RBMTX-Lite-IO USER MANUAL







Elproma Elektronika Sp. z o.o. Ul. Szymanowskiego 13 05-092 Łomianki k/Warszawy

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1 Document history

Revision	Date	Changes	
#1.0	16.01.2019	Preliminary version	



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2 Package

2.1 Box

User can find product sticker on the box which matches sticker placed on the device - it proves that your router is an original product. More information about stickers are in chapter Product sticker

2.2 Package contents

Complete package contains:

- 1. RBMTX-Lite-IO router
- 2. Antenna GSM (SMA connector)
- 3. Power adapter
- 4. Wall holder



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2.3 Router versions

There are many ways to upgrade your RBMTX-Lite-IO router. List below shows typical configuration and different combinations (variants) of this router.

Option	Typical Option		
Power supply	9-30V	-	
Memory	256MB RAM, 512MB MicroSD card (part used for Linux system, the size of SD card can be changed in the future)		
Processor	Cortex A7, max. 528MHz, I.MX6UL(L)	-	
RS232	System console -		
RS485	1	-	
GPIO	3 x Inputs, 3 x outputs -		
Connection	UMTS/LTE Cat. 1 LTE Cat. 4		
Dual SIM	available -		
LAN	Ethernet 10/100Mbps -		



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3 General presentation

3.1 External connections

3.1.1 GSM/UMTS/LTE antenna connector

SMA antenna connector placed on front panel is used to connect external GSM/UMTS/LTE. It must be connected to establish a connection with GSM/UMTS/LTE network. In good circumstances (good coverage, level of received signal is high) use antenna which is included in package. When signal strength is poor please use outdoor directional/omnidirectional or indoor antenna.

<u>Note:</u> If antenna is not connected, connection with GSM/UMTS/LTE network will be impossible.

3.1.2 Router serial port, either full RS232/RS485

Serial RS232/RS485 (RJ-45 connector marked as "RS232/485") is placed on front panel of router. Serial connector pinout is described in a tables below.

vei		
RS232 RS485	2x RS485	RB-MTX
	RJ45	
А	A1	1
5V	5V	2
В	B1	3
GND	GND	4
ΤХ	A2	5
RX	B2	6
RTS	NC	7
CTS	NC	8

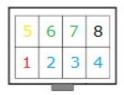
	Rb-MTX	RS232	RS 485
	RJ45	DB9F	DB9F
Α	1	nc	1
5∨	2	2	2
В	3	3	nc
GND	4	nc	nc
ТХ	5	5	5
RX	6	ns	6
RTS	7	7	nc
CTS	8	8	nc



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3.1.3 GPIO connector

Router has 8-pin GPIO connector marked as "IO". Below is the schema and pinout of GPIO connector.



"IO" connector schema

Pin no.	Signal	Description
1	3.3 V	-
2	IN1	Digital Input 1, range 03,3V*
3	IN2	Digital Input 2, range 03,3V*
4	IN3	Digital Input 3, range 03,3V*
5	OC1	Open collector Output
6	OUT1	Digital Output 1, range 03,3V
7	OUT2	Digital Output 2, range 03,3V
8	GND	Ground

Table 1. GPIO connector pinout

* - can be extended to Digital Input, range from 0 to max. 30V (option)

3.1.4 LAN connector

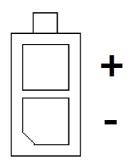
Second RJ-45 connector (marked as "LAN") is placed next to serial connector and is used for communication with PC or laptop through Ethernet interface. WWW configuration is available in the web browser (default IP address is 192.168.1.234). You can change the default address in <u>"Local network"</u> tab.



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3.1.5 Power supply connector

Please use power adapter which is included in package. It ensures "clean" power supply input and avoids short transients on power supply lines originating from inductive load switching. Power supply range of RBMTX-Lite-IO router is 9-30V and below is the pinout of 2-pin power supply connector.



Power supply connector pinout

NOTE: The device is switched off by removing the external power supply from the electric socket. The electric socket must be located close to the device and easily accessible.



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3.1.6 SIM card holders

One SIM card holder is placed in front panel of RBMTX-Lite-IO and the second one is located inside the device. To insert SIM card into the extractable holder **push yellow button and take SIM drawer out** as show in the picture and place SIM card. To operate the module in a GSM network, it is necessary to insert at least one active SIM card.

3.2 Product sticker

A production sticker includes the following information:

- Product serial number
- CE marking
- 15-digit bar code
- model signature (RBMTX-Lite-IO)



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3.3 LED operation

Router has four LED indicating its operation. The diode description is presented in the table below.

Diode	Color	Description
U1	Red	User controlled
U2	Blue	Router activity
S	Yellow	 Network indicator: RBMTX-Lite-IO 3G: Flicker slowly (200ms ON, 1800ms OFF) – Network searching Flicker slowly (1800ms ON, 200ms OFF) – Idle/Data transfer Always ON – Voice/CSD calling RBMTX-Lite-IO 4G: Flicker slowly (200ms ON, 1800ms OFF) – Network searching Flicker slowly (1800ms ON, 200ms OFF) – Idle Flicker slowly (1800ms ON, 200ms OFF) – Idle Always ON – Voice calling
PWR	Green	Power supply



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4 Basic features and services

Basic features and available services are contained in table below.

Feature / service	Description
Supported bands	UMTS variant: • GSM 900/1800 MHz • UMTS 900/2100 MHz LTE variant: • GSM 900/1800 MHz • WCDMA FDD B1, B8 Class 3 • LTE FDD B1, B3, B7, B8, B20, B28A
Data features	 LTE Cat. 1 (downlink 10 Mbit/s, uplink 5 Mbit/s) or LTE Cat. 4 (downlink 150 Mbit/s, uplink 50 Mbit/s) – LTE variants only UMTS (downlink 7.2 Mbit/s) GPRS (Multi-slot class 10, max BR downlink 85,6 Kb/s) Embedded protocols: PPP, TCP/IP, UDP/IP, MMS, HTTP, HTTPS, SSL, FTP, FTPS, SMTP, SMTPS, NTP, NITZ, PING Ports forwarding, Ipsec, OpenVPN Class B GSM 07.10 multiplexing protocol
Power supply	 Nominal voltage range: 9V-30V Maximum continuous (average) supply power: 5W Peak (momentary) supply current: 1 A
Interfaces	 GSM/UMTS/LTE antenna connector: SMA 2 x SIM Card holders (1 x external + 1 x internal): 1.8V, 3V standards RS232 and RS485 via RJ-45 8-pin GPIO connector Ethernet connector microUSB (OTG) Power supply connector Factory default reset button TR switch 4 x LED
Other	 Physical size: Max. Dimensions: 83 x 53.5 x 26 mm (w/ connectors) Operating temperature range: Min20°C Max. 60°C



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5 Using the router

5.1 Setting up the router

To set the router, do the following steps:

5.1.1 Inserting SIM card(s)

- Push yellow button placed on front panel and take SIM drawer out.
- Place SIM card in the holder

Router is available with one or two SIM card slots. To insert the second SIM card please unscrew one of the routers panel, eject PCB board and put the SIM into internal SIM holder.

5.1.2 Connecting antenna

• Connect GSM/UMTS/LTE antenna to SMA connector

5.1.3 Connecting power supply cable

• Connect power supply cable into power supply connector

5.1.4 Connecting LAN cable with RJ-45

• Plug LAN cable into RJ-45 plug.



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5.2 Router configuration

Router is configured via web browser. Router settings are divided into sections which allows user to easily find needed option. If you need to save new settings please apply them using "Save settings". You can also discard changes by choosing appropriate option from menu.

WARNING: Cache of router is cleared on device reset. NOTE: Not all tabs are available on every router version.

5.2.1 Setting up the connection

When you connect all necessary cables (see <u>Setting up the router</u>) you can setup connection. Connect LAN cable to your computer and go to Internet protocol TCP/IP properties (*Network connections -> Local Area Connection ->Internet protocol TCP/IP-> Properties*) and set your IP address as 192.168.1.x. Please read how to change TCP/IP settings of your network card in this thread (example for Windows 7): <u>http://windows.microsoft.com/en-us/windows/change-tcp-ip-settings#1TC=windows-7</u>



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5.2.2 Router status page

Go to your web browser and put IP address **192.168.1.234**. You will be asked for username and password. By default it is:

Username: admin

Password: 12345

If Username and Password is correct you should see the following screen:

TELE©RIGIN	RBMTX3 Router Confi	guration	
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmware: 181128		www.teleorigin.co
Device status Basic	Status		
Wan config	System	CPU load	0.10, 0.10, 0.13, 1/91, 17683
Local network		Temperature	51.2°C
Modem settings		Up time	5d 6:7:50
Connection control		Memory (total/free)	253040 kB/186356 kB
Ports configuration TCP/IP forwarding	Modem information	Model, firm. ver., IMEI	EG91 (EG91EFBR05A04M4G), IMEI: 862831030128867
VLAN		PIN, Operator	READY, Operator: Orange Orange
Static routes		Network Status	Registered (home network, LAC=E2EA, CID=2C32424)
Dynamic DNS		Signal Strength (CSQ)	Excellent, -67 dBm (CSQ=23)
Access control		Packet Data Service	LTE
Advanced		GSM SIM selection	MASTER
OpenVPN	GSM	IP/Mask	10.66.27.61/255.255.255.252
IPsec	Connected	MAC Address	1E:8E:E5:A0:94:EC
IPsec authentication		RX/TX bytes (packets)	26.58 MB/29.86 MB (119036/109278)
NTRIP Text messages actions	LAN1	IP/Mask	192.168.90.125/255.255.2
E-mail actions		MAC Address	36:07:11:44:44:1F
SNMP		RX/TX bytes (packets)	40.66 MB/4.66 KB (150874/204)
Administration	WiFi	SSID	AP4 (freq: 2.447 GHz)
Registration		Link quality/Signal level	47/70/-63 dBm
Time			70:4D:7B:D1:CB:A0
Syslog		AP MAC	
User files		IP/Mask	192.168.90.125/255.255.255.0
Configuration		MAC Address	A0:C9:A0:58:07:A3
Backup and restore		RX/TX bytes (packets)	45.75 MB/27.52 MB (171762/51258)
Discard changes	VPNCLOUD	IP/Mask	172.63.5.15/255.255.255.0
		RX/TX bytes (packets)	16.50 MB/21.73 MB (75841/63385)
Save Settings			

You can check if router is connected to network, its parameters and information about PPP connection. Device status page is refreshing automatically.



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In table below you can find the description of each field in "Device status" tab:

Field	Example	Description
CPU Load	0.67, 0.22, 0.16, 1/85, 9732	CPU load parameters
Temperature	51,2 C	Processor temperature
Uptime	20d 19:22:21	Total uptime
Memory (total/free)	253040 kB/192532 kB	Total/free memory available
Model, firmware ver., IMEI	GMM: UG95 or EG9x	GSM module info
IMEI	359852050093104	device serial number
PIN, Operator	READY, Operator: Orange	Available SIM card statuses: SIM PIN - PIN lock (please set right PIN number in "GSM network" tab) READY - SIM unlocked SIM PUK - PUK lock
Network Status	Registered (home network, LAC=2B21, CID=028FC03)	registration status (1st parameter), location area code (2nd parameter), cell ID (3rd parameter). Possible statuses: - not registered, router is not currently searching a new operator to register to - registered, home network - not registered, but router is currently searching a new operator to register to - registration denied - unknown - registered, roaming
Signal Strength (CSQ)	Excellent, -73 dBm (CSQ=20)	-
Packet Data Service	LTE	type of packet data service
GSM selection	MASTER	SIM card selection
LAN1 IP/Mask	192.168.90.125/255.255.255.0	-
LAN1 MAC address	36:07:11:44:44:1F	-
RX/TX bytes (packets)	40.66 MB/4.66 KB (150885/204)	RX/TX packets used
VPNCLOUD IP/Mask	172.63.5.15/255.255.255.0	
VPNCLOUD RX/TX bytes (packets)	10.11 MB/7.05 MB (41778/29863)	Routers with TACS option



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5.2.3 WAN config

WAN config page is shown in the illustration below.

TELE©RIGIN	RBMTX3 Router Config	guration	⊜ ELPROMA
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	vare: 181128	www.teleorigin.com
Device status Basic	Wan configuration	n	
Wan config Local network	WAN interface / default ga	ateway configuration	* *
Modem settings	WAN interface	GSM	
Connection control Ports configuration TCP/IP forwarding VLAN	NAT	WAN LAN1 WIFI Network Address Translation on the interface	
Static routes Dynamic DNS Access control	Set default gateway manually	Enabled	
Advanced OpenVPN	Default gateway interface	GSM	
IPsec IPsec authentication	Default gateway IP address	Enter default gateway	
NTRIP Text messages actions E-mail actions	Set default DNS manually	Enabled	
E-mail actions SNMP	Nameserver IP master	8.8.8	
Administration Registration	Nameserver IP slave	8.8.4.4	
Time Syslog User files			
Configuration			
Backup and restore			
Discard changes			
Save Settings			



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5.2.4 Local network

On "Local network" configuration page you can find essential parameters needed for LAN connection. Here you can set IP Address (or set it to be downloaded via DHCP), mask, default gateway and DNS addresses. Last two options can be entered manually or downloaded automatically via GSM or DHCP. Router can also works as DHCP server - you can define its range and set list of IP-MAC binds.

TELE©RIGIN	RBMTX3 Router Config	guration		⊜ ELPROMA
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	are: 181128		www.teleorigin.com
Device status Basic	Networking			
Wan config	LAN configuration			
Local network Modem settings		Configuration	IP Address	Mask
Connection control	IP configuration	Static •	192.168.90.234	255.255.255.0
Ports configuration		Enabled	Range Start	Range End
TCP/IP forwarding	DHCP Server		192.168.1.100	192.168.1.200
VLAN	Defined DNS servers for	Enabled	Master	Slave
Static routes	DHCP clients			
Dynamic DNS		Set	Enter MAC Address	
Access control	MAC address			
Advanced				
OpenVPN				
IPsec				
IPsec authentication				
NTRIP				
Text messages actions E-mail actions				
E-mail actions SNMP				
Administration				
Registration				
Time				
Syslog				
User files				
Configuration				
Backup and restore				
Discard changes				
Save Settings				



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5.2.5 Modem settings

On "Modem settings" page you can define internet connection parameters (APN, username, password, CSD, ISP IP and Modem band) for one or two SIM cards (depending on modem version). To use internet you should know those parameters - they are essential for getting access to internet. The parameters should be ensured by your mobile network provider.

	RBMTX3 Router Config	CELPROMA
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	are: 181128 www.teleorigin.com
Device status Basic	Modem settings	
Wan config Local network	GSM connection settings	
Modem settings	SIM slot	Master
Connection control	PIN	C Enabled
Ports configuration		1234
TCP/IP forwarding		Enter PIN here
VLAN	Predefined APN	enter manually
Static routes	APN	internet
Dynamic DNS		Enter APN here or select it from above list
Access control Advanced	Username	
OpenVPN		Enter username here
IPsec	Password	
IPsec authentication		Enter password here
NTRIP	Modem band	2G, 3G and 4G
Text messages actions		Select modem band
E-mail actions	Connection	Always on V
SNMP		Modem connect
Administration		
Registration		
Time		
Syslog		
User files		
Configuration		
Backup and restore		
Discard changes		
Save Settings		

To enter the PIN for SIM card you need to mark "Enabled" field and then fill the field below with correct PIN. Please note that outgoing calls are made always on MASTER SIM card.



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5.2.6 Connection control

Here you can set parameters of switching between two SIM cards. You can define time for ping and ping counter for 4 IP addresses you choose. In example (picture) here after 3 pings that take 10 seconds each card will change from Master to Slave or opposite.

	RBMTX3 Router Config		⊖ ELPROMA
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	are: 181128 ww	/w.teleorigin.com
Device status Basic	GSM switching		
Wan config Local network	GSM connection conntrol		<u>^</u>
Modem settings	Limits	10	
Connection control		Enter ping timeout in seconds (1-1000)	
Ports configuration		3	
TCP/IP forwarding		Enter ping count (1-3600)	
VLAN		600	
Static routes		Enter ping interval in seconds (0-86400, 0 - disable)	
Dynamic DNS Access control		60	
Advanced		Enter ping threshold in percent (1-100)	
OpenVPN	IP 1		
IPsec	19-1	Enabled Set this option to enable ping testing IP 1	
IPsec authentication			
NTRIP		Enter IP address	
Text messages actions			
E-mail actions	IP 2	Enabled	
SNMP		Set this option to enable ping testing IP 2	
Administration			
Registration		Enter IP address	
Time	IP 3	Enabled	
Syslog		Set this option to enable ping testing IP 3	
User files			
Configuration Backup and restore		Enter IP address	
Discard changes	IP 4	Enabled	
Distanti changes	1. 4	Set this option to enable ping testing IP 4	
Save Settings		Enter IP address	



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5.2.7 Ports configuration

User is able to set port settings under RS232/RS485 port configuration page. There are 3 configurable ports: /dev/ttyS0, /dev/ttyACM0 and /dev/ttyS1 or /dev/ttyUSB0 (depending on modem version). Every port can be set to different mode. On /dev/ttyS0 you can set terminal, ModBus gateway or NTRIP mode. Two other ports can work as modem port (modem control and modem data) or SMS receiving port (see also: SMS Actions section).

Every port can also be set to forwarding mode that allows user to forward it to TCP/UDP port (as server or client). Port /dev/ttyS0 can also be forwarded to modem control or modem data port. In that case no other mode can be set on that port. Setting modes on /dev/ttyS0 and /dev/ttyS1 (LTE modem variant only) enables setting port parameters: baud rate, data bits, parity checking and protocol. If parameter is inactive, this means that user can't control it in currently set mode.

TELE©RIGIN	RBMTX3 Router Configuratio	n		
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmware: 18	1128		www.teleorigin.com
Device status Basic	Ports			
Wan config Local network	Port settings			
Modem settings Connection control Ports configuration	Port type	Serial RS-232 External /dev/rs232	Serial RS-485 External /dev/rs485	Modem control Internal Port-A
TCP/IP forwarding	Mode	None 🔻	None 🔻	None 🔻
VLAN Static routes	Baud rate	115 200 🔻	115 200 🔻	
Dynamic DNS	Data bits	8 🔻	8 🔻	
Access control Advanced	Parity	None 🔻	None 🔻	
OpenVPN	Stop bits	1 •	1 •	
IPsec IPsec authentication	Flow control	None 🔻	None T	
NTRIP	Forwarding configuration			
Text messages actions E-mail actions	То	Network v	Network v	
SNMP	Mode	Server •	Server •	Server 🔻
Administration Registration	Interface	LAN	WAN 🔻	LAN
Time	Protocol	TCP	TCP	TCP
Syslog User files	Server IP or domain			
Configuration	Server as domain name		Enter Server as domain name	2
Backup and restore Discard changes	Port			
Save Settings				



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5.2.8 TCP/IP forwarding

You can forward single port or port ranges onto certain IP address. To add new rule for single port, enter TCP/IP Forwarding tab. In "Single port rules" section click button "New" and enter all necessary informations: Identifier, check "Enabled" field, enter external and internal port, choose protocol (TCP or UDP) and enter IP address. When adding new rule or switching tab, currently edited rule is automatically saved. You can delete it (or any other rule) by pressing "Delete" button. After changes click Save Settings to save whole configuration. You can edit port range rules in the same way in Port range rules section. You can also set IP address of demilitarized zone in DMZ section.

TELE©RIGIN	RBMTX3 Router Config	guration
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	vare: 181128 www.teleorigin.com
Device status Basic	TCP/IP forwarding	B
Wan config Local network	Single port rules	Â
Modem settings Connection control	Rules list	
Ports configuration		New Delete Please choose a rule you would like to edit. Please note that after editing rules you have to save global settings.
TCP/IP forwarding		Please choose a rale you would like to eart. Please note that after earling rules you have to suve global settings.
VLAN Static routes	Identifier	Please enter any name/identifier
Dynamic DNS Access control	Enable rule	Enabled Set this option to enable this rule
Advanced OpenVPN	External port	
IPsec	Internal port	
IPsec authentication NTRIP	Protocol	×
Text messages actions	IP address	
E-mail actions SNMP	Port range rules	
Administration Registration	Rules list	
Time Syslog		New Delete Please choose a rule you would like to edit. Please note that after editing rules you have to save global settings.
User files Configuration	Identifier	Please enter any name/identifier
Backup and restore Discard changes	Enable rule	Enabled Set this option to enable this rule
Save Settings	First port	
	Last port	
	Protocol	· · · · · · · · · · · · · · · · · · ·



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5.2.9 VLAN

VLAN tab enables user to create virtual IP addresses. You can define IP, netmask and identifier from range 0-4095. If you enable IEEE 802.1Q tagging Virtual IP becomes part of VLAN.

TELE©RIGIN	RBMTX3 Router Config	suration
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	are: 181128 www.teleorigin.com
Device status Basic	VLAN/Virtual IP c	onfiguration
Wan config	VLAN Virtual IP list	×
Local network		New Delete
Modem settings Connection control		Please choose VLAN you would like to edit. Please note that after editing those things you have to save global
Ports configuration		settings.
TCP/IP forwarding	Enable VLAN	Enabled
VLAN		Set this option to enable this VLAN
Static routes		
Dynamic DNS	Description	Please enter VLAN description.
Access control	Interface	LAN1 T
Advanced	Interface	LANI
OpenVPN	IEEE 802.1Q tagging	Enabled
IPsec		Set this option to enable IEEE 802.1Q tagging
IPsec authentication NTRIP	Identifier	
Text messages actions		Please enter number from range 0-4095.
E-mail actions	IP	
SNMP	Netmask	
Administration		
Registration		
Time		
Syslog User files		
User files Configuration		
Backup and restore		
Discard changes		
Save Settings		



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5.2.10 Static routes

Under static routes tab you can define your own routings. Please click Add new button to add new routing. Enter identifier (used only to distinguish routings in www configuration), choose interface, enter destination network, netmask and gateway.

	RBMTX3 Router Con	figuration	A
	Modem EG91, 1 SIM, firm	ware: 181128 www.teleorigin.co	om
Device status Basic	Static routes		
Wan config Local network	Static routes list	T	^
Modem settings Connection control		New Delete Please choose a route you would like to edit. Please note that after editing routes you have to save global settings.	
Ports configuration TCP/IP forwarding VLAN	Identifier	Please enter any name/identifier/IP	
Static routes	Destination network		
Dynamic DNS Access control	Destination netmask		
Advanced	Interface	None T	
OpenVPN	Gateway		
IPsec IPsec authentication			
NTRIP			
Text messages actions			
E-mail actions			
SNMP			
Administration			
Registration			
Time Syslog			
Sysiog User files			
Configuration			
Backup and restore			
Discard changes			
Save Settings			



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5.2.11 Dynamic DNS

Dynamic DNS is a service which allows user to make your device available under specific www address regardless of its IP changes. In order to do that you must create an account on one of web pages that are supported by RBMTX-Lite-IO router (currently DynDNS.org or No-IP.com). After creating account, please enter necessary information in Dynamic DNS tab of www configuration: your service provider, in case of DynDNS its type, username, password, host name and two intervals. Update interval is time between two checks whether IP address had changed. Forced update interval is time between updating IP data regardless of IP change. Please last two fields empty to use default value if you're not sure what to input there.

TELE©RIGIN	RBMTX3 Router Confi	iguration	⊖ ELPROMA
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firm	ware: 181128	www.teleorigin.com
Device status Basic	Dynamic DNS		
Wan config Local network	DDNS service	Disabled ▼ Note that DDNS can only work on devices with public IP.	•
Modem settings Connection control	DynDNS type	Custom	
Ports configuration TCP/IP forwarding	Username	Enter username	
VLAN Static routes	Password	Enter password	
Dynamic DNS Access control Advanced	Hostname	Enter hostname	
OpenVPN IPsec	Update interval (sec)	IP change check interval. Default: 1 min. Max: 10 days Leave this field empty to use default value	
IPsec authentication NTRIP	Force update interval (sec)	Forced DDNS server update interval. Default: 1 week Leave this field empty to use default value	
Text messages actions E-mail actions SNMP			
Administration Registration			
Time Syslog User files			
Configuration Backup and restore			
Discard changes			



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5.2.12 Access control

First section of Access Control tab allows you to configure SSH protocol. You can turn it on or off, set on which port and interfaces (also OpenVPN and IPsec tunnels) it should be accessible. You can also toggle logging via SSH as root and change/delete passwords/keys for root and service user. Remember to save whole configuration after changing password by pressing Save Configuration button from main menu. Deleting password means that it won't be needed to log on. When logging via SSH, key authentication has higher priority than password. That means that user with authorized key won't be prompted for a password and user without key will be able to login using password. You can paste multiple keys into SSH root key and SSH service key fields.

ATTENTION: Service account is used to upgrade firmware. Turning SSH off will disable firmware upgrades.

You can generate necessary keys directly on router. Press the Generate button and wait for a while-the process can take few minutes. You should not change settings or switch tabs then. After the generation the message will be displayed. Public key will be automatically pasted into the keys field (if the field wasn't empty before pressing the button, its contents will be saved, the newly generated key will appear first on the list). From now you will be able to download private and public keys by pressing Get private key and Get public key buttons. To login using the key under Linux, you have to download private key, change its name to id_rsa and put it in /home/user/.ssh folder.

In WWW config access section you can toggle HTTP/HTTPS access www configuration and change ports and interfaces (OpenVPN and IPsec tunnels also) on which they will be available. You can also change password for www configuration (the change will be immediate, no saving configuration is needed). For security reasons disabling both HTTP and HTTPS is not possible.



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RBMTX3 Router Configuration

TELE©RIGIN

UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	are: 181128 www.teleorigin.com
Device status Basic	Access control	
Wan config Local network	SSH configuration	
Modem settings Connection control	SSH enabled	Enabled Set this option to enable SSH service
Ports configuration TCP/IP forwarding VLAN	Interfaces	Choose on which interfaces SSH should be accessible
Static routes	OpenVPN tunnels	I
Dynamic DNS	IPsec tunnels	1 2 3 4 Choose tunnels on which SSH should be accessible
Access control Advanced OpenVPN	SSH login as root	✓ Enabled, Port: 65535 Set this option to enable logon via SSH as root
IPsec	SSH root password	
IPsec authentication NTRIP Text messages actions E-mail actions SNMP Administration	SSH root key	Generate Get private key Get public key Paste public keys of authorized users here You can also generate the public key and download its private key by clicking Generate button Second
Registration Time Syslog	WWW config access config	Generating key may take up to 3 minutes, please be patient uration
User files	Access protocols	🖉 HTTP 🖉 HTTPS
Configuration Backup and restore Discard changes	Interfaces	LAN1 WIFI GSM OpenVPN IPsec Choose on which interfaces www config should be accessible
	OpenVPN tunnels	I
Save Settings	IPsec tunnels	1 2 3 4 Choose tunnels on which www config should be accessible
	HTTP port	80
	UTTDE port	•



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5.2.13 Open VPN

You can connect your router to a VPN network or create your own one using OpenVPN software. It is possible to create up to four VPN connections (tunnels). To view and change settings of any of tunnels select it from Tunnel configuration list under OpenVPN tab. Then choose if router should be server or client and connection type: tun or tap. Tun connection can be single- or multiclient. Depending on what you choose here, you will later need to enter client/server IP addresses or network and netmask.

If the device should be server, please enter port on which it should listen for connections (the default VPN port is 1194, remember to open the port you chose under the firewall tab). Next, please select network device on which the connection should be held: eth (external RJ45 port) or ppp (connection via mobile network). It is also necessary to choose network protocol: TCP or UDP (use the second option if you are not sure what to choose). For tun mode user should also enter server and client Ips (we advise you to use addresses from 10.x.x.x pool). For tap mode please enter VPN sub network address and net mask (for example 10.1.0.0 and 255.255.255.0). In most cases, your device will reserve first IP address from the pool (that is 10.1.0.1 if you are using 10.1.0.0 network).

If the device is set into client mode, in addition to settings same as those for server, you should input VPN server's IP in Remote Server IP field and its listening port in the Port field.

After filling in all necessary information user should fill in four certificate fields. The certificates should be generated on any PC (see VPN online help for more information). The contents of files should be pasted into appropriate fields of configuration. You can improve security of your VPN connection by entering TLS key into the TLS key field on every device in VPN network.

The last setting is toggling LZO compression (we advise you to enable it to improve network communication) and adding extra configuration parameters in Additional configuration field.



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TELE©RIGIN	RBMTX3 Router Config	guration 🔤 ELPROMA
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	vare: 181128 www.teleorigin.com
Device status Basic	OpenVPN tunnels	5
Wan config Local network	Tunnel configuration	openVPN tunnel 1 • Please select VPN tunnel you would like to configure •
Modem settings Connection control	OpenVPN mode	Disabled •
Ports configuration	Connection mode	Router (TUN) single-cli 🔻
TCP/IP forwarding VLAN Static routes	Remote Server IP or domain	
Dynamic DNS Access control	Remote Server as domain name	Enter Remote Server as domain name
Advanced	VPN device	Y
OpenVPN IPsec IPsec authentication	NAT-T	Enable NAT Traversal (NAT-T) Set this option to enable the use of NAT-T (i.e. the encapsulation of ESP in UDP packets) if needed, which can help with clients that are behind restrictive firewalls.
NTRIP Text messages actions	Port	
E-mail actions	Protocol	TCP v
SNMP Administration	Network	
Registration	Netmask	
Time Syslog	Server IP	
User files	Client IP	
Configuration Backup and restore Discard changes	CA cert	Generate
Save Settings	CA key	



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5.2.14 Ipsec static/Ipsec mobile

IPsec is group of internet protocols that enables user to create safe connection between devices. To configure such connection on RBMTX-Lite-IO router you need to go through three tabs of configuration: Tunnels, Mobile Clients, Keys and Certificates. First of all, you need to enable IPsec under Tunnels tab. Below this option there is a combo box that enables you to switch between different tunnel configurations. If you want to enable specific tunnel, please select Enable tunnel checkbox. Then specify network interface on which the connection will be held. It is impossible to discuss all ways to create IPsec connection, so we have described sample configuration below.

Let's say we want to connect two RBMTX-Lite-IO routers with following IP numbers: 123.45.67.1, 123.45.67.2. First option, DPD interval is time after which the connection is closed if the other device is not responding. You can put any value here, we will enter 3600 seconds. Then you have to choose local subnet that will be available on remote side of the connection. It can be single host, network or LAN subnet. Let's say we will be connecting more devices later so we choose network. On first router we enter following settings: IP=192.168.36.1, Network=192.168.36.0 and Netmask=255.255.255.0. The IP must be set properly according to the network and netmask. Next step is entering remote subnet. The local subnet on first device must match remote subnet on the second device and vice versa. We have specified local subnet on second router with following settings: IP=192.168.35.0, Netmask=255.255.255.0. After specifying local and remote subnet: Address=192.168.35.0, Netmask=255.255.255.0. After specifying local and remote subnets, you should enter remote gateway which should be other device's IP. In our case we enter 123.45.67.2 on first router and 123.45.67.1 on second one.

Afterwards we have to define first phase of the proposal. We choose negotiation modeaggressive is les secure, but faster than main. Next setting is device's identifier. The most common setting is My IP address for PSK authentication and RSA Cert subject for RSA certificates. Now, please choose encryption, hash algorithm and DH key group-they must be the same on both sides of connection. Blowfish encryption is usually the fastest and AES is the slowest but most secure. You can optionally set lifetime of phase 1 or leave the field blank to use default value. The most important setting of phase 1 is choosing authentication method: Pre-shared key is like password, you have to enter the same key on both sides. More sophisticated authentication method is using RSA certificates, but you need to generate certificate and key for every device. You have two options here: either input other device's certificate in Peer certificate field or add CA certificate (we will cover that topic later).



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In the second phase of proposal please specify the protocol (ESP is authentication with encryption, AH is authentication only), encryption algorithm, hash algorithm and PFS key group. Please note that you can choose multiple algorithms, but at least one should match on both sides of the connection. The last setting is phase 2 lifetime (leave field empty for using default value).

After configuring all settings remember to save configuration. The configuration of IPsec connection is finished unless you chose to authenticate with RSA certificates and CA certificate. In that case click on Keys and Certificates tab. Here you can add multiple Pre-shared keys and CA certificates. Adding both is similar, so we will explain only adding CA certificates. To add new one, please click on Add new button. Specify Identifier (which is used only for distinguish them in www configuration), paste CA certificate and certificate revoke list. Last field is optional and lets you ban users that shouldn't be allowed to join your network anymore.

IMPORTANT: After filling in fields click Save button and then save whole configuration by clicking Save settings. If you want to delete certificate, choose it from the list, click Delete button and then save whole configuration.

It is possible to create IPsec connection with non-static-IP-devices. In order to do this please click Mobile clients tab. Configuration is similar to the tunnel configuration, but there are less settings (for example there is no PSK field-you should add pre-shared keys for mobile clients in Keys and Certificates tab).

IMPORTANT: When configuring IPsec connection you will sometimes want to add custom routing. This topic is covered in next section.



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UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	rare: 181128		www.teleorigin.com
Device status Basic	IPsec tunnels			
Wan config Local network	Enable IPsec	Enabled		·
Local network Modem settings Connection control	Tunnel configuration	IPsec tunnel 1 Please select IPsec tunnel you would	like to configure	
Ports configuration	Enable tunnel	Enabled		
TCP/IP forwarding VLAN Static routes	Local Interface	Interface GSM •	Default route	
Dynamic DNS Access control	Local subnet	Type Host only ▼	Network	Netmask
Advanced OpenVPN	Remote host(s)	IP Address	Any host Any host any host any host any host or check Any host for server.	role.
IPsec IPsec authentication NTRIP	Remote subnet	Type Host only ▼	Network	Netmask
Text messages actions	Connection	Always on 🔻		
E-mail actions SNMP Administration	NAT-T	Enable NAT Traversal (NAT-T) Set this option to force use of NAT-T are behind restrictive firewalls.	i.e. the encapsulation of ESP in UDP p	ackets), which can help with clients that
Registration Time	Phase 1 proposal (Authen	tication)		
Syslog User files	Protocol	IKE v2 🔻		
Configuration Backup and restore	Change default algorithms proposal	Enabled		
Discard changes	Encryption	AES 256 AES 192 AES 128 3 DES	Blowfish 256 Blowfish 192 Blowfish 128	Camellia 256 Camellia 192 Camellia 128
	Integrity	SHA2 512	SHA2 384 MD5 96	SHA2 256



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5.2.15 Generating SSL certificates

In order to use SSL authentication creating few files and copying them into adequate fields under OpenVPN or IPsec tabs of www configuration is needed. This can be done using PC with Linux and openssl installed. There is also Windows version of software available at http://gnuwin32.sourceforge.net/packages/openssl.htm.

At first we need to create folder, in which all our keys and certificates will be stored. Let's say it will be \sim /keys. We create two files in it: list of certificates and file enumerating them:

touch index.txt echo 00 > serial and subdirectories, where the certificates and keys will be stored: *mkdir private certs newcerts crl*

In order to create certificates, the certificate authority (CA) is needed . It is "main" certificate used to create other certificates. After creating private CA key: openssl genrsa -des3 -out private/cakey.pem 1024

Warning: please remember the CA password! The CA certificate is generated: openssl req -new -x509 -days 365 -key private/cakey.pem -out cacert.pem

When creating a certificate user has to provide some information like country, state/province, city, company name, e-mail address and common name. The last field is most important, it has to be unique for every device. After creating CA certificate generation of certificate for every device used is needed.

At first the private key is generated: *openssl genrsa -des3 -out private/device1key.pem*

Then we generate certificate request:

openssl req -new -key private/device1key.pem -out device1req.pem

Here user has to enter country, state etc. again. They can be the same as before except the common name.

Certificate authority signs the certificate: *openssl ca -notext -in device1req.pem -out device1cert.pem*

If certificate will be used on RBMTX-Lite-IO router, password on private key has to be disabled:

openssl rsa -in private/device1key.pem -out private/device1key.pem_nopass

The whole process is repeated for every device (unique common names and filenames have to be unique for different devices!).



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If IPsec protocol will be used, certain fields in www configuration under Ipsec/Tunnels tab have to be filled in. Content of *device1cert.pem* file should be pasted into the Certificate field and contents of *device1key.pem_nopass* into the Key field. Peer Certificate field can be filled with another device's certificate file or left empty. In this case the CA certificate has to be provided under Keys and Certificates tab. Contents of *cacert.pem* file should be inserted there.

If the OpenVPN protocol will be used, under OpenVPN tab content of *cacert.pem* has to be pasted into CA cert field, content of *device1cert.pem* into Server/Client cert field and *device1key.pem_nopass* into Server/Client private key field. The Diffie- Hellman parameters file has to be created for VPN connection:

openssl dhparam -out dh1024.pem 1024

And its content should be copied into DH PEM field. This file is common for all devices in VPN network.

TELE©RIGIN	RBMTX3 Router Config		
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmware: 181128 www		
Device status Basic	Keys & Certificates		
Wan config Local network	IPsec secrets		
Modem settings	Key list	T	
Connection control Ports configuration TCP/IP forwarding VLAN Static routes Dynamic DNS Access control Advanced OpenVPN IPsec IPsec authentication NTRIP Text messages actions E-mail actions SNMP Administration Time Syslog		New Delete Please choose a key you would like to edit. Please note that after editing keys you have to save global settings.	
	Identifier	Name to identify key and its value.	
	Кеу	This can be: IP, FQDN, user@FQDN, %any, subnet in CIDR notation, address ranges (two addresses separated by a - without any spaces).	
	Key type		
	Key value	To use certificate or key (RSA Key type) enter its Identifier.	
	Use own secret file	Enabled	
	User defined secret file	Enter name of uploaded secrets file.	
	View generated secrets file	View If you enable IPsec after Save settings you can view generated ipsec.secrets	
User files	Keys & Certs		
Configuration Backup and restore	Keys & certs list		
Discard changes		New Delete Please choose a certificate you would like to edit. Please note that after editing certificates you have to save global settings.	
Save Settings	Identifier	Please enter any name/identifier	



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5.2.16 NTRIP configuration page

One of /dev/ttyS0 port modes is communication with external device using NTRIP protocol. If you decide to use it, it is necessary to set the mode under RS232 Port configuration page. Then, enter settings in NTRIP page. Server address, port and initial position fields are necessary. Username and passwords are optional.

It is also possible to choose data request mode. After entering required data, please click Get List button to download data streams list from the server – it may take a while, please be patient. After downloading the list please select one of data streams.

Attention: Entering initial position is necessary to login to NTRIP server if no external device sending NMEA frames is connected to the S0 port.

TELE©RIG <mark>I</mark> N	RBMTX3 Router Configuration		© ELPROMA
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmware: 181128		www.teleorigin.com
Device status Basic	NTRIP		
Wan config Local network	NTRIP	Enabled Set this option to enable NTRIP service	A
Modem settings Connection control	Server address		
Ports configuration	Port		
TCP/IP forwarding VLAN	Username		
Static routes	Password		
Dynamic DNS Access control	Initial position	Enabled Set this option to enable login to NTRIP server with fixed position.	
Advanced		Use this option when there is no external source of NMEA frames connected via RS232.	
OpenVPN IPsec	Latitude	N v 52 °0 '.0	
IPsec authentication	Longitude	₩ ▼ 22 °0 '.0	
NTRIP Text messages actions	Data request mode	NTRIP Version 2.0 Caster in TCP/IP V	
E-mail actions SNMP	Mountpoint	Get List	
Administration Registration Time Syslog User files Configuration			
Backup and restore Discard changes			
Save Settings			



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5.2.17 Text messages actions

Text messages (SMS) actions tab allows user to define shell scripts that will be executed every time router receives SMS with specified content.

To enable this option ensure that global SMS Actions checkbox is enabled and you have set one of available ports into SMS receiving mode under Ports configuration tab. Then click New button, enter any identifier and command-sms content that will trigger action. You can write any shell script you want and/or set GPIO action to be executed.

TELE©RIGIN	RBMTX3 Router Config	guration				
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmware: 181128 ww					
Device status Basic	Text messages act	tions				
Wan config Local network	Text messages (SMS) serve	er				
Modem settings Connection control Ports configuration	Management	Incoming text messages (SMS) Sent text messages (SMS) Report text messages (SMS) Help				
TCP/IP forwarding VLAN	Text messages (SMS) confi	guration				
Static routes Dynamic DNS	Enabled	Enabled				
Access control	Text messages (SMS) actions					
Advanced OpenVPN IPsec IPsec authentication	Text messages (SMS) actions list	SMSback my IP				
NTRIP Text messages actions E-mail actions	Identifier	SMSback my IP Please enter any identifier				
SNMP Administration Registration	Command	Myip Please enter command (content of text message)				
Time Syslog User files Configuration	Script	<pre>#!/bin/bash smssend.sh \$SMS_SENDER "GSM IP: \$(myip gsm); LAN IP: \$(myip lan)" This script will be executed after receiving text message (SMS) command</pre>				
Backup and restore Discard changes Save Settings						



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5.2.18 E-mail actions

In the "E-mail Actions" section, the user can set up an e-mail account for sending messages (set the parameters: recipient, sender, server address, port, user and password). It is also possible to set up a script that will be launched automatically (messages can be sent with attachments or not, it is possible to compress the file before sending).

TELE©RIGIN	RBMTX3 Router Config	
	Modem EG91, 1 SIM, firmw	vare: 181128 www.teleorigin.com
Device status Basic	E-mail Actions	
Wan config Local network	E-mail configuration	
Modem settings Connection control	E-mail sending	Enabled Set this option if you want to allow router send e-mails.
Ports configuration TCP/IP forwarding VLAN	Recipient	All messages will be delivered to this e-mail address
Static routes Dynamic DNS	From:	Enter "From:" field of e-mails here e.g. "me@example.com"
Access control Advanced	Host name	Enter host name here e.g. "smtp.gmail.com"
OpenVPN IPsec	Port	Enter port number here e.g. "587"
IPsec authentication NTRIP Text messages actions	Username	Enter your username of e-mail service
E-mail actions SNMP	Password	(confirmation)
Administration		Enter password from your e-mail service twice
Registration Time	E-mail Actions	
Syslog	E-mail actions list	Y
User files Configuration Backup and restore		New Delete Please choose action you would like to edit. Please note that after editing rules you have to save global settings.
Discard changes	Identifier	Please enter any identifier
Save Settings	Date (Month/Day of month) of script execution	Please enter month(s) and day(s) of month(s) when script will be executed. Ranges can be defined with dashes e.g. "1-15", you can also use commas e.g. "1,6,7". Note, that using "*" replaces all months/days, and "1-12/2" means "every 2 months/days from range 1-12 (2,4,6,)"



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5.2.19 SNMP

	RBMTX3 Router Config						
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	are: 181128		www.teleorigin.com			
Device status Basic	SNMP						
Wan config Local network	SNMP	Enabled Set this option to enable SNMP service.		A			
Modem settings Connection control	RBMTX MIB file	Download					
Ports configuration TCP/IP forwarding	SNMP networking						
VLAN Static routes	Protocol & Port	Protocol UDP V	Port 161				
Dynamic DNS Access control Advanced	Interfaces	✓ LANWIFIGSM					
OpenVPN IPsec	e accessible						
IPsec authentication NTRIP	SNMP information						
Text messages actions E-mail actions	System location	Set description of system location	Location info				
SNMP Administration	Administrator contact	Set contact information to system administ	Contact info trator				
Registration Time	SNMP users						
Syslog User files	Username	T					
Configuration Backup and restore		New Delete Please choose a username you would like t	o edit. Please note that after editin	g you have to save global settings.			
Discard changes	Username & access type	Access type	Username				
Save Settings	Authentication	Protocol v	Password	Confirm password			
	Encryption	Protocol	Password	Confirm password			



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5.2.20 GPIO

To configure or check the GPIO lines please go to GPIO tab. You can read current GPIO states or set initial states of GPIO pins. You can also add new GPIO event (one time or regular) on all or selected pin.

	RBMTX3 Router Config	guration 🔶 ELPROM	A
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, GPIO,	firmware: 181128 www.teleorigin.co	m
Device status Basic	GPIO		
Wan config Local network Modem settings Connection control	Read current GPIO states	2 3 4 5 6 7 Refresh	*
Ports configuration TCP/IP forwarding VLAN	Initial states	5 6 7 These are initial states of GPIO pins that are set after the modem is powered on. Checked checkbox means HIGH state, unchecked means LOW state.	
Static routes Dynamic DNS	GPIO events		
Access control	GPIO events list		
Advanced OpenVPN IPsec		New Delete Update/Add Please choose event you would like to edit. Please note that after editing rules you have to save global settings.	
IPsec authentication NTRIP	Identifier	Please enter any identifier	
Text messages actions E-mail actions	Event type	Y	
SNMP	Repeat every:		
GPIO	Days:H:M:S		
Administration Registration	Repeat every	Please enter UTC date/time	
Time	Y/M/D		
Syslog User files	H:M:S		
Configuration Backup and restore Discard changes Save Settings	Event action	on pin(s) number 5 6 7 Test	



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5.2.21 Time

Here you can manually set hardware clock or input IP of NTP server to synchronize time automatically

TELE©RIGIN	RBMTX3 Router Config	uration								()	LPROMA
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmwa	are: 181128								www.te	leorigin.com
Device status Basic	NTP										
Wan config Local network	RTC time (UTC)	2019-01-16 15:01:48									^
Modem settings Connection control Ports configuration	NTP Peer 1 prefered server	Enabled D.europe.p. Enter IP add	ool.ntp.org dress NTP server		En	ter NTP Se	rver as o	lomain na	ame		
TCP/IP forwarding VLAN	NTP Peer 2 server	er 2 server C Enabled 1.europe.pool.ntp.org Enter IP address NTP server C Enter NTP Server as domain name									
Static routes Dynamic DNS Access control	NTP Peer 3 server	Enabled Enter IP address NTP server									
Advanced OpenVPN IPsec	Set Date(Y/M/D) and Time(h:m:s)	2019 1 16	15 1 47		PI	Set lease enter		ne below	and press Se	t button	
IPsec authentication	NTP Status	s remote	refid	st	t	when	pool	reach	delay	offset	jitter
NTRIP		* 212.110.158.28	89.109.251.21	2	u	27	1024	377	100.079	-0.936	1.806
Text messages actions		+ tkswf.friesenec .	.GPS.	1	u	36	1024	377	85.498	-4.783	1.421
E-mail actions											
SNMP											
Administration											
Registration											
Time											
Syslog User files											
Configuration											
Backup and restore											
Discard changes											
Save Settings											



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5.2.22 Syslog

Here you can define how router should save your logs. Router has internal memory that get overwritten when it reaches its end. You can also save logs on your computer by clicking download (manually). It is also possible to get remote access to logs by enabling Remote service and setting SYSLOG host.

	RBMTX3 Router Config		⊜ ELPROMA
	Modem EG91, 1 SIM, firmw	are: 181128	www.teleorigin.com
Device status Basic	SYSLOG		
Wan config Local network	Local service log	View Download	
Modem settings Connection control	Remote service	Enabled If this option is set, device will store system logs on remote host	
Ports configuration TCP/IP forwarding	SYSLOG host	Enter SYSLOG hast IP address here	
VLAN Static routes Dynamic DNS	SYSLOG host as domain name	Enter SYSLOG host as domain name	
Access control	Heartbeat	Send	
Advanced			
OpenVPN			
IPsec			
IPsec authentication			
NTRIP			
Text messages actions			
E-mail actions			
SNMP			
Administration			
Registration Time			
Syslog			
User files			
Configuration			
Backup and restore			
Discard changes			
Save Settings			



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5.2.23 User files

You can upload to the router your own scripts and executable files and set them to be used in certain situations (e.x. when the VPN connection is established or at router startup). Under User files tab there is a list of user files. It is refreshed automatically after selecting tab, it can be also manually refreshed by pressing Refresh button. To delete file, select it from the list and press Delete button. To upload file, click Upload new button. You will be redirected to separate site. Choose file by pressing Browse... button and commit your choice by clicking Upload. After upload you will be informed if the whole operation was successful or the error message will be displayed. Use link to return to the main page of www configuration. All files are stored with rights for file execution, so they can be used in scripts.

Below the file upload panel there are two fields, where you can write scripts. Startup script will be executed after startup procedure of router and Reconfiguration script every time you click Save Configuration button in www configuration. You can write your scripts in Bash or PHP, but remember to use special header for scripts ((#!/bin/bash lub #!/usr/bin/php). You can execute uploaded user files, they are stored in /root/userfiles.

WARNING: Binary files uploaded to router should be compiled for processor installed in router!

	RBMTX3 Router Config	guration
	Modem EG91, 1 SIM, firmw	are: 181128 www.teleorigin.com
Device status Basic	User files	
Wan config Local network	Files upload	
Modem settings Connection control Ports configuration TCP/IP forwarding	User files list	Refresh Delete Download Select File: Wybierz plik Nie wybrano pliku
VLAN Static routes Dynamic DNS		Upload Files are stored in /root/userfiles/. You can delete files by choosing one from list and clicking Delete button
Access control Advanced	Scripts	
OpenVPN IPsec IPsec authentication NTRIP Text messages actions	Startup script	This script will be executed after boot-up procedure
E-mail actions SNMP Administration Registration Time Syslog	Reconfiguration script	This script will be executed after reconfiguration procedure (changing settings via www configuration)
User files		
Configuration Backup and restore Discard changes Save Settings		



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5.2.24 Backup and restore

Under backup and restore tab user can:

- Save/load alternative configurations
- Configure FTP client to periodically check FTP server for latest configuration
- Download/Upload backup configuration

TELE©RIGIN	RBMTX3 Router Config	guration CELPROMA
UNIQUE TECHNOLOGY FOR TELEMETRY	Modem EG91, 1 SIM, firmw	are: 181128 www.teleorigin.com
Device status Basic	Backup and upgra	de
Wan config Local network	Alternative configurations	
Modem settings	Configuration list	< <unused>></unused>
Connection control		Configuration name < <unused>></unused>
Ports configuration TCP/IP forwarding		Delete Save Load
VLAN		Here you can save/load alternative configuration files
Static routes	Downloading configuration	n from FTP
Dynamic DNS		
Access control	FTP configuration daemon	Enabled
Advanced	uaemon	
OpenVPN	URL	
IPsec		Please enter full FTP path to compressed configuration file, e.x. ftp://192.168.1.1/configuration.tar.bz2
IPsec authentication NTRIP	Username	
Text messages actions	Password	
E-mail actions	Force SSL connection	Enabled
SNMP		FTP server has to support SSL.
Administration	Check interval	
Registration		Enter interval in seconds between FTP checks or leave the field empty to use the default value (60).
Time Syslog	Upload current	
User files	configuration to FTP	Upload
Configuration	Download configuration	
Backup and restore	Settingaration	
Discard changes	Download	
	Here you can download your	current configuration for later use.
Save Settings	Upload configuration	
	Select File: Wybierz plik N	e wybrano pliku

5.2.25 Discard changes

Discard current changes in configuration which were not saved yet.

5.2.26 Save settings

To save your settings click save setting and wait until message will show up to confirm your configuration data was saved.



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5.3 System logs description

This paragraph shows structure of typical System log with some basic errors:

01/01/0000:00:30 rbmtx-lite-io syslogd 1.4.1: restart. 01/01/0000:00:31 rbmtx Start: RBMTX-Lite-IO - FIRM:181026 - router and firmware info 01/01/0000:00:35 rbmtx supervisor[560]: SIM Holder open/closed – SIM holder open/closed by software 01/01/0000:00:36 rbmtx supervisor[560]: Modem init 1 – first initialization try 01/01/0000:01:09 rbmtx supervisor[560]: Init /dev/ttyS1 – **port initialization** 01/01/0000:01:10 rbmtx supervisor[560]: Init /dev/ttyACM0 01/01/0000:01:13 rbmtx supervisor[560]: Modem is not registered on the GSM network – router is not able to log into network 01/01/0000:01:13 rbmtx supervisor[560]: Entering Modem is ready 01/01/0000:01:13 rbmtx supervisor[560]: Entering PIN OK - router is ready for connection 01/01/0000:01:13 rbmtx supervisor[560]: Entering PIN error code: - wrong PIN message 01/01/0000:01:14 rbmtx login[811]: unable to change tty `/dev/ttyS0' for user `root' 01/01/0000:01:14 rbmtx login[811]: ROOT LOGIN on `ttyS0' 01/01/0000:01:20 rbmtx pppd[901]: pppd 2.4.5 started by root, uid 0 - **connection** 01/01/0000:01:21 rbmtx chat[903]: timeout set to 2 seconds 01/01/0000:01:21 rb chat[903]: send (AT) 01/01/0000:01:21 rbmtx chat[903]: expect (OK) 01/01/0000:01:21 rbmtx chat[903]: AT 01/01/0000:01:21 rbmtx chat[903]: OK 01/01/0000:01:21 rbmtx chat[903]: send (ATZ0) 01/01/0000:01:21 rbmtx chat[903]: expect (OK) 01/01/0000:01:21 rbmtx chat[903]: ATZ0 01/01/0000:01:21 rbmtx chat[903]: OK 01/01/0000:01:21 rbmtx chat[903]: send (AT) 01/01/0000:01:21 rbmtx chat[903]: abort on (NO DIALTONE) 01/01/0000:01:21 rbmtx chat[903]: abort on (ERROR) 01/01/0000:01:21 rbmtx chat[903]: abort on (NO ANSWER) 01/01/0000:01:21 rbmtx chat[903]: abort on (BUSY) 01/01/0000:01:21 rbmtx chat[903]: expect (OK) 01/01/0000:01:21 rbmtx chat[903]: AT 01/01/0000:01:21 rbmtx chat[903]: OK 01/01/0000:01:21 rbmtx chat[903]: send (ATZ0) 01/01/0000:01:21 rbmtx chat[903]: abort on (NO CARRIER) 01/01/0000:01:21 rbmtx chat[903]: timeout set to 30 seconds 01/01/0000:01:21 rbmtx chat[903]: expect (OK) 01/01/0000:01:21 rbmtx chat[903]: ATZ0 01/01/0000:01:21 rbmtx chat[903]: OK 01/01/0000:01:21 rbmtx chat[903]: send (AT) 01/01/0000:01:21 rbmtx chat[903]: expect (OK) 01/01/0000:01:21 rbmtx chat[903]: AT 01/01/0000:01:21 rbmtx chat[903]: OK 01/01/0000:01:21 rbmtx chat[903]: send (AT+CGDCONT=1,"ip","example.apn") 01/01/0000:01:22 rbmtx chat[903]: clear abort on (ERROR) 01/01/0000:01:22 rbmtx chat[903]: send (dddATD*99#) 01/01/0000:01:23 rbmtx supervisor[560]: pppd check loop:1 01/01/0000:01:25 rbmtx chat[903]: expect (CONNECT) 01/01/0000:01:25 rbmtx chat[903]: AT+CGDCONT=1,"ip","example.apn"



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5.4 Elproma Device Manager

Elproma Device Manager is an application which allows you to find RBMTX-Lite-IO routers in local area network (LAN) and then restore factory settings by entering their IMEI number. It is particularly useful when you forgot IP number of device and you can't access it by terminal on serial port.

The installation process is pretty simple. On Windows system – unpack the file from <u>EDM-native</u> and then launch EDM.exe. Linux version is available here: <u>edm</u>. The main window of program consists of table-list of devices available on your network and buttons: Scan, Clear List and Reset. First you need to scan the network for devices. It takes few seconds to list all the devices. Please also keep in mind that it takes a while to boot router so it won't respond immediately after you turn it on.

8 💿 😣			 S S 			
IP address 192.168.1.234	HW Address 36:07:26:BE:2A:4C	Device type RBMTX - H24	Firmware version 120515	Uptime 00:02:06	Reset	Scan
						Clear list
						Reset
						:

😝 💿 🛞					
	ddress Device typ		Uptime	Reset	Scan
192.168.1.223 36:07:26:	BE:2A:4C RBMTX - H24	120515	00:04:56		Jean
					Clear list
					Reset
		Please en OK	nter 📎 🛞 ter IMEI: Cancel		



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When the scan is complete you can see list of available devices in the table. You can review information like IP address, MAC address, device name, firmware version and uptime. If you want to restore factory settings on any device on the list, click the Reset button and enter IMEI. Program will send special packet to all devices, but only the one with IMEI you have entered will be affected. If the IMEI is correct and the factory settings have been restored you should see "IMEI OK" in one of cells of last column. This device will now reset to load new settings and after about 1-2 minutes it will confirm that whole operation was successful - you should see then that "IMEI OK" will change to "done".

8 💿 🛞			\odot \odot \otimes			
IP address	HW Address	Device type	Firmware version	Uptime	Reset	_
192.168.1.223	36:07:26:BE:2A:4C	RBMTX - H24	120515	00:04:56	IMELOK	Scan
						Clear list
						Reset

8 💿 🛞		 S S S 				
IP address	HW Address	Device type	Firmware version	Uptime	Reset	Scan
192.168.1.234	36:07:26:BE:2A:4C	RBMTX - H24	120515	00:03:41	done	
						Clear list
						Reset



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RMTX-Lite-IO | We are talking M2M language ...

6 Troubleshooting

6.1 No communication with the router

If there is no communication with the router do the following steps:

- Check all external connections of the router
- Verify if power supply is correct
- Check if TCP/IP parameters are correct
- Check if any firewall is not blocking connection with the router

6.2 Router answers but there is no internet connection

If there is no internet connection do following:

- Check if antenna is connected properly
- Check if you have reception of GPRS/UMTS/LTE signal in your area (on website of GSM provider
- Check if you configured your router with proper parameters provided by your network provider (they should match in order to connect to internet)
- In case you do not have internet access contact your provider in order to get internet access



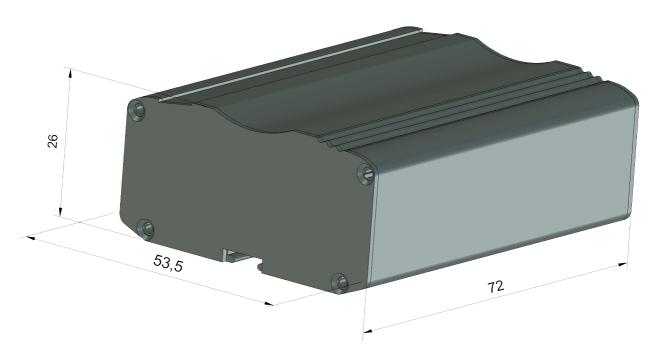
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7 Technical characteristics

7.1 Mechanical characteristic

Max. dimensions	72 x 53.5 x 26 mm (w/o connectors)
Weight	\approx 90 g (only router w/o any external connection)
Volume	$\approx 100 \text{ cm}3 \text{ (w/o connectors)}$

7.2 Housing (dimension diagram)



7.3 Electrical characteristic

7.3.1 Power supply

- Nominal voltage range: 9V-30V
- Maximum continuous (average) supply power: 5W
- Peak (momentary) supply current: 1A



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7.3.2 RF characteristics

7.3.2.1 Frequency ranges – UMTS variant

Band	Receive	Transmit	Unit
EGSM900	925 ~ 960	880 ~ 915	MHz
DCS1800	1805 ~ 1880	1710 ~ 1785	MHz
UMTS2100	2110 ~ 2170	1920 ~ 1980	MHz
UMTS1900	1930 ~ 1990	1850 ~ 1910	MHz
UMTS900	925 ~ 960	880 ~ 915	MHz
UMTS850	869 ~ 894	824 ~ 849	MHz



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7.3.2.2 Frequency ranges - LTE Cat. 1 and LTE Cat. 4 variants

3GPP Band	Transmit	Receive	Unit
EGSM900	880~915	925~960	MHz
DCS1800	1710~1785	1805~1880	MHz
WCDMA B1	1920~1980	2110~2170	MHz
WCDMA B2	1850~1910	1930~1990	MHz
WCDMA B4	1710~1755	2110~2155	MHz
WCDMA B5	824~849	869~894	MHz
WCDMA B8	880~915	925~960	MHz
LTE-FDD B1	1920~1980	2110~2170	MHz
LTE FDD B2	1850~1910	1930~1990	MHz
LTE-FDD B3	1710~1785	1805~1880	MHz
LTE FDD B4	1710~1755	2110~2155	MHz
LTE FDD B5	824~849	869~894	MHz
LTE-FDD B7	2500~2570	2620~2690	MHz
LTE-FDD B8	880~915	925~960	MHz
LTE FDD B12	699~716	729~746	MHz
LTE FDD B13	777~787	746~756	MHz
LTE-FDD B20	832~862	791~821	MHz
LTE-FDD B28A	703~733	758~788	MHz



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7.3.2.3 External antenna

The external antenna is connected to the router via SMA connector. Antenna must have parameters as shown below in table.

Antenna frequency range	Supporting GSM, UMTS or LTE frequencies for GSM
Impedance	50 Ω
DC impedance	0 Ω
Gain	0 dBi
VSWR (with cable)	-10 dB

The antenna chosen for working with router should best fit to circumstances of environment it is used in. When the router is placed in a room or somewhere where the range of networks signal is too low, the outdoor or specific indoor antenna should be used to increase it.



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7.4 Environmental characteristic

Attention! Exceeding the values may result in permanent damage to the module.

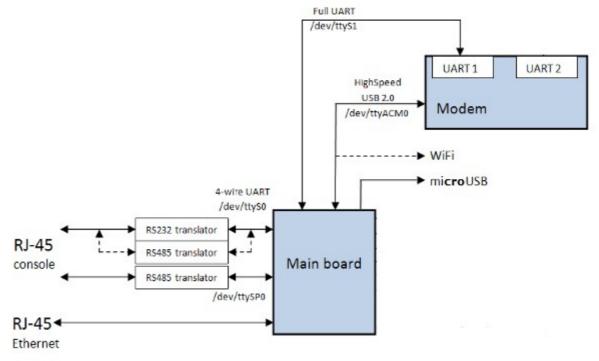
Parameter	Min	Max	Unit
Ambient Operating Temperature	-20	60	°C



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8 Router architecture

Diagram below shows simplified architecture of RBMTX-Lite-IO. Features marked with dotted lines are available as option





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9 Safety recommendations

9.1 General Safety

Please follow safety regulations regarding the use of radio equipment due to the possibility of radio frequency interference. Read given advices carefully.

Switch *off* GSM router when:

- in an aircraft using cellular telephones in aircraft may endanger the operation of the aircraft; it is illegal
- at a refuelling point
- in any area with potentially explosive atmosphere which could cause an explosion or fire
- in hospitals and any other places where medical equipment is in use

Respect restrictions on the use of radio equipment in any area or place where it is signalized that using cellular telephony is forbidden or dangerous.

Using GSM modem close to other electronic equipment may also cause interference if the equipment is inadequately protected. It may lead to damage or failure of GSM modem or the other equipment.

9.2 Care and Maintenance

The RBMTX-Lite-IO router is a electronic product that should be treated with care. Please follow suggestions shown below due to using router for many years.

- Do not expose router to any extreme circumstances like high temperature or high humidity
- Do not keep router in dirty and dust places
- Do not disassemble the router
- Do not expose the router to any water, rain or steam
- Do not drop, shake or knocking your router
- Do not place your router close to magnetic devices credit cards, etc
- Use of third party equipment or accessories, not made or authorized by Elproma Electronika Sp. z o.o. may invalid the warranty of router and/or cause failure or permanent damage of router
- Do not expose the router to children under 3 years

9.3 Responsibility

The router is under your responsibility. Please treat it with care, and respect local regulations. This is not a toy – keep it out of the reach of children.

Try to use security features (PIN etc.) to block unauthorized use or theft.



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10Accessories

The tables below shows recommended accessories for RBMTX-Lite-IO router.

Part No.	Name	Description
RB-PS12VP2L15	12V power adaptor	<1,5m> 2 PIN
RB-PSCP2L15	Supply cable	2PIN <1,5m> open end
RB-904G	GSM/UMTS/LTE antenna	2J011
RB-89MSH	SIM drawer	MOLEX 0912360001
RB-MDI	DIN Holder	
RB-MR2R4	RS232/RS485 2in1 cable	

Power cable - open end



RS232/485 cable





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11 Safety Recommendations

READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc
- Where there is risk of explosion such as gasoline stations, oil refineries, etc

It is responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity.

We recommend following the instructions of the hardware user guides for a correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conforming to the security and fire prevention regulations.

The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. The same cautions have to be taken for the SIM, checking carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode.

The system integrator is responsible of the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as of any project or installation issue, because the risk of disturbing the GSM network or external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force.

Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the people (20 cm). In case of this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

1. The unit does not provide protection from lightning and surge. For outdoor installation use outdoor nonmetallic case safety approved according UL 50. Additionally you should provide protection from lightning and over voltage according National code.

2. Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas: Where it can interfere with other electronic devices in environments such as hospitals,



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airports, aircrafts, etc. Where there is risk of explosion such as gasoline stations, oil refineries, etc. It is responsibility of the user to enforce the country regulation and the specific environment regulation. Do not disassemble the product; any mark of tampering will compromise the warranty validity. We recommend following the instructions of the hardware user guides for a correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conforming to the security and fire prevention regulations. The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. Same cautions have to be taken for the SIM, checking carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode. The system integrator is responsible of the functioning of the final product; therefore, care has to be given to the external components of the unit, as well as of any project or installation issue, because the risk of disturbing the GSM network or external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force. Every unit has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm/8"). In case this requirement cannot be satisfied, the system integrator should assess the final product against the SAR regulation. The European Community provides some Directives for the electronic equipment introduced on the market. All the relevant information and the text of the Directive 2014/53/EU (RED) regarding telecommunication equipment are available at the European Commission website: http://ec.europa.eu/growth/sectors/electrical-engineering/red-directive_en



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12 Certifications

12.1 Conformity Assessment Issues

The RBMTX-Lite-IO has been assessed in order to satisfy the essential requirements of the RED Directive 2014/53/EU (Radio Equipment Directive) to demonstrate the conformity against the harmonised standards with the final involvement of a Notified Body.



12.2 National restrictions

This device is intended for use in all EU countries (and other countries following the EU directive 2014/53/EU) without any limitation except for the countries mentioned below:

Norway This subsection does not apply for the geographical area within a radius of 20 km from the centre of Ny-Ålesund



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13 List of Acronyms

ACM	A same lated Call Mater
ACM	Accumulated Call Meter
ASCII	American Standard Code for Information Interchange
AT	Attention commands
CB	Cell Broadcast
CBS	Cell Broadcasting Service
ССМ	Call Control Meter
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CMOS	Complementary Metal-Oxide Semiconductor
CR	Carriage Return
CSD	Circuit Switched Data
CTS	Clear To Send
DAI	Digital Audio Interface
DCD	Data Carrier Detected
DCE	Data Communications Equipment
DRX	Data Receive
DSR	Data Set Ready
DTA	Data Terminal Adaptor
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
EMC	Electromagnetic Compatibility
ETSI	European Telecommunications Equipment Institute
FTA	Full Type Approval (ETSI)
GPRS	General Radio Packet Service
GSM	Global System for Mobile communication
HF	Hands Free
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IRA	Internationale Reference Alphabet
ITU	International Telecommunications Union
IWF	Inter-Working Function
LCD	Liquid Crystal Display



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RMTX-Lite-IO | We are talking M2M language ...

LED	Light Emitting Diode
LF	Linefeed
ME	Mobile Equipment
MMI	Man Machine Interface
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
OEM	Other Equipment Manufacturer
PB	Phone Book
PDU	Protocol Data Unit
PH	Packet Handler
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PUCT	Price per Unit Currency Table
PUK	PIN Unblocking Code
RACH	Random Access Channel
RLP	Radio Link Protocol
RMS	Root Mean Square
RTS	Ready To Send
RI	Ring Indicator
SAR	Specific Absorption Rate (e.g. of the body of a person in an electromagnetic field)
SCA	Service Center Address
SIM	Subscriber Identity Module
SMD	Surface Mounted Device
SMS	Short Message Service
SMSC	Short Message Service Center
SPI	Serial Protocol Interface
SS	Supplementary Service
TIA	Telecommunications Industry Association
UDUB	User Determined User Busy
USSD	Unstructured Supplementary Service Data



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14 On-line support

Elproma provides a range on on-line support which includes:

- the latest version of this document
- the latest drivers for RBMTX-Lite-IO
- technical support

This information can be found on our websites at: www.elpromaelectronics.com or www.teleorigin.com

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