

# TK500v2 Router Series

Version:  
v1.0.78

Date:  
07.06.2025



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|-------|--|-----|
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# 1 Introduction

## 1.1 Copyright Notice

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## 1.2 Trademark

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## 1.3 Legal Notice

The information in this document is subject to change without notice and is not a commitment by Welotec GmbH.

It is possible that this user manual contains technical or typographical errors. Corrections are made regularly without being pointed out in new versions.

## 1.4 Contact information for technical support

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## 1.5 Description

The TK500 series of routers for industrial applications provides a stable high-speed connection between remote devices and customer sites over LAN and (depending on model) WLAN or 2G/3G/4G networks. They can operate over a voltage range of 12 to 24 V DC and have a temperature range from -15°C to 70°C at a relative humidity of 95 %, ensuring high stability and reliability under severe conditions. The TK500 can be used at a workstation or mounted on a DIN rail.

TK500 series products support VPN (IPSec/PPTP/ L2TP/GRE/SSL VPN), which ensures secure connections between remote devices and customer locations.

## 1.6 Important safety note:

### 1.6.1 This product is not suitable for the following applications

- Areas where radio applications (such as cell phones) are not allowed
- Hospitals and other places where the use of cell phones is not permitted
- Gas stations, fuel depots and places where chemicals are stored
- Chemical plants or other places where there is a risk of explosion Metal surfaces that can weaken the radio signal level

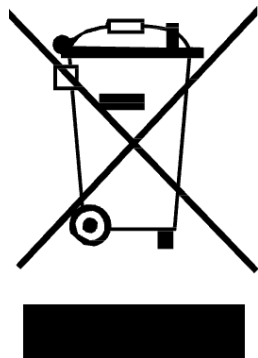
### 1.6.2 Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### 1.6.3 WEEE Notice

The European Directive on Waste Electrical and Electronic Equipment (WEEE), which became effective on February 13, 2003, has led to major changes regarding the reuse and recycling of electrical equipment.

The main objective of this directive is to prevent waste from electrical and electronic equipment and to promote reuse, recycling and other forms of recovery. The WEEE logo on the product or packaging indicates that the product must not be disposed of with other household waste. You are responsible for disposing of all discarded electrical and electronic equipment at appropriate collection points. Separate collection and sensible recycling of your electronic waste helps to use natural resources more sparingly. In addition, proper recycling of waste electrical and electronic equipment ensures human health and environmental protection.



For more information on disposal, recycling, and collection points for waste electrical and electronic equipment, contact your local municipal authority, waste disposal companies, the distributor, or the manufacturer of the equipment.

## 1.7 Content checklist

Each TK500 wireless router is delivered in a package with standard accessories. Additional accessories can be ordered. Check the contents of your package carefully and if anything is missing or damaged, contact your sales partner from Welotec GmbH.

## 1.7.1 Scope of delivery

### Standard accessories

| Accessory            | Quantity | Description                                       |
|----------------------|----------|---|
| TK500 router         | 1        | TK500 series industrial router                    |
| Network cable        | 1        | Network cable CAT5, 1.5 meters                    |
| Manual               | 1        | Data medium with manual                           |
| Licensing conditions | 1        | "Third Party Software Notifications and Licenses" |
| Power supply         |          |   |
| Terminal block       | 1        | 7-pole terminal block for power supply            |

### Components set (depending on model)

| Product              | Quantity | Description  |
|----------------------|----------|--|
| TK500 router         | 1        | TK500 series industrial router   |
| Network cable        | 1        | Network cable CAT5, 1.5 meters   |
| Mobile antenna       | 1        | 5 m magnetic base antenna (TK515L, TK515L-W, TK505U) 2G/3G/4G                                  |
| WLAN antenna         | 2        | Plug-on antennas (WLAN) (TK515L-W)   |
| Manual               | 1        | Data medium with manual  |
| Licensing conditions | 1        | "Third Party Software Notification and Licenses"   |
| Power supply         |          |  |
|                      |          | Table power supply, input 100-240 V AC, output 12 V DC (for TK5xx), incl. 7-pin terminal block |
|                      | 1        | Plug, European standard  |

## 1.8 Product information

### 1.8.1 Environmental conditions

Operating temperature: -15 to 70°C

Relative humidity during operation: 5 to 95 % non-condensing

Storage temperature: -40 to +85°C

## 1.8.2 Power supply

Power supply: 1 terminal strip (7-pin) incl. voltage socket and serial connection

Input voltage: 12 - 24 V DC

## 1.8.3 Physical properties

Housing: steel, protection class IP30

Weight: 450 g

Dimensions (mm): 35 x 127 x 108.2 mm



## 2 Regulatory Compliances

### 2.1 CE and UKCA Notice

#### 2.1.1 Complies with: RADIO EQUIPMENT DIRECTIVE 2014/53/EU and Radio Equipment Regulations 2017 (SI 2017 No. 1206)

**Article 3.1a Safety: Low Voltage Directive 2014/35/EU**

- EN 62368-1 :2020

**Article 3.1a Health:**

- EN 62311:2020

**Article 3.1b EMC: EMC Directive 2014/30/EU**

- EN 55032:2020
- EN 55035:2019
- EN 61000-3-2:2019
- EN 61000-3-3:2019

**Article 3.2 Radio:**

- ETSI EN 301 328 V2.2.2 (2019-07)
- ETSI EN 301 489-1 V2.2.3 (2019-11)
- ETSI EN 301 489-17 V3.2.4 (2020-09)
- ETSI EN 301 489-52 V1.2.1 (2021-11)
- ETSI EN 301 511 V12.5(2017-03)
- ETSI EN 908-1 V15.1 (2021-09)
- ETSI EN 908-2 V13.1.1 (2020-06)
- ETSI EN 908-13 V13.2.1 (2022-02)

**RoHS 2 Directive 2011/65/EU & 2015/863/EU**

The corresponding markings are located on the device:



## 3 Installation guide

### 3.1 Typical use

With routers of the TK500 series you can connect devices with Ethernet, WLAN or RS-232/485 via GPRS/HSUPA/UMTS/LTE to the Internet. To ensure security and uninterrupted access, the TK500 series supports VPN connections, enabling remote access and secure data transmission over the Internet.

### 3.2 Wiring diagram

| Interface                         | Description  |
|-----------------------------------|--|
| Power connection                  | 12-24 V DC   |
| Serial                            | RS 232, RS 485   |
| Ethernet ports                    | Five 10/100Base-TX RJ45-Ports                              |
| Antenna connection (mobile radio) | SMA (f)  |
| Antenna connection (WLAN)         | SMA-R (f)  |
| SIM card slot                     | Slot for inserting the SIM card (TK525L-W, TK525L, TK525U) |

#### 3.2.1 Connection of the serial interfaces and I/O's

Description of LED lights:

 = LED on
  = LED off
  = LED flashing

| Signal                    | On                | Off       | Flashing          |
|---------------------------|-------------------|-----------|-------------------|
| Power on                  | PWR, STATUS, WARN | ERR       |                   |
| Firmware execution        | PWR, WARN         | ERR       | STATUS            |
| Dial-up to the Internet   | PWR               | ERR       | STATUS, WARN      |
| Establishing a connection | PWR               | WARN, ERR | STATUS            |
| Update firmware           | PWR               |           | STATUS, WARN, ERR |
| Reset to factory settings | PWR               | WARN      | STATUS, ERR       |

## Description of the LED signals



Signal: 1-9

(Poor signal, the router can not work correctly, please check the antenna connection and the local signal strength of the mobile network.)



Signal: 10-19

(Router operates normally)



Signal: 20-31

(Perfect signal level)

## 3.3 Fast internet connection

### 3.3.1 Inserting the SIM card

Open the TK router SIM/UiM compartment at the top of the device and insert the SIM card into the card holder.

### 3.3.2 Antenna installation

After installing the TK500, connect the antenna and screw the antenna tight. Place the antenna where a good signal strength is achieved.



#### Note

Position and angle can affect signal strength.

### 3.3.3 Power supply

Connect the power supply included in the scope of delivery to the device and check whether the LED display for “Power” lights up. Contact Welotec technical support if no indicator lights up. You can configure the TK500 when the power indicator is flashing.

### 3.3.4 Connecting

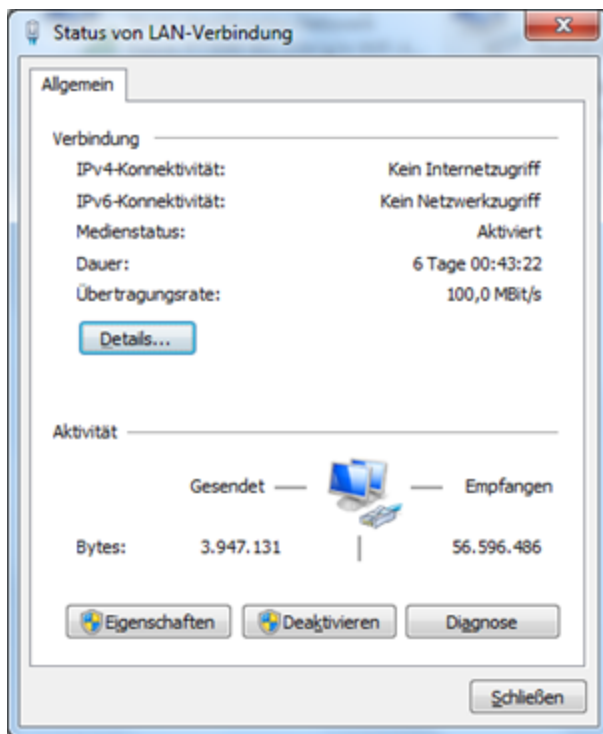
Connect the TK500 to the PC:

1. Connect the Ethernet cable of the TK500 to the PC.
2. Then one LED indicator of the RJ45 interface lights up green and the other indicators flash.

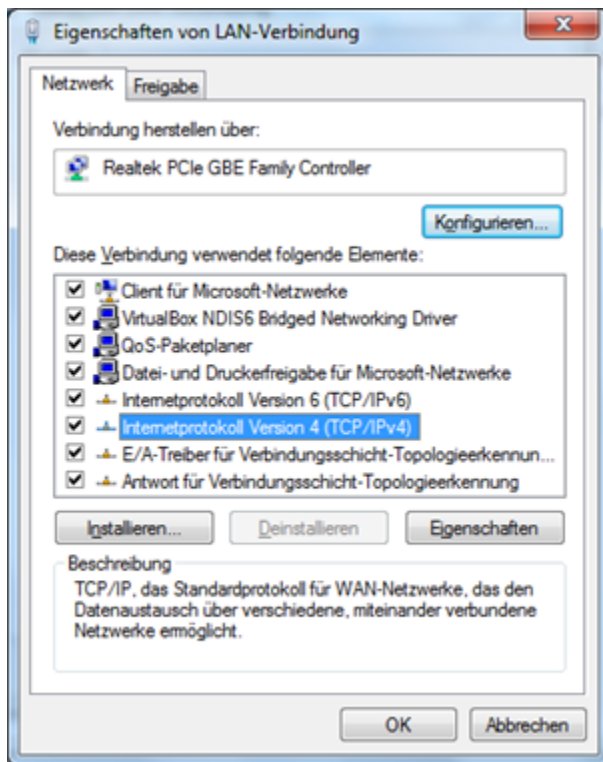
### 3.3.5 Connecting the TK router device to the PC for the first time

The TK500 router can assign IP addresses for the PC automatically. Set up the PC so that IP addresses are retrieved automatically via DHCP. (Basis is the Windows operating system):

1. Open the Control Panel, double-click the “*Network and Sharing Center*” icon to open the “*Network and Sharing Center*” screen.
2. Click “*LAN Connection*” and open the screen with the “*Status of LAN Connection*”:

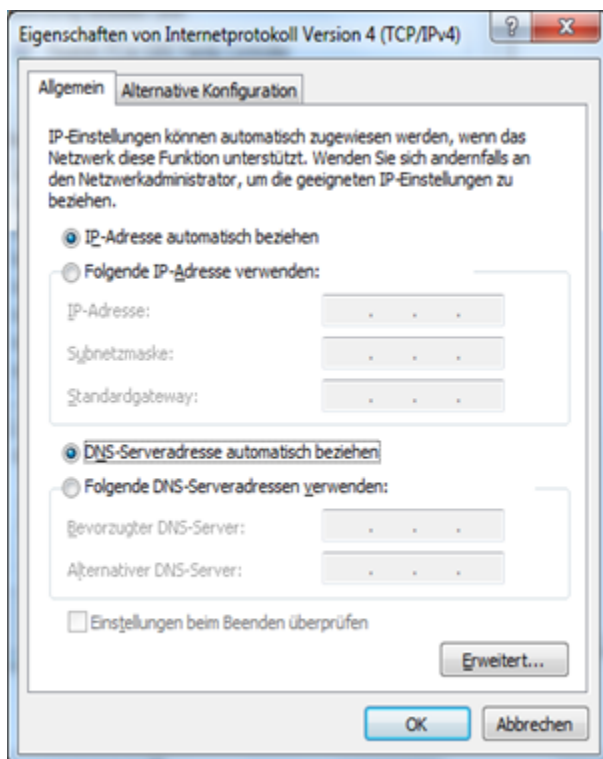


3. Click “*Properties*” and open the LAN connection properties screen:



4. Select "**Internet Protocol Version 4 (TCP/IPv4)**", click the "**Properties**" button, and check if your PC can obtain IP and DNS address automatically. (You can also set up the PC in the subnet: 192.168.2.0/24, e.g. IP: 192.168.2.10, netmask: 255.255.255.0 Default gateway: 192.168.2.1)

By clicking "**OK**", the TK router assigns an IP address to the PC: 192.168.2.X, as well as the gateway: 192.168.2.1 (the default address of the TK500).



After configuring the TCP/IP protocols, you can use the ping command to check whether the connection between

the PC and the router is established without errors. The following is an example of running the ping command under Windows 7:

Windows key+R -> Enter "cmd" -> press Enter -> Enter "Ping 192.168.2.1" -> press Enter With this display:

```
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. Alle Rechte vorbehalten.

C:\Users\>ping 192.168.2.1

Ping wird ausgeführt für 192.168.2.1 mit 32 Bytes Daten:
Antwort von 192.168.2.1: Bytes=32 Zeit=1ms TTL=64
Antwort von 192.168.2.1: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.2.1: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.2.1: Bytes=32 Zeit<1ms TTL=64

Ping-Statistik für 192.168.2.1:
    Pakete: Gesendet = 4, Empfangen = 4, Verloren = 0
    (0% Verlust),
Ca. Zeitangaben in Millisek.:
    Minimum = 0ms, Maximum = 1ms, Mittelwert = 0ms

C:\Users\>
```

The connection between the PC and the router has been established correctly.

The following example contains errors:

```
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. Alle Rechte vorbehalten.

C:\Users\>ping 192.168.2.1

Ping wird ausgeführt für 192.168.2.1 mit 32 Bytes Daten:
PING: Fehler bei der Übertragung. Allgemeiner Fehler.
PING: Fehler bei der Übertragung. Allgemeiner Fehler.
PING: Fehler bei der Übertragung. Allgemeiner Fehler.
PING: Fehler bei der Übertragung. Allgemeiner Fehler.

Ping-Statistik für 192.168.2.1:
    Pakete: Gesendet = 4, Empfangen = 0, Verloren = 4
    (100% Verlust),

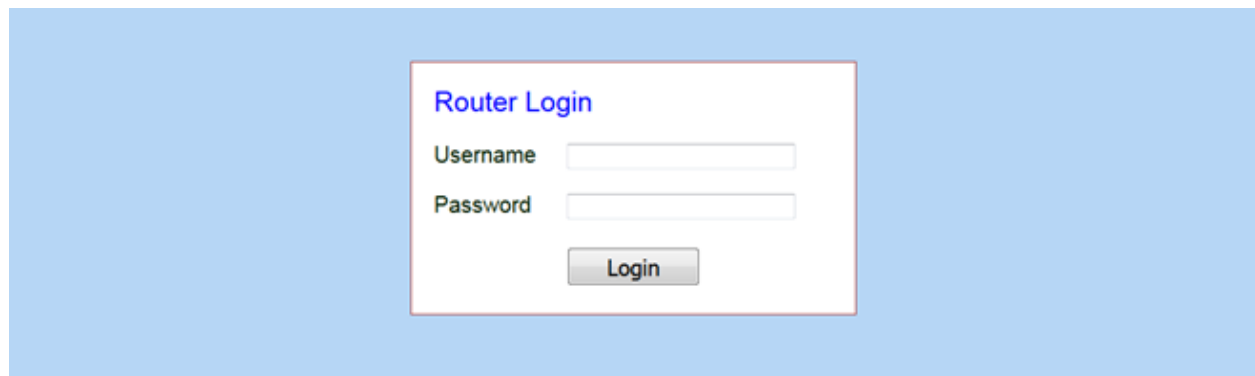
C:\Users\>
```

The connection is not working properly and you should go through the instructions again and check your settings.

### 3.3.6 Configuring the TK500 (Optional)

After you have performed the steps described in the previous chapter, you can configure the router:

1. Open any Internet browser (e.g. Google Chrome) and enter the default IP address of the router: <http://192.168.2.1>. The following login page pops up:



The image shows a web browser window with a light blue background. In the center, there is a white box with a red border titled "Router Login". Inside this box, there are two input fields: "Username" and "Password". Below these fields is a "Login" button. The "Username" field is empty, and the "Password" field is also empty.

Enter the user name (default: adm) and password (default: 123456), and then click “**Login**” to open the configuration screen.

## 2. Change the IP configuration:

If you want to set your own IP, follow the instructions below:

| System   | Network | Services                    | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|-----------------------------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change! |         |                             |          |     |     |       |             |        |
| <b>System Status</b>   |         |                             |          |     |     |       |             |        |
| Name   |         | Router                      |          |     |     |       |             |        |
| Serial Number  |         | RF6152104290001             |          |     |     |       |             |        |
| Description  |         | TK525L-W-v2                 |          |     |     |       |             |        |
| Current Version  |         | V1.0.10                     |          |     |     |       |             |        |
| Current Bootloader Version                                     |         | 1.1.3.r4955                 |          |     |     |       |             |        |
| Router Time  |         | 2021-09-24 15:47:02         |          |     |     |       |             |        |
| PC Time  |         | 2021-09-24 15:47:02         |          |     |     |       |             |        |
| Up time  |         | 0 day, 00:13:20             |          |     |     |       |             |        |
| CPU Load (1 / 5 / 15 mins)                                     |         | 0.03 / 0.03 / 0.03          |          |     |     |       |             |        |
| Memory consumption Total/Free                                  |         | 121.27MB / 94.93MB (78.28%) |          |     |     |       |             |        |

### 1. Click **Network > VLAN**.

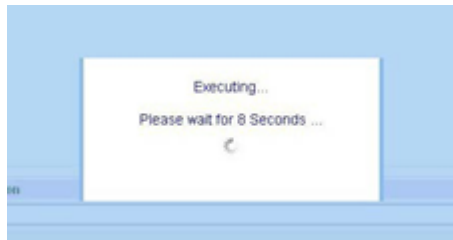
### 2. To add a VLAN ID, click “**Add**”.

| System   | Network | Services | Firewall | QoS  | VPN  | Tools | Application | Status |
|--|---------|----------|----------|------|--|-------|-------------|--------|
| Your password have security risk, please click here to change! |         |          |          |      |  |       |             |        |
| <b>VLAN</b>  |         |          |          |      |  |       |             |        |
| VLAN ID  | LAN1    | LAN2     | LAN3     | LAN4 | Primary IP/Netmask   |       |             |        |
| 1  | ✓       | ✓        | ✓        | ✓    | 192.168.2.1/255.255.255.0  |       |             |        |
|  |         |          |          |      | <input type="button" value="Add"/> <input type="button" value="Modify"/> <input type="button" value="Delete"/> |       |             |        |

For example, change the IP address to **192.168.1.254** and select the LAN ports to be assigned to this IP address.

| System   | Network              | Services   | Firewall | QoS                                 | VPN | Tools                               | Application | Status |            |         |                      |                      |
|--|----------------------|--|----------|-------------------------------------|-----|-------------------------------------|-------------|--------|------------|---------|----------------------|----------------------|
| Your password have security risk, please click here to change! |                      |  |          |                                     |     |                                     |             |        |            |         |                      |                      |
| <b>VLAN</b>  |                      |  |          |                                     |     |                                     |             |        |            |         |                      |                      |
| VLAN ID  |                      | <input type="text" value="2"/>   |          |                                     |     |                                     |             |        |            |         |                      |                      |
| <b>VLAN Virtual Interface</b>                                  |                      |  |          |                                     |     |                                     |             |        |            |         |                      |                      |
| Primary IP   |                      |  |          |                                     |     |                                     |             |        |            |         |                      |                      |
| IP Address   |                      | <input type="text" value="192.168.1.254"/>   |          |                                     |     |                                     |             |        |            |         |                      |                      |
| Netmask  |                      | <input type="text" value="255.255.255.0"/>   |          |                                     |     |                                     |             |        |            |         |                      |                      |
| MTU  |                      | <input type="text" value="1500"/>  |          |                                     |     |                                     |             |        |            |         |                      |                      |
| Secondary IP(s)  |                      |  |          |                                     |     |                                     |             |        |            |         |                      |                      |
|  |                      | <table border="1"> <thead> <tr> <th>IP Address</th> <th>Netmask</th> </tr> </thead> <tbody> <tr> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </tbody> </table> |          |                                     |     |                                     |             |        | IP Address | Netmask | <input type="text"/> | <input type="text"/> |
| IP Address   | Netmask              |  |          |                                     |     |                                     |             |        |            |         |                      |                      |
| <input type="text"/>   | <input type="text"/> |  |          |                                     |     |                                     |             |        |            |         |                      |                      |
|  |                      | <input type="button" value="Add"/>   |          |                                     |     |                                     |             |        |            |         |                      |                      |
| <b>VLAN Member Ports</b>                                       |                      |  |          |                                     |     |                                     |             |        |            |         |                      |                      |
| LAN1   |                      | LAN2   |          | LAN3                                |     | LAN4                                |             |        |            |         |                      |                      |
| <input checked="" type="checkbox"/>                            |                      | <input checked="" type="checkbox"/>  |          | <input checked="" type="checkbox"/> |     | <input checked="" type="checkbox"/> |             |        |            |         |                      |                      |
| <input type="button" value="Apply"/>                           |                      | <input type="button" value="Cancel"/>  |          | <input type="button" value="Back"/> |     |                                     |             |        |            |         |                      |                      |

3. Click “**Apply**” and the following screen will be displayed:



The IP address of the TK500 has been changed. In order for you to access the configuration page again the PC must be set up in the same subnet, for example: **192.168.1.10/24** - Then enter the changed IP address (**192.168.1.254**) in your browser.

### 3.3.7 Connecting the TK router to the Internet

Perform the following configuration steps to establish a connection between the TK500 and the Internet.

Click **Network > Cellular**, and enable the function by **Enable**:



System Network Services Firewall QoS VPN Tools Application Status

Your password have security risk, please click here to change!

**Cellular**

Enable ☒

Time schedule  Schedule Management

PPPoE Bridge ☐

Shared Connection(NAT) ☒

Default Route ☒

SIM1 Network Provider  Manage

Network Select Type

Static IP ☐

Connection Mode

Redial Interval  Seconds

Show Advanced Options ☐

**Profiles**

| Index | APN | Access Number | Authentication Type | Username | Password |
|-------|-----|---------------|---------------------|----------|----------|
| 1     |     | *99#          | Auto                |          |          |

Add

Apply Cancel

Check the entries and select a preset network provider under **SIM1 Network Provider**, or add a self-created profile of a provider:

You can obtain the APN, dial-in number, user name and password from your local network provider. Check with them for the details.

Via **Show Advanced Options** you can make further settings, such as the PIN code if it is set on the SIM card.

Show Advanced Options ☒

Dual SIM Enable ☐

Initial Commands

Binding ICCID

PIN Code

Dial Timeout  Seconds

MTU

MRU

TX Queue Length

Enable IP head compression ☒

Use default asyncmap ☐

Use Peer DNS ☒

Link Detection Interval  Seconds(0: disable)

Link Detection Max Retries

Debug ☐

Debug Modem ☐

Expert Options

ICMP Detection Mode

ICMP Detection Server

ICMP Detection Interval  Seconds

ICMP Detection Timeout  Seconds

ICMP Detection Retries

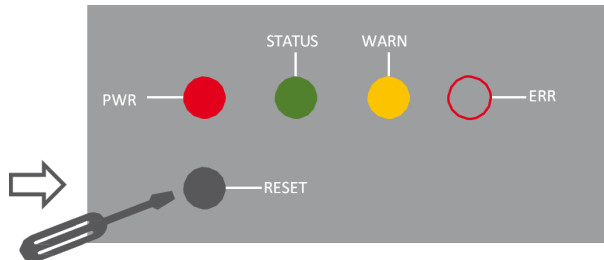
If you have set the correct configuration, the TK500 can now connect to the Internet. Open an Internet browser, type “[www.welotec.com](http://www.welotec.com)” and the Welotec website will open.

## 3.4 Reset to factory settings

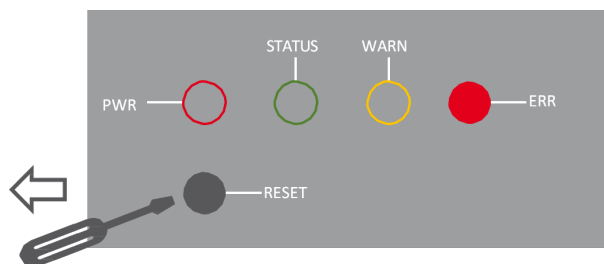
### 3.4.1 Hardware method

● = LED on ○ = LED off ⚡ = LED flashing

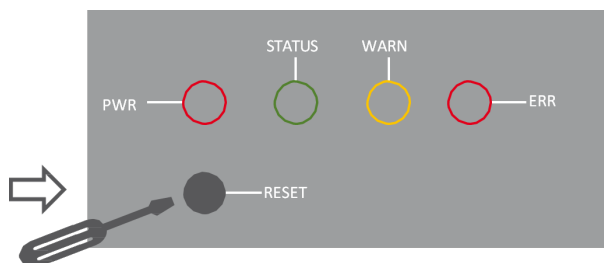
1. Press the **RESET** key while switching on the TK500:



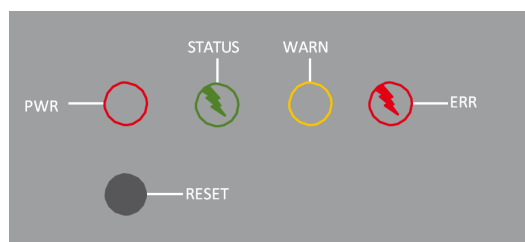
2. As soon as the ERROR LED lights up (approx. 10 seconds after switching on), release the **RESET** key:



3. After a few seconds, the ERROR LED light will stop illuminating. Now press the **RESET** key again:



4. The ERROR and STATUS LED lights will then flash, indicating that the reset to the default setting was successful.



#### Factory default settings:

- IP: 192.168.2.1

- Net mask: 255.255.255.0

- Username: adm

- Password: 123456

- Serial parameter: 115200-N-8-1

## 3.4.2 Web method

1.) Log in to the TK500 web-based user interface and select **System > Config Management**:



The screenshot shows the TK500 web-based user interface. At the top, there is a navigation bar with tabs: System, Network, Services, Firewall, QoS, VPN, Tools, Application, and Status. Below the navigation bar, a yellow warning message states: "Your password have security risk, please click here to change!". The main content area is titled "Config Management" and is divided into two sections: "Router Configuration" and "Network Provider (ISP)". Under "Router Configuration", there is a text input field containing "No file selected.", followed by "Browse...", "Import", and "Backup" buttons. Below this is a button labeled "Restore default configuration". Under "Network Provider (ISP)", there is another text input field containing "No file selected.", followed by "Browse...", "Import", and "Backup" buttons.

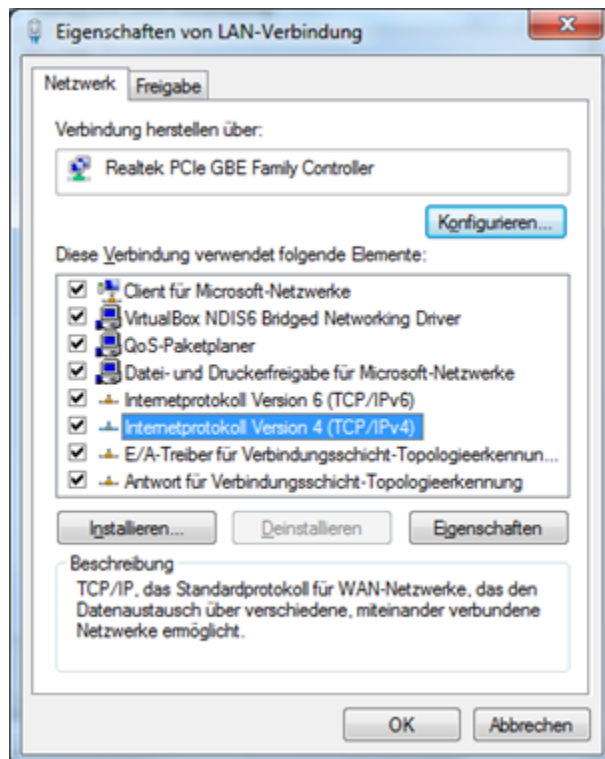
2.) Click **Restore default configuration** to reset the TK500 to its factory settings. After that the router will be re-booted.

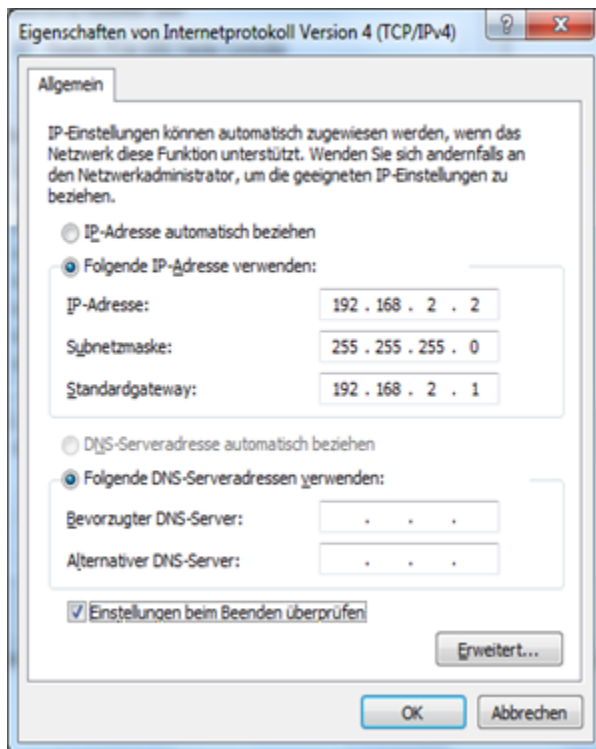
## 4 System

The TK-500 Router must be properly configured before use. This chapter describes the web-based configuration.

### 4.1 Preparation

First connect your devices to the TK500 via cable or hub (switch) and set the IP address for the PC and TK500 in the same subnet, e.g.: set the PC IP address to 192.168.2.2, netmask: **255.255.255.0**, gateway (default IP of TK500: **192.168.2.1**):





Open an Internet browser and enter the IP address of the TK500: <http://192.168.2.1> (default IP of the TK500).

On the following login page, you must log in as an administrator. Enter the user name and password (default: *adm/123456*).

Router Login

Username   
Password

Click on “**Login**” to open the configuration page.

| System   | Network | Services   | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|--|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change! |         |  |          |     |     |       |             |        |
| <b>System Status</b>   |         |  |          |     |     |       |             |        |
| Name   |         | Router   |          |     |     |       |             |        |
| Serial Number  |         | RL6151823435201  |          |     |     |       |             |        |
| Description  |         | TK525L   |          |     |     |       |             |        |
| Current Version  |         | 2.3.0.r4648  |          |     |     |       |             |        |
| Current Bootloader Version                                     |         | 1.1.3.r4560  |          |     |     |       |             |        |
| Router Time  |         | 2018-10-01 13:58:23  |          |     |     |       |             |        |
| PC Time  |         | 2018-10-01 13:58:24 <input type="button" value="Sync Time"/> |          |     |     |       |             |        |
| Up time  |         | 0 day, 00:08:19  |          |     |     |       |             |        |
| CPU Load (1 / 5 / 15 mins)                                     |         | 1.00 / 0.48 / 0.20   |          |     |     |       |             |        |
| Memory consumption   |         | 27.73MB / 7,140.00KB (25.14%)                                |          |     |     |       |             |        |
| Total/Free   |         |  |          |     |     |       |             |        |

## System

The system settings include the following ten areas: Basic Setup, Time, Serial Port, Admin Access, System Log, Config Management, Scheduler, Upgrade, Reboot and Logout.

| System            | Net |
|-------------------|-----|
| Basic Setup       |     |
| Time              |     |
| Serial Port       |     |
| Admin Access      |     |
| System Log        |     |
| Config Management |     |
| Scheduler         |     |
| Upgrade           |     |
| Reboot            |     |
| Logout            |     |

## 4.2 Basic Setup

In the Basic Setup you can change the language of the menu and the host name. This menu item can be accessed via **System > Basic Setup**.

| System   | Network | Services  | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|-----------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change! |         |           |          |     |     |       |             |        |
| <b>Basic Setup</b>   |         |           |          |     |     |       |             |        |
| Language   |         | English ▼ |          |     |     |       |             |        |
| Hostname   |         | Router    |          |     |     |       |             |        |
| Apply  |         | Cancel    |          |     |     |       |             |        |

| Parameter name | Description                         | Default | Example   |
|----------------|-------------------------------------|---------|-----------|
| Language       | Set language for configuration page | English | English   |
| Host Name      | Host name of the TK500              | Router  | My Router |

## 4.3 Time

In this menu item the system time of the router can be adjusted. It is also possible to set up a time server (NTP Time Server) to automatically keep the system time up to date.

System
Network
Services
Firewall
QoS
VPN
Tools
Application
Status

Your password have security risk, please click here to change!

Time

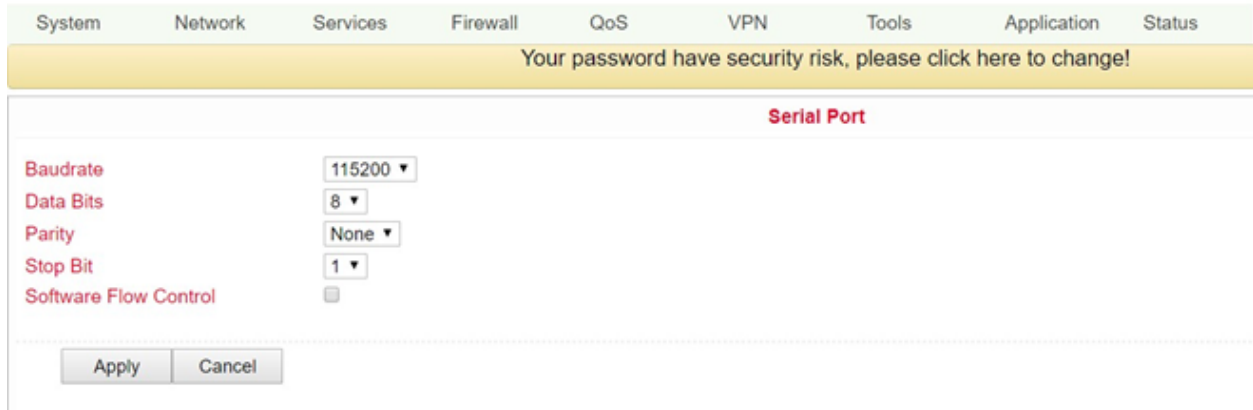
Router Time2018-10-01 14:05:36  
PC Time2018-10-01 14:05:37 Sync Time  
TimezoneUTC+01:00 France, Germany, Italy  
Auto Daylight Savings Time☒  
Auto Update TimeEvery 1 hour  
Trigger Connect On Demand☐  
NTP Time Servers0.de.pool.ntp.org  
1.de.pool.ntp.org  
2.de.pool.ntp.org

Apply
Cancel

| Name  | Description  | Default   |
|---|--|---|
| Router Time   | Router time  | 2017-08-01 16:00:00   |
| PC Time   | Time of the PC (or the time of the device connected to the router) | The Sync Time button allows you to synchronize the time with the connected device |
| Timezone  | Set time zone  | selectable time zone  |
| Auto Daylight Savings Time                                      | Automatic changeover: daylight saving time/winter time             | Disabled  |
| Auto Update Time  | Time of the automatic time update                                  | Disabled  |
| NTP Time Servers (after enabling the "Auto Update Time" option) | Setting for NTP time server (maximum three entries)                | pool.ntp.org  |

## 4.4 Serial Port

You can adjust the settings for the serial port of the router via the menu item **System > Serial Port**.



The screenshot shows the 'Serial Port' configuration page. At the top, there is a navigation bar with tabs: System, Network, Services, Firewall, QoS, VPN, Tools, Application, and Status. Below the navigation bar is a yellow warning message: 'Your password have security risk, please click here to change!'. The main content area is titled 'Serial Port' and contains the following settings:

- Baudrate: 115200
- Data Bits: 8
- Parity: None
- Stop Bit: 1
- Software Flow Control: ☐

At the bottom of the form, there are two buttons: 'Apply' and 'Cancel'.

| Name                  | Description                   | Default  |
|-----------------------|-------------------------------|----------|
| Baud Rate             | Serial baud rate              | 115200   |
| Data Bits             | Serial data bits              | 8        |
| Parity                | Set parity bit of serial data | None     |
| Stop Bit              | Set stop bit of serial data   | 1        |
| Software Flow Control | Software flow control         | Disabled |

## 4.5 Admin Access

In this area you can change or adjust important settings, such as the password of the administrator or the port assignment for access to the router. These settings can be reached via **System > Admin Access**.



## Username / Password

|                      |  |
|----------------------|--|
| Username             | <input type="text" value="adm"/>       |
| Old Password         | <input type="password" value="•••••"/> |
| New Password         | <input type="password"/>               |
| Confirm New Password | <input type="password"/>               |

## Management

| Enable                              | Service Type | Service Port                      | Local access                        | Remote access                       | Allowed addresses from WAN (Optional) | Description |
|-------------------------------------|--------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|-------------|
| <input checked="" type="checkbox"/> | HTTP         | <input type="text" value="80"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="text"/>                  |             |
| <input type="checkbox"/>            | HTTPS        | <input type="text" value="443"/>  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="text"/>                  |             |
| <input checked="" type="checkbox"/> | TELNET       | <input type="text" value="23"/>   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="text"/>                  |             |
| <input type="checkbox"/>            | SSHD         | <input type="text" value="22"/>   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="text"/>                  |             |
| <input type="checkbox"/>            | HTTP_API     | <input type="text" value="4444"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="text"/>                  |             |
| <input type="checkbox"/>            | Console      |                                   |                                     |                                     |                                       |             |

## Non-privileged users

| Username             | Password                 |
|----------------------|--------------------------|
| <input type="text"/> | <input type="password"/> |

## Other Parameters

Login timeout  Seconds

Apply

Cancel

| Name                                    | Description   | Default  |
|---|---|--|
| User-name/Password                      |   |  |
| Username                                | Username for login to the configuration page  | adm  |
| Old Password                            | To change the password, it is necessary to enter the old password   | 123456   |
| New Password                            | Enter new password  |  |
| Confirm New Password                    | Enter new password again  |  |
| Management                              |   |  |
| HTTP/HTTPS/TELNET/SSHD/HTTP_API/Console |   |  |
| Enable                                  | Select to enable  | Enabled  |
| Service Type                            | HTTP/HTTPS/TELNET/SSHD/HTTP_API/Console   | 80/443/23/22/4444/Blank  |
| Local Access                            | Enabled - Allow router to be managed via LAN (e.g.: HTTP).  | Enabled  |
| Remote Access                           | Enabled - Allow the TK500 to be managed over WAN (e.g.: HTTP).  | Enabled  |
| Allowed addresses from WAN (Optional)   | Sets the range of allowed IP addresses for WAN  | Servers for control services can be specified, such as 192.168.2.1/30 or 192.168.2.1 |
| Description                             | Describe management parameters (without effect on the TK500)  |  |
| Non-privileged users                    |   |  |
| Username                                | Create user names without administrator rights  |  |
| Password                                | Create password for user without administrator rights   |  |
| Other parameters                        |   |  |
| Login Timeout                           | Set log timeout, after this value connection with the configuration page is disconnected and you have to log in again | 500 Seconds  |

## 4.6 System Log

Setting options for logging log files. You can reach these via **System > System Log**.

| System   | Network | Services                            | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|-------------------------------------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change! |         |                                     |          |     |     |       |             |        |
| <b>System Log</b>  |         |                                     |          |     |     |       |             |        |
| Log to Remote System   |         | <input checked="" type="checkbox"/> |          |     |     |       |             |        |
| IP Address / Port(UDP)   |         | 192.168.2.254 : 514                 |          |     |     |       |             |        |
| Log to Console   |         | <input type="checkbox"/>            |          |     |     |       |             |        |
| Apply  |         | Cancel                              |          |     |     |       |             |        |

| Name                  | Description   | Default   |
|-----------------------|---|---|
| Log to Remote System  | Enable remote log server                              | Disabled (if enabled, IP address and port can be entered) |
| IP Address/Port (UDP) | Set IP address and port of the remote protocol server | Port: 514   |
| Log to Console        | Output of the log on the serial interface             | Disabled  |

## 4.7 Config Management

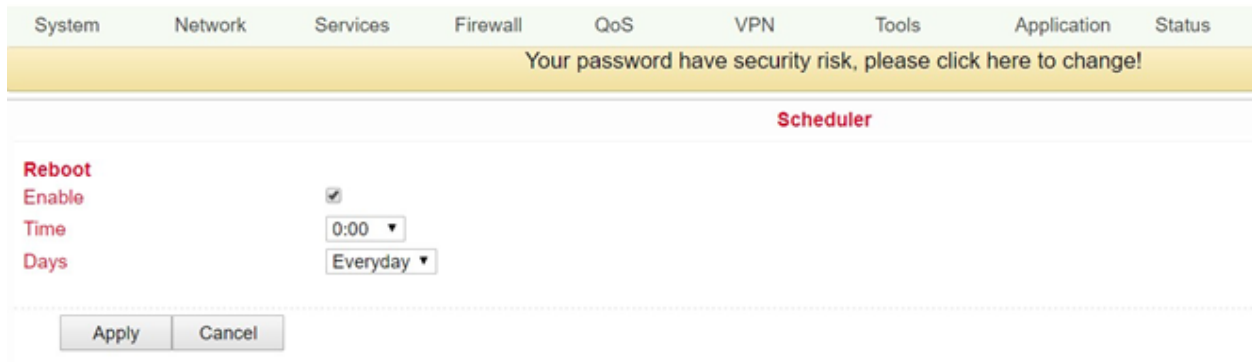
Backup and import of router configurations, as well as reset to factory settings of the router and backup or restore the provider data. You can reach this menu item via **System > Config Management**.

| System   | Network | Services | Firewall  | QoS | VPN    | Tools | Application | Status |
|--|---------|----------|-----------|-----|--------|-------|-------------|--------|
| Your password have security risk, please click here to change! |         |          |           |     |        |       |             |        |
| <b>Config Management</b>                                       |         |          |           |     |        |       |             |        |
| <b>Router Configuration</b>                                    |         |          |           |     |        |       |             |        |
| No file selected.  |         |          | Browse... |     | Import |       | Backup      |        |
| Restore default configuration                                  |         |          |           |     |        |       |             |        |
| <b>Network Provider (ISP)</b>                                  |         |          |           |     |        |       |             |        |
| No file selected.  |         |          | Browse... |     | Import |       | Backup      |        |

| Name                          | Description  |
|-------------------------------|--|
| Router Configuration          | Upload/save configuration file for import/backup   |
| Restore default configuration | Click to reset the TK500 (to activate the default configuration, the TK500 must be restarted). |
| Network Provider (ISP)        | To import or save APN, username, password and other parameters from traditional operator.      |
| Browse                        | Using the Browse button you can select the file with the settings to be uploaded via Import    |

## 4.8 Scheduler

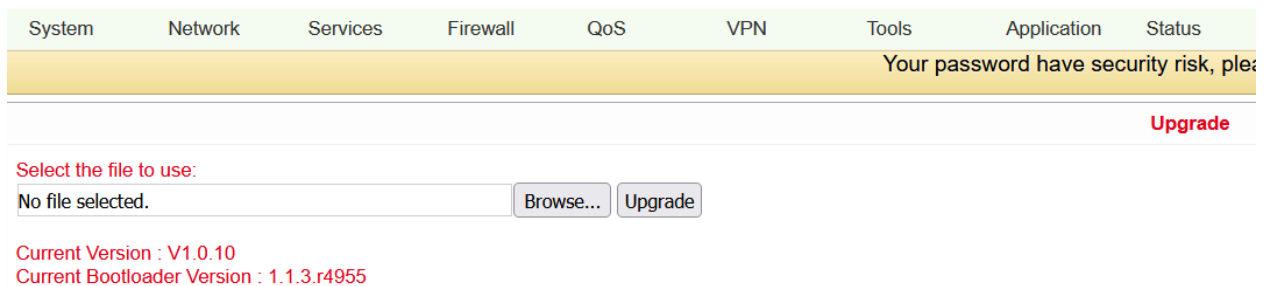
The scheduler is used to set the automatic reboot for the router. You can define the settings for this via **System > Scheduler**.



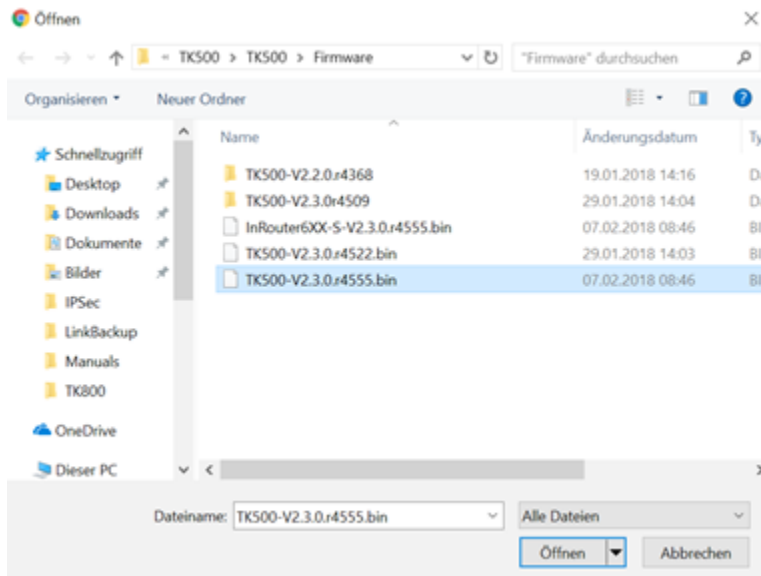
| Name   | Description                                      |
|--------|--|
| Enable | Switches the Auto Reboot on or off               |
| Time   | Time at which the TK500 router is to be rebooted |
| Days   | Everyday selection for daily restart             |

## 4.9 Upgrade

In this area, the router provides you with an interface for updating the firmware. To be reached via **System > Upgrade**.



To update the system, select the update file (e.g. TK500-V2.2.0v4xxx.bin) in your file system via the **Select\_file\_** button.



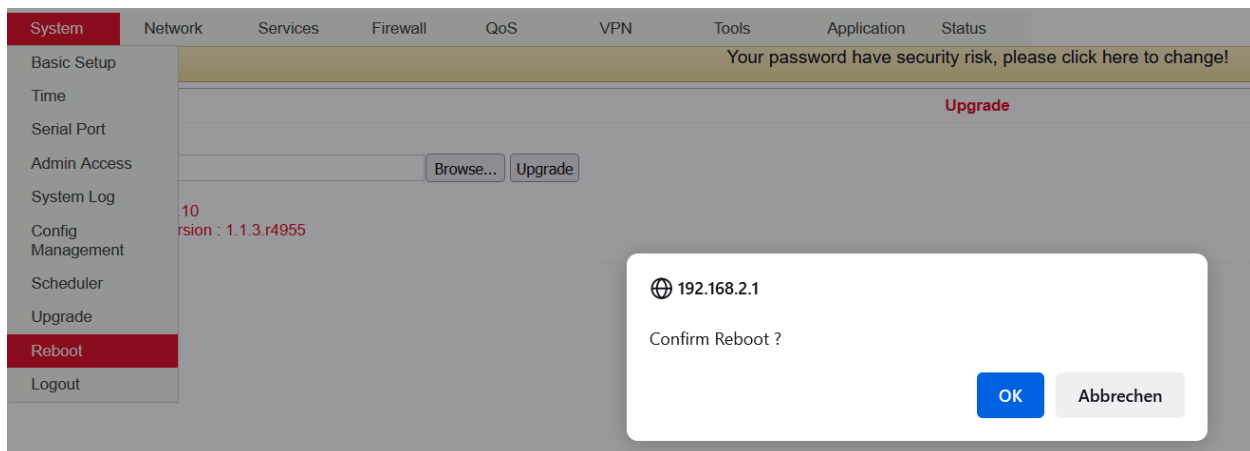
Click the “**Upgrade**” button and confirm the start of the upgrade



After successfully updating the firmware, click **Reboot** to restart the TK500.

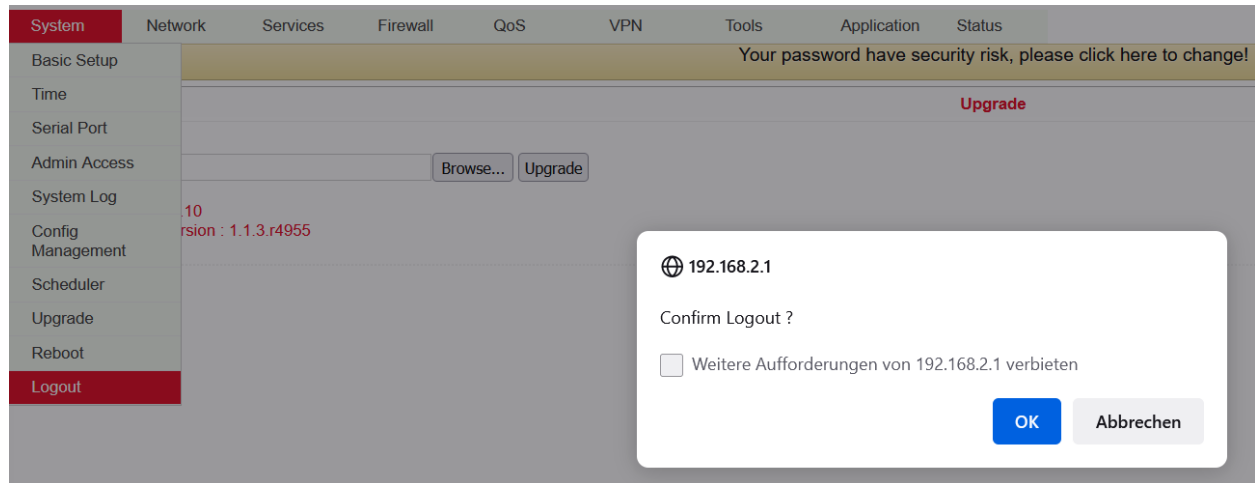
## 4.10 Reboot

If you need to reboot your router, select **System > Reboot**. Then click “**OK**” to reboot the system.



## 4.11 Logout

To log out of the system, click **System > Logout** and confirm the logout with “OK”.



# 5 Network

Use the network settings to configure Cellular, WAN, WAN(STA), VLAN, Switch WLAN Mode, WLAN Client, Link Backup, VRRP, IP Passthrough, Static Route, OSPF

## 5.1 Cellular

In this menu area you define and configure the dial-up of your router. Can be reached via **Network > Cellular**.

System Network Services Firewall QoS VPN Tools Application Status

Your password have security risk, please click [here](#) to change!

Cellular

**Enable** ☒

**Time schedule** ALL Schedule Management

**PPPoE Bridge** ☐

**Shared Connection(NAT)** ☒

**Default Route** ☒

**SIM1 Network Provider** T-Mobile (public IP) Manage

**Network Select Type** Auto

**Static IP** ☐

**Connection Mode** Always Online

**Redial Interval** 30 Seconds

**Show Advanced Options** ☐

**Profiles**

| Index | APN | Access Number | Authentication Type | Username | Password |
|-------|-----|---------------|---------------------|----------|----------|
| 1     |     | *99#          | Auto                |          |          |

Add

Apply Cancel

| Name                    | Description   | Default                    |
|-------------------------|---|----------------------------|
| Enable                  | Activates the dialup function   | Enabled                    |
| Time Schedule           | Set time for online and offline (see also 3.2.1.1)  | ALL                        |
| Shared Connection (NAT) | Enabled - device connected to router  | Enabled                    |
| Default Route           | Mobile radio interface as standard route to the Internet                                      | Enabled                    |
| Network Provider (ISP)  | Select local ISP, if not listed here, select "Custom"   | Custom                     |
| APN                     | APN parameters supplied by the provider   | internet.t-d1.de (Telekom) |
| Access Number           | Dial-up parameters provided by the local ISP  | *99***1#                   |
| Username                | Username provided by the provider   | tm                         |
| Password                | Password provided by the local ISP  | tm                         |
| Network Select Type     | Select mobile network type (2G, 3G, 4G only)  | Auto                       |
| Connection Mode         | Connection mode: Router is always online  | Always Online              |
| Redial Interval         | If dial-up fails, the TC router dials again after this interval                               | 30 Seconds                 |
| Show Advanced Options   | Allows configuring advanced options   | Disabled                   |
| PIN Code                | Field for the PIN number of the SIM card  | Blank                      |
| MTU                     | Set MTU (Maximum Transmission Unit)   | 1500                       |
| Authentication Type     | PAP, CHAP   | Auto                       |
| Use Peer DNS            | Enable this option to accept peer DNS   | Enabled                    |
| Link Detection Interval | Set interval for connection detection (0 = disabled)  | 55 Seconds                 |
| Debug                   | Enable debug mode   | Disabled                   |
| Debug Modem             | Enable Debug Modem  | Disabled                   |
| ICMP Detection Mode     | Monitor Traffic: Only when no data is flowing, a Keep Alive ping is sent at regular intervals | Monitor Traffic            |
| ICMP Detection Server   | Set server for ICMP detection; empty field means none is available                            | Blank                      |
| ICMP Detection Interval | Set interval for ICMP detection   | 30 Seconds                 |
| ICMP Detection Timeout  | Set timeout for ICMP detection (TK500 is restarted on ICMP timeout)                           | 20 Seconds                 |
| ICMP Detection Retries  | Set maximum number of retries if ICMP fails   | 5                          |



## 5.1.1 Schedule Management

Schedule management (next to “Time schedule”):

Enable

Time schedule



ALL ▾

Schedule Management

Here you can run your own dialup strategy, i.e. you can define here over three time ranges when the router should be online.

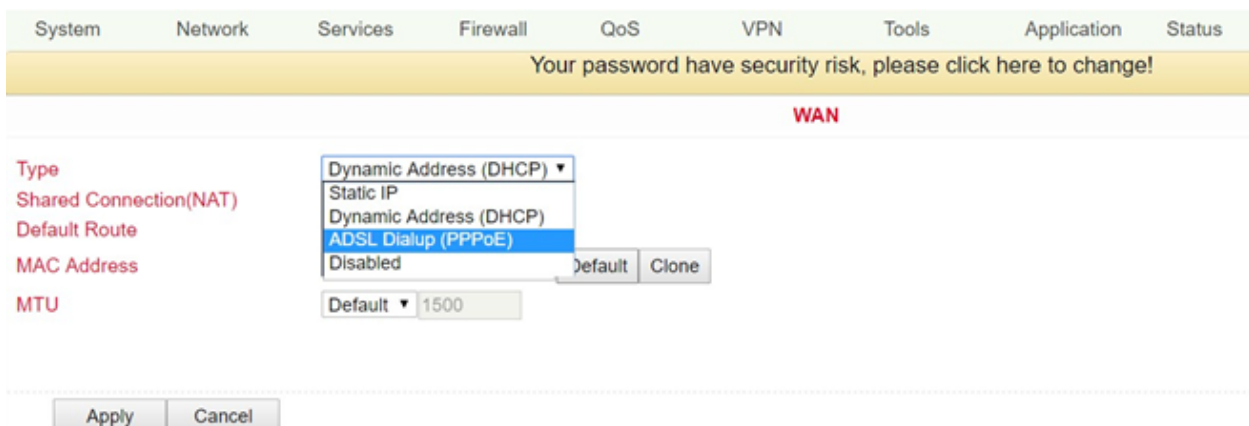


| Name         | Description            | Default     |
|--------------|------------------------|-------------|
| Name         | Name for the schedule  | Schedule_1  |
| Sunday       | Sunday                 | Blank       |
| Monday       | Monday                 | Enabled     |
| Tuesday      | Tuesday                | Enabled     |
| Wednesday    | Wednesday              | Enabled     |
| Thursday     | Thursday               | Enabled     |
| Friday       | Friday                 | Enabled     |
| Saturday     | Saturday               | Blank       |
| Time Range 1 | Set time range 1       | 9:00-12:00  |
| Time Range 2 | Set time range 2       | 14:00-18:00 |
| Time Range 3 | Set time range 3       | 0:00-0:00   |
| Description  | Describe configuration | Blank       |

You can also create multiple schedules if, for example, different working hours apply on one working day.

## 5.2 WAN

Here you can set up a new WAN (Wide Area Network). To be reached via **Network > WAN**.



On this page the type of the WAN port can be set:

| Name | Description  | Default  |
|------|--|----------|
| Type | Static IPDynamic Address(DHCP)ADSL Dialup(PPPoE)Disabled | Disabled |

Only one WAN type can be enabled at a time. Enabling one type disables another.

## 5.2.1 Static IP

System
Network
Services
Firewall
QoS
VPN
Tools
Application
Status

Your password have security risk, please click here to change!

WAN

Type
Static IP

Shared Connection(NAT)
☒

Default Route
☒

MAC Address
00:18:05:0C:C3:9B
Default
Clone

IP Address
192.168.2.254

Netmask
255.255.255.0

Gateway
192.168.2.1

MTU
Default
1500

Multi-IP Settings

| IP Address | Netmask | Description |
|------------|---------|-------------|
|            |         |             |

Apply
Cancel

| Name  | Description  | Default        |
|---|--|----------------|
| Type  | Static IP  | Dis-abled      |
| Shared Connection (NAT)   | Enabled - local device connected to router can access the Internet                       | Enabled        |
| Default Route   | Mobile radio interface as standard route to the Internet                                 | Enabled        |
| MAC Address   | Set MAC address (button Default = standard, Clone = newly created MAC address)           | Default        |
| IP Address  | Set IP address for WAN port  | 192.168.1.29   |
| Netmask   | Set netmask for WAN port   | 255.255.255.0  |
| Gateway   | Set WAN gateway  | 192.168.1.1    |
| MTU   | Set the maximum transmission unit (MTU), the options "Default" and "Manual" are possible | Default = 1500 |
| "Multi-IP Settings" (a maximum of 8 additional IP addresses can be set) |  |                |
| IP Address  | Set another IP address for LAN   | Blank          |
| Netmask   | Set netmask  | Blank          |
| Description   | Describe settings  | Blank          |

## 5.2.2 Dynamic Address (DHCP)

System
Network
Services
Firewall
QoS
VPN
Tools
Application
Status

Your password have security risk, please click here to change!

WAN

Type
Dynamic Address (DHCP)

Shared Connection(NAT)
☒

Default Route
☒

MAC Address
00:18:05:0C:C3:9B
Default
Clone

MTU
Default
1500

Apply
Cancel

| Name                   | Description  | Default        |
|------------------------|--|----------------|
| Type                   | Dynamic Address (DHCP)   |                |
| Share Connection (NAT) | Enabled - local device connected to router can access the Internet                       | Enabled        |
| Default Route          | Mobile radio interface as standard route to the Internet                                 | Enabled        |
| MAC Address            | Set MAC address  |                |
| MTU                    | Set the maximum transmission unit (MTU), the options "Default" and "Manual" are possible | Default = 1500 |

## 5.2.3 ADSL Dialup (PPPoE)

| System   | Network                             | Services | Firewall | QoS | VPN   | Tools | Application | Status |
|--|-------------------------------------|----------|----------|-----|-------|-------|-------------|--------|
| Your password have security risk, please click here to change!             |                                     |          |          |     |       |       |             |        |
| <b>WAN</b>   |                                     |          |          |     |       |       |             |        |
| Type   | ADSL Dialup (PPPoE) ▼               |          |          |     |       |       |             |        |
| Shared Connection(NAT)   | <input checked="" type="checkbox"/> |          |          |     |       |       |             |        |
| Default Route  | <input checked="" type="checkbox"/> |          |          |     |       |       |             |        |
| MAC Address  | 00:18:05:0C:C3:9B                   |          | Default  |     | Clone |       |             |        |
| MTU  | Default ▼                           |          | 1492     |     |       |       |             |        |
| <b>ADSL Dialup (PPPoE) Settings</b>  |                                     |          |          |     |       |       |             |        |
| Username   | <input type="text"/>                |          |          |     |       |       |             |        |
| Password   | <input type="password"/>            |          |          |     |       |       |             |        |
| Static IP  | <input type="checkbox"/>            |          |          |     |       |       |             |        |
| Connection Mode  | Always Online ▼                     |          |          |     |       |       |             |        |
| Show Advanced Options  | <input checked="" type="checkbox"/> |          |          |     |       |       |             |        |
| Service Name   | <input type="text"/>                |          |          |     |       |       |             |        |
| TX Queue Length  | <input type="text" value="3"/>      |          |          |     |       |       |             |        |
| Enable IP head compression   | <input type="checkbox"/>            |          |          |     |       |       |             |        |
| Use Peer DNS   | <input checked="" type="checkbox"/> |          |          |     |       |       |             |        |
| Link Detection Interval  | <input type="text" value="55"/>     |          | Seconds  |     |       |       |             |        |
| Link Detection Max Retries   | <input type="text" value="10"/>     |          |          |     |       |       |             |        |
| Debug  | <input type="checkbox"/>            |          |          |     |       |       |             |        |
| Expert Options   | <input type="text"/>                |          |          |     |       |       |             |        |
| ICMP Detection Server  | <input type="text"/>                |          |          |     |       |       |             |        |
| ICMP Detection Interval  | <input type="text" value="30"/>     |          | Seconds  |     |       |       |             |        |
| ICMP Detection Timeout   | <input type="text" value="20"/>     |          | Seconds  |     |       |       |             |        |
| ICMP Detection Retries   | <input type="text" value="3"/>      |          |          |     |       |       |             |        |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> |                                     |          |          |     |       |       |             |        |

| Name                                      | Description  | Default        |
|---|--|----------------|
| Type                                      | ADSL Dialup (PPPoE)  |                |
| Share Connection (NAT)                    | Enabled - local device connected to router can access the Internet                       | Enabled        |
| Default Route                             | Mobile radio interface as standard route to the Internet                                 | Enabled        |
| MAC Address                               | Set MAC address  |                |
| MTU                                       | Set the maximum transmission unit (MTU), the options "Default" and "Manual" are possible | Default = 1492 |
| ADSL Dialup (PPPoE) Settings              |  |                |
| Username                                  | Set user name to dial in   | Blank          |
| Password                                  | Set password to dial in  | Blank          |
| Static IP                                 | Enable static IP addresses   | Disabled       |
| Connection Mode                           | Set connection mode ("Connect on Demand"/"Always On-line"/"Manual")                      | Always Online  |
| Show Advanced Options/erweiterte Optionen |  |                |
| Show advanced options                     | Enable advanced configuration  | Disabled       |
| Service Name                              | Here you can assign a name for the service   | Blank          |
| TX Queue Length                           | Set the length of the transfer queue   | 3              |
| Enable IP head compression                | Click to enable IP header compression  | Blank          |
| User Peer DNS                             | Enable peer DNS for users  | Disabled       |
| Link Detection Interval                   | Set interval for connection detection  | 55 Seconds     |
| Link Detection Max Retries                | Set maximum number of repetitions for connection detection                               | 10 (times)     |
| Debug                                     | Select to enable debug mode  | Disabled       |
| Expert Options                            | Set expert parameters  | Blank          |
| ICMP Detection Server                     | Set server for ICMP detection  | Blank          |
| ICMP Detection Intervall                  | Set time for ICMP detection  | 30             |
| ICMP Detection Timeout                    | Set timeout for ICMP detection   | 3              |
| ICMP Detection Retries                    | Set maximum number of retries for ICMP detection   | 3              |

## 5.3 WAN(STA)

Under this menu item **Network > WAN(STA)** you can configure the TK500 as a WAN station. The settings in this menu item are the same as those in the WAN settings.

| System  | Network               | Services | Firewall | QoS | VPN | Tools | Status |
|---|-----------------------|----------|----------|-----|-----|-------|--------|
| <b>WAN(STA)</b>                                 |                       |          |          |     |     |       |        |
| Type  | <div>Disabled ▼</div> |          |          |     |     |       |        |
| <div> <div>Apply</div> <div>Cancel</div> </div> |                       |          |          |     |     |       |        |

## 5.4 VLAN

A Virtual Local area Network (VLAN) is a logical subnet within a switch or an entire physical network. A VLAN separates physical networks into subnets by ensuring that VLAN-capable switches do not forward the frames (data packets) of one VLAN to another VLAN. This happens even though the subnets may be connected to common switches.

### 5.4.1 VLAN table

In the VLAN table you can change the assignment of VLANs to FastEthernet ports and create new VLANs.

| System   | Network | Services | Firewall | QoS  | VPN                       | Tools  | Application |
|--|---------|----------|----------|------|---------------------------|--------|-------------|
| Your password have security risk, please click here to change! |         |          |          |      |                           |        |             |
| <b>VLAN</b>  |         |          |          |      |                           |        |             |
| VLAN ID  | LAN1    | LAN2     | LAN3     | LAN4 | Primary IP/Netmask        |        |             |
| 1  | ✓       | ✓        | ✓        | ✓    | 192.168.2.1/255.255.255.0 |        |             |
|  |         |          |          |      | Add                       | Modify | Delete      |

### 5.4.2 Port Mode

In the Port Mode menu, different VLAN IDs can be assigned to the network ports FastEthernet LAN1 to LAN4.

## VLAN

### Port Mode

MAC Address

| Port | Enable                              | Speed Duplex       | Mode     | Native VLAN                    |
|------|-------------------------------------|--------------------|----------|--------------------------------|
| LAN1 | <input checked="" type="checkbox"/> | Auto Negotiation ▾ | Access ▾ | <input type="text" value="1"/> |
| LAN2 | <input checked="" type="checkbox"/> | Auto Negotiation ▾ | Access ▾ | <input type="text" value="1"/> |
| LAN3 | <input checked="" type="checkbox"/> | Auto Negotiation ▾ | Access ▾ | <input type="text" value="1"/> |
| LAN4 | <input checked="" type="checkbox"/> | Auto Negotiation ▾ | Access ▾ | <input type="text" value="1"/> |

**NOTE:**  
Native VLAN is only valid in trunking mode



The options Access and Trunk are available for the FastEthernet ports. In Access Mode, VLAN1 is always selected. In Trunk Mode you can assign VLAN IDs between 1-4000, which you have created before, to the FastEthernet ports.

## 5.5 Switch WLAN Mode

Settings for the WLAN type can be made here. A distinction is made between Access Point (AP) and Station (STA). This can be accessed under *Network > Switch WLAN Mode*.

| System                               | Network | Services                              | Firewall | QoS | VPN | Tools | Status |
|--------------------------------------|---------|---------------------------------------|----------|-----|-----|-------|--------|
| <b>Switch WLAN Mode</b>              |         |                                       |          |     |     |       |        |
| WLAN Type                            |         | AP ▾ (*Reboot to take effect)         |          |     |     |       |        |
| <input type="button" value="Apply"/> |         | <input type="button" value="Cancel"/> |          |     |     |       |        |

| Name | Description       | Default |
|------|-------------------|---------|
| AP   | Access Point Mode | AP      |
| STA  | Client Mode       |         |

If **WLAN TYPE STA** (for station) is selected, the menu under Network changes. It is then possible to configure **WAN(STA)** under 3.2.3 and to set up only one client for an existing WLAN under 3.2.6.a **WLAN Client**.

## 5.6 WLAN Client

If the item *STA* was selected as WLAN type when configuring the *Switch WLAN Mode* (see 3.2.6.), it is no longer possible to configure a WLAN. You can then only configure the TK 500 as a WLAN client. This then works under *Network > WLAN Client*.

| System  | Network | Services                 | Firewall | QoS | VPN | Tools | Status |
|---|---------|--------------------------|----------|-----|-----|-------|--------|
| <b>WLAN Client</b>                              |         |                          |          |     |     |       |        |
| Enable  |         | <input type="checkbox"/> |          |     |     |       |        |
| <div> <div>Apply</div> <div>Cancel</div> </div> |         |                          |          |     |     |       |        |

To configure the router as a WLAN client, please click Enable.

| System  | Network | Services                            | Firewall | QoS | VPN | Tools | Status |
|---|---------|-------------------------------------|----------|-----|-----|-------|--------|
| <b>WLAN Client</b>                              |         |                                     |          |     |     |       |        |
| Enable  |         | <input checked="" type="checkbox"/> |          |     |     |       |        |
| Mode  |         | 802.11b/g/n ▼                       |          |     |     |       |        |
| SSID  |         | welotec                             |          |     |     |       |        |
| Auth Mode                                       |         | WPA2-PSK ▼                          |          |     |     |       |        |
| Encryption Method                               |         | AES ▼                               |          |     |     |       |        |
| WPA/WPA2 PSK                                    |         | *****                               |          |     |     |       |        |
| <div> <div>Apply</div> <div>Cancel</div> </div> |         |                                     |          |     |     |       |        |

Now enter the data to connect the TK500 to an existing WLAN.

## 5.7 Link Backup

This option secures connections between wireless WAN and Ethernet WAN. If one WAN fails, the TK500 automatically uses the other. You can configure this under *Network > Link Backup*.



[Link Backup](#)

Enable ☒  
 Backup Mode   
 Main Link   
 ICMP Detection Server   
 Backup Link   
 ICMP Detection Interval  Seconds  
 ICMP Detection Timeout  Seconds  
 ICMP Detection Retries   
 Restart Interface When ICMP Failed ☐

| Name                    | Description   | Default     |
|-------------------------|---|-------------|
| Enable                  | Activate the service for connection backup                                      | Disabled    |
| Main Link               | Selection of WAN, dialup and WAN(STA) as main WAN possible                      | WAN         |
| ICMP Detection Server   | ICMP can ensure a connection to a specific destination                          | Blank       |
| ICMP Detection Interval | Time interval between ICMP packets  | 10          |
| ICMP Detection Timeout  | Timeout for the individual ICMP packets   | 3 (Seconds) |
| ICMP Detection Retries  | If no retry of ICMP detection was successful, the backup connection is selected | 3           |
| Backup Link             | Select backup connection  | Dialup      |
| Backup Mode             | Hot Backup / Cold Backup  | Hot Backup  |

## 5.8 VRRP

The Virtual Router Redundancy Protocol (VRRP) is a method for increasing the availability of important gateways in local networks by means of redundant routers. Several physical routers are combined into a logical group. This group of routers now presents itself in the network as a logical virtual router. For this purpose, the logical router is assigned a virtual IP address and a virtual MAC address. One of the routers within the group is defined as the virtual master router, which then binds the virtual MAC address and the virtual IP address to its network interface and informs the other routers of the group, which act as virtual backup routers. You can set up this function under **Services > VRRP**.

| System   | Network | Services | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|----------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change!   |         |          |          |     |     |       |             |        |
| <b>VRRP</b>  |         |          |          |     |     |       |             |        |
| <div> <div>Enable VRRP-I</div> <div> <input checked="" type="checkbox"/> </div> </div> <div> <div>Group ID</div> <div>1</div> </div> <div> <div>Priority</div> <div>20 (254:highest)</div> </div> <div> <div>Advertisement Interval</div> <div>60 Seconds</div> </div> <div> <div>Virtual IP</div> <div></div> </div> <div> <div>Authentication Type</div> <div>None</div> </div> <div> <div>Monitor</div> <div>None</div> </div> <div> <div>Enable VRRP-II</div> <div> <input checked="" type="checkbox"/> </div> </div> <div> <div>Group ID</div> <div>2</div> </div> <div> <div>Priority</div> <div>10 (254:highest)</div> </div> <div> <div>Advertisement Interval</div> <div>60 Seconds</div> </div> <div> <div>Virtual IP</div> <div></div> </div> <div> <div>Authentication Type</div> <div>None</div> </div> <div> <div>Monitor</div> <div>None</div> </div> |         |          |          |     |     |       |             |        |
| <div> <div>Apply</div> <div>Cancel</div> </div>  |         |          |          |     |     |       |             |        |

The TK500 series offers the possibility to create two different VRRP (VRRP I and VRRP II) groups.

| Name                   | Description                                  | Default  |
|------------------------|--|--|
| Enable VRRP-I          | Select to activate VRRP                      | Disabled   |
| Group ID               | Select group ID for router (range 1-255)     | 1  |
| Priority               | Select priority for router (range 1 - 254)   | 20 (the larger the number, the higher the priority)                      |
| Advertisement Interval | Set advertisement interval                   | 60 Seconds   |
| Virtual IP             | Set virtual IP for the group                 | Blank  |
| Authentication Type    | Optional: Typ „None/Password Authentication“ | None. If Password Authentication is selected, a password can be assigned |
| Virtual MAC            | Virtual MAC address                          | Disabled   |
| Monitor                | Checking the WAN connection                  | None   |
| Enable VRRP-II         | Select to activate VRRP                      | Disabled   |
| Group ID               | Select group ID for router (range 1-255)     | 2  |
| Priority               | Select priority for router (range 1 - 254)   | 10 (the larger the number, the higher the priority)                      |
| Advertisement Interval | Set advertisement interval                   | 60 Seconds   |
| Virtual IP             | Set virtual IP for the 2nd group             | Blank  |
| Authentication Type    | Optional: Typ „None/Password Authentication“ | None. If Password Authentication is selected, a password can be assigned |
| Virtual MAC            | Virtual MAC address                          | Disabled   |
| Monitor                | Checking the WAN connection                  | None   |

## 5.9 IP Passthrough

Here you can assign the WAN IP to a device connected to a LAN port.

System
Network
Services
Firewall
QoS
VPN
Tools

Your password have security risk, please click here to change!

IP Passthrough

Enable IP Passthrough

☒

IP Passthrough Mode

DHCP Dynamic

DHCP Lease

2

Minutes

Apply

Cancel

Only one device can obtain this IP address and access the Internet. The LAN port should be of the Static type. The function does not work with a link backup.

## 5.10 Static Route

Here it is possible to add static routes. Static routes provide your router with additional routing information. Under normal circumstances, the router has sufficient information when configured for Internet access, and no additional static routes need to be configured. Static routes need to be set only in exceptional circumstances, such as when your network contains multiple routers or IP subnets. You can add static routes under **Network > Static Route** by clicking the Add button.

System
Network
Services
Firewall
QoS
VPN
Tools
Application
Status

Your password have security risk, please click here to change!

Static Route

| Destination | Netmask       | Gateway | Interface | Description |
|-------------|---------------|---------|-----------|-------------|
| 0.0.0.0     | 255.255.255.0 | 0.0.0.0 |           |             |

Apply

Cancel

| Name        | Description                                 | Default       |
|-------------|---|---------------|
| Destination | Set IP address of the destination           | Blank         |
| Netmask     | Set subnet mask of the destination          | 255.255.255.0 |
| Gateway     | Set gateway of the destination              | Blank         |
| Interface   | Optional LAN/WAN port access to target      | Blank         |
| Description | Freely selectable name for the static route | Blank         |

## 5.11 OSPF

Open Shortest Path First refers to a link-state routing protocol developed by the IETF.

This is a protocol for dynamic routing in IP networks. Dynamic routing detects changes in the network independently by the routers exchanging information with each other. The routing tables adapt dynamically to the respective situation.

Optimal routes to a destination can be determined based on various properties and metrics such as the number of hops, the bandwidth, the utilization of a link or configured costs. Failures of individual links are detected and alternative paths are calculated within a short time.

| System   | Network                                | Services                        | Firewall                        | QoS                                | VPN                              | Tools                              | Application                        | Status               |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
|--|--|---------------------------------|---------------------------------|------------------------------------|----------------------------------|------------------------------------|------------------------------------|----------------------|------------------------------------|-------------------|----------------|----------------|----------------------|----------------------|--------------------------|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------|----------------------------------|------------------------------------|--------------------------|
| Your password have security risk, please click here to change!   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>OSPF</b>  |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>Enable</b><br><input checked="" type="checkbox"/>   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>Router ID</b><br><input type="text"/>   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>Route Advanced Options</b><br><input checked="" type="checkbox"/>   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>ABR Type</b><br><input type="text" value="cisco"/>  |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>RFC1583 Compatibility</b><br><input type="checkbox"/>   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>OSPF Opaque-LSA</b><br><input type="checkbox"/>   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>SPF Delay Time</b><br><input type="text" value="200"/> mseconds   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>SPF Initial-holdtime</b><br><input type="text" value="1000"/> mseconds  |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>SPF Max-holdtime</b><br><input type="text" value="10000"/> mseconds   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>Reference Bandwidth</b><br><input type="text" value="100"/>   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>User Commands</b><br><input type="text"/>   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>Network</b>   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <table border="1"> <thead> <tr> <th>IP Address</th> <th>Netmask</th> <th>Area ID</th> </tr> </thead> <tbody> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </tbody> </table>  |  |                                 | IP Address                      | Netmask                            | Area ID                          | <input type="text"/>               | <input type="text"/>               | <input type="text"/> | <input type="button" value="Add"/> |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| IP Address   | Netmask                                | Area ID                         |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <input type="text"/>   | <input type="text"/>                   | <input type="text"/>            |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>Interface</b>   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <table border="1"> <thead> <tr> <th>Interface</th> <th>Network</th> <th>Hello Interval</th> <th>Dead Interval</th> <th>Retransmit Interval</th> <th>Transmit Delay</th> </tr> </thead> <tbody> <tr> <td><input type="text"/></td> <td><input type="text" value="Broadcast"/></td> <td><input type="text" value="10"/></td> <td><input type="text" value="40"/></td> <td><input type="text" value="5"/></td> <td><input type="text" value="1"/></td> </tr> </tbody> </table>  |  |                                 |                                 |                                    |                                  |                                    |                                    |                      | Interface                          | Network           | Hello Interval | Dead Interval  | Retransmit Interval  | Transmit Delay       | <input type="text"/>     | <input type="text" value="Broadcast"/> | <input type="text" value="10"/> | <input type="text" value="40"/> | <input type="text" value="5"/>  | <input type="text" value="1"/>  |                      |                                  |                                    |                          |
| Interface  | Network                                | Hello Interval                  | Dead Interval                   | Retransmit Interval                | Transmit Delay                   |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <input type="text"/>   | <input type="text" value="Broadcast"/> | <input type="text" value="10"/> | <input type="text" value="40"/> | <input type="text" value="5"/>     | <input type="text" value="1"/>   |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
|  |  |                                 |                                 |                                    |                                  | <input type="button" value="Add"/> |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>Interface Advanced Options</b> <input checked="" type="checkbox"/>  |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <table border="1"> <thead> <tr> <th>Interface</th> <th>Passive Interface</th> <th>Cost</th> <th>Priority</th> <th>Authentication</th> <th>Key ID</th> <th>Key</th> <th>MTU Ignore</th> </tr> </thead> <tbody> <tr> <td><input type="text"/></td> <td><input type="checkbox"/></td> <td><input type="text" value="10"/></td> <td><input type="text" value="10"/></td> <td><input type="text"/></td> <td><input type="text" value="adm"/></td> <td><input type="text" value="....."/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table> |  |                                 |                                 |                                    |                                  |                                    |                                    |                      | Interface                          | Passive Interface | Cost           | Priority       | Authentication       | Key ID               | Key                      | MTU Ignore                             | <input type="text"/>            | <input type="checkbox"/>        | <input type="text" value="10"/> | <input type="text" value="10"/> | <input type="text"/> | <input type="text" value="adm"/> | <input type="text" value="....."/> | <input type="checkbox"/> |
| Interface  | Passive Interface                      | Cost                            | Priority                        | Authentication                     | Key ID                           | Key                                | MTU Ignore                         |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <input type="text"/>   | <input type="checkbox"/>               | <input type="text" value="10"/> | <input type="text" value="10"/> | <input type="text"/>               | <input type="text" value="adm"/> | <input type="text" value="....."/> | <input type="checkbox"/>           |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
|  |  |                                 |                                 |                                    |                                  |                                    | <input type="button" value="Add"/> |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <b>Area</b>  |  |                                 |                                 |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <table border="1"> <thead> <tr> <th>Area ID</th> <th>Area</th> <th>No Summary</th> <th>Authentication</th> </tr> </thead> <tbody> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="checkbox"/></td> <td><input type="text"/></td> </tr> </tbody> </table>   |  |                                 |                                 |                                    |                                  |                                    |                                    |                      | Area ID                            | Area              | No Summary     | Authentication | <input type="text"/> | <input type="text"/> | <input type="checkbox"/> | <input type="text"/>                   |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| Area ID  | Area                                   | No Summary                      | Authentication                  |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
| <input type="text"/>   | <input type="text"/>                   | <input type="checkbox"/>        | <input type="text"/>            |                                    |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |
|  |  |                                 |                                 | <input type="button" value="Add"/> |                                  |                                    |                                    |                      |                                    |                   |                |                |                      |                      |                          |  |                                 |                                 |                                 |                                 |                      |                                  |                                    |                          |

**Area Advanced Options**

**Area Range**

| Area ID              | IP Address           | Netmask              | Not Advertisement        | Cost                 |
|----------------------|----------------------|----------------------|--------------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="checkbox"/> | <input type="text"/> |
| Add                  |                      |                      |                          |                      |

**Area Virtual Link**

| Area ID              | ABR Address          | Authentication                 | Key ID               | Key                  | Hello Interval | Dead Interval | Retransmit Interval | Transmit Delay |
|----------------------|----------------------|--------------------------------|----------------------|----------------------|----------------|---------------|---------------------|----------------|
| <input type="text"/> | <input type="text"/> | <input type="text" value="v"/> | <input type="text"/> | <input type="text"/> | 10             | 40            | 5                   | 1              |
| Add                  |                      |                                |                      |                      |                |               |                     |                |

**Redistribution**

| Redistribution Type                    | Metric               | Metric Type                    |
|--|----------------------|--------------------------------|
| <input type="text" value="connected"/> | <input type="text"/> | <input type="text" value="v"/> |
| Add                                    |                      |                                |

**Redistribution Advanced Option**


Always Redistribute Default Route



Redistribute Default Route Metric

Redistribute Default Route Metric Type



Default Metric

**Distance Management**

| Area Type                               | Distance             |
|---|----------------------|
| <input type="text" value="inter-area"/> | <input type="text"/> |
| Add                                     |                      |

# 6 Services

In the service settings, you configure the DHCP service, DNS forwarding, VRRP, and other related parameters.

## 6.1 DHCP Service

The Dynamic Host Configuration Protocol (DHCP) is a communication protocol in network technology. It enables the assignment of the network configuration to clients through a server. In this way, devices in the network can be assigned IP addresses dynamically. You can access this service under **Services > DHCP Service**.

| System   | Network | Services                                   | Firewall | QoS                  | VPN | Tools | Application | Status               |
|--|---------|--|----------|----------------------|-----|-------|-------------|----------------------|
| Your password have security risk, please click here to change!             |         |  |          |                      |     |       |             |                      |
| <b>DHCP Service</b>  |         |  |          |                      |     |       |             |                      |
| Enable DHCP  |         | <input checked="" type="checkbox"/>        |          |                      |     |       |             |                      |
| IP Pool Starting Address   |         | <input type="text" value="192.168.2.2"/>   |          |                      |     |       |             |                      |
| IP Pool Ending Address   |         | <input type="text" value="192.168.2.100"/> |          |                      |     |       |             |                      |
| Lease  |         | <input type="text" value="60"/> Minutes    |          |                      |     |       |             |                      |
| DNS  |         | <input type="text" value="192.168.2.1"/>   |          |                      |     |       |             | <a href="#">Edit</a> |
| Windows Name Server (WINS)   |         | <input type="text" value="0.0.0.0"/>       |          |                      |     |       |             |                      |
| <b>Static DHCP</b>   |         |  |          |                      |     |       |             |                      |
| MAC Address  |         | IP Address                                 |          | Host                 |     |       |             |                      |
| <input type="text" value="00:00:00:00:00:00"/>                             |         | <input type="text" value="192.168.2.2"/>   |          | <input type="text"/> |     |       |             |                      |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> |         |  |          |                      |     |       |             |                      |

| Name  | Description   | Default       |
|---|---|---------------|
| Enable DHCP   | Click to enable DHCP  | Enabled       |
| IP Pool Starting Address                              | Set start IP address of the DHCP pool                                 | 192.168.2.2   |
| IP Pool Ending Address                                | Set end IP address of the DHCP pool                                   | 192.168.2.100 |
| Lease   | Set valid lease time for the IP address received from the DHCP server | 60 minutes    |
| DNS   | Set DNS server (click via Edit)                                       | 192.168.2.1   |
| Windows Name Server                                   | Set WINS  | Blank         |
| Static DHCP (a maximum of 20 IP addresses can be set) |   |               |
| MAC Address   | Set MAC address of a designated IP address                            | Blank         |
| IP Address  | Set static IP address   | 192.168.2.2   |
| Host  | Set hostname  | Blank         |

## 6.2 DNS

Up to two DNS servers can be entered here if the router is part of a domain network that uses DNS for address resolution. You can enter the data under **Network > DNS**.

| System   | Network | Services                                   | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|--|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change!             |         |  |          |     |     |       |             |        |
| <b>DNS</b>   |         |  |          |     |     |       |             |        |
| Primary DNS  |         | <input type="text" value="192.168.2.100"/> |          |     |     |       |             |        |
| Secondary DNS  |         | <input type="text" value="8.8.8.8"/>       |          |     |     |       |             |        |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> |         |  |          |     |     |       |             |        |

| Name          | Description       | Default |
|---------------|-------------------|---------|
| Primary DNS   | Set primary DNS   | Blank   |
| Secondary DNS | Set secondary DNA | Blank   |

## 6.3 DNS Relay

When DNS relay is enabled (by default, if DHCP is set up), the IP address of the router is assigned to the DHCP clients as the DNS server. All DNS requests to the router are forwarded to your ISP's DNS servers. If DNS Relay is disabled, the Router assigns the ISP's DNS servers to the DHCP clients. You can access these settings via **Services > DNS Relay**.

| System   | Network              | Services                            | Firewall | QoS | VPN | Tools | Application | Status |
|--|----------------------|-------------------------------------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change!             |                      |                                     |          |     |     |       |             |        |
| <b>DNS Relay</b>   |                      |                                     |          |     |     |       |             |        |
| Enable DNS Relay   |                      | <input checked="" type="checkbox"/> |          |     |     |       |             |        |
| <b>Static [IP address &lt;=&gt; Domain Name] Pairing</b>                   |                      |                                     |          |     |     |       |             |        |
| IP Address   | Host                 | Description                         |          |     |     |       |             |        |
| <input type="text"/>   | <input type="text"/> | <input type="text"/>                |          |     |     |       |             |        |
|  |                      | <input type="button" value="Add"/>  |          |     |     |       |             |        |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> |                      |                                     |          |     |     |       |             |        |

With the **Add** button up to 20 DNS pairs can be created.

| Name   | Description                         | Default                       |
|--|-------------------------------------|-------------------------------|
| Enable DNS Relay   | Click to enable DNS forwarding      | Enabled (after enabling DHCP) |
| Static (IP Address <-> Domain Name) Pairing (maximum 20 DNS pairs) |                                     |                               |
| IP Address   | Set IP address <-> DNS pairs        | Blank                         |
| Host   | Set names of IP address<->DNS pairs | Blank                         |
| Description  | Describe IP address<->DNS pairs     | Blank                         |

## 6.4 DDNS (Dynamic DNS)

DDNS or dynamic DNS is used if the WAN connection does not have a fixed public IP address, but services are still to be accessed externally. Since the IP address of the provider can change again and again with a normal WAN connection, a secure setup, e.g. of a VPN tunnel, is not possible. Therefore one uses providers of dynamic DNS servers, which ensure that your WAN connection always gets over the IP address. You can reach the configuration via **Network > DDNS**.

| System  | Network | Services | Firewall | QoS | VPN | Tools | Application | Status |
|---|---------|----------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change!  |         |          |          |     |     |       |             |        |
| <b>DDNS</b>   |         |          |          |     |     |       |             |        |
| <b>Dynamic DNS ==&gt; WAN</b>   |         |          |          |     |     |       |             |        |
| Current Address<br>Service Type <span>Disabled ▼</span>   |         |          |          |     |     |       |             |        |
| <b>Dynamic DNS ==&gt; Dialup</b>  |         |          |          |     |     |       |             |        |
| Current Address <b>37.80.83.157</b><br>Service Type <span>No-IP.com ▼</span><br>URL <b>http://www.no-ip.com/</b><br>Username <span>gh-admin</span><br>Password <span>.....</span><br>Hostname <span>welotec.ddns.net</span><br>Wildcard <input type="checkbox"/><br>MX <span></span><br>Backup MX <input type="checkbox"/><br>Force Update <input type="checkbox"/> |         |          |          |     |     |       |             |        |
| Last Update <b>2018-10-01 13:49:17</b><br>Last Response <b>2018-10-01 13:49:17 Update successful.</b>   |         |          |          |     |     |       |             |        |
| <div> <div>Apply</div> <div>Cancel</div> </div>   |         |          |          |     |     |       |             |        |

| Name            | Description             | Default  |
|-----------------|-------------------------|----------|
| Current Address | Show current IP address | Blank    |
| Service Type    | Select DDNS provider    | Disabled |

There are various setting options for different DDNS service providers. These are selected via the service type.



**Dynamic DNS ==> WAN**

Current Address

Service Type

**Dynamic DNS ==> Dialup**

Current Address

Service Type

URL

Username

Password

Hostname

Wildcard

MX

Backup MX

Force Update

No-IP is used here as an example for the setup. For this, you need a No-IP account, which you have to create yourself. There are various providers here, some of which are free of charge, but some of which are subject to a charge. The assignment of the Dynamic DNS can be assigned to the WAN as well as to the dialup connection.

**Dynamic DNS ==> Dialup**

Current Address

Service Type

URL

Username

Password

Hostname

Wildcard

MX

Backup MX

Force Update

Last Update

Last Response

Apply Cancel

| Name          | Description   | Default  |
|---------------|---|----------|
| Service Type  | DynDNS - Dynamic  | Disabled |
| URL           | http://www.dyndns.com/  | Set      |
| Username      | Registered username for   |          |
| DDNS          | Blank   |          |
| Password      | Registered password for DDNS                                    | Blank    |
| Hostname      | Registered hostname for DDNS                                    | Blank    |
| Wildcard      | Can be activated if wildcard is to be used                      | Disabled |
| MX            | Entering an MX record   | Blank    |
| Backup MX     | Can be activated if MX-Record should run as backup              | Disabled |
| Force Update  | Forces the update of the account                                | Disabled |
| Last Update   | Shows when the IP address was last changed                      |          |
| Last Response | Indicates the last time communication was made with the service |          |

## 6.5 DTU

DTU stands for Data Terminal Unit and is used to connect devices with serial interface (RS-232 and RS-485). You can create the configuration under **Services > DTU**. If DTU is activated, the console port is automatically deactivated.

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Your password have security risk, please click here to change!

### DTU

**Enable** ☒

**DTU Protocol** Transparent

**Protocol** UDP

**Mode** Client

**Frame Interval** 100 mseconds

**Serial Buffer Frames** 4

**Multi-Server Policy** Parallel

**Min Reconnect Interval** 15 Seconds

**Max Reconnect Interval** 180 Seconds

**DTU ID**

**Source IP**

**DTU ID Report Interval** 0 Seconds

**Multi Server**

| Server Address       | Server Port          |
|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> |

| Name                   | Description   | Default     |
|------------------------|---|-------------|
| Enable                 | Click to activate DTU   | Disabled    |
| DTU Protocol           | Set DTU protocol  | Transparent |
| Protocol               | Possible options are “TCP” and “UDP                                       | UDP         |
| Mode                   | Set DTU as client or server, depending on DTU Protocol selection possible | Client      |
| Frame Interval         | Set the frame interval in milliseconds                                    | 100 msec    |
| Serial Buffer Frames   | Default buffer frames   | 4           |
| Multi-Server Policy    | Selection between Parallel and Poll                                       | Parallel    |
| Min Reconnect Interval | Min Reconnect Interval  | 15 Sec      |
| Max Reconnect Interval | Max Reconnect Interval  | 180 Sec     |
| DTU ID                 | Default ID for the DTU  | Blank       |
| Source IP              | IP address of the source computer   | Blank       |
| DTU ID Report Interval | Time interval for sending the DTU ID                                      | 0           |
| Source IP              | IP address of the source computer   | Blank       |
| DTU ID Report Interval | Time interval for sending the DTU ID                                      | 0           |
| Multi Server           |   |             |
| IP-Adresse             | Set up IP address for receiving data                                      | Blank       |
| Server Port            | Set up server port for receiving data                                     | Blank       |

Depending on the selection of the DTU protocol, the selection fields may vary.

## 6.6 SMS

The TK500 can be reached from outside via SMS and reacts to various commands sent via SMS. You have the possibility to query the status of the device or to restart the device. The router is configured via **Services > SMS**.

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Your password have security risk, please click here to change!

**SMS**

Enable ☒

Status Query  (English Only)

Reboot  (English Only)

**SMS Access Control**

Default Policy

| Phone Number  | Action | Description      |
|---------------|--------|------------------|
| 4917212345678 | Accept | 1. SMS Empfänger |

| Name               | Description   | De-<br>fault  |
|--------------------|---|---------------|
| Enable             | Click to enable or disable SMS control  | Dis-<br>abled |
| Status Query       | Set status request SMS to display the status of the router via SMS (e.g.: show status).                                   | Blank         |
| Reboot             | Lets the router restart (e.g. reboot)   | Blank         |
| SMS Access Control |   |               |
| Default Policy     | Block or Accept control SMS from specific phone.  | Ac-<br>cept   |
| Phone Number       | Enter phone numbers to send SMS to router. The format for mobile number is 491712345678 (please do not enter +49 or 0049) | Blank         |
| Action             | Accept or block the previously entered phone number   | Ac-<br>cept   |
| Description        | Description for the created dataset   | Blank         |

To be able to send an SMS to the router, the mobile number of the inserted card must be known. The SMS is then sent to this number.



SMS that you receive on your cell phone:

Host: (SN);

Uptime: (the operating time of the router at the time of this reboot);

State: (Online/Offline) (Radio-WAN-IP)

LAN: (Ready) (LAN-IP)

## 6.7 Traffic Manager

The Traffic Manager can be used to provide the data consumption of the dial-up connection interface. You can configure this service under **Services > Traffic Manager**.

| System   | Network | Services                            | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|-------------------------------------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change!             |         |                                     |          |     |     |       |             |        |
| <b>Traffic Manager</b>   |         |                                     |          |     |     |       |             |        |
| Enable   |         | <input checked="" type="checkbox"/> |          |     |     |       |             |        |
| Alarm Threshold  |         | 50000 MB/Month                      |          |     |     |       |             |        |
| Disconnect Threshold   |         | 0 MB/Month                          |          |     |     |       |             |        |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> |         |                                     |          |     |     |       |             |        |

| Name                    | Description   | De-<br>fault  |
|-------------------------|---|---------------|
| Enable                  | Click to enable or disable SMS control  | Dis-<br>abled |
| Alarm Thresh-<br>old    | Sets the amount of data in MB per month at which an alarm should be generated. If 0 is set as value, no alarm will be generated | Blank         |
| Disconnect<br>Threshold | If the set value is reached, the dial-up connection is interrupted  | Blank         |

The amount of data used can be checked at any time under Traffic Statistics (see 3.8.3).

## 6.8 Alarm Manager

The Alarm Manager can be used to generate various alarms. You can configure this service under **Services > Alarm Manager**.

| System   | Network | Services                            | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|-------------------------------------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change!             |         |                                     |          |     |     |       |             |        |
| <b>Alarm Manager</b>   |         |                                     |          |     |     |       |             |        |
| <b>Alarm Input</b>   |         |                                     |          |     |     |       |             |        |
| System Service Fault   |         | <input type="checkbox"/>            |          |     |     |       |             |        |
| Memory Low   |         | <input type="checkbox"/>            |          |     |     |       |             |        |
| WAN Link-Up/Down   |         | <input checked="" type="checkbox"/> |          |     |     |       |             |        |
| LAN Link-Up/Down   |         | <input type="checkbox"/>            |          |     |     |       |             |        |
| Dialup Up/Down   |         | <input checked="" type="checkbox"/> |          |     |     |       |             |        |
| Traffic Alarm  |         | <input type="checkbox"/>            |          |     |     |       |             |        |
| Traffic Disconnect Alarm   |         | <input type="checkbox"/>            |          |     |     |       |             |        |
| SIM/UIM Card Fault   |         | <input type="checkbox"/>            |          |     |     |       |             |        |
| Signal Quality Fault   |         | <input type="checkbox"/>            |          |     |     |       |             |        |
| <b>Alarm Output</b>  |         |                                     |          |     |     |       |             |        |
| Console  |         | <input checked="" type="checkbox"/> |          |     |     |       |             |        |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> |         |                                     |          |     |     |       |             |        |

| Name         | Description  | Default  |
|--------------|--|----------|
| Alarm Input  | Select here the areas for which an alarm is to be generated                    | none     |
| Alarm Output | Here you can choose whether the alarms should be issued via the console or not | selected |

# 7 Firewall

The **Firewall** menu item allows you to set the parameters for the router's firewall. Various settings are possible here.

## 7.1 Basic

Here you can configure the basic settings of the firewall.

| System   | Network | Services                            | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|-------------------------------------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change!             |         |                                     |          |     |     |       |             |        |
| <b>Basic</b>   |         |                                     |          |     |     |       |             |        |
| Default Filter Policy  |         | Accept ▼                            |          |     |     |       |             |        |
| Block Anonymous WAN Requests (ping)  |         | <input type="checkbox"/>            |          |     |     |       |             |        |
| Filter Multicast   |         | <input checked="" type="checkbox"/> |          |     |     |       |             |        |
| Defend DoS Attack  |         | <input checked="" type="checkbox"/> |          |     |     |       |             |        |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> |         |                                     |          |     |     |       |             |        |

| Name                               | Description  | Default   |
|------------------------------------|--|-----------|
| Default Filter Policy              | Possible options are allow and block                                 | Allow     |
| Block Anonymous WAN Request (ping) | Enable to block ping requests generated anonymously from the network | Dis-abled |
| Filter Multicast                   | Click to enable filtering of multicast                               | En-abled  |
| Defend DoS Attack                  | Click to enable fending off DoS attacks                              | En-abled  |

## 7.2 Filtering

At this point you can filter what the firewall should let through and what not. Various configurations are possible here, which you can reach via **Firewall > Filtering**.

| System   | Network | Services  | Firewall    | QoS          | VPN              | Tools    | Application              | Status      |
|--|---------|-----------|-------------|--------------|------------------|----------|--------------------------|-------------|
| Your password have security risk, please click here to change!             |         |           |             |              |                  |          |                          |             |
| <b>Filtering</b>   |         |           |             |              |                  |          |                          |             |
| Enable   | Proto   | Source    | Source Port | Destination  | Destination Port | Action   | Log                      | Description |
| Yes  | TCP     | 0.0.0.0/0 | 7110-7113   | 192.168.2.12 | 7110             | Accept   | Yes                      | Test        |
| <input checked="" type="checkbox"/>  | ALL ▼   | 0.0.0.0/0 |             |              |                  | Accept ▼ | <input type="checkbox"/> |             |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> |         |           |             |              |                  |          |                          |             |

| Name             | Description  | Default  |
|------------------|--|----------|
| Enable           | Click to activate filtering  | Enabled  |
| Proto            | Selection of the protocol. The options "TCP"/"UDP"/"ICMP" are possible | All      |
| Source           | Set source IP address  | Blank    |
| Source Port      | Set source port if corresponding protocol was selected                 | Blank    |
| Destination      | Set destination IP   | Blank    |
| Destination Port | Set destination port if corresponding protocol was selected            | Blank    |
| Action           | Selection whether setting should be accepted or blocked                | Allowed  |
| Log              | Click to enable logging of the setting                                 | Disabled |
| Description      | Describe configuration   | Blank    |

## 7.3 Content Filtering

The content filter in the firewall allows you to filter the call of special URLs, which can then be blocked or allowed. You can create the configuration under **Firewall > Content Filtering**.

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Your password have security risk, please click here to change!

Content Filtering

| Enable URL                          | Action | Log                      | Description |
|-------------------------------------|--------|--------------------------|-------------|
| <input checked="" type="checkbox"/> | Accept | <input type="checkbox"/> |             |

Apply
Cancel

| Name        | Description                                   | Default  |
|-------------|---|----------|
| Enable      | Enable or disable the content filter function | Enabled  |
| URL         | Entering the URL to be blocked or filtered    | Blank    |
| Action      | Selection whether URL is blocked or accepted  | Enabled  |
| Log         | Can be activated for logging                  | Disabled |
| Description | Describe configuration                        | Blank    |

## 7.4 Port Mapping

NAT-PMP (NAT Port Mapping) allows a computer in a private network (behind a NAT router) to automatically configure the router so that devices behind the router can be reached from outside the private network. It essentially controls what is known as port forwarding. NAT-PMP, like UPnP also, and allows a program to request all incoming data from outside on a specific TCP or UDP port. You can perform the configuration under **Firewall > Port Mapping**.



System Network Services Firewall QoS VPN Tools Application Status

Your password have security risk, please click here to change!

**Port Mapping**

| Enable                              | Proto | Source    | Service Port | Internal Address | Internal Port | Log                      | External Address(Optional)/Tunnel Name(OpenVPN) | Description    |
|-------------------------------------|-------|-----------|--------------|------------------|---------------|--------------------------|---|----------------|
| <input checked="" type="checkbox"/> | TCP   | 0.0.0.0/0 | 8080         | 192.168.2.12     | 12080         | <input type="checkbox"/> |   | Port an Client |

Apply Cancel

| Name  | Description  | De-<br>fault  |
|---|--|---------------|
| Enable  | Enable or disable port mapping   | En-<br>abled  |
| Proto   | Selection of TCP, UDP or TCP&UDP protocols   | TCP           |
| Source  | Enter source IP  | 0.0.0.0/0     |
| Service Port  | Enter port of the service  | 8080          |
| Internal Address                                    | Set internal IP for mapping  | Blank         |
| Internal Port                                       | Set port mapping to "internal"   | 8080          |
| Log   | Click to enable logging of port mapping  | Dis-<br>abled |
| External Address (Optional) / Tunnel Name (OpenVPN) | Used in conjunction with VPN. For port forwarding with VPN, the virtual VPN IP address of the TC router must be entered here | Blank         |
| Description   | Describe the meaning of the individual classifications   | Blank         |

## 7.5 Virtual IP Mapping

The IP of an internal PC can be assigned to a virtual IP. An external network can access the internal PC via this virtual IP address. You can set up this configuration under **Firewall > Virtual IP Mapping**.

System Network Services Firewall QoS VPN Tools Application Status

Your password have security risk, please click here to change!

**Virtual IP Mapping**

Virtual IP for Router

Source IP Range  (Example: "1.1.1.1", "1.1.1.0/24", "1.1.1.1 - 2.2.2.2")

| Enable Virtual IP                   | Real IP              | Log                      | Description          |
|-------------------------------------|----------------------|--------------------------|----------------------|
| <input checked="" type="checkbox"/> | <input type="text"/> | <input type="checkbox"/> | <input type="text"/> |

Apply Cancel

| Name                  | Description                      | Default  |
|-----------------------|----------------------------------|----------|
| Virtual IP for Router | Set virtual IP for router        | Blank    |
| Source IP Range       | Set range of source IP addresses | Blank    |
| Virtual IP            | Set virtual IP                   | Blank    |
| Real IP               | Set real IP                      | Blank    |
| Log                   | Enable logging for virtual IP    | Disabled |
| Description           | Describe configuration           | Blank    |

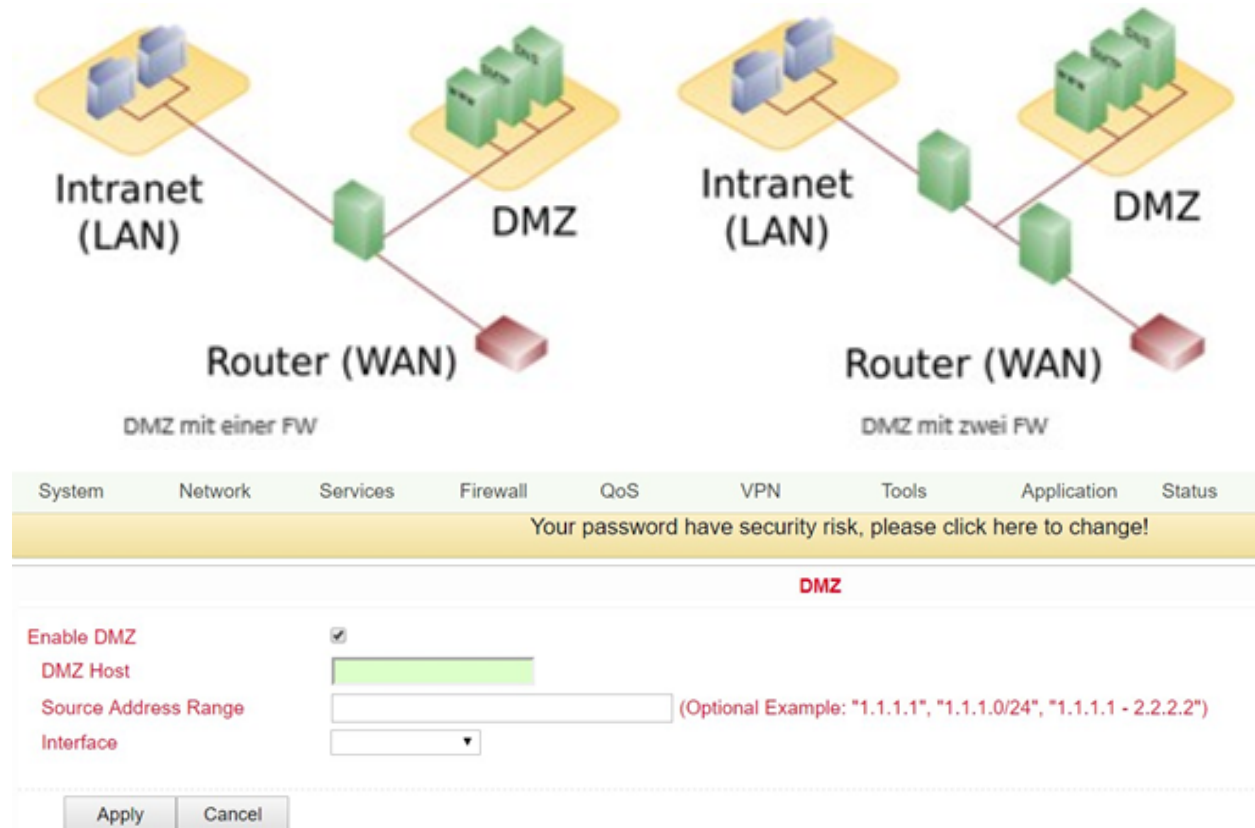
## 7.6 DMZ

A Demilitarized Zone (**DMZ**) refers to a computer network with security-controlled access to the servers connected to it.

The systems set up in the DMZ are shielded from other networks (e.g. Internet, LAN) by one or more firewalls. This separation allows access to publicly accessible services while protecting the internal network (LAN) from unauthorized access from the outside.

The purpose is to make services of the computer network available to both the Internet (WAN) and the intranet (LAN) on as secure a basis as possible.

A DMZ provides protection by isolating a system from two or more networks.



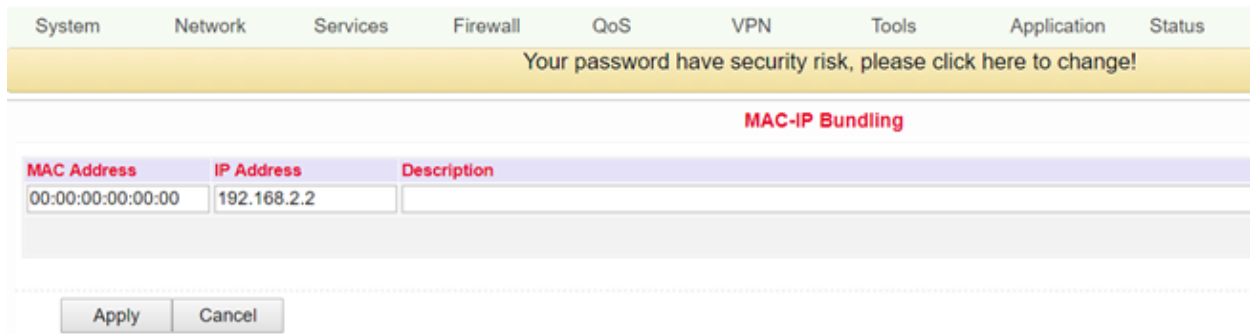
By mapping all ports and the external PC, you can access all ports of the device connected to the TK500.

With this function it is not possible to assign the administration port of the TK500 (e.g.: 80 TCP) to the port of the device. To forward port 80, change the management port of the router under **System > Admin Access**.

| Name                 | Description                              | Default  |
|----------------------|--|----------|
| Enable DMZ           | Click to enable DMZ                      | Disabled |
| DMZ Host             | Set DMZ host IP                          | Blank    |
| Source Address Range | Set IP address with restricted IP access | Blank    |
| Interface            | Selection of the appropriate interface   | Blank    |

## 7.7 MAC-IP Bundling

MAC IP bundling means assigning a predefined IP address to a defined MAC address. Thus the given MAC address always gets the same IP address. You can reach this menu item under **Firewall > MAC-IP Bundling**.



If a firewall blocks all access to the external network, only PCs with MAC-IP bundling will gain access to the external network.

| Name        | Description                  | Default     |
|-------------|------------------------------|-------------|
| MAC Address | Set MAC address for bundling | Blank       |
| IP Address  | Set IP address for bundling  | 192.168.2.2 |
| Description | Describe configuration       | Blank       |

## 7.8 NAT

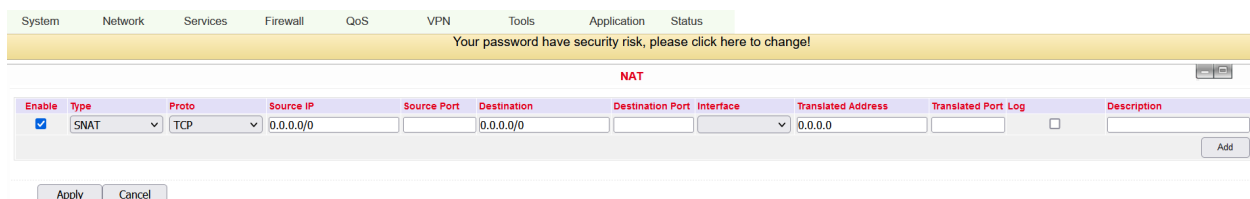
Network Address Translation (NAT) In computer networks, Network Address Translation is the collective term for procedures that automatically replace address information in data packets with other information in order to connect different networks. They are therefore typically used on routers.

### 7.8.1 Use of Source-NAT (SNAT)

It allows devices with private network addresses to connect to the Internet. Private IP addresses cannot usually be routed by the provider, so they must be translated into a public, routable IP address. The TK500v2 has implemented this function, which enables communication between different networks. In addition, a relevant security aspect is found in NAT, since a public IP address cannot be traced back to the associated private IP address.

### 7.8.2 Use of Destination-NAT (DNAT)

This is used to offer services that are operated on computers under a single IP address. It is often referred to as port mapping or port forwarding.



## 7.8.3 Configuration

- To configure NAT, go to the menu item *Firewall* and select the subitem *NAT*.
- Here you can find a list of all existing NAT rules
- New NAT rules can be added via the *Add* button

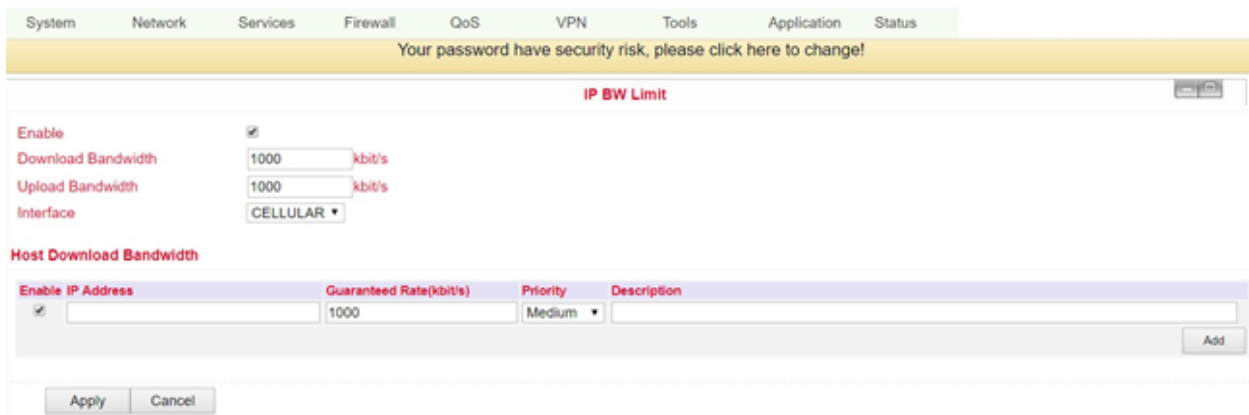
## 8 QoS

In the TCP/IP world, QoS describes the quality of a communication service from the user's point of view. Network service quality is often defined on the basis of the parameters bandwidth, delay, packet loss and jitter.

The network load influences the quality of the transmission. For example, how long does it take for a data packet to reach the recipient? For this reason, attempts are made to mark data packets with corresponding service classes. Prioritized data packets are then forwarded preferentially in routers or switches. In the TK 500 series it is therefore possible to limit and allocate the bandwidths accordingly. You can set this up via "QoS".

### 8.1 IP BW Limit

Under the menu item *QoS > IP BW Limit* you can limit the down- or upload bandwidth and bind it to IP addresses, as well as prioritize them.



System Network Services Firewall QoS VPN Tools Application Status

Your password have security risk, please click [here](#) to change!

#### IP BW Limit

Enable ☒

Download Bandwidth  kbit/s

Upload Bandwidth  kbit/s

Interface

#### Host Download Bandwidth

| Enable                              | IP Address           | Guaranteed Rate(kbit/s)           | Priority                            | Description          |
|-------------------------------------|----------------------|-----------------------------------|-------------------------------------|----------------------|
| <input checked="" type="checkbox"/> | <input type="text"/> | <input type="text" value="1000"/> | <input type="text" value="Medium"/> | <input type="text"/> |

| Name                     | Description   | Default    |
|--------------------------|---|------------|
| Enable                   | Click to enable   | Disabled   |
| Download Bandwidth       | Set the bandwidth for the download                                  | 1000kbit/s |
| Upload Bandwidth         | Set the bandwidth for upload  | 1000kbit/s |
| Interface                | Selection of the interface to which the bandwidth is to be assigned | Cellular   |
| Host Download Bandwidth  |   |            |
| Enable                   | Enable the function   | Enabled    |
| IP Adresse               | Specify the IP address for allocation                               | Blank      |
| Guaranteed Rate (kbit/s) | Indication of guaranteed bandwidth in kbit/s                        | 1000       |
| Priority                 | Assigning priority  | Medium     |
| Description              | Rule description  | Blank      |

## 9 VPN

A VPN (virtual private network) is a closed logical network in which the participants are physically separated from each other and connected via an IP tunnel. With this VPN, you can access a local network, e.g. the company network, while on the road or from your home office. This requires VPN software that both communicates with the network's router and is installed on the computer you want to use to access the network. There are different types of VPN connections (tunnels) that can be configured under this menu item on the TK 500 series.

|  |   |   |  |   |     |       |             |        |
|--|---|---|--|---|-----|-------|-------------|--------|
| System   | Network   | Services  | Firewall   | QoS   | VPN | Tools | Application | Status |
| Your password have security risk, please click here to change! |   |   |  |   |     |       |             |        |
| VPN  |   |   |  |   |     |       |             |        |
| Name   | Tunnel Description  | Phase 1 Parameters  | Phase 2 Parameters                                 | Link Detection Parameters   |     |       |             |        |
| IPSec_tunnel_1   | Router_192.168.2.1<br>ESP, Tunnel Mode; Main Mode; Manually Activated | Authentication Type:<br>Shared Key<br>Policy: 3des-md5-modp1024<br>Lifetime:<br>86400Seconds<br>Disabled Perfect Forward Secrecy(PFS)<br>Disabled XAUTH | Policy: aes128-sha1-96<br>Lifetime:<br>3600Seconds | Enable DPD, Interval:<br>60Seconds, Timeout:<br>180Seconds<br>Disabled ICMP Detection |     |       |             |        |
| Add  |   | Show Detail Status  |  |   |     |       |             |        |
| Manual Refresh Refresh   |   |   |  |   |     |       |             |        |

Overview of the existing VPN connections. With **Add** a new tunnel can be created, see 3.6.2.

### 9.1 IPSec Settings

In this menu item you configure the settings for IPSec, which can be reached via **VPN > IPSec Settings**.

| System  | Network | Services | Firewall | QoS | VPN | Tools | Application | Status |
|---|---------|----------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change!  |         |          |          |     |     |       |             |        |
| IPSec Settings  |         |          |          |     |     |       |             |        |
| <div> <div>Enable NAT-Traversal (NATT)</div> <div><input checked="" type="checkbox"/></div> </div> <div> <div>Keep alive time interval of NATT</div> <div>60</div> <div>Seconds</div> </div> <div> <div>Enable Compression</div> <div><input checked="" type="checkbox"/></div> </div> <div> <div>Debug</div> <div><input type="checkbox"/></div> </div> <div> <div>Force NATT</div> <div><input type="checkbox"/></div> </div> <div> <div>Dynamic NATT Port</div> <div><input type="checkbox"/></div> </div> |         |          |          |     |     |       |             |        |
| <div> <div>Apply</div> <div>Cancel</div> </div>   |         |          |          |     |     |       |             |        |

| Name                             | Description                                   | Default    |
|----------------------------------|---|------------|
| Enable NAT-Traversal (NATT)      | Click to enable                               | Disabled   |
| Keep alive time interval of NATT | Setting the duration for maintaining the NATT | 60 Seconds |
| Enable Compression               | Switch compression on or off                  | Enabled    |
| Debug                            | Switch debug mode on or off                   | Disabled   |
| Enable                           | Activate the function                         | Enabled    |
| Force NATT                       | Switch NATT force on or off                   | Disabled   |
| Dynamic NATT Port                | Switching a dynamic NATT port on or off       | Disabled   |

The address change via NAT is interpreted by a VPN gateway as a security-critical change to the data packets, the VPN negotiation fails, and no connection is established. These problems occur, for example, when dialing in via some UMTS mobile networks, where the network operator's servers do not support address conversion in connection with IPSec-based VPNs.

In order to be able to successfully establish a VPN connection in these cases, NATT (NAT Traversal) provides a method for overcoming these problems when handling data packets with changed addresses.

NATT can only be used for VPN connections that use ESP (Encapsulating Security Payload) for authentication. Unlike AH (Authentication Header), ESP does not take the IP header of the data packets into account when determining the hash value for authentication. The hash value calculated by the receiver therefore corresponds to the hash value entered in the packets

## 9.2 IPSec Tunnels

Via *VPN > IPSec Tunnels* you can set up a corresponding tunnel.

| System                       | Network                                      | Services                            | Firewall | QoS | VPN | Tools | Status |
|------------------------------|--|-------------------------------------|----------|-----|-----|-------|--------|
| <b>IPSec Tunnels</b>         |  |                                     |          |     |     |       |        |
| <b>Edit IPSec tunnel</b>     |  |                                     |          |     |     |       |        |
| <b>Show Advanced Options</b> |  | <input checked="" type="checkbox"/> |          |     |     |       |        |
| <b>Basic Parameters</b>      |  |                                     |          |     |     |       |        |
| Tunnel Name                  | <input type="text" value="IPSec_tunnel_1"/>  |                                     |          |     |     |       |        |
| Destination Address          | <input type="text" value="0.0.0.0"/>         |                                     |          |     |     |       |        |
| Startup Modes                | <input type="text" value="Auto Activated"/>  |                                     |          |     |     |       |        |
| Restart WAN when failed      | <input checked="" type="checkbox"/>          |                                     |          |     |     |       |        |
| Negotiation Mode             | <input type="text" value="Main Mode"/>       |                                     |          |     |     |       |        |
| IPSec Protocol               | <input type="text" value="ESP"/>             |                                     |          |     |     |       |        |
| IPSec Mode                   | <input type="text" value="Tunnel Mode"/>     |                                     |          |     |     |       |        |
| VPN over IPSec               | <input type="text" value="None"/>            |                                     |          |     |     |       |        |
| Tunnel Type                  | <input type="text" value="Subnet - Subnet"/> |                                     |          |     |     |       |        |
| Local Subnet                 | <input type="text" value="192.168.2.1"/>     |                                     |          |     |     |       |        |
| Local Netmask                | <input type="text" value="255.255.255.0"/>   |                                     |          |     |     |       |        |
| Remote Subnet                | <input type="text" value="0.0.0.0"/>         |                                     |          |     |     |       |        |
| Remote Netmask               | <input type="text" value="255.255.255.0"/>   |                                     |          |     |     |       |        |

### Phase 1 Parameters

IKE Policy 3DES-MD5-DH2 ▼  
 IKE Lifetime 86400 Seconds  
 Local ID Type IP Address ▼  
 Remote ID Type IP Address ▼  
 Authentication Type Shared Key ▼  
 Key

### XAUTH Parameters

XAUTH Mode ☒  
 XAUTH Username   
 XAUTH Password   
 MODECFG ☐

### Phase 2 Parameters

IPsec Policy 3DES-MD5-96 ▼  
 IPsec Lifetime 3600 Seconds  
 Perfect Forward Serecy(PFS) None ▼

### Link Detection Parameters

DPD Time Interval 60 Seconds(0: disable)  
 DPD Timeout 180 Seconds  
 ICMP Detection Server   
 ICMP Detection Local IP   
 ICMP Detection Interval 60 Seconds  
 ICMP Detection Timeout 5 Seconds  
 ICMP Detection Retries 10



This page presents the web-based parameters for the TK500.

| Name                    | Description   |
|-------------------------|---|
| Show Advanced Options   | Click to enable advanced options  |
| Basic Parameters        |   |
| Tunnel Name             | Tunnel Name   |
| Destination Address     | Set the destination address of the IPsec VPN server                     |
| Startup Modes           | Possible modes are "Auto Activate"/ "Triggered by Data"/"Passive"/"Manu |
| Restart WAN when failed | WAN Interface is restarted if tunnel setup fails                        |
| Negotiation Mode        | Optional: "Main Mode" or "Aggressive Mode"                              |
| IPsec Protocol          | Optional: "ESP" or "AH"   |
| IPsec Mode              | Optional: "Tunnel Mode" or "Transport Mode"                             |



Table 1 – continued from previous page

| Name  | Description   |
|---|---|
| VPN over IPSec  | L2TP or GRE over IPSec                                    |
| Tunnel Type   | Selection field for various setting options               |
| Local Subnet  | Set protected IPSec subnet (Local)                        |
| Local Netmask   | Set protected IPSec subnet mask (Local)                   |
| Remote Subnet   | Set protected IPSec subnet (remote)                       |
| Remote Netmask  | Set protected IPSec subnet mask (remote)                  |
|   | Phase 1 Parameters  |
| IKE Policy  | Multi-selection list for the policy                       |
| IKE Lifetime  | Set IKE validity period                                   |
| Local ID Type   | Selection of “FQDN”; “USERFQDN” or “IP address” possible  |
| Remote ID Type  | Selection of “IP address”; “USERFQDN”; or “FQDN” possible |
| Authentication Type                                   | Selection of “Shared Key” or “Certificate” possible       |
| Key (if authentication type “Shared Key” is selected) | Set IPSec key for VPN negotiation                         |
|   | XAUTH Parameters  |
| XAUTH Mode  | Enable XAUTH  |
| XAUTH Username  | XAUTH Username  |
| XAUTH Password  | XAUTH Password  |
| MODECFG   | Enable MODECFG  |
|   | Phase 2 Parameters  |
| IPSec Policy  | Multi-selection list for the policy                       |
| IPSec Lifetime  | Set IPSec validity period                                 |
| Perfect Forward Secrecy (PFS)                         | Optional: “Disable”; “GROUP1”; “Group2”; “Group5”         |
|   | Link Detection Parameters                                 |
| DPD Time Interval                                     | Set DPD Time Interval                                     |
| DPD Timeout   | Set DPD Timeout   |
| ICMP Detection Server                                 | Set server for ICMP detection                             |
| ICMP Detection Local IP                               | Set local IP for ICMP discovery                           |
| ICMP Detection Interval                               | Set interval for ICMP detection                           |
| ICMP Detection Timeout                                | Set timeout for ICMP detection                            |
| ICMP Detection Max Retries                            | Set maximum number of retries for ICMP detection          |

## 9.3 GRE Tunnels

Generic Routing Encapsulation (GRE) is a network protocol developed by Cisco and defined in RFC 1701. GRE can be used to wrap other protocols and thus transport them in an IP tunnel. GRE uses the IP protocol 47, the GRE header is structured as follows:

|                            |   |   |   |       |       |                   |               |
|----------------------------|---|---|---|-------|-------|-------------------|---------------|
| C                          | R | K | S | Recur | Flags | Ver               | Protocol Type |
| Checksum (optional)        |   |   |   |       |       | Offset (optional) |               |
| Key (optional)             |   |   |   |       |       |                   |               |
| Sequence Number (optional) |   |   |   |       |       |                   |               |
| Routing (optional)         |   |   |   |       |       |                   |               |

A GRE packet is therefore composed of an IP header, a GRE header and the actual payload. You can set up this GRE tunnel under **VPN > GRE Tunnels**.

System Network Services Firewall QoS VPN Tools Application Status

Your password have security risk, please click here to change!

GRE Tunnels

| Enable                              | Name | Local virtual IP | Peer Address | Remote virtual IP | Remote Subnet | Remote Netmask | Key | NAT                      | Description |
|-------------------------------------|------|------------------|--------------|-------------------|---------------|----------------|-----|--------------------------|-------------|
| <input checked="" type="checkbox"/> | tun0 | 0.0.0.0          | 0.0.0.0      | 0.0.0.0           | 0.0.0.0       | 255.255.255.0  |     | <input type="checkbox"/> |             |

Add

Apply Cancel

| Name                  | Description                                  | Default       |
|-----------------------|--|---------------|
| Enable                | Click to enable                              | Enabled       |
| Tunnel Name           | Set names for GRE tunnels                    | tun0          |
| Local Virtual IP      | Set local virtual IP                         | 0.0.0.0       |
| Peer Address          | Set peer address                             | 0.0.0.0       |
| Remote Virtual IP     | Set virtual IP of the remote network         | 0.0.0.0       |
| Remote Subnet Address | Set remote subnet address                    | 0.0.0.0       |
| Remote Subnet Netmask | Set remote subnet mask                       | 255.255.255.0 |
| Key                   | Set the key for the encryption of the tunnel | Blank         |
| NAT                   | Click to enable NAT function                 | Disabled      |
| Description           | Add description                              | Blank         |

## 9.4 L2TP Clients

Layer 2 Tunneling Protocol (L2TP) is a network protocol that tunnels frames of OSI model link layer protocols through routers between two networks over an IP network. L2TP routers and the IP connections between them appear as L2 switches. The L2TP client establishes the connection to the L2TP server here. You can reach the configuration via **VPN > L2TP Clients**.

System Network Services Firewall QoS VPN Tools Application Status

Your password have security risk, please click here to change!

L2TP Clients

| Name           | Tunnel Description            | Local IP Address | Remote IP Address | Tunnel Status | Conncted Time |
|----------------|-------------------------------|------------------|-------------------|---------------|---------------|
| <div>Add</div> | <div>Show Detail Status</div> |                  |                   |               |               |

5 Seconds Stop

Clicking on the **Add** button starts the configuration of the L2TP client.

### L2TP Clients

|                                |   |
|--------------------------------|---|
| Enable                         | <input checked="" type="checkbox"/>           |
| Tunnel name                    | <input type="text" value="L2TP_tunnel_1"/>    |
| L2TP Server                    | <input type="text"/>                          |
| Username                       | <input type="text"/>                          |
| Password                       | <input type="text"/>                          |
| L2TP Server Name               | <input type="text" value="l2tpserver"/>       |
| Startup Modes                  | <input type="text" value="Auto Activated"/> ▾ |
| Authentication Type            | <input type="text" value="CHAP"/> ▾           |
| Enable Challenge Secrets       | <input type="checkbox"/>                      |
| Local IP Address               | <input type="text"/>                          |
| Remote IP Address              | <input type="text"/>                          |
| Remote Subnet                  | <input type="text"/>                          |
| Remote Netmask                 | <input type="text" value="255.255.255.0"/>    |
| Multi Remote Subnet            | <input type="checkbox"/>                      |
| Link Detection Interval        | <input type="text" value="60"/> Seconds       |
| Max Retries for Link Detection | <input type="text" value="5"/>                |
| Enable NAT                     | <input type="checkbox"/>                      |
| MTU                            | <input type="text" value="1500"/>             |
| MRU                            | <input type="text" value="1500"/>             |
| Enable Debug                   | <input type="checkbox"/>                      |
| Expert Options(Expert Only)    | <input type="text"/>                          |

Save

Cancel

| Name                           | Description   | Default        |
|--------------------------------|---|----------------|
| Enable                         | Enables the tunnel settings   | Enabled        |
| Tunnel Name                    | Set name for tunnel   | L2TP_TUNNEL_1  |
| L2TP Server                    | Enter the address of the L2TP server  | Blank          |
| Username                       | Set username for server   | Blank          |
| Password                       | Set password for server   | Blank          |
| L2TP Server Name               | Set name for server   | l2tpserver     |
| Startup Modes                  | Set modes for startup: "Auto Activated", "Triggered by Data", "Manually Activated", "L2TPo- verIPSec" | Auto Activated |
| Authentication Type            | Set authentication type: "CHAP", "PAP"  | CHAP           |
| Enable Challenge Secrets       | Select to enable secret keys (challenge)  | Disabled       |
| Challenge Secrets              | If Enable Challenge Secrets is enabled, the secret key can be entered here                            | Blank          |
| Local IP Address               | Set local IP address  | Blank          |
| Remote IP Address              | Set remote IP address   | Blank          |
| Remote Subnet                  | Set remote subnet   | Blank          |
| Remote Subnet Net-mask         | Set remote subnet mask  | 255.255.255.0  |
| Link Detection Interval        | Set interval for link detection   | 60             |
| Max Retries for Link Detection | Set maximum number of retries for link detection  | 5              |
| Enable NAT                     | Click to enable NAT   | Disabled       |
| MTU                            | Set MTU parameters  | 1500           |
| MRU                            | Set MRU parameters  | 1500           |
| Enable Debug Mode              | Click to enable debug mode  | Disabled       |
| Expert Options                 | Set expert options  | Blank          |

## 9.5 PPTP Clients

PPTP (Point to Point Tunneling Protocol) is a VPN tunneling method for remote access connections. It is based on the Remote Access Server for Microsoft Windows NT including authentication. A PPTP client is integrated not only in Windows, but also in Linux and MacOS. Set up the PPTP client under **VPN > PPTP Clients**.

System
Network
Services
Firewall
QoS
VPN
Tools
Application
Status

Your password have security risk, please click here to change!

### PPTP Clients

| Name                 | Tunnel Description                  | Local IP Address | Remote IP Address | Tunnel Status | Conncted Time |
|----------------------|-------------------------------------|------------------|-------------------|---------------|---------------|
| <button>Add</button> | <button>Show Detail Status</button> |                  |                   |               |               |

5 Seconds
Stop

To set up a new PPTP client, click on the **Add** button. To view details of an existing PPTP client, click the **Show Detail Status** button. When you have clicked the **Add** button, you can make the following configuration settings.

**PPTP Clients****Edit PPTP Tunnel**

|                                |  |
|--------------------------------|--|
| Enable                         | <input checked="" type="checkbox"/>            |
| Tunnel name                    | <input type="text" value="PPTP_tunnel_1"/>     |
| PPTP Server                    | <input type="text"/>                           |
| Username                       | <input type="text"/>                           |
| Password                       | <input type="password"/>                       |
| Startup Modes                  | <input type="text" value="Auto Activated"/>    |
| Authentication Type            | <input type="text" value="Auto"/>              |
| Local IP Address               | <input type="text"/>                           |
| Remote IP Address              | <input type="text"/>                           |
| Remote Subnet                  | <input type="text"/>                           |
| Remote Netmask                 | <input type="text" value="255.255.255.0"/>     |
| Link Detection Interval        | <input type="text" value="60"/> <b>Seconds</b> |
| Max Retries for Link Detection | <input type="text" value="5"/>                 |
| Enable NAT                     | <input type="checkbox"/>                       |
| Enable MPPE                    | <input type="checkbox"/>                       |
| Enable MPPC                    | <input type="checkbox"/>                       |
| MTU                            | <input type="text" value="1500"/>              |
| MRU                            | <input type="text" value="1500"/>              |
| Enable Debug                   | <input type="checkbox"/>                       |
| Expert Options(Expert Only)    | <input type="text"/>                           |

Save

Cancel

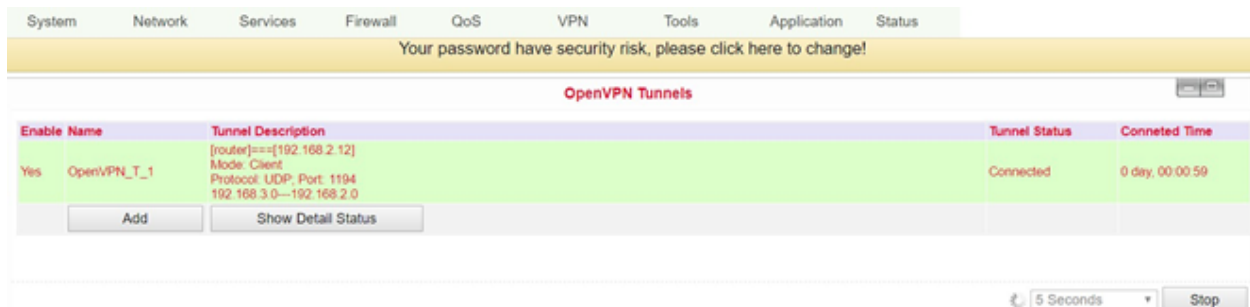
| Name                           | Description  | Default        |
|--------------------------------|--|----------------|
| Enable                         | Click to enable  | Enabled        |
| Tunnel Name                    | Tunnel Name (set automatically)  | PPTP_tunnel_1  |
| PPTP Server                    | Set address for PPTP server  | Blank          |
| Username                       | Set username for the server  | Blank          |
| Password                       | Set password for the server  | Blank          |
| Startup Mode:                  | Set modes for start “Auto Activated”, “Triggered by Data”, “Manually Activated | Auto Activated |
| Authentication Type            | Set authentication type: “PAP”, “CHAP”, “MS-CHAPv1”, “MS-CHAPv2”               | Auto           |
| Local IP Address               | Set local IP address   | Blank          |
| Remote IP Address              | Set remote IP address  | Blank          |
| Remote Subnet                  | Set remote subnet  | Blank          |
| Remote Subnet Netmask          | Set remote subnet mask   | 255.255.255.0  |
| Link Detection Interval        | Set interval for link detection  | 60             |
| Max Retries for Link Detection | Set maximum number of retries for link detection                               | 5              |
| Enable NAT                     | Click to enable NAT  | Blank          |
| Enable MPPE                    | Click to enable MPPE (Microsoft Point to Point Encryption)                     | Blank          |
| Enable MPPC                    | Click to enable MPPC (Microsoft Point to Point Compression)                    | Blank          |
| MTU                            | Set MTU parameters   | 1500           |
| MRU                            | Set MRU parameters   | 1500           |
| Enable Debug Mode              | Click to enable debug mode   | Blank          |
| Expert Options                 | Only for Welotec R&D   | Blank          |

## 9.6 OpenVPN Tunnels

OpenVPN is a free software for setting up a Virtual Private Network (VPN) over an encrypted TLS connection. The OpenSSL library is used for encryption. OpenVPN uses either UDP or TCP for transport.

OpenVPN is licensed under the GNU GPL and supports operating systems such as Linux, Windows, iOS and a variety of customized Linux-based endpoints such as TK 500 and TK 800 series routers.

On the TK500 configuration page, select the **VPN > Open VPN Tunnels** options as shown below:



The screenshot displays the 'OpenVPN Tunnels' configuration page. At the top, there are tabs for System, Network, Services, Firewall, QoS, VPN, Tools, Application, and Status. A yellow warning banner states: 'Your password have security risk, please click here to change!'. Below this, the 'OpenVPN Tunnels' section contains a table with the following data:

| Enable | Name        | Tunnel Description   | Tunnel Status | Conncted Time   |
|--------|-------------|--|---------------|-----------------|
| Yes    | OpenVPN_T_1 | [router]====[192.168.2.12]<br>Mode: Client<br>Protocol: UDP: Port: 1194<br>192.168.3.0---192.168.2.0 | Connected     | 0 day, 00:00:59 |

Below the table are buttons for 'Add' and 'Show Detail Status'. At the bottom of the page, there is a refresh button and a dropdown menu set to '5 Seconds', followed by a 'Stop' button.

Click **Add** to add a new OpenVPN tunnel. With **Show Detail Status** you can view the status of an already configured OpenVPN tunnel.

| System   | Network                             | Services | Firewall | QoS | VPN | Tools           |
|--|-------------------------------------|----------|----------|-----|-----|-----------------|
| Your password have security risk, please                         |                                     |          |          |     |     |                 |
|  |                                     |          |          |     |     | OpenVPN Tunnels |
| <b>Edit OPENVPN Tunnel</b>                                       |                                     |          |          |     |     |                 |
| Tunnel name  | OpenVPN_T_1                         |          |          |     |     |                 |
| Enable   | <input checked="" type="checkbox"/> |          |          |     |     |                 |
| Mode   | Client ▾                            |          |          |     |     |                 |
| Protocol   | UDP ▾                               |          |          |     |     |                 |
| Port   | 1194                                |          |          |     |     |                 |
| OPENVPN Server   | 192.168.2.12                        |          |          |     |     |                 |
| Authentication Type  | X.509 Cert ▾                        |          |          |     |     |                 |
| Pre-shared Key   |                                     |          |          |     |     |                 |
| Local IP Address   | 192.168.3.0                         |          |          |     |     |                 |
| Remote IP Address  | 192.168.2.0                         |          |          |     |     |                 |
| Remote Subnet  |                                     |          |          |     |     |                 |
| Remote Netmask   | 255.255.255.0                       |          |          |     |     |                 |
| Link Detection Interval  | 60                                  | Seconds  |          |     |     |                 |
| Link Detection Timeout   | 300                                 | Seconds  |          |     |     |                 |
| Renegotiate Interval   | 86400                               | Seconds  |          |     |     |                 |
| Enable NAT   | <input checked="" type="checkbox"/> |          |          |     |     |                 |
| Enable LZO   | <input type="checkbox"/>            |          |          |     |     |                 |
| Encryption Algorithms  | AES(256) ▾                          |          |          |     |     |                 |
| MTU  | 1500                                |          |          |     |     |                 |
| Max Fragment Size  |                                     |          |          |     |     |                 |
| Debug Level  | Warn ▾                              |          |          |     |     |                 |
| Interface Type   | TUN ▾                               |          |          |     |     |                 |
| Expert Options(Expert Only)                                      |                                     |          |          |     |     |                 |
| <div> <div>Save</div> <div>Cancel</div> <div>Delete</div> </div> |                                     |          |          |     |     |                 |

| Name  | Description  |
|---|--|
| Tunnel name                                     | Predefined   |
| Enable  | Enable this configuration  |
| Mode  | Select “Client” or “Server” mode   |
| Protocol  | Selection of the “UDP” or “TCP” protocol   |
| Port  | Default port for OpenVPN is 1194   |
| OPENVPN Server                                  | IP or DNS of the OpenVPN server  |
| Authentication Type                             | Selection of the authentication type. Depending on the selection, different fields are available |
| Pre-shared Key                                  | Set static password if Pre shared Key, shared key or TLS-AUTH is selected                        |
| Remote Subnet, Remote Netmask                   | Set static route of the router, always in the direction of the peer’s subnet                     |
| Username/Password                               | If User/Password is selected, the corresponding data is entered in these fields                  |
| Link Detection Interval, Link Detection Timeout | Always use default   |
| Renegotiate Interval                            | Always use default   |
| Enable NAT                                      | Set NAT mode, in the meantime routing mode is disabled   |
| Enable LZO                                      | Enable LZO compression   |
| Encryption Algorithms                           | Set encryption algorithm, must match server  |
| MTU   | Always use default, 1500   |
| Max Fragment Size                               | Maximum size of individual packets   |
| Debug Level                                     | Selection of debug outputs in the log  |
| Interface Type                                  | TUN / TAP  |
| Expert Options (Expert Only)                    | More OpenVPN commands (only for experienced users)   |

## 9.7 OpenVPN Advanced

This configuration page is only used for the OpenVPN server and provides advanced functions. You can reach this point via **VPN > OpenVPN Advanced**.

System   Network   Services   Firewall   QoS   VPN   Tools   Application   Status

Your password have security risk, please click here to change!

OpenVPN Advanced

Enable Client-to-Client (Server Mode Only) ☐

Client Management

| Enable                              | Tunnel name | Username/CommonName | Password | Client IP(4th byte must be 4n+1) | Local Static Route | Remote Static Route |
|-------------------------------------|-------------|---------------------|----------|----------------------------------|--------------------|---------------------|
| <input checked="" type="checkbox"/> | OpenVPN_T_  |                     |          |                                  |                    |                     |

Add

Apply   Cancel

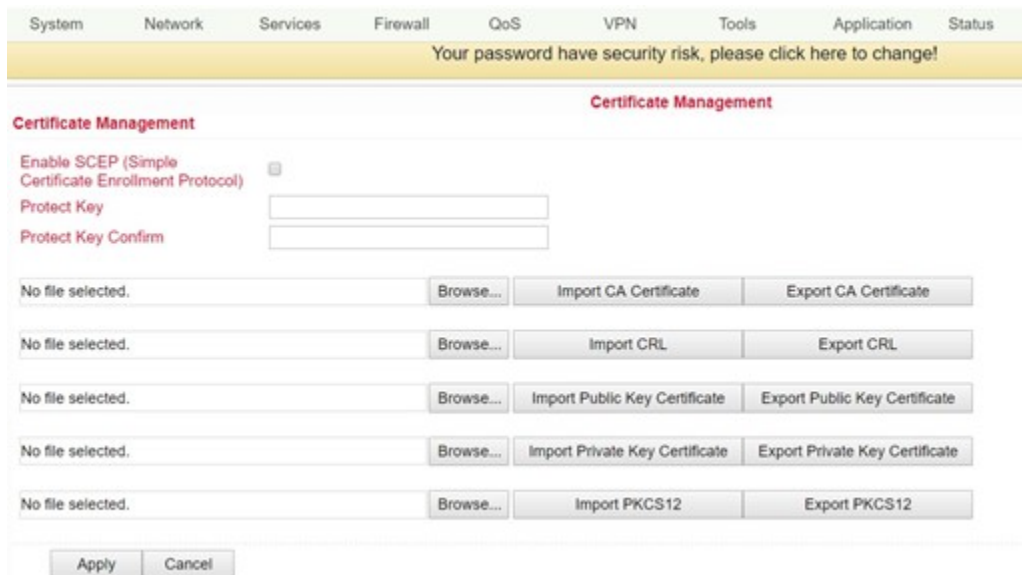


| Name                                       | Description  |
|--|--|
| Enable Client-to-Client (Server Mode Only) | Enable client access to other clients                                  |
| Client Management                          |  |
| Enable                                     | Enable the function  |
| Tunnel Name                                | Tunnel name of the client  |
| Username/Common Name                       | Username (using username/password mode) or common name in CA (CA mode) |
| Client IP                                  | Specification of the client IP address                                 |
| Local Static Route                         | Subnet of the client   |
| Remote Static Route                        | Subnet of the server   |

CA can only be created from the customer's PC, not from TK500.

## 9.8 Certificate Management

Under the menu item **VPN > Certificate Management** you can include the certificates that you want to use for your VPN connections. You can also export already existing certificates.



The screenshot shows the 'Certificate Management' page in a web interface. At the top, there is a navigation bar with tabs: System, Network, Services, Firewall, QoS, VPN, Tools, Application, and Status. Below the navigation bar, a yellow banner displays the message: 'Your password have security risk, please click here to change!'. The main heading 'Certificate Management' is centered. Below the heading, there is a section for 'Enable SCEP (Simple Certificate Enrollment Protocol)' with a checkbox. Underneath, there are two input fields labeled 'Protect Key' and 'Protect Key Confirm'. The interface then lists five rows of file management options, each with a 'Browse...' button and two action buttons: 'Import CA Certificate', 'Export CA Certificate', 'Import CRL', 'Export CRL', 'Import Public Key Certificate', 'Export Public Key Certificate', 'Import Private Key Certificate', 'Export Private Key Certificate', and 'Import PKCS12', 'Export PKCS12'. At the bottom, there are 'Apply' and 'Cancel' buttons.

| Name                                  | Description   | Default          |
|---------------------------------------|---|------------------|
| Enable SCEP                           | Click to enable   |                  |
| Protect Key                           | Set a key to protect the certificates                               | Blank            |
| Protect Key Confirm                   | Confirm the key to protect the certificates                         | Blank            |
| Import/Export CA Certificate          | Import or export CA certificate                                     | Blank            |
| Import/Export Certificate (CRL)       | Import or export CRL certificate                                    | Blank            |
| Import/Export Public Key Certificate  | Import/export public key certificate                                | Blank            |
| Import/Export Private Key Certificate | Import or export private key certificate                            | Blank            |
| Import/Export PKCS12                  | Import or export PKCS12 (private key and X.509 certificate)         | Blank            |
| Browse                                | Via Browse the respective file is selected and can then be imported | No file selected |

# 10 Tools

The tools are useful tools and include PING detection, trace route, connection speed tests, etc.

## 10.1 PING

Select the item *Tools > Ping* if you want to test if there is a connection to the network/Internet.

| System   | Network | Services                              | Firewall | QoS                                 | VPN | Tools | Application | Status |
|--|---------|---------------------------------------|----------|-------------------------------------|-----|-------|-------------|--------|
| Your password have security risk, please click here to change!   |         |                                       |          |                                     |     |       |             |        |
| <b>PING</b>  |         |                                       |          |                                     |     |       |             |        |
| Host   |         | <input type="text" value="8.8.8.8"/>  |          | <input type="button" value="Ping"/> |     |       |             |        |
| Ping Count   |         | <input type="text" value="4"/>        |          |                                     |     |       |             |        |
| Packet Size  |         | <input type="text" value="32"/> Bytes |          |                                     |     |       |             |        |
| Expert Options   |         | <input type="text"/>                  |          |                                     |     |       |             |        |
| <pre> PING 8.8.8.8 (8.8.8.8): 32 data bytes 40 bytes from 8.8.8.8: icmp_seq=0 ttl=117 time=138.2 ms 40 bytes from 8.8.8.8: icmp_seq=1 ttl=117 time=26.0 ms 40 bytes from 8.8.8.8: icmp_seq=2 ttl=117 time=25.0 ms 40 bytes from 8.8.8.8: icmp_seq=3 ttl=117 time=24.2 ms  --- 8.8.8.8 ping statistics --- 4 packets transmitted, 4 packets received, 0% packet loss round-trip min/avg/max = 24.2/53.3/138.2 ms           </pre> |         |                                       |          |                                     |     |       |             |        |

| Name           | Description              | Default |
|----------------|--------------------------|---------|
| Host           | Destination for PING     | Blank   |
| Ping Count     | Set number of PINGs      | 4 Mal   |
| Packet Size    | Set packet size for PING | 32 Byte |
| Expert Options | Advanced parameters      | Blank   |

## 10.2 Traceroute

Traceroute (tracert) determines via which routers and Internet nodes the IP data packets reach the queried computer. You can enter the data under **Tools > Traceroute**.

System
Network
Services
Firewall
QoS
VPN
Tools
Application
Status

Your password have security risk, please click here to change!

Traceroute

Host
8.8.8.8
Trace

Maximum Hops
20

Timeout
3
Seconds

Protocol
UDP

Expert Options

1 \* \* \*  
2 \* \* \*  
3 \* \* \*  
4 \* \* \*  
5 \* \* \*  
6 \* \* \*  
7 \* \* \*  
8 80.156.5.17 (80.156.5.17) 27.680 ms 18.820 ms 21.380 ms  
9 217.5.118.14 (217.5.118.14) 27.020 ms 27.240 ms 26.680 ms  
10 87.128.238.134 (87.128.238.134) 25.740 ms 24.280 ms 26.660 ms  
11 \* \* \*  
12 66.249.94.146 (66.249.94.146) 43.600 ms 216.239.56.150 (216.239.56.150) 26.720 ms 216.239.63.254 (216.239.63.254) 27.940 ms  
13 209.85.240.177 (209.85.240.177) 25.120 ms 108.170.233.35 (108.170.233.35) 25.180 ms 216.239.48.79 (216.239.48.79) 27.200 ms  
14 google-public-dns-a.google.com (8.8.8.8) 25.040 ms 26.000 ms 23.800 ms

| Name           | Description                 | Default   |
|----------------|-----------------------------|-----------|
| Host           | Destination for Trace Route | Blank     |
| Max Hops       | Set maximum number of hops  | 20        |
| Time Out       | Set timeout                 | 3 Seconds |
| Protocol       | Optional: "ICMP"/"UDP"      | UDP       |
| Expert Options | Advanced parameters         | Blank     |

## 10.3 Link Speed Test

Test the connection speed via upload or download. Please select this area via **"Tools > Link Speed Test"**.

System
Network
Services
Firewall
QoS
VPN
Tools
Application
Status

Your password have security risk, please click here to change!

Link Speed Test

No file selected.
Browse...
upload
download

Via the **Browse** button you can upload a corresponding file from the computer. The file should be between 10 and 2000MB in size. After selecting the file, click on the **Upload** button. The result will be displayed.

## 10.4 TCPDUMP

The TCPDUMP function reads data in the form of packets sent over the network and displays them on the screen or saves them to files.

| System  | Network | Services             | Firewall     | QoS | VPN | Tools                 | Application | Status |
|---|---------|----------------------|--------------|-----|-----|-----------------------|-------------|--------|
| Your password have security risk, please click here to change |         |                      |              |     |     |                       |             |        |
| <b>TCPDUMP</b>  |         |                      |              |     |     |                       |             |        |
| Interface   |         | ANY ▾                |              |     |     |                       |             |        |
| Capture Number  |         | 10 (10-1000)         |              |     |     |                       |             |        |
| Expert Options  |         | <input type="text"/> |              |     |     |                       |             |        |
|   |         |                      |              |     |     |                       |             |        |
| Start Capture   |         |                      | Stop Capture |     |     | Download Capture File |             |        |

# 11 Application

The menu item “*Application*” is currently not supported.

## 11.1 SMART-EMS

| System   | Network | Services                               | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|--|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change              |         |  |          |     |     |       |             |        |
| <b>SMART-EMS</b>   |         |  |          |     |     |       |             |        |
| Server URL   |         | <input type="text"/>                   |          |     |     |       |             |        |
| Username   |         | <input type="text" value="adm"/>       |          |     |     |       |             |        |
| Password   |         | <input type="password" value="....."/> |          |     |     |       |             |        |
| Contact Interval   |         | <input type="text"/>                   |          |     |     |       |             | Hours  |
| Send running config  |         | <input type="checkbox"/>               |          |     |     |       |             |        |
| Write startup  |         | <input type="checkbox"/>               |          |     |     |       |             |        |
| <input type="button" value="Apply"/> <input type="button" value="Cancel"/> |         |  |          |     |     |       |             |        |

## 12 Status

Under “**Status**” you get information about system, modem, network connections, routing table, device list and protocol.

### 12.1 System


Select from the menu **Status > System** to get information about your system.

| System   | Network  | Services | Firewall | QoS | VPN | Tools | Application | Status |
|--|--|----------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change! |  |          |          |     |     |       |             |        |
| <b>System</b>  |  |          |          |     |     |       |             |        |
| Name   | Router   |          |          |     |     |       |             |        |
| Serial Number  | RL6151823435201  |          |          |     |     |       |             |        |
| Description  | TK525L   |          |          |     |     |       |             |        |
| Current Version  | 2.3.0.r4648  |          |          |     |     |       |             |        |
| Current Bootloader Version                                     | 1.1.3.r4560  |          |          |     |     |       |             |        |
| Router Time  | 2018-10-01 16:21:57  |          |          |     |     |       |             |        |
| PC Time  | 2018-10-01 16:21:58 <input type="button" value="Sync Time"/> |          |          |     |     |       |             |        |
| Up time  | 0 day, 02:31:53  |          |          |     |     |       |             |        |
| CPU Load (1 / 5 / 15 mins)                                     | 0.36 / 0.16 / 0.11   |          |          |     |     |       |             |        |
| Memory consumption<br>Total/Free                               | 27.73MB / 5,864.00KB (20.65%)                                |          |          |     |     |       |             |        |

This page displays the status of the system, including information about the name, model type, current version, etc.

### 12.2 Modem

Check the status of your modem under **Status > Modem**.

| System   | Network  | Services | Firewall | QoS | VPN | Tools | Application | Status |
|--|--|----------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change! |  |          |          |     |     |       |             |        |
| <b>Modem</b>   |  |          |          |     |     |       |             |        |
| <b>Dialup</b>  |  |          |          |     |     |       |             |        |
| Status   | modem is ready   |          |          |     |     |       |             |        |
| Signal Level   |  (22) |          |          |     |     |       |             |        |
| RSSI   | -69 dBm  |          |          |     |     |       |             |        |
| Register Status  | registered   |          |          |     |     |       |             |        |
| IMEI(ESN) Code   | 867377025051750  |          |          |     |     |       |             |        |
| IMSI Code  | 262011406930165  |          |          |     |     |       |             |        |
| Network Type   | 4G   |          |          |     |     |       |             |        |
| PLMN   | 26201  |          |          |     |     |       |             |        |
| LAC  | 2EE2   |          |          |     |     |       |             |        |
| Cell ID  | 01E13103   |          |          |     |     |       |             |        |

Here you can view the status of the modem including the signal strength.

## 12.3 Traffic Statistics

If you want to view the data consumption of the SIM card in the TK500, then you can do this under **Status > Traffic Statistics**.

| System   | Network | Services | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|----------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change! |         |          |          |     |     |       |             |        |
| Traffic Statistics   |         |          |          |     |     |       |             |        |
| Dialup   |         |          |          |     |     |       |             |        |
| Month Receive Traffic  |         | 1,743KB  |          |     |     |       |             |        |
| Month Transmit Traffic   |         | 3,547KB  |          |     |     |       |             |        |
| Day Receive Traffic  |         | 1,743KB  |          |     |     |       |             |        |
| Day Transmit Traffic   |         | 3,547KB  |          |     |     |       |             |        |
| Hour Receive Traffic   |         | 7991B    |          |     |     |       |             |        |
| Hour Transmit Traffic  |         | 7876B    |          |     |     |       |             |        |
| <div>Clear</div>   |         |          |          |     |     |       |             |        |

Here you can see the monthly, daily and hourly data that has been received or transmitted. Via the button “**Clear**” you can reset the entries to 0.

## 12.4 Alarm

Check the alarms generated by the TK500, for example created under 3.3.7. in the Alarm Manager. You can access this menu item under **Status > Alarm**.

SystemNetworkServicesFirewallQoSVPNToolsApplicationStatus

Your password have security risk, please click here to change!

Alarm

| ID | Status | Level | Date                     | Content                                  |
|----|--------|-------|--------------------------|--|
| 1  | raise  | INFO  | Fri Sep 28 16:36:50 2018 | Interface cellular,changed state to up   |
| 2  | raise  | INFO  | Thu Sep 27 16:53:14 2018 | Interface cellular,changed state to up   |
| 3  | raise  | INFO  | Tue Aug 1 15:01:12 2017  | Interface cellular,changed state to up   |
| 4  | raise  | INFO  | Thu Sep 20 15:47:27 2018 | Interface cellular,changed state to down |
| 5  | raise  | INFO  | Tue Sep 18 15:28:15 2018 | Interface cellular,changed state to up   |
| 6  | raise  | INFO  | Thu Sep 20 14:57:49 2018 | Interface cellular,changed state to down |
| 7  | raise  | INFO  | Tue Sep 18 15:26:36 2018 | Interface cellular,changed state to up   |
| 8  | raise  | INFO  | Tue Sep 18 15:29:40 2018 | Interface cellular,changed state to up   |
| 9  | raise  | INFO  | Tue Sep 18 15:26:16 2018 | Interface cellular,changed state to up   |
| 10 | raise  | INFO  | Tue Sep 18 16:01:10 2018 | Interface cellular,changed state to down |
| 11 | raise  | INFO  | Tue Aug 1 14:00:21 2017  | Interface cellular,changed state to up   |

Clear All AlarmsConfirm All Alarms

In this example the monthly limit of the SIM card has been reached. With the button “**Clear All Alarms**” you can delete all alarm messages and with “**Confirm All Alarms**” you confirm that you have taken note of the alarm.



## 12.5 WLAN

Via **Status > WLAN** you can view all WLAN networks that are in the reception range of the TK500. For this, the WLAN function must be activated in the TK500 (see 3.2.6).

| System  | Network       | Services          | Firewall    | QoS       | VPN     | Tools  | Status |
|---|---------------|-------------------|-------------|-----------|---------|--------|--------|
| <b>WLAN</b>   |               |                   |             |           |         |        |        |
| Channel   | SSID          | BSSID             | Security    | Signal(%) | Mode    | Status |        |
| 1   | JD-PRO-Remote | 0e:18:0a:9f:b0:47 | WPA2PSK/AES | 34        | 11b/g/n |        |        |
| 1   | WeloLabor     | 00:18:0a:9f:b0:47 | WPA2PSK/AES | 39        | 11b/g/n |        |        |
| <div> <span>3 Seconds</span> <span>Stop</span> </div> |               |                   |             |           |         |        |        |

## 12.6 Network Connections

Via **Status > Network Connections** you can get an overview of the network connections of the TK500.

| System   | Network | Services                    | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|-----------------------------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change! |         |                             |          |     |     |       |             |        |
| Network Connections  |         |                             |          |     |     |       |             |        |
| WAN  |         |                             |          |     |     |       |             |        |
| MAC Address  |         | 00:18:05:0C:C3:9B           |          |     |     |       |             |        |
| Connection Type  |         | Dynamic Address (DHCP)      |          |     |     |       |             |        |
| IP Address   |         | 0.0.0.0                     |          |     |     |       |             |        |
| Netmask  |         | 0.0.0.0                     |          |     |     |       |             |        |
| Gateway  |         | 0.0.0.0                     |          |     |     |       |             |        |
| DNS  |         | 0.0.0.0                     |          |     |     |       |             |        |
| MTU  |         | 1500                        |          |     |     |       |             |        |
| Status   |         | Renewing...                 |          |     |     |       |             |        |
| Connection time  |         |                             |          |     |     |       |             |        |
| Remaining Lease  |         | 0 day, 00:00:00             |          |     |     |       |             |        |
| <div>RenewRelease</div>  |         |                             |          |     |     |       |             |        |
| Dialup   |         |                             |          |     |     |       |             |        |
| Connection Type  |         | Dialup                      |          |     |     |       |             |        |
| IP Address   |         | 37.80.83.157                |          |     |     |       |             |        |
| Netmask  |         | 255.255.255.252             |          |     |     |       |             |        |
| Gateway  |         | 37.80.83.158                |          |     |     |       |             |        |
| DNS  |         | 10.74.210.210,10.74.210.211 |          |     |     |       |             |        |
| MTU  |         | 1500                        |          |     |     |       |             |        |
| Status   |         | Connected                   |          |     |     |       |             |        |
| Connection time  |         | 0 day, 02:36:53             |          |     |     |       |             |        |
| <div>ConnectDisconnect</div>                                   |         |                             |          |     |     |       |             |        |
| LAN  |         |                             |          |     |     |       |             |        |
| Connection Type  |         | Static IP                   |          |     |     |       |             |        |
| MAC Address  |         | 00:18:05:0C:C3:9C           |          |     |     |       |             |        |
| IP Address   |         | 192.168.2.1                 |          |     |     |       |             |        |
| Netmask  |         | 255.255.255.0               |          |     |     |       |             |        |
| Gateway  |         |                             |          |     |     |       |             |        |
| DNS  |         |                             |          |     |     |       |             |        |
| MTU  |         | 1500                        |          |     |     |       |             |        |

Here you can see at a glance the network connections via WAN, dialup or LAN.

## 12.7 Route Table

If you want to have an overview of the routing table in the TK500, select **Status > Route Table** from the menu.

| System   | Network         | Services     | Firewall | QoS       | VPN | Tools | Application | Status |
|--|-----------------|--------------|----------|-----------|-----|-------|-------------|--------|
| Your password have security risk, please click here to change! |                 |              |          |           |     |       |             |        |
| Route Table  |                 |              |          |           |     |       |             |        |
| Destination  | Netmask         | Gateway      | Metric   | Interface |     |       |             |        |
| 192.168.2.0  | 255.255.255.255 | 0.0.0.0      | 0        | tun0      |     |       |             |        |
| 37.80.83.156   | 255.255.255.252 | 0.0.0.0      | 0        | cellular  |     |       |             |        |
| 192.168.2.0  | 255.255.255.0   | 0.0.0.0      | 0        | lan0      |     |       |             |        |
| 127.0.0.0  | 255.0.0.0       | 0.0.0.0      | 0        | lo        |     |       |             |        |
| default  | 0.0.0.0         | 37.80.83.158 | 0        | cellular  |     |       |             |        |

After clicking on it, you will see the routing table of the TK500.

## 12.8 Device List

| System   | Network           | Services     | Firewall | QoS | VPN | Tools | Application | Status |
|--|-------------------|--------------|----------|-----|-----|-------|-------------|--------|
| Your password have security risk, please click here to change! |                   |              |          |     |     |       |             |        |
| Device List  |                   |              |          |     |     |       |             |        |
| Interface  | MAC Address       | IP Address   | Host     |     |     |       |             |        |
| usb0   | 4C:54:99:45:E5:D5 | 37.80.83.158 |          |     |     |       |             |        |
| lan0   | 00:0E:C6:CD:23:FE | 192.168.2.12 |          |     |     |       |             |        |

Under the menu item **Status > Device List** all devices are displayed which are connected to the TK500.

Overview of the devices connected to the TK500.

## 12.9 Log

Documentation of the system events (logs) of the TK500. You reach this area under **Status > Log**.

| System  | Network        | Services          | Firewall   | QoS               | VPN                             | Tools | Application | Status |
|---|----------------|-------------------|--|-------------------|---------------------------------|-------|-------------|--------|
| Your password have security risk, please click here to change!  |                |                   |  |                   |                                 |       |             |        |
| Log   |                |                   |  |                   |                                 |       |             |        |
| when local/remote addresses exist within the same /24 subnet as --ifconfig endpoints. (silence this warning with --ifconfig-nowarn) |                |                   |  |                   |                                 |       |             |        |
| notice  | Oct 1 16:29:12 | openvpn[4015]     | TUN/TAP device tun0 opened   |                   |                                 |       |             |        |
| notice  | Oct 1 16:29:12 | openvpn[4015]     | TUN/TAP TX queue length set to 100   |                   |                                 |       |             |        |
| notice  | Oct 1 16:29:12 | openvpn[4015]     | do_ifconfig, tt->ipv6=0, tt->did_ifconfig_ipv6_setup=0   |                   |                                 |       |             |        |
| notice  | Oct 1 16:29:12 | openvpn[4015]     | /sbin/ifconfig tun0 192.168.3.0 pointopoint 192.168.2.0 mtu 1500   |                   |                                 |       |             |        |
| notice  | Oct 1 16:29:12 | openvpn[4015]     | /tmp/OpenVPN_T_1.up tun0 1500 1557 192.168.3.0 192.168.2.0 init  |                   |                                 |       |             |        |
| info  | Oct 1 16:29:12 | openvpn-up[29129] | tunnel(OpenVPN_T_1),tun0 up: 192.168.3.0 <=> 192.168.2.0, tun mtu:1500, link mtu:1557                        |                   |                                 |       |             |        |
| debug   | Oct 1 16:29:12 | openvpn-up[29129] | add ACL rule: enabled to accept & log, [proto: 1, 0.0.0.0/0 port 7110:7113 => 192.168.2.12 port 7110 ], Test |                   |                                 |       |             |        |
| debug   | Oct 1 16:29:12 | openvpn-up[29129] | applying MAC-IP rules  |                   |                                 |       |             |        |
| info  | Oct 1 16:29:12 | openvpn-up[29129] | stop_qoslimit:old interface name not get   |                   |                                 |       |             |        |
| info  | Oct 1 16:29:12 | openvpn-up[29129] | ratelimit_enable is 0  |                   |                                 |       |             |        |
| info  | Oct 1 16:29:12 | openvpn-up[29129] | firewall ACL does not exist for domain rules.  |                   |                                 |       |             |        |
| info  | Oct 1 16:29:12 | openvpn-up[29129] | Clear connection table in openvpn up...  |                   |                                 |       |             |        |
| notice  | Oct 1 16:29:12 | openvpn[4015]     | UDPv4 link local: [undef]  |                   |                                 |       |             |        |
| notice  | Oct 1 16:29:12 | openvpn[4015]     | UDPv4 link remote: [AF_INET]192.168.2.12:1194  |                   |                                 |       |             |        |
| info  | Oct 1 16:29:12 | udhcpd[460]       | Sending discover...  |                   |                                 |       |             |        |
| info  | Oct 1 16:29:15 | udhcpd[460]       | Sending discover...  |                   |                                 |       |             |        |
|   |                |                   | Clear Log  | Download Log File | Download System Diagnosing Data |       |             |        |

This page displays the system log, which can be downloaded here.

It may occur that problems cannot be diagnosed and rectified immediately. In these cases, we ask you to send the diagnostic log to Welotec. To do this, click on “[Download System Diagnosing Data](#)”, and then send us the log with a description of the error to [support@welotec.com](mailto:support@welotec.com)

## 12.10 Third Party Software

Here are the software terms and licenses from all third party vendors related to the TK500 router series.

| System   | Network | Services | Firewall | QoS | VPN | Tools | Application | Status |
|--|---------|----------|----------|-----|-----|-------|-------------|--------|
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# 13 Technical specifications

## 13.1 Device properties

| Property               | Value                      |
|------------------------|----------------------------|
| Dimensions (W x H x D) | 35 x 127 x 108,2 mm        |
| Operating voltage      | 230 V AC to 12 V – 24 V DC |
| Approval               | CE compliant               |

## 13.2 Environmental conditions

| Property                    | Value                    |
|-----------------------------|--------------------------|
| Operating temperature range | -15 to +70 °C            |
| Air humidity                | 5 - 95 %, non condensing |
| Concussions                 | IEC 60068-2-27           |
| Free fall                   | IEC 60068-2-32           |
| Vibration                   | IEC 60068-2-6            |

## 13.3 Radio frequencies

### 13.3.1 Radio frequencies LTE Europe

| Fre-<br>quency | Frequency range and transmission power  | Router                           |
|----------------|---|----------------------------------|
| Band 1         | Frequency range Down: 2110 MHz – 2170 MHz Frequency range Up: 1920 MHz – 1980 MHz Max. transmission power: 200 mW | TK525U, TK525L, TK525L W, TK525W |
| Band 3         | Frequency range Down: 1805 MHz – 1880 MHz Frequency range Up: 1710 MHz – 1785 MHz Max. transmission power: 200 mW | TK525U, TK525L, TK525L-W, TK525W |
| Band 7         | Frequency range Down: 2620 MHz – 2690 MHz Frequency range Up: 2500 MHz – 2570 MHz Max. transmission power: 200 mW | TK525U, TK525L, TK525L-W, TK525W |
| Band 8         | Frequency range Down: 925 MHz – 960 MHz Frequency range Up: 880 MHz – 915 MHz Max. transmission power: 200 mW     | TK525U, TK525L, TK525L-W, TK525W |
| Band 20        | Frequency range Down: 791 MHz – 821 MHz Frequency range Up: 832 MHz – 862 MHz Max. transmission power: 200 mW     | TK525U, TK525L, TK525L W, TK525W |
| Band 28        | Frequency range Down: 703 MHz – 748 MHz Frequency range Up: 758 MHz – 803 MHz Max. transmission power: 200 mW     | TK525U, TK525L, TK525L-W, TK525W |

## 13.3.2 Radio frequencies UMTS Europe

| Fre-<br>quency | Frequency range and transmission power  | Router                           |
|----------------|---|----------------------------------|
| Band 1         | Frequency range Down: 2110 MHz – 2170 MHz Frequency range Up: 1920 MHz – 1980 MHz Max. transmission power: 251 mW | TK525U, TK525L, TK525L-W, TK525W |
| Band 8         | Frequency range Down: 925 MHz – 960 MHz Frequency range Up: 880 MHz – 915 MHz Max. transmission power: 251 mW     | TK525U, TK525L, TK525L-W, TK525W |

## 13.3.3 Radio frequencies GSM Europe

| Fre-<br>quency | Frequency range and transmission power   | Router                           |
|----------------|--|----------------------------------|
| GSM 900        | Frequency range Down: 925 MHz – 960 MHz Frequency range Up: 880 MHz – 915 MHz Max. transmission power: 1995 mW   | TK525U, TK525L, TK525L-W, TK525W |
| GSM 1800       | Frequency range Down: 1805 MHz – 1880 MHz Frequency range Up: 1710 MHz – 1785 MHz Max. transmission power: 40 mW | TK525U, TK525L, TK525L-W, TK525W |

## 13.3.4 Radio frequencies LTE Asia

| Fre-<br>quency | Frequency range and transmission power  | Router                           |
|----------------|---|----------------------------------|
| Band 1         | Frequency range Down: 1920 MHz – 1980 MHz Frequency range Up: 2110 MHz – 2170 MHz Max. transmission power: 200 mW | TK525U, TK525L, TK525L-W, TK525W |
| Band 3         | Frequency range Down: 1805 MHz – 1880 MHz Frequency range Up: 1710 MHz – 1785 MHz Max. transmission power: 200 mW | TK525U, TK525L, TK525L-W, TK525W |
| Band 7         | Frequency range Down: 2620 MHz – 2690 MHz Frequency range Up: 2500 MHz – 2570 MHz Max. transmission power: 200 mW | TK525U, TK525L, TK525L-W, TK525W |
| Band 38 China  | Frequency range Down: 2570 MHz – 2620 MHz Frequency range Up: n.b. Max. transmission power: 200 mW                | TK525U, TK525L, TK525L-W, TK525W |
| Band 40 China  | Frequency range Down: 2300 MHz – 2400 MHz Frequency range Up: n.b. Max. transmission power: 200 mW                | TK525U, TK525L, TK525L-W, TK525W |
| Band 41 China  | Frequency range Down: 2496 MHz – 2690 MHz Frequency range Up: n.b. Max. transmission power: 200 mW                | TK525U, TK525L, TK525L-W, TK525W |

## 13.4 Radio frequencies UMTS Asia

| Fre-<br>quency | Frequency range and transmission power  | Router                           |
|----------------|---|----------------------------------|
| Band 1         | Frequency range Down: 2110 MHz – 2170 MHz Frequency range Up: 1920 MHz – 1980 MHz Max. transmission power: 251 mW | TK525U, TK525L, TK525L-W, TK525W |
| Band 8         | Frequency range Down: 925 MHz – 960 MHz Frequency range Up: 880 MHz – 915 MHz Max. transmission power: 251 mW     | TK525U, TK525L, TK525L-W, TK525W |

### 13.4.1 Radio frequencies GSM Asia

| Fre-<br>quency | Frequency range and transmission power   | Router                           |
|----------------|--|----------------------------------|
| GSM 900        | Frequency range Down: 925 MHz – 960 MHz Frequency range Up: 880 MHz – 915 MHz Max. transmission power: 1995 mW     | TK525U, TK525L, TK525L-W, TK525W |
| GSM 1800       | Frequency range Down: 1805 MHz – 1880 MHz Frequency range Up: 1710 MHz – 1785 MHz Max. transmission power: 1000 mW | TK525U, TK525L, TK525L-W, TK525W |

### 13.4.2 Radio frequencies UMTS Global

| Fre-<br>quency | Frequency range and transmission power  | Router                           |
|----------------|---|----------------------------------|
| Band 1         | Frequency range Down: 2110 MHz – 2170 MHz Frequency range Up: 1920 MHz – 1980 MHz Max. transmission power: 251 mW | TK525U, TK525L, TK525L-W, TK525W |
| Band 8         | Frequency range Down: 925 MHz – 960 MHz Frequency range Up: 880 MHz – 915 MHz Max. transmission power: 251 mW     | TK525U, TK525L, TK525L-W, TK525W |

### 13.4.3 Radio frequencies GSM Global

| Fre-<br>quency | Frequency range and transmission power   | Router                           |
|----------------|--|----------------------------------|
| GSM 850        | Frequency range Down: 869 MHz – 894 MHz Frequency range Up: 824 MHz – 849 MHz Max. transmission power: 1995 mW     | TK525U, TK525L, TK525L-W, TK525W |
| GSM 1900       | Frequency range Down: 1930 MHz – 1990 MHz Frequency range Up: 1850 MHz – 1910 MHz Max. transmission power: 1000 mW | TK525U, TK525L, TK525L-W, TK525W |

### 13.4.4 Radio frequencies WLAN

| Frequency | Frequency range and transmission power                                | Router   |
|-----------|---|----------|
| 2,4 GHz   | Frequency range: 2400 MHz – 2483,5 MHz Max. transmission power: 40 mW | TK525L-W |

# 14 Support

In case of problems with installation and operation, send an e-mail to the following address: [support@welotec.com](mailto:support@welotec.com)



# 15 OSS Clearings

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## bridge-utils

V1.0.4

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### **openssl**

V1.0.2u

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V1.0.20220627

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## rp-pppoe

V3.8

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V1.09

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V0.4

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V1.14.1

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## **gmp**

V6.2.0

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This package is an SSL implementation written by Eric Young ([eay@cryptsoft.com](mailto:eay@cryptsoft.com)).

The implementation was written so as to conform with Netscape's SSL.

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