QNAP

QGD-1602P

10GbE Smart Edge PoE Switch

A powerful SD-WAN/QuWAN platform with networking upgrade
Overview

• New member of Guardian Smart Edge PoE Switch series
• Voice from customers on the existing QNAP Guardian switch
• Performance upgrade on QGD-1602P
• Features & Advantages
  ✓ 20GbE internal bandwidth capacity
  ✓ PoE Features
  ✓ Virtualization
  ✓ QuWAN SD-WAN solution
• Flexible deployment topology
Guardian Smart Edge PoE Switch

3rd Generation
Guardian Smart Edge PoE Switch

QGD-1602P
- 10GbE SFP+
- Intel Atom® C3558/C3758
- Intel QAT
- Virtual machine with QTS
- Hybrid cloud storage
- IEEE 802.3bt Ready
- SD-WAN (QuWAN)

QGD-1600P
- Intel Celeron® J4125
- Equipped with QTS
- Virtual machine
- Hybrid cloud storage
- IEEE 802.3bt Ready

1st Generation
Unmanaged PoE switch

2nd Generation
L2/ L3 Managed PoE Switch

Power Sourcing Equipment (PSE) product evolution
Voice from customers on the existing QNAP Guardian switch

We need more Ethernet bandwidth for my LAN applications
- 2.5GbE NAS/Computers are now common.
- Many Wi-Fi router/AP now support 2.5GbE.

Is it possible to increase internal bandwidth between QTS host and switch?
- Internal bandwidth capacity is 2GbE on previous model for multiple virtual machines to access the switch via internal interface.

Why is there only one host port?
- Only one host port available for QTS on different networking topology deployment.

Can we have more CPU speed/cores for virtualization?
- 4-core Intel Celeron® CPU is only option on previous model.
QGD-1600P vs QGD-1602P

QGD-1600P

Intel® Celeron® J4115
4-core 1.8 GHz processor
14 x 1GbE RJ45 Ethernet ports
2 x 1GbE RJ45/SFP Combo ports
1 x 1GbE RJ45 host port
4 x 802.3bt PoE ports up to 60W
12 x 802.3af/at PoE ports
2GbE Internal bandwidth capacity
Max. 8GB memory

QGD-1602P

New

Intel® Atom® C3558/C3758 4-core/8-core 2.2 GHz processor
8 x 1G/2.5GbE RJ45 Ethernet ports
8 x 1GbE RJ45 Ethernet ports
2 x 10GbE SFP+ ports
2 x 1GbE host ports
4 x 802.3bt PoE ports up to 90W
12 x 802.3af/at PoE ports
20GbE Internal bandwidth capacity
Max. 64GB memory

Performance upgrade!

Improved features
Guardian's hardware advantages

QNAP QGD-1602P
QGD-1602P
hardware architecture

- **CPU**: Intel Atom C3558/C3758 4/8-core
- **RAM**: 8GB RAM (up to 64GB)
- **Host Interface**: 4 x RJ45, 2 x Internal 10GbE, 8 x 1GbE, 2 x 5GbE
- **USB**: 3.0 x 2
- **2 x 2.5" SSD/HDD**
- **2 x M.2 NVMe**
- **2 x PCIe Gen 3**

**System power button (Rear)**
- **Power Supply**
- **System Power**
- **PoE Power Max:** C3558:380W / C3758:220W

**Switch**
- Microchip VSC7448
- **PoE Controller**
- **16 x RJ45**
  - 8 x 1GbE
  - 8 x 2.5GbE

**Improved features**
- **2 x M.2 NVMe**
- **2 x 10GbE SFP+**

**Host power controller**
20GbE internal bandwidth capacity

Host

- Intel® Atom® C3558/C3758
- 4/8-core

Internal 10GbE

Switch

- Microchip VSC7448

Virtual machine
The QGD-1602P supports Intel® QuickAssist Technology (Intel® QAT). It offers up to 20 Gbps cryptography and compression, offload security and compression algorithms for better performance on VPN traffic via IPsec.
QGD-1602P hardware features

**Front**
- LCM
- 2 x 1G/2.5G/5GbE Multi-Gigabit host ports
- 8 x 2.5GbE Multi-Gigabit switch ports
- 2 x 10GbE SFP+ ports
- USB 3.0
- 2 x 1GbE host ports
- 8 x 1GbE switch ports
- Separated Host/Switch system indicator and reset button

**Back**
- System power
- PCIe Gen3 slot x 2

Host Power button
QGD-1602P Internal View

- Intel® Atom® Processor
- DDR4 Memory
- 2 x PCIe Gen3 x2 (x4 connector) Slots
- 2.5-inch HDD / SSD slots
- 2 x M.2 NVMe SSD slots
QNAP

QGD-1602P

PoE Features
Guardian Smart Edge PoE Switch

PoE Advantages

1. Supports the new generation of IEEE 802.3bt power supply standard
2. PoE scheduling
3. High total power supply rating design 380 watts PoE power supply budget at max
4. Support 4 Port **90 watt** (PoE++)
   12 Port 30 watt (PoE+)
5. Camera device remote restart
6. Power supply priority configuration
7. Remote intelligent monitoring and management interface
Support PoE power scheduling management

With PoE scheduling function, it can supply power only on the specified working day and time to save energy and electricity, and to save extra power cost for you!
Guardian supports the PoE remote management interface, allowing you to remotely log in and manage your PoE devices wherever you are, for real-time monitoring of your devices' power usage.
Guardian provides rich graphical PoE data information, including real-time power consumption status, available wattage information, and various PoE operation status, so that enterprises can effectively grasp the power usage status of the equipment.
QGD-1602P
L2 Network Management
Guardian provides an intuitive and friendly web management interface that allows users to easily perform device monitoring, configuration, firmware updates, and advanced network management functions.
Complete Layer 2 network management function

IGMP Snooping
Optimizing multicast performance helps in-line media streaming, VoIP and other bandwidth-intensive applications that are sensitive to time delays.

VLAN
Enhance network security by isolating traffic within the enterprise based on requirements such as administrators, general users, employees, or visitors.

Link Aggregation (LACP)
Combine two physical lines to form a high-speed virtual data transmission path, increasing transmission speed and enhancing network connection reliability.

Quality of Service
Different network usage priorities can be configured according to the port or VLAN group to ensure the quality of service and optimize network transmission efficiency.
Complete Layer 2 network management function

Access-Control List (ACL)
The device supports access control mechanisms, so you can set multiple access rules & specify specific protocols, IP addresses, subnet masks, and port access conditions.

Loop detection and protection
When the network generates a loop, the network that generates the loop will be closed, effectively avoiding network interruption.

Port Mirroring
Allows network administrators to capture data (packets) for specific ports to monitor the network or troubleshoot.

Jumbo frame
The device supports the Jumbo Frame huge packet setting, which helps improve overall data transmission efficiency.
Virtualization and SD-WAN solution
Run virtual machines and containers: multiple applications in a box

Virtualization Station and Container Station lead a full range of hybrid virtual application solutions. For your versatile needs, you can rely on QNAP's complete virtualization application support. Choosing the right deployment strategy for your virtualization needs can be easy!
Guardian All-in-one VM solution

Traditional NAS + Switch
- RouterOS
- Virtualization Station
- Virtual Switch
- NIC
- WAN
- Internet
- LAN Networking Devices

Guardian solution
- Guardian vSwitch Mode
- RouterOS
- VM
- VM
- Internet
- LAN Networking Devices
QuWAN - SD-WAN solution on Guardian

QGD-1602P supports the installation of QNAP SD-WAN solution – QuWAN. QuWAN allow SMB branch offices, restaurants & chain stores to set up SD-WAN easily.
Guardian x QWA-AC2600 SD-WAN solution

• Establish SD-WAN via QuWAN between each office.
• Share the wireless network to the device with the QWA-2600AC wireless network card.

QWA-2600AC as Wi-Fi access point mode
Guardian x QuWAN x pfSense solution

QuWAN

pfSense VM

pfSense WAN

Virtual Switch

Virtual Switch

Virtual Switch

Ethernet Port 1

QuWAN WAN

QuWAN LAN

pfSense LAN

Ethernet Port 2

Ethernet Port 3

QGD-1602P
Guardian Wireless AP Integrated Solution

Traditional Deployment

- UniFi Cloud Key
- UAP-AC-PRO
- UAP-XG
- UAP-AC-M
- USW-Pro-24-POE
- USG-PRO-4

Guardian solution

- UAP-AC-PRO
- UAP-XG
- UAP-AC-M

Advantages

1. One machine covers all features, saving a lot of space
2. Highly expandable capabilities to meet future growth needs
3. Integrated solution

Remote Access to UniFi Controller

Internet

Guardian Smart PoE Switch

Hybrid Cloud

myQNAPcloud

UniFi Controller

pfsense (DHCP Server)
Guardian brings IP Phone integrated solution

Traditional VoIP Phone Deployment
Guardian brings IP Phone integrated solution

Guardian solution

Internet

Location A

IP PBX

Location B

Internet

PSTN

Voice Gateway

Location C

Router

Internet

Voice Gateway
QNAP

QGD-1602P

Flexible networking topology for deployment
## Flexible Guardian choice for VM deployment

<table>
<thead>
<tr>
<th>Model</th>
<th>CPU cores</th>
<th>Memory</th>
<th>Recommended VM deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td>QGD-1600P</td>
<td>4</td>
<td>8GB max</td>
<td>2</td>
</tr>
<tr>
<td>QGD-1602P-C3558</td>
<td>4</td>
<td>64GB max</td>
<td>4</td>
</tr>
<tr>
<td>QGD-1602P-C3758</td>
<td>8</td>
<td>64GB max</td>
<td>6</td>
</tr>
</tbody>
</table>
Guardian solution for Restaurant and Retail Store

**PoE**

- **4K PTZ Surveillance**
  - Powering multiple cameras and integrating QVR Pro solution

- **Point of Sales**
  - Consumption behavior analysis and data storage

- **Electronic menu**
  - Provide power and networking capabilities

- **WiFi 5/6 PoE Access point**
  - PoE powered and supports installation of AP Controller software

**Digital Signage**
- Provide power and content management

**2.5GbE NAS for Data storage/backup**
- Save customer data, work documents, letter materials

**QuWAN**
- To create SD-WAN network with headquarters and other stores

**Improved features**

Flexible networking topology for deployment

Virtual Machine

QVR Pro

2 x 10GbE internal

4 x 2.5GbE PoE (802.3bt)
4K PTZ Surveillance Camera

8 x 1GbE PoE (802.3at)
POS
Electronic menu

Internet
Wi-Fi 6 QHora-301W at AP mode

Customer’s laptop/phones

2 x 10GbE SFP+ ports
Flexible networking topology for deployment

- **Virtual Machine**
- **QuWAN**
- **QVR Pro**
- **2 x 10GbE internal**

**5GbE Host port**
- **Internet**

**4 x 2.5GbE PoE (802.3bt)**
- **PoE 4x4 Wi-Fi access point**
- **Customer's laptop/phones**

- **Surveillance Camera**
- **POS**
- **Electronic menu**

**8 x 1GbE PoE (802.3at)**
Guardian solution for SMB and workstation

**PoE**

- **4K PTZ Surveillance**
  - Powering multiple cameras and integrating QVR Pro solution

- **Wi-Fi 5/6 PoE AP**
  - PoE powered and supports installation of AP Controller software

- **2.5/5/10GbE Network device**
  - Provide Network management and Internet access requirements for devices

**Firewall**

- Protect corporate internal network from external intrusions and internal network attacks

**Wake on Lan**

- Allows a computer/NAS to be turned on or awakened by a network message

**QuWAN**

- To create SD-WAN with headquarters and other stores
Flexible networking topology for deployment

- Virtual Machine
- QuWAN
- FreePBX
- VLAN
- 10GbE
- 2 x 10GbE internal

QNAP QCD-1602P

- 2 x USB 3.0
- TR-004U RAID expansion
- 8 x 2.5GbE ports
- PC with 2.5GbE
- QHora-301W (AP mode)

- 8 x 1GbE PoE (802.3at)
- Surveillance Camera
- VoIP phone
- Printer

- 2 x 10GbE SFP+ ports
- QSW-M408 10GbE L2 switch
- 10GbE L2 switch
- Internet

- VLAN1
- VLAN2
Guardian solution for SMB and workstation

**PoE**

- **4K PTZ Surveillance**
  Powering multiple cameras and integrating QVR Pro solution

- **Wi-Fi 5/6 PoE AP**
  PoE powered and supports installation of AP Controller software

- **2.5/5/10GbE Network device**
  Provide Network management and Internet access requirements for devices

- **Transparent Firewall via pfSense**
  Protect internal network via transparent firewall without making any IP address changes on other devices.

**Improved features**

- **Multi-WAN via RouterOS**
  Load Balancing or Failover
Flexible networking topology for deployment

- Virtual Machine
- MikroTik RouterOS
- pfSense
- FreePBX
- QNAP
- 2 x PCIe Gen 3
- 16-bay TL-D1600S
- 802.3at.bt PoE wireless AP
- 8 x 2.5GbE PoE (802.3bt.at)
- 2 x 10GbE SFP+ ports
- Internet
- VLAN1
- VLAN2
- 8 x 1GbE PoE (802.3at)
- Surveillance Camera
- VoIP phone
- Printer
- WAN1
- WAN2
- 2 x 10GbE internal
- VLAN
Extend Guardian functionality with the PCIe slot

The Guardian QGD-1602P features two PCIe Gen 3 expansion slots, and you can flexibly configure a variety of QNAP PCIe expansion cards as needed.

- **QM2**
- **QM2-2S-220A**
- **QM2-2P-244A**
- **QM2-2P-344**
- **QM2-2P-384**

- **QM2**
- **QM2-2S10G1TA**
- **QM2-2P10G1TA**

- **QWA-AC2600**

- **USB 3.1 Gen 2 (10Gbps)**
- **USB-U31A2P01**
QNAP TR & TL expansion units for storage expansion or as a backup destination

QNAP TL JBOD and TR RAID expansion units can expand the QGD-1602P storage capacity. They support either the configurations of the storage pool, or the snapshots storage from volume and LUN.
Easy expansion of storage space via USB

- USB 3.2 Gen 2 10Gbps JBOD
- Software RAID
- QNAP JBOD Manager utility for Windows / Mac/ Ubuntu

- USB 3.2 Gen1 5 Gbps / Gen2 10G bps RAID
- Hardware RAID 0/1/5/10, configurable via a dip switch or via software
- QNAP External RAID Manager utility for Windows / Mac/ Ubuntu
High performance expansion of storage space via PCIe

4-bay TL-D400S + 1 x QXP-400eS-A1164 PCIe 4-port SATA card + 1 x 1M SFF-8088 cable

4-bay TL-R400S

8-bay TL-D800S + 1 x QXP-800eS-A1164 PCIe 8-port SATA card + 2 x 1M SFF-8088 cables

16-bay TL-D1600S + 4 x 1M SFF-8088 to SFF-8644 cables

12-bay TL-R1200S-RP + 1 x QXP-1600eS PCIe 16-port SATA card + 3 x 1M SFF-8088 to SFF-8644 cables
Manage expansion units with QTS

The TL JBOD and TR RAID units can be monitored and managed in the QTS storage and snapshot manager.

Enclosure & QTS Disk related features:

- Temperature warning
- S.M.A.R.T test
- Seagate Ironwolf IHM*
- Disk Scan*
- Disk Erase
- Disk performance test

* Not supported with the TR-002, TR-004, and TR-004U.
Enclosure management fully integrated into QTS

When SSD becomes more popular, the temperature management of the enclosure is more important than before.

Monitor the FAN speed via NAS UI and configure the threshold of temperature warning.

<table>
<thead>
<tr>
<th>Storage Temperature (°C)</th>
<th>Acceleration Factor</th>
<th>Max storage duration at end of drive life</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>168</td>
<td>2 days</td>
</tr>
<tr>
<td>80</td>
<td>101</td>
<td>4 days</td>
</tr>
<tr>
<td>75</td>
<td>60</td>
<td>6 days</td>
</tr>
<tr>
<td>70</td>
<td>35</td>
<td>10 days</td>
</tr>
<tr>
<td>65</td>
<td>20</td>
<td>18 days</td>
</tr>
<tr>
<td>60</td>
<td>11.5</td>
<td>32 days</td>
</tr>
<tr>
<td>55</td>
<td>6.5</td>
<td>56 days</td>
</tr>
<tr>
<td>50</td>
<td>3.5</td>
<td>104 days</td>
</tr>
<tr>
<td>45</td>
<td>1.9</td>
<td>192 days</td>
</tr>
<tr>
<td>40</td>
<td>1</td>
<td>365 days</td>
</tr>
<tr>
<td>35</td>
<td>0.52</td>
<td>1.9 years</td>
</tr>
<tr>
<td>30</td>
<td>0.26</td>
<td>3.8 years</td>
</tr>
<tr>
<td>25</td>
<td>0.13</td>
<td>7.8 years</td>
</tr>
<tr>
<td>20</td>
<td>0.062</td>
<td>16 years</td>
</tr>
<tr>
<td>15</td>
<td>0.029</td>
<td>34 years</td>
</tr>
<tr>
<td>10</td>
<td>0.013</td>
<td>75 years</td>
</tr>
</tbody>
</table>
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

The storage is individual for each disk, it will show 8 independent external disks with TL JBOD or as a single disk with IR RAID unit. This mode is also for cross-platform compatibility among various O.S.

- 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.
## QNAP storage expansion solutions summary

<table>
<thead>
<tr>
<th></th>
<th>TL SATA JBOD</th>
<th>TL USB JBOD</th>
<th>TR RAID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connectivity</strong></td>
<td>PCIe (Multi-ch SATA)</td>
<td>USB 3.2 Gen 2</td>
<td>TR-002: USB 3.2 Gen 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TR-004: USB 3.2 Gen 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TR-004U: USB 3.2 Gen 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4: TR-004, TR-004U</td>
</tr>
<tr>
<td><strong>Supported O.S</strong></td>
<td>QNAP QTS, Windows, Linux/Ubuntu</td>
<td>QNAP QTS, Windows, Mac, Linux/Ubuntu</td>
<td>QNAP QTS, Windows, Mac, Linux/Ubuntu</td>
</tr>
<tr>
<td><strong>Create QTS storage pool</strong></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>QTS operations such as disk scan</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>X</td>
</tr>
<tr>
<td><strong>H/W RAID Protection</strong></td>
<td>X</td>
<td></td>
<td>Yes (RAID 0/1/5/10)</td>
</tr>
<tr>
<td><strong>RAID level migration &amp; capacity expansion</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>X</td>
</tr>
<tr>
<td><strong>Max units supported by QGD-1602P</strong></td>
<td>2</td>
<td>1*</td>
<td>2*</td>
</tr>
</tbody>
</table>

*The combined number of connected TR and TL USB expansion units cannot exceed 2.*
QNAP

QGD-1602P

Your Best Choice

PoE

LAYERS 2

2.5/5 GbE

SFP+

10GbE

PCIe

Intel® ATOM

Intel® QuickAssist Technology

Microchip

© 2020 Copyright is owned by QNAP Technology Co., Ltd. QNAP Technology reserves all rights. A trademark or mark used or registered by QNAP Technology Co., Ltd. The products and company names mentioned in the file may be trademarked owned by other companies.