RocketStor 4243AS (RS4243AS)

Hardware User Guide

V1.01 - May 11, 2026

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1. Overview

The RS4243AS is a 2U all-flash storage platform engineered for high-performance workloads. It features a dense front-loading design with 24 hot-plug U.2 NVMe SSD bays, delivering massive storage bandwidth and ultra-low latency. The system is equipped with a natively integrated, high-performance dual-port 100GbE QSFP28 NVMe-oF Adapter. establishing a true end-to-end NVMe path from media to network. Coupled with a power supply and comprehensive system management, this platform serves as an ideal storage foundation for demanding applications such as high-performance computing and real-time data analytics.

1.1. Key Features

1.1.1. RS4243AS

- Support 24 U.2 NVMe SSDs
- Support Cables:
  - Passive (1 - 5m)
  - Active Optical (5m - 20m)
- Support LED Management
- Supports NVMe SSD power-on/off (for safe SSD removal).
- Support Alarming
- Support SMART Fan Control
- Support NVMe SSD hot-plug (One hot- plug operation at a time)
- Support Fan hot-plug
- Air Inlet Temperature Sensor
- Supports real-time air inlet temperature monitoring
- Support the Host Architecture: X86 / ARM
- Supported Operating Systems: RS4243AS has no OS restriction; depends on initiator NIC.

Note: The OS used for actual testing is Ubuntu 24.04.3 server, Redhat 9.5 and Redhat 10 (RoCE & TCP).

1.1.2. NVMe-oF Adapter (Western Digital RapidFlex C2000)

- NVMe-oF Adapter Port: Two 100 GbE ports
- NVMe-oF Adapter Port Type: QSFP28
- NVM Express® base specification revision 1.4 support
- NVMe over Fabrics specification revision 1.1 support
- NVMe-oF on RoCE v2 or TCP (not both at the same time)

1.1.3. Storage Adapter (HighPoint Rocket 1528D)

- Support data transfer rate 32 GB/s
- Provide three internal SlimSAS (SFF-8654 x8) connectors

1.2. Basic Specifications

The following table describes the basic specifications of the RS4243AS.

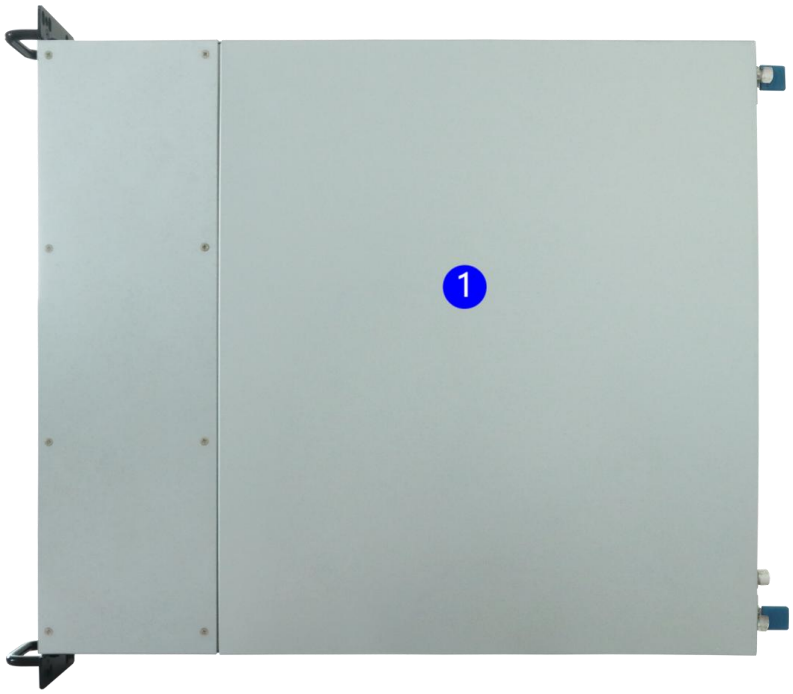
Table 1: Basic Specifications of RS4243AS

Model	**RS4243AS**
Chassis Dimensions	504mm *430 mm * 88mm (W *H *D)
Chassis Weight	14.48kg
Power Consumption	● **Idle mode**: 87.5W ● **I/Os mode**: 287.5W Notes: The I/Os mode power consumption is measured with two PSUs and SANDISK SN655 30.72TB*24. Actual power consumption may differ based on system hardware and configuration.
Operating Voltage	100V ~ 240V AC In
Power Supply Unit	Dual 1300 W (1+1 Redundant)
Work Temperature	+10°C ~ + 35°C
Storage Temperature	+5°C ~ +45°C
MTBF (Mean Time Before Failure)	920,585 Hours

2. System Features

The following views illustrate the product's hardware components and layout.

2.1. Upper View



①. **Cover**: Encloses the chassis to protect internal components.

2.2. Front View

The following table describes the key components of the front view.

Table 2: Key components of the front view

Number	Type	Description
①	Handle	Used to push or pull the RS4243AS into or out of the cabinet rails.
②	NVMe SSD Trays	Used to fix the position of the SSD and prevent it from shifting.
③	Tray Eject Button	Provides positive spring pressure for locking trays.
④	Tray LED	The I/O status of the current SSD. See Tray LED for details.
⑤	POWER Button	This button controls the power supply status for the RS4243AS. Pressing this button will disconnect the main power supply, but the backup power supply will remain active. When performing many maintenance tasks, the power cable must be unplugged first. ● Short Press (press once): Power on ● Long Press (approximately 4 seconds): Force shutdown See POWER LED for details.

⑥	UID Button	The UID button is used to locate the RS4243AS device or quickly disable the beeper. ● Short Press (press once): Enable quick RS4243AS location (LED lights up; refer to UID LED for more details). ● Long Press (approximately 4 seconds): Disable the beeper. Note: This setting takes effect temporarily, not permanently.
⑦	BMC RESET Button	A dedicated reset pinhole provides hardware-level recovery functions for the BMC, including service reset and factory reset, to resolve inaccessibility issues caused by BMC software hangs or configuration errors. ● Long Press (4s ≤ t < 8s): Reset BMC ● Long press (t ≥ 8s): Reset BMC and restore BMC factory settings. To achieve these purposes, the BMC RESET button works in conjunction with the UID LED. See UID LED for details.
⑧	Health LED	A Health LED is located on the front panel of the RS4243AS. See Health LED for details.
⑨	Air Inlet Temperature Sensor	This serves as a thermal inspection point where you can quickly assess chassis temperature and exhaust airflow through physical feel.

2.2.1. POWER LED

The POWER LED is located on the chassis's front panel. When this LED is on, the system power is on. Refer to the table below for more information.

Table 3: LED Indicators of the POWER LED

LED	Color	Status	Description
POWER LED		**OFF**	The RS4243AS is not powered on or booted.
		**Solid Green**	The RS4243AS is booted up and in PSU-degraded mode (single-PSU boot or one PSU removed after dual-PSU boot).
		**Solid Blue**	The RS4243AS is booted up, and all PSUs are online.

2.2.2. UID LED

The UID (Unit Identification) LED is located on the chassis's front panel. It helps visually identify the target device by matching the physical UID button.

Table 4: LED Indicators of the UID LED

LED	Color	Status	Description
UID LED		**OFF**	The UID is not activated.
		**Solid Blue**	The UID is activated.
		Flash Blue	Press the BMC reset button for 4 seconds until the UID LED flashes blue, indicating the reset has taken effect.

2.2.3. Health LED

The Health LED is located on the front panel of the chassis. It provides real-time visual indication of the BMC's operational state and system event severity.

Refer to the table below for more information.

Table 5: LED Indicators of the Health LED

LED	Color	Status	Description
Health LED		**OFF**	The RS4243AS is not connected to the power cord.
		**Flash Orange**	The Warning events occur. ● Voltage sensors: Reading deviates by ±8% from the nominal value. ● NVMe-oF Adapter temperature between 85℃ and 95℃. ● Storage Adapter temperature between 85℃ and 95℃ ● NVMe drive temperature between 80℃ and 85℃ ● NVMe-oF Adapter & Storage Adapter link speed < Gen4 (i.e., Gen1/2/3). ● NVMe-oF Adapter & Storage Adapter link width< x16 (i.e., x1/x2/x4/x8). ● Fan not present. ● NVMe drive not present. ● NVMe drive warning. ● Power supply alert.
		**Flash Red**	The Critical events occur. ● Voltage sensors: Reading deviates by ±10% from the nominal value. ● NVMe-oF Adapter temperature ≥ 95° C. ● Storage Adapter temperature ≥ 95° C. ● NVMe drive temperature ≥ 85° C. ● Power supply not present.
		**Fast Flash Green**	The LED blinks green at 4 Hz to indicate that the chassis is updating the firmware for the NVMe-oF Adapter, Storage Adapter, BMC, IOM, Power MCU, and Power CPLD.
		Solid Green	The chassis has started normally.
		Slow Flash Green	The LED blinks green at 4 Hz to indicate that the chassis is starting up.

2.2.4. SSD Tray LED

The SSD tray is located on the chassis's front panel and has two LEDs. These LEDs indicate the physical presence, activity, locator state, and failure alarm of the NVMe SSD in the corresponding drive bay. Refer to the table below for more information.

Table 6: LED Indicators of the SSD Tray LED

LED	LED location	Color	Status	Description
SSD Tray LED	**Both side**		**OFF**	This disk was not detected, or the chassis has powered off.
	Right side		**Solid Green**	The SSD is detected.
			Flash Green	The SSD is in active (I/O) status.
	Left side		**Flash Blue**	The SSD's location.
			Solid Red	The SSD has failed.

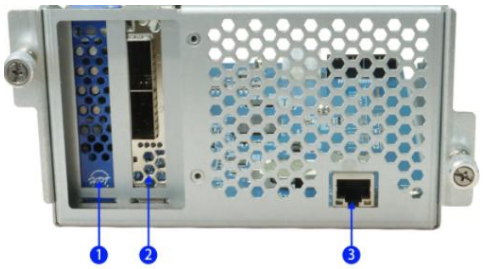
2.2.5. SSD Tray Location Reference

This section defines the physical layout sequence and corresponding numbering of all SSD trays on the RS4243AS. Understanding this sequence is essential for accurate drive installation and replacement, as well as for locating specific drives via management systems or status LEDs.

2.3. Rear View

The following table describes the key components of the rear view.

Table 7: Key components of the rear view

Number	Type	Description
①	Power Supply Unit	Two 1300w Power Supply Units. Provide a stable power supply for the Chassis. See Power Supply Unit for details.
②	IOM Module	 ● **1: Storage Adapter** Used to provide a composite indication of the adapter's PCIe bandwidth, power status, and chipset temperature warning. See Storage Adapter for details. ● **2: NVMe-oF Adapter** NVMe over Fabrics Adapter. used to convert and forward NVMe-oF commands to NVMe devices. See NVMe-oF Adapter for details. ● **3: RJ45 Connector** 1 Gb Ethernet connector used to assign a static IP address to the RS4243AS for BMC remote management.

2.3.1. Power Supply Unit

The RS4243AS is equipped with two 1300W power supply units. These power supply units support hot-plug, automatically detecting and adapting to input voltages ranging from 100V to 240V.

The following table describes the key components of the Power Supply Unit.

Table 8: Key components of the Power Supply Unit

Number	Type	Description
①	Power supply LED	It indicates the power supply unit's input power, output mode, operational state, firmware update status, and failure alarms. See PSU LED for details.
②	Blue release button	A safety lock that ensures power-off before removal.
③	AC Power IN	Used to connect the AC power cord.
④	Power Fan	Used to provide active cooling for the power supply unit, ensuring its stable operation.
⑤	Black Handle	Used for hot-swap operations, enabling safe power supply insertion and extraction while providing a secure grip for easy handling.

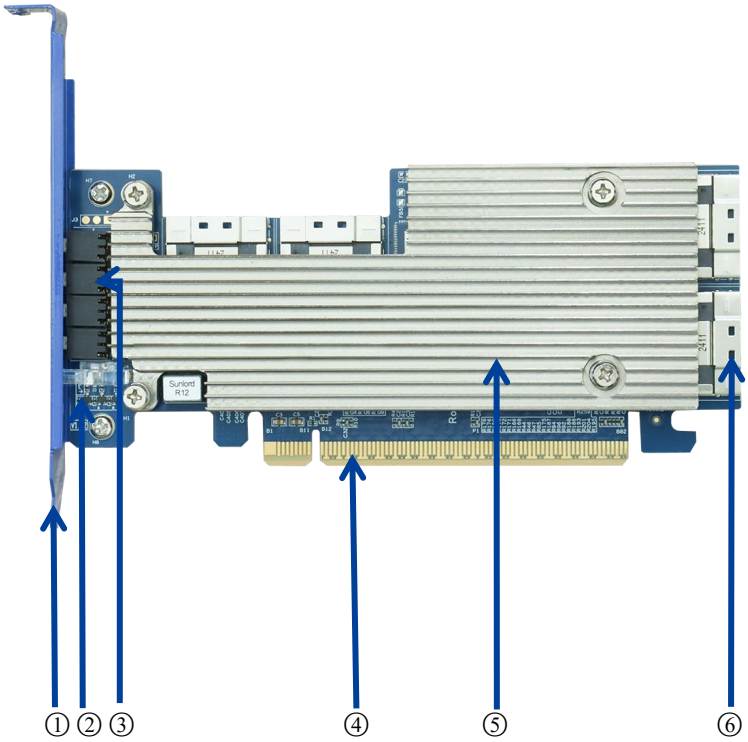
2.3.1.1. PSU LED

The PSU LED is located on the PSU's rear panel. It indicates the power supply unit's input power, output mode, operational state, firmware update status, and failure alarms. Refer to the table below for more information.

Table 9: LED Indicators of the PSU LED

LED	Color	Status	Description
PSU LED		**OFF**	The power cord is not connected.
		**Solid Green**	The chassis is powered on and receiving a stable 12V supply.
		Slow Flash Green	The LED blinks green at 1 Hz to indicate that the Power is connected to the chassis, but the power button has not been pressed; the PSU is in standby mode.
		**Solid Red**	● The AC power cord unplugs, or the AC input is lost (while a redundant power supply unit remains powered); ● +12V main output critical event detected, causing system shutdown (e.g., PSU failure, fan failure).
		Flash Red	The power supply unit has encountered the following warning events: High temperature/High power/High current/Fan speed too low.

2.3.2. Storage Adapter (HighPoint Rocket 1528D)

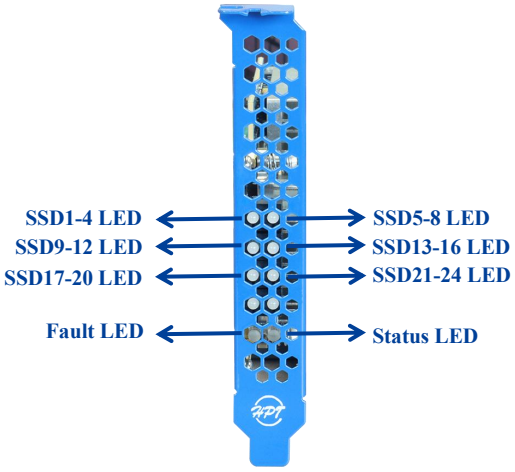


The following table describes the key components of the Storage Adapter.

Table 10: Key components of the Storage Adapter

Number	Type	Description
①	Bracket	The Storage Adapter is secured to the chassis by a bracket.
②	RGB LED	Status LED and Fault LED. ● Status LED -- The status of the Storage Adapter PCIe bandwidth. ● Fault LED -- The status of the Broadcom chipset temperature.
③	LED	Six SSD LEDs. The SSD LED indicates the SSD's bandwidth state. Each LED represents four SSDs.
④	PCIe Host Interface	PCIe 4.0 x16 host interface. With the PCIe interface, this connector provides power to the board.
⑤	Cooling System	Passive Heatsink. Used to dissipate heat from electronic components prone to heat generation.
⑥	Storage Interface	Three internal SFF-8654 connectors. Connect the Storage Adapter to the storage devices using a cable.

2.3.2.1. Storage Adapter LED

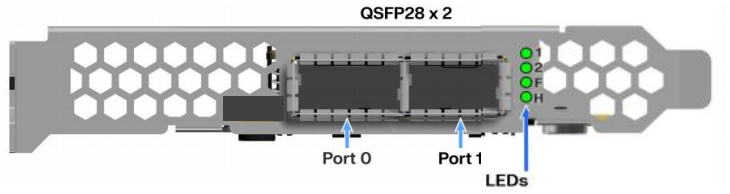


The following table describes the SSD LED, Status LED, and Fault LED of the Storage Adapter.

Table 11: Description of Storage Adapter LED

LED	Color	Status	Description
SSD LED		**OFF**	The Storage Adapter is powered off, or the SSD is not detected.
		Solid Green	All four SSDs are detected normally.
		Solid Red	Partial failures-red deepens as more drives fail; solid red when all fail.
Status LED		**OFF**	The Storage Adapter is powered off.
	Notes: The LED blinks blue twice in the first second, then goes out for 1 second and continues cycling. The following represents the bandwidth status of the Storage Adapter.		
		Interval Flash Green	PCIe 4.0 x16.
		Interval Flash Yellow	PCIe 4.0 x8 or PCIe 3.0 x16.
		Interval Flash Cyan	PCIe 4.0 x4 or PCIe 3.0 x8.
		Interval Flash White	PCIe 3.0 x4.
		Interval Flash Red	Not appear as above.
Fault LED		**OFF**	The Storage Adapter is powered off.
		Fast Flash Red	The LED blinks red at 4 Hz to indicate that the Broadcom chipset temperature has exceeded the recommended temperature threshold (105℃).

2.3.3. NVMe-oF Adapter (Western Digital RapidFlex C2000)

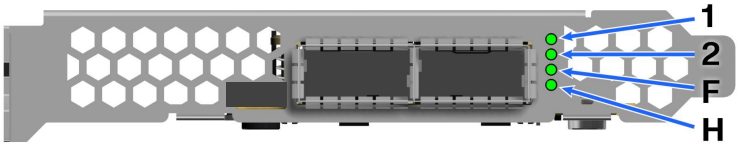


The NVMe-oF adapter has two 100Gb Ethernet ports (Port 0 & Port 1) via QSFP28 connectors, supporting 100GBASE-CR4, 50Gbps, and 25Gbps, with LEDs indicating board status and activity.

- **LEDs**: Indicate various board states and activity.
- **QSFP28**: Equipped with two 100Gb Ethernet ports, port type QSFP28. For compatibility with the RS4243AS, please refer to the following:

  - : Compatible Software
  - : Compatible Initiators
  - : Compatible Operating Systems
  - : Compatible Ethernet Switches
  - : Compatible Cables

2.3.3.1. NVMe-oF Adapter LED



- **1** – Ethernet lane activity for Port 0.
- **2** – Ethernet lane activity for Port 1.
- **F** – Firmware state.
- **H** – Hardware and power state.

The following table describes the key components of the NVMe-oF Adapter LED.

Table 12: Description of NVMe-oF Adapter LED

LED	Color	Status	Description
1 & 2 LED		**OFF**	The adapter is powered off.
		Fast Flash Green	The Ethernet lane is connected and has I/O activity.
		Medium Flash Green	The Ethernet lane is connected but has no current I/O activity.

		Slow Flash Green	The Ethernet lane is not connected and has no I/O activity.
F LED		**OFF**	The adapter is powered off.
		**Solid Amber**	Boot sequence started. Notes: A sustained solid Amber LED indicates that the adapter must be shipped back to the factory (also known as a "bricked" state). This includes a Power-On SelfTest (POST) failure. This LED status is controlled by the boot.
	Notes: The following LED statuses are controlled by FW. The flash rate is once per second.		
		**Flash Amber**	Action Required (AR) Condition Example causes: ● Booted to golden ● Core dumps in flash ● An additional "attention" state where the user should access the A2000 Target's Management Interface for status.
		**Solid Green**	Press and hold the Reset button on the C2000, then release it to clear the configuration.
		Flash Green	FW Up with no errors. FW will blink the green LED during normal operation.
		**Solid Orange**	Reset button has been depressed.
H LED	Notes: The secondary Ethernet Management Port (EMP) and reset state are represented on a dual LED in the same package. The reset function employs the green LED and the EMP employs the red LED. Combined, they appear to the user as a single amber color. The following LED statuses are controlled by HW.		
		**OFF**	Board has a hardware fault or is not receiving 12V in.
		**Solid Green**	Board is out of reset.
		**Solid Orange**	Power is being applied, but the board is held in reset.

2.3.3.2. Compatible Software

The following table lists software compatible with the NVMe-oF Adapter.

Software	Version
NVMe-CLI	1.16 and later

2.3.3.3. Compatible Initiators

The following tables display initiator devices compatible with the NVMe-oF Adapter.

NVIDIA®, Mellanox® ConnectX®-5d

Model	Protocol(s)	Firmware	Driver
MCX556A-ECAT	TCP	16.35.4030-LTS	RHEL 9.4: ● Inbox: 5.14.0-427.13.1.el9_4.x86_64 ● OFED: 23.10-3.2.2.0-LTS Ubuntu 24.04: ● Inbox: 6.8.0-48-generic ● OFED: 24.07-0.6.1.0
MCX516A-CCAT	RoCE v2, TCP		
MCX516A-CDAT	RoCE v2		

NVIDIA, Mellanox ConnectX-6

Model	Protocol(s)	Firmware	Driver
MCX614106A-CCAT	RoCE v2, TCP	20.39.3560-LTS	RHEL 9.4: ● Inbox: 5.14.0-427.13.1.el9_4.x86_64 ● OFED: 23.10-3.2.2.0-LTS Ubuntu 24.04: ● Inbox: 6.8.0-48-generic ● OFED: 24.07-0.6.1.0
MCX614106A-CCAT	RoCE v2, TCP	22.39.3560-LTS	
MCX614106A-CCAT	RoCE v2, TCP		

Broadcom®

Model	Protocol(s)	Firmware	Driver
P2100G	RoCE v2	230.1.116.0	RHEL 9.2: 230.1.116.0

SANBlaze

Model	Protocol(s)	Firmware	Driver
V10.7-64-Beta15-C8	RoCE v2, TCP	Inbox	Inbox

Western Digital RapidFlex

Model	Protocol(s)	Firmware	Driver
A2000 Initiator	RoCE v2, TCP	A2000Ifw_2.0.0	N/A
C2000 Initiator			

2.3.3.4. Compatible Operating Systems

The following table lists operating systems compatible with the NVMe-oF Adapter.

Operating System	Version	Kernel
Ubuntu	24.04 (RoCE & TCP)	LTS 6.8.0-60-generic
Red Hat Enterprise Linux	9.2 (RoCE & TCP)	LTS 5.14.0-284.11.1.el9_2.x86_64
	9.4 (RoCE & TCP)	LTS 5.14.0-427.13.1.el9_4.x86_64

2.3.3.5. Compatible Ethernet Switches

The following table lists Ethernet switches compatible with the NVMe-oF Adapter.

Manufacturer	Model	FW Version
NVIDIA®	Spectrum® SN2100	3.10.4504
	Spectrum SN2700	3.10.4504
	Spectrum SN3700	3.10.4504
	Spectrum SN4700	3.10.4504
Cisco®	Nexus® 3000 C3232C	NXOS: 9.3.14
	Nexus 9000 C9332D-GX2B	NXOS: 10.5.1
Arista®	7050CX3-32S-R	4.27.0F

2.3.3.6. Compatible Cables

The following table lists cables compatible with the NVMe-oF Adapter.

Manufacturer	Type	Model	Length
NVIDIA / Mellanox	Active	MFA1A00-C003	3m
		MFA1A00-C005	5m
		MFA1A00-C010	10m
		MFA1A00-C050	50m
	Passive	MCP1600-C001E30N	1m
		MCP1600-C002E30N	2m
		MCP1600-C003E30L	3m
		MCP1600-C005	5m

2.4. Side View

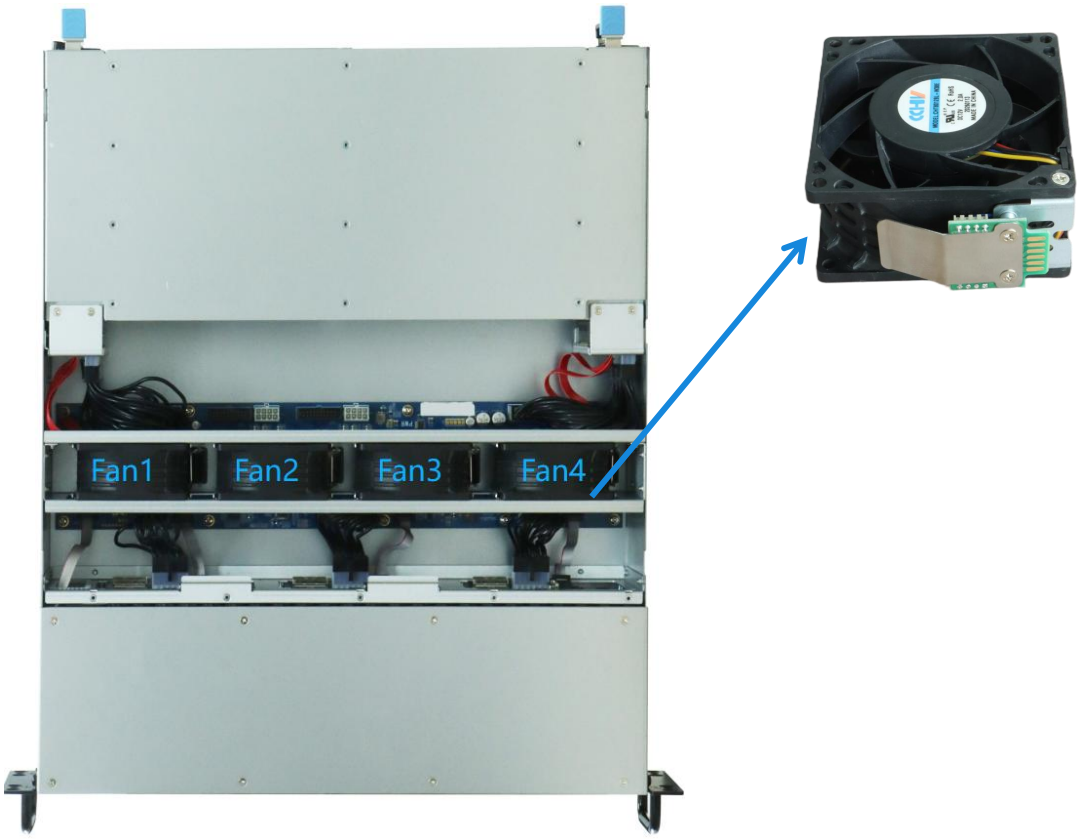
Side rail mounting surface.

For detailed side rail installation procedures, refer to **Installation Instructions NJ21A59-26** on our official website.

2.5. Internal View

Warning: The beeper and system fans shown in this section are informational only and are not user-serviceable. Unauthorized opening of the chassis will void the warranty. For repair or replacement of internal components, please contact HighPoint Technical Support.

2.5.1. System Fans



Four heavy-duty fans provide cooling for the system.

The system fans are hot-plug, allowing for safe replacement while the system is operational.

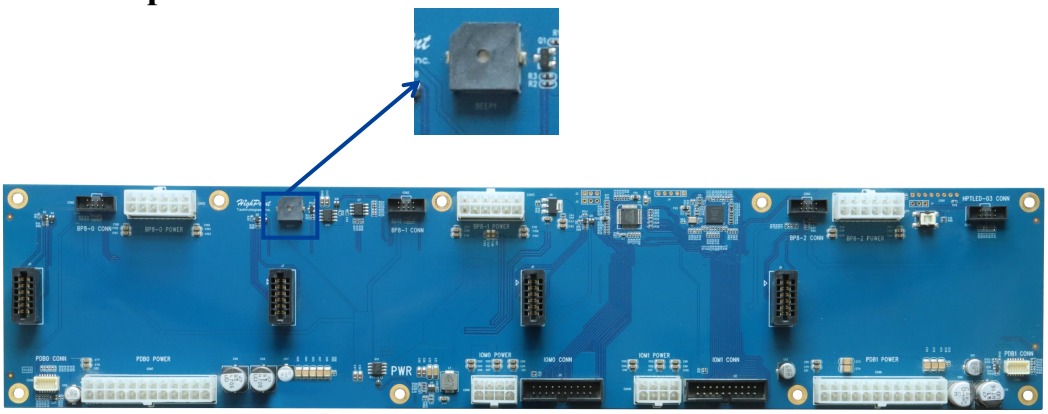
The fans support two control types: Manual and Smart. Refer to the table below for more information.

Table 13: Description of System Fans

Type	Description
Smart Fan Control (Note: The maximum temperature value from points SSD, NVMe-oF Adapter, Storage Adapter, air intake, and air outlet determines the control adjustment.)	**Level: 1** ● **SSD, NVMe-oF Adapter, Storage Adapter**: Temperature ≤ 40°C → Fan speed percentage 40% ● **Air intake**: Temperature ≤ 15°C → Fan speed percentage 25% ● **Air outlet**: Temperature ≤ 40°C → Fan speed percentage 25%
	Level: 2 ● **SSD, NVMe-oF Adapter, Storage Adapter**: 40°C < Temperature ≤ 50°C → Fan speed percentage 50% ● **Air intake**: 15°C < Temperature ≤ 20°C → Fan speed percentage 30% ● **Air outlet**: 40°C < Temperature ≤ 45°C → Fan speed percentage 35%
	Level: 3 ● **SSD, NVMe-oF Adapter, Storage Adapter**: 50°C < Temperature ≤ 60°C → Fan speed percentage 60%

	● **Air intake**: 20°C < Temperature ≤ 25°C → Fan speed percentage 35% ● **Air outlet**: 45°C < Temperature ≤ 50°C → Fan speed percentage 45%
	Level: 4 ● **SSD, NVMe-oF Adapter, Storage Adapter**: 60°C < Temperature ≤ 70°C → Fan speed percentage 80% ● **Air intake**: 25°C < Temperature ≤ 30°C → Fan speed percentage 40% ● **Air outlet**: 50°C < Temperature ≤ 55°C → Fan speed percentage 55%
	Level: 5 ● **SSD, NVMe-oF Adapter, Storage Adapter**: Temperature > 70°C → Fan speed percentage 100% ● **Air intake**: 30°C < Temperature ≤ 35°C → Fan speed percentage 45% ● **Air outlet**: 55°C < Temperature ≤ 60°C → Fan speed percentage 65%
	Level: 6 ● **Air intake**: 35°C < Temperature ≤ 40°C → Fan speed percentage 50% ● **Air outlet:** 60°C < Temperature ≤ 65°C → Fan speed percentage 75%
	Level: 7 ● **Air intake**: Temperature > 40°C → Fan speed percentage 100% ● **Air outlet**: Temperature > 65°C → Fan speed percentage 100%
Manual Fan Control Note: For full-speed I/O operation, manually set the duty value to above 60.	Duty cycle: 40%, Around 4155, 4215, 4050, 4270 RPM
	Duty cycle: 60%, Around 6136, 6136, 6136, 6254 RPM
	Duty cycle: 80%, Around 7906, 8024, 7670, 8024 RPM
	Duty cycle: 100%, Around 9440, 9440, 9086, 9558 RPM

2.5.2. Beeper



The beeper will activate an alarm when a critical event is detected. You can turn off this beeper by pressing the **UID button**. This setting takes effect temporarily, not permanently.

The beeper alarms are triggered based on two primary sensor data types: **discrete** and **threshold**. Refer to the tables below for more information.

Table 14: Description of Beeper (Discrete Sensors)

General Rule: For discrete sensors, a beeper is typically triggered when the sensor reads a value indicating an **abnormal or fault state**, most commonly the value **1**.

Type	Sensor	Alarm Trigger Condition (Value)	Description (Example)
IPMI sensor	PSU_Present Sensor	Value = 1	The power supply is unplugged while powered on.
	PSU_Alert Sensor	Value = 1	The PSU fan speed is too low while the PSU is powered on.
System Fan sensor	Fan_Present	Value = 1	Removing the fan does not trigger an audible alert; the fan only displays RPM.
NVMe-oF Adapter sensor	c2000_link_speed	Value = 1 or 2 or 3 or 5	Link Speed Abnormal (e.g., is not Gen4.)
	c2000_link_width	Value = x1 or x2 or x4 or x8	Link Width Abnormal (e.g., lower than expected x16.)
Storage Adapter sensor	c2000_link_speed	Value = 1 or 2 or 3 or 5	Link Speed Abnormal (e.g., is not Gen4.)
	c2000_link_width	Value = x1 or x2 or x4 or x8	Link Width Abnormal (e.g., lower than expected x16.)
NVMe Drive sensor	nvmeX_Warning	Value = 1	SMART Critical Warning field not equal to 0x00.
	nvmeX_Present	Value = 1	NVMe Drive removal while powered on.

Table 15: Description of Beeper (Threshold Sensors)

Type	Sensor	Alarm Trigger Condition	
		Upper critical	Lower critical
ADC sensor	ADC0_2V5	10%	-10%
	ADC1_3V3_1	10%	-10%
	ADC2_12V_Aux	10%	-10%
	ADC4_1V8	10%	-10%
	ADC5_1V	10%	-10%
	ADC8_12V	10%	-10%
	ADC9_3V3_2	10%	-10%
C2000 sensor	c2000_temp	95	/
Storage Adapter sensor	c1528_temp	95	/
	c1528_3V3	10%	-10%
	c1528_12V	10%	-10%
NVMe Drive sensor	nvmeX_temp	85	/

3. Remove and install component

This section describes how to install and remove component.

3.1. Recommended tools

The procedures in this document may require the following tools:

- Antistatic Wrist Strap
- Screwdriver

Notes:

Prioritize ESD Protection: Always wear a properly grounded antistatic wrist strap before performing any operation.

Match Tool Specifications: Always use a perfectly sized screwdriver to avoid stripping the screw head, which can cause irreparable damage.

3.2. NVMe SSD Tray

3.2.1. Install the SSD into the NVMe SSD Tray

1. Press the tray eject button to eject the eject mechanisms.

2. Pull the eject mechanisms to remove the tray from the backplane.

3. Remove the baffle assembly at the rear of the tray by removing the screws.

4. Carefully insert the U.2/ U.3 NVMe SSD into the tray.

5. Secure the NVMe SSD with the mounting screws.

6. Slide the tray into the backplane slot and push it to the rear of the backplane.

7. Close the eject mechanisms to lock the tray.

3.2.2. Remove the SSD from the NVMe Tray

Note: It is advisable to handle only one hot-plug task per instance.

1. Press the tray eject button to release the eject mechanisms.

2. Pull the eject mechanisms to remove the tray from the backplane slot.

3. Remove the mounting screws securing the NVMe SSD.

4. Carefully take the U.2 / U.3 NVMe SSD out of the tray.

5. Reattach the baffle assembly to the rear of the tray using the screws.

6. Slide the empty tray back into the backplane slot and push it fully to the rear.

7. Close the eject mechanisms to lock the tray.

4. Using the RS4243AS

Follow the SOP steps below to set up the RS4243AS, including hardware installation, environment configuration, and rack mounting.

- Hardware Installation – Provides four connection modes, including dual-port/single-port direct connection or via a switch, to accommodate different network topologies.
- Operating Environment Configuration – Describes how to configure the Initiator IP, set the target NVMe-oF adapter IP via BMC, and use nvme discover/connect commands to connect to target disks over RDMA/TCP.
- Using the RS4243AS in a Center Rack – Describes how to install the RS4243AS into a center rack and safely remove it from the rack.

4.1. Hardware Installation

The four physical connection configurations include single-port and dual-port direct connections and connections via a switch.

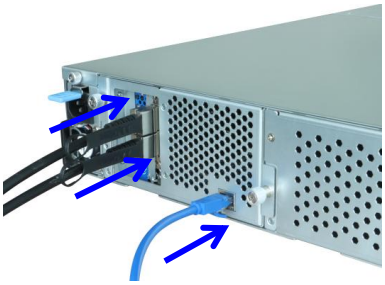
Notes:

In direct connect mode, up to 2 motherboards can access the RS4243AS simultaneously.

In switch mode, the maximum number of supported motherboards accessing the RS4243AS equals the total number of switch ports minus 2.

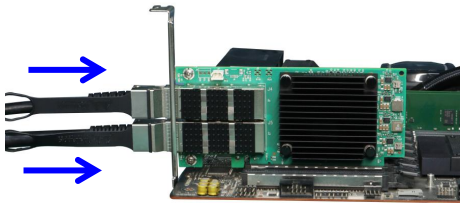
4.1.1. NVMe-oF Dual-Port + Network card Dual-Port

1. Use a wired ESD wrist strap that is properly grounded.
2. Unpack and remove the RS4243AS and check it for damage. If it appears damaged, please contact HighPoint Technical Support.
3. Hardware installation on the Target (RS4243AS).
   1) Install the SSD into the NVMe SSD Trays. Refer here.
   2) Connect the RJ45 Ethernet patch cable to the router and the other end of the cable to the rear of the chassis.
   3) Connect the end of the QSFP28 Ethernet patch cables to the rear of the chassis.

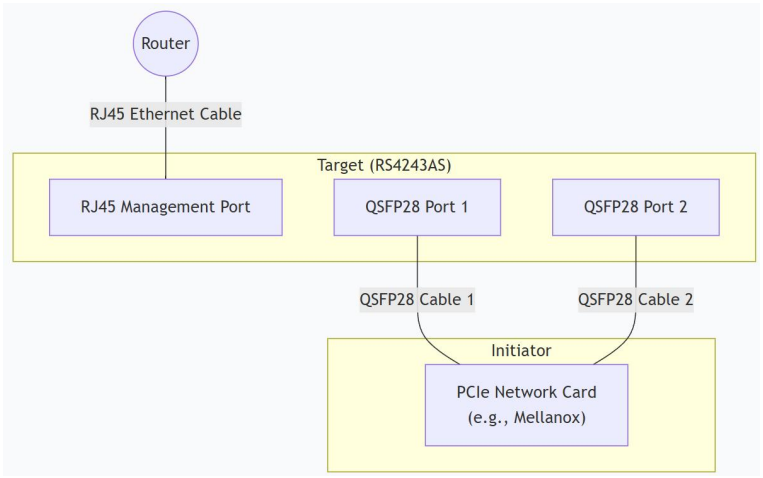


   4) Connect the UL power cord to the rear of the chassis and connect it to an AC power source.

4. Hardware installation on the Initiator (PCIe network interface card, for example: Mellanox)
   1) Insert the PCIe network interface card into the motherboard's PCIe slot.
   2) Connect the opposite end of the QSFP28 Ethernet patch cables (already connected to the rear of the chassis) to the PCIe network interface card’s ports.



The following topology diagram shows the Target (RS4243AS) connected to the router via RJ45 and to the Initiator’s PCIe NIC via dual QSFP28 cables.



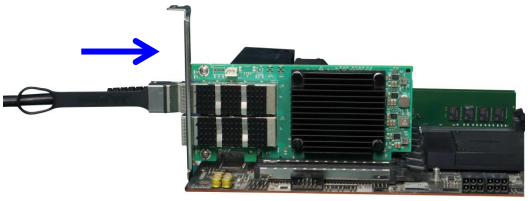
5. Press the power button to power up the chassis, then power up the motherboard.

4.1.2. NVMe-oF Single-Port + Network card Single-Port

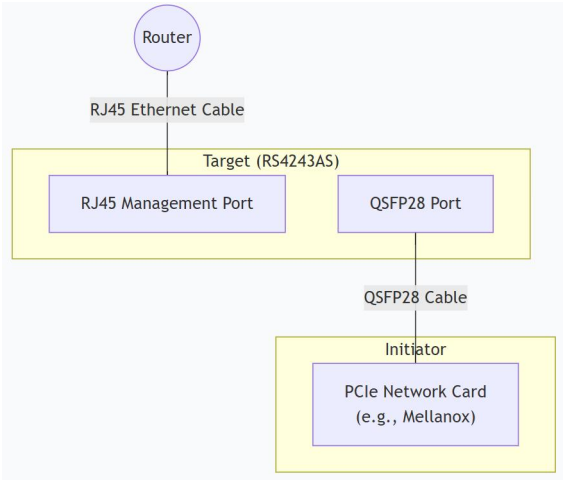
1. Use a wired ESD wrist strap that is properly grounded.
2. Unpack and remove the RS4243AS and check it for damage. If it appears damaged, please contact HighPoint Technical Support.
3. Hardware installation on the Initiator (RS4243AS).
   1) Install the SSD into the NVMe SSD Trays. Refer here.
   2) Connect the RJ45 Ethernet patch cable to the router and the other end of the cable to the rear of the chassis.
   3) Connect the QSFP28 Ethernet patch cable to the rear of the chassis.

   4) Connect the UL power cord to the rear of the chassis and connect it to an AC power source.

4. Hardware installation on the Target (PCIe network interface card, for example: Mellanox)
   1) Insert the PCIe network interface card into the motherboard's PCIe slot.
   2) Connect the opposite end of the QSFP28 Ethernet patch cable (already connected to the rear of the chassis) to the PCIe network interface card's port.



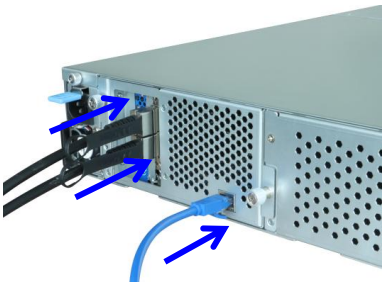
The following topology diagram shows the Target (RS4243AS) connected to the router via RJ45 and to the Initiator's PCIe NIC via a single QSFP28 cable.



5. Press the power button to power up the chassis, then power up the motherboard.

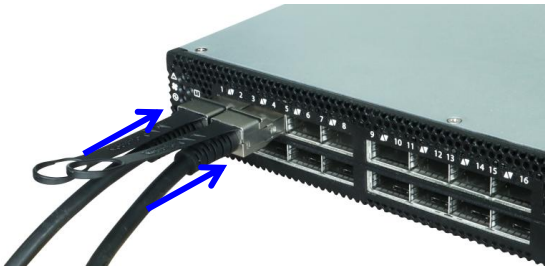
4.1.3. NVMe-oF Dual-Port + Network card Dual-Port + Switch

1. Use a wired ESD wrist strap that is properly grounded.
2. Unpack and remove the RS4243AS and check it for damage. If it appears damaged, please contact HighPoint Technical Support.
3. Hardware installation on the Initiator (RS4243AS).
   1) Install the SSD into the NVMe SSD Trays. Refer here.
   2) Connect the RJ45 Ethernet patch cable to the router and the other end of the cable to the rear of the chassis.
   3) Connect the QSFP28 Ethernet patch cables to the rear of the chassis.



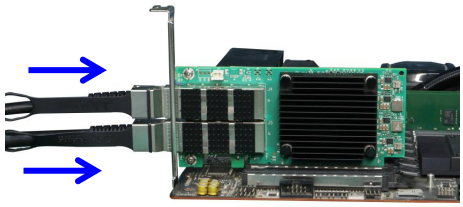
   4) Connect the UL power cord to the rear of the chassis and connect it to an AC power source.

   5) Connect the other ends of the QSFP28 cables to the corresponding ports on the Ethernet Switch.

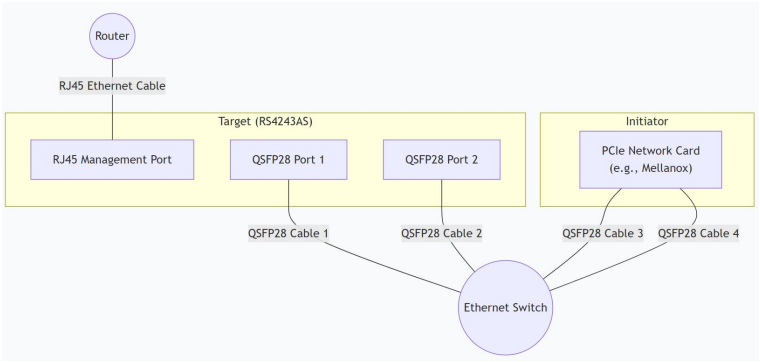


4. Hardware installation on the Target (PCIe network interface card, for example: Mellanox)
   1) Insert the PCIe network interface card into the motherboard's PCIe slot.
   2) Connect the QSFP28 Ethernet patch cables to the Ethernet Switch.

3) Connect the opposite end of the QSFP28 Ethernet patch cables (already connected to the rear of the Ethernet Switch) to the PCIe network interface card's ports.



The following topology diagram shows the Target (RS4243AS) connected to the router via RJ45 and to the Ethernet switch via dual QSFP28 cables. At the same time, the Initiator's PCIe NIC is also connected to the same switch via dual QSFP28 cables.



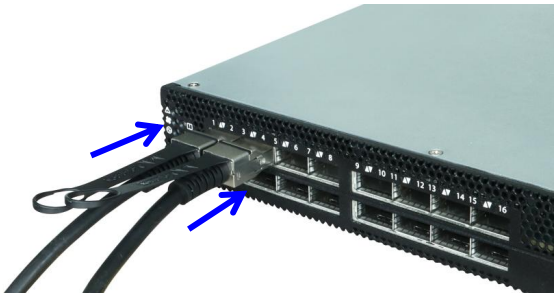
5. Press the power button to power up the chassis, then power up the motherboard.

4.1.4. NVMe-oF Single-Port + Network card Single-Port + Switch

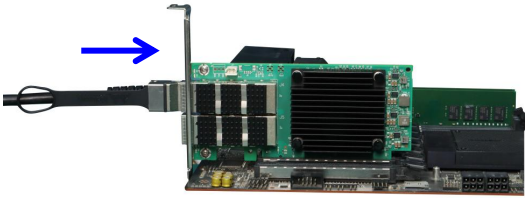
1. Use a wired ESD wrist strap that is properly grounded.
2. Unpack and remove the RS4243AS and check it for damage. If it appears damaged, please contact HighPoint Technical Support.
3. Hardware installation on the Initiator (RS4243AS).
   1) Install the SSD into the NVMe SSD Trays. Refer here.
   2) Connect the RJ45 Ethernet patch cable to the router and the other end of the cable to the rear of the chassis.
   3) Connect the other end of the RJ45 Ethernet patch cable and QSFP28 Ethernet patch cable to the rear of the chassis.

   4) Connect the UL power cord to the rear of the chassis and connect it to an AC power source.

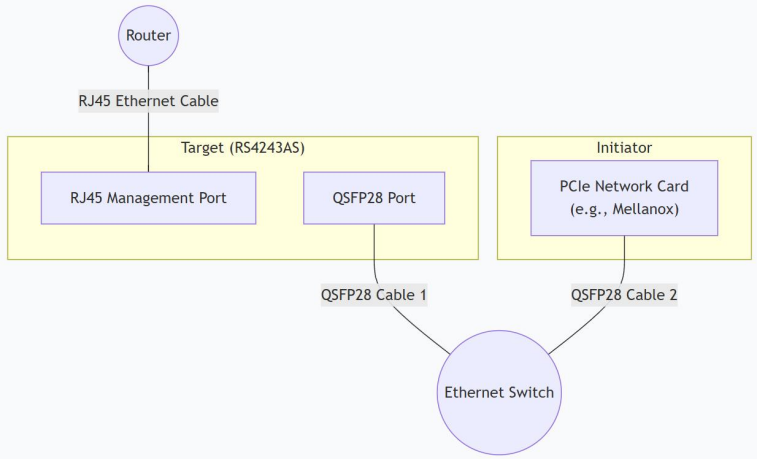
   5) Connect the other ends of the QSFP28 cables to the corresponding ports on the Ethernet Switch.
4. Hardware installation on the Target (PCIe network interface card, for example: Mellanox)
   1) Insert the PCIe network interface card into the motherboard's PCIe slot.
   2) Connect the QSFP28 Ethernet patch cables to the Ethernet Switch.



   3) Connect the opposite end of the QSFP28 Ethernet patch cable (already connected to the rear of the Ethernet Switch) to the PCIe network interface card’s port.



The following topology diagram shows the Target (RS4243AS) connected to the router via RJ45 and to the Ethernet switch via a single QSFP28 cable. At the same time, the Initiator’s PCIe NIC is also connected to the same switch via a single QSFP28 cable.



5. Press the power button to power up the chassis, then power up the motherboard.

4.2. Operating Environment Configuration

4.2.1. Initiator Configuration

The Mellanox network card used in this section is only an example for the Initiator in our test environment. For actual deployment, please use the network card that matches your specific configuration.

1. Power on the initiator system and boot into the OS. (Ubuntu is used as an example in this guide)
2. Enter the following commands to manage NVMe devices.

   #**apt install nvme-cli**

```
root@test:/home/test# apt install nvme-cli
Reading package lists ... Done
Building dependency tree ... Done
Reading state information ... Done
The following NEW packages will be installed:
  nvme-cli
0 upgraded, 1 newly installed, 0 to remove and 162 not upgraded.
Need to get 680 kB of archives.
After this operation, 1,729 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 nvme-cli amd64 2.8-1ubuntu0.1 [680 kB]
Fetched 680 kB in 6s (107 kB/s)
Selecting previously unselected package nvme-cli.
(Reading database ... 87054 files and directories currently installed.)
Preparing to unpack .../nvme-cli_2.8-1ubuntu0.1_amd64.deb ...
Unpacking nvme-cli (2.8-1ubuntu0.1) ...
Setting up nvme-cli (2.8-1ubuntu0.1) ...
nvmf-connect-nbft.service is a disabled or a static unit not running, not starting it.
nvmf-connect.target is a disabled or a static unit not running, not starting it.
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning candidates...
Scanning processor microcode...
Scanning linux images...

Running kernel seems to be up-to-date.

The processor microcode seems to be up-to-date.

Restarting services...

Service restarts being deferred:
 systemctl restart unattended-upgrades.service

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@test:/home/test#
```

3. Download and install the driver.

   1) Enter the following command to install the bzip2 utility:

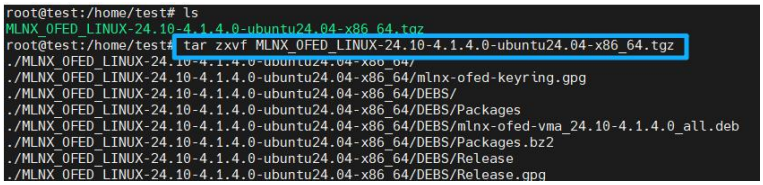
   #apt install bzip2

```
root@test:/home/test# apt install bzip2
Reading package lists ... Done
Building dependency tree ... Done
Reading state information ... Done
Suggested packages:
  bzip2-doc
The following NEW packages will be installed:
  bzip2
0 upgraded, 1 newly installed, 0 to remove and 162 not upgraded.
Need to get 34.5 kB of archives.
After this operation, 112 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 bzip2 amd64 1.0.8-5.1build0.1 [34.5 kB]
Fetched 34.5 kB in 2s (22.8 kB/s)
Selecting previously unselected package bzip2.
(Reading database ... 87259 files and directories currently installed.)
Preparing to unpack .../bzip2_1.0.8-5.1build0.1_amd64.deb ...
Unpacking bzip2 (1.0.8-5.1build0.1) ...
Setting up bzip2 (1.0.8-5.1build0.1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning candidates...
Scanning processor microcode...
Scanning linux images...

Running kernel seems to be up-to-date.

The processor microcode seems to be up-to-date.

Restarting services...

Service restarts being deferred:
 systemctl restart unattended-upgrades.service

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

   2) Download the driver.

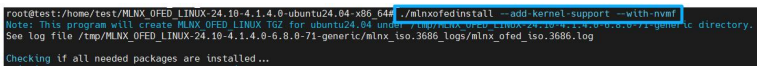
3) Enter the following command to extract the driver package:

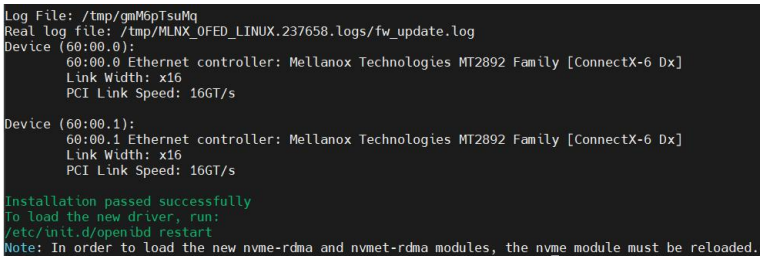
#tar zxvf MLNXxxx.tgz



4) Navigate to the extracted directory and enter the following command to install the driver:

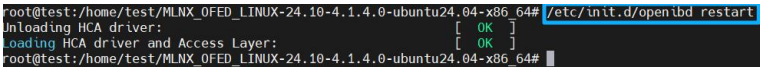
#./mlnxofedinstall --add-kernel-support --with-nvmf





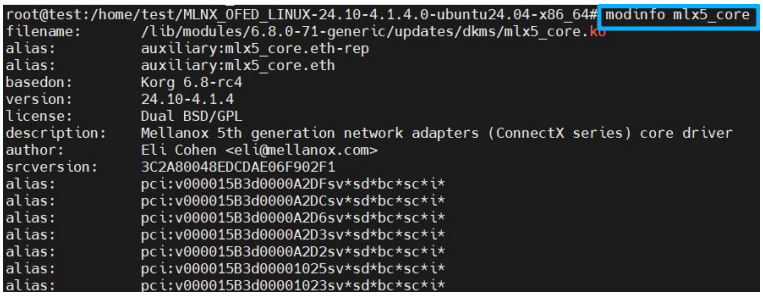
5) Enter the following command to restart the OpenIBD service and apply Mellanox driver changes:

#/etc/init.d/openibd restart



6) Enter the following command to verify the driver installation:

#modinfo mlx5_core



4. Reboot the initiator system (some drivers require a reboot).
5. Enter the following command to load the required NVMe-over-Fabrics kernel modules:

#modprobe nvmet

#modprobe nvmet-rdma

#modprobe nvmet-tcp

#modprobe mlx5_core

Note: Use **mlx5_core** as an example; please replace it with the name of your specific driver module.

6. Enter the following command to display Mellanox network card network interfaces.

   #ip a

```
root@test:/home/test# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: enp36s0f0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN group default qlen 1000
    link/ether 04:42:1a:0c:68:67 brd ff:ff:ff:ff:ff:ff
3: enp65s0f0np0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether e8:9e:49:7c:19:c8 brd ff:ff:ff:ff:ff:ff
    inet 169.254.212.141/16 brd 169.254.255.255 scope global noprefixroute enp65s0f0np0
       valid_lft forever preferred_lft forever
    inet6 fe80::dce0:4353:af09:d9b4/64 scope link
       valid_lft forever preferred_lft forever
4: enp65s0f1np1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether e8:9e:49:7c:19:c9 brd ff:ff:ff:ff:ff:ff
    inet 169.254.124.7/16 brd 169.254.255.255 scope global noprefixroute enp65s0f1np1
       valid_lft forever preferred_lft forever
    inet6 fe80::7e7:6deb:be31:77e7/64 scope link
       valid_lft forever preferred_lft forever
5: enp36s0f1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 04:42:1a:0c:68:65 brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.117/24 brd 192.168.0.255 scope global dynamic noprefixroute enp36s0f1
       valid_lft 86262sec preferred_lft 75462sec
    inet6 fe80::9907:e80c:d8ad:2d40/64 scope link
       valid_lft forever preferred_lft forever
6: wlp38s0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether f4:b3:01:3b:8a:0d brd ff:ff:ff:ff:ff:ff
root@test:/home/test# ip addr add 192.168.1.40/24 dev enp65s0f0np0
```

7. Enter the following command to configure the Initiator IP Address.

   #ip addr add 192.168.1.40/24 dev enp65s0f0np0

```
root@test:/home/test# ip addr add 192.168.1.40/24 dev enp65s0f0np0
```

```
root@test:/home/test# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: enp36s0f0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN group default qlen 1000
    link/ether 04:42:1a:0c:68:67 brd ff:ff:ff:ff:ff:ff
3: enp65s0f0np0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether e8:9e:49:7c:19:c8 brd ff:ff:ff:ff:ff:ff
    inet 169.254.212.141/16 brd 169.254.255.255 scope global noprefixroute enp65s0f0np0
       valid_lft forever preferred_lft forever
    inet 192.168.1.40/24 scope global enp65s0f0np0
       valid_lft forever preferred_lft forever
    inet6 fe80::dce0:4353:af09:d9b4/64 scope link
       valid_lft forever preferred_lft forever
4: enp65s0f1np1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether e8:9e:49:7c:19:c9 brd ff:ff:ff:ff:ff:ff
    inet 169.254.124.7/16 brd 169.254.255.255 scope global noprefixroute enp65s0f1np1
       valid_lft forever preferred_lft forever
    inet6 fe80::7e7:6deb:be31:77e7/64 scope link
       valid_lft forever preferred_lft forever
5: enp36s0f1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 04:42:1a:0c:68:65 brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.117/24 brd 192.168.0.255 scope global dynamic noprefixroute enp36s0f1
       valid_lft 86244sec preferred_lft 75444sec
    inet6 fe80::9907:e80c:d8ad:2d40/64 scope link
       valid_lft forever preferred_lft forever
6: wlp38s0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether f4:b3:01:3b:8a:0d brd ff:ff:ff:ff:ff:ff
```

Notes:

Enp65s0f0np0 and 192.168.1.40 are example interface names.

Ensure the assigned IP address is in the same subnet as the target.

This completes the single- port configuration. For dual- port, repeat the steps for each port—each must be in the same subnet as its corresponding target.

4.2.2. Target Configuration

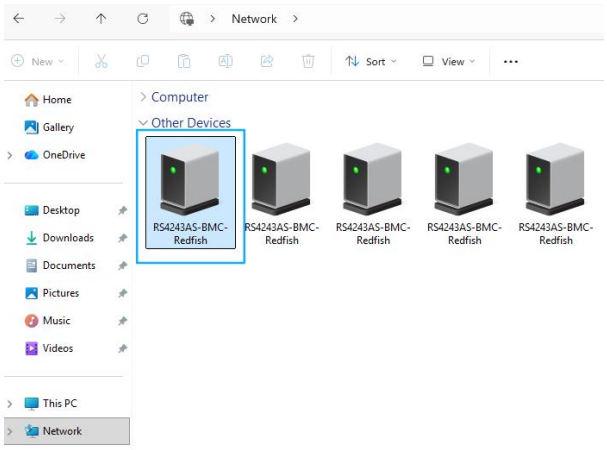
Note: The RS4243AS must obtain a valid IP address via DHCP. SSDP discovery requires the device to have an IP address assigned by a DHCP server. Without a DHCP server, the device cannot be discovered. Please ensure a DHCP server is present on your network.

1. Obtain the RS4243AS IP Address via SSDP.

- **For Windows User**

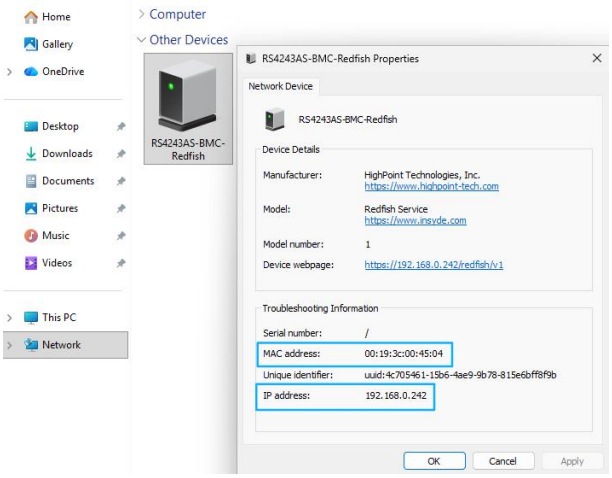
1) Power on the RS4243AS and the system.

2) Open **Network** in **File Explorer** and locate the **HighPoint device** under **Other Devices**.



3) Match the correct device using the MAC address printed on the chassis label.

4) Right-click the device, select **Properties**, and note the **IP address** displayed in the properties window.



- **For Linux User- via SSDP Utility**

1) Power on the RS4243AS and the system.

2) Download the SSDP Utility from the HighPoint official website.

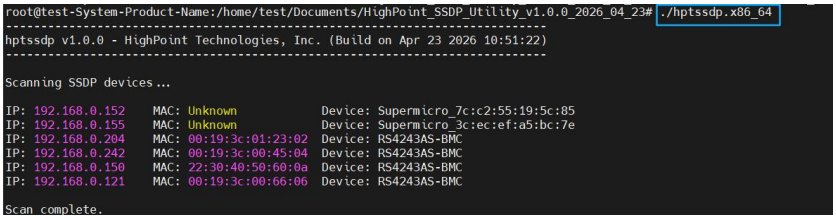
3) Open a terminal with root privileges.

4) Enter the following command to unzip the SSDP Utility.

#tar zxvf HighPoint_SSDP_Utility_v1.0.0_2026__**.tar.gz**

5) Enter the following command to run the SSDP Utility.

#./hptssdp.x86_64



6) Use the MAC address on the chassis label to match the device returned in the SSDP query results.

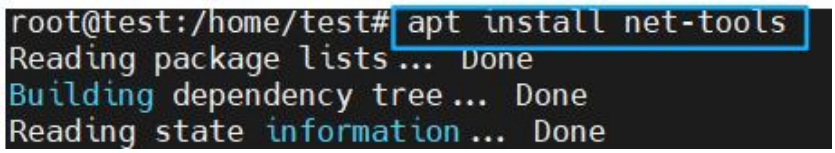
- **For Linux User- via net-tools**

1) Power on the RS4243AS and the system.

2) Open a terminal with root privileges.

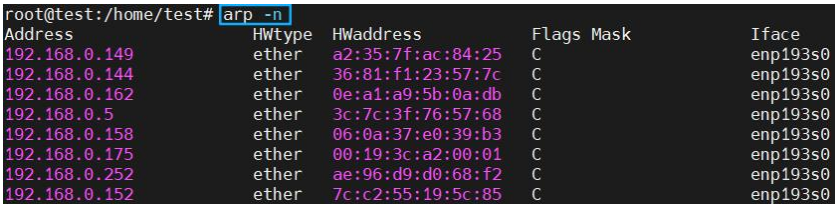
3) Enter the following command to install the net-tools package:

#apt install net-tools



4) Enter the following command to view the ARP cache table.

#arp -n



5) Use the MAC address on the chassis label to match the device returned in the ARP cache table.

2. Open the HPT BMC Management Login Page.

1) Open your web browser.

2) Enter the https:// followed by that IP address (e.g., https://192.168.1.100) to reach the HPT BMC management page.

3) Log in using the default username and the unique password printed on the device label.

Default username: root; Default password: 0penBmc

Note: The first character is the number zero, not the letter O.)Refer to the label on your device chassis for the unique password.

3. Configure the NVMe-oF adapter (Western Digital RapidFle C2000) IP Address.

1) Navigate to **Hardware status → NVMe-oF** and choose the NVMe-oF Protocol.

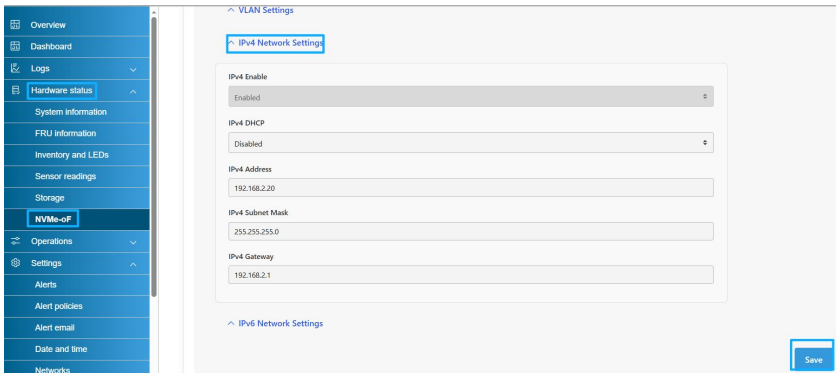
Note: For RDMA mode, select RoCE; for TCP mode, select TCP.

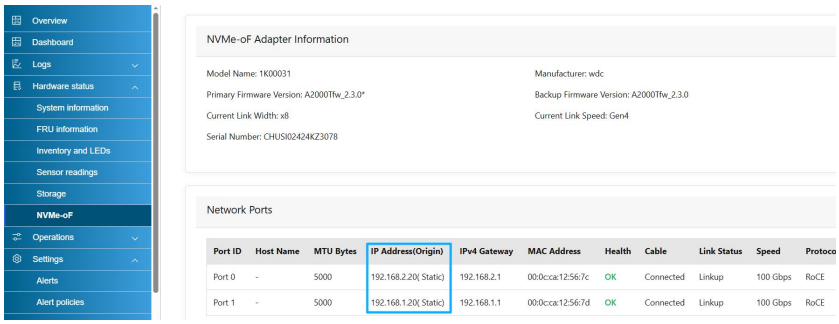
2) Click **Save**, and reboot to take effect.

3) Navigate to **Port Settings → Select Port** and choose the desired port.

4) Click **IPv4 Network Settings** to configure the IP address.

5) Click **Save**.



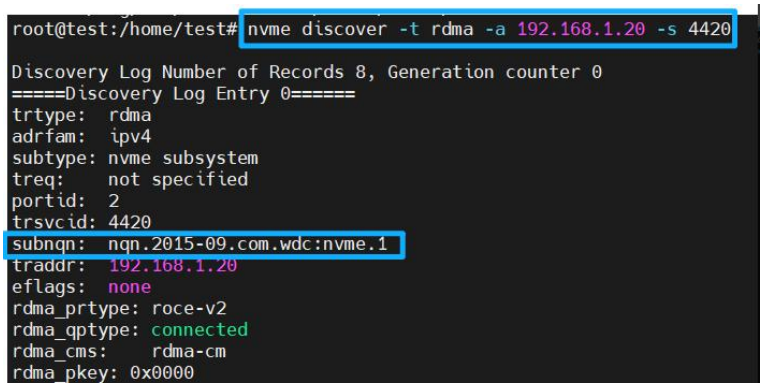


4.2.3. Discover and Connect Disks on the Initiator

- **RDMA Mode**

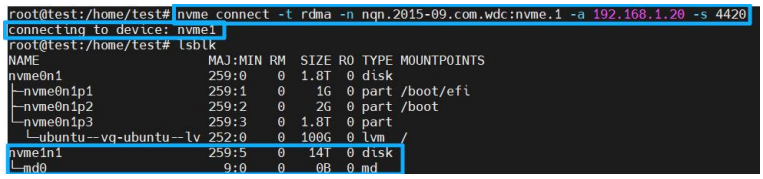
1. Enter the following command to discover available NVMe subsystems using RDMA.

   #nvme discover -t rdma -a 192.168.1.20 -s 4420



2. Enter the following command to connect to disks remotely.

   #nvme connect -t rdma -n <name_of_subsystem> -a 192.168.1.20 -s 4420 --nr-io-queues=16



- **TCP Mode**

1. Enter the following command to discover available NVMe subsystems using TCP.

   #nvme discover -t tcp -a 192.168.1.20 -s 4420

2. Enter the following command to connect to disks remotely.

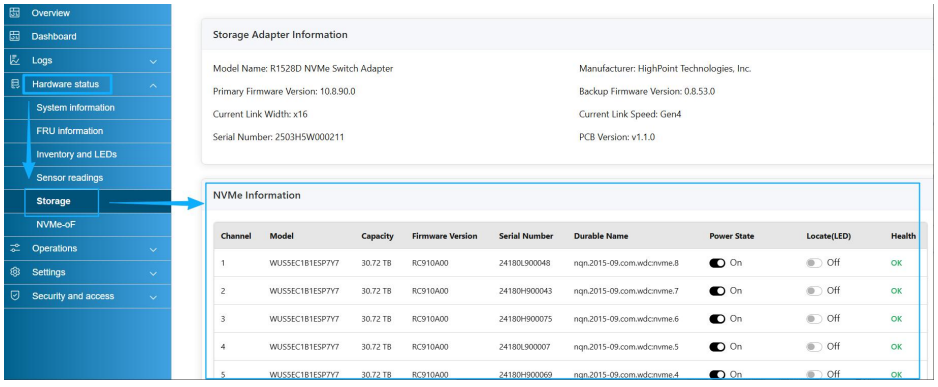
   #nvme connect -t tcp -n <name_of_subsystem> -a 192.168.1.20 -s 4420 --nr-io-queues=16

Notes:

The IP address 192.168.1.20 is an example; it is the IP address of the NVMe-oF adapter configured on the Target. Refer to Section 4.2.2, Step 3.

Replace <name_of_subsystem> with the actual NVMe subsystem name obtained from the discovery step.

View disk information through the BMC web interface. Navigate to: **Hardware status → Storage → NVMe Information** (as shown in the figure below).



4.3. Use the RS4243AS in a Center Rack

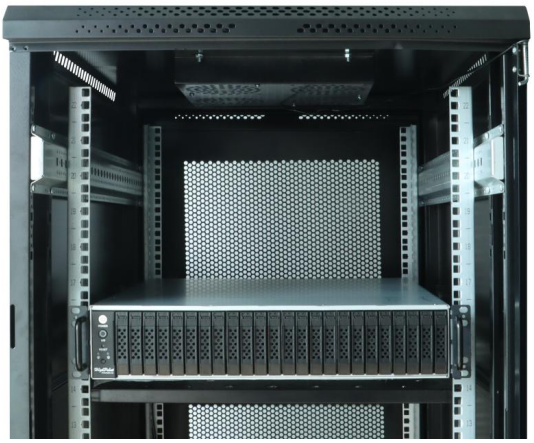
4.3.1. Install the RS4243AS into a Center Rack

To install the chassis into the rack using the pre-attached rail system:

1. Ensure the inner rails are securely mounted to the chassis, and the outer rails are correctly installed on the rack posts.
2. Align the inner rails on the chassis with the front ends of the outer rack rails.

Note: For detailed rail installation procedures, refer to Installation Instructions NJ21A59-26 on our official website.

3. Gently slide the chassis into the rack, applying even pressure on both sides to ensure smooth insertion.
   Once fully inserted, the locking tabs will audibly click into place, indicating the chassis is securely locked in the rack.



4.3.2. Remove the RS4243AS from a Center Rack

1. Ensure the chassis is fully powered off and all power and data cables have been disconnected.
2. Locate the locking tabs on both sides of the rails. Press both tabs inward simultaneously to release the lock.
3. Apply an even pulling force on both sides of the chassis to slide it out smoothly along the rails.
4. Lift it out of the rack and place it on a stable, secure work surface or the floor.

5. Troubleshooting

5.1. Mellanox NVMe Driver Not Loaded Correctly

1. Description of the Problem

The host's system disk is an NVMe SSD. After installing the Mellanox driver, the system still uses the built-in NVMe driver, preventing the nvme_rdma module from loading and causing NVMe over RDMA connection failures.

2. Cause of the Problem

The Mellanox driver does not replace the system's default NVMe driver, leading to a conflict. The wrong driver module is loaded during system boot.

3. Solution

Note: Be sure to replace `6.8.0-71-generic` with your actual kernel version (check using `uname -r`).

1) Remove conflicting NVMe host/target drivers, retain NVMe generic driver:
   #mv /lib/modules/6.8.0-71-generic/kernel/drivers/nvme/host /home/test/6.8.0-17-nvme-backup/
   #mv /lib/modules/6.8.0-71-generic/kernel/drivers/nvme/target /home/test/6.8.0-17-nvme-backup/
2) Regenerate the initrd boot file:
   a. Add the nvme module to the initramfs configuration to include it in the initrd:
      #nano /etc/initramfs-tools/modules
      Add a new line with **nvme** at the end of the file, then save and exit.
   b. Rebuild dependencies: **#depmod -a 6.8.0-71-generic**
   c. Change to the /boot directory and regenerate the initramfs image:
      #cd /boot
      #mkinitramfs -o initrd.img-6.8.0-71-generic.new 6.8.0-71-generic
   d. Back up the original image and replace it with the new one:
      #mv initrd.img-6.8.0-71-generic initrd.img-6.8.0-71-generic.old
      #mv initrd.img-6.8.0-71-generic.new initrd.img-6.8.0-71-generic
   e. Reboot the system for the changes to take effect.

5.2. Failure to Connect 24 NVMe SSDs

1. Description of the Problem

Attempting to connect 24 NVMe SSDs using the nvme connect command fails, with errors indicating queue resource issues.

2. Cause of the Problem

The PCIe P2P (Peer-to-Peer) number queue value is too high. Default values vary by platform. This value correlates with the CPU core count; a larger value consumes more resources and is more likely to cause allocation failures.

3. Solution

Explicitly specify --nr-io-queues=8 in the nvme connect command to map 24 drives successfully. For better performance, you may try increasing the value to 16 later.

#nvme connect -t rdma -n nqn.2015-09.com.wdc:nvme.18 -a 192.168.2.30 -s 4420 --nr-io-queues=8

Notes:

Add the parameter `--nr-io-queues=8` (or try 16) to the nvme connect command.

Replace with your actual NQN and IP.

6. Revision History

6.1. Version 1.00, April 17, 2026

Initial version.

6.2. Version 1.01, May 11, 2026

1. Removed internal hardware details (BP8/PWR/IOM boards, cable routing, cover/fan removal) and moved them to the Internal Troubleshooting Guide.
2. Added warranty warning for chassis opening.