

01.10 100001 10 07 01.000000 00000 000 00 0000001 00001 000000 000000 01 00000111 000000

USER MANUAL RUT955 LTE Router

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Attention



Before using the device we strongly recommend reading this user manual first.



Do not rip open the device. Do not touch the device if the device block is broken.



All wireless devices for data transferring may be susceptible to interference, which could affect performance.



The device is not water-resistant. Keep it dry.



Device is powered by low voltage +9V DC power adaptor.

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SAFETY INFORMATION

In this document you will be introduced on how to use a router safely. We suggest you to adhere to the following recommendations in order to avoid personal injuries and or property damage.

You have to be familiar with the safety requirements before using the device!

To avoid burning and voltage caused traumas, of the personnel working with the device, please follow these safety requirements.



The device is intended for supply from a Limited Power Source (LPS) that power consumption should not exceed 15VA and current rating of overcurrent protective device should not exceed 2A.



The highest transient overvoltage in the output (secondary circuit) of used PSU shall not exceed 36V peak.



The device can be used with the Personal Computer (first safety class) or Notebook (second safety class). Associated equipment: PSU (power supply unit) (LPS) and personal computer (PC) shall comply with the requirements of standard EN 60950-1.



Do not mount or service the device during a thunderstorm.



To avoid mechanical damages to the device it is recommended to transport it packed in a damage-proof pack.

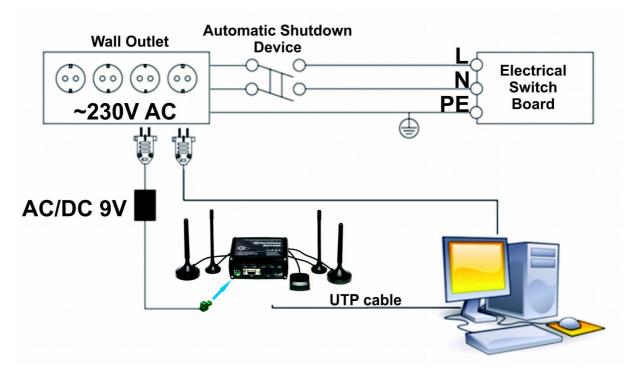
Protection in primary circuits of associated PC and PSU (LPS) against short circuits and earth faults of associated PC shall be provided as part of the building installation.

To avoid mechanical damages to the device it is recommended to transport it packed in a damage-proof pack. While using the device, it should be placed so, that its indicating LEDs would be visible as they inform in which working mode the device is and if it has any working problems.

Protection against overcurrent, short circuiting and earth faults should be provided as a part of the building installation.

Signal level of the device depends on the environment in which it is working. In case the device starts working insufficiently, please refer to qualified personnel in order to repair this product. We recommend forwarding it to a repair center or the manufacturer. There are no exchangeable parts inside the device.

Device connection



1 Introduction

Thank you for purchasing a RUT955 LTE router!

RUT955 is part of the RUT9xx series of compact mobile routers with high speed wireless and Ethernet connections.

This router is ideal for people who'd like to share their internet on the go, as it is not restricted by a cumbersome cable connection. Unrestricted, but not forgotten: the router still supports internet distribution via a broadband cable, simply plug it in to the wan port, set the router to a correct mode and you are ready to browse.

2 Specifications

2.1 Ethernet

- IEEE 802.3, IEEE 802.3u standards
- 3 x LAN 10/100Mbps Ethernet ports
- 1 x WAN 10/100Mbps Ethernet port
- Supports Auto MDI/MDIX

2.2 Wi-Fi

- IEEE 802.11b/g/n WiFi standards
- 2x2 MIMO
- AP and STA modes
- 64/128-bit WEP, WPA, WPA2, WPA&WPA2 encryption methods
- 2.401 2.495GHz Wi-Fi frequency range
- 20dBm max WiFi TX power
- SSID stealth mode and access control based on MAC address

2.3 Hardware

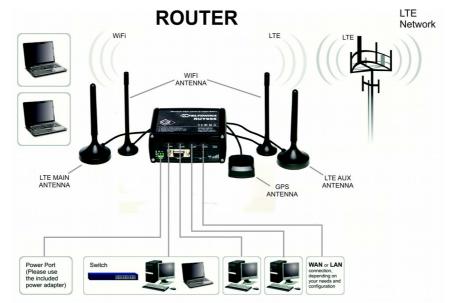
- High performance 560 MHz CPU with 128 Mbytes of DDR2 memory
- 2 pin industrial DC power socket
- Attachable DIN rail adapter
- 4 pin industrial socket for 2/4 wire RS485
- DB9 socket for full-featured RS232
- USB A socket for external devices4 pin industrial socket for 2/4 wire RS485
- Reset/restore to default button
- 2 x SMA for LTE , 2 x RP-SMA for WiFi antenna connectors
- 4 x Ethernet LEDs, 1 x Power LED
- 1 x bi-color connection status LED, 5 x connection strength LEDs
- 10 pin industrial socket for inputs/outputs:
 - 0 3 V digital input
 - 0 30 V digital galvanically isolated input
 - 0 24 V analog input 30 V, 250 mA digital open collector output
 - 40 V, 4 A SPST relay output

2.4 Electrical, Mechanical & Environmental

- Dimensions (H x W x D) 80mm x 106mm x 46mm
- Weight

- 250g
- 100 240 VAC -> 9 VDC wall adapter • Power supply
- Input voltage range
- 9-30VDC
- < 7W • Power consumption
- Operating temperature -40° to 75° C
- Storage temperature -45° to 80° C
- Operating humidity
- 10% to 90% Non-condensing
- Storage humidity
- 5% to 95% Non-condensing

2.5 Applications



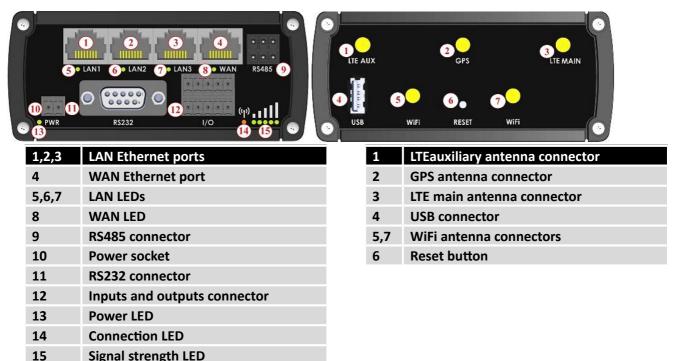
3 Setting up your router

3.1 Installation

After you unpack the box, follow the steps, documented below, in order to properly connect the device. For better Wi-Fi performance, put the device in clearly visible spot, as obstacles such as walls and door hinder the signal.

- 1. First assemble your router by attaching the necessary antennas and inserting the SIM card.
- 2. To power up your router, please use the power adapter included in the box. (IMPORTANT: Using a different power adapter can damage and void the warranty for this product.).
- 3. If you have a wired broadband connection you will also have to connect it to the WAN port of the router.

3.1.1 Front Panel and Back Panel



3.1.2 Connection status LED indication

Constant blinking (~ 2Hz) – router is turning on. LED turned off – it has no 4G data connection LED turned on – it has 4G data connection.

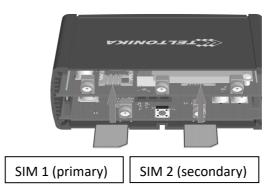
Explanation of connection status LED indication:

- 1. Green and red blinking alternatively ever 500 ms: no SIM or bad PIN;
- 2. Green, red and yellow blinking alternatively every 500 ms: connecting to GSM;
- 3. Red blinking every 1 sec: connected 2G, but no data session established;
- 4. Yellow blinking every 1 sec: connected 3G, no data session established;
- 5. Green blinking every 1 sec: connected 4G, no data session established;

Red lit and blinking rapidly while data is being transferred: connected 2G with data session; Yellow lit and blinking rapidly while data is being transferred: connected 3G with data session; Green lit and blinking rapidly while data is being transferred: connected 4G with data session;

3.1.3 Hardware installation

1. Remove back panel and insert SIM card which was given by your ISP (Internet Service Provider). Correct SIM card orientation is shown in the picture.



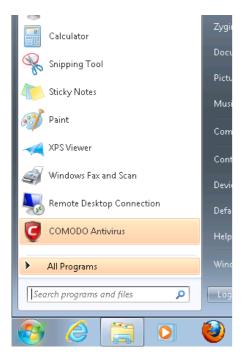
- 2. Attach LTE main and Wi-Fi antennas.
- 3. Connect the power adapter to the socket on the front panel of the device. Then plug the other end of the power adapter into a wall outlet or power strip.
- 4. Connect to the device wirelessly (SSID: **Teltonika_Router**) or use Ethernet cable and plug it into any LAN Ethernet port.

3.2 Logging in

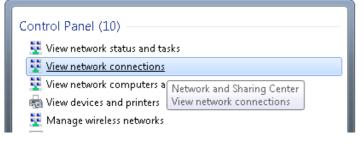
After you're complete with the setting up as described in the section above, you are ready to start logging into your router and start configuring it. This example shows how to connect on Windows 7. On windows Vista: click Start -> Control Panel -> Network and Sharing Centre -> Manage network Connections -> (Go to step 4). On Windows XP: Click Start -> Settings -> Network Connections -> (see step 4). You wont's see "Internet protocol version 4(TCP/IPv4)", instead you'll have to select "TCP/IP Settings" and click options -> (Go to step 6)

We first must set up our network card so that it could properly communicate with the router.

1. Press the start button



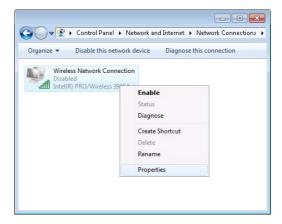
3. Click "View network connections"



2. Type in "network connections", wait for the results to pop up.



4. Then right click on your wireless device that you use to connect to other access points (It is the one with the name "Wireless Network Connection" and has signal bars on its icon).



5. Select Internet Protocol Version 4 (TCP/IPv4) and then click Properties

	automatically" and "Obtain DNS server address
University Wireless Network Connection Properties	automatically", the router should lease you an IP and you
Networking Sharing	should be ready to login.
Connect using:	should be ready to login.
Intel(R) PR0/Wireless 3945ABG Network Connection	Internet Protocol Version 4 (TCP/IPv4) Properties
Configure	
Inis connection uses the following items: If the connection uses the following items: If the connection uses the following items:	General Alternate Configuration
Client for Microsoft Networks QoS Packet Scheduler Plant Sharing for Microsoft Networks Action Content Scheduler Action Content Sch	You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator
Internet Protocol Version 6 (TCP/IPv6) Internet Protocol Version 4 (TCP/IPv4)	for the appropriate IP settings.
Link-Layer Topology Discovery Mapper I/0 Driver Link-Layer Topology Discovery Responder	Obtain an IP address automatically
Install	O Use the following IP address:
Description Transmission Control Protocol/Internet Protocol. The default	IP address:
wide area network protocol that provides communication across diverse interconnected networks.	Sybnet mask:
	Default gateway:
OK Cancel	Optain DNS server address automatically
	Use the following DNS server addresses:
	Preferred DNS server:
	Alternate DNS server:
	Validate settings upon exit Adyanced
	OK Cancel

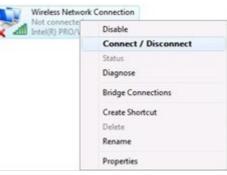
6. By default the router is going to have DHCP enabled,

which means that if you select "Obtain an IP address

7. If you choose to configure manually here's what you do:

First select an IP address. Due to the stock settings that your router has arrived in you can only enter an IP in the form of 192.168.1.XXX, where XXX is a number in the range of 2-254 (192.168.1.2, 192.168.1.254, 192.168.1.155 and so on... are valid; 192.168.1.0, 192.168.1.1, 192.168.1.255, 192.168.1.699 and so on... are not). Next we enter the subnet mask: this has to be "255.255.255.0". Then we enter the default gateway: this has to be "192.168.1.1". Finally we enter primary and secondary DNS server IPs. One will suffice, though it is good to have a secondary one as well as it will act as a backup if the first should fail. The DNS can be your routers IP (192.168.1.1), but it can also be some external DNS server (like the one Google provides: 8.8.8.8).

or the appropriate IP settings.	d to ask your network administrator
) Obtain an IP address automa	tically
Ose the following IP address:	
<u>I</u> P address:	192.168.1.100
S <u>u</u> bnet mask:	255.255.255.0
Default gateway:	192.168.1.1
Obtain DNS server address at	utomatically
 Use the following DNS server 	addresses:
Preferred DNS server:	192.168.1.1
	8.8.8.8
<u>A</u> lternate DNS server:	0.0.0



Right click on the Wireless network icon and select **Connect / Disconnect**. A list should pop up with all available wireless networks. Select "Teltonika" and click **connect**. Then we launch our favorite browser and enter the routers IP into the address field:

-	
4	192.168.1.1
\sim	

Press enter. If there are no problems you should be greeted with a login screen such as this:

Autho	orization Required
Please enter	your username and password.
Username	admin
Password	
	Login

Enter the default password, which is "admin01" into the "Password" field and then either click Login with your mouse or press the Enter key. You have now successfully logged into the RUT955!

From here on out you can configure almost any aspect of your router.

4 Operation Modes

The RUT9xx series router supports various operation modes. It can be connected to the internet (WAN) via mobile, standard Ethernet cable or via a wireless network. When connecting to the internet, you may also backup your main WAN connection with one or two backup connections. Any interface can act like backup if configured so. At first router uses its main WAN connection, if it is lost then router tries to connect via backup with higher priority and if that fails too, router tries the second backup option.

WAN	Main WAN	Backup WAN	LAN
Mobile	V	V	x
Ethernet	V	V	V
Wi-Fi	V	V	V

In later sections it will be explained, in detail, how to configure your router to work in a desired mode.

5 Powering Options

The RUT9xx router can be powered from power socket or over Ethernet port. Depending on your network architecture you can use LAN 1 port to power the device.



RUT9xx can be powered from power socket and over Ethernet simultaneously. Power socket has higher priority meaning that the device will draw power from power socket as long as it is available.

When RUT9xx is switching from one power source to the other it loses power for a fraction of the second and may reboot. The device will function correctly after the reboot.



Though the device can be powered over Ethernet port it is not compliant with IEEE 802.3af-2003 standard. Powering RUT9xx from IEEE 802.3af-2003 power supply **will damage the device** as it is not rated for input voltages of PoE standard.

5.1 Powering the device from higher voltage

If you decide not to use our standard 9 VDC wall adapters and want to power the device from higher voltage (15 – 30 VDC) please make sure that you choose power supply of high quality. Some power supplies can produce voltage peaks significantly higher than the declared output voltage, especially during connecting and disconnecting them.

While the device is designed to accept input voltage of up to 30 VDC peaks from high voltage power supplies can harm the device. If you want to use high voltage power supplies it is recommended to also use additional safety equipment to suppress voltage peaks from power supply.

6 Status

The status section contains various information, like current IP addresses of various network interfaces; the state of the routers memory; firmware version; DHCP leases; associated wireless stations; graphs indicating load, traffic, etc.; and much more.

6.1 Overview

O Overview section contains various information summaries.

System Mobile Mobile Image: Searching; N/A; 3G (WCDMA) Router uptime 0d 4h 54m 33s (since 2016-10-27, 06:46:48) Data connection Disconnected Local device time 2016-10-27, 11:41:21 State Searching; N/A; 3G (WCDMA) Memory usage RAM: 41% used FLASH: 5% used SiM card slot in use SIM 1 (not inserted) Firmware version Used: 51MB, Free: 72MB, Total: 123 MB Bytes received/sent * 0 B / 408 B Wireless Image: Simple and the formula and the formu	
Router uptime Od 4h 54m 33s (since 2016-10-27, 06:46:48) Local device time 2016-10-27, 11:41:21 Memory usage RAM: 41% used FLASH: 5% used SIM card slot in use SIM 1 (not inserted) Bytes received/sent * 0 B / 408 B Wireless SID Teltonika_Router (AP) IP address N *	
Local device time 2016-10-27, 11:41:21 Memory usage RAM: 41% used Firmware version Used: 51MB, Free: 72MB, Total: 123 MB	k:
Memory usage RAM: 41% used FLASH: 5% used SIM card slot in use SIM 1 (not inserted) Firmware version Used: 51MB, Free: 72MB, Total: 123 MB Bytes received/sent * 0 B / 408 B Wireless Image: Comparison of the	1
Firmware version Used: 51MB, Free: 72MB, Total: 123 MB Bytes received/sent * 0 B / 408 B Wireless Image: Control of the second sec	148 148
Wireless ON WAN Wan Wired SSID Teltonika_Router (AP) IP address N/A	2ª
SSID ® Teltonika_Router (AP) IP address N/A	2.4
SSID ® Teltonika_Router (AP) IP address N/A	
Mode 1- AP; 7 CH (2.442 GHz) Backup WAN status Backup link is disabled	
Local Network	
IP / netmask 192.168.2.1 / 255.255.255.0 LAN SSH; HTTP; HTTPS	
Clients connected 0 WAN No access	
Recent System Events	
1 2016-10-27 11:32:23 - CONFIG: Network configuration has been c 1 2016-10-26 12:19:26 - Mobile data connected: N/A	
2 2016-10-27 10:13:16 - Web UI: Authentication was succesful fro 2 2016-10-27 06:36:04 - Joined 3G WCDMA	
3 2016-10-27 08:45:49 - SSH: Password auth succeeded from LAN 19 3 2016-10-27 06:28:30 - Joined 3G WCDMA	
4 2016-10-27 08:45:05 - SSH: Password auth succeeded from LAN 19 4 2016-10-27 06:05:45 - Joined 3G WCDMA	

* Your carrier's data usage accounting may differ. Teltonika is not liable should any accounting discrepancies occur.

6.2 System Information

The System Information tab contains data that pertains to the routers operating system.

K TELTONIKA Status N	letwork Services System Logout
System Information	
System	
Router name	RUT955
Host name	Teltonika-RUT955.com
Router model	Teltonika RUT955 LTE
Firmware version	RUT9XX_R_00.02.376
Kernel version	3.10.36
Local device time	2016-05-24, 11:01:14
Uptime	0d 0h 42m 11s (since 2016-05-24, 10:19:03)
Load average	1 min: 99%; 5 mins: 63%; 15 mins: 35%
Temperature	34.9° C
Memory	
Free	84868 kB / 126556 kB (67%)
Cached	14740 kB / 126556 kB (11%)
Buffered	5476 kB / 126556 kB (4%)

System explanation:

	system explanation:							
	Field Name	Sample value	Explanation					
1.	Router Name	RUT955	Name of the router (hostname of the routers system). Can be changed in System -> Administration.					
2.	Host name	Teltonika-RUT955.com	Indicates how router will be seen by other devices on the network. Can be changed in System -> Administration.					
3.	Router Model	Teltonika RUT955 LTE	Routers model.					
4.	Firmware Version	RUT9XX_R_00.02.376	Shows the version of the firmware that is currently loaded in the router. Newer versions might become available as new features are added. Use this field to decide whether you need a firmware upgrade or not.					
5.	Kernel Version	3.10.36	The version of the Linux kernel that is currently running on the router.					
6.	Local Time	2016-05-24, 11:02:39	Shows the current system time. Might differ from your computer, because the router synchronizes it's time with an NTP server.Format [year-month-day, hours:minutes:seconds].					
7.	Uptime	0d 0h 44m 1s (since 2016-05-24, 10:19:03)	Indicates how long it has been since the router booted up. Reboots will reset this timer to 0.Format [day's hours minutes seconds (since year-month-day, hours: minutes: seconds)].					
8.	Load Average	1 min: 88%; 5 mins: 73%; 15 mins: 42%	Indicates how busy the router is. Let's examine some sample output: "1 min: 88%, 5 mins: 73%, 15 mins: 42%". The first number mean past minute and second number means that in the past minute there have been, on average, 88% processes running or waiting for a resource.					
9.	Temperature	34.9° C	Device's temperature					

Memory explanation:

Field Name Sample Value

1.	Free	84584 kB /126556 kB (66%)	The amount of memory that is completely free. Should this rapidly decrease or get close to 0, it would indicate that the router is running out of memory, which could cause crashes and unexpected reboots.
2.	Cached	14784 kB /126556 kB (11%)	The size of the area of memory that is dedicated to storing frequently accessed data.
3.	Buffered	5504 kB / 126556 kB (4%)	The size of the area in which data is temporarily stored before moving it to another location.

6.3 Network Information

6.3.1.1 Mobile

Display information about mobile modem connections. Mobile Information

Mobile 🛲		SIM card slot in use: <i>SIM 1</i>
Data connection state	Connected	
IMEI	860461024350889	
IMSI	246012101426458	
Sim card state	Ready	
Signal strength	-88 dBm	
Cell ID	2C86315	
RSRP	-119 dBm	
RSRQ	-11 dBm	
SINR	-1.2 dBm	
Operator	OMNITEL LT	
Operator state	Registered (home)	
Connection type	4G (LTE)	
Bytes received *	39.9 KB (40832 bytes)	
Bytes sent *	27.0 KB (27674 bytes)	

Mobile information:

	Field Name	Sample Value	Explanation
1.	Data connection	Connected	Mobile data connection status
	state		
2.	IMEI	860461024350889	Modem's IMEI (International Mobile Equipment Identity) number
3.	IMSI	246012101426458	IMSI (International Mobile Subscriber Identity) is used to identify
			the user in a cellular network
4.	SIM card state	Ready	Indicates the SIM card's state, e.g. PIN required, Not inserted, etc.
5.	Signal strength	-88 dBm	Received Signal Strength Indicator (RSSI). Signal's strength
			measured in dBm
6.	Cell ID	2C86315	ID of operator cell that device is currently connected to
7.	RSRP	-119 dBm	Indicates the Reference Signal Received Power
8.	RSRQ	-11 dBm	Indicates the Reference Signal Received Quality
9.	SINR	-1.2 dBm	Indicates the Signal to Interference plus Noise Ratio
10.	Operator	OMNITEL LT	Operator's name of the connected GSM network
11.	Operator state	Registered (home)	GSM network's status

12.	Connection type	4G (LTE)	Indicates the GSM network's access technology
13.	Bytes received	39.9 KB (40832 bytes)	How many bytes were received via mobile data connection
14.	Bytes sent	27.0 KB (27674 bytes)	How many bytes were sent via mobile data connection

6.3.1.2 WAN

Display information about WAN connection.

	ΓΟΝΙΚ	А	Status -	Network -	Services	System			Logou
Mobile	WAN	LAN	Wireless	OpenVPN	VRRP	Topology	Access		
WAN I	nforma	ation							
WAN									
Interface				Mobile					
Туре				NDIS					
IP address				10.22.20.	146				
Netmask				255.255.2	55.252				
Gateway				10.22.20.	145				
DNS 1				213.226.1	31.131				
DNS 2				193.219.8	8.36				
Connected				0h 56m 4	s				
Ports									
					• 1410	2 DO 1000	€ 		
Backup W	/AN Statu	s							
					WAN backu	p link is disabled			Refresh

WAN information:

VVAIV	injormation.		
	Field Name	Sample Value	Explanation
1.	Interface	Mobile	Specifies through what medium the router is connecting to the internet. This can either be Wired, Mobile or Wi-Fi.
2.	Туре	NDIS	Specifies the type of connection. This can either be static or DHCP.
3.	IP address	10.22.20.146	The IP address that the routers uses to connect the internet.
5.	Netmask*	255.255.255.252	Specifies a mask used to define how large the WAN network is
6.	Gateway*	10.22.20.145	Indicates the default gateway, an address where traffic destined for the internet is routed to.
7.	DNS*	213.226.131.131 / 193.219.88.36	Domain name server(s).
8.	Connected*	0h 56m 4s	How long the connection has been successfully maintained.

*-These fields show up on other connection modes.

**-Exclusive to other Modes with DHCP.

6.3.1.3 LAN

Display information about LAN connections.

Mobile WAN LAN	Wireless OpenVPN	VRRP Topology	Access					
LAN Information								
LAN Information								
Name	IP address	Netmask	Ethernet MAC address	Connected for				
Lan	192.168.99.218	255.255.255.0	00:1E:42:00:00:00	1h 53m 56s				
DHCP Leases								
Hostname	IP address	LAN name	MAC address	Lease time remaining				
?	192.168.99.120	Lan	D4:85:64:65:2B:D4	10h 11m 13s				
Ports								

LAI	N information:		
	Field Name	Sample Value	Explanation
1.	Name	Lan	Lan instance name
2.	IP address	192.168.99.218	Address that the router uses on the LAN network.
3.	Netmask	255.255.255.0	A mask used to define how large the LAN network is
4.	Ethernet LAN	00:1E:42:00:00:00	MAC (Media Access Control) address used for communication in a Ethernet
	MAC address		LAN (Local Area Network)
5.	Connected for	1h 53m 56s	How long LAN has been successfully maintained.

DHCP Leases

.

If you have enabled a DHCP server this field will show how many devices have received an IP address and what those IP addresses are.

	Field Name	Sample Value	Explanation
1.	Hostname	?	DHCP client's hostname
2.	IP address	192.168.99.120	Each lease declaration includes a single IP address that has been leased to the client
3.	Lan name	Lan	Lan instance name
4.	MAC address	D4:85:64:65:2B:D4	The MAC (Media Access Control) address of the network interface on which the lease will be used. MAC is specified as a series of hexadecimal octets separated by colons
5.	Lease time remaining	10h 11m 13s	Remaining lease time for addresses handed out to clients

6.3.1.4 Wireless

Wireless can work in two modes, Access Point (AP) or Station (STA). AP is when the wireless radio is used to create an Access Point that other devices can connect to. STA is when the radio is used to connect to an Access Point via WAN.

6.3.1.4.1 Station

Display information about wireless connection (Station mode).

Mobile	WAN	LAN	Wireless	OpenVPN	VRRP	Topology	Access		
Wirele	Wireless Information								
Wireless Information									
Channel				1 (2.41 GHz	Z)				
Country cod	le			00 (World)					
Wireless	Wireless Status								
SSID			Mode		Encryption	Wirel	ess MAC	Signal quality	Bitrate
Teltonika_F	Router		Station (STA	0	no encryptio	n 00:1E	:42:10:80:22	61%	43.3 MBit/s
Teltonika_F	Router_Test	t	Access Poir	nt (AP)	no encryptio	n 02:1E	:42:00:11:03	79%	1.0 MBit/s
Associate	ed Statio	ns							
MAC Addre	SS	De	evice Name	Signal	RX Ra	te		TX Rate	
00:1E:42:10):80:22	?		-67 dBm	1.0 Mb	it/s, MCS 0, 201	IHz	43.3 Mbit/s, MCS 10,	20MHz
									Refresh C

Client mode information

	Field Name	Sample Value	Explanation					
1.	Channel	1 (2.41 GHz)	The channel that the AP, to which the routers is connected to, uses. Your wireless radio is forced to work in this channel in order to maintain the connection.					
2.	Country	00	Country code.					
3.	SSID	Teltonika_Router	The SSID that the AP, to which the routers is connected to, uses.					
4.	Mode	Station (STA)	Connection mode – Client indicates that the router is a client to some local AP.					
5.	Encryption	WPA2 PSK (CCMP)	The AP, to which the router is connected to, dictates the type of encryption.					
6.	Wireless MAC	00:1E:42:10:80:22	The MAC address of the access points radio.					
7.	Signal Quality	61%	The quality between routers radio and some other device that is connecting to the router. Will show 0% if no devices are trying to connect or are currently maintaining a connection.					
8.	Bit rate	43.3 MBit/s	The physical maximum possible throughput that the routers radio can handle. Keep in mind that this value is cumulative - The bitrate will be shared between the router and other possible devices that connectto the local AP.					

6.3.1.4.2 Access Point

Displays information about wireless connection (Access Point mode).

Mobile WAN	LAN Wireless	OpenVPN	VRRP	Topology	Access			
Wireless Information								
Wireless Information								
Channel		11 (2.46 GH	Z)					
Country code		00 (World)						
Wireless Status								
SSID	Mode		Encryption	Wirele	ess MAC	Signal quality	Bit rate	
Teltonika_Router_Test	Access Poin	t (AP)	no encryption	00:1E	42:00:11:03	80%	54.0 MBit/s	
Associated Stations	;							
MAC Address	Device Name		Signal	RX Rate		TX Rate		
FC:C2:DE:91:36:A6	android-9aed2b207	7a54c74	-54 dBm	24.0 Mbit/s	s, MCS 0, 20MH	Hz 54.0 Mbit/s, M	ICS 0, 20MHz	
							Refresh C	

Wireless AP information

	Field Name	Sample Value	Explanation					
1.	Channel	11 (2.46 GHz)	The channel which is used to broadcast the SSID and to establish new connections to devices.					
2.	Country code	00(World)	Country code.					
3.	SSID	Teltonika_Router_Test	The SSID that is being broadcast. Other devices will see this and will be able to use to connect to your wireless network.					
4.	Mode	Access Point (AP)	Connection mode – Master indicates that you router is an access point.					
5.	Encryption	No Encryption	The type of encryption that the router will use to authenticate, establish and maintain a connection.					
6.	Wireless MAC	00:1E:42:00:00:03	MAC address of your wireless radio.					
7.	Signal Quality	80%	The quality between routers radio and some other device that is connecting to the router. Will show 0% if no devices are trying to connect or are currently maintaining a connection.					
8.	Bit rate	54.0 MBit/s	The bitrate will be shared between all devices that connect to the routers wireless network.					

Additional note: MBit/s indicates the bits not bytes. To get the throughput in bytes divide the bit value by 8, for e.g. 54MBits/s would be 6.75MB/s (Mega Bytes per second).

6.3.1.5 Associated Stations

Outputs a list of all devices and their MAC addresses that are maintain a connection with your router right now.

This can either be the information of the Access Point that the router is connecting to in STA mode or a list of all devices that are connecting to the router in AP mode:

	Field Name	Sample Value	Explanation
1.	MAC Address	FC:C2:DE:91:36:A6	Associated station's MAC (Media Access Control) address
2.	Device Name	Android- 9aed2b2077a54c74	DHCP client's hostname
3.	Signal	-54dBm	Received Signal Strength Indicator (RSSI). Signal's strength measured

			in dBm
4.	RX Rate	24.0Mbit/s, MCS 0, 20MHz	The rate at which packets are received from associated station
5.	TX Rate	54.0Mbit/s, MCS 0, 20MHz	The rate at which packets are sent to associated station

6.3.1.6 OpenVPN Client

Display OpenVPN connection information on client side.

Mobile	WAN	LAN	Wireless	OpenVPN	VRRP	Topology	Access				
Open	OpenVPN Information										
Client_C	lient										
OpenVPN	I										
Enabled				Yes							
Status				Connected							
Туре				Client							
IP				10.0.0.2							
Mask				255.255.255	5.255						
Time				0h 0m 13s							

	Field Name	Sample Value	Explanation
1.	Enabled	Yes/No	OpenVPN status
2.	Status	Connected	Connection status
3.	Туре	Client	A type of OpenVPN instance that has been created
4.	IP	10.0.0.2	Remote virtual network's IP address
5.	Mask	255.255.255.255	Remote virtual network's subnet mask
6.	Time	0h 0m 13s	For how long the connection has been established

6.3.1.7 OpenVPN Server

Display OpenVPN connection information on server side.

Mobile	WAN	LAN	Wireless	OpenVPN	VRRP	Topology	Access		
	OpenVPN Information Server_Server								
OpenVPN									
Enabled				Yes					
Status				Connected					
Туре				Server					
IP				10.0.0.1					
Mask				255.255.25	5.255				
Time				0h 6m 31s					
Clients In	formation								
Common M	lame			Real Addres	ss			Virtual Address	Connection Since
Test001				212.59.13.2	26:52638			10.0.0.6	Thu May 05 2016 07:46:29 GMT+0300 (FLE Standard Time)

	Field Name	Sample Value	Explanation
1.	Enabled	Yes/No	OpenVPN status
2.	Status	Connected	Connection status

2.	Туре	Server	A type of OpenVPN instance that has been created
3.	IP	10.0.0.1	Remote virtual network's IP address
4.	Mask	255.255.255.255	Remote virtual network's subnet mask
5.	Time	0h 3m 24s	For how long the connection has been established

6.3.1.8 Clients information

It will show information, when router is configured as OpenVPN TLS server.

	Field Name	Sample Value	Explanation
1.	Common Name	Test001	Client connection
2.	Real Address	212.59.13.225:52638	Client's IP address and port number
3.	Virtual Address	10.0.0.6	Virtual address which has been given to a client
4.	Connection Since	Thu May 05 2016 07:46:29 GMT + 0300 (FLE Standard Time)	Since when connection has been established

6.3.1.9 VRRP

VRRP (Virtual Router Redundancy Protocol) for LAN

Mobile	WAN	LAN	Wireless	OpenVPN	VRRP	Topology	Access	
VRRP Information								
VRRP LA	N Status							
Status				Enabled				
Virtual ip				192.168.1.2	53			
Priority				100				
Router				Master				
								Refresh

	Field Name	Sample Value	Explanation
1.	Status	Enabled	VRRP status
2.	Virtual IP	192.168.1.253	Virtual IP address(- es) for LAN's VRRP (Virtual Router Redundancy Protocol) cluster
3.	Priority	100	Router with highest priority value on the same VRRP (Virtual Router

			Redundancy Protocol) cluster will act as a master, range [1 - 255]
4.	Router**	Master	Connection mode – Master

**-Exclusive to other Modes with Slave.

6.3.1.10 Topology

Network scanner allows you to quickly retrieve information about network devices. When router is configured to use Mobile as WAN and Connection type is selected *"PPP"*, then possible to scan only the LAN side.



6.3.1.11 Access

Display information about local and remote active connections status.

Mobile	WAN	LAN	Wireless	OpenVPN	VRRP	Topology	Access		
Acces	s Status	6							
Access in	formation	La	st Connections	5					
Local Acc	ess								
Туре		St	atus		Port	Active C	onnections		
SSH		Er	abled		22	0 (0.00	3)		
HTTP		Er	abled		80	1 (9.26	<b)< td=""><td></td><td></td></b)<>		
HTTPS		Er	abled		443	0 (0.00	3)		
Remote #	Access								
Туре		Sta	utus		Port	Active	Connections		
SSH		Dis	abled		22	0 (0.00	B)		
HTTP		Dis	abled		80	0 (0.00	B)		
HTTPS		En	abled		443	6 (558	12 KB)		
									Refresh

	Field Name	Sample Value	Explanation
1.	Туре	SSH; HTTP; HTTPS	Type of connection protocol
2.	Status	Disabled/Enabled	Connection status
3.	Port	22; 80; 443	Connection port used
4.	Active	0(0.00B);1(9.26 KB);	Count of active connections and amount of data transmitted in KB

Connections	6(558.12 KB)
-------------	--------------

**-Exclusive to other Modes with Slave.

6.3.1.11.1 Last Connections

Displays information about local and remote last 3 connections status

Acces	Access Status					
Access Inf	formation	Last Connections				
Last Local	Connectior	15				
Туре	Date		IP	Authentications Status		
SSH	2016-03	3-03, 13:40:59 3-03, 13:47:44 3-09, 08:59:41	192.168.2.10 192.168.2.10 192.168.1.214	Succeeded Succeeded Succeeded		
HTTP	2016-03-09, 08:30:04 2016-03-09, 13:52:08 2016-03-09, 08:26:16		192.168.1.214 192.168.1.214 192.168.1.214	Succeeded Succeeded Succeeded		
HTTPS	There a	re no records yet.				
Last Remo	te Connecti	ons				
Туре	Date		IP	Authentications Status		
SSH	2016-03	-07, 07:57:51 -07, 08:41:46 -07, 08:41:55	212.59.13.226 119.167.153.187 119.167.153.187	Succeeded Failed Failed		
HTTP	2016-03	-07, 07:56:06 -07, 07:57:15 -09, 14:13:05	10.8.32.1 212.59.13.226 10.8.32.1	Succeeded Succeeded Succeeded		
HTTPS	There a	re no records yet.				

	Field Name	Sample Value	Explanation
1.	Туре	SSH; HTTP; HTTPS	Type of connection protocol
2.	Date	2016-03-03, 13:40:59	Date and time of connection
3.	IP	192.168.2.10	IP address from which the connection was made
4.	Authentications Status	Failed; Succeed	Status of authentication attempt

6.4 Device information

The page displays factory information that was written into the device during manufacturing process.

Device Information

Device	
Serial number	15981598
Product code	RUT95517V000
Batch number	1010
Hardware revision	0202
IMEI	860425471954719
IMSI	246022547254719
Ethernet LAN MAC address	00:1E:42:10:42:00
Ethernet WAN MAC address	00:1E:42:10:42:01
Wireless MAC address	00:1E:42:10:42:02
Modem	
Model	ME909u-521
FW version	12.631.07.01.00

	Field Name	Sample Value	Explanation
1.	Serial number	15981598	Serial number of the device
2.	Product code	RUT95517V000	Product code of the device
3.	Batch number	1010	Batch number used during device's manufacturing process
4.	Hardware revision	0202	Hardware revision of the device
5.	IMEI	860425471954819	Identification number of the internal modem
6.	IMSI	246022547254719	Subscriber identification number of the internal modem
6.	Ethernet LAN MAC	00:1E:42:10:42:00	MAC address of the Ethernet LAN ports
7.	Ethernet WAN MAC	00:1E:42:10:42:01	MAC address of the Ethernet WAN port
8.	Wireless MAC	00:1E:42:10:42:02	MAC address of the Wi-Fi interface
9.	Model	ME909-521	Router's modem model
10.	FW version	12.631.07.01.00	Router's modem firmware version

6.5 Services

The page displays usage of the available services.

Teltonika	Status - Netw	ork 🔹 Services 🔹	System -		Logout 🖻
Services					
Services Status					
VRRP LAN	Disabled	Restart	DDNS	Disabled	Restart
OpenVPN servers	Disabled	Restart	Site blocking	Disabled	Restart
OpenVPN clients	Disabled	Restart	Content blocker	Disabled	Restart
SNMP agent	Disabled	Restart	SMS utils rules	Enabled	Restart
SNMP trap	Disabled	Restart	Hotspot	Disabled	Restart
NTP client	Enabled	Restart	Hotspot logging	Disabled	Restart
IPsec	Disabled	Restart	GRE tunnel	Disabled	Restart
Ping reboot	Disabled	Restart	QoS	Disabled	Restart
Input/Output rules	Disabled	Restart	GPS	Disabled	Restart

1.1 Routes

The page displays ARP table and active IP routes of the device.

6.5.1 **ARP**

Show the routers active ARP table. An ARP table contains recently cached MAC addresses of every immediate device that was communicating with the router.

ARP				
IP Address	MAC Address	Interface		
10.0.207.217	02:50:F3:00:00:00	eth2		
192.168.99.17	00:25:22:D7:CA:A7	br-lan		
192.168.99.36	38:2C:4A:64:2D:E5	br-lan		
192.168.99.155	00:00:00:00:00:00	br-lan		

	Field Name	Sample Value	Explanation
1.	IP Address	192.168.99.17	Recently cashed IP addresses of every immediate device that was communicating with the router
2.	MAC Address	00:25:22:D7:CA:A7	Recently cached MAC addresses of every immediate device that was communicating with the router
3.	Interface	br-lan	Interface used for connection

6.5.2 Active IP-Routes

Show the routers routing table. The routing table indicates where a TCP/IP packet, with a specific IP address, should be directed to.

Active IP Routes					
Network	Target	IP Gateway	Metric		
ррр	0.0.0.0/0	10.0.207.217	0		
ррр	10.0.207.216/29	0.0.0.0	0		
ррр	10.0.207.217	0.0.0.0	0		
lan	192.168.99.0/24	0.0.0.0	0		

	Field Name	Sample Value	Explanation
1.	Network	ррр	Interface to be used to transmit TCP/IP packets through
2.	Target	192.168.99.0/24	Indicates where a TCP/IP packet, with a specific IP address, should be directed
3.	IP Gateway	0.0.0	Indicates through which gateway a TCP/IP packet should be directed
4.	Metric	0	Metric number indicating interface priority of usage

6.5.3 Active IPv6-Routes

Display active IPv6 routes for data packet transition.

Active IPv6-Routes						
Network	Target	IPv6-Gateway	Metric			
loopback	0:0:0:0:0:0:0:0/0	0:0:0:0:0:0:0:0/0	FFFFFFF			
loopback	0:0:0:0:0:0:0:0/0	0:0:0:0:0:0:0:0/0	FFFFFFF			
loopback	0:0:0:0:0:0:0:1	0:0:0:0:0:0:0:0/0	00000000			
ррр	FF00:0:0:0:0:0:0:0/8	0:0:0:0:0:0:0:0/0	00000100			
loopback	0:0:0:0:0:0:0:0/0	0:0:0:0:0:0:0/0	FFFFFFF			

	Field Name	Sample Value	Explanation
1.	Network	loopback	Network interface used
2.	Target	0:0:0:0:0:0:0:0/0	Indicates where a TCP/IP packet, with a specific IP address, should be directed
3.	IPv6-Gateway	0:0:0:0:0:0:0/0	Indicates through which gateway a TCP/IP packet should be directed
4.	Metric	FFFFFFF	Metric number indicating interface priority of usage

6.6 Graphs

Real-time graphs show how various statistical data changes over time.

6.6.1 Mobile Signal Strength

Displays mobile signal strength variation in time (measured in dBm)

Mobile Signal	3					
3m		2	m		1m	
-80 dBm						
-93 dBm						
-106 dBm						
						(3 minutes window, 1 second interva
Connection type: 3G (WCDMA)	Signal:	-72 dBm	Average: -72.0 c	Bm	Peak: -72 dBm
2G (GSM)		2G (GPRS)	2G (EDGE)	30	G (WCDM	A) 3G (HSDPA)

	Field Name	Sample Value	Explanation
1.	Connection type	3G (WCDMA)	Type of mobile connection used
2.	Signal	-72 dBm	Current signal strength value
3.	Average	-72.0 dBm	Average signal strength value
4.	Peak	-72 dBm	Peak signal strength value

6.6.2 Realtime Load

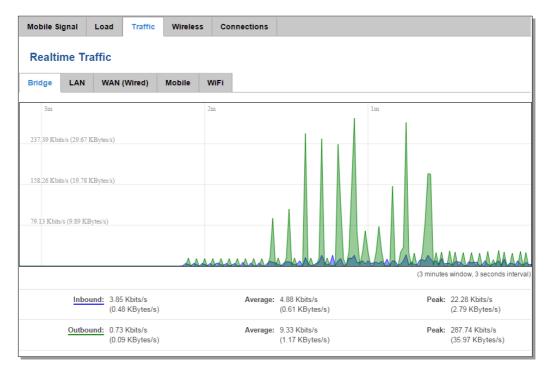
This tri-graph illustrates average CPU load values in real time. The graph consists out of three color coded graphs, each one corresponding to the average CPU load over 1 (red), 5 (orange) and 15 (yellow) most recent minutes.



	Field Name	Sample Value	Explanation
1.	1/5/15 Minutes Load	0.83	Time interval for load averaging, colour of the diagram
2.	Average	0.86	Average CPU load value over time interval (1/5/15 Minute)
3.	Peak	1.50	Peak CPU load value of the time interval

6.6.3 Realtime Traffic

This graph illustrates average system inbound and outbound traffic over the course of ~3 minutes; each new measurement is taken every 3 seconds. The graph consists out of two colors coded graphs (green graph shows the outbound traffic, blue graph shows inbound traffic). Although not graphed, the page also displays peak loads and average of inbound and outbound traffic.



	Field Name	Explanation
1.	Bridge	Cumulative graph, which encompasses wired Ethernet LAN and the wireless network.
2.	LAN	Graphs the total traffic that passes through both LAN network interfaces.
3.	WAN (Wired)	Graphs the amount of traffic which passed through the current active WAN connection.
4.	Mobile	Graphs the amount of traffic which passed through the mobile network connection.
5.	Wi-Fi	Shows the amount of traffic that has been sent and received through the wireless radio.

6.6.4 Realtime Wireless

Display the wireless radio signal, signal noise and theoretical maximum channel permeability. Average and peak signal levels are displayed.

Mobile Signal Load	Traffic Wireless Connections	
Realtime Wireless		
Teltonika_Router_AP	eltonika_Router	
3m -43 dBm -62 dBm -81 dBm	2m	1m
Signal: -46 dB	m (SNR 49 dBm) Average: -45 dB	(3 minutes window, 3 seconds interva Bm (SNR 49 dBm) Peak: -31 dBm (SNR 64 dBm)
Noise: -95 dB	m Average: -95 dE	Bm Peak: -95 dBm
3m 0 MBit/s 0 MBit/s 0 MBit/s	2m	1m
		(3 minutes window, 3 seconds inter
Phy Rate: 1 MBit	/s Average: 1 MBi	it/s Peak: 1 MBit/s

6.6.5 Realtime Connections

Displays currently active network connections with the information about network, protocol, source and destination addresses, transfer speed.

Mobile Signal Load Traffic Wireless Connections									
Realtime Connections									
This page gives yo	his page gives you an overview of currently active network connections.								
Active Connections									
3m			2m		lm				
1									
1									
0									
						(3 minutes window, 3 seconds interval)			
	UDP: 2		Average	: 2		Peak: 2			
	TCP: 1		Average	: 1		Peak: 2			
	Other: 1		Average	: 1		Peak: 1			
Network	Protocol	Source		Destination	Transf	er			
IPV4	UDP	192.168.99.36:1	137	192.168.99.255:137	253.35	KB (3326 Pkts.)			
IPV4	TCP	192.168.99.36:4	49942	192.168.99.129:80	110.60	KB (619 Pkts.)			
IPV4	UDP	192.168.99.105	:137	192.168.99.255:137	43.27 k	(B (568 Pkts.)			
IPV4	UNKNOWN	0.0.0.0:0		224.0.0.1:0	2.34 K	B (75 Pkts.)			

6.7 Mobile Traffic

Displays mobile connection data sent and received in KB of this day, week, Month.

ta Usage					
Death					
12 Both					
				10h	
					<u>Delete data</u>
usage * : 5.08	KB		<u>Sent*:</u> 2.13	KB <u>Rec</u>	eived *: 2.95 KB
		usage *: 5.08 KB			

By default mobile traffic usage logging is disabled. To use this functionality is needed to enable it.

TEL	TONIKA	Status - Netwo	rk- Se	Logout	
Today	Current Week	Current Month	Total	Configuration	
Mobil	e Traffic Usa	ge Logging			
		Enable 📝			
	Interval betv	veen records (sec) 60			
					Save

	Field Name	Sample Value	Explanation
1.	Enable	Enable/Disable	Make a functionality active/inactive
2.	Interval between records (sec)	60	The interval between logging records (minimum 60 sec)

6.8 Speed Test

Speed test is a tool for measuring your internet connection upload and download speeds. You can select servers for manual testing, or use auto test.

TELTONIKA	Status - Network -	Services - System -	Logout
Speed Test			
Begin auto test		40 00 Speed 20 Mets/s 100	Get servers list
Server	Penki Kontinentai Vilnius Lith	Server 1	Begin test
Ping	16 ms	Server 2	Begin test
Download speed	18.66 Mbits/s	Server 3	Begin test
Upload speed	4.63 Mbits/s	Server 4	Begin test
Test again			

6.9 Events Log

Event log displays such actions as: login, reboot, firmware flashing and reset.

6.9.1 All Events

Display all router events, their types and time of occurrence.

All Ev	vents System Eve	ents Netwo	ork Events	Events Reporting	Reporting Configuration	
Eve	ents Log					
Event	s Log					
Events	per page 10 🔻				:	Search
ID +	Date 🕈	Event type 🕈	Event 🕈			
3181S	2015-05-11, 16:11:47	Config	Firewall confi	guration has been change	d	
3180S	2015-05-11, 16:09:29	Port	Wired WAN (connection operational		
3179S	2015-05-11, 16:05:13	Port	Wired WAN (connection non operationa	I	
3178S	2015-05-11, 16:02:39	DHCP	Leased 192.1	.68.1.232 IP address for cl	ient FC:C2:DE:91:36:A6 - android-	9aed2b2077a54c74 in WiFi
3177S	2015-05-11, 16:02:39	Port	Wired WAN (connection operational		
3176S	2015-05-11, 16:02:38	DHCP	Leased 192.1	.68.1.232 IP address for cl	ient FC:C2:DE:91:36:A6 - android-	9aed2b2077a54c74 in WiFi
3175S	2015-05-11, 16:02:37	DHCP	Leased 192.1	.68.1.232 IP address for cl	ient FC:C2:DE:91:36:A6 - android-	9aed2b2077a54c74 in WiFi
3174S	2015-05-11, 16:02:36	DHCP	Leased 192.1	.68.1.232 IP address for cl	ient FC:C2:DE:91:36:A6 - android-	9aed2b2077a54c74 in WiFi
31735	2015-05-11, 16:02:36	DHCP	Leased 192.1	.68.1.232 IP address for cl	ient FC:C2:DE:91:36:A6 - android-	9aed2b2077a54c74 in WiFi
3172S	2015-05-11, 16:02:35	DHCP	Leased 192.1	.68.1.232 IP address for cl	ient FC:C2:DE:91:36:A6 - android-	9aed2b2077a54c74 in WiFi
Showin	g 1 to 10 of 1912 entries					Next >>

6.9.2 System Events

Display all system events, their type and time of occurrence. Events include authentication or reboot requests, incoming and outgoing SMS and calls, Mails, Configuration changes, DHCP events.

Sys	stem Log						
AII	Authentication	Reboot	SMS/Call	Mail	Configuration	DHCP	
Event	ts Log						
Events	per page 🛛 10 🖌						Search
ID 🕈	Date 🕈	Eve	nt type 🕈	Event 🕈			
1040	2016-03-10, 08:53:01	Web) UI	Authentica	ation was succesful fro	om HTTP LA	N 192.168.1.214
1039	2016-03-10, 08:48:47	Con	fig	Firewall co	onfiguration has been (changed	
1038	2016-03-09, 09:35:29	DHC	P	Leased 19	92.168.1.214 IP addres	s for client (00:11:25:A2:A0:7A - user in LAN
1037	2016-03-09, 09:35:27	DHC	P	Leased 19	92.168.1.214 IP addres	s for client (00:11:25:A2:A0:7A - user in LAN
1036	2016-03-09, 09:35:24	Port		Wired WA	N connection operatio	inal	
1035	2016-03-09, 09:34:28	Con	fig	Hotspot co	onfiguration has been	changed	
1034	2016-03-09, 09:34:18	DHC	P	Leased 19	92.168.1.214 IP addres	s for client (00:11:25:A2:A0:7A - user in LAN

6.9.3 Network Events

Display information about recent network events like connection status change, lease status change, network type or operator change.

All Ev	vents System Events	Network E	Events Events Reporting Reporting Configuration
Co	nnections Log		
All	Wireless Mobile Dat	a Networ	rk Type Network Operator
Conn	ections Log		
Events	per page 10 🔻		Search
ID 🕈	Date 🕈	Action +	Result +
312	2015-05-11 15:48:49	WiFi	WiFi client connected: FC:C2:DE:91:36:A6 android-9aed2b2077a54c74
311	2015-05-11 15:48:43	WiFi	WiFi client disconnected: FC:C2:DE:91:36:A6 android-9aed2b2077a54c74
310	2015-05-11 15:48:37	WiFi	WiFi client connected: FC:C2:DE:91:36:A6 android-9aed2b2077a54c74
309	2015-05-11 15:48:31	WiFi	WiFi client disconnected: 20:34:47:41:4B:45
308	2015-05-11 15:36:56	WiFi	WiFi client connected: 20:34:47:41:4B:45
307	2015-05-11 15:36:55	WiFi	WiFi client disconnected: 00:1E:42:10:80:22
306	2015-05-11 15:30:32	WiFi	WiFi client connected: 00:1E:42:10:80:22
305	2015-05-11 15:30:26	WiFi	WiFi client disconnected: 00:1E:42:10:80:22
304	2015-05-11 15:19:58	WiFi	WiFi client connected: 00:1E:42:10:80:22
303	2015-05-11 15:19:52	WiFi	WiFi client disconnected: FC:C2:DE:91:36:A6 android-9aed2b2077a54c74
Showin	g 1 to 10 of 312 entries		Next >>

6.9.4 Events Reporting

Allow to view, enable/disable or modify created rules for events reporting.

All Events	System Events	Network Events	Events Reporting	Reporting Configuration	1				
Events Reporting									
Events Repo	rting Rules								
Event type	Event subty	oe Acti	on E	nable Sor	t				
FW upgrade	From file	Send	I SMS		Edit Delete				
New DHCP clier	nt Connected fr	om LAN Send	I SMS	2	Edit Delete				
Config change	All	Sen	i sms	•	Edit Delete				
* All rules are exe	cuted in current list ord	er.							
Events Reporti	ng Configuration								
Event type	Event type Event subtype Action								
Config change	All	▼ Send SMS ▼	Add						

6.9.4.1 Events Reporting Configuration

Allow to review created rules details and modify them, so after event occurrence, messages or emails are sent to specified address or phone numbers with information about the event.

Event Reporting Configuration	n		
Modify Event Reporting Rule			
Enable			
Event type	Reboot 🖌		
Event subtype	After unexpected shut do	wn 🖌	
Event subtype	All		
Action	Send SMS 🔽		
Enable delivery retry			
Message text on Event	Router name - %rn; Event type - %et; Event text - %ex; Time stamp - %ts;	Time stamp - %ts Serial number - %sn LAN MAC address - %kn Connection state - %cs SiM stot in use - %su Event type - %et FVV available on server - %fs Network state - %ns New line - %nl	Router name - %rn WAN MAC address - %wm Curren RW version - %fc Operator name - %on Signal strength - %ss IMSI - %in Event text - %ex LAN IP - %l WAN IP address - %wi
Get status after reboot			
Recipient's phone number		+	

	Field Name	Sample Value	Explanation
1.	Enable	Enable/Disable	Make a rule active/inactive
2.	Event type	Reboot	Select event type about which occurrence information will be sent
3.	Event subtype	After unexpected shut down	Specify event subtype to activate the rule
4.	Event subtype	All/Loaded	Event subtype for which the rule is applied
5.	Action	Send SMS	Action to perform when an event occurs
6.	Enable delivery retry	Enable/Disable	Enables to send SMS again if first try to send SMS was unsuccessful.
7.	Message text on Event	Router name - %rn; Event type - %et; Event text - %ex; Time stamp - %ts;	Message text on specific event
8	Get status after reboot	Enable/Disable	Receive router status information after reboot
9.	Recipient's phone number	+123456789	For whom you want to send a SMS

6.9.5 Reporting Configuration

Displays configured services for event reporting, allows enabling, disabling, viewing and modifying parameters.

All Events	System Events	Network Events	Events Reporting	Reporting Configuration							
	Events Log Files Report										
Events Log	Events Log Report Rules										
Events log	Т	ransfer type	Enable	Sort							
System	E	Email	Ø	••	Edit Delete)					
Network	F	TP	Ø	••	Edit Delete)					
* All rules are ex	ecuted in current list o	rder.									
Events Log Re	porting Configuration	n:									
Events log	Transfer type										
System 🔻	Email 🔻	Add									

6.9.5.1 Events Log Report Configuration

Allow to change the configuration of periodic events reporting to email or FTP.

FTP:

All Events	System Events	Network Ev	rents	Events Repo	orting	Reporting Configuration			
Events L	Events Log Report Configuration								
Modify even	Modify events log file report rule								
		Enable 🗹							
		Events log S	System '	•					
	Ti	ansfer type F	TP 🔻						
	Co	mpress file 🕑							
		Host 19	92.168.12	3.123					
		User name Us	sername]				
		Password 🚥	•••••		ø				
	Interval betw	een reports 🛛 🛛	Veek 🔻						
		Weekday M	londay	T					
		Hour 1	.2 🔻						

	Field Name	Sample Value	Explanation
1.	Enable	Enable/Disable	Make a rule active/inactive
2.	Events log	System	Events log for which the rule is applied
3.	Transfer type	FTP	Events log file transfer type: Email/FTP
4.	Compress file	Enable	Enable/disable compress events log file using gzip
5.	Host	192.168.123.123	FTP (File Transfer Protocol) host name, e.g. , 192.168.123.123. Allowed characters (a-z-A-Z0-9!@#\$%^&*+-/=?_`{ }~.)
6.	User name	Username	User name for authentication on SMTP (Simple Mail Transfer Protocol) or FTP (File Transfer Protocol) server. Allowed characters (a-z-A-Z0-9!@#\$ $%^{*+-/=}^{(+)}$.)
7.	Password	password	Password for authentication on SMTP (Simple Mail Transfer Protocol) or FTP (File Transfer Protocol) server. Allowed characters (a-z-A-Z0-9!@#\$%^&*+-/=?_`{ }~.)
8.	Interval between reports	Week	Send report every selected time interval
9.	Weekday	Monday	Day of the week to get events log report
10.	Hour	12	Hour of the day to get events log report

Modify events log file report rule	
Enable	
Events log	System 🔽
Transfer type	Email 🐱
Compress file	
Subject	Subject
Message	YourMessage
SMTP server	smtp.gmail.com
SMTP server port	25
Secure connection	
User name	User
Password	••••••
Sender's email address	sendersemail@example
Recipient's email address	recipientemail@example 🗜
Interval between reports	Week 🐱
Weekday	Sunday 🖌
Hour	1 🗸

	Field Name	Sample Value	Explanation
1.	Enable	Enable/Disable	Make a rule active/inactive
2.	Events log	System	Event log for which the rule is applied
3.	Transfer type	Email	Events log file transfer type: Email/FTP
4.	Compress file	Enable	Enable/disable compress events log file using gzip
5.	Subject	Subject	Subject of an email
6.	Message	YourMessage	Message to send in email
7.	SMTP server	smtp.gmail.com	SMTP (Simple Mail Transfer Protocol) server address
8.	SMTP server port	25	SMTP (Simple Mail Transfer Protocol) server port
9.	Secure connection	Enable/Disable	Enables/disables secure connection. Use only if server supports SSL or TLS
10.	User name	User	User name for authentication on SMTP (Simple Mail Transfer Protocol)
11.	Password	•••••	User password for authentication on SMTP (Simple Mail Transfer Protocol)
12.	Sender's email address	sendersemail@example.com	An address that will be used to send your email from. Allowed characters (a-zA-ZO-9%+-)
13.	Recipient's email address	recipientemail@example.com	For whom you want to send an email to. Allowed characters (a-zA-Z0-9%+-)
14.	Interval between reboots	Week	Send report every select time interval

15.	Weekday	Sunday	Day of the week to get events log report
16.	Hour	1	Hour of the day to get events log report

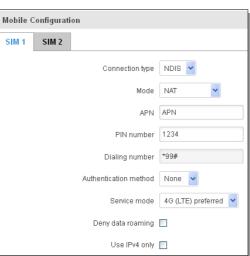
7 Network

7.1 Mobile

7.1.1 General

7.1.1.1 Mobile configuration

Here you can configure mobile settings which are used when connecting to your local 3G/LTE network.



	Field Name	Sample value	Explanation
1.	Connection type	PPP / NDIS	PPP mode uses dialling number to establish data connection. NDIS mode (default) does not use dialling and PPP protocol to establish data connection it is usually faster than PPP mode.
2.	Mode	NAT / Passthrough / Use bridge	NAT mode enables network address translation on router. Bridge mode bridges LTE data connection with LAN. In this mode the router does not have internet connection as ISP provides IP directly to end device (PC, tablet or smart phone).Using Bridge mode will disable most of the router capabilities and you can access your router's settings only by using static IP address on your end device. Passthrough mode is similar with bridge mode except that in passthrough mode router does have internet connection.
3.	APN	"APN"	Access Point Name (APN) is a configurable network identifier used by a mobile device when connecting to a GSM carrier.
4.	PIN number	"1234" or any number that falls between 0000 and 9999	A personal identification number is a secret numeric password shared between a user and a system that can be used to authenticate the user to the system.
5.	Dialing number	*99***1#	Dialling number is used to establish a mobile PPP (Point-to-Point- Protocol) connection.
6.	Authentication method	CHAP, PAP or none	Authentication method, which your carrier uses to authenticate new connections. (This selection is unavailable on the alternate model)
7.	Username	"username"	Your username that you would use to connect to your carriers network. This field becomes available when you select an authentication method (i.e. authentication method is not "none").

			These fields are always enabled on the alternate model.
8.	Password	"password"	Your password that you would use to connect to your carriers network. This field becomes available when you select an authentication method (i.e. authentication method is not "none"). These fields are always enabled on the alternate model.
9.	Service mode	2G only, 2G preferred, 3G only, 3G preferred, 4G (LTE) only, 4G (LTE) preferred or automatic.	Your network preference. If your local mobile network supports 2G, 3G and 4G (LTE) you can specify to which network you wish to connect. E.g.: if you choose 2G, the router will connect to a 2G network, so long as it is available, otherwise it will connect to a network that provides better connectivity. If you select auto, then the router will connect to the network that provides better connectivity.
10.	Deny data roaming	Enable/Disable	If enabled this function prevents the device from establishing mobile data connection while not in home network.
11.	Use IPv4 only	Enable / Disable	If enabled this function makes the device to use only IPv4 settings when connecting to operator.

Warning: If an invalid PIN number was entered (i.e. the entered PIN does not match the one that was used to protect the SIM card), your SIM card will get blocked. To avoid such mishaps it is highly advised to use an unprotected SIM. If you happen to insert a protected SIM and the PIN number is incorrect, your card won't get blocked immediately, although after a couple of reboots OR configuration saves it will.

7.1.1.1.1 Passthrough mode

Mode	Passthrough -	
APN	bangapro	
PIN number	1525	
Dialing number	*99#	
Authentication method	None 💌	
Service mode	Automatic -	
Deny data roaming		
Use IPv4 only		
DHCP mode	Static 💌	
MAC Address		
Lease time	12	Hours -

Using Passthrough Mode will disable most of the router capabilities!

DHCP mode: Static

Enter your computer MAC address (xx:xx:xx:xx) to MAC Address field and select Lease time (expire time for lease addresses). Device, which MAC address will be entered, will get IP from GSM operator. Other connected devices to the router LAN will get IP from router DHCP server, but these devices will not have internet access.

DHCP mode: Dynamic

Using Dynamic mode, device will get IP from GSM operator , which connect to the router firstly. Using Passthrough in dynamic mode, the DHCP in LAN will be disabled.

DHCP mode: No DHCP

Using no DHCP mode, IP (also subnet, gateway and DNS) from GSM operator should be entered in device, which is connected to the router LAN, manually. Using Passthrough in no DHCP mode, the DHCP in LAN will be disabled.

7.1.1.2 Mobile Data On Demand

	Mobile Data On Demand			
		Enable		
		No data timeout (sec)	10	
Poss	ible values	Explanation		
Enał	ole/Disable	Mobile Data On Demand f on only when it's in use	unction enables you to	o keep m

timeout period

7.1.1.3 Force LTE network

1-99999999

Field name Enable

timeout(sec)

No data

1.

2.

orce LTE network	
Enable	
Reregister	
Interval (sec) 300	
	Save

A mobile data connection will be terminated if no data is transferred during the

	Field name	Possible values	Explanation
1.	Enable	Enable/Disable	Enable/disable try to connect to LTE network every x seconds (used only if service mode is set to 4G (LTE) preferred)
2.	Reregister	Enable/Disable	If this enabled, modem will be reregister before try to connect to LTE network
3.	Interval (sec)	180 - 3600	Time in seconds between tries to connect to LTE network. Range [180-3600]

7.1.2 SIM Management

General	SIM Management	Network Operators	Mobile Data Limit	SIM Idle Protection	
SIM Swi	itching				
Primary Card					
	Primary	/SIM card SIM 1 🔽			
SIM Switchi	ng				
	Enable automatic	switching 🔲			
	Che	ck interval 4			
SIM1 To SI	M2 SIM2 To SIM1				
	On we	aksignal 📃			
	On	data limit 🔲			
	On	sms limit 🔲			
On roaming		n roaming 🔲			
	N	o network 📃			
	On netwo	rk denied 📃			
	On data conn	ection fail 📃			

	Field name	Possible values	Explanation
1.	Primary SIM card	SIM 1 / SIM 2	SIM card that will be used in the system as a primary SIM card
2.	Enable automatic switching	Enable/Disable	Automatically switch between primary and secondary SIM cards based on the various rules and criterions defined below
3.	Check interval	1-3600	Check interval in seconds
4.	On weak signal	Enable/Disable	Perform a SIM card switch when a signal's strength drops below a certain threshold
5.	On data limit*	Enable/Disable	Perform a SIM card switch when mobile data limit for your current SIM card is exceeded
6.	On SMS limit*	Enable/Disable	Perform a SIM card switch when SMS limit for your current SIM card is exceeded
7.	On roaming	Enable/Disable	Perform a SIM card switch when roaming is detected
8.	No network	Enable/Disable	Perform a SIM card switch when no operator is detected
9.	On network denied	Enable/Disable	Perform a SIM card switch when network is denied
10.	On data connection fail	Enable/Disable	Perform a SIM card switch when data connection fails

* Your carrier's data usage accounting may differ. Teltonika is not liable should any accounting discrepancies occur.

7.1.3 Network Operators

7.1.3.1 Network Operators

This function lets you Scan, Select and enter manual Network Operator to which router should connect. Function will provide great utility when router is in Roaming conditions. Operator is selected only for the active SIM card. In order to specify operator for the other SIM card it must first be selected as primary SIM in "SIM Management".

Network Operators	Operators List
Network Opera	ators
Current SIM	
SIM card in use	SIM 1
Current operator	OMNITEL LT
Scan For Network Op	erators
SIM 1 SIM 2	
Scan for operators	Connection mode : Auto Select

	Field Name	Sample Value	Explanation
1.	SIM card in use	SIM 1 / SIM 2	Shows current SIM card's in use
2.	Current operator	OMNITEL LT	Operator's name of the connected GSM network

Note: after clicking Scan for operators' button- You will lose current mobile connection! For changing network operator status have to be available. There is manual connection to network operator, you have to fill numeric name, and it's have to be available.

7.1.3.2 Operator List

This function lets to create white list/black list based on operator's code.

Network Operators	Operators List			
Operators list				
Settings				
	Enable			
	Mode	White list 💌		
Operators List				
Name		Operator code	Sort	
Tele2 LT		24603	••	Delete
Add				

	Field name	Possible values	Explanation
1.	Enable	Enable/Disable	Enable/disable operators blocking
2.	Mode	White list/Black list	White list - allows every operator on the list and blocks everything else. Black list – block every operator on the list and allow everything else
3.	Name	Tele2 LT	Operator's name
4.	Operator code	24603	Operator's code

7.1.4 Mobile Data Limit

This function lets you limit maximum amount of data transferred on WAN interface in order to minimize unwanted traffic costs.

7.1.4.1 Data Connection Limit Configuration

General	SIM Management	Network Operators	Mobile Data Limit	SIM Idle Protection
Mobile	Data Limit Con	figuration		
SIM1	SIM2			
Data Conr	ection Limit Configur	ration		
	Enable data con	nection limit 🕑		
	Data	a limit* (MB) 200		
		Period Month 🔻		
		Start day 1 🔹		

	Field Name	Sample value	Explanation
1.	Enable data connection limit	Enable/Disable	Disables mobile data when a limit for current period is reached
2.	Data limit* (MB)	200	Disable mobile data after limit value in MB is reached
3.	Period	Month/Week/Day	Period for which mobile data limiting should apply
4.	Start day/ Start hour	1	A starting time for mobile data limiting period

* Your carrier's data usage accounting may differ. Teltonika is not liable should any accounting discrepancies occur.

7.1.4.2 SMS Warning Configuration

ſ		
	SMS Warning Configuration	
	Enable S	MS warning 🔽
	Dat	a limit* (MB) 300
		Period Month 🛩
		Start day 1 🗸
	Pho	one number +37012345678
Field Name	Sample value	Explanation
Enable SMS warning	Enable/Disable	Enables sending of warning SMS message when mobile data limit
		for current period is reached
Data limit* (MB)	300	Send warning SMS message after limit value in MB is reached
Period	Month/Week/Day	Period for which mobile data limiting should apply
Start day/ Start hour	1	A starting time for mobile data limiting period

* Your carrier's data usage accounting may differ. Teltonika is not liable should any accounting discrepancies occur.

7.1.5 SIM Idle protection

Some operators block user SIM cards after period of inactivity. This function enables router to periodically switch to secondary SIM card and establish data connection with mobile network in order to prevent SIM card blocking.

7.1.5.1 Settings

1.

2. 3. 4. 5.

SIM Idle Protection Configuration							
SIM1	SIM2						
		Enable					
		Period	Week 💌				
		Day	Monday 🖌				
		Hour	1 💌				
		Minute	0 🕶				
		Host to ping	8.8.8.8				
		Ping package size	56				
		Ping requests	2				

	Field Name	Sample value	Explanation
1.	Enable	Enable/Disable	Enables SIM idle protection
2.	Period	Month / Week	Switches between monthly and weekly SIM activation periods
3.	Day	1-31 / Monday - Sunday	Specifies the day for SIM idle protection activation, 1-31 if Period is Month, and Monday – Sunday if period is week.
4.	Hour	1-24	Specifies the hour for SIM idle protection activation
5.	Minute	1-60	Specifies the minute for SIM idle protection activation
6.	Host to ping	8.8.8.8	Specifies IP address or domain name to send data packages to
7.	Ping package size	56	Specifies ping Package size in bytes
8.	Ping requests	2	Specifies requests to be sent

7.1.5.2 Test

Tests the functioning of idle protection with your parameters entered at settings tab.

General	SIM Management	Network Operators	Mobile Data Limit	SIM Idle Protection			
Settings Test							
SIM Idle Protection Test							
SIM	SIM state	Host ip	Ping				
SIM1	OK (inserted)	8.8.8.8	Success				
SIM2	Not inserted	N/A	N/A				

	Field Name	Sample value	Explanation
1.	SIM	SIM1 / SIM2	Displays SIM number
2.	SIM state	OK (inserted)	Displays status of the SIM card
3.	Host IP	8.8.8.8	Displays the IP of the Host
4.	Ping	Success	Displays status of ping attempt

7.2 WAN

7.2.1 **Operation Mode**

Your WAN configuration determines how the router will be connecting to the internet.

WAN								
Your V	/our WAN configuration determines how the router will be connecting to the internet.							
Ope	eration Mode							
	Main WAN	Backup WAN	Interface Name	Protocol	IP Address	Sort		
(<u>1</u>)	۲		Mobile (WAN)	DHCP	10.132.38.224		Edit	
1	0		Wired (WAN2)	DHCP	-	••	Edit	
(i:-	0		WiFi (WAN3)	DHCP	-	••	Edit	
							Save	

	Туре	Explanation
1.	Main WAN	Switches between Mobile, Wired and Wi-Fi interface for main WAN
2.	Backup WAN/Load balancing	Let's user to select one or two interfaces for WAN backup
3.	Interface Name	Displays WAN interface name, and changes interface priority, the interface at the table top has the highest priority
4.	Protocol	Displays protocol used by WAN interface
5.	IP Address	Displays IP address acquired by specific interface
6.	Sort	Sorts table rows and changes interface priority, the highest interface has highest priority

7.2.2 Common configuration

Common configuration allows you to configure your TCP/IP settings for the wan network.

Common Configuration						
General Setup	Advanced Settings					
	Protocol	DHCP V				
	Really switch protocol?	Switch protocol				

You can switch between the Static, DHCP or PPPoE protocol by selecting the protocol that you want to use and then pressing **Switch Protocol**.

7.2.2.1 General Setup

7.2.2.1.1 Static:

Common Configu	Common Configuration						
General Setup	Advanced Settings						
	Protocol	Static 🗸					
	IPv4 address	192.168.99.162]				
	IPv4 netmask	255.255.255.0 💌					
	IPv4 gateway	192.168.99.254					
	IPv4 broadcast	192.168.99.255]				
	Use custom DNS servers	8.8.8.8	×				
		8.8.6.6	× +				

This is the configuration setup for when you select the static protocol.

	Filed name	Sample	Explanation
1.	IPv4 address	192.168.99.162	Your routers address on the WAN network
2.	IPv4 netmask	255.255.255.0	A mask used to define how "large" the WAN network is
3.	IPv4 gateway	192.168.99.254	Address where the router will send all the outgoing traffic
4.	IPv4 broadcast	192.168.99.255	Broadcast address (auto generated if not set). It is best to leave this blank unless you know what you are doing.
5.	Use custom DNS servers	8.8.8.8 8.8.6.6	Usually the gateway has some predefined DNS servers. As such the router, when it needs to resolve a hostname ("www.google.com", "www.cnn.com", etc) to an IP address, it will forward all the DNS requests to the gateway. By entering custom DNS servers the router will take care of host name resolution. You can enter multiple DNS servers to provide redundancy in case the one of the server fails.

7.2.2.1.2 DHCP:

Common Configuration					
General Setup	Advanced Settings				
	Protocol	DHCP 💙			
Hostname to se	nd when requesting DHCP	Teltonika			

When you select the DHCP protocol you can use it as is, because most networks will not require any additional advanced configuration.

7.2.2.1.3 PPPoE

This protocol is mainly used by DSL providers:

Common Configuration				
General Setup	Advanced Settings			
	Protocol	PPPoE		
	PAP/CHAP username	test		
	PAP/CHAP password	••••	Ø	
	Access Concentrator	auto		
	Service Name	auto		

This is the configuration setup for when you select PPPoE protocol.

	Filed name	Sample	Explanation
1.	PAP/CHAP username	test	Your username and password that you would use to connect to your carriers network.
2.	PAP/CHAP password	your_password	A mask used to define how "large" the WAN network is
3.	Access Concentrator	auto	Specifies the name of access concentrator. Leave empty to auto detect.
4.	Service Name	auto	Specifies the name of the service. Leave empty to auto detect.

7.2.2.2 Advanced

These are the advanced settings for each of the protocols, if you are unsure of how to alter these attributes it is highly recommended to leave them to a trained professional:

7.2.2.1 Static

		Common Config	uration			
		General Setup	Advanced Settings			
			Disable	NAT	D	
			Override MAC ad	dress 86	6:48:71:B7:E9	E9:E4
			Override	MTU 1	500	
			Use gateway r	metric 0		
	Field	name	Sample	value	2	Explanation
1.	Disab	ole NAT	On/Off			Toggle NAT on and off.
2	Over	ride MAC addı	ress 86:48:7	'1:B7:E		Override MAC address of the WAN interface. If your ISP gives a static IP address it might also bind it to your computers address (i.e. that IP will only work with your computer). In field you can enter your computers MAC address and fool gateway in thinking that it is communicating with your compu-

			gateway in thinking that it is communicating with your computer.
3.	Override MTU	1500	Maximum Transmission Unit – specifies the largest possible size of a data packet.
4.	Use gateway metric	0	The WAN configuration by default generates a routing table entry.
			With this field you can alter the metric of that entry.

7.2.2.2 DHCP

Common Configuration				
General Setup Advanced Settings				
Disable NAT				
Use broadcast flag				
Use default gateway	×			
Use DNS servers advertised by peer	×			
Use gateway metric	0			
Client ID to send when requesting DHCP				
Vendor Class to send when requesting DHCP				
Override MAC address	86:48:71:B7:E9:E4			
Override MTU	1500			

	Field name	Sample value	Explanation
1.	Disable NAT	Enable/Disable	If checked, router will not perform NAT (masquerade) on this interface
2	Use broadcast flag	Enable/Disable	Required for certain ISPs, e.g. Charter with DOCSIS 3
3.	Use default gateway	Enable/Disable	If unchecked, no default route is configured
4.	Use DNS server advertised by peer	Enable/Disable	If unchecked, the advertised DNS server addresses are ignored
5.	User gateway metric	0	The WAN configuration by default generates a routing table entry With this field you can alter the metric of that entry
6.	Client ID to send when		Specify client ID which will be sent when requesting DHCP

	requesting DHCP		(Dynamic Host Configuration Protocol)
7.	Vendor Class to send when requesting DHCP		Specify vendor class which be sent when requesting DHCP (Dynamic Host Configuration Protocol)
8.	Override MAC address	86:48:71:B7:E9:E4	Override MAC address of the WAN interface. If your ISP gives you a static IP address it might also bind it to your computers MAC address (i.e. that IP will only work with your computer). In this field you can enter your computers MAC address and fool the gateway in thinking that it is communicating with your computer.
9.	Override MTU	1500	Maximum transmission unit – specifies the largest possible size of a data packet.

7.2.2.3 PPPoE

Common Configuration		
General Setup Advanced Settings		
Disable NAT		
Use default gateway	×	
Use gateway metric	0	
Use DNS servers advertised by peer	×	
LCP echo failure threshold	0	
LCP echo interval	5	
Inactivity timeout	0	

	Field name	Sample value	Explanation
1.	Disable NAT	Enable/Disable	If checked, router will not perform NAT (masquerade) on this interface
2	Use default gateway	Enable/Disable	If unchecked, no default route is configured
3.	Use gateway metric	0	
4.	Use DNS servers advertised by peer	Enable/Disable	If unchecked, the advertised DNS server addresses are ignored
5.	LCP echo failure threshold	0	Presume peer to be dead after given amount of LCP echo failures, use 0 to ignore failures
6.	LCP echo interval	5	Send LCP echo requests at the given interval in seconds, only effective in conjunction with failure threshold
7.	Inactivity timeout	0	Close inactive connection after the given amount of seconds, use 0 to persist connection

7.2.2.2.4 IP Aliases

IP aliases are a way of defining or reaching a subnet that works in the same space as the regular network.

General Setup	Advanced Settings	
	IP Address	192.168.99.161
	Netmask	255.255.255.0 🔻
	Gateway	192.168.99.254
Delete		
Add		

As you can see, the configuration is very similar to the static protocol; only in the example a 99th subnet is defined. Now if some device has an IP in the 99 subnet (192.168.99.xxx) and the subnets gateway metric is "higher" and the device is trying to reach the internet it will reroute it's traffic not to the gateway that is defined in common configurations but through the one that is specified in IP aliases.

General Setup	Advanced Settings	
	IP Broadcast	
	DNS Server	
Delete		
Add		
		Save

You may also optionally define a broadcast address and a custom DNS server.

7.2.2.5 Backup WAN configuration

Backup WAN is function that allows you to back up your primary connection in case it goes down. There can be two backup connections selected at the same time, in that case, when primary connection fails, router tries to use backup with higher priority and if that is unavailable or fails too, then router tries the backup with lower priority.

Backup Configuration			
Timing and other parameters will indicate how and when it will be determined that your conventional connection has gone down			
Health monitor interval	10 sec. 💌		
Health monitor ICMP host(s)	8.8.4.4		
Health monitor ICMP timeout	3 sec. 💌		
Attempts before failover	3 🕶		
Attempts before recovery	3 🗸		

The majority of the options consist of timing and other important parameters that help determine the health of your primary connection. Regular health checks are constantly performed in the form of ICMP packets (Pings) on your primary connection. When the connections state starts to change (READY->NOT READY and vice versa) a necessary amount of failed or passed health checks has to be reached before the state changes completely. This delay is instituted so as to mitigate "spikes" in connection availability, but it also extends the time before the backup link can be brought up or down.

		Field Name	Sample value	Explanation
--	--	------------	--------------	-------------

1.	Health monitor Interval	Disable/5/10/20/30/60/120 Seconds	The interval at which health checks are performed
2.	Health monitor ICMP host(s)	Disable/DNS Server(s) /WAN GW/Custom	Where to Ping for a health check. As there is no definitive way to determine when the connection to internet is down for good, you'll have to define a host whose availability that of the internet as a whole.
3.	Health monitor ICMP timeout	1/3/4/5/10 Seconds	How long to wait for an ICMP request to come back. Set a higher value if your connection has high latency or high jitter (latency spikes).
4.	Attempts before failover	1/3/5/10/15/20	How many checks should fail for your WAN connection to be declared DOWN for good.
5.	Attempts before recovery	1/3/5/10/15/20	How many checks should pass for your WAN connection to be declared UP.

7.2.2.3 How do I set up a backup link?

First we must select a main link and choose one or two backup links in WAN section. Then push the "Edit" button and configure your WAN and Backup Wan settings to your liking. Click Save and wait until the settings are applied. Now in the Status -> Network Information -> WAN page there should be a status indication for the backup WAN. If everything is working correctly you should see something like this:

	Backup WAN Status			
		WAN: [Wired] IN USE	Backup WAN: [3G] READY	
The above picture shows the status for Backup WAN configured on a wired main link. You can now simulate a				
downed link by simply unplugging your Ethernet WAN cable. When you've done so you should see this:				

Backup WAN Status		
	WAN: [Wired] NOT READY	Backup WAN: [36] IN USE

And, if you plug the cable back in you should, again, see this:

7.3

			LAN
Backup WAN Status			
	WAN: [Wired] IN USE	Backup WAN: [36] READY	

This page is used to configure the LAN network, where all your devices and computers that you connect to the router will reside.

7.3.1 Configuration

7.3.1.1 General Setup

Configuration		
General Setup	Advanced Settings	
	IP address	192.168.1.1
	IP netmask	255.255.255.0 💌
	IP broadcast	

	Field name	Sample value	Explanation
1.	IP address	192.168.1.1	Address that the router uses on the LAN network
2	IP netmask	255.255.255.0	A mask used to define how large the LAN network is
3.	IP broadcast		IP broadcasts are used by BOOTP and DHCP clients to find and send requests to their respective servers

7.3.1.2 Advanced settings

Configuration		
General Setup	Advanced Settings	
	Accept router advertisements	3
	Override MTU	J 1500
	Use gateway metric	0
	Use WAN port as LAN	1

	Field name	Sample value	Explanation
1.	Accept router advertisements	Enable/Disable	If enabled allows accepting router advertisements (Disabled by default)
2.	Override MTU	1500	MTU (Maximum Transmission Unit) specifies the largest possible size of a data packet
3.	Use gateway metric	0	With this field you can alter the metric of that entry

4. Use WAN port as LAN Enable/Disable Enable/disable WAN port using as LAN port

7.3.2 DHCP Server

The DHCP server is the router side service that can automatically configure the TCP/IP settings of any device that requests such a service. If you connect a device that has been configured to obtain IP address automatically the DHCP server will lease an IP address and the device will be able to fully communicate with the router.

7.3.2.1 General Setup

Advanced Settings		
DHCP	Enable •	
Start	100	
Limit	155	
Lease time	12	Hours •
	DHCP Start Limit	DHCP Enable Start 100 Limit 155

	Field Name	Sample value	Explanation
1.	DHCP	Enable / Disable/ DHCP Relay	Manage DHCP server
2.	Start	100	The starting address of the range that the DHCP server can use to give out to devices. E.g.: if your LAN IP is 192.168.2.1 and your subnet mask is 255.255.255.0 that means that in your network a valid IP address has to be in the range of [192.168.2.1 – 192.168.2.254](192.168.2.0 and 192.168.2.255 are special unavailable addresses). If the Start value is set to 100 then the DHCP server will only be able to lease out addresses starting from 192.168.2.100
3.	Limit	155	How many addresses the DHCP server gets to lease out. Continuing on the above example: if the start address is 192.168.2.100 then the end address will be 192.168.2.254 ($100 + 155 - 1 = 254$).
4.	Lease time	12	How long can a leased IP be considered valid. An IP address after the specified amount of time will expire and the device that leased it out will have to request for a new one. Select Hour or Minute (minimum 2min).

7.3.2.2 Advanced settings

You can also define some advanced options that specify how the DHCP server will operate on your LAN network.

DHCP Server			
General Setup	Advanced Settings		
	Dynamic DHCF	×	
	Force		
	IP netmask		
	DHCP Options] ₽

	Field Name	Sample Value	Explanation
1.	Dynamic DHCP	Checked/Unchecked	Dynamically allocate client addresses, if set to ${\tt 0}$ only clients present in the ${\tt ethers}$ files are served
2.	Force	Checked/Unchecked	Forces DHCP serving even if another DHCP server is detected on the same network segment.
3.	IP netmask		You can override your LAN netmask here to make the DHCP server think it's serving a larger or a smaller network than it actually is.
4.	DHCP Options		Additional options to be added for this DHCP server. For example with '26,1470' or 'option:mtu, 1470' you can assign an MTU per DHCP. Your client must accept MTU by DHCP for this to work.

7.3.2.3 Static Leases

This page is used to configure static IP leases.

ostname	MAC address	IP address	
Printer	10:a5:d0:70:9c:72 (192.168.1.104) 👻	192.168.1.104 🔽	Delete

	Field Name	Sample Value	Explanation
1.	Hostname	Printer	Name which will be linked with IP address.
2.	MAC address	10:a5:d0:70:9c:72 (192.168.1.104)	Device MAC address
3.	IP address	192.168.1.104	Device IP address

7.3.2.4 IP Aliases

7.3.2.4.1 General Setup

IP aliases are the way of defining or reaching a subnet that works in the same space as the regular network.

IP Aliases		
General Setup	Advanced Settings	
	IP Address	192.168.99.161
	Netmask	255.255.255.0
	Gateway	192.168.99.254
Delete		
Add		

7.3.2.4.2 Advanced Settings

You may also optionally define a broadcast address and a custom DNS server.

IP Aliases		
General Setup	Advanced Settings	
	IP Broadcast	
	DNS Server	,
Delete		
Add		

7.4 Wireless

On this page you can configure your wireless settings. Depending on whether your WAN mode is set to Wi-Fi or not, the page will display either the options for configuring an **Access Point** or options for configuring a **connection** to some local access point.

Access Point:

Wireless Ac	Wireless Access Point				
Here you can configur	lere you can configure your wireless settings like radio frequency, mode, encryption etc				
Device Configura	tion				
General Setup	Advanced Settings				
	Enable wireles	s 🔽			
	Chann	el Auto	~		
Interface Configuration					
General Setup	Wireless Security	MAC Filter	Advanced Settings		
	SS	D Teltonika_Rou	uter		
	Hide SSI	D 🗖			
WRP100 Configur	WRP100 Configuration				
Con	nect WRP100 automatica	lly 💌			
Back to Overvi	iew				Save

Here you can see the Overview of the wireless configuration. It is divided into two main sections – device and interface. One is dedicated to configuring hardware parameters other – software.

Here you can toggle the availability of the wireless radio and the physical channel frequency.

Important note: As seen in the picture you should always Save before toggling the radio on and off.

SSID – Your wireless networks identification string. This is the name of your Wi-Fi network. When other Wi-Fi capable computers or devices scan the area for Wi-Fi networks they will see your network with this name.

Hide SSID – Will render your SSID hidden from other devices that try to scan the area.

Connect to WRP100 automatically – let Teltonika WRP100 wireless repeater connect to this router automatically.

7.4.1.1 Device

7.4.1.1.1 Advanced Settings

General Setup	Advanced Settings	
	Mode	802.11g+n 🔻
	Country code	00 - World 🔹
	Transmit power	100 % •
	Fragmentation threshold	2346
	RTS/CTS threshold	2346

Here you can configure more advanced parameters:

	Field name	Sample value	Explanation
1.	Mode	Auto, b, g, g+n	Different modes provide different throughput and security options.
2.	Country Code	Any ISO/IEC 3166 alpha2 country code	Selecting this will help the wireless radio configure its internal parameters to meet your countries wireless regulations.
3.	Transmit power	20%/40%/60%/80%/100%	Select Wi-Fi signal power
4.	Fragmentation threshold	2346	The smallest packet size that can be fragmented and transmitted by multiple frames. In areas were interference is a problem, setting a lower fragment threshold might help reduce the probability of unsuccessful packet transfers, thus increasing speed.
5.	RTS/CTS Threshold	2346	Request to send threshold. It can help resolve problems arising when several access points are in the same area, contending.

7.4.1.2 Interface

7.4.1.2.1 Security

Encryption – there are many modes of encryption, a distinctive classis pointed out below.

Interface Configuration							
General Setup	Wireless Security	MAC Filter	Advanced Settings				
	Encrypti	ion WPA-PSKA	WPA2-PSK mixed mode 🔻				
	Cipl		T				
	ĸ	íey	ø				

First select an encryption method: TKIP, CCMP, TKIP&CCMP and auto. Note: Some authentication methods won't support TKIP (and TKIP&CCMP) encryption. After you've selected your encryption method, you should enter your pass phrase, which must be at least 8 characters long.

7.4.1.2.2 MAC-Filter

Interface Configuration						
General Setup	Wireless Security	MAC Filter	Advanced Settings			
MAC address filter		ter Allow listed	only v			
	MAC I	ist 00:11:22:33:	44:55			

Filter – you can define a rule for what to do with the MAC list you've defined. You can either allow only the listed MACs or allow ALL, but forbid only the listed ones.

7.4.1.2.3 Advanced settings

Separate clients – prevents Wi-Fi clients from communicating with each other on the same subnet.

Increase TTL packet size – increase TTL packet size for incoming packets.

Interface Configuration						
General Setup	Wireless Security	MAC Filter	Advanced Settings			
	Separate clients 🔲					

7.4.1.3 Client

RUT9xx can work as a Wi-Fi client. Client mode is nearly identical to AP, except for the fact that most for the options are dictated by the wireless access point that the router is connecting to. Changing them can result in an interrupted connection to an AP.

In addition to standard options you can also click the **Scan** button to rescan the surrounding area and attempt to connect to a new wireless access point.

	Main WAN	Backup WAN	Interface Name	Protocol	IP Address	Sort	
(1.	۲		WiFi (WAN)	DHCP			Edit Scan
<u>.</u>)	0		Mobile (WAN2)	DHCP	-		Edit
t,	0		Wired (WAN3)	DHCP	-	••	Edit

7.5 VLAN

Tag based

On this page you can configure your Virtual LAN settings, either Port based or Tag based.

7.5.1 VLAN Networks

Field Name

1.

7.5.1.1 VLAN Functionality

VLAN Functionality	
	VLAN mode Disabled 🗸
Sample Value	Explanation
Disabled / Port based /	Lets user to choose the VLAN mode or disable VLAN

7.5.1.2 VLAN Network List

If VLAN mode – Port based:

VLAN Netwo	VLAN Networks List						
		LAN ports		Wireless access points			
VLAN ID	1	2	3	Teltonika_Router	LAN		
1	On 🔽	On 💌	On 🔽		None Delete		
Add							

	Field Name	Sample Value	Explanation
1.	VLAN ID	1	VLAN Identification number, allowed in range (1-4094)
2.	LAN ports 1 / 2 / 3	on	Switches each LAN port between ON, OFF or tagged state.
3.	Wireless access points	Enabled / Disabled	Assign selected access point(s) to selected LAN.
4.	LAN	None	Select to which LAN to assign selected LAN ports and wireless access points.

If VLAN mode – Tag based:

VLAN Networks List						
	Wireless access points					
VLAN ID	Teltonika_Router	LAN				
2		None	Delete			
Add						

	Field Name	Sample Value	Explanation
1.	VLAN ID	2	VLAN Identification number, allowed in range (1-4094)
3.	Wireless access points	Enabled / Disabled	Assign selected access point(s) to selected LAN.
4.	LAN	None	Select to which LAN to wireless access point(s).

7.5.2 LAN Networks

In this page you can create extra LAN networks, and assign them with LAN Ports and wireless access points. You can get extra information on how to configure any of your LAN's settings in section – 7.3 LAN

LAN				
LAN Networks List				
LAN name	Interface name			
Lan	eth0 tap0	Edit		
LAN name: LAN2	Add New			

	Field Name	Sample Value	Explanation
1.	LAN name	Lan	Specifies new LAN name
2.	Interface	eth0 tap0	Specifies LAN interface name
	name		

7.6 Firewall

In this section we will look over the various firewall features that come with RUT9.

7.6.1 General Settings

The routers firewall is a standard Linux iptables package, which uses routing chains and policies to facilitate control over inbound and outbound traffic.

General Settings	Port Forwarding	Traffic Rules	Custom Rules	DDOS Prevention				
Firewall eneral settings allows you to set up default firewall policy.								
General Settings								
	Drop invalid packe	ts 🗌						
	Inp	ut Accept 🔻						
	Outp	ut Accept 🔻						
	Forwa	rd Reject 🔻						

	Field Name	Sample value	Explanation
1.	Drop Invalid packets	Checked/Unchecked	A "Drop" action is performed on a packet that is determined to be invalid

2.	Input	Reject/Drop/Accept	DEFAULT* action that is to be performed for packets that pass through the Input chain.
3.	Output	Reject/Drop/Accept	DEFAULT* action that is to be performed for packets that pass through the Output chain.
4.	Forward	Reject/Drop/Accept	DEFAULT* action that is to be performed for packets that pass through the Forward chain.

*DEFAULT: When a packet goes through a firewall chain it is matched against all the rules for that specific chain. If no rule matches said packet, an according Action (either Drop or Reject or Accept) is performed.

Accept – Packet gets to continue down the next chain.

Drop – Packet is stopped and deleted.

Reject – Packet is stopped, deleted and, differently from Drop, an ICMP packet containing a message of rejection is sent to the **source** of the dropped packet.

7.6.2 **DMZ**

DMZ Configuration		
	Enable	
	DMZ host IP address	

By enabling DMZ for a specific internal host (for e.g.: your computer), you will expose that host and its services to the routers WAN network (i.e. - internet).

7.6.3 Port Forwarding

Here you can define your own port forwarding rules.

Firewall - Port Forwarding

Port forwarding allows remote computers on the Internet to connect to a specific computer or service within the private LAN.

Port Forwarding Rules						
Name	Protocol	Source	Via	Destination	Enable	Sort
Enable_SSH_WAN_PASSTHROUGH	ТСР	From any host in wan	To any router IP at port 22	Forward to IP 127.0.0.1, port 22 in Ian		Edit Delete
Enable_HTTP_WAN_PASSTHROUGH	Н ТСР	From any host in wan	To any router IP at port 80	Forward to IP 127.0.0.1, port 80 in Ian		Edit Delete
Enable_HTTPS_WAN_PASSTHROUG	ЭН ТСР	From any host in wan	To any router IP at port 443	Forward to IP 127.0.0.1, port 443 in Ian		Edit Delete
Enable_CLI_WAN_PASSTHROUGH	ТСР	From any host in wan	To any router IP at port 4200	Forward to IP 127.0.0.1, port 4200 in Ian		Edit Delete
New Port Forward Rule						
Name P	rotocol	External port (s) Internal II	o Internal port (s)	
Enable_Test_Rule	TCP+UDP 🔽	12345	192.168	12345		Add

You can use port forwarding to set up servers and services on local LAN machines. The above picture shows how you can set up a rule that would allow a website that is being hosted on 192.168.1.109, to be reached from the outside by entering http://routersExternallp:12345/.

	Field Name	Sample value	Explanation
1.	Name	Enable_SSH_WAN_PASSTHROUGH	Name of the rule. Used purely to make it easier to manage rules.
2.	Protocol	TCP/UDP/TCP+UDP/Other	Type of protocol of incoming packet.
3.	External Port	1-65535	From this port on the WAN network the traffic will be forwarded.
4.	Internal IP address	IP address of some computer on your LAN	The IP address of the internal machine that hosts some service that we want to access from the outside.
5.	Internal port	1-65535	To that port on the internal machine the rule will redirect the traffic.

When you click **edit** you can fine tune a rule to near perfection, if you should desire that.

This page allows you to change advanced properti	es of the port forwarding entry. Although, in most cases there is no need to modify those settings.	
Enable		
Name	Enable_SSH_WAN_PAS	
Protocol	ТСР	
Source zone	🔿 lan: lan: 🚉 🛬 🛜	
	Vpn: openvpn: 🖓 gre tunnel: 🔿	
	💿 wan: wan: 🔩 ppp: 🔩	
Source MAC address	any +	
Source IP address	any	
Source port	any	
External IP address	any	
External port	22	
Internal zone	💿 lan: lan: 🚉 🚉 🛜	
	vpn: openvpn: 🎧 gre tunnel: 🕥	
	🔿 wan: wan: 🔩 ppp: 🔩	
Internal IP address	127.0.0.1	
Internal port	any	
Enable NAT loopback		
Extra arguments		

	Field Name	Sample value	Explanation
1.	Name	ENABLE_SSH_WAN_PASSTHROUGH	Name of the rule. Used purely to make it easier to manage rules.
2.	Protocol	TCP/UDP/TCP+ UDP/ICMP/Custom	You may specify multiple by selecting (custom) and then entering protocols separated by space
3.	Source zone	LAN/VPN/WAN	Match incoming traffic from this zone only
4.	Source MAC address	any	Match incoming traffic from these MACs only
5.	Source IP address	any	Match incoming traffic from this IP or range only
7.	Source port	any	Match incoming traffic originating from the given source port or port range on the client host only
8.	External IP address	any	Match incoming traffic directed at the given IP address only
9.	External port	22	Match incoming traffic directed at the given destination port or port range on this host only
10.	Internal zone	LAN/VPN/WAN	Redirect matched incoming traffic to the specified internal zone
11.	Internal IP address	127.0.0.1	Redirect matched incoming traffic to the specified internal host
12.	Internal port	any	Redirect matched incoming traffic to the given port on the internal host
13.	Enable NAT loopback	Enable/Disable	NAT loopback enables your local network (i.e. behind your router/modem) to connect to a forward-facing IP address (such as 208.112.93.73) of a machine that it also on your local network
14.	Extra arguments		Passes additional arguments to iptables. Use with care!

7.6.4 Traffic Rules

The traffic rule page contains a more generalized rule definition. With it you can block or open ports, alter how traffic is forwarded between LAN and WAN and many more things.

General Settings F	Port Forwarding	Traffic Rules	Custom Rules	DDOS Preventi	on			
Firewall - Traffic Rules Fraffic rules define policies for packets traveling between different zones, for example to reject traffic between certain hosts or to open WAN ports on the router.								
Traffic Rules								
Name	Protocol	Sou	rce De	estination	Action	Enable	Sort	
Allow-DHCP-Relay	UDP	Fron	n any host in wan To po	o any router IP at ort 67 on this device	Accept input		Edit Delete	
Allow-DHCP-Renew	UDP	Fron	n any host in wan To po	o any router IP at ort 68 on this device	Accept input		Edit Delete	
Allow-Ping	ICMP with type ec	ho-request Fron	n any host in wan To th	o any router IP on iis device	Accept input		Edit Delete	

	Field Name	Explanation
1.	Name	Name of the rule. Used for easier rules management purpose only
2.	Protocol	Protocol type of incoming or outgoing packet
3.	Source	Match incoming traffic from this IP or range only
4.	Destination	Redirect matched traffic to the given IP address and destination port
5.	Action	Action to be taken for the packet if it matches the rule
6.	Enable	Self-explanatory. Uncheck to make the rule inactive. The rule will not be deleted, but it also will not be loaded into the firewall.
7.	Sort	When a packet arrives, it gets checked for a matching rule. If there are several rules that match the rule, the first one is applied i.e. the order of the rule list impacts how your firewall operates, therefore you are given the ability to sort your list as you wish.

You can configure firewall rule by clicking **edit** button.

This page allows you to change advanced properties	s of the traffic rule entry, such as matched source and destination hosts.
Enable	
Name	Allow-DHCP-Relay
Restrict to address family	IPv4 and IPv6 💙
Protocol	UDP 💌
Match ICMP type	any 🖌 🕨
Source zone	O Any zone
	🔿 lan: lan: 🔩 🔩 🐡
	Vpn: openvpn: 🕥 gre tunnel: 🔿
	💿 🗤 wan: 🔜 ppp: 🔜
Source MAC address	any
Source address	any
Source port	any
Destination zone	Device (input)
	Any zone (forward)
	🔘 Ian: Ian: 🛃 🔜 🛜
	vpn: openvpn: () gre tunnel: ()
	🔘 wan: wan: 🏊 ppp: 🏊
Destination address	any
Destination port	67
Action	accept 💙
Extra arguments	

	Field Name	Sample value	Explanation
1.	Name	"Allow-DHCP-Relay"	Used to make rule management easier
2.	Restrict to address family	IPv4 and IPV6	Match traffic from selected address family only
3.	Protocol	TCP/UDP/Any/ICMP/Custom	Protocol of the packet that is being matched against traffic rules.
4.	Match ICMP type	any	Match traffic with selected ICMP type only
5.	Source zone	any zone/LAN/VPN/WAN	Match incoming traffic from this zone only
6.	Source MAC address	any	Match incoming traffic from these MACs only
7.	Source address	any	Match incoming traffic from this IP or range only
8.	Source port	any	Match incoming traffic originating from the given source port or port range on the client host only
9.	Destination zone	Device/Any zone/LAN/VPN/WAN	Match forwarded traffic to the given destination zone only
10.	Destination address	any	Match forwarded traffic to the given destination IP address or IP range only
11.	Destination port	67	Match forwarded traffic to the given destination port or port range only
12.	Action	Drop/Accept/Reject + chain + additional rules	Action to be taken on the packet if it matches the rule. You can also define additional options like limiting packet volume, and defining to which chain the rule belongs

7.6.4.1 Open Ports On the Router

Open Ports On Ro	uter		
Name	Protocol	External port	
Open_Port_rule	TCP	• 22	Add

	Field Name	Sample value	Explanation
1.	Name	Open_Port_rule	Used to make rule management easier
2.	Protocol	TCP/UDP/Any/ICMP/Custom	Protocol of the packet that is being matched against traffic rules.
3.	External port	1-65535	Match incoming traffic directed at the given destination port or port range on this host.

7.6.4.2 New Forward Rule

	New Fo	orward Rule				
	Name		Source	Destination		
	Forward	d rule new	LAN 🗸	WAN 💌	Add	
Field Name		Sample value		Explanation		
Name		Forward rule	new	Used to make rule	management easier	
Source		LAN/VPN/WA	N	Match incoming tr	affic from selected a	

2	2.	Source	LAN/VPN/WAN	Match incoming traffic from selected address family only
11	3.	Protocol	TCP/UDP/Any/ICMP/Custom	Protocol of the packet that is being matched against traffic rules.

7.6.4.3 Source NAT

1.

Source NAT is a specific form of masquerading which allows fine grained control over the source IP used for outgoing traffic, for example to map multiple WAN addresses to internal subnets.

Source NAT								
Source NAT is a specific form of masquerading which allows fine grained control over the source IP used for outgoing traffic, for example to map multiple WAN addresses to internal subnets.								
Name	Protocol	Source	Destination		SNAT	Enable		
SNAT	TCP+UDP	From any host in Ian	To any host,	port 22 in wan	Rewrite to source IP 10.101.1.10, port 22		Edit Delete	
New Source NAT								
Name			Source	Destination	Source IP		Source port	
New Sh	NAT rule		LAN 💌	WAN 🗸			Do not rewrite Add	

	Field Name	Sample value	Explanation
1.	Name	SNAT	Used to make rule management easier

2.	Protocol	TCP/UDP/Any/ICMP/Custom	Protocol of the packet that is being matched against traffic rules.
3.	Source	LAN/VPN/WAN	Match incoming traffic from selected address family only
4.	Destination	LAN/VPN/WAN	Forward incoming traffic to selected address family only
5.	SNAT	Rewrite to source IP 10.101.1.10	SNAT (Source Network Address Translation) rewrite packet\'s source IP address and port
6.	Enable	Enable/Disable	Make a rule active/inactive

You can configure firewall source NAT rule, by clicking **edit** button.

This page allows you to change advanced properti	ies of the traffic rule entry, such as matched source and destination hosts.
Enable	V
Name	SNAT
Protocol	All protocols 💌
Source zone	💿 Ian: lan: 🔩 🚉 🥽
	O vpn: openvpn:∩ gre tunnel:∩
	🔿 🗰 wan: 🗟 ppp: 📓
Source MAC address	any
Source IP address	any
Source port	any
Destination zone	🔘 lan: lan: 🔜 🔩 🤝
	O vpn: openvpn:∩ gre tunnel:∩
	💿 😡 wan: wan: 🚉 ppp: 🚉
Destination IP address	✓
Destination port	any
SNAT IP address	10.101.1.10
SNAT port	22
Extra arguments	

	Field Name	Sample value	Explanation
1.	Name	SNAT	Used to make rule management easier
2.	Protocol	TCP/UDP/Any/ICMP/Custom	Protocol of the packet that is being matched against traffic rules.
3.	Source zone	LAN/VPN/WAN	Match incoming traffic from this zone only
4.	Source MAC address	any	Match incoming traffic from these MACs only
5.	Source address	any	Match incoming traffic from this IP or range only
6.	Source port	any	Match incoming traffic originating from the given source port or port range on the client host only
7.	Destination zone	LAN/VPN/WAN	Match forwarded traffic to the given destination zone only
8.	Destination IP address	Select from the list	Match forwarded traffic to the given destination IP address or IP range only
9.	Destination port	any	Match forwarded traffic to the given destination port or port range only

10.	SNAT IP address	"10.101.1.10"	Rewrite matched traffic to the given IP address
11.	SNAT port	"22"	Rewrite matched traffic to the given source port. May be left empty to only rewrite the IP address'
12.	Extra arguments		Passes additional arguments to iptables. Use with care!

7.6.5 Custom Rules

Here you have the ultimate freedom in defining your rules – you can enter them straight into the iptables program. Just type them out into the text field ant it will get executed as a Linux shell script. If you are unsure of how to use iptables, check out the internet for manuals, examples and explanations.

General Settings	Port Forwarding	Traffic Rules	Custom Rules	DDOS Prevention	Port Scan Prevention				
Firewall - Custom Rules Custom rules allow you to execute arbritary iptables commands which are not otherwise covered by the firewall framework. The commands are executed after each firewall restart, right after the default ruleset has been loaded.									
# This file is interpreted # Put your custom iptab # be executed with each	les rules here, they will								
# put custom rules into	ains are flushed and rec the root chains e.g. INPL a.g. input_wan_rule or po	JT or FORWARD or	into the						
Reset						Save			

7.6.6 **DDOS Prevention**

7.6.6.1 SYN Flood Protection

SYN Flood Protection allows you to protect from attack that exploits part of the normal TCP three-way handshake to consume resources on the targeted server and render it unresponsive. Essentially, with SYN flood DDoS, the offender sends TCP connection requests faster than the targeted machine can process them, causing network saturation.

General Settings	Port Forwarding	Traffic Rules	Custom Rules	DDOS Prevention	Port Scan Prevention	
DDOS Preven	tion					
SYN Flood Protecti	on					
E	nable SYN flood protectior	n 🔽				
	SYN flood rate	25				
	SYN flood burs	50				
	TCP SYN cookies	6				

	Field Name	Sample value	Explanation
1.	Enable SYN flood protection	Enable/Disable	Makes router more resistant to SYN flood attacks.
2.	SYN flood rate	"25"	Set rate limit (packets/second) for SYN packets above which the traffic is considered a flood.
3.	SYN flood burst	"50"	Set burst limit for SYN packets above which the traffic is considered a flood if it exceeds the allowed rate.
4.	TCP SYN cookies	Enable/Disable	Enable the use of SYN cookies (particular choices of initial TCP sequence numbers by TCP servers).

7.6.6.2 Remote ICMP requests

Attackers are using ICMP echo request packets directed to IP broadcast addresses from remote locations to generate denial-of-service attacks.

Remote ICMP requests	
Enable ICMP requests	
Enable ICMP limit	
Limit period	Second •
Limit	10
Limit burst	5

	Field Name	Sample value	Explanation
1.	Enable ICMP requests	Enable/Disable	Blocks remote ICMP echo-request type
2.	Enable ICMP limit	Enable/Disable	Enable ICMP echo-request limit in selected period
3.	Limit period	Second/Minute/Hour/Day	Select in what period limit ICMP echo-request
4.	Limit	"10"	Maximum ICMP echo-request during the period
5.	Limit burst	"5"	Indicating the maximum burst before the above limit kicks in.

7.6.6.3 SSH Attack Prevention

Prevent SSH (Allows a user to run commands on a machine's command prompt without them being physically present near the machine.) attacks by limiting connections in defined period.

SSH Attack Prevention	
Enable SSH limit	
Limit period	Second 🔻
Limit	10
Limit burst	5

Field Name

Sample value

1.	Enable SSH limit	Enable/Disable	Enable SSH connections limit in selected period
2.	Limit period	Second/Minute/Hour/Day	Select in what period limit SSH connections
3.	Limit	"10"	Maximum SSH connections during the period
4.	Limit burst	"5"	Indicating the maximum burst before the above limit
			kicks in.

7.6.6.4 HTTP Attack Prevention

HTTP attack sends a complete, legitimate HTTP header, which includes a 'Content-Length' field to specify the size of the message body to follow. However, the attacker then proceeds to send the actual message body at an extremely slow rate (e.g. 1 byte/110 seconds). Due to the entire message being correct and complete, the target server will attempt to obey the 'Content-Length' field in the header, and wait for the entire body of the message to be transmitted, hence slowing it down.

HTTP Attack Prevention	
Enable HTTP limit	
Limit period	Second •
Limit	10
Limit burst	10

	Field Name	Sample value	Explanation
1.	Enable HTTP limit	Enable/Disable	Limits HTTP connections per period
2.	Limit period	Second/Minute/Hour/Day	Select in what period limit HTTP connections
3.	Limit	"10"	Maximum HTTP connections during the period
4.	Limit burst	"10"	Indicating the maximum burst before the above limit kicks in.

7.6.6.5 HTTPS Attack Prevention

HTTPS Attack Prevention			
Enable HTTPS limit			
Limit period	Second		
Limit	10		
Limit burst	10		

	Field Name	Sample value	Explanation
1.	Enable HTTPS limit	Enable/Disable	Limits HTTPS connections per period
2.	Limit period	Second/Minute/Hour/Day	Select in what period limit HTTPS connections
3.	Limit	"10"	Maximum HTTPS connections during the period
4.	Limit burst	"10"	Indicating the maximum burst

7.6.7 Port Scan Prevention

7.6.7.1 Port Scan

Port Scan		
Enable		
Interval	30	
Scan count	10	

	Field Name	Sample value	Explanation
1.	Enable	Enable/Disable	Enable port scan prevention
2.	Interval	30	Time interval in seconds counting how much port scan $(10-60 \text{ sec.})$
3.	Scan count	10	How much port scan before blocked

7.6.7.2 Defending type

Defending type	
	SYN-FIN attack 📃
	SYN-RST attack 📃
	X-Mas attack 📃
	FIN scan 📃
	NULLflags attack 📃
L	

	Field Name	Explanation
1.	SYN-FIN attack	Protect from SYN-FIN attack
2.	SYN-RST attack	Protect from SYN-RST attack
3.	X-Mas attack	Protect from X-Mas attack
4.	FIN scan	Protect from FIN scan
5.	NULLflags attack	Protect from NULLflags attack

7.7 Routing

7.7.1 Static Routes

Static routes specify over which interface and gateway a certain host or network can be reached.

5 Dynamic Rout	es			
Static Routes				
ver which interface and	l gateway a certain host or	network can be reach	ed.	
tes				
Interface	Destination address	Netmask	Gateway	Metric
WAN (Mobile) 🔽	0.0.0.0	0.0.0.0		0 Delete
WAN2 (Wired) 🖌	0.0.0.0	0.0.0.0		0 Delete
WAN3 (WIFI)	0.0.0.0	0.0.0.0		0 Delete
				Save
	utes er which interface and es Interface WAN (Mobile) 👻	utes er which interface and gateway a certain host or es Interface Destination address WAN (Mobile) V 0.0.0 WAN2 (Wired) V 0.0.0	utes er which interface and gateway a certain host or network can be reached es Interface Destination address WAN (Mobile) 0.0.0.0 WAN2 (Wired) 0.0.0.0	utes er which interface and gateway a certain host or network can be reached. es Interface Destination address Netmask Gateway WAN (Mobile) ♥ 0.0.0 0.0.0 0.0.0 WAN2 (Wired) ♥ 0.0.0 0.0.0 0.0.0

	Field name	Value	Explanation
1.	Routing table	MAIN/WAN/WAN2/WAN3	Defines the table to use for the route
2.	Interface	MAIN/WAN/WAN2/WAN3	The zone where the target network resides
3.	Destination address	IP address	The address of the destination network
4.	Netmask	IP mask	Mask that is applied to the Target to determine to what actual IP addresses the routing rule applies
5.	Gateway	IP address	To where the router should send all the traffic that applies to the rule
6.	Metric	integer	Used as a sorting measure. If a packet about to be routed fits two rules, the one with the higher metric is applied.

Additional note on Target & Netmask: You can define a rule that applies to a single IP like this: Target - some IP; Netmask - 255.255.255.255. Furthermore you can define a rule that applies to a segment of IPs like this: Target – some IP that STARTS the segment; Netmask – Netmask that defines how large the segment is. E.g.:

192.168.55.161	255.255.255.255	Only applies to 192.168.55.161
192.168.55.0	255.255.255.0	Applies to IPs in range 192.168.55.0-192.168.55.255
192.168.55.240	255.255.255.240	Applies 192.168.55.240 - 192.168.55.255
192.168.55.161	255.255.255.0	192.168.55.0 - 192.168.55.255
192.168.0.0	255.255.0.0	192.168.0.0 - 192.168.255.255

7.7.2 Dynamic Routes

7.7.2.1 General

Dynamic routes provide dynamic routing which enables router to select paths according to real-time logical network layout changes.

Static Rou	Static Routes Dynamic Routes				
General	OSPF Protocol	General Protocols			
Dynam	Dynamic Routes				
General Se	General Settings				
		Enable			
		Router ID 192.168.1.1			
			Save		

	Field name	Value	Explanation
1.	Enable	Enable/Disable	Enable dynamic routes
2.	Router ID	192.168.1.1	Router's ID

7.7.2.2 OSPF Protocol

7.7.2.2.1 OSPF General Instance

General OSPF Protocol Gener	ral Protocols
OSPF Protocol Configuration	on
OSPF General Instance	
Ena	ble 🔲
8	tub 🔲
RFC1583 compatib	ility 🗖
Imp	All 💙
Exp	oort All

	Field name	Value	Explanation
1.	Enable	Enable/Disable	Enables OSPF protocol
2.	Stub	Enable/Disable	Enable/Disable stub
3.	RFC1583 compatibility	Enable/Disable	Enables OSPF compatibility with RFC1583 specification
4.	Import	All/None/custom	Set if the protocol must import routes
5.	Export	All/None/custom	Set if the protocol must export routes

7.7.2.2.2 OSPF Area

The OSPF network can be divided into sub-domains called areas.

Area name	Enable	
OSPF_area	No	Edit Delete

	Field name	Value	Explanation
1.	Area name	OSPF_area	OSPF area's name
2.	Enable	Yes/No	Enable/disable OSPF area

To see at specific configuration settings press **"edit"** button located in newly created OSPF area. A new page with detailed configuration appears, as shown in the picture below.

Area Instance: OSPF_area		
Main Settings		
Enabled		
Stub		
OSPF interface		
Interface		
There are no interfaces created yet		
Interface br-lan V Add New		
OSPF networks		
IP Hidden		
There are no networks created yet		
New IP: Add New		
Back to Overview Save		

	Field name	Value	Explanation
1.	Enabled	Enable/Disable	Enable specific OSPF area
2.	Stub	Enable/Disable	Enable/disable stub
3.	Interface	br-lan	A interface that new instance will have
4.	New IP		Name of the new OSPF network configuration. Used for easer configurations management purpose only

7.7.2.3 General Protocol

General OSPF Protocol General Protocols	
General Protocols Configuration	
Kernel Options	
Enable 🗌	
Learn 🔲	
Persist	
Scan time 20	
Import All	×
Export All	*
Device Options	
Enable 🗌	
Scan time	

	Field name	Value	Explanation			
1.	Enable	Enable/Disable	Enable/Disable settings			
2.	Learn	Enable/Disable	Enables routes learning			
3.	Persist	Enable/Disable	If checked it allows to store routes. After a restart, routes will be still configured			
4.	Scan time	20	Time between scans			
5.	Import	All	Set if the protocol must import routes			
6.	Export	All	Set if the protocol must export routes			
7.	Enable	Enable/Disable	If checked the protocol will not be configured			
8.	Scan time	10	Time between scans			

7.7.2.3.1 Static Routes

Static Routes			
Prefix	Туре		
There are no static route	s created yet		
New Static Route			
Prefix	Туре		
Prefix	Router	Add	
		Sa	ve

	Field name	Explanation
1.	Prefix	Protocol prefix of incoming or outgoing packet
2.	Туре	Protocol type of incoming or outgoing packet

7.8 Load Balancing

Policies									
Policy	Me	mbers assigne	d	Ratio	Sort				
balanced	Mo Wii			3 2	••		Edit	Delete	
	A	dd							
Rule	Source address	Source port	Destination address	Destinati port	ion	Protocol	Policy assigned	Sort	
default_rule	_	_	0.0.0.0/0	_		all	balanced	e e Ec	lit

Load balancing lets users divide traffic between different interfaces.

8 Remote monitoring and administration

RUT9XX supports multiple monitoring and administration possibilities. One can get routers information through SMS or using RMS (Remote Management System). Furthermore, some system related parameters can be obtained using MODBUSD or MQTT publisher services. How to use them are described in the 9.19 and 9.20 chapters respectively. The main focus is on parameters, which change from time to time, like signal strength, operators name (it is quite common to change of operator name in countries where inner roaming is used) or module temperature. Although it is also possible to read more static values, like MAC address, router's serial number and many others. The access to the mentioned parameters is implemented in both MODBUSD and MQTT publisher applications. Apart from getting of some parameters, MODBUSD also supports setting of some system related parameter, for example, change value of digital output. Although it sounds frustrating, this functionality is sometimes useful and necessary.

Some applications, like MQTT publisher or RMS allows monitoring or administrating several routers from one place. It is very useful functionality, when you have few routers and would like to change some parameter using single application. RMS share some similarities with SSH (Secure Shell) and indeed, one of RMS feature is to allows SSH access to remote router. There is no separate chapter about RMS in this manual, because the interface of RMS is very intuitive and user friendly. You can access RMS by using your browser with supplied username and a password at

By sending SMS to the router the user can execute some command, like reboot, switch wifi on or off and many others. With each SMS the user need to specify router's administrator password. This is done for authentication purposes. The list of commands that may be executed through the SMS is limited. Full list of commands can be found on Services-SMS Utilities of routers WEB page. More about router's management using SMS can found in chapter 9.8.

Another interesting router monitoring solution is SNMP (Simple Network Management Protocol). By not going into deep details about this protocol, it is another manner to monitor router parameters. It allows the user to check current operator, modem model and other router parameters. Compared to other applications and services, only SNMP have ability to inform the user about the occurrence of specific event (called trap) in the system. The main drawback of this protocol is, that it does not allow to change anything. You can read more about SNMP in chapter 8.9.

Apart from services mentioned earlier, there is one service, which is used only for communication between router and Android type device (phones, etc'). It is called json-rpc and allows to set or get various parameters of the system.

JSON-RPC can execute the same commands, like user through SSH. To sum up, this approach opens wide possibilities in communication between router and Android. However, there is no separate topic about JSON-RPC in this manual, because this type of communication is generally not for end-user use.

Each approach has its advantages and disadvantages. In some situations, maybe MQTT publisher works better than MODBUSD, while in others, MODBUSD will be the better choice. The most versatile manner of system monitoring and administration is through SSH. The SSH provides complete control of the router. The user can execute commands, write shell scripts and do many other things. In such case, the user only needs application to connect router through SSH. The most popular application used in Windows type operating systems is called Putty. If you try to connect to router from Unix like operating system, you only need to execute ssh command with some arguments, like hostname and username (in this case – root).

Sometimes the use of SSH is not necessary, so other more conservative services/applications are used. The complete list of applications and services, which can be used for router administration and monitoring are given below. It can be seen, that all applications, except MQTT publisher and SNMP supports setting/getting of some system related parameter.

	Application	Can obtain parameters	Can set parameters
1.	MQTT publisher	•	0
2.	MODBUS daemon	•	•
3.	SSH	•	•
4.	RMS	•	•
5.	SMS	•	•
6.	SNMP	•	0
7.	JSON-RPC	•	•

By summarizing, RUT9XX provides several solutions for router management. Each user can choose what solution to use. If required functionality is not found in particular service, the user can combine several applications, for example, use MQTT publisher along with SNMP. Finally, if user has special needs, he can write shell script and execute it via SSH or use json-rpc.

9 Services

9.1 VRRP

9.1.1 VRRP LAN Configuration Settings

VRRP LAN Configuration Settings	
Enable	
IP address	192.168.1.253
Virtual ID	1
Priority	100

	Field name	Sample	Explanation
1.	Enable	Enable/Disable	Enable VRRP (Virtual Router Redundancy Protocol) for LAN
2.	IP address	192.168.1.253	Virtual IP address for LAN's VRRP (Virtual Router Redundancy Protocol) cluster
3.	Virtual ID	1	Routers with same IDs will be grouped in the same VRRP (Virtual Router Redundancy Protocol) cluster, range [1-255]
4.	Priority	100	Router with highest priority value on the same VRRP (Virtual Router Redundancy Protocol) cluster will act as a master, range [1-255]

9.1.2 **Check Internet connection**

		Check in	ternet connection		
			E	Enable [
			Ping IP ad	ddress	8.8.4.4
			Ping in		10
		Ping timeou		t (sec)	1
			Ping packe	et size	50
			Ping retry	count	100
	Field name		Sample	Expl	anation
1.	Enable		Enable/Disable	Enat	ole WAN's connection monitoring
2.	Ping IP address	5	8.8.4.4	A ho	ost to send ICMP (Internet Control Message Protocol) pac
R	Ping interval		10	Time	e interval in seconds between two Pings

3.	Ping interval	10	Time interval in seconds between two Pings
4.	Ping timeout (sec)	1	Response timeout value, interval [1 - 9999]
5.	Ping packet size	50	ICMP (Internet Control Message Protocol) packet's size, interval [0 - 1000]
6.	Ping retry count	100	Failed Ping attempt's count before determining that connection is lost, interval [1 – 9999]

9.2 **TR-069**

TR-069 is a standard developed for automatic configuration and management of remote devices by Auto Configuration Servers (ACS).

9.2.1 TR-069 Parameters Configuration

TR-069 Parameters Configuration		
Enable		
Enable Periodic Transmission		
User name	admin]
Password	•••••	ø
URL	http://192.168.1.110:808(

	Field name	Sample	Explanation
1.	Enable	Enable/Disable	Enable TR-069 client
2.	Enable Periodic Transmission	Enable / Disable	Enable periodic transmissions of data to server
3.	User name	admin	User name for authentication on TR-069 server
4.	Password	*****	Password for authentication on TR-069 server
5.	URL	http://192.168.1.110:8080	TR-069 server URL address

9.3 Web filter

9.3.1 Site blocking

Site Blocking	Proxy Based Content Blocker		
Site Blocking Settings			
Site Blocking	Site Blocking		
	Enable Mode Whitelist		
Enable	Host name		
	www.yahoo.com Delete		
Add			

	Field name	Sample	Explanation
1.	Enable	Enable/Disable	Enable host name based websites blocking
2.	Mode	Whitelist/Blacklist	Whitelist - allow every site on the list and block everything else. Blacklist - block every site on the list and allow everything else.
3.	Enable	Enable/Disable	Check to enable site blocking
4.	Host name	www.yahoo.com	Block/allow site with this hostname

9.3.2 **Proxy Based Content Blocker**

Site Blocking	Proxy Based Content B	ocker			
Proxy Based URL Content Blocker Configuration					
Proxy Based UR	Proxy Based URL Content Blocker				
	Enable				
	Mode	Blacklist •			
URL Filter Rules	URL Filter Rules				
Enable	URL content				
	example.com	Delete			

	Field name	Sample	Explanation
1.	Enable	Enable/Disable	Enable proxy server based URL content blocking. Works with HTTP protocol only
2.	Mode	Whitelist/Blacklist	Whitelist - allow every part of URL on the list and block everything else. Blacklist - block every part of URL on the list and allow everything else
3.	URL content	example.com	Block/allow any URL containing this string. Example.com, example.*, *.example.com

9.4 NTP

NTP configuration lets you setup and synchronize routers time.

General Time Servers		
Time Synchronisation		
General		
Current system time	2016-03-09 08:32:52	Sync with browser
Time zone	UTC	
Enable NTP	V	
Update interval (in seconds)	3600	
Save time to flash		
Count of time synchronizations		
Clock Adjustment		
Offset frequency	0	
		Save

	Field name	Description
1.	Current System time	Local time of router.
2.	Time zone	Time zone of your country.
3.	Enable NTP	Enable system's time synchronization with time server using NTP (Network Time

		Protocol)
4.	Update interval	How often router updates systems time
5.	Save time to flash	Save last synchronized time to flash memory
6.	Count of time synchronizations	Total amount of times that router will do the synchronization. Note: If left blank - the count will be infinite
7.	Offset frequency	Adjust the minor drift of the clock so that it will be more accurate

Note, that under **Time Servers** at least one server has to be present, otherwise NTP will not serve its purposes.

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		
		TELTONIKA Status Network Services System	Logout 🖻
		R\$232 R\$485	
		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 - Add	
			Save

Teltonika solutions

www.teltonika.lt

	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 increase 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.

TELTONIKA Status No.	etwork - Services - System -	Logout 🖻
R\$232 R\$485		
RS485 Configuration		
RS485 Serial Configuration		
Enabled		
Baud rate	115200 💌	
Parity	None 💌	
Flow contro	None 💌	
Serial type	Console	
Interface	Allow IP	
This section contains no values yet		
Interface name: LAN 💌 Add		
		Davia

	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.

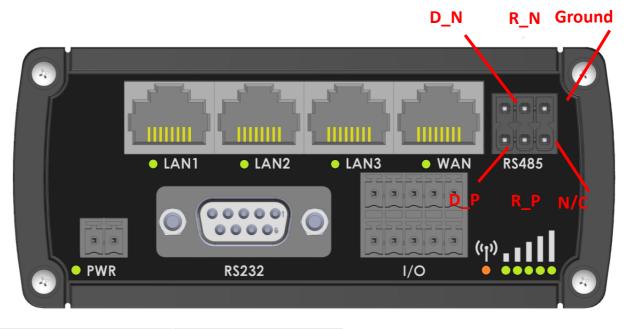
Twisted pair is the prefered cable for RS-485 networks. Twisted pair cables picks up noise and other electromagnetically induced voltages as common mode signals, which are rejected by the differential receivers.

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)

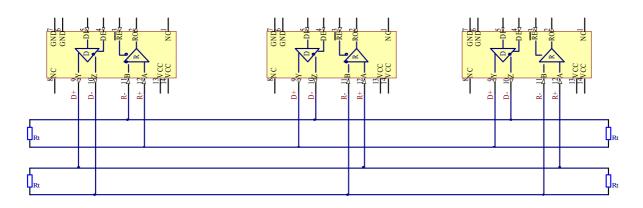
9.5.2.3 RS485 connector pin-out



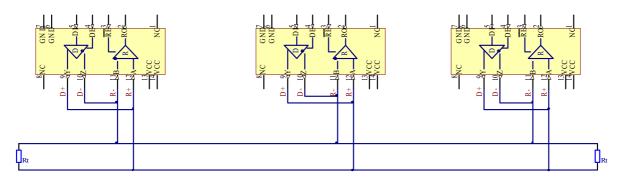
Name	Description	Туре
D_P	Driver positive signal	Differential Output
D_N	Driver negative signal	Differential Output
R_P	Receiver positive signal	Differential input
R_N	Receiver negative signal	Differential input
Ground	Device ground	Differential Output

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)

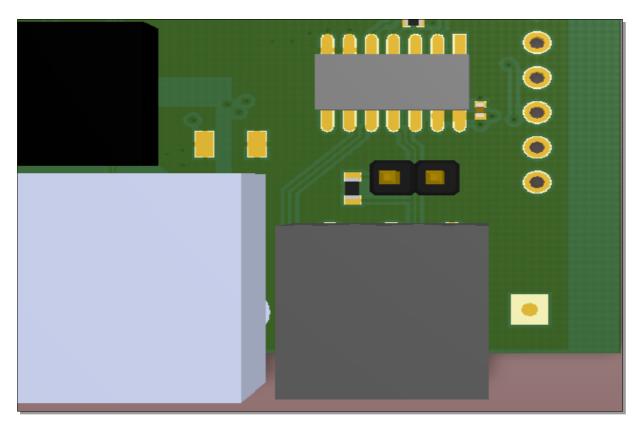
Termination resistor, equal in resistance to cable characteristic impedance, must be connected at each end of the cable to reduce reflection and ringing of the signals when the cable lengths get relatively long. Rise time of the RUT9XX RS-485 driver is about 5ns, so maximum unterminated cable length 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 $12k\Omega$. 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}> 375 Ω .

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

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
А	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</port></host>
E	Local echo	Turn local echo on: ATE1 Turn local echo off: ATE0
Н	Hang up current call	To end data connection: ATH
0	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	IPsec	GRE Tunnel	PPTP	L2TP			
OpenVP	OpenVPN						
OpenVPN C	onfiguratio	on					
Tunnel name		Т	UN/TAP		Protocol	Port	Enabled
There are no openVPN configurations yet							
Role: Client	▼ New c	onfiguration name:	demo		Add New		

OpenVPN	IPsec GRE Tunnel	PPTP L2TP						
 New Open∨PN	New Open∀PN instance was created successfully. Configure it now							
OpenVPN	ı							
OpenVPN Con	figuration							
Tunnel name	TUN/TAP	Protocol	Port	Enable				
Client_demo	Tun_c_demo	UDP	1194		Edit Delete			
Role: Client	 New configuration name 	e:		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).

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.

OpenVPN Instance: Client_demo

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	Ð
Enable keepalive	V	
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]

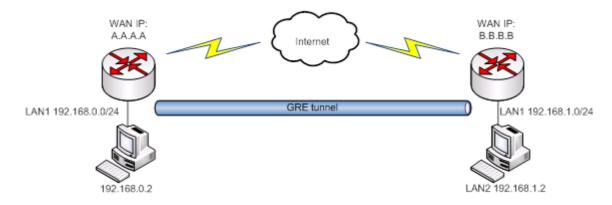
Phase 1 and **Phase 2** must be configured accordingly to the IPSec server configuration, thus algorithms, authentication and lifetimes of each phase must be identical.

Phase							
The phase must match with another incoming connection to establish IPSec							
Phase 1	Phase 2						
		Encryption algorithm	3DES 💌				
		Authentication	SHA1 💌				
		DH group	MODP1536				
		Lifetime (h)	8 Minutes 🗸				
Phase							
Phase							
	st match with	another incoming coni	nection to establish IPSec				
	st match with Phase 2	another incoming coni	nection to establish IPSec				
The phase mu		another incoming con	action to establish IPSec 3DES				
The phase mu							
The phase mu		Encryption algorithm	3DES Y				

	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.

OpenVPN	IPsec	GRE Tunnel	PPTP	L2TP						
Gre-tun	Gre-tunnel Instance: Gre_tunnel									
Main Settings										
		Ena	bled 🖌							
Remote endpoint IP address			ress 84.1	48.7.87						
Remote network			work 192.	168.2.0						
Remote network netmask			nask 24							
Local tunnel IP		el IP 10.0	.0.1							
Local tunnel netmask		nask 24								
		Ν	NTU 1500)						
			TTL 255							
PMTUD			TUD 🖉							
		Enable Keep a	alive 🖌							
		Keep Alive I	host							
		Keep Alive inte	erval							

	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).

OpenVPN	IPsec	GRE Tunnel	PPTP	L2TP				
PPTP S	erver In	stance: Ppt	pd_serv	/er				
Main Setting	js							
		Er	able 📃					
		al IP 192.	168.0.1					
	Remote IP range start			168.0.20				
		Remote IP range	end 192.	168.0.30				
User name		Pa	issword			User IP		
youruser			•••••		ø			Delete
Add								
								Save

	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	•••••	ø
Back to Overview		Save

	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.

ain Setting	s						
		Enal	ble 📃				
		Local	IP 192.16	8.0.1			
		Remote IP range be	gin 192.16	8.0.20			
		Remote IP range e	nd 192.16	i8.0.30			
Jser name				Password			
user				••••	ø	Delete	
Add							

	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	ø					

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	•••••	Ø
IP source	Custom •	
Network	WAN T	
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	 dydns.org 3322.org no-ip.com easydns.com 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	Call Utilities	User Groups	SMS Management	Remote Config	uration	Statistics	
SMS Utilitie	s						
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 statu	S	vpnstatus				Edit	Delete

- 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
- 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.

- 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

SMS Utilities	Call Utilities	User Groups	SMS Manager	nent Remote Configu	ration Statistics	
SMS Conf	iguration					
lodify SMS Ru	ıle					
		Enable 🔽				
		Action Re	boot	*		
		SMS text reb	pot			
		SMS	text, which let you reboo	ot your router. E.g. "reboot"		
	Authorizati	on method No	authorization	~		
	Allo	wed users Fro	m all numbers 🗸 🗸			
	Get status via SMS a	after reboot 🔽				
	Get ir	nformation:				
	Me	WA Cor Cor Sig	iter name - %rn; N IP - %wi; Data inection state - %cs; inection type - %ct; nal Strenght - %ss; v 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 - %w Curren FW version - %fc Operator name - %on Signal strength - %ss IMSI - %in Event text - %ex LAN IP - %ii WAN IP address - %wi	
Back to Ov	erview					Save

	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	

- î

		when this rule is met.	
	Enable SMS Status	This check box will enable and	SMS status is disabled by default.
		disable SMS status function.	,
	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
			in 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 set	tings	
	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.

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. (It his box is selected, SMS will disable HTTP access from LAN. Enable remote HTTP Enable this to reach router via HTTP from LAN. (Vide 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 VAN. Enable remote HTTPS Enable this to reach router via ALTPS from VAN (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 VAN. 12. Restore to default If this box is selected, SMS will enable HTTPS access 13. Fore control to be performed when this rule is met. Allows to restore router to default settings via SMS. 13. Fore switch SIM Management. Password. 14. Authorization method What kind of authorization to use for SIM management. Allows SIM switch via SIMS. 13. Fore switch SIM SMS text with will change active sim and second performed when this rule is met. Allows SIM switch via SIMS. 14. Authorization method What kind of authorization to use for SIM management. Allows SIM switch via SIMS. 14. Fore cervict SIM SMS text with with with rule is met. <			use for SIM management.	password.
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. Enable remote HTTP access Enable this to reach router via HTTPs for WAN (Wide Area Network). If this box is not selected, SMS will enable HTTP access from WAN. 12. Restore to default 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 SMS text which will turn Wi-Fi use for SIM management. No authorization, by serial or by router admin password. Action The action to be performed when this rule is met. Allows SIM switch via SMS. SMS text SMS text which will chanagement. Allows SIM switch via SMS. Action The actor to be performed when this rule is met. SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters. SMS text SMS text which will chanagement. Allows SIM switch via SMS. Authorization		Allowed users		· ·
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		Enable		Allows to upgrade router's Config via SMS.
		Action		Router will reboot after this rule is executed.

_			CNAC have any size latters where any and	
	SMS text	SMS text which will force router to upgrade configuration from	SMS text can contain letters, numbers, spaces and special symbols. Capital letters also matters.	
		server.		
	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/o	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			
17.	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.	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, for	mat 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 out	tput 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 🛛

S	Sa	/e	

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

international format. You 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 Utilities	Call Utilities	User Groups	SMS Management	Remote Configuration	Statistics	
Read SMS	Send SMS S	Storage				
SMS Messages						
SMS per page 1	0 🗸				Search	
Date 🕈			Sender •	Messag	je 🔹	•
2016-05-05 13:51	:56		+370612345678	Labas		
Showing 1 to 1 of 1	entries					
				Refresh	Delete	Select all

9.8.4.2 Send SMS

Read SMS Send SMS	Storage	
Send SMS		
Send SMS Message		
	Phone Number	+3701111111
	Message	My text.
		SMS 1 (152 characters left)
		Send

	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.

Read SMS Send SMS Storage	
SMS Storing	
Configuration	
Save messages on SIM	
SIM card memory	Used:0 Available: 50
Leave free space	1
	Save

	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 C	Send Configuration					
Configurati	on Messa	ige				
Network	VPN					
		Generate SMS	New	~		
		WAN	\checkmark			
		Interface	Mobile 💙			
		Primary SIM card	SIM1 🔽			
		Mobile connection	Use pppd mode 🖌			
		APN	internet.mnc012.mcc34c]		
Dialing number			+3706000001]		
		Authentication method	CHAP 🔽			
		User name	admin]		
		Password	•••••	ø		
		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	Generate new SMS settings or use current device

		configuration	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	"+3706000001"	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	Send Configuration Message				
network.wan.ifname=eth1, network.ppp.enabled=0, n network.wan.ipaddr=217.147.40.44, network.wan.netr network.wan.gateway=217.147.40.44, network.wan.b	nask=255.255.255.0,				
Phone number	+3706000001				
Authorization method	No authorization				
	(Send			

	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	"+3706000001"	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.

SMS Utilities	Call Utilities	User Groups	SMS Management	Remote Configuration	Statistics	
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	V				
Enable remote access	\checkmark				
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 Tra Host/I Po Communit	P 192.168.99.155 rt 162				
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	Email To SMS	Scheduled S	MS Auto Reply	SMS Forwarding	SMPP	
Post/Ge	et Configurati	on				
SMS Post/G	et Settings					
		Enable	7			
		User name	admin			
		Password	•••••	ø		
						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	Explanati on		
http:// {IP_ADDRESS}	<pre>/cgi-bin/sms_read? username={your_user_name}&password={your_password}&number={MESSAGE_INDEX} /cgi-bin/sms_send? username={your_user_name}&password={your_password}&number={PHONE_NUMBER} &text={MESSAGE_TEXT}</pre>			
	<pre>/cgi-bin/sms_delete? username={your_user_name}&password={your_password}&number={MESSAGE_INDEX} /cgi-bin/ sms_list? username={your_user_name}&password={your_password}</pre>	Delete message List all message s		
	/cgi-bin/sms_ total? username={your_user_name}&password={your_password}	Number of message s 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.	ОК	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

Post/Get	Email To SMS	Scheduled	SMS	Auto Reply	SMS Forwarding	SMPP		
POP3 E	POP3 Email To SMS Configuration							
Email To SI	mail To SMS Settings							
		Enable						
		POP3 server	pop.gm	ail.com]			
		Server port	995]			
		User name	admin					
		Password	admin0	1	ø			
	Secure co	onnection (SSL)						
	Che	eck email every	1 -	Minutes -				
								Save

	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	un	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	"+3706000001"	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 SMS Forwa	arding To SMS SMS Forwarding To Email				
SMS Forwarding To HTTP Configuration					
SMS Forwarding To HTTP Settings	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
	420		

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	+3706000001			

	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	+3706000001	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**

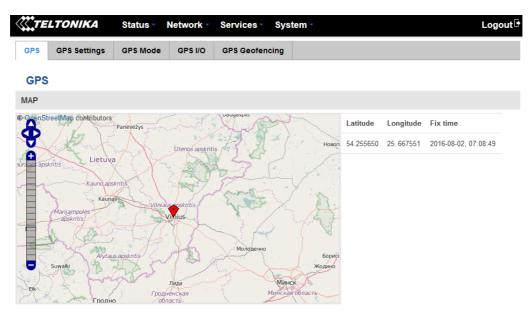
Post/Get	Email To SMS	Scheduled	I SMS	Auto Reply	SMS Forwarding	SMPP
SMPPS	Server Config	uration				
Transmitter	Configuration					
		Enable				
		User name	admin]	
		Password	•••••	•	ø	
		Server port	7777]	

	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



9.11.2 GPS Settings

This is the GP	his is the GPS parameters comfiguration page.								
	() TE	LTONIKA	Status -	Network -	Services -	System			Logout 🖻
	GPS	GPS Settings	GPS Mode	GPS I/O	GPS Geofenc	ing			
	GPS	Configuratio	'n						
	GPS Se	ttings							
			Enable GPS ser	vice 🔽					
		Enable	GPS Data to se	erver					
		Ren	note host/IP add	ress 212.47.99	9.61				
			I	Port 17050					
			Prot	ocol TCP -]				
									Save

	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

(() TE	LTONIKA	Status -	Network -	Services *	System -		Logout
GPS	GPS Settings	GPS Mode	GPS I/O	GPS Geofen	cing		
Gps	Mode Config	uration					
Data se	nding						
		Min per	iod 5				
		Min distar	1Ce 200				
		Min an	gle 30				
		Min saved reco	rds 20				
		Send per	iod 60				
Rules							
Wan	Туре	Digital isolated input	Min period	Min saved records	Send period	Enable	Sort
Mobile	Home	Low	5	20	60	×.	Edit Delete
GPS Co	onfiguration						
Wan	Туре	Digita Input	al Isolated				
Mobile	Home	• Low	•	Add			
							Save
Teltonika	solutions						www.teltonika

Data sending

Values

Notes

Field na

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 automatically 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.	Туре	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

((), TE	LTONIKA	Status -	Network -	Services -	System -		Logout 🖻
GPS	GPS Settings	GPS Mode	GPS I/O	GPS Geofenci	ng		
GPS	I/O Configur	ation					
Check	Analog						
		Interval [se	ec] 5				
Input R	ules						
Input	Priority	Generate eve	nt	Enable	Sort		
There are	e no gps rules create	d yet					
GPS In	put Configuration	I					
Input typ	oe Trigge	r					
Digital	▼ Input	open 🔻	Add				
							Save

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

TELTONIKA	Status 👻 I	Network -	Services -	System	-		Logout 🖻
GPS GPS Settings	GPS Mode	GPS I/O	GPS Geofen	ing			
GPS Data Config	uration						
	Enal	ble 🔽					
	Input ty	rpe Digital	•				
	Trigg	ger Input ope	en 💌				
	Prior	rity Low -	·				
Back to Overview							Save

	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

(), TE	LTONIKA	Status -	Network -	Services - Sys	tem -	Logout	
GPS	GPS Settings	GPS Mode	GPS I/O	GPS Geofencing			
GPS	Geofencing						
Geofer	ncing						
		Ena	ble 📃				
		Longitude	(X) 0.000000				
		Latitude	(Y) 0.000000				
		Rad	ius 200				
	Get	t current coordina	tes Get				
			×				

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

Wireless Hotspot Configuration								
General Settings								
Main Settings	Session Settings							
	Enable							
	AP IP							
	Authentication mode	Without radius 🖌						
	External landing page							
	Landing page address							
	Protocol	HTTP 💌						
	HTTPS redirect							

Users Configuration										
User name	Password	ldle 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.	ΑΡ ΙΡ	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 Addres	ses The Client Can Access Witho	out First Authenticating							
Enable Add	iress	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	Rest	ricte	d Inte	met A	Acces	s	Log	ging	L	andin	ig Pag	ge	Rad	ius S	erver									
Telterille	Teltonika Router																							
Teitonika_	Route																							
Internet Access Restriction Settings																								
Select Time	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																								
Intern	Internet access allowed																							
Intern	et acce	ess blo	ocked																					

9.12.3 **Logging**

9.12.3.1 Configuration

Γ

Configuration	Log								
Wireless Hotspot Logging Settings									
Logging To FTP Settings									
		Enable	\checkmark						
		Server address	your.ftp.server						
		username							
		•••••	ø						
		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

Configuration 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.

General	Template					
Wireless Hotspot Landing Settings						
Landing Page Settings						
	Page title Teltonika Hotspot					
	Theme Custom 💙					
	Upload login page Browse No file si	elected.				
	Login page file Download					
	Demo preview					
🕑 Terms (Of Services					
🖲 Backgr	ound Configuration					
🖲 Logo In	nage Configuration					
🕑 Link Co	onfiguration					
🕑 Text Co	onfiguration					

	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.

General Template	
Landing Page Template Editor	
Modify login page template by your needs	
<html lang="en"> <html <="" h<="" html="" lang="en" th=""><th></th></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html></html>	
Reset	

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.

General	Restricted	Internet Access	Logging	Landing Page	Radius Server	Statistics	
Radiu	s Server C	Configuration					
General S	ettings						
		Enable					
		Remote access					
		Accounting port	1813				
		Authentication port	1812				
Users Co	nfiguration Se	ettings					
Enable	User name	Reply message	Idle timeou	ut Session time	out Download	d bandwidth	Upload bandwidth
There are n	o users created	yet.					
Username			Ρ	assword			
							Add
Clients Co	onfiguration S	Settings					
Enable	Client r	name	IP address	Netma	sk Rad	ius shared secre	t
There are n	o clients created	l yet.					
Add							

	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.

General	Restricted Internet	Access	Logging	Landing Page	e Radius Sei	ver Statistics		
Hotspo	t Statistics							
Hotspot sta	atistics							
Events per p	age 10 🔻						Search	
Username 🕈		IP 🕈	MAC + S	tart 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 Status Vetwork Services System	Logout 🖻
Teltonika login: root Password:	A
BusyBox v1.19.4 (2016-05-05 14:14:22 EEST) built-in shell (ash) Enter 'help' for a list of built-in commands.	
I	
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

Ping Reboot	Periodic Reboot							
Periodic R	Periodic Reboot							
Periodic Reboo	t Setup							
		Enable						
		Days	 Sunday Monday Tuesday Wednesday Thursday Friday Saturday 					
		Hours	23					
	1	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.

Settings	
General Settings	Advanced Settings
	Enable
	Use secure mode

9.15.2 Advanced Settings

Settings		
General Settings	Advanced Settings	
	Use UPnP port mapping	
U	se 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 exter	nal ports may be redirected to	which internal addresses and por	ts		
Comment	External ports	Internal addresses	Internal ports	Action	Sort
Allow high ports	1024-65535	0.0.0.0/0	1024-65535	allow 🗸	Delete
Add					

	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 redirec	ts.				

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 nam	e: 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

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).

Mounted file sys	tems	Samba	Samba user						
Network Shares									
Mounted file syst	Mounted file systems								
Filesystem	Mount	Point	Available	Used					
/dev/sda1	/mnt/sd	a1	7.84 GB / 14.65 GB	47% (6.81 GB)	Safely Remove Disk				
						Refresh C			

	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.

Mounted file systems	Samba Saml	ba user				
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	+		Delete
Add						
						Save

	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.

Mounted file systems	Samba	Samba user	
Samba users			
Users			
Username			
This section contains no valu	ies yet		
Add user:			
Username	Password		
user	pass1	ø	Add

	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.

	↓ TELTONIKA Status → Network	 Services 	System -	Logout
Sta	tatus Input Output			
Ir	nput/Output Status			
Тур	De	Associated pins	S	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)		GND (digital & analog input)	1 2 3 4 5
2	Digital isolated input (04V: low logic level / 930V: hi level)	gh logic	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)	678910

Relay output (NO)

Teltonika solutions

Relay output (COM) (24V, 4A)

www.teltonika.lt

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.

(TEL	ΤΟΝΙΚ	A Stat	us - Ne	etwork -	Services -	System -		Logout 🗗	
Status	Input	Output							
Input/	Output								
Create rules	Create rules for Input/Output configuration.								
Check Analog									
		I	nterval [sec	3					
Input Rul	es								
Туре		Trigger		Act	tion	Enable	Sort		
There are r	no input rule	s created yet							
Input Cor	nfiguratio	n							
Input type		Analog type	Trigg	jer	Action				
Analog		Analog Voltage Analog Voltage		de range	Send SMS	- Add			
		Analog Curren	t					Save	

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

Input Rules				
Туре	Trigger	Action	Enable	Sort
Digital	Input open	Send SMS		Edit Delete

	Field name	Sample	Explanation
1.	Туре	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 Analog Voltage Analog Current	Inside range -	Send SMS	Add			
		_			Save		

	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.

	KA Status Ne	etwork - Services - System - Logo	ıt 🖻
Status Input	Output		
Input Config	guration		
	Enable	e 🖸	
	Input type	e Analog -	
	Analog type	e Voltage (up to 24V)	
	Min [V]	ŋ [10]	
	Max [V]	ŋ 15	
	Triger	er Inside range	
	Action	n Activate output	
	Output activated	d While exist -	
	Output type	e Relay output	
Back to Oven	view	Save	

	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 address	sender@example.com	Specify your email address. Only shown when Action is Send email
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	ON/OFF	Post/Get Configuration	Periodic Control	Scheduler					
Output Configura	Output Configuration								
Output configuration in	active state								
	Open collector	output Low level							
	Relay	output Contacts closed							
					Save				

	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 Configuration	ON/OFF	Post/Get Configuration	Periodic Control	Scheduler	
Output					
Output					
	Digital OC outp	Dut Turn on			
	Digital relay out	Dut 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

Output Configuration	ON/OFF	Post/Get Configuration	Periodic Control	Scheduler	
Post/Get Config	uration				
Output Post/Get Setting	IS				
	Ena	ble			
	Userna	me user1			
	Passw	ord pass1	ø		

	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&delay=15&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=off&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=off&pin=c

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.

TELTO	NIKA S	tatus 👻 Netv	vork - Services	 System 			Logout 🖻
Status Ir	output						
Output Conf	iguration OI	N/OFF Post/	Get Configuration	Periodic Control	Scheduler		
Periodic	Output Cor	ntrol					
Control Rule	s						
Action	Mode	Action timeo	ut Days		Enable		
On	Fixed	10	Wed		1	Edit	Delete
Add							
							Save

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.

on/OFF Post	//Get Configuration	Periodic Control	Scheduler		
ontrol	_	Periodic Control	Scheduler		
Enable	_				
Enable	_				
Output	Digital OC output				
Action	On 💌				
Action timeout					
Timeout (sec)					
Mode	Fixed -				
Hours					
Minutes					
	Action Action timeout Timeout (sec) Mode Hours Minutes Days	Action On Action timeout Timeout (sec) Mode Fixed Hours	Action On C Action timeout Timeout (sec) Mode Fixed V Hours Minutes Days Ø Monday Useday Useday Useday Useday Gaussian Useday Useday Useday Useday Useday Useday Useday Saturday	Action On Conception Action timeout Conception Timeout (sec) Mode Fixed Conception Hours Days Monday Tuesday Tuesday Wednesday Conception Thursday Saturday	Action On C Action timeout Timeout (sec) Mode Fixed C Hours Minutes Days I Monday Useday Useday Useday G Useday G Useday G Useday G Useday G Useday G G G G G G G G G G G G G G G G G G G

Back to Overview

	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

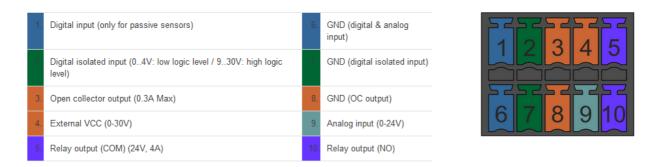
9.18.3.7 Scheduler

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 Con	figura	ation	C)N/OF	F	Pos	t/Get	Conf	igura	tion	Pe	eriodi	c Cor	ntrol	S	ched	uler							
Output	Sch	edu	ler																					
Configure S	ched	uled	Outp	uts																				
					0	utput	Digi	tal rela	ay out	put 🛓														
Days/Hours	0-1 h	1-2h	2-3h	3-4h	4-5h	5-6h	6-7h	7-8h	8-9h	9-10h	10-11h	11-12h	12-13h	13-14	14-15	15-16h	16-171	17-18	18-191	19-201	20-211	h 21 -22 h	22-23h	23-24 h
Monday																								
Tuesday																								
Wednesday																								
Thursday																								
Friday																								
Saturday																								
Sunday																								
Digital	OC o	utput a	active																					
Digital	relay	output	activ	e (rela	y cont	acts c	losed)																	
Both a	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:



Туре	Description	Ratings	QTY
Input (digital)	Digital non-isolated input for passive sensors	3V Max	1
Input(digital)	Digital input with galvanic isolation	04V – low level 930V – 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

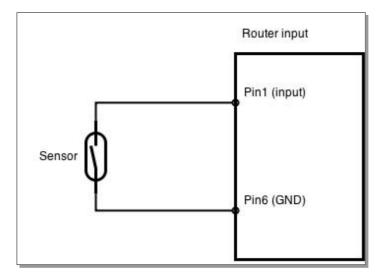
9.18.4.1 Digital input for passive sensors

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:

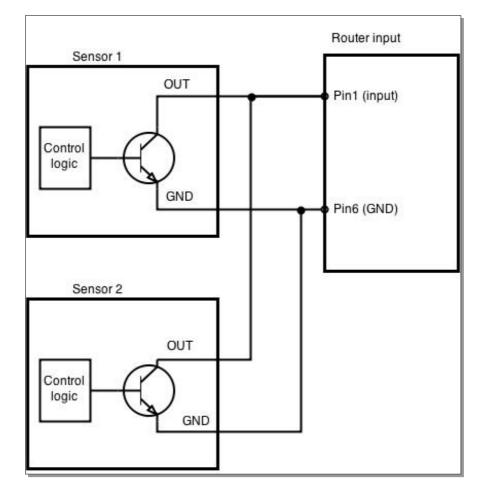
Passive infrared (PIR) sensors for motion detection (sensors with open collector or relay output are suitable type to use)	· · · · · · · · · · · · · · · · · · ·
Mechanical Switches, pushbuttons	
	SPST
Reed switches, which opens or closes its contacts when magnetic field is near	HAR
Any sensor with open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

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



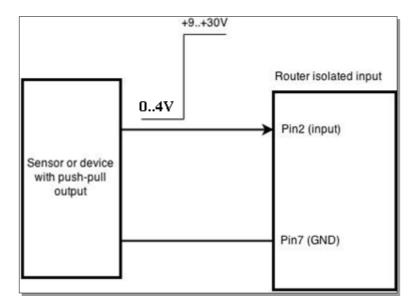
Example schematic of connecting multiple sensors with open collector outputs:

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 100 $\!\Omega$.

Input voltage levels:

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

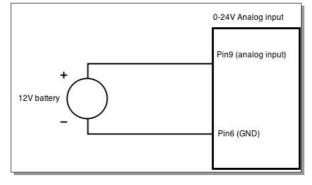
Maximum ratings:

- 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.

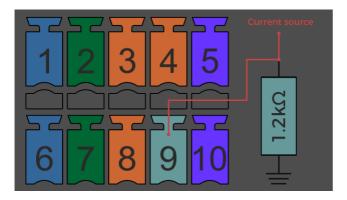
9.18.4.3 Analog input

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 $1.2k\Omega$ 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:

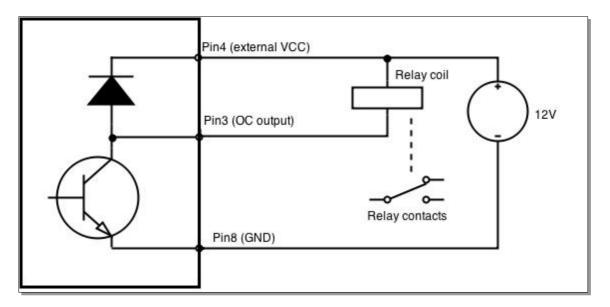
Input voltage range, V	Measurement error, %
0 <vin≤ 1<="" td=""><td><20</td></vin≤>	<20
1 <vin≤ 2<="" td=""><td><10</td></vin≤>	<10
2 <vin≤ 5<="" td=""><td><5</td></vin≤>	<5
5 <vin≤ 24<="" td=""><td><3</td></vin≤>	<3

9.18.4.4 Open collector output

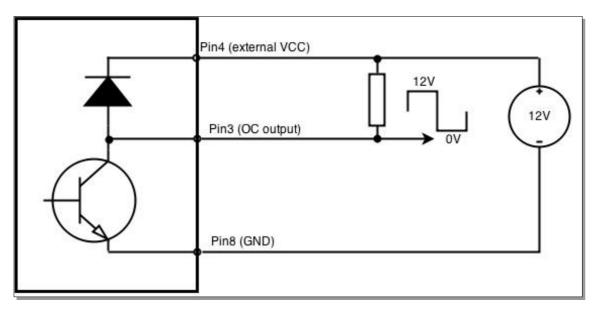
This output can be used to drive external relay. In order for the output to work correctly, external voltage that is connected to a relay also needs to be connected to I/O header pin 4. There is flyback diode located inside the device to protect it from spikes occurring when inductive load (relay coil) 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 $4.7k\Omega$.

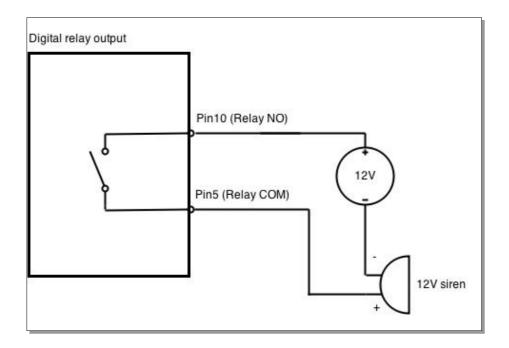


9.18.4.5 Relay output

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.

Broker	Publisher		
MQTT	Broker		
		Enable	
		Local Port	
		Enable Remote Access	
Broker se	ettings		
Security	Bridge	Miscellaneous	
		Use TLS/SSL	
			Save

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)

Security	Bridge	Miscellaneous	
		Use TLS/S	SL 🕑
		CA F	ile Browse No file selected.
		CERT F	ile Browse No file selected.
		Key F	ile Browse No file selected.
		TLS version	on 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.

	Miscellaneous	Bridge	Security
	Enab		
	Connection Nam		
	Remote Addre		
1883	Remote Po		
· •	Use Remote TLS/SS		
	Jse Remote Bridge Log	U	
+	Тор		
	Try Priva		
	Clean Sessio		

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.

,

Security	Bridge	Miscellaneous	
		ACL F	ile Browse No file selected.
		Password F	Browse No file selected.
		Persisten	ce 📃
		Allow Anonymo	us 🖌

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.

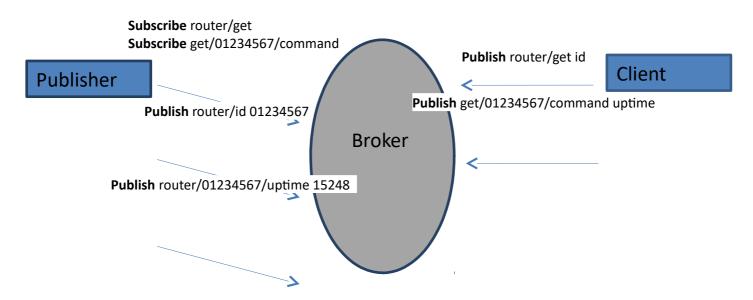
Broker	Publisher				
MQTT	Publishe	r			
		Enable	×		
		Hostname			
		Port			
		Username			
		Password			
					Save

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.



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.

Save

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 1 - General	Step 2 - Mobile	Step 3 - LAN	Step 4 - WiFi				
Step - Gener	Step - General						
First, let's change your r	outer password from the	default one.					
Password Settings							
	New password	•••••	ø				
	Confirm new password	•••••	ø				
Time Zone Settings	;						
	Current system time	2016-03-16 09	27:33	Sync with browser			
	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

Step 1 - General	Step 2 - Mobile	Step 3 - LAN	Step 4 - WiFi				
Mobile Configuration							
Next, let's configure you	r mobile settings so yo	u can start using int	ernet right away.				
Mobile Configuratio	on (SIM1)						
	Operator pro	file None		~			
	Al	PN					
	PIN numb	per					
	Dialing numb	ber *99#					
Authentication method		od None 🔽					
	Service mo	de 4G (LTE) pref	erred 💌				
Show	mobile info at login pa	ge 🗌					

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 1 - General Step 2 - Mobile Ste	ep 3 - LAN Step 4 - WiFi
Step - LAN	
Here we will setup the basic settings of a typical LAN	I 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
Skip Wizard	Save

Step 4 (Wi-Fi)

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

Step 1 - General Step 2 - Mobile S	itep 3 - LAN Step 4 - WiFi					
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					
Skip Wizard	Save					

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

General	Troubleshoot	Backup	Access Control	Diagnostics	MAC Clone	Overview	Monitoring		
Admin	Administration Settings								
Router Na	Router Name And Host Name								
		Router nam							
		Host nam	e Teltonika						
Administr	ator Password								
		New passwor	d	ø					
	Confir	m new passwor	d	ø					
Language	Settings								
		Languag	e English 💌						
IPv6 Supp	ort								
		Enabl	e 🔲						
Login Pag	e								
	Show mobile	info at login pag	e 🗌						
	Show WA1	N IP at login pag	e 🗌						
Leds indic	ation								
		Enabl	e 🗹						
Restore D	efault Settings								
		Restore to defau	It 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**

General	Troubleshoot	Backup	Access Control	Diagnostics
Trouble	eshoot Settin			
Troublesho	ot			
	S	ystem log level	Debug 🖌	
		Save log in	RAM memory	*
	Include GSI	MD information		
	Include PPI	PD information		
	Include chat sc	ript information		
In	clude network topolo	ogy information		
		System log	Show	
		Kernel log	Show	
	Tr	oubleshootfile	Download	

	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.		

10.3.3 Backup

General	Troubleshoot	Backup	Access Control	Diagnostics	MAC Clone
Backuj	0				
Backup Co	nfiguration				
	E	Backup archive:	Download		
Restore Co	nfiguration				
	Resto	re from backup:	Upgrade from file Browse No file Upload archive	selected.	

	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

General	Troubleshoot	Backup	Access Control	Diagnostics	MAC Clone
General	Safety				
Access	Control				
SSH Acces	s Control				
	Enab	le SSH access	V		
	Remo	te SSH access			
		Por	22		
Web Acces	s Control				
	Enable	e HTTP access			
	Enable remote	e HTTP access			
		Por	80		
	Enable remote	HTTPS access			
		Por	443		
CLI Config	uration				
		Enable CLI			
	Ena	ble remote CLI			
		Por	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	Enables remote HTTP access to router
	access	
6.	Port	Port to be used for HTTP communication
7.	Enable remote	Enables remote HTTPS access to router
	HTTPS access	
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

General Troubleshoot Backup	Access Control	Diagnostics	MAC Clone	Overview	Monitoring			
General Safety								
Block Unwanted Access								
SSH Access Secure	SSH Access Secure							
Ena	ble 📃							
Clean after reb	oot 🔲							
Fail co	unt 5							
WebUI Access Secure								
Ena	ble 📃							
Clean after reb	oot 🔲							
Fail co	unt 5							
List Of Blocked Addresses								
Events per page 10				Sea	rch			
Service •		Blocked addres	ss •	Bloc	ked 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**

General	Troubleshoot	Backup	Access Control	Diagnostics	MAC Clone	Overview	Monitoring
Diagno	stics						
Network Ut	ilities						
ŀ	Host						
Ac	tion Ping	Tracerou	te Nslookup				

	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**

General	Troubleshoot	Backup	Access Control	Diagnostics	MAC Clone	Overview	Monitoring	
MAC A	ddress Clone	e						
MAC Addr	ess Clone							
	WAN MAC address	02:1E:10:1F:	00:00 Get	PC MAC address		Save Re	estore to default	

	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).

General	Troubleshoot	Backup	Access Control	Diagnostics	MAC Clone	Overview	Monitoring	
Overvi	Overview Page Configuration							
Overview ⁻	Tables							
		Mobil	e 🗹					
		SMS counte	ir 🗌					
		System	n 🗹					
		Wireles	s 🗹					
		WAI	N 🗹					
		Local networ	k 🗹					
		Access contro	ol 🗹					
	Rece	ent system event	s 🗹					
	Rece	nt network event	s 🗹					
	Teltonik	a_Router Hotspo	ot 🔲					
		VRRI	•					
		Monitorin	g 🔲					

	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</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.

TELT	CELTONIKA Status Network Services System Logout						
General	Troubleshoot	Backup	Access Control	Diagnostics	MAC Clone	Overview	Monitoring
Remote	e Monitoring						
Remote Ac	cess Control						
	Enable rer	mote monitoring	g 🔽				
Status							
Monitoring			Enabled				
Connection s	tate		Connected to moni	toring system			
Router LAN N	/IAC address		00:1E:42:1E:42:10				
Router serial	number		77885555				
							Refresh C
							Save

	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.							
# Put your custom commands here that should be executed once # the system init finished. By default this file does nothing.							
exit 0							
Upload script file Browse No file selected.							
Upload							
Backup script file Download							
Reset							

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.

Create	Load						
Creat	Create Restore Point						
Create Restore Point And Download							
Title	Download						

10.5.2 **Restore point load**

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

Create Load							
Load Restore Point							
Restore Point							
File Browse No file selected.	Load						

10.6 Firmware

10.6.1 Firmware

TELTONIKA	Status - Network - Service	s - System -	Logout	
Firmware FOTA				
Firmware				
Current Firmware Inform	nation	Firmware Available On Server		
Firmware version	RUT9XX_R_00.02.341	Firmware version	RUT9XX_R_00.02.345	
Firmware build date	2016-05-04, 15:12:44			
Kernel version	3.10.36		Check for New FW	
Firmware Upgrade Setti	ings			
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 Browse No file	selected.		
Upgrade				

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.

10.6.2 **FOTA**

Firmware	FOTA				
Firmware Over The Air Configuration					
Server Settin	gs				
	Server add	dress http://rms.teltonika.lt/fota/			
	Userr	name admin			
	Pass	sword ••••••			
	Enable auto d	check 🔽			
	Auto check r	mode 🛛 On router startup 💌			
	WAN	wired			

	Field name	Explanation	
1.	Server address	Specify server address to check for firmware updates. E.g. "http://teltonika.sritis.lt/rut9xx_auto_update/clients/"	
2.	User name	User name for server authorization.	
3.	Password	Password name for server authorization.	
4.	Enable auto check	Check box to enable automatic checking for new firmware updates.	
5.	Auto check mode	Select when to perform auto check function.	
6.	WAN wired	Allows to update firmware from server only if routers WAN is wired (if box is checked).	

10.7 Reboot

Router reboot	
Warning! During reboot you will temporarily lose the connection.	
Pakast	
Reboot	

Reboot router by pressing button "Reboot".

11 Device Recovery

The following section describes available options for recovery of malfunctioning device. Usually device can become unreachable due to power failure during firmware upgrade or if its core files were wrongly modified in the file system. Teltonika's routers offer several options for recovering from these situations.

11.1 Reset button

Reset button is located on the back panel of the device. Reset button has several functions:

Reboot the device. After the device has started and if the reset button is pressed for up to 4 seconds the device will reboot. Start of the reboot will be indicated by flashing of all 5 signal strength LEDs together with green connection status LED.

Reset to defaults. After the device has started if the reset button is pressed for at least 5 seconds the device will reset all user changes to factory defaults and reboot. To help user to determine how long the reset button should be pressed, signal strength LEDs indicates the elapsed time. All 5 lit LEDs means that 5 seconds have passed and reset button can be released. Start of the reset to defaults will be indicated by flashing of all 5 signal strength LEDs together with red connection status LED. SIM PIN on the main SIM card is the only user parameter that is kept after reset to defaults.

11.2 Bootloader's WebUI

Bootloader also provides a way to recover the router functionality when the firmware is damaged. To make it easier to use bootloader has its own webserver that can be accessed with any web browser.

Procedure for starting bootloader's webserver:

Automatically. It happens when bootloader does not detect master firmware. Flashing all 4 Ethernet LEDs indicate that bootloader's webserver has started.

Manually. Bootloader's webserver can be requested by holding reset button for 3 seconds while powering the device on. Flashing all 4 Ethernet LEDs indicates that bootloader's webserver has started.

Bootloader's WebUI can be accessed by typing this address in the web browser:

Note: it may be necessary to clear web browser's cache and to use incognito/anonymous window to access bootloader's WebUI.

12 Glossary:

WAN – Wide Area Network is a telecommunication network that covers a broad area (i.e., any network that links across metropolitan, regional, or national boundaries). Here we use the term WAN to mean the external network that the router uses to reach the internet.

LAN – A local area network (LAN) is a computer network that interconnects computers in a limited area such as a home, school, computer laboratory, or office building.

DHCP – The Dynamic Host Configuration Protocol (DHCP) is a network configuration protocol for hosts on Internet Protocol (IP) networks. Computers that are connected to IP networks must be configured before they can communicate with other hosts. The most essential information needed is an IP address, and a default route and routing prefix. DHCP eliminates the manual task by a network administrator. It also provides a central database of devices that are connected to the network and eliminates duplicate resource assignments.

ETHERNET CABLE – Refers to the CAT5 UTP cable with an RJ-45 connector.

AP – Access point. An access point is any device that provides wireless connectivity for wireless clients. In this case, when you enable Wi-Fi on your router, your router becomes an access point.

DNS – Domain Name Resolver.A server that translates names such as to their respective IPs. In order for your computer or router to communicate with some external server it needs to know it's IP, its name "" just won't do. There are special servers set in place that perform this specific task of resolving names into IPs, called Domain Name servers. If you have no DNS specified you can still browse the web, provided that you know the IP of the website you are trying to reach.

ARP – Short for Adress Resolution Protocol,a used to convert an into a physical address (called a), such as an address.

PPPoE – Point-to-Point Protocol over Ethernet. PPPoE is a specification for connecting the users on an Ethernet to the internet through a common broadband medium, such as DSL line, wireless device or cable modem.

DSL – digital subscriber line - it is a family of technologies that provide internet access by transmitting digital data using a local telephone network which uses the public switched telephone network.

NAT – network address translation – an internet standard that enables a local-area network (LAN) to use one set of IP addresses for internet traffic and a second set of addresses for external traffic.

LCP – Link Control Protocol – a protocol that is part of the PPP (Point-to-Point Protocol). The LCP checks the identity of the linked device and either accepts or rejects the peer device, determines the acceptable packet size for transmission, searches for errors in configuration and can terminate the link if the parameters are not satisfied.

BOOTP – Bootstrap Protocol – an internet protocol that enables a diskless workstation to discover its own IP address, the IP address of a BOOTP server on the network, and a file to be loaded into memory to boot the machine. This enables the workstation to boot without requiring a hard or floppy disk drive.

TCP – Transmission Control Protocol – one of the main protocols in TCP/IP networks. Whereas the IP protocol deals only with packets, TCP enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent.

TKIP – Temporal Key Integrity Protocol – scrambles the keys using hashing algorithmand, by adding an integritychecking feature, ensure that the keys haven't been tampered with.

CCMP – Counter Mode Cipher Block Chaining Message Authentication Code Protocol – encryption protocol designed for Wireless LAN products that implement the standards of the IEEE 802.11i amendment to the original IEEE802.11 standard. CCMP is an enchanged data cryptographic encapsulation designed for data confidentiality and based upon the Counter Mode with CBC-MAC (CCM) of the AES (Advanced Encyprion Standard) standard.

MAC – Media Access Control – hardware address that uniquely identifies each node of a network. In IEEE 802 networks, the Data Link Control (DCL) layer of the PSO Reference Model is divided into two sub-layers: the Logical Link Control (LLC) layer and the Media Access Control layer. The MAC layer interfaces directly with the network medium. Consequently, each different type of network medium requires a different MAC layer.

DMZ – Demilitarized Zone – a computer or small subnetwork that sits between a trusted internal network, such as a corporate private LAN, and an untrusted external network, such as the public internet.

UDP – User Datagram Protocol – a connectionless protocol that, like TCP, runs on top of IP networks. Provides very few error recovery services, offering instead a direct way to send and receive datagrams over IP network.

VPN – Virtual Private Network – a network that is constructed by using public wires — usually the Internet — to connect to a private network, such as a company's internal network.

VRRP – Virtual Router Redundancy Protocol - an election protocol that dynamically assigns responsibility for one or more virtual router(s) to the VRRP router(s) on a LAN, allowing several routers on a multiaccess link to utilize the same virtual IP address.

GRE Tunnel – Generic Routing Encapsulation - a tunneling protocol developed by Cisco Systems that can encapsulate a wide variety of network layerprotocols inside virtual point-to-point links over an Internet Protocol internetwork.

PPPD – Point to Point Protocol Daemon – it is used to manage network connections between two nodes on Unixlikeoperating systems. It is configured using command-line arguments and configuration files.

SSH – Secure SHell - a program to log into another computer over a network, to execute commands in a remote machine, and to move files from one machine to another. It provides strong authentication and secure communications over insecure channels.

VRRPD – Virtual Router Redundancy Protocol – it is designed to eliminate the single point of failure associated with statically routed networks by automatically providing failover using multiple LAN paths through alternate routers.

SNMP – Simple Network Management Protocol - a set of protocols for managing complex networks. SNMP works by sending messages, called *protocol data units (PDUs)*, to different parts of a network.

13 Changelog

Nr.	Date	Version	Comments
1	2017-02-01	1.26	