ASRock®

WS

C621A WS

User Manual

Copyright Notice:

Disclaimer:

FC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.
"Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate"

ASRock Website: http://www.asrock.com

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Contents

Chapter 1 Introduction

Thank you for purchasing ASRock C621A WS motherboard, a reliable motherboard produced under ASRock's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock's commitment to quality and endurance.

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

Because the motherboard specifications and the BIOS software might be updated, the content of this documentation will be subject to change without notice. In case any modifications of this documentation occur, the updated version will be available on ASRock's website without further notice. If you require technical support related to this motherboard, please visit our website for specific information about the model you are using. You may find the latest VGA cards and CPU support list on ASRock's website as well. ASRock website http://www.asrock.com.

1.1 Package Contents

- ASRock C621A WS Motherboard (ATX Form Factor)
- ASRock C621A WS Quick Installation Guide
- ASRock C621A WS Support CD
- 1 x TPM-SPI module
- 1 x CPU Non-Fabric Carrier (Optional)
- 1 x Mini SAS HD to 4*SATA Cable (60cm) (Optional)
- 1 x SATA Power Cable (80cm) (Optional)
- 1 x SATA3 Data Cable (60cm) (Optional)
- 1 x I/O Panel Shield

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

English

1

1.2 Specifications

Platform	• ATX Form Factor • 12 Layer PCB • 2oz Copper PCB
CPU	• Supports 3rd Generation Intel® Xeon® Scalable Processors • Intel® Socket 4189 (Socket P+) • Digi Power Design • 7 Power Phase Design
Chipset	• Intel® C621A
Memory	• Eight Channel Memory Technology (1DPC) • 8 x DDR4 DIMM Slots • Supports DDR4 3200/2933/2666/2400/2133/1866 DDR4 RDIMM/ RDIMM-3DS/ LRDIMM/ LRDIMM-3DS/ Intel®Optane™ Persistent Memory 200 Series • Max. capacity of system memory: RDIMM: 64GB, LRDIMM: 128GB, RDIMM-3DS/ LRDIMM-3DS: 256GB
Expansion Slot	• 4 x PCIe Gen4x16 Slots (PCIE1/PCIE3/PCIE5/PCIE7)* • 3 x PCIe Gen4x8 Slots (PCIE2/PCIE4/PCIE6)* * If PCIE2 is occupied, PCIE3 will downgrade to x8 mode. If PCIE4 is occupied, PCIE5 will downgrade to x8 mode. If PCIE6 is occupied, PCIE7 will downgrade to x8 mode.
Graphics	• Aspeed® AST2500 BMC Controller • Supports D-Sub with max. resolution up to 1920x1200 @ 60Hz
LAN	**2 x 10 Gigabit LAN 100/1000/2500/5000/10000 Mb/s (Intel® X710-AT2)** • Supports Wake-On-LAN • Supports Lightning/ESD Protection • Supports Energy Efficient Ethernet 802.3az • Supports PXE

2 x Gigabit LAN 10/100/1000 Mb/s (Intel® I210)
- Supports Wake-On-LAN
- Supports Lightning/ESD Protection
- Supports Energy Efficient Ethernet 802.3az
- Supports PXE

1 x Dedicated IPMI (ASPEED AST2500)
- Supports iKVM and vMedia

Storage	• 2 x SATA3 6.0 Gb/s Connectors • 1 x Mini-SAS HD Connector • 1 x Ultra M.2 Socket (M2_1, Key M), supports type 2242/2280/22110 SATA3 6.0 Gb/s & PCIe Gen3x4 (32 Gb/s) modes* • 1 x M.2 Socket (M2_2, Key M), supports type 2242/2280/22110 SATA3 6.0 Gb/s & PCIe Gen3x1 (8 Gb/s) modes* * Supports Intel® Optane™ Technology * Supports NVMe SSD as boot disks * Supports ASRock U.2 Ki
RAID	• Supports RAID 0, RAID 1, RAID 5 and RAID 10 for SATA storage devices • Supports RAID 0, RAID 1, RAID 5 for M.2 NVMe storage devices
Rear Panel I/O	• 1 x UID Switch w/ LED • 1 x D-Sub Port • 4 x USB 3.2 Gen1 Ports (Supports ESD Protection) • 2 x RJ45 (10GbE), 2 x RJ45 (1GbE) • 1 x RJ45 Dedicated IPMI LAN port
Connector	• 1 x SPI TPM Header • 1 x LPC TPM Header • 1 x COM Port Header • 5 x System Fan Connectors (6-pin) • 1 x 24 pin ATX Power Connector (Hi-Density Power Connector)

English

- 1 x 8 pin 12V Power Connector (Hi-Density Power Connector)
- 1 x 4 pin 12V Power Connector (Hi-Density Power Connector)
- 1 x Vertical Type A USB 2.0
- 1 x USB 2.0 Header (Supports 2 USB 2.0 ports) (Supports ESD Protection)
- 1 x USB 3.2 Gen1 Headers (Support 2 USB 3.2 Gen1 ports) (Supports ESD Protection)
- 2 x USB3.2 Gen2 ports (2 Type-C headers)
- 2 x Front Panel Type C USB 3.2 Gen2 Headers (Supports ESD Protection)
- 2 x SGPIO Headers
- 1 x Auxiliary Panel Header
- 1 x Intelligent Platform Management Bus Header
- 1 x Backplane PCI Express Hot-Plug Connector Header
- 1 x SMBus Header
- 1 x PMbus Header
- 1 x CPU HP-SMBus Connector
- 1 x Thermal Sensor Header
- 1 x Virtual RAID On CPU Header
- 1 x BMC Heartbeat LED
- 1 x StandbyPower LED
- 5 x FanFail LED
- 1 x Non Maskable Interrupt Button Header
- 1 x Buzzer
- 1 x Dr. Debug with LED

BIOS Feature	• AMI UEFI Legal BIOS • ACPI 5.0 Compliant wake up events • SMBIOS 2.3 Support
Hardware Monitor	• Temperature Sensing: CPU, PCH, MB, Card Side • Fan Tachometer: CPU, Rear, Front Fan Tachometer • Quiet Fan (Auto adjust chassis fan speed by CPU temperature): CPU Fan • Fan Multi-Speed Control: CPU, Rear, Front Fan • Voltage Monitoring: CPU1_PVCCIN, PVDDQ_ABCD,PVDDQ_EFGH, 1.05V_PCH,1.8V_PCH, +BAT,PVNN_PCH, 3.3V,5V,12V,3.3VSB, 5VSB

OS	Microsoft® Windows®
	• 10 64-bit / 11 64-bit
	• Server 2016 (64 bit)
	• Server 2019 (64 bit)
	• Server 2022 (64 bit)
	Linux®:
	• Red Hat Enterprise Linux Server 7.9 (64 bit) / 8.3 (64 bit)
	• CentOs 7.9 (64 bit) / 8.3 (64 bit)
	• SUSE Enterprise Linux Server 12 SP5 (64 bit) / 15 SP2 (64 bit)
	• Ubuntu 20.04.1 (64 bit) / 20.10 (64 bit)
	Hypervisor:
	• VMWare® ESXi 6.7 U3 / vSphere 6.7 U3
	• VMWare® ESXi 7.0.U1c / vSphere 7.0.U1c
	• Hyper-V Winders Server 2016
	• Hyper-V Winders Server 2019
	* Please refer to our website for the latest OS support list.
Certifica-tions	• FCC, CE
	• ErP/EuP ready (ErP/EuP ready power supply is required)

* For detailed product information, please visit our website: http://www.asrock.com

> ⚠ *Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of your system. It should be done at your own risk and expense. We are not responsible for possible damage caused by overclocking.*

1.3 Motherboard Layout
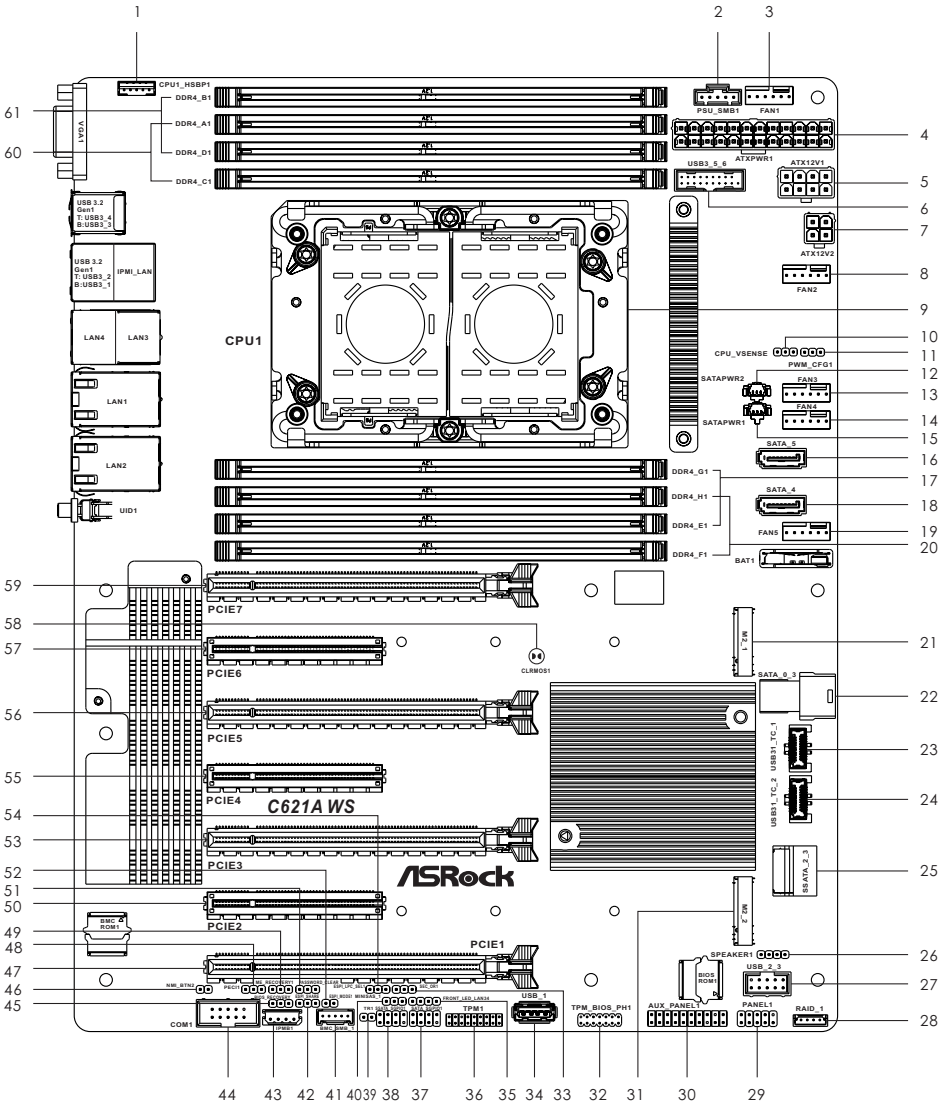
No.	Description
1	Backplane PCI Express Hot-Plug Connector (CPU1_HSBP1)
2	PSU SMBus Header (PSU_SMB1)
3	System Fan Connector (FAN1)
4	ATX Power Connector (ATXPWR1)
5	ATX 12V Power Connector (ATX12V1)
6	USB 3.2 Gen1 Header (USB3_5_6)
7	ATX 12V Power Connector (ATX12V2)
8	System Fan Connector (FAN2)
9	LGA 4189 CPU Socket (CPU1)
10	CPU VSENSE Header (CPU_VSENSE)
11	PWM Configuration Header (PWM_CFG1)
12	SATA DOM Power Connector (SATAPWR2)
13	System Fan Connector (FAN3)
14	System Fan Connector (FAN4)
15	SATA DOM Power Connector (SATAPWR1)
16	SATA3 DOM Connector (SATA_5)
17	2 x 288-pin DDR4 DIMM Slots (DDR4_E1, DDR4_G1)*
18	SATA3 DOM Connector (SATA_4)
19	System Fan Connector (FAN5)
20	2 x 288-pin DDR4 DIMM Slots (DDR4_F1, DDR4_H1)*
21	M.2 Socket (M2_1) (Type 2242/2280/22110)
22	Mini-SAS HD Connector (SATA_0_3)
23	Front Panel Type C USB 3.2 Gen2 Header (USB31_TC_1)**
24	Front Panel Type C USB 3.2 Gen2 Header (USB31_TC_2)**
25	SATA3 Connectors (SSATA_3)(Upper), (SSATA3_2)(Lower)**
26	Speaker Header (SPEAKER1)
27	USB 2.0 Header (USB_2_3)
28	Virtual RAID On CPUHeader (RAID_1)
29	System Panel Header (PANEL1)
30	Auxiliary Panel Header (AUX_PANEL1)
31	M.2 Socket (M2_2) (Type 2242/2280/22110)
32	TPM-SPI Header (TPM_BIOS_PH1)
33	Security Override Jumper (SEC_OR1)

No.	Description
34	Vertical USB 2.0 Port (USB_1)
35	Front LAN LED Header (FRONT_LED_LAN34)
36	TPM Header (TPM1)
37	SATA SGPIO Connector (SATA_SGPIO1)
38	SATA SGPIO Connector (SSATA_SGPIO1)
39	Thermal Sensor Header (TR1)
40	MiniSAS HD SATA/PCIE Slection Jumper (MINISAS_1)
41	BMC SMBus Header (BMC_SMB_1)
42	ESPI Flash Sharing Jumper (ESPI_SHARE)
43	Intelligent Platform Management Bus Header (IPMB1)
44	COM Header (COM1)
45	BIOS Recovery Jumper (BIOS_RECOVERY1)
46	Non Maskable Interrupt Button (NMI_BTN2)
47	PCI Express 4.0 x16 Card Slot (PCIE1)
48	CPU PECI Mode Jumper (PECI1)
49	ME Recovery Jumper (ME_RECOVERY1)
50	PCI Express 4.0 x8 Card Slot (PCIE2)
51	Password Reset Jumper (PASSWORD_CLEAR)
52	BIOS Swap Override Header (ESPI_MODE1)
53	PCI Express 4.0 x16 Card Slot (PCIE3)
54	ESPI/LPC Selection Jumper (ESPI_LPC_SEL1)
55	PCI Express 4.0 x8 Card Slot (PCIE4)
56	PCI Express 4.0 x16 Card Slot (PCIE5)
57	PCI Express 4.0 x8 Card Slot (PCIE6)
58	Clear CMOS Pad (CLRMOS1)
59	PCI Express 4.0 x16 Card Slot (PCIE7)
60	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_C1)*
61	2 x 288-pin DDR4 DIMM Slots (DDR4_B1, DDR4_D1)*

For DIMM installation and configuration instructions, please see p.21 (Installation of Memory Modules (DIMM)) for more details.

**2 Type-C USB headers (USB31_TC1/USB31_TC2) are shared with 2 SATA 7-pin headers (SSATA_2/SSATA_3) (BOM option)*

1.4 Onboard LED Indicators
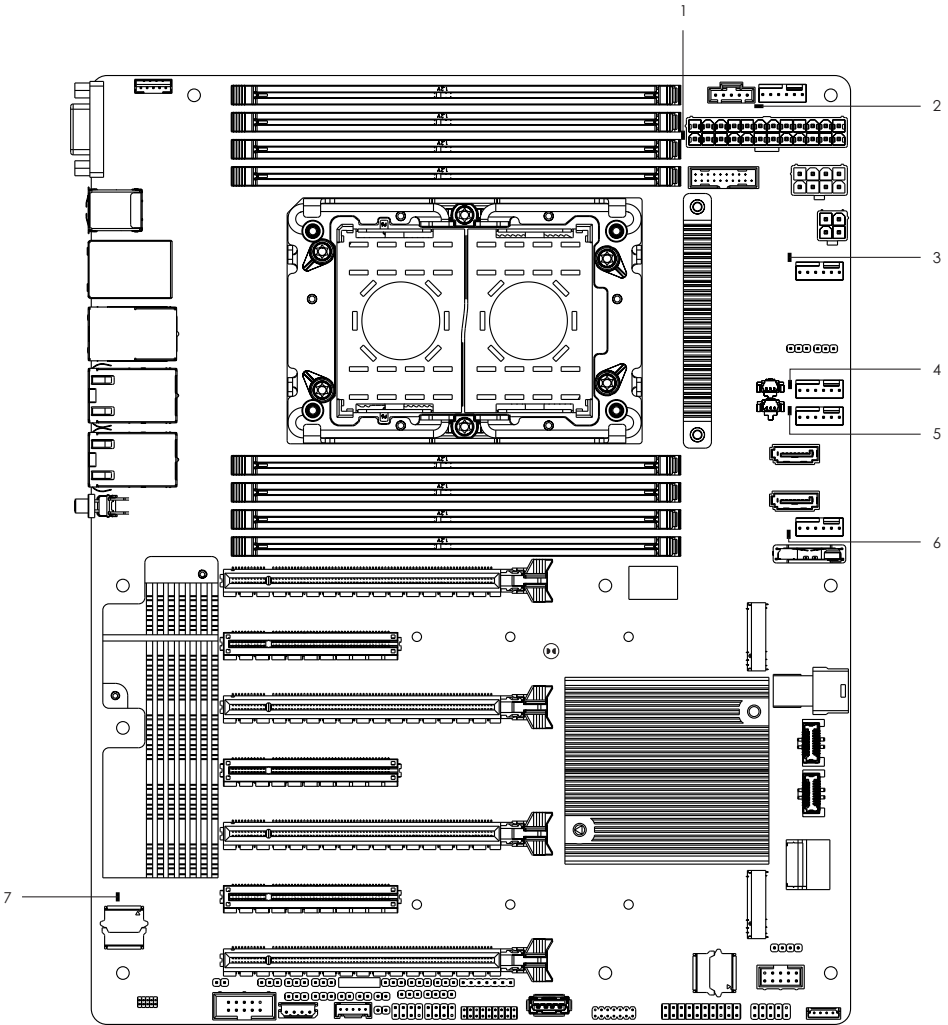
No.	Item	Status	Description
1	SB_PWR1	Green	STB PWR ready
2	FAN_LED1	Amber	FAN1 failed
3	FAN_LED2	Amber	FAN2 failed
4	FAN_LED3	Amber	FAN3 failed
5	FAN_LED4	Amber	FAN4 failed
6	FAN_LED5	Amber	FAN5 failed
7	BLED1	Green	BMC heartbeat LED

1.5 I/O Panel
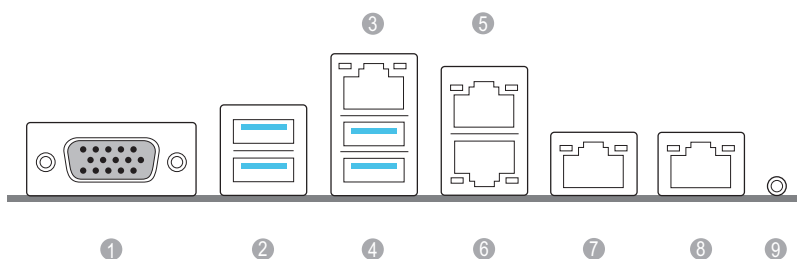
No.	Description	No.	Description
1	VGA Port (VGA1)	6	1G LAN RJ-45 Port (LAN4)**
2	USB 3.2 Gen1 Ports (USB3_3_4)	7	10G LAN RJ-45 Port (LAN1)***
3	LAN RJ-45 Port (IPMI_LAN)*	8	10G LAN RJ-45 Port (LAN2)***
4	USB 3.2 Gen1 Ports (USB3_1_2)	9	UID Switch (UID1)
5	1G LAN RJ-45 Port (LAN3)**		

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

ACT/LINK LED
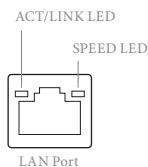
SPEED LED

LAN Port

Dedicated IPMI LAN Port LED Indications

Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10M bps connection or no link
Blinking Orange	Data Activity	Yellow	100M bps connection
On	Link	Green	1G bps connection

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

ACT/LINK LED — SPEED LED

ACT/LINK LED — SPEED LED
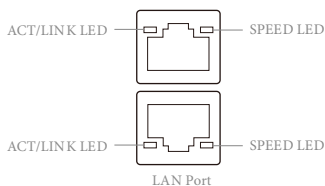
LAN Port

LAN Port (LAN3, LAN4) LED Indications

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

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

ACT/LINK LED
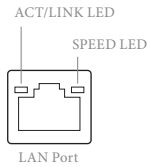
SPEED LED

LAN Port

LAN Port (LAN1, LAN2) LED Indications

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

Chapter 2 Installation

This is an ATX form factor (12" x 9.6", 30.5 cm x 24.4 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
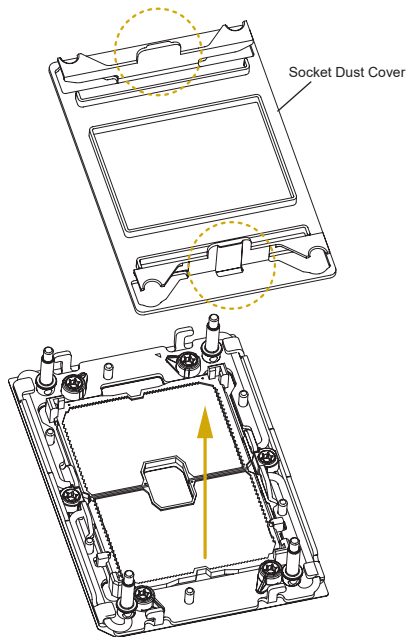
Socket Dust Cover

2

CPU Carrier

3

4

5

180°

6

7

CPU Carrier

8

Heatsink

CPU Carrier

Socket
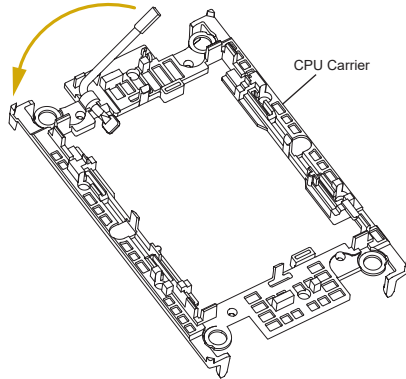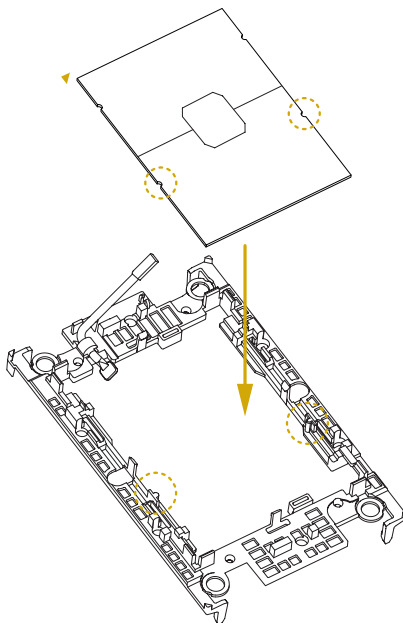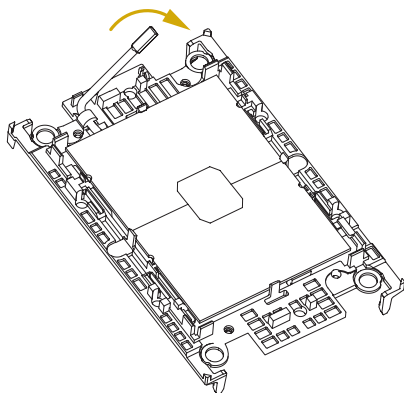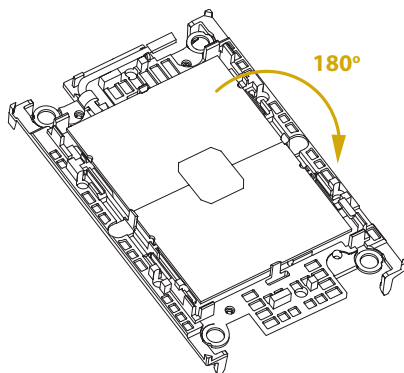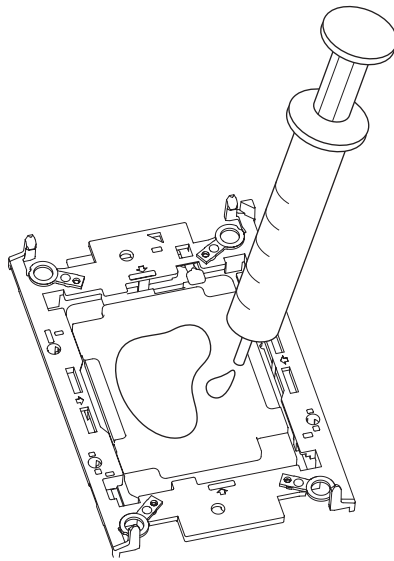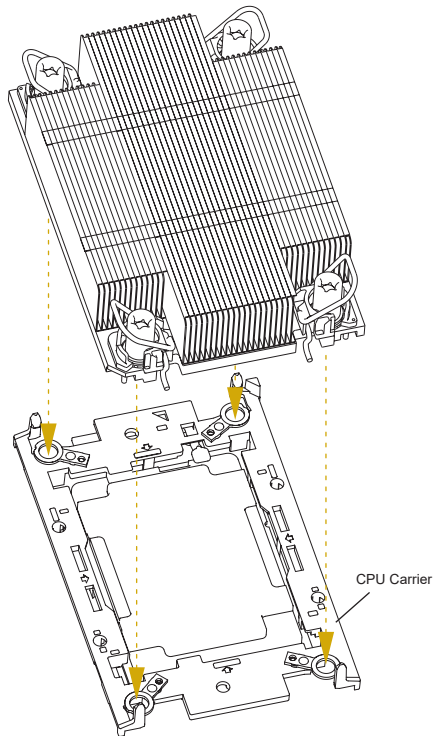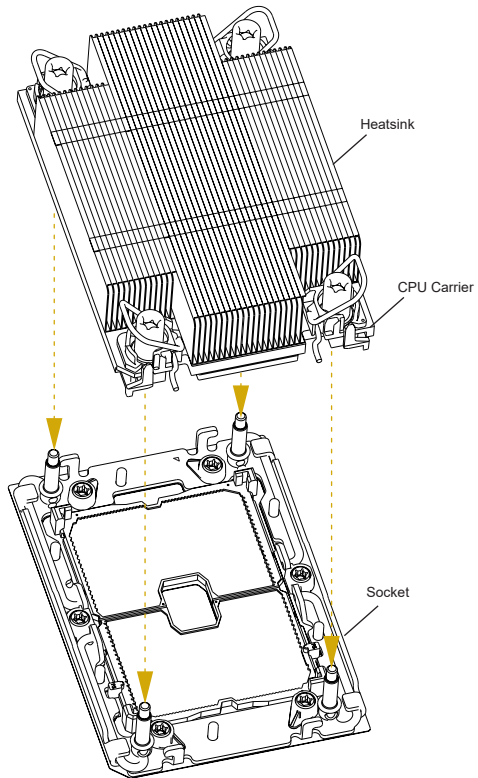
9
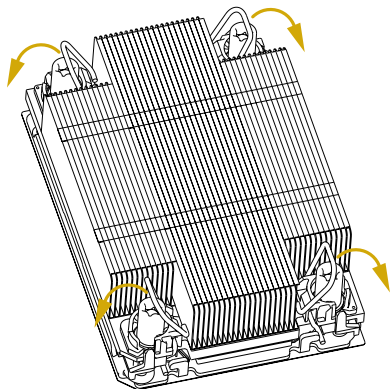
10
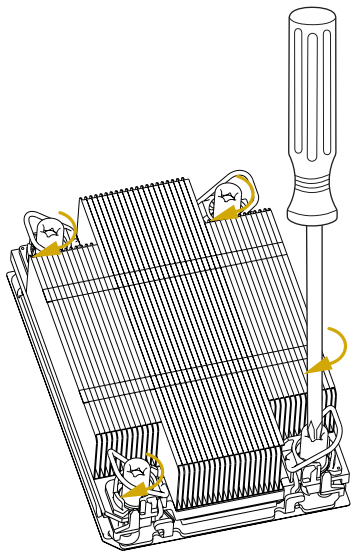
2.4 Installation of Memory Modules (DIMM)

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

	A1	B1	C1	D1	E1	F1	G1	H1
				CPU1				
1 DIMM			#					
2 DIMMS			#				#	
4 DIMMS			#	#			#	#
8 DIMMS	#	#	#	#	#	#	#	#

⚠️ 1. 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. For eight channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR4 DIMM pairs.
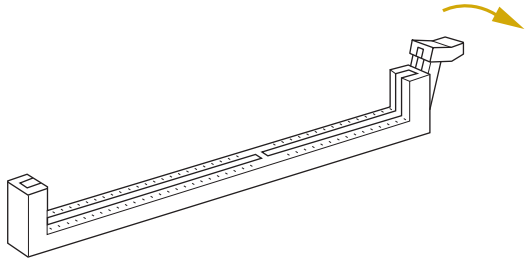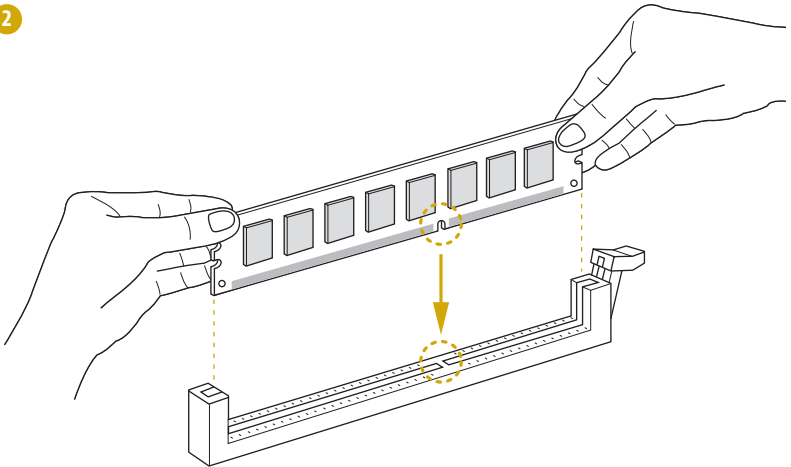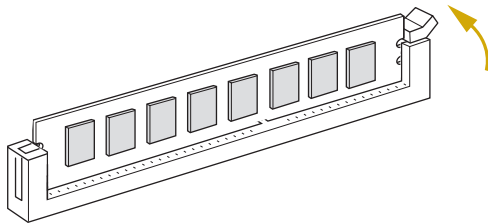
2.5 Expansion Slots (PCIe Slots)

There are 7 PCIe slots on this motherboard.

PCIE slot:
PCIE1, PCIE3, PCIE5 and PCIE7 (PCIE 4.0 x16 slot, from CPU1) are used for PCIe x16 lane width cards.
PCIE2, PCIE4 and PCIE6 (PCIE 4.0 x8 slot, from CPU1) are used for PCIe x8 lane width cards.

Slot	Generation	Mechanical	Electrical	Source
PCIE7	4.0	x16	x16	CPU1
PCIE6	4.0	x8	x8	CPU1
PCIE5	4.0	x16	x16	CPU1
PCIE4	4.0	x8	x8	CPU1
PCIE3	4.0	x16	x16	CPU1
PCIE2	4.0	x8	x8	CPU1
PCIE1	4.0	x16	x16	CPU1

PCIe Slot Configurations

	PCIE2	PCIE3
Single PCIE Card	N/A	x16
Two PCIE Cards	x8	x8

	PCIE4	PCIE5
Single PCIE Card	N/A	x16
Two PCIE Cards	x8	x8

	PCIE6	PCIE7
Single PCIE Card	N/A	x16
Two PCIE Cards	x8	x8

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.

Short	Open	
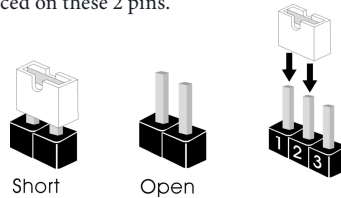
MiniSAS HD SATA/PCIE Selection Jumper (3-pin MINISAS_1) (see p.6, No. 40)	**1_2** SATA (Default)	**2_3** PCIE
CPU PECI Mode Jumper (3-pin PECI1) (see p.6, No. 48)	**1_2** CPU PECI connected to PCH	**2_3** CPU PECI connected to BMC (Default)
Security Override Jumper (3-pin SEC_OR1) (see p.6, No. 33)	**1_2** Descriptor Security Override	**2_3** Not override (Default)
ME Recovery Jumper (3-pin ME_RECOVERY1) (see p.6, No. 49)	**1_2** Normal Mode (Default)	**2_3** ME Recovery Mode
Password Reset Jumper (3-pin PASSWORD_ CLEAR) (see p.6, No. 51)	**1_2** Normal Mode (Default)	**2_3** Password Clear

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BIOS Recovery Jumper (3-pin BIOS_RECOVERY1) (see p.6, No. 45)	**1_2** Normal Mode (Default)	**2_3** Recover BIOS
ESPI/LPC Selection Jumper (3-pin ESPI_LPC_SEL1) (see p.6, No. 54)	**1_2** ESPI (Default)	**2_3** LPC
ESPI Flash Sharing Jumper (3-pin ESPI_SHARE) (see p.6, No. 42)	**1_2** Master ESPI Flash Sharing (Default)	**2_3** Slave ESPI Flash Sharing

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".

Short   Open
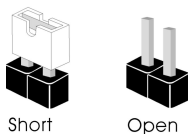
BIOS Swap Override Jumper (ESPI_MODE1) (see p.6, No. 52)	**1_2** 2-pin Jumper	Open: Disable Override (Default) Short: Enable Override

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.6, No. 29)

PLED+
PLED-
PWRBTN#
GND

1

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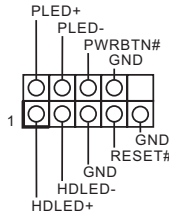
Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments. Particularly note the positive and negative pins before connecting the cables.

🔍 **PWRBTN (Power Switch):**
Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.

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

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

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

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

Auxiliary Panel Header
(18-pin AUX_PANEL1)
(see p.6, No. 30)
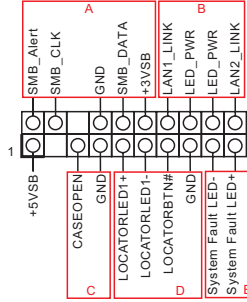
This header supports multiple functions on the front panel, including the front panel SMB, internet status indicator and chassis intrusion pin.

A. Front panel SMBus connecting pin (6-1 pin FPSMB)
This header allows you to connect SMBus (System Management Bus) equipment. It can be used for communication between peripheral equipment in the system, which has slower transmission rates, and power management equipment.

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

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

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

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

Mini-SAS HD Connector
Right-Angle:
(SATA_0_3)
(see p.6, No. 22)

SATA_0_3
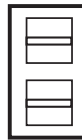
This connector supports MiniSAS-to-SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.

28

USB 3.2 Gen1 Header
(19-pin USB3_5_6)
(see p.6, No. 6)

IntA_PA_D+
IntA_PA_D-
GND
IntA_PA_SSTX+
IntA_PA_SSTX-
GND
IntA_PA_SSRX+
IntA_PA_SSRX-
Vbus

1

Vbus
IntA_PB_SSRX-
IntA_PB_SSRX+
GND
IntA_PB_SSTX-
IntA_PBA_SSTX+
GND
IntA_PB_D-
IntA_PB_D+
Dummy
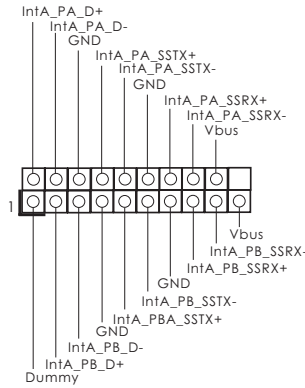
Besides four default USB 3.2 Gen1 ports on the I/O panel, there is one USB 3.2 Gen1 header on this motherboard. This USB 3.2 Gen1 header can support two USB 3.2 Gen1 ports.

System Fan Connectors
(6-pin FAN1)
(6-pin FAN2)
(6-pin FAN3)
(6-pin FAN4)
(6-pin FAN5)
(see p.6, No. 3, 8, 13, 14, 19)

6 5 4 3 2 1

GND
FAN_VOLTAGE
FAN_SPEED
FAN_SPEED_CONTROL
SENSOR
NC
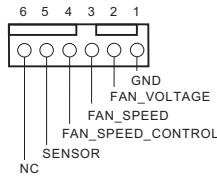
Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control.

Front Panel Type C USB 3.2 Gen2 Headers
(20-pin USB31_TC_1)
see p.6, No. 23)
(20-pin USB31_TC_2)
(see p.6, No. 24)

There are two Front Panel Type C USB 3.2 Gen2 Header on this motherboard. These headers are used for connecting USB 3.2 Gen2 modules for additional USB 3.2 Gen2 ports.

*2 Type-C USB headers (USB31_TC1/ USB31_TC2) are shared with 2 SATA 7-pin headers (SSATA_2/SSATA_3) (BOM option).

USB 2.0 Connector
(USB_1)
(see p.6, No. 34)

There is one vertical USB 2.0 port on this motherboard.

USB 2.0 Header (9-pin USB_2_3) (see p.6, No. 27)	USB_PWR P- P+ GND DUMMY 1 P+ GND P- USB_PWR	This is one header on this motherboard. This USB 2.0 header can support two ports.
ATX Power Connector (24-pin ATXPWR1) (see p.6, No. 4)	3V 3V GND 5V GND 5V GND PWROK_PS 5VSB 12V 12V 3V 1 12 13 24 3V -12V GND PSON# GND GND GND N/A 5V 5V 5V GND	This motherboard provides a 24-pin ATX power connector. To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13.
ATX 12V Power Connectors (8-pin ATX12V1) (see p.6, No. 5) (4-pin ATX12V2) (see p.6, No. 7)	GND 1 4 5 8 12V GND 1 2 3 4 12V	This motherboard provides one 8-pin and one 4-pin ATX 12V power connectors.
SATA DOM Power Connector (3-pin SATAPWR1) (see p.6, No. 15) (3-pin SATAPWR2) (see p.6, No. 12)	+5V GND +12V	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.
TPM Header (17-pin TPM1) (see p.6, No. 36)	GND +3VSB LAD0 +3V LAD3 PCIRST# LFRAME# PCICLK 1 GND SERIRQ# S_PWRDWN# GND LAD1 LAD2 SMB_DATA_MAIN SMB_CLK_MAIN GND	This connector supports 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.
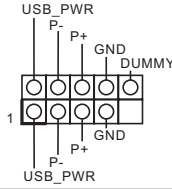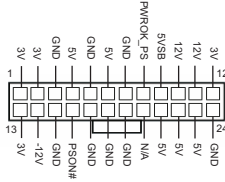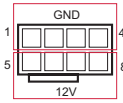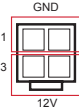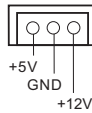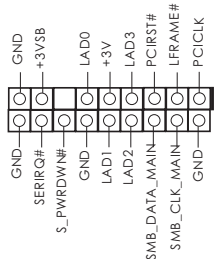
TPM-SPI Header
(13-pin TPM_BIOS_PH1)
(see p.6, No. 32)

TPM_CS#
GND
RSMRST#
MISO
SPI_CS
SPI_WP

SPI PIRQ
SPI_RST
MOSI
SPI_CLK
X
+3.3V
SPI_HOLD

1
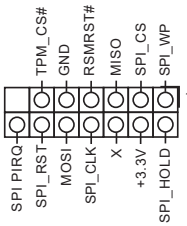
This connector supports Trusted Platform Module (TPM) system for SPI interface, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

PSU SMBus Header
(5-pin PSU_SMB1)
(see p.6, No. 2)

ALERT
SMBCLK   +3V
1
SMBDATA
GND
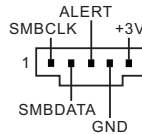
PSU SMBus monitors the status of the power supply, fan and system temperature.

Intelligent Platform Management Bus Header
(4-pin IPMB1)
(see p.6, No. 43)

IPMB_SDA
IPMB_SCL

GND
No Connect
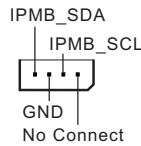
This 4-pin connector is used to provide a cabled base-board or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.

Baseboard Management Controller SMBus Header
(5-pin BMC_SMB_1)
(see p.6, No. 41)

BMC_SMB_PRESENT_1_N
Power
BMC_SMBCLK7
GND
BMC_SMBDATA7
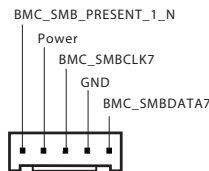
The header is used for the SM BUS devices.

CPU HP-SMBus Connector
(5-pin CPU1_HSBP1)
(see p.6, No. 1)

+3V
CPU_HP_SCL
CPU_HP_SDA
P0_HP_ALERT_L
GND

1
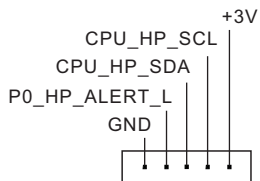
This header is used for the hot plug feature of HDDs on the backplane.

Serial ATA3 DOM Connectors (SATA_4) (see p.6, No. 18) (SATA_5) (see p.6, No. 16)	SATA_5 SATA_4	The SATA3 DOM connectors support both SATA DOMs (Disk-On-Module) and SATA data cables for internal storage devices.
Serial ATA3 Connectors Vertical: (SATA_4) (see p.6, No. 18) (SATA_5) (see p.6, No. 16)	SATA_5 SATA_4	These two SATA3 connectors support SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate. *2 Type-C USB headers (USB31_TC1/ USB31_TC2) are shared with 2 SATA 7-pin headers (SSATA_2/SSATA_3) (BOM option).
Serial Port Header (9-pin COM1) (see p.6, No. 44)	DDCD#1 TTXD1 GND RRTS#1 RRI#1 CCTS#1 DDSR#1 DDTR#1 RRXD1	This COM header supports a serial port module.
Clear CMOS Pad (CLRMOS1) (see p.6, No. 58)		This allows you to clear the data in CMOS. To clear CMOS, take out the CMOS battery and short the Clear CMOS Pad.
Non Maskable Interrupt Button Header (NMI_BTN2) (see p.6, No. 46)	GND 1 CONTROL	Please connect a NMI device to this header.
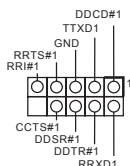
Thermal Sensor Header (2-pin TR1) (see p.6, No. 39)	TR1 1 ⊙⊙ GND	Please connect the thermal sensor cable to either pin 1-2 or pin 2-3 and the other end to the device which you wish to monitor its temperature.
Front LAN LED Header (4-pin FRONT_LED_LAN34) (see p.6, No. 35)	1 ⊙⊙⊙⊙ LAN4_LINK LED_PWR LED_PWR LAN3_LINK	This 4-pin connector is used for the front LAN status indicator.
Chassis Speaker Header (4-pin SPEAKER1) (see p.6, No. 26)	DUMMY SPEAKER 1 ⊙⊙⊙⊙ +5V DUMMY	Please connect the chassis speaker to this header.
Serial General Purpose Input/Output Headers (7-pin SATA_SGPIO1) (see p.6, No. 37) (7-pin SSATA_SGPIO1) (see p.6, No. 38)	SCLOCK SLOAD GND ⊙⊙⊙⊙ 1 ⊙⊙⊙ SDATAOUT GND	The headers support Serial Link interface for onboard SATA connections.
PWM Configuration Header (3-pin PWM_CFG1) (see p.6, No. 11)	GND SMB_DATA_VSB SMB_CLK_VSB 1 ⊙⊙⊙	This header is used for PWM configurations.
CPU VSENSE Header (3-pin CPU_VSENSE) (see p.6, No. 10)	H_VSENSEINPMAX_CPU1 GND GND 1 ⊙⊙⊙	This header is used to detect CPU1 VSENSE.
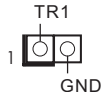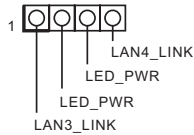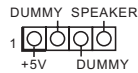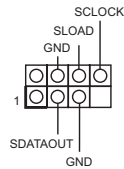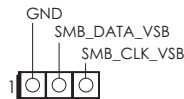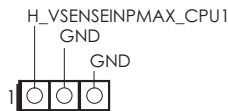
Virtual RAID On CPU
Header
(4-pin RAID_1)
(see p.6, No. 28)

1 ⃝⃝⃝⃝
VROC RAID KEY
GND
+3VSB
GND
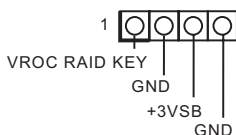
This connector supports Intel®
Virtual RAID on CPU and
NVME/AHCI RAID on CPU
PCIE.

With the introduction of the Intel VROC product, there are three modes of operation:

SKU	HW key required	Key features
Pass-thru	Not needed	• Pass-thru only (no RAID) • LED Management • Hot Plug Support • RAID 0 support for Intel Fultondale NVMe SSDs
Standard	VROCSTANMOD	• Pass-thru SKU features • RAID 0, 1, 10
Premium	VROCPREMMOD	• Standard SKU features • RAID 5 • RAID 5 Write Hole Closure
ISS	VROCISSDMOD	

*Only Intel SSDs are supported.

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

2.8 Unit 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)
(see p.11, No. 9)

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

2.9 Driver Installation Guide

To install the drivers to your system, please insert the support CD to your optical drive first. Then, the drivers compatible to your system can be auto-detected and listed on the support CD driver page. Please follow the order from top to bottom to install those required drivers. Therefore, the drivers you install can work properly.

English

2.10 M.2_SSD (NGFF) Module Installation Guide

The M.2, also known as the Next Generation Form Factor (NGFF), is a small size and versatile card edge connector that aims to replace mPCIe and mSATA.
The Ultra M.2 Socket (M2_1) supports a M.2 SATA3 6.0 Gb/s module or a M.2 PCI Express module up to Gen3 x4 (32Gb/s). The M.2 Socket (M2_2) supports a M.2 SATA3 6.0 Gb/s module or a M.2 PCI Express module up to Gen3 x1 (8 Gb/s).

Installing the M.2_SSD (NGFF) Module
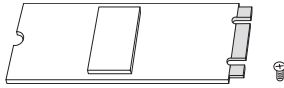
Step 1

Prepare a M.2_SSD (NGFF) module and the screw.
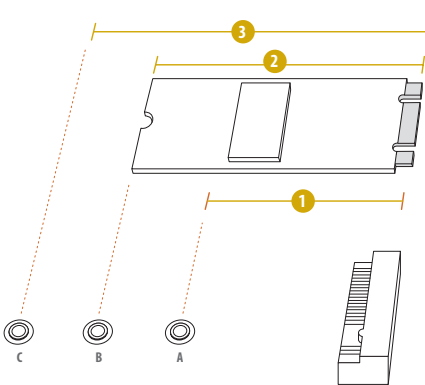
Step 2

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

No.	1	2	3
Nut Location	A	B	C
PCB Length	4.2cm	8cm	11cm
Module Type	Type 2242	Type 2280	Type 22110
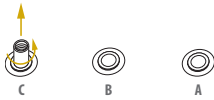
Step 3

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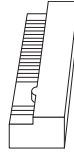
Step 4

Peel off the yellow protective film on the nut to be used. Hand tighten the standoff into the desired nut location on the motherboard.
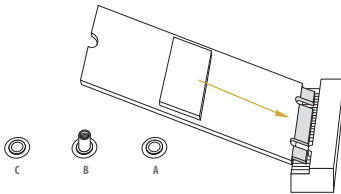
Step 5

Align and gently insert the M.2 (NGFF) SSD module into the M.2 slot. Please be aware that the M.2 (NGFF) SSD module only fits in one orientation.
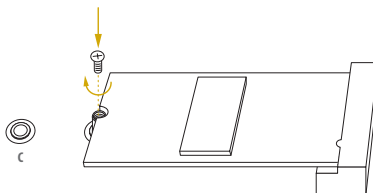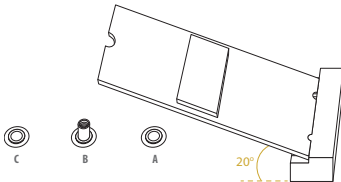
Step 6

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

For the latest updates of M.2_SSD (NFGG) module support list, please visit our website for details: http://www.asrock.com

English

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 <Del> during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY; otherwise, POST will continue with its test routines.

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

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

3.1.1 UEFI Menu Bar

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

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

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

3.1.2 Navigation Keys

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

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

3.2 Main Screen

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

```
                              Aptio Setup - AMI
      Main  Advanced  Security  Boot  Server Mgmt  Event Logs  Exit

    UEFI Version      :                                Set the Date. Use Tab to
    BMC Version       : 1.02.00                        switch between Date elements.
    CPLD Version      : 0.02                           Default //Ranges:
                                                       Year: 2005-2099
    Processor Type    : Intel(R) Xeon(R) Gold 6338N CPU @ 2.20GHz  Months: 1-12
    Processor Speed   : 1600MHz                        Days: Dependent on month
    Microcode Update  : 606A6/0D000280                 Range of Years may vary.
    L1 Cache Size     : 80KB
    L2 Cache Size     : 1280KB
    L3 Cache Size     : 49152KB

    PCH Information   : LBG QS/PRQ - C621A - S2

    Total Memory      : 32GB,    Single-Channel Memory Mode  ↔: Select Screen
                                                       ↑↓: Select Item
    DDR4_A1           : None                           Enter: Select
    DDR4_B1           : None                           +/-: Change Option
    DDR4_C1           : DDR4-2666 DRx8 32GB R-DIMM      F1: General Help
    DDR4_D1           : None                           F7: Discard Changes
    DDR4_E1           : None                           F9: Load UEFI Defaults
    DDR4_F1           : None                           F10: Save and Exit
    DDR4_G1           : None                           ESC: Exit
    DDR4_H1           : None
    System Date                     [Sat 01/04/2098]
    System Time                     [13:09:34]

                    Version 2.21.1280 Copyright (C) 2021 AMI
```

3.3 Advanced Screen

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

```
                            Aptio Setup — AMI
        Main  Advanced  Security  Boot  Server Mgmt  Event Logs  Exit

    ▶ CPU Configuration                          CPU Configuration Parameters
    ▶ DRAM Configuration
    ▶ Chipset Configuration
    ▶ Storage Configuration
    ▶ ACPI Configuration
    ▶ USB Configuration
    ▶ Super IO Configuration
    ▶ Serial Port Console Redirection
    ▶ H/W Monitor
    ▶ Runtime Error Logging
    ▶ Intel SPS Configuration
    ▶ Intel® VMD technology
    ▶ Tls Auth Configuration                     ↔: Select Screen
                                                 ↑↓: Select Item
      UEFI Update Utility                        Enter: Select
    ▶ Instant Flash                              +/-: Change Option
                                                 F1: General Help
                                                 F7: Discard Changes
                                                 F9: Load UEFI Defaults
                                                 F10: Save and Exit
                                                 ESC: Exit

                    Version 2.21.1280 Copyright (C) 2021 AMI
```

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

3.3.1 CPU Configuration

```
                                    Aptio Setup - AMI
        Advanced

  Intel(R) Xeon(R) Gold 6330N CPU @ 2.20GHz          ▲   Intel SpeedStep technology
  Microcode Revision              606A6/0D0001E0         allows processors to switch
  Intel VT-x Technology           Supported              between multiple frequencies
                                                         and voltage points for better
  Intel SpeedStep Technology      [Enabled]              power saving and heat
  Intel Turbo Boost Technology    [Enabled]              dissipation.
  Intel Hyper Threading Technology [Enabled]             CPU turbo ratio can be fixed
  Long Duration Maintained        [1s]                   when Intel SpeedStep
  Short Duration Power Limit      Auto                   Technology set Disabled and
  Long Duration Power Limit       Auto                   Intel Turbo Boost Technology
  Active Processor 1 Cores        [All]                  set Enabled.
  Active Processor 2 Cores        [All]

  Enable Intel TXT Support        [Disabled]         ↔: Select Screen
  Intel Virtualization Technology [Enabled]          ↑↓: Select Item
  Enable SMX                      [Disabled]         Enter: Select
  DCU Streamer Prefetcher         [Enabled]          +/-: Change Option
  Hardware Prefetcher             [Enabled]          F1: General Help
  Adjacent Cache Line Prefetch    [Enabled]          F7: Discard Changes
                                                     F9: Load UEFI Defaults
  Package C State Support         [C0/C1 state]      F10: Save and Exit
  CPU C6 State Support            [Disabled]         ESC: Exit
  Enhanced Halt State(C1E)        [Disabled]
  Hardware P-States               [Native Mode]
  AES-NI                          [Enabled]      ▼

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```

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.

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.

English

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 UmaBasedClutering 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

```
                              Aptio Setup - AMI
        Advanced

 Enforce POR                      [Disabled]         Enforce POR - Enforces Plan Of
 DRAM Frequency                   [Auto]             Record restrictions for DDR4
 Numa                             [Enabled]          frequency and voltage
                                                     programming. Disable -
 IMC Interleaving                 [1-way Interleave] Disables this feature.
 Mirror Mode                      [Disabled]
 Memory Rank Sparing              [Disabled]
 ADDDC Sparing                    [Disabled]
 Multi Rank Sparing               [Two Rank]
 Patrol Scrub                     [Disabled]
 Data Scrambling for DDR4         [Enabled]

                                                     ↔: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Option
                                                     F1: General Help
                                                     F7: Discard Changes
                                                     F9: Load UEFI Defaults
                                                     F10: Save and Exit
                                                     ESC: Exit

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```

Enforce POR

Enable to enforce POR restrictions for DDR4 frequency and voltage programming.

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

Mirror Mode will set entire 1LM/2LM memory in system to be mirrored, consequently reducing the memory capacity by half. Mirror Enable will disable XPT Prefetch.

Memory Rank Sparing

Enable or disable Memory Rank Sparing.

ADDDC Sparing

Enable or disable Memory Rank Sparing.

English

Multi Rank Sparing

Set Multi Rank Sparing number. Default and the maximum is 2 ranks per channel.

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

```
                                     Aptio Setup - AMI
          Advanced

     MMCFG Base                          [Auto]              Select MMCFG Base
     MMIO High Base                      [32T]
     MMIO High Granularity Size          [64G]
     Above 4G Decoding                   [Enabled]
     Primary Graphics Adapter            [PCI Express]
     Onboard VGA                         [Auto]
     VT-d                                [Enabled]
     PCIe Hot Plug                       [Disabled]

     PCIE1 Link Width                    [x16]
     PCIE1 Link Speed                    [Auto]
     PCIE1 ASPM Support                  [L1 Only]
     PCIE3/PCIE2 Link Width              [Auto]
     PCIE3/PCIE2 Link Speed              [Auto]           ←→: Select Screen
     PCIE3/PCIE2 ASPM Support            [L1 Only]        ↑↓: Select Item
     PCIE5/PCIE4 Link Width              [Auto]           Enter: Select
     PCIE5/PCIE4 Link Speed              [Auto]           +/-: Change Option
     PCIE5/PCIE4 ASPM Support            [L1 Only]        F1: General Help
     PCIE7/PCIE6 Link Width              [Auto]           F7: Discard Changes
     PCIE7/PCIE6 Link Speed              [Auto]           F9: Load UEFI Defaults
     PCIE7/PCIE6 ASPM Support            [L1 Only]        F10: Save and Exit
                                                          ESC: Exit
     SR-IOV Support                      [Enabled]
     Restore AC Power Loss               [No change]
     Restore AC Power Current State      Last State

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```

MMCFG Base

Use this item to select MMCFG Base.

MMIO High Base

Use this item to select MMIO High Base.

MMIO High Granularity Size

Use this item to select MMIO Granularity Size.

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, you may 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] or [Onboard Hdmi] .

VT-d

Intel Virtualization Technology for Directed I/O helps your 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.

PCIE1 Link Width

This allows you to select PCIE1 Link Width. The default value is [x16].

PCIE1 Link Speed

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

PCIE1 ASPM Support

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

PCIE3/PCIE2 Link Width

This allows you to select PCIE3/PCIE2 Link Width. The default value is [x16].

PCIE3/PCIE2 Link Speed

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

PCIE3/PCIE2 ASPM Support

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

PCIE5/PCIE4 Link Width

This allows you to select PCIE5/PCIE4 Link Width. The default value is [x16].

PCIE5/PCIE4 Link Speed

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

PCIE5/PCIE4 ASPM Support

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

PCIE7/PCIE6 Link Width

This allows you to select PCIE7/PCIE6 Link Width. The default value is [x16].

PCIE7/PCIE6 Link Speed

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

PCIE7/PCIE6 ASPM Support

This option enables or disables the ASPM support for all 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

Select 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.

Restore AC Power Current State

This allows you to restore AC Power Current State

3.3.4 Storage Configuration

```
                              Aptio Setup - AMI
        Advanced

     SATA_0_3 Link Width              [x4]            Configure SATA_0_3 Link Width
     SATA Controller                  [Enabled]
     SATA Mode Selection              [AHCI]
     SATA ALPM                        [Enabled]

  ▶ SATA_0 : Not Detected
  ▶ SATA_1 : Not Detected
  ▶ SATA_2 : Not Detected
  ▶ SATA_3 : Not Detected
  ▶ SATA_4 : Not Detected
  ▶ SATA_5 : Not Detected

     sSATA Controller                 [Enabled]
     sSATA/M.2_SATA Mode Selection    [AHCI]          ↔: Select Screen
     sSATA ALPM                       [Enabled]       ↑↓: Select Item
                                                      Enter: Select
  ▶ M2_1(PCIE) : Not Detected                         +/-: Change Option
  ▶ M2_1(SATA) : Not Detected                         F1: General Help
  ▶ M2_2(PCIE) : Not Detected                         F7: Discard Changes
  ▶ M2_2(SATA) : Not Detected                         F9: Load UEFI Defaults
                                                      F10: Save and Exit
                                                      ESC: Exit



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```

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 Aggressive Link Power Management.

sSATA Controller

Use this item to enable or disable SATA Controllers.

sSATA/M.2_SATA Mode Selection

Identify the SATA/M.2_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 Aggressive Link Power Management.

3.3.5 ACPI Configuration

```
                              Aptio Setup — AMI
        Advanced

   PCIE Devices Power On              [Disabled]        Allow the system to be waked
   Ring-In Power On                   [Disabled]        up by a PCIE device and enable
   RTC Alarm Power On                 [By OS]           wake on LAN.




                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Option
                                                        F1: General Help
                                                        F7: Discard Changes
                                                        F9: Load UEFI Defaults
                                                        F10: Save and Exit
                                                        ESC: Exit


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```
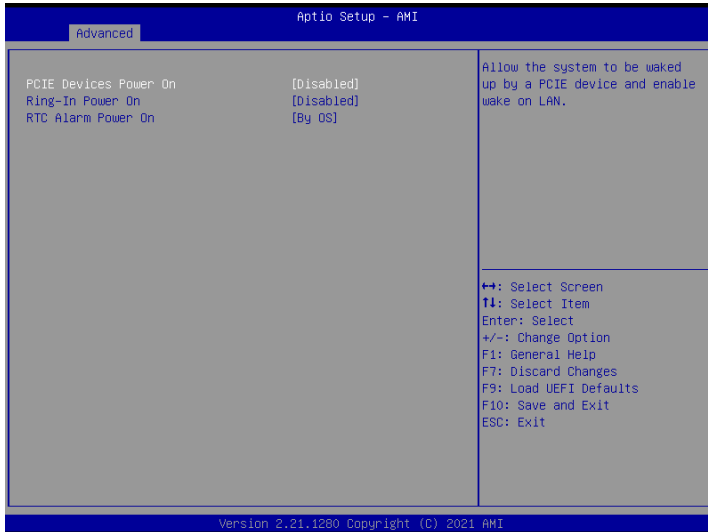
PCIE Devices Power On

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

Ring-In Power On

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

RTC Alarm Power On

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

3.3.6 USB Configuration

```
                              Aptio Setup — AMI
      Advanced

   Legacy USB Support               [Enabled]              Enables Legacy USB support.
                                                           AUTO option disables legacy
                                                           support if no USB devices are
                                                           connected. DISABLE option will
                                                           keep USB devices available
                                                           only for EFI applications.




                                                           ↔: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Option
                                                           F1: General Help
                                                           F7: Discard Changes
                                                           F9: Load UEFI Defaults
                                                           F10: Save and Exit
                                                           ESC: Exit



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```

Legacy USB Support

Use this option to enable or disable legacy support for USB devices. The default value is [Enabled].

3.3.7 Super IO Configuration

```
                              Aptio Setup - AMI
          Advanced

     AST2500 Super IO Configuration                        Set Parameters of COM1

       Super IO Chip                      AST2500
     ▶ Serial Port 1 Configuration
     ▶ SOL Configuration




                                                          ↔: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Option
                                                          F1: General Help
                                                          F7: Discard Changes
                                                          F9: Load UEFI Defaults
                                                          F10: Save and Exit
                                                          ESC: Exit


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```
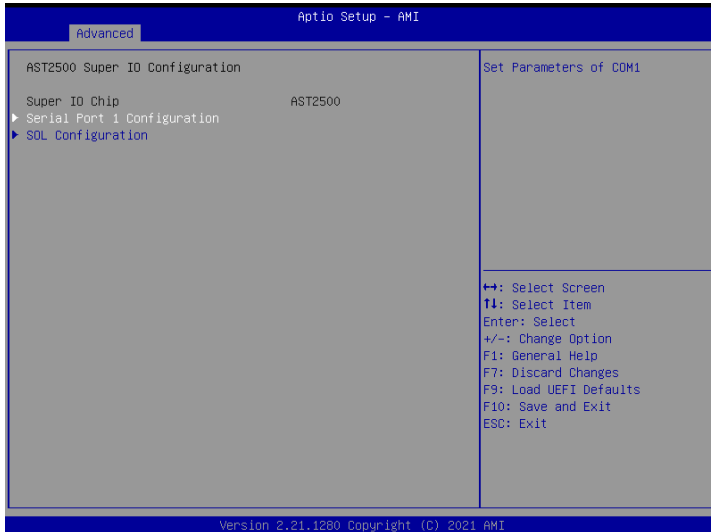
Serial Port 1 Configuration

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

Serial Port

Use this item to enable or disable the serial port.

Change Settings

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

SOL Configuration

Use this item to set parameters of SOL.

SOL Port

Use this item to set parameters of SOL.

Change Settings

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

3.3.8 Serial Port Console Redirection

```
                              Aptio Setup - AMI
        Advanced

                                                      Console Redirection Enable or
      COM1                                            Disable.
      Console Redirection              [Disabled]
    ▶ Console Redirection Settings

      SOL
      Console Redirection              [Disabled]
    ▶ Console Redirection Settings

      Legacy Console Redirection
    ▶ Legacy Console Redirection Settings

      Serial Port for Out-of-Band Management/
      Windows Emergency Management Services (EMS)   ↔: Select Screen
      Console Redirection EMS          [Enabled]    ↑↓: Select Item
    ▶ Console Redirection Settings                  Enter: Select
                                                    +/-: Change Option
                                                    F1: General Help
                                                    F7: Discard Changes
                                                    F9: Load UEFI Defaults
                                                    F10: Save and Exit
                                                    ESC: Exit

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```

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].

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

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.

Redirect After POST

When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

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

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.

Out-of-Band Mgmt Port
Microsof t Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.

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

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

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

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

Data Bits EMS

Parity EMS

Stop Bits EMS

3.3.9 H/W Monitor

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

```
                            Aptio Setup - AMI
        Advanced

   TEMP_DDR4_F              : N/A          ▲ Watch Dog Timer
   TEMP_DDR4_G              : N/A
   TEMP_DDR4_H              : N/A
   TEMP_PSU1               : N/A
   TEMP_PSU2               : N/A
   FAN1                   : N/A
   FAN2                   : N/A
   FAN3                   : 4000 RPM
   FAN4                   : N/A
   FAN5                   : N/A
   FAN1_1                 : N/A
   FAN2_1                 : N/A
   FAN3_1                 : N/A
   FAN4_1                 : N/A          ↔: Select Screen
   FAN5_1                 : N/A          ↑↓: Select Item
   FAN_PSU1                : N/A          Enter: Select
   FAN_PSU2                : N/A          +/-: Change Option
   PWR_PSU1_PIN            : N/A          F1: General Help
   PWR_PSU2_PIN            : N/A          F7: Discard Changes
   PWR_PSU1_POUT           : N/A          F9: Load UEFI Defaults
   PWR_PSU2_POUT           : N/A          F10: Save and Exit
                                         ESC: Exit
   Watch Dog Timer         [Auto]
                                      ▼

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```

Watch Dog Timer

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

3.3.10 Runtime Error Logging

```
                          Aptio Setup – AMI
        Advanced

  WHEA Support                   [Enabled]          Enable or disable Windows
                                                    Hardware Error Architecture.
  System Error                   [Enabled]
  S/W Error Injection Support    [Disabled]
  Memory Error                   [Enabled]
   Correctable Error Threshold   FF

  PCIE Corrected Error Enable    [Enabled]
   PCIE Corrected Error Threshold 1
  PCIE  Uncorrected Error Enable [Enabled]
  PCIE  Fatal Error Enable       [Enabled]

                                                    ↔: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/−: Change Option
                                                    F1: General Help
                                                    F7: Discard Changes
                                                    F9: Load UEFI Defaults
                                                    F10: Save and Exit
                                                    ESC: Exit



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```

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. When it is set to [Enabled], you can 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 Ftal errors.

3.3.11 Intel SPS Configuration

```
                              Aptio Setup - AMI
       Advanced

   SPS Version                 4.4.4.53
   SPS FW State                Operational



                                                  ↔: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Option
                                                  F1: General Help
                                                  F7: Discard Changes
                                                  F9: Load UEFI Defaults
                                                  F10: Save and Exit
                                                  ESC: Exit



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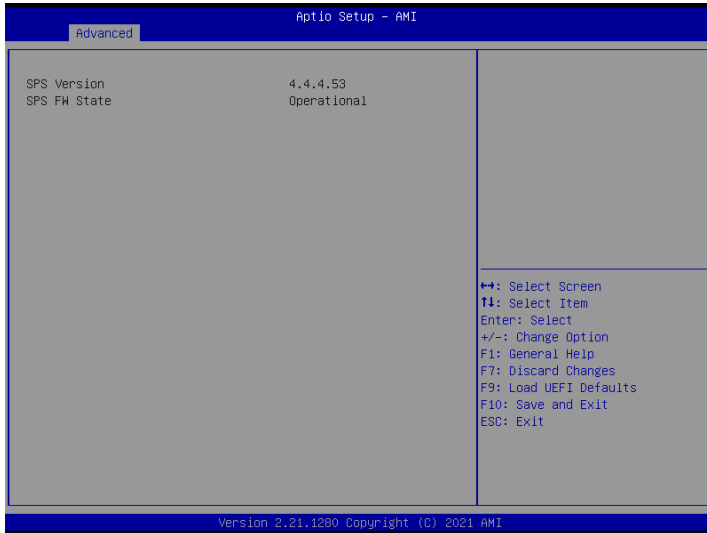
SPS screen displays the Intel SPS Configuration information, such as Operational Firmware Version and Firmware State.

3.3.12 Intel® VMD technology

```
                            Aptio Setup - AMI
         Advanced

   Intel® VMD technology
   ------------------------------------------------
 ▶ Intel® VMD for Volume Management Device on Socket 0




                                                   ↔: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Option
                                                   F1: General Help
                                                   F7: Discard Changes
                                                   F9: Load UEFI Defaults
                                                   F10: Save and Exit
                                                   ESC: Exit


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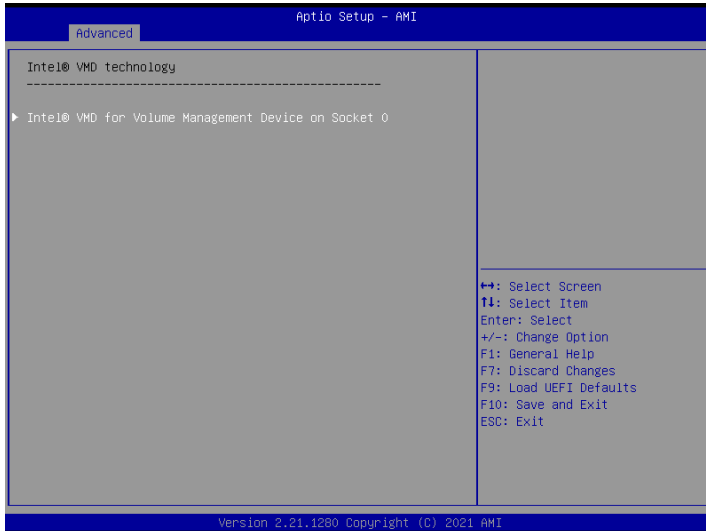
Press <Enter> to bring up the Intel(R) VMD for Volume Management Device
Configuration menu.

Intel(R) VMD for Volume Management Device on Socket 0

Intel(R) VMD for Volume Management Device Technology

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 1A

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

VMD port 1C

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

VMD port 1D

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

Hot Plug Capable

Enable/Disable Hot Plug for PCIe Root Ports 1A-1D.

Intel(R) VMD for Volume Management Device Technology

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 2A

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

VMD port 2B

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

VMD port 2C

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

VMD port 2D

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

Hot Plug Capable

Enable/Disable Hot Plug for PCIe Root Ports 2A-2D.

Intel(R) VMD for Volume Management Device Technology

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 3A

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

VMD port 3B

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

VMD port 3C

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

VMD port 3D

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 3A-3D.

Intel(R) VMD for Volume Management Device Technology

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 4A

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

VMD port 4B

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

VMD port 4C

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

VMD port 4D

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 4A-4D.

English

3.3.13 Tls Auth Configuration

```
                        Aptio Setup — AMI
        Advanced

                                              Press <Enter> to configure
   ▶ Server CA Configuration                   Server CA.

   ▶ Client Cert Configuration




                                              ↔: Select Screen
                                              ↑↓: Select Item
                                              Enter: Select
                                              +/-: Change Option
                                              F1: General Help
                                              F7: Discard Changes
                                              F9: Load UEFI Defaults
                                              F10: Save and Exit
                                              ESC: Exit


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```
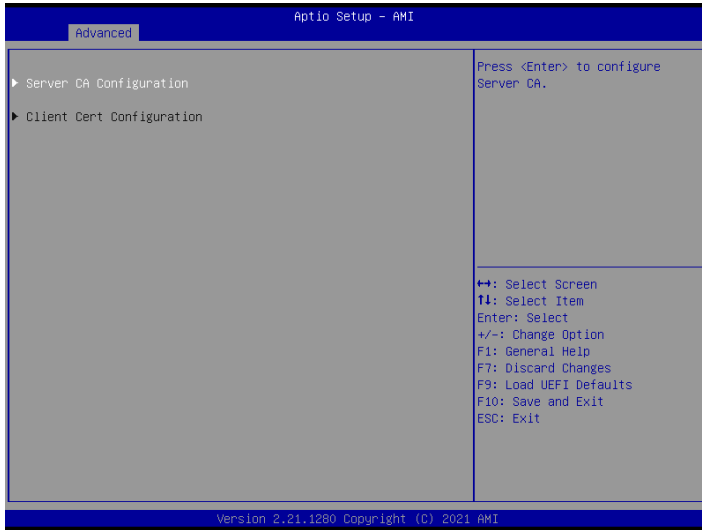
Server CA Configuration

Press <Enter> to configure Server CA.

Client Cert Configuration

Press <Enter> to configure Client Cert.

3.3.14 Instant Flash

Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows 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 compli-cated 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.

```
                              Aptio Setup - AMI
        Main   Advanced   Security   Boot   Server Mgmt   Event Logs   Exit

     Supervisor Password            Not Installed        Set or change the password for
     User Password                  Not Installed        the administrator account.
                                                         Only the administrator has
     Supervisor Password                                 authority to change the
     User Password                                       settings in the UEFI Setup
                                                         Utility. Leave it blank and
   ▶ Secure Boot                                         press enter to remove the
                                                         password.




                                                         ↔: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Option
                                                         F1: General Help
                                                         F7: Discard Changes
                                                         F9: Load UEFI Defaults
                                                         F10: Save and Exit
                                                         ESC: Exit


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```

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.

```
                              Aptio Setup - AMI
             Security

  Vendor Keys                    Valid                  Install factory default Secure
                                                        Boot keys after the platform
  Factory Key Provision          [Disabled]             reset and while the System is
▶ Install default Secure Boot keys                      in Setup mode
▶ Clear Secure Boot keys
▶ Export Secure Boot variables
▶ Enroll Efi Image

  Device Guard Ready
▶ Remove 'UEFI CA' from DB
▶ Restore DB defaults

  Secure Boot variable | Size| Keys| Key Source
▶ Platform Key(PK)     |    0|    0| No Keys           ↔: Select Screen
▶ Key Exchange Keys    |    0|    0| No Keys           ↑↓: Select Item
▶ Authorized Signatures|    0|    0| No Keys           Enter: Select
▶ Forbidden  Signatures|    0|    0| No Keys           +/-: Change Option
▶ Authorized TimeStamps|    0|    0| No Keys           F1: General Help
▶ OsRecovery Signatures|    0|    0| No Keys           F7: Discard Changes
                                                        F9: Load UEFI Defaults
                                                        F10: Save and Exit
                                                        ESC: Exit


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```

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.

Enroll Efi Image

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

Restore DB defaults

Restore DB variable to factory defaults.

Platform Key(PK)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: 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

Key Source: Default, External, Mixed, Test

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)

English

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.
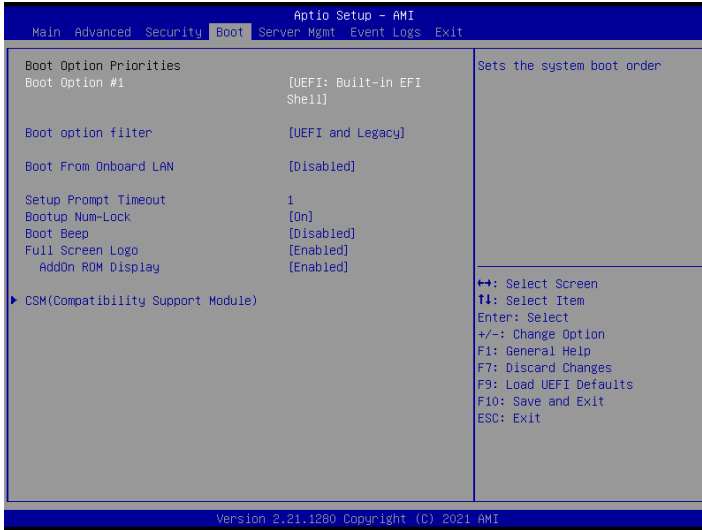
Boot Option #1

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

```
                        Aptio Setup - AMI
                  Boot

CSM                          [Custom]            Enable to launch the
Launch Other Storage OpROM Policy  [Legacy only]  Compatibility Support Module.
Launch Video OpROM Policy     [Legacy only]       If you are using Windows 8 or
                                                  later versions 64-bit UEFI and
PCIE1 Slot OpROM             [Auto]               all of your devices support
PCIE2 Slot OpROM             [Auto]               UEFI, you may also disable CSM
PCIE3 Slot OpROM             [Auto]               for faster boot speed.
PCIE4 Slot OpROM             [Auto]
PCIE5 Slot OpROM             [Auto]
PCIE6 Slot OpROM             [Auto]
PCIE7 Slot OpROM             [Auto]
M2_1 Slot OpROM             [Auto]
M2_2 Slot OpROM             [Auto]
                                                 ↔: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Option
                                                 F1: General Help
                                                 F7: Discard Changes
                                                 F9: Load UEFI Defaults
                                                 F10: Save and Exit
                                                 ESC: Exit

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```

CSM

Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test. If you are using Windows 10 64-bit 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.

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.)

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.)

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.)

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.)

SLIM5 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.)

PCIE6 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.)

PCIE7 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.)

English

3.6 Server Mgmt

```
                          Aptio Setup - AMI
      Main   Advanced   Security   Boot   Server Mgmt   Event Logs   Exit

    BMC Self Test Status              PASSED           Wait For BMC response for
    Wait For BMC                      [Enabled]        specified time out. In
                                                       PILOTII, BMC starts at the
   ▶ System Event Log                                  same time when BIOS starts
   ▶ View System Event Log                             during AC power ON. It takes
   ▶ BMC Network Configuration                         around 30 seconds to
   ▶ BMC Tools                                         initialize Host to BMC
                                                       interfaces.



                                                       ↔: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Option
                                                       F1: General Help
                                                       F7: Discard Changes
                                                       F9: Load UEFI Defaults
                                                       F10: Save and Exit
                                                       ESC: Exit



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```

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 System Event Log
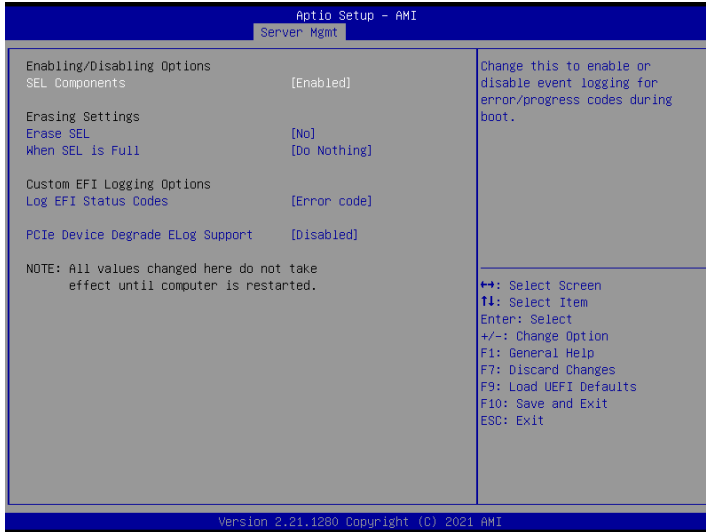
SEL Components

Change this to enable ro disable event logging for error/progress codes during boot.

Erase SEL

Use this to choose options for earsing SEL.

When SEL is Full

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

Log EFI Status Codes

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

PCIe Device Degrade ELog Support

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

3.6.2 View System Event Log

Press <Enter> to view the System Event Log Records.
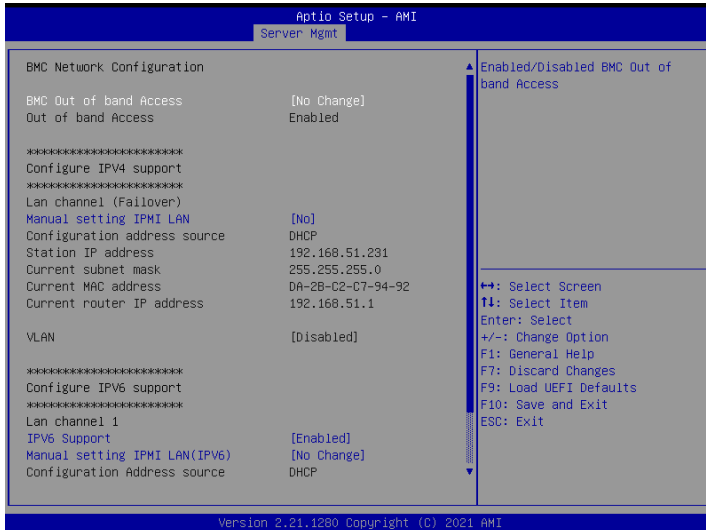
3.6.3 BMC Network Configuration

```
                        Aptio Setup - AMI
                          Server Mgmt

  BMC Network Configuration                      ▲  Enabled/Disabled BMC Out of
                                                    band Access
  BMC Out of band Access          [No Change]
  Out of band Access              Enabled


  ***************************
  Configure IPV4 support
  ***************************
  Lan channel (Failover)
  Manual setting IPMI LAN         [No]
  Configuration address source    DHCP
  Station IP address              192.168.51.231
  Current subnet mask             255.255.255.0
  Current MAC address             DA-2B-C2-C7-94-92            ↔: Select Screen
  Current router IP address       192.168.51.1                ↑↓: Select Item
                                                               Enter: Select
  VLAN                            [Disabled]                   +/-: Change Option
                                                               F1: General Help
                                                               F7: Discard Changes
  ***************************                                  F9: Load UEFI Defaults
  Configure IPV6 support                                       F10: Save and Exit
  ***************************                                  ESC: Exit
  Lan channel 1
  IPV6 Support                    [Enabled]
  Manual setting IPMI LAN(IPV6)   [No Change]
  Configuration Address source    DHCP                      ▼

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```

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*
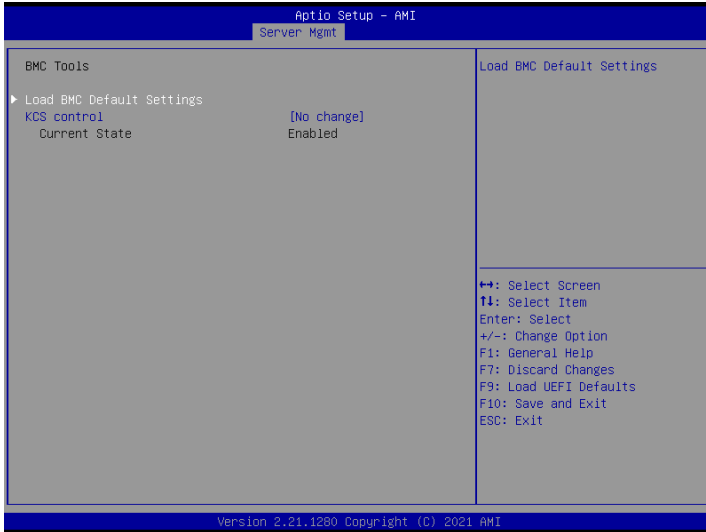
VLAN

IPV6 Support

Enable or Disable LAN1 IPV6 Support.

Manual Setting IPMI LAN(IPV6)

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

3.6.4 BMC Tools

```
                        Aptio Setup - AMI
                         Server Mgmt

  BMC Tools                                          Load BMC Default Settings

▶ Load BMC Default Settings
  KCS control                      [No change]
    Current State                  Enabled



                                                     ↔: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Option
                                                     F1: General Help
                                                     F7: Discard Changes
                                                     F9: Load UEFI Defaults
                                                     F10: Save and Exit
                                                     ESC: Exit


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```
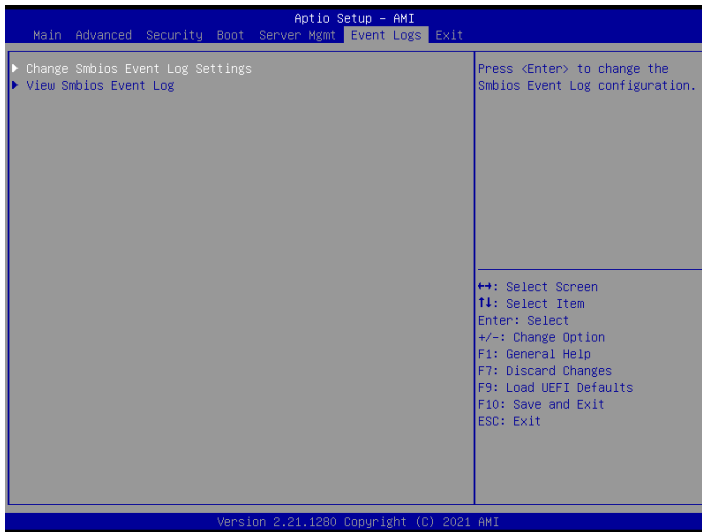
Load BMC Default Settings

Use this item to load BMC default settings.

KCS control

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

3.7 Event Logs

```
                              Aptio Setup - AMI
        Main  Advanced  Security  Boot  Server Mgmt  Event Logs  Exit

   ▶ Change Smbios Event Log Settings            Press <Enter> to change the
   ▶ View Smbios Event Log                       Smbios Event Log configuration.




                                                 ↔: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Option
                                                 F1: General Help
                                                 F7: Discard Changes
                                                 F9: Load UEFI Defaults
                                                 F10: Save and Exit
                                                 ESC: Exit



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```

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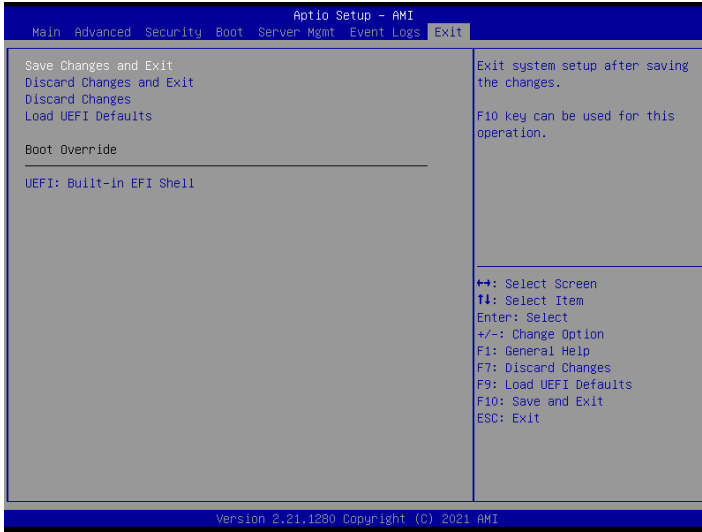Choose option to enable/disable logging of System boot event.

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

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

English

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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.

Discard Changes

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

Load UEFI Defaults

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

Chapter 4 Software Support

4.1 Install Operating System

This motherboard supports various Microsoft® Windows® / Linux® compliant. Because motherboard settings and hardware options vary, use the setup procedures in this chapter for general reference only. Refer to your OS documentation for more information.

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

* Before installing the Linux OS, please first enter the BIOS settings, go to "Advanced" > "Chipset Configura-tion" and set "IGPU Multi-Monitor" option to "Disabled".*

4.2 Support CD Information

The Support CD that came with the motherboard contains necessary drivers and useful utilities that enhance the motherboard's features.

4.2.1 Running The Support CD

To begin using the support CD, insert the CD into your CD-ROM drive. The CD automatically displays the Main Menu if "AUTORUN" is enabled in your computer. If the Main Menu does not appear automatically, locate and double click on the file "ASRSetup. exe" from the root folder in the Support CD to display the menu.

4.2.2 Drivers Menu

The Drivers Menu shows the available device's drivers if the system detects installed devices. Please install the necessary drivers to activate the devices.

4.2.3 Utilities Menu

The Utilities Menu shows the application softwares that the motherboard supports. Click on a specific item then follow the installation wizard to install it.

4.2.4 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.

English

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/ Intel®Optane™ Persistent Memory 200 Series.
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 adaquate 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 or want to know more about ASRock, you're welcome to visit ASRock's website at http://www.asrock.com; or you may contact your dealer for further information. For technical questions, please submit a support request form at https://event.asrock.com/tsd.asp

ASRock Incorporation

2F., No.37, Sec. 2, Jhongyang S. Rd., Beitou District,

Taipei City 112, Taiwan (R.O.C.)

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ASRock America, Inc.

13848 Magnolia Ave, Chino, CA91710

U.S.A.

Phone: +1-909-590-8308

Fax: +1-909-590-1026

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2.1077(a)

Responsible Party Name: ASRock Incorporation

Address: 13848 Magnolia Ave, Chino, CA91710

Phone/Fax No: +1-909-590-8308/+1-909-590-1026

hereby declares that the product

Product Name : Motherboard

Model Number : C621A WS

Conforms to the following specifications:

☒   FCC Part 15, Subpart B, Unintentional Radiators

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Representative Person's Name: **Jason**

Signature :   *Jason Chou*

Date : **May 12, 2017**

EU Declaration of Conformity

/ISRock®

For the following equipment:

Motherboard

(Product Name)

C621A WS / ASRock

(Model Designation / Trade Name)

ASRock Incorporation

(Manufacturer Name)

2F., No.37, Sec. 2, Jhongyang S. Rd., Beitou District, Taipei City 112, Taiwan (R.O.C.)

(Manufacturer Address)

☒ **EMC —Directive 2014/30/EU (from April 20th, 2016)**
- ☐ EN 55022:2010/AC:2011 Class B ☒ EN 55024:2010/A1:2015
- ☒ EN 55032:2012+AC:2013 Class B ☒ EN 61000-3-3:2013
- ☒ EN 61000-3-2:2014

☐ **LVD —Directive 2014/35/EU (from April 20th, 2016)**
- ☐ EN 60950-1 : 2011+ A2: 2013 ☐ EN 60950-1 : 2006/A12: 2011

☒ RoHS — Directive 2011/65/EU
☒ CE marking

(EU conformity marking)

C E

ASRock EUROPE B.V.

(Company Name)

Bijsterhuizen 1111 6546 AR Nijmegen The Netherlands

(Company Address)

Person responsible for making this declaration:

Jason Chou

(Name, Surname)

A.V.P

(Position / Title)

August 22, 2021

(Date)

P/N: 15G062313000AK V1.0