

OPEN Industry Standard, Flexible Architecture

GREEN Less Heat, Less Power Consumption

STABLE Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

GENOAD8UD-2T

GENOAD8UD-2T/X5550

User Manual

English



Version 1.0

Published February 2023

Copyright©2023 ASRock Rack INC. All rights reserved.

Copyright Notice:

No part of this documentation may be reproduced, transcribed, transmitted, or translated in any language, in any form or by any means, except duplication of documentation by the purchaser for backup purpose, without written consent of ASRock Rack Inc.

Products and corporate names appearing in this documentation may or may not be registered trademarks or copyrights of their respective companies, and are used only for identification or explanation and to the owners' benefit, without intent to infringe.

Disclaimer:

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

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

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



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

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

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

The terms HDMI® and HDMI High-Definition Multimedia Interface, and the HDMI logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.



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)



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	1
1.1 Package Contents	1
1.2 Specifications	2
1.3 Unique Features	5
1.4 Motherboard Layout	6
1.5 Onboard LED Indicators	9
1.6 I/O Panel	10
1.7 Block Diagram	12
Chapter 2 Installation	13
2.1 Screw Holes	13
2.2 Pre-installation Precautions	13
2.3 Installing the CPU	14
2.4 Installation of Memory Modules (DIMM)	19
2.5 Expansion Slots (PCI Express Slots)	21
2.6 Onboard Headers and Connectors	22
2.7 ATX PSU / DC-IN Power Connections	33
2.8 Dr. Debug	34
2.9 Identification purpose LED/Switch	40
2.10 M.2 SSD Module Installation Guide	41
2.11 Dual LAN and Teaming Operation Guide	43
Chapter 3 UEFI Setup Utility	44
3.1 Introduction	44
3.1.1 UEFI Menu Bar	44

3.1.2	Navigation Keys	45
3.2	Main Screen	46
3.2.1	Mother Board Information	47
3.2.2	Processor Information	47
3.2.3	Memory Information	48
3.3	Advanced Screen	49
3.3.1	CPU Configuration	50
3.3.2	Chipset Configuration	51
3.3.3	Storage Configuration	53
3.3.4	NVMe Configuration	54
3.3.5	ACPI Configuration	55
3.3.6	USB Configuration	56
3.3.7	Super IO Configuration	57
3.3.8	Serial Port Console Redirection	58
3.3.9	H/W Monitor	61
3.3.10	PCI Subsystem Settings	62
3.3.11	AMD CBS	63
3.3.12	AMD PBS	64
3.3.13	PSP Firmware Versions	66
3.3.14	Network Stack Configuration	67
3.3.15	Driver Health	69
3.3.16	Tls Auth Configuration	70
3.3.17	Instant Flash	71
3.4	Security	72

3.4.1	Install Default Secure Boot Keys	73
3.4.2	Clear Secure Boot Keys	74
3.4.3	Key Management	75
3.5	Server Mgmt	79
3.6	Event Logs	81
3.7	Boot Screen	83
3.8	Exit Screen	84
Chapter 4 Software Support		85
4.1	Download and Install Operating System	85
4.2	Download and Install Software Drivers	85
4.3	Contact Information	85
Chapter 5 Troubleshooting		86
5.1	Troubleshooting Procedures	86
5.2	Technical Support Procedures	88
5.3	Returning Merchandise for Service	88

Chapter 1 Introduction

Thank you for purchasing ASRock Rack **GENOAD8UD-2T / GENOAD8UD-2T/X550** motherboard, a reliable motherboard produced under ASRock Rack's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock Rack's commitment to quality and endurance.

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



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

*If you require technical support related to this motherboard, please visit our website for specific information about the model you are using.
<http://www.asrockrack.com/support/>*

1.1 Package Contents

- ASRock Rack GENOAD8UD-2T/GENOAD8UD-2T/X550 Motherboard
(Deep Micro-ATX Form Factor: 10.4-in x 10.5-in)
- Quick Installation Guide
- 1 x I/O Shield
- 1 x MCIO X8 to 8 SATA +8P Cable (63cm)
- 1 x ATX 4P to 24P Power Cable (8cm)
- 2 x Screws for M.2 Sockets



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

1.2 Specifications

GENOAD8UD-2T / GENOAD8UD-2T/X550	
MB Physical Status	
Form Factor	Deep Micro-ATX
Dimension	10.4" x 10.5" (264.16 x 266.7 mm)
Processor System	
CPU	Supports AMD EPYC GENOA processors
Socket	1 Socket SP5 (LGA 6096)
Thermal Design Power (TDP)	400W
Chipset	System on Chip
System Memory	
Supported DIMM Quantity	8 DIMM slots (1DPC)
Supported Type	Supports DDR5 288-pin RDIMM, RDIMM-3DS
Max. Capacity per DIMM	RDIMM: 96GB (2R) RDIMM-3DS: 512GB (2S8Rx4)
Max. Frequency	4800MHz
Voltage	1.1V
Note	Memory capacity, frequency, and voltage support is to be validated
Expansion Slot	
Slot 6	PCIe5.0 x16
Slot 5	PCIe5.0 x16
Slot 4	PCIe5.0 x16
Slot 3	PCIe5.0 x16
Other PCIe Expansion Connectors	
M.2	2 M-key (PCIe5.0 x4); support 2280/2260/2242/2230 form factor
MCIO	2 MCIO (PCIe5.0 x8) 2 MCIO (PCIe5.0 x8 or 8 SATA 6Gb/s) 1 MCIO (PCIe5.0 x4)
Storage	
CPU Built-in Storage	AMD EPYC GENOA (16 SATA 6Gb/s): 2 MCIO
Ethernet	
Additional Ethernet Controller	GENOAD8UD-2T: Intel® X710-AT2: 2 RJ45 (10GbE) GENOAD8UD-2T/X550: Intel® X550-AT2: 2 RJ45 (10GbE)
USB	
Controller/Hub	AMD EPYC GENOA

Connectors/Headers	External: 2 Type-A (USB3.2 Gen1) Internal: 1 header (19-pin, 2 USB3.2 Gen1)
Graphics	
Controller	ASPEED AST2600
VRAM	DDR4 512MB
Security	
TPM	1 (13-pin, SPI)
Rear Panel I/O	
UID Button/LED	1 UID button w/ LED
VGA Port	1 DB15 (VGA)
USB	2 Type-A (USB3.2 Gen1)
RJ45	2 RJ45 (10GbE), 1 dedicated IPMI
Hardware Monitor	
Temperature	CPU, MB, TR1 Temperature sensing
Fan	CPU/Rear/Front Fan Tachometer CPU Quiet Fan (Allow Chassis Fan Speed Auto-Adjust by CPU Temperature) CPU/Rear/Front Fan Multi-Speed Control
Voltage	VCORE, VCCSA, VCCM, 3V, 5V, 12V, +BAT, 3VSB, 5VSB, VCCIO, +2.5V_VPP
Server Management	
BMC Controller	ASPEED AST2600
IPMI Dedicated GLAN	1 Realtek RTL8211F for dedicated management GLAN
System BIOS	
Type	AMI UEFI BIOS; 256 Mb (32MB) SPI Flash ROM
Features	ASRock Rack Instant Flash, ACPI 6.4 and above compliance wake up events, SMBIOS 3.5.0 and above, Plug and Play(PnP)
Other Internal Connectors/Headers	
PSU connector	1 (4-pin, ATX PSU signal) w/ ATX 24-pin adapter cable, 3 (8-pin, ATX 12V) support 12V DC-in
Other Power Connector	1 (6-pin) for HDD power
Auxiliary Panel Header	1 (18-pin): chassis intrusion, system fault LED, LAN1/LAN2 activity LED, locate, SMBus
System Panel	1 (9-pin): power switch, reset switch, system power LED, HDD activity LED
NMI Header	1
COM Header	1
Speaker Header	1 (4-pin)
Fan Header	6 (6-pin)
Thermal Sensor Header	1

TPM Header	1 (13-pin, SPI)
SGPIO Header	2
HSBP	1
SMbus Header	1
PMbus Header	1
IPMB Header	1
Clear CMOS	1 (contact pads)
LED Indicators	
Standby Power LED	1 (5VSB)
Fan Fail LED	6
BMC Heartbeat LED	1
Support OS	
OS	Microsoft® Windows*: - Server 2016 (64bit) - Server 2019 (64bit) - Server 2022 (64 bit) Linux*: - RedHat Enterprise Linux Server 8.3 (64 bit) / 8.4 (64 bit) - CentOS 8.3 (64 bit) / 8.4 (64 bit) - SUSE SLES 15.2 (64 bit) / 12.5 (64 bit) - UBuntu 21.04 (64 bit) / 20.04.3 (64 bit) / 18.04.5 (64 bit) Hypervisor: - VMWare® ESXi 6.7.0 u3 / vSphere 6.7.0 u3 - VMWare® ESXi 7.0 U1 / vSphere 7.0 U1 - VMWare® ESXi 7.0 U2a / vSphere 7.0 U2b - CITRIX Hypervisor 8.2.0 <i>*Please refer to our website for the latest OS support list.</i>
Environment	
Temperature	Operation temperature: 10°C ~ 35°C (50 - 95 degF) / Non operation temperature: -40°C ~ 70°C (-40 - 158degF)
Humidity	Non operation humidity: 20% ~ 90% (Non condensing)

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



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

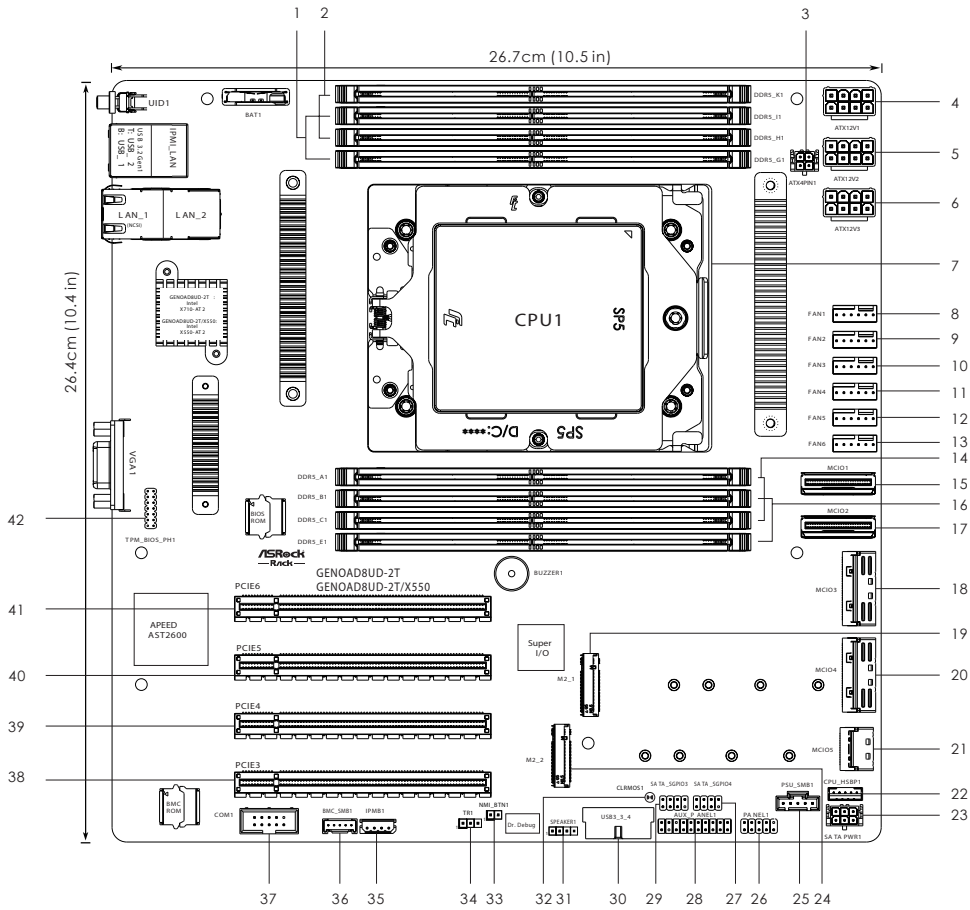


If you install Intel® LAN utility or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If you install the drivers only, it will pass the WHQL tests.

1.3 Unique Features

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

1.4 Motherboard Layout

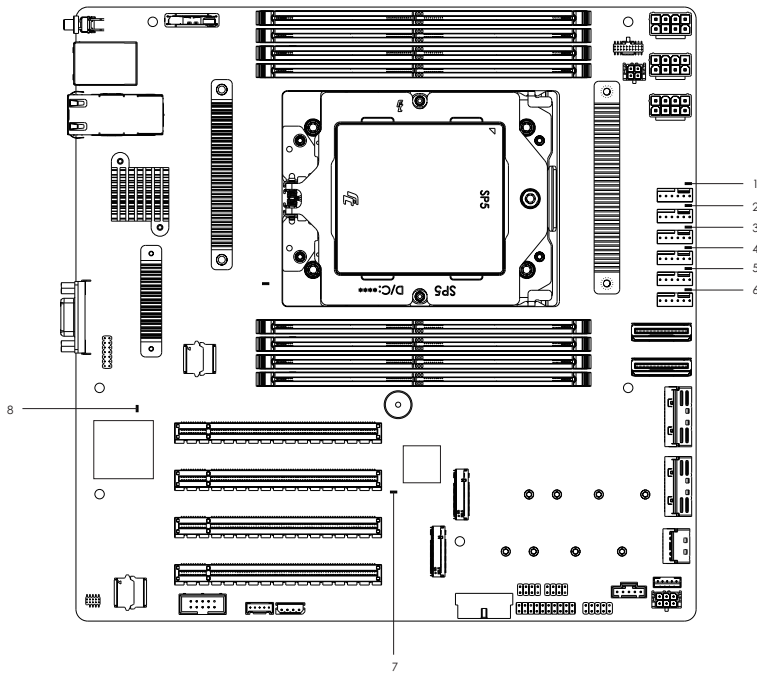


No.	Description
1	2 x 288-pin DDR5 DIMM Slots (DDR5_G1, DDR5_I1)*
2	2 x 288-pin DDR5 DIMM Slots (DDR5_H1, DDR5_K1)*
3	ATX 4-PIN Power Connector (ATX4PIN1 (<i>ATX 24pin-to-4pin</i>))
4	ATX 12V Power Connector (ATX12V1)
5	ATX 12V Power Connector (ATX12V2)
6	ATX 12V Power Connector (ATX12V3)
7	AMD Socket SP5 (SM-LGA-6096) (CPU1)
8	System Fan Connector (FAN1)
9	System Fan Connector (FAN2)
10	System Fan Connector (FAN3)
11	System Fan Connector (FAN4)
12	System Fan Connector (FAN5)
13	System Fan Connector (FAN6)
14	2 x 288-pin DDR5 DIMM Slots (DDR5_A1, DDR5_C1)*
15	Mini Cool Edge IO x8 Connector (MCIO1)
16	2 x 288-pin DDR5 DIMM Slots (DDR5_B1, DDR5_E1)*
17	Mini Cool Edge IO x8 Connector (MCIO2)
18	Mini Cool Edge IO x8 Connector (MCIO3)
19	M.2 Socket (M2_1) (Type 2230/2242/2260/2280)
20	Mini Cool Edge IO x8 Connector (MCIO4)
21	Mini Cool Edge IO x4 Connector (MCIO5)
22	Backplane PCI Express Hot-Plug Connector (CPU1_HSBP1)
23	SATA Power Connector (SATAPWR1)
24	M.2 Socket (M2_2) (Type 2230/2242/2260/2280)
25	PSU SMBus Header (PSU_SMB1)
26	System Panel Header (PANEL1)
27	SATA SGPIO Connector (SATA_SGPIO4)
28	Auxiliary Panel Header (AUX_PANEL1)
29	SATA SGPIO Connector (SATA_SGPIO3)
30	USB 3.2 Gen1 Header (USB3_3_4)
31	Chassis Speaker Header (SPEAKER1)
32	Clear CMOS Pad (CLRMOS1)
33	Non Maskable Interrupt Button (NMI_BTN1)
34	Thermal Sensor Header (TR1)

No.	Description
35	Intelligent Platform Management Bus Header (IPMB1)
36	BMC SMBus Header (BMC_SMB1)
37	COM Port Header (COM1)
38	PCI Express 5.0 x16 Slot (PCIE3)
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	SPI TPM Header (TPM_BIOS_PH1)

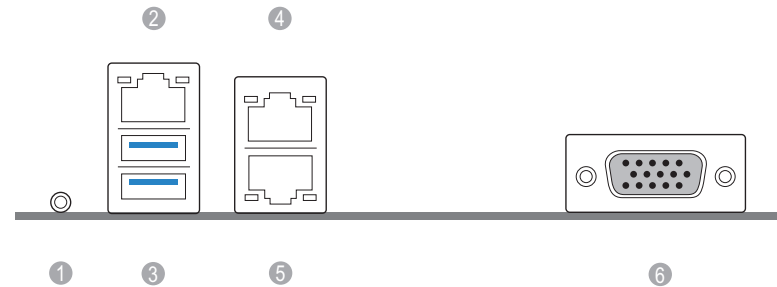
* For DIMM installation and configuration instructions, please see p.19 (Installation of Memory Modules (DIMM)) for more details.

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	LED_FAN6	Red	FAN6 failed
7	SB_PWR1	Green	STB PWR ready
8	BMC_LED1	Green	BMC heartbeat LED

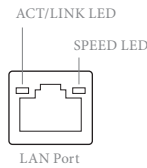
1.6 I/O Panel



No.	Description	No.	Description
1	UID Switch (UID1)	4	10G LAN RJ-45 Port (LAN_1)**
2	IPMI LAN Header (IPMI_LAN1)*	5	10G LAN RJ-45 Port (LAN_2)**
3	USB 3.2 Gen1 Ports (USB3_1_2)	6	VGA Port (VGA1)

LAN Port LED Indications

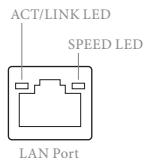
*There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.



Dedicated IPMI LAN Port LED Indications

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

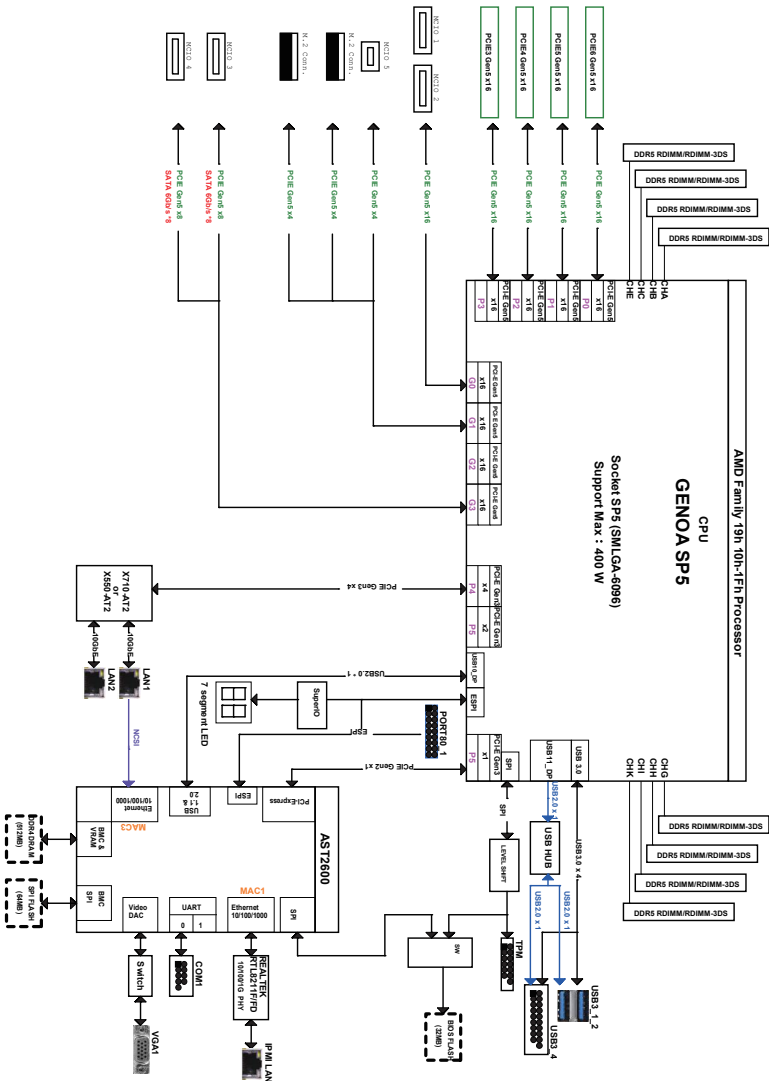
**There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.



10G LAN Port LED Indications

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

1.7 Block Diagram



Chapter 2 Installation

This is a Deep Micro-ATX form factor (10.4" x 10.5", 265 x 26.7 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.



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

2.1 Screw Holes

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



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

2.2 Pre-installation Precautions

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

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

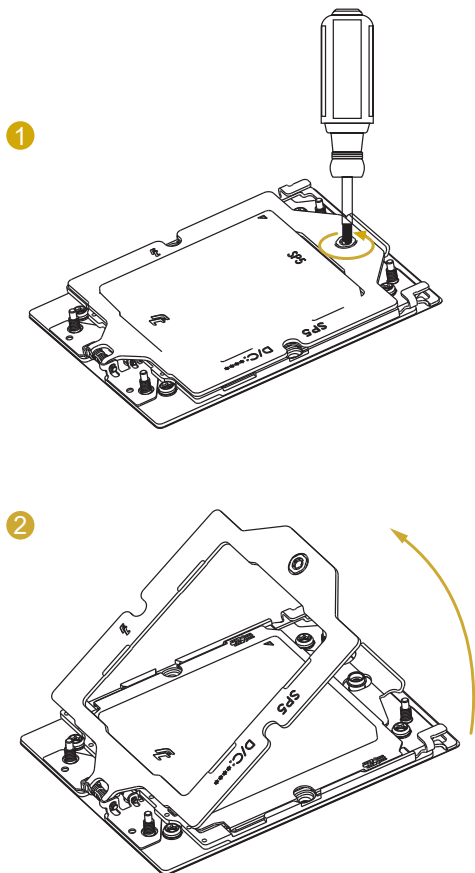


Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

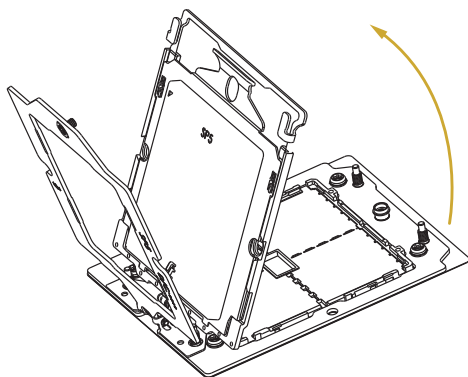
2.3 Installing the CPU



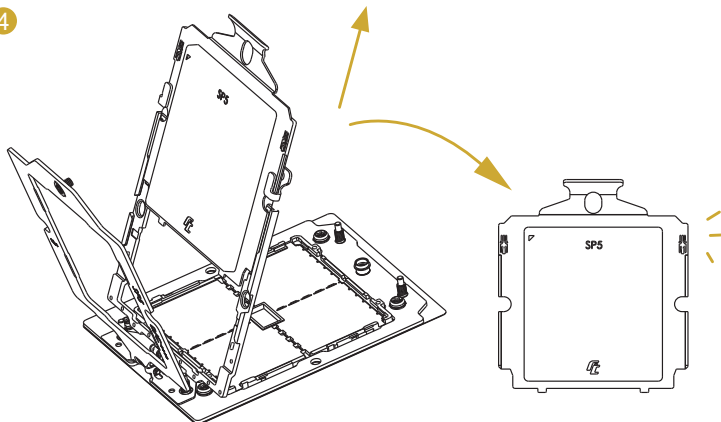
1. Before you insert the CPU into the socket, please check if the PnP cap is on the socket, if the CPU surface is unclean, or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all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



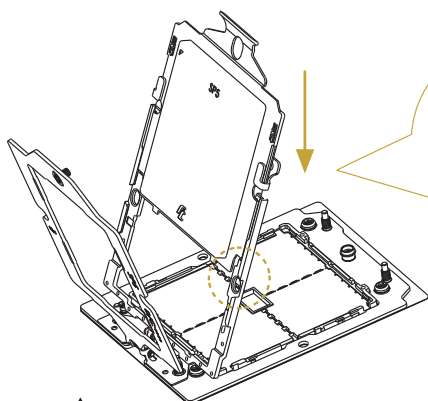
3



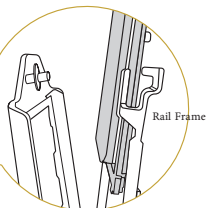
4



5



Carrier Frame with CPU



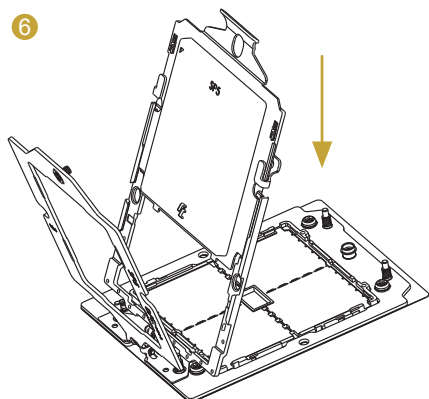
Rail Frame

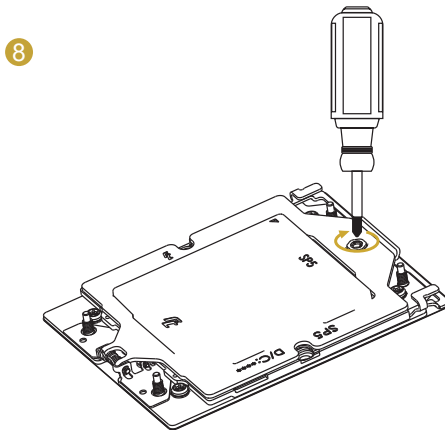
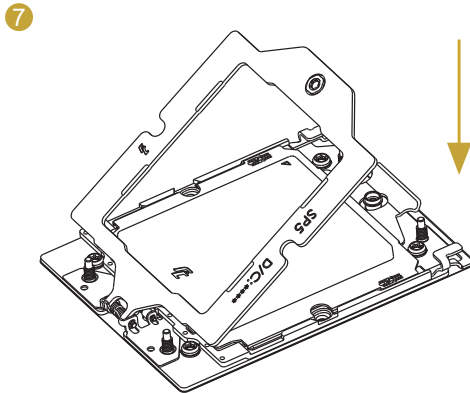
Please make sure that the carrier frame with CPU is closely attached to the rail frame while inserting it.



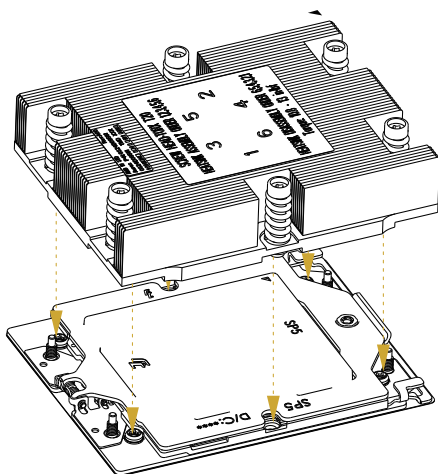
Install the carrier frame with CPU. Don't separate them.

6

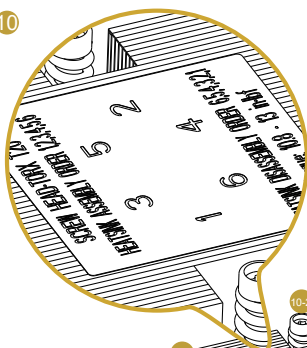




9



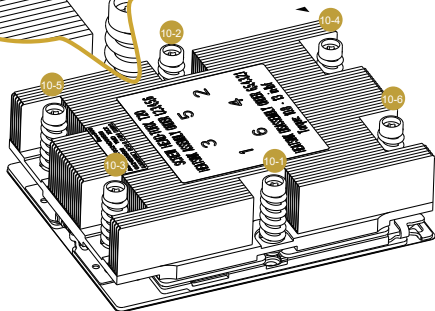
10



Set your torque wrench to 1.54 in-lb.
One fourth a turn each time.

Tighten the screws in a sequential order
1 > 2 > 3 > 4 > 5 > 6.

Loosen the screws in a reverse order.



2.4 Installation of Memory Modules (DIMM)

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

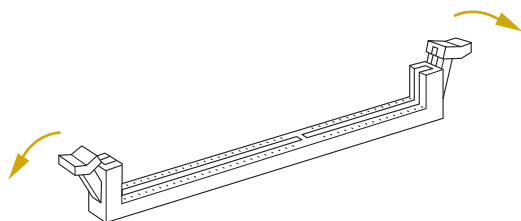


1. It is not allowed to install a DDR, DDR2, DDR3 or DDR4 memory module into a DDR5 slot; otherwise, this motherboard and DIMM may be damaged.
2. For Twelve channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR5 DIMMs.

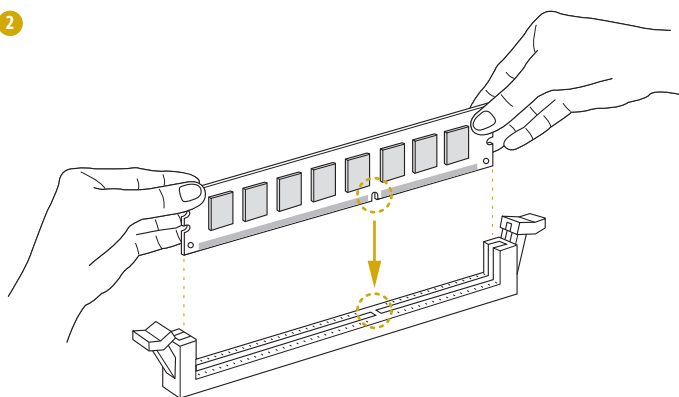
Recommended Memory Configurations

	CPU1							
	A1	B1	C1	E1	G1	H1	I1	K1
1 DIMM	#							
2 DIMMS	#				#			
4 DIMMS	#		#		#		#	
8 DIMMS	#	#	#	#	#	#	#	#

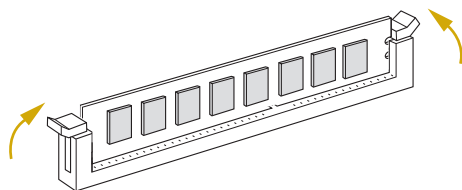
1



2



3



2.5 Expansion Slots (PCI Express Slots)

There are four PCI Express slots on this motherboard.

PCIe slots:

PCIe6 (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.

PCIe4 (PCIe 5.0 x16 slot, from CPU1) is used for PCI Express x16 lane width cards.

PCIe3 (PCIe 5.0 x16 slot, from CPU1) is used for PCI Express x16 lane width cards.

Slot	Generation	Mechanical	Electrical	Source
PCIe6	5.0	x16	x16	CPU1
PCIe5	5.0	x16	x16	CPU1
PCIe4	5.0	x16	x16	CPU1
PCIe3	5.0	x16	x16	CPU1

Installing an expansion card

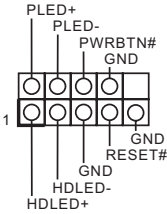
- Step 1. Before installing an expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.
- Step 2. Remove the system unit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

2.6 Onboard Headers and Connectors



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

System Panel Header
(9-pin PANEL1)
(see p.6, No. 26)



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



PWRBTN (Power Switch):

Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.

RESET (Reset Switch):

Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

PLED (System Power LED):

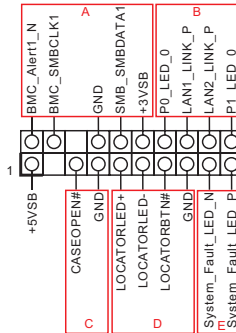
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S4 sleep state or powered off (S5).

HDLED (Hard Drive Activity LED):

Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

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

Auxiliary Panel Header
(18-pin AUX_PANEL1)
(see p.6, No. 28)



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



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

This header allows you to connect SMBus (System Management Bus) equipment. It can be used for communication between peripheral equipment in the system, which has slower transmission rates, and power management equipment.

B. Internet status indicator (2-pin LAN1_LED, LAN2_LED)

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

C. Chassis intrusion pin (2-pin CHASSIS)

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

D. Locator LED (4-pin LOCATOR)

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

E. System Fault LED (2-pin LOCATOR)

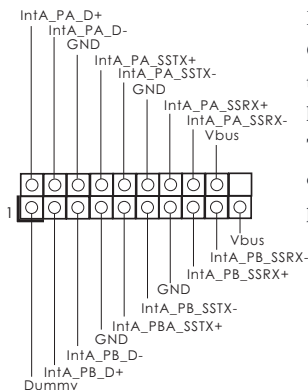
This header is for the Fault LED on the system.

USB 3.2 Gen1 Header

Right-Angled:

(19-pin USB3_3_4)

(see p.6, No. 30)

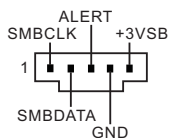


Besides two default USB 3.2 Gen1 ports on the I/O panel, there is one USB 3.2 Gen1 header on this motherboard. This USB 3.2 Gen1 header can support two USB 3.2 Gen1 ports.

PSU SMBus Header

(PSU_SMB1)

(see p.6, No. 25)



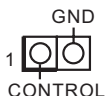
PSU SMBus monitors the status of the power supply, fan and system temperature.

Non Maskable Interrupt

Button Header

(2-pin NMI_BTN1)

(see p.6, No. 33)

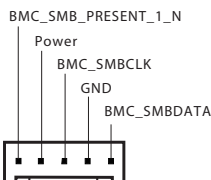


Please connect a NMI device to this header.

BMC SMB Header

(5-pin BMC_SMB1)

(see p.6, No. 36)

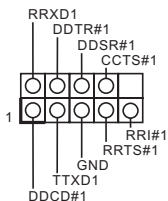


The header is used for the SMBUS devices.

Serial Port Header

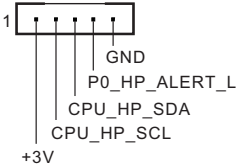
(9-pin COM1)

(see p.6, No. 37)



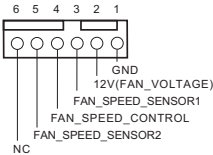
This COM header supports a serial port module.

Backplane PCI Express
Hot-Plug Connector
(5-pin CPU1_ HSBP1)
(see p.6, No. 22)



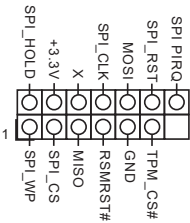
The header is used for the hot plug feature of HDDs on the backplane.

System Fan Connectors
(6-pin FAN1)
(see p.6, No. 8)
(6-pin FAN2)
(see p.6, No. 9)
(6-pin FAN3)
(see p.6, No. 10)
(6-pin FAN4)
(see p.6, No. 11)
(6-pin FAN5)
(see p.6, No. 12)
(6-pin FAN6)
(see p.6, No. 13)



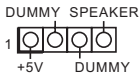
Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control.

SPI TPM Header
(13-pin TPM_BIOS_PH1)
(see p.6, No. 42)



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.

Chassis Speaker Header
(4-pin SPEAKER1)
(see p.6, No. 31)



Please connect the chassis speaker to this header.

Clear CMOS Pad
(CLRCMOS1)
(see p.6, No. 32)



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

ATX Power Connectors

(8-pin ATX12V1)

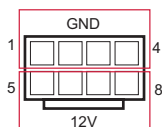
(see p.6, No. 4)

(8-pin ATX12V2)

(see p.6, No. 5)

(8-pin ATX12V3)

(see p.6, No. 6)



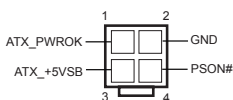
This motherboard provides three ATX power connectors.

ATX 4-PIN Power Connector

(4-pin ATX4PIN1)

(ATX 24pin-to-4pin)

(see p.6, No. 3)



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 or ATX12V3 connector on the motherboard for power supply and signal communication.

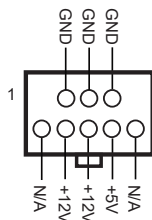
For DC-IN 12V application, it is not necessary to use this ATX 4-PIN power connector.

Micro-Fit SATA Power

(DC-IN mode)

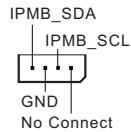
(6-pin SATAPWR1)

(see p.6, No. 23)



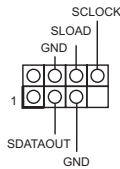
Please use a SATA power cable to connect this SATA Power Connector and your SATA HDD for supplying power from the motherboard, when using DC-IN mode without SATA power supply.

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



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

Serial General Purpose
Input/Output Headers
(7-pin SATA_SGPI03)
(see p.6, No. 29)
(7-pin SATA_SGPI04)
(see p.6, No. 27)



These headers support Serial Link interface for onboard SATA connections.

Thermal Sensor Header
(3-pin TR1)
(see p.6, No. 34)



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

MCIO x8 Connectors

Vertical:

(MCIO1)

(see p.6, No. 15)

(MCIO2)

(see p.6, No. 17)

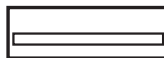
(MCIO3)

Right-Angled:

(see p.6, No. 18)

(MCIO4)

(see p.6, No. 20)



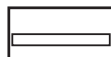
These connectors are used for the PCIE devices.

MCIO x4 Connector

Right-Angled:

(MCIO5)

(see p.6, No. 21)



The connector is used for the PCIE devices.

MCIO1 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	G0_RXP0	B2	G0_TXP0
A3	G0_RXN0	B3	G0_TXN0
A4	GND	B4	GND
A5	G0_RXP1	B5	G0_TXP1
A6	G0_RXN1	B6	G0_TXN1
A7	GND	B7	GND
A8	BP_TYPE	B8	SCL
A9	WAKE#	B9	SDA
A10	GND	B10	GND
A11	DP	B11	BUF_RST0_L
A12	DN	B12	R_PRSNT_N
A13	GND	B13	GND
A14	G0_RXP2	B14	G0_TXP2
A15	G0_RXN2	B15	G0_TXN2
A16	GND	B16	GND
A17	G0_RXP3	B17	G0_TXP3
A18	G0_RXN3	B18	G0_TXN3
A19	GND	B19	GND
A20	G0_RXP4	B20	G0_TXP4
A21	G0_RXN4	B21	G0_TXN4
A22	GND	B22	GND
A23	G0_RXP5	B23	G0_TXP5
A24	G0_RXN5	B24	G0_TXN5
A25	GND	B25	GND
A26	BP_TYPE	B26	SCL
A27	WAKE#	B27	SDA
A28	GND	B28	GND
A29	DP	B29	BUF_RST0_L
A30	DN	B30	R_PRSNT_N
A31	GND	B31	GND
A32	G0_RXP6	B32	G0_TXP6
A33	G0_RXN6	B33	G0_TXN6
A34	GND	B34	GND
A35	G0_RXP7	B35	G0_TXP7
A36	G0_RXN7	B36	G0_TXN7
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO2 Pin Definition

Pin	Definition	Pin	Definition
A1	GND	B1	GND
A2	G0_RXP8	B2	G0_TXP8
A3	G0_RXN8	B3	G0_TXN8
A4	GND	B4	GND
A5	G0_RXP9	B5	G0_TXP9
A6	G0_RXN9	B6	G0_TXN9
A7	GND	B7	GND
A8	BP_TYPE	B8	SCL
A9	WAKE#	B9	SDA
A10	GND	B10	GND
A11	DP	B11	BUF_RST0_L
A12	DN	B12	R_PRSENT_N
A13	GND	B13	GND
A14	G0_RXP10	B14	G0_TXP10
A15	G0_RXN10	B15	G0_TXN10
A16	GND	B16	GND
A17	G0_RXP11	B17	G0_TXP11
A18	G0_RXN11	B18	G0_TXN11
A19	GND	B19	GND
A20	G0_RXP12	B20	G0_TXP12
A21	G0_RXN12	B21	G0_TXN12
A22	GND	B22	GND
A23	G0_RXP13	B23	G0_TXP13
A24	G0_RXN13	B24	G0_TXN13
A25	GND	B25	GND
A26	BP_TYPE	B26	SCL
A27	WAKE#	B27	SDA
A28	GND	B28	GND
A29	DP	B29	BUF_RST0_L
A30	DN	B30	R_PRSENT_N
A31	GND	B31	GND
A32	G0_RXP14	B32	G0_TXP14
A33	G0_RXN14	B33	G0_TXN14
A34	GND	B34	GND
A35	G0_RXP15	B35	G0_TXP15
A36	G0_RXN15	B36	G0_TXN15
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO3 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	G3_RXP7	B2	G3_TXP7
A3	G3_RXN7	B3	G3_TXN7
A4	GND	B4	GND
A5	G3_RXP6	B5	G3_TXP6
A6	G3_RXN6	B6	G3_TXN6
A7	GND	B7	GND
A8	BP_TYPE	B8	SCL
A9	WAKE#	B9	SDA
A10	GND	B10	GND
A11	DP	B11	BUF_RST0_L
A12	DN	B12	R_PRSNT_N
A13	GND	B13	GND
A14	G3_RXP5	B14	G3_TXP5
A15	G3_RXN5	B15	G3_TXN5
A16	GND	B16	GND
A17	G3_RXP4	B17	G3_TXP4
A18	G3_RXN4	B18	G3_TXN4
A19	GND	B19	GND
A20	G3_RXP3	B20	G3_TXP3
A21	G3_RXN3	B21	G3_TXN3
A22	GND	B22	GND
A23	G3_RXP2	B23	G3_TXP2
A24	G3_RXN2	B24	G3_TXN2
A25	GND	B25	GND
A26	BP_TYPE	B26	SCL
A27	WAKE#	B27	SDA
A28	GND	B28	GND
A29	DP	B29	BUF_RST0_L
A30	DN	B30	R_PRSNT_N
A31	GND	B31	GND
A32	G3_RXP1	B32	G3_TXP1
A33	G3_RXN1	B33	G3_TXN1
A34	GND	B34	GND
A35	G3_RXP0	B35	G3_TXP0
A36	G3_RXN0	B36	G3_TXN0
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO4 Pin Definition

Pin	Definition	Pin	Definition
A1	GND	B1	GND
A2	G3_RXP15	B2	G3_TXP15
A3	G3_RXN15	B3	G3_TXN15
A4	GND	B4	GND
A5	G3_RXP14	B5	G3_TXP14
A6	G3_RXN14	B6	G3_TXN14
A7	GND	B7	GND
A8	BP_TYPE	B8	SCL
A9	WAKE#	B9	SDA
A10	GND	B10	GND
A11	DP	B11	BUF_RST0_L
A12	DN	B12	R_PRSENT_N
A13	GND	B13	GND
A14	G3_RXP13	B14	G3_TXP13
A15	G3_RXN13	B15	G3_TXN13
A16	GND	B16	GND
A17	G3_RXP12	B17	G3_TXP12
A18	G3_RXN12	B18	G3_TXN12
A19	GND	B19	GND
A20	G3_RXP11	B20	G3_TXP11
A21	G3_RXN11	B21	G3_TXN11
A22	GND	B22	GND
A23	G3_RXP10	B23	G3_TXP10
A24	G3_RXN10	B24	G3_TXN10
A25	GND	B25	GND
A26	BP_TYPE	B26	SCL
A27	WAKE#	B27	SDA
A28	GND	B28	GND
A29	DP	B29	BUF_RST0_L
A30	DN	B30	R_PRSENT_N
A31	GND	B31	GND
A32	G3_RXP9	B32	G3_TXP9
A33	G3_RXN9	B33	G3_TXN9
A34	GND	B34	GND
A35	G3_RXP8	B35	G3_TXP8
A36	G3_RXN8	B36	G3_TXN8
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

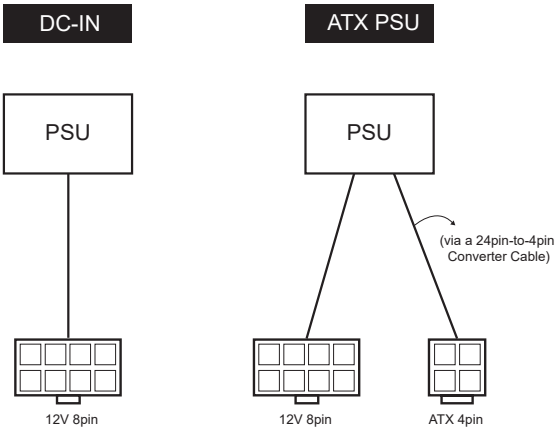
MCIO5 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	G1_RXP3	B2	G1_TXP3
A3	G1_RXN3	B3	G1_TXN3
A4	GND	B4	GND
A5	G1_RXP2	B5	G1_TXP2
A6	G1_RXN2	B6	G1_TXN2
A7	GND	B7	GND
A8	BP_TYPE	B8	SCL
A9	WAKE#	B9	SDA
A10	GND	B10	GND
A11	DP	B11	BUF_RST0_L
A12	DN	B12	R_PRSENT_N
A13	GND	B13	GND
A14	G1_RXP1	B14	G1_TXP1
A15	G1_RXN1	B15	G1_TXN1
A16	GND	B16	GND
A17	G1_RXP0	B17	G1_TXP0
A18	G1_RXN0	B18	G1_TXN0
A19	GND	B19	GND

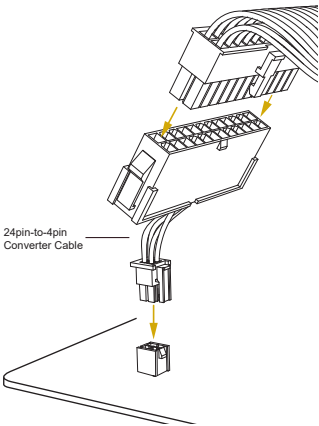
2.7 ATX PSU / DC-IN Power Connections

This motherboard supports both +12V DC and ATX power input. Please refer to the table below for the required connections between the motherboard and the power supply.

Connector	DC-IN	ATX PSU
12V 8pin	O	O
ATX 4pin	X	O <i>(with the bundled ATX 24pin-to-4pin converter cable)</i>



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



2.8 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_OPMROM_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

2.9 Identification purpose LED/Switch

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

Unit Identification
purpose LED/Switch
(UID1)

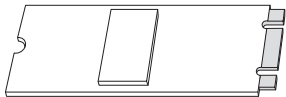


When the UID button on the front or rear panel is pressed, the front/rear UID blue LED indicator will be turned on. Press the UID button again to turn off the indicator.

2.10 M.2 SSD Module Installation Guide

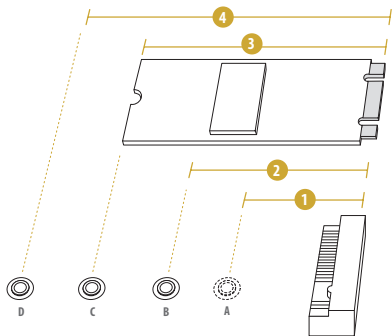
The M.2 Socket (M2_1/M2_2, Key M) supports type 2230/2242/2260/2280 M.2 PCI Express module up to Gen5 x4 (32GT/s x4).

Installing the M.2 SSD Module



Step 1

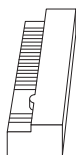
Prepare a M.2_SSD module and the screw.



Step 2

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

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



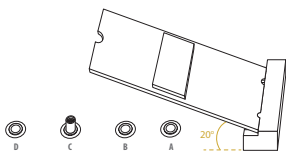
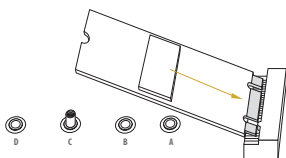
Step 3

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



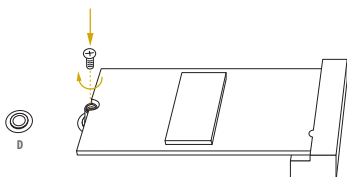
Step 4

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



Step 5

Align and gently insert the M.2 SSD module into the M.2 slot. Please be aware that the M.2 SSD module only fits in one orientation.



Step 6

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

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 for twice the transmission bandwidth, making data transmission more effective and improving the quality of transmission of distant images. Fault tolerance on the dual LAN network prevents network downtime by transferring the workload from a failed port to a working port.



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

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

Step 1

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

Step 2

Click the **Settings** tab.

Step 3

Click the **Modify Team** button.

Step 4

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

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

Chapter 3 UEFI Setup Utility

3.1 Introduction

This section explains how to use the UEFI SETUP UTILITY to configure your system. The UEFI chip on the motherboard stores the UEFI SETUP UTILITY. You may run the UEFI SETUP UTILITY when you start up the computer. Please press <F2> or during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY; otherwise, POST will continue with its test routines.

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



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

3.1.1 UEFI Menu Bar

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

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

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

3.1.2 Navigation Keys

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

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

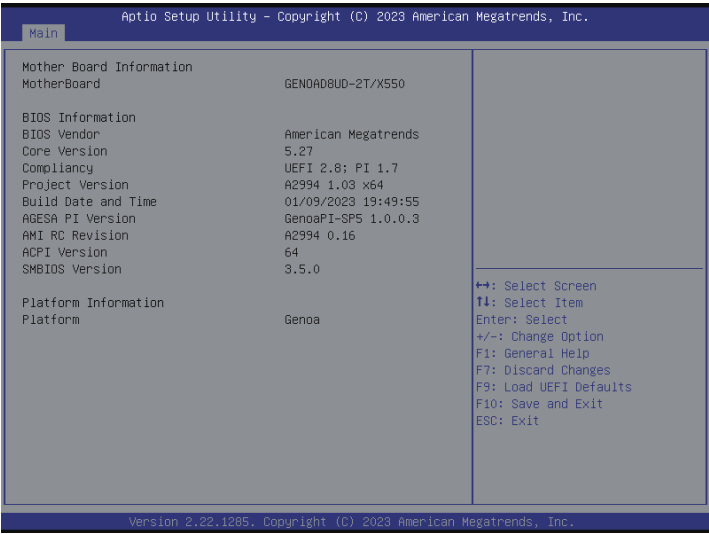
3.2 Main Screen

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



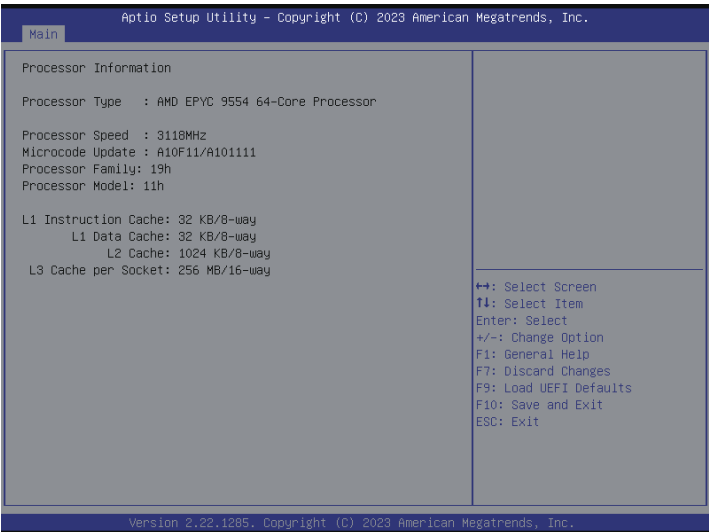
3.2.1 Mother Board Information

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



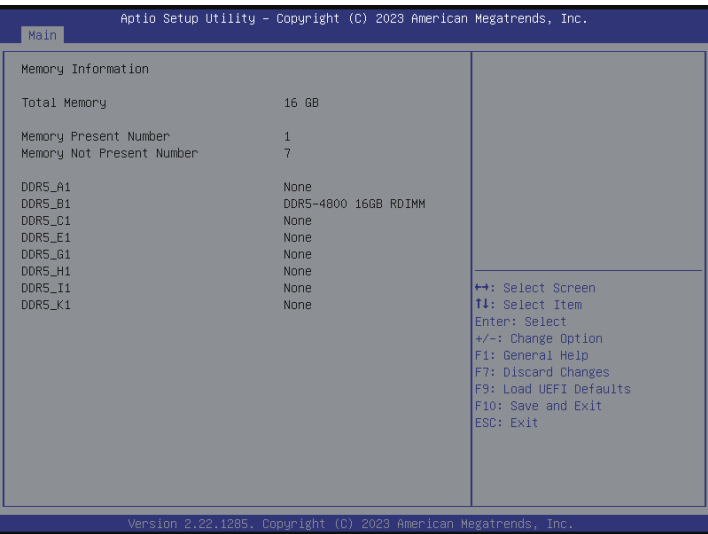
3.2.2 Processor Information

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



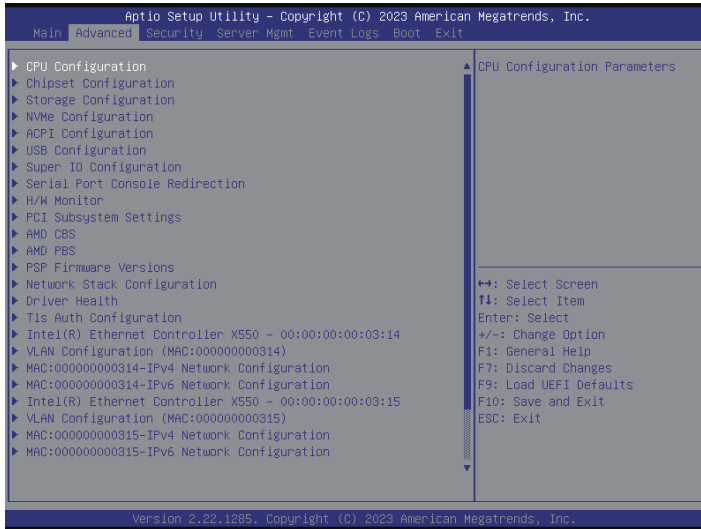
3.2.3 Memory Information

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



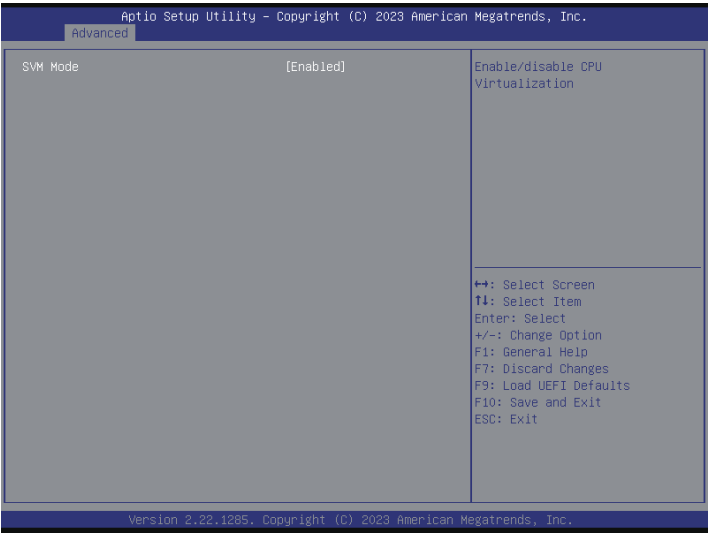
3.3 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Chipset Configuration, Storage Configuration, NVMe Configuration, ACPI Configuration, USB Configuration, Super IO Configuration, Serial Port Console Redirection, H/W Monitor, PCI Subsystem Settings, AMD CBS, AMD PBS, PSP Firmware Versions, Tls Auth Configuration, Network Stack Configuration and Instant Flash.



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

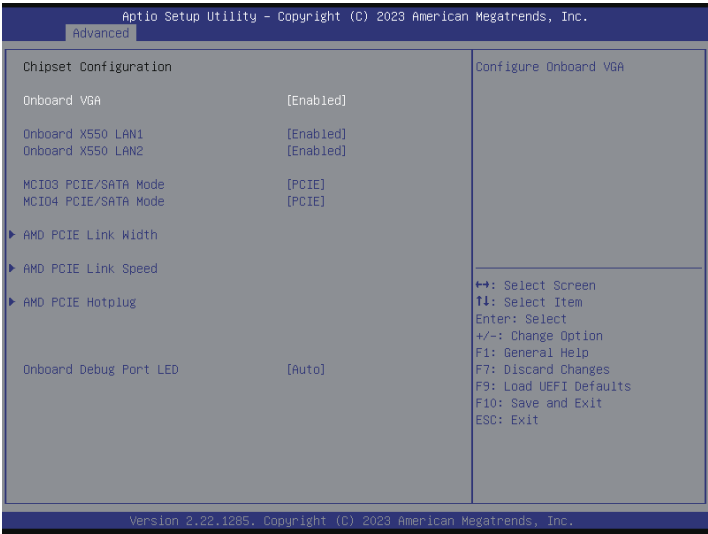
3.3.1 CPU Configuration



SVM Mode

Enable or disable CPU Virtualization.

3.3.2 Chipset Configuration



Onboard VGA

Use this to enable or disable the Onboard VGA function.

Onboard X550 LAN1/LAN2

Use this to enable or disable the Onboard LAN function.

MICO3 PCIE/SATA Mode

Configure MICO3 PCIE/SATA Mode.

MCIO4 PCIE/SATA Mode

Configure MCIO4 PCIE/SATA Mode.

AMD PCIE Link Width

This displays the PCIE3/4/5/6 and MCIO3/4/11/12 Link Width.

The default value for PCIE is [x16] and MCIO is [x4x4/x4x4].

AMD PCIE Link Speed

This displays the MCIO3/4/5/11/12 and M2_1/2_1 Link Speed. The default value is [Auto].

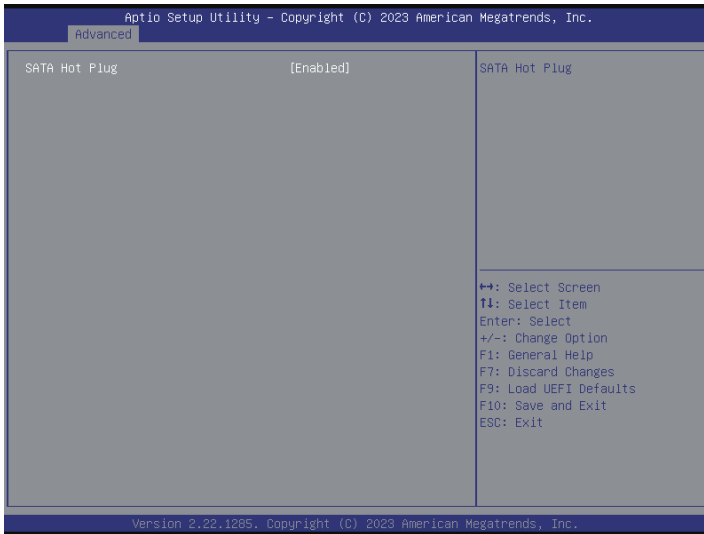
AMD PCIE Hotplug

Select this item to configure Hot Plug for PCIE, MCIO and M2 globally.

Onboard Debug Port LED

Use this item to configure the onboard Dr. Debug LED.

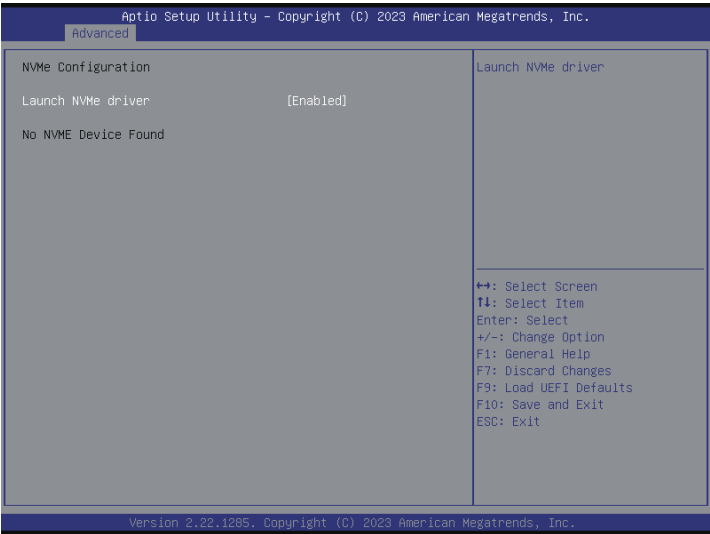
3.3.3 Storage Configuration



SATA Hot Plug

Use this to enable or disable the SATA Hot Plug Function.

3.3.4 NVMe Configuration

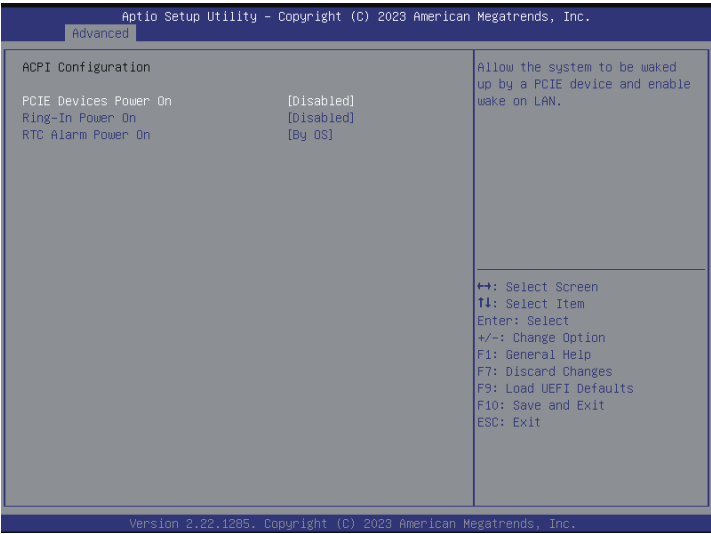


The NVMe Configuration displays the NVMe controller and Drive information.

Launch NVMe driver

Select this item to enable or disable launch NVMe driver.

3.3.5 ACPI Configuration



PCIE Devices Power On

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

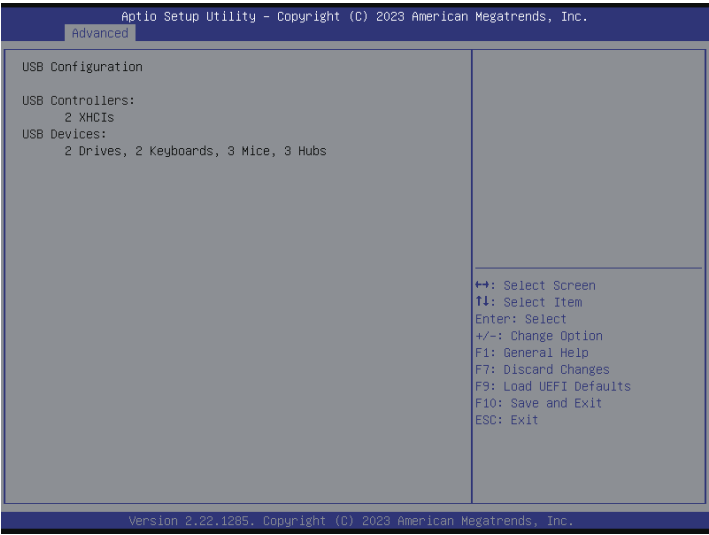
Ring-In Power On

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

RTC Alarm Power On

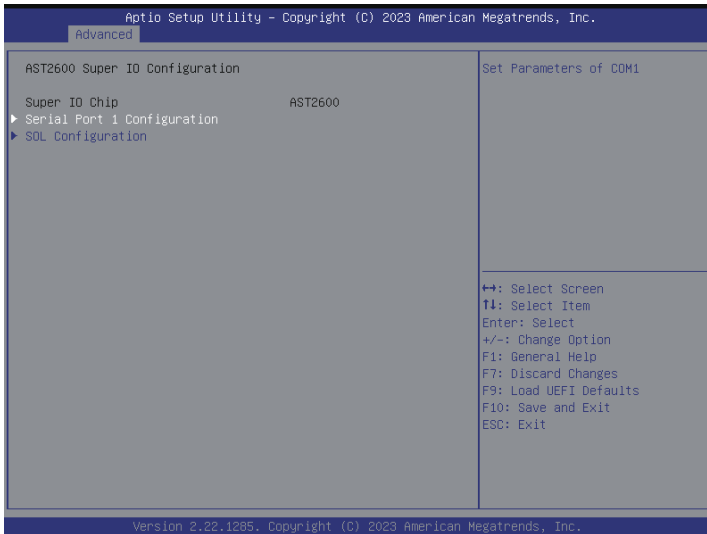
Use this item to enable or disable RTC (Real Time Clock) to power on the system.

3.3.6 USB Configuration



This displays the USB Controllers and USB Devices information.

3.3.7 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.

SOL Configuration

Use this item to set parameters of SOL.

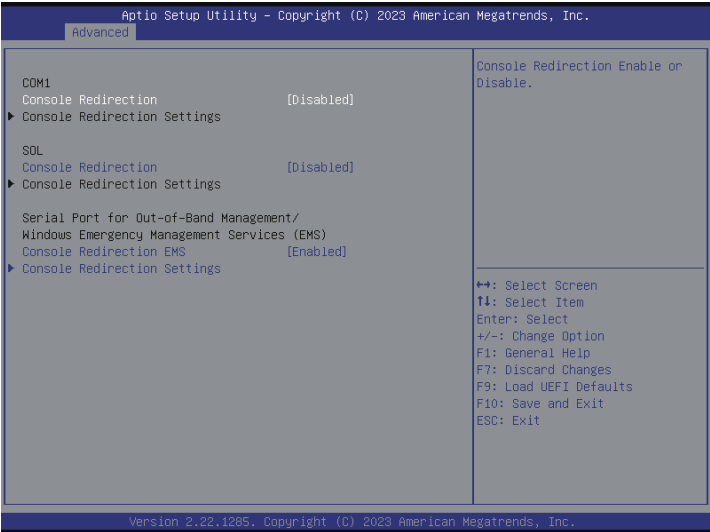
SOL Port

Use this item to set parameters of SOL.

Change Settings

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

3.3.8 Serial Port Console Redirection



COM1 / SOL

Console Redirection

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

Console Redirection Settings

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

Terminal Type

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

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

Bits Per Second

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

Parity

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

Recorder Mode

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

Resolution 100x31

Use this to enable or disable extended terminal resolution support.

Putty Keypad

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

Console Redirection Settings

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

Out-of-Band Mgmt Port

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

Terminal Type EMS

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

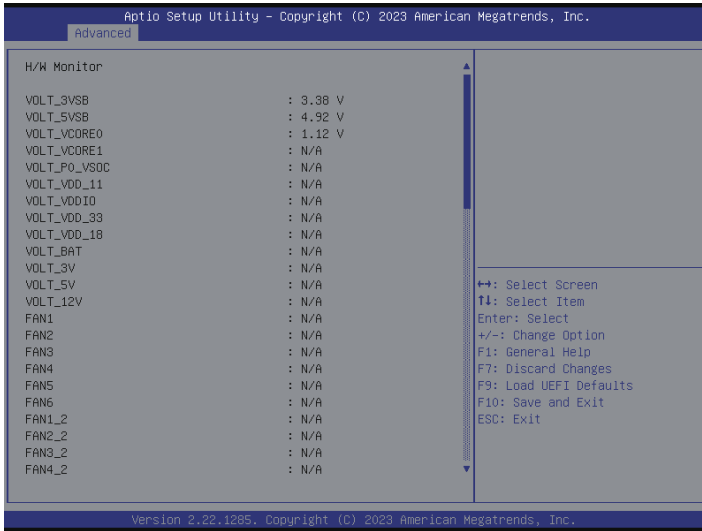
Data Bits

Parity

Stop Bits

3.3.9 H/W Monitor

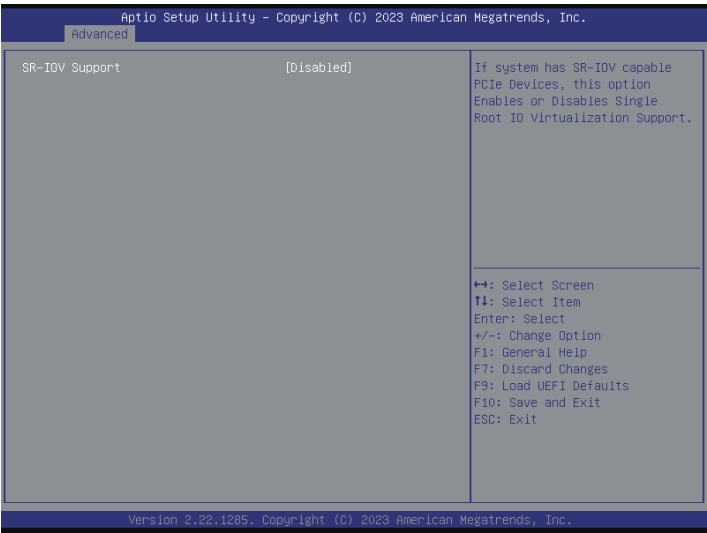
In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



Watch Dog Timer

Use this to enable or disable the Watch Dog Timer. The default value is [Disabled].

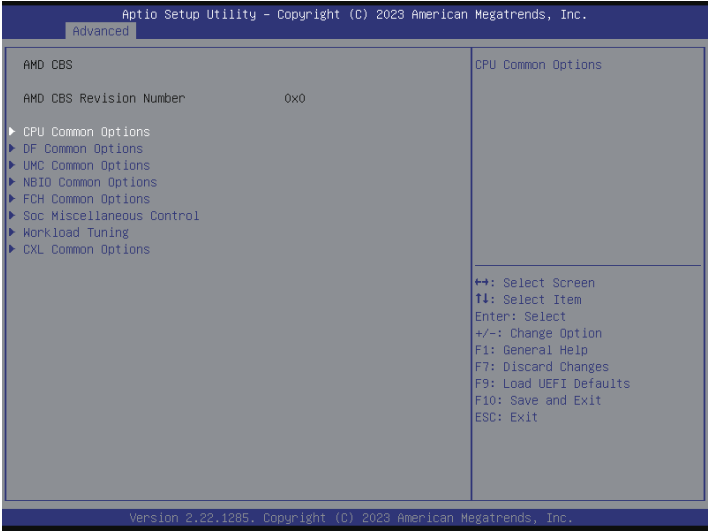
3.3.10 PCI Subsystem Settings



SR-IOV Support

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

3.3.11 AMD CBS



CPU Common Options

Use this item to configure CPU Common options.

DF Common Options

Use this item to configure DF Common options.

UMC Common Options

Use this item to configure UMC Common options.

NBIO Common Options

Use this item to configure NBIO Common options.

FCH Common Options

Use this item to configure FCH Common options.

Soc Miscellaneous Control

Use this item to configure Soc Miscellaneous Control options.

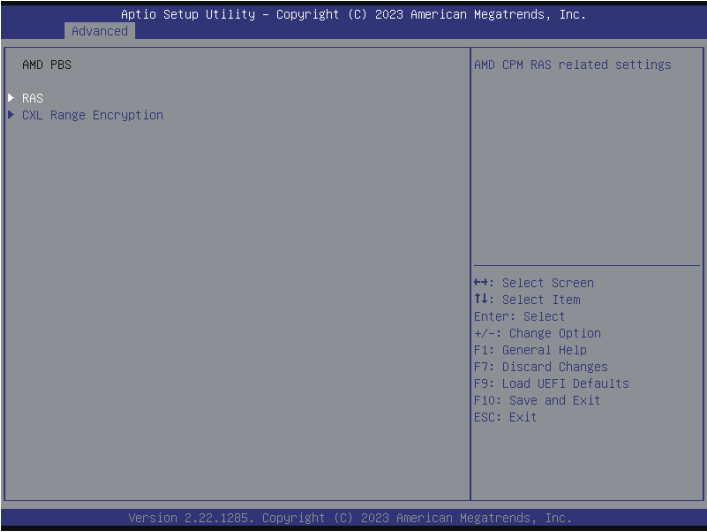
Workload Tuning Options

Use this item to configure Workload Tuning options.

CXL Common Options

Use this item to configure CXL Common options.

3.3.12 AMD PBS



RAS

Use this item to configure AMD CPM RAS related settings.

RAS Periodic SMI Control

Use this to enable or disable Periodic SMI for polling [MCA Threshold] error.

SMI Threshold

This limits the number of [MCA Threshold and Deferred Error SMI source] per a unit time.

RAS Periodic SMI Control

Use this to defines the time scale.

SMI Scale Unit

Use this to defines the unit of time scale.

SMI Period

Use this to defines the polling interval with ms unit. Input 0 value to disable this function.

GHEs Notify Type

This specifies the notification type for deferred/corrected errors.

GHEs UnCorr Notify Type

This specifies the notification type for uncorrected errors.

PCIe GHEs Notify Type

This specifies the notification type for PCIe corrected errors.

PCIe UnCorr GHES Notify Type

This specifies the notification type for PCIe uncorrected errors.

PCIe Root Port Corr Err Mask Reg

Use this to initialize the PCIe AER corrected error mask register of root port.

PCIe Root Port UnCorr Err Mask Reg

Use this to initialize the PCIe AER uncorrected error mask register of root port.

PCIe Root Port UnCorr Err Sev Reg

Use this to initialize the PCIe AER uncorrected error severity registers of root port.

PCIe Device Corr Err Mask Reg

Use this to initialize the PCIe AER corrected error mask register of PCIe device.

PCIe Device UnCorr Err Mask Reg

Use this to initialize the PCIe AER uncorrected error mask register of PCIe device.

PCIe Device UnCorr Error Sev Reg

Use this to initialize the PCIe AER uncorrected error severity registers of PCIe device

CXL DP CIE Mask Enable

Use this to enable or disable masking of CXL DP correctable error-internal error.

DRAM Hard Post Package Repair

Use this to enable or disable the spare DRAM rows to replace malfunctioning rows via an in-field repair mechanism.

HEST DMC Structure Support

Use this to enable or disable HEST DMC (Deferred Maching Check) structure support.

CXL Error Report Support

Use this to enable or disable CXL error reporting.

CXL Range Encryption

Configure AMD CXL range encryption setting.

Range 1/2/3/4/5/6/7 Memory Base

This item allows you to enter memory range base address.

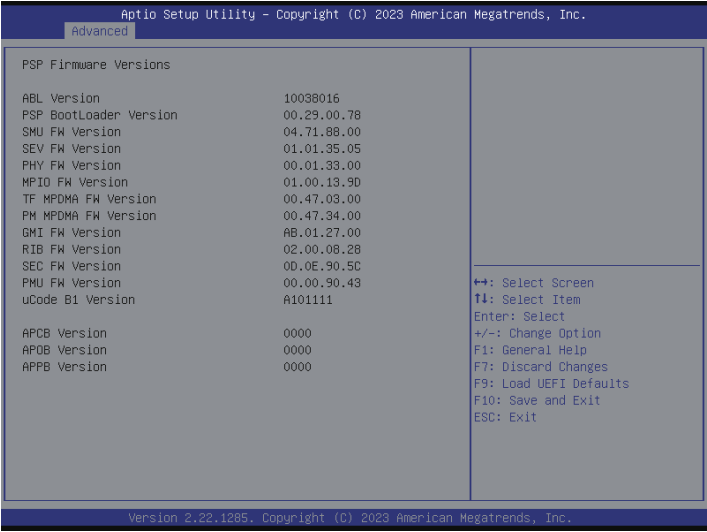
Range 1/2/3/4/5/6/7 Memory Limit

This item allows you to enter memory range limit address.

Start CXL Range Encryption

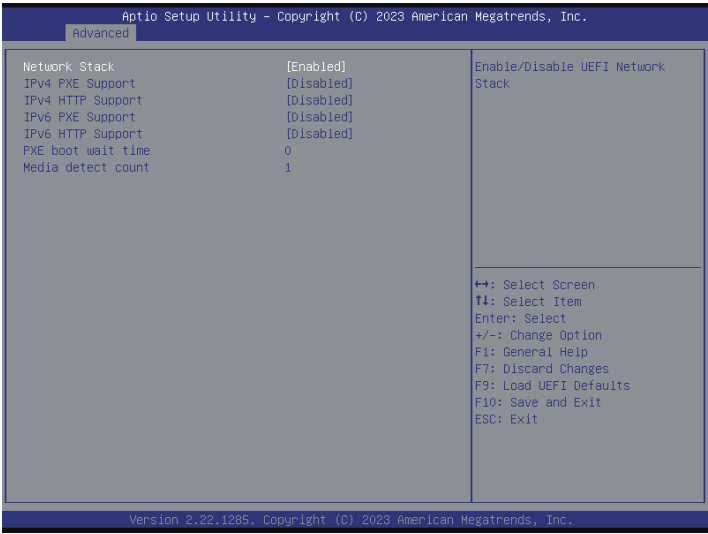
Use this to encrypt all memory ranges..

3.3.13 PSP Firmware Versions



The PSP Firmware Versions displays the version information of ABL, PSP BootLoader, SMU FW, SEV FW, PHY FW, MPIO FW, TF MPDMA FW, PM MPDMA FW, GMI FW, RIB FW, SEC FW, PMU FW, uCode B1, APCB, APDB, and APPB.

3.3.14 Network Stack Configuration



Network Stack

Use this to enable or disable UEFI Network Stack.

Ipv4 PXE Support

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

Ipv4 HTTP Support

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

Ipv6 PXE Support

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

Ipv6 HTTP Support

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

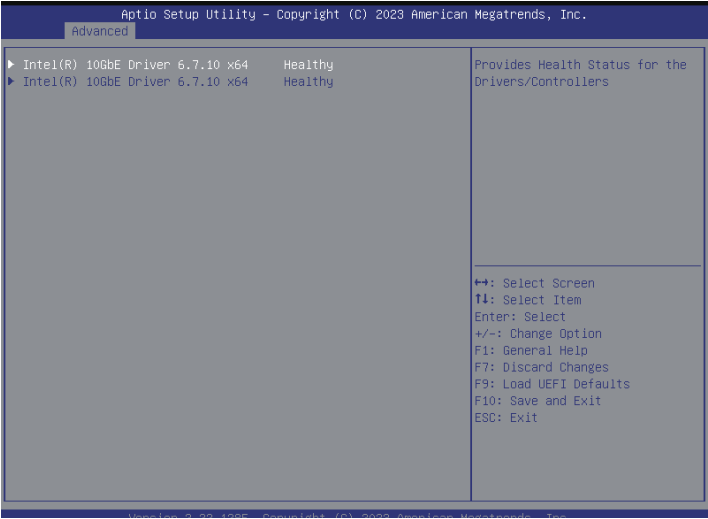
PXE boot wait time

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

Media detect count

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

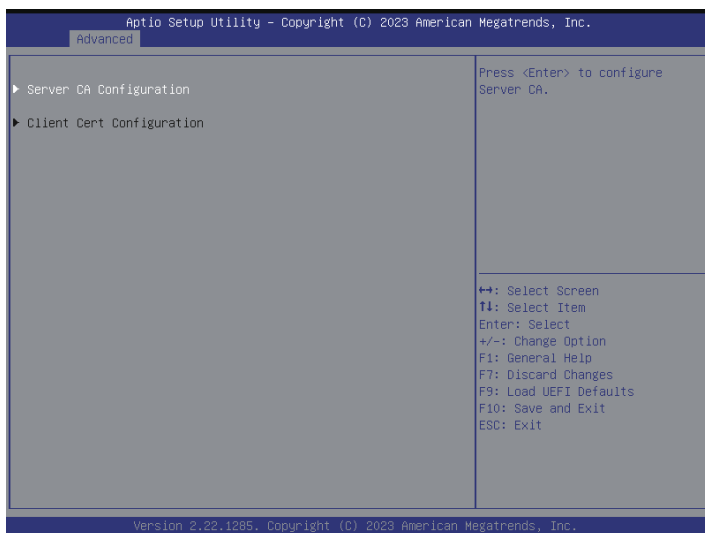
3.3.15 Driver Health



Inter (R) 10GbE Driver 6.7.10 x64

Provides Health Status for the Drivers/Controllers.

3.3.16 Tls Auth Configuration



Server CA Configuration

Press <Enter> to configure Server CA.

Client Cert Configuration

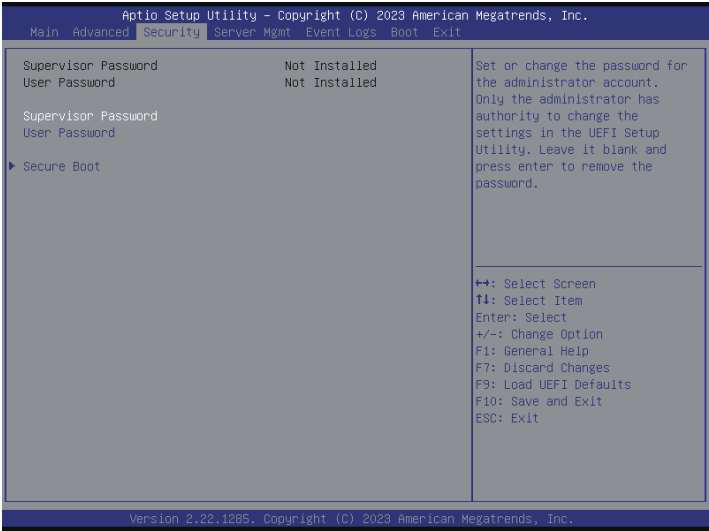
Press <Enter> to configure Client Cert.

3.3.17 Instant Flash

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

3.4 Security

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



Supervisor Password

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

User Password

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

Secure Boot

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

Secure Boot Mode

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

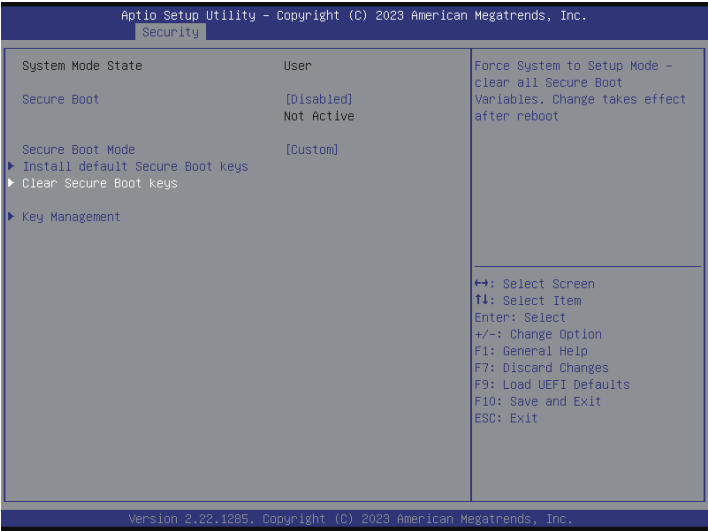
3.4.1 Install Default Secure Boot Keys

Please install default secure boot keys if it is the first time you use secure boot. Select Clear Secure Boot keys item to clear the assigned secure boot keys.



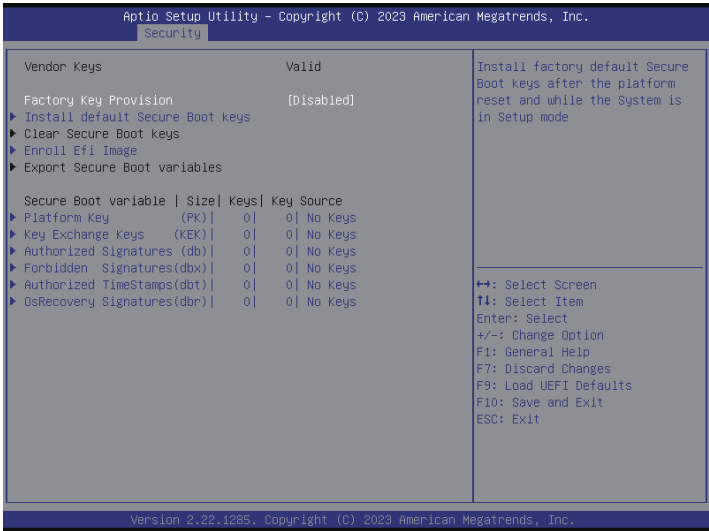
3.4.2 Clear Secure Boot Keys

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



3.4.3 Key Management

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



Factory Key Provision

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

Install Default Secure Boot Keys

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

Clear Secure Boot Keys

This 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, External, 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, External, 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, External, 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, External, 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, External, 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)

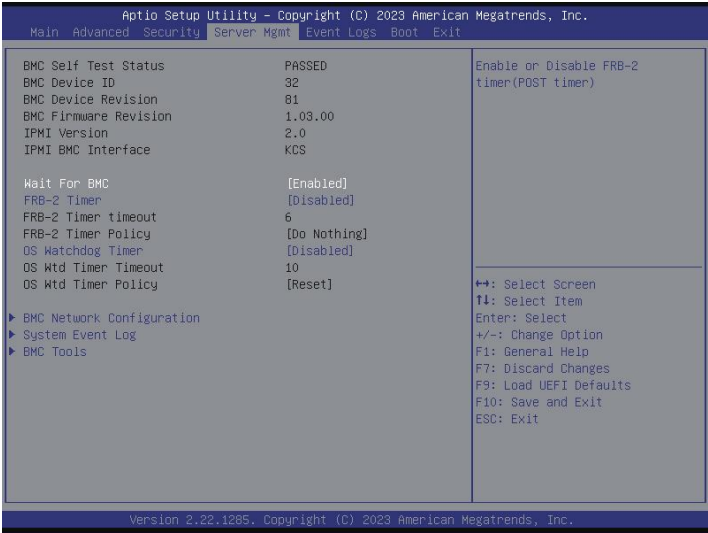
d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, External, Mixed

3.5 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

This allows you to enable or disable FRB-2 timer (POST timer)

FRB-2 Timer Timeout

This allows you 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

This allows you 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

This allows you to configure BMC network parameters.

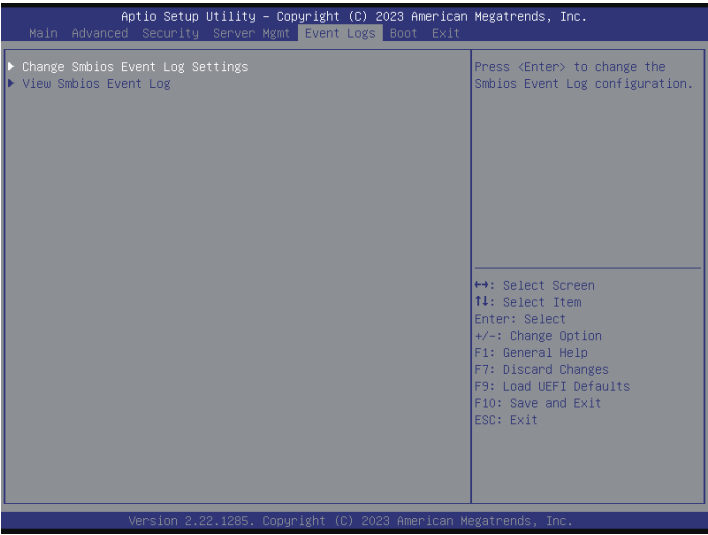
System Event Log

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

BMC Tools

This allows you to configure about KCS control, restore AC power loss and load BMC default settings.

3.6 Event Logs



Change Smbios Event Log Settings

This allows you to configure the Smbios Event Log Settings.

When entering the item, you will see the followings:

Smbios Event Log

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

Erase Event Log

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

When Log is Full

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

Log System Boot Event

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

MECI (Multiple Event Count Increment)

Use this item to enter the increment value for the multiple event counter. The valid range is from 1 to 255.

METW (Multiple Event Time Window)

Use this item to specify the number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.

Log EFI Status Code

Enable or disable the logging of EFI Status Codes as OEM reserved type E0 (if not already converted to legacy).

Convert EFI Status Codes to Standard Smbios Type

Enable or disable the converting of EFI Status Codes to Standard Smbios Types (Not all may be translated).

View Smbios Event Log

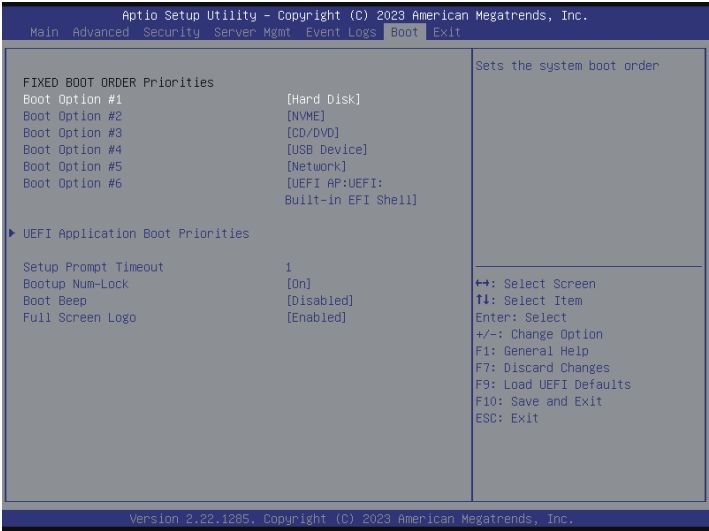
Press <Enter> to view the Smbios Event Log records.



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

3.7 Boot Screen

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



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

Use this to set the system boot order.

UEFI Application Boot Priorities

Specifies the Boot Device Priority sequence from available UEFI Application.

Setup Prompt Timeout

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

Bootup Num-Lock

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

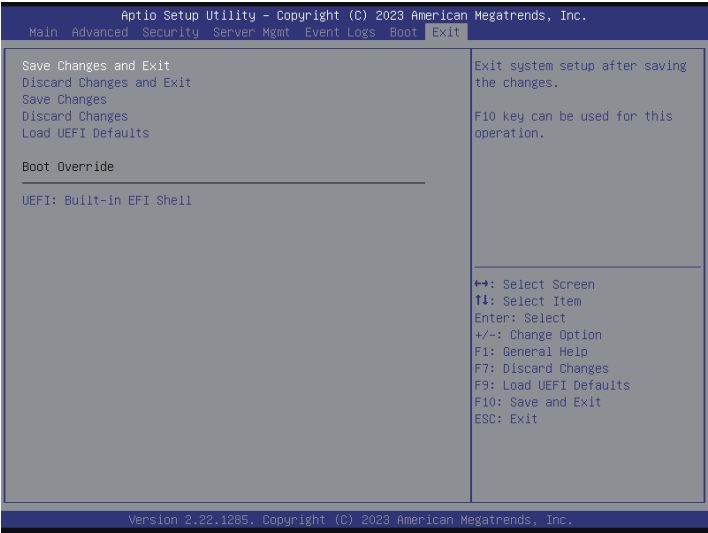
Boot Beep

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

3.8 Exit Screen



Save Changes and Exit

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

Discard Changes and Exit

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

Save Changes

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

Discard Changes

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

Load UEFI Defaults

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

Chapter 4 Software Support

After all the hardware has been installed, we suggest you go to our official website at <http://www.ASRockRack.com> and make sure if there are any new updates of the BIOS / BMC firmware for your 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 your OS manufacturer. Please refer to your OS documentation for more instructions.

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

4.2 Download and Install Software Drivers

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

To download necessary drivers, go to the product page, click on the "Download" tab, choose the operating system you use, and select the driver you need to be downloaded.

4.3 Contact Information

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

Chapter 5 Troubleshooting

5.1 Troubleshooting Procedures

Follow the procedures below to troubleshoot your system.



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

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

If there is no power...

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

If there is no video...

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

If there are memory errors...

1. Verify that the DIMM modules are properly seated in the slots.
2. Use recommended DDR4 RDIMM, LRDIMM, 3DS and NVDIMMs.
3. If you have installed more than one DIMM modules, they should be identical with the same brand, speed, size and chip-type.
4. Try inserting different DIMM modules into different slots to identify faulty ones.
5. Check the settings of the 115V/230V switch on the power supply.

Unable to save system setup configurations...

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

Other problems...

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

5.2 Technical Support Procedures

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

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

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

5.3 Returning Merchandise for Service

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

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

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

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

Contact Information

If you need to contact ASRock Rack or want to know more about ASRock Rack, you're welcome to visit ASRock Rack's website at <http://www.asrockrack.com>; or you may contact your 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