TeleRouter user manual

(english)

Art.Nr. 9373-ANALOG
Art.Nr. 9373-ISDN
Art.Nr. 9373-PPPOE

14.05.2019

Content

1 Description

- For remote maintenance via the analog or ISDN-network make a connection to the TELE-Router on site
- Take the TELE-Router as a secure VPN-gateway between automation-network and corporate-network
- Connect the network-nodes via the 4 switched network-ports
- Routes between two networks using the WAN-port
- The TELE-Router holds as an NTP-server the S7-Time up to date
- ProfiNet is also supported

!Attention!

Plug **ONLY** a cable to the analog or ISDN-jack according to the device-type! Nevertheless, if a not the device type appropriate cable plugged, it can lead to **damage** to the **hardware**. The device type can be identified by the selected box and the label on the jack.

2 Installation

2.1 Power connection

For the power supply to the device is either the included AC adapter or an existing local power supply with min. 24V DC 350mA power connected to the 3-pin green plug. In the included AC plug adapter the power poles are marked with colored sleeves.

The PLUS-pole with the color "red", the MINUS pole with the color "blue". Connect the POSITIVE pole of the left screw terminal and the NEGATIVE pole on the right (outer) screw terminal. The middle connector is used to ground and must be connected to PE.

2.2 LAN-connector

This connector is an autosensing 10/100 Mbit/s connector. For the connection to a Hub or a network connector, you should use a socalled patch-cable (both sided RJ-45, 1to1, shielded).

2.3 Analogue-modem connector

When connecting the telephone, the cable with the black (TAE-)plug is plugged in the telephone socket (N-contact). Please note that with some plugs a locking device has to be removed with a screwdriver in order to extract the plug from the TAE-socket. The other side, a so-called western-plug, has to be plugged, with the ejector up, in the small hole of the modem. You will hear how the locking device latches. In order to extract the western-plug, simply press down the locking lug and extract the plug.

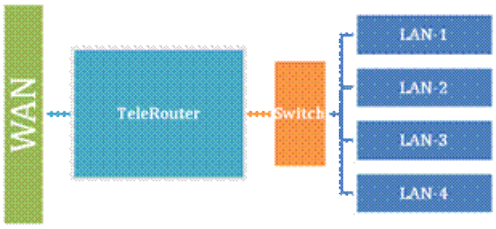
3 Introduction

TeleRouter is a scalable router with 4 x LAN - switch port and 1 x WAN port. Optionally can be installed an analog or ISDN modem

Via the integrated web interface, you can configure and operate TeleRouter. Applications for TeleRouter are e.g. Gateway / Connect / remote maintenance of

- automation networks
- profinet networks
- or standard Ethernet networks

Especially TeleRouter supports Simatic S7 systems from Siemens. With a few simple steps TeleRouter is ready for the desired mode. The optional analog or ISDN modem also enables operation as a dial-up (dial-in) router. For TeleRouter are available extension modules depending on the mode.



4 Hardware performance

4.1 Standart hardware performance

In the standard version TeleRouter is configured with a WAN port and 4 LAN ports equipped as a switch. The following operating modes are possible.

Betriebsarten	Ethernetgateway (Bridge) IP-Router Anschluss an DSL/Kabelmodem (PPPoE)
Services	DHCP Client/Server PPPoE Client NTP Client/Server OpenVPN Client/Server (VPN@Office) DynDNS Client Firewall
Anschlüsse	1 x WAN 4 x LAN-Port als Switch

4.2 Modem upgrade

Equipped with a modem (analog or ISDN), in addition to the standard features the TELE-ROUTER can be used as dial (dial-in) router. .

Betriebsarten	Einwähl (Dialin)- Router Ethernetgateway (Bridge) IP-Router Anschluss an DSL/Kabelmodem (PPPoE)
Services	DHCP Client/Server PPPoE Client NTP Client/Server OpenVPN Client/Server (VPN@Office) DynDNS Client Firewall
Anschlüsse	1 x Modem (analog 56 kBit oder ISDN 64 kBit) 1 x WAN 4 x LAN-Port als Switch

4.3 Configuration

In the configuration can be set the network, routing mode, etc. The data entry forms are self-explanatory as a rule. We are glad to accept suggestions from users to make operation even easier.

When supplied, the following IP addresses are set:

WAN: 192.168.1.57

LAN: 192.168.2.1 mit DHCP-Server

You have the following options to adress Tele router via web browser.

Awarded an IP address on the PC from the corresponding line segment (eg 192.168.1.100 and 192.168.2.100) and connect the PC corresponding to the LAN or WAN via Ethernet. Enter in the Browser http://192.168.1.57 or http://192.168.2.1. Or you can adjust your computer to obtain an IP address automatically and connect him to the LAN port on the TeleRouter. TeleRouter notify that the PC will automatically assign an IP address. In the browser, you can connect with the device http://telerouter

TeleRouter can always be started with this default setting, without the settings are lost.
Proceed as follows:

- Place a paper clip or similar prepared in order to press the work RESET button.

Do not worry, we will make no work RESET. The button is hidden between the WAN and LAN ports. There is a small hole. Insert there the paper clip.

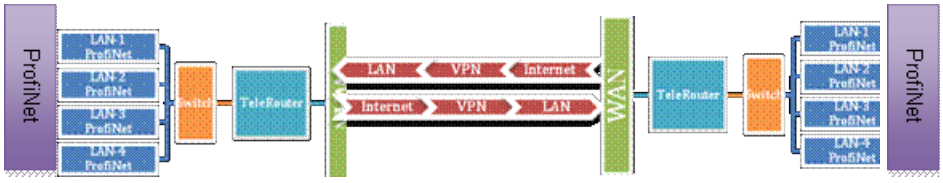
- De-energize equipment
- on again
- if the 4 four LED's are extinguished and only the power LED is on, hold down the button with paper clip until all 4 LEDs flashes rapidly .
- release the button
- when the LED S3 (bottom right) is lit, press button again

Then the device boots in the default setting. Now you can make the required changes to the network settings. These settings are active only after rebooting the device.

parameter	possible setting	routing direction / purpose
device name	"as desired“	
ProfiNet	yes /no	determines whether the TeleRouter as ProfiNet routers are used soll, **define you as a routing interface: WAN / OVPN**
standard gateway	fixed (as specified) WAN viaDHCP WAN via PPPoE LAN via DHCP Modem via PPP	
1. DNS		
2. DNS		
routing mode	office	LAN -> routing interface
	machine	routing interface -> LAN
routing interface	WAN/IP (standard)	IP routing via WAN generally
	modem	IP routing **only** via Modem
	WAN/PPPOE	IP routing **only** via PPPoE at the WAN port
	WAN/OVPN	routing **only** via OVPN at the WAN port
	WAN/bridge	ethernet routing at the WAN port

4.4 ProfiNET router (only possible with ProfiNET option)

If ProfiNet is enabled the TeleRouter is used to connect / remote maintenance of Profinet networks. Here is a schematic example.



The Profinet connection is implemented via a secure VPN connection. VPN connection can be established via WAN (TCP / IP) or WAN / PPPoE. To set a Profinet connection with 2 x message

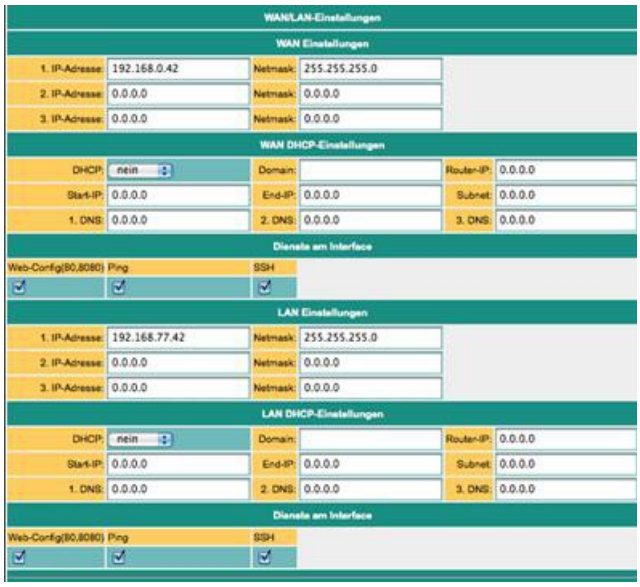
router: When ProfiNet is activated, telephone routers used to connect / remote maintenance of Profinet networks. Here is a schematic example.

- Activate ProfiNet option on both devices.
- Setting up a page as OpenVPN server and the other as OpenVPN client (see below) Enable ProfiNet on both devices.
- possibly activate DynDNS / PPPoE

The devices will connect automatically. Upon successful connection between the two can Profinet networks to communicate. Attention! It is no real-time data exchange possible.

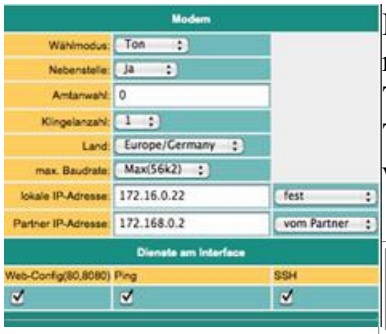
parameter	possible setting	routing direction/ purpose
name of device	"as desired"	
ProfiNet	yes /no	determines whether the TeleRouter is used as ProfiNet router **Do set its routing interface: WAN / OVPN**
standard gateway	fixed (as specified) of WAN via DHCP of WAN via PPPoE of LAN via DHCP of modem via PPP	
1. DNS		
2. DNS		
routing mode	office	LAN -> routing interface
	machine	routing interface -> LAN
routing interface	WAN/IP	IP routing via WAN
	modem	IP-Routing via modem
	WAN/PPPOE	IP routing via PPPoE at the WAN-port
	WAN/OVPN	routing via OVPN at the WAN port
	WAN/Bridge	ethernet routing at the WAN port

4.5 WAN-settings / LAN-settings



The WAN / LAN port can each receive up to 3 different IP addresses and subnets.
The port can also be used as a DHCP server or client. Here are entered the necessary data for the IP assignment.
For the operations of a DHCP / Server can be set fixed assignments MAC-IP-adress.
(See below, "DHCP fixed addresses). Next is to define which services are available at the port (web config), ping, ssh (only for developers)

4.6 Modem settings

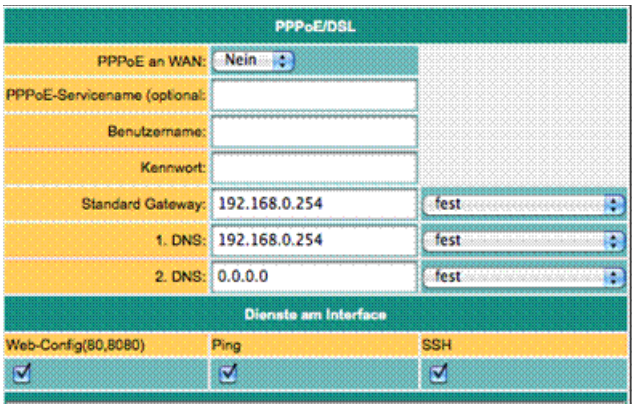


Here the modem parameters are defined. A modem connection is realized as a PPP connection. This allows also be used with TeleRouter alia dial routers. An ideal replacement for example is TeleService IE from Siemens. In the bottom line can be determined which services are available at the interface.

parameter	possible setting	purpose
dial mode	sound pulse	Sets the selection mode. Tone or pulse. Default is tone, only old telephone systems require pulse.
extension	yes no	Specifies whether the operation is on a telephone system. If yes, the official selection is set
number of rings	0 - 5	Number of rings before the modem receives a call.

		0 = Modem does not answer!
country	Select the country in which the device is operated	The modem conforms to the technical specifications of the phone line in the respective country. In general, a choice between Europe / Germany and USA selection of the country in which the device is operated
maximum baud rate (only analog modem)	Maximum connection speed used by the modem	If fluctuations in line quality, it may be more effective to operate the modem at a lower speed. This saves auto-negotiation of new modulation
SDN/EAZ (only ISDN)	end device number	This determines to which device number responding the ISDN modem with a call. No entry means the modem always responds. This number can go from your phone provider or telephone system administrator

4.7 PPPOE settings

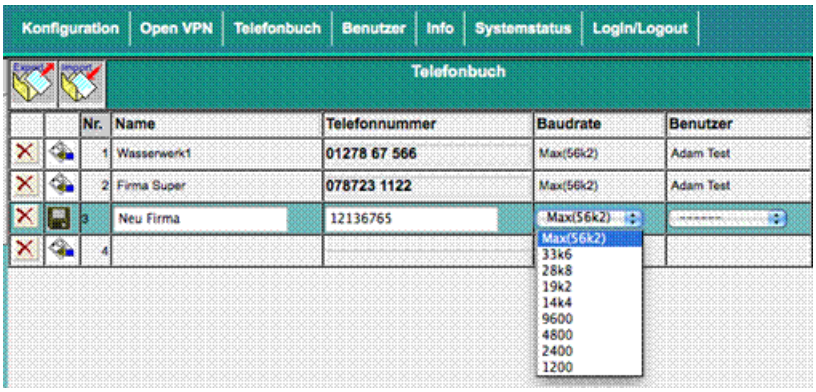


Define here the parameters for operation at a fixed DSL / cable modem. To overview and easier configuration are possible also the default gateway and DNS settings. As a rule, here are to set "auto PPPoE".

Here can also be selected which services are available at the interface.

parameter	possible setting	purpose
PPPoE at the WAN	yes no	Determines whether the PPPoE WAN port should be active.
PPPoE- name of service	optional	is provided by your ISP. Usually free
user name	as submitted by the provider	
password	as submitted by the provider	

4.8 Phone book



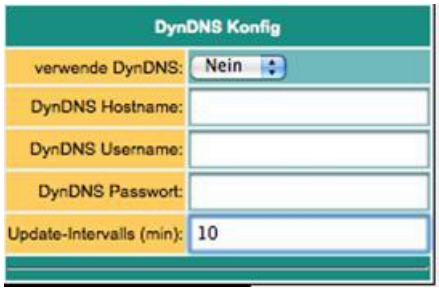
parameter	possible setting	purpose
name	name of the entry	as desired
phone number	number of the user	By clicking on the number, the connection established
baud rate (not at ISDN)	1200- 56kBit	maximum connection speed with the partners
user	user from the user list	For the dial-up user access is be managed under dial-up users

In the phone book are managed all facilities with a modem connection. The connection with a partner is simply done by clicking on the phone number. User and password are maintained in the dial-in user database. Thus it possible to use a multi-user systems. TeleRouter can also be used for other dial-up PPP access.

4.9 Routing firewall rules

Normally the routing is allowed on all network subscribers. As soon as there is an entry in this table, an access will be possible only via the rules above. In the standard edition the routing is only possible for LAN or from LAN. See operating mode. The "operation of the Advanced" allows rules in both directions.

4.10 DynDNS Konfig



If TeleRouter to be reached by OpenVPN as via the Internet, the Internet IP address of the device must be known. Meaningful here is not to work with a fixed IP address because the provider possibly allocate a new IP address here after new connection establishment (eg via PPPoE). It makes more sense here to access the device always with the same domain name.

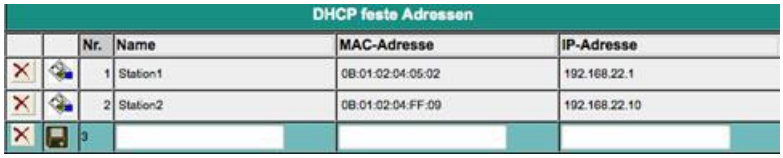
The service provider DynDNS offers this service on the Internet. (http://www.dyndns.org). DynDNS = Dynamic

DomainNameSever. For operating the service, you must sign in to DynDNS. For more information visit the website of DynDNS. Up to 5 dynamic IP adresses are free. If you need several, you can book at DynDNS for a fee a corresponding number of domain names. The price is very low, about 30, - U.S. $ per year.

Roughly speaking, this means:
You register at DynDNS the desired host name. e.g. meineanlage.dynalias.com. For your access you will receive an username and password. Enter this data in the setting of a DynDNS config and set "use DynDNS" to yes. The DynDNS refreshes in the selected time interval the data in DynDNS. If the Provider assign a new IP address that will be corrected again within this interval, thanks DynDNS. You reach your TeleRouter under the registered name, eg: meineanlage.dynalias.com. Enter this domain name in your office device at the VPN users.

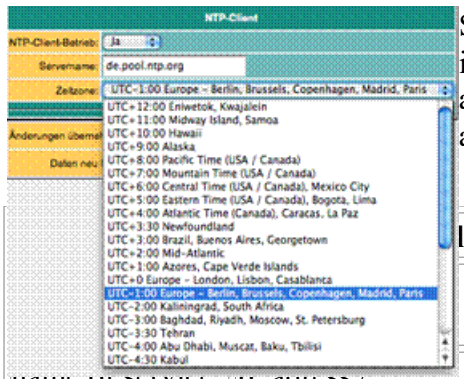
parameter	possible setting	purpose
name	any desired text	serves for info
protocol	TCP UDP TCP/UDP ARP	The protocol which is to be routed
port	1 - 65565	port or port area, which is to be routed z.B 1 – 1024, 2002 – 2048, 8080, 0 means all ports
IP adress	IP	

4.11 DHCP fixed MAC /IP address mapping



If the built-in DHCP server (at the WAN or LAN) is operated, it can be useful, to allocate specific IP stations always the same IP address. Here you can specify which MAC address is replaced by which IP address.

4.12 NTP client

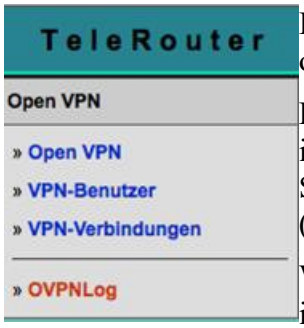


So that TeleRouter always runs with current time, we have implemented an NTP client. This allows TeleRouter automatically synchronize over the Internet or by any other available in the network time server date and time.

	le setting	purpose
		switch NTP client on or off
name of service	IP adress / domain name of the NTP client	Enter the IP address or the domain name of the desired NTP server. Be sure that this

		Server via the specified routed away accessible.
time zone	timezone in which the TeleRouter operated	necessary so TeleRouter has the correct local time

4.13 Open VPN settings

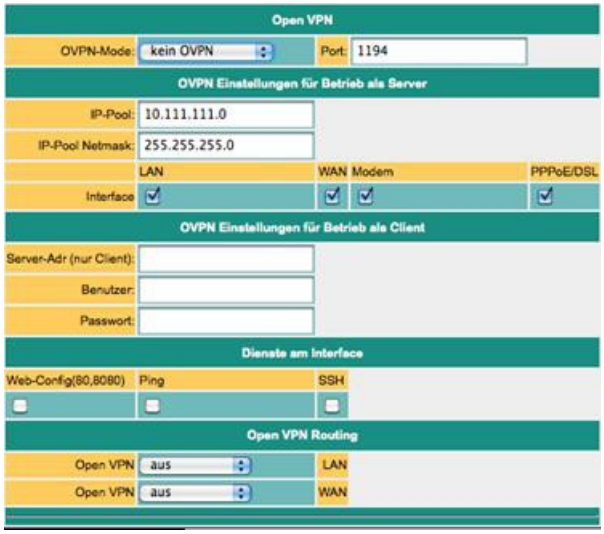


In TeleRouter we have implemented the popular OpenVPN released under open source. Detailed information can be found at http://www.openvpn.net.

Here I would like to briefly explain the function of OpenVPN, as implemented in TeleRouter. Basically there are two modes of the OpenVPN: Server or client. A server normally configures the device to the system (machine).

With OpenVPN we present TeleRouter in a new network interface. This interface is connected via a line (virtual circuit) with the OpenVPN interface of the partner device. The line is implemented by software. Here are exchanged all protocols for this interface on its own UPD / TCP channel. One can say it is made a telephone connection between the devices via UDP / TCP. Of course, the connection is encrypted. The keys are stored in the message router.

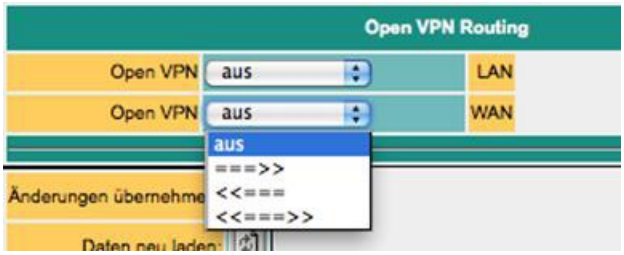
Configuration OVPN operation:



parameter	possible setting	purpose
OVPN mode	no OVPN server (UDP) client (UDP) server (TCP) client (UDP)	sets the OVPN operating mode of the device. In the server mode TeleRouter waits for a connection, In the client operating TeleRouter takes even before the connection to the partner.
port	1024 - 65535	port number on which the OVPN service will run, standard 1194.
IP pool (only for server)	default: 10.111.111.0	out this pool, the partner (client) will be allocated the IP address.
IP pool netmask	default:	associated netmask for the IP pool

	255.255.255.0	
server adress (only in client operating)	IP adresse or URL of the servers	the address of the server. Can take place in the notation xxx.xxx.xxx.xxx or in plain text (as a URL). Is only used in client mode.
user	user name	name of the user with which the server will be logged
password	user password	your unique password

The options "services on the interface" determine what services are available at present VPN connection.
Open VPN routing
This determines, in what form should be routed to the WAN / LAN port via VPN.



from: Routing is not possible to interface
===>: Routing from the VPN interface
<===: Routing from the Interface to the VPN
<===>: Routing in both directions

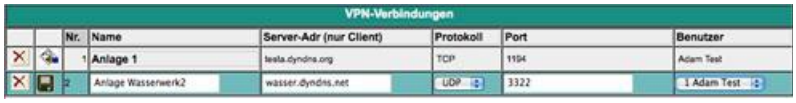
admission

Who is now allowed to build an OpenVPN connection? How can access to be controlled?
CAUTION! In principle, each of the certificate and the IP address of the TeleProf has and establish a VPN connection to access the device. It is to compare when you connect the device to the telephone line and assign a password for the dial-up modem.
You can use the extension "Advanced Router" for your own certificates. This provides more security.

4.14 VPN user

Here you can manage the users who are allowed to connect via OVPN.

4.15 VPN connections

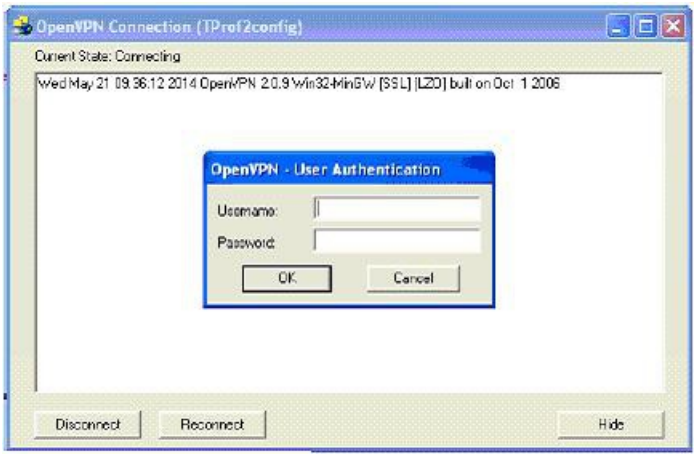


You can manage your machine-VPN-connections similar to a phonebook. If the time server address, protocol and port are entered, it will enter a reference to a VPN user.

4.16 Establish the connection with the OpenVPN GUI

After the installation the OVPN GUI icon should appear in the taskbar.

Move the right mouse button over the icon, klick config file and restart Connect. The rest should work automatically. Is there only one config file, so you go directly to Connect.



Enter your VPN username and password. Subsequently, a connection should be built.

If it doesn't work aswell, please check your log file. The configuration file can be edited by clicking on "edit config file".

```
##############################################
# client-side OpenVPN 2.0 config file        #
# for connecting to TeleRouter               #
#                                            #
# On Windows, you might want to rename this  #
# file so it has a .ovpn extension           #
##############################################

# hier die Remote IP-Adresse für TeleRouter eingeben
# here set the remote ip address of TeleRouter
# e.g. remote tprof2.dynalias.org
# replace xxxx with the ip address
remote xxxx

# hier den Port für OPenVPN eingeben
# here set port of TeleProf II standard is 1194
# if you change it, yopu have to change it on both sides
port 1194

# Specify that we are a client and that we
# will be pulling certain config file directives
# from the server.
client
pull

# Use the same setting as you are using on
# the server.
# On most systems, the VPN will not function
# unless you partially or fully disable
# the firewall for the TUN/TAP interface.
dev tun

# Windows needs the TAP-Win32 adapter name
# from the Network Connections panel
# if you have more than one.  On XP SP2,
# you may need to disable the firewall
# for the TAP adapter.
;dev-node MyTap

# Are we connecting to a TCP or
# UDP server?  Use the same setting as
# on the server.
proto udp
;proto tcp


explicit-exit-notify 3

# Keep trying indefinitely to resolve the
# host name of the OpenVPN server.  Very useful
# on machines which are not permanently connected
# to the internet such as laptops.
resolv-retry infinite
```

On windows, OpenVPN will install an adapter called TAP network adapter. This is a virtual network adapter. This adapter will get an ip-address from the IP pool if the connection was successfully. Have you switched the router mode on your TeleRouter device, so you will automatically be set to the same Ethernet IP network of TeleRouter the appropriate route.

Example:
IP-Pool: 10.111.111.0
IP-Pool-Mask: 255.255.255.0
Ethernet-IP TeleRouter: 192.168.100.1
Ethernet-IP-Mask: 255.255.255.0
IP-address of your PC: 192.168.1.1
address of your TAP-Adapters: 10.111.111.16

If the connection was successfully, all ip packets in the network 10.111.111.0 and 192.168.100.0 sent via the IP address of the TAP 10.111.111.16. If it lose the connection, this route is automatically

removed.

4.17 Using WinTELEPROF software over VPN

1. Connect VPN
2. Create an entry in your ip-address book with the first ip address of the IP pool of the TeleRouter (for example: 10.111.111.1): Creating and get in touch or on the ethernet ip address of the TeleRouter (192.168.100.1 for example)

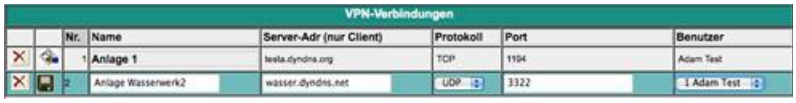
4.18 Configuration of the remote device

1. Connect VPN
2. Use the webbrowser with the first IP address of the IP pool of your TeleRouter (for example: 10.111.111.1) or call the ethernet ip address of the TeleRouter (for example: 192.168.100.1).

4.19 VPN-user

Here you can manage the users who are allowed to connect via OVPN.

4.20 VPN-connections



In the VPN connections may be similar to a phonebook machines to be managed. It becomes server address, protocol and port is entered. It will be a reference to a VPN user entered.

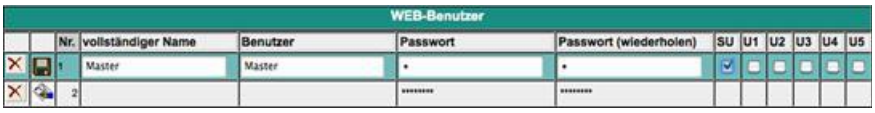
4.21 User management

In the user management you manage the users, with what right the WEB interface is allowed to be operated.

Moreover, the access data for user to be maintained, which is a dial-up connection (modem).

4.22 WEB-User

Here is the mask for entering the web interface user. Per users can be assigned various permissions. Generally, only a user with "SU" is allowed to make changes. U1 - U5 may only use the interface. In TeleRouter expansion modules have "U1" - "U5" more precisely specified servicing rights.



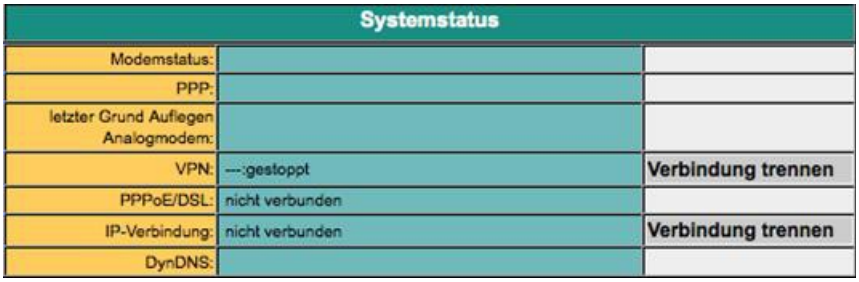
4.23 DFU Users

Here is the mask for entering the dial-up user interface. The user receives only the access when active is on "yes". Further is only available the addition of "dial in & out" or "dial out".

When a user dials in, all entries are reviewed to "dial in & out". Other users are denied the access. The assignment take place in the phone book.

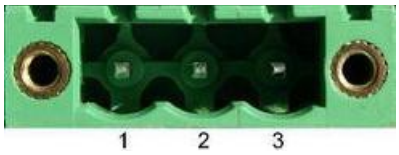
4.24 System status

Display the device status



5 Technical data

5.1 pin assignment power supply



Pin number	Short form	Designation	Direction
1	P24V	24V DC voltage	input
2	PE	earthing	input
3	M24V	mass	input

5.2 Pinning Ethernet

Pin no.	Short name	Notation	Direction
1	TX +	receive line +	Out
2	TX –	receive line –	Out
3	RX +	send line +	In
6	RX –	send line –	In

5.3 Pin assignment RJ12

Pin number	Short form	Designation
1	NC	not connected

2	NC	not connected
3	A	A-line
4	B	B-line
5	NC	not connected
6	NC	not connected

5.4 pin assignment ISDN

Pin no.	Short Form	name	direction
1	NC	Not connected	
2	NC	Not connected	
3	TX +	Send line +	Out
4	RX +	received line +	In
5	RX –	received line –	In
6	TX –	Send line –	Out
7	NC	Not connected	
8	NC	Not connected	

5.5 Special assignment ISDN-plug

for RS232-device

Pin nr.	Short name	Description	Direction
1	CTS	Clear To Send	Input
2	DSR	Data Set Ready	Input
3	RxD	Receive Data	Input
4	GND	Signal ground	
5	DCD	Data Carrier Detect	Input
6	TxD	Transmit Data	Output
7	DTR	Data Terminal Ready	Output
8	RTS	Request to Send	Output