OPEN
Industry Standard, Flexible Architecture

GREEN
Less Heat, Less Power Consumption

STABLE
Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

W790D8UD-1L1N
W790D8UD-1L1N2T/BCM

User Manual

English

Version 1.30
Published Sep. 2024

Copyright Notice:

Disclaimer:

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

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

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

WARNING

THIS PRODUCT CONTAINS A BUTTOON BATTERY
If swallowed, a button battery can cause serious injury or death.
Please keep batteries out of sight or reach of children.

ASRock Rack's Website: www.ASRockRack.com

INTEL END USER SOFTWARE LICENSE AGREEMENT
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.

LICENSE. Licensee has a license under Intel's copyrights to reproduce Intel's Software only in its unmodified and binary form, (with the accompanying documentation, the "Software") for Licensee's personal use only, and not commercial use, in connection with Intel-based products for which the Software has been provided, subject to the following conditions:

(a) Licensee may not disclose, distribute or transfer any part of the Software, and You agree to prevent unauthorized copying of the Software.

(b) Licensee may not reverse engineer, decompile, or disassemble the Software.

(c) Licensee may not sublicense the Software.

(d) The Software may contain the software and other intellectual property of third party suppliers, some of which may be identified in, and licensed in accordance with, an enclosed license.txt file or other text or file.

(e) Intel has no obligation to provide any support, technical assistance or updates for the Software.

OWNERSHIP OF SOFTWARE AND COPYRIGHTS. Title to all copies of the Software remains with Intel or its licensors or suppliers. The Software is copyrighted and protected by the laws of the United States and other countries, and international treaty provisions. Licensee may not remove any copyright notices from the Software. Except as otherwise expressly provided above, Intel grants no express or implied right under Intel patents, copyrights, trademarks, or other intellectual property rights. Transfer of the license terminates Licensee's right to use the Software.

DISCLAIMER OF WARRANTY. The Software is provided "AS IS" without warranty of any kind, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF LIABILITY. NEITHER INTEL NOR ITS LICENSORS OR SUPPLIERS WILL BE LIABLE FOR ANY LOSS OF PROFITS, LOSS OF USE, INTERRUPTION OF BUSINESS, OR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND WHETHER UNDER THIS AGREEMENT OR OTHERWISE, EVEN IF INTEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

LICENSE TO USE COMMENTS AND SUGGESTIONS. This Agreement does NOT obligate Licensee to provide Intel with comments or suggestions regarding the Software. However, if Licensee provides Intel with comments or suggestions for the modification, correction, improvement or enhancement of (a) the Software or (b) Intel products or processes that work with the Software, Licensee grants to Intel a non-exclusive, worldwide, perpetual, irrevocable, transferable, royalty-free license, with the right to sublicense, under Licensee's intellectual property rights, to incorporate or otherwise utilize those comments and suggestions.

TERMINATION OF THIS LICENSE. Intel or the sublicensor may terminate this license at any time if Licensee is in breach of any of its terms or conditions. Upon termination, Licensee will immediately destroy or return to Intel all copies of the Software.

THIRD PARTY BENEFICIARY. Intel is an intended beneficiary of the End User License Agreement and has the right to enforce all of its terms.

U.S. GOVERNMENT RESTRICTED RIGHTS. The Software is a commercial item (as defined in 48 C.F.R. 2.101) consisting of commercial computer software and commercial computer software documentation (as those terms are used in 48 C.F.R. 12.212), consistent with 48 C.F.R. 12.212 and 48 C.F.R 227.7202-1 through 227.7202-4. You will not provide the Software to the U.S. Government. Contractor or Manufacturer is Intel Corporation, 2200 Mission College Blvd., Santa Clara, CA 95054.

EXPORT LAWS. Licensee agrees that neither Licensee nor Licensee's subsidiaries will export/re-export the Software, directly or indirectly, to any country for which the U.S. Department of Commerce or any other agency or department of the U.S. Government or the foreign government from where it is shipping requires an export license, or other governmental approval, without first obtaining any such required license or approval. In the event the Software is exported from the U.S.A. or re-exported from a foreign destination by Licensee, Licensee will ensure that the distribution and export/re-export or import of the Software complies with all laws, regulations, orders, or other restrictions of the U.S. Export Administration Regulations and the appropriate foreign government.

APPLICABLE LAWS. This Agreement and any dispute arising out of or relating to it will be governed by the laws of the U.S.A. and Delaware, without regard to conflict of laws principles. The Parties to this Agreement exclude the application of the United Nations Convention on Contracts for the International Sale of Goods (1980). The state and federal courts sitting in Delaware, U.S.A. will have exclusive jurisdiction over any dispute arising out of or relating to this Agreement. The Parties consent to personal jurisdiction and venue in those courts. A Party that obtains a judgment against the other Party in the courts identified in this section may enforce that judgment in any court that has jurisdiction over the Parties.

Licensee's specific rights may vary from country to country.

CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.

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

AUSTRALIA ONLY

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage caused by our goods. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. If you require assistance please call ASRock Rack Tel : +886-2-55599600 ext.123 (Standard International call charges apply)

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 a cordance 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

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

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

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

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.

Contents

Chapter 1 Introduction

Thank you for purchasing ASRock Rack ***W790D8UD-1L1N2T/BCM*** *or* ***W790D8UD-1L1N*** motherboard, a reliable motherboard produced under ASRock Rack's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock Rack's commitment to quality and endurance.

In this manual, chapter 1 and 2 contains introduction of the motherboard and step-by-step guide to the hardware installation. Chapter 3 and 4 contains the configuration guide to BIOS setup and information of the Support Software.

Because the motherboard specifications and the BIOS software might be updated, the content of this manual will be subject to change without notice. In case any modifications of this manual occur, the updated version will be available on ASRock Rack website without further notice. Find the latest memory and CPU support lists on ASRock Rack website as well. ASRock Rack's Website: www.ASRockRack.com

About this motherboard technical support, please visit the website for specific informationhttp://www.asrockrack.com/support/

1.1 Package Contents

- ASRock Rack W790D8UD-1L1N2T/BCM, W790D8UD-1L1N motherboard (Deep Micro-ATX form factor: 10.4-in x 10.5-in)
- Quick installation guide
- 1 x SATA3 cable (60cm)
- 1 x Oculink to 4 SATA cable (60cm)
- 1 x ATX 4P to 24P power cable (8cm)
- 1 x I/O shield
- 1 x screw for M.2 socket
- 2 x CPU Non-Fabric carriers

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

English

1.2 Specifications

W790D8UD-1L1N2T/BCM / W790D8UD-1L1N	
Physical Status	
Form Factor	Deep Micro-ATX
Dimension	10.4" x 10.5" (264 x 266 mm)
Processor System	
CPU	Supports Intel® Xeon® W-2500/2400 and W-3500/3400 series processors
Socket	Single Socket LGA 4677
Thermal Design Power (TDP)	~350W
Support O.C.	~700W
Chipset	Intel® W790
System Memory	
Supported DIMM Quantity	8 DIMM slots (2DPC)
Supported Type	DDR5 288-pin RDIMM/ RDIMM-3DS
Max. Capacity per DIMM	RDIMM: 64GB RDIMM-3DS: 2H- 128 GB/ 4H- 256 GB
Max. Frequency	4400MT/s (2DPC) / 4800MTS (1DPC)
Voltage	1.1V
Note	*memory support is to be validated*
PCIe Expansion Slots (SLOT7 close to CPU)	
SLOT7	PCIe5.0 x16 [CPU]
SLOT6	PCIe5.0 x16 [CPU]
SLOT5	PCIe5.0 x16 [CPU]
SLOT4	PCIe5.0 x16 [CPU]
Other PCIe Expansion Connectors	
M.2 slot	1 M-key (PCIe4.0 x4), supports 2280 form factor [PCH]
OCuLink	1 OCuLink (PCIe4.0 x4 or 4 SATA 6Gb/s) [PCH] 1 OCuLink (PCIe4.0 x4) [PCH]
SATA/SAS Storage	
PCH Built-in Storage	Intel® W790 (Up to 8 SATA 6Gb/s; RAID 0/1/5/10): 1 OCuLink, 4 SATA 7-pin
Ethernet	
Additional Ethernet Controller	**W790D8UD-1L1N2T/BCM:** 2 RJ45 (10GbE) by Broadcom BCM57416 1 RJ45 (2.5GbE) by Intel® i226 1 RJ45 (1GbE) by Intel® i210 **W790D8UD-1L1N:** 1 RJ45 (2.5GbE) by Intel® i226 1 RJ45 (1GbE) by Intel® i210"

USB	
Controller/Hub	Intel® W790
Connectors/headers	External: 2 Type-A (USB3.2 Gen1) Internal: 1 header (19-pin, 2 USB3.2 Gen1) 1 header (9-pin, 2 USB2.0)
Graphics	
Controller	**W790D8UD-1L1N2T/BCM:** ASPEED AST2600: 1 DB15 (VGA) **W790D8UD-1L1N:** NA
Security	
TPM	1 (13-pin, SPI)
Rear I/O	
UID button/LED	1 UID button w/ LED
Video output	**W790D8UD-1L1N2T/BCM:** 1 DB15 (VGA) **W790D8UD-1L1N:** NA
Serial port	1 DB9 (COM)
USB	2 Type-A (USB3.2 Gen1)
RJ45	**W790D8UD-1L1N2T/BCM:** 2 RJ45(10GbE), 1 RJ45(2.5GbE), 1 RJ45(1GbE), 1 dedicated IPMI **W790D8UD-1L1N:** 1 RJ45(2.5GbE), 1 RJ45(1GbE)
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
Server Management	
BMC Controller	**W790D8UD-1L1N2T/BCM:** ASPEED AST2600: iKVM, vMedia support **W790D8UD-1L1N:** NA
IPMI Dedicated GLAN	**W790D8UD-1L1N2T/BCM:** 1 RJ45 Dedicated IPMI LAN port by Realtek RTL8211F **W790D8UD-1L1N:** NA
System BIOS	
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

Internal Connectors/Headers	
PSU connector	1 (4-pin, ATX PSU signal) w/ ATX 24-pin adapter cable, 4 (8-pin, ATX 12V)
Auxiliary panel header	1 (18-pin): chassis intrusion, system fault LED, LAN1/LAN2 activity LED, locate, SMBus
System panel header	1 (9-pin): power switch, reset switch, system power LED, HDD activity LED
NMI button	1
LAN3/LAN4 LED header	**W790D8UD-1L1N2T/BCM:** 1 **W790D8UD-1L1N:** NA
Speaker header	1 (4-pin)
Buzzer	1
Fan header	7 (4-pin)
Thermal sensor header	1
TPM header	1 (13-pin, SPI)
SGPIO header	1
HSBP	1
SMbus header	**W790D8UD-1L1N2T/BCM:** 1 **W790D8UD-1L1N:** NA
PMbus header	1
IPMB header	**W790D8UD-1L1N2T/BCM:** 1 **W790D8UD-1L1N:** NA
Clear CMOS	1 (contact pads)
Others	2 (1-pin, TGPIO header) (W790D8UD-1L1N2T/BCM only)
LED Indicators	
Standby Power LED	1 (5VSB)
80 debug port LED	1
Fan Fail LED	7
BMC Heartbeat LED	1
Supported OS	
OS	Microsoft® Windows® - Windows 10 (64 bit) - Windows 11 (64 bit) Linux® - RedHat Enterprise Linux Server 9.2 (64bit) - CentOs 8.5 (64 bit) - SUSE SLE 15.5 (64 bit) - UBuntu 23.04 (64 bit) * Please refer to our website for the latest OS support list.

Enviroment	
Operating temperature	10 - 35°C (50 - 95 degF)
Non-operating temperature	-40 - 70°C (-40 - 158degF)

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

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

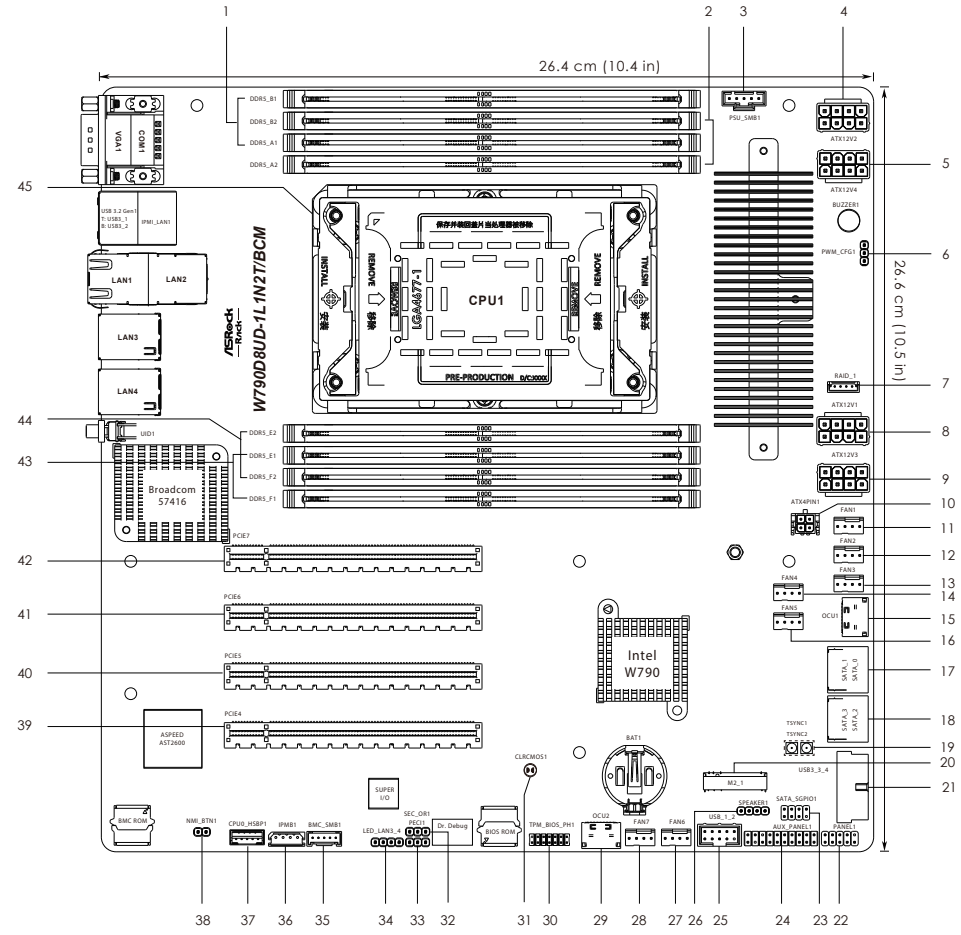
If installing Intel® LAN utility or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If installing the drivers only, it will pass the WHQL tests.

1.3 Unique Features

ASRock Rack Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows 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

W790D8UD-1L1N2T/BCM :

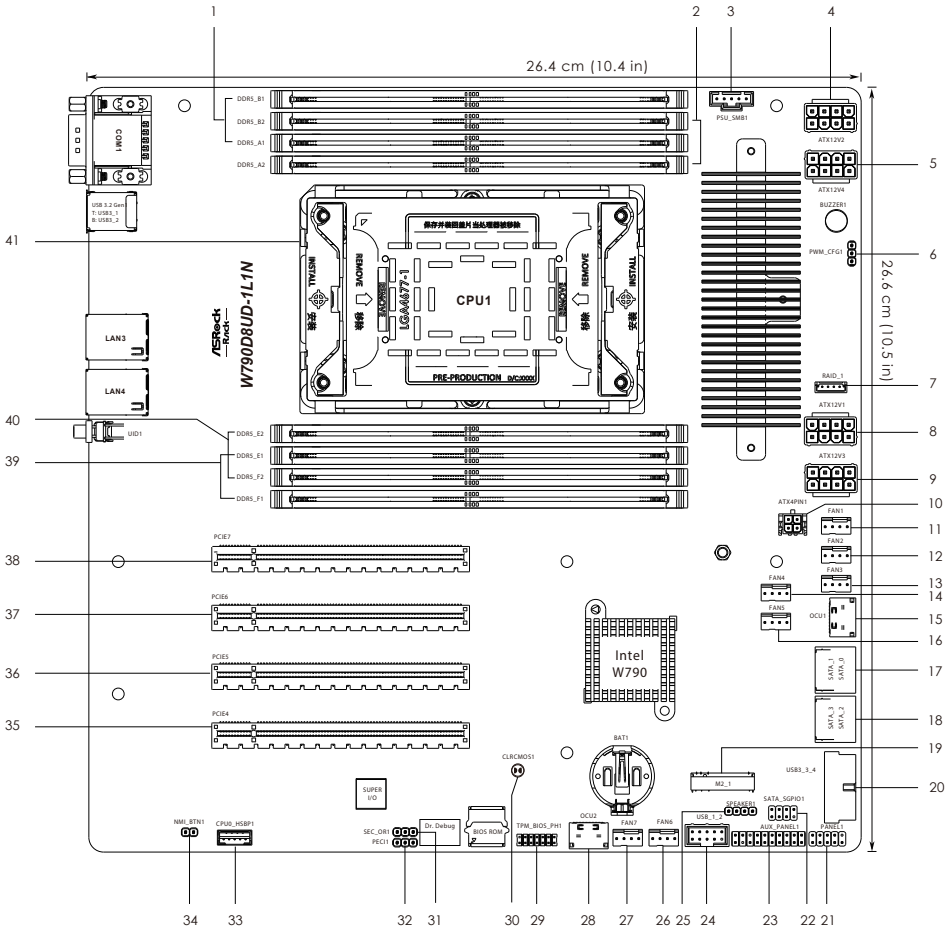


No.	Description
1	2 x 288-pin DDR5 DIMM Slots (DDR5_A1, DDR5_B1)*
2	2 x 288-pin DDR5 DIMM Slots (DDR5_A2, DDR5_B2)*
3	PSU SMBus Header (PSU_SMB1)
4	ATX 12V Power Connector (ATX12V2)
5	ATX 12V Power Connector (ATX12V4)
6	PWM Configuration Header (PWM_CFG1)
7	Virtual RAID On CPU Header (RAID_1)
8	ATX 12V Power Connector (ATX12V1)
9	ATX 12V Power Connector (ATX12V3)
10	Micro-Fit ATX 4Pin Power Connector (ATX4PIN1)
11	System Fan Connector (FAN1)
12	System Fan Connector (FAN2)
13	System Fan Connector (FAN3)
14	System Fan Connector (FAN4)
15	OCuLink x4 Connector (OCU1)
16	System Fan Connector (FAN5)
17	SATA3 Connectors (SATA_1)(Upper), (SATA_0)(Lower)
18	SATA3 Connectors (SATA_3)(Upper), (SATA_2)(Lower)
19	TGPIO Headers (TSYNC1, TSYNC2)
20	M-key M.2 Socket (M2_1) (Type 2280)
21	USB 3.2 Gen1 Header (USB3_3_4)
22	System Panel Header (PANEL1)
23	SATA SGPIO Header (SATA_SGPIO1)
24	Auxiliary Panel Header (AUX_PANEL1)
25	USB 2.0 Header (USB_1_2)
26	Speaker Header (SPEAKER1)
27	System Fan Connector (FAN6)
28	System Fan Connector (FAN7)
29	OCuLink x4 Connector (OCU2)
30	SPI TPM Header (TPM_BIOS_PH1)
31	Clear CMOS Pad (CLRCMOS1)
32	Security Override Jumper (SEC_OR1)
33	CPU PECI Mode Jumper (PECI1)

No.	Description
34	LAN LED Connector (LED_LAN3_4)
35	BMC SMBus Header (BMC_SMB1)
36	Intelligent Platform Management Bus Header (IPMB1)
37	Backplane PCI Express Hot-Plug Connector (CPU0_HSBP1)
38	Non Maskable Interrupt Button (NMI_BTN1)
39	PCI Express 5.0 x16 Slot (PCIE4)
40	PCI Express 5.0 x16 Slot (PCIE5)
41	PCI Express 5.0 x16 Slot (PCIE6)
42	PCI Express 5.0 x16 Slot (PCIE7)
43	2 x 288-pin DDR5 DIMM Slots (DDR5_E1, DDR5_F1)*
44	2 x 288-pin DDR5 DIMM Slots (DDR5_E2, DDR5_F2)*
45	LGA 4677 CPU Socket (CPU1)

**For DIMM installation and configuration instructions, please see p.26 (Installation of Memory Modules (DIMM)) for more details.*

W790D8UD-1L1N :

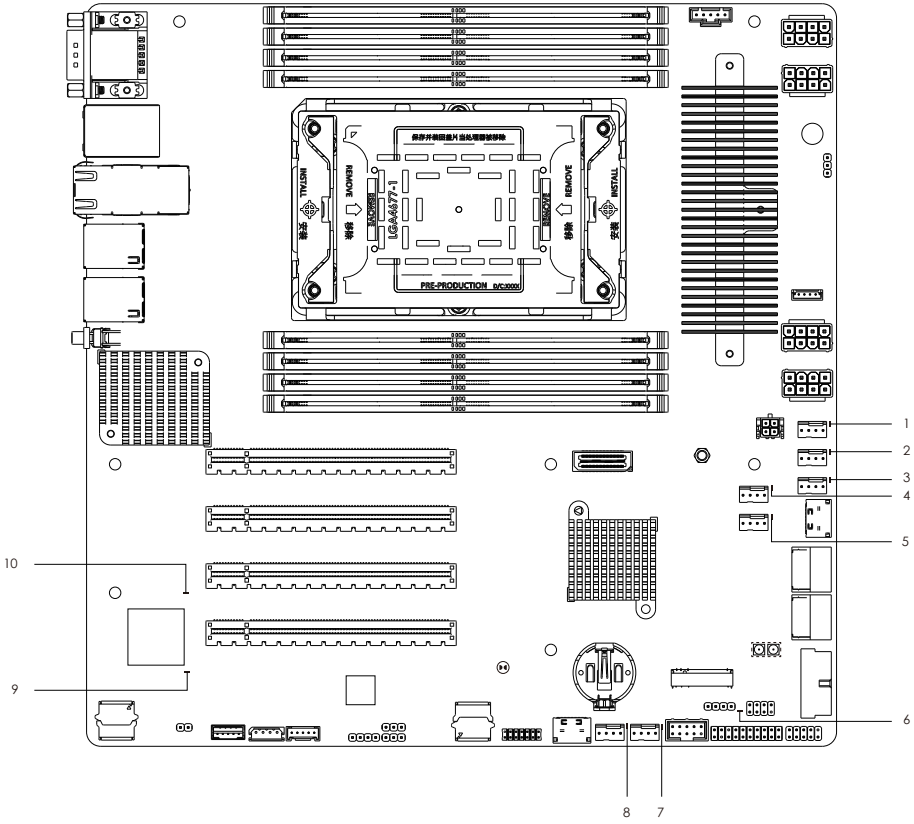


No.	Description
1	2 x 288-pin DDR5 DIMM Slots (DDR5_A1, DDR5_B1)*
2	2 x 288-pin DDR5 DIMM Slots (DDR5_A2, DDR5_B2)*
3	PSU SMBus Header (PSU_SMB1)
4	ATX 12V Power Connector (ATX12V2)
5	ATX 12V Power Connector (ATX12V4)
6	PWM Configuration Header (PWM_CFG1)
7	Virtual RAID On CPU Header (RAID_1)
8	ATX 12V Power Connector (ATX12V1)
9	ATX 12V Power Connector (ATX12V3)
10	Micro-Fit ATX 4Pin Power Connector (ATX4PIN1)
11	System Fan Connector (FAN1)
12	System Fan Connector (FAN2)
13	System Fan Connector (FAN3)
14	System Fan Connector (FAN4)
15	OCuLink x4 Connector (OCU1)
16	System Fan Connector (FAN5)
17	SATA3 Connectors (SATA_1)(Upper), (SATA_0)(Lower)
18	SATA3 Connectors (SATA_3)(Upper), (SATA_2)(Lower)
19	M-key M.2 Socket (M2_1) (Type 2280)
20	USB 3.2 Gen1 Header (USB3_3_4)
21	System Panel Header (PANEL1)
22	SATA SGPIO Header (SATA_SGPIO1)
23	Auxiliary Panel Header (AUX_PANEL1)
24	USB 2.0 Header (USB_1_2)
25	Speaker Header (SPEAKER1)
26	System Fan Connector (FAN6)
27	System Fan Connector (FAN7)
28	OCuLink x4 Connector (OCU2)
29	SPI TPM Header (TPM_BIOS_PH1)
30	Clear CMOS Pad (CLRCMOS1)
31	Security Override Jumper (SEC_OR1)
32	CPU PECI Mode Jumper (PECI1)
33	Backplane PCI Express Hot-Plug Connector (CPU0_HSBP1)
34	Non Maskable Interrupt Button (NMI_BTN1)
35	PCI Express 5.0 x16 Slot (PCIE4)

No.	Description
36	PCI Express 5.0 x16 Slot (PCIE5)
37	PCI Express 5.0 x16 Slot (PCIE6)
38	PCI Express 5.0 x16 Slot (PCIE7)
39	2 x 288-pin DDR5 DIMM Slots (DDR5_E1, DDR5_F1)*
40	2 x 288-pin DDR5 DIMM Slots (DDR5_E2, DDR5_F2)*
41	LGA 4677 CPU Socket (CPU1)

**For DIMM installation and configuration instructions, please see p.25 (Installation of Memory Modules (DIMM)) for more details.*

1.5 Onboard LED Indicators

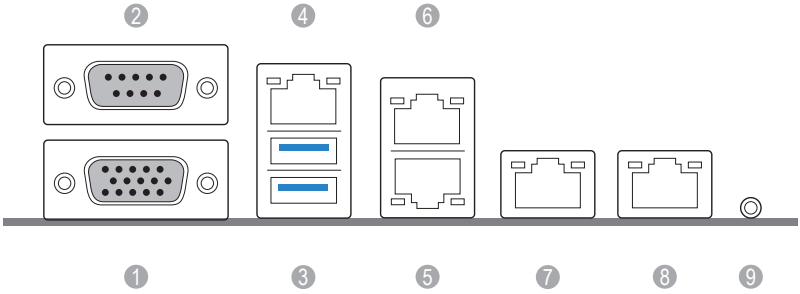


No.	Item	Status	Description
1	LED_FAN1	Red	FAN1 failed
2	LED_FAN2	Red	FAN2 failed
3	LED_FAN3	Red	FAN3 failed
4	LED_FAN4	Red	FAN4 failed
5	LED_FAN5	Red	FAN5 failed
6	SB_PWR1	Green	STB PWR ready
7	LED_FAN6	Red	FAN6 failed
8	LED_FAN7	Red	FAN7 failed
9	BMC_LED1	Green	BMC heartbeat LED *(W790D8UD-1L1N2T/BCM only)*
10	CATERR	Red	CPU CATERR error

English

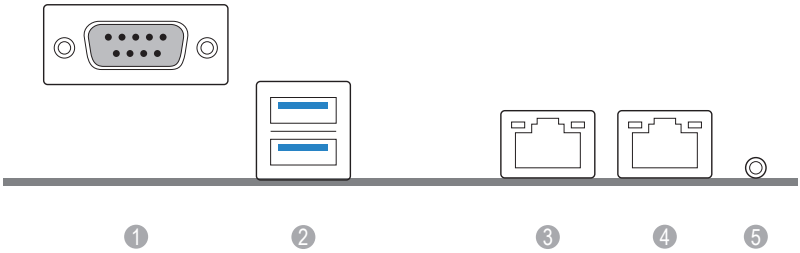
1.6 I/O Panel

W790D8UD-1L1N2T/BCM :



No.	Description	No.	Description
1	VGA Port (VGA1)	6	10G LAN RJ-45 Port (LAN2)****
2	Serial Port (COM1)	7	1G LAN RJ-45 Port (LAN3)**
3	USB 3.2 Gen1 Ports (USB3_1_2)	8	2.5G LAN RJ-45 Port (LAN4)***
4	LAN RJ-45 Port (IPMI_LAN1)*	9	UID Switch (UID1)
5	10G LAN RJ-45 Port (LAN1)****		

W790D8UD-1L1N:

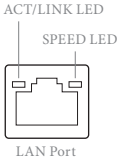


No.	Description	No.	Description
1	Serial Port (COM1)	4	2.5G LAN RJ-45 Port (LAN4)***
2	USB 3.2 Gen1 Ports (USB3_1_2)	5	UID Switch (UID1)
3	1G LAN RJ-45 Port (LAN3)**		

English

LAN Port LED Indications

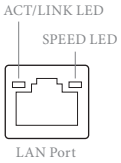
*There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.



IPMI LAN Port LED Indications (*W790D8UD-1L1N2T/BCM only)*

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

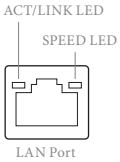
**There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.



1G 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

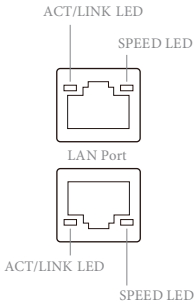
***There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.



2.5G 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	2.5Gbps connection

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

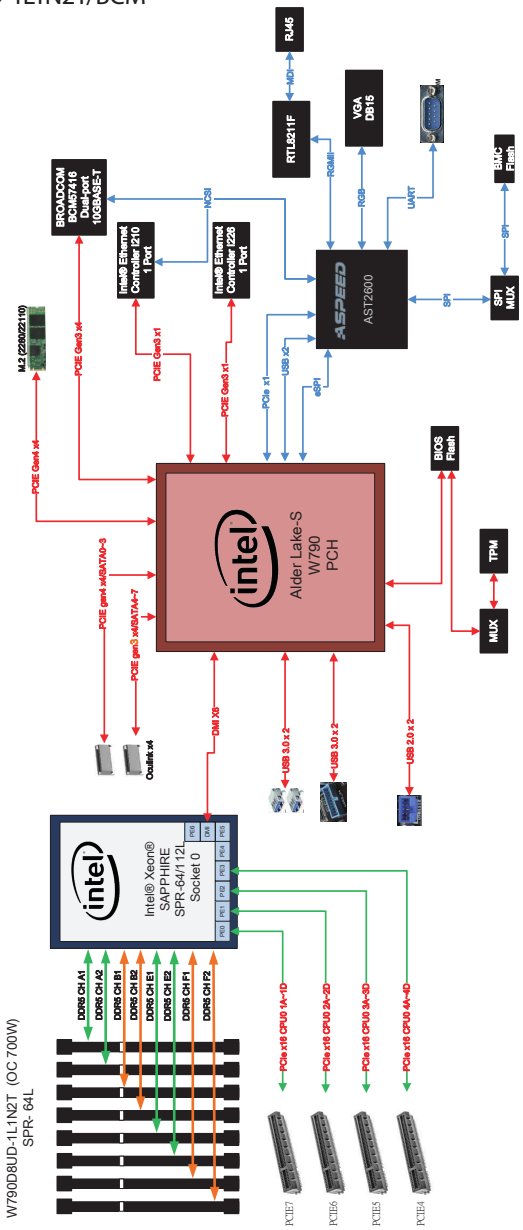


10G LAN Port LED Indications (*W790D8UD-1L1N2T/BCM only)*

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

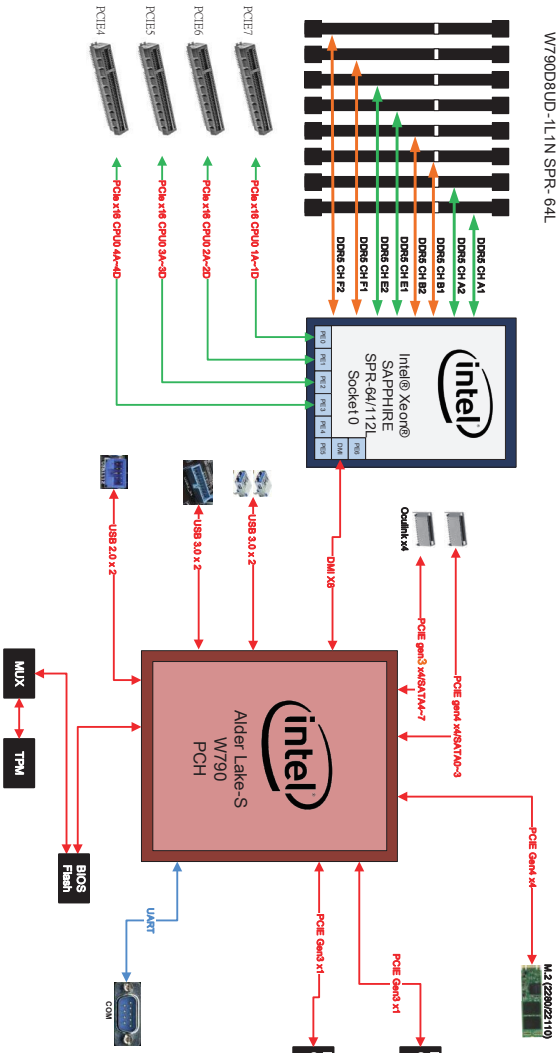
1.7 Block Diagram

W790D8UD-1L1N2T/BCM



English

W790D8UD-1L1N



Chapter 2 Installation

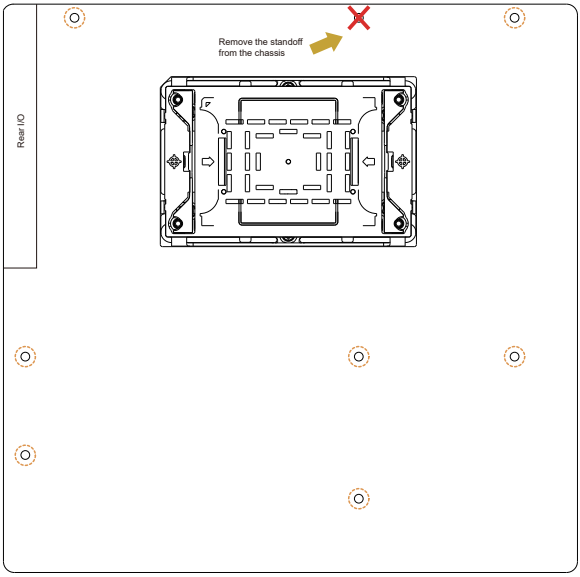
This is a deep micro-ATX form factor (10.4" x 10.5") motherboard. Before installing the motherboard, study the configuration of the chassis to ensure that the motherboard fits into it.

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

2.1 Screw Holes

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

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



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

2.2 Pre-installation Precautions

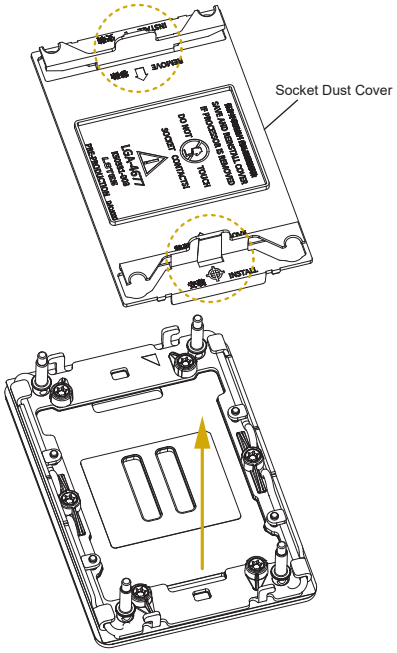
Take note of the following precautions before installing motherboard components or change any motherboard settings.

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

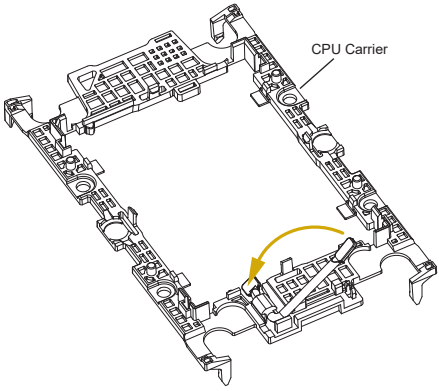
Before installing or removing any component, ensure that the power is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

2.3 Installing the CPU and Heatsink

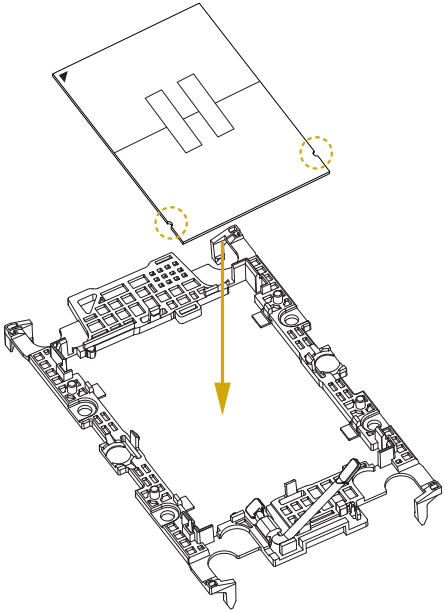
1



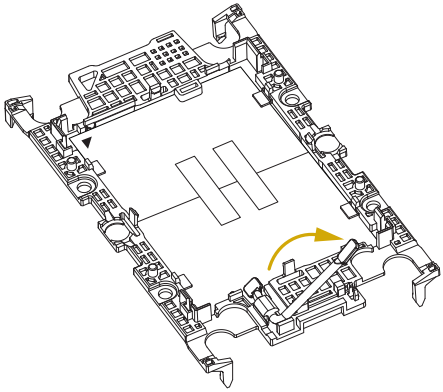
2



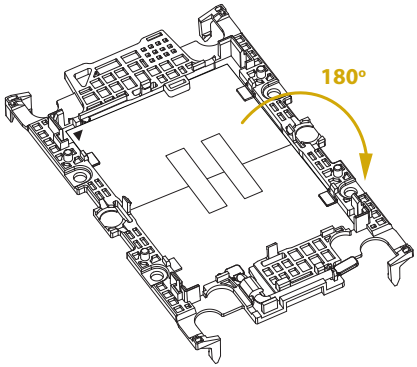
3



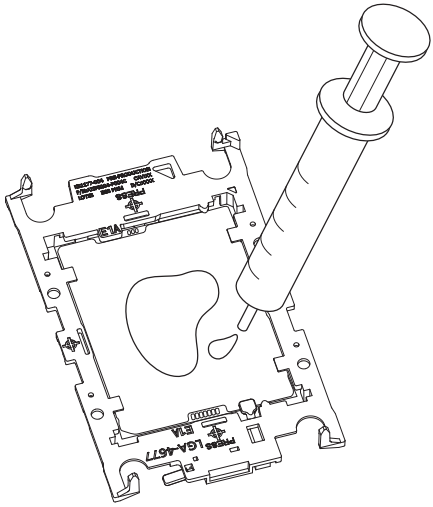
4



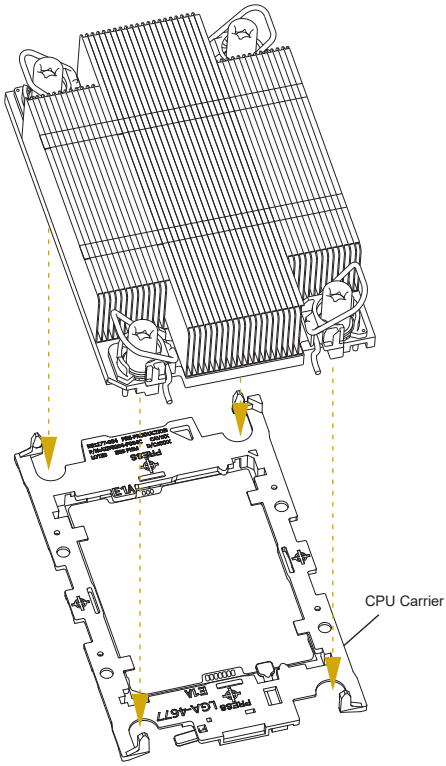
5



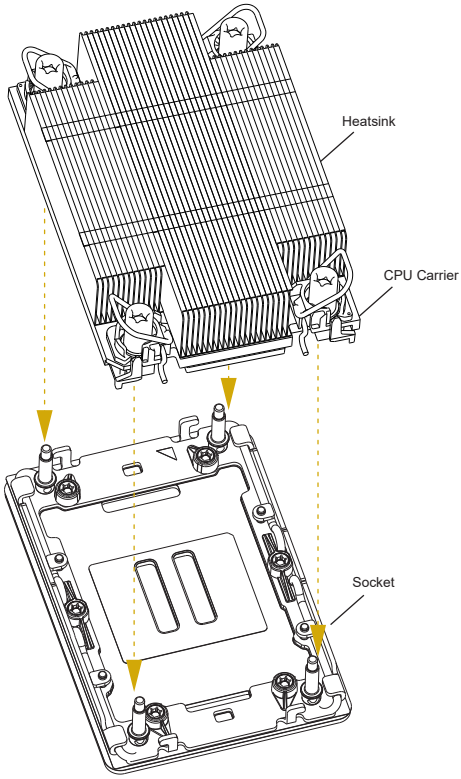
6



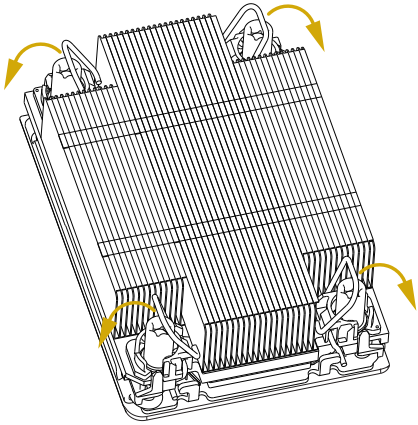
7



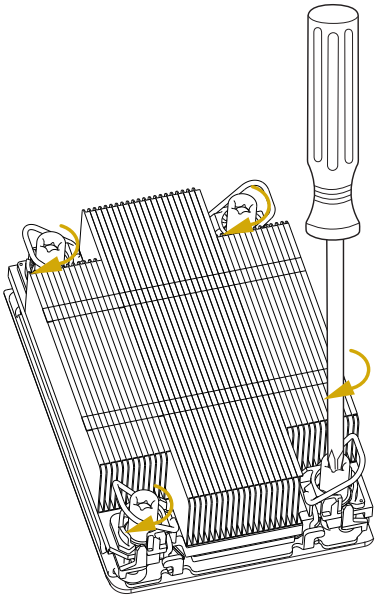
8



9



10



2.4 Installation of Memory Modules (DIMM)

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

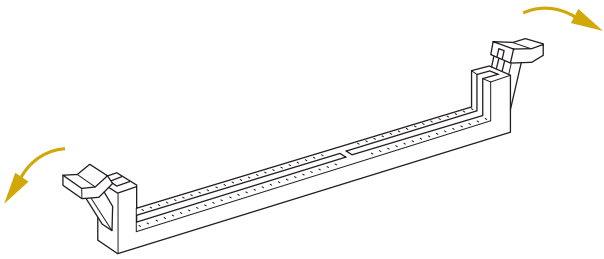
1. *For Dual channel configuration, it always needs to install identical (the same brand, speed, size and chip-type) DDR5 DIMM groups.*
2. *It is not allowed to install a DDR, DDR2, DDR3 or DDR4 memory module into a DDR5 slot; otherwise, this motherboard and DIMM may be damaged.*

Recommended Memory Configurations

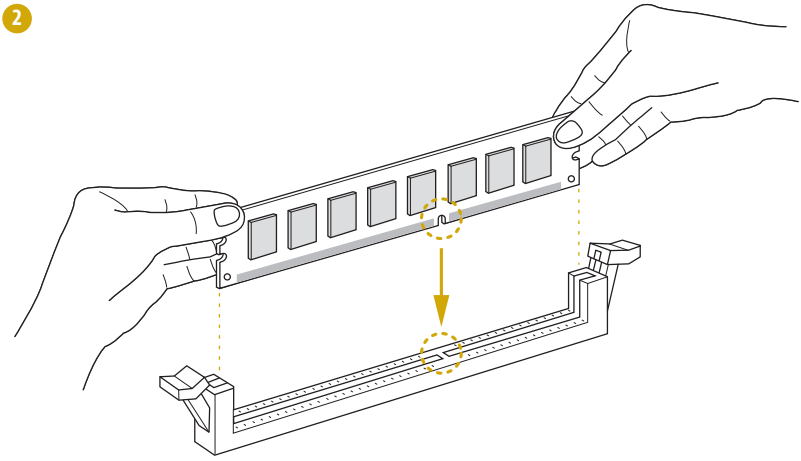
DIMM Slot		Number of DIMM Installed											
		1	1	1	1	2	2	4	6	6	6	6	8
CPU1	A1	V				V		V	V	V	V	V	V
	A2									V		V	V
	B1			V			V	V	V	V	V	V	V
	B2								V		V		V
	E1		V				V	V	V	V	V	V	V
	E2								V		V		V
	F1				V	V		V	V	V	V	V	V
	F2									V		V	V

The symbol V indicates the slot is populated.

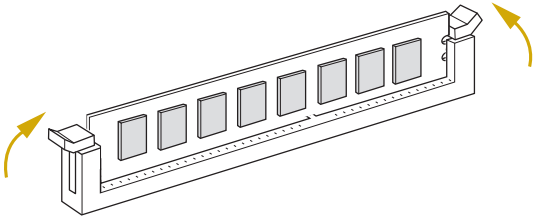
1



2



3



English

2.5 Expansion Slots (PCI Express Slots)

There are 4 PCI Express slots on this motherboard.

PCIE slot:

PCIE4 (PCIE 5.0 x16 slot, from CPU1) is used for PCI Express x16 lane width cards.
PCIE5 (PCIE 5.0 x16 slot, from CPU1) is used for PCI Express x16 lane width cards.
PCIE6 (PCIE 5.0 x16 slot, from CPU1) is used for PCI Express x16 lane width cards.
PCIE7 (PCIE 5.0 x16 slot, from CPU1) is used for PCI Express x16 lane width cards.

Slot	Generation	Mechanical	Electrical	Source
PCIE4	5.0	x16	x16	CPU1
PCIE5	5.0	x16	x16	CPU1
PCIE6	5.0	x16	x16	CPU1
PCIE7	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.

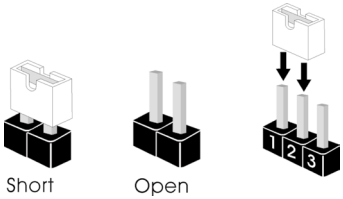
Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

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.



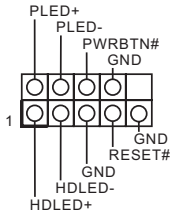
Security Override Jumper (3-pin SEC_OR1) (see p.7, No. 31)	1_2 Descriptor Security Override	2_3 Not override (Default)
CPU PECI Mode Jumper (3-pin PECI1) (see p.7, No. 32)	1_2 CPU PECI connected to PCH	2_3 CPU PECI connected to BMC (Default)

English

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.7, No. 21)



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

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

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

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

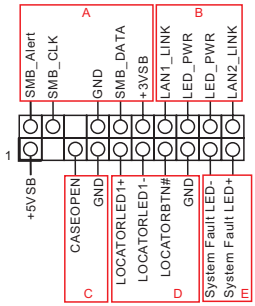
HDLED (Hard Drive Activity LED):
Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

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

TGPIO Headers
(TSYNC1, TSYNC2)
(see p.7, No. 19)
(W790D8UD-1L1N2T/
BCM only)

Time-aware General-Purpose Input/Output header allows user to control time-aware at run time.

Auxiliary Panel Header
(18-pin AUX_PANEL1)
(see p.7, No. 23)



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

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

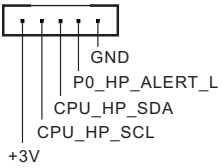
B. Internet status indicator (2-pin LAN1_LED, LAN2_LED)
These two 2-pin headers allow user to use the Gigabit internet indicator cable to connect to the LAN status indicator. When this indicator flickers, it means that the internet is properly connected.

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

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

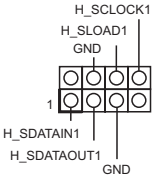
E. System Fault LED (2-pin LOCATOR)
This header is for the Fault LED on the system.

Backplane PCI Express Hot-Plug Connector (5-pin CPU0_ HSBP1) (see p.7, No. 36)



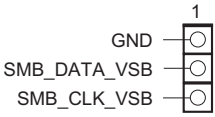
This header is used for the hot plug feature of HDDs on the backplane.

Serial General Purpose Input/Output Header (7-pin SATA_SGPIO1) (see p.7, No. 22)



This header supports Serial Link interface for onboard SATA connections.

PWM Configuration Header (3-pin PWM_CFG1) (see p.7, No. 6)

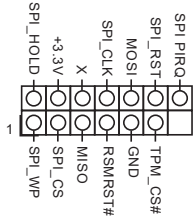


The header is used for PWM configurations.

Non Maskable Interrupt Button Header (NMI_BTN1) (see p.7, No. 37)

Please connect a NMI device to this header.

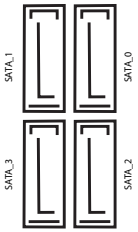
SPI TPM Header (13-pin TPM_BIOS_PH1) (see p.7, No. 29)



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

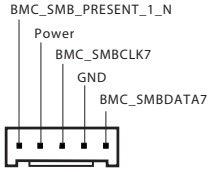
English

Serial ATA3 Connectors
Right-Angle:
(SATA_0:
see p.7, No. 17)(Upper)
(SATA_1:
see p.7, No. 17)(Lower)
(SATA_2:
see p.7, No. 18)(Upper)
(SATA_3:
see p.7, No. 18)(Lower)



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

BMC SMB Header
(5-pin BMC_SMB1)
(see p.7, No. 34)

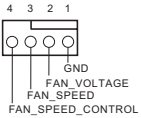


These headers are used for the SM BUS devices.

Clear CMOS Pad
(CLRCMOS1)
(see p.7, No. 30)

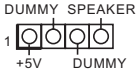
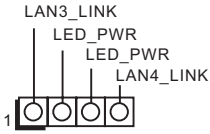
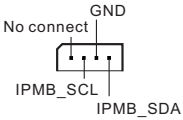
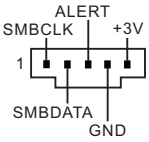
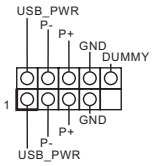
This allows user to clear the data in CMOS. To clear CMOS, take out the CMOS battery and short the Clear CMOS Pad.

System Fan Connectors
(4-pin FAN1)
(see p.7, No. 11)
(4-pin FAN2)
(see p.7, No. 12)
(4-pin FAN3)
(see p.7, No. 13)
(4-pin FAN4)
(see p.7, No. 14)
(4-pin FAN5)
(see p.7, No. 16)
(4-pin FAN6)
(see p.7, No. 26)
(4-pin FAN7)
(see p.7, No. 27)



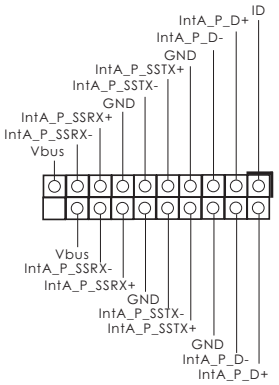
Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control.

English

OCuLink Connectors Right-Angle: (OCU1) (see p.7, No. 15) (OCU2) (see p.7, No. 28)		Please connect PCIE SSDs to these connectors.
Chassis Speaker Header (4-pin SPEAKER1) (see p.7, No. 25)		Please connect the chassis speaker to this header.
LAN LED Connector (LED_LAN3_4) (see p.7, No. 33)		These 4-pin connectors are used for the front LAN status indicator.
Intelligent Platform Management Bus Header (4-pin IPMB1) (see p.7, No. 35)		This 4-pin connector is used to provide a cabled base-board or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.
PSU SMBus Header (5-pin PSU_SMB1) (see p.7, No. 3)		PSU SMBus monitors the status of the power supply, fan and system temperature.
USB 2.0 Header (9-pin USB_1_2) (see p.7, No. 24)		There is one USB 2.0 header on this motherboard. This USB 2.0 header can support two ports.

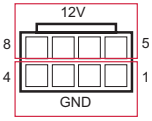
English

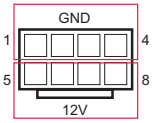
USB 3.2 Gen1 Header
Right-Angle:
(19-pin USB3_3_4)
(see p.7, No. 20)



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

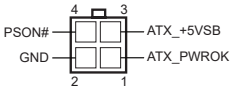
ATX 12V Power Connectors
(8-pin ATX12V1)
(see p.7, No. 8)
(8-pin ATX12V2)
(see p.7, No. 4)
(8-pin ATX12V3)
(see p.7, No. 9)
(8-pin ATX12V4)
(see p.7, No. 5)





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

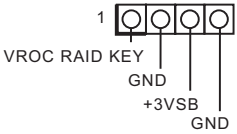
Micro-Fit ATX 4Pin Power Connector
(4-pin ATX4PIN1
(ATX 24pin-to-4pin))
(see p.7, No. 10)



The motherboard provides one 4-pin power/signal connector which is a required input for ATX power source.

When using ATX power, it is necessary to use a 24pin-to-4pin power cable to connect between the 24pin power connector of PSU and the ATX12V1, ATX12V2, ATX12V3 or ATX12V4 connector on the motherboard for power supply and signal communication.

English

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

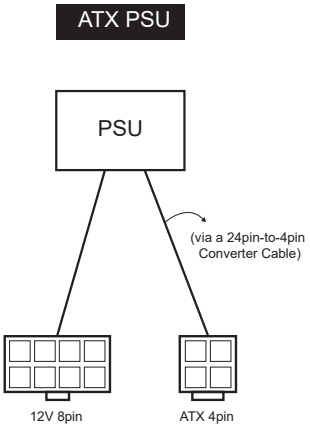
*For further details on VROC, please refer to the official information released by Intel.

English

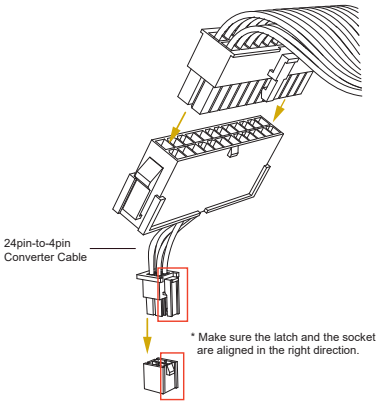
2.8 ATX PSU Power Connections

This motherboard supports ATX power input. Please refer to the table below for the required connections between the motherboard and the power supply.

Connector	ATX PSU
12V 8pin	O
ATX 4pin	O *(with the bundled ATX 24pin-to-4pin converter cable)*



The following diagram illustrates how to connect the bundled ATX 24pin-to-4pin converter cable.



2.9 Dr. Debug

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

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

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

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

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

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

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

2.10 Unit Identification purpose LED/Switch

With the UID button, user can be able to locate the server working on from behind a rack of servers.

Unit Identification purpose LED/Switch (UID1)		When the UID button on the front or rear panel is pressed, the front/rear UID blue LED indicator will be turned on. Press the UID button again to turn off the indicator.

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

2.11 Dual LAN and Teaming Operation Guide

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

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

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

Step 1

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

Step 2

Click the **Settings** tab.

Step 3

Click the **Modify Team** button.

Step 4

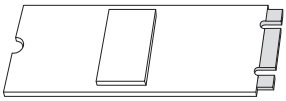
Select the adapter that want to be the primary adapter and click the **Set Primary** button.

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

2.12 M.2 SSD Module Installation Guide

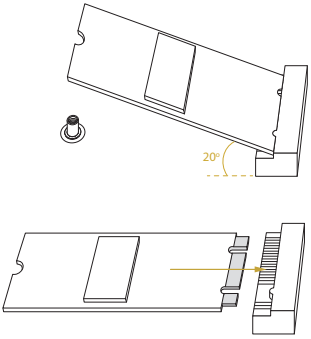
The M.2 Socket (M2_1, Key M) supports type 2280 M.2 PCI Express module up to Gen4 x4 (16GT/s x4).

Installing the M.2 SSD Module



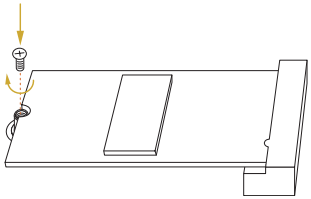
Step 1

Prepare a M.2 SSD module and the screw.



Step 2

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 3

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 <Del> 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> to enter the UEFI SETUP UTILITY after POST, or by pressing the reset button on the system chassis. This allows user to restart by turning the system off and then back on.

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

3.1.1 UEFI Menu Bar

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

Item	Description
Main	To set up the system time/date information
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.

English

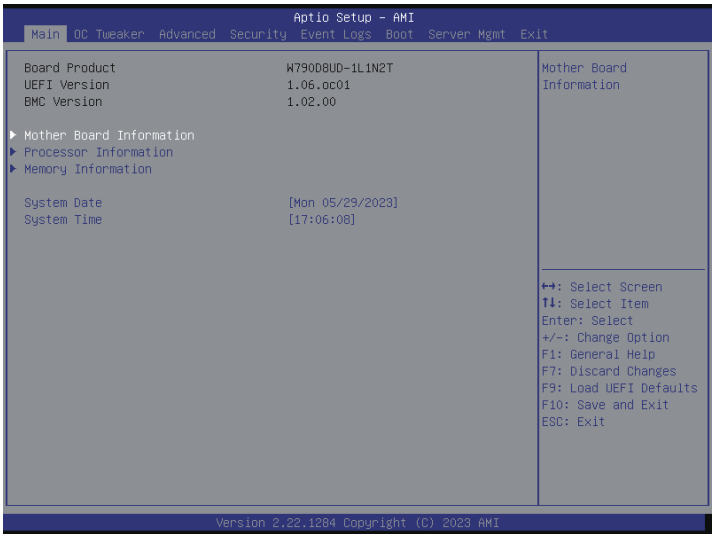
3.1.2 Navigation Keys

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

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

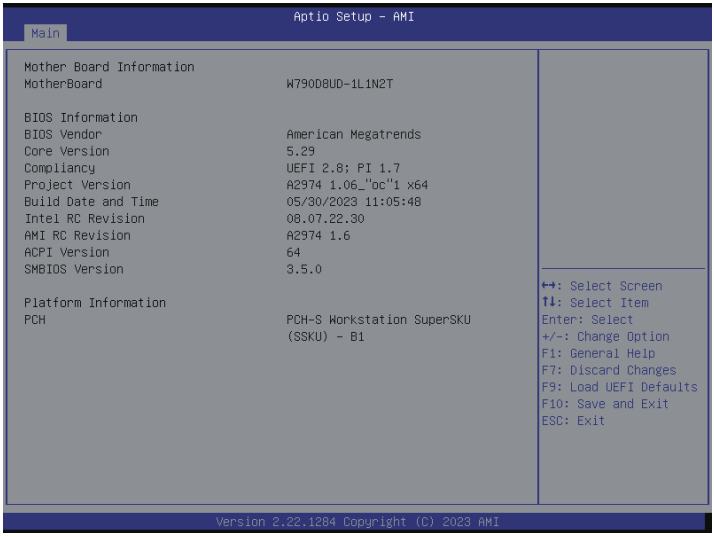
3.2 Main Screen

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



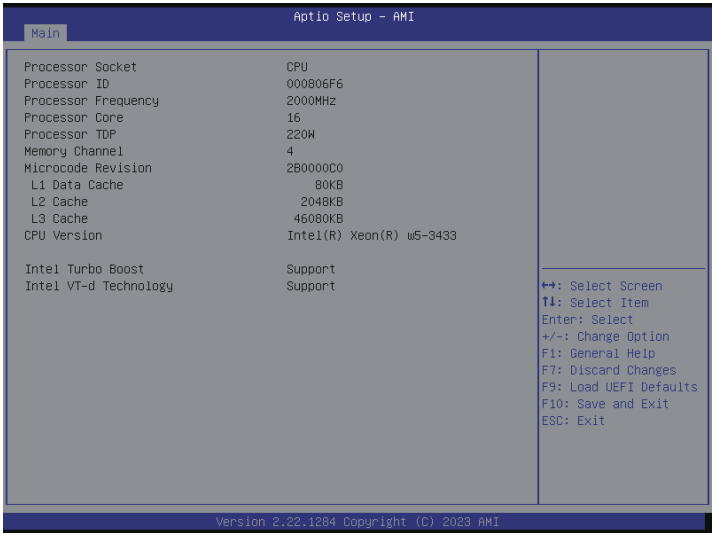
3.2.1 Motherboard Information

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



3.2.2 Processor Information

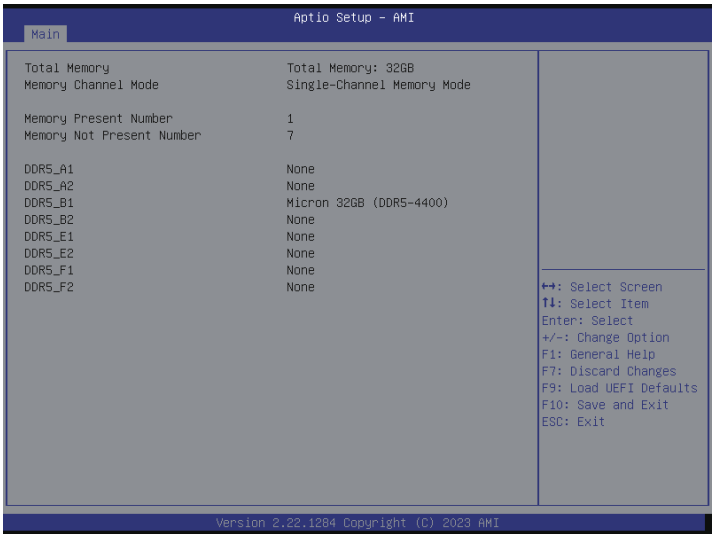
Press [Enter] to view the information of the processor.



English

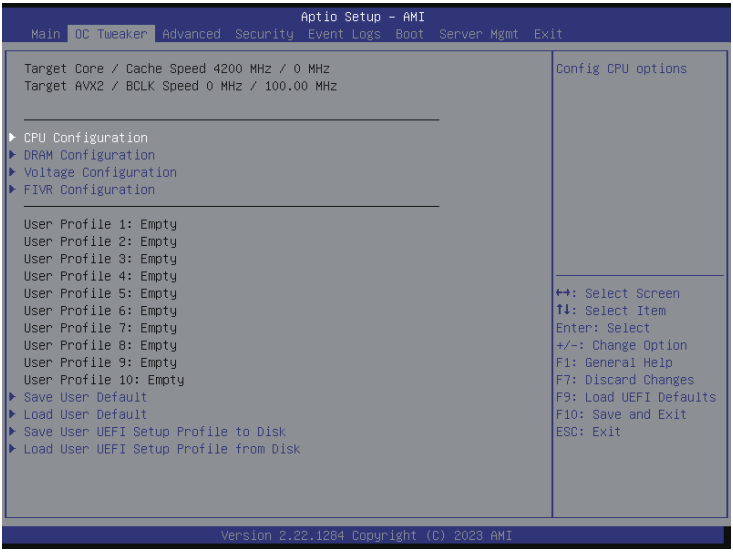
3.2.3 Memory Information

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

Configue CPU options.

DRAM Configuration

Configue DRAM Timing.

Voltage Configuration

Configue Voltage options.

FIVR Configuration

Configue 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.

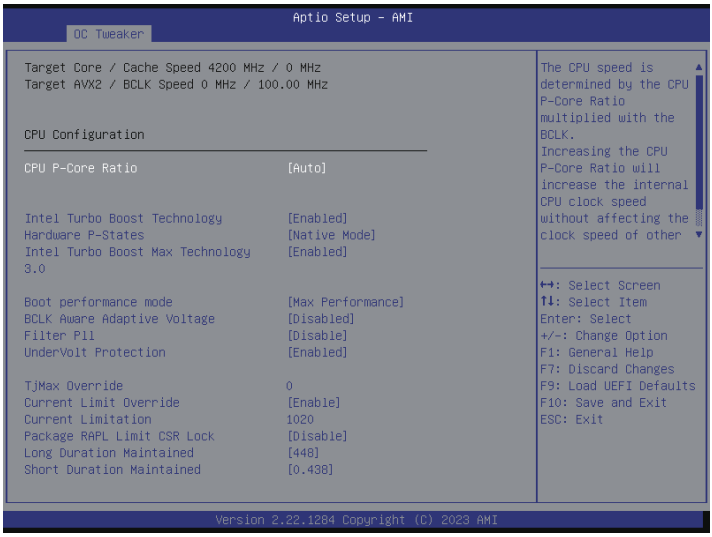
Save User UEFI Setup Profile to Disk

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 P-Core Ratio

Configure the CPU P-Core Ratio, the CPU speed is determinded by the CPU P-Core Ratio multiplied with the BCLK. Increasing the CPU P-Core Ratio will increase the internal CPU clock speed.

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 Adative 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 BCKL 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.

TjMax Override

Specified value here to support TjMax 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 Limitation

Current limitation in 1/8 A increments. This field is locked by VR_CURRENT_CONFIG[LOCK], Value<=CURRENT_LIMIT.

Package RAPL Limit CSR Lock

Select this item to enable or disable locking of Package RAPL Limit CSR and a reset will be required to unlock the register.

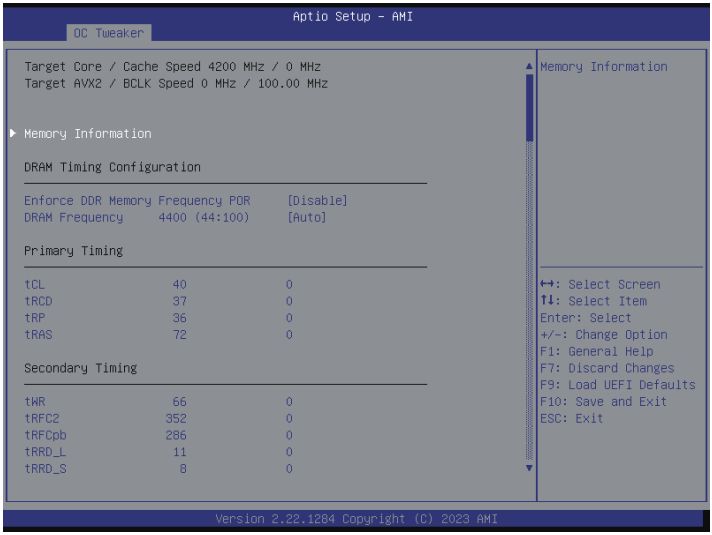
Long Duration Maintained

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

Short Duration Maintained

Configure the period of time until the CPU ratio is lowered when the Short Duration Power Limit is exceeded.

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 4400 (44:100)

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 (tRFCpb)

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 CASrd to CKE low time.

tWRPDEN

Configure CASwr 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 + tSTABtiming parameter for RDIMMs (RCD).

tXSDLL

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

tZQOPER

Configure the Normal operation Full callbration 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

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.

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 Promote Warnings

Determines if MRC warnings are promoted to system level.

Promote 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 disble memory test during fast boot.

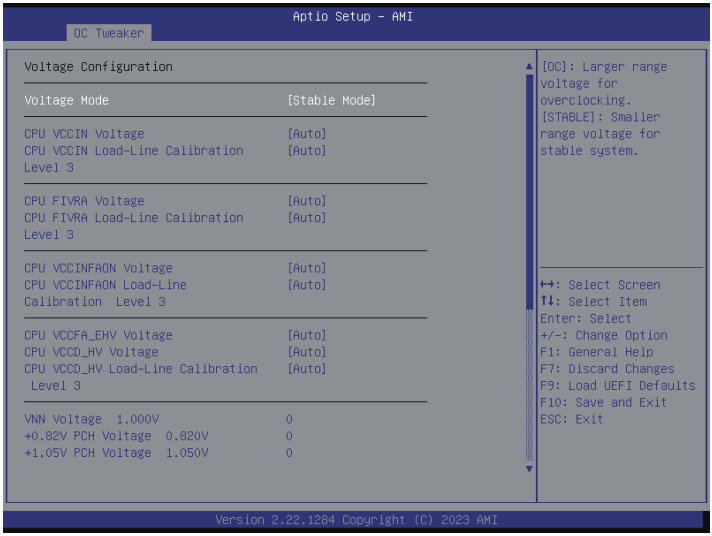
Attempt Fast Boot

[Enable] - Protions of memory reference code will be skipped when possible to increase boot speed on warm boots.
[Disable] - Disable this feature.
[Audo] - Sets it to the MRC default setting; current default is Disable.

Attempt Fast Cold Boot

[Enable] - Protions of memory reference code will be skipped when possible to increase boot speed on cold boots.
[Disable] - Disable this feature.
[Audo] - 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 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 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 configue secure mode by auto, enable or disable.

VDD Voltage

Configure the memory VDD Voltage

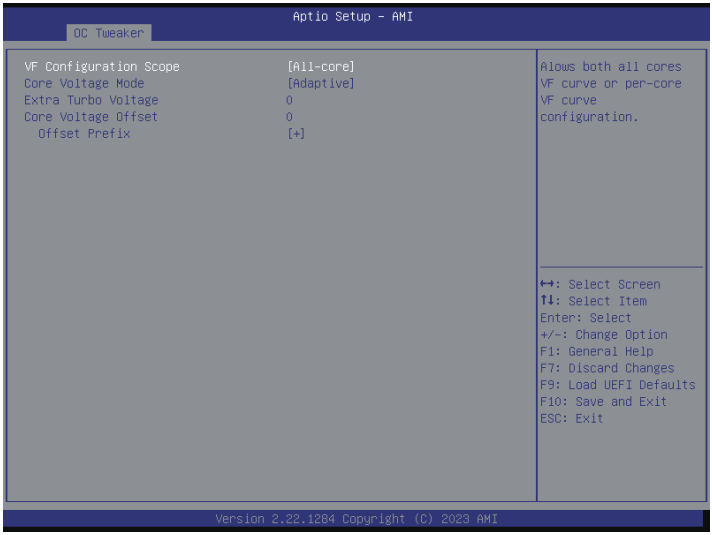
VDDQ Voltage

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.

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 the 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 the 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 the processor.

SVID/FIVR

SVID Support

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

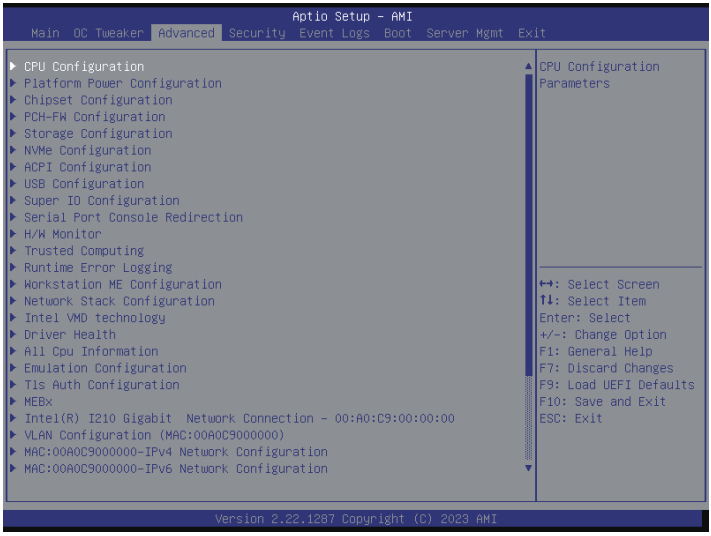
Select this item to enable or disable FIVR Faults. When FIVR faults are disabled, OVP and OCP protection mechanisms will be masked.

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

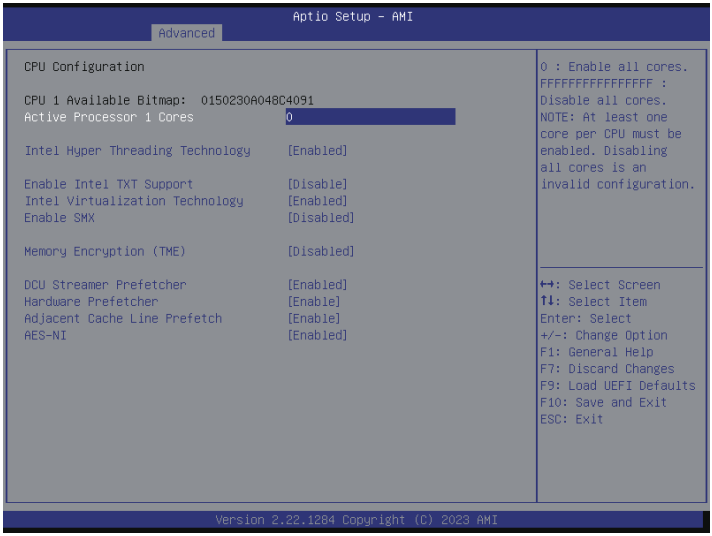
In this section, it allows user to configure and view the following items: CPU Configuration, Platform Power Configuration, Chipset Configuration, PCH-FW Configuration, Storage Configuration, NVMe Configuration, ACPI Configuration, USB Configuration, Super IO Configuration, Serial Port Console Redirection, H/W Monitor, Trusted Computing, 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.

English

3.4.1 CPU Configuration



Active Processor 1 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.

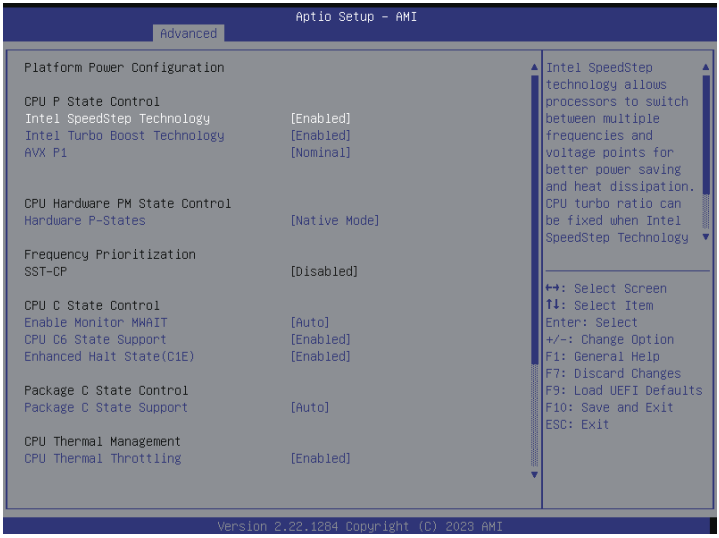
Adjacent Cache Line Prefetch

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 State Support

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 seletion. PERF/Balanced, Perf/Bananced or Power/Power.

Long Duration Power Limit

Select this item to configure the Long Duration Power Limit. 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.

Long Duration Maintained

Select this item to configure the Long Duration Maintained value. PL1 value is in seconds. The value may vary from 0 to 448. Indicates the time window over which TDP value should be maintained.

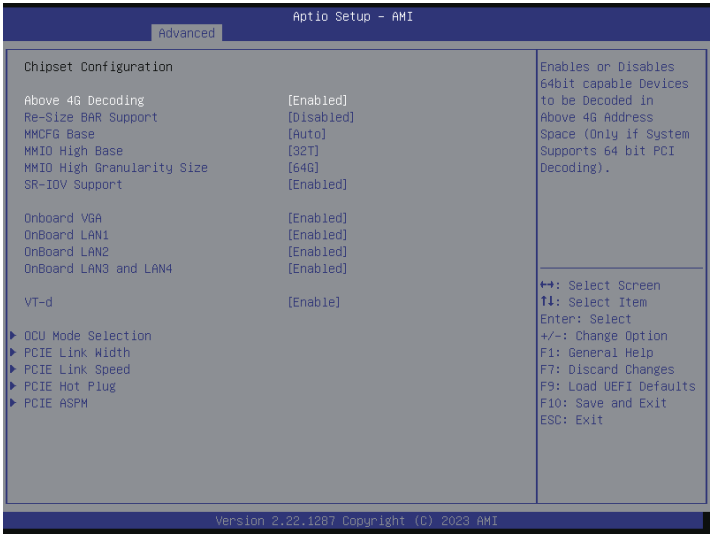
Short Duration Power Limit

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

Short Duration Maintained

Select this item to configure the Short Duration Maintained value. PL2 value is in seconds. The value may vary from 0 to 0.438. Indicates the time window over which TDP value should be maintained.

3.4.3 Chipset Configuration



Above 4G Decoding

Globally Enables or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if 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/ LAN2/LAN3 and LAN4

Use this to enable or disable the Onboard LAN function.

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.

OCU Mode Selection

Switch the COU link to PCIE or SATA.

PCIE Link Width

Select this item to configure PCIE Link Width.

PCIE4/PCIE5/PCIE6/PCIE7 Link Width
Select PCIE port Bifurcation for PCIE4/PCIE5/PCIE6/PCIE7.

PCIE Link Speed

Select PCIE Link Speed.

M2_1 Link Speed
Select Link Speed for M2_1.

OCU1/OCU2 Link Speed
Select Link Speed for OCU1/OCU2.

PCIE4/PCIE5/PCIE6/PCIE7 Link Speed
Select Link Speed for PCIE4/PCIE5/PCIE6/PCIE7.

PCIE Hot Plug

Select this item to configure PCIE Hot Plug globally.

OCU1/OCU2 Hot Plug
Enable or disable PCIE Hot Plug.

PCIE4/PCIE5/PCIE6/PCIE7 Hot Plug
Enable or disable PCIE and MCIO Hot Plug.

PCIE4/PCIE5/PCIE6/PCIE7 Surprise Hot Plug
Enable or disable PCIE and MCIO Surprise Hot Plug.

PCIE ASPM

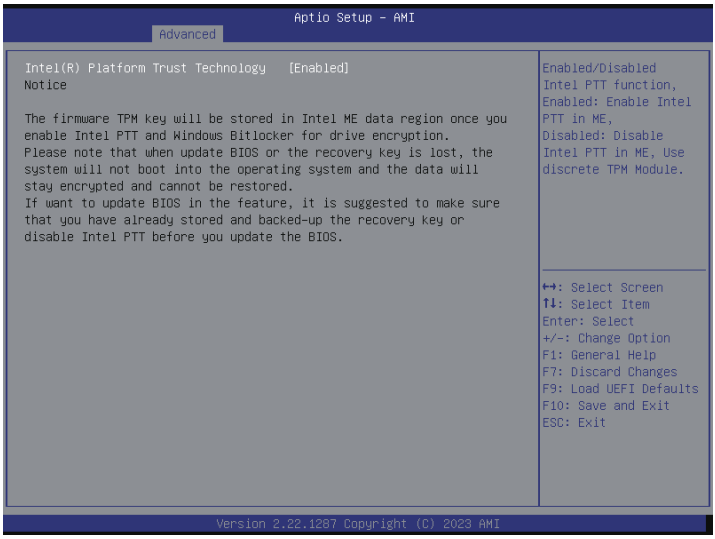
Selec this item to configure the PCIE ASPM.

PCI-E ASPM Support (Global)
Set this item to Auto to configure all PCIe root ports.

OCU1/OCU2 ASPM Support
Enables or disables the ASPM support for all CPU downstream devices.

PCIE4/PCIE5/PCIE6/PCIE7 ASPM Support
Enables or disables the ASPM support for all CPU downstream devices. Select [Auto] for the default value.

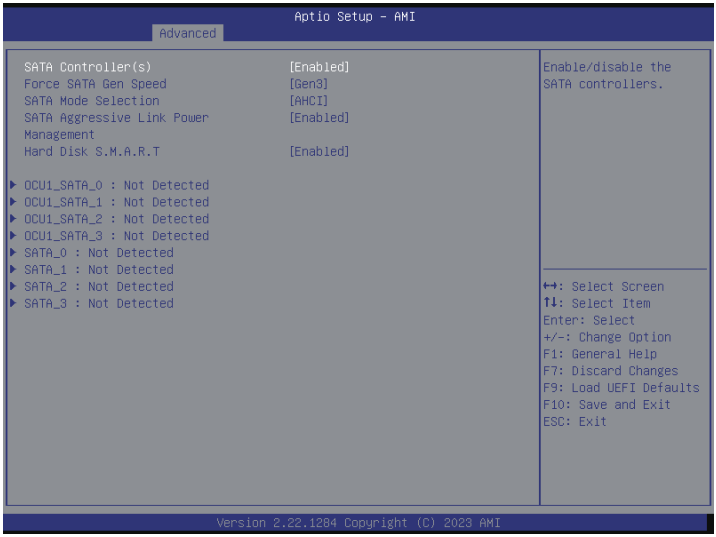
3.4.4 PCH-FW Configuration



Intel(R) Platform Trust Technology

Select this item to enable or disable Intel PTT function ME

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.

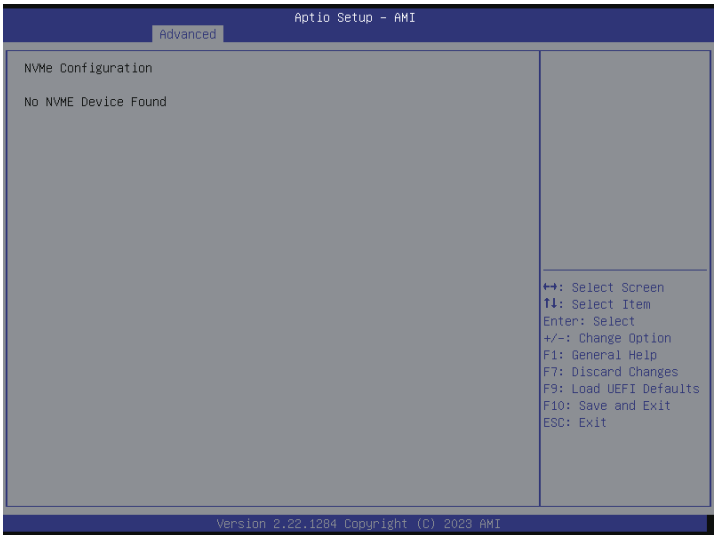
Hard Disk S.M.A.R.T.

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, SATA_0/1/2/3

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

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.

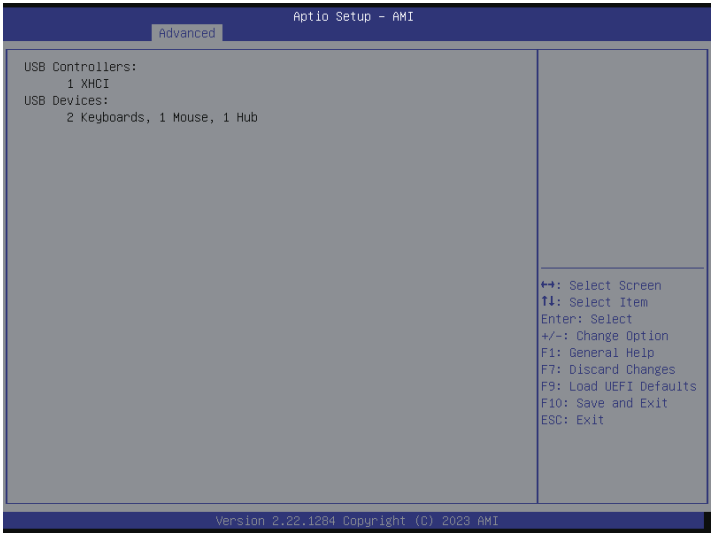
USB Keyboard/Remote Power On

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.

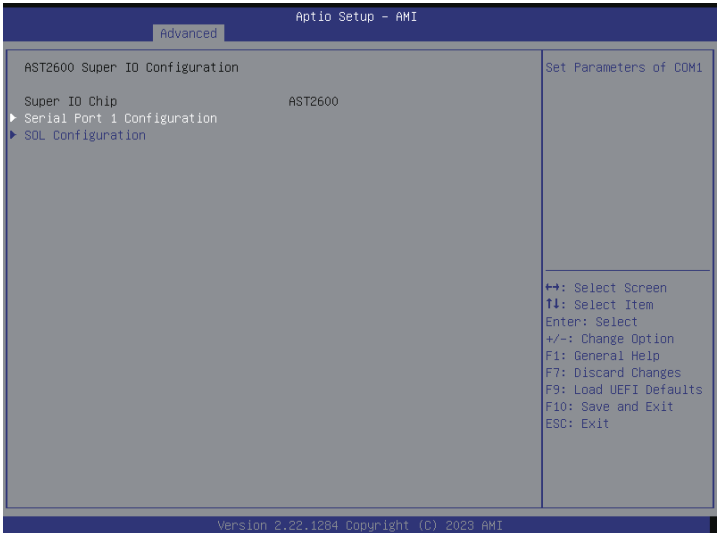
3.4.8 USB Configuration



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.

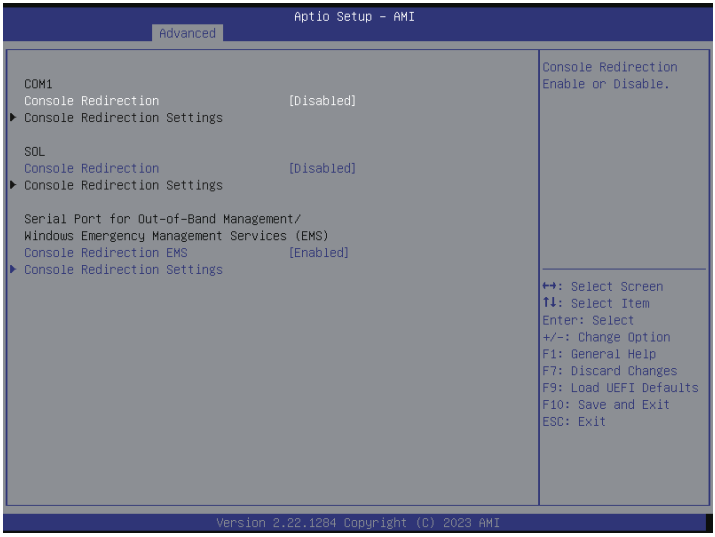
SOL Port

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

Microsof t 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].

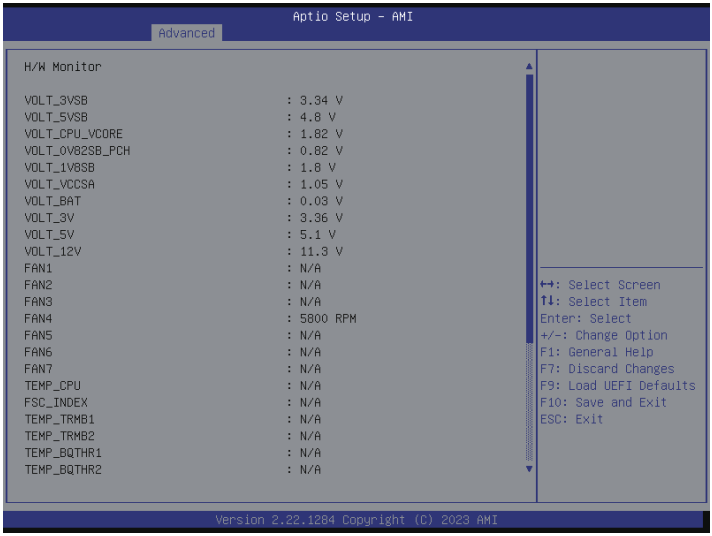
Data Bits EMS

Parity EMS

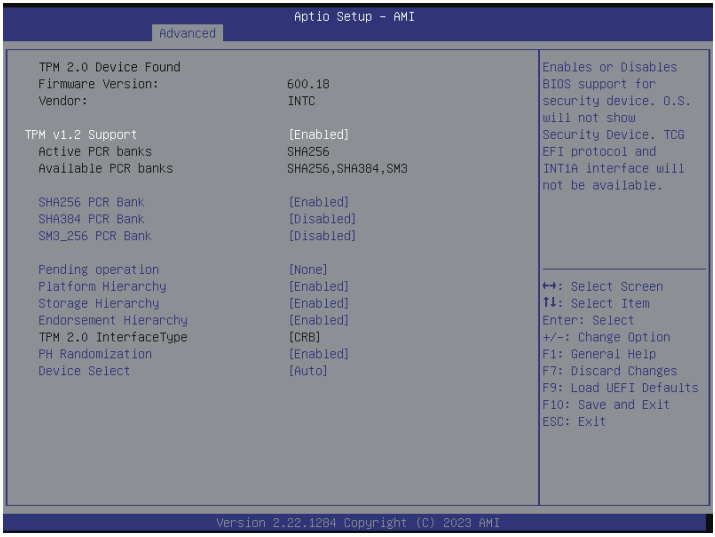
Stop Bits EMS

3.4.11 H/W Monitor

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



3.4.12 Trusted Computing



NOTE: Options vary depending on the version of the TPM module connected.

TPM v1.2 Support

Enable or disable BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

Active PCR banks

This item displays active PCR Banks.

Available PCR Banks

This item displays available PCR Banks.

SHA256 PCR Bank

Use this item to enable or disable SHA256 PCR Bank

SHA384 PCR Bank

Use this item to enable or disable SHA384 PCR Bank.

SM3_256 PCR Bank

Use this item to enable or disable SM3_256 PCR Bank.

Pending Operation

Schedule an Operation for the Security Device.
NOTE: The computer will reboot during restart in order to change State of the Device.

Platform Hierarchy

Use this item to enable or disable Platform Hierarchy.

Storage Hierarchy

Use this item to enable or disable Storage Hierarchy.

Endorsement Hierarchy

Use this item to enable or disable Endorsement Hierarchy.

TPM 2.0 InterfaceType

Select the Communication Interface to TPM 2.0 Device.

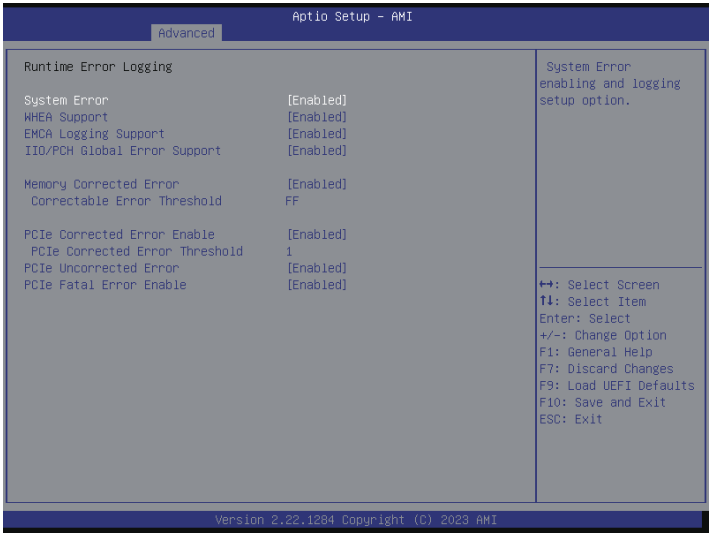
PH Randomization

Enable or diable Platform Hierarchy randomization. Do not enable this question in production platforms. This is for development testing.

Device Select

Use this item to select the TPM device to be supported. TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices. If TPM 2.0 devices are not found, TPM 1.2 devices will be enumerated.

3.4.13 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.

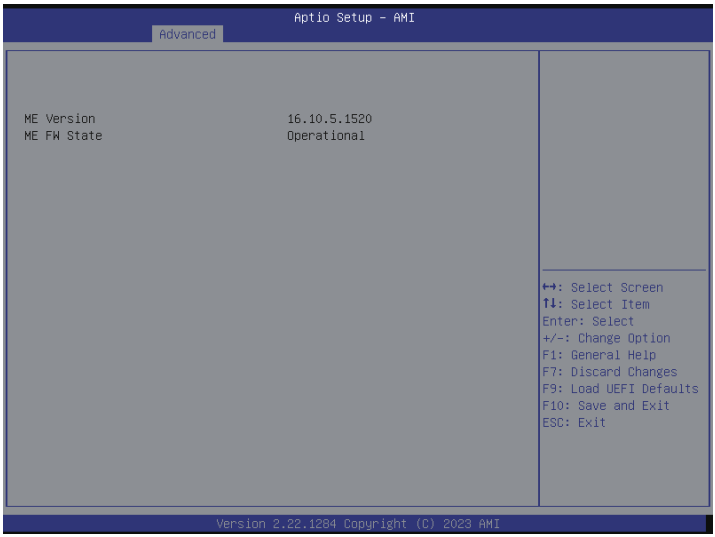
PCIE Uncorrected Error

Use this item to enable or disable PCIe Uncorrectable errors.

PCIE Fatal Error Enable

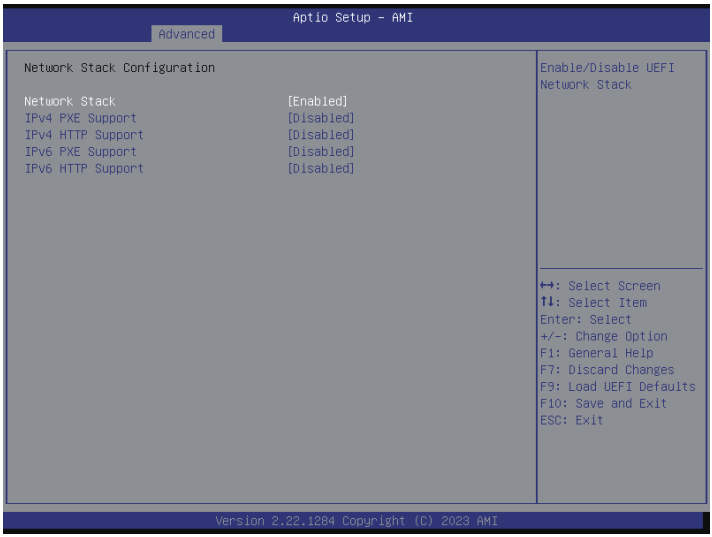
Use this item to enable or disable PCIe Ftal errors.

3.4.14 Workstation ME Configuration



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

3.4.15 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.

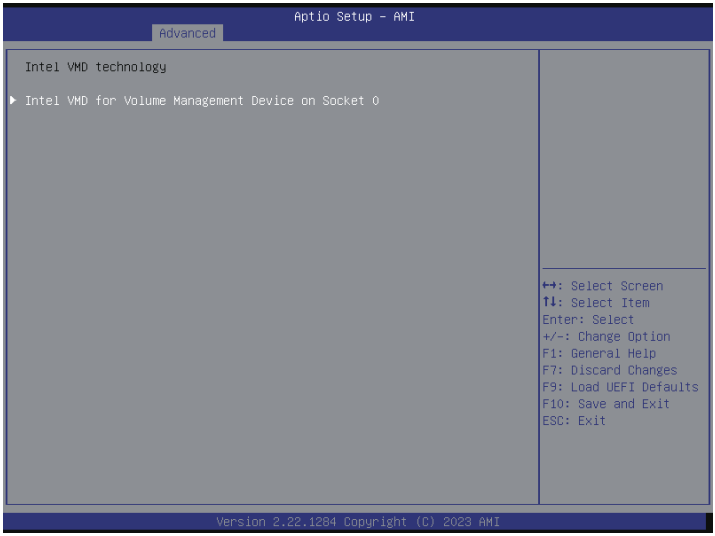
IPv6 PXE Support

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.

3.4.16 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 PCIE7, IOU1 PCIE6, IOU2 PCIE5, IOU3 PCIE4

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

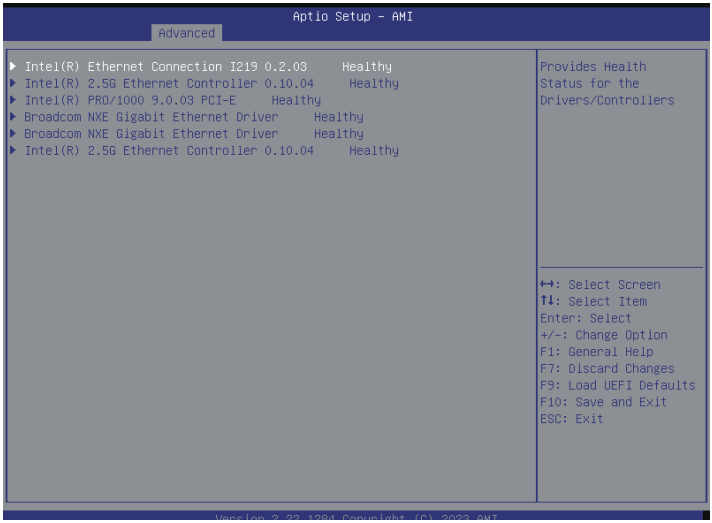
Enable/Disable VMD

Use this item to enable or disable VMD in this Stack.
When [Enabled], user is allowed to configure the options below.

VMD port A
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.

3.4.17 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.

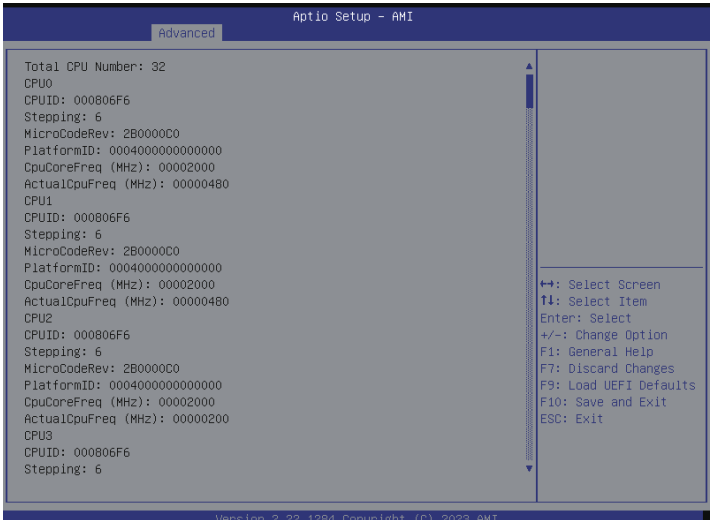
Broadcom NXE Gigabit Ethernet Driver Healthy

Provides Health Status for the Drivers/Controllers.

Inter (R) 2.5GbE Ethernet Controller 0.10.04 Healthy

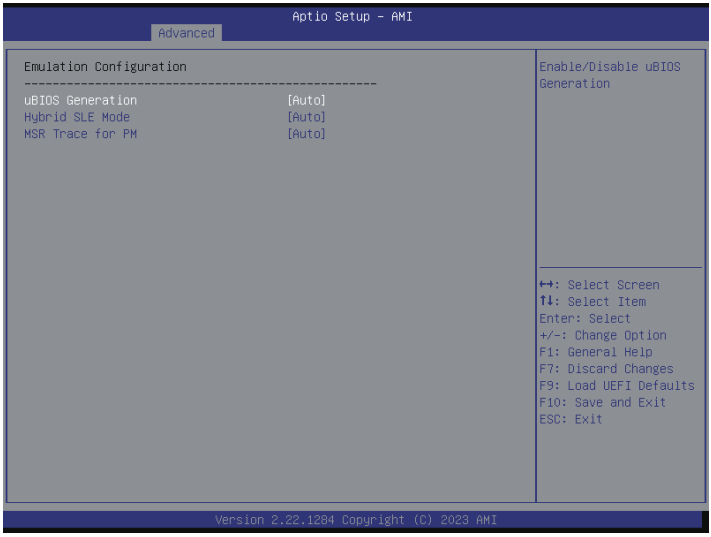
Provides Health Status for the Drivers/Controllers.

3.4.18 All CPU Informaton



Select this item to display all CPU information.

3.4.19 Emulation Configuration



uBIOS Generation

Use this item to enable or disable uBIOS Generation.

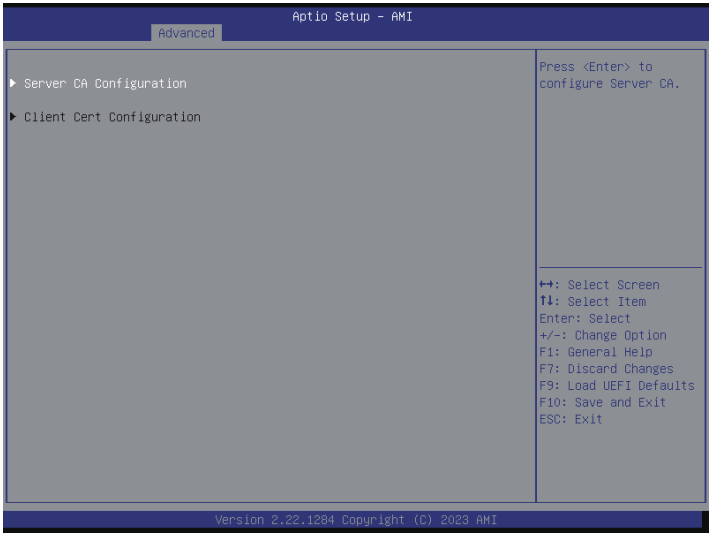
Hybrid SLE Mode

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.

3.4.20 Tls Auth Configuration



Server CA Configuration

Press <Enter> to configure Server CA.

Enroll Cert

Press <Enter> to enroll cert.

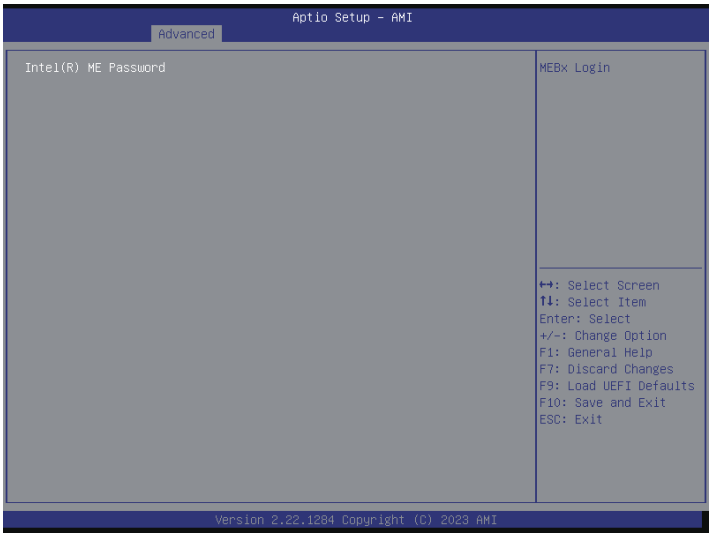
Delete Cert

Press <Enter> to delete cert.

Client Cert Configuration

Press <Enter> to configure Client Cert.

3.4.21 MEBx



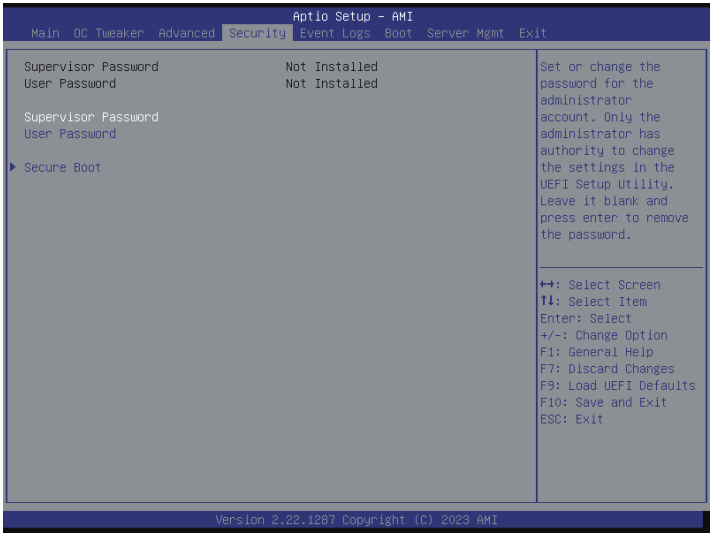
This Formset contains forms for configuring MEBx.

3.4.22 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. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

Secure Boot

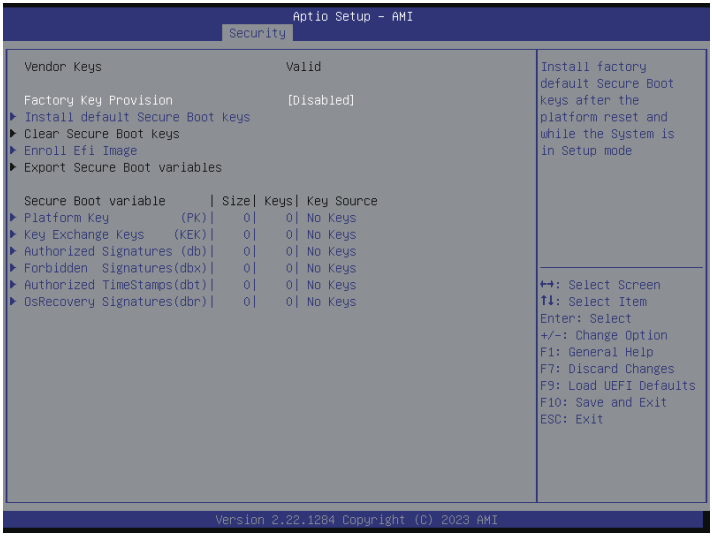
Use this to enable or disable Secure Boot Control. The default value is [Disabled]. Enable to support Windows Server 2012 R2 or later versions Secure Boot.

Secure Boot Mode

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

3.5.1 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 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

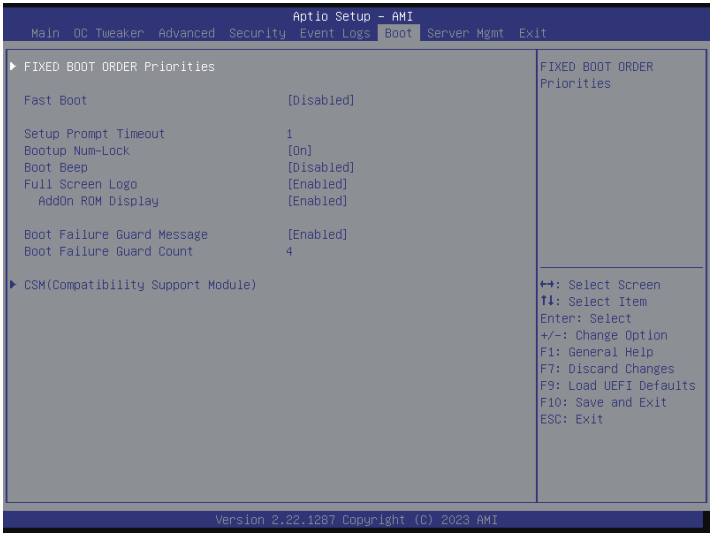
Press <Enter> to view the Smbios Event Log records.

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

English

3.7 Boot Screen

In this section, it will display the available devices on the system for configuring 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 want to see the AddOn ROM information when the system boots, please select [Enabled]. Configuration options: [Enabled] and [Disabled]. The default value is [Enabled].

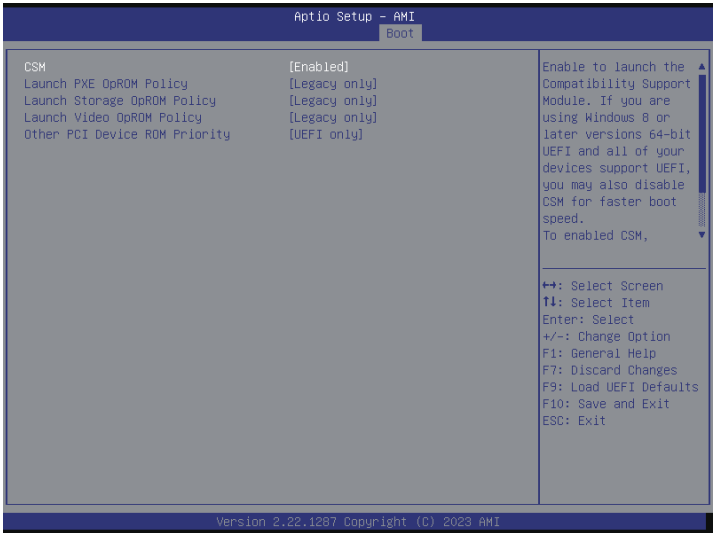
Boot Failure Guard Message

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



CSM (Compatibility Support Module)

Select this item to enable or disable the Compatibility Support Module support.

When enabling this item, the sub-items as below are displayed:

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.

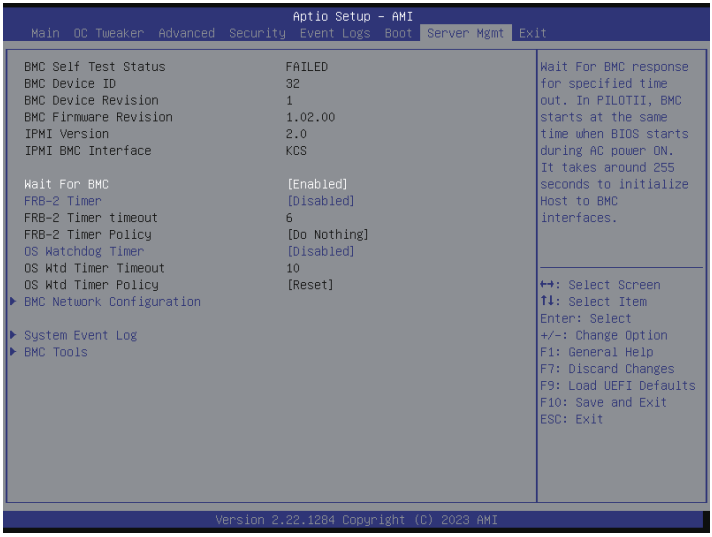
Launch Video OpROM Policy

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.

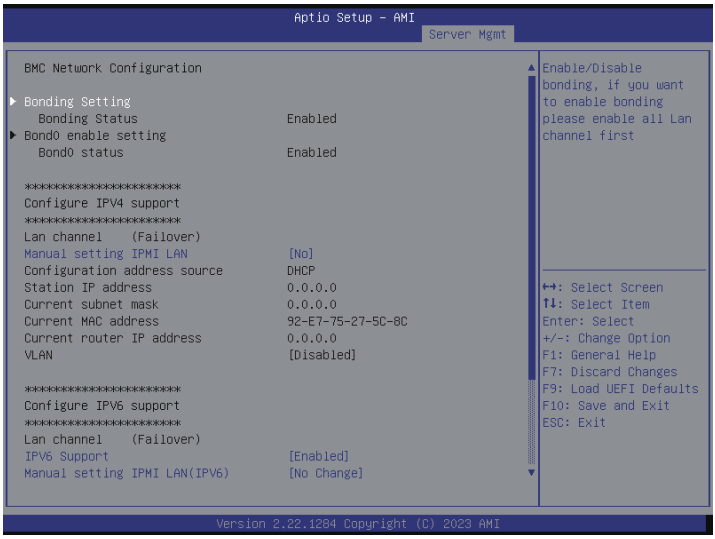
System Event Log

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 setings.

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.

Lan Channel (Failover)

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

Enabled or disabled Virtual Local Area Network. Select [Enabled] to configure VLAN ID and VLAN priority.

IPV6 Support

Enabled/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 ro disable event logging for error/progress codes during boot.

Erase SEL

Use this to choose options for earsing SEL.

When SEL is Full

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

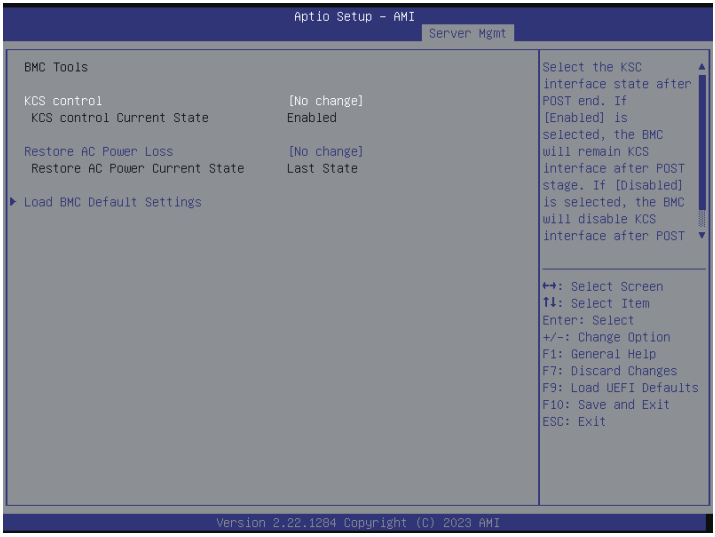
Log EFI Status Codes

Use this item to disable the logging of EFI Status Codes or log only error code or only progress 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 KCS interface after POST stage. If [Disabled] is selected, the BMC will disable KCS interface after POST stage.

Restore AC Power Loss

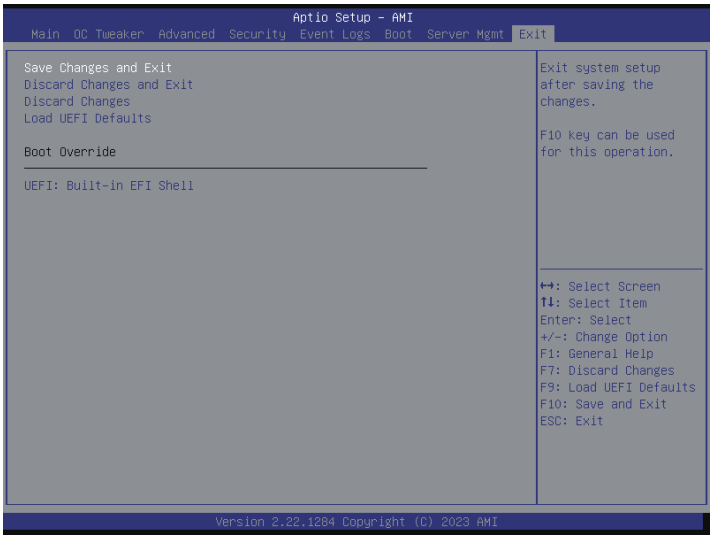
This allows user to set the power state after an unexpected AC/power loss. If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers. If [Last State] is selected, it will recover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

Load BMC Default Settings

Use this item to load BMC default settings.

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.

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 offical 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.

4.3 Contact Information

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

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 adaquate 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

ASRock Rack Incorporation

e-mail: ASRockRack_sales@asrockrack.com

ASRock Rack EUROPE B.V.

Bijsterhuizen 11-11
6546 AR Nijmegen
The Netherlands
Phone: +31-24-345-44-33

ASRock Rack America, Inc.

13848 Magnolia Ave, Chino, CA91710 U.S.A.
Phone: +1-909-590-8308
Fax: +1-909-590-1026