QNAP

外部 RAID 设备

TR-002
TR-004

用户指南

内容

8. 声明

1. 前言

关于本指南

本指南提供有关 QNAP TR-002 和 TR-004 外部 RAID 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用户和存储管理员。本指南假定用户已对存储和备份概念有基本了解。

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 TR-002 和 TR-004 外部 RAID 设备的基本信息。

关于 QNAP 外部 RAID 设备

QNAP 外部 RAID 设备旨在提高 NAS 或计算机的容量和实用性。这些设备支持 RAID、JBOD 和端口倍增器，以增强跨多个平台的兼容性和安全性。TR-002 和 TR-004 特有一个模式开关，用于轻松访问 RAID 配置，其 USB C 型端口可确保实现快速高效的数据传输。

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 。

组件	TR-002	TR-004
订购信息		
订购部件号	TR-002	TR-004
存储		
硬盘架	2 x 3.5 英寸 SATA 6 Gbps	4 x 3.5 英寸 SATA 3 Gbps
	💬 **注** TR-004 与 SATA 6 Gbps 硬盘兼容。	
硬盘兼容性	• 3.5 英寸 SATA 机械硬盘 • 2.5 英寸 SATA 机械硬盘 • 2.5 英寸 SATA 固态硬盘	
硬盘托盘类型	锁头式	
热插拔	是	
外部 I/O 端口和扩展插槽		
USB 端口	1 x USB 3.1 Gen 2 (10 Gbps) C 型	1 x USB 3.0 C 型
	🔴 **重要** 此端口仅用于将 RAID 设备连接到 NAS 或计算机。	
接口		
按钮	• 弹出 • 设置 • USB 一键复制	

组件	TR-002	TR-004
开关	• 电源 ⚠️ **重要** QNAP 建议在关闭 RAID 设备的电源后至少等待两秒钟，然后再接通电源。 • 模式	
尺寸		
外形规格	立式	
尺寸（高 x 宽 x 深）	169 x 102 x 219 mm （6.65 x 4.02 x 8.62 英寸）	169 x 160.2 x 219 mm （6.65 x 6.31 x 8.62 英寸）
净重	1.37 kg（3.02 磅）	1.85 kg（4.08 磅）
其他		
电源单元	36W，100-240V AC，50/60 Hz	65W，100-240V AC，50/60 Hz
	⚠️ **警告** 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。	
噪声声级	17.8 db(A)	18.1 db(A)
	💬 **注** 噪声声级在距 RAID 设备一米以内的旁观者位置测得。测试设备安装了最大数量的硬盘以低速运行。	
风扇	系统：1 x 7 cm，12V DC 智能风扇	系统：1 x 12 cm，12V DC 智能风扇
	⚠️ **警告** 为避免潜在伤害或组件的损坏，设备连接电源时，切勿触及风扇。	
工作温度	0℃ 至 40℃（32 至 104℉）	
相对湿度	• 无冷凝相对湿度：5% 至 95% • 湿球温度：27℃ (80.6℉)	
安全锁孔	Kensington 安全锁孔	

💡 **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。

包装内容

项目	数量
外部 RAID 设备	1
交流电源适配器	1
电源线	1
USB C 型至 A 型连接器线缆	1
硬盘托盘钥匙	2
USB 线缆夹	1
适用于 2.5 英寸硬盘的螺丝	• TR-002：6 • TR-004：12

项目	数量
适用于 3.5 英寸硬盘的螺丝	• TR-002：8 • TR-004：16
快速安装指南 (QIG)	1

组件

前面板
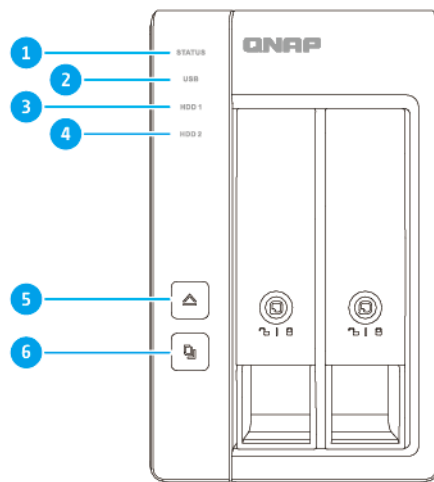
TR-002

编号	组件	编号	组件
1	状态 LED	4	硬盘 2 LED
2	USB LED	5	弹出按钮
3	硬盘 1 LED	6	USB 一键复制按钮
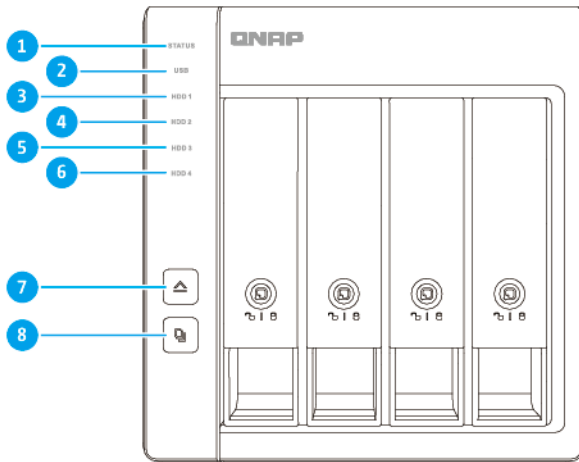
TR-004

编号	组件	编号	组件
1	状态 LED	5	硬盘 3 LED
2	USB LED	6	硬盘 4 LED
3	硬盘 1 LED	7	弹出按钮
4	硬盘 2 LED	8	USB 一键复制按钮

后面板
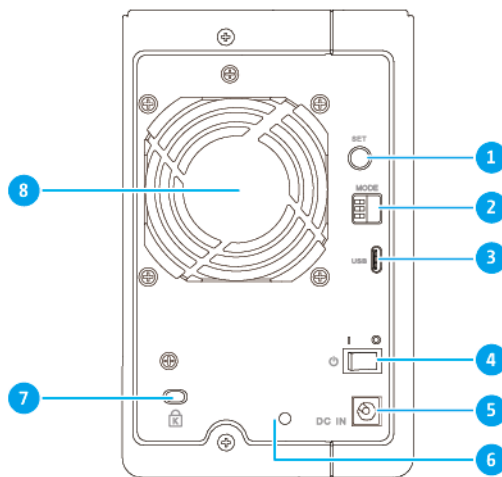
TR-002
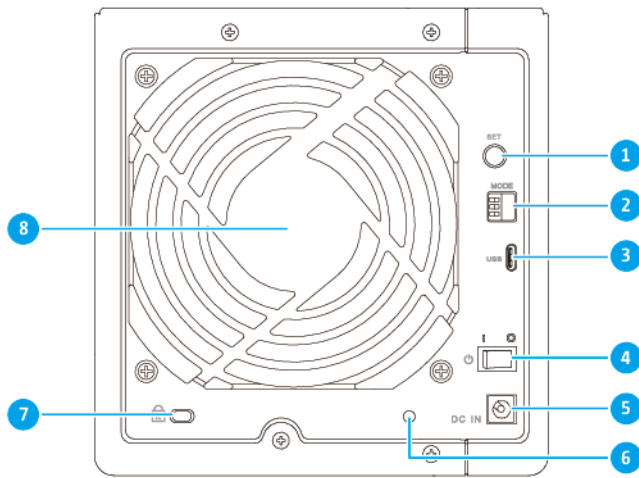
TR-004

编号	组件	编号	组件
1	Set 按钮	5	电源输入
2	模式开关	6	USB 线夹槽
3	• TR-002：USB 3.1 Gen 2 C 型端口 • TR-004：USB 3.0 C 型端口	7	Kensington 安全锁孔
4	电源开关	8	系统风扇

硬盘编号
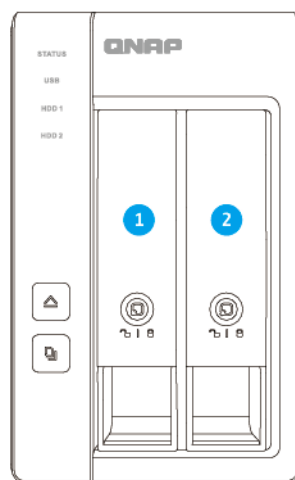
TR-002
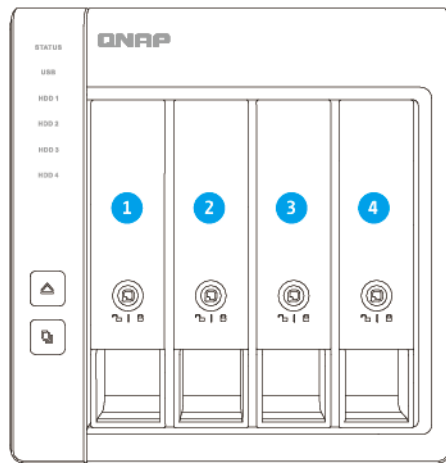
TR-004

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。

- 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。

- 设备不适合在儿童可能会出现的场所使用。

安装要求

类别	项目
环境	• 室温：0˚C 至 40˚C（32 至 104˚F） • 无冷凝相对湿度：5% 至 95% • 湿球温度：27˚C (80.6˚F) • 平坦的防静电表面，无直射阳光、液体或化学药剂
硬件和外围设备	• NAS 或计算机 • 存储硬盘 有关兼容硬盘的详细信息，请转到 https://www.qnap.com/compatibility。 • USB 连接器线缆
工具	• 1 号或 2 号十字螺丝刀 • 防静电腕带

设置 RAID 设备

1. 将 RAID 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 3.5 英寸托盘上安装 3.5 英寸硬盘

   - 在 2.5 英寸托盘上安装 3.5 英寸硬盘

3. 连接电源线。

4. 将 RAID 设备连接到 NAS 或计算机。
   有关详细信息，请参见以下主题：

   - 将 RAID 设备连接到 NAS

   - 将 RAID 设备连接到计算机

5. 打开 RAID 设备电源。

6. 可选: 配置 RAID 设置。
   有关详细信息，请参见 RAID 配置。

3. 硬件安装

本节提供有关安装硬盘、将 RAID 设备连接到 NAS 或计算机以及安装 USB 线缆夹的信息。

硬盘安装

QNAP 外部 RAID 设备兼容 3.5 英寸和 2.5 英寸硬盘以及 2.5 英寸固态硬盘。

在 3.5 英寸托盘上安装 3.5 英寸硬盘

> ⚠️ **警告**
>
> - 除非 RAID 设备处于"单个"或"软件控制"模式，否则安装硬盘会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。

1. 关闭 RAID 设备电源。

2. 取下硬盘托盘。

   a. 可选: 解除对托盘的锁定。

> 📝 **注**
> 预装硬盘托盘未锁定。

> ❗ **重要**
> 请确保将硬盘托盘钥匙存放在安全的地方。
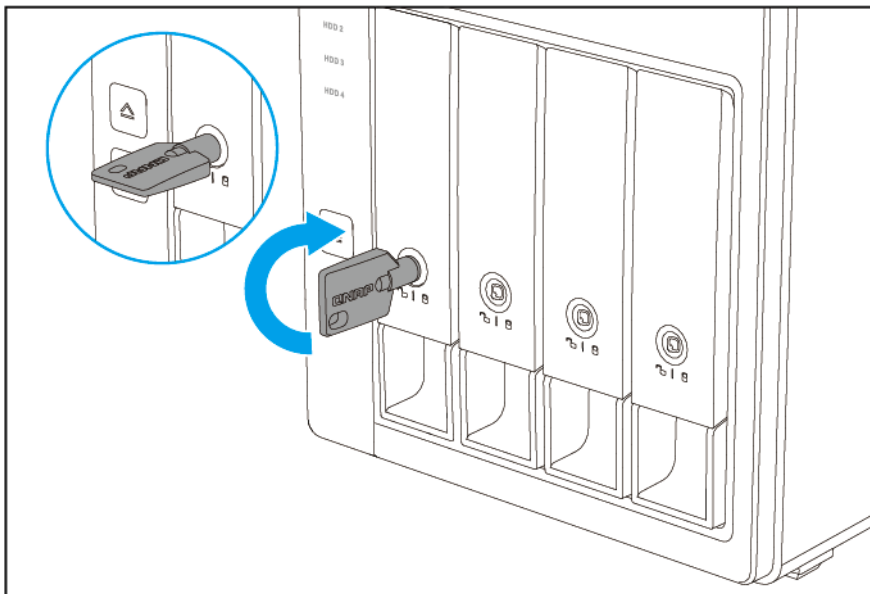
   b. 拉动手柄以松开托盘。

   c. 拉出托盘。
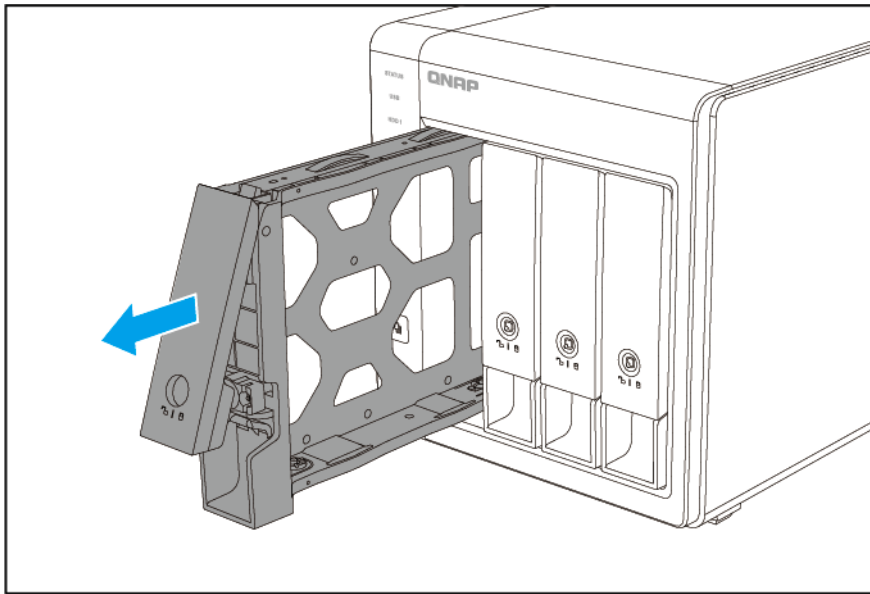
3. 将硬盘安装到托盘上。

    a. 取下托盘两侧的固定面板。
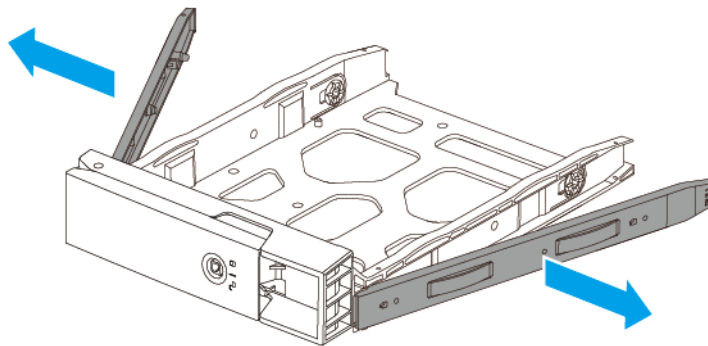
    b. 将硬盘放在托盘上，使硬盘两侧的孔与托盘两侧的孔对齐。

    c. 装上固定面板。
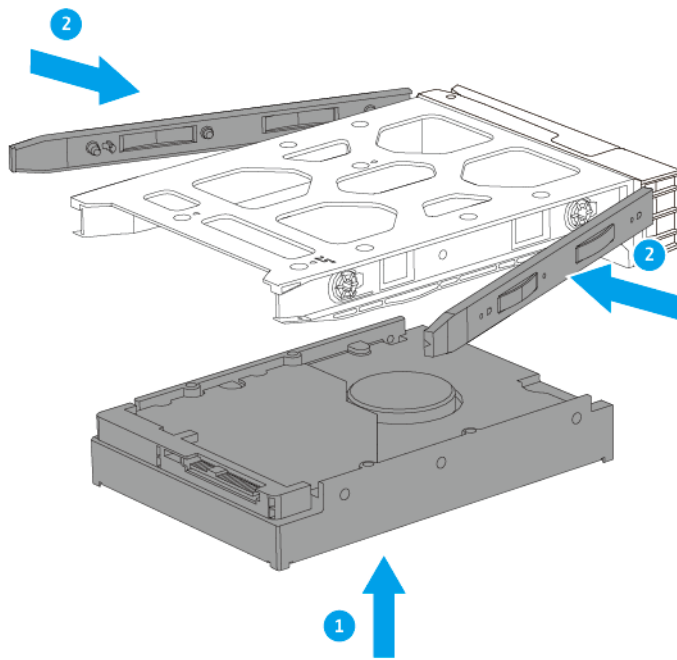
d. 可选: 装上螺丝，进一步固定硬盘。
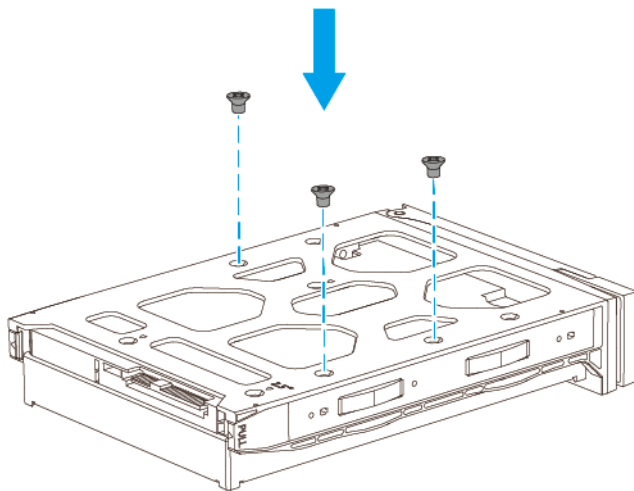
> ⓘ **重要**
> QNAP 建议在转运时将螺丝装到硬盘托盘上。

4. 将托盘装入硬盘架。

    a. 将托盘插入硬盘架。

    b. 推动手柄。

c. 可选: 锁住托盘。

5. 打开 RAID 设备电源。

🛑 **重要**
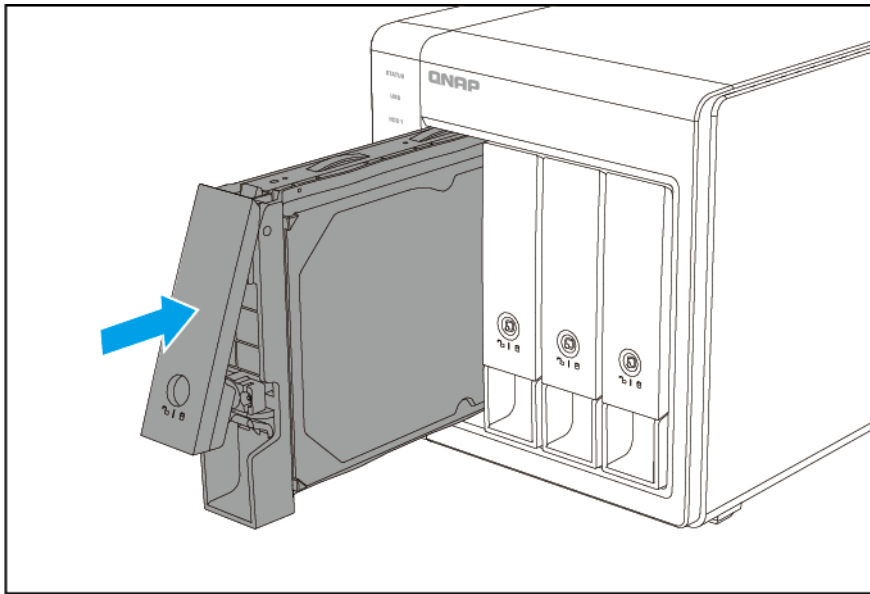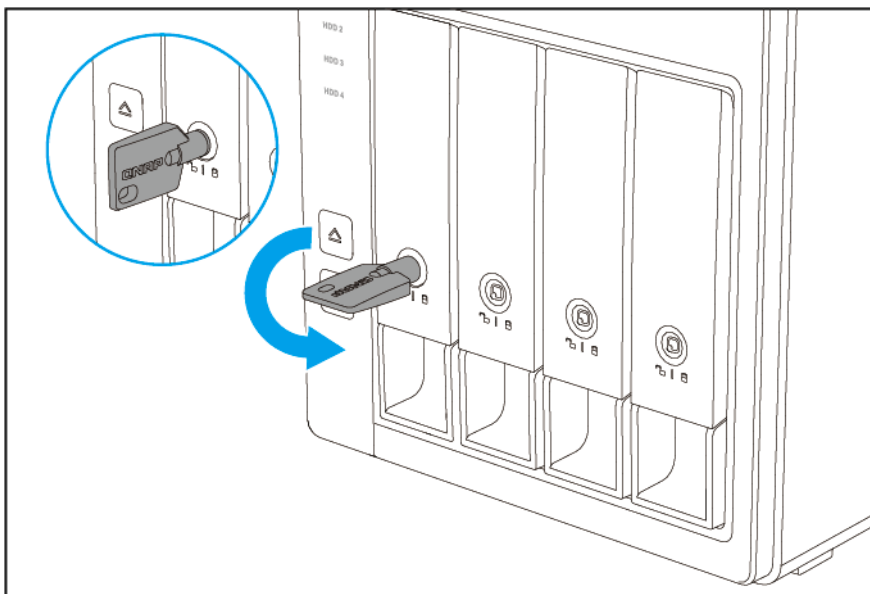
RAID 设备最长可能需要 30 秒才能检测到安装的新硬盘。

在 2.5 英寸托盘上安装 3.5 英寸硬盘

⚠️ **警告**

- 除非 RAID 设备处于"单个"或"软件控制"模式，否则安装硬盘会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。

1. 关闭 RAID 设备电源。

2. 取下硬盘托盘。

   a. 可选: 解除对托盘的锁定。

> **注**
> 预装硬盘托盘未锁定。

> **重要**
> 请确保将硬盘托盘钥匙存放在安全的地方。
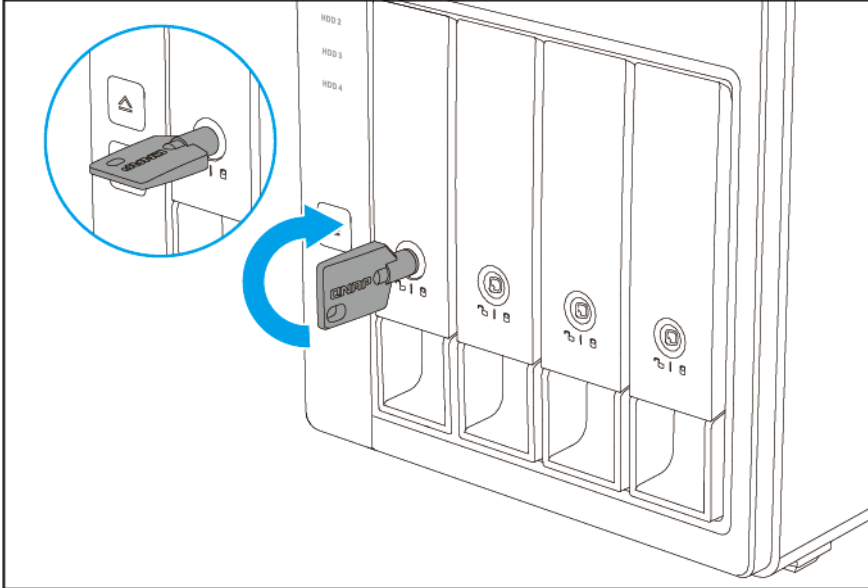
   b. 拉动手柄以松开托盘。

   c. 拉出托盘。
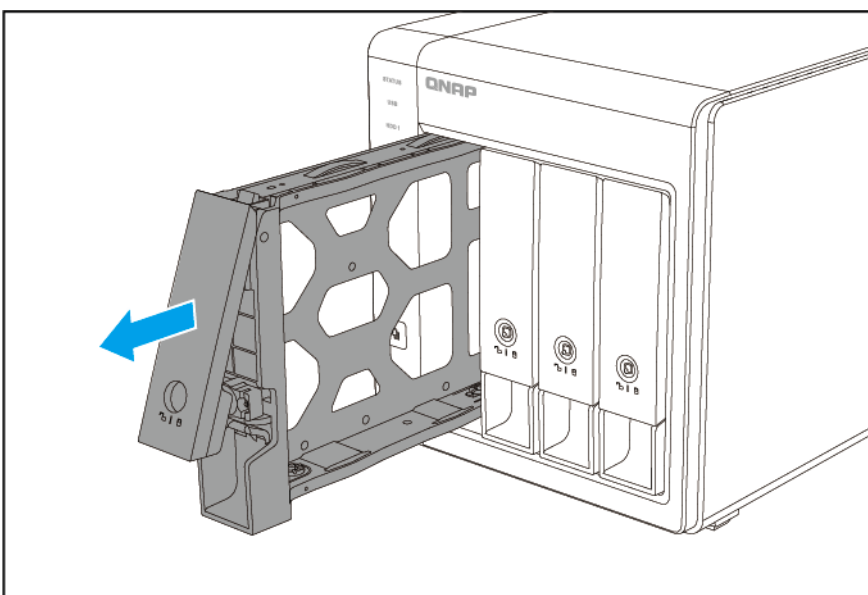
3. 将硬盘安装到托盘上。

    a. 取下托盘右侧的固定面板。
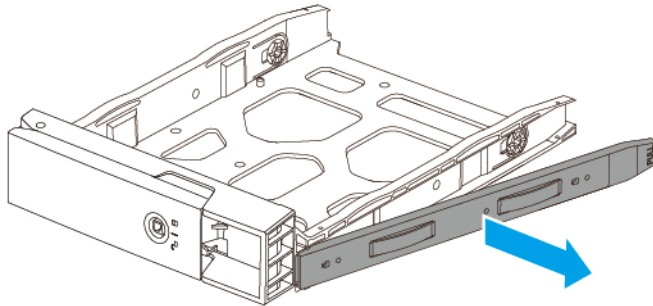
b. 将硬盘放在托盘上，使硬盘底部的孔与托盘底部的孔对齐。

c. 安装螺丝。
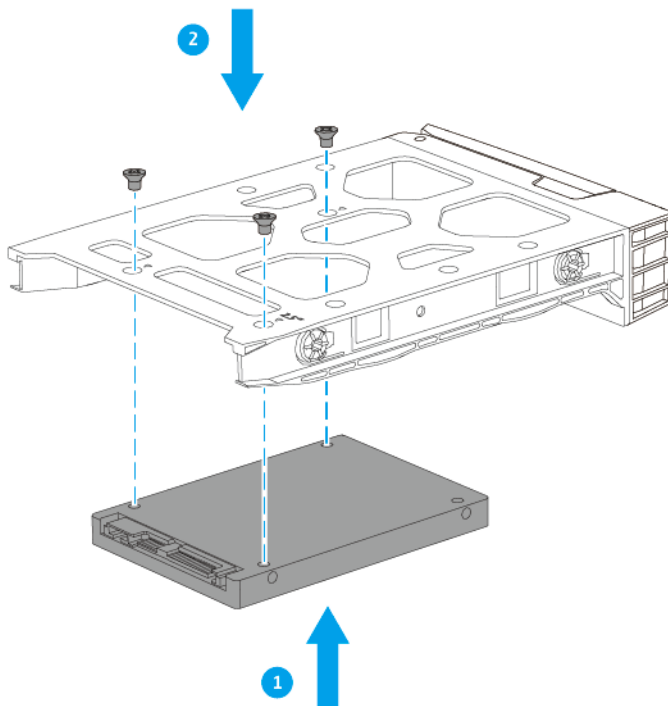
4. 将托盘装入硬盘架。

    a. 将托盘插入硬盘架。

b. 推动手柄。
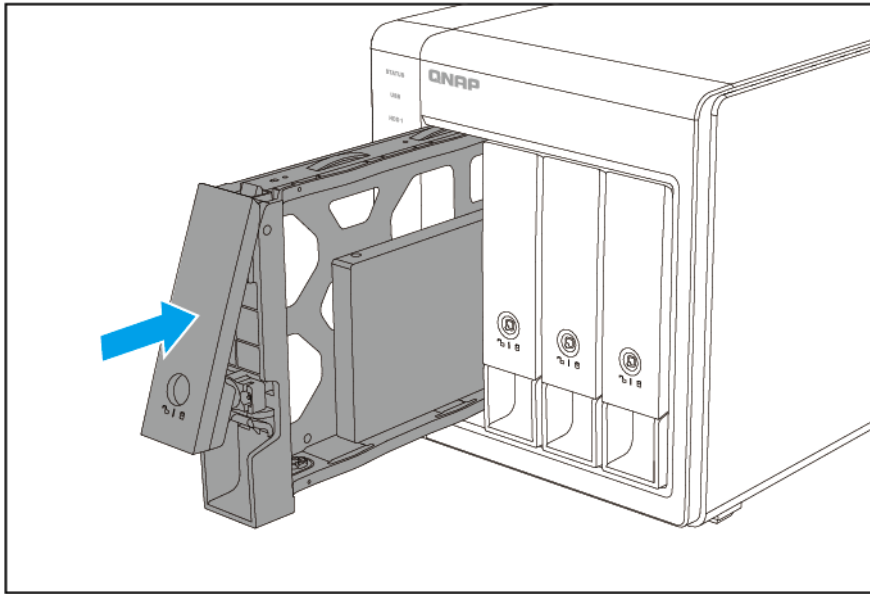
c. 可选: 锁住托盘。
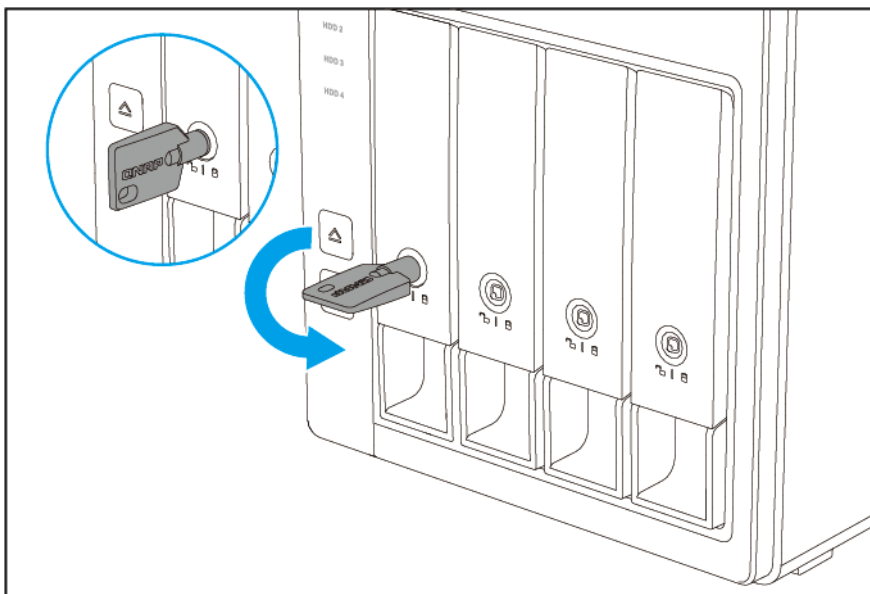
5. 打开 RAID 设备电源。

重要
RAID 设备最长可能需要 30 秒才能检测到安装的新硬盘。

将 RAID 设备连接到 NAS

一个 QNAP NAS 最多可以支持两个外部 RAID 设备。

警告

> 在短时间内反复断开外部设备与主机设备的连接并重新连接时，可能会发生启动故障。
> QNAP 建议在将外部设备重新连接到主机设备之前等待 10 秒。

1. 将 RAID 设备连接到 NAS。

   a. 将 USB 线缆连接到 RAID 设备上的 USB 3.0 C 型端口。

   b. 将 USB 线缆连接到 NAS 上的 USB 端口。

   c. 可选: 将第二个 RAID 设备连接到 NAS。
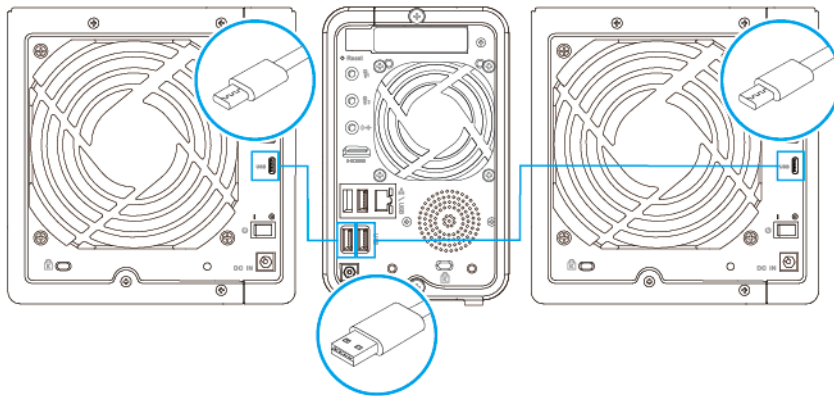
2. 打开 RAID 设备电源。

3. 确认 NAS 能够识别 RAID 设备。

   a. 以管理员身份登录 QTS。

   b. 转到**主菜单** > **存储与快照总管** > **概述** > **存储**。

   c. 确认 RAID 设备已列出。

将 RAID 设备连接到计算机

Windows、macOS 或 Linux 计算机不限制可以支持的 RAID 设备数量。但是，QNAP 建议一次最多保持四个 RAID 设备连接。

> ⚠ **警告**
> 在短时间内反复断开外部设备与主机设备的连接并重新连接时，可能会发生启动故障。
> QNAP 建议在将外部设备重新连接到主机设备之前等待 10 秒。

1. 将 RAID 设备连接到计算机。

   a. 将 USB 线缆连接到 RAID 设备上的 USB 3.0 C 型端口。

   b. 将 USB 线缆连接到计算机上的 USB 端口。

   c. 可选: 将其他 RAID 设备连接到计算机。
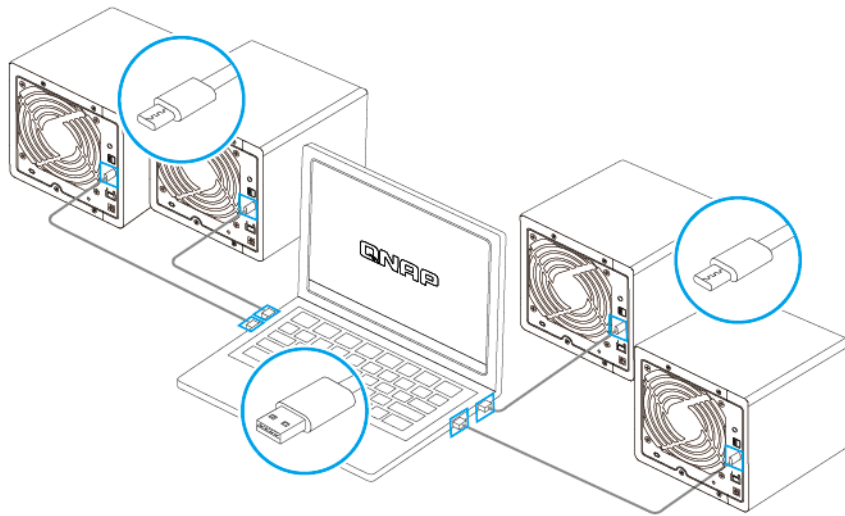
2. 打开 RAID 设备电源。

3. 确认计算机能够识别 RAID 设备。

    a. 转到计算机的磁盘管理实用程序或在 Windows 或 macOS 中打开 QNAP External RAID Manager。

    b. 确认 RAID 设备已列出。

安装 USB 线缆夹

> **重要**
> USB 线缆夹将线缆固定在设备附近，以免对线缆或附近组件造成潜在损坏。
> 将线缆夹连接到 RAID 设备后，不应将其取下。

1. 将线缆夹插入到线夹槽中。
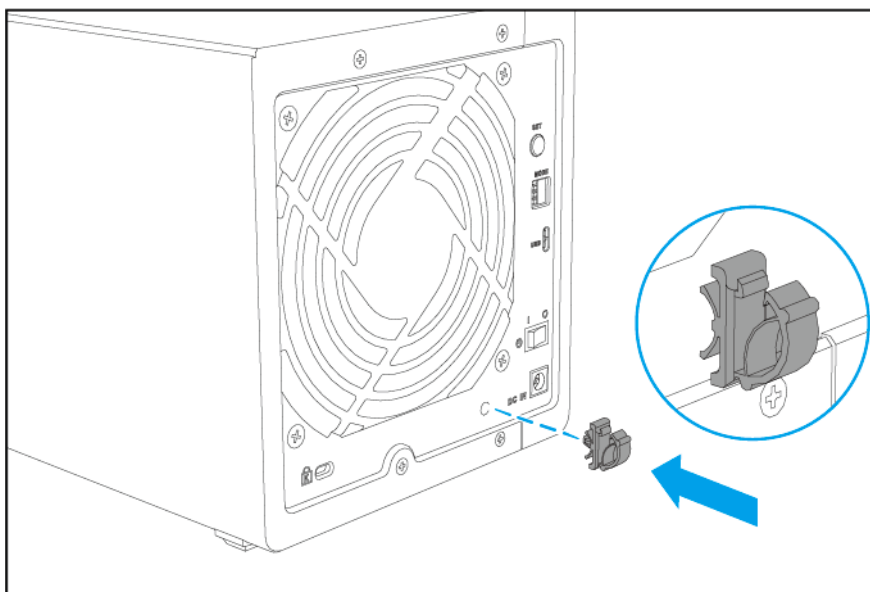
2. 将线缆插入线缆夹中。
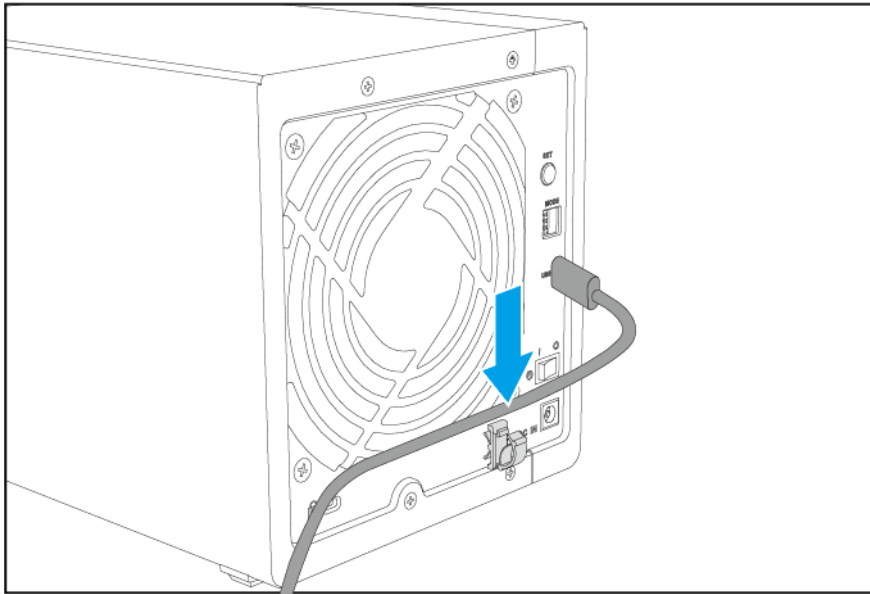
3. 固定线缆夹以固定线缆。
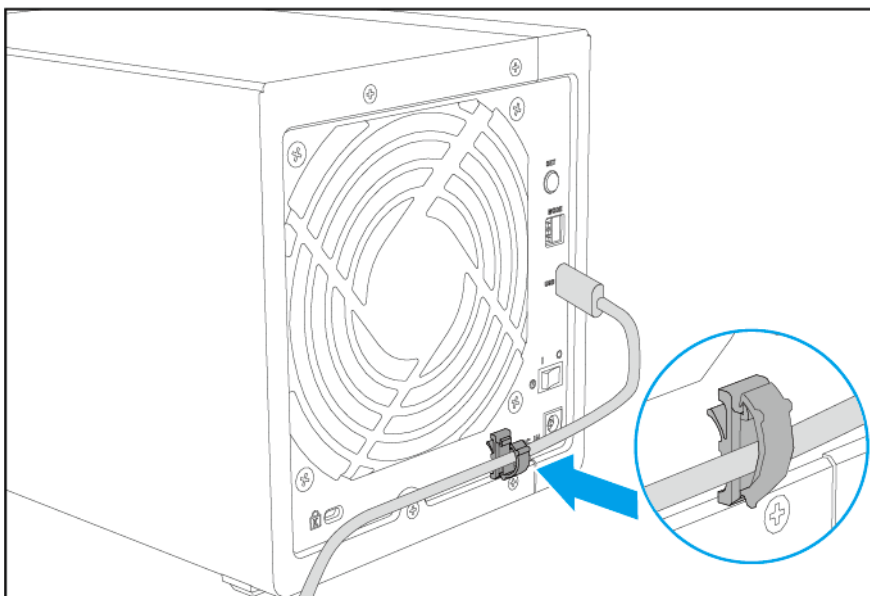
从 USB 线缆夹中取出 USB 线缆

1. 松开线缆夹。
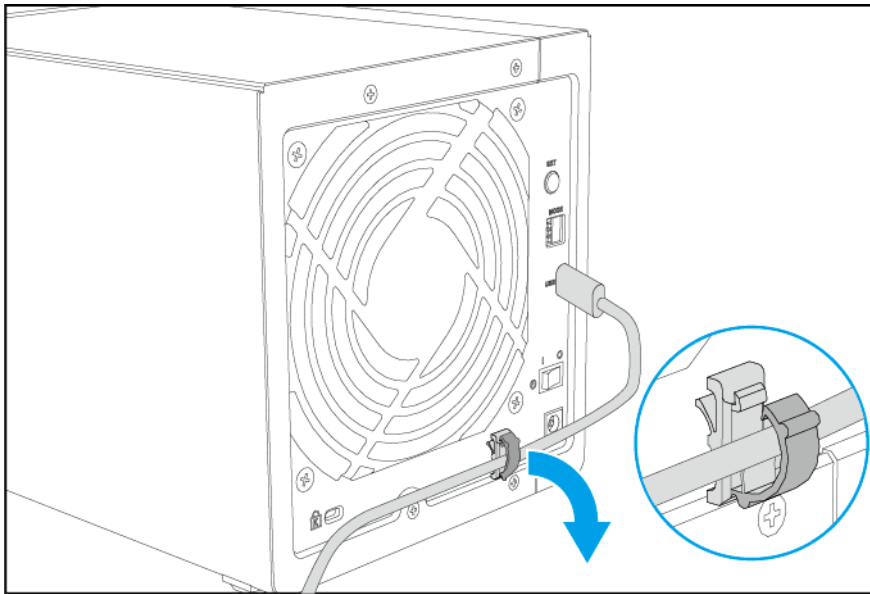
2. 将线缆从线缆夹中取出。
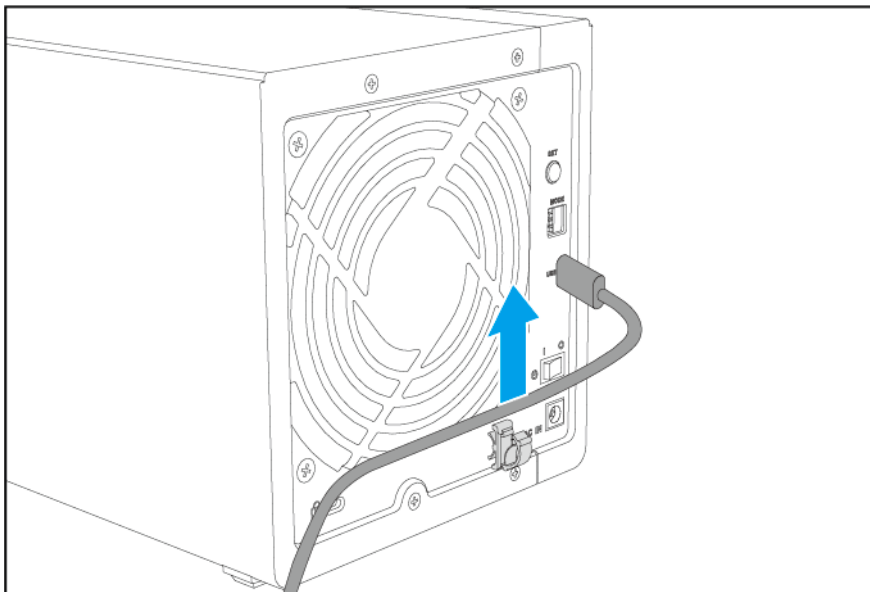
4. RAID 配置

本节提供有关配置 RAID 设置的信息。

> **重要**
> 以下情况将中断与 RAID 设备的连接，导致写入到硬盘的数据丢失。
>
> - 在使用另一个 RAID 组或磁盘时创建或删除 RAID 组
>
> - RAID 组故障（不包括降级模式），或在使用另一个 RAID 组时添加或移除 RAID 组
>
> - RAID 设备处于"单个"模式时插入或取出硬盘
>
> - 按住 Set 按钮三秒或更长时间，直到 RAID 设备机箱发出提示音

支持的 RAID 类型

QNAP 外部 RAID 设备支持多种 RAID 类型。

> **重要**
>
> - 如果容量不同的磁盘组合到一个 RAID 组中，则所有磁盘将按照最小磁盘的容量进行工作。例如，如果 RAID 组包含五个 2 TB 磁盘和一个 1 TB 磁盘，则总容量将为 6 TB。
>
> - 在 RAID 组中只能使用一种类型的磁盘（HDD 或 SSD）。不支持一个 RAID 组有不同类型的磁盘。
>
> - QNAP 建议为每种容量和每种磁盘创建单独的 RAID 组。

> **注**
> RAID 设备不支持容量扩展或 RAID 级别迁移。

RAID 类型	磁盘数量	描述	兼容性
JBOD（Just a Bunch Of Disks，磁盘簇）	2 个或多个	• JBOD 以线性方式将多个磁盘组合在一起。系统向一个磁盘写入数据，该磁盘写满后再向下一磁盘写入数据。 • JBOD 支持使用所有磁盘容量，但无任何磁盘故障保护能力，也无法提高性能。 • 除非有特别的原因需要使用 JBOD，否则请改为使用 RAID 0。	• TR-002 • TR-004
RAID 0	2 个或多个	• 多个磁盘通过条带化组合在一起。 • RAID 0 的读/写速度最快，而且可以使用所有磁盘的总容量。 • RAID 0 没有磁盘故障保护能力。使用此 RAID 类型时，必须制定适当的数据备份计划。 • 建议将 RAID 0 用于高性能应用，例如视频编辑。	• TR-002 • TR-004

RAID 类型	磁盘数量	描述	兼容性
RAID 1	2	• 相同的数据副本存储在两个磁盘上。如果任一磁盘出现故障，仍可从另一磁盘读取数据。 • 损失一半的总磁盘容量，换取高级别的数据保护。 • 如果有两个磁盘，建议使用 RAID 1。 ⊘ **重要** 删除 RAID 1 组不会格式化硬盘。	• TR-002 • TR-004
RAID 5	3 个或多个	• 数据和奇偶校验信息在所有磁盘上进行条带化。 • 损失一个磁盘的容量用于奇偶校验。这意味着，任一磁盘出现故障时均可被替代，其上的数据也可恢复。 • 条带化意味着每额外增加一个磁盘，读取速度均会提高。 • 若要在数据保护和速度之间实现良好的平衡，建议使用 RAID 5。	TR-004
RAID 10	4	• 此模式将每两个磁盘组成 RAID 1，以提供故障保护能力。然后，磁盘对均使用 RAID 0 条带化在一起。 • RAID 10 的随机读取/写入速度超快，故障保护能力极佳，但损失总磁盘容量的一半。 • RAID 10 以一半的存储空间换取极佳的故障保护能力和写入性能，	TR-004

存储模式

针对 NAS 设备和计算机，QNAP 外部 RAID 设备支持不同的存储模式。

存储模式	描述
NAS 存储	通过创建存储池或静态卷增加 QNAP NAS 的存储容量。 ⊘ **重要** 使用 NAS 扩展模式时： • 必须将 RAID 设备设置为"软件控制"模式。有关详细信息，请参见 模式开关。 • 不能将 RAID 设备设置为"单个"模式。 • RAID 设备不能包含多个 RAID 组。 • RAID 设备不能用于扩展现有存储池或静态卷。
外部存储	将 RAID 设备用作 NAS 或 Windows、macOS 或 Linux 计算机的外部硬件 RAID 设备。

存储模式和平台支持

配置	NAS 存储模式	外部存储模式
软件控制	必需	是
单个	否	是
JBOD	是	是
RAID 0/1/5/10	是	是
多个 RAID 组	否	是

模式开关

您可以使用 RAID 设备后面板上的模式开关手动配置 RAID 设置，方法是将开关移动到相应位置，如上图所示。

> ! **重要**
>
> - 在 RAID 组中只能使用一种类型的磁盘（HDD 或 SSD）。不支持一个 RAID 组有不同类型的磁盘。
>
> - 如果容量不同的磁盘组合在一个 RAID 组中，则所有磁盘将按照最小磁盘的容量进行工作。

配置	描述
单个	NAS 或计算机将每个已安装的磁盘标识为单独的外部硬盘。多个磁盘不会合并为单个卷或 RAID 组。 此配置也称为端口倍增器。
• JBOD • RAID 0 • RAID 1/10 • RAID 5	QNAP 外部 RAID 设备为这些 RAID 类型提供硬件 RAID 支持。 有关详细信息，请参见支持的 RAID 类型。

配置	描述
软件控制	此为默认出厂设置。 使用此模式可以在 Windows 或 Mac 计算机上使用 QNAP External RAID Manager，或者在 QNAP NAS 上使用"存储与快照总管"，配置 RAID 设置。 请转到 http://www.qnap.com/download 下载 QNAP External RAID Manager 和支持文档。 ！ **重要** • 在 RAID 设备中必须至少安装一个硬盘才能被 QNAP External RAID Manager 识别。 • 请不要与任何其他 RAID 管理软件同时使用 QNAP External RAID Manager。这样做可能会影响 QNAP External RAID Manager 的响应时间。

使用模式开关配置 RAID 设置

从单个模式切换到 RAID 模式或软件控制模式

⚠ **警告**
配置 RAID 设置会删除硬盘上的所有数据，但切换到"软件控制"模式或从"软件控制"模式切换时除外。

1. 请确保将"模式"开关设置为"单个"。
   有关详细信息，请参见模式开关。

2. 将"模式"开关设置为"软件控制"或所需的 RAID 模式。

3. 按住 Set 按钮 3 秒钟。
   扩展设备发出一声提示音。

💬 **注**
切换到"软件控制"模式时，无需按下 Set 按钮。

4. 请确认已应用这些设置。

   a. 在计算机中打开 **QNAP External RAID Manager** 或在 QTS 中转到**存储与快照总管**。

   b. 请确认已更改这些设置。

方法	用户操作
QNAP External RAID Manager	1. 在计算机中打开 **QNAP External RAID Manager**。 2. 找到 RAID 组，并确认已将状态更改为所需设置。
存储与快照总管	1. 以管理员身份登录 QTS。 2. 转到**主菜单** > **存储与快照总管** > **存储** > **磁盘/VJBOD**。 3. 找到 RAID 组，并确认已将状态更改为所需设置。

从 RAID 模式或软件控制模式切换到不同模式

⚠ **警告**
配置 RAID 设置会删除硬盘上的所有数据，但切换到"软件控制"模式或从"软件控制"模式切换时除外。

1. 请确保将"模式"开关设置为"软件控制"或 RAID 模式。

2. 将"模式"开个设置为"单个"。

3. 按住 Set 按钮 3 秒钟。
   扩展设备发出一声提示音。

> **提示**
> 如果要将 RAID 设备保持在"单个"模式，请在此处停止。

4. 将"模式"开关设置为"软件控制"或所需的 RAID 设置。

5. 按住 Set 按钮 3 秒钟。
   扩展设备发出一声提示音。

> **注**
> 切换到"软件控制"模式时，无需按下 Set 按钮。

6. 请确认已应用这些设置。

   a. 在计算机中打开 **QNAP External RAID Manager** 或在 QTS 中转到**存储与快照总管**。

   b. 请确认已更改这些设置。

方法	用户操作
QNAP External RAID Manager	1. 在计算机中打开 **QNAP External RAID Manager**。 2. 找到 RAID 组，并确认已将状态更改为所需设置。
存储与快照总管	1. 以管理员身份登录 QTS。 2. 转到**主菜单** > **存储与快照总管** > **存储** > **磁盘/VJBOD**。 3. 找到 RAID 组，并确认已将状态更改为所需设置。

5. 基本操作

本章介绍外部 RAID 设备的基本操作。

弹出按钮

按"弹出"按钮可断开外部 RAID 设备或其分区与运行 QTS 4.3.6（或更高版本）的 QNAP NAS 的连接，或与运行 QNAP External RAID Manager 实用工具的 Windows 计算机的连接。

对于运行 QNAP External RAID Manager 实用工具的 macOS 计算机，按"弹出"按钮会卸载卷，但不会断开 RAID 设备与计算机的连接。

USB 一键复制按钮

"USB 一键复制"按钮用于在外部存储模式下，在外部 RAID 设备与 NAS 之间复制数据。

此功能支持增量备份。RAID 设备只会复制在上次备份后修改或添加的文件。

只有当 RAID 设备连接到运行 QTS 4.4.1（或更新版本）并具有"USB 一键复制"按钮的 NAS 时，才能使用"USB 一键复制"按钮。

Set 按钮

Set 按钮用于从外部 RAID 设备的后面板配置 RAID 设置。有关详细信息，请参见模式开关。

LED

开启外部 RAID 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 RAID 设备已连接的情况。

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	RAID 正在重建。
	红色	• 硬盘无效。 • 系统风扇故障。 • RAID 设备处于降级模式（RAID 1 或 RAID 5 中的一个成员硬盘出现故障）。
	闪烁红色，间隔 2 秒	RAID 设备处于待机模式，但系统异常。
	绿色	RAID 设备准备就绪。
	闪烁绿色，间隔 1.5 秒	RAID 设备处于待机模式。
	熄灭	RAID 设备已关机。
硬盘	闪烁绿色	• 正在访问数据。 • 正在复制数据。 • 外部应用程序正在监控 RAID 设备。
	绿色	硬盘可供访问。
	熄灭	• RAID 设备处于待机模式。 • 未检测到硬盘。

LED	状态	描述
USB	蓝色	RAID 设备连接至主机。
	熄灭	· RAID 设备未连接至主机。 · RAID 设备处于待机模式。

警告音

时长	频率	描述
短提示音（0.5 秒）	1	· RAID 设备正在启动。 · RAID 设备准备就绪。 · 修改了 RAID 设置。
长提示音（2 秒）	3 次（每 5 分钟）	· 系统风扇故障。 · 系统或硬盘过热。 · RAID 组处于降级模式。 · RAID 组发生故障。
	3 次（不重复）	· RAID 重建过程已开始。 · RAID 重建过程已完成。

待机模式

RAID 设备特有待机模式，有助于降低噪声和功耗。当 RAID 设备进入待机模式时，系统风扇和已安装的 HDD 停止旋转，系统进程暂停。唤醒后，RAID 设备将返回到先前的系统状态，并恢复所有暂停的进程。

RAID 设备在以下条件下进入待机模式：

· 主机进入休眠或待机模式或已关机。
只有主机的 USB 电源设计支持时，RAID 设备才会进入待机模式。

· USB 缆线已断开连接。

> **注**
> 在 RAID 重建期间，TR-002 不会进入待机模式。如果 TR-002 在 RAID 重建期间收到进入待机模式的指示，则会先完成 RAID 重建，再进入待机模式。

6. 故障排除

本章介绍基本故障排除信息。

强制存储与快照总管或 QNAP External RAID Manager 识别 RAID 设备

如果"存储与快照总管"或 QNAP External RAID Manager 找不到 RAID 设备，则硬盘或数据可能有故障。

1. 关闭 RAID 设备电源。

2. 取下所有硬盘。

3. 打开 RAID 设备电源。

4. 使用"存储与快照总管"或 QNAP External RAID Manager 找到 RAID 设备。

5. 重新插入硬盘。

6. 继续完成 RAID 配置。

热插拔故障硬盘

在以下情况下，RAID 设备支持热插拔硬盘：

- RAID 1：一个成员硬盘有故障

- RAID 5：一个成员硬盘有故障

- RAID 10：

  - 一个成员硬盘有故障

  - 两个成员硬盘有故障（一个在硬盘架 1 或 2 上，另一个在硬盘架 3 或 4 上）

1. 登录 QTS。

2. 转到**主菜单** > **存储与快照总管** > **存储** > **外部存储设备**。

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 RAID 设备中取下故障硬盘。

6. 等待 30 秒或 RAID 设备发出两次提示音。

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。
   RAID 设备发出两次提示音。

10. 等待 30 秒或 RAID 设备发出两次提示音。

11. 转到**主菜单** > **存储与快照总管** > **存储** > **存储/快照**。

12. 找到包含新硬盘的卷，然后确认状态为正在重建。

支持和其他资源

QNAP 提供了以下资源：

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

支持和其他资源

7. 术语表

QTS

QNAP NAS 操作系统

QNAP External RAID Manager

可用于查看和配置 QNAP RAID 设备的 Windows 和 macOS 实用工具

存储与快照总管

可用于查看和配置连接到 QNAP NAS 的 QNAP 外部 RAID 设备的 QTS 与 QuTS hero 实用工具

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Version 3, 29 June 2007

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2. Source Code.

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