SB403-VG

Storage Barebone
User's Manual

UM_SB403-VG_v1.7_091922

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Document Release History

Release Date	Version	Update Content
October, 2018	1	User's Manual release to public.
May, 2019	1.1	1. Specifications update 2. New Cover
July, 2019	1.2	Safety Label update
November, 2019	1.3	BP update.
December, 2019	1.4	SW update.
August 2021	1.5	HW update RAID update
September 2021	1.6	BP update.
September 2022	1.7	Section 4.9/ Section 5.2 Firmware SOP update.

Preface

Copyright

Trademarks

Changes

The material in this document is for information purposes only and is subject to change without notice.

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 harware 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 distintively 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 serverly 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 disintergration.
- Carefully and accurately mount the equipment into the rack. Uneven mechanical loading may lead to hazadous 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 Acess 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 assistence. 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 selecting and purchasing the SB403-VG.
This user's manual is provided for professional technicians to perform easy hardware setup, basic system configurations, and quick software startup. This document pellucidly presents a brief overview of the product design, device installation, and firmware settings for SB403-VG. For the latest version of this user's manual, please refer to the AIC® website: https://www.aicipc.com/en/productdetail/51003.

Chapter 1 Product Features

SB403-VG is a flexible storage server 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 server motherboard, including multifarious connectors, jumpers, and LED descriptions. These descriptions assist users to configure different settings and functions of the motherboard, as well as to 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 BMC Configuration Settings

This chapter illustrates the diverse functions of IPMI BMC, including the details on logging into the web page and assorted definitions. These descriptions are helpful in configuring various functions through Web GUI without entering the BIOS setup. For more information of BMC configurations, please refer to IPMI BMC (Aspeed2500) User's Manual for a more detailed description.

Chapter 6 RAID Configuration

This chapter provides details about how to manage and configure RAID in SATA/SAS/SSD systems through BIOS CU.

Chapter 7 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

SB403-VG is a high density storage storage server that includes a mother board, a chassis, power supply, fan, and drive 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.

1.1 Box Contents

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

- Chassis
  (includes power supply, fan & HDD tray)
- Power cord (vary per region)
- 26" Slide rail x 1 set (optional)
- Screw kit x 1

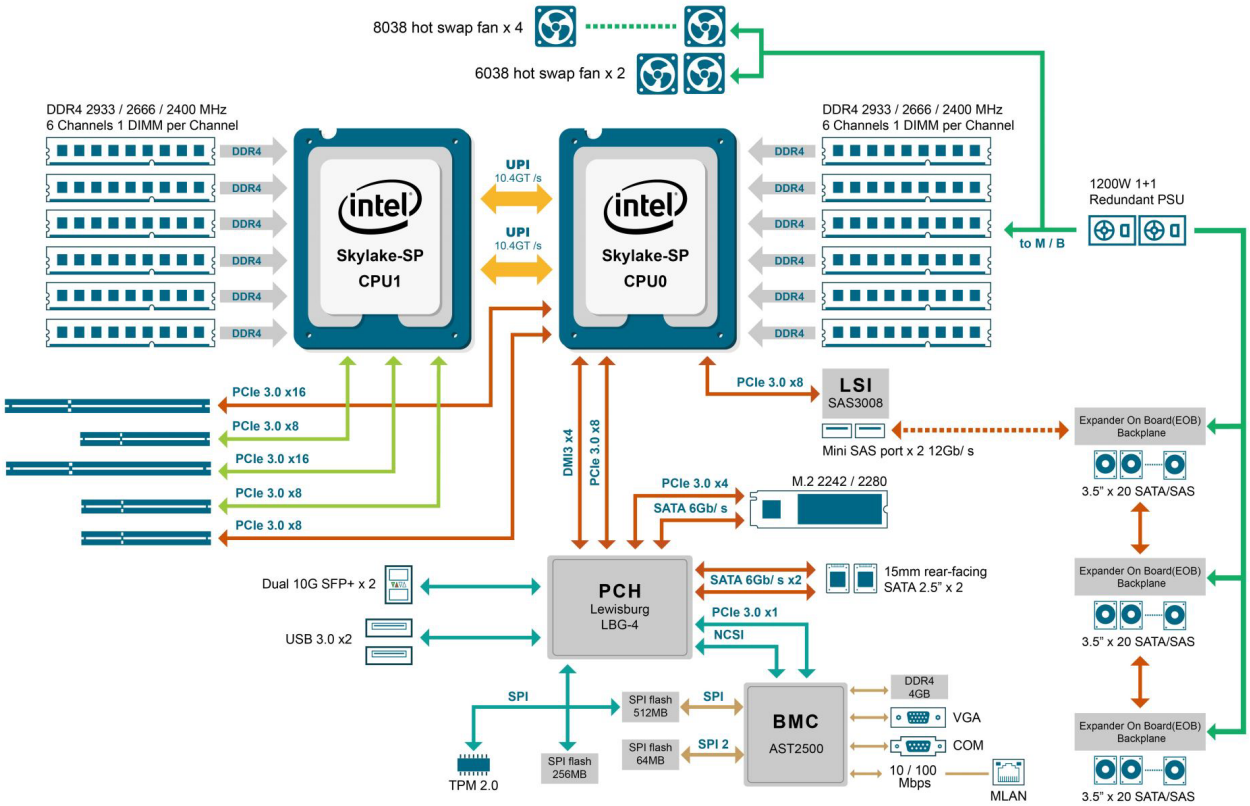
Product features are subject to change without notice.

1.2 Specifications

Dimensions (W x D x H)	mm : 435 x 953 x 175.7		
	inches : 17.1 x 37.5 x 6.9		
Motherboard	AIC Server Board Virgo		
Processor	Processor Support	• Intel® Xeon® Scalable Processors (Skylake and next gen. CPU) • Supports CPU TDP up to 140W	
	UPI Speeds	10.4 GT/s, 9.6 GT/s	
	Socket Type	Socket P0 (LGA-3647 Socket)	
Chipset Support	Intel® Lewisburg C620 series PCH		
System Memory	• 6 x memory channels per CPU, 1 x DIMM per channel • 12 x DIMM slots support: 2666/2400MHz RDIMM/LRDIMM (feature supports up to DDR4 2933MHz by next gen. process upgrade) - up to 192GB RDIMM SRx4 - up to 384GB RDIMM DRx4 - up to 1536GB RDIMM 3DS 8Rx4 - up to 768GB LRDIMM QRx4 - up to 1536GB LRDIMM 3DS 8Rx4 • Intel® NVM DIMM (Apache Pass) support by next gen. Purley Refresh CPU		
Front Panel	System power on/off, System reset, 2 x USB 3.0 Type A		
LEDs	Power status, System alert, LAN activity, Drive activity, System ID		
Drive Bays	External	3.5" hot swap	60 (Top-Loading)
		2.5" hot swap	2 (15mm, rear)
Backplane	3 x 20-port 12G SAS backplanes with 28-PHY expander		
Expansion Slots	PCIe 3.0	• 2 x16 slots (FHHL) • 3 x8 slots (FHHL)	
Rear I/O	LAN	• 2 x 10GbE SFP+ • 1 x GbE RJ45 dedicated to BMC management	
	USB	2 x USB 3.0 Type A	
	VGA	1 x external DB-15 VGA port	
	Serial Port	1 x external DB-9 COM port	
Power Supply	1600W 1+1 redundant power supply 80+ Platinum • AC INPUT : 200~240V,50/60Hz,12A • DC OUTPUT :1600W		
System Cooling	Middle : 4 x 80x38mm hot swap fans		
	Rear : 2 x 60x38mm easy swap fans		

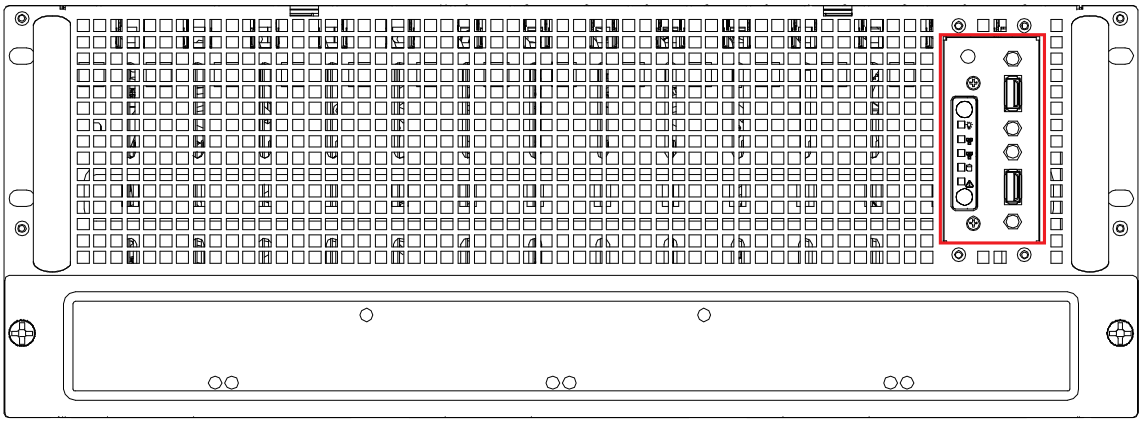
System BIOS	BIOS Type	Insyde UEFI BIOS
	BIOS Features	• ACPI • PXE • WOL • AC loss recovery • IPMI 2.0 KCS interface • SMBIOS • Serial console redirection • BIOS Boot Specification • BIOS Recovery Mode • SRIOV • iSCSI • TPM • PCIe Hotplug
On-board Devices	SATA/SAS	Intel® Lewisburg PCH on-chip solution • 8 x SATA 6.0 Gb/s (by 2 x mini-SAS) + 2 x SATA 6.0 Gb/s (by 2 x SATA 7 pin) Broadcom SAS IOC SAS3008 supports up to 8 ports 12G SAS via 2 x SFF-8643 mini-SAS HD (optional)
	BMC	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
	Network Controllers	• Intel® PCH (Lewisburg) Integrated 10GbE LAN Controller with dual 10GbE SFP+ + 2 x configurable ports support 10GbE (KR/SFI/XFI) or 1GbE (KX) (option) • Realtek RTL8201EL for BMC dedicated management port
	Graphics	Aspeed AST2500 Advanced PCIe Graphics & Remote Management Processor • PCIe VGA/2D Controller • 1920x1200@60Hz 32bpp
System Management	• Baseboard Management Controller • Intelligent Platform Interface 2.0 (IPMI 2.0) • iKVM, Media Redirection, IPMI over LAN, Serial over LAN • SMASH Support • HTML5 • Redfish	
Environmental Specifications	• Storage temperature : -10ºC(14ºF) ~ 60ºC(140ºF) • Operating temperature : 0ºC(32ºF) ~ 35ºC(95ºF) • Storage operating humidity : 5%~95% non-condensing	
Gross Weight	(w/ PSU & Rail)	kgs : 47
		lbs : 103.6
Packaging Dimensions	(W x D x H)	mm : 603 x 1191 x 404
		inches : 23.7 x 46.9 x 15.9
Mounting	Standard	37” tool-less slide rail

1.3 System Block Diagram



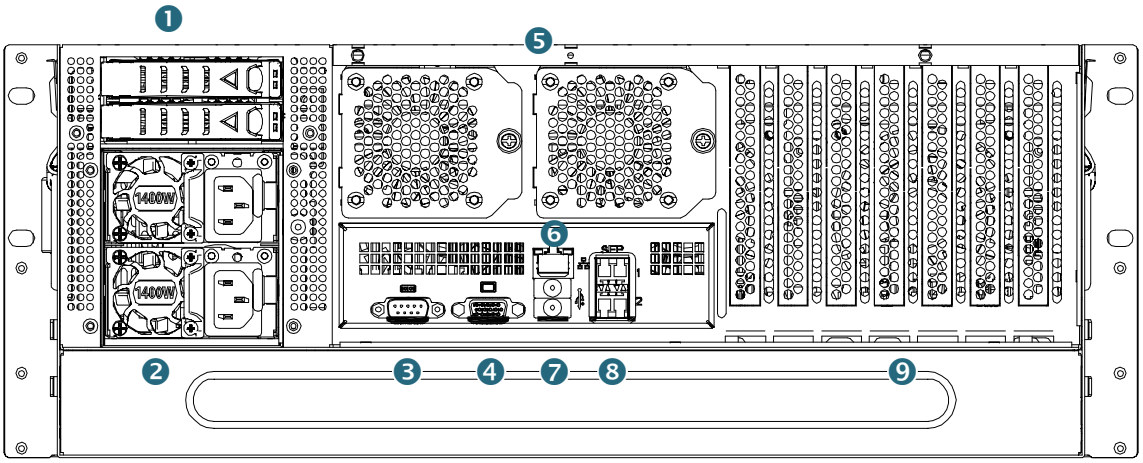
1.4 Features

Front Panel



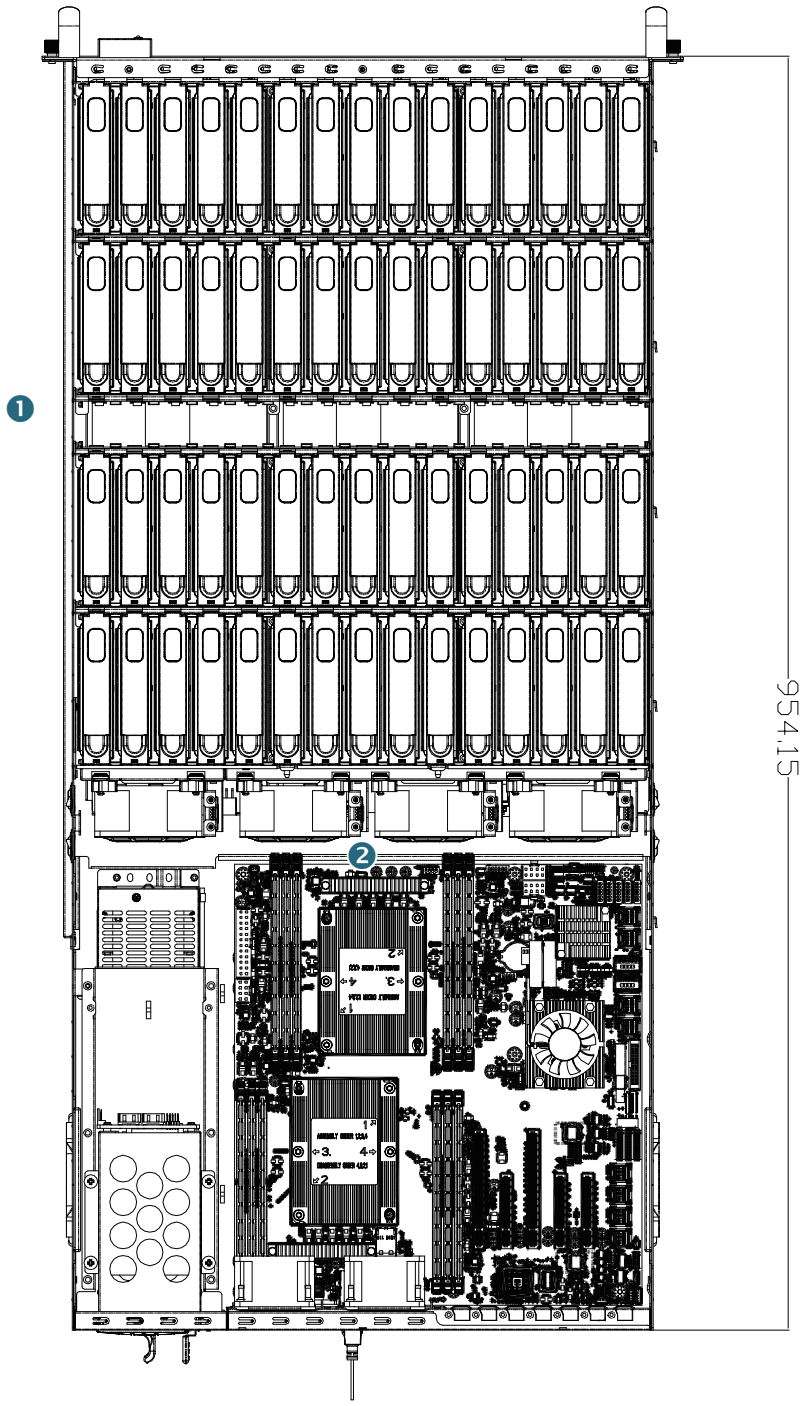
Item	Description	Item	Description
	Power Button		Drive Activity LED
	Power Status LED		System Alert LED
	LAN1&2 LED		System Reset Button
USB 3.0 Type A port *2			

Rear Panel



Item	Description
1	2 x 2.5 inch hot swap drive (15mm)
2	1600W 1+1 redundant power supply 80+ Platinum
3	1 x DB-9 COM port
4	1x DB-15 VGA port
5	2 x60x38mm easy swap fans
6	1 x GbE RJ45 dedicated to BMC management port
7	2 x USB 3.0 port
8	2 x GbE RJ45
9	PCIe 3.0 slot

Top View



Item	Description
1	60 x 3.5 inch hot swap drive
2	4 x 80x38mm hot swap fans

Chapter 2. Hardware Setup

This section describes a simple instruction guide for installing the hardware components on the serverboard system. Turn off and unplug all system and peripheral devices before proceeding.

2.1 Central Processing Unit

The serverboard supports dual Xeon scalable processors and Socket P0 (LGA-3647).

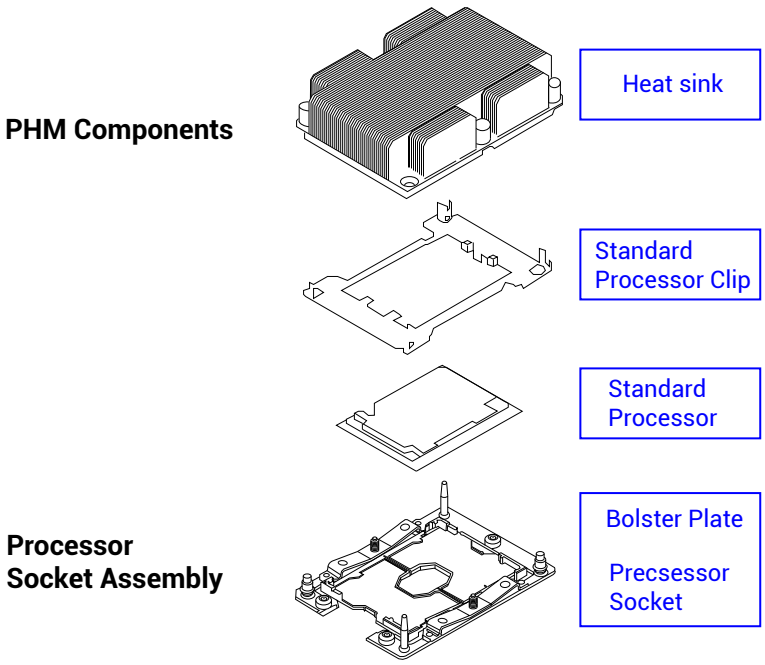
2.1.1 Processor Installation

To ensure a safe and easy setup, you need to prepare before installation:
☑ a T20 Torx screwdriver
☑ ESD wrist strap/mat and conductive foam pad

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.

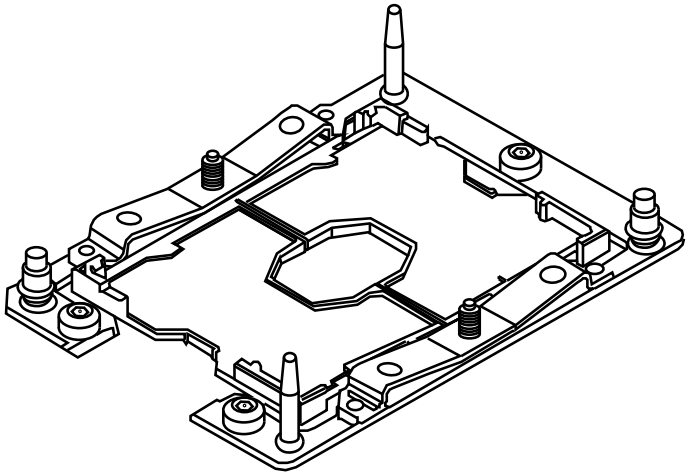
CAUTION
When unpacking a processor, hold the processor only by its edges to avoid touching the contacts.

Standard Processor Assembly:
A standard processor assembly is comprised of PHM(Processor Heat sink Module) components and processor socket assembly.



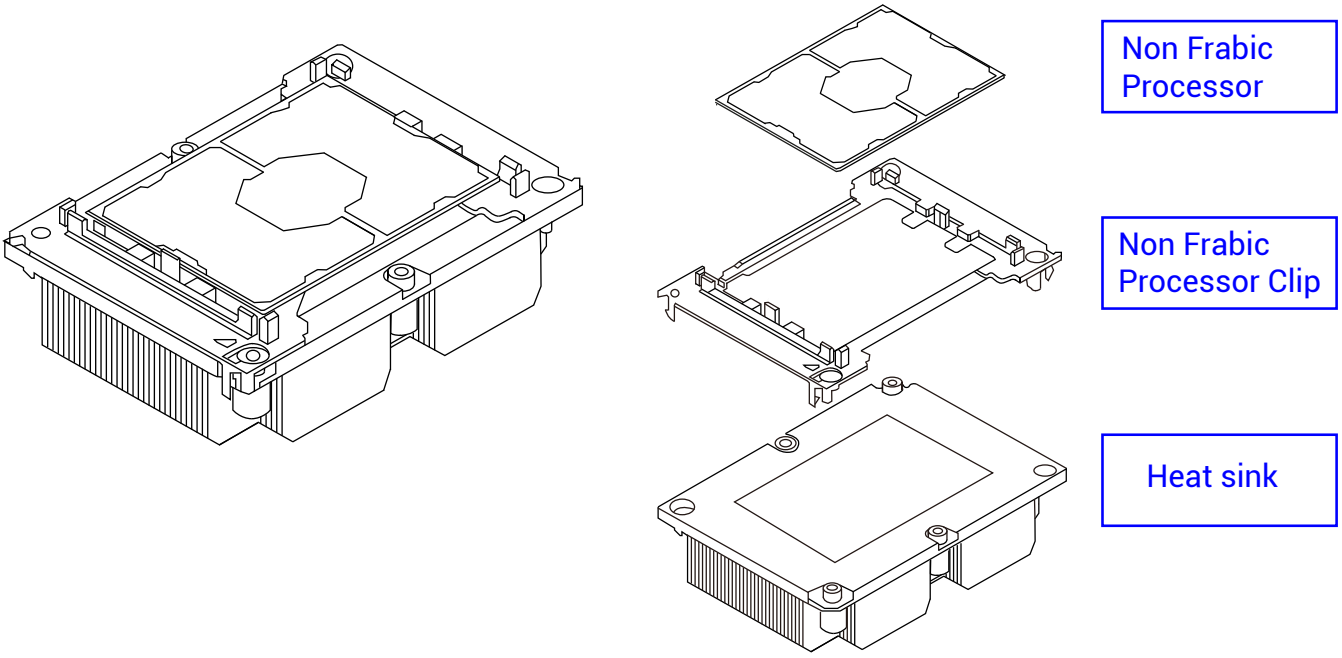
Processor Socket Assembly:

The server board includes two processor sockets (LGA-3647), supports two Intel® Xeon® Processor Scalable Family and has a Thermal Design Power (TDP) of up to 165W on selected models.



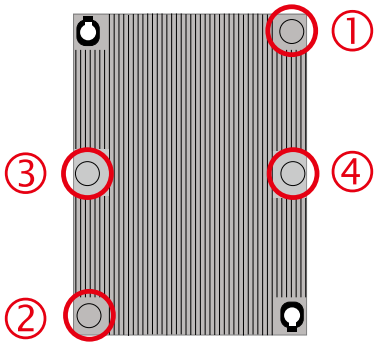
2.1.2 CPU heatsink

PHM (Processor Heat sink Module) Component:

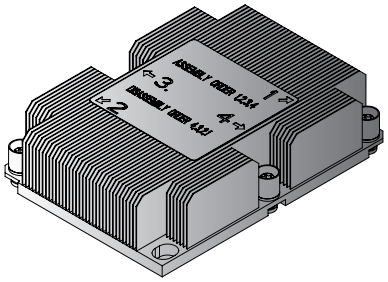


PHM Screw Installation Order:
The PHM sits level with the processor socket assembly. The PHM is NOT installed properly if it does not sit level with the processor socket assembly. Once the PHM is seated over the processor socket assembly, the four heat sink torque screws must be secured in the following order as shown below.

Processor Heat Sink – Top View with Screw Tightening Order



CAUTION
Failure to tighten the heat sink screws in the specified order may cause damage to the processor socket assembly. Heat sink screws should be tighted to 12 in-lbs torque according to the ndicated order on the top of the heat sink label.

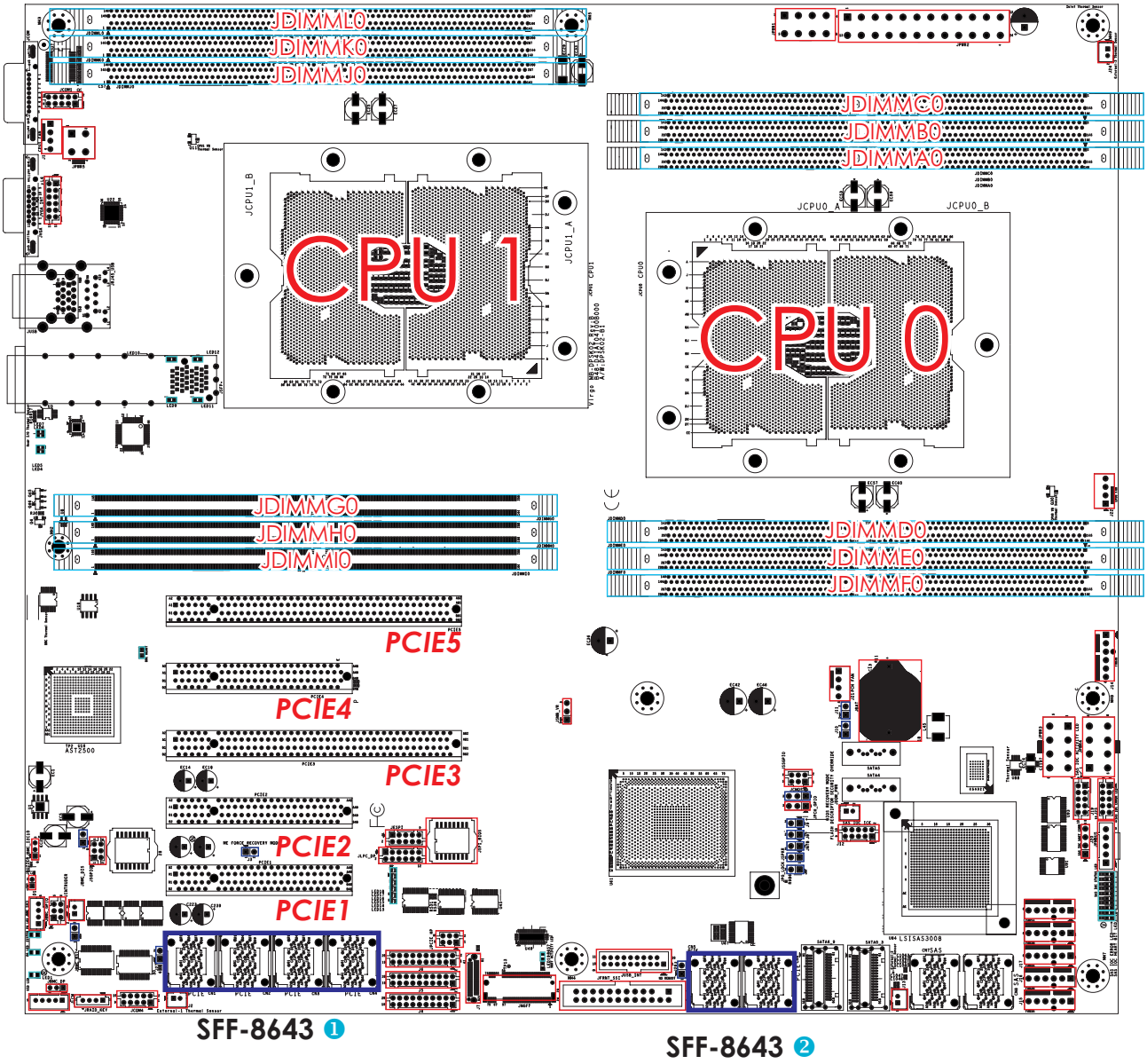


CAUTION
There may be possible thermal during physical contact with the heat sink. Avoid moving the heat sink after it has contacted the top of the CPU. Too much movement could disturb the layer of thermal compound, causing voids and leading to ineffective heat dissipation and component damage.

This information is provided for professional technicians only.

2.2 System Memory

This server board supports up to twelve DDR4 2400 and 2666 Registered ECC DRAM/ Load-Reduced DIMM.



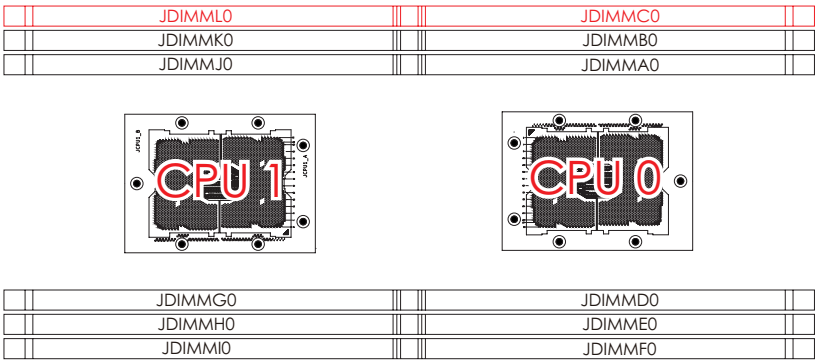
NOTE

-In Virgo case, the lanes from CPU#0 are routed to PCIe slots 1 & 5 and onboard SFF-8643.

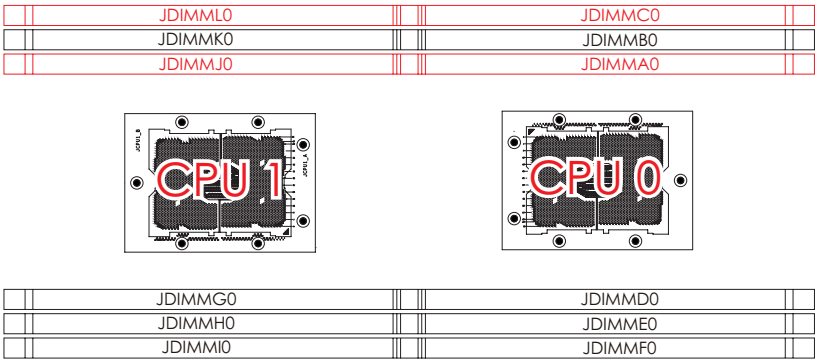
-The lanes from CPU#1 are routed to PCIe slots 2/3/4 and the onboard SFF-8643.

2.2.1 DIMM Installation Order

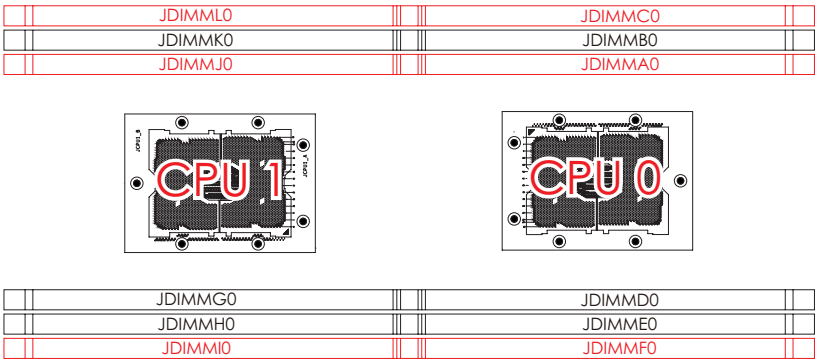
DIMM Numbers	DIMM ARRANGMENT	
	CPU1	CPU0
2 DIMMs	JDIMM_L0	JDIMM_C0



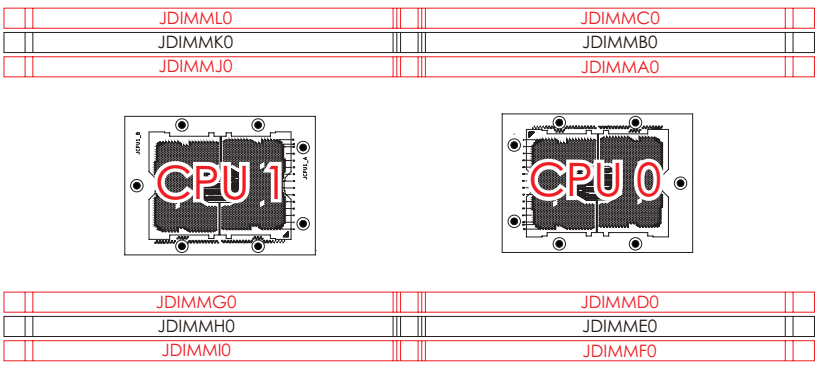
	CPU1	CPU0
4 DIMMs	JDIMM_L0	JDIMM_C0
	JDIMM_J0	JDIMM_A0



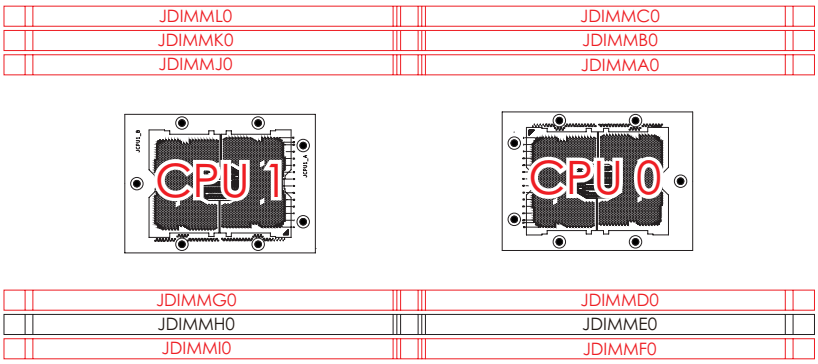
	CPU1	CPU0
6 DIMMs	JDIMM_L0	JDIMM_C0
	JDIMM_J0	JDIMM_A0
	JDIMM_I0	JDIMM_F0



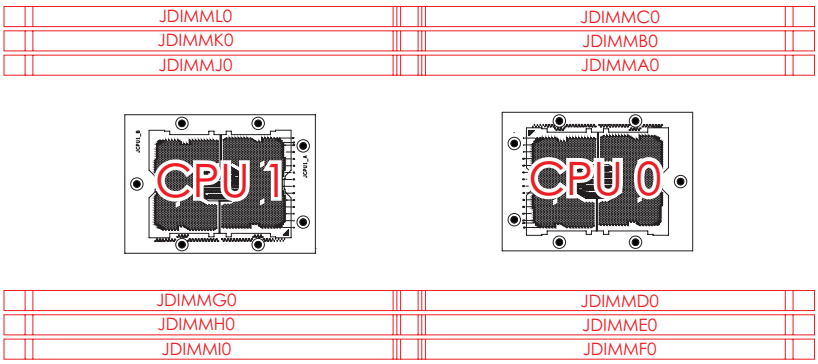
	CPU1	CPU0
8 DIMMs	JDIMM_L0	JDIMM_C0
	JDIMM_J0	JDIMM_A0
	JDIMM_G0	JDIMM_D0
	JDIMM_I0	JDIMM_F0



	CPU1	CPU0
10 DIMMs	JDIMM_L0	JDIMM_C0
	JDIMM_K0	JDIMM_B0
	JDIMM_J0	JDIMM_A0
	JDIMM_G0	JDIMM_D0
	JDIMM_I0	JDIMM_F0



	CPU1	CPU0
12 DIMMs	JDIMM_L0	JDIMM_C0
	JDIMM_K0	JDIMM_B0
	JDIMM_J0	JDIMM_A0
	JDIMM_G0	JDIMM_D0
	JDIMM_H0	JDIMM_E0
	JDIMM_I0	JDIMM_F0



2.2.2 DCPMM DIMM Population

	CPU0						CPU1					
DIMM	JDIMMF0	JDIMME0	JDIMMD0	JDIMMA0	JDIMMB0	JDIMMC0	JDIMML0	JDIMMK0	JDIMMJ0	JDIMMG0	JDIMMH0	JDIMMI0
App Direct Mode	DCPMM	DRAM1	DRAM1	DRAM1	DRAM1	DCPMM	-	-	-	-	-	-
Memory Mode	DCPMM	DRAM2	DRAM2	DRAM2	DRAM2	DCPMM	-	-	-	-	-	-
Mixed Memory Mode	DCPMM	DRAM3	DRAM3	DRAM3	DRAM3	DCPMM	-	-	-	-	-	-
App Direct Mode	DCPMM	DRAM1	DRAM1	DRAM1	DRAM1	DCPMM	DCPMM	DRAM1	DRAM1	DRAM1	DRAM1	DCPMM
Memory Mode	DCPMM	DRAM2	DRAM2	DRAM2	DRAM2	DCPMM	DCPMM	DRAM2	DRAM2	DRAM2	DRAM2	DCPMM
Mixed Memory Mode	DCPMM	DRAM3	DRAM3	DRAM3	DRAM3	DCPMM	DCPMM	DRAM3	DRAM3	DRAM3	DRAM3	DCPMM

NOTE

DIMM Type	RDIMM	3DS RDIMM	LRDIMM	3DS LRDIMM	Capacity
DRAM1	✓	✓	✓	✓	Any Capacity
DRAM2	✓	✓	✓	✓	≥32GB
DRAM3	✓	✓	✓		Any Capacity
DCPMM	Any Capacity (Uniformly for all channels for system configuration)				

NOTE

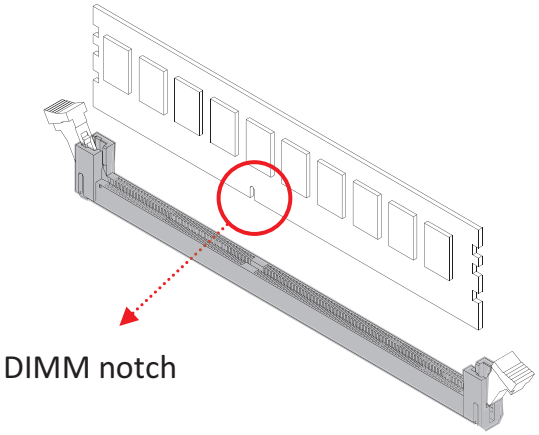
Please abide to the DCPMM population rules listed below for your system to function accordingly.

- There is only a maximun of 1 DCPMM in each channel.
- Populate DCPMM DIMM on IMC0 before IMC1.

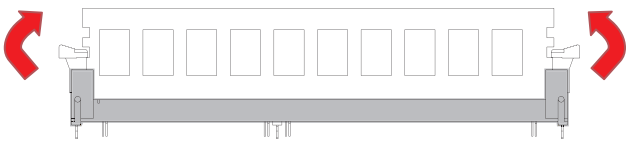
2.2.3 DIMM Installation

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.



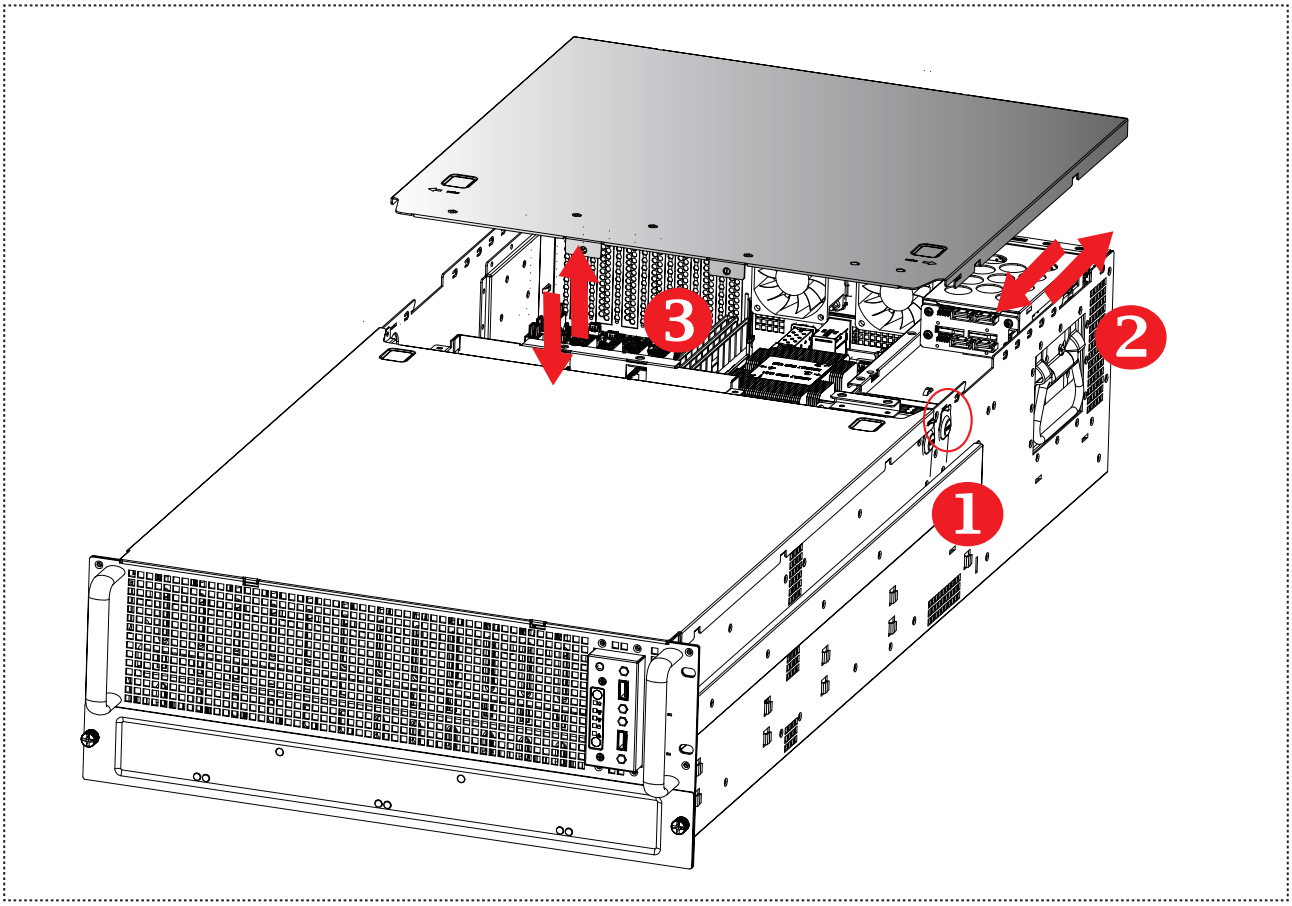
Step 3 Close the retaining clips to complete installation.



This information is provided for professional technicians only.

2.3 Top Cover

① Press the eject button on both sides of the chassis simultaneously to release the cover from the chassis.
② Push the cover towards the front panel.
③ Lift upward to remove the cover.

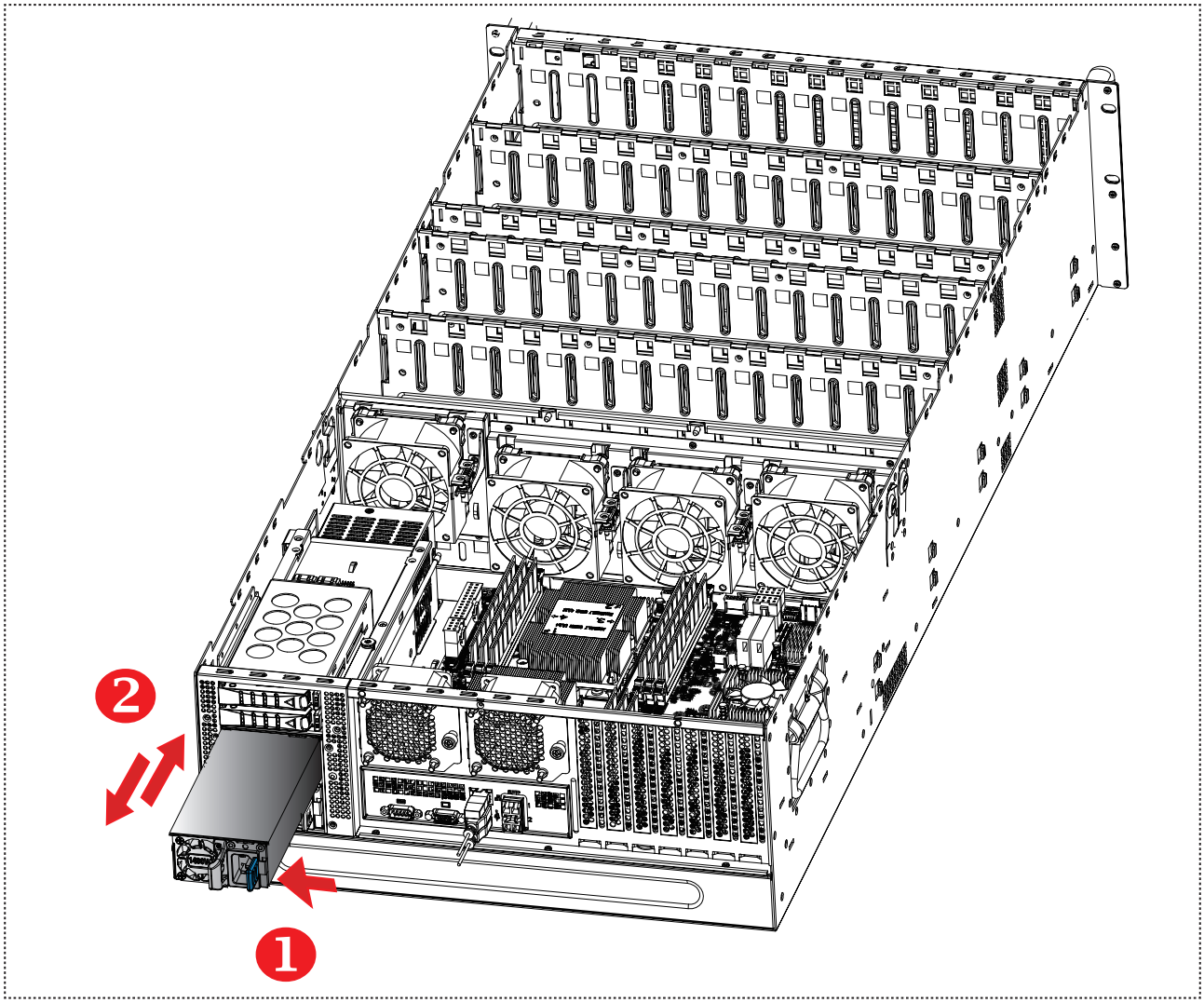


This information is provided for professional technicians only.

2.4 Power Supply Unit

2.4.1 Installation

① Press the ejector 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.



2.4.2 LED Indicator

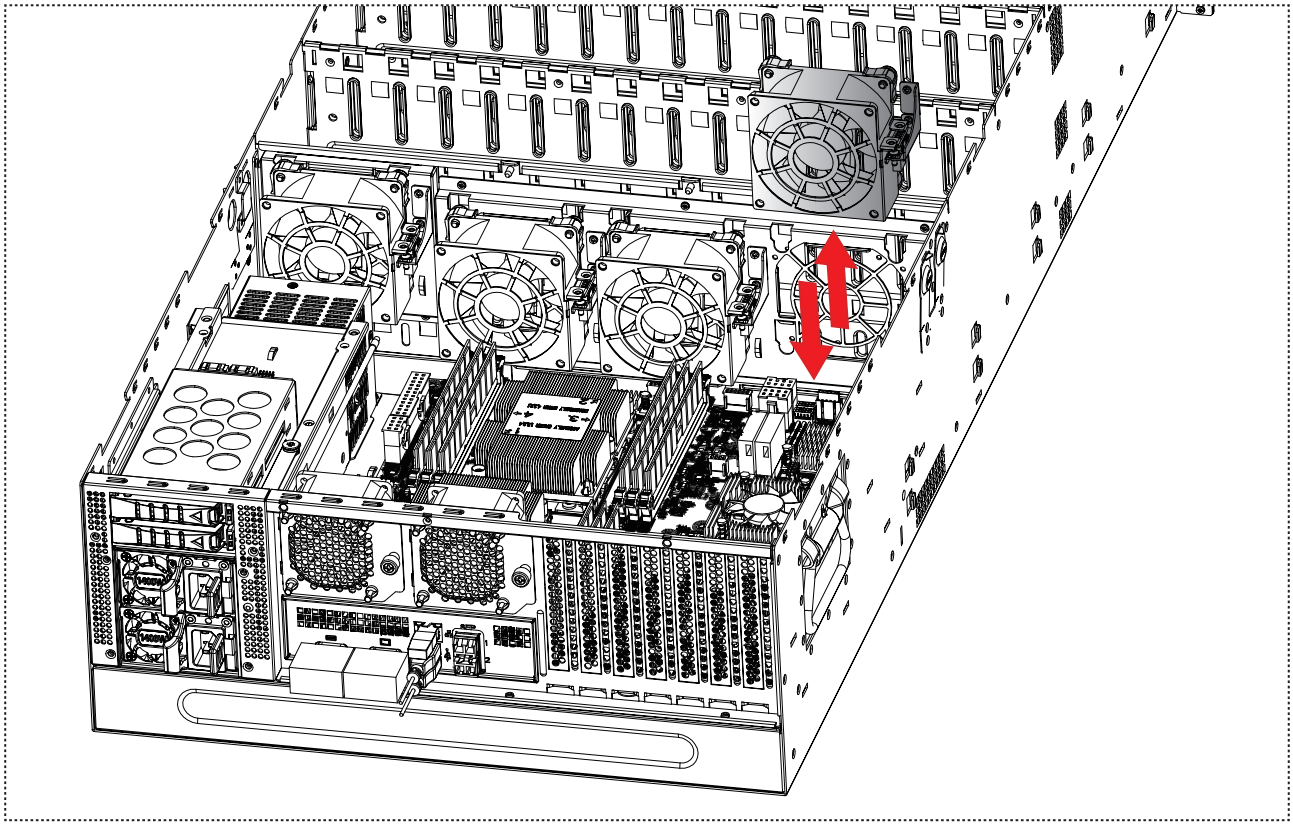
Color	Behavior	Description
Green	Solid	Output on and working normally.
	Blinking, 1Hz	Only 12Vsb (PS off) or PSU is in cold redundant state.
Amber	Solid	Power supply critical event causing a shutdown; AC cord unpluggled or AC power lost, failure, OCP, OVP, fan fail.
	Blinking, 1Hz	Power supply warnning events where the power supply continues to operate high temp, high power, high current, slot fan.

This information is provided for professional technicians only.

2.5 Fan

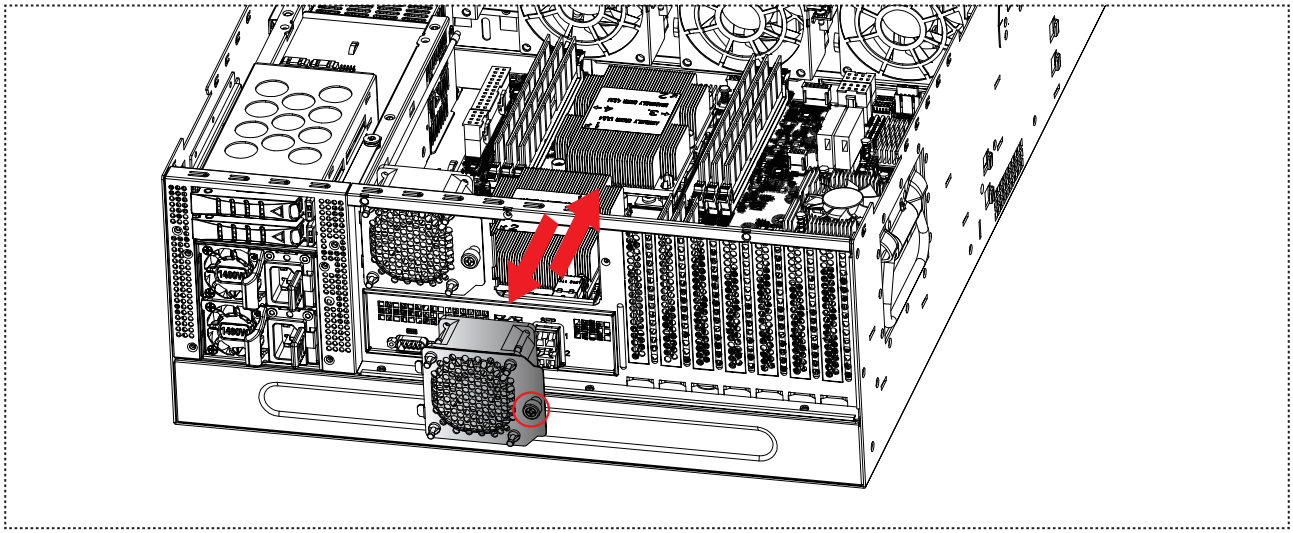
2.5.1 Internal Fan

① Remove the top cover from the chassis. Please refer to Section 2.3 Top Cover.
② Unplug the cables and connectors from the server board.
③ Pull the top fan out of the chassis.



2.5.2 Rear Panel Fan

Secure or loosen the thumb screw x 1 on the fan module to install or remove.

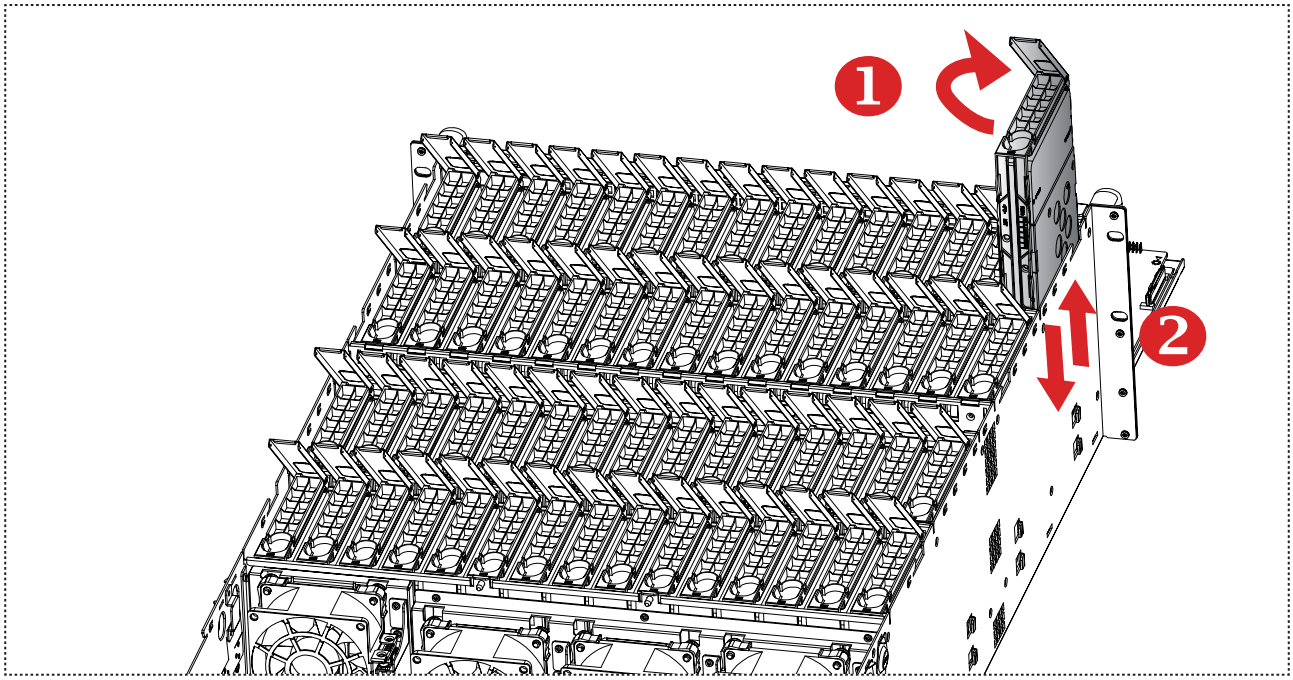


This information is provided for professional technicians only.

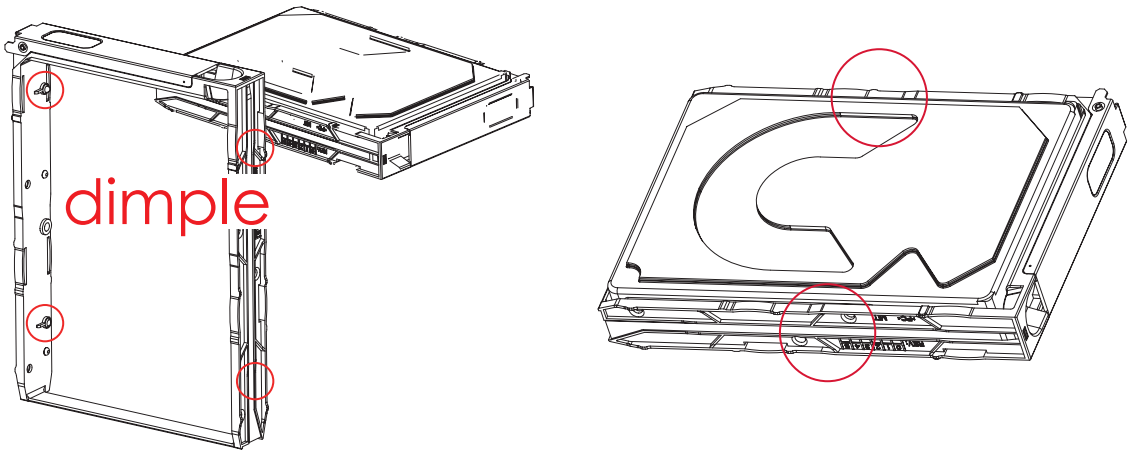
2.6 Disk Drive

2.6.1 Disk Drive 3.5-inch

① Press the release button on the tray lever.
② Pull upwards to remove the HDD tray from the chassis.



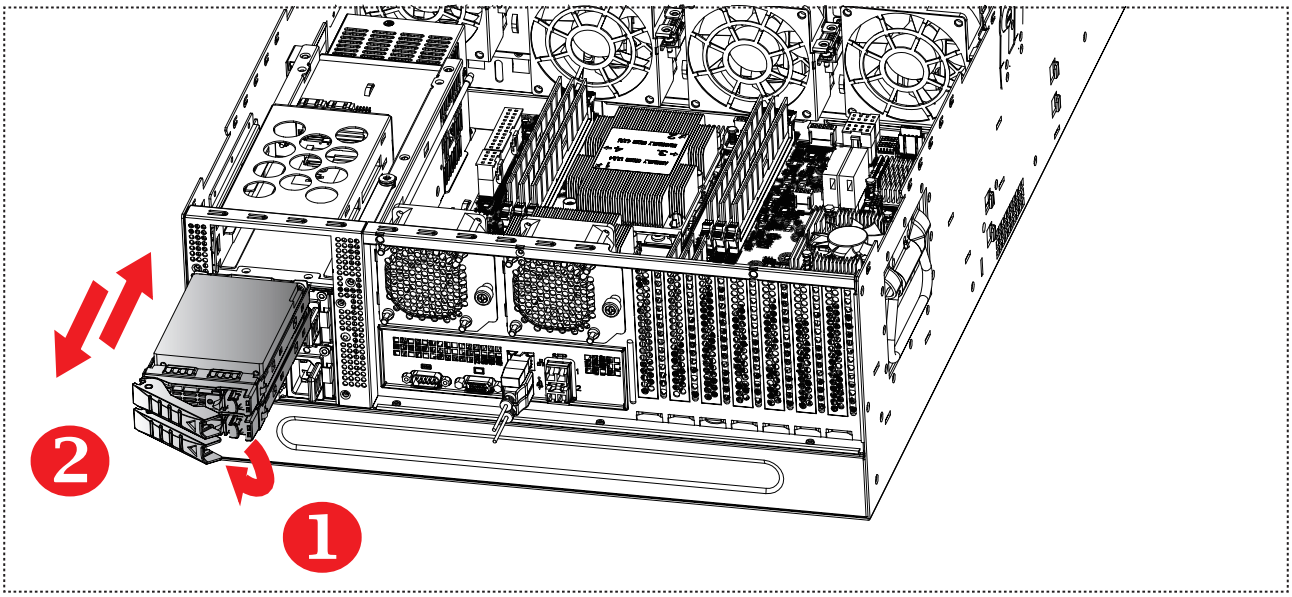
③ Match the dimples on the tray with the disk drive.
④ Insert the disk drive into the tray. Ensure that the HDD is not damaged during installation process.



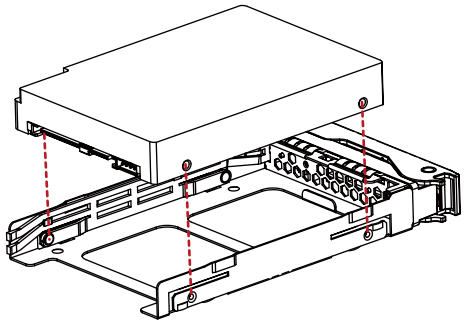
⑤ Insert the drive tray into chassis HDD cage. Ensure the drive tray is pushed to the end of the drive slot.
⑥ Close the tray lever.

2.6.2 Disk Drive: 2.5-inch

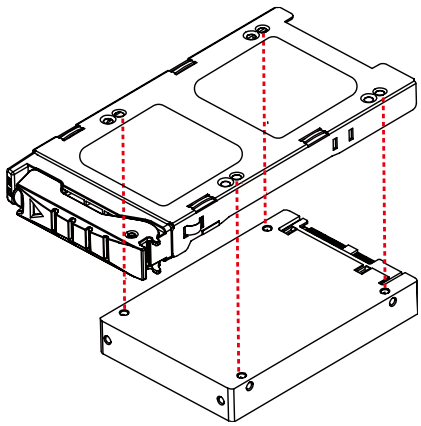
① Press the ejector on the tray to release the handle.
② Pull the tray handle completely outward.
③ Pull the drive tray out of the chassis.



④ Insert the disk drive into the tray. Ensure that the dimples on the tray match the disk drive. For additional assurance, fasten the screws * 4 on the tray to secure the disk drive.



2.5" SSD dimple location



2.5" SSD screw location

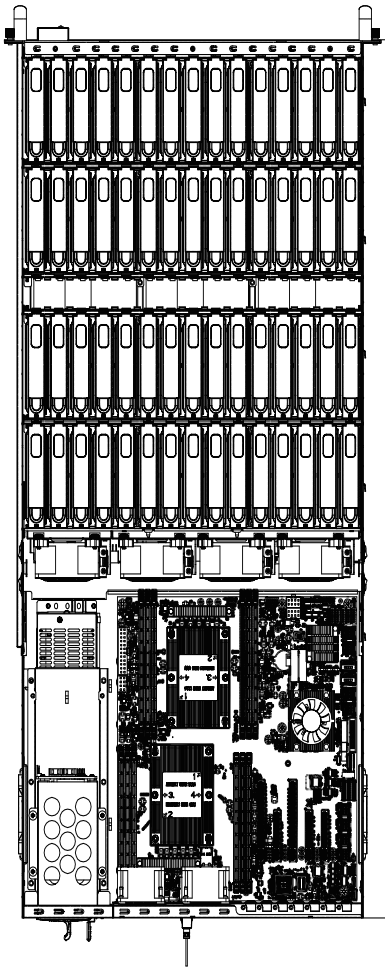
⑤ Push the tray with the installed disk drive into the end of the drive slot in the chassis.
⑥ Close the tray handle.

This information is provided for professional technicians only.

2.6.3 LED Indicator

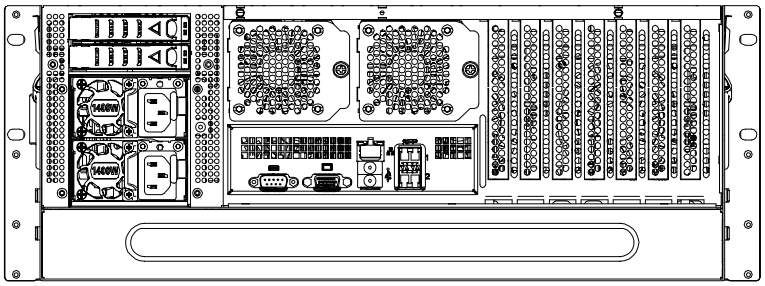
Indicator	Color	Behavior	Description
HDD Activity	Blue	Solid	Disk drive is present.
		Blinking	Drive activity is detected or has located HDD(slow)
		Off	Disk drive is not connected or the system power is off.
HDD Fault/Status	Red	Off	Normal
		Blinking	Re-building status for RAID.
		Solid	There is a drive fault.

2.6.4 Drive Slot Map



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

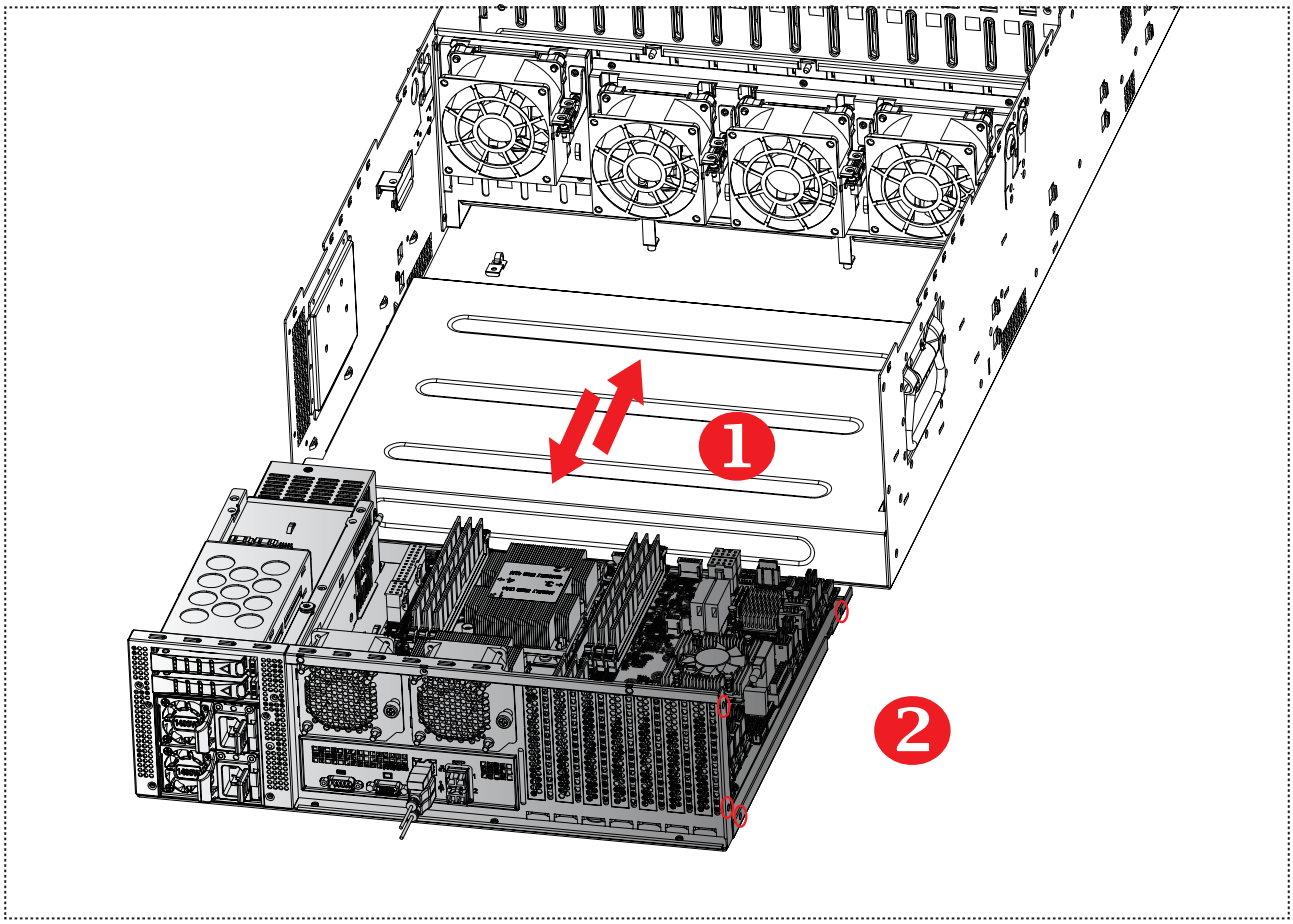
RAID card														
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14



Drive Slot Number
1
2

2.7 Motherboard

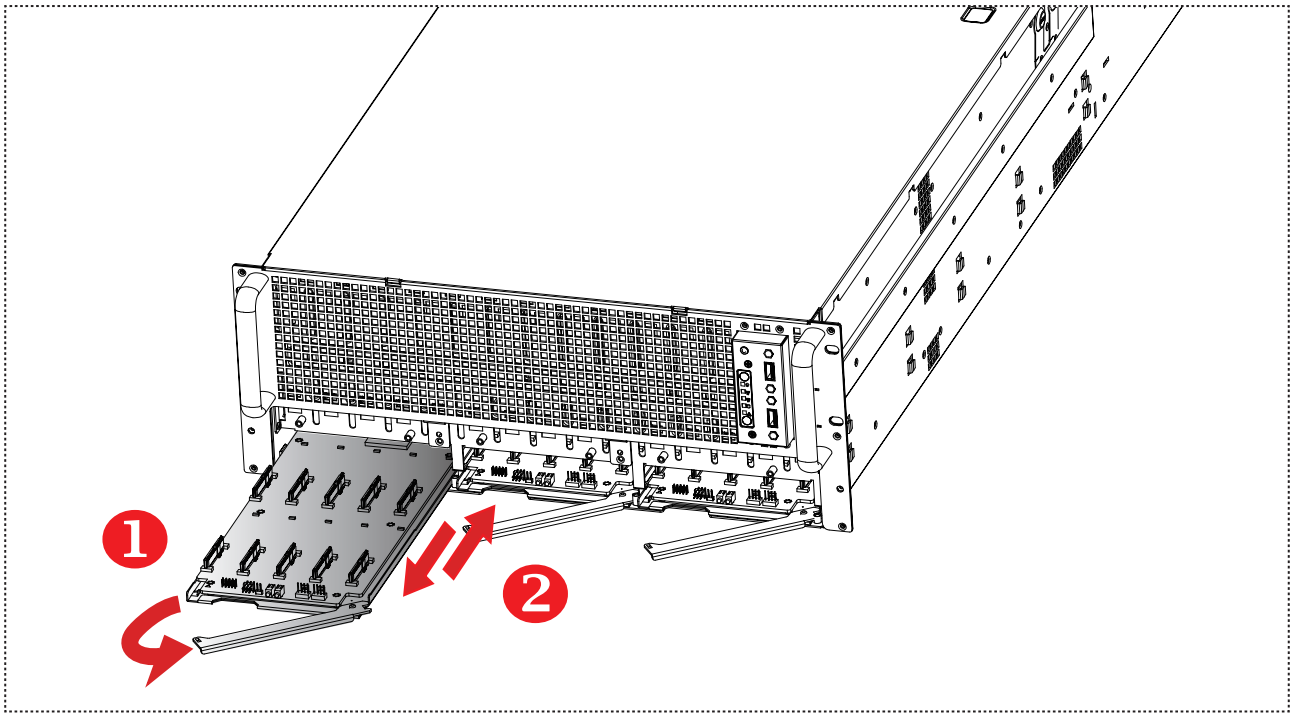
① Dislodge the screw x 8 pcs on both sides (x 4 pcs on each side) of the system.
② Pull the motherboard tray out of the chassis.



This information is provided for professional technicians only.

2.8 Drive Backplane

① Open the lever on the backplane.
② Pull the backplane module to remove.
③ Close the lever.



This information is provided for professional technicians only.

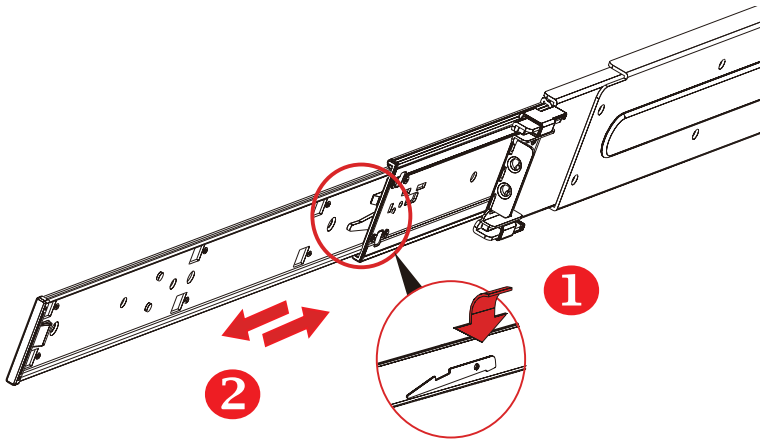
2.9 Slide Rail

NOTE
This sections 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 spefications or quick installation guide that came with your purchased product.

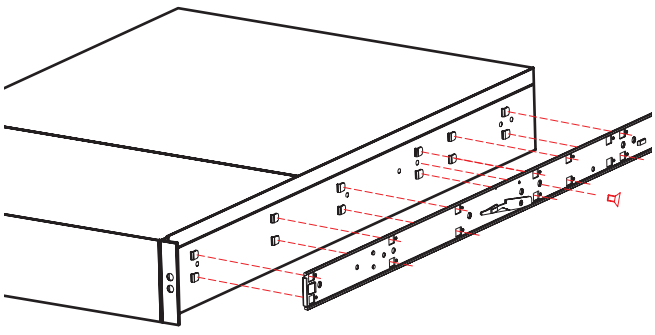
CAUTION
They rack may tilt and fall due to incorrect installation or placed on uneven grounds. The rack must be placed in a flat surface before you begin to slide the system barebone in for servicing.

NOTE
It requires at least 2 people to install the chassis for safety purpose.

① Pull out the inner slide rail.
a. Press the trigger downward to release the inner side rail.
b. Pull the inner rail out of the blade slide.



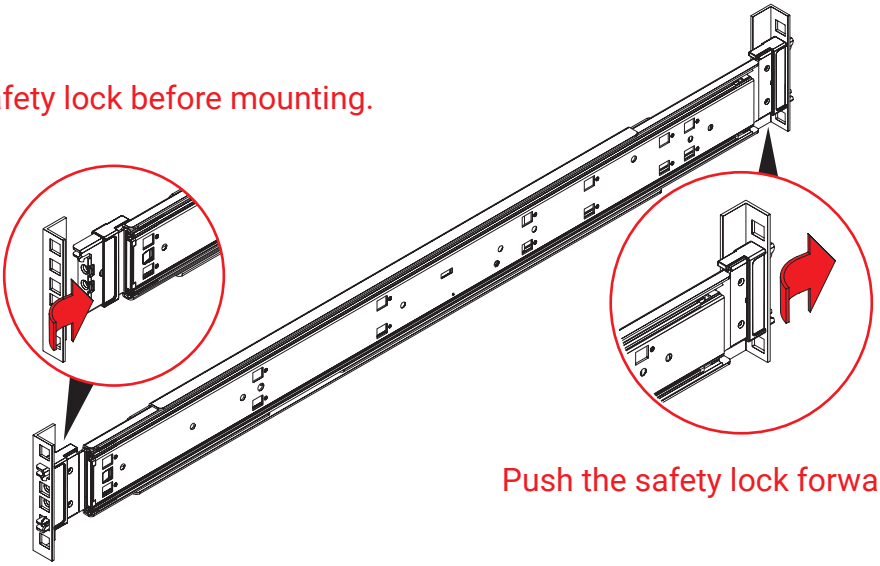
② Install the inner slide rail onto the chassis.
Align the rectangular holes on the inner side of the chassis with the bayonets on the side of chassis. Secure the inner chassis with the screw form from the standard screw kit after the bayonets go through the holes and are accurately positioned.



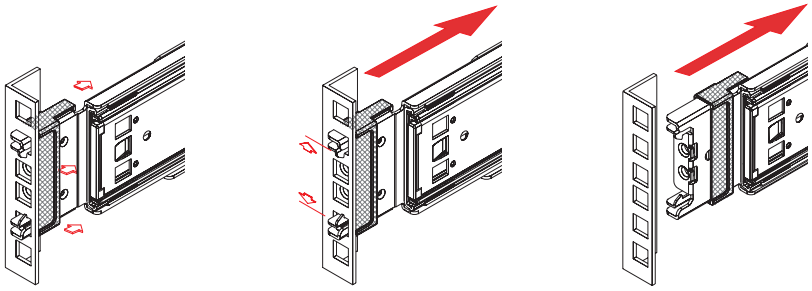
The bayonet on the chassis is per-formes as per the recommended dimension and location

③ Install the outer cabinet to the slide rail.
Insert the stag into the upper and lower square holes on rail from the back of rail. Push the safety lock forward to secure the bracket. Make certain to check if the safety lock is in disenaged position before mounting the brackets.

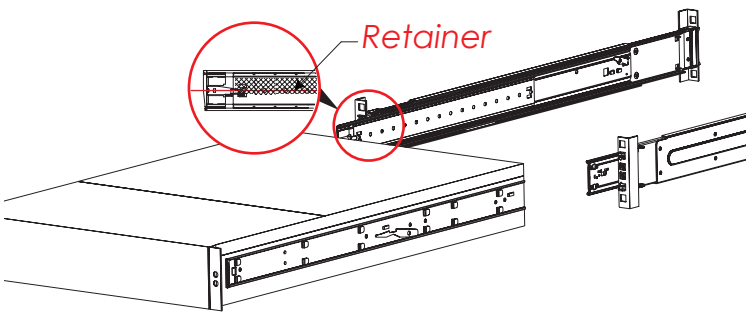
Release the safety lock before mounting.



Push the safety lock forward to secure



④ Installing the chassis into the cabinet
Insert the inner side of chassis into the cabinet. Check if the ball retainer is fully opened before installation. It may cause catastrophic damage to the chassis if ball retainer is not in fully open position while mounting the chassis. While pushing the chassis back into the cabinet, release the slide from locking position by pressing the trigger downward.

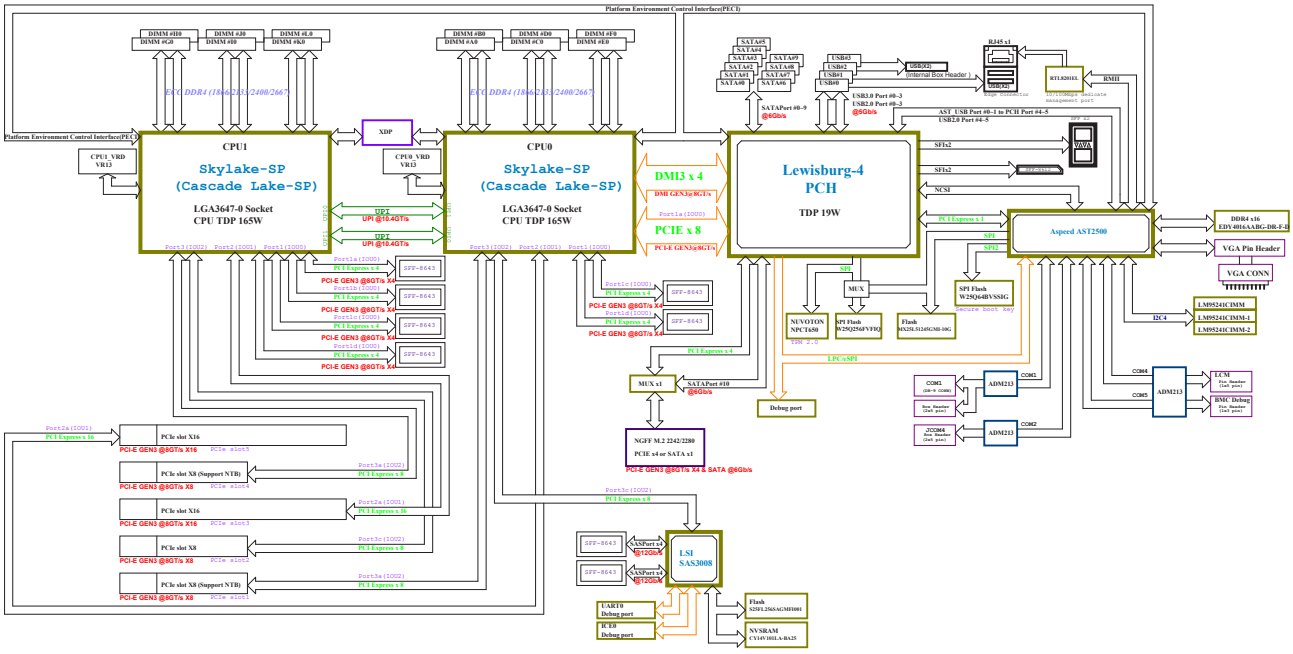


Chapter 3. Hardware Settings

This section describes the jumpers, internal connectors, and internal LEDs settings.

3.1 Motherboard

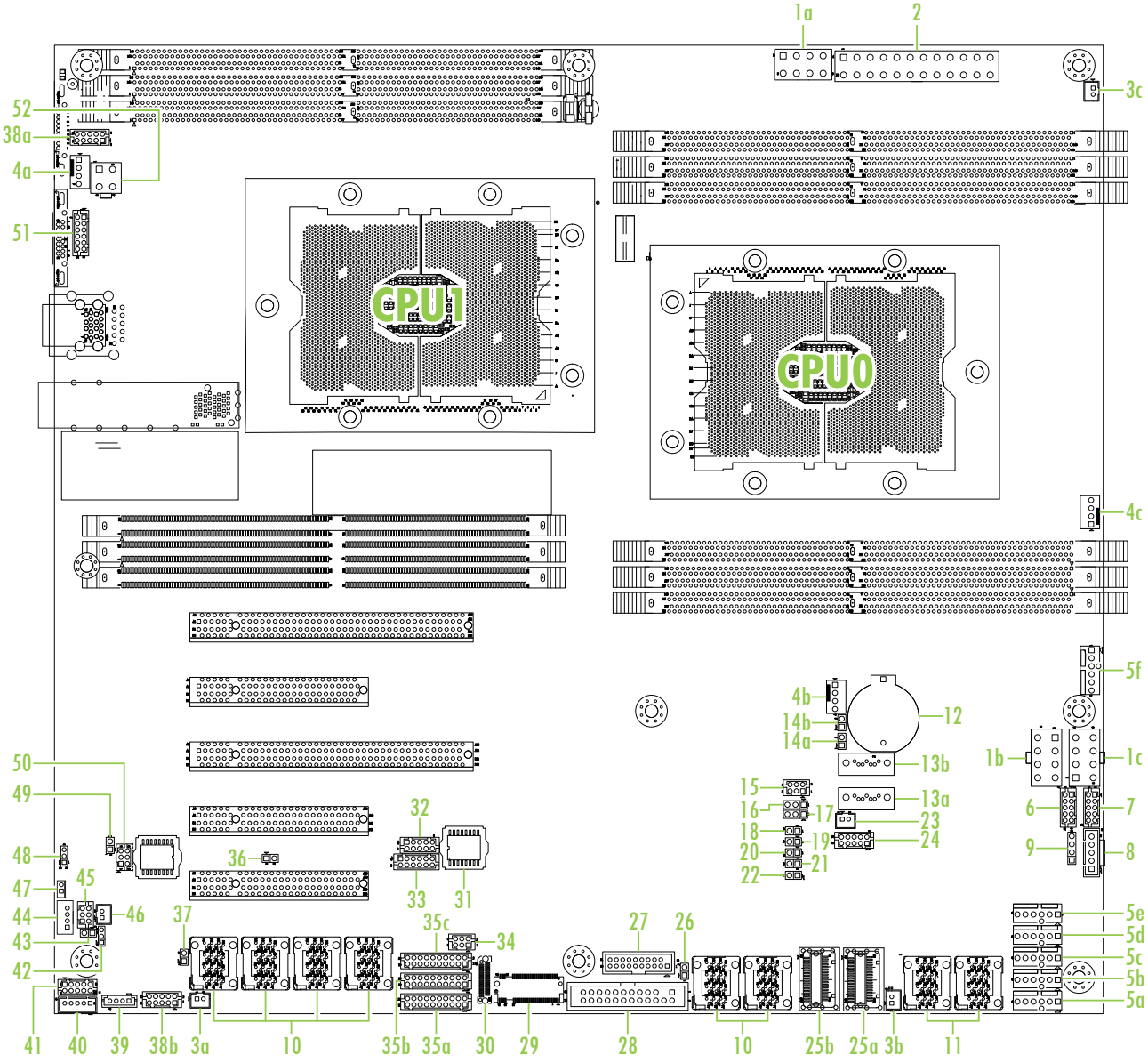
3.1.1 Block Diagram



3.1.2 Content List

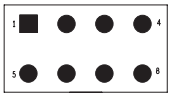
Connector/Jumper/Header		Location	Connector/Jumper/Header		Location
1a 1b 1c	Power Supply Connector	JPWR1, JPWR3, JPWR4	27	Front I/O USB Header	JUSB_INT
2	Power Supply Connector	JPWR2	28	SSI Front Panel Header	JFRNT_SSI
3a 3b 3c	External Thermal Sensor	J2, J13, J24	29	NGFF Connector	JNGFF
4a 4b 4c	CPU Fan Header PCH Fan Header	J1 & J22 J21	30	Internal 10GbE (Reserved)	J7
5a 5b 5c 5d 5e 5f	Fan Header	J15, J16, J17, J23, J18, J14	31	SPI ROM Socket	JSPI_BIOS
6	SAS IOC Activity LED Header	J19	32	ESPI Header	JESPI
7	SAS IOC Error LED Header	J25	33	Debug Port Header	JLPC_DP
8	PMBUS Header	JPMBUS	34	PCIe Hot-Plug SMB Header	JPCIE_HP
9	SAS IOC UART Header	J20	35a 35b 35c	PCIe Hot-Plug Front Panel Header	J4, J5, J6
10	SFF-8643 Connector (PCIE)	CN1, CN2, CN3, CN4, CN5, CN6	36	ME Force Recovery Mode Jumper	J3
11	SFF-8643 Connector (SAS)	CN7, CN8	37	BMC Debug Port Select Jumper	J27
12	Battery Socket	JBAT	38a 38b	Front COM Header	JCOM1 JCOM4
13a 13b	Serial ATA	SATA4 SATA5	39	VROC KEY Header	JRAID_KEY
14a 14b	SATA4 & SATA5 Pin-7 Power Header	J10 J11	40	LCM Header	JLCM
15	PCH SSGPIO Header	JSSGPIO	41	10GbE Carrier Board Header (Reserved)	J28
16	Clear CMOS Jumper	JCMOS	42	BMC Debug Port Header	JBMC_DP
17	PCH GPIO Header	JPCH_GPIO	43	BMC Reset Jumper	JBMC_RST
18	BIOS Recovery Mode Jumper	J9	44	BMC I2C1 Header	JBMC_I2C1
19	Flash Descriptor Security override Jumper	J8	45	BMC GPIO Header	JBMC_GPIO
20	NTB	JNTB	46	Intruder	JINTRUDER
21	Speaker	JSPKR	47	BMC Buzzer	JBUZZER
22	System PG Lock	JPG_LOCK	48	BMC I2C10 Header	JBMC_I2C10
23	SATA-DOM Power Connector	JDOM_PWR	49	BMC Disable Jumper	JBMC_DIS
24	SAS IOC ICE Header	J12	50	PCH SGPIO Header	JSGPIO
25a 25b	Mini SAS Connector	SATA0_3 SATA6_9	51	Front VGA Header	JVGA_INT
26	No Reboot(Watch Dog) Jumper	J26	52	Power Supply Connector	JPWR5

3.1.3 Placement



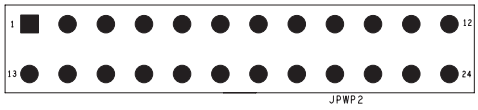
3.1.4 Connector

1a ~ 1c Power Connector (JPWR1, JPWR3 & JPWR4)



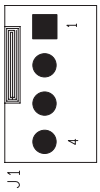
GND	1	5	+12V
GND	2	6	+12V
GND	3	7	+12V
GND	4	8	+12V

2 Power Connector (JPWR2)



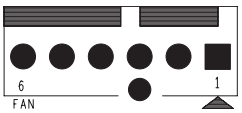
+3.3V	1	13	+3.3V
+3.3V	2	14	+12V
GND	3	15	GND
+5V	4	16	PS_ON#
GND	5	17	GND
+5V	6	18	GND
GND	7	19	GND
POWER_OK	8	20	NC
+5V_AUX	9	21	+5V
+12V	10	22	+5V
+12V	11	23	+5V
+3.3V	12	24	GND

4a 4b 4c Fan Header (J1, J21 & J22)



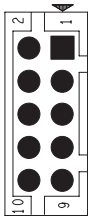
1	PWM
2	TACH
3	+12V
4	GND

5 Fan Header (J14, J15, J16, J17, J18, J23)



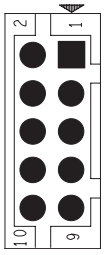
1	FAULT
2	PRSNT_N
3	PWM
4	+12V
5	+12V
6	GND

6 SAS IOC Activity LED Header (J19)



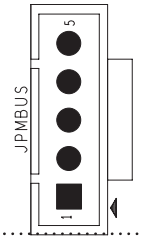
+3.3V	1	2	GND
SAS_LED_GPIO12	3	4	SAS_LED_GPIO8
SAS_LED_GPIO13	5	6	SAS_LED_GPIO9
SAS_LED_GPIO14	7	8	SAS_LED_GPIO10
SAS_LED_GPIO15	9	10	SAS_LED_GPIO11

7 SAS IOC Error LED Header (J25)



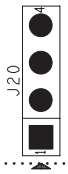
+3.3V	1	2	GND
SAS_LED_GPIO20	3	4	SAS_LED_GPIO16
SAS_LED_GPIO21	5	6	SAS_LED_GPIO17
SAS_LED_GPIO22	7	8	SAS_LED_GPIO18
SAS_LED_GPIO23	9	10	SAS_LED_GPIO19

8 PMBus Header (JPMBUS)



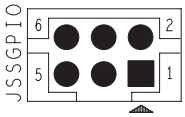
1	SMB_PMBUS_CLK
2	SMB_PMBUS_DATA
3	PMBUS_ALERT_N
4	GND
5	+3.3V

9 SAS IOC UART Header (J20)



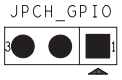
1	UART0_TX
2	GND
3	UART0_RX
4	SAS3008_1V8

15 PCH SSGPIO Header (JSSGPIO)



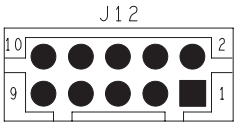
GND	1	2	PCH_SSDATAOUT0
PCH_SSDATAOUT1	3	4	PCH_SSLOAD
+3.3V	5	6	PCH_SSCLOCK

17 PCH GPIO Header (JPCH_GPIO)



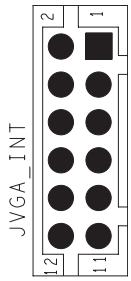
1	PCH_GPP_C16
2	PCH_GPP_C17
3	GND

24 SAS IOC ICE Header (J12)



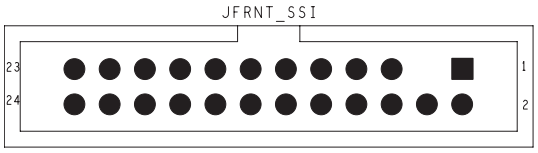
ICE0_TMS	1	2	ICE0_TRST_L
ICE0_TDO	3	4	ICE0_TCK
ICE0_TDI	5	6	SAS3008_1V8
NC	7	8	GND
SYS_HALT_L0	9	10	NC

27 Front I/O USB Header (JUSB_INT)



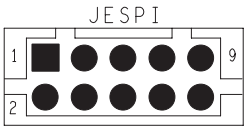
+5V_USB23	1	11	PCH_FP_USB2_P3
PCH_FP_USB3_RX_N2	2	12	PCH_FP_USB2_N3
PCH_FP_USB3_RX_P2	3	13	GND
GND	4	14	PCH_FP_USB3_TX_P3
PCH_FP_USB3_TX_N2	5	15	PCH_FP_USB3_TX_N3
PCH_FP_USB3_TX_P2	6	16	GND
GND	7	17	PCH_FP_USB3_RX_P3
PCH_FP_USB2_N2	8	18	PCH_FP_USB3_RX_N3
PCH_FP_USB2_P2	9	19	+5V_USB23
PCH_USB_OC#23	10	20	KEY (no pin)

28 SSI Front Panel Header (JFRNT_SSI)



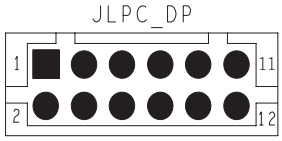
+3.3V	1	2	+3.3V_DUAL
KEY (no pin)	3	4	+5V_AUX
PWR_LED#	5	6	UIDLED_OUT#
+3.3V	7	8	SYS_HEALTH#2
HD_LED#	9	10	SYS_HEALTH#1
SW_PWR_BTN#	11	12	LAN1_LINK_UP
GND	13	14	LAN1_TRAFFIC
SW_RST_BTN#	15	16	I2C8SDA
GND	17	18	I2C8SCL
UID_SW_IN#	19	20	INTRUDER#
+3.3V_DUAL	21	22	LAN2_LINK_UP
FP_NMI_BTN	23	24	LAN2_TRAFFIC

32 EPSI Header (JEPSI)



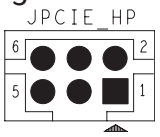
+5V_AUX	1	2	PGPPA_PCH
PCH_SMI_N	3	4	SMB_HOST_3V3_DAT
PCH_LPC_CLKRUN_N	5	6	SMB_HOST_3V3_CLK
PCH_PME_N	7	8	PCH_ESPI_RST_N
GND	9	10	PCH_ESPI_ALENT1_N

33 Debug Port Header (JLPC_DP)



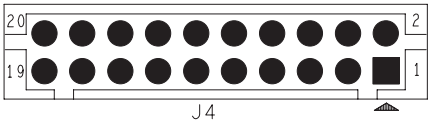
GND	1	2	CLK_24M_DP80
PCH_LDRQ0_N	3	4	PCH_LFRAME_N
AST_SERIRQ	5	6	RST_PLTRST_N
PCH_LPC_LAD2	7	8	PCH_LPC_LAD3
PCH_LPC_LAD1	9	10	+3.3V
GND	11	12	PCH_LPC_LAD0

34 PCIE Hot-Plug SMB Header (JPCIE_HP)



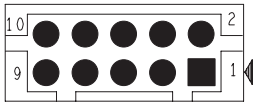
CPU0_HP_I2C_CLK	1	2	CPU1_HP_I2C_CLK
CPU10_HP_I2C_DAT	3	4	CPU1_HP_I2C_DAT
+3.3V	5	6	GND

35 PCIE Hot-Plug Front Panel Header (J4, J5, & J6)



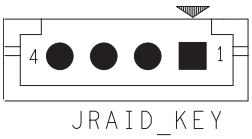
+3.3V	1	2	+3.3V
PRSNT-1	3	4	PRSNT-2
PWR FAULT-1	5	6	PWR FAULT-2
PWR ENABLE-1	7	8	PWR ENABLE-2
ATTEN BUTTON-1	9	10	ATTEN BUTTON-2
MRL/EMIS-1	11	12	MRL/EMIS-2
EMIL-1	13	14	EMIL-2
ATTEN LED-1	15	16	ATTEN LED-2
PWR LED-1	17	18	PWR LED-2
GND	19	20	GND

38 Front COM Header (JCOM1 & JCOM4)



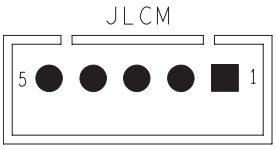
DSRB	1	2	DCDB
RTSB	3	4	RXDB
CTSB	5	6	TXDB
RIB	7	8	DTRB
NC	9	10	GND

39 VROC KEY Header (JRAID_KEY)



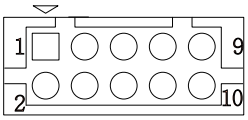
1	GND
2	+3.3V_DUAL
3	GND
4	PCH_GPP_C10

40 LCM Header (JLCM)



1	SW_PWR_BTN#
2	SW_RST_BTN#
3	TXDC
4	RXDC
5	GND

41 10GbE Carrier Board Header (J28)

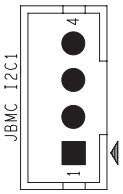


+3.3V_DUAL	1	2	+3.3V_DUAL
LAN_LED3_ACT	3	4	LAN_LED2_ACT
LAN_LED3_10G	5	6	LAN_LED2_10G
LAN_LED3_1G	7	8	LAN_LED2_1G
GND	9	10	GND

42 BMC Debug Port Header (JBMC_DP)

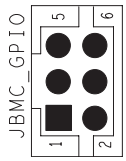
1	BMC_UART_TXD5
2	BMC_UART_RXD5
3	GND

44 BMC I2C1 header (JBMC_I2C1)



1	I2C1SDA
2	GND
3	I2C1SCL
4	NC

45 BMC GPIO Header (JBMC_GPIO)

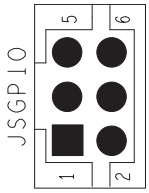


GND	1	2	EXTRST#
I2C9SDA	3	4	BMC_GPY1
I2C9SCL	5	6	BMC_GPY0

48 BMC I2C10 header (JBMC_I2C10)

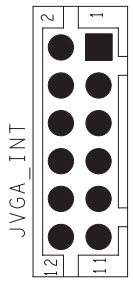
1	GND
2	I2C10SDA
3	I2C10SCL

50 PCH SGPIO header (JSGPIO)



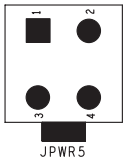
GND	1	2	PCH_SDATAOUT0
PCH_SDATAOUT1	3	4	PCH_SLOAD
+3.3V	5	6	PCH_SCLOCK

51 Front VGA Header (VGA_INT)



DVO_5V	1	2	GND
GND	3	4	DACROA
DDC_DATAO	5	6	GND
AVSYNCO	7	8	DACGOA
AHSYNCO	9	10	GND
DDC_CLKO	11	12	DACBOA

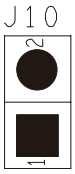
52 Power Connector (JPWR5)



GND	1	3	+12V
GND	2	4	+12V

3.1.5 Jumper

14a SATA4 Pin-7 Power Header (J10)



J10	Setting	
Short	SATA4 pin-7 Power	
Open	Normal	Default

14b SATA5 Pin-7 Power Header (J11)

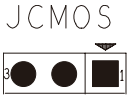
J11	Setting	
Short	SATA5 pin-7 Power	
Open	Normal	Default

NOTE

- If the SATA DOM power is supplied by the motherboard, please close the jumper.
- If the SATA DOM power is supplied by external power, please open the jumper.
- If the a SATA type hard drive is connected to the motherboard, please open the jumper.

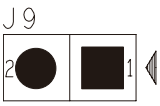
SATA DOM Jumper

16 Clear CMOS Jumper (JCMOS)



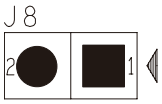
JCMOS	Setting	
Pin1-2	Normal	Default
Pin2-3	Clear CMOS	

18 BIOS Recovery Mode Jumper (J9)



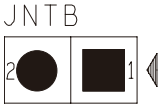
J9	Setting	
Short	BIOS Recovery Mode	
Open	Normal	Default

19 Flash Descriptor Security override Jumper (J8)



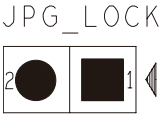
J8	Setting	
Short	Flash Security override	
Open	Normal	Default

20 NTB Jumper (JNTB)



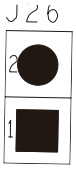
JNTB	Setting	
Short	Downstream port	
Open	Upstream port	Default

22 System Power Good Lock (JPG_LOCK)



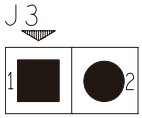
JPG_LOCK	Setting	
Short	Lock	
Open	Normal	Default

26 No Reboot(Watch Dog) Jumper (J26)



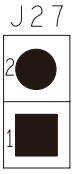
J26 (No Reboot)	Setting	
Short	Enable	
Open	Disable	Default

36 ME Force Recovery Mode Jumper (J3)



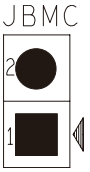
J3	Setting	
Short	ME Recovery Mode	
Open	Normal	Default

37 BMC Debug Port (J27)



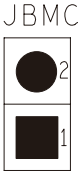
J27	Setting	
Short	JCOM	
Open	JBMC_DP	Default

43 BMC Reset Jumper (JBMC_RST)



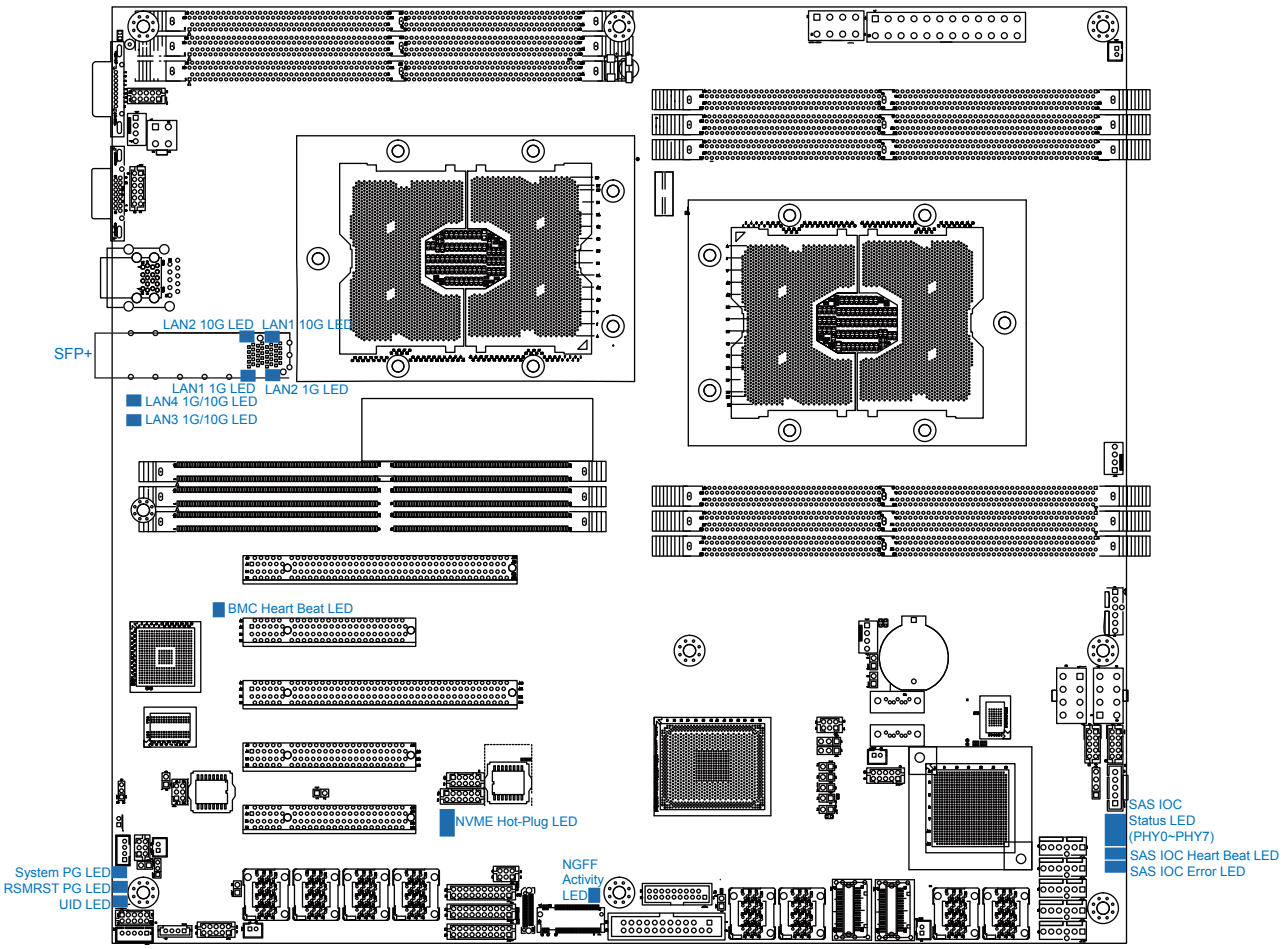
JBMC_RST	Setting	
Short	Reset BMC	
Open	Normal	Default

49 BMC ARM (JBMC_DIS)



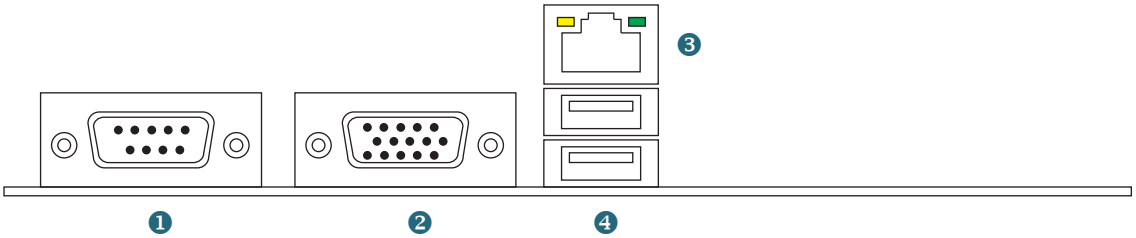
JBMC_DIS	Setting	
Short	Disable	
Open	Normal	Default

3.1.6 Internal LED



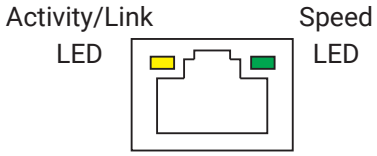
Item	Color	Behavior	Description
Heart Beat	Green	Blinking	BMC activity is detected.
		Off	BMC is not active.
SYS PG	Green	Solid	System power is ready.
		Off	System power is not ready.
RSMRST PG	Yellow	Solid	Resume Well Reset is ready.
		Off	Resume Well Reset is not ready.
SAS IOC Status	Green	Blinking	PHY0-7 activity is detected.
		Off	PHY0-7 no activity is detected.
SAS IOC Heart Beat	Green	Blinking	SAS IOC activity is detected.
		Off	SAS IOC no activity is detected.
SAS IOC Error	Yellow	Solid	SAS IOC failure is detected.
		Off	SAS IOC no failure is detected.
NIC 3 10G	Green	Blinking	10G link activity is detected.
NIC 3 1G	Yellow	Blinking	1G link activity is detected.
NIC 4 10G	Green	Blinking	10G link activity is detected.
NIC 4 1G	Yellow	Blinking	1G link activity is detected.
NGFF Activity	Blue	Blinking	NGFF activity is detected.
		Off	NGFF activity is not detected.

3.1.7 Rear I/O Panel



Item	Placement	Item	Placement
1	COM port	3	RJ45 port for BMC
2	VGA port	4	USB 2.0/3.0 Port *2

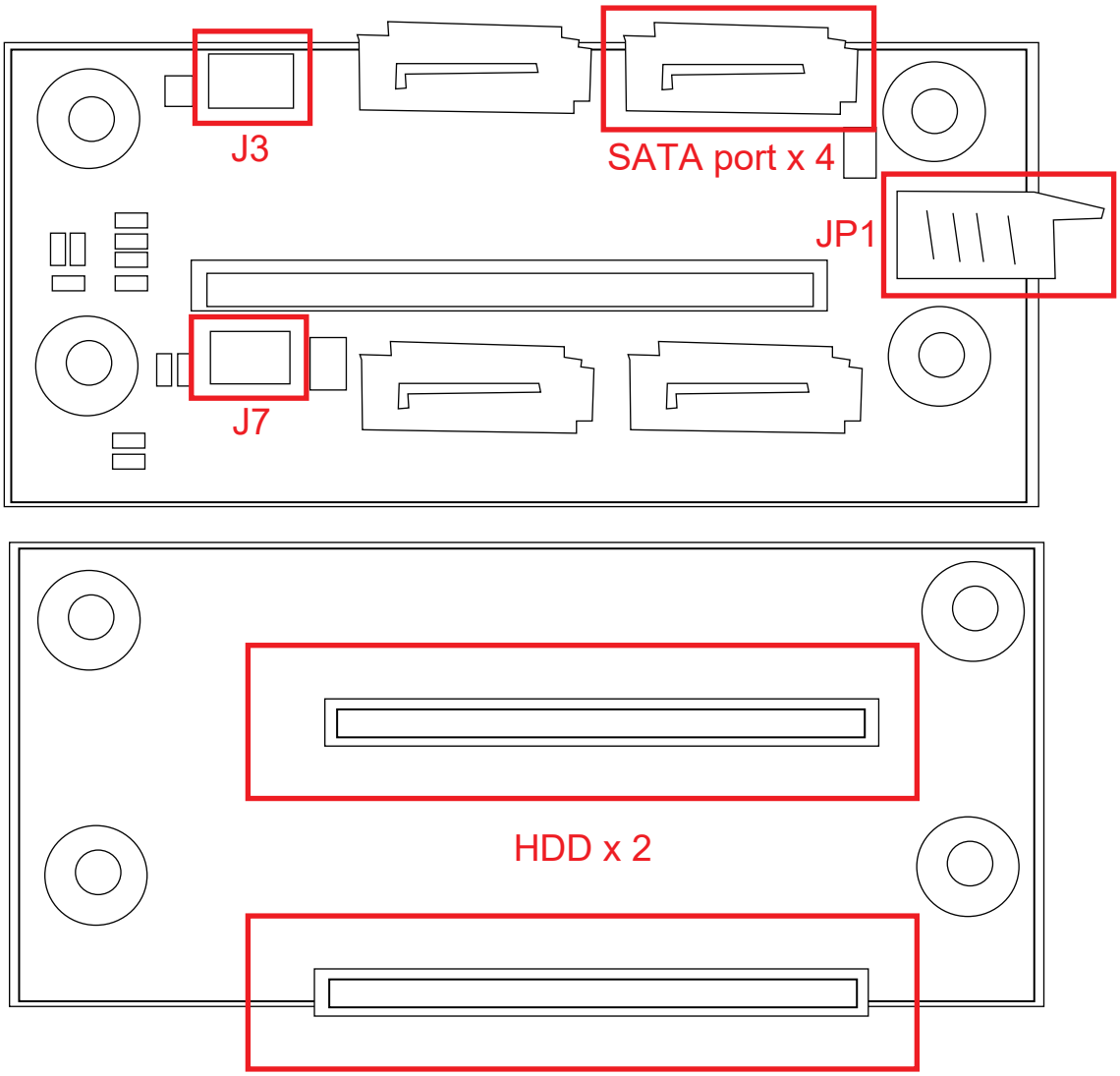
LAN LED



Indicator	Color	Behavior	Description
Activity/Link	Yellow	Off	No link.
		Blinking	Data activity.
		Solid	Link.
Speed	Green	Off	10M bps connection or no link.
		Off	100M bps connection.
		Solid	1G bps connection.

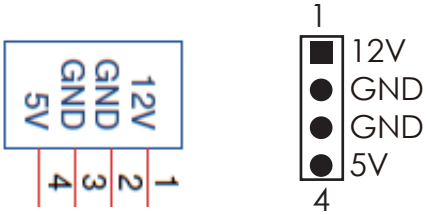
3.2 Drive Backplane: 2 Bay

3.2.1 Component Placement

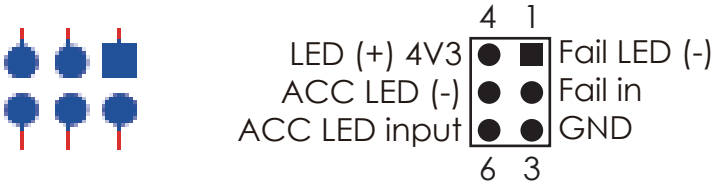


3.2.2 Connector

Power Connector (JP1)



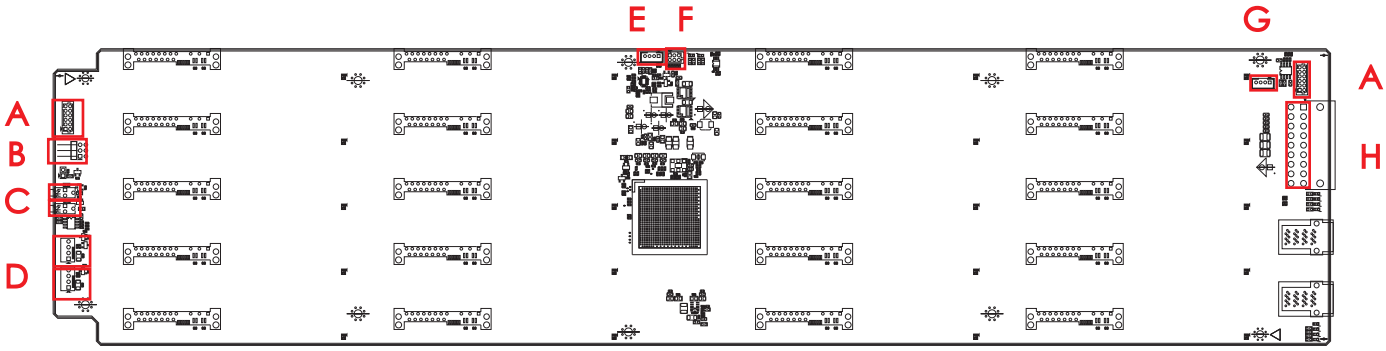
LED I/O Connector



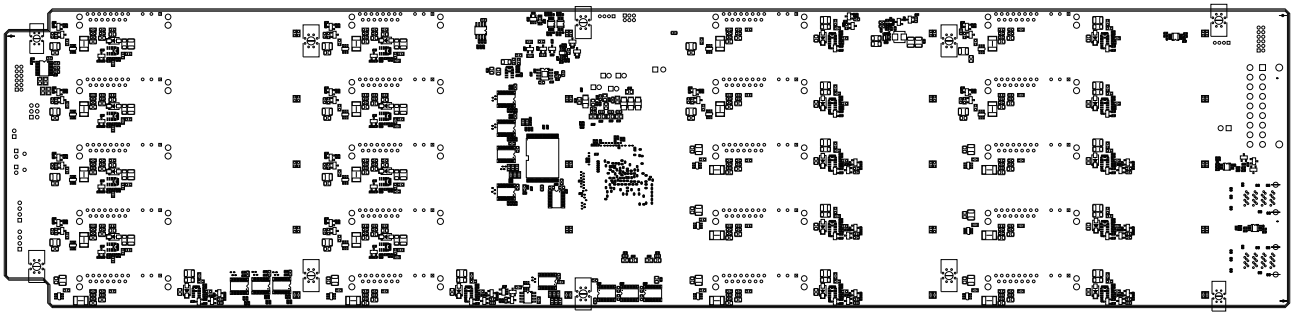
3.2 Drive Backplane: 20 Bay

3.2.1 Component Placement

Top View

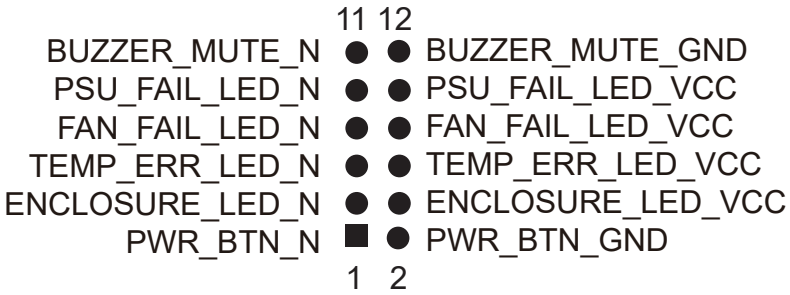


Bottom view

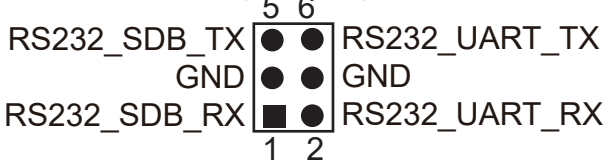


3.2.2 Connector

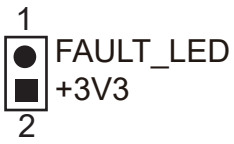
A Front Panel Control Connector (JREAR & JFRONT)



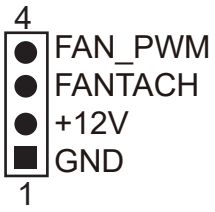
B UART Header (JUART1)



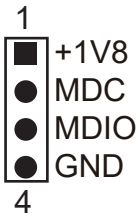
C Fault LED Connector (J1)



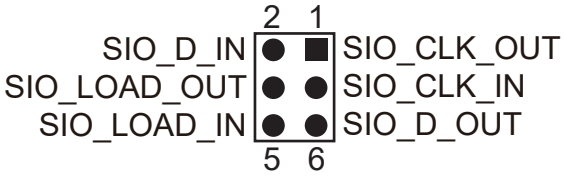
D Fan Connector (JFAN0 &JFAN1)



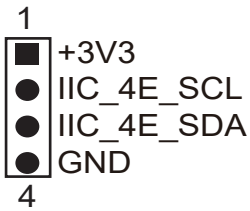
E MDIO Connector (JMDIO1)



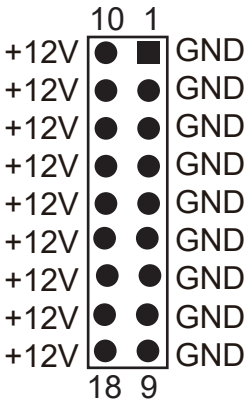
F SGPIO Connector (JSGPIO1)



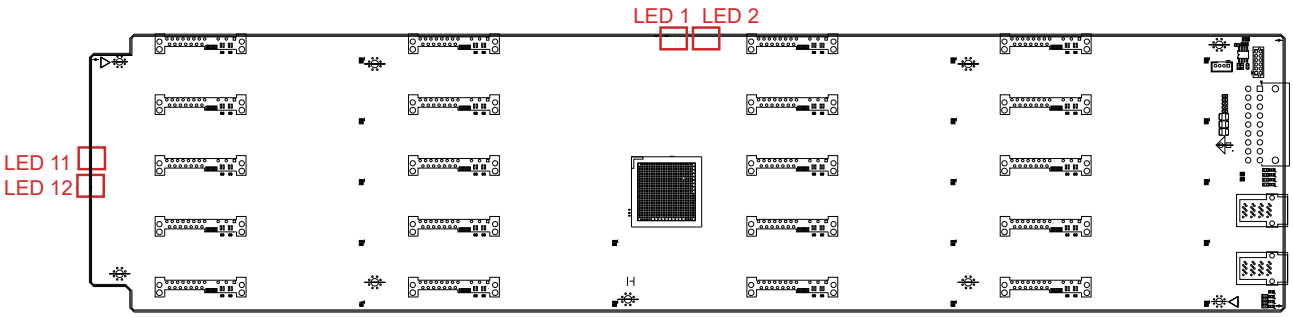
G I^2C Connector (JI2C1)



H Power Connector (JP1)



3.2.3 Internal LED



Item	Color	Behavior	Description
Drive Activity (LED11)	Blue	Solid	Disk drive is present.
		Off	Drive activity is detected or located.
Drive Fault (LED12)	Red	Solid	There is a drive fault.
		Off	Disk drive is not connected or the system is off.
Expander Blink (LED1)	Blue	Blinking	Expander is alive, 0.0833Hz (12 seconds per cycle).
Expander Heart Beat (LED2)	Blue	Blinking	Expander FW is running.

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 **Esc** 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 notice that the BIOS menu are continually changing due to the BIOS update. The BIOS menu provided are the most updated ones when this manual is written.

NOTE
For further details about the BIOS, please refer to BIOS section in the Virgo manual for reference. AIC® website link: https://www.aicipc.com/en/productdetail/20855.

4.1 Navigation Keys

The navigation keys are listed below.

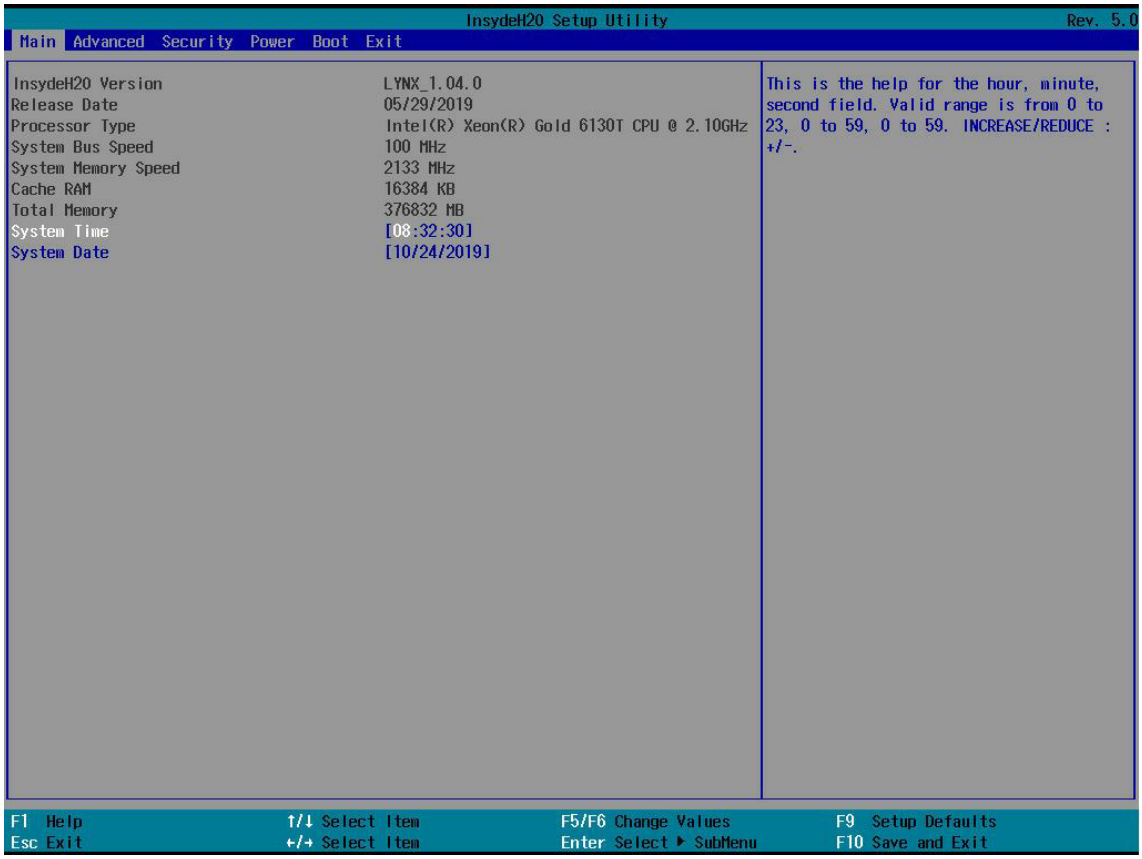
Function Key	Description
< ↑ > < ← > < → > < ↓ >	Select item.
< Enter >	Select and enter sub-screen.
< ✚ > < ▪ >	Modify selected option.
< F1 >	General help.
< F2 >	Previous Value.
< F3 >	Optimized defaults.
< F4 >	Save & Exit.
< F5> < F6 >	Change values.
< F7 >	Discard Change and Exit.
< F9 >	Load Optimal Default for all values.
< F10 >	Save changes and exit.
< F12 >	Print Screen.
< Esc >	Exit the current menu screen.

4.2 BIOS 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.
Power	Sets the power management parameters.
Boot	Sets boot options, such as Quick Boot or USB Boot.

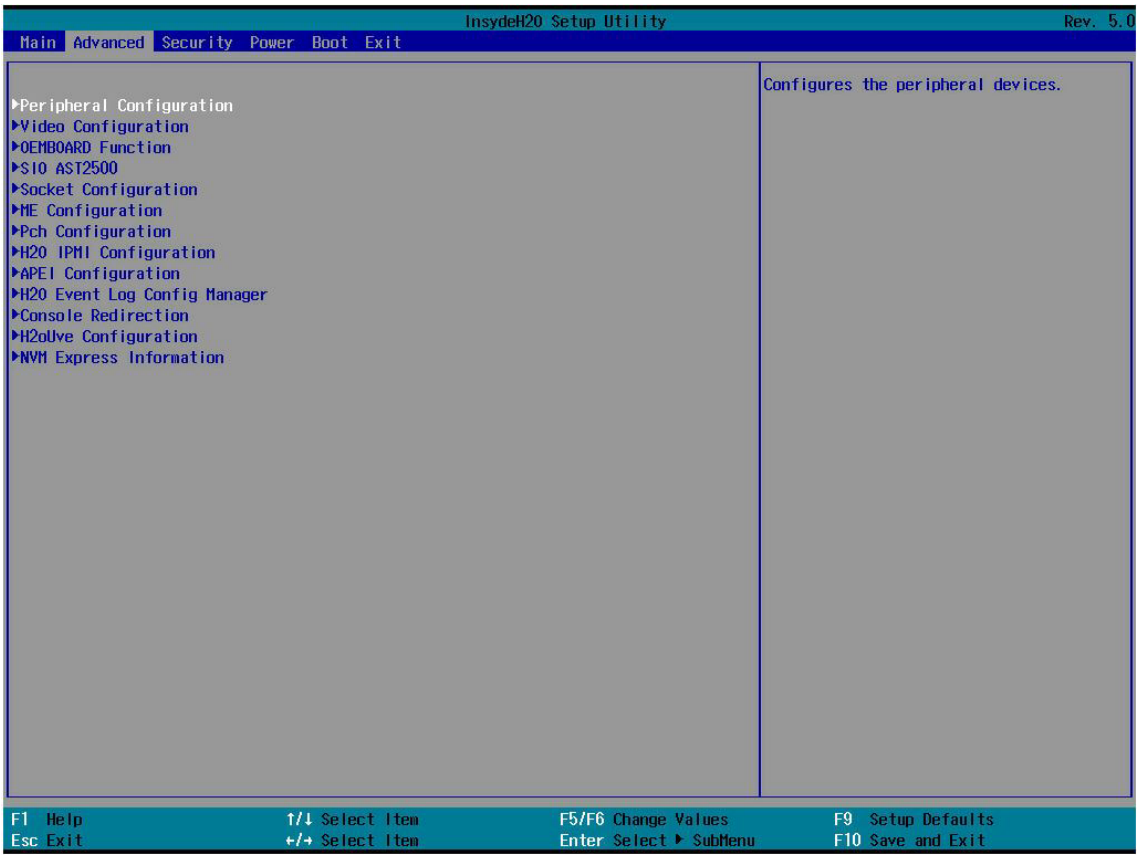
4.3 Main



4.3.1 Main

Main	
System time	Configures the current time.
System date	Configures the current date.

4.4 Advanced



4.4.1 Peripheral Configuration

Peripheral Configuration		
PCIe SR-IOV	Enable	Disable
PCIe ARI	Enable	Disable
ARI Forward	Enable	Disable
Spread Spectrum	Enable	Disable

4.4.2 Video Configuration

Video Configuration		
Display Mode	Plug In First	On Board First

4.4.3 OEMBoard Function

OEMBoard Function				
Messiah Function	SMBIOS Updated	SMBIOS Updated	Auto	By Utility
	SMBIOS TO BMC Redfish	Write SMBIOS to BMC	Enable	Disable
	Halt On Error Function	Halt On Error	Enable	Disable
	Manufacturing Function	Manufacturing Test Mode	Enable	Disable
		Dumped Storage	USB Storage	SATA Storage
		USB Test Function	Enable	Disable
		SATA Test Function	Enable	Disable

4.4.4 SIO AST2500

SIO AST2500				
Serial Port A	Auto	Enable	Disable	
Base I/O Address	2E8	2F8	3E8	3F8
Interrupt	IRQ3		IRQ4	
Serial Port B	Auto	Enable	Disable	
Base I/O Address	2E8	2F8	3E8	3F8
Interrupt	IRQ3		IRQ4	
Serial Port D	Auto	Enable	Disable	
Base I/O Address	2E8	2F8	3E8	3F8
Interrupt	IRQ7		IRQ10	

4.4.5 Socket Configuration

Socket Configuration						
Processor Configuration	Per-Socket Information	Hyper-Threading [ALL]	Enable	Disable		
		VMX	Enable	Disable		
		Enable SMX	Enable	Disable		
		Extended APIC	Enable	Disable		
Common RefCode Configuration	MMCFG Size	64M	128M	256M		
		512M	1G	2G		
	MMIO High Base	56T	40T	24T		
		16T	4T	1T		
	MMIO High Granularity Size	1G	4G	16G		
		64G	256G	1024G		
	Serial Debug Message Level	Disable	Minimum			
		Normal	Maximum			
UPI Configuration	UPI General Configuration	UPI Status	Link Speed Mode	Slow	Fast	
			Link Frequency Select	Auto	9.6Gb/s	
				10.4Gb/s	Use Per Link Setting	
			Link L0p Enable	Auto	Enable	Disable
			Link L1 Enable	Auto	Enable	Disable
			Legacy VGA Socket	Min=0, Max=3		
			Legacy VGA Stack	Min=0, Max=6		
Memory Configuration	Integrated Memory Controller (iMC)	Enforce POR	Auto	POR	Disable	
		Memory Frequency	Auto	Selections in MHz		
		IMC BCLK	Auto	100 MHz	133 MHz	
		MRC Promote Warnings	Enable	Disable		
		Promote Warnings	Enable	Disable		
		Halt on mem Training Error	Enable	Disable		
		Attempt Fast Boot	Auto	Enable	Disable	
		Attempt Fast Cold Boot	Auto	Enable	Disable	
		MemTest On Fast Boot	Auto	Enable	Disable	
		Enable ADR	Enable	Disable		
		2x Refresh Enable	Auto	Enable	Disable	

Memory Configuration	Memory Map	Volatile Memory Mode	Auto	1LM	2LM		
		AppDirect cache	Auto	Enable	Disable		
		eADR Support	Auto	Enable	Disable		
		1LM Memory Interleave Granularity	Auto	256B Target, 256B Channel	64B Target, 64B Channel		
		IMC Interleaving	Auto	1-way Interleave	2-way Interleave		
		Channel Interleaving	Auto	1-way Interleave			
			2-way Interleave	3-way Interleave			
		Rank Interleaving	Auto	1-way Interleave	2-way Interleave		
			4-way Interleave	8-way Interleave			
		Socket Interleave Below 4GB	Enable	Disable			
	Memory RAS Configuration	Static Virtual Lockstep Mode	Enable	Disable			
		Mirror mode	Enable Mirror Mode (1LM)	Disable			
		Mirror TAD0	Enabled	Disable			
		Enable Partial Mirror	Partial Mirror Mode (1LM)	Disable			
		UEFI ARM Mirror	Enable	Disable			
		Memory Rank Sparing	Enable	Disable			
		Correctable Error Threshold	Min= 0x0, Max= 0x7fff				
		SDDC Plus One	Enable	Disable			
		ADDDC Sparing	Enable	Disable			
		Set NGN Die Sparing	Enable	Disable			
		Patrol Scrub	Enable	Disable			
		Patrol Scrub Interval	Min=0, Max=24				
		Patrol Scrub Address Mode	Reverse Address	System Physical Address			
	NGN Configuration	NGNVM DIMM Secure Erase Unit	NGN Factory Reset/Clear	Enable	Disable		
			Average Power Budget	Min=10000, Max=18000			
			Publish ARS capability	Auto	Enable	Disable	
			NGN CMD Time	Auto	1N	2N	
			NGN ECC Read Check	Auto	Enable	Disable	
			Thermal Throttling Thresholds Offset	Auto	Enable		
			CR Fast Go Configuration	Auto	Default	Option 1 ~ 5	
			CR Latch System ShutdoWn State	Enable	Disable		
			Snoopy mode for 2LM	Enable	Disable		
			Extended Type 17 Structure	Enable	Disable		
			Enable power cycle policy	Enable	Disable		
			Snoopy mode for AD	Enable	Disable		

Memory Configuration	NGN Configuration	NGNVM DIMM Secure Erase Unit	App Direct Memory Hole	Enable	Disable	
			LSx implementation	SWSMI	ASL	
			SMBus Max Access Time	Min= 0, Max= 4294967295		
			SMBus Release Delay	Min= 0, Max= 4294967295		
			Erase All DIMMs	Enable	Disable	
			S0 CH0~5 S1 CH0~5 S2 CH0~5 S3 CH0~5	Enable	Disable	
	Memory Dfx Configuration	Load NGN DIMM Management Drivers	Auto	Enable	Disable	
		Memory Interleaving	Auto	NUMA	2-way Node Interleave	4-way Node Interleave
		Lock NGN CSRs	Auto	Enable	Disable	
		NGN ECC Correctable error	Auto	Enable	Disable	
		NGN ECC Write Check	Auto	Enable	Disable	
		NGN ECC Write Retry Flow Exit	Auto	Enable	Disable	
		C/A Parity Enable	Auto	Enable	Disable	
		High Address Region	Auto	Bit Postion 33~45		
		Low Mem Channel Config	Auto	Channel 0	Channel 1	Channel 2
		CLX A0 Starve Threshold	Enable	Disable		
		Configuration Mask for 2LM	Normal	Aggressive		
		CR Halt/Warn Mixed SKU	Auto	Enable	Disable	
		Crystal Ridge ACPI Debug Interface	ACPI Debug Object	COM1		
		NFIT debug logs	Enable	Disable		
		NFIT NVDIMM SKU Based	Enable	Disable		
		Publish NVDIMM DIMM Ctrl Region SPA	Enable	Disable		
		Skip ARS on Boot	Enable	Disable		
		ECC Checking	Auto	Enable	Disable	
		2GB Short Stroke Configuration	Interleaved	Non-Interleaved	Disable	
		Force 1-Ch Way in FM 2-2-2 Configuration	Enable	Disable		

IIO Configuration	PCI 64-Bit Resource Allocation	Enable		Disable	
	PCIe Train by BIOS	Yes		No	
	PCIe Hot Plug	Auto	Manual	Enable	Disable
	PCIe ACPI Hot Plug	Enable	Disable	Per-Port	
	PCI-E Completion Timeout (Global) Disable	Yes	No	Per-Port	
	PCI-E Global Timeout Value	50us to 10ms	16ms to 55ms	65ms to 210ms	260ms to 900ms
		1s to 3.5s	4s to 13s	17s to 64s	
	PCI-E ASPM Support (Global)	L1 Only	Disable	Per-Port	
	IOAT Configuration	Sck0 IOAT Config	Disable TPH	Yes	No
			Prioritize TPH	Enable	Disable
			Relaxed Ordering	Enable	Disable
			IOAT Function 0/1/2/3/4/5/6/7 Items	DMA	Enable
					Disable
				No Snoop	Enable
					Disable
	Intel® VT for Directed I/O (VT-d)	Intel® VT for Directed I/O (VT-d)	Enable	Disable	
		Interrupt Remapping	Enable	Disable	
		PassThrough DMA	Enable	Disable	
		ATS	Enable	Disable	
		Posted Interrupt	Enable	Disable	
		Coherency Support (Non-Isoch)	Enable	Disable	
		Access Control Services	Enable	Disable	
	Intel® VMD technology	Intel® VMD for Volume Management Device on Socket 0/1/2/3	Intel® VMD for Volume Management Device for PStack0~ PStack2	Enable	Disable
			VMD port 1A~1D/ 2A~2D/ 3A~3D	Enable	Disable
			Hot Plug Capable	Enable	Disable
			CfgBar size	Min=20, Max=28	
			CfgBar attribute	32-bit non-prefetchable	
				64-bit non-prefetchable	
				64-bit prefetchable	
			MemBar1 size	Min=12, Max=47	
			MemBar1 attribute	32-bit non-prefetchable	
				64-bit non-prefetchable	
				64-bit prefetchable	
			MemBar2 size	Min=12, Max=47	

IIO Configuration	Intel® VMD technology	Intel® VMD for Volume Management Device on Socket 0	MemBar2 attribute	32-bit non-prefetchable	
				64-bit non-prefetchable	
				64-bit prefetchable	
Advanced Power Configuration	CPU P State Control	WFR Uncore GV Rate Reduction	Auto	Enable	Disable
		Uncore Freq Scaling (UFS)	Enable	Disable	
		AVX ICCP pre-grant level	128 Heavy	256 Light	256 Heavy
			512 Light	512 Heavy	
		SpeedStep (Pstates)	Enable	Disable	
		Config TDP	Normal	Level 1	Level 2
		P State Domain	All	One	
		EIST PSD Function	HW_ALL	SW_ALL	SW_ANY
		SINGLE_PCTL	Enable	Disable	
		Single Power Domain (SPD)	Enable	Disable	
		Boot performance mode	Max Performance	Max Efficient	Set by Intel Node Manager
		Energy Efficient Turbo	Enable	Disable	
		Turbo Mode	Enable	Disable	
		CPU Flex Ratio Override	Enable	Disable	
		Perf P-Limit Differential	Min=0, Max=7		
		Perf P-Limit Clip	Min=0, Max=31		
		Perf P-Limit Threshold	Min=0, Max=31		
		Perf P Limit	Enable	Disable	
	Hardware PM State Control	Hardware P-States	Disable	Native Mode	
			Out of Band Mode	Native Mode with No Legacy Support	
		HardwarePM Interrupt	Enable	Disable	
		EPP Enable	Enable	Disable	
		APS rocketing	Enable	Disable	
		Scalability	Enable	Disable	
		RAPL Prioritization	Enable	Disable	
	Package C State Control	Package C State	C0/C1 state	C2 state	
			C6(non Retention)	C6(Retention) state	
			No Limit	Auto	
		C2C3TT	Min=0, Max=255		
		PKG C-state Lat. Neg.	Enable	Disable	
		LTR IIO Input	Take IIO LTR input	Ignore IIO LTR input	
		MDLL Off	Auto	Enable	Disable
		Latency Tolerence Requirement	Snoop Latency Override	Enable	Disable
			Force Snoop Latency Override	Enable	Disable
			Snoop Latency Multiplier	Min=0, Max=7	
			Force Non-Snoop Latency Override	Min=0x0, Max=0x3ff	

Advanced Power Configuration	Package C State Control	Latency Tolerence Requirement	Non-Snoop Latency Override	Enable	Disable
			Non-Snoop Latency Multiplier	Min=0, Max=7	
			Non-Snoop Latency Value	Min=0x0, Max=0x3ff	
		Pkg C-state SA Power Management Control	CPU0 SAPMCTL_CFG/ CPU1 SAPMCTL_CFG/ CPU2 SAPMCTL_CFG/ CPU3 SAPMCTL_CFG	IIO0_PKGC_ CLK_GATE_ DISABLE	Enable
					Disable
				IIO1_PKGC_ CLK_GATE_ DISABLE	Enable
					Disable
				IIO2_PKGC_ CLK_GATE_ DISABLE	Enable
					Disable
				UPI01_PKGC_ CLK_GATE_ DISABLE	Enable
					Disable
				UPI23_PKGC_ CLK_GATE_ DISABLE	Enable
					Disable
				MC1 PKGC CLK GATE DISABLE	Enable
					Disable
				MC0 PKGC CLK GATE DISABLE	Enable
					Disable
				UPI01 PLL Shutdown En	Enable
					Disable
				UPI23 PLL Shutdown En	Enable
					Disable
				PCIe IIO0 PLL Shutdown En	Enable
					Disable
				PCIe IIO1 PLL Shutdown En	Enable
					Disable
				PCIe IIO2 PLL Shutdown En	Enable
					Disable
				MC0 PLLs Shutdown En	Enable
					Disable
				MC1 PLLs Shutdown En	Enable
					Disable
				SetVID Decay Disable	Enable
					Disable
				SAPMCTL_CFG LOCK	Enable
					Disable

4.4.6 ME Configuration

ME Configuration					
Server ME Configuration	General ME Configuration	Altitude	Min=0x0, Max=0xffff		
		MCTP Bus Owner	Min=0x0, Max=0xffff		
Server ME Debug Configuration	Server ME General Configuration	ME Initialization Complete Timeout	Min=0, Max=12		
		Enable HSIO Messaging	Enable	Disable	
		DRAM Init Done Enable	0	1	None
		DRAM Initialization Status	Auto - true status	0 - Success	
			1 - No Memory in Channels	2 - Memory Init Error	
		Host Reset Warning	0	1	None
		Enable Pre-DramInit Done ME Reset	0	1	None
		HMRFPO_LOCK Message	Enable	Disable	
		HMRFPO_ENABLE Message	Enable	Disable	
		END_OF_POST Message	Enable	Disable	
		HECI-1 Enable HECI-2 Enable HECI-3 Enable	Enable	Disable	
		Core Bios Done Message	Enable	Disable	
	Override ICC Clock Settings	Override ICC Clock Settings	Override ICC Clock Settings	0	
				1	
				None	
			ICC Clock Spread Spectrum	0	
				1	
				None	
		NM Configuration	Boot Mode Override	0	
				1	
				None	
			Boot Mode	Performance Optimized	
				Power Optimized	
			Cores Disable Override	0	
				1	
				None	
			Cores To Disable	Min=0x0, Max=0x7f	
			Power Measurement Override	0	
				1	
				None	
			Power Measurement	Enable	
				Disable	
			Hardware Change Override	0	
				1	
				None	
			Hardware Changed	Yes	
				No	

4.4.7 PCH Configuration

PCH Configuration						
PCH Devices	PCH state after G3	S0	S5	Last State		
PCH SATA Configuration	SATA Controller	Enable	Disable			
	Configure SATA as	AHCI	RAID			
	Support Aggressive Link Power Management	Enable	Disable			
	Port 0~7	Enable	Disable			
	SATA Port 0 DevSlp	Enable	Disable			
	Hot Plug	Enable	Disable			
	Configure as eSATA	Enable	Disable			
	Mechanical Presence Switch	Enable	Disable			
	Spin Up Device	Enable	Disable			
	SATA Device Type	Hard Disk Drive	Sata State Drive			
	SATA Topology	Unknown	ISATA	Direct Connect	Flex	M2
PCH sSATA Configuration	sSATA Controller	Enable	Disable			
	Configure sSATA as	AHCI	RAID			
	Support Aggressive Link Power Management	Enable	Disable			
	Port 0~5	Enable	Disable			
	sSATA Port 0~5 DevSlp	Enable	Disable			
	Hot Plug	Enable	Disable			
	Configure as eSATA	Enable	Disable			
	Spin Up Device	Enable	Disable			
	sSATA Device Type	Hard Disk Drive	Sata State Drive			
	SATA Topology	Unknown	ISATA	Direct Connect	Flex	M2
USB Configuration	USB Precondition	Enable	Disable			
	USB Per-Connector Disable	Enable	Disable			
	USB XHCI MSI Disable WA	Enable	Disable			
	XHCI Over Current Pins	Enable	Disable			
	XHCI Wake On Usb Enable	Enable	Disable			
	Place XHCI BAR below 4GB	Enable	Disable			
ADR Configuration	Enable/Disable ADR	Platform-POR	Enable	Disable		
	ADR GPIO	GPIO B	GPIO C			
	Host Partition Reset ADR Enable	Platform-POR	Enable	Disable		
	Enable/Disable ADR Timer	Platform-POR	Enable	Held-off		
	ADR timer expire time	Platform-POR	0 uS	25 uS	50 uS	100 uS
	ADR timer multiplier	Platform-POR	x1, x8, x24, x40, x56, x64, x72, x80, x88, x96			

4.4.8 H2O IPMI Configuration

H2O IPMI Configuration			
IPMI Support	Enable	Disable	
BMC Warmup Time	Min=0, Max=240		
ACPI SPMI Table	Enable	Disable	
Boot Option Support	Enable	Disable	
Set BIOS version to BMC	Enable	Disable	
BMC Configuration	Watchdog Timer Support	Enable	Disable
	Not disable in OS	Enable	Disable
	Watchdog Timer Timeout	Min=2, Max=8	
	Watchdog Timer Action	No Action	Hard Reset
		Power Down	Power Cycle
	Power Cycle Time Support	Enable	Disable
	Power Cycle Time	Min=0, Max=255	
	Power Button	Enable	Disable
	Reset Button	Enable	Disable
	NMI Button	Enable	Disable
	LAN Port Configuration	Dedicated	Shared
	LAN Channel Number	Min=0, Max=15	
	IPv4 Source	Static	DHCP
	IPv6 Mode	Enable	Disable
	IPv6 Prefix Length	Min=0, Max=255	
SDR List	SDR List Support	Enable	Disable

4.4.9 APEI Configuration

APEI Configuration					
ACPI Platform Error Interface	APEI Support	Enable		Disable	
	APEI Error Injection	MEMORY_CE	MEMORY_UE_NON_FATAL	MEMORY_UE_FATAL	PCIE_CE
		PCIE_UE_NON_FATAL	PCIE_UE_FATAL	Disable	
	Defrag Level	ROM Space under 1/4	ROM Space under 1/3	ROM Space under 1/2	Every time When Error Occur
	APEI UEFI Revision	UEFI 2.2		UEFI 2.3.1	

4.4.10 Console Redirection

Console Redirection								
Console Serial Redirection Setup	Console Serial Redirect	Enable				Disable		
	Terminal Type	VT_100		VT_100+		VT_UTF8		PC_ANSI
	Baud Rate	1200	2400	4800	9600	19200	38400	57600	115200
	Data Bits	7 Bits				8 Bits		
	Parity	Even		Odd		None		
	Stop Bits	1 Bits				2 Bits		
	Flow Control	RTS/CTS		XON/XOFF		None		
	Information Wait Time	0 Second	2 Second	5 Second	10 Second	30 Second		
	C.R. After Legacy Boot	Yes				No		
	Text Mode Resolution	AUTO	Force 80x25	Force 80x24 (DEL FIRST ROW)	Force 80x24 (DEL LAST ROW)	Limit 128x40 (Default)		
	Auto Refresh	Enable				Disable		
	Auto adjust Terminal resolution	Enable				Disable		

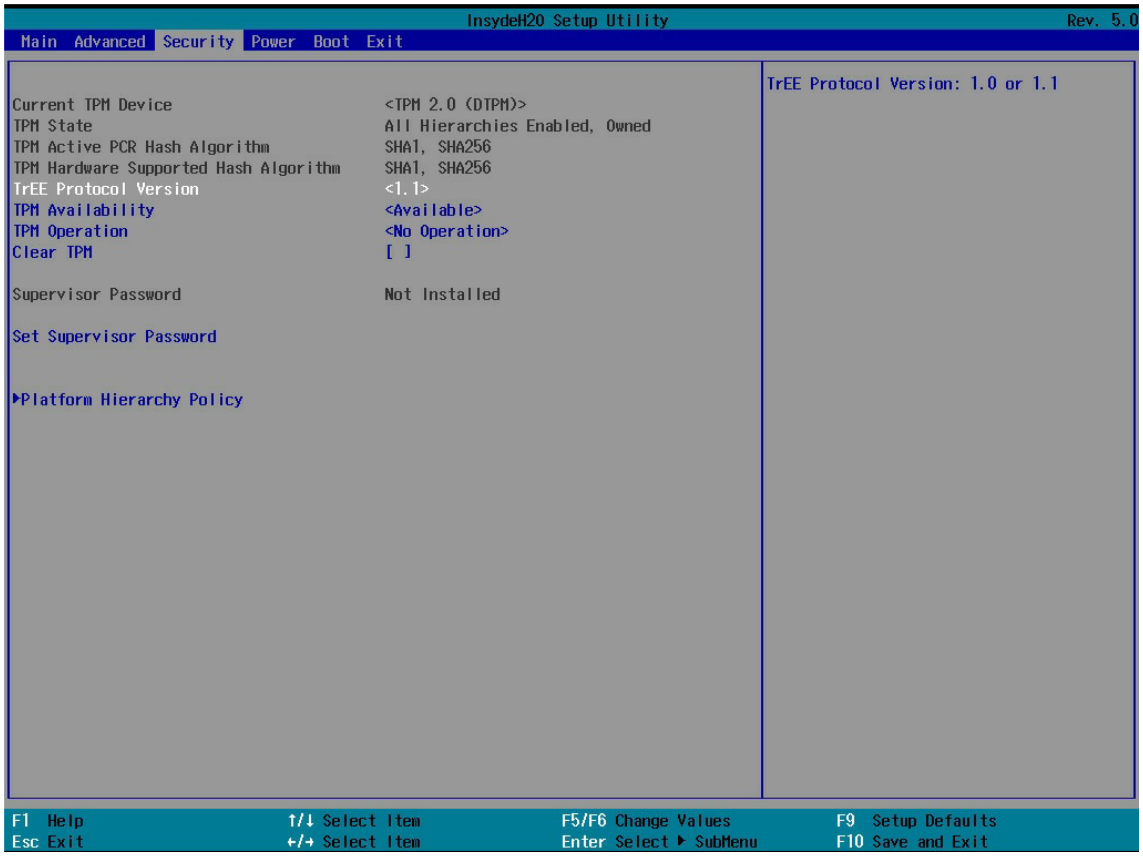
4.4.11 H2O Event Log Config Manager

H2O Event Log Config Manager						
Configuration Pages	BIOS Event Log Configuration	BIOS Event Log Viewer	Log Event To	ALL	BIOS	
				BMC SEL	Memory	Disable
			Event Log Full option	Overwrite	Clear All	Stop Logging
	POST Message Configuration	POST Message Configuration		Enable	Disable	
		Progress Code		Enable	Disable	
		Error Code		Enable	Disable	
		Debug Code		Enable	Disable	
		Log POST Message		Enable	Disable	
		Show POST Message		Enable	Disable	
	Serial Debug Message Configuration	EFI DEBUG Message Configuration	Advanced Mode	Enable	Disable	
			DEBUG_INIT	Enable	Disable	
			DEBUG_WARN	Enable	Disable	
			DEBUG_LOAD	Enable	Disable	
			DEBUG_FS	Enable	Disable	
			DEBUG_INFO	Enable	Disable	
			DEBUG_ DISPATCH	Enable	Disable	
			DEBUG_ VARIABLE	Enable	Disable	
			DEBUG_BM	Enable	Disable	
			DEBUG_BLKIO	Enable	Disable	
			DEBUG_NET	Enable	Disable	
			DEBUG_UNDI	Enable	Disable	
			DEBUG_ LOADFILE	Enable	Disable	
			DEBUG_EVENT	Enable	Disable	
			DEBUG_GCD	Enable	Disable	
			DEBUG_CACHE	Enable	Disable	
			DEBUG_ VERBOSE	Enable	Disable	
			DEBUG_ERROR	Enable	Disable	
			EFI DEBUG Message Level	Enable	Disable	
		Status Code Serial Message Configuration	Show Progress Code Serial Message	Enable	Disable	
			Show Error Code Serial Message	Enable	Disable	
			Show Debug Code Serial Message	Enable	Disable	
Event And Message Pages	BIOS Event Log Viewer	Show BIOS Event Log				
	Serial Debug Message Viewer					

4.4.12 H2oUve Configuration

H2oUve Configuration			
H2oUve Setup	H2OUVE Support	Enable	Disable

4.5 Security



4.5.1 Security

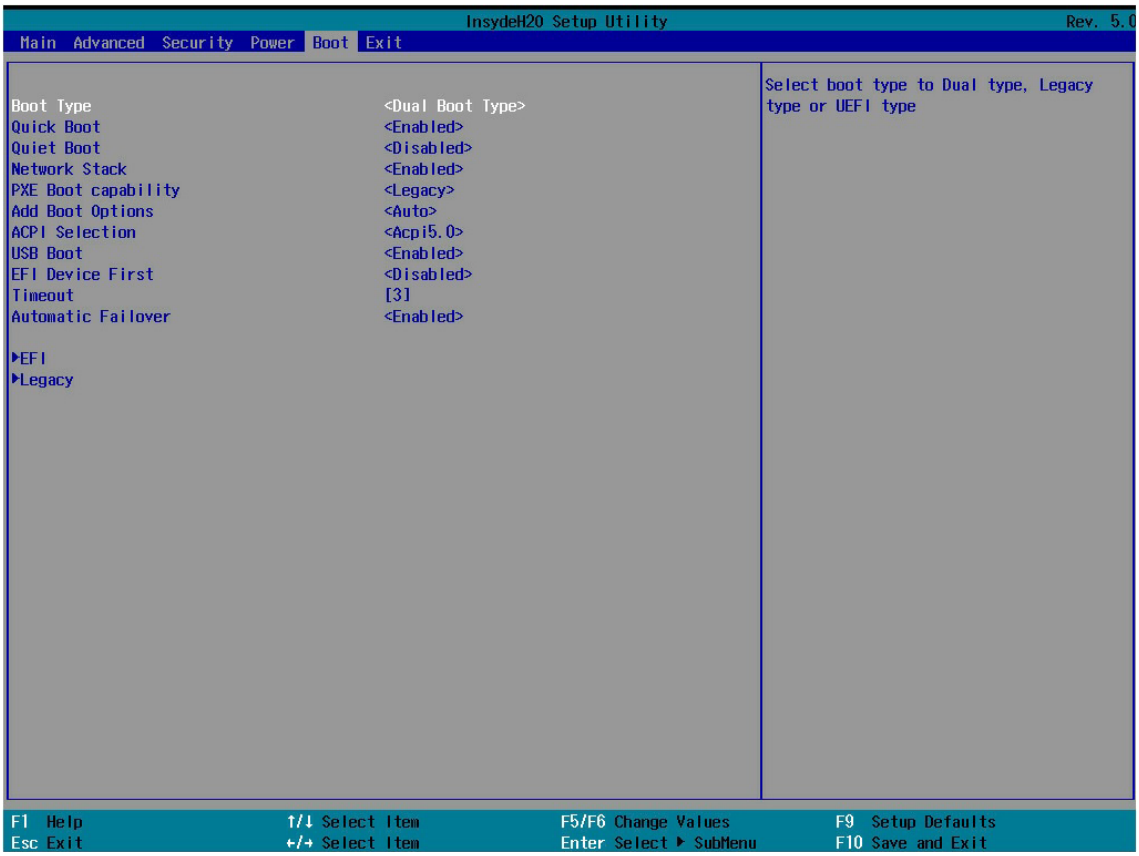
Security			
Current TPM Device	Not Detected	TPM 1.2	TPM 2.0
TPM Active PCR Hash Algorithm	SHA1, SHA256		
TPM Hardware Supported Hash Algorithm	SHA1, SHA256		
TrEE Protocol Version	1.0	1.1	
TPM Availability	Available	Hidden	
TPM Operation	No operation	Disable and Deactivate	Enable and Activate
Clear TPM	0	1	None
Power on Password	Enable	Disable	

4.6 Power

4.6.1 Power

Power		
Wake on PME	Enable	Disable

4.7 Boot



4.7.1 Boot

Boot				
Boot Type	Dual Boot Type	Legacy Boot Type		UEFI Boot Type
Quick Boot	Enable	Disable		
Quiet Boot	Enable	Disable		
Network Stack	Enable	Disable		
PXE Boot capability	Disable	UEFI:IPv4		UEFI:IPv6
	UEFI:IPv4/UEFI:IPv6	Legacy		
Add Boot Options	First	Last		Auto
ACPI Selection	Acpi1.0B	Acpi3.0		Acpi4.0
	Acpi5.0	Acpi6.0		Acpi6.1
USB Boot	Enable	Disable		
EFI Device First	Enable	Disable		
Timeout	Min=0, Max=10			
Automatic Failover	Enable	Disable		
EFI	Normal Boot Menu	Normal		Advance
	Boot Type Order	Hard Disk Drive CD/DVD-ROM Drive USB PXE Other Device		
	Other Device			
Legacy	Boot Device Priority	Normal Boot Menu	Normal	Advance
	Boot Type Order	Floppy Drive Hard Disk Drive CD/DVD-ROM Drive USB Others		
	USB			

4.8 Exit

4.8.1 Exit

Exit	
Exit Saving Changes	Exit system setup and save your changes.
Save Change Without Exit	Save your changes without exiting the system.
Exit Discarding Changes	Discard your changes when existing the system.
Load Optimal Defaults	Load optimal default items.
Load Custom Defaults	Resets the BIOS settings to the default values and overwrites any previously customized settings.
Save Custom Defaults	Saves the cumostomized defaults in BIOS settings.
Discard Changes	Discard your changes.

4.9 BIOS Update Process

This is the manual for updating BIOS on **VIRGO** system, the new BIOS supports to update from BIOS ver VIRG1070 or later. Here are the update procedures

DOS:
1. Copy VIRG1080.bin into **dos** folder
2. Copy dos folder to USB stick or HDD
3. Enter to DOS folder and execute the below command flash.bat
4. Reboot if complete the updated

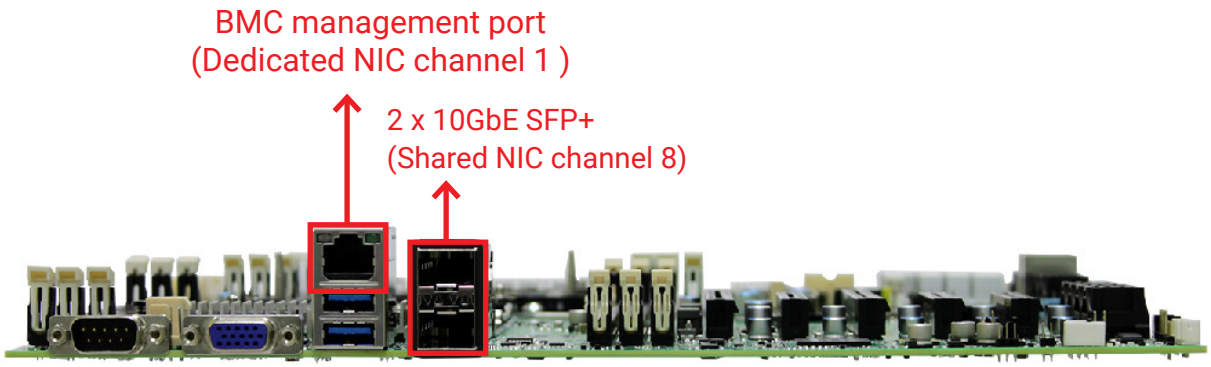
Linux:
1. Copy VIRG1080.bin into linux/ InsydeH2OFFT_x86_LINUX64_200.02.00.02 folder
2. Copy linux folder to USB stick or HDD
3. Enter to linux folder and execute the below command./flash.sh
4. Reboot if complete the updated

EFI:
1. Copy VIRG1080.bin into **efi** folder
2. Copy efi folder to USB stick or HDD
3. Boot into internal shell enters the usb efi folder and executes the below command Bios.nsh
4. Reboot if complete the updated

NOTE
Please refer to “Bios Update Process.doc” in bios release zip file for details.

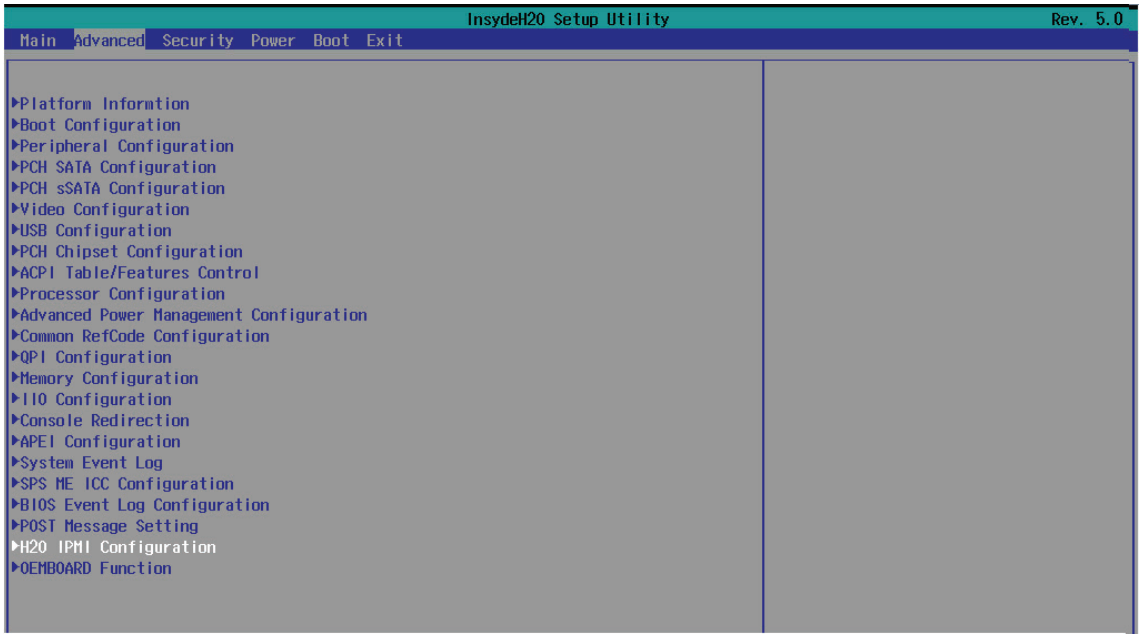
Chapter 5. BMC Configuration Settings

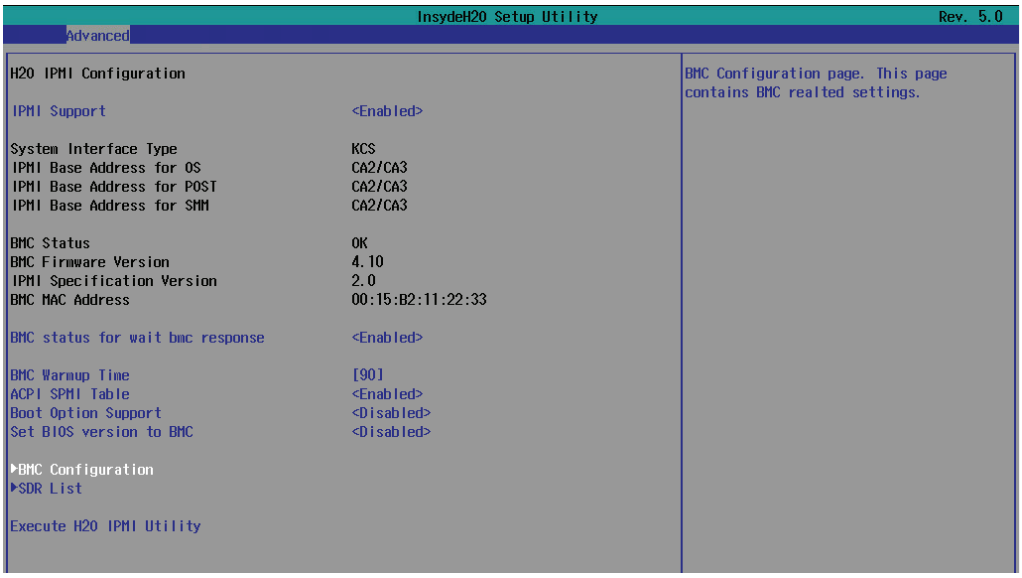
Insert Ethernet LAN cable into the BMC LAN port. There are two methods to setup BMC IP:

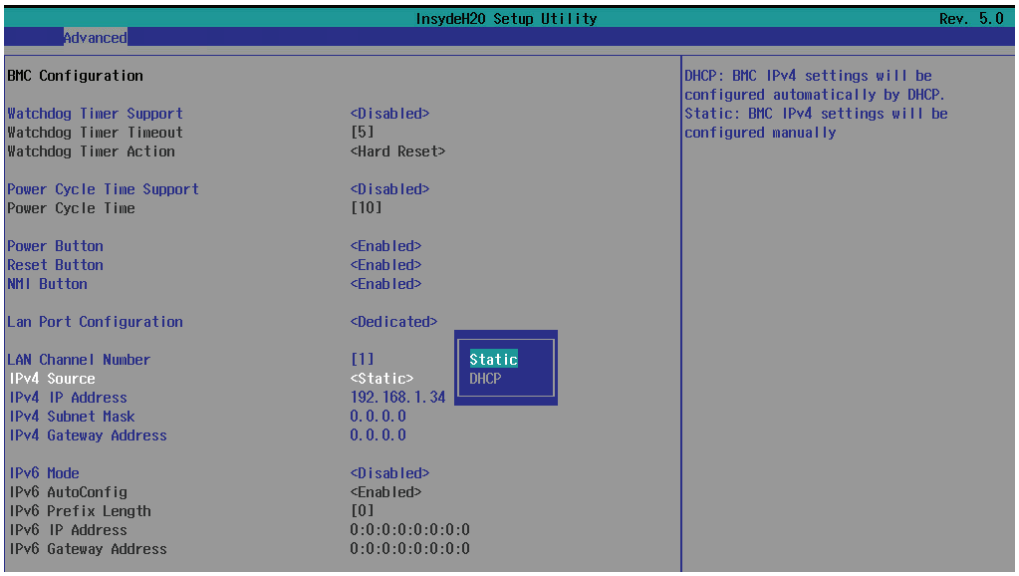


5.1 Setup

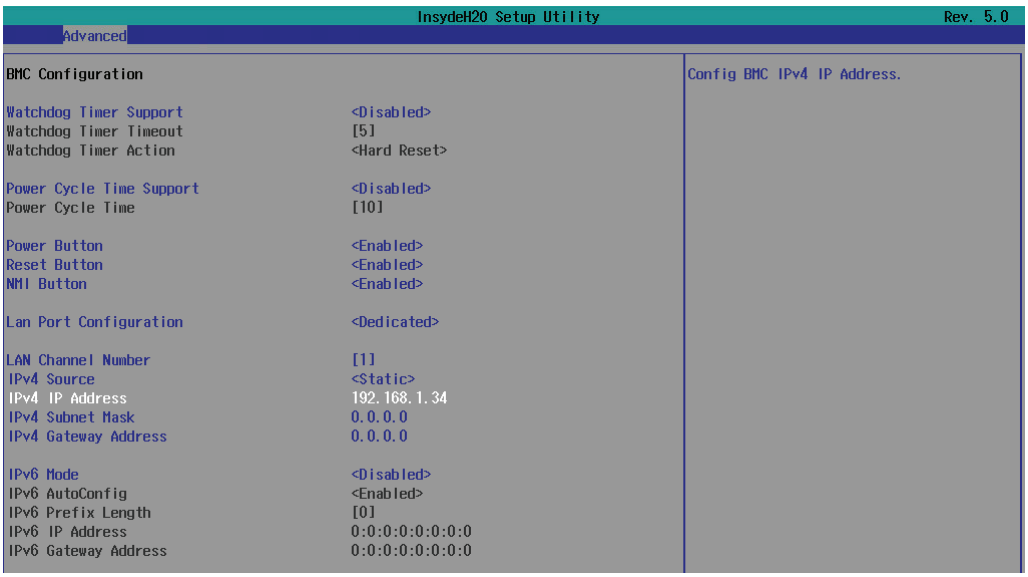
Step 1 BIOS SETUP → Advanced → H2O IPMI configuration → BMC Configuration → IPv4 source → Static







Step 2 Input the IP address. Set static IP.

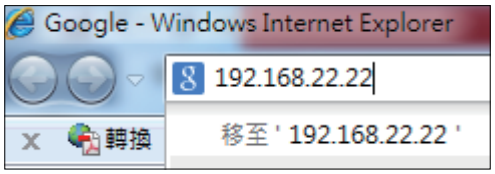


Step 3 Input the subnet mask address.

5.2 Web GUI

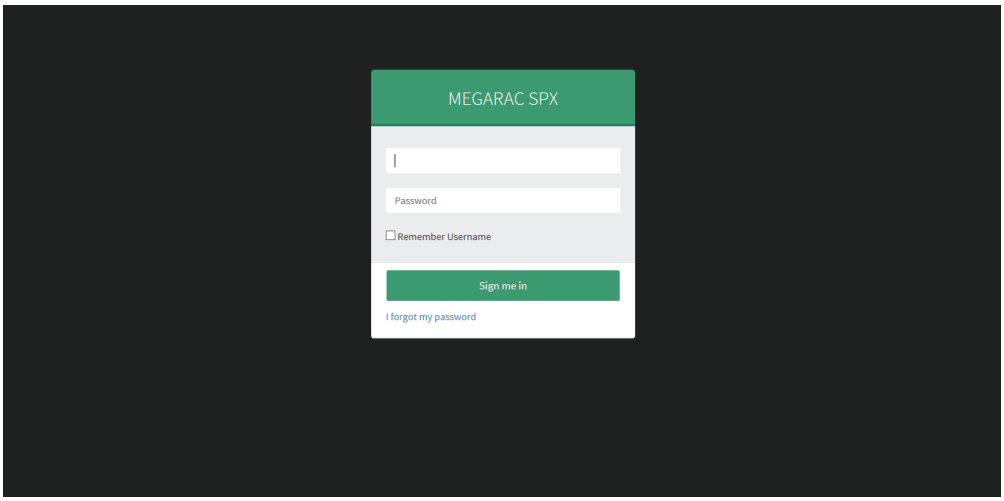
The IP address below is an example using the default IP setting. The IP address is configurable.

Step 1 Open the browser then type default BMC IP address: 192.168.22.22



Step 2 Use the default user name and password for first-time login to BMC WEB GUI.

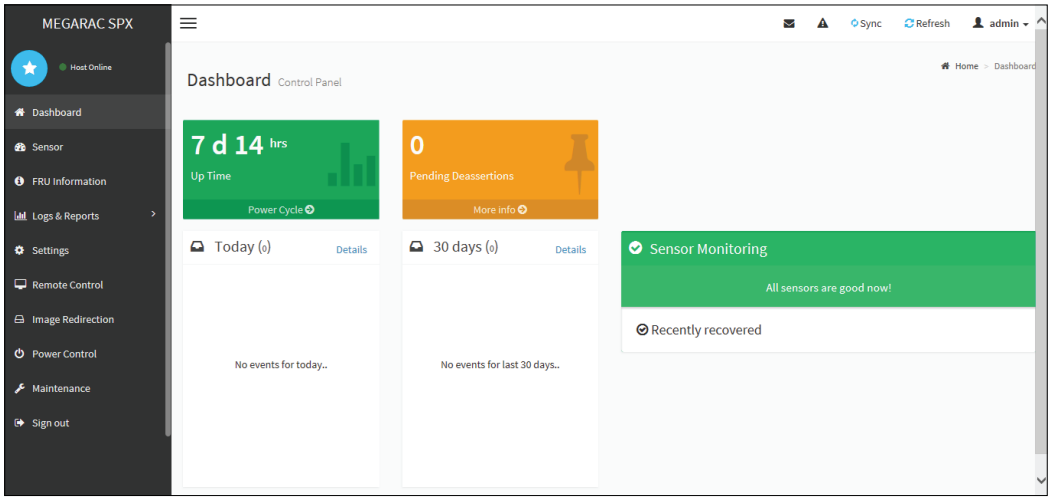
Field:	Default
User Name:	admin
Password:	admin



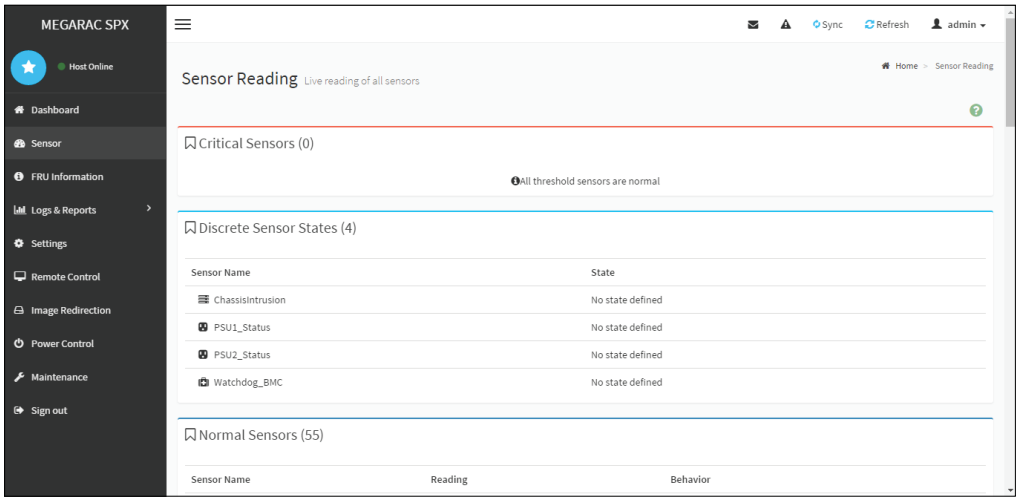
NOTE
The default user name and password are in lower-case characters.

NOTE
Users who login with the admin user name and password will have full administrative power. The admin password can be changed after login.

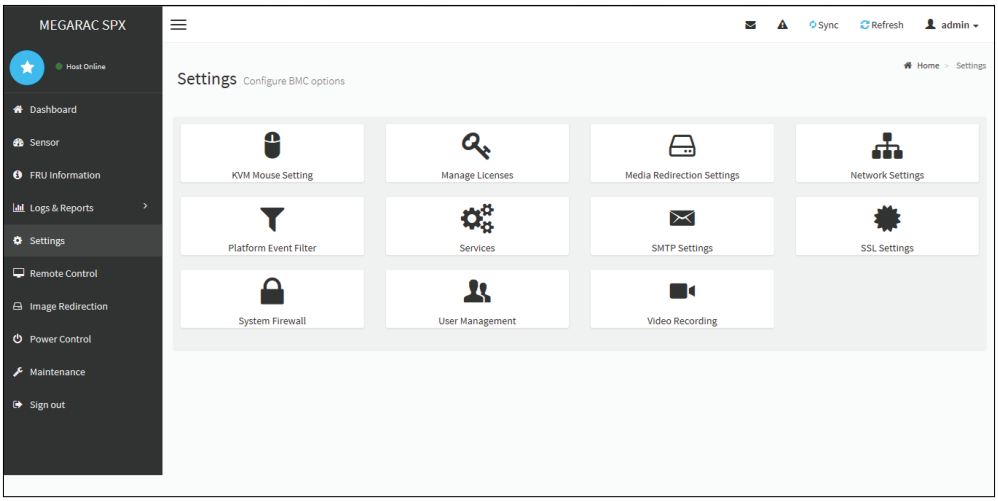
Dashboard: The Dashboard page gives the overall information about the status of a device.



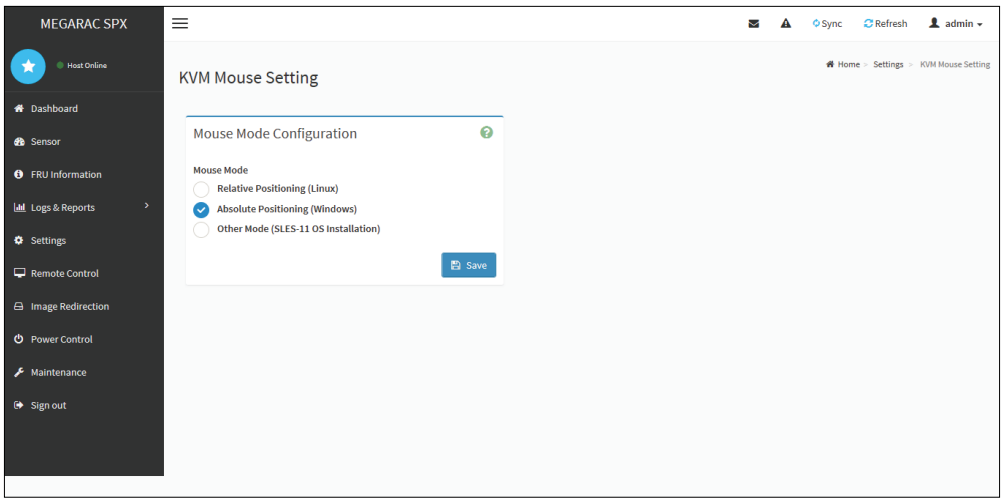
Server Health - Sensor Readings: Then Sensors Readings page displays all the sensor related information.



Settings: The Settings page allows you to access various configuration settings.

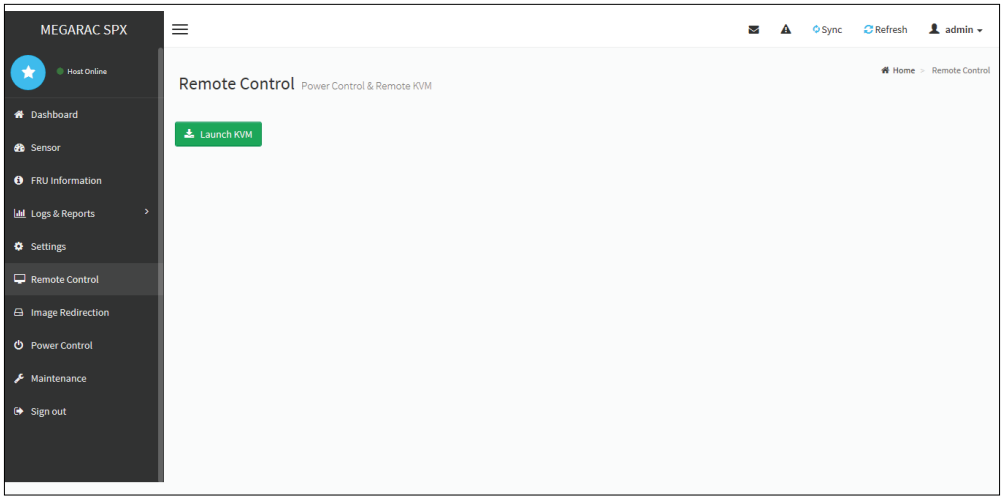


KVM Mouse Setting: The KVM Mouse Setting page displays the setting for mouse emulation from local window to remote screen.

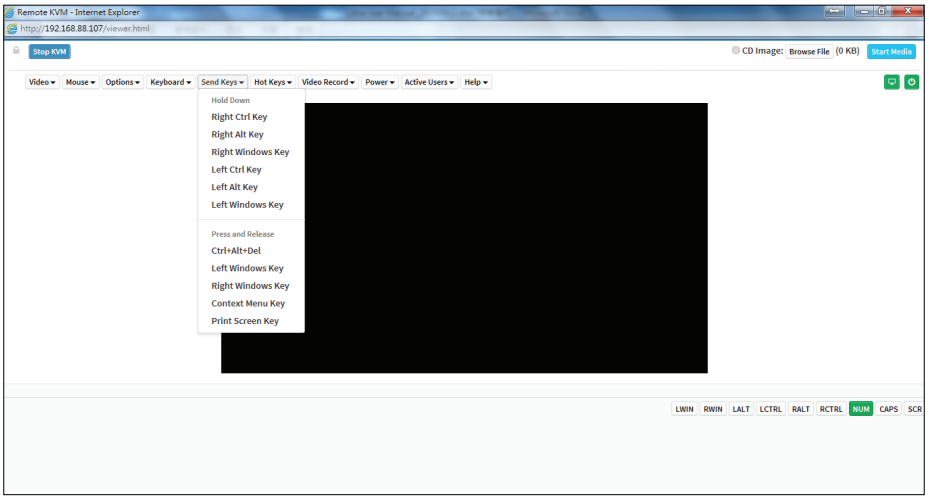


- For Windows OS environment, set mode to absolute.
- For Linux OS environment, set mode to relative.
- For SLES-11 OS environment, set mode to other mode.

Remote Control: The Remote Control page allow you to access any of the managed devices within your system.



Environmental setting:



NOTE
For further details about the BMC, please refer to BMC section in the Virgo manual for reference.
AIC® website link: https://www.aicipc.com/en/productdetail/20855.

5.2.1 Firmware Update

This wizard takes you through the process of firmware upgradation. A reset of the box will automatically follow if the upgrade is completed or cancelled. An option to Preserve All Configuration is available. Enable it, if you wish to preserve configured settings through the upgrade.

Warning: Please note that after entering update mode widgets, other web pages and services will not work. All open widgets will be closed automatically. If upgrade process is cancelled in the middle of the wizard, the device will be reset.

> **NOTE**
> The firmware upgrade process is a crucial operation. Make sure that the chances of a power or con¬nectivity loss are minimal when performing this operation.
> Once you enter into Update Mode and choose to cancel the firmware flash operation, the Mega¬RAC® card must be reset. This means that you must close the Internet browser and log back onto the MegaRAC® card before you can perform any other types of operations.
> Once Firmware upgrade using web is started, the regular IPMI command will not be allowed for safety concern if Enable IPMI Command handling during flashing support is disabled in project configuration.

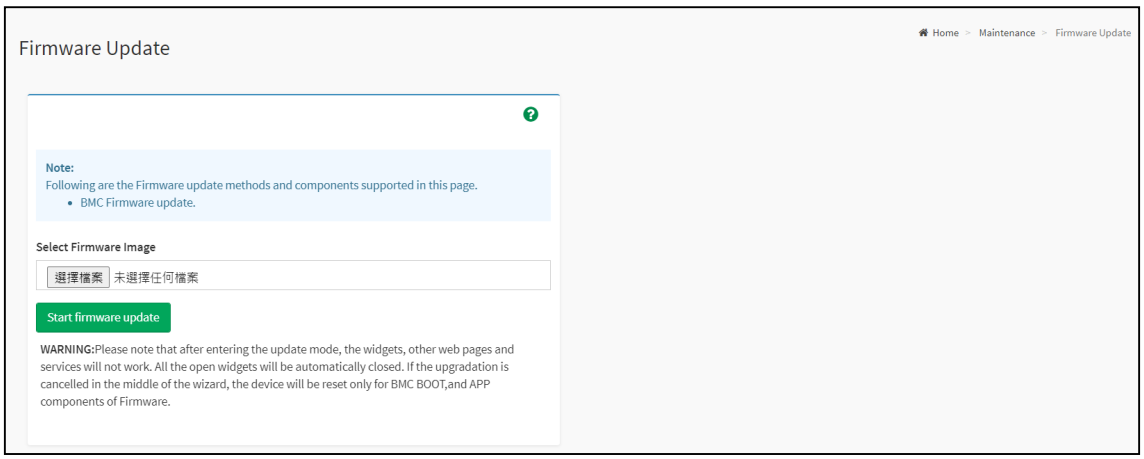
To configure, choose Firmware Image Location under Maintenance. To open Firmware Update page, click Maintenance → Firmware Update from the menu bar.

Procedure

1. Click Browse to select firmware image.

> **NOTE**
> A file upload pop-up will be displayed for http/https but in the case of tftp files, the file is automatically uploaded displaying the status of upload.

2. Click Start firmware update to load the Firmware Update information. A sample screenshot is displayed below.



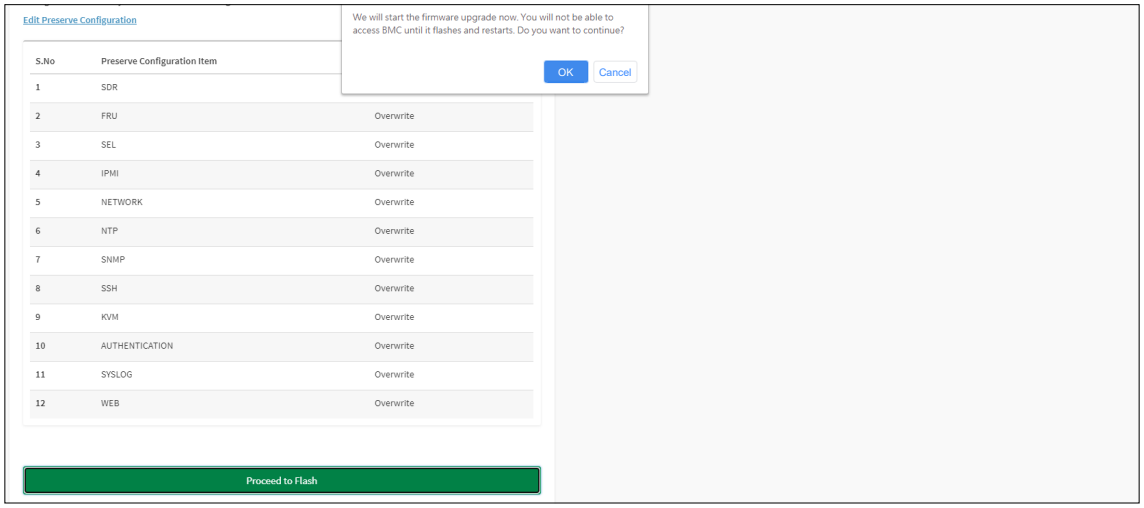
> **NOTE**
> SignImage Public Key is feature based option. If encrypted Signimage feature is enabled, then support to Upload a public.pem key info option will be available.

3. Click Preserve all Configuration to preserve all configuration.
   - **Preserve all Configuration**: To preserve all configuration.
   - **Edit Preserve Configuration**: To modify the Preserve status settings.

This wizard takes you through the process of AMI based firmware upgradation. The protocol information to be used for firmware image transfer during this update is as follows.

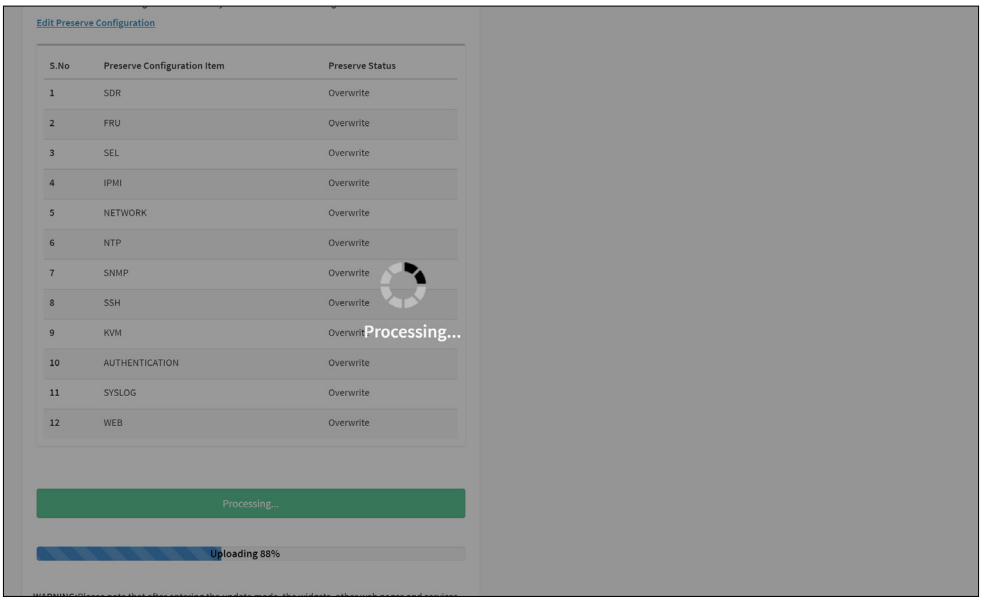
> **NOTE**
> All configuration items will be preserved/overwrite as default during the restore configuration operation.

4. Click Proceed to Flash, it will prompt you with the warning message. Click Ok to start the Firmware update.



5. The Firmware update undergoes the following steps:
   a. Closing all active client requests
   b. Preparing Device for Firmware Upgrade
   c. Uploading Firmware Image.

A sample screenshot is shown as below.



d. Verifying Firmware Image

In Section Based Firmware Update, you can configure the firmware image for section based flashing. Check the required sections and click Proceed to update the firmware.

If flashing is required for all images, select the option Full Flash .

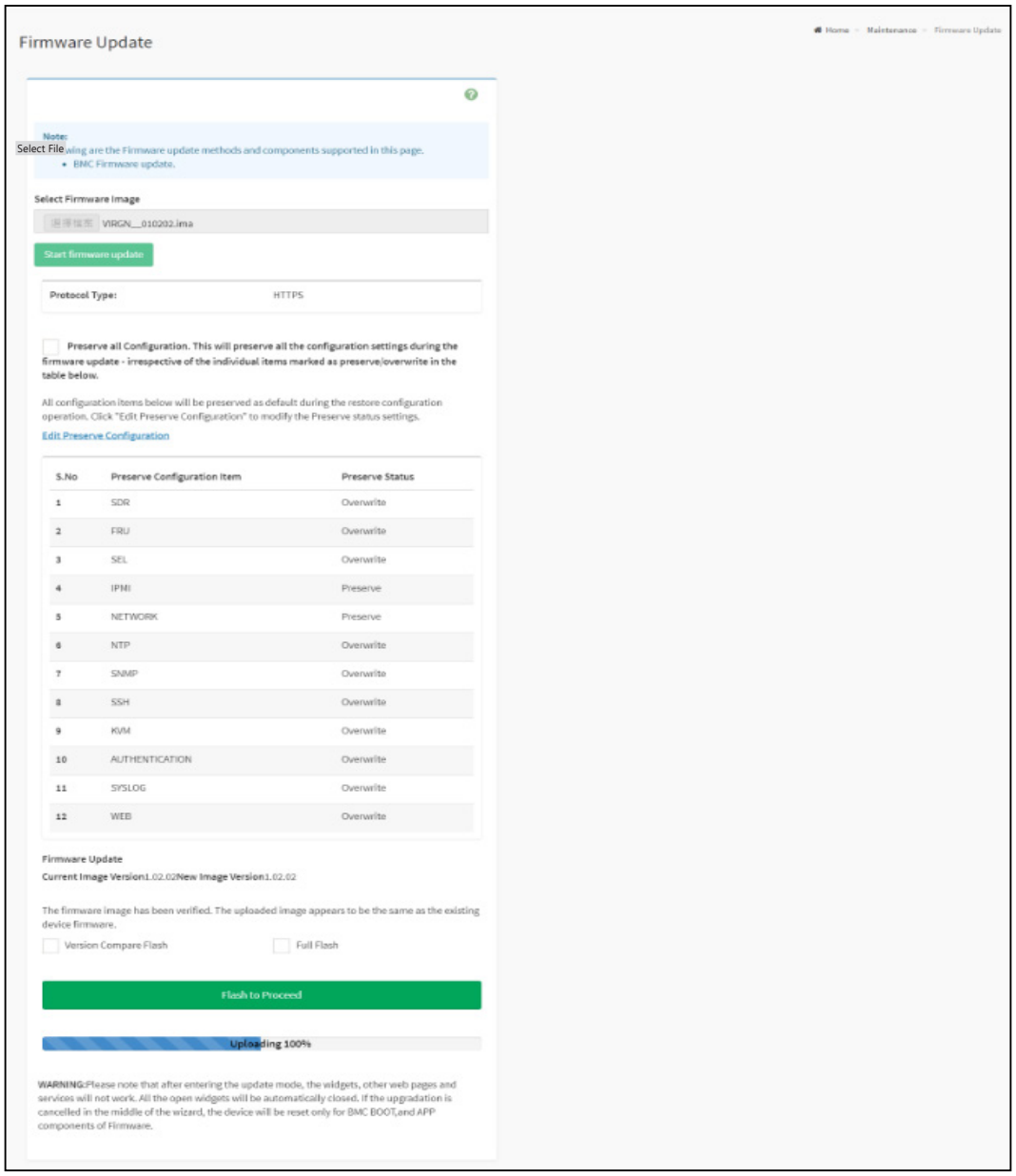
If you select Version Compare Flash option from web, the current and uploaded module versions, FMHlocation, size will be compared.

If the modules differ in size and location, proceed with force firmware upgrade.

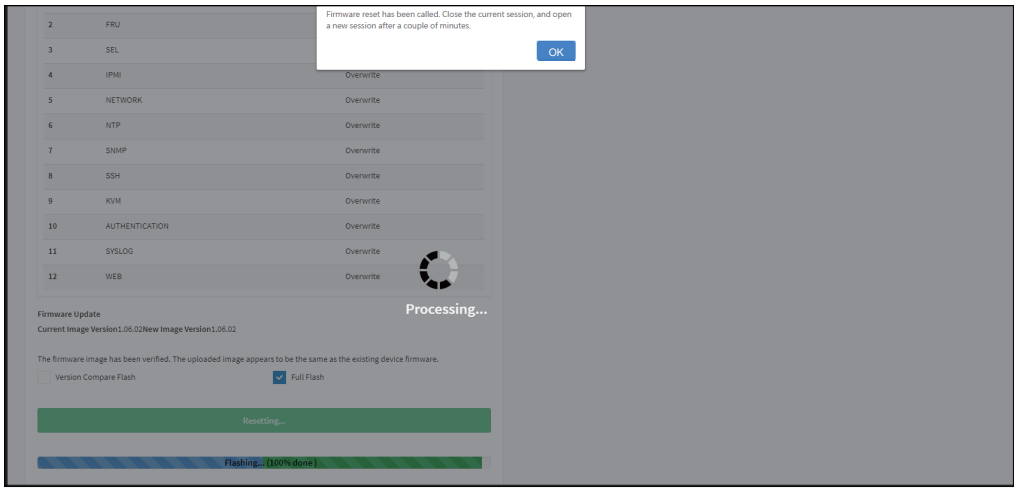
If all the module versions are same, restart BMC by saying all the module versions are similar.

If only few module versions are differ, those module will be flashed.

> **NOTE**
> Only selected sections of the firmware will be updated. Other sections are skipped. Before starting flash operation, you are advised to verify the compatibility between image sections.



e. Flashing Firmware Image
f. Resetting the image. The sample screenshot of Firmware update is as shown below.

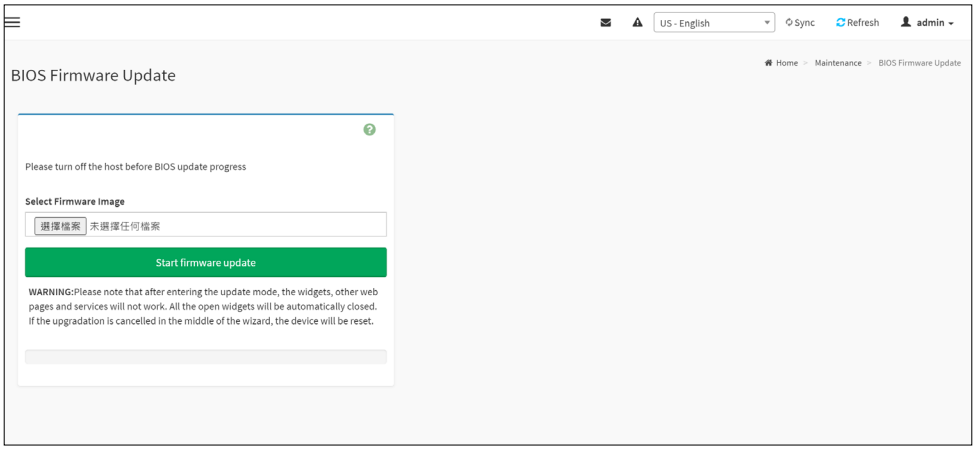


NOTE
The Firmware Update page will be disabled and you will not be able to perform any other tasks until firmware upgrade is completed and the device is rebooted. You can now follow the in¬structions presented in the subsequent pages to successfully update the card's firmware. The device will reset if update is canceled. The device will also reset upon successful completion of firmware update.

5.2.2 BIOS Firmware Update

This wizard takes you through the process of host BIOS firmware upgradation. A screenshot of BIOS Firmware Update is as shown below.

To perform BIOS Firmware Update operation, click Maintenance → BIOS Firmware Update from the menu bar. A sample screenshot is displayed below.

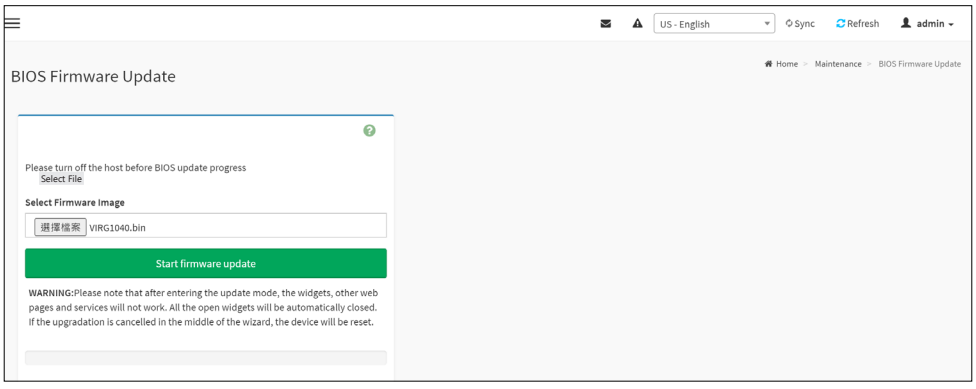


Procedure

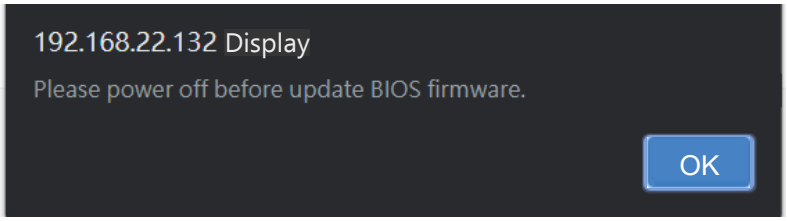
1. Click Browse to select BIOS Firmware image.

> **NOTE**
> Firmware update wizard will detect .bin extension as BIOS firmware image.

2. Click Start Firmware Update to load the BIOS firmware image information. A sample screenshot is displayed below.

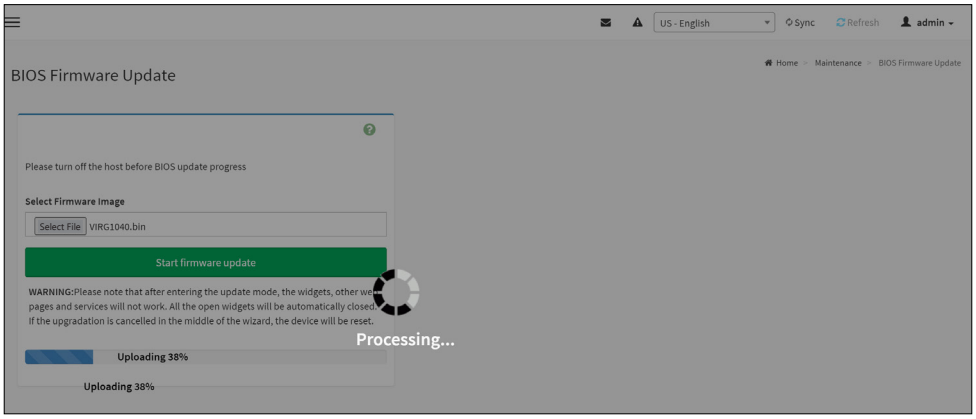


> **NOTE**
> Once you enter Firmware update page, an alert message will pop up if the system is on. The wizard will activate the update process after the user powers off the system.



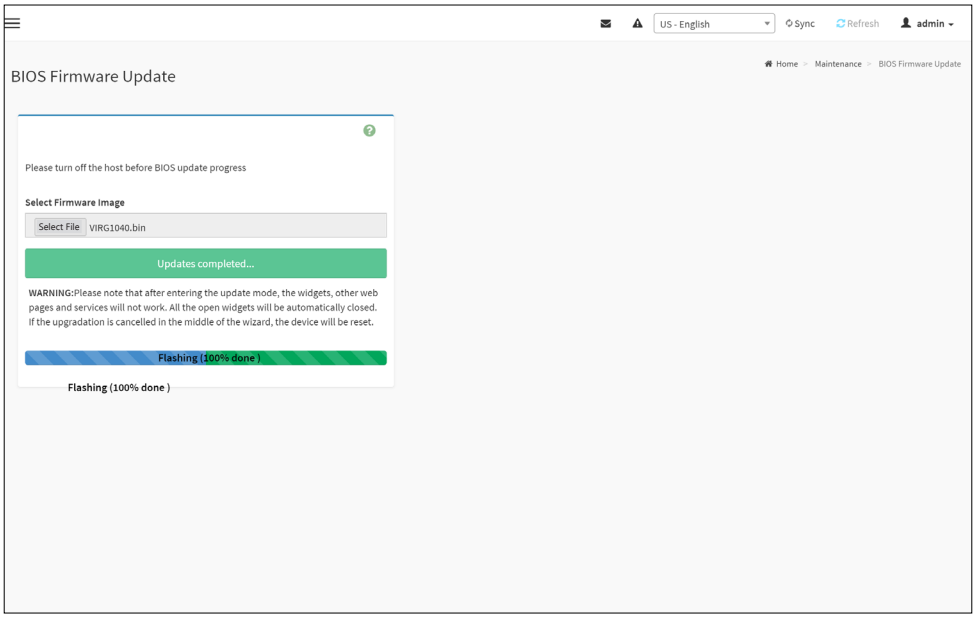
3. Click Proceed, it will prompt you with the warning message. Click Ok to start the firmware update.
4. The BIOS Firmware Update undergoes the below steps.
   a. Uploading Firmware Image
   b. Flashing Firmware Image

A sample screenshot is displayed below.



NOTE
You will not be able to perform any other tasks until firmware upgrade is completed and the device is off.

Once the BIOS firmware update is completed, it will prompt you with the success message. Click OK to complete the process. A sample screenshot is displayed below.



Chapter 6. RAID Configuration

This firmware (LSI® Integrated RAID solution) provides protection for the sytem boot volume. This firmware features 4 fundamental RAID attributes:

- The Integrated Mirroring (RAID 1)
- The Integrated Mirroring + Striping (RAID 10)
- The Integrated Mirroring Enhanced (RAID 1E)
- The Integrated Striping (RAID 0)

6.1 Mirrored Volume Configuration

Enter SAS3 BIOS CU to configure and manage Integrated RAID volumes.

6.1.1 Create Mirrored Volumes

Procedure

Step 1: Load BIOS and press Ctrl+C to initiate SAS3 BIOS CU.
The following message will appear: Please wait, invoking SAS Configuration Utility...

Step 2: Wait for a few seconds for the Adapter List window to appear.

> **NOTE**
> In some systems, the following message will pop up instead: LSI Corp Configuration Utility will load following initialization! If this occurs, the SAS3 BIOS CU will load after the system completes POST.

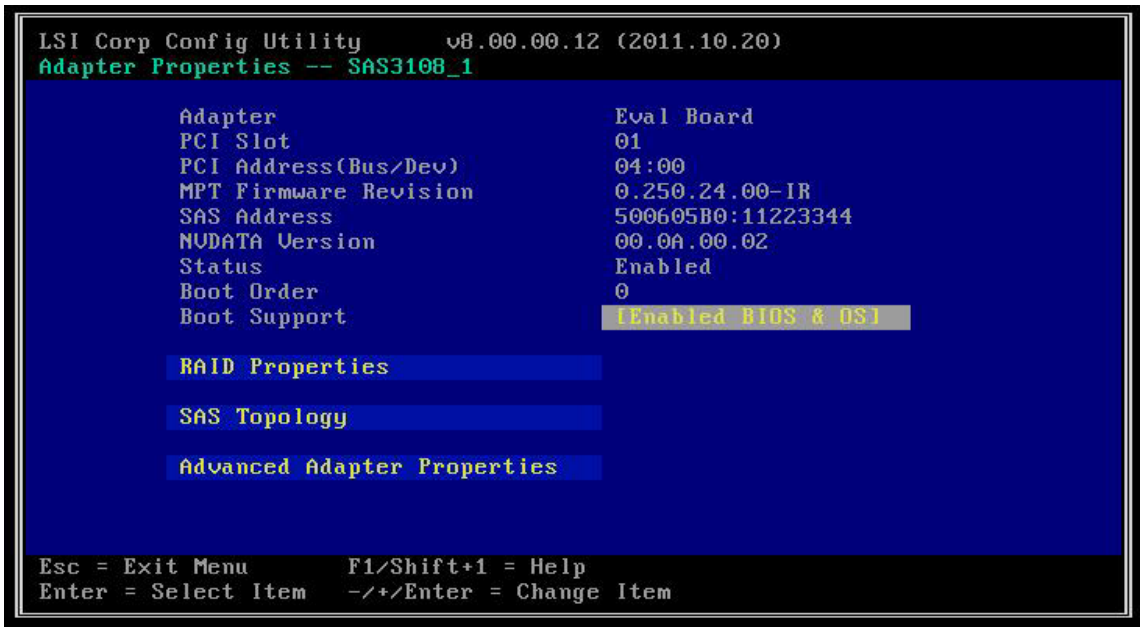
6.1.2 Create Integrated Mirroring Volume

Create a two-disk Integrated Mirroring (RAID 1) volume.

Procedure

Step 1: In Adapter List window, select an LSI SAS-3 adapter and press Enter. The Adapter Properties window is shown below.

Adapter Properties Window page



Step 2: Select RAID Properties and press Enter.

Step 3: Select Create RAID 1 Volume.

Step 4: Select a line that has a No entry in the RAID Disk column. , press the space bar to change the No to Yes to add the disk to the new array. This disk is the Primary disk in the array.

Step 5: Select another line and press the space bar to add the second disk to the array. This disk is the Secondary disk in the array.

Step 6: Press C to create the array. A menu window will appear.

Step 7: From the menu options, select Save changes and then exit this menu.

6.1.3 Create an Integrated Mirroring Enhanced/Mirroring + Striping Volume

Create an Integrated Mirroring Enhanced (RAID 1E) or Integrated Mirroring + Striping (RAID 10) volume.

Procedure

Step 1: In the Adapter List window, select an LSI SAS-3 adapter and press Enter.

Step 2: Select RAID Properties and press Enter.

Step 3: Select Create RAID 1E Volume.

Step 4: Select a line that has No entry in the RAID Disk column. Press the space bar to change No to Yes to add the disk to the new array.

Step 5: Select another line and press the space bar to add another disk to the array.

NOTE
If you select an odd number of disks, the SAS3 BIOS CU creates an Integrated Mirroring Enhanced array. If you select an even number of disks, it creates an Integrated Mirroring + Striping array. As you add disks, the Array Size field changes to reflect the size of the new array.

Step 6: Press C to create the array. A menu window will appear.

Step 7: From the menu options, select Save changes and then exit this menu. A message will appear briefly. SAS3 BIOS CU will return to the Adapter Properties window. Initialization of the new array continues in the background.

6.1.4 Expand an Integrated Mirroring Volume with OCE

Expand an existing RAID 1 volume with OCE.

Procedure

Step 1: Replace one of the two volume disk drives with a drive that has at least 50 GB more capacity.

Step 2: Wait until synchronization completes on the new disk and the volume returns to the Optimal state.

Step 3: Replace the other volume disk drive with a drive that has at least 50 GB more capacity.

Step 4: Wait until synchronization completes on the new disk and the volume returns to the Optimal state.

Step 5: In the Adapter List window, select the LSI SAS adapter with the RAID 1 volume and press Enter.

Step 6: Select RAID Properties and press Enter. The Select New Array Type window will appear.

Step 7: Select View Existing Array. If necessary, press Alt + N to switch to the RAID 1 volume with the new, higher-capacity disk drives.

Step 8: Select Manage Volume. The Manage Volume window will appear.

Step 9: Select Online Capacity Expansion. A menu window will appear with a warning message and with options to start the expansion process or quit.

Step 10: Press Y to start the expansion. The RAID Properties window will appear when the expansion process completes.

Step 11: Run a commercial tool specific to the operating system to move or increase the size of the partition on the newly expanded RAID 1 volume.

6.2 Manage Hot Spare Disks

Create/delete one or two global hot spare disks to safeguard the data on mirrored volumes on the controller.

6.2.1 Create Hot Spare Disks

Add global hot spare disks to an existing volume.

Procedure

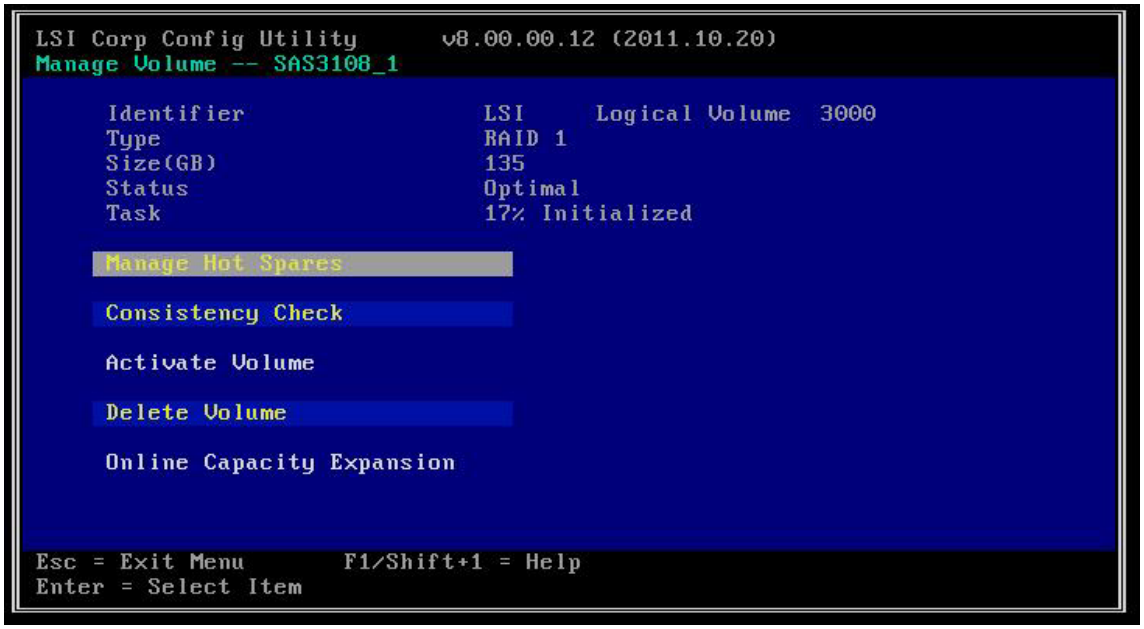
Step 1: Select the adapter on which you want to create hot spare disks and press Enter.

Step 2: Select RAID Properties and press Enter.

Step 3: Select View Existing Array. The View Array window will appear. If necessary, press Alt + N to switch to another array.

Step 4: Select Manage Volume. The Manage Volume window will appear as shown below.

Figure 6 Manage Volume Window page



Step 5: Select Manage Hot Spares.

Step 6: Identify a disk that is not part of a RAID array and that is not identified as a hot spare disk.

NOTE
A global hot spare disk must have 512-byte blocks and nonremovable media. The disk type must be either SATA with extended command set support or SAS with SMART support.

Step 7: Select the Hot Spare field for this disk and press the space bar. The Hot Spare status changes to Yes.

Step 8: Repeat the preceding step to select a second global hot spare disk (optional).

Step 9: Press C to create the hot spare disk. A menu window will appear.

NOTE
An error message will appear if the selected disk is not at least as large as the smallest disk used in the existing array or arrays. An error message will also appear if you try to add a SATA disk as a hot spare for arrays that use SAS disks, or if you try to add a SAS disk as a hot spare for arrays that use SATA disks.

Step 10: Select Save changes and then exit this menu to create the hot spare disk or disks.

6.2.2 Delete a Hot Spare Disk

Delete a global hot spare disk.

Procedure

Step 1: Access the Manage Hot Spares window by following the first five steps of Section 1.2.1.

Step 2: Select a hot spare disk to delete and press C.

Step 3: Select Save changes and then exit this menu to complete the deletion of the hot spare disk. The configuration utility pauses while it removes the global hot spare.

6.3 Other Configuration Tasks

This section explains how to perform other configuration and maintenance tasks for mirrored arrays.

6.3.1 View Array Properties

View the RAID properties of a mirrored array.

Procedure

Step 1: In the Select an adapter from the adapter list.

Step 2: Select RAID Properties. The Select New Array Type window will appear.

Step 3: Select View Existing Array.

6.3.2 Run a Consistency Check

Use the Consistency Check command to verify that the data is synchronized on the mirrored disks in the array.

Run a consistency check on a selected mirrored array:

Procedure

Step 1: Select an adapter.

Step 2: Select RAID Properties and press Enter.

Step 3: Select View Existing Array. If necessary, press Alt + N to switch to another array on this adapter.

Step 4: Select Manage Volume. The Manage Volume window will appear.

Step 5: Select Consistency Check in the Manage Volume window.

Step 6: Press Y to start the consistency check. The consistency check will run in the background. If it encounters any data miscompares, it will stores the information in a bad block table.

6.3.3 Activate an Array

Activate a selected array.

Procedure

Step 1: Select an adapter and press Enter.
Step 2: Select RAID Properties and then press Enter.
Step 3: Select View Existing Array. If necessary, press Alt + N to switch to another array on this adapter.
Step 4: Select Manage Volume.
Step 5: Select Activate Array in the Manage Volume window.
Step 6: Press Y to activate the array. Wait a few seconds for the arrray to activate.

6.3.4 Delete an Array

Delete a selected array.

Procedure

Step 1: Select an adapter.
Step 2: Select RAID Properties and then press Enter.
Step 3: Select View Existing Array. If necessary, press Alt + N to switch to another array on this adapter.
Step 4: Select Manage Volume. The Manage Volume window will appear.
Step 5: Select Delete Array. A menu window will appears.
Step 6: Press Y to delete the array or press N to cancel the deletion process. Wait for a few seconds to delete the array.

NOTE
If there is another remaining array and one or two hot spare disks, the BIOS checks the hot spare disks to determine if they are compatible with the remaining array. If they are not compatible (too small or wrong disk type), the BIOS deletes them also.

6.3.5 Locate Disk Drives in a Volume

Locate disk drives by flashing their LEDs.

Procedure

Step 1: Select the a controller on the Adapter List window and press Enter.
Step 2: Highlight SAS Topology and press Enter. The SAS Topology window will appear.
Step 3: Select the disk in the Device Identifier column and press Enter. The LED on the disk will flash until you press a key to stop it.
Step 4: To identify all the disk drives in a volume, select the volume in the left column of the SAS Topology window and press Enter. The LED will flash on all disk drives in the volume until you press a key to stop them.

6.3.6 Select a Boot Disk

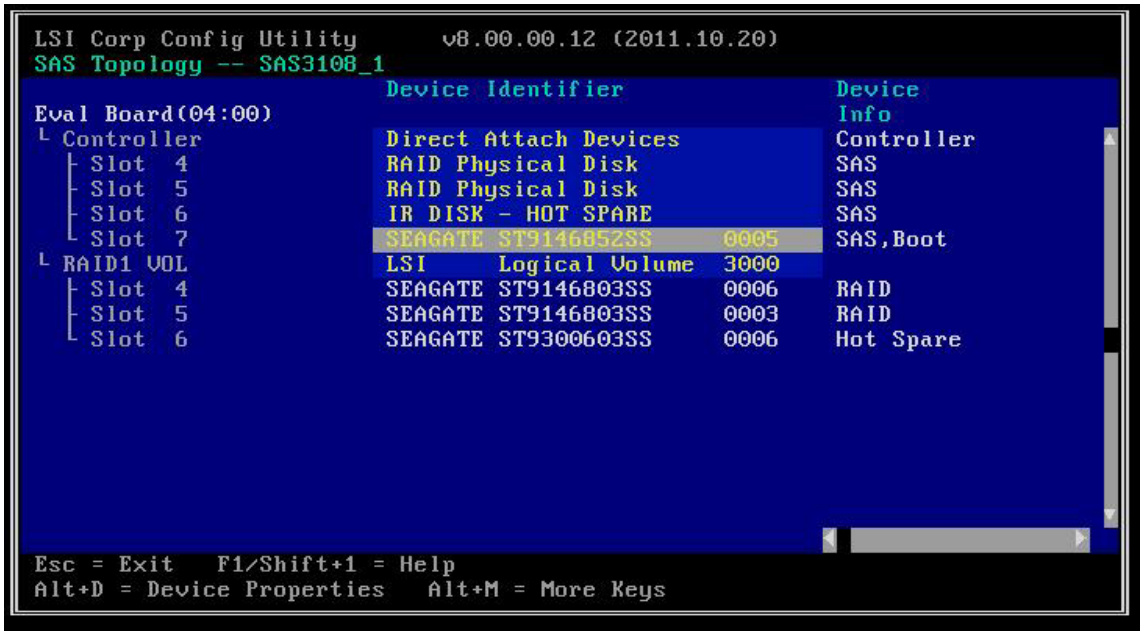
Select a boot disk.

Procedure

Step 1: Select an adapter from the adapter list.

Step 2: Select the SAS Topology option. If a device is currently designated as the boot device, the Device Info column on the SAS Topology window lists the word Boot, as shown below.

Boot Device on SAS Topology Window page



If a device is currently designated as the alternative boot device, the Device Info column will show the word Alt.

Step 3: Select the boot disk and press Alt + B.

Step 4: Select the current boot disk and press Alt + B to remove the boot designator.

Step 5: Select the new boot disk and press Alt + B to change the boot disk.

Step 6: Select thethe disk and press Alt + A to select an alternative boot disk.

6.4 Integrated Striping

Configure Integrated Striping volumes.

6.4.1 Integrated Striping Configiration

Procedure

Step 1: Load BIOS and press Ctrl+C to initiate SAS3 BIOS CU.
The following message will appear: Please wait, invoking SAS Configuration Utility...
Step 2: Wait for a few seconds for the Adapter List window to appear.

> **NOTE**
> In some systems, the following message will pop up instead: LSI Corp Configuration Utility will load following initialization! If this occurs, the SAS3 BIOS CU will load after the system completes POST.

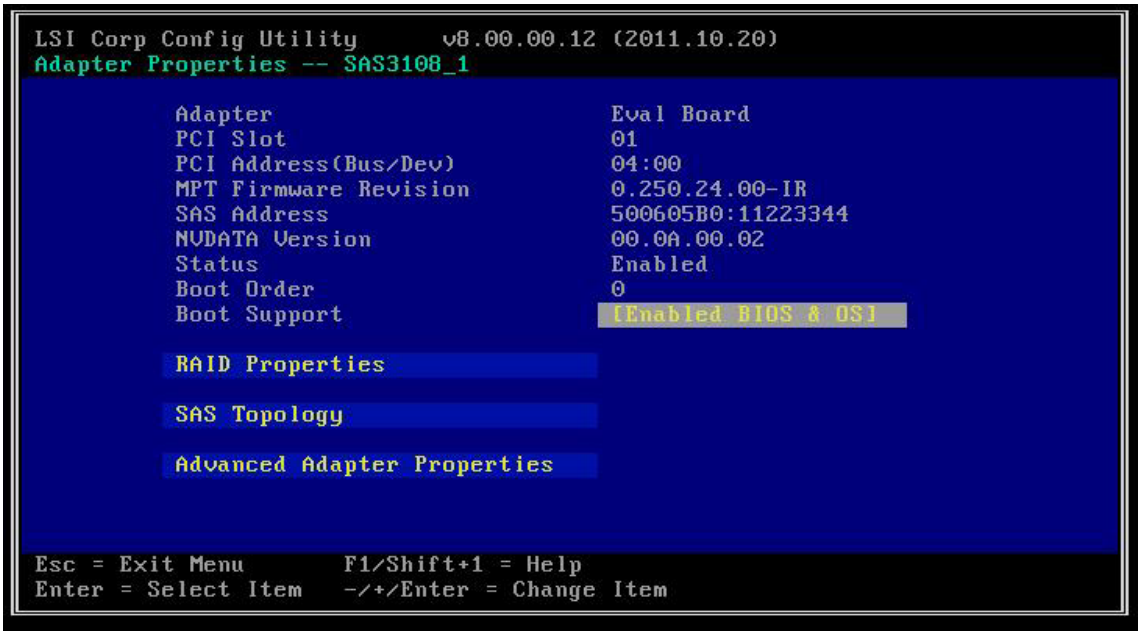
6.4.2 Create Integrated Striping Volumes

Create one or two Integrated Striping volumes on each LSI SAS-3 controller.

Procedure

Step 1: Select an adapter and press Enter. The Adapter Properties window is shown below.

Adapter Properties Window page



Step 2: Select RAID Properties and press Enter.
Step 3: Select Create RAID 0 Volume. The Create New Array window will appear.
Step 4: Select a line that has a No entry in the RAID Disk column. change the No to Yes by pressing the space bar to add the disk to the new array.
Step 5: Select another line and press the space bar to add another disk to the array.
Step 6: Continue adding disks until you reach the aimed number of disks.
Step 7: Press C to create the array.
Step 8: From the menu options, select Save changes and then exit this menu. A message will appear briefly, and then the SAS3 BIOS CU returns to the Adapter Properties window. Initialization of the new array will continue in the background.

6.4.3 Other Configuration Tasks

View Array Properties

View the RAID properties of an array.

Step 1: Select an adapter from the adapter list.

Step 2: Select RAID Properties.

Step 3: Select View Existing Array. The View Array window will appear, showing information about the array and each disk in it.

Step 4: If the currently displayed array is not the one you want, press Alt + N to view another array on the adapter.

Activate an Array

Activate a selected array.

Step 1: Select an LSI SAS adapter and press Enter. The Adapter Properties window will appear.

Step 2: Select RAID Properties and press Enter.

Step 3: Select View Existing Array. If necessary, press Alt + N to switch to another array on this adapter.

Step 4: Select Manage Volume. The Manage Volume window will appear.

Step 5: Select Activate Array in the Manage Volume window. A menu window will appear.

Step 6. Press Y to activate the array. The array becomes active after a pause.

Delete an Array

Delete a selected array.

Step 1: Select an adapter.

Step 2: Select RAID Properties and press Enter.

Step 3: Select View Existing Array. If necessary, press Alt + N to switch to another array on this adapter.

Step 4: Select Manage Volume. The Manage Volume window will appear.

Step 5: Select Delete Array.

Step 6: Either press Y to delete the array, or press N to cancel the deletion process. Wait for a few seconds to delete the array.

Locate Disk Drives in a Volume

Locate disk drives by flashing their LEDs.

Procedure

Step 1: Select the controller on the Adapter List window and press Enter.

Step 2: Highlight SAS Topology and press Enter. The SAS Topology window will appear.

Step 3: Select the disk in the Device Identifier column and press Enter. The LED on the disk will flash until you press a key to stop it.

Step 4: To identify all the disk drives in a volume, select the volume in the left column of the SAS Topology window and press Enter. The LEDs flash on all disk drives in the volume until you press a key to stop them.

Select a Boot Disk

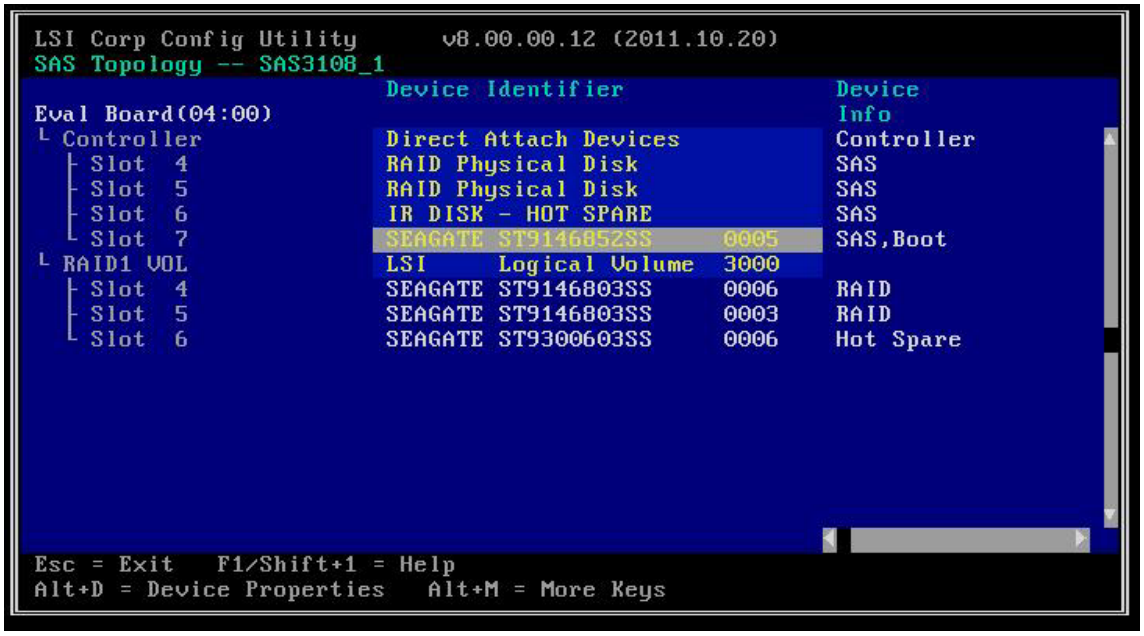
Select a boot disk.

Procedure

Step 1: Select an adapter from the Adapter List.

Step 2: Select the SAS Topology option. If a device is currently designated as the boot device, the Device Info column on the SAS Topology window lists the word Boot as shown below.

Boot Device on SAS Topology Window page



If a device is currently designated as the alternative boot device, the Device Info column shows the word Alt.

Step 3: Select the preferred boot disk and press Alt + B.

Step 4: Select the current boot disk and press Alt + B to remove the boot designator.

Step 5: Select the new boot disk and press Alt + B to change the boot disk.

Step 6: Select an alternative boot disk and press Alt + A.

6.5 Intel® RSTe

Intel® RSTe (Rapid Storage Technology enterprise) is a software that suports systems equipped with SSDs, SATA or SAS devices. The purpose of its utility is to manage and configure RAID systems. Supported features of Intel® RSTe include SATA RAID Option ROM, SCU RAID Legacy Option ROM, SATA/SCU RAID UEFI Driver, Graphical User Interface, CSMI (Common Storage Managemnet Interface), hot plug, SCU and AHCI drive roaming, SGPIO on SCU, hot spare disk, RAID smart support and many other features. To view the complete features and instructions about Intel® RSTe, please visit the Intel® website for further details.

Chapter 7. Technical Support

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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.