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GREEN Less Heat, Less Power Consumption

STABLE Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

1U12L4E-GENOA/2Q

User Manual

English



Version 1.02

Published Oct. 2025

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

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

CALIFORNIA, USA ONLY

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

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

Setting up the Server in a Restricted Access Location/Restricted Access Area

- Access can only be gained by service persons or by users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.
- Access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.
- Leave enough clearance (25 inches in the front and 30 inches in the back of the rack) to allow the front door to be opened completely and to allow for sufficient airflow.
- This product is for installation merely in a Restricted Access Location.
- This product is not suitable for use with visual display work place devices according to §2 of the the German Ordinance for Work with Visual Display Units.
- Only skilled person and Instructed person can remove the chassis covers to access the inside of the system.

ASRock Rack's Website: www.ASRockRack.com

Replaceable Batteries

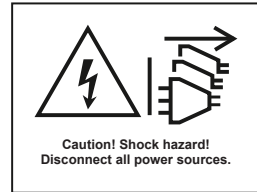
CAUTION

**RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS**

Warning

When removal of the chassis lid required for servicing:

- Turn off power and unplug any power cords/cables, and
- Reinstall the chassis lid before restoring power.



Important Safety Instructions

Pay close attention to the following safety instructions before performing any of the operation. Basic safety precautions should be followed to protect yourself from harm and the product from damage:

- Operation of the product should be carried out by suitably trained, qualified, and certified personnel only to avoid risk of injury from electrical shock or energy hazard.
- Disconnect the power cord from the wall outlet when installing or removing main system components, such as the server motherboard and power supply unit.
- Place the system on a stable and flat surface.
- Use extreme caution when working with high-voltage components.
- When handling parts, use a grounded wrist strap designed to prevent static discharge.
- Keep the area around the system clean and clutter-free.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags when not in use.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- The power cord must be connected to a socket or outlet with a ground connection.

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Chapter 1 Introduction

Thank you for purchasing 1U12L4E-GENOA/2Q, a reliable barebone system produced under ASRock Rack's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock Rack's commitment to quality and endurance.

This guide provides the instructions of insertion and extraction of chassis components, such as chassis covers, system fans, power supplies, hard drive trays, and other main components this system supports. If the system is pre-installed a server motherboard, refer to the server motherboard user manual for the information of the server motherboard components, specifications and BIOS settings.

System	ASRock Rack Server Motherboard
1U12L4E-GENOA/2Q	GENOAD12M3-2Q



Because the hardware specifications might be updated, the content of this documentation will be subject to change without notice.



The illustrations shown in this manual are for reference purposes only and may not exactly match the model purchased.



If requiring technical support related to this system, please visit the website for specific information about the using model.
<http://www.asrockrack.com/support/>

1.1 Shipping Box Contents

Item	Quantity
Server Barebone: 1U12L4E-GENOA/2Q	1
CPU Heatsink	1
Rail Kit	1
Accessory Box - 2 Power Cords - 1 Quick Installation Guide - M2 & M3 Screws	1

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

1.2 Specifications

1U12L4E-GENOA/2Q	
System	
Form Factor	1U Rackmount
Dimension	955 x 438 x 43.5mm (37.6" x 17.24" x 1.71")
Support MB	GENOAD12M3-2Q
Front Panel	
Button	Power switch, ID switch, system reset
LED	Power status, UID, hard drive activity, system fault
External Drive Bay / Storage	
Front Side Drive Bay	12 Hot-swap 3.5" SATA drive bays 4 Hot-swap 2.5" NVMe (PCIe4.0 x4) drive bays, supports 7mm height
Front Side Backplane	3 4-port SATA passive backplane (1U12L4E_HDDBP) 1 4-port NVMe passive backplane (1U12L4E_BPB)
Internal Side	2 M-key (PCIe5.0 x4 or 4 SATA 6Gb/s), supports 22110/2280/2260 form factor
Power Supply	
Type	1+1 Hot-swap slim RPSU
Output Watt	1000W @ 100-240Vac input
AC Input	100-240Vac, 50/60Hz
System Fan	
Fan	6 PWM easy-swap 40x56mm fans
Processor System	
CPU	Supports AMD EPYC™ 9005*/9004 (with AMD 3D V-Cache™ Technology) and 97x4 series processors *A BIOS update is required to support AMD EPYC™ 9005 series processors.
Socket	1 Socket SP5 (LGA 6096)
Thermal Design Power	Up to 300W
Chipset	System on Chip

System Memory	
Supported DIMM Quantity	12 DIMM slots (1DPC)
Supported Type	Supports DDR5 288-pin RDIMM, RDIMM-3DS
Max. Capacity per DIMM	RDIMM: 128GB (2Rx4) RDIMM-3DS: 256GB (2Rx4)
Max. DIMM Frequency	4800MHz
Voltage	1.1V
PCIe Expansion Slot	
PCIe x16	1 FHHL PCIe5.0 x16 via RB1UX16R_G5 1 HHHL PCIe5.0 x16 via RB1UX16L_G5
TPM	
TPM Support	1 (13-pin, SPI)
Ethernet	
Additional GbE Controller	Broadcom BCM57414: 2 SFP28 (25GbE)
OCP Slot	1 OCP NIC 3.0 (PCIe5.0 x16)
Server Management	
BMC Controller	ASPEED AST2600
IPMI Dedicated GLAN	1 Realtek RTL8211F for dedicated management GLAN
Rear I/O	
UID Button/ LED	1 UID button
VGA Port	1 DB15 (VGA)
USB3.2 Gen1 Port	2 Type-A (USB3.2 Gen1)
RJ45	1 Dedicated IPMI
Other Network Connector	2 SFP28 (25GbE)
System BIOS	
BIOS Type	AMI UEFI BIOS; 256Mb (32MB) SPI Flash ROM
BIOS Features	ASRock Rack Instant Flash, ACPI 6.4 and above compliance wake up events, SMBIOS 3.5.0 and above, Plug and Play (PnP)

Hardware Monitor	
Temperature	CPU, MB, TR1 temperature sensing
Fan	Fan tachometer CPU quiet fan (allows chassis fan speed auto-adjust by CPU temperature) Fan multi-speed control
Voltage	VOLT_3VSB, VOLT_5VSB, VOLT_VCORE0, VOLT_VCORE1, VOLT_P0_VSOC, VOLT_VDD_11, VOLT_VDDIO, VOLT_VDD_33, VOLT_VDD_18, VOLT_BAT, VOLT_3V, VOLT_5V, VOLT_12V
Environment	
Temperature	Operation temperature: 10°C ~ 35°C Non operation temperature: -40°C ~ 70°C
Humidity	Non operation humidity: 20% ~ 90% (non condensing)

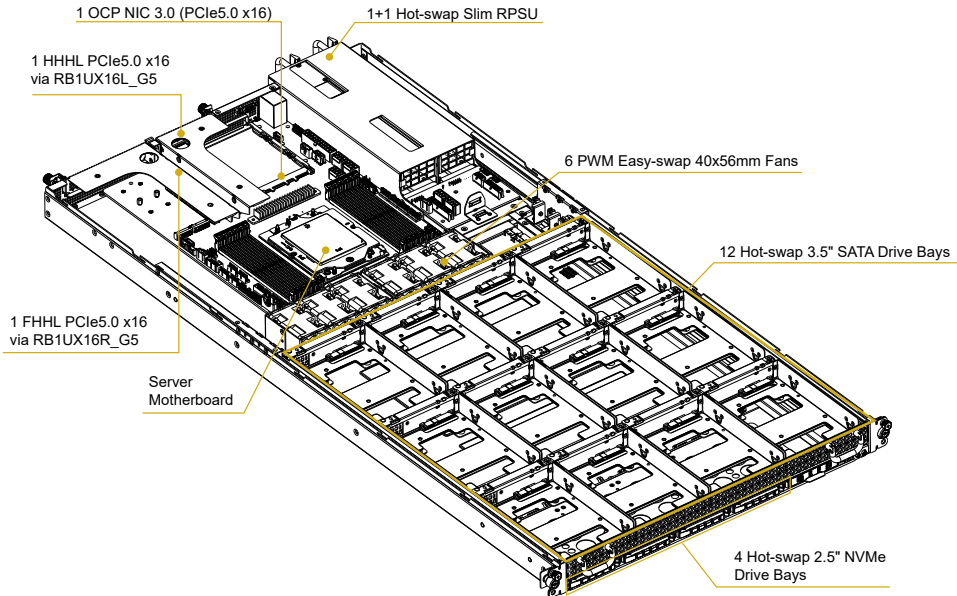


The functions are supported depending on the type of the server motherboard. Refer to the server motherboard user manual for detailed information.

Chapter 2 Server System Overview

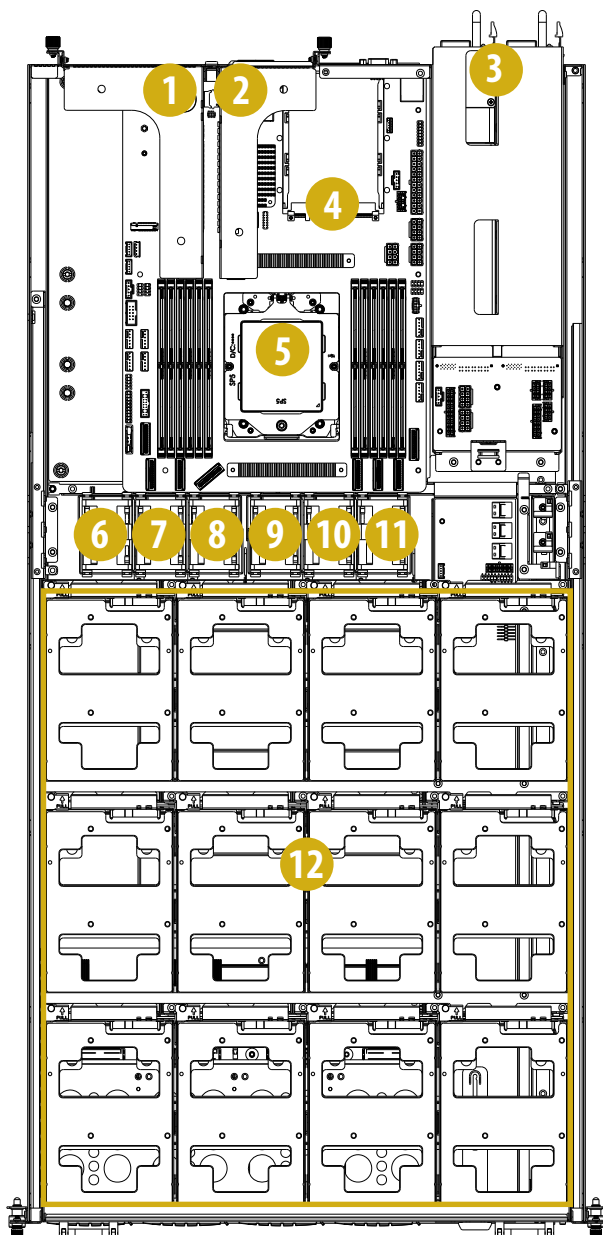
This chapter provides diagrams showing the location of important components of the server system.

2.1 System Components



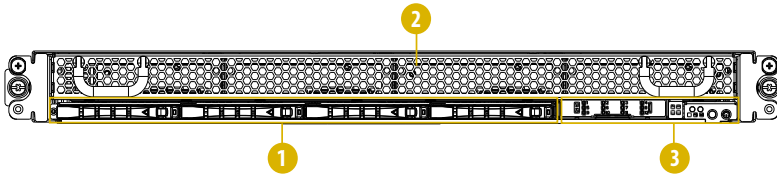
Note: The illustrations in this user manual are for references only. The actual product may be slightly different by SKU.

2.2 Internal Features



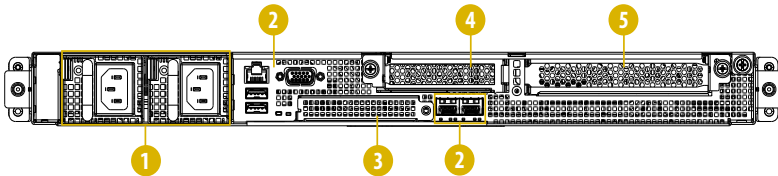
No.	Description
1	1 FHHL PCIe5.0 x16 via RB1UX16R_G5
2	1 HHHL PCIe5.0 x16 via RB1UX16L_G5
3	1+1 Hot-swap slim RPSU
4	1 OCP NIC 3.0 (PCIe5.0 x16) slot
5	Server motherboard
6	PWM easy-swap 40x56mm fan (FAN6)
7	PWM easy-swap 40x56mm fan (FAN5)
8	PWM easy-swap 40x56mm fan (FAN4)
9	PWM easy-swap 40x56mm fan (FAN3)
10	PWM easy-swap 40x56mm fan (FAN2)
11	PWM easy-swap 40x56mm fan (FAN1)
12	12 Hot-swap 3.5" SATA drive bays

2.3 System Front Panel



No.	Description
1	4 Hot-swap 2.5" NVMe (PCIe4.0 x4) drive bays, support 7mm height
2	Front vent
3	Front I/O panel

2.4 System Rear Panel



No.	Description
1	1+1 Hot-swap slim RPSU
2	Rear I/O panel (depends on the specification of the server motherboard)
3	1 OCP NIC 3.0 (PCIe5.0 x16) slot
4	1 HHHL PCIe5.0 x16 via RB1UX16L_G5
5	1 FHHL PCIe5.0 x16 via RB1UX16R_G5

Chapter 3 Hardware Installation and Maintenance

This chapter helps user to assemble the chassis and install components.

Before You Begin

Before working with the server, pay close attention to the “Important Safety Instructions” at the beginning of this manual.



Ensure the motherboard battery is installed before unplugging the power cord or installing/removing the motherboard. Failure to follow this precaution may result in physical injury or damage to motherboard components.

1. Make sure the server is powered off.

Power down the server if it is still running.

- (1) Press the Power button to power off the server from full-power mode to standby-power (sleep) mode. The Power LED at the front turns from solid green to blinking green.
- (2) Disconnect the power cord first from the AC outlet and then from the server.
The power LED turns off.



The server is not completely powered down when pressing the Power button on the front panel. The Power button lets the server toggle between Power On and Standby (Sleep) modes. Some internal circuitry remain active in the Standby mode. To remove all power from the system completely, be sure to disconnect the power cord from the server.

2. Ensure having a clean and stable working environment. Avoid dust and dirt because contaminants may cause malfunctions.
3. Ground properly before touching any system component. A discharge of static electricity may damage components. Wear a grounded wrist strap if available.



1. Some components are already pre-installed. Simply properly connect the relevant cables before or after installation.
2. Refer to the server motherboard user manual for instructions on how to install server motherboard components.

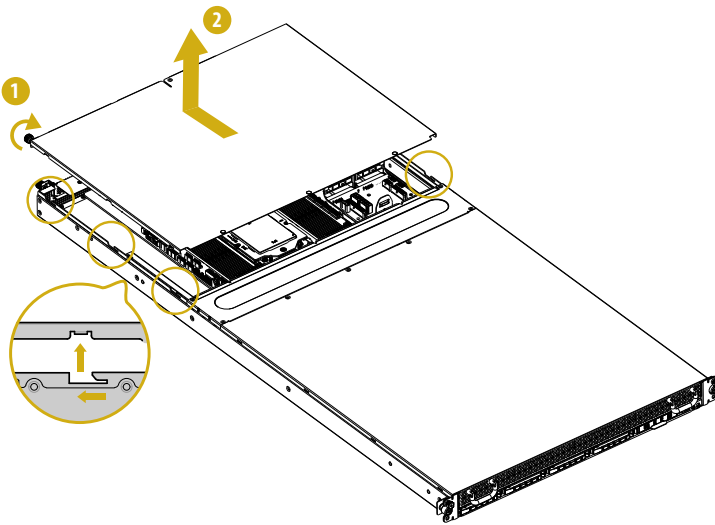
3.1 Server Top Cover

Removing the Server Top Cover

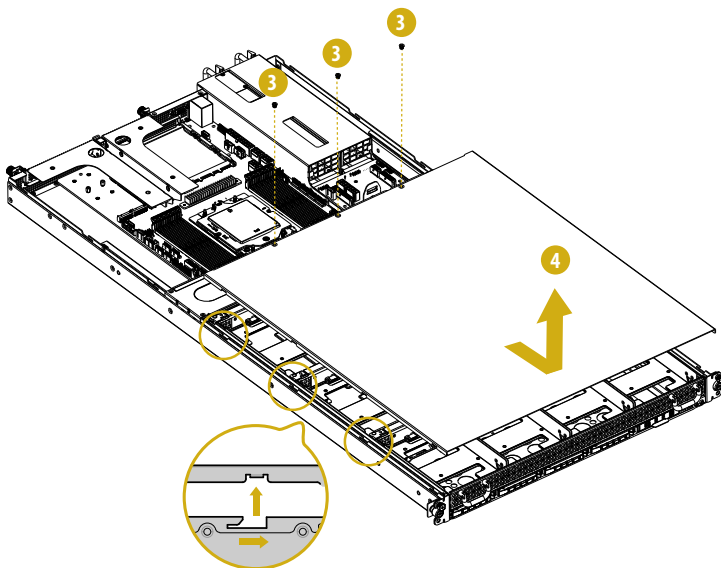


1. Before removing the top cover, power off the server and unplug the power cord.
2. The system must be operated with the chassis top cover installed to ensure proper cooling.

1. Hand-release the thumbscrew on the rear side of the chassis.
2. Push the top rear cover toward the REAR of the chassis to release the cover from the locked position. Lift up and remove the cover.

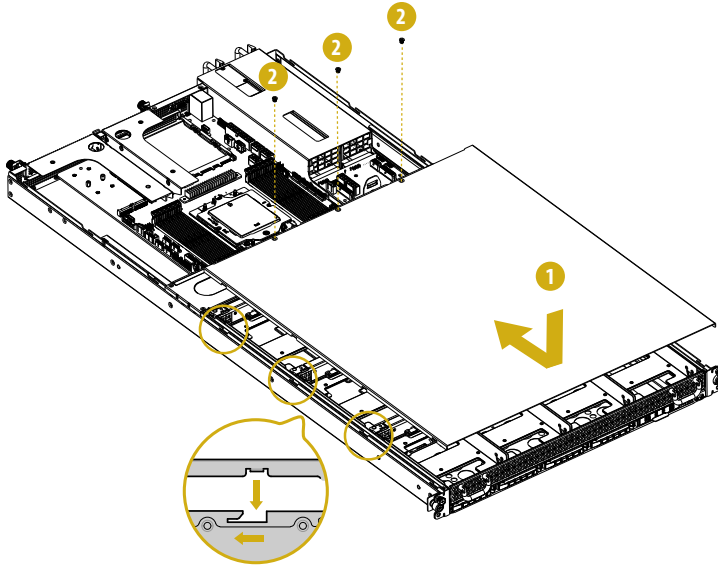


3. Remove the screws securing the top front cover to the chassis.
4. Push the top front cover toward the FRONT of the chassis to release the cover from the locked position. Lift up and remove the cover.

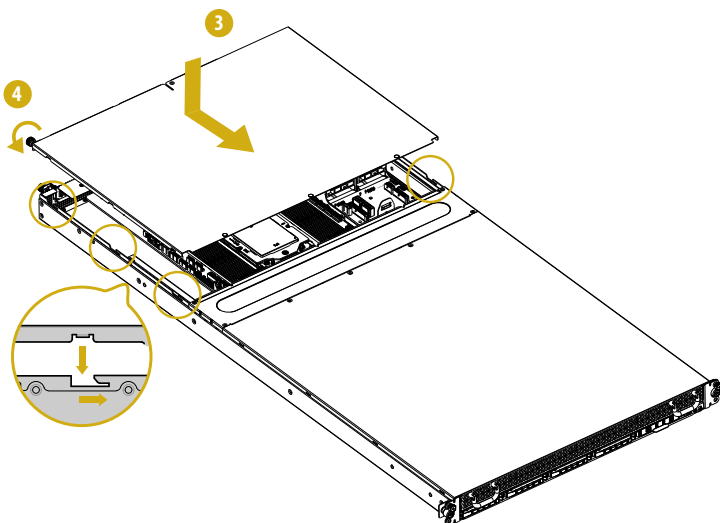


Installing the Server Top Cover

1. Lower the top front cover on the chassis, making sure the side latches align with the cutouts. Slide the top front cover toward the REAR of the chassis.
2. Secure the cover in place with screws.



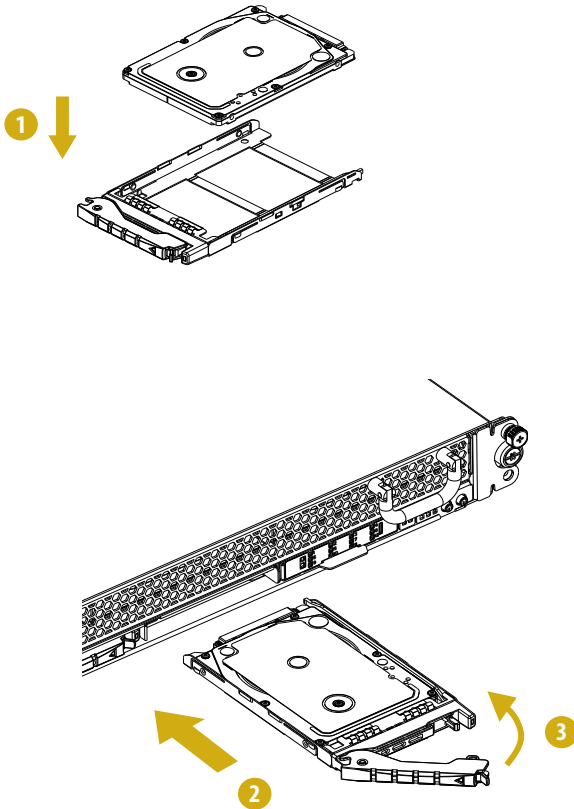
3. Lower the top rear cover on the chassis, making sure the side latches align with the cutouts. Slide the top rear cover toward the FRONT of the chassis.
4. Hand-tighten the thumbscrew on the rear side of the chassis.



3.2 Hard Drive

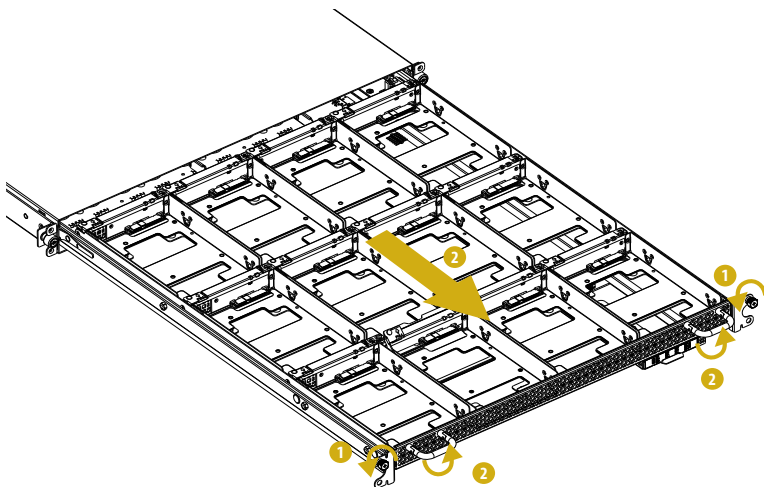
Installing the 2.5" Hard Drive

1. Place a 2.5" hard drive into the tray with the printed circuit board side facing down.
2. Slide the tray into the hard drive bay until the drive is fully seated.
3. Push in the locking lever to lock the tray in place.

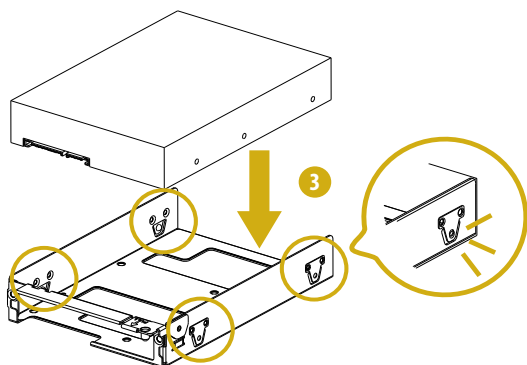


Installing the 3.5" Hard Drive

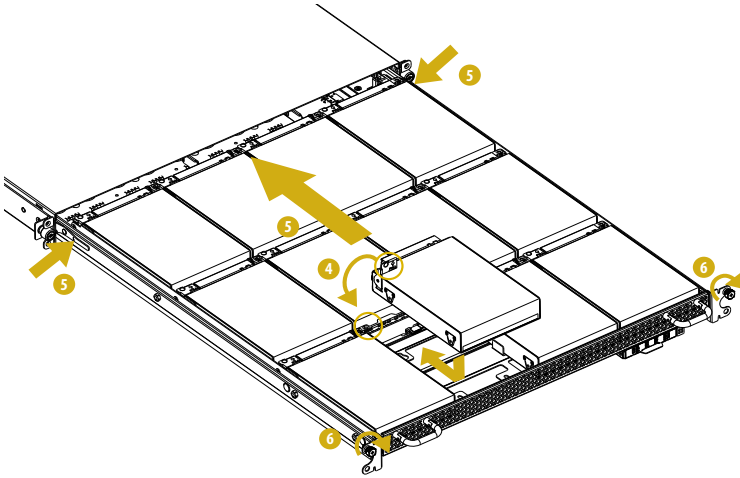
1. Hand-release the thumbscrews securing the 3.5" drive bay.
2. Pull the drive bay to the end until hearing click.



3. Place the 3.5" hard drive into the tray with the printed circuit board side facing down. Carefully align the mounting holes in the hard drive and the tray until installing in place.



4. Place the 3.5" drive assembly into the drive bay and use the latch to lock it in place.
5. After installing the 3.5" drive assembly, lift the latches on both sides of drive bay and push bay in simultaneously into the chassis.
6. Hand-tighten the thumbscrews to secure the drive bay to the chassis.



3.3 Power Supply

The 1U12L4E-GENOA/2Q system can accommodate two power supplies in the bay at the rear of the chassis. Each unit provides up to 1000W of power. One power supply is required for full load operation, with the other power supply purely as a redundant, load-sharing backup. It can be removed without affecting system operation.



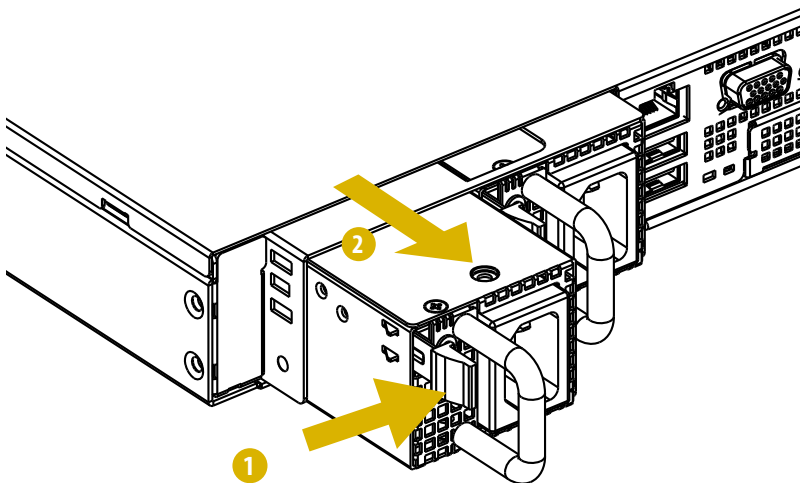
1. Before replacing the power supply, power off the server, unplug the power cord, and disconnect all wiring from the power supply.
2. The redundant system does not require powering down the server.

Removing the Power Supply Unit

1. Hold onto the power supply handle while pressing the locking lever towards the power supply handle.

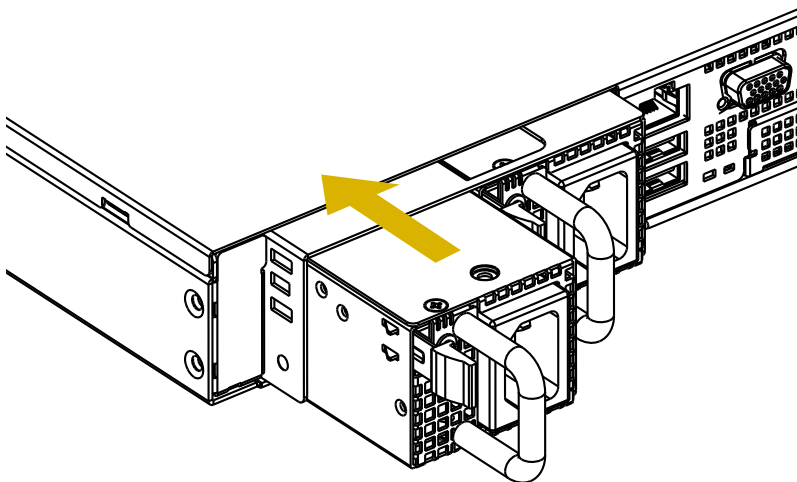
Note: The illustration is for references only. The actual PSU type may be slightly different by models.

2. Pull out the power supply unit from the chassis.



Installing the Power Supply Unit

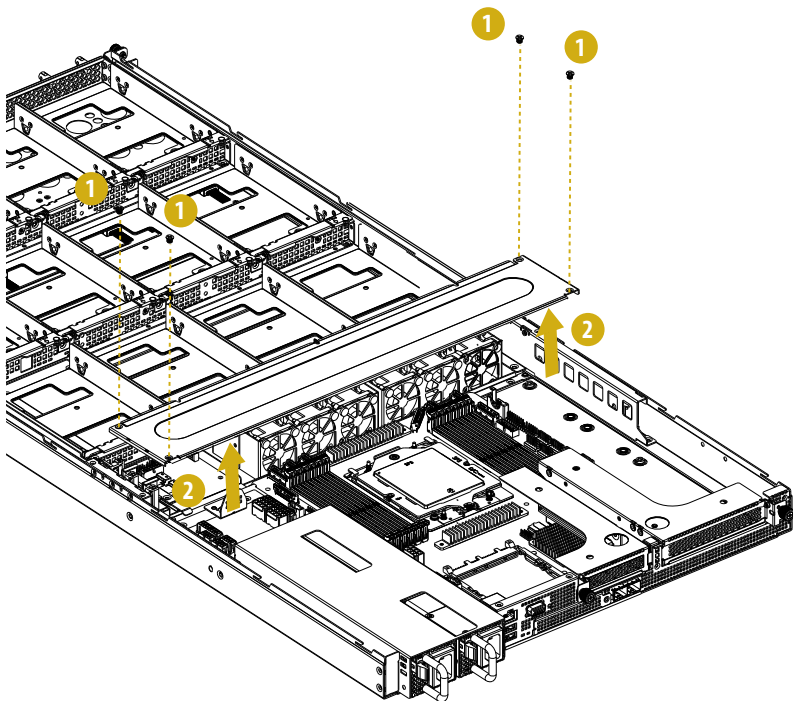
1. Align the power supply unit with the power supply bay.
2. Carefully slide the PSU all the way into the power supply bay until it clicks into place.



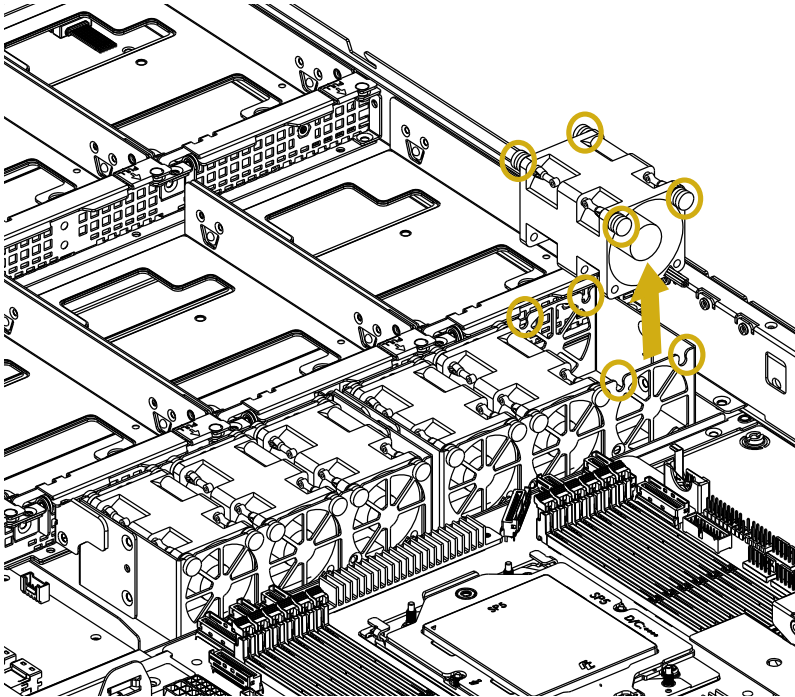
3.4 System Fan

Replacing the System Fan

1. Remove the screws securing the fan-retention bracket to the fan cage.
2. Remove the fan-retention bracket from the chassis.

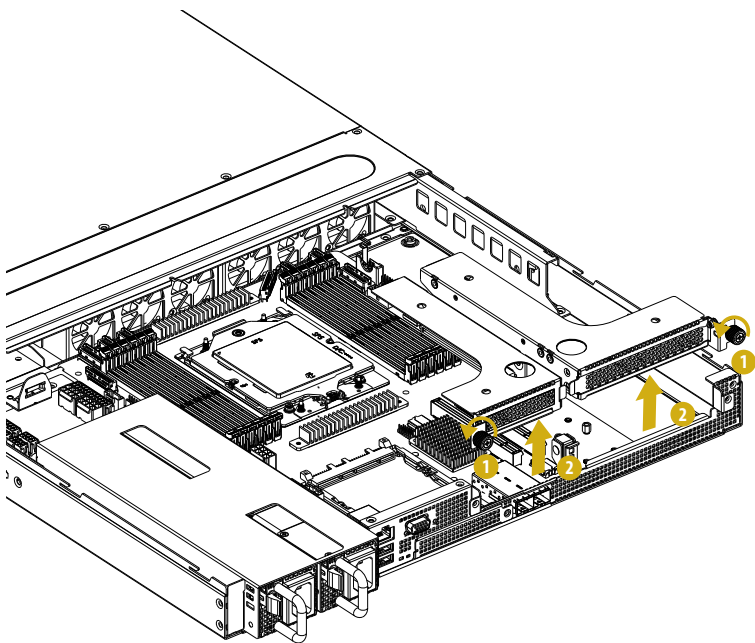


3. Press and hold the clip on the fan.
4. Align the mounting holes on the fan bar with the fan mount on the replacement fan.
5. Be aware of the mount location of each fan.
6. Gently place the fan on the fan bar. Make sure the fan is well seated. Connect the end of the fan cable to the fan connector.

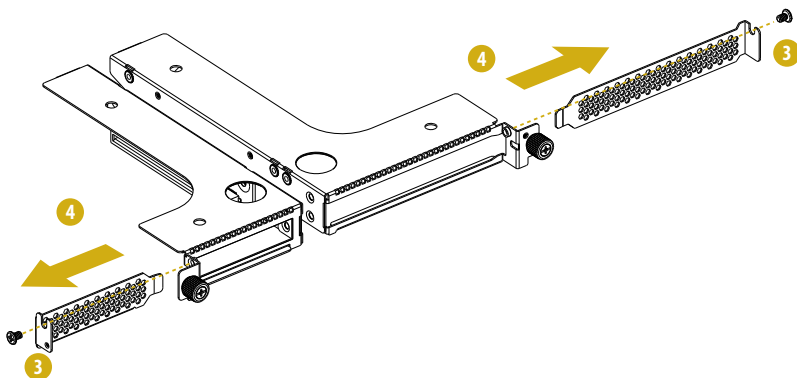


3.5 Add-in Card

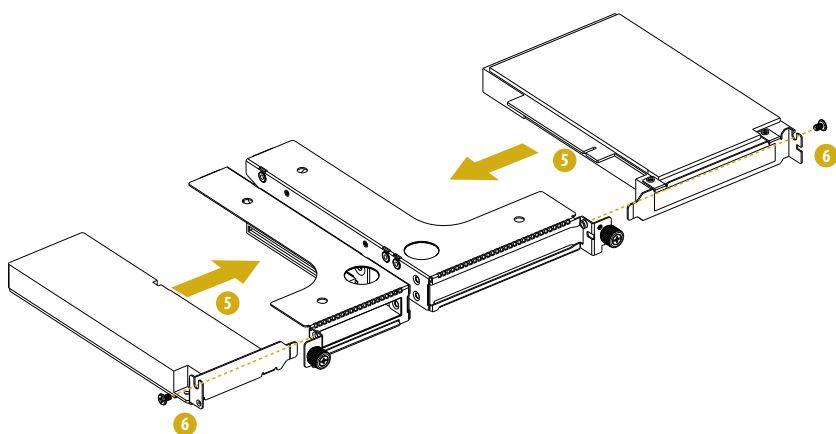
1. Hand-release the thumbscrews securing the riser-card brackets on the chassis.
2. Lift up and remove the riser-card brackets from the chassis.



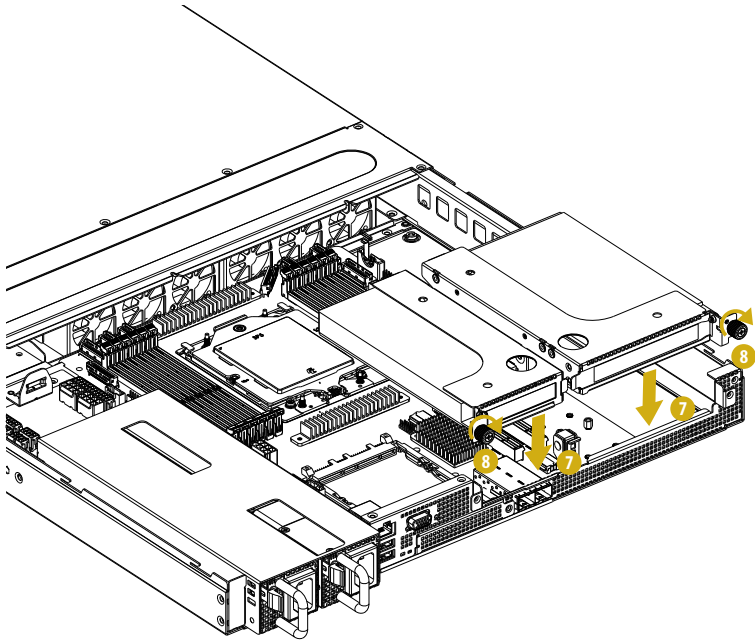
3. Remove the screws securing the blanking plates on the riser-card brackets.
4. Slide the blanking plates out sideways.



5. Install the add-in cards to the riser-card brackets.
6. Secure the add-in cards to the brackets with screws.



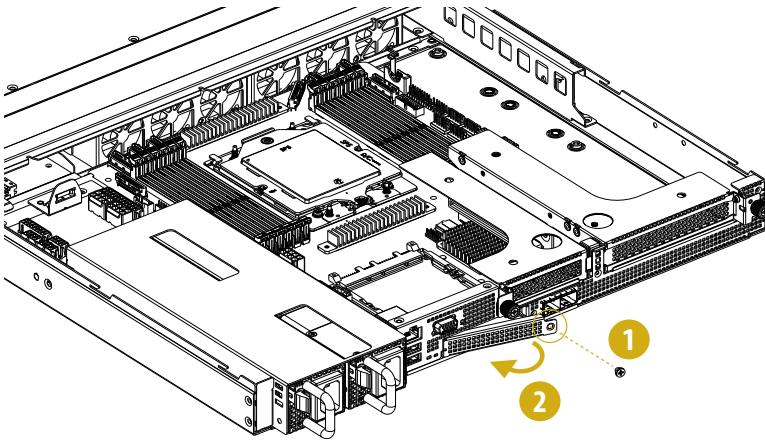
7. Align the riser-card assemblies with the openings of the chassis. Place the assemblies into the chassis.
8. Hand-tighten the thumbscrews to secure the assemblies to the chassis.



3.6 OCP Card

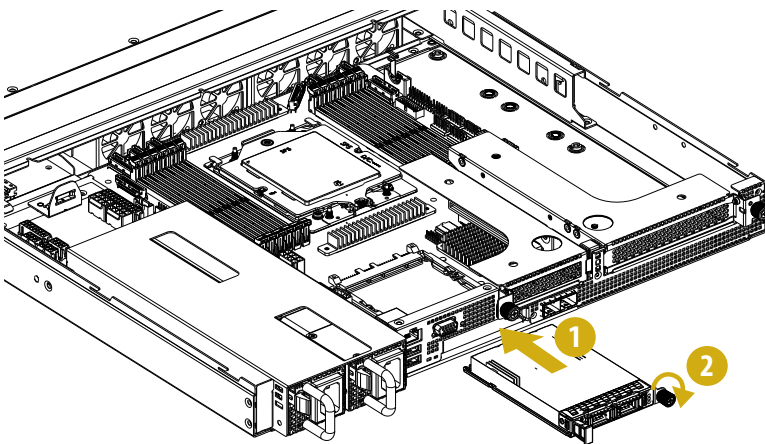
Removing Slot Cover

Remove the screw securing the slot cover to the chassis and remove the cover.



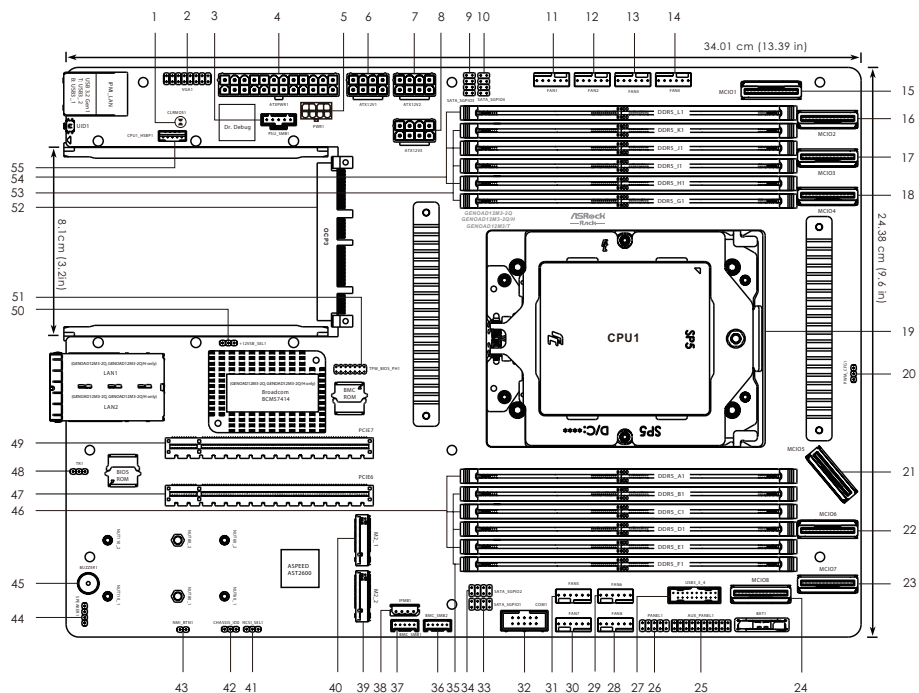
Installing the OCP Card

Install the OCP card into the slot. Make sure the card is well seated and hand-tighten the thumbscrew.



Chapter 4 Server Motherboard (GENOAD12M3-2Q)

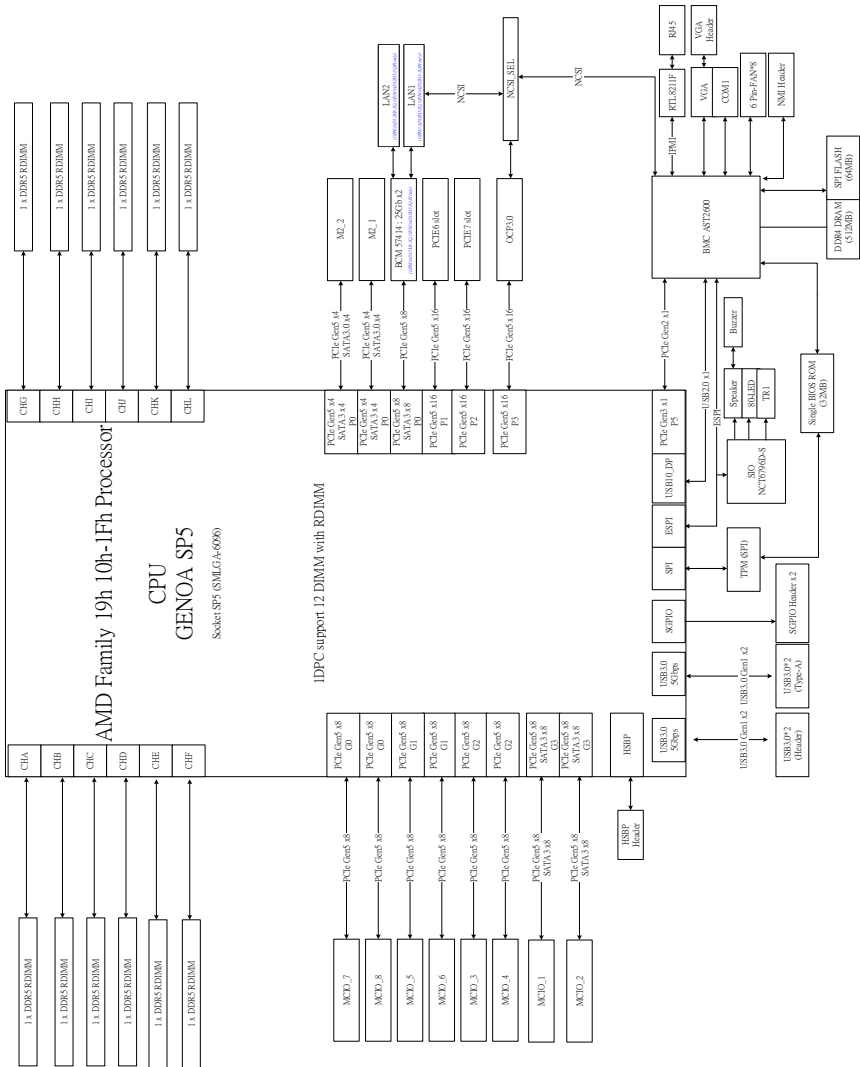
4.1 Layout



No.	Description
1	Clear CMOS Pad (CLRMOS1)
2	Front VGA Header (VGA1)
3	PSU SMBus Header (PSU_SMB1)
4	ATX Power Connector (ATXPWR1)
5	Micro-Hi Power Connector (PWR1)
6	ATX 12V Power Connector (ATX12V1)
7	ATX 12V Power Connector (ATX12V2)
8	ATX 12V Power Connector (ATX12V3)
9	SATA SGPIO Connector (SATA_SGPIO3)
10	SATA SGPIO Connector (SATA_SGPIO4)
11	System Fan Connector (FAN1)
12	System Fan Connector (FAN2)
13	System Fan Connector (FAN3)
14	System Fan Connector (FAN4)
15	Mini Cool Edge IO Connector (MCIO1)
16	Mini Cool Edge IO Connector (MCIO2)
17	Mini Cool Edge IO Connector (MCIO3)
18	Mini Cool Edge IO Connector (MCIO4)
19	AMD Socket SP5 (SM-LGA-6096) (CPU1)
20	PWM Configuration Header (PWM_CFG1)
21	Mini Cool Edge IO Connector (MCIO5)
22	Mini Cool Edge IO Connector (MCIO6)
23	Mini Cool Edge IO Connector (MCIO7)
24	Mini Cool Edge IO Connector (MCIO8)
25	Auxiliary Panel Header (AUX_PANEL1)
26	System Panel Header (PANEL1)
27	USB 3.2 Gen1 Header (USB3_3_4)
28	System Fan Connector (FAN8)
29	System Fan Connector (FAN6)
30	System Fan Connector (FAN7)
31	System Fan Connector (FAN5)
32	COM Port Header (COM1)
33	SATA SGPIO Connector (SATA_SGPIO1)

No.	Description
34	SATA SGPIO Connector (SATA_SGPIO2)
35	3 x 288-pin DDR5 DIMM Slots (DDR5_B1, DDR5_D1, DDR5_F1)
36	MC SMBus Header (BMC_SMB2)
37	MC SMBus Header (BMC_SMB1)
38	Intelligent Platform Management Bus Header (IPMB1)
39	M.2 Socket (M2_2) (Type 2260/2280/22110)
40	M.2 Socket (M2_1) (Type 2260/2280/22110)
41	NCSI Mode Jumper (NCSI_SEL1)
42	Chassis ID Jumper (CHASSIS_ID0)
43	Non Maskable Interrupt Button (NMI_BTN1)
44	Speaker Header (SPEAKER1)
45	Buzzer (BUZZER1)
46	3 x 288-pin DDR5 DIMM Slots (DDR5_A1, DDR5_C1, DDR5_E1)
47	PCI Express 5.0 x16 Slot (PCIE6)
48	Thermal Sensor Header (TR1)
49	PCI Express 5.0 x16 Slot (PCIE7)
50	OCP3 +12VSB Power Jumper (+12VSB_SEL1)
51	SPI TPM Header (TPM_BIOS_PH1)
52	OCP NIC 3.0 Slot (PCIe5.0 x16) (OCP3)
53	3 x 288-pin DDR5 DIMM Slots (DDR5_G1, DDR5_I1, DDR5_K1)
54	3 x 288-pin DDR5 DIMM Slots (DDR5_H1, DDR5_J1, DDR5_L1)
55	Backplane PCI Express Hot-Plug Connector (CPU1_HSBP1)

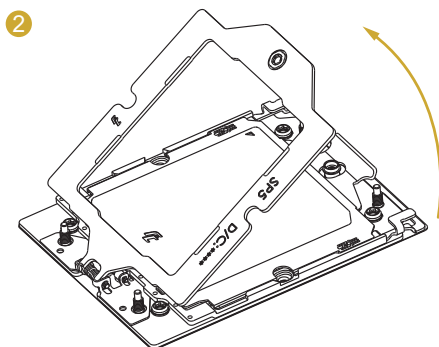
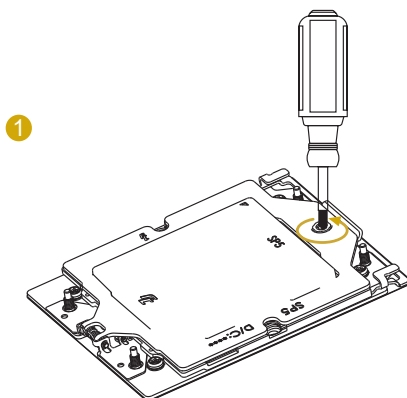
4.2 Block Diagram



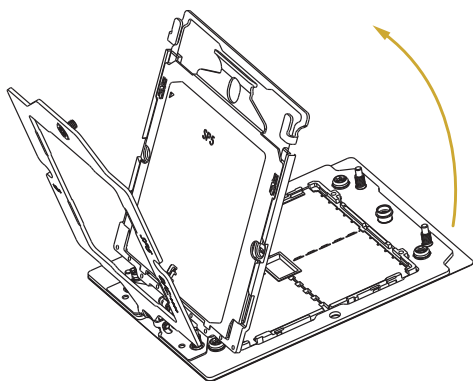
4.3 Installing the CPU and Heatsink (LGA 6096 Socket)



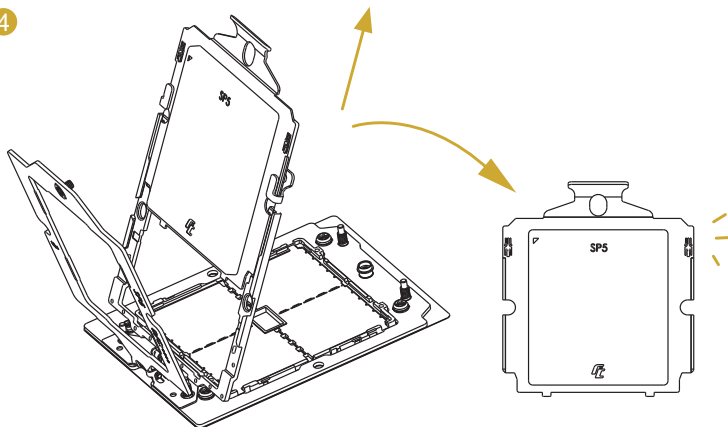
1. Before inserting the CPU into the socket, check if the PnP cap is on the socket, if the CPU surface is unclean, or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all power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



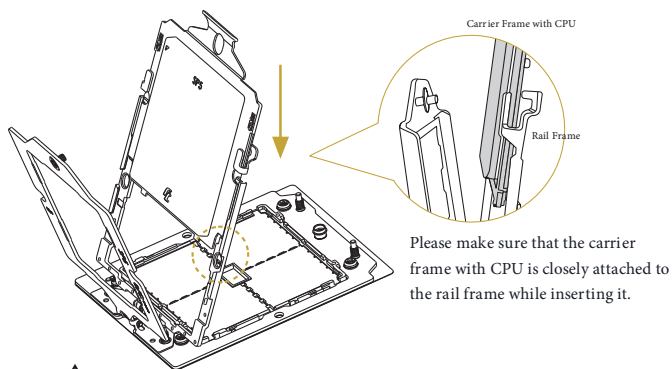
3



4

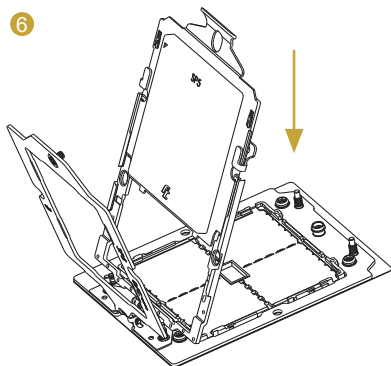


5

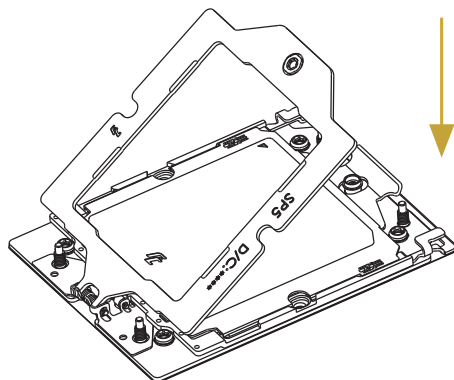


Install the carrier frame with CPU. Don't separate them.

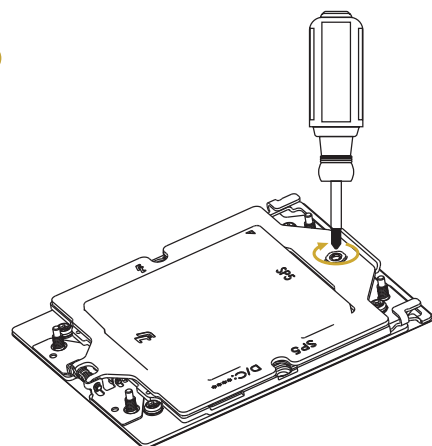
6



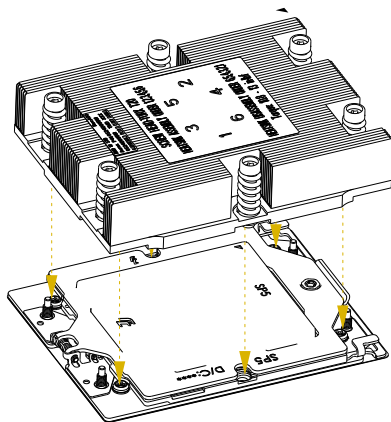
7



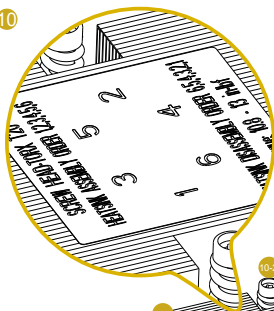
8



9

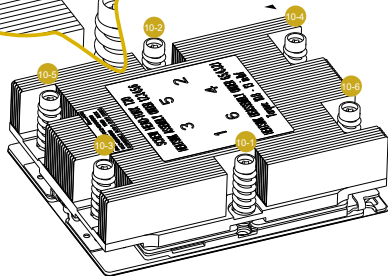


10



Set the torque wrench to 10.8-13.0 in-lb.
One fourth a turn each time.

Tighten the screws in a sequential order
1 > 2 > 3 > 4 > 5 > 6.
Loosen the screws in a reverse order.

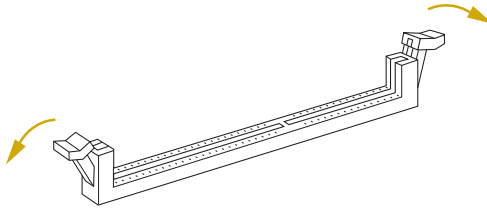


4.4 Installing the Memory Modules (DIMM)

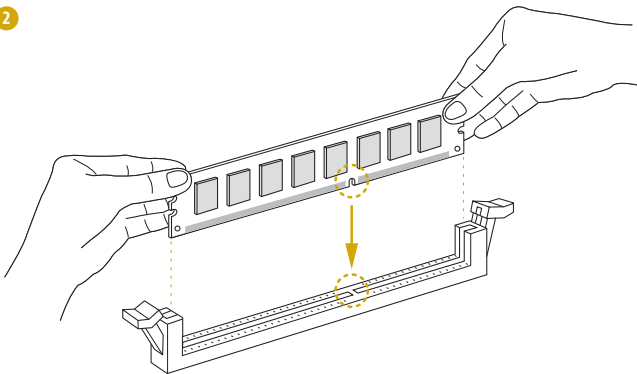


The DIMM only fits in one correct orientation. It will cause permanent damage to the server motherboard and the DIMM if forcing the DIMM into the slot at incorrect orientation. For more information about DIMM installation, refer to the server motherboard user manual.

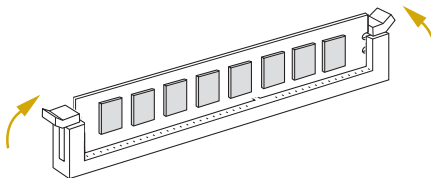
1



2



3



Appendix

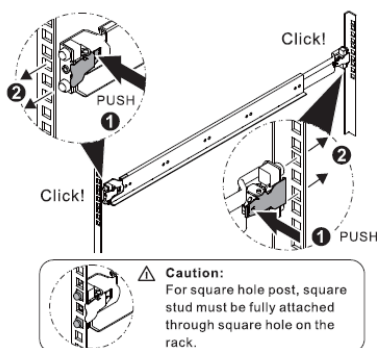
Installing the Server in a Rack



The rails installation instructions in this manual are example only, the actual rail assembly procedure may differ slightly.

Installation

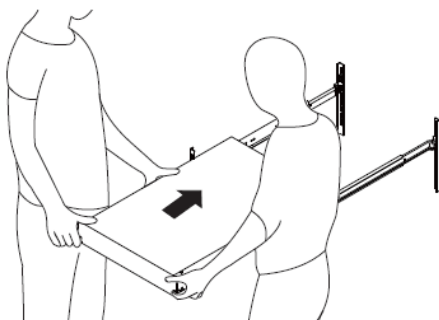
1. Attach the rails to the rack.



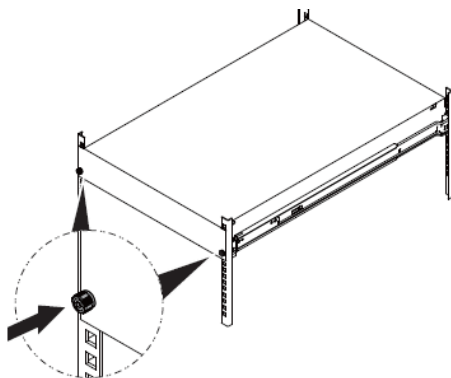
2. Install the chassis with at least 2 people. Properly place the chassis directly on the L shelf.



Some slide rails are labeled with either L or R. Identify prior to rail installation. Install the rail labeled with L on the left side of rack, and the rail labeled with R on the right side of rack.

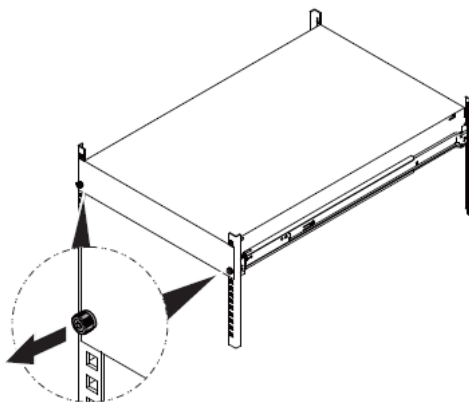


3. Hand-tighten the thumbscrews on the front bracket.

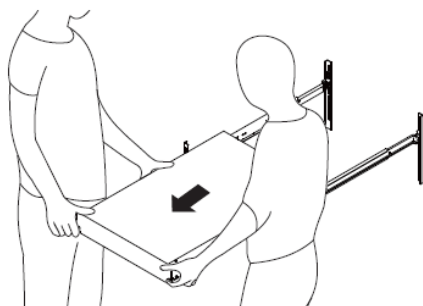


Removal

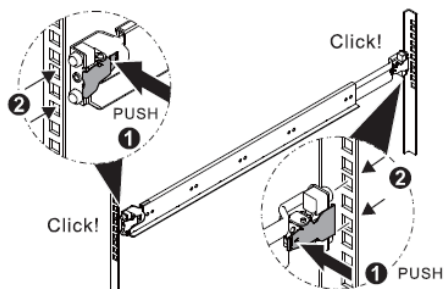
1. Hand-release the thumbscrews on the front bracket.



2. Pull out the chassis from L shelf carefully with at least 2 people.



3. Remove slide rail from rack



1. The server is heavy. For safe lifting, two or more persons are required to install the server into the rack.
2. When connecting cables to the server, make sure there is enough cable slack so sliding the server in and out of the rack without accidentally unplugging a cable.

Contact Information

Contact ASRock Rack or want to know more about ASRock Rack, you're welcome to visit ASRock Rack's website at <http://www.asrockrack.com>; or contact the dealer for further information. For technical questions, please submit a support request form at <https://event.asrockrack.com/tsd.asp>

ASRock Rack Incorporation

e-mail: ASRockRack_sales@asrockrack.com

ASRock Rack EUROPE B.V.

Bijsterhuizen 11-11
6546 AR Nijmegen
The Netherlands
Phone: +31-24-345-44-33

ASRock Rack America, Inc.

4331 Eucalyptus Ave, Chino, CA 91710 U.S.A.
Phone: +1-909-590-8308
Fax: +1-909-590-1026