

# **AscentOptics**

# **GPON OLT STICK**

## **User Guide**

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## Revision history

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Version	date	illustrate
V1.1	January 26 , 2025	First draft published

## Preface

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### About the document

This document introduces the product parameters, application scenarios, and related operation guidelines of GPON OLT STICK.

### Security Level

public     Internal Disclosure     confidential

### Target audience

This document is intended for network engineers, technical support, etc.

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## The term

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The term	illustrate
GPON	Gigabit Passive Optical Network
OLT	Optical Line Terminal
ONU	Optical Network Unit
QoS	Quality of Service

## 1. Product Introduction

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ASCENTOPTICS GPON OLT STICK encapsulates the GPON OLT in SFP form, making it easy to work with Ethernet switches/routers/gateways and other devices to provide a simple, flexible, and cost-effective GPON network solution.

- Plug and play, manageable, and rate-limitable
- GPON service auto-configuration
- Supports up to 32 ONUs with automatic registration.
- Supports MAC switching within optical networks
- Supports business flow classification and QoS
- Suitable for industrial parks, hotels, apartments, shopping malls, schools, and FTTR.



Figure 1.1 ASCENTOPTICS GPON OLT STICK

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## 2. Product Parameters

<b>Product Specifications</b>	
<b>Structure</b>	MSA SFP
<b>GPON rate</b>	2.5G/1.25G
<b>TCONT number</b>	256
<b>Number of Gem Ports</b>	256
<b>Maximum split ratio</b>	1:32
<b>Maximum transmission distance</b>	10km
<b>FEC</b>	support
<b>Dynamic bandwidth allocation</b>	support
<b>OMCI</b>	support
<b>Inter-optical network switching</b>	support
<b>Rogue ONU Detection</b>	support
<b>Operating temperature</b>	-40°C ~ 85°C
<b>Power consumption</b>	<3W

Table 2.1 ASCENTOPTICS GPON OLT STICK Product Specifications

### 3. Application scenarios

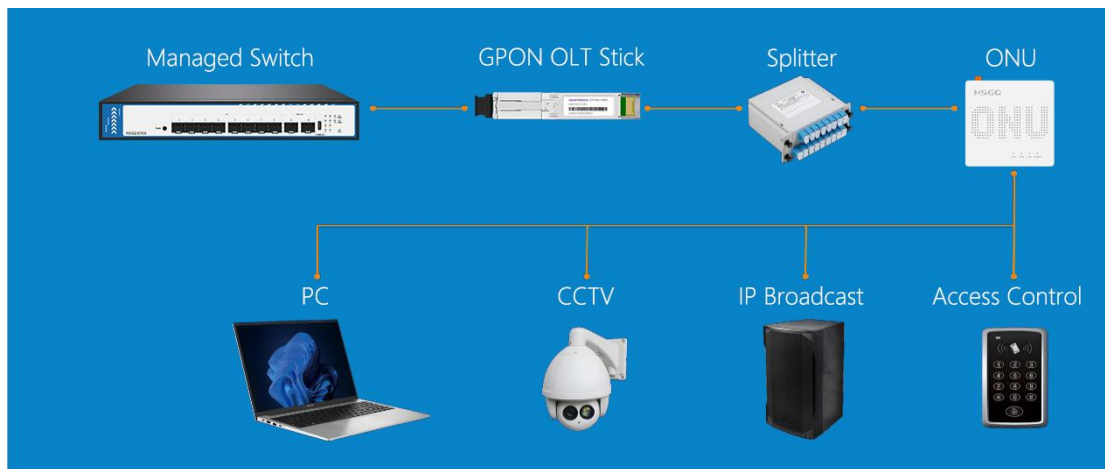


Figure 3.1 Application scenarios of ASCENTOPTICS GPON OLT Stick

OLT Stick is an emerging product in the OLT modularization process, mainly targeting increasingly complex and varied network structures. It integrates and complements Ethernet and PON, is small in size, powerful in function, and low in cost, making it a powerful tool for projects and Fiber to the Room (FTTR). It is also suitable for upgrading and transforming old community networks, with fast cutover, short construction period, and a beautiful and simple appearance.

## 4. Operating Instructions

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### 4.1 Install

#### 4.1.1 Equipment installation

The topology diagram is shown below. Stick is connected to the optical port of the switch with management function. Then, the in fiber of the splitter is connected to Stick, and the out fiber is connected to each ONU. The computer is connected to the switch via network cable. The environment setup is complete.

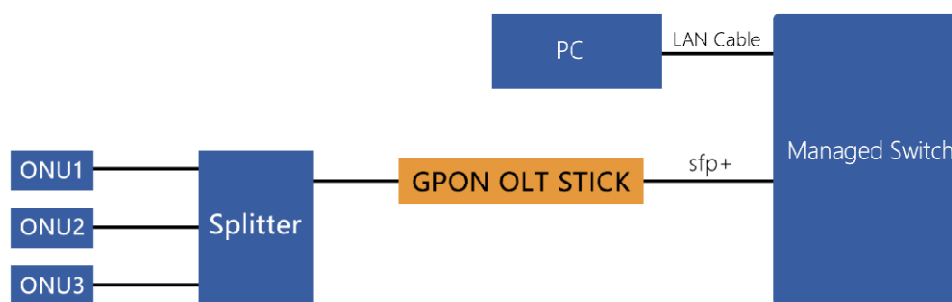


Figure 4.1 Topology Diagram

#### 4.1.2 Managing computer configuration

After the environment is set up, you need to configure your computer's IP address. The steps are as follows:

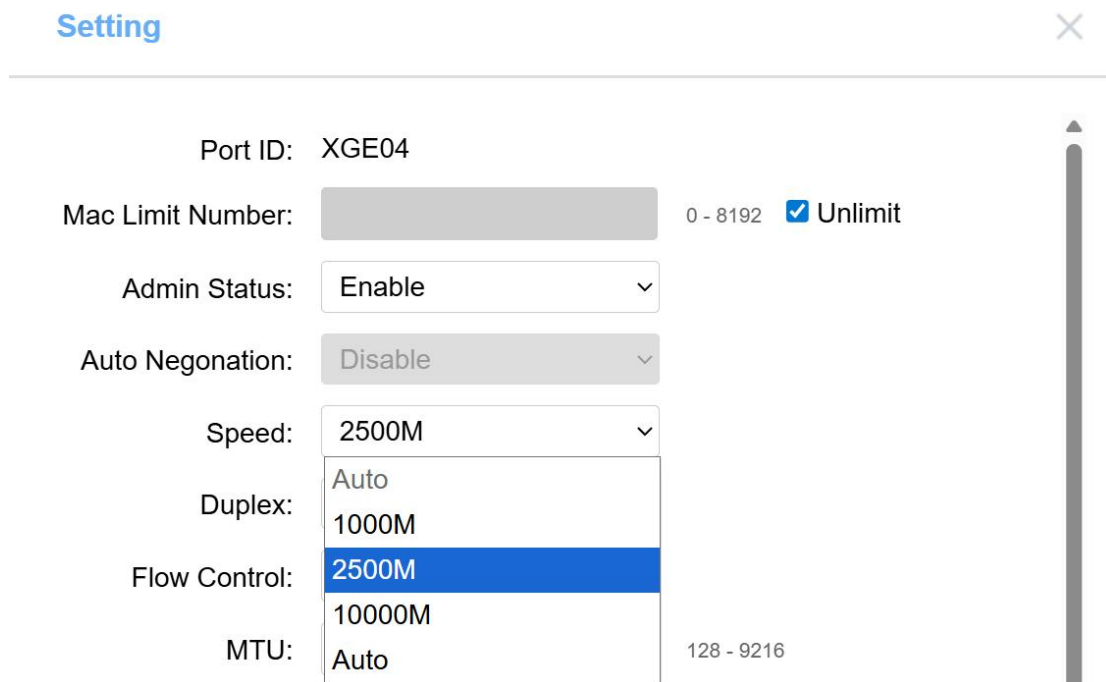
1. Open Control Panel > Network and Internet > Network and Sharing Center > Change adapter settings
  2. Locate the Ethernet port connected to the switch, right-click and select Properties.
  3. Select "Internet Protocol Version 4 (TCP/IPv4)" > Properties
  4. Cancel automatic IP acquisition and set a static IP (on the same network segment as the switch; here, we assume the switch's IP is 192.168.99.1 ) :
    - IP address: 192.168.99.xx ( xx is any unused address between 2 and 254)
    - Subnet mask: 255.255.255.0
  5. Click "Advanced" and add an IP address on the same network segment as Stick (Stick's default IP address is 192.168.100.254 ) :
    - Add IP address: 192.168.100.xx ( xx is any unused address from 1 to 253 )
    - Subnet mask: 255.255.255.0
-

### 4.1.3 Switch configuration

The Stick uplink port supports two speed modes: 2.5G full-duplex and 1G full-duplex.

#### 4.1.3.1 2.5G full-duplex

1. Access the switch management page and configure the port inserted by Stick to be a full-duplex fixed 2.5G port.



2. Checking the status, if it displays 2.5G, it indicates a successful connection, as shown in the port XGE04 in the image below :

>	XGE01	Enable	Link Down	Auto(-)	Fiber	1	Unlimit	XGE01	Setting
>	XGE02	Enable	Link Down	Auto(-)	Fiber	1	Unlimit	XGE02	Setting
>	XGE03	Enable	Link Down	Auto(-)	Fiber	1	Unlimit	XGE03	Setting
>	XGE04	Enable	Link UP	2500M	Fiber	1	Unlimit	XGE04	Setting

Figure 4.2 Port List

#### 4.1.3.2 1G full-duplex

The 1G full-duplex setup is similar to the 2.5G full-duplex setup, except that the switch port needs to be configured to a fixed 1G full-duplex.

Port ID: XGE04

Mac Limit Number:   Unlimit

Admin Status:  ▾

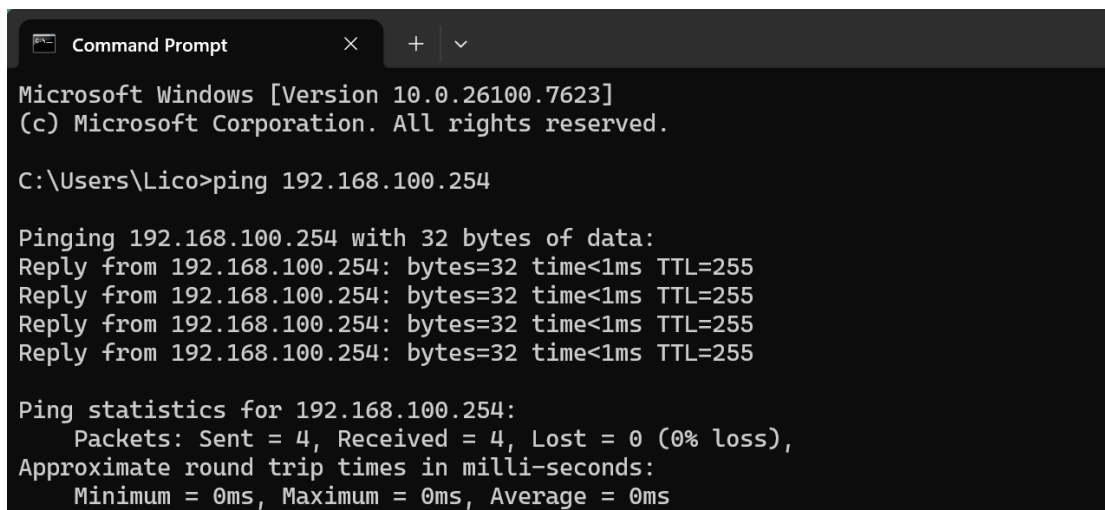
Auto Negonation:  ▾

Speed:  ▾

Duplex:

#### 4.1.4 Telnet Login

1. Open CMD, type Ping 1 92.168.100.254, and if the ping is successful, you can access Stick via Telnet.



```
Microsoft Windows [Version 10.0.26100.7623]
(c) Microsoft Corporation. All rights reserved.

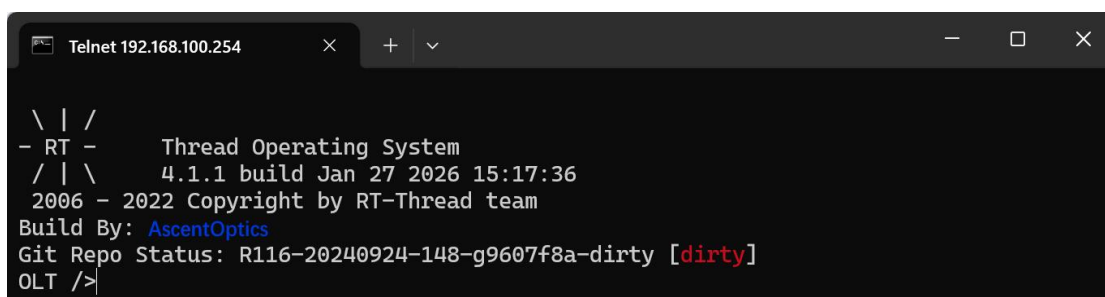
C:\Users\Lico>ping 192.168.100.254

Pinging 192.168.100.254 with 32 bytes of data:
Reply from 192.168.100.254: bytes=32 time<1ms TTL=255
Reply from 192.168.100.254: bytes=32 time<1ms TTL=255
Reply from 192.168.100.254: bytes=32 time<1ms TTL=255
Reply from 192.168.100.254: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.100.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure 4.3 Ping Status

2. Entering Telnet 192.168.100.254 will take you to Stick's telnet management interface, as shown in the figure below .



```
Telnet 192.168.100.254

\ | /
- RT -   Thread Operating System
 / | \   4.1.1 build Jan 27 2026 15:17:36
2006 - 2022 Copyright by RT-Thread team
Build By: AscentOptics
Git Repo Status: R116-20240924-148-g9607f8a-dirty [dirty]
OLT />
```

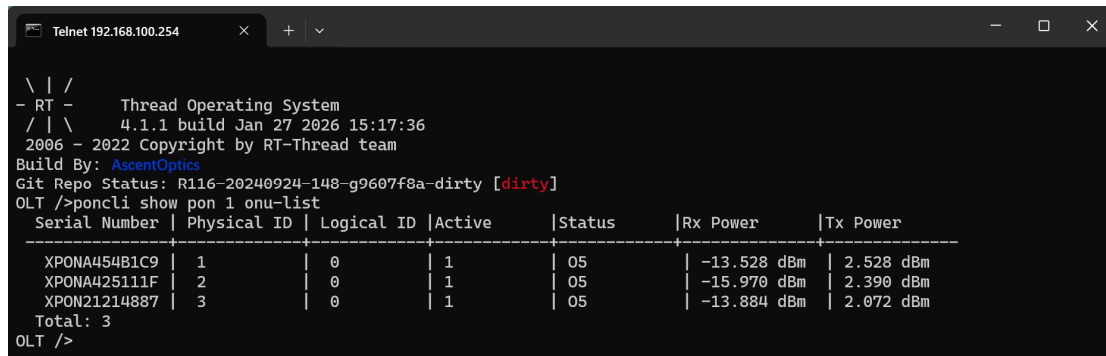
Figure 4.4 Status after entering Telnet

## 4.2 Common commands

### 4.2.1 Check ONU status

Command: **poncli show pon 1 onu-list**

Function: To check the ONU status under PON port 1, as shown in the figure below:



```
Telnet 192.168.100.254
\ \ /
- RT - Thread Operating System
/ / \ 4.1.1 build Jan 27 2026 15:17:36
2006 - 2022 Copyright by RT-Thread team
Build By: AscentOptics
Git Repo Status: R116-20240924-148-g9607f8a-dirty [dirty]
OLT />poncli show pon 1 onu-list
Serial Number | Physical ID | Logical ID | Active | Status | Rx Power | Tx Power
-----|-----|-----|-----|-----|-----|-----
XPONA454B1C9 | 1 | 0 | 1 | 05 | -13.528 dBm | 2.528 dBm
XPONA425111F | 2 | 0 | 1 | 05 | -15.970 dBm | 2.390 dBm
XPON21214887 | 3 | 0 | 1 | 05 | -13.884 dBm | 2.072 dBm
Total: 3
OLT />
```

Figure 4.5 ONU status under PON port 1

Serial Number: The unique serial number of the ONU

Physical ID: ONU physical location number

Logical ID: The logical number of the ONU

Active: Whether it is in an active state.

Status Description:

- O5: Indicates that the ONU has registered and gone online.
- O1: Offline status
- O2~O4: Registration in progress

## 4.2.2 Change Stick IP address

Command: net config ip <addr> (eg:1 92.168.100.1 ~1 92.168.100 .254)

This command is used to configure the IP address of the Stick (the default is 192.168.100.254 ) to ensure that different Sticks can be managed separately on the same device. As shown in the figure below, after configuring the IP, enter reset to restart the Stick and then connect to the new Stick IP to log in to the Stick again.

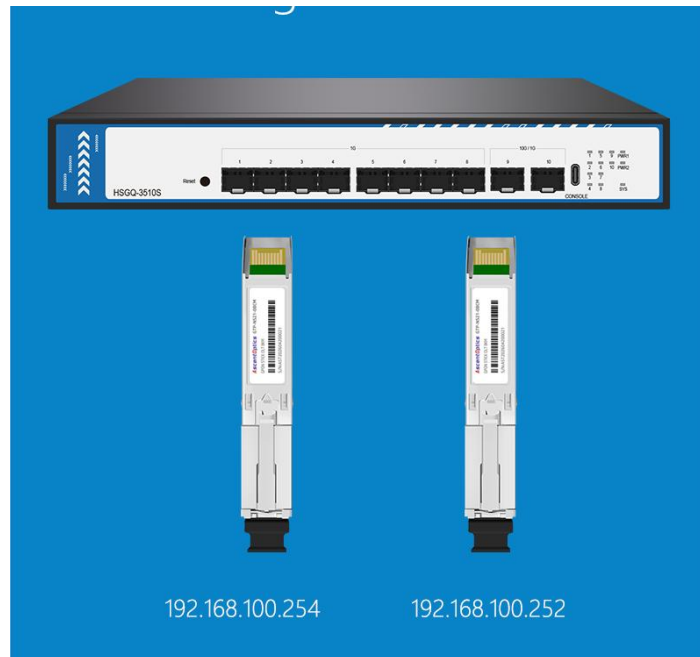


Figure 4. Diagram of multiple sticks inserted into the same device.

```
Telnet 192.168.100.254
\ | /
- RT -   Thread Operating System
/ | \   4.1.1 build Jan 27 2026 15:17:36
2006 - 2022 Copyright by RT-Thread team
Build By: AscentOptics
Git Repo Status: R116-20240924-148-g9607f8a-dirty [dirty]
OLT />net config ip 192.168.100.252
network ip updated to 192.168.100.252

Configuration saved.
Please execute 'reset' to reboot and apply changes.
OLT />reset
```

Figure 4.7 Changing the Stick IP Address

*Note: Please ensure the IP address is set correctly before resetting, otherwise Telnet will not be able to log in.*

### 4.2.3 Check device version and DDM information

Command: **poncli stick info/ddm**

The command `poncli stick info` is used to check the current running status and software version of the OLT stick.

The command `poncli stick ddm` is used to view the DDM information of the OLT stick.

```

\ | /
- RT -   Thread Operating System
/ | \   4.1.1 build Jan 27 2026 15:17:36
2006 - 2022 Copyright by RT-Thread team
Build By: AscentOptics
Git Repo Status: R116-20240924-148-g9607f8a-dirty [dirty]
OLT />poncli stick info
===== PON Stick Information =====
Vendor          : oem
Product Model   : TS-GB32
Serial Number   : TS202601270001
ASIC Version    : 23042601
Software Version : v0.1.8
=====

OLT />poncli stick ddm
===== PON DDM Information =====
Optical TX Power      : -3.15 dBm [-2.00 ~ -13.00]
Optical TX Bias Current : 25.45 (mA) [10 ~ 80]
Optical TX Voltage    : 3.28 (V) [3.00 ~ 3.33]
Optical RX Voltage    : 3.26 (V) [3.00 ~ 3.33]
Optical Temp         : 60.31 °C [<95]
CPU Temp             : 45.44 °C [<75]
Optical kb Calibration : OK
TX Power Threshold    : -2.00 dBm - -13.00dBm
Gpon Rate            : down(2.5Gbps) up(1.25Gbps)
Distance             : 10 (km) [<12]
ONU Sensitivity       : -27.00 (dBm)
KEY Verification      : PASSED
=====

```

Figure 4.8 View stick information

### 4.2.4 Remote management and cloud management configuration

Command: **net config dhcp 1**

This command is used to configure an external DHCP sub-IP for the OLT stick, which serves the same purpose as the sub-IP for a regular box-type OLT. Once the device obtains an external IP address, it can be remotely managed or managed via the cloud, as shown in the figure below.

**Note:** When enabling this command, the OLT stick needs to be restarted to apply the configuration changes.

```
\ | /
- RT -   Thread Operating System
 / | \   4.1.1 build Jan 27 2026 15:17:36
        2006 - 2022 Copyright by RT-Thread team
Build By: AscentOptics
Git Repo Status: R116-20240924-148-g9607f8a-dirty [dirty]
OLT />net config dhcp 1
network dhcp updated to 1
Dual IP mode enabled: Primary IP (static) on e0, DHCP sub-IP will be obtained in background.
Using primary static IP: 192.168.100.252

Configuration saved.
Please execute 'reset' to reboot and apply changes.
OLT />reset
```

Figure 4.9 Configure OLT stick sub-IP DHCP

After the OLT stick restarts, you can use the ifconfig command to view the IP address obtained by DHCP , as shown in the figure below:

```
\ | /
- RT -   Thread Operating System
 / | \   4.1.1 build Jan 27 2026 15:17:36
        2006 - 2022 Copyright by RT-Thread team
Build By: AscentOptics
Git Repo Status: R116-20240924-148-g9607f8a-dirty [dirty]
OLT />ifconfig
network interface device: e0
MTU: 1500
MAC: 98 c7 a4 1e fc 2e
FLAGS: UP LINK_UP INTERNET_UP DHCP_ENABLE ETHARP BROADCAST
ip address: 192.168.100.252
gw address: 0.0.0.0
net mask : 255.255.0.0
dns server #1: 192.168.123.1
dns server #2: 0.0.0.0

network interface device: e2 (Default)
MTU: 1500
MAC: 98 c7 a4 1e fc 2e
FLAGS: UP LINK_UP INTERNET_UP DHCP_ENABLE ETHARP BROADCAST
ip address: 192.168.123.189
gw address: 192.168.123.1
net mask : 255.255.255.0
dns server #1: 192.168.123.1
dns server #2: 0.0.0.0
OLT />
```

Figure 4.10 Viewing the DHCP IP address of the OLT Stick

Remote access to the stick (within the local area network) is achieved by obtaining the DHCP IP address. Simply use `telnet OLT stick` to retrieve the DHCP IP address, as shown in the image below.

```
Telnet 192.168.123.189
\ | /
- RT -   Thread Operating System
 / | \   4.1.1 build Jan 27 2026 15:17:36
        2006 - 2022 Copyright by RT-Thread team
Build By: AscentOptics
Git Repo Status: R116-20240924-148-g9607f8a-dirty [dirty]
OLT />
```

Figure 4.12 Telnet access to the OLT Stick's DHCP IP

Cloud management functionality is not yet available. Please stay tuned.

## 4.2.5 Upgrade Stick software version

Command: **tftp -i e0 -f -g 192.168.100.xx ubimage.bin**

This command is used to upgrade the Stick version, where xx is the configured network card. Upgrading Stick requires TFTP upgrade software. Place the upgrade file ubimage in the folder you created, and then the TFTP software will locate that path, as shown in the image below:

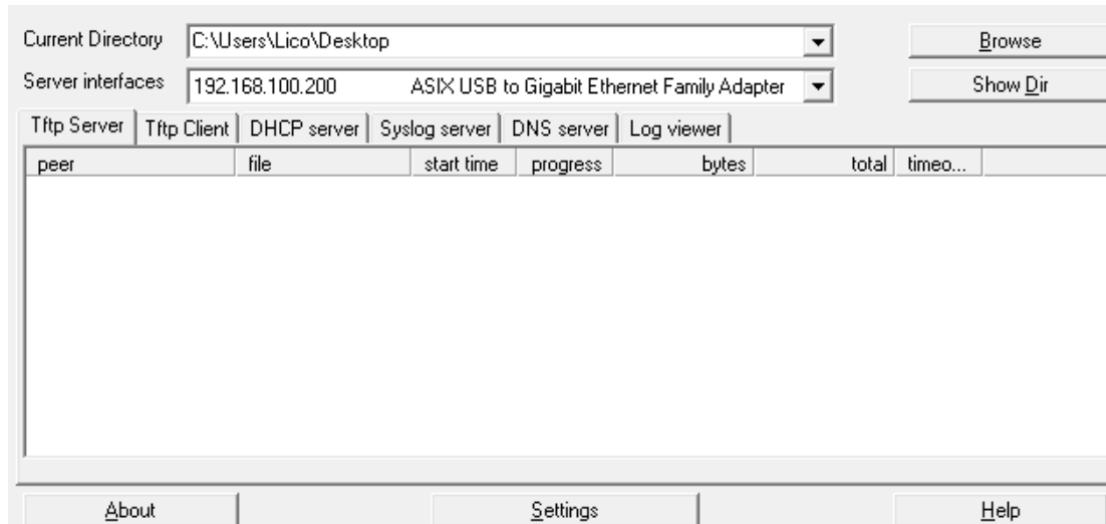


Figure 4.13 Upgrading Stick version using TFTP software

Next, enter the upgrade command in Telnet, press Enter, and wait a while for a successful ping, as shown in the figure below:

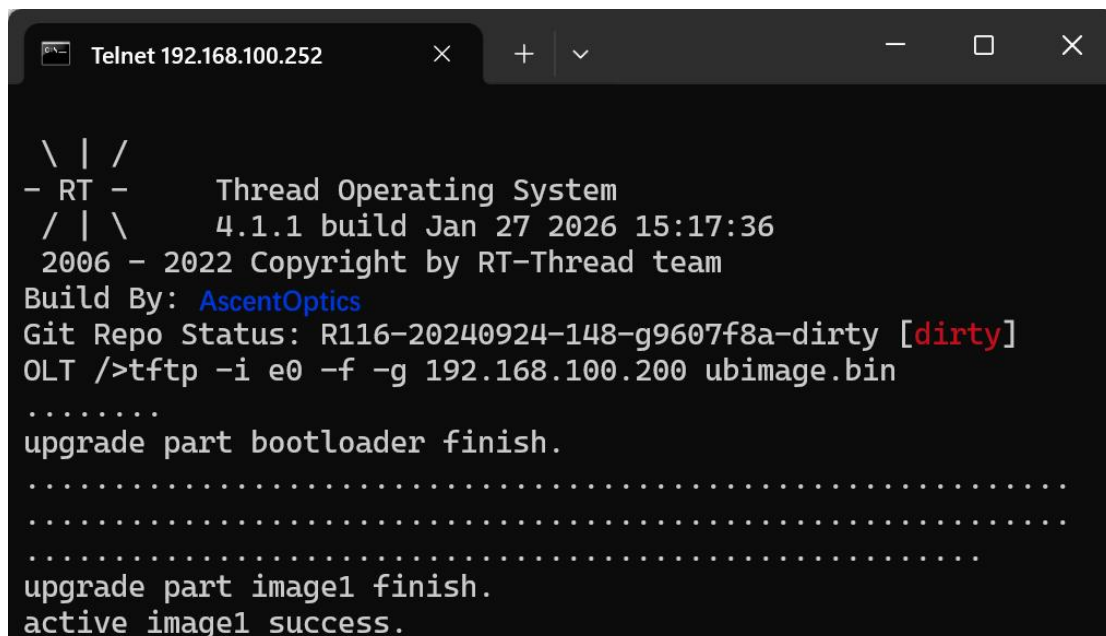


Figure 4. Example of a successful upgrade ( version 14 )

## 5. Test cases (for reference)

The test topology is roughly as follows:

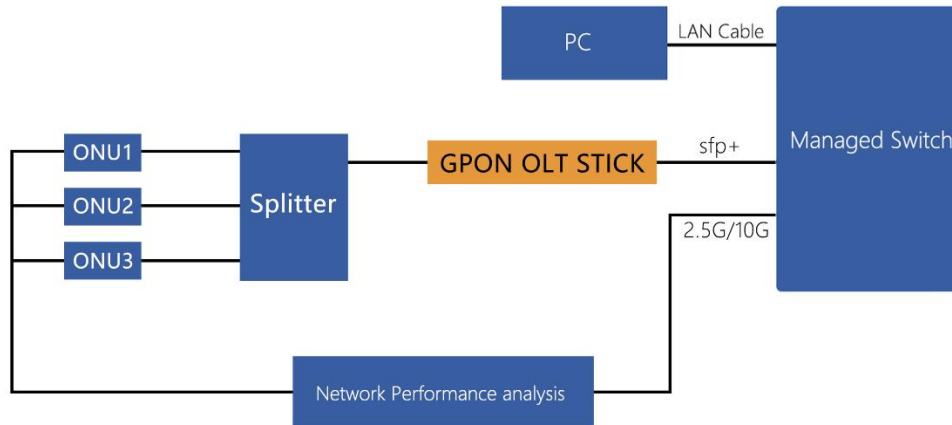


Figure 5.1 Test Topology

Each ONU needs to be configured in the administrator interface and assigned a VLAN with tags (  $n$  ,  $n+1$  , ...). The switch needs to configure the ports connected to the Stick and the streamer with VLANs with tags (  $n$  ,  $n+1$  , ...). Both ports should be in tag mode. The streamer needs to be configured with a downlink VLAN (on the switch side, the ID is also from  $n$  ,  $n+1$  , ...). If it is 1 : 4, register the ONUs according to the VLAN IDs from  $n$  to  $n+3$  and then perform streamer configuration (Note: the configured VLANs must correspond one-to-one. If it is one-to-many streamer configuration, assuming downlink is 2500MB and uplink is 1190MB, then 2500MB is allocated to 4 downlink streams and 1190MB is allocated to 4 uplink streams). The same applies to 1:16 and 1:32 . The VLAN IDs of the registered ONUs, the VLAN configurations of the two ports of the switch, and the downlink VLAN IDs of the streamer are ordered from  $n$  to the next VLAN.