



**QNAP**

# TS-h2490FU

用户指南

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# 1. 前言





## 关于本指南

本指南提供有关设备的信息以及有关硬件安装的分步说明。此外，还提供了有关基本操作和故障排除信息的说明。

## 受众

本文档的目标读者为存储管理员。本指南假定用户具有相关知识，并具备安装、维护和排除服务器、服务器组件和存储系统相关问题的资质。本指南还假定用户经过识别危险的培训，其中包括为防止人身伤害以及数据与财产损失用户需要采取的适当操作。

## 文档约定

符号	描述
	注释，提供默认配置设置和其他补充信息。
	重要注释，提供有关所需配置设置的信息以及其他关键信息。
	提示，提供有关执行任务或配置设置的建议或备选方法。
	警告，提供警告信息，如果忽略此信息，可能会导致潜在损失、伤害甚至死亡。

## 2. 产品概述

本章提供有关 QNAP 设备的基本信息。

### 关于 TS-h2490FU

这款全闪存 TS-h2490FU 由第二代 AMD EPYC™ 7002 系列处理器提供支持，设计用于为企业级解决方案提供可扩展平台。它采用 24 U.2 NVMe 固态硬盘，最高可实现 472K/205K 的随机读取/写入 IOPS，并且延迟极低。此 ZFS NAS 具有出色的可靠性，支持嵌入式重复数据删除和压缩、近乎无限的快照和实时 SnapSync。TS-h2490FU 消除了数据中心、虚拟化和关键任务中的生产力瓶颈，是 I/O 密集型和延迟敏感应用的理想选择。

### 硬件规格



#### 警告

- 如果您的 QNAP 产品有硬件方面的缺陷，请将产品退回 QNAP 或 QNAP 授权的服务中心进行维修或更换。您本人或未经授权的第三方对产品进行的任何维修或维护流程均会使保修失效。
- 对于因未经授权进行的修改和安装不受支持的第三方应用程序而造成的任何损坏或数据丢失，QNAP 概不负责。
- 有关详细信息，请参见 [QNAP 产品保修服务条款](#)。





#### 提示

型号规格如有更改，恕不另行通知。要查看最新规格，请转到 <https://www.qnap.com>。

订购部件号	CPU	内存	电源
TS-h2490FU-7232P-64G	AMD EPYC™ 7232P	64 GB	冗余
TS-h2490FU-7302P-128G	AMD EPYC™ 7302P	128 GB	冗余

组件	TS-h2490FU-7232P-64G	TS-h2490FU-7302P-128G
处理器		
CPU	AMD EPYC™ 7232P	AMD EPYC™ 7302P
频率	8 核/16 线程 3.1 GHz 基本/3.2 GHz 脉冲	16 核/32 线程 3.0 GHz 基本/3.3 GHz 脉冲
架构	x86 64 位	
加密引擎	AES-NI	
内存		
预安装内存	64 GB RAM: 8 x 8 GB RDIMM DDR4 ECC	128 GB RAM: 8 x 16 GB RDIMM DDR4 ECC

组件	TS-h2490FU-7232P-64G	TS-h2490FU-7302P-128G
内存插槽	16 x DDR4 Long-RDIMM   <b>重要</b> <ul style="list-style-type: none"> <li>请仅使用 QNAP 内存模块，以保证系统性能和稳定性。对于有多个内存插槽的 NAS 设备，请使用规格相同的 QNAP 模块。</li> <li>使用不受支持的模块可能导致性能下降、引发错误或使操作系统无法启动。</li> <li>只能同时使用一种类型的双列直插式内存模块 (DIMM)。不要将寄存型 DIMM (RDIMM) 与降载型 DIMM (LRDIMM) 内存混用。</li> </ul>	
最大内存	4 TB RAM: 16 x 256 GB	
闪存	5 GB (双重引导操作系统保护)	
存储		
硬盘架	24 x 2.5 英寸 U.2 PCIe NVMe	
硬盘兼容性	2.5 英寸硬盘架: 2.5 英寸 U.2 NVMe Gen 3.0 x 4 固态硬盘   <b>提示</b> <ul style="list-style-type: none"> <li>有关兼容硬盘型号的列表，请转到 <a href="https://www.qnap.com/compatibility">https://www.qnap.com/compatibility</a>。</li> </ul>	
SSD 缓存加速支持	受支持。	
热插拔	受支持。	
网络		
25 Gb 以太网端口	2 x 25 GbE SmartNIC SFP28	4 x 25 GbE SmartNIC SFP28
2.5 Gb 以太网端口	2 x 2.5 GbE RJ45	
外部 I/O 端口和扩展插槽		
PCIe 插槽	<ul style="list-style-type: none"> <li>2 x PCIe 4.0 x4</li> <li>2 x PCIe 4.0 x8</li> <li>1 x PCIe 4.0 x16</li> </ul>  <b>提示</b> 有关兼容扩展卡的列表，请转到 <a href="https://www.qnap.com/compatibility">https://www.qnap.com/compatibility</a> 。	
USB 端口	2 x USB 3.2 Gen 1 A 型	
界面		
按钮	<ul style="list-style-type: none"> <li>电源</li> <li>重置</li> </ul>	
尺寸		
外形规格	2U 机架式	
尺寸 (高 x 宽 x 深)	88.3 x 481 x 510.2 mm (34.76 x 18.93 x 20.09 英寸)	

组件	TS-h2490FU-7232P-64G	TS-h2490FU-7302P-128G
净重	15.2 kg (33.51 磅)	
其他		
导轨兼容性	RAIL-A03-57  <b>注</b> <ul style="list-style-type: none"> <li>• 安装信息位于导轨套件包中。</li> <li>• 有关详细信息，请转到 <a href="http://srcqnap.qnap.com.tw/en/product/rail-kit">http://srcqnap.qnap.com.tw/en/product/rail-kit</a>。</li> </ul>	
电源单元	2 x 1100W, 200-240V AC, 50/60 Hz	
系统电池	CR2032 锂电池 (3V, 225 mAh)	
噪声声级	53.5 dB(A)  <b>注</b> 噪声声级在距 NAS 一米以内的旁观者位置测得。测试 NAS 安装了最大数量的硬盘以低速运行。	
风扇	系统：4 x 60 mm 12V DC 风扇	
工作温度	0°C 至 35°C (32 至 95°F)	
相对湿度	<ul style="list-style-type: none"> <li>• 无冷凝相对湿度：5% 至 95%</li> <li>• 湿球温度：27°C (80.6°F)</li> </ul>	

**提示**

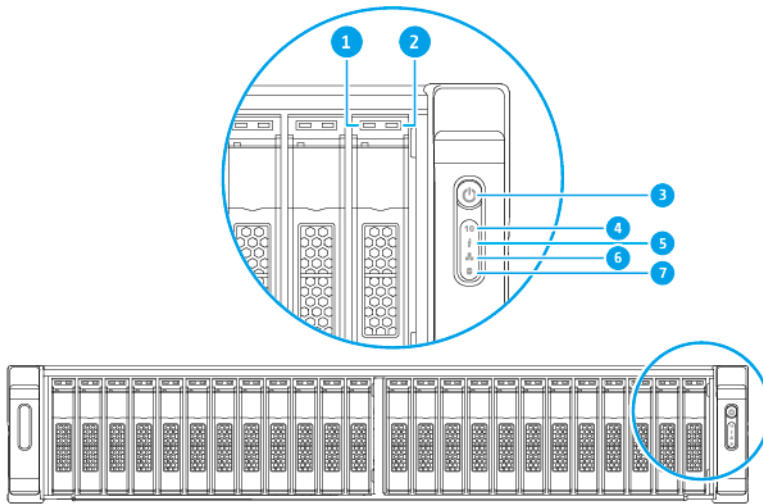
有关兼容的硬盘型号和扩展卡的列表，请转到 <https://www.qnap.com/compatibility>。

## 包装内容

项目	数量
TS-h2490FU	1
电源线	2
以太网线	1 x Cat 5e
适用于 2.5 英寸硬盘的螺丝	96
快速安装指南 (QIG)	1

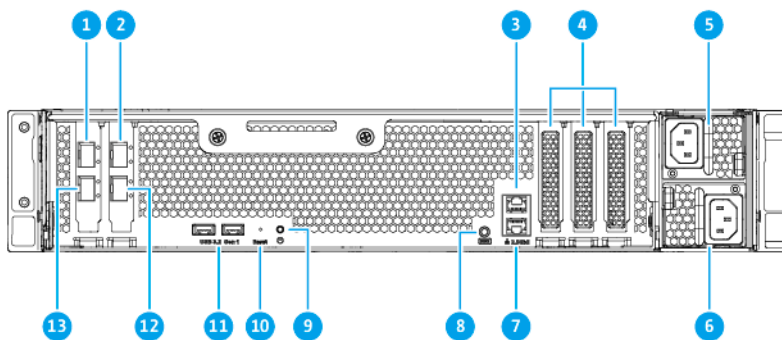
## 组件

## 前面板




编号	组件	编号	组件
1	硬盘活动 LED	5	系统状态 LED
2	硬盘状态 LED	6	2.5 Gb 以太网 LED
3	电源按钮	7	扩展单元 LED
4	10 Gb 以太网 LED	-	-

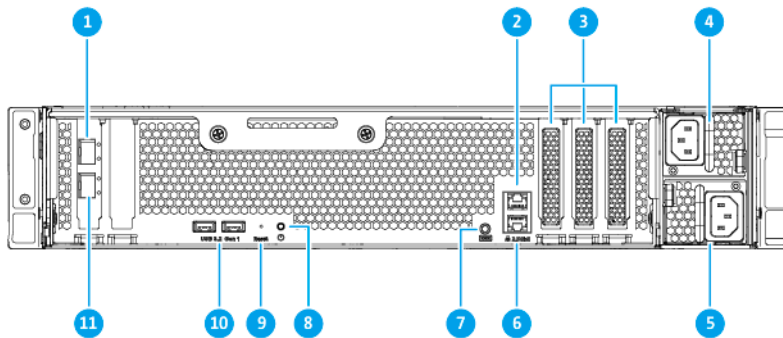
## 后面板




TS-h2490FU-7302P-128G



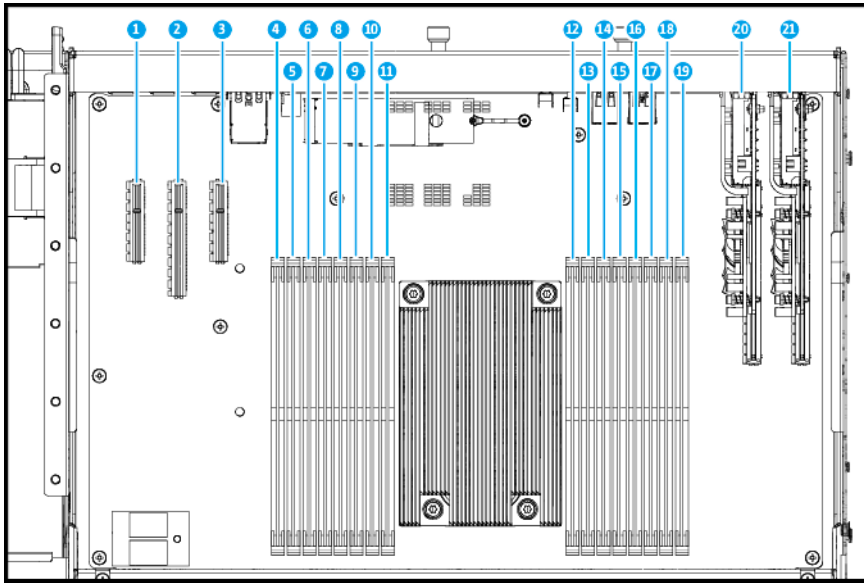
编号	组件	编号	组件
1	以太网端口 1 (25 GbE SFP28)	8	COM 端口  注 此端口仅供工程使用。
2	以太网端口 3 (25 GbE SFP28)	9	电源按钮
3	以太网端口 5 (2.5 GbE RJ45)	10	重置按钮
4	PCIe 半高盖板	11	USB 3.2 Gen 1 A 型端口
5	电源单元 1	12	以太网端口 4 (25 GbE SFP28)
6	电源单元 2	13	以太网端口 2 (25 GbE SFP28)
7	以太网端口 6 (2.5 GbE RJ45)	-	-





### TS-h2490FU-7232P-64G

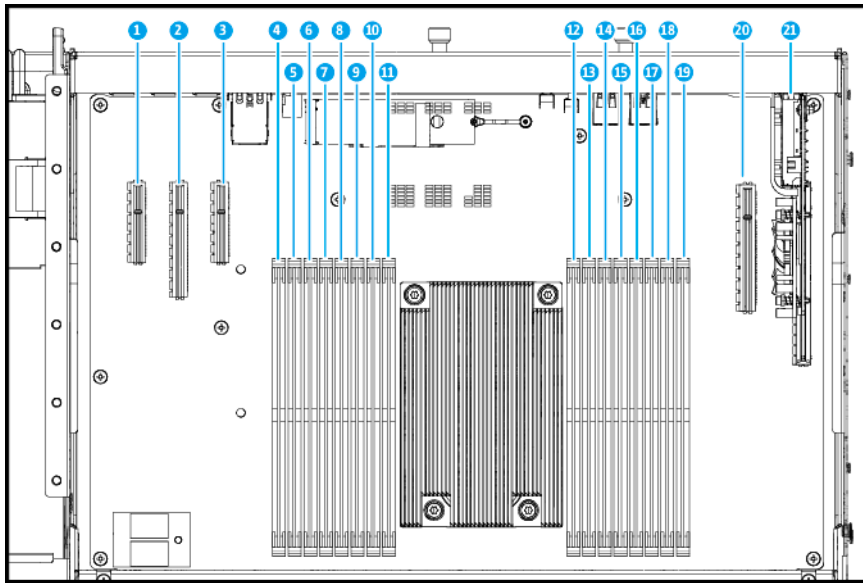
编号	组件	编号	组件
1	以太网端口 1 (25 GbE SFP28)	7	COM 端口  注 此端口仅供工程使用。
2	以太网端口 5 (2.5 GbE RJ45)	8	电源按钮
3	PCIe 半高盖板	9	重置按钮
4	电源单元 1	10	USB 3.2 Gen 1 A 型端口
5	电源单元 2	11	以太网端口 2 (25 GbE SFP28)
6	以太网端口 6 (2.5 GbE RJ45)	-	-

## 系统主板




TS-h2490FU-7302P-128G

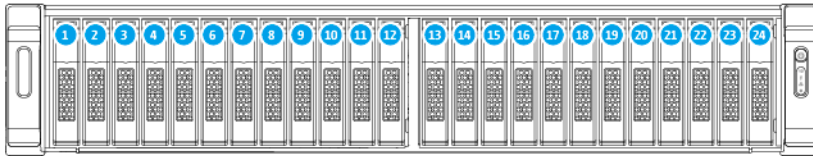
编号	组件	编号	组件
1	PCIe 插槽 1 (PCIe 4.0 x4)	12	内存插槽 9 (通道 E, DIMM 1)
2	PCIe 插槽 2 (PCIe 4.0 x8)	13	内存插槽 10 (通道 E, DIMM 2)
3	PCIe 插槽 3 (PCIe 4.0 x4)	14	内存插槽 11 (通道 F, DIMM 1)
4	内存插槽 1 (通道 D, DIMM 2)	15	内存插槽 12 (通道 F, DIMM 2)
5	内存插槽 2 (通道 D, DIMM 1)	16	内存插槽 13 (通道 G, DIMM 1)
6	内存插槽 3 (通道 C, DIMM 2)	17	内存插槽 14 (通道 G, DIMM 2)
7	内存插槽 4 (通道 C, DIMM 1)	18	内存插槽 15 (通道 H, DIMM 1)
8	内存插槽 5 (通道 B, DIMM 2)	19	内存插槽 16 (通道 H, DIMM 2)
9	内存插槽 6 (通道 B, DIMM 1)	20	PCIe 插槽 4 (PCIe 4.0 x8)  注 此插槽预安装了 25 GbE SFP28 网卡。
10	内存插槽 7 (通道 A, DIMM 2)	21	PCIe 插槽 5 (PCIe 4.0 x16)  注 此插槽预安装了 25 GbE SFP28 网卡。
11	内存插槽 8 (通道 A, DIMM 1)	-	-



TS-h2490FU-7232P-64G

编号	组件	编号	组件
1	PCIe 插槽 1 (PCIe 4.0 x4)	12	内存插槽 9 (通道 E, DIMM 1)
2	PCIe 插槽 2 (PCIe 4.0 x8)	13	内存插槽 10 (通道 E, DIMM 2)
3	PCIe 插槽 3 (PCIe 4.0 x4)	14	内存插槽 11 (通道 F, DIMM 1)
4	内存插槽 1 (通道 D, DIMM 2)	15	内存插槽 12 (通道 F, DIMM 2)
5	内存插槽 2 (通道 D, DIMM 1)	16	内存插槽 13 (通道 G, DIMM 1)
6	内存插槽 3 (通道 C, DIMM 2)	17	内存插槽 14 (通道 G, DIMM 2)
7	内存插槽 4 (通道 C, DIMM 1)	18	内存插槽 15 (通道 H, DIMM 1)
8	内存插槽 5 (通道 B, DIMM 2)	19	内存插槽 16 (通道 H, DIMM 2)
9	内存插槽 6 (通道 B, DIMM 1)	20	PCIe 插槽 4 (PCIe 4.0 x8)
10	内存插槽 7 (通道 A, DIMM 2)	21	PCIe 插槽 5 (PCIe 4.0 x16)
			 <b>注</b> 此插槽预安装了 25 GbE SFP28 网卡。
11	内存插槽 8 (通道 A, DIMM 1)	-	-

## 硬盘编号



## 安全信息

以下说明有助于确保个人安全和环境安全。在执行任何操作之前，请仔细阅读这些说明。

### 一般说明

- 设备应存放在通过器具、锁和钥匙或任何安保措施限制进入的安全场所。
- 只有经过授权并掌握技能的合格人员才能实际接触设备，相关人员需了解所有限制措施、安全预防措施和安装维护流程。
- 为避免潜在伤害或组件的损坏，请务必等硬盘和其他内部系统组件冷却后再触碰。
- 请执行静电放电 (ESD) 规程，以避免可能的人员受伤或组件受损。

### 电源

- 为降低失火或触电风险，请确保只将电源线连接到接地良好的电源插座。



配备冗余电源的设备可能有一条或多条电源单元 (PSU) 线。为避免受到严重伤害，安装或更换系统组件前，经培训的维修技师必须先从设备拔下所有 PSU 线。

### 系统电池

- 为避免潜在的电池爆炸、导致人员受伤或组件受损，请确保使用同型电池更换现有电池。
- 请按当地法规或电池制造商的指示正确处置使用过的电池。

## 运动的部件



**转动的风扇叶片：** 在设备连接到电源时，使您的身体各部位远离正在转动的风扇叶片。



**运动的组件：** 使您的身体各部位远离正在运动的其他组件。

## 安装要求

类别	项目
环境	<ul style="list-style-type: none"> <li>• 室温：0°C 至 40°C (32 至 104°F)</li> <li>• 无冷凝相对湿度：5% 至 95%</li> <li>• 湿球温度：27°C (80.6°F)</li> <li>• 平坦的防静电表面，无直射阳光、液体或化学药剂</li> <li>• 无可能阻塞 NAS 通风或者压住 NAS 或电源线的物品</li> </ul>
硬件和外围设备	<ul style="list-style-type: none"> <li>• 存储硬盘 有关兼容硬盘型号的列表，请转到 <a href="https://www.qnap.com/compatibility">https://www.qnap.com/compatibility</a>。</li> <li>• 网线</li> </ul>
工具	<ul style="list-style-type: none"> <li>• 1 号或 2 号十字螺丝刀</li> <li>• 防静电腕带</li> </ul>

## 设置 NAS



### 重要

在设置 NAS 或安装 NAS 组件之前，请仔细阅读[安全信息](#)中的所有安全要求和信息。

1. 将 NAS 设备置于符合要求的环境中。  
有关详细信息，请参见[安装要求](#)。
2. 安装硬盘。  
有关详细信息，请参见以下主题：
  - [在 2.5 英寸托盘上安装 2.5 英寸固态硬盘](#)

有关兼容的硬盘和扩展卡的列表，请转到 <http://www.qnap.com/compatibility>。

3. 安装扩展卡。  
有关详细信息，请参见[更换扩展卡](#)。
4. 连接扩展单元。  
有关详细信息，请参见以下主题：  
[连接 SAS 扩展单元](#)。

[连接 USB 扩展单元。](#)

5. 连接电源线和所有适用的线缆。
6. 启动 NAS 电源。  
有关详细信息，请参见[前面板](#)。
7. 安装 QuTS hero。  
有关详细信息，请参见 [QuTS hero 安装](#)。
8. 登录 QuTS hero。  
如果 QuTS hero 在您的 NAS 发现了未使用的磁盘，则会要求您初始化这些磁盘。单击**初始化**开始该过程。

## 3. 安装和配置

本章提供了具体的硬件和固件安装与配置步骤。

### 硬件安装

本节提供有关安装硬盘、内存模块和扩展卡的信息。

### 硬盘安装

TS-h2490FU 兼容 2.5 英寸 U.2 NVMe PCIe 固态硬盘。

#### 在 2.5 英寸托盘上安装 2.5 英寸固态硬盘



#### 警告

- 安装硬盘将删除硬盘上的所有数据。
- 请执行静电放电 (ESD) 规程，以避免组件损坏。

•



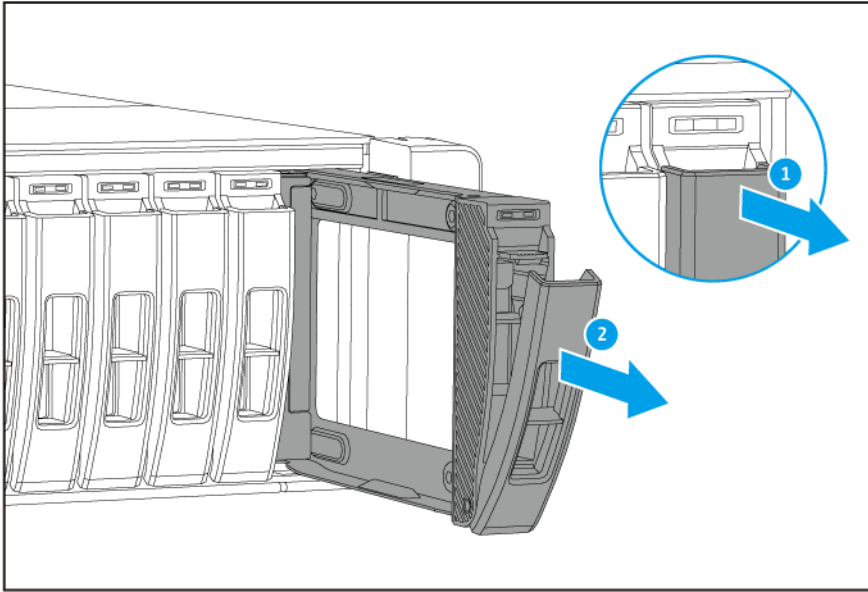
**转动的风扇叶片：**使您的双手和身体其他部位远离正在转动的风扇叶片。

•



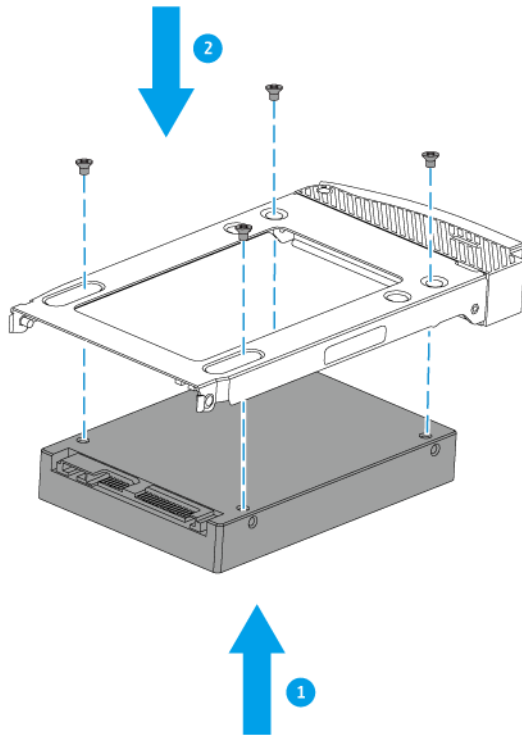
**其他运动的组件：**使您的双手和身体其他部位远离正在运动的其他组件。

1. 关闭 NAS 电源。
2. 取下硬盘托盘。
  - a. 拉动手柄以松开托盘。
  - b. 拉出托盘。



**3. 将硬盘安装到托盘上。**

- a.** 将硬盘放在托盘上，使硬盘底部的孔与托盘底部的孔对齐。

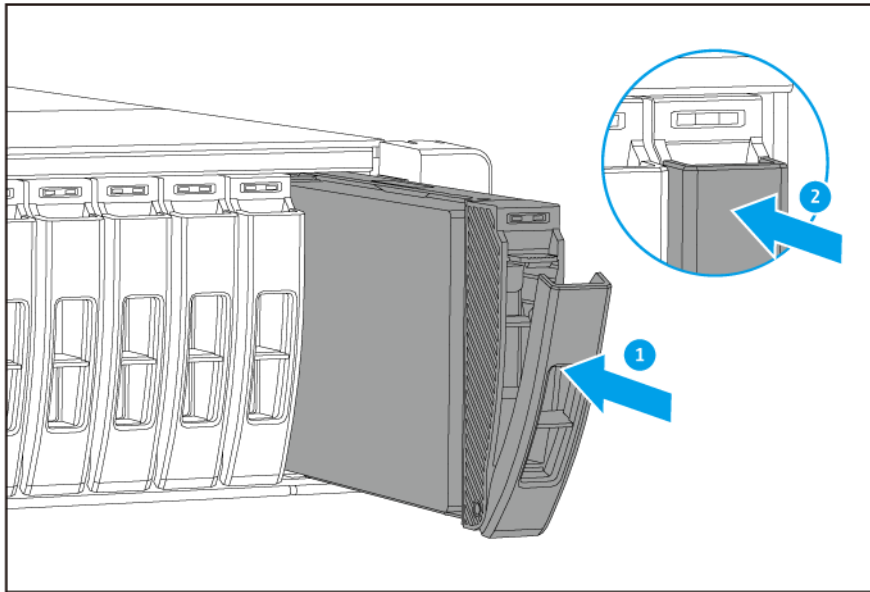


- b.** 安装螺丝。

**4. 将托盘装入硬盘架。**

- a.** 将托盘插入硬盘架。





b. 推动手柄。

5. 启动 NAS 电源。

## 更换内存模块

TS-h2490FU 有 16 个内存插槽。您可以通过升级内存模块来增加 NAS 的内存容量。为了获得最佳性能，请同时更换所有八个槽中的内存模块。

请仅使用 QNAP 内存模块，以保证系统性能和稳定性。可以从授权经销商处购买 QNAP 内存模块。



### 重要

QNAP 建议以八个为一组安装模块。

- 确保所有八个模块完全相同。
- 按顺序在指定的插槽中安装每组模块。
- 以八个或十六个为一组安装内存模块。安装八个内存模块时，请将内存安装在插槽 1、3、5、7、10、12、14 和 16 中。

有关插槽顺序的详细信息，请参见下表。

模块组	插槽编号
第一组	插槽 1、3、5、7、10、12、14 和 16
第二组	插槽 2、4、6、8、9、11、13 和 15



### 警告

- 请执行静电放电 (ESD) 规程，以避免组件损坏。

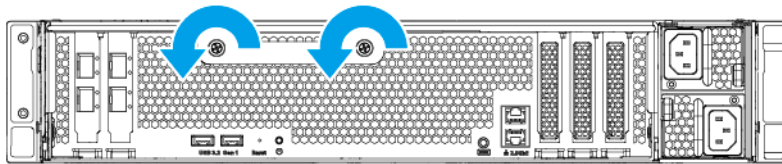


**转动的风扇叶片：**使您的双手和身体其他部位远离正在转动的风扇叶片。

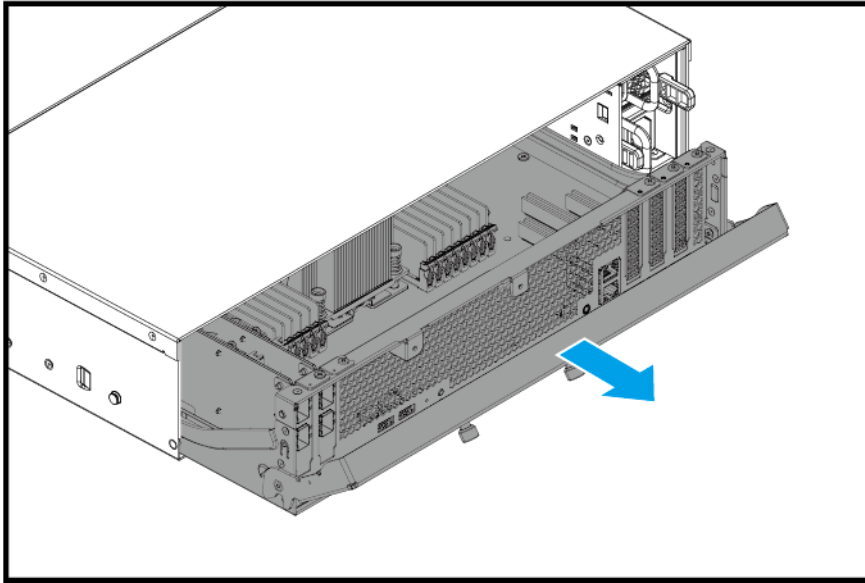


**其他运动的组件：**使您的双手和身体其他部位远离正在运动的其他组件。

1. 关闭设备。
2. 从插座上拔下电源线。
3. 拔掉所有线缆和外接部件。
4. 取下外壳盖。
  - a. 松开螺丝。



- b. 将控制器从机箱中拉出。



5. 取下现有模块。

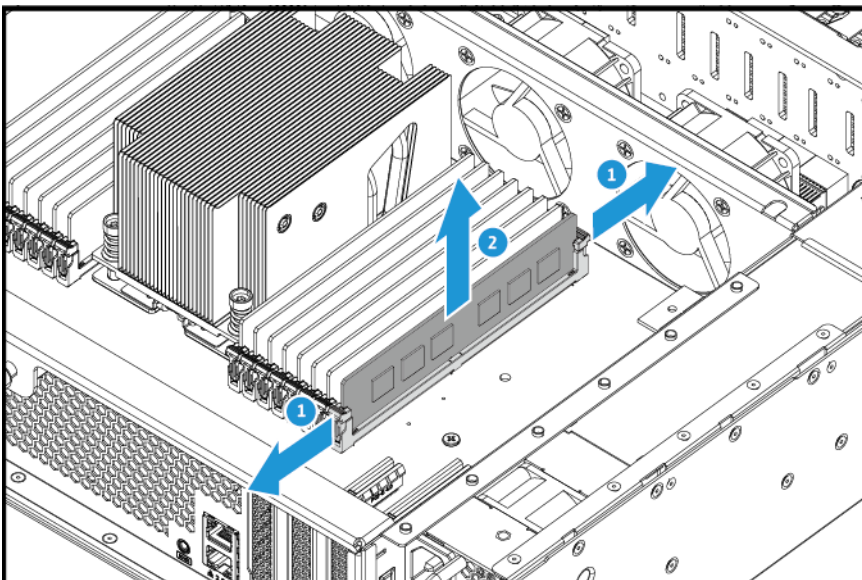
- a. 同时向外推动固定夹以释放模块。
- b. 确认模块向上倾斜并已完全脱离插槽。



**警告**

如果尝试在模块尚未完全脱离时将其取出，可能会损坏模块和主板。

- c. 握住模块边缘。
- d. 小心将模块滑出插槽。



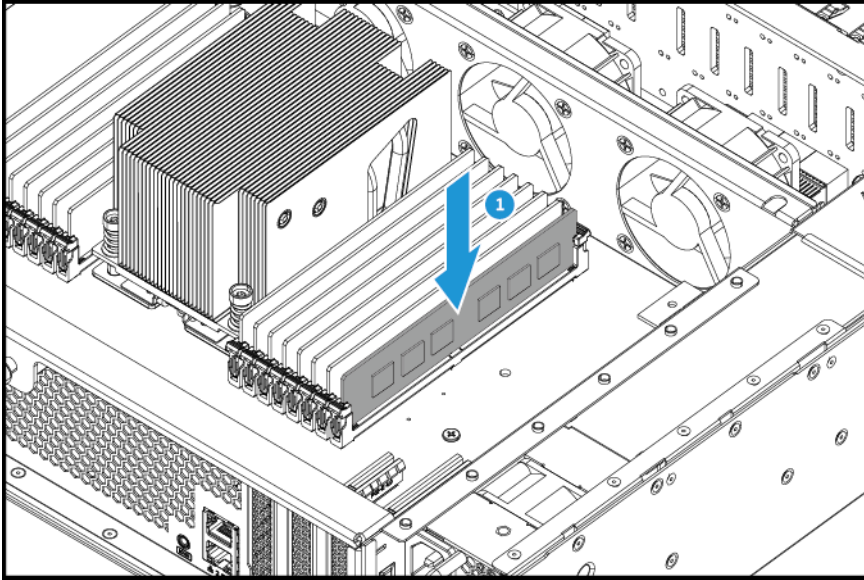
**警告**

- 请勿触摸内部组件，特别是金属接头。

- 不要折弯模块。

## 6. 安装新模块。

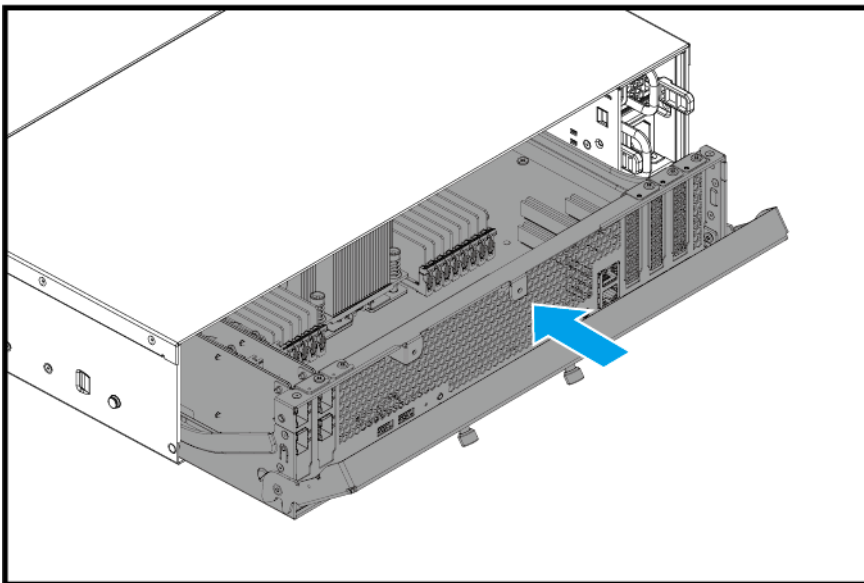
- 将凹口与插槽内的凸起对齐。
- 将模块插入插槽中。



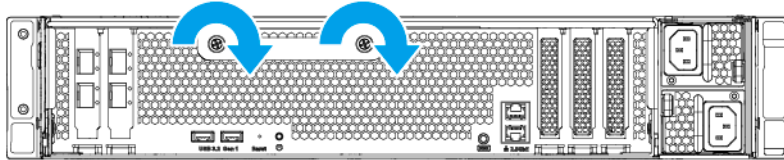
- 确认金属接头已完全插入插槽中。
- 小心地向下按压模块，直到固定夹将模块锁定到位。

## 7. 安装外壳盖。

- 将盖板放在设备上。
- 将设备推入机箱。



- c. 拧紧螺丝。



8. 连接所有线缆和外接部件。
9. 启动设备。
10. 确认设备能够识别该模块。
  - a. 以管理员身份登录 QuTS hero。
  - b. 转到**控制台 > 系统 > 系统状态 > 硬件信息**。
  - c. 检查**内存总容量**值。

## 更换扩展卡

TS-h2490FU 系列支持精选的扩展卡，其中一些需要 QNAP PCIe 支架。从公司网站购买的 QNAP 品牌扩展卡随附有适合 TS-h2490FU 系列的支架。



### 警告

- 只有合格人员才能执行以下步骤。不遵守说明可能会导致重伤或死亡。
- 请执行静电放电 (ESD) 规程，以避免组件损坏。

•



**转动的风扇叶片：**使您的双手和身体其他部位远离正在转动的风扇叶片。

•

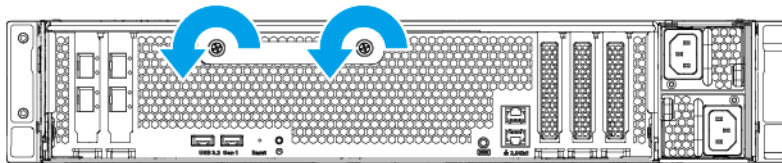


**其他运动的组件：**使您的双手和身体其他部位远离正在运动的其他组件。

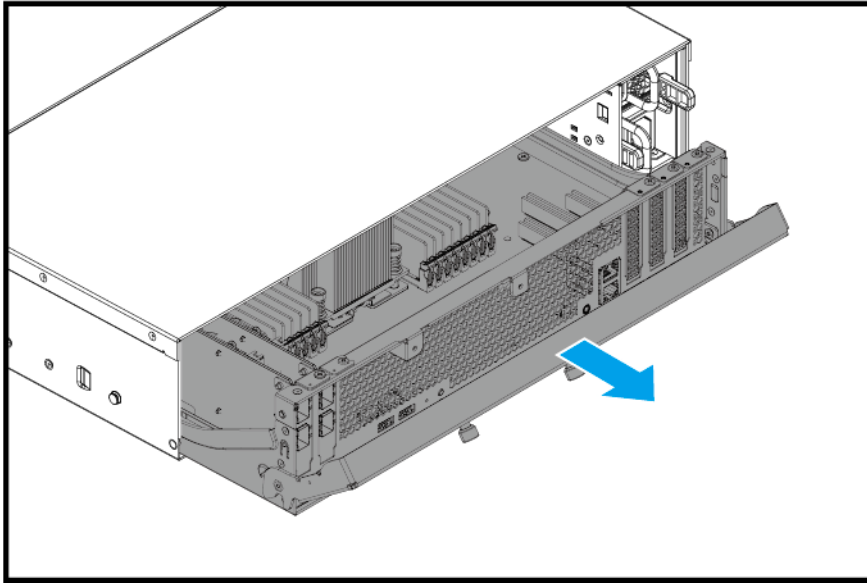
**重要**

- 双端口 25GbE SFP28 网络扩展卡预装在 TS-h2490FU-7302P-128G 的 PCIe Gen 4.0 x8 插槽 4 和 5 上。
- 一个双端口 25GbE SFP28 网络扩展卡预装在 TS-h2490FU-7232P-64G 的 PCIe Gen 4.0 x8 插槽 5 上。
- 如果有扩展卡安装在插槽 3 中，插槽 2 的速度会从 x8 下降到 x4。
- 如果有扩展卡安装在插槽 4 中，插槽 5 的速度会从 x16 下降到 x8。
- 有关扩展卡插槽编号的详细信息，请参见[系统主板](#)。

1. 关闭设备。
2. 从插座上拔下电源线。
3. 拔掉所有线缆和外接部件。
4. 取下外壳盖。
  - a. 松开螺丝。

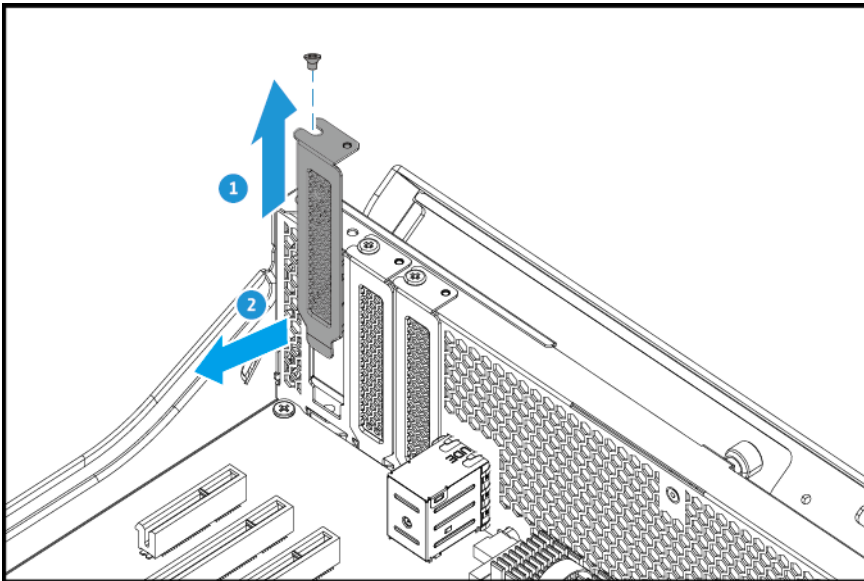


- b. 将控制器从机箱中拉出。



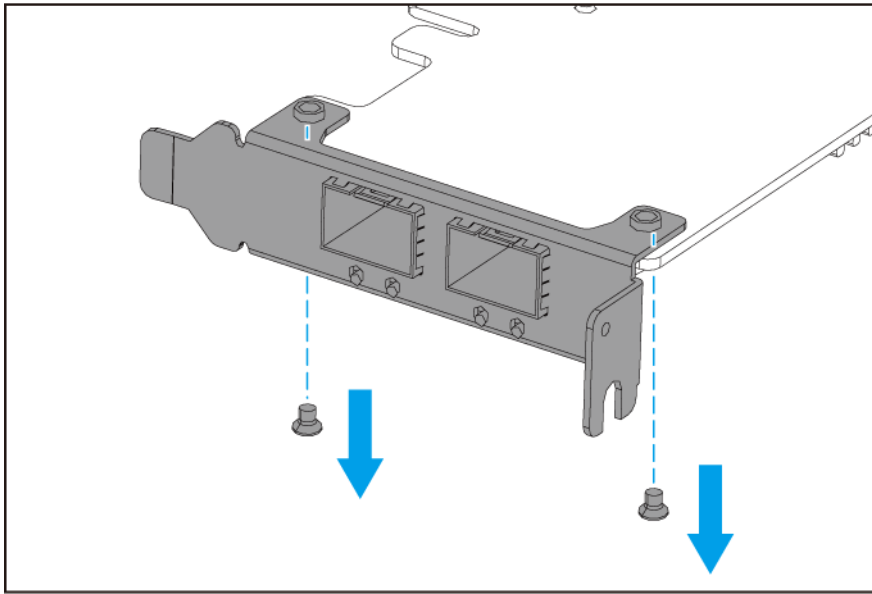
**5. 取下 PCIe 盖板。**

- a. 取下用于将盖板固定到支架的螺丝。
- b. 将盖板从插槽中拉出。

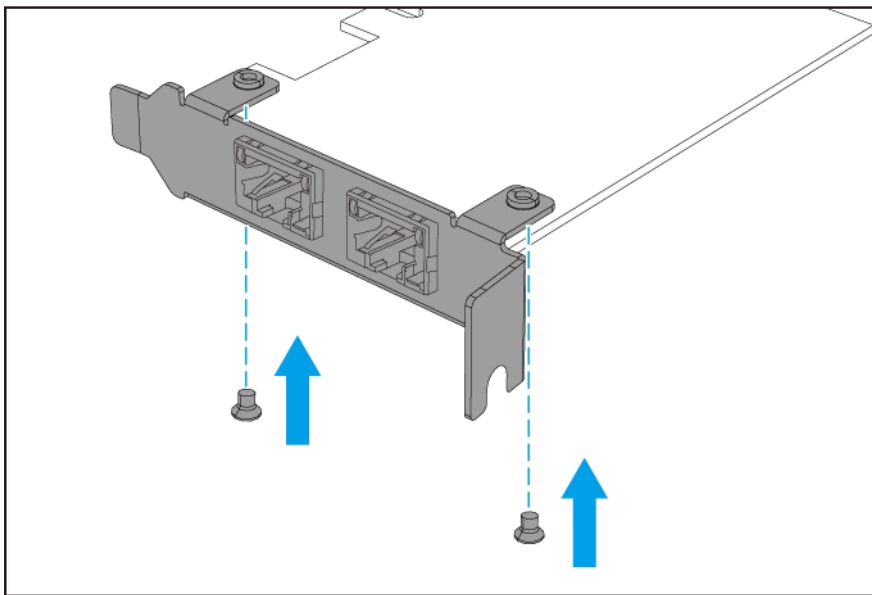


**6. 可选: 将 QNAP 支架安装到扩展卡上。**

- a. 卸下现有支架的所有螺丝。

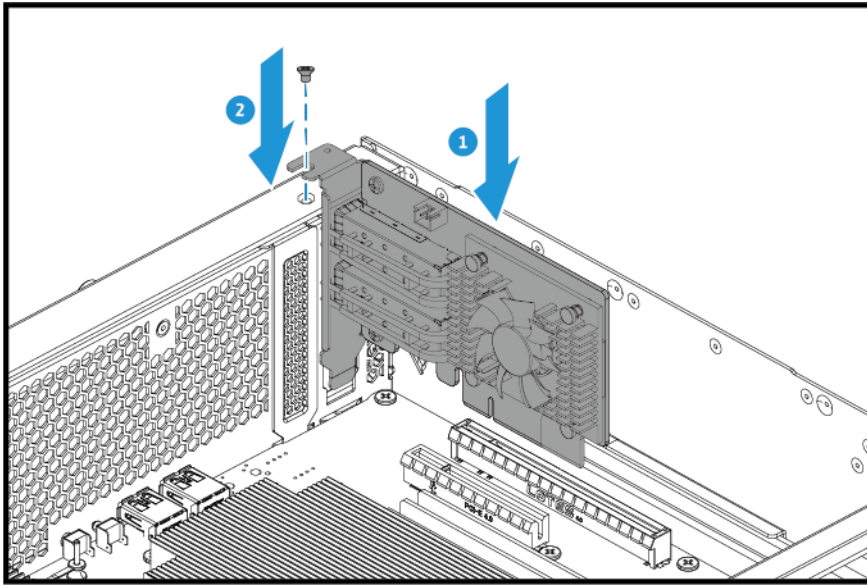


- b. 小心地从扩展卡取下支架。
- c. 使用相同的螺丝将 QNAP 支架安装到扩展卡上。



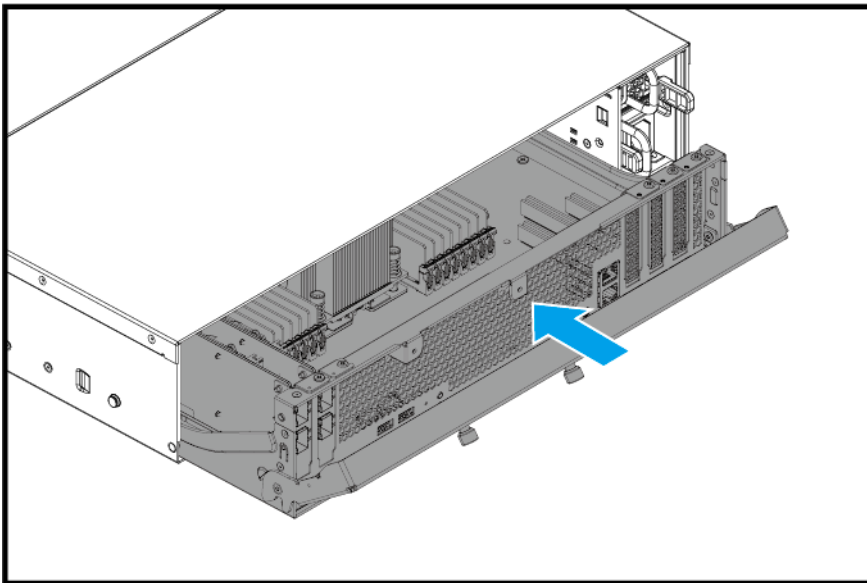
- d. 确认支架不会移动。
7. 安装扩展卡。
- a. 握住卡片边缘。
  - b. 将其插入插槽中。
  - c. 安装螺丝。



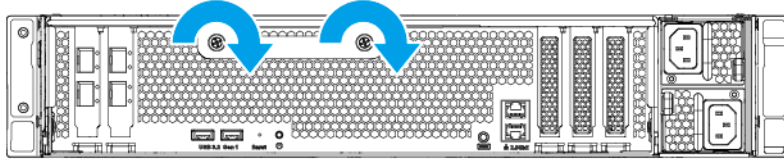


**8. 安装外壳盖。**

- a. 将盖板放在设备上。
- b. 将设备推入机箱。



- c. 拧紧螺丝。



9. 连接所有线缆和外接部件。
10. 将电源线连接到插座。
11. 启动 NAS 电源。

### 热插拔冗余电源单元

1. 关闭存储控制器的电源。
2. 从插座和要更换的电源单元 (PSU) 上拔下电源线。

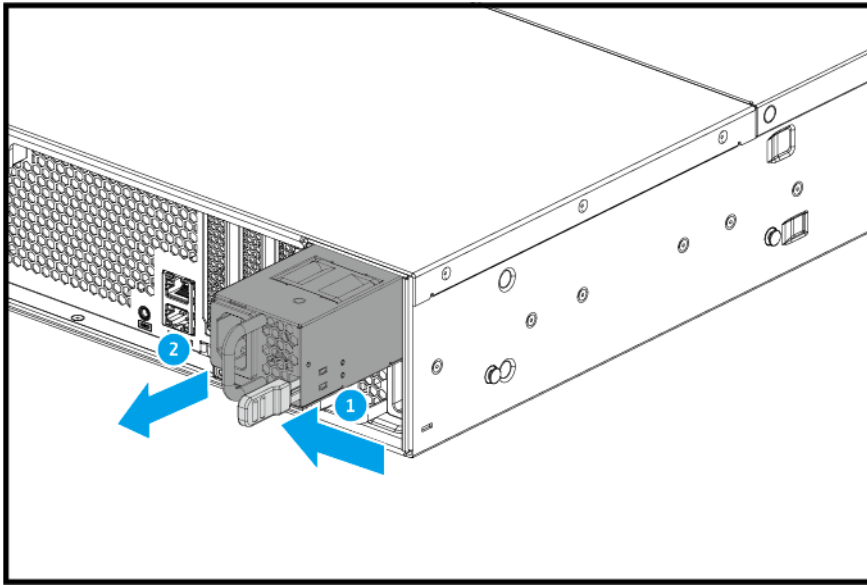


#### 警告

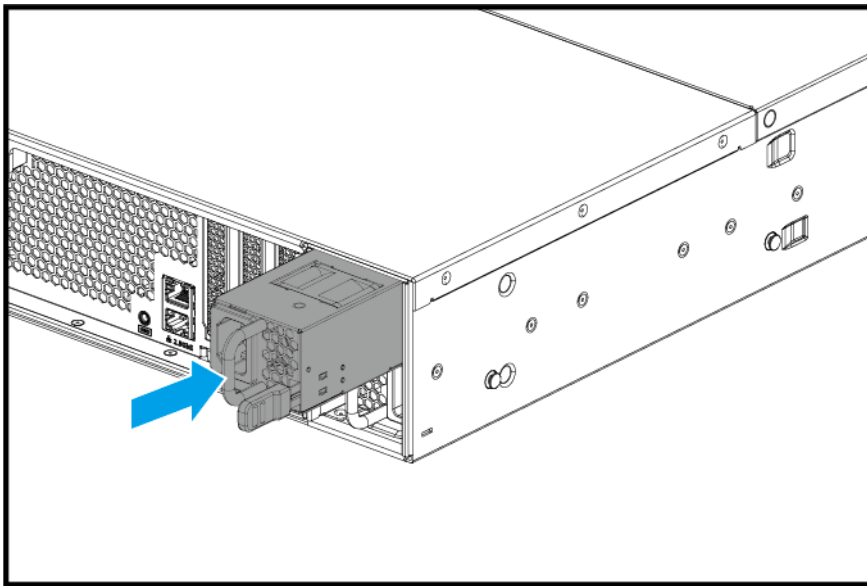


NAS 可能有一条或多条冗余电源单元 (PSU) 线。为避免受到严重伤害，安装或更换系统组件前，经培训的维修技师必须先拔下所有 PSU 线。

3. 向手柄方向紧按门锁并拉出 PSU。



4. 插入新 PSU。



5. 将电源线连接到 PSU 和插座。
6. 启动存储控制器的电源。
7. 启用 PSU 故障警报。
  - a. 以管理员身份登录 QuTS hero。
  - b. 转到控制台 > 系统 > 硬件 > 一般设置。
  - c. 选择启用冗余电源模式。
  - d. 单击应用。

## 安装扩展单元

TS-h2490FU 支持 SAS 扩展单元和 USB 扩展单元。有关详细信息，请参见下表。

您可以从 QNAP 或授权经销商处购买存储扩展配件。

有关详细信息，请转到 <https://shop.qnap.com/>。

有关兼容扩展单元的列表和最大可应用扩展单元数，请转到 <http://www.qnap.com/go/compatibility-expansion>。

扩展单元型号	描述	所需配件
REXP-1620U-RP	<ul style="list-style-type: none"> <li>使用 SAS 12 Gbps (SFF-8644) 接口</li> <li>支持 SAS/SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>SAS-12G2E 存储扩展卡</li> <li>mini-SAS SFF-8644 线缆</li> <li>RAIL-A03-57</li> </ul>
REXP-1220U-RP	<ul style="list-style-type: none"> <li>使用 SAS 12 Gbps (SFF-8644) 接口</li> <li>支持 SAS/SATA HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>SAS-12G2E 存储扩展卡</li> <li>mini-SAS SFF-8644 线缆</li> <li>RAIL-A03-57</li> </ul>
REXP-1610U-RP	<ul style="list-style-type: none"> <li>使用 SAS 6 Gbps (SFF-8644) 接口</li> <li>支持 SATA/HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>SAS-12G2E 存储扩展卡</li> <li>mini-SAS SFF-8644 线缆</li> <li>RAIL-A03-57</li> </ul>
REXP-1210U-RP	<ul style="list-style-type: none"> <li>使用 SAS 6 Gbps (SFF-8644) 接口</li> <li>支持 SATA/HDD/SSD</li> </ul>	<ul style="list-style-type: none"> <li>SAS-12G2E 存储扩展卡</li> <li>mini-SAS SFF-8644 线缆</li> <li>RAIL-A03-57</li> </ul>
TR-002	<ul style="list-style-type: none"> <li>使用 USB 3.2 Gen 2 C 型接口</li> <li>支持 SATA 硬盘</li> </ul>	<ul style="list-style-type: none"> <li>USB 3.2 Gen 2 A 型至 C 型线缆</li> </ul>
TR-004	<ul style="list-style-type: none"> <li>使用 USB 3.2 Gen 1 C 型接口</li> <li>支持 SATA 硬盘</li> </ul>	<ul style="list-style-type: none"> <li>USB 3.2 Gen 1 A 型至 C 型线缆</li> </ul>
TR-004U	<ul style="list-style-type: none"> <li>使用 USB 3.2 Gen 1 C 型接口</li> <li>支持 SATA 硬盘</li> </ul>	<ul style="list-style-type: none"> <li>USB 3.2 Gen 1 A 型至 C 型线缆</li> <li>RAIL-B02</li> </ul>
TL-D800C	<ul style="list-style-type: none"> <li>使用 USB 3.2 Gen 2 C 型接口</li> <li>支持 SATA 硬盘</li> </ul>	<ul style="list-style-type: none"> <li>USB 3.2 Gen 2 A 型至 C 型线缆</li> </ul>
TL-R1200C-RP	<ul style="list-style-type: none"> <li>使用 USB 3.2 Gen 2 C 型接口</li> <li>支持 SATA 硬盘</li> </ul>	<ul style="list-style-type: none"> <li>USB 3.2 Gen 2 A 型至 C 型线缆</li> <li>RAIL-B02</li> </ul>

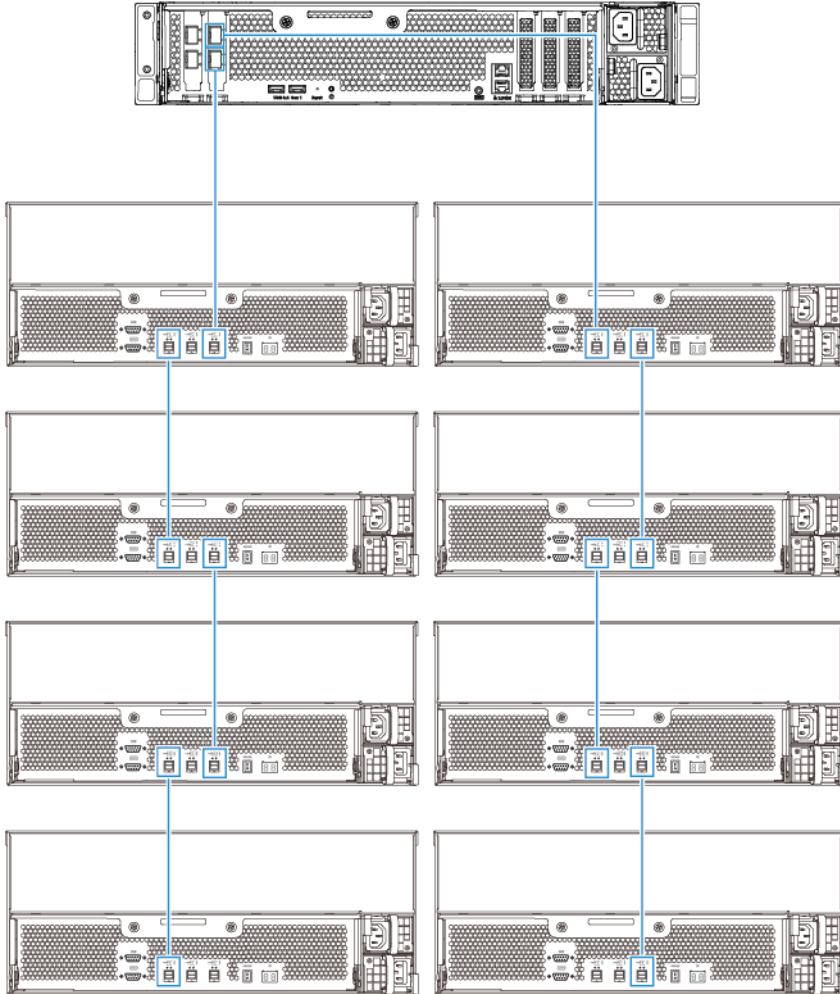
## 连接 SAS 扩展单元

要将设备连接到 SAS 扩展单元，必须在设备中安装存储扩展卡。

有关所需配件的详细信息，请参见[安装扩展单元](#)。

1. 在 PCIe 插槽上安装存储扩展卡。  
有关详细信息，请参见[更换扩展卡](#)。

- 按以下拓扑将扩展单元连接到设备。



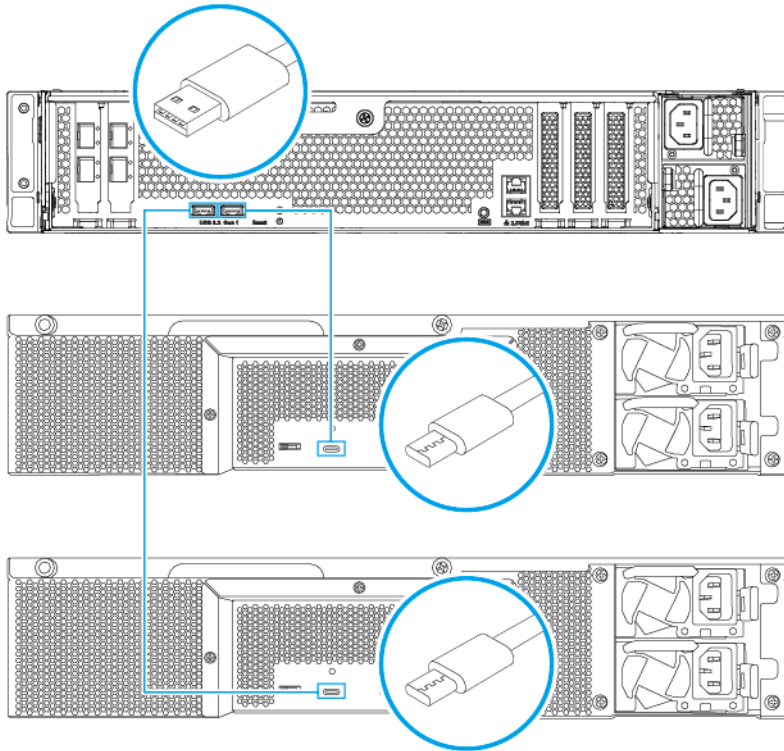
QNAP 建议始终使用双通道配置，以防止因扩展单元故障或线缆断开而导致存储停机。只有在无法使用双通道配置的情况下，才应使用单通道配置。

- 为扩展单元接通电源。
- 确认设备能够识别扩展单元。
  - 以管理员身份登录 QuTS hero。
  - 转到**主菜单 > 存储与快照总管 > 概述 > 系统**。
  - 确认扩展单元已列出。

### 连接 USB 扩展单元

要将 TS-h2490FU 连接到 USB 扩展单元，需要 USB A 型至 USB C 型线缆或 USB C 型至 USB C 型线缆。有关所需配件的详细信息，请参见[安装扩展单元](#)。

1. 将扩展单元连接到 NAS。
  - a. 将 USB 线缆连接到扩展单元上的 USB B 型或 USB C 型端口。
  - b. 将 USB 线缆连接到 NAS 上的 USB 3.2 Gen 1 A 型端口。



2. 为扩展单元接通电源。
3. 确认 NAS 能够识别扩展单元。
  - a. 以管理员身份登录 QTS。
  - b. 转到**主菜单 > 存储与快照总管 > 总览 > 系统**。
  - c. 确认扩展单元已列出。

## QuTS hero 安装

TS-h2490FU 使用 QNAPQuTS hero 操作系统。可以使用以下任一方法安装 QuTS hero。

方法	描述	要求
Qfinder Pro 安装 (推荐)	<p>如果 NAS 已连接到您的局域网，可以执行以下操作：</p> <ul style="list-style-type: none"> <li>• 使用 Qfinder Pro 定位 NAS。</li> <li>• 完成“智能安装指南”向导中的步骤。</li> </ul> <p>有关详细信息，请参见<a href="#">使用 Qfinder Pro 安装 QuTS hero</a>。</p>	<ul style="list-style-type: none"> <li>• 计算机</li> <li>• 网线</li> <li>• Qfinder Pro 安装程序</li> </ul>
云安装	<p>如果 NAS 已连接到 Internet，可以执行以下操作：</p> <ul style="list-style-type: none"> <li>• 扫描 NAS 上的二维码。</li> <li>• 登录您的 myQNAPcloud 帐户。</li> <li>• 使用 myQNAPcloud Link 远程访问 NAS。</li> <li>• 完成“智能安装指南”向导中的步骤。</li> </ul> <p>有关详细信息，请参见<a href="#">使用 Cloud Key 安装 QuTS hero</a>。</p>	<ul style="list-style-type: none"> <li>• 计算机或移动设备</li> <li>• 网线</li> <li>• myQNAPcloud 帐户</li> <li>• Cloud Key</li> </ul>

## 使用 Qfinder Pro 安装 QuTS hero



### 警告

安装 QuTS hero 将删除硬盘上的所有数据。请先备份您的数据，然后再继续。



### 注

您可以随时恢复为 QTS 操作系统。有关详细信息，请参见《QuTS hero 用户指南》。

1. 启动设备。
2. 将设备连接到您的局域网中。
3. 在已连接到同一局域网的计算机上运行 Qfinder Pro。



### 注

要下载 Qfinder Pro，请转到 <https://www.qnap.com/utilities>。

4. 在列表中找到 NAS，然后双击名称或 IP 地址。  
**智能安装指南**将在默认 Web 浏览器中打开。
5. 单击**启动智能安装指南**。  
此时会出现**安装固件**窗口。
6. 使用以下任意方法安装固件：

安装方法	步骤
自动	<p>单击<b>开始</b>。 自动搜索可用固件更新并安装固件。</p>

安装方法	步骤
手动安装	<p>a. 单击<b>手动安装</b>。 此时会出现<b>安装固件</b>窗口。</p> <p>b. 单击<b>浏览</b>。 此时会出现上传文件窗口。</p> <p>c. 选择文件。</p> <p>d. 单击<b>打开</b>。 启动固件安装。</p>
跳过	<p>a. 单击<b>跳过</b>。 跳过固件安装。</p>

## 7. 指定以下信息

- **NAS 名称**：指定 1 至 14 个字符的名称。名称支持字母（A 到 Z、a 到 z）、数字（0 到 9）和连字符 (-)，但不能以连字符结尾。
- **密码**：指定 1 至 64 个字符的管理员密码。密码支持所有 ASCII 字符。

## 8. 单击下一步。

## 9. 指定时区、日期和时间。



### 提示

QNAP 建议连接到 NTP 服务器，以确保 NAS 遵循协调世界时 (UTC) 标准。

## 10. 单击下一步。

此时会出现**配置网络设置**屏幕。

## 11. 选择**自动获取 IP 地址(DHCP)**。

## 12. 单击下一步。

此时会出现**跨平台文件传输服务**屏幕。

## 13. 选择将用于访问 NAS 上共享文件夹的设备类型。

## 14. 单击下一步。

## 15. 检查设置。

## 16. 单击**应用**。

此时会出现确认消息。



### 警告

单击**是**后，将先删除硬盘上的所有数据，然后再安装 QuTS hero。

## 17. 单击**是**。

- 此时会出现 **QuTS hero** 安装进度条。
- **QuTS hero** 即安装完毕。



### 注

完成 QuTS hero 安装可能需要几分钟时间。

## 18. 可选: 单击**转到 NAS 管理**。



**提示**

单击**转到 NAS 管理**以设置更高级的 QuTS hero 配置和设置。有关详细信息，请参见《QuTS hero 用户指南》。

## 使用 Cloud Key 安装 QuTS hero

**警告**

安装 QuTS hero 将删除硬盘上的所有数据。请先备份您的数据，然后再继续。

**注**

您可以随时恢复为 QTS 操作系统。有关详细信息，请参见《QuTS hero 用户指南》。

1. 启动设备。
2. 将设备连接到 Internet。
3. 使用以下方法之一转到“QNAP Cloud 安装”页面：
  - 在您的计算机上，转到 <http://install.qnap.com/>。
  - 使用移动设备扫描 NAS 上的二维码。

网页中会列出本地网络上所有尚未初始化的 QNAP NAS 设备。

4. 在列表中找到 NAS，然后单击**初始化**。

**注**

如果未列出您的 NAS，请按网页上的说明指定 NAS 上的 Cloud Key。

安装向导将在默认 Web 浏览器中打开。

5. 创建帐户或登录 myQNAPcloud。

**注**

创建帐户后，您必须返回此页面才能完成安装。

6. 为 NAS 指定 myQNAPcloud 设备名称。

**注**

- myQNAPcloud 设备名称用于远程访问 NAS。
- 因安全原因，在您的 NAS 上初始化 myQNAPCloud Link 远程连接服务后，会将其禁用。通过 LAN 连接到 QuTS hero，然后安装 myQNAPCloud Link 可启用此服务。

7. 单击**下一步**。

**智能安装指南**将在默认 Web 浏览器中打开。

8. 执行以下任一操作。

- 要检查是否有可供使用的最新版本，单击**开始**。  
向导会下载可供使用的最新版本，下载完成后，NAS 会重新启动。如果没有更新的版本，向导会自动显示**智能安装指南**。
- 要安装立即可用的版本，单击**跳过**。

9. 单击**启动智能安装指南**。  
此时会出现**安装固件**窗口。

## 10. 使用以下任意方法安装固件：

安装方法	步骤
自动	单击 <b>开始</b> 。 自动搜索可用固件更新并安装固件。
手动安装	<ol style="list-style-type: none"> <li>a. 单击<b>手动安装</b>。 此时会出现<b>安装固件</b>窗口。</li> <li>b. 单击<b>浏览</b>。 此时会出现上传文件窗口。</li> <li>c. 选择文件。</li> <li>d. 单击<b>打开</b>。 启动固件安装。</li> </ol>
跳过	单击 <b>跳过</b> 。 跳过固件安装。

## 11. 指定以下信息

- **NAS 名称**：指定 1 至 14 个字符的名称。名称支持字母（A 到 Z、a 到 z）、数字（0 到 9）和连字符（-），但不能以连字符结尾。
- **密码**：指定 1 至 64 个字符的管理员密码。密码支持所有 ASCII 字符。

12. 单击**下一步**。

## 13. 指定时区、日期和时间。

**提示**

QNAP 建议连接到 NTP 服务器，以确保 NAS 遵循协调世界时 (UTC) 标准。

14. 单击**下一步**。

此时会出现**配置网络设置**屏幕。

15. 选择**自动获取 IP 地址(DHCP)**。16. 单击**下一步**。

此时会出现**跨平台文件传输服务**屏幕。

## 17. 选择将用于访问 NAS 上共享文件夹的设备类型。

18. 单击**下一步**。

## 19. 检查设置。

20. 单击**应用**。

此时会出现确认消息。

**警告**

单击**确认**后，将先删除硬盘上的所有数据，然后再安装 QuTS hero。

21. 单击**确认**。

QuTS hero 即安装完毕。

22. 可选: 单击**转到 NAS 管理**。

**提示**


单击**转到 NAS 管理**以设置更高级的 QuTS hero 配置和设置。有关详细信息，请参见《QuTS hero 用户指南》。

## 4. 基本操作

本章介绍 NAS 的基本操作。

### 电源按钮

操作	用户操作	结果
启动电源	按下此按钮一次。	设备开机。
关闭电源	按住此按钮 1.5 秒钟。	设备关机。
强制关机	按住此按钮 5 秒钟。	设备关机。

 **重要**  
 仅当设备无响应时才能使用此方法。

### 重置按钮

操作	用户操作	结果
基本系统重置	按住此按钮 3 秒钟。	<p>以下设置将重置为默认值：</p> <ul style="list-style-type: none"> <li>• 系统管理员密码：默认密码为第一个 MAC 地址（去掉特殊字符），以大写字母表示。例如，如果第一个 MAC 地址为 00-08-9B-F6-15-75，则管理员密码将为 00089BF61575。</li> </ul> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  <b>注</b>              您可以使用 Qfinder Pro 找到第一个 MAC 地址。设备上粘贴的标签也会在 MAC1 下列出此地址。           </div> <ul style="list-style-type: none"> <li>• TCP/IP 配置：               <ul style="list-style-type: none"> <li>• 通过 DHCP 自动获取 IP 地址设置</li> <li>• 禁用巨型帧</li> <li>• 如果启用端口中继（仅限多局域网型号），则端口中继模式将重置为“主动备份(故障转移)”。</li> </ul> </li> <li>• 系统端口：8080（系统服务端口）</li> <li>• 安全等级：低（允许所有连接）</li> <li>• LCD 面板密码：（空白）</li> <li>• VLAN：禁用</li> </ul>

操作	用户操作	结果
高级系统重置	按住此按钮 15 秒钟。	恢复默认出厂设置。 <ul style="list-style-type: none"> <li>要在高级系统重置后检索旧数据，请在 NAS 上重新创建先前的文件夹结构。</li> </ul>

## LED


开启设备电源后，LED 指示灯会指示系统状态和相关信息。以下 LED 信息仅适用于硬盘已正确安装并且设备已连接到网络或主机的情况。



### 注

只有安装 10 GbE 网络扩展卡时，10 GbE LED 才能工作。

有关 LED 位置的详细信息，请参见[组件](#)。

LED	状态	描述
系统状态	红绿交替闪烁，间隔 0.5 秒	<ul style="list-style-type: none"> <li>• 硬盘正在格式化。</li> <li>• 设备正在初始化。</li> <li>• 操作系统正在更新。</li> <li>• RAID 正在重建。</li> <li>• 正在进行在线 RAID 容量扩展。</li> <li>• 正在进行在线 RAID 级别迁移。</li> <li>• 固件正在更新。</li> </ul> <p> <b>重要</b> 更新固件时，请勿拔下电源线或 USB 缆线，也不要强行退出应用程序。</p>
	红色	<ul style="list-style-type: none"> <li>• 硬盘无效。</li> <li>• 共享文件夹容量已满。</li> <li>• 共享文件夹即将被占满。</li> <li>• 系统风扇故障。</li> <li>• 访问（读/写）数据时出错。</li> <li>• 在硬盘上检测到坏扇区。</li> <li>• 设备处于降级只读模式（RAID 5 或 RAID 6 中的两个成员硬盘出现故障，但仍可读取数据）。</li> <li>• 硬件自检发生错误。</li> </ul>
	闪烁红色，间隔 0.5 秒	设备处于降级模式（RAID 1、RAID 5 或 RAID 6 中的一个成员硬盘出现故障）。
	绿色	设备已就绪。
	闪烁绿色，间隔 0.5 秒	<ul style="list-style-type: none"> <li>• 设备未配置。</li> <li>• 硬盘未格式化。</li> </ul>
	熄灭	<ul style="list-style-type: none"> <li>• 所有硬盘都处于待机模式。</li> <li>• 设备已关机。</li> </ul>
硬盘活动	闪烁红色	正在访问数据，但在此过程中发生读/写错误。
	红色	发生硬盘读/写错误。
	闪烁绿色	正在访问数据。
	绿色	硬盘就绪。
	熄灭	未检测到硬盘。
硬盘状态	绿色	硬盘就绪。
	红色	发生硬盘读/写错误。
	闪烁红色，每秒 5 次	操作系统正在定位硬盘。
	熄灭	未检测到硬盘。

LED	状态	描述
2.5 Gb 速度 LAN	绿色	网络连接以 2.5 Gbps 的速度运行。
	橙色	网络连接以 1 Gbps 的速度运行。
	熄灭	<ul style="list-style-type: none"> <li>• 网络连接以 10 Mbps 的速度运行。</li> <li>• 没有网络连接。</li> </ul>
2.5 Gb 活动 LAN	橙色	网络连接已建立。
	闪烁橙色	正在从网络访问设备。
	熄灭	没有网络连接。
10 Gb 以太网速度	绿色	10 GbE 网络连接已建立。
	橙色	网络连接以低于 10 Gbps 的速度运行。
	熄灭	没有网络连接。
10 Gb 以太网活动	橙色	网络连接已建立。
	闪烁橙色	正在传输数据。
	熄灭	没有网络连接。
扩展	橙色	扩展单元已连接。
	熄灭	未检测到扩展单元。

## 警告音

时长	频率	描述
短提示音 (0.5 秒)	1	<ul style="list-style-type: none"> <li>• NAS 正在启动。</li> <li>• 按下重置按钮 3 秒钟后，NAS 将重置配置。</li> <li>• 按下重置按钮 10 秒钟后，NAS 将重置配置并重新启动。</li> <li>• 操作系统已更新。</li> </ul>
	3	<ul style="list-style-type: none"> <li>• 无法检测到已安装的磁盘。</li> </ul>

时长	频率	描述
长提示音 (1.5 秒)	3 (每 5 分钟)	<ul style="list-style-type: none"> <li>• 电源发生错误。</li> <li>• 系统风扇故障。</li> <li>• 风扇模块已移除。</li> <li>• 无法将 NAS 数据复制到连接到前 USB 端口的外部存储设备。</li> </ul>
	2	<ul style="list-style-type: none"> <li>• 存储池的容量即将被占满。</li> <li>• 存储池的容量已满。</li> <li>• 发生存储池状态错误。</li> <li>• 共享文件夹即将被占满。</li> <li>• 共享文件夹容量已满。</li> <li>• 发生共享文件夹状态错误。</li> <li>• 插入或抽出硬盘。</li> </ul>
	1	<ul style="list-style-type: none"> <li>• NAS 已通过强制关闭关机 (硬件关闭)。</li> <li>• NAS 已成功开机并准备就绪。</li> </ul>
长提示音和短提示音	一长两短	JBOD 扩展单元已移除。



## 5. NAS 迁移

通过将所有硬盘从源 NAS 安装到目标 NAS，可以将数据和设置从当前 NAS 迁移到另一个型号的 NAS，从而使中断次数降到最低。迁移后，目标 NAS 上将保留 RAID 配置和其他设置。

### NAS 迁移要求

只能将硬盘和系统设置迁移到特定的 NAS 型号，具体取决于源 NAS。有关与直接 NAS 迁移兼容的 NAS 型号列表，请参见 <https://www.qnap.com/en/nas-migration>。

设备必须符合以下要求：

- 目标 NAS 必须在与源 NAS 相同的 QuTS hero 版本（或更高版本）上运行。



#### 重要

由于文件系统不兼容，因此不支持 QTS NAS 和 QuTS hero NAS 之间的系统迁移。



#### 警告




在 QTS NAS 和 QuTS hero NAS 之间迁移硬盘可能导致数据损坏。


- 目标 NAS 必须有足够可用的硬盘架，以容纳要从源 NAS 迁移的所有硬盘。

对于不支持 NAS 迁移的 NAS 型号，请参见[如何使用 HBS3 在 QTS 和 QuTS hero 之间迁移数据和文件夹权限](#)。

### NAS 迁移后的状态和设置变化

迁移后，NAS 数据和设置的状态会发生变化。

数据和设置	NAS 迁移后
注册的 myQNAPcloud 名称	注册的 myQNAPcloud 名称不会迁移。
对共享文件夹加密	<p>如果 NAS 不支持文件系统加密，加密的共享文件夹不会迁移。</p> <p> <b>警告</b> 为防止数据丢失，请备份加密共享文件夹的加密密钥并将其保存在安全的位置。也可以选择迁移之前解密共享文件夹。</p>
共享文件夹	<p>所有共享文件夹及其中存储的下载文件都会得到保留。</p> <p> <b>警告</b> 为防止数据丢失，请在迁移之前备份加密共享文件夹的加密密钥或密码，并将其保存在安全的位置。</p> <p> <b>重要</b> 迁移后，必须重新配置目标 NAS 上的文件夹权限。</p>
网络	如果目标 NAS 上的网络端口数量或规格与源 NAS 不同，则以下网络和虚拟设置可能会更改并需要重新配置：端口中继、虚拟机、Thunderbolt 等。
Windows AD 配置	必须重新配置 Windows AD 配置。

数据和设置	NAS 迁移后
许可证	许可证不会迁移。  <b>警告</b> QNAP 建议在迁移数据之前停用源 NAS 的许可证。
应用程序	如果目标 NAS 的 RAM 少于源 NAS，则以下功能和应用程序可能无法运行：Virtualization Station、Qsirch 和快照。
服务	只能使用目标 NAS 支持的服务。
多媒体功能	默认情况下，会禁用某些多媒体功能。

## 迁移 NAS



### 重要

执行 NAS 迁移之前，请确保您已了解所有要求以及迁移后可能发生的变化。有关详细信息，请参见以下主题：

- [NAS 迁移要求](#)
- [NAS 迁移后的状态和设置变化](#)

1. 关闭源 NAS 和目标 NAS。
2. 取下硬盘。



### 重要

QNAP 建议在安装硬盘时按照源 NAS 硬盘顺序安装。拆除硬盘时，记下硬盘托盘顺序。

- a. 从源 NAS 中取下硬盘。
  - b. 从目标 NAS 中取下硬盘托盘。
3. 安装硬盘。
    - a. 将源 NAS 硬盘安装到目标 NAS 硬盘托盘上。
    - b. 将硬盘托盘插入目标 NAS 中。
  4. 启动目标 NAS 的电源。
  5. 在目标 NAS 上以管理员身份登录 QuTS hero。  
目标 NAS 会自动检查最新固件更新。

## 6. 故障排除

本章介绍基本故障排除信息。

### 强制 Qfinder Pro 或 myQNAPcloud 定位 NAS

如果在 QuTS hero 安装过程中 Qfinder Pro 或 myQNAPcloud 无法定位 NAS，则硬盘或数据可能有故障。

1. 关闭 NAS 电源。
2. 取下所有硬盘。
3. 启动 NAS 电源。
4. 使用 Qfinder Pro 或 myQNAPcloud 定位 NAS。
5. 重新插入硬盘。
6. 继续安装 QuTS hero。

### 热插拔故障硬盘

在以下情况下，NAS 支持热插拔硬盘：

RAID 类型	磁盘数量	情形
RAID 1	2	一个成员硬盘有故障
RAID 5	≥ 3	一个成员硬盘有故障
RAID 6	≥ 4	一个或两个成员硬盘有故障
RAID 10	≥ 4 (必须为偶数)	处于两个不同对中的一个或两个成员硬盘有故障。
RAID 50	≥ 6	每个子组的一个磁盘有故障。
RAID 60	≥ 8	每个子组的两个磁盘有故障。
三重镜像	3 的倍数。(例如, 3、6、9、12 个磁盘等。)	一个或两个成员硬盘有故障。
RAID-TP	≥ 5	一个、两个或三个成员硬盘有故障。

1. 登录 QuTS hero。
2. 转到**主菜单 > 存储与快照总管 > 存储 > 磁盘/VJBOD**。
3. 找到发生故障的硬盘。
4. 准备一个与故障硬盘具有相同或更大容量的新硬盘。
5. 从设备中取下故障硬盘。
6. 等待 20 秒或设备发出两声提示音。
7. 从硬盘托盘中取下故障硬盘。
8. 将新硬盘插入硬盘托盘中。
9. 安装新硬盘。  
此时 NAS 会发出两声提示音。
10. 转到**主菜单 > 存储与快照总管 > 存储**。

11. 找到包含新硬盘的共享文件夹，然后确认状态为正在重建。

## 恢复被意外移除的正常硬盘

NAS 支持独有的 RAID 恢复技术，可以从意外断开或移除的硬盘中恢复发生故障的 RAID 磁盘卷。用户可以从降级模式恢复非活动 RAID 1、RAID 5、RAID 6、RAID 10、RAID 50、RAID 60 卷、三重镜像和 RAID-TP 卷。

磁盘卷	RAID 恢复支持	磁盘数量	被移除硬盘的最大数量
RAID 0	是	≥ 2	不适用
RAID 1	是	2	1
RAID 5	是	≥ 3	1
RAID 6	是	≥ 4	2
RAID 10	否	≥ 4 (必须为偶数)	处于两个不同对中的一个或两个成员硬盘有故障。
RAID 50	是	≥ 6	每个子组的一个磁盘有故障。
RAID 60	是	≥ 8	每个子组的两个磁盘有故障。
三重镜像	是	3 的倍数。(例如, 3、6、9、12 个磁盘等。)	2
RAID-TP	是	≥ 5	3

## 支持和其他资源

QNAP 提供了以下资源：

资源	URL
文档	<a href="https://docs.qnap.com">https://docs.qnap.com</a>
兼容性列表	<a href="https://www.qnap.com/compatibility">https://www.qnap.com/compatibility</a>
NAS 迁移兼容性	<a href="https://www.qnap.com/en/nas-migration">https://www.qnap.com/en/nas-migration</a>
扩展单元兼容性	<a href="http://www.qnap.com/go/compatibility-expansion">http://www.qnap.com/go/compatibility-expansion</a>
服务门户	<a href="https://service.qnap.com">https://service.qnap.com</a>
产品支持状态	<a href="https://www.qnap.com/product/eol.php">https://www.qnap.com/product/eol.php</a>
下载	<a href="https://download.qnap.com">https://download.qnap.com</a>
社区论坛	<a href="https://forum.qnap.com">https://forum.qnap.com</a>
QNAP 配件商店	<a href="https://shop.qnap.com">https://shop.qnap.com</a>

## 7. 术语表

### **Cloud Key**

分配给每个 NAS 设备的唯一 8 位数代码

### **myQNAPcloud**

提供各种远程访问服务，如 DDNS 和 myQNAPcloud Link

### **myQNAPcloud Link**

可用于通过 Internet 访问 NAS，而且不必配置复杂的端口转发设置

### **Qfinder Pro**

一种 QNAP 实用工具，可用于查找和访问局域网中的 QNAP NAS 设备

### **QuTS hero**

采用 ZFS 文件系统的 QNAP NAS 操作系统

## 8. 声明

本章提供有关保修、免责声明、许可和联邦法规的信息。

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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)
电池	0	0	0	0	0	0
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。						
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						