



QNAP

TS-h3088XU-RP

User Guide

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1. Preface





About This Guide

This guide provides information about the device and step-by-step instructions on installing the hardware. It also provides instructions on basic operations and troubleshooting information.

Audience

This document is intended for storage administrators. This guide assumes that the user is knowledgeable and qualified to install, maintain, and troubleshoot issues involving servers, server components, and storage systems. This guide also assumes that the user is trained to recognize hazards, including the appropriate actions the user needs to take to prevent personal injury and damage to data and property.

Document Conventions

Symbol	Description
	Notes provide default configuration settings and other supplementary information.
	Important notes provide information on required configuration settings and other critical information.
	Tips provide recommendations or alternative methods of performing tasks or configuring settings.
	Warnings provide information that, when ignored, may result in potential loss, injury, or even death.

2. Product Overview

This chapter provides basic information about the QNAP device.

About the TS-h3088XU-RP

Powered by an Intel® Xeon® W processor, the all-flash TS-h3088XU-RP is designed to deliver a scalable platform for enterprise-level solutions. Featuring 30 SATA drive bays, this ZFS NAS supports inline data deduplication and compression, 65536 snapshots, and real-time SnapSync, a disaster recovery solution that enables you to automatically back up data from one NAS to another. The TS-h3088XU-RP is ideal for I/O-intensive and latency-sensitive applications, satisfying performance demands in virtualization, data centers, and mission-critical 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	CPU	Memory	Power supply
TS-h3088XU-RP-W1250-32G	Intel® Xeon® W-1250	32 GB	Redundant
TS-h3088XU-RP-W1270-64G	Intel® Xeon® W-1270	64 GB	Redundant

Component	TS-h3088XU-RP-W1250-32G	TS-h3088XU-RP-W1270-64G
Processor		
CPU	Intel® Xeon® W-1250	Intel® Xeon® W-1270
Frequency	6-core/12-thread 3.3 GHz base/4.7 GHz turbo	8-core/16-thread 3.4 GHz base/5.0 GHz turbo
Architecture	x86 64-bit	
Encryption engine	AES-NI	
Memory		
Pre-installed memory	32 GB RAM: 2 x 16 GB UDIMM DDR4 ECC	64 GB RAM: 4 x 16 GB UDIMM DDR4 ECC

Component	TS-h3088XU-RP-W1250-32G	TS-h3088XU-RP-W1270-64G
Memory slots	4 x DDR4 Long-DIMM <div> Important<ul style="list-style-type: none">• 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.• Using unsupported modules may degrade performance, cause errors, or prevent the operating system from starting.</div>	
Maximum memory	128 GB RAM: 4 x 32 GB	
Flash memory	5 GB (dual-boot OS protection)	
Storage		
Drive bays	30 x 2.5-inch SATA 6 Gbps <div> Tip<p>The drive bays are backward compatible with SATA 3 Gbps drives.</p></div>	
Drive compatibility	2.5-inch bays: <ul style="list-style-type: none">• 2.5-inch SATA hard disk drives• 2.5-inch SATA solid-state drives <div> Important<p>For the list of compatible drive models, go to https://www.qnap.com/compatibility.</p></div>	
SSD cache acceleration support	Supported	
Hot-swapping	Supported	
Network		
25 Gigabit Ethernet ports	2 x 25 GbE SFP28	
2.5 Gigabit Ethernet ports	4 x 2.5 GbE RJ45	
External I/O Ports & Expansion Slots		
PCIe slots	<ul style="list-style-type: none">• 1 x PCIe 3.0 x8 (slot 1)• 2 x PCIe 3.0 x4 (slots 2 and 3) <div> Important<ul style="list-style-type: none">• One dual-port 25GbE SFP28 network expansion card is pre-installed on PCIe slot 1.• Slot 1 will reduce its speed from x8 to x4 if an expansion card is installed on slot 2.</div> <p>For details, see System Board.</p>	

Component	TS-h3088XU-RP-W1250-32G	TS-h3088XU-RP-W1270-64G
USB ports	<ul style="list-style-type: none">• 2 x USB 3.2 Gen 2 (10Gbps) 5V/1A Type-A• 2 x USB 3.2 Gen 2 (10Gbps) 5V/3A Type-C	
HDMI ports	1 x HDMI 1.4b (up to 4096 x 2160 resolution at 30 Hz)	
Interface		
Buttons	<ul style="list-style-type: none">• Power• Reset	
Dimensions		
Form factor	2U Rackmount	
Dimensions (H x W x D)	88.3 x 481.07 x 515.02 mm (3.48 x 18.94 x 20.28 in)	
Net weight	12.26 kg (27.03 lbs)	
Other		
Rail compatibility	RAIL-A03-57 <div><div></div><div>Note<ul style="list-style-type: none">• Rail kits are not included with the NAS and must be purchased separately. For details, contact an authorized reseller or go to http://shop.qnap.com.• Information on rail kit installation can be found in the installation guide included in the rail kit package.</div></div>	
Power supply unit	2 x 550W, 100-240V AC, 50/60 Hz	
System battery	CR2032 lithium battery (3V, 225 mAh)	
Sound level	53 dB(A) <div><div></div><div>Note<p>The sound level was tested at a bystander position, which is within one meter of the NAS. The test NAS operated at low speed with the maximum number of drives installed.</p></div></div>	
Fans	System: 3 x 60 mm, 12V DC fans	
Operating temperature	0°C to 40°C (32°F to 104°F)	
Relative humidity	<ul style="list-style-type: none">• Non-condensing relative humidity: 5% to 95%• Wet-bulb temperature: 27°C (80.6°F)	

**Tip**

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

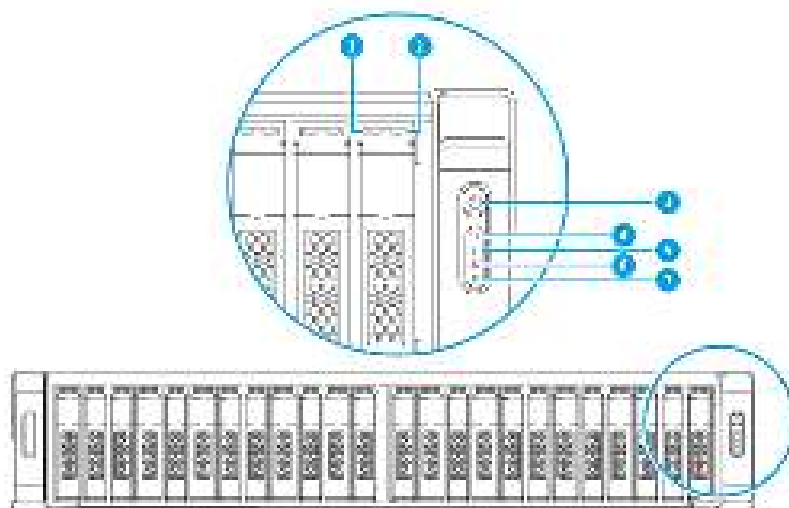
Package Contents

Item	Quantity
TS-h3088XU-RP	1
Power cord	2

Item	Quantity
Ethernet cable	1 x Cat5e
Screws for 2.5-inch drives	120
Quick Installation Guide (QIG)	1

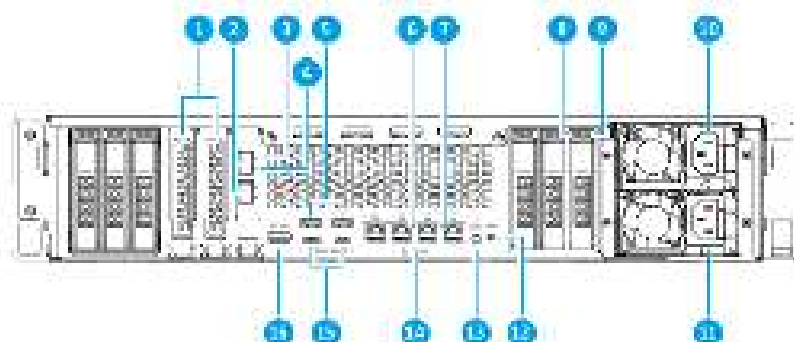
Components

Front Panel



No.	Component	No.	Component
1	Drive activity LED	5	System status LED
2	Drive status LED	6	LAN LED
3	Power button	7	Expansion unit LED
4	10 Gigabit Ethernet LED	-	-

Rear Panel

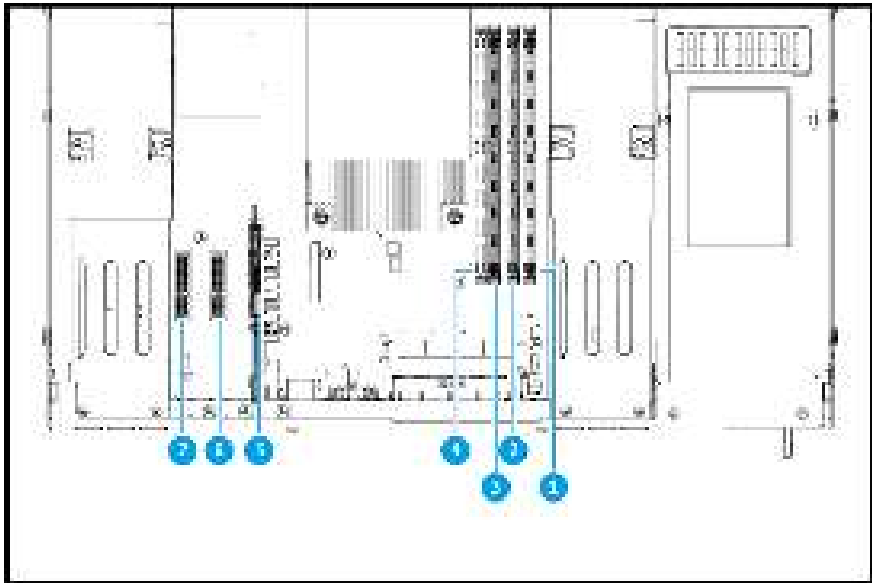


No.	Component	No.	Component
1	PCIe low-profile covers	9	Drive status LED
2	25 Gigabit Ethernet ports	10	Power supply unit 1
3	25 Gigabit Ethernet speed LED	11	Power supply unit 2
4	25 Gigabit Ethernet activity LED	12	Reset button
5	USB 3.2 Gen 2 Type-A ports	13	Maintenance port
6	2.5 Gigabit Ethernet speed LED	14	2.5 Gigabit Ethernet ports
7	2.5 Gigabit Ethernet activity LED	15	USB 3.2 Gen 2 Type-C ports
8	Drive activity LED	16	HDMI 1.4b port


Note

This port is only for engineering purposes.

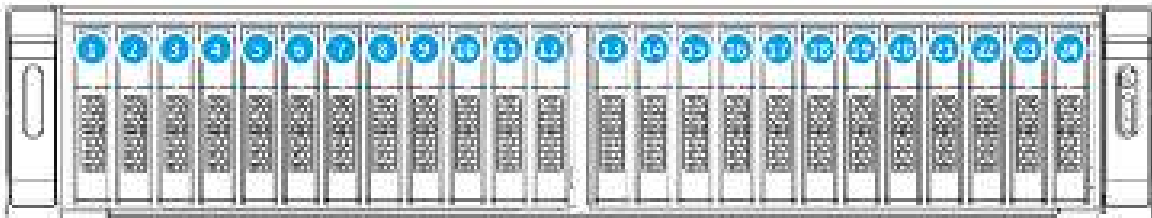
System Board



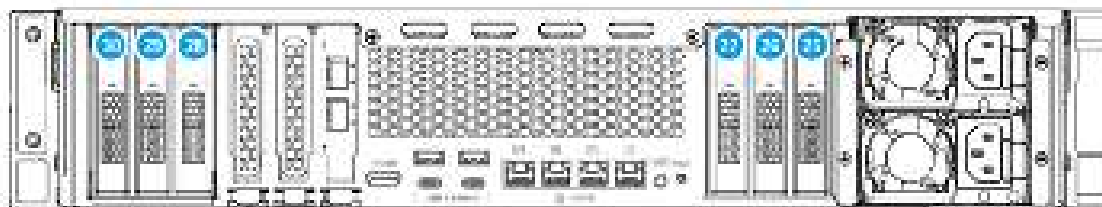
No.	Component	No.	Component
1	Memory slot 1	5	PCIe slot 1 (PCIe 3.0 x8) <div><div></div><div>Note One dual-port 25GbE SFP28 network expansion card is pre-installed on PCIe slot 1.</div></div>
2	Memory slot 2	6	PCIe slot 2 (PCIe 3.0 x4)
3	Memory slot 3	7	PCIe slot 3 (PCIe 3.0 x4)
4	Memory slot 4	-	-

Drive Numbering

Front Drive Numbering



Rear Drive Numbering



Safety Information

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

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.
- 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

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

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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.

System Battery

- 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.

Moving Parts

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

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

Installation Requirements

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

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 the NAS on a rack.
3. Install the drives.
For details, see [Installing 2.5-inch Solid-State Drives](#).
4. Install expansion cards.
For details, see [Replacing Expansion Cards](#).
5. Connect the Expansion Units.

For details, see the following topics:

- [Connecting SAS Expansion Units](#)
- [Connecting USB Expansion Units](#)

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.

If QuTS hero finds unused disks in your NAS, it will ask you to initialize these disks. Click **Initialize** to start the process.

3. Installation and Configuration

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

Hardware Installation

This section provides information on removing or installing drives, memory modules, expansion cards, power supply units, fans, rail kits, and expansion units.

Installing 2.5-inch Solid-State Drives



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.

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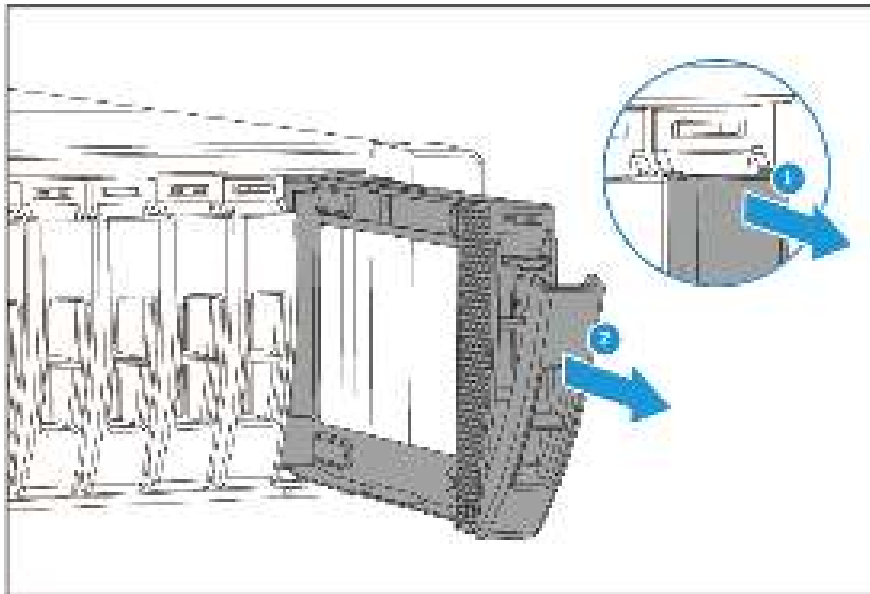
Other moving components: Keep your hands and other body parts away from other moving components.



Important

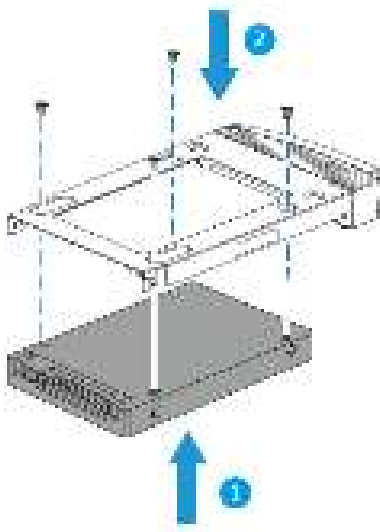
- This device only supports drives with a maximum height of 15mm.
- For the list of compatible drive models, go to <https://www.qnap.com/compatibility>.

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.

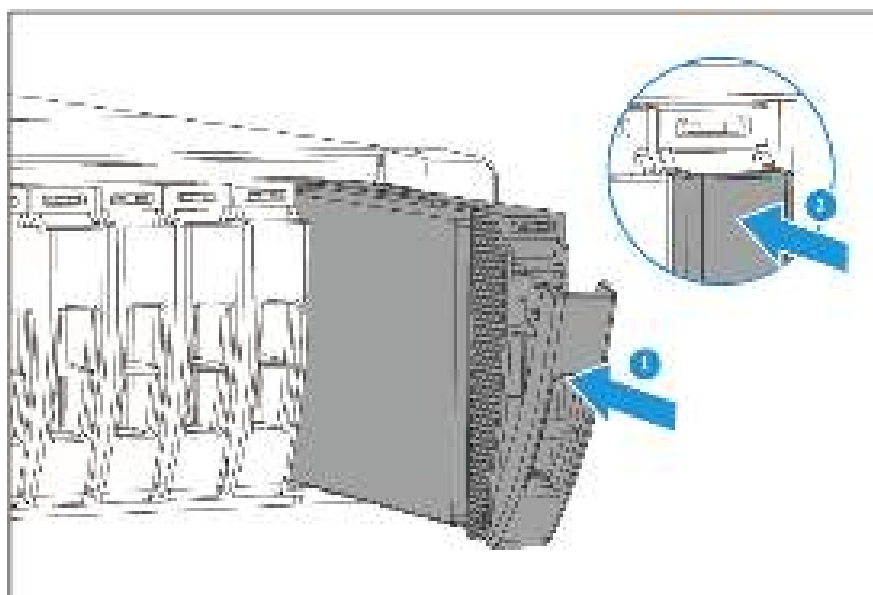
- a.** Place the drive on the tray so that the holes on the bottom of the drive are aligned with the holes on the bottom of the tray.



- b.** Attach the screws.

4. Load the tray into the bay.

- a.** Insert the tray into the bay.



b. Push the handle.

5. Power on the NAS.

Replacing Memory Modules

The TS-h3088XU-RP has 4 memory slots. You can increase the memory capacity of the NAS by upgrading memory modules. For optimal performance, replace memory modules in all four slots at the same time. This NAS also comes with two or four ECC memory modules. ECC memory modules provide extra protection from undetected data corruption.

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.
 - Ensure that each pair uses identical modules.
 - Install the pairs in sequence and follow the assigned slots for each pair.
 - Install memory modules in groups of two. When installing two memory modules, install the memory in slots 1 and 3.
- For details on slot numbering, see [System Board](#).
- Use only all ECC memory modules, or all non-ECC memory modules. Installing both types of memory modules will cause the ECC modules to perform as non-ECC modules.

Module Pair	Slot Number
First pair	Slots 1 and 3
Second pair	Slots 2 and 4

**Warning**

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

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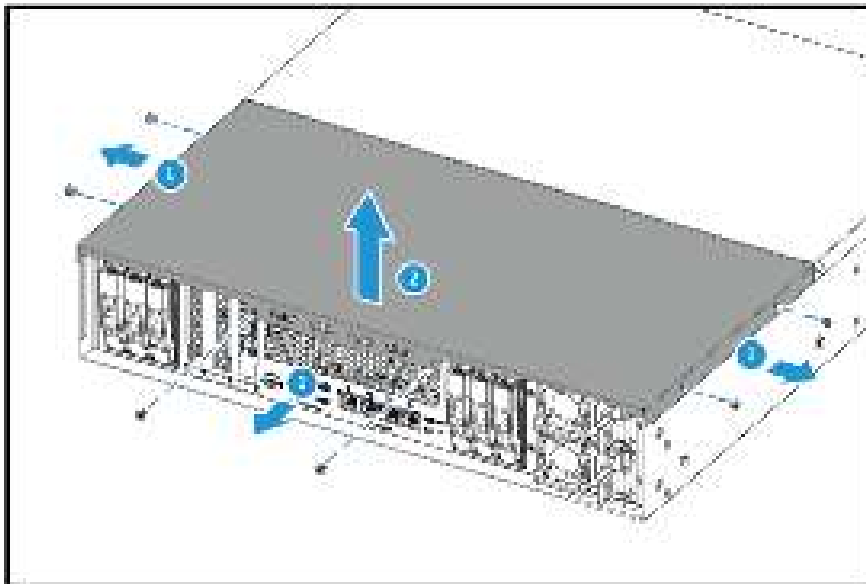
Moving fan blades: Keep your hands and other body parts away from moving fan blades.

-



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 case cover from the rear half of the device.
 - a. Loosen the screws.
 - b. Lift the cover off the device.

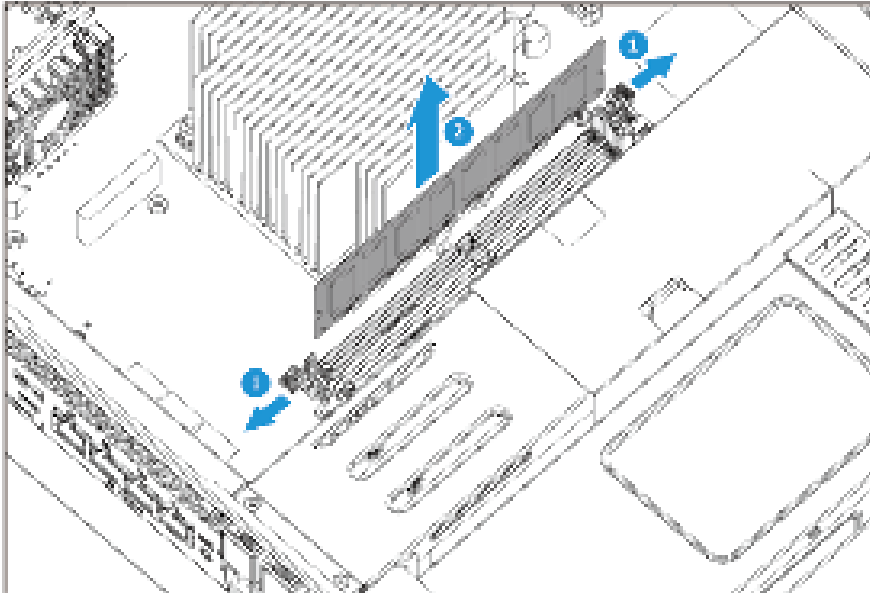


5. Remove an existing module.
 - a. Push the retention clips outward simultaneously to release the module.
 - b. Verify that the module has tilted upward and is completely released from the slot.

**Warning**

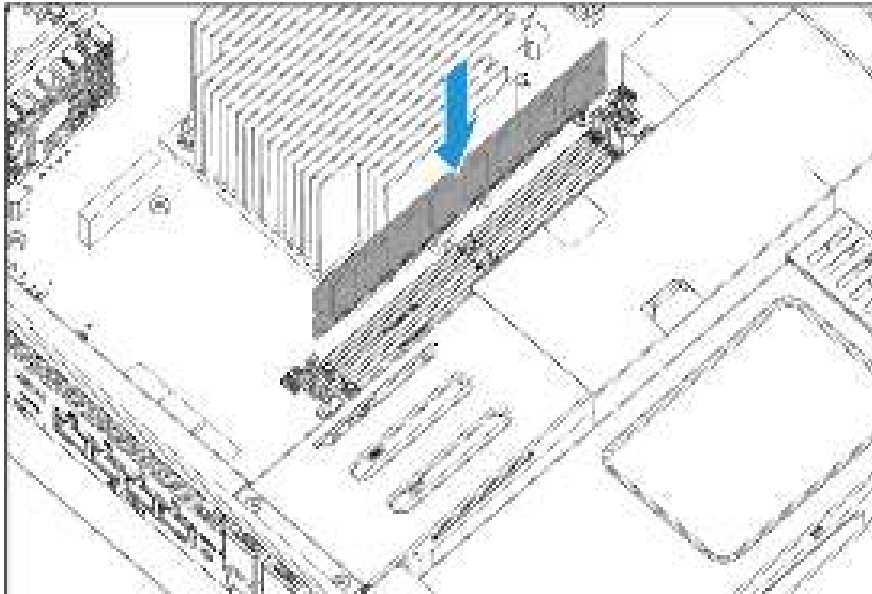
Attempting to remove a module that is not completely released may damage the module and the motherboard.

- c. Hold the module by the edges.
- d. Carefully slide the module out of the slot.

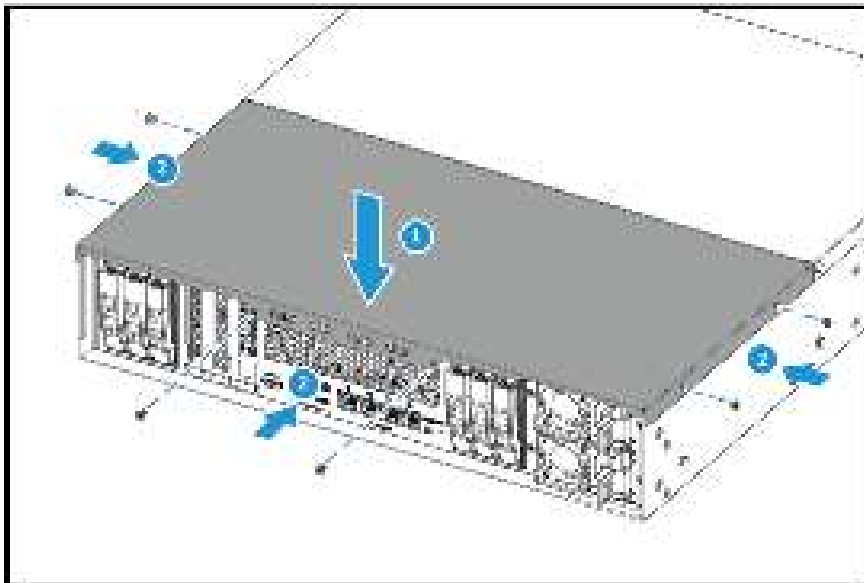
**Warning**

- 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 on the rear half of the device.
- a. Place the cover on the device.
 - 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 administrator.
- b. Go to **Control Panel > System > System Status > Hardware Information**.
- c. Check the value for **Total memory**.

Replacing Expansion Cards

The TS-h3088XU-RP 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 TS-h3088XU-RP.



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.

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

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

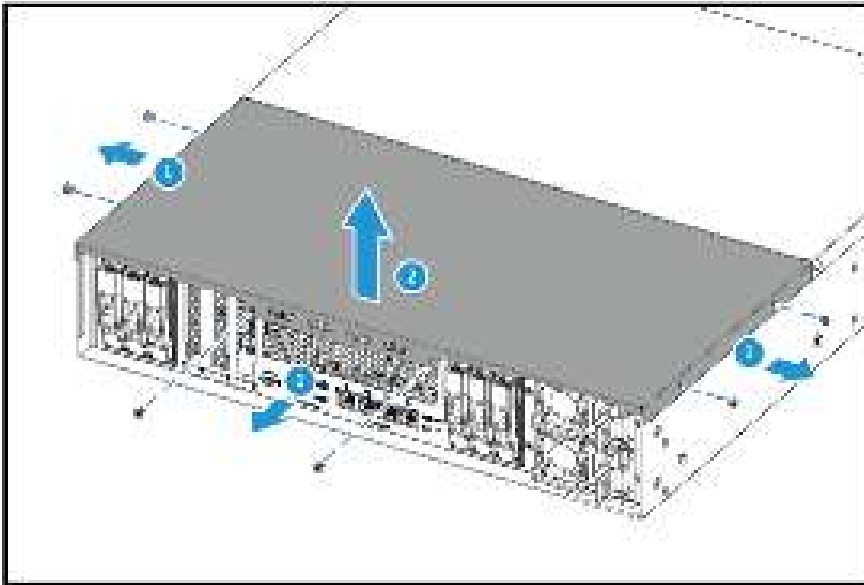


Important

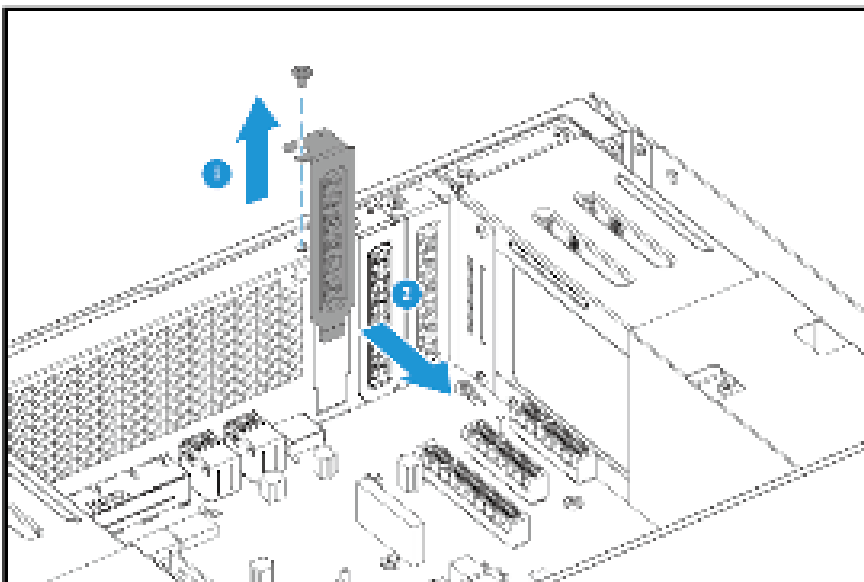
- One dual-port 25GbE SFP28 network expansion card is pre-installed on PCIe Gen 3.0 x8 slot 1. Please reserve this slot for the expansion card for optimal performance.
- Slot 1 will reduce its speed from x8 to x4 if an expansion card is installed on slot 2.
- For expansion card slot numbering, see [System Board](#).

1. Check the expansion cards and brackets supported by your model on the QNAP website.
 - a. Go to www.qnap.com/compatibility.
 - b. Click **Search by NAS**.
 - c. Specify the number of bays and the specific model of your NAS.
 - d. Under **Category**, select the component or device type.
 - e. Locate a specific component or device model in the list.
 - f. Optional: Click the corresponding **Note** icon to view more information.
2. Power off the device.
3. Disconnect the power cord from the electrical outlet.

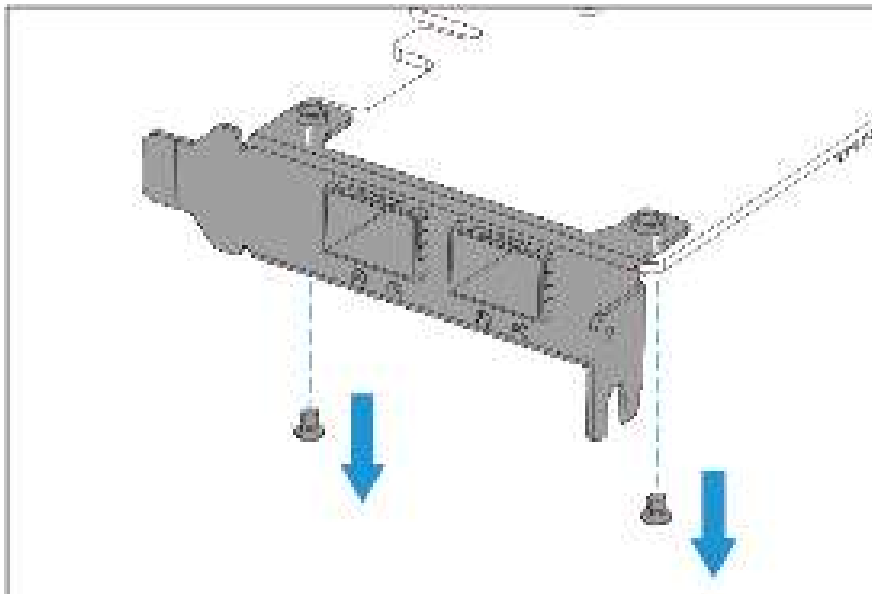
4. Disconnect all cables and external attachments.
5. Remove the case cover from the rear half of the device.
 - a. Loosen the screws.
 - b. Lift the cover off the device.



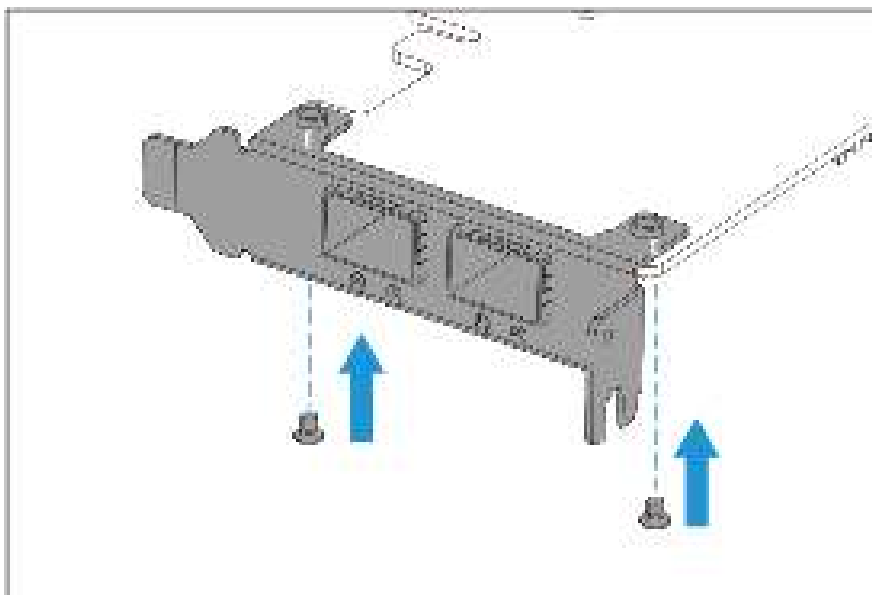
6. Remove the PCIe cover.
 - a. Remove the screw that secures the cover to the bracket.
 - b. Pull the cover away from the slot.



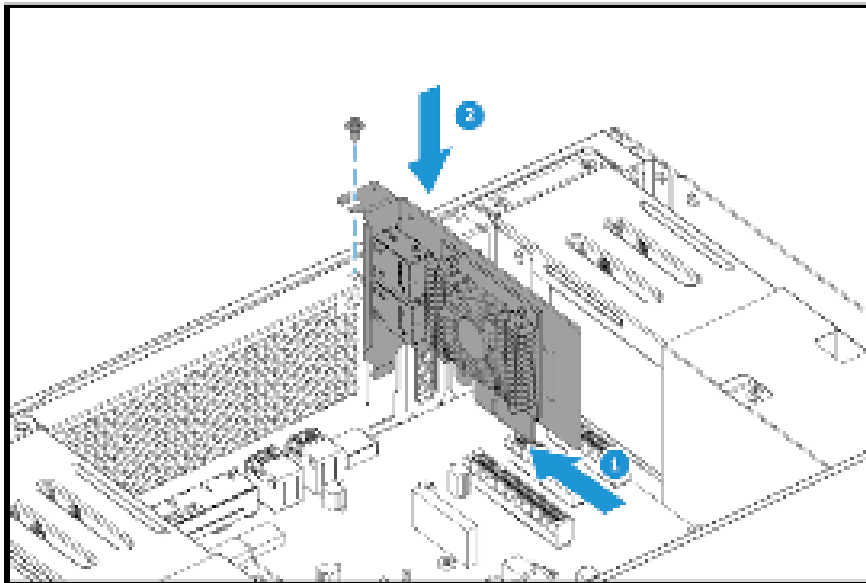
7. Optional: Attach the QNAP bracket to the expansion card.
 - a. Remove all screws of the existing bracket.



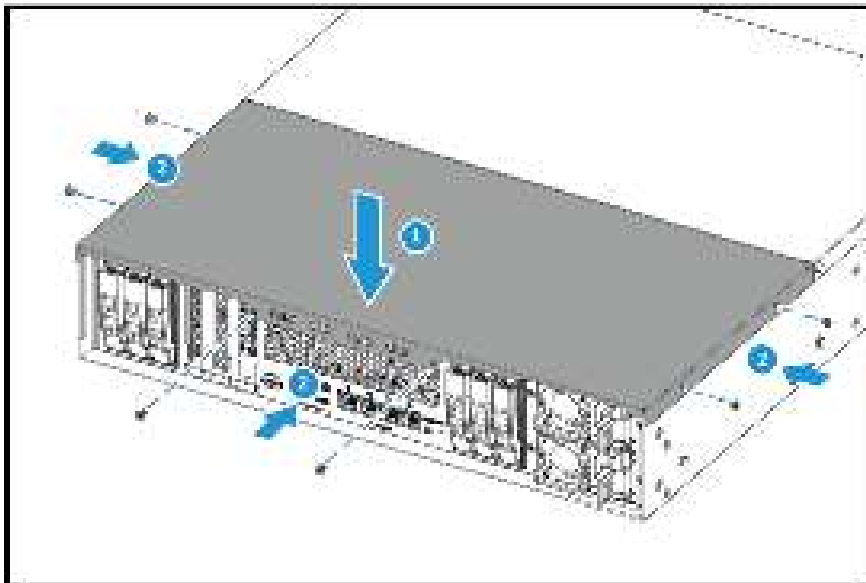
- b.** Carefully pull the bracket away from the card.
- c.** Attach the QNAP bracket to the card using the same screws.



- d.** Verify that the bracket does not move.
- 8.** Install the expansion card.
- a.** Hold the card by the edges.
 - b.** Insert the card into the slot.
 - c.** Attach the screw.



9. Attach the case cover.
 - a. Place the cover on the device.
 - b. Tighten the screws.



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

Hot-Swapping Redundant Power Supply Units



Warning

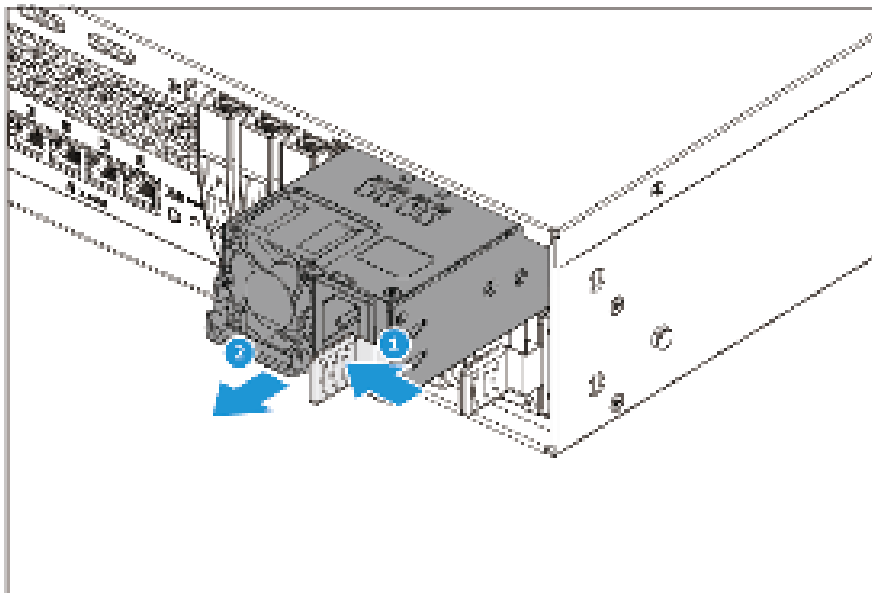
- Electric shock hazard.

-

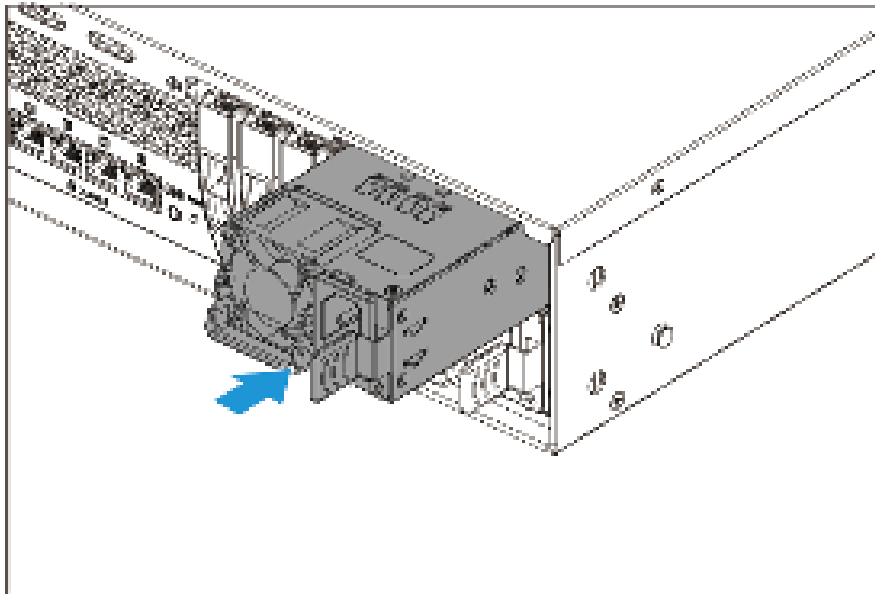


The NAS may have one or more power supply unit (PSU) cords. To avoid serious injuries, a trained service technician must disconnect all PSU cords before installing or replacing system components.

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.
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**.

Replacing Fans

The fan unit of the device contains three fans to ensure adequate cooling.



Warning

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

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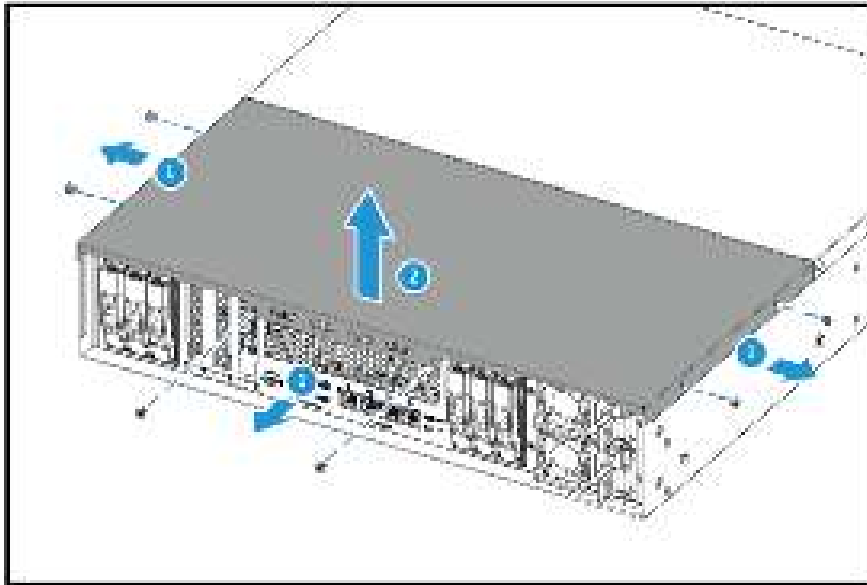
Moving fan blades: Keep your hands and other body parts away from moving fan blades.

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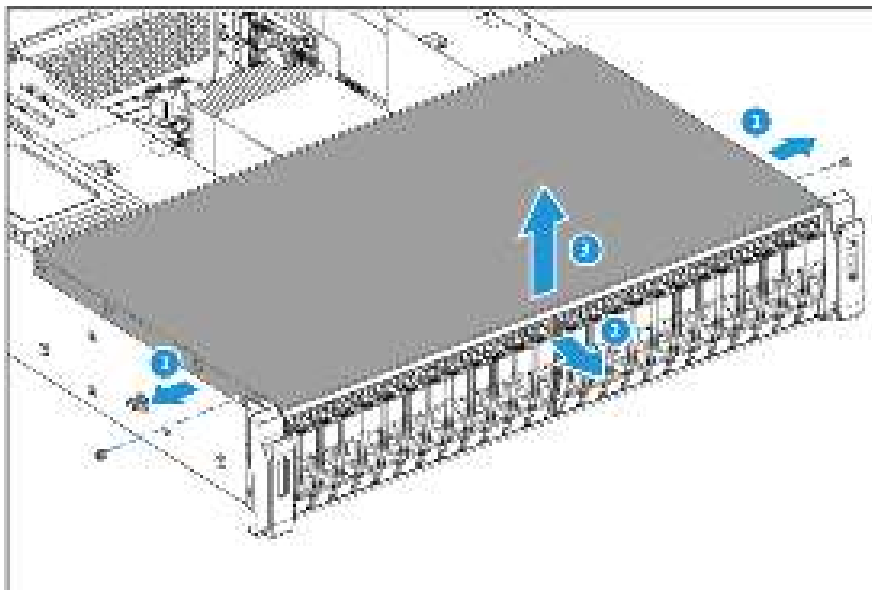


Other moving components: Keep your hands and other body parts away from other moving components.

1. Power off the device.
2. Remove the case cover from the rear half of the device.
 - a. Loosen the screws.
 - b. Lift the cover off the device.

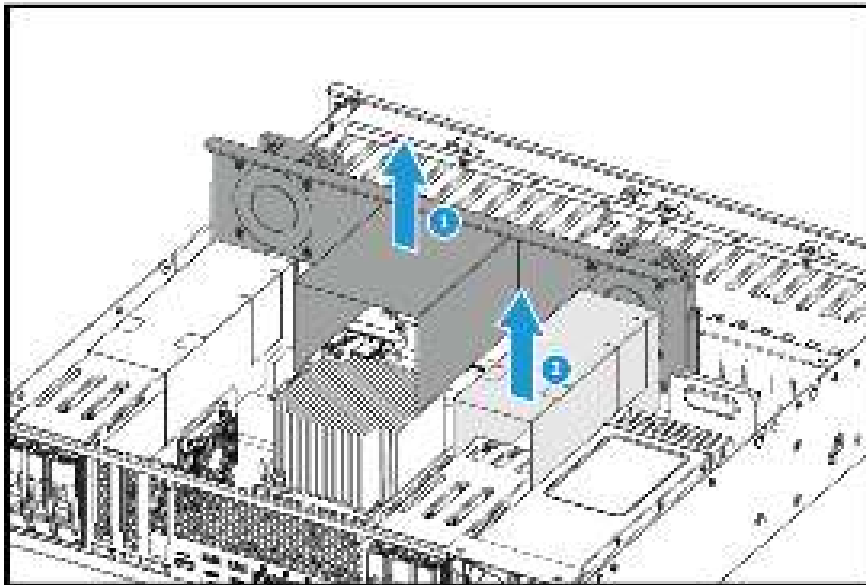


3. Remove the case cover from the front half of the device.
 - a. Loosen the screws.
 - b. Slide the cover slightly forward.
 - c. Lift the cover off the device.

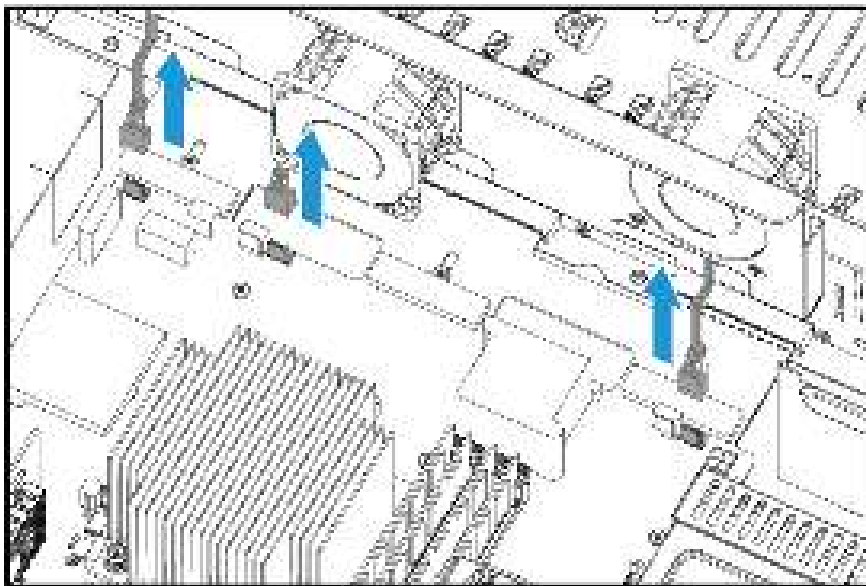


4. Remove the fan unit.

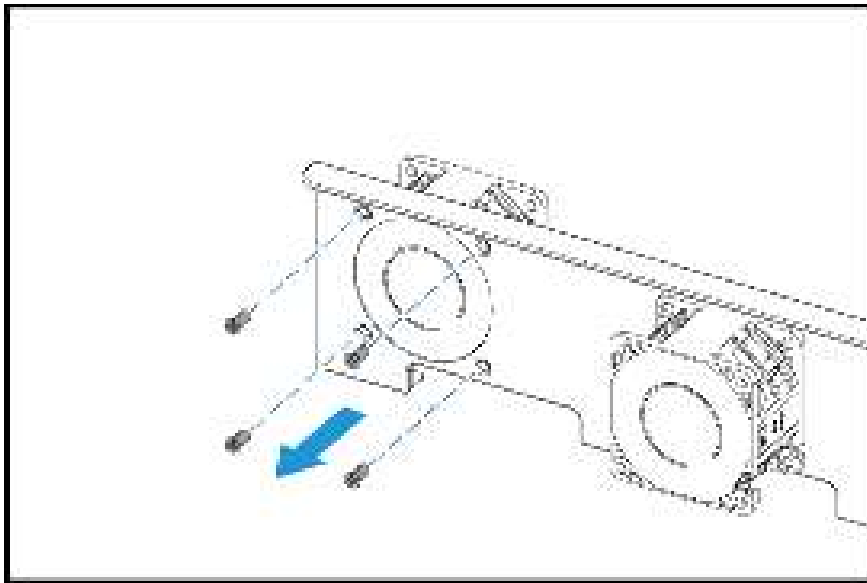
- a. Lift the fan unit from the slot.
- b. Remove the transparent cover.



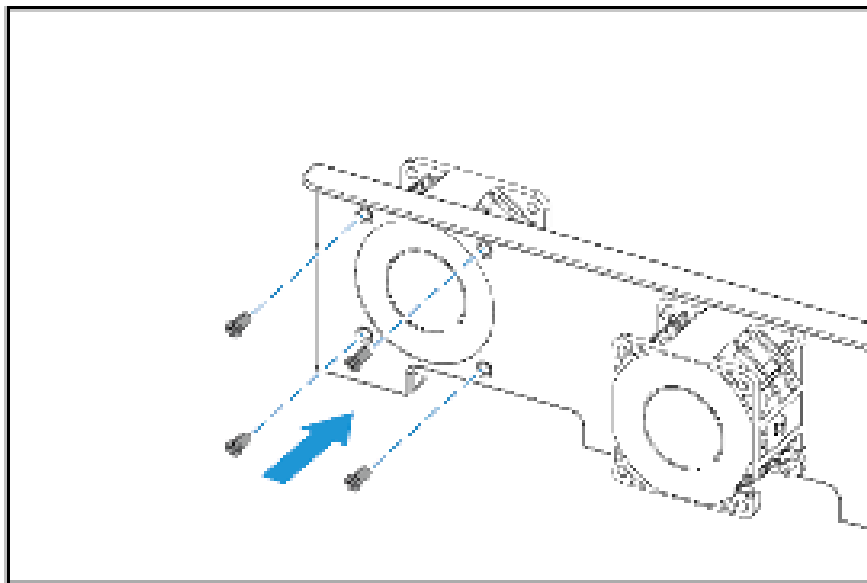
- c. Disconnect the power connector of each fan from the system board.



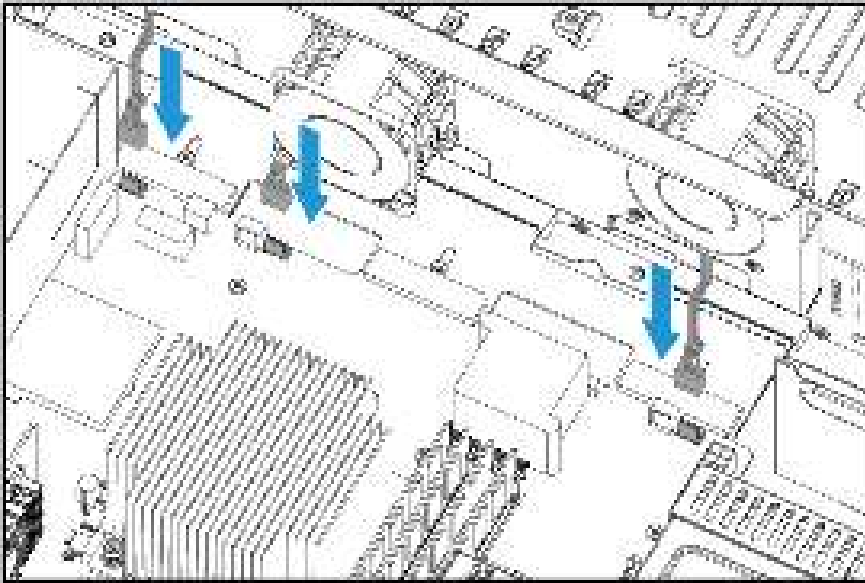
5. Remove the fan by detaching the screws.



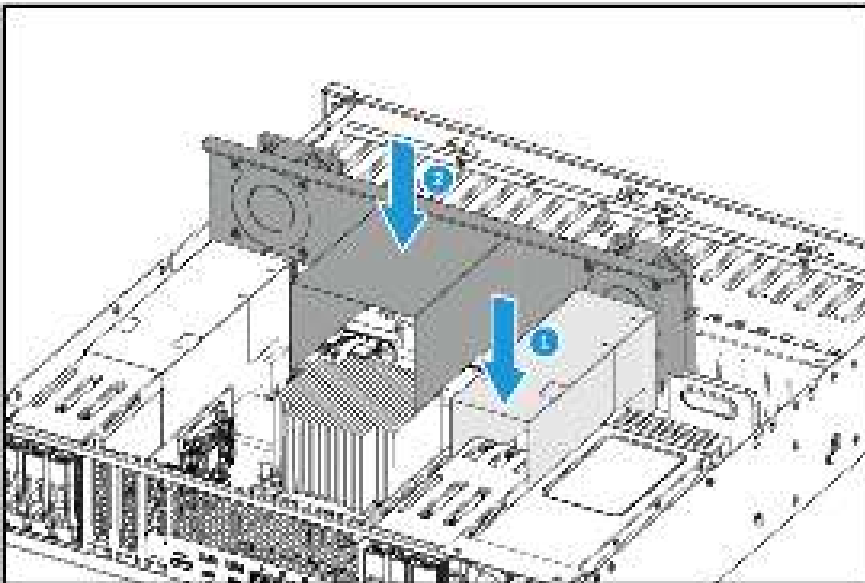
6. Install a new fan by attaching the screws.



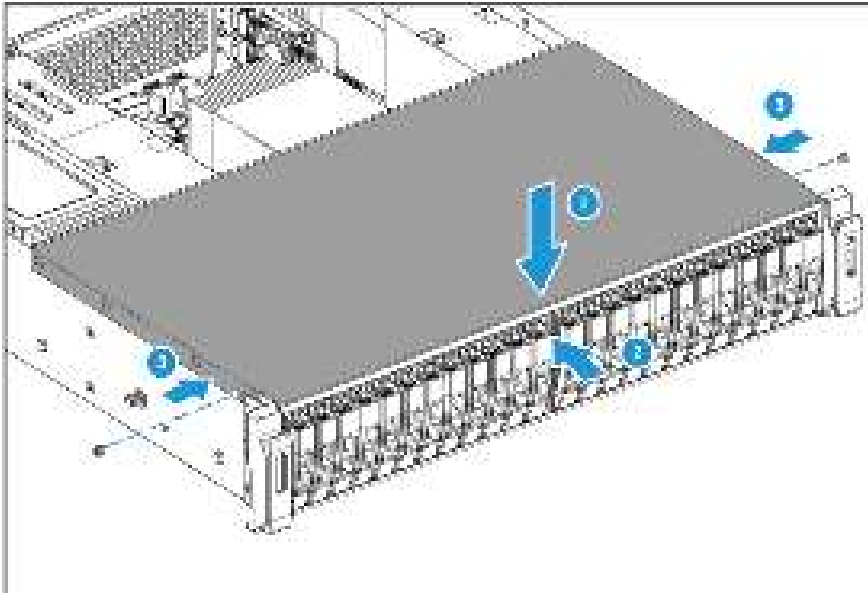
7. Insert the fan unit.
 - a. Reattach the power connector of each fan to the system board.



- b. Attach the transparent cover.
- c. Insert the fan unit into the slot.

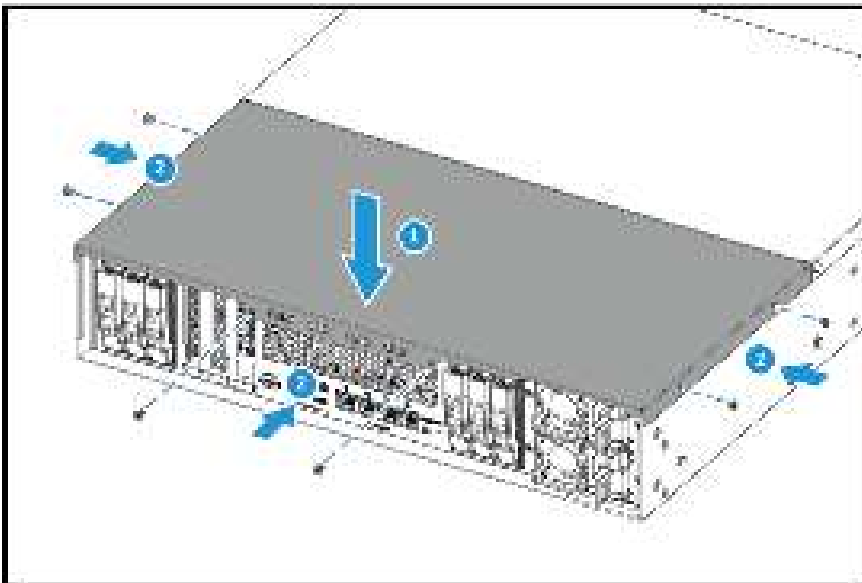


- 8. Attach the case cover on the front half of the device.
 - a. Place the cover on the device.
 - b. Slide the cover slightly toward the rear of the device.
 - c. Tighten the screws.



9. Attach the case cover on the rear half of the device.

- a. Place the cover on the device.
- b. Tighten the screws.



Expansion Unit Installation

The TS-h3088XU-RP 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 <http://www.qnap.com/go/compatibility-expansion>.

Expansion Unit Model	Description	Required Accessories
REXP-1620U-RP	<ul style="list-style-type: none"> • Uses a SAS 12 Gbps (SFF-8644) interface • Supports SAS/SATA HDD/SSD 	<ul style="list-style-type: none"> • SAS-12G2E storage expansion card • mini-SAS SFF-8644 cable • RAIL-A03-57
REXP-1220U-RP		
REXP-1610U-RP	<ul style="list-style-type: none"> • Uses a SAS 6 Gbps (SFF-8644) interface • Supports SATA/HDD/SSD 	<ul style="list-style-type: none"> • SAS-12G2E storage expansion card • mini-SAS SFF-8644 cable • RAIL-A03-57
REXP-1210U-RP		
TL-R1620Sep-RP	<ul style="list-style-type: none"> • Uses a SAS 12 Gbps (SFF-8644) interface • Supports SAS/SATA HDD/SSD 	<ul style="list-style-type: none"> • One of the following storage expansion cards: <ul style="list-style-type: none"> • SAS-12G2E • QXP-820S-B3408 • QXP-1620S-B3616W • mini-SAS SFF-8644 cable • RAIL-A03-57
TL-R1220Sep-RP		
TL-D400S	<ul style="list-style-type: none"> • Uses a SAS 6 Gbps (SFF-8088) interface • Supports SATA/HDD/SSD 	<ul style="list-style-type: none"> • 1 x SFF-8088 connector cable • QXP-400eS-A1164 host bus adapter
TL-D800S	<ul style="list-style-type: none"> • Uses a SAS 6 Gbps (SFF-8088) interface • Supports SATA/HDD/SSD 	<ul style="list-style-type: none"> • 2 x SFF-8088 connector cables • QXP-800eS-A1164 host bus adapter
TL-D1600S	<ul style="list-style-type: none"> • Uses a SAS 6 Gbps (SFF-8088) interface • Supports SATA/HDD/SSD 	<ul style="list-style-type: none"> • 4 x SFF-8088 to SFF-8644 connector cables • QXP-1600eS host bus adapter
TL-R400S	<ul style="list-style-type: none"> • Uses a SAS 6 Gbps (SFF-8088) interface • Supports SATA/HDD/SSD 	<ul style="list-style-type: none"> • 1 x SFF-8088 connector cable • QXP-400eS-A1164 host bus adapter • RAIL-B02
TL-R1200S-RP	<ul style="list-style-type: none"> • Uses a SAS 6 Gbps (SFF-8088) interface • Supports SATA/HDD/SSD 	<ul style="list-style-type: none"> • 3 x SFF-8088 to SFF-8644 connector cables • QXP-1600eS host bus adapter • RAIL-B02
TR-002	<ul style="list-style-type: none"> • Uses a USB 3.2 Gen 2 Type-C interface • Supports SATA drives 	<ul style="list-style-type: none"> • USB 3.2 Gen 2 Type-A to Type-C cable • USB 3.2 Gen 2 Type-C to Type-C cable

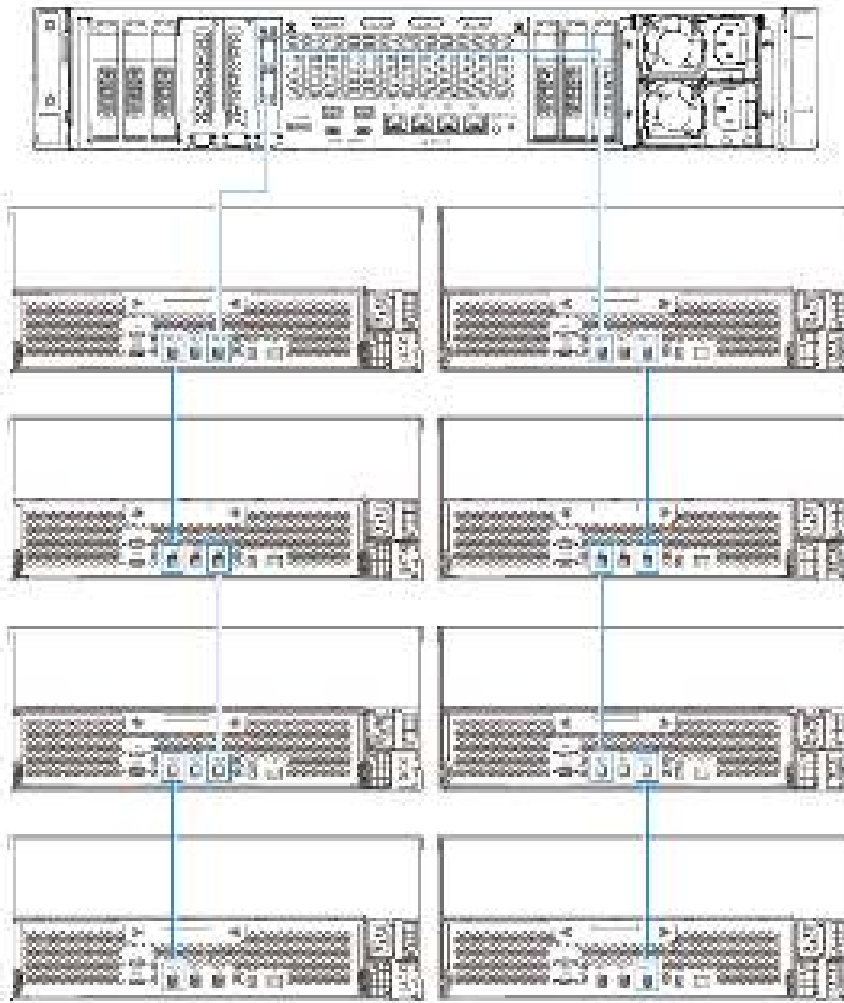
Expansion Unit Model	Description	Required Accessories
TR-004	<ul style="list-style-type: none"> • Uses a USB 3.2 Gen 1 Type-C interface • Supports SATA drives 	<ul style="list-style-type: none"> • USB 3.2 Gen 2 Type-A to Type-C cable • USB 3.2 Gen 2 Type-C to Type-C cable
TR-004U	<ul style="list-style-type: none"> • Uses a USB 3.2 Gen 1 Type-C interface • Supports SATA drives 	<ul style="list-style-type: none"> • USB 3.2 Gen 2 Type-A to Type-C cable • USB 3.2 Gen 2 Type-C to Type-C cable • RAIL-B02
TL-D800C	<ul style="list-style-type: none"> • Uses a USB 3.2 Gen 2 Type-C interface • Supports SATA drives 	<ul style="list-style-type: none"> • USB 3.2 Gen 2 Type-A to Type-C cable • USB 3.2 Gen 2 Type-C to Type-C cable
TL-R1200C-RP	<ul style="list-style-type: none"> • Uses a USB 3.2 Gen 2 Type-C interface • Supports SATA drives 	<ul style="list-style-type: none"> • USB 3.2 Gen 2 Type-A to Type-C cable • USB 3.2 Gen 2 Type-C to Type-C cable • RAIL-B02

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.



Important

QNAP recommends always using dual-path configuration to prevent storage downtime due to expansion unit failure or cable disconnection. Single-path configuration should be used only in a situation where it is not possible to use dual-path configuration.

3. Power on the expansion units.
4. Verify that the expansion units are recognized by the device.
 - a. Log on to QuTS hero as 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 SATA JBOD expansion units, a host bus adapter must be installed on the NAS.

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

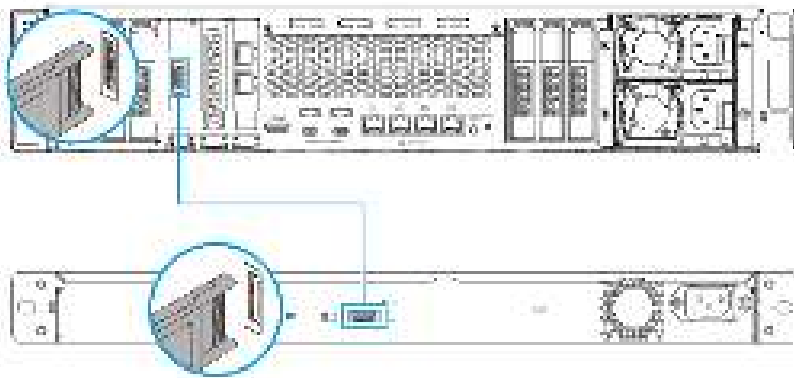
1. Power off the NAS.
2. Install a host bus adapter on the PCIe slot.
For details, see [Replacing Expansion Cards](#).



Important

The QNAP QXP host bus adapter is required for connecting the SATA JBOD enclosure to a host device. Third-party host bus adapters are not compatible with QNAP JBOD enclosures.

3. Connect the expansion unit to the NAS.



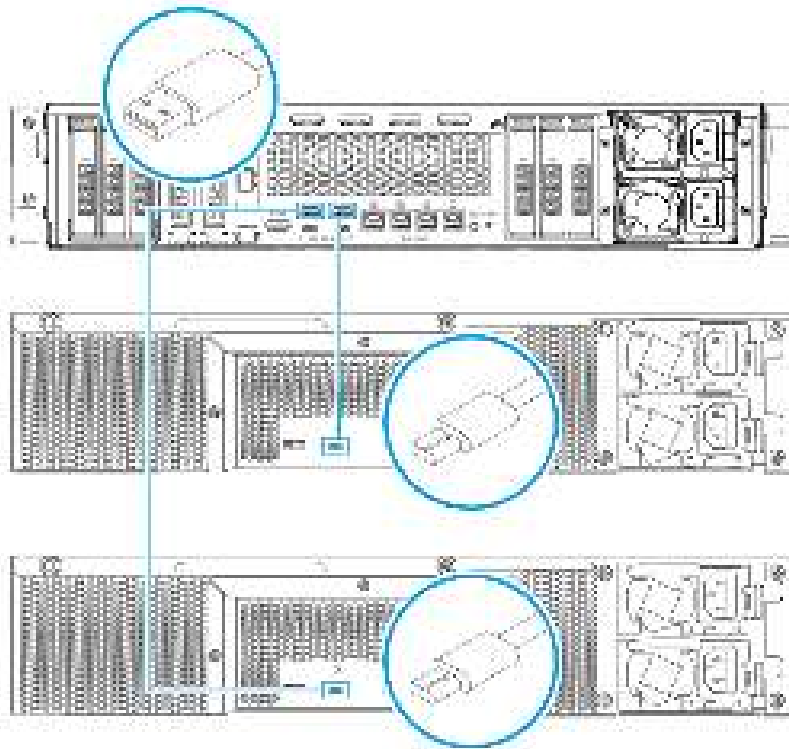
4. Power on the SATA JBOD expansion unit.
5. Power on the NAS.
6. Verify that the expansion unit is recognized by the NAS.
 - a. Log on to QuTS hero as administrator.
 - b. Go to **Main Menu > Storage & Snapshots > Overview > System**.
 - c. Verify that the expansion unit is listed.

Connecting USB Expansion Units

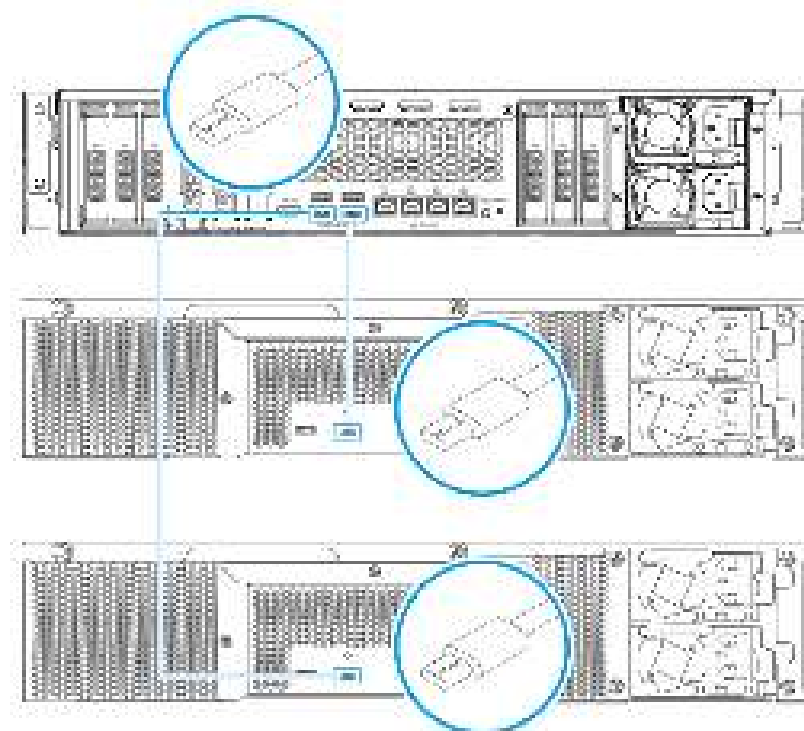
To connect the device to USB expansion units, USB Type-A to USB Type-C cables or USB Type-C to USB Type-C cables are required.

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

1. Verify that the NAS is powered off.
2. 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 3.2 Gen 2 Type-A or USB Type-C port on the NAS.



Connecting to a USB 3.2 Gen 2 Type-A port on the NAS.



Connecting to the USB 3.2 Gen 2 Type-C port on the NAS.

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

Rail Kits

Rail kits are not included with the NAS and must be purchased separately. For details, contact an authorized reseller or go to <http://shop.qnap.com>.

The TS-h3088XU-RP is compatible with the following rail kit model:

Model	Compatible Rail Kit
TS-h3088XU-RP	RAIL-A03-57

You can find installation information in the rail kit package.

QuTS hero Installation

The TS-h3088XU-RP 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"> • Locate the NAS using Qfinder Pro. • Complete the steps in the Smart Installation Guide wizard. <p>For details, see Installing QuTS hero Using Qfinder Pro.</p>	<ul style="list-style-type: none"> • Computer • Network cable • Qfinder Pro installer
Cloud installation	<p>If the NAS is connected to the internet, you can do the following:</p> <ul style="list-style-type: none"> • Scan the QR code on the NAS. • Log into your myQNAPcloud account. • Use myQNAPcloud Link to remotely access your NAS. • Complete the steps in the Smart Installation Guide wizard. <p>For details, see Installing QuTS hero Using the Cloud Key.</p>	<ul style="list-style-type: none"> • Computer or mobile device • Network cable • myQNAPcloud account • Cloud Key

You can also install the QNAP QTS operating system. If your NAS is connected to the internet, the option to install QTS will appear in the Smart Installation Guide wizard using any of the methods in the table. You can also manually download the QTS firmware from download.qnap.com.



Warning

QuTS hero and QTS use different file systems. Switching operating systems will reset the NAS and delete all data.

Installing QuTS hero Using Qfinder Pro



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

6. Install firmware using any of the following methods:

Installation methods	Steps
Automatic	Click Start . Automatically searches for available firmware updates and installs firmware.
Manual installation	<ol style="list-style-type: none"> a. Click Manual Installation. The Install Firmware window appears. b. Click Browse. The upload file window appears. c. Select file. d. Click Open. Starts firmware installation.
Skip	<ol style="list-style-type: none"> a. Click Skip. Skips firmware installation.

7. 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.
- **Password:** Specify an administrator password with 1 to 64 characters. The password supports all ASCII characters.

8. Click **Next**.

9. 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.

10. Click **Next**.

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

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

12. Click **Next**.

The **Cross-platform file transfer service** screen appears.

13. Select the types of devices that you will use to access shared folders on the NAS.

14. Click **Next**.

15. Review the settings.

16. Click **Apply**.

A confirmation message appears.


Warning

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

17. Click **Yes**.

- The **QuTS hero** installation progress bar appears.
- **QuTS hero** is installed.

**Note**

It may take a couple of minutes to complete QuTS hero installation.

18. Optional: Click **Go to NAS Management**.

**Tip**

Click **Go to NAS Management** to set more advanced QuTS hero configurations and settings. For details, see QuTS hero User Guide.

Installing QuTS hero Using the Cloud Key

**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 the internet.
3. Go to the QNAP Cloud Installation page using one of the following methods:
 - On your computer, go to <http://install.qnap.com/>.
 - 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. Locate the NAS in the list and then click **Initialize**.

**Note**

If your NAS is not listed, follow the instructions on the web page to specify the Cloud Key on the NAS.

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**.

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

The **Cross-platform file transfer service** screen appears.

17. Select the types of devices that you will use to access shared folders on the NAS.

18. Click **Next**.

19. Review the settings.

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

**Warning**

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

21. Click **Confirm**.
QuTS hero is installed.

22. Optional: Click **Go to NAS Management**.


**Tip**

Click **Go to NAS Management** to set more advanced QuTS hero configurations and settings.
For details, see QuTS hero User Guide.


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 5 seconds.	The device powers off. <div>  Important Use this method only when the device is unresponsive. </div>

Reset Button

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"> System administrator password: The default password is the first MAC address in uppercase letters without special characters. For example, if the first MAC address is 00-08-9B-F6-15-75, then the admin password will be 00089BF61575. <div>  Note You can find the first MAC address using Qfinder Pro. A label attached to the device also lists the address as MAC1. </div> <ul style="list-style-type: none"> TCP/IP configuration: <ul style="list-style-type: none"> Obtain IP address settings automatically via DHCP Disable jumbo frames If port trunking is enabled (multi-LAN models only), the port trunking mode is reset to "Active Backup (Failover)". System port: 8080 (system service port) Security level: Low (Allow all connections) LCD panel password: (blank) VLAN: Disabled
Advanced system reset	Press and hold the button for 15 seconds.	<p>The default factory settings are restored.</p> <ul style="list-style-type: none"> To retrieve old data after an advanced system reset, recreate the previous folder structure on the NAS.


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.

**Note**

The 10 GbE LED only works when a 10 GbE network expansion card is installed.

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"> • The drive is being formatted. • The device is being initialized. • The operating system is being updated. • RAID rebuilding is in progress. • Online RAID Capacity Expansion is in progress. • Online RAID Level Migration is in progress. • The firmware is being updated. <div>  Important 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"> • The drive is invalid. • The shared folder has reached its full capacity. • The shared folder is about to reach its full capacity. • The system fan is not functioning. • An error occurred when accessing (read/write) the data. • A bad sector is detected on the hard drive. • 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). • A hardware self-test error occurred.
	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"> • The device is not configured. • A drive is not formatted.
	Off	<ul style="list-style-type: none"> • All drives are in standby mode. • The device is powered off.
10 Gigabit Ethernet	Green	The network connection is operating at 10 Gbps.
	Off	The device is not connected to a 10 GbE network.

LED	Status	Description
LAN	Orange	The network connection is operating. <div>  Note The LAN LED can only detect the device's in-built Ethernet port connections. It cannot detect network expansion cards' Ethernet port connection status. </div>
	Flashes orange	The device is being accessed from the network.
	Off	The device is not connected to a network.
Expansion	Orange	An expansion unit is connected.
	Off	No expansion unit has been detected.
Drive Activity	Flashes red	The data is being accessed and a read/write error occurs during the process.
	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 or 100 Mbps.
	Off	<ul style="list-style-type: none"> • The network connection is operating at 10 Mbps. • There is no network connection.
2.5 Gigabit Activity LAN	Orange	A network connection has been established.
	Flashes orange	The device is being accessed from the network.
	Off	There is no network connection.
25 Gigabit Ethernet speed	Green	The network connection is operating at 25 Gbps.
	Orange	The network connection is operating at below 25 Gbps.
	Off	There is no network connection.
25 Gigabit Ethernet activity	Orange	A network connection has been established.
	Flashes orange	Data is being transmitted.
	Off	There is no network connection.

Audio Alert

Duration	Frequency	Description
Short beep (0.5 seconds)	1	<ul style="list-style-type: none"> The NAS is starting up. When the reset button is pressed for 3 seconds, the NAS resets configurations. When the reset button is pressed for 10 seconds, the NAS resets configurations and reboots. The operating system was updated.
	3	<ul style="list-style-type: none"> Cannot detect installed disk.
Long beep (1.5 seconds)	3 (every 5 minutes)	<ul style="list-style-type: none"> A power error occurred. The system fan is not functioning.
	2	<ul style="list-style-type: none"> The storage pool is about to reach full capacity. The storage pool has reached full capacity. A storage pool status error occurred. The shared folder is about to reach its full capacity. The shared folder has reached its full capacity. A shared folder status error occurred. A drive is plugged in or out.
	1	<ul style="list-style-type: none"> The NAS was powered off by force shutdown (hardware shutdown). The NAS was powered on successfully and is ready.
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.
Encrypted shared folders	<p>If the NAS does not support file system encryption, encrypted shared folders are not migrated.</p> <div>  Warning 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. </div>
Shared folders	<p>All shared folders and the downloaded files stored in them are retained.</p> <div>  Warning To prevent data loss, back up and save encryption keys or passwords of encrypted shared folders in a safe place before migration. </div> <div>  Important Folder permissions on the destination NAS must be reconfigured after migration. </div>

Data and Settings	After NAS Migration
Network	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.
Windows AD configuration	Windows AD configurations must be reconfigured.
Licenses	<p>Licenses are not migrated.</p> <div>  Warning QNAP recommends deactivating licenses on the source NAS before data migration. </div>
Applications	If the destination NAS has less RAM than the source NAS, the following features and applications might not function: Virtualization Station, Qsirch, and Snapshots.
Services	Only services supported by the destination NAS are available.
Multimedia features	Some multimedia features are disabled by default.

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	≥ 3	One member drive fails
RAID 6	≥ 4	One or two member drives fail
RAID 10	≥ 4 (Must be an even number)	One or two member drives in two different pairs fail.
RAID 50	≥ 6	One disk per subgroup fails.
RAID 60	≥ 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	≥ 5	One, two, or three member drives fail.

1. Log on to QTS.
2. Go to **Main Menu > Storage & Snapshots > Storage > Disks/VJBOD**.
3. Locate the failed drive.
4. Prepare a new hard drive with a capacity that is the same as or larger than the failed hard 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 Space**.

11. Locate the shared folder 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 disk volumes 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, and RAID-TP volume from degraded mode.

Disk Volume	RAID Recovery Support	Number of Disks	Maximum Number of Removed Drives
RAID 0	Yes	≥ 2	N/A
RAID 1	Yes	2	1
RAID 5	Yes	≥ 3	1
RAID 6	Yes	≥ 4	2
RAID 10	No	≥ 4 (Must be an even number)	One or two member drives in two different pairs fail.
RAID 50	Yes	≥ 6	One disk per subgroup fails.
RAID 60	Yes	≥ 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	≥ 5	3

Support and Other Resources

QNAP provides the following resources:

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

7. Glossary

Cloud Key

Unique 8-digit code assigned to each NAS device

myQNAPcloud Link

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

myQNAPcloud

Provides various remote access services such as DDNS and myQNAPcloud Link

Qfinder Pro

QNAP utility that lets you locate and access QNAP NAS 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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FCC Class A Notice



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