

TS-x73AU

TS-873AU
TS-873AU-RP
TS-1273AU-RP
TS-1673AU-RP

User Guide

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1. Preface





About This Guide

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

Audience

This document is intended for consumers and storage administrators. This guide assumes that the user has a basic understanding of storage and backup concepts.

Document Conventions

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

2. Product Overview

This chapter provides basic information about the QNAP device.

About the TS-x73AU

The TS-x73AU is powered by a high-performance AMD Ryzen™ Embedded V1000 series V1500B quad-core 2.2 GHz processor, with up to 32 GB of DDR4 memory. The NAS is provisioned for expansion with two USB 3.2 Gen 2 Type-C ports, one USB 3.2 Gen 2 Type-A port, and one USB 3.2 Gen 1 Type-A port. The TS-x73AU is available in 8-bay, 12-bay, and 16-bay models. Each TS-x73AU supports installation of SATA drive bays, features two 2.5 Gigabit Ethernet ports, and two PCIe 3.0 x4 slots (or one PCIe 3.0 x 8 slot) for various applications and expansion options. Encrypted file transfer performance can be enhanced with AES-NI encryption acceleration.

Hardware Specifications



Warning

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

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

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











Tip



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

Ordering P/N	Drive bays	Memory	Power supply
TS-873AU-4G	8	4 GB	Single
TS-873AU-RP-4G	8	4 GB	Redundant
TS-1273AU-RP-8G	12	8 GB	Redundant
TS-1673AU-RP-16G	16	16 GB	Redundant

Component	TS-873AU TS-873AU-RP	TS-1273AU-RP	TS-1673AU-RP
Processor			
CPU	AMD Ryzen™ Embedded V1500B		
Frequency	4-core/8-thread 2.20 GHz		
Architecture	x86 64-bit		
Encryption engine	AES-NI		
Memory			
Pre-installed memory	4 GB RAM: 1 x 4 GB UDIMM DDR4	8 GB RAM: 1 x 8 GB UDIMM DDR4	16 GB RAM: 1 x 16 GB UDIMM DDR4

Component	TS-873AU TS-873AU-RP	TS-1273AU-RP	TS-1673AU-RP
Memory slots	2 x UDIMM DDR4		
	 Important <ul style="list-style-type: none"> • Use only QNAP memory modules to maintain system performance and stability. For NAS devices with more than one memory slot, use QNAP modules with identical specifications. • Using unsupported modules may degrade performance, cause errors, or prevent the operating system from starting. 		
Maximum memory	32 GB RAM: 2 x 16 GB		
Flash memory	5 GB (dual-boot OS protection)		
Storage			
Drive bays	8 x 3.5-inch SATA 6 Gbps	12 x 3.5-inch SATA 6 Gbps	16 x 3.5-inch SATA 6 Gbps
	 Note The SATA 6 Gbps drive bays are backward compatible with SATA 3 Gbps drives.		
Drive compatibility	3.5-inch bays: <ul style="list-style-type: none"> • 3.5-inch SATA hard disk drives • 2.5-inch SATA hard disk drives • 2.5-inch SATA solid-state drives 		
SSD cache acceleration support	Supported		
Hot-swapping	Supported		
Network			
2.5 Gigabit Ethernet Ports	2 x 2.5 GbE RJ45		
	 Note The 2.5 Gigabit Ethernet port provides 4 network connection speeds: 2.5 Gbps, 1 Gbps, 100 Mbps, and 10 Mbps		
Wake-on-LAN	Yes (GbE RJ45)		
External I/O Ports & Expansion Slots			
PCIe slots	1 x PCIe 3.0 x8	2 x PCIe 3.0 x4	
	 Tip For the list of compatible expansion cards, go to https://www.qnap.com/compatibility .		
USB ports	<ul style="list-style-type: none"> • 2 x USB 3.2 Gen 2 Type-C • 1 x USB 3.2 Gen 2 Type-A • 1 x USB 3.2 Gen 1 Type-A 		
Interface			

Component	TS-873AU TS-873AU-RP	TS-1273AU-RP	TS-1673AU-RP
Buttons	<ul style="list-style-type: none"> • Power • Reset 		
Dimensions			
Form factor	2U Rackmount		3U Rackmount
Dimensions (H x W x D)	89.5 x 423.8 x 371 mm (3.52 x 16.68 x 14.60 in)	89.5 x 425.3 x 371 mm (3.52 x 16.74 x 14.60 in)	132 x 430 x 371 mm (5.19 x 16.92 x 14.60 in)
Net weight	<ul style="list-style-type: none"> • TS-873AU: 8.04 kgs (17.72 lbs) • TS-873AU-RP: 9.15 kgs (20.17 lbs) 	9.69 kgs (21.36 lbs)	13.53 kgs (29.82 lbs)
Others			
Rail compatibility	RAIL-B02  Note <ul style="list-style-type: none"> • Rail kits are not included with the NAS and must be purchased separately. For details, contact an authorized reseller or go to http://shop.qnap.com. • Information on rail kit installation can be found in the installation guide included in the rail kit package. 		
Power supply unit	<ul style="list-style-type: none"> • TS-873AU: 250W, 100-240V AC, 50/60 Hz • TS-873AU-RP: 2 x 300W, 100-240V AC, 50/60 Hz 	TS-1273AU-RP: 2 x 300W, 100-240V AC, 50/60 Hz	TS-1673AU-RP: 2 x 550W, 100-240V AC, 50/60 Hz
System battery	CR2032 lithium battery 3V  Warning To avoid potential injury or damage to components, ensure that the drives and other internal system components have cooled before touching them.  Important Dispose of used batteries according to local regulations or the instructions of the battery manufacturer.		
Sound level	<ul style="list-style-type: none"> • TS-873AU: 24.9 db(A) • TS-873AU-RP: 23.9 db(A) 	25.2 db(A)	26.7 db(A)
	 Note The sound level was tested at a bystander position, which is within one meter of the NAS. The test NAS operated at low speed with the maximum number of drives installed.		

Component	TS-873AU TS-873AU-RP	TS-1273AU-RP	TS-1673AU-RP
Fans	System: 2 x 80 mm, 12V DC smart fans		System: 3 x 80 mm, 12V DC smart fans
	<div style="display: flex; align-items: center;">  <p>Warning</p> </div> <div style="text-align: center; margin: 10px 0;">  </div> <p>To avoid potential injury or damage to components, do not touch the fans while the NAS is connected to a power source.</p>		
Operating temperature	0°C to 40°C (32°F to 104°F)		
Relative humidity	<ul style="list-style-type: none"> • Non-condensing relative humidity: 5% to 95% • Wet-bulb temperature: 27°C (80.6°F) 		

**Tip**

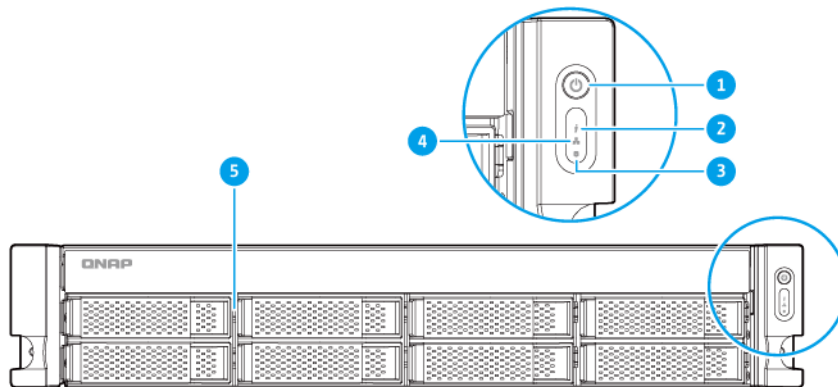
For the list of compatible drive models and expansion cards, go to <https://www.qnap.com/compatibility>.

Package Contents

Item	Quantity
TS-x73AU	1
Power cords	<ul style="list-style-type: none"> • TS-873AU: 1 • TS-873AU-RP: 2 • TS-1273AU-RP: 2 • TS-1673AU-RP: 2
Ethernet cables	1 x CAT5e cable
Screws for 3.5-inch drives	<ul style="list-style-type: none"> • TS-873AU, TS-873AU-RP: 32 • TS-1273AU-RP: 48 • TS-1673AU-RP: 64
Screws for 2.5-inch drives	<ul style="list-style-type: none"> • TS-873AU, TS-873AU-RP: 24 • TS-1273AU-RP: 36 • TS-1673AU-RP: 48
Quick Installation Guide (QIG)	1

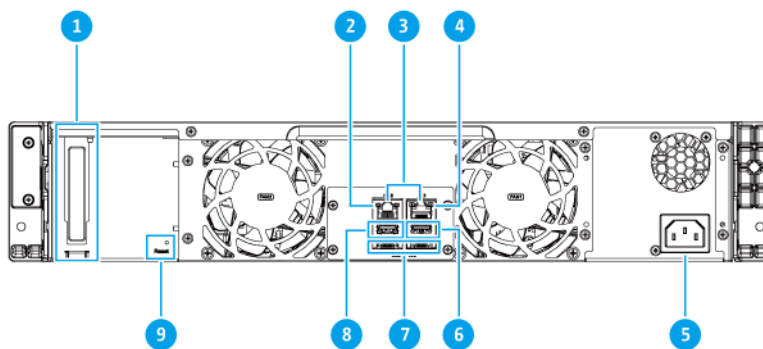
Components

Front Panel



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

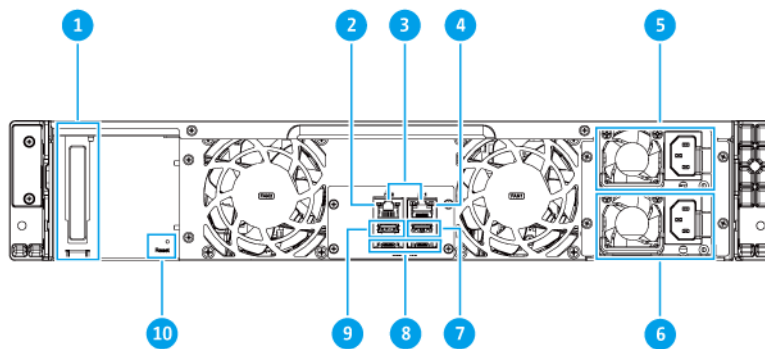
Rear Panel



TS-873AU

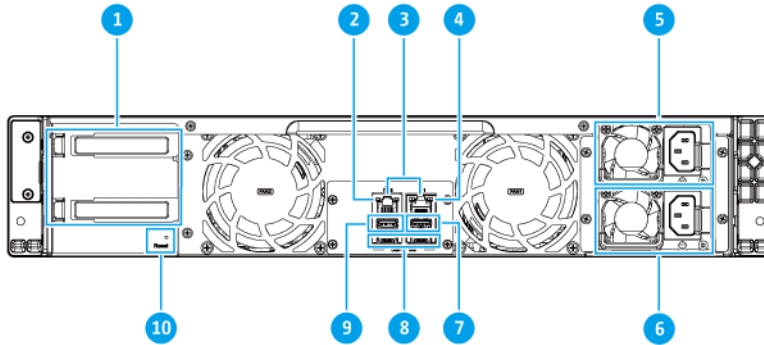
No.	Component	No.	Component
1	PCIe low-profile cover	6	USB 3.2 Gen 1 Type-A port

No.	Component	No.	Component
2	2.5 Gigabit Ethernet activity LED	7	USB 3.2 Gen 2 Type-C ports
3	2.5 Gigabit Ethernet ports	8	USB 3.2 Gen 2 Type-A port
4	2.5 Gigabit Ethernet speed LED	9	Reset button
5	Power input	-	-



TS-873AU-RP

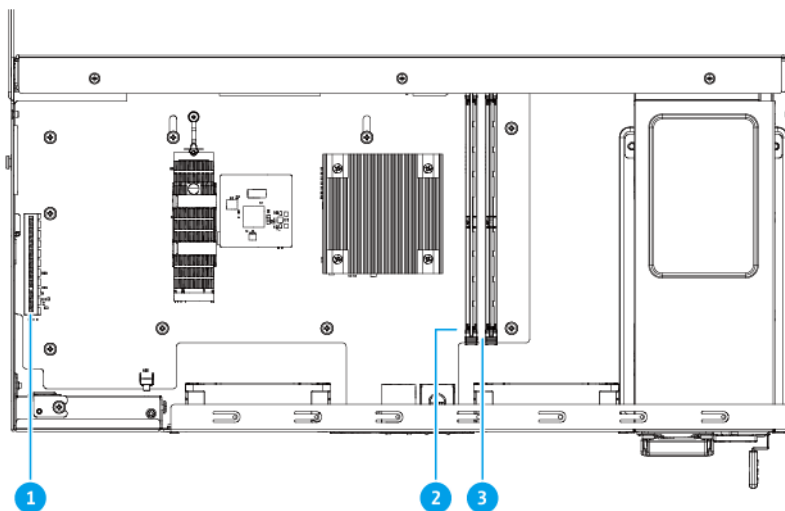
No.	Component	No.	Component
1	PCIe low-profile cover	6	Power supply unit 2
2	2.5 Gigabit Ethernet activity LED	7	USB 3.2 Gen 1 Type-A port
3	2.5 Gigabit Ethernet ports	8	USB 3.2 Gen 2 Type-C ports
4	2.5 Gigabit Ethernet speed LED	9	USB 3.2 Gen 2 Type-A port
5	Power supply unit 1	10	Reset button



TS-1273AU-RP, TS-1673AU-RP

No.	Component	No.	Component
1	PCIe low-profile covers	6	Power supply unit 2
2	2.5 Gigabit Ethernet activity LED	7	USB 3.2 Gen 1 Type-A port
3	2.5 Gigabit Ethernet ports	8	USB 3.2 Gen 2 Type-C ports
4	2.5 Gigabit Ethernet speed LED	9	USB 3.2 Gen 2 Type-A port
5	Power supply unit 1	10	Reset button

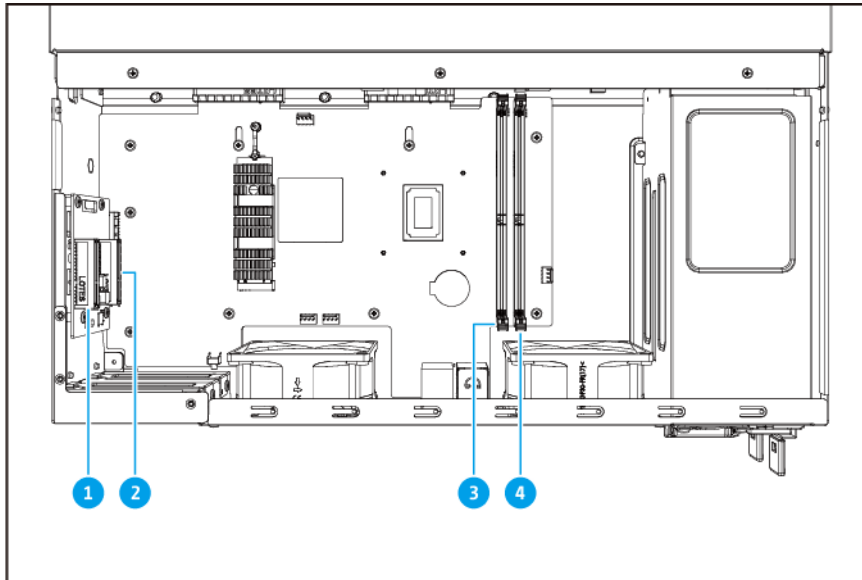
System Board



TS-873AU, TS-873AU-RP

No.	Component	No.	Component
1	PCIe 3.0 x8 slot	3	Memory slot 1
2	Memory slot 2	-	-

TS-1273AU-RP, TS-1673AU-RP

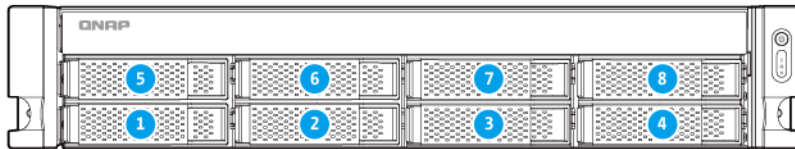


No.	Component	No.	Component
1	PCIe 3.0 x4 slot 2	3	Memory slot 2
2	PCIe 3.0 x4 slot 1	4	Memory slot 1

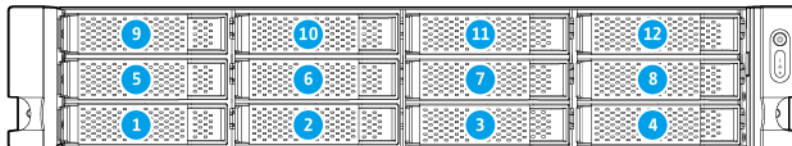


Note
The image does not include the case cover.

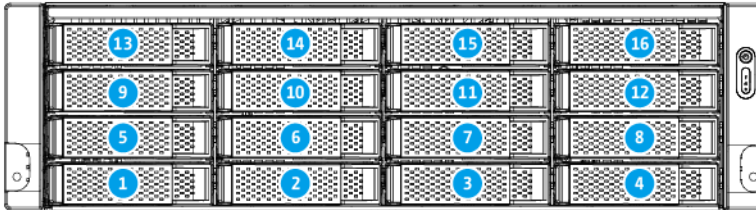
Drive Numbering



TS-873AU, TS-873AU-RP



TS-1273AU-RP



TS-1673AU-RP

Safety Information

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

General Instructions

- The device should be stored in a secure location with restricted access, controlled through the use of a tool, lock and key, or any means of security.
- Only qualified, skilled, and authorized persons with knowledge of all restrictions, safety precautions, and installation and maintenance procedures should have physical access to the device.
- To avoid potential injury or damage to components, ensure that the drives and other internal system components have cooled before touching them.
- Observe electrostatic discharge (ESD) procedures to avoid potential injury or damage to components.

Power

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



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

System Battery

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

- Dispose of used batteries properly according to local regulations or the instructions of the battery manufacturer.

Moving Parts

-



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.

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
Hardware and peripherals	<ul style="list-style-type: none"> • Storage drives For the list of compatible drive models, go to https://www.qnap.com/compatibility. • Network cable
Tools	<ul style="list-style-type: none"> • Phillips #1 or #2 screwdriver • Anti-static wrist strap

Setting Up the NAS



Important

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

1. Place your NAS device in an environment that meets the requirements.
For details, see [Installation Requirements](#).
2. Install the drives.
For details, see the following topics:
 - [Installing 3.5-inch Hard Drives on 3.5-inch Trays](#)
 - [Installing 2.5-inch Hard Drives or Solid State Drives on 3.5-inch Trays](#)

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

3. Optional: Install expansion cards.
For details, see [Installing Expansion Cards](#).
4. Connect the NAS to the network.
5. Optional: Connect expansion units.
For details, see the following topics:
 - [Connecting SAS Expansion Units](#)
 - [Connecting SATA JBOD Expansion Units](#)
 - [Connecting USB Expansion Units](#)
6. Connect the power cord and all applicable cables.
7. Power on the NAS.
8. Install QTS.
For details, see [QTS Installation](#).
9. Log on to QTS.

3. Installation and Configuration

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

Hardware Installation

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

Removing the Case Cover



Warning

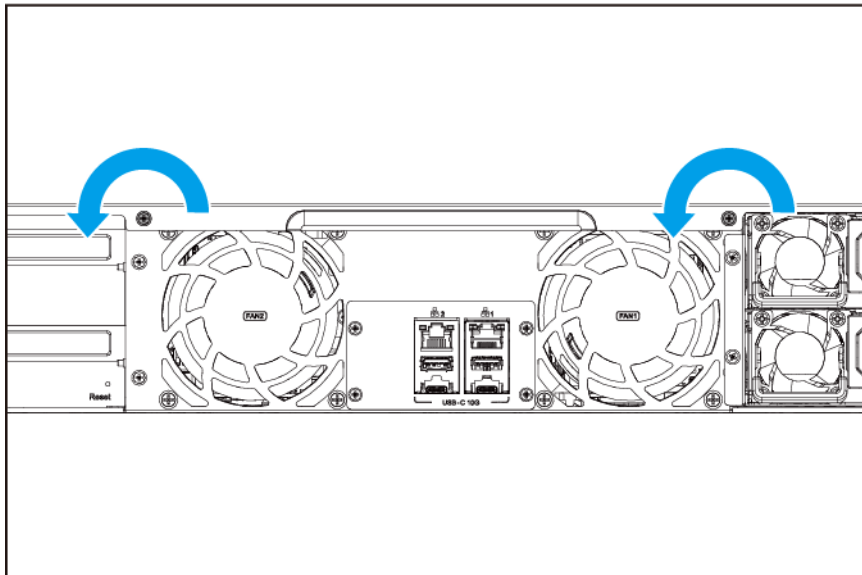
- Only qualified personnel should perform the following steps. Failure to follow instructions can result in serious injury or death.

-

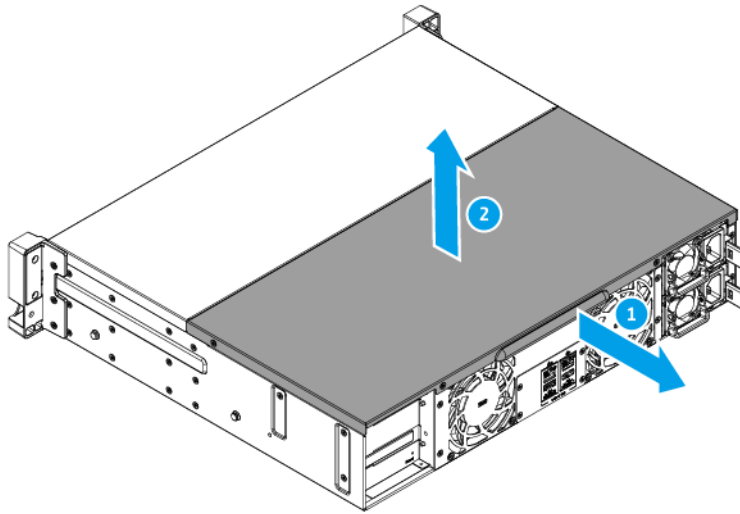


Moving fan blades: Keep your hands and other body parts away from moving fan blades.

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. Slide the cover back.
- c. Lift the cover off the NAS.



Attaching the Case Cover



Warning

-



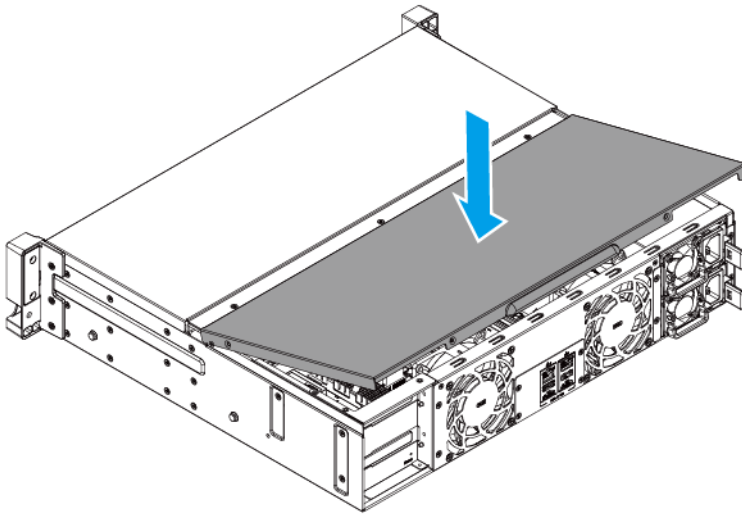
Moving fan blades: Keep your hands and other body parts away from moving fan blades.

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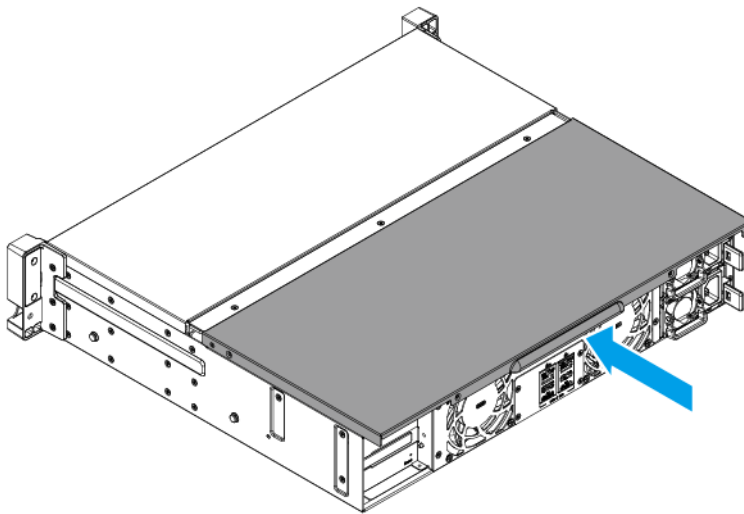


Other moving components: Keep your hands and other body parts away from other moving components.

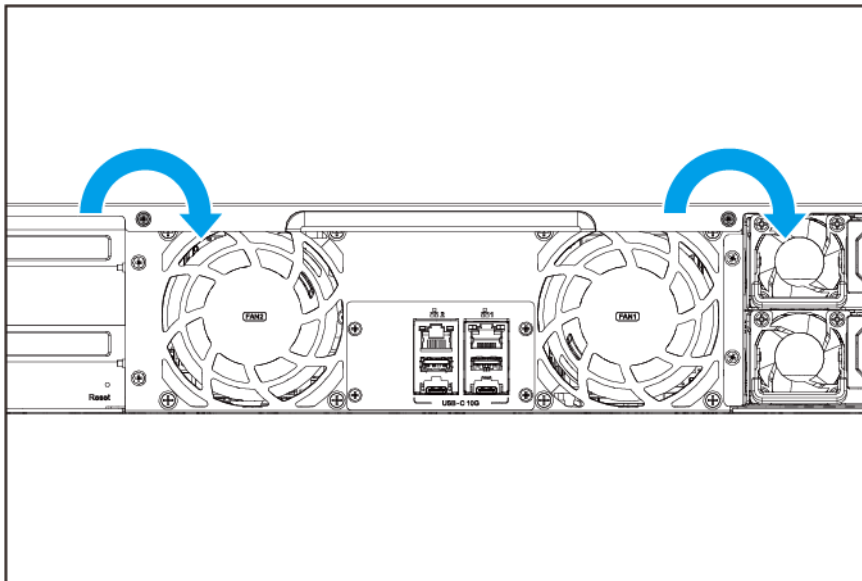
1. Place the cover on the NAS.



2. Slide the cover forward.



3. Tighten the screws.



4. Connect all cables and external attachments.
5. Connect the power cord to the electrical outlet.
6. Power on the device.

Drive Installation

The TS-x73AU is compatible with 3.5-inch and 2.5-inch hard drives, and 2.5-inch solid state drives.

Installing 3.5-inch Hard Drives on 3.5-inch Trays



Tip

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.

•



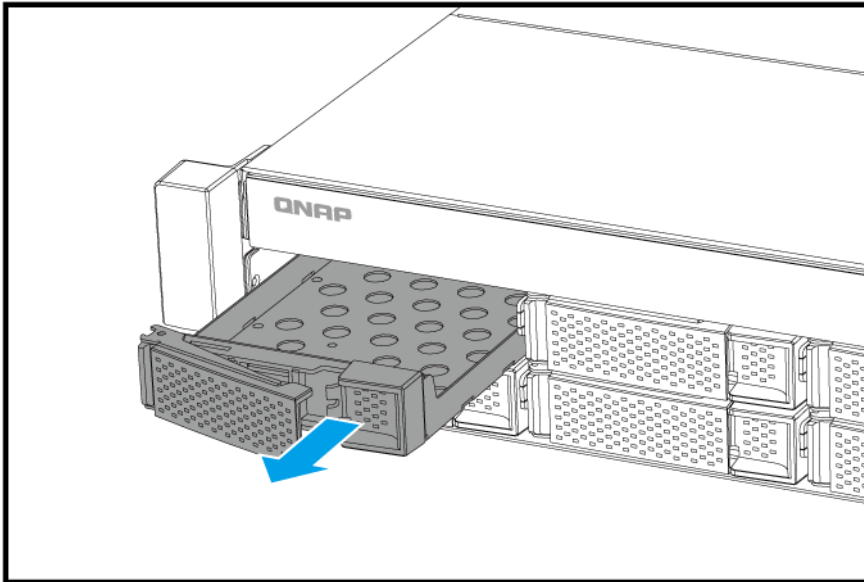
Moving fan blades: Keep your hands and other body parts away from moving fan blades.

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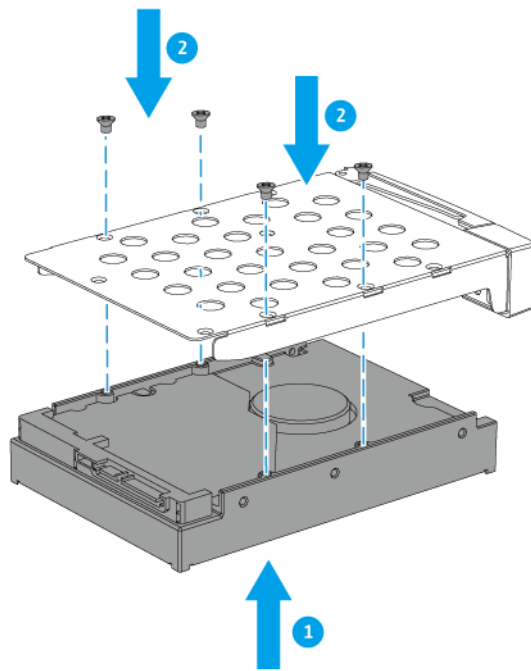


Other moving components: Keep your hands and other body parts away from other moving components.

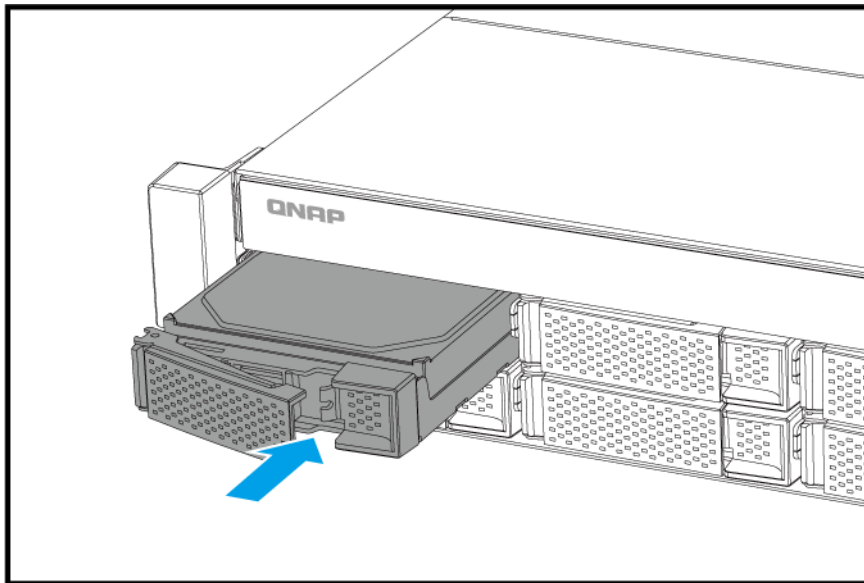
1. Power off the NAS.
2. Remove the drive tray.
 - a. Pull the tray handle outward.
 - b. Pull the tray out.



3. Install a drive on the tray.
 - a. Place the tray on the drive so that the holes on the tray are aligned with those on the drive.
 - b. Attach the screws.



- 4.** Load the tray into the bay.
 - a.** Insert the tray into the bay.
 - b.** Slide the tray into the bay.
 - c.** Push the handle.
 - d.** Lock the tray.



5. Power on the NAS.

Installing 2.5-inch Hard Drives or Solid State Drives on 3.5-inch Trays



Tip

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.

•



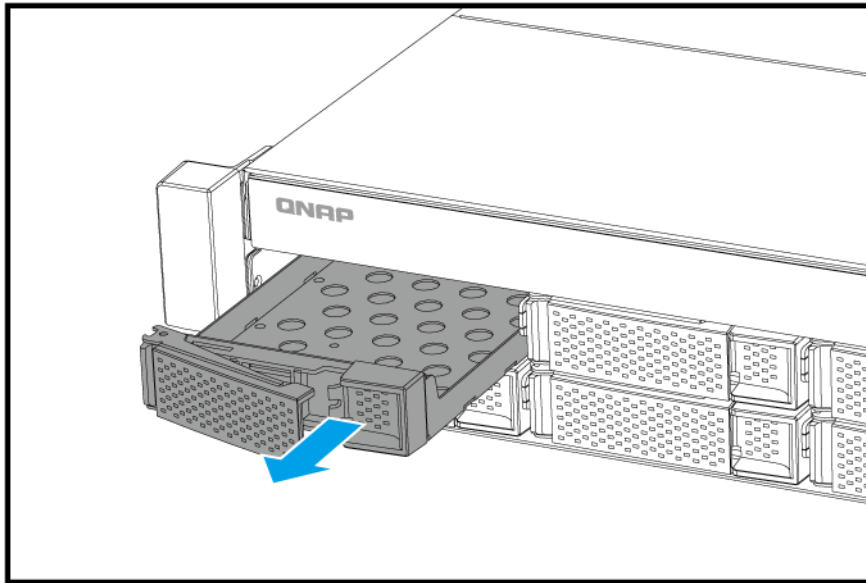
Moving fan blades: Keep your hands and other body parts away from moving fan blades.

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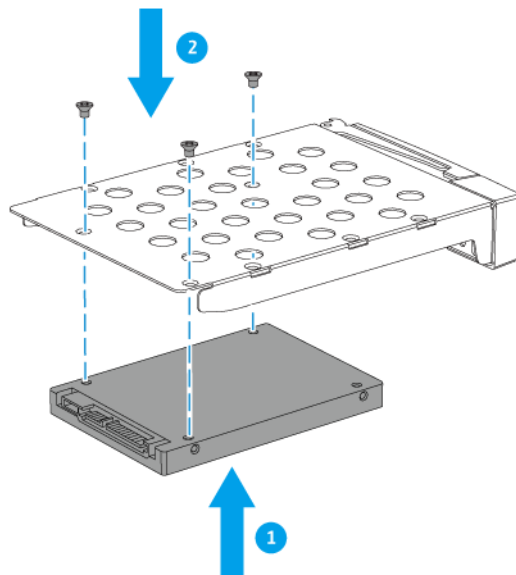


Other moving components: Keep your hands and other body parts away from other moving components.

1. Power off the NAS.
2. Remove the drive tray.
 - a. Pull the tray handle outward.
 - b. Pull the tray out.

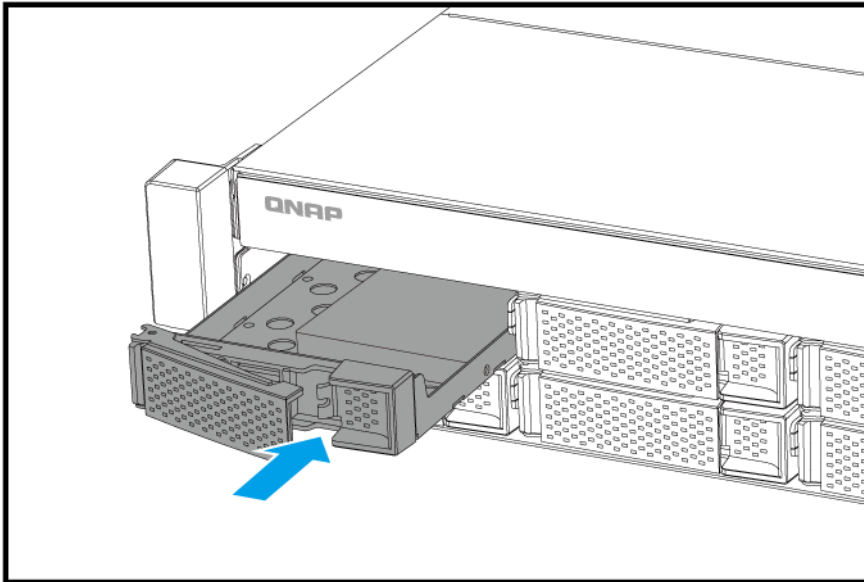


3. Install a drive on the tray.
 - a. Place the tray on the drive so that the holes on the tray are aligned with those on the drive.
 - b. Attach the screws.



4. Load the tray into the bay.

- a. Insert the tray into the bay.
- b. Slide the tray into the bay.
- c. Push the handle.
- d. Lock the tray.



5. Power on the NAS.

Replacing Memory Modules

The TS-x73AU has two memory slots. You can increase the memory capacity of the NAS by upgrading memory modules. For optimal dual-channel performance, replace memory modules in all four 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 each pair uses identical modules.



Warning

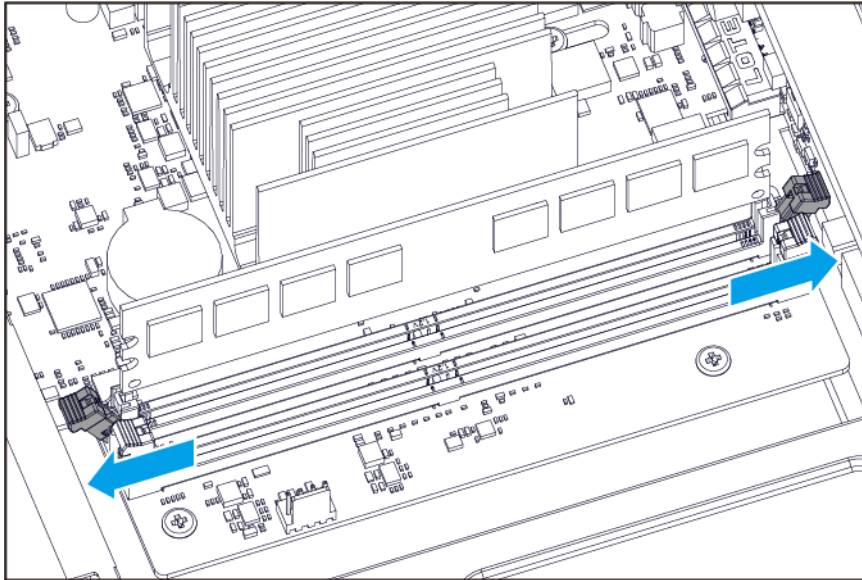
- Only qualified personnel should perform the following steps. Failure to follow instructions can result in serious injury or death.
- Observe electrostatic discharge (ESD) procedures to avoid damage to components.
-



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

1. Power off the device.

2. Remove the case cover.
For details, see [Removing the Case Cover](#).
3. Remove an existing module.
 - a. Push the retention clips outward simultaneously to release the module.

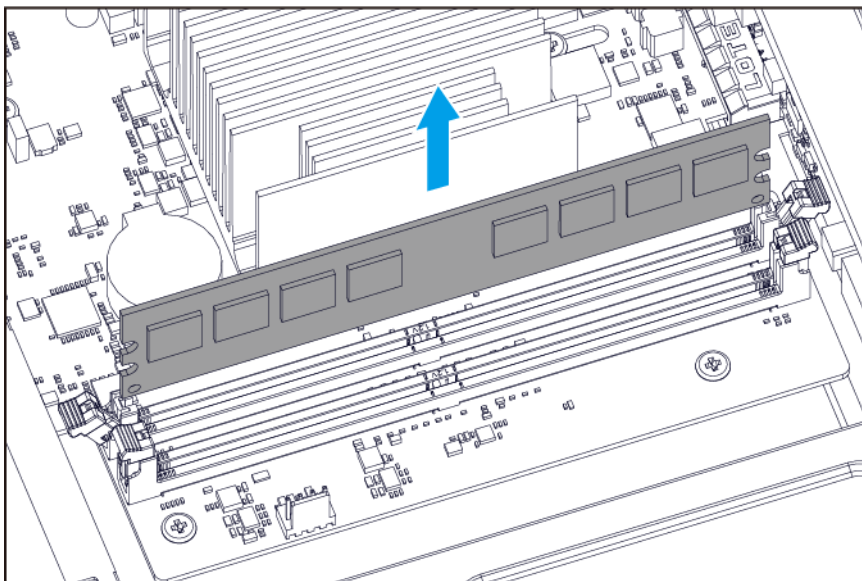


- b. Verify that the module has tilted upward and is completely released from the slot.

**Warning**

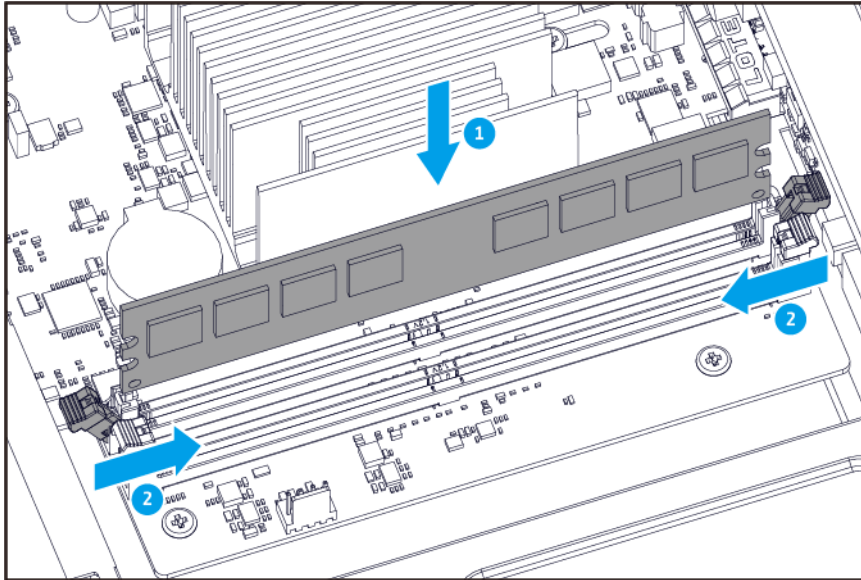
Attempting to remove a module that is not completely released may damage the module and the motherboard.

- c. Hold the module by the edges.



4. 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.



5. Attach the case cover.
For details, see [Attaching the Case Cover](#).
6. Verify that the module is recognized by the device.
 - a. Log on to QTS as administrator.
 - b. Go to **Control Panel > System > System Status > Hardware Information**.
 - c. Check the value for **Total memory**.
7. Power on the device.

Installing Expansion Cards

The TS-x73AU 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-x73AU.



Warning



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.

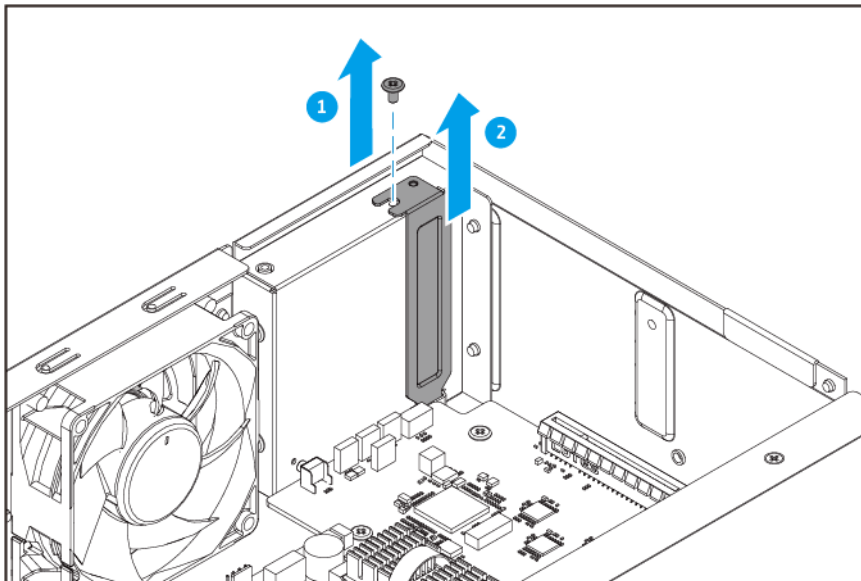


Note

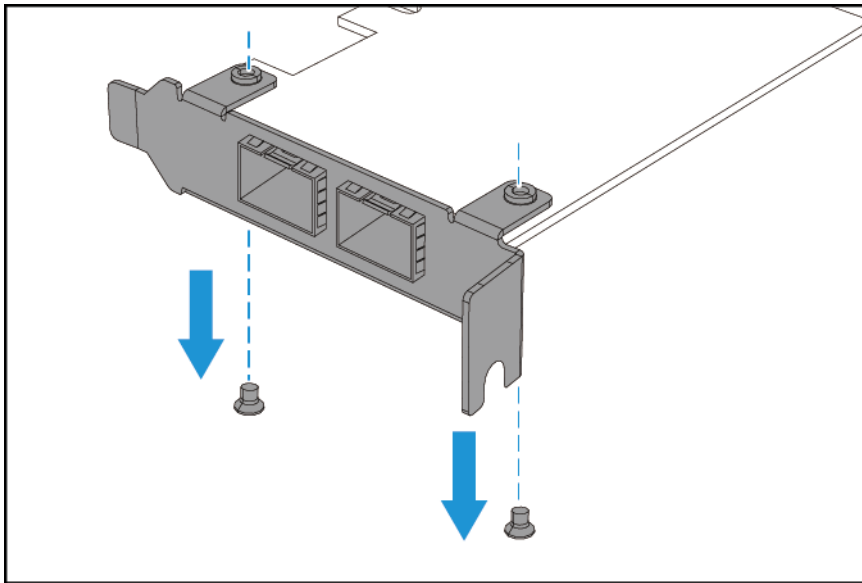
Check the expansion card power supply requirements and compatibility list before installation. For more information, see www.qnap.com/compatibility.

Installing Expansion Cards on the TS-873AU and TS-873AU-RP

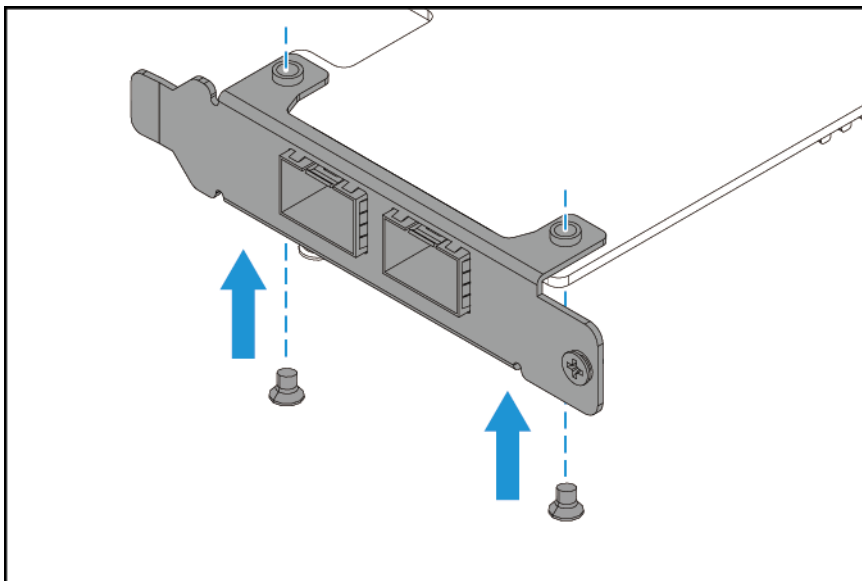
1. Power off the device.
2. Remove the case cover.
For details, see [Removing the Case Cover](#).
3. Remove the PCIe cover.
 - a. Remove the screw that secures the cover to the chassis.
 - b. Pull the cover away from the slot.



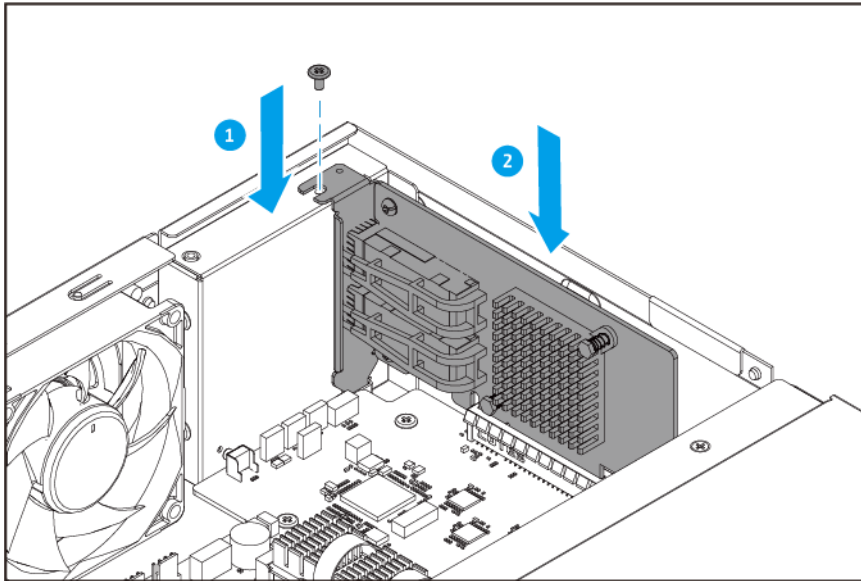
4. Optional: Attach the QNAP bracket to the expansion card.
 - a. Remove all screws of the existing bracket.



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



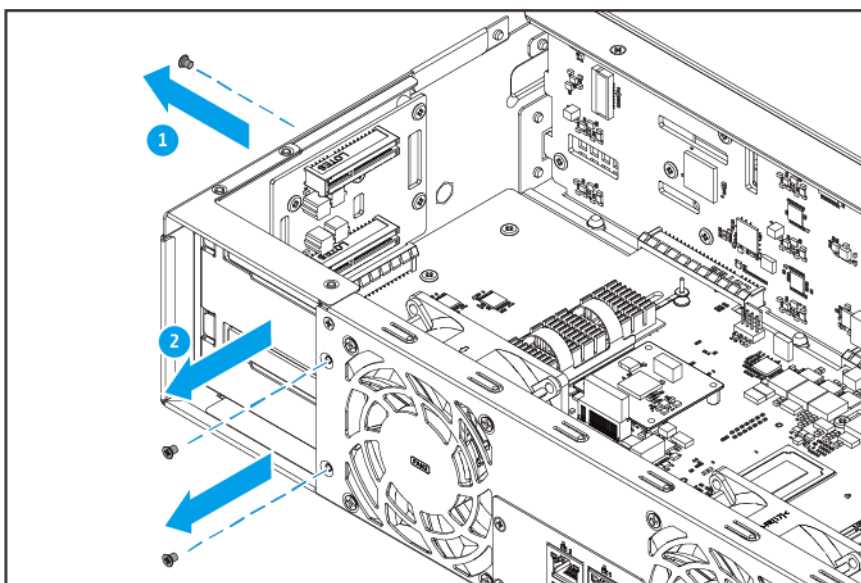
- d.** Verify that the bracket does not move.
- 5.** Install the expansion card.
- a.** Hold the card by the edges.
 - b.** Insert the card into the slot.
 - c.** Attach the screw.



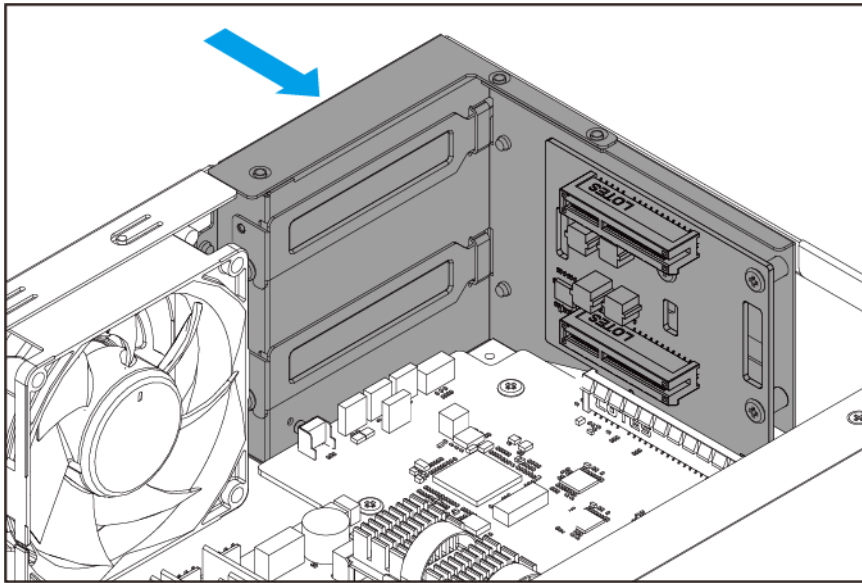
6. Attach the case cover.
For details, see [Attaching the Case Cover](#).
7. Power on the device.

Installing Expansion Cards on the TS-1273AU-RP and TS-1673AU-RP

1. Power off the device.
2. Remove the case cover.
For details, see [Removing the Case Cover](#).
3. Remove the PCIe cover.
 - a. Remove the screw that secures the bracket to the chassis.

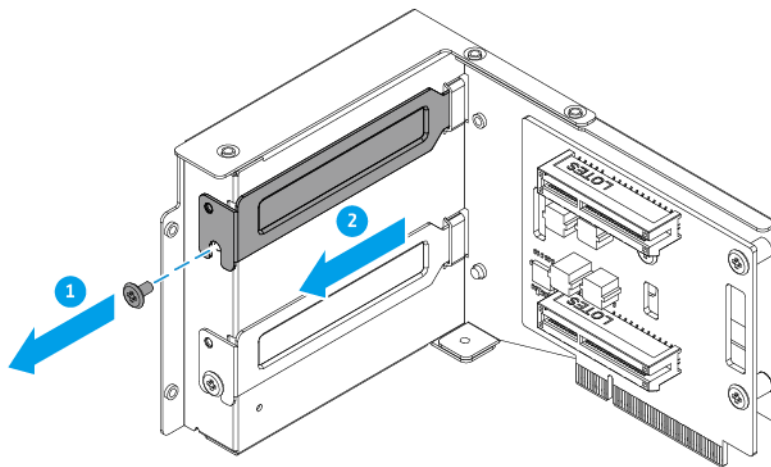


- b. Pull the bracket away from the chassis.



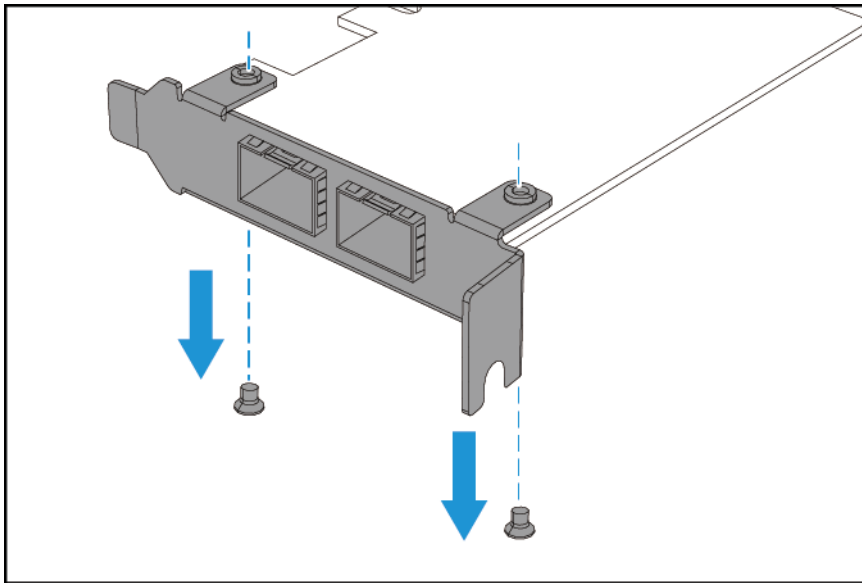
- c. Remove the screw that secures the cover to the bracket.

- d. Pull the cover away from the slot.

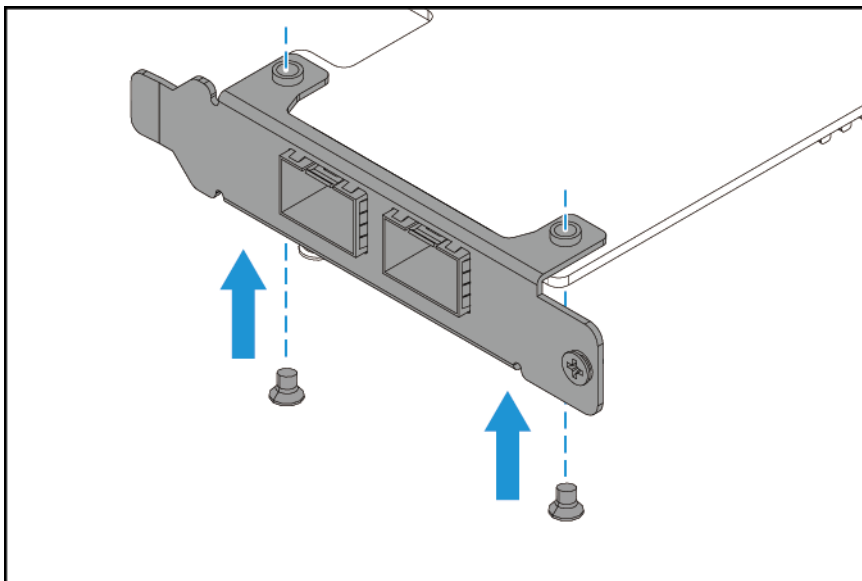


4. Optional: Attach the QNAP bracket to the expansion card.

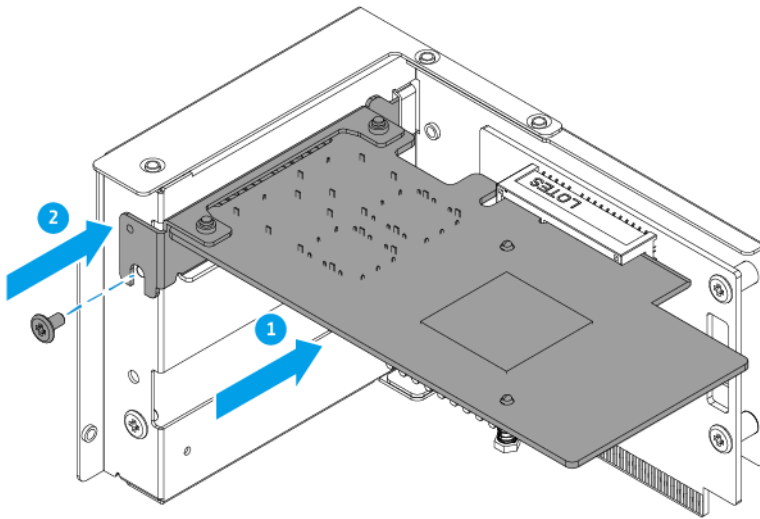
- a. Remove all screws of the existing bracket.



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

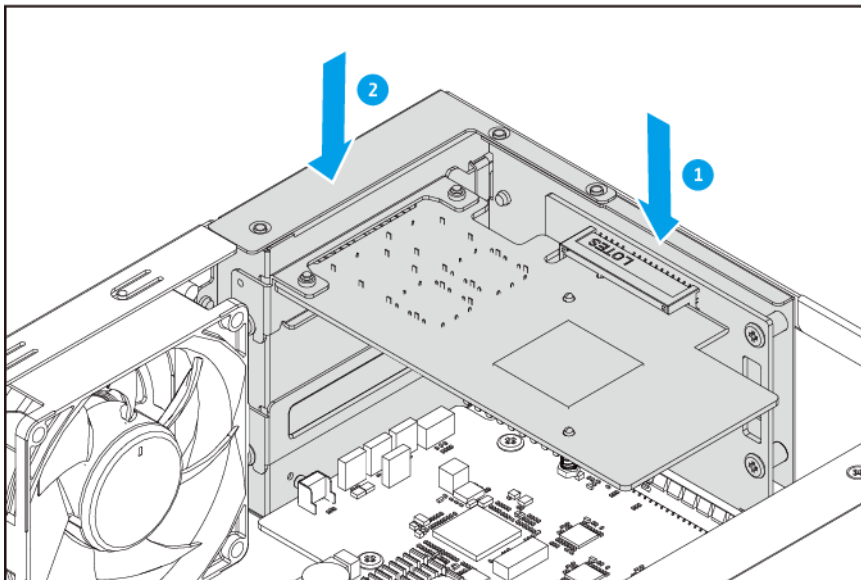


- d.** Verify that the bracket does not move.
- 5.** Install the expansion card.
- a.** Hold the card by the edges.
 - b.** Insert the card into the slot.
 - c.** Attach the screw.

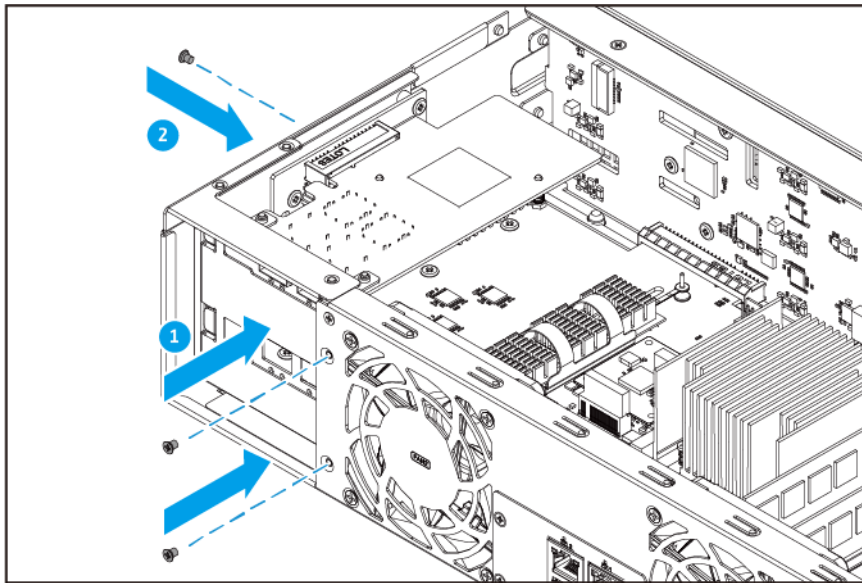


6. Insert the PCIe bracket.

- a. Line up the riser card connector on the PCIe slot on the motherboard.
- b. Insert the PCIe bracket.



- c. Attach the screws of the PCIe bracket to the chassis.



7. Attach the case cover.
For details, see [Attaching the Case Cover](#).
8. Power on the device.

Installing a Dual-Slot PCIe Bracket with Riser Card into A Single-Slot PCIe Bracket

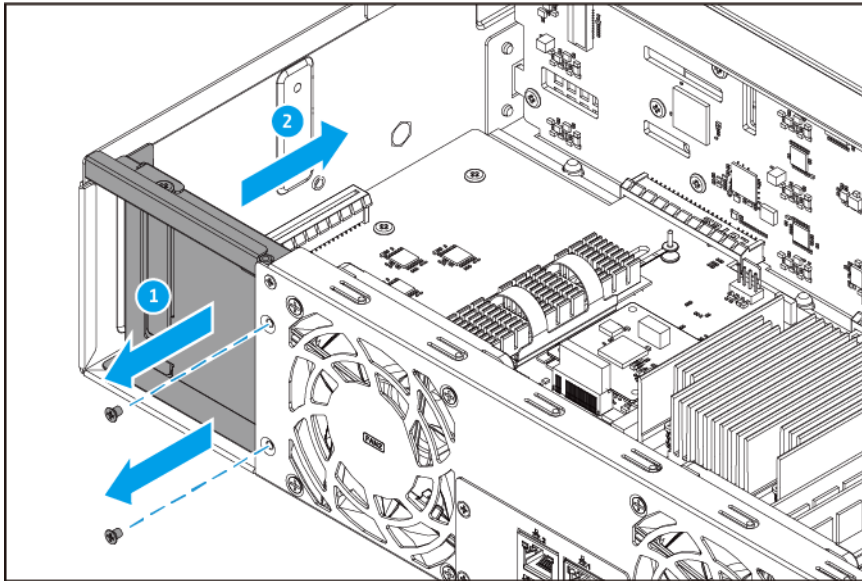
The TS-873AU and TS-873AU-RP are compatible with a dual-slot PCIe bracket with riser card. For details, please see table below.

You can purchase PCIe bracket accessories from QNAP or an authorized reseller.

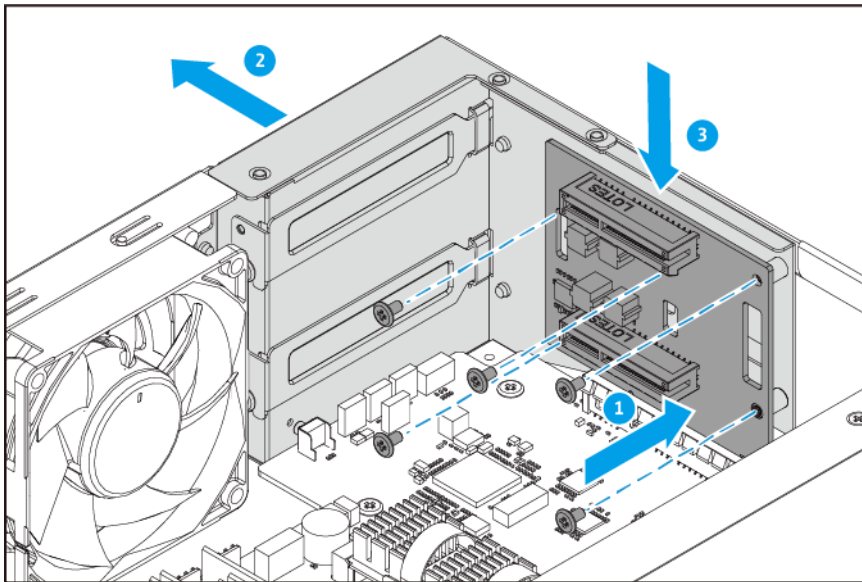
For details, go to <https://shop.qnap.com/>.

NAS Model	Accessory Part Number
<ul style="list-style-type: none"> • TS-873AU • TS-873AU-RP 	BRKT-RISER-2P-2U

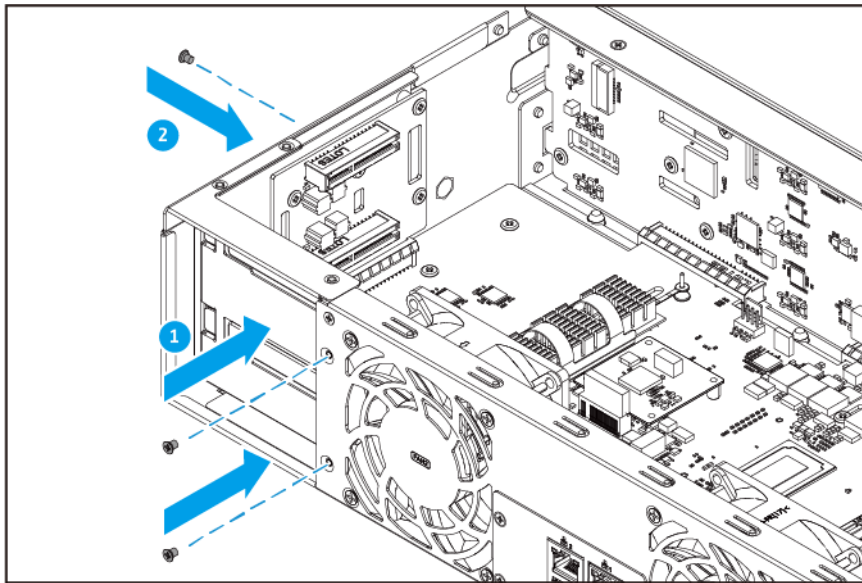
1. Power off the device.
2. Remove the case cover.
For details, see [Removing the Case Cover](#).
3. Remove the screws that attach the bracket to the chassis.
4. Pull away the bracket from the chassis.



5. Attach the dual-slot PCIe bracket with riser card.
 - a. Attach the screws of the riser card to the dual-slot PCIe bracket.
 - b. Insert the PCIe bracket into the slot.
 - c. Attach the riser card connector to the system board.



- d. Attach the screws of the PCIe bracket to the chassis.



6. Attach the case cover.
For details, see [Attaching the Case Cover](#).
7. Power on the device.

Hot-Swapping Redundant Power Supply Units



Warning



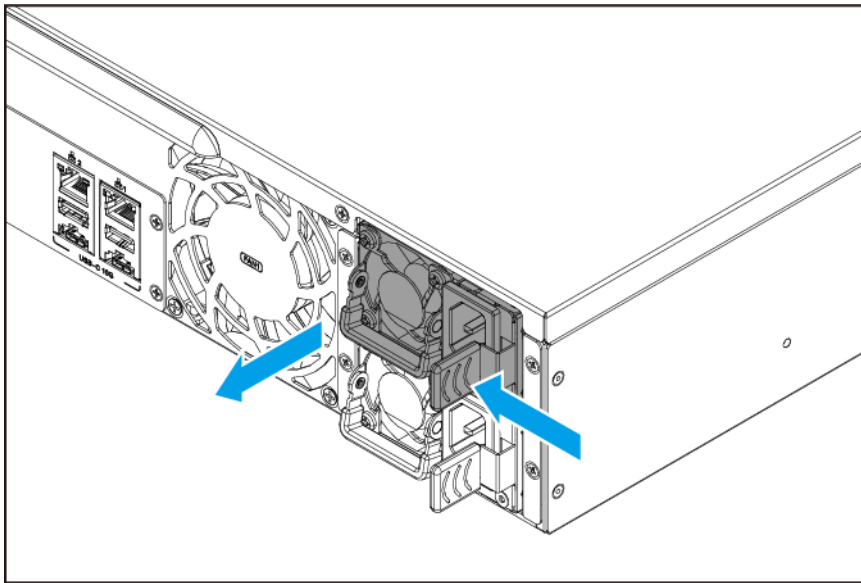
The NAS may have one or more power supply unit (PSU) cords. To avoid serious injuries, a trained service technician must disconnect all PSU cords before installing or replacing system components.



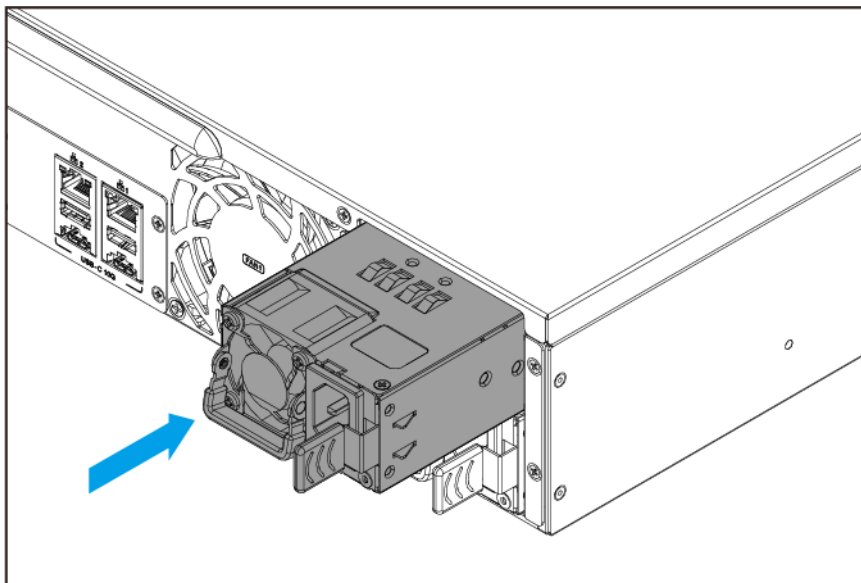
Note

This section is only applicable to TS-873AU-RP, TS-1273AU-RP, TS-1673AU-RP models.

1. Power off the device.
2. Disconnect the power cord from the electrical outlet and the PSU that you are replacing.
3. Firmly press the latch toward the handle and then pull the PSU out.



4. Insert the new PSU.



5. Connect the power cord to the PSU and the electrical outlet.
6. Power on the device.
7. Enable alerts for PSU failures.
 - a. Log on to QTS 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-x73AU is compatible with various QNAP expansion units. For details, please see table below.

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

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

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

Expansion Unit Model	Description	Required Accessories	
REXP-1620U-RP	<ul style="list-style-type: none"> • Uses a SAS 12 Gbps (SFF-8644) interface • Supports SAS/SATA HDD/SSD 	<ul style="list-style-type: none"> • SAS-12G2E storage expansion card • mini-SAS SFF-8644 cable • RAIL-A03-57 	
REXP-1220U-RP			
REXP-1610U-RP			
REXP-1210U-RP			
TL-D400S	<ul style="list-style-type: none"> • Uses a SAS 6 Gbps (SFF-8088) interface • Supports SATA HDD/SSD 	<ul style="list-style-type: none"> • 1 x SFF-8088 connector cable • QXP-400eS-A1164 host bus adapter 	
TL-D800S		<ul style="list-style-type: none"> • 2 x SFF-8088 connector cables • QXP-800eS-A1164 host bus adapter 	
TL-D1600S		<ul style="list-style-type: none"> • 4 x SFF-8088 to SFF-8644 connector cables • QXP-1600eS host bus adapter 	
TL-R400S		<ul style="list-style-type: none"> • 1 x SFF-8088 connector cable • QXP-400eS-A1164 host bus adapter • RAIL-B02 	
TL-R1200S-RP		<ul style="list-style-type: none"> • 3 x SFF-8088 to SFF-8644 connector cables • QXP-1600eS host bus adapter • RAIL-B02 	
TR-004		<ul style="list-style-type: none"> • Uses a USB 3.2 Gen 1 Type-C interface • Supports SATA drives 	USB 3.2 Gen 1 Type-A to Type-C cable
TR-004U			<ul style="list-style-type: none"> • USB 3.2 Gen 1 Type-A to Type-C cable • RAIL-B02
TR-002	<ul style="list-style-type: none"> • Uses a USB 3.2 Gen 2 Type-C interface • Supports SATA drives 	<ul style="list-style-type: none"> • USB 3.2 Gen 2 Type-A to Type-C cable • USB 3.2 Gen 2 Type-C to Type-C cable 	

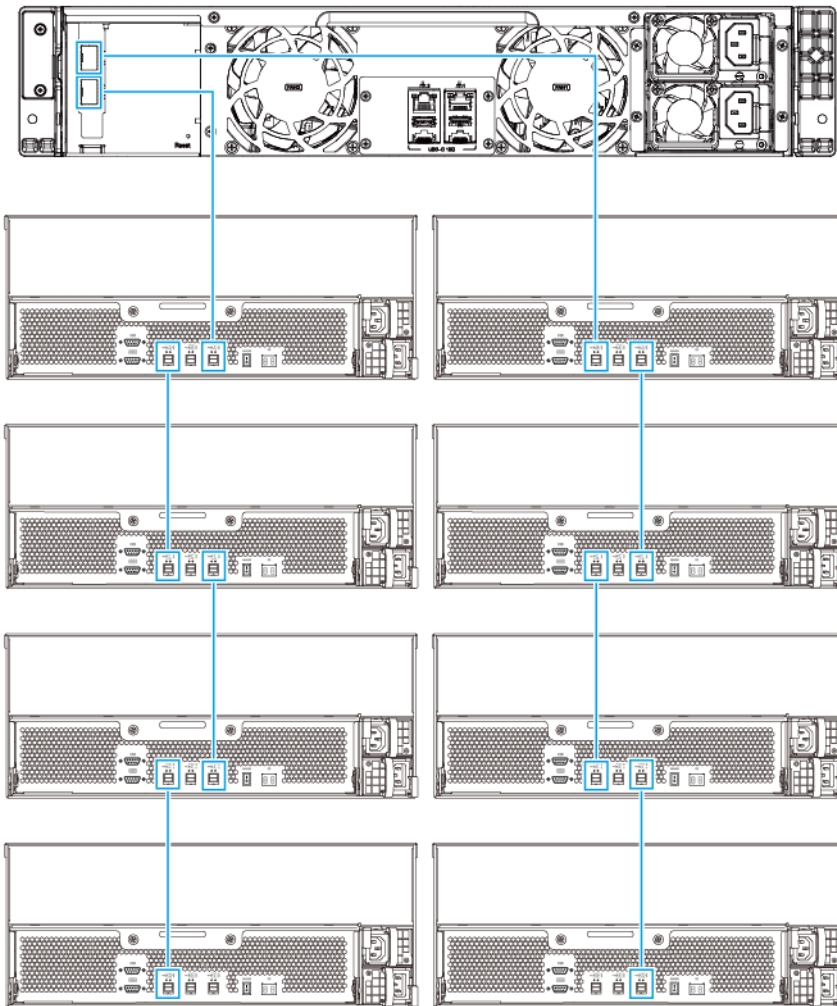
Expansion Unit Model	Description	Required Accessories
TL-D800C	<ul style="list-style-type: none"> • Uses a USB 3.2 Gen 2 Type-C interface • Supports SATA drives 	USB 3.2 Gen 2 Type-C to Type-C cable
TL-R1200C-RP		<ul style="list-style-type: none"> • USB 3.2 Gen 2 Type-C to Type-C cable • RAIL-B02

Connecting SAS Expansion Units

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

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

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



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

Connecting SATA JBOD Expansion Units

To connect the device to SATA JBOD expansion units, a host bus adapter must be installed on the NAS. For required accessories details, see [Expansion Unit Installation](#).

1. Power off the NAS.

2. Install a host bus adapter on the PCIe slot.



Important

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

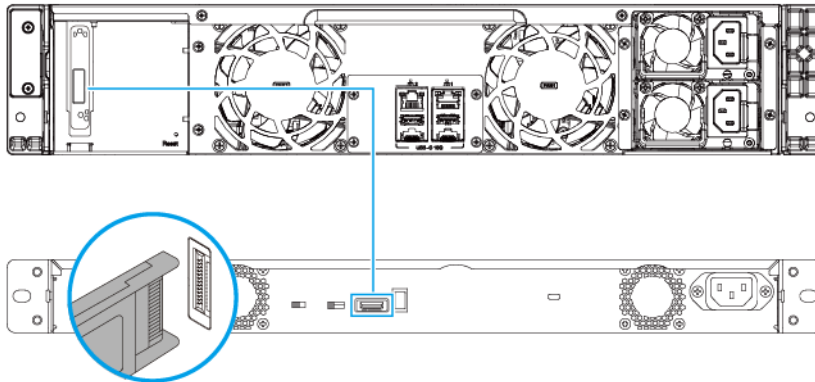
For details, see [Installing Expansion Cards](#).

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



Note

This image shows connecting the NAS to a TL-R400S.



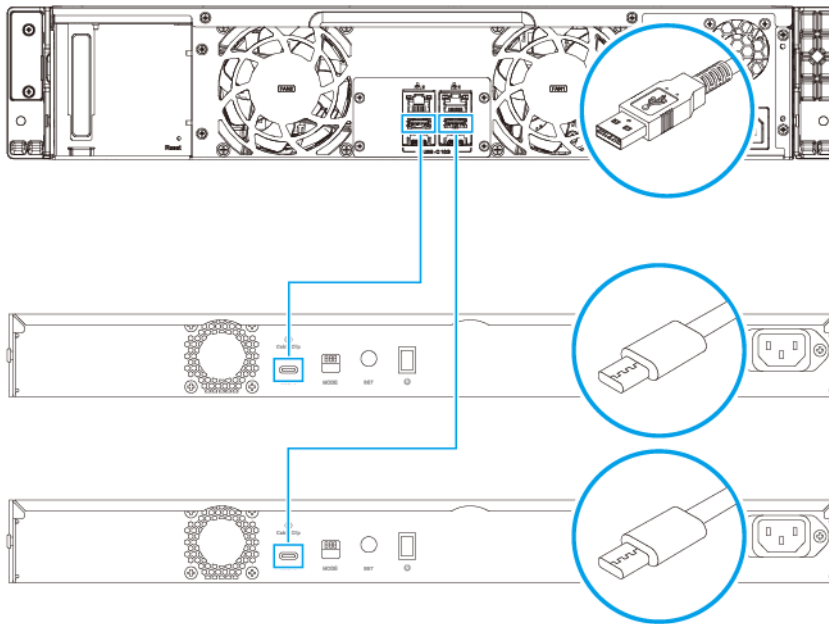
4. Power on the SATA JBOD expansion units.
5. Power on the NAS.
6. Verify that the expansion units are recognized by the NAS.
 - a. Log on to QTS as administrator.
 - b. Go to **Main Menu > Storage & Snapshots > Overview > System**.
 - c. Verify that the expansion units are listed.

Connecting USB Expansion Units

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

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

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

Rail Kits

The TS-x73AU is compatible with the following models:

- RAIL-B02

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>.

You can find installation information in the rail kit package.

QTS Installation

The TS-x73AU uses the QNAP QTS operating system. You can install QTS 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 QTS 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 QTS Using the Cloud Key.</p>	<ul style="list-style-type: none"> • Computer or mobile device • Network cable • myQNAPcloud account • Cloud Key

Installing QTS Using Qfinder Pro



Warning

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

1. Power on the NAS.
2. Connect the NAS 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**.
6. 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.
7. Click **Next**.
8. 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.

9. Click **Next**.
10. Select **Obtain an IP address automatically (DHCP)**.
11. Click **Next**.
12. Select the types of devices that you will use to access shared folders on the NAS.
13. Click **Next**.
14. Review the settings.
15. Click **Apply**.
A confirmation message appears.

**Warning**

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

16. Click **Confirm**.
QTS is installed.

Installing QTS Using the Cloud Key

**Warning**

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

1. Power on the NAS.
2. Connect the NAS to the internet.
3. Go to the QNAP Cloud Installation page using one of the following methods:
 - On your computer, go to <http://install.qnap.com/>.
 - Scan the QR code on the NAS using a mobile device.

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

4. Find your NAS from 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 QTS through LAN and then installing myQNAPcloud Link.

7. Click **Next.**

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

8. Click **Start Smart Installation Guide.****9. 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.

10. Click **Next.****11. 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.

12. Click **Next.****13. Select **Obtain an IP address automatically (DHCP)**.****14. Click **Next**.****15. Select the types of devices that you will use to access shared folders on the NAS.****16. Click **Next**.****17. Review the settings.****18. Click **Apply**.**

A confirmation message appears.

**Warning**

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


19. Click **Confirm.**

QTS is installed.

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 3 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.

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](#) .



Note

Only TS-873AU and TS-873AU-RP models have expansion unit LEDs.

LED	Status	Description
System Status	Flashes green and red alternately every 0.5 seconds	<ul style="list-style-type: none"> The drive is being formatted. The device is being initialized. The operating system is being updated. RAID rebuilding is in progress. Online RAID Capacity Expansion is in progress. Online RAID Level Migration is in progress. The firmware is being updated. <p> Important When updating the firmware, do not remove the power cord or USB cable, and do not force-exit the application.</p>
	Red	<ul style="list-style-type: none"> The drive is invalid. The disk volume has reached its full capacity. The disk volume is about to reach its full capacity. The system fan is not functioning. An error occurred when accessing (read/write) the data. A bad sector is detected on the hard drive. The device is in degraded read-only mode (two member drives failed in RAID 5 or RAID 6 but the data can still be read). A hardware self-test error occurred.
	Flashes red every 0.5 seconds	The device is in degraded mode (one member drive failed in RAID 1, RAID 5, or RAID 6).
	Flashes green every 0.5 seconds	<ul style="list-style-type: none"> The device is not configured. A drive is not formatted.
	Flashes green every 2 seconds	All drives are in standby mode.
	Flashes green every second	The device is not configured.
	Green	The device is ready.
Off	<ul style="list-style-type: none"> All drives are in standby mode. The device is powered off. 	
LAN	Orange	A network connection has been established.
	Flashes orange	The device is being accessed from the network.
2.5 Gigabit Ethernet speed	Green	The network connection is operating at 2.5 Gbps.
	Orange	<ul style="list-style-type: none"> The network connection is operating at 1 Gbps. The network connection is operating at 100 Mbps.
	Off	The network connection is operating at 10 Mbps.


LED	Status	Description
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.
Drive	Flashes red	The data is being accessed and a read/write error occurs during the process.
	Red	<ul style="list-style-type: none"> A drive read/write error occurred. The drive temperature is over the threshold.
	Flashes green	<ul style="list-style-type: none"> Data is being accessed. Data is being copied.
	Green	<ul style="list-style-type: none"> The drive can be accessed. The device is powered on.
	Off	No drive was detected.
Expansion Unit	Blue	A QNAP expansion unit is connected.
	Off	No USB or SATA external storage devices connected.

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	Cannot detect installed disk.

Duration	Frequency	Description
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.
	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 disk volume is about to reach its full capacity. • The disk volume has reached its full capacity. • A volume status error occurred. • A drive is plugged in or out. • The iSCSI is about to reach full capacity.
	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.

Reset Button

Operation	User Action	Result
Basic system reset	Press and hold the button for 3 seconds.	<p>The following settings are reset to default:</p> <ul style="list-style-type: none"> • System administrator password: The default password is the first MAC address in uppercase letters without special characters. For example, if the first MAC address is 00-08-9B-F6-15-75, then the admin password will be 00089BF61575. <p> Tip You can find the first MAC address using Qfinder Pro. A label attached to the device also lists the address as MAC1.</p> <ul style="list-style-type: none"> • TCP/IP configuration: <ul style="list-style-type: none"> • Obtain IP address settings automatically via DHCP • Disable jumbo frames • If port trunking is enabled (multi-LAN models only), the port trunking mode is reset to “Active Backup (Failover)”. • System port: 8080 (system service port) • Security level: Low (Allow all connections) • LCD panel password: (blank) • VLAN: Disabled
Advanced system reset	Press and hold the button for 15 seconds.	<p>The default factory settings are restored.</p> <ul style="list-style-type: none"> • To retrieve old data after an advanced system reset, recreate the previous folder structure on the NAS.

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 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:

- 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).
- 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. For details, see [Copying NAS Data Using HBS](#).

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	<p>If the NAS does not support file system encryption, encrypted disk volumes are not migrated.</p> <div style="border-left: 2px solid red; padding-left: 10px;"> <p> 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.</p> </div>

Data and Settings	After NAS Migration
Shared folders	<p>All shared folders and the downloaded files stored in them are retained.</p> <p> Warning To prevent data loss, back up and save encryption keys or passwords of encrypted shared folders in a safe place before migration.</p> <p> Important Folder permissions on the destination NAS must be reconfigured after migration.</p>
Network	<ul style="list-style-type: none"> 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	<p>Licenses are not migrated.</p> <p> Warning To prevent losing all your software licenses, QNAP recommends deactivating licenses on the source NAS before data migration.</p>
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

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 > Services** .
 - 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: <ul style="list-style-type: none"> • 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**.
The **Create a Storage Space** window appears.
5. 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 host name 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 - 65535.
Password	The password used to access the storage space
Use SSL connection	Requires SSL connection when accessing the remote NAS

6. 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.

7. Click **Create**.

8. Click **Select**.
9. 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**.
The dialog box closes.
 - g. Optional: Add more paired folders if necessary.



Tip

- Click  to edit an existing folder.
- Click  to delete an existing pair.

10. Click **Next**.
The **Scheduling** window appears.
11. Select **Sync Now**.
12. Click **Next**.
13. Review the job summary.
14. 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. Click **Import/Export Users**.
The **Import/Export Users** window appears.
 - c. Select **Export user and user group settings**.
 - d. 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 **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.
For details, see *Back up the source NAS users or group settings*.
The source NAS user settings file is imported to the destination NAS.

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 QTS 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 QTS 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.

1. Log on to QTS.
2. Go to **Main Menu > Storage & Snapshots > Storage > Disks/VJBOD** .
3. Locate the failed drive.
4. Prepare a new hard drive with a capacity that is the same as or larger than the failed hard drive.
5. Remove the failed drive from the device.
6. Wait for 20 seconds or until the device beeps twice.
7. Remove the failed drive from the drive tray.
8. Insert the new drive into the drive tray.
9. Install the new drive.
The NAS beeps twice.
10. Go to **Main Menu > Storage & Snapshots > Storage Space** .
11. Locate the 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 disk volumes from unintentional disconnection or removal of drives. Users can recover an inactive RAID 1, RAID 5, RAID 6, RAID 10, RAID 50, or RAID 60 volume from degraded mode.

Disk Volume	RAID Recovery Support	Number of Disks	Maximum Number of Removed Drives
Single	No	1	N/A
JBOD	Yes	≥ 2	
RAID 0	Yes		
RAID 1	Yes	2	1
RAID 5	Yes	≥ 3	2
RAID 6	Yes	≥ 4	
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.

Support and Other Resources

QNAP provides the following resources:

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

7. Glossary

Cloud Key

Unique 8-digit code assigned to each NAS device

myQNAPcloud Link

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

myQNAPcloud

Provides various remote access services such as DDNS and myQNAPcloud Link

QNAP ID

User account that enables you to use myQNAPcloud remote access and other QNAP services

Qfinder Pro

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

QTS

QNAP NAS operating system

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CE Notice



This QNAP NAS complies with CE Compliance Class A.

FCC Notice

FCC Class A Notice



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.



Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.



Important

Any modifications made to this device that are not approved by QNAP Systems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

VCCI Notice



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VCCI-A

BSMI Notice



D33B77
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SJ/T 11364-2006



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	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
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
风扇组装	0	0	0	0	0	0
电力供应组装	0	0	0	0	0	0
电池	0	0	0	0	0	0
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