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STABLE Robust Design, Quality Parts

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Server/Workstation
Motherboard

W790D8HM3

User Manual

English



Version 1.20

Published Jan. 2026

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

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ASRock Rack's Website: www.ASRockRack.com



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 UKCA Directives. Full text of UKCA declaration of conformity is available at: <http://www.asrockrack.com>



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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.



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 **W790D8HM3** 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. You may 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 W790D8HM3 motherboard
(Half-Width form factor: 6.6" x 17")
- Quick installation guide
- 2 x screws for M.2 sockets
- 2 x CPU Non-Fabric carriers



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

1.2 Specifications

W790D8HM3	
Physical Status	
Form Factor	Half-Width
Dimension	6.6" x 17" (167.64 x 431.8mm)
Processor System	
CPU	Supports Intel® Xeon® W-2500/2400 and W-3500/3400 series processors
Socket	Single Socket E (LGA4677)
Chipset	Intel® W790
System Memory	
Supported DIMM Quantity	8 DIMM slots (1DPC)
Supported Type	DDR5 288-pin RDIMM/ RDIMM-3DS
Max. Capacity per DIMM	RDIMM: 64GB RDIMM-3DS: 2H- 128GB/ 4H- 256GB
Max. Frequency	4800MTS
Voltage	1.1V
<i>Note: Memory support is to be validated.</i>	
PCIe Expansion Slots	
PCIe5.0 x16	SLOT1: Slim Cool Edge (PCIe5.0 x16) [CPU]
	SLOT2: Slim Cool Edge (PCIe5.0 x16) [CPU]
Other PCIe Expansion Connectors	
M.2	1 M-key (PCIe4.0 x4), supports 2280 form factor [PCH]
	1 M-key (PCIe4.0 x4), supports 22110 form factor [PCH]
OCuLink	1 OCuLink (PCIe3.0 x4 or 4 SATA 6Gb/s) [PCH]
	1 OCuLink (PCIe4.0 x4 or 4 SATA 6Gb/s) [PCH]
MCIO	2 MCIO (PCIe5.0 x8) [CPU]
	6 MCIO* (PCIe5.0 x8) [CPU] <i>*MCIO3~8 are nly available when using with Intel® Xeon® W-3500/3400 series processors</i>
SATA/SAS Storage	
PCH Built-in Storage	Intel® W790 (Up to 8 SATA 6Gb/s; RAID 0/1/5/10): 2 Oculink for 8 SATA
Ethernet	
OCP Slot	1 OCP NIC 3.0 (PCIe5.0 x16) [CPU]
Server Management	
BMC Controller	ASPEED AST2600: iKVM, vMedia support
IPMI Dedicated GLAN	1 RJ45 Dedicated IPMI LAN port by Realtek RTL8211F

Graphics	
Controller	ASPEED AST2600: 1 Mini-DP (VGA), 1 (15-pin) header
Rear I/O	
UID Button/LED	1 UID button w/ LED
Video Port	1 Mini-DP* (VGA, adapter cable required) <i>*The Mini Display Port provides VGA analog output. To connect to a D-Sub (VGA) display, an adapter cable is required. Please contact ASRock Rack for cable availability.</i>
USB Port	2 Type A (USB3.2 Gen1)
LAN Port	1 dedicated IPMI
Internal Connectors/Headers	
Power Connector	4 (8-pin, Micro-Hi 12V), 1 (19-pin, CM Board Standby Power 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
NMI Header	1
COM Header	1 (9-pin)
VGA Header	1 (15-pin)
Speaker Header	1 (4-pin)
Fan Header	8 (6-pin)
Thermal Sensor Header	1
TPM Header	1 (13-pin, SPI)
VROC Header	1
SGPIO Header	1
HSBP	1
SMBus Header	1
PMbus Header	1
IPMB Header	1
USB Header	1 header (19-pin, 2 USB3.2 Gen1)
Clear CMOS	1 (contact pads)
LED Indicators	
Standby Power LED	1 (5VSB)
Fan Fail LED	8
BMC Heartbeat LED	1
System BIOS	
Type	AMI 256Mb SPI Flash ROM
Features	Plug and Play, ACPI 5.0 and above compliance wake up events, SMBIOS 2.3 and above, ASRock Rack Instant Flash

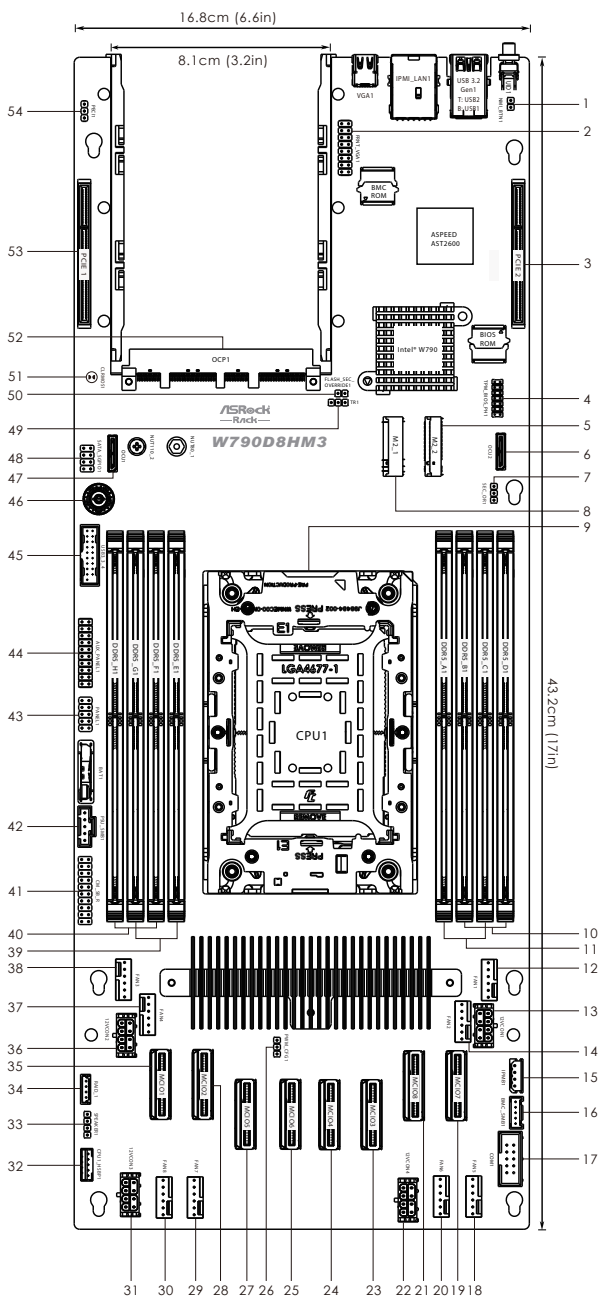
Hardware Monitor	
Temperature	CPU, MB, Card Side, TR1 Temperature Sensing
Fan	Fan Tachometer CPU Quiet Fan (Allow Chassis Fan Speed Auto-Adjust by CPU Temperature) Fan Multi-Speed Control
Voltage	CPU1_PVCCIN, 1.05V_PCH, 1.8V_PCH, +BAT, PVNN_PCH, 3.3V, 5V, 12V, 3.3VSB, 5VSB, +12V, +12VSB
Supported OS	
OS	Microsoft® Windows® - Windows 10 (64 bit) - Windows 11 (64 bit) Linux® - RedHat Enterprise Linux Server 9.3 (64bit) - SUSE SLE 15.5 (64 bit) - Ubuntu 23.04 (64 bit) <i>*Please refer to the website for the latest OS support list.</i>
Enviroment	
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

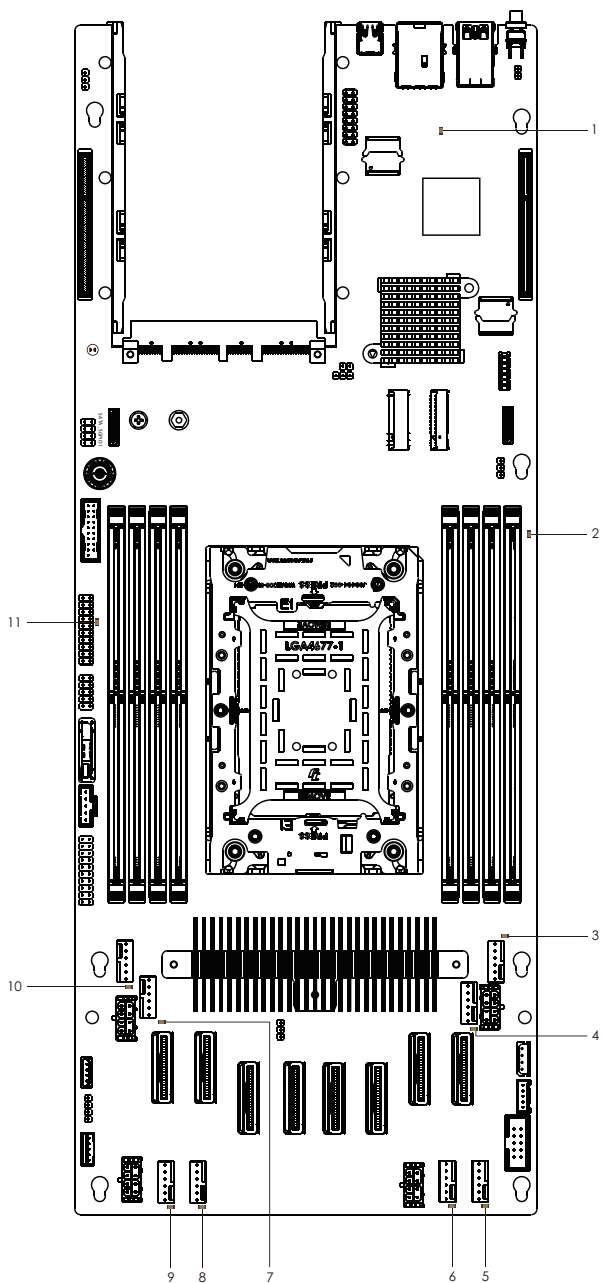


No.	Description
1	Non Maskable Interrupt Button (NMI_BTN1)
2	Front VGA Header (FRNT_VGA1)
3	PCI Express 5.0 x16 Slot (PCIE2)
4	SPI TPM Header (TPM_BIOS_PH1)
5	M-key M.2 Socket (M2_2) (Type 22110)
6	OCuLink Connector (OCU2)
7	Security Override Jumper (SEC_OR1)
8	M-key M.2 Socket (M2_1) (Type 2280)
9	LGA 4677 CPU Socket (CPU1)
10	2 x 288-pin DDR5 DIMM Slots (DDR5_B1, DDR5_D1)*
11	2 x 288-pin DDR5 DIMM Slots (DDR5_A1, DDR5_C1)*
12	System Fan Header (FAN1)
13	Micro-Hi Power Connector (12VCON1)
14	System Fan Header (FAN2)
15	Intelligent Platform Management Bus Header (IPMB1)
16	BMC SMBus Header (BMC_SMB1)
17	Serial Port Header (COM1)
18	System Fan Header (FAN5)
19	Mini Cool Edge IO x8 Connector (MCIO7)
20	System Fan Header (FAN6)
21	Mini Cool Edge IO x8 Connector (MCIO8)
22	Micro-Hi Power Connector (12VCON4)
23	Mini Cool Edge IO x8 Connector (MCIO3)
24	Mini Cool Edge IO x8 Connector (MCIO4)
25	Mini Cool Edge IO x8 Connector (MCIO6)
26	PWM Configuration Header (PWM_CFG1)
27	Mini Cool Edge IO x8 Connector (MCIO5)
28	Mini Cool Edge IO x8 Connector (MCIO2)
29	System Fan Header (FAN7)
30	System Fan Header (FAN8)
31	Micro-Hi Power Connector (12VCON3)
32	Backplane PCI Express Hot-Plug Connector (CPU1_HSBP1)
33	Speaker Header (SPEAKER1)

No.	Description
34	Virtual RAID On CPU Header (RAID_1)
35	Mini Cool Edge IO x8 Connector (MCIO1)
36	Micro-Hi Power Connector (12VCON2)
37	System Fan Header (FAN4)
38	System Fan Header (FAN3)
39	2 x 288-pin DDR5 DIMM Slots (DDR5_E1, DDR5_G1)*
40	2 x 288-pin DDR5 DIMM Slots (DDR5_F1, DDR5_H1)*
41	CM Board Standby Power Header (CM_SB_R)
42	PSU SMBus Header (PSU_SMB1)
43	System Panel Header (PANEL1)
44	Auxiliary Panel Header (AUX_PANEL1)
45	USB 3.2 Gen1 Header (USB3_3_4)
46	Thumbscrew
47	OCuLink Connector (OCU1)
48	SATA SGPIO Connector (SATA_SGPIO1)
49	Thermal Sensor Header (TR1)
50	Flash Security Jumper (FLASH_SEC_OVERRIDE1)
51	Clear CMOS Pad (CLRMOS1)
52	OCP 3.0 Gen5 x16 Mezzanine Card Slot (OCP1)
53	PCI Express 5.0 x16 Slot (PCIE1)
54	CPU PECI Mode Jumper (PECI1)

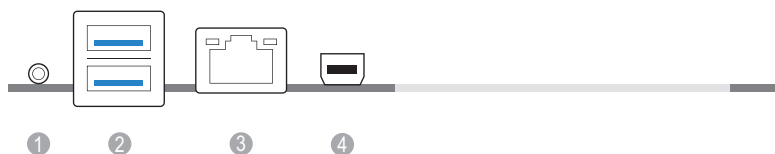
**For DIMM installation and configuration instructions, please see p.20 (Installing the Memory Modules (DIMM)) for more details.*

1.5 Onboard LED Indicators



No.	Item	Status	Description
1	BMC_LED1	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	
2	LED_CATERR2	Red	CPU CATERR error
3	LED_FAN1	Red	FAN1 failed
4	LED_FAN2	Red	FAN2 failed
5	LED_FAN5	Red	FAN5 failed
6	LED_FAN6	Red	FAN6 failed
7	LED_FAN4	Red	FAN4 failed
8	LED_FAN7	Red	FAN7 failed
9	LED_FAN8	Red	FAN8 failed
10	LED_FAN3	Red	FAN3 failed
11	SB_PWR1	Green	STB PWR ready

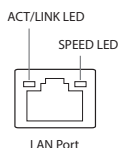
1.6 I/O Panel



No.	Description	No.	Description
1	UID Switch (UID1)	3	LAN RJ-45 Port (IPMI_LAN1)*
2	USB 3.2 Gen1 Ports (USB3_1_2)	4	Mini Display Port (VGA1)

LAN Port LED Indications

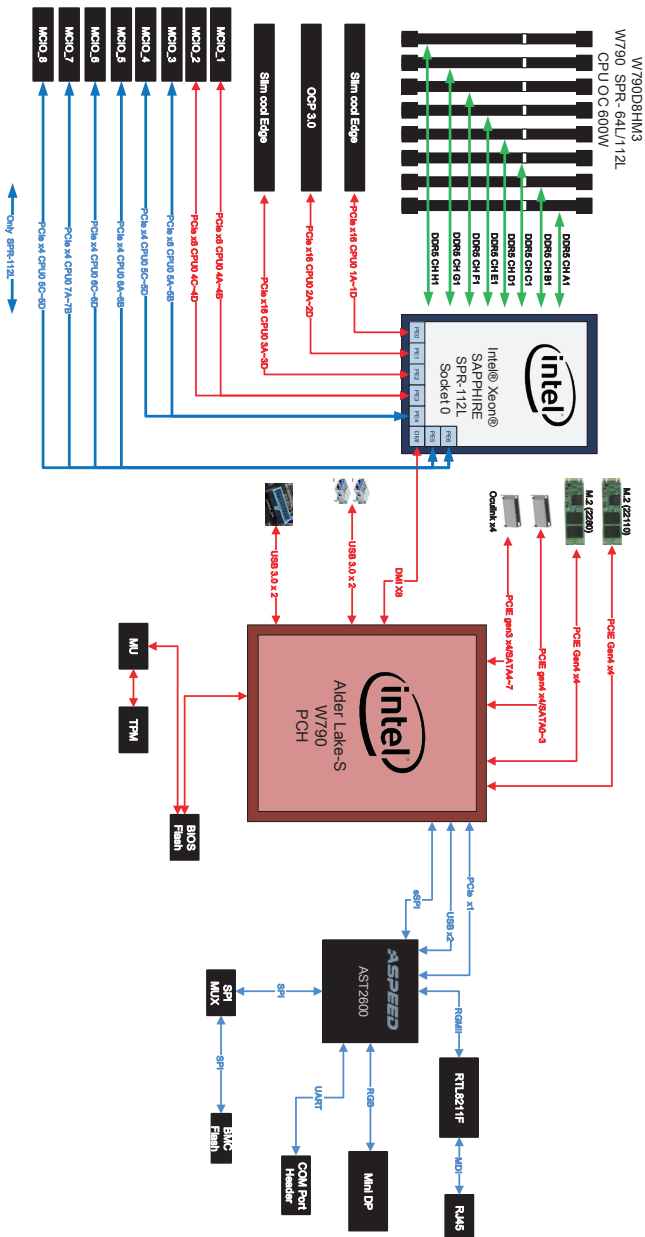
*There is an LED on each side of IPMI LAN port. Please refer to the table below for the LAN port LED indications.



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	Yellow	100Mbps connection
On	Link	Green	1Gbps connection

1.7 Block Diagram



Chapter 2 Installation

This is a Half-Width form factor (6.6" x 17") 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.

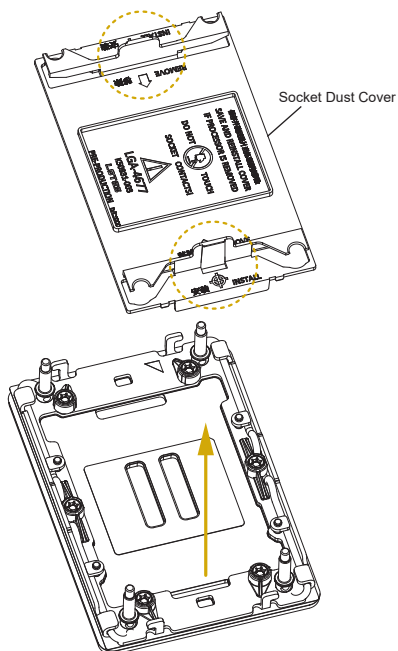
2.2 Pre-installation Precautions

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

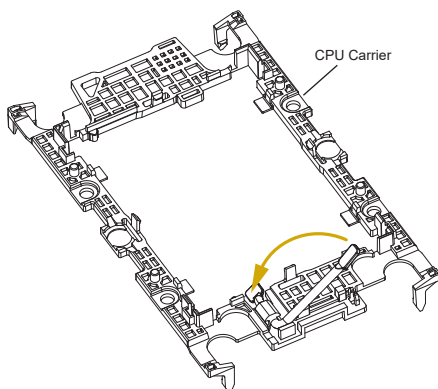
1. Unplug the power cord from the wall socket before touching any components.
2. To avoid damaging the motherboard's components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before 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.

2.3 Installing the CPU and Heatsink

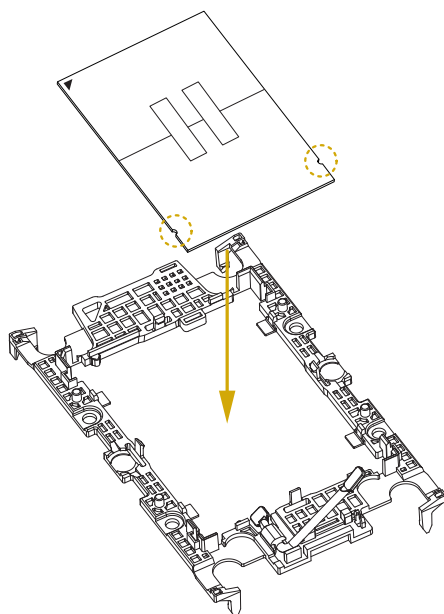
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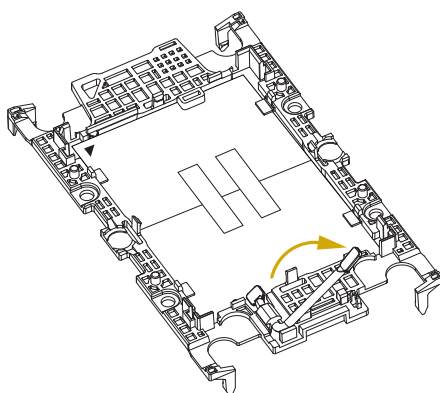
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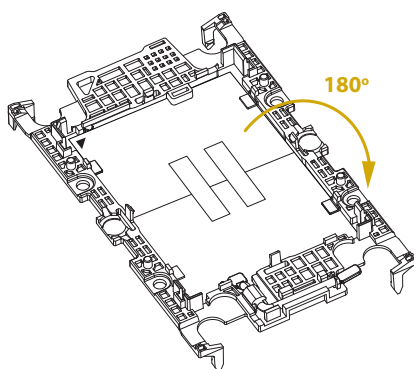
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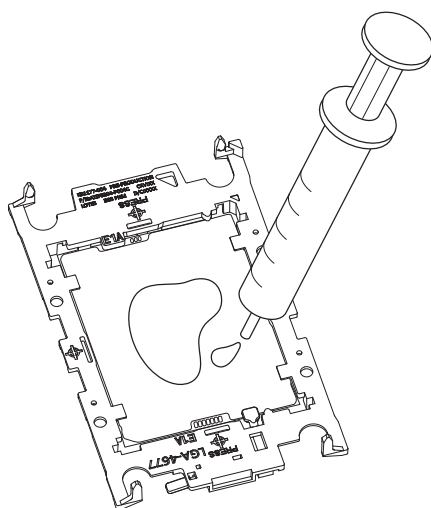
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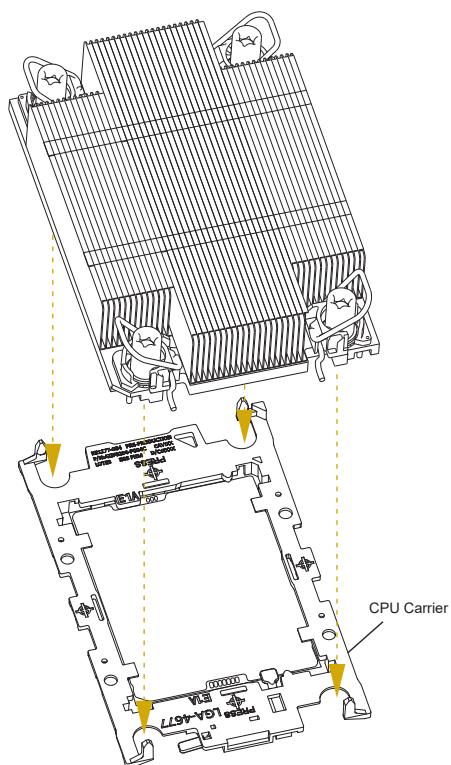
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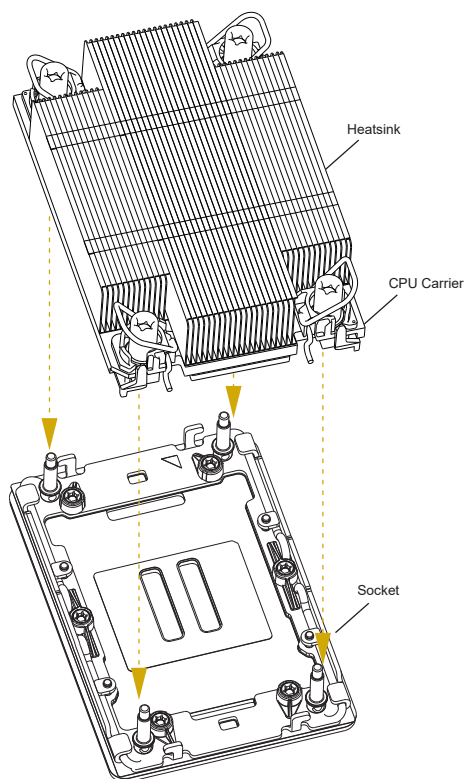


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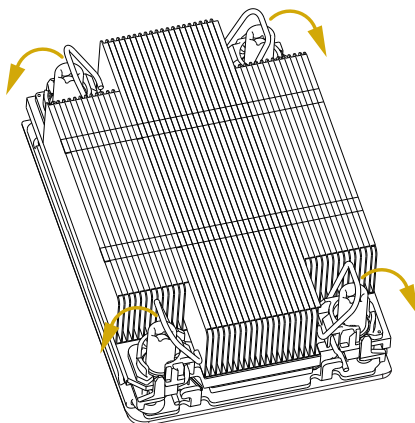


7

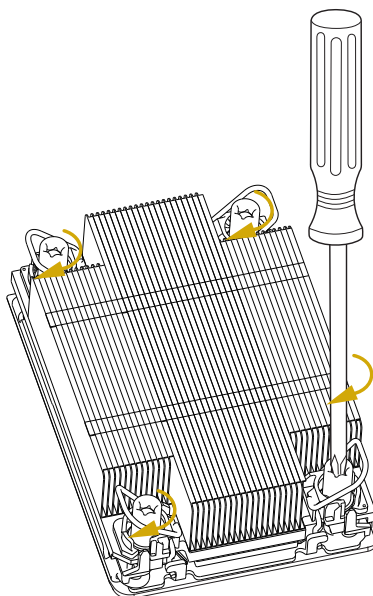




9



10



2.4 Installing the Memory Modules (DIMM)

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

CPU1											
DDR5_A1, B1, C1, D1						DDR5_E1, F1, G1, H1					



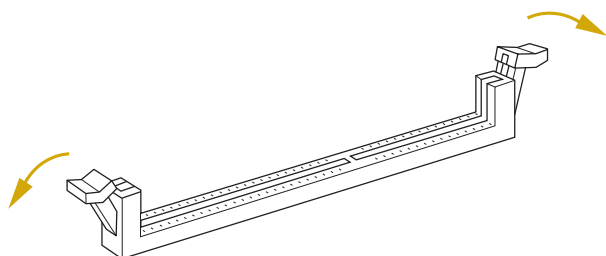
1. For Eight channel configuration, it always needs to install identical (the same brand, speed, size and chip-type) DDR5 DIMM groups.
2. Eight Channel Memory Technology is enabled only when 8 or 16 memory modules are installed.
3. It is not allowed to install a DDR, DDR2, DDR3 or DDR4 memory module into a DDR5 slot; otherwise, this motherboard and DIMM may be damaged.

Recommended Memory Configurations

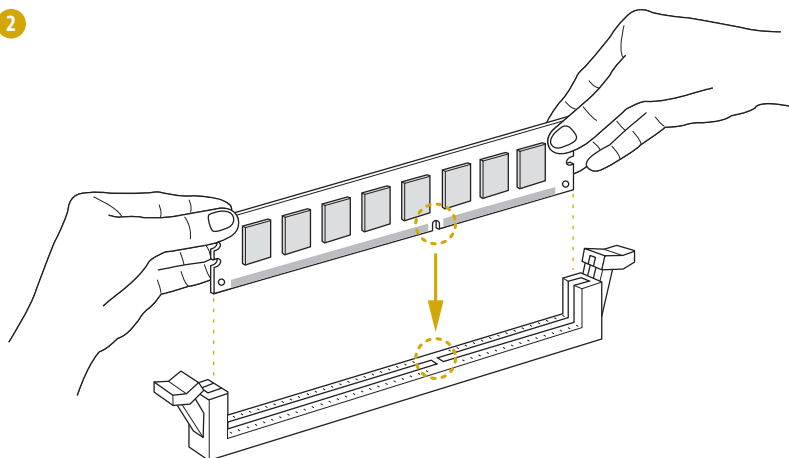
DIMM Slot		Number of DIMM Installed											
		1	1	1	1	2	2	4	6	6	6	6	8
CPU1	A1	V				V		V	V	V		V	V
	B1			V						V	V	V	V
	C1						V	V	V	V	V		V
	D1								V		V	V	V
	E1		V				V	V	V	V	V		V
	F1				V				V		V	V	V
	G1					V		V	V	V		V	V
	H1									V	V	V	V

The symbol V indicates the slot is populated.

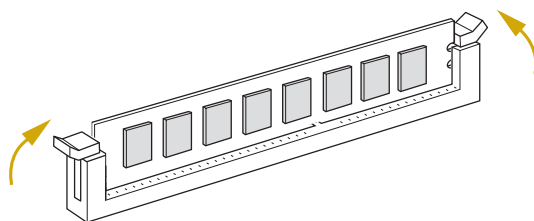
1



2



3



2.5 Expansion Slots (PCI Express Slots)

There are 2 PCI Express slots on this motherboard.

PCIe slots:

PCIE1 (PCIe 5.0 x16 slot, from CPU1) is used for PCI Express x16 lane width cards.

PCIE2 (PCIe 5.0 x16 slot, from CPU1) is used for PCI Express x16 lane width cards.

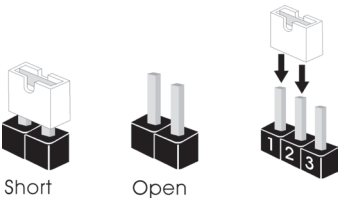
Slot	Generation	Mechanical	Electrical	Source
PCIE1	5.0	x16	x16	CPU1
PCIE2	5.0	x16	x16	CPU1

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 starting the installation.
- Step 2. Remove the system unit cover (if the motherboard is already installed in a chassis).
- Step 3. Remove the bracket facing the slot that intending to use. Keep the screws for later use.
- Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
- Step 5. Fasten the card to the chassis with screws.
- Step 6. Replace the system cover.

2.6 Jumper Setup

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



CPU PECI Mode Jumper
(3-pin PECI1)
(see p.6, No. 54)



CPU PECI connected to
BMC (Default)



CPU PECI connected to
PCH

Security Override Jumper
(3-pin SEC_OR1)
(see p.6, No. 7)

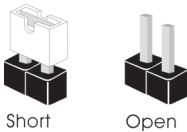


Descriptor Security
Override



Not Override (Default)

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”.



Flash Security Jumper
(FLASH_SEC_OVER-
RIDE1)
(see p.6, No. 50)



2-pin Jumper

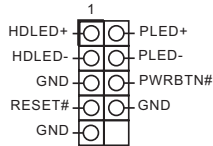
Open: Enalbe FLASH Security
(Default)
Short: Disable FLASH Security

2.7 Onboard Headers and Connectors



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

System Panel Header
(9-pin PANEL1)
(see p.6, No. 43)



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):

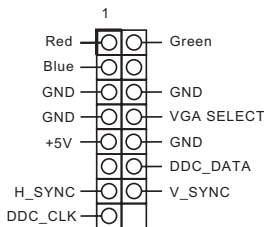
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S4 sleep state or powered off (S5).

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.

Front VGA Header
(15-pin FRNT_VGA1)
(see p.6, No. 2)

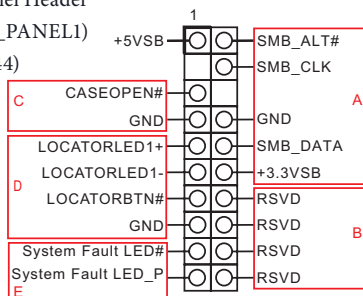


Please connect either end of VGA_2X8 cable to VGA header.

Auxiliary Panel Header

(18-pin AUX_PANEL1)

(see p.6, No. 44)



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



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.

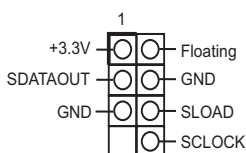
E. System Fault LED (2-pin SYSTEM STATUS)

This header is for the Fault LED on the system.

SATA SGPIO Connectors

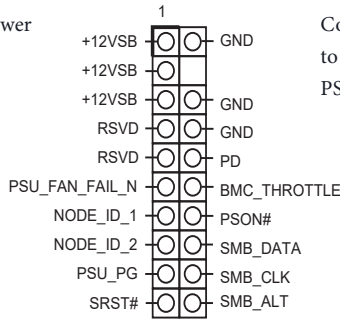
(7-pin SATA_SGPIO1)

(see p.6, No. 48)



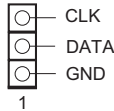
The header supports Serial Link interface for onboard SATA connections.

CM Board Standby Power Header
(19-pin CM_SB_R)
(see p.6, No. 41)



Connect this 19-pin header to the PSU for +12VSB and PSON PWROK.

PWM Configuration Header
(3-pin PWM_CFG1)
(see p.6, No. 26)



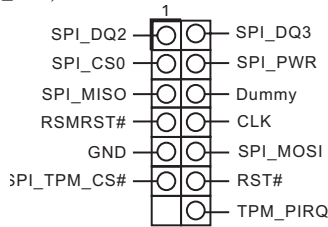
The header is used for PWM configurations.

Non Maskable Interrupt Button Header
(NMI_BTN1)
(see p.6, No. 1)



Please connect a NMI device to this header.

SPI TPM Header
(13-pin TPM_BIOS_PH1)
(see p.6, No. 4)



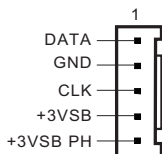
This connector supports Trusted Platform Module (TPM) system for SPI interface, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

OCuLink Connectors
(OCU1)
(see p.6, No. 47)
(OCU2)
(see p.6, No. 6)



Please connect PCIE SSDs to the connector.

BMC SMB Header
(5-pin BMC_SMB1)
(see p.6, No. 16)



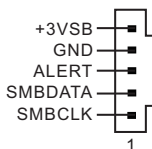
The header is used for the SM BUS devices.

Clear CMOS Pad
(CLRMOS1)
(see p.6, No. 51)



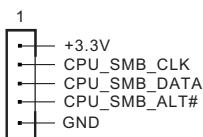
This allows user to clear the data in CMOS. To clear CMOS, take out the CMOS battery and short the Clear CMOS Pad.

PSU SMBus Header
(5-pin PSU_SMB1)
(see p.6, No. 42)



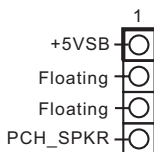
PSU SMBus monitors the status of the power supply, fan and system temperature.

Backplane PCI Express
Hot-Plug Connector
(5-pin CPU1_HSBP1)
(see p.6, No. 32)



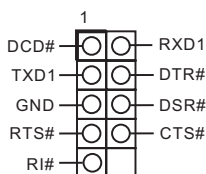
This header is used for the hot plug feature of HDDs on the backplane.

Chassis Speaker Header
(4-pin SPEAKER1)
(see p.6, No. 33)



Please connect the chassis speaker to this header.

Serial Port Header
(9-pin COM1)
(see p.6, No. 17)



This COM1 header supports a serial port module.

System Fan Headers

(6-pin FAN1)

(see p.6, No. 12)

(6-pin FAN2)

(see p.6, No. 14)

(6-pin FAN5)

(see p.6, No. 18)

(6-pin FAN6)

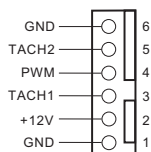
(see p.6, No. 20)

(6-pin FAN7)

(see p.6, No. 29)

(6-pin FAN8)

(see p.6, No. 30)



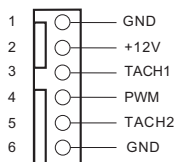
Please connect fan cables to the fan headers and match the black wire to the ground pin. All fans support Fan Control. The fan max. current is 5A and the max. power is 60Watts.

(6-pin FAN3)

(see p.6, No. 38)

(6-pin FAN4)

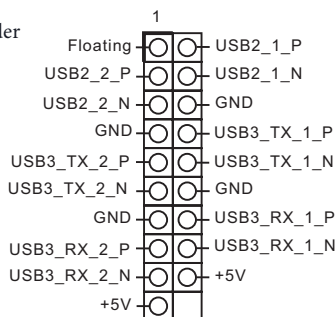
(see p.6, No. 37)



USB 3.2 Gen1 Header

(19-pin USB3_3_4)

(see p.6, No. 45)



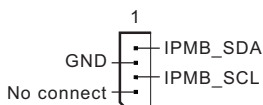
Besides two default USB 3.2 Gen1 ports on the I/O panel, there is one USB 3.2 Gen1 header on this motherboard. This USB 3.2 Gen1 header can support two USB 3.2 Gen1 ports.

Intelligent Platform

Management Bus Header

(4-pin IPMB1)

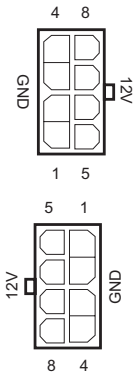
(see p.6, No. 15)



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.

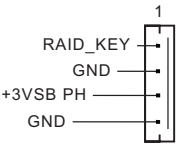
Micro-Hi Power
Connectors

- (8-pin 12VCON1)
(see p.6, No. 13)
- (8-pin 12VCON2)
(see p.6, No. 36)
- (8-pin 12VCON3)
(see p.6, No. 31)
- (8-pin 12VCON4)
(see p.6, No. 22)



This motherboard provides three 8-pin Micro-Hi 12V power connectors.

Virtual RAID On CPU
Header
(4-pin RAID_1)
(see p.6, No. 34)



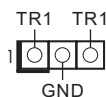
This connector supports Intel® Virtual RAID on CPU and NVME/AHCI RAID on CPU PCIE.

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.

Thermal Sensor Header
(3-pin TR1)
(see p.6, No. 49)



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.

Mini Cool Edge IO x8
Connectors
(MCIO1)
(see p.6, No. 35)
(MCIO2)
(see p.6, No. 28)
(MCIO3)
(see p.6, No. 23)
(MCIO4)
(see p.6, No. 24)
(MCIO5)
(see p.6, No. 27)
(MCIO6)
(see p.6, No. 25)
(MCIO7)
(see p.6, No. 19)
(MCIO8)
(see p.6, No. 21)



This motherboard supports eight Mini Cool Edge IO x8 Connectors. Please connect these connectors to the HDD backplane board.

**MCIO3~8 are only available when used with Intel® Xeon® W-3500/3400 series processors*

MCIO1 Pin Definition

Pin	Definition	Pin	Definition
A1	GND	B1	GND
A2	RX_DP0	B2	TX_DP0
A3	RX_DN0	B3	TX_DN0
A4	GND	B4	GND
A5	RX_DP1	B5	TX_DP1
A6	RX_DN1	B6	TX_DN1
A7	GND	B7	GND
A8	SPARE_A8	B8	SCL1
A9	WAKE#	B9	SDA1
A10	GND	B10	GND
A11	DP	B11	PERST0_N
A12	DN	B12	PRSENT0_N
A13	GND	B13	GND
A14	RX_DP2	B14	TX_DP2
A15	RX_DN2	B15	TX_DN2
A16	GND	B16	GND
A17	RX_DP3	B17	TX_DP3
A18	RX_DN3	B18	TX_DN3
A19	GND	B19	GND
A20	RX_DP4	B20	TX_DP4
A21	RX_DN4	B21	TX_DN4
A22	GND	B22	GND
A23	RX_DP5	B23	TX_DP5
A24	RX_DN5	B24	TX_DN5
A25	GND	B25	GND
A26	SPARE_A26	B26	SCL2
A27	WAKE#	B27	SDA2
A28	GND	B28	GND
A29	DP	B29	PERST1_N
A30	DN	B30	PRSENT1_N
A31	GND	B31	GND
A32	RX_DP6	B32	TX_DP6
A33	RX_DN6	B33	TX_DN6
A34	GND	B34	GND
A35	RX_DP7	B35	TX_DP7
A36	RX_DN7	B36	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

MCIO2 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	RX_DP8	B2	TX_DP8
A3	RX_DN8	B3	TX_DN8
A4	GND	B4	GND
A5	RX_DP9	B5	TX_DP9
A6	RX_DN9	B6	TX_DN9
A7	GND	B7	GND
A8	SPARE_A8	B8	SCL1
A9	WAKE#	B9	SDA1
A10	GND	B10	GND
A11	DP	B11	PERST0_N
A12	DN	B12	PRSNT0_N
A13	GND	B13	GND
A14	RX_DP10	B14	TX_DP10
A15	RX_DN10	B15	TX_DN10
A16	GND	B16	GND
A17	RX_DP11	B17	TX_DP11
A18	RX_DN11	B18	TX_DN11
A19	GND	B19	GND
A20	RX_DP12	B20	TX_DP12
A21	RX_DN12	B21	TX_DN12
A22	GND	B22	GND
A23	RX_DP13	B23	TX_DP13
A24	RX_DN13	B24	TX_DN13
A25	GND	B25	GND
A26	SPARE_A26	B26	SCL2
A27	WAKE#	B27	SDA2
A28	GND	B28	GND
A29	DP	B29	PERST1_N
A30	DN	B30	PRSNT1_N
A31	GND	B31	GND
A32	RX_DP14	B32	TX_DP14
A33	RX_DN14	B33	TX_DN14
A34	GND	B34	GND
A35	RX_DP15	B35	TX_DP15
A36	RX_DN15	B36	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

MCIO3 Pin Definition

Pin	Definition	Pin	Definition
A1	GND	B1	GND
A2	RX_DP0	B2	TX_DP0
A3	RX_DN0	B3	TX_DN0
A4	GND	B4	GND
A5	RX_DP1	B5	TX_DP1
A6	RX_DN1	B6	TX_DN1
A7	GND	B7	GND
A8	SPARE_A8	B8	SCL1
A9	WAKE#	B9	SDA1
A10	GND	B10	GND
A11	DP	B11	PERST0_N
A12	DN	B12	PRSENT0_N
A13	GND	B13	GND
A14	RX_DP2	B14	TX_DP2
A15	RX_DN2	B15	TX_DN2
A16	GND	B16	GND
A17	RX_DN3	B17	TX_DP3
A18	RX_DP3	B18	TX_DN3
A19	GND	B19	GND
A20	RX_DN4	B20	TX_DP4
A21	RX_DP4	B21	TX_DN4
A22	GND	B22	GND
A23	RX_DP5	B23	TX_DP5
A24	RX_DN5	B24	TX_DN5
A25	GND	B25	GND
A26	SPARE_A26	B26	SCL2
A27	WAKE#	B27	SDA2
A28	GND	B28	GND
A29	DP	B29	PERST1_N
A30	DN	B30	PRSENT1_N
A31	GND	B31	GND
A32	RX_DN6	B32	TX_DN6
A33	RX_DP6	B33	TX_DP6
A34	GND	B34	GND
A35	RX_DP7	B35	TX_DP7
A36	RX_DN7	B36	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	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	RX_DN8	B2	TX_DN8
A3	RX_DP8	B3	TX_DP8
A4	GND	B4	GND
A5	RX_DP9	B5	TX_DP9
A6	RX_DN9	B6	TX_DN9
A7	GND	B7	GND
A8	SPARE_A8	B8	SCL1
A9	WAKE#	B9	SDA1
A10	GND	B10	GND
A11	DP	B11	PERST0_N
A12	DN	B12	PRSNT0_N
A13	GND	B13	GND
A14	RX_DN10	B14	TX_DN10
A15	RX_DP10	B15	TX_DP10
A16	GND	B16	GND
A17	RX_DN11	B17	TX_DP11
A18	RX_DP11	B18	TX_DN11
A19	GND	B19	GND
A20	RX_DP12	B20	TX_DP12
A21	RX_DN12	B21	TX_DN12
A22	GND	B22	GND
A23	RX_DP13	B23	TX_DN13
A24	RX_DN13	B24	TX_DP13
A25	GND	B25	GND
A26	SPARE_A26	B26	SCL2
A27	WAKE#	B27	SDA2
A28	GND	B28	GND
A29	DP	B29	PERST1_N
A30	DN	B30	PRSNT1_N
A31	GND	B31	GND
A32	RX_DN14	B32	TX_DN14
A33	RX_DP14	B33	TX_DP14
A34	GND	B34	GND
A35	RX_DP15	B35	TX_DP15
A36	RX_DN15	B36	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	Definition	Pin	Definition
A1	GND	B1	GND
A2	RX_DP0	B2	TX_DP0
A3	RX_DN0	B3	TX_DN0
A4	GND	B4	GND
A5	RX_DP1	B5	TX_DP1
A6	RX_DN1	B6	TX_DN1
A7	GND	B7	GND
A8	SPARE_A8	B8	SCL1
A9	WAKE#	B9	SDA1
A10	GND	B10	GND
A11	DP	B11	PERST0_N
A12	DN	B12	PRSENT0_N
A13	GND	B13	GND
A14	RX_DP2	B14	TX_DP2
A15	RX_DN2	B15	TX_DN2
A16	GND	B16	GND
A17	RX_DN3	B17	TX_DP3
A18	RX_DP3	B18	TX_DN3
A19	GND	B19	GND
A20	RX_DP4	B20	TX_DP4
A21	RX_DN4	B21	TX_DN4
A22	GND	B22	GND
A23	RX_DN5	B23	TX_DP5
A24	RX_DP5	B24	TX_DN5
A25	GND	B25	GND
A26	SPARE_A26	B26	SCL2
A27	WAKE#	B27	SDA2
A28	GND	B28	GND
A29	DP	B29	PERST1_N
A30	DN	B30	PRSENT1_N
A31	GND	B31	GND
A32	RX_DN6	B32	TX_DN6
A33	RX_DP6	B33	TX_DP6
A34	GND	B34	GND
A35	RX_DN7	B35	TX_DP7
A36	RX_DP7	B36	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	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	RX_DP8	B2	TX_DP8
A3	RX_DN8	B3	TX_DN8
A4	GND	B4	GND
A5	RX_DP9	B5	TX_DP9
A6	RX_DN9	B6	TX_DN9
A7	GND	B7	GND
A8	SPARE_A8	B8	SCL1
A9	WAKE#	B9	SDA1
A10	GND	B10	GND
A11	DP	B11	PERST0_N
A12	DN	B12	PRSNT0_N
A13	GND	B13	GND
A14	RX_DN10	B14	TX_DN10
A15	RX_DP10	B15	TX_DP10
A16	GND	B16	GND
A17	RX_DP11	B17	TX_DP11
A18	RX_DN11	B18	TX_DN11
A19	GND	B19	GND
A20	RX_DP12	B20	TX_DP12
A21	RX_DN12	B21	TX_DN12
A22	GND	B22	GND
A23	RX_DP13	B23	TX_DP13
A24	RX_DN13	B24	TX_DN13
A25	GND	B25	GND
A26	SPARE_A26	B26	SCL2
A27	WAKE#	B27	SDA2
A28	GND	B28	GND
A29	DP	B29	PERST1_N
A30	DN	B30	PRSNT1_N
A31	GND	B31	GND
A32	RX_DP14	B32	TX_DP14
A33	RX_DN14	B33	TX_DN14
A34	GND	B34	GND
A35	RX_DN15	B35	TX_DP15
A36	RX_DP15	B36	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	Definition	Pin	Definition
A1	GND	B1	GND
A2	RX_DP0	B2	TX_DP0
A3	RX_DN0	B3	TX_DN0
A4	GND	B4	GND
A5	RX_DP1	B5	TX_DP1
A6	RX_DN1	B6	TX_DN1
A7	GND	B7	GND
A8	SPARE_A8	B8	SCL1
A9	WAKE#	B9	SDA1
A10	GND	B10	GND
A11	DP	B11	PERST0_N
A12	DN	B12	PRSENT0_N
A13	GND	B13	GND
A14	RX_DP2	B14	TX_DP2
A15	RX_DN2	B15	TX_DN2
A16	GND	B16	GND
A17	RX_DP3	B17	TX_DP3
A18	RX_DN3	B18	TX_DN3
A19	GND	B19	GND
A20	RX_DN4	B20	TX_DP4
A21	RX_DP4	B21	TX_DN4
A22	GND	B22	GND
A23	RX_DP5	B23	TX_DP5
A24	RX_DN5	B24	TX_DN5
A25	GND	B25	GND
A26	SPARE_A26	B26	SCL2
A27	WAKE#	B27	SDA2
A28	GND	B28	GND
A29	DP	B29	PERST1_N
A30	DN	B30	PRSENT1_N
A31	GND	B31	GND
A32	RX_DP6	B32	TX_DP6
A33	RX_DN6	B33	TX_DN6
A34	GND	B34	GND
A35	RX_DP7	B35	TX_DP7
A36	RX_DN7	B36	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

MCIO8 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	RX_DP8	B2	TX_DP8
A3	RX_DN8	B3	TX_DN8
A4	GND	B4	GND
A5	RX_DP9	B5	TX_DP9
A6	RX_DN9	B6	TX_DN9
A7	GND	B7	GND
A8	SPARE_A8	B8	SCL1
A9	WAKE#	B9	SDA1
A10	GND	B10	GND
A11	DP	B11	PERST0_N
A12	DN	B12	PRSNT0_N
A13	GND	B13	GND
A14	RX_DP10	B14	TX_DP10
A15	RX_DN10	B15	TX_DN10
A16	GND	B16	GND
A17	RX_DP11	B17	TX_DP11
A18	RX_DN11	B18	TX_DN11
A19	GND	B19	GND
A20	RX_DN12	B20	TX_DP12
A21	RX_DP12	B21	TX_DN12
A22	GND	B22	GND
A23	RX_DP13	B23	TX_DP13
A24	RX_DN13	B24	TX_DN13
A25	GND	B25	GND
A26	SPARE_A26	B26	SCL2
A27	WAKE#	B27	SDA2
A28	GND	B28	GND
A29	DP	B29	PERST1_N
A30	DN	B30	PRSNT1_N
A31	GND	B31	GND
A32	RX_DP14	B32	TX_DP14
A33	RX_DN14	B33	TX_DN14
A34	GND	B34	GND
A35	RX_DP15	B35	TX_DP15
A36	RX_DN15	B36	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

2.8 Unit 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.

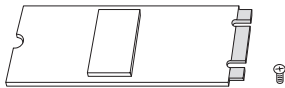


Press and hold the UID button for 4 seconds, the BMC will trigger an external reset.

2.9 M.2 SSD Module Installation Guide

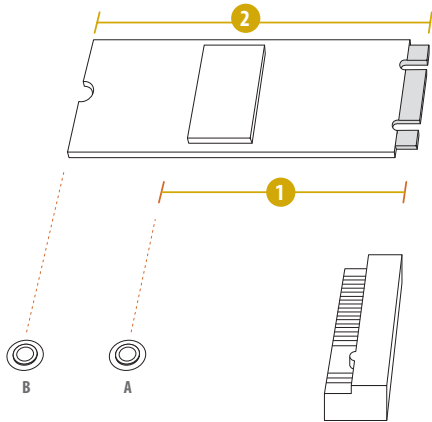
The M.2 Socket (M2_1/M2_2, Key M) supports either a M.2 SATA3 6.0Gb/s module or a M.2 PCI Express module up to Gen4x4 (16Gb/s x4).

Installing the M.2 SSD Module



Step 1

Prepare a M.2 SSD module and the screw.

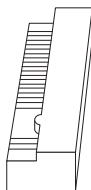
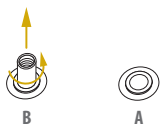


Step 2

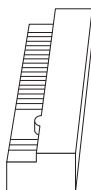
Depending on the PCB type and length of your M.2 SSD module, find the corresponding nut location to be used.

M2_1:	No.	1
	Nut Location	A
	PCB Length	8cm
	Module Type	Type2280

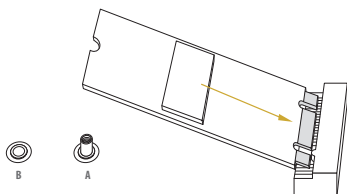
M2_2:	No.	2
	Nut Location	B
	PCB Length	11cm
	Module Type	Type22110

**Step 3**

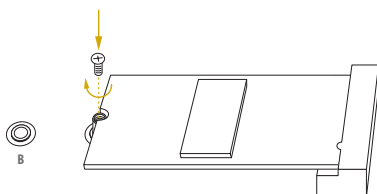
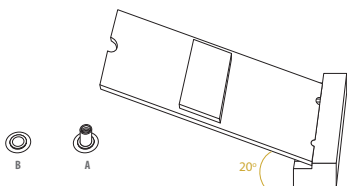
Move the standoff based on the module type and length. Skip Step 3 and 4 and go straight to Step 5 if using the default nut. Otherwise, release the standoff by hand.

**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
OC Tweaker	For overclocking configurations
Advanced	To set up the advanced UEFI features
Security	To set up the security features
Event Logs	For event log configuration
Boot	To set up the default system device to locate and load the Operating System
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

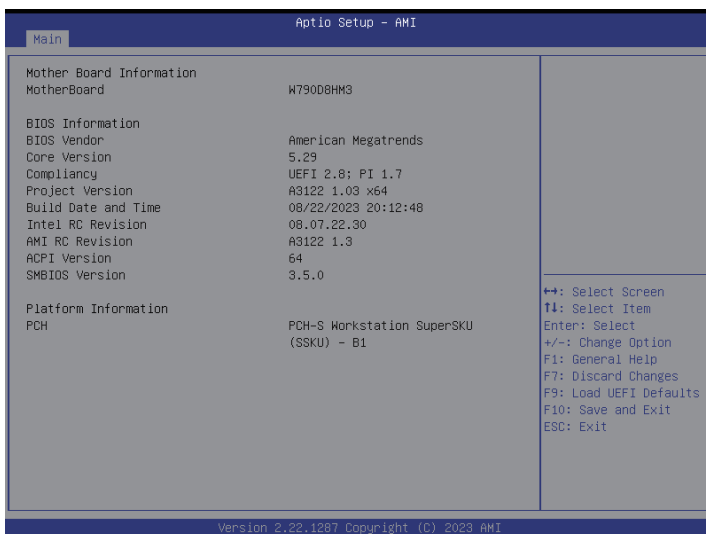
3.2 Main Screen

Entering the UEFI SETUP UTILITY, the Main screen displays the system overview. The Main screen provides system overview information and allows user to set the system time and date.



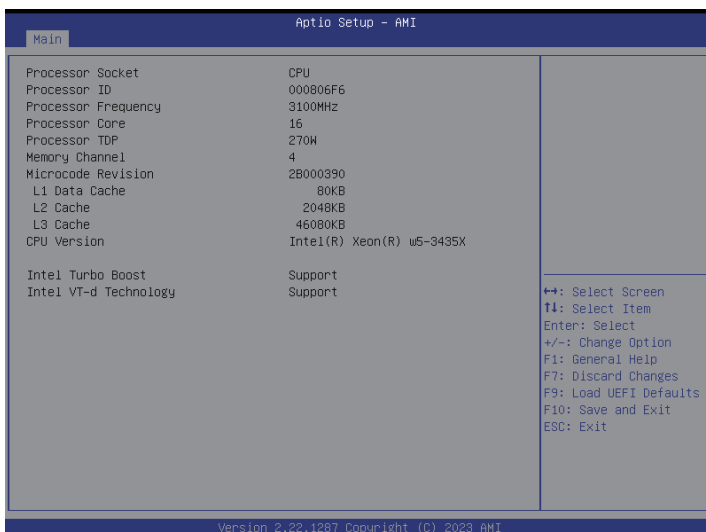
3.2.1 Motherboard Information

Press [Enter] to view the information of the motherboard.



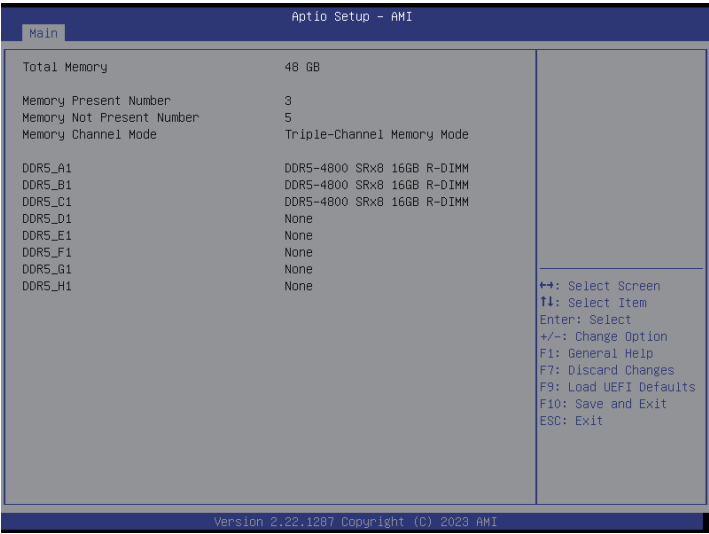
3.2.2 Processor Information

Press [Enter] to view the information of the processor.



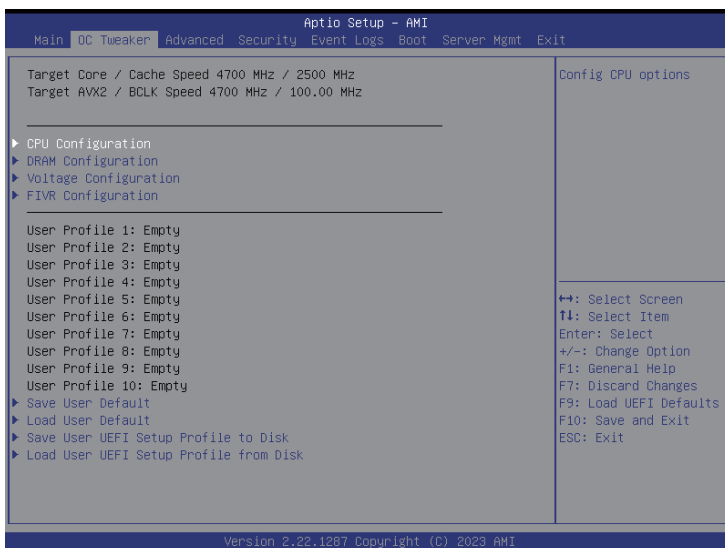
3.2.3 Memory Information

Press [Enter] to view the information of the memory.



3.3 OC Tweaker

In the OC Tweaker screen allowing user to set up overclocking features.



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

CPU Configuration

Configure CPU options.

DRAM Configuration

Configure DRAM Timing.

Voltage Configuration

Configure Voltage options.

FIVR Configuration

Configure FIVR options.

Save User Default

Type a profile name and press enter to save the settings as user default.

Load User Default

Load previously saved user defaults.

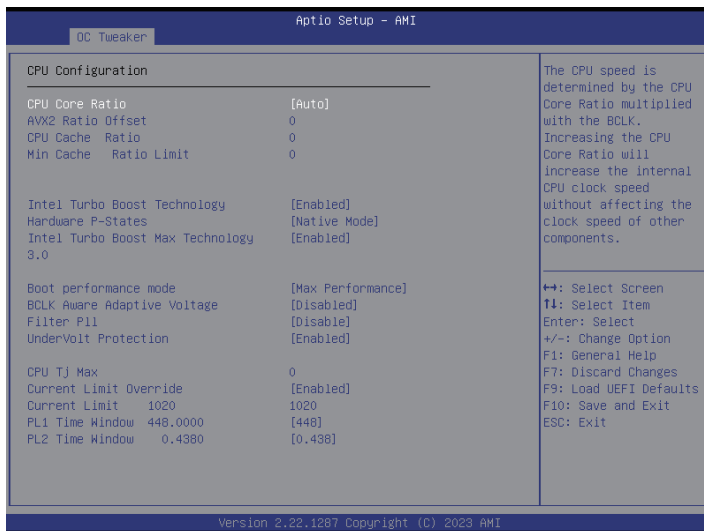
Save User UEFI Setup Profile to Disk

This helps user to save current UEFI settings as an user profile to disk.

Load User UEFI Setup Profile from Disk

This helps user to load previous saved profile from the disk.

3.3.1 CPU Configuration



CPU Core Ratio

Configure the CPU Core Ratio, the CPU speed is determined by the CPU Core Ratio multiplied with the BCLK. Increasing the CPU Core Ratio will increase the internal CPU clock speed without affecting the clock speed of other components.

AVX2 Ratio Offset

AVX2 Ratio Offset specifies a negative offset from the CPU Ratio for AVX workloads. AVX is a more stressful workload that lower the AVX ratio to ensure maximum possible ratio for SSE workloads.

CPU Cache Ratio

The CPU Internal Bus Speed Ratio. The maximum should be the same as the CPU Ratio.

Min Cache Ratio Limit

The CPU Internal Bus Speed minimum ratio.

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.

Hardware P-States

Select this item to configure the Hardware chooses a P-state basing on OS Request (Disable), OS guidance (Native Mode) or autonomously (Out of Band Mode).

Intel Turbo Boost Max Technology 3.0

Select this item to enable or disable Intel Turbo Boost Max Technology 3.0 (ITBMT 3.0) support.

Boot Performance Mode

Select the performance state that the BIOS will set before OS hand off.

BCLK Aware Adaptive Voltage

Select this item to enable or disable the BCLK Aware Adaptive Voltage. When enabled, pcode will be aware of the BCLK frequency when calculating the CPU V/F curves. This is ideal for BCLK OC to avoid high voltage overrides.

Filter PLL

Select enable to allow the Filter PLL for high BCLK Overlocking levels.

UnderVolt Protection

It is recommended to keep this item enabled by default. When UnderVolt Protection is enabled, user will not be able to program under voltage in OS runtime.

CPU Tj Max

Specified value here to support Tj Max in the range of 105 to 115 deg Celsius. Uses Pcode Mailbox 0xAC. Range 105-115. 0 is for No override.

Current Limit Override

Select this item to disable for doing nothing or enable for override Current limitation in 1/8 A increments. The default value is [Disable].

Current Limit 1020

This value represents the Maximum instantaneous current allowed at any given time.

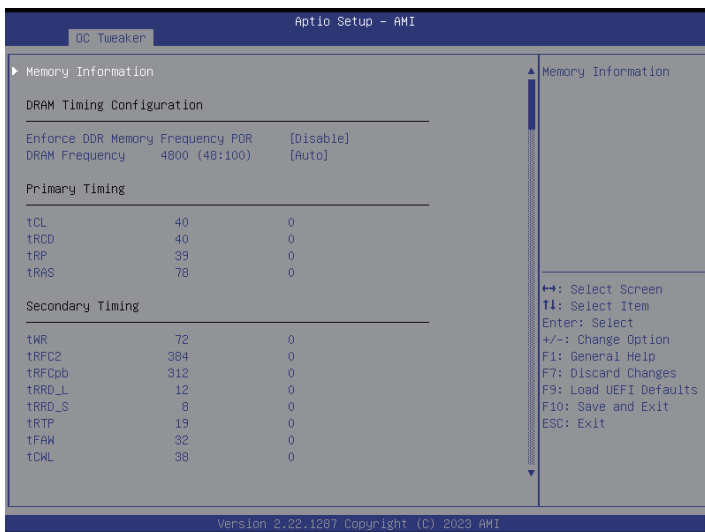
PL1 Time Window 448.0000

When the Long Duration Power Limit is exceeded, select this item to configure the time period until the CPU ratio is lowered.

PL2 Time Window 0.4380

When the Short Duration Power Limit is exceeded, select this item to configure the time period until the CPU ratio is lowered.

3.3.2 DRAM Configuration



Memory Information

Allows users to browse the serial presence detect (SPD) and Intel extreme memory profile (XMP) for DDR modules.

DRAM Timing 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 4800 (48:100)

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

Primary Timing

CAS# Latency (tCL)

The time between sending a column address to the memory and the beginning of the data in response.

RAS# to CAS# Delay (tRCD)

The number of clock cycles required between the opening of a row of memory and accessing columns within it.

Row Precharge Time (tRP)

The number of clock cycles required between the issuing of the precharge command and opening the next row.

RAS# Active Time (tRAS)

The number of clock cycles required between a bank active command and issuing the precharge command.

Secondary Timing

Write Recovery Time (tWR)

The amount of delay that must elapse after the completion of a valid write operation, before an active bank can be precharged.

Refresh Cycle Time² (tRFC₂)

The number of clocks from a Refresh command until the first Activate command to the same rank.

Refresh Cycle Time per Bank (tRFC_{pb})

The number of clocks that a per bank Refresh command takes to complete.

RAS to RAS Delay (tRRD_L)

The number of clocks between two rows activated in different banks of the same rank.

RAS to RAS Delay (tRRD_S)

The number of clocks between two rows activated in different banks of the same rank.

Read to Precharge (tRTP)

The number of clocks that are inserted between a read command to a row pre-charge command to the same rank.

Four Activate Window (tFAW)

The time window in which four activates are allowed the same rank.

CAS Write Latency (tCWL)

Configure CAS Write Latency.

Third Timing

DRAM Refresh Interval (tREFI)

Configure refresh cycles at an average periodic interval.

tREF Block

Configure the number of H clocks to block scheduler before checking returned safe signals.

DRAM CKE Minimum Pulse Width (tCKE)

Configure the period of time the DDR4 initiates a minimum of one refresh command internally once it enters Self-Refresh mode.

DRAM Active to Active/Refresh Time (tRC)

Configure the minimum active to Active/Refresh Time.

Fourth Timing**tPRPDEN**

Configure tPRPDEN. tPRPDEN, tACTPDEN, tREFPDEN will use this single value.

tXP

Configure the CKE low exit time before a new command can be sent after CKE comes up.

tRDPDEN

Configure CAS_{rd} to CKE low time.

tWRPDEN

Configure CAS_{wr} to CKE low time.

tSTAGGER_Ref

Configure to limit the rate of refresh commands sent to a single channel.

tRDA

Configure the read CAS w/AutoPrecharge to Activate delay.

tWRA

Configure the write CAS w/AutoPrecharge to Activate delay.

tWRPRE

Configure the write CAS to Precharge delay.

tWRRDA

Configure the write CAS to Read CAS with AutoPrecharge delay.

tMRD

Configure DDR tMRD timing parameter. MRS to MRS minimum delay in number of DCLK.

tCPDED

This is the tCPDED parameter, only used with DDR5.

tCPED2SRX

This is the minimum time in SR for RDIMMs (RCD) without clocking stop; the time from the SRE single CK CS# assertion to the SRX command to the RCD.

tCSSR

This is the tCSL timing parameter for UDIMMs (no RCD) and the tCSSR timing parameter for RDIMMs (RCD).

tSRX2SRX

This is the tCSH_SRExit timing parameter for UDIMMs (no RCD) and the tSRX2SRX timing parameter for RDIMMs (RCD).

tSTAB

This is the tCKACT + tSTAB timing parameter for RDIMMs (RCD).

tXSDLL

Configure tXSDLL. Exit Self Refresh to commands requiring a locked DLL.

tZQOPER

Configure the Normal operation Full calibration time.

tMOD

Configure the Mode Register Set command update delay.

tXSOFFSET

Set this field to the number of 1/2 the number of Dclks to get 10ns.

Turn Around Timing

TAT Training Value

tRRSG

Configure between Read CAS to Read CAS delay, same bank group. tRRSG needs to be greater than or equal to tRRSR.

tWWSG

Configure between Write CAS to Write CAS delay, same bank group. tWWSG needs to be greater than or equal to tWWSR.

tRWSG

Configure between Read CAS to Write CAS delay, same bank group. tRWSG needs to be greater than or equal to tRWSR.

tWRSG

Configure between Write CAS to Read CAS delay, same bank group. tWRSG needs to be greater than or equal to tWRSR.

tRRSR

Configure between Read CAS to Read CAS delay, same rank, different bank groups. tRRSG needs to be greater than or equal to tRRSR.

tWWSR

Configure between Write CAS to Write CAS delay, same rank, different bank groups. tWWSG needs to be greater than or equal to tWWSR.

tRWSR

Configure between Read CAS to Write CAS delay, same rank, different bank groups. tRWSG needs to be greater than or equal to tRWSR.

tWRSR

Configure between Write CAS to Read CAS delay, same rank, different bank groups. tWRSG needs to be greater than or equal to tWRSR.

tRRDR

Configure between Read CAS to Read CAS delay, different rank.

tWWDR

Configure between Write CAS to Write CAS delay, different rank.

tRWDR

Configure between Read CAS to Write CAS delay, different rank.

tWRDR

Configure between Write CAS to Read CAS delay, different rank.

tRRDD

Configure between Read CAS to Read CAS delay, different DIMM.

tWWDD

Configure between Write CAS to Write CAS delay, different DIMM.

tRWDD

Configure between Read CAS to Write CAS delay, different DIMM.

tWRDD

Configure between Write CAS to Read CAS delay, different DIMM.

tRRDS

Configure between Read CAS to Read CAS delay, different SubRanks.

tWWDs

Configure between Write CAS to Write CAS delay, different SubRanks.

tRWDS

Configure between Read CAS to Write CAS delay, different SubRanks.

tWRDS

Configure between Write CAS to Read CAS delay, different SubRanks.

TAT Runtime Value

tRRSG

Configure between Read CAS to Read CAS delay, same bank group. tRRSG needs to be greater than or equal to tRRSR.

tWWSG

Configure between Write CAS to Write CAS delay, same bank group. tWWSG needs to be greater than or equal to tWWSR.

tRWSG

Configure between Read CAS to Write CAS delay, same bank group. tRWSG needs to be greater than or equal to tRWSR.

tWRSG

Configure between Write CAS to Read CAS delay, same bank group. tWRSG needs to be greater than or equal to tWRSR.

tRRSR

Configure between Read CAS to Read CAS delay, same rank, different bank groups. tRRSG needs to be greater than or equal to tRRSR.

tWWSR

Configure between Write CAS to Write CAS delay, same rank, different bank groups. tWWSG needs to be greater than or equal to tWWSR.

tRWSR

Configure between Read CAS to Write CAS delay, same rank, different bank groups.
tRWSG needs to be greater than or equal to tRWSR.

tWRSR

Configure between Write CAS to Read CAS delay, same rank, different bank groups.
tWRSR needs to be greater than or equal to tWRSR.

tRRDR

Configure between Read CAS to Read CAS delay, different rank.

tWWDR

Configure between Write CAS to Write CAS delay, different rank.

tRWDR

Configure between Read CAS to Write CAS delay, different rank.

tWRDR

Configure between Write CAS to Read CAS delay, different rank.

tRRDD

Configure between Read CAS to Read CAS delay, different DIMM.

tWWDD

Configure between Write CAS to Write CAS delay, different DIMM.

tRWDD

Configure between Read CAS to Write CAS delay, different DIMM.

tWRDD

Configure between Write CAS to Read CAS delay, different DIMM.

tRRDS

Configure between Read CAS to Read CAS delay, different SubRanks.

tWWDS

Configure between Write CAS to Write CAS delay, different SubRanks.

tRWDS

Configure between Read CAS to Write CAS delay, different SubRanks.

tWRDS

Configure between Write CAS to Read CAS delay, different SubRanks.

ODT Setting

ODT WR (A1)/(A2)/(B1)/(B2)/(C1)/(C2)/(D1)/(D2)

Configure the memory on die termination resistors WR.

ODT NOM Rd (A1)/(A2)/(B1)/(B2)/(C1)/(C2)/(D1)/(D2)

Configure the memory on die termination resistors NOM Rd.

ODT NOM Wr (A1)/(A2)/(B1)/(B2)/(C1)/(C2)/(D1)/(D2)

Configure the memory on die termination resistors NOM Wr.

ODT PARK (A1)/(A2)/(B1)/(B2)/(C1)/(C2)/(D1)/(D2)

Configure the memory on die termination resistors PARK.

ODT PARK DQS (A1)/(A2)/(B1)/(B2)/(C1)/(C2)/(D1)/(D2)

Configure the memory on die termination resistors PARK DQS.

Advanced Setting

MRC Premote Warnings

Determines if MRC warnings are promoted to system level.

Premote Warnings

Determines if warnings are promoted to system level.

MemTest

Enable or disable memory test during normal boot.

MemTest Loops

Number of memory test loops during normal boot, set to 0 to run memtest infinitely.

MemTest On Cold Fast Boot

Enable or disable memory test during fast boot.

Attempt Fast Boot

[Enable] - Portions of memory reference code will be skipped when possible to increase boot speed on warm boots.

[Disable] - Disable this feature.

[Audio] - Sets it to the MRC default setting; current default is Disable.

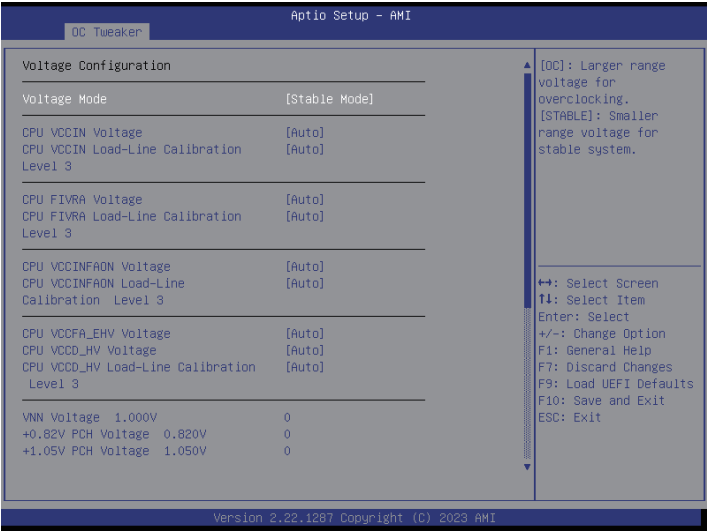
Attempt Fast Cold Boot

[Enable] - Portions of memory reference code will be skipped when possible to increase boot speed on cold boots.

[Disable] - Disable this feature.

[Auto] - Sets it to the MRC default setting; current default is Disable.

3.3.3 Voltage Configuration



Voltage Mode

[OC] - Larger range voltage for overclocking.

[Stable] - Smaller range voltage for stable system.

CPU VCCIN Voltage

Input voltage for the processor by the external voltage regulator.

CPU VCCIN Load-Line Calibration Level3

CPU VCCIN Load-Line Calibration helps prevent VCCIN voltage droop when the system is under heavy loading.

CPU VCCIN Auto Phase

Use this item to configure CPU VCCIN Auto Phase.

CPU FIVRA Voltage

Input voltage for the processor by the external voltage regulator.

CPU FIVRA Load-Line Calibration Level3

CPU FIVRA Load-Line Calibration helps prevent FIVRA voltage droop when the system is under heavy loading.

CPU VCCINFAON Voltage

Input voltage for the processor by the external voltage regulator.

CPU VCCINFAON Load-Line Calibration Level3

CPU VCCIN Load-Line Calibration helps prevent VCCINFAON voltage droop when the system is under heavy loading.

CPU VCCINFAON Auto Phase

Use this item to configure CPU VCCINFAON Auto Phase.

CPU VCCFA_EHV Voltage

Input voltage for the processor by the external voltage regulator.

CPU VCCD_HV Voltage

Input voltage for the processor by the external voltage regulator.

CPU VCCD_HV Load-Line Calibration Level3

CPU VCCD_HV Load-Line Calibration helps prevent VCCD_HV voltage droop when the system is under heavy loading.

VNN Voltage 1.000V

Configure the voltage for the VNN.

+0.82V PCH Voltage 0.820V

Configure the voltage for the +0.82V PCH.

+1.05 PCH Voltage 1.050V

Configure the voltage for the +1.05 PCH.

Secure Mode

Select this item to configure secure mode by auto, enable or disable.

VDD Voltage

Configure the memory VDD Voltage

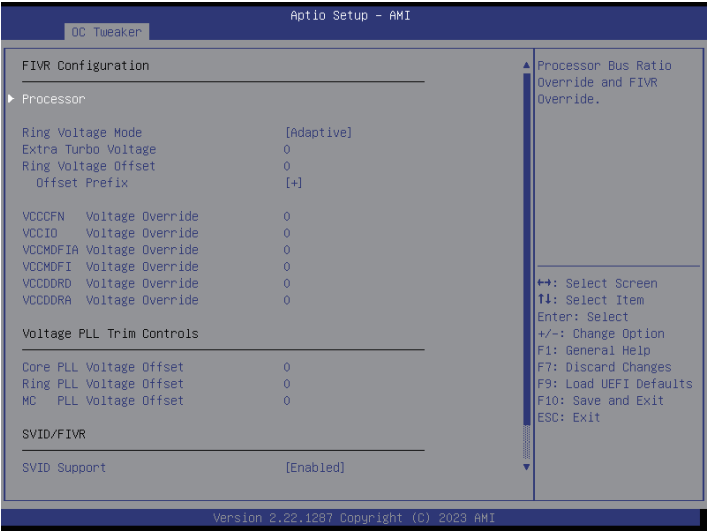
VDDQ Voltage

Configure the memory VDDQ Voltage

VPP Voltage

Configure the memory VPP Voltage

3.3.4 FIVR Configuration



FIVR Configuration

Processor

Select this item to configure the Processor Bus Ratio Override and FIVR Override.

VF Configuration Scope

Select this item to configure both all cores VF curve or per-core VF curve.

Core Voltage Mode

Configure this item between Adaptive and Override Voltage modes.

Extra Turbo Voltage

Specifies the extra turbo voltage applied while Core is operation in turbo mode.

Core Voltage Offset

Specifies the Offset Voltage applied to the Global Core domain. This voltage is specified in millivolts.

Offset Prefix

Set the offset value as positive or negative.

Ring Voltage Mode

Configure this item between Adaptive and Override Voltage modes.

Extra Turbo Voltage

Specifies the extra turbo voltage applied while Core is operation in turbo mode.

Ring Voltage Offset

Specifies the Offset Voltage applied to the Ring domain. This voltage is specified in millivolts.

Offset Prefix

Set the offset value as positive or negative.

VCCCFN Voltage Override

Specifies the Override Voltage applied to the VCCCFN domain.

VCCIO Voltage Override

Specifies the Override Voltage applied to the VCCIO domain.

VCCMDFIA Voltage Override

Specifies the Override Voltage applied to the VCCMDFIA domain.

VCCMDFI Voltage Override

Specifies the Override Voltage applied to the VCCMDFI domain.

VCCDDRD Voltage Override

Specifies the Override Voltage applied to the VCCDDRD domain.

VCCDDRA Voltage Override

Specifies the Override Voltage applied to the VCCDDRA domain.

Voltage PLL Trim Controls

Core PLL Voltage Offset

PLL Voltage offset ranges from 0 to 15 bins, each bin is 15mV. Adding 5 or more bins will help to increase the range of this domain frequency in extreme overclocking conditions. The best bins will be different on each processor, user has to find the best bins for your own processor.

Ring PLL Voltage Offset

PLL Voltage offset ranges from 0 to 15 bins, each bin is 15mV. Adding 5 or more bins will help to increase the range of this domain frequency in extreme overclocking conditions. The best bins will be different on each processor, user has to find the best bins for your own processor.

MC PLL Voltage Offset

PLL Voltage offset ranges from 0 to 15 bins, each bin is 15mV. Adding 5 or more bins will help to increase the range of this domain frequency in extreme overclocking conditions. The best bins will be different on each processor, user has to find the best bins for your own processor.

SVID/FIVR

SVID Support

Select this item to enable or disable SVID. Disabling SVID disables input voltage overrides.

SVID Voltage Override (VccIn)

Overrides the Vccin input voltage. This controls the input voltage to the CPU and will affect all CPU domain.

FIVR Faults

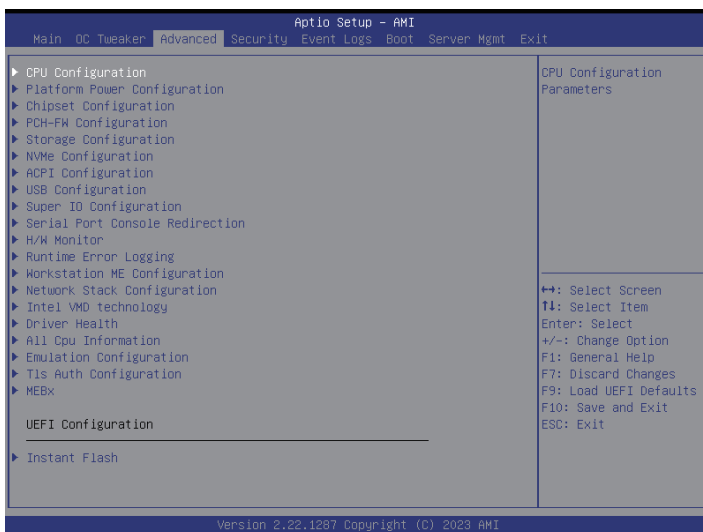
Select this item to enable or disable FIVR Faults. When FIVR faults are disabled, OVP and OCP protection mechanisms will be masked.

FIVR Efficiency Management

FIVR efficiency management is good for power delivery efficiency, but it may be an impediment to proper power delivery control under overclocking, particularly BCLK overclocking.

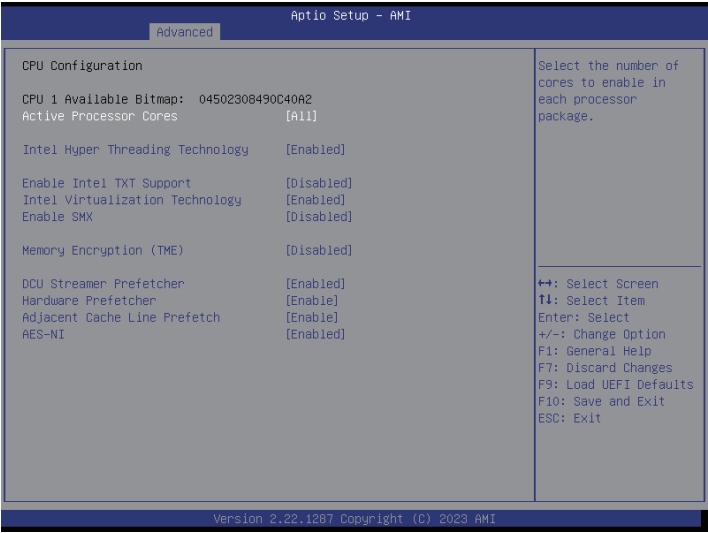
3.4 Advanced Screen

In this section, it allows user to configure and view the following items: CPU Configuration, Platform Power Configuration, Chipset Configuration, PCH-FW Configuration, Storage Configuration, NVMe Configuration, ACPI Configuration, USB Configuration, Super IO Configuration, Serial Port Console Redirection, H/W Monitor, Runtime Error Logging, Workstation ME Configuration, Network Stack Configuration, Intel VMD Technology, Driver Health, All CPU Information, Emulation Configuration, Tls Auth Configuration, MEBx and Instant Flash.



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

3.4.1 CPU Configuration



Active Processor Cores

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

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 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.

Memory Encryption (TME)

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

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.

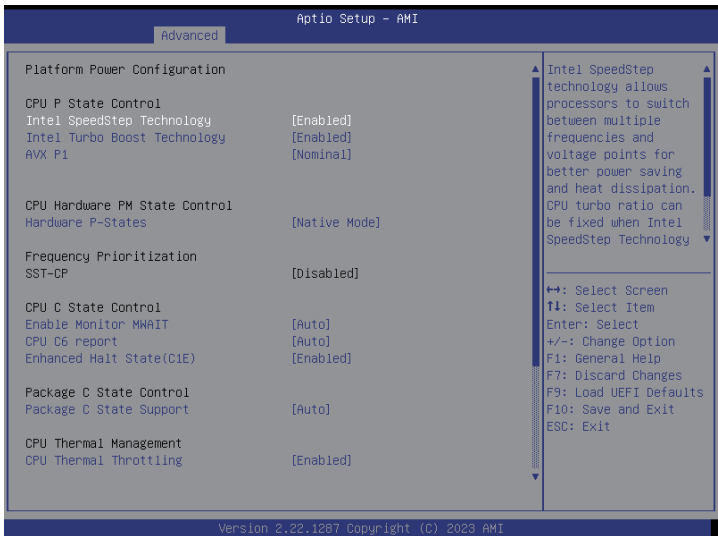
Adjacent Cache Line Prefetch

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.

3.4.2 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

Select this item to configure 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)

Native Mode with No Legacy Support: Hardware autonomously chooses a P-state based on OS guidance with no legacy support.

SST-CP

Select this item to enable or disable the SST-CP feature.



About SST configurations are base on the Intel® related supported specifications.

Enable Monitor MWAIT

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

CPU C6 Report

Select this item to configure the CPU C6 (ACPI C3) report to OS.

Enhanced Halt State (C1E)

This item specific the Core C1E auto promotion Control whether takes effect after reboot.

Package C State Support

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

CPU Thermal Throttling

Select this item to enable or disable Thermal Monitor.

Power Performance Tuning

This allows user 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

This allows user to use input from ENERGY_PERF_BIAS_CONFIG mode selection. PERF/Balanced, Perf/Balanced or Power/Power.

PL1 Power Limit4095.000

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 448.0000

Use this item to configure the period of time until the CPU ratio is lowered when the Long Duration Power Limit is exceeded. PL1 value is in seconds. The value may vary from 0 to 448.

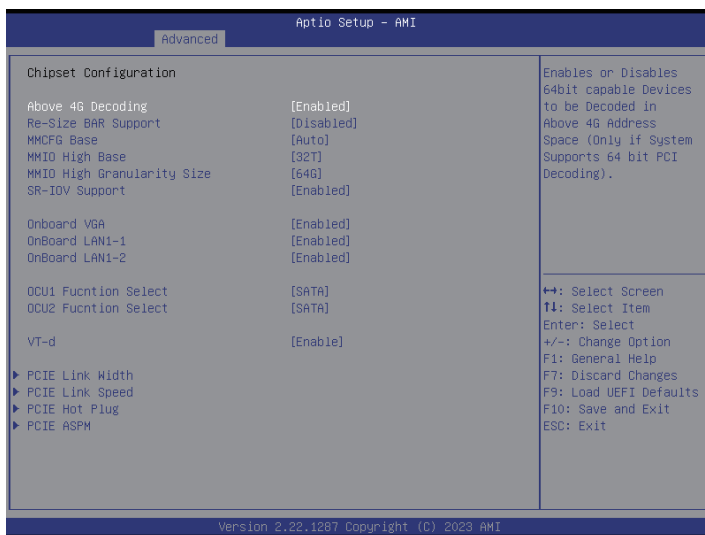
PL2 Power Limit 4095.000

Use this item to configure Package Power Limit 2 (PL2) 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.

PL2 Time Window 0.4380

Use this item to configure the period of time until the CPU ratio is lowered when the Short Duration Power Limit is exceeded.

3.4.3 Chipset Configuration



Above 4G Decoding

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

Re-Size BAR Support

If system has Resizable BAR capable PCIe Devices, this option enables or disables Resizable BAR support.

MMCFG Base

Use this item to select MMCFG Base.

MMIO High Base

Use this item to select MMIO High Base.

MMIO High Granularity Size

Use this item to select MMIO Granularity Size.

SR-IOV Support

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

Onboard VGA

Use this to enable or disable the Onboard VGA function.

Onboard LAN1-1

Use this to enable or disable the Onboard LAN function.

Onboard LAN1-2

Use this to enable or disable the Onboard LAN function.

OCU1 Function Select

Select SATA or PCIe work in MiniSAS port.

OCU2 Function Select

Select SATA or PCIe work in MiniSAS port.

VT-d

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

PCIE Link Width

Select this item to configure PCIE Link Width.

PCIE1/PCIE2 Link Width

Select PCIE port Bifurcation for PCIE1/PCIE2.

OCP1 Link Width

Select OCP1 Link Width.

MCIO1/2/3/4/5/6/7/8 Link Width

Select MCIO1/2/3/4/5/6/7/8 Link Width.

PCIE Link Speed

Select PCIE Link Speed.

M2_1/M2_2 Link Speed

Select Link Speed for M2_1/M2_2.

PCIE1/PCIE2 Link Speed

Select Link Speed for PCIE1/PCIE2.

OCP1 Link Speed

Select Link Speed for OCP1.

MCIO1-1/1-2/2-1/2-2/3-1/3-2/4-1/4-2/5-1/5-2/6-1/6-2/7-1/7-2/8-1/8-2 Link Speed

Select Link Speed for MCIO1-1/1-2/2-1/2-2/3-1/3-2/4-1/4-2/5-1/5-2/6-1/6-2/7-1/7-2/8-1/8-2.

PCIE Hot Plug

Select this item to configure PCIE Hot Plug globally.

OCU1/2 Hot Plug

Enable or disable PCIE Hot Plug.

PCIE1/2, OCP1, MCIO1-1/1-2/2-1/2-2/3-1/3-2/4-1/4-2/5-1/5-2/6-1/6-2/7-1/7-1/8-1/8-2 Hot Plug

Enable or disable PCIE and MCIO Hot Plug.

PCIE1/2, OCP1, MCIO1-1/1-2/2-1/2-2/3-1/3-2/4-1/4-2/5-1/5-2/6-1/6-2/7-1/7-1/8-1/8-2 Surprise Hot Plug

Enable or disable PCIE and MCIO Surprise Hot Plug.

PCIE ASPM

Select this item to configure the PCIE ASPM.

PCI-E ASPM Support (Global)

Set this item to Auto to configure all PCIe root ports.

PCIE1 ASPM Support

Enables or disables the ASPM support in a PCIe root port. Select [Auto] for the default value.

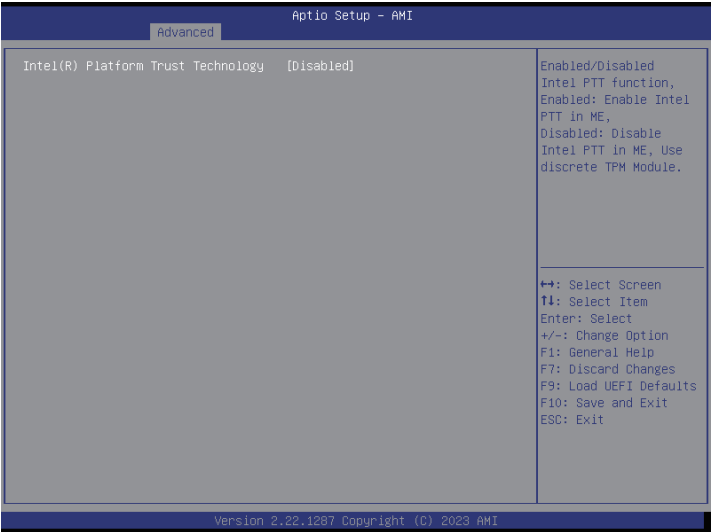
OCP1 ASPM Support

Enables or disables the ASPM support in a PCIe root port. Select [Auto] for the default value.

MCIO1-1/1-2/2-1/2-2/3-1/3-2/4-1/4-2/5-1/5-2/6-1/6-2/7-1/7-1/8-1/8-2 ASPM Support

Enables or disables the ASPM support for all CPU downstream devices.

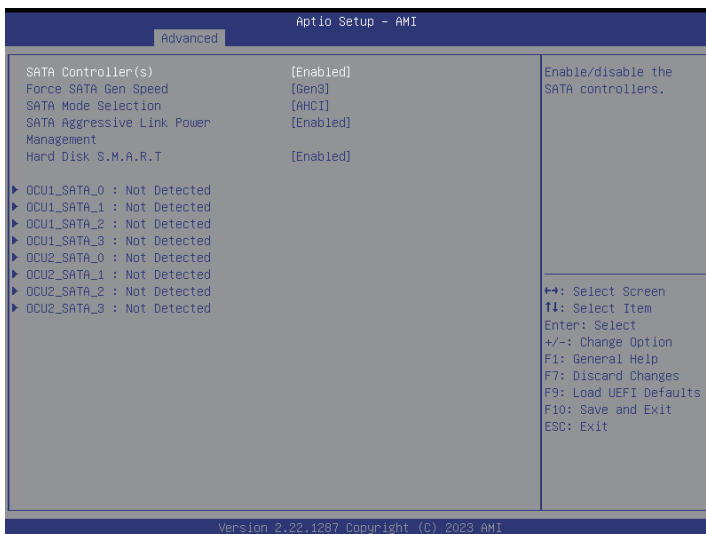
3.4.4 PCH-FW Configuration



Intel(R) Platform Trust Technology

Use this item to configure Intel PTT function. Select Enabled to use Intel PTT in ME. Disable this option to use discrete TPM Module.

3.4.5 Storage Configuration



SATA Controller (s)

Select this item to enable or disable SATA Controllers.

Force SATA Gen Speed

Select this item to change SATA Gen Speed for port.

SATA Mode Selection

Select AHCI to support new features that improve performance.

SATA Aggressive Link Power Management

SATA Aggressive Link Power Management allows SATA devices to enter a low power state during periods of inactivity to save power. It is only supported by AHCI mode.

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.

OCU1_SATA_0/1/2/3, OCU2_SATA_0/1/2/3

Select this item to configure the External SATA, Hot Plug, Spin Up Device and SATA Device Type.

External SATA

Enable or disable SATA safe removal notifications.

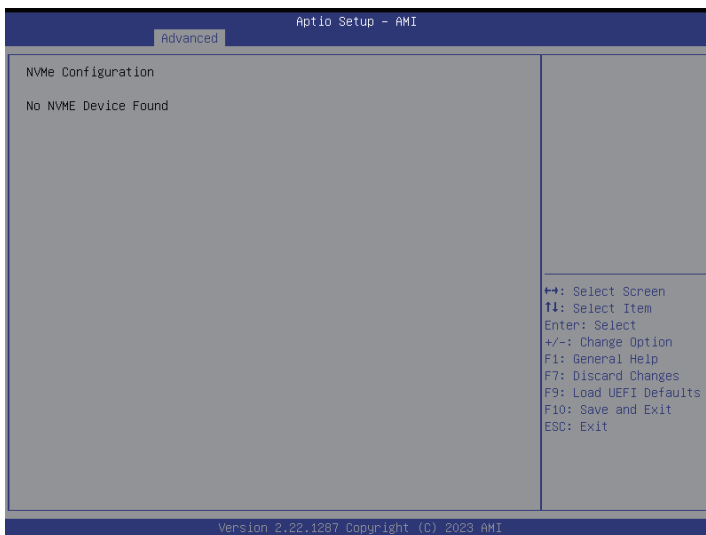
Hot Plug

Enable or disable Hot Plug for specified port.

SATA Device Type

Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

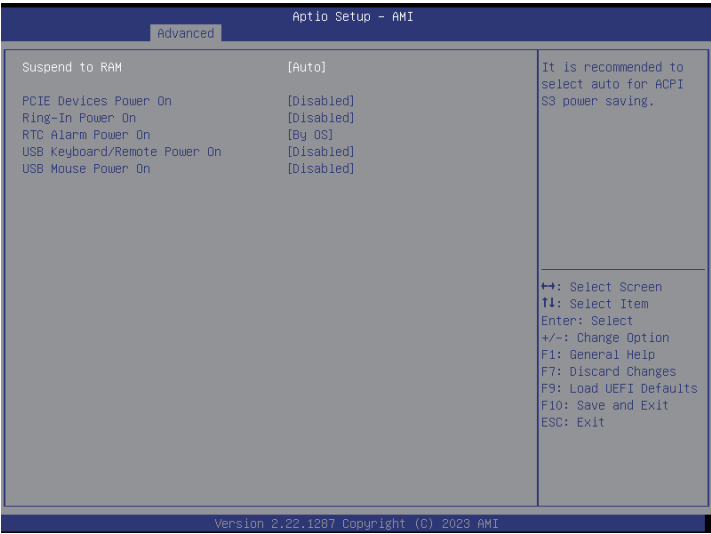
3.4.6 NVMe Configuration



NVMe Configuration

The NVMe Configuration displays the NVMe controller and Drive information.

3.4.7 ACPI Configuration



Suspend to RAM

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

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

Use this item to enable or disable RTC (Real Time Clock) to power on the system.

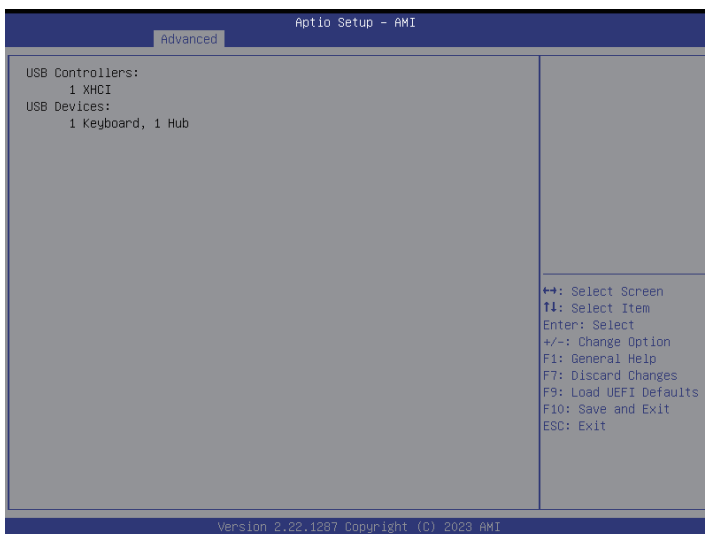
USB Keyboard/Remote Power On

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

USB Mouse Power On

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

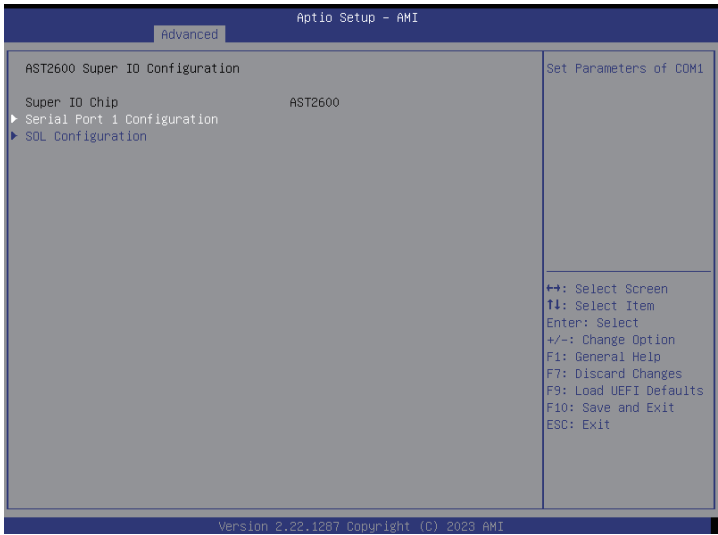
3.4.8 USB Configuration



USB Configuration

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

3.4.9 Super IO Configuration



Serial Port 1 Configuration

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

Serial Port

Use this item to enable or disable the serial port.

Change Settings

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

SOL Configuration

Use this item to set parameters of SOL.

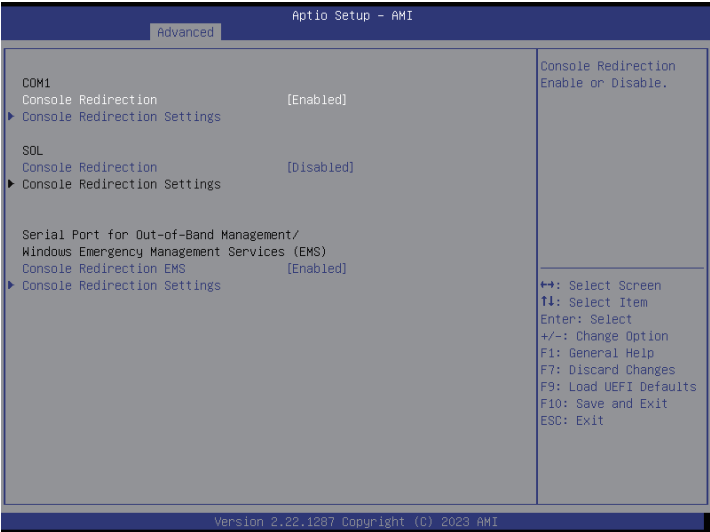
SOL Port

Use this item to set parameters of SOL.

Change Settings

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

3.4.10 Serial Port Console Redirection



COM1 / SOL

Console Redirection

Use this option to enable or disable Console Redirection. If this item is set to Enabled, it allows user 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 computer and the host computer to which 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. 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. If this item is set to Enabled, it allows user 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 computer and the host computer to which 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 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].

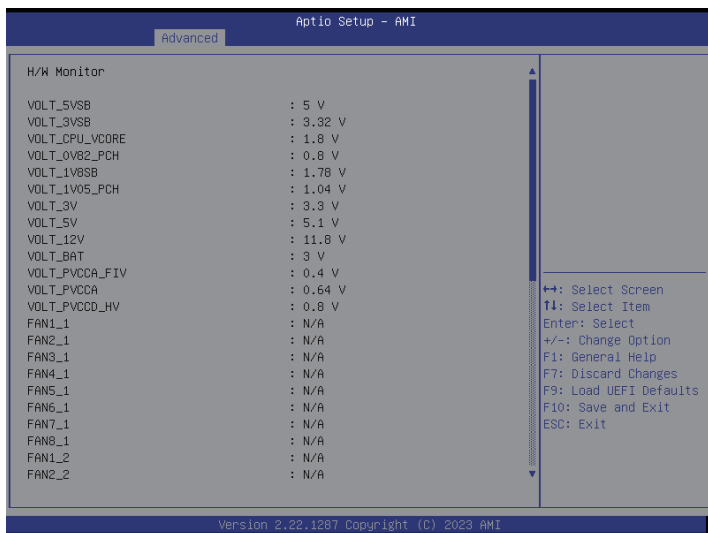
Data Bits EMS

Parity EMS

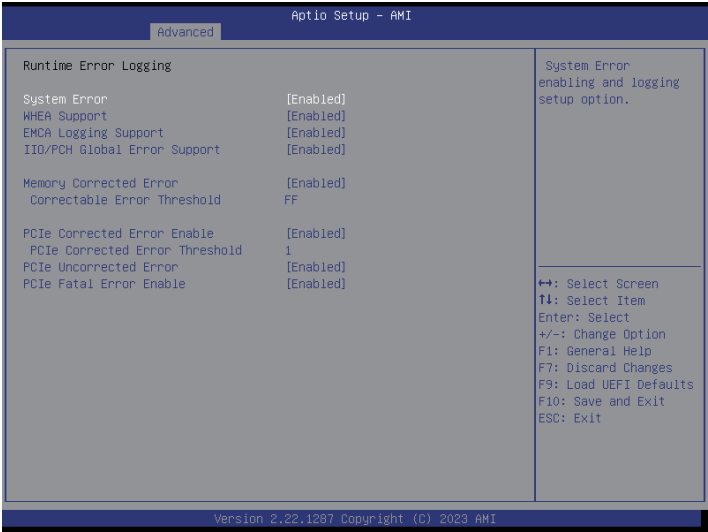
Stop Bits EMS

3.4.11 H/W Monitor

This section allows user 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.



3.4.12 Runtime Error Logging



System Error

Use this item to enable or disable System Error feature. When it is set to [Enabled], it allows user to configure Memory Error and PCIe Error log features.

WHEA Support

Use this item to enable or disable Windows Hardware Error Architecture.

EMCA Logging Support

Use this item to enable or disable EMCA Logging.

IIO/PCH Global Error Support

Use this item to enable or disable IIO/PCH Error Support.

Memory Corrected Error

Use this item to enable or disable Memory Corrected Error.

Correctable Error Threshold

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

PCIe Corrected Error Enable

Use this item to enable or disable PCIe Correctable errors.

PCIe Corrected Error Threshold

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

PCIe Uncorrected Error Enable

Use this item to enable or disable PCIe Uncorrectable errors.

PCIe Fatal Error Enable

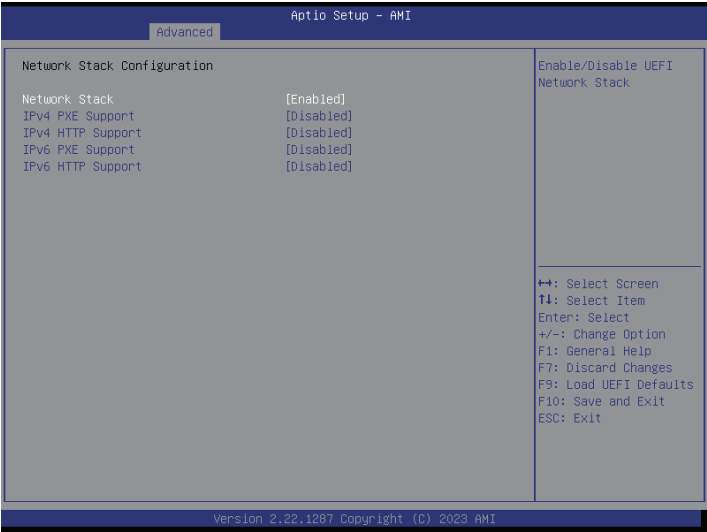
Use this item to enable or disable PCIe Ftal errors.

3.4.13 Workstation ME Configuration



Select this item to display the ME Version and ME FW State information.

3.4.14 Network Stack Configuration



Network Stack

Enable UEFI network stack can prevents to perform from the single-user network boots and network installation. If disabled, the host does not use the network interface.

IPv4 PXE Support

Enable IPv4 PXE Boot support. If disabled, IPv4 PXE Boot Option is not supported.

IPv4 HTTP Support

Enable IPv4 HTTP Boot support. If disabled, IPv4 HTTP Boot Option is not supported.

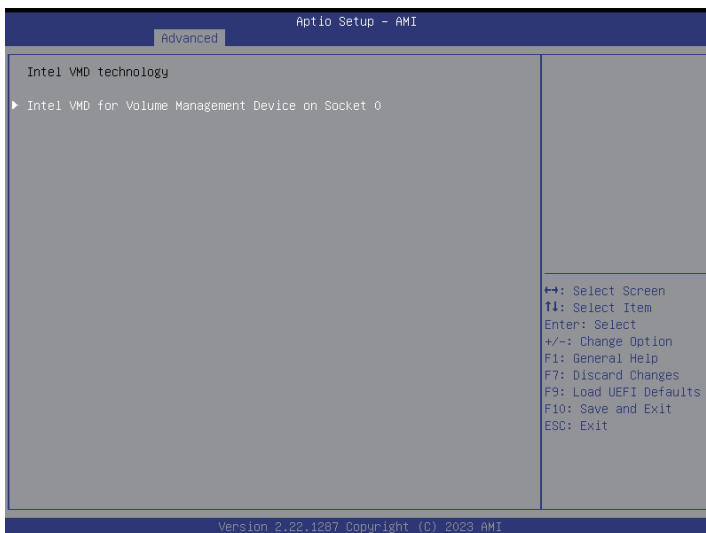
IPv6 PXE Support

Enable IPv6 PXE Boot support. If disabled, IPv6 PXE Boot Option is not supported.

IPv6 HTTP Support

Enable IPv6 HTTP Boot support. If disabled, IPv6 HTTP Boot Option is not supported.

3.4.15 Intel® VMD technology



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

Intel VMD for Volume Management Device on Socket 0

VMD Config for IOU0 PCIE2, IOU2 PCIE1, IOU3 MCIO2/MCIO1, IOU4 MCIO8/MCIO7, IOU5 MCIO4/MCIO3, IOU6 MCIO6/MCIO5

Use these items to enable or disable Intel(R) Volume Management Device Technology in specific Stack.

Enable/Disable VMD

Use this item to enable or disable VMD in this Stack.

When [Enabled], user is allowed to configure the options below.

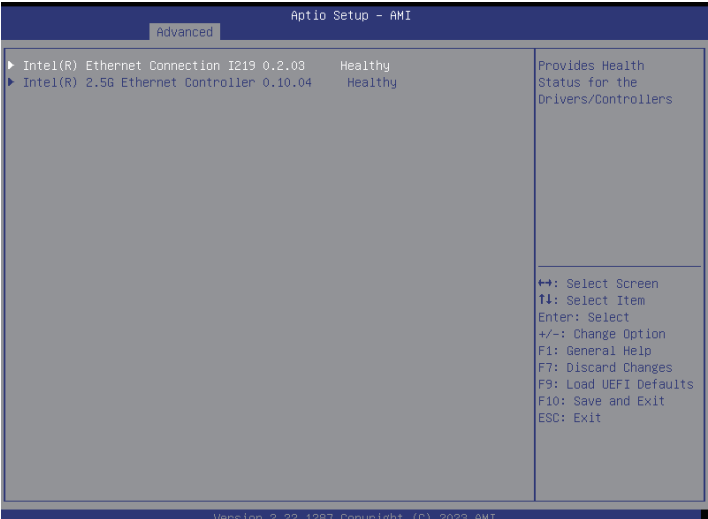
VMD port A/B/C/D/E/F/G

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.

3.4.16 Driver Health



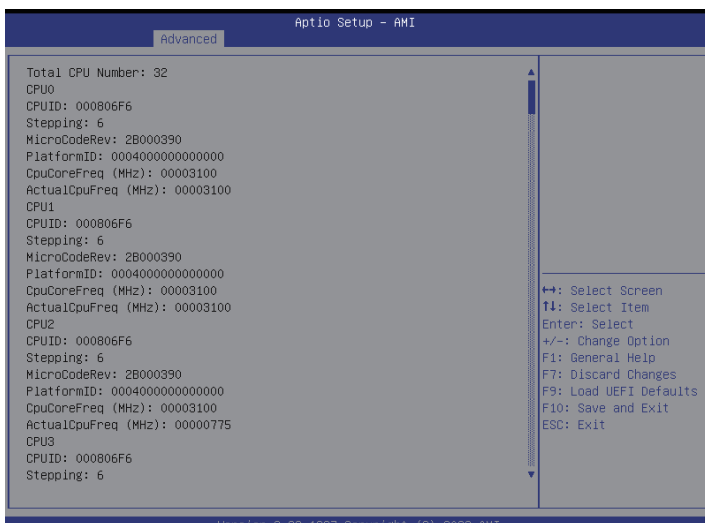
Inter (R) Ethernet Connection I219 0.2.03 Healthy

Provides Health Status for the Drivers/Controllers.

Inter (R) 2.5G Ethernet Controller 0.10.04 Healthy

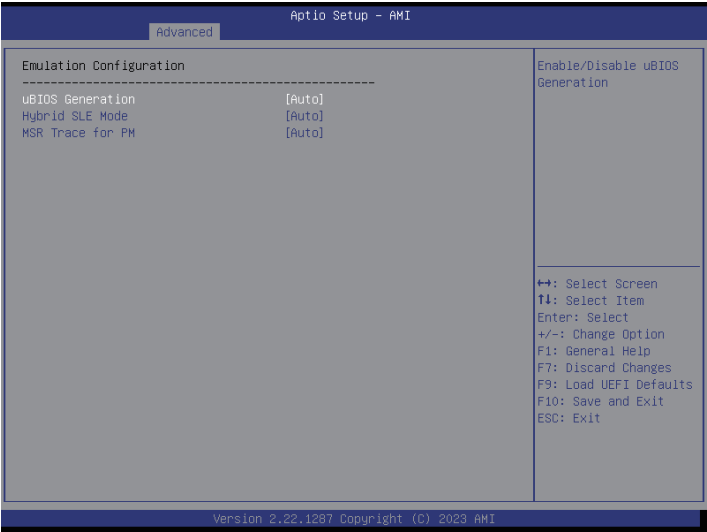
Provides Health Status for the Drivers/Controllers.

3.4.17 All CPU Information



Select this item to display all CPU information.

3.4.18 Emulation Configuration



uBIOS Generation

Use this item to enable or disable uBIOS Generation.

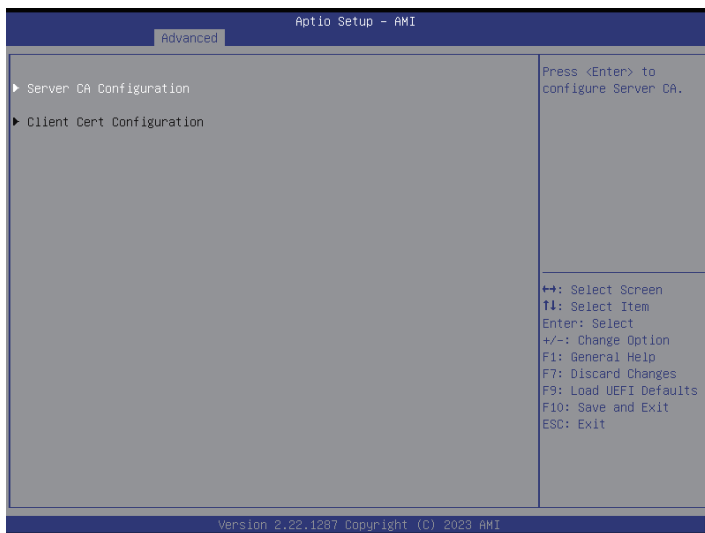
Hybrid SLE Mode

Use this item to enable or disable Hybrid System Level Emulation Mode.

MSR Trace for PM

Use this item to enable or disable MSR Trace for Power management in uBIOS.

3.4.19 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.

3.4.20 MEBx



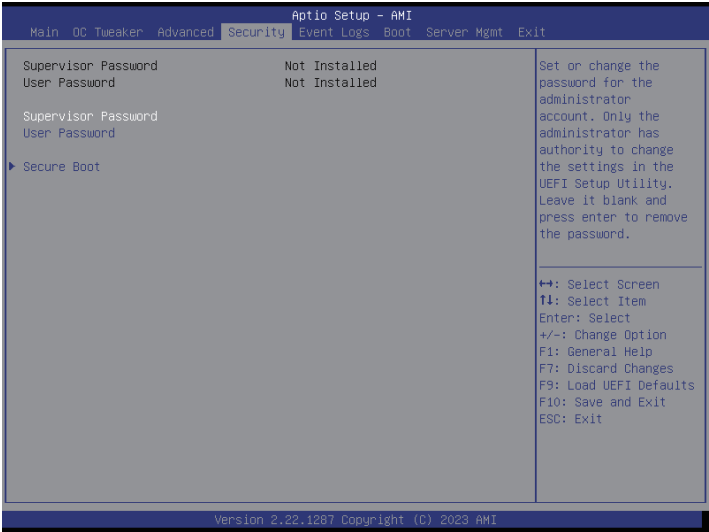
This Formset contains forms for configuring MEBx.

3.4.21 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. Execute the Instant Flash utility, the utility will show the UEFI files and the respective information. Select the proper UEFI file to update UEFI, and reboot the system after the UEFI update process is completed.

3.5 Security

In this section, set or change the supervisor/user password for the system. For the user password, can 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. User is unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

Secure Boot

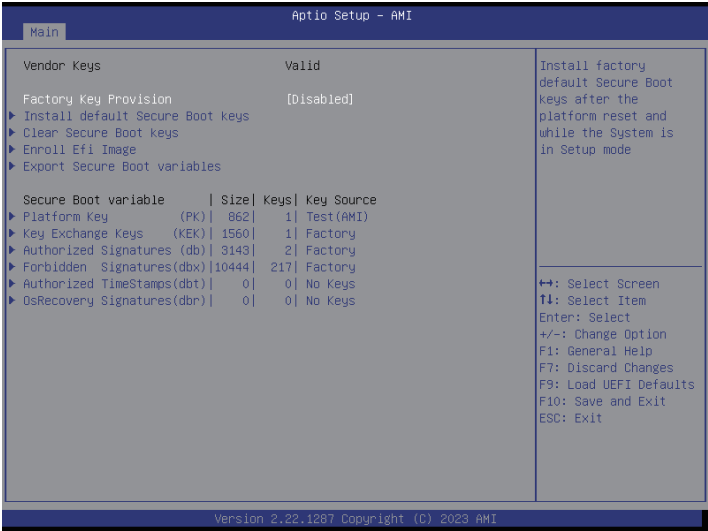
Use this to enable or disable Secure Boot Control. The default value is [Disabled]. Enable to support Windows Server 2012 R2 or later versions Secure Boot.

Secure Boot Mode

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

3.5.1 Key Management

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



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 using the secure boot.

Clear Secure Boot Keys

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

Enroll Efi Image

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

Export Secure Boot Variables

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

Platform Key(PK)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

- a) EFI_SIGNATURE_LIST
- b) EFI_CERT_X509 (DER)
- 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

3.6 Event Logs



Change Smbios Event Log Settings

Select this item to configure the Smbios Event Log Settings.

When entering the item, the screen displays following sub-items:

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 or disable logging of System boot event.

View Smbios Event Log

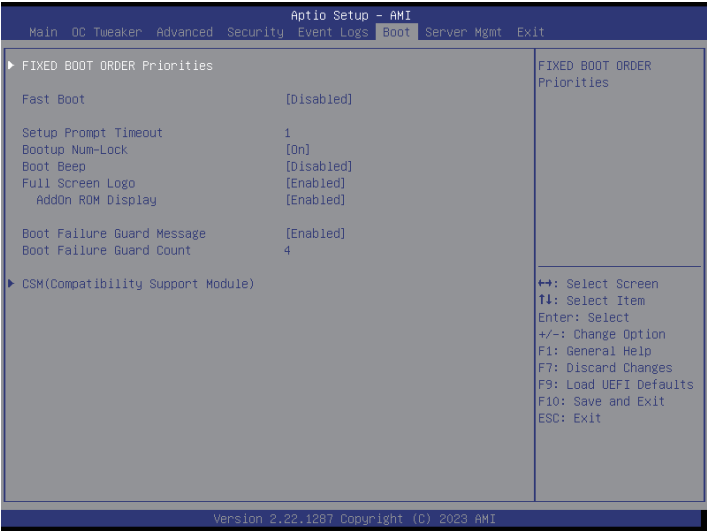
Press <Enter> to view the Smbios Event Log records.



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

3.7 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.



FIXED BOOT ORDER Priorities

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

Use this item to set the system boot order.

UEFI Application Boot Priorities

Specifies the Boot Device Priority sequence from available UEFI Application.

Fast Boot

Enables or disables fast boot which skips memory training and attempts to boot using last known good configuration.

Setup Prompt Timeout

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

Bootup Num-Lock

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

Boot Beep

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

Full Screen Logo

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

AddOn ROM Display

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

Boot Failure Guard Message

If the computer fails to boot for a number of times the system automatically restores the default settings.

Boot Failure Guard Count

Use this item to configure Boot Failure Guard Count.

3.7.1 CSM Parameters



CSM (Compatibility Support Module)

CSM

Enable to launch the Compatibility Support Module. Please do not disable unless running a WHCK test. If using Windows 8 64-bit UEFI and all of the devices support UEFI, it may also disable CSM for faster boot speed.

Boot Option Filter

This option controls Legacy/UEFI ROMs priority.

Launch PXE OpROM Policy

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

Launch Storage OpROM Policy

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

Launch Video OpROM Policy

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

Other PCI Device ROM Priority

For PCI devices other than Network, Mass Storage or Video defines which OpROM to launch.

3.8 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.

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.

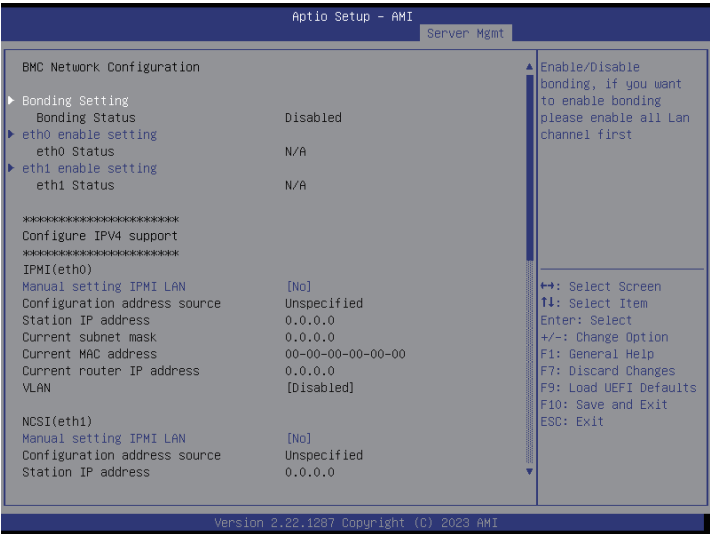
System Event Log

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.

3.8.1 BMC Network Configuration



Bonding Setting

Select this item to enabled or disabled bonding. Please enable all lan channel first when want to enable bonding.

eth0 enable Setting

BMC LAN enable setting.

eth1 enable Setting

BMC LAN enable setting.

Manual Setting IPMI LAN

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

VLAN

Enable or disable 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

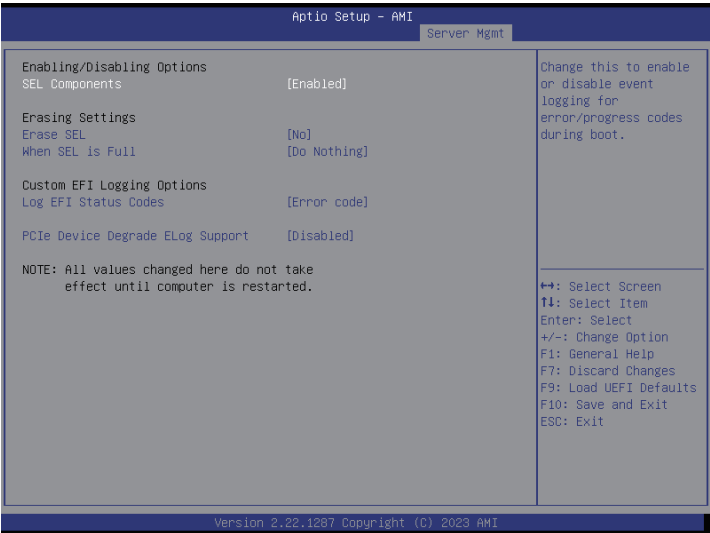
Enable or disable LAN1 IPV6 Support.

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.

3.8.2 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.

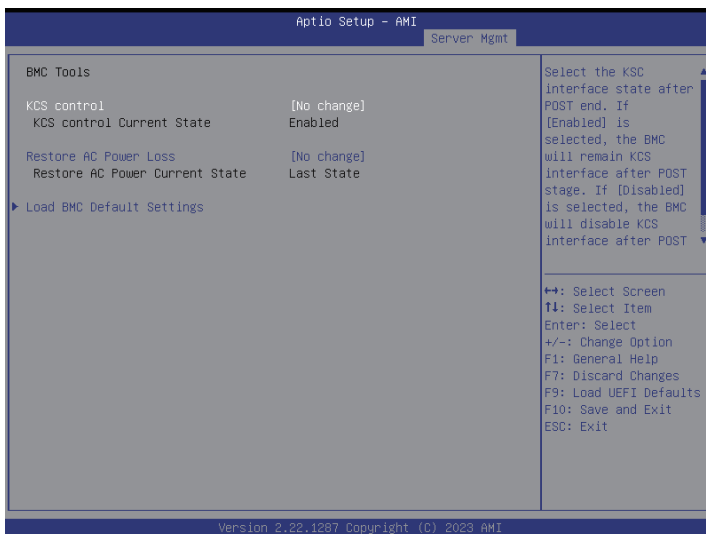
Log EFI Status Codes

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.

3.8.3 BMC Tools



KCS control

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

Restore AC Power Loss

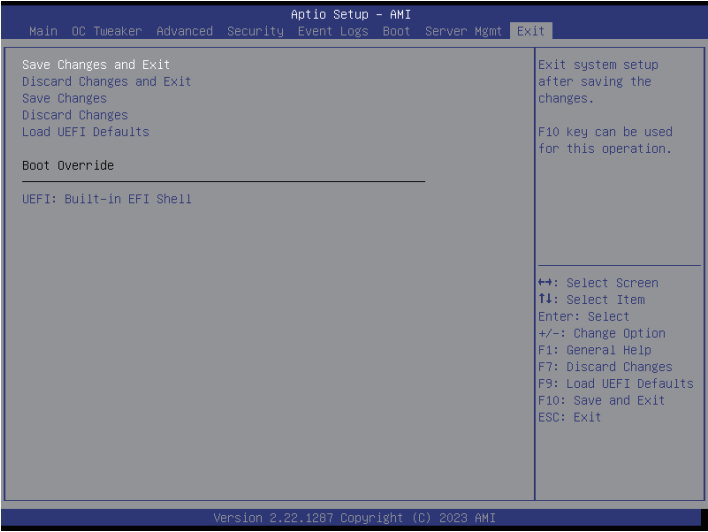
This allows user to set the power state after an unexpected AC/power loss. If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers. If [Last State] is selected, it will recover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

Load BMC Default Settings

Use this item to load BMC default settings.

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

3.9 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. Press <F7> key or select [Yes] to discard all changes.

Load UEFI Defaults

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

Chapter 4 Software Support

After all the hardware has been installed, it suggests to go 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® SATA Floppy Image 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 the website at <http://www.ASRockRack.com>.

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

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 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 DDR5 RDIMM/RDIMM-3DS
3. Install more than one DIMM modules that 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 related problem on ASRock Rack's FAQ page:
<http://www.asrockrack.com/support>

5.2 Technical Support Procedures

If 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 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, it's 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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