4-bay NAS

TS-451D2

Featuring an Intel Celeron J4025 dual-core CPU and 2x GbE ports as a storage for smart home
Need for a large storage space for increasing amount of video and work files

- Able to store many types of files
- Important files on tablet and phone
- Lossless storage of photos and videos for the best memories
- Secure and reliable RAID data protection and anti-virus / anti-hacker
# 4-bay TS-451D2 with up to 64TB capacity

<table>
<thead>
<tr>
<th>RAID Type</th>
<th>Min. # of Disks</th>
<th>Disk Configuration</th>
<th>Speed</th>
<th>Data Redundancy/Protection when disk fails</th>
</tr>
</thead>
<tbody>
<tr>
<td>JBOD</td>
<td>1</td>
<td>4 x 16TB disk capacity</td>
<td>★★★</td>
<td>Partial (accessible if on undamaged disks)</td>
</tr>
<tr>
<td>RAID 0</td>
<td>2</td>
<td>64TB (combined)</td>
<td>★★★★★</td>
<td>none</td>
</tr>
<tr>
<td>RAID 1</td>
<td>2</td>
<td>2 x 16TB (smallest capacity), Supports dual RAID 1 volumes</td>
<td>★</td>
<td>Allows 1 disk failure</td>
</tr>
<tr>
<td>RAID 5</td>
<td>3</td>
<td>48TB [smallest capacity x (n-1)]</td>
<td>★★★★</td>
<td>Allows 1 disk failure</td>
</tr>
<tr>
<td>RAID 6</td>
<td>4</td>
<td>32TB [smallest capacity x (n-2)]</td>
<td>★★★</td>
<td>Allows 2 disks failure</td>
</tr>
<tr>
<td>RAID 10</td>
<td>4</td>
<td>32TB [smallest capacity x (n/2)]</td>
<td>★★★★</td>
<td>Allows 2 disks failure (Each of the RAID 1 group allows 1 disk failure)</td>
</tr>
</tbody>
</table>
Intel Celeron J4025 dual-core 2.0GHz SoC

Power-efficient x86 Multimedia NAS

Dual-core J4025
Code name: Gemini Lake Refresh

2.0GHz Base
2.9GHz Burst

NAS models:

TS-451D2-2G
2 GB RAM (1 x 2 GB)

TS-451D2-4G
4 GB RAM (1 x 4 GB)
4-bay TS-451D2 front view

LED indicators: Status, LAN, USB

Disk LED indicators: Disk 1~4

Power button

Copy button

USB 3.2 Gen 1 port

4 x 3.5”/2.5” SATA 6Gb/s HDD/SSD bay

Includes 2 keys for locking the trays
Intuitive HDD and SSD installations

01

3.5-inch HDD: tool-less installation

02

2.5-inch HDD / SSD: use a screwdriver
Effortless RAM Upgrade to 8GB

Dual-channel memory
2 x DDR4 SO-DIMM slots, total 8 GB (2 x 4 GB)

✓ Optional 2GB and 4GB memory upgrade modules
4-bay TS-451D2 rear view

- 1 x 12cm smart fan
- 2 x RJ45 GbE ports
- 3 x USB 3.2 Gen 1 ports
- DC 12V power input
- 1 x 4K HDMI v2.0 60Hz
- Reset button
- Kensington security slot
Use QNAP NAS to build your personal cloud

Due to COVID-19, people continue to work from home. NAS allows you to access and share the data anytime and anywhere with an Internet connection. NAS can even connect to the public cloud or your company’s private cloud and lets you access the data with a computer, iOS, or Android app.
QuMagie smart albums and accelerated AI classification

Organize photos with similar faces using facial recognition

Classify photos into 400 different themes using Subject Detection: People, tags, dates, events, etc.

Album view

Folder View

TS-451D2
Use Qsync to organize and share daily photos

- Synchronize data with NAS and devices in real-time
  - Travel photos and videos sync to NAS via Qsync
  - Use Qfiling to archive files
  - Cross-platform device synchronization (Editing photos and videos, writing a travel blog, displaying high-resolution photo movies on the PC platform)
  - Use Qsirch to search for photos and videos
  - Share with other friends
Stream files to Apple TV, Fire TV, Android TV, Roku

- Use the remote control of your media player to navigate
- Categorization and multiple sorting methods to enjoy your media content
- Filters and keyword searches to locate a file quickly

Qmedia

Airplay, DLNA, network streaming

TS-451D2
Set content sources for all multimedia applications

Go to Content Management in Multimedia Console

Assign folders as content sources for each application.
Enjoy the content with Plex Media Server

- Internet
- Media management
- Media information
- Supports many media types
- Sharing management
Full multimedia experience over competitors

- 4K HDMI v2.0 60Hz output
- Up to 2-ch 4K real-time transcoding
- Use Cinema28 for multi-room streaming
- Supports USB Keyboard and mouse
Up to 4K video real-time transcoding

Integrates Intel® HD Graphics 600 graphics processor, up to 700 MHz, providing up to 2 channels of video playback and transcoding for smooth playback on versatile client devices.
QNAP snapshot features for file recovery

1. Fully supports all storage configurations at the storage pool level.
2. Easily take, manage and restore snapshots.
3. Using the mature Ext4 file system for “out of volume” snapshots

<table>
<thead>
<tr>
<th>RAM Size</th>
<th>NAS SKU</th>
<th>Maximum Total Snapshot Numbers</th>
<th>Maximum Snapshot Numbers per Volume/LUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>2GB</td>
<td>TS-451D2-2G</td>
<td>64</td>
<td>32</td>
</tr>
<tr>
<td>4GB and more</td>
<td>TS-451D2-4G</td>
<td>1024</td>
<td>256</td>
</tr>
</tbody>
</table>

File level

Block level

Removeable drives

PC or server

Cloud / NAS
macOS Time Machine backup for multiple users

Use HBS 3 (Hybrid Backup Sync 3) to backup the data from mac to NAS via Time Machine. And then backup the NAS data to an external enclosure.

Create the backup job:

1. Select Time Machine Backup as the source
2. Select TR-004 as the destination
3. - Setup 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

File Station with QuDedup

Access from cloud

File Station QuDedup

Backup/Restore

TCP BBR

File Station with QuDedup

Access from cloud

File Station QuDedup

Backup/Restore

TCP BBR

File Station with QuDedup

Access from cloud

File Station QuDedup
Qsirch 5.0 for NAS advanced file search & management

QNAP file management and search solutions

- Qfile auto uploads
- File Station uploads
- Qsync Data sync
- Other backup ways

NAS data

- Data indexing
- Exclusion

Data search and filter

- Image
- Video
- Music
- Docs
- PDF
- Email

Data preview

- Music, photo, video preview
- Documents and keywords

Share

Filing and archiving

Web

Mac Finder

Browser plugin

Mobile app
Connect to Dropbox, OneDrive, Google Drive and more

Qfile

File Station

Local NAS

Remote NAS

Cloud Storage
Connect to home or office NAS with myQNAPcloud and QNAP ID (QID)

Anytime / Anywhere
Register and login with Email or phone number
QNAP QVPN and QBelt protocol for anywhere access

Secure Encrypted Connection: DTLS + SSL + AES-256 encryption

New VPN protocol: Decreases the chance of being detected

Works on desktop & mobile devices: Windows, macOS, Android, iOS
Always get in touch with Notification Center

Centralized setting
One interface to integrate all notification settings and operations

Support multiple notification methods
Meet your various notification scenarios

Highly flexible rule setting
Easily filter important messages you want to receive

Multi-language support
Support 23 language & composed by professionals

Double insurance
Notification history and test function ensure you don’t miss one message
QVR Pro surveillance center with IP cams

4GB or more RAM required

5,000+ compatible IP cameras

8 free recording channels

30 expandable channels w/ licenses

USB webcam support (UVC cams)

For 2GB RAM model:

- Surveillance Station 5.1
  - 2 free recording channels
  - 32 expandable channels w/ licenses
Container Station for running multiple apps

AI, IoT, Commonly-used Container Recommendation
• One-click installation wizard helps you quickly setup
• Supports Docker Compose YAML format to create applications

Easily import/export containers
• Imports images or containers from PC or NAS
• Exports images or containers to NAS as backup

Docker® Hub marketplace
Easy to download apps
HybridMount provides two modes for file-based cloud storage gateway

<table>
<thead>
<tr>
<th></th>
<th>Network drive mount</th>
<th>File Cloud Gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Setup Method</strong></td>
<td>Mount cloud drives and file servers</td>
<td>Select “File Cloud Gateway” mode and create a dedicated cache space</td>
</tr>
<tr>
<td><strong>Connections</strong></td>
<td>No limit</td>
<td>2 free and perpetual connections. Purchase license for more connections</td>
</tr>
<tr>
<td><strong>Access Performance</strong></td>
<td>Depends on network speed</td>
<td>High performance thanks to caching</td>
</tr>
<tr>
<td><strong>Access in File Station</strong></td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>Access through SMB / NFS / AFP</strong></td>
<td>Partially supported</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>Sync with the cloud</strong></td>
<td>Sync only when browsing</td>
<td>Sync constantly for quick access</td>
</tr>
<tr>
<td><strong>Integration with QTS Apps</strong></td>
<td>Not supported</td>
<td>Supported</td>
</tr>
</tbody>
</table>

- Online collaboration
- File data analysis

Integration with QTS Apps

NAS cache

Internet

Slower

LAN

Faster
Use Virtual JBOD to expand NAS capacity

Max. 8 VJBOD connections

TS-451D2

TS-832XU

TS-832X

1GbE iSCSI VJBOD
Economical and flexible QNAP expansion enclosures for multi-platform usage

QNAP TR and TL external storage enclosures have many advantages for NAS capacity expansion.

**Bigger capacity**
- 2, 4, 8-bay choices
- NAS may support up to 2 enclosures

**USB connectivity**
- The most popular interface

**Better compatibility: NAS or PC/server**
- Expand NAS or server storage capacity or data migration between different hosts
- QNAP External RAID Manager and JBOD Manager for monitoring the JBOD status
One enclosure for two different uses: internal expansion or external disk mode

**RAID & Storage Pool**

All disks of TR & TL expansion units would be identified by Storage & Snapshot manager, then configure as a RAID of storage pool.

**External Disk Mode**

Each disk acts as a single disk; it will show 8 independent disks with TL JBOD, or as a single disk or individual disks with TR RAID. This mode is also for cross-platform compatibility between OSes.

- TL & TR units cannot be configured as a RAID group with those internal disks from NAS.
- TR units can only support RAID 0/1/5/10 and JBOD modes.
Extend warranty to 5 years to protect your assets

Standard 2-year warranty + optional 3-year extended warranty = 5 years of warranty

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

2-year Standard Warranty
- 2-year standard 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)

Optional 3-year Extended Warranty
- Extending your warranty with this paid service, available within 90 days of the initial unit purchase.
- Offers identical service to standard warranty.

P/N: EXTW-GREEN-3Y
- Go to the warranty site
- Register the NAS
- Purchase the coverage
USB to 5GbE/2.5GbE adapter with QNAP QNA-UC5G1T

QNAP adapters do not support the following functions in QTS:

- Port trunking (LACP)
- DHCP server
- RADVD server
- Static route

Existing wiring:
- 5GbE Cat 5e
- QXG-10G1T or QNA-UC5G1T
- QNAP QNA-UC5G1T: USB 3.2 Gen 1 to 5GbE/2.5GbE/1GbE network adapter

Existing wiring:
- QNAP 10GbE switch
- Cat 5e 5GbE
- Cat 5e 5GbE
- QNAP 10GbE switch
4 x HDDs, RAID 5, 2 x GbE performance data

2 x GbE Windows sequential transfer

<table>
<thead>
<tr>
<th></th>
<th>Read</th>
<th>Write</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x HDDs</td>
<td>221</td>
<td>221</td>
</tr>
</tbody>
</table>

2 x GbE Windows sequential transfer, NAS volume encryption

<table>
<thead>
<tr>
<th></th>
<th>Read</th>
<th>Write</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x HDDs</td>
<td>221</td>
<td>195</td>
</tr>
</tbody>
</table>

Tested in QNAP Labs. Figures may vary by environment.
Test environment:
NAS: TS-451D2-4G, QTS 4.4.2, 4 x Seagate ST1000NM0033 1TB HDDs, RAID 5, thick volume
Client PC: Windows 10 Pro, Intel Core i7-6700 3.4 GHz, 32GB RAM
IOMeter: RAM*4, 30-sec ramp up time, 3-min seq. run time, 2 workers, 64-outstanding
## A complete lineup for building up your home cloud

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processor</strong></td>
<td>Intel Celeron J4025 2-core 2.0 GHz, up to 2.9 GHz</td>
<td>Intel Celeron J4125 4-core 2.0 GHz, up to 2.7 GHz</td>
<td>Intel Celeron J1900 4-core 2.0 GHz, up to 2.42 GHz</td>
<td>Annapurna Labs AL314 4-core 1.7 GHz</td>
<td></td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>DDR4, max. 8 GB</td>
<td>DDR4, max. 8 GB</td>
<td>DDR3L, max. 8 GB</td>
<td>DDR3, max. 8 GB</td>
<td></td>
</tr>
<tr>
<td><strong>PCIe slot</strong></td>
<td>---</td>
<td>PCIe 2.0 x4</td>
<td>• 253D: PCIe 2.0 x4</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>1GbE port</strong></td>
<td>2</td>
<td>1</td>
<td>---</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>2.5GbE port</strong></td>
<td>With a USB adapter</td>
<td>With a PCIe or USB adapter</td>
<td>2</td>
<td>With a USB adapter</td>
<td>1</td>
</tr>
<tr>
<td><strong>5GbE port</strong></td>
<td>With a USB adapter</td>
<td>With a PCIe or USB adapter</td>
<td>With a PCIe or USB adapter</td>
<td>With a PCIe or USB adapter</td>
<td>With a USB adapter</td>
</tr>
<tr>
<td><strong>10GbE port</strong></td>
<td>---</td>
<td>With a PCIe adapter</td>
<td>With a PCIe adapter</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>USB port</strong></td>
<td>4 x 3.2 Gen 1 + 3 x 2.0</td>
<td>2 x 3.2 Gen 1 + 3 x 2.0</td>
<td>2 x 3.2 Gen 1 + 3 x 2.0</td>
<td>2 x 3.2 Gen 1 + 2 x 2.0</td>
<td>3 x 3.2 Gen 1</td>
</tr>
<tr>
<td><strong>SSD cache</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>HDMI output</strong></td>
<td>4K 60Hz</td>
<td>4K 60Hz</td>
<td>4K 60Hz</td>
<td>1080P 30Hz</td>
<td>---</td>
</tr>
</tbody>
</table>
TS-451D2

Impressive, yet affordable!

Home cloud. Done.

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