



OPEN Industry Standard, Flexible Architecture

GREEN Less Heat, Less Power Consumption

STABLE Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

2U1G-B650/EVAC



User Manual

English



Version 1.11

Published Oct. 2025

Copyright©2025 ASRock Rack Inc. All rights reserved.

Copyright Notice:

No part of this documentation may be reproduced, transcribed, transmitted, or translated in any language, in any form or by any means, except duplication of documentation by the purchaser for backup purpose, without written consent of ASRock Rack Inc.

Products and corporate names appearing in this documentation may or may not be registered trademarks or copyrights of their respective companies, and are used only for identification or explanation and to the owners' benefit, without intent to infringe.

Disclaimer:

Specifications and information contained in this documentation are furnished for informational use only and subject to change without notice, and should not be constructed as a commitment by ASRock Rack. ASRock Rack assumes no responsibility for any errors or omissions that may appear in this documentation.

With respect to the contents of this documentation, ASRock Rack does not provide warranty of any kind, either expressed or implied, including but not limited to the implied warranties or conditions of merchantability or fitness for a particular purpose.

In no event shall ASRock Rack, its directors, officers, employees, or agents be liable for any indirect, special, incidental, or consequential damages (including damages for loss of profits, loss of business, loss of data, interruption of business and the like), even if ASRock Rack has been advised of the possibility of such damages arising from any defect or error in the documentation or product.



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

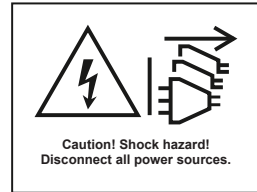
CAUTION

**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.

Contents

Chapter 1 Introduction	1
1.1 Shipping Box Contents	2
1.2 Specifications	3
Chapter 2 Server System Overview	6
2.1 System Components	6
2.2 Internal Features	7
2.3 System Front Panel	8
2.4 System Rear Panel	8
2.5 I/O Panel	9
Chapter 3 Hardware Installation and Maintenance	12
3.1 Server Top Cover	13
3.2 Power Supply	15
3.3 System Fan	17
3.4 Add-in Card	18
3.5 EVAC	24
Appendix	25
Installing the CPU (LGA 1718 Socket)	25
Installing the Memory Modules (DIMM)	28
Block Diagram (B650D4U)	29

Chapter 1 Introduction

Thank you for purchasing 2U1G-B650/EVAC, 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
2U1G-B650/EVAC	B650D4U/1U4L2E



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: 2U1G-B650/EVAC	1
CPU EVAC Heatsink	1
Rail Kit	1
Accessory Box	1
- 1 2.5" Hard Drive Tray	
- 2 Power Cords	
- 1 Quick Installation Guide	
- 2 M3 Screws	



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

1.2 Specifications

2U1G-B650/EVAC	
System	
Form Factor	2U Rackmount
Dimension	477.7 x 430.4 x 88mm (18.8" x 16.9" x 3.5")
Support MB	B650D4U/1U4L2E
Front Panel	
Button	Power button, system reset button
LED	System fail LED, LAN1/LAN2 activity, power status LED
I/O Port	2 Type-A (USB3.2 Gen1)
External Drive Bay / Storage	
Internal Side	1 Optional fixed 2.5" drive bay 1 M-key (PCIe5.0 x4), supports 2280/2242 form factor [CPU] 1 M-key (PCIe4.0 x4), supports 2280/2242 form factor [FCH]
Power Supply	
Type	1+1 Hot-swap CRPS
Output Watt	1000W @ 100-127Vac input 1200W @ 200-240Vac input
Efficiency	80-PLUS Platinum
AC Input	AC 100-127V/12A, 50-60Hz AC 200-240V/7.5A, 50-60Hz
System Fan	
Fan	4 PWM easy-swap 80x38mm fans
Processor System	
CPU	Supports AMD EPYC™ 4005/4004 and AMD Ryzen™ 9000/8000/7000 Series Processors
Socket	Single Socket AM5 (LGA 1718)
Thermal Design Power	Up to 170W
Chipset	AMD B650E

System Memory	
Supported DIMM Quantity	4 DIMM slots (2DPC)
Supported Type	DDR5 288-pin ECC/non-ECC UDIMM
Max. Capacity per DIMM	48GB
Max. DIMM Frequency	5600MHz (1DPC) 3600MHz (2DPC)
Voltage	1.1V
PCIe Expansion Slot	
PCIe x16	1 FHFL dual-slot PCIe5.0 x16 via RB2UX16L_G5_RDV Support GPU card dimensions (L x W x H): 335 x 131 x 39mm (GPU power connector on the south edge) 312 x 154.5 x 39mm (GPU power connector on the east edge)
PCIe x4	1 FHHL PCIe4.0 x4 via riser cable
Ethernet	
Additional GbE Controller	Intel® i210: 2 RJ45 (1GbE)
Server Management	
BMC Controller	ASPEED AST2600
IPMI Dedicated GLAN	1 Realtek RTL8211F for dedicated management GLAN
Graphics	
Controller	ASPEED AST2600: 1 DB15 (VGA), 1 (15-pin) header AMD Processors with Graphics: 1 HDMI, 1 DisplayPort
Rear I/O	
UID Button/ LED	1 UID button w/ LED
Video Port	1 DB15 (VGA), 1 DisplayPort, 1 HDMI
Serial Port	1 DB9 (COM)
USB 3.2 Gen1 Port	4 Type-A (USB3.2 Gen1)
RJ45	2 RJ45 (1GbE) 1 Dedicated IPMI

System BIOS	
BIOS Type	AMI UEFI BIOS; 256Mb (32MB) SPI Flash ROM
BIOS Features	Plug and Play, ACPI 6.4 compliance wake up events, SMBIOS 3.5
Hardware Monitor	
Temperature	CPU, DDR, MB, card side, chipset, M.2 slot
Fan	Fan tachometer Multi-speed control CPU quiet fan (allows chassis fan speed auto-adjust by CPU temperature)
Voltage	VOLT_3VSB, VOLT_5VSB, VOLT_P0_VCORE, VOLT_P0_VSOC, VOLT_VMEM, VOLT_VMISC, VOLT_1.8V_PT21, VOLT_VSUS10, VOLT_VDDI0, VOLT_V10_PHY_DIG, VOLT_VDD_1P8, VOLT_MD_VDDO, 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)

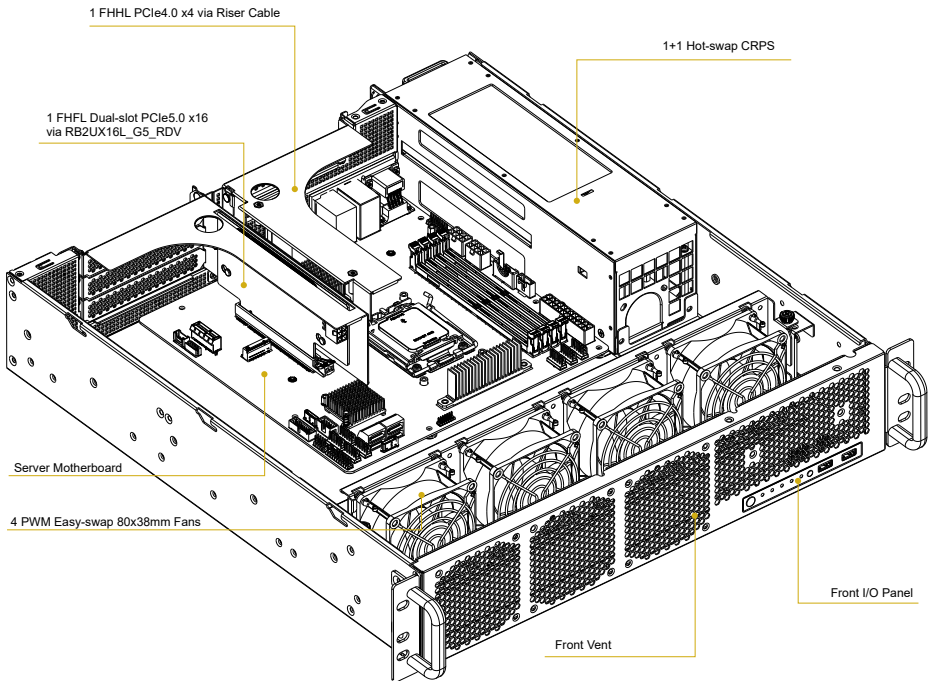


The functions are supported depending on the type of the server motherboard. Refer to the server motherboard user manual for detailed information.

Chapter 2 Server System Overview

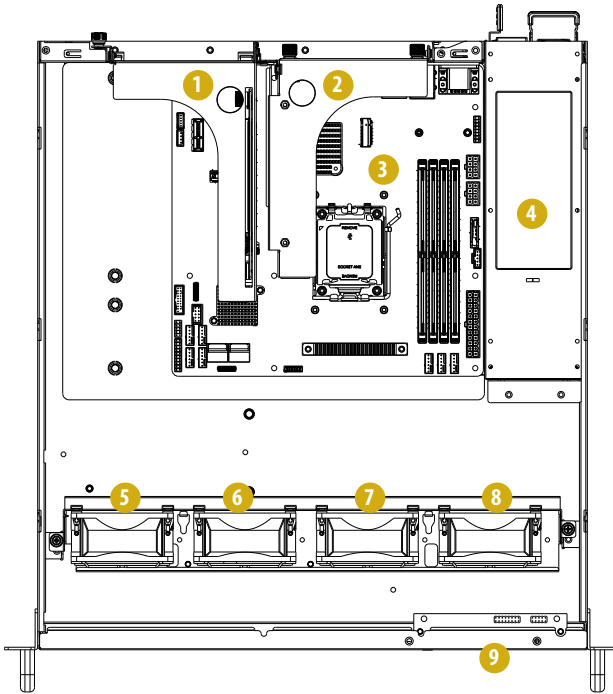
This chapter provides diagrams showing the location of important components of the server system.

2.1 System Components



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

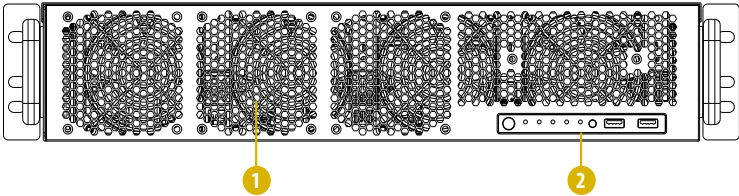
2.2 Internal Features



No.	Description
1	1 FHFL dual-slot PCIe5.0 x16 slots via RB2UX16L_G5_RDV
2	1 FHHL PCIe4.0 x4 slot via riser cable
3	Server motherboard
4	1+1 Hot-swap CRPS
5	1 PWM easy-swap 80x38mm fan (FAN4)
6	1 PWM easy-swap 80x38mm fan (FAN3)
7	1 PWM easy-swap 80x38mm fan (FAN2)
8	1 PWM easy-swap 80x38mm fan (FAN1)
9	Front I/O panel

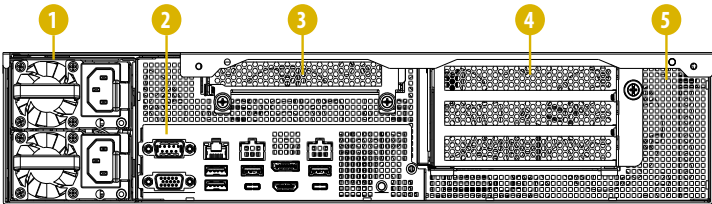
Note: This illustration is without EVAC. For more information about EVAC, refer to section 3.5 EVAC.

2.3 System Front Panel



No.	Description
1	Front vent
2	Front I/O panel

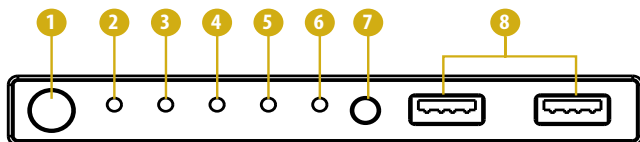
2.4 System Rear Panel



No.	Description
1	1+1 Hot-swap CRPS
2	Rear I/O panel (depends on the specification of the server motherboard)
3	1 FHHL PCIe4.0 x4 slot via riser cable
4	1 FHFL dual-slot PCIe5.0 x16 slots via RB2UX16L_G5_RDV
5	Rear vent

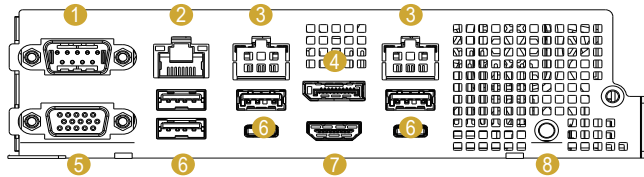
2.5 I/O Panel

Front I/O Panel



No.	Description
1	Power button
2	Power status LED
3	Hard drive status LED
4	LAN1 activity LED
5	LAN2 activity LED
6	System fail LED
7	System reset button
8	2 Type-A (USB3.2 Gen1) ports

Rear I/O Panel



No.	Description
1	1 DB9 (COM) port
2	1 Dedicated IPMI LAN port
3	2 RJ45 (1GbE) LAN ports
4	1 DisplayPort
5	1 DB15 (VGA) port
6	4 Type-A (USB3.2 Gen1) ports
7	1 HDMI port
8	UID button w/ LED

Note: The functions are supported depending on the type of the server motherboard.

Power Button

Press the power button to power on or power off the system. To remove all power from the system completely, disconnect the power cord from the server.

System Reset Button

When the system is completely unresponsive, press the system reset button to reboot the server without shutting it off and initialize the system.

UID Button

Press the ID button to toggle the baseboard UID LED on and off. Use this button to locate the server working on from behind a rack of servers.

Status LED Definitions

Power Status LED	
Status	Description
Off	Power off
Green	Power on

LAN1, LAN2 Activity LEDs	
Status	Description
Off	No link
Blinking Blue	Link between system and network

System Fail LED	
Status	Description
Off	Running or normal operation
Red	At least one sensor has critical alert.

UID LED	
Status	Description
Off	System identification is disabled.
Blue	System identification is active.

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.

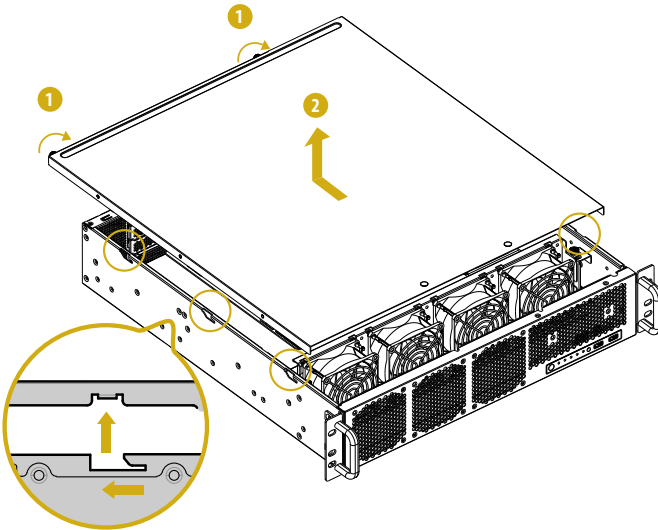
3.1 Server Top Cover

Removing the Server Top Cover



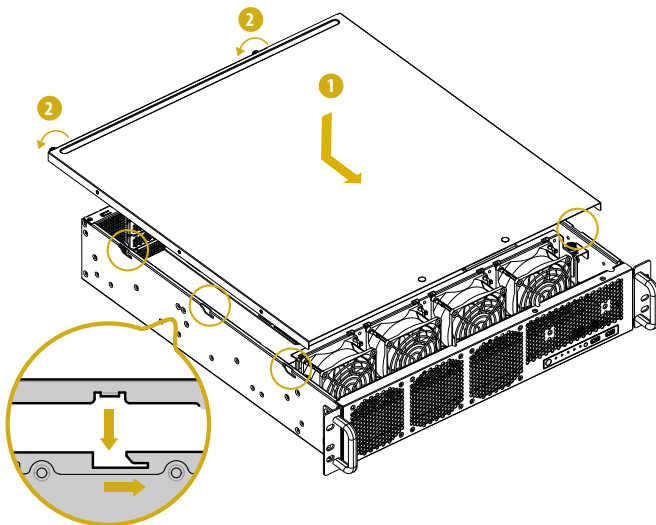
1. Before removing the top cover, power off the server and unplug the power cord.
2. The system must be operated with the chassis top cover installed to ensure proper cooling.

1. Hand-release the thumbscrews on the REAR side of the chassis.
2. Push the top cover toward the REAR 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 cover on the chassis, making sure the side latches align with the cutouts. Slide the cover toward the FRONT side.
2. Hand-tighten the thumbscrews on the REAR side of the chassis.



3.2 Power Supply

The 2U1G-B650/EVAC system can accommodate two power supply units in the bay at the rear of the chassis. Each unit provides up to 1200W of power. One power supply unit is required for full load operation, with the other PSU purely as a redundant, load-sharing backup. One PSU can be removed without affecting system operation.

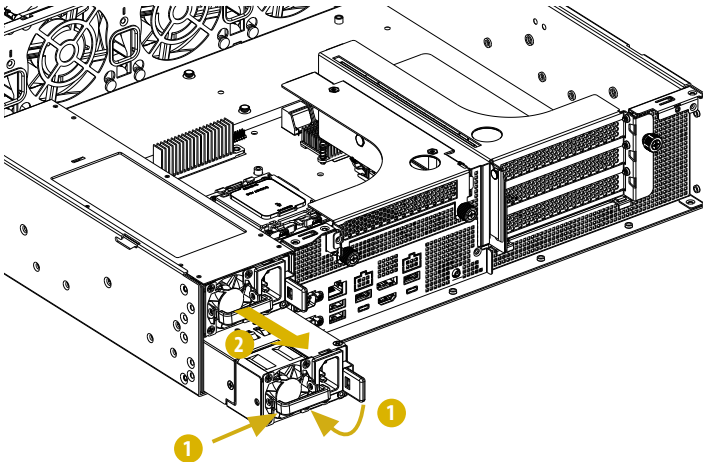
Removing the Power Supply Unit



1. Before replacing the power supply, power off the server, unplug the power cord, and disconnect all wiring from the power supply.
2. In a redundant system, it does not need to power down the server.

To remove a failed power supply unit, identify the failed PSU by checking the power supply LEDs on the PSUs.

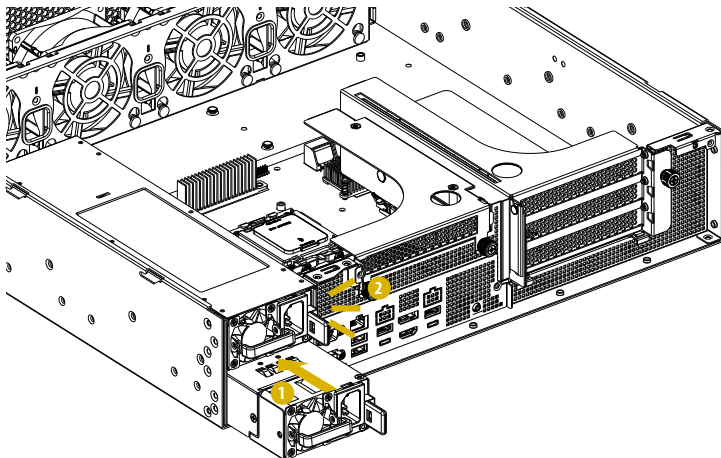
1. Hold onto the power supply handle while pressing the locking lever towards the power supply handle.
2. Pull to remove the PSU from the chassis.



Installing the Power Supply Unit

Align the power supply unit with the power supply bay. Ensure the LED appears on the upper right when installing the PSU.

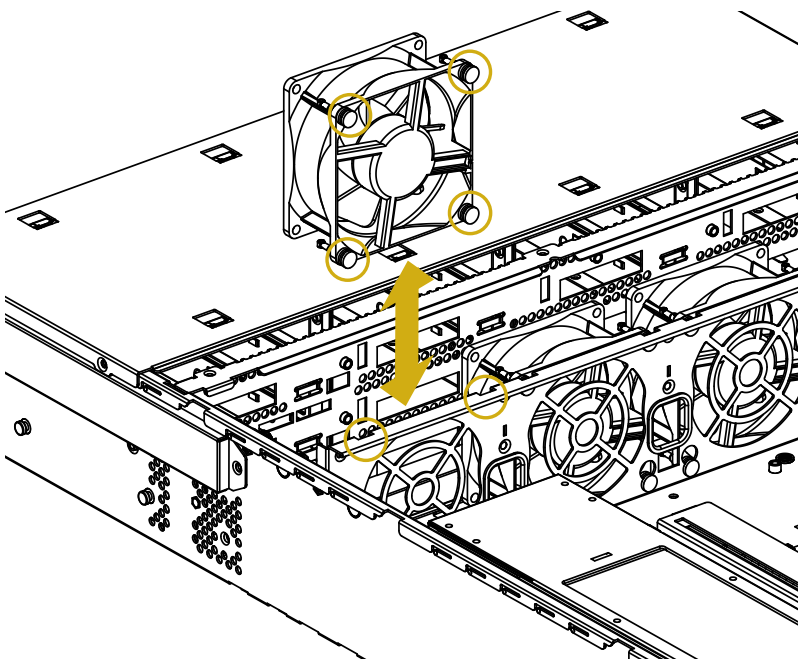
1. Carefully slide the PSU all the way into the power supply bay.
2. Make sure the PSU clicks in place and is well installed.



3.3 System Fan

Replacing the System Fan

1. Lift to remove the failed fan.
2. Align the mounting holes on the replacement fan corners with the fan mounts on the fan bracket.
3. Gently place the fan onto the mounts.
4. Make sure the fan is well seated.



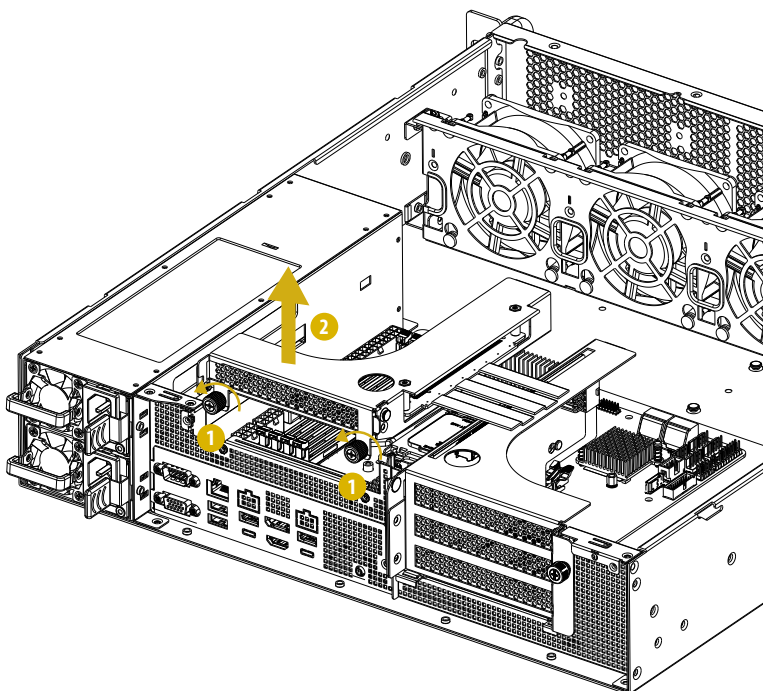
3.4 Add-in Card

Installing the Add-in Card to FHHL PCIe4.0 x4 Slot via Riser Cable

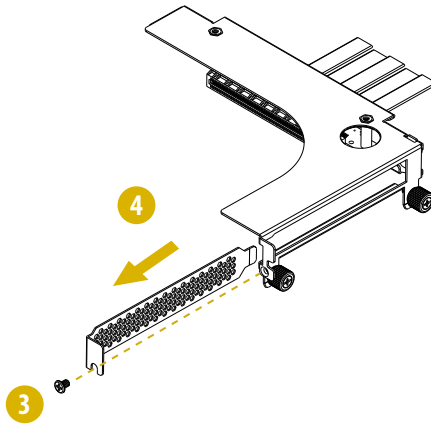


1. Install an add-in card to the chassis only when having a riser cable installed on the server motherboard.
2. Before installing the add-in card, power off the server and unplug the power cord.

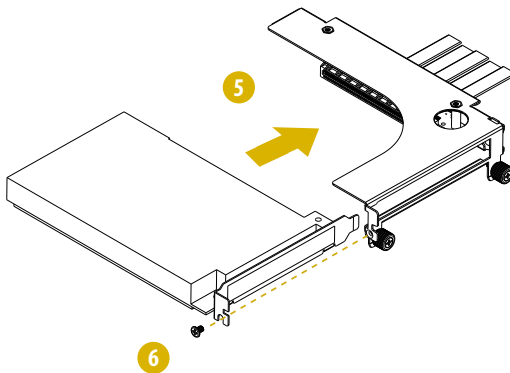
1. Hand-release the thumbscrews securing the riser cable bracket to the chassis.
2. Lift up and remove the riser cable bracket from the chassis.



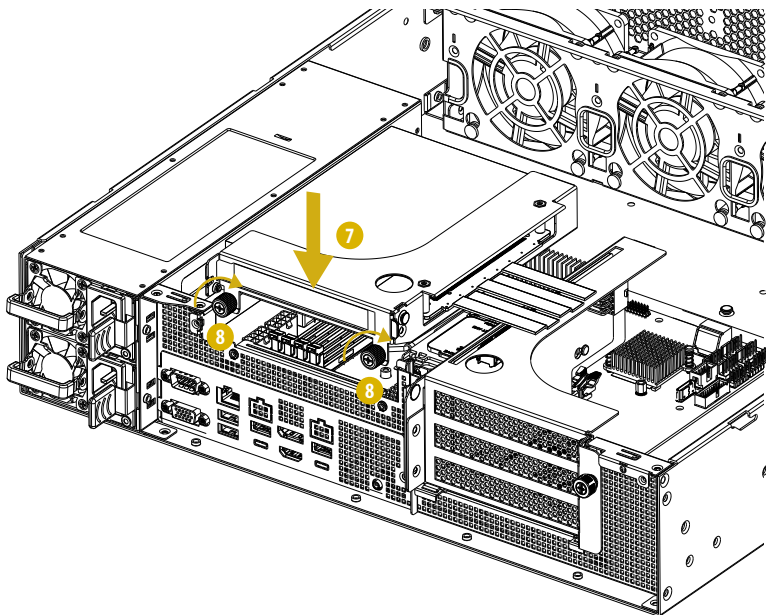
3. Remove the screw securing the blanking plate on the riser cable bracket.
4. Slide the blanking plate out sideways.



5. Install the add-in card to the riser cable bracket.
6. Secure the add-in card to the bracket with the screw.



7. Align the add-in card assembly with the opening of the chassis. Place it into the chassis.
8. Hand-tighten the thumbscrews to secure the assembly to the chassis.

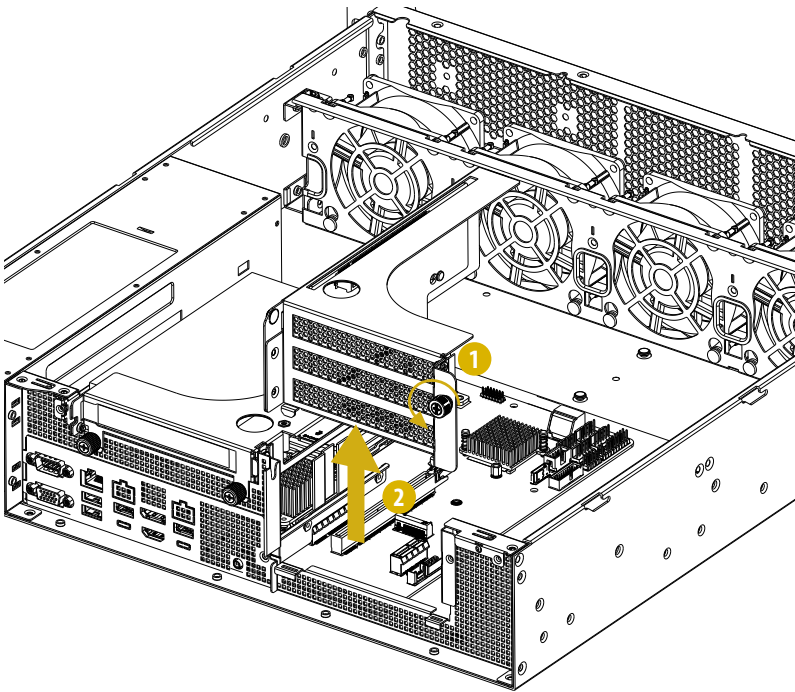


Installing the Add-in Card to FHFL Dual-slot PCIe5.0 x16 Slots via Riser-card

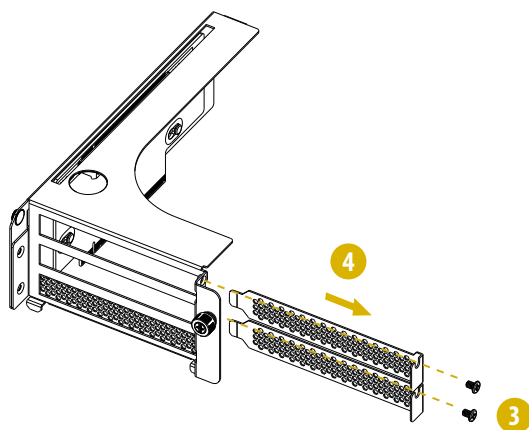


1. Before installing the add-in card, power off the server and unplug the power cord.
2. Maximum supported GPU card dimensions (L x W x H):
GPU power connector on the south edge: 335 x 131 x 39mm
GPU power connector on the east edge: 312 x 154.5 x 39mm
3. To ensure the sufficient length for connecting the GPU to the PSU, use the 12VHPWR adapter pre-installed in the system.

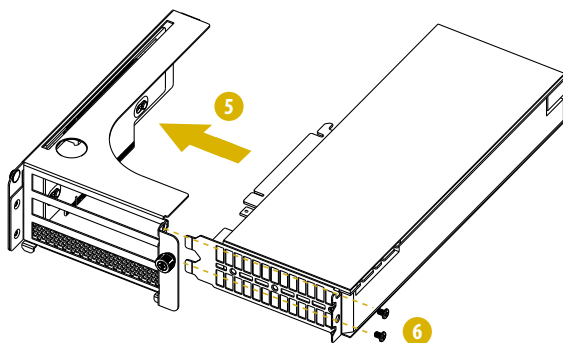
1. Hand-release the thumbscrew securing the riser-card bracket to the chassis.
2. Lift up and remove the riser-card bracket from the chassis.



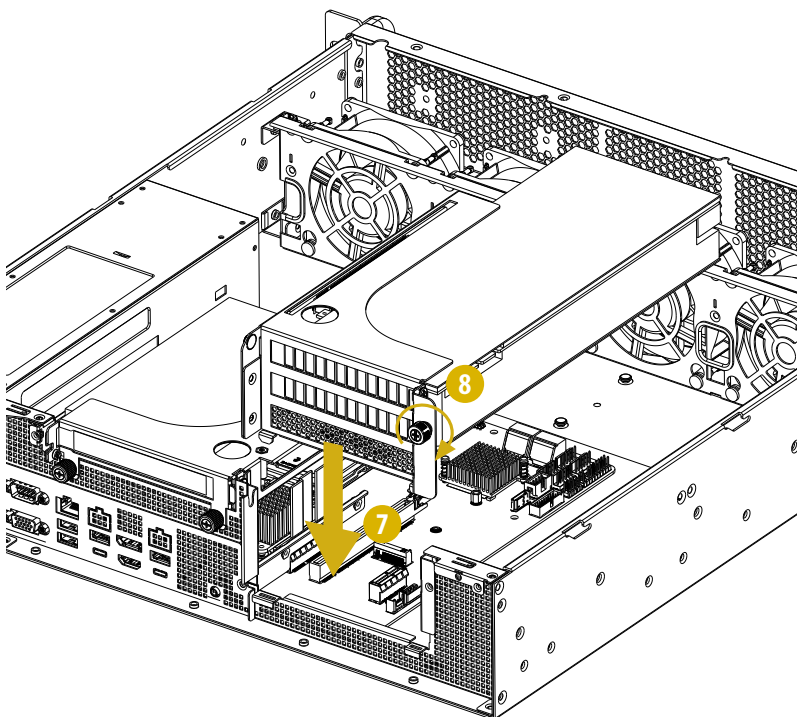
3. Remove the screws securing the blanking plates on the riser-card bracket.
4. Slide the blanking plates out sideways.



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

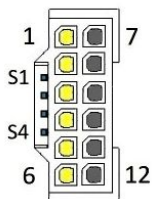


7. Align the add-in card assembly with the opening of the chassis. Place it into the chassis.
8. Hand-tighten the thumbscrew to secure the assembly to the chassis.



9. Connect the pre-installed 12VHPWR adapter to the 16-pin port of the GPU, making sure the connector clicks into place for a secure, full connection.

12VHPWR adapter pin definition:

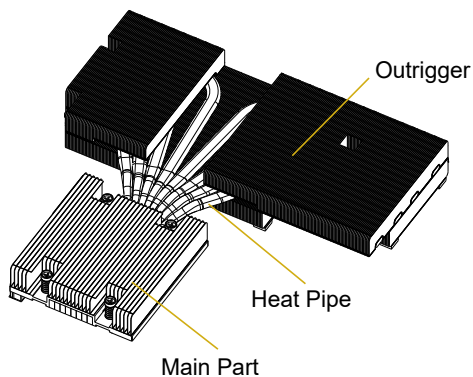


Pin No.	Signal
1 ~ 6	12V
7 ~ 12	GND
S1	NC
S2	NC
S3	Sense0
S4	Sense1

3.5 EVAC

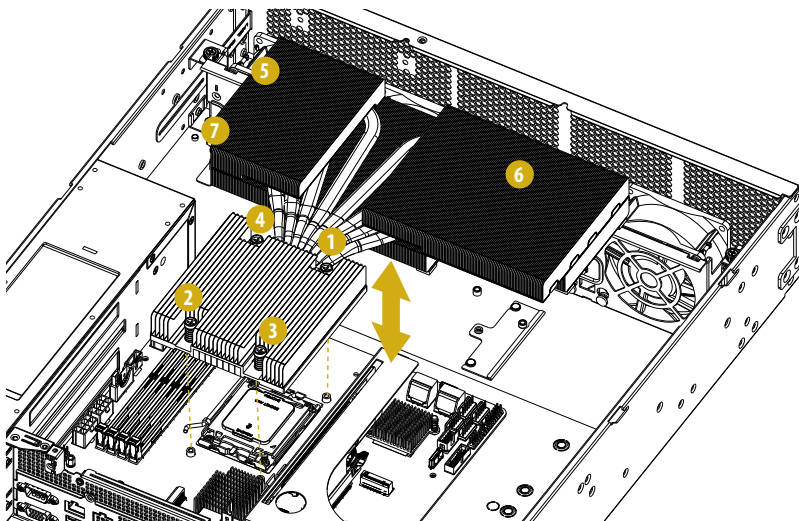
EVAC (Enhanced Volume Air Cool Solution) is a heatsink module used for improving CPU cooling capability and memory cooling balance.

The EVAC consisted of main part, heat pipe and outrigger as shown below:



Installing the EVAC

1. To avoid damaging the heat pipe, make sure to hold both the main part and outrigger simultaneously when assembling the EVAC on the chassis.
2. Set the torque wrench to 4.8-5.2 lb-in. One fourth a turn each time.
3. Tighten the screws in a sequential order 1 > 2 > 3 > 4 > 5 > 6 > 7. Loosen the screws in a reverse order.

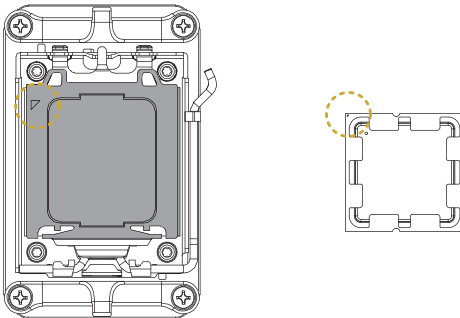


Appendix

Installing the CPU (LGA 1718 Socket)

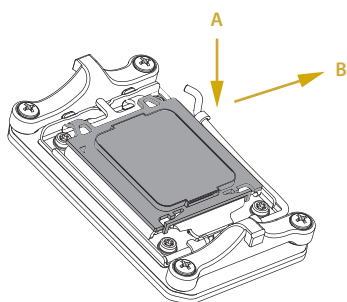


1. Before inserting the 1718-Pin CPU into the socket, check if the **PnP cap** is on the socket, if the CPU surface is unclean, or if there are any **bent pins** in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all power cables before installing the CPU.

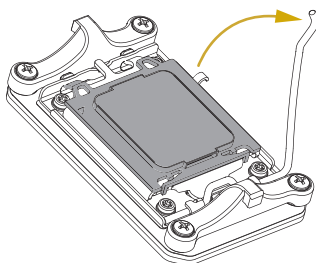


Turn the CPU to the correct orientation before opening the CPU socket cover.

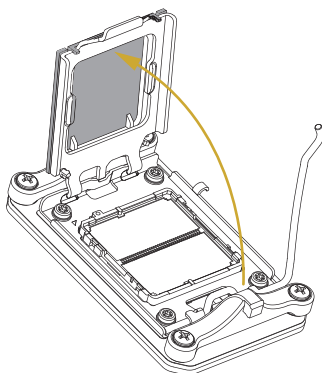
1



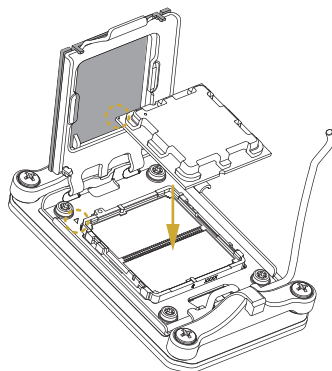
2



3

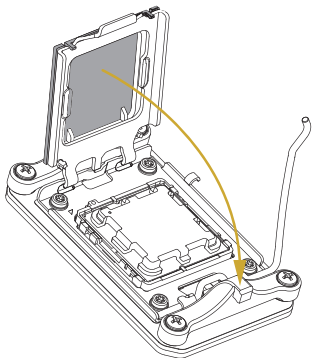


4

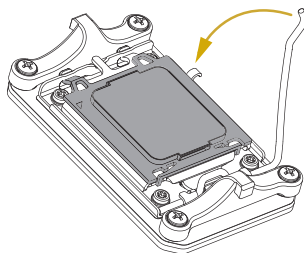


Carefully place the CPU in as flat as possible. Do not drop it.

5



6

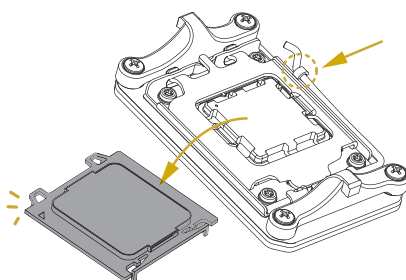


Make sure the CPU is aligned with the socket before locking it into place.

7



Make sure the black cover plate is always in place until it pops off when closing the socket lever.



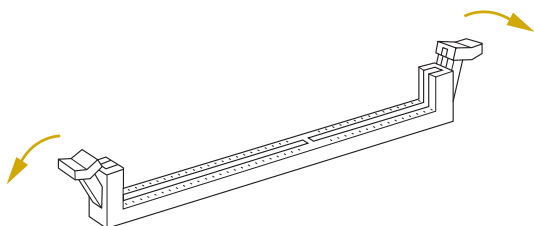
Save the cover after the processor is removed. The cover must be placed if wishing to return the server motherboard for after service.

Installing the Memory Modules (DIMM)

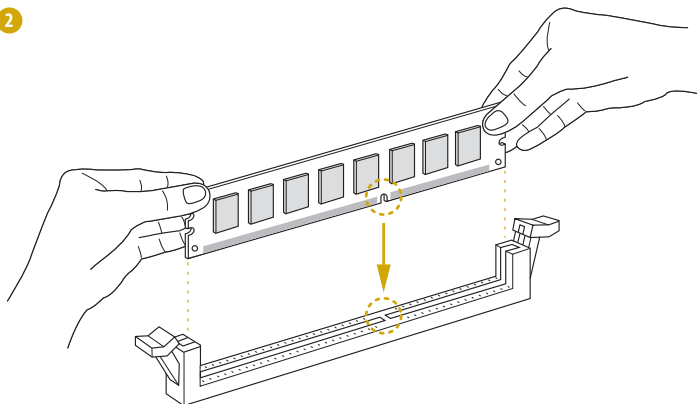


The DIMM only fits in one correct orientation. It will cause permanent damage to the server motherboard and the DIMM if forcing the DIMM into the slot at incorrect orientation. For more information about DIMM installation, refer to the server motherboard user manual.

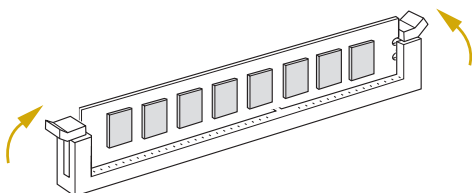
1



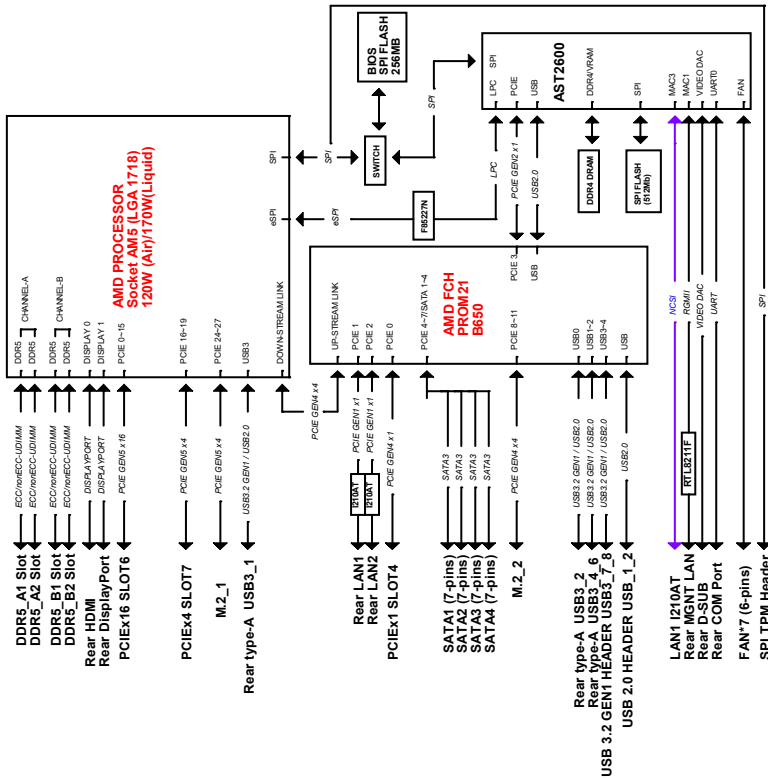
2



3



Block Diagram (B650D4U)



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