

# User Manual

*StreamTo*  
*Version 1.2.0*

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*Build 2*  
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# 1 Usage

StreamTo is a console tool running on MS-Windows or Linux based USB-Host computers. At least one USB OABR-Stick Raw must be connected and latest `broadway2_api` must be already installed as described in `broadway2` user manual.

The `streamto` tool supports:

- FC611 - USB OABR Adapter Raw (TJA1100MRA4)
- FC612 - USB OABR Adapter Raw (TJA1101)

# 2 Overview

StreamTo supports following use-cases.

- Stream mpeg-4 ts-files from file to Layer2 as AVTP
- Receive Ethernet Layer2 stream and convert to Layer3 RTP
- Receive Ethernet Layer-2 frames and save them as pcapng files

For build-in help simply enter:

```
> streamto -h
```

## 2.1 File to AVTP stream

With this command, a recorded ts-file can be used as source and stream AV contents on Ethernet Layer2. Means, would replace an AVTP Ethernet camera and enables a pre-defined stream for validation and verification of video monitors and decoders connected direct to Automotive Ethernet Layer2.

Open the specified H.264/H.265 TS file and send contents as IEEE P1722 AVTP compliant stream.

```
> streamto ts2av <ts-file>  
[-u <unique_id>]  
[-m <desination_mac_address>]  
[-vtci <number>]  
[-l]  
[-d <device_instance>]
```

Options:

- h --help  
Display this help text and exit.
- v --verbose  
Enable verbose mode.
- d --device\_instance  
Zero-based index of the device instance to use, default 0.
- u --unique\_id <ID>  
Unique ID used in the IEEE 802.1Qat stream ID, default 0.
- m --mac\_address <MAC address>  
Source/destination MAC address specified as string with 12 characters (e.g. '112233445566').  
Defaults to FF-FF-FF-FF-FF-FF (the broadcast address) if this option is not specified.
- vtci --vlan\_tci <number>  
Specifies the VLAN tag control information (TCI) for the sent Ethernet frames, zero for no VLAN (default).
- l --loop

Rewind the file to the beginning when end of file is reached.

## 2.2 AVTP stream to RTP

Receive an IEEE P1722 AVTP compliant stream, convert it to an RTP/UDP stream, and forward it to the specified host. For simplest usage, using local-host as destination, will enable to run VLC MediaPlayer on given RTP port to decode and show received Layer2 AVTP streams.

```
> streamto av2rtp <destination_host>  
  [-u <unique_id>]  
  [-m <source_mac_address>]  
  [-p <port_number>]  
  [-d <device_instance>]
```

Arguments:

<destination\_host> target ip-addr on TCP/IP. Default port is 5000

Options:

`[-u <unique_id>`  
Unique ID used in the IEEE 802.1Qat stream ID, default 0.

`[-m <source_mac_address>]`  
MAC address specified as string with 12 characters  
(e.g. '112233445566'), default 0xFFFFFFFFFFFF

`[-p <port_number>]`  
Port number to be used, default 5000.

`[-d <device_instance>]`  
Zero-based index of the device instance to use, default 0.

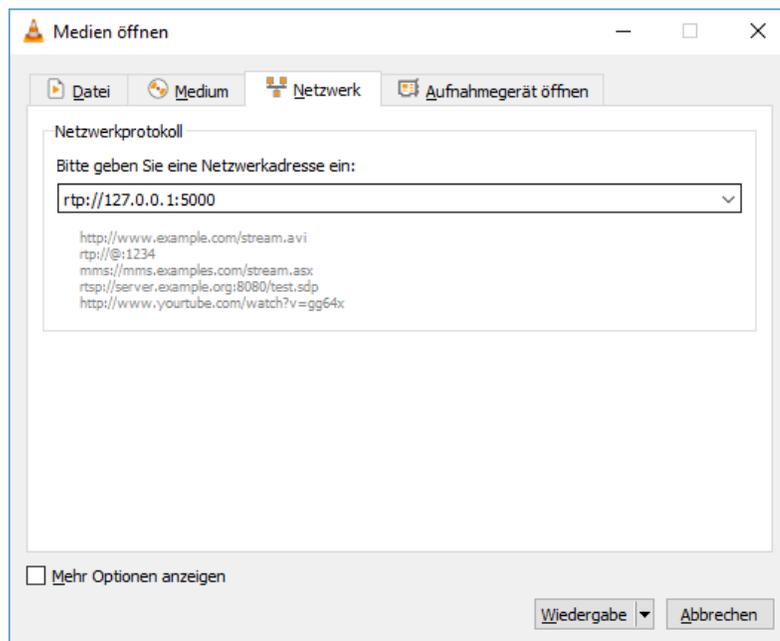
## 2.3 RTP to VLC Media Player

Requires installed VLC Media Player. VLC Media Player is available for Windows and Linux.

Famous and well known open-source Video LAN tool can be downloaded here:

**<https://www.videolan.org/vlc/index.de.html>**

As streamto supports the conversion from received AVTP Layer2 streams to standard Layer3 RTP protocols, VLC Media Player needs just to be configured for receiving this RTP network stream to decode and show it.



## 2.4 PCAPNG

As USB-Raw-Adapters are not installed as network devices, network analysis tools like Wireshark cannot be used directly. In daily usage and most common for high bandwidth data, recording to file and verify data later is even better. This feature will bring more enhanced features for 100Base-T1 networks. The USB-Raw-Adapters FC611,FC612 can be used to record precise timestamped Layer-2 frames and write them in pcapng file format. These files can be opened with Wireshark for offline analysis. In difference to standard USB network devices, timestamps have full nanoseconds resolution of HW-MAC inside the adapter. This avoids USB latency/jitter for precise measurements. Another option using USB-Raw-Adapters is easier multi-instance support to connect to 100Base-T1 switches and record multiple sessions for each port.

Capture Ethernet frames and write them to a .pcapng file. Suffix .pcapng will be appended to the specified filename.

```
> streamto pcap <filename>
  [-fbs <frames>]
  [-maxkb <size> | -maxmb <size>]
  [-d <device_instance>]
```

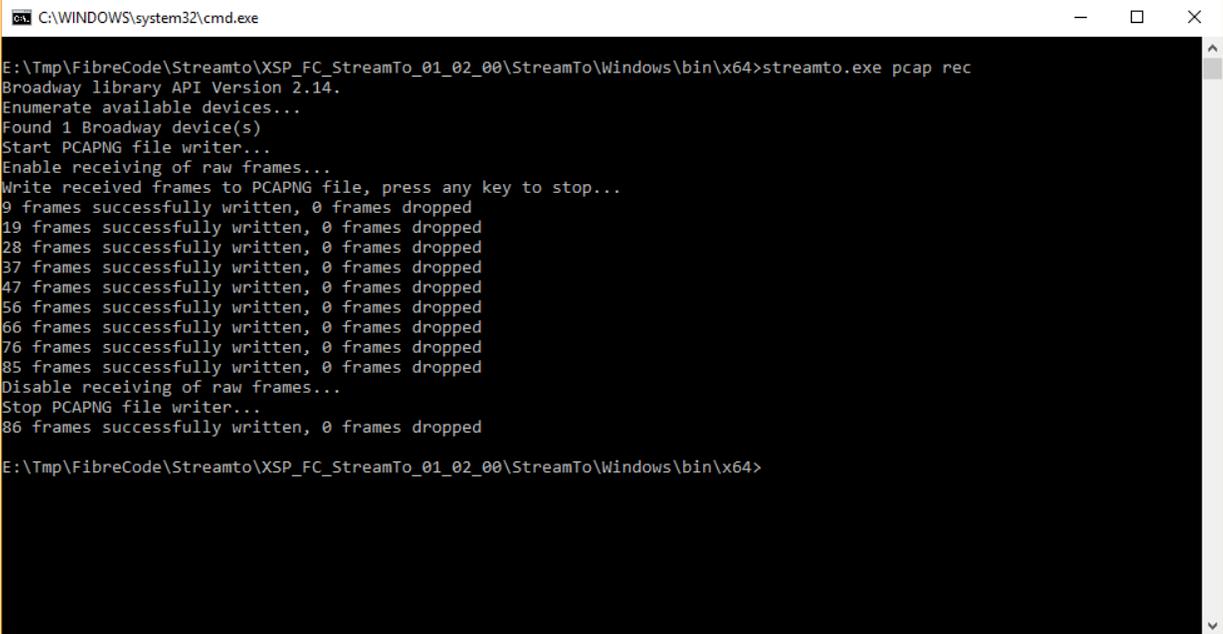
Arguments:

<filename> filename for pcapng-file. In case of using .max options, will be basename with incremented numbers.

Options:

```
[-fbs --frame_buffer_size <frames>]
Size of the intermediate buffer in frames, default 20000 frames.
[-maxkb --max_file_size_KB <size>]
Max size of a pcap-ng file in kilobytes \
(1'000 bytes), zero for no limit (default).
[-maxmb --max_file_size_MB <size>]
Max size of a pcap-ng file in megabytes \
(1'000'000 bytes), zero for no limit (default).
```

Example to use streamto recording on connected adapter with friendly name "orange".



```
C:\WINDOWS\system32\cmd.exe
E:\Tmp\FibreCode\Streamto\XSP_FC_StreamTo_01_02_00\StreamTo\Windows\bin\x64>streamto.exe pcap rec
Broadway library API Version 2.14.
Enumerate available devices...
Found 1 Broadway device(s)
Start PCAPNG file writer...
Enable receiving of raw frames...
Write received frames to PCAPNG file, press any key to stop...
9 frames successfully written, 0 frames dropped
19 frames successfully written, 0 frames dropped
28 frames successfully written, 0 frames dropped
37 frames successfully written, 0 frames dropped
47 frames successfully written, 0 frames dropped
56 frames successfully written, 0 frames dropped
66 frames successfully written, 0 frames dropped
76 frames successfully written, 0 frames dropped
85 frames successfully written, 0 frames dropped
Disable receiving of raw frames...
Stop PCAPNG file writer...
86 frames successfully written, 0 frames dropped

E:\Tmp\FibreCode\Streamto\XSP_FC_StreamTo_01_02_00\StreamTo\Windows\bin\x64>
```

After recording sessions are finished, just use Wireshark and open recorded .pcapng files.

As shown in Wireshark screen-dump, interface name is "orange". This is a pretty helpful feature when using multiple adapters connected to Automotive Ethernet switches.

The screenshot shows the Wireshark network protocol analyzer interface. The main pane displays a list of 10 broadcast packets, all of type LLC, originating from the source MAC address fc:00:11:22:33:44. The interface details pane for the selected frame (Frame 1) shows the following information:

- Interface id: 0 (orange)
- Interface name: orange
- Interface description: FibreCode FC612 Stick
- Encapsulation type: Ethernet (I)
- Arrival Time: Jan 1, 1970 01:13:55.146112800 W. Europe Standard Time
- Epoch Time: 835.146112800 seconds

The packet bytes pane shows the raw data of the frame:

```

0000 ff ff ff ff ff fc 00 11 22 33 44 88 a8 00 07 ..... "3D...
0010 81 00 00 15 00 a0 00 01 b7 00 00 00 00 00 00 ..8..0.....
0020 05 a0 38 c0 da 30 00 01 02 03 04 05 06 07 08 09 ..8..0.....
0030 0a 0b 0c 0d 0e 0f 10 11 12 13 14 15 16 17 18 19 ..... !"#$%&'()*
0040 1a 1b 1c 1d 1e 1f 20 21 22 23 24 25 26 27 28 29 ..... +,-./01 23456789
0050 2a 2b 2c 2d 2e 2f 30 31 32 33 34 35 36 37 38 39 .....
0060 3a 3b 3c 3d 3e 3f .....
    
```