



# TDS-h2489FU-R2

## User Guide

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# 1. Important Information

## Original Packaging

Please keep the original packaging and packaging materials. If you want to return the product or send it for repairs, please use the original packaging to avoid damage.

QNAP reserves the right not to provide a refund or warranty service for products that are damaged due to improper packaging.

## Hardware Defects

If your QNAP product has hardware defects, return the product to QNAP or a QNAP-authorized service center for maintenance or replacement. Any attempt to repair or perform maintenance procedures on the product by you or an unauthorized third party invalidates the warranty.

QNAP is not responsible for any damage or data loss caused by unauthorized modifications and installation of unsupported third-party applications.

For details, see the [QNAP Warranty Terms and Conditions](#).

## Safety information

The following instructions help ensure personal safety and environmental safety. Read these instructions carefully before performing any operation.

### General Instructions

- The device should be stored in a secure location with restricted access, controlled through the use of a tool, lock and key, or any means of security.
- Only qualified, skilled, and authorized persons with knowledge of all restrictions, safety precautions, and installation and maintenance procedures should have physical access to the device.

### WARNING



To avoid potential injury or damage to components, ensure that the drives and other internal system components have cooled before touching them.



Observe electrostatic discharge (ESD) procedures to avoid potential injury or damage to components.

## Power

### **WARNING**



To reduce the risk of fire or electric shock, ensure that you only connect the power cord to a properly grounded electrical outlet.



Devices with redundant power supply may have one or more power supply unit (PSU) cords. To avoid serious injuries, a trained service technician must disconnect all PSU cords from the device before installing or replacing system components.

## Moving Parts

### **WARNING**



**Moving fan blades:** Keep your body parts away from any moving fan blades while the device is connected to a power source.



**Moving components:** Keep your body parts away from any other moving components.

The device is not suitable for use in locations where children are likely to be present.

## System Battery

### **WARNING**



#### **INGESTION HAZARD**

- This product may contain a button battery.
- Keep batteries out of reach of children.
- If swallowed, a lithium button battery can cause severe or fatal injuries within 2 hours.
- If you think batteries may have been swallowed or placed inside any part of the body, seek immediate medical attention.

- To avoid potential battery explosion, causing injury or damage to components, ensure that you replace the existing battery with a battery of the same type.

- Dispose of used batteries properly according to local regulations or the instructions of the battery manufacturer.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- For information on the type and voltage of the button battery in your device, please see the hardware specification table.
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat, or incinerate. Doing so may result in injury due to venting, leakage, or explosion resulting in chemical burns.
- Ensure the batteries are installed correctly according to polarity (+ and -).
- Do not mix old and new batteries, or different brands or types of batteries, such as alkaline, carbon-zinc, or rechargeable batteries.
- Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations.
- Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep them away from children.

## Rail Kits

Rackmount models may require rail kits for installation onto a server rack or cabinet.

To ensure equipment and personal safety, please carefully read the installation instructions for your rail kit before you install the rail kit and mount your device.

To check if your device is a rackmount unit, see the hardware specification table.

### **WARNING**

- When the rail kit is installed on the server rack, do not fully extend and unlatch the rails except when mounting or unmounting a device.
- Leaving the rails fully extended out and unlatched may cause heavy equipment to fall. This can cause equipment damage and severe or even fatal injuries.
- Before you prepare the rails for device mounting or unmounting, please carefully read and ensure you understand the installation instructions.
- Do not place any objects or add any extra load onto the device or rails when mounting or unmounting a device.
- When mounting a device, slide the device all the way into the server rack to fully latch the rails and secure the device to the server rack.

## 2. Product Overview

This chapter provides basic information about the QNAP device.

### About the TDS-h2489FU-R2

Featuring dual Intel® Xeon® Silver 4300 processors and 24 U.2 NVMe Gen 4 x4 SSD bays, QNAP's flagship NVMe all-flash storage TDS-h2489FU-R2 is designed for I/O-intensive and latency-sensitive applications. The ZFS-based QuTS hero operating system supports inline data deduplication and compression for reducing I/O and SSD storage consumption, which significantly extends SSD lifespan with a higher price-performance ratio for all-flash storage arrays. The TDS-h2489FU-R2 can easily meet your requirements for modern data centers, virtualization, and mission-critical backup/restore tasks.

### Hardware Specifications

#### Warning

- If your QNAP product has hardware defects, return the product to QNAP or a QNAP-authorized service center for maintenance or replacement. Any attempt to repair or perform maintenance procedures on the product by you or an unauthorized third party invalidates the warranty.
- QNAP is not responsible for any damage or data loss caused by unauthorized modifications and installation of unsupported third-party applications.
- For details, see the [QNAP Warranty Terms and Conditions](#).

#### Tip

Model specifications are subject to change without prior notice. To see the latest specifications, go to <https://www.qnap.com>.

Ordering P/N	Drive bays	Memory	Power supply
TDS-h2489FU-R2-4309Y-64G	24	64 GB	Redundant
TDS-h2489FU-R2-4314-128G	24	128 GB	Redundant
TDS-h2489FU-R2-4314-256G	24	256 GB	Redundant
TDS-h2489FU-R2-4314-512G	24	512 GB	Redundant
TDS-h2489FU-R2-4314-1T	24	1 TB	Redundant



**Note**

Models TDS-h2489FU-R2-4314-512G and TDS-h2489FU-R2-4314-1T are only available by customer request.

Component	TDS-h2489FU-R2-4309Y-64G	TDS-h2489FU-R2-4314-128G TDS-h2489FU-R2-4314-256G	TDS-h2489FU-R2-4314-512G TDS-h2489FU-R2-4314-1T
Processor			
CPU	2 x Intel® Xeon® Silver 4309Y	2 x Intel® Xeon® Silver 4314	2 x Intel® Xeon® Silver 4314
Frequency	8-core/16-thread, up to 3.6 GHz	16-core/32-thread, up to 3.4 GHz	16-core/32-thread, up to 3.4 GHz
Architecture	x86 64-bit		
Encryption engine	AES-NI		
Memory			
Pre-installed memory	64 GB RAM: 8 x 8 GB DDR4 ECC RDIMM	TDS-h2489FU-R2-4314-128G: 8 x 16 GB DDR4 ECC RDIMM (128 GB RAM) TDS-h2489FU-R2-4314-256G: 8 x 32 GB DDR4 ECC RDIMM (256 GB RAM)	TDS-h2489FU-R2-4314-512G: 16 x 32 GB DDR4 ECC RDIMM (512 GB RAM) TDS-h2489FU-R2-4314-1T: 32 x 32 GB DDR4 ECC RDIMM (1 TB RAM)
Memory slots	32 x ECC RDIMM DDR4 (16 slots per socket) <div><div>Important</div><div><ul style="list-style-type: none"><li>Use only QNAP memory modules to maintain system performance and stability. For NAS devices with more than one memory slot, use QNAP modules with identical specifications.</li><li>Using unsupported modules may degrade performance, cause errors, or prevent the operating system from starting.</li></ul></div></div> <div><div>Note</div><div>This device supports ECC memory modules.</div></div>		



Component	TDS-h2489FU-R2-4309Y-64G	TDS-h2489FU-R2-4314-128G TDS-h2489FU-R2-4314-256G	TDS-h2489FU-R2-4314-512G TDS-h2489FU-R2-4314-1T
Maximum memory	1 TB (32 x 32 GB)		
Flash memory	5 GB (dual-boot OS protection)		
Storage			
Drive bays	<div>24 x 2.5-inch U.2 PCIe Gen 4 NVMe bays</div> <div><div>Tip</div><ul style="list-style-type: none"><li>• Bays 17-24 also support SATA 6 Gbps.</li><li>• The U.2 PCIe Gen 4 NVMe bays are backward compatible with PCIe Gen 3 U.2 drives.</li><li>• The SATA 6 Gbps bays are backward compatible with SATA 3 Gbps drives.</li></ul></div>		
Drive compatibility	<div>2.5-inch bays:</div> <ul style="list-style-type: none"><li>• Bays 1-16: 2.5-inch U.2 PCIe Gen 4 NVMe solid-state drives M.2 PCIe Gen 4 NVMe solid-state drives</li><li>• Bays 17-24: 2.5-inch U.2 PCIe Gen 4 NVMe solid-state drives M.2 PCIe Gen 4 NVMe solid-state drives 2.5-inch SATA hard disk drives 2.5-inch SATA solid-state drives</li></ul> <div><div>Note</div><p>For the list of compatible drive models, go to <a href="https://www.qnap.com/compatibility">https://www.qnap.com/compatibility</a>. A QDA-UMP4 drive adapter is required for installing M.2 NVMe SSD in 2.5-inch bays. For more details, see the drive adapter Quick Installation Guide.</p></div>		
M.2 SSD slots	Slot 1: M.2 NVMe PCIe Gen 3 x4 / SATA 6 Gbps Slot 2: M.2 NVMe PCIe Gen 3 x2 / SATA 6 Gbps		
M.2 SSD form factor	2280		

Component	TDS-h2489FU-R2-4309Y-64G	TDS-h2489FU-R2-4314-128G TDS-h2489FU-R2-4314-256G	TDS-h2489FU-R2-4314-512G TDS-h2489FU-R2-4314-1T
SSD cache acceleration support	2.5-inch drive bays: 1 to 24		
Hot-swapping	The device supports hot-swapping drives except for the following: M.2 SSDs		
Network			
2.5 Gigabit network interface	<div>4 x 2.5 GbE RJ45</div> <div><b>Note</b> These ports provide 2.5 Gbps, 1 Gbps, 100 Mbps, and 10 Mbps network connection speeds.</div>		
25 Gigabit Ethernet ports	2 x 25 GbE SFP28 SmartNIC (via a pre-installed dual-port 25GbE network card)		
Wake-on-LAN	Yes (2.5 GbE RJ45)		
External I/O Ports & Expansion Slots			

Component	TDS-h2489FU-R2-4309Y-64G	TDS-h2489FU-R2-4314-128G TDS-h2489FU-R2-4314-256G	TDS-h2489FU-R2-4314-512G TDS-h2489FU-R2-4314-1T
PCIe slots	Slot 1: 1 x PCIe Gen 4 x16		
	<div>Note</div> Slot 1 provides the width of PCIe Gen 4 x16 when slot 2 is not in use, and the width of PCIe Gen 4 x8 when slot 2 is in use.		
	Slot 2: 1 x PCIe Gen 4 x8		
	<div>Note</div> Slot 2 is pre-installed with a dual-port 25GbE SFP28 network expansion card.		
	Slot 3: 1 x PCIe Gen 4 x16		
	<div>Note</div> Slot 3 provides the width of PCIe Gen 4 x16 when slot 4 is not in use, and the width of PCIe Gen 4 x8 when slot 4 is in use.		
USB ports	Slot 4: 1 x PCIe Gen 4 x8		
	<div>Tip</div> For the list of compatible drive models and expansion cards, go to <a href="https://www.qnap.com/compatibility">https://www.qnap.com/compatibility</a> .		
USB ports			
4 x USB 3.2 Gen 1 Type-A			
Interface			
Buttons	<ul style="list-style-type: none"><li>• Power</li><li>• Reset</li><li>• OLED panel power</li></ul>		
Dimensions			
Form factor	2U Rackmount		
Dimensions (H x W x D)	88.3 x 446.2 x 713.2 mm (3.48 x 17.57 x 28.08 in)		

Component	TDS-h2489FU-R2-4309Y-64G	TDS-h2489FU-R2-4314-128G TDS-h2489FU-R2-4314-256G	TDS-h2489FU-R2-4314-512G TDS-h2489FU-R2-4314-1T
Net weight	22.77 kg (50.20 lbs)		
Others			
Rail compatibility	<div>RAIL-E03</div> <div><div>Note</div><ul style="list-style-type: none"><li>• Rail kits are not included with the NAS and must be purchased separately. For details, contact an authorized reseller or go to <a href="https://shop.qnap.com">https://shop.qnap.com</a>.</li><li>• Information on rail kit installation can be found in the installation guide included in the rail kit package. For details, go to <a href="https://www.qnap.com/go/product/rail-kit">https://www.qnap.com/go/product/rail-kit</a>.</li></ul></div>		
Power supply unit	2 x 1200W, 100-240V AC, 50/60Hz		
System battery	CR2032 lithium battery (3V, 225 mAh)		
Fans	System: 6 x 60 mm, 12V DC fans		
Operating temperature	0°C to 35°C (32°F to 95°F)		
Relative humidity	<ul style="list-style-type: none"><li>• Non-condensing relative humidity: 5% to 95%</li><li>• Wet-bulb temperature: 27°C (80.6°F)</li></ul>		

**Tip**

For the list of compatible drive models and expansion cards, go to <https://www.qnap.com/compatibility>.

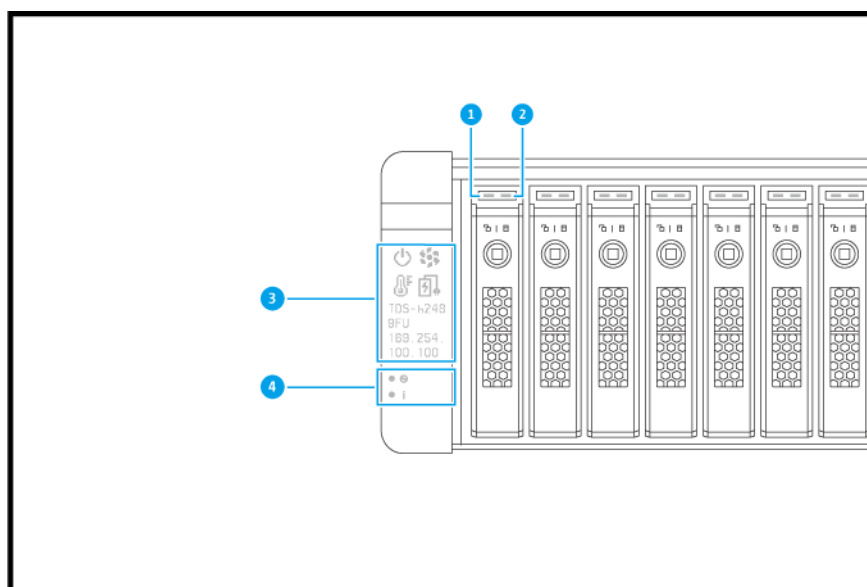
## Package Contents

Item	Quantity
TDS-h2489FU-R2 NAS	1

Item	Quantity
Power cord	2
Ethernet cables	1 x Cat 5e
Drive tray keys	2
Screws for 2.5-inch drives	96
Screws for M.2 SSDs	2
Quick Installation Guide (QIG)	1

## Components

### Front Panel

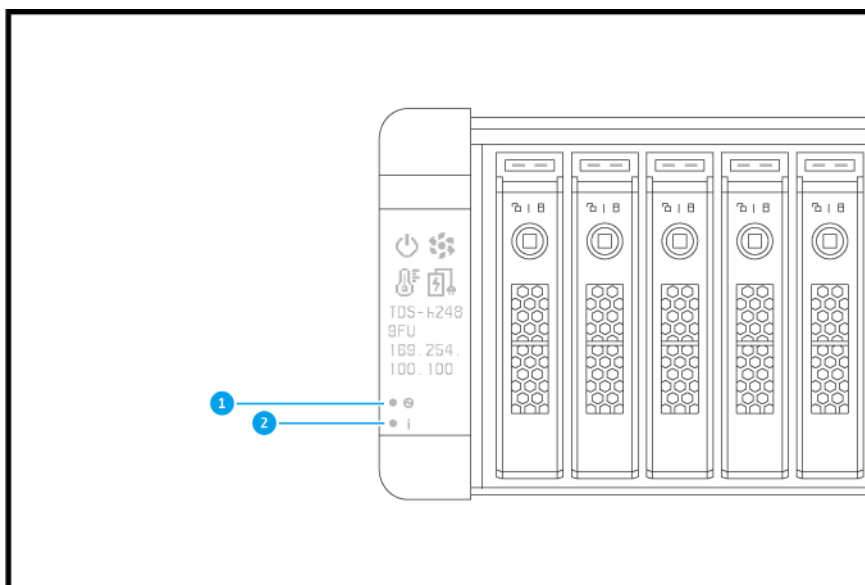


No.	Component	No.	Component
1	Drive activity LED	3	OLED panel
2	Drive status LED	4	Front panel LEDs

### Front Panel LEDs

The front panel LEDs indicate system status and related information when the NAS is powered on. The following LED information applies only when the drive is correctly installed and when the NAS is connected to the network.

For details on the location of the LEDs, see [Front Panel](#).



No.	Component	No.	Component
1	System power LED	2	System status LED

LED	Status	Description
System power	Blue	The device is powered on.
	Flashes blue	Errors or warnings are detected (for example, fan error, one or more power supply units are not detected).
	Off	The power supply unit is disconnected.
System status	Flashes green and red alternately every 0.5 seconds	<ul style="list-style-type: none"> <li>A drive is being formatted.</li> <li>The device is being initialized.</li> <li>The operating system is being updated.</li> <li>RAID rebuilding is in progress.</li> <li>Online RAID Capacity Expansion is in progress.</li> <li>Online RAID Level Migration is in progress.</li> </ul>
	Green	The device is ready.

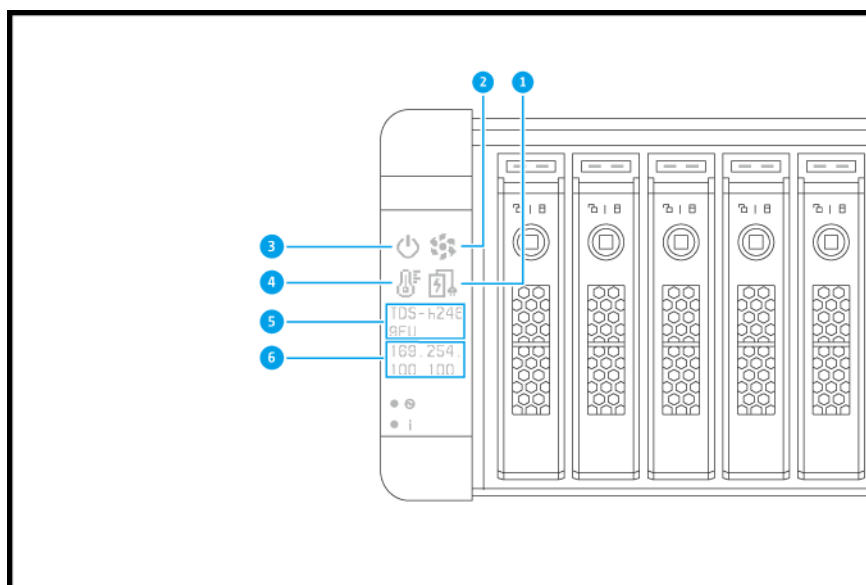
LED	Status	Description
System status	Flashes green every 0.5 seconds	<ul style="list-style-type: none"> <li>• The device is not configured.</li> <li>• A drive is not formatted.</li> </ul>
	Red	<ul style="list-style-type: none"> <li>• A drive is invalid.</li> <li>• A volume has reached its full capacity.</li> <li>• A volume is about to reach its full capacity.</li> <li>• A system fan is not functioning.</li> <li>• An error occurred when accessing (read/write) the data.</li> <li>• A bad sector is detected on a drive.</li> <li>• The device is in degraded read-only mode (two member drives failed in RAID 5 or RAID 6 but the data can still be read).</li> <li>• A hardware self-test error occurred.</li> </ul>
	Flashes red every 0.5 seconds	The device is in degraded mode (one member drive failed in RAID 1, RAID 5, or RAID 6).
	Off	<ul style="list-style-type: none"> <li>• The device is powered off.</li> <li>• All drives are in standby mode.</li> </ul>

## Front Panel OLED Display

The OLED display shows the status of the nodes and main components.

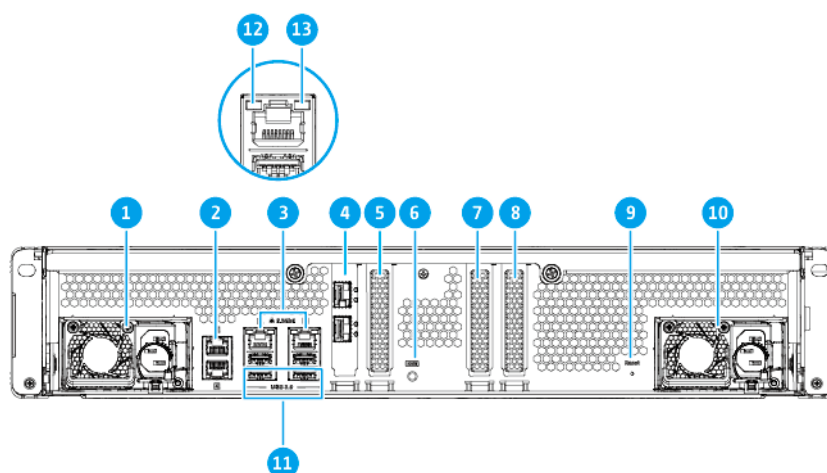
For details on the location of the OLED display, see [Front Panel](#).





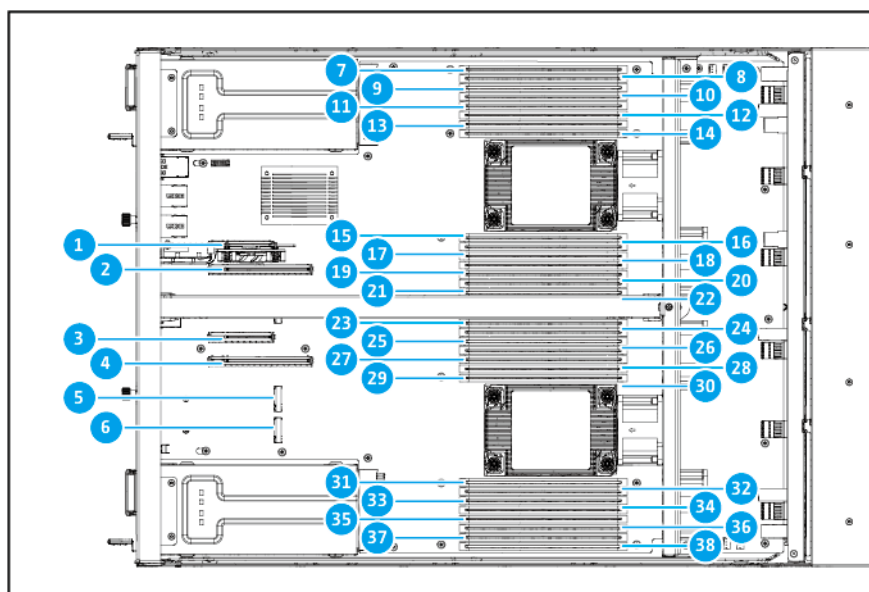
No.	Component	No.	Component
1	Power module LED	4	Temperature status
2	Fan status	5	Device name
3	Power status	6	IP address

## Rear Panel



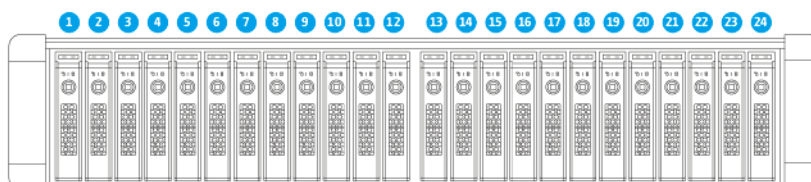
No.	Component	No.	Component
1	Power supply unit 2	8	PCIe slot 1 (PCIe 4.0 x16)
2	2.5 Gigabit Ethernet ports (RJ45)	9	Reset button
3	2.5 Gigabit Ethernet ports (RJ45)	10	Power supply unit 1
4	PCIe slot 4 (PCIe 4.0 x8)  <b>Note</b> This slot is preinstalled with a 25 GbE SFP28 network card.	11	USB 3.2 Gen 1 Type-A ports
5	PCIe slot 3 (PCIe 4.0 x16)	12	Gigabit Ethernet speed LED
6	COM port  <b>Note</b> This port is only for engineering purposes.	13	Gigabit Ethernet activity LED
7	PCIe slot 2 (PCIe 4.0 x8)	-	-

## System Board



No.	Component	No.	Component
1	PCIe slot 4 (PCIe 4.0 x8)  <b>Note</b> This slot is preinstalled with a 25 GbE SFP28 network card.	20	Memory slot 19 (Channel A, DIMM 1)
2	PCIe slot 3 (PCIe 4.0 x16)	21	Memory slot 18 (Channel B, DIMM 2)
3	PCIe slot 2 (PCIe 4.0 x8)	22	Memory slot 17 (Channel B, DIMM 1)
4	PCIe slot 1 (PCIe 4.0 x16)	23	Memory slot 16 (Channel N, DIMM 1)
5	M.2 SSD slot 2	24	Memory slot 15 (Channel N, DIMM 2)
6	M.2 SSD slot 1	25	Memory slot 14 (Channel M, DIMM 1)
7	Memory slot 32 (Channel F, DIMM 1)	26	Memory slot 13 (Channel M, DIMM 2)
8	Memory slot 31 (Channel F, DIMM 2)	27	Memory slot 12 (Channel P, DIMM 1)
9	Memory slot 30 (Channel E, DIMM 1)	28	Memory slot 11 (Channel P, DIMM 2)
10	Memory slot 29 (Channel E, DIMM 2)	29	Memory slot 10 (Channel O, DIMM 1)
11	Memory slot 28 (Channel H, DIMM 1)	30	Memory slot 9 (Channel O, DIMM 2)
12	Memory slot 27 (Channel H, DIMM 2)	31	Memory slot 8 (Channel K, DIMM 2)
13	Memory slot 26 (Channel G, DIMM 1)	32	Memory slot 7 (Channel K, DIMM 1)
14	Memory slot 25 (Channel G, DIMM 2)	33	Memory slot 6 (Channel L, DIMM 2)
15	Memory slot 24 (Channel C, DIMM 2)	34	Memory slot 5 (Channel L, DIMM 1)
16	Memory slot 23 (Channel C, DIMM 1)	35	Memory slot 4 (Channel I, DIMM 2)
17	Memory slot 22 (Channel D, DIMM 2)	36	Memory slot 3 (Channel I, DIMM 1)
18	Memory slot 21 (Channel D, DIMM 1)	37	Memory slot 2 (Channel J, DIMM 2)
19	Memory slot 20 (Channel A, DIMM 2)	38	Memory slot 1 (Channel J, DIMM 1)

## Drive Numbering



Drive Label	Drive Type	Compatible Drives
1 to 16	2.5-inch U.2 PCIe Gen 4 NVMe	<ul style="list-style-type: none"> <li>2.5-inch U.2 PCIe Gen 3 NVMe solid-state drives</li> <li>2.5-inch U.2 PCIe Gen 4 NVMe solid-state drives</li> </ul>
17 to 24	2.5-inch U.2 PCIe Gen 4 NVMe and 2.5-inch SATA	<ul style="list-style-type: none"> <li>2.5-inch U.2 PCIe Gen 4 NVMe solid-state drives</li> </ul> <div> <b>Note</b>            These are also compatible with PCIe Gen 3 drives.         </div> <ul style="list-style-type: none"> <li>2.5-inch SATA hard disk drives</li> <li>2.5-inch SATA solid-state drives</li> </ul>

## Installation Requirements

Category	Item
Environment	<ul style="list-style-type: none"> <li>Room temperature: 0°C to 40°C (32°F to 104°F)</li> <li>Non-condensing relative humidity: 5% to 95%</li> <li>Wet-bulb temperature: 27°C (80.6°F)</li> <li>Flat, anti-static surface without exposure to direct sunlight, liquids, or chemicals</li> <li>Free from objects that may obstruct device ventilation or apply pressure to the device or power cord</li> </ul>
Hardware and peripherals	<ul style="list-style-type: none"> <li>Storage drives For the list of compatible drive models, go to <a href="https://www.qnap.com/compatibility">https://www.qnap.com/compatibility</a>.</li> <li>Network cable</li> </ul>
Tools	<ul style="list-style-type: none"> <li>Phillips #1 or #2 screwdriver</li> <li>Anti-static wrist strap</li> </ul>

## Setting Up the NAS

### Important

Read all safety requirements and information carefully before setting up the NAS or installing NAS components.

1. Place your NAS device in an environment that meets the requirements.  
For details, see [Installation Requirements](#).

2. Install drives.  
For details, see the following topics:

- [Installing 2.5-inch Solid-State Drives on 2.5-inch Trays](#)
- [Installing M.2 Solid-State Drives](#)

For the list of compatible drive models, go to <https://www.qnap.com/compatibility>.

3. Optional: Install expansion cards.  
For details, see [Replacing Expansion Cards](#).
4. Connect the NAS to the network.
5. Optional: Connect expansion units.  
For details, see [Expansion Unit Installation](#).

- 6.** Connect the power cord and all applicable cables.
- 7.** Power on the NAS.  
For details, see [Front Panel](#).
- 8.** Install QuTS hero.  
For details, see [QuTS hero Installation](#).
- 9.** Log on to QuTS hero.

## 3. Installation and Configuration

This chapter provides specific hardware and firmware installation and configuration steps.

### Hardware installation

This section provides information on installing drives, memory modules, and expansion cards.

### Drive Installation

The TDS-h2489FU-R2 is compatible with 2.5-inch U.2 NVMe PCIe solid-state drives. Bays 17-24 also support SATA 6 Gbps.

### Installing 2.5-inch Solid-State Drives on 2.5-inch Trays

#### Warning

- Installing a drive deletes all data on the drive.
- Observe electrostatic discharge (ESD) procedures to avoid damage to components.



**Moving fan blades:** Keep your hands and other body parts away from moving fan blades.

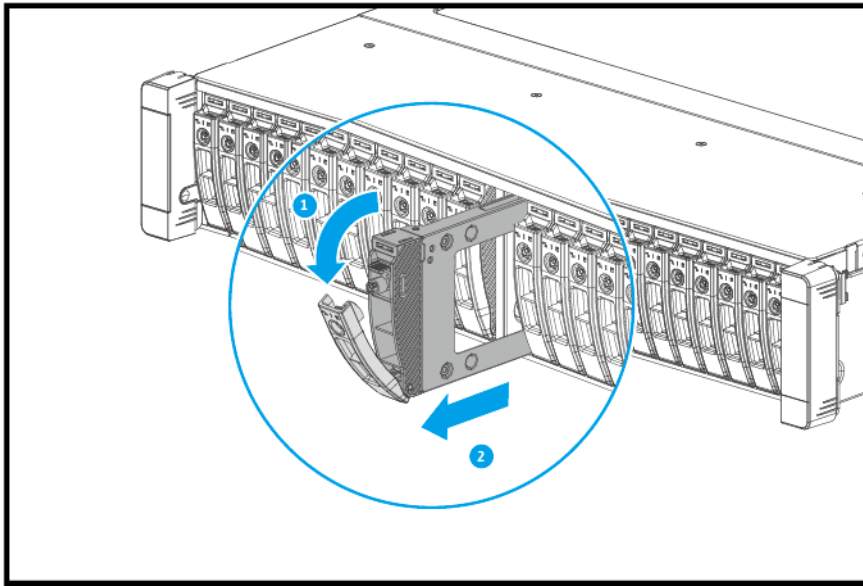


**Other moving components:** Keep your hands and other body parts away from other moving components.

1. Power off the NAS.
2. Remove the drive tray.
  - a. Pull the handle to release the tray.

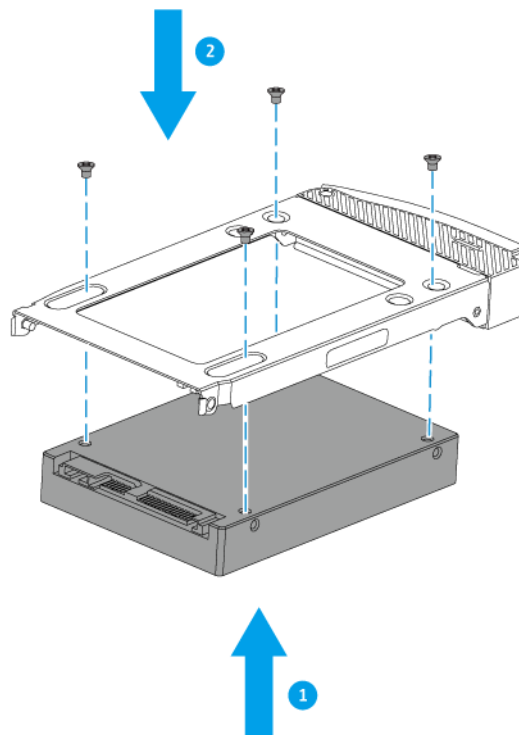


- b.** Pull the tray out.



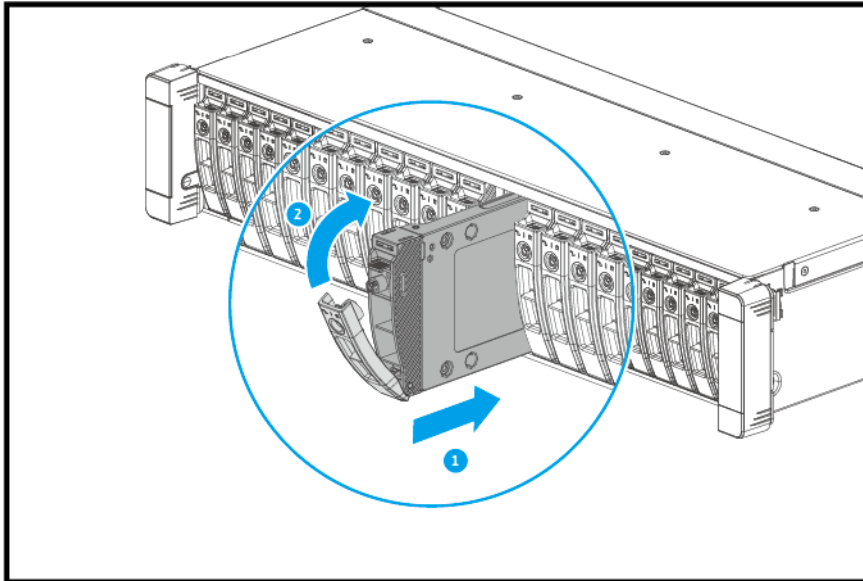
- 3.** Install a drive on the tray.

- a.** Place the drive on the tray so that the holes on the bottom of the drive are aligned with the holes on the bottom of the tray.



- b.** Attach the screws.

4. Load the tray into the bay.
  - a. Insert the tray into the bay.



- b. Push the handle.
  - c. Lock the tray.
5. Power on the NAS.

## Installing M.2 Solid-State Drives

The TDS-h2489FU-R2 has two M.2 SSD slots on the [System Board](#). For a list of compatible M.2 SSDs, go to <https://www.qnap.com/compatibility>.

### Warning

- Installing a drive deletes all data on the drive.
- Observe electrostatic discharge (ESD) procedures to avoid damage to components.



**Moving fan blades:** Keep your hands and other body parts away from moving fan blades.

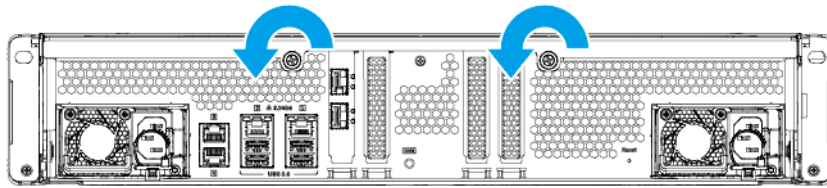


**Other moving components:** Keep your hands and other body parts away from other moving components.

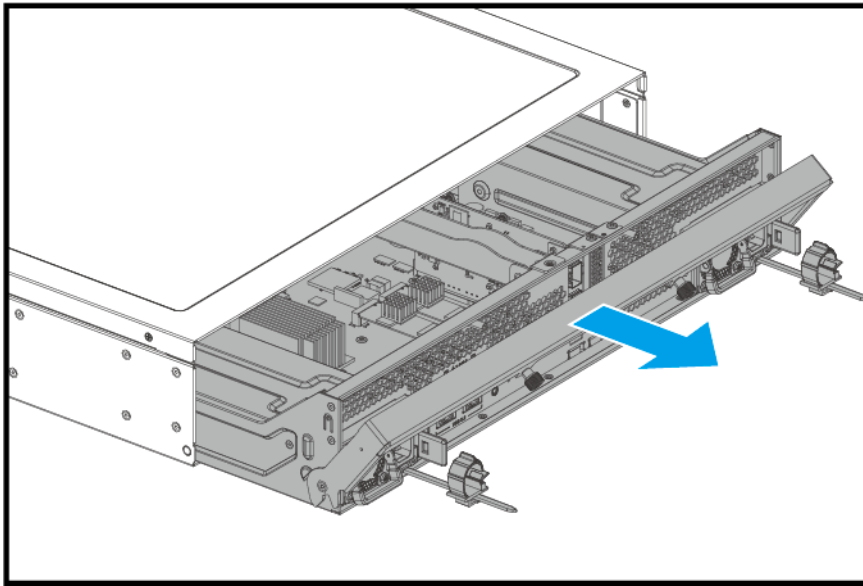
**Note**

- QNAP recommends installing heatsinks on the M.2 SSD controllers to enhance cooling efficiency and to ensure consistent performance.
- Before installing non-QNAP heatsinks, ensure that they are of the appropriate size and shape.
- The ordering P/N for QNAP heatsinks is: HS-M2SSD-01.

1. Power off the device.
2. Disconnect the power cord from the electrical outlet.
3. Disconnect all cables and external attachments.
4. Remove the storage controller.
  - a. Loosen the screws.



- b.** Pull the controller out of the chassis.



- 5.** Install a heatsink on the M.2 SSD.

- a.** Locate the controller on the M.2 SSD.

**Note**

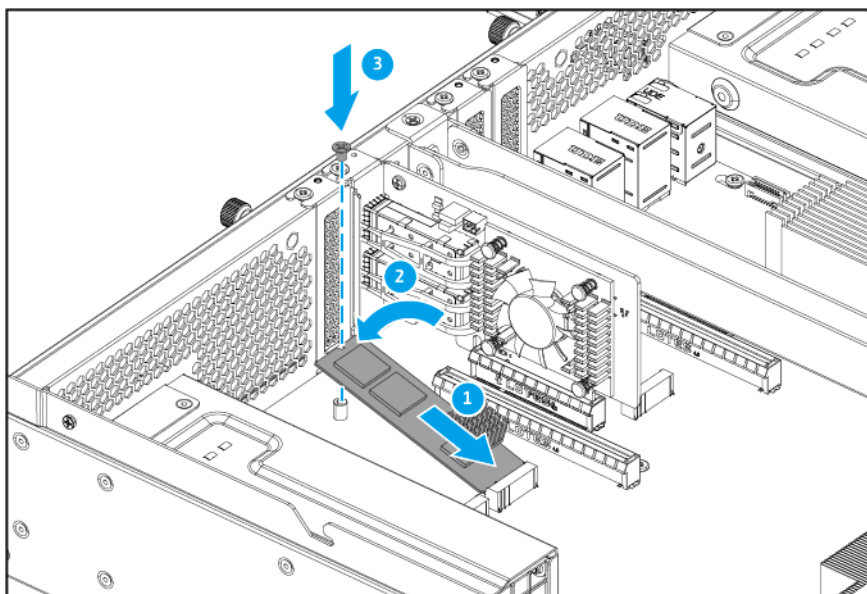
The controller location varies depending on the model and manufacturer of the M.2 SSD.

For details, refer to the documentation or contact the manufacturer.

- 6.** Install the M.2 SSD.

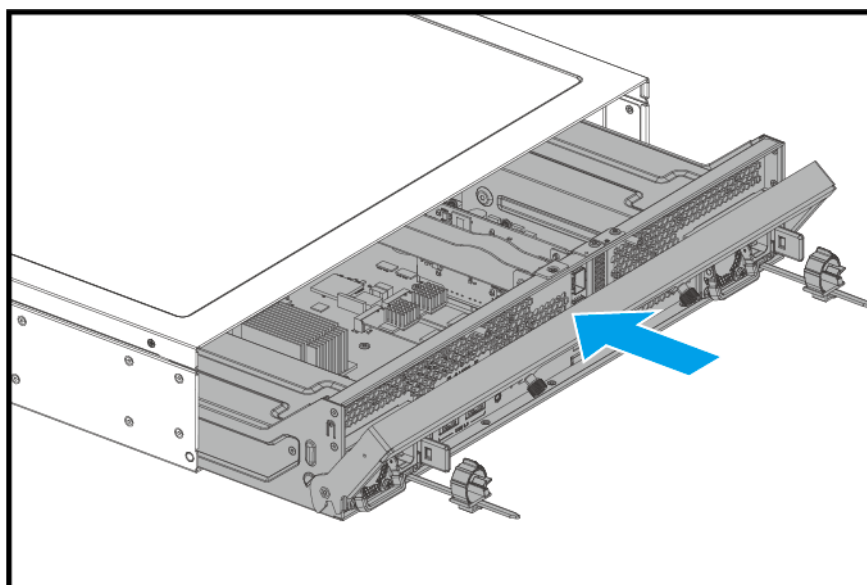
- a.** Remove the screw.
  - b.** Insert the M.2 SSD into the slot.

- c.** Attach the screw.

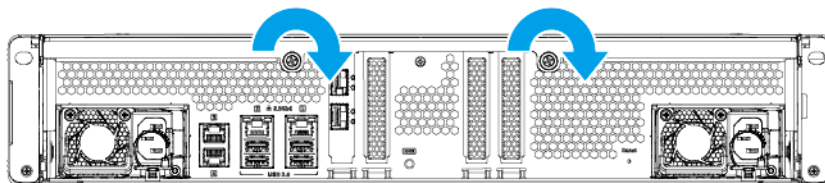


- 7.** Attach the case cover.

- a.** Push the storage controller into the chassis.



- b. Tighten the screws.



8. Connect all cables and external attachments.
9. Connect the power cord to the electrical outlet.
10. Power on the device.

## Replacing Memory Modules

The TDS-h2489FU-R2 has 32 memory slots. You can increase the memory capacity of the NAS by upgrading memory modules. For optimal performance, replace 8 memory modules for one CPU at the same time.

Use only QNAP memory modules to maintain system performance and stability. You can purchase QNAP memory modules from authorized resellers.

### Important

QNAP recommends installing modules in pairs to run dual-channel mode.

- Ensure that all modules are identical.
- Install the groups in sequence and follow the assigned slots for each group.

For details on slot order, see [System Board](#).

Configurations	Slot Number
2 CPU, 2 DIMMs	Slots 3 and 19
2 CPU, 4 DIMMs	Slots 3, 16, 19, and 32
2 CPU, 8 DIMMs	Slots 3, 7, 12, 16, 19, 23, 28, and 32

Configurations	Slot Number
2 CPU, 16 DIMMs	Slots 1, 3, 5, 7, 10, 12, 14, 16, 17, 19, 21, 23, 26, 28, 30, 32
2 CPU, 32 DIMMs	All slots

### Warning

- Observe electrostatic discharge (ESD) procedures to avoid damage to components.

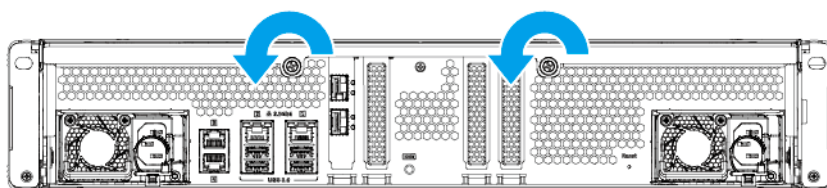


**Moving fan blades:** Keep your hands and other body parts away from moving fan blades.



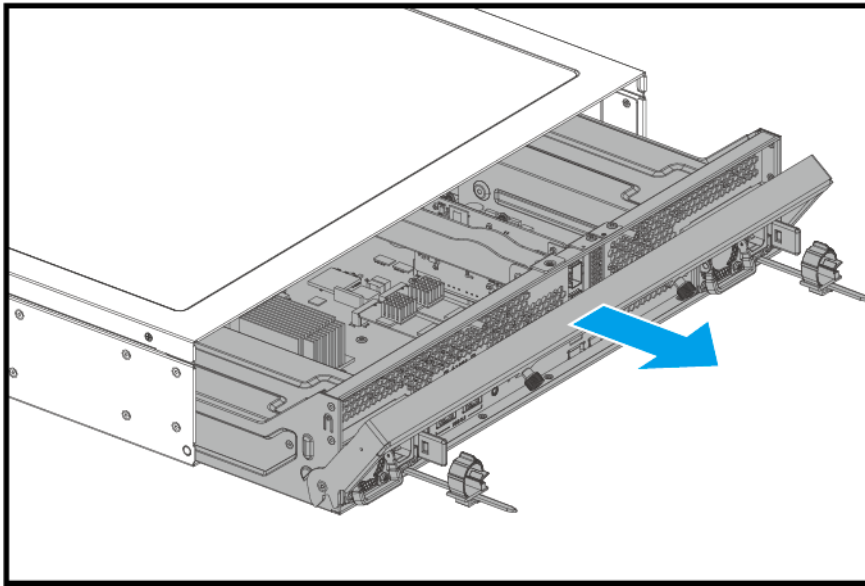
**Other moving components:** Keep your hands and other body parts away from other moving components.

1. Power off the device.
2. Disconnect the power cord from the electrical outlet.
3. Disconnect all cables and external attachments.
4. Remove the storage controller.
  - a. Loosen the screws.





- b.** Pull the controller out of the chassis.



- ## 5. Remove an existing module.

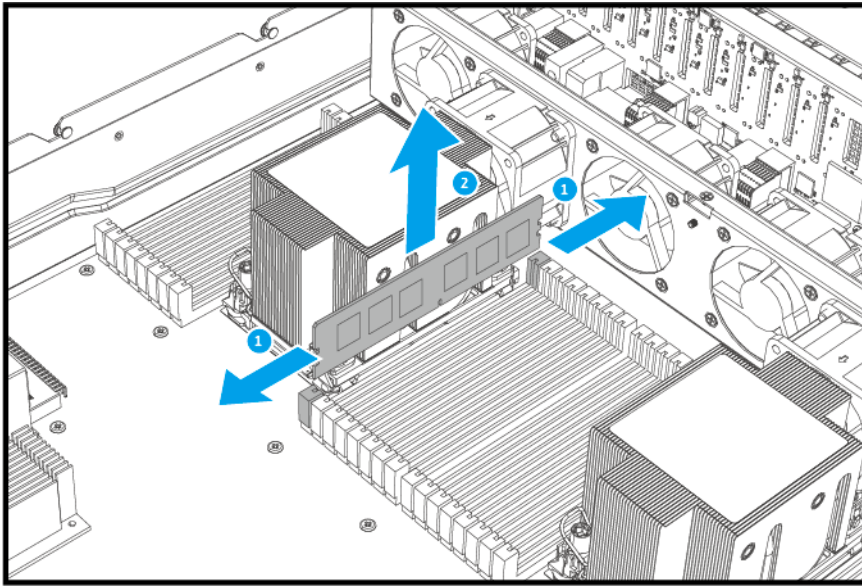
- a.** Push the retention clips outward simultaneously to release the module.
- b.** Verify that the module has tilted upward and is completely released from the slot.

### Warning

Attempting to remove a module that is not completely released may damage the module and the system board.

- c.** Hold the module by the edges.

- d. Carefully slide the module out of the slot.

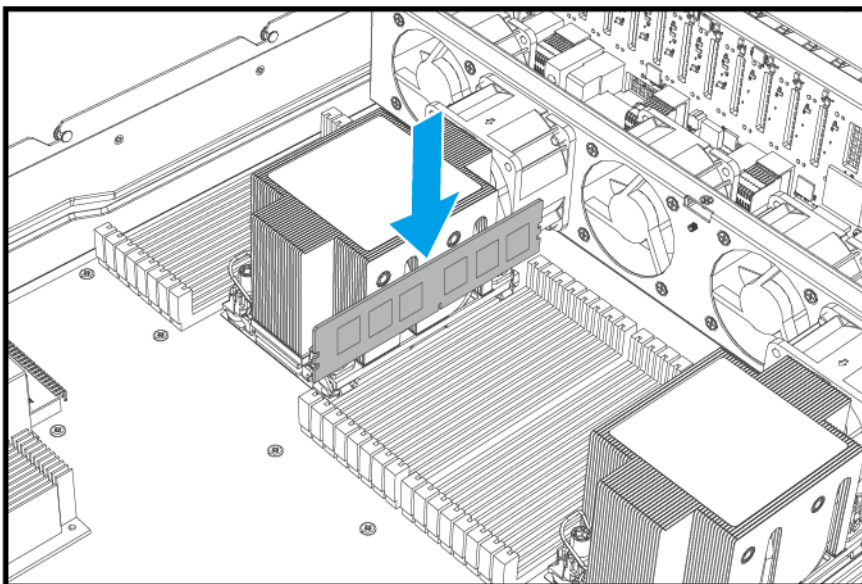


### Warning

- Do not touch the internal components, particularly the metal connectors.
- Do not bend the module.

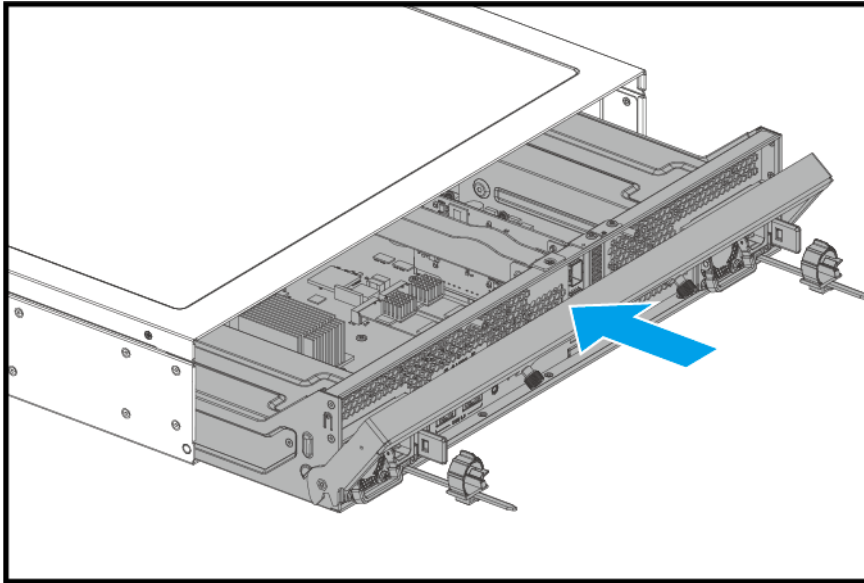
6. Install a new module.

- a. Align the notch with the ridge in the slot.
- b. Insert the module into the slot.

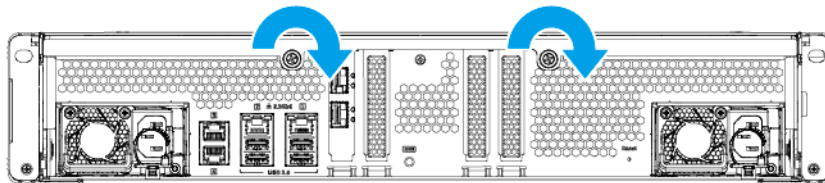


- c. Verify that the metal connectors are completely inserted into the slot.
- d. Carefully press down on the module until the retention clips lock the module into place.

7. Attach the case cover.
  - a. Push the storage controller into the chassis.



- b. Tighten the screws.



8. Connect all cables and external attachments.
9. Power on the device.
10. Verify that the module is recognized by the device.
  - a. Log on to QuTS hero as an administrator.
  - b. Go to **Control Panel > System > System Status > Hardware Information**.
  - c. Check the value for **Total memory**.

## Replacing Expansion Cards

The TDS-h2489FU-R2 series supports selected expansion cards, some of which require QNAP PCIe brackets. QNAP-branded expansion cards purchased from the company website are shipped with the brackets necessary to fit the TDS-h2489FU-R2 series.

### Warning

- Only qualified personnel should perform the following steps. Failure to follow instructions can result in serious injury or death.
- Observe electrostatic discharge (ESD) procedures to avoid damage to components.



**Moving fan blades:** Keep your hands and other body parts away from moving fan blades.



**Other moving components:** Keep your hands and other body parts away from other moving components.

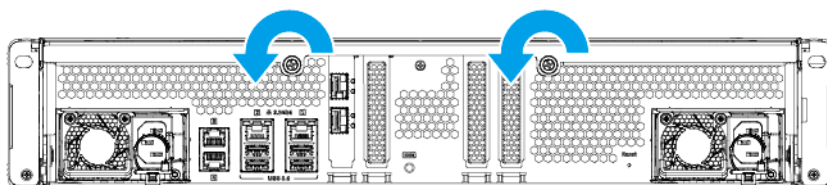
### Important

- One dual-port 25GbE SFP28 network expansion card is pre-installed on PCIe Gen 4 x8 slot 4.
- Slot 1 will reduce its speed from x16 to x8 if an expansion card is installed on slot 2.
- Slot 3 will reduce its speed from x16 to x8 if an expansion card is installed on slot 4.
- For expansion card slot numbering, see [System Board](#).

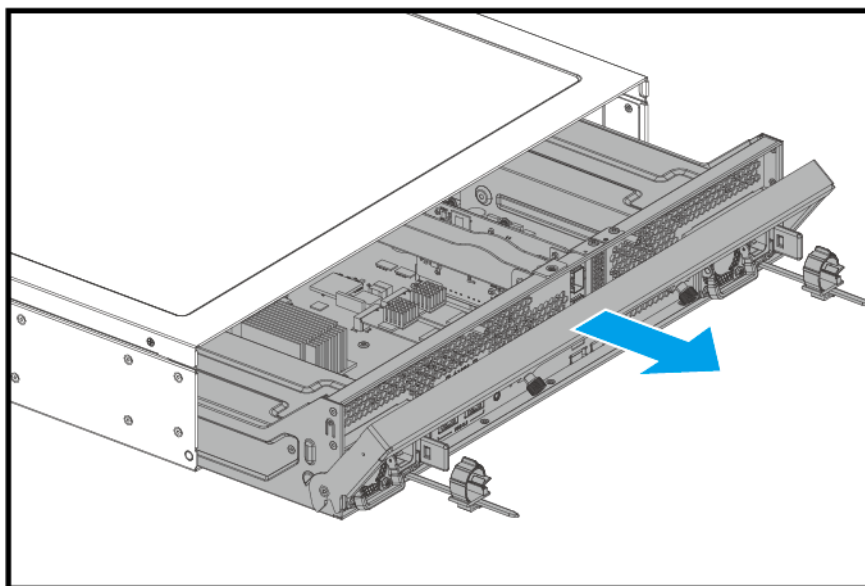
1. Power off the device.
2. Disconnect the power cord from the electrical outlet.
3. Disconnect all cables and external attachments.

**4. Remove the storage controller.**

- a.** Loosen the screws.

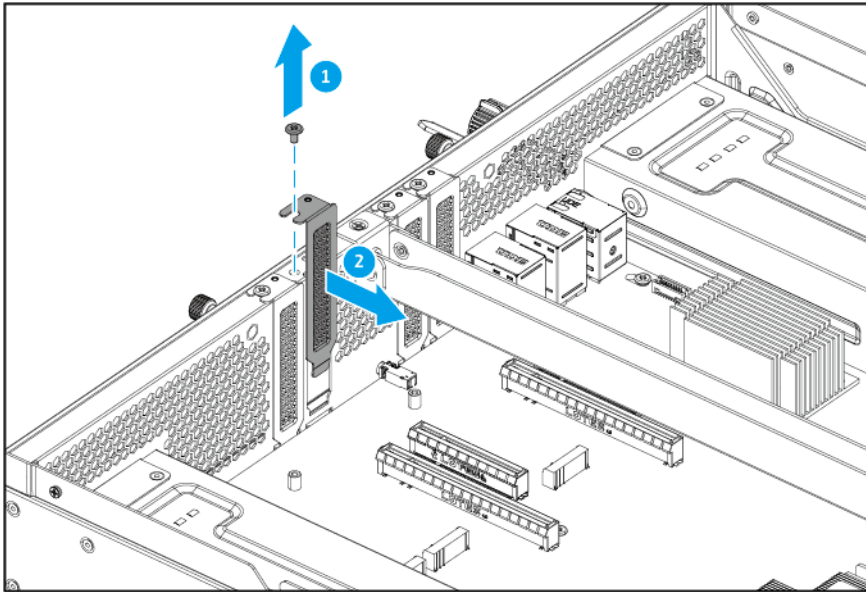


- b.** Pull the controller out of the chassis.

**5. Remove the PCIe cover.**

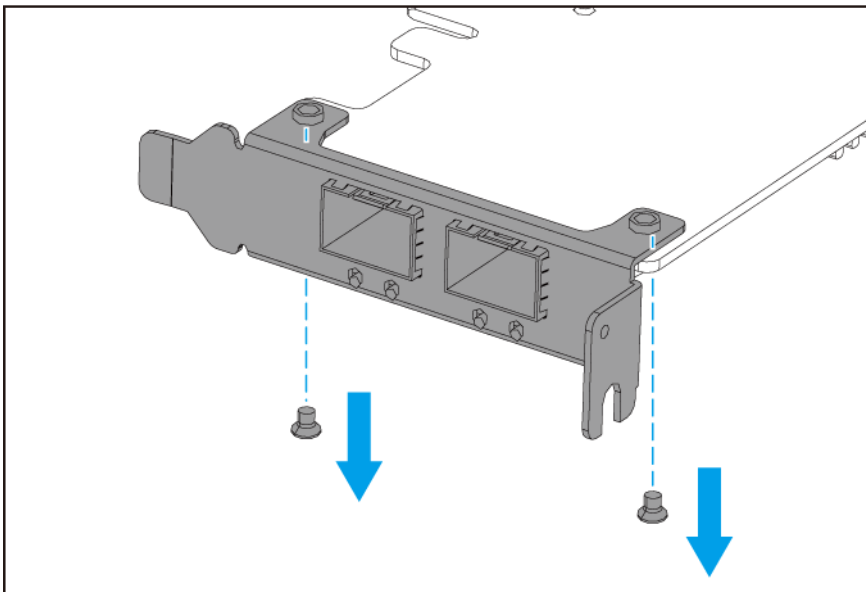
- a.** Remove the screw that secures the cover to the bracket.

- b.** Pull the cover away from the slot.



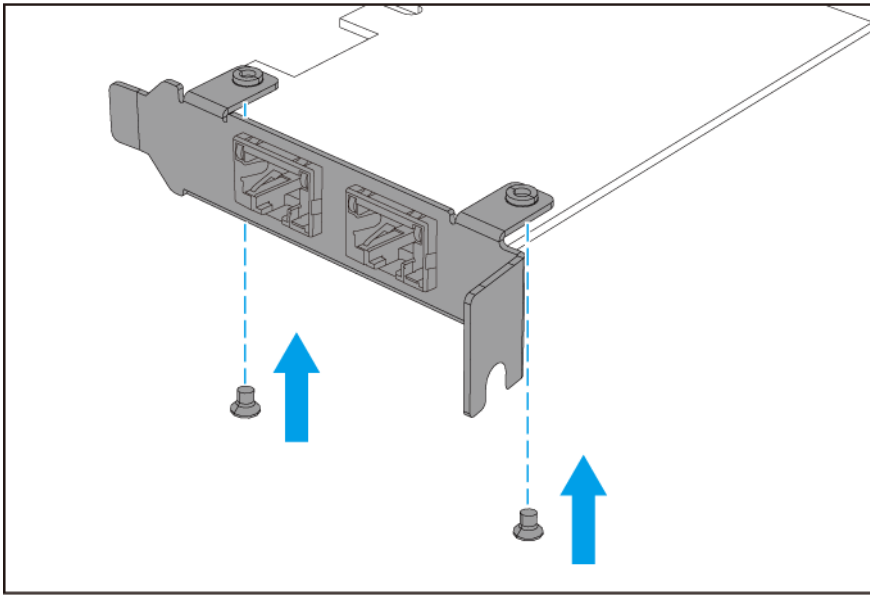
- 6.** Optional: Attach the QNAP bracket to the expansion card.

- a.** Remove all screws of the existing bracket.



- b.** Carefully pull the bracket away from the card.

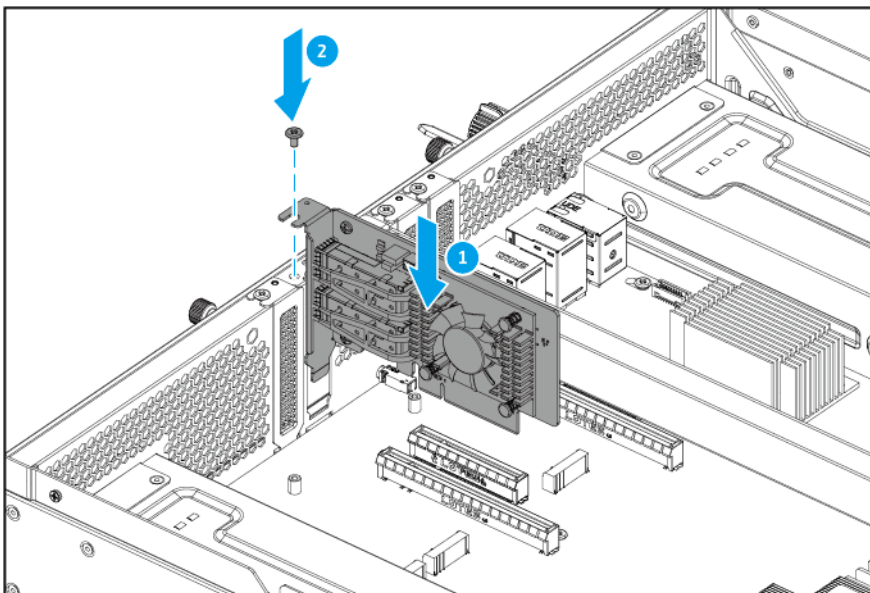
- c.** Attach the QNAP bracket to the card using the same screws.



- d.** Verify that the bracket is secured to the card.

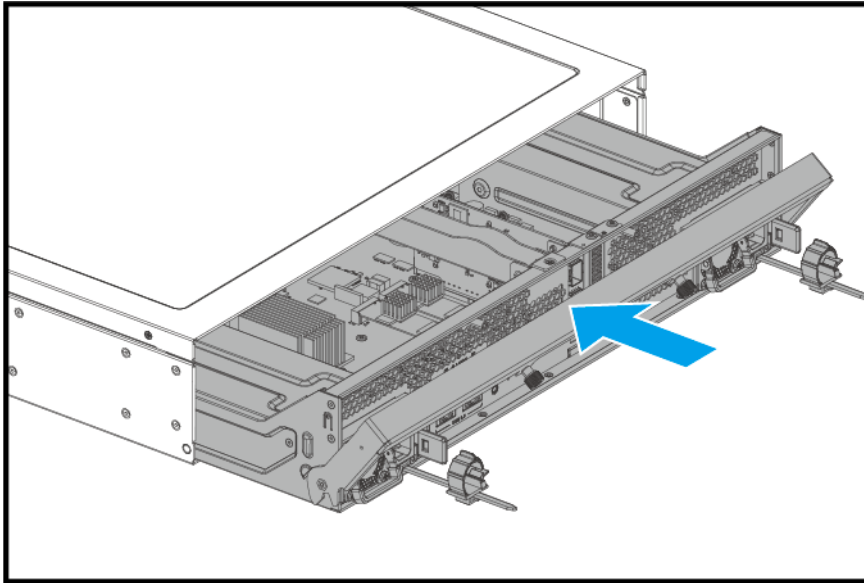
**7.** Install the expansion card.

- a.** Hold the card by the edges.  
**b.** Insert the card into the slot.  
**c.** Attach the screw.

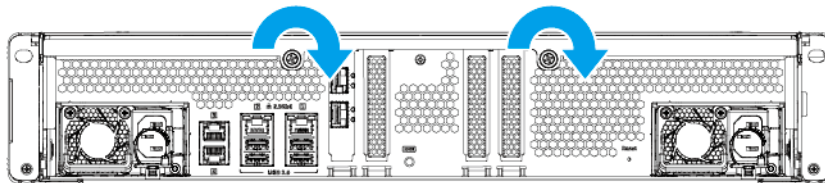




8. Attach the case cover.
  - a. Push the storage controller into the chassis.



- b. Tighten the screws.



9. Connect all cables and external attachments.
10. Connect the power cord to the electrical outlet.
11. Power on the NAS.

## Hot-Swapping Redundant Power Supply Units

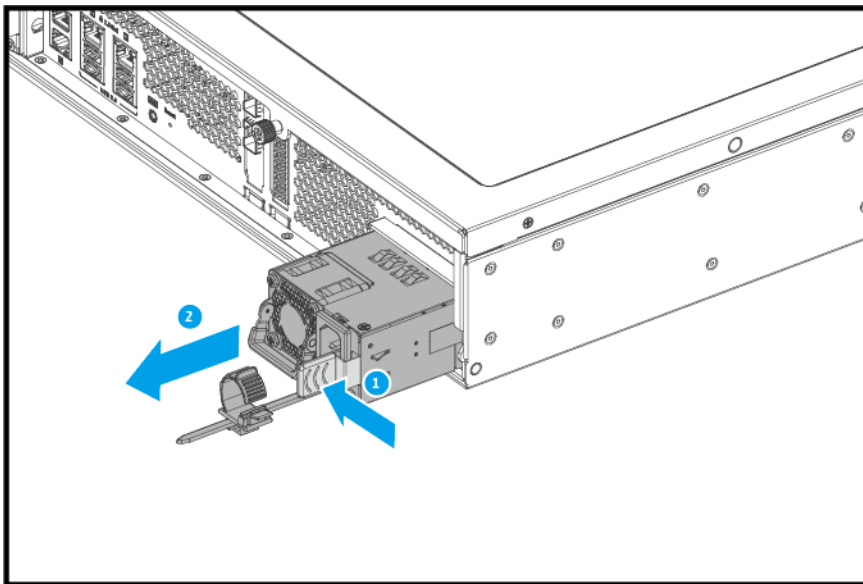
1. Power off the storage controller.

2. Disconnect the power cord from the electrical outlet and the power supply unit (PSU) that you are replacing.

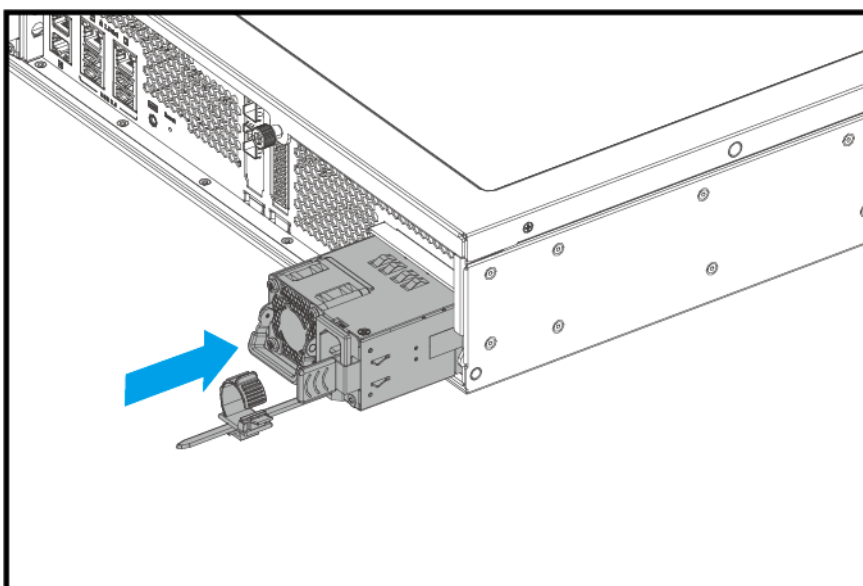
**Warning**

The NAS may have one or more power supply unit (PSU) cords. To avoid serious injuries, a trained service technician must disconnect all PSU cords before installing or replacing system components.

3. Firmly press the latch toward the handle and then pull the PSU out.



4. Insert the new PSU.



5. Connect the power cord to the PSU and the electrical outlet.

6. Power on the storage controller.
7. Enable alerts for PSU failures.
  - a. Log on to QuTS hero as administrator.
  - b. Go to **Control Panel > System > Hardware > General**.
  - c. Select **Enable Redundant Power Supply Mode**.
  - d. Click **Apply**.

## Expansion Unit Installation

The TDS-h2489FU-R2 supports SAS, SATA, and USB expansion units. For details, see the table below.

You can purchase storage expansion accessories from QNAP or an authorized reseller.

For details, go to <https://shop.qnap.com/>.

For the list of compatible expansion units and the maximum number of applicable expansion units, go to <https://www.qnap.com/go/compatibility-expansion>.

Expansion Unit Model	Description	Required Accessories
SAS expansion units		
TL-R1620Sep-RP	<ul style="list-style-type: none"> <li>• Uses a SAS 12 Gbps (SFF-8644) interface</li> <li>• Supports SAS/SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• One of the following storage expansion cards:               <ul style="list-style-type: none"> <li>• QXP-820S-B3408</li> <li>• QXP-1620S-B3616W</li> </ul> </li> <li>• mini-SAS SFF-8644 cable</li> <li>• RAIL-B02</li> </ul>
TL-R1220Sep-RP	<ul style="list-style-type: none"> <li>• Uses a SAS 12 Gbps (SFF-8644) interface</li> <li>• Supports SAS/SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• One of the following storage expansion cards:               <ul style="list-style-type: none"> <li>• QXP-820S-B3408</li> <li>• QXP-1620S-B3616W</li> </ul> </li> <li>• mini-SAS SFF-8644 cable</li> <li>• RAIL-B02</li> </ul>
SATA expansion units		

Expansion Unit Model	Description	Required Accessories
TL-D400S	<ul style="list-style-type: none"> <li>• Uses a SATA 6 Gbps (SFF-8088) interface</li> <li>• Supports SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• 1 x SFF-8088 connector cable</li> <li>• QXP-400eS-A1164 host bus adapter</li> </ul>
TL-D800S	<ul style="list-style-type: none"> <li>• Uses a SATA 6 Gbps (SFF-8088) interface</li> <li>• Supports SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• 2 x SFF-8088 connector cables</li> <li>• QXP-800eS-A1164 host bus adapter</li> </ul>
TL-D1600S	<ul style="list-style-type: none"> <li>• Uses a SATA 6 Gbps (SFF-8088) interface</li> <li>• Supports SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• 4 x SFF-8088 to SFF-8644 connector cables</li> <li>• QXP-1600eS-A1164 host bus adapter</li> </ul>
TL-R400S	<ul style="list-style-type: none"> <li>• Uses a SATA 6 Gbps (SFF-8088) interface</li> <li>• Supports SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• 1 x SFF-8088 connector cable</li> <li>• QXP-400eS-A1164 host bus adapter</li> <li>• RAIL-B02</li> </ul>
TL-R1200S-RP	<ul style="list-style-type: none"> <li>• Uses a SATA 6 Gbps (SFF-8088) interface</li> <li>• Supports SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• 3 x SFF-8088 to SFF-8644 connector cables</li> <li>• QXP-1600eS-A1164 host bus adapter</li> <li>• RAIL-B02</li> </ul>
PCIe expansion units		
TL-R1200PES-RP	<ul style="list-style-type: none"> <li>• Uses a PCIe 32 Gbps or 64 Gbps (SFF-8644) interface</li> <li>• Supports SATA HDD/SDD</li> </ul>	<ul style="list-style-type: none"> <li>• One of the following host bus adapter and cable pairings: <ul style="list-style-type: none"> <li>• Adapter: QXP-3X4PES Cable: CAB-PCIE10M-8644-4X</li> <li>• Adapter: QXP-3X8PES Cable: CAB-PCIE10M-8644-8X</li> </ul> </li> <li>• RAIL-B02</li> </ul>

Expansion Unit Model	Description	Required Accessories
TL-R1600PES-RP	<ul style="list-style-type: none"> <li>• Uses a PCIe 32 Gbps or 64 Gbps (SFF-8644) interface</li> <li>• Supports SATA HDD/SDD</li> </ul>	<ul style="list-style-type: none"> <li>• One of the following host bus adapter and cable pairings:               <ul style="list-style-type: none"> <li>• Adapter: QXP-3X4PES Cable: CAB-PCIE10M-8644-4X</li> <li>• Adapter: QXP-3X8PES Cable: CAB-PCIE10M-8644-8X</li> </ul> </li> <li>• RAIL-B02</li> </ul>
TL-R2400PES-RP	<ul style="list-style-type: none"> <li>• Uses a PCIe 32 Gbps or 64 Gbps (SFF-8644) interface</li> <li>• Supports SATA HDD/SDD</li> </ul>	<ul style="list-style-type: none"> <li>• One of the following host bus adapter and cable pairings:               <ul style="list-style-type: none"> <li>• Adapter: QXP-3X4PES Cable: CAB-PCIE10M-8644-4X</li> <li>• Adapter: QXP-3X8PES Cable: CAB-PCIE10M-8644-8X</li> </ul> </li> <li>• RAIL-A02-90</li> </ul>
USB expansion units		
TR-002	<ul style="list-style-type: none"> <li>• Uses a USB 3.2 Gen 2 Type-C interface</li> <li>• Supports SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• USB 3.2 Gen 2 Type-A to Type-C cable</li> </ul>
TR-004	<ul style="list-style-type: none"> <li>• Uses a USB 3.2 Gen 1 Type-C interface</li> <li>• Supports SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• USB 3.2 Gen 1 Type-A to Type-C cable</li> </ul>
TR-004U	<ul style="list-style-type: none"> <li>• Uses a USB 3.2 Gen 1 Type-C interface</li> <li>• Supports SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• USB 3.2 Gen 1 Type-A to Type-C cable</li> <li>• RAIL-B02</li> </ul>
TL-D800C	<ul style="list-style-type: none"> <li>• Uses a USB 3.2 Gen 2 Type-C interface</li> <li>• Supports SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• USB 3.2 Gen 2 Type-A to Type-C cable</li> </ul>
TL-R1200C-RP	<ul style="list-style-type: none"> <li>• Uses a USB 3.2 Gen 2 Type-C interface</li> <li>• Supports SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• USB 3.2 Gen 2 Type-A to Type-C cable</li> <li>• RAIL-B02</li> </ul>

## Connecting PCIe Expansion Units

To connect PCIe expansion units, a host bus adapter must be installed on the NAS.

For required accessories details, see [Expansion Unit Installation](#).

1. Install a host bus adapter on the PCIe slot.  
For details, see [Replacing Expansion Cards](#).

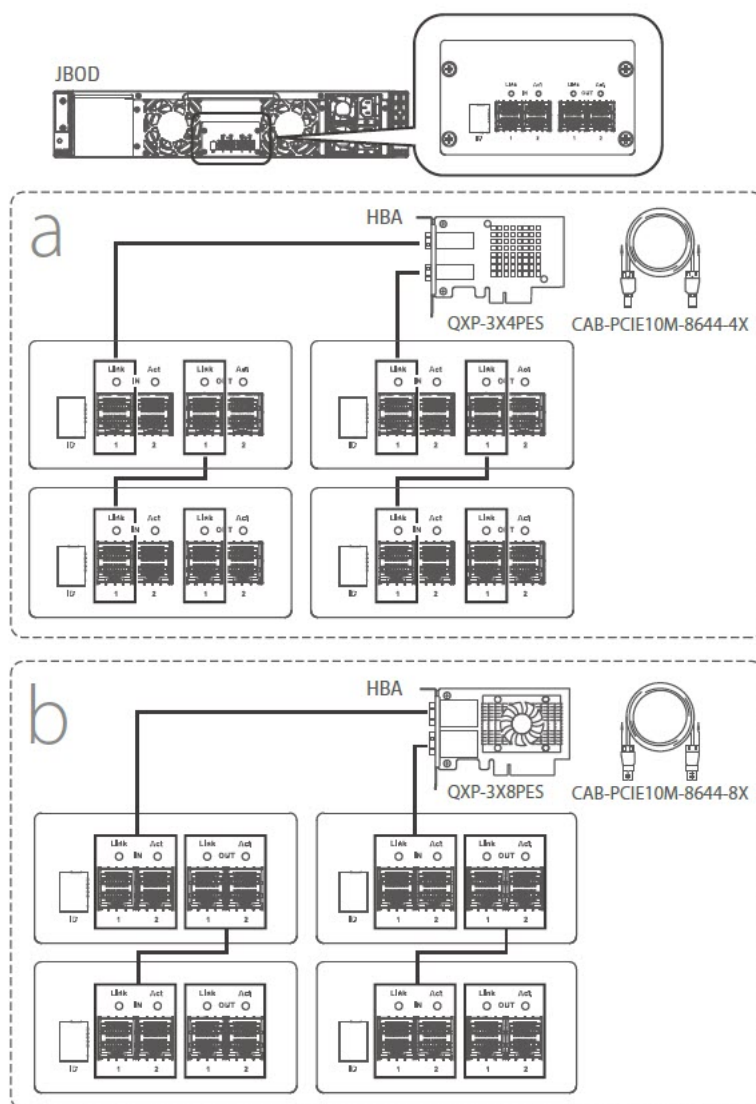
### Important

A QNAP QXP host bus adapter is required for connecting PCIe expansion units to a host device. Third-party host bus adapters are not compatible with QNAP expansion units.

2. Connect one or more PCIe expansion units to the NAS.  
Use one of the following topologies according to the host bus adapter (HBA) model installed on the NAS.

### Important

- Ensure you use compatible cables for your host bus adapter model.
- If you use the CAB-PCIE10M-8644-4X cable, you must connect the cable to the left side of the port for both upstream and downstream ports.
- For details, see the hardware user guide for your expansion unit model.



3. Power on the expansion units.
4. Power on the NAS.
5. Verify that the expansion units are recognized by the NAS.
  - a. Log on to QuTS hero as an administrator.

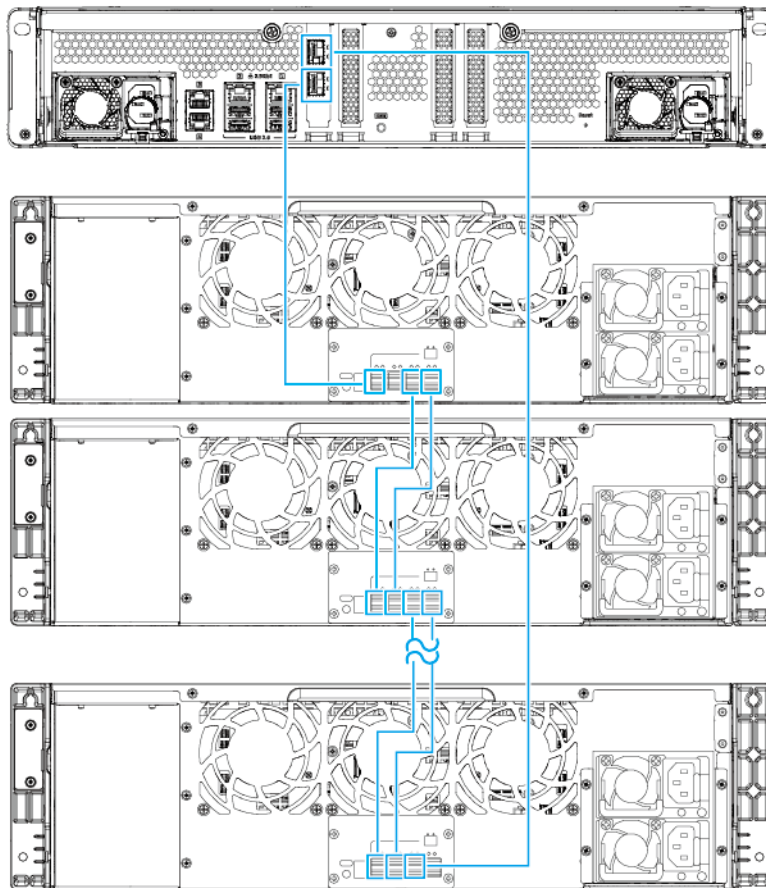
- b. Go to **Main Menu > Storage & Snapshots > Overview > System**.
- c. Verify that the expansion units are listed.

## Connecting SAS Expansion Units

To connect the device to SAS expansion units, a storage expansion card must be installed in the device.

For required accessories details, see [Expansion Unit Installation](#).

1. Install a storage expansion card on the PCIe slot.  
For details, see [Replacing Expansion Cards](#).
2. Connect the expansion units to the device using the following topology.



3. Power on the expansion units.
4. Verify that the expansion units are recognized by the device.
  - a. Log on to QuTS hero as an administrator.
  - b. Go to **Main Menu > Storage & Snapshots > Overview > System**.
  - c. Verify that the expansion units are listed.



## Connecting SATA JBOD Expansion Units

To connect the TDS-h2489FU-R2 to SATA JBOD expansion units, a host bus adapter must be installed on the NAS.

For required accessories details, see [Expansion Unit Installation](#).

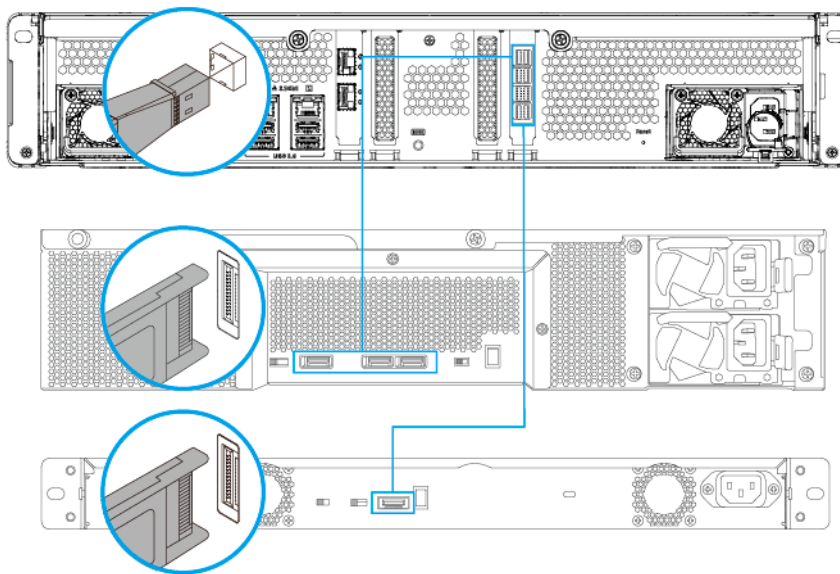
1. Power off the NAS.
2. Install a host bus adapter on the PCIe slot.

### Important

A QNAP QXP host bus adapter is required for connecting SATA expansion units to a host device. Third-party host bus adapters are not compatible with QNAP expansion units.

For details, see [Replacing Expansion Cards](#).

3. Connect the expansion units to the NAS using the following topology.

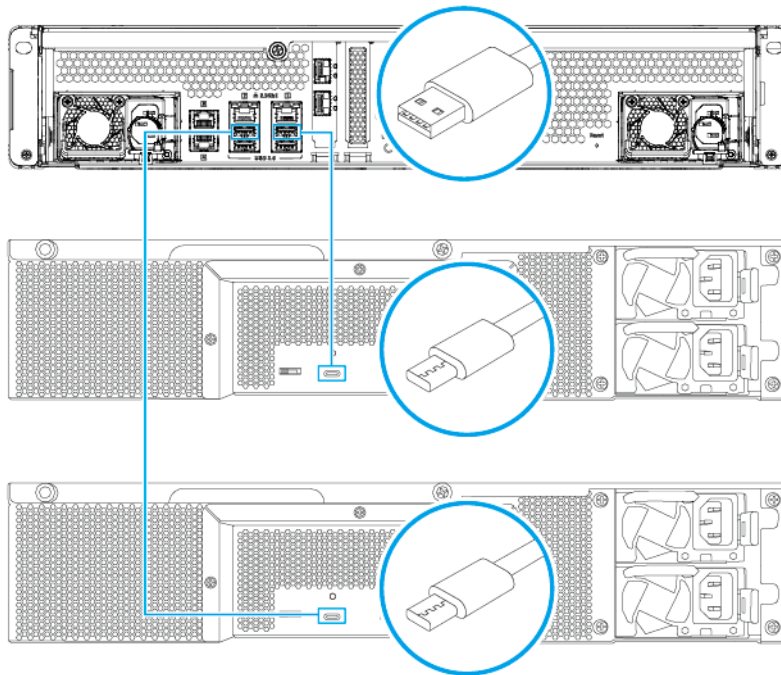


4. Power on the expansion units.
5. Power on the NAS.
6. Verify that the expansion units are recognized by the NAS.
  - a. Log on to QuTS hero as an administrator.
  - b. Go to **Main Menu > Storage & Snapshots > Overview > System**.
  - c. Verify that the expansion units are listed.

## Connecting USB Expansion Units

To connect the TDS-h2489FU-R2 to USB expansion units, USB Type-A to USB Type-C cables or USB Type-C to USB Type-C cables are required. For required accessories details, see [Expansion Unit Installation](#).

1. Connect the expansion unit to the NAS.
  - a. Connect the USB cable to the USB Type-C port on the expansion unit.
  - b. Connect the USB cable to a USB Type-A port on the NAS.



2. Power on the expansion units.
3. Verify that the expansion units are recognized by the NAS.
  - a. Log on to QTS as an administrator.
  - b. Go to **Main Menu > Storage & Snapshots > Overview > System**.
  - c. Verify that the expansion units are listed.

## QuTS hero Installation

The TDS-h2489FU-R2 uses the QNAP QuTS hero operating system. You can install QuTS hero using any of the following methods.

Method	Description	Requirements
Qfinder Pro installation (Recommended)	<p>If the NAS is connected to your local area network, you can do the following:</p> <ul style="list-style-type: none"> <li>• Locate the NAS using Qfinder Pro.</li> <li>• Complete the steps in the Smart Installation Guide wizard.</li> </ul> <p>For details, see <a href="#">Initializing QuTS hero using Qfinder Pro</a>.</p>	<ul style="list-style-type: none"> <li>• Computer</li> <li>• Network cable</li> <li>• Qfinder Pro installer</li> </ul>
Cloud installation	<p>If the NAS is connected to the internet, you can do the following:</p> <ul style="list-style-type: none"> <li>• Scan the QR code on the NAS.</li> <li>• Log into your myQNAPcloud account.</li> <li>• Use myQNAPcloud Link to remotely access your NAS.</li> <li>• Complete the steps in the Smart Installation Guide wizard.</li> </ul> <p>For details, see <a href="#">Initializing QuTS hero using the cloud installation website</a>.</p>	<ul style="list-style-type: none"> <li>• Computer or mobile device</li> <li>• Network cable</li> <li>• myQNAPcloud account</li> <li>• Cloud Key</li> </ul>

## Initializing QuTS hero using Qfinder Pro

You can initialize QuTS hero using Qfinder Pro, which is a utility designed to help you locate and manage QNAP devices on your network.

### Warning

Installing QuTS hero deletes all data on the drives. Back up your data before proceeding.

1. Power on the device.
2. Connect the device to your local area network.
3. Run Qfinder Pro on a computer that is connected to the same local area network.

### Note

To download Qfinder Pro, go to <https://www.qnap.com/utilities>.

4. Locate the NAS in the list and then double-click the name or IP address.  
The **Smart Installation Guide** opens in the default web browser.

5. If the screen shows a different operating system, click **QuTS hero**.

**Note**

This step is only required if the NAS supports installing more than one operating system and the default operating system for installation is not QuTS hero.

The NAS restarts and the smart installation screen shows QuTS hero as the operating system to install.

6. Click **Start Smart Installation Guide**.  
The **Install Firmware** window appears.
7. Install firmware using any of the following methods:

Installation methods	Steps
Automatic	Click <b>Start</b> . Automatically searches for available firmware updates and installs firmware.
Manual installation	<p><b>a.</b> Click <b>Manual Installation</b>. The <b>Install Firmware</b> window appears.</p> <p><b>b.</b> Click <b>Browse</b>. The upload file window appears.</p> <p><b>c.</b> Select file.</p> <p><b>d.</b> Click <b>Open</b>. Starts firmware installation.</p>
Skip	Click <b>Skip</b> . Skips firmware installation.

8. Specify the following information

- **NAS name:** Specify a name with 1 to 14 characters. The name supports letters (A to Z, a to z), numbers (0 to 9), and hyphens (-), but cannot end with a hyphen.
- **Username:** Specify an administrator username that contains 1 to 32 characters. The name can contain letters (A to Z, a to z), numbers (0 to 9), and hyphens (-), multi-byte Chinese, Japanese, Korean, and Russian characters.  
The username cannot contain the following special characters: grave accent (`), asterisk (\*), equal sign (=), plus sign (+), square brackets ([ ]), curly brackets ({ }), slash (/), vertical bar (|), semicolon (;), colon (:), apostrophe ('), quotation mark ("), comma (,), less than sign (<), greater than sign (>), backslash (\), question mark (?), percent sign (%), dollar sign (\$), and the space character.

**Important**

To protect your NAS from brute force attacks, create a new system administrator account during QuTS hero initialization to disable the default "admin" account.

- **Password:** Specify an administrator password with 1 to 64 characters. The password supports all ASCII characters.

9. Click **Next**.

10. Specify the time zone, date, and time.

**Tip**

QNAP recommends connecting to an NTP server to ensure that the NAS follows the Coordinated Universal Time (UTC) standard.

11. Click **Next**.

The **Configure the network settings** screen appears.

12. Select **Obtain an IP address automatically (DHCP)**.

13. Click **Next**.

14. Review the settings.

15. Click **Apply**.

A confirmation message appears.

**Warning**

Clicking **Initialize** deletes all data on the drive before installing QuTS hero.

16. Click **Initialize**.

QuTS hero initialization starts. It may take a few minutes to complete the process.

After the initialization, you can click **Go to NAS Management** to start using QuTS hero and configuring other settings.

## Initializing QuTS hero using the cloud installation website

You can initialize QuTS hero on the cloud installation website, which is designed to help you set up QNAP devices.

**Warning**

Initializing QuTS hero deletes all data on the drives. Back up your data before proceeding.

1. Power on the device.

2. Connect the device to the internet.

3. Go to the QNAP Cloud Installation website using one of the following methods:

- On your computer, go to the website dedicated to your region.
  - Global: <https://install.qnap.com>
  - China: <https://install.qnap.com.cn>
- Or scan the QR code on the NAS using a mobile device.

The web page lists all the uninitialized QNAP NAS devices on the local network.

4. Find your NAS from the list and then click **Initialize**.

**Tip**

If your NAS is connected to the Internet, you can also go to <https://install.qnap.com/set> to enter the Cloud Key printed on the NAS. This allows you to initialize the NAS even if your NAS and your computer are not on the same network.

The installation wizard opens in the default web browser.

5. Create an account or sign in to myQNAPcloud.

**Note**

You must return to this page to complete the installation after creating an account.

6. Specify the myQNAPcloud device name for the NAS.

**Note**

- The myQNAPcloud device name is used when remotely accessing the NAS.
- For security purposes, the myQNAPcloud Link remote connection service will be disabled on your NAS after initialization. You can enable it by connecting to QuTS hero through LAN and then installing myQNAPcloud Link.

7. Click **Next**.

The **Smart Installation Guide** opens in the default web browser.

8. Perform any of the following actions.

- To check for the latest available version, click **Start**.  
The wizard downloads the latest available version, and then the NAS restarts after the download is complete. If a newer version is not available, the wizard automatically displays the **Smart Installation Guide**.
- To install the out-of-the-box version, click **Skip**.
- If the screen shows a different operating system, click **QuTS hero**.  
The NAS restarts and the smart installation screen shows QuTS hero as the operating system to install.

9. Click **Start Smart Installation Guide**.  
The **Install Firmware** window appears.

10. Install firmware using any of the following methods:

Installation methods	Steps
Automatic	Click <b>Start</b> . Automatically searches for available firmware updates and installs firmware.
Manual installation	<p><b>a.</b> Click <b>Manual Installation</b>. The <b>Install Firmware</b> window appears.</p> <p><b>b.</b> Click <b>Browse</b>. The upload file window appears.</p> <p><b>c.</b> Select file.</p> <p><b>d.</b> Click <b>Open</b>. Starts firmware installation.</p>
Skip	Click <b>Skip</b> . Skips firmware installation.

11. Specify the following information

- **NAS name:** Specify a name with 1 to 14 characters. The name supports letters (A to Z, a to z), numbers (0 to 9), and hyphens (-), but cannot end with a hyphen.
- **Username:** Specify an administrator username that contains 1 to 32 characters. The name can contain letters (A to Z, a to z), numbers (0 to 9), and hyphens (-), multi-byte Chinese, Japanese, Korean, and Russian characters.  
The username cannot contain the following special characters: grave accent (`), asterisk (\*), equal sign (=), plus sign (+), square brackets ([ ]), curly brackets ({}), slash (/), vertical bar (|), semicolon (;), colon (:), apostrophe ('), quotation mark ("), comma (,), less than sign (<), greater than sign (>), backslash (\), question mark (?), percent sign (%), dollar sign (\$), and the space character.

### Important

To protect your NAS from brute force attacks, create a new system administrator account during QuTS hero initialization to disable the default "admin" account.

- **Password:** Specify an administrator password with 1 to 64 characters. The password supports all ASCII characters.

12. Click **Next**.

13. Specify the time zone, date, and time.

**Tip**

QNAP recommends connecting to an NTP server to ensure that the NAS follows the Coordinated Universal Time (UTC) standard.

14. Click **Next**.  
The **Configure the network settings** screen appears.

15. Select **Obtain an IP address automatically (DHCP)**.

16. Click **Next**.

17. Review the settings.

18. Click **Apply**.  
A confirmation message appears.

**Warning**

Clicking **Initialize** deletes all data on the drive before installing QuTS hero.

19. Click **Initialize**.  
QuTS hero initialization starts. It may take a few minutes to complete the process.  
After the initialization, you can click **Go to NAS Management** to start using QuTS hero and configuring other settings.



## 4. Basic Operations

This chapter describes basic NAS operations.

### Power Button

Operation	User Action	Result
Power on	Press the button once.	The device powers on.
Power off	Press and hold the button for 1.5 seconds.	The device powers off.
Force power off	Press and hold the button for 4 seconds.	The device powers off. <div> <b>Important</b>              Use this method only when the device is unresponsive.           </div>

### Reset Button

#### Important

To protect your device from brute force attacks, QNAP recommends disabling the default `admin` account after a system reset. To disable the default `admin` account, you must first create a new administrator account, log out of the `admin` account, and then log in with the new account.

Operation	User Action	Result
Basic system reset	Press and hold the button for 3 seconds.	<p>The following settings are reset to default:</p> <ul style="list-style-type: none"> <li>• The <code>admin</code> account is automatically enabled.</li> <li>• System administrator password: For details on the default password, see <a href="#">this FAQ</a>.</li> <li>• TCP/IP configuration: <ul style="list-style-type: none"> <li>• Obtain IP address settings automatically via DHCP</li> <li>• Disable jumbo frames</li> <li>• If port trunking is enabled (multi-LAN models only), the port trunking mode is reset to "Active Backup (Failover)".</li> </ul> </li> <li>• System port: 8080 (system service port)</li> <li>• Security level: Low (Allow all connections)</li> <li>• LCD panel password: (blank)</li> <li>• VLAN: Disabled</li> </ul>
Advanced system reset	Press and hold the button for 15 seconds. Press and hold the button for 10 seconds.	<p>The default factory settings are restored.</p> <ul style="list-style-type: none"> <li>• To retrieve old data after an advanced system reset, recreate the previous folder structure on the NAS.</li> </ul>

## LEDs

LEDs indicate the system status and related information when the device is powered on. The following LED information applies only when the drive is correctly installed and when the device is connected to the network or to a host.

For details on the location of the LEDs, see [Components](#).

LED	Status	Description
System status	Flashes green and red alternately every 0.5 seconds	<ul style="list-style-type: none"> <li>• A drive is being formatted.</li> <li>• The device is being initialized.</li> <li>• The operating system is being updated.</li> <li>• RAID rebuilding is in progress.</li> <li>• Online RAID Capacity Expansion is in progress.</li> <li>• Online RAID Level Migration is in progress.</li> <li>• The firmware is being updated.</li> </ul> <div> <b>Important</b>            When updating the firmware, do not remove the power cord or USB cable, and do not force-exit the application.         </div>
	Red	<ul style="list-style-type: none"> <li>• A drive is invalid.</li> <li>• A shared folder has reached its full capacity.</li> <li>• A shared folder is about to reach its full capacity.</li> <li>• A system fan is not functioning.</li> <li>• An error occurred when accessing (read/write) the data.</li> <li>• A bad sector is detected on a drive.</li> <li>• The device is in degraded read-only mode (two member drives failed in RAID 5 or RAID 6 but the data can still be read).</li> <li>• A hardware self-test error occurred.</li> </ul>
	Flashes red every 0.5 seconds	The device is in degraded mode (one member drive failed in RAID 1, RAID 5, or RAID 6).
	Green	The device is ready.
	Flashes green every 0.5 seconds	<ul style="list-style-type: none"> <li>• The device is not configured.</li> <li>• A drive is not formatted.</li> </ul>

LED	Status	Description
System status	Off	<ul style="list-style-type: none"> <li>All drives are in standby mode.</li> <li>The device is powered off.</li> </ul>
Drive activity	Flashes red	Data is being accessed, and during the process a drive read/write error occurred.
	Red	A drive read/write error occurred.
	Flashes green	Data is being accessed.
	Green	The drive is ready.
	Off	No drive was detected.
Drive status	Green	The drive is ready.
	Red	A drive read/write error occurred.
	Flashes red 5 times per second	The drive is being located in the operating system.
	Off	No drive was detected.
2.5 Gigabit speed LAN	Green	The network connection is operating at 2.5 Gbps.
	Orange	The network connection is operating at 1 Gbps.
	Off	<ul style="list-style-type: none"> <li>The network connection is operating at 10 Mbps.</li> <li>There is no network connection.</li> </ul>
2.5 Gigabit activity LAN	Yellow	A network connection has been established.
	Flashes yellow	The device is being accessed from the network.
	Off	There is no network connection.
Expansion	Orange	An expansion unit is connected.
	Off	No expansion unit has been detected.

## Audio Alert

Duration	Frequency	Description
Short beep (0.5 seconds)	1	<ul style="list-style-type: none"> <li>The NAS is starting up.</li> <li>When the reset button is pressed for 3 seconds, the NAS resets configurations.</li> <li>When the reset button is pressed for 10 seconds, the NAS resets configurations and reboots.</li> <li>The operating system was updated.</li> </ul>
	3	<ul style="list-style-type: none"> <li>Cannot detect installed disk.</li> <li>The firmware was updated.</li> </ul>
Long beep (1.5 seconds)	1	<ul style="list-style-type: none"> <li>The NAS is powering off.</li> <li>The NAS was powered off by force shutdown (hardware shutdown).</li> <li>The NAS was powered on successfully and is ready.</li> </ul>
	2	<ul style="list-style-type: none"> <li>A storage pool is about to reach full capacity.</li> <li>A storage pool has reached full capacity.</li> <li>A storage pool status error occurred.</li> <li>A disk volume is about to reach its full capacity.</li> <li>A shared folder is about to reach its full capacity.</li> <li>The drives are in degraded mode.</li> <li>A drive is rebuilding.</li> <li>A volume status error occurred.</li> </ul>
	3 (every 5 minutes)	<ul style="list-style-type: none"> <li>A power error occurred.</li> <li>A system fan is not functioning.</li> <li>A fan module has been removed.</li> </ul>
Long and short beeps	1 long and 2 short beeps	The JBOD expansion unit has been removed.

## 5. NAS Migration

You can migrate data and settings from your current NAS to another NAS model with minimal disruptions by installing all the hard drives from the source NAS to the destination NAS. RAID configuration and other settings are retained on the destination NAS after migration.

### NAS migration requirements

You can only migrate drives and system settings to specific NAS models, depending on your source NAS. For the list of NAS models compatible with direct NAS migration, see <https://www.qnap.com/en/nas-migration>.

Your device must meet the following requirements:

- The destination NAS must run on the same QuTS hero version as the source NAS (or later).

#### Important

Due to incompatibilities in file system, system migration between QTS NAS and QuTS hero NAS is not supported.

#### Warning

Migrating drives between QTS NAS and QuTS hero NAS can cause data corruption.

- The destination NAS must have sufficient free drive bays to accommodate all the drives that you are migrating from the source NAS.

For NAS models that do not support NAS migration, see [How to Migrate Data and Folder Permissions between QTS and QuTS hero with HBS3](#).

### Status and setting changes after NAS migration

The status of NAS data and settings varies after migration.

Data and Settings	After NAS Migration
Registered myQNAPcloud name	Your registered myQNAPcloud name is not migrated.

Data and Settings	After NAS Migration
Encrypted shared folders	<p>If the NAS does not support file system encryption, encrypted shared folders are not migrated.</p> <p><b>Warning</b></p> <p>To prevent data loss, back up and save the encryption keys of encrypted shared folders in a safe place. You can also choose to decrypt shared folders before migration.</p>
Shared folders	<p>All shared folders and the downloaded files stored in them are retained.</p> <p><b>Warning</b></p> <p>To prevent data loss, back up and save encryption keys or passwords of encrypted shared folders in a safe place before migration.</p> <p><b>Important</b></p> <p>Folder permissions on the destination NAS must be reconfigured after migration.</p>
Network	<p>If the number of network ports or network port specifications on the destination NAS is different from the source NAS, the following network and virtual settings may change and require reconfiguration: port trunking, virtual machines, Thunderbolt, and more.</p>
Windows AD configuration	<p>Windows AD configurations must be reconfigured.</p>
Licenses	<p>Licenses are not migrated.</p> <p><b>Warning</b></p> <p>To prevent losing all your software licenses, QNAP recommends deactivating licenses on the source NAS before data migration.</p>
Applications	<p>If the destination NAS has less RAM than the source NAS, the following features and applications might not function: Virtualization Station, Qsirch, and Snapshots.</p>
Services	<p>Only services supported by the destination NAS are available.</p>
Multimedia features	<p>Some multimedia features are disabled by default.</p>

## Migrating a NAS

### Important

Before performing NAS migration, ensure that you understand all requirements and possible changes after migration.

For details see the following topics:

- [NAS migration requirements](#)
- [Status and setting changes after NAS migration](#)

1. Power off the source NAS and the destination NAS.
2. Remove the drives.

### Important

QNAP recommends following the source NAS drive order when installing the drives. Take note of the drive tray order when removing the drives.

- a. Remove the drives from the source NAS.
  - b. Remove the drive trays from the destination NAS.
3. Install the drives.
    - a. Install source NAS drives onto the destination NAS drive trays.
    - b. Insert the drive trays into the destination NAS.
  4. Power on the destination NAS.
  5. Log on to QuTS hero as an administrator on the destination NAS.

The destination NAS automatically checks for the latest firmware update.



## 6. Troubleshooting

This chapter describes basic troubleshooting information.

### Forcing Qfinder Pro or myQNAPcloud to locate the NAS

If Qfinder Pro or myQNAPcloud is unable to locate the NAS during QuTS hero installation, the drives or data may be faulty.

1. Power off the NAS.
2. Remove all drives.
3. Power on the NAS.
4. Locate the NAS using Qfinder Pro or myQNAPcloud.
5. Reinsert the drives.
6. Continue with the QuTS hero installation.

### Hot-swapping Failed Drives

The NAS supports hot-swapping of drives in the following situations:

RAID Type	Number of Disks	Situation
RAID 1	2	One member drive fails.
RAID 5	$\geq 3$	One member drive fails.
RAID 6	$\geq 4$	One or two member drives fail.
RAID 10	$\geq 4$ (Must be an even number)	One or two member drives in two different pairs fail.
RAID 50	$\geq 6$	One disk per subgroup fails.
RAID 60	$\geq 8$	Two disks per subgroup fail.
Triple Mirror	Multiple of 3. (For example, 3, 6, 9, 12 disks and so forth.)	One or two member drives fail.
RAID-TP	$\geq 5$	One, two, or three member drives fail.

1. Log on to QuTS hero.
2. Go to **Main Menu > Storage & Snapshots > Storage > Disks/VJBOD**.
3. Locate the failed drive.

4. Prepare a new drive with a capacity that is the same as or larger than the failed drive.
5. Remove the failed drive from the device.
6. Wait for 20 seconds or until the device beeps twice.
7. Remove the failed drive from the drive tray.
8. Insert the new drive into the drive tray.
9. Install the new drive.  
The NAS beeps twice.
10. Go to **Main Menu > Storage & Snapshots > Storage > Storage/Snapshots**.
11. Locate the storage pool that contains the new drive and then verify that the status is Rebuilding.

## Recovering Unintentionally Removed Healthy Drives

The NAS supports exclusive RAID recovery technology to recover failed RAID groups from unintentional disconnection or removal of drives. Users can recover an inactive RAID 1, RAID 5, RAID 6, RAID 10, RAID 50, RAID 60, Triple Mirror, or RAID-TP group from degraded mode.

RAID Type	RAID Recovery Support	Number of Disks	Disk Failure Tolerance
RAID 0	Yes	$\geq 2$	N/A
RAID 1	Yes	2	1
RAID 5	Yes	$\geq 3$	1
RAID 6	Yes	$\geq 4$	2
RAID 10	Yes	$\geq 4$ (Must be an even number)	One disk per subgroup fails.
RAID 50	Yes	$\geq 6$	One disk per subgroup fails.
RAID 60	Yes	$\geq 8$	Two disks per subgroup fail.
Triple Mirror	Yes	Multiple of 3. (For example, 3, 6, 9, 12 disks and so forth.)	2
RAID-TP	Yes	$\geq 5$	3

## Support and other resources

QNAP provides the following resources:

Resource	URL
Documentation	<a href="https://download.qnap.com">https://download.qnap.com</a>
Compatibility List	<a href="https://www.qnap.com/compatibility">https://www.qnap.com/compatibility</a>
NAS Migration Compatibility	<a href="https://www.qnap.com/go/nas-migration">https://www.qnap.com/go/nas-migration</a>
Expansion Unit Compatibility	<a href="https://www.qnap.com/go/compatibility-expansion">https://www.qnap.com/go/compatibility-expansion</a>
Service Portal	<a href="https://service.qnap.com">https://service.qnap.com</a>
Product Support Status	<a href="https://www.qnap.com/go/product/eol.php">https://www.qnap.com/go/product/eol.php</a>
Downloads	<a href="https://download.qnap.com">https://download.qnap.com</a>
Community Forum	<a href="https://forum.qnap.com">https://forum.qnap.com</a>
QNAP Accessories Store	<a href="https://shop.qnap.com">https://shop.qnap.com</a>

## 7. Glossary

### Cloud Key

Unique 8-digit code assigned to each NAS device

### myQNAPcloud

Provides various remote access services such as DDNS and myQNAPcloud Link

### myQNAPcloud Link

Enables you to access QNAP devices over the internet without configuring complex port forwarding settings

### Qfinder Pro

QNAP utility that lets you locate and access QNAP devices in your local area network

### QuTS hero

QNAP NAS operating system featuring ZFS file system

## 8. Notices

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Version 3, 29 June 2007

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## **7. Conveying Non-Source Forms.**

You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:

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- e. Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.

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### FCC Class A Notice



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2. This device must accept any interference received, including interference that may cause undesired operation.

### Note

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VCCI-A

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壳体	0	0	0	0	0	0
显示	0	0	0	0	0	0
印刷电路板	0	0	0	0	0	0
金属螺帽	0	0	0	0	0	0
电缆组装	0	0	0	0	0	0
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