SB202-A6

Storage Barebone
User's Manual

Table of Contents

Document Release History

Release Date	Version	Update Content
June, 2022	1	User's Manual release to public.
July, 2022	1.1	System block diagram update.
August, 2022	1.2	Add Chapter 5. BMC Configuration settings.

Preface

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Changes

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Warning

1. A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.
2. Use only shielded cables to connect I/O devices to this equipment.
3. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

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Instruction Symbols

Special attention should be given to the instruction symbols below.

 NOTE This symbol indicates that there is an explanatory or supplementary instruction.

 CAUTION This symbol denotes possible hardware impairment. Upmost precaution must be taken to prevent serious hardware damage.

 WARNING This symbol serves as a warning alert for potential body injury. The user may suffer possible injury from disregard or lack of attention.

Safety Instructions

Before you commence, please attentively read the following important discretions below. All cautions and warnings on the equipment or in the manuals should be circumspectly noted and reviewed.

Always ground yourself to prevent static electricity.
請全程接地，以防止靜電。
请全程接地，以防止静电。
Всегда заземляйте себя, чтобы избежать статического электричества.
Aard jezelf altijd om statische elektriciteit te voorkomen.

- Firmly ground yourself at all times when installing or assembling the internal components of the server. Most of electronic components in the server are highly sensitive to electrical static discharge.
- Use a solid grounding wrist strap and distinctively place all electronic components in static-shielded devices to prevent static. Grounding wrist straps can be purchased in any electronic supply store.
- Confirm that the power source is turned off and then disconnect the power cords from your system before performing any type of installation or manual servicing. A sudden surge of power could severely damage the sensitive electronic components.
- Do not precipitously open the system's top cover. If you must open the cover for maintenance purposes, only a trained technician should be allowed to proceed this action. Integrated circuits on computer boards are highly sensitive to static electricity. Before operating a board or integrated circuit, touch an unpainted portion of the system unit chassis for a couple of seconds to discharge any static electricity on your body.

Place the server in a stable environment.
請將伺服器放置在穩定的環境中。
请将伺服器放置在稳定的环境中。
Поместите сервер в стабильную среду.
Plaats de server in een stabiele omgeving.

- Place this equipment on a stable surface when installing. A small mild drop or fall could cause fatal injury to both the equipment and the person handling the equipment.
- Please keep this equipment away from humidity to prevent vast rust and disintegration.
- Carefully and accurately mount the equipment into the rack. Uneven mechanical loading may lead to hazardous consequences.
- This equipment is to be installed for operation in an environment with maximum ambient temperature below 35°C.
- Review the environment before performing any installation or servicing. Keep the equipment away from hazardous and uneven grounds.
- This server must be installed only in Restricted Access Locations.

Handle equipment with care.
請謹慎操作設備。
请谨慎操作设备。
Обращайтесь с оборудованием осторожно.
Behandel de apparatuur voorzichtig.

- Do not cover the openings of the system. The openings on the system are for air convection, which intentionally protect the equipment from overheating.
- Never pour any liquid into ventilation openings of the system. This could cause catastrophic fire or electrical shock.

- Ensure that the voltage of the power source is within the specification on the label when connecting the equipment to the power outlet. The current load and output power of loads must be within the specification.
- This equipment must be firmly connected to reliable grounding before usage. Pay special attention to power supplied other than direct connections, e.g. using of power strips.
- Place the power cord out of the way of foot traffic. Do not place anything over the power cord. The power cord must be rated for the product, voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product.

Pay attention to hardware maintenance.

注意硬體維護。

注意硬体维护。

Обратите внимание на обслуживание оборудования.

Besteed aandacht aan hardware-onderhoud.

- If the equipment is not used for a long time, disconnect the equipment from mains to avoid being damaged by transient over-voltage.
- Module and drive bays must not be empty. They must have a dummy cover.
- Never open the equipment without professional assistance. For safety reasons, only qualified service personnel should open the equipment.
- If one of the following situations arise, the equipment should be checked and tested by service personnel:
  1. The power cord or plug is damaged.
  2. Liquid has penetrated the equipment.
  3. The equipment has been exposed to moisture.
  4. The equipment does not work well or will not work according to its user manual.
  5. The equipment has been dropped and/or damaged.
  6. The equipment has obvious signs of breakage.
  7. Please disconnect this equipment from the AC outlet before cleaning. Do not use liquid or detergent for cleaning. The use of a moisture sheet or cloth is recommended for cleaning.

⚠ **CAUTION**
The equipment intended for installation should be placed in Restricted Access Location.

⚠ **CAUTION**
There will be a risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions. After performing any installation or servicing, make sure the enclosure is correct in position before turning on the power.

⚠ **CAUTION**
This unit may have more than one power supply. Disconnect all power sources before maintenance to avoid electric shock.

About This Manual

Thank you for choosing and purchasing SB202-A6 Storage Server Barebone.

This user's manual is prepensely designed for professional technicians to perform dexterous hardware setup, basic system configurations, and quick software startup. This document pellucidly presents a brief overview of the product design, equipment installation, and firmware settings for our product SB202-A6. For the latest version of this user's manual, please refer to the AIC® website: https://www.aicipc.com/en/productdetail/51328.

Chapter 1 Product Features

SB202-A6 is a flexible storage barebone that is specifically designed to accommodate diverse corporations and enterprises for managing heavy workloads and multiple applications.

Chapter 2 Hardware Setup

This chapter displays an easy installation guide for assembling the hardware in this product. Utmost caution for proceeding to set up the hardware is highly advised. Most of the components are highly fragile and vulnerable to exterior influence. Do not endanger the device by placing the device in an unstable environment.

Chapter 3 Hardware Settings

This chapter elaborates the overall layout of the system board which may vary according to the system. These descriptions assist professional technicians to configure different settings of the motherboard and confirm the location of each connector and jumper.

Chapter 4 BIOS Configuration Settings

This chapter introduces the key features of BIOS, including the descriptions and option keys for diverse functions. These details provide users to effortlessly navigate and configure the input/output devices.

Chapter 5 Technical Support

For more information or suggestion, please contact the nearest AIC® corporation representative in your district or visit the AIC® website: https://www.aicipc.com/en/index. It is our greatest honor to provide the best service for our customers.

Chapter 1. Product Features

SB202-A6 is a 2U high density storage server that includes motherboard, chassis, power supply, and SSD backplane. For more information about our product, please visit our website at https://www.aicipc.com/en/index.

Before removing the subsystem from the shipping carton, visually inspect the physical condition of the shipping carton. Exterior damage to the shipping carton may indicate that the contents of the carton are damaged. If any damage is found, do not remove the components; contact the dealer where the subsystem was purchased for further instructions. Before continuing, first unpack the subsystem and verify that the number of components in the shipping carton is accurate and in good condition.

- 2U general purpose storage server supports 12 hot swap 3.5"/2.5" universal SATA/SAS/NVMe U.2 drive bays

- Supports 3rd Gen. Intel® Xeon® Scalable processors (codename Ice Lake)

- Onboard Baseboard Management Controller for system management and IPMI control

- Front-to-back airflow and hot swap redundant fans to provide optimal thermal conditions

- Dedicated BMC management port

1.1 Box Contents

This product contains the components listed below.
Please confirm the number and the condition of the components before installation.

	Pre-installed into the system		Number
✓	1200W/1600W redundant power supply 80+ Platinum		1+1
✓	External	3.5" hot swap disk drive tray (Gen4 NVMe, 3.5" or 2.5" SATA)	12
		2.5" disk drive tray (rear)	2
✓	Internal	2 x M.2(NGFF)/ M-Key/ 2280	2
✓	Heat sink		1
✓	Easy swap fans 6 x 60x38mm		6
✓	AIC® motherboard		1
✓	4 port SAS/SATA/NVMe backplanes with 1xSFF-8643 + 2xSFF8654		1
	Accessory Item		Number
✓	EPE foam for front board: 563*420*105H		1
✓	EPE foam for rear board: 563*420*105H		1
✓	EPE foam for front tray: 563*345*145H		1
✓	EPE foam for rear tray: 563*345*145H		1
✓	EPE foam for M/B		1
✓	EPE pad: 140*100*25T (for rail box)		2
✓	EPE pad: 183*100*45T (for HSK box)		2
✓	Power cord		vary per region
✓	28-inch tool-less slide rail assembly		1

Product features are subject to change without notice.

1.2 Specifications

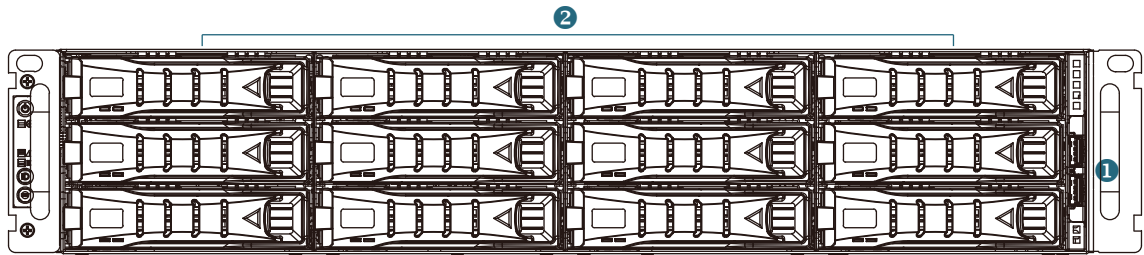|					
Dimensions (W x D x H)	mm : 438 x 800 x 88		**Riser Card** (included)	2U2S_RB24_G4 x2	1 x16 + 1 x8 PCIe slots
	inches : 17.2 x 31.4 x 3. 1				
Motherboard	AIC Server Board		**System BIOS**	BIOS Type	AMI UEFI BIOS
Processor	Processor Support	3rd Gen Intel® Xeon® Scalable Processors (Ice Lake) *Please contact AIC Technical Support for more info/details about optimized CPUs and specialized system.*		BIOS Features	• ACPI • PXE • AC loss recovery • IPMI KCS interface • SMBIOS • Serial console redirection • BIOS Boot Specification • BIOS Recovery Mode
	CPU Interconnection	11.2GT/s			
	Socket Type	1+1 Socket P+ (LGA 4189)			
Chipset Support	Intel® C621A		**On-board Devices**	SATA	Intel® Lewisburg PCH on-chip solution • 14 x SATA 6.0 Gb/s (3 Mini-SAS HD, SATA DOM, SATA DOM or M.2) • RAID 0, 1, 5, 10 support by Intel RSTe
System Memory	32 x DDR4 3200Mhz • Total 16+16 DIMM slots (2DPC) • Up to 12TB 3DS ECC RDIMM/LRDIMM • Intel® Optane™ Persistent Memory 200 Series support				
Front Panel	• System power on/off • System reset • System ID			IPMI	Aspeed AST2500 Advanced PCIe Graphics & Remote Management Processor • Baseboard Management Controller • Intelligent Platform Interface 2.0 (IPMI 2.0) • iKVM, Media Redirection, IPMI over LAN, Serial over LAN • SMASH Support • HTML5 • Redfish
LEDs	Power LED, ID LED, Fail LED • Power (Secondary) • Warning B : • Power (Primary) • Warning				
Drive Bays	External	3.5" hot swap	12 (Gen4 NVMe, 3.5" or 2.5" SATA)	Network Controllers	Networking options provided via OCP Mezzanine extension
		2.5"	2 (rear)		
	Internal	M.2	2 x M.2(NGFF)/M-Key/2280	Graphics	Aspeed AST2500 Advanced PCIe Graphics & Remote Management Processor • PCIe VGA/2D Controller • 1920x1200@60Hz 32bpp
Backplane	1 x 4-port SATA/SAS/NVMe backplane with 1 x SFF-8643 + 2x SFF-8654 (Slimline 8i) connectors				
Expansion Slots	PCIe 4.0	• 4 PCIe 4.0 x8 • 2 PCIe 4.0 x16 • 1 OCP NIC 3.0			
Rear I/O	USB	2 x USB 3.0 Type A in double-stack connector	**Environmental Specifications**	• Storage temperature: -10°C(14°F) ~ 60°C(140°F) • Operating temperature: 0°C(32°F) ~ 35°C(95°F) • Storage operating humidity: 5%~95% non-condensing	
	Serial Port	1 x DB9			
Power Supply	1200W/1600W 1+1 redundant power supply 80+ Platinum • AC Input: 100~240V, 50/60Hz, 7-3.5A		**Gross Weight**	(w/ PSU & Rail)	kgs : 20
					lbs : 44
System Cooling	6 x 60x38mm easy swap fans		**Packaging Dimensions**	(W x D x H)	mm : 595 x 1115 x 239
System Management	• IPMI : Aspeed AST2500 Advanced PCIe Graphics & Remote Management Processor • Baseboard Management Controller • Intelligent Platform Interface 2.0 (IPMI 2.0) • iKVM, Media Redirection, IPMI over LAN, Serial over LAN • SMASH Support				inches : 23.4 x 43.9 x 9.4
			Mounting	Standard	28" tool-less slide rail

1.3 System Block Diagram

6038 hot swap fan x 6

SKU1 : 12 x SAS/SATA ■
SKU2 : 4 x tri-mode ■ +8 x SAS/SATA ■
SKU3 : 8 x tri-mode ■ +4 x SAS/SATA ■
SKU4 : 12 x tri-mode ■

NVMe/SAS/SATA Backplane
For 3.5"/2.5" x 4 NVMe/SAS/SATA
Slim line x 8

NVMe/SAS/SATA Backplane
For 3.5"/2.5" x 4 NVMe/SAS/SATA
Slim line x 8

NVMe/SAS/SATA Backplane
For 3.5"/2.5" x 4 NVMe/SAS/SATA
Slim line x 8

DDR4 3200 / 2933 / 2666 / 2400 MHz
8 Channels 2 DIMM per Channel

DDR4 3200 / 2933 / 2666 / 2400 MHz
8 Channels 2 DIMM per Channel

intel
Ice Lake-SP
CPU 1

intel
Ice Lake-SP
CPU 0

UPI 11.2GT/s
UPI 11.2GT/s
UPI 11.2GT/s
UPI 11.2GT/s

to M / B

1200W 1+1
Redundant PSU

PCIe x 8 Slot (FHHL)   PCIe x 8 Gen4
PCIe x 16 Slot(FHHL)   PCIe x 16 Gen4
PCIe x 8 Slot x 2 (HHHL)   PCIe x 16 Gen4

DMI3 x4 8Gb / s
PCIe Uplink x 8 Gen3

PCIe x 8 Gen4   PCIe x 8 Slot (FHHL)
PCIe x 16 Gen4   PCIe x 16 Slot(FHHL)
PCIe x 16 Gen4

OCP 3.0 PCIe x 16

RAID Adapter
or HBA Card
(8 port 12G SAS)

Expander
On Board (EOB)
Backplane
(8 port 12G SAS)

M.2   PCIe x 4 Gen3

PCH
Lewisburg
LBG-R

SATA 6Gb x 12

Mini SAS HD   Mini SAS HD   Mini SAS HD

Real USB 3.0 x 2   USB3.0 x 2
Front USB 3.0 x2   USB3.0 x 2

SATA 6Gb x 2

3.5"/2.5"x 12
SATA/SAS
External

2.5" x 2
SATA External

SKU1

PCIe x 1
USB1.1 / 2.0
SPI

TPM 2.0 (optional)

MLAN   1GB

COM   RS232

BMC
AST2500

SPI   BIOS ROM
SPI   BMC ROM

VGA   RGB

4

1.4 Features

Front Panel

Item	Content	Description
1	USB port	2 USB 3.0 Type A
2	Drive Tray	12 external 3.5-inch disk drive

LED Indicator

Item	Description	Item	Description
⏻	Power Button	⚠	Alert LED
💡	Power Status LED	ID	ID LED
⟳	System Reset Button	ID	ID Button

Rear Panel
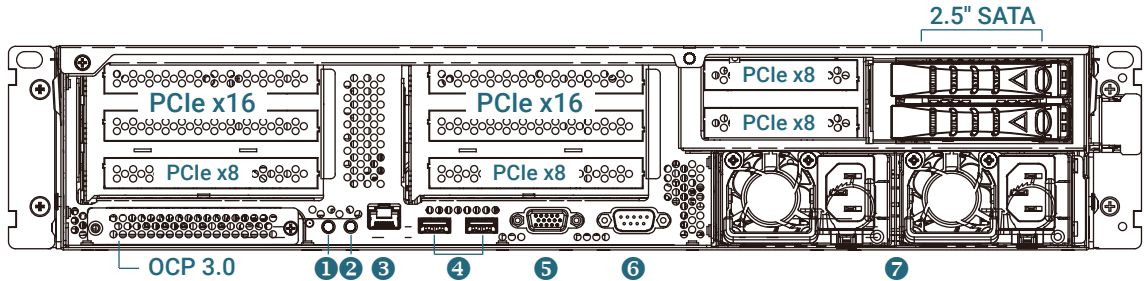
Item	Content	Description
1	Power Switch	PWR_BTN1
2	UID Switch	UID1
3	LAN port	1 GbE RJ45 dedicated to BMC management
4	USB port	2 Gen1 USB 3.2 Type A
5	VGA port	1 external DB-15 VGA port
6	Serial port	1 external DB-9 COM port
7	PSU	1200W/1600W 1+1 redundant power supply

Top View

Riser card

2 x 2.5" drive bays

1200W/1600W
1+1 redundant power supply

Serverboard

6 x 60x38mm
easy swap fans

12 x 3.5" hot swap drive bays
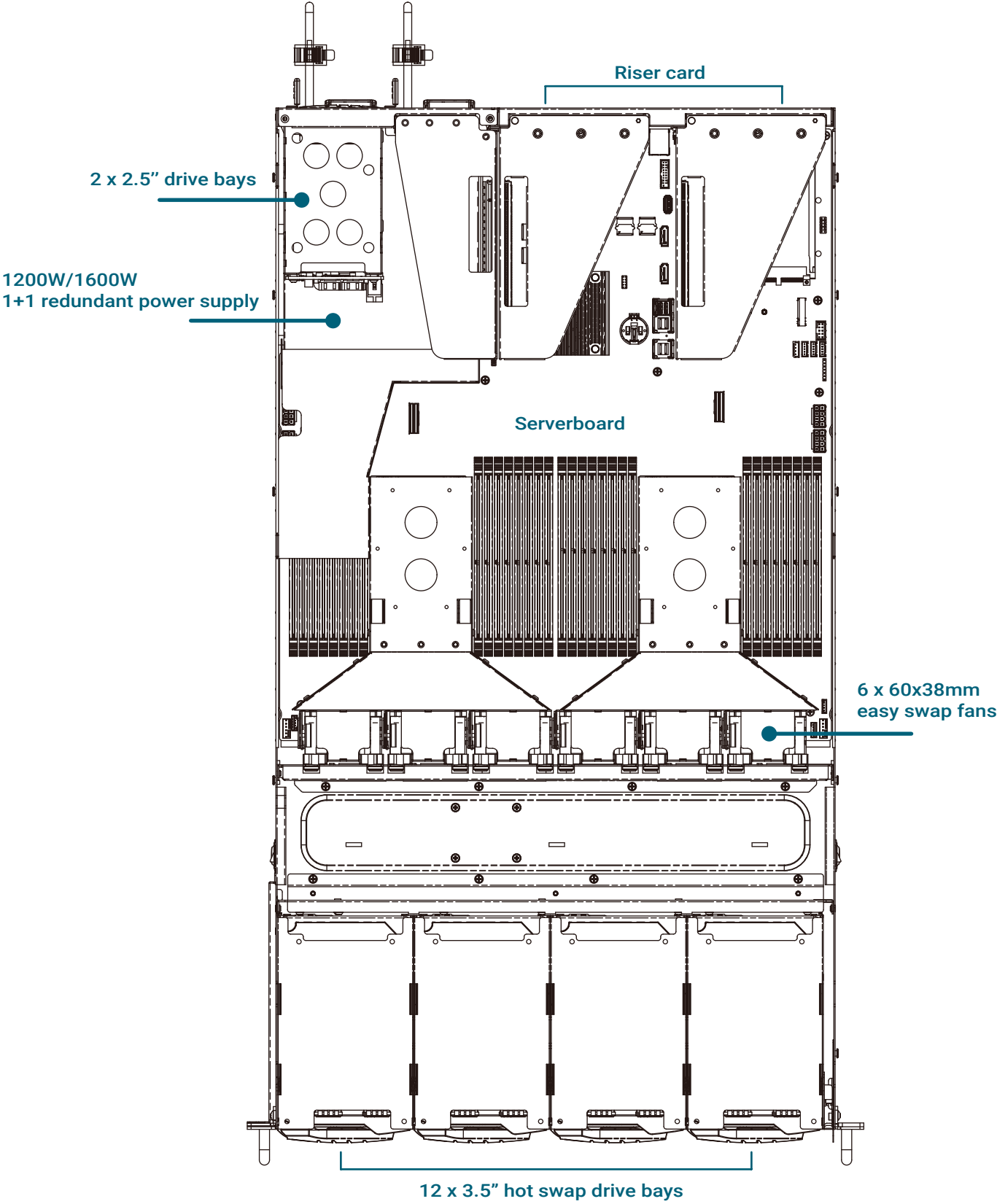
Chapter 2. Hardware Setup

This chapter provides the graphic detail and basic instruction for hardware installation. Turn off the system and unplug all peripheral devices before proceeding.

2.1 Central Processing Unit

The serverboard supports dual Xeon scalable processors and Socket P+ (LGA-4189).

2.1.1 Installation

To ensure a safe and easy setup, you need to prepare before installation:

☑ a T30 torque screwdriver

☑ ESD wrist strap/mat and conductive foam pad

☑ Safe and stable environment

> ⚠ **CAUTION**
> The pins of the processor socket are vulerable and easily susceptible to damage if fingers or any foreign objects are pressed against them. Please keep the socket protective cover on when the processor is not installed.

> ⚠ **CAUTION**
> When unpacking a processor, hold the processor only by its edges to avoid touching the contacts.

Standard Processor Assembly:
A standard processor assembly is comprised of 5 components: processor carrier, processor, bolster plate assembly, socket and back plate.
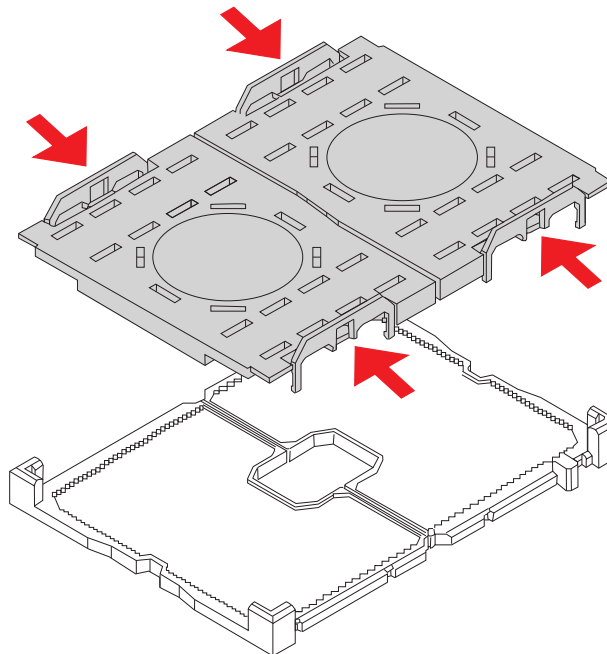

standard processor assembly

Heatsink

Processor Carrier

Processor

Bolster Plate Assembly

LGA4189

Back plate
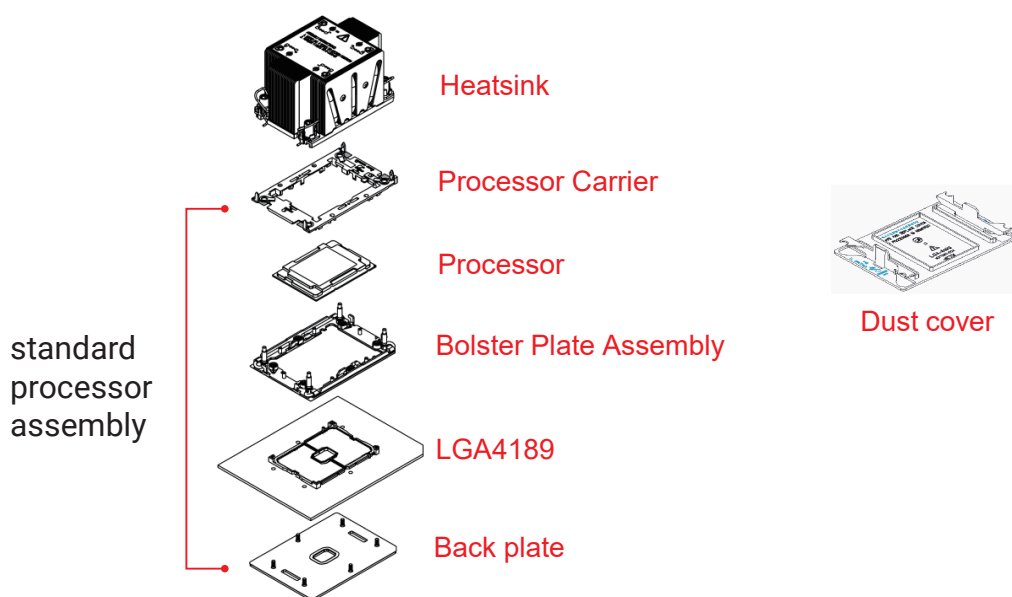
Dust cover

> 📝 This information is provided for professional technicians only.

Procedure:

① Remove the dust cover. Push the tab inward on both sides to remove.
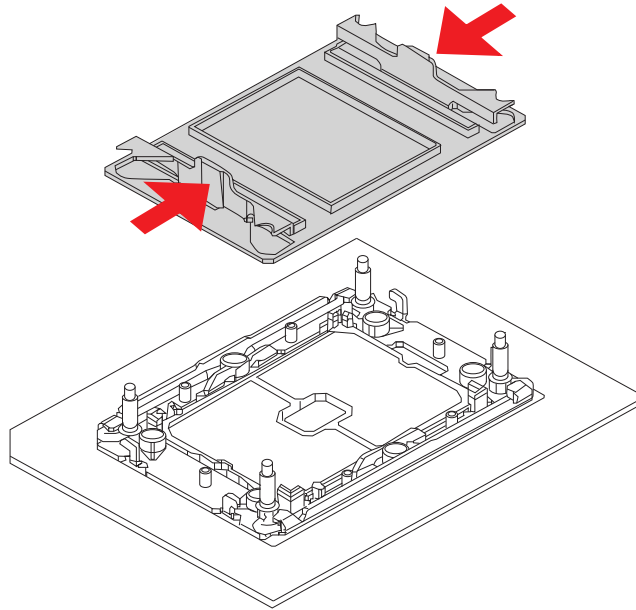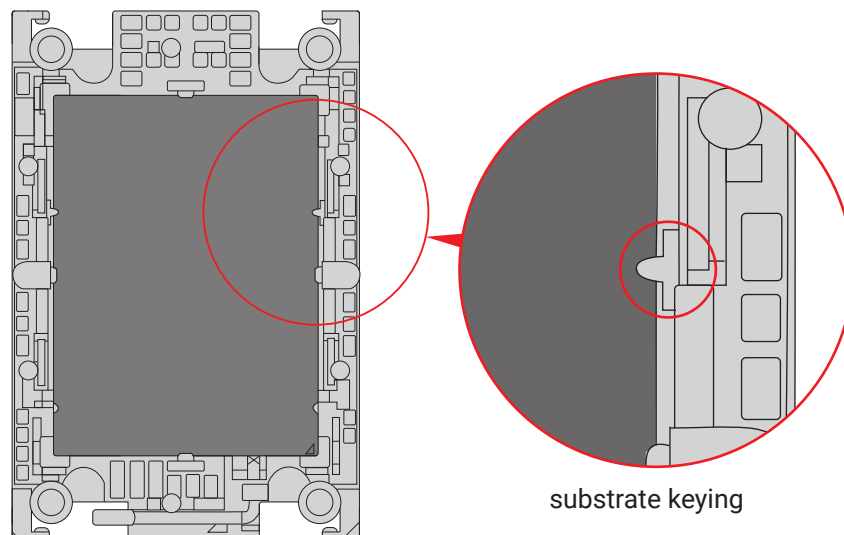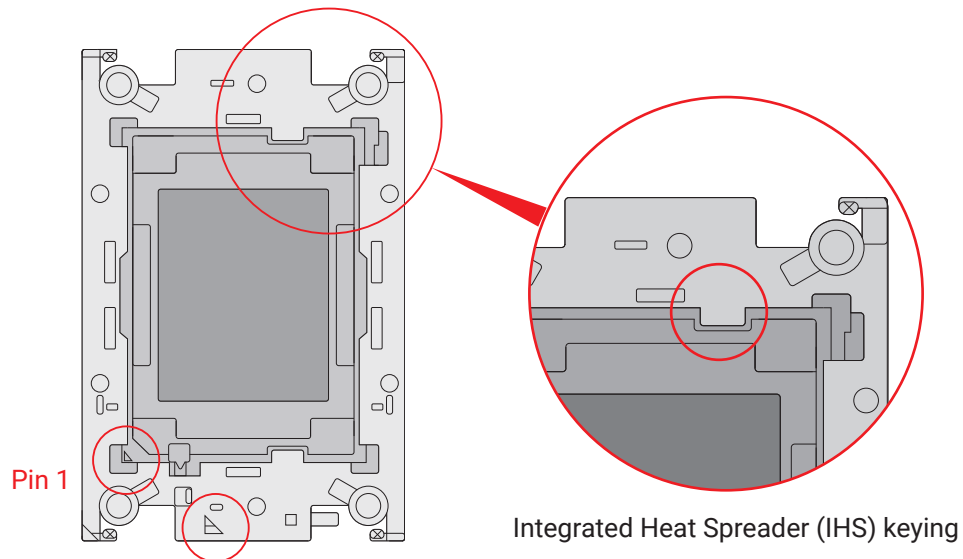
② Remove the Pnp cap from the socket. Press the tabs on both sides to remove.

③ Insert the CPU into the CPU carrier. Carefully align and insert on side of the CPU and then the other.

> **NOTE**
> Must ensure to match the direction and pin of the CPU with the carrier. Refer to the placement of pin 1.

Pin 1

Integrated Heat Spreader (IHS) keying

substrate keying

④ Attach the heat sink onto the CPU carrier. Hook the corners of the CPU carrier to the back side of the heat sink.
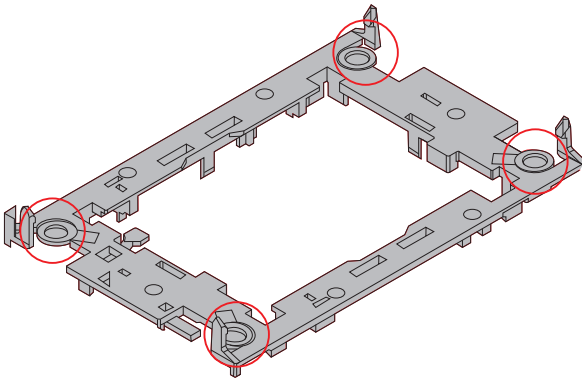
CPU carrrier
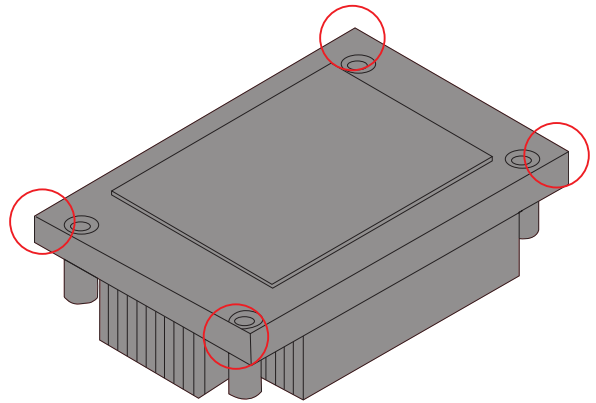
Heat sink back side

⑤ Install the assembled heat sink and CPU carrier onto the CPU socket. Please use a T-30 torque driver tighten the nuts in the four corners of the heat sink labeled in the order 1 → 2 → 3 → 4.

CAUTION
Failure to tighten the heat sink screws in the specified order may cause damage to the processor socket assembly. Heat sink screws is recommended to be tightened to 8 in-lbs torque, but can be tightened to 12 in-lbs torque according to the indicated order on the top of the heatsink label.
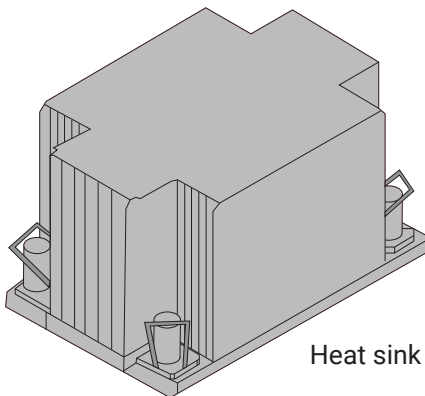
Heat sink with carrier
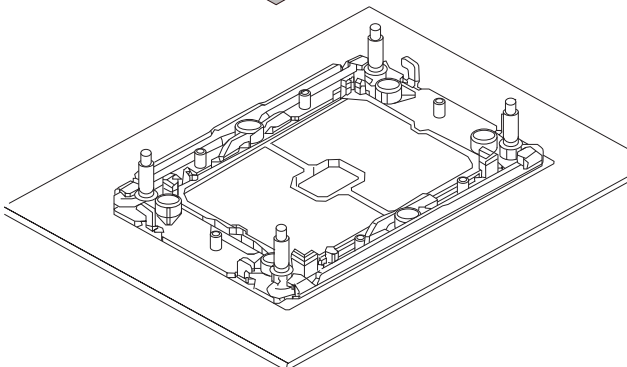
CPU socket
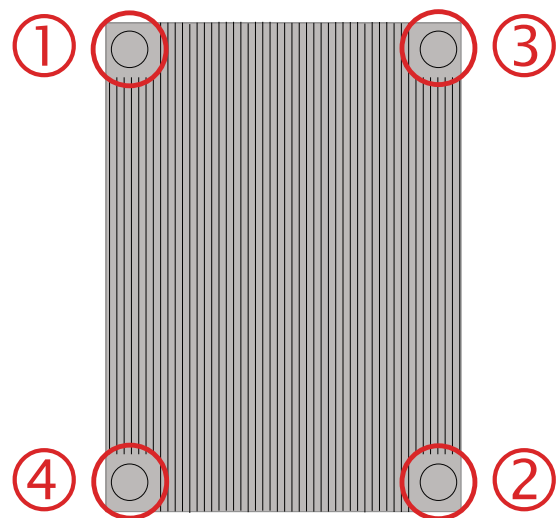
Screw tightening order

⑥ Press the rotating wire located on the four corners of the heat sink to latch position to secure the heat sink.
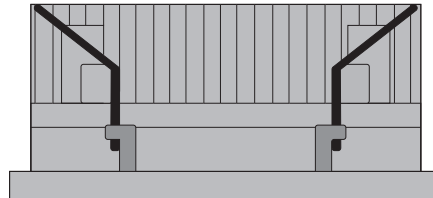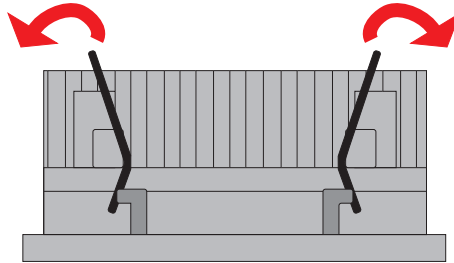
Latched postion

2.2 System Memory

2.2.1 Placement

The DIMMs are displayed on the serverboard as DDR4_B1/ DDR4_B2/DDR4_A1/DDR4_A2/DDR4_D1/ DDR4_D2/DDR4_C1/DDR4_C2/DDR4_G2/DDR4_G1/DDR4_H2/DDR4_H1/ DDR4_E2/DDR4_E1/DDR4_F2/DDR4_F1/DDR4_J1/DDR4_J2/DDR4_I1/DDR4_I2/DDR4_L1/ DDR4_L2/DDR4_K1/DDR4_K2.

To ensure satisfactory performance, you need to:

☑ Verify the DIMM type:
   This product supports DDR4 (RDIMM/RDIMM-3DS/LRDIMM/LRDIMM-3DS).
☑ Verify if all of the DIMMs installed are of the same DIMM type to avoid memory failure and loss of performance speed.
☑ Verify if the DIMMs are populated in parallel slots across channels to activate DUAL Channel Memory Technology.
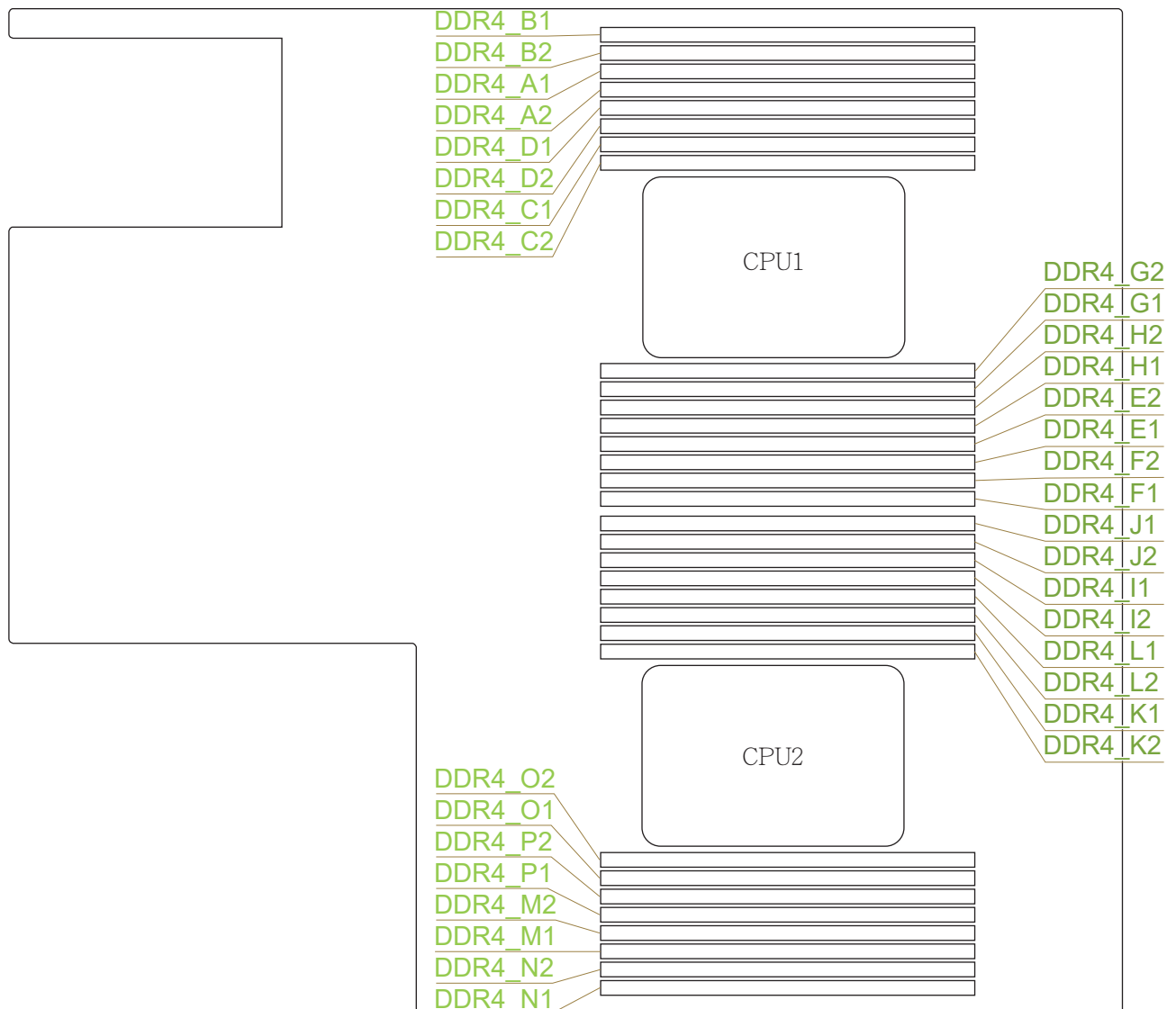
2.2.2 DIMM Population

1 CPU Configuration

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

The symbol # indicates that the DIMM slot is populated.

2 CPU Configurations

Placement		DIMM Number						
		1	2	4	6	8	12	16
CPU1	A1		#	#	#	#	#	#
	B1	#				#	#	#
	C1			#	#	#	#	#
	D1					#		#
	E1		#	#	#	#	#	#
	F1				#	#	#	#
	G1			#	#	#	#	#
	H1					#		#
	A2						#	#
	B2						#	#
	C2						#	#
	D2							#
	E2						#	#
	F2						#	#
	G2						#	#
	H2							#
Placement		1	2	4	6	8	12	16
CPU2	I1		#	#	#	#	#	#
	J1	#				#	#	#
	K1			#	#	#	#	#
	L1					#		#
	M1		#	#	#	#	#	#
	N1				#	#	#	#
	O1			#	#	#	#	#
	P1					#		#
	I2						#	#
	J2						#	#
	K2						#	#
	L2							#
	M2						#	#
	N2						#	#
	O2						#	#
	P2							#

2.2.3 Installation

Step 1 Unlock the DIMM socket by pressing the retaining clips outward.

Step 2 Insert the memory module into the slot. Make sure that the DIMM notch is accurately positioned.

DIMM notch
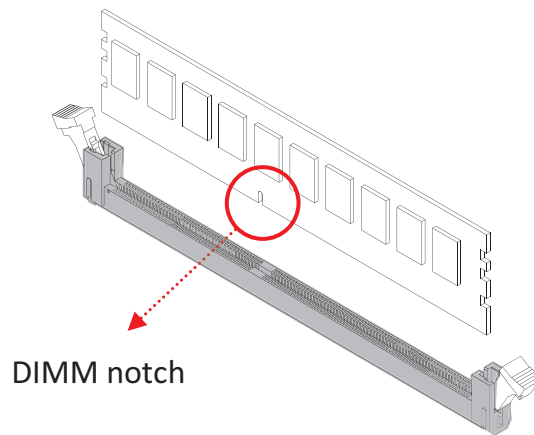
Step 3 Close the retaining clips to complete installation.
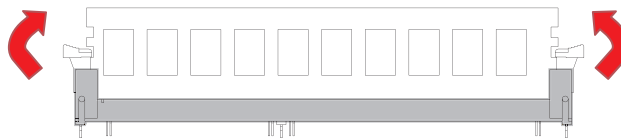
2.3 M.2 SSD (NGFF) Card

① Align and insert the M.2 card into the socket. Ensure the size of your M.2 card match the corresponding standoff on the serverboard.

② Fasten the screw to complete setup.

③ Installation complete.
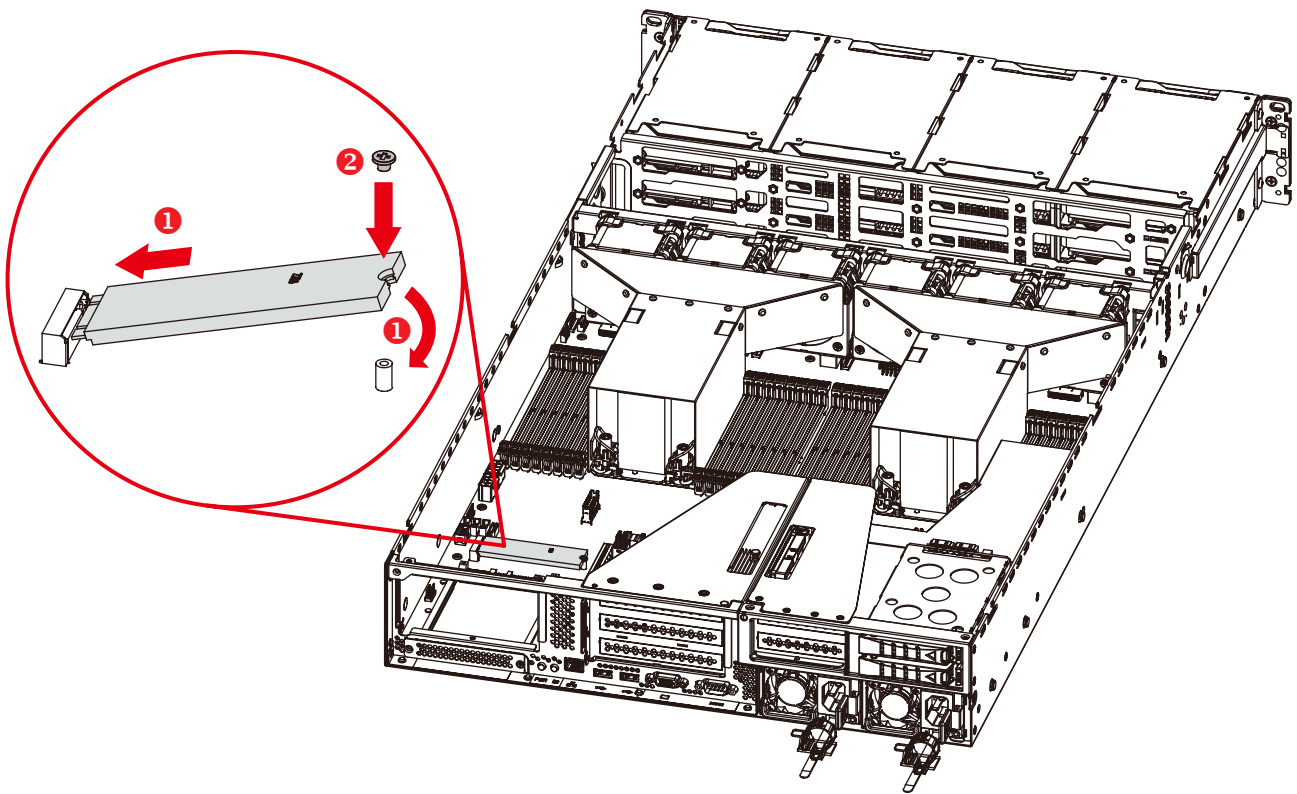
This information is provided for professional technicians only.

2.4 Top Cover

① Press the button on the both side of the chassis.
② Slide the top cover towards the rear of the system barebone.
③ Lift the top cover upward to remove.
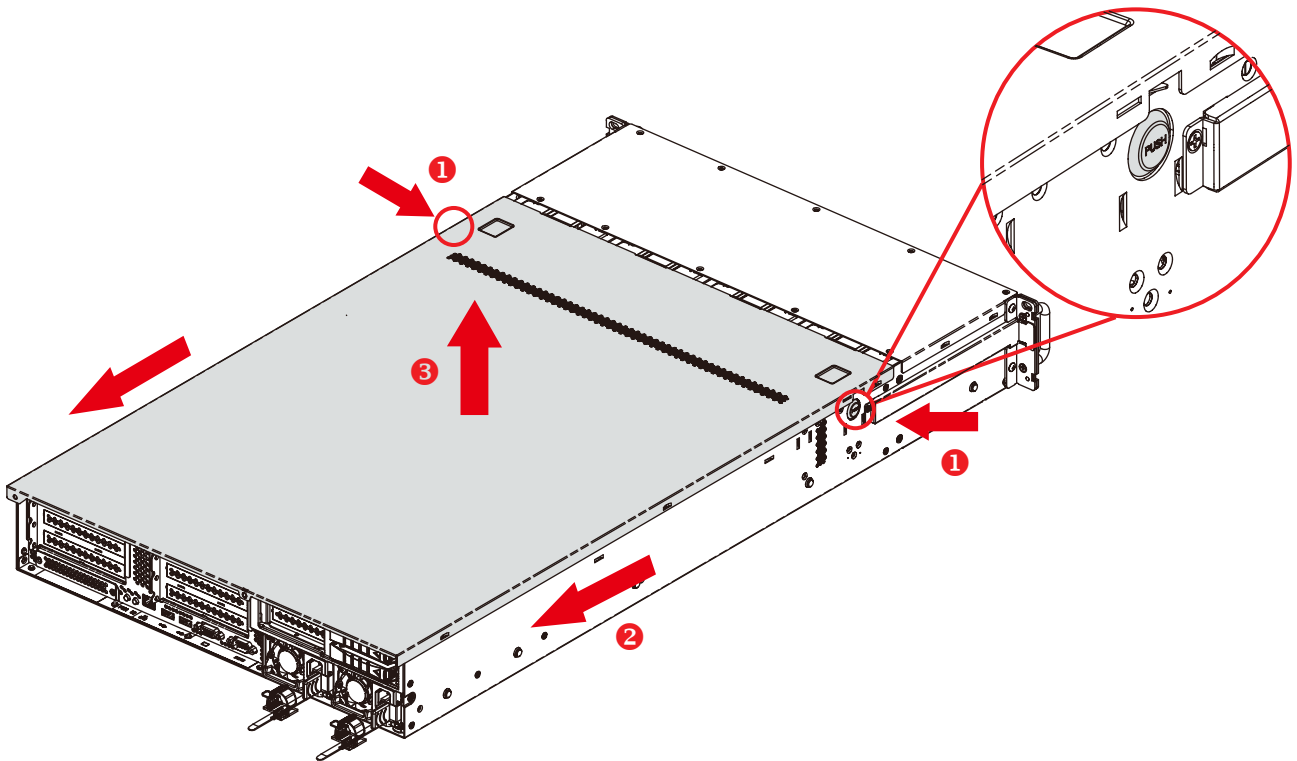
📝 This information is provided for professional technicians only.

2.5 Power Supply Unit

2.5.1 Installation

① Press the latch to release the module.
② Pull the handle to remove the module out of the chassis.
③ Push the replaced power supply unit into the chassis. Ensure that the module is hooked into the cage.
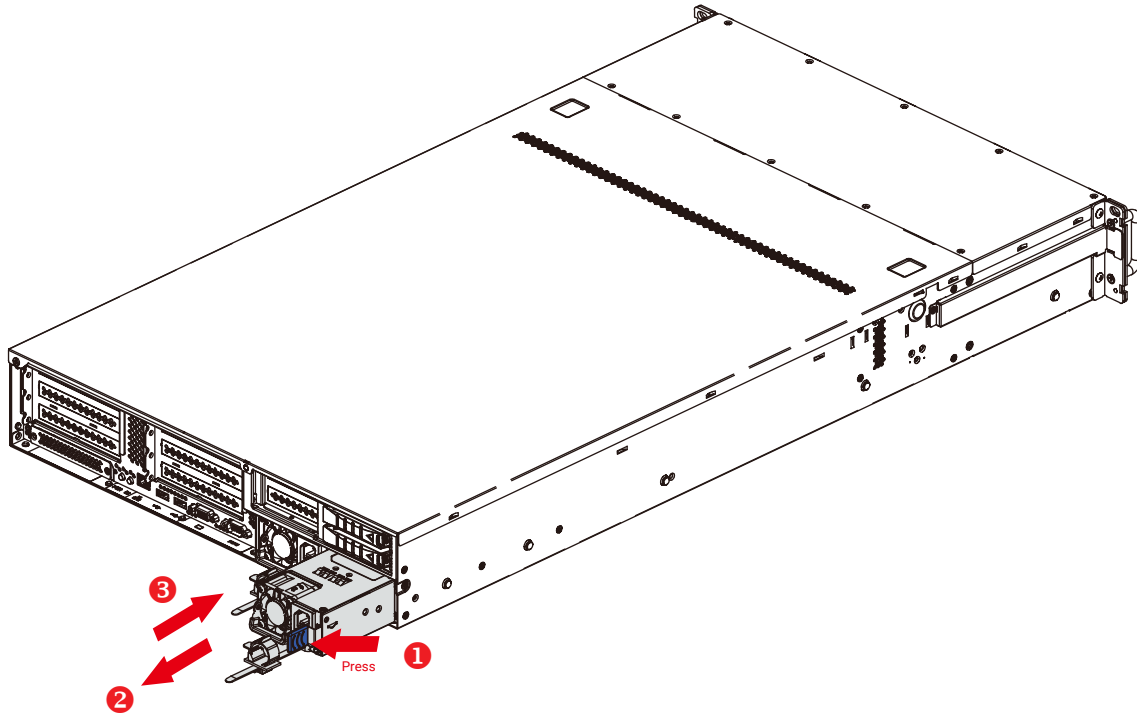
2.5.2 LED Indicator

Indicator Color	Behavior
Green	Output on and Ok.
Green (blinking, 1Hz)	Only 12Vsb (PS off) or PSU is in cold redundant state
Amber	Power supply critical event causing a shutdown; AC cord unplugged or AC power lost, failure, OCP, OVP, fan fail.
Amber (blinking, 1Hz)	Power supply warning events where the power supply continues to operate high temp, high power, high current, slow fan.

This information is provided for professional technicians only.

2.6 Fan

① Remove the top cover from the chassis. Please refer to <u>Section 2.4.</u>
② Remove the air ducts from the chassis.
③ Unplug the cables and connectors from the fan.
④ Pull the fan module from the node. Check to carefully dislodge the rubber connectors from the attached bracket.
⑤ Insert the replaced fan into the node. Verify to align the rubber connectors with the appropriate slot in the bracket.
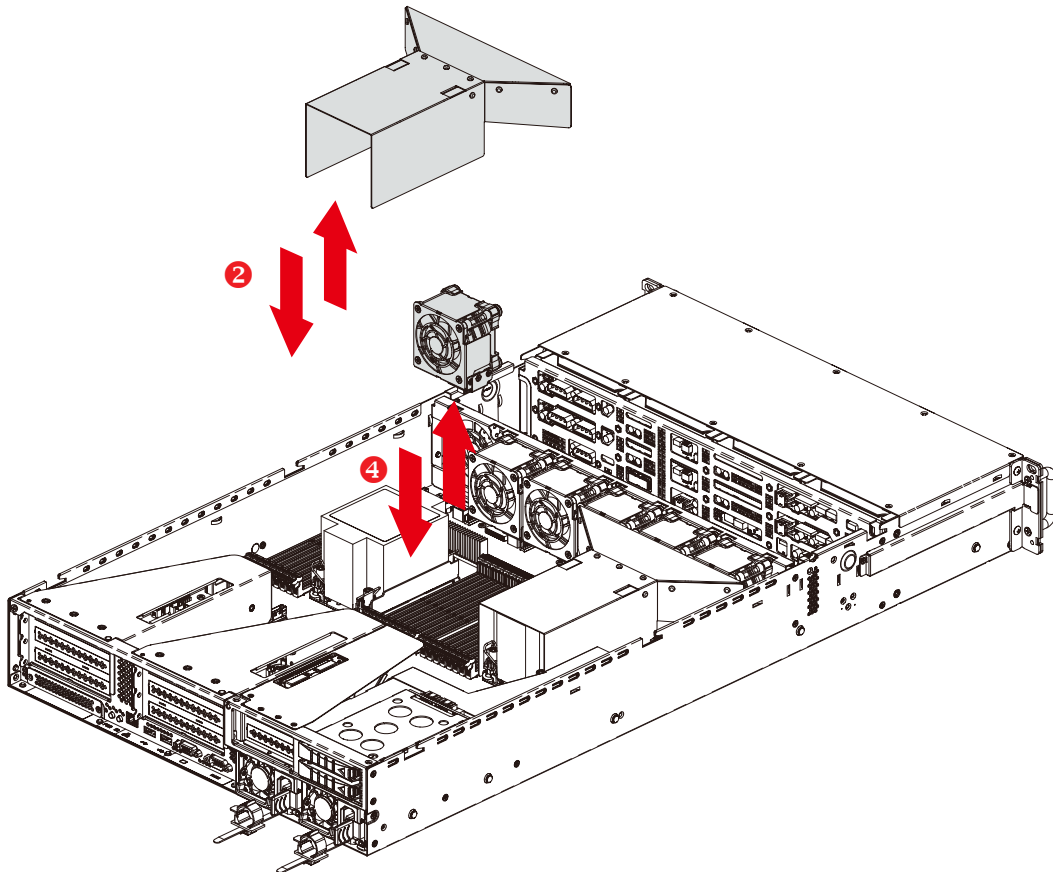
This information is provided for professional technicians only.

2.7 Disk Drive

2.7.1 Drive: 3.5-inch

① Press the release button on the tray lever to loosen the lever.
② Pull the tray lever outward completely.
③ Pull the tray out of the system.
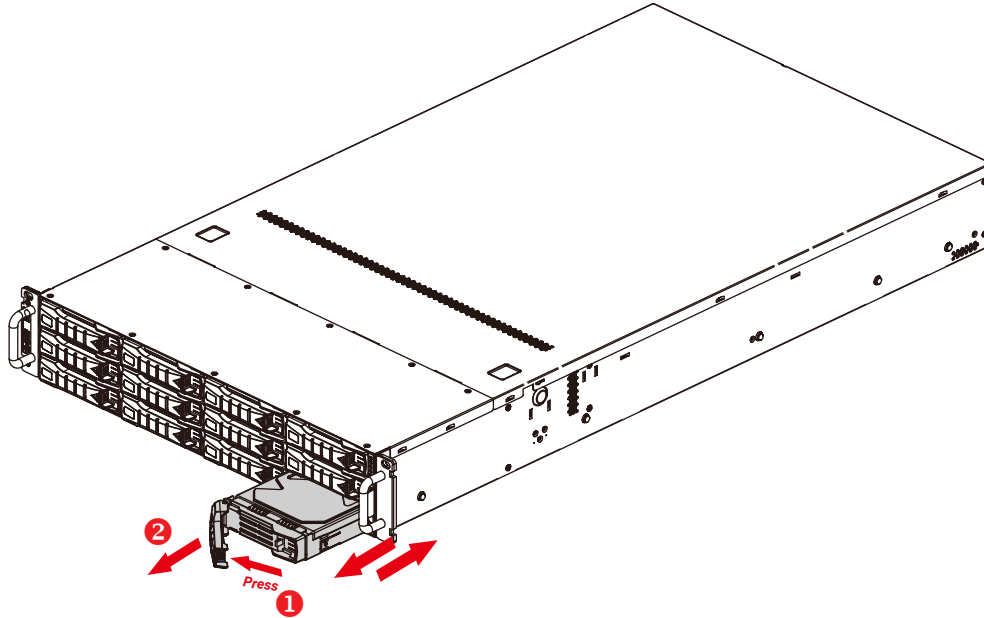
④ Insert the hard disk drive into the tray. Ensure that the dimples on the tray match the hard disk drive. For additional assurance, fasten the screws x 2 on the drive tray to secure the hard disk drive.
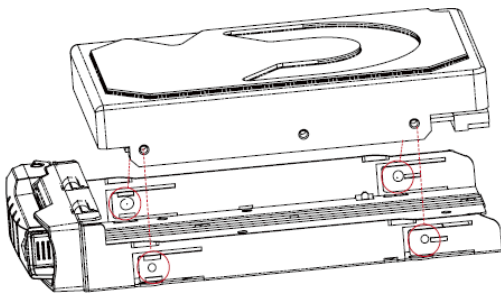
3.5" HDD dimple location   3.5" HDD screw location
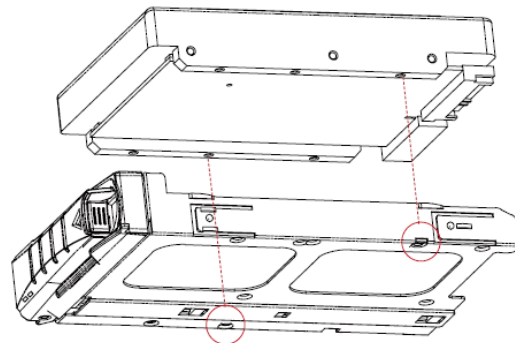
2.7.2 Drive: 2.5-inch

① Press the release button on the tray lever to loosen the lever.
② Pull the tray lever outward completely.
③ Pull the tray out of the system.
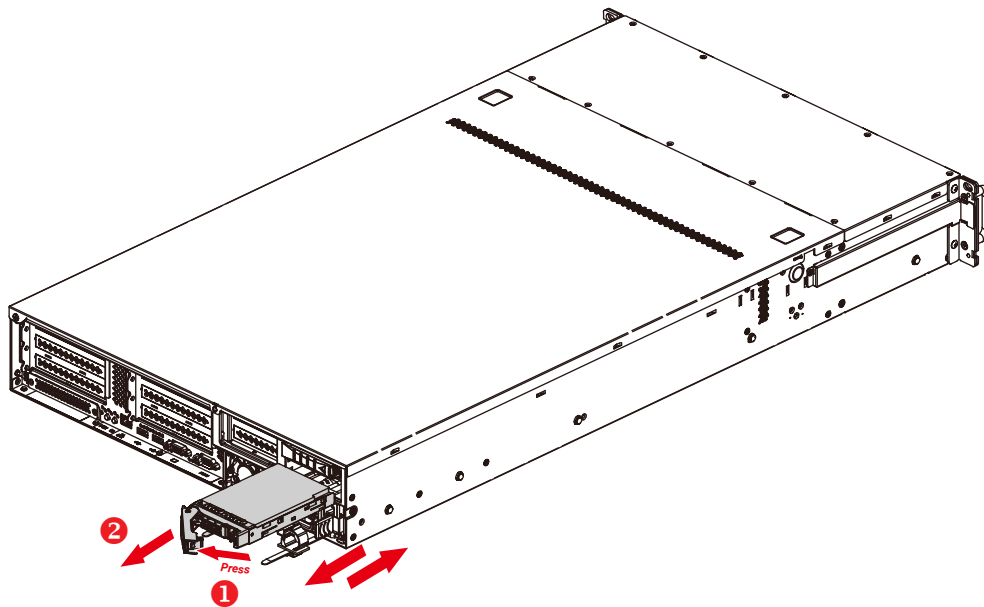
2.7.3 LED Indicator

Indicator Color	Behavior
Blue LED (solid)	SATA/SAS/NVMe drive is in idle state.
Blue LED (blinking)	SATA/SAS/NVMe is active.
Red LED (solid)	SATA/SAS/NVMe is not detected.
Red and Green LED (blinking, 1Hz)	SATA/SAS/NVMe is in locate status.

This information is provided for professional technicians only.

2.8 Riser Card

① Pull upward to remove the riser card from the system.
② Insert the PCIe card into the card slot.
③ Insert the replaced riser card into the appropriate card slot. Ensure that the card is properly aligned.
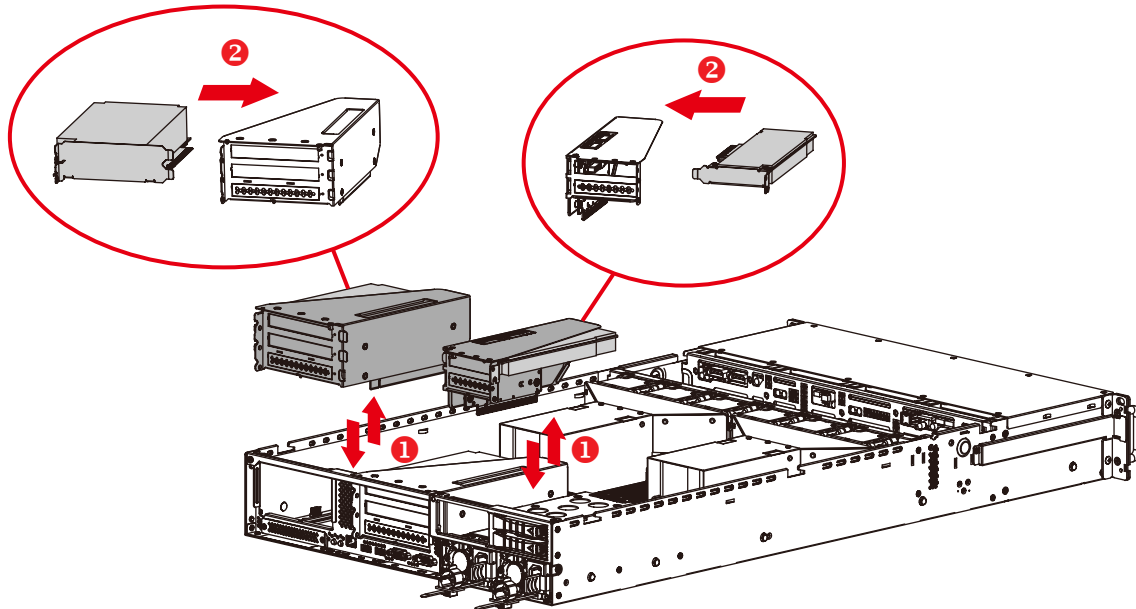
This information is provided for professional technicians only.

2.9 Drive Slot Map

Front Panel
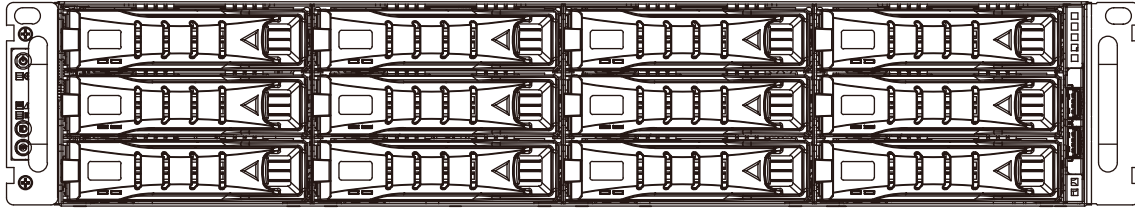
- 1 x SATA + 2 x NVMe tri-mode

SATA 1	SATA 2	SATA 3	SATA 4
NVMe 1	NVMe 2	NVMe 3	NVMe 4
NVMe 5	NVMe 6	NVMe 7	NVMe 8

2.10 Slide Rail

NOTE

This section provides a basic instruction for mounting the slide rail onto the system. Tool-less rails vary per order. The rail in this manual may not exactly match the rail for your system. Please refer to the specifications or quick installation guide that came with your purchased product.

CAUTION

They rack may tilt and fall due to incorrect installation or placed on uneven grounds. The rack must be placed in a flat surface before you begin to slide the system barebone in for servicing.

1. Pull the inner rail out of the slide rail until it clicks.
2. Detach the inner rail completely from the slide rail by pulling the white tab forward.
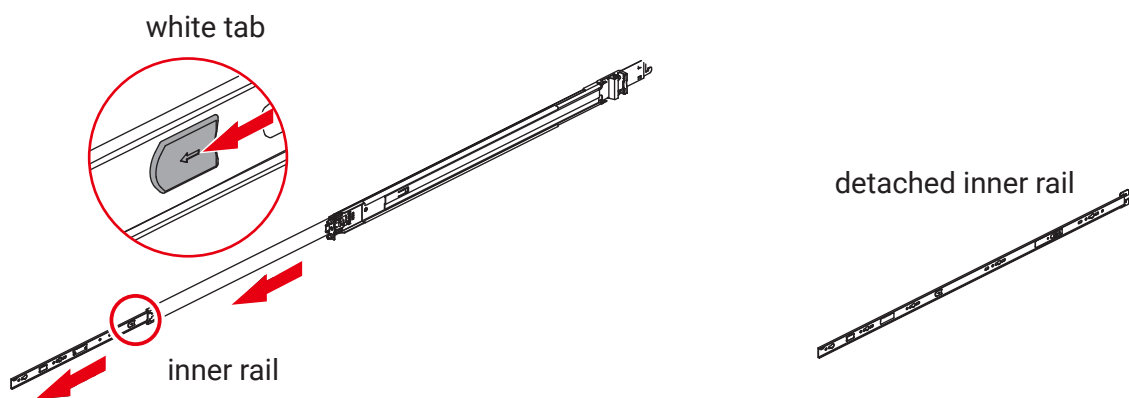
3. After the inner rail is dislodged, adjust the middle rail back to its original position by pushing the tab on the middle rail.
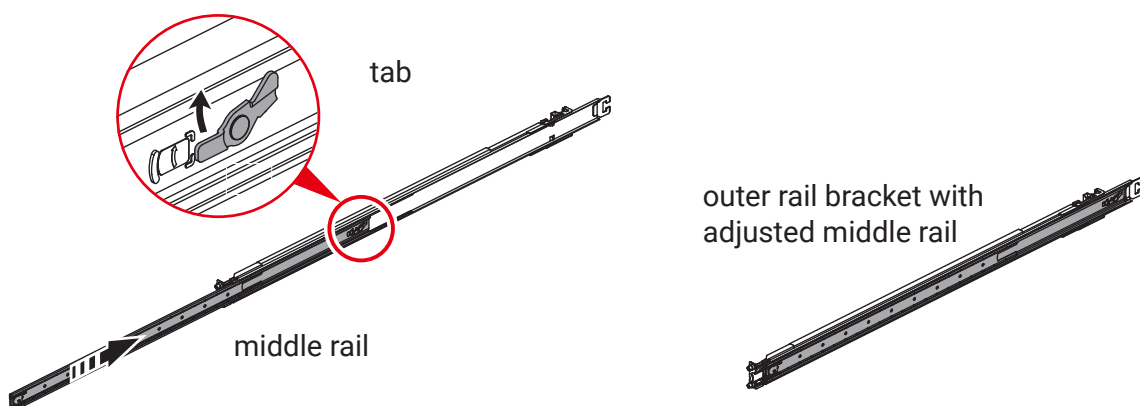
4. Install the inner rail onto the system barebone. Lock the keyholes and secure the screws on sides of the system.

Keyhole

screw
M4X4L
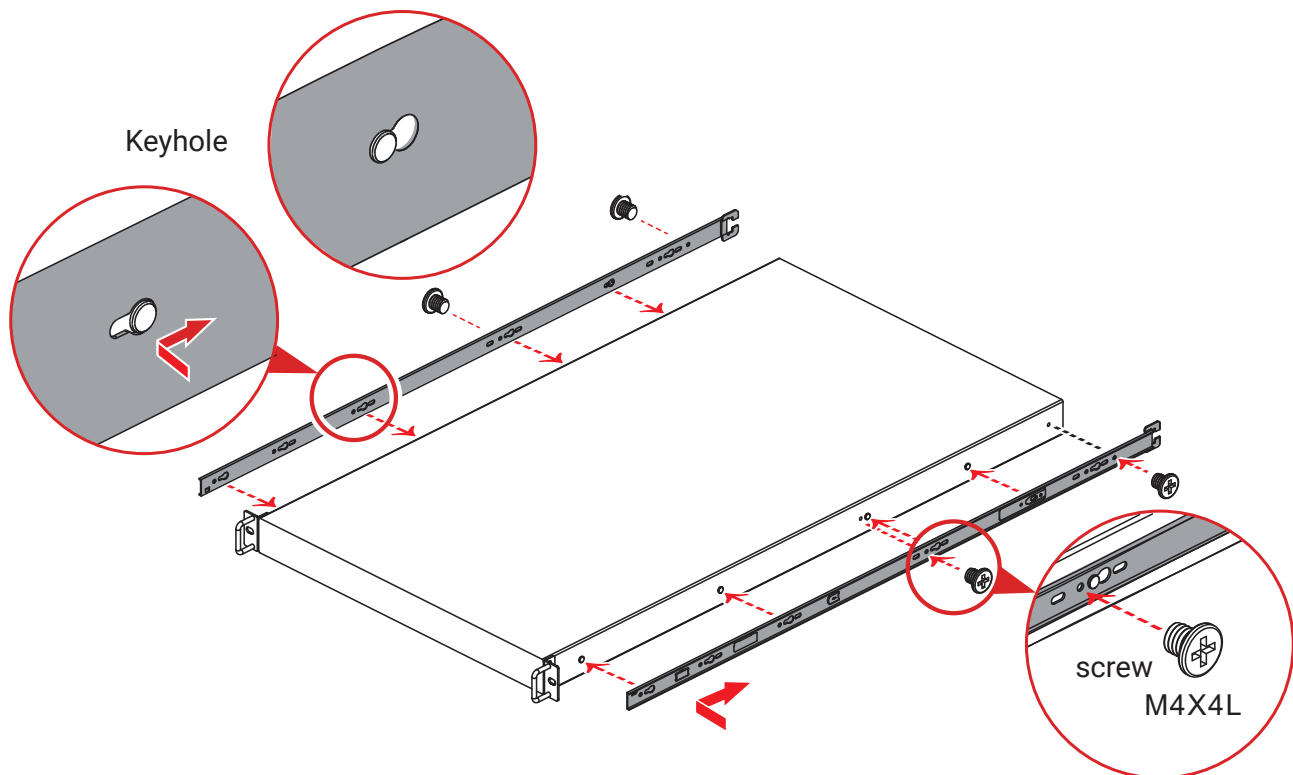
5. Continue installing the outer rail bracket to the mounting frame. Attach the outer rail assembling to the frame and press the bracket to form a rack on both ends. Repeat to fully mount the bracket assembly on the other side.

Rear bracket

Rear bracket

Attach and press bracket.   bracket secured.

Front bracket

Front bracket
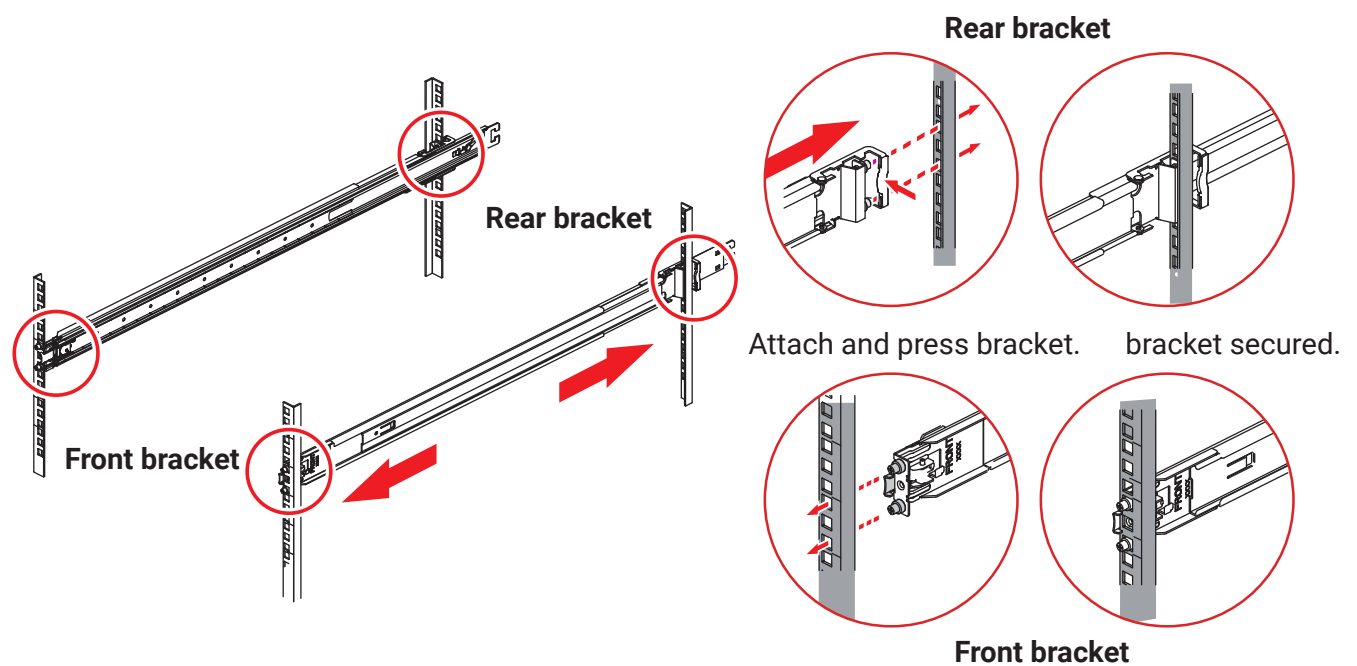
6. Insert the chassis to complete the installation.
    a. Pull the middle rail fully extended in lock position, ensure ball bearing retainer is
       located at the front of the middle rail.
    b. Insert the chassis into middle-outer rails.
    c. When hit a stop, please pull/push the blue release tab on the inner rails.
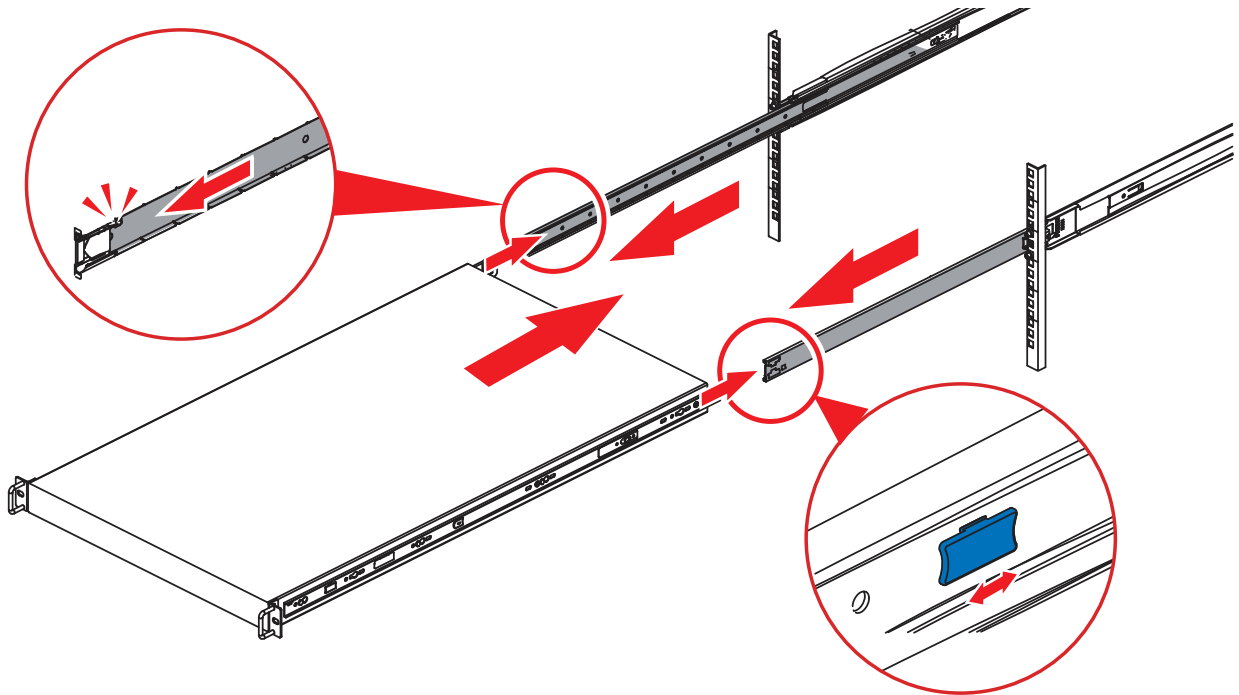
7. Tighten and secure the chassis with the shipping screws.

M5x9L
screw
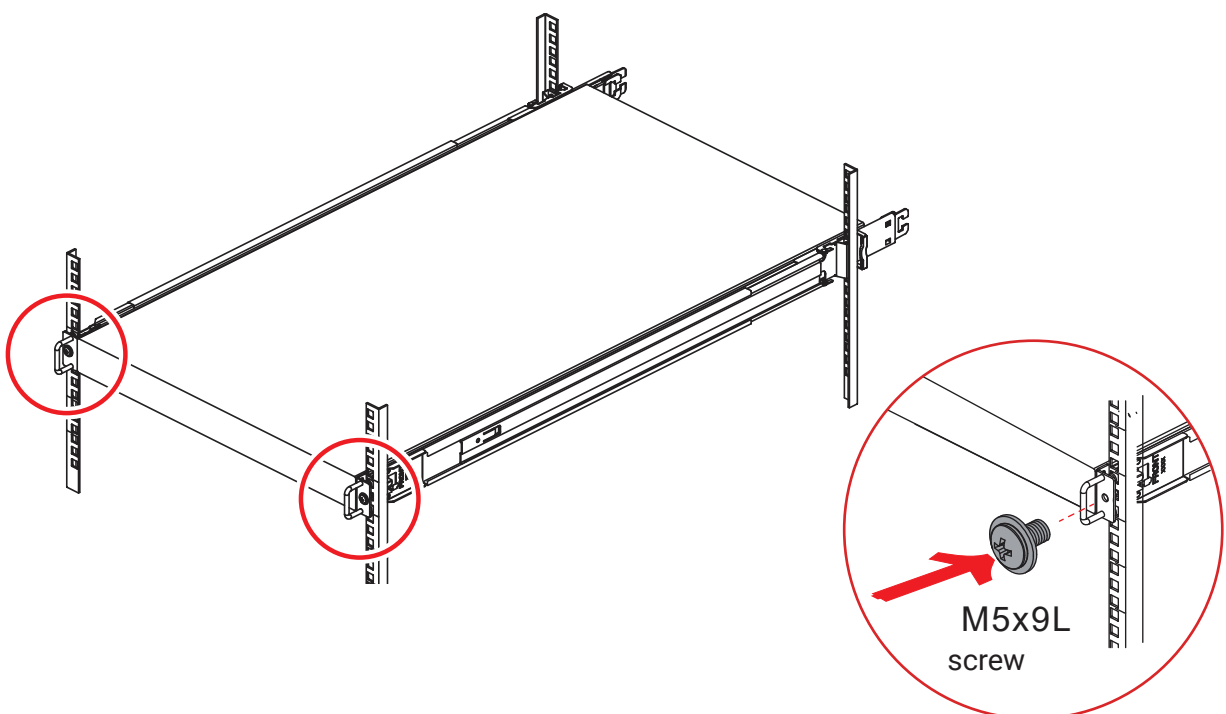
Chapter 3. Hardware Specifications

This section provides illustrations that display the internal jumpers, connectors and system LED indicators on the A6 motherboard. The motherboard layout and essential connectors are listed below for your reference.

3.1 Motherboard Settings

3.1.1 Block Diagram
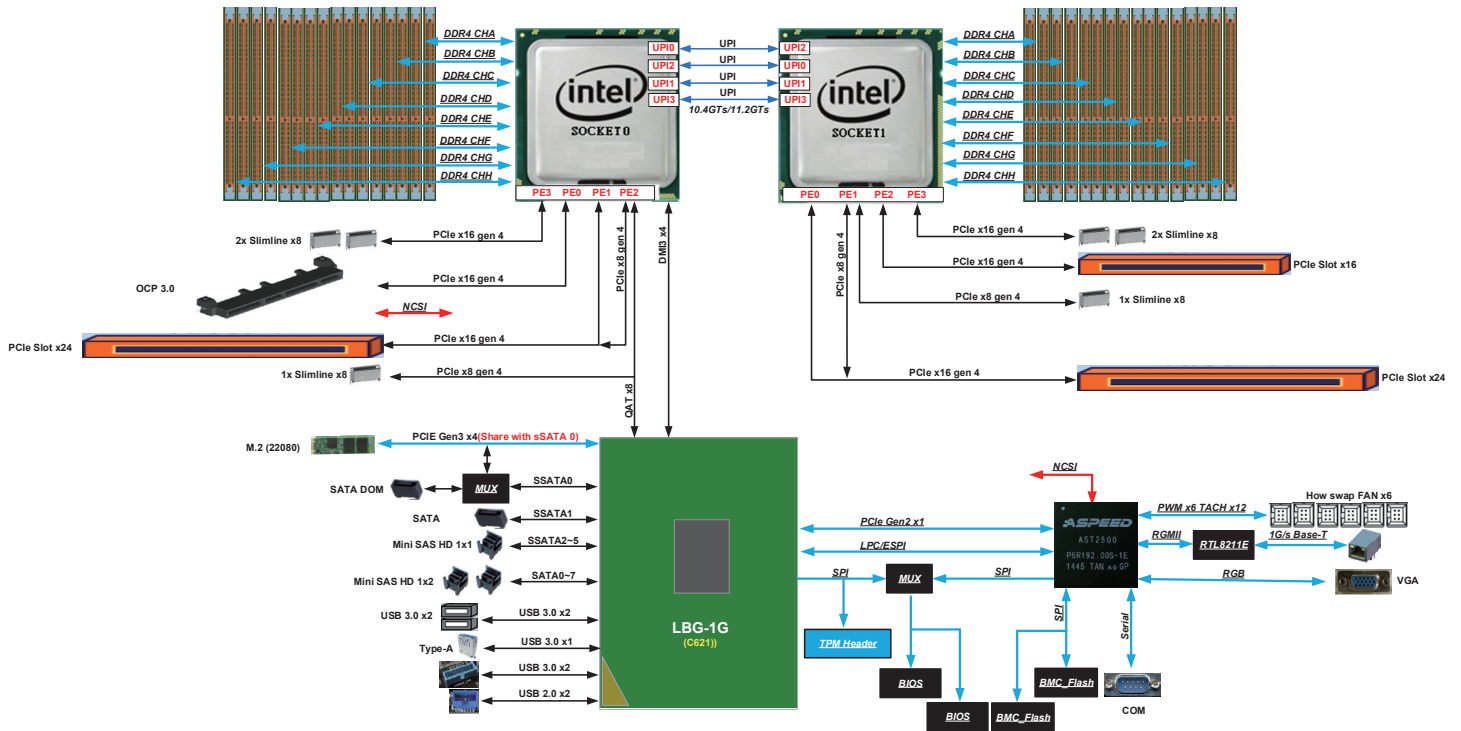
3.1.2 Content List

	Item	Placement		Item	Placement
1	System Panel Header	PANEL1	19	BIOS ROM Socket	BIOS_ROM
2	Intelligent Platform Management Bus Header	IPMB1	20	Serial Port	COM1
3	M.2 Socket	M2_1	21	VGA Port	VGA1
4	USB 2.0 Header	USB_1_2	22	Front VGA Header	FRNT_VGA1
5a 5b 5c	BMC SMBus Header	BMC_SMB1 BMC_SMB2 BMC_SMB3	23	TPM-SPI Header	TPM_BIOS_PH1
6a 6b 6c 6d	GPU Power Connector	GPU_PWR1 GPU_PWR2 GPU_PWR3 GPU_PWR4	24a 24b	USB 3.2 Gen1 Port	USB3_1 USB3_2
7	PWM Configuration Header	PWM_CFG1	25	BMC ROM Socket	BMC_ROM
8	Virtual RAID On CPU Header	RAID_1	26	Buzzer	BUZZER
9a 9b 9c 9d 9e 9f 9g 9h	System Fan Connector	FAN1 FAN2 FAN3 FAN4 FAN5 FAN6 FAN7 FAN8	27	Battery Socket	BAT1
10a 10b	Backplane PCI Express Hot-Plug Connector	CPU1_HSBP1 CPU2_HSBP1	28	SATA SGPIO Connector	SSATA_SGPIO1
11a 11b 11c 11d 11e 11f	Slimline NVMe Connector	SLIM1 SLIM2 SLIM3 SLIM4 SLIM5 SLIM6	29	Vertical Type A USB 3.2 Gen1 Connector	USB3_3_5
12	HDD Backplane Power Connector	HSBP_PWR1	30	LAN port	IPMI_LAN1
13	PDB Power Connector	CRPS_IN1	31	USB 3.2 Gen1 Header	USB3_3_4
14	SATA Power Connector	HDD_PWR1	32	SATA3 Connector	SSATA1
15a 15b	PSU Connector	PSU_CON1 PSU_CON2	33	SATA DOM Power Connector	SSATAPWR1
16	Auxiliary Panel Header	AUX_PANEL1	34	SATA3 DOM Connector	SSATA0
17	PCIE 4.0 x16 slot	PCIE3	35a 35b	Mini SAS HD Connector	SATA_0_7 SSATA_2_5
18a 18b	PCIE 4.0 x24 slot	PCIE1 PCIE2	36	OCP 3.0 Gen4 x16 Mezzanine Card Slot	OCP3
	Header/Jumper	**Location**		**Header/Jumper**	**Location**
A	BIOS Swap Override Header	ESPI_MODE1	F	Password Reset Jumper	PASSWORD_CLEAR
B	PMBUS Mode Jumper	PMBUS_SEL_CLK1	G	BIOS Recovery	BIOS_RECOVERY1
C	PMBUS Mode Jumper	PMBUS_SEL_DAT1	H	ME Recovery	ME_RECOVERY1
D	PMBUS Mode Jumper	PMBUS_SEL_ALT1	I	ESPI/LPC Selection Jumper	ESPI_LPC
E	QAT Mode Jumper	QAT_SEL	J	ESPI Flash Sharing Jumper	ESPI_SHARE

3.1.3 Placement
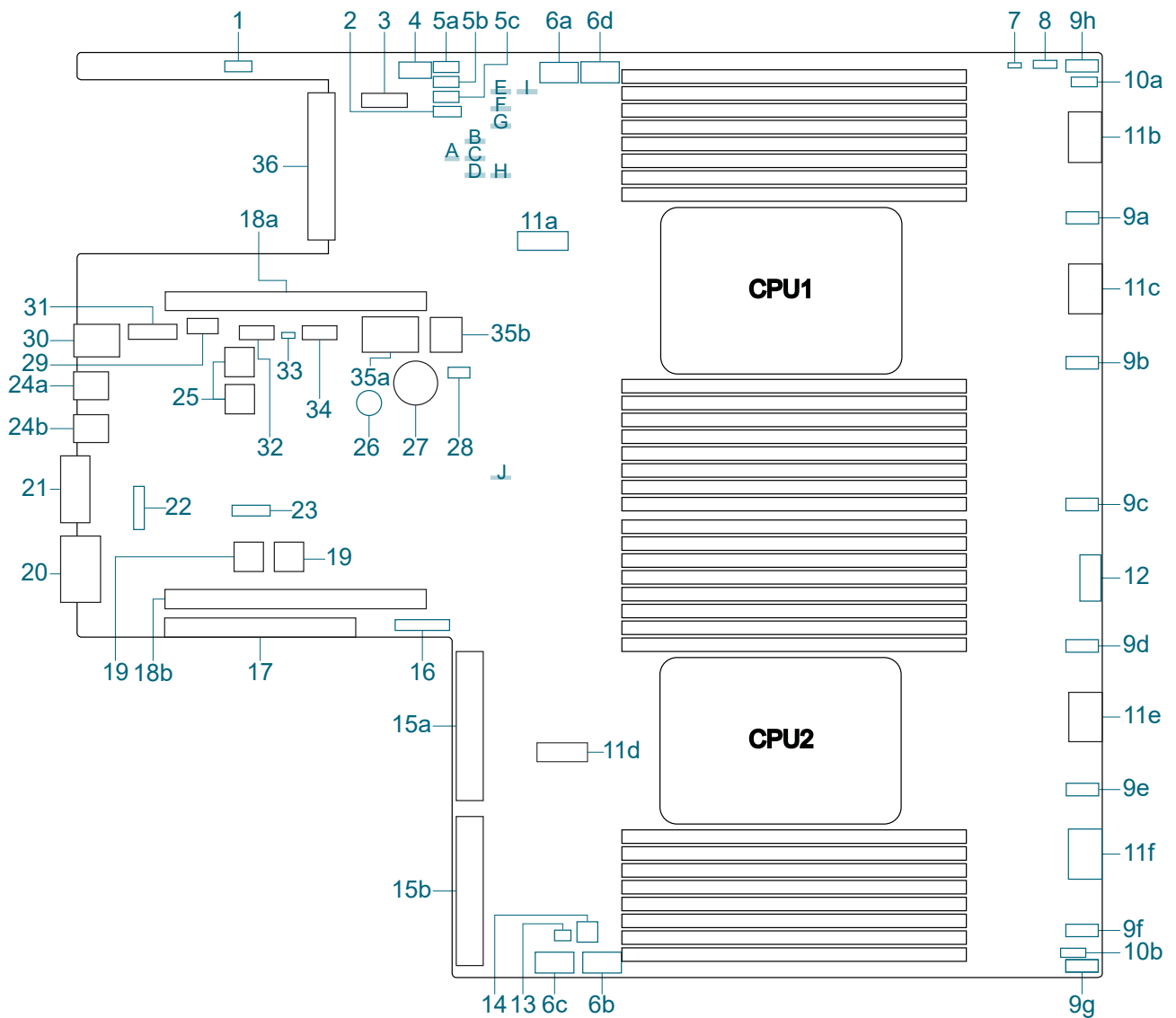
3.1.4 Connector and Jumper Definition

1 System Panel Header (PANEL1)
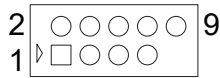
HDLED+	1	2	PLED+
HDLED-	3	4	PLED-
GND	5	6	PWRBTN#
RESET#	7	8	GND
GND	9	10	

2 Intelligent Platform Management Bus Header (IPMB1)
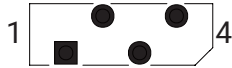
1	IPMB_SDA
2	GND
3	IPMB_SCL
4	NC

4 USB 2.0 Header (USB_1_2)
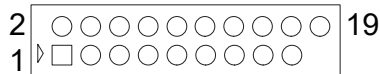
Dummy	1	2	IntA_PA_D+
IntA_PB_D+	3	4	IntA_PA_D-
IntA_PB_D-	5	6	GND
GND	7	8	IntA_PA_SSTX+
IntA_PB_SSTX+	9	10	IntA_PA_SSTX-
IntA_PB_SSTX	11	12	GND
GND	13	14	IntA_PA_SSRX+
IntA_PB_SSRX+	15	16	IntA_PA_SSRX-
IntA_PB_SSRX	17	18	Vbus
Vbus	19		

5a ~ 5c BMC SMBus Header (BMC_SMB1/BMC_SMB2/BMC_SMB3)

1	BMC_SMBDATA
2	GND
3	BMC_SMBCLK
4	Power
5	BMC_SMB_PRESENT_1_N

6a ~ 6d GPU Power Connector (GPU_PWR1/GPU_PWR2/GPU_PWR3/GPU_PWR4)
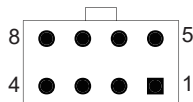
GND	1	5	+12V
GND	2	6	+12V
GND	3	7	+12V
GND	4	8	+12V

7 PWM Configuration Header (PWM_CFG1)

1	GND
2	SMB_DATA_VSB
3	SMB_CLK_VSB

8 Virtual RAID On CPU Header (RAID_1)

1	VROC RAID KEY
2	GND
3	+3VSB
4	GND

9a ~ 9h System fan Connectors (FAN1/FAN2/FAN3/FAN4/FAN5/FAN6/FAN7/FAN8)

1	GND
2	12V (FAN_VOLTAGE)
3	FAN_SPEED_SENSOR1
4	FAN_SPEED_CONTROL
5	FAN_SPEED_SENSOR2
6	NC

10a ~ 10b Backplane PCI Express Hot-Plug Connector (CPU1_HSBP1/CPU2_HSBP1)

1	+3V
2	CPU_HP_SCL
3	CPU_HP_SDA
4	P0_HP_ALERT_L
5	GND

12 HDD Backplane Power Connector (HSBP_PWR1)
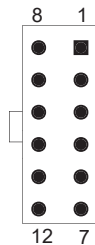
+12V	1	7	GND
+12V	2	8	GND
+12V	3	9	GND
+12V	4	10	GND
+12V	5	11	GND
+12V	6	12	GND

13 PDB Power Connector (CRPS_IN1)
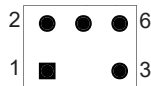
PS_ON#	1	2	PSU1_PWROK
No key	3	4	N/A
+12VSB	5	6	GND

14 SATA Power Connector (HDD_PWR1)
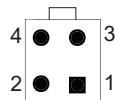
GND	1	2	GND
+12V	3	4	+5V

16 Auxiliary Panel Header (AUX_PANEL1)
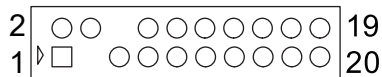
+5VSB	1	2	SMB_Alert
No key	3	4	SMB_CLK
CASEOPEN#	5	6	No key
GND	7	8	GND
LOCATORLED1+	9	10	SMB_DATA
LOCATORLED1-	11	12	+3VSB
LOCATORBTN#	13	14	LAN1_LINK
GND	15	16	LED_PWR
System Fault LED-	17	18	LED_PWR
System Fault LED+	19	20	LAN2_LINK

22 Front VGA Header (FRNT_VGA1)
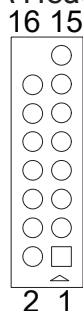
Red	1	2	Green
Blue	3	4	
GND	5	6	GND
GND	7	8	VGA SELECT
+5V	9	10	GND
	11	12	DDC _ D AT A
H_SYNC	13	14	V_SY N C
DDC _ C L K	15	16	No Key

31

23 TPM-SPI Header (TPM_BIOS_PH1)

1 2
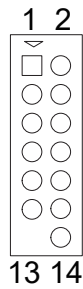
13 14

SPI_DQ2	1	2	SPI_DQ3
SPI_CS0	3	4	+3.3V
SPI_MISO	5	6	TPM_Present
RSMRST#	7	8	CLK
GND	9	10	SPI_MOSI
SPI_TPM_CS#	11	12	RST#
No Key	13	14	TPM_PIRQ

28 SATA SGPIO Connector (SSATA_SGPIO1)

5 ○ ○ ○ ○ 8
1 □ ○ ○ 4
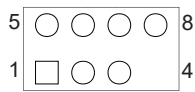
+3.3V	1	2	
SDATAOUT	3	4	SDATAIN
GND	5	6	SLOAD
No Key	7	8	SCLOCK

31 USB 3.2 Gen1 Header (USB3_3_4)
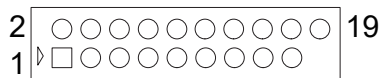
2 ○○○○○○○○○ 19
1 ▷□○○○○○○○○

Dummy	1	2	IntA_PA_D+
IntA_PB_D+	3	4	IntA_PA_D-
IntA_PB_D-	5	6	GND
GND	7	8	IntA_PA_SSTX+
IntA_PB_SSTX+	9	10	IntA_PA_SSTX-
IntA_PB_SSTX	11	12	GND
GND	13	14	IntA_PA_SSRX+
IntA_PB_SSRX+	15	16	IntA_PA_SSRX-
IntA_PB_SSRX	17	18	Vbus
Vbus	19		

A BIOS Swap Override Header (ESPI_MODE1)

ESPI_MODE1	Setting	
Short	Enable Override	
Open	Disable Override	Default

B C D PMBUS Mode Jumper (PMBUS_SEL_CLK1, PMBUS SEL_DAT1 and PMBUS_SEL_ALT1)

PMBUS_SEL_CLK1 PMBUS_SEL_DAT1 PMBUS_SEL_ALT1	Setting	
Pin 1-2	PMBus connected to BMC	Default
Pin 2-3	PMBus connected to PCH	

E QAT Mode Jumper (QAT_SEL)

QAT_SEL	Setting	
Pin 1-2	QAT Asymmetric	Default
Pin 2-3	QAT Symmetric	

F Password Reset Jumper (PASSWORD_CLEAR)

PASSWORD_CLEAR	Setting	
Pin 1-2	Normal Mode	Default
Pin 2-3	Password Clear	

G BIOS Recovery (BIOS_RECOVERY1)

BIOS_RECOVERY1	Setting	
Pin 1-2	Normal Mode	Default
Pin 2-3	Recover BIOS	

H ME Recovery (ME_RECOVERY1)

ME_RECOVERY1	Setting	
Pin 1-2	Normal Mode	Default
Pin 2-3	ME Recovery Mode	

I ESPI/LPC Selection Jumper (ESPI_LPC)

ESPI_LPC	Setting	
Pin 1-2	ESPI	Default
Pin 2-3	LPC	

J ESPI Flash Sharing Jumper (ESPI_SHARE)

ESPI_SHARE	Setting	
Pin 1-2	Master ESPI Flash Sharing	Default
Pin 2-3	Slave ESPI Flash Sharing	

3.1.5 LED Indicator

Item		Color	Behavior
Fan LED	LED_FAN1~ LED_FAN8	Red	Failure to activate fan.
BMC Heartbeat LED	BLED	Green	BMC is active.
		Off	BMC is not detected.
Standby Power LED	SB_PWR1	Green	STB PWR is ready.
		Off	STB PWR is not detected.
HDD LED	HDD_LED	Green	HDD is active.
		Off	HDD is not detected.
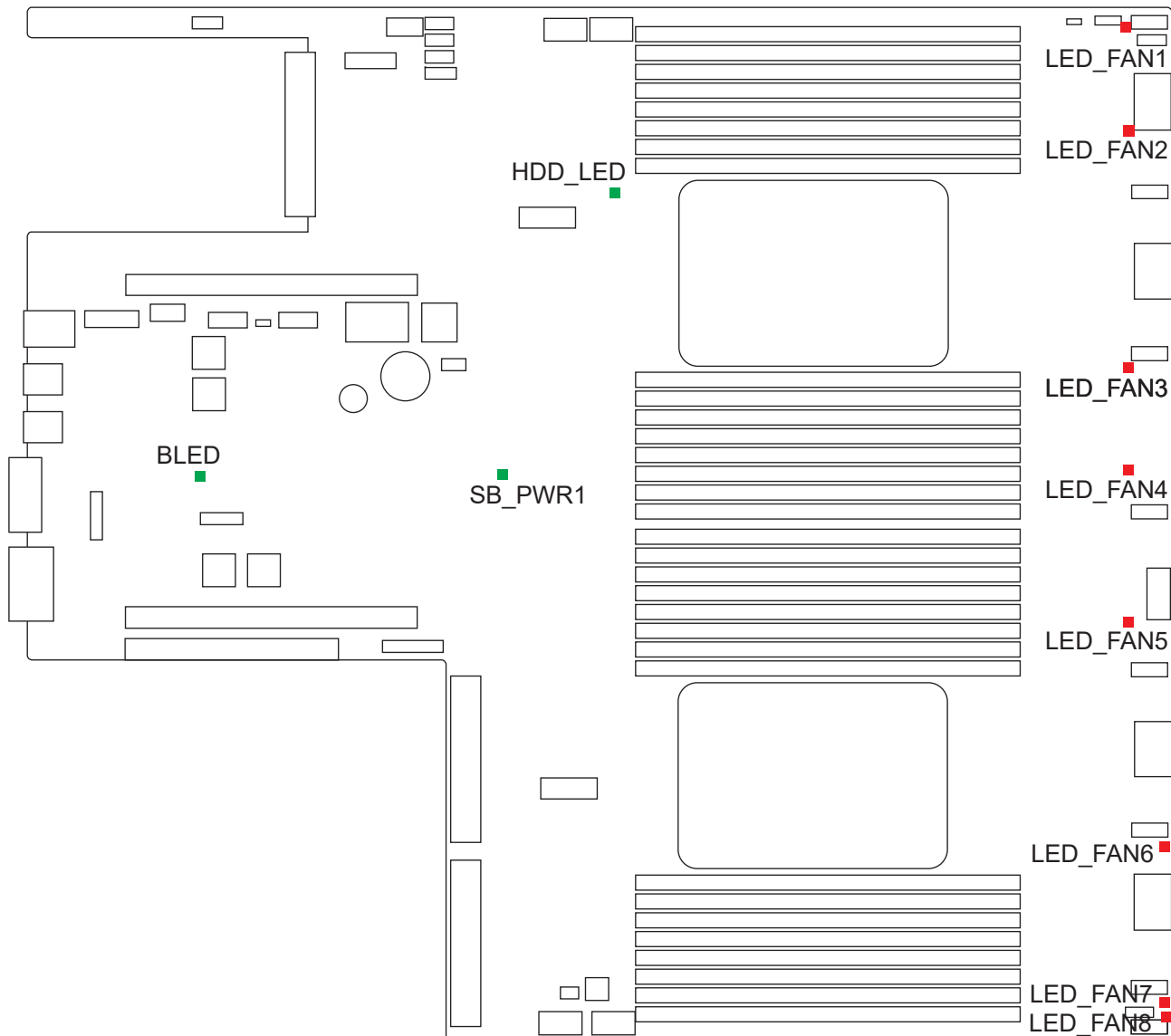
3.1.6 Input and Output Panel
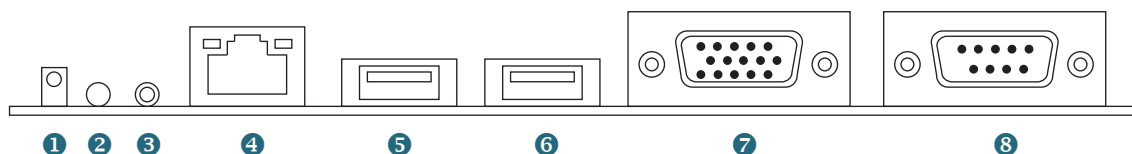
	Item	Placement		Item	Placement
1	System Fault LED	SYS_FAULT_LED1	5	USB 3.2 Gen1 Port	USB3_1
2	Power Button	PWR_BTN1	6	USB 3.2 Gen1 Port	USB3_2
3	UID Switch	U1D1	7	VGA port	VGA1
4	LAN RJ45 Port	IPMI_LAN	8	Serial Port	COM1

LAN port LED Indicator
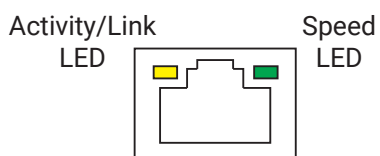
Item	Color	Behavior
Activity/Link LED	Off	No link.
	Yellow (blinking)	Data activity.
	On	Link.
Speed LED	Off	10M bps connection or no link.
	Off	100M bps connection.
	Green	1G bps connection.

3.2 Drive Backplane: 4 Bay (SAS/SATA/NVMe)

3.2.1 Placement

Top view

Bottom view
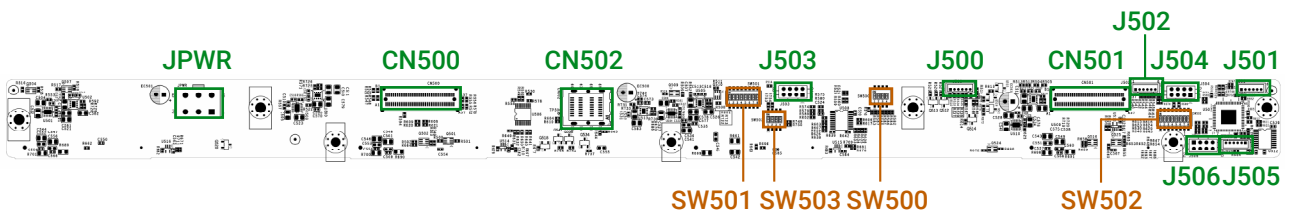
3.2.2 Connector

SGPIO Connector (J506)

SSATA_DATAOUT	2	1	SMB_SATA_CLK0
SSATA_LOAD	4	3	SMB_SATA_DAT0
SSATA_CLOCK	6	5	UBM0_SCL
GND	8	7	UBM0_SDA

UBM Connector (J500)

1	BP_PWRDIS_Q6
2	BP_PWRDIS_Q7
3	BP_M4
4	BP_M5
5	BP_M6
6	BP_M6

UBM Connector (J502)

1	BP_PWRDIS_Q4
2	BP_PWRDIS_Q5
3	BP_M0
4	BP_M1
5	BP_M2
6	BP_M3

PCIe Hot-plug SMBus Connector (J504)

SMB_BP_SHP1_SCL	2	1	SMB_BP_SHP0_SCL
SMB_BP_SHP1_SDA	4	3	SMB_BP_SHP0_SDA
BP_SHPINT_OUT_N1	6	5	BP_SHPINT_OUT_N0
GND	8	7	GND

UBM Connector (J501)

1	BP_LED7
2	SSD_RSTOUT_N4
3	SSD_RSTOUT_N5
4	SSD_RSTOUT_N6
5	SSD_RSTOUT_N7
6	CPRSNT_N2

SGPIO Connector (J503)

SATA_DATAOUT	2	1	SMB_SATA_CLK1
SATA_LOAD	4	3	SMB_SATA_DAT1
SATA_CLOCK	6	5	UBM2_SCL
GND	8	7	UBM2_SDA

UBM Connector (J505)

1	BP_LRA
2	BP_LRF
3	BP_LRL
4	BP_LED4
5	BP_LED5
6	BP_LED6

3.2.3 LED Indicator

LED5 LED2   LED7 LED1   LED6 LED4   LED8 LED3
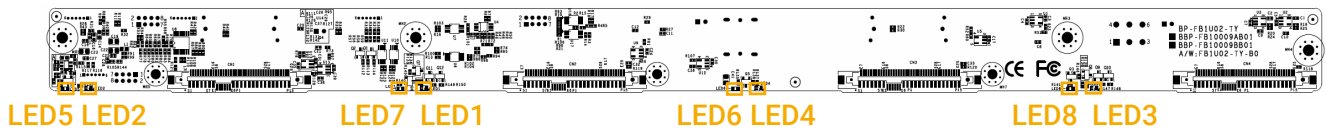
Indicator	Color	Behavior
LED5	Blue (Blinking)	CN1 SSD activity.
	Off	CN1 SSD activity not detected.
LED2	Red	CN1 SSD fault.
	Green	CN1 SSD local.
LED7	Blue (Blinking)	CN2 SSD activity.
	Off	CN2 SSD activity not detected.
LED1	Red	CN2 SSD fault.
	Green	CN2 SSD local.
LED6	Blue (Blinking)	CN3 SSD activity.
	Off	CN3 SSD activity not detected.
LED4	Red	CN3 SSD fault.
	Green	CN3 SSD local.
LED8	Blue (Blinking)	CN4 SSD activity.
	Off	CN4 SSD activity not detected.
LED3	Red	CN4 SSD fault.
	Green	CN4 SSD local.

3.2.4 Cable Routing

Top view

Connects to SATA/SAS/NVMe storage device

Bottom view

Connects two 3-pin plug
from motherboard

Connects the data cable
to the motherboard

Connects the data cable
to the motherboard
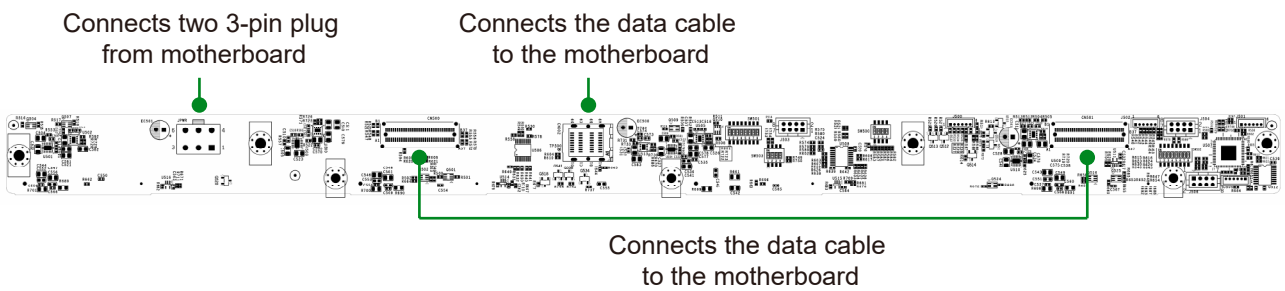
3.3 Drive Backplane: 4 Bay (SAS/SATA)

3.3.1 Placement

Top view
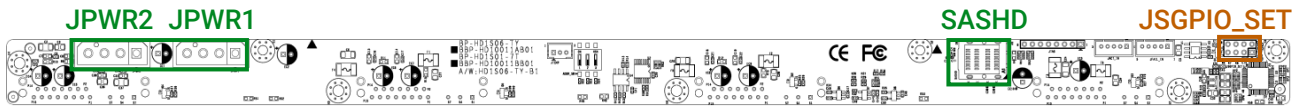
Bottom view
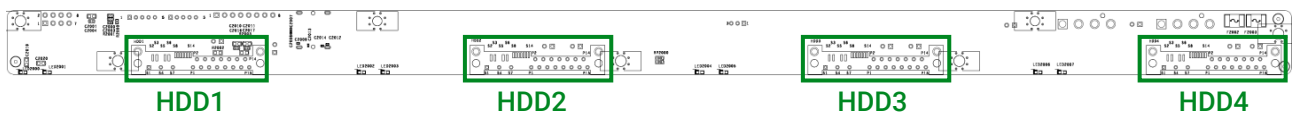
3.3.2 Connector

Power Connector (JPWR1, JPWR 2)
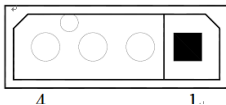
1	+12V
2	GND
3	GND
4	+5V

3.3.3 Jumper

Function and SGPIO setting (JSGPIO_SET)
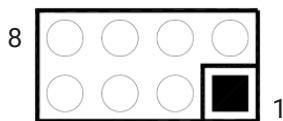
Pin1, 2	Open	Disable External LED input.
	Close	Enable External LED input.
Pin3, 4	Open	Activity LED from HDD Pin P11.
	Close	Activity LED from SGPIO.
Pin5 ,6	Open	Identify behavior according to Host.
	Close	Blinking the Identify LED behavior.
Pin7, 8	Open	Disable SGPIO.
	Close	Enable SGPIO.

3.3.4 LED Indicator
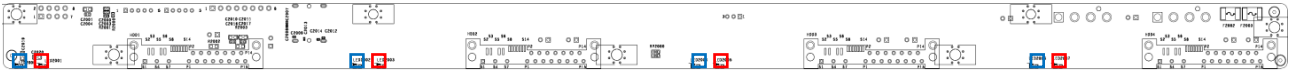
Indicator	Color	Behavior
HDD Activity LEDs	Blue (Blinking)	HDD Activity detected or Locate HDD
	On	HDD present
	Off	HDD no connect or Power Off
HDD Fault/Status LEDs	Red (Blinking)	Re-build status
	On	HDD Fault or Locate HDD
	Off	Normal

Chapter 4. BIOS Configuration Settings

This chapter demonstrates how to configure the UEFI BIOS settings in your system device. You can enter the BIOS screen during system startup.

To enter BIOS configuration settings,
- Press **F2** or **Delete** key during the Power-On-Self-Test (POST)

To enter BIOS after POST, you have to restart the system by using one of the three methods:
- Press **Ctrl** + **Alt** + **Delete.**
- Press the reset button on the system chassis.
- Turn the system off and on.

> **NOTE**
> The following pages provide the details of BIOS menu. Please be noted that the BIOS menu are continually changing due to the BIOS updating. The BIOS menu provided are the most updated ones when this manual is written.

4.1 Navigation Keys

The navigation keys are listed below.

Function Key	Description
< ↑ > < ← > < → > < ↓ >	Select item.
< Tab >	Next function
< Enter >	Select and enter sub-screen.
< + > < - >	Modify selected option.
<PGUP>	Previous page
<PGDN>	Next page.
<HOME>	Top screen.
< F1 >	General help.
< F7 >	Discard Change and Exit.
< F9 >	Load Optimal Default for all values.
< F10 >	Save changes and exit.
< F12 >	Print Screen.
< Esc >	Exit the current menu screen.

4.2 BIOS Setup

4.2.1 Menu

Press ⬅ and ➡ to select the options of the menu bar.
Press **Enter** to access the option screen.

Menu	Description
Main	Displays basic system information and date & time.
Advanced	Allows configuration of advanced system settings.
Security	Sets passwords and security functions.
Boot	Sets boot options, such as Quick Boot or USB Boot.
Server Management	Configure BMC parameter.
Event Logs	Configure Smbios event logs.

4.3 Main

4.4 Advanced

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

  ▶ CPU Configuration                         CPU Configuration Parameters
  ▶ 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
  ▶ Intel SPS Configuration
  ▶ Intel® VMD technology
  ▶ Tls Auth Configuration                    ↔: Select Screen
                                              ↑↓: Select Item
    UEFI Update Utility                       Enter: Select
  ▶ Instant Flash                             +/-: Change Option
                                              F1: General Help
                                              F7: Discard Changes
                                              F9: Load UEFI Defaults
                                              F10: Save and Exit
                                              ESC: Exit




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```

4.4.1 CPU Configuration

CPU Configuration	
Intel(R) Speed Step Technology	Intel(R) 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(R) SpeedStep Technology set Disabled and Intel(R) Turbo Boost Technology set Enabled.
Intel(R) Turbo Boost Technology	Intel(R) Turbo Boost Technology enables the processor to run above its base operating fre- quency when the operating system requests the highest performance state.
Intel(R) Hyper Threading Technology	Intel(R) Hyper Threading Technology allows multiple threads to run on each core, so that the overall performance on threaded software is improved.
Long Duration Maintained	Configure the period of time until the CPU ratio is lowered when the Long Duration Power Limit is exceeded.
Short Duration Power Limit	Configure Package Power Limit 2 in watts. When the limit is exceeded, the CPU ratio will be lowered immediately. A lower limit can protect the CPU and save power, while a higher limit may improve performance.
Long Duration Power Limit	Configure Package Power Limit 1 in watts. When the limit is exceeded, the CPU ratio will be lowered after a period of time. A lower limit can protect the CPU and save power, while a higher limit may improve performance.
Active Processor 1/2 Cores	Select the number of cores to enable in each processor package.
Enable Intel(R) TXT Support	Enables Intel(R) Trusted Execution Technology Configuration.
Intel(R) Virtualization Technology	Intel(R) 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]).

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Hardware Prefetcher	Automatically prefetch data and code for the processor. Enable for better performance.
Adjacent Cache Line Prefetcher	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 Uma Based Clutering knob.

4.4.2 DRAM Configuration

DRAM Configuration	
Enforce POR	Enable to enforce POR restrictions for DDR4 frequency and voltage programming.
DRAM Frequency	If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.
Numa	Use this item to enable or disable Non Uniform Memory Access (NUMA).
IMC Interleaving	Select to configure IMC Interleaving settings.
Mirror Mode	Mirror Mode will set entire 1LM/2LM memory in system to be mirrored, consequently reducing the memory capacity by half. Mirror Enable will disable XPT Prefetch.
Memory Rank Sparing	Enable or disable Memory Rank Sparing.
ADDDC Sparing	Enable or disable Memory Rank Sparing.
Multi Rank Sparing	Set Multi Rank Sparing number. Default and the maximum is 2 ranks per channel.
Patrol Scrub	Patrol Scrub is a background activity initiated by the processor to seek out and fix memory errors. The default value is [Enabled].
Data Scrambling for DDR4	Enable: Enables data scrambling for DDR4. Disable: Disables this feature. Auto: Sets it to the MRC default setting; current default is Enable.

4.4.3 Chipset Configuration

Chipset Configuration	
MMCFG Base	Use this item to select MMCFG Base.
MMIO High Base	Use this item to select MMIO High Base.
MMIO High Granularity Size	Use this item to select MMIO Granularity Size.
Above 4G Decoding	Enable or disable 64bit capable Devices to be decoded in Above 4G Address Space (only if the system supports 64 bit PCI decoding).
Primary Graphics Adapter	If PCI Express graphics card is installed on the motherboard, you may use this option to select PCI Express or Onboard VGA as the primary graphics adapter.
Onboard VGA	Use this to enable or disable the Onboard VGA function. The default value is [Auto].
VT-d	Intel(R) Virtualization Technology for Directed I/O helps your virtual machine monitor bet- ter 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.

OCP3 Link Width	This allows you to select OCP3 Link Width. The default value is [x16].
OCP3 Link Speed	This allows you to select OCP3 Link Speed. The default value is [Auto].
OCP3 ASPM Support	This option enables or disables the ASPM support for all CPU downstream devices.
PCIE1/2/3 Link Width	This allows you to select PCIE1 Link Width. The default value is [x16x8].
PCIE1/2/3 Link Speed	This allows you to select PCIE1 Link Speed. The default value is [Auto].
PCIE1/2/3 ASPM Support	This option enables or disables the ASPM support for all CPU downstream devices.
SLIMELIN 1-1/1-2/ 2-1/2-2/3-1/3-2/ 4-1/4-2/5-1/5-2/6-1/ 6-2 Link Speed	This allows you to select SLIMLINE Link Speed. The default value is [Auto].
SLIMELIN 1-1/1-2/ 2-1/2-2/3-1/3-2/ 4-1/4-2/5-1/5-2/6-1/ 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.
Restore AC Power Current State	This allows you to restore AC Power Current State.

4.4.4 Storage Configuration

Storage Configuration	
SATA Controller	Use this item to enable or disable SATA Controllers.
SATA Mode Selection	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive. Press <Ctrl+I> to enter RAID ROM during UEFI POST process.
SATA ALPM	Use this item to enable or disable Aggressive Link Power Management.
sSATA Controller	Use this item to enable or disable SATA Controllers.
sSATA/M.2_SATA Mode Selection	Identify the SATA/M.2_SATA port is connected to Solid State Drive or Hard Disk Drive. Press <Ctrl+I> to enter RAID ROM during UEFI POST process.
sSATA ALPM	Use this item to enable or disable Aggressive Link Power Management.

4.4.5 NVMe Configuration

NVMe Configuration
The NVMe Configuration displays the NVMe controller and Drive information.

4.4.6 ACPI Configuration

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.

4.4.7 USB Configuration

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

4.4.8 Super IO Configuration

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.

4.4.9 Serial Port Console

Serial Port Configuration	
Console Redirection	Use this option to enable or disable Console Redirection. If this item is set to Enabled, you can select a COM Port to be used for Console Redirection.
Console Redirection Settings	Use this option to configure Console Redirection Settings and specify how your computer and the host computer to which you are connected exchange information. Both computers should have the same or compatible settings.
Terminal Type	Use this item to select the preferred terminal emulation type for out-of-band management. It is recommended to select [VT-UTF8].
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 over flow. 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 Settings	Use this option to configure Legacy Console Redirection Settings and specify how your computer and the host computer to which you are connected exchange information.
Redirection COM Port	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
Resolution	On Legacy OS, the Number of Rows and Columns supported redirection.
Redirect After POST	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

4.4.10 H/W Monitor

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

4.4.11 Runtime Error Logging

Runtime Error Logging	
WHEA Support	Use this item to enable or disable Windows Hardware Error Architecture.
System Error	Use this item to enable or disable System Error feature. When it is set to [Enabled], you can configure Memory Error and PCIE Error log features.
S/W Error Injection Support	When it is set to [Enabled], S/W Error Injection is supported by unlocking MSR 0x790.
Memory Error	Memory enabling and logging setup option.
Correctable Error Threshold	Correctable Error Threshold (0 - 0x7FFF) used for sparing, tagging and leaky bucket.
PCIE Corrected Error Enable	Use this item to enable or disable PCIe Correctable errors.
PCIE Corrected Error Threshold	PCIE Correctable Error Threshold (0x01-0xFF) used for sparing, tagging and leaky bucket.
PCIE Uncorrected Error Enable	Use this item to enable or disable PCIe Uncorrectable errors.
PCIE Fatal Error Enable	Use this item to enable or disable PCIe Ftal errors.

4.4.12 Intel(R) SPS

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

4.4.13 Intel(R) VMD technology

Intel(R) VMD technology	
Intel(R) VMD for Volume Management Device Technology	Use this item to enable or disable Intel(R) Volume Management Device Technology in this Stack. When [Enabled], users are allowed to configure the options below.
VMD port 1A/1C/2A/2B/2C/ 2D/3A/3B/3C/3D/ 4A/4B/4C/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 3A-3D.

4.4.14 Tls Auth Configuration

H/W Monitor	
Server CA Configuration	Press <Enter> to configure Server CA.
Client Cert Configuration	Press <Enter> to configure Client Cert.

4.5 Security

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

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




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




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```
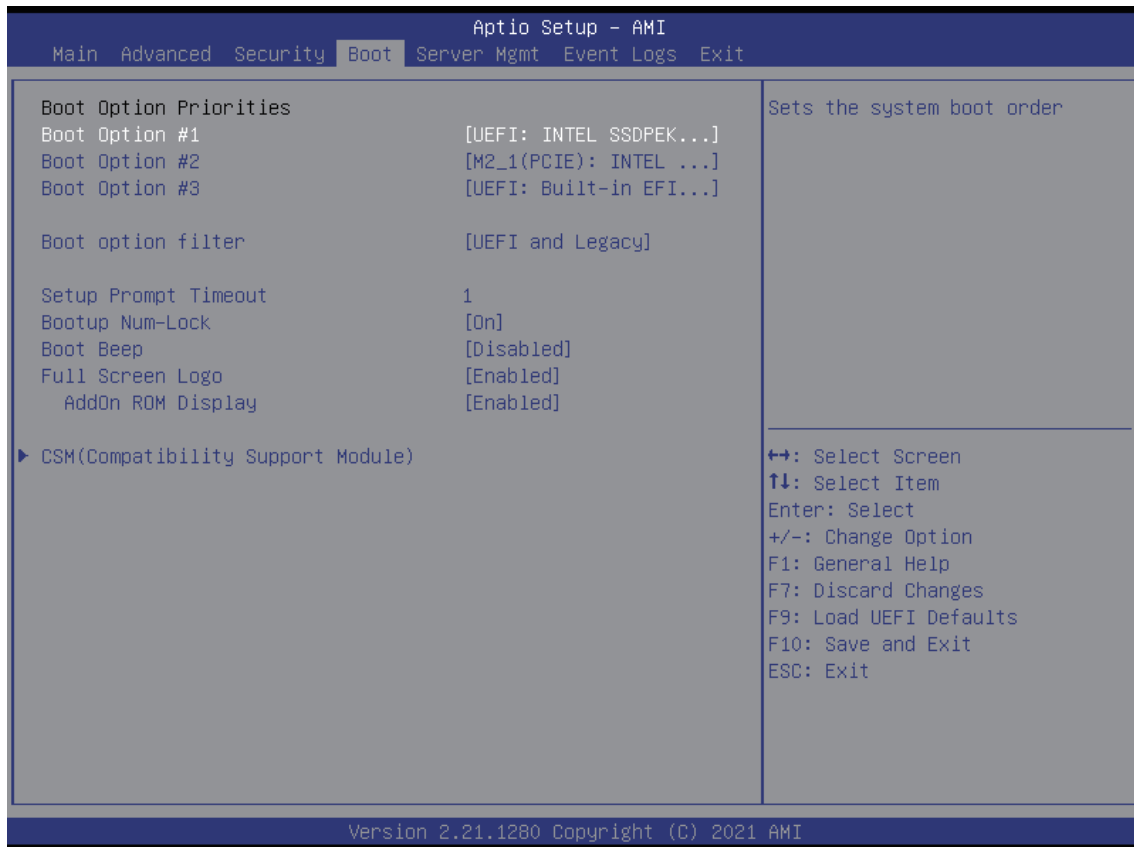
Security	
Supervisor Password	Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.
User Password	Set or change the password for the user account. Users are 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.

4.5.1 Key Management

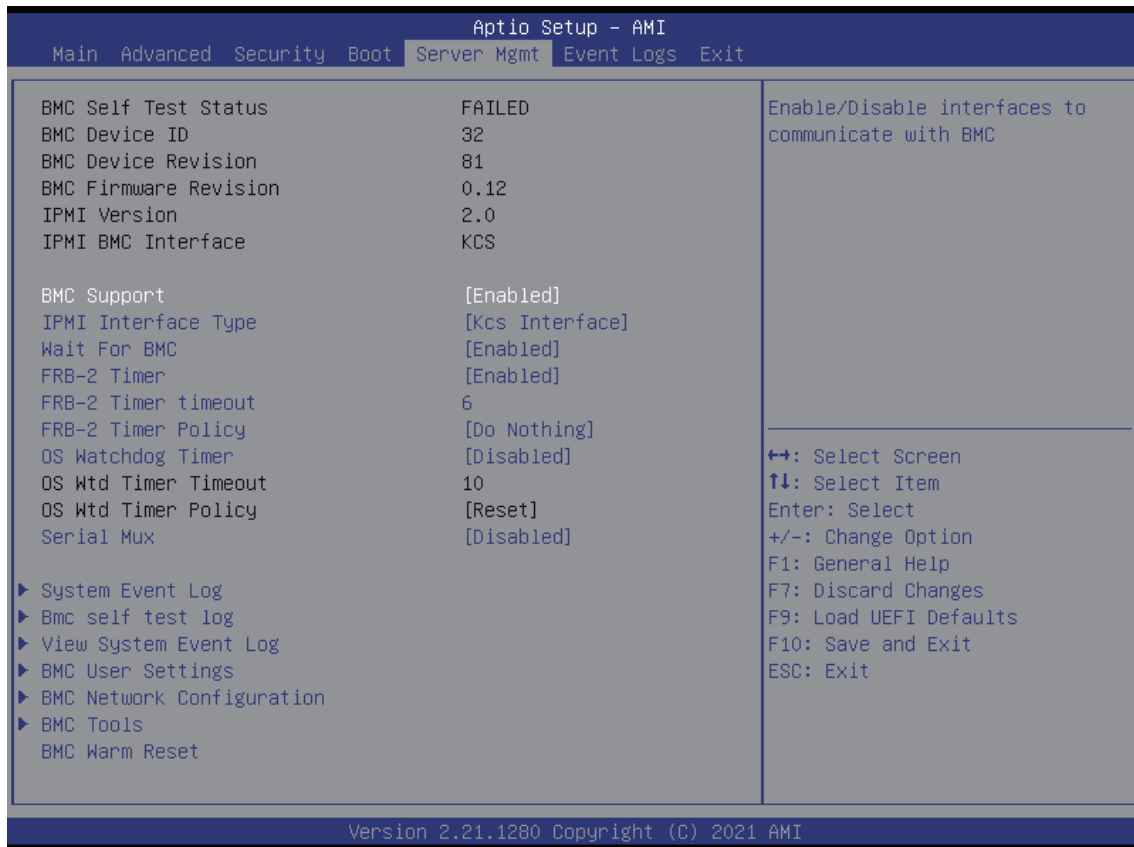| Key Management	
Factory Key Provision	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.
Install Default Secure Boot Keys	Please install default secure boot keys if it's the first time you use secure boot.
Enroll Efi Image	Allow the image to run in Secure Boot mode. Enroll SHA256 hash of the binary into Authorized Signature Database (db).
Restore DB defaults	Restore DB variable to factory defaults.

4.6 Boot

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

     Boot Option Priorities                                    Sets the system boot order
     Boot Option #1                  [UEFI: INTEL SSDPEK...]
     Boot Option #2                  [M2_1(PCIE): INTEL ...]
     Boot Option #3                  [UEFI: Built-in EFI...]

     Boot option filter              [UEFI and Legacy]

     Setup Prompt Timeout            1
     Bootup Num-Lock                 [On]
     Boot Beep                       [Disabled]
     Full Screen Logo                [Enabled]
       AddOn ROM Display             [Enabled]

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




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```

Boot	
Boot Option #1/2/3	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].
Add On ROM Display	Use this option to adjust AddOn ROM Display. If you enable the option "Full Screen Logo" but you want to see the AddOn ROM information when the system boots, please select [Enabled]. Configuration options: [Enabled] and [Disabled]. The default value is [Enabled].

4.6.1 CSM Parameters

CSM Parameters	
CSM	Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test. If you are using Windows 10 64-bit and all of your devices support UEFI, you may also disable CSM for faster boot speed.
Launch Other Storage OpROM Policy	Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.
Launch Video OpROM Policy	Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.
OCP3 Slot OpROM	Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)
PCIE1/2/3 Slot OpROM	Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)
SLIM1/2/3/4/5/6 Slot OpROM	Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)
M2_1 Slot OpROM	Use this item to select slot storage and Network Option ROM policy. In Auto option, the default is Disabled with NVMe device, but it is Legacy with other devices. (This item can't select Video Option ROM policy.)

4.7 Server Management

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

     BMC Self Test Status          FAILED         Enable/Disable interfaces to
     BMC Device ID                 32             communicate with BMC
     BMC Device Revision           81
     BMC Firmware Revision         0.12
     IPMI Version                  2.0
     IPMI BMC Interface            KCS

     BMC Support                   [Enabled]
     IPMI Interface Type           [Kcs Interface]
     Wait For BMC                  [Enabled]
     FRB-2 Timer                   [Enabled]
     FRB-2 Timer timeout           6
     FRB-2 Timer Policy            [Do Nothing]
     OS Watchdog Timer             [Disabled]      ←→: Select Screen
     OS Wtd Timer Timeout          10              ↑↓: Select Item
     OS Wtd Timer Policy           [Reset]         Enter: Select
     Serial Mux                    [Disabled]      +/-: Change Option
                                                   F1: General Help
   ▶ System Event Log                              F7: Discard Changes
   ▶ Bmc self test log                             F9: Load UEFI Defaults
   ▶ View System Event Log                         F10: Save and Exit
   ▶ BMC User Settings                             ESC: Exit
   ▶ BMC Network Configuration
   ▶ BMC Tools
     BMC Warm Reset


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Server Mgmt	
BMC Support	Enable/Disable interfaces to Communicate with BMC.
IPMI Interface Type	Type of Interface to communicate BMC from HOST.
Wait For BMC	Wait For BMC response for specified time out. BMC starts at the same time when BIOS starts during AC power ON. It takes around 90 seconds to initialize Host to BMC interfaces.
FRB-2 Timer	Enable or Disable FRB-2 timer(POST timer).
FRB-2 Timer Timeout	Enter value between 1 to 30 min for FRB-2 Timer Expiration.
FRB-2 Timer Policy	Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.
OS Watchdog Timer	If enabled, starts a BIOS timer which can only be shut off by Management Software after the OS loads. Helps determine that the OS successfully loaded or follow the OS Boost Watchdog Timer policy.
Serial Mux	Press <Enter> to enable or disable Serial Mux configuration.

4.7.1 System Event Log

System Event Log	
SEL Components	Change this to enable or disable event logging for error/progress codes during boot.
Erase SEL	Use this to choose options for earsing SEL.
When SEL is Full	Use this to choose options for reactions to a full SEL.
Log EFI Status Codes	Use this item to disable the logging of EFI Status Codes or log only error code or only progress code or both.

4.7.2 BMC Self Test Log

BMC Self Test Log	
Erase SEL	Use this to choose options for earsing SEL.
When SEL is Full	Use this to choose options for reactions to a full SEL.

4.7.3 View System Event Log

View System Event Log
Press <Enter> to view the System Event Log Records.

4.7.4 BMC User Settings

BMC User Settings	
Add User	Press <Enter> to add a user.
Delete User	Press <Enter> to delete a user.
Change User Settings	Press <Enter> to change user settings.

4.7.5 BMC Network

BMC Network	
BMC Out of Band Access	Enabled/Disabled BMC Out of band Access.
Manual Setting IPMI LAN	If [No] is selected, the IP address is assigned by DHCP. If you prefer using a static IP address, toggle to [Yes] and the changes take effect after the system reboots. The default value is [No].
Configuration Address Source	Select to configure BMC network parameters statically or dynamically(by BIOS or BMC). Configuration options: [Static] and [DHCP].
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.

4.7.6 BMC

BMC Network	
Load BMC Default Settings	Use this item to load BMC default settings.
KCS control	Select the KSC interface state after POST end. If [Enabled] is selected, the BMC will remain KCS interface after POST stage. If [Disabled] is selected, the BMC will disable KCS interface after POST stage.
BMC Warm Reset	Press <Enter> to do Warm Reset BMC.

4.8 Event Logs

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

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




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




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```
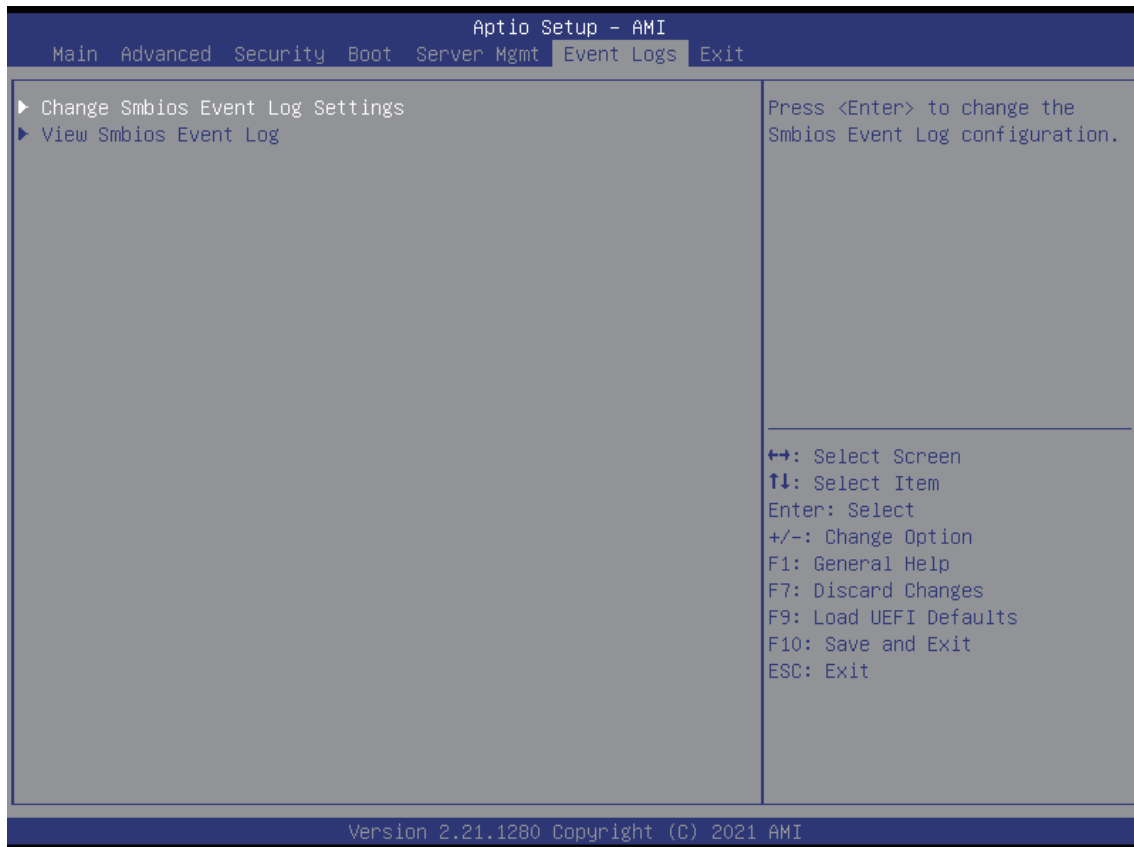
4.8.1 Change Smbios Event Log Settings

Change Smbios Event Log Settings	
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.

4.8.2 View Smbios Event Log

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

4.9 Exit

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

   Save Changes and Exit                          Exit system setup after saving
   Discard Changes and Exit                       the changes.
   Discard Changes
   Load UEFI Defaults                             F10 key can be used for this
                                                  operation.
   Boot Override

   UEFI: INTEL SSDPEKNW512G8, Partition 1
   M2_1(PCIE): INTEL SSDPEKNW512G8
   UEFI: Built-in EFI Shell

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

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```

Exit	
Save Changes and Exit	When you select this option, the following message "Save configuration changes and exit setup?" will pop-out. Press <F10> key or select [Yes] to save the changes and exit the UEFI SETUP UTILITY.
Discard Changes and Exit	When you select this option, the following message "Discard changes and exit setup?" will pop-out. Press <ESC> key or select [Yes] to exit the UEFI SETUP UTILITY without saving any changes.
Discard Changes	When you select this option, the following message "Discard changes?" will pop-out. Press <F7> key or select [Yes] to discard all changes.
Load UEFI Defaults	Load UEFI default values for all the setup questions. F9 key can be used for this operation.

Chapter 5. BMC Configuration Settings

5.1 Login Information

Initial access prompts you to enter the User Name and Password. A sample screenshot of the login screen is given below.

The fields are explained as follows:

Username: Enter your username in this field.

Password: Enter your password in this field.

Remember Username: Check this option to remember your login Username. If you select this option, the browser will save your credentials internally in its memory, and when you open that site the next time, it will auto-fill Username for you.

Sign me in: After entering the required credentials, click the Sign me in to login.

I Forgot my Password: If you forget your password, you can generate a new password using this link.

Language: Select the language of Web GUI, you can choose English, Traditional Chinese or Simplified Chinese.

> **NOTE**
> **Default username and password**
> * Username: admin
> * Password: 123456789
>
> **Password Change**
> When the BMC is updated, the default username and password will be changed to
> * Username: admin
> * Password: password
>
> Enter to change the user's password.
>
> **Chassis ID**
> Before updating the BMC, enter the command below to login with the correct version.
>
> ```
> ipmitool -I lanplus -H <ip> -U <user> -P <password>raw 0x3a 0xaa 0x53 0x42 0x32 0x30 0x32 0x2d 0x41 0x36
> ```

5.2 Web GUI

5.2.1 Menu Bar

The menu bar displays the following.
Firmware Information will be displayed with the latest version, date and time details.

- Dashboard
- Sensor
- System Information
- Logs & Reports
- Settings
- Remote Control
- Image Redirection
- Power Control
- Miscellaneous
- Maintenance
- Sign out
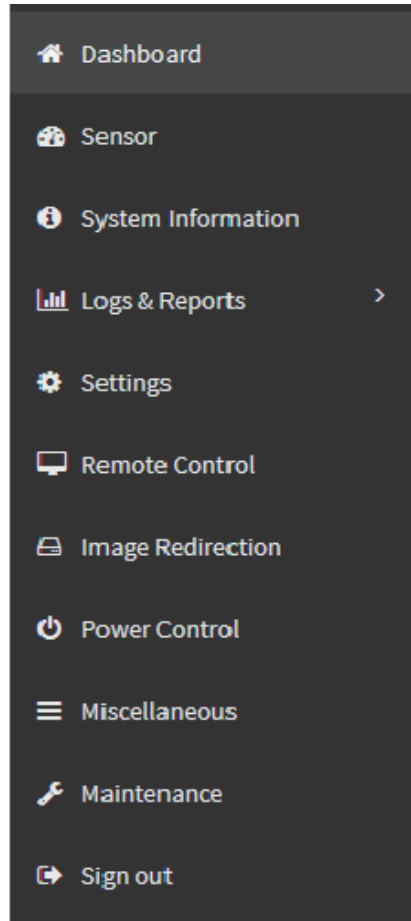
📝 **NOTE**
For further details about the BMC, please refer to SB202-A6 BMC Manual for reference.
AIC® website link: https://www.aicipc.com/en/productdetail/51328.

5.2.2 Dashboard

The Dashboard page gives the overall information about the status of a device.

To open the Dashboard page, click Dashboard from the menu bar. A sample screenshot of the Dashboard page is shown below.
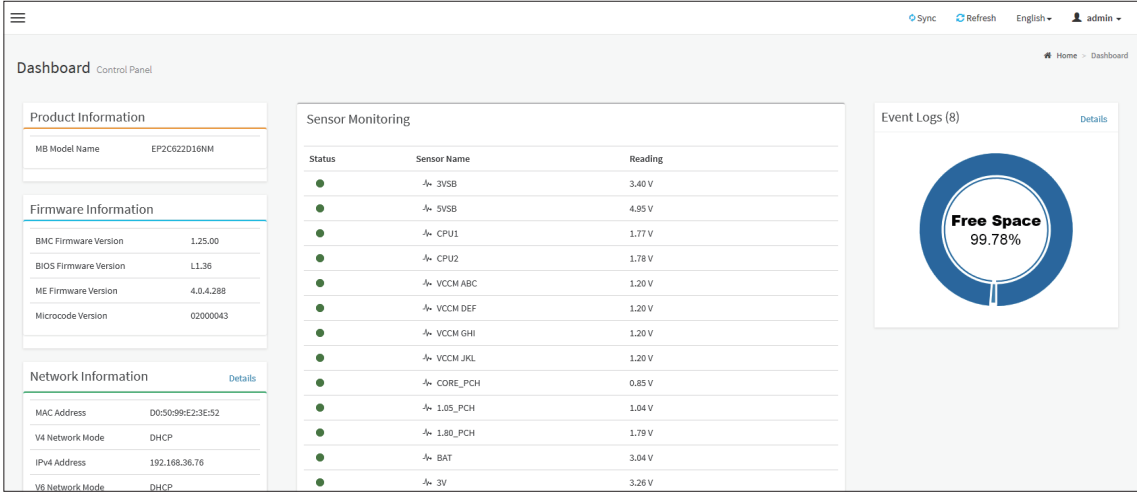
A brief description of the Dashboard page is given below.

- Firmware Information
- Network Information
- Sensor Monitoring
- Event Logs

5.2.3 Sensor

The Sensor Reading page displays all the sensor related information.

To open the Sensor Reading page, click Sensor from the menu. Click on any sensor to show more information about that particular sensor, including thresholds and a graphical representation of all associated events. A screenshot of Sensor Reading page is given below.
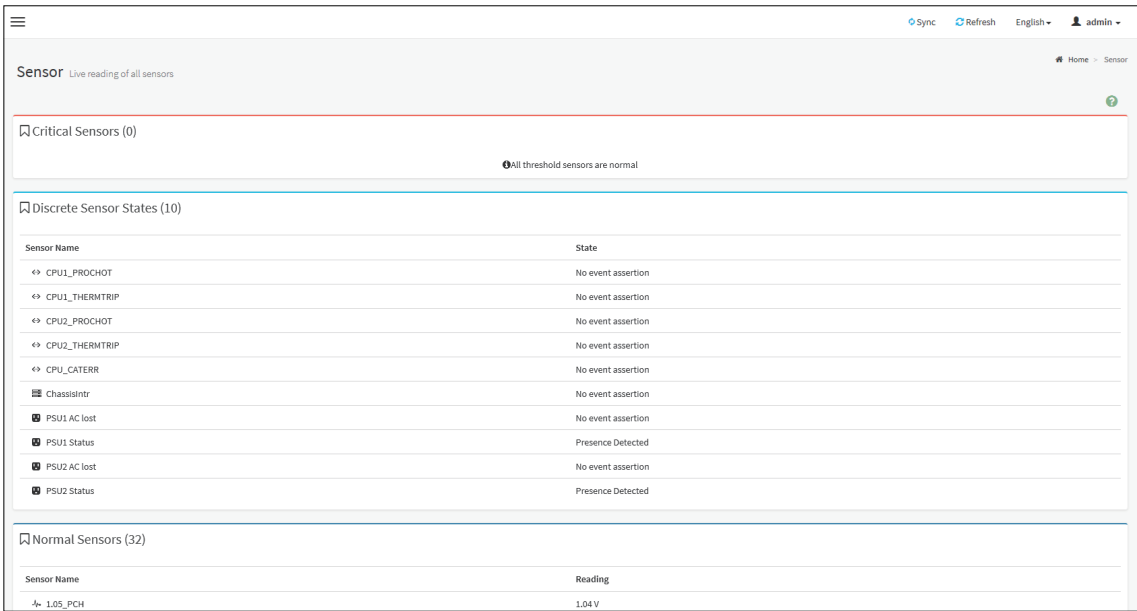
5.2.4 System Information

This group of pages allows you to views system information.
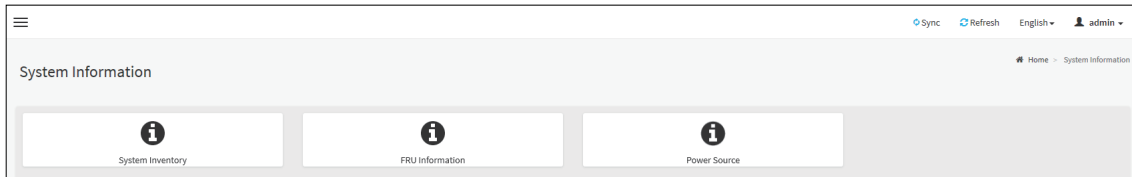
A brief description of the system Information page is given below.

- System Inventory
- FRU Information
- Power Source

5.2.5 Logs & Reports

IPMI Event Log

This page displays the list of event logs occurred by the different sensors on this device. Double click on a record to see the details of that entry. You can use the sensor type or sensor name filter options to view those specific events or you can also sort the list of entries by clicking on any of the column headers.

Video Log

This page displays the list of video logs occurred by the different events on this device.
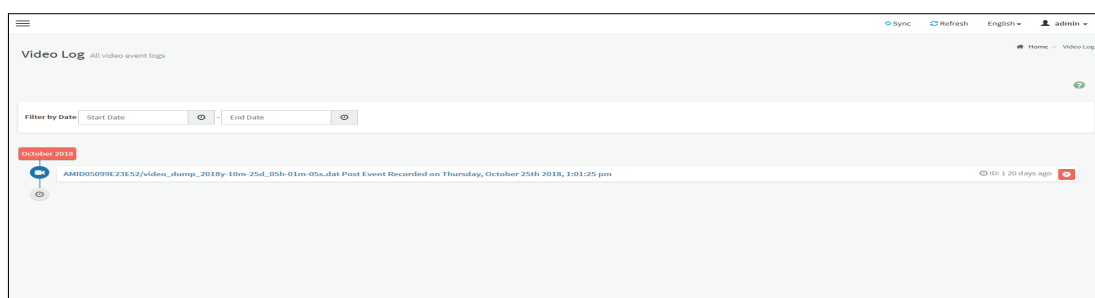
Filter By Date: Filtering can be done by selecting Start Date and End Date.

5.2.6 Settings

This group of pages allows you to access various configuration settings. A screenshot of Configuration Group menu is shown below.
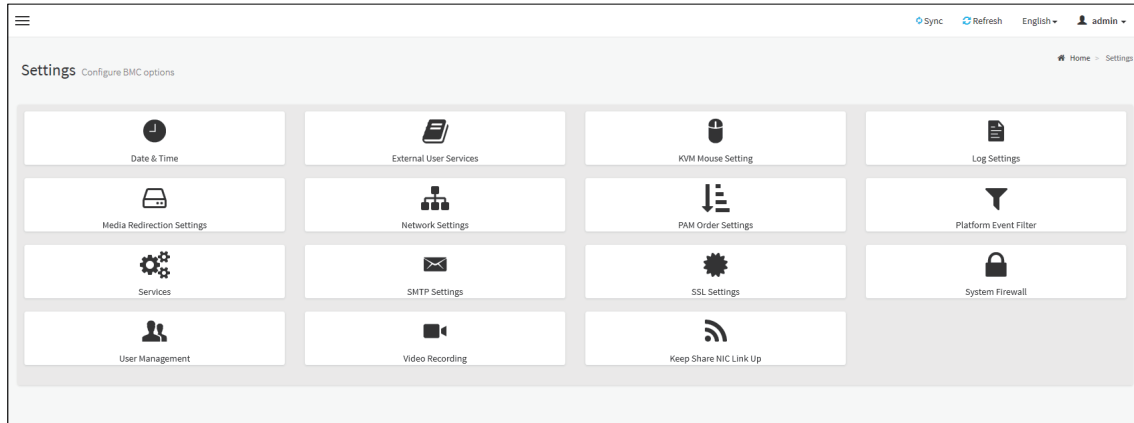
- Data & Time
- External User services
- KVM Mouse Settings
- Log Settings
- Media Redirection
- Network Settings
- PAM Order Settings
- Platform Event Filter
- Services
- SMTP Settings
- SSL Settings
- System Firewall
- User Management
- Video Recording
- Keep Share NIC Link Up

5.2.7 Remote Control

This page is used to launch the remote console redirection.

Launch KVM: Click the button to open remote control KVM page.
Launch Java KVM: Click the button to open Java KVM application.

5.2.8 Image Redirection

This page is used to configure the images into BMC for redirection.

Remote Media
This page is used to configure the remote images into BMC for redirection.

Media Type: Displays type of Media such as CD/DVD, Floppy and Hard-disk.
Media Instance: Displays total media instance count.
Image Name: Displays the default recovery image name on the server.
Status: Displays the status of the media.
Session Index: Displays Media Server Session Index.
Start/Stop Redirection: To start or stop media redirection.
Pause: To pause the media redirection.
Refresh Image List: To get latest Image lists from the Remote Storage.

> **NOTE**
> To configure the image, you need to enable Remote Media support first.

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5.2.9 Power Control

This page is used to view and control the power of the server.
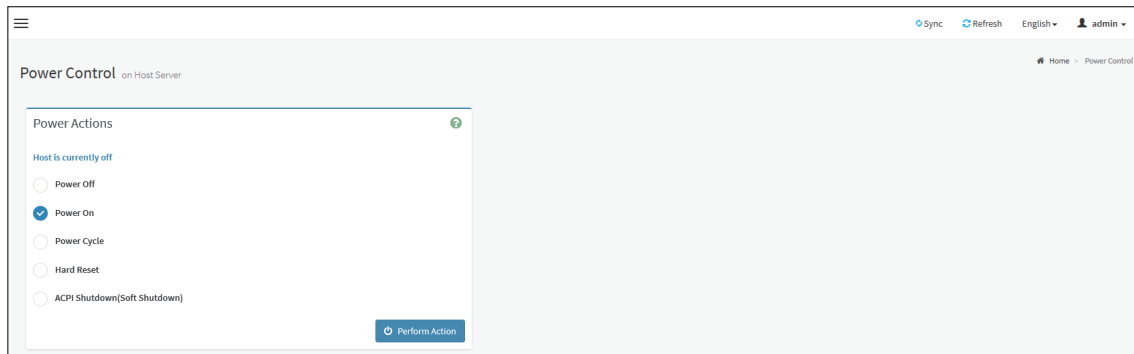
5.2.10 Miscellaneous

This page is used to configure miscellaneous settings.
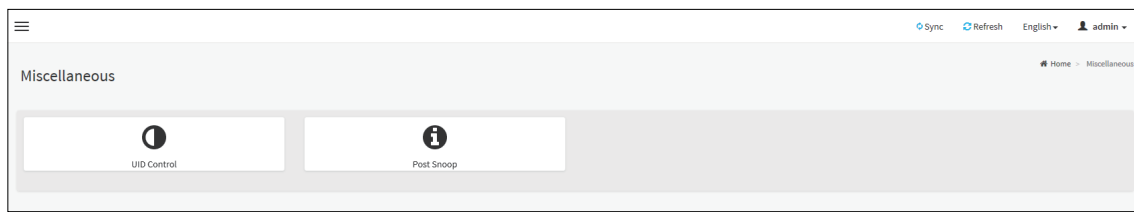
- UID Control
- Post Snoop

5.2.11 Maintenance

This page is used to do maintenance tasks on the device.
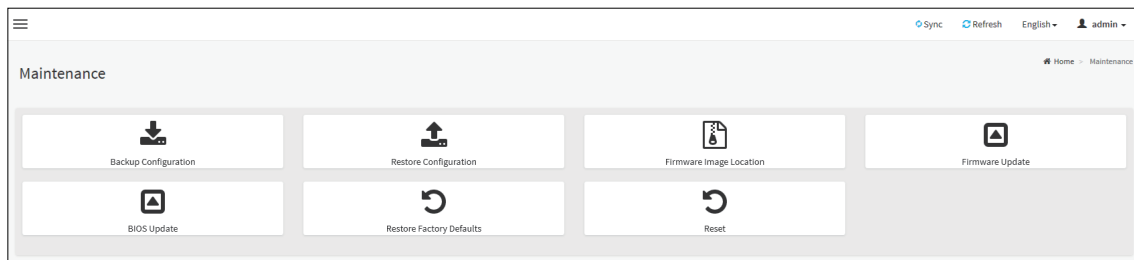
- Backup Configuration
- Restore Configuration
- Firmware Image Location
- Firmware Update
- BIOS Update
- Restore Factory Defaults
- Reset
- Sign Out

5.2.11.1 Firmware Update

This page is used to update BMC firmware.
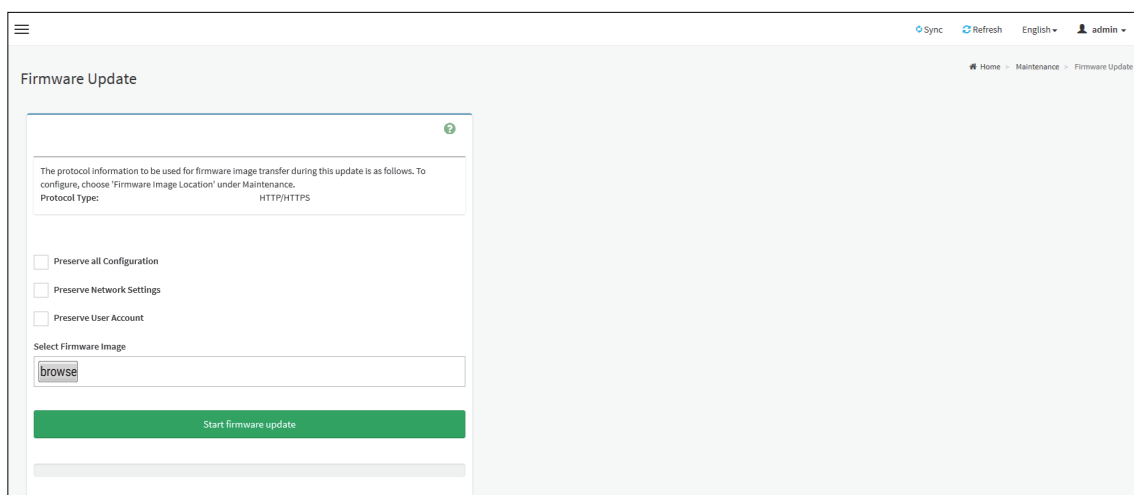
Preserve all Configuration: To preserve all configuration.
Preserve Network Settings: To preserve network settings.
Preserve User Account: To preserve user accounts.
Select Firmware Image: To Select the firmware image to be uploaded.
Start Firmware Update: To Start the firmware update.

- **Steps to update BMC firmware via IPMI webUI**

(Supports server motherboard built with BMC AST2500 controller)

BMC Firmware Update

[Maintenance] -> [Firmware Update]
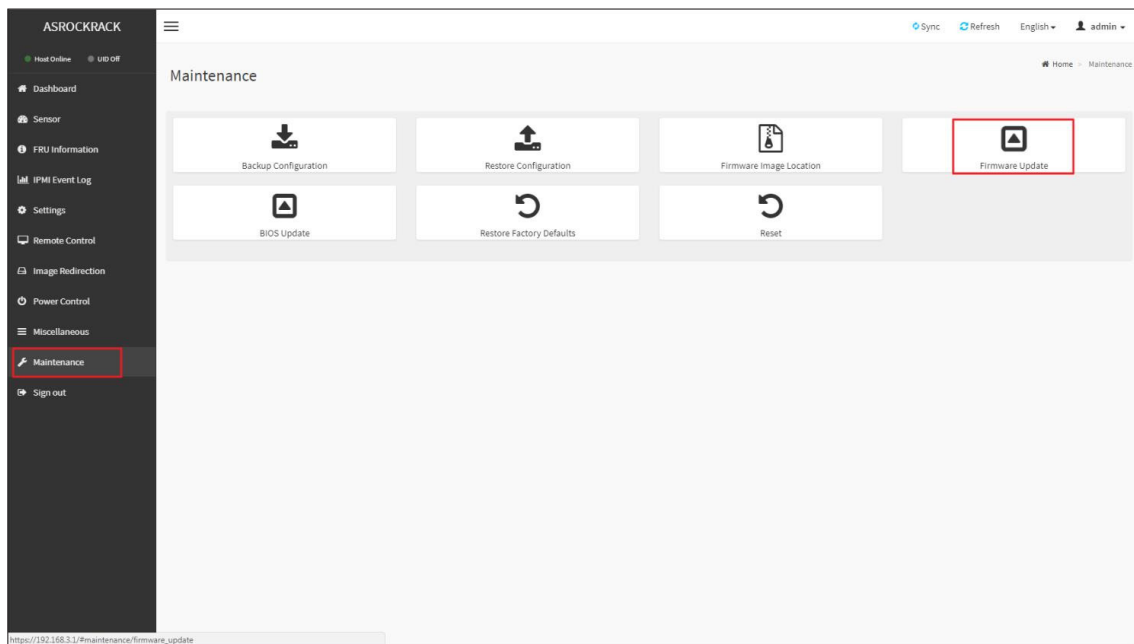
This wizard will takes you through the process of firmware upgrades.
Click the "Choose File" to select the BMC FW file. Then click "Start firmware update" for the upgrade process.
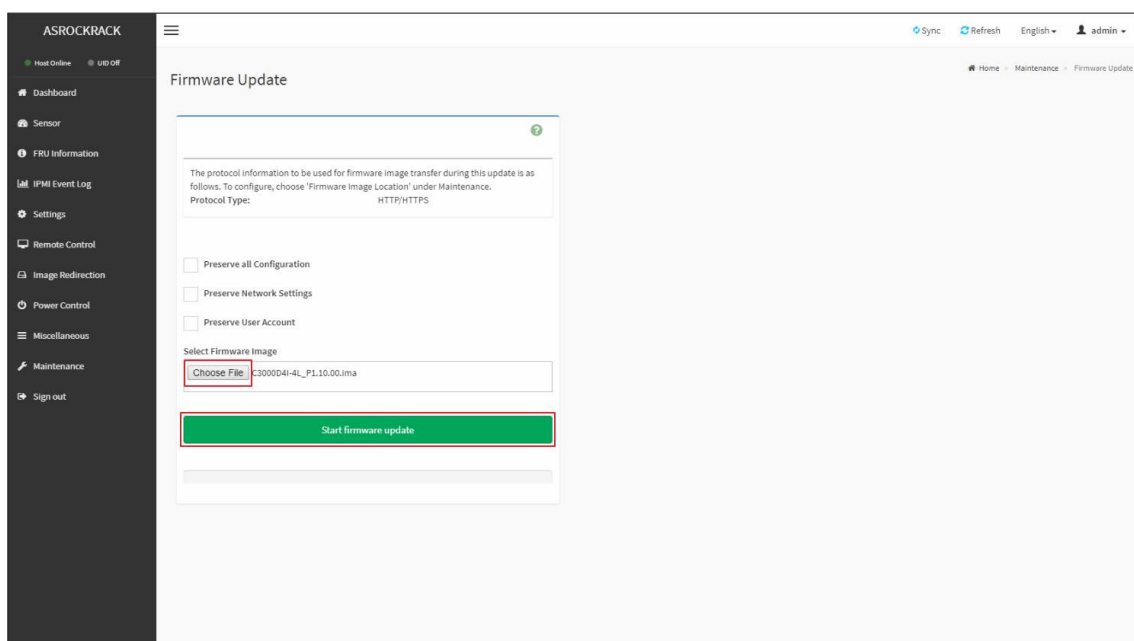
FW verification processing, please wait a few second.
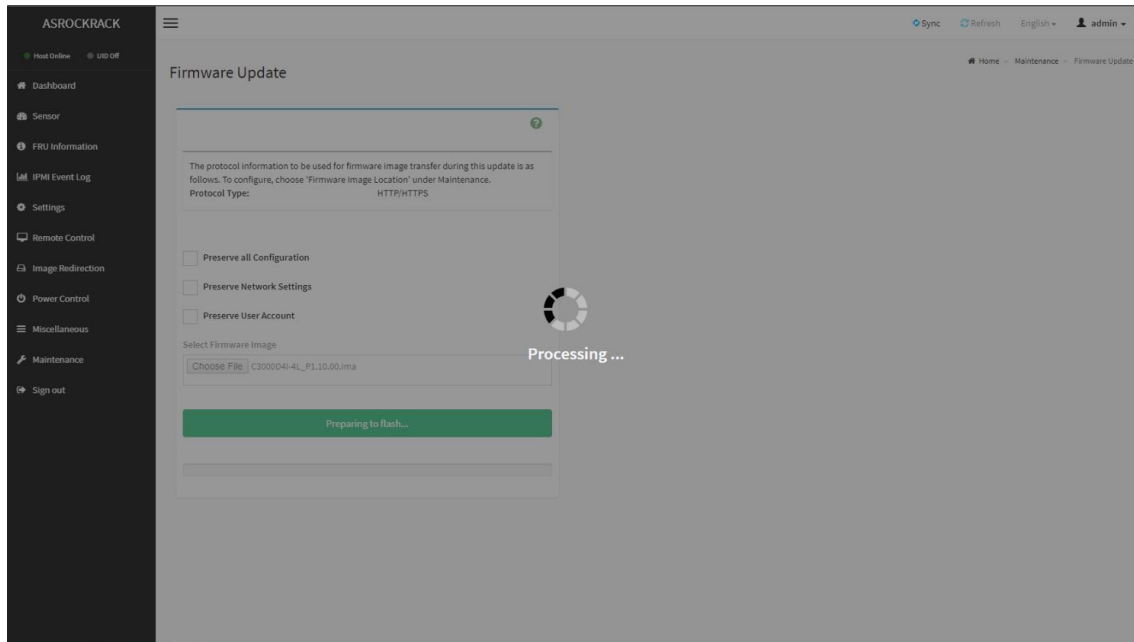
Click "Proceed" to continue the BMC FW upgrade process.
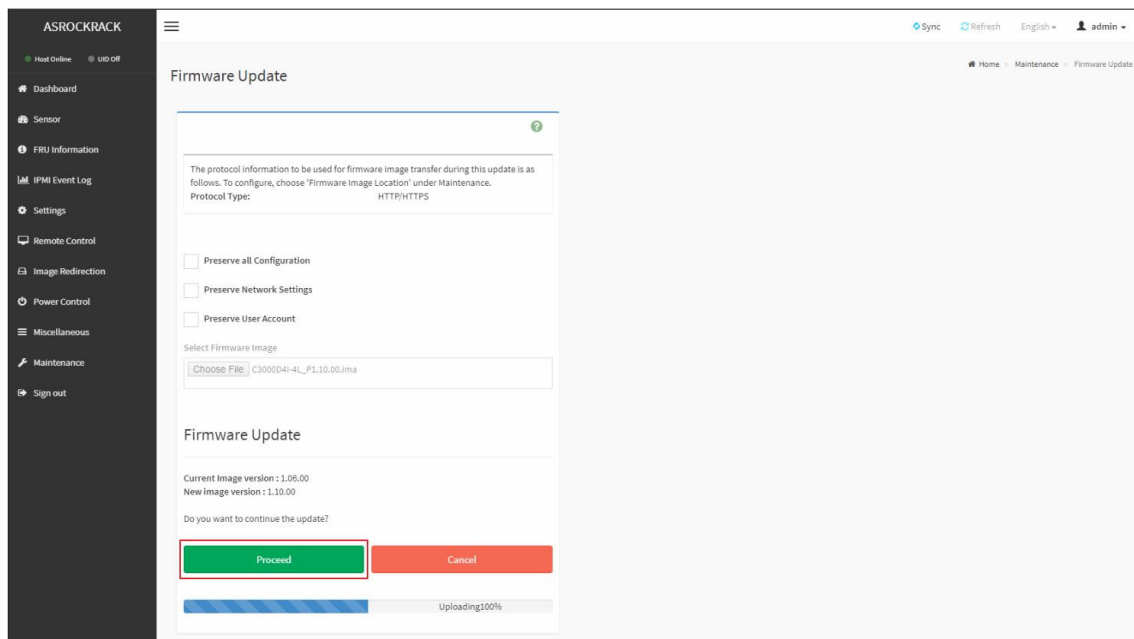
Click "OK" to start the actual BMC FW upgrade operation.
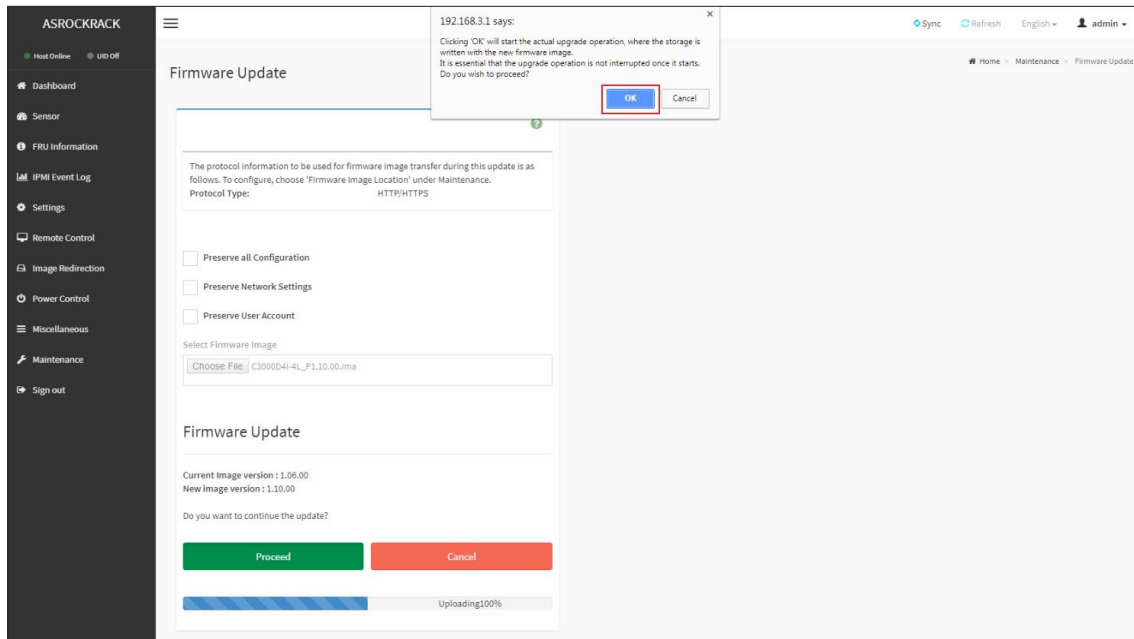
FW upgrade is processing, please wait a few second.
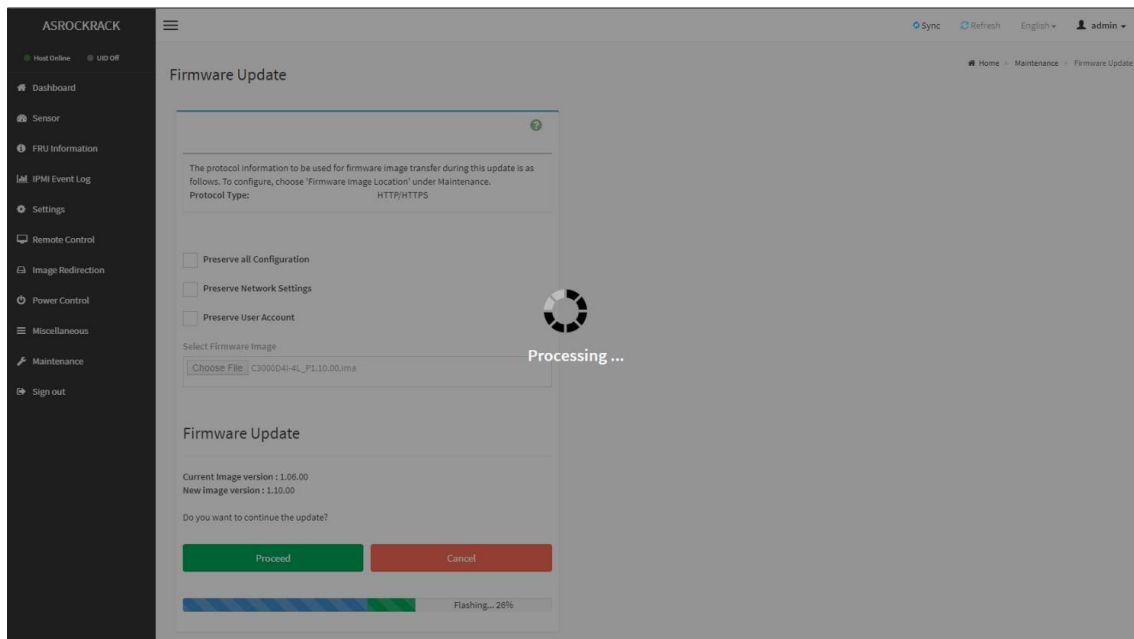
BMC FW upgrade process finished. Click "OK" and reboot the system.
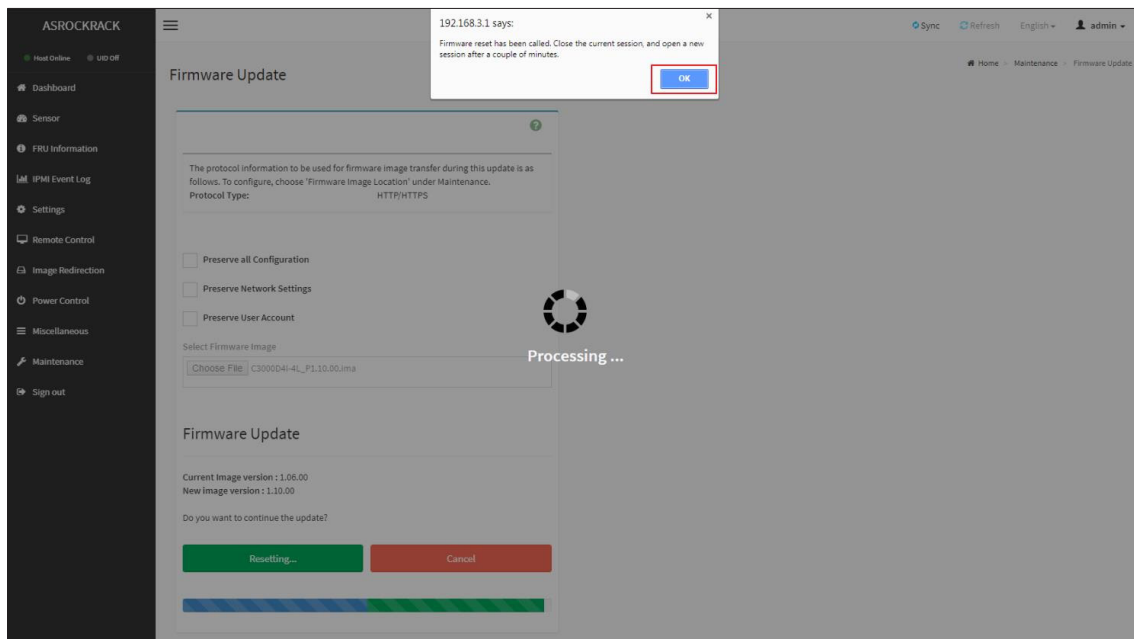
> **NOTE**
> Clear the browser cookies after the BMC FW upgrade process finished.

5.2.11.2 BIOS Firmware Update

This page is used to update BIOS firmware.

Preserve BIOS configuration: To preserve BIOS configuration.

Immediately shutdown server to flash BIOS: To shutdown server immediately to flash BIOS.

Start Firmware Update: To Start the BIOS update.

- **Steps to update BIOS firmware via IPMI webUI**

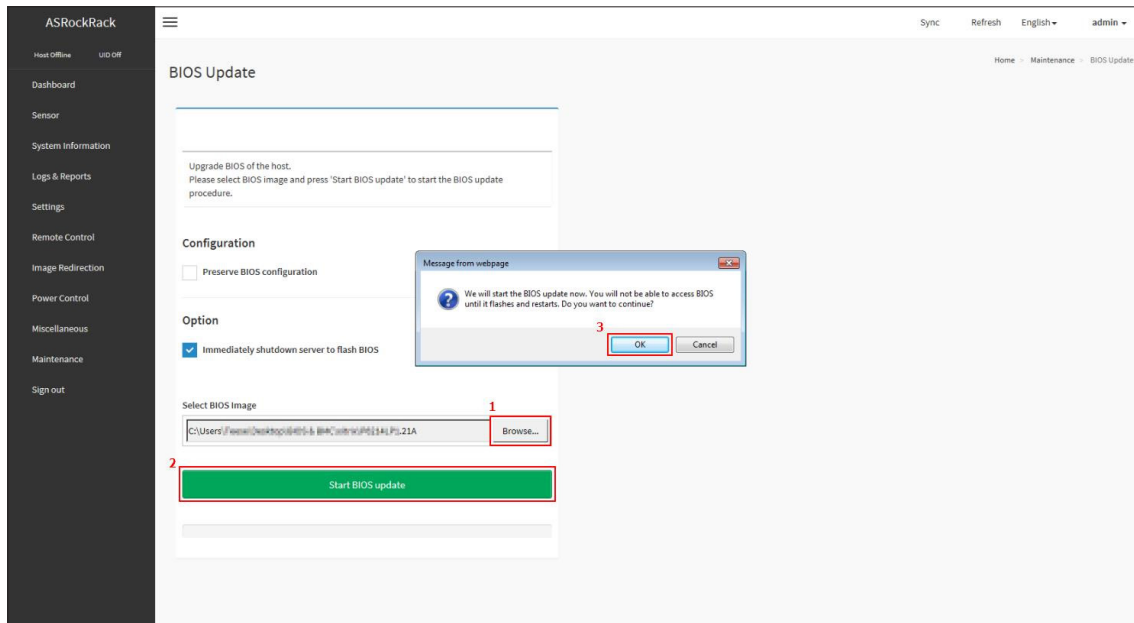(Supports server motherboard built with BMC AST2500 controller)

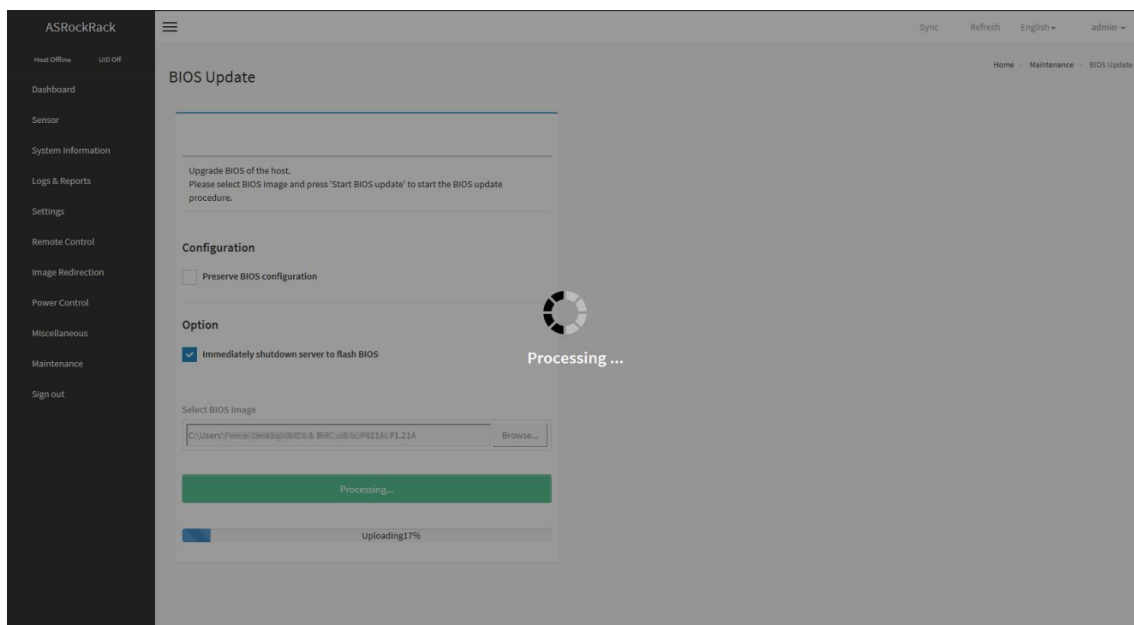**BIOS Firmware Update**

[Maintenance] -> [BIOS Update]
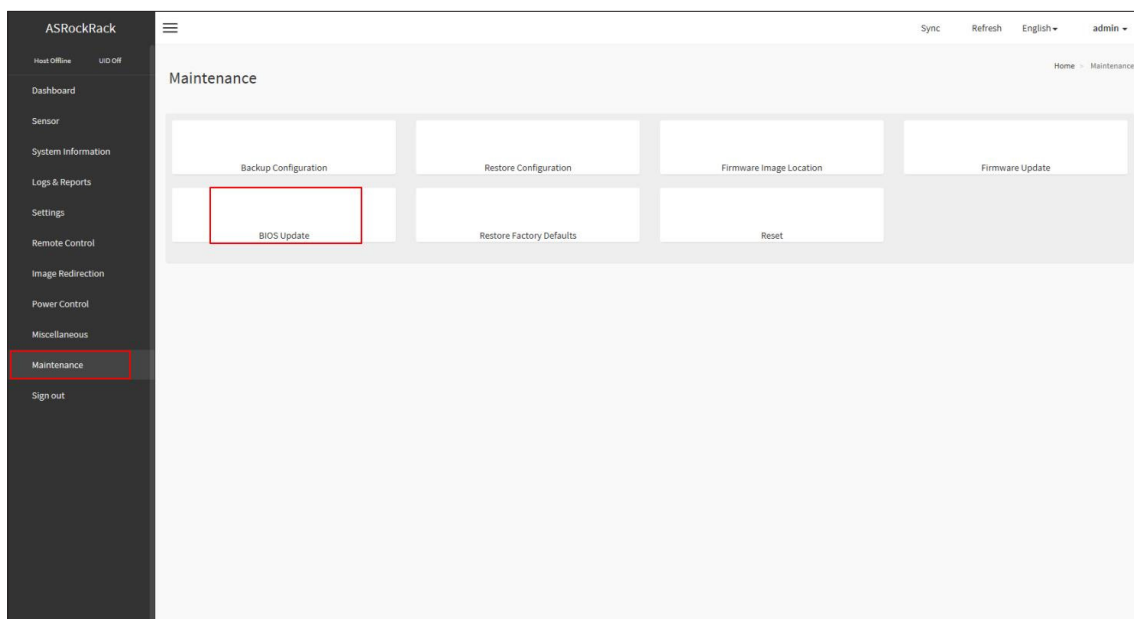
This wizard will takes you through the process of firmware upgrades.

Click the "Browse..." to select the BIOS FW file. Then click "Start BIOS update" for the upgrade process. And click "OK" if confirmed to continue the process.

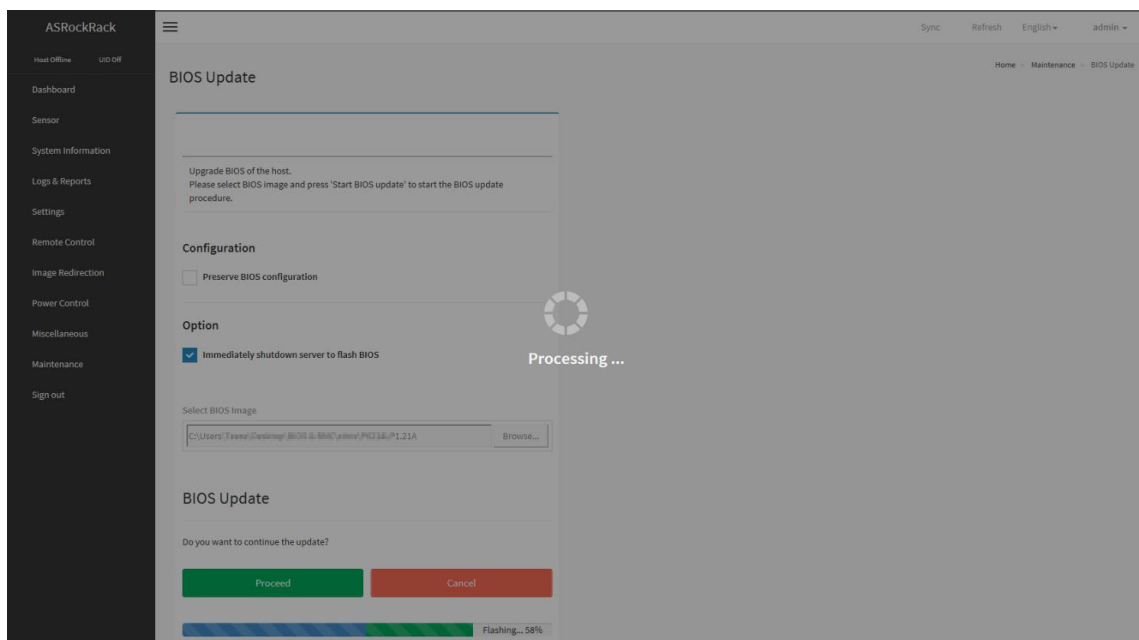
FW verification processing, please wait a few second.

Click "Proceed" to continue the BIOS FW upgrade process. Then click "OK" to start the actual BIOS FW upgrade operation.
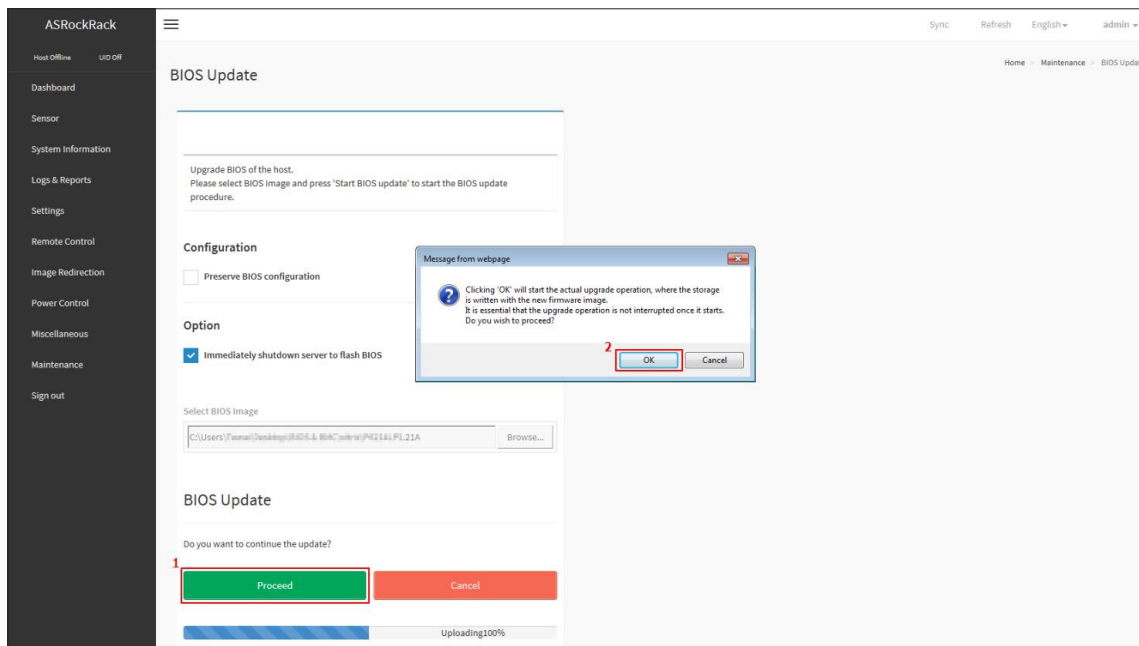
FW upgrade is processing, please wait a few second.

BIOS FW upgrade process finished. Click "OK" to reload the webpage.

> **NOTE**
> Clear the browser cookies after the BIOS FW upgrade process finished.

Chapter 6. Technical Support

AIC®

www.aicipc.com

Taiwan, Global Headquarters
Address: No. 152, Section 4,
Linghang N. Rd, Dayuan District,
Taoyuan City 337, Taiwan
Tel: +886-3-433-9188
Fax: +886-3-287-1818
Sales Email: sales@aicipc.com.tw
Support Email: support@aicipc.com

Shanghai, China
Address: Room 215, Building 4, No.471
Guiping Road, Xuhui District,
Shanghai City, 200233 China
Tel: +86-21-54961421
Sales Email: sales@aicipc.com.cn
Support Email: support@aicipc.com

Moscow, Russia
Address: No.500, 5th Floor, 5th Entrance,
32A, Khoroshevskoye Shosse, Moscow,
123007
Tel: +7-4997019998
Sales Email: support-ru@aicipc.com.tw
Support Email: rma.russia@aicipc.com.tw

North California, United States
Address: 48531 Warm Springs
Boulvard Suite 404 Fremont, CA
94539, United States
Tel: +1-510-573-6730
Sales Email: sales@aicipc.com
Support Email: support@aicipc.com

South California, United States
Address: 21808 Garcia Lane
City of Industry, CA 91789,
United States
Toll free: + 1-866-800-0056
Tel: +1-909-895-8989
Fax: + 1-909-895-8999
Sales Email: sales@aicipc.com
Support Email: support@aicipc.com

New Jersey, United States
Address: 322 Route 46 West Suite 100
Parsippany, NJ 07054 United States
Tel: +1-973-884-8886
Fax: +1-973-884-4794
Sales Email: sales@aicipc.com
Support Email: support@aicipc.com

Houten, The Netherlands
Address: Peppelkade 58, 3992AK, Houten,
The Netherlands
Tel: +31-30-6386789
Fax: +31-30-6360638
Sales Email: sales@aicipc.nl
Support Email: support@aicipc.com

For additional technical support or questions about trouble shooting, please contact the AIC® representative nearest to you or visit our AIC® website for more information.
AIC® website: https://www.aicipc.com/en/faq.