

The QNAP logo is displayed in white, bold, uppercase letters within a blue rounded rectangular box in the top-left corner of the page.

TS-hx90FU

TS-h1090FU

TS-h2490FU

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 TS-hx90FU

Powered by 2nd Gen AMD EPYC™ processors, the all-flash TS-hx90FU series is designed to deliver a scalable platform for enterprise-level solutions. The U.2 NVMe solid-state drives can deliver excellent random read/write IOPS with ultra-low latency. This ZFS NAS comes with utmost reliability and supports inline data deduplication and compression, up to 65536 snapshots, and real-time SnapSync. The TS-hx90FU series is ideal for I/O-intensive and latency-sensitive applications, eliminating productivity bottlenecks in data centers, virtualization, 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-h1090FU-7232P-64G	AMD EPYC™ 7232P	64 GB	Redundant
TS-h1090FU-7302P-128G	AMD EPYC™ 7302P	128 GB	Redundant
TS-h1090FU-7302P-256G	AMD EPYC™ 7302P	256 GB	Redundant
TS-h2490FU-7232P-64G	AMD EPYC™ 7232P	64 GB	Redundant
TS-h2490FU-7302P-128G	AMD EPYC™ 7302P	128 GB	Redundant
TS-h2490FU-7302P-256G	AMD EPYC™ 7302P	256 GB	Redundant

Component	TS-h2490FU-7232P-64G TS-h2490FU-7302P-128G TS-h2490FU-7302P-256G	TS-h1090FU-7232P-64G TS-h1090FU-7302P-128G TS-h1090FU-7302P-256G
Processor		
CPU	<ul style="list-style-type: none"> • TS-h2490FU-7232P-64G: AMD EPYC™ 7232P • TS-h2490FU-7302P-128G: AMD EPYC™ 7302P • TS-h2490FU-7302P-256G: AMD EPYC™ 7302P 	<ul style="list-style-type: none"> • TS-h1090FU-7232P-64G: AMD EPYC™ 7232P • TS-h1090FU-7302P-128G: AMD EPYC™ 7302P • TS-h1090FU-7302P-256G: AMD EPYC™ 7302P
Frequency	<ul style="list-style-type: none"> • TS-h2490FU-7232P-64G: 8-core/16-thread up to 3.2 GHz • TS-h2490FU-7302P-128G: 16-core/32-thread up to 3.3 GHz • TS-h2490FU-7302P-256G: 16-core/32-thread up to 3.3 GHz 	<ul style="list-style-type: none"> • TS-h1090FU-7232P-64G: 8-core/16-thread up to 3.2 GHz • TS-h1090FU-7302P-128G: 16-core/32-thread up to 3.3 GHz • TS-h1090FU-7302P-256G: 16-core/32-thread up to 3.3 GHz
Architecture	x86 64-bit	
Encryption engine	AES-NI	
Memory		
Pre-installed memory	<ul style="list-style-type: none"> • TS-h2490FU-7232P-64G: 64 GB RAM: 8 x 8 GB RDIMM DDR4 ECC • TS-h2490FU-7302P-128G: 128 GB RAM: 8 x 16 GB RDIMM DDR4 ECC • TS-h2490FU-7302P-256G: 256 GB RAM: 8 x 32 GB RDIMM DDR4 ECC 	<ul style="list-style-type: none"> • TS-h1090FU-7232P-64G: 64 GB RAM: 8 x 8 GB RDIMM DDR4 ECC • TS-h1090FU-7302P-128G: 128 GB RAM: 8 x 16 GB RDIMM DDR4 ECC • TS-h1090FU-7302P-256G: 256 GB RAM: 8 x 32 GB RDIMM DDR4 ECC
Memory slots	16 x DDR4 RDIMM	12 x DDR4 RDIMM

Component	TS-h2490FU-7232P-64G TS-h2490FU-7302P-128G TS-h2490FU-7302P-256G	TS-h1090FU-7232P-64G TS-h1090FU-7302P-128G TS-h1090FU-7302P-256G
Memory slots	<div style="background-color: #fff9e6; padding: 10px;"> <p>Important</p> <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. • You can only use one type of dual in-line memory module (DIMM) at a time. Do not mix registered DIMM (RDIMM) with load-reduction DIMM (LRDIMM) memory. </div>	
Maximum memory	4 TB RAM: 16 x 256 GB	1 TB RAM: 12 x 128 GB
Flash memory	5 GB (dual-boot OS protection)	
Storage		
Drive bays	24 x 2.5-inch U.2 PCIe NVMe	10 x 2.5-inch U.2 PCIe NVMe / SATA 6Gbps
Drive compatibility	2.5-inch U.2/U.3 NVMe PCIe Gen4/Gen3 x4 solid-state drives <div style="background-color: #e6f2ff; padding: 5px;"> <p>Note Gen4 solid-state drives will run at Gen3 speeds.</p> </div>	<ul style="list-style-type: none"> • 2.5-inch U.2/U.3 NVMe PCIe Gen4/Gen3 x4 solid-state drives • 2.5-inch SATA solid-state drives <div style="background-color: #fff9e6; padding: 10px; margin-top: 10px;"> <p>Tip</p> <ul style="list-style-type: none"> • For the list of compatible drive models, go to https://www.qnap.com/compatibility. </div>
Hot-swapping	This device supports hot-swapping for all drives.	
Network		

Component	TS-h2490FU-7232P-64G TS-h2490FU-7302P-128G TS-h2490FU-7302P-256G	TS-h1090FU-7232P-64G TS-h1090FU-7302P-128G TS-h1090FU-7302P-256G
25 Gigabit Ethernet ports	<ul style="list-style-type: none"> • TS-h2490FU-7232P-64G: 2 x 25 GbE SmartNIC SFP28 • TS-h2490FU-7302P-128G: 4 x 25 GbE SmartNIC SFP28 • TS-h2490FU-7302P-256G: 4 x 25 GbE SmartNIC SFP28 	<ul style="list-style-type: none"> • TS-h1090FU-7232P-64G: 2 x 25 GbE SmartNIC SFP28 • TS-h1090FU-7302P-128G: 2 x 25 GbE SmartNIC SFP28 • TS-h1090FU-7302P-256G: 2 x 25 GbE SmartNIC SFP28
<p>Note The 25 Gigabit Ethernet port is also compatible with 10 GbE SFP+.</p>		
2.5 Gigabit network interface	<p>2 x 2.5 GbE RJ45</p> <p>Note The 2.5 Gigabit Ethernet ports support the following network connectivity speeds: 2.5 GbE, 1 GbE, 100 Mb, and 10 Mb.</p>	
External I/O Ports & Expansion Slots		
PCIe slots	<ul style="list-style-type: none"> • 2 x PCIe 4.0 x4 • 2 x PCIe 4.0 x8 • 1 x PCIe 4.0 x16 	2 x PCIe 4.0 x16
<p>Tip For the list of compatible drive models and expansion cards, go to https://www.qnap.com/compatibility.</p>		
USB ports	2 x USB 3.2 Gen 1 Type-A	3 x USB 3.2 Gen 1 Type-A
Interface		
Buttons	<ul style="list-style-type: none"> • Power • Reset 	
Dimensions		
Form factor	2U Rackmount	1U Rackmount

Component	TS-h2490FU-7232P-64G TS-h2490FU-7302P-128G TS-h2490FU-7302P-256G	TS-h1090FU-7232P-64G TS-h1090FU-7302P-128G TS-h1090FU-7302P-256G
Dimensions (H x W x D)	88.3 x 481 x 510.2 mm (3.48 x 18.93 x 20.09 in)	44 x 430 x 580 (1.73 x 16.93 x 22.83 in)
Net weight	15.2 kg (33.51 lbs)	10.3 kg (22.71 lbs)
Other		
Rail compatibility	RAIL-A03-57	RAIL-B02
	<p>Note</p> <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 https://shop.qnap.com. • Information on rail kit installation can be found in the installation guide included in the rail kit package. For details, go to https://www.qnap.com/go/product/rail-kit. 	
Power supply unit	2 x 1100W, 100-240V AC, 50/60 Hz	2 x 550W, 100-240V AC, 50/60 Hz
System battery	CR2032 lithium battery (3V, 225 mAh)	
	<p>Warning</p> <ul style="list-style-type: none"> • This battery is a button battery. If swallowed, a lithium button battery can cause severe or fatal injuries within 2 hours. Keep batteries out of reach of children. • 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. 	
	<p>Important</p> <p>Dispose of used batteries according to local regulations or the instructions of the battery manufacturer.</p>	
Fans	System: 4 x 60 mm, 12V DC fans	System: 5 x 60 mm, 12V DC fans
Operating temperature	0°C to 40°C (32°F to 104°F)	

Component	TS-h2490FU-7232P-64G TS-h2490FU-7302P-128G TS-h2490FU-7302P-256G	TS-h1090FU-7232P-64G TS-h1090FU-7302P-128G TS-h1090FU-7302P-256G
Relative humidity	<ul style="list-style-type: none"> • Non-condensing relative humidity: 5% to 95% • Wet-bulb temperature: 27°C (80.6°F) 	

Tip

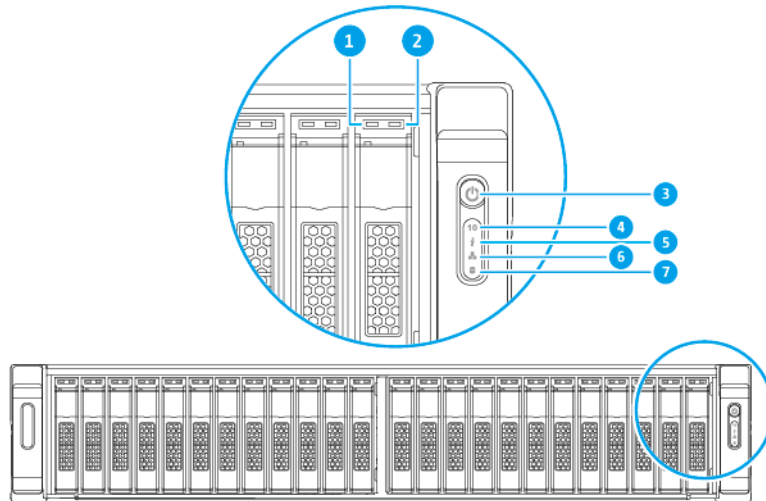
For the list of compatible drive models and expansion cards, go to <https://www.qnap.com/compatibility>.

Package Contents

Item	Quantity
TS-hx90FU	1
Power cord	2
Ethernet cable	1 x Cat 5e
Drive tray keys	TS-h1090FU: 2
Screws for 2.5-inch drives	<ul style="list-style-type: none"> • TS-h2490FU: 96 • TS-h1090FU: 40
Quick Installation Guide (QIG)	1

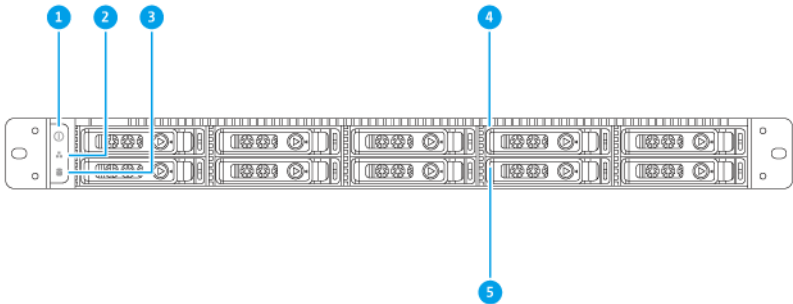
Components

Front Panel



TS-h2490FU

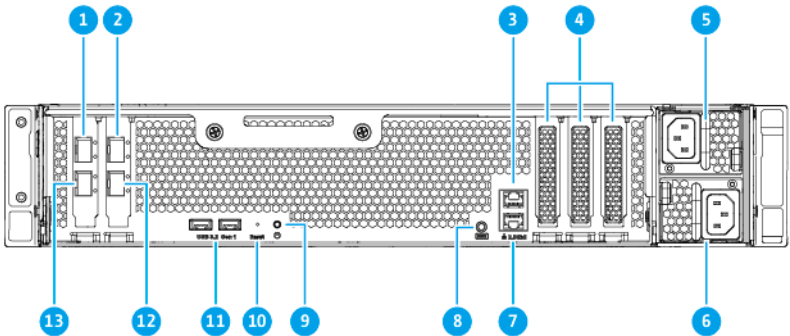
No.	Component	No.	Component
1	Drive activity LED	5	System status LED
2	Drive status LED	6	LAN LED
3	Power button	7	Expansion unit LED
4	10 Gigabit Ethernet LED	-	-



TS-h1090FU

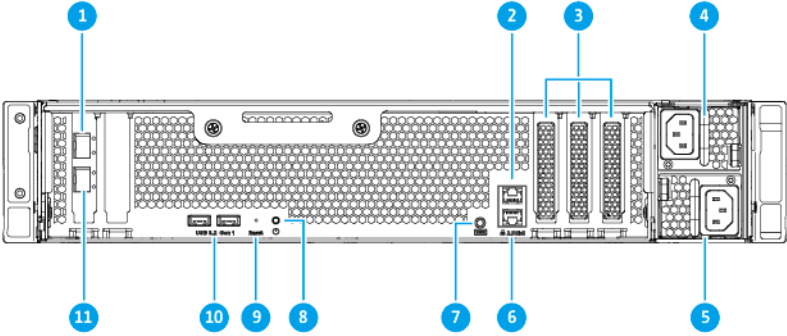
No.	Component	No.	Component
1	Power button	4	Drive activity LED
2	LAN LED	5	Drive status LED
3	Expansion unit LED	-	-

Rear Panel



TS-h2490FU-7302P-128G, TS-h2490FU-7302P-256G

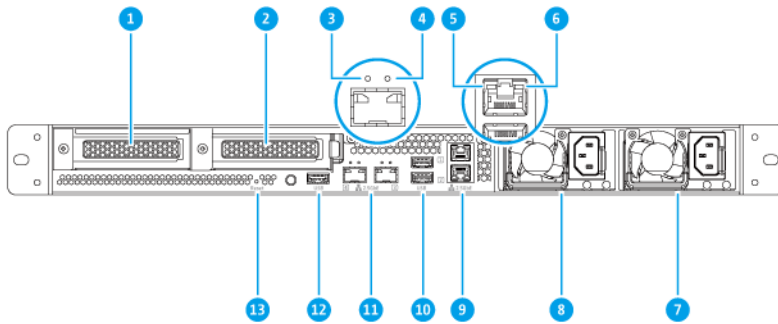
No.	Component	No.	Component
1	Ethernet port 1 (25 GbE SFP28)	8	COM port
			<div style="border: 1px solid #ccc; padding: 5px; background-color: #f0f0f0;"> <p>Note This port is only for engineering purposes.</p> </div>
2	Ethernet port 3 (25 GbE SFP28)	9	Power button
3	Ethernet port 5 (2.5 GbE RJ45)	10	Reset button
4	PCIe low-profile covers	11	USB 3.2 Gen 1 Type-A ports
5	Power supply unit 1	12	Ethernet port 4 (25 GbE SFP28)
6	Power supply unit 2	13	Ethernet port 2 (25 GbE SFP28)
7	Ethernet port 6 (2.5 GbE RJ45)	-	-



TS-h2490FU-7232P-64G

No.	Component	No.	Component
1	Ethernet port 1 (25 GbE SFP28)	7	COM port
			<div style="border: 1px solid #ccc; padding: 5px; background-color: #f0f0f0;"> <p>Note This port is only for engineering purposes.</p> </div>

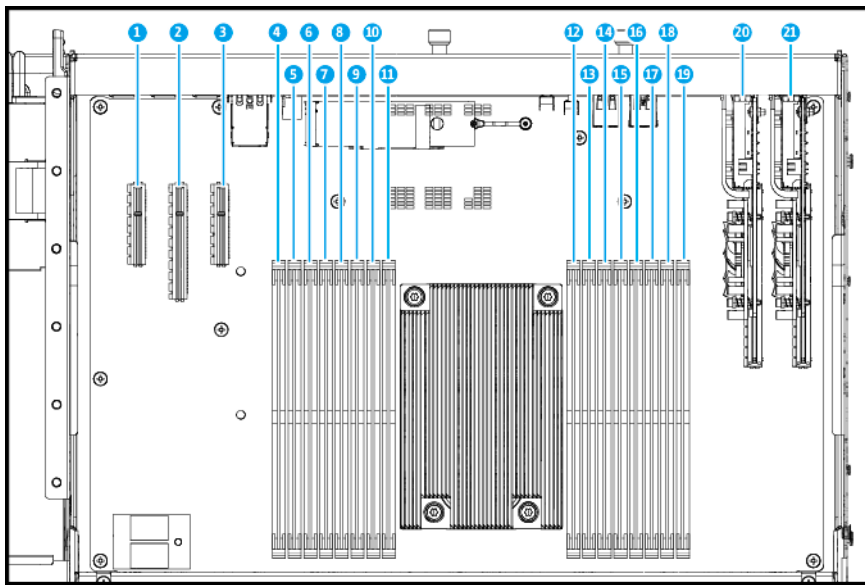
No.	Component	No.	Component
2	Ethernet port 3 (2.5 GbE RJ45)	8	Power button
3	PCIe low-profile covers	9	Reset button
4	Power supply unit 1	10	USB 3.2 Gen 1 Type-A ports
5	Power supply unit 2	11	Ethernet port 2 (25 GbE SFP28)
6	Ethernet port 4 (2.5 GbE RJ45)	-	-



TS-h1090FU

No.	Component	No.	Component
1	PCIe low-profile cover	8	Power supply unit 1
2	PCIe low-profile cover	9	2.5 Gigabit Ethernet ports (RJ45)
3	25 Gigabit Ethernet speed LED	10	USB 3.2 Gen 1 Type-A ports
4	25 Gigabit Ethernet activity LED	11	25 Gigabit Ethernet ports (SFP28)
5	2.5 Gigabit Ethernet speed LED	12	USB 3.2 Gen 1 Type-A port
6	2.5 Gigabit Ethernet activity LED	13	Reset button
7	Power supply unit 2	-	-

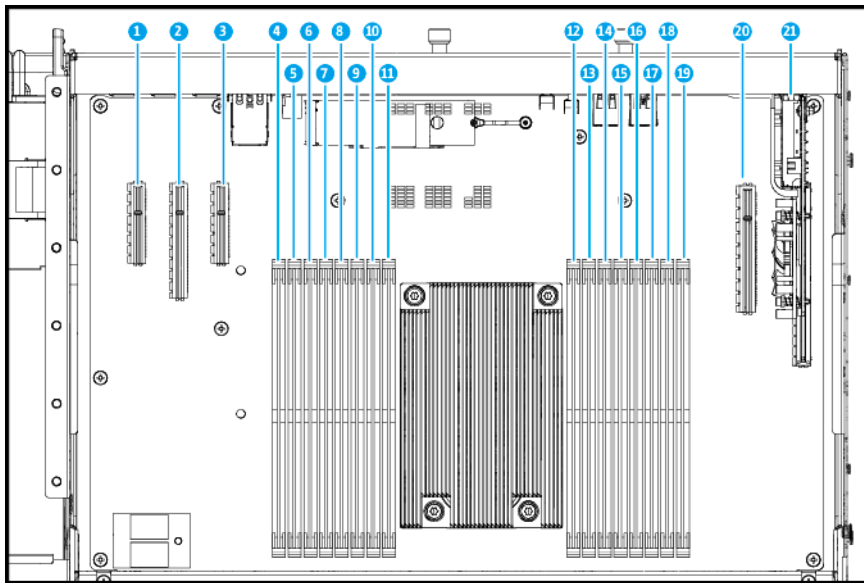
System Board



TS-h2490FU-7302P-128G

No.	Component	No.	Component
1	PCIe slot 1 (PCIe 4.0 x4)	12	Memory slot 9 (Channel E, DIMM 1)
2	PCIe slot 2 (PCIe 4.0 x8)	13	Memory slot 10 (Channel E, DIMM 2)
3	PCIe slot 3 (PCIe 4.0 x4)	14	Memory slot 11 (Channel F, DIMM 1)
4	Memory slot 1 (Channel D, DIMM 2)	15	Memory slot 12 (Channel F, DIMM 2)
5	Memory slot 2 (Channel D, DIMM 1)	16	Memory slot 13 (Channel G, DIMM 1)
6	Memory slot 3 (Channel C, DIMM 2)	17	Memory slot 14 (Channel G, DIMM 2)
7	Memory slot 4 (Channel C, DIMM 1)	18	Memory slot 15 (Channel H, DIMM 1)
8	Memory slot 5 (Channel B, DIMM 2)	19	Memory slot 16 (Channel H, DIMM 2)
9	Memory slot 6 (Channel B, DIMM 1)	20	PCIe slot 4 (PCIe 4.0 x8)
			<p>Note</p> <p>This slot is preinstalled with a 25 GbE SFP28 network card.</p>

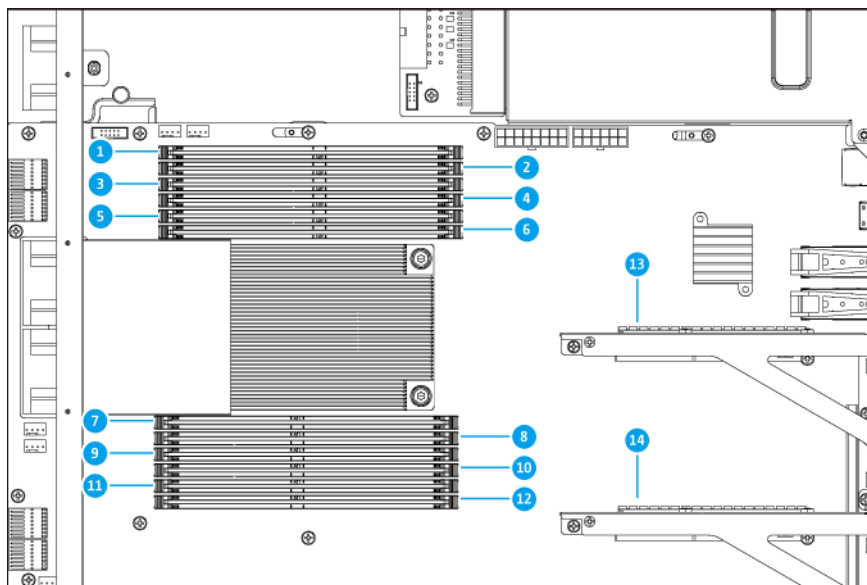
No.	Component	No.	Component
10	Memory slot 7 (Channel A, DIMM 2)	21	PCIe slot 5 (PCIe 4.0 x16)
<div style="border: 1px solid #ccc; background-color: #f0f0f0; padding: 10px; margin: 10px 0;"> <p>Note</p> <p>This slot is preinstalled with a 25 GbE SFP28 network card.</p> </div>			
11	Memory slot 8 (Channel A, DIMM 1)	-	-



TS-h2490FU-7232P-64G

No.	Component	No.	Component
1	PCIe slot 1 (PCIe 4.0 x4)	12	Memory slot 9 (Channel E, DIMM 1)
2	PCIe slot 2 (PCIe 4.0 x8)	13	Memory slot 10 (Channel E, DIMM 2)
3	PCIe slot 3 (PCIe 4.0 x4)	14	Memory slot 11 (Channel F, DIMM 1)
4	Memory slot 1 (Channel D, DIMM 2)	15	Memory slot 12 (Channel F, DIMM 2)
5	Memory slot 2 (Channel D, DIMM 1)	16	Memory slot 13 (Channel G, DIMM 1)
6	Memory slot 3 (Channel C, DIMM 2)	17	Memory slot 14 (Channel G, DIMM 2)
7	Memory slot 4 (Channel C, DIMM 1)	18	Memory slot 15 (Channel H, DIMM 1)
8	Memory slot 5 (Channel B, DIMM 2)	19	Memory slot 16 (Channel H, DIMM 2)

No.	Component	No.	Component
9	Memory slot 6 (Channel B, DIMM 1)	20	PCIe slot 4 (PCIe 4.0 x8)
10	Memory slot 7 (Channel A, DIMM 2)	21	PCIe slot 5 (PCIe 4.0 x16)
		<p>Note This slot is preinstalled with a 25 GbE SFP28 network card.</p>	
11	Memory slot 8 (Channel A, DIMM 1)	-	-

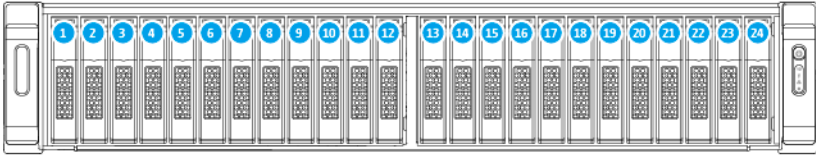


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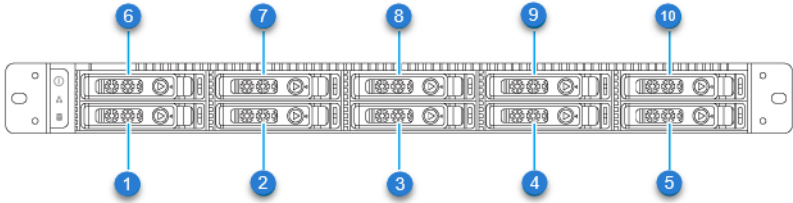
No.	Component	No.	Component
1	Memory slot 1 DIMM 1 (H1)	8	Memory slot 8 DIMM 8 (B1)
2	Memory slot 2 DIMM 2 (G2)	9	Memory slot 9 DIMM 9 (B2)
3	Memory slot 3 DIMM 3 (G1)	10	Memory slot 10 DIMM 10 (C1)
4	Memory slot 4 DIMM 4 (F1)	11	Memory slot 11 DIMM 11 (D1)
5	Memory slot 5 DIMM 5 (E2)	12	Memory slot 12 DIMM 12 (D2)

No.	Component	No.	Component
6	Memory slot 6 DIMM 6 (E1)	13	PCIe slot 2 (PCIe 4.0 x16) Note This slot is preinstalled with a riser card.
7	Memory slot 7 DIMM 7 (A1)	14	PCIe slot 1 (PCIe 4.0 x16) Note This slot is preinstalled with a riser card.

Drive Numbering



TS-h2490FU



TS-h1090FU

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 drives.
For details, see [Installing 2.5-inch Solid-state Drives on 2.5-inch Trays](#).
For a list of compatible drives and expansion cards, go to <http://www.qnap.com/compatibility>.
3. Optional: Install expansion cards.
For details, see the following topics:
 - [Replacing Expansion Cards on the TS-h2490FU](#)
 - [Installing Expansion Cards on the TS-h1090FU](#)
4. Optional: Connect expansion units.
For details, see the following topics:
 - [Connecting SAS Expansion Units](#).
 - [Connecting USB Expansion Units](#).
5. Connect the power cord and all applicable cables.
6. Power on the NAS.
For details, see [Front Panel](#).
7. Install QuTS hero.
For details, see [QuTS hero Installation](#).
8. 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 installing drives, memory modules, expansion cards, power supply units, expansion units, handles, and rail kits.

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.



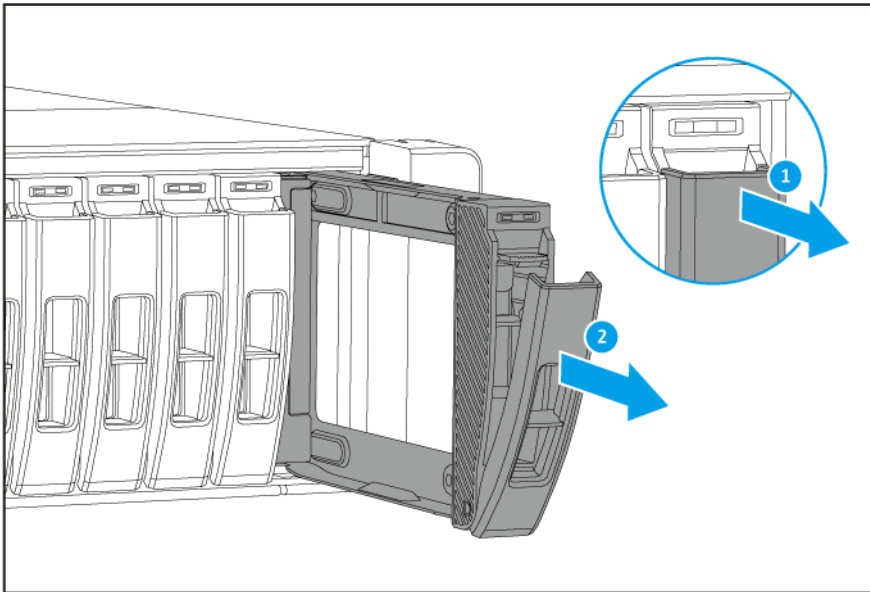
Other moving components: Keep your hands and other body parts away from other moving components.

Note

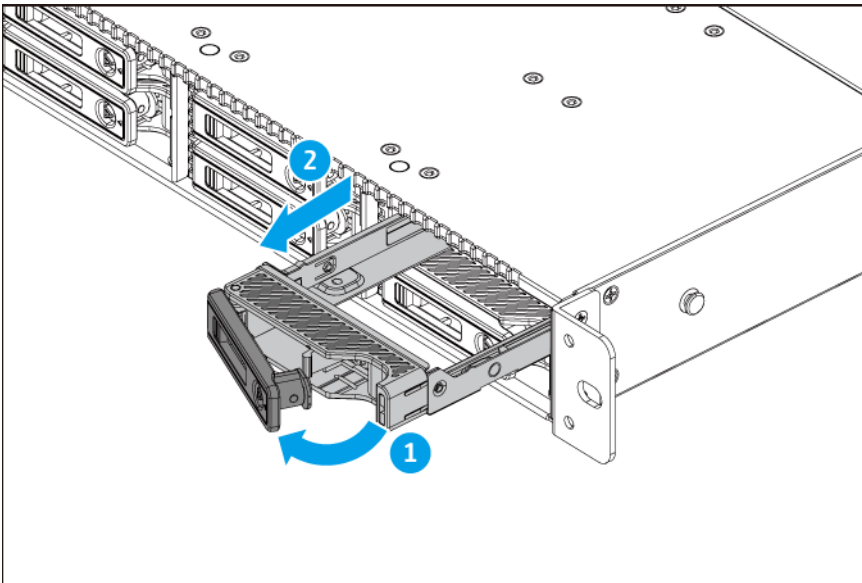
The TS-h2490FU is compatible with 2.5-inch U.2 NVMe PCIe solid-state drives, and the TS-h1090FU is compatible with 2.5-inch U.2 NVMe PCIe solid-state drives and SATA 6 Gbps solid-state drives.

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

b. Pull the tray out.



TS-h2490FU

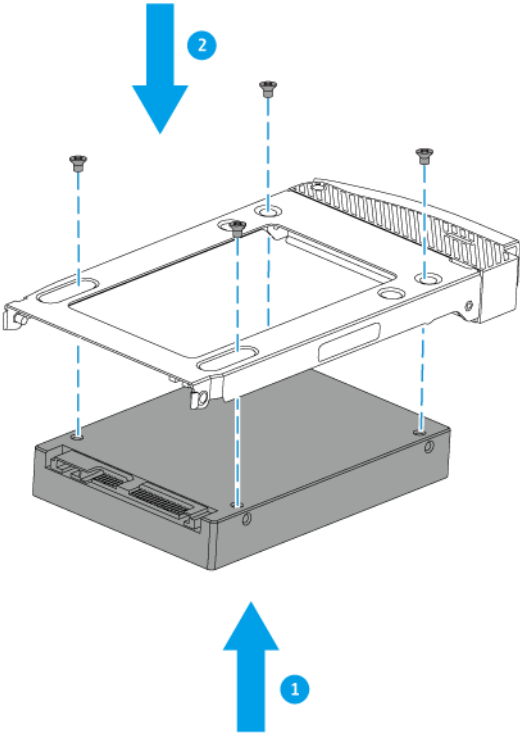


TS-h1090FU

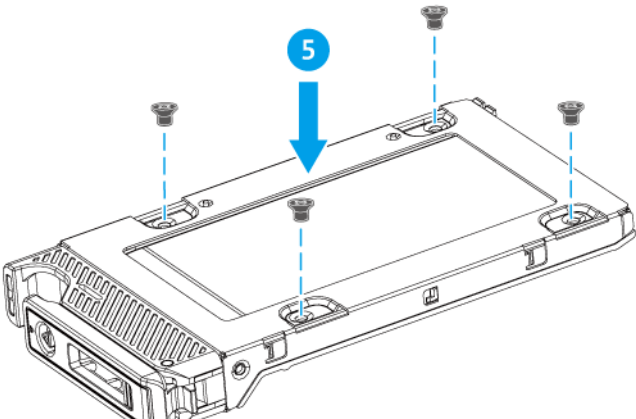
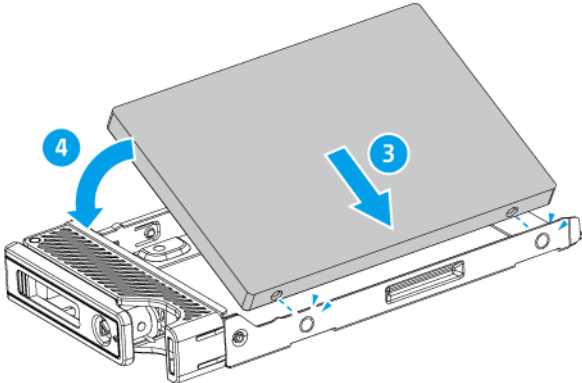
3. Install a drive on the tray.

- 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.

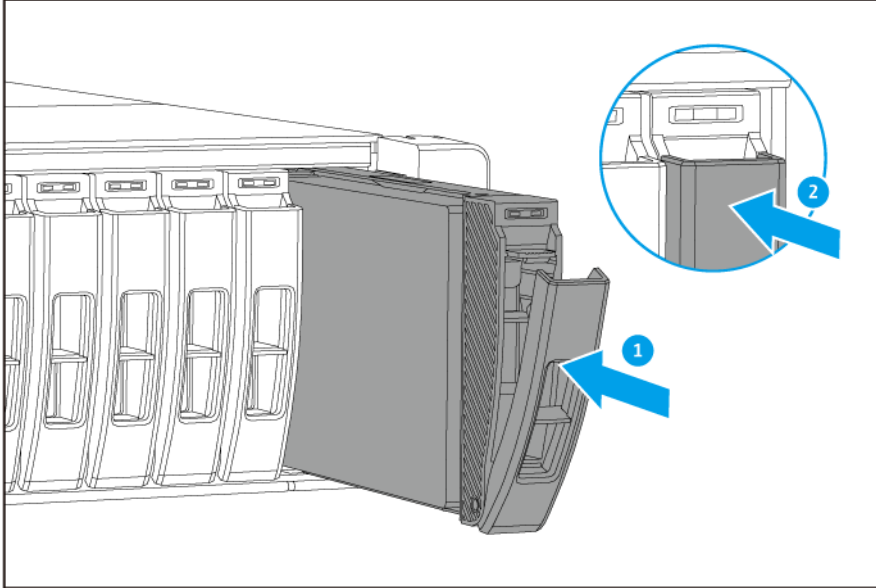
b. Attach the screws.



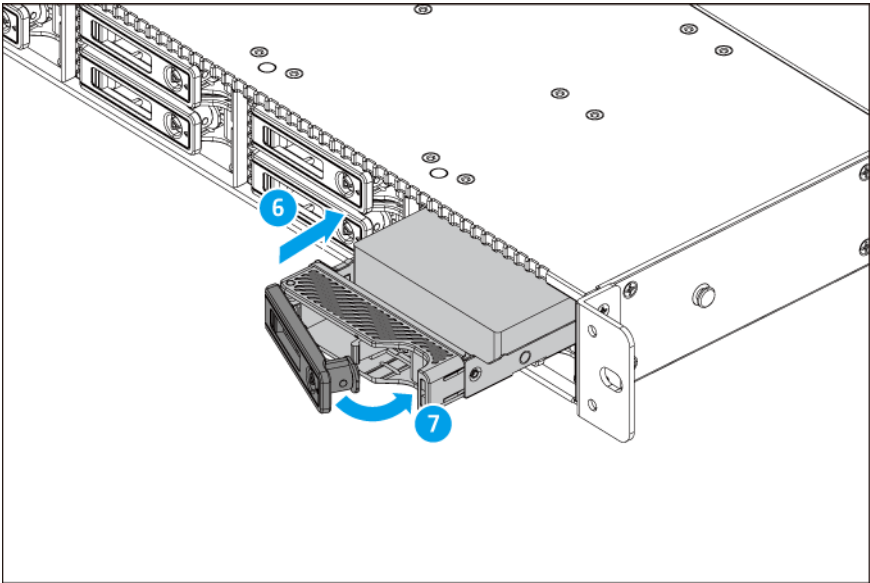
TS-h2490FU



- 4. Load the tray into the bay.
 - a. Insert the tray into the bay.
 - b. Push the handle.



TS-h2490FU



TS-h1090FU

- c. Optional: Lock the tray.
- 5. Power on the NAS.

Replacing Memory Modules on the TS-h2490FU

The TS-h2490FU has 16 memory slots. You can increase the memory capacity of the NAS by upgrading memory modules. For optimal performance, replace memory modules in all eight slots 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 groups of eight.

- Ensure that all eight modules are identical.
- Install the groups in sequence and follow the assigned slots for each group.
- Install memory modules in groups of eight or sixteen. When installing eight memory modules, install the memory in slots 1, 3, 5, 7, 10, 12, 14, and 16.

For details on slot order, see the table below.

Module Group	Slot Number
First group	Slots 1, 3, 5, 7, 10, 12, 14, and 16
Second group	Slots 2, 4, 6, 8, 9, 11, 13, and 15

Warning

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



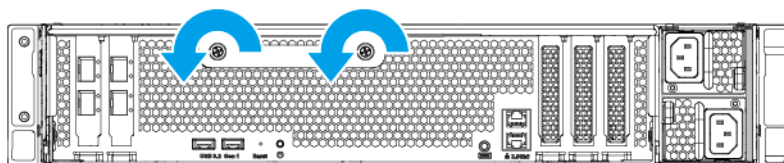
Moving fan blades: Keep your hands and other body parts away from moving fan blades.



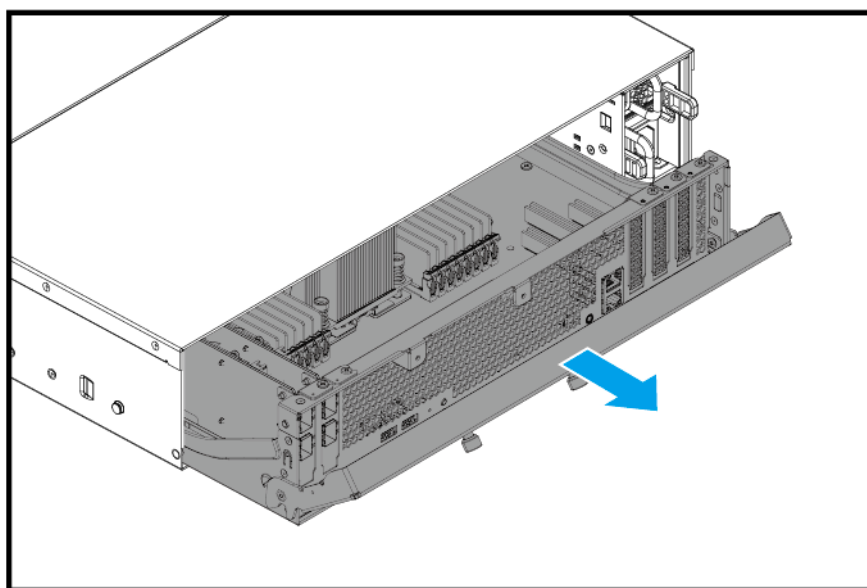
Other moving components: Keep your hands and other body parts away from other moving components.

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

4. Remove the case cover.
 - a. Loosen the screws.



- b. Pull the controller out of the chassis.



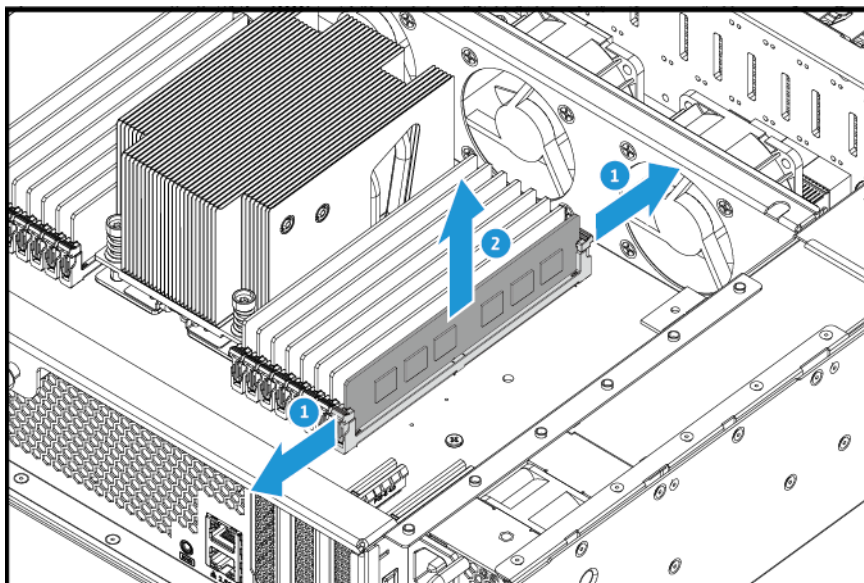
5. Remove an existing module.
 - a. Push the retention clips outward simultaneously to release the module.
 - b. Verify that the module has tilted upward and is completely released from the slot.

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.

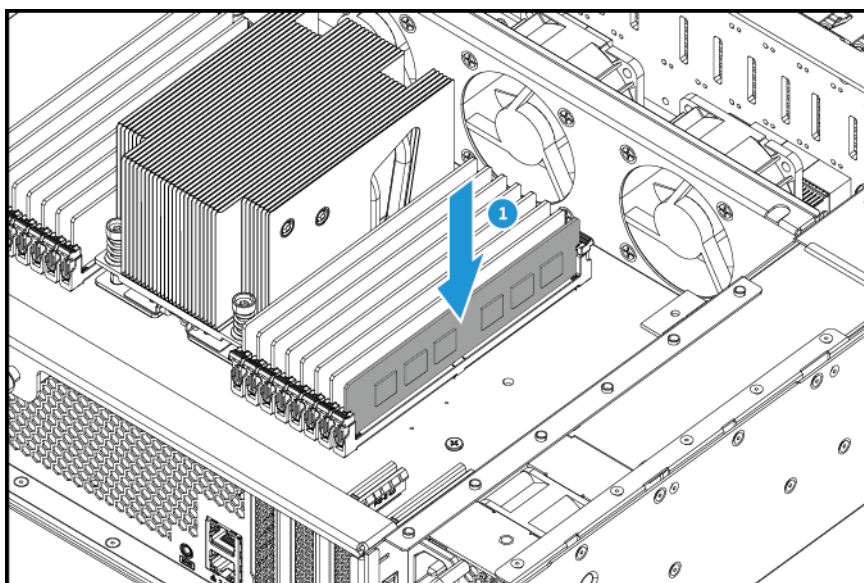


Warning

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

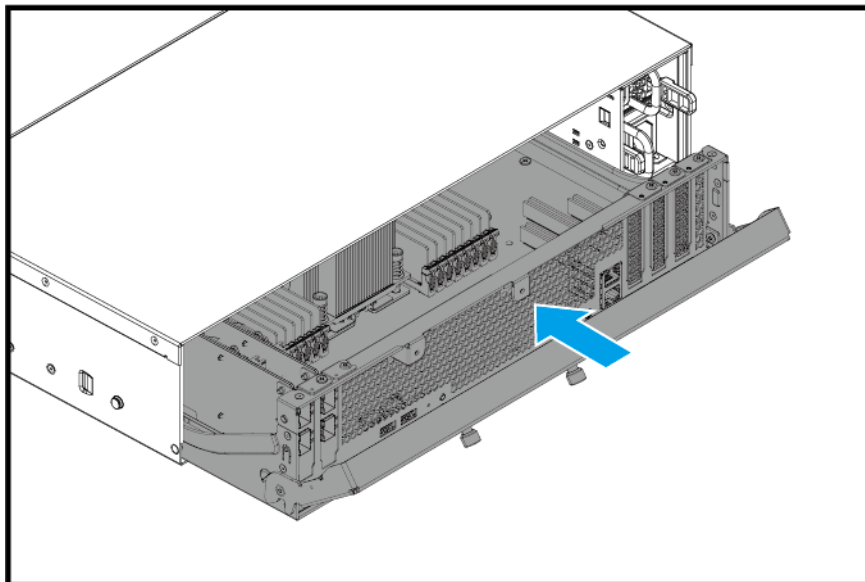
6. Install a new module.

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

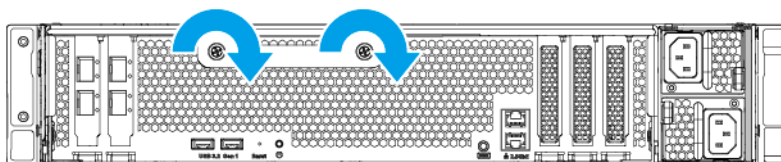


- c. Verify that the metal connectors are completely inserted into the slot.
- d. Carefully press down on the module until the retention clips lock the module into place.

7. Attach the case cover.
 - a. Place the cover on the device.
 - b. Push the device into the chassis.



- c. 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 Memory Modules on the TS-h1090FU

The TS-h1090FU has 12 memory slots. You can increase the memory capacity of the NAS by upgrading memory modules. For optimal performance, replace memory modules in all slots 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

- Ensure that all modules are identical.
- Install memory modules in the blue slots first. When installing eight memory modules, install the memory in slots 1, 2, 4, 5, 7, 9, 10, and 12.

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

Warning

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

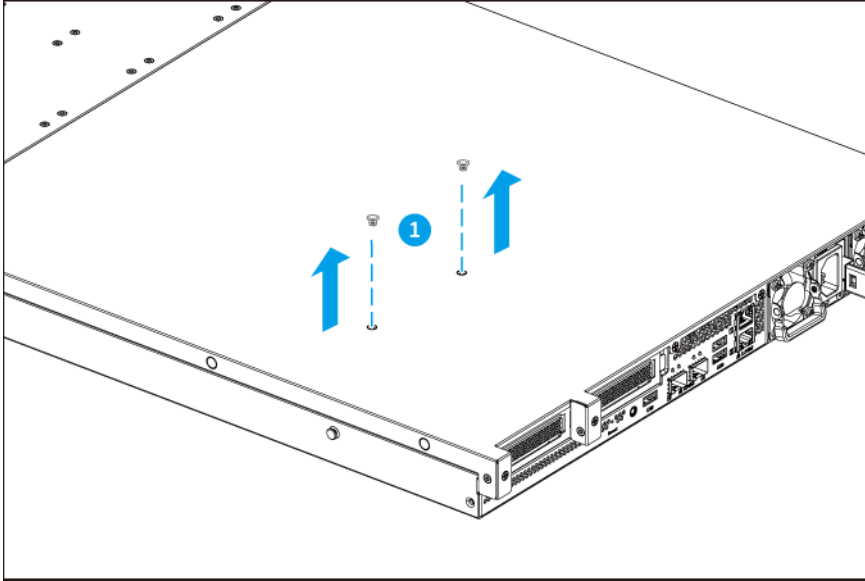
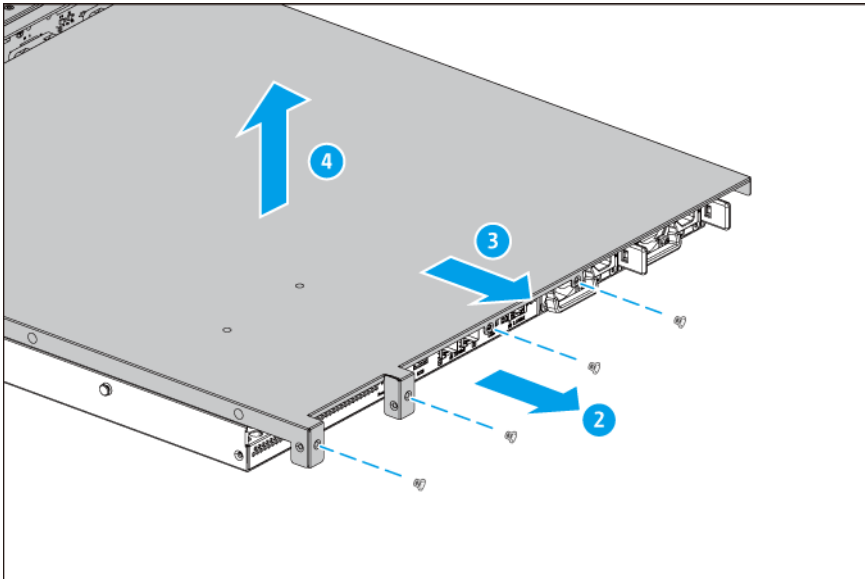


Moving fan blades: Keep your hands and other body parts away from moving fan blades.



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.

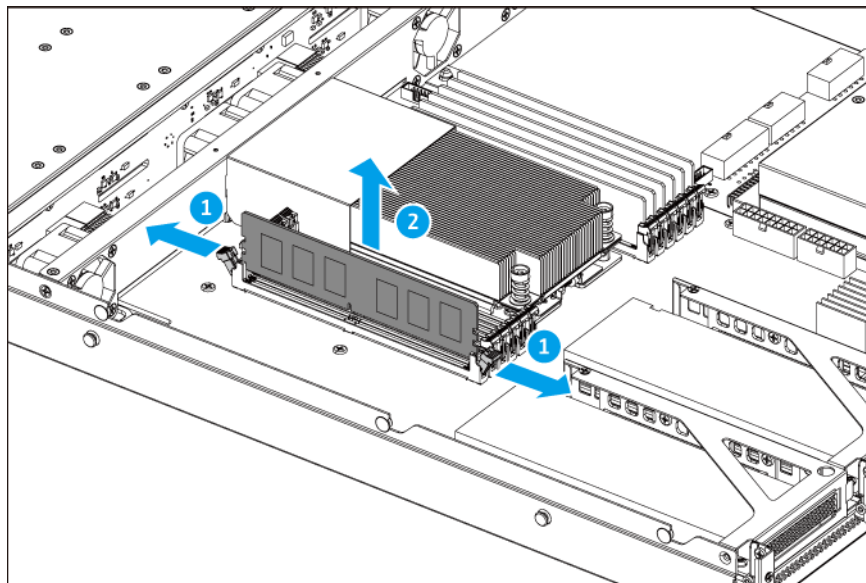
4. Remove the case cover.**a. Remove the top screws.****b. Remove the screws on the rear panel.****c. Slide the cover back.****d. Lift the cover off the device.****5. Remove an existing module.****a. Push the retention clips outward simultaneously to release the module.**

- 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 system board.

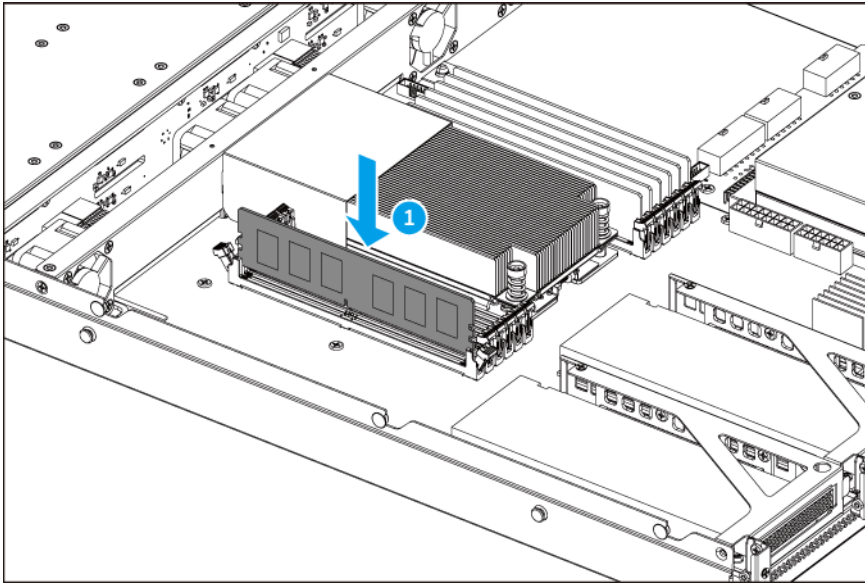
- c.** Hold the module by the edges.
- d.** Carefully slide the module out of the slot.

**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.

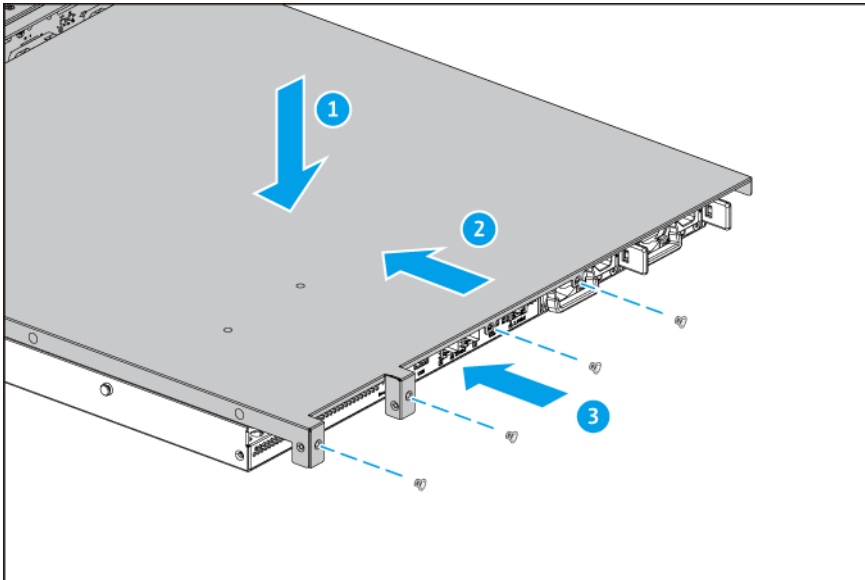


- c.** Verify that the metal connectors are completely inserted into the slot.

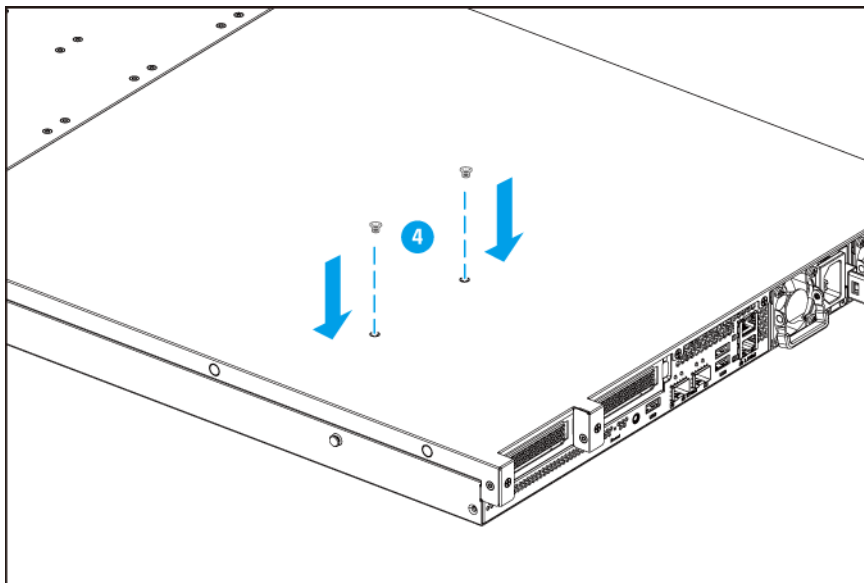
- d.** Carefully press down on the module until the retention clips lock the module into place.

- 7.** Attach the case cover.

- a.** Place the cover on the device.
- b.** Slide the cover forward.
- c.** Attach the screws on the rear panel.



- d. Attach the top 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 on the TS-h2490FU

The TS-h2490FU 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-h2490FU.

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.



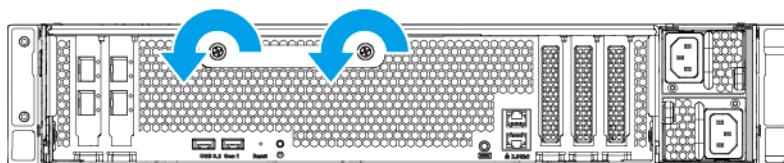
- **Other moving components:** Keep your hands and other body parts away from other moving components.

Important

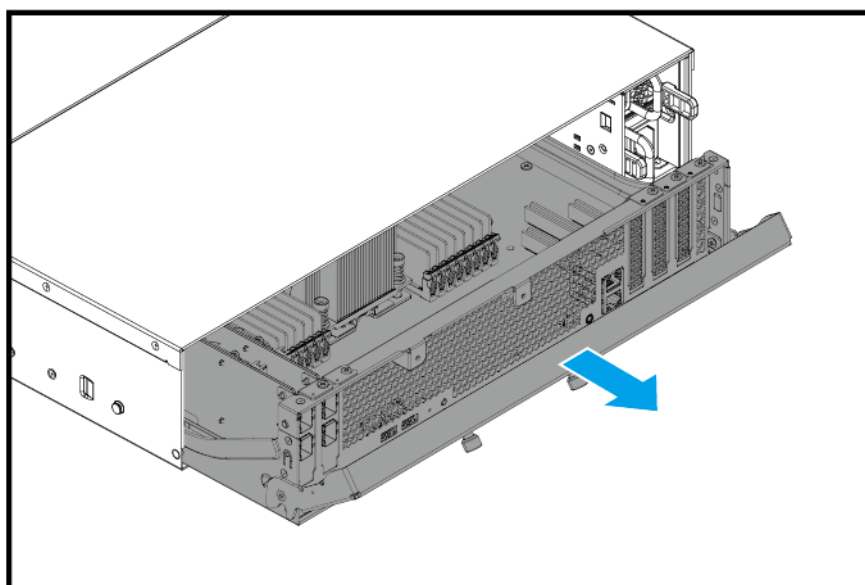
- Two dual-port 25GbE SFP28 network expansion cards are pre-installed in PCIe Gen 4.0 x8 slots 4 and 5 on the TS-h2490FU-7302P-128G.
- One dual-port 25GbE SFP28 network expansion card is pre-installed in PCIe Gen 4.0 x16 slot 5 on the TS-h2490FU-7232P-64G.
- Slot 2 will reduce its speed from x8 to x4 if an expansion card is installed in slot 3.
- Slot 5 will reduce its speed from x16 to x8 if an expansion card is installed in 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 case cover.
 - a. Loosen the screws.

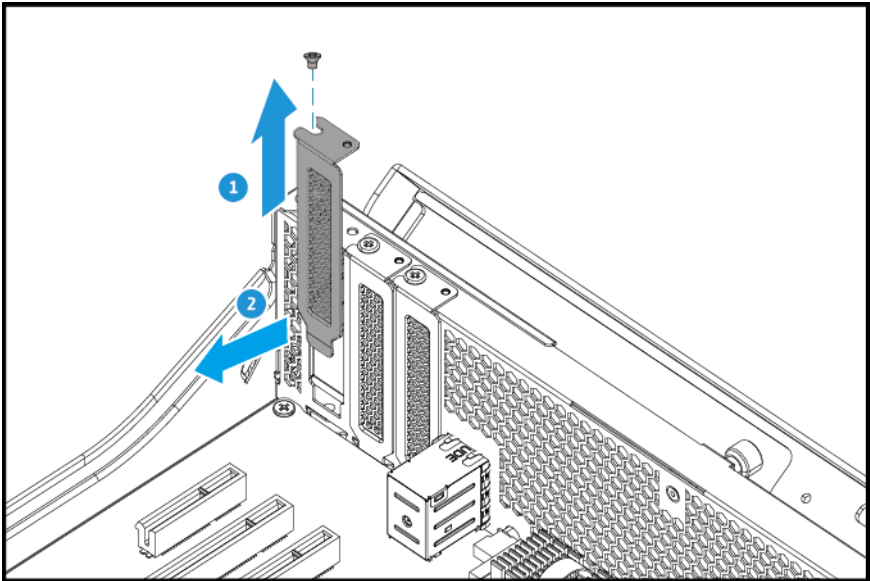


- b. Pull the controller out of the chassis.



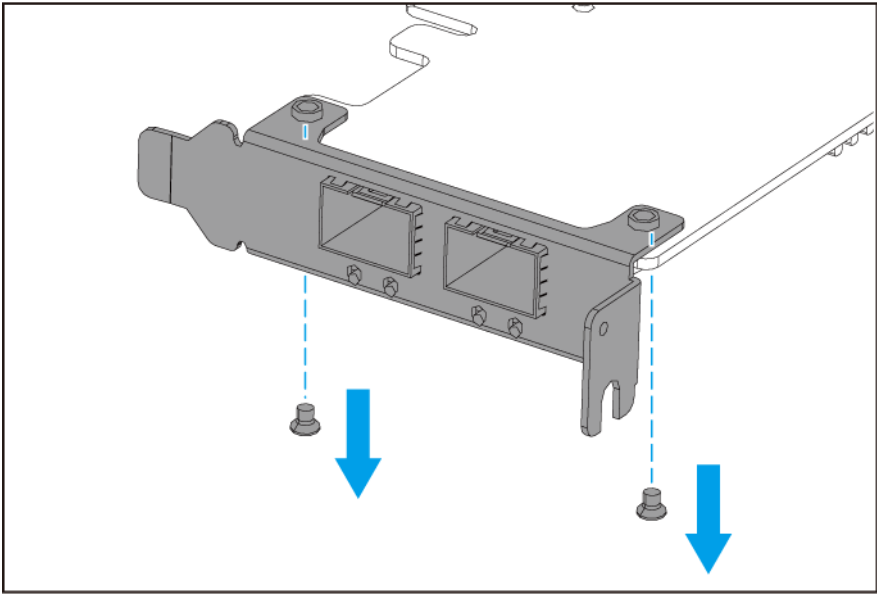
5. Remove the PCIe cover.
 - a. Remove the screw that secures the cover to the chassis.

b. Pull the cover away from the slot.



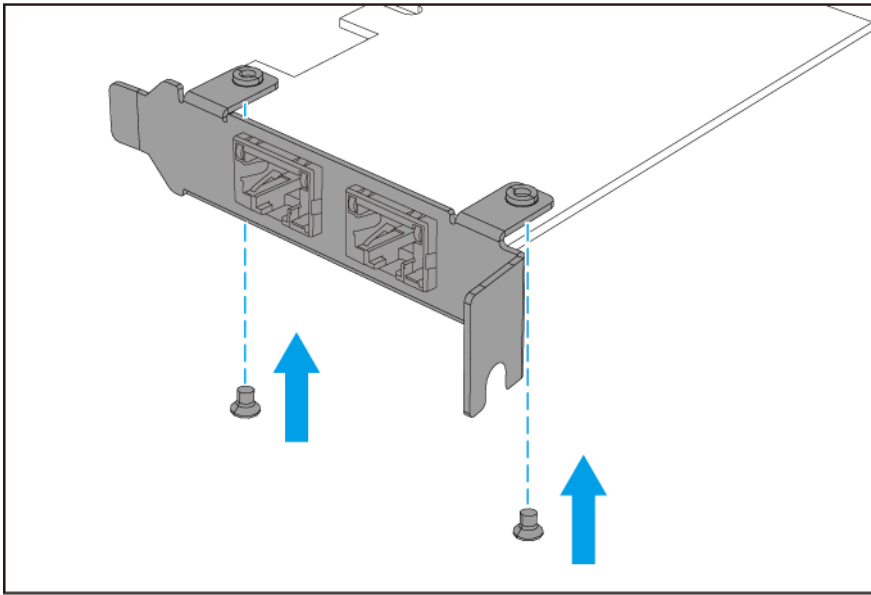
6. Optional: Attach the QNAP bracket to the expansion card.

a. Remove all screws of the existing bracket.



b. Carefully pull the bracket away from the card.

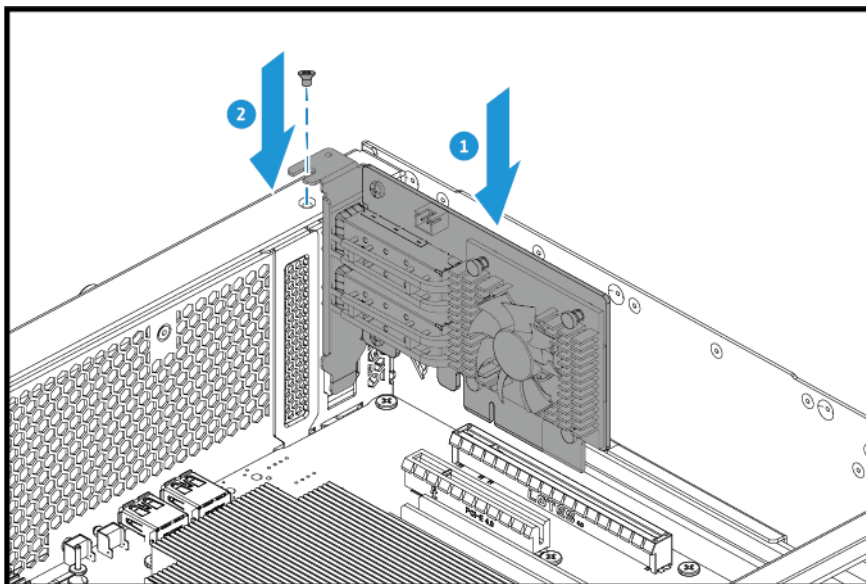
- c. Attach the QNAP bracket to the card using the same screws.



- d. Verify that the bracket does not move.

7. Install the expansion card.

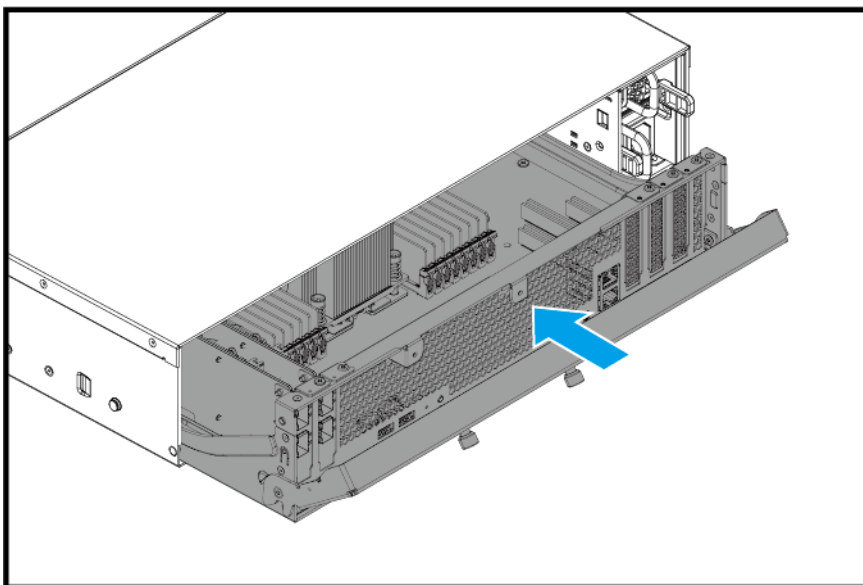
- a. Hold the card by the edges.
b. Insert the card into the slot.
c. Attach the screw.



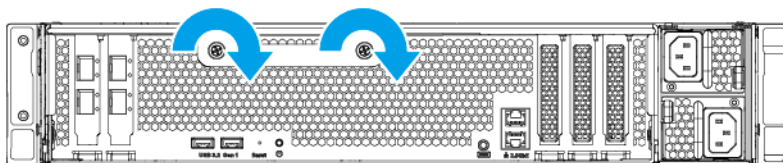
8. Attach the case cover.

- a. Place the cover on the device.

- b.** Push the device into the chassis.



- c.** Tighten the screws.



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

Installing Expansion Cards on the TS-h1090FU

The TS-h1090FU 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-h1090FU.

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.

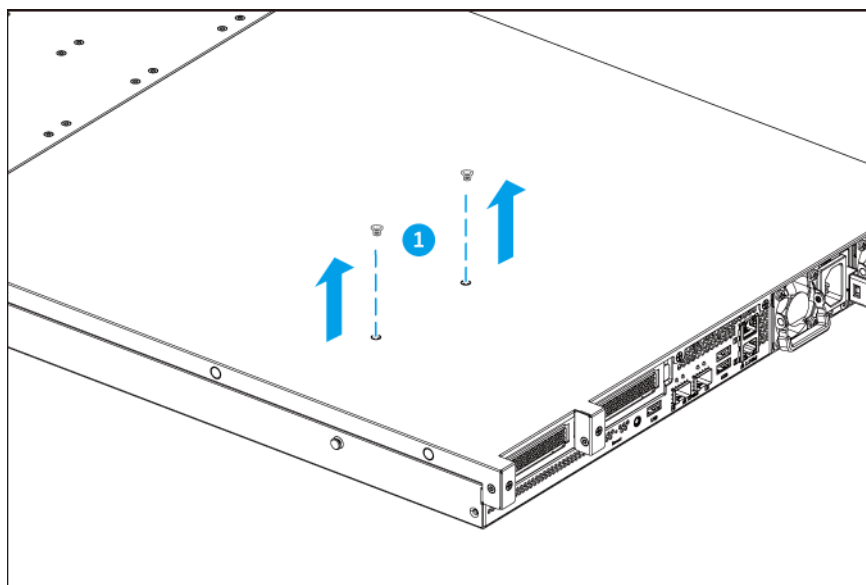


Other moving components: Keep your hands and other body parts away from other moving components.

Note

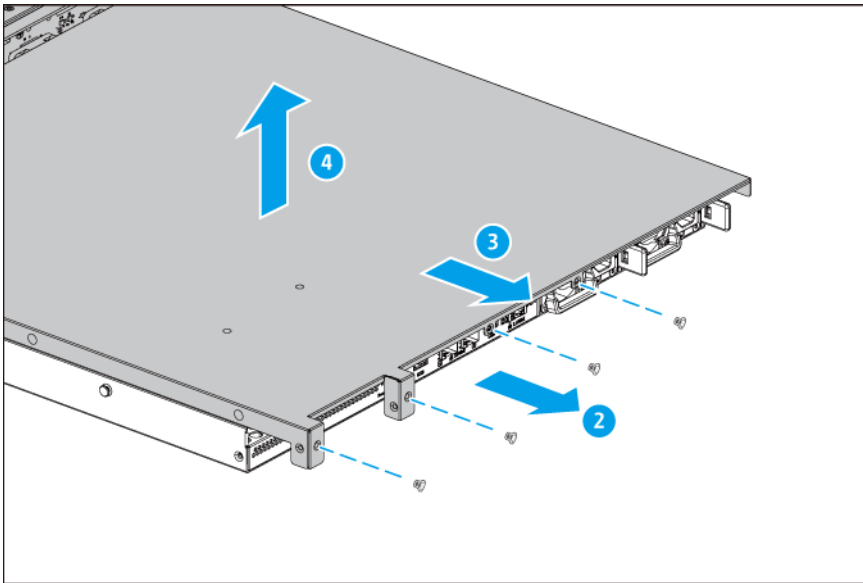
For expansion card slot numbering, see [System Board](#).

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



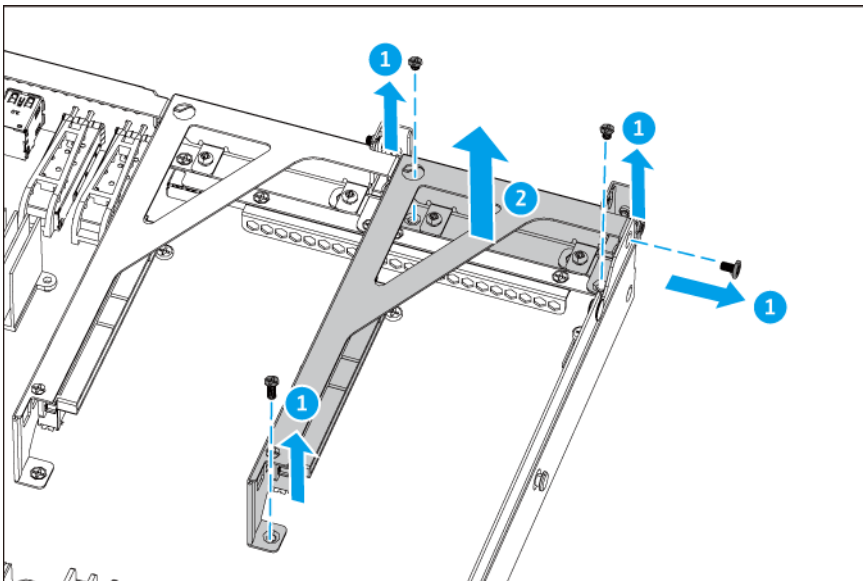
- b. Remove the screws on the rear panel.
- c. Slide the cover back.

- d. Lift the cover off the device.



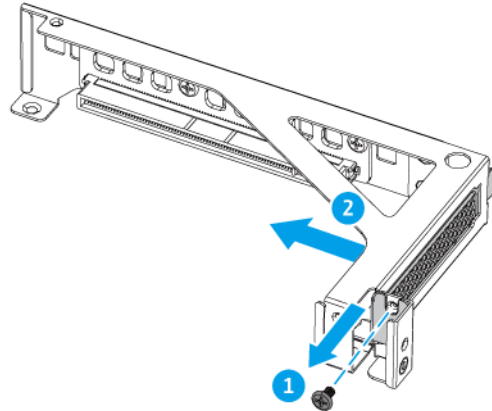
5. Remove the PCIe cover.

- a. Remove the screws that secure the expansion card module to the chassis.
b. Remove the expansion card module.



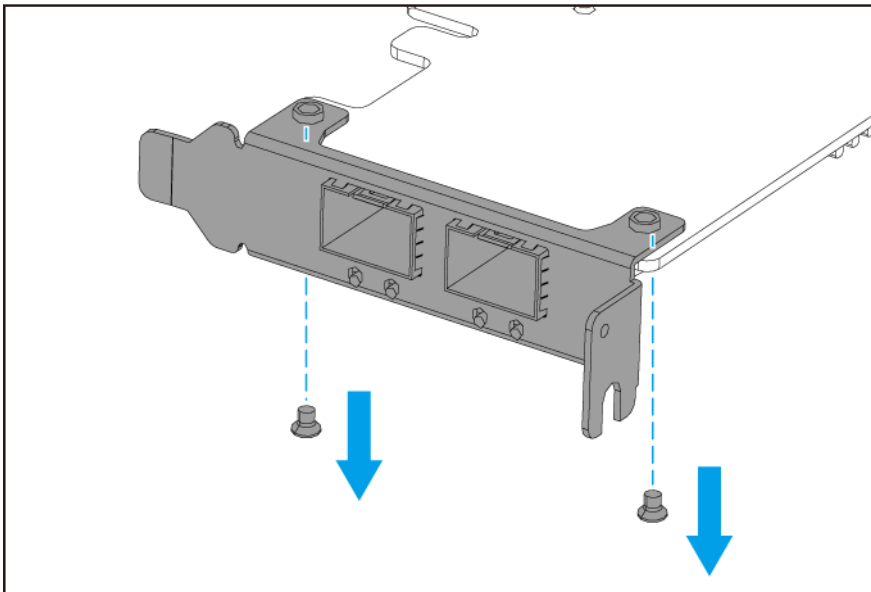
- c. Remove the screw that secures the cover to the expansion card module.

- d. Pull the cover away from the slot.



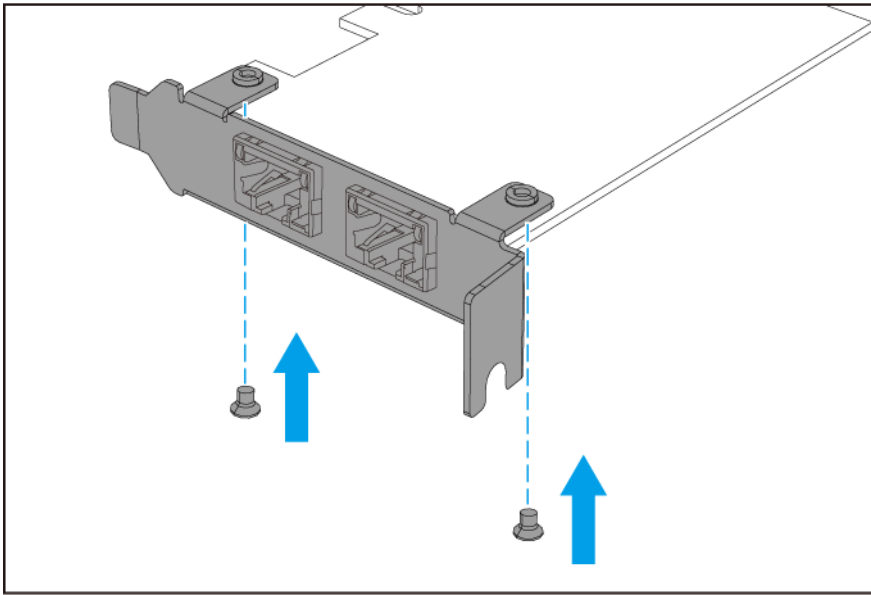
6. Optional: Attach the QNAP bracket to the expansion card.

- a. Remove all screws of the existing bracket.



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

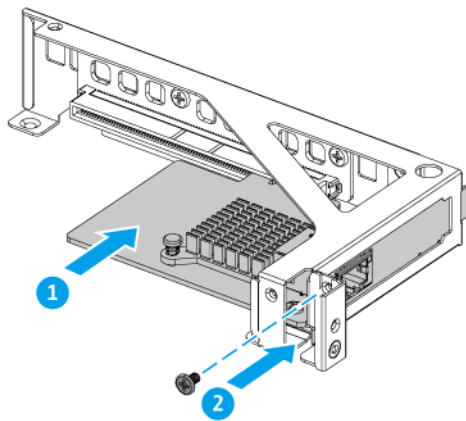
- c.** Attach the QNAP bracket to the card using the same screws.



- d.** Verify that the bracket does not move.

7. Install the expansion card.

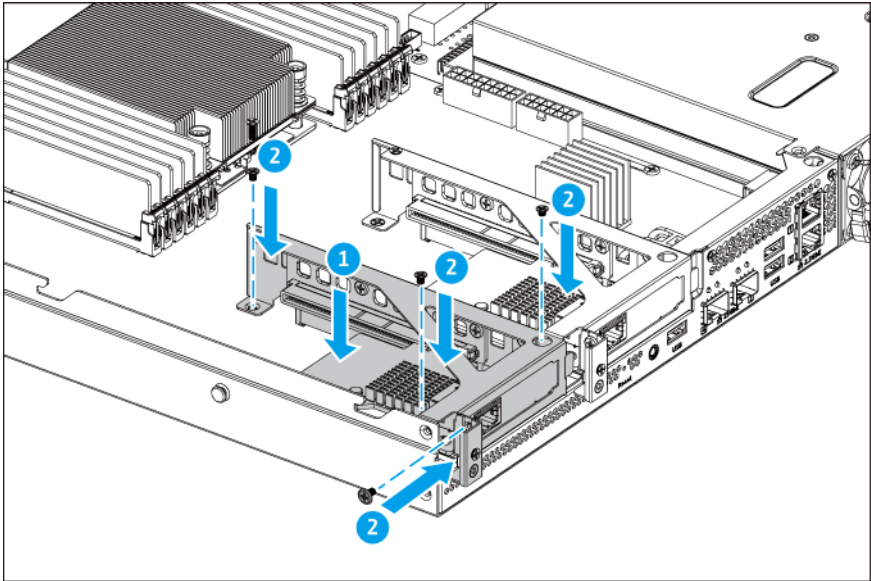
- a.** Hold the card by the edges.
b. Insert the card into the slot.
c. Attach the screw.



8. Attach the expansion card module.

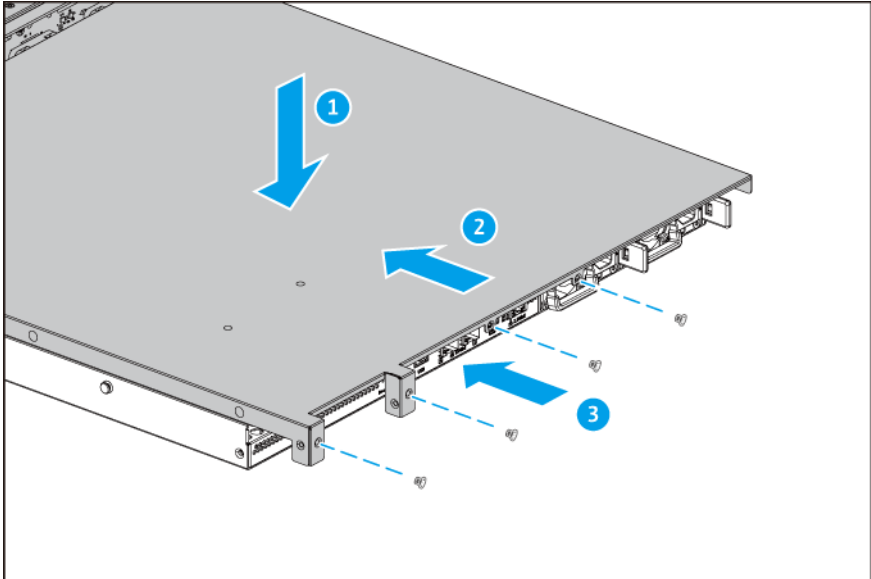
- a.** Insert the module into the chassis.

b. Attach the screws that secure the module to the chassis.

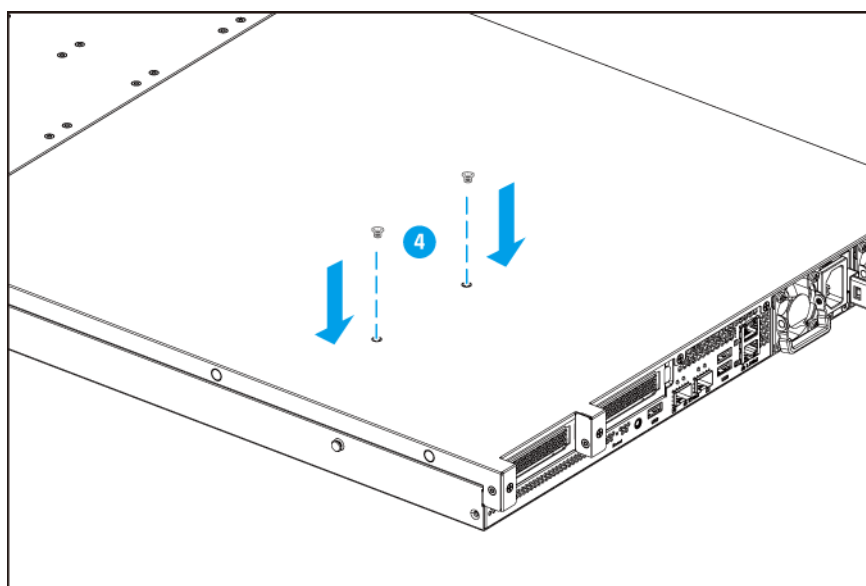


9. Attach the case cover.

- a. Place the cover on the device.
- b. Slide the cover forward.
- c. Attach the screws on the rear panel.



- d. Attach the top 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

NAS devices with redundant power supply units (PSUs) support hot-swapping.

Warning

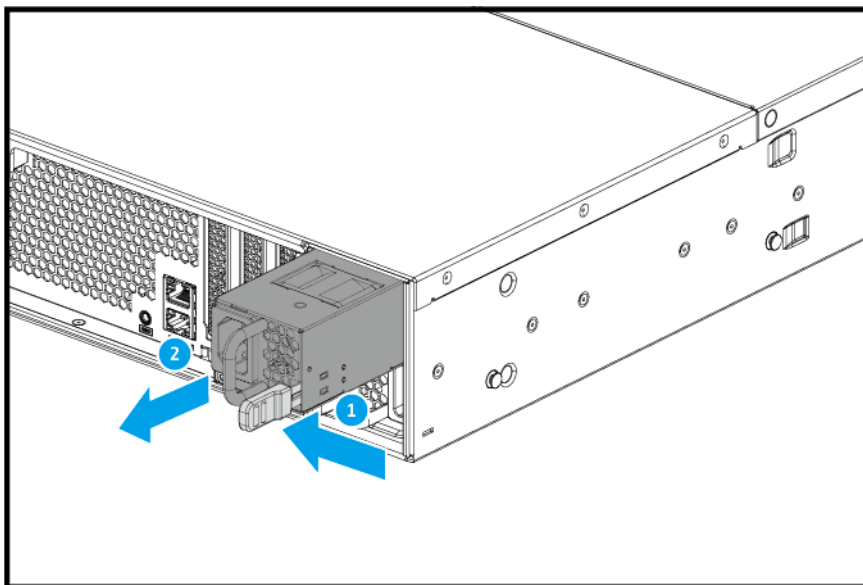
- Electric shock hazard.



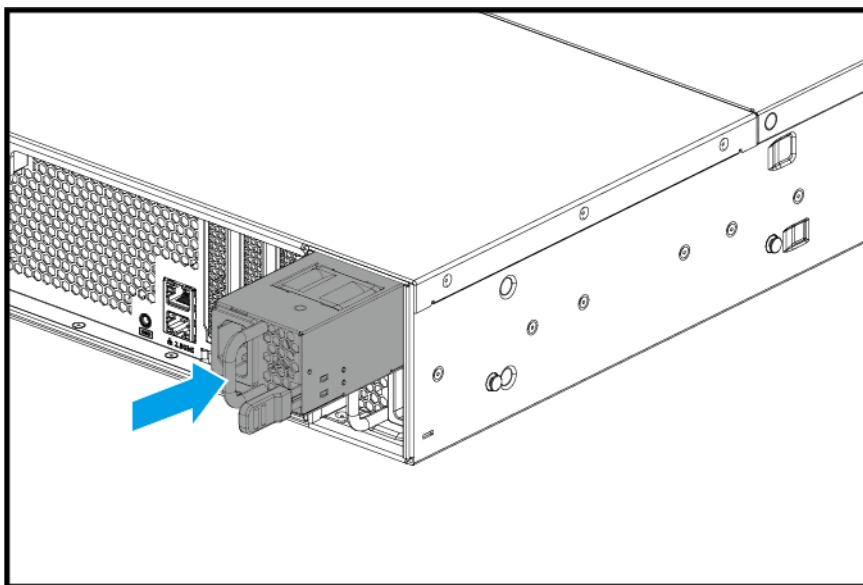
- The NAS may have one or more power supply unit (PSU) cords. To avoid serious injuries, a trained service technician must disconnect all PSU cords before installing or replacing system components.

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

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



3. Insert the new PSU.



4. Connect the power cord to the PSU and the electrical outlet.
5. 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 TS-hx90FU supports SAS expansion units 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
TL-D400S	<ul style="list-style-type: none"> • Uses a SATA 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 SATA 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 SATA 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-A1164 host bus adapter
TL-R400S	<ul style="list-style-type: none"> • Uses a SATA 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 SATA 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-A1164 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 HDD/SSD 	<ul style="list-style-type: none"> • USB 3.2 Gen 2 Type-A 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 HDD/SDD 	<ul style="list-style-type: none"> • USB 3.2 Gen 1 Type-A to Type-C cable
TR-004U	<ul style="list-style-type: none"> • Uses a USB 3.2 Gen 1 Type-C interface • Supports SATA HDD/SDD 	<ul style="list-style-type: none"> • USB 3.2 Gen 1 Type-A 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 HDD/SDD 	<ul style="list-style-type: none"> • USB 3.2 Gen 2 Type-A 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 HDD/SDD 	<ul style="list-style-type: none"> • USB 3.2 Gen 2 Type-A 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.

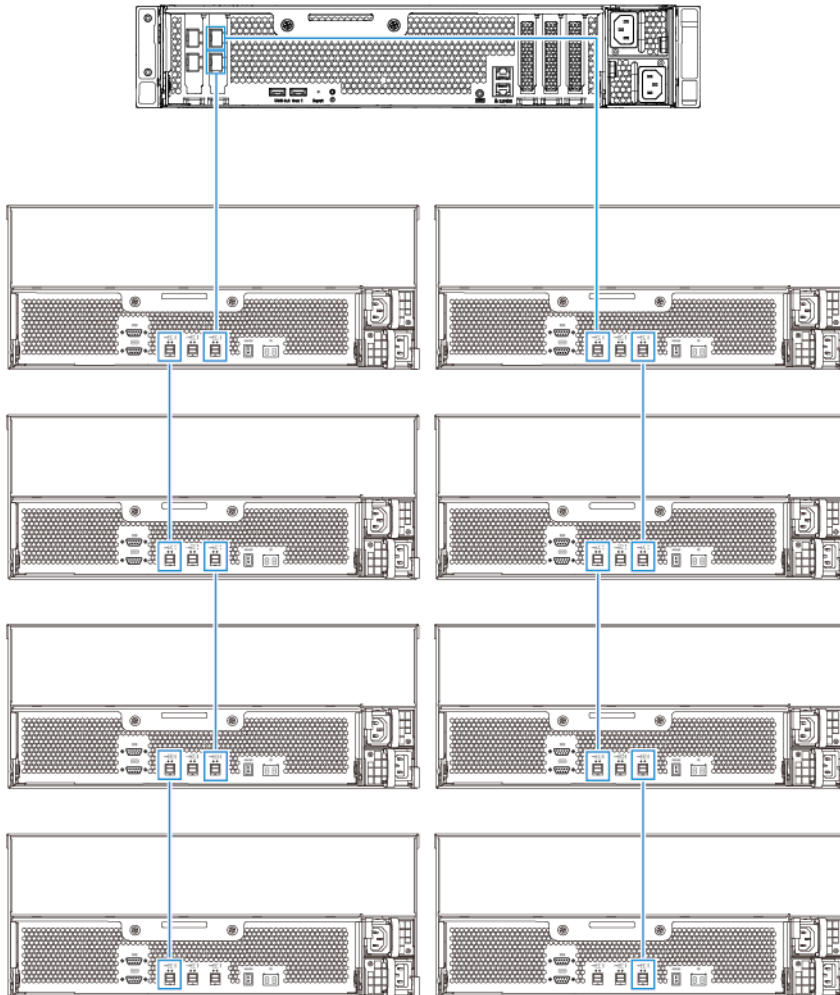
For required accessories details, see [Expansion Unit Installation](#).

1. Install a storage expansion card on the PCIe slot.

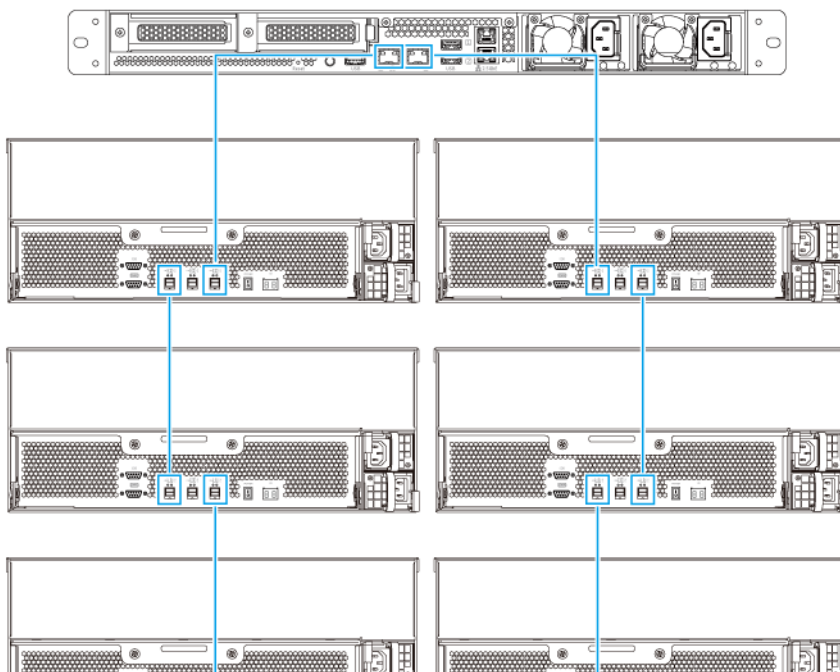
For details, see the following topics:

- [Replacing Expansion Cards on the TS-h2490FU](#)
- [Installing Expansion Cards on the TS-h1090FU](#)

2. Connect the expansion units to the device using the following topology.



TS-h2490FU



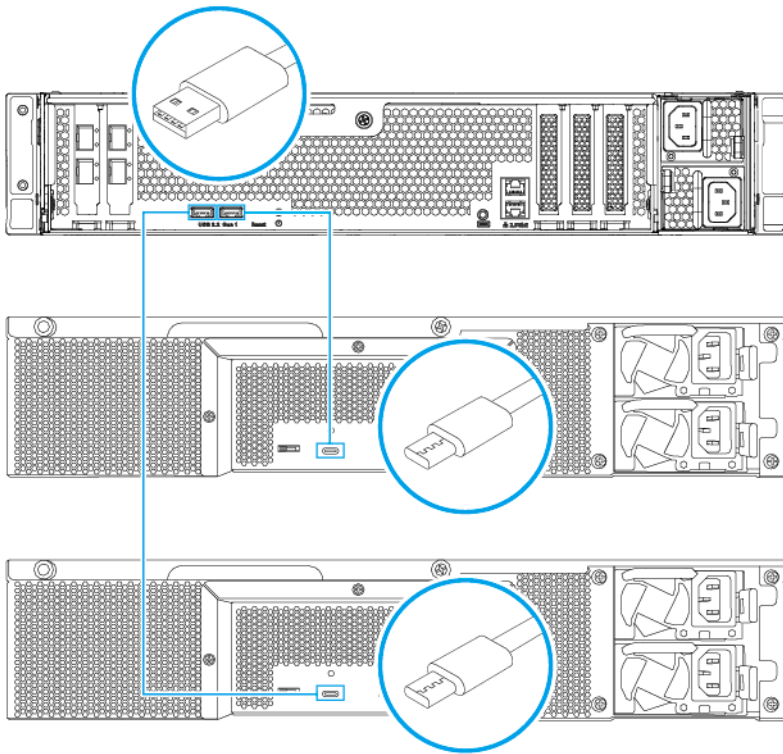
QNAP recommends always using dual-path configuration to prevent storage downtime due to expansion unit failure or cable disconnection. Single-path configuration should be used only in a situation where it is not possible to use dual-path configuration.

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.

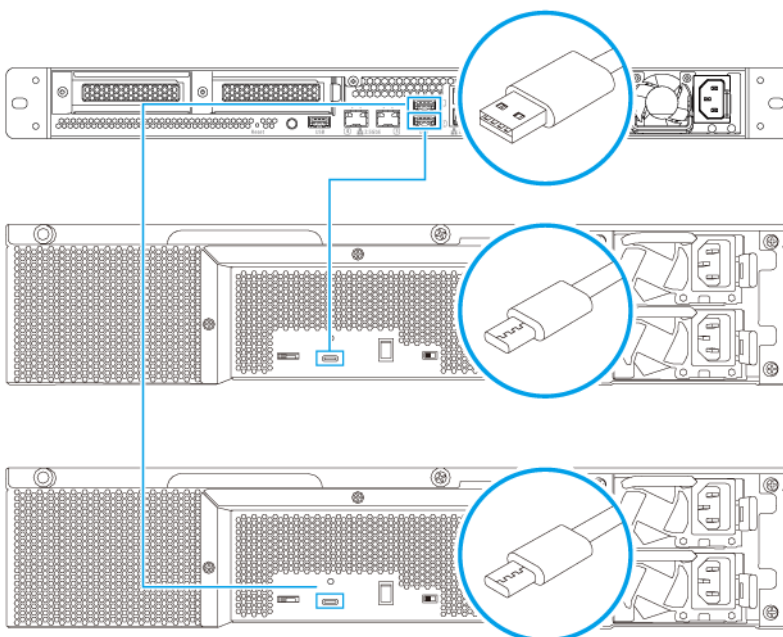
Connecting USB Expansion Units

To connect the TS-hx90FU to USB expansion units, USB Type-A 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 3.2 Gen 2 Type-A port on the NAS.



TS-h2490FU



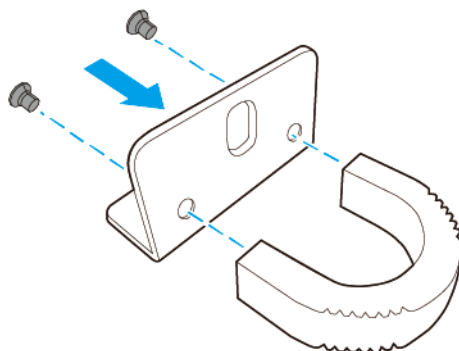
TS-h1090FU

2. Power on the expansion units.
3. 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.

Installing Handles

Installing handles enables you to better grip and secure the device on a rack.

1. Power off the NAS.
2. Install a handle on an angle bracket.
 - a. Align the openings on the handle with the two round screw holes on the angle bracket.
 - b. Attach the screws to lock the handle to the angle bracket.

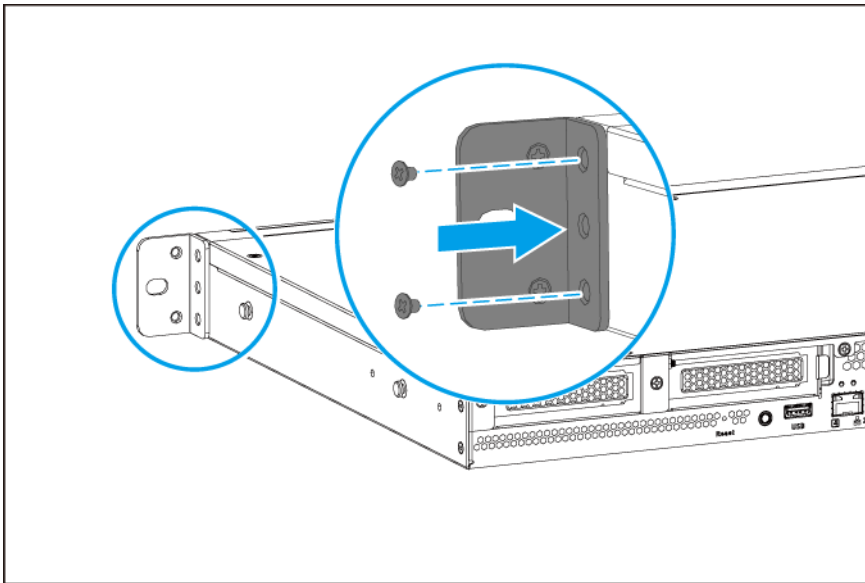


3. Install the angle bracket on the device.
 - a. Align the holes on the angle bracket with the holes on the chassis.

Note

Ensure that the handle faces the same direction as the front panel.

- b. Attach the screws.



4. Install a second handle on the other side of the chassis.
5. Power on the NAS.

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>.

Model	Compatible Rail Kit
TS-h2490FU	RAIL-A03-57
TS-h1090FU	RAIL-B02

You can find installation information in the rail kit package.

QuTS hero Installation

The TS-hx90FU 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

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 <https://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>

Installation methods	Steps
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 10 seconds.	<p>The device powers off.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Important</p> <p>Use this method only when the device is unresponsive.</p> </div> <div style="background-color: #e1eef6; padding: 10px; border: 1px solid #ccc; margin-top: 10px;"> <p>Note</p> <p>After forcing the device to power off, the fans will spin very fast for about 3 seconds. This is normal and to be expected.</p> </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"> • The <code>admin</code> account is automatically enabled. • System administrator password: For details on the default password, see this FAQ. • 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"> • A 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 style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Important When updating the firmware, do not remove the power cord or USB cable, and do not force-exit the application.</p> </div>
	Red	<ul style="list-style-type: none"> • A drive is invalid. • A shared folder has reached its full capacity. • A shared folder is about to reach its full capacity. • A 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.

LED	Status	Description
System status	Off	<ul style="list-style-type: none"> All drives are in standby mode. The device is powered off.
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.
LAN	Orange	The network connection is operating.
	Flashes orange	The device is being accessed from the network.
	Off	The device is not connected to a network.
2.5 Gigabit Ethernet speed	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"> The network connection is operating at 10 Mbps. There is no network connection.
2.5 Gigabit Ethernet activity	Orange	A network connection has been established.
	Flashes orange	The device is being accessed from the network.
	Off	There is no network connection.
10 Gigabit Ethernet	Green	The network connection is operating at 10 Gbps.

LED	Status	Description
10 Gigabit Ethernet	Flashes green	The device is being accessed from a 10 GbE network.
	Off	The device is not connected to a 10 GbE network.
25 Gigabit Ethernet speed	Green	The network connection is operating at 25 Gbps.
	Orange	The network connection is operating at 10 Gbps or 1 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.
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"> 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. The fan module has been removed. The NAS data cannot be copied to the external storage device connected to the front USB port.

Duration	Frequency	Description
Long beep (1.5 seconds)	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.

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> <div data-bbox="507 383 1385 584" style="background-color: #ffe6e6; padding: 10px;"> <p>Warning</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> </div>
Shared folders	<p>All shared folders and the downloaded files stored in them are retained.</p> <div data-bbox="507 685 1385 887" style="background-color: #ffe6e6; padding: 10px;"> <p>Warning</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> </div> <div data-bbox="507 913 1385 1077" style="background-color: #fff2cc; padding: 10px;"> <p>Important</p> <p>Folder permissions on the destination NAS must be reconfigured after migration.</p> </div>
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> <div data-bbox="507 1480 1385 1644" style="background-color: #ffe6e6; padding: 10px;"> <p>Warning</p> <p>QNAP recommends deactivating licenses on the source NAS before data migration.</p> </div>
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	≥ 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 QuTS hero.
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/go/nas-migration
Expansion Unit Compatibility	https://www.qnap.com/go/compatibility-expansion
Service Portal	https://service.qnap.com
Product Support Status	https://www.qnap.com/go/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

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 NAS devices in your local area network

QuTS hero

QNAP NAS operating system featuring ZFS file system

8. Notices

This chapter provides information about warranty, disclaimers, licensing, and federal regulations.

Limited warranty

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Version 3, 29 June 2007

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Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of protecting users' freedom to change the software. The systematic pattern of such abuse occurs in the area of products for individuals to use, which is precisely where it is most unacceptable. Therefore, we have designed this version of the GPL to prohibit the practice for those products. If such problems arise substantially in other domains, we stand ready to extend this provision to those domains in future versions of the GPL, as needed to protect the freedom of users.

Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it effectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

The precise terms and conditions for copying, distribution and modification follow.

Terms and Conditions

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To "modify" a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a "modified version" of the earlier work or a work "based on" the earlier work.

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To "propagate" a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To "convey" a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays "Appropriate Legal Notices" to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

2. Source Code.

The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source form of a work.

A "Standard Interface" means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

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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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