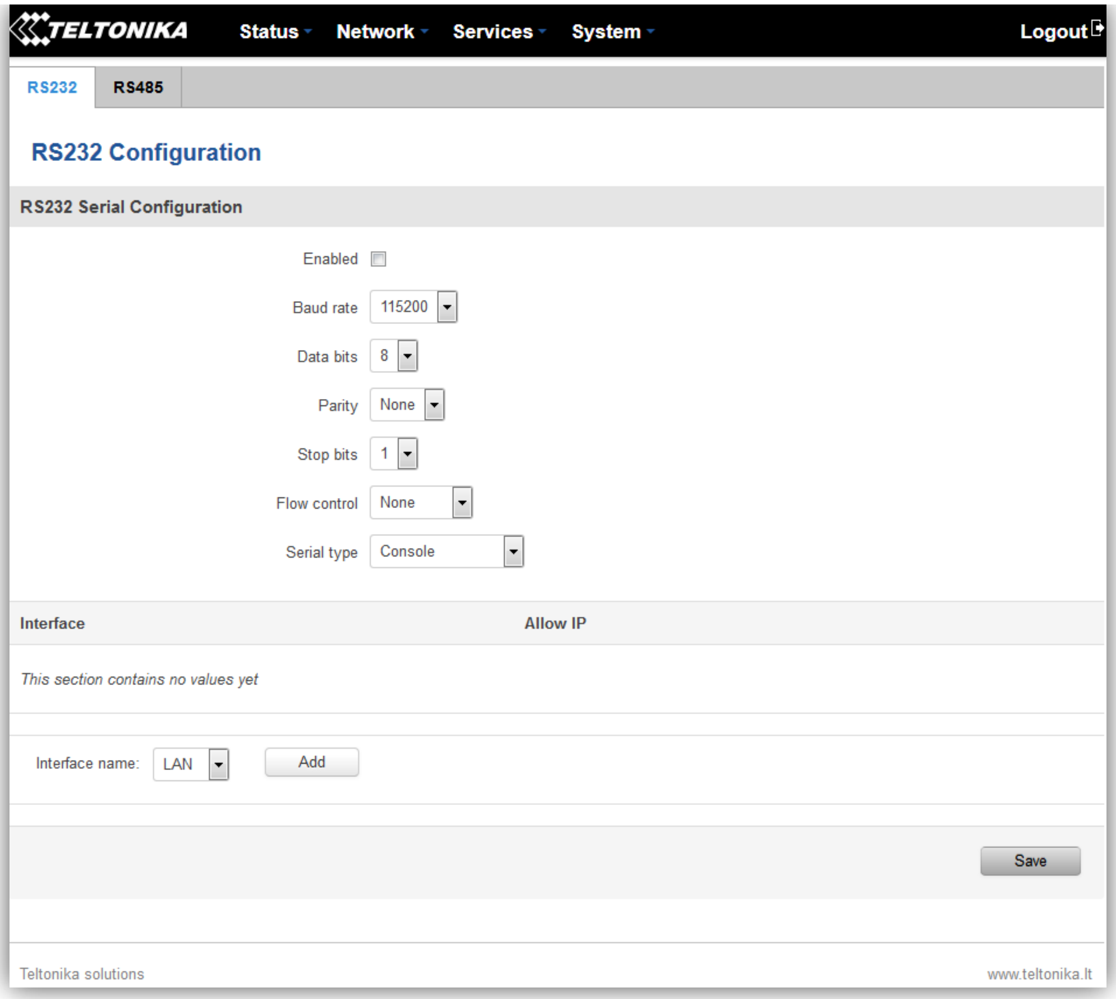
9.5 RS232/RS485

RS232 and RS485 functions are designed to utilize available serial interfaces of the router. Serial interfaces provide possibility for legacy devices to gain access to IP networks.

9.5.1 RS232



RS232 Configuration

RS232 Serial Configuration

Enabled □
Baud rate 115200
Data bits 8
Parity None
Stop bits 1
Flow control None
Serial type Console

Interface | Allow IP

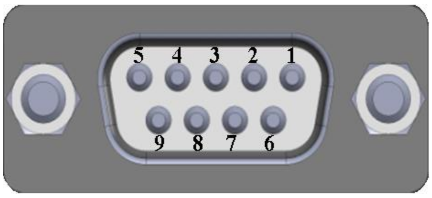
This section contains no values yet

Interface name: LAN

	Field name	Sample	Explanation
1.	Enabled	Enable/Disable	Check the box to enable the serial port function.
2.	Baud rate	300 / 115200	Select the communication speed of the serial interface.
3.	Data bits	5 - 8	Specifies how many bits will be used for character
4.	Parity	None / Odd / Even	Select the parity bit setting used for error detection during data transfer.
5.	Stop bits	1 / 2	Specifies how many stop bits will be used to detect the end of character
6.	Flow control	None / RTS- CTS / Xon-Xoff	Specifies what kind of characters to use for flow control
7.	Serial type	Console / Over IP / Modem / Modbus Gateway	Specifies function of serial interface
8.	Interface	LAN/ WAN/ VPN	Interface used for connection
9.	Allow IP	192.168.1.102	Allow IP connecting to server

9.5.1.1 RS232 connector pinout

RS232 connector type on this device is DCE female. DCE stands for Data Communication Equipment.



Pin	Name*	Description*	Direction on this device
1	DCD	Data Carrier Detect	Output
2	RXD	Receive Data	Output
3	TXD	Transmit Data	Input
4	DTR	Data Terminal Ready	Input
5	GND	Signal Ground	-
6	DSR	Data Set Ready	Output
7	RTS	Ready To Send	Input
8	CTS	Clear to send	Output
9	RI	Ring indicator	Output (connected to +5V permanently via 4.7k resistor)

*The names and descriptions that indicate signal direction (such as TXD, RXD, RTS, CTS, DTR, and DSR) are named from the point of view of the DTE device.

9.5.1.2 Cables

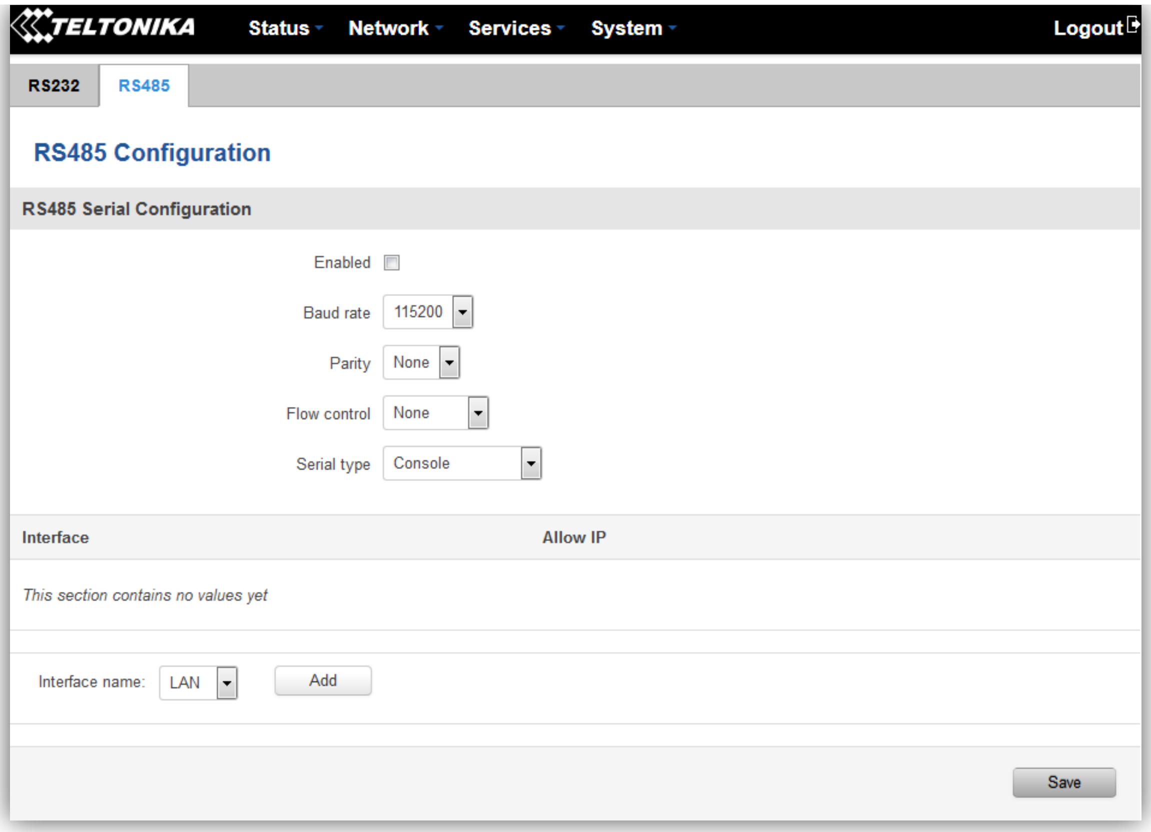
RUT9xx has DCE female connector. To connect a standard DTE device to it, use straight-through Female/Male RS232 cable:

To connect another DCE device to RUT9xx, a Null-modem (crossed) Female/Female cable should be used:

Maximum cable length is 15meters, or the cable length equal to a capacitance of 2500 pF (for a 19200 baud rate). Using lower capacitance cables can increase the distance. Reducing communication speed also can increace maximum cable length. The following table lists boud rate vs. Maximum cable length.

9.5.2 RS485

RS-485 is differential serial data transmission standart for use in long ranges or noisy environments.



RS485 Configuration

RS485 Serial Configuration

Enabled □

Baud rate 115200

Parity None

Flow control None

Serial type Console

Interface	Allow IP

This section contains no values yet

Interface name: LAN Add

Save

	Field name	Sample	Explanation
1.	Enabled	Enable/Disable	Check the box to enable the serial port function.
2.	Baud rate	300 / 115200	Selectthe communication speed of the serial interface.
3.	Parity	None / Odd / Even	Selectthe parity bit setting used for error detection during data transfer.
4.	Flow control	None / RTS- CTS / Xon-Xoff	Specifies what kind of characters to use for flow control
5.	Serial type	Console / Over IP / Modem / Modbus Gateway	Specifies function of serial interface
6.	Interface	LAN/ WAN/ VPN	Interface used for connection
7.	Allow IP	192.168.1.102	Allow IP connecting to server

9.5.2.1 Maximum data rate vs. transmission line length

RS-485 standart can be used for network lengths up to 1200 meters, but the maximum usable data rate decreases as the transmission length increases. Device operating at maximum data rate(10Mbps) is limited to transmission length of about 12 meters, while the 100kbps data rate can achieve a distance up to 1200 meters.A rough relation between maximum transmission length and data rate can be calculated using approximation:

$$L_{max}(m) = \frac{10^8}{DR(bit/s)}$$

Where Lmax is maximum transmission length in meters and DR is maximum data rate in bits per second.

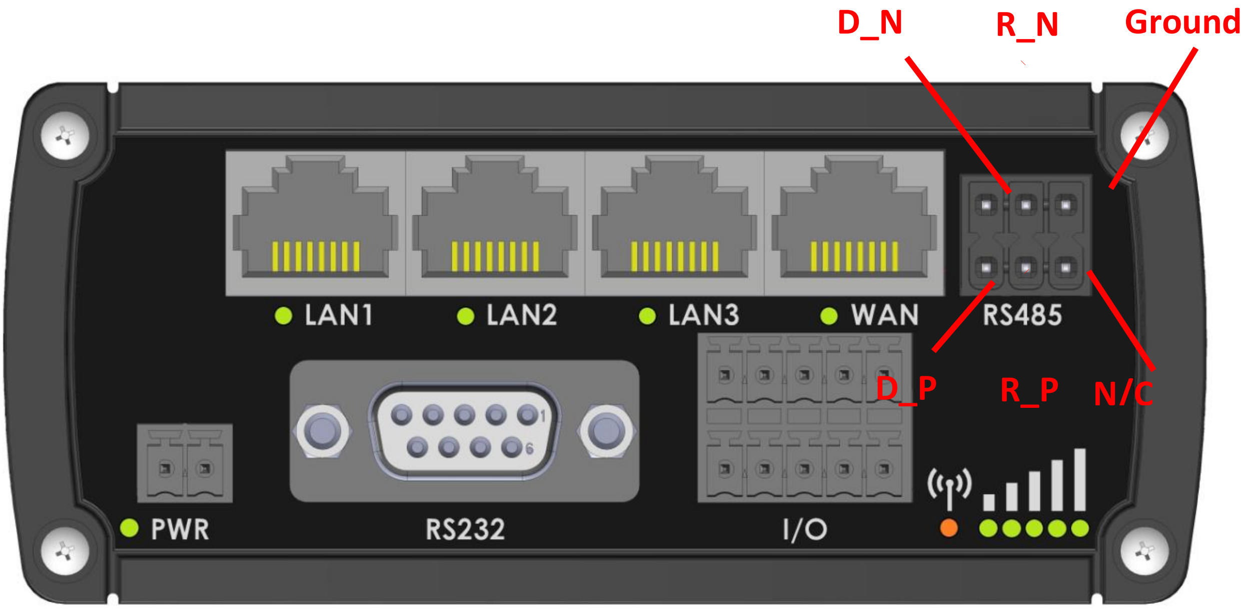
Twisted pair is the prefered cable for RS-485 networks. Twisted pair cables picks up noise and other electromagnetically induced voltages as common mode signals, which are rejected by the differential receivers.

9.5.2.2 Cable type

Recomended cable parameters:

Parameter	Value
Cable Type	22-24 AWG, 2 – pair (used for full-duplex networks) or 1-pair (used for half duplex networks). One addtitional wire for ground connection is needed.
Characteristic cable Impedance	120 Ω @ 1MHz
Capacitance (conductor to conductor)	36 pF/m
Propagation Velocity	78% (1.3 ns/ft)

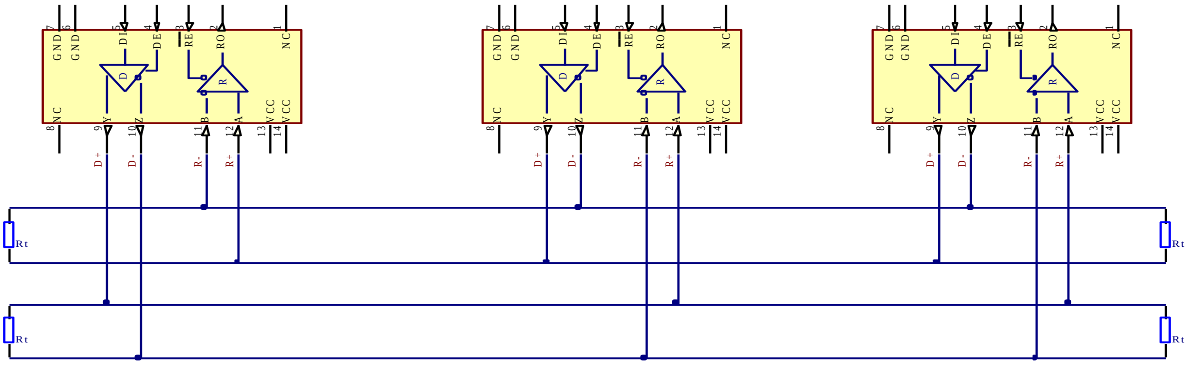
9.5.2.3 RS485 connector pin-out



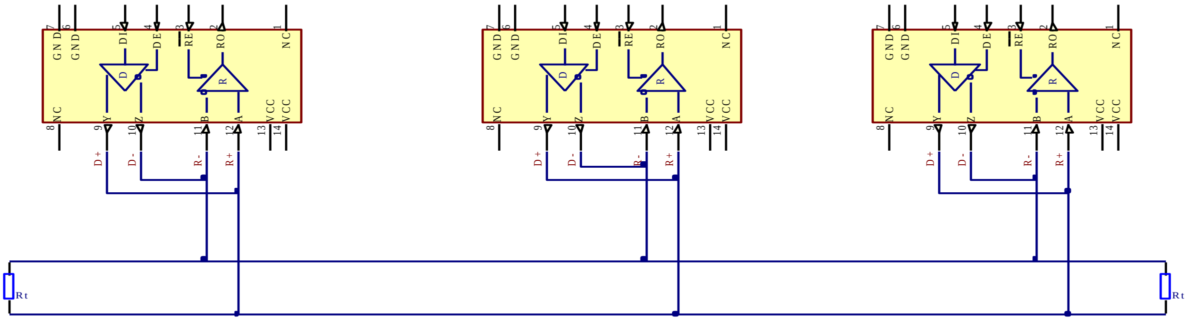
Name	Description	Type
D_P	Driver positive signal	Differential Output
D_N	Driver negative signal	Differential Output
R_P	Receiver positive signal	Differential input
R_N	Receiver negative signal	Differential input
Ground	Device ground	Differential Output

9.5.2.4 2-Wire and 4-Wire Networks

Below is an example of 4- wire network electrical connection. There are 3 devices shown in the example. One of the devices is master and other two- slaves. Termination resistors are placed at each cable end. Four-wire networks consists of one „master“ with its transmitter connected to each of the “slave” receivers on one twisted pair. The“slave” transmitters are all connected to the “master” receiver on a second twisted pair.



Example 2-wire network electrical connection: to enable 2-wire RS-485 configuration in Teltonika router, you need to connect D_P to R_P and D_N to R_N at the device RS-485 socket. Termination resistors are placed at each cable end.



9.5.2.5 Termination

When to use (place jumper)

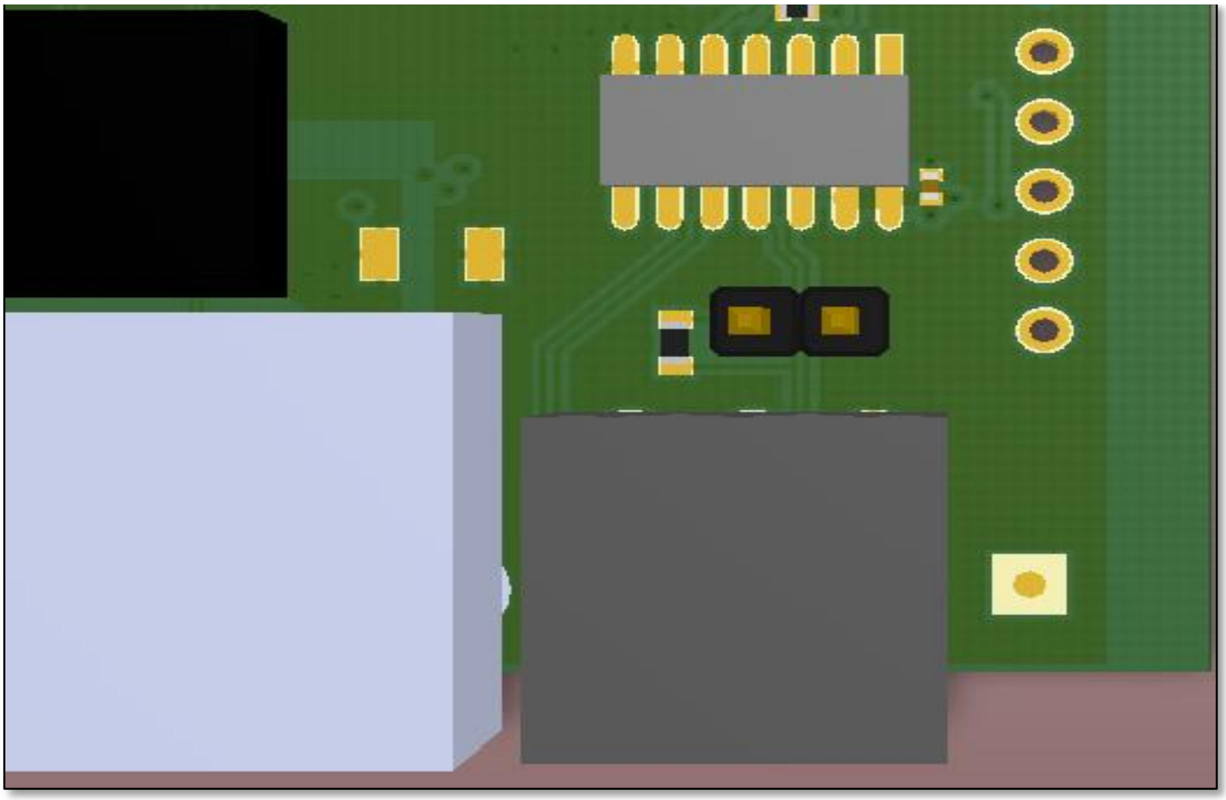
Termination resistor, equal in resistance to cable characteristic impedance, must be connected at each end of the cable to reduce reflection and ringing of the signals when the cable lengths get relatively long. Rise time of the RUT9XX RS-485 driver is about 5ns, so maximum unterminated cable length is about 12cm. As transmission line cables will be always longer than 12 cm, termination is mandatory all the time if RUT9xx is located at the end of the cable.

When not to use (remove jumper)

If your RS-485 consists of more than two devices and RUT9xx router is located not on the end of the line, for example at the middle, RUT9xx termination resistor needs to be disabled.In this case, please termination at other devices which are situated at the ends of the line.

How to enable termination

120 Ω termination resistor is included on RUT9xx PCB and can be enabled by shorting contacts(shown in the picture below), placing 2.54mm pitch jumper:



9.5.2.6 Number of devices in RS-485 Network

One RUT9xx RS-485 driver is capable of driving maximum 32 receivers, provided that receiver input impedance is 12kΩ. If receiver impedances are higher, maximum number of receivers in network increases. Any combination of receiver types can be connected together, provided their parallel impedance does not exceed R_{Load}> 375Ω.

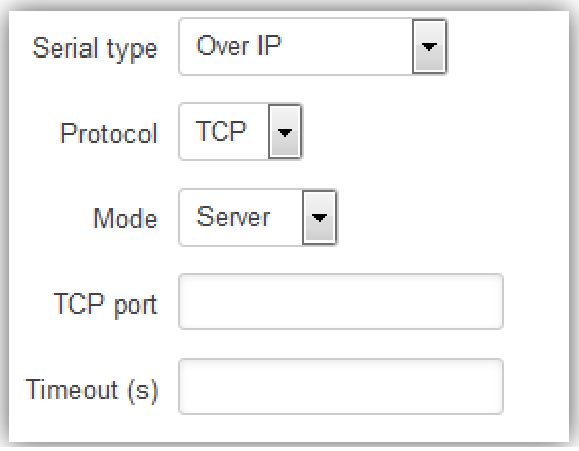
9.5.3 Modes of different serial types in RS232 and RS485

9.5.3.1 Console mode

In this mode the serial interface set up as Linux console of the device. It can be used for debug purposes, to get the status of the device or to control it.

9.5.3.2 Over IP mode

In this mode the router provides connection to TPC/IP network for the devices connected via serial interfaces.



Serial type: Over IP

Protocol: TCP

Mode: Server

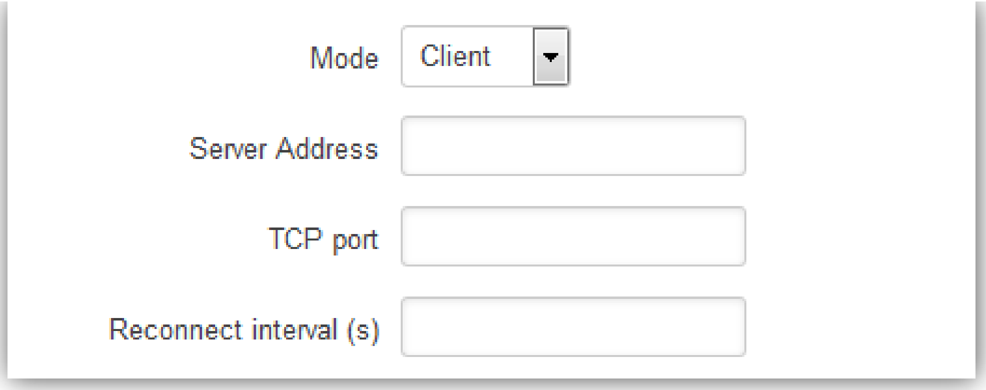
TCP port:

Timeout (s):

	Field name	Explanation
1.	Protocol	Select which protocol to use for data transmission

2.	Mode	Select mode to apply for router. Server - wait for incoming connection. Client - initiate the connection. Bidirect – On default acts like client, but at the same time waits for incoming connections.
3.	TCP port	Specify port number that will be used to listen for incoming connections (Server) or port of the remote server (Client)
4.	Timeout (s)	Disconnect client if not active connection

Client:



Mode: Client

Server Address:

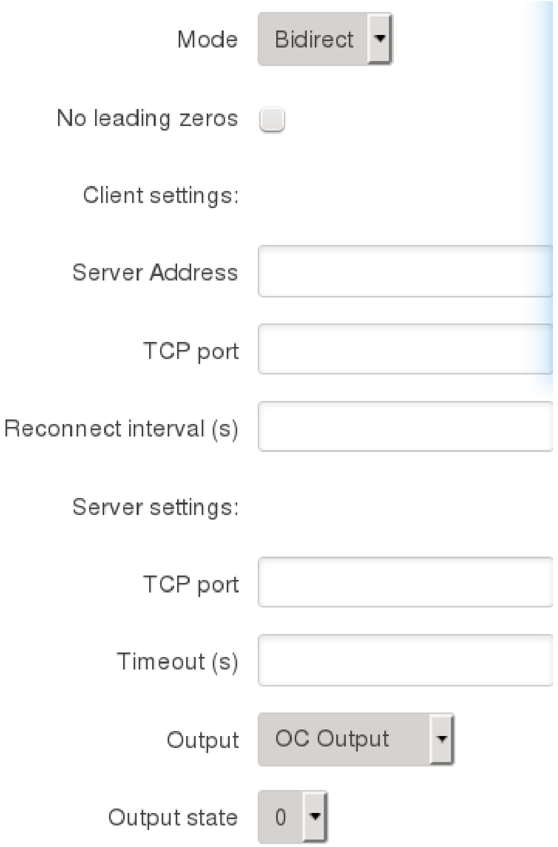
TCP port:

Reconnect interval (s):

	Field name	Explanation
1.	Server Address	Specify server address which client have to connect
2.	TCP port	Specify port number that will be used to listen for incoming connections (Server) or port of the remote server (Client)
3.	Reconnect intervals (s)	Specify intervals connection to server if it fails

Bidirect:

Bidirect mode allows bi-directional communication through serial interface. In default state application acts like client, but at the same time, listens to any incoming connections on dedicated port. When there is connection incoming the application drops current connection to remote server and acts like a server to the new connection. This triggers configured output change, which can be used to inform any auxiliary devices about connection status change. When the client connection is terminated application returns to default mode and continues as a client to remote server.



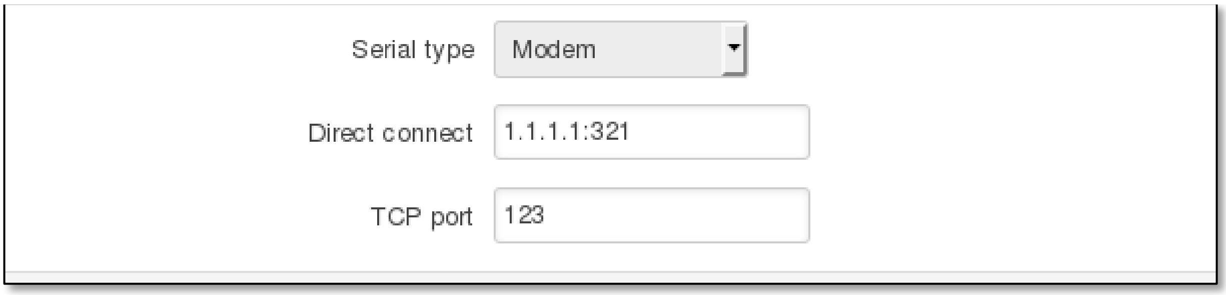
Mode: Bidirect
No leading zeros: □
Client settings:
Server Address:
TCP port:
Reconnect interval (s):
Server settings:
TCP port:
Timeout (s):
Output: OC Output
Output state: 0

	Field name	Explanation
1.	Server Address	Specify server address which client will connect to
2.	TCP port	Specify port number to connect to (Client settings) or listen for incoming connections (Server settings)
3.	Reconnect intervals (s)	Specify time intervals for reconnection to server if connection fails
4.	TCP port	Specify port number that will be used to listen for incoming connections (Server settings) or port of the remote server to connect (Client settings)
5.	Timeout (s)	Timeout period for inactive client connections
6.	Output	Output (OC or Relay) to indicate that application switched from client (default) to server state
7.	Output state	Output state value (0 or 1), when application reverts to server mode

9.5.3.3 Modem mode

In this mode the router imitates dial-up modem. Connection to TCP/IP network can be established using AT commands. The connection can be initiated by the device connected via serial interface with ATD command:

ATD<host>:<port>. If **Direct connect** settings are specified the connection to the server is always active. Data mode can be entered by issuing ATD command. Incoming connection is indicated by sending RING to the serial interface.



Serial type: Modem

Direct connect: 1.1.1.1:321

TCP port: 123

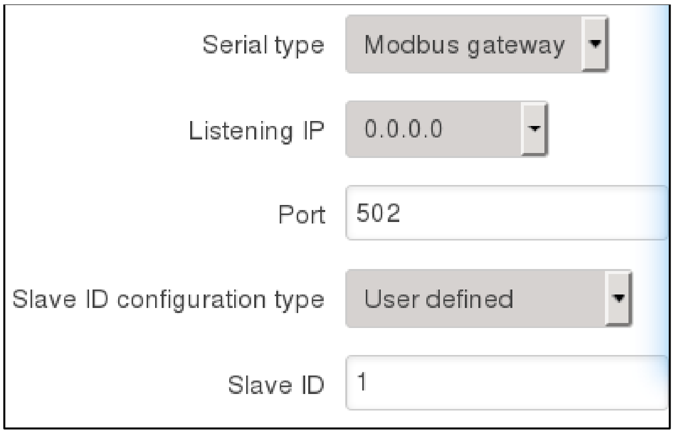
	Field name	Explanation
1.	Direct connect	Enter hostname:port to maintain constant connection to specified host. Leave empty to use ATD command to initiate connection.
2.	TCP port	Specify TCP port number that will be used to listen for incoming connections. Leave it empty to disable incoming connections.

This is the AT command set used in **Modem** mode of the serial interfaces:

Command	Description	Usage
A	Answer incoming call	To answer incoming connection: ATA
D	Dial a number	To initiate data connection: ATD<host>:<port> To enter data mode with **Direct connect** settings: ATD
E	Local echo	Turn local echo on: ATE1 Turn local echo off: ATE0
H	Hang up current call	To end data connection: ATH
O	Return to data mode	To return to data mode from command mode: ATO
Z	Reset to default configuration	To reset the modem to default configuration: ATZ

9.5.3.4 Modbus Gateway mode

This mode allows redirecting TCP data coming to specified port to RTU specified by slave ID. As we can see later, slave ID can be specified by the user or can be obtained directly from the Modbus header.



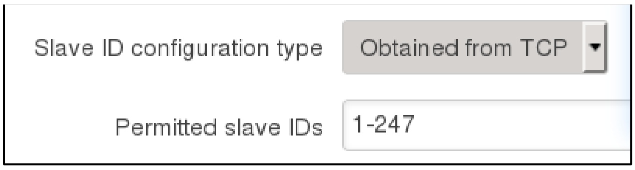
Serial type: Modbus gateway

Listening IP: 0.0.0.0

Port: 502

Slave ID configuration type: User defined

Slave ID: 1



Slave ID configuration type: Obtained from TCP

Permitted slave IDs: 1-247

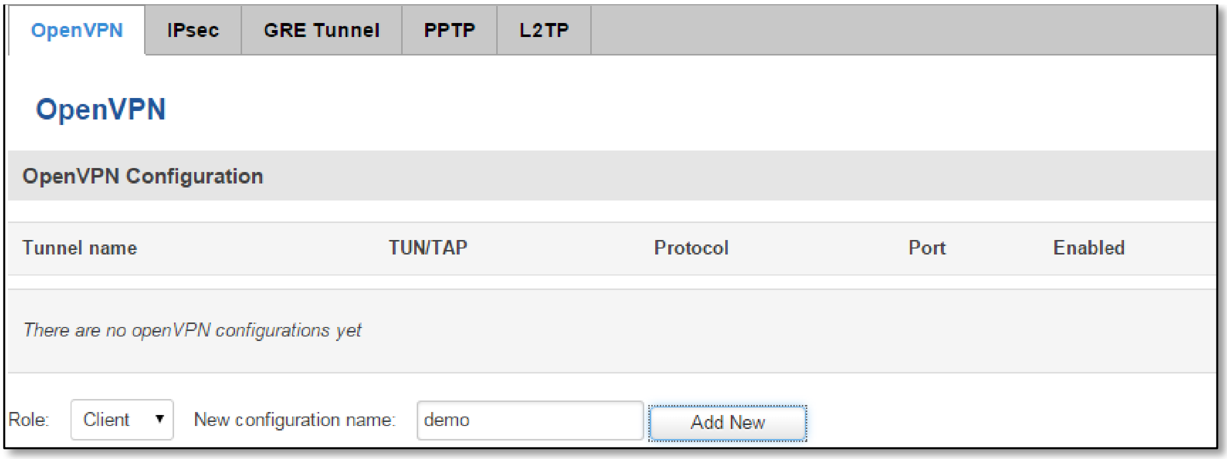
	Field name	Explanation
1.	Listening IP	IP address on which Modbus gateway should wait for incoming connections
2.	Port	Port number for Modbus Gateway
3.	Slave ID configuration type	There are two options available for this parameter. “User defined” redirects all data to slave ID specified by the parameter “Slave ID”. “Obtain from TCP” redirects data to slave ID according to Modbus TCP header
4.	Slave ID	ID of the Modbus TCP slave device which is connected to the router
5.	Permitted slave IDs	Allows specifying the list of permitted slave IDs for redirecting of the Modbus TCP data. Individual values can be separated using ‘,’ (comma), while the range can be specified using ‘-‘ (hyphen), e.g., 1,2,4-6. All other slave IDs not listed here are ignored.

9.6 VPN

9.6.1 OpenVPN

VPN (Virtual Private Network) is a method for secure data transfer through unsafe public network. This section explains how to configure OpenVPN, which is implementation of VPN supported by the RUT9 router.

A picture below demonstrates default OpenVPN configurations list, which is empty, so you have to define a new configuration to establish any sort of OpenVPN connection. To create it, enter desired configuration name in **“New configuration name”** field, select device role from **“Role”** drop down list. For example, to create an OpenVPN client with configuration name demo, select client role, name it “demo” and press **“Add New”** button as shown in the following picture.

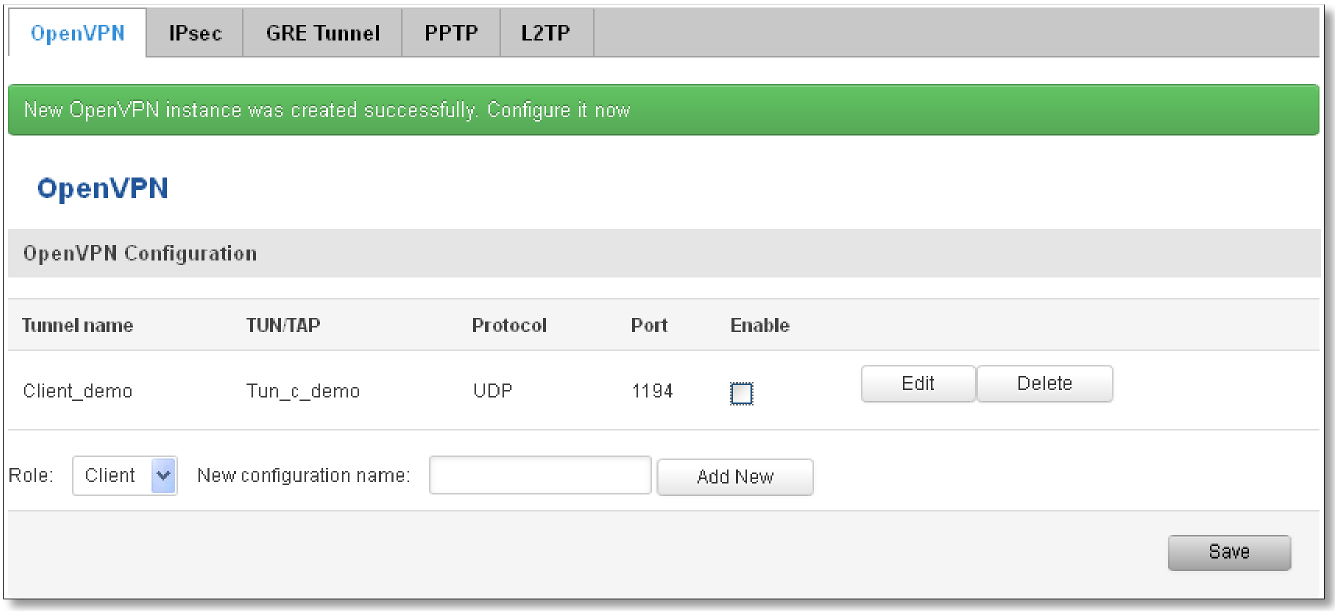


OpenVPN

OpenVPN Configuration

Tunnel name	TUN/TAP	Protocol	Port	Enabled
There are no openVPN configurations yet				

Role: Client ▾ New configuration name: demo



New OpenVPN instance was created successfully. Configure it now

OpenVPN

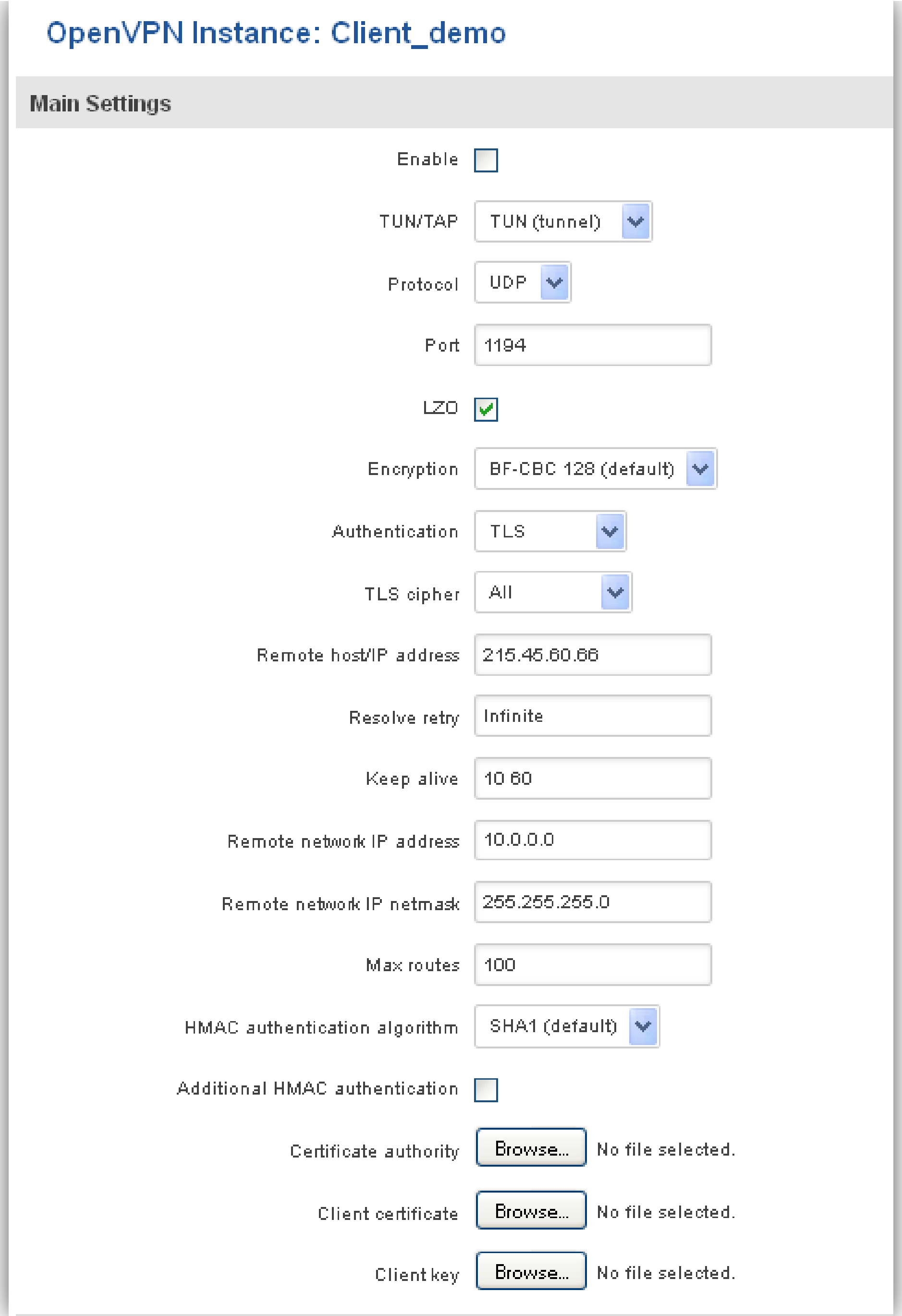
OpenVPN Configuration

Tunnel name	TUN/TAP	Protocol	Port	Enable	
Client_demo	Tun_c_demo	UDP	1194	□	Edit Delete

Role: Client New configuration name: Add New

Save

To see at specific configuration settings press **“edit”** button located in newly created configuration entry. A new page with detailed configuration appears, as shown in the picture below (TLS client example).



OpenVPN Instance: Client_demo

Main Settings

Enable	☐
TUN/TAP	TUN (tunnel)
Protocol	UDP
Port	1194
LZO	☑
Encryption	BF-CBC 128 (default)
Authentication	TLS
TLS cipher	All
Remote host/IP address	215.45.60.66
Resolve retry	Infinite
Keep alive	10 60
Remote network IP address	10.0.0.0
Remote network IP netmask	255.255.255.0
Max routes	100
HMAC authentication algorithm	SHA1 (default)
Additional HMAC authentication	☐
Certificate authority	Browse... No file selected.
Client certificate	Browse... No file selected.
Client key	Browse... No file selected.

There can be multiple server/client instances.

You can set custom settings here according to your VPN needs. Below is summary of parameters available to set:

	Field name	Explanation
1.	Enabled	Switches configuration on and off. This must be selected to make configuration active.
2.	TUN/TAP	Selects virtual VPN interface type. TUN is most often used in typical IP-level VPN connections, however, TAP is required to some Ethernet bridging configurations.
3.	Protocol	Defines a transport protocol used by connection. You can choose here between TCP and UDP.
4.	Port	Defines TCP or UDP port number (make sure, that this port allowed by firewall).
5.	LZO	This setting enables LZO compression. With LZO compression, your VPN connection will generate less network traffic; however, this means higher router CPU loads. Use it carefully with high rate traffic or low CPU resources.

6.	Encryption	Selects Packet encryption algorithm.
7.	Authentication	Sets authentication mode, used to secure data sessions. Two possibilities you have here: “Static key” means, that OpenVPN client and server will use the same secret key, which must be uploaded to the router using “Static pre-shared key” option. “TLS” authentication mode uses X.509 type certificates. Depending on your selected OpenVPN mode (client or server) you have to upload these certificates to the router: For client: Certificate Authority (CA), Client certificate, Client key. For server: Certificate Authority (CA), Server certificate, Server key and Diffie-Hellman (DH) certificate used to key exchange through unsafe data networks. All mention certificates can be generated using OpenVPN or Open SSL utilities on any type host machine. Certificate generation and theory is out of scope of this user manual.
8.	TLS cipher	Packet encryption algorithm (cipher)
9.	Remote host/IP address	IP address of OpenVPN server (applicable only for client configuration).
10.	Resolve Retry	Sets time in seconds to try resolving server hostname periodically in case of first resolve failure before generating service exception.
11.	Keep alive	Defines two time intervals: one is used to periodically send ICMP request to OpenVPN server, and another one defines a time window, which is used to restart OpenVPN service, if no ICPM request is received during the window time slice. Example Keep Alive “10 60”
12.	Remote network IP address	IP address of remote network, an actual LAN network behind another VPN endpoint.
13.	Remote network IP netmask	Subnet mask of remote network, an actual LAN network behind another VPN endpoint.
14.	Max routes	Allow a maximum number of routes to be pulled from an OpenVPN server
15.	HMAC authentication algorithm	Sets HMAC authentication algorithm
16.	Additional HMAC authentication	Add an additional layer of HMAC authentication on top of the TLS control channel to protect against DoS attacks
17.	Certificate authority	Certificate authority is an entity that issues digital certificates. A digital certificate certifies the ownership of a public key by the named subject of the certificate.
18.	Client certificate	Client certificate is a type of digital certificate that is used by client systems to make authenticated requests to a remote server. Client certificates play a key role in many mutual authentication designs, providing strong assurances of a requester's identity.
19.	Client key	Authenticating the client to the server and establishing precisely who they are

After setting any of these parameters press **“Save”** button. Some of selected parameters will be shown in the configuration list table. You should also be aware of the fact that router will launch separate OpenVPN service for every configuration entry (if it is defined as active, of course) so the router has ability to act as server and client at the same time.

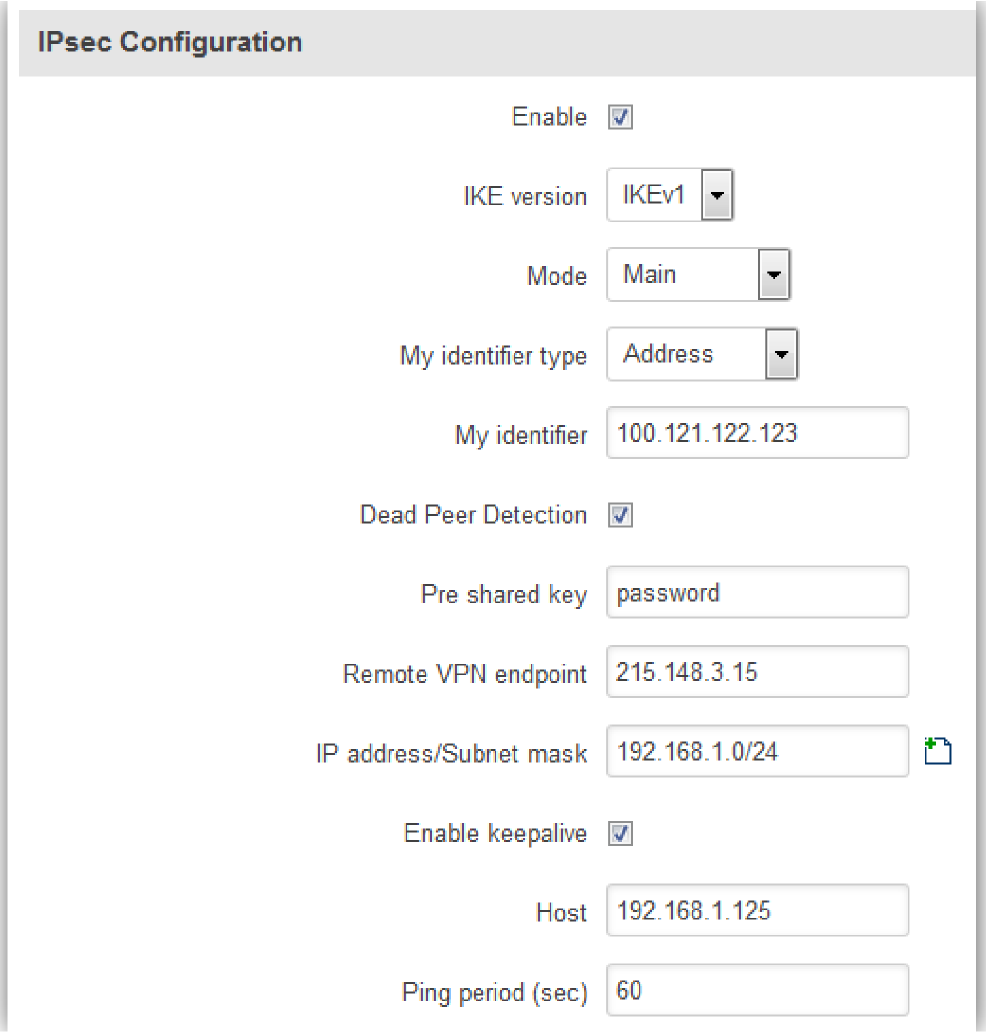
9.6.2 IPSec

The IPsec protocol client enables the router to establish a secure connection to an IPsec peer via the Internet. IPsec is supported in two modes - transport and tunnel. Transport mode creates secure point to point channel between two hosts. Tunnel mode can be used to build a secure connection between two remote LANs serving as a VPN solution.

IPsec system maintains two databases: Security Policy Database (SPD) which defines whether to apply IPsec to a packet or not and specify which/how IPsec-SA is applied and Security Association Database (SAD), which contain Key of each IPsec-SA.

The establishment of the Security Association (IPsec-SA) between two peers is needed for IPsec communication. It can be done by using manual or automated configuration.

Note: router starts establishing tunnel when data from router to remote site over tunnel is sent. For automatic tunnel establishment used tunnel Keep Alive feature.



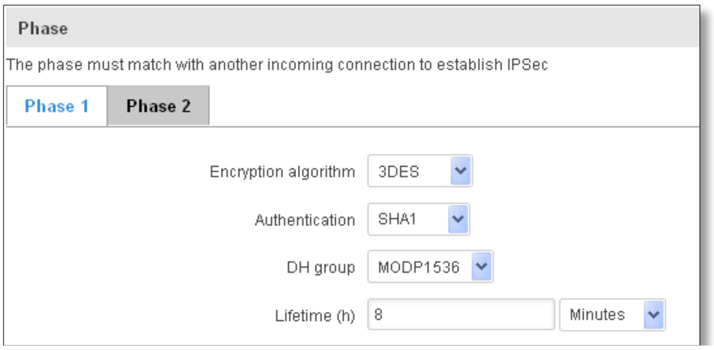
IPsec Configuration

Enable	☑
IKE version	IKEv1
Mode	Main
My identifier type	Address
My identifier	100.121.122.123
Dead Peer Detection	☑
Pre shared key	password
Remote VPN endpoint	215.148.3.15
IP address/Subnet mask	192.168.1.0/24
Enable keepalive	☑
Host	192.168.1.125
Ping period (sec)	60

	Field name	Value	Explanation
1.	Enable	Enabled/Disabled	Check box to enable IPSec.
2.	IKE version	IKEv1 or IKEv2	Method of key exchange
3.	Mode	"Main" or "Aggressive"	ISAKMP (Internet Security Association and Key Management Protocol) phase 1 exchange mode
4.	My identifier type	Address, FQDN, User FQDN	Choose one accordingly to your IPSec configuration
5.	My identifier		Set the device identifier for IPSec tunnel. In case RUT has Private IP, its identifier should be its own LAN network address. In this way, the Road Warrior approach is possible.
6.	Dead Peer Detection	Enabled/Disabled	The values clear, hold and restart all active DPD
7.	Pre shared key		A shared password to authenticate between the peer

8.	Remote VPN endpoint		Domain name or IP address. Leave empty or any
9.	IP address/Subnet mask		Remote network secure group IP address and mask used to determine to what subnet an IP address belongs to. Range [0-32]. IP should differ from device LAN IP
10.	Enable keep alive	Enabled/Disabled	Enable tunnel keep alive function
11.	Host		A host address to which ICMP (Internet Control Message Protocol) echo requests will be send
12.	Ping period (sec)		Send ICMP echo request every x seconds. Range [0-999999]

Phase 1 and **Phase 2** must be configured accordingly to the IPSec server configuration, thus algorithms, authentication and lifetimes of each phase must be identical.



Phase

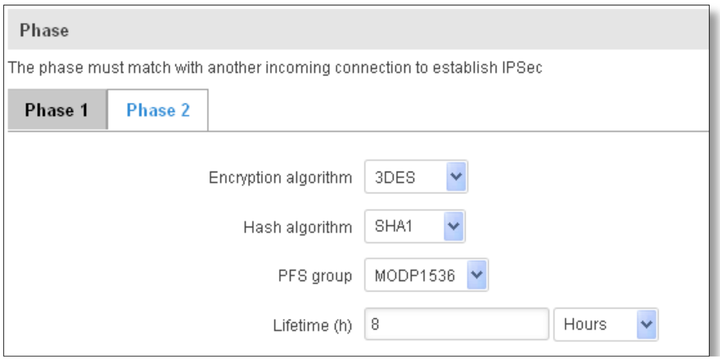
The phase must match with another incoming connection to establish IPSec

Encryption algorithm: 3DES

Authentication: SHA1

DH group: MODP1536

Lifetime (h): 8 Minutes



Phase

The phase must match with another incoming connection to establish IPSec

Encryption algorithm: 3DES

Hash algorithm: SHA1

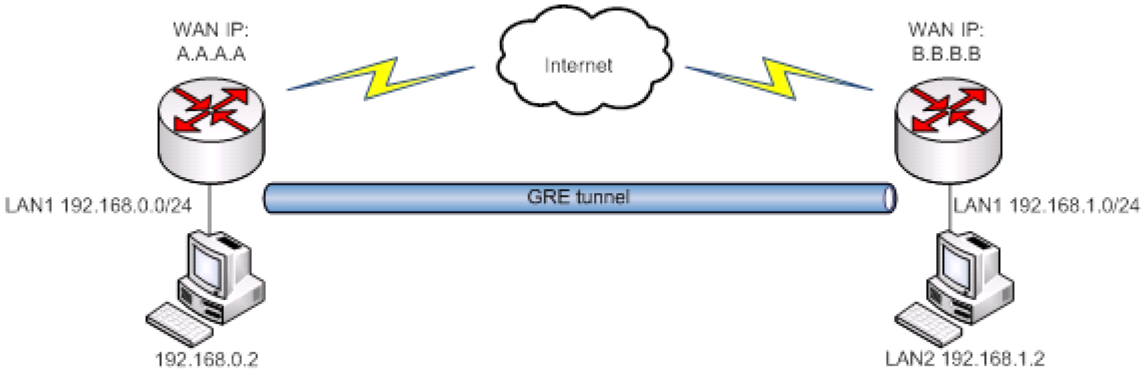
PFS group: MODP1536

Lifetime (h): 8 Hours

	Field name	Value	Explanation
1.	Encryption algorithm	DES, 3DES, AES 128, AES 192, AES256	The encryption algorithm must match with another incoming connection to establish IPSec
2.	Authentication	MD5, SHA1, SHA256, SHA384, SHA512	The authentication algorithm must match with another incoming connection to establish IPSec
3.	Hash algorthm	MD5, SHA1, SHA256, SHA384, SHA512	The hash algorithm must match with another incoming connection to establish IPSec
4.	DH group	MODP768, MODP1024, MODP1536, MODP2048, MODP3072, MODP4096	The DH (Diffie-Helman) group must with another incoming connection to establish IPSec
4.	PFS group	MODP768, MODP1024, MODP1536, MODP2048, MODP3072, MODP4096, No PFS	The PFS (Perfect Forward Secrecy) group must match with another incoming connection to establish IPSec
5.	Lifetime	Hours, Minutes, Seconds	The time duration for phase

9.6.3 GRE Tunnel

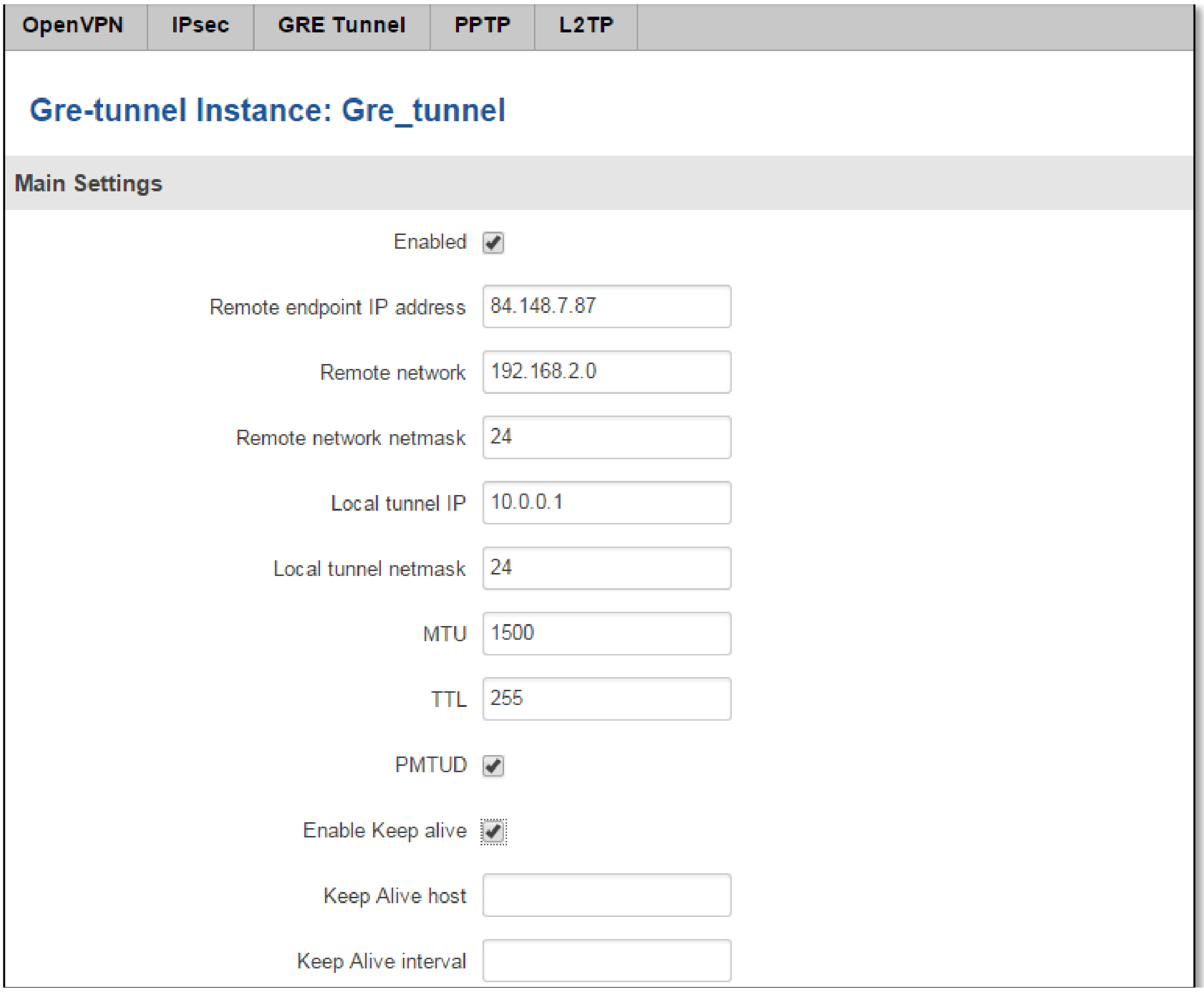
GRE (Generic Routing Encapsulation RFC2784) is a solution for tunneling RFC1812 private address-space traffic over an intermediate TCP/IP network such as the Internet. GRE tunneling does not use encryption it simply encapsulates data and sends it over the WAN.



In the example network diagram two distant networks LAN1 and LAN2 are connected.

To create GRE tunnel the user must know the following parameters:

1. Source and destination IP addresses.
2. Tunnel local IP address
3. Distant network IP address and Subnet mask.



Gre-tunnel Instance: Gre_tunnel

Main Settings

Enabled ☑

Remote endpoint IP address: 84.148.7.87

Remote network: 192.168.2.0

Remote network netmask: 24

Local tunnel IP: 10.0.0.1

Local tunnel netmask: 24

MTU: 1500

TTL: 255

PMTUD ☑

Enable Keep alive ☑

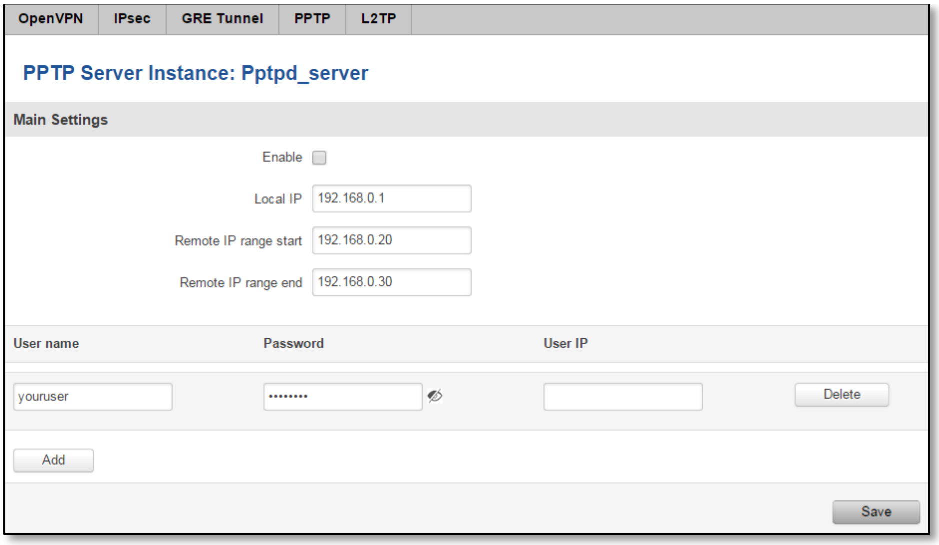
Keep Alive host:

Keep Alive interval:

	Field name	Explanation
1.	Enabled	Check the box to enable the GRE Tunnel function.
2.	Remote endpoint IP address	Specify remote WAN IP address.
3.	Remote network	IP address of LAN network on the remote device.
4.	Remote network netmask	Network of LAN network on the remote device. Range [0-32].
5.	Local tunnel IP	Local virtual IP address. Cannot be in the same subnet as LAN network.
6.	Local tunnel netmask	Network of local virtual IP address. Range [0-32]
7.	MTU	Specify the maximum transmission unit (MTU) of a communications protocol of a layer in bytes.
8.	TTL	Specify the fixed time-to-live (TTL) value on tunneled packets [0-255]. The 0 is a special value meaning that packets inherit the TTL value.
9.	PMTUD	Check the box to enable the Path Maximum Transmission Unit Discovery (PMTUD) status on this tunnel.
10.	Enable Keep alive	It gives the ability for one side to originate and receive keep alive packets to and from a remote router even if the remote router does not support GRE keep alive.
11.	Keep Alive host	Keep Alive host IP address. Preferably IP address which belongs to the LAN network on the remote device.
12.	Keep Alive interval	Time interval for Keep Alive. Range [0 - 255].

9.6.4 PPTP

Point-to-Point Tunneling Protocol (PPTP) is a protocol (set of communication rules) that allows corporations to extend their own corporate network through private "tunnels" over the public Internet. Effectively, a corporation uses a wide-area network as a single large local area network. A company no longer needs to lease its own lines for wide-area communication but can securely use the public networks. This kind of interconnection is known as a virtual private network (VPN).



PPTP Server Instance: Pptpd_server

Main Settings

Enable □

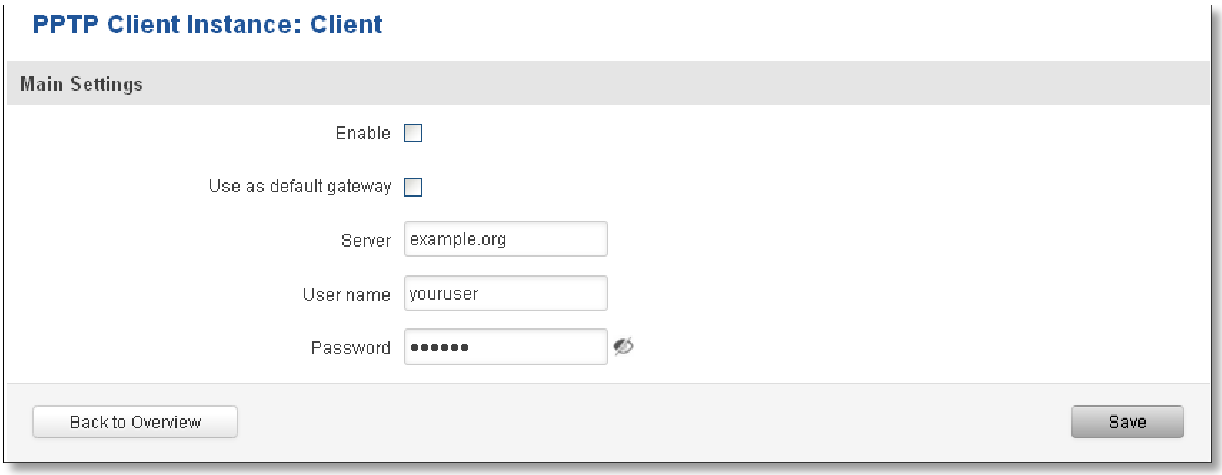
Local IP 192.168.0.1

Remote IP range start 192.168.0.20

Remote IP range end 192.168.0.30

User name	Password	User IP
youruser	••••••••	

	Field name	Explanation
1.	Enable	Check the box to enable the PPTP function.
2.	Local IP	IP Address of this device (RUT)
3.	Remote IP range begin	IP address leases beginning
4.	Remote IP range end	IP address leases end
5.	Username	Username to connect to PPTP (this) server
6.	Password	Password to connect to PPTP server
7.	User IP	Users IP address



PPTP Client Instance: Client

Main Settings

Enable □

Use as default gateway □

Server example.org

User name youruser

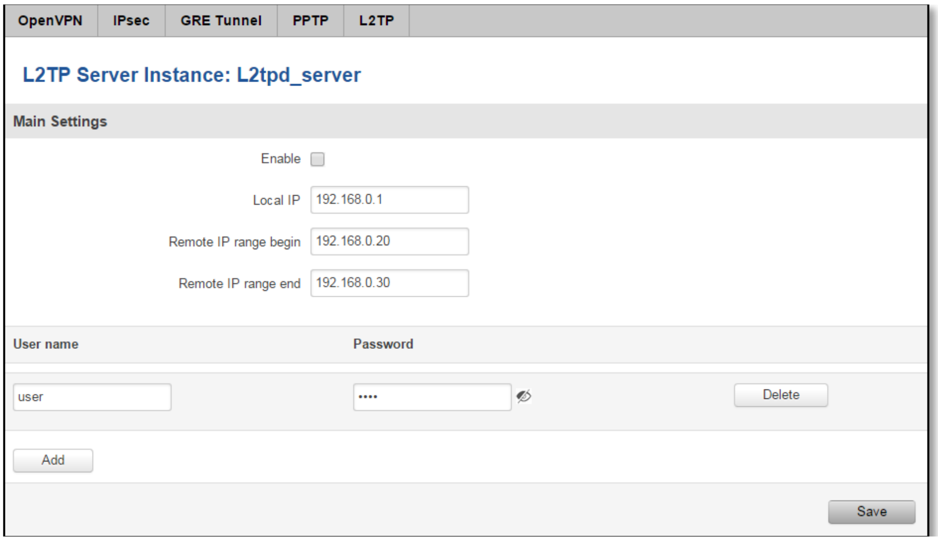
Password ••••••

	Field name	Explanation
1.	Enable	Enable current configuration

2.	Use as default gateway	Use this PPTP instance as default gateway
3.	Server	The server IP address or hostname
4.	Username	The user name for authorization with the server
5.	Password	The password for authorization with the server

9.6.5 L2TP

Allows setting up a L2TP server or client. Below is L2TP server configuration example.



L2TP Server Instance: L2tpd_server

Main Settings

Enable □

Local IP: 192.168.0.1

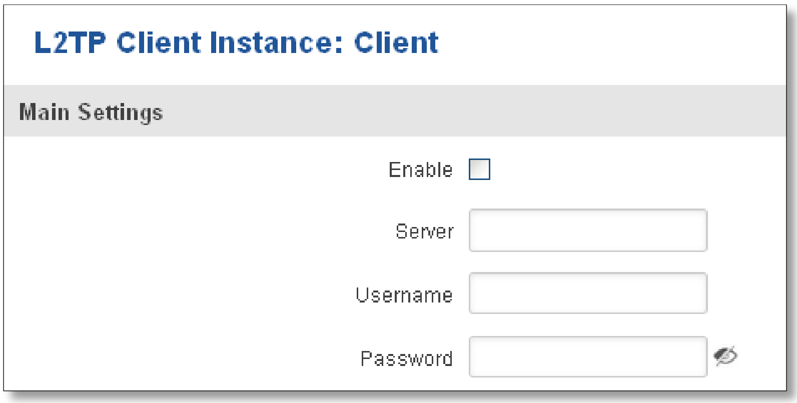
Remote IP range begin: 192.168.0.20

Remote IP range end: 192.168.0.30

User name	Password
user	••••

	Field name	Explanation
1.	Enable	Check the box to enable the L2TP Tunnel function.
2.	Local IP	IP Address of this device (RUT)
3.	Remote IP range begin	IP address leases beginning
4.	Remote IP range end	IP address leases end
5.	Username	Username to connect to L2TP (this) server
6.	Password	Password to connect to L2TP server

Client configuration is even simpler, which requires only **Servers IP**, **Username** and **Password**.



L2TP Client Instance: Client

Main Settings

Enable □

Server

Username

Password

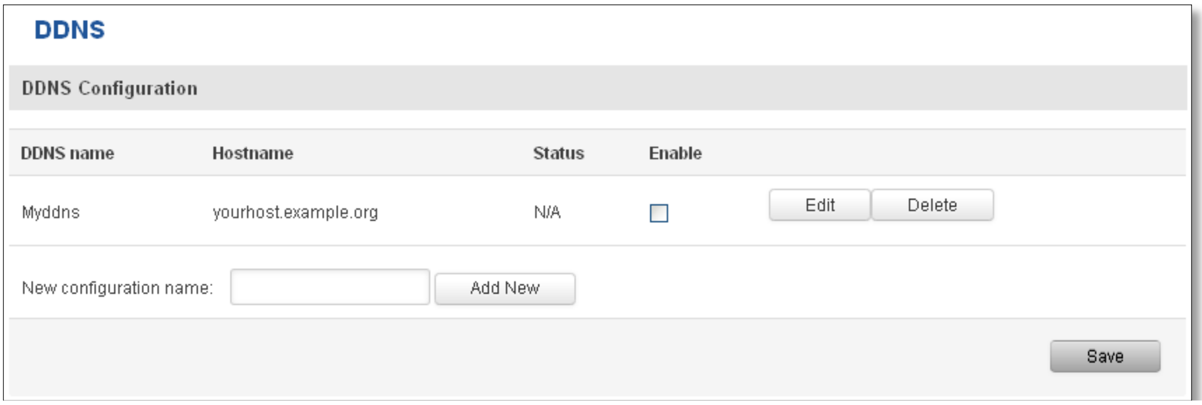
9.7 Dynamic DNS

Dynamic DNS (DDNS) is a domain name service allowing to link dynamic IP addresses to static hostname.

To start using this feature firstly you should register to DDNS service provider (example list is given in description).

You are provided with add/delete buttons to manage and use different DDNS configurations at the same time!

You can configure many different DDNS Hostnames in the main DDNS Configuration section.



DDNS

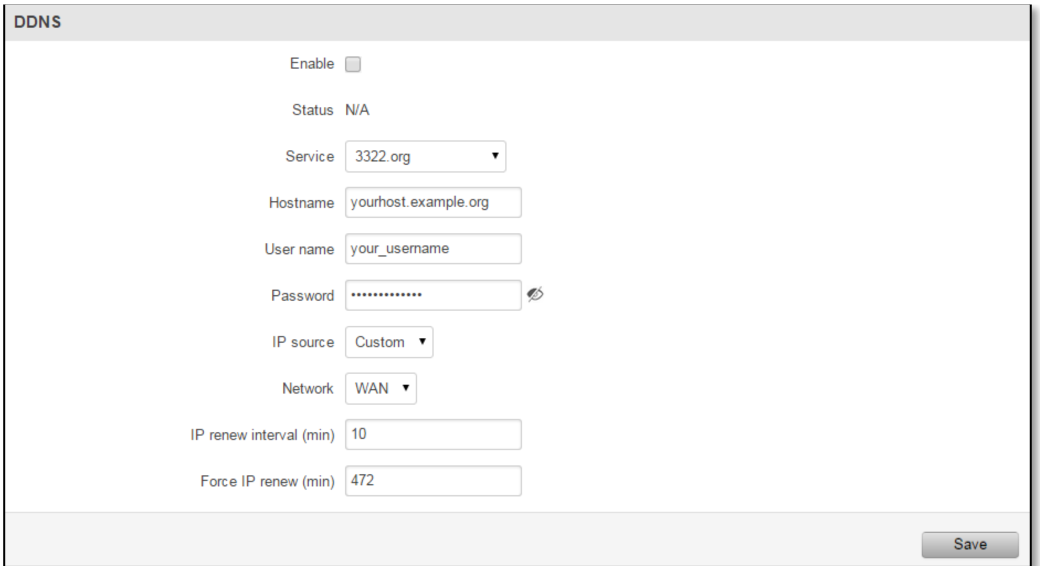
DDNS Configuration

DDNS name	Hostname	Status	Enable	
Myddns	yourhost.example.org	N/A	□	Edit Delete

New configuration name: Add New

Save

To edit your selected configuration, hit **Edit**.



DDNS

Enable □

Status N/A

Service 3322.org

Hostname yourhost.example.org

User name your_username

Password ••••••••••••••

IP source Custom

Network WAN

IP renew interval (min) 10

Force IP renew (min) 472

Save

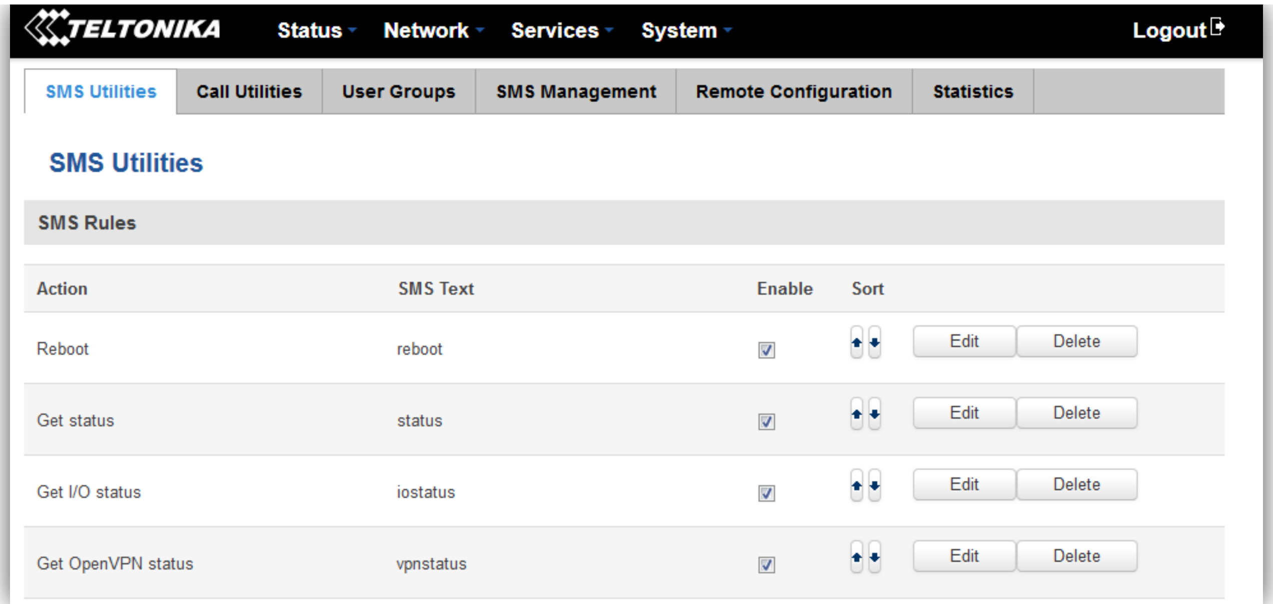
	Field name	Value	Explanation
1.	Enable	Enable/Disable	Enables current DDNS configuration.
2.	Status		Timestamp of the last IP check or update.
3.	Service	1. dydns.org 2. 3322.org 3. no-ip.com 4. easydns.com 5. zoneedit.com	Your dynamic DNS service provider selected from the list. In case your DDNS provider is not present from the ones provided, please feel free to use "custom" and add hostname of the update URL.
4.	Hostname	yourhost.example.org	Domain name which will be linked with dynamic IP address.
5.	Username	your_username	Name of the user account.
6.	Password	your_password	Password of the user account.
7.	IP Source	Public Private Custom	This option allows you to select specific RUT interface, and then send the IP address of that interface to DDNS server. So if, for example, your RUT has Private IP (i.e. 10.140.56.57) on its WAN (3G interface), then you can send this exact IP to DDNS server by selecting "Private", or by selecting "Custom" and "WAN" interface. The DDNS server will then resolve hostname queries to this specific IP.

8.	Network	WAN	Source network
9.	IP renew interval (min)	10 (minutes)	Time interval (in minutes) to check if the IP address of the device have changed.
10.	Force IP renew	472 (minutes)	Time interval (in minutes) to force IP address renew.

9.8 SMS Utilities

RUT955 has extensive amount of various SMS Utilities. These are subdivided into 6 sections: SMS Utilities, Call Utilities, User Groups, SMS Management, Remote Configuration and Statistics.

9.8.1 SMS Utilities



SMS Utilities

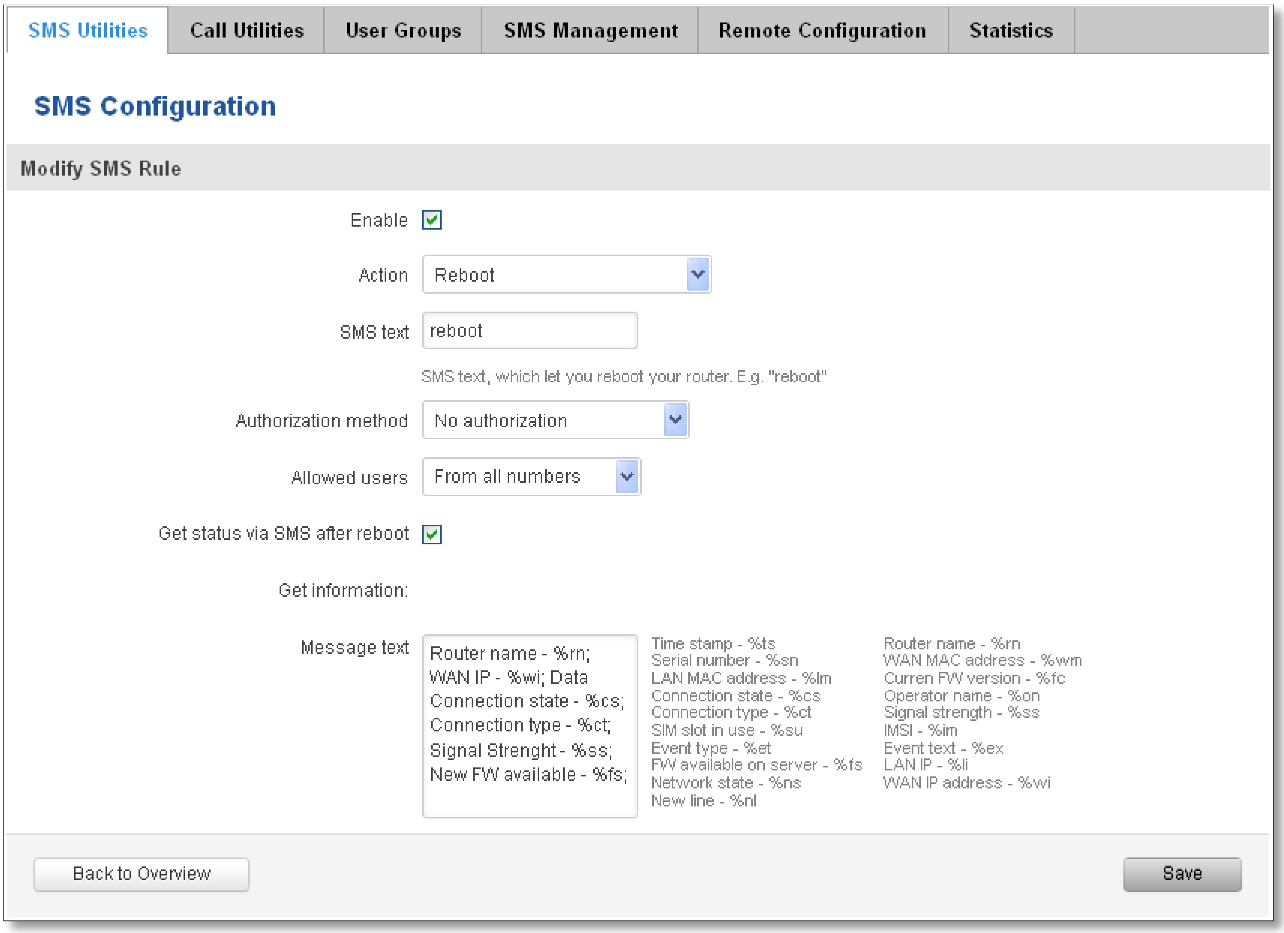
SMS Rules

Action	SMS Text	Enable	Sort		
Reboot	reboot	☑	↑↓	Edit	Delete
Get status	status	☑	↑↓	Edit	Delete
Get I/O status	iostatus	☑	↑↓	Edit	Delete
Get OpenVPN status	vpnstatus	☑	↑↓	Edit	Delete

All configuration options are listed below:

- Reboot
- Get status
- Get I/O status
- Switch output on / off
- Get OpenVPN status
- Switch WiFi on / off
- Switch mobile data on / off
- Change mobile data settings
- Get list of profiles
- Change profile
- Manage OpenVPN
- SSh access control
- Web access control
- Restore to default
- Force SIM switch
- GPS coordinates
- GPS on / off
- FW upgrade from server
- Config update from server
- Switch monitoring on / off
- Monitoring status

You can choose your SMS Keyword (text to be sent) and authorized phone number in the main menu. You can edit each created rule by hitting **Edit** button.



SMS Configuration

Modify SMS Rule

Enable ☑

Action: Reboot

SMS text: reboot

SMS text, which let you reboot your router. E.g. "reboot"

Authorization method: No authorization

Allowed users: From all numbers

Get status via SMS after reboot ☑

Get information:

Message text:

Router name - %rn;
WAN IP - %wi; Data
Connection state - %cs;
Connection type - %ct;
Signal Strenght - %ss;
New FW available - %fs;

Time stamp - %ts
Serial number - %sn
LAN MAC address - %lm
Connection state - %cs
Connection type - %ct
SIM slot in use - %su
Event type - %et
FW available on server - %fs
Network state - %ns
New line - %nl

Router name - %rn
WAN MAC address - %wm
Curren FW version - %fc
Operator name - %on
Signal strength - %ss
IMSI - %im
Event text - %ex
LAN IP - %li
WAN IP address - %wi

	Field name	Explanation	Notes
1.	**Reboot**		
	Enable	This check box will enable and disable SMS reboot function.	Allows router restart via SMS.
	Action	The action to be performed when this rule is met.	
	SMS text	SMS text which will reboot router.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
	Get status via SMS after reboot	Check this to recieve connection status via SMS after a reboot.	If you select this box, router will send status once it has rebooted and is operational again. This is both separate SMS Rule and an option under SMS Reboot rule.
	Message text	Which status information should be included in SMS: Data state, Operator, Connection type, Signal Strength, Connection State, IP	You can select which status elements to display.
2.	**Get status**		
	Enable	Check this to receive connection status via SMS.	Allows to get router's status via SMS. This is both separate SMS Rule and an option under SMS Reboot rule.
	Action	The action to be performed	

		when this rule is met.	
	Enable SMS Status	This check box will enable and disable SMS status function.	SMS status is disabled by default.
	SMS text	SMS text which will send routers status.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
	Message text	Which status information should be included in SMS: Data state, Operator, Connection type, Signal Strength, Connection State, IP	You can select which status elements to display.
3.	**Get OpenVPN status**		
	Enable	This check box will enable and disable this function.	Allows to get OpenVPN‘s status via SMS.
	Action	The action to be performed when this rule is met.	
	SMS text	SMS text which will send OpenVPN status.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
4.	**Switch WiFi On/Off**		
	Enable	This check box will enable and disable this function.	Allows Wi-Fi control via SMS.
	Action	The action to be performed when this rule is met.	Turn WiFi ON or OFF.
	SMS text	SMS text which will turn Wi-Fi ON/OFF.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
	Write to config	Permanently saves Wi-Fi state.	With this setting enabled, router will keep Wi-Fi state even after reboot. If it is not selected, router will revert Wi-Fi state after reboot.
5.	**Switch mobile data on/off**		
	Enable	This check box will enable and disable this function.	Allows mobile control via SMS.
	Action	The action to be performed when this rule is met.	Turn mobile ON or OFF.
	SMS text	SMS text which will turn mobile data ON/OFF.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
	Write to config	Permanently saves mobile network state.	With this setting enabled, router will keep mobile state even after reboot. If it is not selected, router will revert mobile state

			after reboot.
6.	**Manage OpenVPN**		
	Enable	This check box will enable and disable this function.	Allows OpenVPN control via SMS.
	Action	The action to be performed when this rule is met.	Turn OpenVPN ON or OFF.
	SMS text	Keyword which will turn OpenVPN ON/OFF.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters. After Keyword you have to write OpenVPN name.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
7.	**Change mobile data settings**		
	Enable	This check box will enable and disable this function.	Allows to change mobile settings via SMS.
	Action	The action to be performed when this rule is met.	
	SMS text	Key word that will precede actual configuration parameters.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.

Mobile Settings via SMS parameters:

	Parameter	Value(s)	Explanation
1.	apn=	e.g. internet.gprs	Sets APN. i.e: apn=internet.gprs
2.	dialnumber=	e.g. *99***1#	Sets dial number
3.	auth_mode=	none pap chap	Sets authentication mode
4.	service=	Auto 4gpreferred 4gonly 3gpreferred 3gonly 2gpreferred 2gonly	You can add as many phone numbers as you need. Dropdown list with additional rows will show up if you click on “add” icon at the end of phone number row.
5.	username=	user	Used only if PAP or CHAP authorization is selected
6.	password=	user	Used only if PAP or CHAP authorization is selected

All Mobile settings can be changed in one SMS. Between each <parameter=value> pair a space symbol is necessary.

Example: *cellular apn=internet.gprs dialnumber=*99***1#auth_mode=pap service=3gonly username=user password=user*

Important Notes:

- 3G settings must be configured correctly. If SIM card has PIN number you must enter it at “Network” > “3G” settings. Otherwise SMS reboot function will not work.

- Sender phone number must contain country code. You can check sender phone number format by reading the details of old SMS text massages you receiving usually.

	Field name	Explanation	Notes
8.	**Get list of profiles**		
	Enable	This check box will enable and disable this function.	Allows to get list of profiles via SMS.
	Action	The action to be performed when this rule is met.	
	SMS text	SMS text which will send list of profiles.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
9.	**Change profile**		
	Enable	This check box will enable and disable this function.	Allows profile change via SMS.
	Action	The action to be performed when this rule is met.	
	SMS text	Keyword which will change active profile.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters. After Keyword you have to write profile name.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
10.	**SSH access Control**		
	Enable	This check box will enable and disable this function.	Allows SSH access control via SMS.
	Action	The action to be performed when this rule is met.	
	SMS text	SMS text which will turn SSH access ON/OFF.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
	Enable SSH access	Enable this to reach router via SSH from LAN (Local Area Network).	If this box is selected, SMS will enable SSH access from LAN. If this box is not selected, SMS will disable SSH access from LAN.
	Enable remote SSH access	Enable this to reach router via SSH from WAN (Wide Area Network).	If this box is selected, SMS will enable SSH access from WAN. If this box is not selected, SMS will disable SSH access from WAN.
11.	**Web access Control**		
	Enable	This check box will enable and disable this function.	Allows Web access control via SMS.
	Action	The action to be performed when this rule is met.	
	SMS text	SMS text which will turn Web access ON/OFF.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to	No authorization, by serial or by router admin

		use for SIM management.	password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
	Enable HTTP access	Enable this to reach router via HTTP from LAN (Local Area Network).	If this box is selected, SMS will enable HTTP access from LAN. If this box is not selected, SMS will disable HTTP access from LAN.
	Enable remote HTTP access	Enable this to reach router via HTTP from WAN (Wide Area Network).	If this box is selected, SMS will enable HTTP access from WAN. If this box is not selected, SMS will disable HTTP access from WAN.
	Enable remote HTTPS access	Enable this to reach router via HTTPS from WAN (Wide Area Network).	If this box is selected, SMS will enable HTTPS access from WAN. If this box is not selected, SMS will disable HTTPS access from WAN.
12.	**Restore to default**		
	Enable	This check box will enable and disable this function.	Allows to restore router to default settings via SMS.
	Action	The action to be performed when this rule is met.	Router will reboot after this rule is executed.
	SMS text	SMS text which will turn Wi-Fi ON/OFF.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
13.	**Force switch SIM**		
	Enable	This check box will enable and disable this function.	Allows SIM switch via SMS.
	Action	The action to be performed when this rule is met.	
	SMS text	SMS text which will change active SIM card to another one.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
	Sender phone number	Phone number of person who can receive router status via SMS message.	You can add as many phone numbers as you need. Dropdown list with additional rows will show up if you click on “add” icon at the end of phone number row.
14.	**Force FW upgrade from server**		
	Enable	This check box will enable and disable this function.	Allows to upgrade router‘s FW via SMS.
	Action	The action to be performed when this rule is met.	Router will reboot after this rule is executed.
	SMS text	SMS text which will force router to upgrade firmware from server.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
15.	**Force Config update from server**		
	Enable	This check box will enable and disable this function.	Allows to upgrade router‘s Config via SMS.
	Action	The action to be performed when this rule is met.	Router will reboot after this rule is executed.

	SMS text	SMS text which will force router to upgrade configuration from server.	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	No authorization, by serial or by router admin password.
	Allowed users	Whitelist of allow users	From all numbers, from group or from single number.
16.	**Switch monitoring on/off**		
	Enable	This check box will enable and disable this function.	Allows monitoring control via SMS.
	Action	The action to be performed when this rule is met.	Turn monitoring ON or OFF.
	SMS text	SMS text which will turn monitoring ON/OFF	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	By serial or by router admin password.
	Allowed users	Whitelist of allow users	From all uers, from group or from single number.
17.	**Get I/O status**		
	Enable	This check box will enable and disable this function.	Allows get I/O status via SMS.
	Action	The action to be performed when this rule is met.	
	SMS text	SMS text which let you get input/output status	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	By serial or by router admin password.
	Allowed users	Whitelist of allow users	From all uers, from group or from single number.
18.	**Switch output on / off**		
	Enable	This check box will enable and disable this function.	Allows output control via SMS.
	Action	The action to be performed when this rule is met.	Turn output ON or OFF.
	Active timeout	Rule active for a specific time, format seconds	
	SMS text	SMS text which let you manage your router output by your selected settings	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	By serial or by router admin password.
	Allowed users	Whitelist of allow users	From all uers, from group or from single number.
	Output type	Type of the output (Digital OC output or Relay output) which will be activated	
19.	**GPS coordinates**		
	Enable	This check box will enable and disable this function.	Allows get GPS coordinates via SMS.
	Action	The action to be performed when this rule is met.	
	SMS text	SMS text which let you to get your router GPS coordinates	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	By serial or by router admin password.
	Allowed users	Whitelist of allow users	From all uers, from group or from single number.
20.	**GPS**		
	Enable	This check box will enable and	Allows control GPS via SMS.

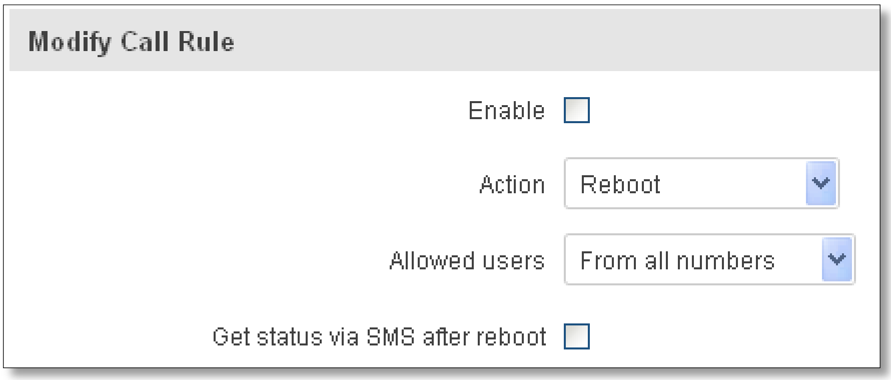
		disable this function.	
	Action	The action to be performed when this rule is met.	Turn GPS ON or OFF.
	SMS text	SMS text which let you to turn on or turn off your	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.
	Authorization method	What kind of authorization to use for SIM management.	By serial or by router admin password.
	Allowed users	Whitelist of allow users	From all uers, from group or from single number.

Important Notes:

- Mobile settings must be configured correctly. If SIM card has PIN number you must enter it at "Network" > "3G" settings. Otherwise SMS reboot function will not work.
- Sender phone number must contain country code. You can check sender phone number format by reading the details of old SMS text massages you receiving usually.

9.8.2 Call Utilities

Allow users to call to the router in order to perform one of the actions: Reboot, Get Status, turn Wi-Fi ON/OFF, turn Mobile data ON/OFF. Only thing that is needed is to call routers SIM card number from allowed phone (user) and RUT9 will perform all actions that are assigned for this particular number. To configure new action on call rules you just need to click the Add button in the „New Call rule" section. After that, you get in to the "Modify Call Rule section".



Modify Call Rule

Enable □

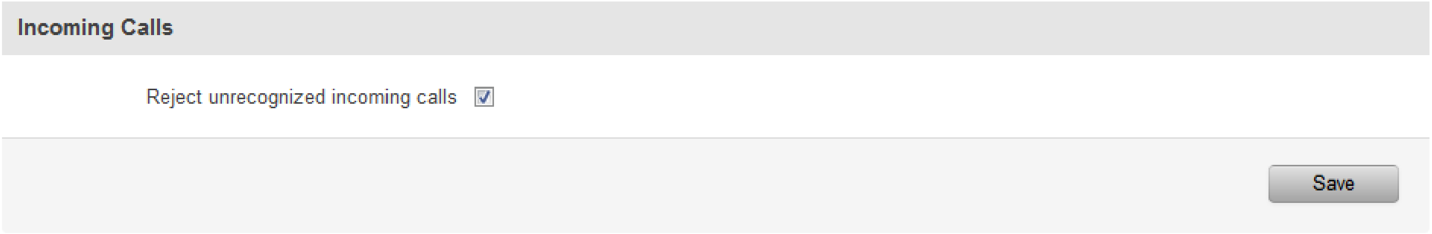
Action: Reboot

Allowed users: From all numbers

Get status via SMS after reboot □

	Field name	Sample	Explanation
1.	Enable	Enable/Disable	Enables the rule
2.	Action	Reboot	Action to be taken after receiving a call, you can choose from following actions: Reboot, Send status, Switch Wi-Fi, Switch mobile data.
3.	Allowed users	From all numbers	Allows to limit action triggering from all users, to user groups or single user numbers
4.	Get status via SMS after reboot	Enable/Disable	Enables automatic message sending with router status information after reboot

9.8.2.1 Incoming Calls



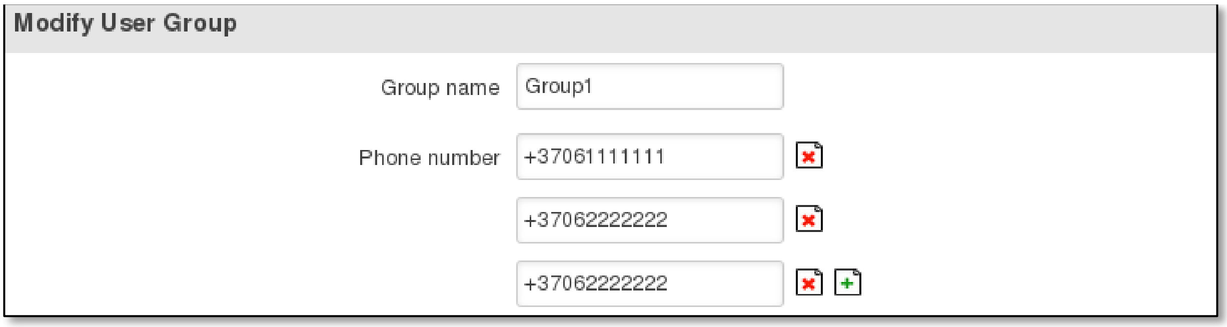
Incoming Calls

Reject unrecognized incoming calls ☑

	Field name	Sample	Explanation
1.	Reject unrecognized incoming calls	Enable/Disable	If a call is made from number that is not in the active rule list, it can be rejected with this option

9.8.3 User Groups

Give possibility to group phone numbers for SMS management purposes. You can then later use these groups in all related SMS functionalities. This option helps if there are several Users who should have same roles when managing router via SMS. You can create new user group by entering group name and clicking on Add button in “Create New User Group” section. After that you get to “Modify User Group” section.



Modify User Group

Group name: Group1

Phone number: +37061111111

+37062222222

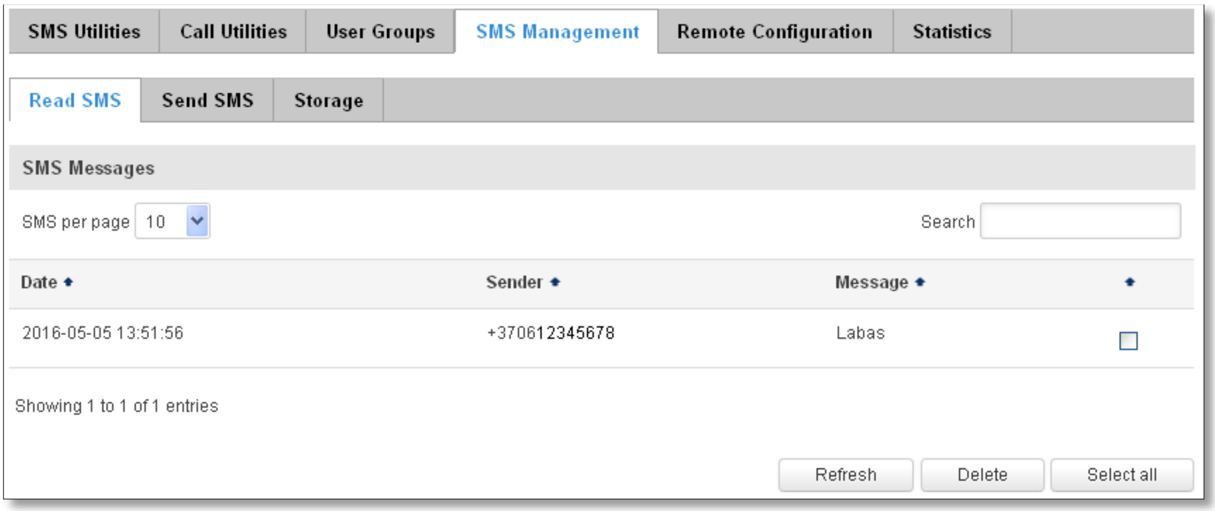
+37062222222

	Field name	Sample	Explanation
1.	Group name	Group1	Name of grouped phone numbers
2.	Phone number	+37061111111	Number to add to users group, must match international format. You can add phone numbers fields by clicking on the green + symbol

9.8.4 SMS Management

9.8.4.1 Read SMS

In SMS Management page Read SMS you can read and delete received/stored SMS.



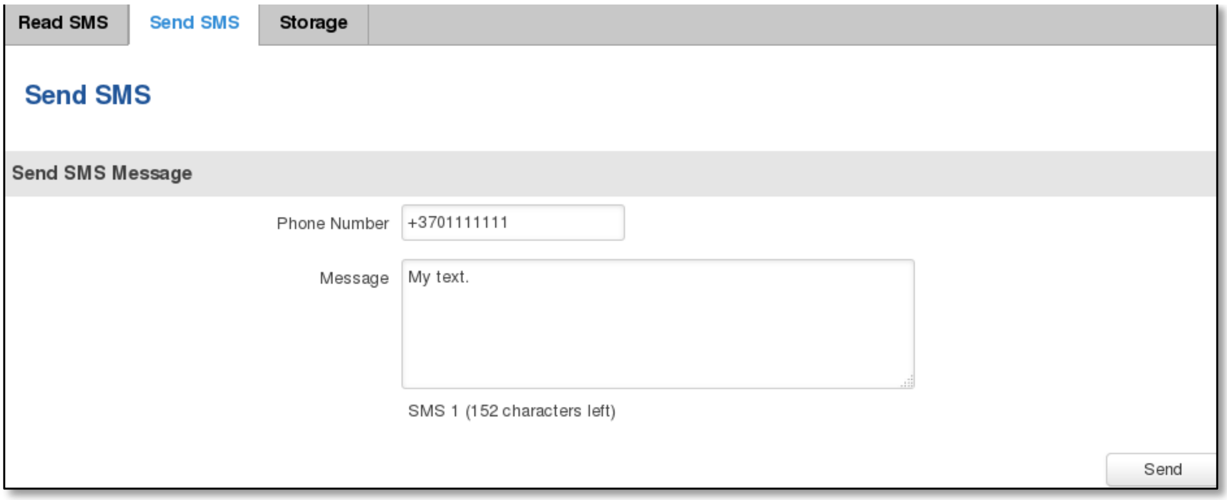
SMS Messages

SMS per page 10 Search

Date	Sender	Message	
2016-05-05 13:51:56	+370612345678	Labas	□

Showing 1 to 1 of 1 entries

9.8.4.2 Send SMS



Send SMS

Send SMS Message

Phone Number: +3701111111

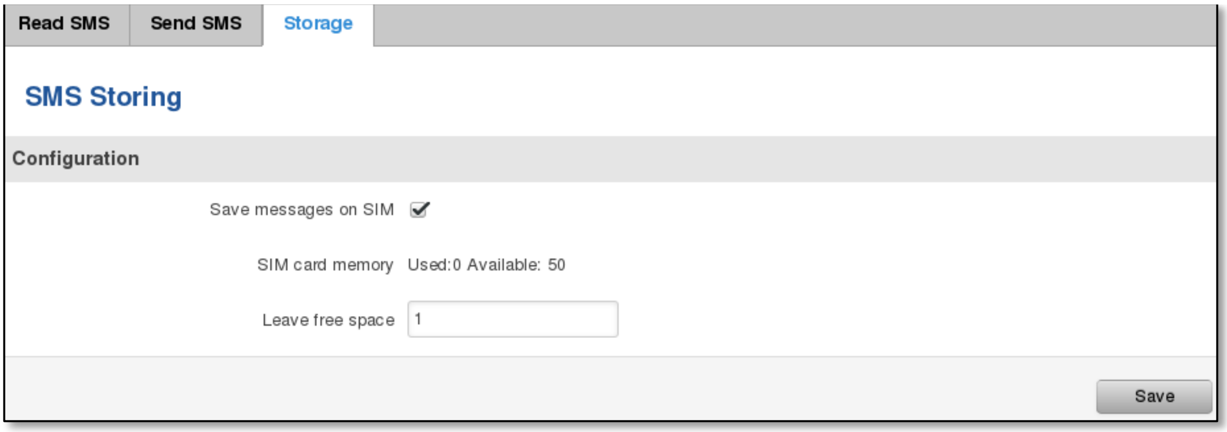
Message: My text.

SMS 1 (152 characters left)

	Field name	Sample	Explanation
1.	Phone number	+3701111111	Recipients phone number. Should be preceded with country code, i.e. “+370”
2.	Message	My text.	Message text, special characters are allowed.

9.8.4.3 Storage

With **storage** option you can choose for router NOT to delete SMS from SIM card. If this option is not used, router will automatically delete all incoming messages after they have been read. Message status “read/unread” is examined every 60 seconds. All “read” messages are deleted.



SMS Storing

Configuration

Save messages on SIM ☑

SIM card memory Used:0 Available: 50

Leave free space 1

	Field name	Sample	Explanation
1.	Save messages on SIM	Enabled / Disabled	Enables received message storing on SIM card
2.	SIM card memory	Used: 0 Available: 50	Information about used/available SIM card memory
3.	Leave free space	1	How much memory (number of message should be left free

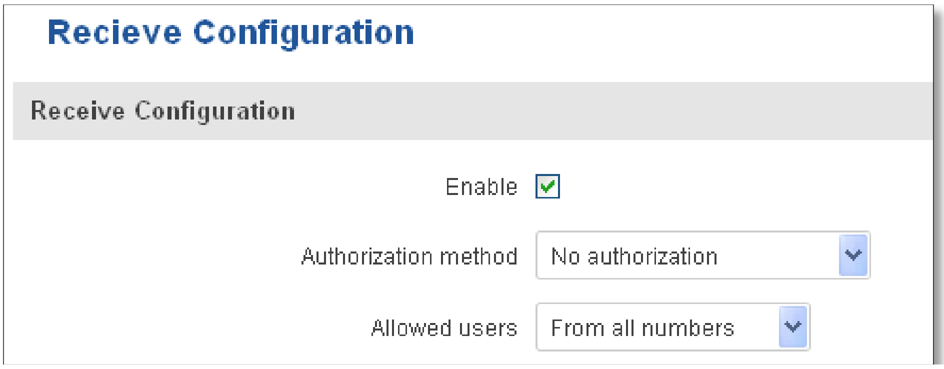
9.8.5 Remote Configuration

RUT9xx can be configured via SMS from another RUT9xx. You only have to select which configuration details have to be sent, generate the SMS Text, type in the phone number and Serial number of the router that you wish to configure and Send the SMS.

Total count of SMS is managed automatically. You should be aware of possible number of SMS and use this feature at your own responsibility. It should not, generally, be used if you have high cost per SMS. This is especially relevant if you will try to send whole OpenVPN configuration, which might acumulate ~40 SMS.

9.8.5.1 Receive configuration

This section controls how configuration initiation party should identify itself. In this scenario RUT955 itself is being configured.


Recieve Configuration

Receive Configuration

Enable ☑

Authorization method No authorization

Allowed users From all numbers

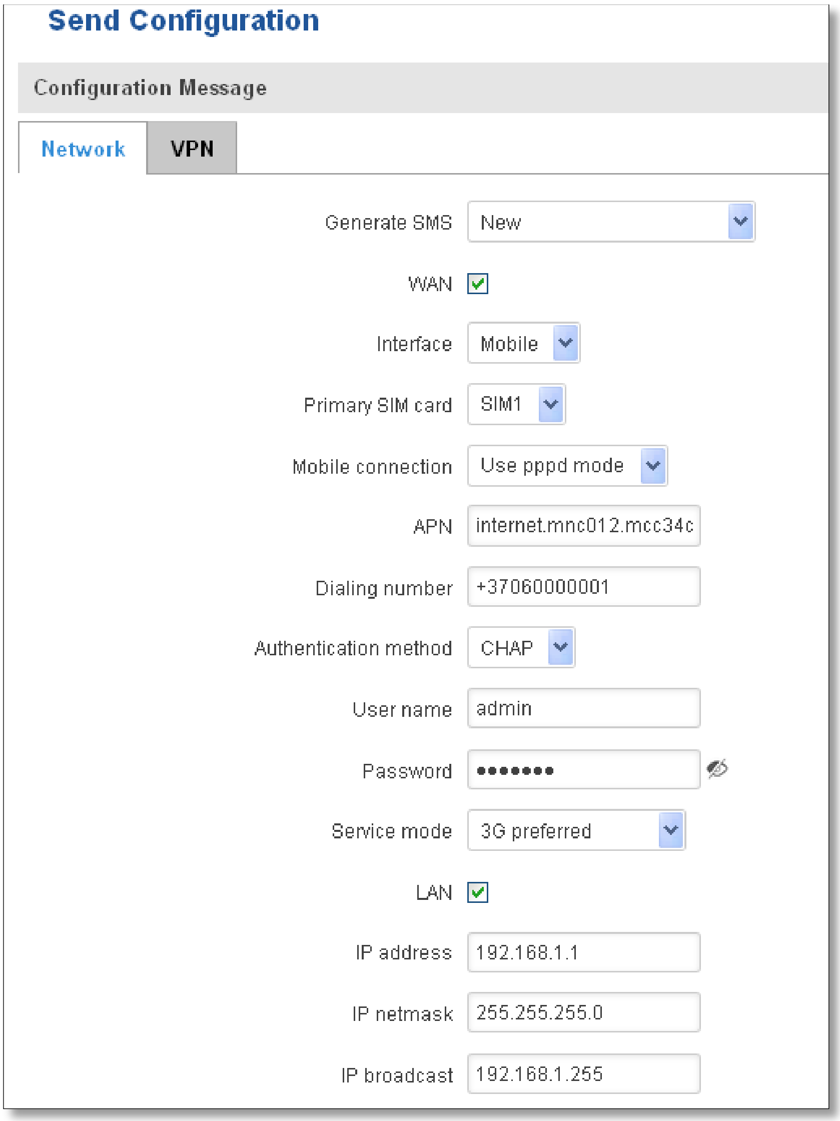
	Field name	Values	Notes

1.	Enable	Enabled / Disabled	Enables router to receive configuration
1.	Authorization method	No authorization / By serial By administration password	Describes what kind of authorization to use for SMS management. Method at Receiving and Sending ends must match
2.	Allowed users	From all numbers From group From single number	Gives greater control and security measures

Note, that for safety reasons Authorization method should be configured before deployment of the router.

9.8.5.2 Send configuration

This section lets you configure remote RUT955 devices. The authorization settings must confirm to those that are set on the receiving party.



Send Configuration

Configuration Message

Generate SMS: New

WAN: ☑

Interface: Mobile

Primary SIM card: SIM1

Mobile connection: Use pppd mode

APN: internet.mnc012.mcc34c

Dialing number: +37060000001

Authentication method: CHAP

User name: admin

Password: •••••••

Service mode: 3G preferred

LAN: ☑

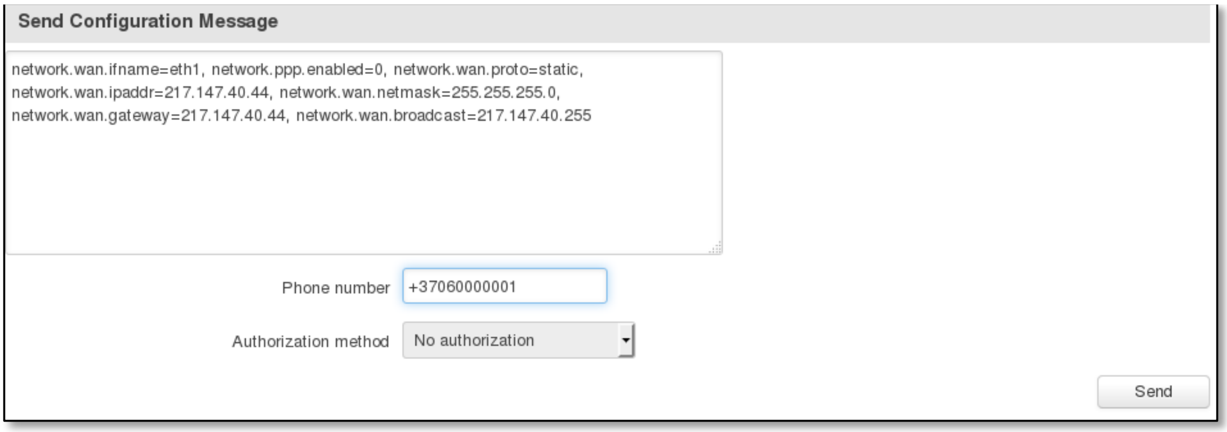
IP address: 192.168.1.1

IP netmask: 255.255.255.0

IP broadcast: 192.168.1.255

	Field name	Values	Notes

1.	Generate SMS	New/From current configuration	Generate new SMS settings or use current device configuration
2.	Interface	Mobile/Wired	Interface type used for WAN (Wide Area Network) connection
3.	WAN	Enable/Disable	Include configuration for WAN (Wide Area Network)
4.	LAN	Enable/Disable	Include configuration for LAN (Local Area Network)
6.	Protocol	Static/DHCP	Network protocol used for network configuration parameters management
7.	IP address	“217.147.40.44”	IP address that router will use to connect to the internet
8.	IP netmask	“255.255.255.0”	That will be used to define how large the WAN (Wide Area Network) network is
11.	IP gateway	“217.147.40.44”	The address where traffic destined for the internet is routed to
12.	IP broadcast	“217.147.40.255”	A logical address at which all devices connected to a multiple-access communications network are enabled to receive datagrams.
13.	Primary SIM card	SIM1/SIM2	A SIM card that will be used as primary
14.	Mobile connection	Use pppd mode Use ndis mode	An underlying agent that will be used for mobile data connection creation and management
15.	APN	“internet.mnc012.mcc345.gprs”	(APN) is the name of a gateway between a GPRS or 3G mobile networks and another computer network, frequently the public Internet.
16.	Dialing number	“+37060000001”	A phone number that will be used to establish a mobile PPP (Point-to-Point Protocol) connection
17.	Authentication method	CHAP/PAP/None	Select an authentication method that will be used to authenticate new connections on your GSM carrier's network
18.	User name	“admin”	User name used for authentication on your GSM carrier's network
19.	Password	“password”	Password used for authentication on your GSM carrier's network
20.	Service mode	Auto 4G (LTE) preferred 4G (LTE) only 3G preferred 3G only 2G preferred 2G only	You can add as many phone numbers as you need. Dropdown list with additional rows will show up if you click on “add” icon at the end of phone number row.
21.	IP address	“192.168.1.1”	IP address that router will use on LAN (Local Area Network) network
22.	IP netmask	“255.255.255.0”	A subnet mask that will be used to define how large the LAN (Local Area Network) network is
23.	IP broadcast	“192.168.1.255”	A logical address at which all devices connected to a multiple-access communications network are enabled to receive datagrams



Send Configuration Message

```
network.wan.ifname=eth1, network.ppp.enabled=0, network.wan.proto=static,
network.wan.ipaddr=217.147.40.44, network.wan.netmask=255.255.255.0,
network.wan.gateway=217.147.40.44, network.wan.broadcast=217.147.40.255
```

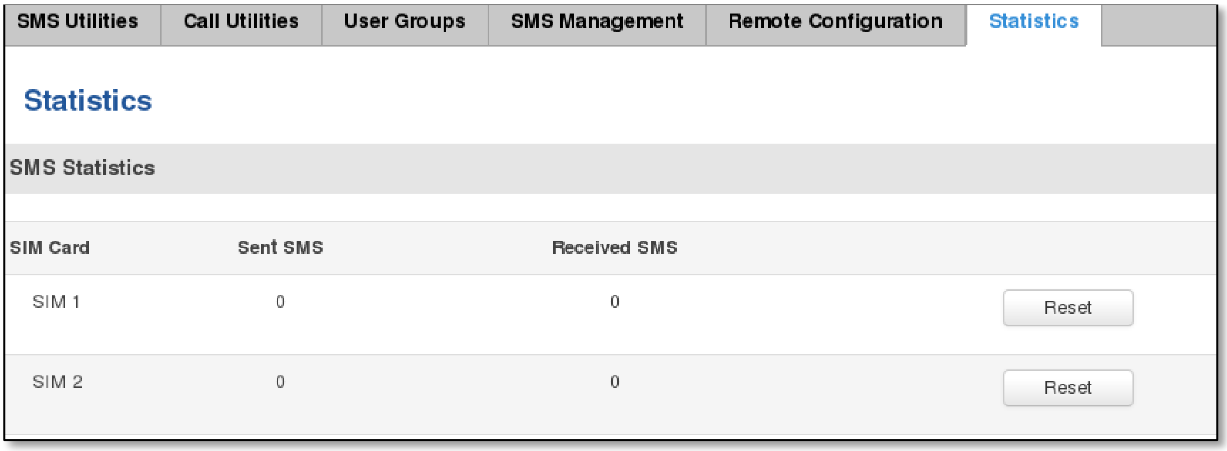
Phone number: +37060000001

Authorization method: No authorization

	Field name	Values	Notes
1.	Message text field	Generated configuration message	Here you can review and modify configuration message text to be sent
2.	Phone number	"+37060000001"	A phone number of router which will receive the configuration
3.	Authorization method	No authorization By serial By router admin password	What kind of authorization to use for remote configuration

9.8.6 Statistics

In statistics page you can review how much SMS was sent and received on both SIM card slots. You can also reset the counters.



Statistics

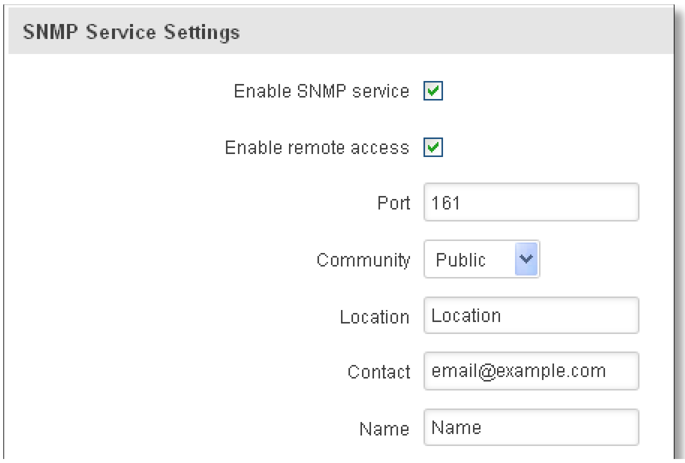
SMS Statistics

SIM Card	Sent SMS	Received SMS	
SIM 1	0	0	Reset
SIM 2	0	0	Reset

9.9 SNMP

SNMP settings window allows you to remotely monitor and send GSM event information to the server.

9.9.1 SNMP Settings



SNMP Service Settings

Enable SNMP service ☑

Enable remote access ☑

Port 161

Community Public

Location Location

Contact email@example.com

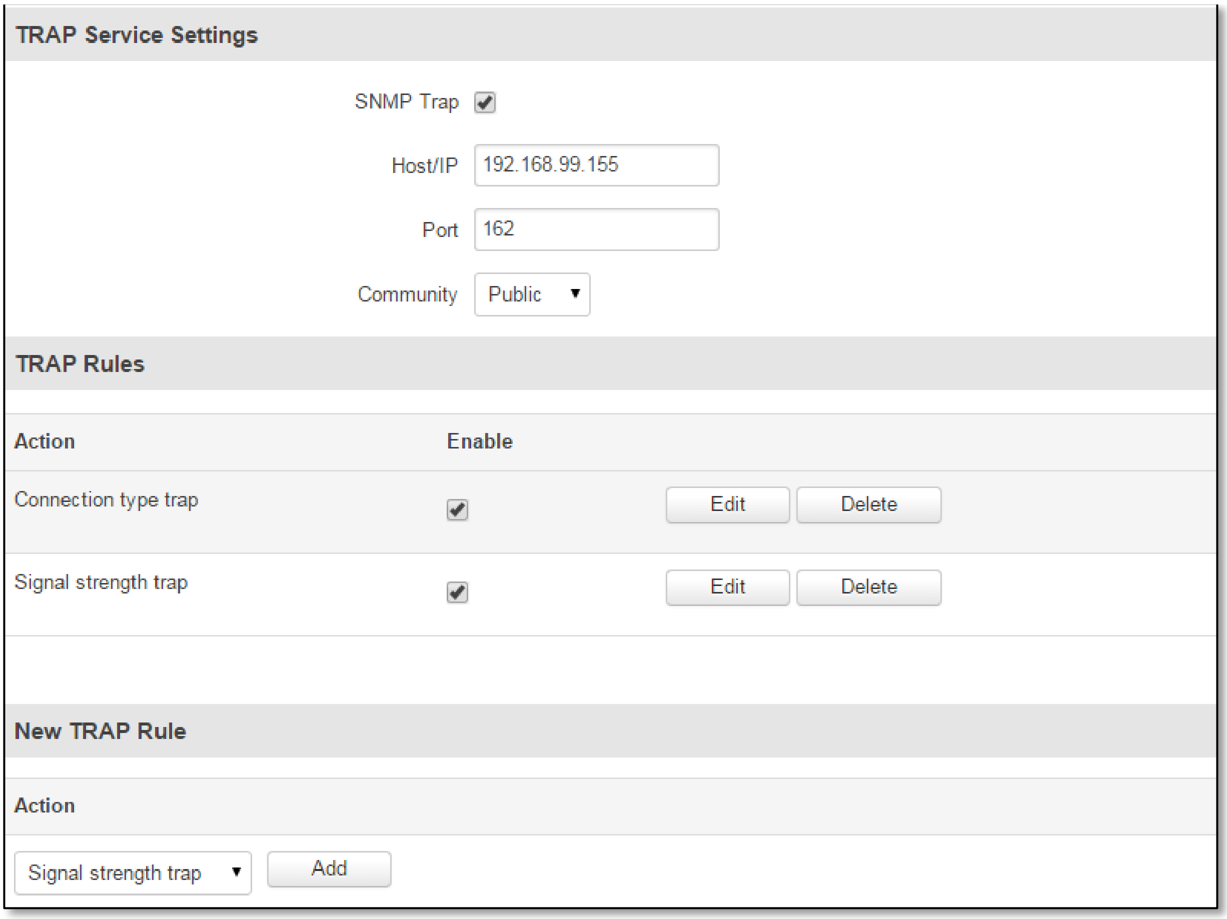
Name Name

	Field name	Sample	Explanation
1.	Enable SNMP service	Enable/Disable	Run SNMP (Simple Network Management Protocol) service on system's start up
2.	Enable remote access	Enable/Disable	Open port in firewall so that SNMP (Simple Network Management Protocol) service may be reached from WAN
3.	Port	161	SNMP (Simple Network Management Protocol) service's port
4.	Community	Public/Private/Custom	The SNMP (Simple Network Management Protocol) Community is an ID that allows access to a router's SNMP data
5.	Community name	custom	Set custom name to access SNMP
6.	Location	Location	Trap named sysLocation
7.	Contact	email@example.com	Trap named sysContact
8.	Name	Name	Trap named sysName

Variables/OID

	OID	Description
1.	1.3.6.1.4.1.99999.1.1.1	Modem IMEI
2.	1.3.6.1.4.1.99999.1.1.2	Modem model
3.	1.3.6.1.4.1.99999.1.1.3	Modem manufacturer
4.	1.3.6.1.4.1.99999.1.1.4	Modem revision
5.	1.3.6.1.4.1.99999.1.1.5	Modem serial number
6.	1.3.6.1.4.1.99999.1.1.6	SIM status
7.	1.3.6.1.4.1.99999.1.1.7	Pin status
8.	1.3.6.1.4.1.99999.1.1.8	IMSI
9.	1.3.6.1.4.1.99999.1.1.9	Mobile network registration status
10.	1.3.6.1.4.1.99999.1.1.10	Signal level
11.	1.3.6.1.4.1.99999.1.1.11	Operator currently in use
12.	1.3.6.1.4.1.99999.1.1.12	Operator number (MCC+MNC)
13.	1.3.6.1.4.1.99999.1.1.13	Data session connection state
14.	1.3.6.1.4.1.99999.1.1.14	Data session connection type
15.	1.3.6.1.4.1.99999.1.1.15	Signal strength trap
16.	1.3.6.1.4.1.99999.1.1.16	Connection type trap

9.9.2 TRAP Settings



TRAP Service Settings

SNMP Trap ☑

Host/IP 192.168.99.155

Port 162

Community Public ▾

TRAP Rules

Action	Enable		
Connection type trap	☑	Edit	Delete
Signal strength trap	☑	Edit	Delete

New TRAP Rule

Action

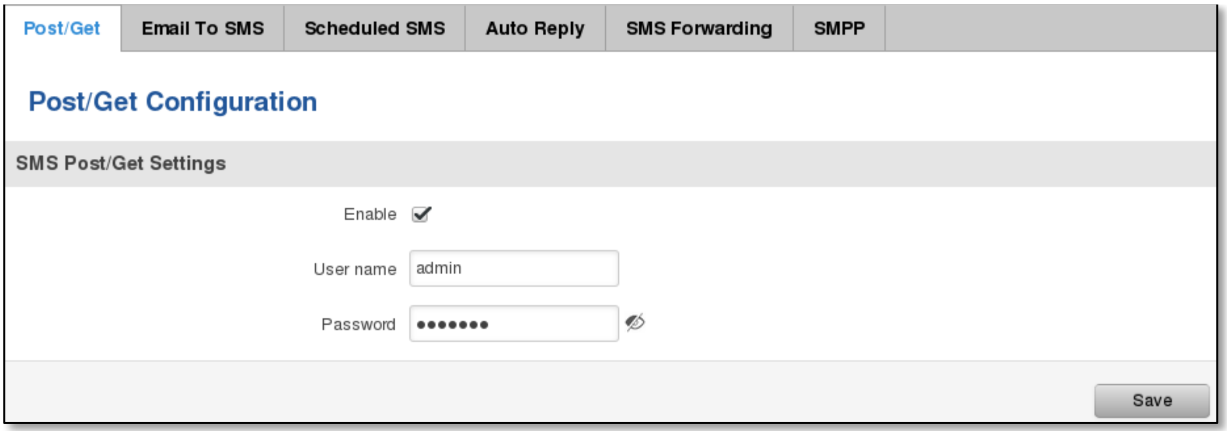
Signal strength trap ▾ Add

	Field name	Sample	Explanation
1.	SNMP Trap	Enable/Disable	Enable SNMP (Simple Network Management Protocol) trap functionality
2.	Host/IP	192.168.99.155	Host to transfer SNMP (Simple Network Management Protocol) traffic to
3.	Port	162	Port for trap's host
4.	Community	Public/Private	The SNMP (Simple Network Management Protocol) Community is an ID that allows access to a router's SNMP data

9.10 SMS Gateway

9.10.1 Post/Get Configuration

Post/Get Configuration allows you to perform actions by writing these requests URI after your device IP address.



Post/Get Configuration

SMS Post/Get Settings

Enable ☑

User name admin

Password •••••••

Save

	Field name	Values	Notes
1.	Enable	Enabled / Disabled	Enable SMS management functionality through POST/GET
2.	User name	admin	User name used for authorization
3.	Password	*******	Password used for authorization (default- admin01)

Do not forget to change parameters in the url according to your POST/GET Configuration!

9.10.1.1 SMS by HTTP POST/GET

It is possible to read and send SMS by using valid HTTP POST/GET syntax. Use web browser or any other compatible software to submit HTTP POST/GET string to router. Router must be connected to GSM network when using "SMS send" feature.

	Action	POST/GET url e.g.
1.	View mobile messages list	/cgi-bin/sms_list?username=admin&password=admin01
2.	Read mobile message	/cgi-bin/sms_read?username=admin&password=admin01&number=1
3.	Send mobile messages	/cgi-bin/sms_send?username=admin&password=admin01&number=0037060000001&text=testmessage
4.	View mobile messages total	/cgi-bin/sms_total?username=admin&password=admin01
5.	Delete mobile message	/cgi-bin/sms_delete?username=admin&password=admin01&number=1

9.10.1.2 Syntax of HTTP POST/GET string

HTTP POST/GET string		Explanation
http://{IP_ADDRESS}	/cgi-bin/sms_read? username={your_user_name}&password={your_password}&number={MESSAGE_INDEX}	Read message
	/cgi-bin/sms_send? username={your_user_name}&password={your_password}&number={PHONE_NUMBER} &text={MESSAGE_TEXT}	Send message
	/cgi-bin/sms_delete? username={your_user_name}&password={your_password}&number={MESSAGE_INDEX}	Delete message
	/cgi-bin/ sms_list? username={your_user_name}&password={your_password}	List all messages
	/cgi-bin/sms_ total? username={your_user_name}&password={your_password}	Number of messages in memory

Note: parameters of HTTP POST/GET string are in capital letters inside curly brackets. Curly brackets ("{ }") are not needed when submitting HTTP POST/GET string.

9.10.1.3 Parameters of HTTP POST/GET string

	Parameter	Explanation
1.	IP_ADDRESS	IP address of your router
2.	MESSAGE_INDEX	SMS index in memory
3.	PHONE_NUMBER	Phone number of the message receiver. Note: Phone number must contain country code. Phone number format is: 00{COUNTRY_CODE} {RECEIVER_NUMBER}. E.g.: 0037062312345 (370 is country code and 62312345 is receiver phone number)
4.	MESSAGE_TEXT	Text of SMS. Note: Maximum number of characters per SMS is 160. You cannot send longer messages. It is suggested to use alphanumeric characters only.

After every executed command router will respond with return status.

9.10.1.4 Possible responses after command execution

	Response	Explanation
1.	OK	Command executed successfully
2.	ERROR	An error occurred while executing command
3.	TIMEOUT	No response from the module received
4.	WRONG_NUMBER	SMS receiver number format is incorrect or SMS index number is incorrect
5.	NO MESSAGE	There is no message in memory by given index
6.	NO MESSAGES	There are no stored messages in memory

9.10.1.5 HTTP POST/GET string examples

http://192.168.1.1/cgi-bin/sms_read?username=admin&password=admin01&number=2

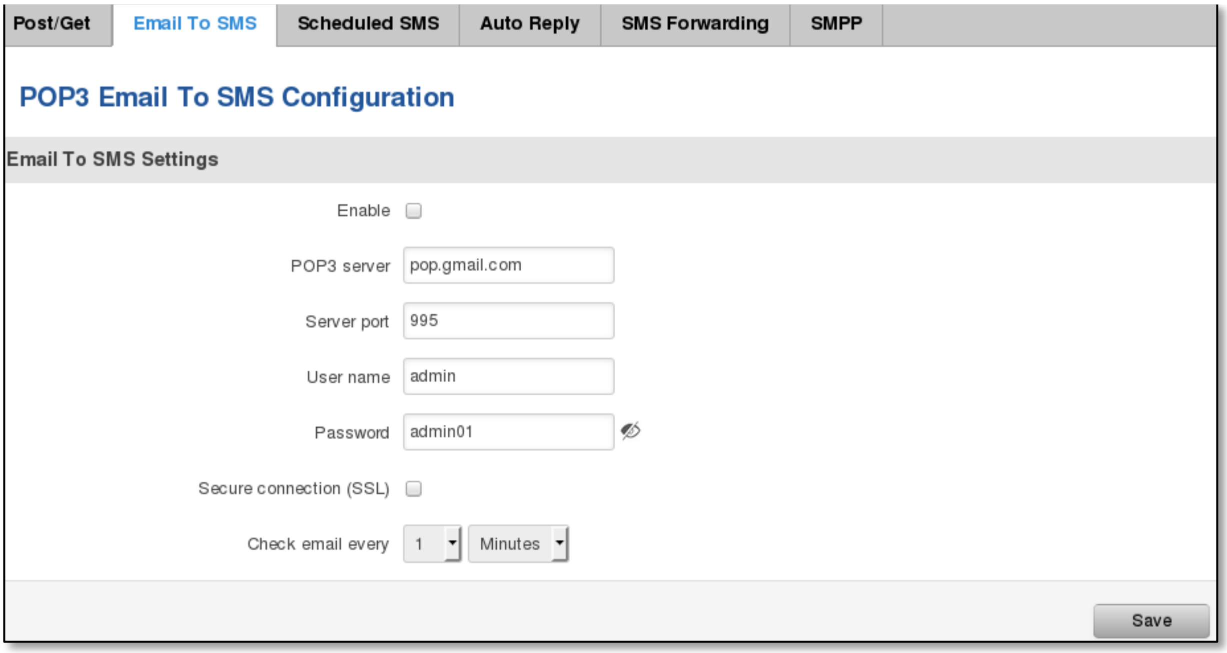
http://192.168.1.1/cgi-bin/sms_send?username=admin&password=admin01&number=0037060000001&text=message

http://192.168.1.1/cgi-bin/sms_delete?username=admin&password=admin01&number=4

http://192.168.1.1 /cgi-bin/sms_list?username=admin&password=admin01

http://192.168.1.1/cgi-bin/sms_total?username=admin&password=admin01

9.10.2 Email to SMS



POP3 Email To SMS Configuration

Email To SMS Settings

Enable □

POP3 server: pop.gmail.com

Server port: 995

User name: admin

Password: admin01

Secure connection (SSL) □

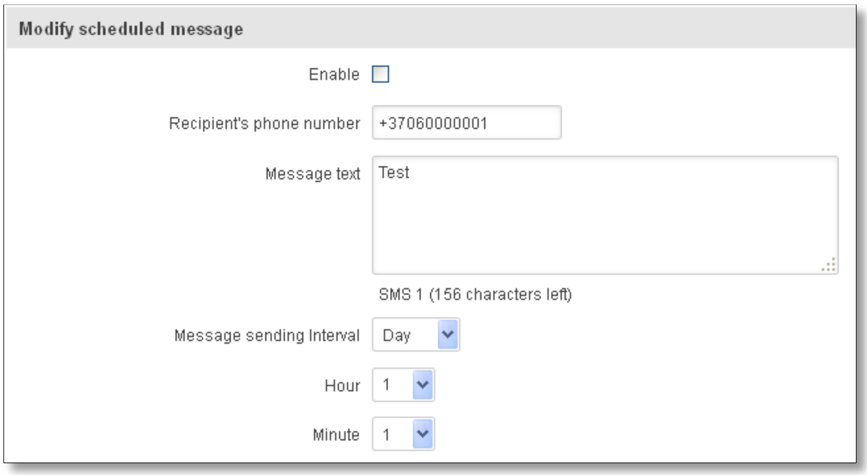
Check email every: 1 Minutes

	Field name	Values	Notes
1.	Enable	Enable/Disable	Allows to convert received Email to SMS
2.	POP3 server	“pop.gmail.com”	POP3 server address
3.	Server port	“995”	Server authentication port
4.	User name	“admin”	User name using for server authentication
5.	Password	“admin01”	Password using for server authentication
6.	Secure connection (SLL)	Enable/Disable	(SSL) is a protocol for transmitting private documents via the Internet. SSL uses a cryptographic system that uses two keys to encrypt data – a public key known to everyone and a private or secret key known only to the recipient of the message.
7.	Check mail every	Minutes Hours Days	Mail checking period

9.10.3 Scheduled Messages

Scheduled messages allow to periodically sending mobile messages to specified number.

9.10.3.1 Scheduled Messages Configuration



Modify scheduled message

Enable □

Recipient's phone number +37060000001

Message text Test

SMS 1 (156 characters left)

Message sending Interval Day

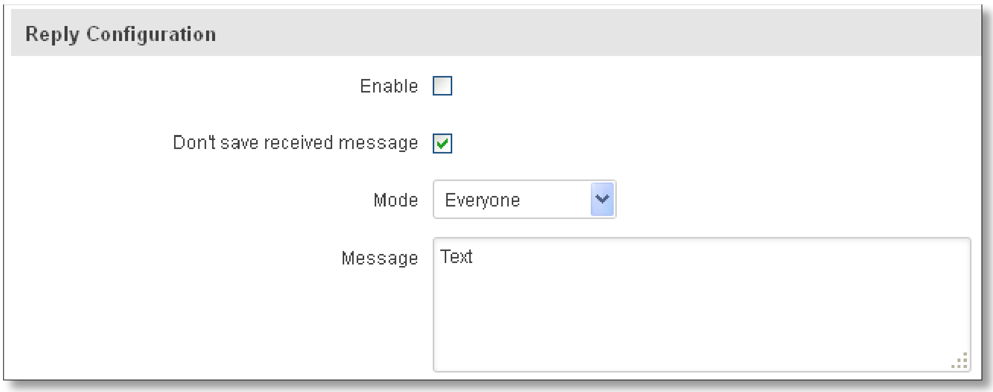
Hour 1

Minute 1

	Field name	Values	Notes
1.	Enable	Enable/Disable	Activates periodical messages sending.
2.	Recipient’s phone number	“+37060000001”	Phone number that will receive messages.
3.	Message text	“Test”	Message that will be send.
4.	Message sending interval	Day/Week/Month/Year	Message sending period.

9.10.4 Auto Reply Configuration

Auto reply allows replying to every message that router receives to everyone or to listed numbers only.



Reply Configuration

Enable □

Don't save received message ☑

Mode: Everyone

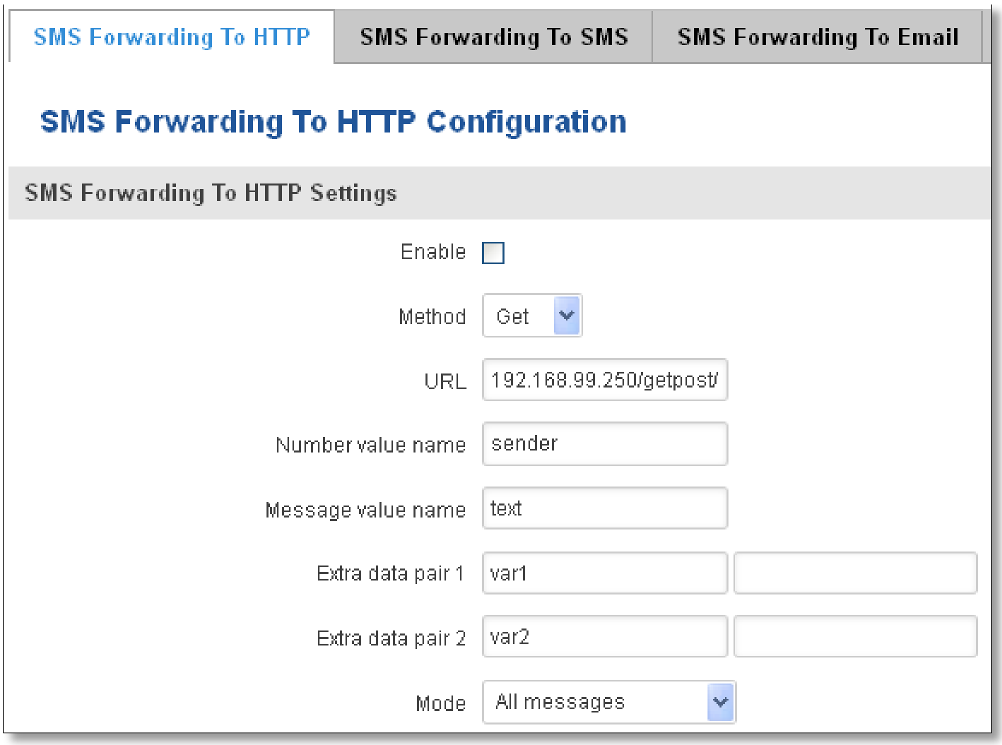
Message: Text

	Field name	Values	Notes
1.	Enable	Enable/Disable	Enable auto reply to every received mobile message.
2.	Don't save received message	Enable/Disable	If enabled, received messages are not going to be saved
3.	Mode	Everyone / Listed numbers	Specifies from which senders received messages are going to be replied.
4.	Message	"Text"	Message text that will be sent in reply.

9.10.5 SMS Forwarding

9.10.5.1 SMS Forwarding To HTTP

This functionality forwards mobile messages from all or only specified senders to HTTP, using either POST or GET methods.



SMS Forwarding To HTTP Configuration

SMS Forwarding To HTTP Settings

Enable □

Method: Get

URL: 192.168.99.250/getpost/

Number value name: sender

Message value name: text

Extra data pair 1: var1

Extra data pair 2: var2

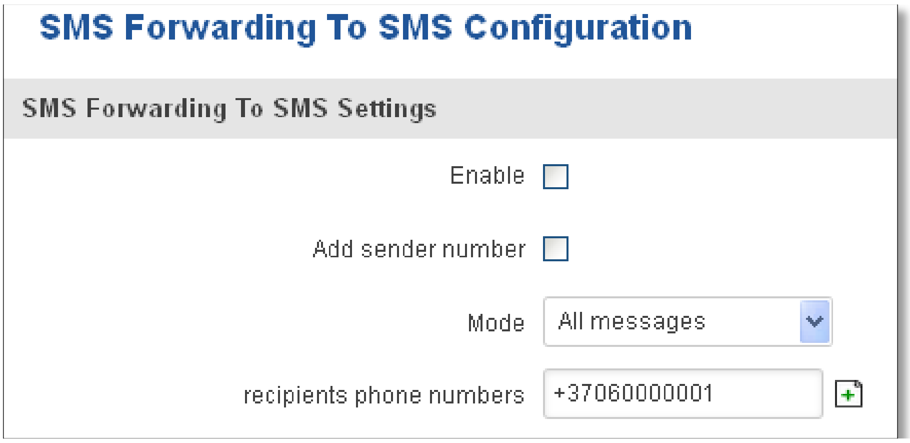
Mode: All messages

	Field name	Values	Notes

1.	Enable	Enable / Disable	Enable mobile message forwarding to HTTP
2.	Method	POST / GET	Defines the HTTP transfer method
3.	URL	192.168.99.250/getpost/index.php	URL address to forward messages to
4.	Number value name	“sender”	Name to assign for sender’s phone number value in query string
5.	Message value name	“text”	Name to assign for message text value in query string
6.	Extra data pair 1	Var1 - 17	If you want to transfer some extra information through HTTP query, enter variable name on the left field and its value on the right
7.	Extra data pair 2	Var2 – “go”	If you want to transfer some extra information through HTTP query, enter variable name on the left field and its value on the right
8.	Mode	All messages/From listed numbers	Specifies which senders messages to forward

9.10.5.2 SMS Forwarding to SMS

This functionality allows forwarding mobile messages from specified senders to one or several recipients.



SMS Forwarding To SMS Configuration

SMS Forwarding To SMS Settings

Enable □

Add sender number □

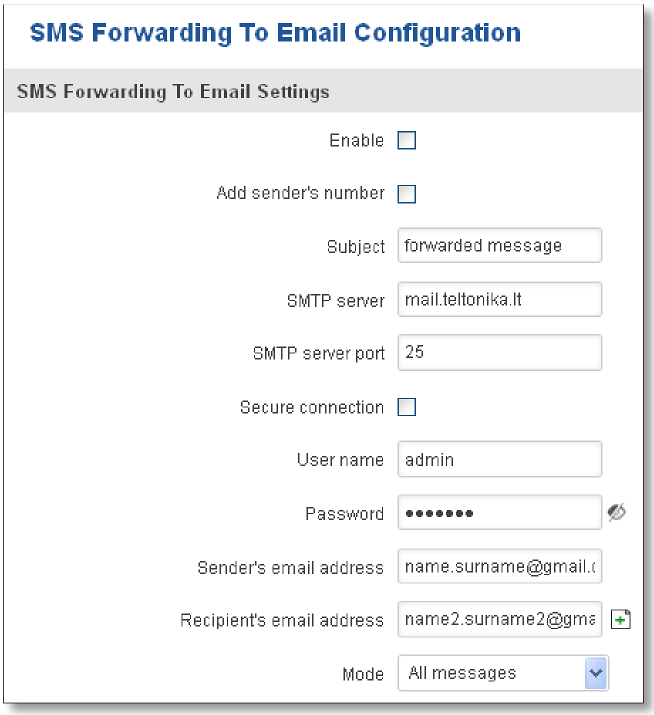
Mode: All messages

recipients phone numbers: +37060000001

	Field name	Values	Notes
1.	Enable	Enable / Disable	Enable mobile message forwarding
2.	Add sender number	Enable / Disable	If enabled, original senders number will be added at the end of the forwarded message
3.	Mode	All message / From listed numbers	Specifies from which senders received messages are going to be forwarded.
4.	Recipients phone numbers	+37060000001	Phone numbers to which message is going to be forwarded to

9.10.5.3 SMS Forwarding to Email

This functionality forwards mobile messages from one or several specified senders to email address.



SMS Forwarding To Email Configuration

SMS Forwarding To Email Settings

Enable □

Add sender's number □

Subject: forwarded message

SMTP server: mail.teltonika.lt

SMTP server port: 25

Secure connection □

User name: admin

Password: •••••••

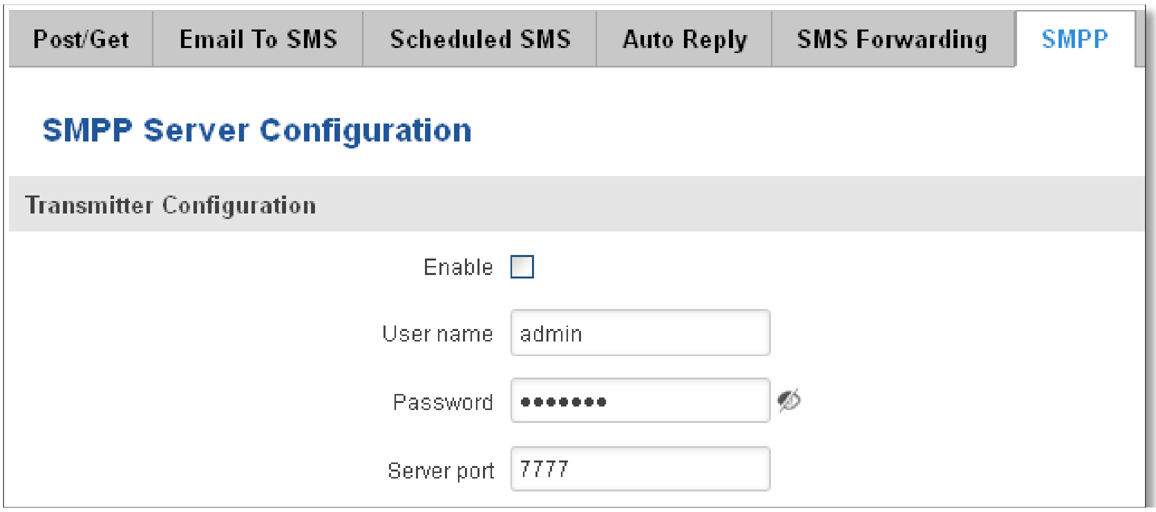
Sender's email address: name.surname@gmail.c

Recipient's email address: name2.surname2@gma

Mode: All messages

	Field name	Values	Notes
1.	Enable	Enable / Disable	Enable mobile message forwarding to email
2.	Add sender number	Enable / Disable	If enabled, original senders number will be added at the end of the forwarded message
3.	Subject	"forwarded message"	Text that will be inserted in email Subject field
4.	SMTP server	mail.teltonika.lt	Your SMTP server's address
5.	SMTP server port	25	Your SMTP server's port number
6.	Secure connection	Enable / Disable	Enables the use of cryptographic protocols, enable only if your SMTP server supports SSL or TLS
7.	User name	"admin"	Your full email account user name
8.	Password	*******	Your email account password
9.	Sender's email address	name.surname@gmail.com	Your address that will be used to send emails from
10.	Recipient's email address	name2.surname2@gmail.com	Address that you want to forward your messages to
11.	Mode	All messages / from listed numbers	Choose which senders messages to forward to email

9.10.6 SMPP



SMPP Server Configuration

Transmitter Configuration

Enable □

User name admin

Password ●●●●●●●

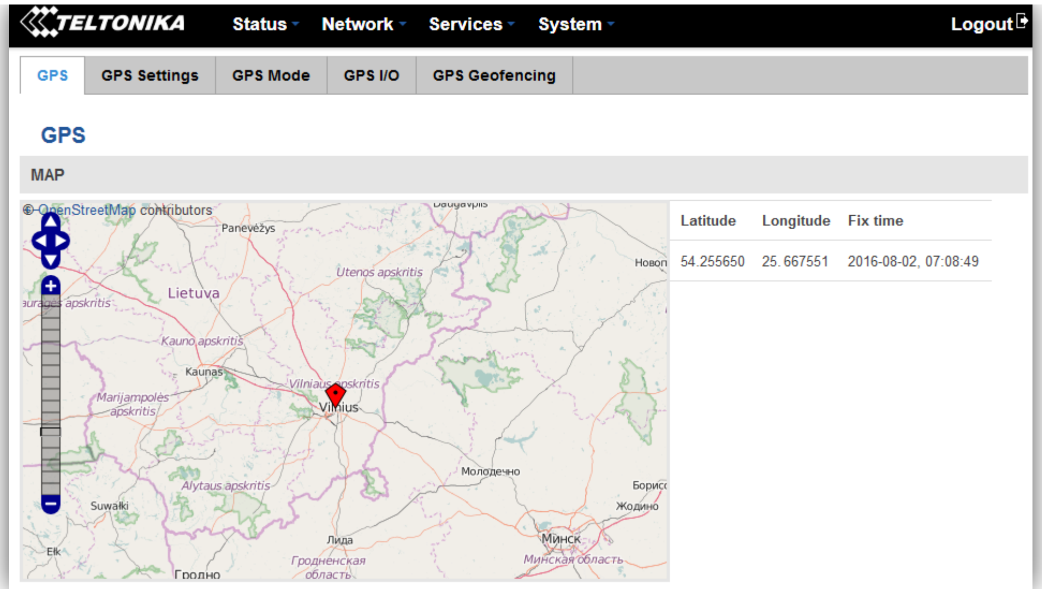
Server port 7777

	Field name	Values	Explanation
1.	Enable	Enable/Disable	Enables SMPP server
2.	User name	admin	User name for authentication on SMPP server
3.	Password	●●●●●●●	Password for authentication on SMPP server
4.	Server port	7777	A port will be used for SMPP server communications. Allowed all not used ports [0-65535]

9.11 GPS

9.11.1 GPS

On this page you can view your current coordinates and position on map



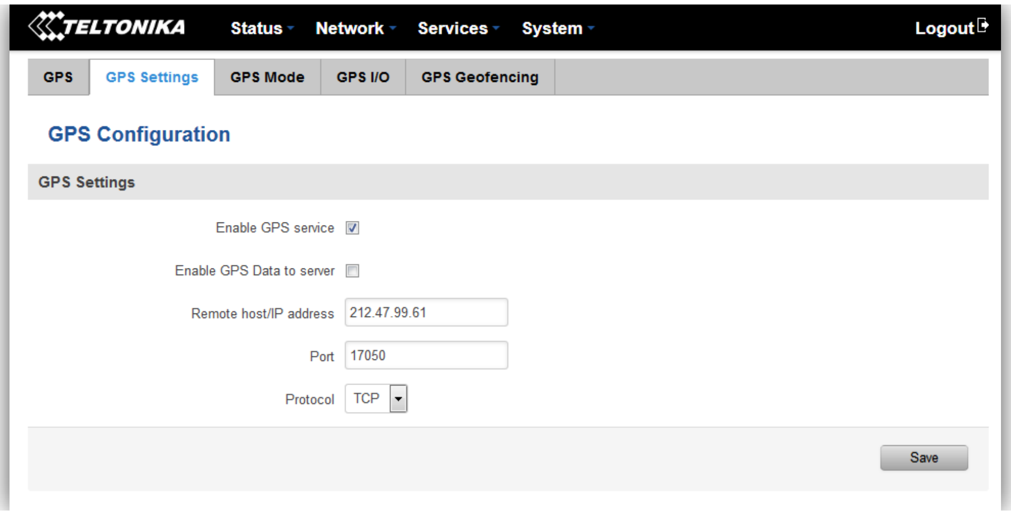
GPS

MAP

Latitude	Longitude	Fix time
54.255650	25.667551	2016-08-02, 07:08:49

9.11.2 GPS Settings

This is the GPS parameters comfiguration page.



GPS Configuration

GPS Settings

Enable GPS service ☑

Enable GPS Data to server □

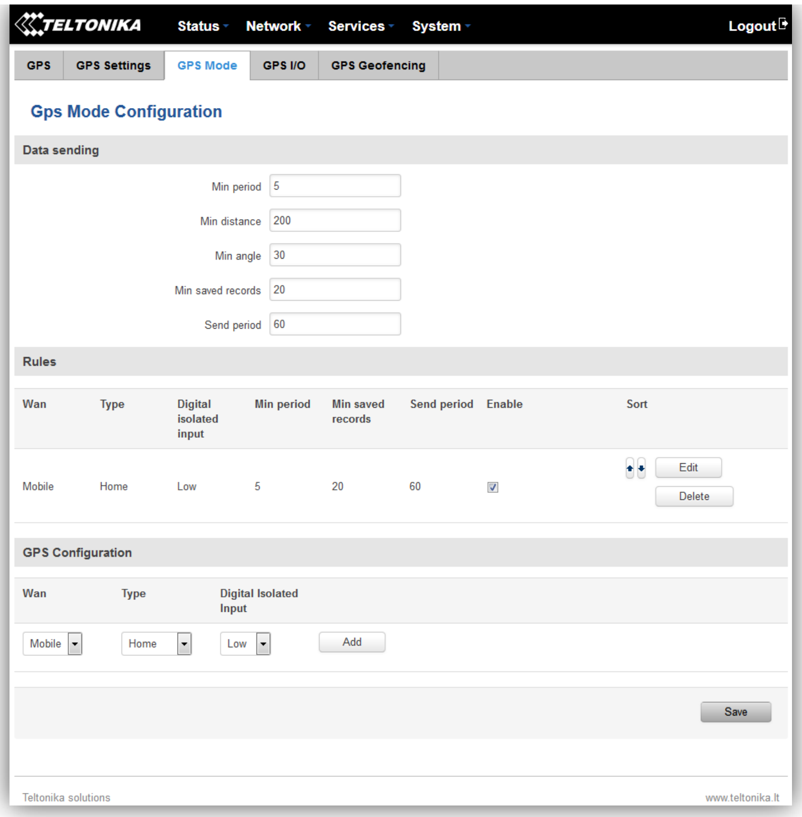
Remote host/IP address 212.47.99.61

Port 17050

Protocol TCP

	Field name	Values	Notes
1.	Enable GPS service	Enable / Disable	By enabling it will start generate your location coordinates
2.	Enable GPS Data to server	Enable / Disable	By enabling it will start generate your location coordinates and transfer them to specified server
3.	Remote host / IP address	212.47.99.61	Server IP address or domain name to send coordinates to
4.	Port	17050	Server port used for data transfer
5.	Protocol	TCP or UDP	Protocol to be used for coordinates data transfer to server

9.11.3 GPS Mode



Gps Mode Configuration

Data sending

Min period 5

Min distance 200

Min angle 30

Min saved records 20

Send period 60

Rules

Wan	Type	Digital isolated input	Min period	Min saved records	Send period	Enable	Sort
Mobile	Home	Low	5	20	60	☑	

GPS Configuration

Wan	Type	Digital Isolated Input
Mobile	Home	Low

Data sending

	Field name	Values	Notes
1.	Min period	5	Period (in seconds) for data collection
2.	Min distance	200	Distance difference (in meters) between last registered and current coordinates to collect data (even if Min period have not passed yet)
3.	Min angle	30	Minimal angle difference between last registered and current coordinates to collect data (even if Min period have not passed yet)
4.	Min saved records	20	Minimal amount of coordinates registered, to send them to server immediately (even if Send period have not passed yet)
5.	Send period	50	Period for sending collected data to server

Rules

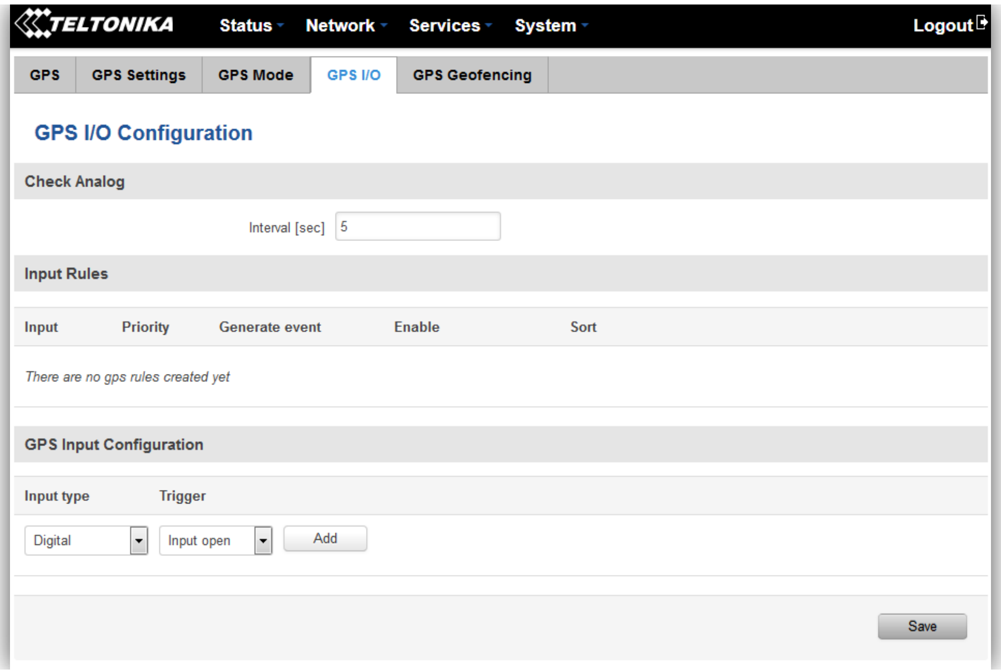
This table shows created GPS rules for data sending.

GPS Configuration

GPS configuration section allows to save several different configurations for GPS data collection, active configuration is automaticaly selected when configured conditions are met.

	Field name	Values	Notes
1.	WAN	Mobile/ Wired/ WiFi	Interface which needs to be used to activate this configuration
2.	Type	Home/ Roaming/ Both	Mobile connection state needed to activate this configuration
3.	Digital Isolated Input	Low logic level/ High logic level/ Both	Input state needed to activate this configuration

9.11.4 GPS I/O



GPS I/O Configuration

Check Analog

Interval [sec] 5

Input Rules

Input | Priority | Generate event | Enable | Sort

There are no gps rules created yet

GPS Input Configuration

Input type: Digital
Trigger: Input open

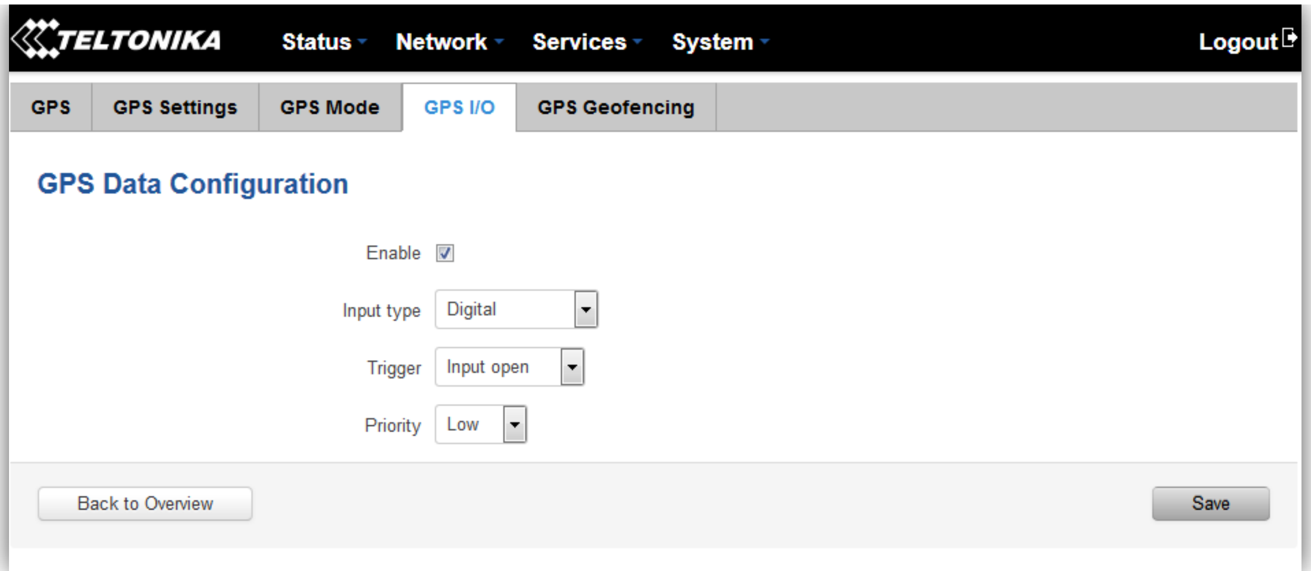
Check Analog

	Field name	Values	Notes
1.	Interval (sec)	5	Interval to check analog input value

Input Rules

In this table shows created Input rules.

GPS Input Configuration



GPS Data Configuration

Enable ☑

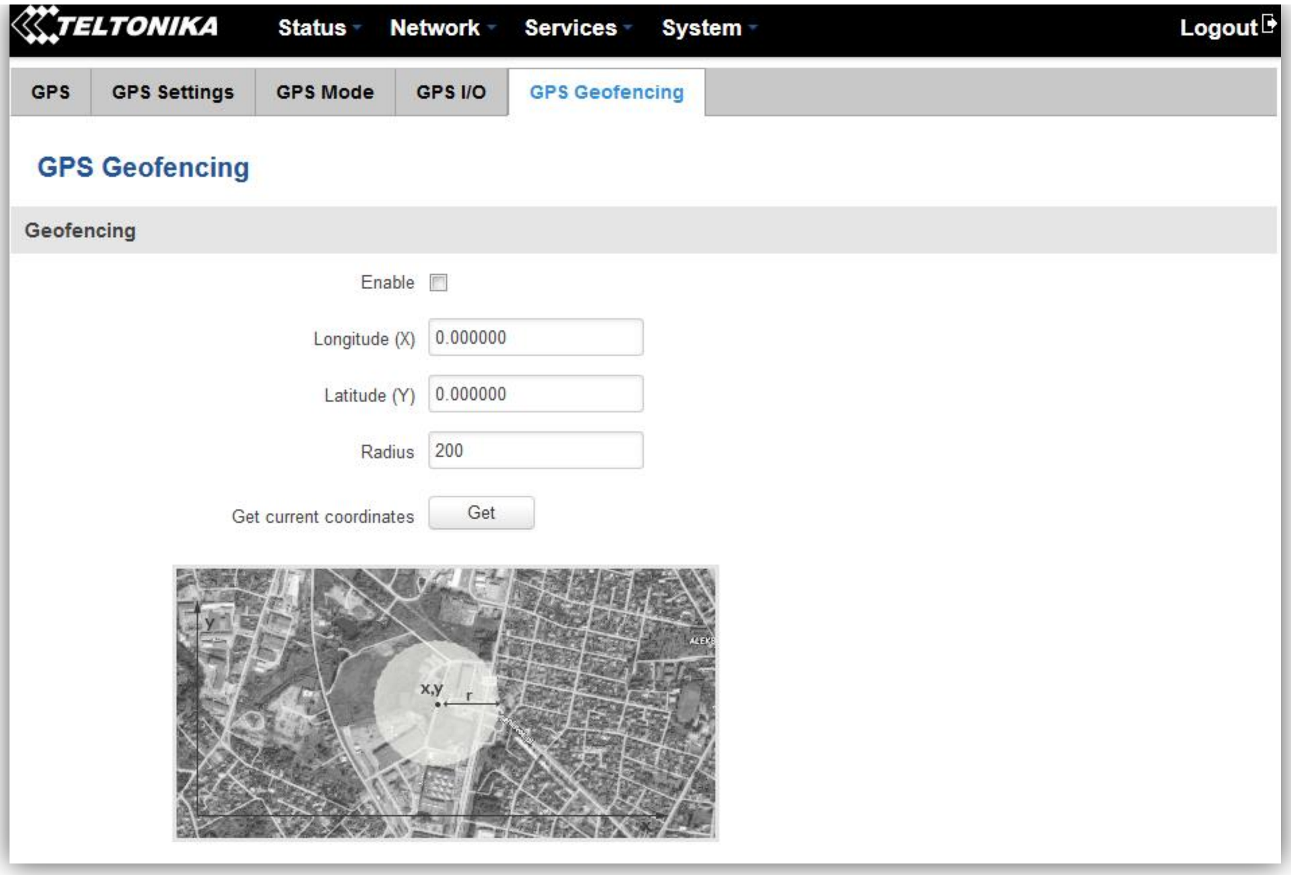
Input type: Digital

Trigger: Input open

Priority: Low

	Field name	Values	Notes
1.	Input Type	Digital/ Digital isolated/ Analog	Select type on your own intended configuration
2.	Trigger	Input open/ Input shorted/ Both	Select trigger event for your own intended configuration
3.	Priority	Low/ High/ Panic	Different priority settings ads different priority flags to event packet, and they can be displayed differently

9.11.5 GPS Geofencing



GPS Geofencing

Geofencing

Enable □

Longitude (X): 0.000000

Latitude (Y): 0.000000

Radius: 200

Get current coordinates

Geofencing is a feature which can detect whenever a device enters or leaves customized area.

	Field name	Notes
1.	Enable	Enable/Disable GPS Geofencing functionality
2.	Longitude (X)	Longitude of selected point
3.	Latitude (Y)	Latitude of selected point
4.	Radius	Radius of selected area
5	Get current coordinates	Get current device coordinates from GPS

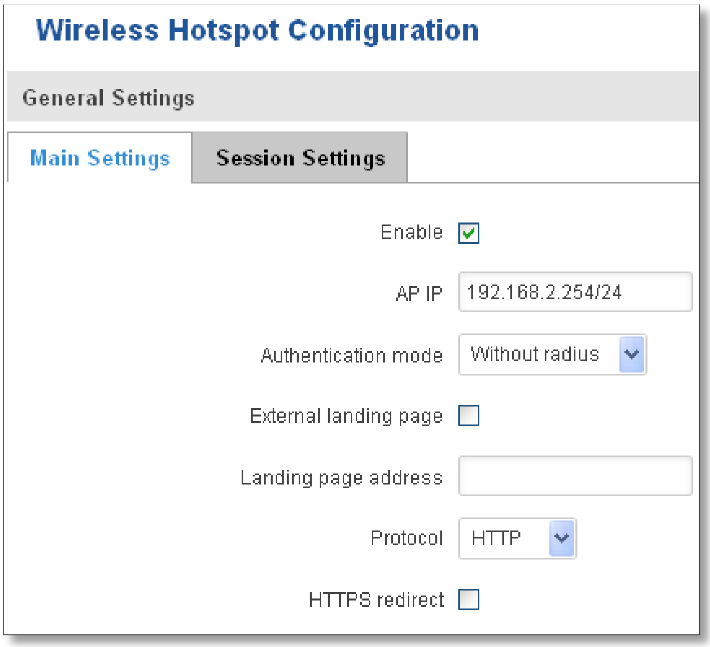
To receive SMS or email when entering or leaving geofence zone, go to Status -> Events Log -> Events reporting page and configure GPS event type!

9.12 Hotspot

Wireless hotspot provides essential functionality for managing an open access wireless network. In addition to standard RADIUS server authentication there is also the ability to gather and upload detailed logs on what each device (denoted as a MAC address) was doing on the network (what sites were traversed, etc.).

9.12.1 General settings

9.12.1.1 Main settings



Enable ☑

AP IP 192.168.2.254/24

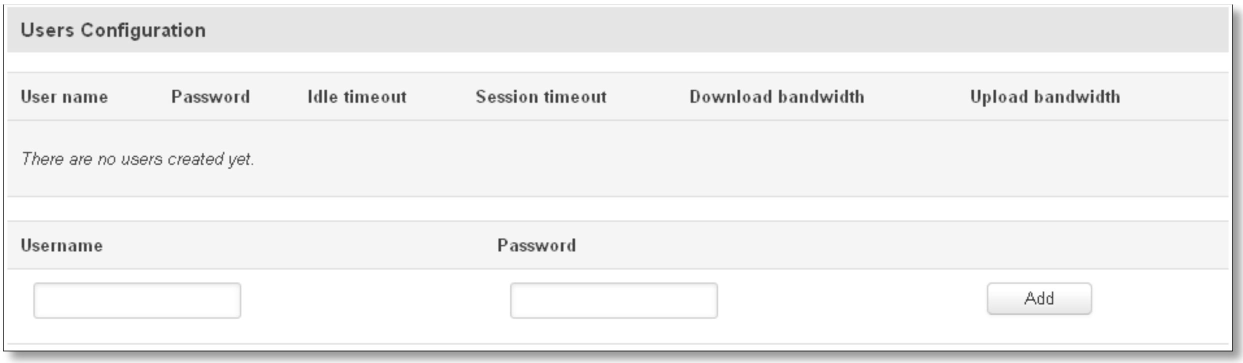
Authentication mode Without radius

External landing page □

Landing page address

Protocol HTTP

HTTPS redirect □



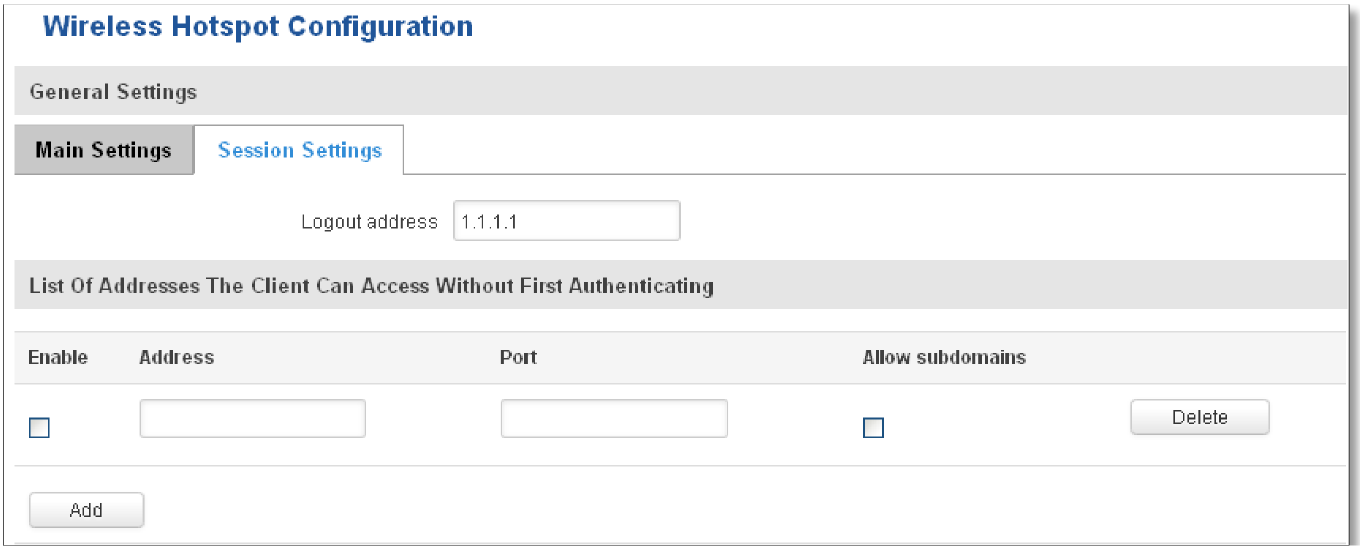
Users Configuration

User name	Password	Idle timeout	Session timeout	Download bandwidth	Upload bandwidth
There are no users created yet.					

Username	Password	
		Add

	Field name	Explanation
1.	Enabled	Check this flag to enable hotspot functionality on the router.
2.	AP IP	Access Point IP address. This will be the address of the router on the hotspot network. The router will automatically create a network according to its own IP and the CIDR number that you specify after the slash. E.g. “192.168.2.254/24” means that the router will create a network with the IP address 192.168.182.0, netmask 255.255.255.0 for the express purpose of containing all the wireless clients. Such a network will be able to have 253 clients (their IP addresses will be automatically granted to them and will range from 192.168.2.1 to 192.168.2.253).
		Authentication mode: External radius
1.	Radius server #1	The IP address of the RADIUS server that is to be used for Authenticating your wireless clients.
2.	Radius server #2	The IP address of the second RADIUS server.
3.	Authentication port	RADIUS server authentication port.
4.	Accounting port	RADIUS server accounting port.
5.	Radius secret key	The secret key is used for authentication with the RADIUS server
6.	UAM port	Port to bind for authenticating clients
7.	UAM UI port	UAM UI port
8.	UAM secret	Shared secret between UAM server an hotspot
9.	NAS Identifier	NAS Identifier
10.	Swap octets	Swap the meaning of input octets and output as it related to RADIUS attributes
11.	Location name	The name of location
		Authentication mode: Internal radius/Without radius
1.	External landing page	Enables the use of external landing page.
2.	Landing page address	The address of external landing page
3.	HTTPS redirect	Redirects HTTP pages to landing page.
		Authentication mode: SMS OTP

9.12.1.2 Session settings



Wireless Hotspot Configuration

General Settings

Main Settings | Session Settings

Logout address: 1.1.1.1

List Of Addresses The Client Can Access Without First Authenticating

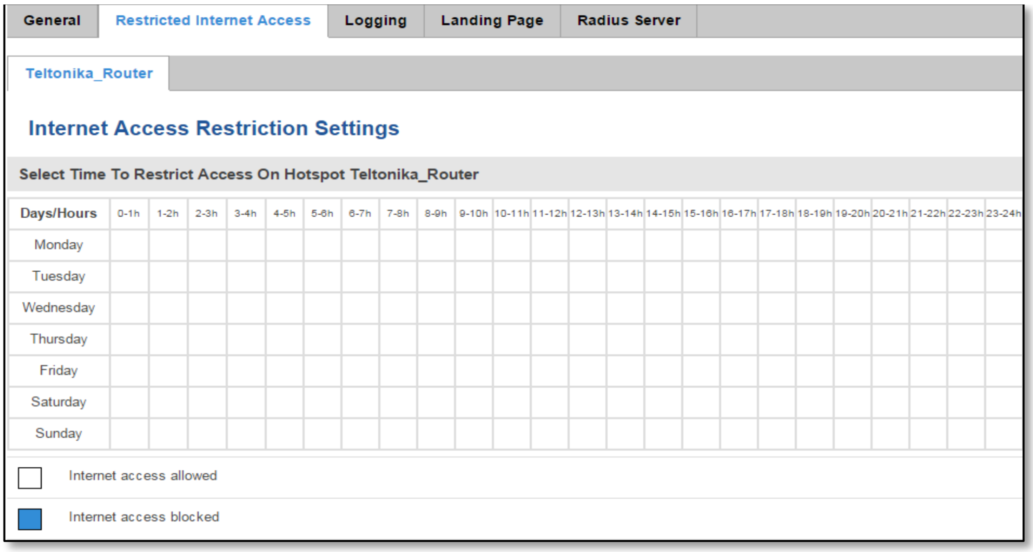
Enable	Address	Port	Allow subdomains	
☐			☐	Delete

Add

	Field name	Explanation
1.	Logout address	IP address to instantly logout a client addressing it
2.	Enable	Enable address accessing without first authenticating
3.	Address	Domain name, IP address or network segment
4.	Port	Port number
5.	Allow subdomains	Enable/Disable subdomains

9.12.2 Internet Access Restriction Settings

Allows disable internet access on specified day and hour of every week.



General | Restricted Internet Access | Logging | Landing Page | Radius Server

Teltonika_Router

Internet Access Restriction Settings

Select Time To Restrict Access On Hotspot Teltonika_Router

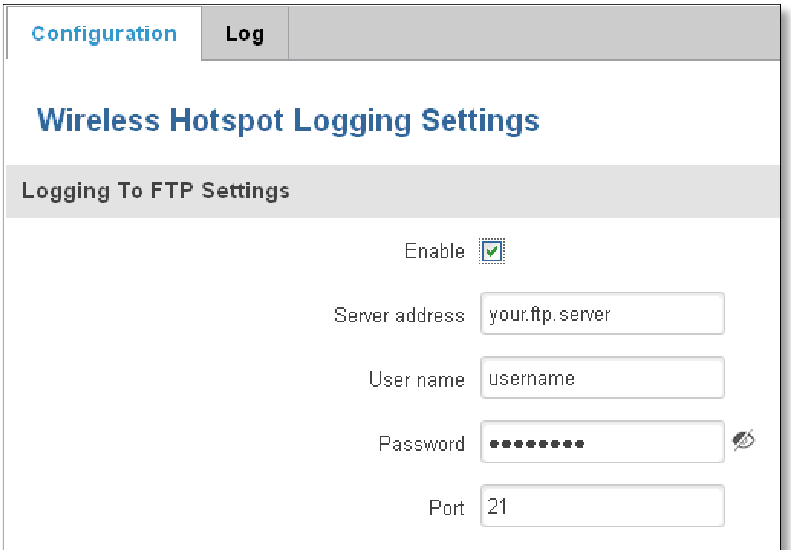
Days/Hours	0-1h	1-2h	2-3h	3-4h	4-5h	5-6h	6-7h	7-8h	8-9h	9-10h	10-11h	11-12h	12-13h	13-14h	14-15h	15-16h	16-17h	17-18h	18-19h	19-20h	20-21h	21-22h	22-23h	23-24h
Monday																								
Tuesday																								
Wednesday																								
Thursday																								
Friday																								
Saturday																								
Sunday																								

☐ Internet access allowed

🟦 Internet access blocked

9.12.3 Logging

9.12.3.1 Configuration



Wireless Hotspot Logging Settings

Logging To FTP Settings

Enable ☑

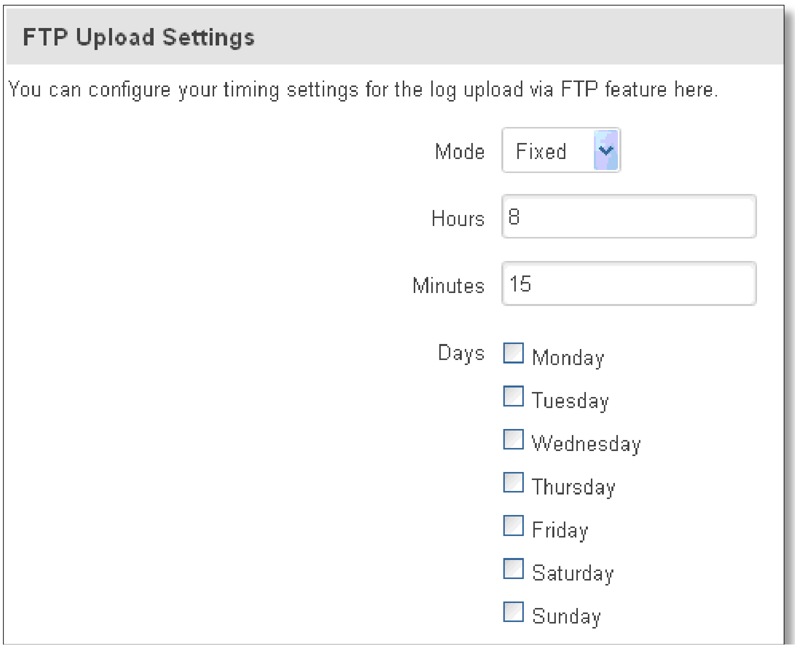
Server address: your.ftp.server

User name: username

Password: ••••••••

Port: 21

	Field name	Explanation
1.	Enable	Check this box if you want to enable wireless traffic logging. This feature will produce logs which contain data on what websites each client was visiting during the time he was connected to your hotspot.
2.	Server address	The IP address of the FTP server to which you want the logs uploaded.
3.	Username	The username of the user on the aforementioned FTP server.
4.	Password	The password of the user.
5.	Port	The TCP/IP Port of the FTP server.



FTP Upload Settings

You can configure your timing settings for the log upload via FTP feature here.

Mode: Fixed

Hours: 8

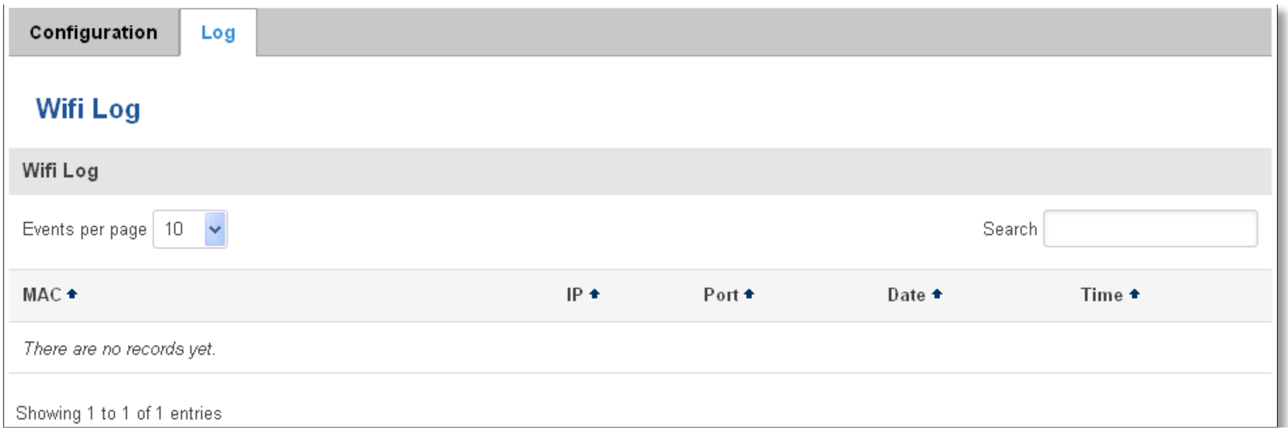
Minutes: 15

Days:
□ Monday
□ Tuesday
□ Wednesday
□ Thursday
□ Friday
□ Saturday
□ Sunday

	Field name	Explanation
1.	Mode	The mode of the schedule. Use "Fixed" if you want the uploading to be done on a specific time of the day. Use "Interval" if you want the uploading to be done at fixed interval.

2.	Interval	Shows up only when “Mode” is set to Interval. Specifies the interval of regular uploads on one specific day. E.g. If you choose 4 hours, the uploading will be done on midnight, 4:00, 8:00, 12:00, 16:00 and 20:00.
3.	Days	Uploading will be performed on these days only
4.	Hours, Minutes	Shows up only when “Mode” is set to Fixed. Uploading will be done on that specific time of the day. E.g. If you want to upload your logs on 6:48 you will have to simply enter hours: 6 and minutes: 48.

9.12.3.2 Log



Wifi Log

Wifi Log

Events per page 10

Search

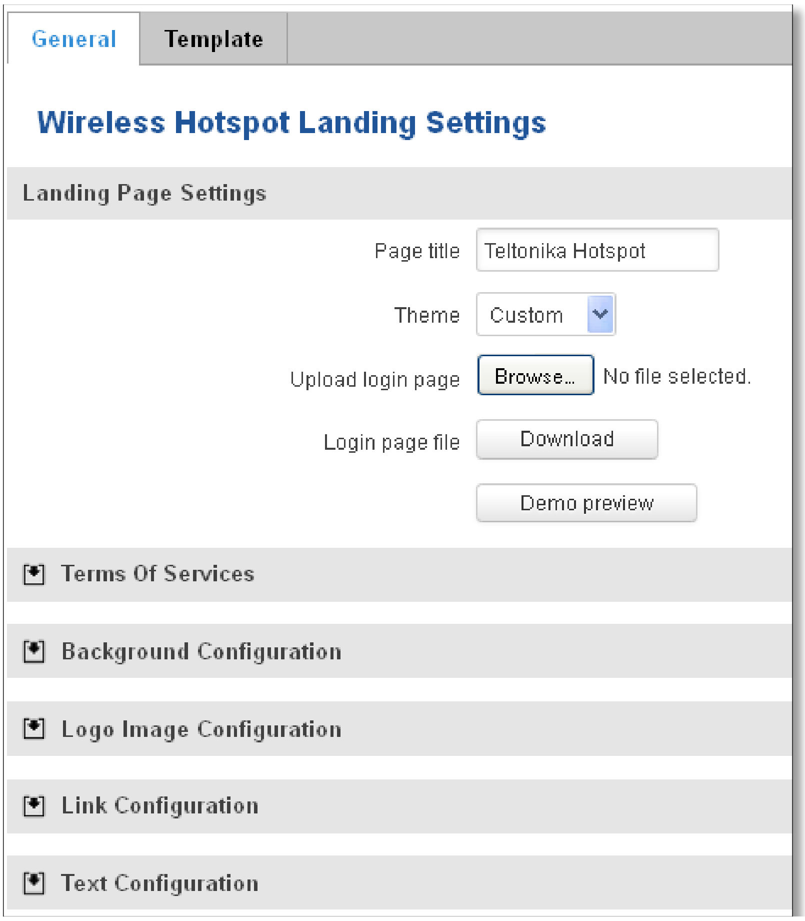
MAC	IP	Port	Date	Time
There are no records yet.				

Showing 1 to 1 of 1 entries

9.12.4 Landing Page

9.12.4.1 General Landing Page Settings

With this functionality you can customize your Hotspot Landing page.



Wireless Hotspot Landing Settings

Landing Page Settings

Page title: Teltonika Hotspot

Theme: Custom

Upload login page: Browse... No file selected.

Login page file: Download

Demo preview

Terms Of Services

Background Configuration

Logo Image Configuration

Link Configuration

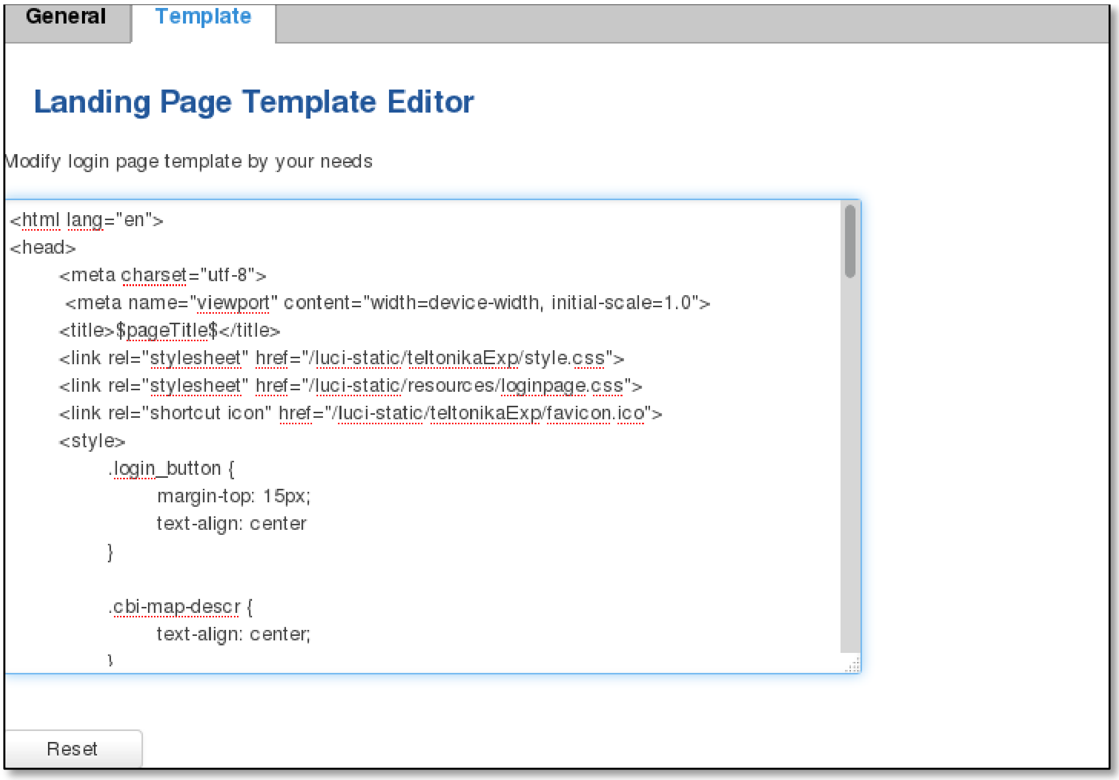
Text Configuration

	Field name	Explanation
1.	Page title	Will be seen as landing page title
2.	Theme	Landing page theme selection
3.	Upload login page	Allows to upload custom landing page theme
4.	Login page file	Allows to download and save your landing page file

In the sections – “Terms Of Services”, “Background Configuration”, “Logo Image Configuration”, “Link Configuration”, “Text Configuration” you can customize various parameters of landing page components.

9.12.4.2 Template

In this page you can review landing page template HTML code and modify it.



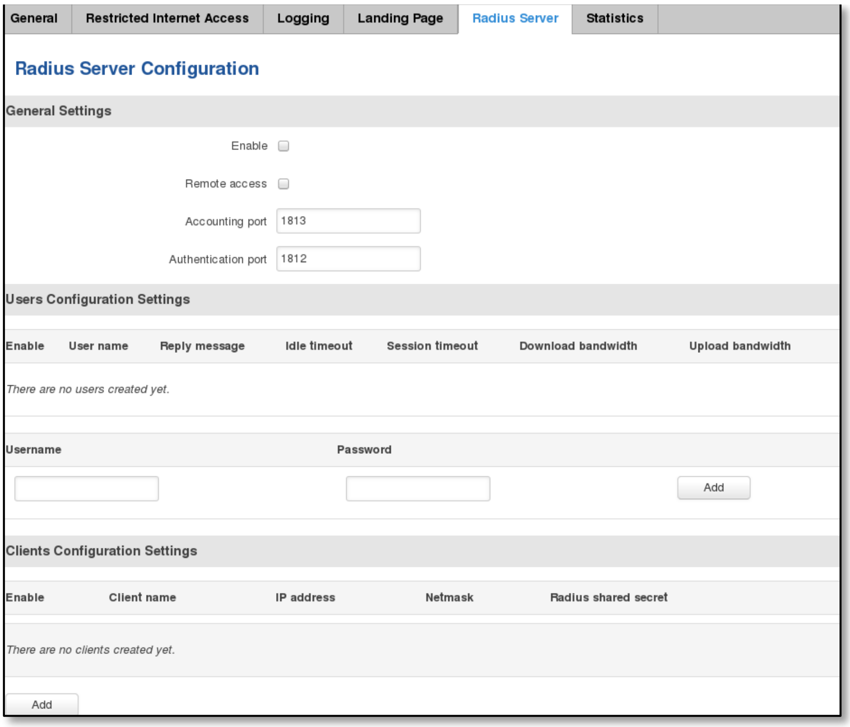
Landing Page Template Editor

Modify login page template by your needs

```
<html lang="en">
<head>
        <meta charset="utf-8">
         <meta name="viewport" content="width=device-width, initial-scale=1.0">
        <title>$pageTitle$</title>
        <link rel="stylesheet" href="/luci-static/teltonikaExp/style.css">
        <link rel="stylesheet" href="/luci-static/resources/loginpage.css">
        <link rel="shortcut icon" href="/luci-static/teltonikaExp/favicon.ico">
        <style>
                .login_button {
                        margin-top: 15px;
                        text-align: center
                }

                .cbi-map-descr {
                        text-align: center;
                }
```

9.12.5 Radius server configuration

An authentication and accounting system used by many Internet Service Providers (ISPs). When you dial in to the ISP you must enter your username and password. This information is passed to a RADIUS server, which checks that the information is correct, and then authorizes access to the ISP system.



Radius Server Configuration

General Settings

Enable □

Remote access □

Accounting port 1813

Authentication port 1812

Users Configuration Settings

Enable	User name	Reply message	Idle timeout	Session timeout	Download bandwidth	Upload bandwidth

There are no users created yet.

Username | Password

Clients Configuration Settings

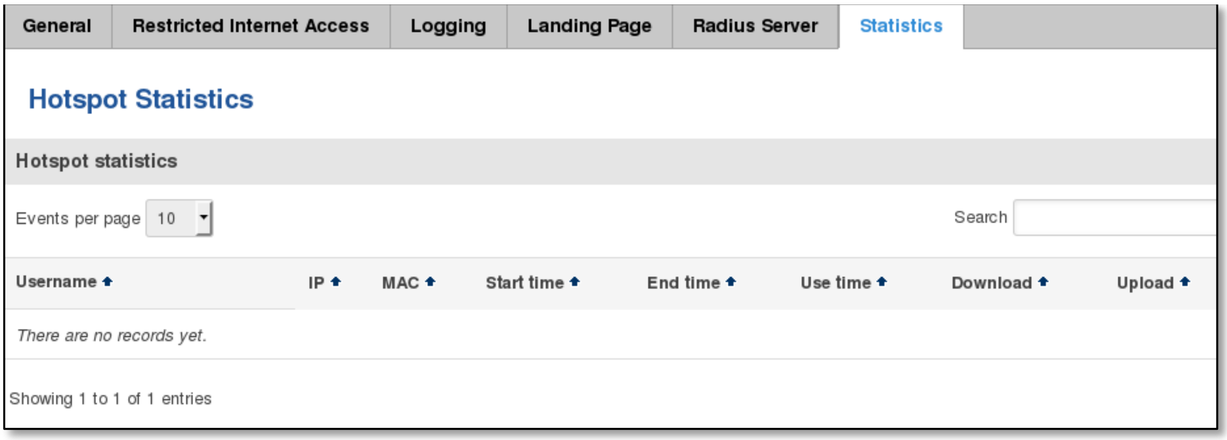
Enable	Client name	IP address	Netmask	Radius shared secret

There are no clients created yet.

	Field name	Explanation
1.	Enable	Activates an authentication and accounting system
2.	Remote access	Activates remote access to radius server
3.	Accounting port	Port on which to listen for accounting
4.	Authentication port	Port on which to listen for authentication

9.12.6 Statistics

On hotspot statistics page you can review statistical information about hotspot instances.



Hotspot Statistics

Hotspot statistics

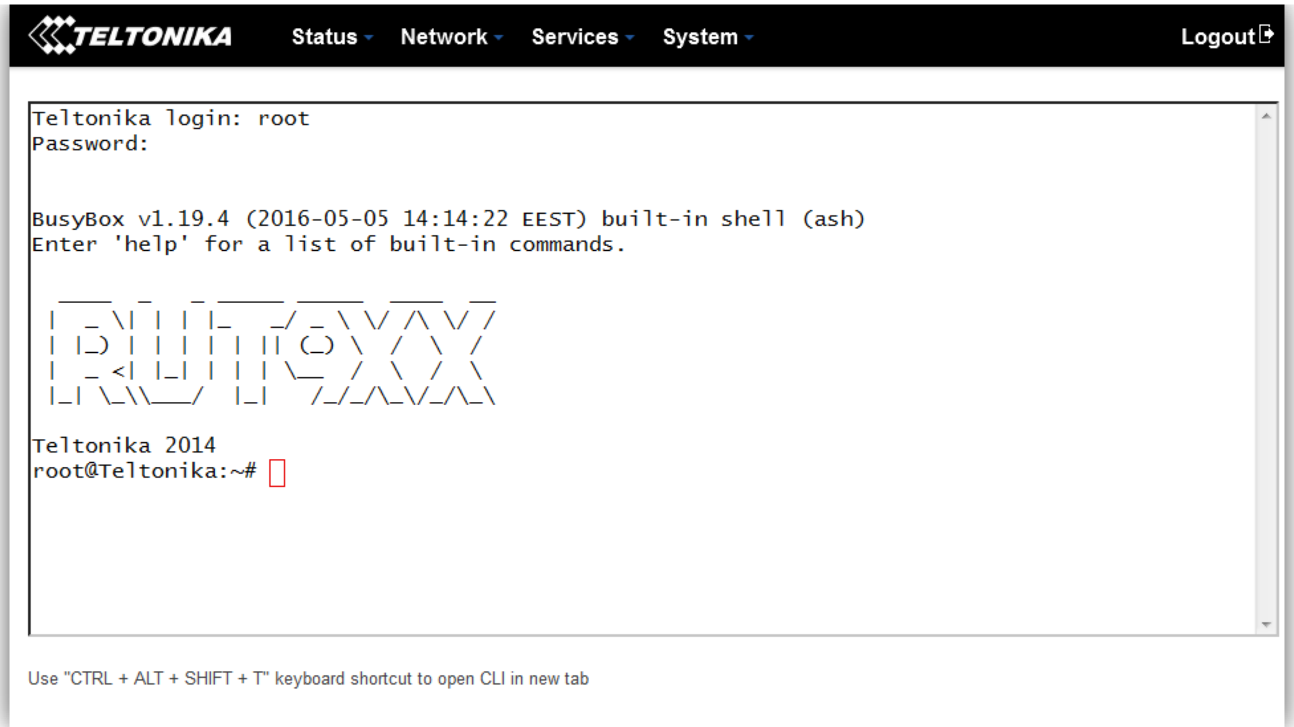
Events per page 10 Search

Username	IP	MAC	Start time	End time	Use time	Download	Upload
There are no records yet.							

Showing 1 to 1 of 1 entries

9.13 CLI

CLI or Comand Line Interface functionality allows you to enter and execute comands into routers terminal.



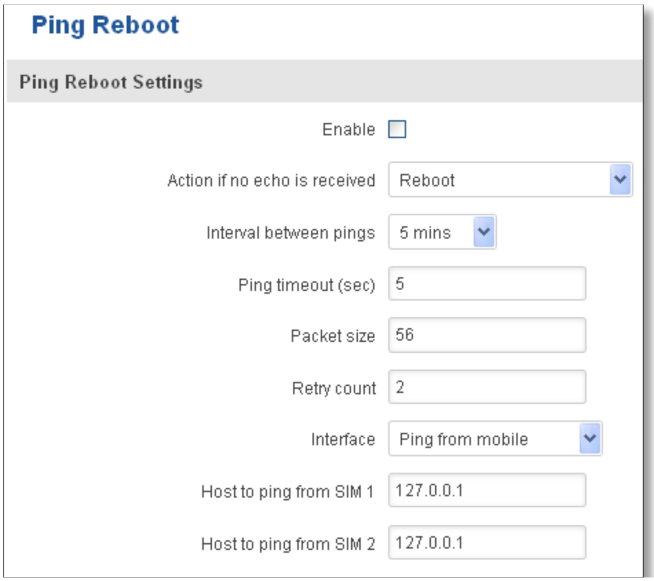
```
Teltonika login: root
Password:


BusyBox v1.19.4 (2016-05-05 14:14:22 EEST) built-in shell (ash)
Enter 'help' for a list of built-in commands.

  ____  _   _ _____ _____  ____  __
 |  _ \| | | |_   _/ _ \ \/ /\ \/ /
 | |_) | | | | | || (_) \  /  \  /
 |  _ <| |_| | | | \__  /  \  /  \
 |_| \_\\___/  |_|   /_/_/\_\/_/\_\

Teltonika 2014
root@Teltonika:~# 
```

Use "CTRL + ALT + SHIFT + T" keyboard shortcut to open CLI in new tab

9.14 Auto Reboot

9.14.1 Ping Reboot

Ping Reboot function will periodically send Ping command to server and waits for echo receive. If no echo is received router will try again sending Ping command defined number times, after defined time interval. If no echo is received after the defined number of unsuccessful retries, router will reboot. It is possible to turn of the router rebooting after defined unsuccessful retries. Therefore this feature can be used as “Keep Alive” function, when router Pings the host unlimited number of times. Possible actions if no echo is received: Reboot, Modem restart, Restart mobile connection, (Re) register, None.



Ping Reboot

Ping Reboot Settings

Enable □

Action if no echo is received: Reboot

Interval between pings: 5 mins

Ping timeout (sec): 5

Packet size: 56

Retry count: 2

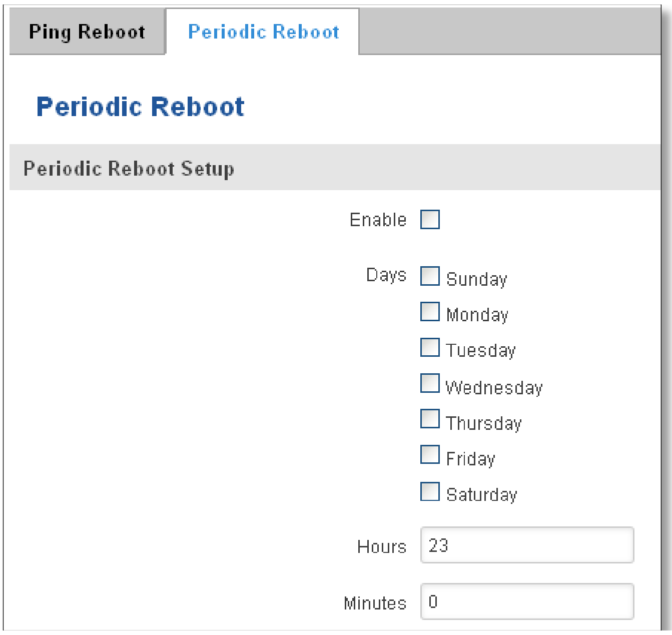
Interface: Ping from mobile

Host to ping from SIM 1: 127.0.0.1

Host to ping from SIM 2: 127.0.0.1

	Field name	Explanation	Notes
1.	Enable	This check box will enable or disable Ping reboot feature.	Ping Reboot is disabled by default.
2.	Action if no echo is received	Action after the defined number of unsuccessful retries	No echo reply for sent ICMP (Internet Control Message Protocol) packet received
3.	Interval between pings	Time interval in minutes between two Pings.	Minimum time interval is 5 minutes.
4.	Ping timeout (sec)	Time after which consider that Ping has failed.	Range(1-9999)
5.	Packet size	This box allows to modify sent packet size	Should be left default, unless necessary otherwise
6.	Retry count	Number of times to try sending Ping to server after time interval if echo receive was unsuccessful.	Minimum retry number is 1. Second retry will be done after defined time interval.
8.	Interface	Interface used for connection	
7.	Host to ping from SIM 1	IP address or domain name which will be used to send ping packets to. E.g. 127.0.0.1 (or www.host.com if DNS server is configured correctly)	Ping packets will be sending from SIM1.
8.	Host to ping from SIM 2	IP address or domain name which will be used to send ping packets to. E.g. 127.0.0.1 (or www.host.com if DNS server is configured correctly)	Ping packets will be sending from SIM2.

9.14.2 Periodic Reboot



Periodic Reboot

Periodic Reboot Setup

Enable □

Days □ Sunday
□ Monday
□ Tuesday
□ Wednesday
□ Thursday
□ Friday
□ Saturday

Hours 23

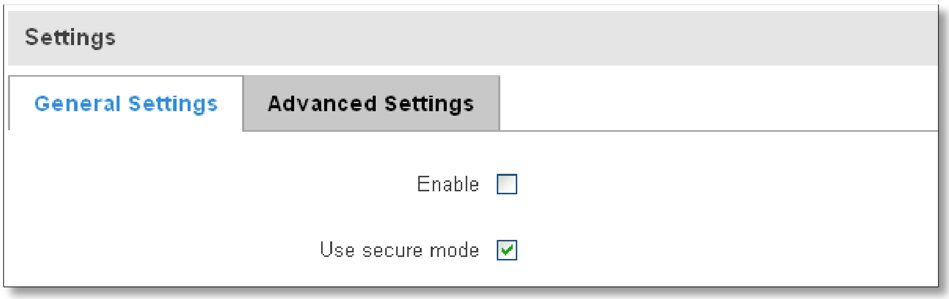
Minutes 0

	Field name	Explanation
1.	Enable	This check box will enable or disable Periodic reboot feature.
2.	Days	This check box will enable router rebooting at the defined days.
3.	Hours, Minutes	Uploading will be done on that specific time of the day

9.15 UPNP

9.15.1 General Settings

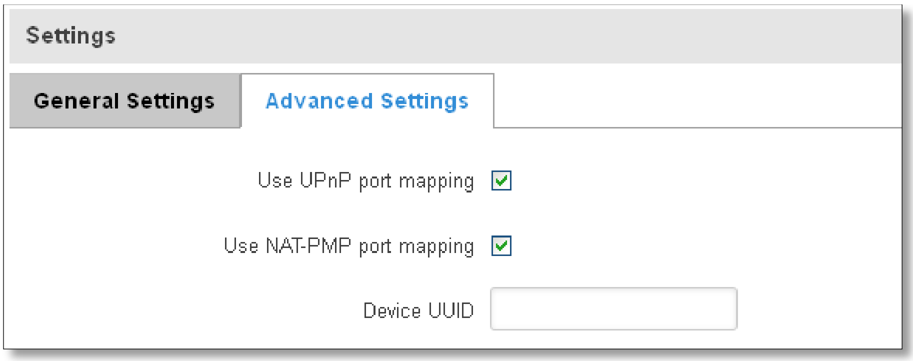
UPnP allows clients in the local network to automatically configure the router.



Enable □

Use secure mode ☑

9.15.2 Advanced Settings



Use UPnP port mapping ☑

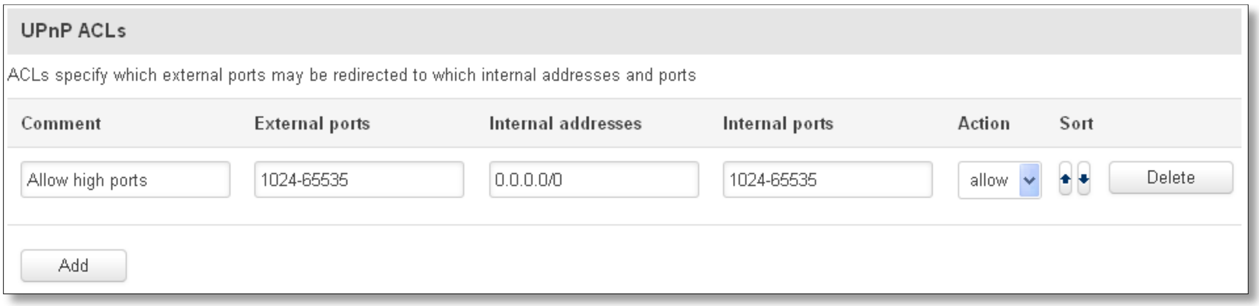
Use NAT-PMP port mapping ☑

Device UUID

	Field name	Explanation
1.	Use UPnP port mapping	Enable UPnP port mapping functionality
2.	Use NAT-PMP port mapping	Enable NAT-PMP mapping functionality
3.	Device UUID	Specify Universal unique ID of the device

9.15.3 UPnP ACLs

ACLs specify which external ports may be redirected to which internal addresses and ports.



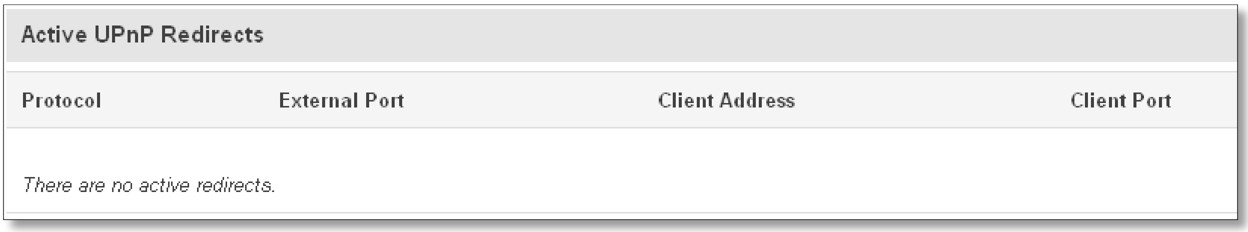
UPnP ACLs

ACLs specify which external ports may be redirected to which internal addresses and ports

Comment	External ports	Internal addresses	Internal ports	Action	Sort	
Allow high ports	1024-65535	0.0.0.0/0	1024-65535	allow	↑↓	Delete

	Field name	Explanation
1.	Comment	Add comment to this rule
2.	External ports	External ports which may be redirected
3.	Internal addresses	Internal address to be redirect to
4.	Internal ports	Internal ports to be redirect to
5.	Action	Allow or forbid UPNP service to open the specified port

9.15.4 Active UPnP Redirects



Active UPnP Redirects

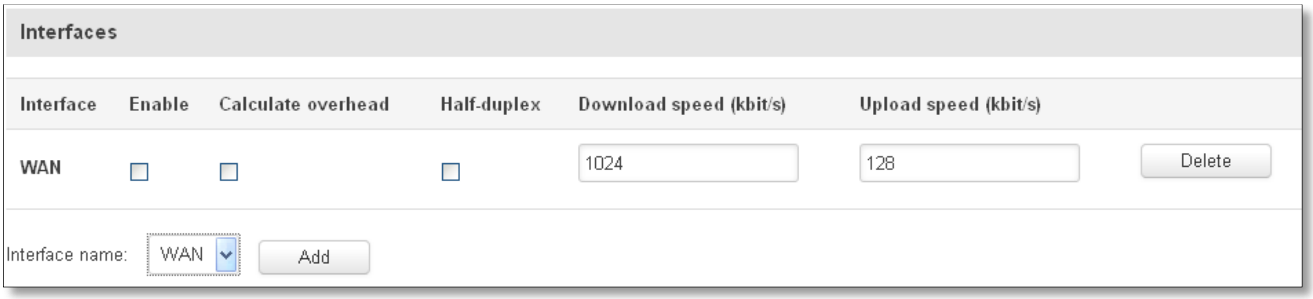
Protocol	External Port	Client Address	Client Port

There are no active redirects.

9.16 QoS

QoS (Quality of Service) is the idea that transmission rates, error rates, and other characteristics can be measured, improved, and, to some extent, guaranteed in advance. QoS is of particular concern for the continuous transmission of high-bandwidth video and multimedia information.

QoS can be improved with traffic shaping techniques such as packet, network traffic, and port prioritization.

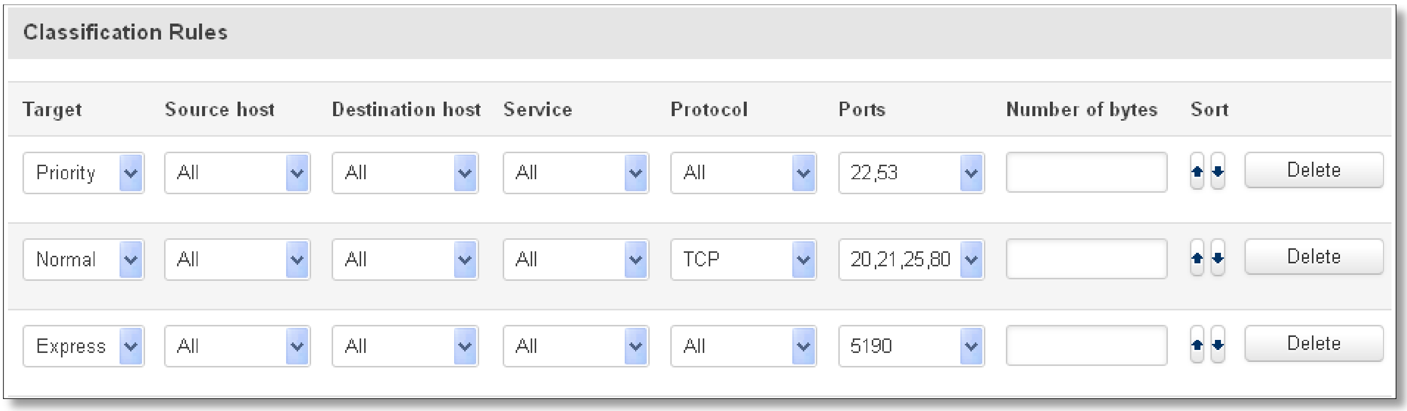


Interfaces

Interface	Enable	Calculate overhead	Half-duplex	Download speed (kbit/s)	Upload speed (kbit/s)	
WAN	□	□	□	1024	128	Delete

Interface name: WAN

	Field name	Value	Explanation
1.	Interface	WAN/LAN/PPP	
2.	Enable	Enable/Disable	Enable/disable settings
3.	Calculate overhead	Enable/Disable	Check to decrease upload and download ratio to prevent link saturation
4.	Half-duplex	Enable/Disable	Check to enable data transmission in both direction on a single carrier
5.	Download speed (kbit/s)	1024	Specify maximal download speed
6.	Upload speed (kbit/s)	128	Specify maximal upload speed



Classification Rules

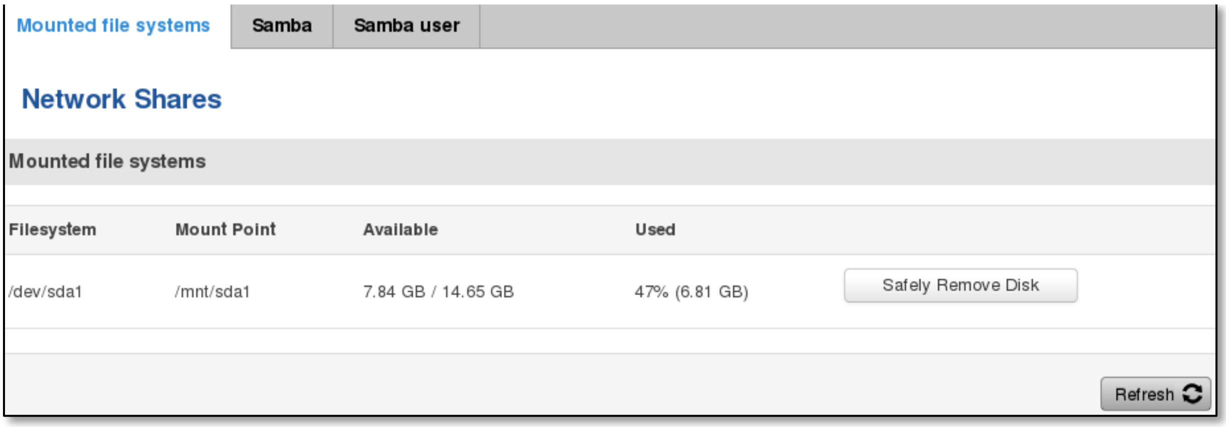
Target	Source host	Destination host	Service	Protocol	Ports	Number of bytes	Sort	
Priority	All	All	All	All	22,53		↑ ↓	Delete
Normal	All	All	All	TCP	20,21,25,80		↑ ↓	Delete
Express	All	All	All	All	5190		↑ ↓	Delete

	Field name	Explanation
1.	Target	Select target for which rule will be applied
2.	Source host	Select host from which data will be transmitted
3.	Destination host	Select host to which data will be transmitted
4.	Service	Select service for which rule will be applied
5.	Protocol	Select data transmission protocol
6.	Ports	Select which port will be used for transmission
7.	Number of bytes	Specify the maximal number of bytes for connection

9.17 Network Shares

9.17.1 Mounted File Systems

On this page you can review mounted file systems (for example USB flashdrive).



Network Shares

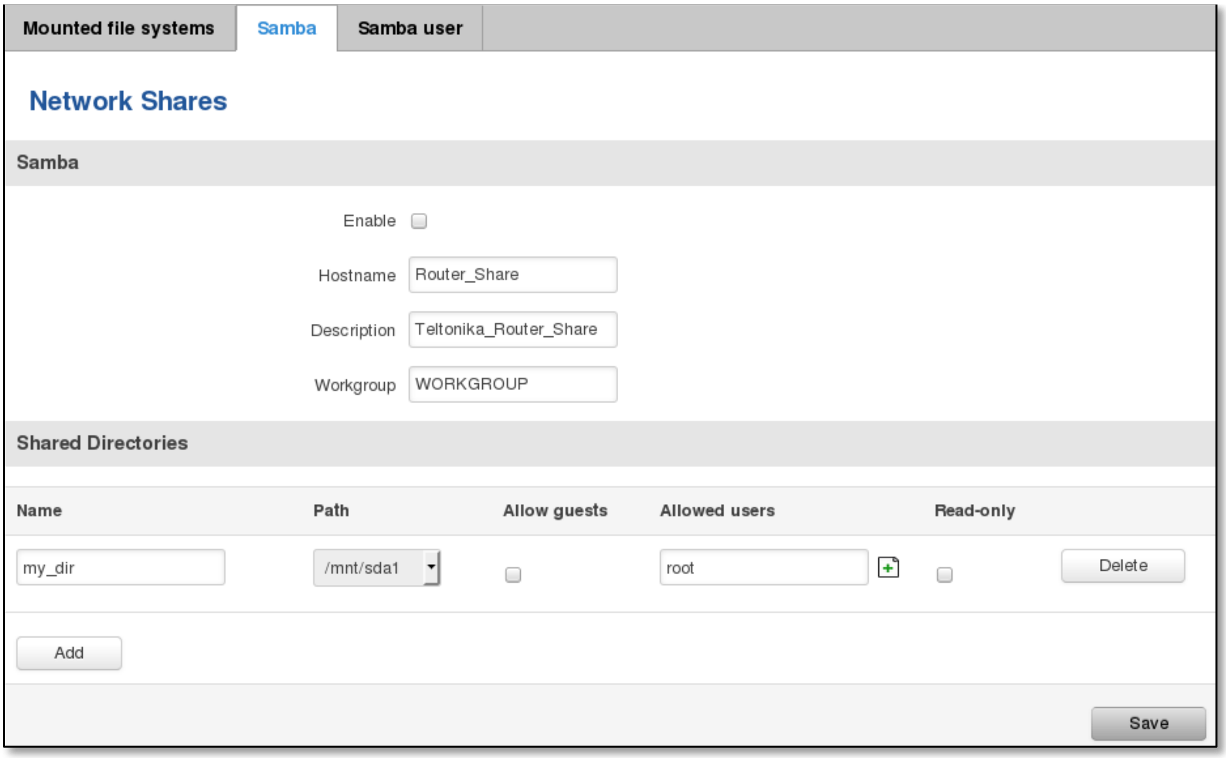
Mounted file systems

Filesystem	Mount Point	Available	Used	
/dev/sda1	/mnt/sda1	7.84 GB / 14.65 GB	47% (6.81 GB)	Safely Remove Disk

	Field name	Explanation
1.	File System	Filesystem on which additional file system is mounted
2.	Mount Point	Directory available for mounting additional file system
3.	Available	Total memory available in mounted system
4.	Used	Free memory in mounted system

9.17.2 Samba

Samba functionality allows network sharing for specified directories.



Network Shares

Samba

Enable □

Hostname: Router_Share

Description: Teltonika_Router_Share

Workgroup: WORKGROUP

Shared Directories

Name	Path	Allow guests	Allowed users	Read-only
my_dir	/mnt/sda1	□	root	□

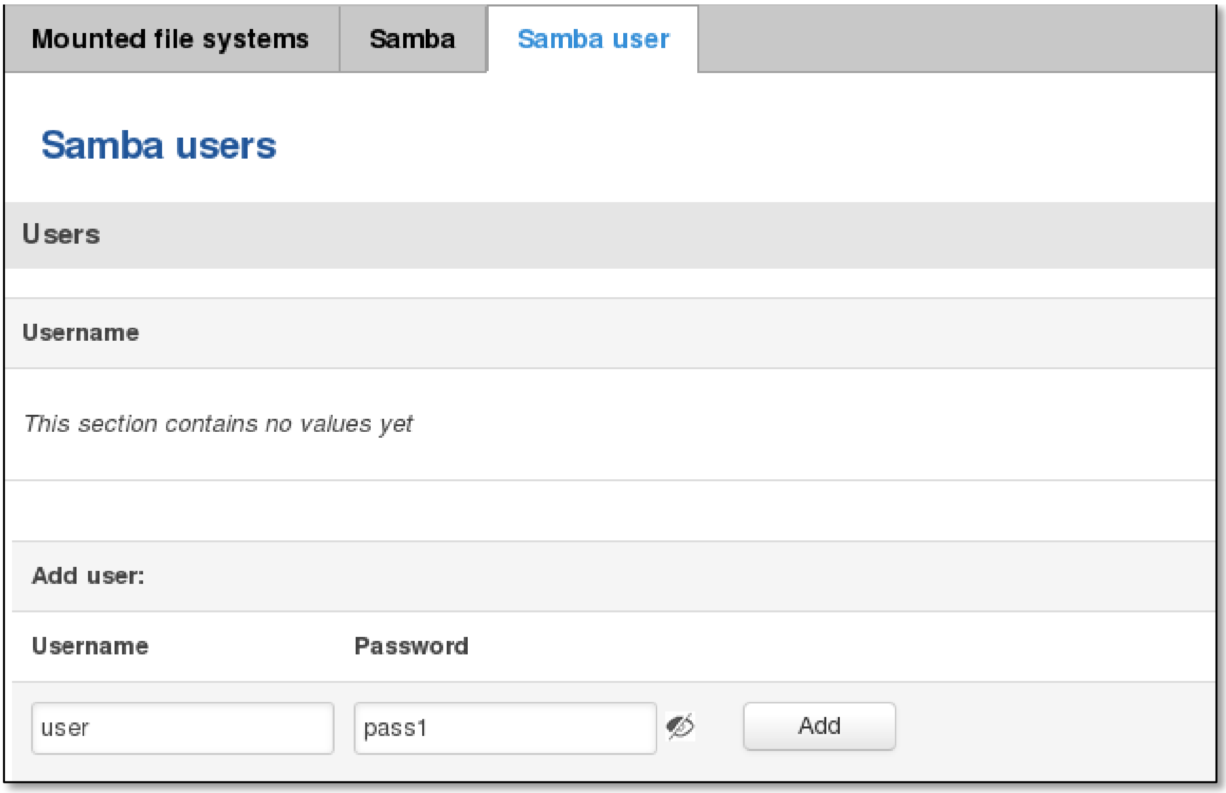
	Field name	Values	Notes
1.	Enable	Enable / Disable	Enables Samba service
2.	Hostname	Router_Share	Name of samba server
3.	Description	Teltonika_Router_Share	Short server description
4.	Workgroup	WORKGROUP	Name of the workgroup

In Shared Directories section you can add directories to be shared and configure some usage parameters:

	Field name	Values	Notes
1.	Name	My_dir	Name of the shared directory
2.	Path	/mnt/sda1	Path to directory to be shared
3.	Allow guests	Enable / Disable	Enable viewing the directory as a guest
4.	Allowed users	root	Specify users to be allowed to share this directory
5.	Read-only	Enable / Disable	Sets user's wrights in the specified directory to read-only

9.17.3 Samba User

In this page you can add new samba users.



Samba users

Users

Username

This section contains no values yet

Add user:

Username: user

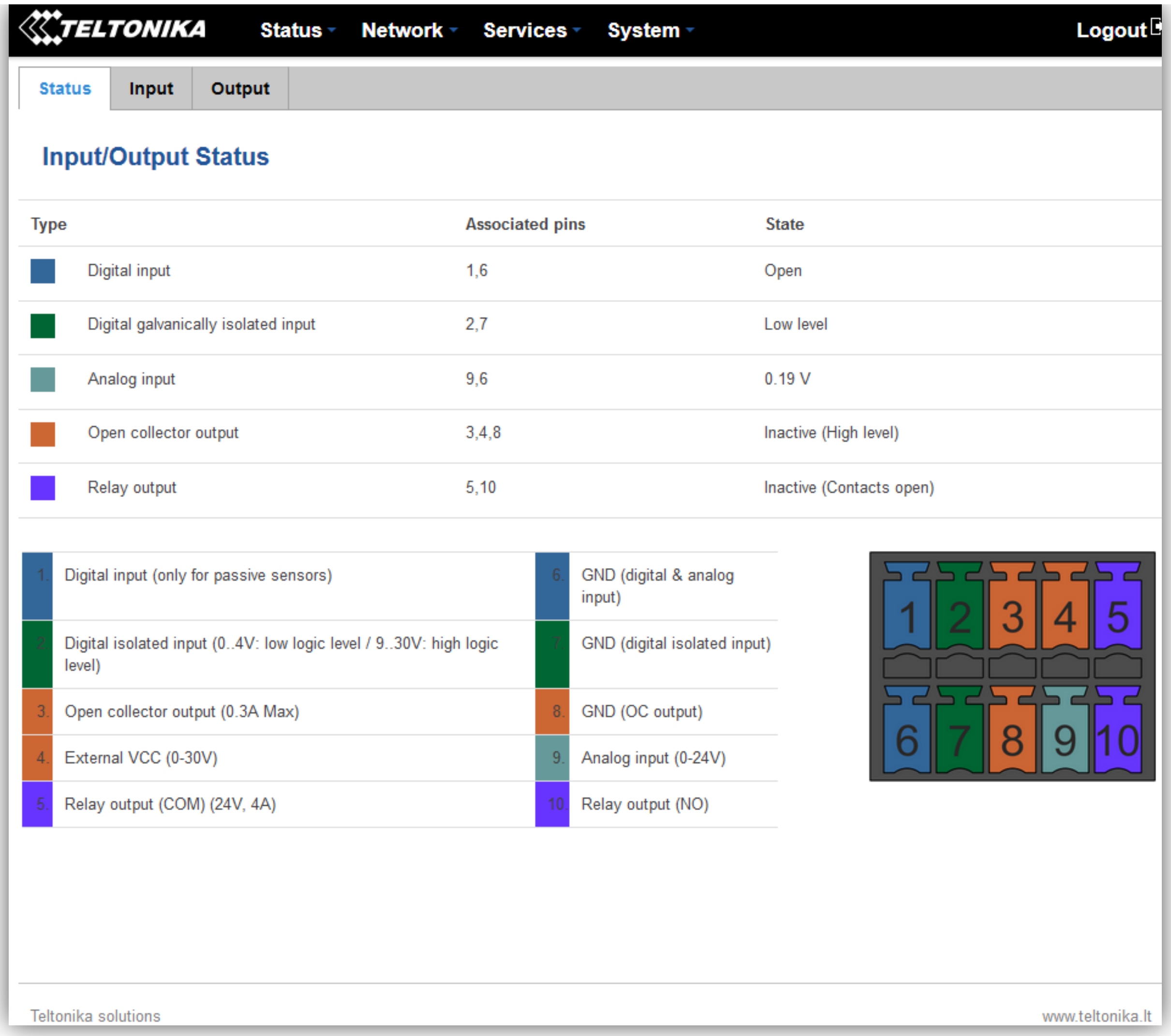
Password: pass1

	Field name	Values	Notes
1.	Username	user	Name of new user
2.	Password	Pass1	New user’s password

9.18 Input/Output

9.18.1 Status

In this page you can review the current state of all router’s inputs and outputs.



Input/Output Status

	Type	Associated pins	State
🟦	Digital input	1,6	Open
🟩	Digital galvanically isolated input	2,7	Low level
🟦	Analog input	9,6	0.19 V
🟧	Open collector output	3,4,8	Inactive (High level)
🟪	Relay output	5,10	Inactive (Contacts open)

1.	Digital input (only for passive sensors)	6.	GND (digital & analog input)
2.	Digital isolated input (0..4V: low logic level / 9..30V: high logic level)	7.	GND (digital isolated input)
3.	Open collector output (0.3A Max)	8.	GND (OC output)
4.	External VCC (0-30V)	9.	Analog input (0-24V)
5.	Relay output (COM) (24V, 4A)	10.	Relay output (NO)

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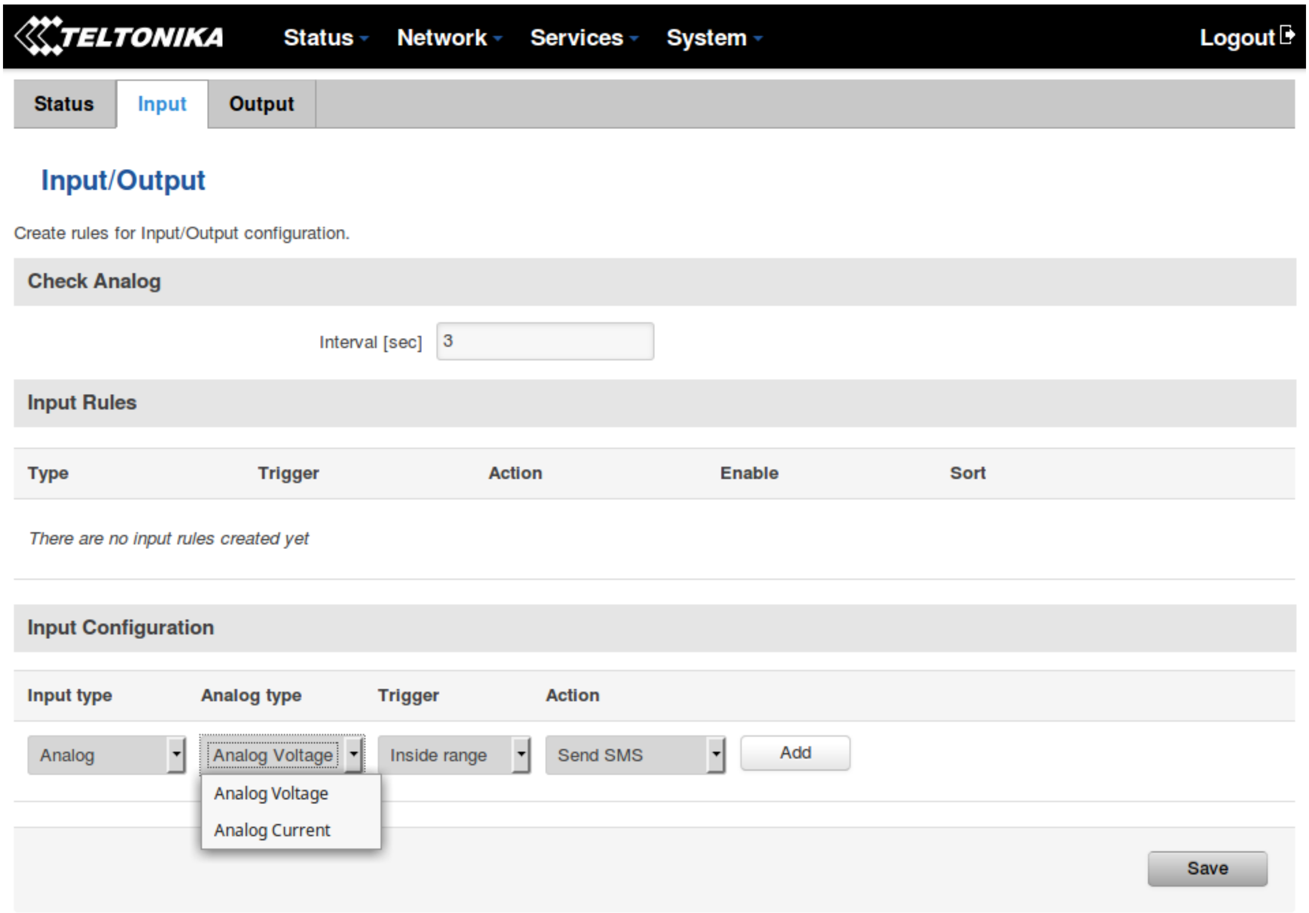
9.18.2 Input

Allows you to set up input parameters and specify what actions should be taken after triggering event of any input. In check analog section you can change the analog input checking interval.



Input/Output

Create rules for Input/Output configuration.

Check Analog

Interval [sec]: 3

Input Rules

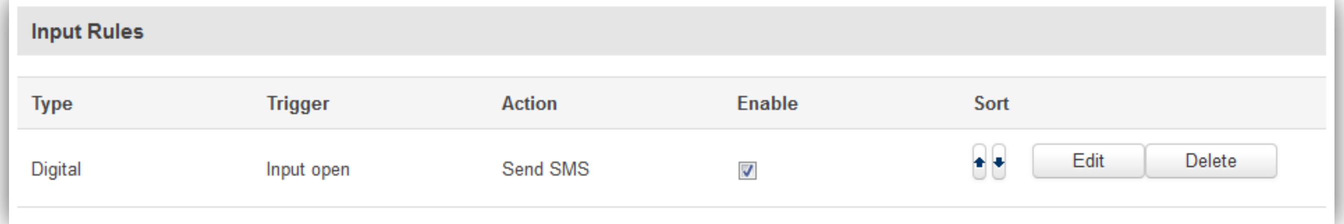
Type	Trigger	Action	Enable	Sort

There are no input rules created yet

Input Configuration

Input type	Analog type	Trigger	Action	
Analog	Analog Voltage	Inside range	Send SMS	Add

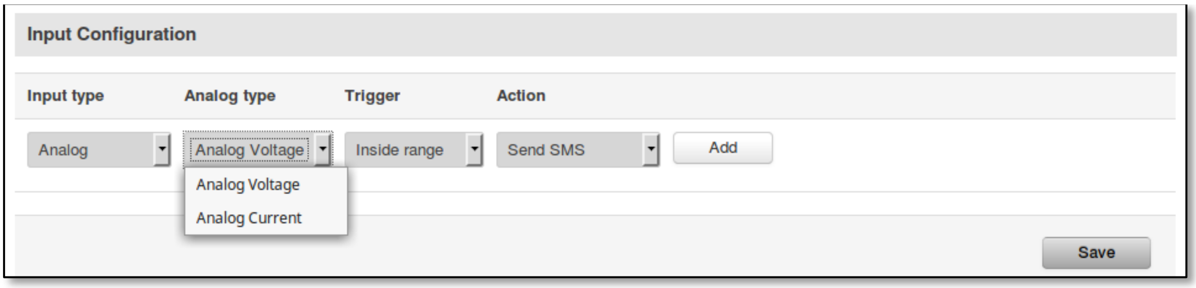
In the input rules section you can create and modify the rules for action after specific input triggering.



Input Rules

Type	Trigger	Action	Enable	Sort
Digital	Input open	Send SMS	☑	

	Field name	Sample	Explanation
1.	Type	Digital/Digital isolated/Analog	Specifies input type
2.	Triger	Input open	Specifies for which trigger rule is applied
3.	Action	Send SMS	Specifies what action is done
4.	Enable	Enable/Disable	Enable input configuration



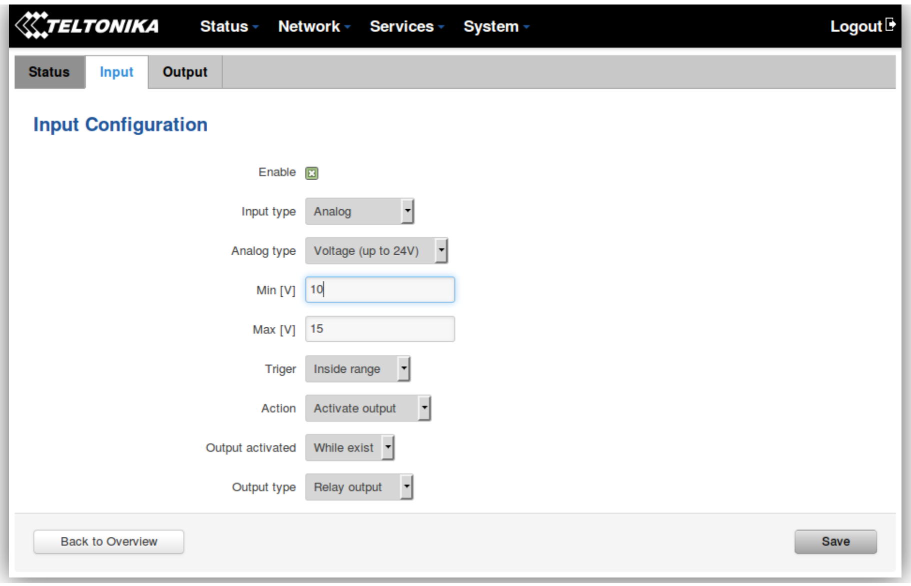
Input Configuration

Input type	Analog type	Trigger	Action	
Analog	Analog Voltage	Inside range	Send SMS	Add

	Field name	Values	Explanation

1.	Input type	Digital/Digital isolated/Analog	Specify input type
1.a	Analog type	Analog Voltage/Analog Current	Specify voltage or current measurement
2.	Triger	Input open / Input shorted/ both	Specify for which trigger rule will be applied
3.	Action	Send SMS/ Change SIM card/ Send email/ Change profile/ Turn WiFi ON or OFF/Reboot/ Output	Choose what action will be done after input triggering

After clicking on ADD button (Or Edit, if the rule is already created) you get the second input configuration page with extra parameters to set.



Input Configuration

Enable ☒

Input type: Analog

Analog type: Voltage (up to 24V)

Min [V]: 10

Max [V]: 15

Triger: Inside range

Action: Activate output

Output activated: While exist

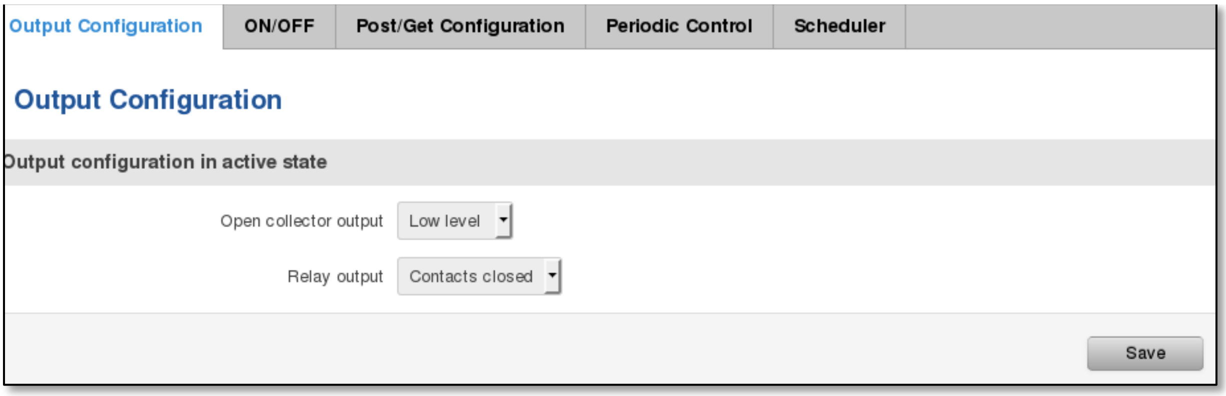
Output type: Relay output

	Field name	Sample	Explanation
1.	Enable	Enable/Disable	Enable this input rule
2.	Input type	Digital/Digital isolated/Analog	Specify the input type
3.	Min V/mA	10	Specify minimum voltage/current. Only shown when Input type is Analog
4.	Max V/mA	20	Specify maximum voltage/current. Only shown when Input type is Analog
5.	Triger	Input open	Specify for which trigger rule will be applied
6.	Action	Send SMS	Specify what action to do
7.	SMS text	Input	Specify message to send in SMS
8.	Recipients phone number	+37012345678	Phone number where you will get SMS. Only shown when Action is Send SMS
9.	Subject	Input	Specify subject of email. Only shown when Action is Send email
10.	Message	Input	Specify message to send in email. Only shown when Action is Send email
11.	SMTP server	mail.example.com	Specify SMTP (Simple Mail Transfer Protocol) server. Only shown when Action is Send email
12.	SMTP server port	123	Specify SNMP server port. Only shown when Action is Send email
13.	Secure connection	Enable/Disable	Specify if server support SSL or TLS. Only shown when Action is Send email
14.	User name	username	Specify user name to connect SNMP server. Only shown when Action is Send email
15.	Password	password	Specify the password of the user. Only shown when Action is Send email
16.	Sender's email	sender@example.com	Specify your email address. Only shown when Action is Send email

	address		
17.	Recipient's email address	recipient@example.com	Specify for whom you want to send email. Only shown when Action is Send email
18.	Sim	Primary/ Secondary	Specify which one SIM card will be changed. Only shown when Action is Change SIM Card
19.	Profile	Admin	Specify which profile will be set and used. Only shown when Action is Change Profile
20.	Reboot after (s)	4	Device will reload after a specified time (in seconds). Only shown when Action is Reboot
21.	Output activated	10	Output will be activated for specified time (in seconds) , or while exists.
22.	Output type	Digital OC output/ Relay output	Specify output type, which will be activated, depending on output time. Only shown when Action is Activate output

9.18.3 Output

9.18.3.1 Output Configuration



Output Configuration

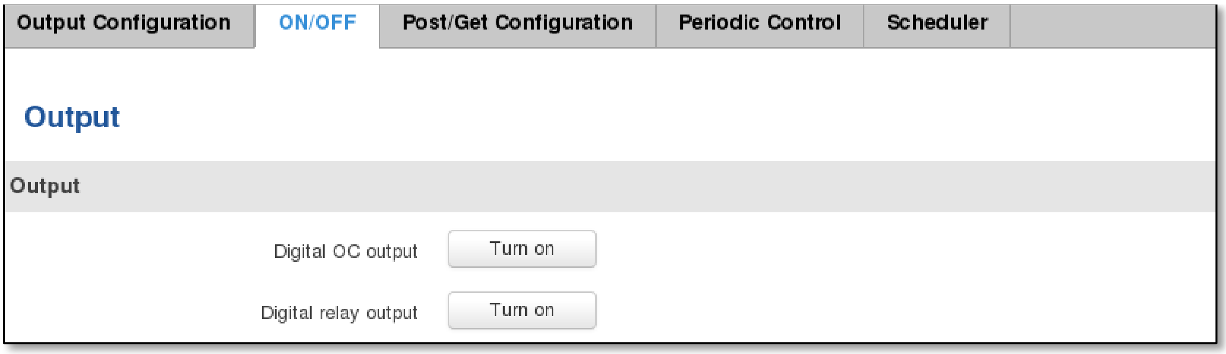
Output configuration in active state

Open collector output: Low level

Relay output: Contacts closed

	Field name	Sample	Explanation
1.	Open collector output	Low level / High level	Choose what open collector output will be in active state
2.	Relay output	Contacts closed / Contacts open	Choose what relay output will be in active state

9.18.3.2 ON/OFF



Output

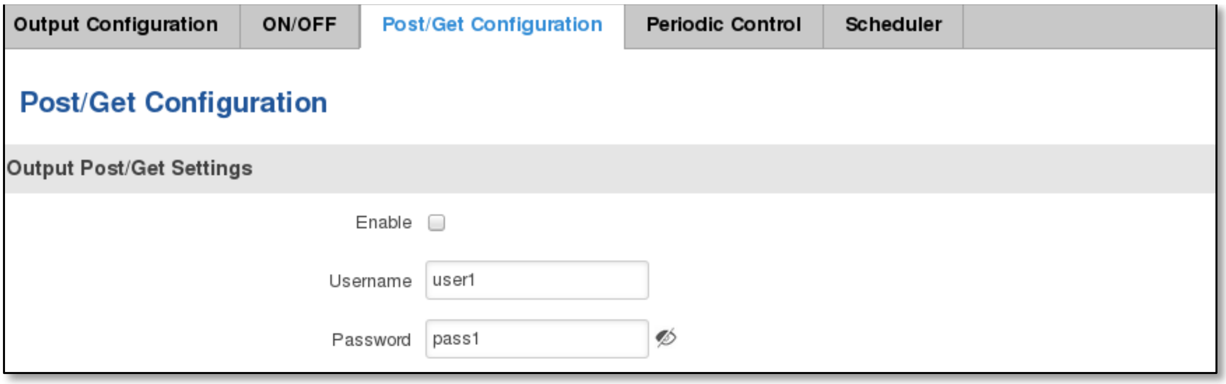
Output

Digital OC output: Turn on

Digital relay output: Turn on

	Field name	Sample	Explanation
1.	Digital OC output	Turn on / Turn Off	Manually toggle Digital OC output
2.	Digital relay output	Turn on / Turn Off	Manually toggle Digital relay output

9.18.3.3 Post/Get Configuration



Post/Get Configuration

Output Post/Get Settings

Enable □

Username user1

Password pass1

	Field name	Example	Explanation
1.	Enable	Enable /Disable	Enable POST/GET output functionality
2.	Username	User1	Service user name
3.	Password	Pass1	User password for authentication

9.18.3.4 Syntax of Output HTTP POST/GET string

With Output post/get you can manage only Outputs (Open collector output and Digital relay output).

	Field name	Example	Explanation
1.	IP_ADDRESS	192.168.1.1	IP address of your router
2.	action	on and off	Specify the action to be taken
3.	pin	oc and relay	Specify the output
4.	delay (sec)	15	Delay in seconds after which action will be started
5.	time (sec)	10	Time in seconds after which the action will be stopped. (if action is on, then it will go back to off after *time*)

Please note:

Delay and time parameters can be used together. Example: delay is 10, time is 5, action is „on“. 10 seconds after command execution output will switch to „on“ (or stay in „on“ state if it‘s already on), then after 5 more seconds it will switch to off state. Overall command execution time is 15 seconds.

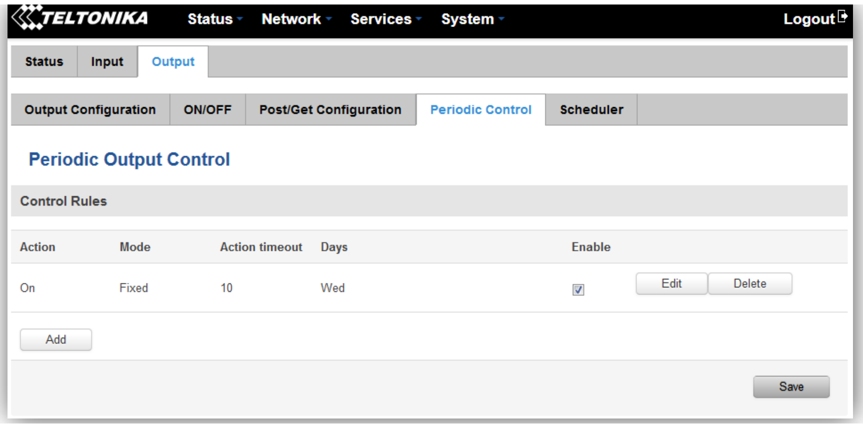
Actions „on“ and „off“ depend on setting „Output configuration in active state“ (on is active state), which can be set via Services > Input/Output > Output

9.18.3.5 Output HTTP POST/GET string examples

http://192.168.1.1/cgi-bin/output?username=User1&password=Pass1&action=on&pin=relay
http://192.168.1.1/cgi-bin/output?username=User1&password=Pass1&action=on&pin=relay&delay=10
http://192.168.1.1/cgi-bin/output?username=User1&password=Pass1&action=on&pin=relay&time=5
http://192.168.1.1/cgi-bin/output?username=User1&password=Pass1&action=on&pin=relay&delay=15&time=5
http://192.168.1.1/cgi-bin/output?username=User1&password=Pass1&action=off&pin=relay&delay=15&time=5
http://192.168.1.1/cgi-bin/output?username=User1&password=Pass1&action=on&pin=oc
http://192.168.1.1/cgi-bin/output?username=User1&password=Pass1&action=off&pin=oc

9.18.3.6 Periodic Control

Periodic control function allows user to set up schedule by which the outputs are either turned ON or OFF at specific time.

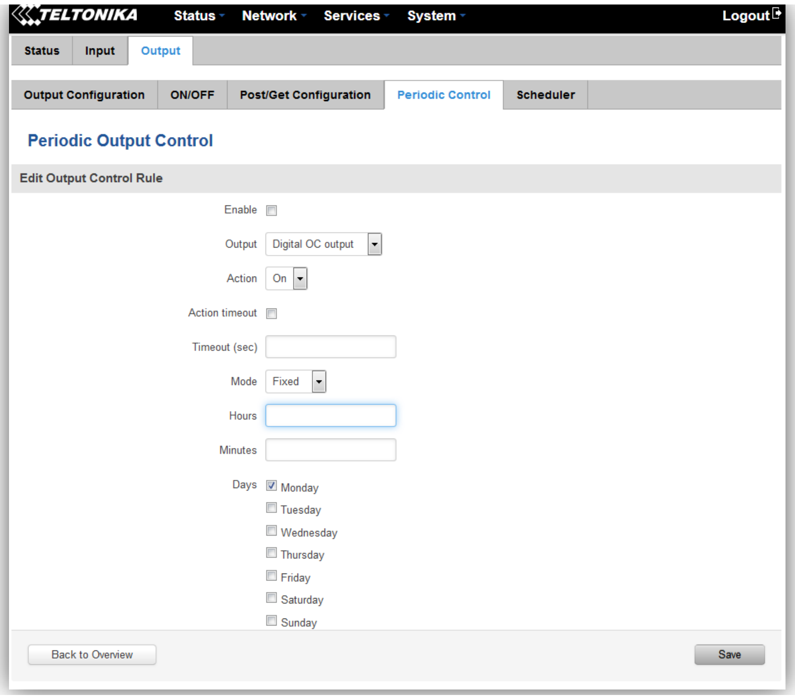


Periodic Output Control

Control Rules

Action	Mode	Action timeout	Days	Enable
On	Fixed	10	Wed	☑

After clicking on ADD button (Or Edit, if the rule is already created) you get the second periodic output configuration page with extra parameters to set.



Periodic Output Control

Edit Output Control Rule

Enable □

Output Digital OC output

Action On

Action timeout □

Timeout (sec)

Mode Fixed

Hours

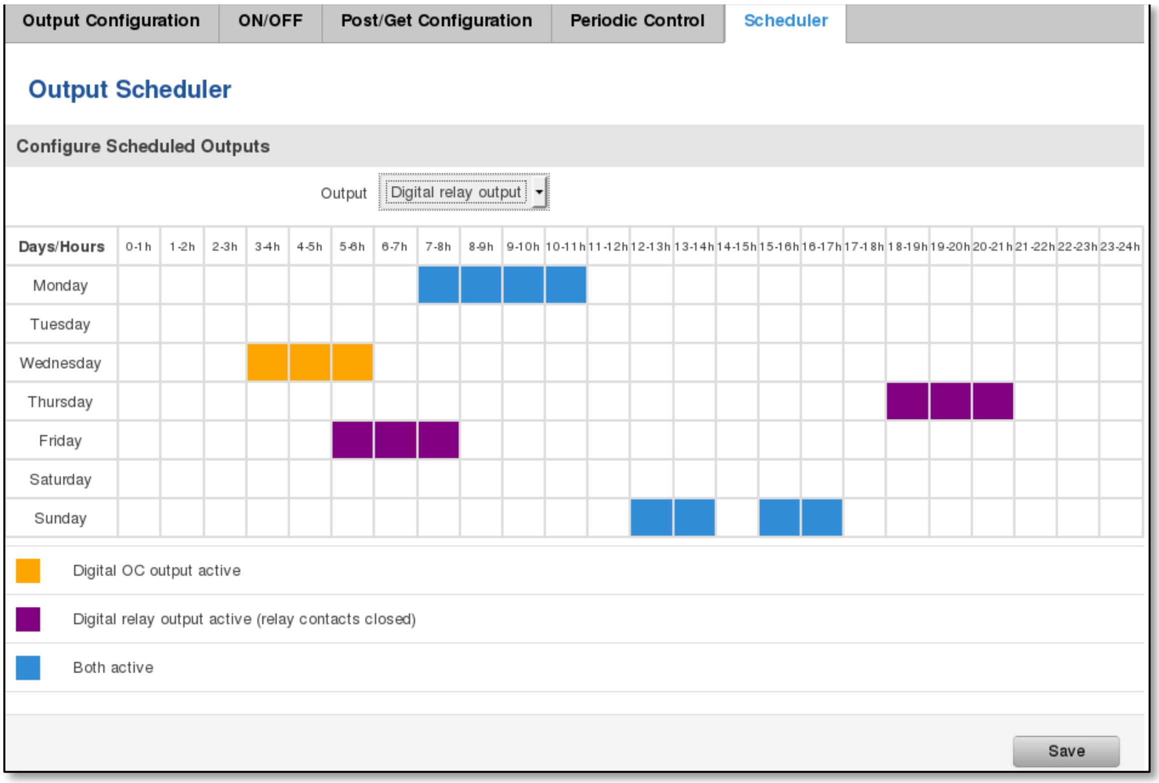
Minutes

Days ☑ Monday
□ Tuesday
□ Wednesday
□ Thursday
□ Friday
□ Saturday
□ Sunday

	Field name	Sample	Explanation
1.	Enable	Enable/Disable	Enable this output rule
2.	Output	Digital/Digital isolated/Analog	Specify the output type
3.	Action	On / Off	Specify the action to be taken
4.	Action timeout	Enabled / Disabled	Enable timeout for this rule
5.	Timeout (sec)	10	Specifies after how much time this action should end.
6.	Mode	Fixed / Interval	Specify the mode of output activation
7.	Hours	15	Specify the hour for rule activation
8.	Minutes	25	Specify the minute for rule activation
9.	Days	Monday	Select the week days for rule activation

9.18.3.7 Scheduler

This function allows you to set up the periodical, hourly schedule for the outputs. You can select on which week days the outputs are going to be on or off.



Output Configuration | ON/OFF | Post/Get Configuration | Periodic Control | Scheduler

Output Scheduler

Configure Scheduled Outputs

Output: Digital relay output

Days/Hours	0-1h	1-2h	2-3h	3-4h	4-5h	5-6h	6-7h	7-8h	8-9h	9-10h	10-11h	11-12h	12-13h	13-14h	14-15h	15-16h	16-17h	17-18h	18-19h	19-20h	20-21h	21-22h	22-23h	23-24h
Monday								🟦	🟦	🟦	🟦													
Tuesday																								
Wednesday				🟧	🟧	🟧																		
Thursday																			🟪	🟪	🟪			
Friday						🟪	🟪	🟪																
Saturday																								
Sunday													🟦	🟦			🟦	🟦						

🟧 Digital OC output active

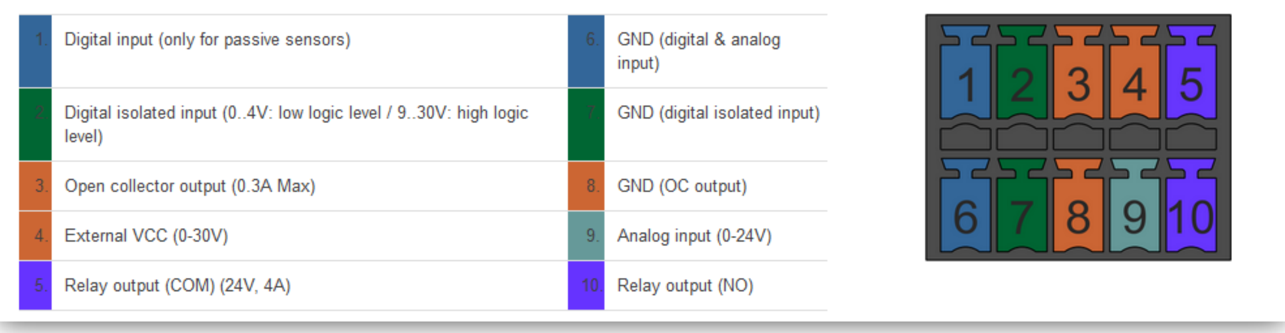
🟪 Digital relay output active (relay contacts closed)

🟦 Both active

Save

9.18.4 Input/Output hardware information

The Input/output (I/O) connector is located in the front panel next to LEDs. Pin-out of the I/O connector:



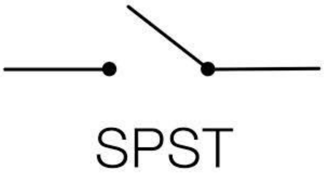
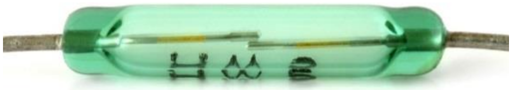
1.	Digital input (only for passive sensors)	6.	GND (digital & analog input)
2.	Digital isolated input (0..4V: low logic level / 9..30V: high logic level)	7.	GND (digital isolated input)
3.	Open collector output (0.3A Max)	8.	GND (OC output)
4.	External VCC (0-30V)	9.	Analog input (0-24V)
5.	Relay output (COM) (24V, 4A)	10.	Relay output (NO)

Type	Description	Ratings	QTY
Input (digital)	Digital non-isolated input for passive sensors	3V Max	1
Input(digital)	Digital input with galvanic isolation	0..4V – low level 9..30V – high level	1
Input (analog voltage/current)	Analog input (0-24V/0-20mA)	24V/20mA Max (with 1.2kΩ shunt)	1
Output (Open collector)	Open collector (OC) output	30V, 0.3A	1
Output (relay)	SPST relay output	24V, 4A	1

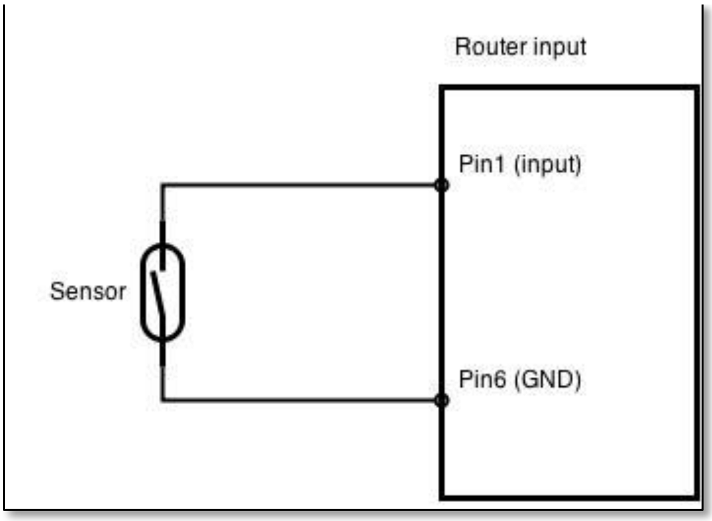
9.18.4.1 Digital input for passive sensors

Absolute maximum ratings:

Maximum voltage on input pin1 with respect to pin6: **3V**
Minimum voltage on input pin1 with respect to pin6: **0V**
The input is protected from short positive or negative ESD transients
This input is designed for connecting sensors with passive output (not outputting voltage) such as:

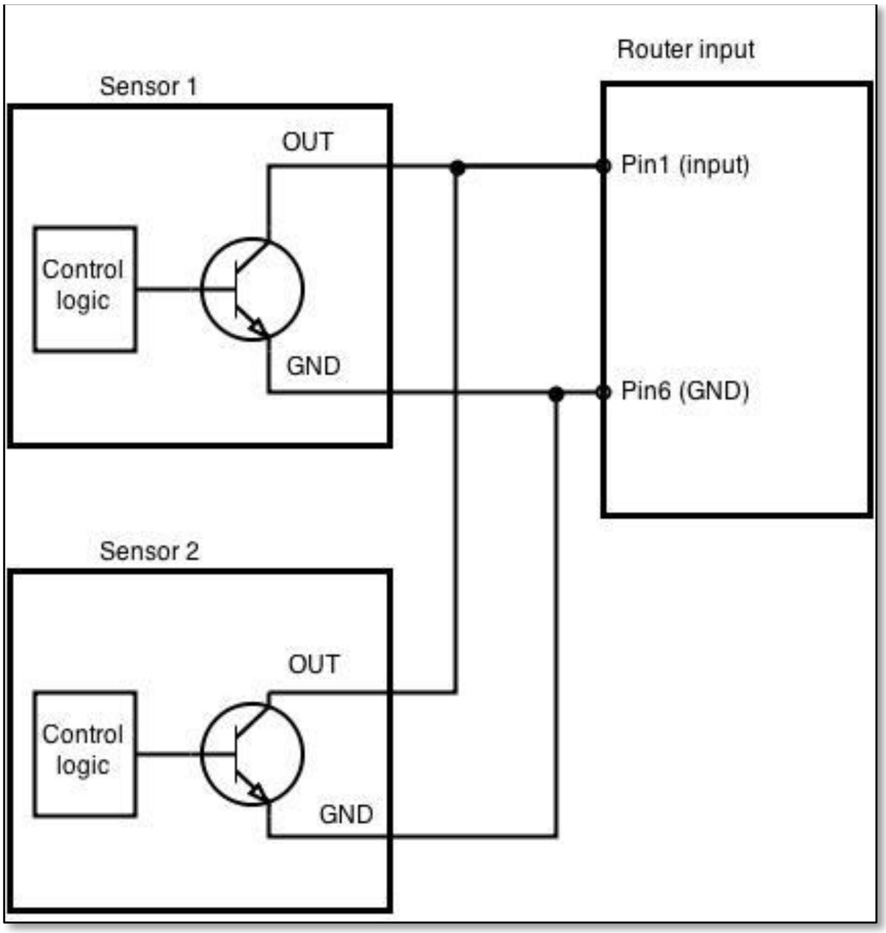
Passive infrared (PIR) sensors for motion detection (sensors with open collector or relay output are suitable type to use)	
Mechanical Switches, pushbuttons	
Reed switches, which opens or closes its contacts when magnetic field is near	
Any sensor with open collector or open drain output (use without pull-up resistor)	

Example schematic of using PIR sensors, mechanical switches, reed switches:



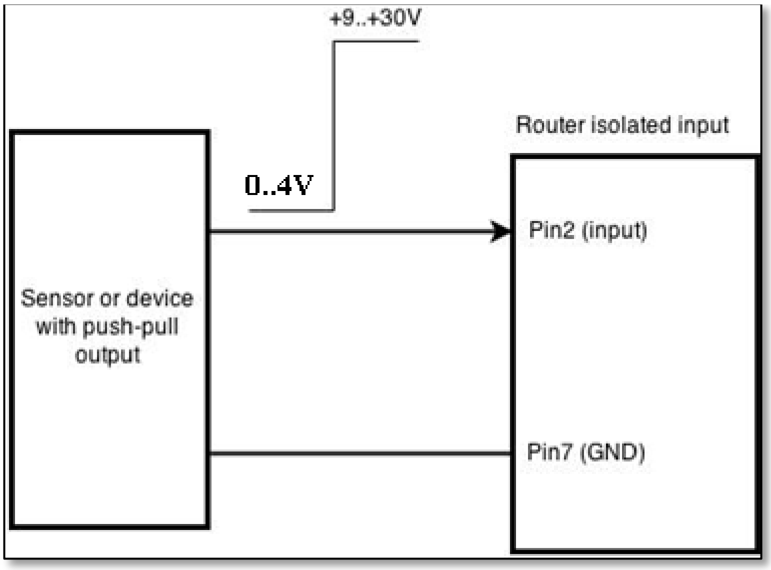
Example schematic of connecting multiple sensors with open collector outputs:

Multiple sensors can be connected in parallel like in the schematic below. In this configuration any sensor will activated the input. The example could be multiple motion sensors located in multiple places. If either of them will sense motion, the configured event (for e.g. alarm) will be activated. This is suitable when you just need to know that alarm is triggered but it is not necessary to know which sensor activated an alarm.



9.18.4.2 Digital galvanically isolated input

Sensors with push-pull output stage can be connected to this input. Example of such circuit is shown in the picture below. The circuit uses optocoupler to isolate the input. In case of the failure at the input, the rest of the circuit remains safe.



The signal source resistance should be less than 100Ω.

Input voltage levels:

- Low level voltage: **0..+4V**
- High level voltage: **+9..30V**

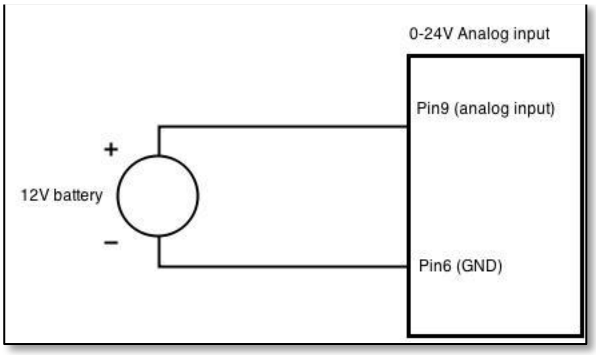
Maximum ratings:

- Maximum voltage that can be connected to pin2 with respect to pin7 is **30V.** Do not exceed this voltage!
- The input is protected from reverse voltage down to -200V.

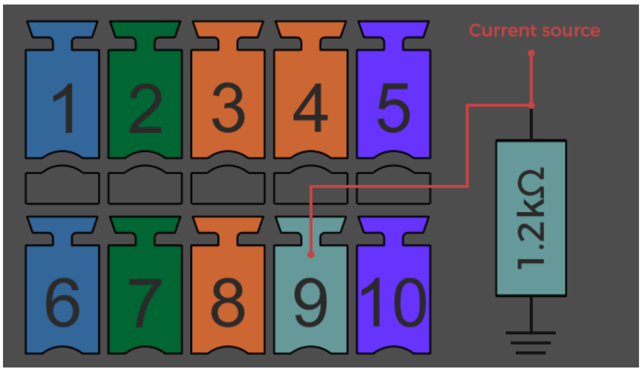
9.18.4.3 Analog input

Analog input is designed to measure analog voltages in the range of 0-24V and convert it to digital domain. This input can also be used to measure current up to 20mA.

Example of monitoring 12V battery voltage:



When Analog input type is „Analog Current“ a 1.2kΩ resistor shunt must be connected as shown below:



Input electrical characteristics:

Parameter	Value
Maximum voltage	24V
Minimum voltage	0V
Resolution	5.859mV
Input low-pass filter cut-off frequency (-3dB)	10Hz
Input resistance (seen between I/O header pins 9 and 6)	131kΩ

Input accuracy:

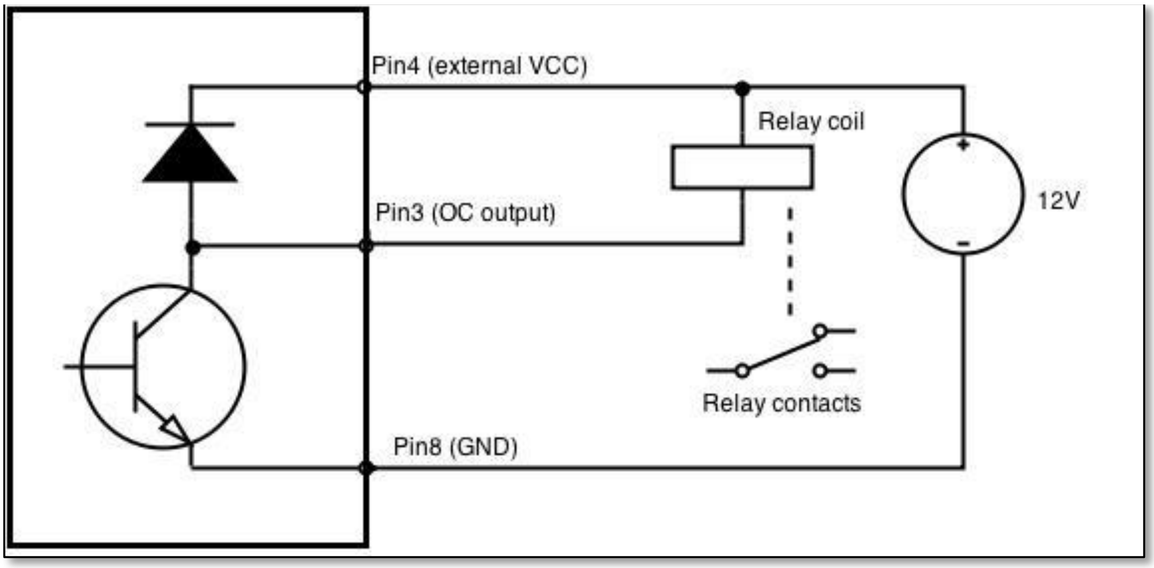
Input voltage range, V	Measurement error, %
0 <Vin≤ 1	<20
1 <Vin≤ 2	<10
2 <Vin≤ 5	<5
5 <Vin≤ 24	<3

9.18.4.4 Open collector output

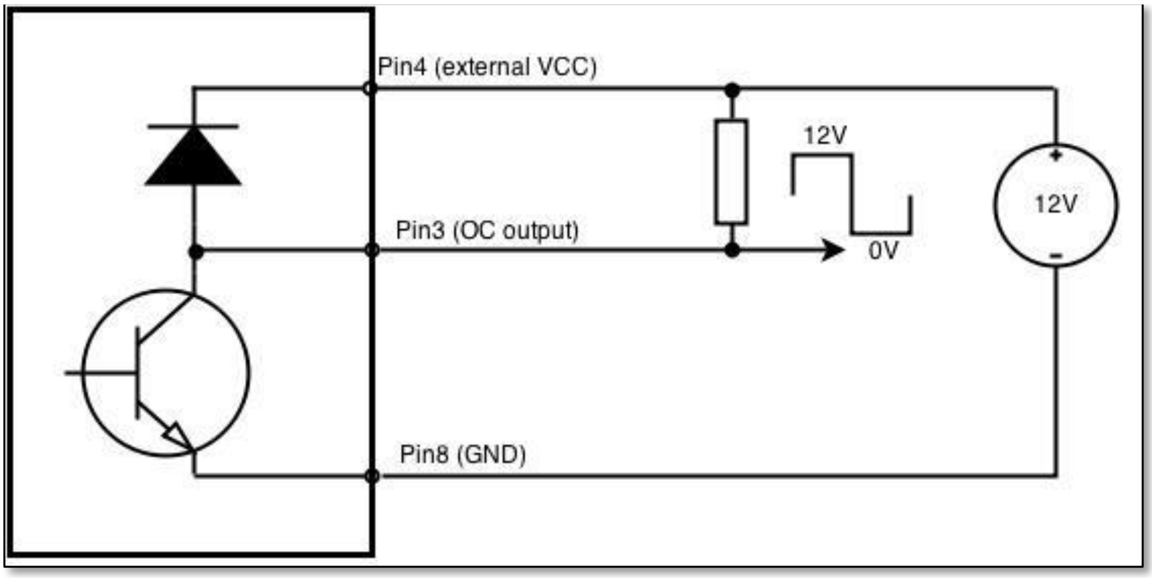
This output can be used to drive external relay. In order for the output to work correctly, external voltage that is connected to a relay also needs to be connected to I/O header pin 4. There is flyback diode located inside the device to protect it from spikes occurring when inductive load (relay coil) is suddenly switched off, so connection of the external diode is not necessary. The output is isolated from the rest of the circuitry using optocoupler. In case of the output failure, the rest of the circuit will remain protected.

Maximum external DC voltage	30V
Maximum output sink current	0.3A

Example of driving a relay:



Output can be also used to generate signals with desired amplitude. Resistor could be for example 4.7kΩ.

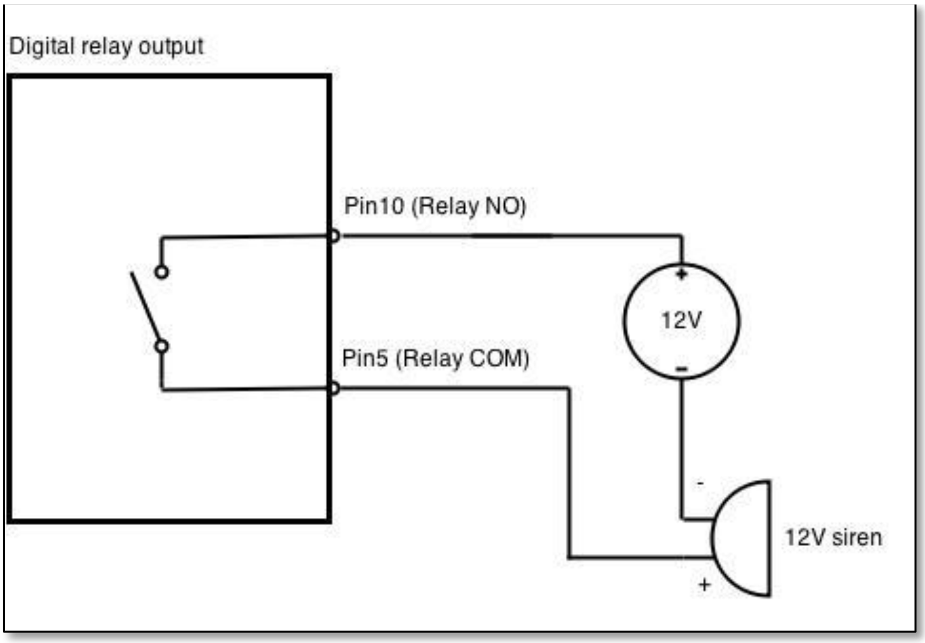


9.18.4.5 Relay output

Relay output has two pins: COM and NO. When the relay is not energized (output not active), these pins are disconnected. One the relay is energized (output active) these pins are become connected together.Relay output is not intended to drive AC voltages.

Maximum DC voltage across relay contacts	24V
Maximum relay DC current	4A

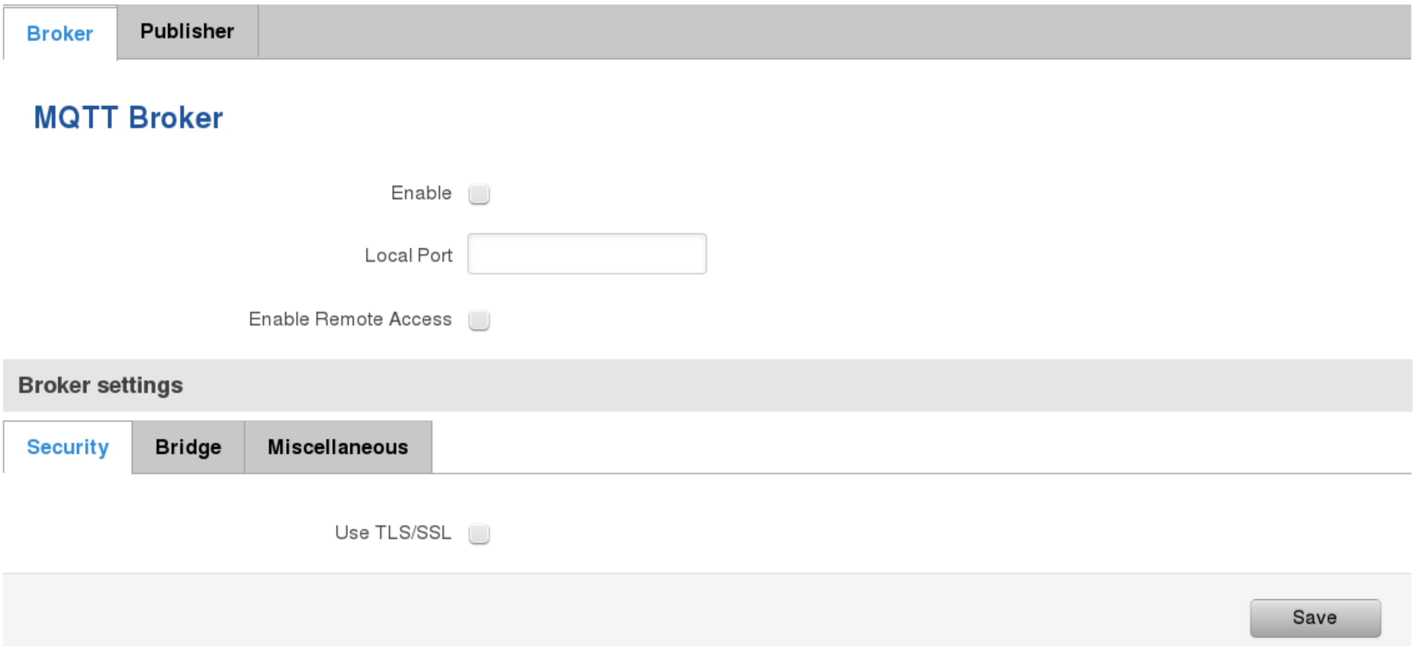
Example of connecting alarm siren to the relay output:



9.19 MQTT

MQTT also known as MQ Telemetry Transport is an publish-subscribe based messaging protocol for use on top of the TCP/IP protocol. It is designed to send short messages from one client (publisher) to another (subscriber) through the brokers, which are responsible for message delivery to the end point. RUT 9XX routers do support this functionality via open source Mosquitto broker. The messages are sent in this way: some client (subscriber) subscribes to specific topic or many of them, and then publisher posts some message to specific topic. The broker then checks who is subscribed to particular topic and transmits data from publisher to subscriber.

RUT9XX supports some functionality of the MQTT broker and MQTT publisher. The main window of parameters is presented below. The broker can be enabled by checking *Enable* and entering the port number on which MQTT broker should run to. In order to accept connections from WAN interface, *Enable Remote Access* should be checked also.



MQTT Broker

Enable □

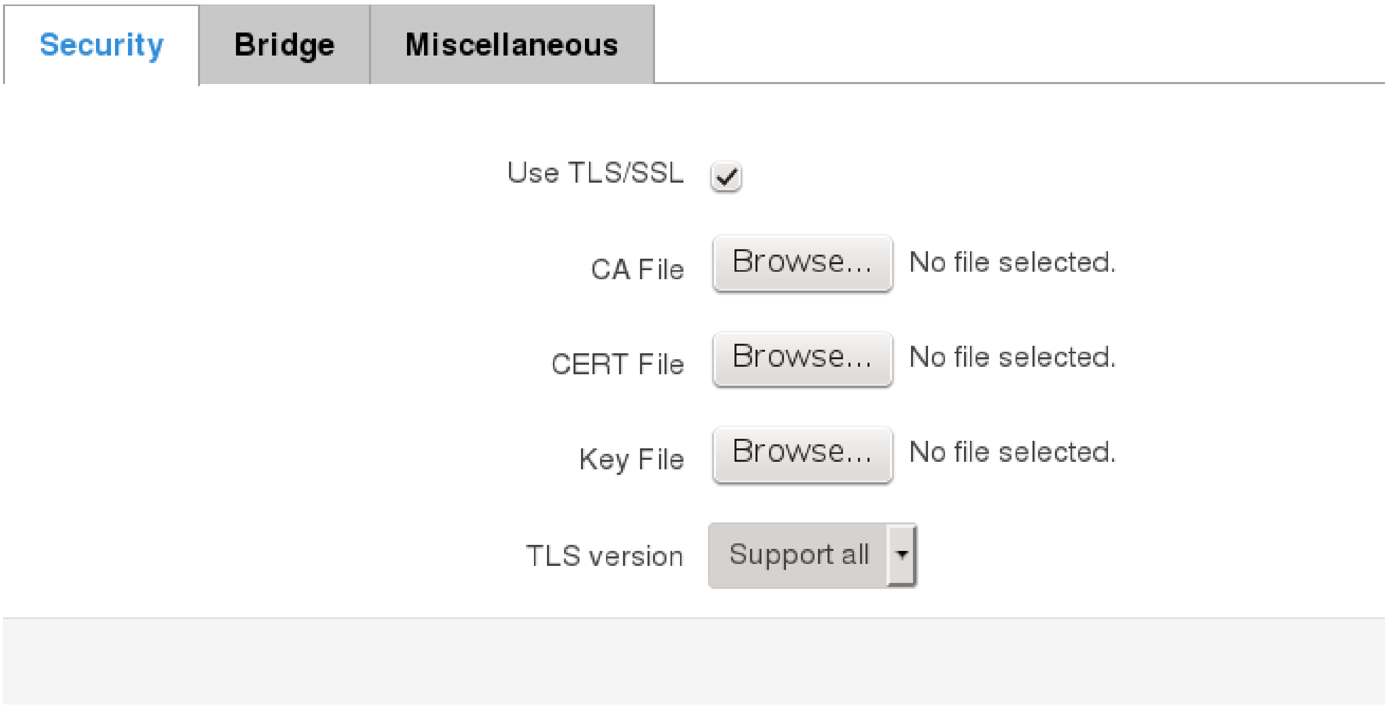
Local Port

Enable Remote Access □

Broker settings

Use TLS/SSL □

In order to use TLS/SSL for connecting clients (subscribers and publishers) to the broker, the one should check *Use TLS/SSL*. After that, additional settings will be displayed to the user as shown below. Here the user can upload certificates, key files and choose TLS version, which will be used for data encryption between broker and clients (subscribers and publishers)



Use TLS/SSL ☑

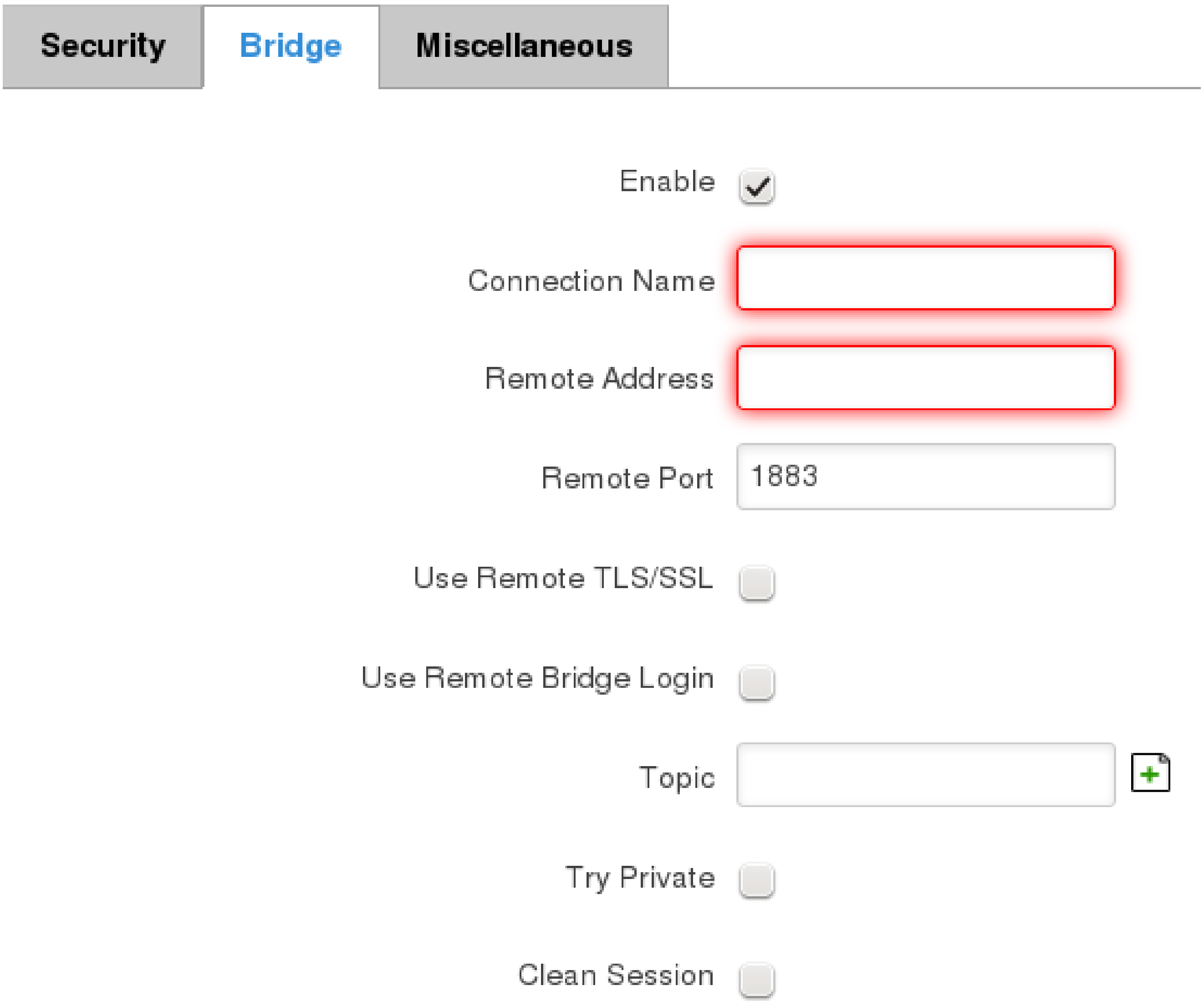
CA File Browse... No file selected.

CERT File Browse... No file selected.

Key File Browse... No file selected.

TLS version Support all

The MQTT broker also supports option called *Bridge*. It means, that two brokers can be connected to each other and share messages. The window of bridge parameters are presented below. There are some mandatory parameters, like *Connection Name*, *Remote Address* and *Remote Port*. Although connection name is mandatory, it should be set to value what you like and according to mosquitto's user manual this option denotes the client ID which will be used when connecting to remote broker. There are some other parameters. If you would like to known that they mean and how to use them you should check for mosquito.conf manual page.



Enable ☑

Connection Name

Remote Address

Remote Port 1883

Use Remote TLS/SSL □

Use Remote Bridge Login □

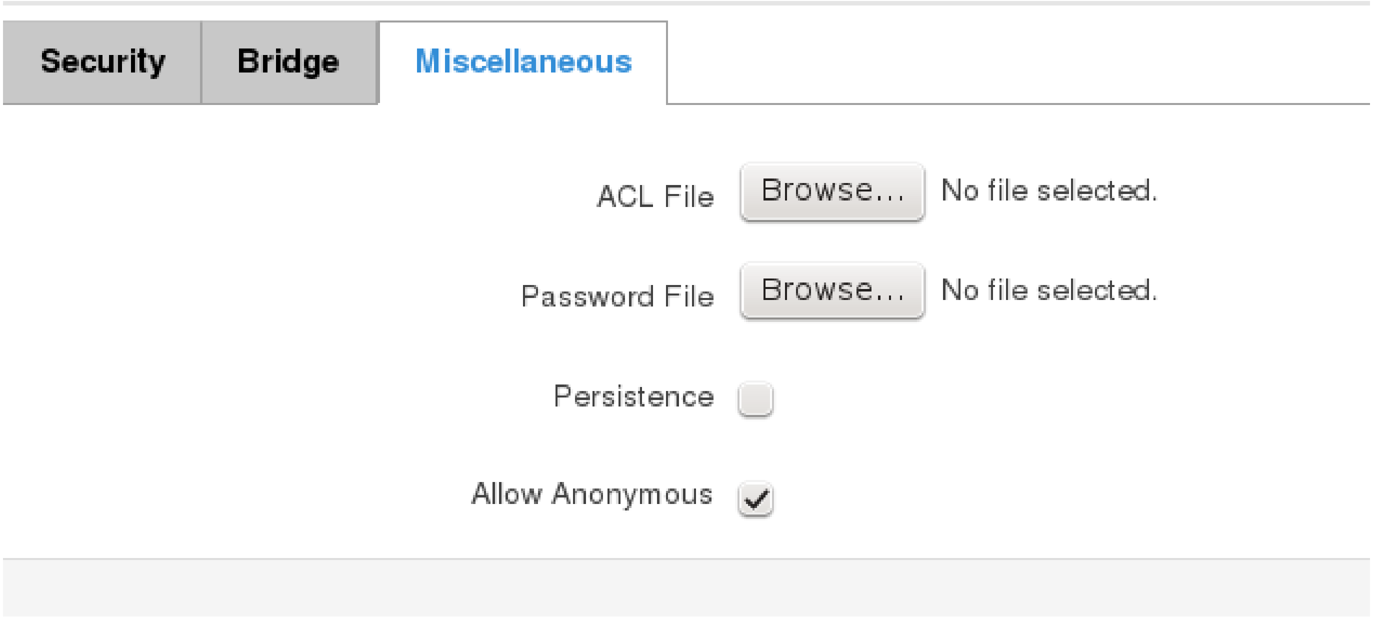
Topic

Try Private □

Clean Session □

,

The last section of parameters is called *Miscellaneous*. It contains parameters, which does not depend on neither *Security*, nor *Bridge* categories. *ACL File* denotes access control list file name. The contents of this file are used to control client access to topics of the broker. The *Password File* denotes the file, there users and corresponding passwords are stored. This file is used for user authentication. This option is related to another option called *Allow Anonymous*. If *Allow Anonymous* is unchecked, only users, which exist in password file will be able to connect to the broker. More about password file can be read on mosquitto configuration manual. The last option is called *Persistence*, it allows to save connection, subscription and message data to the disk, otherwise, the data is stored in memory only.



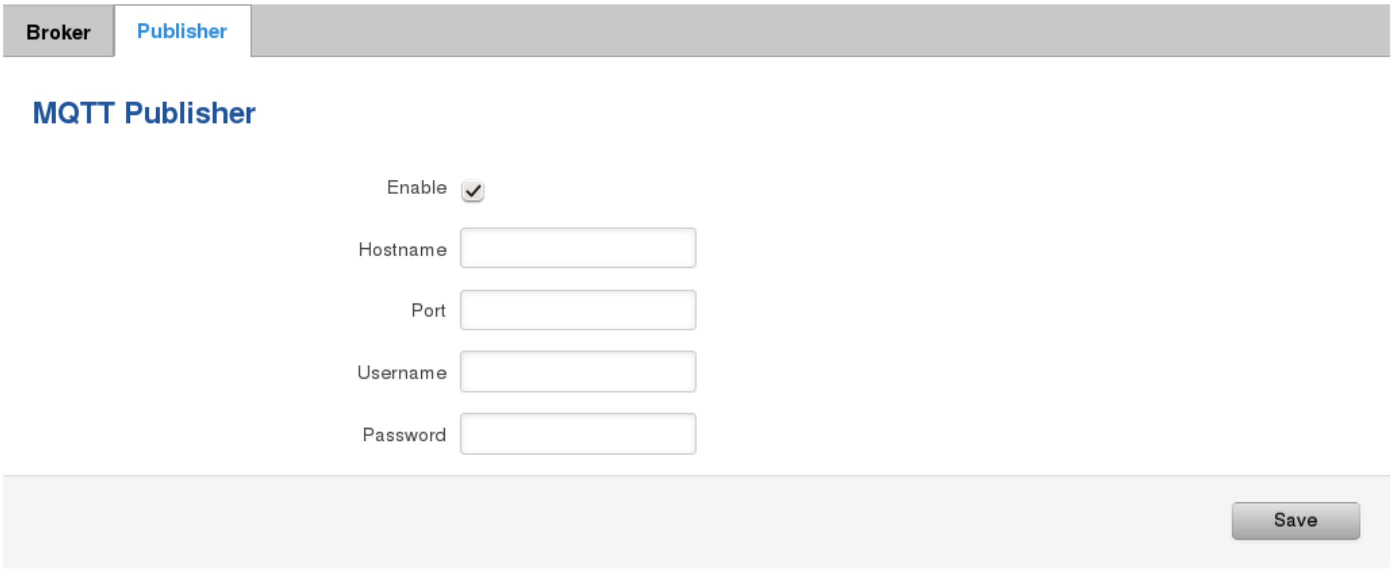
ACL File Browse... No file selected.

Password File Browse... No file selected.

Persistence □

Allow Anonymous ☑

It is possible to configure some sort of MQTT publisher. It is not simple publisher, but publisher, which publishes some system parameters to the broker. The publisher configuration window has few fields, like hostname and port of the broker to connect. Username and password fields are used for authentication. If these fields are left empty, no authentication is performed.



MQTT Publisher

Enable ☑

Hostname

Port

Username

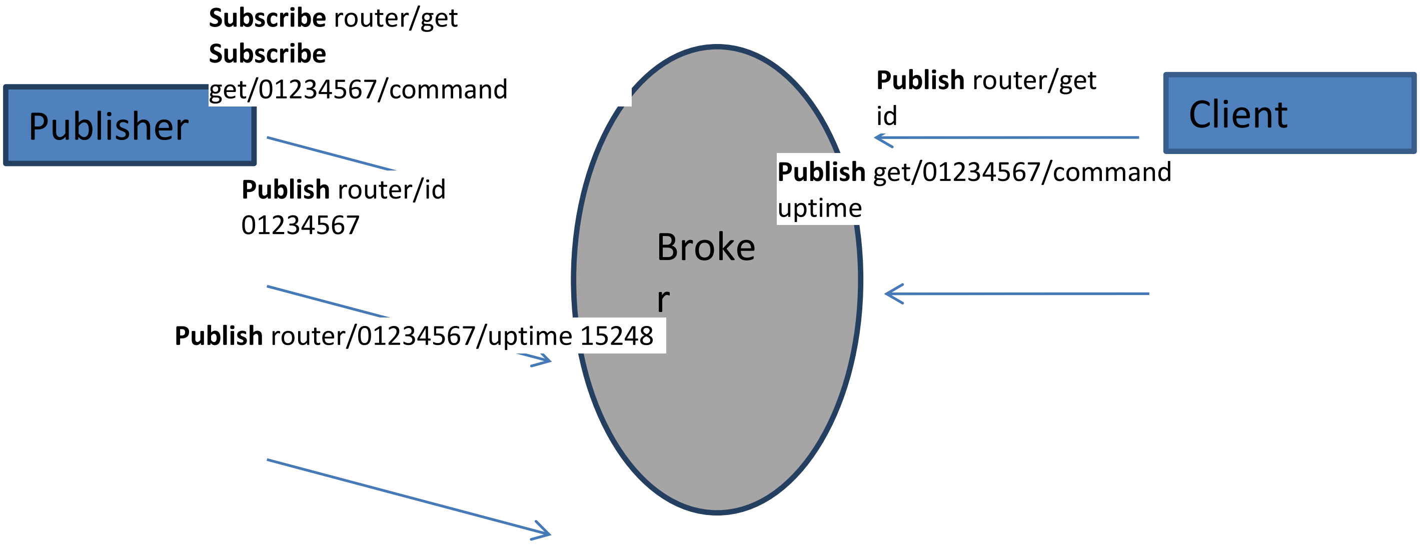
Password

The full list of system parameters, which can be published, are described below.

Parameter name	Parameter description
temperature	Get temperature of the module in 0.1 degrees Celcium
operator	Get current operator’s name
signal	Get signal strength in dBm
network	Get current network type (2G, 3G, 4G, etc’)

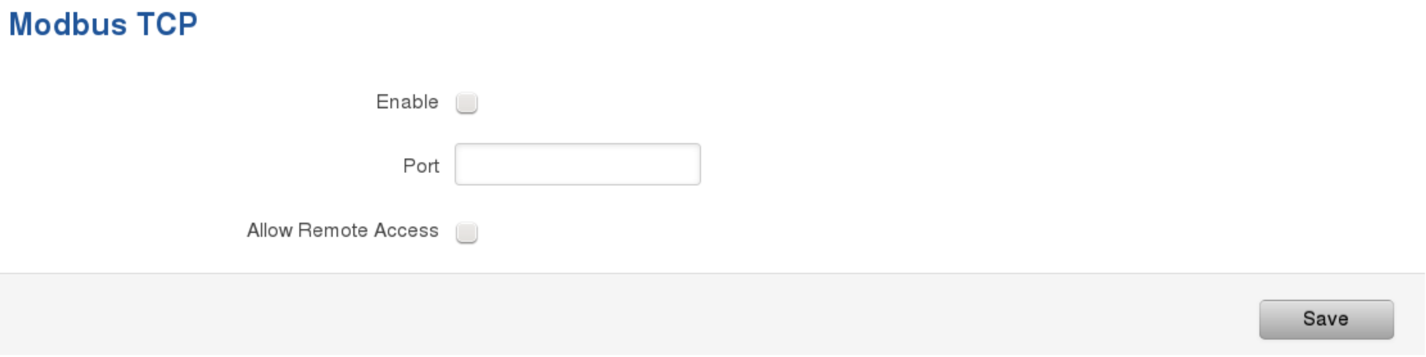
connection	Check if data connection is available
wan	Get WAN’s IP address
uptime	Get system uptime in seconds
name	Get router’s name
digital1	Get value of digital input no. 1
digital2	Get value of digital input no. 2
analog	Get value of analog input

In order system to work, MQTT broker should be configured in advance. You can use the broker, which is installed inside the router, or the broker in the other location. The publisher operates according to the scheme presented below. In the scheme the client tries to subscribe information about router’s uptime. To achieve this multiple commands between client and publisher are being sent.


Subscribe router/get
Subscribe get/01234567/command
Publisher
Publish router/id 01234567
Publish router/01234567/uptime 15248
Broke r
Publish router/get id
Client
Publish get/01234567/command uptime

In general publisher works in such a way: connects to the broker and subscribes to the topics *router/get* and *get/<SERIAL>/command*, there *<SERIAL>* denotes serial number of the router which is currently run publisher. The client then sends message *id* to the topic *router/get*. The following message is received by the publisher, since it is subscribed to that topic. Then the publisher sends response with its serial number to the topic *router/id*. Now the client knows that publisher with some serial number exist. It means, that client can send message with parameter name from the list as a message to the topic *get/<SERIAL>/command* to the broker. The message will be received only by the subscriber, which has the same SERIAL number mentioned in the topic. Now the publisher can send back a response with *router/<SERIAL>/parameter_name* topic and message with a value of requested parameter. It should be noted, that according to MQTT protocol, the topic names are case-sensitive, for example topic router is not the same as topic RoUtEr.

9.20 Modbus TCP interface



Modbus TCP

Enable □

Port

Allow Remote Access □

Modbus TCP interface allows the user to set or get some parameters like module temperature, signal strength, etc. from the router. In other words, Modbus TCP allows to control routers behavior and get its status information. To use Modbus TCP capabilities this feature must be enabled by navigating to Services-Modbus. After "Save" button is pressed, the Modbus daemon will be launched on selected port of the system. Modbus daemon acts as slave device that means, it accepts connection from the master (client) and sends out a response or sets some system related parameter. By the default Modbus will only accept connections through LAN interface. In order to accept connections through WAN interface also, Allow Remote Access must be checked.

To obtain some parameter from the system, the read holding registers command is used. The register number and corresponding system values are described below. Each register contains 2 bytes. For simplification the number of registers for storing numbers is 2, while for storing text information the number of registers is 16.

Required value	Representation	Register number	Number of registers
System uptime	32 bit unsigned integer	1	2
GSM signal strength (dBm)	32 bit integer	3	2
System temperature in 0.1 degrees Celcium	32 bit integer	5	2
System hostname	Text	7	16
GSM operator name	Text	23	16
Router serial number	Text	39	16
Router MAC address	Text	55	16
Router name	Text	71	16
Current SIM card	Text	87	16
Network registration	Text	103	16
Network type	Text	119	16
Digital input 1	32 bit integer	135	2
Digital input 2	32 bit integer	137	2
Current WAN IP address	32 bit unsigned integer	139	2
Analog input	32 bit integer	141	2

The Modbus daemon also supports setting of some system parameters. For this task write holding register command is used. System related parameters and how to use them are described below. The register number refers to the register number where to start write required values. All commands, except "Change APN" accepts only one input parameter. For the APN the number of input registers may vary. The very first byte of APN command denotes a number of SIM card for which set the APN. This byte should be set to 1 (in order to change APN for SIM card number 1) or to 2 (in order to change APN for SIM card number 2).

Value to set	Description	Register number	Register value
Digital output 1 (on/off)	Change the state of the digital output number 1	201	1/0
Digital output 2 (on/off)	Change the state of the digital output number 2	202	1/0
Switch WiFi (on/off)	Allows to switch WiFi on or off	210	1/0
Switch mobile data connection (on/off)	Turns on or off mobile data connection	211	1/0
Switch SIM card (SIM1, SIM2, SIM1->SIM2 and SIM2->SIM1)	Allows to change SIM card in use, 3 possible options are supported	212	0/1/2
Change APN	Allows to change APN	213	APN code
Reboot	Reboots a router	220	1

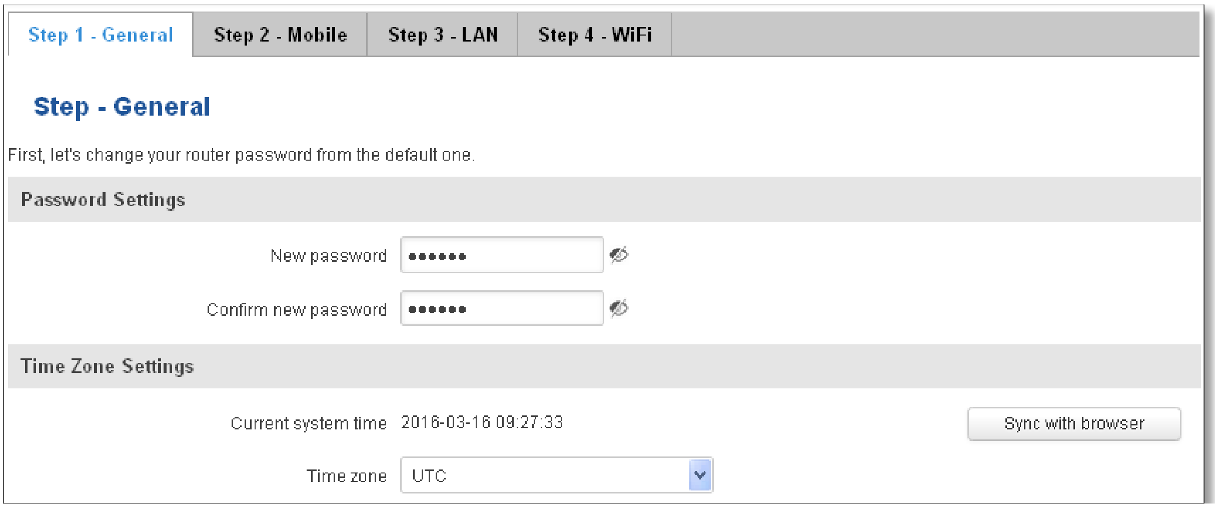
10 System

10.1 Configuration Wizard

The configuration wizard provides a simple way of quickly configuring the device in order to bring it up to basic functionality. The wizard is comprised out of 4 steps and they are as follows:

Step 1 (General change)

First, the wizard prompts you to change the default password. Simply enter the same password into both Password and Confirmation fields and press **Next**.



Step - General

First, let's change your router password from the default one.

Password Settings

New password ••••••

Confirm new password ••••••

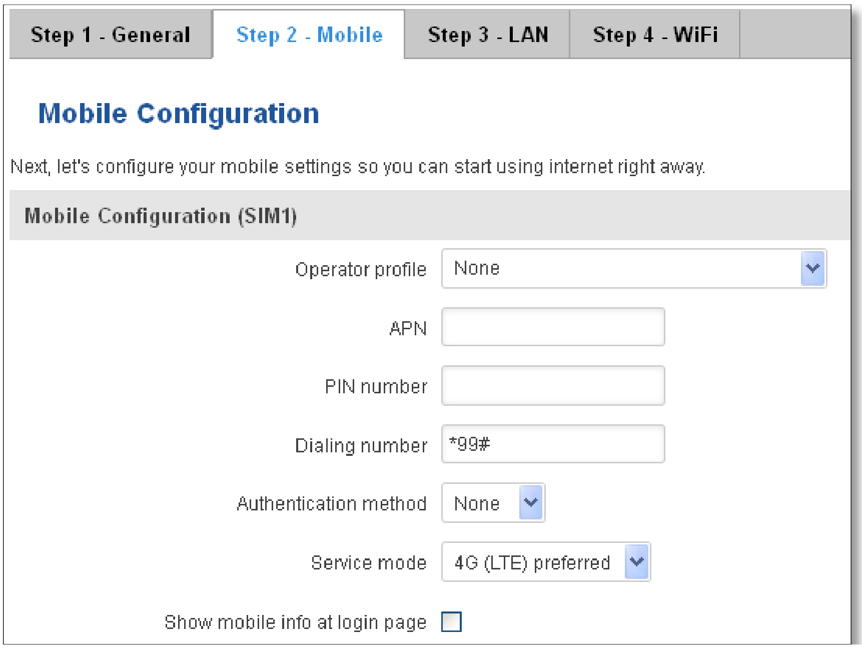
Time Zone Settings

Current system time 2016-03-16 09:27:33

Time zone UTC

Step 2 (Mobile Configuration)

Next we have to enter your mobile configuration. On a detailed instruction on how this should be done see the Mobile section under Network



Mobile Configuration

Next, let's configure your mobile settings so you can start using internet right away.

Mobile Configuration (SIM1)

Operator profile None

APN

PIN number

Dialing number *99#

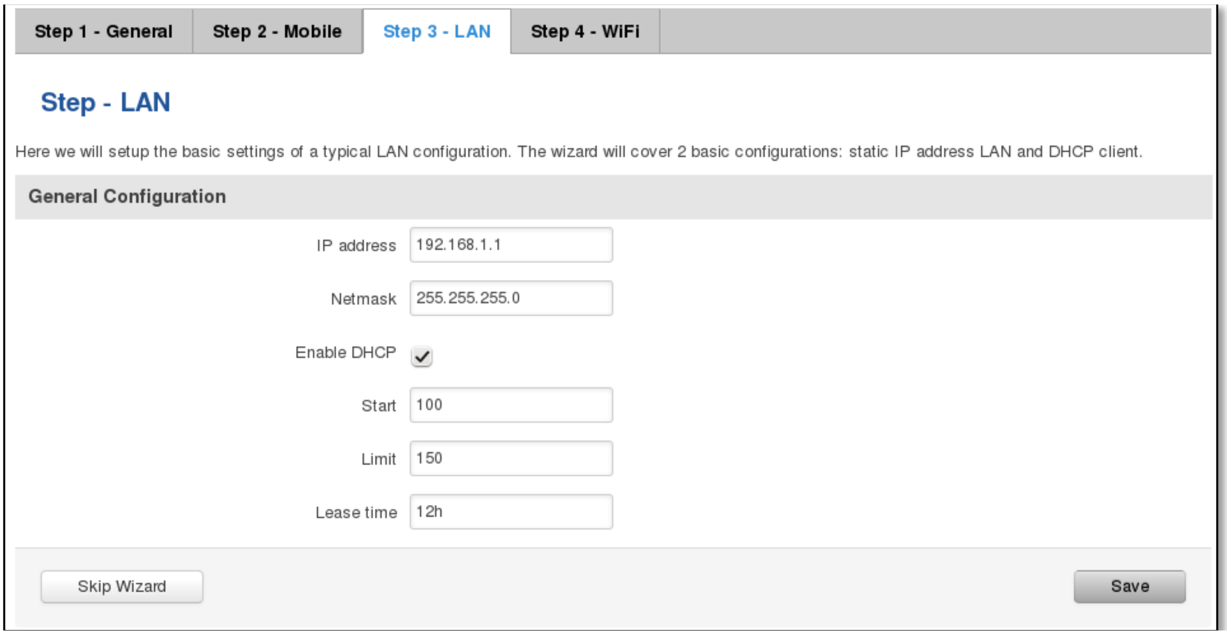
Authentication method None

Service mode 4G (LTE) preferred

Show mobile info at login page □

Step 3 (LAN)

Next, you are given the chance to configure your LAN and DHCP server options. For a detailed explanation see LAN under Network.



Step - LAN

Here we will setup the basic settings of a typical LAN configuration. The wizard will cover 2 basic configurations: static IP address LAN and DHCP client.

General Configuration

IP address: 192.168.1.1

Netmask: 255.255.255.0

Enable DHCP: ☑

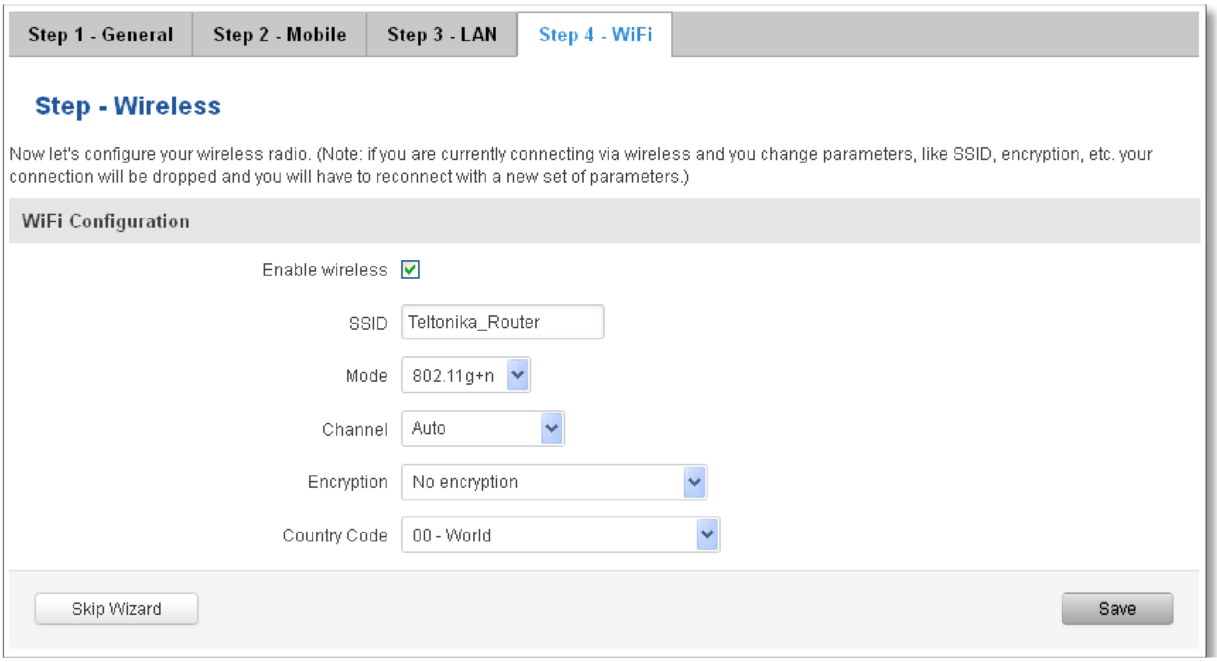
Start: 100

Limit: 150

Lease time: 12h

Step 4 (Wi-Fi)

The final step allows you to configure your wireless settings in order to set up a rudimentary Access Point.



Step - Wireless

Now let's configure your wireless radio. (Note: if you are currently connecting via wireless and you change parameters, like SSID, encryption, etc. your connection will be dropped and you will have to reconnect with a new set of parameters.)

WiFi Configuration

Enable wireless: ☑

SSID: Teltonika_Router

Mode: 802.11g+n

Channel: Auto

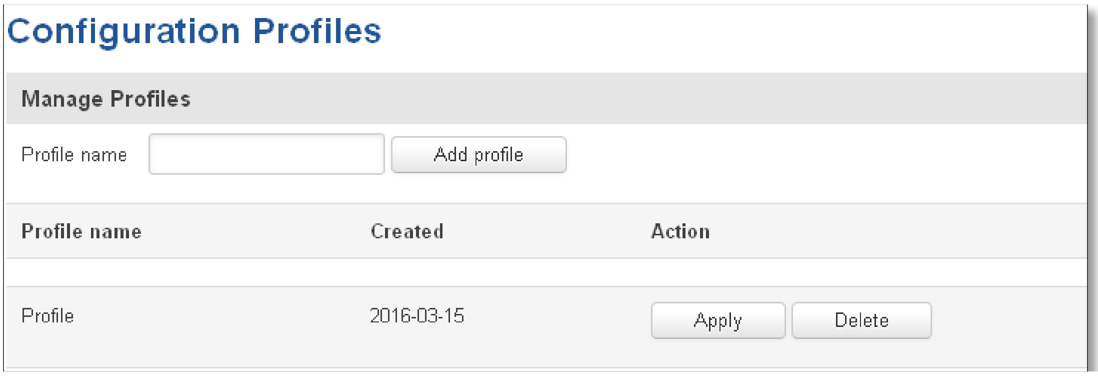
Encryption: No encryption

Country Code: 00 - World

When you're done with the configuration wizard, press **Save**.

10.2 Profiles

Router can have 5 configuration profiles, which you can later apply either via WebUI or via SMS. When you add New Profile, you save **current** full configuration of the router. Note: profile names **cannot** exceed 10 symbols.



Configuration Profiles

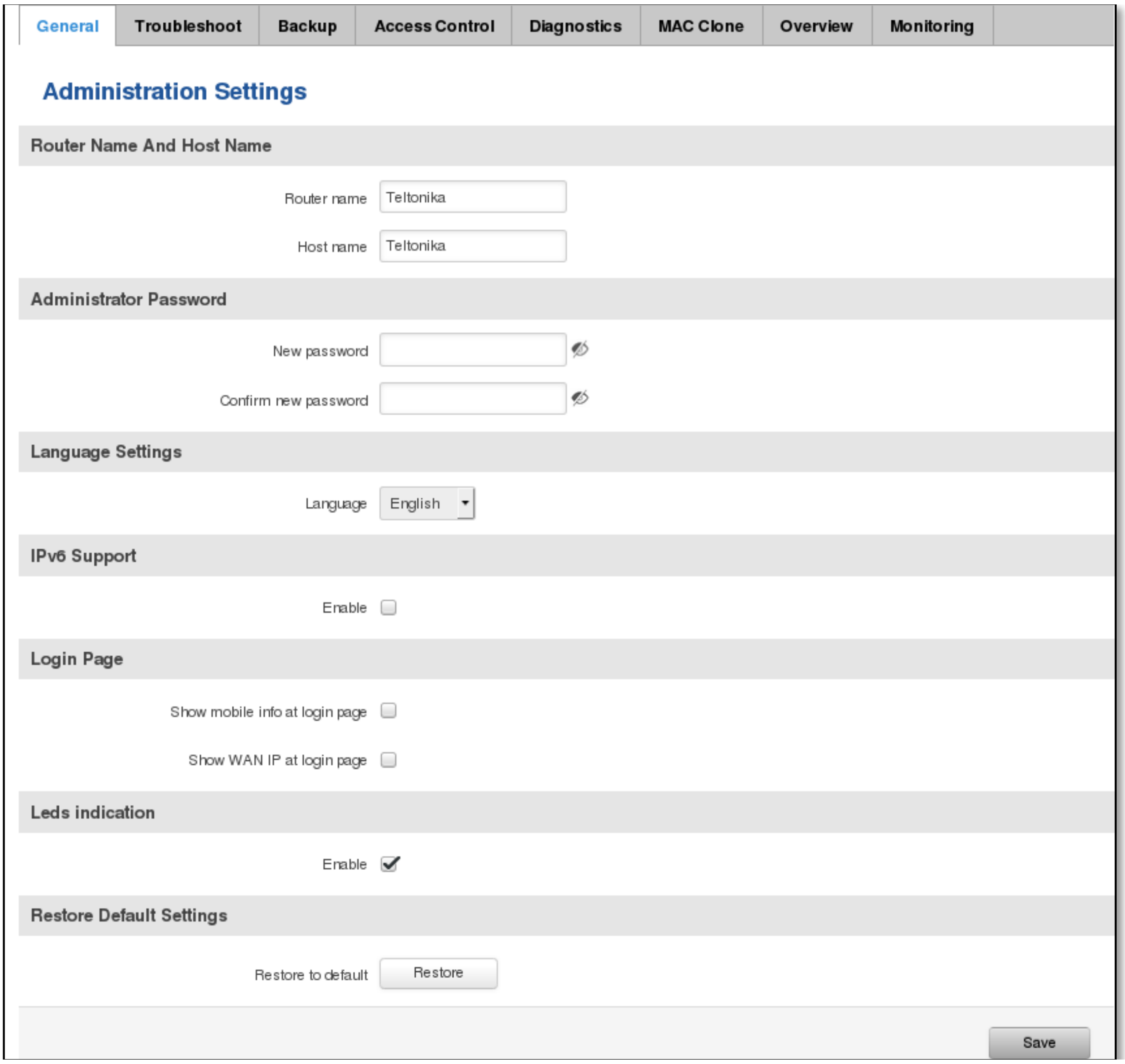
Manage Profiles

Profile name [ ] Add profile

Profile name	Created	Action
Profile	2016-03-15	Apply Delete

10.3 Administration

10.3.1 General



Administration Settings

Router Name And Host Name

Router name: Teltonika

Host name: Teltonika

Administrator Password

New password

Confirm new password

Language Settings

Language: English

IPv6 Support

Enable □

Login Page

Show mobile info at login page □

Show WAN IP at login page □

Leds indication

Enable ☑

Restore Default Settings

Restore to default: Restore

Save

	Field name	Explanation
1.	Router name	Enter your new router name.
2.	Host name	Enter your new host name
3.	New Password	Enter your new administration password. Changing this password will change SSH password as well.
4.	Confirm new password	Re-enter your new administration password.

5.	Language	Website will be translated into selected language.
6.	IPv6 support	Enable IPv6 support on router
7.	Show mobile info at login page	Show operator and signal strength at login page.
8.	Show WAN IP at login page	Show WAN IP at login page.
9	On/Off LEDs	If uncheck, all routers LEDs are off.
10	Restore to default	Router will be set to factory default settings

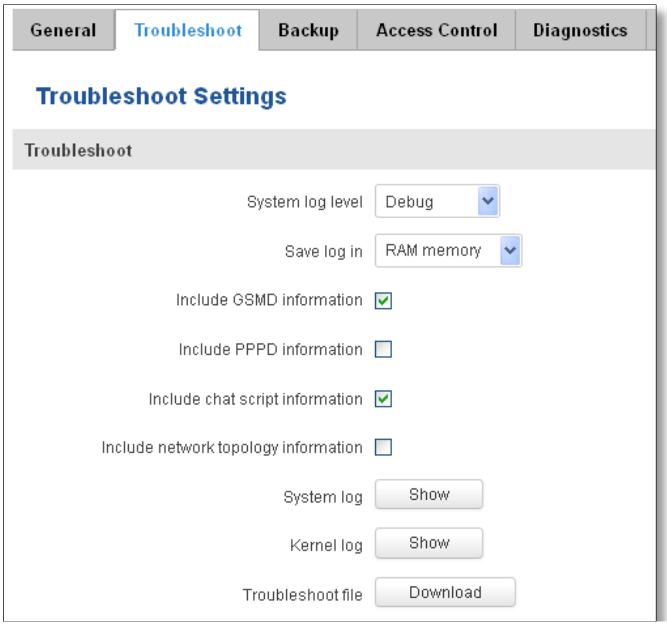
Important notes:

The only way to gain access to the web management if you forget the administrator password is to reset the device factory default settings. Default administrator login settings are:

User Name: **admin**

Password: **admin01**

10.3.2 Troubleshoot



Troubleshoot Settings

Troubleshoot

System log level: Debug

Save log in: RAM memory

Include GSMD information ☑

Include PPPD information □

Include chat script information ☑

Include network topology information □

System log

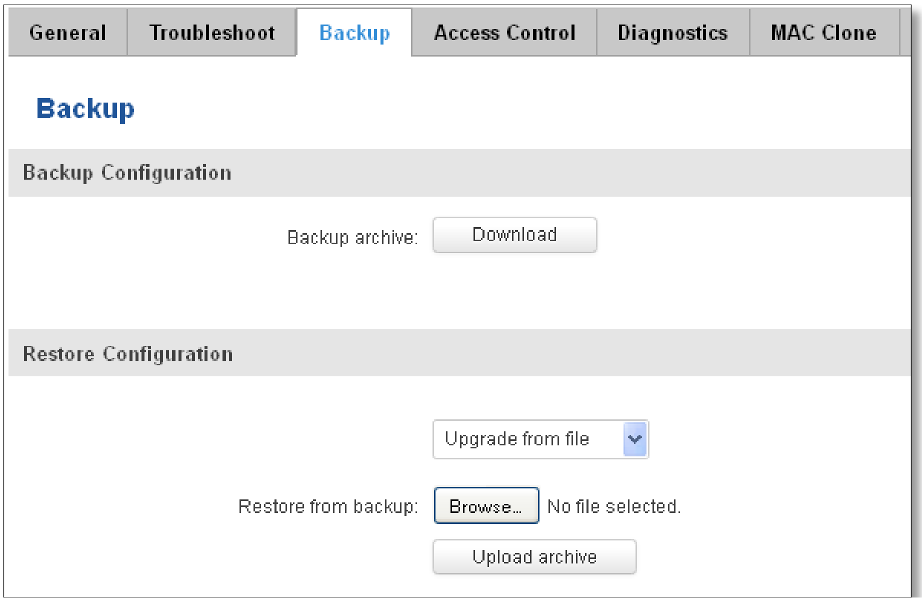
Kernel log

Troubleshoot file

	Field name	Explanation
1.	System log level	Debug level should always be used, unless instructed otherwise.
2.	Save log in	Default RAM memory should always be used unless instructed otherwise.
3.	Include GSMD information	Default setting – enabled should be used, unless instructed otherwise.
4.	Include PPPD information	Default setting – disabled should be used, unless instructed otherwise.
5.	Include Chat script information	Default setting – enabled should be used, unless instructed otherwise.
6.	Include network topology information	Default setting – disabled should be used, unless instructed otherwise.
7.	System Log	Provides on-screen System logging information. It does not, however, substitute troubleshooting file that can be downloaded from System -> Backup and Firmware menu.
8.	Kernel Log	Provides on-screen Kernel logging information. It does not, however, substitute troubleshooting file that can be downloaded from System -> Backup and Firmware menu.

9.	Troubleshoot file	Downloadable archive, that contains full router configuration and all System log files.

10.3.3 Backup



Backup

Backup Configuration

Backup archive: Download

Restore Configuration

Upgrade from file

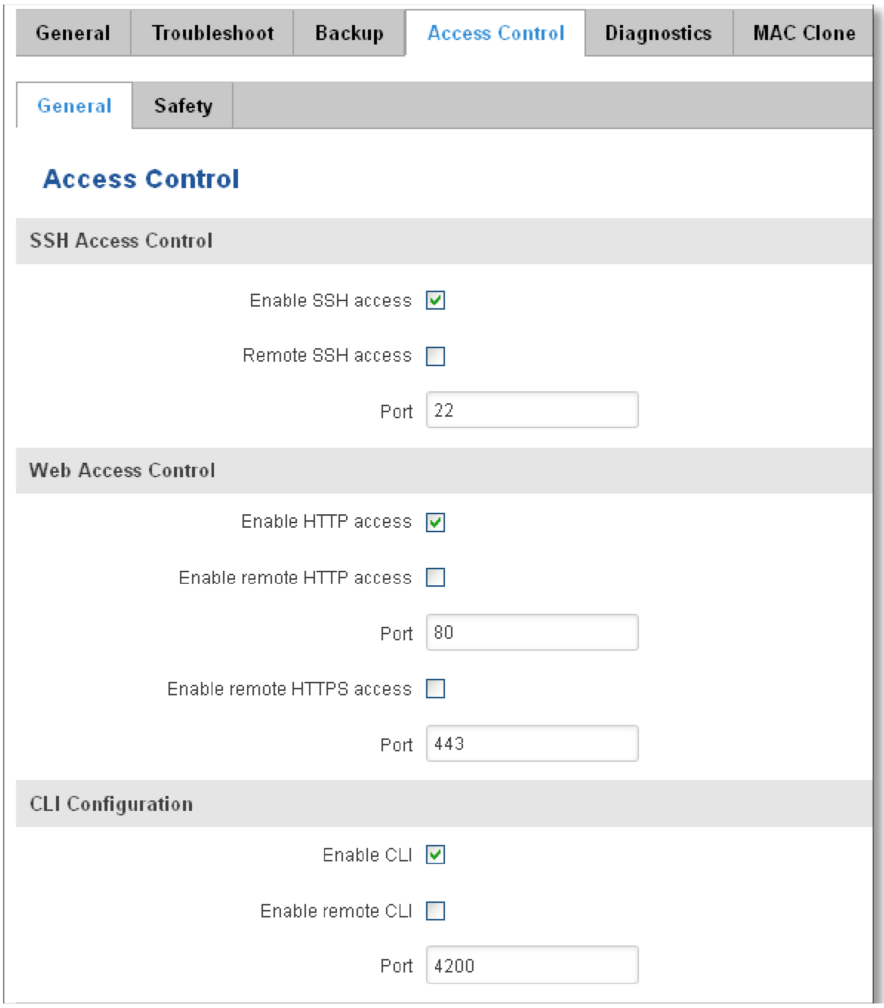
Restore from backup: Browse... No file selected.

Upload archive

	Field name	Explanation
1.	Backup archive	Download current router settings file to personal computer. This file can be loaded to other RUT955 with same Firmware version in order to quickly configure it.
2.	Restore from backup	Select, upload and restore router settings file from personal computer.

10.3.3.1 Access control

10.3.3.1.1 General



Access Control

SSH Access Control

Enable SSH access ☑

Remote SSH access □

Port 22

Web Access Control

Enable HTTP access ☑

Enable remote HTTP access □

Port 80

Enable remote HTTPS access □

Port 443

CLI Configuration

Enable CLI ☑

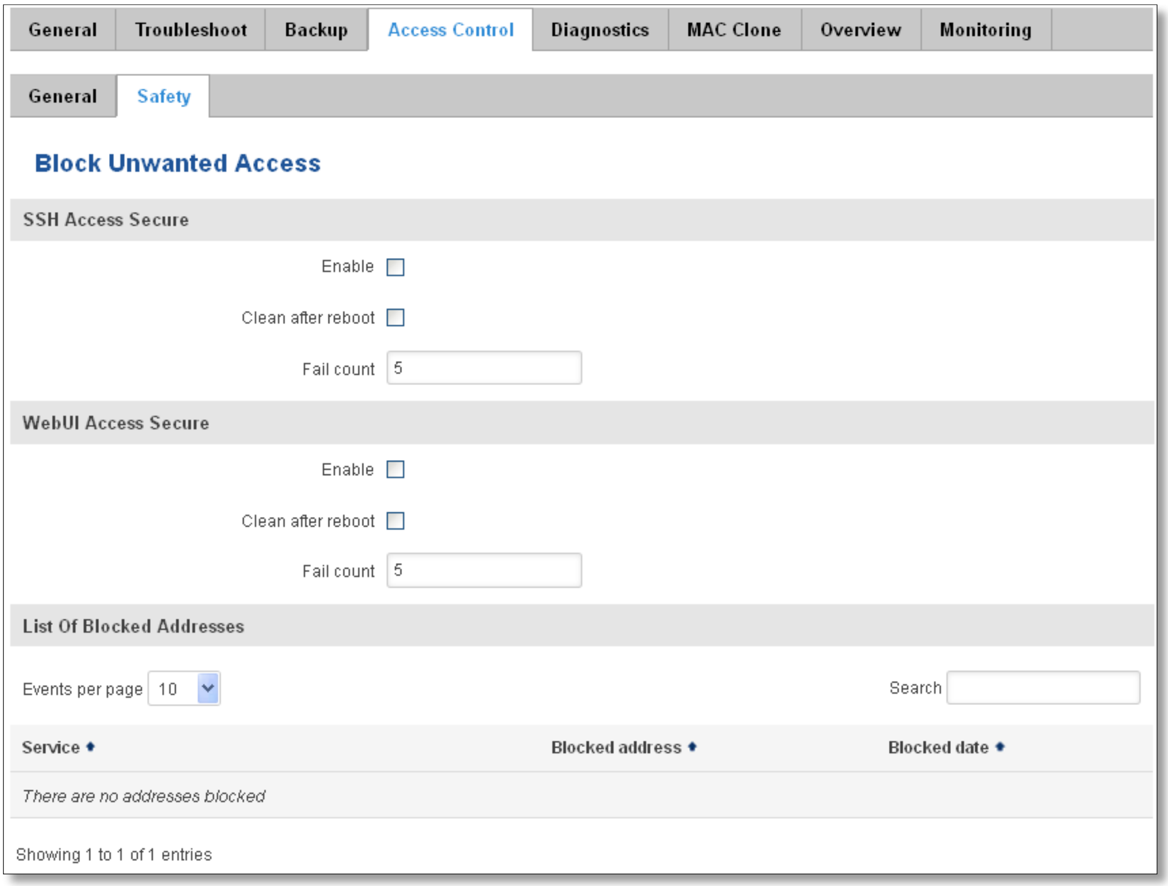
Enable remote CLI □

Port 4200

	Field name	Explanation
1.	Enable SSH access	Check box to enable SSH access.
2.	Remote SSH access	Check box to enable remote SSH access.
3.	Port	Port to be used for SSH connection
4.	Enable HTTP access	Enables HTTP access to router
5.	Enable remote HTTP access	Enables remote HTTP access to router
6.	Port	Port to be used for HTTP communication
7.	Enable remote HTTPS access	Enables remote HTTPS access to router
8.	Port	Port to be used for HTTPS communication
9.	Enable CLI	Enables Command Line Interface
10.	Enable remote CLI	Enables remote Command Line Interface
11.	Port	Port to be used for CLI communication

Note: The router has 2 users: “**admin**” for WebUI and “**root**” for SSH. When logging in via SSH use “**root**”.

10.3.3.1.2 Safety



Block Unwanted Access

SSH Access Secure

Enable □

Clean after reboot □

Fail count 5

WebUI Access Secure

Enable □

Clean after reboot □

Fail count 5

List Of Blocked Addresses

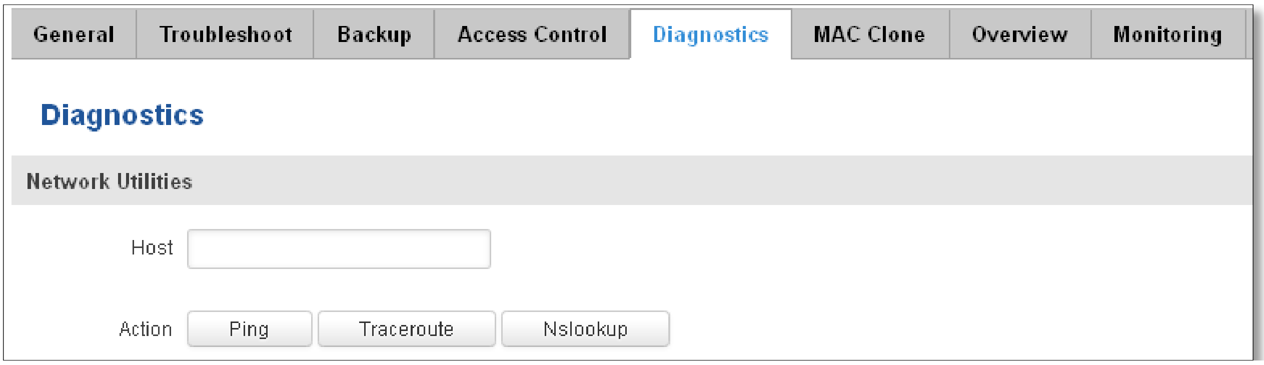
Events per page 10 Search

Service	Blocked address	Blocked date
There are no addresses blocked		

Showing 1 to 1 of 1 entries

	Field name	Explanation
1.	SSH access secure enable	Check box to enable SSH access secure functionality.
2.	Clean after reboot	If check box is selected – blocked addresses are removed after every reboot.
3.	Fail count	Specifies maximum connection attempts count before access blocking.
4.	WebUI access secure enable	Check box to enable secure WebUI access.

10.3.4 Diagnostics



Diagnostics

Network Utilities

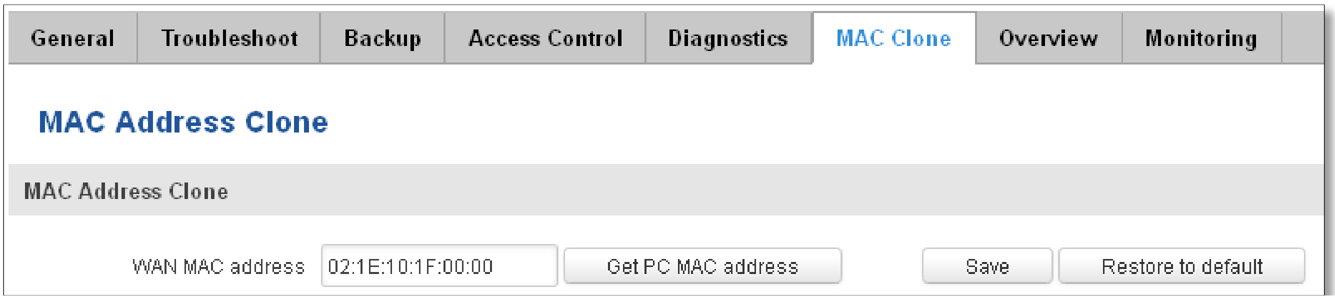
Host

Action

	Field name	Explanation
1.	Host	Enter server IP address or hostname.

2.	Ping	Utility used to test the reach ability of a host on an Internet IP network and to measure the round-trip time for messages sent from the originating host to a destination server. Server echo response will be shown after few seconds if server is accessible.
3.	Traceroute	Diagnostics tool for displaying the route (path) and measuring transit delays of packets across an Internet IP network. Log containing route information will be shown after few seconds.
4.	Nslookup	Network administration command-line tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or for any other specific DNS record. Log containing specified server DNS lookup information will be shown after few seconds.

10.3.5 MAC Clone



MAC Address Clone

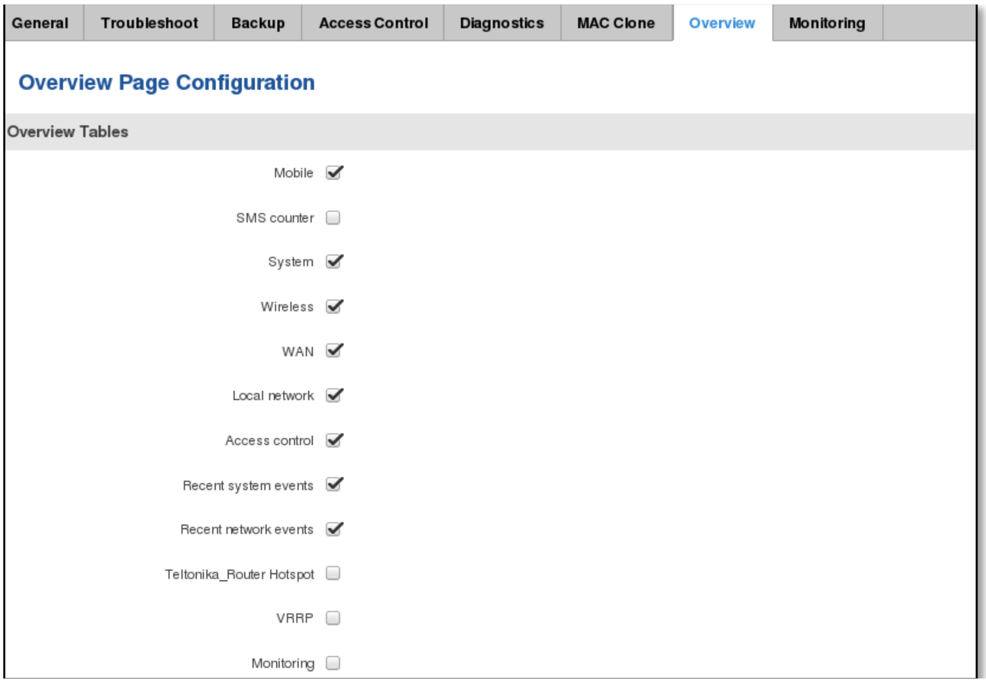
MAC Address Clone

WAN MAC address: 02:1E:10:1F:00:00

	Field name	Explanation
1.	WAN MAC address	Enter new WAN MAC address.

10.3.6 Overview

Select which information you want to get in Overview window (Status -> Overview).



Overview Page Configuration

Overview Tables

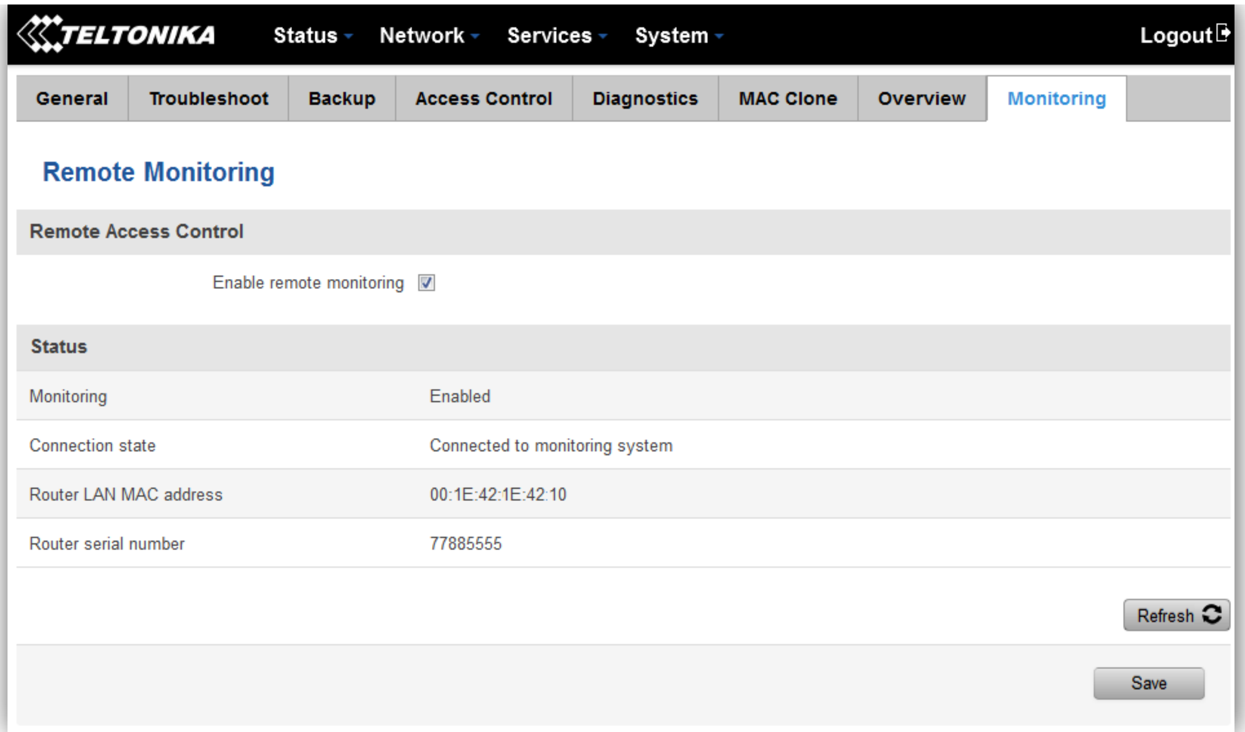
Mobile ☑
SMS counter ☐
System ☑
Wireless ☑
WAN ☑
Local network ☑
Access control ☑
Recent system events ☑
Recent network events ☑
Teltonika_Router Hotspot ☐
VRRP ☐
Monitoring ☐

	Field name	Explanation
1.	Mobile	Check box to show Mobile table in Overview page

2.	SMS counter	Check box to show SMS counter table in Overview page
3.	System	Check box to show System table in Overview page
4.	Wireless	Check box to show Wireless table in Overview page
5.	WAN	Check box to show WAN table in Overview page
6.	Local network	Check box to show Local network table in Overview page
7.	Access control	Check box to show Access control table in Overview page
8.	Recent system events	Check box to show Recent system events table in Overview page
9.	Recent network events	Check box to show Recent network events table in Overview page
10.	<Hotspot name> Hotspot	Check box to show Hotspot instance table in Overview page
11.	VRRP	Check box to show VRRP table in Overview page
12.	Monitoring	Check box to show Monitoring table in Overview page

10.3.7 Monitoring

Monitoring functionality allows your router to be connected to Remote Monitoring System. Also MAC address and router serial numbers are displayed for convenience in this page, because they are needed when adding device to monitoring system.



Remote Monitoring

Remote Access Control

Enable remote monitoring ☑

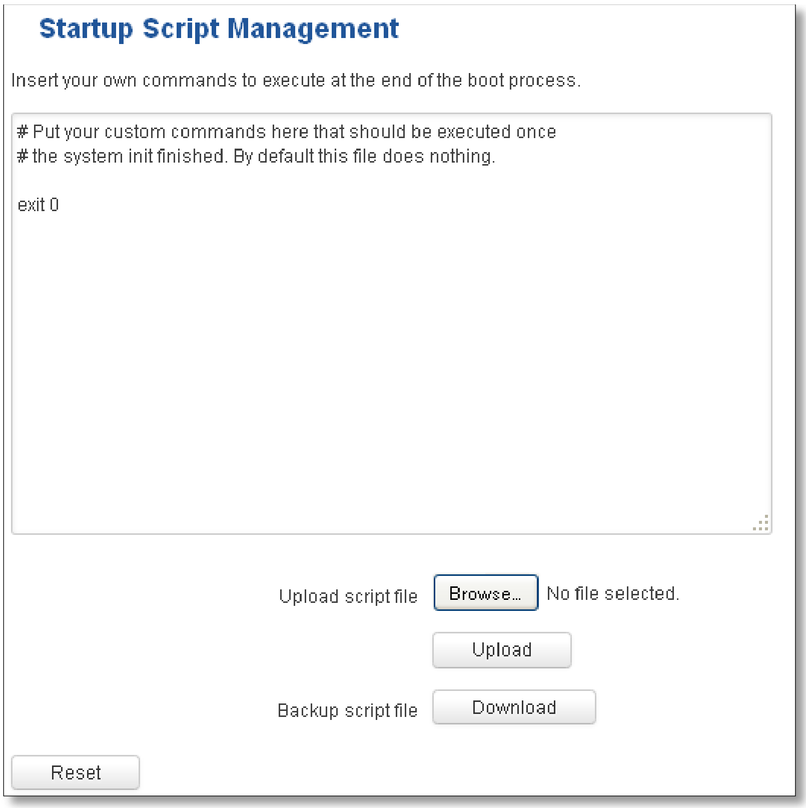
Status

Monitoring	Enabled
Connection state	Connected to monitoring system
Router LAN MAC address	00:1E:42:1E:42:10
Router serial number	77885555

	Field name	Explanation
1.	Enable remote monitoring	Check box to enable/disable remote monitoring
2.	Monitoring	Shows monitoring status.
3.	Router LAN MAC address	MAC address of the Ethernet LAN ports
4.	Router serial number	Serial number of the device

10.4 User scripts

Advanced users can insert their own commands that will be executed at the end of booting process.


Startup Script Management
Insert your own commands to execute at the end of the boot process.
Upload script file
Browse...
No file selected.
Upload
Backup script file
Download
Reset

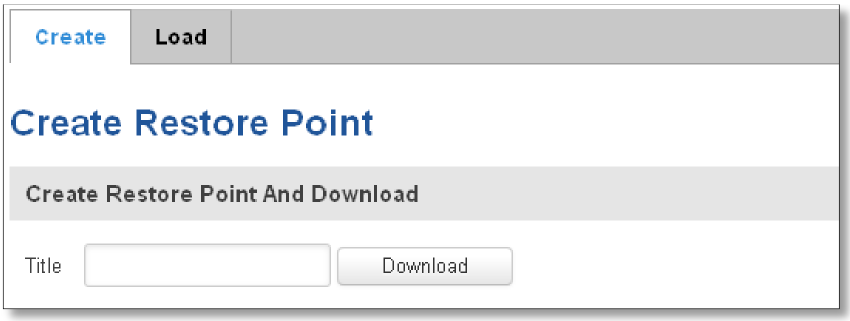
```
# Put your custom commands here that should be executed once
# the system init finished. By default this file does nothing.

exit 0
```

In *Script Management* window is shown content of a file /etc/rc.local. This file is executed at the end of startup, executing the line: sh /etc/rc.local In this script is needed to use sh (ash) commands. It should be noted, that this is embedded device and sh functionality is not full.

10.5 Restore point

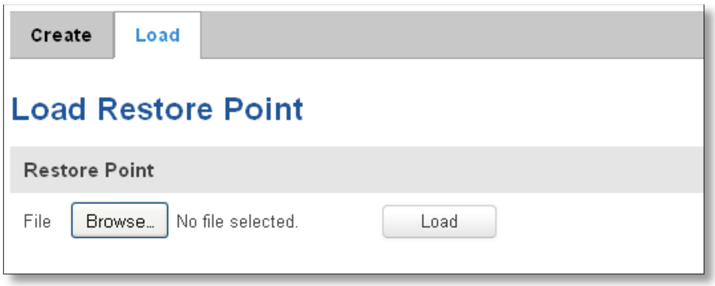
10.5.1 Restore point create

Allow to create firmware restore points with all custom configurations. You can download created restore points to your computer.



10.5.2 Restore point load

Allow to restore configuration from previously saved restore point. You can upload restore point from your computer.



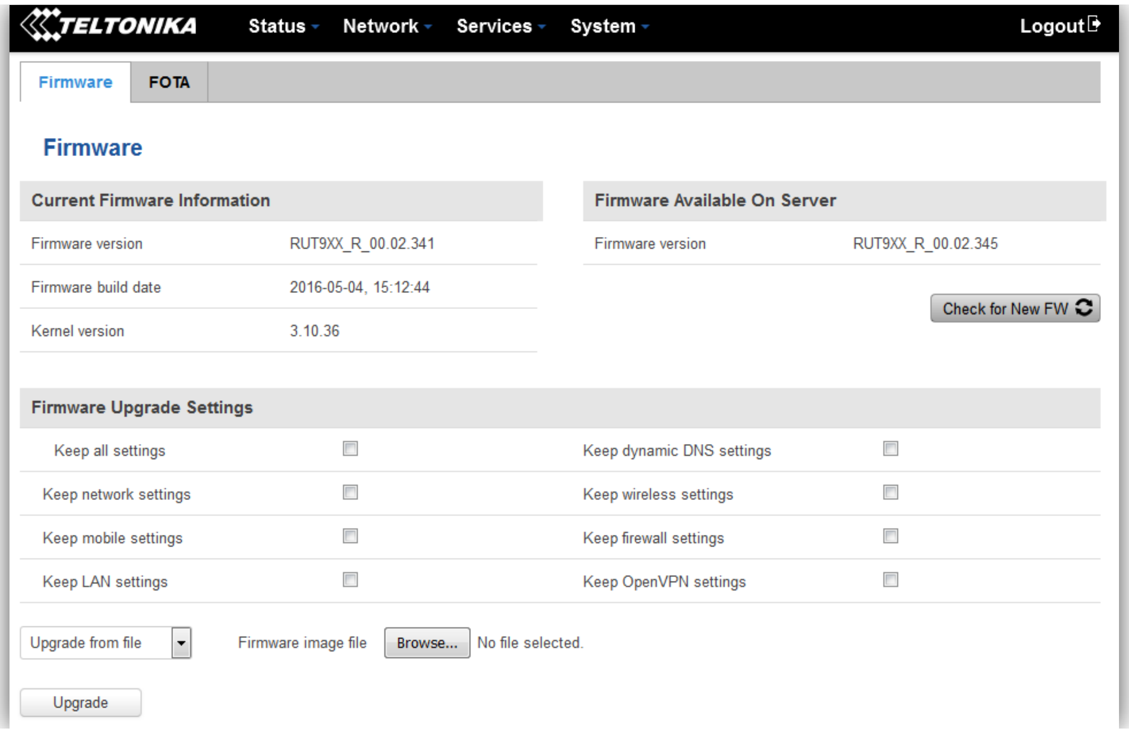
Load Restore Point

Restore Point

File: No file selected.

10.6 Firmware

10.6.1 Firmware



Firmware

Current Firmware Information	
Firmware version	RUT9XX_R_00.02.341
Firmware build date	2016-05-04, 15:12:44
Kernel version	3.10.36

Firmware Available On Server	
Firmware version	RUT9XX_R_00.02.345

Firmware Upgrade Settings

Keep all settings	□	Keep dynamic DNS settings	□
Keep network settings	□	Keep wireless settings	□
Keep mobile settings	□	Keep firewall settings	□
Keep LAN settings	□	Keep OpenVPN settings	□

Upgrade from file — Firmware image file: No file selected.

Keep all settings – if the check box is selected router will keep saved user configuration settings after firmware upgrade. When check box is not selected all router settings will be restored to factory defaults after firmware upgrade. When upgrading firmware, you can choose settings that you wish to keep after the upgrade. This function is useful when firmware is being upgraded via Internet (remotely) and you must not lose connection to the router afterwards.

FW image – router firmware upgrade file.

Warning: Never remove router power supply and do not press reset button during upgrade process! This would seriously damage your router and make it inaccessible. If you have any problems related to firmware upgrade you should always consult with local dealer.