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STABLE Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

SP2C621D32TM3

User Manual

English



Version 1.20

Published July 2024

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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.

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

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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	6
1.4 Motherboard Layout	7
1.5 Onboard LED Indicators	11
1.6 I/O Panel	13
1.7 Block Diagram	15
Chapter 2 Installation	16
2.1 Screw Holes	16
2.2 Pre-installation Precautions	16
2.3 Installing the CPU and Heatsink	17
2.4 Installation of Memory Modules (DIMM)	23
2.4.1 DIMM Population for DDR4	24
2.4.2 DIMM Population for DDR4 and BPS	27
2.5 Expansion Slots (PCI and PCI Express Slots)	30
2.6 Jumper Setup	31
2.7 Onboard Headers and Connectors	33
2.8 Dr. Debug	44
2.9 Identification purpose LED/Switch	50
2.10 Dual LAN and Teaming Operation Guide	51
2.11 M.2 SSD Module Installation Guide	52
Chapter 3 UEFI Setup Utility	54

3.1	Introduction	54
3.1.1	UEFI Menu Bar	54
3.1.2	Navigation Keys	55
3.2	Main Screen	56
3.3	Advanced Screen	57
3.3.1	CPU Configuration	58
3.3.2	DRAM Configuration	61
3.3.3	Chipset Configuration	63
3.3.4	Storage Configuration	66
3.3.5	NVMe Configuration	67
3.3.6	ACPI Configuration	68
3.3.7	USB Configuration	69
3.3.8	Super IO Configuration	70
3.3.9	Serial Port Console Redirection	71
3.3.10	H/W Monitor	75
3.3.11	Runtime Error Logging	76
3.3.12	Network Stack Configuration	78
3.3.13	Intel SPS Configuration	80
3.3.14	Intel® VMD technology	81
3.3.15	Tls Auth Configuratio	86
3.3.15	Instant Flash	87
3.4	Security	88
3.4.1	Key Management	89
3.5	Boot Screen	93

3.5.1	CSM Parameters	95
3.6	Server Mgmt	98
3.6.1	BMC Network Configuration	99
3.6.2	System Event Log	101
3.6.3	View System Event Log	102
3.6.4	BMC Tools	103
3.7	Event Logs	104
3.8	Exit Screen	106
Chapter 4 Software Support		108
4.1	Download and Install Operating System	108
4.2	Download and Install Software Drivers	108
4.3	Contact Information	108
Chapter 5 Troubleshooting		109
5.1	Troubleshooting Procedures	109
5.2	Technical Support Procedures	111
5.3	Returning Merchandise for Service	111

Chapter 1 Introduction

Thank you for purchasing ASRock Rack **SP2C621D32TM3** 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 SP2C621D32TM3 Motherboard
(T-Shape Proprietary Form Factor: 17-in x 19-in, 43.18 cm x 48.26 cm)
- Quick Installation Guide
- 2 x Screws for M.2 Sockets



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

1.2 Specifications

SP2C621D32TM3	
Physical Status	
Form Factor	Proprietary T-shape
Dimension	16.8496" x 18.8724" (427.98 x 479.36 mm)
Processor System	
CPU	Supports 3 rd Gen Intel® Xeon® Scalable processors
Socket	Dual Socket P+ (LGA 4189)
Thermal Design Power (TDP)	300W
Chipset	Intel® C621A
System Memory	
Supported DIMM Quantity	16+16 DIMM slots (2DPC)
Supported Type	DDR4 288-pin RDIMM, LRDIMM, RDIMM/LRDIMM-3DS, Intel® Optane™ Persistent Memory 200 series
Max. Capacity per DIMM	RDIMM: up to 64GB RDIMM-3DS: up to 256GB LRDIMM: up to 128GB LRDIMM-3DS: up to 256GB
Max. Frequency	max. 3200MHz
Voltage	1.2V
PCIe Expansion Slots (SLOT7 close to CPU)	
SLOT3	Gen Z 4C+ (PCIe4.0 x16) [CPU2]
SLOT2	Gen Z 8C (PCIe4.0 x32) [CPU2]
SLOT1	Gen Z 8C (PCIe4.0 x32) [CPU1]
Other PCIe Expansion Connectors	
M.2 slot	2 M-key (PCIe3.0 x4 or SATA 6Gb/s); supports 22110/2280 form factor [PCH]
SlimSAS	2 Slimline (PCIe4.0x8) [CPU1] 2 Slimline (PCIe4.0x8) [CPU2]
Note	SATA DOM will be disabled when M.2 is populated with a SATA device
SATA/SAS Storage	
PCH Built-in Storage	Intel® C621A (10 SATA 6Gb/s, support RAID 0/1/5/10): 2 Mini-SAS HD, 2 SATA DOM or 2 M.2
Ethernet	
Additional Ethernet Controller	2 RJ45 (1GbE) by Intel® i350-AM2
OCP slot	OCP NIC 3.0 (PCIe4.0 x16) [CPU1]
USB	
Connectors/headers	External: 2 Type-A (USB3.2 Gen1) Internal: 1 Type-A (USB3.2 Gen1)

	1 header (26-pin, 1 USB3.2 Gen1 and 1 USB2.0) 1 header (19-pin, 2 USB3.2 Gen1) 1 header (9-pin, 2 USB2.0)
Graphics	
Controller	ASPEED AST2500: 1 DB15 (VGA), 1 (15-pin header)
Security	
TPM	1 (13-pin, SPI)
Rear I/O	
UID button/LED	1 UID button w/ LED
Video output	1 DB15 (VGA)
Serial port	1 RJ45 (COM)
USB	2 Type-A (USB3.2 Gen1)
RJ45	2 RJ45(1GbE), 1 dedicated IPMI
Hardware Monitor	
Temperature	CPU, PCH, MB, Card side 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	CPU1_PVCCIN, CPU2_PVCCIN, PVDDQ_ ABCD, PVDDQ_EFGH, PVDDQ_IJKL, PVDDQ_ MNOP, 1.05V_PCH, 1.8V_PCH, +BAT, PVNN_PCH, 3.3V, 5V, 12V, 3.3VSB, 5VSB
Server Management	
BMC Controller	ASPEED AST2500: iKVM, vMedia support
IPMI Dedicated GLAN	1 RJ45 Dedicated IPMI LAN port by Realtek RTL8211E
System BIOS	
BIOS type	AMI 256Mb SPI Flash ROM
Features	Plug and Play, ACPI 4.0 and above compliance wake up events, SMBIOS 3.3 and above, ASRock Rack Instant Flash
Internal Connectors/Headers	
PSU connector	2 (CRPS IN +12V/+12VSB, max. 2700W)
Other power connector	3 (2x2 pin, 12V) for GPU cards, 1 (2x2 pin, 12V, 5V) for HDD, 2 (3-pin) for SATA DOM, 1 (2x6 pin, 12V) + 1 (2x2 pin, 12V) for HSBP
System panel header	1 (26-pin): System fault LED, locate, SMBus, power switch, reset switch, system power LED, HDD activity LED, LAN LED
NMI button	1
VGA header	1
Buzzer	1
Fan header	6 (2x3-pin) for 2U system, 8 (2x4pin) for 1U system

TPM header	1 (13-pin, SPI)
VROC header	1
SGPIO header	1
HSBP	2
SMBus header	3
PMbus header	1
IPMB header	1
Clear CMOS	1 (contact pads)
ME manufacture mode header	1
LED Indicators	
Standby Power LED	1 (3.3VSB)
80 debug port LED	1
Fan Fail LED	8
BMC Heartbeat LED	1
CPU catter LED	1
HDD LED	1
Support OS	
OS	Microsoft® Windows® Server 2016 (64 bit) Server 2019 (64 bit) Server 2022 (64 bit) Linux Red Hat Enterprise Linux Server 7.9 (64 bit) / 8.5 (64 bit) CentOs 7.9 (64 bit) / 8.5 (64 bit) SUSE Enterprise Linux Server 15 SP2 (64 bit) / 15 SP3 (64 bit) Ubuntu 20.04.2 (64 bit) / 21.04 (64 bit) / 21.10 (64 bit) Hypervisor: VMWare® ESXi 6.7.0 U3 / vSphere 6.7.0 U3 VMWare® ESXi 7.0 U3d / vSphere 7.0 U3d Hyper-V Windows® Server 2016 Hyper-V Windows® Server 2019 <i>*Please refer to our website for the latest OS support list.</i>
Enviroment	
Operating temperature	10 - 35°C (50 - 95 degF)
Non-operating temperature	-40 - 70°C (-40 - 158degF)

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.

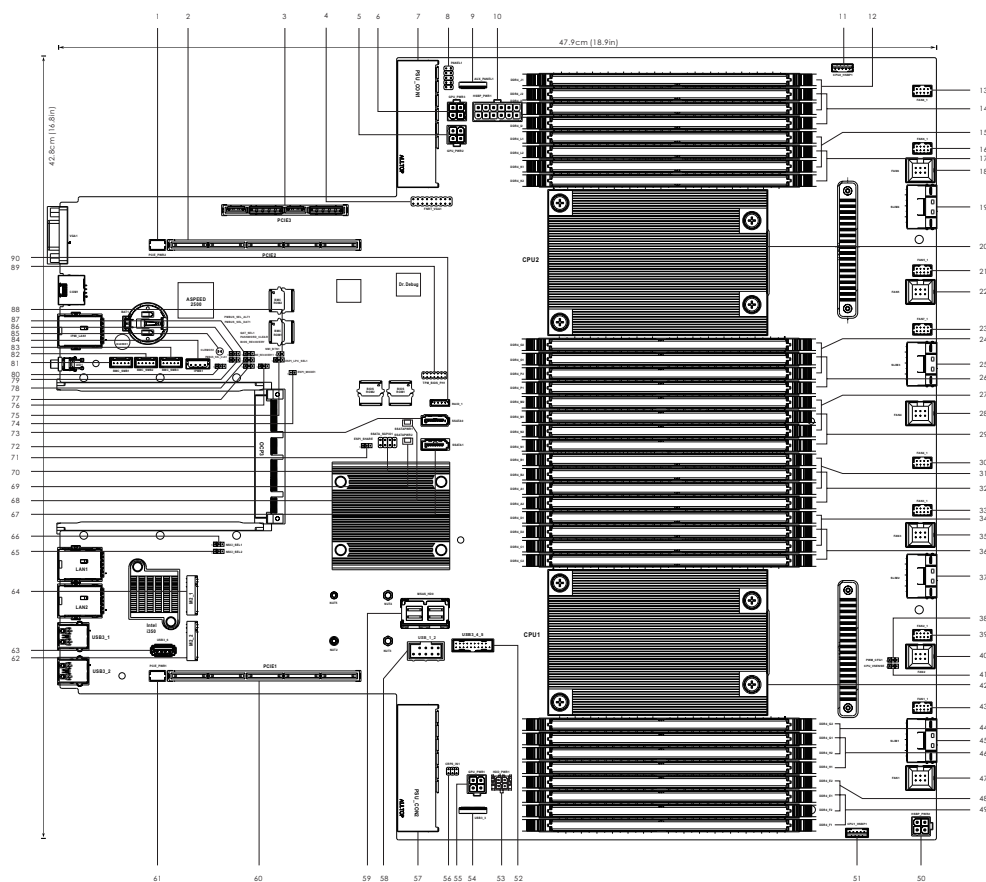


If you install Intel® LAN utility or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If you install the drivers only, it will pass the WHQL tests.

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



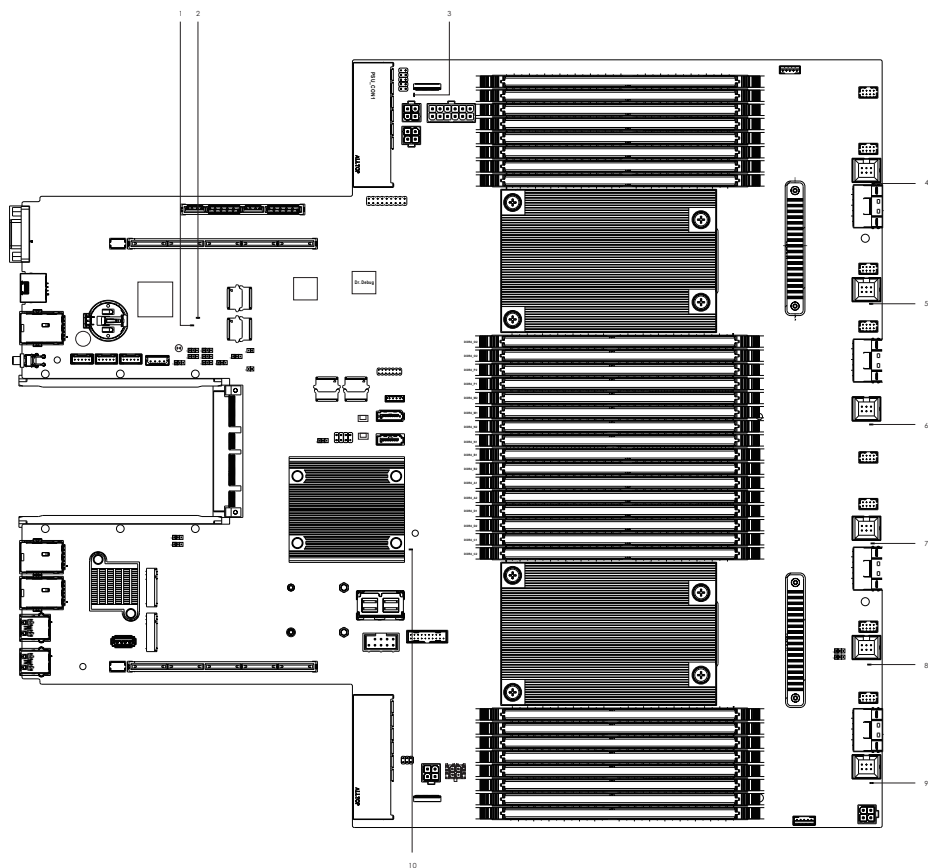
No.	Description
1	PCIE Power Connector (PCIE_PWR2)
2	PCIE 4.0 x32 Slot (PCIE2)
3	PCIE 4.0 x16 Slot (PCIE3)
4	Front VGA Header (FRONT_VGA1)
5	GPU Power Connector (GPU_PWR2)
6	GPU Power Connector (GPU_PWR3)
7	Power Supply Unit Connector (PSU_CON1)
8	System Panel Header (PANEL1)
9	Auxiliary Panel Header (AUX_PANEL1)
10	HDD Backplane Power Connector (HSBP_PWR1)
11	Backplane PCI Express Hot-Plug Connector (CPU2_HSBP1)
12	2 x 288-pin DDR4 DIMM Slots (DDR4_I1, DDR4_J1)*
13	System Fan Connector (FAN8_1) <i>(for 1U system)</i>
14	2 x 288-pin DDR4 DIMM Slots (DDR4_I2, DDR4_J2)*
15	2 x 288-pin DDR4 DIMM Slots (DDR4_K1, DDR4_L1)*
16	System Fan Connector (FAN6_1) <i>(for 1U system)</i>
17	2 x 288-pin DDR4 DIMM Slots (DDR4_K2, DDR4_L2)*
18	System Fan Connector (FAN6) <i>(for 2U system)</i>
19	Slimline x8 Connector (SLIM4)
20	LGA 4189 CPU Socket (CPU2)
21	System Fan Connector (FAN5_1) <i>(for 1U system)</i>
22	System Fan Connector (FAN5) <i>(for 2U system)</i>
23	System Fan Connector (FAN7_1) <i>(for 1U system)</i>
24	2 x 288-pin DDR4 DIMM Slots (DDR4_O2, DDR4_P2)*
25	Slimline x8 Connector (SLIM3)
26	2 x 288-pin DDR4 DIMM Slots (DDR4_O1, DDR4_P1)*
27	2 x 288-pin DDR4 DIMM Slots (DDR4_M2, DDR4_N2)*
28	System Fan Connector (FAN4) <i>(for 2U system)</i>
29	2 x 288-pin DDR4 DIMM Slots (DDR4_M1, DDR4_N1)*
30	System Fan Connector (FAN4_1) <i>(for 1U system)</i>
31	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1)*
32	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2)*
33	System Fan Connector (FAN3_1) <i>(for 1U system)</i>
34	2 x 288-pin DDR4 DIMM Slots (DDR4_C1, DDR4_D1)*
35	System Fan Connector (FAN3) <i>(for 2U system)</i>

No.	Description
36	2 x 288-pin DDR4 DIMM Slots (DDR4_E2, DDR4_F2)*
37	Slimline x8 Connector (SLIM2)
38	PWM Configuration Header (PWM_CFG1)
39	System Fan Connector (FAN2_1) <i>(for 1U system)</i>
40	System Fan Connector (FAN2) <i>(for 2U system)</i>
41	CPU VSENSE Header (CPU_VSENSE)
42	LGA 4189 CPU Socket (CPU1)
43	System Fan Connector (FAN1_1) <i>(for 1U system)</i>
44	2 x 288-pin DDR4 DIMM Slots (DDR4_G2, DDR4_H2)*
45	Slimline x8 Connector (SLIM1)
46	2 x 288-pin DDR4 DIMM Slots (DDR4_G1, DDR4_H1)*
47	System Fan Connector (FAN1) <i>(for 2U system)</i>
48	2 x 288-pin DDR4 DIMM Slots (DDR4_E2, DDR4_F2)*
49	2 x 288-pin DDR4 DIMM Slots (DDR4_E1, DDR4_F1)*
50	HDD Backplane Power Connector (HSBP_PWR2)
51	Backplane PCI Express Hot-Plug Connector (CPU1_HSBP1)
52	USB 3.2 Gen1 Header (USB3_5_6)
53	HDD Power Connector (HDD_PWR1)
54	Front USB 3.2 Gen1 Header (USB3_3)
55	GPU Power Connector (GPU_PWR1)
56	PDB Power Connector (CRPS_IN1)
57	Power Supply Unit Connector (PSU_CON2)
58	USB 2.0 Header (USB_1_2)
59	MiniSAS HD Connector (MSAS_HD0)
60	PCIe 4.0 x32 Slot (PCIe1)
61	PCIe Power Connector (PCIe_PWR1)
62	M.2 Socket (M2_2) (Type 2280/22110)
63	Vertical Type A USB 3.2 Gen1 Connector (USB3_6)
64	M.2 Socket (M2_1) (Type 2280/22110)
65	NCSI Mode Jumper (NCSI_SEL2)
66	NCSI Mode Jumper (NCSI_SEL1)
67	SATA DOM Connector (SSATA1)
68	SATA DOM Power Connector (SSATAPWR1)
69	SATA DOM Power Connector (SSATAPWR2)

No.	Description
70	SATA SGPIO Connector (SSATA_SGPIO1)
71	ESPI Flash Sharing Jumper (ESPI_SHARE)
72	OC3 3.0 Gen4 x16 Mezzanine Card Slot (OC3)
73	SATA DOM Connector (SSATA0)
74	BIOS Swap Override Header (ESPI_MODE1)
75	ESPI/LPC Selection Jumper (ESPI_LPC_SEL1)
76	ME Recovery Jumper (ME_RECOVERY1)
77	BIOS Recovery Jumper (BIOS_RECOVERY1)
78	Password Reset Jumper (PASSWORD_CLEAR)
79	PMBUS Mode Jumper (PMBUS_SEL_DAT1)
80	PMBUS Mode Jumper (PMBUS_SEL_CLK1)
81	BMC SMBus Header (BMC_SMB1)
82	BMC SMBus Header (BMC_SMB2)
83	BMC SMBus Header (BMC_SMB3)
84	Intelligent Platform Management Bus Header (IPMB1)
85	Clear CMOS Pad (CLRMOS1)
86	PMBUS Mode Jumper (PMBUS_SEL_ALT1)
87	QAT Mode Jumper (QAT_SEL)
88	Non Maskable Interrupt Button (NMI_BTN1)
89	TPM-SPI Header (TPM_BIOS_PH1)
90	Virtual RAID On CPU Header (RAID_1)

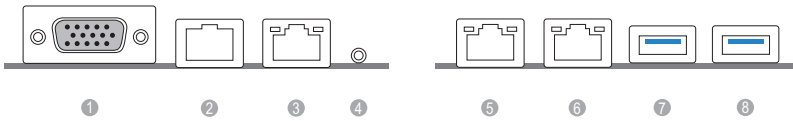
* For DIMM installation and configuration instructions, please see p.20 (Installation of Memory Modules (DIMM)) for more details.

1.5 Onboard LED Indicators



No.	Item	Status	Description
1	BLED	Green	BMC heartbeat LED
2	LED_CATERR1	Red	CPU CATERR error
3	HDD_LED	Green	HDD activity LED
4	SYS_FAN_LED6	Red	FAN6_1 failed
5	SYS_FAN_LED5	Red	FAN5_1failed
6	SYS_FAN_LED4	Red	FAN4_1 failed
7	SYS_FAN_LED3	Red	FAN3_1 failed
8	SYS_FAN_LED2	Red	FAN2_1 failed
9	SYS_FAN_LED1	Red	FAN1_1 failed
10	SB_PWR1	Green	STB PWR ready

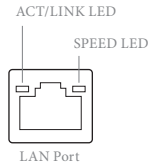
1.6 I/O Panel



No.	Description	No.	Description
1	VGA Header (VGA1)	5	1G LAN RJ-45 Port (LAN1)**
2	Serial Port (RJ45) (COM1)	6	1G LAN RJ-45 Port (LAN2)**
3	IPMI LAN Header (IPMI_LAN1)*	7	USB 3.2 Gen1 Port (USB3_2)
4	UID Switch (UID)	8	USB 3.2 Gen1 Port (USB3_1)

LAN Port LED Indications

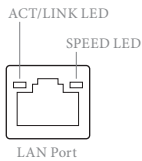
*There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.



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 Orange	Data Activity	Orange	100Mbps connection
On	Link	Green	1Gbps connection

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



1G LAN Port (LAN1, LAN2) LED Indications

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

ONN



Chapter 2 Installation

This is a T-Shape Proprietary form factor (17" x 19", 43.18 cm x 48.26 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.

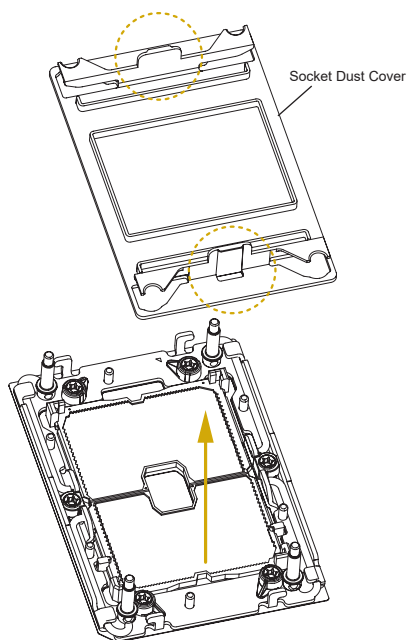


Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

2.3 Installing the CPU and Heatsink



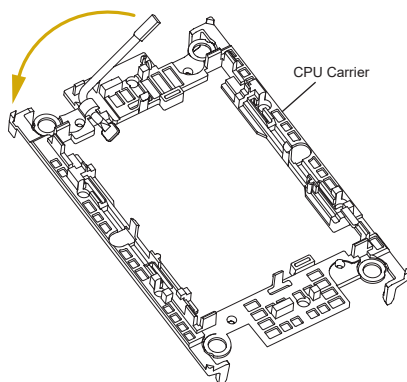
1. Before you insert the CPU into the socket, please check if the PnP cap is on the socket, if the CPU surface is unclean, or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all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

1

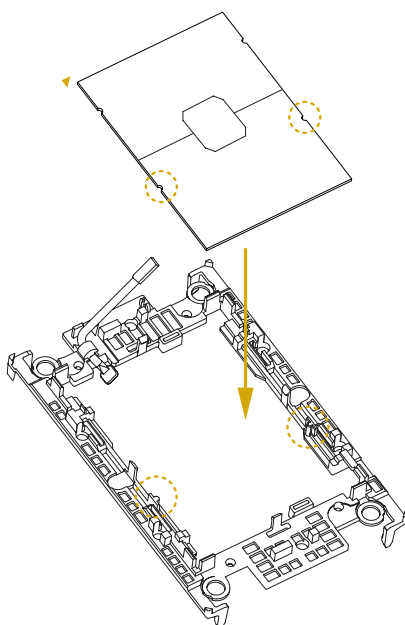


1. Before you installed the heatsink, you need to spray thermal interface material between the CPU and the heatsink to improve heat dissipation.
2. Illustration in this documentation are examples only. Heatsink or fan cooler type may differ.

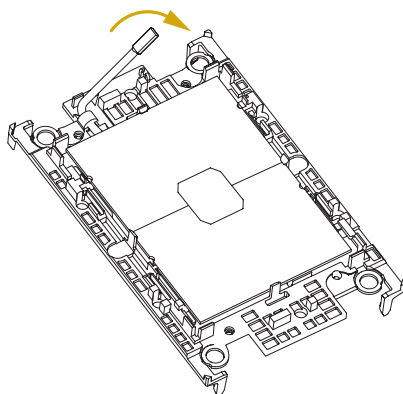
2



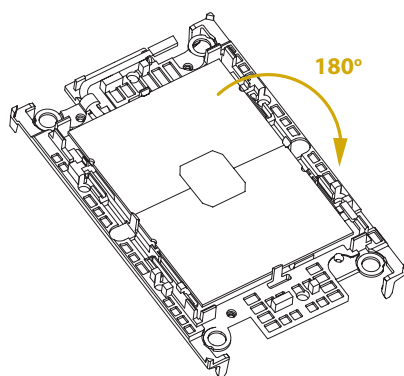
3



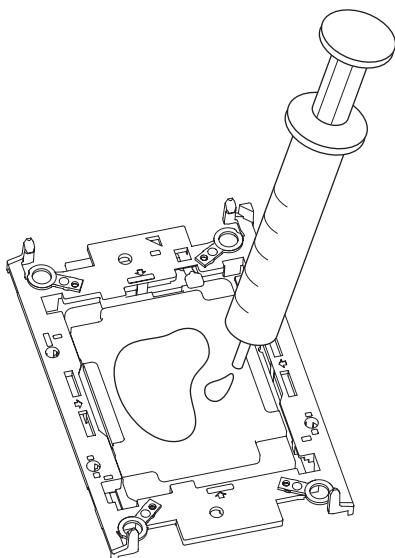
4



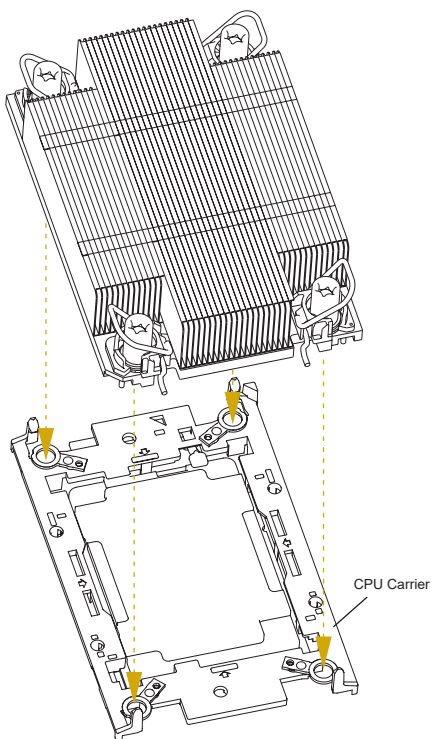
5



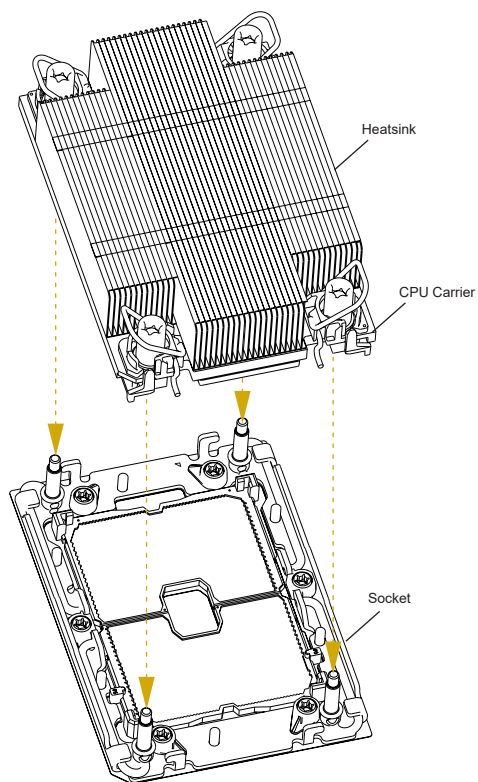
6



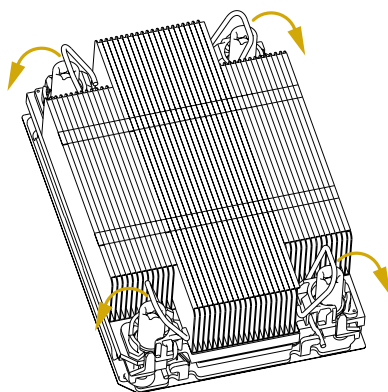
7



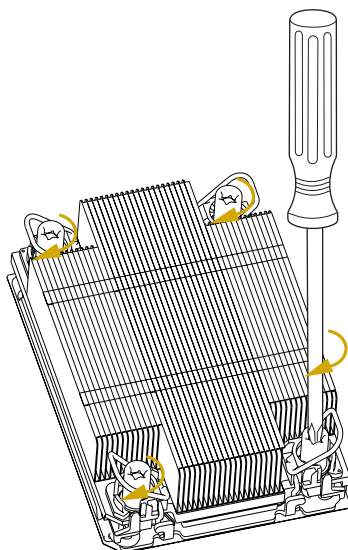
8



9



10



2.4 Installation of Memory Modules (DIMM)

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

CPU1	CPU2
DDR4_A1, B1, C1, D1, E1, F1, G1 H1 (Blue)	DDR4_I2, J2, K2, L2, M1, N1, O1, P1 (Blue)
DDR4_A2, B2, C2, D2, E2, F2, G2, H2 (White)	DDR4_I1, J1, K1, L1, M2, N2, O2, P2 (White)



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

2.4.1 DIMM Population for DDR4

The following is the recommended memory population for installing all volatile DDR4 memory modules, without mixing any Intel Persistent Memory 200 series (BPS).

Recommended Memory Configurations

1 CPU Configurations (DDR4)

		DIMM(S)						
		1	2	4	6	8	12	16
CPU1	A1		#	#	#	#	#	#
	B1	#			#	#	#	#
	C1			#	#	#	#	#
	D1					#		#
	E1		#	#	#	#	#	#
	F1				#	#	#	#
	G1			#	#	#	#	#
	H1					#		#
	A2						#	#
	B2						#	#
	C2						#	#
	D2							#
	E2						#	#
	F2						#	#
	G2						#	#
	H2							#

The symbol # indicates the slot is populated.

2 CPU Configurations (DDR4)

		DIMM(S)						
		1	2	4	6	8	12	16
CPU1	A1		#	#	#	#	#	#
	B1	#			#	#	#	#
	C1			#	#	#	#	#
	D1					#		#
	E1		#	#	#	#	#	#
	F1				#	#	#	#
	G1			#	#	#	#	#
	H1					#		#
	A2						#	#
	B2						#	#
	C2						#	#
	D2							#
	E2						#	#
	F2						#	#
	G2						#	#
	H2							#

		DIMM(S)						
		1	2	4	6	8	12	16
CPU2	I1		#	#	#	#	#	#
	J1	#			#	#	#	#
	K1			#	#	#	#	#
	L1					#		#
	M1		#	#	#	#	#	#
	N1				#	#	#	#
	O1			#	#	#	#	#
	P1					#		#
	I2						#	#
	J2						#	#
	K2						#	#
	L2							#
	M2						#	#
	N2						#	#
	O2						#	#
	P2							#

2.4.2 DIMM Population for DDR4 and BPS

The following is the recommended memory population for installing Intel Persistent Memory 200 series (BPS) memory modules with DDR4 DIMMs:

1 CPU Configuration (DDR4+BPS)

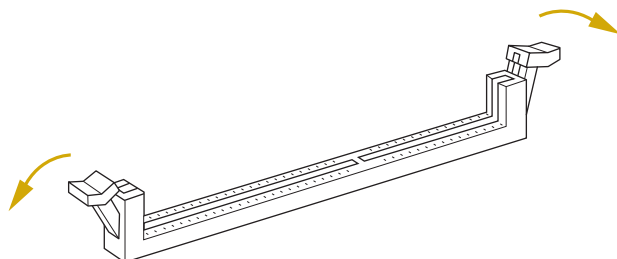
DDR4 + BPS	CPU1							
	A1	B1	C1	D1	E1	F1	G1	H1
4 DDR4 + 4 BPS	DDR4	BPS	DDR4	BPS	DDR4	BPS	DDR4	BPS
6 DDR4 + 1 BPS	DDR4	DDR4	DDR4	BPS	DDR4	DDR4	DDR4	N/A

2 CPU Configuration (DDR4+BPS)

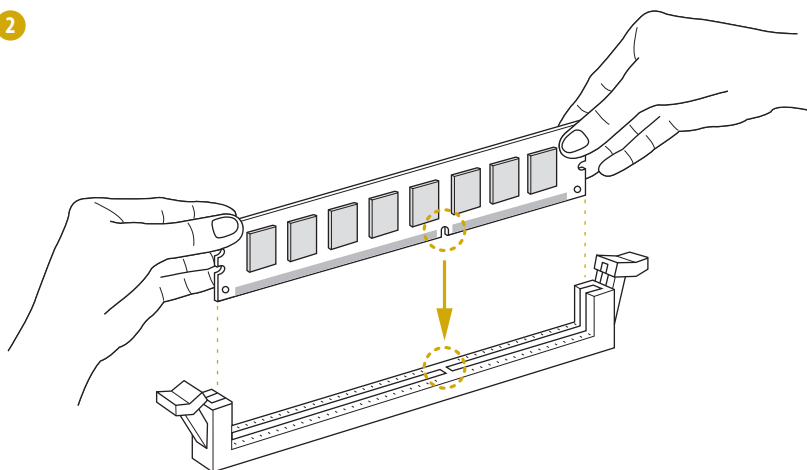
DDR4 + BPS	CPU1							
	A1	B1	C1	D1	E1	F1	G1	H1
8 DDR4 + 8 BPS	DDR4	BPS	DDR4	BPS	DDR4	BPS	DDR4	BPS
12 DDR4 + 2 BPS	DDR4	DDR4	DDR4	BPS	DDR4	DDR4	DDR4	N/A

DDR4 + BPS	CPU2							
	I1	J1	K1	L1	M1	N1	O1	P1
8 DDR4 + 8 BPS	DDR4	BPS	DDR4	BPS	DDR4	BPS	DDR4	BPS
12 DDR4 + 2 BPS	DDR4	DDR4	DDR4	BPS	DDR4	DDR4	DDR4	N/A

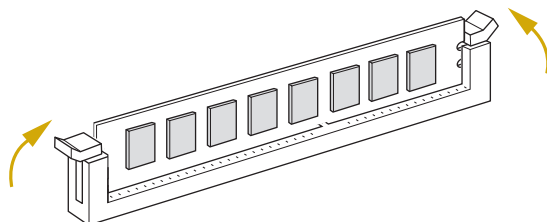
1



2



3



2.5 Expansion Slots (PCI and PCI Express Slots)

There are 3 PCI Express slots on this motherboard.

PCIe slot:

PCIe1 (PCIe 4.0 x32 slot, from CPU1) is used for PCI Express x32 lane width cards.

PCIe2 (PCIe 4.0 x32 slot, from CPU2) is used for PCI Express x32 lane width cards.

PCIe3 (PCIe 4.0 x16 slot, from CPU2) is used for PCI Express x16 lane width cards.

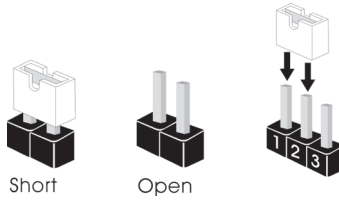
Slot	Generation	Mechanical	Electrical	Source
PCIe 3	4.0	x16	x16	CPU2
PCIe 2	4.0	x32	x32	CPU2
PCIe 1	4.0	x32	x32	CPU1

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 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.



ME Recovery Jumper
(3-pin ME_RECOVERY1)
(see p.7, No. 76)



Normal Mode (Default)



ME Recovery Mode

PMBUS Mode Jumper
(3-pin PMBUS_SEL_CLK1)
(see p.7, No. 80)
(3-pin PMBUS_SEL_DAT1)
(see p.7, No. 79)
(3-pin PMBUS_SEL_ALT1)
(see p.7, No. 86)



PMBus connected to BMC
(Default)



PMBus connected to PCH

Password Reset Jumper
(3-pin PASSWORD_ CLEAR)
(see p.7, No. 78)



Normal Mode (Default)



Password Clear

BIOS Recovery Jumper
(3-pin BIOS_RECOVERY1)
(see p.7, No. 77)



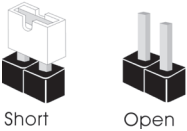
Normal Mode (Default)



Recover BIOS

ESPI/LPC Selection Jumper (3-pin ESPI_LPC_SEL1) (see p.7, No. 75)	1_2  ESPI	2_3  LPC (Default)
ESPI Flash Sharing Jumper (3-pin ESPI_SHARE) (see p.7, No. 71)	1_2  Master ESPI Flash Sharing (Default)	2_3  Slave ESPI Flash Sharing
QAT Mode Jumper (3-pin QAT_SEL) (see p.7, No. 87)	1_2  QAT Asymmetric (Default)	2_3  QAT Symmetric
NCSI Mode Jumper (3-pin NCSI_SEL1) (see p.7, No. 66)	NCSI_SEL1 2_3  +	NCSI_SEL2 1_2  +
NCSI Mode Jumper (3-pin NCSI_SEL2) (see p.7, No. 65)	NCSI is set to onboard LAN (Default) NCSI is set to OCP3.0	

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”.



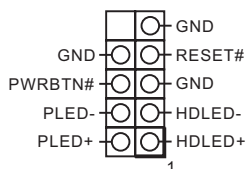
BIOS Swap Override Jumper (ESPI_MODE1) (see p.7, No. 74)	1_2  2-pin Jumper	Open: Disable Override (Default) Short: Enable Override
---	--	---

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. 8)



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.

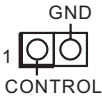
Auxiliary Panel Header
(18-pin AUX_PANEL1)
(see p.7, No. 9)



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

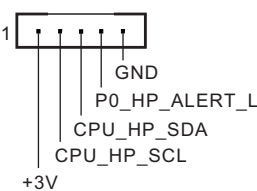
AUX_PANEL1	
PIN	NET
1	+3VSB
2	+3VSB
3	N/A
4	LOCATORLED+
5	PLED-
6	LOCATORLED-
7	+3V
8	N/A
9	System Fault LED-
10	HDLED-
11	PWRBTN#
12	N/A
13	GND
14	N/A
15	RESET#
16	SMB_DATA
17	SMB_CLK
18	GND
19	LOCATORBTN#
20	N/A
21	N/A
22	N/A
23	N/A
24	N/A
25	GND
26	GND

Non Maskable Interrupt
Button Header
(2-pin NMI_BTN1)
(see p.7, No. 88)



Please connect a NMI device to this header.

Backplane PCI Express
Hot-Plug Connectors
(5-pin CPU1_ HSBP1)
(see p.7, No. 51)
(5-pin CPU2_ HSBP1)
(see p.7, No. 11)



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

Front USB 3.2 Gen1

Header

(19-pin USB3_3)

(see p.7, No. 54)



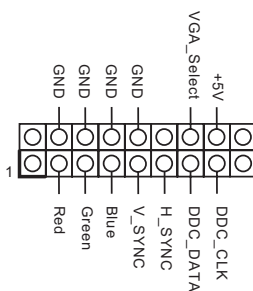
USB3_3	
PIN	NET
1	Vbus
2	Vbus
3	Vbus
4	Vbus
5	Vbus
6	Vbus
7	GND
8	GND
9	GND
10	GND
11	GND
12	GND
13	GND
14	GND
15	INTA PA SSRX-
16	INTA PA SSRX+
17	GND
18	INTA PA SSTX-
19	INTA PA SSTX+
20	GND
21	IntA PA D-
22	IntA PA D+
23	GND
24	IntA PB D-
25	IntA PB D+
26	GND

Besides four default USB 3.2 Gen1 ports on the I/O panel, there are two USB 3.2 Gen1 headers on this motherboard. Each USB 3.2 Gen1 header can support two USB 3.2 Gen1 ports.

Front VGA Header

(17-pin FRNT_VGA1)

(see p.7, No. 4)



Please connect either end of VGA cable to VGA header.

BMC SMB Headers

(5-pin BMC_SMB1)

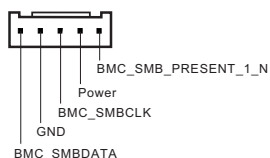
(see p.7, No. 81)

(5-pin BMC_SMB2)

(see p.7, No. 82)

(5-pin BMC_SMB3)

(see p.7, No. 83)

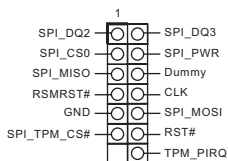


These headers are used for the SM BUS devices.

SPI TPM Header

(13-pin SPI_TPM_J1)

(see p.7, No. 89)



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.

System Fan Connectors

(for 2U system)

(6-pin FAN1)

(see p.7, No. 47)

(6-pin FAN2)

(see p.7, No. 40)

(6-pin FAN3)

(see p.7, No. 35)

(6-pin FAN4)

(see p.7, No. 28)

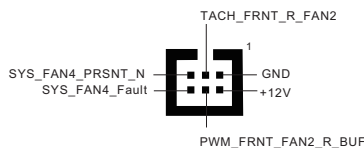
(6-pin FAN5)

(see p.7, No. 22)

(6-pin FAN6)

(see p.7, No. 18)

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



System Fan Connectors

(for 1U system)

(6-pin FAN1_1)

(see p.7, No. 43)

(6-pin FAN2_1)

(see p.7, No. 39)

(6-pin FAN3_1)

(see p.7, No. 33)

(6-pin FAN4_1)

(see p.7, No. 30)

(6-pin FAN5_1)

(see p.7, No. 21)

(6-pin FAN6_1)

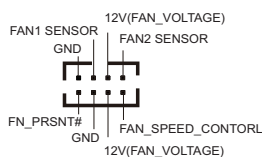
(see p.7, No. 18)

(6-pin FAN7_1)

(see p.7, No. 23)

(6-pin FAN8_1)

(see p.7, No. 13)



Please connect fan cables to the fan connectors and match the black wire to the ground pin.

All fans support Fan Control.

GPU Power Connectors

(4-pin GPU_PWR1)

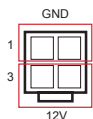
(see p.7, No. 55)

(4-pin GPU_PWR2)

(see p.7, No. 5)

(4-pin GPU_PWR3)

(see p.7, No. 6)

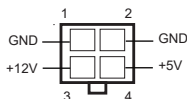


This motherboard provides three GPU power connectors.

SATA Power Connector

(4-pin HDD_PWR1)

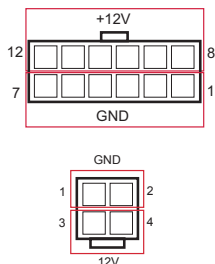
(see p.7, No. 53)



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.

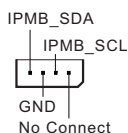
Backplane Power
Connector
(12-pin HSBP_PWR1)
(see p.7, No. 10)

(4-pin HSBP_PWR2)
(see p.7, No. 50)



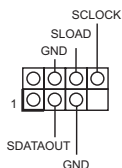
Please connect a 12-pin power cable to this connector to connect a HDD.

Intelligent Platform
Management Bus header
(4-pin IPMB1)
(see p.7, No. 84)



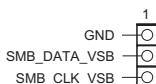
This 4-pin connector is used to provide a cabled baseboard or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.

Serial General Purpose
Input/Output Header
(7-pin SATA_SGPIO1)
(see p.7, No. 69)



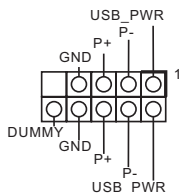
This header supports Serial Link interface for onboard SATA connections.

PWM Configuration
Header
(3-pin PWM_CFG1)
(see p.7, No. 38)



This header is used for PWM configurations.

USB 2.0 Header
(9-pin USB_1_2)
(see p.6, No. 58)



There is one USB 2.0 header on this motherboard. This USB 2.0 header can support two ports.

USB 3.2 Gen1 Connector

(USB3_6)

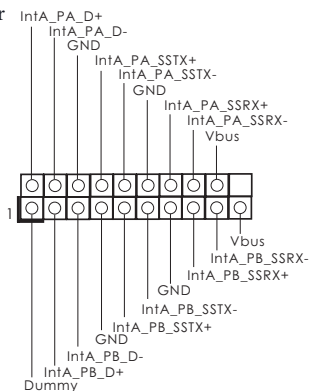
(see p.7, No. 63)



USB 3.2 Gen1 Header

(19-pin USB3_5_6)

(see p.7, No. 78)

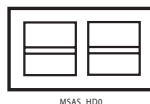


Besides four default USB 3.2 Gen1 ports on the I/O panel, there is one USB 3.2 Gen1 header on this motherboard. This USB 3.2 Gen1 header can support two USB 3.2 Gen1 ports.

Mini SAS HD Connector

(MSAS_HD0)

(see p.7, No.59)



MSAS_HD0

The Mini SAS HD connector supports SAS/SATA data cables for internal storage devices. The current SAS3/ SATA3 interface allows up to 12.0 Gb/s data transfer rate. For connecting SAS HDDs, please contact SAS data cable dealers.

SATA DOM Power

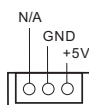
Connectors

(3-pin SSATAPWR1)

(see p.7, No. 68)

(3-pin SSATAPWR2)

(see p.7, No. 69)



Please connect the power cables on the SATA DOM to the connectors.

Serial ATA3 Connectors

(SSATA0)
(see p.7, No. 73)
(SSATA1)
(see p.7, No. 67)

SSATA0



SSATA1



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

Serial ATA3 DOM

Connectors
(SSATA0)
(see p.7, No. 73)
(SSATA1)
(see p.7, No. 67)

SSATA0



SSATA1

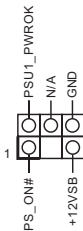


The SATA3 DOM connectors support both a SATA DOM (Disk-On-Module) and a SATA data cable for internal storage devices.

**SATADOM will be disabled when M.2 is populated with a SATA device.*

PDB Power Connector

(5-pin CRPS_IN1)
(see p.7, No. 56)



When a power distribution board is needed, use a power cable to connect this connector and the PDB for power supply.

Clear CMOS Pad

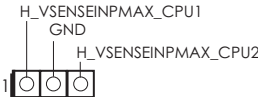
(CLR_CMOS1)
(see p.7, No. 85)



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

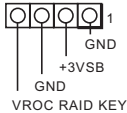
CPU VSENSE Header

(3-pin CPU_VSENSE)
(see p.7, No. 41)



This header is used to detect CPU1 & CPU2 vsense.

Virtual RAID On CPU
Header
(4-pin RAID_1)
(see p.7, No. 90)



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
ISS	VROCISSDMOD	• RAID 5 Write Hole Closure

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

Slimline SAS Connectors

Right-Angle:

(SLIM1)

(see p.7, No. 45)

(SLIM2)

(see p.7, No. 37)

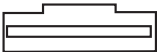
(SLIM3)

(see p.7, No. 25)

(SLIM4)

(see p.7, No. 19)

These connectors are used for
the NVME PCIE devices.



A1	77 79 75	B1
A2		B2
A3		B3
A4		B4
A5		B5
A6		B6
A7		B7
A8		B8
A9		B9
A10		B10
A11		B11
A12		B12
A13		B13
A14		B14
A15		B15
A16		B16
A17		B17
A18		B18
A19		B19
A20		B20
A21		B21
A22		B22
A23		B23
A24		B24
A25		B25
A26		B26
A27		B27
A28		B28
A29		B29
A30		B30
A31		B31
A32		B32
A33		B33
A34		B34
A35		B35
A36		B36
A37	78 80 76	B37

80-pin

Pin	Definition	Pin	Definition
A1	GND_1	B1	GND_12
A2	RX_0+	B2	TX_0+
A3	RX_0-	B3	TX_0-
A4	GND_2	B4	GND_13
A5	RX_1+	B5	TX_1+
A6	RX_1-	B6	TX_1-
A7	GND_3	B7	GND_14
A8	SIDEBAND_7A	B8	SIDEBAND_0A
A9	SIDEBAND_4A	B9	SIDEBAND_1A
A10	GND	B10	GND
A11	SIDEBAND_A+	B11	SIDEBAND_5A
A12	SIDEBAND_A-	B12	SIDEBAND_6A
A13	GND_4	B13	GND_15
A14	RX_2+	B14	TX_2+
A15	RX_2-	B15	TX_2-
A16	GND_5	B16	GND_16
A17	RX_3+	B17	TX_3+
A18	RX_3-	B18	TX_3-
A19	GND_6	B19	GND_17
A20	RX_4+	B20	TX_4+
A21	RX_4-	B21	TX_4-
A22	GND_7	B22	GND_18
A23	RX_5+	B23	TX_5+
A24	RX_5-	B24	TX_5-
A25	GND_8	B25	GND_19
A26	SIDEBAND_7B	B26	SIDEBAND_0B
A27	SIDEBAND_4B	B27	SIDEBAND_1B
A28	GND	B28	GND
A29	SIDEBAND_B+	B29	SIDEBAND_5B
A30	SIDEBAND_B-	B30	SIDEBAND_6B
A31	GND_9	B31	GND_20
A32	RX_6+	B32	TX_6+
A33	RX_6-	B33	TX_6-
A34	GND_10	B34	GND_21
A35	RX_7+	B35	TX_7+
A36	RX_7-	B36	TX_7-
A37	GND_11	B37	GND_32
75	NP_NC_1	78	P_GND_3
76	NP_NC_2	79	P_GND_2
77	P_GND_1	80	P_GND_4

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_OPMOM_INIT
0xB3	DXE_RESET_SYSTEM
0xB4	DXE_USB_HOTPLUG
0xB5	DXE_PCI_BUS_HOTPLUG
0xB6	DXE_NVRAM_CLEANUP
0xB7	DXE_CONFIGURATION_RESET
0xF0	PEI_RECOVERY_AUTO
0xF1	PEI_RECOVERY_USER
0xF2	PEI_RECOVERY_STARTED
0xF3	PEI_RECOVERY_CAPSULE_FOUND
0xF4	PEI_RECOVERY_CAPSULE_LOADED
0xE0	PEI_S3_STARTED
0xE1	PEI_S3_BOOT_SCRIPT
0xE2	PEI_S3_VIDEO_REPOST

0xE3 PEI_S3_OS_WAKE

0x50 PEI_MEMORY_INVALID_TYPE

0x53 PEI_MEMORY_NOT_DETECTED

0x55 PEI_MEMORY_NOT_INSTALLED

0x57 PEI_CPU_MISMATCH

0x58 PEI_CPU_SELF_TEST_FAILED

0x59 PEI_CPU_NO_MICROCODE

0x5A PEI_CPU_ERROR

0x5B PEI_RESET_NOT_AVAILABLE

0xD0 DXE_CPU_ERROR

0xD1 DXE_NB_ERROR

0xD2 DXE_SB_ERROR

0xD3 DXE_ARCH_PROTOCOL_NOT_AVAILABLE

0xD4 DXE_PCI_BUS_OUT_OF_RESOURCES

0xD5 DXE_LEGACY_OPROM_NO_SPACE

0xD6 DXE_NO_CON_OUT

0xD7 DXE_NO_CON_IN

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

2.9 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 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 the 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

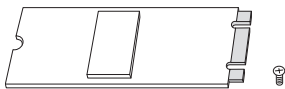
Select the adapter that want to be the primary adapter and click the **Set Primary** button.

If 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.

2.11 M.2 SSD Module Installation Guide

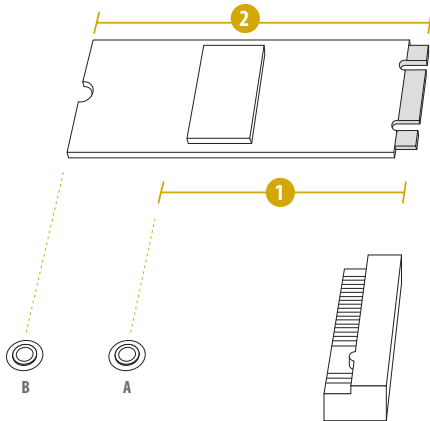
The Ultra M.2 Socket (M2_1/M2_2, Key M) supports either a M.2 SATA3 6.0 Gb/s module or a M.2 PCI Express module up to Gen3 x4 (32Gb/s).

Installing the M.2 SSD Module



Step 1

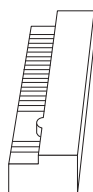
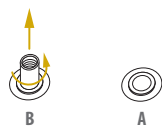
Prepare a M.2 SSD module and the screw.



Step 2

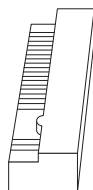
Depending on the PCB type and length of your M.2 SSD module, find the corresponding nut location to be used.

No.	1	2
Nut Location	A	B
PCB Length	8cm	11cm
Module Type	Type2280	Type22110

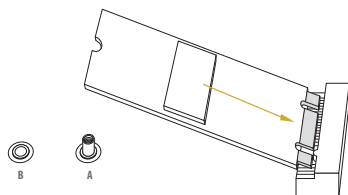
**Step 3**

Move the standoff based on the module type and length. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut.

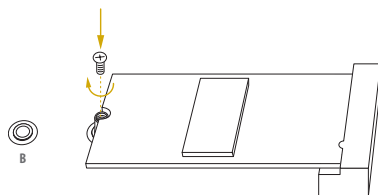
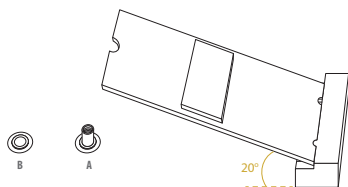
Otherwise, release the standoff by hand.

**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.

Chapter 3 UEFI Setup Utility

3.1 Introduction

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

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



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

3.1.1 UEFI Menu Bar

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

Item	Description
Main	To set up the system time/date information
Advanced	To set up the advanced UEFI features
Security	To set up the security features
Boot	To set up the default system device to locate and load the Operating System
Server Mgmt	To manage the server
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.

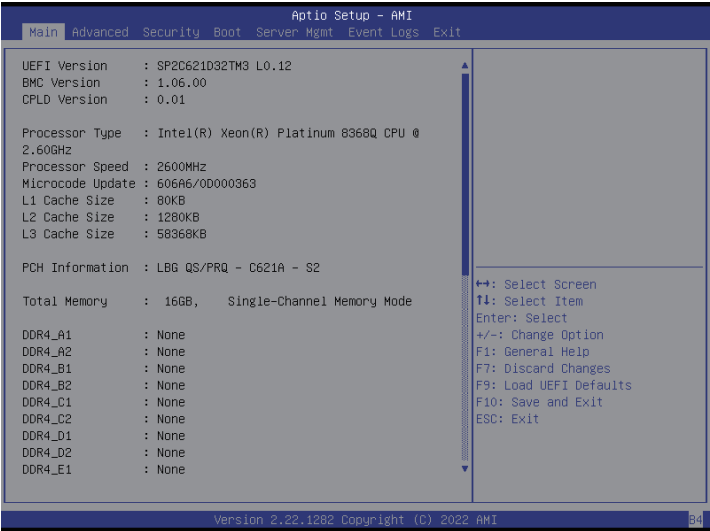
3.1.2 Navigation Keys

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

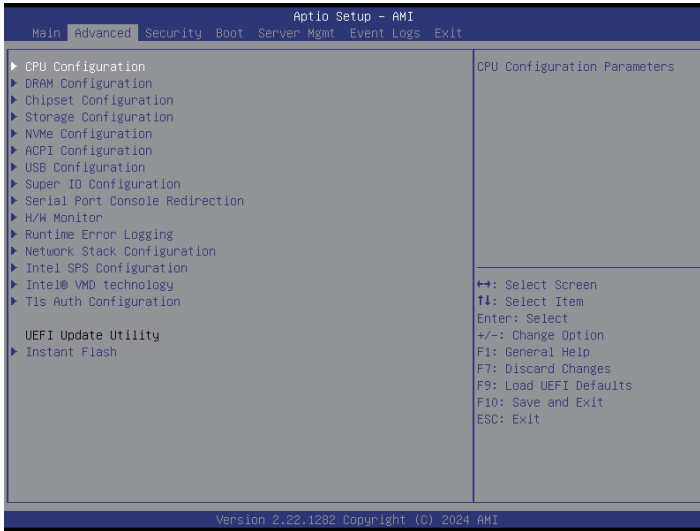
3.2 Main Screen

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.



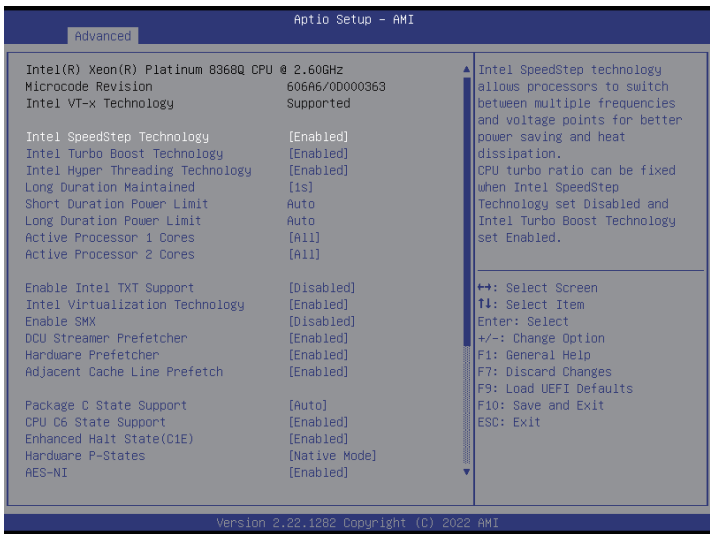
3.3 Advanced Screen

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



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

3.3.1 CPU Configuration



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.

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.

Long Duration Maintained

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

Short Duration Power Limit

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

Long Duration Power Limit

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

Active Processor 1 Cores

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

Active Processor 2 Cores

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

Enable Intel TXT Support

Enables Intel Trusted Execution Technology Configuration.

Intel Virtualization Technology

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

Enable SMX

Use this item to enable Safer Mode Extensions.

DCU Streamer Prefetcher

DCU streamer prefetcher is an L1 data cache prefetcher (MSR 1A4h [2]).

Hardware Prefetcher

Automatically prefetch data and code for the processor. Enable for better performance.

Adjacent Cache Line Prefetch

Automatically prefetch the subsequent cache line while retrieving the currently requested cache line. Enable for better performance.

Package C State Support

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

CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

Enhanced Halt State(C1E)

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

Hardware P-States

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

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

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

AES-NI

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

CPU Thermal Throttling

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

SNC (Sub NUMA)

SNC Disable will support 1-cluster (XPT/KTI prefetch enable) 4-IMC way interleave.

SNC2 Enable supports 2-clusters SNC and 2-way IMC interleave. SNC4 Enable supports

4-clusters SNC and 1-way IMC interleave. Enable SNC2 or SNC4 will gray out iMC_

Interleave knob and UmaBasedClustering knob.

Delayed Authentication Mode (DAM) Override

Use this item to enable or disable overriding the state of the Delayed Authentication Mode (DAM).

UMA-Based Clustering

UMA Based Clustering options include Disable (ALL2ALL), Hemisphere (2 cluster), and Quadrant (4 cluster, not supported on ICX). These options are only valid when SNC is disabled. If SNC is enabled, UMA-Based Clustering is automatically disabled by BIOS.

Total Memory Encryption (TME)

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

SW Guard Extensions (SGX)

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

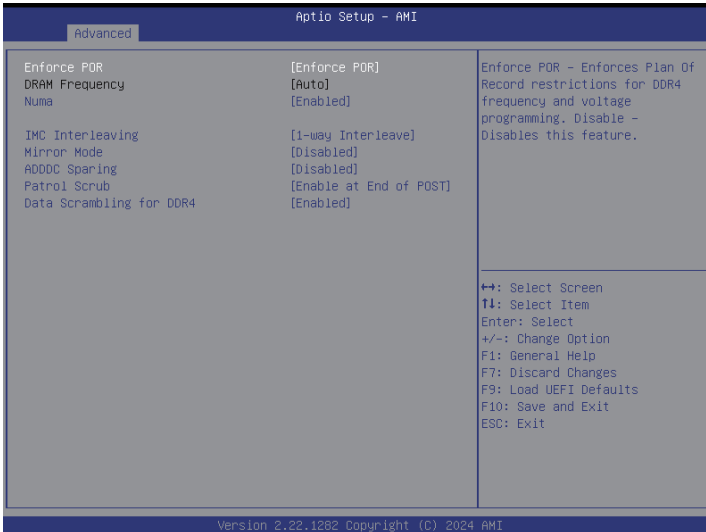
Enable/Disable SGX Auto MP Registration Agent

The MP registration agent is responsible for register the platform.

SGX Registration Server

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

3.3.2 DRAM Configuration



Enforce POR

Enforce POR - Enforces Plan Of Record restrictions for DDR4 frequency and voltage programming.

Disable - Disables this feature.

DRAM Frequency

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

Numa

Use this item to enable or disable Non Uniform Memory Access (NUMA).

IMC Interleaving

Select to configure IMC Interleaving settings.

Mirror Mode

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

ADDDC Sparing

Enable or disable ADDDC Sparing.

Patrol Scrub

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

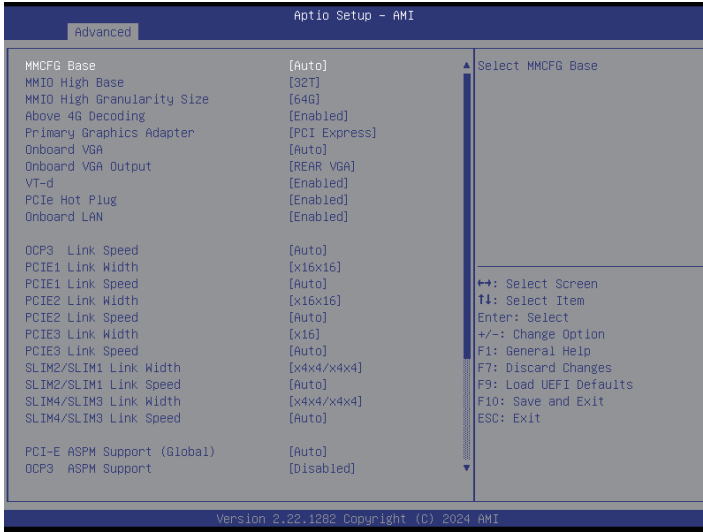
Data Scrambling for DDR4

Enable - Enables data scrambling for DDR4.

Disable - Disables this feature.

Auto - Sets it to the MRC default setting; current default is Enable.

3.3.3 Chipset Configuration



MMCFG Base

Use this item to select MMCFG Base.

MMIO High Base

Use this item to select MMIO High Base.

MMIO High Granularity Size

Use this item to select the allocation size used to assign mmioh resources. Total mmioh space can be up to 32x granularity. Per stack mmioh resource assignments are multiples of the granularity where 1 unit per stack is the default allocation.

Above 4G Decoding

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

Primary Graphics Adapter

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

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

Onboard VGA

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

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

Onboard VGA Output

Select the onboard VGA output to rear side or front side.

VT-d

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

PCIe Hot Plug

Use this item to enable or disable PCIe Hot Plug globally.

Onboard LAN

This allows user to enable or disable the Onboard LAN feature.

OCP3 Link Speed

This allows user to select PCIE Link Speed. The default value is [Auto].

PCIE1 Link Width

This allows user to select PCIE1 Link Width. The default value is [x16x16].

PCIE1 Link Speed

This allows user to select PCIE Link Speed. The default value is [Auto].

PCIE2 Link Width

This allows user to select PCIE2 Link Width. The default value is [x16x16].

PCIE2 Link Speed

This allows user to select PCIE Link Speed. The default value is [Auto].

PCIE3 Link Width

This allows user to select PCIE3 Link Width. The default value is [x16].

PCIE3 Link Speed

This allows user to select PCIE Link Speed. The default value is [Auto].

SLIM2/SLIM1 Link Width

This allows user to select SLIM2/SLIM1 Link Width. The default value is [x4x4/4x4].

SLIM2/SLIM1 Link Speed

This allows user to select PCIE Link Speed. The default value is [Auto].

SLIM4/SLIM3 Link Width

This allows user to select SLIM4/SLIM3 Link Width. The default value is [x4x4/x4x4].

SLIM4/SLIM3 Link Speed

This allows user to select PCIE Link Speed. The default value is [Auto].

PCI-E ASPM Support (Global)

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

OCP3 ASPM Support

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

PCIE1 ASPM Support

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

PCIE2 ASPM Support

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

PCIE3 ASPM Support

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

SLIMLIN2/SLIMLIN1 ASPM Support

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

SLIMLIN4/SLIMLIN3 ASPM Support

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

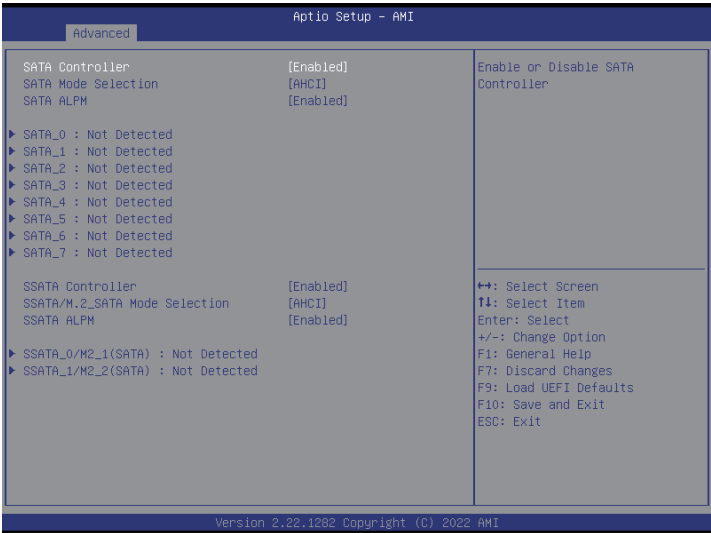
SR-IOV Support

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

Restore AC Power Loss

This allows user to set the power state after a power failure. If [Power Off] is selected, the power will remain off when the power recovers. If [Power On] is selected, the system will start to boot up when the power recovers.

3.3.4 Storage Configuration



SATA Controller

Use this item to enable or disable SATA Controllers.

SATA Mode Selection

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

SATA ALPM

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

SSATA Controller

Use this item to enable or disable SATA Controllers.

SSATA/M.2_SATA Mode Selection

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

SSATA ALPM

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

3.3.5 NVMe Configuration



If there is a NVMe device installed on the motherboard, the NVMe Configuration page will display the relevant information of the NVMe device you are using.

Please note that the information and items shown here may vary depending on the NVMe device you use.

Self Test Option

Select either Short or Extended Self Test. Short option will take a couple of minutes and extended option will take several minutes to complete.

Self Test Action

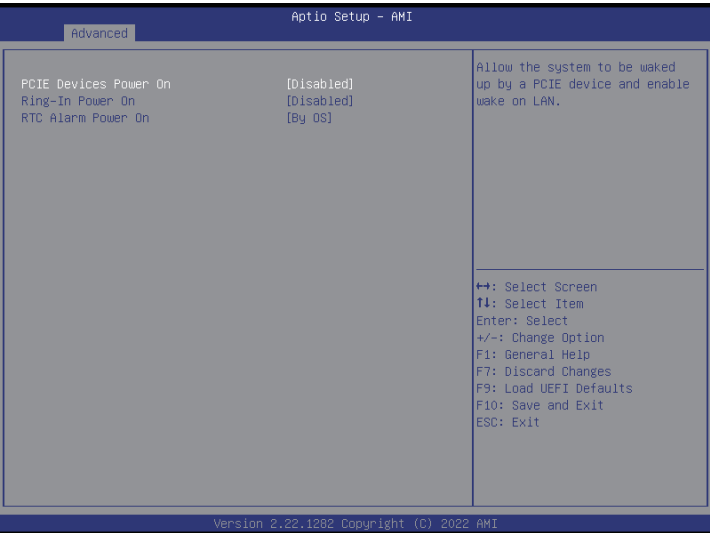
Select either to test Controller alone or Controller and NameSpace. Selecting Controller and NameSpace option will take much longer to complete the test.

Run Device Self Test

Perform device self test for the corresponding Option and Action selected by the user.

Pressing 'ESC' key will abort the test. Result shown below is the recent result logged in the device.

3.3.6 ACPI Configuration



PCIE Devices Power On

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

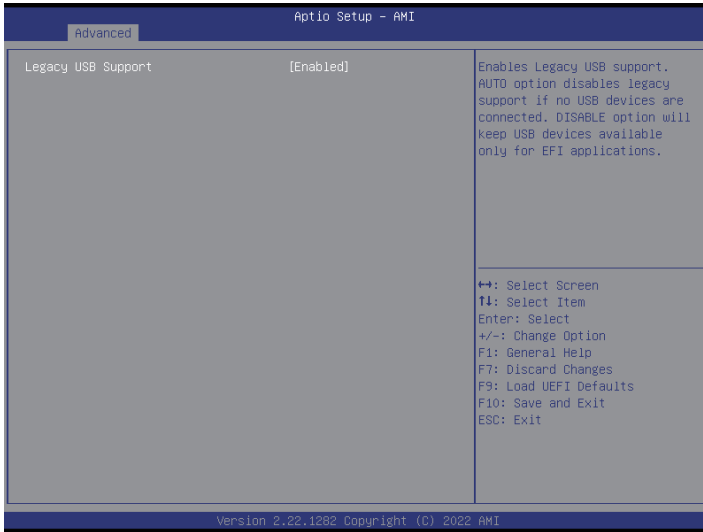
Ring-In Power On

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

RTC Alarm Power On

Allow the system to be waked up by the real time clock alarm. Set it to By OS to let it be handled by your operating system.

3.3.7 USB Configuration

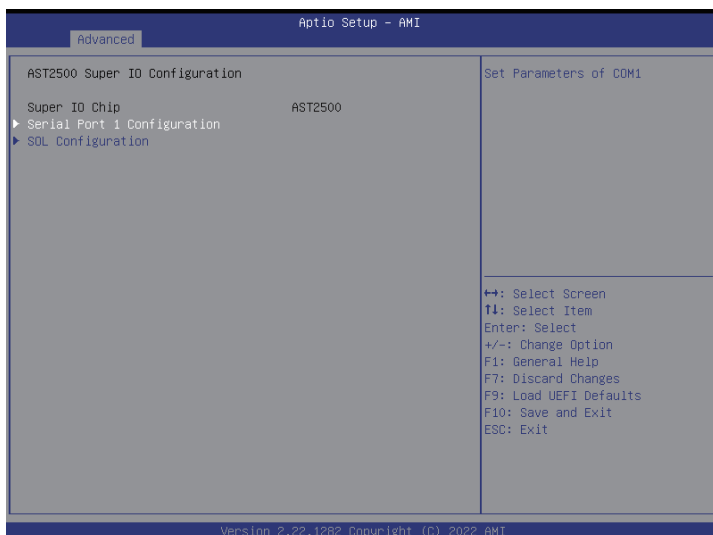


Legacy USB Support

Enable or disable Legacy OS Support for USB 2.0 devices. If you encounter USB compatibility issues it is recommended to disable legacy USB support.

Select UEFI Setup Only to support USB devices under the UEFI setup and Windows/Linux operating systems only.

3.3.8 Super IO Configuration



Serial Port 1 Configuration

Use this item to set parameters of SOL.

Serial Port

Use this item to enable or disable Serial Port (COM).

Change Settings

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

SOL Configuration

Use this item to set parameters of SOL.

SOL Port

Use this item to enable or disable SOL port.

Change Settings

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

3.3.9 Serial Port Console Redirection



COM1/SOL

Console Redirection

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

Console Redirection Settings

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

Terminal Type

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

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

Bits Per Second

Use this item to select the serial port transmission speed. The speed used in the host computer and the client computer must be the same. Long or noisy lines may require lower transmission speed. The options include [9600], [19200], [38400], [57600] and [115200].

Data Bits

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

Parity

Use this item to select the parity bit. The options include [None], [Even], [Odd], [Mark] and [Space]. A parity bit can be sent with the data bits to detect some transmission errors. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.

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

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

Mark: parity bit is always 1.

Space: Parity bit is always 0.

Stop Bits

The item indicates the end of a serial data packet. The standard setting is [1] Stop Bit. Select [2] Stop Bits for slower devices.

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

Use this item to enable or disable extended terminal resolution support.

Putty Keypad

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

Legacy Console Redirection

Legacy Console Redirection Settings

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

Redirection COM Port

Use this item to select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

Resolution

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

Redirection After POST

If the [Bootloader] is selected, legacy console redirection is disabled before booting to legacy OS. If [Always Enable] is selected, legacy console redirection is enabled for legacy OS. The default value is [Always Enable].

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, you can select a COM Port to be used for Console Redirection.

Console Redirection Settings

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

Out-of-Band Mgmt Port

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

Terminal Type EMS

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

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

Bits Per Second EMS

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

Flow Control EMS

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

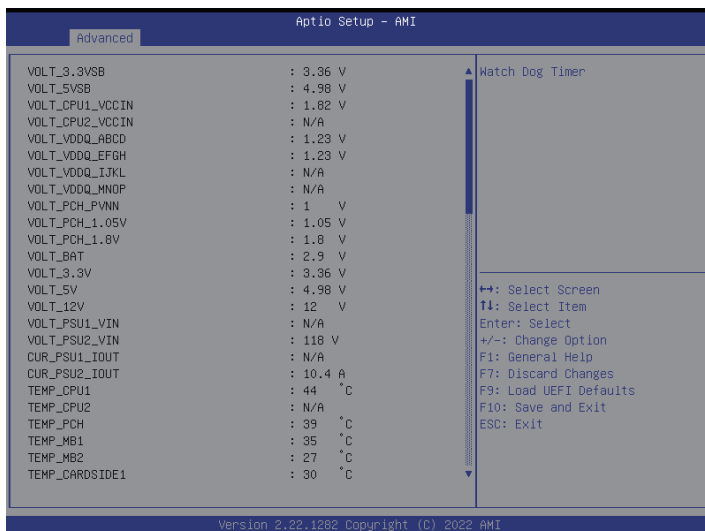
Data Bits EMS

Parity EMS

Stop Bits EMS

3.3.10 H/W Monitor

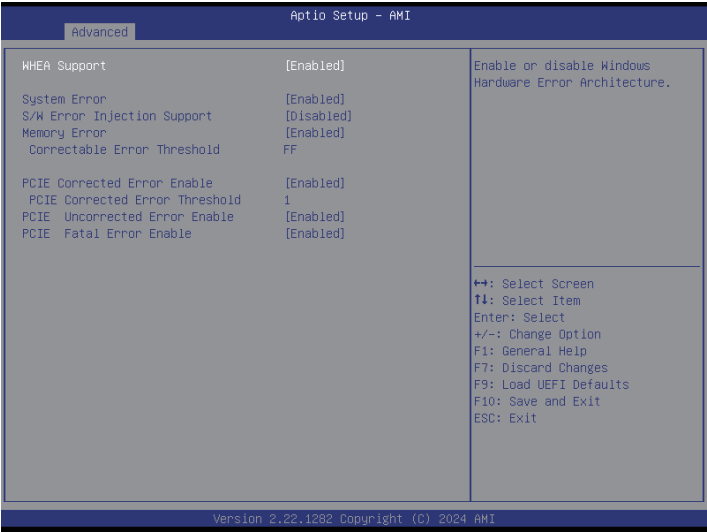
In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



Watch Dog Timer

This allows you to enable or disable the Watch Dog Timer. The default value is [Disabled].

3.3.11 Runtime Error Logging



WHEA Support

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

System Error

Use this item to enable or disable System Error feature. Set it to [Enabled] to configure Memory Error and PCIe Error log features.

S/W Error Injection Support

When it is set to [Enabled], S/W Error Injection is supported by unlocking MSR Ox790.

Memory Error

Memory enabling and logging setup option.

Correctable Error Threshold

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

PCIe Corrected Error Enable

Use this item to enable or disable PCIe Correctable errors.

PCIe Corrected Error Threshold

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

PCIe Uncorrected Error Enable

Use this item to enable or disable PCIe Uncorrectable errors.

PCIe Fatal Error Enable

Use this item to enable or disable PCIe Fatal errors.

3.3.12 Network Stack Configuration



Network Stack

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

IPv4 PXE Support

Enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

IPv4 HTTP Support

Enable or disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

IPv6 PXE Support

Enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

IPv6 HTTP Support

Enable or disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

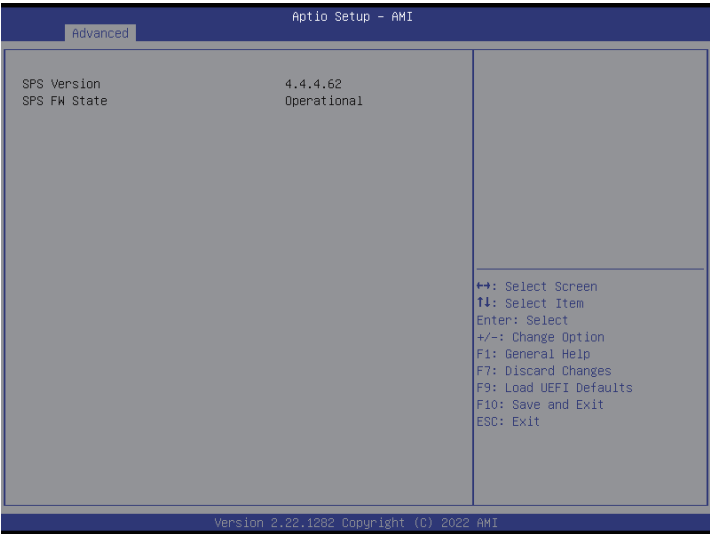
PXE Boot Wait Time

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

Media detect count

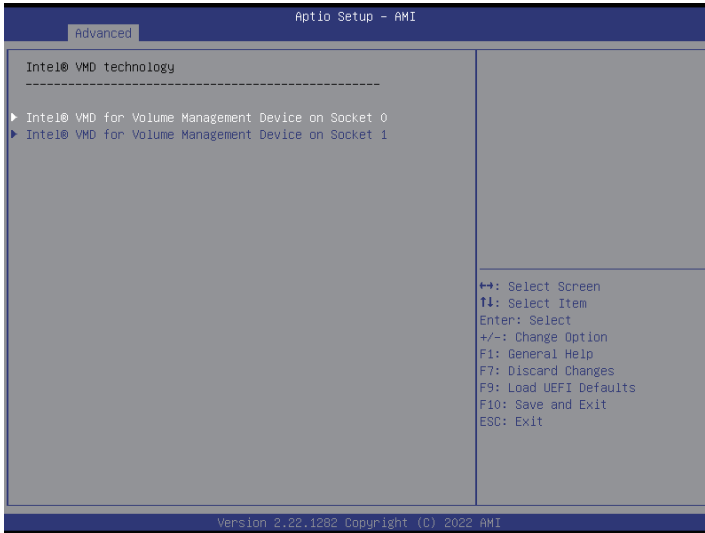
Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

3.3.13 Intel SPS Configuration



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

3.3.14 Intel® VMD technology



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

Intel® VMD for Volume Management Device on Socket 0

VMD Config for IOU 1 (PCIe1)

Enable/Disable VMD

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

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

VMD port A

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

VMD port B

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

VMD port C

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

VMD port D

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.

VMD Config for IOU 3 (PCIE1)

Enable/Disable VMD

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

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

VMD port A

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

VMD port B

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

VMD port C

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

VMD port D

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.

VMD Config for IOU 4 (SLIMLIN2 / SLIMLIN1)

Enable/Disable VMD

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

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

VMD port A

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

VMD port B

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

VMD port C

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

VMD port D

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.

Intel® VMD for Volume Management Device on Socket 1

VMD Config for IOU 0 (PCIe3)

Enable/Disable VMD

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

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

VMD port A

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

VMD port B

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

VMD port C

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

VMD port D

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.

VMD Config for IOU 1 (PCIe2)

Enable/Disable VMD

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

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

VMD port A

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

VMD port B

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

VMD port C

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

VMD port D

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.

VMD Config for IOU 3 (PCIe2)

Enable/Disable VMD

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

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

VMD port A

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

VMD port B

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

VMD port C

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

VMD port D

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.

VMD Config for IOU 4 (SLIMLIN4/SLIMLIN3)

Enable/Disable VMD

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

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

VMD port A

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

VMD port B

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

VMD port C

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

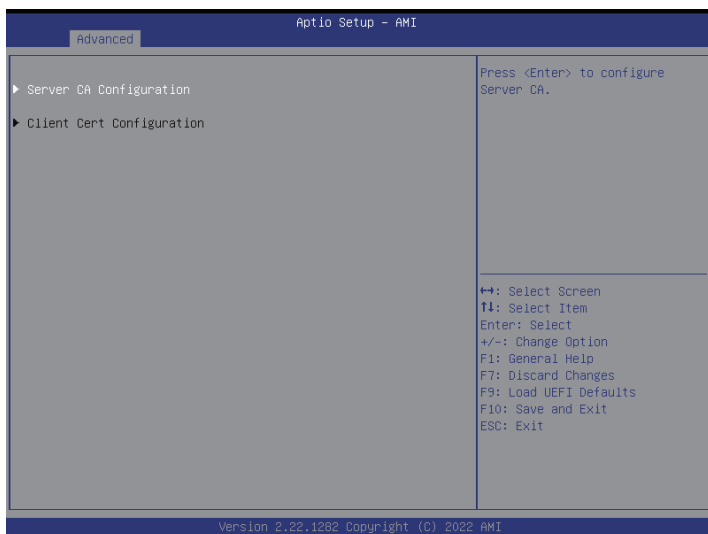
VMD port D

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.

3.3.15 Tls Auth Configuratio



Server CA Configuration

Press <Enter> to configure Server CA.

Client Cert Configuration

Enroll Cert

Press <Enter> to enroll cert.

Delete Cert

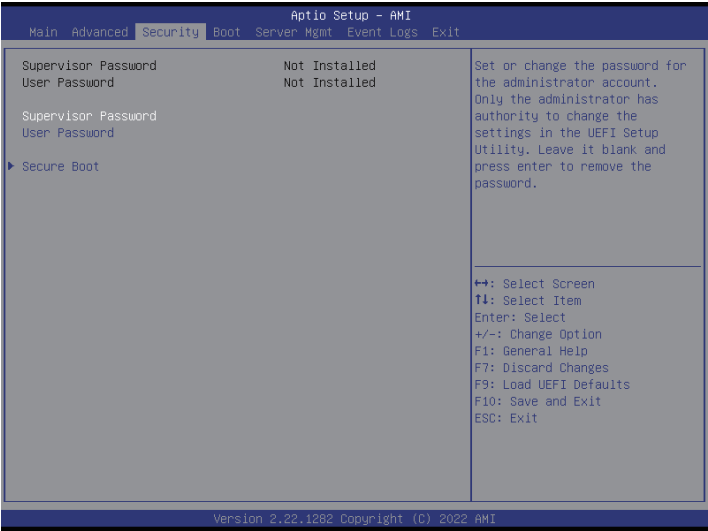
Press <Enter> to delete cert.

3.3.15 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 Key Management

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



Factory Key Provision

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

Install Default Secure Boot Keys

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

Clear Secure Boot keys

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

Export Secure Boot variables

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

Enroll Efi Image

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

Remove 'UEFI CA' from DB

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

Restore DB Defaults

Restore DB variable to factory defaults.

Platform Key(PK)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

- a) EFI_SIGNATURE_LIST
- b) EFI_CERT_X509 (DER)
- c) EFI_CERT_RSA2048 (bin)
- d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed

Key Exchange Keys

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

- a) EFI_SIGNATURE_LIST
- b) EFI_CERT_X509 (DER)
- c) EFI_CERT_RSA2048 (bin)
- d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed

Authorized Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

- a) EFI_SIGNATURE_LIST
- b) EFI_CERT_X509 (DER)
- c) EFI_CERT_RSA2048 (bin)
- d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed

Forbidden Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

- a) EFI_SIGNATURE_LIST
- b) EFI_CERT_X509 (DER)
- c) EFI_CERT_RSA2048 (bin)
- d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed

Authorized TimeStamps

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

- a) EFI_SIGNATURE_LIST
- b) EFI_CERT_X509 (DER)
- c) EFI_CERT_RSA2048 (bin)
- d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed

OsRecovery Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

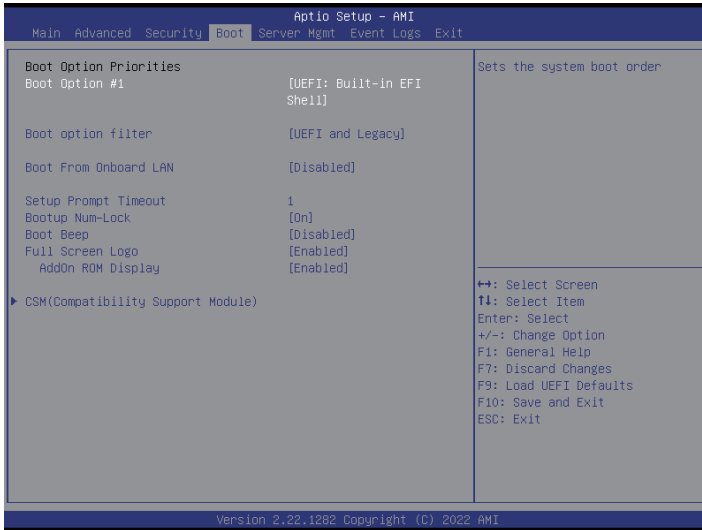
2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed

3.5 Boot Screen

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



Boot Option #1

Use this item to set the system boot order.

Boot Option Filter

This option controls Legacy/UEFI ROMs priority.

Boot From Onboard LAN

Use this item to enable or disable the Boot From Onboard LAN feature.

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

3.5.1 CSM Parameters



CSM

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

Launch Other Storage OpROM Policy

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

Launch Video OpROM Policy

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

OCP3 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

PCIE1 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

SLIM2 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

SLIM1 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

PCIE3 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

PCIE2 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

SLIM4 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

SLIM3 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

M2_1 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

M2_2 Slot OpROM

Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

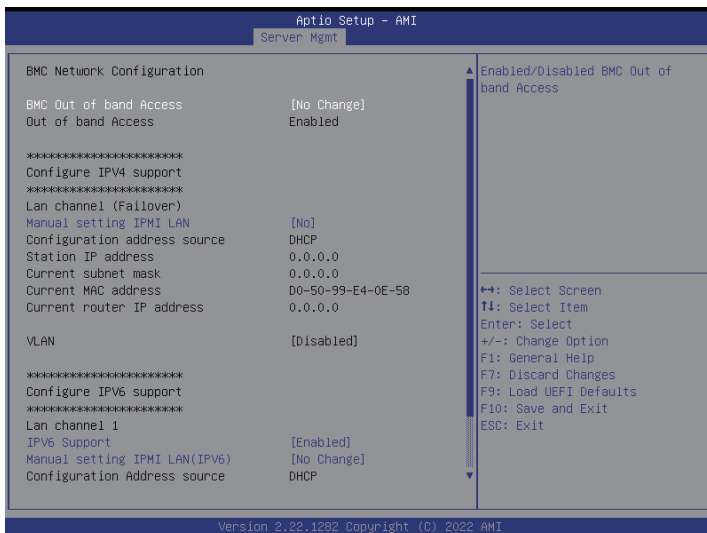
3.6 Server Mgmt



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.

3.6.1 BMC Network Configuration



BMC Out of Band Access

Enabled/Disabled BMC Out of band Access.

Lan Channel (Failover)

Manual Setting IPMI LAN

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

Configuration Address Source

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

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

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



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



The default login information for the IPMI web interface is:

Username: admin

Password: admin

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

VLAN

Enabled/Disabled Virtual Local Area Network.

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.

3.6.2 System Event Log



SEL Components

Change this to enable or disable all features of System Event Logging during boot.

Erase SEL

Use this to choose options for erasing SEL.

When SEL is Full

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

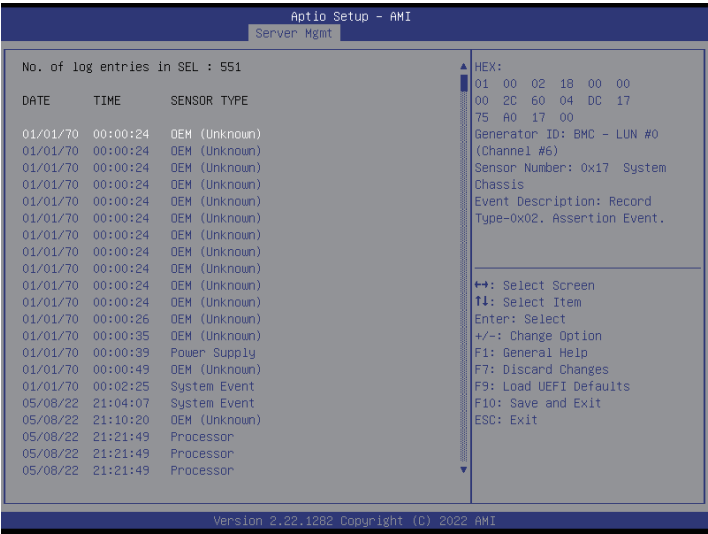
Log EFI Status Codes

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

PCIe Device Degrade ELog Support

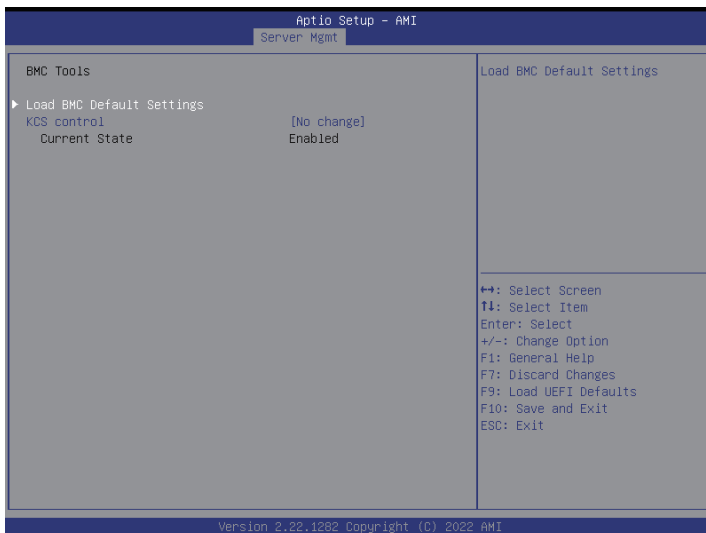
Use this item to enable or disable PCIe Device Degrade Error Logging Support.

3.6.3 View System Event Log



This page display the information of the system event log.

3.6.4 BMC Tools



Load BMC Default Settings

Use this item to Load BMC Default Settings

KCS Control

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



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

3.7 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.

3.8 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. Select [Yes] to save changes done so far to any of the setup options.

Discard Changes

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

Load UEFI Defaults

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

Boot Override

These items displays the available devices. Select an item to start booting from the selected device.

Chapter 4 Software Support

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/ RDIMM-3DS/ LRDIMM/ LRDIMM-3DS.
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>

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