ProfiShark 100M
ProfiShark 1G
ProfiShark 1G+
ProfiShark 10G
ProfiShark 10G+

USER MANUAL

If you have any questions, visit our Knowledge Base:

https://kb.profitap.com/

You can also contact us through our website:

https://www.profitap.com/contact-us/

Or directly by email:

support@profitap.com

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1. Overview

1.1. Hardware Overview

ProfiShark is a portable network traffic capture platform that provides quick packet-level insight anywhere it is deployed. ProfiShark is designed for high performance and accuracy, delivering high-fidelity traffic capture regardless of packet rate, high-precision hardware timestamping, and aggregation to a USB output, while leaving the original network traffic unaltered.

ProfiShark 100M features a fully-passive in-line design, with the network link galvanically separated from the traffic capture system, making it inherently fail-safe and having the same effect on the network link as a patch cable.

ProfiShark 1G provides in-line and out-of-band capture of 10M/100M/1G traffic. It manages full-duplex gigabit traffic capture at wirespeed, which it aggregates and outputs to a USB 3.0 port. It surpasses all standard NICs in capture mode, as it catches any tags and encapsulation without altering the frames. When the TAP becomes unpowered, it activates its bypass circuits, connecting the two attached devices directly. ProfiShark 1G integrates a high-performance fast failover circuit and a proprietary algorithm, reducing the unavailability of the network path down to approximately 1-2 seconds. A dedicated power adapter can be used to prevent failover when disconnecting the USB 3.0 port. ProfiShark 1G also features *Link Failure Propagation*: if one of the network devices is disconnected, the TAP disconnects the line to the other attached device, allowing a redundant path to be activated in the network route node.

ProfiShark 10G features two SFP+ cages, for visibility into 1G and 10G, copper and fiber connections, capturing network traffic in-line or out-of-band. It integrates hardware filters, deep packet inspection and packet slicing for optimizing captured traffic throughput, so as not to oversubscribe the USB 3.0 output (3.2 Gbps).

ProfiShark 1G+ and **ProfiShark 10G+** provide the same features as their respective base models, with the addition of advanced timestamping capabilities, combining hardware (GPS/GLONASS, PPS) and software features for greater control over timestamp synchronization (see 1.4. Advanced Timestamping).

1.2. Package Contents

Note: Please contact the supplier if any part is missing or damaged.

1.2.1. ProfiShark 100M

- ProfiShark 100M main unit
- Transport pouch
- Ethernet cat6a cable (2 m)
- USB 3.0 cable (1.8 m)
- USB key (software, drivers, documentation)
- Quick Start Guide

1.2.2. ProfiShark 1G

- ProfiShark 1G main unit
- Transport pouch
- Ethernet cat6a cable (2 m)
- USB 3.0 cable (1.8 m)
- USB key (software, drivers, documentation)
- Quick Start Guide

1.2.3. ProfiShark 1G+

- ProfiShark 1G+ main unit
- GPS/GLONASS antenna
- Ethernet cat6a cable (2 m)
- USB 3.0 cable (1.8 m)
- USB key (software, drivers, documentation)
- Quick Start Guide

1.2.4. ProfiShark 10G

- ProfiShark 10G main unit
- USB 3.0 cable (1.8 m)
- 1.5 m USB A male to DC 5V cable
- USB key (software, drivers, documentation)
- Quick Start Guide

1.2.5. ProfiShark 10G+

- ProfiShark 10G+ main unit
- GPS/GLONASS Antenna
- USB 3.0 cable (1.8 m)
- 1.5 m USB A male to DC 5V cable
- USB key (software, drivers, documentation)
- Quick Start Guide

1.3. Specifications

	ProfiShark 100M	ProfiShark 1G	ProfiShark 1G+	ProfiShark 10G	ProfiShark 10G+
Capture Interface	2 x RJ45 Ethernet 10/100M	2 x RJ45 Ethernet 10/100/1000M	2 x RJ45 Ethernet 10/100/1000M	2 x SFP+ Ethernet 1/10G	2 x SFP+ Ethernet 1/10G
Capture Output, Management Interface, Powering	1 x USB 3.0	1 x USB 3.0	1 x USB 3.0	1 x USB 3.0	1 x USB 3.0
Optional Power	1 x 5V/1.5A DC input (center positive)	1 x 5V/1.5A DC input (center positive)	1 x 5V/1.5A DC input (center positive)	1 x 5V/1.5A DC input (center positive)	1 x 5V/1.5A DC input (center positive)
LEDs	2 x Speed/Status 2 x Link/Activity 1 x Power	2 x Speed/Status 2 x Link/Activity 1 x Power	2 x Speed/Status 2 x Link/Activity 1 x Sync 1 x Power	4 x Link/Activity 1 x Power	4 x Link/Activity 1 x Sync 1 x Power
In-Line Mode	Yes	Yes	Yes	Yes	Yes
Dual SPAN Inputs Mode	No	Yes	Yes	Yes	Yes
In-Line Latency	2 ns	1G: 380 ± 8 ns 100M: 720 ± 24 ns 10M: 7600 ± 80 ns	1G: 380 ± 8 ns 100M: 720 ± 24 ns 10M: 7600 ± 80 ns	500 ± 20 ns[1]	500 ± 20 ns[1]
Fail-Safe	Network link galvanically separated	Active bypass and fast failover circuits	Active bypass and fast failover circuits	No[2]	No[2]
Supported Capture Speed	10M / 100M	10M / 100M / 1G	10M / 100M / 1G	1G / 10G[3]	1G / 10G[3]
Capture Performance	3.2 Gbps / 3.2 Mpps	3.2 Gbps / 3.2 Mpps	3.2 Gbps / 3.2 Mpps	3.2 Gbps / 5 Mpps	3.2 Gbps / 5 Mpps
Packet Slicing, Filtering, Deep Packet Inspection	No	No	No	Yes	Yes
PoE Passthrough	Yes	Yes	Yes	No	No
Hardware Timestamping	Yes: 8 ns, NTP synchronized	Yes: 8 ns, NTP synchronized	Yes: 8 ns, GPS/PPS/NTP synchronized	1G: 8 ns, NTP synchronized 10G: 6.4 ns, NTP synchronized	1G: 8 ns, GPS/PPS/NTP synchronized 10G: 6.4 ns, GPS/PPS/NTP synchronized
Timing Connectors	—	—	1 x SMA female (PPS) 1 x SMA female (GPS)	—	1 x SMA female (PPS) 1 x SMA female (GPS)
PPS-in Characteristics	—	—	Rising edge active, TTL, 50Ω internally terminated, Vth: ~1.2V, ESD protection: ±15kV	—	Rising edge active, TTL, 50Ω internally terminated, Vth: ~1.2V, ESD protection: ±15kV
Supported OS	Windows 7/8/10/11, Linux, macOS	Windows 7/8/10/11, Linux, macOS	Windows 7/8/10/11, Linux, macOS	Windows 7/8/10/11, Linux, macOS	Windows 7/8/10/11, Linux, macOS
System Requirements	Dual Core Processor 4 GB memory USB 3.0 port	Dual Core Processor 4 GB memory USB 3.0 port	Dual Core Processor 4 GB memory USB 3.0 port	Dual Core Processor 4 GB memory USB 3.0 port	Dual Core Processor 4 GB memory USB 3.0 port
Power Consumption (Full Traffic)	100 Mbps: 2.25 W 10 Mbps: 2.6 W	1 Gbps: 3 W 100 Mbps: 2.25 W 10 Mbps: 2.6 W	1 Gbps: 3 W 100 Mbps: 2.25 W 10 Mbps: 2.6 W	Dependent on the SFP modules used	Dependent on the SFP modules used
Dimensions (WxDxH)	69 x 124 x 24 mm 2.72 x 4.88 x 0.94 in	69 x 124 x 24 mm 2.72 x 4.88 x 0.94 in	105 x 124 x 26 mm 4.13 x 4.88 x 1.02 in	105 x 124 x 26 mm 4.13 x 4.88 x 1.02 in	105 x 124 x 26 mm 4.13 x 4.88 x 1.02 in
Weight	176 g / 0.39 lb	176 g / 0.39 lb	280 g / 0.62 lb	280 g / 0.62 lb	280 g / 0.62 lb
Storage Temperature	-40 to +80 °C	-40 to +80 °C	-40 to +80 °C	-40 to +80 °C	-40 to +80 °C

	-40 to 176 °F	-40 to 176 °F	-40 to 176 °F	-40 to 176 °F	-40 to 176 °F
Operating Temperature	0 to +50 °C 32 to 122 °F	0 to +50 °C 32 to 122 °F	0 to +50 °C 32 to 122 °F	0 to +50 °C 32 to 122 °F	0 to +50 °C 32 to 122 °F
Relative Humidity	10 to 95%, non-condensing	10 to 95%, non-condensing	10 to 95%, non-condensing	10 to 95%, non-condensing	10 to 95%, non-condensing
Compliance	RoHS, CE, UKCA, EAC, EN 45545-2	RoHS, CE, UKCA, EAC, EN 45545-2	RoHS, CE, UKCA, EAC	RoHS, CE, UKCA, EAC	RoHS, CE, UKCA, EAC
Order Reference	C1AP-100	C1AP-1G	C1AP-1G2	C1AP-10G	C1AP-10G2

[1] This is an approximate value. Actual value will depend on the SFPs used.

[2] Due to the nature of SFP modules requiring power for operation, ProfiShark 10G/10G+ doesn't include a bypass feature for fail-safe monitoring. An external TAP can be employed in order to implement fail-safe monitoring.

[3] The use of packet slicing and hardware filtering is recommended for 10G capture to avoid oversubscribing the USB 3.0 interface (3.2 Gbps).

1.4. Advanced Timestamping

ProfiShark 1G+ and 10G+ offer multiple advanced timestamping features. The GPS chip can retrieve the UTC time, and synchronize it with the internal PPS, with a typical precision of ±32 ns. ProfiShark 1G+ and 10G+ can also retrieve the time via SNTP (using ProfiShark Manager or CLI tool), or use the internal RTC (real-time clock), and synchronize it via an external PPS signal. A PPS output is possible, for synchronization with another ProfiShark device, or with any other device accepting a PPS input.

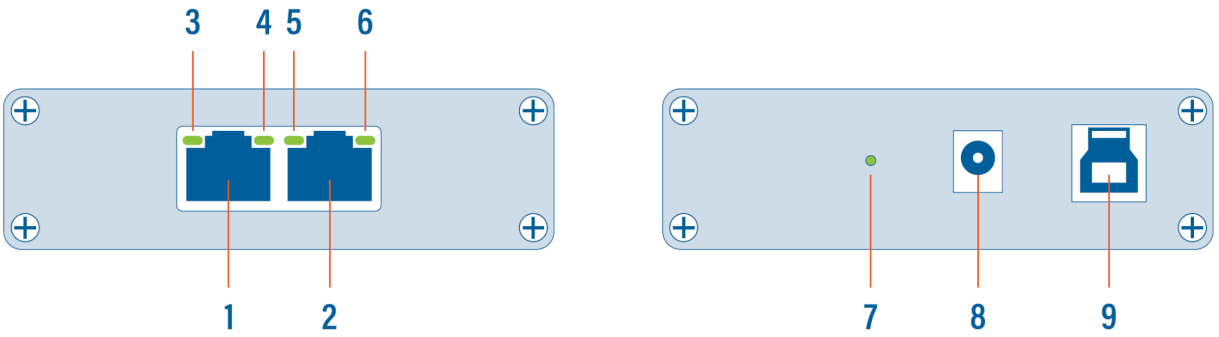
These features can be combined in different ways, providing multiple possible options for accurate and precise timestamping of packets.

The settings and information related to advanced timestamping are located in the ProfiShark Manager's *Timing* Tab. This tab is only available when a ProfiShark 1G+ or 10G+ is connected.

Note: For the best results, the GPS antenna should be set up outside, or near a window. Other factors can affect results, such as weather, cloudiness, and geographical location in regards to satellite availability. The GPS can take a minute to synchronize the UTC time with the internal PPS. The stability of the synchronization increases over time and may take up to 15 minutes to reach its peak.

1.5. Interfaces & LED Behavior

1.5.1. ProfiShark 100M Interface



1, 2 RJ45 Ethernet port A and B

3, 6 Link/Activity LEDs

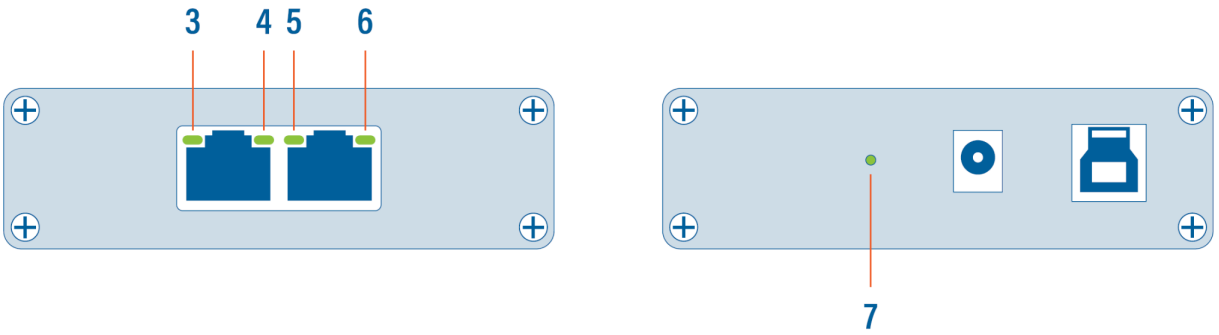
4, 5 Speed LEDs

7 Power LED

8 Optional DC power input (5V, 1A, center positive)

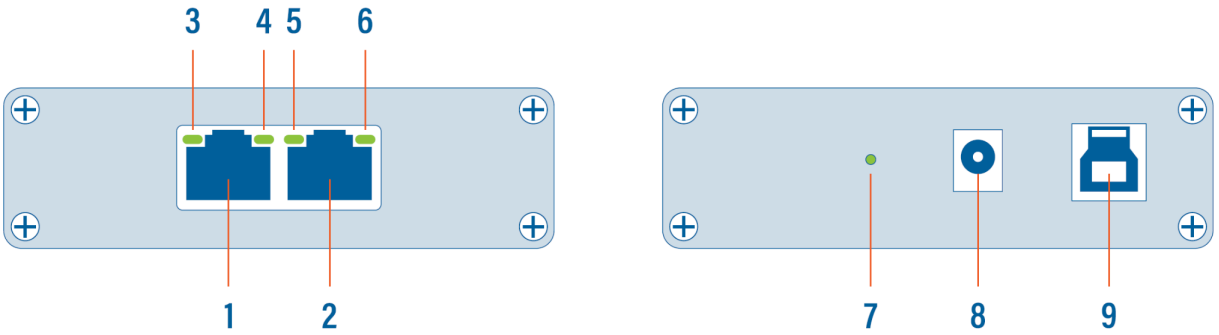
9 USB 3.0 port type B

1.5.2. ProfiShark 100M LED Behavior



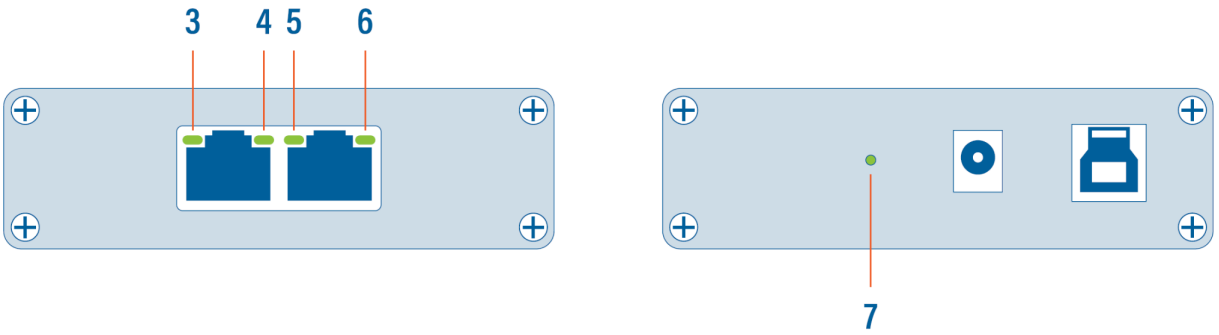
LED state	Meaning
3 and/or **6** steady green	The port is linked.
3 and/or **6** blinking green	The port is linked and has RX/TX activity (traffic is passing through).
4 steady green	ProfiShark operating at 10 Mbps speed.
4 blinking green	ProfiShark is initializing.
5 steady green	ProfiShark operating at 100 Mbps speed.
5 blinking green	ProfiShark firmware is corrupted.
4+5 blinking green	ProfiShark is not connected or is trying to connect.
4+5 alternating blinking	ProfiShark cannot find a common speed between the connected devices.
7 off	No USB cable nor power cable are connected.
7 on	USB cable and/or power cable are connected.
7 blinking	Constant synchronization between system time and hardware timestamp (blink ON every even second, blink OFF every odd second).

1.5.3. ProfiShark 1G Interface



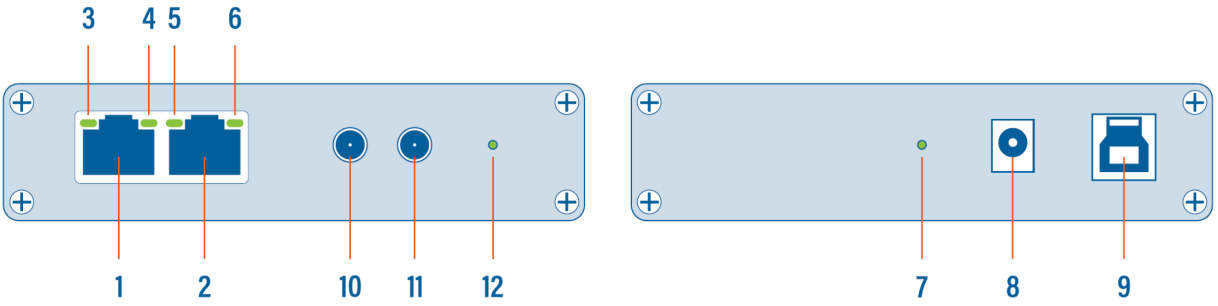
1, 2	RJ45 Ethernet port A and B
3, 6	Link/Activity LEDs
4, 5	Speed LEDs
7	Power LED
8	Optional DC power input (5V, 1A, center positive)
9	USB 3.0 port type B

1.5.4. ProfiShark 1G LED Behavior



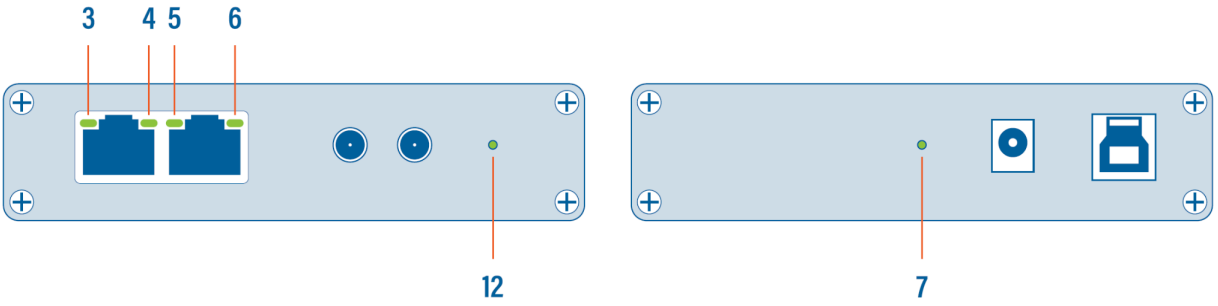
LED state	Meaning
3 and/or **6** steady green	The port is linked.
3 and/or **6** blinking green	The port is linked and has RX/TX activity (traffic is passing through).
4 steady green	ProfiShark operating at 10 Mbps speed.
5 steady green	ProfiShark operating at 100 Mbps speed.
4+5 steady green	ProfiShark operating at 1 Gbps speed.
4+5 blinking green	ProfiShark is not connected or is trying to connect.
4+5 alternating blinking	ProfiShark cannot find a common speed between the connected devices.
7 off	No USB cable nor power cable are connected.
7 on	USB cable and/or power cable are connected.
7 blinking	Constant synchronization between system time and hardware timestamp (blink ON every even second, blink OFF every odd second).

1.5.5. ProfiShark 1G+ Interface



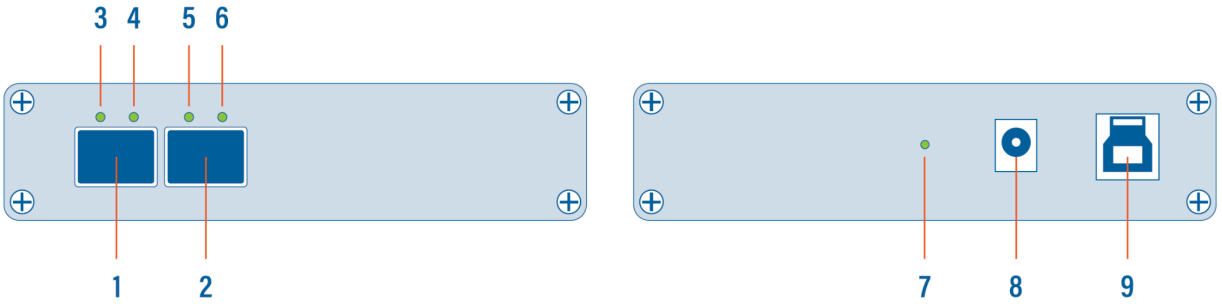
1, 2	RJ45 Ethernet port A and B
3, 6	Link/Activity LEDs
4, 5	Speed LEDs
7	Power LED
8	Optional DC power input (5V, 1A, center positive)
9	USB 3.0 port type B
10	SMA female connector (PPS in/out)
11	SMA female connector (GPS/GLONASS antenna)
12	Sync LED

1.5.6. ProfiShark 1G+ LED Behavior



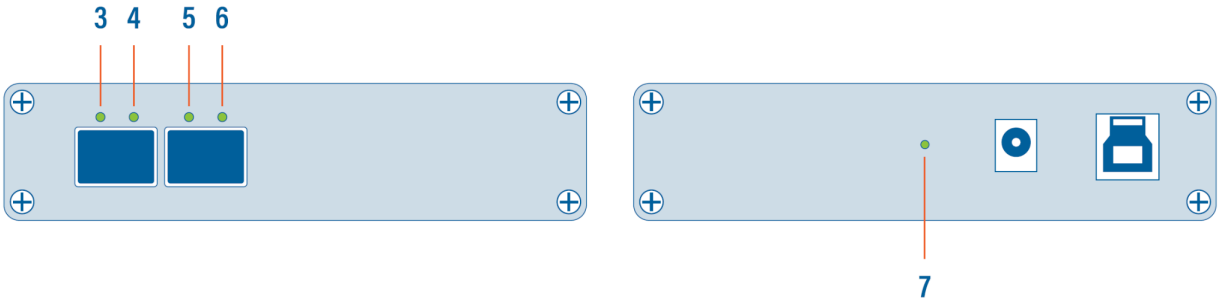
LED state	Meaning
3 and/or **6** steady green	The port is linked.
3 and/or **6** blinking green	The port is linked and has RX/TX activity (traffic is passing through).
4 steady green	ProfiShark operating at 10 Mbps speed.
5 steady green	ProfiShark operating at 100 Mbps speed.
4+**5** steady green	ProfiShark operating at 1 Gbps speed.
4+**5** blinking green	ProfiShark is not connected or is trying to connect.
4+**5** alternating blinking	ProfiShark cannot find a common speed between the connected devices.
7 off	No USB cable nor power cable are connected.
7 on	USB cable and/or power cable are connected.
7 blinking	Constant synchronization between system time and hardware timestamp (blink ON every even second, blink OFF every odd second).
12 on	Internal timestamp synchronized with the configured time system (GPS, NTP, etc.) with an accuracy of ± 16 ns.

1.5.7. ProfiShark 10G Interface



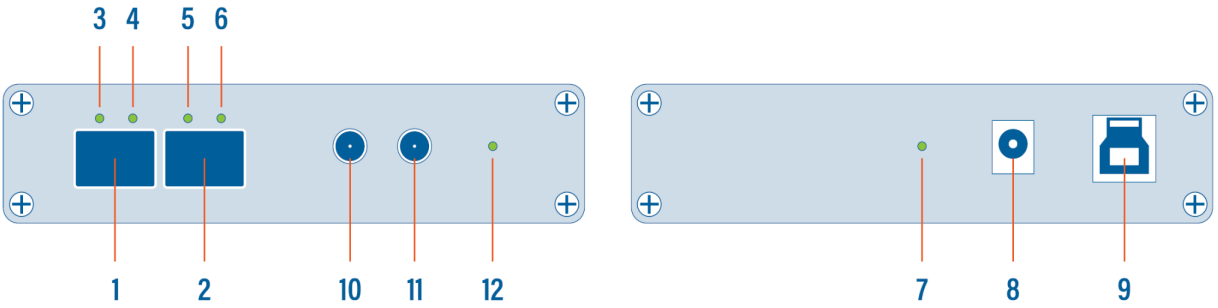
1, 2	SFP+ port A and B
3, 4, 5, 6	SFP and network status and activity LEDs
7	Power LED
8	Optional DC power input (5V, 1A, center positive)
9	USB 3.0 port type B

1.5.8. ProfiShark 10G LED Behavior



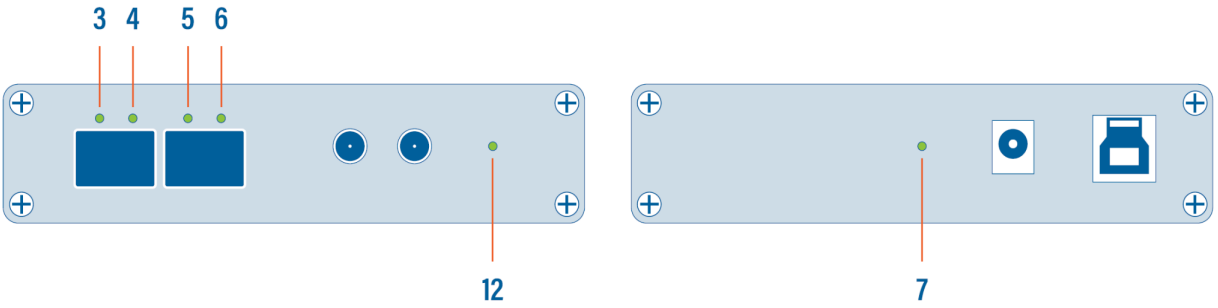
LED state	Meaning
3+**4** and/or **5**+**6** orange	No SFP module present or detected.
3+**4** and/or **5**+**6** green slow blink	No link.
3+**4** and/or **5**+**6** red	Connect additional power.
4 and/or **6** green	SPAN mode, link up.
4 and/or **6** green fast blink	SPAN mode, traffic activity.
3+**4**+**5**+**6** green	In-Line mode, link up.
3+**4**+**5**+**6** green fast blink	In-Line mode, traffic activity.
7 off	No USB cable nor power cable are connected.
7 on	USB cable and/or power cable are connected.
7 blinking	Constant synchronization between system time and hardware timestamp (blink ON every even second, blink OFF every odd second).

1.5.9. ProfiShark 10G+ Interface



1, 2	SFP+ port A and B
3, 4, 5, 6	SFP and network status and activity LEDs
7	Power LED
8	Optional DC power input (5V, 1A, center positive)
9	USB 3.0 port type B
10	SMA female connector (PPS in/out)
11	SMA female connector (GPS/GLONASS antenna)
12	Sync LED

1.5.10. ProfiShark 10G+ LED Behavior



LED state	Meaning
3+**4** and/or **5**+**6** orange	No SFP module present or detected.
3+**4** and/or **5**+**6** green slow blink	No link.
3+**4** and/or **5**+**6** red	Connect additional power.
4 and/or **6** green	SPAN mode, link up.
4 and/or **6** green fast blink	SPAN mode, traffic activity.
3+**4**+**5**+**6** green	In-Line mode, link up.
3+**4**+**5**+**6** green fast blink	In-Line mode, traffic activity.
7 off	No USB cable nor power cable are connected.
7 on	USB cable and/or power cable are connected.
7 blinking	Constant synchronization between system time and hardware timestamp (blink ON every even second, blink OFF every odd second).
12 on	Internal timestamp synchronized with the configured time system (GPS, NTP, etc.) with an accuracy of ± 16 ns.

2. Getting Started

2.1. ProfiShark Software Setup

2.1.1. Windows

To install the ProfiShark Manager on Windows, launch the setup utility located in the "\Windows\Installer\" folder of the USB flash drive. Uninstall any previous version of the ProfiShark Manager before starting the setup utility.

1. Allow the installation to proceed when prompted by Windows User Account Control, and follow the on-screen instructions.
2. When prompted, disconnect and reconnect the ProfiShark.
3. Wait for the installation to complete.
4. Launch the ProfiShark Manager via the shortcut created in the start menu.

2.1.2. Linux

ProfiShark drivers and software can be installed using our repository located at https://ubuntu.profitap.com/.

Supported distributions:

- Ubuntu 20.04
- Ubuntu 22.04
- Kali Linux
- Debian 10
- Debian 11
- Debian 12

Use the following commands:

```
wget https://ubuntu.profitap.com/public.key
```

```
sudo apt-key add public.key
```

```
sudo add-apt-repository https://ubuntu.profitap.com/
```

```
sudo apt-get update
```

If the third step fails on Kali Linux, run the following alternative command:

```
sudo sh -c 'echo "deb https://ubuntu.profitap.com/ kali-rolling main" >>
/etc/apt/sources.list'
```

After these commands, you should be able to see all the available drivers, using:

```
apt-cache search profishark-linux
```

Install the appropriate one with:

```
sudo apt-get install profishark-linux-driver-X.YY.0-ZZ
```

Where X is the kernel major version, YY is the kernel minor version, and ZZ is the distribution release.

This repository will be updated nightly, and will contain the latest driver version built against the latest kernel releases.

If you cannot find the package corresponding to your kernel version, please contact support@profitap.com.

You can install the ProfiShark Manager software with the following command:

```
apt-get install profishark-manager
```

The management software can be run with:

```
/usr/bin/profishark/profishark-manager
```

2.1.3. macOS

macOS 10.15 Catalina and earlier

Run the installer v1.0.35 from the ProfiShark USB key's "macOS" folder.

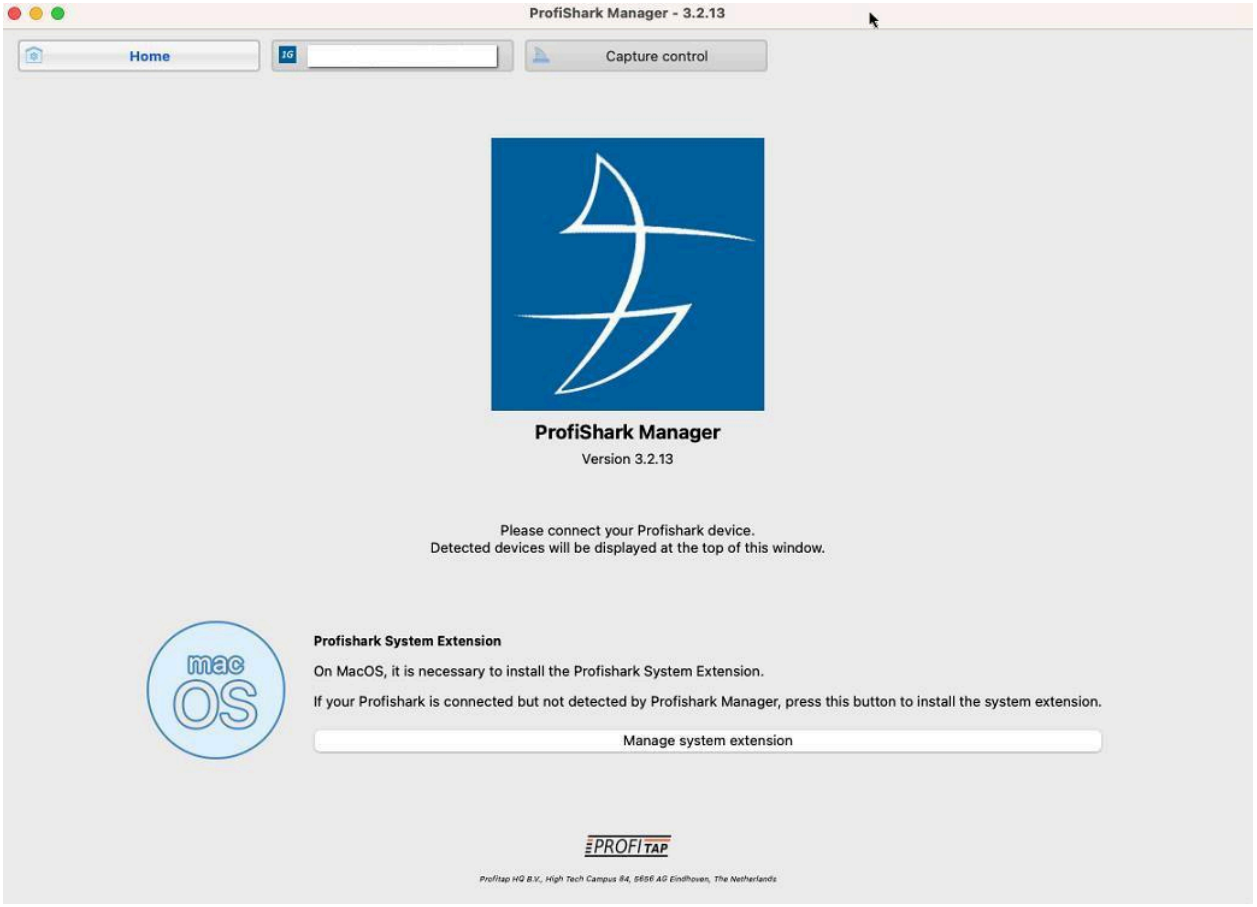
For the installation to complete, a reboot of the system may be required.

macOS 11 Big Sur and later

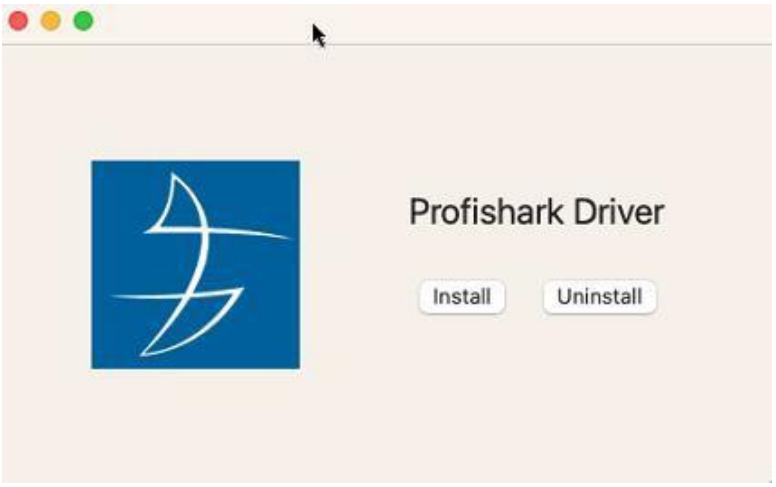
Unpack the installer v3+ from the ProfiShark USB key's "macOS" folder.

Copy the unpacked ProfiShark application to the "Applications" folder and start it.

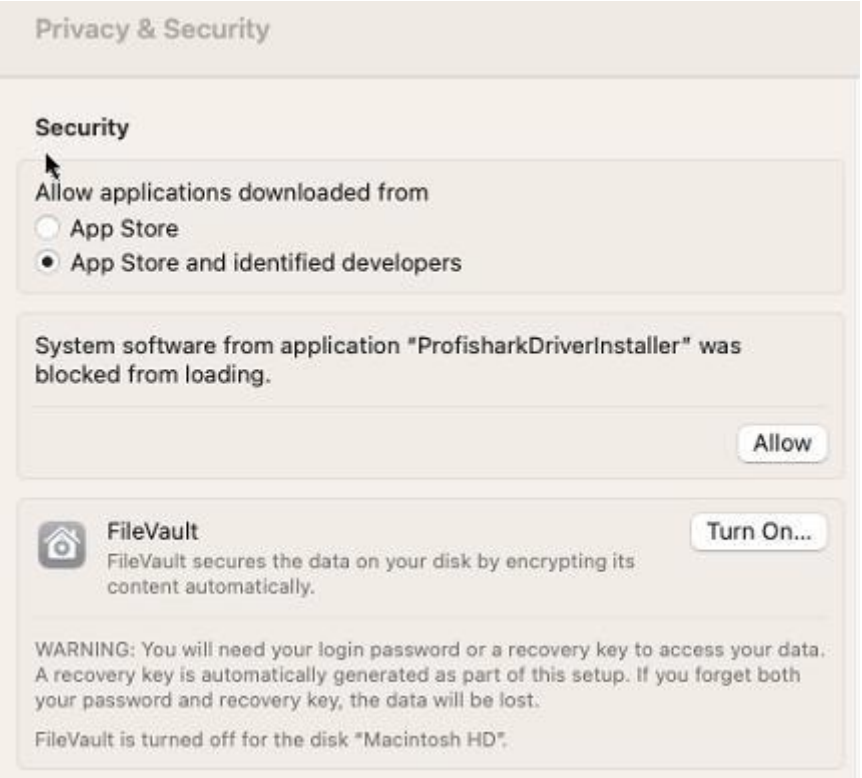
On the ProfiShark Manager's home tab, click the "Manage system extension" button to start the system extension (driver) installation.



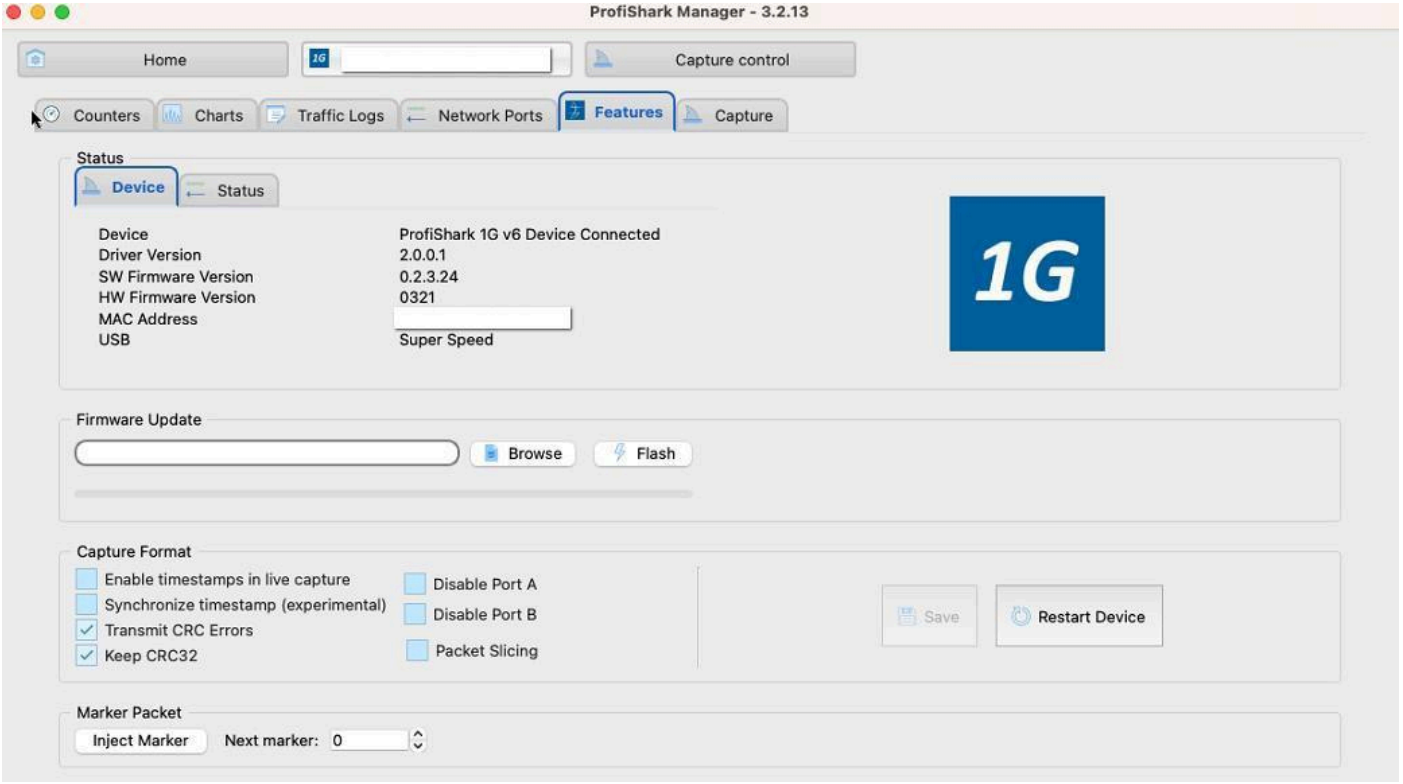
The Driver Control tool will open, allowing installation or uninstallation of the system extension (driver).



Click the "Install" button. You may be asked by macOS to allow the system extension in the "Privacy & Security" configuration.



Once the system extension is installed, reboot the host. Connected ProfiShark devices should now be detected and displayed in the ProfiShark Manager.



To install new ProfiShark Manager versions, the previous ProfiShark Manager and driver should be uninstalled first:

1. From the ProfiShark Manager's "Home" tab, start the Driver Control tool using the "Manage system extension" button.
2. Click the "Uninstall" button.
3. Close both the Driver Control tool and the ProfiShark Manager.
4. Remove the "ProfiShark" application from the "Applications" folder.
5. Reboot the host to complete the uninstallation process.

2.1.4. Synology NAS

DSM 6.1 and 6.2

1. Open the Package Center from the Synology DSM interface.
2. Click "Manual Install" in the upper right-hand corner.
3. Select the .spk file corresponding to the Synology architecture from the ProfiShark USB key.
4. Click "Install".

To find out which architecture your NAS uses, refer to the following page:
https://kb.synology.com/en-me/DSM/tutorial/What_kind_of_CPU_does_my_NAS_have

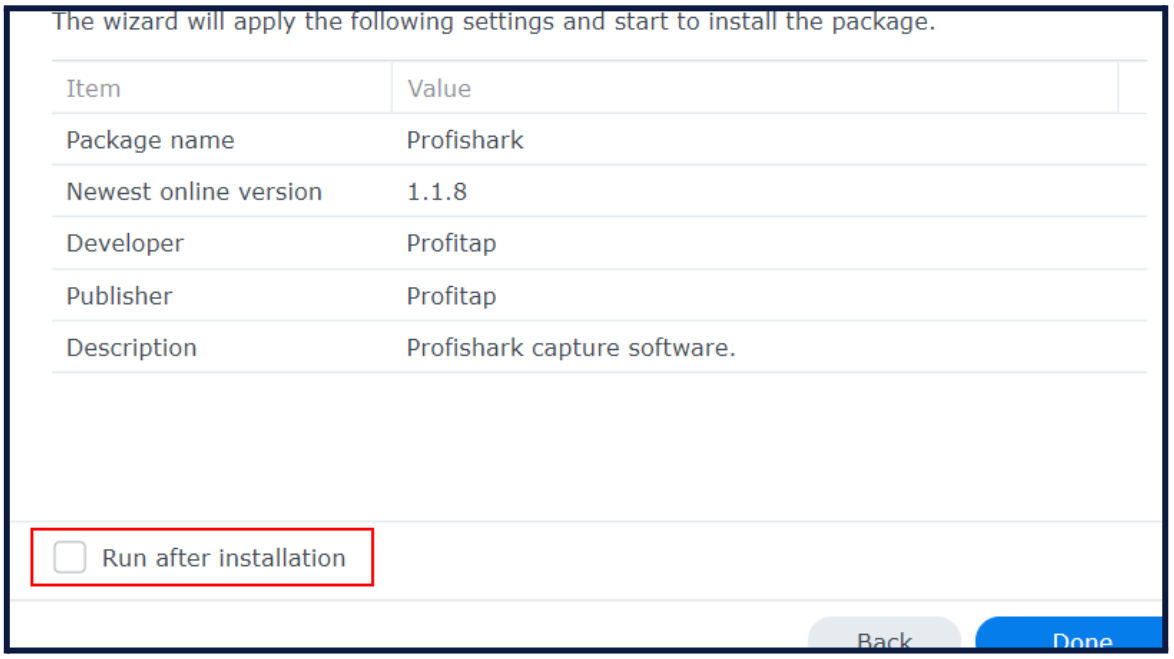
DSM 7.0 and later

DSM 7.0+ comes with a number of restrictions. From this version and later, third-party plugins are not allowed to have root access, which is needed to install the ProfiShark driver.

The current way to proceed is to split the installation in two steps: first the module installation, performed from the DSM GUI, then the driver installation, performed via SSH with admin access.

Uninstall the previous ProfiShark package from the NAS if it is present. Otherwise, the new package will not be accepted.

Install the new package (latest version, available in the ProfiShark USB key), but do NOT start it after installation (untick the checkbox as shown below).

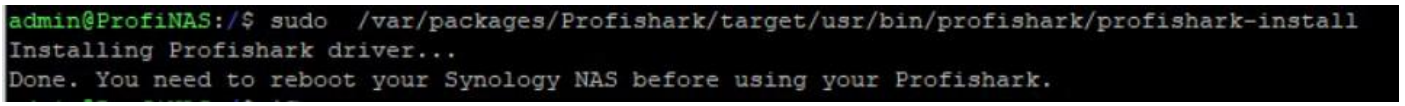


Log into the NAS via SSH with admin credentials, using your SSH client of choice (e.g. PuTTY).

Run the following command:

```
sudo /var/packages/Profishark/target/usr/bin/profishark/profishark-install
```

You should expect the following output:



Reboot the NAS and run the package.

2.1.5. ESXi

Currently, ESXi up to version 6.5 is supported.

Disable the new USB driver from VMware (see https://kb.vmware.com/s/article/2147650) with the following SSH command:

```
esxcli system module set -m=vmkusb -e=FALSE
```

Reboot.

Install the VIB driver file by copying the .vib file from the ProfiShark USB key to the host and running the following SSH command:

```
esxcli software vib install -v /net-profishark-xxxxxxxxx.vib
```

2.2. Analysis Software

2.2.1. Analyzer

All industry standard analyzers are supported and can be used to perform the analysis.

Wireshark is recommended, and can be downloaded at wireshark.org.

To start capturing network data, launch the preferred network analyzer and select the ProfiShark device, which should appear in the list of network interfaces.

2.2.2. Wireshark Extcap Tool

The Extcap Tool allows you to get high-resolution hardware timestamps in live Wireshark capture. It is aimed to replace the dissector, as it provides hardware nanosecond timestamps without altering the packets.

Windows

Copy both the extcap binary file and API .dll from the ProfiShark USB key's 'Windows\Extcap Tool Wireshark' subfolder to the Wireshark 'Global Extcap' path. This path can be found in Wireshark through the following menu path: Help -> About Wireshark -> Folders.

Restart Wireshark. A new capture interface will be displayed in the list of capture interfaces. Its name should be in the form 'ProfiShark <MAC address>'. By capturing on this interface, you will get hardware nanosecond timestamps in Wireshark.

Linux

Copy the extcap binary file from the ProfiShark USB key's '\Linux\Extcap Tool Wireshark\profishark-extcap-linux64_1.0.tar.gz' archive to the Wireshark 'Global Extcap' path. This path can be found in Wireshark through the following menu path: Help -> About Wireshark -> Folders.

Restart Wireshark. A new capture interface will be displayed in the list of capture interfaces. Its name should be in the form 'ProfiShark <MAC address>'. By capturing on this interface, you will get hardware nanosecond timestamps in Wireshark.

2.2.3. Wireshark Dissector

The ProfiShark dissector for Wireshark is used to properly display high-resolution timestamps in live Wireshark capture without the Extcap Tool (see 3.2.2. Live Capture with Wireshark Dissector).

Windows

Copy the 'profishark.dll' file from the ProfiShark USB key's 'Windows\Dissector Wireshark\dist' subfolder corresponding to your Wireshark version and Windows version, to your Wireshark installation folder's 'plugins' subfolder.

For Wireshark 2.6 and later, the dll must be copied to the 'plugins*\epan' folder.

The dissector can be enabled or disabled in Wireshark through the following menu path: Edit -> Preferences -> Protocols -> ProfiShark.

Linux

In the ProfiShark USB key's 'Linux/Dissector Wireshark/' directory, run the following commands:

```
sudo dpkg -i /path/deb/file
```

```
sudo apt-get install -f
```

The dissector can be enabled or disabled in Wireshark through the following menu path: Edit -> Preferences -> Protocols -> ProfiShark.

macOS

Copy the 'profishark.so' file from the ProfiShark USB key's 'macOS/Dissector Wireshark' subfolder corresponding to your Wireshark version, to your Wireshark installation folder's 'plugins' subfolder. Navigate to 'Applications' in Finder, right-click the Wireshark.app Application Bundle and click 'Show Package Contents'.

For Wireshark 2.6 and later, the plugin file must be copied to the '/Applications/Wireshark.app/Contents/PlugIns/wireshark/*/epan' folder.

The dissector can be enabled or disabled in Wireshark through the following menu path: Edit -> Preferences -> Protocols -> ProfiShark.

2.3. Hardware Setup

Connect the line to be monitored to the ProfiShark's network ports.

Connect the ProfiShark to the computer using the supplied USB 3.0 cable.

Note: Connecting to a USB port of specification lower than USB 3.0 may result in data drops, due to bandwidth limitations.

ProfiShark 1G / 1G+

When deploying ProfiShark 1G/1G+ in-line, connect it to the network prior to powering it in order to make full use of its fail-safe capabilities. This step is critical to verify the availability of the in-line path in case of failover.

(Optional) Connect a dedicated power supply to the ProfiShark 1G/1G+ to ensure maximum fail-safe operation at all times. In the absence of a dedicated power supply, the ProfiShark 1G/1G+ is powered through the USB 3.0 cable.

(Optional) Connect the GPS antenna to the ProfiShark 1G+ in order to benefit from GPS-linked timestamp synchronization. Position the antenna outside or near a window for the best results.

ProfiShark 10G / 10G+

If **fiber** SFP/SFP+ modules are used, make sure to match the Tx-Rx / Tx-Rx signal direction at the other end.

If **copper** SFP/SFP+ modules are used, connect either the supplied USB to DC power cable or a compatible 5V/1.5A power supply to the ProfiShark 10G/10G+, to ensure the required power is being supplied to the unit. In the absence of an additional power connection, the ProfiShark 10G/10G+ is powered through the USB 3.0 port alone and can only sustain fiber optic SFP/SFP+ modules.

(Optional) Connect the GPS antenna to the ProfiShark 10G+ in order to benefit from GPS-linked timestamp synchronization. Position the antenna outside or near a window for the best results.

Note: Due to the nature of SFP modules requiring power for operation, ProfiShark 10G/10G+ doesn't include a bypass feature for fail-safe monitoring. An external TAP can be employed in order to implement fail-safe monitoring.

3. Capture Guide

3.1. ProfiShark Manager

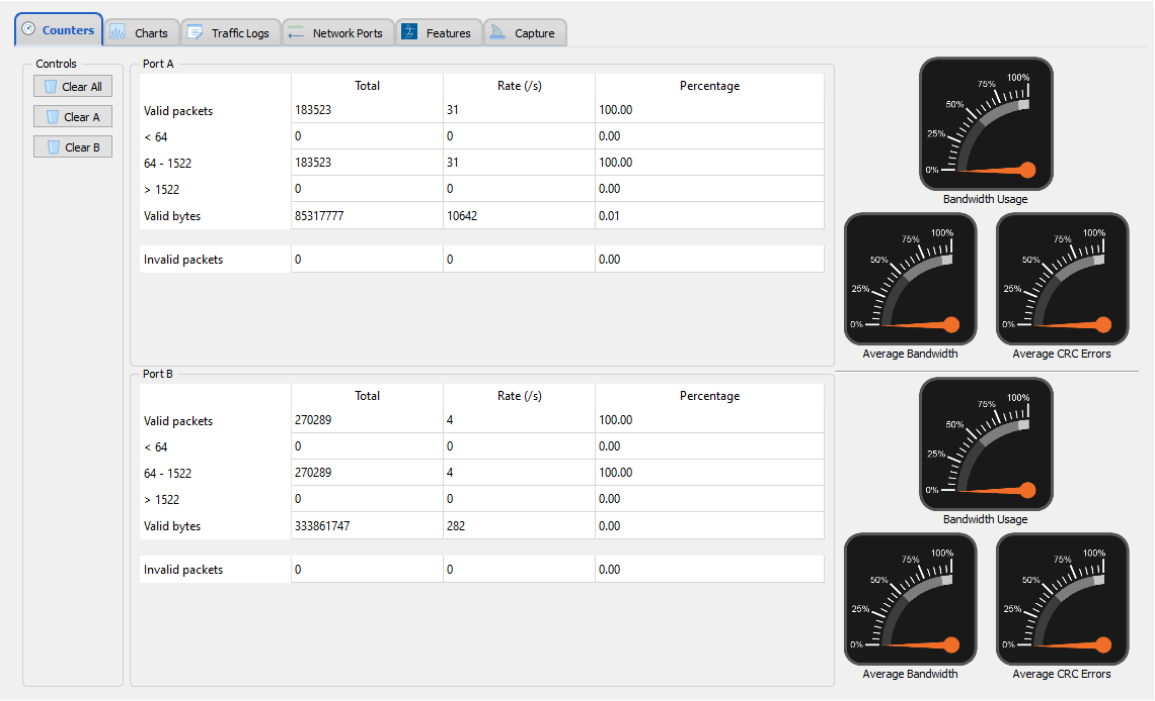
ProfiShark Manager is a standalone application designed and developed by Profitap. It provides means for statistical analysis of a network prior to a deeper investigation using an analyzer. It also provides options for port diagnostic, port control, timestamping, and traffic capture.

A built-in utility allows flashing the firmware and updating the device using a locally stored file. ProfiShark Manager can be used simultaneously with a software network analyzer.

3.1.1. Counters Tab

ProfiShark 100M / 1G / 1G+

The *Counters* tab displays all the ProfiShark built-in counters for both Ethernet ports. These 64-bit hardware counters are cleared at hardware startup.

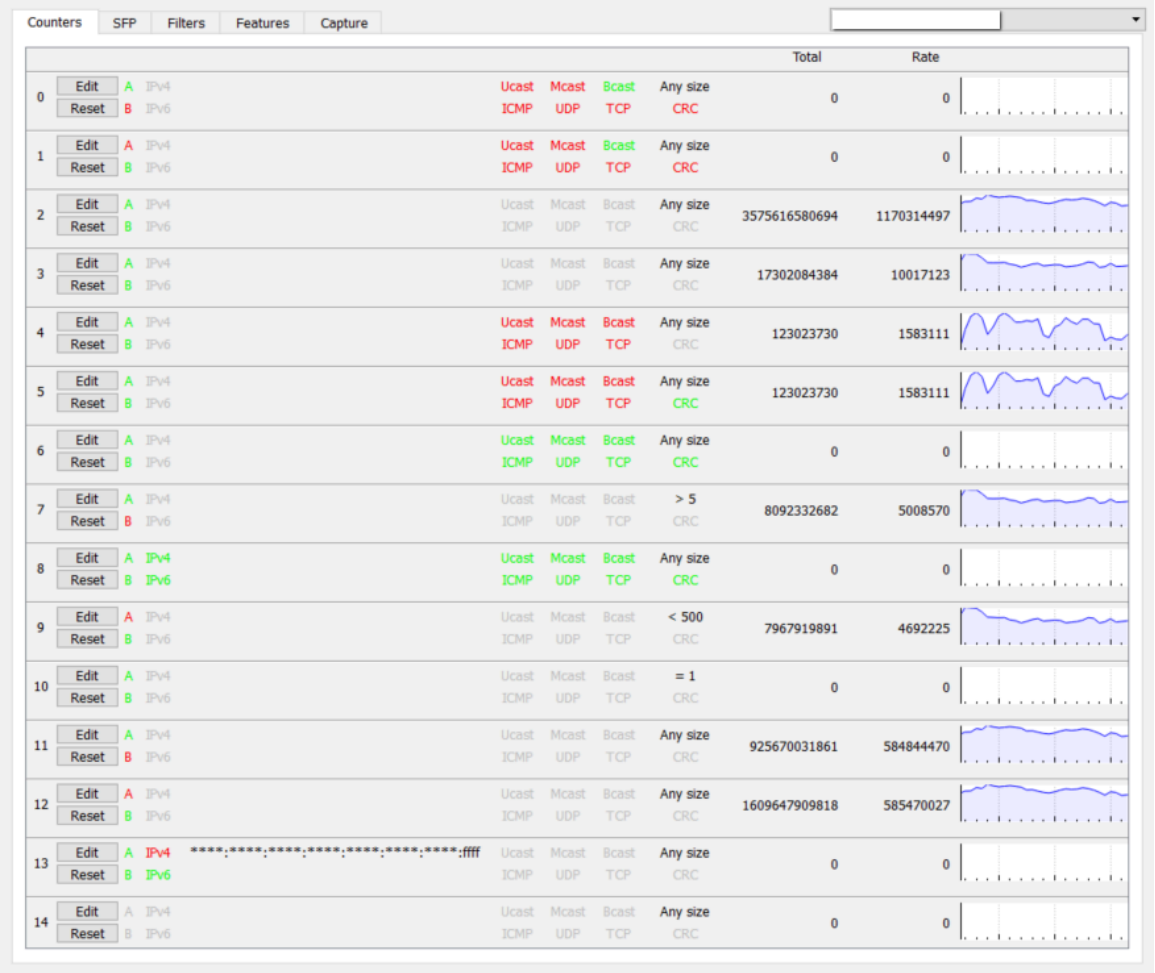


Valid packets	The number of valid packets of any size passing through the port.
Invalid packets	The number of CRC error packets of any size passing through the port.
< 64	The number of packets not exceeding 64 bytes in size.
64 - 1522	The number of packets with a size between 64 and 1522 bytes.
> 1522	The number of jumbo packets, also known as jumbo frames, exceeding 1522 bytes in size.

On the right-hand side are graphical meters displaying current bandwidth usage, average bandwidth usage, and average CRC error rate for each port.

ProfiShark 10G / 10G+

The *Counters* tab displays 15 customizable counters for both SFP+ ports. Each counter can be configured to register packets matching a specific filter when passing through either SFP+ module.



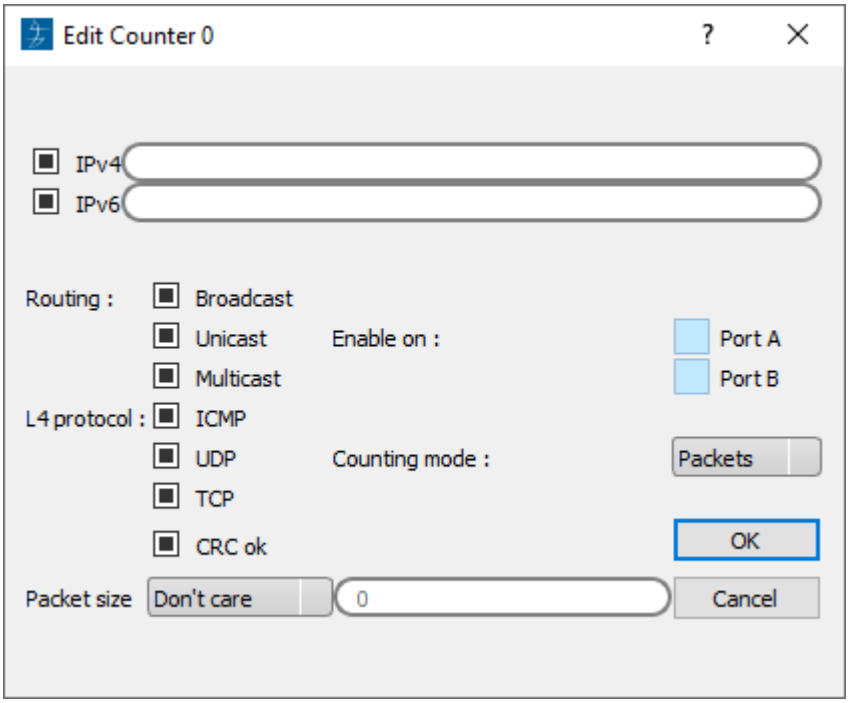
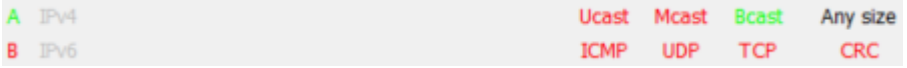
Edit button	Opens the configuration window for this counter.  ■ The counter ignores that frame characteristic. These frames will show in the counter. ☐ The counter filters out the matching frames. These frames will not show in the counter. ☑ The counter only counts the frames matching this specific filter. **IPv4 / IPv6:** If checked, only packets originating from or destined to the specified IPv4 / IPv6 address will be taken into account. **Packet size:** If different than *Don't care*, only packets with a size matching the configured filter will be taken into account. **Enable on:** Depending on the selection made here, only packets passing through either Port A, Port B, or both ports, will be taken into account. **Counting mode:** The *Total* and *Rate* figures can be displayed in either bytes or number of frames. **Note:** If multiple filter fields are configured, only packets matching all filters will be counted.
Reset button	Resets the *Total* figure for this counter. Does not reset the configured filters for this counter.
Matching filter	 This area displays the matching filters for each counter, displaying in red (■) for ignoring, green (☑) for taking into account, and grayed out (☐) for filtered out frames. The frame size is always displayed in black.
Total	Displays the total number of packets or bytes matching the configured filter.
Rate	Displays the current rate of packets or bytes per second matching the configured filter.

Chart display	Displays traffic statistics in a graphical representation of the frames matching the configured filter.

3.1.2. Charts Tab

ProfiShark 100M / 1G / 1G+

The *Charts* tab offers a view of the same statistical information as the *Counters* tab, plotted over time, for a better overview of the data flow.

Depending on the type of packets or events selected on the left side of the screen, the statistical data is plotted accordingly for either port A or B. Refresh rate can also be selected using the drop-down list on the top left-hand corner, further tuning the displayed information.

All data can be expressed either in number of packets per second, or in a percentage of the total number of packets:

- By selecting **packets/s**, each data type displays the corresponding number of packets per second, except for the bandwidth usage which is displayed in bytes per second.
- By selecting **percentage**, each data type is displayed as a percentage of the total number of packets, except for the bandwidth usage which is displayed in percentage of the total bandwidth.

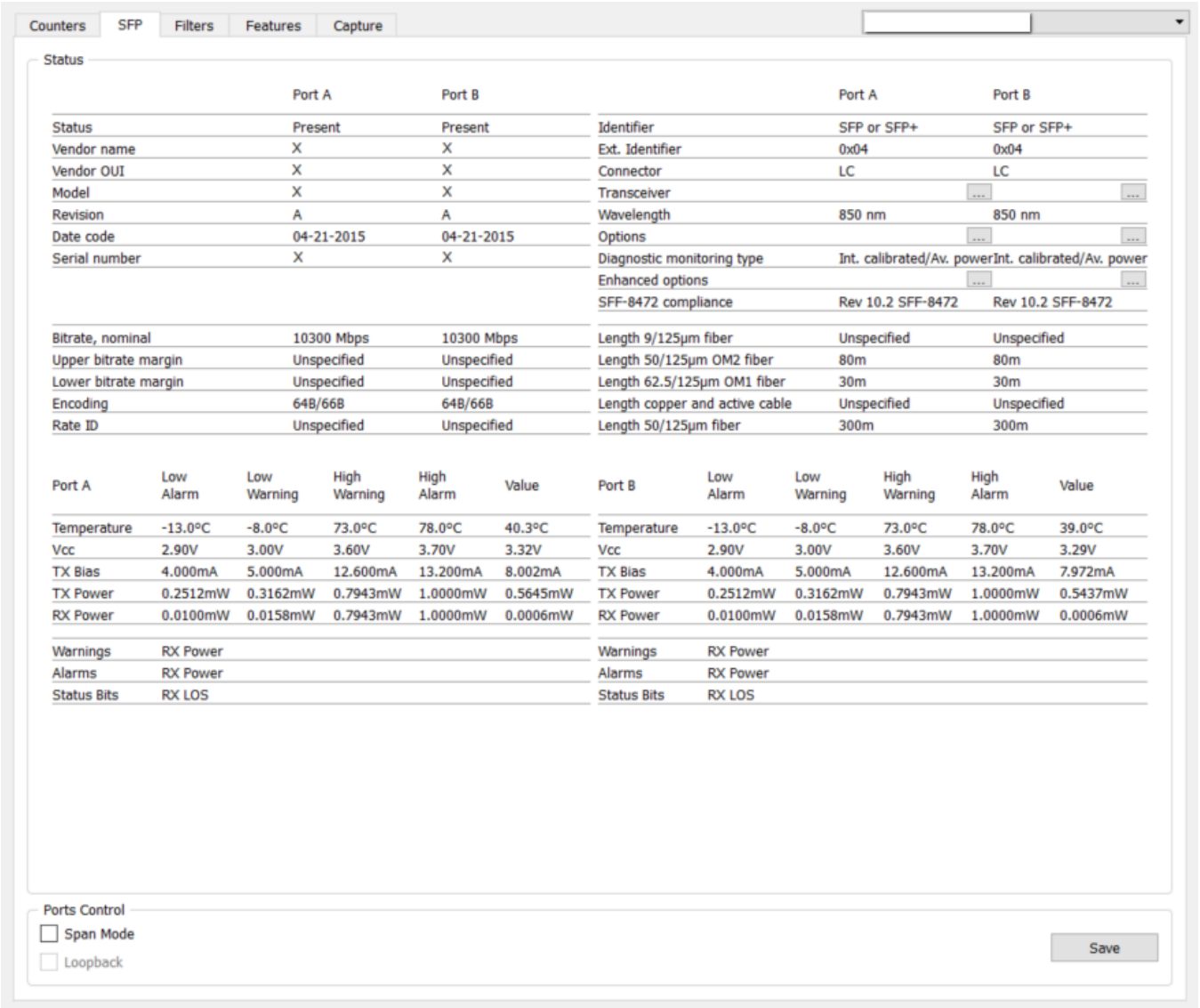
The plotted statistical data can be reset by clicking the *Clear All* button. Disconnecting the ProfiShark also resets the plotted statistical data.

3.1.3. SFP Tab

ProfiShark 10G / 10G+

The *SFP* Tab provides real-time information about the connected SFP+ modules, offering an overview of their general capabilities and real-time sensors.

The *Ports Control* section allows switching between SPAN mode and In-Line mode by ticking or unticking the *Span Mode* checkbox. In SPAN mode, traffic is only received, on either or both ports. In In-Line mode, traffic is transmitted between both ports. A loopback option is available when SPAN mode is enabled. An autonegotiation option is available for each port when the 1 Gbps firmware is active (see *Features* tab).



3.1.4. Traffic Logs Tab

The *Traffic Logs* tab allows users to monitor network ports events.

ProfiShark 100M / 1G / 1G+

Monitor link status, bandwidth usage and CRC error rate for ports A and B. For bandwidth usage and CRC error rate, an entry is added every time the specified threshold is exceeded.

Link status
Logs link status events.

Bandwidth usage
Logs traffic events exceeding the set value. This value represents a percentage of the total bandwidth. For instance, for 1 Gbps, a value of 5.5 will result in only logging traffic events exceeding 55 Mbps (1000 * 0.055).

CRC error %
Logs CRC error events exceeding the set value. This value represents a percentage of the traffic passing through the port. For instance, a value of 5.5 will result in only logging traffic events with a CRC fault rate exceeding 5.5% of the traffic passing through the port.

ProfiShark 10G / 10G+

Monitor SFP module detection, status bit changes, and warnings and alarms.

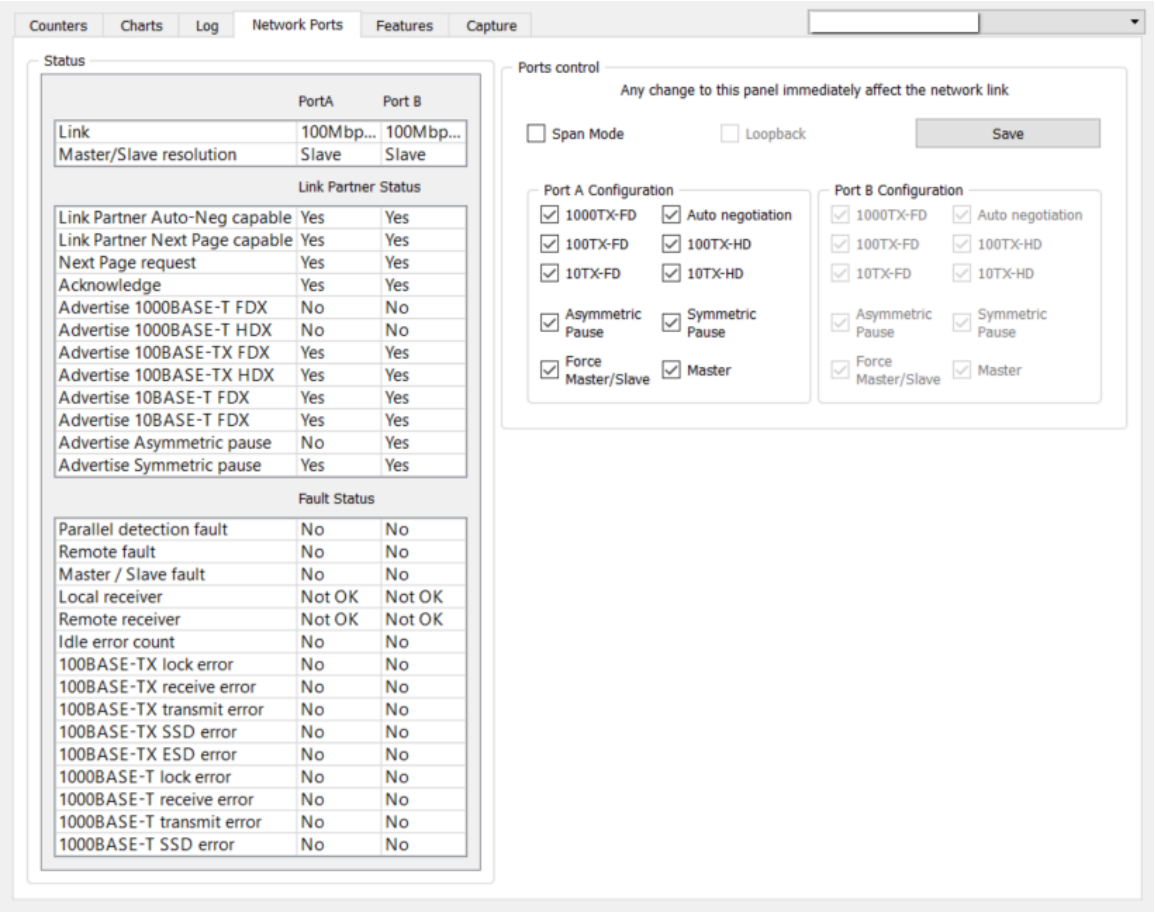
ProfiShark 1G+ / 10G+

Additional options for logging timing-specific events are available on this tab for the 1G+ and 10G+ models.

3.1.5. Network Ports Tab

ProfiShark 1G / 1G+

The *Network Ports* tab allows the customization of port settings for the ProfiShark 1G/1G+, and offers an overview of the ports' status and link capabilities.



When the ProfiShark ports are set to *In-Line Mode* (*Span Mode* option unchecked), devices connected through ports A and B can communicate. In this case, both Ethernet ports are controlled at the same time.

Enabling *SPAN Mode* tells the ProfiShark to intercept two separate data streams, and the connection between ports A and B is severed. In this case, the Ethernet ports can be controlled independently in terms of speed, duplex mode, and autonegotiation.

Span Mode	Checking this option tells the ProfiShark to intercept a separate data stream for each port. Each port can be controlled independently. Unchecking the option sets the ProfiShark to In-Line Mode.
Loopback	This feature is only available for ProfiShark 10G.
Auto negotiation	This feature tries to link the two network devices on the highest possible speed out of those selected for each port (1000TX-FD, 100TX-FD/HD, 10TX-FD/HD). Enabling this feature also allows the selection of flow control features (Asymmetric/Symmetric Pause) and establish or force the Slave/Master device. **Note:** This option is required for 1 Gbps speeds.
1000TX-FD **100TX-FD/HD** **10TX-FD/HD**	If the *Auto negotiation* feature is enabled, multiple speeds can be selected in this section (1000, 100 or 10 in Full or Half Duplex mode) and a link will be attempted at the highest possible speed. If the *Auto negotiation* feature is disabled, only one speed can be selected in this section (10/100 in Full or Half Duplex mode) forcing the link to be established at the selected speed.
Asymmetric pause **Symmetric pause**	These features are flow control related, regulating traffic in cases of buffer overflow situations. **Note:** Only available if *Auto negotiation* is enabled.
Force Master/Slave	Enabling this feature signals to the negotiation process that the network device connected to this port is desired to be the Slave device. **Note:** Only available if *Auto negotiation* is enabled.
Master	Enabling this feature signals to the negotiation process that the network device connected to this port is forced to be the Master device. **Note:** Only available if *Auto negotiation* is enabled.
Force Master/Slave & Master	Enabling both features signals to the negotiation process that the network device connected to this port is forced to be the Master device. **Note:** Only available if *Auto negotiation* is enabled.

A comprehensive list of advertised partner network capabilities is displayed on the left side panel.

3.1.6. Filters Tab

ProfiShark 10G / 10G+

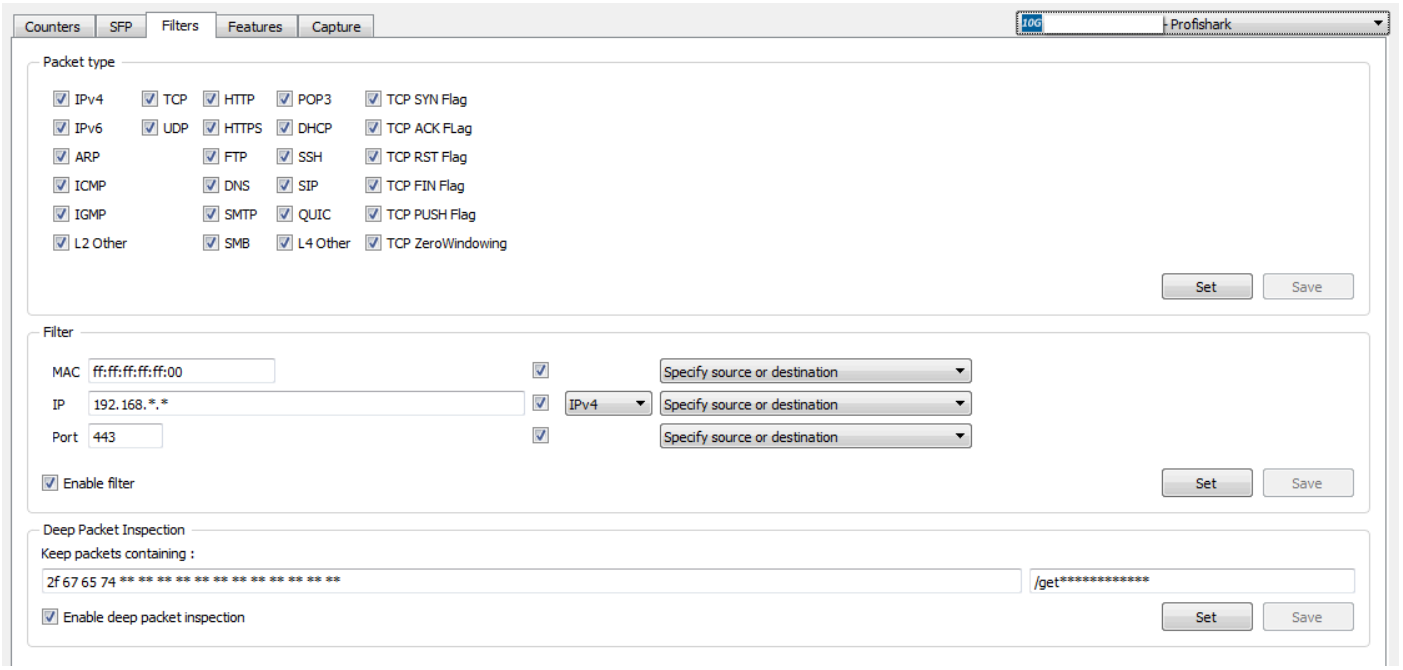
The *Filters* Tab gives access to the ProfiShark 10G/10G+ hardware filters and deep packet inspection (DPI) feature. When enabled, only the packets matching the criteria configured in these filters and DPI will be captured in *Live Capture* and *Direct Capture*. These filters only affect the captured traffic and do not interfere with the counters displayed in the *Counters* Tab.

The *Packet type* section allows you to include or exclude packets based on their type. Selected packet types will be included in the capture, and unselected packet types will be excluded.

The *Filter* section allows filtering on Ethernet MAC, IPv4/6 addresses, and TCP/UDP ports.

The *Deep Packet Inspection* section allows users to search for a particular string (up to 16 characters in length) in the packets. This procedure is performed in real time, even at 20 Gbps. The left field accepts hexadecimal characters, while the right field accepts ASCII characters.

Note: Not all hexadecimal characters can be displayed in the ASCII field.

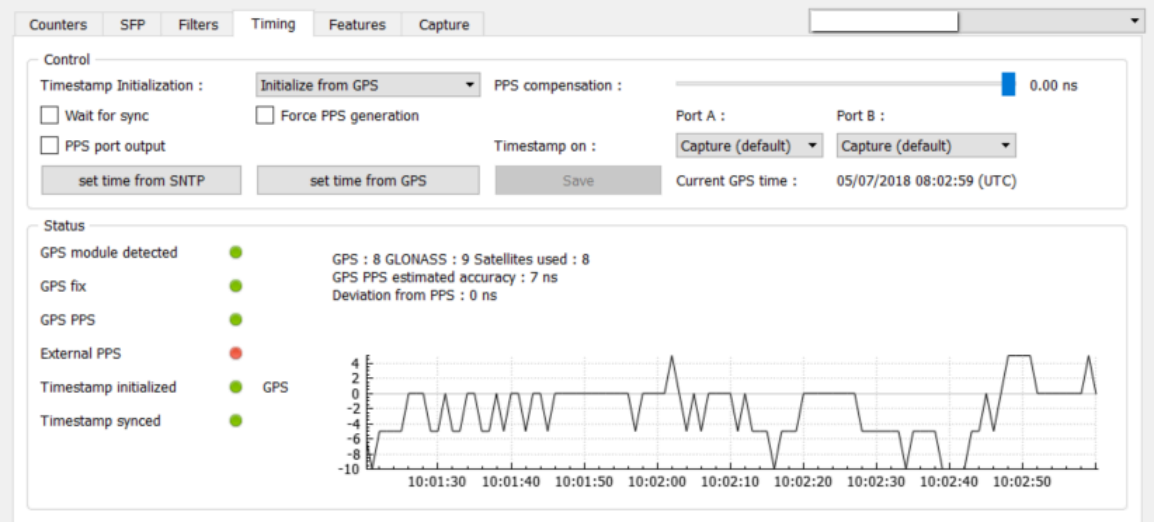


In the example above, ProfiShark has been set to capture only packets originating from or destined to any MAC address ending with 00, originating from or destined to any IPv4 address starting with 192.168, using port 443 for either incoming or outgoing traffic, and carrying matching DPI strings in their payload.

3.1.7. Timing Tab

ProfiShark 1G+ / 10G+

The *Timing* tab displays settings and information related to the advanced timestamping features.

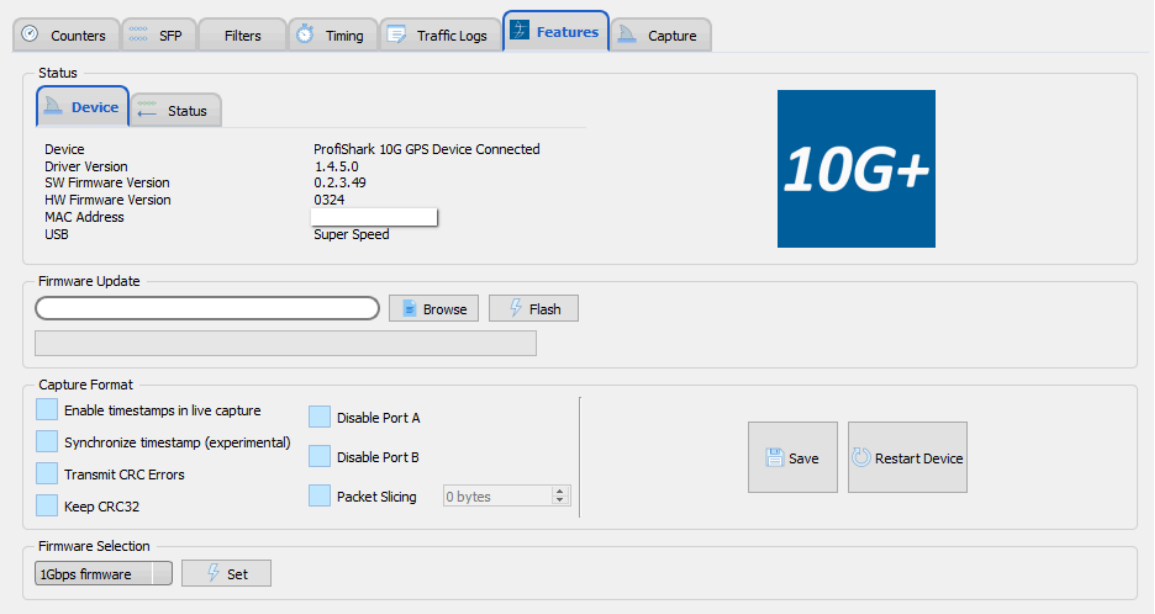


Control	
Timestamp initialization	Sets the source for timestamping at startup: GPS / RTC / System time. If "Do not initialize" is selected, it will start from Epoch 0 (1970).
Wait for sync	If enabled, traffic capture is only allowed after timestamp synchronization has been completed.
PPS port output	If enabled, the PPS port will be set to output mode, sending out a PPS signal if the GPS is synchronized.
Force PPS generation	Forces the generation of a PPS signal from the internal RTC (real-time clock). **Note:** Only active if *PPS port output* is also enabled.
Set time from SNTP/GPS	Sets the source for timestamping to either GPS or an online time service (SNTP).
PPS compensation	The PPS compensation slider tells the PPS to compensate for additional (external) latency. For instance, 1 meter of cable adds 3 ns of latency, in which case the slider should be set to -3 ns (-15 ns for 5 meters, -30 ns for 10 meters, etc.).
Timestamp on Port A/B	**Capture:** Timestamps are set to the packets at the moment they are captured within the device. **Ingress:** Timestamps are adjusted to account for latency to simulate timestamping at port ingress. **Egress:** Timestamps are adjusted to account for latency to simulate timestamping at port egress. Example: Set one port to egress on a first ProfiShark and one to ingress on a second ProfiShark to measure the latency between both ports.

Status	
GPS module detected	If green, the GPS antenna has been detected by the ProfiShark.
GPS fix	If green, the GPS connection is stable. If yellow, the GPS connection is close to being stable.
GPS PPS	If green, the GPS link is stable enough for the PPS chip to start the synchronization.
External PPS	If green, an external PPS is detected, bypassing the internal PPS. If red, no external PPS has been detected.
Timestamp initialized	Indicates the method by which the time data has been obtained: GPS, SNTP, System clock, or RTC.
Timestamp synced	Indicates that the internal timestamping is synchronized with the UTC time.
Satellites status	Indicates the number of GPS and GLONASS satellites found in range, and the number of satellites used for timestamping.
Deviation from PPS	Indicates the instant deviation of the GPS synchronization from the internal PPS.
Graph	The graph section displays the GPS synchronization status and its deviation from the internal PPS over time.

3.1.8. Features Tab

The *Features* tab contains information about the device, the firmware update utility, and options for enabling and disabling capture-related features.



Status

In the *Status* section, the *Device* tab displays hardware and software information about the connected ProfiShark device, and the *Status* tab displays the current status of its network interface.

Device	The connected ProfiShark model.
Driver Version	The version of the driver software currently communicating with the ProfiShark.
SW Firmware Version	Firmware version of the embedded software part.
HW Firmware Version	Firmware version of the programmable hardware part.
MAC Address	A unique identifier encoded into the ProfiShark device.
Link/Module	The status of the link or SFP modules.
Software Dropped Packets	The number of packets dropped by the driver in any mode.
Hardware Dropped Packets	The number of packets dropped due to low USB bandwidth, for instance when connecting the ProfiShark to a USB 2.0 port and attempting a 1 Gbps capture, or when attempting a 10 Gbps capture without any configured filter.

Firmware Update

The *Firmware Update* section allows users to flash the firmware of the connected ProfiShark with a locally stored version. The ProfiShark is unavailable during the firmware update process, which can take up to several minutes to complete. Once finished, the ProfiShark may need to be replugged for the new firmware

to take effect. Do not disconnect the USB port or shut the computer down during the update process. The latest firmware is included in the ProfiShark installation folder.

Note: The ProfiShark Manager will compare the firmware of the connected device(s) with the ones included in the installation folder every time it starts, allowing a new revision to be installed if present.

Capture Format

The *Capture Format* section allows users to enable or disable capture-related features. These options apply to both *Direct Capture* and *Live Capture* modes. Additional customization of the capture process is available in the *Capture* tab.

Enable timestamps in live capture	Appends a Unix formatted timestamp in the header of the packet data. This timestamp can be interpreted by the Profitap Wireshark dissector in *Live Capture* mode. **Note:** This option produces non-standard PCAP files, which require the dissector for timestamps to be interpreted properly. This option is ignored when using *Direct Capture* or *Live Capture* with the Extcap Tool, both of which produce standard PCAP files with high-resolution timestamps.
Synchronize timestamp (experimental)	Synchronizes the ProfiShark's clock speed to the clock of the host it is connected to. When enabled, the host sends 1 pulse per second (1PPS) to the ProfiShark through the USB port. The ProfiShark then smoothly adapts its own clock to the pulses. This feature is useful for keeping the host clock and ProfiShark clock synchronized in order to avoid long-term drift. The drawback is that, since USB cannot provide high-precision timing, per-second pulses can have a variation in the range of several milliseconds. This means that the ProfiShark clock will change speed constantly (but not in steps, very smoothly instead). Thus, this feature is not recommended when troubleshooting microsecond and nanosecond delays in a short time range.
Transmit CRC Errors	When enabled, the ProfiShark will include packets with CRC errors in the capture. These packets are usually filtered out by network interfaces.
Keep CRC32	When enabled, the CRC32 information (32-bit Frame Check Sequence) located at the end of the packets will be kept in the capture. FCS can be interpreted in Wireshark (Edit \ Preferences \ Protocols \ Ethernet \ Assume packets have FCS).
Disable Port A	If checked, frames from port A will not be captured.
Disable Port B	If checked, frames from port B will not be captured.
Packet Slicing	**ProfiShark 100M / 1G / 1G+:** The payload of every captured frame will be dropped, keeping only the header information (the first 128 bytes) up to the application layer. **ProfiShark 10G / 10G+:** Only the specified amount of data will be captured for each frame, starting from the beginning of the frame, specified in bytes.

Firmware Selection

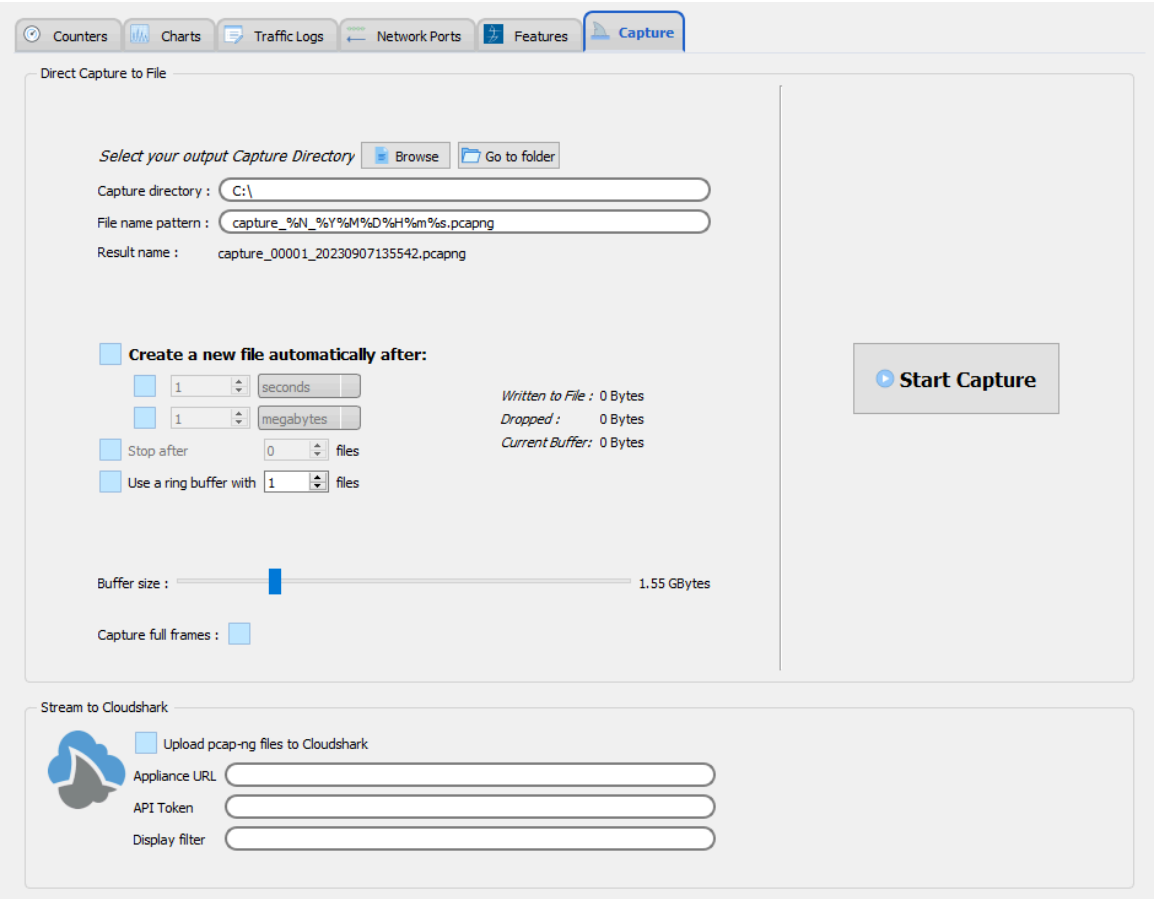
The *Firmware Selection* section allows users to switch between 10 Gbps and 1 Gbps firmware for the ProfiShark 10G and 10G+, effectively altering the operating speed of the connected SFP+ modules.

Note: Switching between firmware versions takes between 4 and 8 seconds to complete, during which the network connection will be severed.

3.1.9. Capture Tab

ProfiShark can capture traffic without the need for third-party capture software. This *Direct Capture* is performed at the driver level, prior to all network stacks and frame processing. *Direct Capture* provides the best performance, enabling small packet capture at wire speed.

The *Capture* tab contains the controls for the *Direct Capture* feature. The captured data is saved to PCAP Next Generation files (.pcapng) with hardware-generated packet timestamps. ProfiShark Manager also provides an option for uploading capture files to Cloudshark.

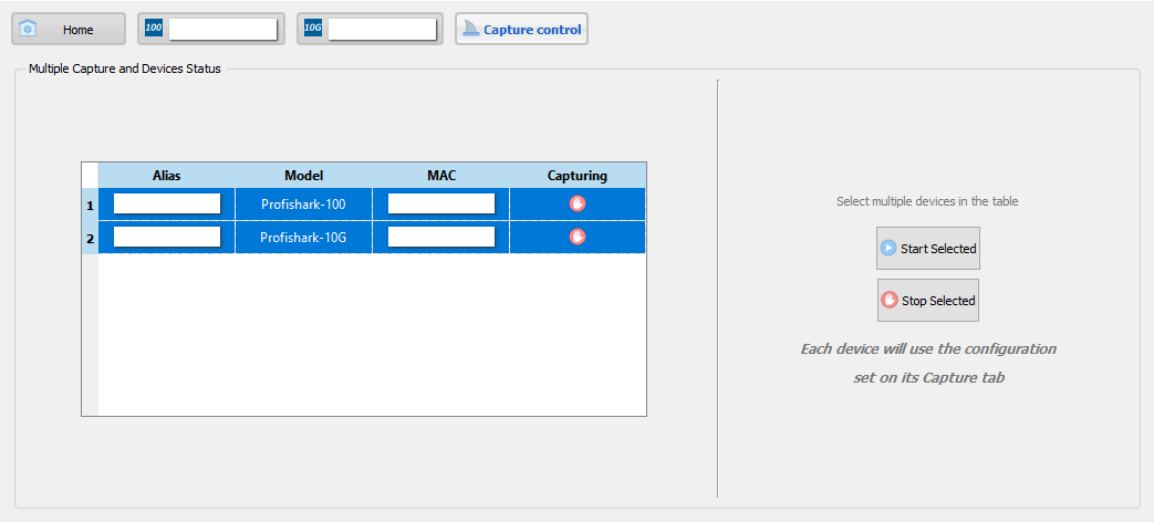


Capture directory	Specify the location where the capture files will be saved.
File name pattern	Specify the naming pattern for the capture files, where %N is the file number, %Y the year, %M the month, %D the day, %H the hour, %m the minute, and %s the second.
Create a new file automatically after	Creates a new file when the specified time or file size is reached.
Stop after	Stops the capture when the specified number of files is reached.
Use a ring buffer with	Overwrites the capture files when the specified number of files is reached.
Statistics	**Written to File:** Performance statistics. Displays the amount of data currently written in the output file, helping users determine the best buffer size. **Dropped:** Dropped bytes. Indicates the amount of data dropped during the capture, due to performance issues or buffer overflow.

	Current Buffer: If dropped packets start to appear ("Dropped" statistic), increase the *Buffer size* value.
Buffer size	In high bandwidth utilization scenarios, a larger buffer size accommodates more data to be temporarily stored into the computer's memory before being saved to the file, helping to avoid captured data being dropped.
Capture full frames	Enable this option to capture the entire L1 Ethernet frames, which include the preamble (0x55), the SFD, and the CRC. This can be useful for TSN (Time-Sensitive Networking) capture.
Upload pcap-ng files to Cloudshark	Enable this option to upload capture files to Cloudshark automatically.
Appliance URL	Set the appropriate URL of the Cloudshark server on which to upload the capture files.
API Token	Set the appropriate token for the Cloudshark server set above.
Display filter	Optional display filter for the capture files uploaded to Cloudshark. Regular Cloudshark/Wireshark display filters can be set here. See: https://wiki.wireshark.org/DisplayFilters

Note: The amount of dropped data depends on the data storage throughput and the amount of allocated memory buffer. Disk arrays or SSDs can drastically improve capture performance.

3.1.10. Capture Control



The *Capture Control* tab allows you to start and stop the traffic capture on multiple ProfiShark devices at once. Select multiple devices and click the *Start Selected* or *Stop Selected* button to start or stop the capture for the selected devices. Each ProfiShark will capture using the settings defined on its *Capture* tab.

3.2. Live Capture

ProfiShark can be used to capture network traffic and send it to a dedicated capture software. The process is transparent for packet size, packet type, and protocol. All tags and encapsulation are preserved (e.g. VLAN, MPLS, GRE).

To start capturing network data directly in your software network analyzer of choice, launch the network analyzer and select the ProfiShark device that should appear in the list of network interfaces.

Note: Capturing traffic at high speeds is extremely CPU intensive and can cause software packet drops. For better performance, it is recommended to use ProfiShark Manager's *Direct Capture* function.

3.2.1. Live Capture with Wireshark Extcap Tool

To capture traffic with ProfiShark directly in Wireshark, the Extcap Tool is recommended, as it provides high-resolution hardware timestamps without altering the packets

First, install the Extcap Tool (see 2.2.2. Wireshark Extcap Tool). This will add a new capture interface in Wireshark in the form 'ProfiShark <MAC address>'. Set the capture options in the ProfiShark Manager's *Features* tab. Open Wireshark, and start the capture on the aforementioned capture interface.

Note: *Direct Capture* must be stopped in order to use the *Live Capture with Wireshark Extcap Tool* function.

3.2.2. Live Capture with Wireshark Dissector

To capture traffic in Wireshark with high-resolution timestamping without the Extcap Tool, the ProfiShark Dissector for Wireshark must be installed for the timestamps to be properly interpreted by Wireshark.

First, install the dissector (see 2.2.3. Wireshark Dissector). In the ProfiShark Manager's *Features* tab, select "Enable timestamps in live capture". Open Wireshark and enable the dissector through the following menu path: Edit -> Preferences -> Protocols -> ProfiShark. Start the capture.

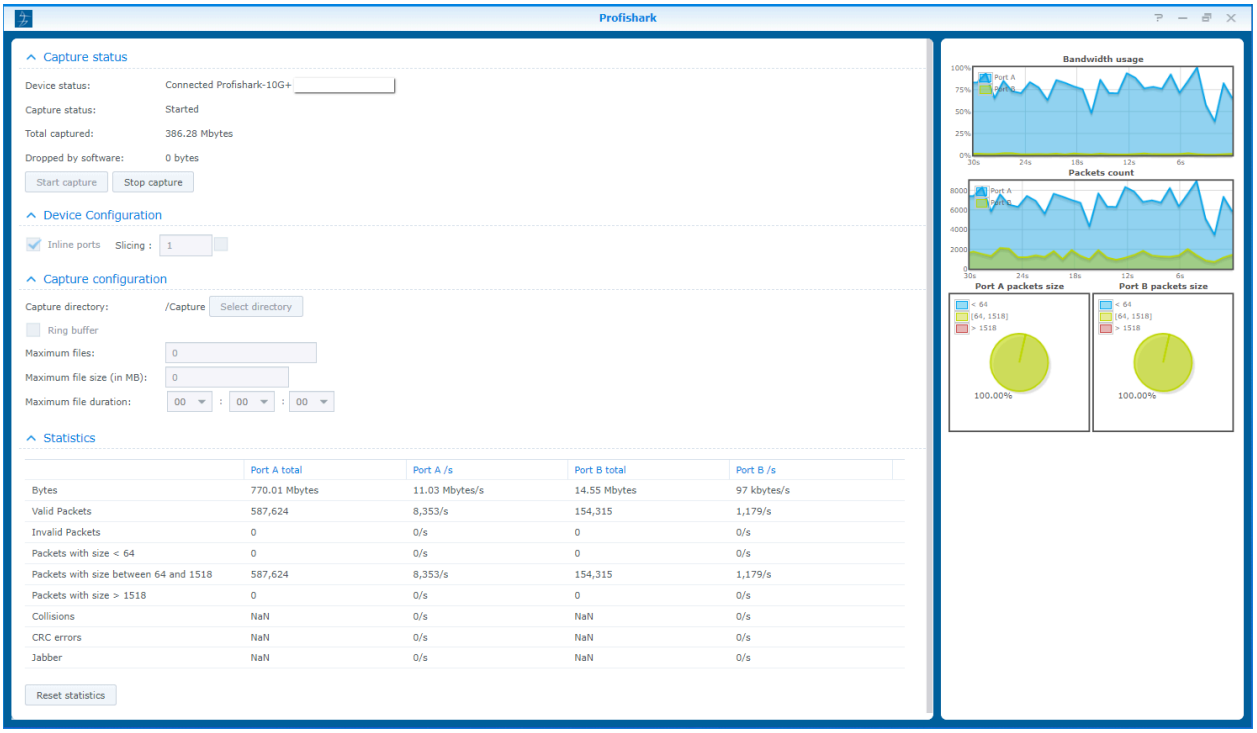
3.3. Long-Term Capture

The long-term capture feature expands the number of use cases for ProfiShark. By combining the capture capabilities of ProfiShark with the storage capabilities of a NAS, it becomes possible to capture traffic for extended periods of time, making it easier to catch intermittent network problems in the act.

The ProfiShark USB key package (included with the product, and also available at resources.profitap.com) provides packages for various Synology architectures.

Install the package corresponding to your Synology NAS (see 2.1.4. Synology NAS).

For optimal capture results, an Intel-equipped Synology NAS is recommended.



Device status	Displays the connected TAP and its MAC address.
Capture status	Specifies whether the capture process is in progress.
Total captured	Displays the total amount of data captured.
Dropped by software	Displays the amount of packets dropped due to performance issues or buffer overflow.
Inline ports	By default, the ProfiShark ports are set to In-Line Mode, meaning that devices connected through ports A and B can communicate. In this case, both ports are controlled at the same time. Unchecking "Inline ports" enables SPAN mode, setting the ProfiShark to intercept two separate data streams. In this case, communication between devices connected to ports A and B is severed, and ports A and B can be controlled independently in terms of speed, duplex mode, and autonegotiation.
Capture directory	Allows users to select the destination folder of the capture file.
Ring buffer	If enabled, overwrites old data, using the circular buffer method of storing new data at the beginning of an existing data file.
Maximum files	After reaching the configured maximum file duration or size, the captured traffic will be saved in a new file, until the number of files configured here is reached.
Maximum file size	This option sets the maximum file size allowed for storing the captured data. Exceeding this value will result in stopping the capture or storing the capture data in a new file.
Maximum file duration	This option sets the maximum duration for storing the captured data. Exceeding this value will result in stopping the capture or storing the capture data in a new file.
Statistics	Displays ongoing and total traffic data for both port A and port B.

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