

# TINA / ProfiNet-WATCHDOG / TINA-II

user manual

V1.12

English



User manual compatible with firmware V1.11 or higher!

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# 1 General

## 1.1 About the manual

This manual describes the devices **TINA** / **TINA-II** (German shortcut for „mobile intelligent network-analyser“) and ProfiNet-WATCHDOG, named as device or analyzer (device) in the following pages.

This documentation can be downloaded on the web page of the product via downloads → documentation.

The manual are aimed to the following user groups:

- planners
- operators
- commissioning staff
- service and maintenance staff

Before you use this device, you should read the manual.

If you have questions and / or problems you can contact the technical support from your dealer.

## 2 System requirements

### 2.1 Software

For using and configuring the analyzer device you need the following tools and software's:

- internet browser (e. g. Microsoft Internet Explorer, Mozilla Firefox or Google Chrome)

Using the device is independent of your operating system and browser from your computer, tablet or mobile phone.

#### **Important:**

**For viewing the website correctly you should check that JavaScript isn't disabled in your browser.**

### 2.2 Hardware

For the commissioning and usage of the device you need the following hardware components beside the analyzer itself:

- device with a WLAN interface (for accessing the device via WLAN)
- 24VDC power supply over detachable connector or USB power supply from PC / Power-Pack
- 2 x Ethernet cables (LAN)

## 3 Commissioning

The device has one WLAN interface and two LAN interfaces. The WLAN interface is used that you can connect your PC, tablet or mobile phone with the device. The LAN interfaces are used for the network analyzing.

### Hint:

**On the TINA and TINA-II devices it is also possible to connect to the web server via the LAN-A interface.**

If you can't or don't want to use the WLAN interface you have the option to expand your device with a third LAN interface by an "Ethernet over USB" adapter. This interface then can be used to access the web server. Please contact your dealer if you're interested.

### Important:

**This chapter describes the factory default of the device. Via the configuration other configuration combinations (e. g. a bridge between LAN to WLAN) are possible.**

### 3.1 Web server access

The *TINA* and *TINA-II* device (and its web server) can be accessed by either using the WLAN or LAN-A interface.

The ProfiNet-WATCHDOG device (and its web server) can be accessed by using the WLAN interface only.

If you have the "Ethernet over USB" adapter you can also use that to access the web server of the device. The adapter can be used on both device types.

### 3.1.1 Access via WLAN

If you want to use the WLAN interface, please make sure the WLAN interface on your PC, tablet or mobile phone is enabled and open the list of available WLAN networks.

In the list of the available WLAN networks you should see a network with the SSID "TINA WiFi" or "ProfiNet-WATCHDOG WiFi" (depending on the device type). The network is not encrypted and so you can connect to it without a password.

On the devices a DHCP server on the WLAN interface is running by default. If the device from where you want to access the device is configured as DHCP client you don't have to change any setting. If your device has a fixed IP address you have to either change your setting to DHCP client or change your IP address so it matches the subnet 192.168.1.0/24 (IP addresses from 192.168.1.1 to 192.168.1.254). The IP address 192.168.1.1 can't be used, because it is the address used by the analyzer itself.

### 3.1.2 Access via LAN

For using the LAN interface you have to connect the LAN-A interface of the analyzer device with a LAN cable to the network socket of your computer.

On the LAN-A interface no DHCP server is running by default. This means that you have to open the network settings of the network card from your PC and navigate to the IP settings. In the IP settings dialog you have to configure a fixed IP address from the subnet 192.168.2.0/24 (addresses from 192.168.2.1 to 192.168.2.254). The IP address 192.168.2.1 is already in use by the analyzer and can't be used for your computer.

#### **Important:**

**Accessing the device by the LAN-A interface can be used for TINA and TINA-II devices only.**



### 3.1.3 Access via USB-LAN

If you have bought the “Ethernet over USB” adapter accessing the device with this interface is also possible. First you have to connect the adapter to your device. In the next step you need a network cable and connect your PC or switch and the adapter with each other.

On factory default a DHCP server on the USB-LAN interface is enabled. This DHCP server assigns IP addresses to devices which are requesting an address. If your computer is configured in DHCP mode (default setting) you don't have to do anything else. Otherwise open the settings of your network card and enable DHCP mode or manually set an IP address from the subnet 192.168.0.1/24 (addresses from 192.168.0.1 to 192.168.0.254). The address 192.168.0.1 is reserved because it's used by the adapter itself.

### 3.1.4 Web interface

After you are connected to the device physically you can open a web browser on your PC, tablet or mobile phone. There you have to enter the IP address 192.168.1.1 (for access via WLAN), 192.168.2.1 (for access via LAN-A) or 192.168.0.1 (for access via USB-LAN) in the address line.

At the first use of the device you will see a dialog with some hints and an input field for the serial number. In this field you have to enter the serial number of the device (the number can be found on the bottom or right side of the device) and click on the button “unlock device”:

**function release**

To confirm the identity of the device please enter the serial number of the device. The serial number can be found on the bottom side of the device.

Please note that the WLAN network from your device is open and no encryption or password protection consists. Everyone can connect and access your data and networks. We recommend to set a WLAN password and encryption (e. g. WPA2) after the device unlocking. The configuration of the device can be changed without any password by default. On the configuration page you can specify a password.

After the serial number was entered and accepted, you will be redirected to the configuration page. On this page you can change all parameters of the device.

serial number:

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If the input is correct the device is unlocked and can be used normally. After the unlocking you will be redirected to the configuration page of the device (*see also web server → configuration*). The function release have to be done only once of course.

#### **Important:**

**The function release is a security mechanism of the device to protect your network data. The reason therefore is that everyone, which is within the WLAN range of the device, can connect to it without a password.**

## 3.2 Bridge interfaces

The analyzer has the possibility to analyze the network traffic. Therefore the device has two LAN interfaces which are operating similar to a network bridge. This means all frames which are received on interface A are sent out on interface B and the other way around. If settings are set through which the device should change network frames the frame which was received on the first interface is different from the frame which is sent on the second interface.

If you e. g. have problems with the communication between two participants, just connect the first participant with a LAN cable to the first interface and the second participant with another LAN cable to the second interface of your analyzer. Thereby the complete communication is led through the device.

On the web server you can now analyze the communication between the two (or more) devices and find the cause of the communication problem easily.

### Hint:

**Both LAN interfaces are supporting the automatically switching of the send and receive line pair (auto MDIX). Thus you can use a 1:1 occupied or a crossed network cable.**

### Important:

**The ProfiNet-WACHTDOG can't change the network traffic between the interfaces or actively sent data by itself. Thereby the RealTime management isn't disturbed.**

### 3.3 User interaction

The device has some status LEDs on the front side of the device. The LEDs have the following meanings:

- **ON:** lights if the device is powered
- **Wi:** lights on active WLAN and blinks on data transfer
- **S1:** currently not in use
- **S2:** currently not in use
- **S3:** currently not in use
- **S4:** currently not in use
- **LAN A:** lights if the link state on interface A is active and blinks on data transfer
- **LAN B:** lights if the link state on interface B is active and blinks on data transfer

Furthermore the device has two buttons on the right side (for devices with desktop cases) or bottom side (for devices with clamping cases). The buttons are used as follows:

- **FS:** button for applying factory defaults
- **T:** currently not in use

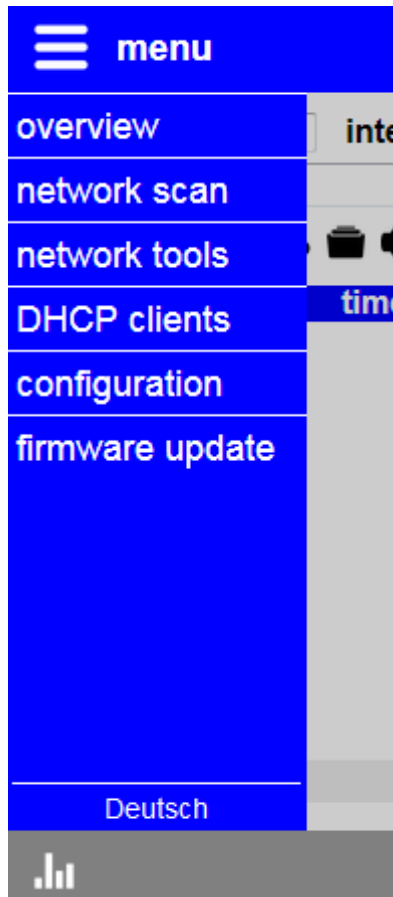
#### 3.3.1 factory defaults

If you want to restore your device to the factory defaults you have to press the “FS” button for at least 3 seconds. For pressing the button you can use a paperclip.

If you have pressed the button for at least 3 seconds and released it again the factory defaults gets loaded into the device. Now your device executes a restart and can be accessed after about 30 seconds via the default settings as described in this chapter.

## 4 web server

The complete operation of the device (display and parameterization) can be done via the integrated web server which is available over the WLAN and / or LAN-A interface of the device as well as the optionally USB-LAN interface (via adapter), depending on the configuration.



The surface of all web pages consists of a header, a footer and a big content area. Thus on all web pages are much space for the real content. This is very helpful on devices with small resolutions or monitor sizes (e. g. smart phones).

If you want to show the navigation bar you have to click on the icon or the text “menu” on the top left corner. With the same method you can hide the menu. The single pages which belongs to the menu entries will be described in this chapter of the manual.

If a password is set in the configuration of the device and if you are currently logged in, a menu item with the name “log out” is shown as last entry in the menu. This entry can be used to log out of the device again.

The language of all surfaces can be changed between German and English in the menu on the bottom of the navigation.

## 4.1 access protection

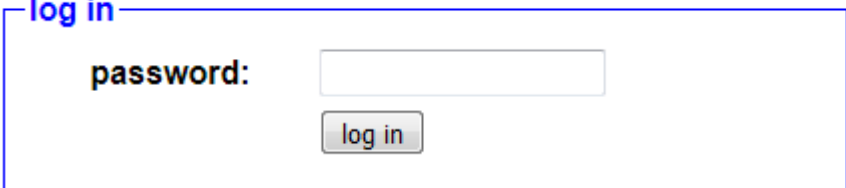
Because the analyzer is able to analyze and change the network traffic which is directed through the device whereby it has access to sensible data and could affect the function of the network it is possible and recommended to protect the device with a password. By configuring a password you can prevent that unauthorized people can monitor or disturb your network.

The following table shows which passwords can be configured and for which pages they are needed:

page	password	description
overview	view	analyzing, monitoring and controlling of the network traffic
network scan	tool	active analyzing and controlling of the network and executing test functions
network tools		
DHCP clients		
configuration	config	viewing and changing the configuration (also passwords) as well as updating the firmware
firmware update		

The configuration of the passwords can be done on the page "configuration". If an empty password is specified, as it is the case on factory defaults, a log in (and log out) isn't needed. The pages can then be accessed directly.

If you access a page which is protected via a password you will see the following log in page:



The screenshot shows a login interface. At the top left, there is a blue link labeled "log in". Below it, the text "password:" is followed by a text input field. Underneath the input field is a button labeled "log in".

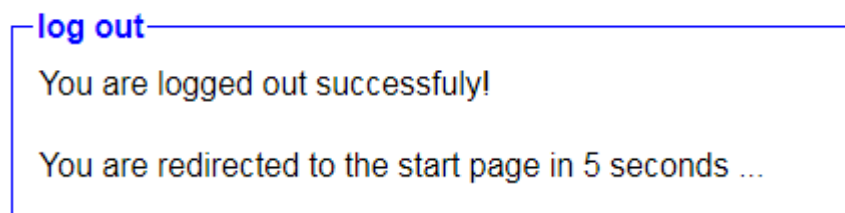
After you have entered the password and clicked on “log in” you will be redirected to the page, which was requested before.

If you have e. g. successfully logged in for the page “overview” with the view password and click on the menu entry “configuration” (which is also password protected) you will see the log in page again. Now you should enter the config password. Your log in to the page “overview” remains.

Because of security reasons we recommend to log out of the device after you have finished your work. Therefore you will see the menu entry “log out” on the menu:



After you have clicked on the menu entry you will see the following message and will be redirected to the start page after 5 seconds:



**Hint:**

**If you have done a firmware update or restart no log out can be done, because through the restart all users are getting logged out automatically.**

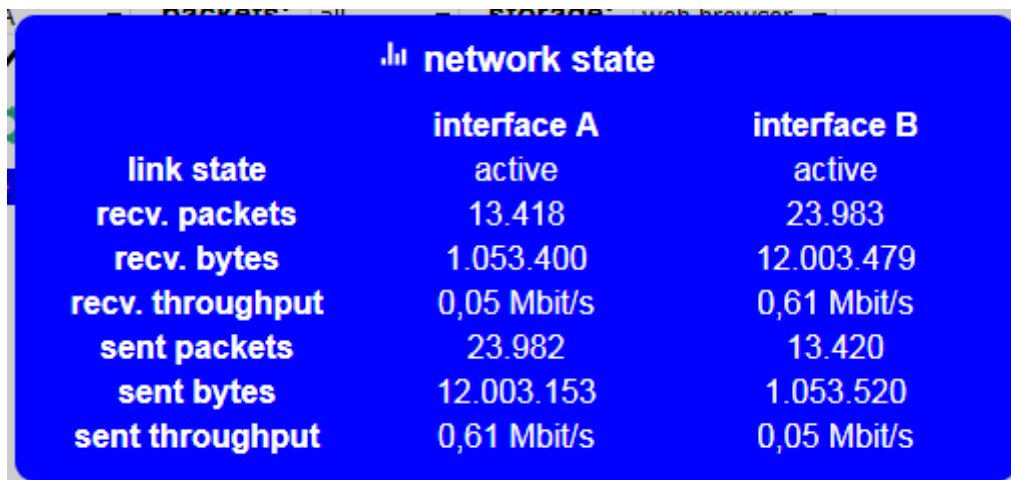
**Important:**

**In the factory defaults no passwords are specified. Thus everyone who can connect to the device can analyze and change your network data, execute tools and view and change the configuration of the device.**

## 4.2 status view

On the footer of the web pages (on all pages which are used for analyzing and controlling the network traffic) you will see a bar chart icon on the bottom left corner which can be used to show the network state.

If you have clicked on the icon the following dialog appears who is refreshed every 5 seconds:



	interface A	interface B
link state	active	active
recv. packets	13.418	23.983
recv. bytes	1.053.400	12.003.479
recv. throughput	0,05 Mbit/s	0,61 Mbit/s
sent packets	23.982	13.420
sent bytes	12.003.153	1.053.520
sent throughput	0,61 Mbit/s	0,05 Mbit/s

The following information will be shown as table and thereby separated for interface A and interface B:

- **link state:** Indicates if the link state is active or not.
- **recv. packets:** Number of received packets.
- **recv. bytes:** Amount of received bytes.
- **recv. throughput:** Data throughput of received bytes.
- **sent packets:** Number of sent packets.
- **sent bytes:** Amount of sent bytes.
- **sent throughput:** Data throughput of sent bytes.

If the device detects an error (e. g. error while sending an e-mail) or the connection to the device is broken, a red warn symbol is shown on the bottom right corner in the footer. By clicking on the symbol the occurred error(s) will be shown.



## 4.3 page overview

The screenshot displays the TINA network analyzer interface. At the top, there is a blue header with a 'menu' button. Below the header, there are several control elements: 'mode: recording', 'interface: A', 'packets: all', and 'storage: web browser'. A 'view filter:' field is also present. Below these are various icons for playback and control. The main area is a table with the following columns: 'no.', 'time', 'source', 'destination', 'protocol', 'length', and 'description'. The table contains 17 rows of traffic data, including ARP, PROFINET, and LLDP frames. At the bottom of the table, there is a 'detail view' button. The footer of the interface shows a small signal strength icon and the copyright notice '© Copyright PI 2017-2019'.

no.	time	source	destination	protocol	length	description
A → B	130	13.787 00:1B:0B:A3:C3:94	08:00:00:FF:FF:FF	???	60	Len=46 Type=???(0x889D)
A → B	137	15.997 10:C3:7B:91:A2:BA	FF:FF:FF:FF:FF:FF	ARP	60	Who has 192.168.1.21? Tell 192.168.1.254!
A → B	138	16.008 01:80:C2:00:00:01	FF:FF:FF:FF:FF:FF	???	60	Len=46 Type=???(0x8874)
A → B	139	16.636 00:0E:8C:87:BC:19	01:80:C2:00:00:0E	PROFINET	60	Len=46 Type=PROFINET(0x8892)
A → B	140	16.687 F4:6D:04:55:14:B8	01:80:C2:00:00:0E	LLDP	204	Len=190 Type=LLDP(0x88CC)
A → B	141	17.317 10:C3:7B:91:A2:BA	FF:FF:FF:FF:FF:FF	ARP	60	Who has 192.168.1.21? Tell 192.168.1.254!
A → B	142	17.836 00:0E:8C:87:BC:19	01:80:C2:00:00:0E	PROFINET	60	Len=46 Type=PROFINET(0x8892)
A → B	143	17.927 F4:6D:04:55:14:AC	01:80:C2:00:00:0E	LLDP	214	Len=200 Type=LLDP(0x88CC)
A → B	144	18.008 01:80:C2:00:00:01	FF:FF:FF:FF:FF:FF	???	60	Len=46 Type=???(0x8874)
A → B	145	18.317 10:C3:7B:91:A2:BA	FF:FF:FF:FF:FF:FF	ARP	60	Who has 192.168.1.21? Tell 192.168.1.254!
A → B	146	18.721 FE80::71CB:A8E...	FF02::C	SSDP	208	63663 » 1900 Len=154
A → B	147	18.934 00:1C:06:01:4E:13	01:80:C2:00:00:0E	LLDP	100	Len=86 Type=LLDP(0x88CC)
A → B	148	19.036 00:0E:8C:87:BC:19	01:80:C2:00:00:0E	PROFINET	60	Len=46 Type=PROFINET(0x8892)
A → B	149	19.162 00:0C:29:F9:A3:76	01:80:C2:00:00:0E	LLDP	225	Len=211 Type=LLDP(0x88CC)
A → B	150	19.317 10:C3:7B:91:A2:BA	FF:FF:FF:FF:FF:FF	ARP	60	Who has 192.168.1.21? Tell 192.168.1.254!
A → B	151	19.837 00:0E:8C:87:BC:19	01:80:C2:00:00:0E	LLDP	132	Len=118 Type=LLDP(0x88CC)
A → B	152	20.008 01:80:C2:00:00:01	FF:FF:FF:FF:FF:FF	???	60	Len=46 Type=???(0x8874)
A → B	153	20.237 00:0E:8C:87:BC:19	01:80:C2:00:00:0E	PROFINET	60	Len=46 Type=PROFINET(0x8892)
A → B	154	20.378 00:0C:29:CC:AD:55	FF:FF:FF:FF:FF:FF	ARP	60	Who has 192.168.1.152? Tell 192.168.1.12!
A → B	155	20.637 10:C3:7B:91:A2:BA	FF:FF:FF:FF:FF:FF	ARP	60	Who has 192.168.1.21? Tell 192.168.1.254!
A → B	156	21.000 00:0C:29:CC:AD:55	FF:FF:FF:FF:FF:FF	ARP	60	Who has 192.168.1.152? Tell 192.168.1.12!
A → B	157	21.437 00:0E:8C:87:BC:19	01:80:C2:00:00:0E	PROFINET	60	Len=46 Type=PROFINET(0x8892)

The page “overview” is the most important and powerful page of the analyzer. Here you can analyze, monitor and control the network traffic.

The main function of the page is the recording of the network traffic, which flows between the bridge interfaces. This data can then be analyzed in the browser directly.

Before you can start a recording you have to set some settings.

Firstly you have to select the “mode” where you can select between “recording” and “monitoring”. The mode “recording” can be used for recording of the complete or of parts of the network traffic which flows through the bridge and is the default option. The mode “monitoring” can be used to record only frames who are evaluated as burglaries (addresses which aren't learned in) of the network monitor.

On the next step you have to select the interface and the packet type which should be recorded. With the option “A and B” both interfaces are respected. The same applies to the packet type “all” which will record incoming and outgoing frames. With these two settings you can configure your recording as you like. In the mode “monitoring” you should select the interface “A and B”. Thereby burglaries of both interfaces get respected.

As the last step it is necessary to specify where do you want to view or store the recorded traffic". You can select between "web browser", "FTP server" and "USB stick" with the help of the selection list "storage". The usage of the FTP server recording requires a completed configuration of the FTP server on the configuration page (*see also chapter web server → configuration → FTP server*). If you want to record to a USB stick you have to plug in the stick before you start the recording. After you have finished your recording you can plug out the USB stick.

**Hint:**

**The USB stick have to be formatted in a FAT file system to use it with the device.**

**Important:**

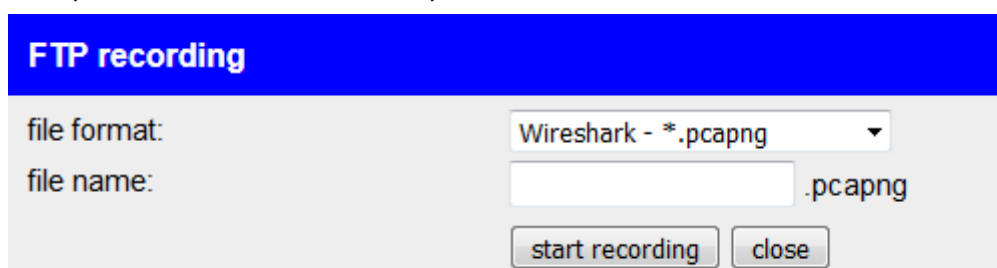
**Don't plug out the USB stick while a recording is running. Otherwise your file and file system could get corrupted.**

If you want to start recording you just have to click on the symbol ►.

After a recording is started you can stop it with a click on the ■ symbol. Alternatively you can restart a recording / reset the view via clicking on the ↺ symbol (only possible for web browser recordings).

A helpful feature is the automatically scrolling which can be enabled by clicking on the icon ▮. If the scrolling is enabled and a new frame arrives the recording table will scroll down to the bottom of the table. The scrolling function can be disabled by clicking on the icon ▮.

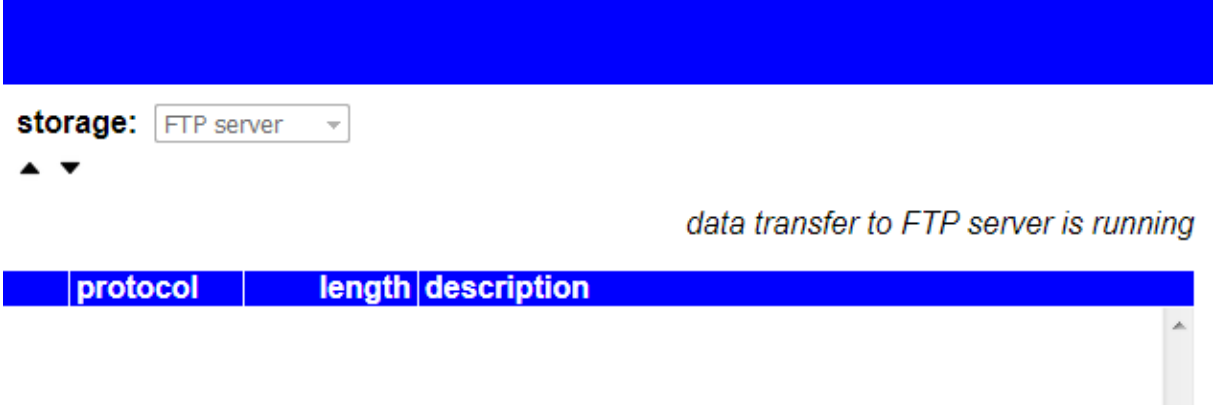
If you start a recording to the FTP server or USB stick you will get a pop-up window. In this window you have to specify the file format (currently only the Wireshark file formats .pcapng and .pcap are available) and a file name (without the extension):



The screenshot shows a pop-up window titled "FTP recording". It contains the following elements:

- file format:** A dropdown menu currently set to "Wireshark - \*.pcapng".
- file name:** A text input field containing ".pcapng".
- Buttons:** "start recording" and "close".

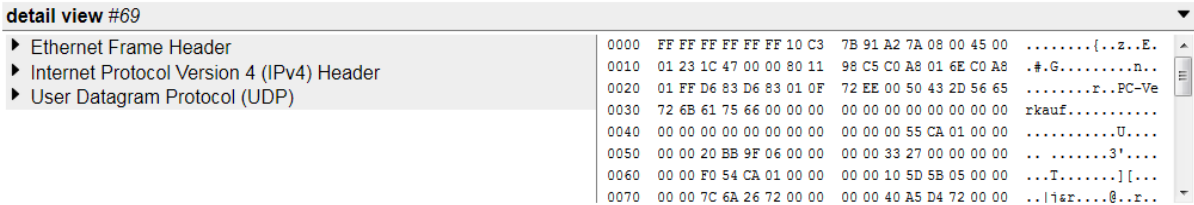
If a FTP server or USB stick recording is running the frames will not appear in the frame table in the browser, because they are sent directly to the server or written to the stick. To check if a FTP or USB recording is running successfully or which error has occurred on the last transfer (if applicable) you can look at the status view on the top right corner (same height as the toolbar with the icons):



**4.3.1 detail view**

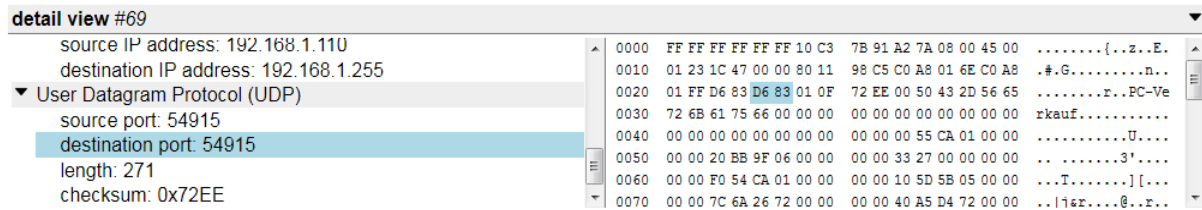
The recording table shows only the transfer direction, an ongoing number, the time, the source address and the destination address of a frame. If the window has enough width the protocol, the length and a description is also shown.

For a detailed view or analyze this information is not enough. Thus the recording page contains a detail view. The detail view of a frame can be opened by clicking on a frame in the table. Now you should see something similar to the following:



On the left side you can see the analyzed data of the frame in textual form. The right side shows the raw data (bytes) of the frame. If your monitor has a small width the two windows will be shown among themselves.

Both the entries in the text view and the bytes in the raw view can be clicked. An selected entry and the corresponding raw data or entry in the text view will be highlighted with a blue color automatically:



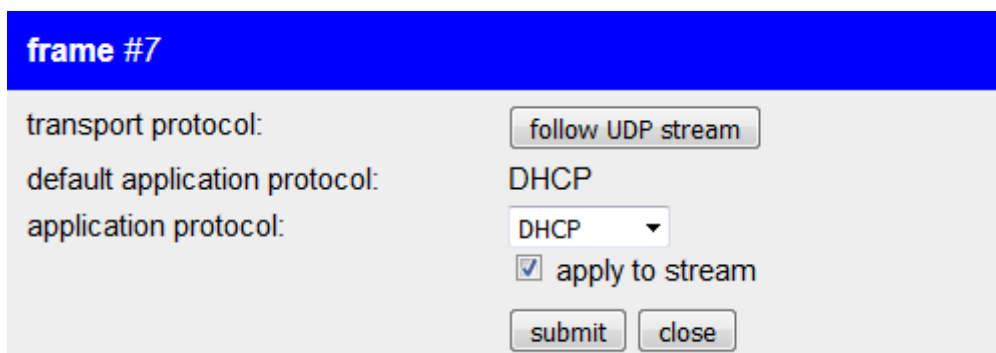
**Hint:**

**Entries in the text view which have sub entries are getting automatically unfolded if you click on them.**

### 4.3.2 frame information and settings

Every frame has some additional information and settings which are not shown within the frame table or the detail view, because they doesn't belong to the data of the frame directly.

If you want to open the view for information and settings of a single frame you have to click on the entry on the frame table. Thereby the entry get's colored in light blue and maybe the detail view get's opened too. Now you can click on the *i* symbol, which can be found on the toolbar which is located above the frame table. Next you should see a dialog similar to the following:



Each line has it's own meaning:

transport protocol: If the frame is a TCP or UDP frame a button will appear, which allows you to set a view filter. This view filter will affect that only

frames which belong to the same TCP or UDP stream will be shown. Furthermore for TCP frames another button to open the analysis dialog of the stream will be shown.

default application protocol: The application protocol (if available) as which the frame would be analyzed by default.

application protocol: Here you can choose as which application protocol the frame should be analyzed. If the checkbox “apply to stream” is checked this setting will also affect all frames which belong to the same TCP or UDP stream.

If you have changed the application protocol of the frame you have to click on the button “submit” to reanalyze the frame or maybe the complete stream.

### 4.3.3 view filter

If you want to filter the viewed record data (e. g. to show only frames with a specific IP address, port or protocol) you have the possibility to set a view filter. The view filter is a string which consists of one or more conditions.

#### Important:

**The view filter only affects the view in the browser. The device always records everything.**

To submit the view filter you have to press the return key (only possible if the focus is on the text field) or click on the icon ✓ behind the text field.

view filter:  ✓

#### Hint:

**The inputs and commands for the the view filter are largely compatible with them from the program Wireshark.**

For the data fields (see table on next page) between the following data types a distinction is made:

name	description
-	fields without a data type can be checked for existence only
truth value	y for true; n for false
number	numeric value (hexadecimal with 0x, octal with 0, binary with 0b or decimal)
string	a string; as well as DNS names or NBNS names
MAC address	a MAC address; address blocks at the end can be omitted
IPv4 address	a IPv4 address; address blocks at the end can be omitted

<b>name</b>	<b>description</b>
IPv6 address	a IPv6 address; shortened with :: allowed; address blocks at the end can be omitted

The following fields can be checked via the view filter:

<b>name</b>	<b>data type</b>	<b>description</b>
eth	-	Ethernet header
eth.dst	MAC address	destination MAC address
eth.src	MAC address	source MAC address
eth.vlan.tpid	number	VLAN protocol ID
eth.vlan.prio	number	VLAN priority
eth.vlan.cfi	truth value	VLAN DEI-/CFI bit
eth.vlan.id	number	VLAN ID
eth.type	number	Ethernet type
eth.len	number	frame length
llc	-	LLC header
llc.dsap	number	destination SAP
llc.ssap	number	source SAP
llc.control	number	control value
llc.snap	-	SNAP extension header
llc.snap.oui	number	manufacturer ID
llc.snap.vlan.tpid	number	VLAN protocol ID
llc.snap.vlan.prio	number	VLAN priority
llc.snap.vlan.cfi	truth value	VLAN DEI-/CFI bit
llc.snap.vlan.id	number	VLAN ID
llc.snap.proto	number	protocol (Ethernet type)
ip	-	IPv4 Header

<b>name</b>	<b>data type</b>	<b>description</b>
ip.version	number	version
ip.hdr_len	number	header length
ip.tos	number	Type Of Service (QoS parameter)
ip.len	number	total length
ip.id	number	identification number
ip.flags	number	flags
ip.frag_offset	number	fragmentation offset
ip.ttl	number	Time To Live
ip.proto	number	IP protocol
ip.checksum	number	header checksum
ip.src	IPv4 address	source IPv4 address
ip.dst	IPv4 address	destination IPv4 address
ip.opt	-	IPv4 option
ip.opt.type	number	option type
ip.opt.len	number	option length
ip.opt.data	-	option data
ipv6	-	IPv6 header
ipv6.version	number	version
ipv6.class	number	traffic class (QoS parameter)
ipv6.flow	number	flow label
ipv6.plen	number	payload length
ipv6.nxt	number	IP protocol or next header
ipv6.hlim	number	maximum count of hops
ipv6.src	IPv6 address	source IPv6 address
ipv6.dst	IPv6 address	destination IPv6 address



<b>name</b>	<b>data type</b>	<b>description</b>
arp	-	ARP protocol
arp.hw.type	number	type of hardware addresses
arp.proto.type	number	type of protocol addresses
arp.hw.size	number	size of hardware addresses
arp.proto.size	number	size of protocol addresses
arp.opcode	number	operation code
arp.src.hw	MAC address	source hardware address
arp.src.proto	IPv4 address	source protocol address
arp.dst.hw	MAC address	destination hardware address
arp.dst.proto	IPv4 address	destination protocol address
rarp	-	RARP protocol
rarp.hw.type	number	type of hardware addresses
rarp.proto.type	number	type of protocol addresses
rarp.hw.size	number	size of hardware addresses
rarp.proto.size	number	size of protocol addresses
rarp.opcode	number	operation code
rarp.src.hw	MAC address	source hardware address
rarp.src.proto	IPv4 address	source protocol address
rarp.dst.hw	MAC address	destination hardware address
rarp.dst.proto	IPv4 address	destination protocol address
lldp	-	LLDP protocol
lldp.tlv	-	Type-Length-Value (TLV)
lldp.tlv.type	number	TLV type
lldp.tlv.len	number	TLV length
lldp.tlv.data	-	TLV value

<b>name</b>	<b>data type</b>	<b>description</b>
mrp	-	MRP protocol
mrp.version	number	version
mrp.block	-	block
mrp.type	number	block type
mrp.length	number	block length
mrp.sequence_id	number	Sequence number
mrp.domain_uuid	number	domain UUID
mrp.prio	number	priority
mrp.sa	MAC address	sender MAC address
mrp.port_role	number	port state
mrp.ring_state	number	ring state
mrp.transition	number	transition
mrp.timestamp	number	time stamp
mrp.interval	number	interval
mrp.blocked	number	blocked number
mrp.oui	number	OID
mrp.data	-	payload
hopopts	-	Hop-By-Hop header (IPv6)
hopopts.nxt	number	IP protocol or next header
hopopts.len	number	header length
hopopts.opts	-	options
routing	-	routing header (IPv6)
routing.nxt	number	IP protocol or next header
routing.len	number	header length
routing.type	number	routing type

<b>name</b>	<b>data type</b>	<b>description</b>
routing.segleft	number	amount of left segments
routing.data	-	type depended data
fragment	-	fragmentation header (IPv6)
fragment.nxt	number	IP protocol or next header
fragment.reserved	-	-
fragment.offset	number	fragmentation offset
fragment.filler	-	-
fragment.more	truth value	indicates if more fragments are following
fragment.id	number	identification
dstop	-	destinations options header (IPv6)
dstop.nxt	number	IP protocol or next header
dstop.len	number	header length
dstop.opts	-	options
icmp	-	ICMPv4 protocol
icmp.type	number	type identifier
icmp.code	number	code (depends on type)
icmp.checksum	number	checksum
icmp.data	-	payload
icmpv6	-	ICMPv6 protocol
icmpv6.type	number	type identifier
icmpv6.code	number	code (depends on type)
icmpv6.checksum	number	checksum
icmpv6.data	-	payload

<b>name</b>	<b>data type</b>	<b>description</b>
igmp	-	IGMP protocol
igmp.type	number	type identifier
igmp.code	number	code (depends on type)
igmp.max_resp	number	maximum response time
igmp.reserved	-	-
igmp.resp_code	number	response code
igmp.checksum	number	checksum
igmp.id	number	identification
igmp.maddr	IPv4 address	group address
igmp.key	number	key
igmp.filler	-	-
igmp.s	truth value	suppress flag (router)
igmp.qrv	number	QRV value
igmp.qqic	number	QQIC value
igmp.num_src	number	number of sources
igmp.src	IPv4 address	source address
tcp	-	TCP header
tcp.srcport	number	source port
tcp.dstport	number	destination port
tcp.seq	number	sequence number
tcp.ack	number	acknowledge number
tcp.hdr_len	number	header length
tcp.reserved	-	-
tcp.flags	number	flags
tcp.window_size	number	window size
tcp.checksum	number	checksum

<b>name</b>	<b>data type</b>	<b>description</b>
tcp.urgent_pointer	number	urgent pointer
tcp.opt	-	TCP option
tcp.opt.type	number	option type
tcp.opt.len	number	option length
tcp.opt.data	-	option data
udp	-	UDP header
udp.srcport	number	source port
udp.dstport	number	destination port
udp.len	number	total length
udp.checksum	number	checksum
dhcp	.	DHCP protocol
dhcp.type	number	protocol type
dhcp.hw.type	number	physical address type
dhcp.hw.len	number	physical address length
dhcp.hops	number	count of relay agents
dhcp.id	number	identification
dhcp.seconds	number	seconds since the start of the client
dhcp.flags	number	flags
dhcp.ip.client	IPv4 address	client IP address
dhcp.ip.your	IPv4 address	own IP address
dhcp.ip.server	IPv4 address	server IP address
dhcp.ip.relay	IPv4 address	relay agent IP address
dhcp.hw.addr	MAC address	client MAC address
dhcp.hw.addr_pad	-	padding after the MAC address
dhcp.hostname	string	name of the server

<b>name</b>	<b>data type</b>	<b>description</b>
dhcp.file	string	file name of the boot file
dhcp.magic	number	magic number
dhcp.opt	-	DHCP option
dhcp.opt.type	number	option type
dhcp.opt.len	number	option length
dhcp.opt.data	-	option data
dns	-	DNS protocol
dns.id	number	identification
dns.type	number	type identifier
dns.opcode	number	operation code
dns.flags	number	flags
dns.rcode	number	response code
dns.count.queries	number	count of queries
dns.count.answers	number	count of answers
dns.count.auth_rr	number	count of name server entries
dns.count.add_rr	number	count of additional entries
dns.qry	-	query
dns.qry.name	string	DNS name
dns.qry.type	number	type identifier
dns.qry.class	number	class
dns.ans	-	response
dns.ans.name	string	DNS name
dns.ans.type	number	type identifier
dns.ans.class	number	class
dns.ans.ttl	number	Time To Live
dns.ans.dlen	number	data length

<b>name</b>	<b>data type</b>	<b>description</b>
dns.ans.data	-	data
dns.ans.ip	IPv4 address	IPv4 address
dns.ans.ipv6	IPv6 address	IPv6 address
dns.ans.hostname	string	host name
dns.auth	-	name server entry
dns.auth.name	string	DNS name
dns.auth.type	number	type identifier
dns.auth.class	number	class
dns.auth.ttl	number	Time To Live
dns.auth.dlen	number	data length
dns.auth.data	-	data
dns.auth.ip	IPv4 address	IPv4 address
dns.auth.ipv6	IPv6 address	IPv6 address
dns.auth.hostname	string	host name
dns.add	-	additional entry
dns.add.name	string	DNS name
dns.add.type	number	type identifier
dns.add.class	number	class
dns.add.ttl	number	Time To Live
dns.add.dlen	number	data length
dns.add.data	-	data
dns.add.ip	IPv4 address	IPv4 address
dns.add.ipv6	IPv6 address	IPv6 address
dns.add.hostname	string	host name
nbns	-	NBNS protocol
nbns.id	number	identification

<b>name</b>	<b>data type</b>	<b>description</b>
nbns.type	number	type identifier
nbns.opcode	number	operation code
nbns.flags	number	flags
nbns.rcode	number	response code
nbns.count.queries	number	count of queries
nbns.count.answers	number	count of answers
nbns.count.auth_rr	number	count of name server entries
nbns.count.add_rr	number	count of additional entries
nbns.qry	-	query
nbns.qry.name	string	DNS name
nbns.qry.type	number	type identifier
nbns.qry.class	number	class
nbns.ans	-	response
nbns.ans.name	string	DNS name
nbns.ans.type	number	type identifier
nbns.ans.class	number	class
nbns.ans.ttl	number	Time To Live
nbns.ans.dlen	number	data length
nbns.ans.data	-	data
nbns.ans.flags	number	flags
nbns.ans.ip	IPv4 address	IPv4 address
nbns.auth	-	name server entry
nbns.auth.name	string	DNS name
nbns.auth.type	number	type identifier
nbns.auth.class	number	class
nbns.auth.ttl	number	Time To Live



<b>name</b>	<b>data type</b>	<b>description</b>
nbns.auth.dlen	number	data length
nbns.auth.data	-	data
nbns.auth.flags	number	flags
nbns.auth.ip	IPv4 address	IPv4 address
nbns.add	-	additional entry
nbns.add.name	string	DNS name
nbns.add.type	number	type identifier
nbns.add.class	number	class
nbns.add.ttl	number	Time To Live
nbns.add.dlen	number	data length
nbns.add.data	-	data
nbns.add.flags	number	flags
nbns.add.ip	IPv4 address	IPv4 address
ntp	-	NTP protocol
ntp.li	number	leap indicator
ntp.vn	number	version
ntp.mode	number	mode
ntp.stratum	number	stratum
ntp.poll	number	polling interval
ntp.precision	number	precision
ntp.delay	number	delay
ntp.dispersion	number	dispersion
ntp.refid	number	reference ID
ntp.reftime	number	reference time stamp
ntp.org	number	original time stamp
ntp.rec	number	receive time stamp

<b>name</b>	<b>data type</b>	<b>description</b>
ntp.xmt	number	transmit time stamp
tftp	-	TFTP protocol
tftp.opcode	number	operation code
tftp.file	string	file name
tftp.mode	string	mode
tftp.datablock	number	block number (for data)
tftp.data	-	-
tftp.ackblock	number	block number (for acknowledge)
tftp.error.code	number	error code
tftp.error.msg	string	error message
snmp	-	SNMP protocol
snmp.tlv	-	Type-Length-Value (TLV)
snmp.tlv.type	number	TLV type
snmp.tlv.length	number	TLV length
snmp.tlv.data	-	TLV value
snmp.value.int	number	TLV value as number
snmp.value.string	string	TLV value as string
snmp.value.counter	number	TLV value as counter
snmp.value.tticks	number	TLV value as time stamp
ftp	-	FTP protocol
ftp.line	string	line
ftp.req.command	string	request command
ftp.req.parameter	string	request parameter
ftp.rsp.code	string	response code

<b>name</b>	<b>data type</b>	<b>description</b>
ftp.rsp.arg	string	response arguments
http	-	HTTP protocol
http.req	string	request
http.req.method	string	method
http.req.uri	string	path
http.req.version	string	version
http.resp	string	response
http.resp.version	string	version
http.resp.code	string	response code
http.resp.desc	string	response text
http.field	string	HTTP property
http.field.name	string	field name
http.field.value	string	field value
smtp	-	SMTP protocol
smtp.line	string	line
smtp.req.command	string	request command
smtp.req.parameter	string	request parameter
smtp.rsp.code	string	response code
smtp.rsp.parameter	string	response parameter
pop	-	POP protocol
pop.line	string	line
pop.req.command	string	request command
pop.req.parameter	string	request parameter
pop.rsp.indicator	string	response indicator

<b>name</b>	<b>data type</b>	<b>description</b>
pop.rsp.desc	string	response description
imap	-	IMAP protocol
imap.line	string	line
imap.tag	string	tag
imap.data	string	data
sip	-	SIP protocol
sip.req	string	request
sip.req.method	string	method
sip.req.uri	string	URI
sip.req.version	string	version
sip.resp	string	response
sip.resp.version	string	version
sip.resp.code	string	response code
sip.resp.desc	string	response text
sip.field	string	SIP field
sip.field.name	string	field name
sip.field.value	string	field value
sdp	-	SDP protocol
sdp.version	string	version
sdp.owner	string	session owner
sdp.owner. username	string	user name
sdp.owner.id	string	session ID
sdp.owner.version	string	version
sdp.owner.ntype	string	network type

<b>name</b>	<b>data type</b>	<b>description</b>
sdp.owner.atype	string	address type
sdp.owner.address	string	address
sdp.session_name	string	session name
sdp.session_info	string	session info
sdp.uri	string	URI
sdp.email	string	e-mail address
sdp.phone	string	Telephone number
sdp.s_con_info	string	connection data of the session
sdp.s_con_info. ntype	string	network type
sdp.s_con_info. atype	string	address type
sdp.s_con_info. address	string	address
sdp.s_bandwidth	string	bandwidth of the session
sdp.time	string	time
sdp.time.start	string	start time
sdp.time.stop	string	end time
sdp.repeat_time	string	repeat time
sdp.timezone	string	time zone
sdp.s_enc_key	string	encryption key of the session
sdp.session_attr	string	session attribute
sdp.media	string	media description
sdp.media.media	string	media type
sdp.media.port	string	port
sdp.media.proto	string	protocol
sdp.media.format	string	format

<b>name</b>	<b>data type</b>	<b>description</b>
sdp.media.title	string	media title
sdp.m_con_info	string	connection data of the media
sdp.m_con_info. ntype	string	network type
sdp.m_con_info. atype	string	address type
sdp.m_con_info. address	string	address
sdp.m_bandwidth	string	bandwidth of the media
sdp.m_enc_key	string	encryption key of the media
sdp.media_attr	string	media attribute
rtp	-	RTP protocol
rtp.version	number	version
rtp.p	truth value	indicates, if padding is available
rtp.x	truth value	indicates, if a extension header is available
rtp.cc	number	CSRC count
rtp.marker	truth value	marker flag
rtp.p_type	number	payload type
rtp.seq	number	sequence number
rtp.timestamp	number	timestamp
rtp.ssrc	number	SSRC
rtp.csrc	number	CSRC
rtp.ext	-	RTP extension header
rtp.ext.profile	number	profile type value
rtp.ext.len	number	length
rtp.ext.data	-	data

<b>name</b>	<b>data type</b>	<b>description</b>
rtp.payload	-	payload
rtp.padding	-	padding
rtcp	-	RTCP protocol
rtcp.version	number	version
rtcp.p	truth value	indicates, if padding is available
rtcp.rc	number	report count
rtcp.sc	number	CSRC count
rtcp.subtype	number	sub type
rtcp.pt	number	packet type
rtcp.length	number	length
rtcp.data	-	data
rtcp.padding	-	padding
tpkt	-	TPKT protocol
tpkt.version	number	version
tpkt.reserved	-	-
tpkt.length	number	length
q931	-	Q.931 protocol
q931.disc	number	protocol discriminator
q931.call_ref_len	number	length of call reference
q931.call_ref	number	call reference
q931. message_type	number	message type
q931.ie	-	information element
q931.ie.id	number	identification
q931.ie.len	number	length

<b>name</b>	<b>data type</b>	<b>description</b>
q931.ie.data	-	data
pn_rt	-	PROFINET-RealTime protocol
pn_rt.frame_id	number	frame ID
pn_rt.cycle_counter	number	cycle counter
pn_rt.ds	number	data state
pn_rt.transfer_status	number	transfer state
pn_dcp	-	PROFINET-DCP protocol
pn_dcp.service_id	number	service ID
pn_dcp.service_type	number	service type
pn_dcp.xid	number	Identification
pn_dcp.response_delay	number	response delay
pn_dcp.data_length	number	data length
pn_dcp.block	-	block
pn_dcp.block.opt	number	block option
pn_dcp.block.subopt	number	block sub option
pn_dcp.block.length	number	block length
pn_dcp.block.status	number	state
pn_dcp.block.data	-	block data
pn_dcp.padding	-	padding



<b>name</b>	<b>data type</b>	<b>description</b>
pn_ptcp	-	PROFINET-PTCP protocol
pn_ptcp.header	-	header
pn_ptcp.pad1	-	padding
pn_ptcp.res1	-	reserved
pn_ptcp.res2	-	reserved
pn_ptcp.delay10ns	number	10ns delay
pn_ptcp.sequence_id	number	sequence number
pn_ptcp.delay1ns_byte	number	1ns delay (byte)
pn_ptcp.pad2	-	padding
pn_ptcp.delay1ns	number	1ns delay
pn_ptcp.tlvheader	-	block
pn_ptcp.tl_type	number	block type
pn_ptcp.tl_length	number	block length
pn_ptcp.tl_data	-	block data
pn_mrirt	-	PROFINET-MRRT protocol
pn_mrirt.version	number	version
pn_mrirt.block	-	block
pn_mrirt.type	number	block type
pn_mrirt.length	number	block length
pn_mrirt.sequence_id	number	sequence number
pn_mrirt.domain_uuid	number	domain UUID
pn_mrirt.sa	MAC address	sender MAC address
pn_mrirt.data	-	data

<b>name</b>	<b>data type</b>	<b>description</b>
pn_mrmt.padding	-	padding
dcerpc	-	DCE/RPC protocol
dcerpc.ver	number	version
dcerpc.ver_minor	number	sub version
dcerpc.pkt_type	number	packet type
dcerpc.cn_flags	number	flags (CN only)
dcerpc.dg_flags1	number	flags part 1 (DG only)
dcerpc.dg_flags2	number	flags part 2 (DG only)
dcerpc.drep	-	data representation
dcerpc.drep. byteorder	number	byte order
dcerpc.drep. character	number	character set
dcerpc.drep.fp	number	floating point format
dcerpc.dg_serial_hi	number	serial number (higher)
dcerpc.dg_obj_id	-	object ID (DG only)
dcerpc.dg_if_id	-	Interface ID
dcerpc.dg_act_id	-	activity ID
dcerpc.dg_server_ boot	number	server boot timestamp
dcerpc.dg_if_ver	number	interface version
dcerpc.dg_seqnum	number	sequence number
dcerpc.dg_opnum	number	operation number (DG only)
dcerpc.dg_if_hint	number	interface hint
dcerpc.dg_act_hint	number	activity hint
dcerpc.frag_len	number	fragmentation length

<b>name</b>	<b>data type</b>	<b>description</b>
dcerpc.dg_frag_num	number	fragment number
dcerpc.dg_auth_proto	number	authentication protocol
dcerpc.cn_auth_len	number	authentication length
dcerpc.dg_serial_lo	number	serial number (lower)
dcerpc.cn_call_id	number	communication ID
dcerpc.cn_alloc_hint	number	allocation hint
dcerpc.cn_ctx_id	number	context ID
dcerpc.cn_cancel_cnt	number	cancel count
dcerpc.cn_status	number	state (only CN)
dcerpc.cn_opnum	number	operation number (CN only)
dcerpc.cn_obj_id	-	object ID (CN only)
dcerpc.cn_reject_res	number	reject reason
dcerpc.cn_max_xmit	number	maximum transmit
dcerpc.cn_max_recv	number	maximum receive
dcerpc.cn_assoc_group	number	group
dcerpc.dg_status	number	state (DG only)
dcerpc.dg_cancel_vers	number	cancel version
dcerpc.dg_cancel_id	number	cancel ID

<b>name</b>	<b>data type</b>	<b>description</b>
dcerpc.dg_cancel_acc	truth value	cancel support
dcerpc.fack_vers	number	version
dcerpc.fack_win	number	window size
dcerpc.fack_tsdu	number	maximum TSDU
dcerpc.fack_frag	number	maximum fragment size
dcerpc.fack_serial	number	serial number
dcerpc.fack_selack_len	number	selective acknowledge length
dcerpc.fack_selack	-	selective acknowledge
pn_io	-	PROFINET-IO protocol
pn_io.alarm_dst_ep	number	destination endpoint
pn_io.alarm_src_ep	number	source endpoint
pn_io.pdu_version	number	PDU version
pn_io.pdu_type	number	PDU type
pn_io.tack	number	TACK
pn_io.window_size	number	window size
pn_io.send_seq_num	number	send sequence number
pn_io.ack_seq_num	number	acknowledge sequence number
pn_io.args_max	number	maximum arguments
pn_io.args_len	number	argument length
pn_io.var_part_len	number	data length
pn_io.var_part	-	data
pn_io.user_data	-	user data

<b>name</b>	<b>data type</b>	<b>description</b>
pn_io.status	-	state
pn_io.status.code	number	error code
pn_io.status.decode	number	error decode
pn_io.status.code1	number	error code 1
pn_io.status.code2	number	error code 2
pn_io.array	-	array
pn_io.array.max_count	number	maximum count
pn_io.array.offset	number	offset
pn_io.array.act_count	number	current count
pn_io.block	-	block
pn_io.block.type	number	block type
pn_io.block.length	number	block length
pn_io.block.version_h	number	version
pn_io.block.version_l	number	sub version
pn_io.block.data	-	data
wol	-	Wake-On-LAN protocol
wol.sync	MAC address	synchronization stream
wol.mac_block	-	MAC address block
wol.mac	MAC address	MAC address
wol.passwd_ip	IP address	password as IP address
wol.passwd_mac	MAC address	password as MAC address
llmnr	-	LLMNR protocol

<b>name</b>	<b>data type</b>	<b>description</b>
llmnr.id	number	identification
llmnr.type	number	type identifier
llmnr.opcode	number	operation code
llmnr.flags	number	flags
llmnr.rcode	number	response code
llmnr.count.queries	number	count of queries
llmnr.count.answers	number	count of answers
llmnr.count.auth_rr	number	count of name server entries
llmnr.count.add_rr	number	count of additional entries
llmnr.qry	-	query
llmnr.qry.name	string	LLMNR name
llmnr.qry.type	number	type identifier
llmnr.qry.class	number	class
llmnr.ans	-	response
llmnr.ans.name	string	LLMNR name
llmnr.ans.type	number	type identifier
llmnr.ans.class	number	class
llmnr.ans.ttl	number	Time To Live
llmnr.ans.dlen	number	data length
llmnr.ans.data	-	data
llmnr.ans.ip	IPv4 address	IPv4 address
llmnr.ans.ipv6	IPv6 address	IPv6 address
llmnr.ans.hostname	string	host name
llmnr.auth	-	name server entry
llmnr.auth.name	string	LLMNR name

<b>name</b>	<b>data type</b>	<b>description</b>
llmnr.auth.type	number	type identifier
llmnr.auth.class	number	class
llmnr.auth.ttl	number	Time To Live
llmnr.auth.dlen	number	data length
llmnr.auth.data	-	data
llmnr.auth.ip	IPv4 address	IPv4 address
llmnr.auth.ipv6	IPv6 address	IPv6 address
llmnr.auth.hostname	string	host name
llmnr.add	-	additional entry
llmnr.add.name	string	LLMNR name
llmnr.add.type	number	type identifier
llmnr.add.class	number	class
llmnr.add.ttl	number	Time To Live
llmnr.add.dlen	number	data length
llmnr.add.data	-	data
llmnr.add.ip	IPv4 address	IPv4 address
llmnr.add.ipv6	IPv6 address	IPv6 address
llmnr.add.hostname	string	host name
ssdp	-	SSDP protocol
ssdp.req	string	request
ssdp.req.method	string	method
ssdp.req.uri	string	path
ssdp.req.version	string	version
ssdp.resp	string	response

<b>name</b>	<b>data type</b>	<b>description</b>
ssdp.resp.version	string	version
ssdp.resp.code	string	response code
ssdp.resp.desc	string	response text
ssdp.field	string	SSDP property
ssdp.field.name	string	field name
ssdp.field.value	string	field value
cotp	-	COTP protocol
cotp.li	number	length
cotp.type	number	type
cotp.destref	number	destination reference
cotp.srcref	number	source reference
cotp.class	number	classification
cotp.opts	number	options
cotp.reason	number	disconnect reason
cotp.eot	truth value	last TPDU
cotp.tpdu_number	number	TPDU number
cotp.sequence_number	number	sequence number
cotp.cause	number	error cause
cotp.parameter	-	parameter
cotp.parameter.code	number	parameter code
cotp.parameter.length	number	parameter length
cotp.parameter.value	-	parameter value
cotp.tpdu_size	number	TPDU size



<b>name</b>	<b>data type</b>	<b>description</b>
cotp.src_tsap	number	source TSAP
cotp.dst_tsap	number	destination TSAP
cotp.checksum	number	checksum

Furthermore there are some group fields, which belongs to multiple other fields (logical OR):

<b>name</b>	<b>fields</b>
eth.addr	eth.dst; eth.src
ip.addr	ip.src; ip.dst
ipv6.addr	ipv6.src; ipv6.dst
arp.hw.addr	arp.src.hw; arp.dst.hw
arp.proto.addr	arp.src.proto; arp.dst.proto
rarp.hw.addr	rarp.src.hw; rarp.dst.hw
rarp.proto.addr	rarp.src.proto; rarp.dst.proto
tcp.port	tcp.srcport; tcp.dstport
udp.port	udp.srcport; udp.dstport
dns.resp	dns.ans; dns.auth; dns.add
dns.resp.name	dns.ans.name; dns.auth.name; dns.add.name
dns.resp.type	dns.ans.type; dns.auth.type; dns.add.type
dns.resp.class	dns.ans.class; dns.auth.class; dns.add.class
dns.resp.ttl	dns.ans.ttl; dns.auth.ttl; dns.add.ttl
dns.resp.dlen	dns.ans.dlen; dns.auth.dlen; dns.add.dlen
dns.resp.data	dns.ans.data; dns.auth.data; dns.add.data

<b>name</b>	<b>fields</b>
dns.resp.ip	dns.ans.ip; dns.auth.ip; dns.add.ip
dns.resp.ipv6	dns.ans.ipv6; dns.auth.ipv6; dns.add.ipv6
dns.resp.hostname	dns.ans.hostname; dns.auth.hostname; dns.add.hostname
nbns.resp	nbns.ans; nbns.auth; nbns.add
nbns.resp.name	nbns.ans.name; nbns.auth.name; nbns.add.name
nbns.resp.type	nbns.ans.type; nbns.auth.type; nbns.add.type
nbns.resp.class	nbns.ans.class; nbns.auth.class; nbns.add.class
nbns.resp.ttl	nbns.ans.ttl; nbns.auth.ttl; nbns.add.ttl
nbns.resp.dlen	nbns.ans.dlen; nbns.auth.dlen; nbns.add.dlen
nbns.resp.data	nbns.ans.data; nbns.auth.data; nbns.add.data
nbns.resp.flags	nbns.ans.flags; nbns.auth.flags; nbns.add.flags
nbns.resp.ip	nbns.ans.ip; nbns.auth.ip; nbns.add.ip
tftp.block	tftp.datablock; tftp.ackblock
http.version	http.req.version; http.resp.version
smtp.parameter	smtp.req.parameter; smtp.rsp.parameter
sip.version	sip.req.version; sip.resp.version
sdp.con_info	sdp.s_con_info; sdp.m_con_info
sdp.con_info.ntype	sdp.s_con_info.ntype; sdp.m_con_info.ntype
sdp.con_info.atype	sdp.s_con_info.atype; sdp.m_con_info.atype
sdp.con_info.address	sdp.s_con_info.address; sdp.m_con_info.address
sdp.bandwidth	sdp.s_bandwidth; sdp.m_bandwidth
sdp.enc_key	sdp.s_enc_key; sdp.m_enc_key

<b>name</b>	<b>fields</b>
dcerpc.obj_id	dcerpc.dg_obj_id; dcerpc.cn_obj_id
dcerpc.opnum	dcerpc.dg_opnum; dcerpc.cn_opnum
wol.passwd	wol.passwd_ip; wol.passwd_mac
llmnr.resp	llmnr.ans; llmnr.auth; llmnr.add
llmnr.resp.name	llmnr.ans.name; llmnr.auth.name; llmnr.add.name
llmnr.resp.type	llmnr.ans.type; llmnr.auth.type; llmnr.add.type
llmnr.resp.class	llmnr.ans.class; llmnr.auth.class; llmnr.add.class
llmnr.resp.ttl	llmnr.ans.ttl; llmnr.auth.ttl; llmnr.add.ttl
llmnr.resp.dlen	llmnr.ans.dlen; llmnr.auth.dlen; llmnr.add.dlen
llmnr.resp.data	llmnr.ans.data; llmnr.auth.data; llmnr.add.data
llmnr.resp.ip	llmnr.ans.ip; llmnr.auth.ip; llmnr.add.ip
llmnr.resp.ipv6	llmnr.ans.ipv6; llmnr.auth.ipv6; llmnr.add.ipv6
llmnr.resp.hostname	llmnr.ans.hostname; llmnr.auth.hostname; llmnr.add.hostname
ssdp.version	ssdp.req.version; ssdp.resp.version

In addition to the fields which belongs to the data of the frame, there are some further fields which belongs to the frame itself:

<b>name</b>	<b>data type</b>	<b>description</b>
frame.number	number	index of the frame
frame.rx	truth value	indicates, if the frame was an incoming frame
frame.time	number	time stamp of the frame (in s)
tcp.stream	number	index of the TCP stream
tcp.analysis.window_update	-	TCP frame, which indicates a „Window Update“

<b>name</b>	<b>data type</b>	<b>description</b>
tcp.analysis.zero_window	-	TCP frame, which indicates a „Zero Window“
tcp.analysis.zero_window_probe	-	TCP frame, which indicates a „Zero Window Probe“
tcp.analysis.zero_window_probe_ack	-	TCP frame, which indicates a „Zero Window Probe ACK“
tcp.analysis.keep_alive	-	TCP frame, which indicates a „Keep Alive“
tcp.analysis.keep_alive_ack	-	TCP frame, which indicates a „Keep Alive ACK“
tcp.analysis.retransmission	-	TCP frame, which indicates a „Retransmission“
tcp.analysis.rto_frame	number	index of the frame to which the Retransmission is linked to
tcp.analysis.duplicate_ack	-	TCP frame, which indicates a „Duplicate ACK“
tcp.analysis.duplicate_ack_num	number	incremental number of the Duplicate ACK from this strand
tcp.analysis.duplicate_ack_frame	number	index of the frame to which the Duplicate ACK is linked to
udp.stream	number	index of the UDP stream
rtp.stream	number	index of the RTP stream
voip.stream	number	index of the VoIP connection
pn_io.stream	number	index of the PROFINET IO connection

If you want to compare a field with another field or a fixed value you need a comparison operator. The following comparison operators are available:

<b>C syntax</b>	<b>textual</b>	<b>description</b>
		checks if the field is present ( <i>no comparison operator and comparison value</i> )
==	eq	checks if the two values are matching
!=	ne	checks if the two values are not matching
>=	ge	checks if the field value is greater than or equal the comparison value
>	gt	checks if the field value is greater than the comparison value
<=	le	checks if the field value is smaller than or equal the comparison value
<	lt	checks if the field value is smaller than the comparison value
&		checks if a bitwise AND combination is not equal to 0
	contains	checks if the filed contains the value

example: `udp.srcport>=1024`

**Hint:**

**For the data types “truth value”, “MAC address”, “IPv4 address” and “IPv6 address” as well as for comparison of two fields or field groups the comparison operators ==/eq and !=/ne as well as checking the field existence can be used only. The contains operator can be only used for the data type “string”.**

If you have multiple conditions you will need combination operators to combine them. The following operators are available:

<b>C syntax</b>	<b>textual</b>	<b>description</b>
&&	and	logical AND, all conditions must be true
	or	logical OR, one condition must be true
^^	xor	logical XOR, only one condition may be true

example: *ip or ipv6*

If you want to group conditions you can use the round brackets. (e. g. *ip.addr==192.168.1.10 and (udp or tcp)*)

Also you can negate a condition by putting an exclamation mark in front of the field name or opening bracket (for a group). (e. g. *!udp*)

**Hint:**

**If you want to remove the view filter you just have to remove the entering from the text field and submit the empty entering.**

#### 4.3.4 search

In addition to the view filter you have the possibility to search for raw data in the frames. This is especially useful if the frame can't be analyzed furthermore automatically. The search depends on the view filter, this means that the search occurs only on viewed frames (e. g. only UDP datagramms, when using the filter *udp*).

For using the search you have a text field on the overview page. In this text field you can enter either a string (have to be entered within double quotes, e. g. *"hello"*) or a hex value (have to start with the 0x suffix, e. g. *0x1A2B3C*).

After entering the search value you can start the searching with the help of the two symbols behind the text field. The symbol ▼ executes a forward search and the symbol ▲ executes a backward search. If the focus is set on the search text field you also have the possibility to press the enter key. This executes a forward search. After the end of the frame list is reached the search begins one the first frame again.


search:  ▲ ▼

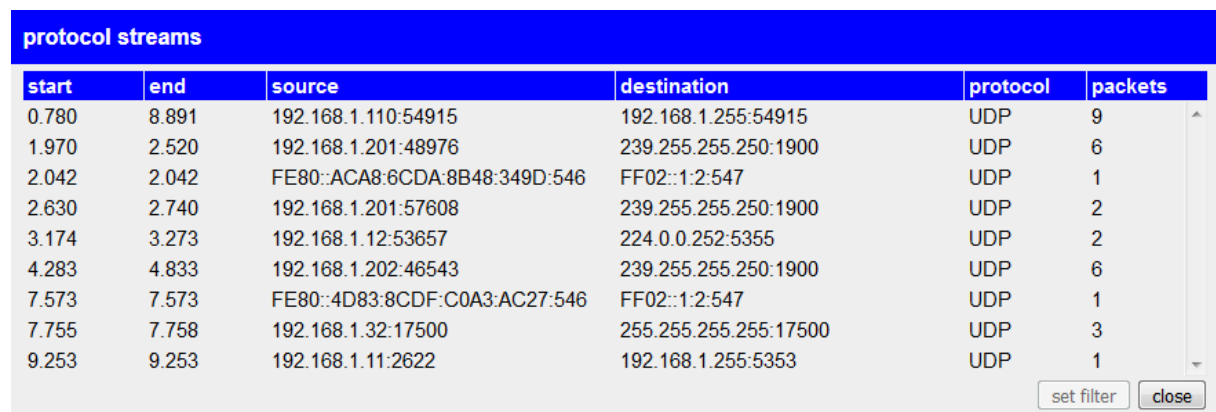
If the string or hex value was found, the detail view of the frame in which the entering was found get's opened and the data get's highlighted in the raw data view (and if applicable in the text view).

### 4.3.5 protocol streams

Often it is not possible that all data can be transmitted via one frame or sometimes it just needs some frame transmitting e. g. before an IP address can be assigned with DHCP. In such cases it is useful to show only frames which belongs to the same stream (OSI layer 4).

While the frames are analyzed on the web page a stream list is build up (currently the transport protocols TCP and UDP are supported). The assignment of a frame to a stream occurs with the help of the IP addresses and ports.

If you want to show a list with all streams you have to click on the  icon in the toolbar. Now you should see the following dialog:



start	end	source	destination	protocol	packets
0.780	8.891	192.168.1.110:54915	192.168.1.255:54915	UDP	9
1.970	2.520	192.168.1.201:48976	239.255.255.250:1900	UDP	6
2.042	2.042	FE80::ACA8:6CDA:8B48:349D:546	FF02::1:2:547	UDP	1
2.630	2.740	192.168.1.201:57608	239.255.255.250:1900	UDP	2
3.174	3.273	192.168.1.12:53657	224.0.0.252:5355	UDP	2
4.283	4.833	192.168.1.202:46543	239.255.255.250:1900	UDP	6
7.573	7.573	FE80::4D83:8CDF:C0A3:AC27:546	FF02::1:2:547	UDP	1
7.755	7.758	192.168.1.32:17500	255.255.255.255:17500	UDP	3
9.253	9.253	192.168.1.11:2622	192.168.1.255:5353	UDP	1

In this dialog you can see the list of all TCP and UDP streams. The single rows can be clicked. After clicking the row is colored with a light blue color and the buttons “set filter” and maybe “show analysis” (currently only for TCP streams) are enabled. If you click on the button “set filter” a view filter get's set. The frame table should then show the frames which belong to the selected stream only. With a click on the button “show analysis” (when available) another dialog gets opened, where you then can see further information about the selected stream, who are collected during the recording.

The setting process of the view filter as well as opening the analysis dialog can also be done via a single frame. Therefore you have to open the dialog “frame information and settings” first. On this dialog you can then click on the “follow TCP stream” or “follow UDP stream”. After



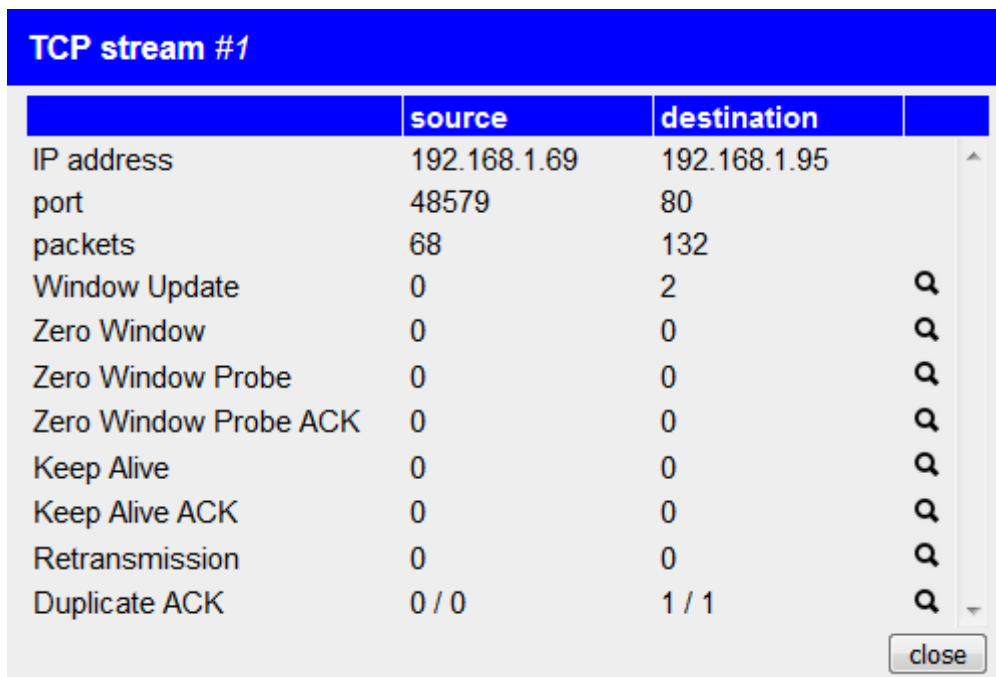
clicking on the button a view filter for the stream gets set. For TCP frames you will have another button with the label “show TCP stream analysis” to open the analysis dialog of the TCP stream.

### 4.3.6 TCP analysis

Some information of TCP streams can't be determined by analyzing single frames, rather the information of all frames from a stream have to be brought together. With such an analysis information like jams or retransmissions can be detected.

Because this analyzing process is relative complex and needs good knowledge of the TCP protocol itself, you don't have to this manually. The web page of the analyzer can show you this TCP status information for each stream easily.

If you want to open the analysis dialog for a TCP stream, you have to click on the button “show TCP stream analysis” within the dialog “frame information and settings” or on the button “show analysis” within the “protocol streams” dialog. After you have clicked on the button you should see the following dialog:




	source	destination	
IP address	192.168.1.69	192.168.1.95	
port	48579	80	
packets	68	132	
Window Update	0	2	Q
Zero Window	0	0	Q
Zero Window Probe	0	0	Q
Zero Window Probe ACK	0	0	Q
Keep Alive	0	0	Q
Keep Alive ACK	0	0	Q
Retransmission	0	0	Q
Duplicate ACK	0 / 0	1 / 1	Q

The dialog shows different information divided by source and destination which represent the two communication partners. In the first lines the IP

address, port as well as the counter of packets for each partner are shown. The next lines then shows the data of the analysis process:

Window Update:	A packet which informs the partner about a changed window size.
Zero Window:	A packet which informs the partner that no further data can be sent. This can be an indication for a data jam.
Zero Window Probe:	A packet which is sent to the partner to check if still no further data can be sent.
Zero Window Probe ACK:	A packet which informs the partner that sill no further data can be sent.
Keep Alive:	A packet which is sent to the partner to keep the connection. This could be needed if the connection is still in use but no data is sent.
Keep Alive ACK:	A packet which acknowledge the keeping of the connection.
Retransmission:	A packet which is sent again. This means the frame is a repetition.
Duplicate ACK:	A packet which acknowledge an received packet again. The first number represents the amount of packet assignments and the second one the total amount of Duplicate ACK packets.


For these different “packet types” a filter can be set directly. Therefore you have to click on the icon  on the corresponding line. This means, if you click on that symbol within the line “Retransmission” only frames of the current stream which were sent again will be shown in the table.

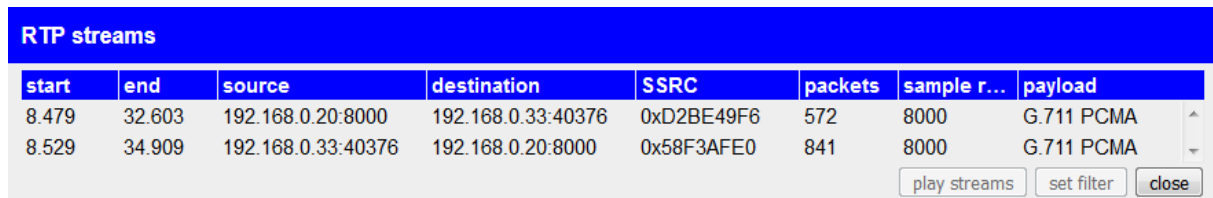
#### 4.3.7 RTP streams

RTP streams are data streams which are used for transmitting audio and video content in real time. The detection and grouping of RTP streams isn't possible with the IP addresses and ports only. Also the SSRC which is located in the RTP frame is used for that.

The analyzing of RTP streams frame for frame isn't very comfortable. Hence the web page offers you a simple list of RTP streams with all

necessary information. Depending on the type of the payload you have the possibility to play the content of the RTP stream (see below).

If you want to show the list of RTP streams you can click on the  icon in the toolbar. Now you should see a dialog similar to the following:



start	end	source	destination	SSRC	packets	sample r...	payload
8.479	32.603	192.168.0.20:8000	192.168.0.33:40376	0xD2BE49F6	572	8000	G.711 PCMA
8.529	34.909	192.168.0.33:40376	192.168.0.20:8000	0x58F3AFE0	841	8000	G.711 PCMA

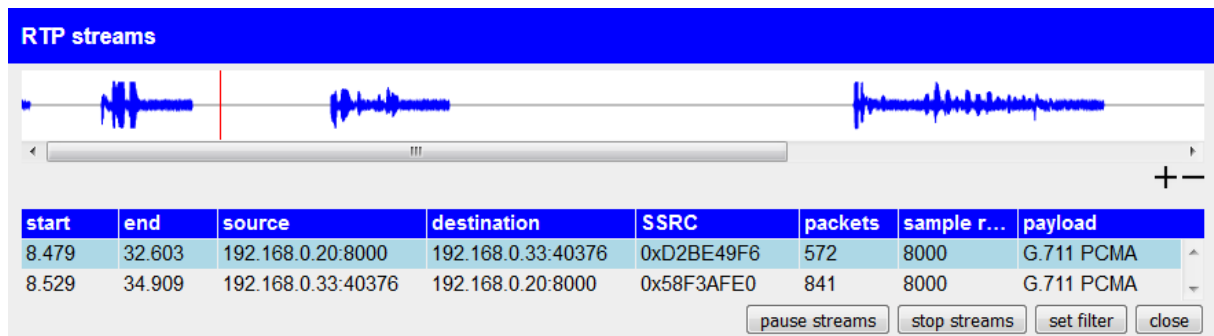
The dialog consists of a table and some buttons. Each row of the table represents a RTP stream and shows information like the start and end time as well as the source, the destination, the SSRC, the packet count, the sample rate (only for supported audio formats) and the type of the payload.

You can select a RTP stream in the table by clicking on one of the rows in the table. If you have clicked on a row the streams get's highlighted with a light blue color and the buttons “play streams” and “set filter” are getting enabled. By clicking on the “set filter” button a view filter get's set whereby frames which belong to this stream in the frame table are shown only.

Additionally to selecting a single RTP stream you have the possibility to select multiple RTP streams. Therefore you have to hold down the Strg/Ctrl key while clicking on the stream in the table. With the same method you can deselect a selected RTP stream. If you click on a RTP stream without pressing the Strg/Ctrl key all selected RTP streams are automatically getting deselected.

If you want to play the content of a single (or multiple) stream(s) you can click on the button “play streams”. This function is currently limited to audio streams with the codecs “G.711 PCMA” and “G.711 PCMU”. Other streams or codecs can not be played.

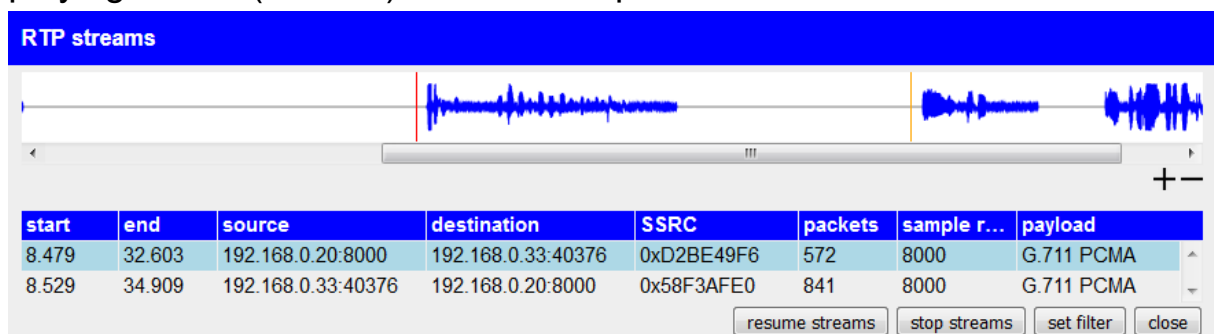
If you have selected at least one audio stream with a supported codec you should see a waveform diagram above the stream table. Such waveform diagrams are commonly used in software for audio editing.



The red line in the diagram indicates the current position of the audio playing. The cursor is only shown if the stream is playing or paused. With the help of the icons + and – you can zoom in or out of the waveform diagram respectively the audio track.

If you have already started the stream playing (*as in the image above*), you should now see the buttons “pause streams” and “stop streams” instead of the button “play streams”. This buttons allows you to pause or stop the playing of the streams. If the playing is paused the button “resume streams” instead of “pause streams” is shown, which allows you to resume the playing of the streams on the paused position.

If you would like to, you can set the position of the stream playing manually. Therefore you just have to place your cursor on the desired position within the waveform diagram. This “hand cursor” is marked with a orange colored line. If your cursor is on the desired position within the waveform diagram you have to click on the left mouse button. Now the playing cursor (red line) is set to this position.



### Hint:

The audio playing is using the “Web Audio API” from your browser. Some internet browsers (e. g. the Microsoft Internet Explorer and the Android Browser) unfortunately aren't supporting this feature.

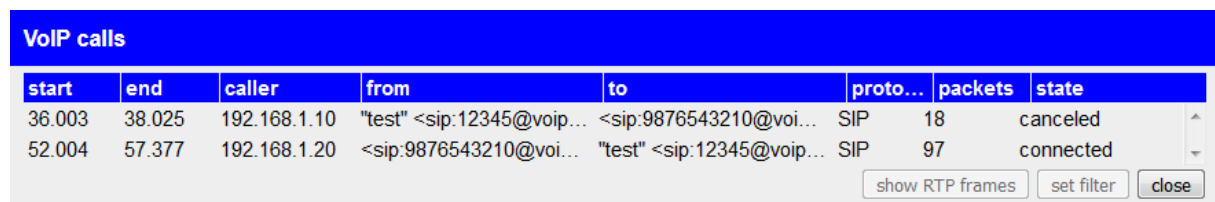
### 4.3.8 VoIP connections

For establishing a VoIP connection or transmitting conversation data the VoIP technology uses multiple protocols. Furthermore a few frames have to be transmitted before a connection or a call can be established.

Because analyzing VoIP connections with single protocol dissectors isn't very comfortable the VoIP protocols are automatically analyzed in more detail. In this process the frame get's assigned to a list of VoIP connections and calls. Currently only the signaling protocol SIP (Session Initiation Protocol) together with SDP (Session Description Protocol) and the data protocols RTP and RTCP are supported.

Furthermore you have the possibility to analyze and play the audio data of the VoIP call, which are transmitted via the RTP protocol.

If you want to show all VoIP calls within a recording you can click on the ☎ symbol. The symbol can be found in the toolbar above the frame table. After clicking on the symbol you should see the following dialog:



start	end	caller	from	to	proto...	packets	state
36.003	38.025	192.168.1.10	"test" <sip:12345@voip...	<sip:9876543210@voi...	SIP	18	canceled
52.004	57.377	192.168.1.20	<sip:9876543210@voi...	"test" <sip:12345@voip...	SIP	97	connected


show RTP frames    set filter    close

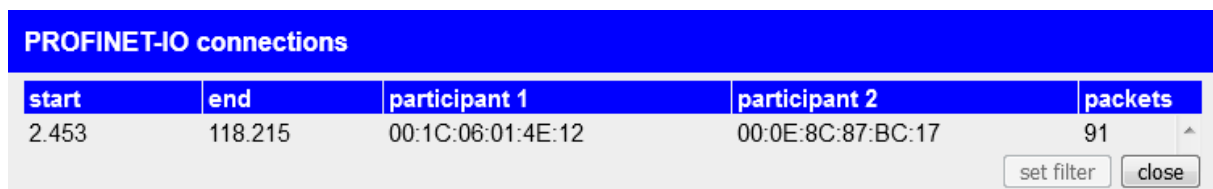
In the dialog you can see a table. Each row in the table represents a VoIP call. In the line you can see different information e. g. start and end time, the number of the two subscribers and the state. If you click on a line in the table the row get's highlighted with a light blue color and the buttons "show RTP streams" and "set filter" are getting enabled. Clicking on the "show RTP streams" button opens the RTP streams dialog. But now this dialog only shows the RTP streams which belong to the selected VoIP call. If you click on the "set filter" button a view filter for the VoIP call get's set. This means that only frames which belong to the VoIP call are shown in the frame table.

### 4.3.9 PROFINET-IO connections

If you want to analyze PROFINET-IO connections (short PN-IO) with the help of the device it can be helpful to show only the PROFINET traffic between two participants.

To offer a better way as manually entering the MAC addresses and other filters the page can show you a list with all PN-IO communications. For this list all PN-IO protocols who are received or sent directly via Ethernet or via TCP and UDP as well as PN-IO Context Manager protocols which are used for the management are respected.

If you want to see the list with all PN-IO connections you just have to click on the symbol , which can be found in the toolbar above the frame table. You should now see a dialog similar to this one:



start	end	participant 1	participant 2	packets
2.453	118.215	00:1C:06:01:4E:12	00:0E:8C:87:BC:17	91

In this dialog you can see a table with all connections. Each row represents one connection and shows the time of the first and last frame, the MAC addresses of the two participants and the amount of frames. If you click on one row it gets highlighted with a light blue color and the button “set filter” gets enabled. If you click on the “set filter” button a view filter gets set, so that now only frames which belongs to the connection are getting shown.

### 4.3.10 application protocols


The selection of the application protocol (OSI layer 5 to 7) while the frame analyzing process is running, isn't as easy as it is on the protocols on OSI layer 2 to 4, because it isn't unique. This is because the application layer uses the underlying protocol and ports to determine the protocol. Although there are standard ports, they can be changed easily (e. g. for port forwarding) and so they aren't unique anymore.

On the recording page of the device you have the possibility to change the assignments of ports in combination with a transport protocol to an application protocol. The assignments can be set without any restrictions.

The following table shows the default protocol assignments, which are set on factory default:

ports	transport protocol	application protocol
67	UDP	DHCP
53	TCP; UDP	DNS
137	UDP	NBNS
123	UDP	NTP
69	UDP	TFTP
161	UDP	SNMP
21	TCP	FTP
80	TCP	HTTP
25	TCP	SMTP
110	TCP	POP
143	TCP	IAMP
5060	TCP; UDP	SIP
102	TCP	TPKT
1720	TCP	Q931
34962, 34963	TCP; UDP	PN-RT

ports	transport protocol	application protocol
135	TCP	DCE/RPC
34964	TCP; UDP	PN-IO <i>(CM via DCE/RPC)</i>
0, 7, 9	UDP	WOL
5355	TCP; UDP	LLMNR
1900	UDP	SSDP

If you want to show or edit the protocol assignments you can click on the icon , which can be found above the table in the toolbar. Now you should see the following dialog:

**protocol assignments**

ports	transport protocol	application protocol	
67	<input type="checkbox"/> TCP <input checked="" type="checkbox"/> UDP	DHCP	—
53	<input checked="" type="checkbox"/> TCP <input checked="" type="checkbox"/> UDP	DNS	—
137	<input type="checkbox"/> TCP <input checked="" type="checkbox"/> UDP	NBNS	—
123	<input type="checkbox"/> TCP <input checked="" type="checkbox"/> UDP	NTP	—
69	<input type="checkbox"/> TCP <input checked="" type="checkbox"/> UDP	TFTP	—
161	<input type="checkbox"/> TCP <input checked="" type="checkbox"/> UDP	SNMP	—
	<input type="checkbox"/> TCP <input type="checkbox"/> UDP	-	+

Every row of the table represents an assignment. If you want to associate multiple ports with a single assignment you can separate them with a comma (e. g. *123,124*). The check boxes on the column “transport protocol” allows you to specify on which transport protocols the assignment is valid. The last column specifies the application protocol.

If you want to delete an existing assignment you can click on the — symbol at the end of the row.

If you want to add a new assignment you have to fill out the last row and finally click on the + symbol.

After you have configured your assignments you can click on the “submit” button to save the assignments. Through that all frames with a application protocol are getting reanalyzed. Furthermore the assignment



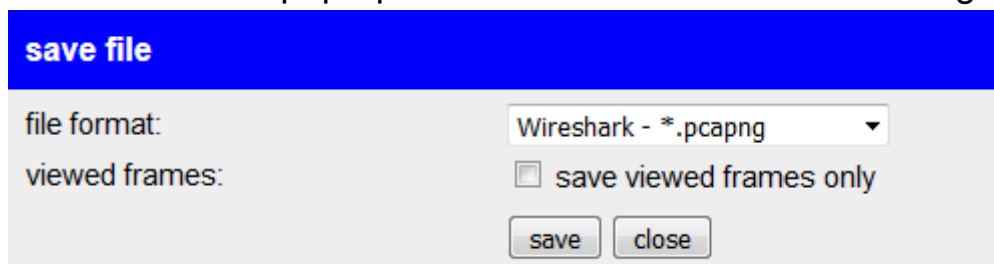
get's saved on the device, so the assignments aren't lost after changing the web page or rebooting the device. If you click on the “close” button or somewhere outside the dialog the dialog get's closed and the assignments are discarded.

If you want to restore to the default protocol assignments you can click on the button “restore default”. After clicking on the button it is necessary to click on the “submit” button to save and submit the assignments.

#### 4.3.11 save recording

If you want to store the recording data (that means the frames which are shown in your browser), you can export the recording which is shown in your browser, in a file format, which is also used by the Wireshark software. Therefore the symbol 📁 is available in the toolbar.

Now you should see a pop-up which looks similar to the following:



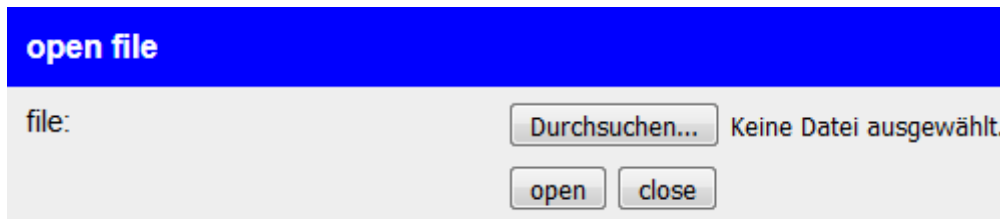
In the pop-up you can choose in which file format (.pcapng or .pcap) you want to save the recording. Also it's possible to save only frames, which are currently shown (depends on the view filter) in the browser.

With a click on the button “save” you will get (depending on your browser settings) a download prompt. Some browsers are storing the file directly to the download folder.

#### 4.3.12 open recording

On the recording page you have also the possibility to open an existing recording file (.pcapng or .pcap file format). In this process it does not matter if the file was created by Wireshark or by one of your analyzer devices. For opening a recording file you just have to click on the 📁 icon.

After you have clicked on the icon you will see a pop-up similar to the following:



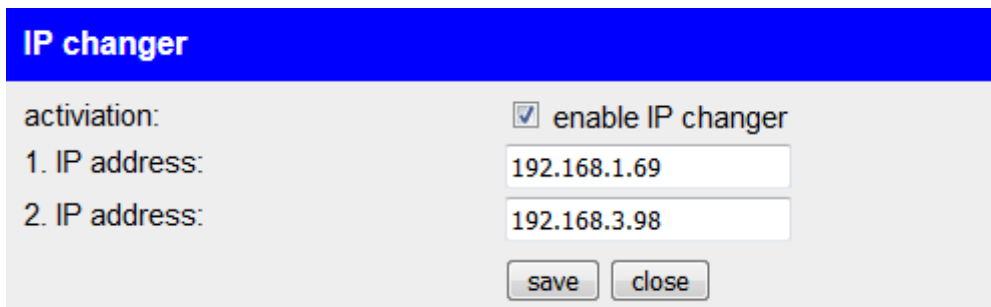
If you have selected a file you can click on the “open” button. Now the file get's read in and the frames from the file are shown in your browser window.

### 4.3.13 IP changer

The analyzer has a function to swap IPv4 addresses so two devices who are in a different subnet can be brought in the same subnet and so they can communicate with each other.

Therefore the IP changer have to be enabled and the two IPv4 addresses have to be configured. Furthermore the two devices have to be connected on different interfaces. This is necessary because the traffic has to flow trough the analyzer device. Otherwise the device can't swap the IPv4 addresses.

To configure the IP changer you have to click on the ⇄ symbol which can be found in the toolbar. Now you should see the following dialog:



**IP changer**

activation:  enable IP changer

1. IP address: 192.168.1.69

2. IP address: 192.168.3.98

save close

In the following example (see picture above) it's assumed that the device with the IP address 192.168.1.69 is connected to the interface A and the device with the IP address 192.168.3.98 is connected to the interface B.

As soon as the IP changer is configured and enabled the device with the IP address 192.168.1.69 can communicate with the other device (original IP address 192.168.3.98) with the help of the “virtual” IP address 192.168.1.98. The same procedures applies to the other way around.

#### Hint:

**The IP changer changes only the first three bytes of the IP address. The fourth and last byte remains preserved.**

#### Important:

**The device doesn't check if the virtual IP address is available in your network. If the IP address is already in used and you enable the IP changer an IP conflict occurs.**

If you start a recording in your web browser (now it's useful to record on the interface “A and B”) you can see how the IP addresses are changed. The IP address fields of frames with an IP address which get's or already was changed are colored in red:

A → B	35	3.047	192.168.1.69	192.168.1.98	TCP	66 51510 » 80 [SYN] Win=8192
B ← A	36	3.048	192.168.3.69	192.168.3.98	TCP	66 51510 » 80 [SYN] Win=8192
B → A	37	3.048	192.168.3.98	192.168.3.69	TCP	60 80 » 51510 [SYN ACK] Win=512
A ← B	38	3.048	192.168.1.98	192.168.1.69	TCP	60 80 » 51510 [SYN ACK] Win=512
A → B	39	3.048	192.168.1.69	192.168.1.98	TCP	60 51510 » 80 [ACK] Win=64240
B ← A	40	3.048	192.168.3.69	192.168.3.98	TCP	60 51510 » 80 [ACK] Win=64240
A → B	41	3.049	192.168.1.69	192.168.1.98	HTTP	414 51510 » 80 [PSH ACK] Win=64240
B ← A	42	3.049	192.168.3.69	192.168.3.98	HTTP	414 51510 » 80 [PSH ACK] Win=64240

Furthermore you can see a tool-tip with some information to the IP changer if you position your cursor above the address fields.

### Hint:

**The IP changer hasn't any function on the ProfiNet-WATCHDOG.**


#### 4.3.14 network monitoring

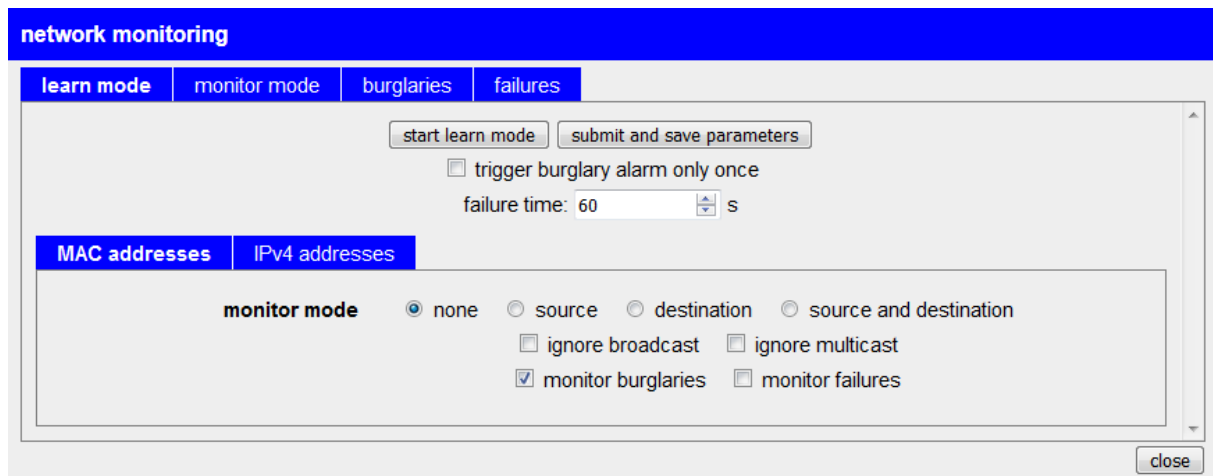
Additionally to the views and tools for the analyzing of the network the analyzer devices you have the possibility to configure and execute a monitoring of your network.

The in-going frames separated by interface A and B are used as basis for the network monitoring. The monitoring thereby can be freely configured to monitor MAC and / or IP addresses for burglaries (unknown addresses) and / or failures (addresses which aren't communicated for a specific time).

Burglaries, this means occurrences of addresses which are not learned in, can be viewed directly (with the complete frame) in the web browser via the recording mode "monitoring", sent to a FTP server or written to a USB stick. Furthermore you can view a list with burglaries on the web page as well as sending burglaries directly as an e-mail.

The monitoring of failures checks the communication times of addresses. This means if an address doesn't communicate for the specified time the address is considered as failed. The monitoring can be done on the monitor dialog of the web page (viewing the first and last communication time as well as a complete log of failures). If enabled, failures can also be sent via e-mail.

To setup the network monitor or view the current state you have to click on the icon  which is located in the toolbar. Now you should see the following dialog:



The dialog has a bar with the following tabs:

- **learn mode:** Here you can set the parameters for the network monitoring and (if desired) start the automatically learning of addresses.
- **monitor mode:** Here you can view and adapt the current parameters of the network monitoring and manage the addresses of the monitoring.
- **burglaries:** Here you have the possibility to manage a list with addresses who have triggered a burglary alarm.
- **failures:** Here you have the possibility to manage a list with addresses who have failed for a specific time or still be considered as failed.

Before you can begin the monitoring of your network you have the setup some parameters.

Therefore the tab “learn mode” have to be selected. Now you should configure the following general parameters:

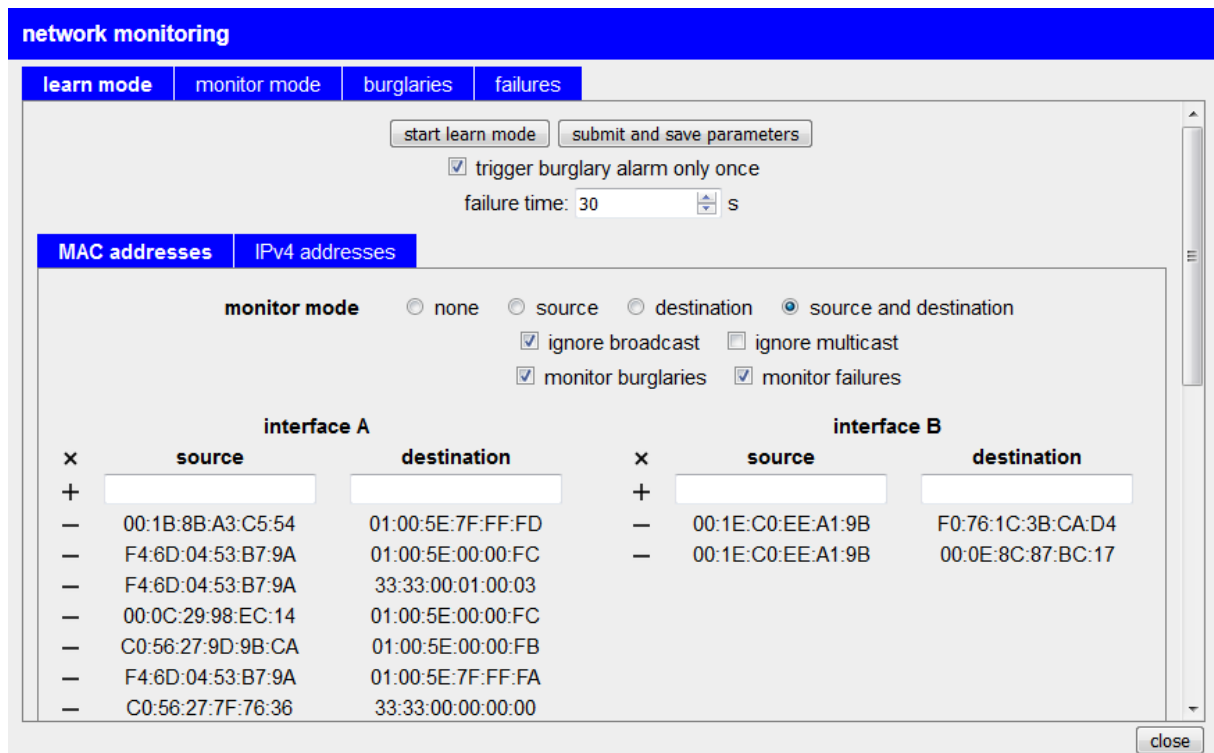
- **trigger burglary alarm only once:** Determines if an alarm on a burglary should be triggered only once for each address. Otherwise an alarm is triggered on each frame with a burglary.
- **failure time:** The time in seconds within the address have to communicate before it's considered as failed.

Below the general parameters you will find another bar with tabs. Thereby each tab defines another address type which can be configured with the following parameters:

- **monitor mode:** selection which addresses of the address type should be monitored:
  - **none:** The addresses aren't monitored.
  - **source:** Only the source address is monitored.
  - **destination:** Only the destination address is monitored.
  - **source and destination:** Each combination of source and destination addresses are monitored.
- **ignore broadcast:** Determines if broadcast addresses should be ignored for the monitoring (only applicable for the modes “destination” and “source and destination”).
- **ignore multicast:** Determines if multicast addresses should be ignored for the monitoring (only applicable for the modes “destination” and “source and destination”).
- **monitor burglaries:** Determines if burglaries (new addresses) should be monitored.
- **monitor failures:** Determines if failures (addresses which haven't communicate for the specified time) should be monitored.

If you have set all settings you can start the learn mode by clicking on the button “start learn mode”. While the learn mode is running all addresses which are currently occurring on the network are inserted to the list.

The list with addresses should be expanding automatically depending on the number of devices in your network. If you think all addresses are learned in you can stop the learn mode with the button “stop learn mode”.



If needed you still can remove addresses from the list manually. Therefore you just need to click on the — icon of the corresponding address entry.

In addition the removing of an address you also can add new addresses to the list (e. g. if they haven't communicated during the learn mode). If you want to add an address you have to enter the address(es) on the first row of the table and finally click on the + icon.

Furthermore you can clear a full address list by clicking on the × icon.

If you want to see the first and last communication time of an address (if available) you have to move your cursor to an address entry. The information will be shown as tool-tip. This feature is available even if the failure monitoring is disabled.

### Hint:

**The learn mode can be executed again at any time. A running monitoring isn't affected by the learn mode.**



When you aren't satisfied with the parameters you can still change the parameters even if the automatically learn mode was run.

Alternatively you could also add all addresses manually after setting the parameters. In this case an automatically learn mode isn't needed.

If you want to start the monitoring with the specified parameters and addresses you have to click on the button "submit and save parameters". Now you will be redirected to the tab "monitor mode".

On this tab you can still add missing addresses by using the + symbol, remove addresses by using the – symbol and clear an address list by using the ✕ symbol.

If an address is added or removed or an address list is cleared the running monitoring is affected immediately. If the changes should be available after a reboot of the analyzer you have to click on the "save parameters" button, after you have finished the adding and removing of addresses. Otherwise the changes will be lost after a reboot.

Furthermore you can change some parameters of the monitoring in the "monitor mode" as well. If you have changed one or more parameters you have to click on the button "save parameters". Thereby the active parameters and addresses are taken over for the monitoring and getting saved in the device.

If you want to record the frames who are considered as a burglary, you have to change the recording mode to “monitoring”. Furthermore it's mainly useful to set the interface to “A and B”, so burglaries on both interfaces are recorded. If the record settings are set you can start it normally.

The screenshot shows the TINA software interface. At the top, there is a blue header with a 'menu' button. Below it, the configuration area includes:
 

- mode: monitoring (dropdown)
- interface: A and B (dropdown)
- packets: all (dropdown)
- storage: web browser (dropdown)
- view filter: (text input)
- search: (text input)

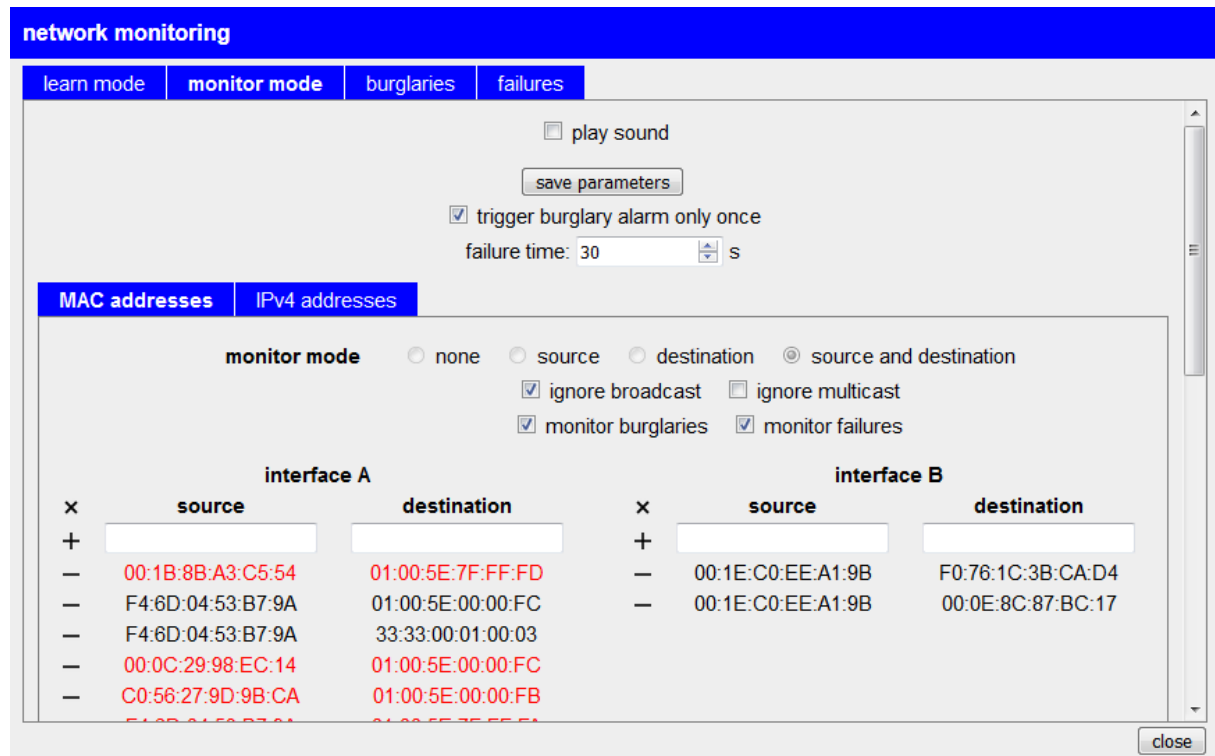
 A toolbar with various icons is located below the configuration. The main area displays a table of captured packets with the following columns: no., time, source, destination, protocol, length, and description. The table contains 18 rows of data, including protocols like UDP, ICMPv4, LLMNR, ICMPv6, ARP, and SSDP. At the bottom of the interface, there is a 'detail view' section and a footer with the text '© Copyright PI 2017-2019'.

	no.	time	source	destination	protocol	length	description
A → B	1	0.000	FE80::A10B:D8E...	FF02::1:2	UDP	153	546 » 547 Len=99
A → B	2	15.578	FE80::FCD7:6F1...	FF02::1:2	UDP	152	546 » 547 Len=98
A → B	3	26.816	192.168.1.130	192.168.1.95	ICMPv4	74	Echo Request
B → A	4	26.818	192.168.1.95	192.168.1.130	ICMPv4	74	Echo Reply
A → B	5	36.314	FE80::2C5B:8079...	FF02::1:3	LLMNR	90	63270 » 5355 Len=36
A → B	6	36.314	192.168.1.115	224.0.0.252	LLMNR	70	63270 » 5355 Len=36
A → B	7	36.315	FE80::4C17:764:1...	FF02::1:FFE4:CBA8	ICMPv6	86	Neighbor Solicitation
A → B	8	36.316	FE80::2C5B:8079...	FF02::1:FFF5:DC99	ICMPv6	86	Neighbor Solicitation
A → B	9	36.761	FE80::FCD7:6F1...	FF02::1:FFE4:CBA8	ICMPv6	86	Neighbor Solicitation
A → B	10	36.762	FE80::2C5B:8079...	FF02::1:FF0A:DEC4	ICMPv6	86	Neighbor Solicitation
B → A	11	50.605	00:0B:F4:73:D0:15	C0:56:27:7F:76:36	ARP	60	192.168.1.95 is at 00:0B:F4:73:D0:15
A → B	12	53.096	FE80::258C:A8A5...	FF02::1:3	LLMNR	87	64004 » 5355 Len=33
A → B	13	53.096	192.168.1.69	224.0.0.252	LLMNR	67	55715 » 5355 Len=33
A → B	14	57.367	192.168.0.72	239.255.255.250	SSDP	483	1900 » 1900 Len=449
A → B	15	57.368	FE80::EDB9:DC9...	FF02::C	SSDP	511	1900 » 1900 Len=457
A → B	16	62.839	192.168.1.12	239.255.255.250	SSDP	525	1900 » 1900 Len=491
A → B	17	64.932	FE80::71CB:A8E...	FF02::1:3	LLMNR	84	60892 » 5355 Len=30
A → B	18	64.932	192.168.1.53	224.0.0.252	LLMNR	64	58540 » 5355 Len=30

**Hint:**

Please note that on the selection “packets” the option “all” or “received” have to be selected, because the monitoring only respects in-going frames.

If you have enabled the monitoring of failures, you can see the state of the addresses on the tab “monitor mode”. Addresses which are considered as failed are colored in red. If the text color is black the address is (currently) not considered as failed.



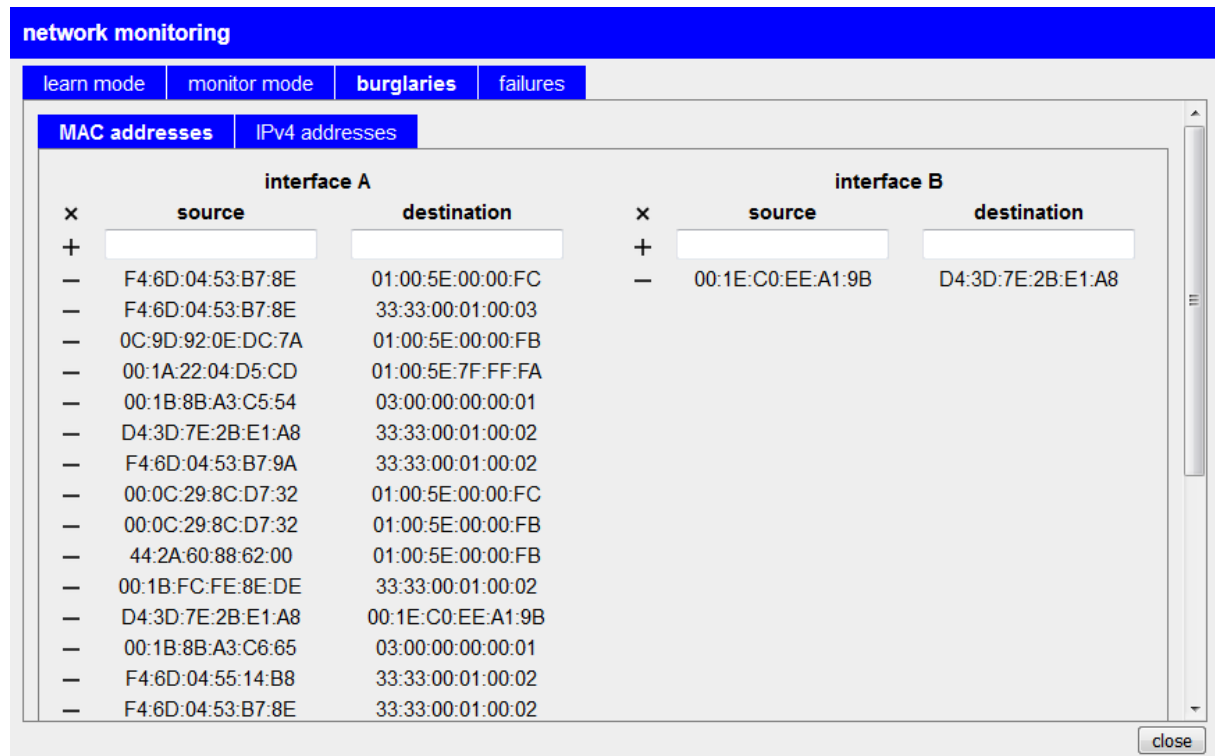
If you want to keep the network monitor open within your browser and do some other work in the meantime, it can be useful to enable the option “play sound”. If the option is enabled a sound will be played if a burglary (only if a monitor recording is running or the parameter “trigger burglary alarm only once” is set) or failure has detected.

A deep sound (750 Hz) signals a failure while a high sound (1250 Hz) signals a burglary.

**Hint:**

The audio playing is using the “Web Audio API” from your browser. Some internet browsers (e. g. the Microsoft Internet Explorer and the Android Browser) unfortunately aren't supporting this feature.

If you have enabled the burglary monitoring on one of the address types and set the parameter “trigger burglary alarm only once” you can see which addresses have triggered an burglary alarm already within the tab “burglaries”:



On this tab you will also get a tool-tip if you place your cursor on one of the address entries. The tool-tip shows the first and last communication time which represents the first and last detection of a burglary.

If an specific address shouldn't trigger an alarm temporarily you can add it to the burglary list manually by filling in the first row and clicking on the + icon. The procedure is the same as on the other tabs.

The same applies to the removing of an address. If an address which was already triggered should be triggered again on the next occurrence you can click on the – icon of the corresponding line.

If you want to reset the complete list you can click on the X icon.

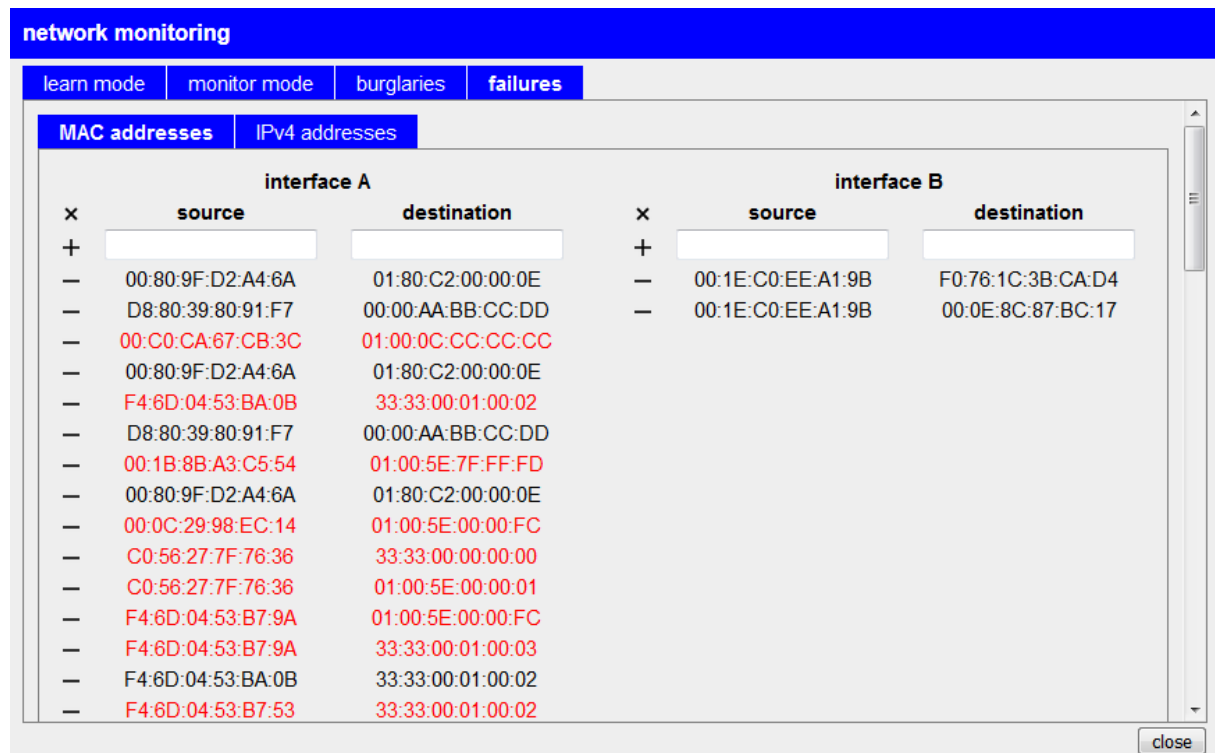
**Hint:**

**The monitoring runs automatically in your device. The lists are also expanding if you haven't opened your web browser.**

**Important:**

**The burglary list get's cleared on a device reboot.**

If the failure monitor is enabled, you can view a log of failures within the tab “failures”. There you will see all failures since the starting of monitoring:



The newest failure will be shown on the first row. If an address hasn't returned since the failure, the entry will be colored in red. Otherwise the text color will be black. If you want to view the time or time span of the failure, you can move the cursor on the entry and the information will be shown as tool-tip.

Even if the adding and removing of entries in the failure log with the help of the icons + and - is possible, this won't affect the failure monitoring.

If you want to clear the failure log you can click on the X symbol.

#### Hint:

The monitoring runs automatically in your device. The lists are also expanding if you haven't opened your web browser.

#### Important:

The failure list get's cleared on a device reboot.


As mentioned earlier the network monitoring can also send burglaries and failures via e-mail. Therefore you have to configure the SMTP server on the configuration page as well as enable the option “enable monitoring” (*see also chapter web server → configuration → SMTP server*).

The e-mail shipping runs in parallelism to the analyzing and monitoring which can be done via the web browser. This means it is possible that a monitor recording in your web browser is running as well as burglaries and failures are sent by e-mail.

**Important:**

**Please note that depending on your configuration an e-mail gets sent for each burglary and failure. This can lead to an enormous number of e-mails. You should check your settings carefully before enabling the e-mail shipping.**

## 4.4 page network scan

 menu

interface:	<input type="text" value="A"/>	device IP address:	<input type="text" value="192.168.1.1"/>
IP start address:	<input type="text" value="192.168.1.20"/>	IP end address:	<input type="text" value="192.168.1.34"/>
name resolution:	<input checked="" type="checkbox"/> enable	port scan:	<input checked="" type="checkbox"/> enable

**interface A**

**IP: 192.168.1.21 - MAC: 08:C5:E1:A3:30:32**  
TCP port: 22  
TCP port: 80

**IP: 192.168.1.29 - MAC: 00:1A:22:04:D5:CD**  
TCP port: 5800  
TCP port: 5900  
TCP port: 7680

**IP: 192.168.1.30 - MAC: 0C:9D:92:11:65:8E**  
TCP port: 5800  
TCP port: 5900  
TCP port: 7680

**IP: 192.168.1.32 - MAC: 00:0C:29:7C:30:CF**  
host name: WIN7SESSION32  
TCP port: 80  
TCP port: 135  
TCP port: 443  
TCP port: 445  
TCP port: 5800  
TCP port: 5900  
TCP port: 8765  
TCP port: 17500

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On the page “network scan” you have the possibility to execute a scan of your network. Thus you can determine which devices are available on your network.

Before you can start a scan you will have to specify some settings. The following settings are available:

- |                    |   |
|--------------------|---|
| interface:         | The interface on which the scan should be executed. It is also possible that the scan is executed on both interfaces. |
| device IP address: | The IP address which should be used from the device during the scan.  |
| IP start address:  | The first IP address of the range which should be scanned.  |
| IP end address:    | The last IP address of the range which should be scanned.   |
| name resolution:   | Determines if the host name of the founded devices should be determined.  |

port scan: Determines if the TCP ports of the founded devices should be checked.

**Important:**

**Please make sure that the chosen device IP address is available on the network or is the IP address of the device itself (for the web server). Otherwise a IP conflict occurs.**

If you have specified all settings you can click on the button “start scan”. The duration of the scan depends on the size of the scan range and the number of activated options. However it's completely normal that the scan works a few minutes.

If you have started the scan you can abort it at any time with the “stop scan” button. Otherwise the scan get's stopped automatically if it's completed.

The network scan is separated in 3 steps:

1. At the first step the device checks the available network participants. If a device was found it will be displayed on the web page.
2. At the next step the device will try to determine the host name of the devices which where found in step 1. Of course this step gets only executed if the option “name resolution” is activated.
3. The last step get's only executed if the port scan is enabled. The port scan will try to check all TCP ports (port 1 to 65535) if they are opened.

**Hint:**

**Please note that devices which are in a different subnet as the scan IP address will be found on the first step, but will fail on the name resolution and port scan.**

**Furthermore only devices which are on the same physically network as the device can be found.**



After the network scan is finished you can sort the result by IP addresses and port numbers by clicking on the button “sort results”. The unsorted list shows the sequence in which the information were collected.

**Hint:**

**The network scan can't be used on ProfiNet-WATCHDOG devices.**

## 4.5 page network tools

☰ menu

**general**  
tool selection:

**local address**  
interface:   
IP address:  subnet mask:   
gateway:

**remote address**  
IP address:

**interface A**

```
Resolve IP address 192.168.1.32 to MAC address
The IP address 192.168.1.32 has the MAC address 00:0C:29:7C:30:CF

Ping is executed for 192.168.1.32 (00:0C:29:7C:30:CF) with 32 bytes of data:
Reply from 192.168.1.32: bytes=32 time<1ms TTL=128
Reply from 192.168.1.32: bytes=32 time<1ms TTL=128
Reply from 192.168.1.32: bytes=32 time<1ms TTL=128
Reply from 192.168.1.32: bytes=32 time<1ms TTL=128
```

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On the page “network tools” you can execute different network tools like ping, traceroute, “Wake On LAN” or name resolution.

Before you can run a network tool you have to specify some settings. The available and needed settings are different from tool to tool.

With the list “tool selection” you can select the tool which you want to use. After you have selected a tool, settings which aren't available for this tool are getting hidden.

The following settings are available for the local address:

- interface: The interface on which the tool should be executed. It is also possible that the tool is executed on both interfaces at the same time.
- IP address: The IP address of the device for the tool.
- subnet mask: The subnet mask of the device for the tool.
- gateway: The IP address of the gateway of the device for the tool.

DNS server:                   The IP address of the DNS server of the device for the tool.

**Important:**

**Please make sure that the chosen IP address is available or is the IP address of the device itself (for the web server). Otherwise a IP conflict occurs.**

The following settings are available for the remote device:

MAC address:                The MAC address of the remote device.

IP address:                 The IP address of the remote device.

port:                        The port for the remote device.

The following general settings are available:

host name:                 The host name, which should be resolved.

SecureOn password:       The password which can be used for “Wake On LAN”.

If you have specified all settings you can click on the button “start tool” to execute the tool. If the tool is finished it gets stopped by itself. Otherwise you can stop the tool manually by clicking on the button “stop tool”.

The process and the result of the tool will be displayed in the “output window” below the button bar.

#### **4.5.1 resolve IP to MAC**

For this tool you will have to enter the local and remote IP address. With the help of the ARP protocol the device determines the MAC address of the device with the entered IP address.

### 4.5.2 ping

The tool “ping” is a common tool for testing the network communication to a network participant. The tool sends 4 pings (*ICMP Echo Requests*) and is similar to windows. If you specify a gateway you can also send pings to a device in another subnet.

### 4.5.3 traceroute

If you want to follow a network route the tool “traceroute” (also know an “tracert”) could help you. The tool works very similar to windows and sends 3 pings for each hop. The trace route will run on a maximum of 32 hops.

### 4.5.4 resolve NetBIOS name

To determine the IP address of a given NetBIOS name you can use the tool “resolve NetBIOS name”. The tool sends a NetBIOS request with the specified host name to the broadcast of the local subnet. The resolving of the NetBIOS name is limited to the physical and logical network.

### 4.5.5 determine NetBIOS name

The tool “determine NetBIOS name” is the counterpart of the tool “resolve NetBIOS name”. For this tool you don't enter a host name to get the devices IP address rather you enter the device IP address and get the host name.

### 4.5.6 resolve LLMNR name

The tool “resolve LLMNR name” is used to resolve a given host name in a local subnet to it's IP address. Some network participants, especially windows, are responding to NetBIOS and LLMNR requests.

### 4.5.7 determine LLMNR name

Similar to the tool for resolving NetBIOS names, the tool for resolving LLMNR names has also a counterpart. This tool, “determine LLMNR name”, can be used to get the host name of a given IP address.

#### 4.5.8 resolve DNS name

With the tool “resolve DNS name” you have the possibility to resolve a DNS name to an IP address. At the settings you have to fill in the IP address of the DNS server and the host name. As result you will get the IP address of the host name and some additional information (e. g. name servers). The resolving of DNS names is, instead of NetBIOS and LLMNR names, also possible through routers.

#### 4.5.9 determine DNS name

In some situations it is helpful to determine the DNS name of a given IP address. For this situation you can use the tool “determine DNS name”. For this tool you have to specify the remote IP address instead of the host name. As a result you will get the DNS name of the device.

#### 4.5.10 Wake On LAN - MAC

If you want to wake up a device via network you need to send the “Magic Packet” from the “Wake On LAN” protocol. This can be done by the tool “Wake On LAN - MAC”. The only thing you have to do is to specify the MAC address of the device which should be woken up. If you're using a SecureOn password, you have to specify this as well (as IP or MAC address). A feedback if the device was woken up can't be done, because the protocol doesn't provides this function.

#### 4.5.11 Wake On LAN - IP

The tool “Wake On LAN - IP” is very similar to the tool “Wake On LAN - MAC”. But this tool doesn't send the “Magic Packet” directly via the Ethernet layer rather it is send in a UDP frame. Because of that you have to specify the local IP address. The target IP address can't be specified because the protocol get's send to the broadcast address. Default ports for “Wake On LAN” are 0, 7 and 9, but you can specify any port.

#### Hint:

**The network tools can't be used on ProfiNet-WATCHDOG devices.**

## 4.6 page DHCP clients

☰ menu

configure server reset list

interface A			interface B		
state	MAC address	IP address	state	MAC address	IP address
⚠	08:C5:F1:A3:20:32	0.0.0.0	🔄	00:1E:C0:EE:A1:9B	0.0.0.0
⚠	5C:FF:35:28:94:5F	0.0.0.0			

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On the page “DHCP clients” you are able to list the DHCP clients which were detected in your network. Furthermore you can assign IP addresses to single devices.

In the table you can see that every DHCP client is shown in a separated row with the MAC and IP address. If the DHCP client hasn't any IP address yet, you will normally see the IP address 0.0.0.0. In the first column you can see the state of the DHCP client. The state is shown via an icon:

- 🔄 DHCP client is searching for servers
- ⚠ DHCP client requests an IP address / DHCP client was offered an IP address
- 🚫 DHCP client or server has declined / rejected the IP address
- ✅ DHCP client was assigned an IP address

If you want to see more information about a specific DHCP client you can simply click on the entry of the DHCP client in the table. Now you should see the following window:

DHCP client	
state:	DHCP client is searching for servers
interface:	B
MAC address:	00:0B:F4:73:D0:15
IP address:	0.0.0.0
link-local IP address:	-
host name:	S7-LAN
subnet mask:	-
gateway:	-
DNS-Server:	-
DHCP server:	-
lease time:	-
IP assignment:	<input type="checkbox"/> 0.0.0.0 ✓
<input type="button" value="close"/>	

Here you can see e. g. the state of the client in textual form, the link-local IP address (if the device assigns an IP address to itself) and information about the DHCP lease (if the devices has received an IP address from a DHCP server).

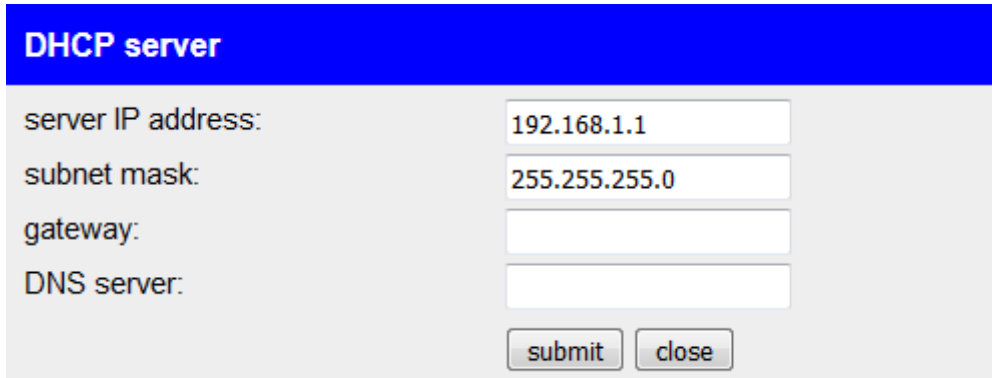
Furthermore you have the possibility to assign an IP address to the device. Therefore you just have to check the check box and enter an IP address into the text field. After that you have to click on the symbol to submit the configuration (this is also necessary if you remove or change the assignment).

**Important:**

**Please note that the IP address which you assign to a device have not to be in used. Otherwise a IP conflict occurs.**

**Furthermore the IP address have to be in the same subnet as the IP address of the server.**

Before you can to such assignments you will have to configure the DHCP server. Therefore you just have to click on the button “configure server” on the top of the page. Now you should see the following window:



DHCP server	
server IP address:	<input type="text" value="192.168.1.1"/>
subnet mask:	<input type="text" value="255.255.255.0"/>
gateway:	<input type="text"/>
DNS server:	<input type="text"/>
<input type="button" value="submit"/> <input type="button" value="close"/>	

Here you can change the IP address from the DHCP server of the device. The fields gateway and DNS server are optional. The settings are automatically preassigned (if possible) with the network settings of the interface A of the device. If you want to save the DHCP server settings you just have to click on the “submit” button.

The DHCP server which can be configured on this page has nothing to do with the DHCP server which can be enabled on the configuration page. The DHCP server which can be configured on this page does not offer IP addresses to devices automatically. Instead it only offers the manually entered IP addresses to the devices shown and enabled on this page.

**Important:**

**Please make sure that the chosen IP address is available or is the IP address of the device itself (for the web server). Otherwise an IP conflict occurs.**



If a device has received an IP address from a DHCP server (regardless if the device configuration is from the DHCP server of the device or from another DHCP server), some more information (received parameters and lease time) are shown in the detail view of the DHCP client:

DHCP client	
state:	DHCP client was assigned an IP address
interface:	B
MAC address:	00:0B:F4:73:D0:15
IP address:	192.168.1.180
link-local IP address:	-
host name:	S7-LAN
subnet mask:	255.255.255.0
gateway:	0.0.0.0
DNS-Server:	0.0.0.0
DHCP server:	192.168.1.1
lease time:	29.5.2018 12:48:35
IP assignment:	<input checked="" type="checkbox"/> 192.168.1.180 ✓
<input type="button" value="close"/>	

**Hint:**

**If you have enabled the DHCP server on interface A the IP address assignment via the page “DHCP clients” isn’t possible for devices which are located on interface A.**

If you want to clear the list of DHCP clients (and thereby all DHCP leases) you can click on the button “reset list”.

**Hint:**

**The assignment of IP addresses via this page can’t be used on the ProfiNet-WATCHDOG devices. But you can still use this page for the monitoring of DHCP assignments.**

## 4.7 page configuration

The screenshot shows a web-based configuration interface for a TINA device. At the top, there is a blue header bar with a white 'menu' button on the left. The main content area is white and contains several configuration sections, each enclosed in a blue-bordered box:

- system**: Contains 'device type: TINA', 'firmware version: 1.10', and a text input field for 'device name'.
- access protection**: Contains a text input field for 'current config password'.
- view password**: Contains a checkbox for 'change password', a text input field for 'new password', and a text input field for 'repeat new password'.
- tool password**: Contains a checkbox for 'change password', a text input field for 'new password', and a text input field for 'repeat new password'.
- config password**: Contains a checkbox for 'change password', a text input field for 'new password', and a text input field for 'repeat new password'.

At the bottom of the page, there is a grey footer bar with the text '© Copyright PI 2017-2020'.

On the configuration page (menu item “configuration”) you have the possibility to set various settings. This allows you to configure the device as needed for your usage. The configuration settings are described in the next points in more detail.

If one of the network interfaces is configured as “DHCP client” you can see if the device has already an IP configuration and how it looks like on this page. Furthermore this page shows the MAC addresses of the single network interfaces.

## 4.7.1 system

**system**

device type: TINA  
firmware version: 1.10  
device name:

The area “system” is mainly used to show some general information about your device. So you can see the device type (**TINA**, ProfiNet-WATCHDOG or **TINA-II**) as well as the firmware version here. An update of the firmware can be done on the page “firmware update”. Furthermore you can give your device a name via the field “device name”. This name then will be displayed on the web interface.

## 4.7.2 access protection

The screenshot shows a configuration page titled "access protection" with a blue border. It contains four sections, each with a blue header and a white background:

- access protection**: A text input field for "current config password".
- view password**: A checkbox labeled "change password", followed by "new password:" and "repeat new password:" text input fields.
- tool password**: A checkbox labeled "change password", followed by "new password:" and "repeat new password:" text input fields.
- config password**: A checkbox labeled "change password", followed by "new password:" and "repeat new password:" text input fields.

The field “access protection” allows you to set the passwords who are needed to access the web pages of the analyzer. If an empty password is configured, the page can be accessed without getting a password prompt. The device offers you to configure three different passwords. Of course you can use the same password for different protections. The following passwords can be configured:

- **view password:** This password is needed to access the page “overview” and thus for analyzing and controlling the network traffic.
- **tool password:** This password is used for accessing the pages “network scan”, “network tools” and “DHCP clients”.
- **config password:** With this password you can access the web pages “configuration” and “firmware update”. Persons who know this password can change all passwords.

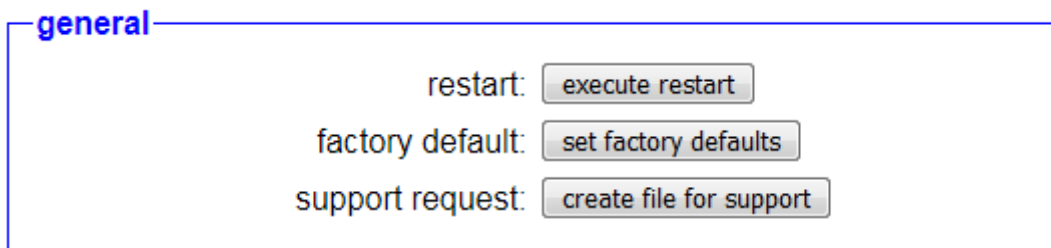
If you want to change one or multiple passwords you have to select the option “change password” on the access types where you want to

change the password first. On the next step you have to enter the new password. This have to be done twice, to reduce the risk of type errors. Before you can save the configuration you have to enter your current config password in the text field “current config password”. On factory defaults this is an empty password.

**Important:**

**On factory defaults the passwords of all access levels are empty passwords. This should definitely be changed, to avoid unauthorized insight to your network traffic as well as unwanted changes on the configuration of the device.**

### 4.7.3 general



In the “general” area you can restart your device as well as setting the device back to it's factory defaults. To execute the action you have to click on the corresponding button.

Furthermore you can click on the button “create file for support” to create a .bin file which contains the configuration and status of your device. This information can be helpful for the support if you have problems or questions to the device.

#### **Important:**

**If you set your device to factory defaults all settings will be lost. This means the function release have to be performed again. Please read the chapter “commissioning”.**

## 4.7.4 LAN-A settings

**LAN-A settings**

MAC address: c4:93:00:0e:ba:6f

DHCP mode:

IP address:

subnet mask:

gateway:

DNS server:

The settings in the group “LAN-A settings” are used for the network attachment and belong to the LAN-A interface:

MAC address: The MAC address of the interface (this value can't be changed).

DHCP mode: - The device is reachable via the specified address.

client The device refers an IP address from a DHCP server.

server The device is reachable via the specified address and provides IP addresses to other devices.

IP address: The IP address of the device.

subnet mask: The subnet mask of the device.

gateway: The IP address of the gateway (optional).

DNS server: The IP address of the DNS server (optional).

### Hint:

If the web server should not be reachable through the LAN-A interface, you just have to set the DHCP mode to “-” and remove the inputs from the IP address and subnet mask fields.

### Important:

**ProfiNet-WATCHDOG devices can generally not be accessed via the LAN-A interface, to not influence the RealTime management.**

## 4.7.5 WLAN settings

**WLAN settings**

deactivate WLAN:  deactivate WLAN

MAC address: c4:93:00:0e:ba:70

DHCP mode: DHCP server ▾

IP address: 192.168.1.1

subnet mask: 255.255.255.0

gateway:


DNS server:

search:

mode: Access Point (AP) ▾

SSID: TINA WiFi

security type: open ▾

password:  

hide SSID:  hide SSID

channel: 1 ▾ 🔍

In the group “WLAN settings” you can specify the configuration of the WLAN interface:


- deactivate WLAN: Specifies if the WLAN interface should be disabled or not.
- MAC address: The MAC address of the interface (this value can't be changed).
- DHCP mode: - The device is reachable via the specified address.
- client The device refers an IP address from a DHCP server.
- server The device is reachable via the specified address and provides IP addresses to other devices.
- IP address: The IP address of the device.
- subnet mask: The subnet mask of the device.
- gateway: The IP address of the gateway (optional).
- DNS server: The IP address of the DNS server (optional).






mode:	Access Point	The device provides an own WLAN network.
	client	The device connects to an existing WLAN network.
SSID:	The SSID (name) of the WLAN network.	
security type:	The security type / encryption of the WLAN network.	
password:	The password, which is needed for logging in to the WLAN network.	
hide SSID:	Specifies if the SSID should be hidden (only applicable if the mode is "Access Point").	
channel:	The channel of the WLAN network. <i>(auto channel = best WLAN channel will be used)</i>	

If you are not sure about the settings of your existing WLAN network you can scan for all available WLAN networks. Therefore you just have to click on the button "start search".

The following message should be shown:

search:  search is running ...

After a few seconds a list with all available WLAN networks is shown:

BSSID	SSID	security	channel	signal
c4:93:00:09:34:bd	TINA WiFi	open	1	
00:1e:c0:1a:83:67	EtherSens WiFi	WEP	3	
c0:56:27:9d:98:db	Test-WLAN	WPA2	7	

To select the configuration of one of the founded WLAN networks you have to click on the row of the entry in the table. Now all fields are filled in with information. Of course the password have to be entered manually, if necessary.

If you want to configure the analyzer to operate as an Access Point (AP) it can be useful to determine which WLAN channel is least charged.

Therefore the device can show you the channel work load. This can be done by clicking on the 🔍 icon behind the channel selection list.

After clicking on the search icon a load symbol will appear instead. A few seconds later the channel work load is determined and shown in a table. This should look similar to the following:

**channel usage**

channel	SSID	signal
1	TINA WiFi Service	-53 dBm
3	EtherSens WiFi	-82 dBm
3	Test-AP	-56 dBm
7	Test-WLAN	-47 dBm

**Hint:**

If the web server should not be reachable through the WLAN interface, you just have to set the DHCP mode to “-” and remove the inputs from the IP address and subnet mask fields.

The WLAN interface can only be disabled if the operating mode is set to “LAN-LAN Bridge” and another interface has an valid IP address.

If you have selected the mode “client” within the WLAN settings a sub group with some more configuration fields will be shown below the above described settings.

Xxx

These settings can be used to configure an additionally WLAN Access Point. This means you can use the WLAN interface as a client and an Access Point to the same time. The following settings are available:

deactivate WLAN-AP: Specifies if the WLAN-AP interface should be disabled or not.

DHCP mode:                    -                    The device is reachable via the specified address.

client	The device refers an IP address from a DHCP server.
server	The device is reachable via the specified address and provides IP addresses to other devices.
IP address:	The IP address of the device.
subnet mask:	The subnet mask of the device.
gateway:	The IP address of the gateway (optional).
DNS server:	The IP address of the DNS server (optional).
SSID:	The SSID (name) of the WLAN network.
security type:	The security type / encryption of the WLAN network.
password:	The password, which is needed for logging in to the WLAN network.
hide SSID:	Specifies if the SSID should be hidden.

**Hint:**

**If the web server should not be reachable through the WLAN-AP interface, you just have to set the DHCP mode to “-” and remove the inputs from the IP address and subnet mask fields.**

**The WLAN-AP interface can only be disabled if another operating mode as “WLAN-WLAN Bridge” is selected and another interface has an valid IP address.**

**Important:**

**When the WLAN network where the analyzer should connect to isn't available, the WLAN-AP interface won't be available in this time too.**

#### **4.7.6 USB-LAN settings**

The settings in the group “USB-LAN settings” are used for the network attachment and belong to the LAN interface of the “Ethernet over USB” adapter:

### USB-LAN settings

MAC address:	00:0e:c6:b9:7e:08
DHCP mode:	-
IP address:	192.168.0.1
subnet mask:	255.255.255.0
gateway:	
DNS server:	

MAC address: The MAC address of the interface (this value can't be changed).

DHCP mode: - The device is reachable via the specified address.  
client The device refers an IP address from a DHCP server.  
server The device is reachable via the specified address and provides IP addresses to other devices.

IP address: The IP address of the device.

subnet mask: The subnet mask of the device.

gateway: The IP address of the gateway (optional).

DNS server: The IP address of the DNS server (optional).

#### Hint:

**Please note that this section is only visible if the USB adapter is connected to the device.**

**If the web server should not be reachable through the USB-LAN interface, you just have to set the DHCP mode to “-” and remove the inputs from the IP address and subnet mask fields.**

### 4.7.7 FTP settings

The following settings belong to the FTP server:


**FTP settings**

server address:

server port:

passive mode:  use passive mode

user name:

password:  

path:

- server address: The IP address or DNS name of the FTP server.
- server port: The port of the FTP server (*default is 21*).
- passive mode: Specifies if passive mode should be used instead of active mode (*uses always port 20 for data transfer*).
- user name: The user name which is used to log in on the FTP server.
- password: The password which is used to log in on the FTP server (*optional*).
- path: The path which should be used by the FTP client (*optional*).

**Hint:**

**Please note that usually a connection to a FTP server via the internet needs an enabled passive mode.**

## 4.7.8 SMTP settings

**SMTP settings**

enable monitoring


network monitoring:  integrate hex dump  
 integrate PCAP file

server address:

server port:

encryption:  use TLS encryption

user name:

password:  

sender mail address:

receiver mail address:

subject:

test e-mail:  send test e-mail after saving the configuration

last error: -

The following settings belong to the SMTP server:

network monitoring:  enable monitoring (*enables the mail shipping for the network monitoring*)

integrate hex dump (*adds a hex dump of the frame on burglary mails*)

integrate PCAP file (*attaches a .pcap file of the frame on burglary mails*)

server address: The IP address or DNS name of the SMTP server.

server port: The port of the SMTP server (*default is 25 or 465 with TLS*).

encryption: Specifies if the connection should be encrypted with TLS.

user name: The user name which is used to log in on the SMTP server (*optional*).

password: The password which is used to log in on the SMTP server (*optional*).

sender mail address: The e-mail address from which the e-mails should be sent.

receiver mail address: The e-mail address to which the e-mails should be sent.

subject: The subject which should be attached in front of the normal subject on the e-mails (*optional*).

test e-mail: Specifies if a test e-mail should be sent after the settings are saved.

last error: Shows the last error of the e-mail sending (*empty, if no error is occurred*).

## 4.7.9 Bridge settings

**Bridge settings**

operating mode: LAN-LAN Bridge ▾

swap MAC:  swap MAC addresses

own frames:  ignore own frames for analyzing

For configuring the bridge some more settings are available within the field “Bridge settings”:

operating mode:	LAN-LAN Bridge	Bridge between LAN-A (A) and LAN-B (B)
	LAN-WLAN Bridge	Bridge between WLAN (A) and LAN-B (B)
	WLAN-WLAN Bridge	Bridge between WLAN-Client (A) and WLAN-AP (B)
swap MAC:	Specifies if the MAC addresses on the interface A (LAN-A or WLAN) should be replaced with the MAC address of the device.	
own frames:	Specifies if the own frames ( <i>frames from and to the device</i> ) should be ignored for the analyzing ( <i>recommended</i> ).	

### Hint:

The setting “swap MAC” is set automatically when changing the setting “mode” (for WLAN) or “operating mode”. But it is also possible to change the setting manually.

### Important:

The swapping of the MAC addresses is needed if the operation mode is set to “LAN-WLAN Bridge” and the WLAN interface works as client or if the operation mode is set to “WLAN-WLAN Bridge”. Otherwise the bridge will not work. This is a limitation of the IEEE 802.11 protocol (WLAN).

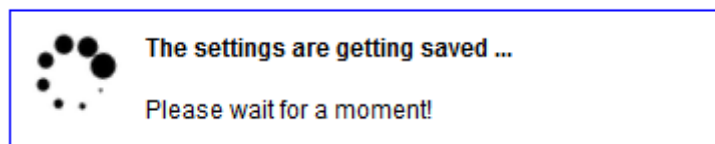


Through activating the MAC swapping the layer 2 protocols (except ARP) on interface A may not be managed properly anymore. For layer 3 protocols currently only IPv4 and IPv6 are supported.

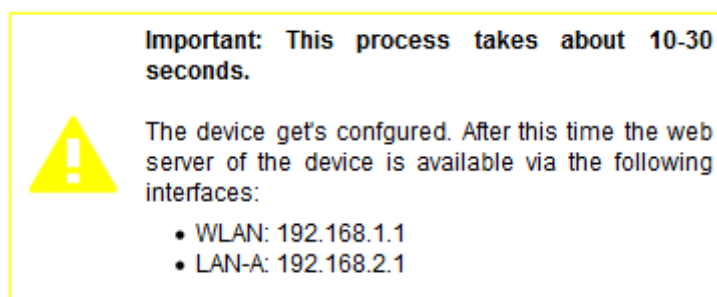
If the setting “ignore own frames for analyzing” is not set all frames which are received or sent from / to the device itself (e. g. for the web server) are also recognized in the recording and in other collected data.

If you change the bridge settings the bridge will be restarted. Thus if currently a recording or the learning of address is running data could be lost.

If you want to save the configuration you have to click on the button “submit configuration”, which is located at the bottom of the page. Now you should see the following message:



If your device does not respond within the next 5 seconds the following message will be shown:



This message indicates that the device is currently not available under the current IP address (e. g. because the IP address, the WLAN network or the operating mode has changed). In the message you will see under which interface and IP address the device will be available in a few seconds. The web page will still try to reconnect to the web page periodically in the background.

If the automatically re-connection does not work within about 1 minute, please check that the computer is connected with the correct interface.

Please do also check the WLAN connection and the IP settings of your computer.

**Hint:**

**After the configuration was saved and the device is available again you will be redirected to the start page.**

**If you have enabled the DHCP client on your device no automatically re-connection to the device will occur because the IP address is unknown.**

## 4.8 page firmware update

☰ menu

**firmware update**

device version: 1.07

firmware file:  Keine Datei ausgewählt.

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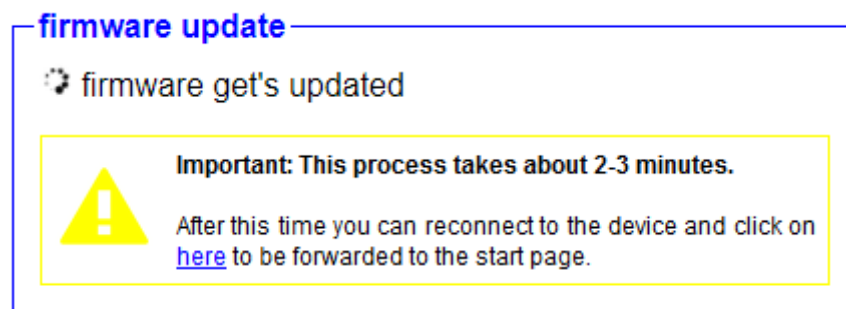
If you want to update the firmware of your device you should click on the menu item “firmware update”. On this page you can see your current version of the device and have the possibility to select a firmware file.

After you have selected a firmware file (this is a file with the extension .bin) you can click on the button “update firmware”, which will start the update process. Now you should see the following message:

**firmware update**

🌀 file get's uploaded and checked ...

If the firmware file was accepted you will see the following message:



The update process takes about 2-3 minutes. After this time you should reconnect to the WLAN network of your device (if your device doesn't do that automatically). This is of course only necessary if you access the web server via the WLAN interface. Now you should be redirected to the start page automatically. If the forwarding does not work you can click on the link in the text.

## 5 Technical data

### 5.1 TINA

<b>Supply voltage:</b>	24V DC +/- 20% (over detachable connector) USB (from PC/Power-Pack)
<b>Power consumption:</b>	2 watt
<b>Display:</b>	web browser status LEDs
<b>Handling/Configuration:</b>	web browser
<b>Interfaces:</b>	2 x 10/100BaseTX RJ45-ethernet-plug Antenna-connector RP-SMA(f) (2.4 GHz IEEE 802.11b/g/n)
<b>Operating temperature:</b>	0 - 55°C
<b>Case:</b>	plastic desktop case
<b>Dimensions:</b>	115 x 95 x 30 mm

### 5.2 ProfiNet-WATCHDOG

<b>Supply voltage:</b>	24V DC +/- 20% (over detachable connector) USB (from PC/Power-Pack)
<b>Power consumption:</b>	1,2 watt
<b>Display:</b>	web browser status LEDs
<b>Handling/Configuration:</b>	web browser
<b>Interfaces:</b>	2 x 10/100BaseTX RJ45-ethernet-plug Antenna-connector RP-SMA(f) (2.4 GHz IEEE 802.11b/g/n)
<b>Operating temperature:</b>	0 - 55°C
<b>Case:</b>	plastic clamping case <i>or</i> plastic desktop case
<b>Dimensions:</b>	plastic clamping case: 114 x 100 x 22,3 mm plastic desktop case: 115 x 95 x 30 mm

### 5.3 TINA-II

<b>Supply voltage:</b>	24V DC +/- 20% (over detachable connector) USB (from USB-power-supply 5V)
<b>Power consumption:</b>	9 watt
<b>Display:</b>	web browser status LEDs
<b>Handling/Configuration:</b>	web browser
<b>Interfaces:</b>	2 x 10/100/1000BaseT RJ45-ethernet-plug 2 x Antenna-connector RP-SMA(f) (2x2 MIMO / 2.4 GHz IEEE 802.11b/g/n + 5 GHz IEEE 802.11ac)
<b>Operating temperature:</b>	0 - 55°C
<b>Case:</b>	plastic desktop case
<b>Dimensions:</b>	115 x 95 x 30 mm