OPEN
Industry Standard, Flexible Architecture

GREEN
Less Heat, Less Power Consumption

STABLE
Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

SPC621D8-2L2T
SPC621D8-2T
SPC621D8

User Manual

English

Version 1.1
Published February 2023

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

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

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

CALIFORNIA, USA ONLY

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

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

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UK CA

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

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

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

DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

Contents

Chapter 1 Introduction

Thank you for purchasing ASRock Rack ***SPC621D8-2L2T / SPC621D8-2T / SPC621D8*** motherboard, a reliable motherboard produced under ASRock Rack's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock Rack's commitment to quality and endurance.

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

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

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

1.1 Package Contents

- ASRock Rack SPC621D8-2L2T / SPC621D8-2T / SPC621D8 Motherboard (ATX Form Factor: 12-in x 9.6-in, 30.5 cm x 24.4 cm)
- Quick Installation Guide
- 1 x I/O Shield
- 1 x Mini SAS HD to 4*SATA Cable (60cm)
- 1 x SATA3 Cable (60cm)
- 2 x Screws for M.2 Sockets
- 1 x CPU Non-Fabric Carrier

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

English

1.2 Specifications

SPC621D8-2L2T / SPC621D8-2T / SPC621D8	
MB Physical Status	
Form Factor	ATX
Dimension	12" x 9.6" (30.5 cm x 24.4 cm)
Processor System	
CPU	3rd Gen Intel Xeon Scalable Processors
Socket	Single Socket P+ (LGA 4189)
Max. Thermal Design Power (TDP)	300W
Chipset	Intel® C621A
System Memory	
Type	- Eight Channel DDR4 memory technology (1DPC) - Supports DDR4 RDIMM/ RDIMM-3DS/ LRDIMM/ LRDIMM-3DS/Intel®Optane ™ Persistent Memory 200 Series
DIMM Size Per DIMM	- RDIMM: 64GB, 32GB, 16GB, 8GB - RDIMM-3DS: 256GB, 128GB, 64GB, 32GB, 16GB, 8GB - LRDIMM: 128GB, 64GB, 32GB - LRDIMM-3DS: 256GB, 128GB, 64GB, 32GB, 16GB, 8GB - Intel®Optane ™ Persistent Memory 200 Series **Max. memory capacity and frequency are to be validated*
DIMM Frequency	- RDIMM: 3200MHz - LRDIMM: 3200MHz **Max. memory capacity and frequency are to be validated*
Voltage	1.2V
Expansion Slot	
PCIe 4.0 x 16	PCIE7: Gen4 x16 link PCIE5: Gen4 x16 link PCIE3: Gen4 x16 link PCIE1: Gen4 x16 link **PCIE7/5/3 auto-switch to PCIe4.0 x8 when PCIE6/4/2 occupied*
PCIe 4.0 x 8	PCIE6: Gen4 x8 link PCIE4: Gen4 x8 link PCIE2: Gen4 x8 link **PCIE7/5/3 auto-switch to PCIe4.0 x8 when PCIE6/4/2 occupied*
Storage	
SATA Controller	**SPC621D8-2L2T:** Intel® C621A (Up to 8 SATA 6Gb/s, support RAID 0/1/5/10): 1 Mini-SAS HD, 2 SATA DOM, 2 M.2

	SPC621D8-2T: Intel® C621A (Up to 12 SATA 6Gb/s, support RAID 0/1/5/10): 1 Mini-SAS HD, 4 SATA 7-pin, 2 SATA DOM, 2 M.2 **SPC621D8:** Intel® C621A (Up to 13 SATA 6Gb/s, support RAID 0/1/5/10): 1 Mini-SAS HD, 6 SATA 7-pin, 2 SATA DOM, 1 M.2
M.2 Slot	**SPC621D8-2L2T / SPC621D8-2T:** 1 (M2_1: M-key (PCIe3.0 x4 or SATA 6Gb/s); Type 22110/2280/2242) 1 (M2_2: M-key (PCIe3.0 x1 or SATA 6Gb/s); Type 22110/2280/2242) **SPC621D8:** 1 (M2_1: M-key (PCIe3.0 x4); Type 22110/2280/2242) 1 (M2_2: M-key (PCIe3.0 x1 or SATA 6Gb/s); Type 22110/2280/2242)
Ethernet	
Interface	10000/1000/100 Mbps by Intel® X710-AT2 1000/100/10 Mbps by Intel® i210
LAN Controller	**SPC621D8-2L2T:** - 2 x RJ45 10GbE RJ45 by Intel® X710-AT2 - 2 x RJ45 1GbE RJ45 by Intel® i210 - 1 x RJ45 Dedicated IPMI LAN port by RTL8211E **SPC621D8-2T:** - 2 x RJ45 10GbE RJ45 by Intel® X710-AT2 - 1 x RJ45 Dedicated IPMI LAN port by RTL8211E **SPC621D8:** - 2 x RJ45 1GbE RJ45 by Intel® i210 - 1 x RJ45 Dedicated IPMI LAN port by RTL8211E - Supports Wake-On-LAN - Supports Energy Effcient Ethernet 802.3az - Supports Dual LAN with Teaming function - Supports PXE - LAN1 supports NCSI
Management	
BMC Controller	ASPEED AST2500
IPMI Dedicated GLAN	1 x Realtek RTL8211E for dedicated management GLAN
Features	Watch Dog NMI
Graphics	
Controller	ASPEED AST2500

Rear Panel I/O	
VGA Port	1 x D-Sub
USB 3.2 Gen1 Port	4
LAN Port	**SPC621D8-2L2T:** - 2(10G)+2(1G)+1(IPMI) RJ45 Gigabit Ethernet LAN port - LAN Ports with LED (ACT/LINK LED and SPEED LED) **SPC621D8-2T:** - 2(10G)+1(IPMI) RJ45 Gigabit Ethernet LAN port - LAN Ports with LED (ACT/LINK LED and SPEED LED) **SPC621D8-2T / SPC621D8:** - 2(1G)+1(IPMI) RJ45 Gigabit Ethernet LAN port - LAN Ports with LED (ACT/LINK LED and SPEED LED)
UID	1
Internal Connector	
Auxiliary Panel Header	1 (includes chassis intrusion, location button & LED, and front LAN LED)
Panel Header	1
TPM Header	1
TPM-SPI Header	1
RAID_1 Header	1
CPU1_HSBP1	1
USB 3.2 Gen1 Header	1 (supports 2 USB 3.2 Gen1 ports)
USB 3.2 Gen2 Type-C Header	2 (supports 2 USB 3.2 Gen2 ports)
USB 2.0 Header	1 (supports 2 USB 2.0 ports)
USB 2.0 Port	1
Fan Header	5 Fans (6-pin)
ATX Power	1 x (24-pin) + 1 x (8-pin) + 1 x (4-pin)
SATA Power	1
PSU SMB	1
BMC SMB	1
IPMB Header	1
NMI Button	1
COM Header	1
Front LAN LED	1
SATA SGPIO	2
TR1	1 (2-pin)
SPEAKER	1
ME Recovery	1
PECI1	1
BIOS Recovery	1

ClearCMOS	1 (short pad)
OH/FanFail LED	5 (only Fan Fail LED)
System BIOS	
BIOS Type	256Mb AMI UEFI Legal BIOS
BIOS Features	- Plug and Play (PnP) - ACPI 2.0 Compliance Wake Up Events - SMBIOS 2.8 Support - ASRock Rack Instant Flash
Hardware Monitor	
Temperature	- CPU Temperature Sensing - PCH/MB/Card side Temperature Sensing
Fan	- Fan Tachometer - CPU Quiet Fan (Allow CPU Fan Speed Auto-Adjust by CPU Temperature) - Fan Multi-Speed Control
Voltage	Voltage Monitoring: CPU1_PVCCIN, CPU2_PVCCIN, PVDDQ_ABCD,PVDDQ_EFGH,PVDDQ_IJKL,PVDDQ_MNOP, 1.05V_PCH,1.8V_PCH, +BAT,PVNN_PCH, 3.3V,5V,12V,3.3VSB, 5VSB
Support OS	
OS	Microsoft® Windows®: - Server 2016 (64 bit) - Server 2019 (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 Windows® Server 2016 - Hyper-V Windows® Server 2019 ** Please refer to our website for the latest OS support list.*
Environment	
Temperature	Operation temperature: 10°C ~ 35°C / Non operation temperature: -40°C ~ 70°C

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

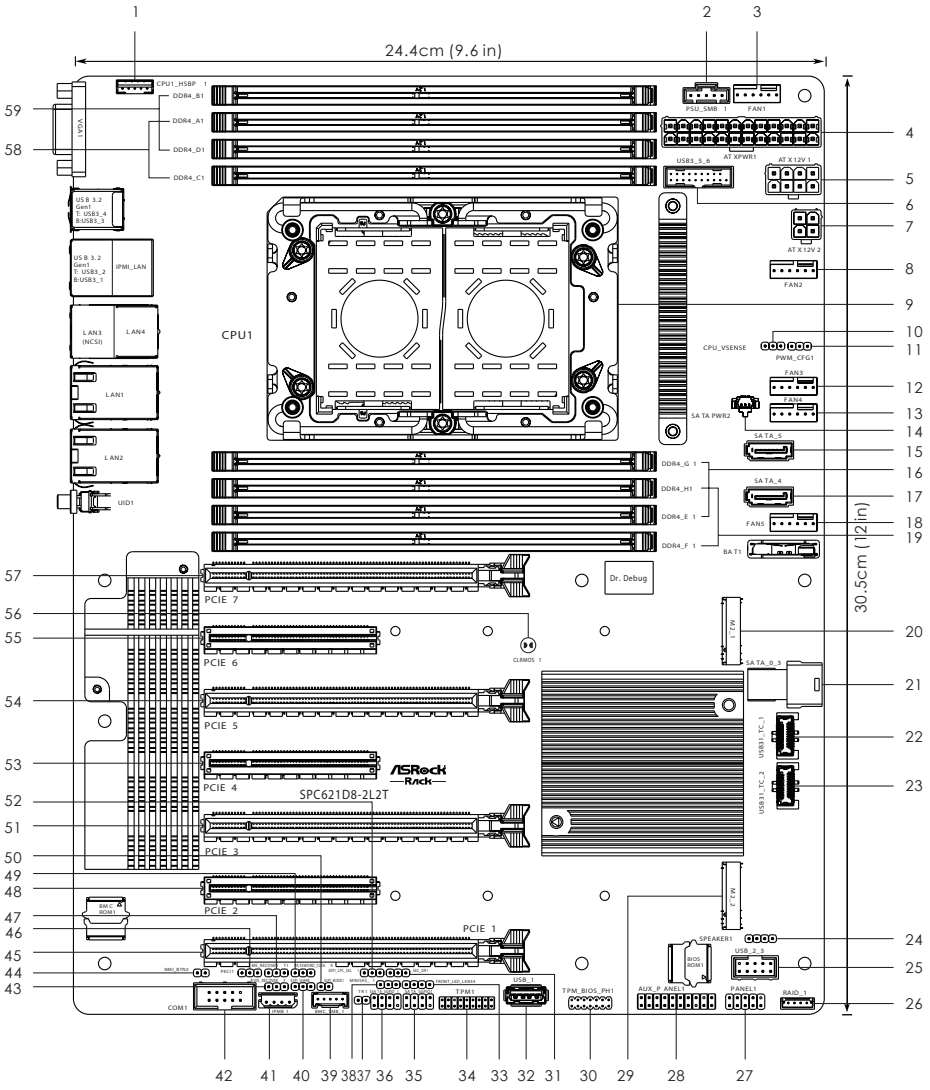
If you install Intel® LAN utility or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If you install the drivers only, it will pass the WHQL tests.

1.3 Unique Features

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

1.4 Motherboard Layout

SPC621D8-2L2T

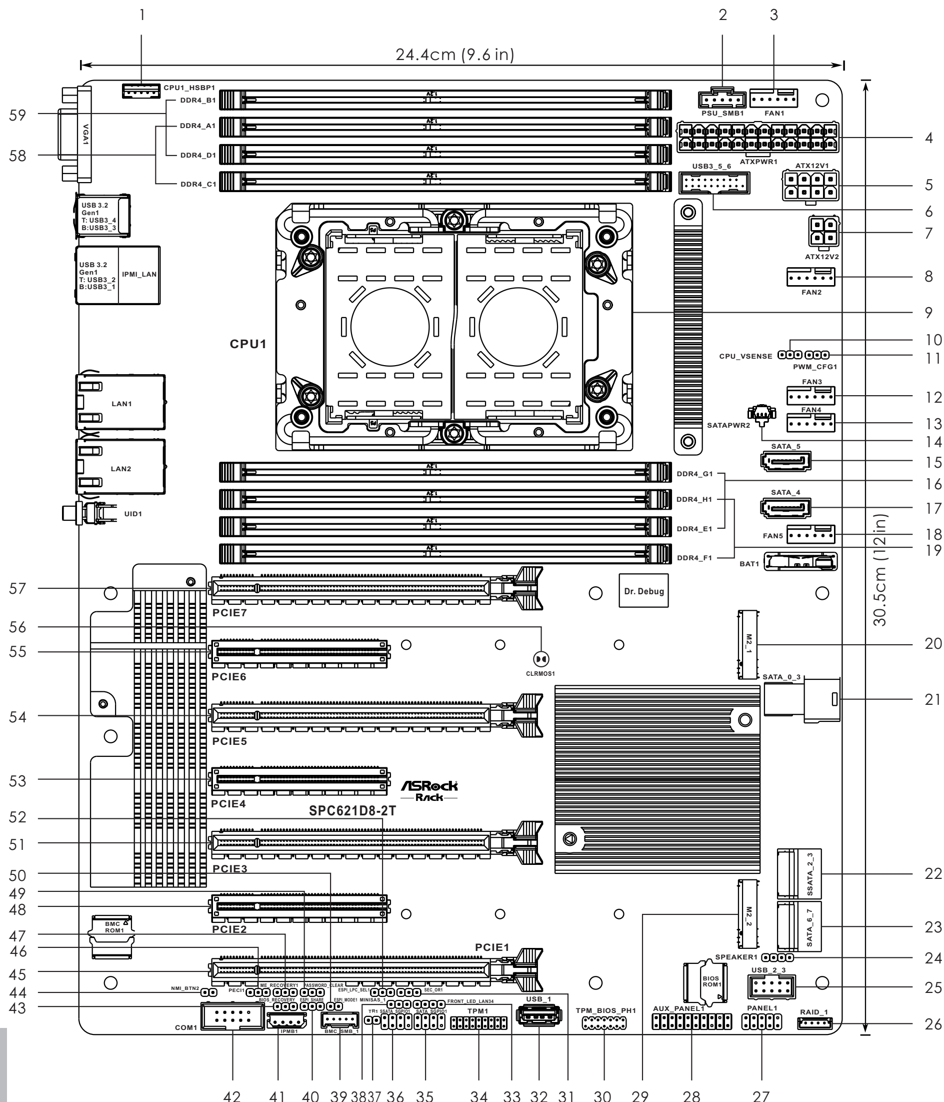


No.	Description
1	Backplane PCI Express Hot-Plug Connector (CPU1_HSBP1)
2	PSU SMBus Header (PSU_SMB1)
3	System Fan Connector (FAN1)
4	ATX Power Connector (ATXPWR1)
5	ATX 12V Power Connector (ATX12V1)
6	USB 3.2 Gen1 Header (USB3_5_6)
7	ATX 12V Power Connector (ATX12V2)
8	System Fan Connector (FAN2)
9	LGA 4189 CPU Socket (CPU1)
10	CPU VSENSE Header (CPU_VSENSE)
11	PWM Configuration Header (PWM_CFG1)
12	System Fan Connector (FAN3)
13	System Fan Connector (FAN4)
14	SATA DOM Power Connector (SATAPWR2)
15	SATA3 DOM Connector (SATA_5)
16	2 x 288-pin DDR4 DIMM Slots (DDR4_E1, DDR4_G1)*
17	SATA3 DOM Connector (SATA_4)
18	System Fan Connector (FAN5)
19	2 x 288-pin DDR4 DIMM Slots (DDR4_F1, DDR4_H1)*
20	M.2 Socket (M2_1) (Type 2242/2280/22110)
21	Mini-SAS HD Connector (SATA_0_3)
22	Front Panel Type C USB 3.2 Gen2 Header (USB31_TC_1)
23	Front Panel Type C USB 3.2 Gen2 Header (USB31_TC_2)
24	Speaker Header (SPEAKER1)
25	USB 2.0 Header (USB_2_3)
26	Virtual RAID On CPUHeader (RAID_1)
27	System Panel Header (PANEL1)
28	Auxiliary Panel Header (AUX_PANEL1)
29	M.2 Socket (M2_2) (Type 2242/2280/22110)
30	TPM-SPI Header (TPM_BIOS_PH1)
31	Security Override Jumper (SEC_OR1)
32	Vertical USB 2.0 Port (USB_1)
33	Front LAN LED Header (FRONT_LED_LAN34)

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

**For DIMM installation and configuration instructions, please see p.32 (Installation of Memory Modules (DIMM)) for more details.*

SPC621D8-2T


24.4cm (9.6 in)
30.5cm (12 in)
CPU1_HSBP1
DDR4_B1
DDR4_A1
DDR4_D1
DDR4_C1
VGA1
PSU_SMB1
FAN1
ATXPWR1
USB3_5_6
ATX12V1
ATX12V2
FAN2
USB 3.2 Gen1 T: USB3_4 B:USB3_3
USB 3.2 Gen1 T: USB3_2 B:USB3_1
IPMI_LAN
CPU1
CPU_VSENSE
PWM_CFG1
FAN3
FAN4
SATAPWR2
SATA_5
SATA_4
FAN5
BAT1
LAN1
LAN2
UID1
DDR4_G1
DDR4_H1
DDR4_E1
DDR4_F1
Dr. Debug
PCIE7
PCIE6
CLRMOS1
M2_1
SATA_0_3
PCIE5
PCIE4
SPC621D8-2T
PCIE3
SSATA_2_3
SATA_6_7
M2_2
PCIE2
BMC ROM1
PCIE1
SPEAKER1
BIOS ROM1
USB_2_3
NMI_BTN2
PECI1
ME_RECOVERY1
BIOS_RECOVERY
PASSWORD_CLEAR
ESPI_SHARE
ESPI_LPC_SEL1
ESPI_MODE1
MINISAS_1
SEC_OR1
FRONT_LED_LAN34
COM1
IPMB1
BMC_SMB_1
TR1
SSATA_SGPIO1
SATA_SGPIO1
TPM1
USB_1
TPM_BIOS_PH1
AUX_PANEL1
PANEL1
RAID_1
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20	M.2 Socket (M2_1) (Type 2242/2280/22110)
21	Mini-SAS HD Connector (SATA_0_3)
22	SATA3 Connectors (SSATA_3)(Upper), (SSATA3_2)(Lower)
23	SATA3 Connectors (SATA_7)(Upper), (SATA3_6)(Lower)
24	Speaker Header (SPEAKER1)
25	USB 2.0 Header (USB_2_3)
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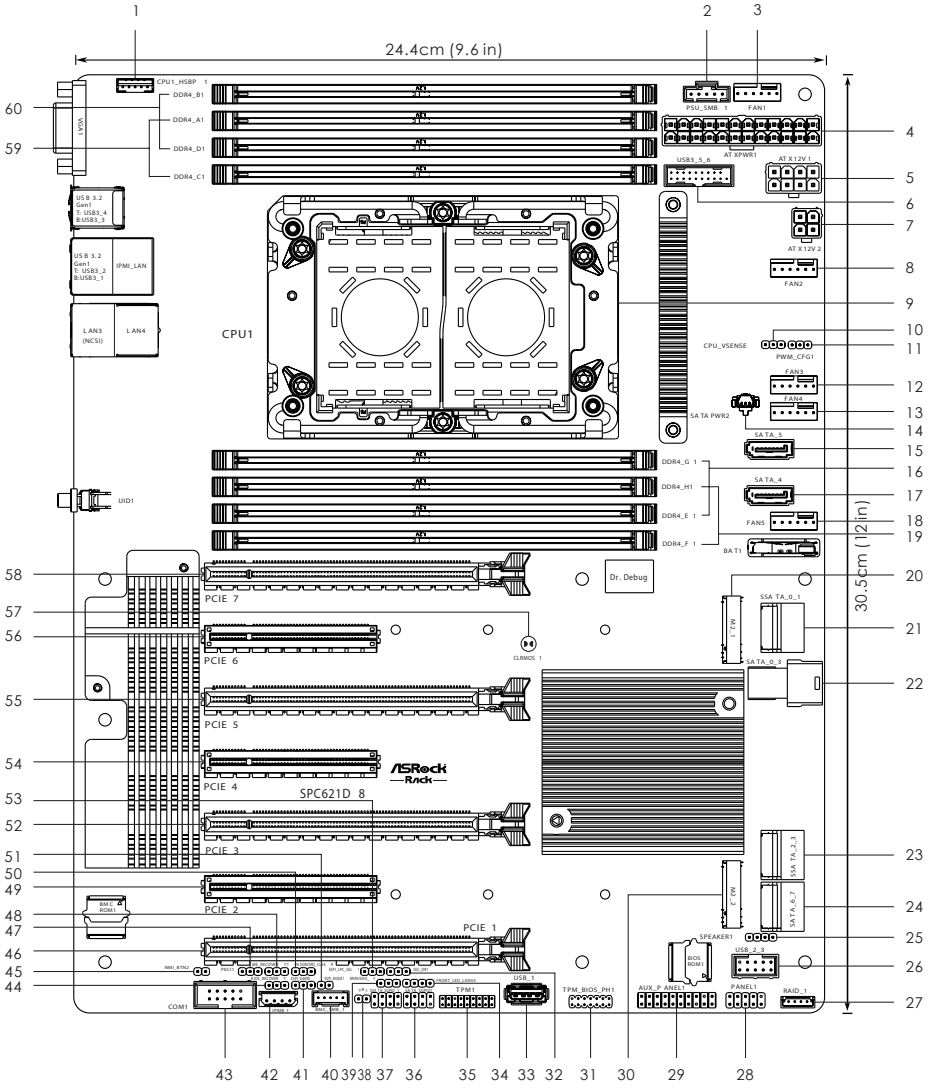
**For DIMM installation and configuration instructions, please see p.32 (Installation of Memory Modules (DIMM)) for more details.*

SPC621D8

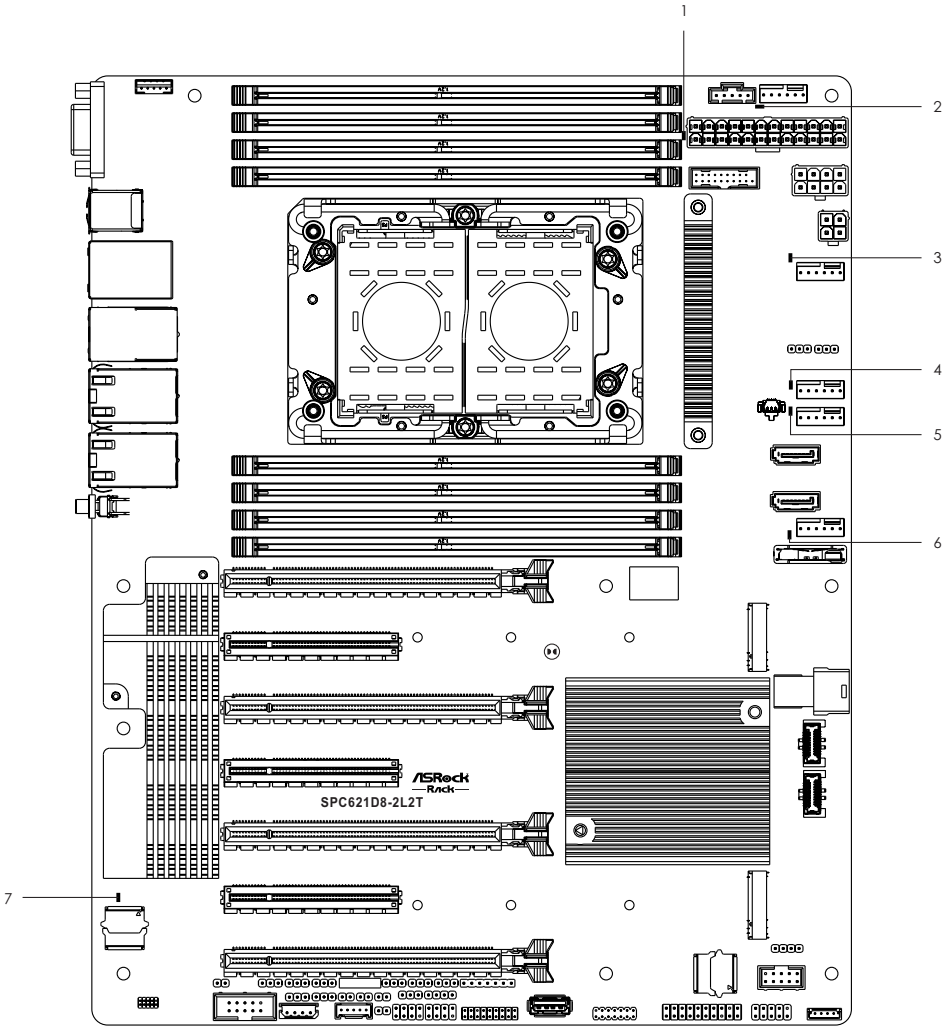

24.4cm (9.6 in)
30.5cm (12 in)
CPU1
SPC621D8
PCIE 7
PCIE 6
PCIE 5
PCIE 4
PCIE 3
PCIE 2
PCIE 1
Dr. Debug
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

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 (ATX12V1)
8	System Fan Connector (FAN2)
9	LGA 4189 CPU Socket (CPU1)
10	CPU VSENSE Header (CPU_VSENSE)
11	PWM Configuration Header (PWM_CFG1)
12	System Fan Connector (FAN3)
13	System Fan Connector (FAN4)
14	SATA DOM Power Connector (SATAPWR2)
15	SATA3 DOM Connector (SATA_5)
16	2 x 288-pin DDR4 DIMM Slots (DDR4_E1, DDR4_G1)*
17	SATA3 DOM Connector (SATA_4)
18	System Fan Connector (FAN5)
19	2 x 288-pin DDR4 DIMM Slots (DDR4_F1, DDR4_H1)*
20	M.2 Socket (M2_1) (Type 2242/2280/22110)
21	Mini-SAS HD Connector (SSATA_0_1)
22	Mini-SAS HD Connector (SATA_0_3)
23	SATA3 Connectors (SSATA_3)(Upper), (SSATA3_2)(Lower)
24	SATA3 Connectors (SATA_7)(Upper), (SATA3_6)(Lower)
25	Speaker Header (SPEAKER1)
26	USB 2.0 Header (USB_2_3)
27	Virtual RAID On CPUHeader (RAID_1)
28	System Panel Header (PANEL1)
29	Auxiliary Panel Header (AUX_PANEL1)
30	M.2 Socket (M2_2) (Type 2242/2280/22110)
31	TPM-SPI Header (TPM_BIOS_PH1)
32	Security Override Jumper (SEC_OR1)
33	Vertical USB 2.0 Port (USB_1)

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

**For DIMM installation and configuration instructions, please see p.32 (Installation of Memory Modules (DIMM)) for more details.*

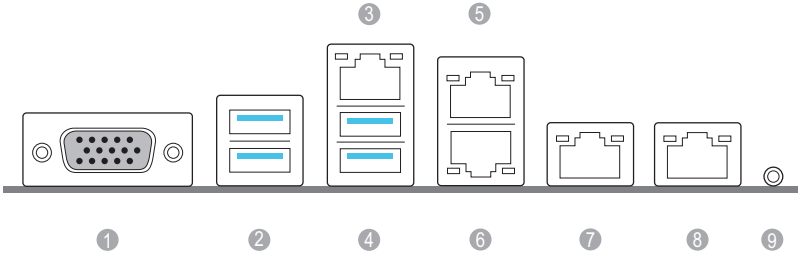
1.5 Onboard LED Indicators



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

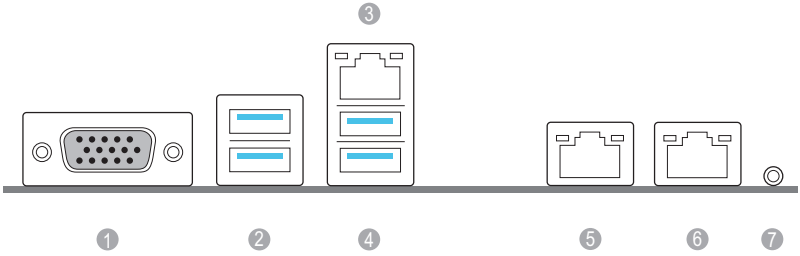
1.6 I/O Panel

SPC621D8-2L2T



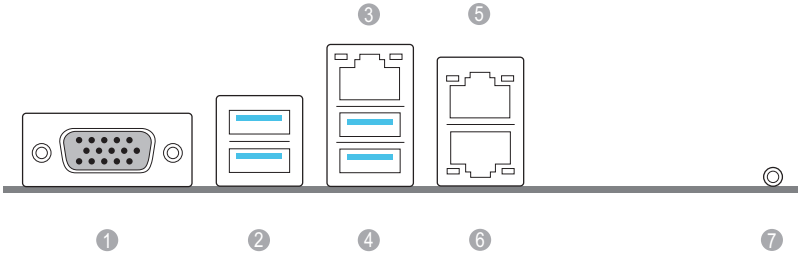
No.	Description	No.	Description
1	VGA Port (VGA1)	6	1G LAN RJ-45 Port (LAN3)**
2	USB 3.2 Gen1 Ports (USB3_3_4)	7	10G LAN RJ-45 Port (LAN1)***
3	LAN RJ-45 Port (IPMI_LAN1)*	8	10G LAN RJ-45 Port (LAN2)***
4	USB 3.2 Gen1 Ports (USB3_1_2)	9	UID Switch (UID1)
5	1G LAN RJ-45 Port (LAN4)**		

SPC621D8-2T



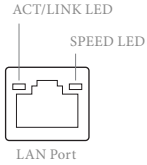
No.	Description	No.	Description
1	VGA Port (VGA1)	5	10G LAN RJ-45 Port (LAN1)***
2	USB 3.2 Gen1 Ports (USB3_3_4)	6	10G LAN RJ-45 Port (LAN2)***
3	LAN RJ-45 Port (IPMI_LAN1)*	7	UID Switch (UID1)
4	USB 3.2 Gen1 Ports (USB3_1_2)		

SPC621D8



No.	Description	No.	Description
1	VGA Port (VGA1)	5	1G LAN RJ-45 Port (LAN4)**
2	USB 3.2 Gen1 Ports (USB3_3_4)	6	1G LAN RJ-45 Port (LAN3)**
3	LAN RJ-45 Port (IPMI_LAN)*	7	UID Switch (UID1)
4	USB 3.2 Gen1 Ports (USB3_1_2)		

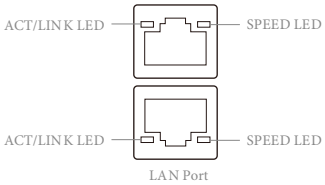
*There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.



Dedicated IPMI LAN Port LED Indications

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

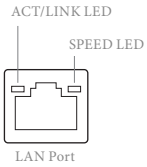
**There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.



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.

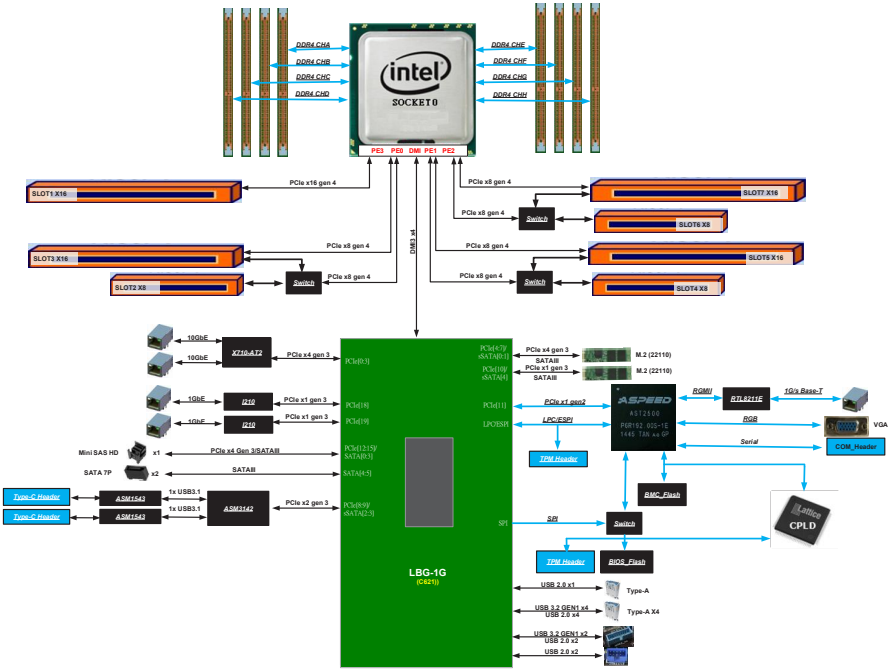


LAN Port (LAN1, LAN2) LED Indications

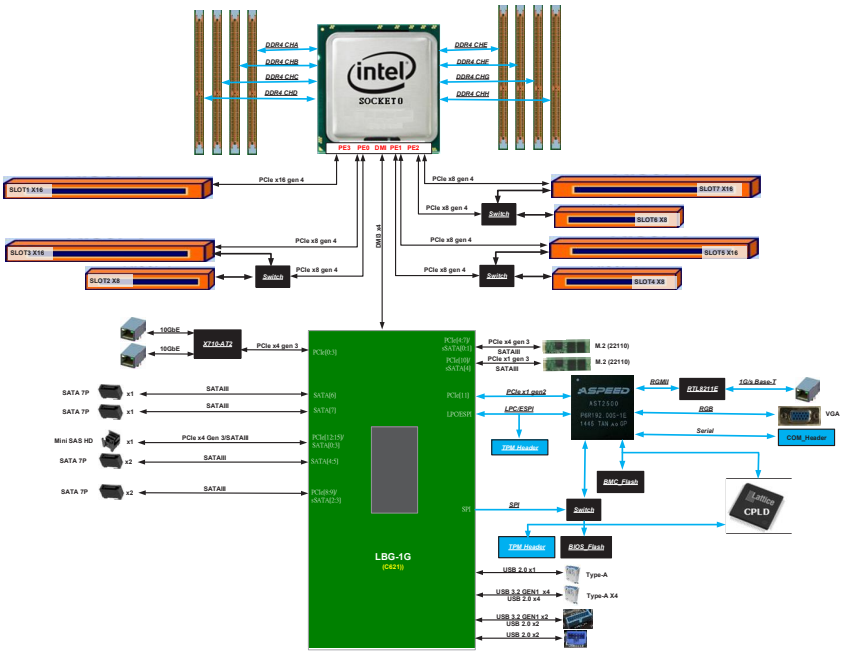
Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	100Mbps connection or no link
Blinking Green	Data Activity	Yellow	1Gbps connection
On	Link	Green	10Gbps connection

1.7 Block Diagram

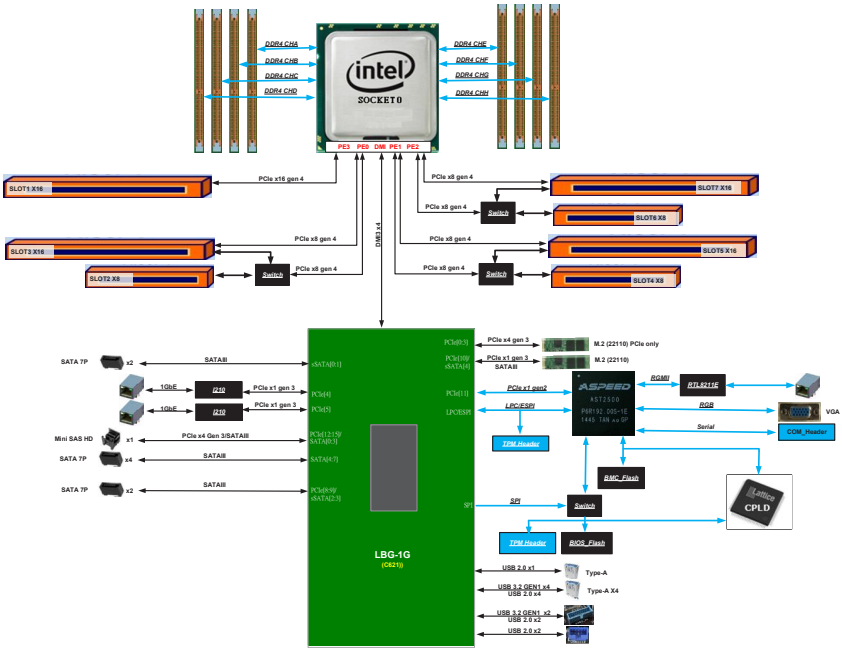
SPC621D8-2L2T



SPC621D8-2T


DDR4 CHA
DDR4 CHB
DDR4 CHC
DDR4 CHD
DDR4 CHE
DDR4 CHF
DDR4 CHG
DDR4 CHH
SOCKET 0
PE3 PE0 DMI PE1 PE2
SLOT1 X16
PCIe x16 gen 4
SLOT7 X16
SLOT6 X8
SLOT3 X16
SLOT5 X16
SLOT2 X8
SLOT4 X8
Switch
PCIe x8 gen 4
DMI3 x4
10GbE
X710-AT2
PCIe x4 gen 3
SATA 7P
Mini SAS HD
SATAIII
PCIe x4 Gen 3/SATAIII
M.2 (22110)
PCIe x1 gen 3
PCIe x1 gen2
LPC/ESPI
ASPEED
RGMII
RTL8211E
1G/s Base-T
RGB
VGA
Serial
COM_Header
TPM Header
BMC_Flash
SPI
Lattice
CPLD
BIOS_Flash
LBG-1G
(C621)
USB 2.0 x1
Type-A
USB 3.2 GEN1 x4
USB 2.0 x4
Type-A X4
USB 3.2 GEN1 x2
USB 2.0 x2

SPC621D8



English

Chapter 2 Installation

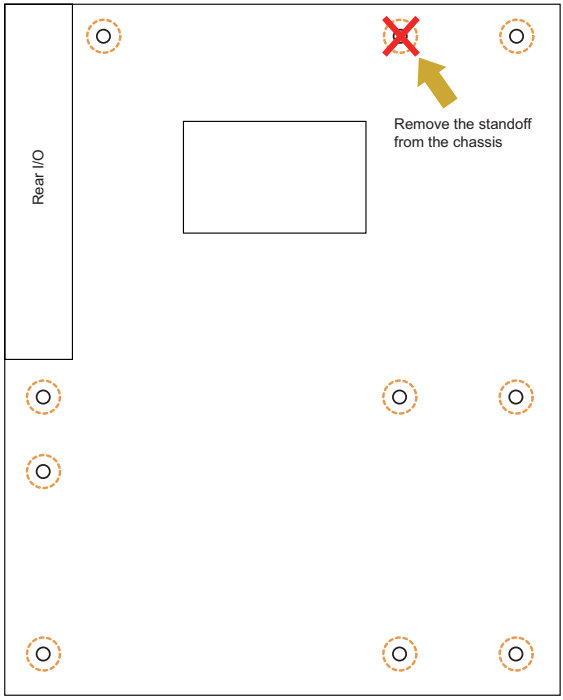
This is an ATX form factor (12" x 9.6", 30.5 cm x 24.4 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

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.

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



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

2.2 Pre-installation Precautions

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

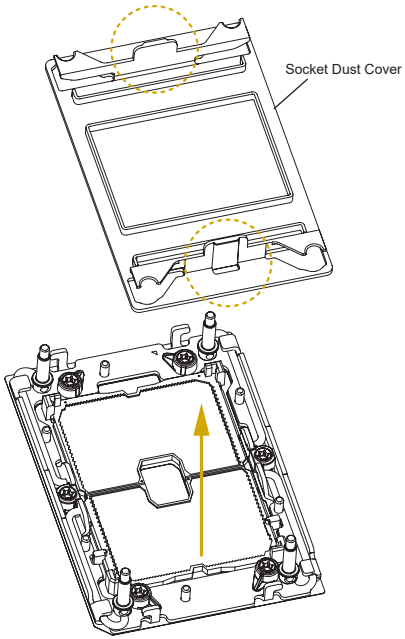
1. Unplug the power cord from the wall socket before touching any components.
2. To avoid damaging the motherboard's components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before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

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

2.3 Installing the CPU and Heatsink

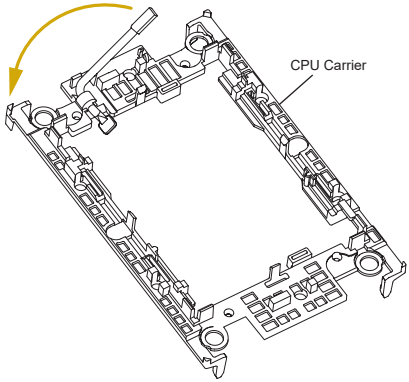
1. *Before you insert the CPU into the socket, please check if the PnP cap is on the socket, if the CPU surface is unclean, or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.*
2. *Unplug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

1



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

2



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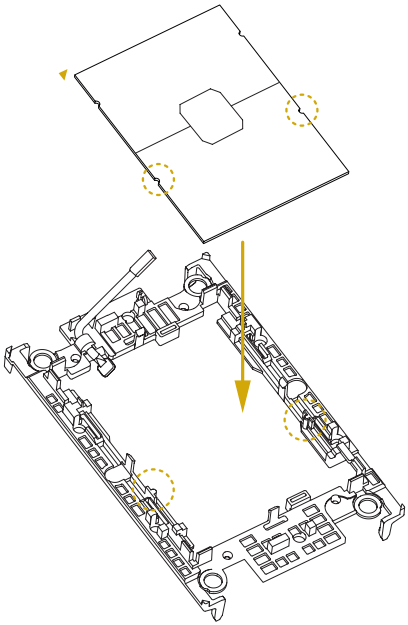

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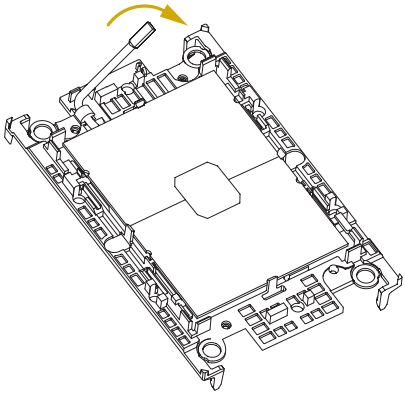

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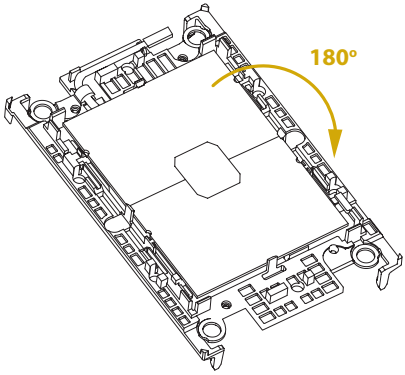

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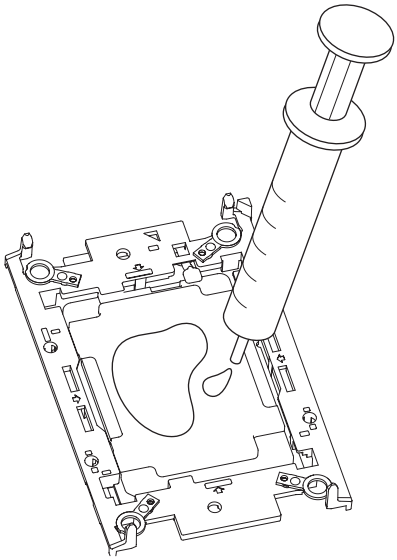

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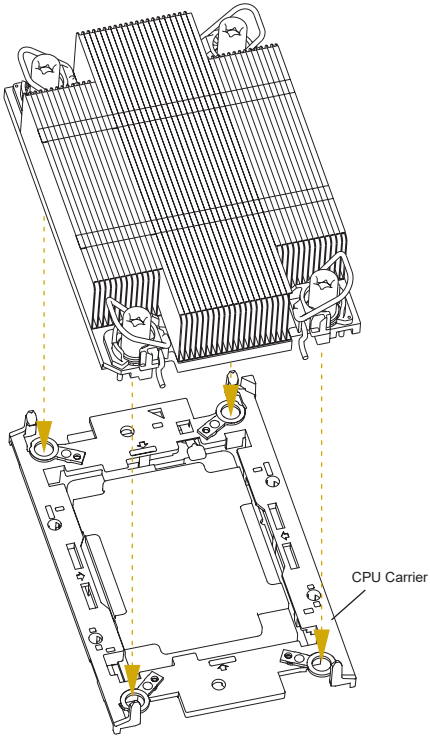
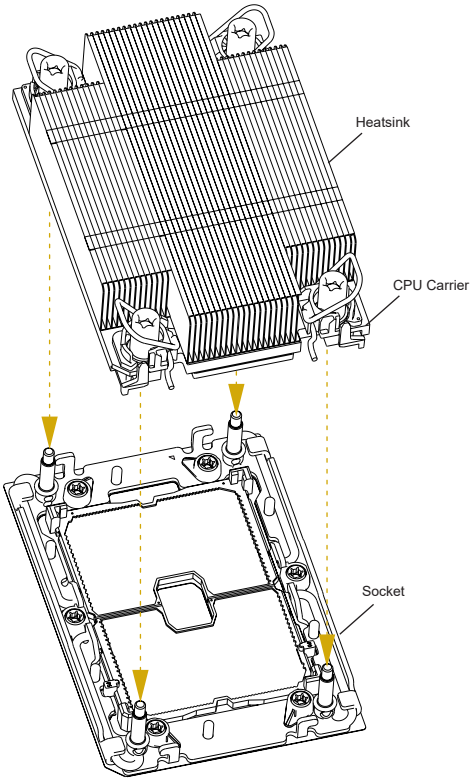
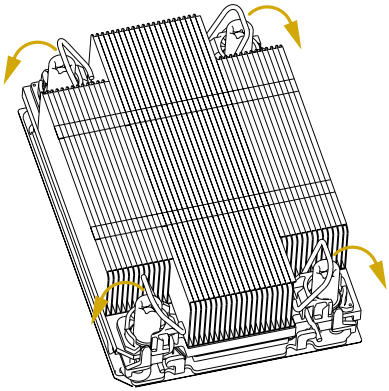


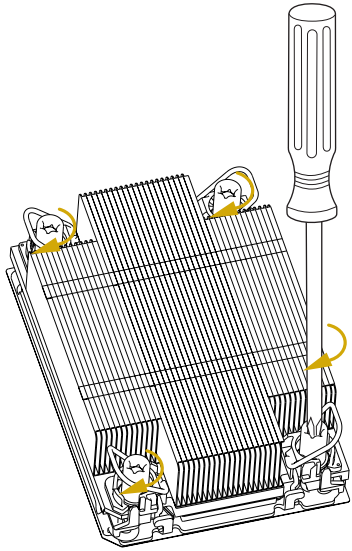
8



9



10



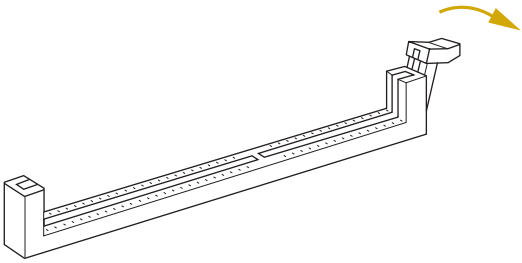
2.4 Installation of Memory Modules (DIMM)

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

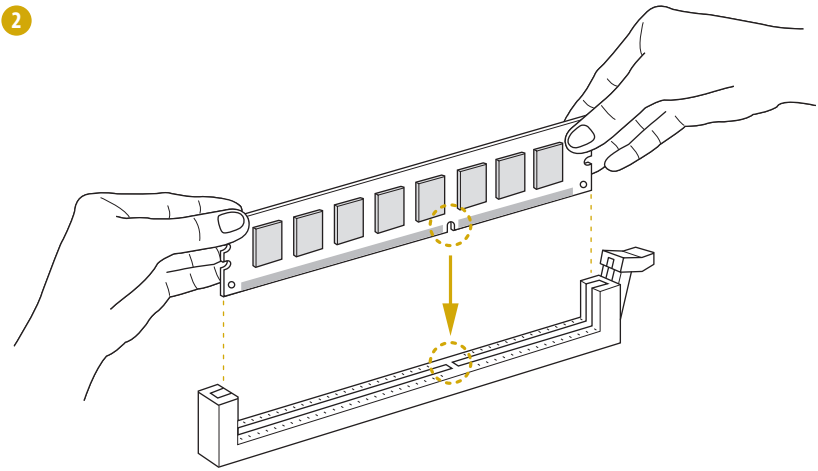
	CPU1							
	A1	B1	C1	D1	E1	F1	G1	H1
1 DIMM	#							
2 DIMMS	#				#			
4 DIMMS	#		#		#		#	
8 DIMMS	#	#	#	#	#	#	#	#

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.*

1



2



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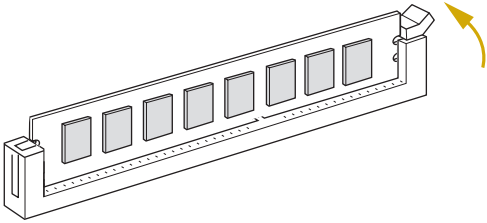


The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

2.5 Expansion Slots (PCI Express Slots)

There are 7 PCI Express slots on this motherboard.

PCIE slot:

PCIE1, PCIE3, PCIE5, and PCIE7 (PCIE 4.0 x16 slot, from CPU1) are used for PCI Express x16 lane width cards.

PCIE2, PCIE4, and PCIE6 (PCIE 4.0 x8 slot, from CPU1) are used for PCI Express 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.

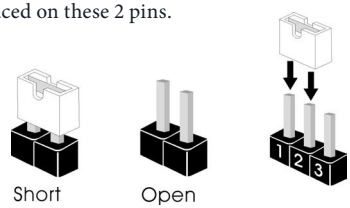
Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

Step 5. Fasten the card to the chassis with screws.

Step 6. Replace the system cover.

2.6 Jumper Setup

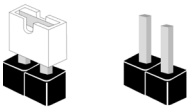
The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is "Short". If no jumper cap is placed on the pins, the jumper is "Open". The illustration shows a 3-pin jumper whose pin1 and pin2 are "Short" when a jumper cap is placed on these 2 pins.



MiniSAS HD SATA/PCIE Selection Jumpers (3-pin MINISAS_1)	 SATA (Default)	 PCIE
CPU PECI Mode Jumper (3-pin PECI1)	 CPU PECI connected to PCH	 CPU PECI connected to BMC (Default)
Security Override Jumper (3-pin SEC_OR1)	 Descriptor Security Override	 Not override (Default)
ME Recovery Jumper (3-pin ME_RECOVERY1)	 Normal Mode (Default)	 ME Recovery Mode
Password Reset Jumper (3-pin PASSWORD_ CLEAR)	 Normal Mode (Default)	 Password Clear

BIOS Recovery Jumper (3-pin BIOS_RECOVERY1)	1_2 Normal Mode (Default)	2_3 Recover BIOS
ESPI/LPC Selection Jumper (3-pin ESPI_LPC_SEL1)	1_2 ESPI (Default)	2_3 LPC
ESPI Flash Sharing Jumper (3-pin ESPI_SHARE)	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".

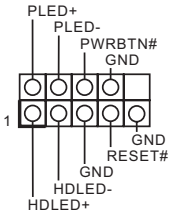


BIOS Swap Override Jumper (ESPI_MODE1)	1_2 2-pin Jumper	Open: Disable Override (Default) Short: Enable Override

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)



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.

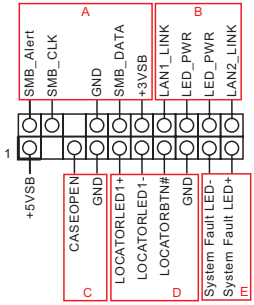
RESET (Reset Switch):
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

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)



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.

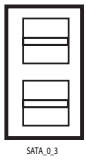
B. Internet status indicator (2-pin LAN1_LED, LAN2_LED)
These two 2-pin headers allow you to use the Gigabit internet indicator cable to connect to the LAN status indicator. When this indicator flickers, it means that the internet is properly connected.

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.

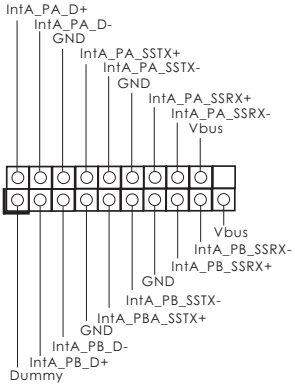
Mini-SAS HD Connector
Right-Angle:
(SATA_0_3)



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

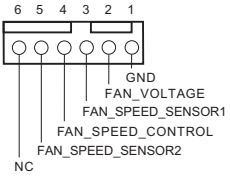
English

USB 3.2 Gen1 Header
(19-pin USB3_5_6)



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)



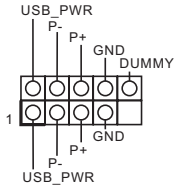
Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control.

SPC621D8-2L2T only:
Front Panel Type C USB 3.2 Gen2 Headers
(20-pin USB31_TC_1)
(20-pin USB31_TC_2)

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.

USB 2.0 Connector
(USB_1)

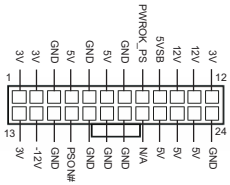
USB 2.0 Header
(9-pin USB_2_3)



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

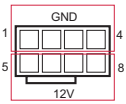
English

ATX Power Connector
(24-pin ATXPWR1)



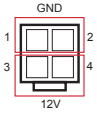
This motherboard provides a 24-pin ATX power connector. To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13.

ATX 12V Power Connectors
(8-pin ATX12V1)

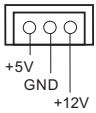


This motherboard provides one 8-pin and one 4-pin ATX 12V power connectors.

(4-pin ATX12V2)

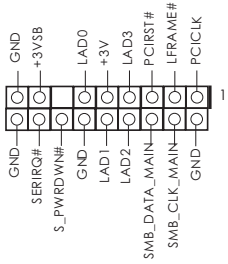


SATA DOM Power Connector
(3-pin SATAPWR2)



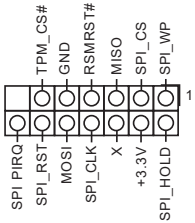
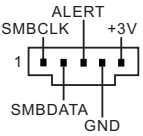
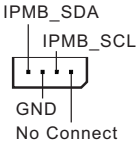
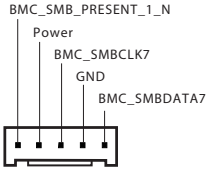
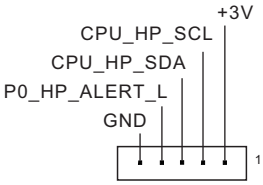
Please use a SATA power cable to connect this SATA Power Connector and your SATA HDD for supplying power from the motherboard, when using DC-IN mode without SATA power supply.

TPM Header
(17-pin TPM1)



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.

English

TPM-SPI Header (13-pin TPM_BIOS_PH1)		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)		PSU SMBus monitors the status of the power supply, fan and system temperature.
Intelligent Platform Management Bus Header (4-pin IPMB1)		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)		The header is used for the SM BUS devices.
CPU HP-SMBus Connector (5-pin CPU1_HSBP1)		This header is used for the hot plug feature of HDDs on the backplane.

Serial ATA3 DOM Connectors
(SATA_4)
(SATA_5)

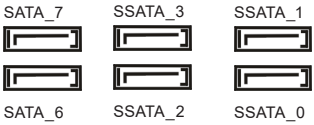
The SATA3 DOM connectors support both SATA DOMs (Disk-On-Module) and SATA data cables for internal storage devices.

Serial ATA3 Connectors
Vertical:
(SATA_4)
(SATA_5)

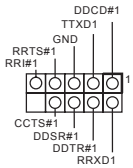
These two SATA3 connectors support SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.

Right-Angle:
(SPC621D8-2T/ SPC621D8 only)
(SATA_6)
(SATA_7)

Right-Angle:
(SPC621D8 only)
(SSATA_0)
(SSATA_1)
(SPC621D8-2T/ SPC621D8 only)
(SSATA_2)
(SSATA_3)



Serial Port Header
(9-pin COM1)

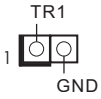
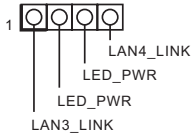
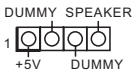
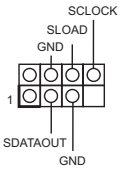
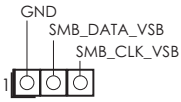
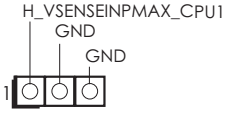


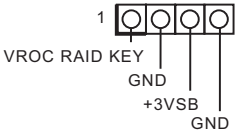
This COM header supports a serial port module.

Clear CMOS Pad
(CLRMOS1)

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

English

Non Maskable Interrupt Button Header (NMI_BTN2)		Please connect a NMI device to this header.
Thermal Sensor Header (2-pin TR1)		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)		This 4-pin connector is used for the front LAN status indicator.
Chassis Speaker Header (4-pin SPEAKER1)		Please connect the chassis speaker to this header.
Serial General Purpose Input/Output Headers (7-pin SATA_SGPIO1) (7-pin SSATA_SGPIO1)		The headers support Serial Link interface for onboard SATA connections.
PWM Configuration Header (3-pin PWM_CFG1)		This header is used for PWM configurations.
CPU VSENSE Header (3-pin CPU_VSENSE)		This header is used to detect CPU1 VSENSE.

Virtual RAID On CPU Header (4-pin RAID_1)		This connector supports Intel® Virtual RAID on CPU and NVME/AHCI RAID on CPU PCIE.

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

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

*Only Intel SSDs are supported.

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

English

2.8 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)		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 Dr. Debug

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

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

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

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

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

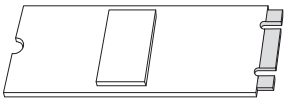
0xE3	PEI_S3_OS_WAKE
0x50	PEI_MEMORY_INVALID_TYPE
0x53	PEI_MEMORY_NOT_DETECTED
0x55	PEI_MEMORY_NOT_INSTALLED
0x57	PEI_CPU_MISMATCH
0x58	PEI_CPU_SELF_TEST_FAILED
0x59	PEI_CPU_NO_MICROCODE
0x5A	PEI_CPU_ERROR
0x5B	PEI_RESET_NOT_AVAILABLE
0xD0	DXE_CPU_ERROR
0xD1	DXE_NB_ERROR
0xD2	DXE_SB_ERROR
0xD3	DXE_ARCH_PROTOCOL_NOT_AVAILABLE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

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

2.10 M.2 SSD Module Installation Guide

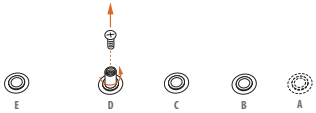
The M.2 Socket (M2_1) supports a M.2 SATA3 6.0 Gb/s module or a M.2 PCI Express module up to Gen3 x4(8GT/s x4) *(SPC621D8-2L2T / SPC621D8-2T only)*. The M.2 Socket (M2_1) supports a M.2 PCI Express module up to Gen3 x4 (32Gb/s) *(SPC621D8 only)*. The M.2 Socket (M2_2) supports a M.2 SATA3 6.0 Gb/s module or a M.2 PCI Express module up to Gen3 x1 (8GT/s x1).

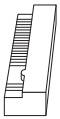
Installing the M.2 SSD Module



Step 1

Prepare a M.2 SSD module and the screw.



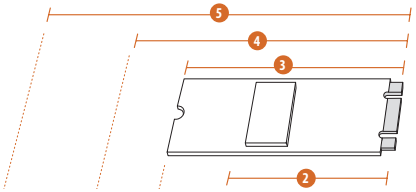


Step 2

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

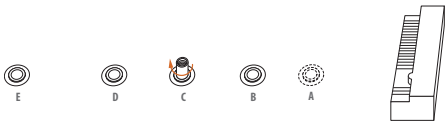
No.	1	2	3
Nut Location	A	B	C
PCB Length	4.2cm	8cm	11cm
Module Type	Type 2242	Type 2280	Type 22110

English



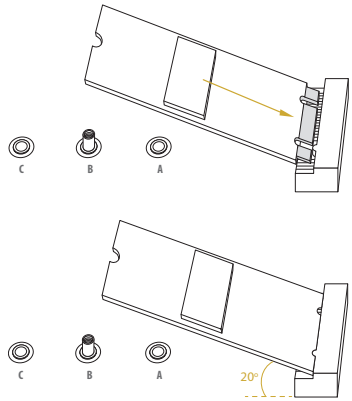
Step 3

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



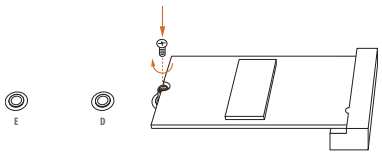
Step 4

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



Step 5

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



Step 6

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

Chapter 3 UEFI Setup Utility

3.1 Introduction

This section explains how to use the UEFI SETUP UTILITY to configure your system. The UEFI chip on the motherboard stores the UEFI SETUP UTILITY. You may run the UEFI SETUP UTILITY when you start up the computer. Please press <F2> or <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.

English

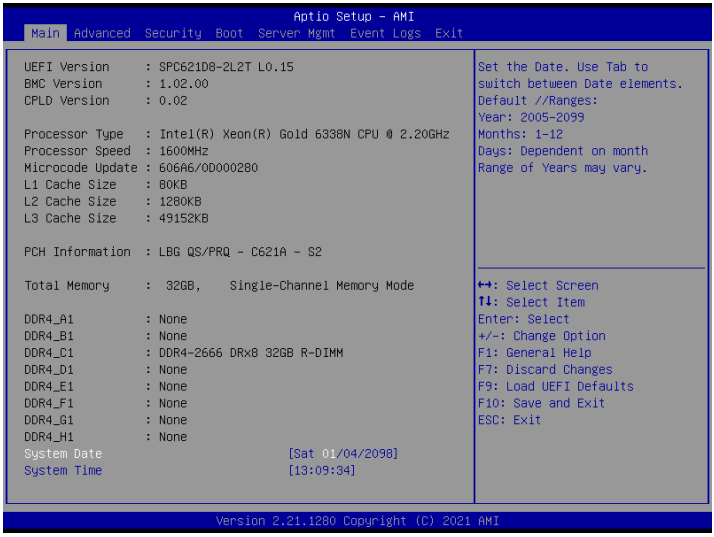
3.1.2 Navigation Keys

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

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

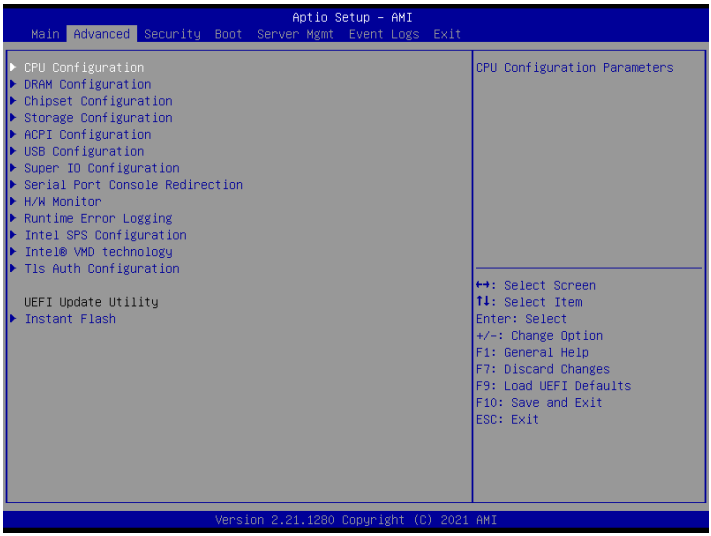
3.2 Main Screen

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



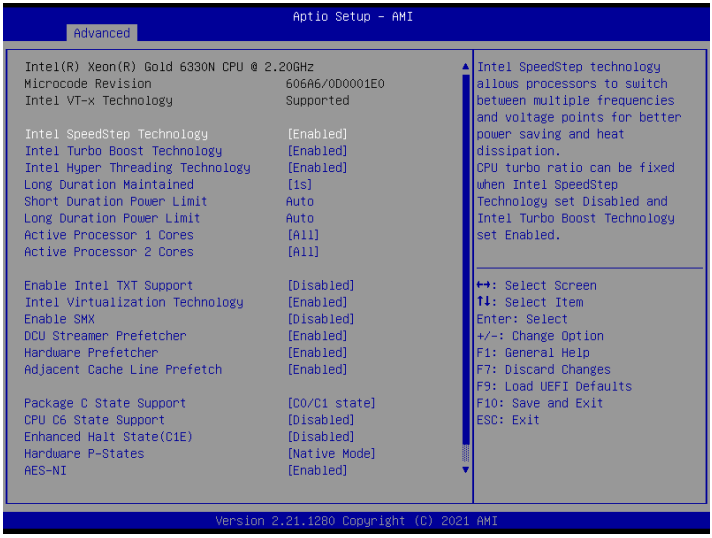
3.3 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, DRAM Configuration, Chipset Configuration, Storage Configuration, 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.



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

3.3.1 CPU Configuration



Intel SpeedStep Technology

Intel SpeedStep technology allows processors to switch between multiple frequencies and voltage points for better power saving and heat dissipation. CPU turbo ratio can be fixed when Intel SpeedStep Technology set Disabled and Intel Turbo Boost Technology set Enabled.

Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issues with some power supplies. Please set this item to [Disabled] if above issues occur.

Intel Turbo Boost Technology

Intel Turbo Boost Technology enables the processor to run above its base operating frequency when the operating system requests the highest performance state.

Intel Hyper Threading Technology

Intel Hyper Threading Technology allows multiple threads to run on each core, so that the overall performance on threaded software is improved.

Long Duration Maintained

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

Short Duration Power Limit

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

Long Duration Power Limit

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

Active Processor 1 Cores

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

Enable Intel TXT Support

Enables Intel Trusted Execution Technology Configuration.

Intel Virtualization Technology

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

Enable SMX

Use this item to enable Safer Mode Extensions.

DCU Streamer Prefetcher

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

Hardware Prefetcher

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

Adjacent Cache Line Prefetch

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

Package C State Support

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

CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

Enhanced Halt State(C1E)

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

Hardware P-States

Disable: Hardware chooses a P-state based on OS Request (Legacy P-States)
Native Mode: Hardware chooses a P-state based on OS guidance
Out of Band Mode: Hardware autonomously chooses a P-state (no OS guidance)

AES-NI

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

CPU Thermal Throttling

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

SNC (Sub NUMA)

SNC disable will support 1-cluster (XPT/KTI Prefetch enable) 4-IMC way interleave. SNC2 Enable supports 2-clusters SNC and 2-way IMC interleave. SNC4 Enable supports 4-clusters SNC and 1-way IMC interleave. Enable SNC2 or SNC4 will gray out iMC_ Interleave knob and 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).

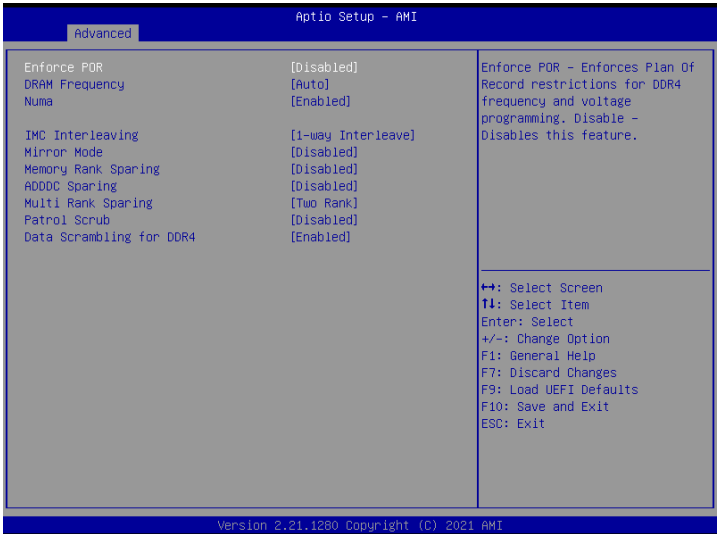
Enable/Disable SGX Auto MP Registration Agent

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



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.

Multi Rank Sparing

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

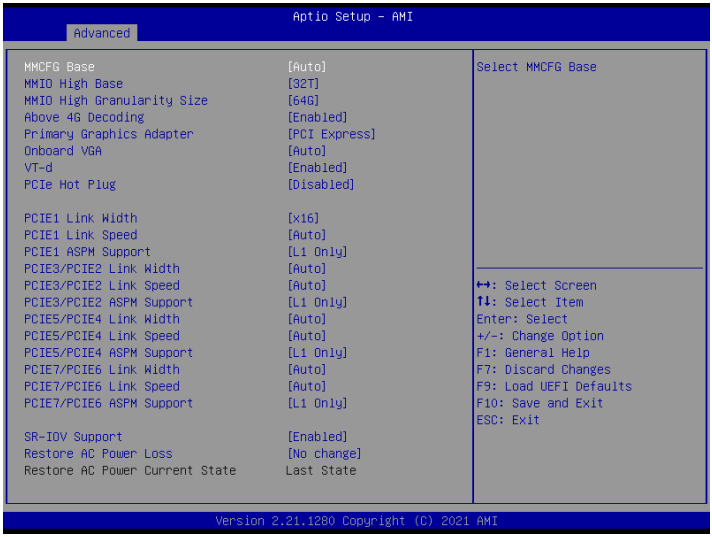
Patrol Scrub

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



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.

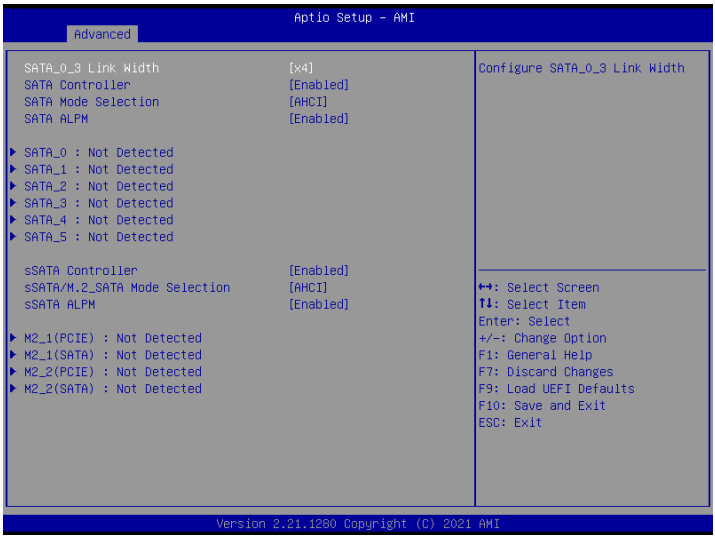
Restore AC Power Loss

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



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

PCIE Devices Power On

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

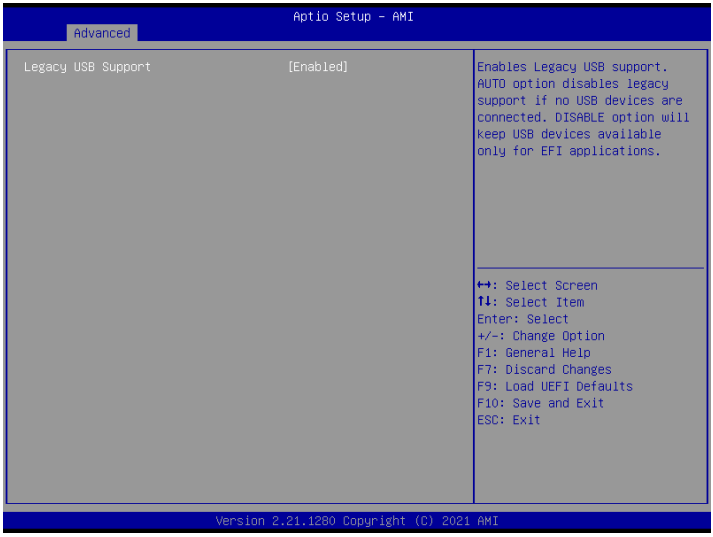
Ring-In Power On

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.

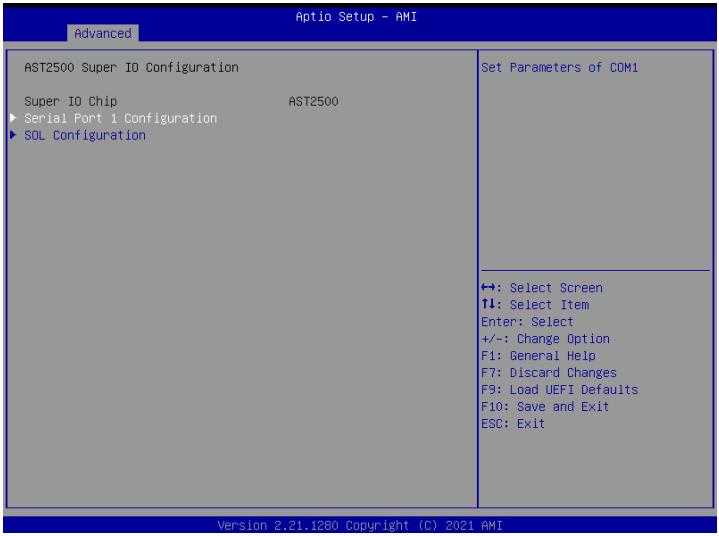
3.3.6 USB Configuration



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



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.

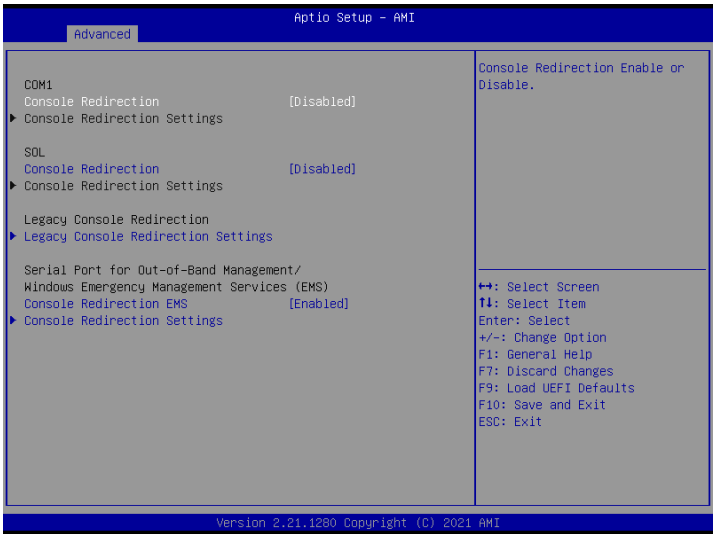
SOL Port

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



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].

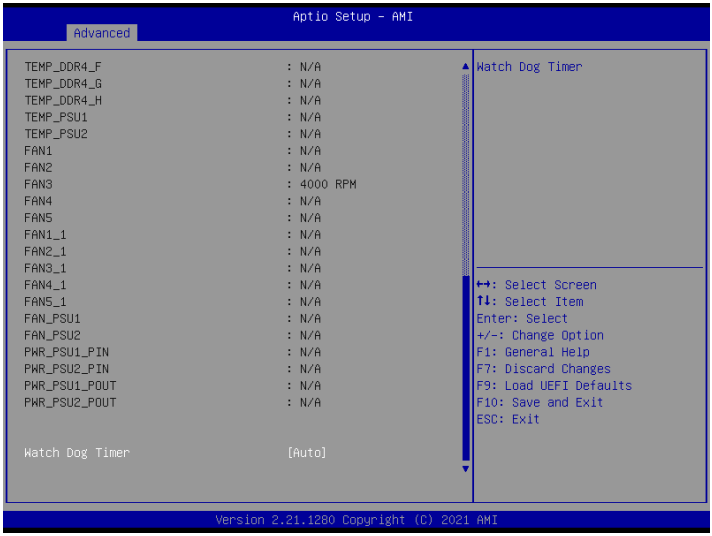
Data Bits EMS

Parity EMS

Stop Bits EMS

3.3.9 H/W Monitor

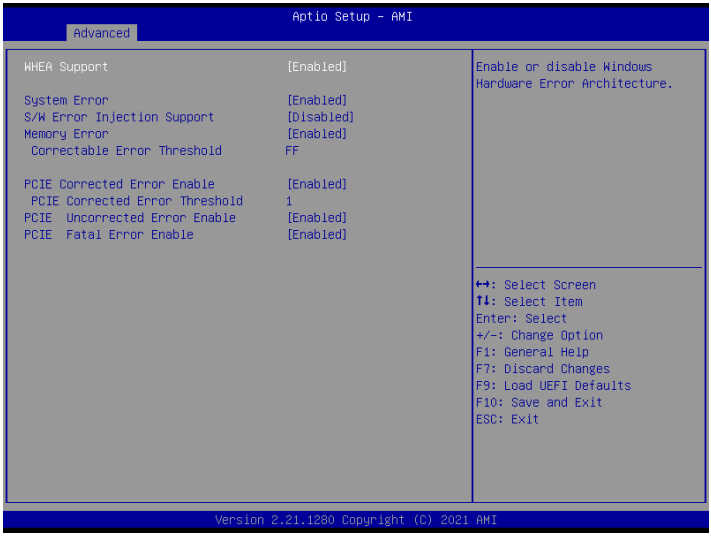
In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



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



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.

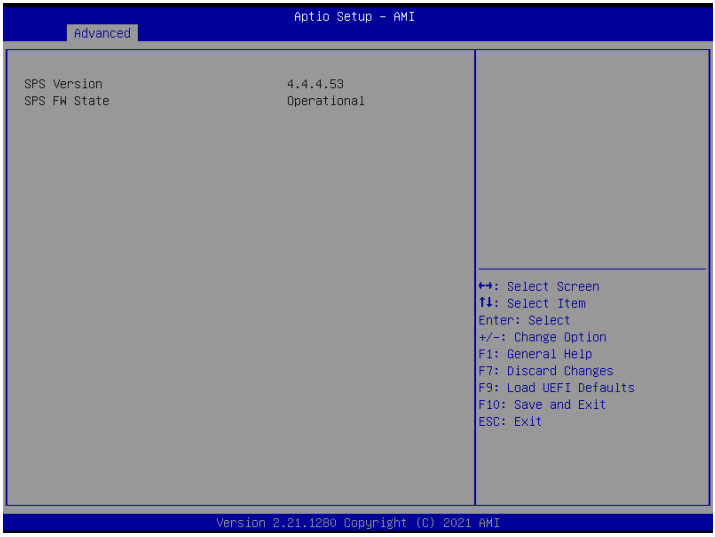
PCIE Uncorrected Error Enable

Use this item to enable or disable PCIe Uncorrectable errors.

PCIE Fatal Error Enable

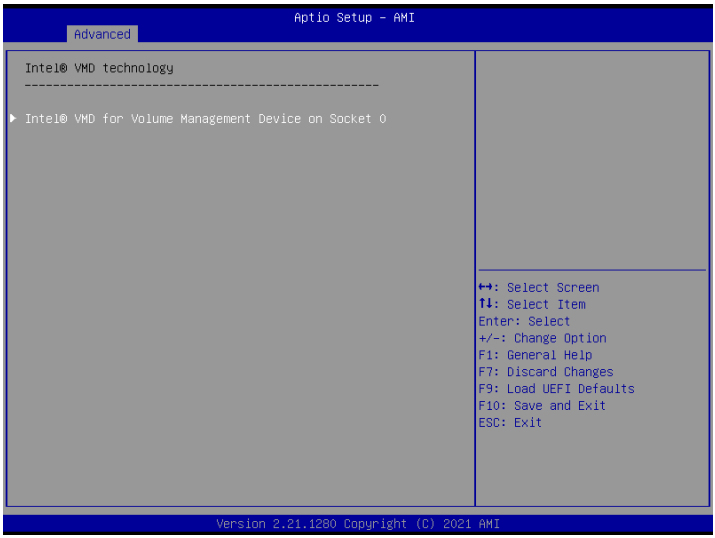
Use this item to enable or disable PCIe Ftal errors.

3.3.11 Intel SPS Configuration



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

3.3.12 Intel® VMD technology



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.

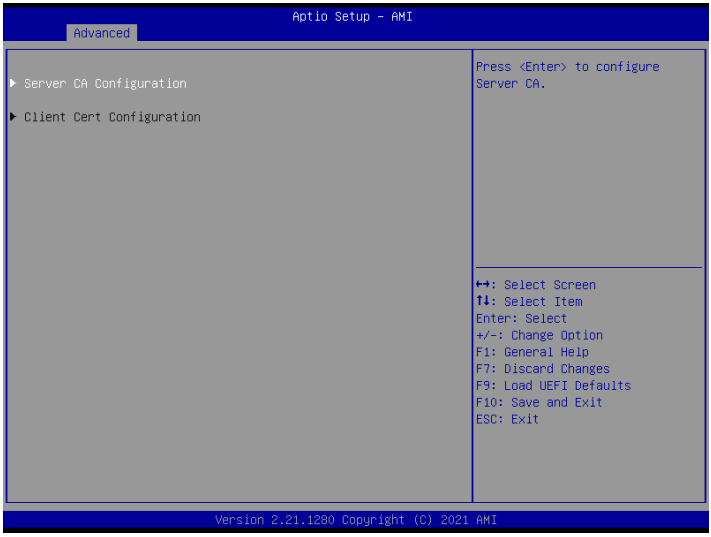
VMD port 4D

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.

3.3.13 Tls Auth Configuration



Server CA Configuration

Press <Enter> to configure Server CA.

Client Cert Configuration

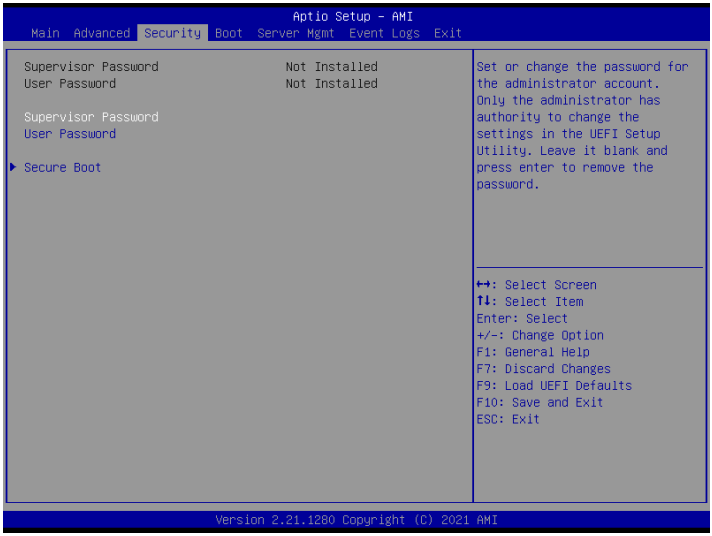
Press <Enter> to configure Client Cert.

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 complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If you execute Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update your UEFI, and reboot your system after the UEFI update process is completed.

3.4 Security

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



Supervisor Password

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

User Password

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

Secure Boot

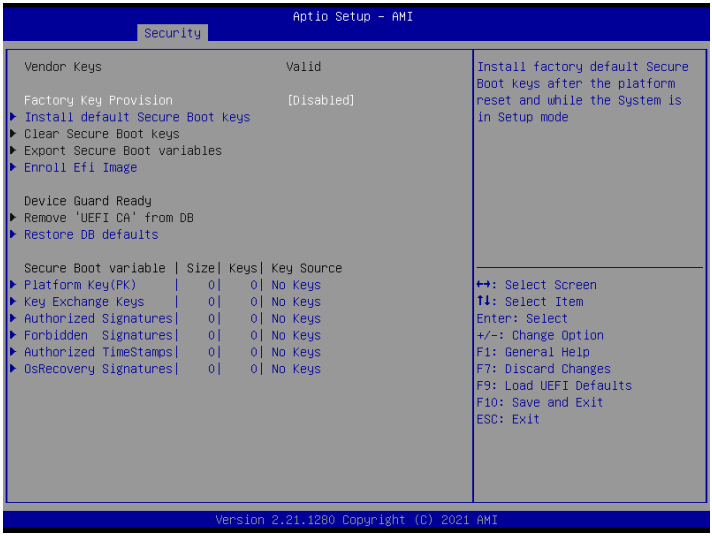
Use this to enable or disable Secure Boot Control. The default value is [Disabled]. Enable to support Windows Server 2012 R2 or later versions Secure Boot.

Secure Boot Mode

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

3.4.1 Key Management

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



Factory Key Provision

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

Install Default Secure Boot Keys

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

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

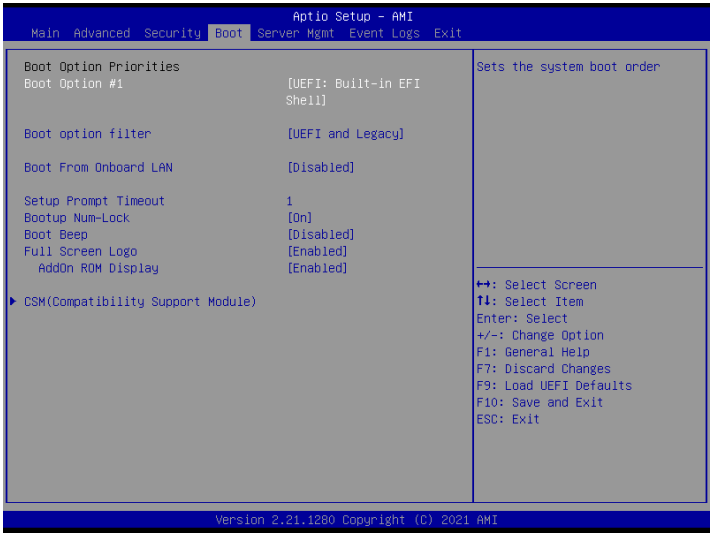
2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Default, External, Mixed

3.5 Boot Screen

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



Boot Option #1

Use this item to set the system boot order.

Boot Option Filter

This option controls Legacy/UEFI ROMs priority.

Boot From Onboard LAN

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

Setup Prompt Timeout

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

Bootup Num-Lock

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

Boot Beep

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

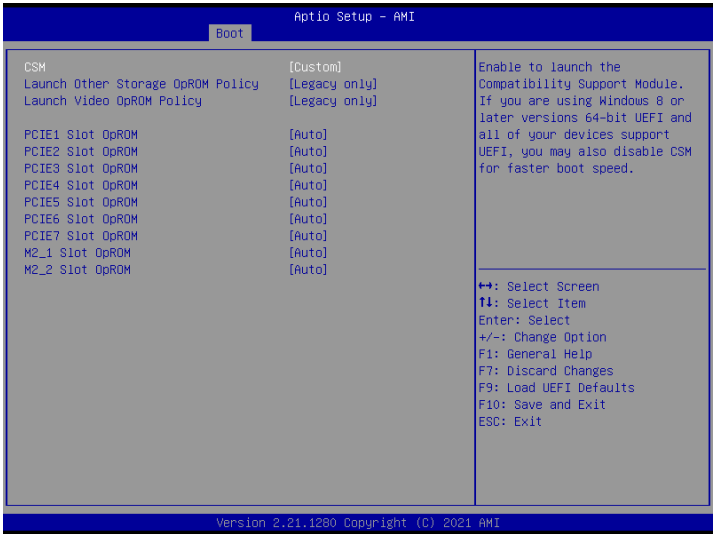
Full Screen Logo

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

AddOn ROM Display

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

3.5.1 CSM Parameters



CSM

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

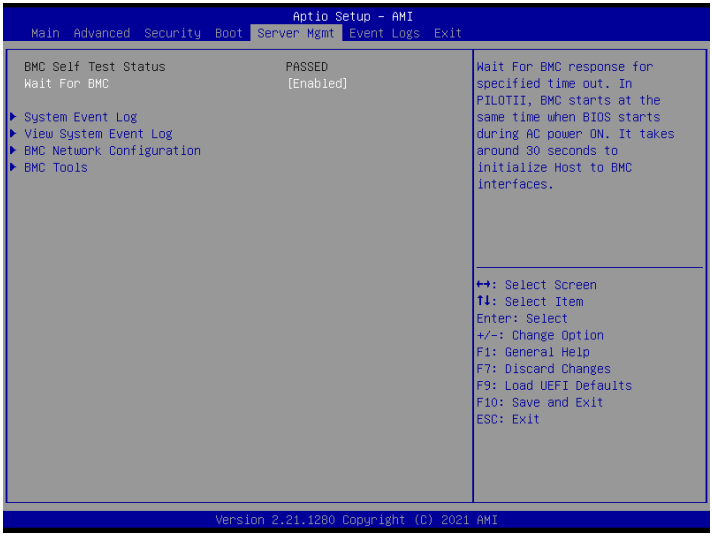
M2_1 Slot OpROM

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.)

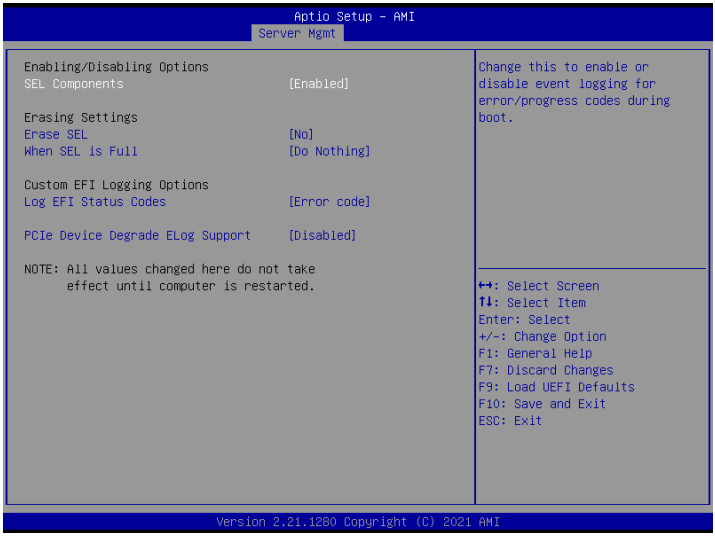
3.6 Server Mgmt



Wait For BMC

Wait For BMC response for specified time out. BMC starts at the same time when BIOS starts during AC power ON. It takes around 90 seconds to initialize Host to BMC interfaces.

3.6.1 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.

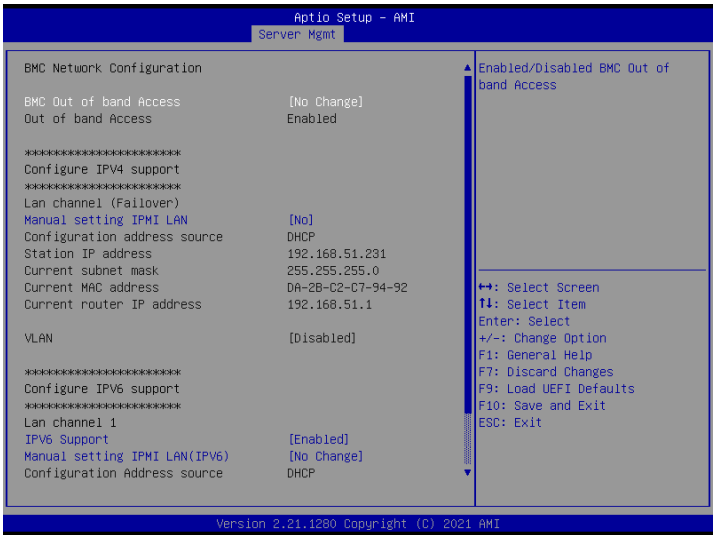
PCIe Device Degrade ELog Support

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



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

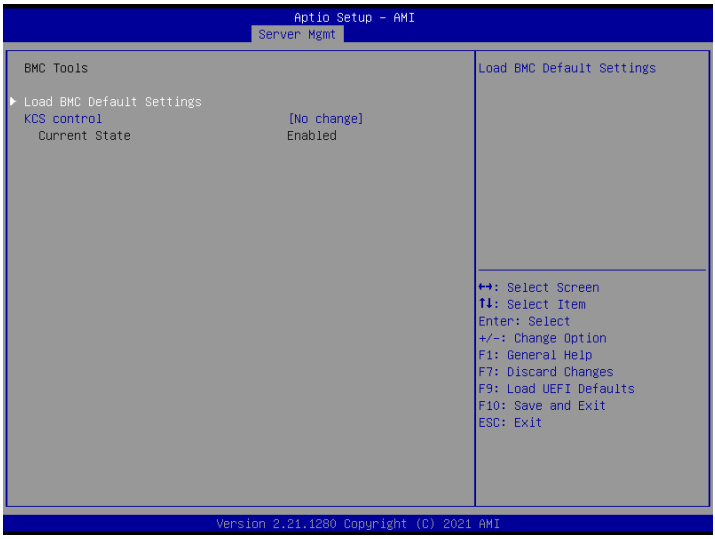
IPV6 Support

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



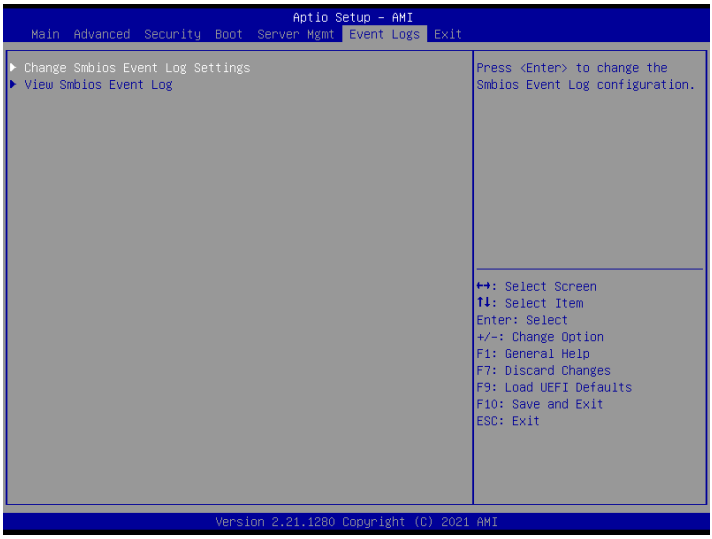
Load BMC Default Settings

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



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

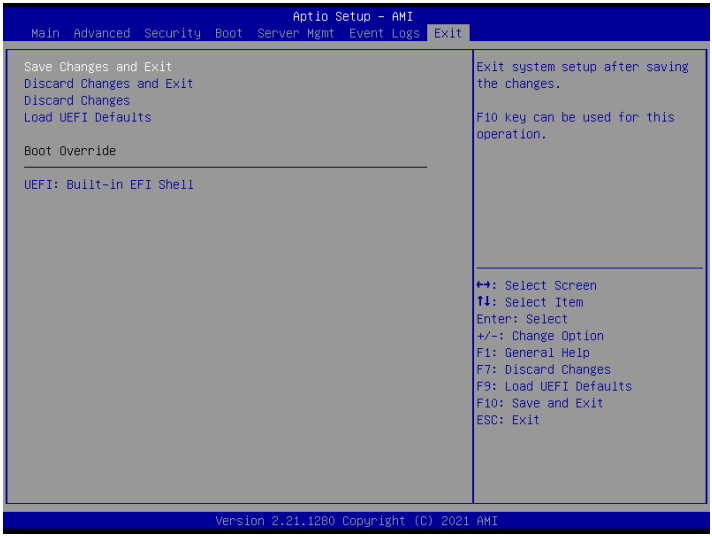
Choose option to enable/disable logging of System boot event.

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.

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

After all the hardware has been installed, we suggest you go to our offical website at http://www.ASRockRack.com and make sure if there are any new updates of the BIOS / BMC firmware for your motherboard.

4.1 Download and Install Operating System

This motherboard supports various Microsoft® Windows® Server / Linux compliant operating systems. Please download the operating system from your OS manufacturer. Please refer to your OS documentation for more instructions.

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

4.2 Download and Install Software Drivers

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

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

4.3 Contact Information

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

Chapter 5 Troubleshooting

5.1 Troubleshooting Procedures

Follow the procedures below to troubleshoot your system.

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

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

If there is no power...

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

If there is no video...

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

If there are memory errors...

1. Verify that the DIMM modules are properly seated in the slots.
2. Use recommended DDR4 RDIMM/RDIMM-3DS/LRDIMM/LRDIMM-3DS/ 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 Rack or want to know more about ASRock Rack, you're welcome to visit ASRock Rack's website at http://www.asrockrack.com; or you may contact your dealer for further information. For technical questions, please submit a support request form at https://event.asrockrack.com/tsd.asp

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