

Industry Standard, Flexible Architecture

OPEN

Less Heat, Less Power Consumption

GREEN

Robust Design, Quality Parts

STABLE

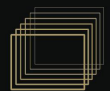
Stable and  
Reliable Solution

Server/Workstation  
Motherboard

SP2C621D16HM3

User Manual

English



Version 1.0

Published July 2023

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"Perchlorate Material-special handling may apply, see [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)"

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- (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.



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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# Chapter 1 Introduction

Thank you for purchasing ASRock Rack **SP2C621D16HM3** motherboard, a reliable motherboard produced under ASRock Rack's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock Rack's commitment to quality and endurance.

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



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

*About this motherboard technical support, please visit the website for specific information <http://www.asrockrack.com/support/>*

## 1.1 Package Contents

- ASRock Rack SP2C621D16HM3 Motherboard  
(Half-Width Form Factor: 6.75" x 21")
- 2 x Screws for M.2 Sockets
- 2 x CPU Non-Fabric Carriers



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

## 1.2 Specifications

| SP2C621D16HM3                             |                                                                                                                         |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Physical Status                           |                                                                                                                         |
| Form Factor                               | Half-Width                                                                                                              |
| Dimension                                 | 6.75" x 21" (171.45 x 533.40 mm)                                                                                        |
| Processor System                          |                                                                                                                         |
| CPU                                       | Supports 3 <sup>rd</sup> Gen Intel® Xeon® Scalable Processors                                                           |
| Socket                                    | Dual Socket P+ (LGA 4189)                                                                                               |
| Thermal Design Power (TDP)                | 270W                                                                                                                    |
| Chipset                                   | Intel® C621A                                                                                                            |
| System Memory                             |                                                                                                                         |
| Supported DIMM Quantity                   | 8+8 DIMM slots (1DPC)                                                                                                   |
| Supported Type                            | DDR4 288-pin RDIMM/ RDIMM-3DS/ LRDIMM/ LRDIMM-3DS, Intel® Optane™ Persistent Memory 200 Series                          |
| Max. Capacity per DIMM                    | RDIMM: up to 64GB<br>RDIMM-3DS: up to 256GB<br>LRDIMM: up to 128GB<br>LRDIMM-3DS: up to 256GB"                          |
| Max. Frequency                            | 3200 MT/s                                                                                                               |
| Voltage                                   | 1.2V                                                                                                                    |
| Note                                      | memory support is to be validated                                                                                       |
| PCIe Expansion Slots (SLOT7 close to CPU) |                                                                                                                         |
| SLOT2                                     | Gen Z 4C (PCIe4.0 x16) [CPU0]                                                                                           |
| SLOT1                                     | Gen Z 4C (PCIe4.0 x16) [CPU0]                                                                                           |
| Other PCIe Expansion Connectors           |                                                                                                                         |
| M.2 slot                                  | 2 M-key (PCIe3.0 x4 or SATA 6Gb/s); Support 2280 form factor [PCH]                                                      |
| SlimSAS                                   | 2 Slimline (PCIe4.0 x8) [CPU0]<br>1 SlimSAS*                                                                            |
| ExaMAX                                    | 2 ExaMAX (PCIe4.0 x16) [CPU1]                                                                                           |
| Note                                      | *SAS is supported by additional RAID card only; The Slimline1 is reserved only to extend SAS from RAID card to ExaMAX3. |
| SATA/SAS Storage                          |                                                                                                                         |
| PCH Built-in Storage                      | Intel® C621A (Up to 10 SATA 6Gb/s; RAID 0/1/5/10):<br>2 M.2, 2 SATA 7-pin, 1 ExaMAX3                                    |
| Ethernet                                  |                                                                                                                         |
| OCP slot                                  | 1 OCP NIC 3.0 (PCIe4.0 x16) [CPU0]                                                                                      |
| USB                                       |                                                                                                                         |
| Controller/Hub                            | Intel® C621A                                                                                                            |

|                                    |                                                                                                                                            |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Connectors/<br>headers             | External:<br>2 Type-A (USB3.2 Gen1)<br>Internal:<br>2 USB2.0 in ExaMAX3                                                                    |
| <b>Graphics</b>                    |                                                                                                                                            |
| Controller                         | ASPEED AST2500:<br>1 DB15 (VGA)                                                                                                            |
| <b>Security</b>                    |                                                                                                                                            |
| TPM                                | 1 (13-pin, SPI)                                                                                                                            |
| <b>Rear I/O</b>                    |                                                                                                                                            |
| UID button/LED                     | 1 UID button w/ LED                                                                                                                        |
| Video output                       | 1 DB15 (VGA)                                                                                                                               |
| USB                                | 2 Type-A (USB3.2 Gen1)                                                                                                                     |
| RJ45                               | 1 dedicated IPMI                                                                                                                           |
| <b>Hardware Monitor</b>            |                                                                                                                                            |
| Temperature                        | CPU, PCH, MB, Card side, OCP, M.2 Temperature Sensing                                                                                      |
| Fan                                | Fan Tachometer<br>CPU Quiet Fan (Allow Chassis Fan Speed Auto-Adjust by CPU Temperature)<br>Fan Multi-Speed Control                        |
| Voltage                            | CPU1_PVCCIN, CPU2_PVCCIN, PVDDQ_ABCD, PVDDQ_EFGH, PVDDQ_IJKL, PVDDQ_MNOP, 1.05V_PCH, 1.8V_PCH, +BAT, PVNN_PCH, 3.3V, 5V, 12V, 3.3VSB, 5VSB |
| <b>Server Management</b>           |                                                                                                                                            |
| BMC Controller                     | ASPEED AST2500: IPMI2.0 with iKVM and vMedia support                                                                                       |
| IPMI Dedicated<br>GLAN             | 1 RJ45 Dedicated IPMI LAN port by Realtek RTL8211E                                                                                         |
| <b>System BIOS</b>                 |                                                                                                                                            |
| BIOS type                          | AMI UEFI BIOS; 256Mb SPI Flash ROM                                                                                                         |
| Features                           | Plug and Play, ACPI 4.0 and above compliance wake up events, SMBIOS 3.3 and above, ASRock Rack Instant Flash                               |
| <b>Internal Connectors/Headers</b> |                                                                                                                                            |
| PSU connector                      | 3 (8-pin, Micro-Hi 12V), 1 (19-pin, CM Board Standby Power 12V)                                                                            |
| Auxiliary panel<br>header          | 1 (18-pin): chassis intrusion, system fault LED, locate, SMBus                                                                             |
| System panel<br>header             | 1 (9-pin): power switch, reset switch, system power LED, HDD activity LED                                                                  |
| NMI button/<br>header              | 1                                                                                                                                          |
| COM header                         | 1 (3-pin)                                                                                                                                  |
| Speaker header                     | 1 (4-pin)                                                                                                                                  |
| Buzzer                             | 1                                                                                                                                          |
| Fan header                         | 4 (6-pin), 2 (4-pin)                                                                                                                       |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TPM header                | 1 (13-pin, SPI)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| VROC header               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| SGPIO header              | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| HSBP                      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| SMBus header              | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| PMbus header              | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| IPMB header               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Clear CMOS                | 1 (contact pads)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Others                    | 1 IPMI_LED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| LED Indicators            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Standby Power LED         | 1 (3VSB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Fan Fail LED              | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| BMC Heartbeat LED         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Supported OS              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| OS                        | <p>Microsoft® Windows®</p> <ul style="list-style-type: none"> <li>- Server 2016 (64 bit)</li> <li>- Server 2019 (64 bit)</li> <li>- Server 2022 (64 bit)</li> </ul> <p>Linux®</p> <ul style="list-style-type: none"> <li>- Red Hat Enterprise Linux Server 7.9 (64bit) / 8.5 (64bit)</li> <li>- CentOS 7.9 (64bit) / 8.5 (64bit)</li> <li>- SUSE Enterprise Linux Server 15 SP2 (64bit) / 15 SP3 (64bit)</li> <li>- Ubuntu 20.04.6 (64bit) / 21.04 (64bit) / 22.04.2 (64bit)</li> </ul> <p>Hypervisor</p> <ul style="list-style-type: none"> <li>- VMWare® ESXi 6.7.0 U3 / 7.0 U3g</li> </ul> <p><i>*Please refer to our website for the latest OS support list.</i></p> |
| Enviroment                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Operating temperature     | 10 - 35°C (50 - 95 degF)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Non-operating temperature | -40 - 70°C (-40 - 158degF)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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



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

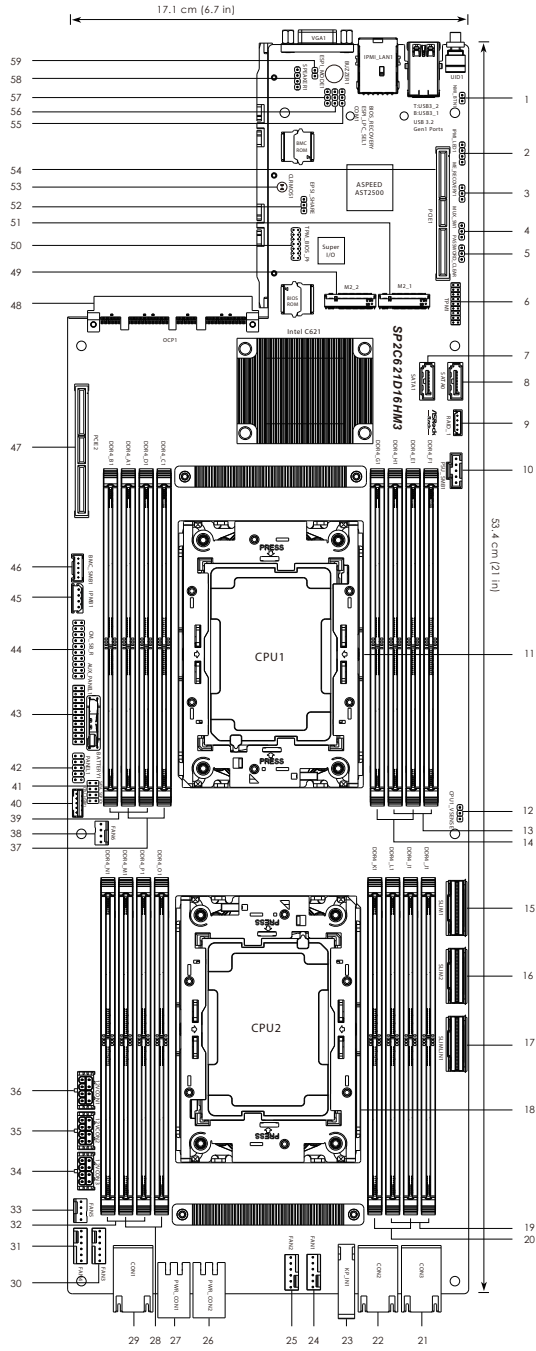


If installing Intel® LAN utility or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If installing the drivers only, it will pass the WHQL tests.

## 1.3 Unique Features

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

# 1.4 Motherboard Layout

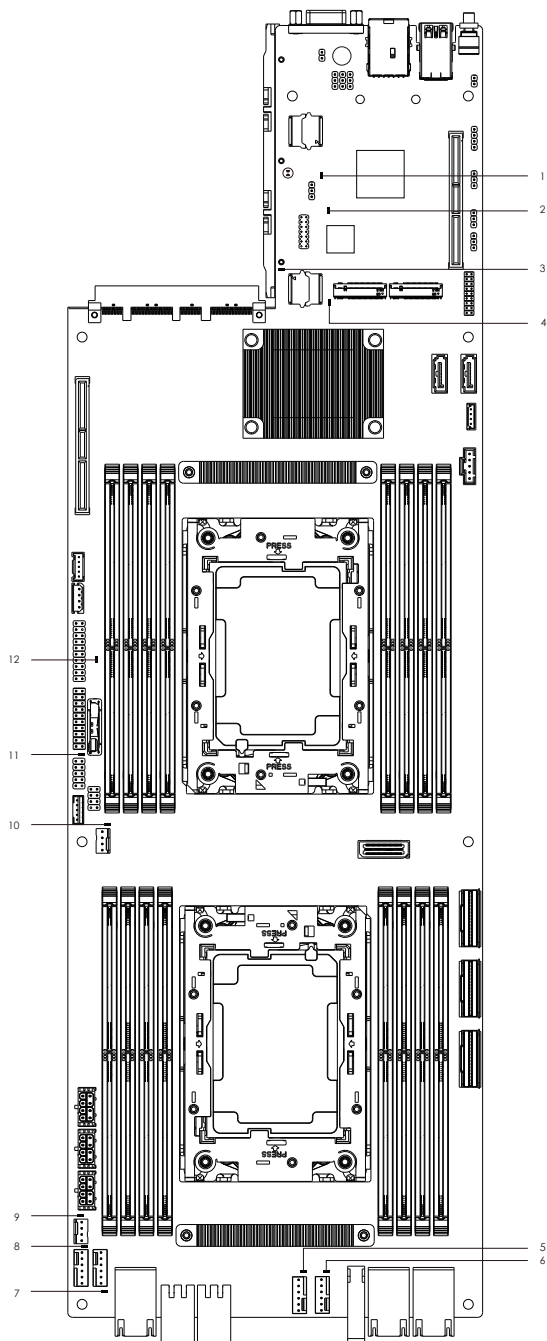


| No. | Description                                     |
|-----|-------------------------------------------------|
| 1   | Non Maskable Interrupt Button (NMI_BTN1)        |
| 2   | IPMI LAN LED Header (IPMI_LED1)                 |
| 3   | ME Recovery Jumper (ME_RECOVERY1)               |
| 4   | BPB Signal Source Selection Jumper (MUX_SW1)    |
| 5   | Password Reset Jumper (PASSWORD_CLEAR1)         |
| 6   | TPM Header (TPM1)                               |
| 7   | SATA3 Connector (SATA1)                         |
| 8   | SATA3 Connector (SATA0)                         |
| 9   | Virtual RAID On CPU Header (RAID_1)             |
| 10  | PSU SMBus Header (PSU_SMB1)                     |
| 11  | LGA 4189 CPU Socket (CPU1)                      |
| 12  | CPU VSENSE Header (CPU1_VSENSE)                 |
| 13  | 2 x 288-pin DDR4 DIMM Slots (DDR4_F1, DDR4_H1)* |
| 14  | 2 x 288-pin DDR4 DIMM Slots (DDR4_E1, DDR4_G1)* |
| 15  | Slimline x8 Connector (SLIM1)                   |
| 16  | Slimline x8 Connector (SLIM2)                   |
| 17  | SAS Connector Supported by RAID Card (SLIMLIN1) |
| 18  | LGA 4189 CPU Socket (CPU2)                      |
| 19  | 2 x 288-pin DDR4 DIMM Slots (DDR4_J1, DDR4_L1)* |
| 20  | 2 x 288-pin DDR4 DIMM Slots (DDR4_I1, DDR4_K1)* |
| 21  | Front Edge Connector (ExaMAX)(CON3)             |
| 22  | Front Edge Connector (ExaMAX)(CON2)             |
| 23  | Front Edge Connector (KP_IN1)                   |
| 24  | System Fan Connector (6-pin) (FAN1)             |
| 25  | System Fan Connector (6-pin) (FAN2)             |
| 26  | Front Edge Connector (PWR_CON2)                 |
| 27  | Front Edge Connector (PWR_CON1)                 |
| 28  | 2 x 288-pin DDR4 DIMM Slots (DDR4_M1, DDR4_O1)* |
| 29  | Front Edge Connector (ExaMAX)(CON1)             |
| 30  | System Fan Connector (6-pin) (FAN3)             |
| 31  | System Fan Connector (6-pin) (FAN4)             |
| 32  | 2 x 288-pin DDR4 DIMM Slots (DDR4_N1, DDR4_P1)* |
| 33  | System Fan Connector (4-pin) (FAN5)             |
| 34  | ATX 12V Power Connector (12VCON3)               |
| 35  | ATX 12V Power Connector (12VCON2)               |

| No. | Description                                          |
|-----|------------------------------------------------------|
| 36  | ATX 12V Power Connector (12VCON1)                    |
| 37  | 2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_C1)*      |
| 38  | System Fan Connector (4-pin) (FAN6)                  |
| 39  | 2 x 288-pin DDR4 DIMM Slots (DDR4_B1, DDR4_D1)*      |
| 40  | Backplane PCI Express Hot-Plug Connector (CPU_HSBP1) |
| 41  | SATA SGPIO Connector (SATA_SGPIO1)                   |
| 42  | System Panel Header (PANEL1)                         |
| 43  | Auxiliary Panel Header (AUX_PANEL1)                  |
| 44  | CM Board Standby Power Header (CM_SB_R)              |
| 45  | Intelligent Platform Management Bus Header (IPMB1)   |
| 46  | BMC SMBus Header (BMC_SMB1)                          |
| 47  | PCI Express 4.0 x16 Slot (PCIE2)                     |
| 48  | OCP 3.0 Gen4 x16 NIC Slot (OCP1)                     |
| 49  | M-key M.2 Socket (M2_2) (Type 2280)                  |
| 50  | TPM-SPI Header (TPM_BIOS_PH1)                        |
| 51  | M-key M.2 Socket (M2_1) (Type 2280)                  |
| 52  | ESPI Flash Sharing Jumper (ESPI_SHARE)               |
| 53  | Clear CMOS Pad (CLRMOS1)                             |
| 54  | PCI Express 4.0 x16 Slot (PCIE1)                     |
| 55  | BIOS Recovery Jumper (BIOS_RECOVERY1)                |
| 56  | ESPI/LPC Selection Jumper (ESPI_LPC_SEL1)            |
| 57  | COM Header (COM1)                                    |
| 58  | Speaker Header (SPEAKER1)                            |
| 59  | BIOS Swap Override Jumper (ESPI_MODE1)               |

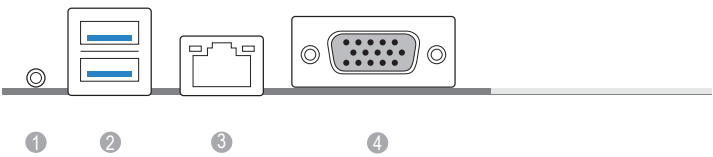
*\*For DIMM installation and configuration instructions, please see p.20 (Installation of Memory Modules (DIMM)) for more details.*

## 1.5 Onboard LED Indicators



| No. | Item         | Status | Description        |
|-----|--------------|--------|--------------------|
| 1   | BLED1        | Green  | BMC heartbeat LED  |
| 2   | LED_CPLD_HB1 | Green  | CPLD heartbeat LED |
| 3   | SB_PWR1      | Green  | STB PWR ready      |
| 4   | LED_CATERR1  | Red    | CPU Caterr error   |
| 5   | FAN_LED2     | Red    | FAN2 failed        |
| 6   | FAN_LED1     | Red    | FAN1 failed        |
| 7   | FAN_LED3     | Red    | FAN3 failed        |
| 8   | FAN_LED4     | Red    | FAN4 failed        |
| 9   | FAN_LED5     | Red    | FAN5 failed        |
| 10  | FAN_LED6     | Red    | FAN6 failed        |
| 11  | HDD_LED      | Green  | HDD blinking       |
| 12  | SYS_LED1     | Red    | System Event       |

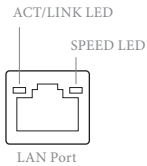
1.6 I/O Panel



| No. | Description                   | No. | Description                 |
|-----|-------------------------------|-----|-----------------------------|
| 1   | UID Switch (UID1)             | 3   | LAN RJ-45 Port (IPMI_LAN1)* |
| 2   | USB 3.2 Gen1 Ports (USB3_1_2) | 4   | VGA Port (VGA1)             |

LAN Port LED Indications

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

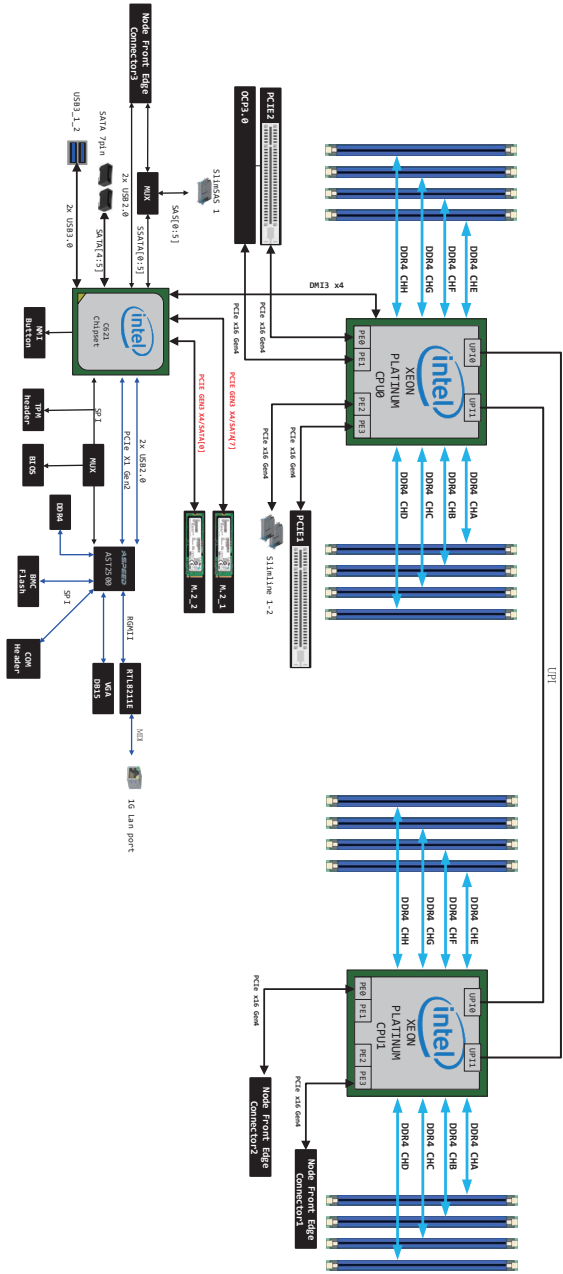


Dedicated IPMI LAN Port LED Indications

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

1.7 Block Diagram

SP2C621D16HM3 R1.00 topology



## Chapter 2 Installation

This is a half-width form factor (6.75" x 21") motherboard. Before installing the motherboard, study the configuration of the chassis to ensure that the motherboard fits into it.



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

### 2.1 Screw Holes

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



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



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

### 2.2 Pre-installation Precautions

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

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



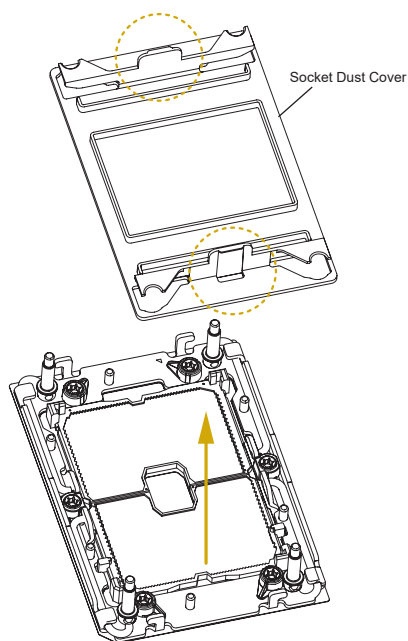
*Before installing or removing any component, ensure that the power is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.*

## 2.3 Installing the CPU and Heatsink



1. Before inserting 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.

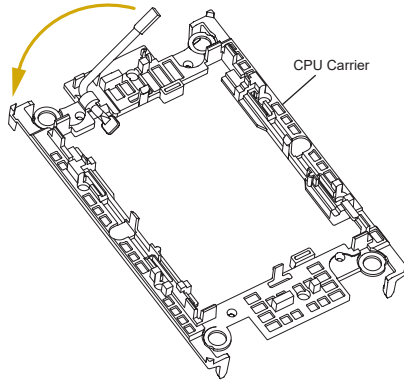
1



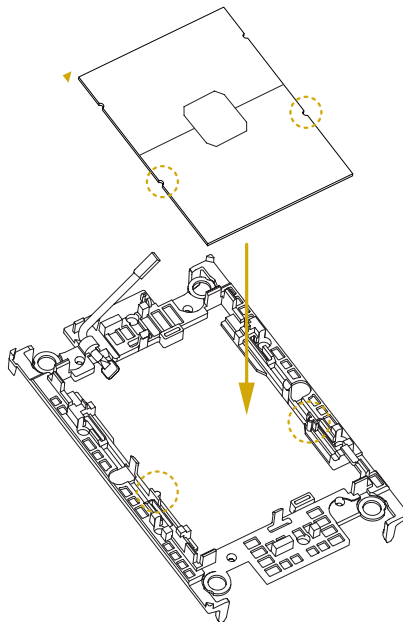


1. Before installing the heatsink, it needs to spray thermal interface material between the CPU and the heatsink to improve heat dissipation.
2. Illustration in this documentation are examples only. Heatsink or fan cooler type may differ.

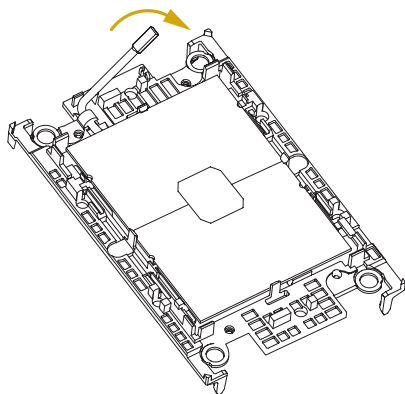
2



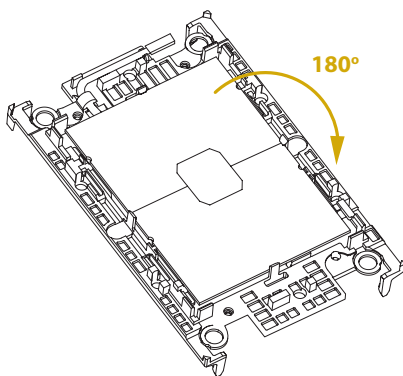
3



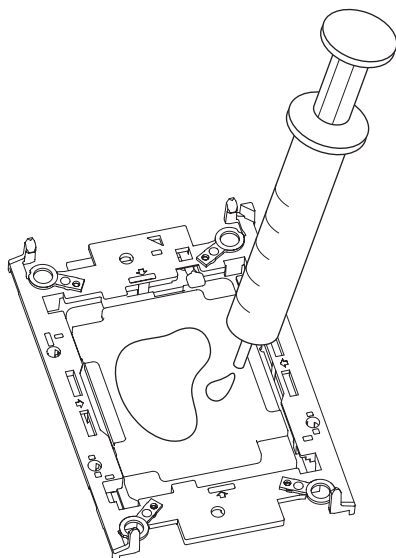
4



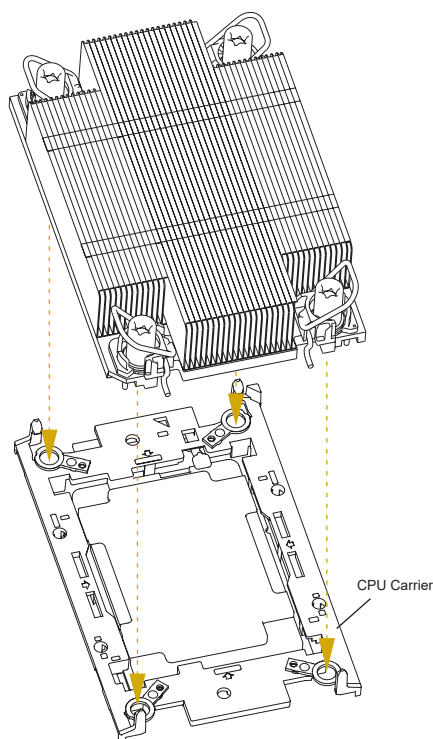
5

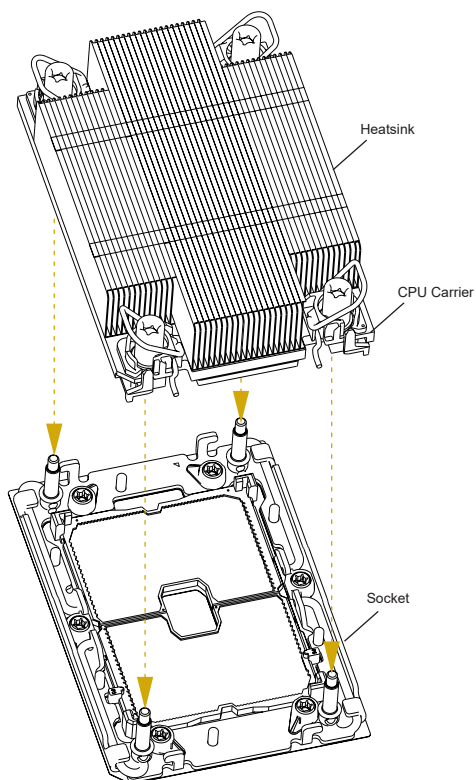


6

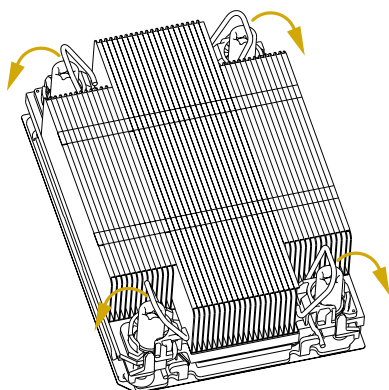


7

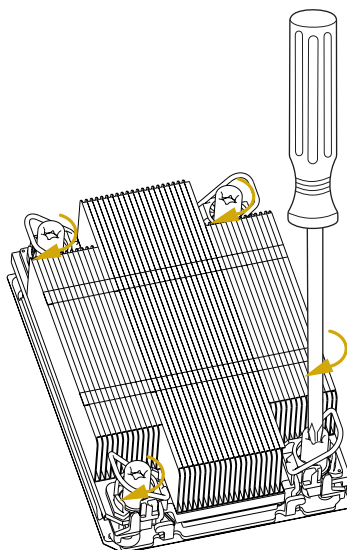




9



10



## 2.4 Installation of Memory Modules (DIMM)

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



1. Before installing a memory module, make sure to turn off the computer and unplug the powercord from the power outlet to prevent damage to the memory module.
2. For eight channel configuration, it always needs to install identical (the same brand, speed, size and chip-type) DDR4 DIMMs.
3. It is not allowed to install a DDR, DDR2 or DDR3 memory module into a DDR4 slot; otherwise, this motherboard and DIMM may be damaged.

### 2.4.1 DIMM Population for DDR4

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

#### 1 CPU Configuration (DDR4)

|         | CPU1 |    |    |    |    |    |    |    |
|---------|------|----|----|----|----|----|----|----|
|         | A1   | B1 | C1 | D1 | E1 | F1 | G1 | H1 |
| 1 DIMM  | #    |    |    |    |    |    |    |    |
| 2 DIMMS | #    |    |    |    | #  |    |    |    |
| 4 DIMMS | #    |    | #  |    | #  |    | #  |    |
| 6 DIMMS | #    |    | #  | #  | #  |    | #  | #  |
| 8 DIMMS | #    | #  | #  | #  | #  | #  | #  | #  |

Note: “#” indicates the slot is populated with a memory module.

2 CPU Configuration (DDR4)

| CPU1     |    |    |    |    |    |    |    |    |
|----------|----|----|----|----|----|----|----|----|
| DDR4     | A1 | B1 | C1 | D1 | E1 | F1 | G1 | H1 |
| 1 DIMM   | #  |    |    |    |    |    |    |    |
| 2 DIMMS  | #  |    |    |    |    |    |    |    |
| 4 DIMMS  | #  |    |    |    | #  |    |    |    |
| 8 DIMMS  | #  |    | #  |    | #  |    | #  |    |
| 16 DIMMS | #  | #  | #  | #  | #  | #  | #  | #  |

| CPU2     |    |    |    |    |    |    |    |    |
|----------|----|----|----|----|----|----|----|----|
| DDR4     | I1 | J1 | K1 | L1 | M1 | N1 | O1 | P1 |
| 1 DIMM   |    |    |    |    |    |    |    |    |
| 2 DIMMS  | #  |    |    |    |    |    |    |    |
| 4 DIMMS  | #  |    |    |    | #  |    |    |    |
| 8 DIMMS  | #  |    | #  |    | #  |    | #  |    |
| 16 DIMMS | #  | #  | #  | #  | #  | #  | #  | #  |

Note: “#” indicates the slot is populated with a memory module.

2.4.2 DIMM Population for DDR4 and BPS

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

1 CPU Configuration (DDR4+BPS)

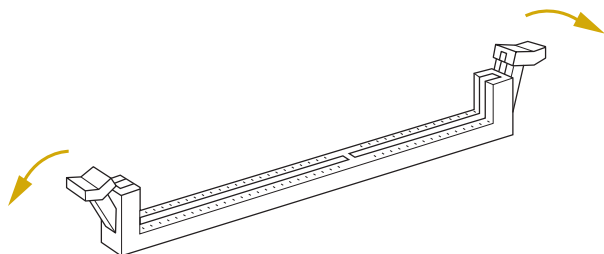
| CPU1                 |      |      |      |     |      |      |      |     |
|----------------------|------|------|------|-----|------|------|------|-----|
| DDR4<br>+<br>BPS     | A1   | B1   | C1   | D1  | E1   | F1   | G1   | H1  |
| 4 DDR4<br>+<br>4 BPS | DDR4 | BPS  | DDR4 | BPS | DDR4 | BPS  | DDR4 | BPS |
| 6 DDR4<br>+<br>1 BPS | DDR4 | DDR4 | DDR4 | BPS | DDR4 | DDR4 | DDR4 | N/A |

2 CPU Configuration (DDR4+BPS)

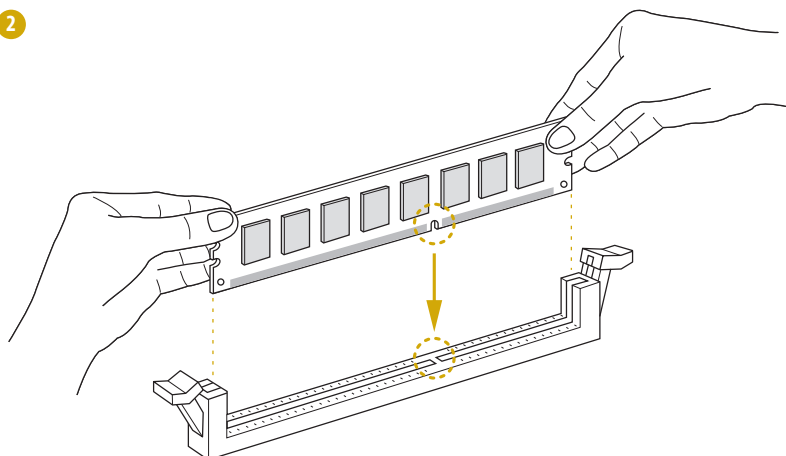
| DDR4<br>+<br>BPS      | CPU1 |      |      |     |      |      |      |     |
|-----------------------|------|------|------|-----|------|------|------|-----|
|                       | A1   | B1   | C1   | D1  | E1   | F1   | G1   | H1  |
| 8 DDR4<br>+<br>8 BPS  | DDR4 | BPS  | DDR4 | BPS | DDR4 | BPS  | DDR4 | BPS |
| 12 DDR4<br>+<br>2 BPS | DDR4 | DDR4 | DDR4 | BPS | DDR4 | DDR4 | DDR4 | N/A |

| DDR4<br>+<br>BPS      | CPU2 |      |      |     |      |      |      |     |
|-----------------------|------|------|------|-----|------|------|------|-----|
|                       | I1   | J1   | K1   | L1  | M1   | N1   | O1   | P1  |
| 8 DDR4<br>+<br>8 BPS  | DDR4 | BPS  | DDR4 | BPS | DDR4 | BPS  | DDR4 | BPS |
| 12 DDR4<br>+<br>2 BPS | DDR4 | DDR4 | DDR4 | BPS | DDR4 | DDR4 | DDR4 | N/A |

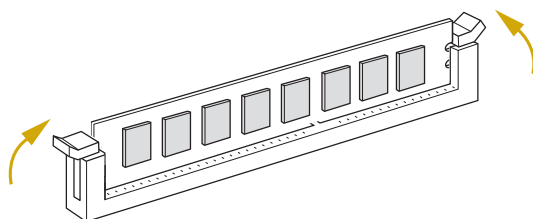
1



2



3



## 2.5 Expansion Slots (PCI Express Slots)

There are 2 PCI Express slots on this motherboard.

### PCIe slot:

PCIE1 (PCIe 4.0 x16 slot, from CPU0) is used for PCI Express x16 lane width cards.

PCIE2 (PCIe 4.0 x16 slot, from CPU0) is used for PCI Express x16 lane width cards.

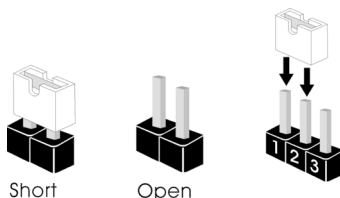
| Slot  | Generation | Mechanical | Electrical | Source |
|-------|------------|------------|------------|--------|
| PCIE2 | 4.0        | x16        | x16        | CPU0   |
| PCIE1 | 4.0        | x16        | x16        | CPU0   |

### Installing an expansion card

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

## 2.6 Jumper Setup

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



|                                                                              |                                        |                          |
|------------------------------------------------------------------------------|----------------------------------------|--------------------------|
| Password Reset Jumper<br>(3-pin PASSWORD_<br>CLEAR1)<br>(see p.6, No. 52)    | <b>1_2</b><br>                         | <b>2_3</b><br>           |
|                                                                              | Normal Mode (Default)                  | Password Clear           |
| ESPI Flash Sharing Jumper<br>(3-pin ESPI_SHARE)<br>(see p.6, No. 5)          | <b>1_2</b><br>                         | <b>2_3</b><br>           |
|                                                                              | Master ESPI Flash Sharing<br>(Default) | Slave ESPI Flash Sharing |
| ESPI/LPC Selection Jumper<br>(3-pin ESPI_LPC_SEL1)<br>(see p.6, No. 56)      | <b>1_2</b><br>                         | <b>2_3</b><br>           |
|                                                                              | ESPI (Default)                         | LPC                      |
| BPB Signal Source Selection<br>Jumper<br>(3-pin MUX_SW1)<br>(see p.6, No. 4) | <b>1_2</b><br>                         | <b>2_3</b><br>           |
|                                                                              | SATA (Default)                         | RAID Card                |
| ME Recovery Jumper<br>(3-pin ME_RECOVERY1)<br>(see p.6, No. 3)               | <b>1_2</b><br>                         | <b>2_3</b><br>           |
|                                                                              | Normal Mode (Default)                  | ME Recovery Mode         |

BIOS Recovery Jumper  
(3-pin BIOS\_RECOVERY1)  
(see p.6, No. 55)



Normal Mode (Default)



Recover BIOS

The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is “Short”. If no jumper cap is placed on the pins, the jumper is “Open”.



Short



Open

BIOS Swap Override  
Jumper  
(ESPI\_MODE1)  
(see p.6, No. 59)



2-pin Jumper

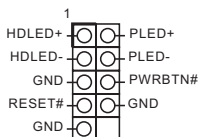
Open: Disable Override (Default)  
Short: Enable Override

## 2.7 Onboard Headers and Connectors



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

System Panel Header  
(9-pin PANEL1)  
(see p.6, No. 42)



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



### **PWRBTN (Power Switch):**

Connect to the power switch on the chassis front panel. Configure the way to turn off the system using the power switch.

### **RESET (Reset Switch):**

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

### **PLED (System Power LED):**

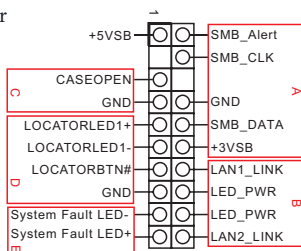
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S4 sleep state or powered off (S5).

### **HDLED (Hard Drive Activity LED):**

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

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

## Auxiliary Panel Header (18-pin AUX PANEL1) (see p.6, No. 43)



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



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

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

### B. Internet status indicator (2-pin LAN1\_LED, LAN2\_LED)

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

### C. Chassis intrusion pin (2-pin CHASSIS)

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

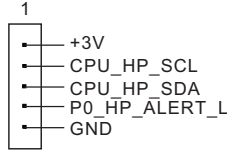
### D. Locator LED (4-pin LOCATOR)

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

### E. System Fault LED (2-pin LOCATOR)

This header is for the Fault LED on the system.

Backplane PCI Express  
Hot-Plug Connector  
(5-pin CPU1\_ HSBP1)  
(see p.6, No. 40)



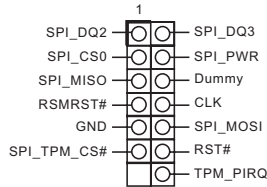
The header is used for the hot plug feature of HDDs on the backplane.

Non Maskable Interrupt  
Button Header  
(NMI\_BTN1)  
(see p.6, No. 1)



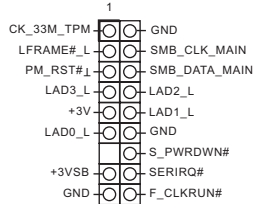
Please connect a NMI device to this header.

TPM-SPI Header  
(13-pin TPM\_BIOS\_PH1)  
(see p.6, No. 50)



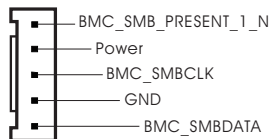
This connector supports SPI Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

TPM Header  
(17-pin TPM1)  
(see p.6, No. 6)



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.

BMC SMB Headers  
(5-pin BMC\_SMB1)  
(see p.6, No. 46)



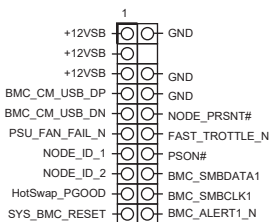
These headers are used for the SM BUS devices.

Clear CMOS Pad  
(CLRMOS1)  
(see p.6, No. 53)



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

CM Board Standby Power Headers  
(19-pin CM\_SB\_R)  
(see p.6, No. 44)



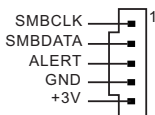
Connect this 19-pin header to the PSU for +12VSB and PSN PWROK.

Serial ATA3 Connectors  
(SATA0)  
(see p.6, No. 8)  
(SATA1)  
(see p.6, No. 7)



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

PSU SMBus Header  
(5-pin PSU\_SMB1)  
(see p.6, No. 10)



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

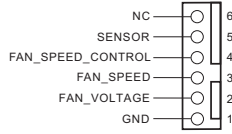
## System Fan Connectors

(6-pin FAN1)

(see p.6, No. 24)

(6-pin FAN2)

(see p.6, No. 25)



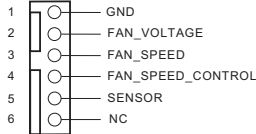
Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control.

(6-pin FAN3)

(see p.6, No. 30)

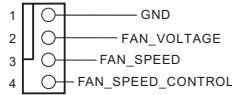
(6-pin FAN4)

(see p.6, No. 31)



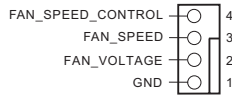
(4-pin FAN5)

(see p.6, No. 33)



(4-pin FAN6)

(see p.6, No. 38)

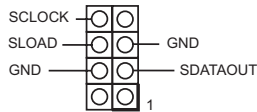


## Serial General Purpose

Input/Output Header

(7-pin SATA\_SGPIO1)

(see p.6, No. 41)

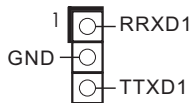


The header supports Serial Link interface for onboard SATA connections.

## Serial Port Header

(3-pin COM1)

(see p.6, No. 57)

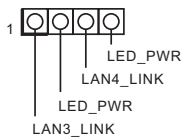


This COM1 header supports a serial port module.

## IPMI LAN LED Header

(4-pin IPMI\_LED1)

(see p.6, No. 2)



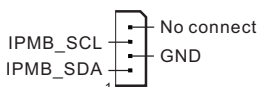
This 4-pin connector is used for the IPMI LAN status indicator.

Chassis Speaker Header  
(4-pin SPEAKER1)  
(see p.6, No. 58)



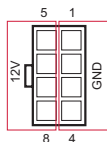
Please connect the chassis speaker to this header.

Intelligent Platform  
Management Bus Header  
(4-pin IPMB1)  
(see p.6, No. 45)



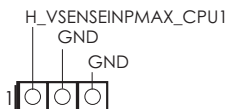
This 4-pin connector is used to provide a cabled base-board or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.

ATX 12V Power  
Connectors  
(8-pin 12VCON1)  
(see p.6, No. 36)  
(8-pin 12VCON2)  
(see p.6, No. 35)  
(8-pin 12VCON3)  
(see p.6, No. 34)



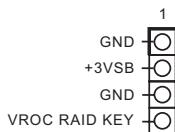
This motherboard provides three 8-pin ATX 12V power connectors.

CPU VSENSE Header  
(3-pin CPU\_VSENSE)  
(see p.6, No. 12)



This header is used to detect CPU1 VSENSE.

Virtual RAID On CPU  
Header  
(4-pin RAID\_1)  
(see p.6, No. 9)



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      | <ul style="list-style-type: none"><li>• Pass-thru only (no RAID)</li><li>• LED Management</li><li>• Hot Plug Support</li><li>• RAID 0 support for Intel Fultondale NVMe SSDs</li></ul> |
| Standard  | VROCSTANMOD     | <ul style="list-style-type: none"><li>• Pass-thru SKU features</li><li>• RAID 0, 1, 10</li></ul>                                                                                       |
| Premium   | VROCPREMMOD     | <ul style="list-style-type: none"><li>• Standard SKU features</li><li>• RAID 5</li></ul>                                                                                               |
| ISS       | VROCISSDMOD     | <ul style="list-style-type: none"><li>• RAID 5 Write Hole Closure</li></ul>                                                                                                            |

\*Only Intel SSDs are supported.

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

Slimline x8 Connectors

- (SLIM1)
- (see p.6, No. 15)
- (SLIM2)
- (see p.6, No. 16)



These connectors are used for the NVME PCIE devices.

SAS Connector Supported

- by RAID Card
- (SLIMLIN1)
- (see p.6, No. 17)

## SLIMLINE pin definition

| Pin | Defeinition | Pin | Defeinition |
|-----|-------------|-----|-------------|
| A1  | GND_1       | B1  | GND_12      |
| A2  | RX_0+       | B2  | TX_0+       |
| A3  | RX_0-       | B3  | TX_0-       |
| A4  | GND_2       | B4  | GND_13      |
| A5  | RX_1+       | B5  | TX_1+       |
| A6  | RX_1-       | B6  | TX_1-       |
| A7  | GND_3       | B7  | GND_14      |
| A8  | SIDEBAND_7A | B8  | SIDEBAND_0A |
| A9  | SIDEBAND_4A | B9  | SIDEBAND_1A |
| A10 | SIDEBAND_3A | B10 | SIDEBAND_2A |
| A11 | SIDEBAND_A+ | B11 | SIDEBAND_5A |
| A12 | SIDEBAND_A- | B12 | SIDEBAND_6A |
| A13 | GND_4       | B13 | GND_15      |
| A14 | RX_2+       | B14 | TX_2+       |
| A15 | RX_2-       | B15 | TX_2-       |
| A16 | GND_5       | B16 | GND_16      |
| A17 | RX_3+       | B17 | TX_3+       |
| A18 | RX_3-       | B18 | TX_3-       |
| A19 | GND_6       | B19 | GND_17      |
| A20 | RX_4+       | B20 | TX_4+       |
| A21 | RX_4-       | B21 | TX_4-       |
| A22 | GND_7       | B22 | GND_18      |
| A23 | RX_5+       | B23 | TX_5+       |
| A24 | RX_5-       | B24 | TX_5-       |
| A25 | GND_8       | B25 | GND_19      |
| A26 | SIDEBAND_7B | B26 | SIDEBAND_0B |
| A27 | SIDEBAND_4B | B27 | SIDEBAND_1B |
| A28 | SIDEBAND_3B | B28 | SIDEBAND_2B |
| A29 | SIDEBAND_B+ | B29 | SIDEBAND_5B |
| A30 | SIDEBAND_B- | B30 | SIDEBAND_6B |
| A31 | GND_9       | B31 | GND_20      |
| A32 | N/A         | B32 | N/A         |
| A33 | N/A         | B33 | N/A         |
| A34 | GND_10      | B34 | GND_21      |
| A35 | N/A         | B35 | N/A         |
| A36 | N/A         | B36 | N/A         |
| A37 | GND_11      | B37 | GND_32      |
| 75  | P_GND_2     | 78  | P_GND_3     |
| 76  | P_GND_4     | 79  | NP_NC_1     |
| 77  | P_GND_1     | 80  | NP_NC_2     |

## 2.8 Unit Identification purpose LED/Switch

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

Unit Identification  
purpose LED/Switch  
(UID1)



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

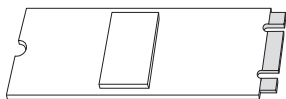
## 2.9 M.2 SSD Module Installation Guide

The Hyper M.2 Socket (M2\_1/M2\_2, Key M) supports type 2280 SATA3 6.0 Gb/s module or a M.2 PCI Express module up to Gen4 x4 (Gen4 x4 16GT/s x4).

### Installing the M.2 SSD Module

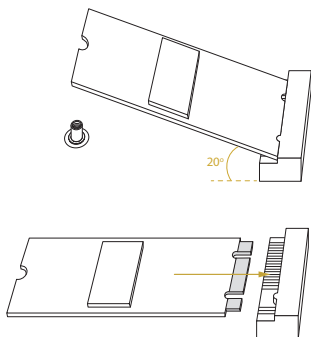
#### Step 1

Prepare a M.2 SSD module and the screw.



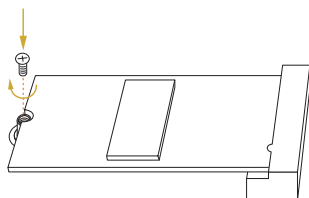
#### Step 2

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



#### Step 3

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



## Chapter 3 UEFI Setup Utility

### 3.1 Introduction

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

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



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

#### 3.1.1 UEFI Menu Bar

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

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

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

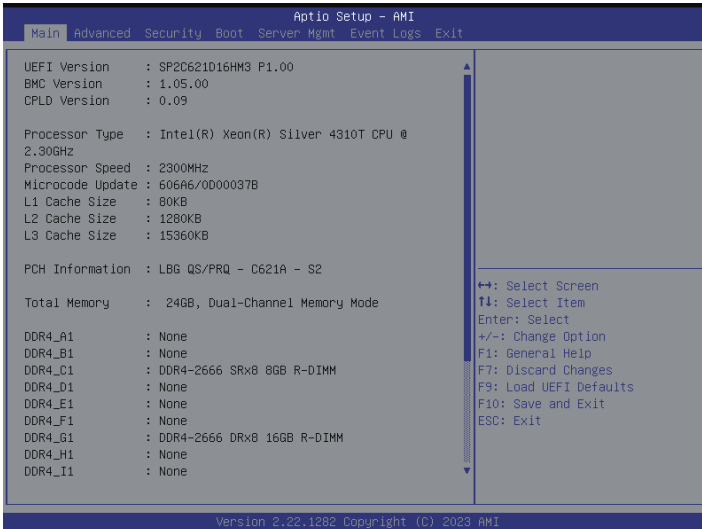
### 3.1.2 Navigation Keys

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

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

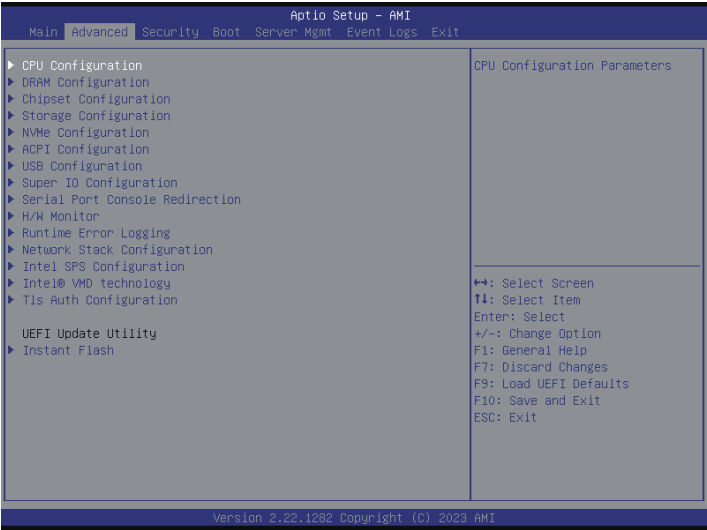
## 3.2 Main Screen

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



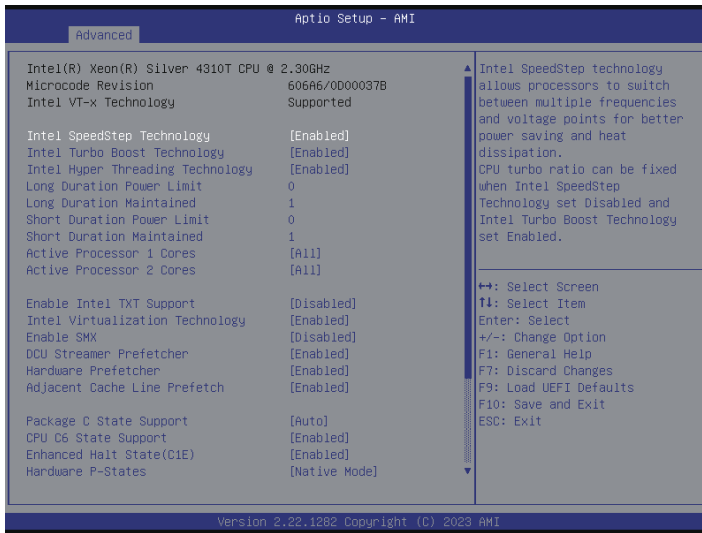
### 3.3 Advanced Screen

In this section, set the configurations for the following items: CPU Configuration, DRAM Configuration, Chipset Configuration, Storage Configuration, NVMe Configuration, ACPI Configuration, USB Configuration, Super IO Configuration, Serial Port Console Redirection, H/W Monitor, Runtime Error Logging, Network Stack Configuration, Intel SPS Configuration, Intel(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 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.

## 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.

## Short Duration Maintained

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

## Active Processor 1 Cores/2 Cores

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

## Enable Intel TXT Support

Enables Intel Trusted Execution Technology Configuration.

## Intel Virtualization Technology

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

## Enable SMX

Use this item to enable Safer Mode Extensions.

## DCU Streamer Prefetcher

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

## Hardware Prefetcher

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

## Adjacent Cache Line Prefetch

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

## Package C State Support

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

## CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

## Enhanced Halt State(C1E)

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

## Hardware P-States

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

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

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

## AES-NI

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

## CPU Thermal Throttling

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

## SNC (Sub NUMA)

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

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

4-clusters SNC and 1-way IMC interleave. Enable SNC2 or SNC4 will gray out iMC\_ Interleave knob and UmaBasedClustering knob.

## 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).

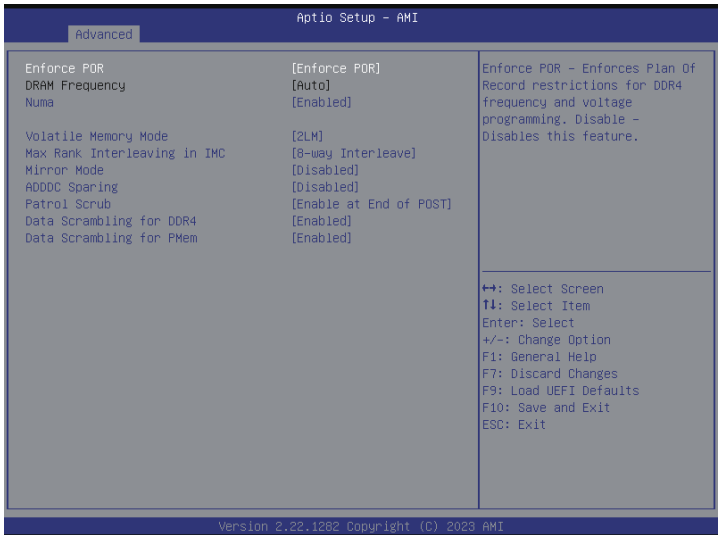
## Enable/Disable SGX Auto MP Registration Agent

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).

#### Volatile Memory Mode

Select 1LM or 2LM mode for Volatile memory. For 2LM memory mode, BIOS will try to configure 2LM but if BIOS is unable to configure 2LM, volatile memory mode will fail back to 1LM.

#### Max Rank Interleaving in IMC

This item allows to select Rank Interleaving setting.

#### 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.

## ADDDC Sparing

Enable or disable Memory Rank Sparing.

## Patrol Scrub

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

## Data Scrambling for DDR4

Enable - Enables data scrambling for DDR4.

Disable - Disables this feature.

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

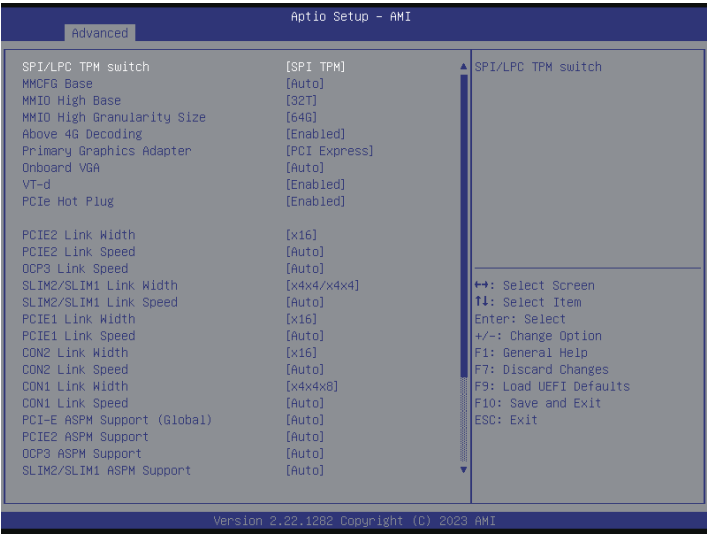
## Data Scrambling for PMem

Enable - Enables data scrambling for PMem.

Disable - Disables this feature.

Auto - Sets it depending on stepping.

### 3.3.3 Chipset Configuration



#### SPI/LPC TPM Switch

Use this item to SPI/LPC TPM.

#### 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, use this option to select PCI Express or Onboard VGA as the primary graphics adapter.

#### Onboard VGA

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

## VT-d

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

## PCIe Hot Plug

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

## PCIe2 Link Width

This allows user to select PCIe2 Link Width. The default value is [x16].

## PCIe2 Link Speed

This allows user to select PCIe2 Link Speed. The default value is [Auto].

## OCP3 Link Speed

This allows user to select OCP3 Link Speed. The default value is [Auto].

## SLIM2/SLIM1 Link Width

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

## SLIM2/SLIM1 Link Speed

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

## PCIe1 Link Width

This allows user to select PCIe1 Link Width. The default value is [x16].

## PCIe1 Link Speed

This allows user to select PCIe1 Link Speed. The default value is [Auto].

## CON2 Link Width

This allows user to select CON2 Link Width. The default value is [x16].

## CON2 Link Speed

This allows user to select CON2 Link Speed. The default value is [Auto].

## CON1 Link Width

This allows user to select CON1 Link Width. The default value is [x4x4x8].

## CON1 Link Speed

This allows user to select CON1 Link Speed. The default value is [Auto].

### PCI-E ASPM Support (Global)

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

### PCIE2 ASPM Support

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

### OCP3 ASPM Support

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

### SLIM2/SLIM1 ASPM Support

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

### PCIE1 ASPM Support

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

### CON2 ASPM Support

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

### CON1 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 user to restore AC Power Current State

### 3.3.4 Storage Configuration



#### SATA Controller

Use this item to enable or disable SATA Controllers.

#### SATA/M.2\_SATA Mode Selection

Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

#### SATA ALPM

SATA Aggressive Link Power Management allows SATA devices to enter a low power state during periods of inactivity to save power. It is only supported by AHCI mode.

#### sSATA Controller

Use this item to enable or disable sSATA Controller.

#### sSATA Mode Selection

Identify the sSATA port is connected to Solid State Drive or Hard Disk Drive.

#### sSATA ALPM

SATA Aggressive Link Power Management allows SATA devices to enter a low power state during periods of inactivity to save power. It is only supported by AHCI mode.

### 3.3.5 NVMe Configuration



The NVMe Configuration displays the NVMe controller and Drive information.

### 3.3.6 ACPI Configuration



#### PCIE Devices Power On

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

#### Ring-In Power On

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

#### RTC Alarm Power On

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

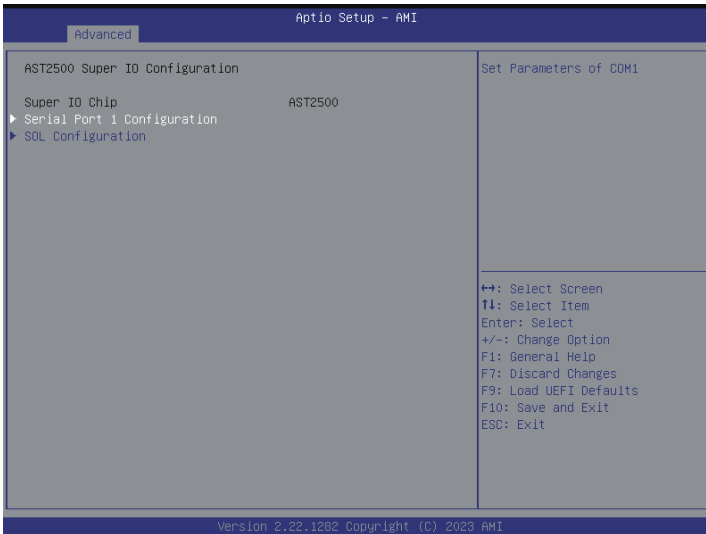
### 3.3.7 USB Configuration



#### Legacy USB Support

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

### 3.3.8 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.

### 3.3.9 Serial Port Console Redirection



#### COM1 / SOL

#### Console Redirection

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

#### Console Redirection Settings

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

#### Terminal Type

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

| Option  | Description                                                     |
|---------|-----------------------------------------------------------------|
| VT100   | ASCII character set                                             |
| 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 the computer and the host computer to which 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 EMS

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

#### Console Redirection Settings

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

#### Out-of-Band Mgmt Port

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

#### Terminal Type EMS

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

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

#### Bits Per Second EMS

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

#### Flow Control EMS

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

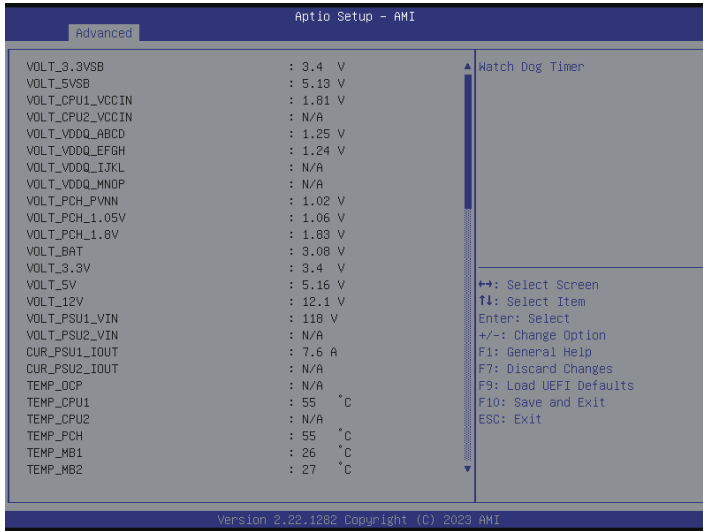
#### Data Bits EMS

#### Parity EMS

#### Stop Bits EMS

### 3.3.10 H/W Monitor

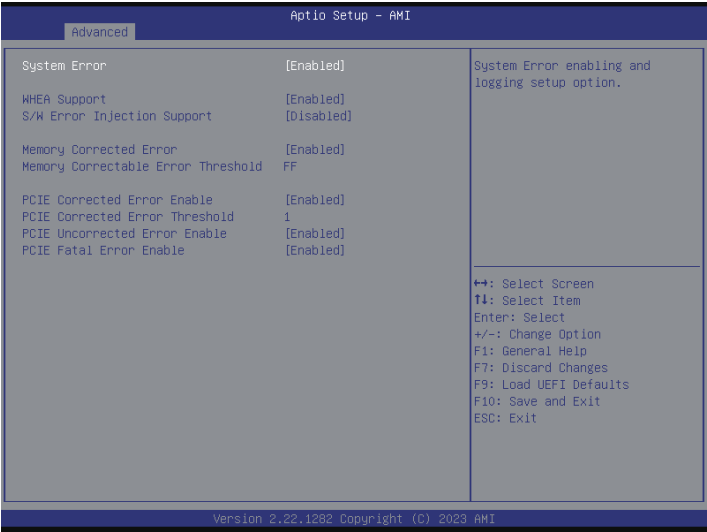
In this section, it allows user to monitor the status of the hardware on the system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



#### Watch Dog Timer

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

### 3.3.11 Runtime Error Logging



#### System Error

Use this item to enable or disable System Error feature. When it is set to [Enabled], it allows user to configure Memory Error and PCIe Error log features.

#### WHEA Support

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

#### S/W Error Injection Support

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

#### Memory Corrected Error

Use this item to enable or disable Memory Corrected Error.

#### Memory Correctable Error Threshold

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

#### PCIe Corrected Error Enable

Use this item to enable or disable PCIe Correctable errors.

#### PCIe Corrected Error Threshold

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

### PCIe Uncorrected Error Enable

Use this item to enable or disable PCIe Uncorrectable errors.

### PCIe Fatal Error Enable

Use this item to enable or disable PCIe Fatal errors.

### 3.3.12 Network Stack Configuration



#### Network Stack

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

#### IPv4 PXE Support

Enable IPv4 PXE Boot support. If disabled, IPv4 PXE Boot Option is not supported.

#### IPv4 HTTP Support

Enable IPv4 HTTP Boot support. If disabled, IPv4 HTTP Boot Option is not supported.

#### IPv6 PXE Support

Enable IPv6 PXE Boot support. If disabled, IPv6 PXE Boot Option is not supported.

#### IPv6 HTTP Support

Enable IPv6 HTTP Boot support. If disabled, IPv6 HTTP Boot Option is not supported.

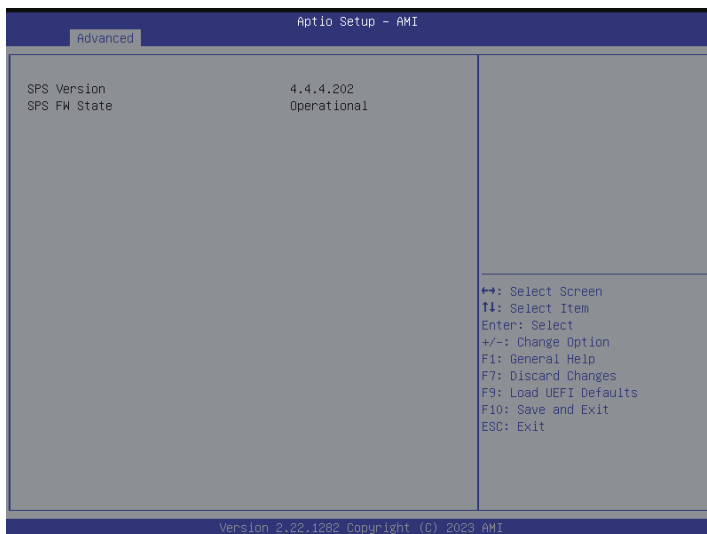
#### PXE Boot Wait Time

Specifies the wait time and press the ESC key to abort the PXE boot.

#### Media Detect Count

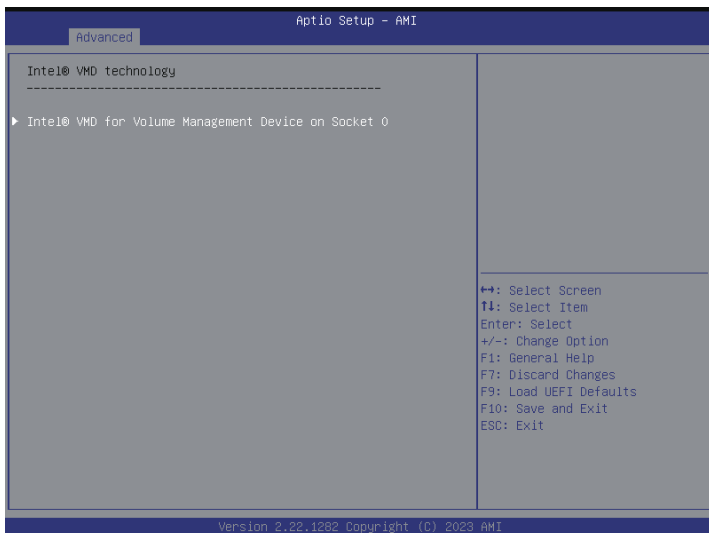
Specifies the number of times the presence of physical storage device are verified on a system reset or power cycle.

### 3.3.13 Intel SPS Configuration



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

### 3.3.14 Intel® VMD technology



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

Use this item to enter Intel(R) Volume Management Device Technology configuration.

#### VMD Config for IOU0 (PCIE2)/IOU3 (SLIMLIN2/SLIMLIN1)/IOU4 (PCIE1)

#### Enable/Disable VMD

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

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

#### VMD port X

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 specific Ports.

## 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.

### 3.3.15 Tls Auth Configuration



#### Server CA Configuration

Press <Enter> to configure Server CA.

#### Client Cert Configuration

##### **Enroll Cert**

Press <Enter> to enroll cert.

##### **Delete Cert**

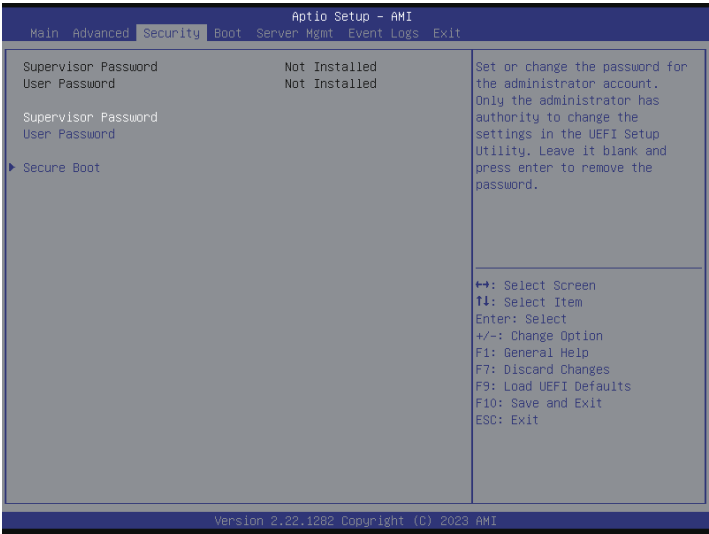
Press <Enter> to delete cert.

### 3.3.16 Instant Flash

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

### 3.4 Security

In this section, set or change the supervisor/user password for the system. For the user password, also can 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 to 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: Factory, 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: Factory, External, Mixed

## Authorized Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate in:

a) EFI\_SIGNATURE\_LIST

b) EFI\_CERT\_X509 (DER)

c) EFI\_CERT\_RSA2048 (bin)

d) EFI\_CERT\_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image (SHA256)

Key Source: Factory, 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: Factory, 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: Factory, 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

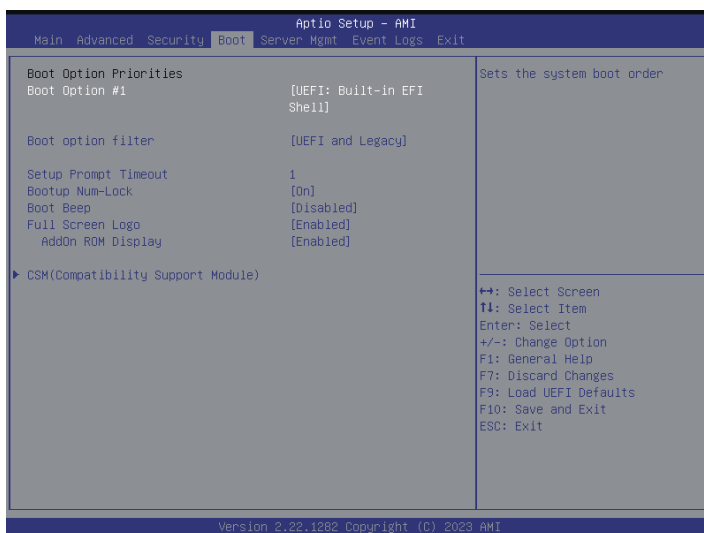
2. Authenticated UEFI Variable

3. EFI PE/COFF Image (SHA256)

Key Source: Factory, External, Mixed

## 3.5 Boot Screen

In this section, it will display the available devices on the system for user 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.

### 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.

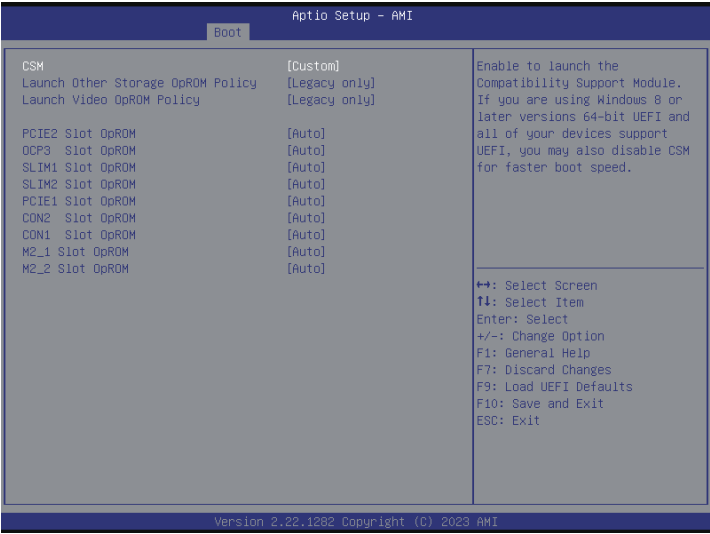
### Full Screen Logo

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 enabling the option “Full Screen Logo” but 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 Support

Enable to launch the Compatibility Support Module. Please do not disable unless running a WHCK test. If using Windows 8 64-bit UEFI and all of the devices support UEFI, it 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.

#### PCIE2/OCP3/SLIM1/SLIM2/PCIE1/CON2/CON1/M2\_1/M2\_2 Slot OpROM

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

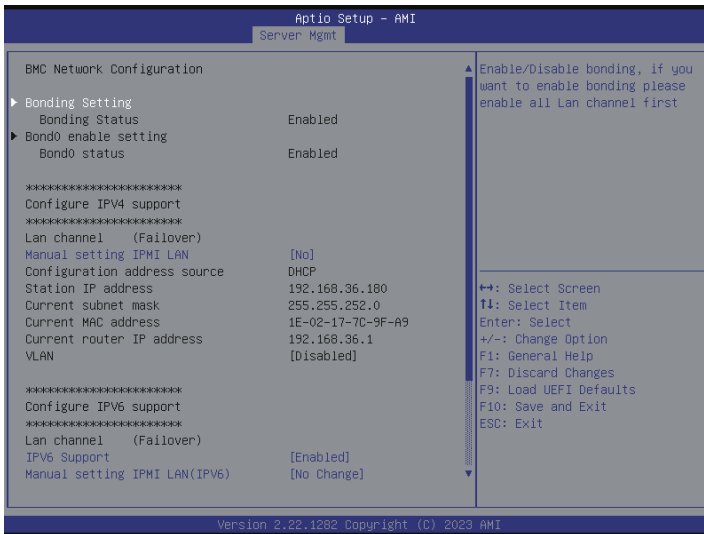
### 3.6 Server Mgmt



#### Wait For BMC

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

## 3.6.1 BMC Network Configuration



### Bonding Setting

Select this item to enabled or disabled bonding. Please enable all lan channel first when want to enable bonding.

### Lan Channel (Failover)

### Manual Setting IPMI LAN

If [No] is selected, the IP address is assigned by DHCP. If 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

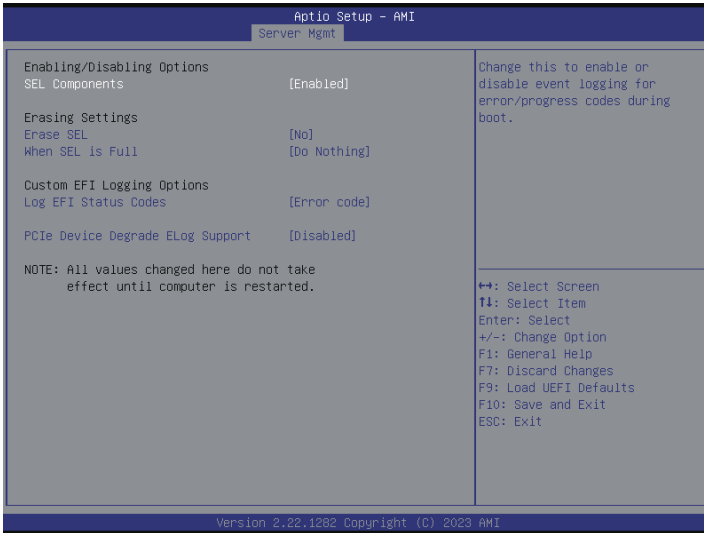
Enable or Disable LAN1 IPv6 Support.

### Manual Setting IPMI LAN(IPV6)

Select to configure LAN channel parameters statically or dynamically(by BIOS or BMC).

Unspecified option will not modify any BMC network parameters during BIOS phase.

## 3.6.2 System Event Log



### SEL Components

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

### Erasing SEL

Use this to choose options for erasing SEL.

### When SEL is Full

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

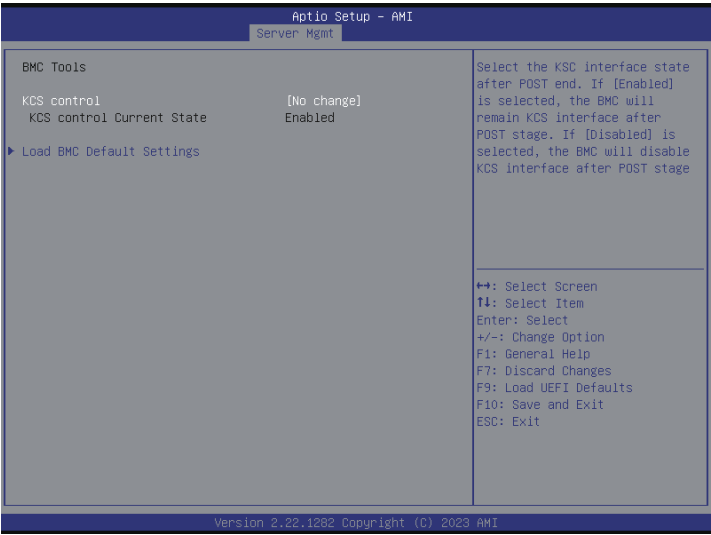
### Log EFI Status Codes

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

### PCIe Device Degrade ELog Support

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

### 3.6.3 BMC Tools



#### KCS control

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

#### Load BMC Default Settings

Use this item to load BMC default settings.

## 3.7 Event Logs



### Change Smbios Event Log Settings

This allows user to configure the Smbios Event Log Settings.

When entering the item, the sub-options are displayed.

#### 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.

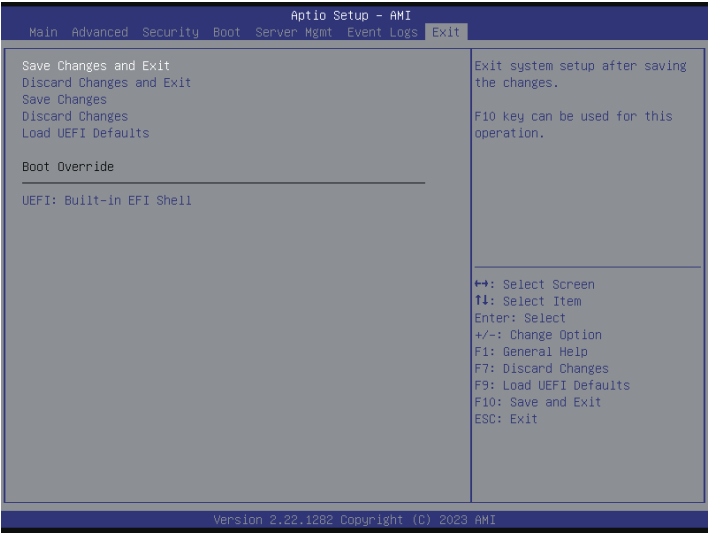
### View Smbios Event Log

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

#### Discard Changes and Exit

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

#### Save Changes

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

#### Discard Changes

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

#### Load UEFI Defaults

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

## Chapter 4 Software Support

After all the hardware has been installed, it suggests to go to the official website at <http://www.ASRockRack.com> and make sure if there are any new updates of the BIOS / BMC firmware for the motherboard.

### 4.1 Download and Install Operating System

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

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

### 4.2 Download and Install Software Drivers

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

To download necessary drivers, go to the product page, click on the "Download" tab, choose the operating system that is used, and then download the using driver.

### 4.3 Contact Information

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

# Chapter 5 Troubleshooting

## 5.1 Troubleshooting Procedures

Follow the procedures below to troubleshoot the system.



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

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

### **If there is no power...**

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

### **If there is no video...**

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

### **If there are memory errors...**

1. Verify that the DIMM modules are properly seated in the slots.
2. Use recommended DDR4 288-pin RDIMM/ RDIMM-3DS/ LRDIMM/ LRDIMM-3DS.
3. Install more than one DIMM modules that should be identical with the same brand, speed, size and chip-type.
4. Try inserting different DIMM modules into different slots to identify faulty ones.
5. Check the settings of the 115V/230V switch on the power supply.

**Unable to save system setup configurations...**

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

**Other problems...**

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

## 5.2 Technical Support Procedures

If the problems are still unsolved, please contact ASRock Rack's technical support with the following information:

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

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

## 5.3 Returning Merchandise for Service

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

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

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

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

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## Contact Information

If it needs 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 contact the dealer for further information. For technical questions, please submit a support request form at <https://event.asrockrack.com/tsd.asp>

### **ASRock Rack Incorporation**

e-mail: [ASRockRack\\_sales@asrockrack.com](mailto:ASRockRack_sales@asrockrack.com)

### **ASRock Rack EUROPE B.V.**

Bijsterhuizen 11-11

6546 AR Nijmegen

The Netherlands

Phone: +31-24-345-44-33

### **ASRock Rack America, Inc.**

13848 Magnolia Ave, Chino, CA91710 U.S.A.

Phone: +1-909-590-8308

Fax: +1-909-590-1026