



QNAP Turbo NAS

TES-x85U Series Hardware User Manual

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Thank you for choosing QNAP products! This user manual provides description of the hardware of the Turbo NAS and relevant guideline of certain functions. Please read carefully and strictly adhere to the instructions of the manual.

This user manual is applicable to the following Turbo NAS models:

TES-1885U, TES-3085U

NOTE

- The “Turbo NAS” is hereafter referred to as “NAS”.
- The product you purchased may not support certain functions dedicated to specific models.
- All features, functionality, and other product specifications are subject to change without prior notice or obligation.
- Information presented is subject to change without notice.
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Note:

- Back up your system periodically to avoid any potential data loss. QNAP disclaims any responsibility of all sorts of data loss or recovery.
- Should you return any components of the NAS package for refund or maintenance, make sure they are carefully packed for shipping. Any form of damages due to improper packaging will not be compensated.

Regulatory Notice



FCC Class A Notice

The TES-x85U series complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

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

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



CE NOTICE

The TES-x85U series complies with CE compliance classes A.

RESTRICTED ACCESS LOCATION

This equipment must be only located where both of the following apply:

- Only authorized and knowledgeable personnel can access the equipment
- Access to the equipment is restricted through the use of lock and key or other means of security and this access is controlled by those in charge of the location.

Symbols in this document

 Warning	This icon indicates the instructions must be strictly followed. Failure to do so could result in injury to human body or death.
 Caution	This icon indicates the action may lead to disk clearance or loss OR failure to follow the instructions could result in data damage, disk damage, or product damage.

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Safety Warnings

1. The NAS can operate normally in temperatures of 0°C–40°C (32°F -104°F) and relative humidity of 5%–95%. Please make sure the environment is well-ventilated.
2. The power cord and devices connected to the NAS must provide correct supply voltage (100W, 90–264V).
3. Do not place the NAS in direct sunlight or near chemicals. Make sure the temperature and humidity of the environment are in optimized level.
4. Unplug the power cord and all connected cables before cleaning. Wipe the NAS with a dry towel. Do not use chemical or aerosol to clean the NAS.
5. Do not place any objects on the NAS for the server's normal operation and to avoid overheat.
6. Use the flat head screws in the product package to lock the hard disks in the NAS when installing hard disks for proper operation.
7. Do not place the NAS near any liquid.
8. Do not place the NAS on any uneven surface to avoid falling off and damage.
9. Make sure the voltage is correct in the location where the NAS is installed. Contact the distributor or the local power supply company for the information.
10. Do not place any object on the power cord.
11. Do not attempt to repair the NAS in any occasions. Improper disassembly of the product may expose the users to electric shock or other risks. For any enquiries, please contact the distributor.
12. The NAS should only be installed in the server room and maintained by the authorized server manager or IT administrator. The server room is locked by key or keycard access and only certified staff is allowed to enter the server room.



Warning:

- Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
- Do NOT touch the fan inside the system to avoid serious injuries.

Chapter 1. CPU and Memory Specifications



Caution: Any unauthorized modifications performed on QNAP products will result in the warranty being voided. QNAP is not responsible for any form of damage or loss of data caused by such modifications. Unauthorized modifications include, but are not limited to, changes made to the default system firmware, installation of unofficial third party applications, and changes to the hardware performed by unauthorized technicians.

	TES-1885U-D1531-32G	TES-1885U-D1531-64G
CPU	Intel® Xeon® 6-core Processor D-1531 (9M Cache, 2.2 GHz)	Intel® Xeon® 6-core Processor D-1531 (9M Cache, 2.2 GHz)
Memory	32GB Non-ECC DDR4 RAM UDIMM	64GB Non-ECC DDR4 RAM UDIMM
Flash Memory	4GB (USB DOM)	4GB (USB DOM)
CPU Replaceable	No	No
Memory Replaceable	Yes	Yes
Long-DIMM slots	4	4
Hard drive slots	12+6	12+6
PCIe slots	4	4

	TES-1885U-D1531-16GR	TES-1885U-D1531-32GR
CPU	Intel® Xeon® 6-core Processor D-1531 (9M Cache, 2.2 GHz)	Intel® Xeon® 6-core Processor D-1531 (9M Cache, 2.2 GHz)
Memory	16GB ECC DDR4 RAM RDIMM	32GB ECC DDR4 RAM RDIMM
Flash Memory	4GB (USB DOM)	4GB (USB DOM)
CPU Replaceable	No	No
Memory Replaceable	Yes	Yes
Long-DIMM slots	4	4
Hard drive slots	12+6	12+6
PCIe slots	4	4

	TES-1885U-D1531-128GR
CPU	Intel® Xeon® 6-core Processor D-1531 (9M Cache, 2.2 GHz)
Memory	128GB ECC DDR4 RAM RDIMM
Flash Memory	4GB (USB DOM)
CPU Replaceable	No
Memory Replaceable	Yes
Long-DIMM slots	4
Hard drive slots	12+6
PCIe slots	4

	TES-1885U-D1521-8GR	TES-1885U-D1521-16GR
CPU	Intel® Xeon® Processor D-1521, 4-core 2.4 GHz	Intel® Xeon® Processor D-1521, 4-core 2.4 GHz
Memory	8 GB ECC RAM (4 GB RDIMM x 2)	16 GB ECC RAM (8 GB RDIMM x 2)
Flash Memory	4GB DOM	4GB DOM
CPU Replaceable	No	No
Memory Replaceable	Yes	Yes
Long-DIMM slots	4	4
Hard drive slots	12+6	12+6
PCIe slots	4	4

	TES-1885U-D1521-32GR
CPU	Intel® Xeon® Processor D-1521, 4-core 2.4 GHz
Memory	32 GB ECC RAM (8 GB RDIMM x 4)
Flash Memory	4GB DOM
CPU Replaceable	No
Memory Replaceable	Yes

Long-DIMM slots	4
Hard drive slots	12+6
PCIe slots	4

	TES-3085U-D1548-32G	TES-3085U-D1548-64G
CPU	Intel® Xeon® 8-core Processor D-1548 (12M Cache, 2.0 GHz)	Intel® Xeon® 8-core Processor D-1548 (12M Cache, 2.0 GHz)
Memory	32GB Non-ECC DDR4 RAM UDIMM	64GB Non-ECC DDR4 RAM UDIMM
Flash Memory	4GB (USB DOM)	4GB (USB DOM)
CPU Replaceable	No	No
Memory Replaceable	Yes	Yes
Long-DIMM slots	4	4
Hard drive slots	24+6	24+6
PCIe slots	4	4

	TES-3085U-D1548-16GR	TES-3085U-D1548-32GR
CPU	Intel® Xeon® 8-core Processor D-1548 (12M Cache, 2.0 GHz)	Intel® Xeon® 8-core Processor D-1548 (12M Cache, 2.0 GHz)
Memory	16GB ECC DDR4 RAM RDIMM	32GB ECC DDR4 RAM RDIMM
Flash Memory	4GB (USB DOM)	4GB (USB DOM)
CPU Replaceable	No	No
Memory Replaceable	Yes	Yes
Long-DIMM slots	4	4
Hard drive slots	24+6	24+6
PCIe slots	4	4

	TES-3085U-D1548-128GR
CPU	Intel® Xeon® 8-core Processor D-1548 (12M Cache, 2.0 GHz)
Memory	128GB ECC DDR4 RAM RDIMM
Flash Memory	4GB (USB DOM)
CPU Replaceable	No
Memory Replaceable	Yes
Long-DIMM slots	4
Hard drive slots	24+6
PCIe slots	4

	TES-3085U-D1531-16GR	TES-3085U-D1531-32GR
CPU	Intel® Xeon® Processor D-1531, 6-core 2.2 GHz	Intel® Xeon® Processor D-1531, 6-core 2.2 GHz
Memory	16 GB ECC RAM (8 GB RDIMM x 2)	32 GB ECC RAM (8 GB RDIMM x 4)
Flash Memory	4GB DOM	4GB DOM
CPU Replaceable	No	No
Memory Replaceable	Yes	Yes

Long-DIMM slots	4	4
Hard drive slots	24+6	24+6
PCIe slots	4	4

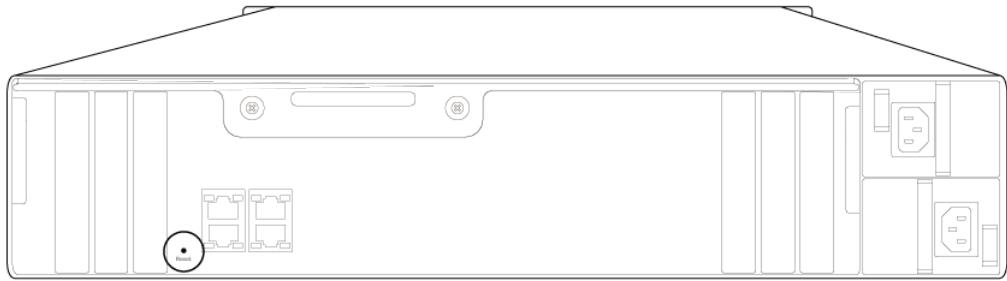
TES-3085U-D1521-16GR	
CPU	Intel® Xeon® Processor D-1521, 4-core 2.4 GHz
Memory	16 GB ECC RAM (8 GB RDIMM x 2)
Flash Memory	4GB DOM
CPU Replaceable	No
Memory Replaceable	Yes
Long-DIMM slots	4
Hard drive slots	24+6
PCIe slots	4

Chapter 2. Power Button and Reset Button Behavior



- Power button: Press to turn on or turn off.

System	Power button (Turn on)	Power button (Hardware turn off)	Power button (Force turn off)
All models	Press once	1.5 sec	5 sec



- Reset button: Press to reset the system settings.

System	Basic system reset (1 beep)	Advanced system reset (2 beeps)
All models	3 sec	10 sec

Basic system reset (3 sec)

Press the reset button for 3 seconds, a beep sound will be heard. The following settings are reset to default:

- System administration password: admin
- TCP/IP configuration: Obtain the IP address settings automatically via DHCP
- TCP/IP configuration: Disable Jumbo Frame
- TCP/IP configuration: If port trunking is enabled (dual LAN models only), the port trunking mode will be reset to "Active Backup (Failover)".
- System Port: 8080 (system service port)
- Security Level: Low (Allow all connections)
- VLAN will be disabled.
- Service binding: All the NAS services run on all available network interfaces.

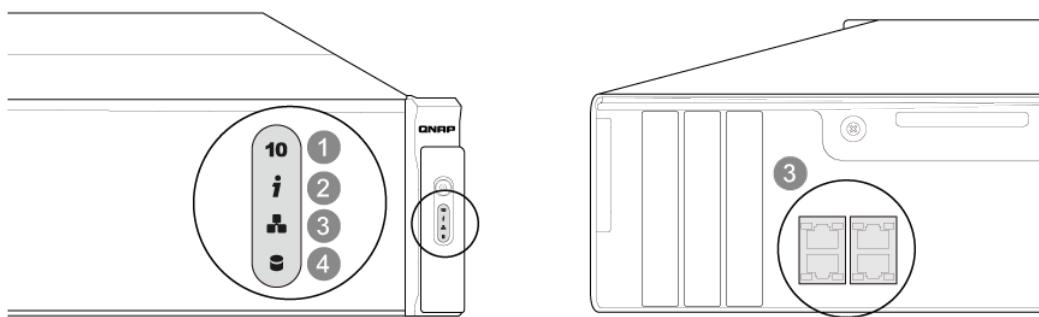
Advanced system reset (10 sec)

Press the reset button for 10 seconds; you will hear two beeps at the third and the tenth seconds. The NAS will reset all the system settings to default as it does by web-based system reset in "Control Panel" > "System Settings" > "Backup / Restore" > "Restore to Factory Default" except all the data are reserved. The settings such as the users, user groups, and the network share folders previously created will be cleared. To retrieve the old data after the advanced system reset, create the same network share folders on the NAS and the data will be accessible again.

Chapter 3. LED and Alarm Buzzer Specifications

3.1 LED

The LED indicators of the NAS indicate the system status and information. When the NAS is turned on, check the following items to make sure the system status is normal. Note that the following LED information is applicable only when users have properly installed the hard drive, and connected the NAS to the network and the power supply.



LED	Color	LED Status	Description
10 GbE	Green	Green	The 10GbE network expansion card is installed.
		Off	No 10GbE network expansion card is installed.
		Flashes green and red alternately every 0.5 sec	<ol style="list-style-type: none"> 1. The hard drive on the NAS is being formatted. 2. The NAS is being initialized. 3. The system firmware is being updated. 4. RAID rebuilding is in process. 5. Online RAID capacity expansion is in process. 6. Online RAID level migration is in process.
System Status	Red/Green	Red	<ol style="list-style-type: none"> 1. The hard drive is invalid. 2. The disk volume has reached its full capacity. 3. The disk volume is going to be full. 4. The system fan is out of function. 5. An error occurs when accessing (read/write) the disk data. 6. A bad sector is detected on the hard drive. 7. The NAS is in degraded read-only mode (2 member drives fail in a RAID 5 or RAID 6 configuration, the disk data can still be read). 8. Hardware self-test error.
		Flashes red every 0.5 sec	The NAS is in degraded mode (one member drive fails in RAID 1, RAID 5 or RAID 6 configuration).
		Flashes green every 0.5 sec	<ol style="list-style-type: none"> 1. The NAS is starting up. 2. The NAS is not configured. 3. A hard disk drive is not formatted.
		Green	The NAS is ready.
		Deep flashes of orange	The NAS is in sleep mode.

		Off	All the hard drives on the NAS are in standby mode.
LAN	Orange	Orange	The disk data is being accessed from the network and a read/write error occurs during the process.
		Flashes orange	The NAS is connected to the network.
Storage Expansion Port Status	Orange	Off	No expansion enclosures are detected.
		Orange	Expansion enclosures are detected.
HDD	Red/ Green	Flashes red	The NAS is being accessed from the network.
		Red	A hard drive read/write error occurs.
		Flashes green	The disk data is being accessed.
		Green	The hard drive can be accessed.

3.2 Beep Alarm

The beep alarm can be disabled in "Control Panel" > "System Settings" > "Hardware".

Beep sound	Number of Times	Description
Short beep (0.5 sec)	1	<ol style="list-style-type: none">1. The NAS is starting up.2. The NAS is being shut down (software shutdown).3. The user presses the reset button to reset the NAS.4. The system firmware has been updated.
Long beep (1.5 sec)	3, every 5 min	The system fan is out of function.
Long beep (1.5 sec)	2	<ol style="list-style-type: none">1. The disk volume is going to be full.2. The disk volume has reached its full capacity.3. The hard drives on the NAS are in degraded mode.4. The user starts the hard drive rebuilding process.5. A hard drive is plugged in or out.
	1	<ol style="list-style-type: none">1. The NAS is turned off by force shutdown (hardware shutdown).2. The NAS has been turned on and is ready.

Chapter 4. Upgrade Memory on QNAP Turbo NAS (RAM Module Installation)



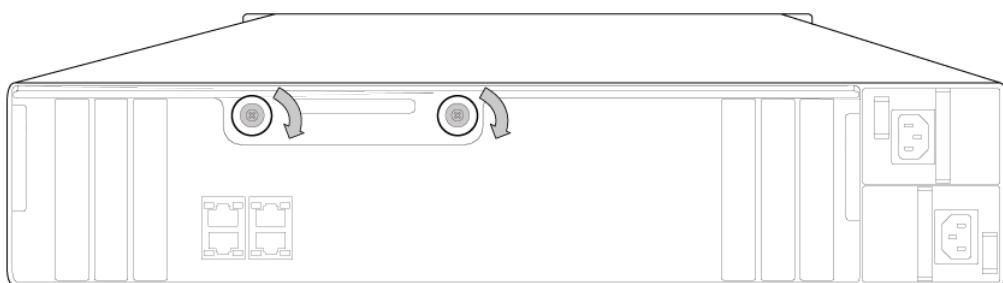
Warning:

- The following instructions should only be performed by an authorized or trained technician.
- Strictly adhere to the instructions in this section to install RAM modules in NAS. Failure to do so could result in property damage, bodily harm or even death.

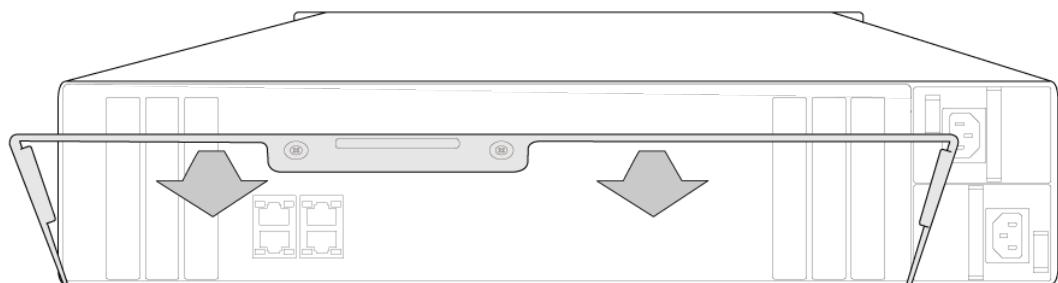
The TES-x85U series allows users to upgrade the memory in their QNAP NAS devices. Ensure that the type of RAM is compatible with the NAS before installing. To determine how much memory is currently in the system, log into QES/QTS as administrator and go to "Control Panel" > "System Settings" > "System Status" to open the System Status window. Under System Information, check for System memory or Total memory.

Carefully follow the steps below:

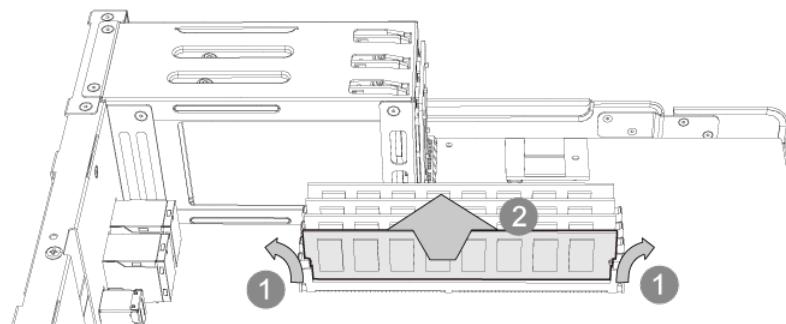
1. Power off the NAS. Wait for device to fully power down.
2. Disconnect power cord(s), network cable(s), and any other cables attached to the device.
3. Before opening the NAS, wear an antistatic wrist strap and connect the crocodile clamp to ground to prevent electrostatic discharge from damaging equipment.
4. Loosen the 2 screws on the back of the NAS located on the handle.



5. Pull the handle outwards to remove the motherboard drawer.

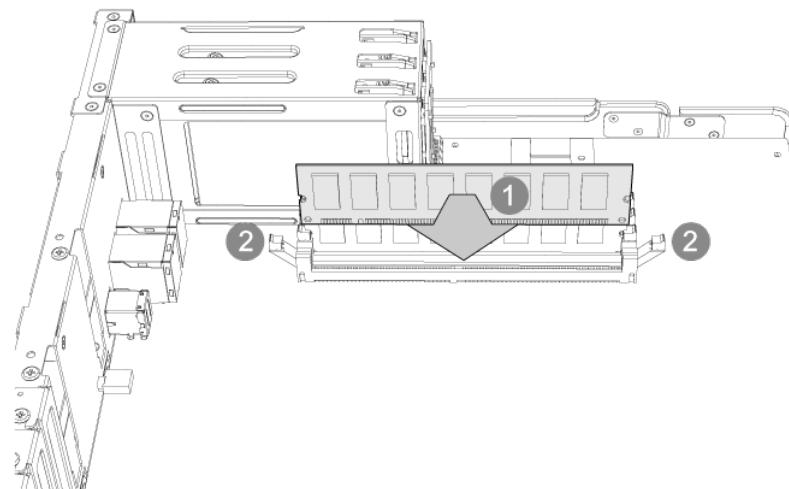
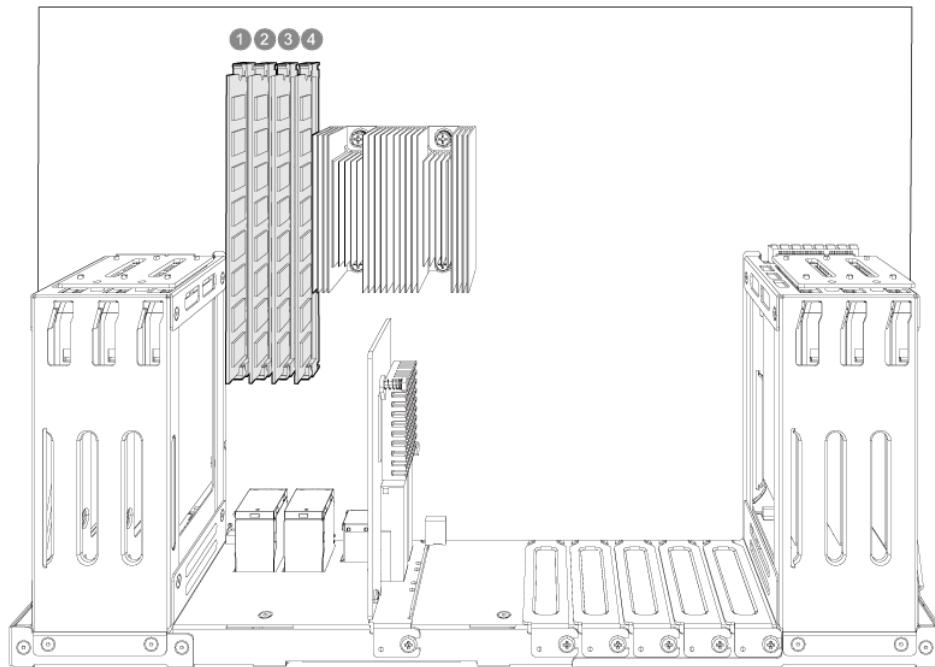


6. Unlock the RAM slot by pressing down on the retention clamps on the sides of the RAM slot. If replacing RAM, remove existing module from socket.

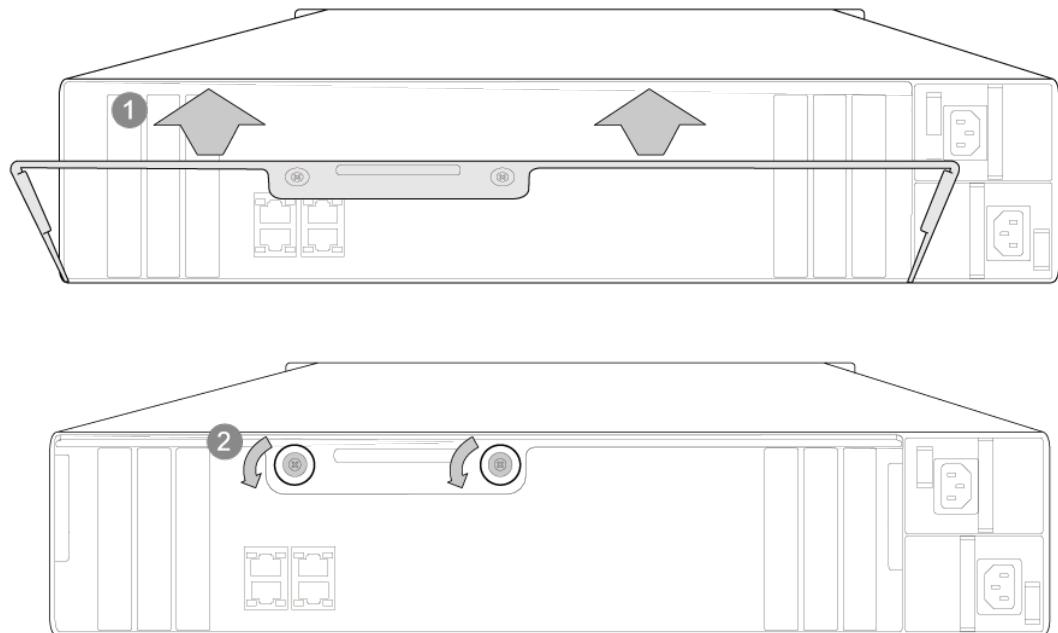


7. Install new RAM:

- i. Grip the new RAM on the edges to avoid touching contacts or circuitry on the module.
- ii. Line up the notch on the RAM to the break in the slot. Ensure that first RAM module is inserted into slot 1 (see below for slot positioning).
- iii. Set the stick into the slot and apply equal pressure onto both ends of the stick until the clamps on the side click and fully lock the RAM in.



8. Slide the motherboard drawer back into the NAS and pull the handle up to close enclosure and insert screws on the handle.



9. Reconnect all cables back into the NAS.
10. Power on NAS.
11. To verify that the memory module is installed correctly and is recognized by the operating system, log into QES/QTS as administrator and go to "Control Panel" > "System Settings" > "System Status" > "System Information" and check for System memory or Total memory.

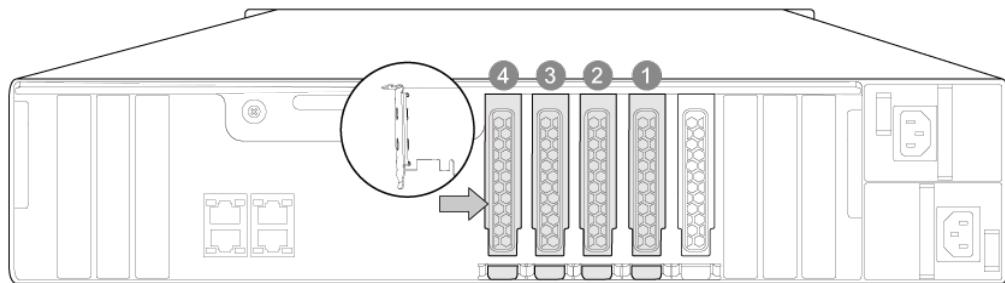
Chapter 5. Expansion Card Installation



Warning:

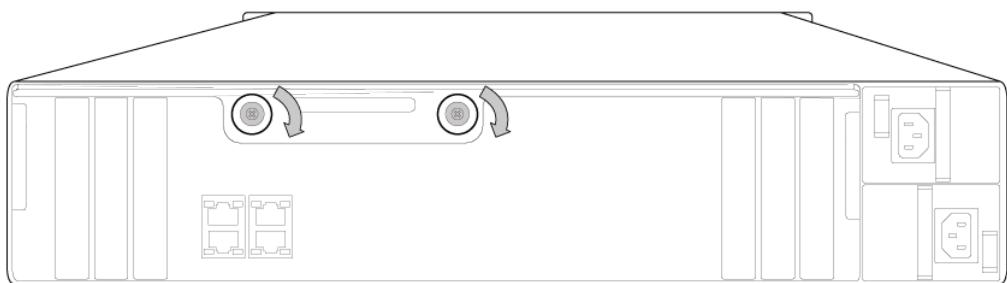
- The following instructions should only be performed by an authorized or trained technician.
- Strictly adhere to the instructions in this section to install PCIe add-in card(s) in NAS. Failure to do so could result in property damage, bodily harm or even death.

The TES-x85U series provides 4 low-profile PCIe expansion slots so that users can add functionality to their NAS. Refer to the compatibility list at <http://qnap.com/compatibility>.

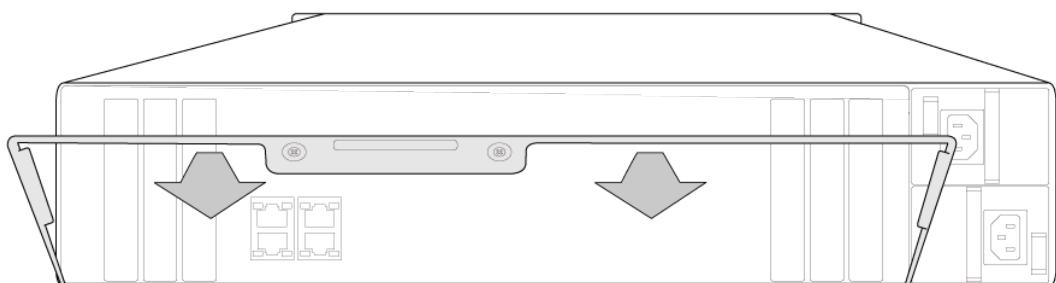


Follow the steps below to install add-in card:

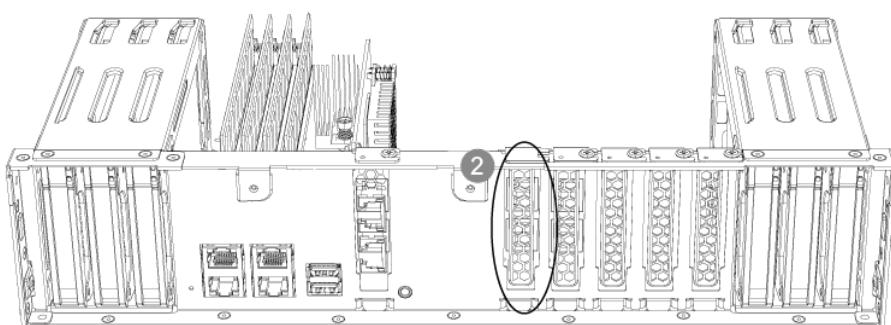
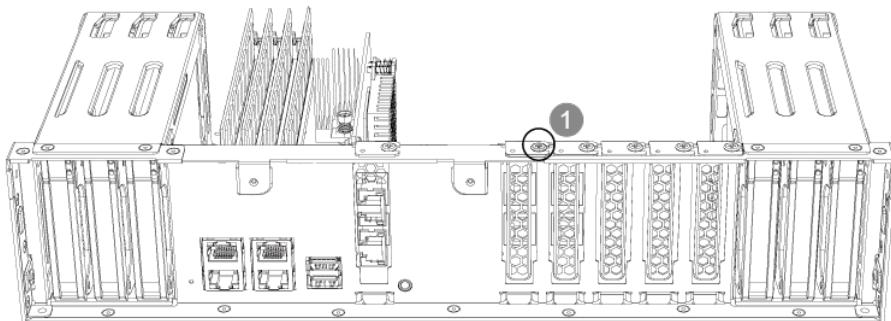
1. Power off the NAS. Wait for device to fully power down.
2. Disconnect power cord(s), network cable(s), and any other cables attached to the device.
3. Before opening the NAS, wear an antistatic wrist strap and connect the crocodile clamp to ground to prevent electrostatic discharge from damaging equipment.
4. Loosen the 2 screws on the back of the NAS located on the handle.



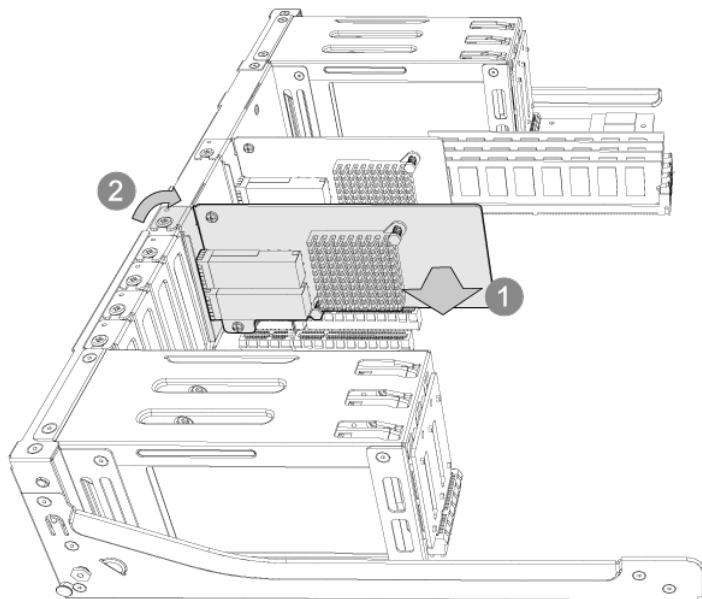
5. Pull the handle outwards to remove the motherboard drawer.



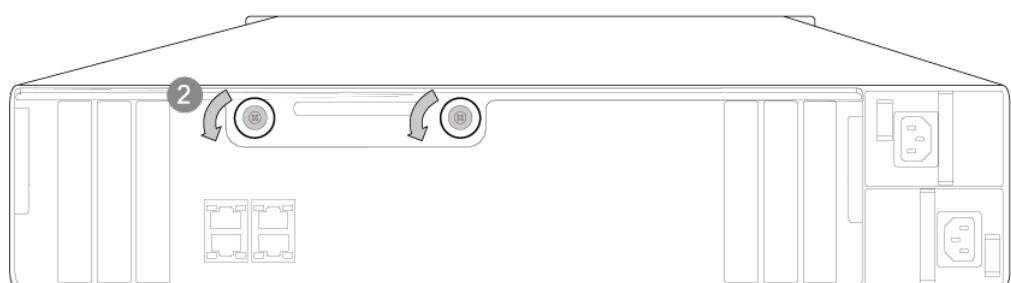
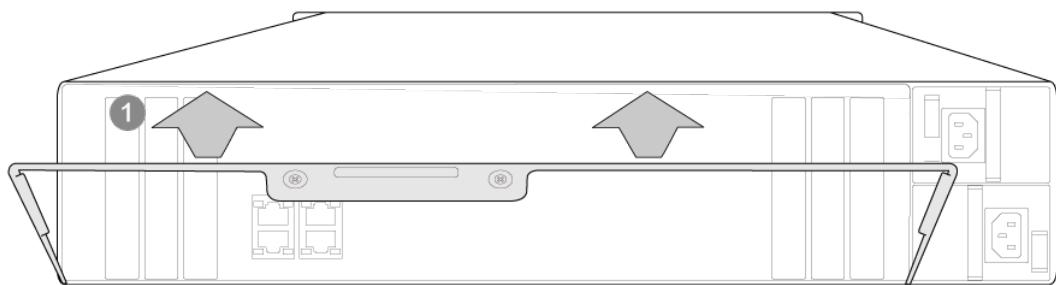
6. Remove screw from the expansion slot cover and detach cover.



7. Line up the notch on the expansion card to the break in the PCIe slot. Fully insert the expansion card to the expansion slot. Fasten screw to lock in card.



8. Slide the motherboard drawer back into the NAS and pull the handle up to close enclosure and insert screws on the handle.



9. Reconnect all cables back into the NAS.

10. Power on NAS.

Chapter 6. Install and Hot-swap Hard Drives

The TES-x85U series is compatible with 2.5-inch/3.5-inch SAS and SATA hard drives. For hard drive compatibility list, go to <http://www.qnap.com/compatibility>.



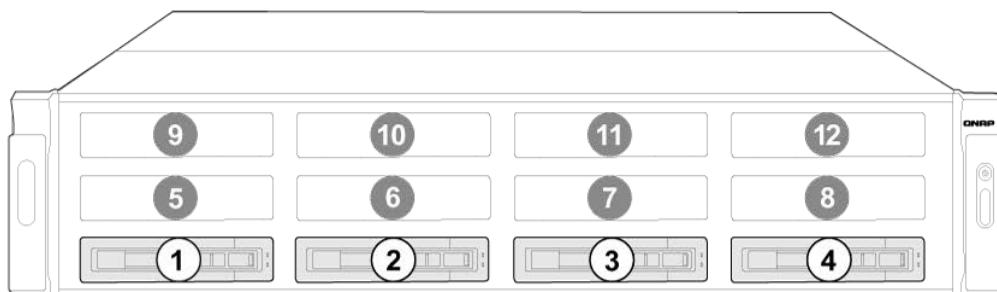
Caution:

- QNAP is not responsible for product damage/malfunction or data loss due to misuse or improper installation of hard disks.
- Note when a hard drive is installed in a QNAP NAS for the first time, the hard drive will be automatically formatted and all the data on disk will be cleared.
- For information on QTS NAS migration, go to docs.qnap.com and check "Migrating from Old NAS" section.

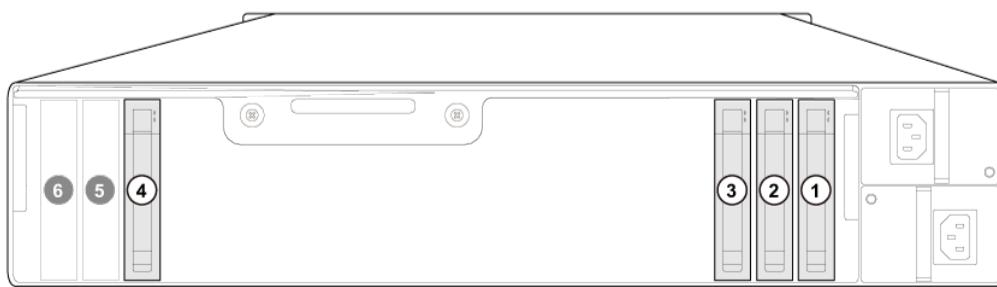
6.1 Hard Drive Bay Numbering

Identify the hard drive position in the diagram below.

1. TES-1885U (front) bay numbering:

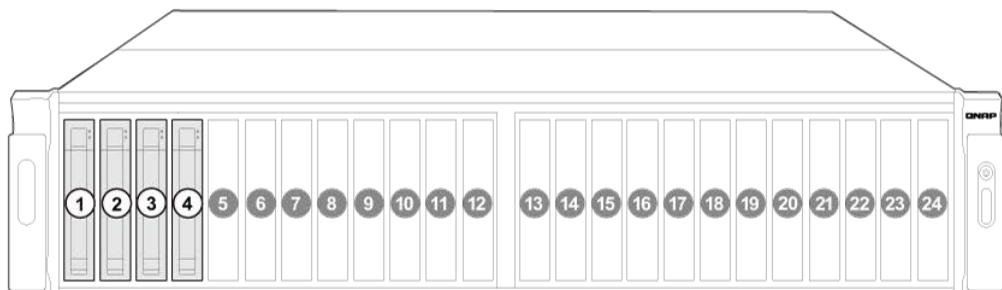


2. TES-1885U (rear) bay numbering:

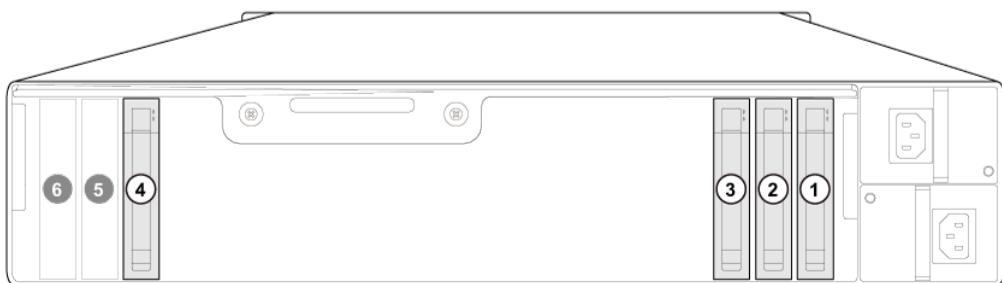


	TES-1885U	
	Front	Rear
Supports 3.5-inch SAS/SATA Hard Drives	Yes	No
Supports 2.5-inch SAS/SATA Hard Drives	Yes	No
Supports 2.5-inch SSD	Yes	Yes
Supports Hot-swapping Hard Drives (RAID 1 or above)	Yes	Yes

3. TES-3085U (front) bay numbering:



4. TES-3085U (rear) bay numbering:



The TES-x85U series uses hard drive bays #1-4 on the front or the back of the unit to store the QES operating system. The user will have the option to select the front or back drives for the operating system during QES quick setup. The QTS operation system is stored across all drive members in the NAS.

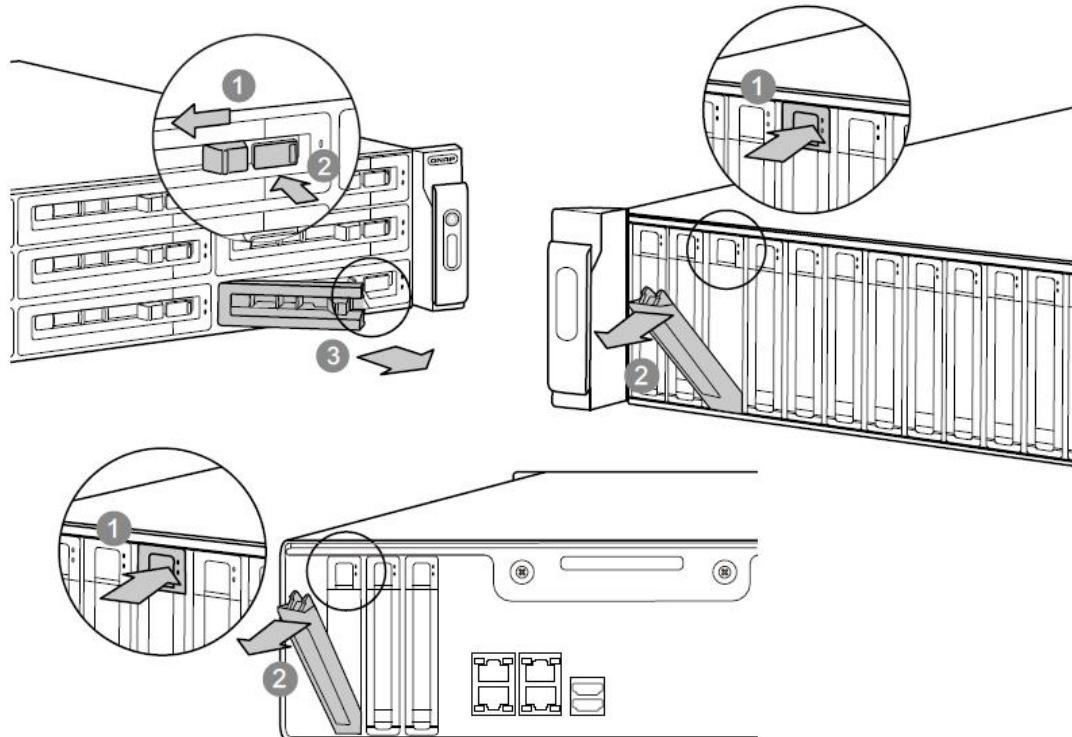
Note: TES-x85U series supports either the QES or QTS operating system.

	TES-3085U	
	Front	Rear
Supports 3.5-inch SAS/SATA Hard Drives	No	No
Supports 2.5-inch SAS/SATA Hard Drives	Yes	No
Supports 2.5-inch SSD	Yes	Yes
Supports Hot-swapping Hard Drives (RAID 1 or above)	Yes	Yes

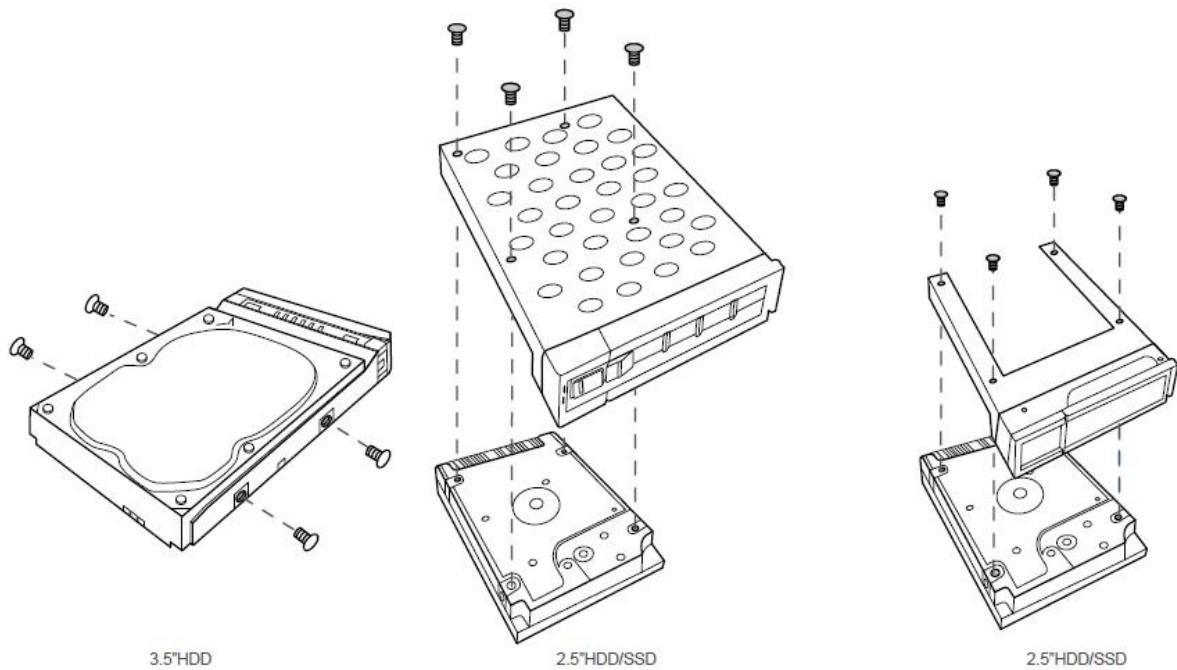
6.2 Install Hard Drives

To install hard drives in NAS, follow the steps below:

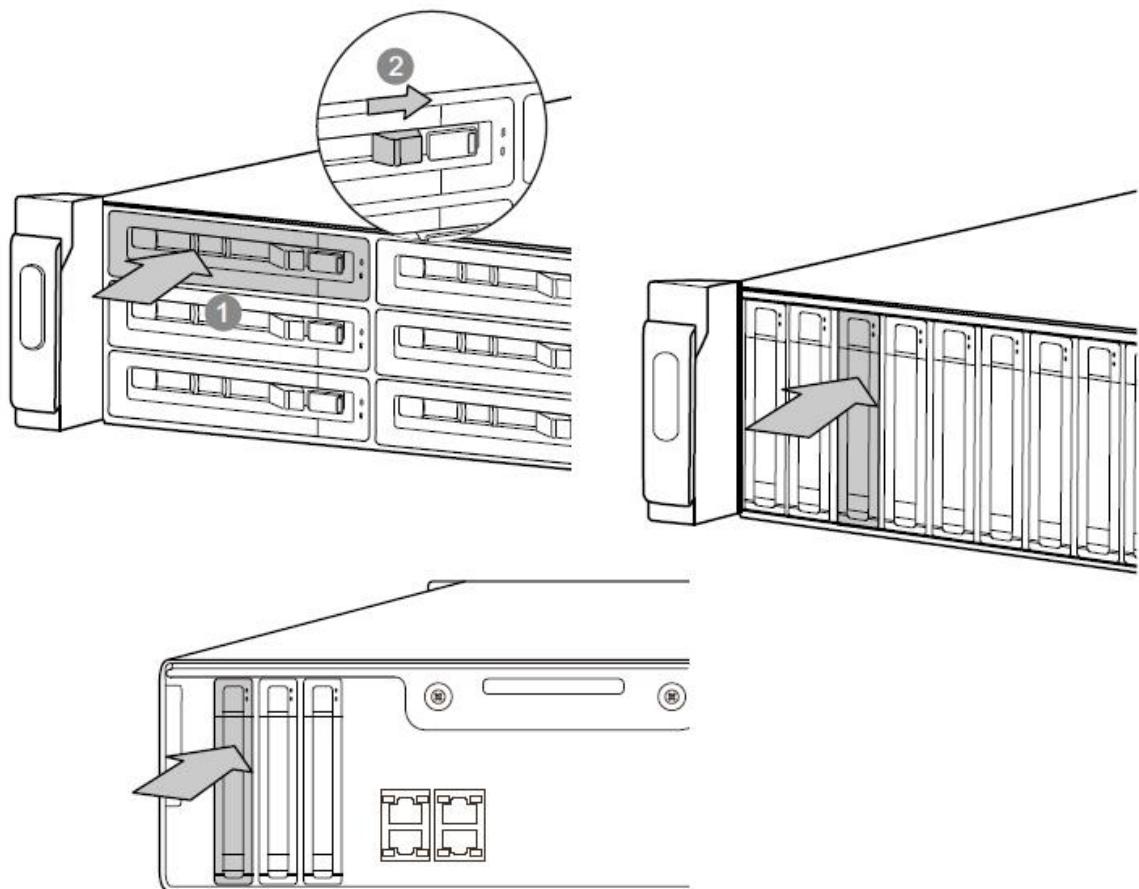
1. Unlock drive tray and remove from enclosure.



2. Install a 3.5" or 2.5" disk drive to the tray.



3. Insert the drive tray into the NAS, close and lock the latch.



4. To verify that the hard drive has been correctly installed and recognized by the operating system, log into QES/QTS as administrator and go to "Storage Manager" > "Storage" > "Disks" or "Disks/VJOB" and confirm the disk is in the System Component or NAS Host section.

6.3 RAID Recovery - Hot-Swap Hard Drives

The TES-x85U series supports hot-swapping hard drives. When one drive fails in RAID 1/5, up to two drives fail in RAID 6/RAID 10*/Triple Mirror**, or up to three drives fail in RAID-TP**, replacing failed drives with a healthy ones will automatically trigger QES/QTS to rebuild the RAID. Follow the steps below to hot-swap hard drives when drive failures occur in a RAID configuration. See section 6.2 for detailed instructions on how to install a new drive.

* One drive each in the RAID 1 pair

** QES only

Follow instructions below for hot-swapping:

1. Log into QES/QTS as administrator and check the storage pool status in "Storage Manager" > "Storage" > "Storage Space". There will be a list of all available storage pools.
2. If one drive fails in RAID 1/5, up to two drives fail in RAID 6/RAID 10*/Triple Mirror**, or up to three drives fail in RAID-TP**, the storage pool status will be labeled as "Degraded" and the Volume/RAID group status should be labeled as "Warning".
3. Go to "Storage Manager" > "Storage" > "Disks" or "Disks/VJBOD" to determine which disk needs to be replaced.
4. Take out bad drive from NAS enclosure and remove hard drive from tray.
5. Install replacement hard drive onto tray.

Note: the capacity of the new drive must be equal to or greater than the capacity of the old drive.

7. Insert tray with hard drive installed into NAS.

Important: Wait for two beeps after removing the faulty hard drive before inserting replacement drive into NAS. The NAS should also beep twice after replacement hard drive is installed.

8. The volume should automatically rebuild. Go to "Storage Manager" > "Storage" > "Storage Space" to confirm.

6.4 RAID Recovery - Accidentally Removal of Healthy Hard Drive (QTS)

The TES-x85U series supports RAID recovery when a healthy drive is unexpectedly removed from a RAID 1/5/6 during hot-swapping or RAID 0/JBOD configuration in QTS. Note that RAID 10 does not support this feature.

When a healthy drive is unexpectedly removed from a RAID group, the status of the RAID will change to "Not active". To recover from an "Not active" status:

1. Re-insert all hard drives back into the NAS in its original order. This includes any bad drive(s) that will need to be replaced after recovery.
2. Log into QTS as administrator and go to "Storage Manager" > "Storage" > "Storage Space".
3. Double click on the affected Storage Pool to open the Storage Pool Management window.
4. In the "Storage Pool Management" window, click on the "Manage" button and select "Recover".

The process should take about 60 seconds for QTS to complete. When recovery is completed, the RAID group should be restored to its initial status.

See chart below for RAID status during this process.

	Initial Status	Status After Healthy Drive is Removed	Status After Drive is Re-Inserted and Storage Pool is Recovered
RAID 0/JBOD	Ready	Not active	Ready
RAID 1/5/6	Ready	Degraded	Rebuilding
RAID 1/5/6	Degraded	Not active	Degraded

The chart below describes the events of an error when using RAID 5.

	RAID 5 (Minimum 3 Disks)	
	QTS	Standard
One drive fails	Degraded mode (may still read and write).	Degraded mode (may still read and write).
One drive fails and there are bad sectors found in the other drive(s)	Read only protect mode (for immediate data backup & hard drive replacement).	RAID crash.
2 hard drives fail	RAID crash.	RAID crash.

The chart below describes the events of an error when using RAID 6.

	RAID 6 (Minimum 4 Disks)	
	QTS	Standard
One or two drives drive fail	Degraded mode. (may still read and write).	Degraded mode. (may still read and write).
Two drives fail and there are bad sectors found in the other drive(s)	Read only protect mode (for immediate data backup & hard drive replacement).	RAID crash.
3 hard drives fail	RAID crash.	RAID crash.

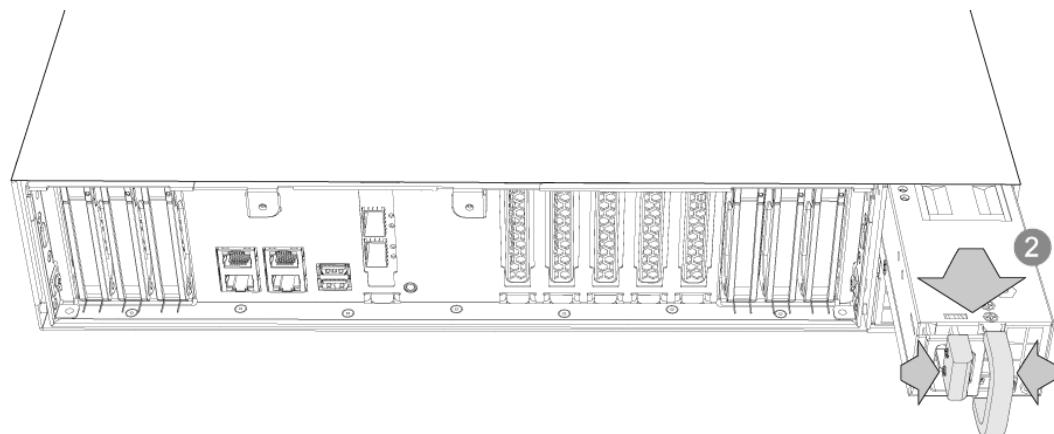
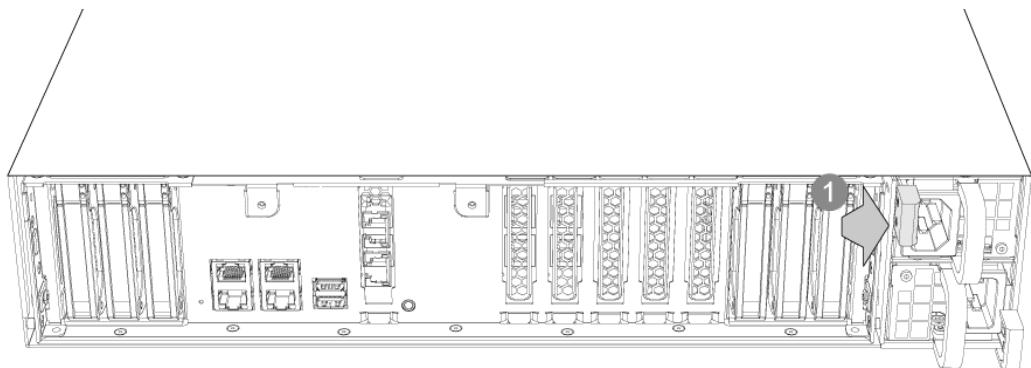
Chapter 7. Install Power Supply Unit and Redundant Power Supply Mode

Note: The following instructions should only be performed by an authorized or trained technician.

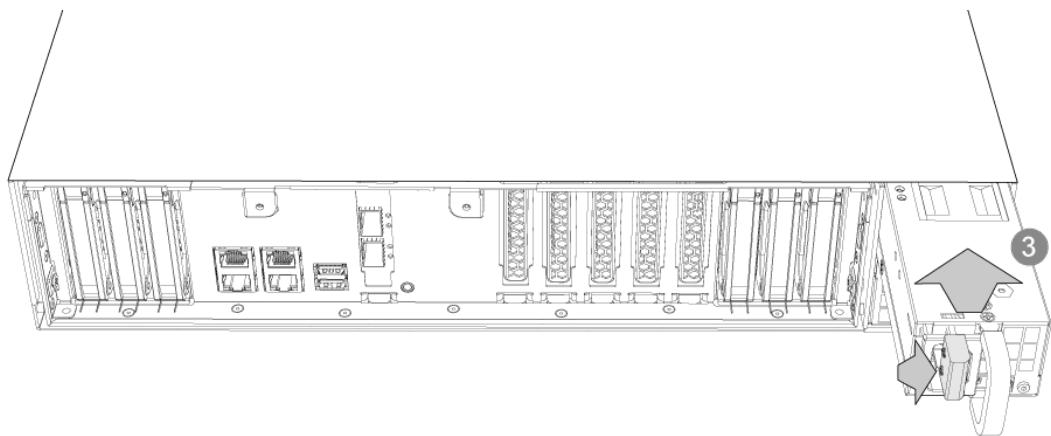
7.1 Replace Power Supply Unit

To replace a failed power supply unit on the TES-x85U series, follow the steps below.

1. Power off the NAS. Wait for device to fully power down.
2. Disconnect power cord(s), network cable(s), and any other cables attached to the device.
3. Firmly press and hold the orange button on back of PSU towards the black handle. Pull out power supply by pulling black handle.



4. Insert new power supply into NAS.

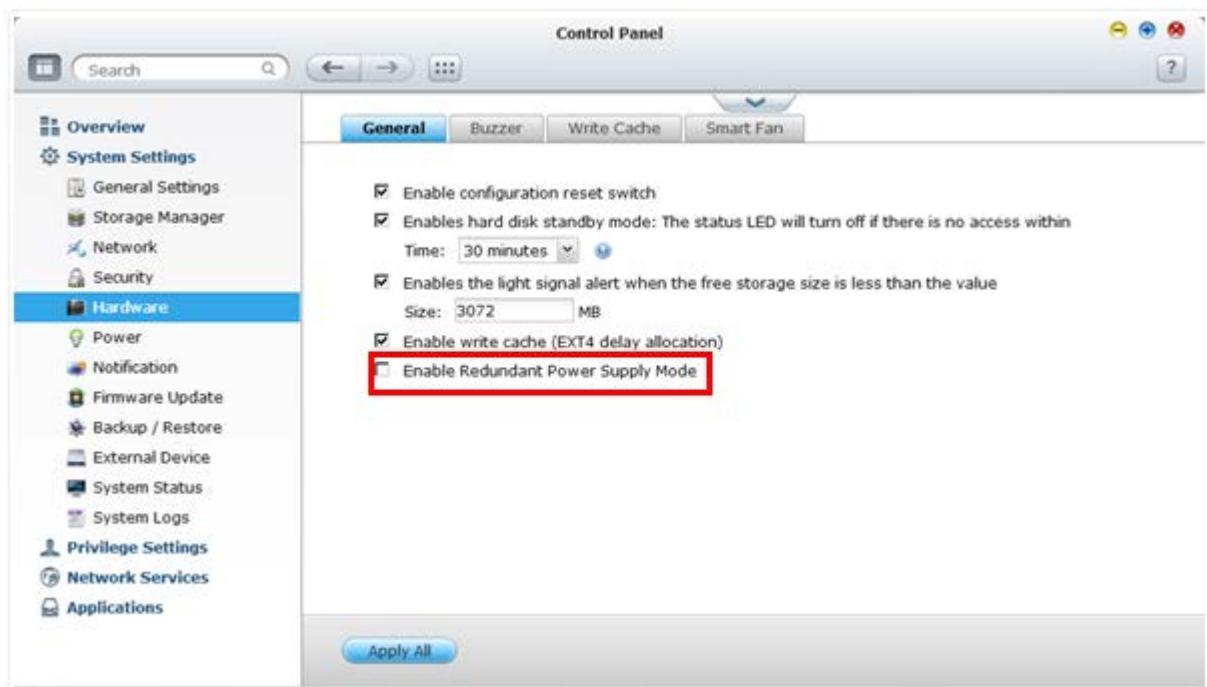


5. Connect the power adaptor and cables to the NAS.

6. Power on NAS.

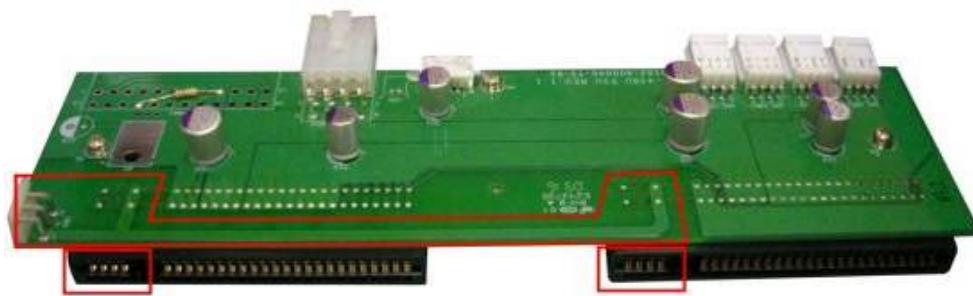
7.2 Redundant Power Supply Mode

If two power supply units (PSU) have been installed on the NAS, both PSUs will supply power to the NAS. Redundant Power Supply Mode is a feature that will alert users of a PSU failure or power interruption. The NAS will beep and log an error message in the "System Logs". Redundant Power Supply Mode can be enabled in QES/QTS under "Control Panel" > "System Settings" > "Hardware" > "General" > "Enable Redundant Power Supply Mode". It is not recommended for users to enable this feature for only one PSU. This function is disabled by default.



WARNING: RISK OF ELECTRIC SHOCK

The connectors on the back panel (bracketed parts below) contain high voltage. Do NOT touch these parts to avoid the risk of electric shock to the maintenance operator.



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