

PROFISHARK 100M

INSTALLATION AND CONFIGURATION MANUAL



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INSTALLATION

1. UNPACKING

Carefully unpack all the items supplied with the **ProfiShark 100M** and retain the packaging for later use:

- ◉ 1 x ProfiShark 100M main unit
- ◉ 1 x Transport pouch
- ◉ 1 x Ethernet cat5e cable (2 m)
- ◉ 1 x USB 3.0 cable (1.8 m)
- ◉ 1 x USB key (Software, Drivers, Documentation)
- ◉ Quick Start Guide

▶ **NOTE:** Please contact the supplier if any part is missing or damaged.

2. HARDWARE OVERVIEW

The ProfiShark 100M is an integrated network TAP providing safe access to the network for monitoring purposes. It is a passive monitoring device, undetectable to the network, leaving the original data traffic unaltered with no extra packets being inserted.

As it is based on USB 3.0 (5 Gbps), the ProfiShark 100M manages full-duplex 100 Mbps capturing at wirespeed, without the bottleneck of an aggregator tap. It also surpasses all standard NICs in capture mode, as it catches any tags and encapsulation without altering the frames.

When the ProfiShark 100M becomes unpowered, it does not interrupt the network data flow, as it is a completely passive TAP.

The ProfiShark 100M is powered directly from the USB 3.0 port. The unit can be managed by the ProfiShark Manager application, found on the supplied USB key or downloadable from the [Profitap Resource Center](#).

FEATURES:

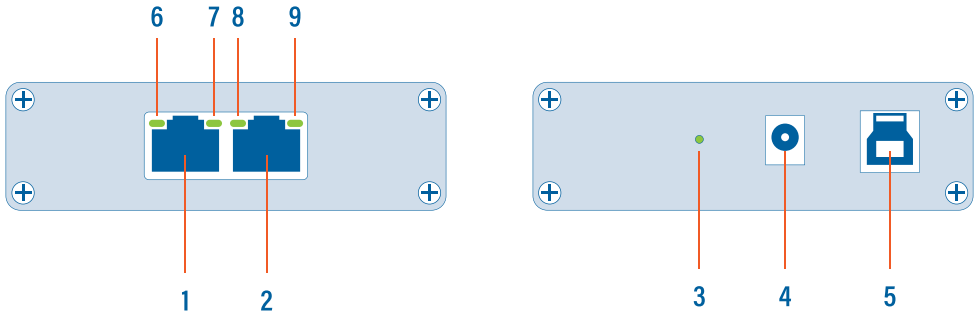
- ◉ 10/100 monitoring on USB 3.0
- ◉ USB 3.0 powered, no adapter required
- ◉ Hardware aggregation
- ◉ 8 ns hardware timestamping for accurate latency testing
- ◉ Real time statistics
- ◉ Compatible with all industry standard analyzers
- ◉ Fail-safe monitoring
- ◉ Low delay, low jitter
- ◉ Low level error and bandwidth monitoring
- ◉ CRC error capture
- ◉ Direct capture to disk
- ◉ In-Line and SPAN (Dual NIC) capture modes
- ◉ Very low CPU usage
- ◉ Invisible to the network
- ◉ PoE passthrough

2.1 Technical and Electrical Specifications

- Powered from USB 3.0 port
- Network link galvanically separated

SYSTEM REQUIREMENTS	MAXIMUM NETWORK LATENCY
Dual Core Processor 4 GB memory USB 3.0 port	100 Mbps: 660 ns 10 Mbps: 6600 ns
LEDS	POWER CONSUMPTION (FULL TRAFFIC)
2 x Speed 2 x Link Activity 1 x Power	100 Mbps: 450 mA 10 Mbps: 520 mA
CONNECTORS	ACCESSORIES
2 x RJ45 8 pins 1 x USB 3.0 1 x 5V DC (center positive)	1.8 m USB 3.0 cable 2 m Ethernet cat5e cable USB key, Transport pouch
DIMENSIONS (WxDxH)	SUPPORTED OS
69 x 124 x 24 mm 2.72 x 4.88 x 0.94 in	Windows 7 / 8 / 10 (32-bit & 64-bit) Linux, macOS High Sierra
CAPTURE PERFORMANCE	
3.2 Gbps	
WEIGHT	STORAGE TEMPERATURE
176g — 0.39 lb	-40 to +80 °C — -40 to 176 °F
RELATIVE HUMIDITY	OPERATING TEMPERATURE
10 to 95%, non-condensing	0 to +50 °C — 32 to 122 °F
COMPLIANCE	ORDER REFERENCE
RoHS — CE	C1AP-100

2.2 Visual Description



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

2.3 LED Functionality

LED	STATE	MEANING
LED 3	OFF	No USB cable nor power cable are connected
	ON	USB cable and/or power cable are connected
	BLINKING	Constant synchronization between system time and hardware timestamp (blink ON every even second, blink OFF every odd second)
LED 7	ON	ProfiShark 100M is operating at 10 Mbps speed
	BLINKING	ProfiShark 100M is initializing
LED 8	ON	ProfiShark 100M is operating at 10 Mbps speed
	BLINKING	ProfiShark 100M firmware is corrupted
LED 7 + LED 8	BLINKING	ProfiShark 100M is not connected or is trying to connect
	ALTERNATING BLINKING	ProfiShark 100M cannot find a common speed between the connected devices
LED 6, LED 9	ON	The port is linked
	BLINKING	The port is linked and has RX/TX activity (traffic is passing through)

3. CONNECTING POWER AND START-UP

In order for the ProfiShark 100M to be ready for analyzing traffic, the following steps have to be taken:

1. Install the ProfiShark Manager.
2. Launch the ProfiShark Manager.
3. Launch the software network analyzer.
4. Tap the line that will be monitored by interconnecting the ProfiShark 100M in between, using Ethernet cables.
5. Connect the ProfiShark 100M to a computer, using the supplied USB 3.0 cable.

- ▶ **NOTE:** Connecting to a USB port of lower specification than USB 3.0 will result in data drops, due to bandwidth limitations.
- ▶ **NOTE:** Connecting the ProfiShark 1G to a different USB port than the one used during the installation requires a reboot of the computer (with the ProfiShark connected) for automatic driver installation for this USB port, and proper handling of the interface by 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 100M.
3. Wait for the installation to complete.
4. Click Launch.

► **NOTE:** The setup utility will create a launch icon in your start menu.

To install the ProfiShark Manager on Linux or macOS, follow the instructions in the *Installation.txt* file located on the USB key or in the latest “ProfiShark USB key” release located in the Resource Center at www.profitap.com/resource-center/

4. ANALYZER INSTALLATION

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

A comprehensive list of compatible analyzers are listed on the ProfiShark 100M product page at: www.profitap.com

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

To start capturing network data, launch the preferred network analyzer and select the new network interface named “ProfiShark 100 Device”.

MONITORING GUIDE

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.

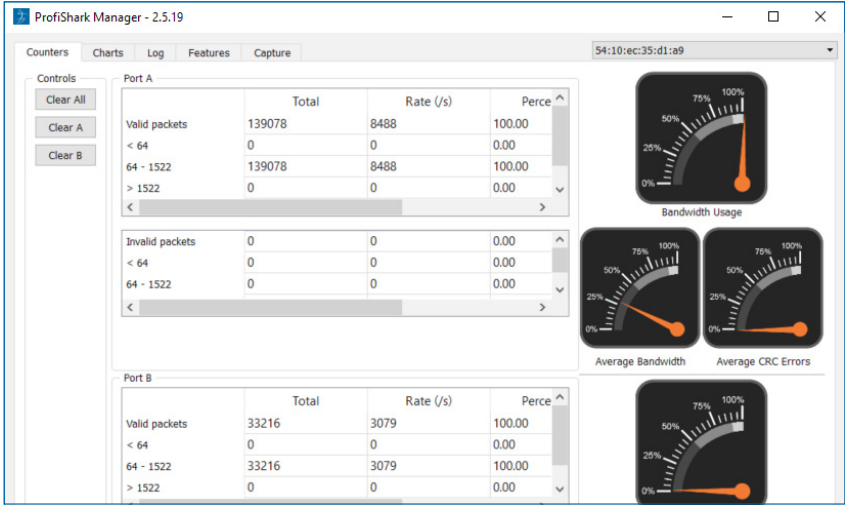
A built-in utility allows flashing the firmware and updating the device online or using a locally stored file. ProfiShark Manager can be used simultaneously with a software network analyzer, without the need to interrupt data capture.

ProfiShark Manager functionalities are grouped in the following tabs:

- ◉ Counter Tab
- ◉ Charts Tab
- ◉ Log Tab
- ◉ Features Tab
- ◉ Capture Tab

1.1 Counters Tab

The *Counters* tab displays all the ProfiShark 100M built-in counters for both Ethernet ports. These 64-bit hardware counters are cleared at hardware startup and link reconnection.

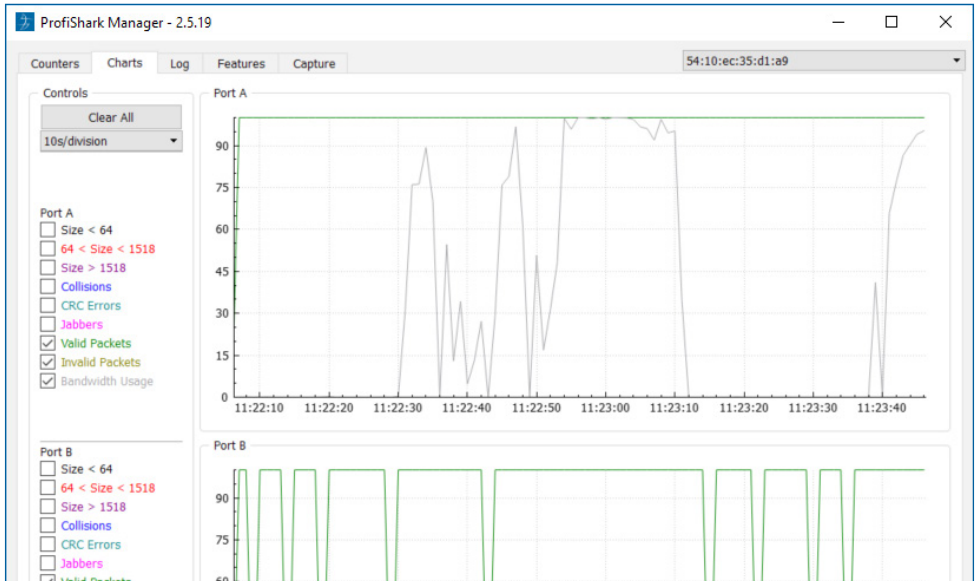


VALID PACKETS	Representing the number of valid packets (of any size) passing through the port.
INVALID PACKETS	Representing the number of CRC error packets (of any size) passing through the port.
< 64	Representing the number of packets (valid/invalid), not exceeding 64 bytes in size.
64 - 1522	Representing the number of jumbo packets, also known as jumbo frames (valid/invalid) with a size between 64-1522 bytes.
> 1522	Representing the number of packets (valid/invalid) exceeding jumbo packet specifications of 1522 bytes in size.

There are also 6 graphical meters (3 for each port), displaying current bandwidth usage, average bandwidth usage, and average CRC error rate for each port.

1.2 Charts Tab

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



Depending on the type of packets or events selected in 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, 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:

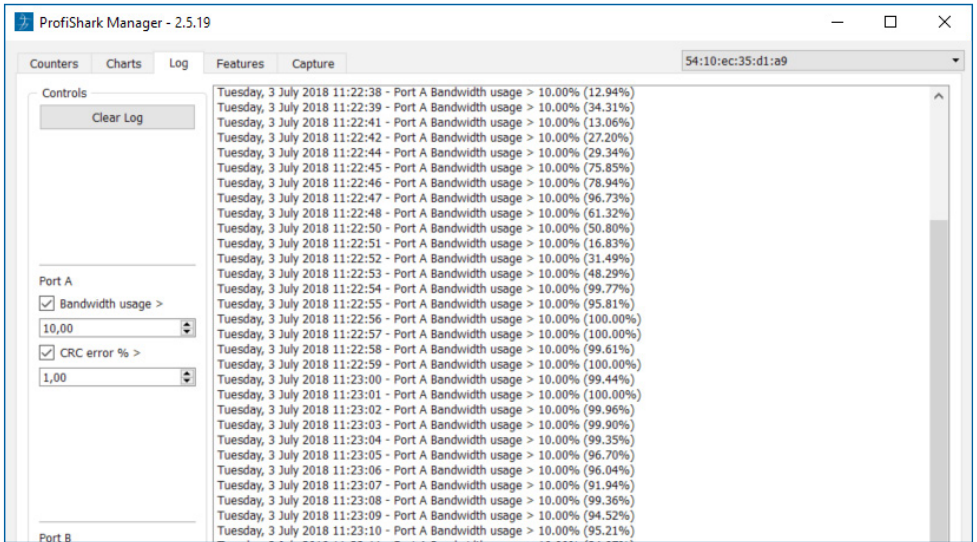
- By selecting *packets/s*, each data type displays the corresponding number of packets per second, except for the bandwidth usage which is displayed in bytes per second.
- By selecting *percentage*, each data type is displayed as a percentage of the total number of packets, except for the bandwidth 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 100M also resets the plotted statistical data.

1.3 Log Tab

The *Log* tab allows the user to monitor bandwidth usage and CRC error rate on either port A or port B. Every time the threshold is exceeded, a log entry is added, allowing to easily identify the type, date, and port of the event.

A certain degree of filtering can be applied on the logs, only displaying events matching the specified percentage.



BANDWIDTH USAGE: Select this option to only log traffic events exceeding the set value. This value represents a percentage of the total 100 Mbps bandwidth. For instance, a value of 5.5 will result in only logging traffic events exceeding 5.5 Mbps (1024 * 0.055).

CRC ERROR: Select this option to only log 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.

1.4 Features Tab

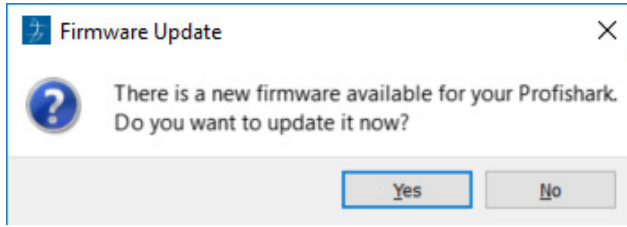
The *Feature* Tab is divided into 3 sections:

- The **Status section**, displaying firmware, hardware and network status for the connected ProfiShark 100M.

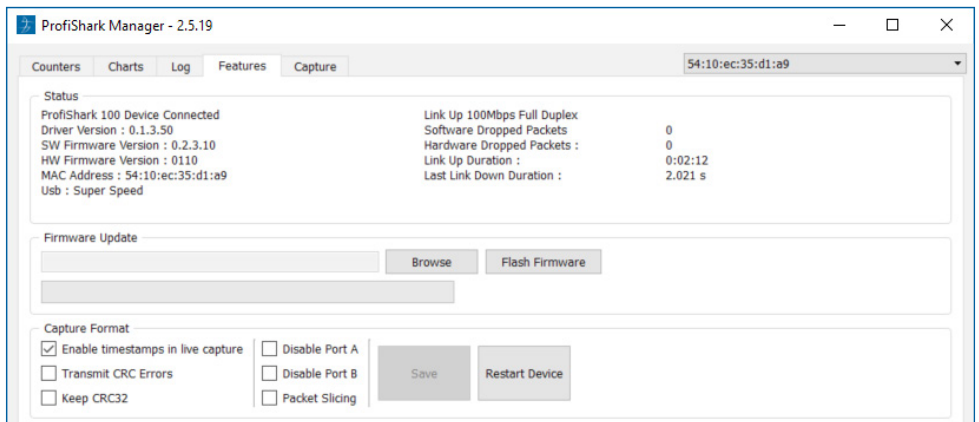
STATUS	
SOFTWARE DROPPED PACKETS	Represents the number of packets dropped by the driver in Live Capture mode.
HARDWARE DROPPED PACKETS	Represents the number of packets dropped due to low USB bandwidth, for example when connecting the ProfiShark 100M to a USB 2.0 port and attempting a full-duplex 100 Mbps capture.

- The **Firmware Update section**, allowing users to flash the firmware of the connected ProfiShark 100M with a locally stored version. The ProfiShark 100M is unavailable during the firmware update process, which can take up to several minutes to complete. Once finished, the ProfiShark 100M 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 can be downloaded from the Resource Center at: www.profitap.com/resource-center/

- ▶ **Note:** The ProfiShark Manager will search for a new firmware release online every time it starts, allowing a new revision to be downloaded and installed, without the need of a locally stored update.



- The *Capture Format* section, allowing users to enable or disable capture-related features. Additional customization of the capturing process is available in the *Capture* tab.



<h2>CAPTURE FORMAT</h2>	
ENABLE TIMESTAMPS IN LIVE CAPTURE	If checked, a Unix formatted timestamp is appended in the header of the packet data. This timestamp can be interpreted by the Profitap Wireshark dissector in <i>Live Capture</i> mode. For more information, see page 21.
TRANSMIT CRC ERRORS	If checked, the ProfiShark 100M will include packets with CRC errors in the capture. These packets are usually filtered out by network interfaces.

CAPTURE FORMAT

KEEP CRC32	If checked, 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	Enabling this feature will result in dropping the payload of every frame captured, keeping only the header information (the first 128 bytes) up to the application layer.

1.5 Capture Tab

1.5.1 Direct Capture Mode

ProfiShark 100M 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 a PCAP Next Generation file (.pcapng) with hardware-generated packet timestamps. ProfiShark Manager also provides an option for uploading capture files to Cloudshark.

Counters Charts Log Network Ports Features Capture

Direct Capture to File

Output Capture File : PCAP-NG

Capture full frames :

Maximum Capture File Size (MB) :

Number of files to use : Loop


Maximum file duration :

Buffer size : 2.17 GBytes

Written to File : 0 Bytes
Dropped : 0 Bytes
Current buffer usage : 0 Bytes

Stream to Cloudshark

Upload pcap-ng files to Cloudshark

 Appliance URL

API Token

Display filter

<p>OUTPUT CAPTURE FILE</p>	<p>Specify the name and location of the capture file. Name extension will be added to the specified name: (_#####_YYYYMMDDHHMMSS).</p>
<p>CAPTURE FULL FRAMES</p>	<p>Enable this option to capture the entire L1 Ethernet frames, which include the preamble (0x55), the SMD, and the CRC. This can be useful for TSN (Time-Sensitive Networking) capture.</p>
<p>MAXIMUM CAPTURE FILE SIZE</p>	<p>Sets the maximum file size allowed for storing the captured data. When the file size reaches this value, the capture either continues in a new file, or stops, depending on the other options.</p>
<p>NUMBER OF FILES TO USE</p>	<p>After reaching the configured maximum duration or file size, the captured traffic will be saved to a new file, until the number of files set here is reached.</p>
<p>MAXIMUM FILE DURATION</p>	<p>Sets the maximum duration for storing the captured data. When this value is reached, the capture either continues in a new file, or stops, depending on the other options.</p>

LOOP	Enabling this option makes the capture overwrite the same file (or files, depending on the "Number of Files to Use" option) after reaching the configured maximum duration or file size.
BUFFER SIZE	In high bandwidth utilization scenarios, a bigger 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.
STATISTICS	<ul style="list-style-type: none"> ◦ 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 usage - If dropped packets start to appear ("Dropped" statistic), increase the <i>Buffer Size</i> value.
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.

1.6.2 Live Capture Mode

ProfiShark 100M can also be used to capture network traffic and send it unaltered 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).

- ▶ **Note:** Capturing traffic at full line rate is CPU intensive and can cause software packet drops. For better performance, Direct Capture mode is recommended.

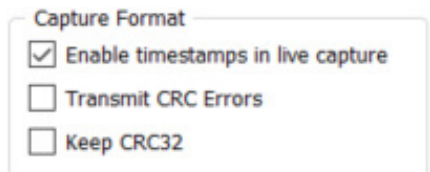
1.6.3 Live Capture Mode with Hardware Timestamping

The hardware timestamping feature can be used in both Live Capture and Direct Capture modes. It enables timestamp accuracy to the nanosecond, as opposed to the microsecond accuracy of software timestamping.

When using this feature in Live Capture mode, the ProfiShark Dissector for Wireshark must be installed for the hardware timestamping information to be properly interpreted by Wireshark.

The dissector files can be found on the provided USB key, or in the Resource Center at www.profitap.com/resource-center/

Hardware timestamping can be enabled from the **Features Tab**, by selecting "Enable timestamps in live capture".



Capture Format

- Enable timestamps in live capture
- Transmit CRC Errors
- Keep CRC32

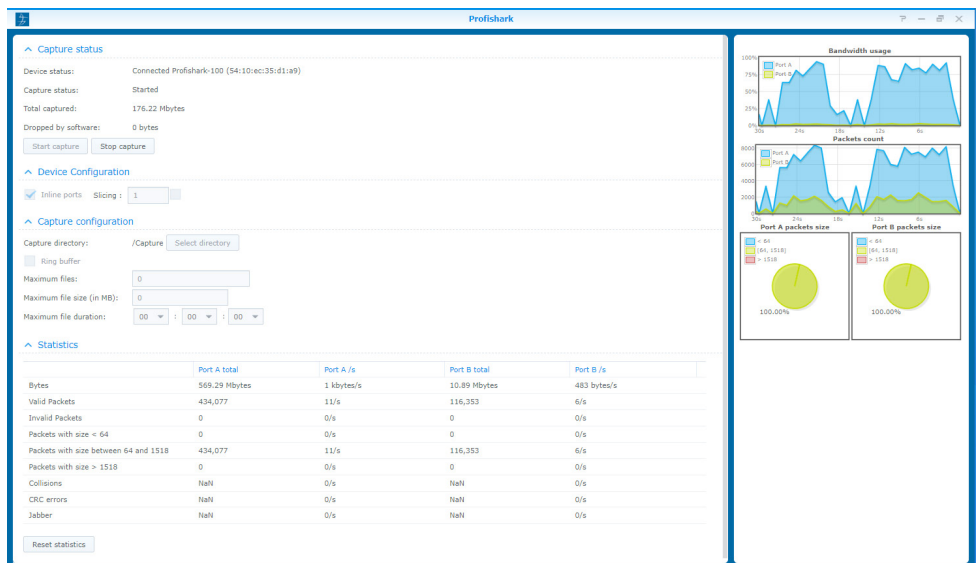
2. LONG TERM CAPTURE

The long-term capture feature expands the number of use cases for ProfiShark 100M. By combining the capture capabilities of ProfiShark 100M 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 profitap.com/resource-center/) provides packages for various Synology architectures.

Install the package corresponding to your Synology NAS. See the image file included in the packages folder for information on the type of CPU used in your 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 100M 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.

LEGAL

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