TS-451DeU
Short-depth 1U NAS

Intel dual-core NAS
Featuring dual M.2 SATA SSD slots and two 2.5GbE ports
OVERVIEW

- The beginning of the 2.5GbE wave: the affordable TS-451DeU with extensive hardware features
- TS-451DeU for high performance backup and business applications
- Parts upgrade and performance demo
Time to upgrade the old Gigabit network to match the rising Wi-Fi 6 (802.11ax)

With the release of Wi-Fi 6 (802.11ax) routers, and their 160MHz large bandwidth throughput and higher wireless performance, it is inevitable to upgrade the Gigabit wired speed to 2.5GbE or higher in businesses!

QNAP 10G switches supporting 2.5GbE

Keep existing wiring for 2.5GbE

<table>
<thead>
<tr>
<th>Speed</th>
<th>CAT 5e</th>
<th>CAT 6</th>
<th>CAT 6A</th>
</tr>
</thead>
<tbody>
<tr>
<td>100M</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>1G</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>2.5G</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>5G</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>10G</td>
<td>X</td>
<td>✔(55m)</td>
<td>✔</td>
</tr>
</tbody>
</table>
Affordable and fast storage for start-ups

- Dual-core J4025
  - 2.0 GHz base
  - 2.9 GHz burst

- Intel UHD Graphics 600 integrated
  - 250 MHz base
  - 750 MHz burst

TS-451DeU

Short-depth 1U NAS

Intel CELERON inside
Upgrade to max. 8GB memory

2 x DDR4 SO-DIMM
Dual-channel, max 8 GB total

TS-451DeU-2G

2GB RAM (1 x 2GB)

Ordering information:
4GB: RAM-4GDR4A0-SO-2400
2GB: RAM-2GDR4T0-SO-2400

* Requiring removing some screws on the top cover
1U rackmount NAS for Qtier & SSD Cache

- **2 x M.2 2280 SATA 6Gb/s SSD ports**
- **4 x 3.5-inch/2.5-inch SATA 6Gb/s HDD/SSD bays**

**LED indicators:**
- Disks
- M.2 SSDs
- Network
- Expansion
- Status

**Power button**
Dual M.2 2280 SATA SSD slots for performance enhancement

Choice 1: SSD cache
Improves random access performance

Choice 2: Qtier
Performance and capacity benefits
Qtier (Auto-Tiering) combines performance & capacity

- QNAP NAS allows the combination of SSD and HDD RAID into the same pool and migrate data automatically based on accessing pattern.
- Provide higher capacity as SSDs can be used to store data.
Easy to install HDD/SSD with hot-swappable design
Multiple USB ports for disks, UPS and other peripherals

- 2 x USB 3.2 Gen 1 (5Gbps)
- 2 x 2.5G/1G/100M/10M network ports
- 3 x 40mm system fan
- Reset button
- 2 x USB 2.0
- Kensington lock slot
Flexibly deployable short-depth chassis TS-451DeU

12-inch depth, 40% less than traditional chassis

Compatible with standard ANSI/EIA-RS-310-D 19-inch rack
With optional RAIL-B02 Rail Kits
100W open frame, noise-reduced, fanless PSU

Three 40mm quiet system fans

Power consumption

<table>
<thead>
<tr>
<th>State</th>
<th>Consumption (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In operation</td>
<td>28.02W</td>
</tr>
<tr>
<td></td>
<td>33.72W*</td>
</tr>
<tr>
<td>HDD sleep</td>
<td>13.18 W</td>
</tr>
<tr>
<td></td>
<td>21.3W*</td>
</tr>
</tbody>
</table>

Noise level

<table>
<thead>
<tr>
<th>State</th>
<th>Noise Level (dB(A))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>21.6 dB(A)</td>
</tr>
<tr>
<td></td>
<td>37.7 dB(A)*</td>
</tr>
</tbody>
</table>

*(1U server reference)

Environmentally friendly design

Power consumption is measured when fully loaded with 1TB NAS drives

Noise level test environment:
Refer to ISO 7779; Maximum HDD loaded; Bystander Position; Average data from 1 meter in front of operating NAS. (Using TS-453BU as reference of 1U single-PSU rackmount server)
Don’t let the switch slow down your entire network

10G SFP+ NAS
TS-832XU-RP

10GBASE-T NAS
TVS-872XT

2.5GBASE-T NAS
TS-451DeU

10GBASE-T NAS

10GBASE-T computer/server
Apple iMac Pro

1GbE switch (limited to max 1Gbps!)
Rule #1: Get a fast NAS with 2.5GbE+

Tested in QNAP Labs. Figures may vary by environment.

NAS: TS-451DeU-2G
OS: QTS 4.4.2, MTU-9000
Disks: Qtier, RAID 5: 4 x Seagate 1TB ES.3 HDD + RAID 1: 2 x Samsung 1TB M.2 860 EVO SSD
Client PC: Intel® Core™ i7-6700 3.40GHz CPU; 32GB RAM; Intel X550 NIC, MTU-9000; Windows® 10 Pro

Iometer SMB sequential throughput: 3 minutes / 2 workers / 64 outstanding / 30 sec ramp up time

Transfer a 10GB file:
23 sec (2 x 2.5GbE) v.s. 89 sec (1 x 1GbE)
reduces 75% backup time!
Rule #2-1: Upgrade the computers and servers with a PCIe NIC

Support 10G/5G/2.5G/1G/100M Multi-Gig

- QXG-10G1T
  - Marvell AQC107
  - 1 x 10GbE NBASE-T
  - PCIe Gen3 x8
  - Low Profile

- QXG-10G2T-107
  - Marvell AQC107S
  - 2 x 10GbE NBASE-T
  - PCIe Gen3 x8
  - Low Profile

Support 5G/2.5G/1G/100M Multi-Gig

- QXG-5G1T-111C
  - Marvell AQC111C
  - 1/2/4 x 5GbE NBASE-T
  - PCIe Gen2 x1, Gen3 x2, Gen3 x4
  - Low Profile

- QXG-5G2T-111C
  - Marvell AQC111C
  - 1/2/4 x 5GbE NBASE-T
  - PCIe Gen2 x1, Gen3 x2, Gen3 x4
  - Low Profile

- QXG-5G4T-111C
  - Marvell AQC111C
  - 1/2/4 x 5GbE NBASE-T
  - PCIe Gen2 x1, Gen3 x2, Gen3 x4
  - Low Profile
Rule #2-2: Upgrade computer network speed with a USB 3.2 Gen 1 adapter

QNAP QNA-UC5G1T:
USB 3.2 Gen 1 Type-C to 5G/2.5G/1G/100M network adapter

Includes a 20cm USB 3.2 Gen 1 Type-C to Type-A cable
Rule #3: Future-proof your network by upgrading to a Multi-Gig switch

Here are the specifications for the Multi-Gig switches:

<table>
<thead>
<tr>
<th></th>
<th>QSW-308-1C</th>
<th>QSW-1208-8C</th>
<th>QSW-804-4C</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ45 1G</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>RJ45 10G/5G/2.5G/1G/100M</td>
<td>1 (Combo port)</td>
<td>8 (Combo port)</td>
<td>4 (Combo port)</td>
</tr>
<tr>
<td>SFP+ 10G</td>
<td>3</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Dimensions</td>
<td>290 x 50 x 42.5 mm (11.4 x 2.0 x 16.7 in)</td>
<td>285 x 43 x 233 mm (11.2x 1.7 x 9.2 in)</td>
<td>-</td>
</tr>
<tr>
<td>Net Weight:</td>
<td>820g</td>
<td>2150g</td>
<td>2100g</td>
</tr>
<tr>
<td>Power</td>
<td>AC adapter, 36W, 100 - 240V</td>
<td>AC adapter, 50W, 100 - 240V</td>
<td>AC adapter, 41W, 100 - 240V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0°C to 40°C (32°F to 104°F)</td>
<td>0°C to 40°C (32°F to 104°F)</td>
<td>-</td>
</tr>
<tr>
<td>Fan</td>
<td>Fan less design</td>
<td>2 x 4cm fan (12V DC)</td>
<td>-</td>
</tr>
<tr>
<td>Management Type</td>
<td>Unmanaged switch</td>
<td>Unmanaged switch</td>
<td>-</td>
</tr>
</tbody>
</table>
Use 2.5GbE to reduce backup & recovery time

- The Remote Snapshot Vault Recovering is based on the Ethernet service.
- Using 1GbE network, recovering large data still takes hours.
- Pair the Snapshot Replica Solution with 2.5GbE interfaces to increase both the backup and recovery speed!
- Using QNAP 10GbE Switch to replace old 1GbE for reducing RTO dramatically.
Qsync for teamwork and productivity improvements

- Windows/Mac/Linux Qsync synchronization utilities
- Use Qsync mobile app to access the data anytime, anywhere
- Central Management Mode & User Customization Mode
- Version control with up to 64 versions for data recovery
- Administrators can erase the data on remote devices when a linked device is stolen
1. Fully supports all storage configurations at the storage pool level.
2. Easily take, manage and restore snapshots.
3. Using the ext4 file system for "out of volume" snapshots

<table>
<thead>
<tr>
<th>RAM Size</th>
<th>Maximum Total Snapshot Number</th>
<th>Maximum Snapshot Number per Volume/LUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>2GB</td>
<td>64</td>
<td>32</td>
</tr>
<tr>
<td>4GB and more</td>
<td>1024</td>
<td>256</td>
</tr>
</tbody>
</table>

- Ransomware cannot overwrite snapshots which are stored out of volume.
Mac Time Machine backup

Create the NAS backup job

1. Select Time Machine Backup as the source
2. Select TR-004U as the destination
3. Set up the schedule
   - Enable QuDedup
Backup data with deduplication

HBS 3 (Hybrid Backup Sync 3)

- **From local NAS (via HBS 3)**
- **From remote NAS (via File Station)**
- **Carry and use (QuDedup Extract Tool)**

- Backup/Restore
- TCP BBR
- Access from the cloud
- CIFS / NFS / FTP

**Locations:***
- Tokyo
- NYC
- London
- Taipei
- File Station with QuDedup (soon)

**Tools:***
- HBS 3 (Hybrid Backup Sync 3)
- File Station with QuDedup (soon)
- QuDedup Extract Tool
Enhance efficiency with online collaboration

Note taking

Backup Data Can Be Restored in Different Places and Taken Anywhere

Image editing

Backup Data Can Be Restored in Different Places and Taken Anywhere
Qsirch 4.0 makes it easy to search files

- Search within NAS and on the Internet
- Large file preview window
- Advanced search for complex keyword search
- 35+ powerful filter conditions
- Easy steps from previewing to sharing

1. Web
2. Mobile
3. Mac Finder
4. Browser extension
Secure Encrypted Connection: DTLS + SSL + AES-256 encryption

New QBelt protocol: Decreases the chance of being detected

Works on many desktop and mobile devices
QVR Pro surveillance solution

For NAS with 4GB RAM or more
- 5,000+ compatible IP cameras
- 8 free camera channels
- 30 channels max. (optional license)
- QUSBCam2 for webcam recording

For NAS with 2GB RAM
- Surveillance Station 5.1
  - 2 free channels
  - 32 channels max. (optional license)
Rackmount NAS for multimedia streaming

Use Cinema28 for multi-room streaming

Use Plex server to stream or transcode media files

Use Qmedia app on Apple TV/Fire TV/Roku/Android TV

QuMagie AI smart albums for object/face classification

Integrated GPU for max 2-ch 4K video transcoding
Use Virtual JBOD to expand NAS capacity

- Max 8 VJBOD connections
- 2.5GbE iSCSI VJBOD connections

Network Devices:
- TS-1263XU-RP
- TS-451DeU
- QSW-1208-8C
- TVS-672N
QNAP TR USB RAID & TL USB JBOD support 2 modes on NAS

- TS-451DeU supports maximum two QNAP TR RAID enclosures or one TL-R1200C-RP USB JBOD enclosure.
- Internal mode with storage pool support or external mode with cross-platform compatibility with Windows/Mac computers.

Mode 1: Expanding the NAS with new volume

Mode 2: Work as backup destination for snapshot replica
- Upgrade RAM & M.2 SATA SSD
- 2.5GbE performance test

RAM modules:
4GB: RAM-4GDR4A0-SO-2400
2GB: RAM-2GDR4A0-SO-2400
Up to 5 years of warranty option available

3-year standard warranty + 2-year extended warranty = 5 years of warranty

https://www.qnap.com/service/product-warranty/

Ordering P/N:
LIC-NAS-EXTW-ORANGE-2Y

Standard Warranty
- Warranty service that comes in effect at the time of purchase.
- Free repair and part replacement for products under normal use during warranty period. (Spare parts and consumables are excluded)

Extended Warranty (optional)
- Extending your warranty, available within 90 days of the initial unit purchase.
- Offers identical service to standard warranty.
TS-451DeU
2 x 2.5GbE, 4 x 3.5”/2.5” SATA + 2 x M.2 2280 SATA