TS-hx77AXU-RP

TS-h1277AXU-RP
TS-h1677AXU-RP

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.

- 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.

-

  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

- This product contains 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.

- 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.

Moving Parts

-

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

-

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

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

2. Product Overview

This chapter provides basic information about your QNAP device.

About the TS-hx77AXU-RP

The high-capacity TS-hx77AXU-RP is powered by an AMD Ryzen™ 7000 series processor, supports up to 128 GB DDR5 memory, and provides an HDD/SSD hybrid storage architecture that delivers reliable server-grade performance. Running the ZFS-based QuTS hero operating system, the TS-hx77AXU-RP supports inline data deduplication, up to 65536 snapshots, real-time SnapSync, and QSAL (QNAP SSD Antiwear Leveling)—providing a storage solution that meets business requirements for file servers, virtualization servers, VDI, and backup/restore.

Hardware specifications

> **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
TS-h1277AXU-RP-R5-16G	AMD Ryzen™ 7000 Series (6-core)	16 GB
TS-h1277AXU-RP-R7-32G	AMD Ryzen™ 7000 Series (8-core)	32 GB
TS-h1677AXU-RP-R7-32G	AMD Ryzen™ 7000 Series (8-core)	32 GB

Component	TS-h1277AXU-RP-R5-16G / TS-h1277AXU-RP-R7-32G	TS-h1677AXU-RP-R7-32G
Processor		
Frequency	• TS-h1277AXU-RP-R5-16G: 6-core/12-thread up to 5.1 GHz burst • TS-h1277AXU-RP-R7-32G: 8-core/16-thread up to 5.3 GHz burst	8-core/16-thread up to 5.3 GHz burst
Architecture	x86 64-bit	
Encryption engine	AES-NI	
Memory		
Pre-installed memory	• TS-h1277AXU-RP-R5-16G: 16 GB RAM: 1 x 16 GB DDR5 UDIMM • TS-h1277AXU-RP-R7-32G: 32 GB RAM: 1 x 32 GB DDR5 UDIMM	32 GB RAM: 1 x 32 GB DDR5 UDIMM

Component	TS-h1277AXU-RP-R5-16G / TS-h1277AXU-RP-R7-32G	TS-h1677AXU-RP-R7-32G
Memory slots	4 x UDIMM DDR5 ⊘ **Important** • 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. • This device supports ECC memory modules.	
Maximum memory	128 GB RAM: 4 x 32 GB	
Flash memory	5 GB (dual-boot OS protection)	
Storage		
Drive bays	12 x 3.5-inch SATA	16 x 3.5-inch SATA
M.2 SSD slots	2 x PCIe Gen 5 x2 NVMe	
M.2 SSD form factor	2280	
Drive compatibility	3.5-inch bays: • 3.5-inch SATA hard disk drives • 2.5-inch SATA solid-state drives 💡 **Tip** • For the list of compatible drive models, go to https://www.qnap.com/compatibility. • The drive bays are backward compatible with SATA 3 Gbps drives.	
SSD cache acceleration support	This device supports SSD cache acceleration for all drives.	
Hot-swapping	The device supports hot-swapping drives except for the following: • M.2 SSDs	
Network		
2.5 Gigabit network interface	2 x 2.5 GbE (RJ45) 💬 **Note** The 2.5 Gigabit Ethernet RJ45 ports support the following network connectivity speeds: 2.5 GbE, 1 GbE, 100 Mbps, and 10 Mbps.	
10 Gigabit network interface	2 x 10GBASE-T (RJ45) 💬 **Note** The 10GBASE-T RJ45 ports support the following network connectivity speeds: 10 GbE, 5 GbE, 2.5 GbE, 1 GbE, and 100 Mbps.	

Component	TS-h1277AXU-RP-R5-16G / TS-h1277AXU-RP-R7-32G	TS-h1677AXU-RP-R7-32G
External I/O Ports & Expansion Slots		
PCIe slots	• Slot 1: PCIe Gen 4.0 x4 • Slot 2: PCIe Gen 4.0 x8 **Note** Slot 2 speed reduces from x8 to x4 when an expansion card is installed in slot 1. • Slot 3: PCIe Gen 4.0 x4 **Tip** For the list of compatible drive models and expansion cards, go to https://www.qnap.com/compatibility.	
USB ports	2 x USB 3.2 Gen 2 Type-A	
Interface		
Buttons	• Power • Reset	
Dimensions		
Form factor	2U Rackmount	3U Rackmount
Dimensions (H x W x D)	88 x 432 x 511 mm (3.46 x 17.01 x 20.12 in)	131 × 482 × 551 mm (5.16 x 18.98 x 21.69 in)
Net weight	13 kg (28.66 lbs)	15.64 kg (34.48 lbs)
Others		
Power supply unit	2 x 550W, 100-240V	
System battery	CR2032 lithium battery (3V, 225 mAh) **Warning** • 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. **Important** Dispose of used batteries according to local regulations or the instructions of the battery manufacturer.	
Fans	3 x 60 mm, 12V DC	
Operating temperature	0˚C to 40˚C (32˚F to 104˚F)	
Relative humidity	• Non-condensing relative humidity: 5% to 95% • Wet-bulb temperature: 27˚C (80.6˚F)	

Tip

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

Package contents

Item	Quantity
TS-hx77AXU-RP	1

Drive trays	• TS-h1277AXU-RP
	
	    • 3.5-inch drive trays: 12
	
	• TS-h1677AXU-RP
	
	    • 3.5-inch drive trays: 16

Power cords	2

Screws for 3.5-inch drives	• TS-h1277AXU-RP:
	  48 screws
	
	• TS-h1677AXU-RP:
	  64 screws

Quick Installation Guide (QIG)	1
Ethernet cable	1 x 10 GbE Cat6A Ethernet cable

Components

Front panel
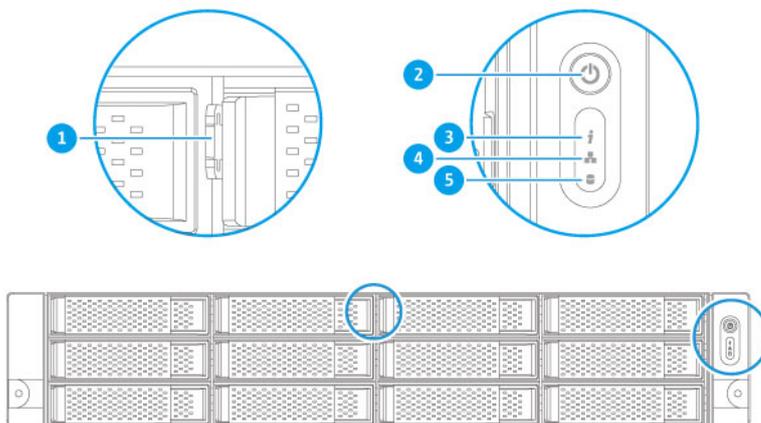
No.	Component	No.	Component
1	Drive LED	4	LAN LED
2	Power button	5	Expansion unit LED
3	Status LED	-	-

Rear panel
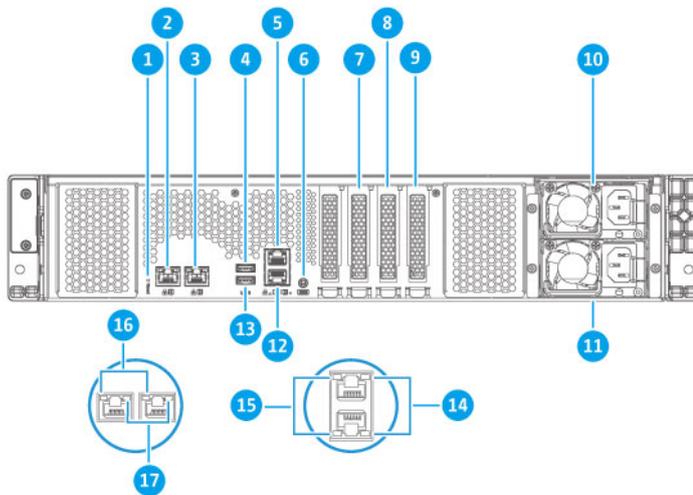
TS-hx77AXU-RP

No.	Component	No.	Component
1	Reset button	10	Power supply unit 1
2	10BASE-T port 1 (RJ45)	11	Power supply unit 2
3	10BASE-T port 2 (RJ45)	12	2.5 Gigabit Ethernet port 2 (RJ45)
4	USB 3.2 Gen 2 Type-A port 1	13	USB 3.2 Gen 2 Type-A port 2
5	2.5 Gigabit Ethernet port 1 (RJ45)	14	2.5 Gigabit Ethernet activity LEDs
6	Console port **Note** This port is only for engineering purposes.	15	2.5 Gigabit Ethernet speed LEDs
7	PCIe slot 3 cover	16	10 Gigabit Ethernet speed LEDs
8	PCIe slot 2 cover	17	10 Gigabit Ethernet activity LEDs
9	PCIe slot 1 cover	-	-

System board
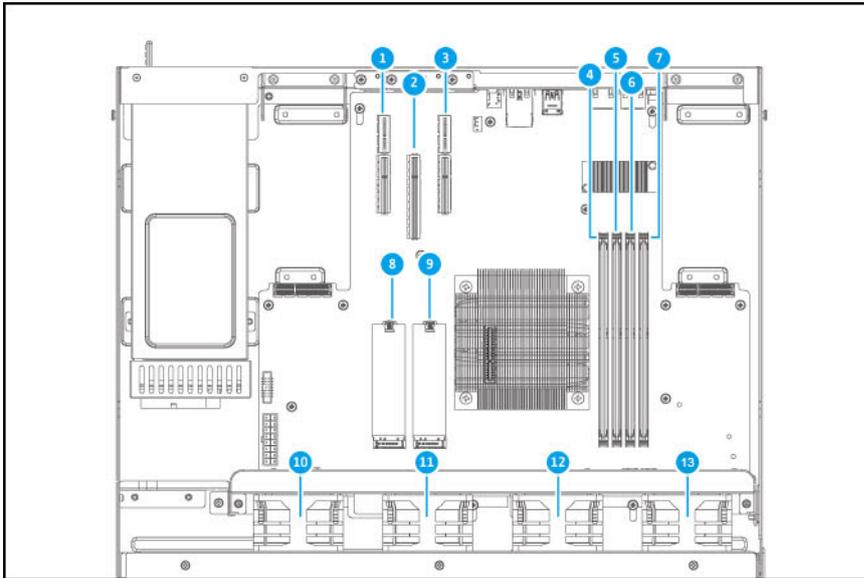
No.	Component	No.	Component
1	PCIe slot 1 (PCIe Gen 4.0 x4)	8	M.2 SSD slot 1
2	PCIe slot 2 (PCIe Gen 4.0 x8)	9	M.2 SSD slot 2
3	PCIe slot 3 (PCIe Gen 4.0 x4)	10	System fan 1
4	Memory slot 1 (Channel A, DIMM 1, black)	11	System fan 2
5	Memory slot 2 (Channel A, DIMM 2, blue)	12	System fan 3
6	Memory slot 3 (Channel B, DIMM 1, black)	13	System fan 4
7	Memory slot 4 (Channel B, DIMM 2, blue)	-	-

Front drive numbering
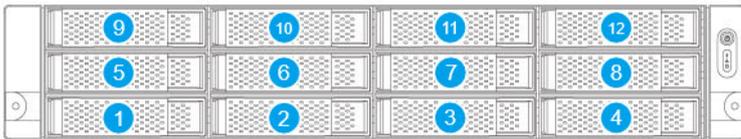
TS-h1277AXU-RP
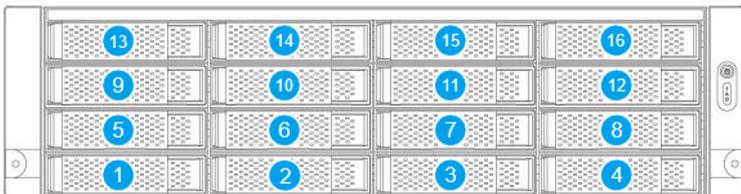
TS-h1677AXU-RP

Installation requirements

Category	Item
Environment	• 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 device ventilation or apply pressure to the device or power cord
Hardware and peripherals	• Storage drives For the list of compatible drive models, go to https://www.qnap.com/compatibility.
	• Network cable
Tools	• 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. Optional: Replace or install additional memory modules.
   For details, see Replacing memory modules.

3. Optional: Install expansion cards.
   For details, see Installing PCIe expansion cards.

4. Optional: Connect expansion units.
   For details, see Expansion unit installation.

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

   - Installing 3.5-inch hard drives

   - Installing 2.5-inch solid-state drives

   - Installing M.2 solid-state drives

6. Connect the power cords and all applicable cables.

> **Note**
> To set up redundant power supply, connect power cords to both power supply units.

7. Power on the NAS.

8. Install QuTS hero.
   For details, see QuTS hero installation.

9. Log on to QuTS hero.

3. Installation and Configuration

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

Hardware installation

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

Removing the case cover

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.

1. Power off the device.

2. Disconnect the power cords from the electrical outlet.

3. Disconnect all cables and external attachments.

4. Loosen the screws that secure the top cover to the chassis.

TS-h1277AXU-RP
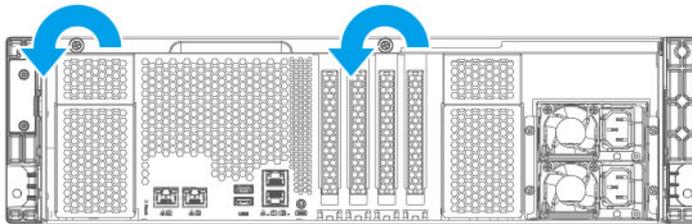
TS-h1677AXU-RP

5. Slide the top cover back.

6. Lift the top cover off the device.
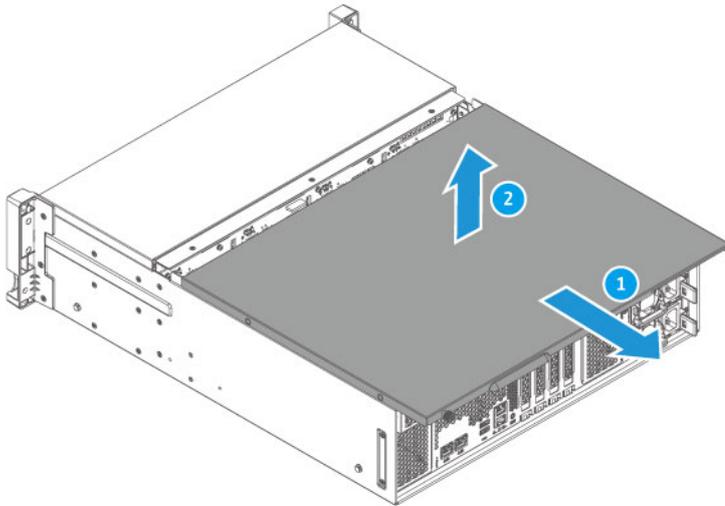
Attaching the case cover

⚠️ **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.
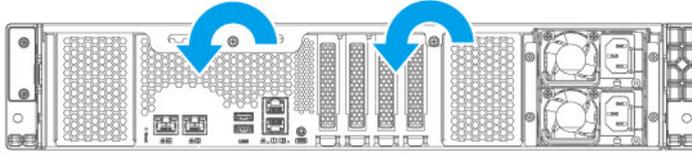
-

  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.

1. Place the cover on the device.

2. Slide the cover forward.
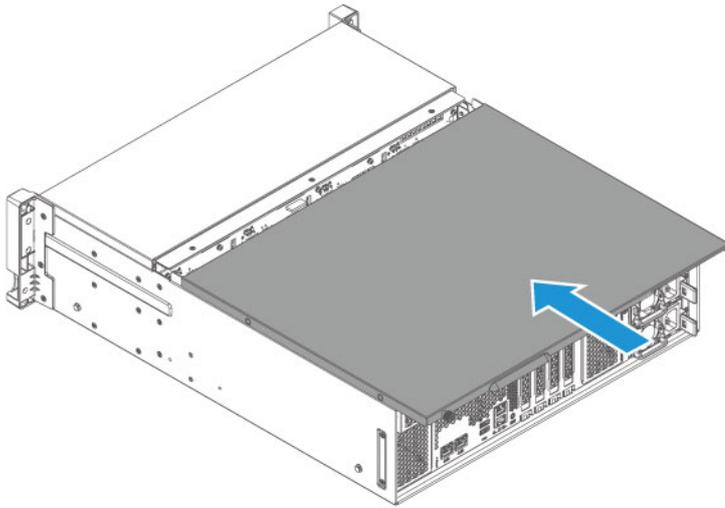
3. Tighten the screws.
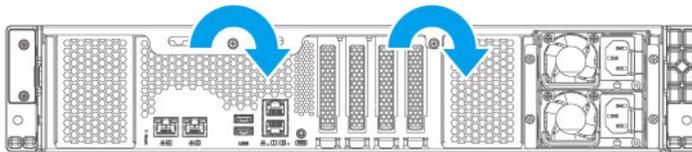
TS-h1277AXU-RP
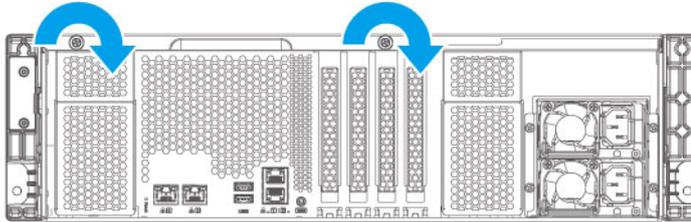
TS-h1677AXU-RP

Drive installation

The TS-hx77AXU-RP is compatible with 3.5-inch hard drives, 2.5-inch solid-state drives, and M.2 solid-state drives.

Installing 2.5-inch solid-state drives

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

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

1. Power off the NAS.

2. Remove the drive tray.

   a. Pull the handle to release the tray.

   b. Pull the tray out.
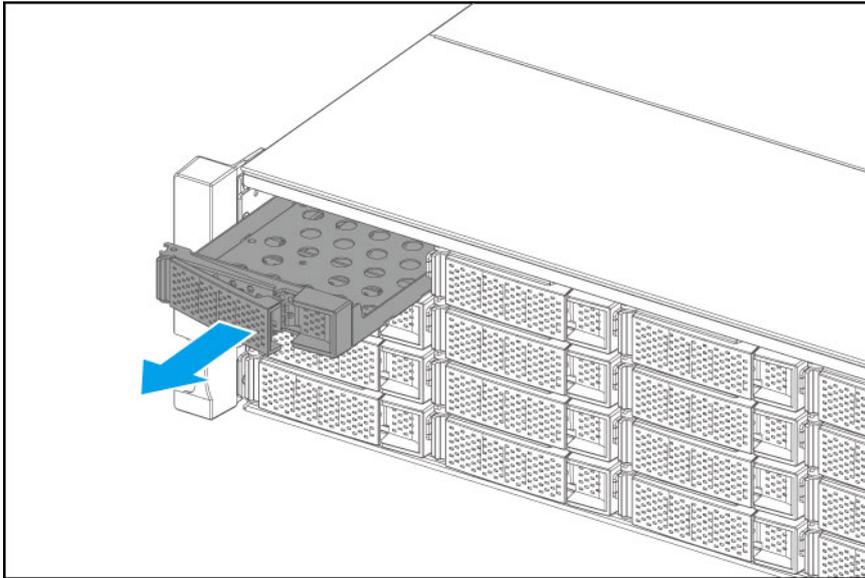
3. Install a drive on the tray.

    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.
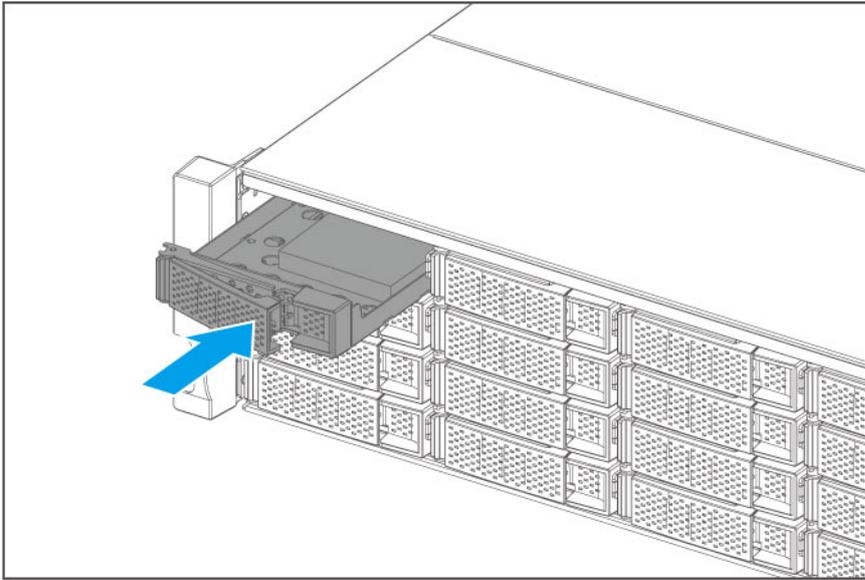
5. Power on the NAS.

Installing 3.5-inch hard drives

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

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

1. Power off the NAS.

2. Remove the drive tray.

   a. Pull the handle to release the tray.

   b. Pull the tray out.
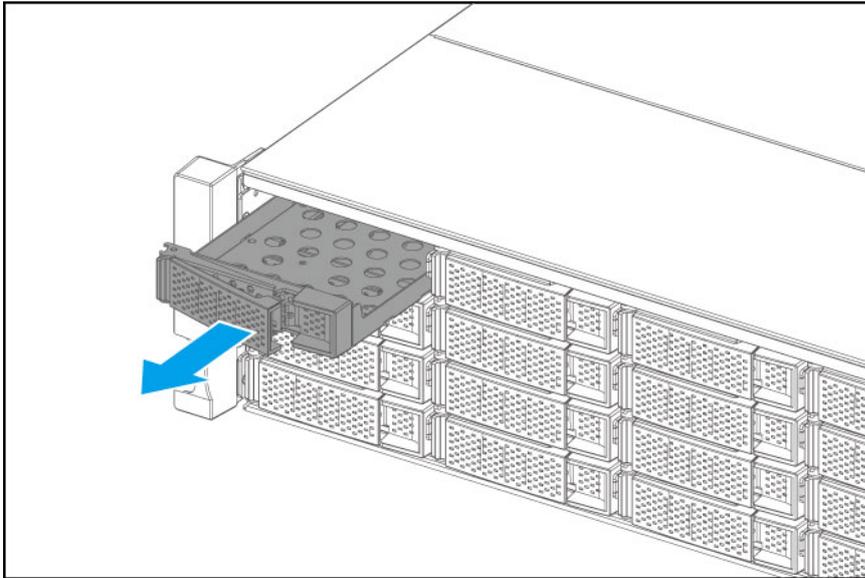
3. Install a drive on the tray.

    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.
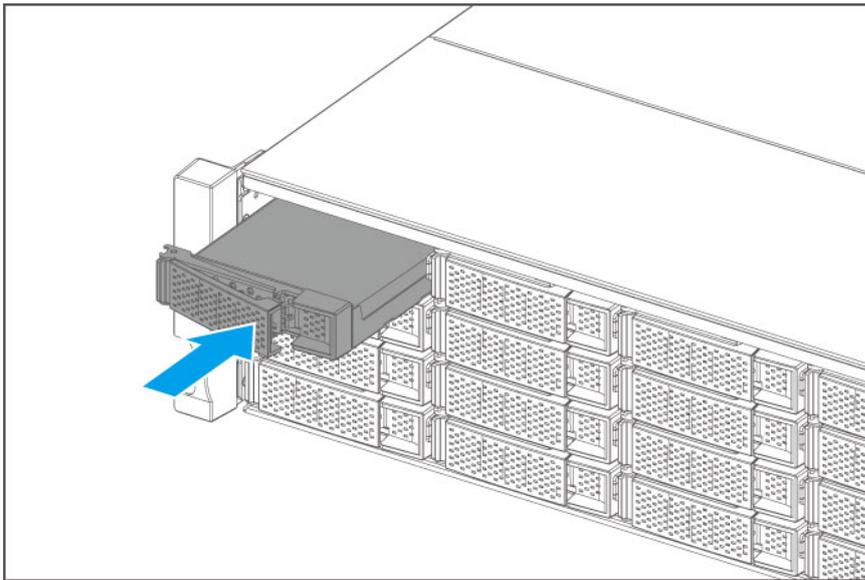
5. Power on the NAS.

Installing M.2 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.

-

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

1. Power off the device.

2. Disconnect the power cords from the electrical outlet.

3. Disconnect all cables and external attachments.

4. Remove the case cover.
   For details, see Removing the case cover.

5. Optional: Remove an M.2 SSD.

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

    a. Pull out the pushpin.

    b. Remove the M.2 SSD.
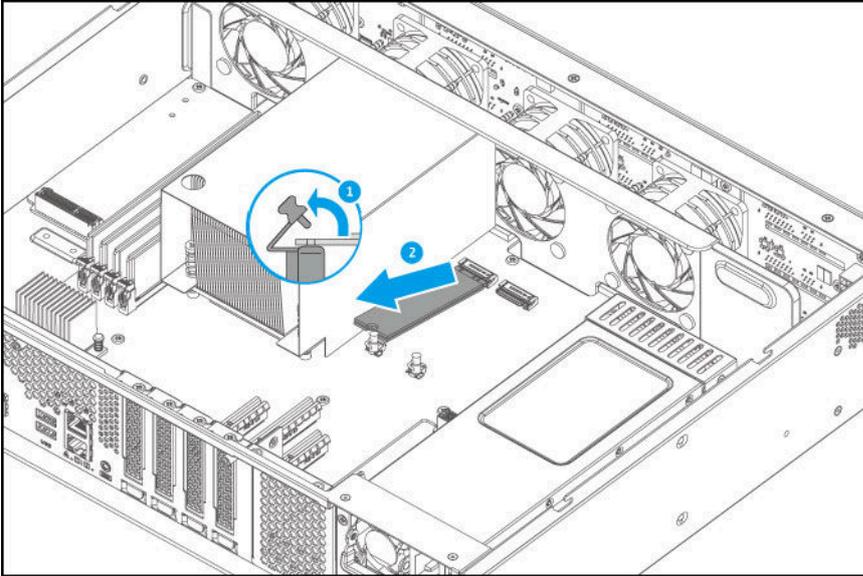
6. Install the M.2 SSD.

    a. Pull out the pushpin.

    b. Insert the M.2 SSD into the slot.

    c. Insert the pushpin to secure the drive.
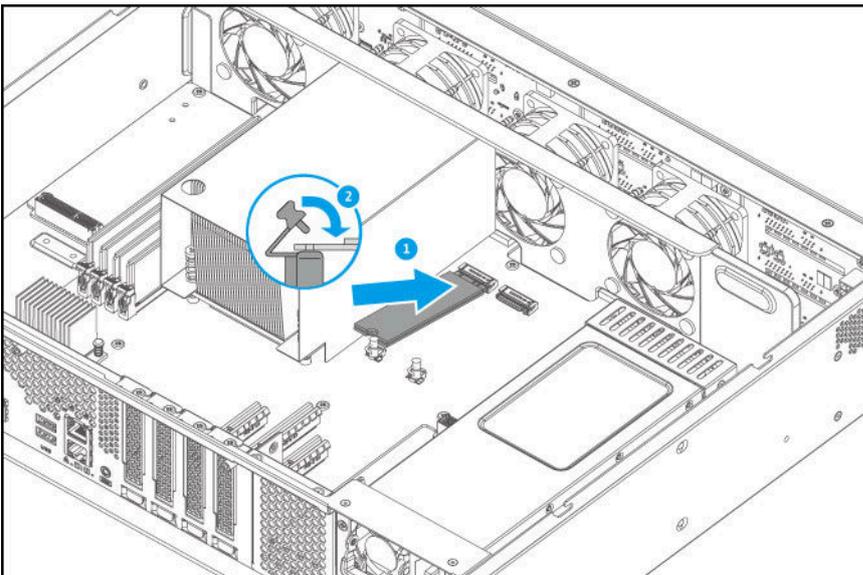
7. Optional: Install an additional M.2 SSD.

8. Attach the case cover.

> **Note**
> For details, see Attaching the case cover.

9. Connect the power cords to the electrical outlet.

10. Connect all cables and external attachments.

11. Power on the device.

Replacing memory modules

This NAS has four memory slots. You can increase the memory capacity of the NAS by upgrading the memory modules.

This NAS also comes preinstalled with one or two non-ECC memory modules. To provide extra protection from undetected data corruption, you can upgrade to ECC memory modules.

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.

> **Important**
> Ensure the following when replacing memory modules:
>
> - When installing only one module, use slot 4.
>
> - When installing two modules, use slots 2 and 4. Ensure that the modules are identical.
>
> - When installing four modules, use slots 2 and 4 for the first pair, and slots 1 and 3 for the second pair. Ensure that each pair uses identical modules.
>
> - 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.
>
> For details on slot numbering, see System board.

> **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.

1. Power off the device.

2. Disconnect the power cords from the electrical outlet.

3. Disconnect all cables and external attachments.

4. Remove the case cover.
   For details, see Removing the case cover.

5. Optional: Remove an existing module.

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

   a. Push the retention clips outward simultaneously to release the module.

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

   b. Hold the module by the edges.

   c. Carefully slide the module out of the slot.
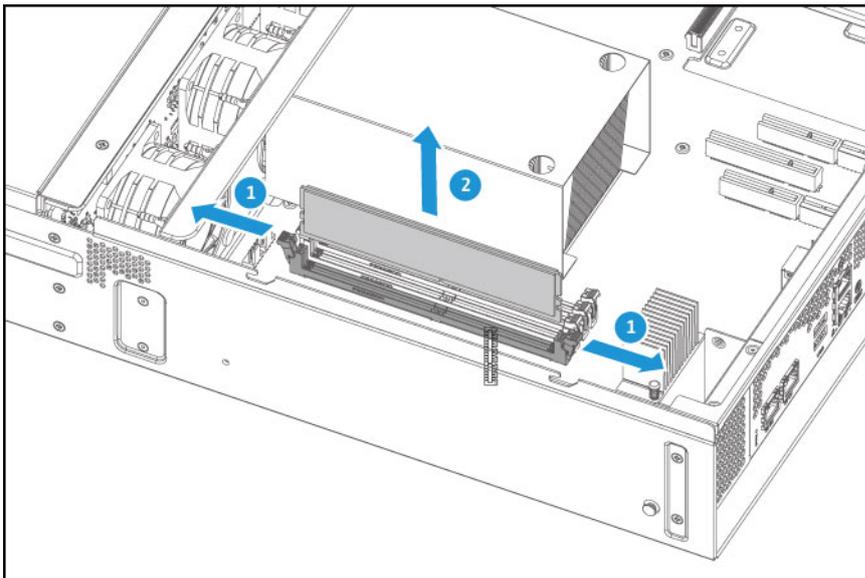
6. Install a new module.

   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.
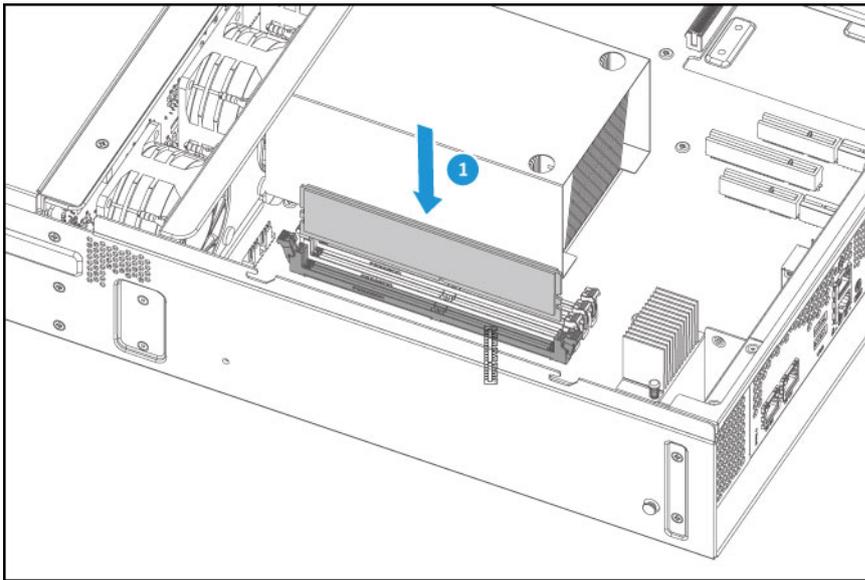
7. Attach the case cover.
   For details, see Attaching the case cover.

8. Connect all cables and external attachments.

9. Connect the power cords to the electrical outlet.

10. Power on the device.

11. 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**.

Installing PCIe expansion cards

The NAS 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 all QNAP NAS models.

> ⚠ **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.

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 cords from the electrical outlet.

4. Disconnect all cables and external attachments.

5. Remove the case cover.
   For details, see Removing the case cover.

6. Remove the PCIe cover.

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

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

   b. Pull the cover away from the slot.
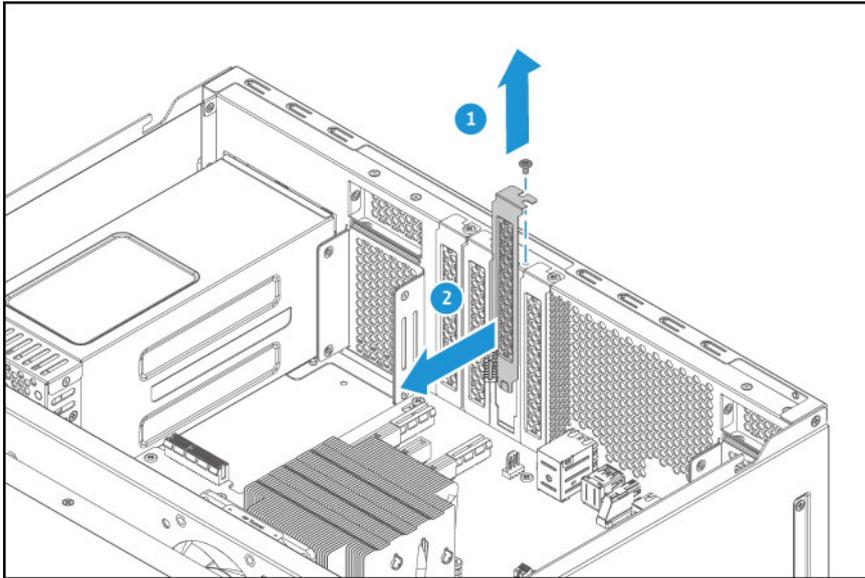
7. Optional: Attach the QNAP bracket to the expansion card.

    a. Remove all screws of the existing bracket.
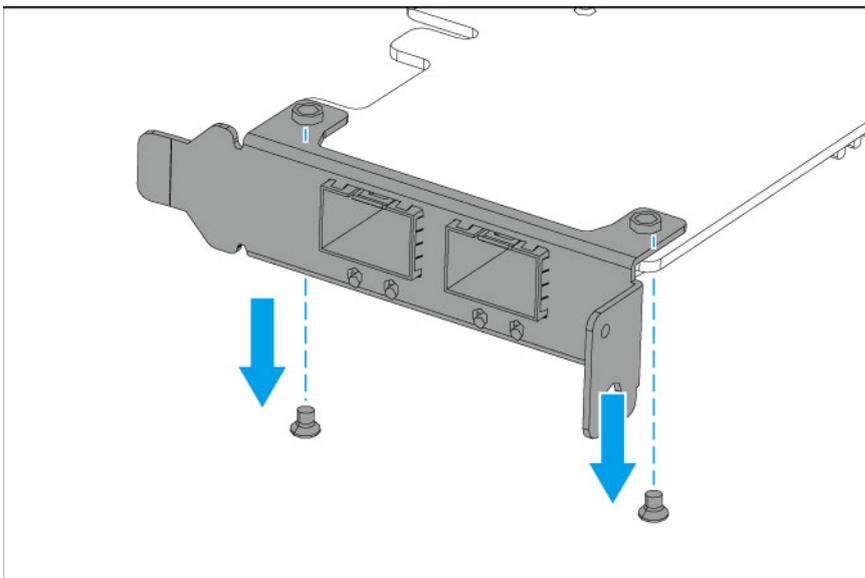
    b. Carefully pull the bracket away from the card.

    c. Attach the QNAP bracket to the card using the same screws.
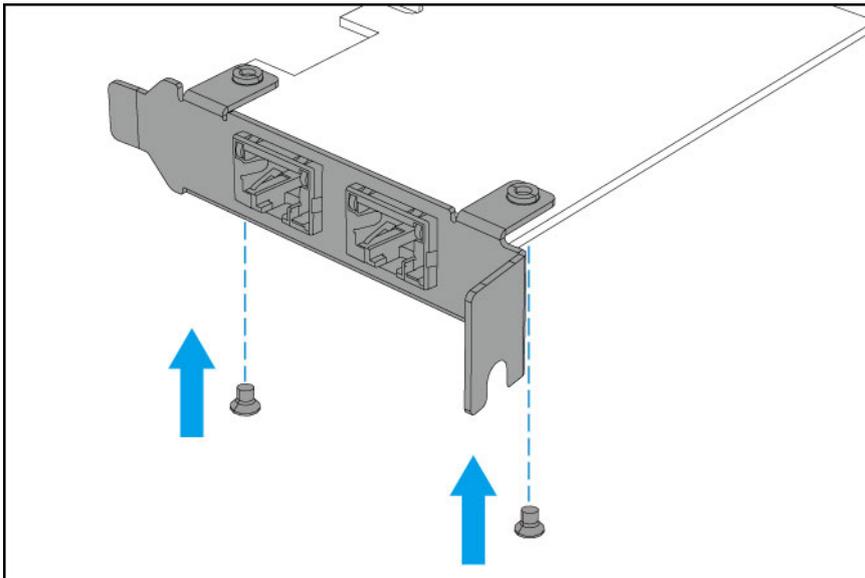
    d. Verify that the bracket does not move.

8. Install the expansion card.

    a. Hold the card by the edges.

    b. Insert the card into the slot.

    c. Attach the screw.
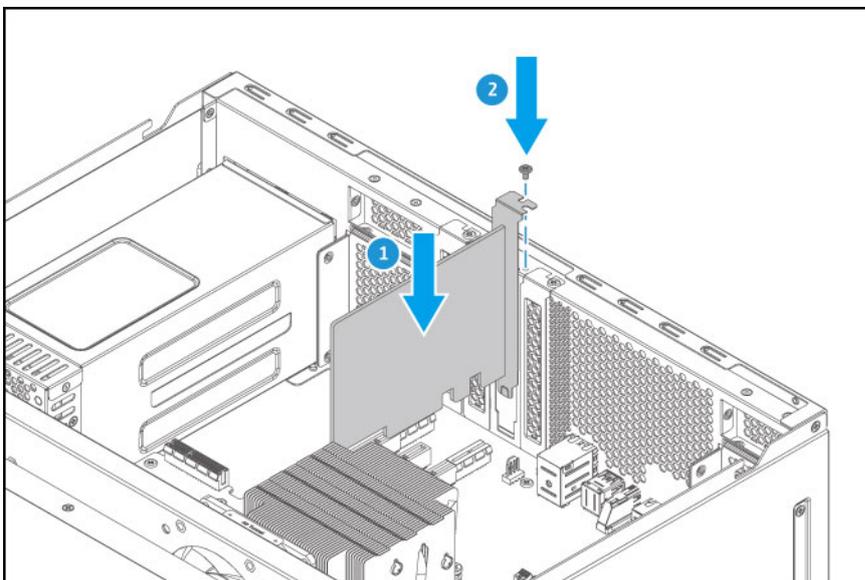
9. Attach the case cover.
For details, see Attaching the case cover.

10. Connect all cables and external attachments.

11. Connect the power cords to the electrical outlet.

12. Power on the device.

Hot-swapping redundant power supplies

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

> ⚠️ **Warning**
> Electric shock hazard.

> 💡 **Tip**
> By default, the NAS issues audio alerts and desktop notifications in case of redundant PSU failures. Redundant PSU failures include when the NAS is operating on a single healthy PSU only. In this case, if you want to stop receiving redundant PSU failure alerts and notifications, go to **Control Panel** > **System** > **Hardware** > **General** and deselect **Enable redundant power supply mode**.

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.
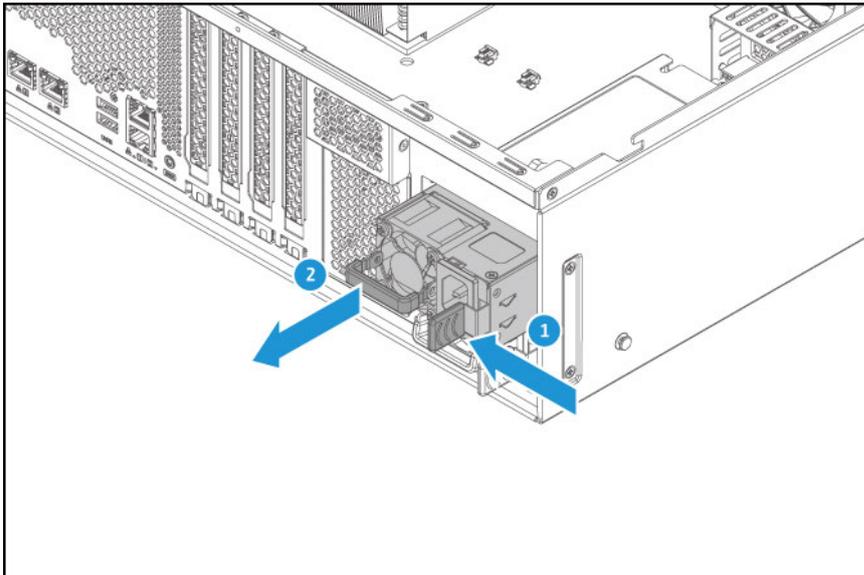
3. Insert the new PSU.
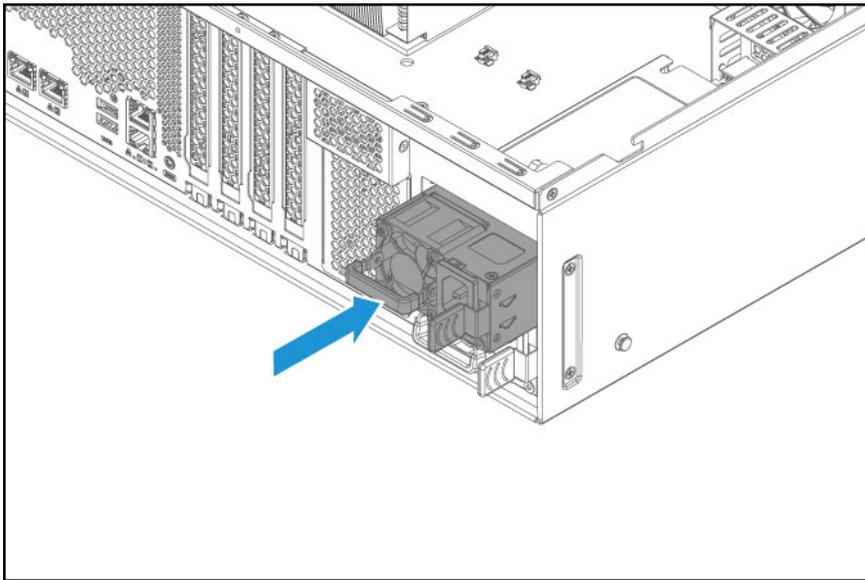
4. Connect the power cord to the PSU and the electrical outlet.

Replacing system fans

> **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.

1. Power off the device.

2. Disconnect the power cords from the electrical outlet.

3. Disconnect all cables and external attachments.

4. Remove the case cover.
   For details, see Removing the case cover.

5. Remove the fan unit from the chassis.

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

    a. Disconnect the power connectors of all fans from the system board.

    b. Lift the fan unit out of the chassis.
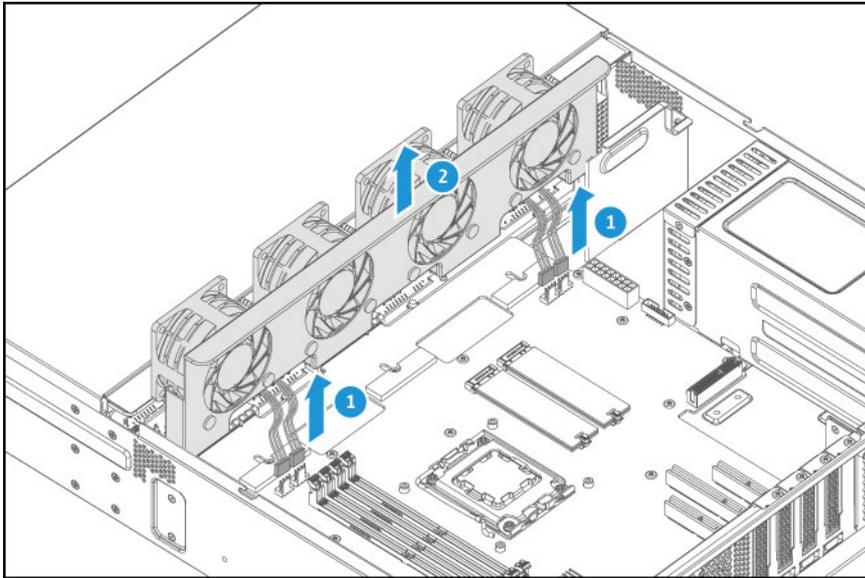
6. Remove the fan.

    a. Remove the rubber pins that secure the fan to the fan unit.
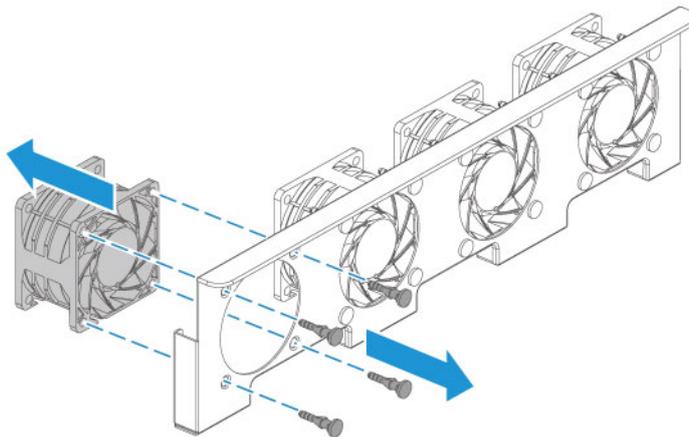
7. Install a new fan.

    a. Align the fan to the screw holes on the fan unit.

    b. Attach the rubber pins that secure the fan to the fan unit.
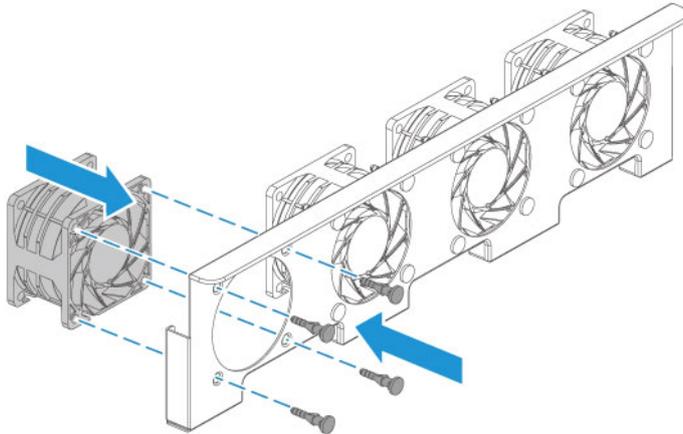
8. Install the fan unit.

   a. Insert the fan unit.

   b. Connect the power connectors of all fans to the system board.
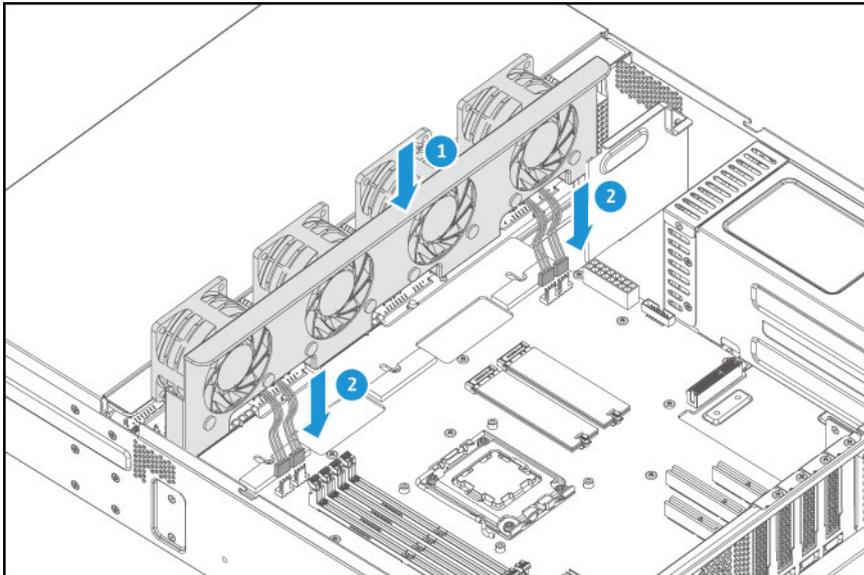
9. Attach the case cover.
   For details, see Attaching the case cover.

10. Connect all cables and external attachments.

11. Connect the power cords to the electrical outlet.

12. Power on the device.

Rail kits

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

The TS-hx77AXU-RP is compatible with the following rail kit models:

Model	Compatible Rail Kit
TS-hx77AXU-RP	RAIL-B02

You can find installation information in the rail kit package.

Expansion unit installation

The TS-hx77AXU-RP supports SAS, SATA JBOD, and USB expansion units. For details, see the table below.

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

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

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

Expansion Unit Model	Description	Required Accessories
SAS expansion units		

TL-R1620Sep-RP	• Uses a SAS 12 Gbps (SFF-8644) interface
	
	• Supports SAS/SATA HDD/SSD
		• One of the following storage expansion cards:
		
		  • QXP-820S-B3408
		
		  • QXP-1620S-B3616W
		
		• mini-SAS SFF-8644 cable
		
		• RAIL-B02

TL-R1220Sep-RP	• Uses a SAS 12 Gbps (SFF-8644) interface
	
	• Supports SAS/SATA HDD/SSD
		• One of the following storage expansion cards:
		
		  • QXP-820S-B3408
		
		  • QXP-1620S-B3616W
		
		• mini-SAS SFF-8644 cable
		
		• RAIL-B02

USB expansion units		
TR-002	• Uses a USB 3.2 Gen 2 Type-C interface • Supports SATA HDD/SSD	• USB 3.2 Gen 2 Type-A to Type-C cable
TR-004	• Uses a USB 3.2 Gen 1 Type-C interface • Supports SATA HDD/SSD	• USB 3.2 Gen 1 Type-A to Type-C cable

Expansion Unit Model	Description	Required Accessories
TR-004U	• Uses a USB 3.2 Gen 1 Type-C interface • Supports SATA HDD/SSD	• USB 3.2 Gen 1 Type-A to Type-C cable • RAIL-B02
TL-D800C	• Uses a USB 3.2 Gen 2 Type-C interface • Supports SATA HDD/SSD	• USB 3.2 Gen 2 Type-A to Type-C cable
TL-R1200C-RP	• Uses a USB 3.2 Gen 2 Type-C interface • Supports SATA HDD/SSD	• USB 3.2 Gen 2 Type-A to Type-C cable • RAIL-B02
SATA expansion units		
TL-D400S	• Uses a SATA 6 Gbps (SFF-8088) interface • Supports SATA HDD/SSD	• 1 x SFF-8088 connector cable • QXP-400eS-A1164 host bus adapter
TL-D800S	• Uses a SATA 6 Gbps (SFF-8088) interface • Supports SATA HDD/SSD	• 2 x SFF-8088 connector cables • QXP-800eS-A1164 host bus adapter
TL-D1600S	• Uses a SATA 6 Gbps (SFF-8088) interface • Supports SATA HDD/SSD	• 4 x SFF-8088 to SFF-8644 connector cables • QXP-1600eS-A1164 host bus adapter
TL-R1200S-RP	• Uses a SATA 6 Gbps (SFF-8088) interface • Supports SATA HDD/SSD	• 3 x SFF-8088 to SFF-8644 connector cables • QXP-1600eS-A1164 host bus adapter • RAIL-B02
TL-R400S	• Uses a SATA 6 Gbps (SFF-8088) interface • Supports SATA HDD/SSD	• 1 x SFF-8088 connector cable • QXP-400eS-A1164 host bus adapter • 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 Installing PCIe expansion cards.

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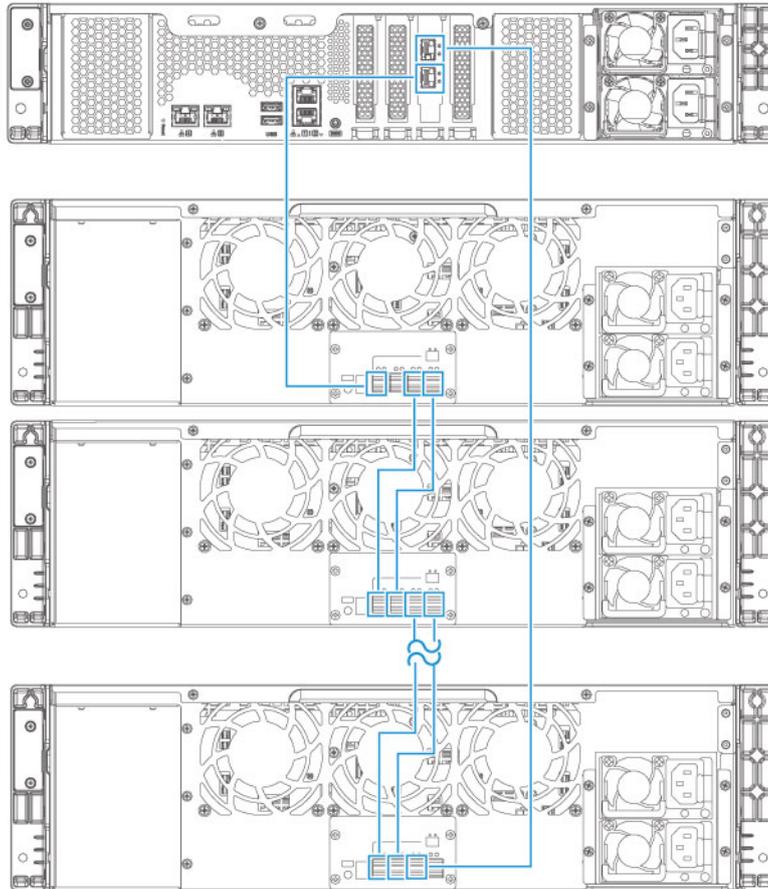
QNAP recommends always using dual-path configuration to prevent storage downtime due to expansion unit failure or cable disconnection. Single-path configuration should be used only in a situation where it is not possible to use dual-path configuration.

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

The TS-hx77AXU-RP series supports connecting one SATA JBOD expansion unit. 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 Installing PCIe expansion cards.

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

3. Connect the expansion unit to the NAS.
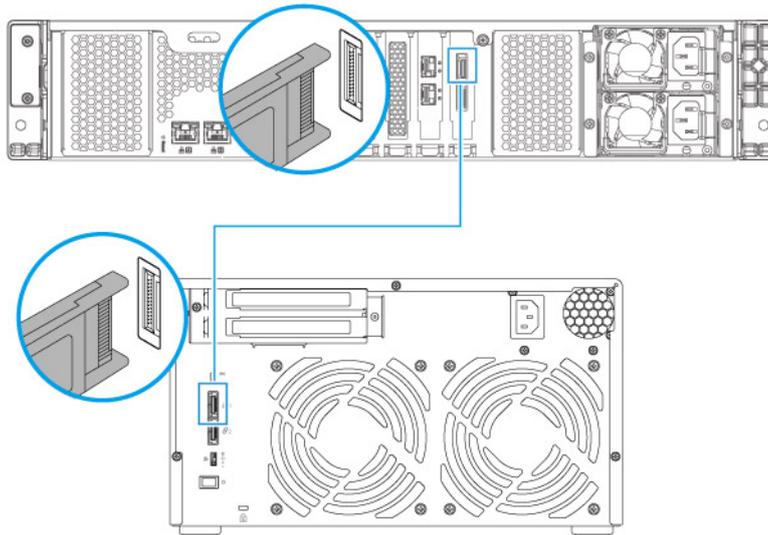
4. Power on the expansion unit.

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 TS-hx77AXU-RP to USB expansion units, a USB Type-A to USB Type-C cable is 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.
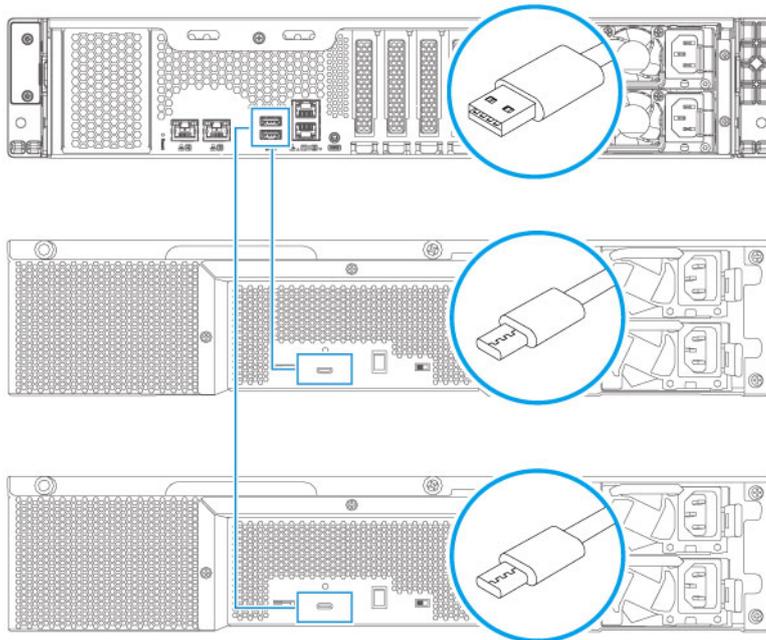
2. Power on the expansion unit.

3. 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.

QuTS hero installation

The TS-hx77AXU-RP uses the QNAP QuTS hero operating system. You can install QuTS hero using any of the following methods.

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 https://download.qnap.com.

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

Method	Description	Requirements
Qfinder Pro installation (Recommended)	If the NAS is connected to your local area network, you can do the following: • Locate the NAS using Qfinder Pro. • Complete the steps in the Smart Installation Guide wizard. For details, see Initializing QuTS hero using Qfinder Pro.	• Computer • Network cable • Qfinder Pro installer
Cloud installation	If the NAS is connected to the internet, you can do the following: • 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. For details, see Initializing QuTS hero using the cloud installation website.	• Computer or mobile device • Network cable • myQNAPcloud account • Cloud Key

Initializing QuTS hero using Qfinder Pro

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

> ⚠️ **Warning**
> Installing QuTS hero deletes all data on the drives. Back up your data before proceeding.

1. Power on the device.

2. Connect the device to your local area network.

3. Run Qfinder Pro on a computer that is connected to the same local area network.

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

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

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

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

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

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

7. Install firmware using any of the following methods:

Installation methods	Steps
Automatic	Click **Start**. Automatically searches for available firmware updates and installs firmware.
Manual installation	**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	Click **Skip**. Skips firmware installation.

8. Specify the following information

- **NAS name**: Specify a name with 1 to 14 characters. The name supports letters (A to Z, a to z), numbers (0 to 9), and hyphens (-), but cannot end with a hyphen.

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

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

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

9. Click **Next**.

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

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

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

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

13. Click **Next**.

14. Review the settings.

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

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

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

Initializing QuTS hero using the cloud installation website

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

> ⚠️ **Warning**
> Initializing QuTS hero deletes all data on the drives. Back up your data before proceeding.

1. Power on the device.

2. Connect the device to the internet.

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

    • On your computer, go to the website dedicated to your region.

        • Global: https://install.qnap.com

        • China: https://install.qnap.com.cn

    • Or scan the QR code on the NAS using a mobile device.

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

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

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

    The installation wizard opens in the default web browser.

5. Create an account or sign in to myQNAPcloud.

> 💬 **Note**
> You must return to this page to complete the installation after creating an account.

6. Specify the myQNAPcloud device name for the NAS.

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

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

8. Perform any of the following actions.

   - To check for the latest available version, click **Start**.
     The wizard downloads the latest available version, and then the NAS restarts after the download is complete. If a newer version is not available, the wizard automatically displays the **Smart Installation Guide**.

   - To install the out-of-the-box version, click **Skip**.

   - If the screen shows a different operating system, click **QuTS hero**.
     The NAS restarts and the smart installation screen shows QuTS hero as the operating system to install.

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

10. Install firmware using any of the following methods:

Installation methods	Steps
Automatic	Click **Start**. Automatically searches for available firmware updates and installs firmware.
Manual installation	**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	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.

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

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

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

12. Click **Next**.

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

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

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

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

16. Click **Next**.

17. Review the settings.

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

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

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

4. Basic Operations

This chapter describes basic NAS operations.

Audio alerts

Duration	Frequency	Description
Short beep (0.5 seconds)	1	• 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.
	3	• The NAS data cannot be copied to the external storage device connected to the USB One Touch Copy port. • The operating system was updated.
Long beep (1.5 seconds)	3 (every 5 minutes)	• A power error occurred. • A system fan is not functioning. • A fan module has been removed.
	2	• A storage pool is about to reach full capacity. • A storage pool has reached full capacity. • A storage pool status error occurred. • A shared folder is about to reach its full capacity. • A shared folder has reached its full capacity. • A shared folder status error occurred. • A drive is plugged in or out.
	1	• The NAS is powering off. • 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.

LEDs

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

For details on the location of the LEDs, see Components.

System Status LED

Status	Description
Flashes green and red alternately every 0.5 seconds	• 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. **(!) Important** When updating the firmware, do not remove the power cord or USB cable, and do not force-exit the application.
Red	• 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 a 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	• The device is not configured. • A drive is not formatted.
Off	• All drives are in standby mode. • The device is powered off.

Drive LED

Status	Description
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.

M.2 SSD LED

Status	Description
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.

LAN LED

Status	Description
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 LED

Status	Description
Green	The network connection is operating at 2.5 Gbps.
Orange	The network connection is operating at 1 Gbps or 100 Mbps.
Off	• The network connection is operating at 10 Mbps. • There is no network connection.

2.5 Gigabit Ethernet Activity LED

Status	Description
Orange	A network connection has been established.
Flashes orange	The device is being accessed from the network.
Off	There is no network connection.

10GBASE-T Ethernet Speed LED

Status	Description
Green	The network connection is operating at 10 Gbps.
Orange	The network connection is operating at 5 Gbps, 2.5 Gbps, 1 Gbps, 100 Mbps, or 10 Mbps.
Off	There is no network connection.

10GBASE-T Ethernet Activity LED

Status	Description
Orange	A network connection has been established.
Flashes orange	Data is being transmitted.
Off	There is no network connection.

Expansion LED

Status	Description
Blue	• A USB JBOD expansion unit has been detected. • A SAS JBOD expansion unit has been detected. • An expansion unit is connected.
Off	• No JBOD expansion unit has been detected. • No expansion unit has been detected.

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. **!** **Important** Use this method only when the device is unresponsive.

Reset button

Operation	User Action	Result

Basic system reset	Press and hold the button for 3 seconds.	The following settings are reset to default:
		
		• The admin account is automatically enabled.
		
		• 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 would be 00089BF61575.
		
		Note
		You can find the first MAC address with Qfinder Pro or attached to a label on the device listed as MAC1.
		
		• TCP/IP configuration:
		
		    • 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)
		
		• VLAN: Disabled

Advanced system reset	Press and hold the button for 10 seconds.	The default factory settings are restored. • To retrieve old data after an advanced system reset, recreate the previous folder structure on the NAS.

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.

QTS NAS migration

NAS migration requirements

You can only migrate drives 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/go/nas-migration.

Your device must meet the following requirements:

- QTS NAS supports several types of NAS migration:

    - ARM NAS to an ARM NAS

    - x86 NAS to an x86 NAS

    - ARM NAS to an x86 NAS

> **Note**
> You cannot migrate from an x86 NAS to an ARM NAS.

- The destination NAS must run on the same QTS 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, you can migrate existing data using HBS 3. For details, see Migrating NAS data using HBS 3.

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 disk volumes	If the NAS does not support file system encryption, encrypted disk volumes are not migrated. ⚠ **Warning** To prevent data loss, back up and save the encryption keys of encrypted disk volumes in a safe place. You can also choose to decrypt disk volumes before migration.

Data and Settings	After NAS Migration
Shared folders	All shared folders and the downloaded files stored in them are retained. ⚠️ **Warning** To prevent data loss, back up and save encryption keys or passwords of encrypted shared folders in a safe place before migration. ❗ **Important** Folder permissions on the destination NAS must be reconfigured after 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, USB QuickAccess, and more. • You must reconfigure network settings when the source NAS is running on QTS 4.3.5 or earlier versions.
Windows AD configuration	Windows AD configurations must be reconfigured.
Licenses	Licenses are not migrated. ⚠️ **Warning** To prevent losing all your software licenses, QNAP recommends deactivating licenses on the source NAS before data migration.
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 QTS as an administrator on the destination NAS.
The destination NAS automatically checks for the latest firmware update.

Migrating NAS data using HBS 3

For NAS models that do not support direct migration, you can initialize the destination NAS then copy data from the source NAS to the destination NAS using HBS 3.

Preparing the destination NAS

1. Log on to QTS.

2. Create one or more storage pools.
For details, see the Creating a Storage Pool topic in the QTS user guide.

3. Create one or more volumes.
For details, see the Volume Creation topic in the QTS user guide.

4. Create shared folders on the destination NAS.
For details, see the Creating a Shared Folder topic in the QTS user guide.

5. Install HBS 3 onto the destination NAS.

    a. Go to **App Center**.

    b. Search for HBS 3.

    c. Click **Install**.
HBS 3 is installed on the destination NAS.

6. Enable the remote server settings on the destination NAS.

    a. Go to **App Center** > **HBS 3** > **Services** > **RTRR Server** .

    b. Click **Enable RTRR Server**.
The RTRR server settings window appears.

    c. Specify the **RTRR Server** settings.

Setting	Description
Password	Specify a password that contains 1 to 16 characters from any of the following groups: • Letters: A to Z, a to z • Numbers: 0 to 9 • Special characters: . - _ ~ ! @ # $ % ^ & ( ) { } • Does not start or end with a space.
Port	Specify a port number to access the RTRR server.

7. Click **Apply**.
A confirmation window appears.

8. Click **OK**.
The remote server settings are completed.

Creating a one-way sync job

1. On the source NAS, go to **App Center** > **HBS 3** > **Sync** .

2. Click **Sync Now**.

3. Select **One-way Sync Job**.
The **Create a Sync Job** window appears.

4. Click **Remote NAS**.

5. Click **Add New Account**.
The **Create a Storage Space** window appears.

6. Select the destination NAS as the destination storage space and specify the following:

Setting	Description
Name	The name used to identify the storage space.
IP address / Host name	The IP address or hostname used to access the storage space. 💡 **Tip** Click 🔍 to scan for available devices.
Port	The port number used to access the storage space. This value must be between 1 to 65535.
Password	The password used to access the storage space.
Use SSL connection	Requires SSL connection when accessing the remote NAS.

7. Optional: Test the connection.

Test	Description
Detect Server	Tests the accessibility of the selected storage space.
Speed Test	Tests the network connection speed of the selected storage space.

8. Click **Create**.

9. Click **Select**.

10. Select the paired folders.

> ❗ **Important**
>
> - All subfolders and files in the selected folder are selected.
>
> - You can only sync up to 16 paired folders per job.

    a. Under the source, click ＋.
A dialog box opens.

    b. Select a folder.

    c. Click **OK**.
The dialog box closes.

    d. Under the destination, click ＋.
A dialog box opens.

    e. Select a folder.

    f. Click **OK**.

    g. Optional: Add more paired folders if necessary.

11. Click **Next**.
The **Schedule** screen appears.

12. Select **Sync now**.

13. Click **Next**.
The **Rules** screen appears.

14. Optional: Configure job rules.

15. Click **Next**.
The **Summary** screen appears.

16. Review the job summary.

17. Click **Create**.
The source NAS runs the created one-way sync job.

> 💬 **Note**
> It may take several minutes to migrate shared folders from the source NAS to the destination
> NAS.

Importing local users or group settings to the destination NAS

1. Power on the source NAS.

2. Back up the users or group settings from the source NAS.

    a. Log on to QTS.

    b. Go to **Control Panel** > **Privilege** > **Users** .

    c. Click **Create**, and then click **Import/Export Users**.
The **Import/Export Users** window appears.

  d. Select **Export user and user group settings**.

  e. Click **Next**.
   The NAS user and user group settings are exported as a file and downloaded onto your computer.

3. Import user settings on the source NAS to the destination NAS.

  a. On the destination NAS, log on to QTS.

  b. Go to **Control Panel** > **Privilege** > **Users** .

  c. Click **Create**, and then click **Import/Export Users**.

  d. Select **Import user and user group settings**.

> **Note**
> You can select whether to send a notification mail to newly created users or overwrite duplicate users.

  e. On your computer, select the user settings file exported from the source NAS.
   The source NAS user settings file is imported to the destination NAS.

QuTS hero NAS 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	If the NAS does not support file system encryption, encrypted shared folders are not migrated. ⚠️ **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.
Shared folders	All shared folders and the downloaded files stored in them are retained. ⚠️ **Warning** To prevent data loss, back up and save encryption keys or passwords of encrypted shared folders in a safe place before migration. ❗ **Important** Folder permissions on the destination NAS must be reconfigured after 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	Licenses are not migrated. ⚠️ **Warning** To prevent losing all your software licenses, QNAP recommends deactivating licenses on the source NAS before data migration.
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 QuTS hero.

2. Go to **Main Menu** > **Storage & Snapshots** > **Storage** > **Disks/VJBOD** .

3. Locate the failed drive.

4. Prepare a new drive with a capacity that is the same as or larger than the failed drive.

5. Remove the failed drive from the device.

6. Wait for 20 seconds or until the device beeps twice.

7. Remove the failed drive from the drive tray.

8. Insert the new drive into the drive tray.

9. Install the new drive.
   The NAS beeps twice.

10. Go to **Main Menu** > **Storage & Snapshots** > **Storage** > **Storage/Snapshots** .

11. Locate the storage pool that contains the new drive and then verify that the status is `Rebuilding`.

Recovering unintentionally removed healthy drives

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

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

Support and other resources

QNAP provides the following resources:

Resource	URL
Documentation	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 devices in your local area network

QTS

QNAP NAS operating system

QuTS hero

QNAP NAS operating system featuring ZFS file system

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Version 3, 29 June 2007

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FCC Class A Notice

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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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