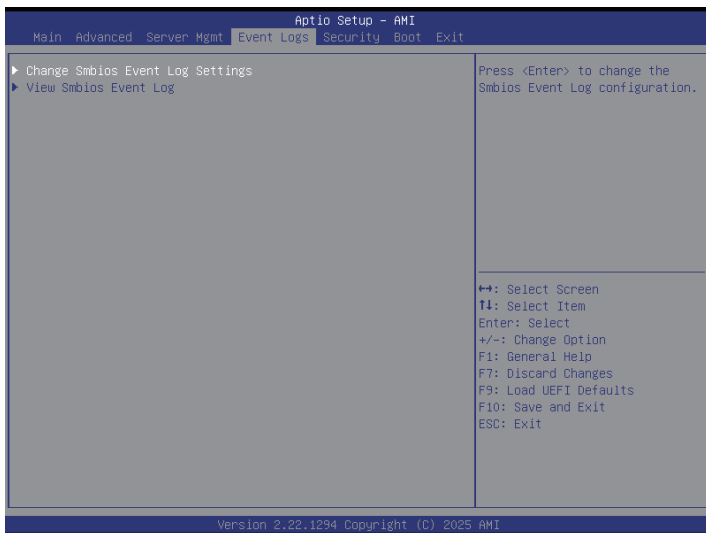
Restore AC Power Loss

This allows user to set the power state after an unexpected AC/power loss. If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers. If [Last State] is selected, it will recover to the state before AC/power loss.

Load BMC Default Settings

Use this item to load BMC default settings.

3.5 Event Logs



Change Smbios Event Log Settings

Select item to configure the Smbios Event Log Settings.

Select this item to configure the sub-items below:

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

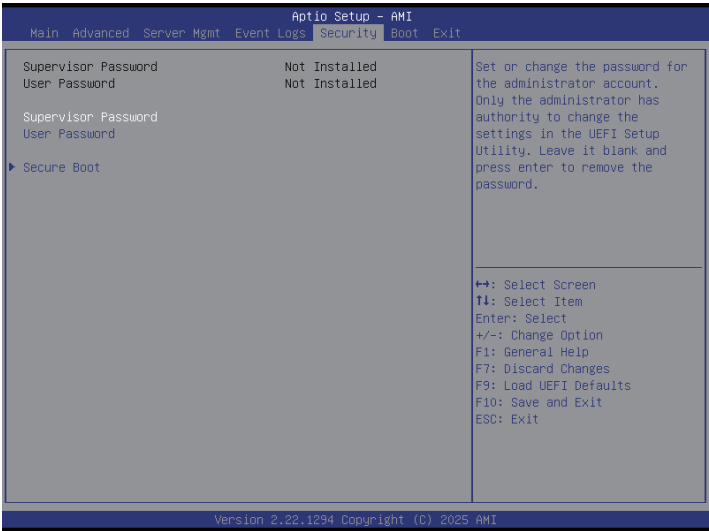
Press <Enter> to view the Smbios Event Log records.



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

3.6 Security

In this section, set or change the supervisor/user password for the system. User can also clear the user password in this section.



Supervisor Password

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

User Password

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

Secure Boot

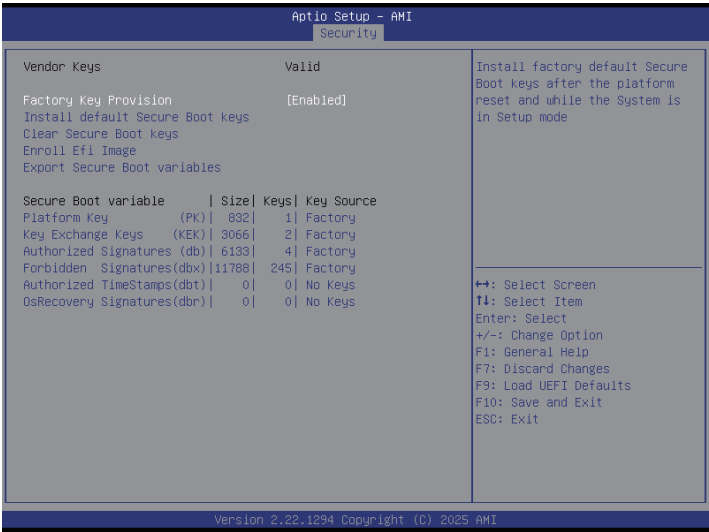
Use this to enable or disable Secure Boot Control. The default value is [Disabled]. Enable to support Windows Server 2012 R2 or later versions Secure Boot.

Secure Boot Mode

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

3.6.1 Key Management

In this section, expert user 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 to use the 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).

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_SHAXXX
- 2. Authenticated UEFI Variable
 - 3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

Key Exchange Keys (KEK)

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_SHAXXX
- 2. Authenticated UEFI Variable
- 3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

Authorized Signatures (db)

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_SHAXXX
- 2. Authenticated UEFI Variable
- 3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

Forbidden Signatures (dbx)

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_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

Authorized TimeStamps (dbt)

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_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

OsRecovery Signatures (dbr)

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_SHAXXX

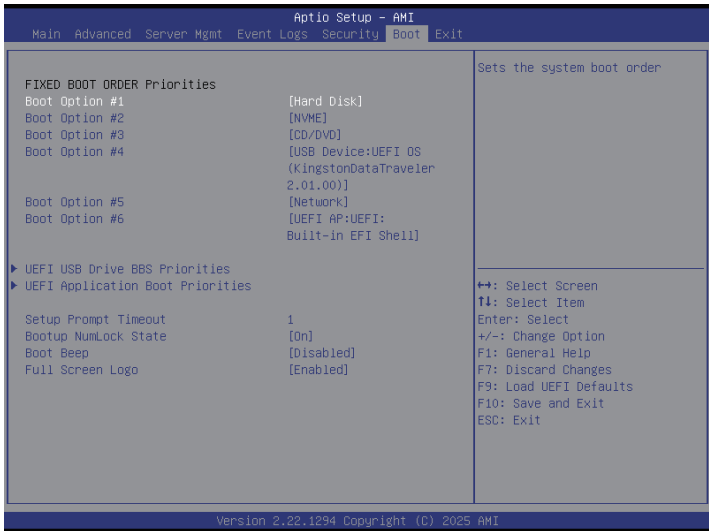
2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

3.7 Boot Screen

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



Boot Option #1/#2/#3/#4/#5/#6

Use this item to set the system boot order.

UEFI USB Drive BBS Priorities

Specifies the Boot Device Priority sequence from available UEFI USB Drives.

UEFI Application Boot Priorities

Specifies the Boot Device Priority sequence from available UEFI Application.

Setup Prompt Timeout

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

Bootup NumLock State

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

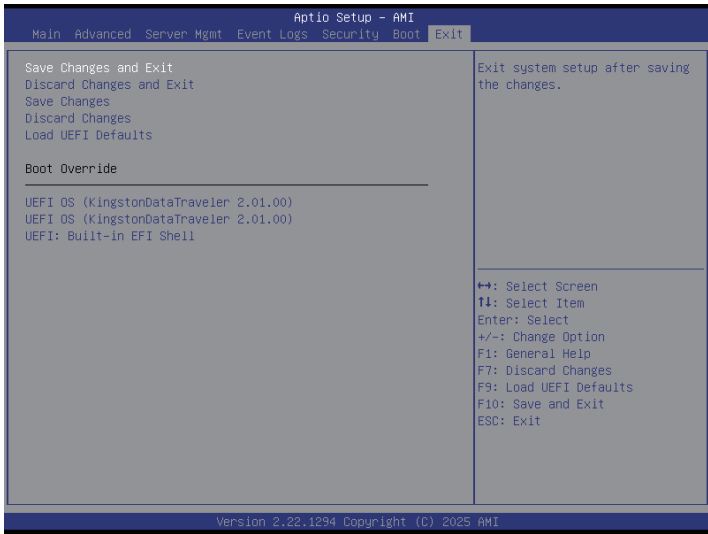
Boot Beep

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

Full Screen Logo

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

3.8 Exit Screen



Save Changes and Exit

When selecting 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 selecting 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.

Save Changes

When selecting this option, the following message “Save changes?” will pop-out. Select [Yes] to save all changes.

Discard Changes

When selecting this option, the following message “Discard changes?” will pop-out. Select [Yes] to discard all changes.

Load UEFI Defaults

Use this item to restore or load default values for all the setup options.

Chapter 4 Software Support

After all the hardware has been installed, we suggest going to the official website at <http://www.ASRockRack.com> and make sure if there are any new updates of the BIOS / BMC firmware for the motherboard.

4.1 Download and Install Operating System

This motherboard supports various Microsoft® Windows® Server/Linux compliant operating systems. Please download the operating system from the OS manufacturer. Please refer to the OS documentation for more instructions.

**Please download the Intel® Rapid Storage Technology driver from the ASRock Rack's website (www.asrockrack.com) to the USB drive while installing OS in SATA RAID mode.*

4.2 Download and Install Software Drivers

This motherboard supports various Microsoft® Windows® compliant drivers. Please download the required drivers from our website at <http://www.ASRockRack.com>.

To download necessary drivers, go to the product page and click on the "Download" tab, choose the operating system, and then select the driver to download.

Chapter 5 Troubleshooting

5.1 Troubleshooting Procedures

Follow the procedures below to troubleshoot the system.



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

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 DDR5 RDIMM/MRDIMM.
3. If having 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 the power supply provides adequate and stable power.

Other problems...

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

5.2 Technical Support Procedures

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

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

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 the invoice marked with the date of purchase is required. By calling the vendor or going to the RMA website (<http://event.asrockrack.com/tsd.asp>) to 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 returning 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 the distributor first for any product related problems during the warranty period.

Contact Information

Contact ASRock Rack or want to know more about ASRock Rack, you're welcome to visit ASRock Rack's website at <http://www.asrockrack.com>; or contact the dealer for further information. For technical questions, please submit a support request form at <https://event.asrockrack.com/tsd.asp>

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