QNAP 企业级 ES NAS 系列：ES1640dc v2、ES1640dc

QNAP 企业级 JBOD 系列： EJ1600 v2 、 EJ1600

硬件使用手册

1.0 版

感谢您购买威联通产品！ 本用户手册提供关于 ES NAS 的硬件信息与其安装及维护说明。请仔细阅读并依照本手册使用产品功能。

本用户手册适用于以下 ES NAS 机型：

ES1640dc v2 及 ES1640dc

本用户手册适用于以下 EJ JBOD 机型：

EJ1600 v2 及 EJ1600

注意

☐ 「ES NAS」以下简称为「NAS」或「ES NAS」。

☐ 部份功能仅适用于特定型号，您所购买的型号可能不支持这些功能。

☐ 所有特性、功能与其他产品规格如有变更，恕不另行通知。

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注意：

☐ 请务必定期您的系统，以避免任何可能发生的数据遗失。威联通不负责任何资料遗失或复原。

☐ 如要把 NAS 包装内的任何组件退回进行退货或保养维修时，请确定货品妥善包装以确保运送无误。若货品运送期间因不妥善包装造成任何损坏，威联通一

概不予负责。

规范声明

FCC 声明

QNAP NAS 符合不同的 FCC 规范等级。详情请参考产品规范等级。一旦确定本产品的等级，请参考以下对应的声明。

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FCC A 级声明

本设备符合 FCC 规则第 15 部份。产品操作受以下两条件限制：

1. 本设备不得造成有害干扰。
2. 本设备必须接受任何接受到的干扰，包含可能造成意外操作的干扰。

注意：本设备已通过测试并符合 FCC 规则第 15 部分 A 级数位设备之限制。此等限制旨在本设备于商业环境中操作时，提供免于有害干扰之合理保护所设计。本设备产生、使用、并可能放射调频能量，若未依据指示安装及使用，可能对无线电通讯造成有害干扰。在住宅区操作本设备可能会造成有害干扰。在这种情况下，使用者必须自行解决干扰现象。

改装：任何未经过威联通科技股份有限公司同意，对此产品之改装，可能会让 FCC 规范授予此使用者操作本装备的权力变为无效。

CE 声明

QNAP NAS 符合不同的 CE 规范等级。详情请参考附录之产品规范等级。

本手册所使用到的符号说明

⚠️ 警告	这个图示表示必须完全依照指示进行。未依照指示进行，将有可能导致身体伤害甚至死亡。
❗ 注意	此符号表示该行为可能会引致硬盘数据被清除，或不依照说明操作之情况下，可能会导致数据、硬盘或产品毁损。

目录

安全须知

1. 本产品的使用环境温度应介于 0°C – 40°C (32°F -104°F)，相对湿度为 5% – 95%。请确保其放置场所通风良好。

2. 与本产品连接的线路和设备必须能提供本产品正常的电量，以确保其运作正常。

3. 切勿将本产品放置于直接受阳光曝晒或靠近化学药剂的场所。请确保其所在环境维持稳定的温度与湿度。

4. 清洁时，请先将电源线及所有连接的缆线拔下，再以干布擦拭 NAS 即可。切勿使用任何化学药剂或喷雾式清洁剂清洁本产品。

5. 为确保系统正常运作，以及避免过热，切勿将任何物品或重物放置于 NAS。

6. 安装硬盘时，请务必使用产品包装所附的平头螺丝将硬盘固定在硬盘抽取盒上，以确保其运作正常。

7. 切勿使本产品靠近水源。

8. 切勿将本产品放置在不平稳的桌子或台面上，以避免因本产品滑落而损坏。

9. 使用本产品时，请留意当地的电压指示。若无法确定，请洽询经销商或当地电力公司。

10. 切勿放置任何物品于电源在线。

11. 切勿自行维修本产品。不当的拆装，可能导致触电或其他不良后果。若有任何维修问题，请洽询当地经销商。

12. 机架式 NAS 机型只能安装于机房，并应由授权之系统管理员或 IT 管理员管理及维护。机房必须上锁，并只允许授权人员进入。

⚠ 警告：

□ 如错误更换电池，可能会有导致爆炸的危险。更换电池时，请务必更换同类型之电池，或更换制造商建议的类型。请依照当地废弃物管理办法规定，处理使用过之电池模块。

□ 切勿触摸系统内之风扇，以避免导致严重伤害。

第一章　QNAP ES NAS 系列介绍

企业级储存设备系列产品 (ES NAS) 提供了强大的功能、优异的可靠性、高可用性及具有如其他 QNAP NAS 产品线之易于操作的储存管理系统。

ES NAS 系列包含两个主要产品：ES1640dc v2 及 ES1640dc。这两种产品皆是适合于中型至大型 iSCSI SAN 架构之企业级储存系统。

ES NAS 系列具有高密度 19 英时框架设计。它可以支持 16 颗硬盘，其高密度的空间设计使得您在数据中心里架设时可以节省宝贵的空间及节省系统冷却所需的能源。

新的 ES NAS 系列产品具有高可用性及可维护性设计并支持双主动储存控制器以及两个电源供应器。此外，ES NAS 可搭配专属外接扩充设备 EJ1600 v2 与 EJ1600，采用高速外接 mini-SAS 接口进行串接，最多可扩充至 128 颗磁盘。这些储存扩充设备也有高可用性的设计 (例如双电源供应器、与主 ES NAS 系统的冗余联机)。相较于其他企业级 NAS，新的 ES NAS 提供了许多增强的功能：

- 为提供高性能与进阶数据存取服务，ES NAS 系列为一具高度软硬件结合的系统：标准企业级硬件配备并搭载优化储存、企业级操作系统 QES (QES 基于 ZFS 文件系统)。
- 搭载 Intel® Xeon® E5 系列处理器的双储存控制器，为您在需要同时执行多个储存工作及进阶的数据服务提供优秀的运算能力。
- 双主动储存控制器能相互监控，当其一控制器发生故障时，另一控制器可以立即接管储存资源。
- 无须中断服务之固件升级：可让控制器固件升级时不会中断数据存取。
- 可对 1 至 16 颗硬盘 (完整 SSD 磁盘组) 的系统快取进行快取组态。
- 在数据写入 HDD 前，系统会自动将数据副本维护到由 DRAM、一个 mSATA/M.2 SSD 模块和电池备份单元所组成的电池快取设备，完善保护您的重要数据。
- 储存池分割与延展 (可跨不同扩充设备) 提供了一种整合多颗硬盘的机制，来扩大储存空间，可横跨多个扩充机柜支持多个 RAID 群组 (请注意所有的 RAID 群组必须为相同的 RAID 类型)。储存池分割有助于达到最大的性能与提供更优异的数据安全性。
- RAID-TP (三重奇偶校验) 提供进阶的冗余保护，能防止三颗硬盘同时损坏。
- 三重镜像资料写入：同时写入至三个不同硬盘。所以如果同一磁盘阵列群组中 三分之二的 硬盘损坏，磁盘阵列群组中的数据将不会遗失。

- 支持 OpenStack 并可整合至 OpenStack 云端运算环境。QES 完整支持 OpenStack® Cinder，您只需要将驱动程序安装在 OpenStack Cinder 节点，并透过 Cinder 节点将区块层级储存空间分配给其他节点。

数据安全与加密

结合世界级数据复原能力与加密功能，ES NAS 系列产品提供了独特的高可用性、高性能与安全性。QES 操作系统提供共享文件夹和 LUN 加密的功能以保护机密的商业数据。LUN 加密适用于所有类型的硬盘，包括固态硬盘 (SSD)。此外，WORM (一次写入，多次读取) 功能可提供共享文件夹内容窜改防范。

第二章　硬件规格

型号	ES1640dc v2	ES1640dc
外形规格	3U，机架式	
处理器	Intel® Xeon® E5-2420 v2 六核心处理器 (2.2GHz, 15MB L3, 80W TDP)	
内存 (每个系统 2 组)	ES1640dc-v2-E5-160G： 每个控制器 (每个系统含双控制器): DDR3 ECC RDIMM 2 x 32GB (共 64GB) 1 x 16GB (NVRAM) 写入快取 ES1640dc-v2-E5-96G： 每个控制器 (每个系统含双控制器): DDR3 ECC RDIMM 2 x 16GB (共 32GB) 1 x 16GB (NVRAM) 写入快取	ES1640dc： 每个控制器 (每个系统含双控制器): DDR3 ECC RDIMM 2 x 16GB (共 32GB) 1 x 16GB (NVRAM) 写入快取
支持硬盘数量类型	16 x 2.5 吋/3.5 吋 硬盘架可锁	16 x 2.5 吋/3.5 吋

硬盘接口	SAS 12Gb/s 可向后支援 SAS 6Gb/s	SAS 6Gb/s
JBOD 扩充设备端口 (每个系统 2 组)	两个 mini-SAS 12Gb/s 接口 (SFF-8644)	两个 mini-SAS 6Gb/s 接口 (SFF-8088)
电池备援 NVRAM (每个系统 2 组)	M.2 2280 作为 NVRAM (SATA 讯号)	mSATA 作为 NVRAM
10Gbps 网络端口 (每个系统 2 组)	4 个 SFP + (Intel XL710-AM 1) * 由于目前的驱动程序问题，QES 1.1.3 于每个以太网络端口只支持到 2.5 Gb/s 传速。10Gb/s 支持将于日后的固件更新提供。	2 x RJ45 (Intel X540-BT2)
PCIe 扩充插槽 (每个系统 2 组)	1 个 PCIe x8 (Gen3 x8 讯号) 插槽： 预安装 LAN-10G2T-X550 网络适配器 (2 个 10GbE RJ45 端口)，可用 40GbE 网络适配器取代。 1 个 PCIe x4 (Gen2 x4 讯号) 插槽：预安装双端口 Mini-SAS 卡。	1 个 PCIe x8 (Gen2 x8 讯号) 插槽：40GbE 或 10GbE 网络卡专用。 1 个 PCIe x4 (Gen2 x4 讯号) 插槽：双端口 Mini-SAS 卡专用。
风扇模块 (每个系统 2 组)	可抽换散热风扇模块 (60*60*38mm; 16000 RPM/12v/2.8A x 3)	
电源供应器	770W，1+1，100-240V@50/60Hz (热抽换热备援电源供应器)	
温度	0 °C 至 40 °C	
相对湿度	5 % 至 95 %	
尺寸 (公厘)	618 (深) x 446.2 (宽) x 132 (高)，不含把手	
重量 (净重)	26.75 kg	

扩充机柜

扩充模块	EJ1600 v2	EJ1600
机种	3U 机架式	
支持硬盘数量类型	16 x 2.5 吋/3.5 吋 硬盘架可锁	16 x 2.5 吋/3.5 吋
硬盘接口	SAS 12Gbps (可向后支援 SAS 6Gbps)	SAS 6Gbps
JBOD 扩充设备端口 (每个系统 2 组)	两个 mini-SAS 12Gb/s 端口 (SFF-8644) 预留一个 mini-SAS 12Gb/s 专用端口	两个 mini-SAS 6Gb/s s 端口 (SFF-8088)
风扇模块 (每个系统 2 组)	可抽换散热风扇模块 (60 *60*38 mm；16000RPM/12v/2.8A x 3)	
电源	450W 100-240V@50/60Hz (冗余/热插入)	
温度	0 ℃ 至 40 ℃	
相对湿度	5 % 至 95 %	
尺寸（公厘）	618 (深) x 446.2 (宽) x 132 (高)，不含把手	
重量 (净重)	24.11 kg	
所有产品规格如有变更恕不另行通知。		

第三章 系统组件

前面板特色

电源按钮、电源/状态 LED 指示灯与 LCD 状态显示皆位于前面板，使您能轻松获得所需的信息。

ES1640dc v2：

ES1640dc：

注意：请参阅下一节「前面板 LED 灯号与按钮」，以取得更详细的说明。

前面板 LED 灯号与按钮

项目	说明	LED 颜色	状态
1	电源开关		系统电源开关。欲强制关闭 ES NAS，按下并按住约 10 秒 (或是当您听到长哔一声，表示系统已经进行关机的程序，即可放开)。

2	系统电源 LED 指示灯	蓝色	亮 = 系统电源开启 关 = 系统电源关闭
3	状态	绿色 红色	绿色 = 系统正常运作。 红色= 以下一项或多项状况存在： • 发生系统错误或警告讯息 (RAID 降级模式、内存故障、风扇/电源供应器故障、系统/硬盘温度太高、储存池到达临界值等)，已记录于 QES 的系统记录来通知系统管理员。系统会在错误更正后，将 LED 灯重设为绿色。 • 系统执行接管 (Takeover)[*] • 电源供应器已被拔除。
4	LCD 状态显示 00		此两位数之数字代表各储存控制器开机过程中的各个阶段。左右两个数字各代表左储存控制器 (SCB) 和右储存控制器 (SCA)，请参阅 QES 的高可用 (High Availability) 应用程序以获得系统各组件之名称。 无任何显示：BIOS 正在开机 1：设备侦测 2：网络设定 3：系统设定 4：服务开始 5：系统自我检测 0：系统就绪
5	硬盘状态 LED 指示灯 (上方)	绿色 红色	绿色 = 磁盘驱动器状态为就绪。 慢速闪烁 = QES 中［储存空间总管］的［定位］功能可指示磁盘驱动器的所在位置。 红色 = 错误/毁损。 关闭 = 无硬盘存在。
5	硬盘 活动LED 指示灯 (下方)	绿色	恒亮/慢速闪烁 = 没有磁盘驱动器活动 闪灯 = 磁盘驱动器高速活动或磁盘驱动器已被设定为磁盘阵列的一部份。 **注意**：还未将储存池在 QES 中脱机前，请勿

			更换所属之磁盘驱动器。只有在磁盘驱动器所属的磁盘阵列具容错保护，且您已收到来自 QES 的错误警示，您才能将状态为在线的磁盘驱动器更换。如需更多信息，请参阅软件使用手册。
* 双主动控制器系统可在其中一个储存控制器发生故障时，让另一控制器来接管其磁盘区的资源。接管 (Takeover) 可以手动启动或当故障发生时，自动进行容错转移 (请参阅软件使用手册)。			

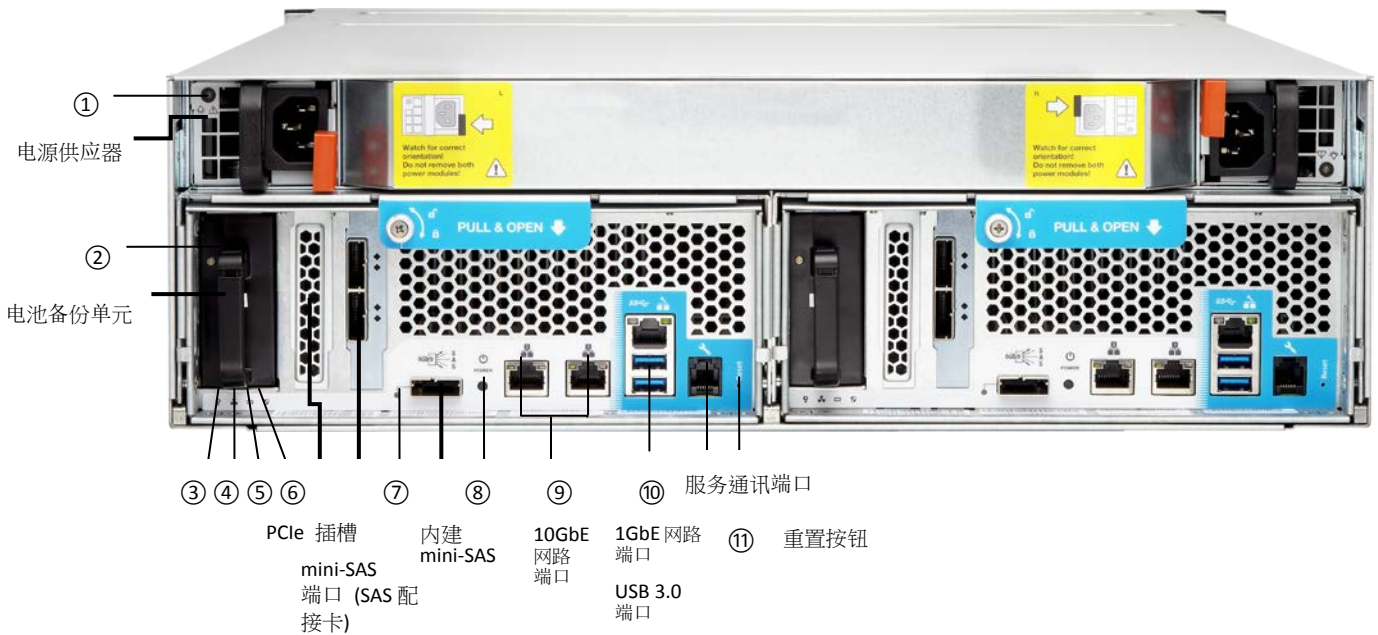## 后面板特色

后面板共有两个储存控制器，两个皆包含 I/O 扩充插槽、以太网络端口、USB 端口、主板内建 mini-SAS 端口、SAS 配接卡上的 SAS 端口、控制器电源按钮、重置按钮、系统管理端口与 BBU。

ES1640dc v2：

电源供应器

电池备份单元

1GbE 连接端口
USB 3.0 连接端口

服务通讯端口

重置按钮

ES1640dc：

电源供应器

电池备份单元

PCIe 插槽

mini-SAS 端口（SAS 配接卡）

内建 mini-SAS

10GbE 网路端口

1GbE 网路端口

USB 3.0 端口

服务通讯端口

重置按钮
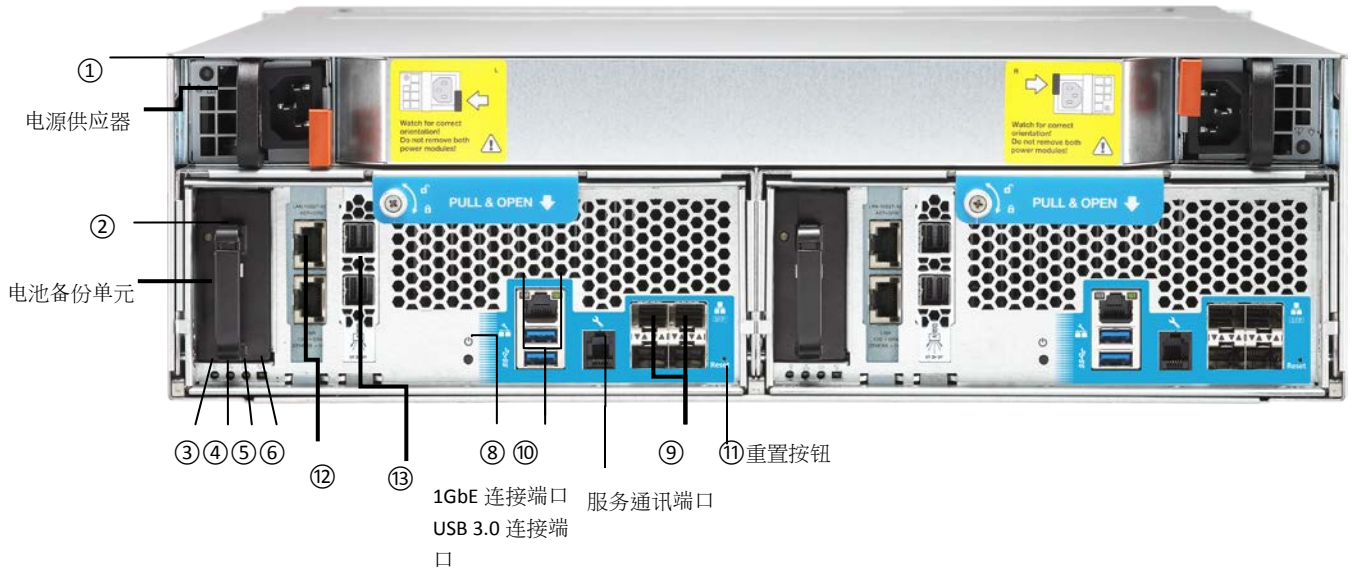
注意：对于这些功能的详细描述，请参阅以下章节。

后面板 LED 灯号与按钮

项目	说明	LED 颜色	状态

1	电源 LED 指示灯	绿色 橘色	恒亮 = 电源已开启且电源供应器正常运作。
			闪绿 = 系统关机
			闪橘 = AC 电源线已拔除
			关闭 =以下一项或多项状况存在：
			  • AC 电源无法使用
			  • 电源供应器故障
			  • 电流供应超出目前限制

2	BBU LED (于电池模块上)	绿色 红色 橘色	绿色 = 正常 闪绿 = 复制数据到 NVRAM 红色 = 损坏 橘色 = 充电/学习 关闭 = 未正确连接到 ES NAS
3	状态	绿色 橘色	关闭 = 系统电源关闭。 绿色 = 系统正常运作。 闪绿 = 系统正在开机。
4	风扇	绿色 橘色	绿色 = 风扇运作正常。 橘色 = 损坏/错误。 关闭 = 未检测到任何风扇。

5	BBU LED 灯号（于储存控制器上)	绿色 橘色	绿色 = 正常
			闪橘 = 错误/损坏
			关闭 = 以下一项或多项状况存在 ：
			  • 储存控制器电源未开启
			  • 本系统无法检测到 BBU

6	高可用性 LED	绿色 橘色	绿色 = 启用状态 闪橘 = 执行接管 (Takeover)* 或切回 (giveback)** 橘色 = 储存控制器已经接管另一储存控制器。

			关闭 = 以下一项或多项条件存在：
			• 此储存控制器已被另一个储存控制器接管。
			• 储存控制器电源未开启。
7	主板内建 mini-SAS 端口 LED	绿色 红色	关闭 = 无连结 绿色 = 网络链接 闪灯 = 网络传输 红色 = 错误/损坏
8	电源开关		储存控制器的电源开关。若要关闭储存控制器，请按下并按住按钮约 5 秒。此按钮的开关机功能与 QES 中〔高可用〕 (High Availability) 应用程序之开机及关机的功能相同。
9（左）	10 Gigabit 以太网络 RJ-45 端口 LAN 1/LAN 2 速度 LED	绿色 橘色 关闭	绿色 = 10GbE 联机 橘色 = 1GbE 联机 关闭 = 100Mbps 联机
9（右）	10 Gigabit 以太网络 RJ-45 端口 LAN 1/LAN 2/LAN3/LAN4 联机/活动 LED	绿色	关闭 = 无连结 绿色 = 网络链接 闪灯 = 网络传输
9 (ES1640dc v2 左)	10Gigabit 以太网络 SFP + LAN 1/LAN 2/LAN3/LAN4 速度 LED	绿色 橘色 关闭	绿色 = 10GbE 联机 橘色 = 1GbE 联机
9 (ES1640dc v2 右)	10Gigabit 以太网络 SFP + LAN 1/LAN 2/LAN3/LAN4 联机/活动 LED	绿色 关闭	关闭 = 无连结 绿色 = 网络链接 闪烁 = 网络传输
10（左）	管理端口	绿色	关闭 = 无连结

	联机/活动 LED	关闭	绿色 = 网络链接 闪烁 = 网络传输
10（右）	管理端口 速度 LED	绿色 橘色	橘色 = 1GbE 联机 绿色 = 100Mbps 联机
11	重置按钮		按住系统重置按钮以重新启动储存控制器，而不需关闭系统电源。
12 (ES1640dc v2)	PCIe Gen3 x8 插槽		预先安装 LAN-10G2T-X550 网络适配器于两个 10GbE (RJ45) 连接端口
13 (ES1640dc v2)	PCIe Gen2 x4 插槽		主板内建双路径 Mini-SAS (SFF-8644) 扩充卡

* 双主动控制器系统可在其中一个储存控制器发生故障时，让另一控制器来接管其磁盘区的资源。接管 (Takeover) 可以手动启动或当故障发生时，自动进行容错转移 (请参阅软件使用手册)。

** 储存控制器 A (或 B) 已经接管系统。而后储存控制器 B (或 A)上的任何错误已经解决，且可以回复之前的作业。切回 (Giveback) 可手动进行或设定由系统自动恢复。 (请参阅软件使用手册)。

储存控制器

本系统所使用之双控制器配置，从系统的背面检视时，左边控制器为储存控制器 A (SCA) 而右边是储存控制器 B (SCB)，SCA 与 SCB 为在 QES 中所显示之名称。双控制器配置可提供储存空间存取备援。当其中一台控制器 I/O 发生问题时，其他控制器将会继续提供存取服务。

每个储存控制器都包含一个 BBU，一个 SAS 配接卡 (预安装在其中一个 PCIe 插槽)、1 个 PCIe 扩充卡插槽、内建 mini-SAS 端口、电源按钮、两个 10Gigabit 以太网络端口、1 个管理端口、2 个 USB 3.0 端口、1 个服务端口、以及重置按钮。

冗余电源供应器

电源供应器模块为 770 W 电源供应器 (100-127V˜/10A，50-60Hz; 200-240V˜/5A，50-60Hz 自动切换范围输入)。ES NAS 有两个相同电源供应模块提供备用电源。如果电源供应器发生故障，另一电源供应器将会保持系统运作，直到故障的电源供应器可被替换。

注意：请参阅后面板 LED 灯号与按钮的说明描述。

PCIe 扩充卡

ES NAS 采用点对点、高速 PCI Express (PCIe) Gen2 (x4) 和 Gen3 (x8) I/O 扩充。系统可支持另一个 PCIe (Gen3 x8) 扩充卡。而 Gen2 (x4) 插槽已预安装 SAS 配接卡。

主板内建 mini-SAS 端口

两个主板上的序列式 SCSI (SAS) 提供点对点 6Gb/s (或 12Gb/s，视 ES NAS 的型号) 数据传输至另一台连接的储存设备上。

SAS 配接卡 (HBA)

除了上述的主板内建 SAS，系统也预安装了 SAS 配接卡，以提供两个额外的 mini-SAS 端口，可用于扩充设备的连接。SAS 配接卡支持 12Gb/s 或 6Gb/s 传输速度 (取决于机型)。ES1640dc v2 提供了 12Gb/s SAS 配接卡而 ES1640 dc 则提供了 6Gb/s SAS 配接卡。

电池备份单元 (BBU)

BBU 电池规格：10.8V 2200mAH

ES NAS 的高速缓存受电池所保护。BBU 提供电源给予写入快取。如果电源中断，快取中的数据必须写入于 mSATA 记忆卡，此时电池能提供所需电力。每个控制器都有一个 BBU，若是系统单一 BBU 故障时，另一端控制器的 BBU 将会同时保护两边的写入快取数据，不会直接影响系统性能。但若是两个 BBU 都故障，ES NAS 为了确保数据安全，将会让数据直接写入硬盘，您可以在 QES 中设定 BBU 学习排程；如需更多信息，请参阅软件使用手册。

10GbE 网络

ES1640dc v2 具有 4 个SFP+ (Intel® XL710-AM1) 而 ES1640dc 则具有 2 个 RJ45 (Intel® X540-BT2)

ES NAS 系列之平台架构的设计乃是采用 Intel® Xeon® E5 v2 处理器。ES NAS 系列的以太网络端口配备 Intel XL710 或 X540 以太网络卡，以提供硬件性能优化与其他卸除的功能。此外，QES 更提供了进阶的网络设定如巨型封包 (Jumbo Frame) 和 Port Trunking (又称链路聚合，Link Aggregation) 及 VLAN设定，让您优化 IP SAN 环境的性能与安全性。40GbE 网络可透过安装网络适配器于 PCIe 扩充插槽 (PCIe Gen3 x8) 轻易地实现。

ES1640dc v2 的 PCIe 插槽预先安装了 LAN-10G2T-X550 网络卡，提供两个 10GbE RJ45 连接端口。使用者可使用双连接端口的 QSFP+ 40GbE 网络卡加以取代，来获得更佳的资料传输性能并简化网络线连接。

储存功能

磁盘和磁盘驱动器箱

QES NAS 储存系统最多可支持两个冗余储存控制器，并配备最新的 SAS 12Gb/s 或 6Gb/s 磁盘驱动器接口 (ES1640dc v2 具备 12Gb/s SAS 磁盘驱动器接口，而 ES1640dc 则具备 6Gb/s 磁盘驱动器接口)。磁盘驱动器箱可容纳 16 颗硬盘，并可搭配专属外接扩充设备 EJ1600 与 EJ1600 v2，采用高速外接 SAS 接口进行串接，最多可扩充至 128 颗磁盘。系统并可支持全 SSD 磁盘驱动器。磁盘驱动器编号方式由最左下方为 1 至最右上之编号为 16。

ES NAS 系统支持双主动控制器，每个控制器皆能同时处理 IO。透过 QES 储存空间总管以新增一个储存池并将其指派给其中一个控制器 (SCA 或 SCB)。在此双主动控制器的架构下，LUN 可被规划属于任一个控制器，以平衡 IO 存取。系统并设定有冗余连接，如果主机无法透过其所属控制器存取储存空间，容错转移机制将会把储存空间移转至另一个控制器，并将透过新的控制器进行 IO 存取。

固态硬盘 (SSD)

此系统可以容纳高速固态硬盘 (SSD) 与传统硬盘 (如 SAS 与 NL-SAS 磁盘驱动器)。然而固态硬盘对于 I/O 密集的工作负荷是为最佳的选择，它们可用于 QES 的快取加速。高速缓存组态可提供 1 个磁盘至最多 16 个磁盘 (全固态硬盘) 作为系统快取。如果您计划要安装 SSD，请由底部 (磁盘驱动器 1~4) 先安装，因为这些磁盘驱动器将作为系统磁盘驱动器。

RAID 设置

RAID 设置可增进数据储存的可靠性与性能。

容错式磁盘阵列 (RAID) 将许多磁盘组合成一个磁盘阵列。导入 RAID 配置可增进容错能力，并提升数据储存的可靠性与数据服务的性能。若数组中的一或多个磁盘发生故障，数据可从数组中的其他磁盘还原。视储存空间操作系统及可用的磁盘数目而定，支持的 RAID 类型可能会有所不同。

下表概述不同的 RAID 类型：

RAID 类型	说明
Single Disk（单独的硬盘）	在 NAS 上可以设定单独的 RAID 群组。然而，此设定无法提供任何冗余保护。因此，若发生磁盘毁损或损坏，该磁盘中的所有数据将会遗失。
RAID 0 等量硬盘群组	等量 RAID 群组将两或多个磁盘合并成一个大型逻辑磁盘。此组态拥有最快的磁盘存取性能，但无法在磁盘故障或损坏时提供数据冗余保护。磁盘容量为所有磁盘的总和。磁盘等量通常用来最大化磁盘容量，或加快磁盘存取的速度。请注意，RAID 0 组态不建议用来储存敏感数据。
RAID 1 镜像硬盘群组	磁盘镜像会将镜像对中其中一个磁盘的内容自动镜像至另一个磁盘来保护数据。此组态能在单一磁盘故障时提供保护能力。储存容量等于最小单一磁盘的容量，第二个磁盘是用来备份第一个磁盘的数据。RAID 1 组态适合用来储存企业或个人层级的敏感数据。
RAID 5	RAID 5 组态适合组织用来执行需要高储存效率及数据保护的数据库与其他以交易为基础的应用程序。若要建立 RAID 5 群组，最少需要使用 3 个硬盘。RAID 5 群组的总容量等于数组中最小磁盘容量乘以 (硬盘 −1) 的数目。建议使用相同厂牌与容量的硬盘 (但非必须)，以建立最有效率的硬盘容量。 此外，若系统包含四个磁盘，则可使用三个磁盘建置 RAID 5 数据数组，并将第四个磁盘作为备用磁盘。在此组态中，如果发生实体磁盘故障，系统将会自动使用备用磁盘重建数组。RAID 5 组态可以承受一个磁盘故障，而不致失去系统正常运作能力。当 RAID 5 中的磁盘发生故障时，磁盘区将会以「降级模式」运作。此阶段无法提供任何数据保护，若单元出现第二个磁盘故障，则所有数据将会遗失。故障的磁盘应立即更换。用户可以在关闭服务器后安装新磁盘，或在服务器运作时以热插入方式更换新磁盘。完成磁盘区重建程序后，磁盘区将会恢复正常状态。
RAID 6	RAID 6 群组可以满足关键数据的防护需求。若要建立 RAID 6 群组，至少需要 4 个硬盘。RAID 6 群组的总容量等于数组中最小磁盘容量乘以 (硬盘 -2) 的数目。建议使用相同厂牌与容量的硬盘（但非必须），以建立最有效率的硬盘容量。RAID 6 可以承受 2 个磁盘故障，并让系统保持正常运作。

RAID 10	RAID 10 是 RAID 1 (镜像) 与 RAID 0 (等量) 的组合，但不具备同位检查。RAID 10 是涵盖多个磁盘的等量磁盘区，提供容错及高速数据传输能力。RAID 10 群组的储存容量等于数组中最小磁盘容量乘以 (数组中的硬盘数量/2)。建议使用相同厂牌与容量的硬盘建立 RAID 10 群组。RAID 10 适合大量交易应用，例如需要高性能与容错能力的数据库。RAID 10 允许最多两个磁盘发生故障 (来自一个硬盘)。
RAID 50	RAID 50 是 RAID 5 (分散式同位检查) 与 RAID 0 (等量) 的组合。建议用于需要高容错、容量及随机存取性能的应用。RAID 50 至少需要 6 颗硬盘，可解决每个 RAID 5 数组中一颗硬盘故障的状况。RAID 50 的总储存容量等于其所有 RAID 5 数组的总和。RAID 5 群组的总容量等于数组中最小的磁盘大小乘以 (硬盘数 − 1) 的数目。建议使用相同厂牌与容量的硬盘 (但非必须)，以建立最有效率的硬盘容量。
RAID 60	RAID 60 是 RAID 6 (双重分散式同位检查) 与 RAID 0 (等量) 的组合。提供比 RAID 50 更强大的容错能力，但每等量需要多一颗硬盘。RAID 60 至少需要 8 颗硬盘，可解决每个 RAID 6 数组中两颗硬盘故障的状况。RAID 的总储存容量为其所有 RAID 6 数组的总和。RAID 的总储存容量等于其所有 RAID 6 数组的总和。RAID 6 群组的总容量等于数组中最小的磁盘大小乘以 (硬盘数 − 2)。建议使用相同厂牌与容量的硬盘 (但非必须)，以建立最有效率的硬盘容量。
三重镜像	三重镜像旨在降低 RAID 1 数据遗失的风险，以应对主要与镜像磁盘故障的状况，或防止有不可恢复的读取错误，三重镜像同时写入三个独立的硬盘。所以如果同群组中两个 HDD 毁损，该系统能继续存取数据，且性能也不会降低。它的优点是为性能极佳；缺点是可用容量相对较少。
RAID-TP (三重奇偶校验)	RAID-TP (三重奇偶校验) 与 RAID 5 与 RAID 6 相似。RAID-TP 会将数据等量写入硬盘，但会进行三次数据校验并将数据写入三个磁盘。RAID-TP 使用三个独立算式来计算个别校验，可在三个磁盘及 (或) 区块同时故障时重建数据。RAID-TP 强化处理冗余的能力，特别适合于关键数据的保护需求。RAID-TP 至少需要 4 颗硬盘。

重置按钮的行为

重置按钮：按下后重设系统设定。

系统	基本系统重设 (1 哔声)	进阶系统重设 (2 哔声)
所有 ES 机型	3 秒	10 秒

基本系统重设（3 秒）

按下［重设］按钮 3 秒，将会有一哔声。系统管理者密码将重新设定为默认值。

进阶系统重设（10 秒）

按下「重设」按钮约 10 秒钟后，您将会在第 3 秒和第 10 秒的时听到哔声。已建立的使用者和使用者群组将会被清除。ES NAS 将重设所有的系统设定，如同您使用 网页所提供的重设功能（［控制面板）＞［系统设定］＞［备份/还原］＞［回复出厂默认值］＞［重新初始化 NAS]）。请注意按下重置按钮，ES NAS 上的数据将「不会」被删除。

管理端口

管理端口是由 Intel®82579 Gigabit 以太网络控制器所提供。管理端口可让您联机至 ES NAS 的 QES 桌面。预设的 ES NAS 管理网站是 169.254.100.100:8080。如果 ES NAS 已经设定为使用 DHCP，您可以使用 QNAP Qfinder Pro 以检查 ES NAS 的 IP 地址。请确定 ES NAS 及执行 QNAP Qfinder Pro 的计算机都连接到同一个子网内。系统需要在双控制器上皆设定管理 IP，且控制器的管理端口都必须连接到管理网络。此联机需使用单独的 LAN 或 VLAN，不得使用生产环境 (Production) 的 LAN 或 VLAN 来管理网络流量。若要设定管理端口的 IP 地址，请参阅软件使用手册。当储存控制器发生故障时，您可以启用［高可用 (High Availability)］应用程序所提供的［丛集选项］并启用［管理端口自动转移］选项。当故障发生时，您将可以使用相同的 IP 地址，但透过另一储存控制器的管理端口来管理您的 ES NAS。如需更多信息，请参阅软件使用手册。

服务端口

注意：此服务连接端口为主要提供硬体的安装、设定及维护，并只能由 QNAP 技术支持人员所使用或当您透过 QNAP 技术支持人员指示所使用。

服务端口是 RS 232 端口但为 RJ-11 接口。请使用适当的缆线/转换器 (亦即 RJ-11 转 DB9/DB 9 转 USB 或 RJ-11 转 USB) 以连接此端口与您的计算机。针脚配置的定

义如下：

6 5 4 3 2 1
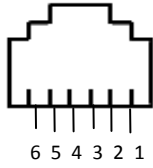
| 针脚编号	讯号	说明
1	Rx1	UART1 数据接收
2	Tx1	UART 1 数据传输
3	GND	Ground
4	Rx2	UART 2 数据接收
5	Tx2	UART 2 数据传输
6	GND	Ground

计算机或终端机须符合如下的设定以连接此服务端口：

☐ 115200 鲍率 (baud rate)

☐ 8 数据位 (data bits)

☐ 1 停止位 (stop bit)

☐ 无同位检查 (No parity)

☐ 流量控制：XON / XOFF

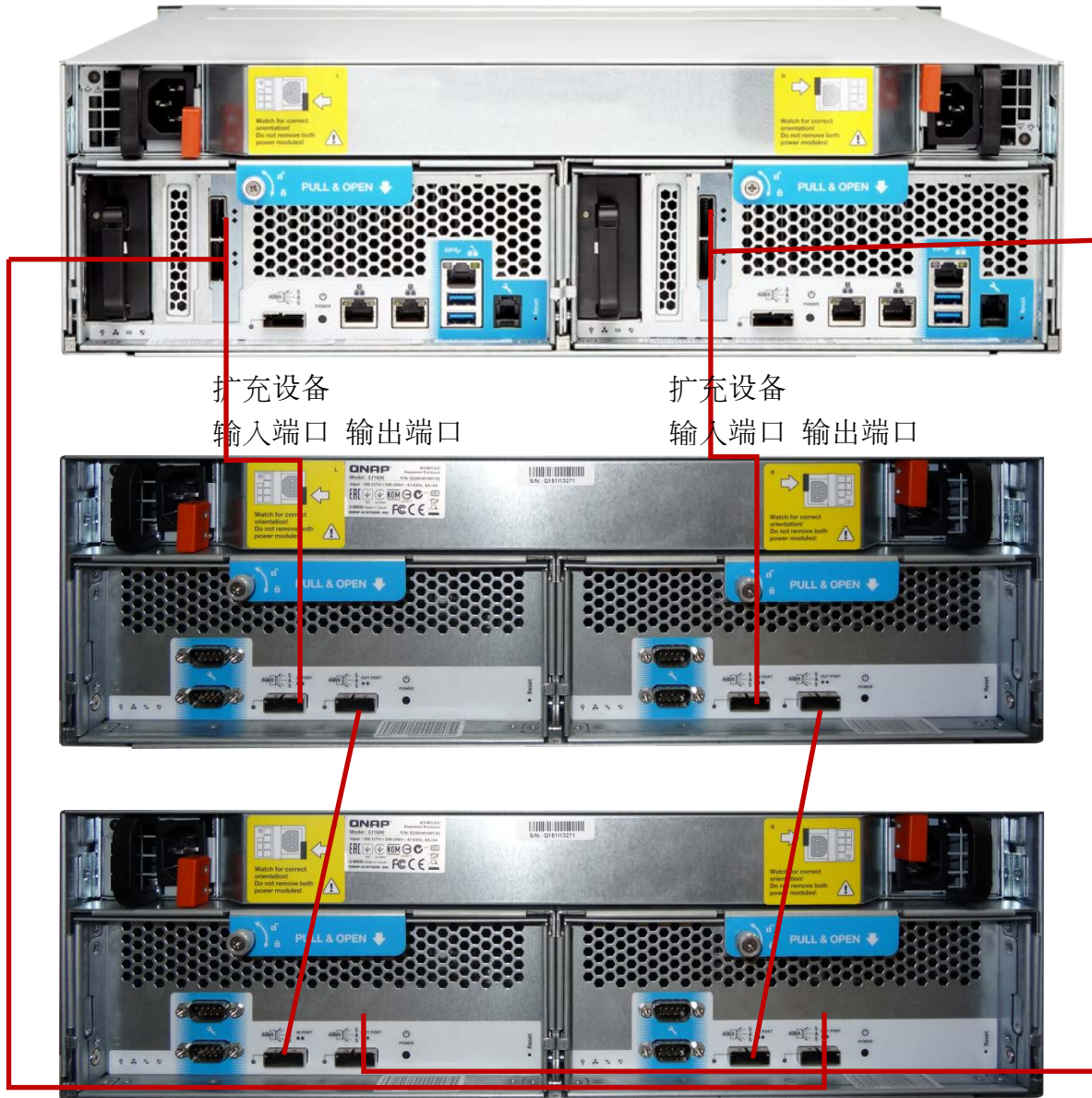☐ 默认的用户名称/*密码* ：admin / *admin*。

扩充设备连接

ES NAS 系列提供扩充机柜以扩充主 ES NAS 的磁盘驱动器数量。有两种扩充设备：EJ1600 和 EJ1600 v2。这些扩充设备透过 12 或 6Gbps SAS 扩充端口连接至主 ES NAS。

下图为 ES1640 dc v2 和扩充设备 EJ1600 v2 的连接示意图：
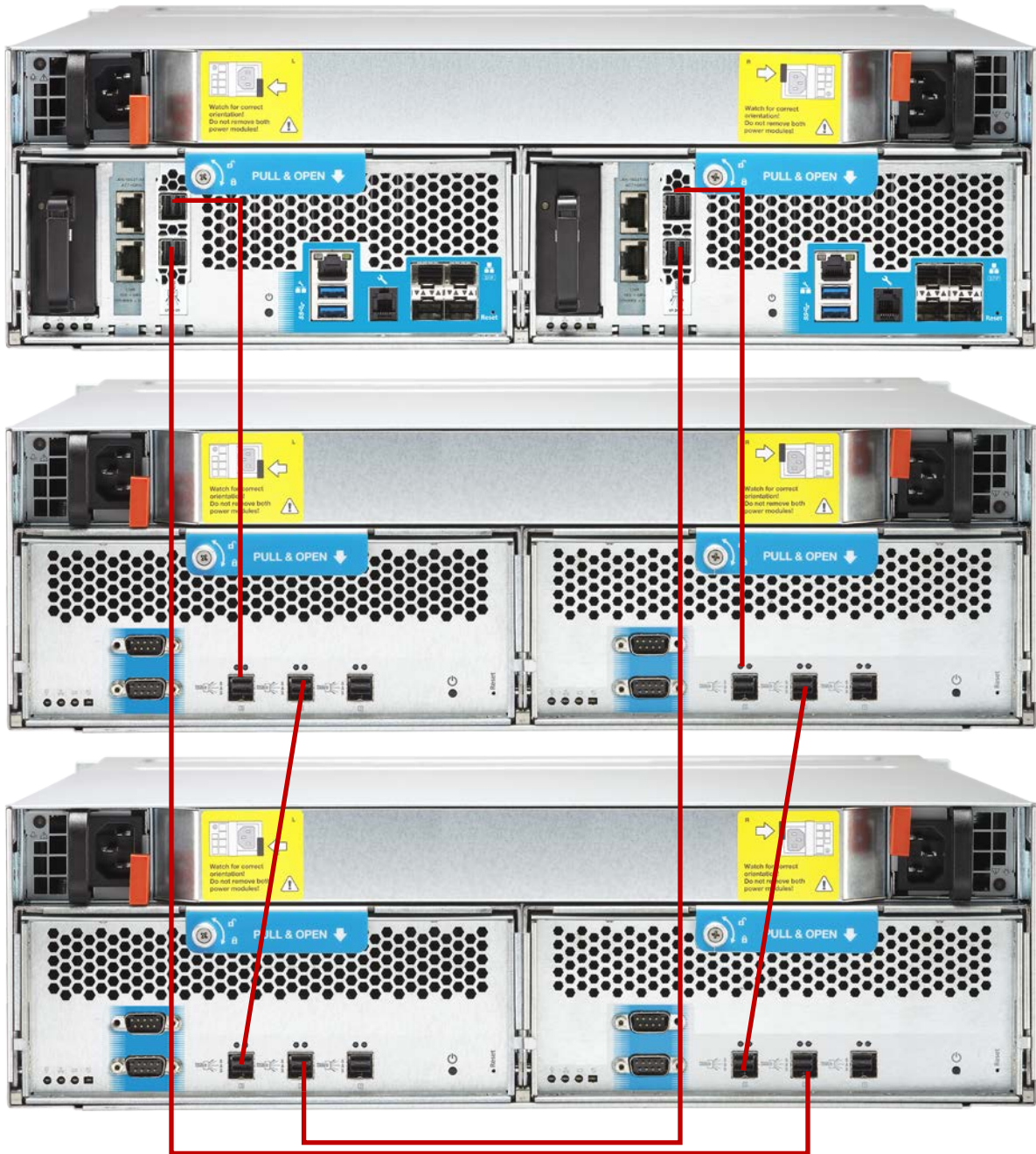
下图为 ES1640 dc 和扩充设备 EJ1600 的连接示意图：

扩充设备　　　　　　　　　　　　扩充设备
输入端口　输出端口　　　　　　　输入端口　输出端口

如上图中所示使用交互串联的连接方式将这些扩充设备相连接。此链接方式提供备
援路径到相连的机柜。并搭配 QES 的高可用 (High Availability) 所提供的系统自动
转移保护可进一步防止 JBOD 故障或失去连结。
下列程序说明如何将扩充机柜连接至主要 ES NAS：

1. 将 mini-SAS 缆线的一端连接到 SAS HBA (储存控制器 A 上) 所提供的两个
SAS 端口之一。将此 mini-SAS 缆线的另一端连接至扩充机柜左侧控制器的
SAS IN 端口。

2. 将 mini-SAS 缆线的一端连接到 SAS HBA (储存控制器 A 上) 所提供的两个 SAS 端口之一。将此 mini-SAS 缆线的另一端连接至扩充设备右侧控制器的 SAS IN 端口。

3. 如果需要连接更多的扩充设备，请将扩充设备左侧储存控制器的 SAS OUT 端口与下一个扩充设备左侧控制器的 SAS IN 端口相连。重复此步骤以连接这两个扩充设备的右侧储存控制器。

4. 如果是连接最后一个扩充设备，使用 mini-SAS 缆线连接最后一个扩充设备左侧控制器的 SAS OUT 端口和 ES NAS 的 mini-SAS 端口 (储存控制器 B 上) 相连接 (交叉串连到另一储存控制器)。

5. 使用 mini-SAS 缆线连接最后一个扩充机柜右侧控制器的 SAS OUT 端口和 ES NAS 的 mini-SAS 端口 (储存控制器 A 上) 相连接 (交叉串连到另一储存控制器)。

6. 将电源线连接到新的扩充设备 (和主 ES NAS)。

注意：

1. 如果 ES NAS 电源并未开启，建议先将扩充设备的电源开启然后在开启 ES NAS 的电源。

2. 当您使用 mini-SAS 缆线连接 mini-SAS 端口时，请确定 mini-SAS 缆线的接口正确锁入/扣入 mini-SAS 端口。当您欲拔除 mini-SAS 缆线时，请轻拉手拉环以解除其锁定的状态。

3. 请使用 mini-SAS SFF-8088 to SFF-8088 连接线以连接 ES1640dc 跟 EJ1600。如要连接 ES1640dc v2 跟 EJ1600 v2，请使用 mini-SFF-8644 至 SFF-8644 连接线。如要连接 ES1640dc v2 和 EJ1600，则请使用 mini-SAS SFF-8644 至 SFF-8088 连接线。

扩充设备功能

跟主 ES NAS 系统一样，扩充设备的电源开关按钮、电源/状态 LED 指示灯与 LCD 状态显示皆位于前面板让您可以轻松存取。

EJ1600 v2：

①
②
③
④
⑤

EJ1600：

①
②
③
④
⑤

扩充设备前面板 LED 灯号与按钮

项目	说明	LED 颜色	状态
1	电源开关按钮		系统电源开启按钮
2	系统电源 LED 指示灯	蓝色	开启 = 系统电源开启 关闭 = 系统电源关闭
3	状态	绿色 红色	绿色 = 系统正常运作。 红色 = 电源供应器已被拔除。

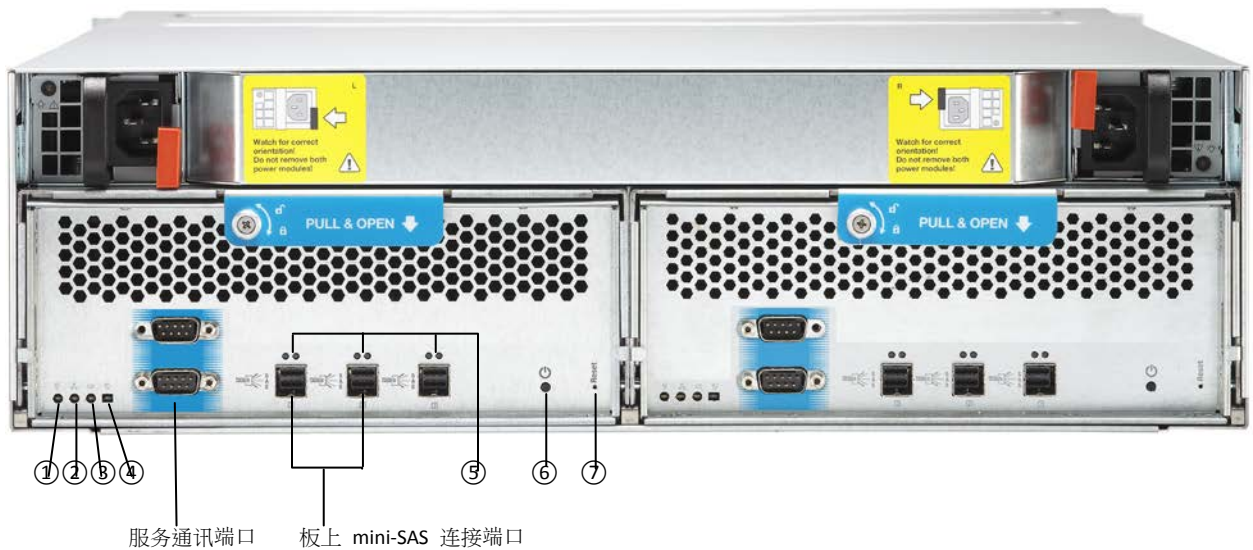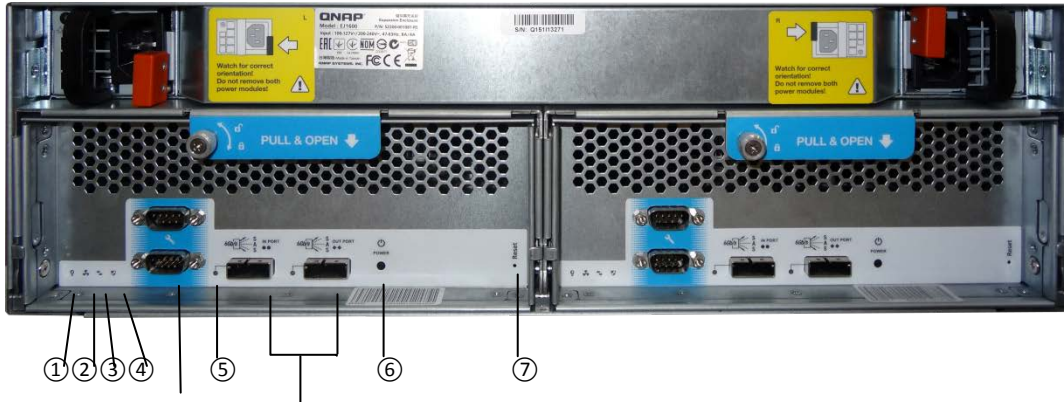| 4	LCD 状态显示 01		两位数的数字代表扩充设备识别号码。它对应于 QES 的储存空间总管里所显示的 REXP #。

机箱 ID 编号

每个扩充设备都具有其独特的编号。QES 的储存空间总管使用设备 ID 以识别每个扩充机柜。

这两个设备机型 EJ1600 和 EJ1600 v2 于前方面板的 LCD 状态显示皆会显示此两位数的 ID 编号。QES 将扩充设备之 ID 编号表示为 REXP#。扩充设备上并没有可手动设定设备标识符的开关。如要对于扩充设备进行重新编号，请使用 QES 所提供的［重新初始化储存设备 ID］功能。

后面板上的 LED 灯号跟按钮

EJ1600 v2:

服务通讯端口　　板上 mini-SAS 连接端口

EJ1600：

服务通讯端口　板上 mini-SAS 连接端口

后面板上的 LED 灯号与按钮

1	状态	绿色	关闭 =系统电源关闭。
		橘色	绿色 = 系统的正常运作。
			闪绿 = 系统正在开机。
2	风扇	绿色	绿色 = 风扇运作正常。
		橘色	橘色 = 损坏／错误
			关闭 = 未侦测到任何风扇
3	联机状态	绿色	绿色 = 正常
		橘色	橘色 = 连入或连出的 SAS 端口联机已中断。
			关闭 = 以下一项或多项状况存在：
			●扩充设备的电源未开启。
			●ES NAS 系统无法侦测到扩充设备。
4	高可用性 LED	绿色	绿色 = 启用状态
		橘色	闪橘 = 执行接管（Takeover）* 或切回（giveback）**
			橘色 = 储存控制器已经接管另一储存控制器。
			关闭 = 以下一项或多项状况存在：
			●此储存控制器已被另一个储存控制器接管。
			●储存控制器电源未开启。
5	主板内建 SAS 端口 LED	绿色	关闭 = 无连结
		红色	绿色 = 网络链接
			闪灯 = 网络活动
			红灯 = 错误/损坏

6	电源开关		扩充控制器的电源开关按钮。如果要关闭扩充控制器，请按住开关大约 5 秒。
7	重设		扩充控制器重设按钮
* QES 未提供扩充设备的开关功能。			

主板内建 SAS 端口

两个内建的 SAS 端口可提供与主 ES NAS 连接 (6Gb/s 或 12Gb/s 数据传输的速率，视扩充机柜机型而定)。

磁盘和磁盘驱动器箱

ES NAS 系统

此系统可以容纳高速固态硬盘 (SSD) 与传统硬盘 (如 SAS 与 NL-SAS 磁盘驱动器)。然而固态硬盘对于 I/O 密集的工作负荷是为最佳的选择，它们可用于 QES 的快取加速。高速缓存组态可提供由 1 个磁盘至最多 16 个磁盘 (全固态硬盘) 作为系统快取。

服务端口扩充设备

注意：此服务端口为主要提供硬件的安装、设定及维护，并只能由 QNAP 技术支持人员所使用或当您透过 QNAP 技术支持人员指示所使用。

服务端口是 RS 232 端口但为 DB-9 (或 DE-9 接口)。针脚配置的定义如下：
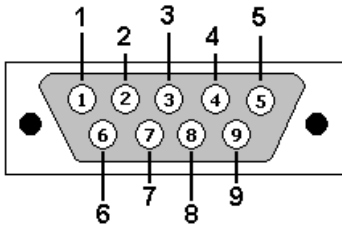
针脚编号	讯号	说明
1	NC	无连结
2	Rx	接收数据
3	Tx	传送数据
4	NC	无连结
5	GND	Ground
6	NC	无连结
7	NC	无连结
8	NC	无连结
9	NC	无连结

计算机或终端机须符合如下的设定以连接此服务端口：

☐ 115200 鲍率

☐ 8 个数据位

☐ 1 停止位

☐ 无同位检查

☐ 流量控制：XON /XOFF

☐ 默认的用户名称/*密码*：admin/*admin* 。

第四章　服务与维修

附注：这一章是为系统维修指引。系统维修必须由合格之计算机设备维修人员所执行并受过专门训练以辨识物品中的有害物品及有害能源等级。

安全性考虑

于执行服务程序之前请先审核所有安全性信息。

为避免损坏，当您需要设定系统或处理零件时，请注意警示。由手指或其他导体传出之静电可能会损坏系统主板或其他会受静电干扰之设备。这类型的损害可能会损害设备的寿命。

⚠️ **警告**：为避免静电损坏：
- 避免用手接触并使用防静电的容器运输和储存产品。
- 请先将零件置于地面再从容器中将它们移除。
- 避免触摸针脚或电路。
- 当触摸易受静电干扰的组件或组件时，请务必正确地使用接地。

⚠️ **警告**：为降低触电风险或设备损坏：
- 请勿停止电源线接地插头。
- 确保设备的电源供应器插孔与电源插座可方便存取。
- 从设备上的电源供应器拔除电源线，以完全停止供电。

⚠️ **警告**：为了降低高温表面所造成之伤害, 让磁盘驱动器与内部系统组件冷却后再触摸它们。

准备程序

若要存取某些组件和执行某些服务程序，您必须执行下列其中一项或多项程序：
- 您必须使用机架滑轨的锁定功能的来支持 ES NAS。
- 关闭系统电源

如果您必须从机架移除系统或从系统中移除非热插入组件，请先关闭系统电源。请参阅下一节以取得更多关闭系统电源的详细信息。
- 关闭系统电源。
- 如果放置于机架上的 ES NAS 使您非常难以进行维护的工作、请将 ES NAS 从机架上移除。使用反向机架安装程序来从机架上移除 ES NAS。请参阅下一章〈快速机架配件安装〉。

关闭 ES NAS 的电源

⚠️ **警告**：为了降低人身伤害、电击或设备损失，请将 ES NAS 的电源线拔除以确定无任何供电。前面板的电源开关按钮并不会完全关闭系统电源。部份的电源供应器与某些内部电路仍保持作用中的状态直到 AC 电源被移除。

重要事项：如果安装的是热插入设备，则不需关闭 ES NAS 的电源。

1. 备份系统数据。
2. 使用 QES 所提供之系统关闭功能，请参阅软件使用手册。
3. 设备前面板的系统电源 LED 指示灯应为关闭。
4. 拔除电源线。

系统现在无任何电源。

更换电池备份单元 (BBU)

当 LED 指出电池已损坏、或 QES 警告电池可能发生故障时，您才需要更换电池。每个储存控制器包含一个电池备份单元 (BBU)。如要移除 BBU：

注意：安装电池模块时，请确定电池 LED 灯不会闪烁。如果电池 LED 在闪烁（请参阅第三章〈系统组件〉），表示电池模块正在备份数据，请等到 LED 停止闪烁再进行操作。

1. 按下电池模块的把手以解除锁定，并从储存控制器中抽出及移除电池模块。
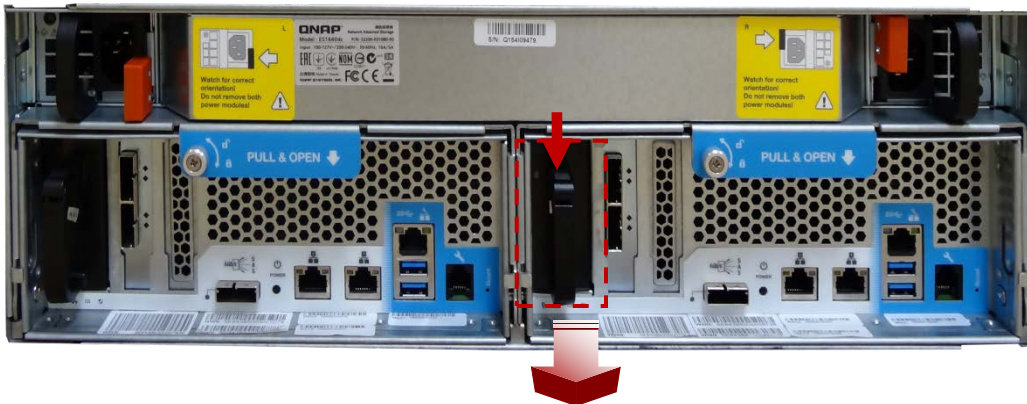
若要替换组件，请依照移除程序相反的步骤。

装回可热插入的电源供应器

系统配备 2 个可热插入电源供应器 (770W)。这些电源供应器提供备用电源；当其中一个出现故障，则另一电源供应器可供给整个系统电源。

若要移除热插入电源供应器 :

1. 确定系统已安装多少个可热插入电源供应器：
- 如果系统只安装了 1 个可热插入电源供应器，安装时请先关闭电源并从 ES NAS 拔除电源线。
- 如果安装超过一个可热插入电源供应器，请继续执行以下的步骤：
2. 拔除 AC 电源插头。
3. 按下把手旁的闩锁以解除锁定。
4. 将电源供应器拔出电源供应器凹槽。

若要更换组件，请依照移除程序相反的步骤。并请注意以下警告。

⚠ **警告**：为降低触电的风险或设备损害, 请确认电源供应器已安装才将电源线连接到电源供应器。

装回热插入 SAS 硬盘

警告：
- I. 请勿移除底端 4 颗硬盘，因为他们是用来安装或设定操作系统的硬盘。
- II. 为避免数据遗失，请备份所有硬盘上的数据。

若要移除硬盘：

1. 请将欲移除的硬盘所包含之储存池脱机。如需更多信息，请参阅软件操作手册的「储存空间总管」应用程序说明。

2. 压下以解锁硬盘。
3. 移除硬盘。
4. 欲更换此硬盘，请使用螺丝安装并固定硬盘于 托盘上。
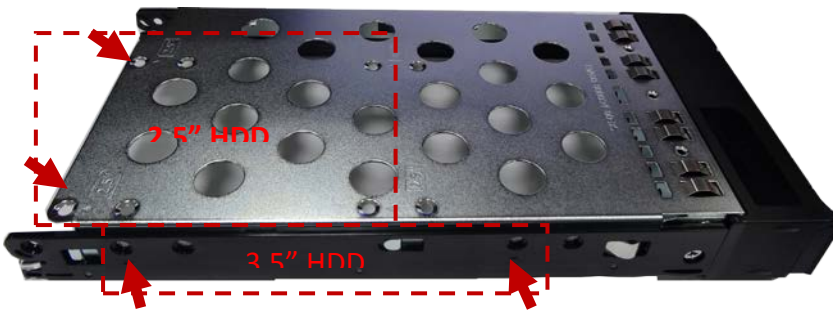
更换可置换风扇模块

若要移除风扇：

1. 关闭此风扇所属之储存控制器，您可以从 QES 中 (请参阅软件手册的「高可用」应用程序说明)，或是透过按下储存控制器上的「电源」按钮。
2. 松开储存控制器上的手栓螺丝并从系统卸下储存控制器。
3. 移除风扇模块。
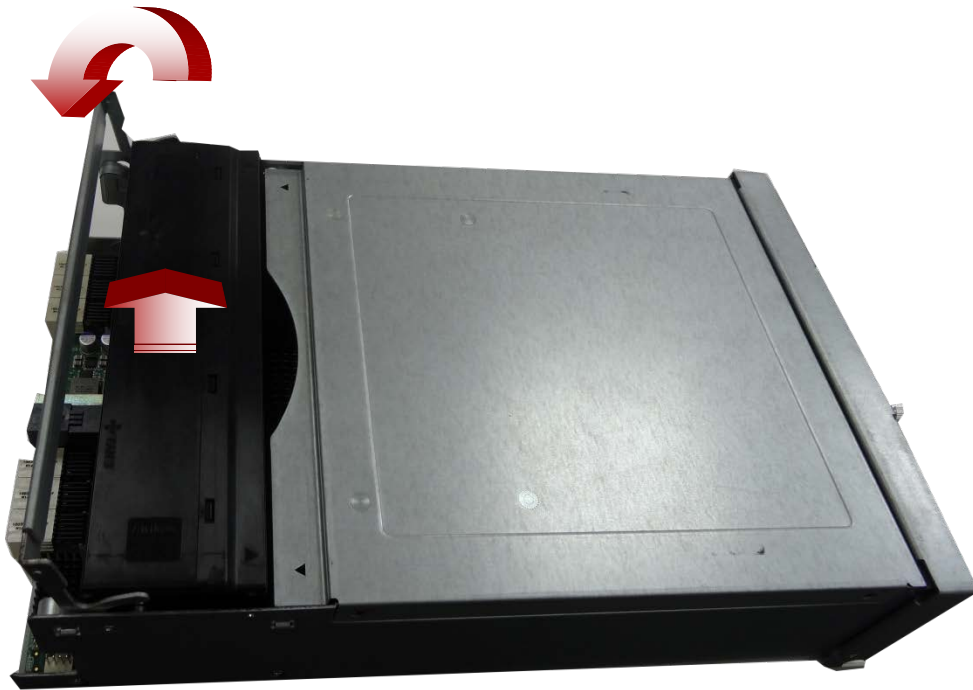
若要置换风扇模块，请依照移除步骤的相反程序并将把手往前推 (请勿压下风扇模块)，以固定风扇并确认安装。

安装扩充卡

若要安装 PCIe 扩充卡：

1. 关闭您欲安装扩充卡之所属储存控制器。您可以从 QES 中 (请参阅软件手册中的「高可用」应用程序说明)，或是透过按下储存控制器上的「电源」按钮。

2. 松开储存控制器上的手栓螺丝并从系统卸下储存控制器。

3. 将储存控制器上的螺丝移除 (上面 3 个及侧边各 2 个)，以打开储存控制器之上盖。
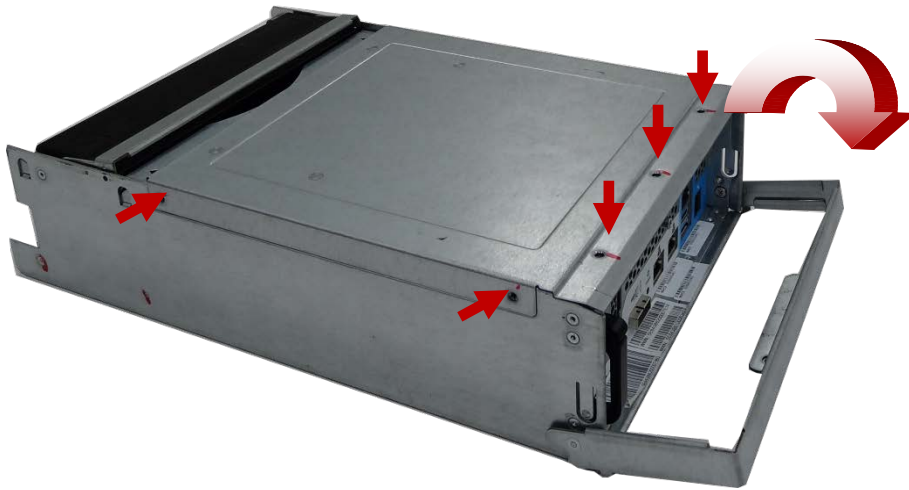
4. 移除金属挡板之螺丝以移除金属挡板。

5. 对齐并将 PCIe 卡插入插槽。

6. 使用螺丝将 PCIe 卡固定于机壳。

注意：当移除或插入储存控制器时，请使用储存控制器之手把，以正确搬移储存控制器。放回储存控制器于机器上时请正确锁上，以确定其已稳固安装于系统中。

安装 DIMM

若要安装 DIMM：

1. 关闭先前已安装扩充卡的储存控制器，您可以从 QES 中 (请参阅软件手册中

的「高可用」应用程序说明) 执行，或是按下储存控制器上的「电源」按钮。
(请参阅〈第三章：系统组件〉中后面板 LED 灯号与按钮介绍)。

2. 松开储存控制器上的手栓螺丝并从系统卸下储存控制器。

3. 将储存控制器上的螺丝移除 (上面 3 个及侧边各 2 个)，以打开储存控制器
   之上盖。
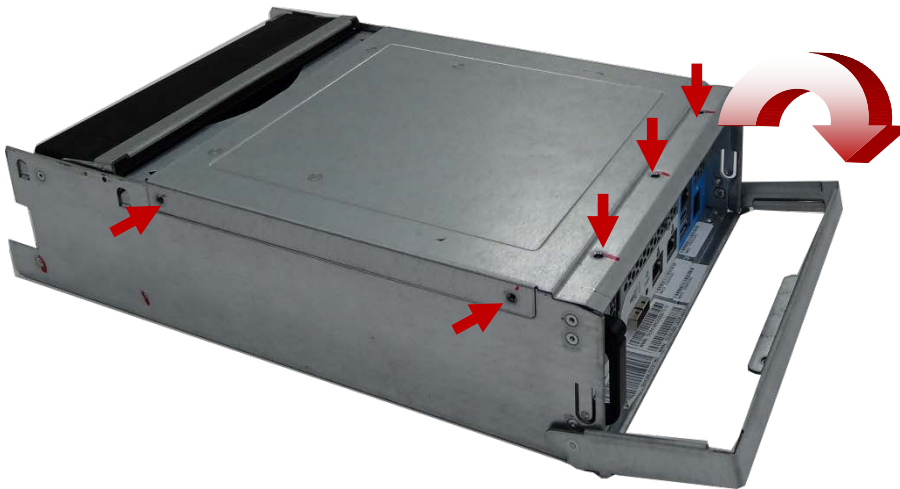
4. 插入 DIMM。
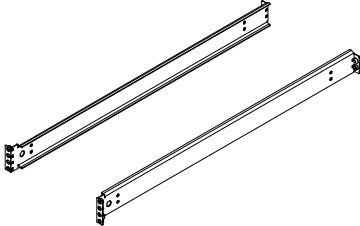
注意：更换或升级系统组件时 ， 请参考 QNAP 网站上选购配件的兼容性清单。

第五章　快速机架配件安装说明

概观

本章详细说明如何使用机架配件将 ES NAS 固定至机柜中。这些快速机架配件能自动锁入机架的方孔内并大幅减少安装的时间。

配件内容

项目	图示
两个固定托架（左、右） 注意：此定拖架可使用于深度为 24 吋和 36 吋之机柜。	
两个浮动螺帽	
6 颗十字槽螺丝	

⚠️ **注意**

静电放电 (Electrostatic discharge) 可能会损坏电子组件。在开始任何的安装程序前，请确定您已正确使用接地。

⚠️ **注意**

永远将最重的机器放置于机架的最底部。

⚠️ **警告**

在使用或安装于机架前，请先确定机架为平稳。确定机柜平稳 支架 平放于地板上及机架的重量全部卸除于地板上。

⚠️ **警告**

确保机架都有防倾倒措施。这类的措施包括将机架固定于地板、平稳支脚、或结合上述由机柜制造商所提供之平衡措施。

⚠️ **警告**

欲搬动或安装/移除 ES NAS，至少需要两个人以降低人身伤害的风险或设备损坏。

机器上架

将左侧和右侧固定架先安置为「U」型的方向。

重要

固定架上有正确的标示固定架的方位（左前、右前）。

注意：固定架可以调整至符合机柜的深度。

附注：按下扣锁弹片以悬挂拖架于机架孔中并释放弹片卡以固定拖架于机架上。

1. 使用包装内的螺丝将滑轨后端固定至机柜背面（图 1 步骤 2 所示）。
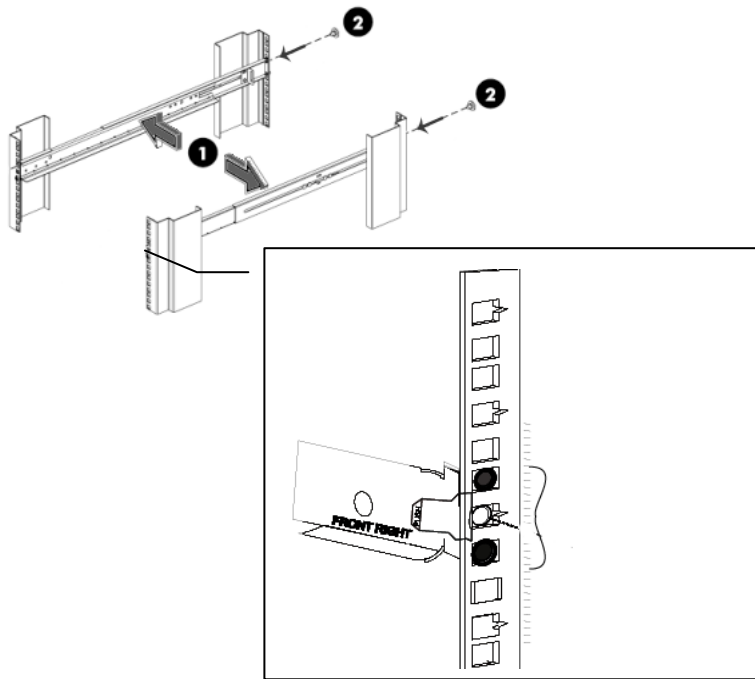
图 1：将拖架固定到机架上

2. 将浮动螺帽置于拖架中线以上六个孔位（或 2U 空间) 以上并将其扣入前方机架之方形孔。这些浮动螺帽最后将用来固定 ES NAS 机壳于机柜上（图 2）。
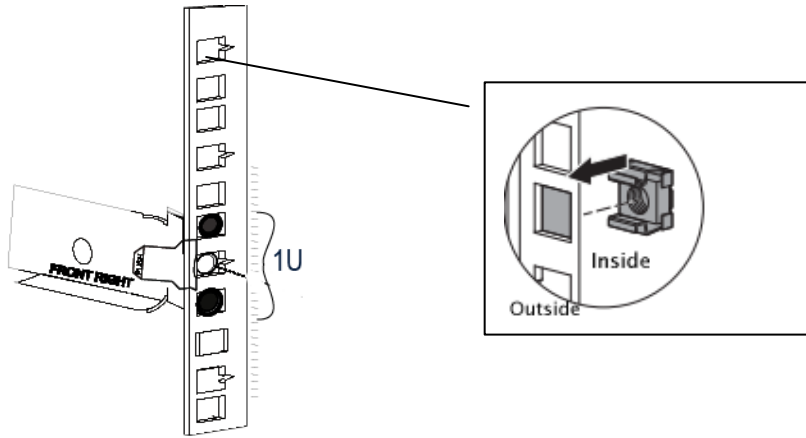
图 2：将浮动螺帽固定于机架上

3. 将 ES NAS 滑入并置于拖架上 (图 3)。
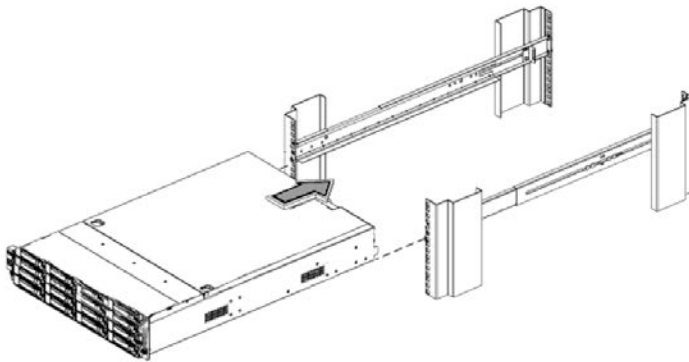
图 3：将机器滑入机架

4. 使用包装内的螺丝将 ES NAS 固定于前方机架上 (图 4 步骤 1)。下方孔位固定可以使用螺丝，但上方孔位 (相隔 2U 空间) 应使用浮动螺帽 (步骤 3)。将 LED 护盖放回设备的前面板上 (图 4 步骤 2)。请先把 ES NAS 开机后再执行此项作业，LED 护盖盖上后，您将无法开关电源按钮。

图 4：使用螺丝固定

附录 A：于高可靠度的环境中启用多重路径 (MPIO)

ES NAS 支持多主机联机与多端口配置，使得您在以太网架构之 存储 局域网络 (SAN) 环境中部署虚拟储存空间，并同时能达到有效运用资源、最大化传输率、降低响应所需时间、错误移转及负载平衡。多重路径使用备援设备 (如储存控制器、缆线、和交换器) 在服务器跟储存设备间建立连的路径。当其中这些相连接的设备发生故障时，多重路径会自动使用替代的路径使得应用程序还能够继续存取所需的数据。于 ES NAS 上的每一个储存控制器应该连接在具有冗余机制下的网络设备，期在此环境下任何的设备或组成部分发生故障时，不会中断任何数据存取的作业。
Windows Server 2008 中新的 MPIO 功能包括设备特定模块 (DSM)，其设计遵循 双主动式控制器（Active/Active）控制器模型的储存数组 (如 ES NAS) 使用。
如下的图标显示如何部属此多重路径：
依照如下的指示以配置 iSCSI 联机：

- 请勿将两个以太网络卡配置为同一子网。每一个以太网络接口必须为个别的子网。
- 对于数据传输端口 (data port)，QES 只允许固定 IP 地址之设置。
- 将 iSCSI 的网络与其他网络流量分开。
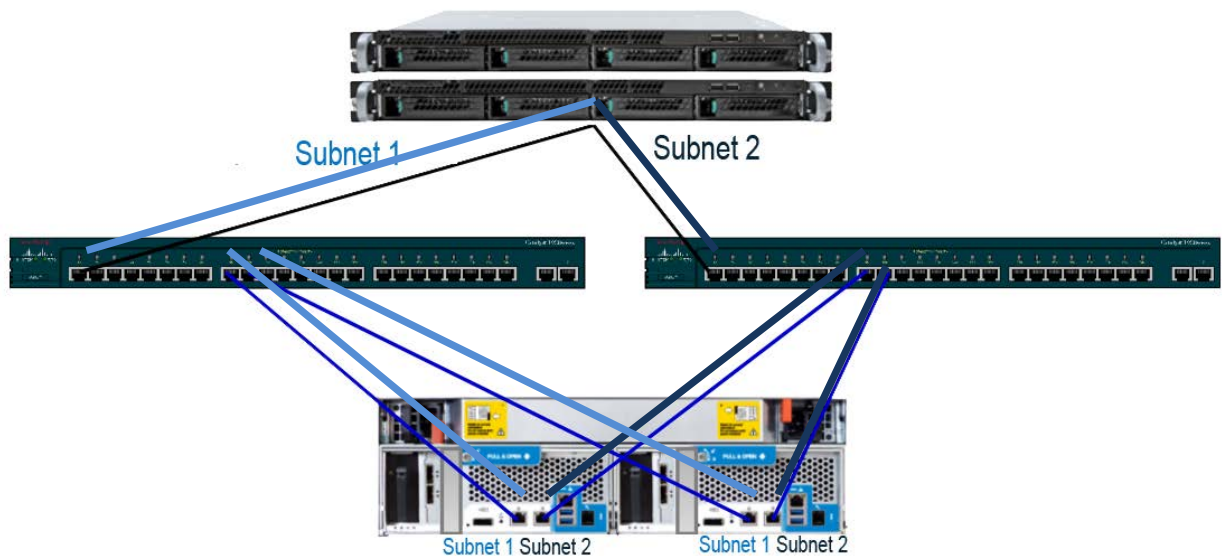
使用如上的配置，每一个主机上的网络端口都能存取双储存控制器，以帮助减少网

络故障发生时存取服务中断或所需之修复措施。

附录 B：系统灯号及蜂鸣器说明

NAS 的 LED 灯号指示系统状态；当 NAS 开启时，可以检查以下项目确定系统运作正常。请注意检视灯号状态前，必须在 NAS 上正确安装好硬盘、接上电源及连接至网络。

您可以在「控制面板」＞「系统设定」＞「硬件配置」＞「蜂鸣器」页面关闭。

蜂鸣	次数	说明
短哔 (0.5 秒)	1	1. 系统开启中。 2. (透过软件) 关闭系统中。 3. 系统重设。 4. ES NAS 正在进行切回 (Giveback)。
短哔 (0.5 秒)	3	ES NAS 正在进行接管 (Takeover)。
短哔 (0.5 秒)	3	系统固件已更新。
长哔 (0.5 秒)	3，每 5 分钟	1. 系统风扇无法使用。 2. 系统心跳讯息 无法侦测。
长哔 (1.5 秒)	2	1. 硬盘群组容量快满。 2. 硬盘群组容量已满。 3. 硬盘降级模式。 4. 电池备份单元 (BBU/电源供应器移除)。 5. 扩充设备遗失链接。
	1	1. 透过硬件强制关闭系统中。 2. 系统已正确开启并可使用。

附录 C：安规及认证

NAS Models	FCC	CE
ES1640dc	Class A	Class A
ES1640dc v2	Class A	Class A

附录 D：技术支持

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论坛：http://forum.qnap.com

美国及加拿大地区技术支持：
Email：http://helpdesk.qnap.com/
电话：＋1-909-595-2782 #3
地址：168 University Parkway, Pomona CA 91768
服务时间：08:00-17:00 (GMT- 08:00 Pacific Time, Monday to Friday)

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Version 3, 29 June 2007

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17. Interpretation of Sections 15 and 16.
If the disclaimer of warranty and limitation of liability provided above cannot be given local legal effect according to their terms, reviewing courts shall apply local law that most closely approximates an absolute waiver of all civil liability in connection with the Program, unless a warranty or assumption of liability accompanies a copy of the Program in return for a fee.

END OF TERMS AND CONDITIONS