

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

**QNAP**

# ES1686dc

## User Guide

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# 1. Important Information

## Original Packaging

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

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

## Hardware Defects

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

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

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

## Safety information

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

### General Instructions

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

### **WARNING**



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



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

## Power

### WARNING



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



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

## Moving Parts

### WARNING



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



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

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

## System Battery

### WARNING



#### INGESTION HAZARD

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

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

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

## Rail Kits

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

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

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

### **WARNING**

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

## 2. Product Overview

This chapter provides basic information about the QNAP ES1686dc NAS.

### About the ES1686dc

The ES1686dc is designed to deliver a scalable platform for enterprise-level solutions. It is equipped with a powerful multi-core processor, AES-NI hardware encryption engine, and both USB 3.0 and 10GbE ports, allowing it to deliver optimal performance for enterprise users. The ES1686dc supports up to 16 storage drives. This number can be increased by attaching multiple expansion units. It has redundant storage controllers and power supplies to provide the necessary reliability, serviceability, and read/write speeds.

### 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](#).

Ordering P/N	CPU	Memory	Power supply
ES1686dc-2123IT-64G	Intel® Xeon™ D-2123IT	64 GB (32 GB per controller)	Redundant
ES1686dc-2142IT-96G	Intel® Xeon® D-2142IT	96 GB (48 GB per controller)	Redundant
ES1686dc-2142IT-128G	Intel® Xeon® D-2142IT	128 GB (64 GB per controller)	Redundant

Component	ES1686dc-2123IT-64G	ES1686dc-2142IT-96G ES1686dc-2142IT-128G
Processor		
CPU	Intel® Xeon™ D-2123IT	Intel® Xeon® D-2142IT
Frequency	4-core/8-thread 2.2 GHz base/3.0 GHz turbo	8-core/16-thread 1.9 GHz/3.0 GHz turbo




Component	ES1686dc-2123IT-64G	ES1686dc-2142IT-96G ES1686dc-2142IT-128G
Architecture	x86 64-bit	
Encryption engine	AES-NI	
Memory		
Memory slots	8 x DDR4 RDIMM or LRDIMM slots per controller <div style="background-color: #fff9e6; padding: 10px; margin-top: 10px;"> <p><b>Important</b></p> <ul style="list-style-type: none"> <li>Use only QNAP memory modules to maintain system performance and stability. For NAS devices with more than one memory slot, use QNAP modules with identical specifications.</li> <li>Using unsupported modules may degrade performance, cause errors, or prevent the operating system from starting.</li> <li>You can only use one type of dual in-line memory module (DIMM) at a time. Do not use registered DIMM (RDIMM) with load-reduction DIMM (LRDIMM) memory.</li> </ul> </div>	
Maximum memory	512 GB RAM: 8 x 64 GB	
Flash memory	4 GB (dual-boot OS protection)	
Cache for Copy-to-Flash	64 GB per controller	
Storage		
Drive bays	16 x 3.5-inch SAS 12 Gbps <div style="background-color: #e6f2ff; padding: 10px; margin-top: 10px;"> <p><b>Note</b></p> <p>The interface is backward compatible to SAS 6 Gbps.</p> </div>	



Component	ES1686dc-2123IT-64G	ES1686dc-2142IT-96G ES1686dc-2142IT-128G
Drive compatibility	3.5-inch bays: <ul style="list-style-type: none"> <li>• 3.5-inch SATA hard disk drives</li> <li>• 3.5-inch SAS hard disk drives</li> <li>• 2.5-inch SATA hard disk drives</li> <li>• 2.5-inch SATA solid-state drives</li> <li>• 2.5-inch SAS hard disk drives</li> <li>• 2.5-inch SAS solid-state drives</li> </ul> <div style="background-color: #ffffcc; padding: 10px; margin-top: 10px;"> <p><b>Tip</b></p> <p>For the list of compatible drive models, go to <a href="https://www.qnap.com/compatibility">https://www.qnap.com/compatibility</a>. A QDA-SA or QDA-SA2 drive adapter is required for installing SATA HDD/SSD. For more details, see the drive adapter Quick Installation Guide.</p> </div>	
SSD cache acceleration support	3.5-inch drive bays: 1 to 16	
Network		
10 Gigabit Ethernet ports	4 x 10GbE SFP+ ports per controller	
Gigabit Ethernet ports	3 x GbE RJ45 ports per controller	
External I/O Ports & Expansion Slots		
PCIe slots	2 x PCIe 3.0 x8 slots per controller <div style="background-color: #ffffcc; padding: 10px; margin-top: 10px;"> <p><b>Tip</b></p> <p>For the list of compatible expansion cards, go to <a href="https://www.qnap.com/compatibility">https://www.qnap.com/compatibility</a>.</p> </div>	
USB ports	2 x USB 3.0 Type-A ports per controller <div style="background-color: #e6f2ff; padding: 10px; margin-top: 10px;"> <p><b>Note</b></p> <p>For engineering purposes only.</p> </div>	

Component	ES1686dc-2123IT-64G	ES1686dc-2142IT-96G ES1686dc-2142IT-128G
Interface		
Buttons	NAS <ul style="list-style-type: none"> <li>• Power</li> <li>• OLED panel power button</li> </ul> Storage Controllers <ul style="list-style-type: none"> <li>• Power</li> <li>• Reset</li> </ul>	
Dimensions		
Form factor	3U Rackmount	
Dimensions (H x W x D)	132 x 483.05 x 630.62 mm (5.20 x 19.02 x 24.83 in)	
Net weight	25.83 kg (56.95 lbs)	
Others		
Rail compatibility	RAIL-E02 <div style="background-color: #e6f2ff; padding: 10px; margin-top: 10px;"> <p><b>Note</b></p> <p>Information on rail kit installation can be found in the installation guide included in the rail kit package.</p> </div>	
Power supply unit	2 x 770W, 90-264V AC, 50/60 Hz <div style="background-color: #ffe6e6; padding: 10px; margin-top: 10px;"> <p><b>Warning</b></p> <p>To reduce the risk of fire or electric shock, ensure that you only connect the power cord to a properly grounded electrical outlet.</p> </div>	

Component	ES1686dc-2123IT-64G	ES1686dc-2142IT-96G ES1686dc-2142IT-128G
System battery	CR2032 lithium battery (3V, 225 mAh) <div style="background-color: #ffe6e6; padding: 10px; margin-top: 10px;"> <p><b>Warning</b></p> <p>To avoid potential battery explosion, causing injury or damage to components, ensure that you replace the existing battery with a battery of the same type.</p> </div> <div style="background-color: #fff2cc; padding: 10px; margin-top: 10px;"> <p><b>Important</b></p> <p>Dispose of used batteries according to local regulations or the instructions of the battery manufacturer.</p> </div>	
Hot-swappable battery backup unit	2 x 10.8V, 2200 mAh	
Sound level	55.8 db(A) <div style="background-color: #e6f2ff; padding: 10px; margin-top: 10px;"> <p><b>Note</b></p> <p>The sound level was tested at a bystander position, which is within one meter of the NAS. The test NAS operated at low speed with the maximum number of drives installed.</p> </div>	
Hot-swappable fan module	System: 60 x 60 x 38 mm, 12V DC fan <div style="background-color: #ffe6e6; padding: 10px; margin-top: 10px;"> <p><b>Warning</b></p> <ul style="list-style-type: none"> <li>•  To avoid potential injury or damage to components, do not touch the fans while the NAS is connected to a power source.</li> <li>• To ensure proper cooling, replacement of the fan should be completed within 10 seconds.</li> </ul> </div>	
Operating temperature	0°C to 40°C (32°F to 104°F)	
Relative humidity	<ul style="list-style-type: none"> <li>• Non-condensing relative humidity: 5% to 95%</li> <li>• Wet-bulb temperature: 27°C (80.6°F)</li> </ul>	

**Tip**

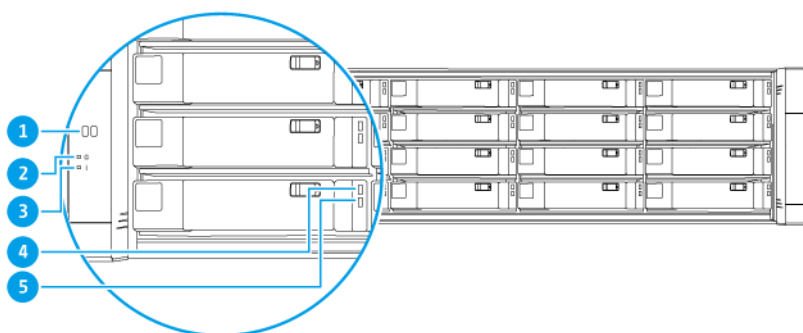
Model specifications are subject to change without prior notice. To see the latest specifications, go to <https://www.qnap.com>.

## Package Contents

Item	Quantity
ES1686dc NAS	1
Power cord	2
Ethernet cable	6
Screws for 2.5-inch drives	64
Screws for 3.5-inch drives	64
RAIL-E02 rail kit	1
Quick Installation Guide (QIG)	1

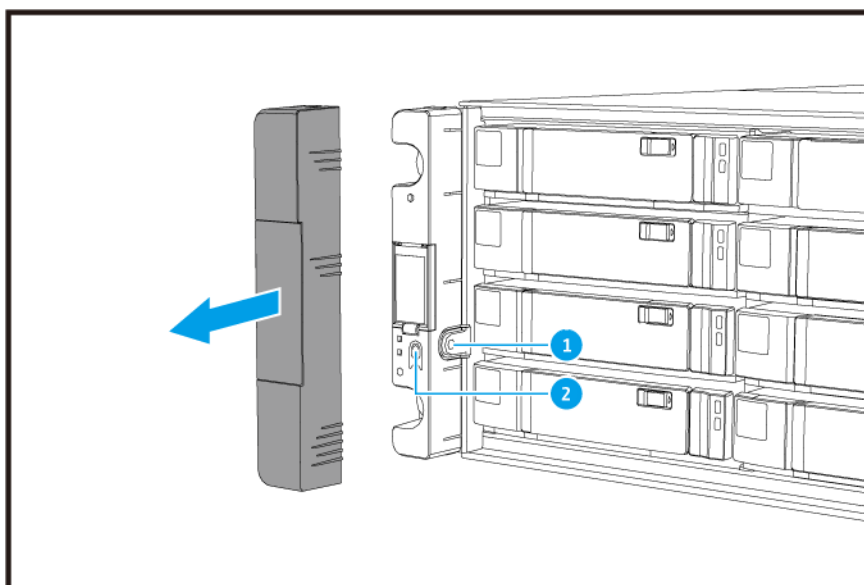
## Components

### Front Panel



No.	Component	No.	Component
1	OLED panel	4	Drive status LED
2	System power LED	5	Drive activity LED
3	Status LED	-	-

## Front Panel Buttons



### Note

Pull the panel cover to access the front panel buttons.

No.	Component	No.	Component
1	OLED panel power button	2	Power button

Operation	User Action	Result
Power on NAS	Press the power button.	<ul style="list-style-type: none"> <li>Both storage controllers power on.</li> <li>All storage and management services are disabled.</li> </ul> <div style="background-color: #ffffcc; padding: 10px; margin-top: 10px;"> <p><b>Tip</b></p> <ul style="list-style-type: none"> <li>System startup takes 10 to 15 minutes, depending on the number of installed drives and connected devices. Check the rear panel LEDs to determine the startup status. For details, see <a href="#">Rear Panel LEDs</a>.</li> <li>This button can only be used to power on the two storage controllers. Use the respective rear panel storage controller power button to power off the storage controllers. For details, see <a href="#">Storage Controller Power Button</a>.</li> </ul> </div>
Power on OLED display	Press the OLED button.	The OLED display powers on.
Power off OLED display	Press the OLED button.	The OLED display powers off.

## Front Panel LEDs

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

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


LED	Status	Description
System power	Blue	System powered on
System status	Green	System operating normally

LED	Status	Description
System status	Red	<ul style="list-style-type: none"> <li>System errors or warnings (e.g. degraded RAID mode, memory failure, fan/power supply failure, system/disk temperature too high, storage pool reaching threshold value) were detected. Refer to the QES User Guide for details.</li> <li>The system is performing takeover. The dual active-active controller system enables a single controller to take over the pool disk resources owned by the other controller in the event of a controller failure. Takeovers can be initiated manually or be set up with the automatic system failover protection. For more information, refer to the QES user guide.</li> <li>Power supply unit unplugged</li> </ul>
Drive status	Green	Drive can be accessed
	Flashing green slowly	The QES Storage Manager Locate command is enabled and is identifying the drive
	Red	Drive read/write error
	Off	Drive not installed
Drive activity	Flashing green continuously or slowly	No drive activity
	Flashing green	High activity on drive or drive being configured as part of an array







## Front Panel OLED Display






The OLED display displays the status of the storage controllers and main components.

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

Icon name	Icon	Description
Controller power status		<ul style="list-style-type: none"> <li>On: Both controllers are powered on</li> <li>Flashing: Both controllers are booting</li> </ul>



Icon name	Icon	Description
Controller power status		<ul style="list-style-type: none"> <li>On: Only controller A is powered on</li> <li>Flashing: Controller A is booting</li> </ul>
		<ul style="list-style-type: none"> <li>On: Only controller B is powered on</li> <li>Flashing: Controller B is booting</li> </ul>
Controller fan status		<ul style="list-style-type: none"> <li>On: The fan modules of both controllers are operating normally</li> <li>Flashing: The fan modules of both controllers are operating incorrectly or are not installed</li> </ul>
		<p>If both controllers are installed:</p> <ul style="list-style-type: none"> <li>Flashing: The fan module in controller A is operating incorrectly or is not installed</li> </ul> <p>If only controller A is installed:</p> <ul style="list-style-type: none"> <li>On: The fan module in controller A is operating normally</li> <li>Flashing: The fan module in controller A is operating incorrectly or is not installed</li> </ul>
		<p>If both controllers are installed:</p> <ul style="list-style-type: none"> <li>Flashing: The fan module in controller B is operating incorrectly or is not installed</li> </ul> <p>If only controller B is installed:</p> <ul style="list-style-type: none"> <li>On: The fan module in controller B is operating normally</li> <li>Flashing: The fan module in controller B is operating incorrectly or is not installed</li> </ul>
Controller battery backup unit		<ul style="list-style-type: none"> <li>On: The BBUs of both controllers are operating normally</li> <li>Flashing: The BBUs of both controllers are operating incorrectly</li> <li>Highlighted: The BBUs of both controllers are charging</li> <li>Off: The BBUs of both controllers are not detected</li> </ul>

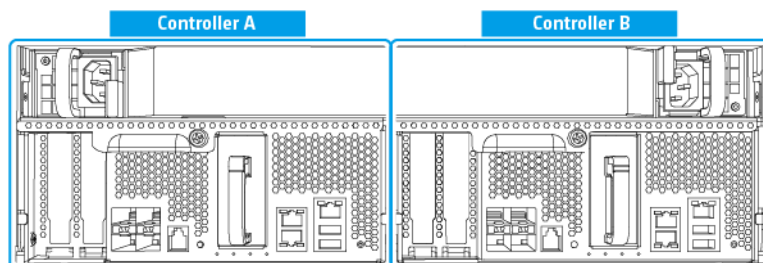
Icon name	Icon	Description
Controller battery backup unit		<p>If both controllers are powered on:</p> <ul style="list-style-type: none"> <li>Flashing: The BBU in controller A is operating incorrectly or is not detected</li> <li>Highlighted: The BBU in controller A is charging</li> </ul> <p>If only controller A is powered on:</p> <ul style="list-style-type: none"> <li>On: The BBU in controller A is operating normally</li> <li>Flashing: The BBU in controller A is operating incorrectly or is not detected</li> <li>Highlighted: The BBU in controller A is charging</li> </ul>
		<p>If both controllers are powered on:</p> <ul style="list-style-type: none"> <li>Flashing: The BBU in controller B is operating incorrectly or is not detected</li> <li>Highlighted: The BBU in controller B is charging</li> </ul> <p>If only controller B powered on:</p> <ul style="list-style-type: none"> <li>On: The BBU in controller B is operating normally</li> <li>Flashing: The BBU in controller B is operating incorrectly or is not detected</li> <li>Highlighted: The BBU in controller B is charging</li> </ul>
High availability status		<ul style="list-style-type: none"> <li>On: In active state</li> <li>Flashing: Performing takeover or undergoing giveback</li> </ul>
		Highlighted: Controller A is in takeover state
		Highlighted: Controller B is in takeover state

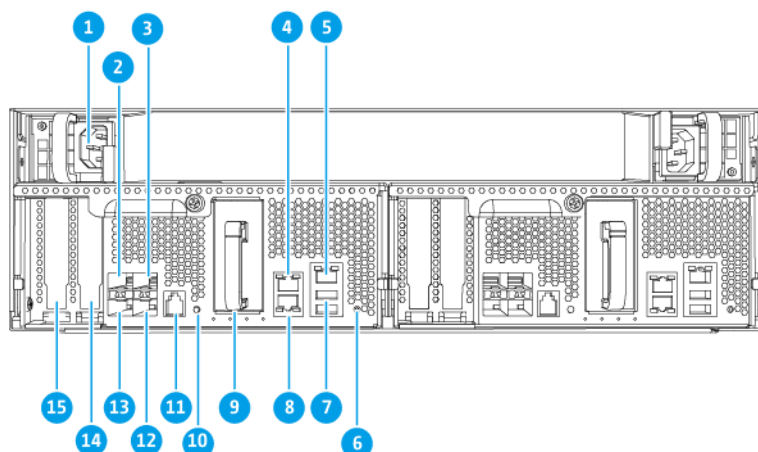
Icon name	Icon	Description
Two-digit display	05	<p>The two-digit display shows the booting status of each storage controller. The left digit is controller A, and right is controller B.</p> <ul style="list-style-type: none"> <li>• No Display: BIOS booting</li> <li>• 1: Detecting device</li> <li>• 2: Applying network settings</li> <li>• 3: Applying system settings</li> <li>• 4: Service starting</li> <li>• 5: System self-testing</li> <li>• 8: System initializing</li> <li>• 0: System ready</li> </ul>

### Tip

To view the full list of system components and their status, open **High Availability** in QES.

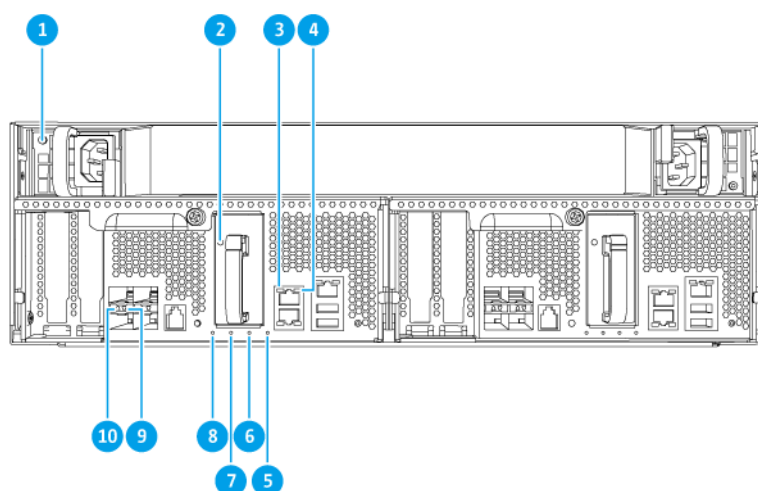
## Rear Panel





No.	Component	No.	Component
1	Power supply unit 1	9	Battery backup unit
2	Ethernet port 6 (10GbE SFP+)	10	Power button
3	Ethernet port 4 (10GbE SFP+)	11	Service port
			<p><b>Note</b></p> <p>This port is only for engineering purposes.</p>
4	Ethernet port 2 (GbE RJ45)	12	Ethernet port 5 (10GbE SFP+)
5	Ethernet port 1 (GbE RJ45, management port)	13	Ethernet port 7 (10GbE SFP+)
6	Reset button	14	PCIe 3.0 x8 slot 1
7	USB 3.0 Type-A ports	15	PCIe 3.0 x8 slot 2
			<p><b>Note</b></p> <p>This port is only for engineering purposes.</p>
8	Ethernet port 3 (GbE RJ45)	-	-

## Rear Panel LEDs



No.	Component	No.	Component
1	Power supply LED	6	Battery backup unit status LED
2	Battery backup unit LED	7	Fan status LED
3	Gigabit Ethernet speed LED	8	Status LED
4	Gigabit Ethernet activity LED	9	10 Gigabit Ethernet activity LED
5	High availability LED	10	10 Gigabit Ethernet speed LED

The following LED information applies only when the drive is correctly installed and when the NAS is connected to the network.

LED	Status	Description
Power supply unit	Green	<ul style="list-style-type: none"> <li>Powered on</li> <li>Power supply functioning normally</li> </ul>
	Flashing green	System powering off
	Orange	AC power cord unplugged or malfunctioning

LED	Status	Description
Power supply unit	Off	One or more of the following conditions exist: <ul style="list-style-type: none"> <li>• AC power unavailable</li> <li>• Power supply failed</li> </ul>
Battery backup unit	Green	Functioning normally
	Red	Malfunctioning
	Orange	Charging or learning
	Off	Not correctly attached to the ES1686dc
Status	Green	System operating normally
	Flashing green	System booting
	Off	System powered off
Fan	Green	Functioning normally
	Orange	Malfunctioning
	Off	Fans not detected
Battery backup unit status	Green	Functioning normally
	Orange	Writing buffer for Copy-to-Flash For details, see <a href="#">Battery Backup Unit</a> .
	Off	One or more of the following conditions exist: <ul style="list-style-type: none"> <li>• Storage controller is powered off</li> <li>• System cannot detect battery backup unit</li> </ul>
High availability	Green	Active State

LED	Status	Description
High availability	Flashing orange	<p>One of the following:</p> <ul style="list-style-type: none"> <li>Performing takeover: The dual active-active controller system enables a controller to take over the pool disk resources and access the data upon the failure of the other controller. Takeovers can be initiated manually or be set up with the automatic system failover protection. For more details, refer to the QES user guide.</li> <li>Undergoing giveback: One of the storage controllers has taken over the system. The other storage controller has resumed operations and is ready to resume data service. Giveback can be initiated manually or be set up with automatic failback after system recovers. For more details, refer to the QES user guide.</li> </ul>
	Orange	Storage controller has taken over from the other storage controller
	Off	<p>One or more of the following conditions exist:</p> <ul style="list-style-type: none"> <li>Storage controller failed</li> <li>Storage controller is powered off</li> </ul>
10 Gigabit Ethernet port speed	Green	10GbE connection
	Orange	1GbE connection
	Off	100 Mbps connection
10 Gigabit Ethernet port activity	Green	Network link active
	Flashing green	Network link active
	Off	No network link
1 Gigabit Ethernet port activity	Green	Network link established
	Flashing green	Network link active
	Off	No network link



LED	Status	Description
1 Gigabit Ethernet port speed	Green	1GbE connection
	Orange	100 Mbps connection

## Storage Controller Power Button

Operation	User Action	Result
Power on	Press the button once.	The storage controller powers on.
Power off	Press and hold the button for 5 seconds.	The storage controller powers off.
Force power off	Press and hold the button for 10 seconds.	The storage controller shuts down.  <div style="border: 1px solid #f08080; background-color: #ffe6e6; padding: 5px; margin-top: 10px;"> <p><b>Warning</b></p> <p>Use this method only when the storage controller is unresponsive. This action may result in data loss.</p> </div>

## Reset Button

Operation	User Action	Result
Basic system reset	Press and hold the button for 3 seconds.	<p>The following settings are set to default values.</p> <ul style="list-style-type: none"> <li>• System administrator password: For details on the default password, see <a href="#">this FAQ</a>.</li> <li>• TCP/IP configuration: <ul style="list-style-type: none"> <li>• IP address settings: Automatically obtained via DHCP</li> <li>• Jumbo frames: Disabled</li> <li>• Port trunking mode: Failover (multi-LAN models only)</li> </ul> </li> <li>• Security level: Low (Allow all connections)</li> <li>• LCD panel password: (blank)</li> <li>• VLAN: Disabled</li> <li>• Service binding: NAS services can run on any available network interface</li> </ul>

Operation	User Action	Result
Advanced system reset	Press and hold the button for 10 seconds.	The device performs a basic system reset. All default system settings are also restored, deleting all previously created users, user groups, and shared folders. The user data stored on the disks is retained. To retrieve data after an advanced system reset, recreate the previous folder structure on the NAS.

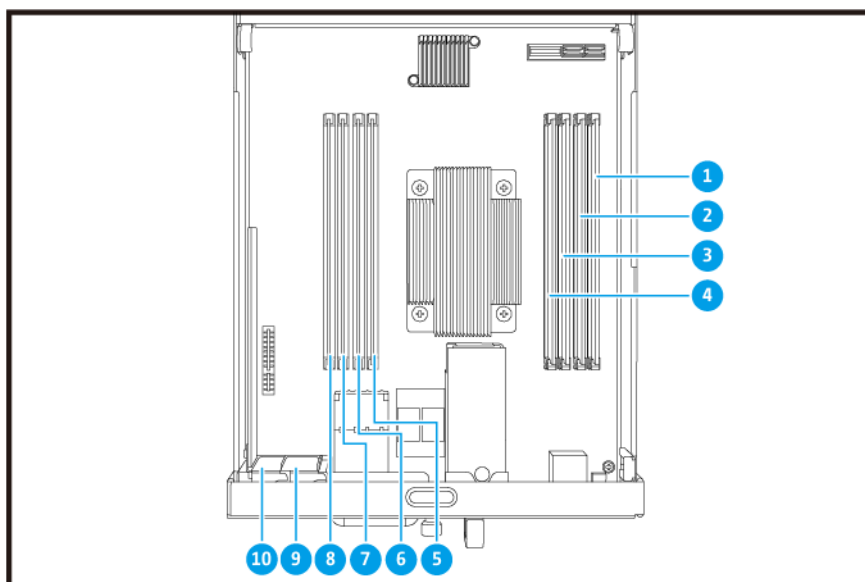
## Battery Backup Unit

The battery backup unit (BBU) protects the data integrity of each storage controller. If both power supply units fail during a power outage, the system uses the BBUs for power and activates the asynchronous DRAM refresh (ADR) feature of the processors. While the BBUs supply power, cached data stored in the DRAM are written to the M.2 SSDs. This process is called Copy-to-Flash. Once power is restored and the system restarts, any logs, archives, or other important data are reconstructed from the data stored on the M.2 SSDs.

### Warning

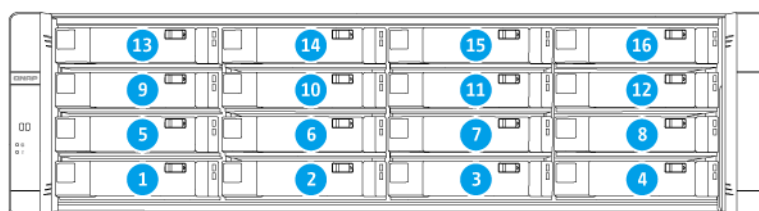
During a power outage, do not remove storage controllers while their BBU status LEDs are orange. Removing a storage controller during this period interrupts the Copy-to-Flash process and may result in data loss.

## System Board



No.	Component	No.	Component
1	Memory slot 1	6	Memory slot 6
2	Memory slot 2	7	Memory slot 7
3	Memory slot 3	8	Memory slot 8
4	Memory slot 4	9	PCIe 3.0 x8 slot 1
5	Memory slot 5	10	PCIe 3.0 x8 slot 2

## Drive Numbering



## Installation Requirements

Category	Item
Environment	<ul style="list-style-type: none"> <li>• Room temperature: 0°C to 40°C (32°F to 104°F)</li> <li>• Non-condensing relative humidity: 5% to 95%</li> <li>• Wet-bulb temperature: 27°C (80.6°F)</li> <li>• Flat, anti-static surface without exposure to direct sunlight, liquids, or chemicals</li> <li>• Free from objects that may obstruct NAS ventilation or apply pressure to the NAS or power cord</li> <li>• Restricted access <ul style="list-style-type: none"> <li>• The NAS 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.</li> <li>• Only qualified, trained, and authorized NAS administrators with knowledge of all restrictions, safety precautions, and installation and maintenance procedures should have physical access to the NAS.</li> </ul> </li> </ul>

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

## Setting Up the NAS

### Important

Read all safety requirements and information in [Safety Information](#) carefully before setting up the NAS or installing NAS components.

- Place your NAS device in an environment that meets the requirements.  
For details, see [Installation Requirements](#).
- Install the drives.  
For details, see the following topics:
  - [Drive Configuration](#)
  - [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 a list of compatible drives and expansion cards, go to <http://www.qnap.com/compatibility>.
- Optional: Install expansion cards.  
For details, see [Installing Expansion Cards](#).
- Connect the NAS to the network.  
For details, see the following topics:
  - [Management Port Configuration](#)
  - [Multipath I/O Network Configuration](#)
- Optional: Connect the SAS Expansion Units.  
For details, see [Connecting SAS Expansion Units](#).
- Connect the power cord and all applicable cables.
- Power on the NAS.  
For details, see [Front Panel Buttons](#).
- Install QES.  
For details, see [QES Installation](#).

**9.** Log on to QES.

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

**10.** Open **High Availability** and check the system status.

If any of the components are experiencing issues, check if they are properly installed.

## 3. Installation and Configuration

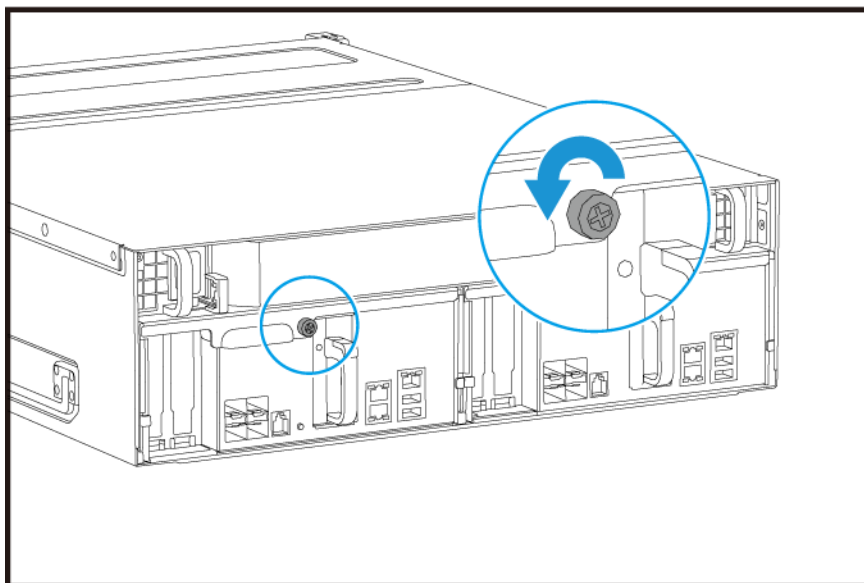
This chapter provides specific hardware and firmware installation and configuration steps.

### Hardware Installation

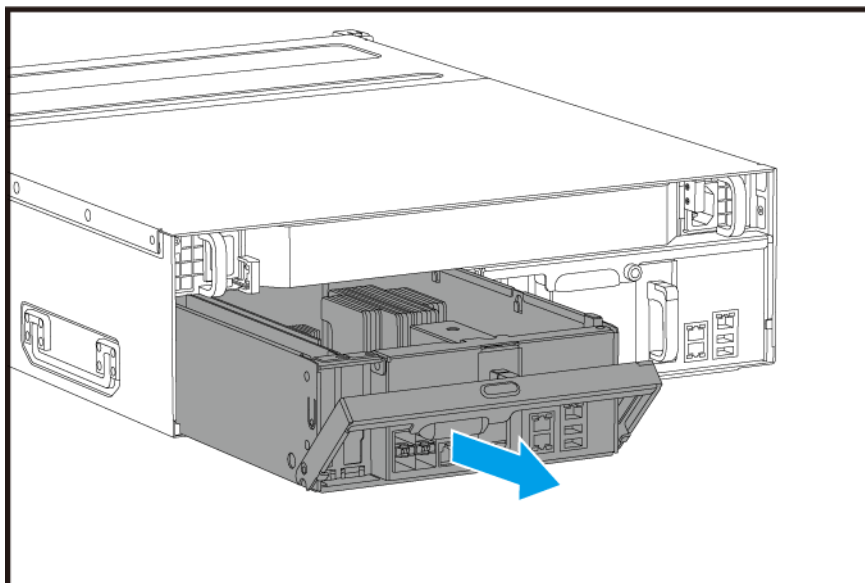
This section provides information on removing or installing the storage controller, drives, expansion cards, power supply units, fan modules, memory modules, and battery backup units.

#### Removing a Storage Controller

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

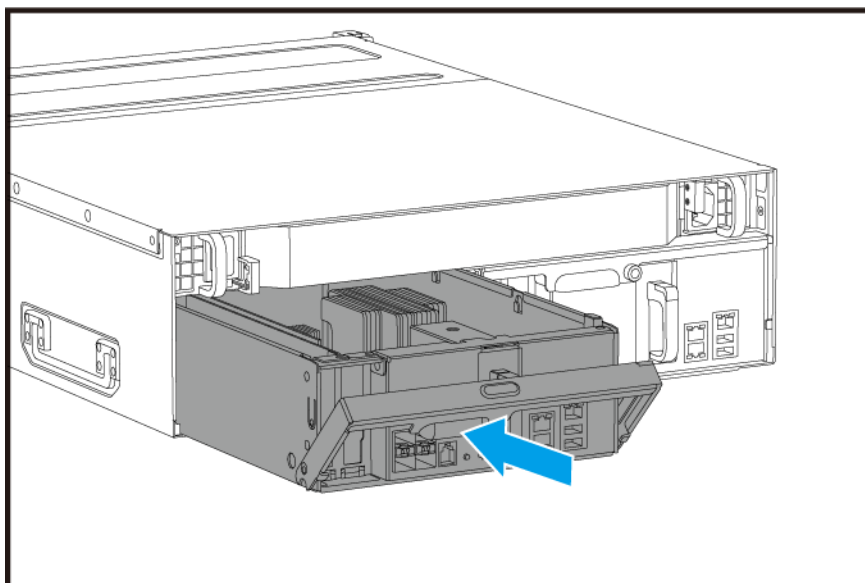


- b.** Pull the handle to pull out the storage controller.



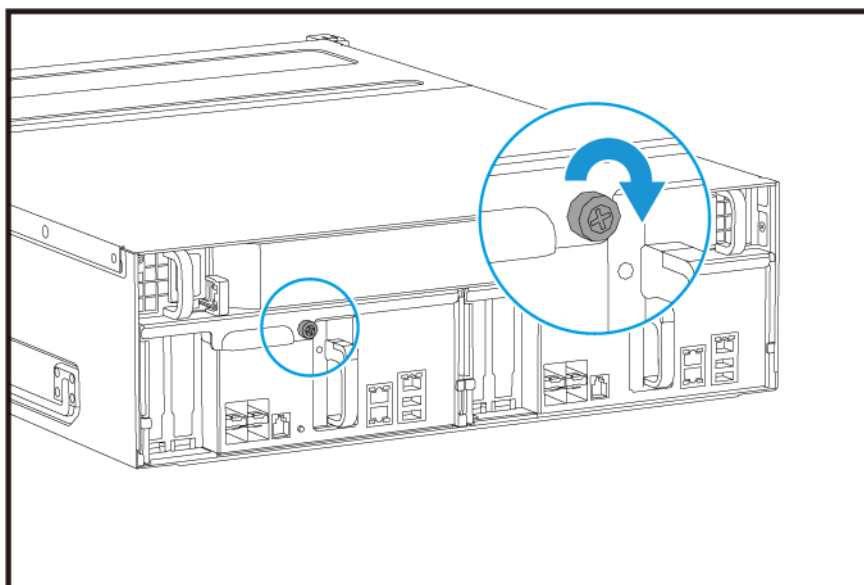
## Installing a Storage Controller

- 1.** Load the controller into the NAS.
  - a.** Insert the controller into the chassis.
  - b.** Push the handle up.





2. Tighten the screw.



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

## Drive Installation

The ES1686dc is compatible with 3.5-inch hard drives and 2.5-inch hard drives.

## Drive Configuration

The ES1686dc supports the following drive configurations.

Configuration	Description
All SSDs	Use all solid-state drives (SSDs) for I/O intensive workloads and business-critical storage.
All HDDs	Use all hard disk drives (HDDs) for the best value for capacity. This configuration is suitable for storing cold data and running applications that require sequential data access, such as video editing and surveillance software.
Hybrid	Use a combination of SSDs and HDDs to balance cost and performance. In addition to high input/output operations per second (IOPS), the ES1686dc also supports creating an SSD read cache to further increase storage performance. This configuration is especially suitable for virtual desktop infrastructure (VDI) and web servers. When using a hybrid configuration, QNAP recommends installing SSDs in drive bays 1 to 4.

Drive bays 1 to 4 are reserved for system configurations. QNAP recommends using drive bays 5 to 16 for data storage. This setup prevents data storage operations from interfering with the basic operation of the NAS system. This also allows easier migration of drives used for data storage.

For details on drive numbering, see [Drive Numbering](#).

## Installing 3.5-inch Hard Drives on 3.5-inch Trays

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.
- Do not replace a drive without first bringing the storage pool offline in QES. You may replace a drive online only when it is part of an array that has been configured for fault tolerance and a predictive failure alert is received from QES. For more information, refer to the QES user guide.



- **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.

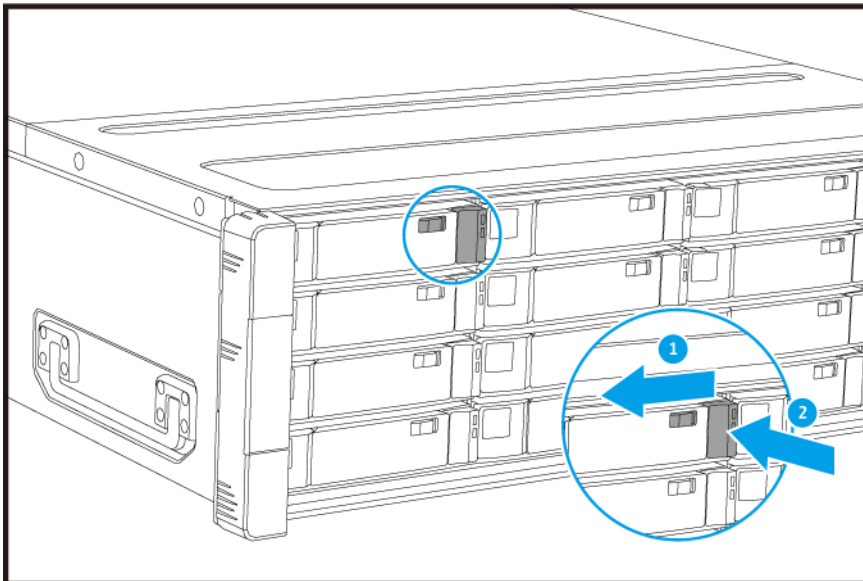
### Note

- A QNAP QDA-SA or QDA-SA2 drive adapter is required for installing a SATA HDD or SSD onto the drive tray.
- The QDA-SA or QDA-SA2 drive adapter allows SATA 6 Gbps drives to be installed into 3.5-inch SAS drive bays on QNAP Enterprise ZFS NAS devices.

1. Power off the NAS.

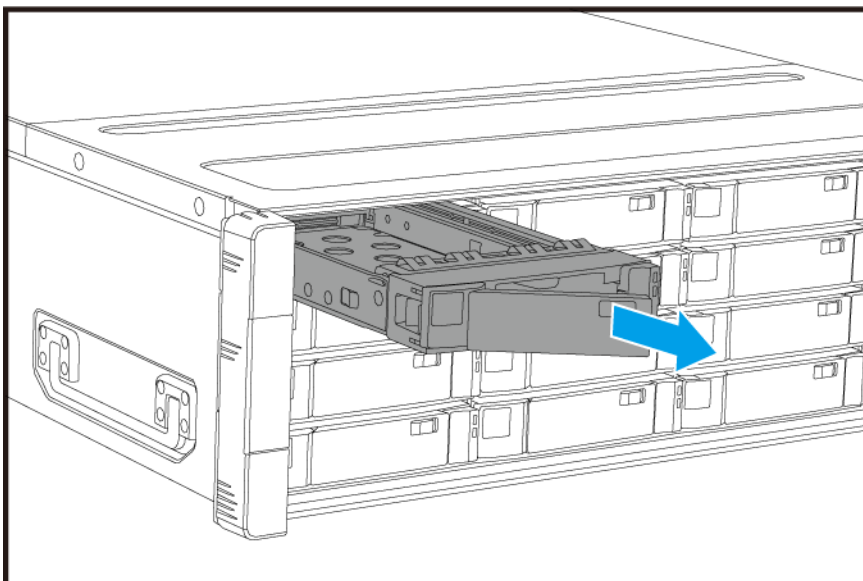
**2. Remove the drive tray.**

- a.** Slide the lock to the left.



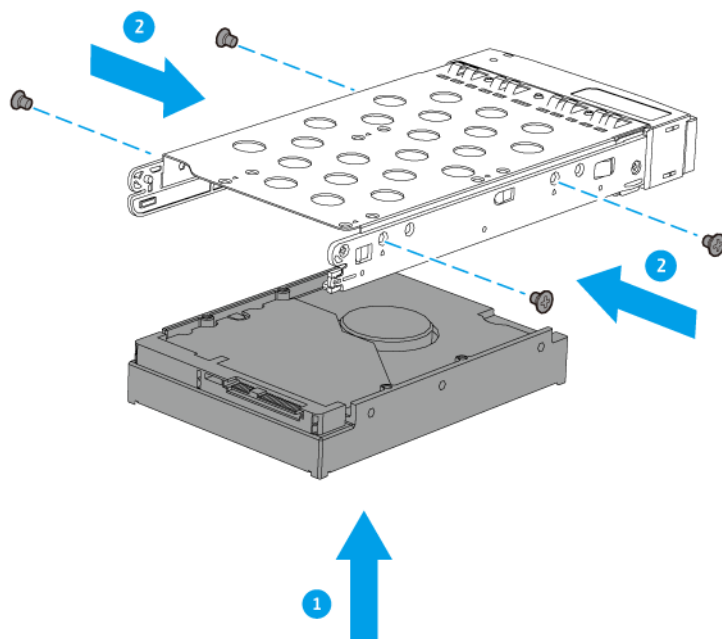
- b.** Push the button to release the handle.

- c.** Pull the tray out.

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

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

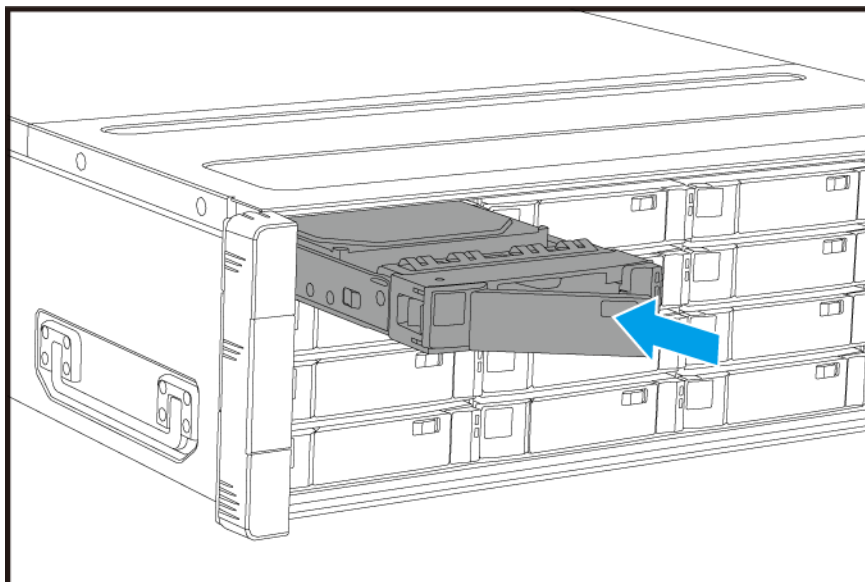
**b.** Attach the screws.



**4.** Load the tray into the bay.

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

**b.** Push the handle.



**c.** Slide the lock to the right.

**5.** Power on the NAS.

## 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>.

### Warning

- Installing a drive deletes all data on the drive.
- Observe electrostatic discharge (ESD) procedures to avoid damage to components.
- Do not replace a drive without first bringing the storage pool offline in QES. You may replace a drive online only when it is part of an array that has been configured for fault tolerance and a predictive failure alert is received from QES. For more information, refer to the QES user guide.



- **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.

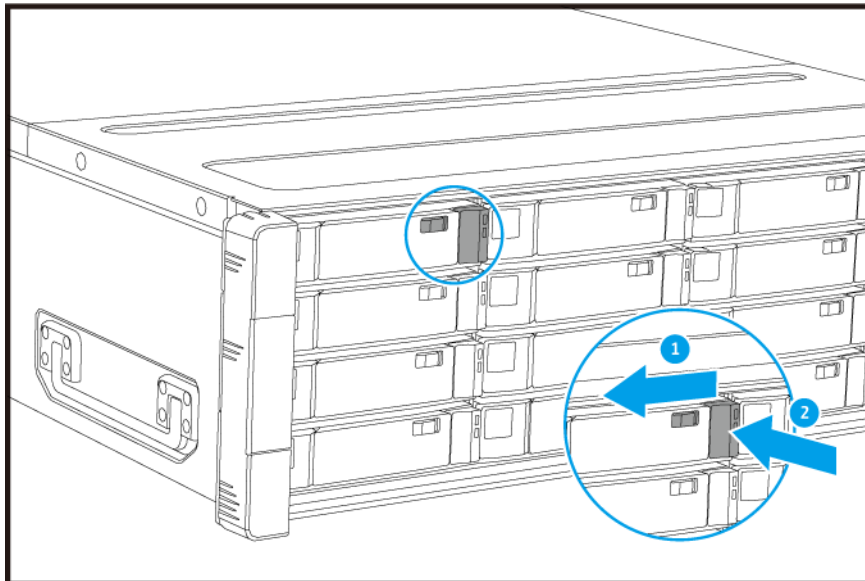
### Note

- A QNAP QDA-SA or QDA-SA2 drive adapter is required for installing a SATA HDD or SSD onto the drive tray.
- The QDA-SA or QDA-SA2 drive adapter allows SATA 6 Gbps drives to be installed into 3.5-inch SAS drive bays on QNAP Enterprise ZFS NAS devices.

1. Power off the NAS.

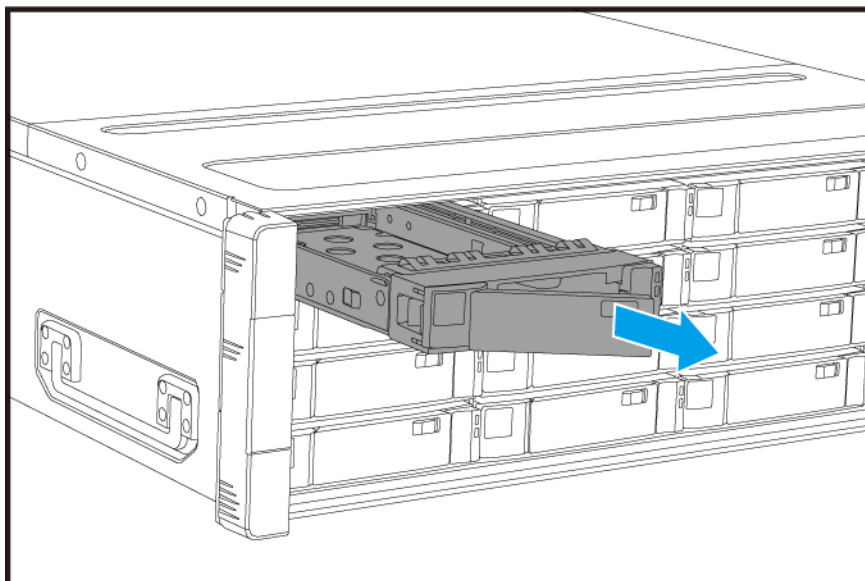
**2. Remove the drive tray.**

- a.** Slide the lock to the left.



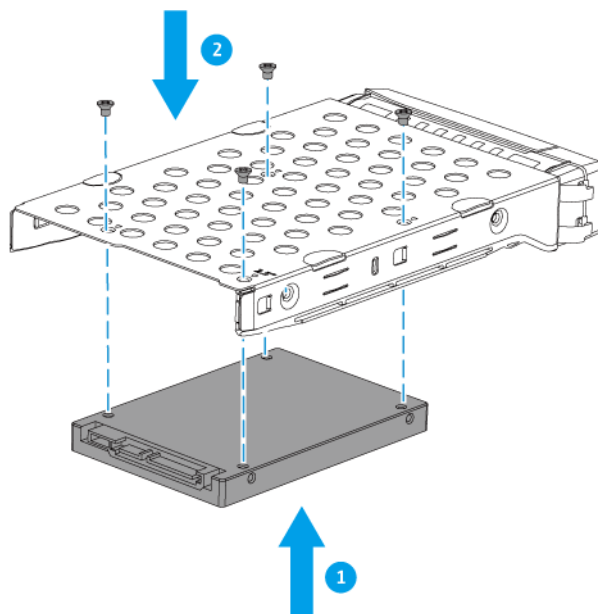
- b.** Push the button to release the handle.

- c.** Pull the tray out.

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

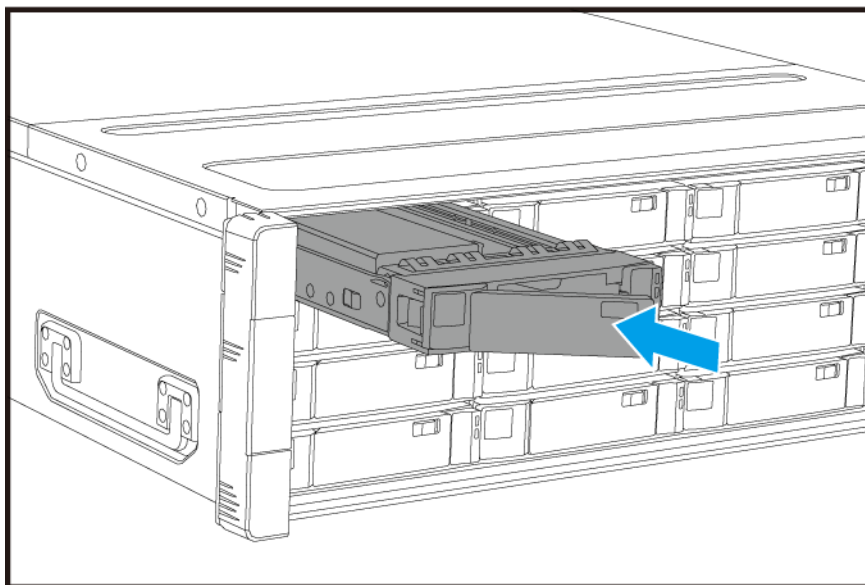
- a.** Place the drive on the tray so that the holes on the bottom of the drive are aligned with the holes on the bottom of the tray.

- b.** Attach the screws.



- 4.** Load the tray into the bay.

- a.** Insert the tray into the bay.  
**b.** Push the handle.



- c.** Slide the lock to the right.

- 5.** Power on the NAS.



## Installing Expansion Cards

The ES1686dc 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 ES1686dc.

### 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.



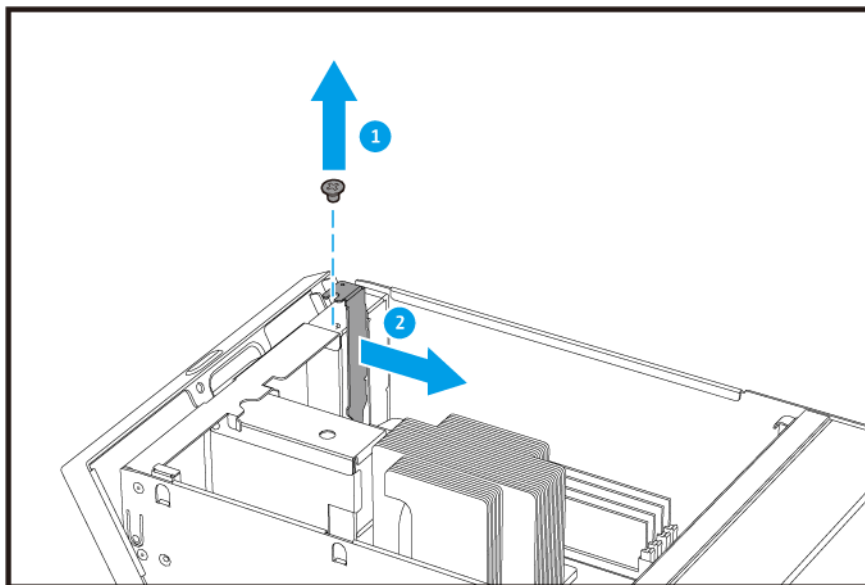
- **Moving fan blades:** Keep your hands and other body parts away from moving fan blades.



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

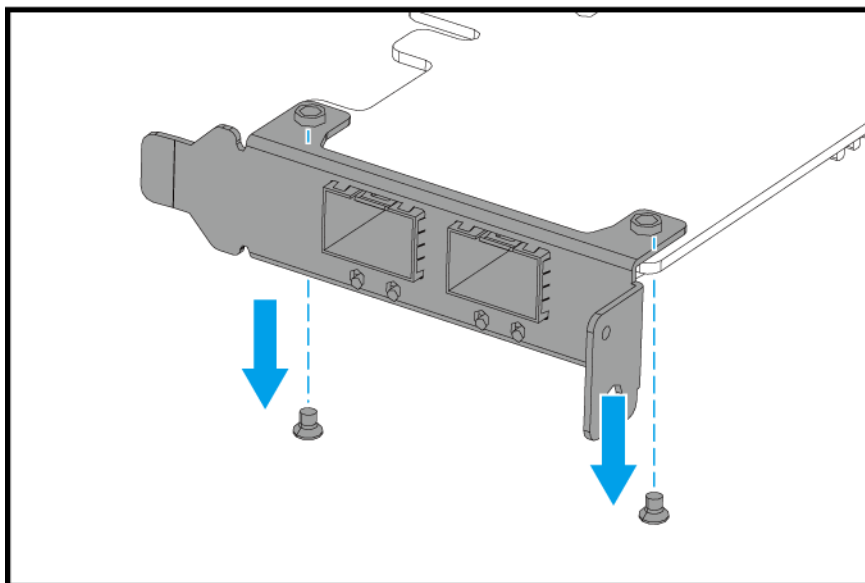
1. Check the expansion cards and brackets supported by your model on the QNAP website.
  - a. Go to [www.qnap.com/compatibility](http://www.qnap.com/compatibility).
  - b. Click **Search by NAS**.
  - c. Specify the number of bays and the specific model of your NAS.
  - d. Under **Category**, select 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. Remove the storage controller.  
For details, see [Removing a Storage Controller](#).
3. Remove the PCIe cover.
  - a. Remove the screw that secures the cover to the bracket.

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



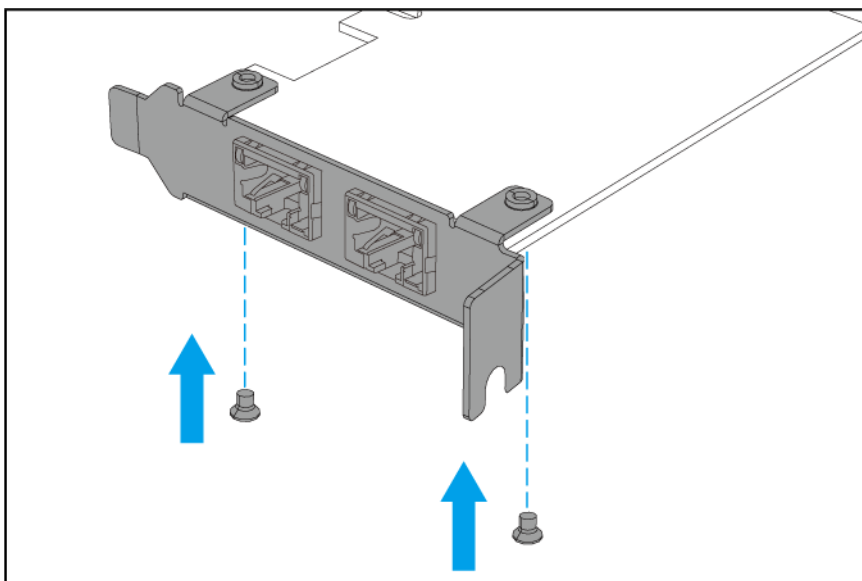
- 4.** Optional: Attach the QNAP bracket to the expansion card.

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



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

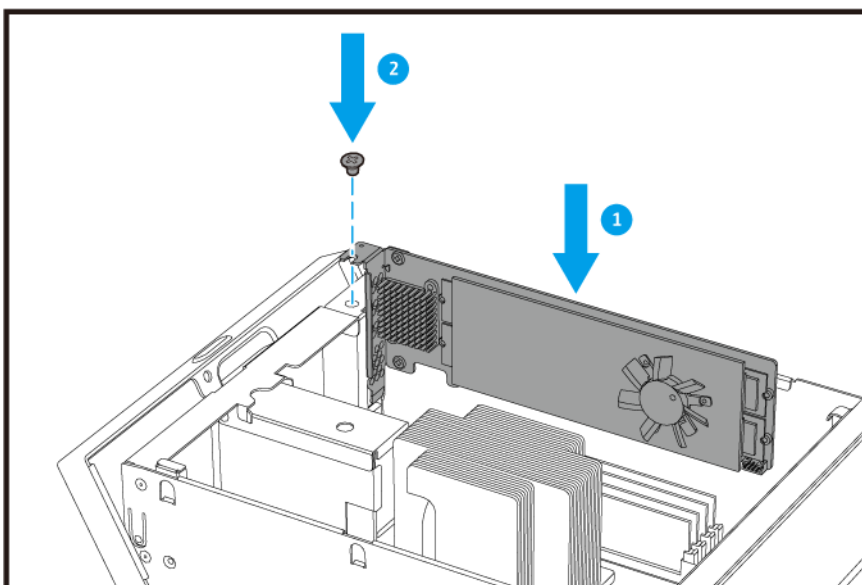
- c. Attach the QNAP bracket to the card using the same screws.



- 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. Install the storage controller.

For details, see [Installing a Storage Controller](#).

## Replacing Memory Modules

Each storage controller has eight memory slots. You can increase the memory capacity of the NAS by upgrading the memory module.

Use only QNAP modules of the same type and capacity to maintain system performance and stability. You can purchase QNAP memory modules from authorized resellers.

### Important

For best results, QNAP recommends installing modules in pairs.

- Ensure that each pair uses identical modules.
- Install the pairs in sequence and follow the assigned slots for each pair.
- The ES1686dc has eight memory slots. For optimal quad-channel performance, install memory modules on either four or eight of the slots. When installing four memory modules, install the memory in slots 1, 3, 6, and 8.

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

Module Pair	Slot Number
First pair	Slots 1 and 8
Second pair	Slots 3 and 6
Third pair	Slots 2 and 7
Fourth pair	Slots 4 and 5

### 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. Remove the storage controller.

For details, see [Removing a Storage Controller](#).

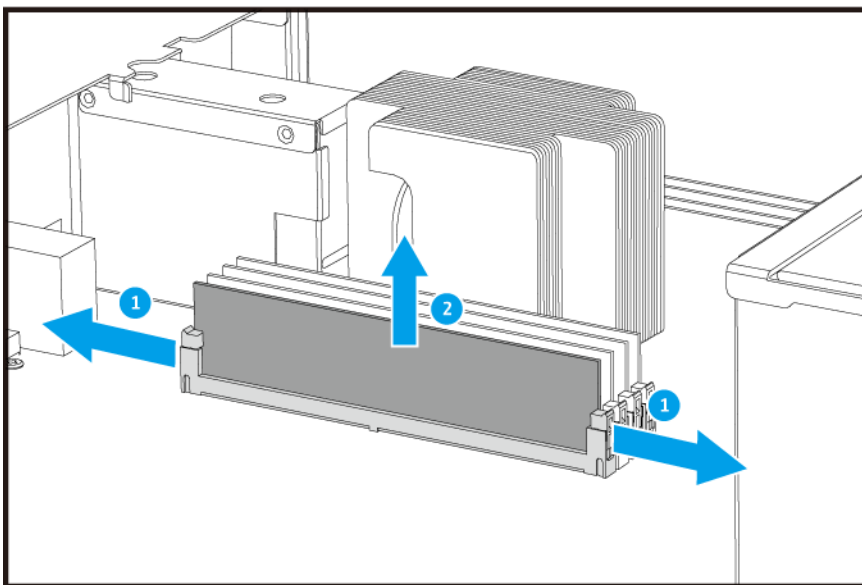
**2. Remove an existing module.**

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

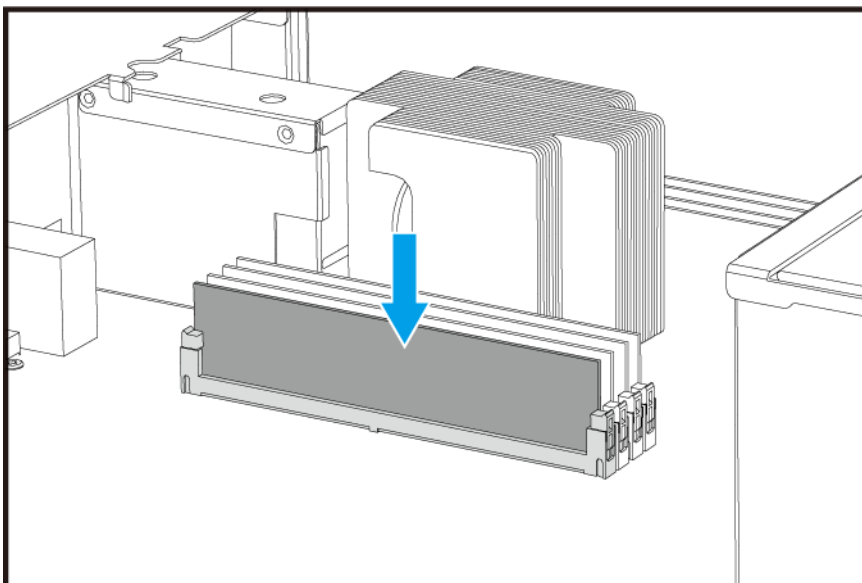
**Warning**

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

- b. Hold the module by the edges and then carefully slide it out of the slot.

**3. 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.



4. Install the storage controller.  
For details, see [Installing a Storage Controller](#).
5. Verify that the module is recognized by the NAS.
  - a. Log on to QES as administrator.
  - b. Go to **Control Panel > System > System Status > Hardware Information**.
  - c. Check the values for each memory slot.

## Replacing the Fan Module

The fan module of the ES1686dc contains three fans to ensure adequate cooling.

### Warning



- To avoid potential injury or damage to components, do not touch the fans while the NAS is connected to a power source.
- 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.



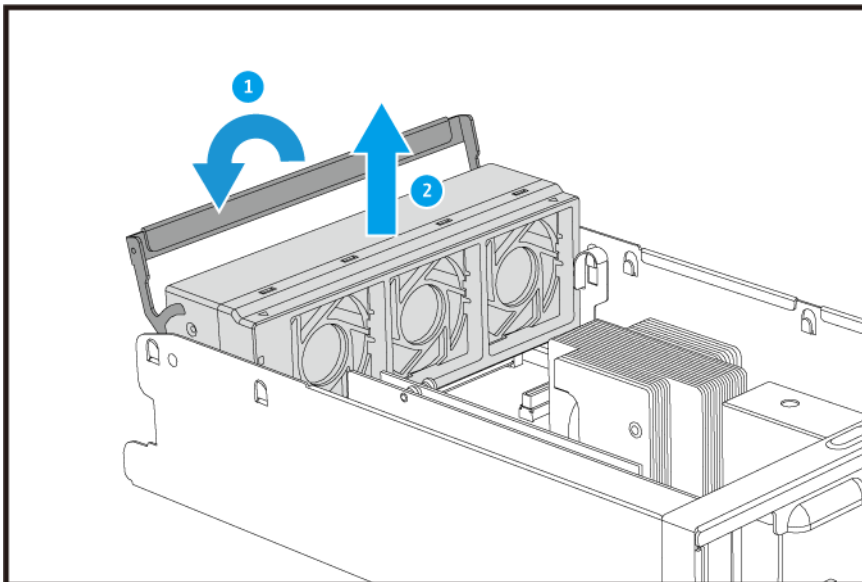
- **Moving fan blades:** Keep your hands and other body parts away from moving fan blades.



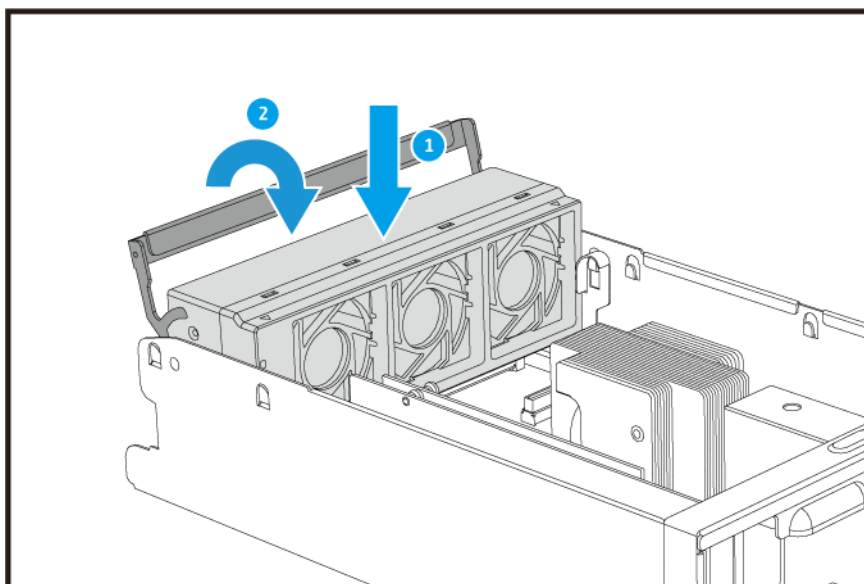
- **Other moving components:** Keep your hands and other body parts away from other moving components.

1. Remove the storage controller.  
For details, see [Removing a Storage Controller](#).

2. Remove the fan module.
  - a. Pull the handle to release the fan module.
  - b. Pull the module out.



3. Install a new fan module.
  - a. Insert the module into the chassis.
  - b. Push the handle down to lock the module in place.



4. Install the storage controller.  
For details, see [Installing a Storage Controller](#).

## Hot-swapping Redundant Power Supply Units

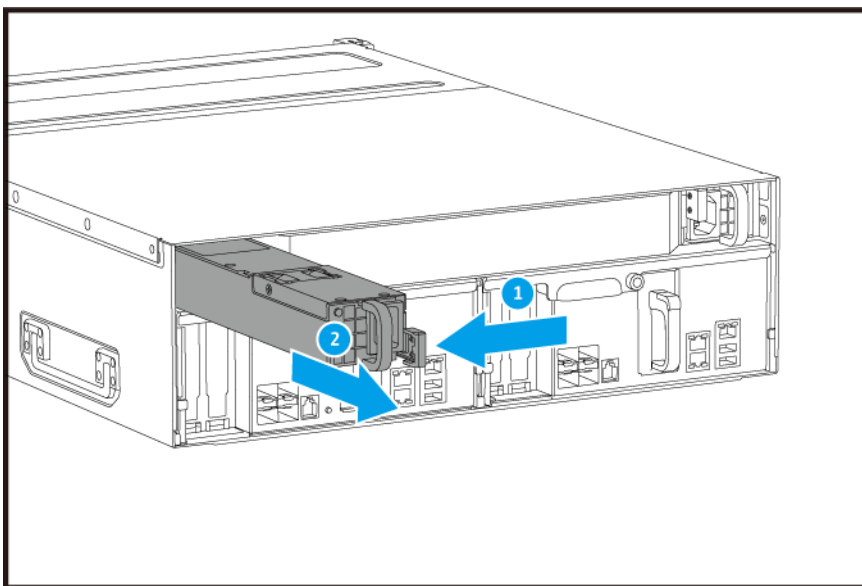
1. Power off the storage controller.

2. Disconnect the power cord from the electrical outlet and the PSU that you are replacing.

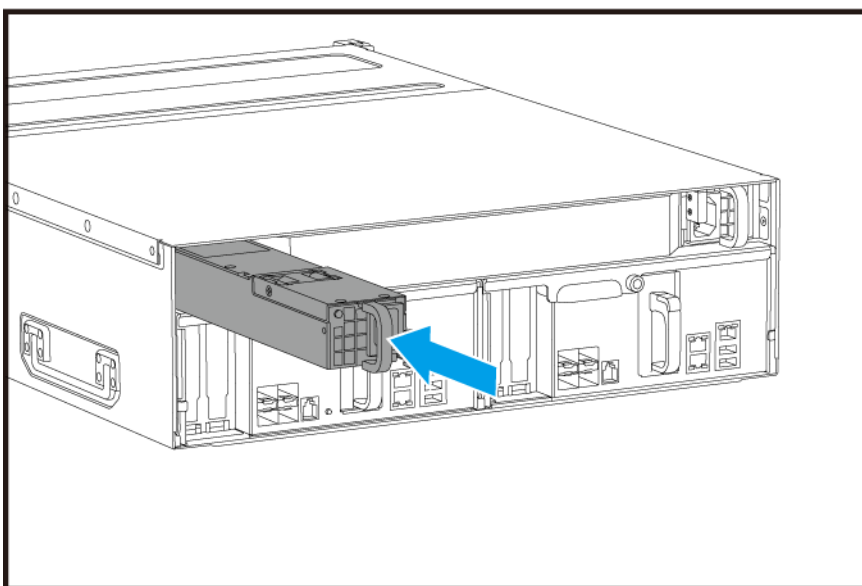
**Warning**

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

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



4. Insert the new PSU.



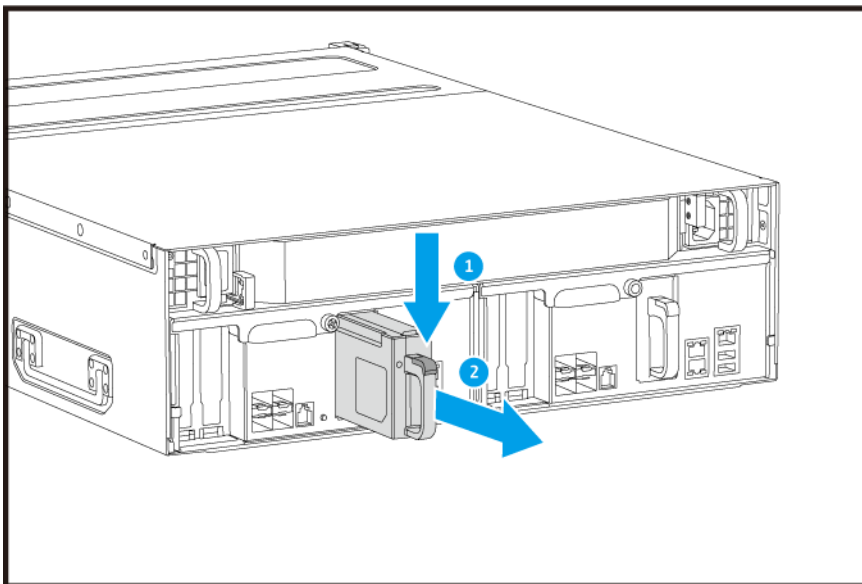
5. Connect the power cord to the PSU and the electrical outlet.
6. Power on the storage controller.



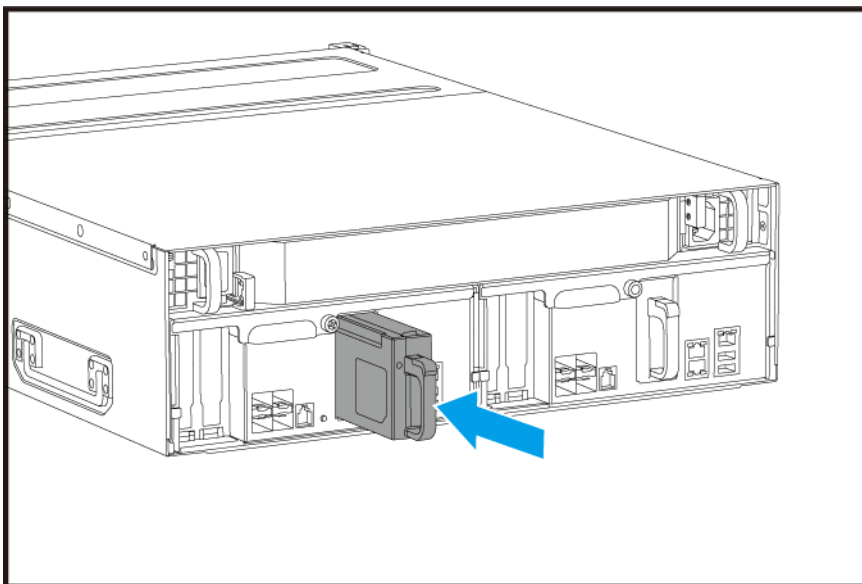
## Replacing the Battery Backup Unit

If the power supply unit of the storage controller fails, the system will switch to the battery backup unit (BBU) for power.

1. Press the button and pull the BBU out.



2. Insert the new BBU into the slot until it locks in place.



## Expansion Unit Installation

The ES1686dc supports SAS expansion units and is compatible with the EJ1600 v2. When connecting to the EJ1600 v2, some storage expansion accessories are required. Refer to the following table for details.

Expansion Unit Type	Description	Required Accessories	Maximum Expansion Units Supported
EJ1600 v2	<ul style="list-style-type: none"> <li>• Uses a SAS 12 Gbps interface</li> <li>• Supports SAS HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>• SAS-12G2E storage expansion card</li> <li>• Mini-SAS SFF-8644 cable</li> <li>• RAIL-E02 rail kit</li> </ul>	7

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

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

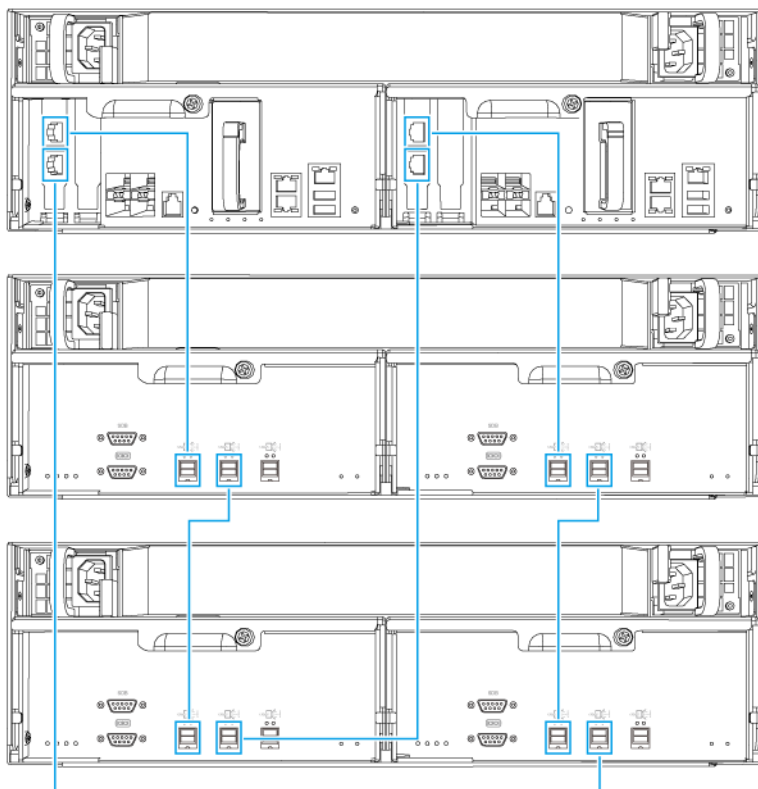
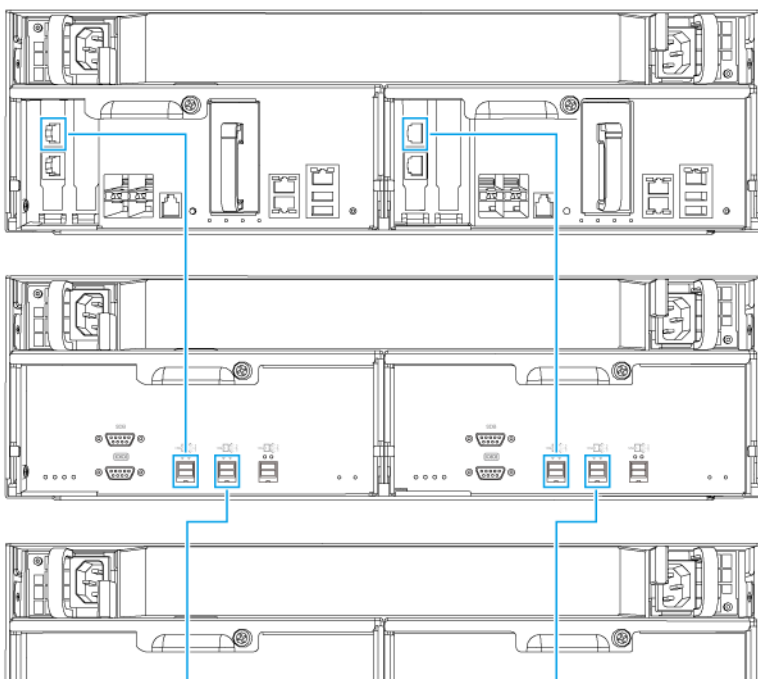
## Connecting SAS Expansion Units

1. Install a storage expansion card on the PCIe slot.  
For details, see [Installing Expansion Cards](#).

2. Connect the expansion units to the NAS using one of the following topologies.

**Important**

QNAP recommend 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.

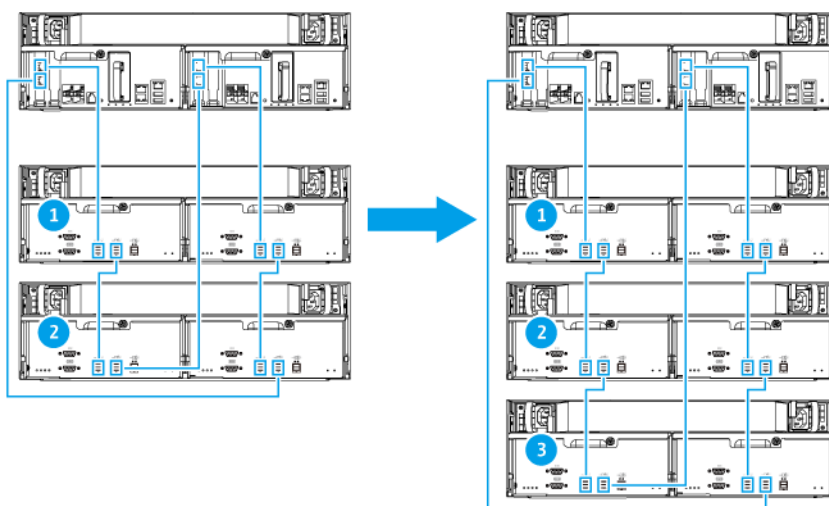
**Dual-path configuration**

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

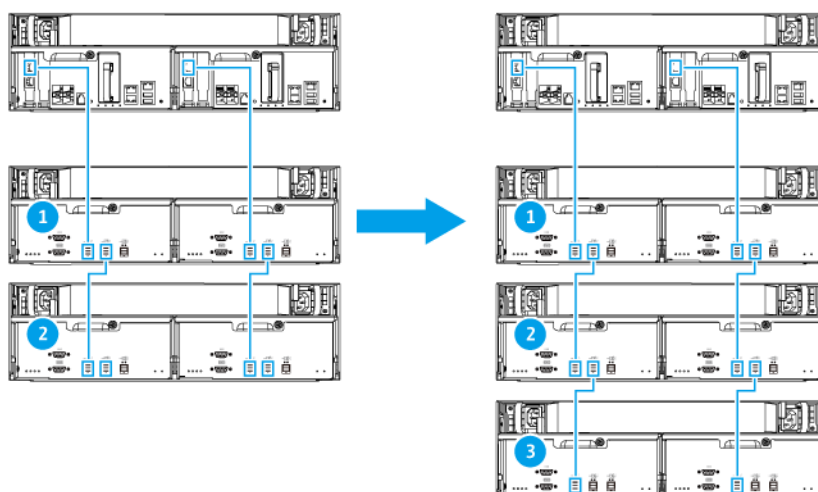
## Adding an SAS Expansion Unit

### Important

- When adding an expansion unit to an existing NAS topology, the new expansion must be added last. For example, if there are 2 existing expansion units, then you must add the new unit in sequence as expansion unit 3.
- If you are using a dual-path configuration, you must prepare 2 new SAS cables.



### Dual-path configuration



### Single-path configuration

1. Mount the new expansion unit on the rack.
2. Install the drives in the new expansion unit.
3. If you are using a dual-path configuration, disconnect the loop cables from the SAS ports on the last expansion unit.  
Loop cables are the SAS cables that you use to connect the last expansion unit back to the NAS.
4. Using the two new SAS cables, connect the last expansion unit to the new expansion unit.
5. If you are using a dual-path configuration, connect the loop cables to the new expansion unit.
6. Connect the power cables to the new expansion unit.
7. Power on the new expansion unit.
8. Log on to QES as administrator.
9. Go to **Main Menu > Storage Manager > Storage > Disks**.
10. Click **Recover**, and then select **Reinitialize enclosure ID**.

QES scans for and detects the new expansion unit and installed disks.

## Replacing an SAS Expansion Unit

1. Take all storage pools on the old expansion unit offline.

### Warning

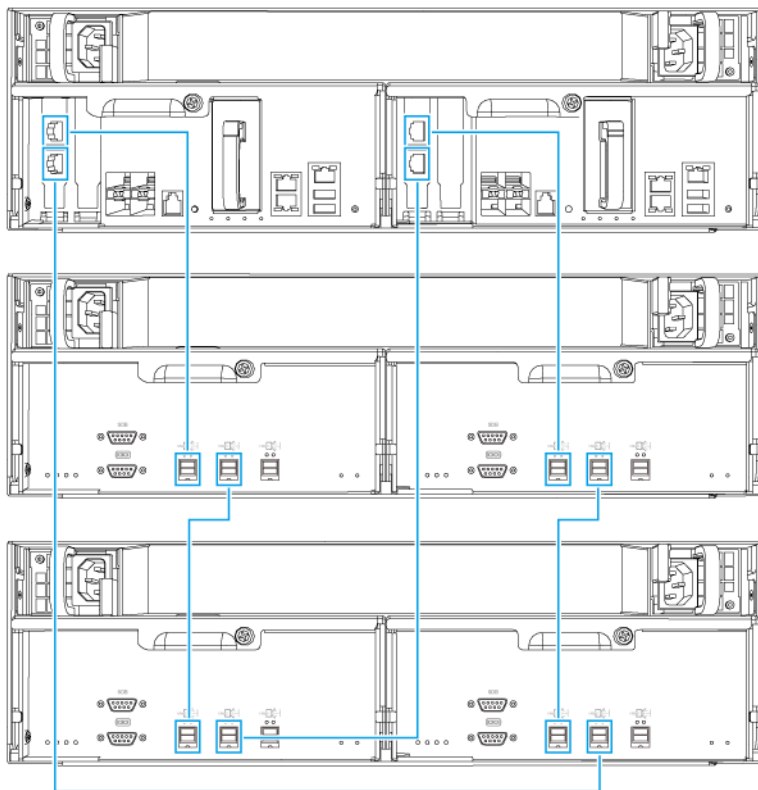
Disconnecting an expansion unit containing online storage pools may result in data loss.

Configuration	Description
Single-path configuration	If you disconnect a SAS expansion unit, all succeeding units in the connection will also be disconnected. For example, if you are replacing expansion unit 2, then you must take the storage pools on expansion units 3 and 4 offline.
Dual-path configuration	If you disconnect an old expansion unit, only its storage pools will be taken offline.

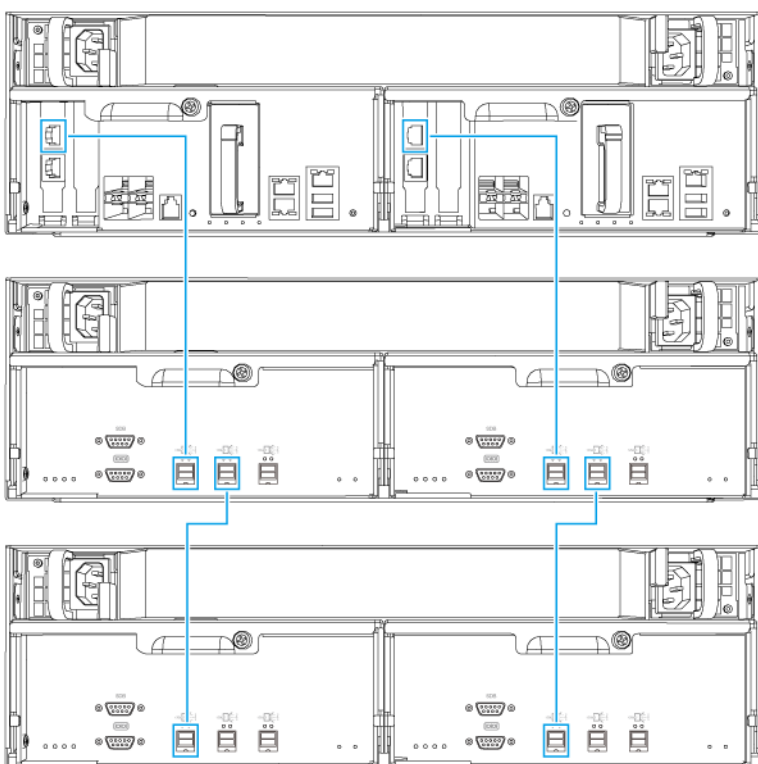
For more information, refer to the QES User Guide.

2. Press and hold the power button on the old expansion unit for 5 seconds. The old expansion unit powers off.
3. Disconnect all SAS cables from the old expansion unit.
4. Disconnect all power cables from the old expansion unit.
5. Unmount and remove the old expansion unit from the rack.
6. Remove the drives from the old expansion unit.
7. Mount the new expansion unit on the rack.
8. Install the drives in the new expansion unit.

9. Connect the SAS cables to the new expansion unit.  
Use one of the following cabling topologies, depending on your current cabling layout. For more information, see [Connecting SAS Expansion Units](#).



### Dual-path configuration



10. Connect the power cables to the new expansion unit.
11. Power on the new expansion unit.
12. Log on to QES as administrator.
13. Go to **Main Menu > Storage Manager > Storage > Disks**.
14. Click **Recover**, and then select **Reinitialize enclosure ID**.  
QES scans for and detects the new expansion unit and installed disks.
15. Bring all offline storage pools back online.

## QES Installation

The ES1686dc uses the QNAP QES operating system. If the NAS is connected to your local area network, you can install QES using Qfinder Pro.

Mode	Description
Quick setup	Install QES and configure basic settings. For details, see the following topics: <ul style="list-style-type: none"> <li>• <a href="#">Installing QES Using a Static IP Address</a></li> <li>• <a href="#">Installing QES Using a Dynamic IP Address</a></li> </ul>
Manual setup	Install QES and configure advanced settings such as device type access and the QES system file storage pool. For details, see <a href="#">Installing QES Using Manual Setup</a> .

## Installing QES Using a Static IP Address

### Warning

Installing QES 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.

### Tip

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

4. Locate the IP address of the storage controller from the device list.  
If the computer is connected to the NAS through the management port, Qfinder Pro will also display the the IP address of the second controller.



Controller Number	IP Address
1	169.254.100.100
2	169.254.100.101

5. Configure the network settings.
  - a. On your Windows device, go to **Control Panel > Network and Internet > Network and Sharing Center**.
  - b. Identify and click the network interface connected to the management port.  
The connection status window opens.
  - c. Click **Properties**.  
The connection properties window opens.
  - d. From the list of connections, select **Internet Protocol Version 4 (TCP/IPv4)**.
  - e. Click **Properties**.  
The **Internet Protocol Version 4 (TCP/IPv4) Properties** window opens.
  - f. Select **Use the following IP address**.
  - g. Specify an IP address and subnet mask.  
Example:
    - IP address: 169.254.1.10
    - Subnet mask: 255.255.0.0
  - h. Click **OK**.

**Tip**

You can change the settings back to their original configuration after installing QES.

6. In Qfinder Pro, double-click an uninitialized controller.  
The setup wizard opens.
7. Click **Quick Setup**.  
The **Quick Setup** window opens.

8. Specify a NAS name and password.

Field	Requirements
<b>NAS name</b>	<ul style="list-style-type: none"> <li>• Length: 1-14 characters</li> <li>• Valid characters: A-Z, a-z, 0-9</li> <li>• Valid special characters: Hyphen (-)</li> <li>• Not allowed: The last character is a hyphen (-)</li> </ul>
<b>Password</b>	<ul style="list-style-type: none"> <li>• Length: 5-64 characters</li> <li>• Valid characters: All ASCII characters</li> </ul>

9. Specify the static IP address of the management port of each controller.

Example:

- LAN IP block: 10.8.13.xx
- Controller 1 IP address: 10.8.13.62
- Controller 2 IP address: 10.8.13.78

10. Click **Proceed**.

A confirmation message appears.

**Warning**

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

11. Click **Confirm**.

The wizard installs QES and restarts the NAS.

You must initialize any unused disks upon your next login.

## Installing QES Using a Dynamic IP Address

**Warning**

Installing QES 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.

**Tip**

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

4. Locate the NAS in the device list.

**Tip**

Refer to the device type and MAC address to identify the NAS. Its status is a question mark (?).

If the computer is connected to the NAS through the management port, Qfinder Pro will also display the the details of the second controller.

5. Double-click an uninitialized controller.  
The setup wizard opens.
6. Click **Quick Setup**.  
The **Quick Setup** window opens.
7. Specify a NAS name and password.

Field	Requirements
<b>NAS name</b>	<ul style="list-style-type: none"> <li>• Length: 1-14 characters</li> <li>• Valid characters: A-Z, a-z, 0-9</li> <li>• Valid special characters: Hyphen (-)</li> <li>• Not allowed: The last character is a hyphen (-)</li> </ul>
<b>Password</b>	<ul style="list-style-type: none"> <li>• Length: 5-64 characters</li> <li>• Valid characters: All ASCII characters</li> </ul>

8. Specify DHCP as the IP address.
9. Click **Proceed**.  
A confirmation message appears.

**Warning**

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

10. Click **Confirm**.  
The wizard installs QES and restarts the NAS.  
You must initialize any unused disks upon your next login.

## Installing QES Using Manual Setup

**Warning**

Installing QES 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.

**Tip**

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

4. Locate the NAS in the device list, and then double-click the name or IP address.  
The setup wizard opens.
5. Click **Manual Setup**.  
The **Enter the NAS name and administrator's password** screen appears.
6. Specify a NAS name and password.

Field	Requirements
<b>NAS name</b>	<ul style="list-style-type: none"> <li>• Length: 1-14 characters</li> <li>• Valid characters: A-Z, a-z, 0-9</li> <li>• Valid special characters: Hyphen (-)</li> <li>• Not allowed: The last character is a hyphen (-)</li> </ul>
<b>Password</b>	<ul style="list-style-type: none"> <li>• Length: 5-64 characters</li> <li>• Valid characters: All ASCII characters</li> </ul>

7. Click **Next**.  
The **Set the date and time** screen appears.
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**.  
The **Configure the network settings** screen appears.
10. Select **Obtain an IP address automatically (DHCP)**.
11. Click **Next**.  
The **Cross-platform file transfer service** screen appears.
12. Select the types of devices that you will use to access shared folders on the NAS.
13. Click **Next**.  
The **Check system disk status** screen appears.

14. Select a storage pool to install QES on.

**Important**

Once the installation process starts, the selected storage pool cannot be modified. Reinitialize the NAS before selecting a different disk group.

15. Click **Next**.  
The **Summary** screen appears.
16. Review the settings.
17. Click **Apply**.  
A confirmation message appears.

**Warning**

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

18. Click **Confirm**.  
The wizard installs QES and restarts the NAS.

**Note**

You must initialize any unused disks upon your next login.

## Service Port Configuration

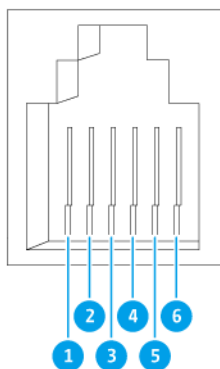
The service port is the main point for hardware installation, configuration, and maintenance activities.

**Important**

Only use the service port when directed by QNAP technical support personnel.

## Storage Controller Service Port

The storage controller service port is a RS-232 port with an RJ-11 connector. Use the appropriate cable/adaptor (i.e. RJ-11 to DB9/DB9 to USB or RJ-11 to USB) to connect this port with your computer. The pin-outs are defined as follows:



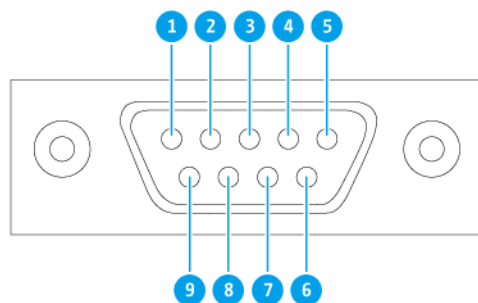
Pin Number	Signal	Description
1	Rx1	Receive Data of UART1
2	Tx1	Transmit Data of UART1
3	GND	Ground
4	Rx2	Receive Data of UART2
5	Tx2	Transmit Data of UART2
6	GND	Ground

Configure the baud rate and character format of the PC or terminal to match these console port default characteristics:

- 115200 baud rate
- 8 data bits
- 1 stop bit
- No parity
- Flow control: XON/XOFF
- Default username/password: `admin/admin`

## Expansion Unit Service Port

The expansion unit service port is a RS-232 port with an DB-9 (or DE-9) connector. The pin-outs are defined as the following:



Pin Number	Signal	Description
1	NC	No Connection
2	Rx	Receive Data
3	Tx	Transmit Data
4	NC	No Connection
5	GND	Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection

Configure the baud rate and character format of the PC or terminal to match these console port default characteristics:

- 115200 baud rate
- 8 data bits
- 1 stop bit
- No parity

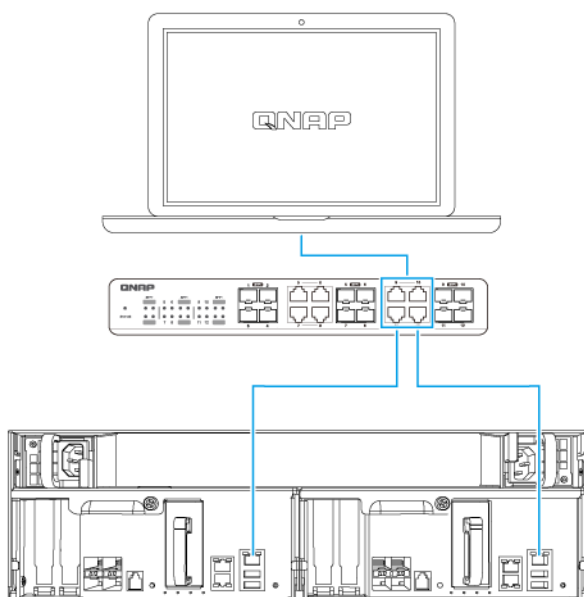
- Flow control: XON/XOFF
- Default username/password: admin/admin

## Management Port Configuration

Management is provided by the Intel® i210 Gigabit Ethernet controller. The management port allows you to connect to the QES desktop of the ES1686dc. The default ES1686dc management website is 169.254.100.100:8080. If the NAS has been configured to use DHCP, you can use the QNAP Qfinder Pro to check the IP address of the NAS. Make sure the NAS and the computer that runs the QNAP Qfinder Pro are connected to the same subnet.

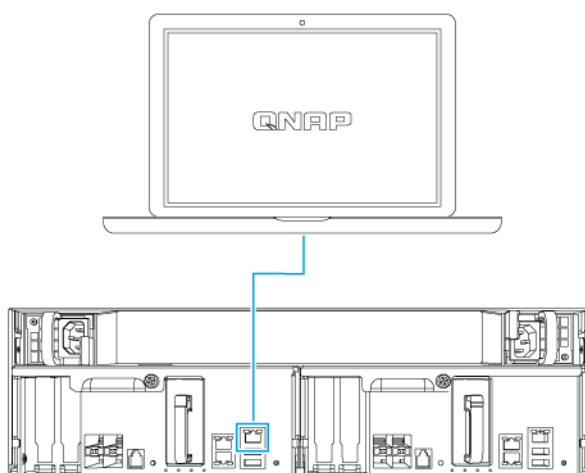
The system requires that the management IP addresses are configured on both controllers and that the controllers' management ports are connected to the management network. This should be a separate LAN or a VLAN because you should not use the production LAN or VLAN for management network traffic. To configure the management port IP address, refer to the QES User Guide. If one storage controller fails, you can enable takeover function from the High Availability app in QES to manage the system through the management port of the other storage controller with the same IP address. For more information, see the QES User Guide.

The following diagrams illustrate management port connections.



**Connected to a QES endpoint using DHCP**



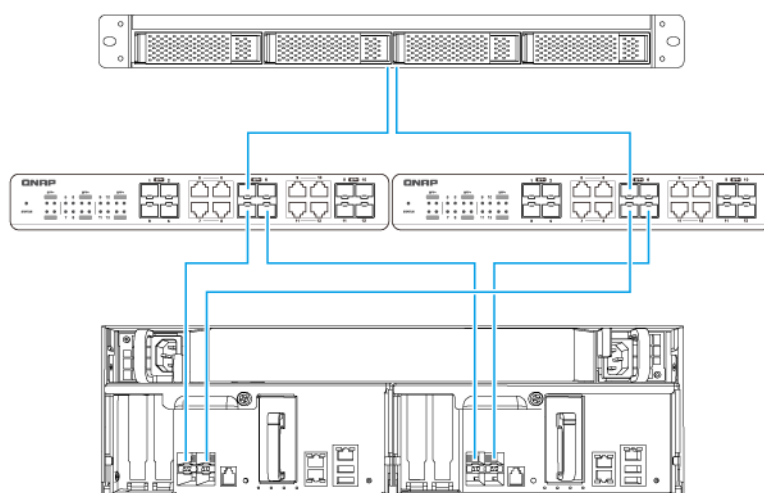


**Directly connected to a QES endpoint**

## Multipath I/O Network Configuration

Multipath I/O (MPIO) is a fault-tolerance technique where more than one physical network path is created between a server and a storage device such as a NAS. If any one network path goes down due to the failure of a switch, cable, or network card, the server can route I/O through the remaining network paths with no storage downtime. The ES1686dc supports MPIO on iSCSI connections using standard Ethernet infrastructure.

The following diagram is an example of how the multipath I/O should be implemented:



**Important**

## Requirements:

- Each QES data port must use a static IP address.
- Each server and storage controller must be connected to at least two different physical switches on different subnets.

## Recommendations:

- Use dedicated network switches or VLANs to separate iSCSI traffic from other network traffic.

Platform	QNAP Application Note Name
Windows	Configuring Microsoft iSCSI Storage with QNAP Enterprise-Class ES NAS
Linux	Configuring Linux iSCSI Storage with QNAP ES NAS

For further information, see the following user guide: <https://download.qnap.com/Storage/TechnicalDocument/ES1640dc-v2/ESNAS-UG1102-20180103-en.pdf>

## 4. Troubleshooting

This chapter describes basic troubleshooting information.

### Forcing Qfinder Pro to Locate the NAS

If Qfinder Pro is unable to locate the NAS during QES 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.
5. Reinsert the drives.
6. Continue with the QES installation.

### Hot-swapping Failed Drives

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

RAID Type	Situation
RAID 1	One member drive fails
RAID 5	One member drive fails
RAID 6	One or two member drives fail
RAID 10	One or two member drives in two different pairs fail.
RAID 50	One disk per subgroup fails.
RAID 60	Two disks per subgroup fail.
Triple Mirror	One or two member drives fail.
RAID-TP	One, two, or three member drives fail.

1. Log on to QES as administrator.
2. Go to **Main Menu > Storage Manager > Storage > Disks**.
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 NAS.

6. Wait for 20 seconds or until the NAS 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 Manager > Storage Space**.
11. Locate the volume that contains the new drive and then verify that the status is `Rebuilding`.

## Support and Other Resources

QNAP provides the following resources:

Resource	URL
Documentation	<a href="https://docs.qnap.com">https://docs.qnap.com</a>
Service Portal	<a href="https://service.qnap.com">https://service.qnap.com</a>
Downloads	<a href="https://download.qnap.com">https://download.qnap.com</a>
Community Forum	<a href="https://forum.qnap.com">https://forum.qnap.com</a>

## 5. Glossary

### **QES**

QNAP NAS operating system

### **Qfinder Pro**

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

## 6. Notices

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### FCC Class A Notice



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

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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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