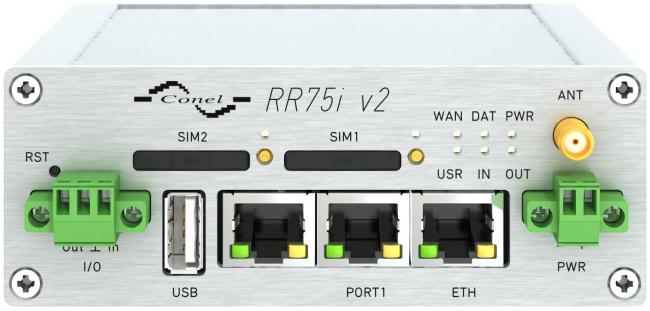
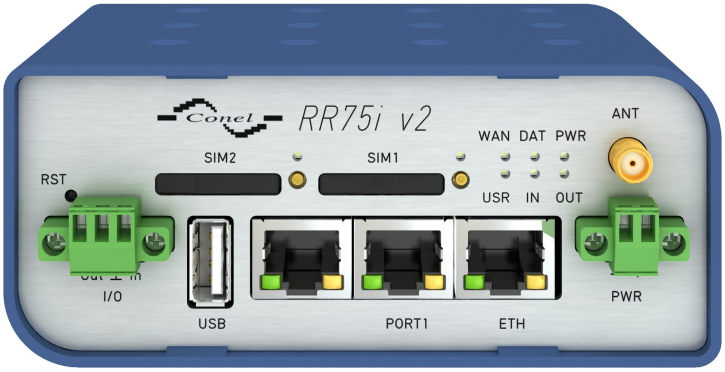
GSM-R Router

RR75i v2

USER'S MANUAL





ADVANTECH

Advantech B+B SmartWorx – Americas

Advantech B+B SmartWorx
707 Dayton Road
Ottawa, IL 61350 USA

Website
www.advantech-bb.com

Advantech – Europe

Advantech Czech s.r.o.
Sokolska 71
562 04, Usti nad Orlici,
Czech Republic

Website
www.advantech-bb.com

© 2020 Advantech Czech s.r.o. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photography, recording, or any information storage and retrieval system without written consent. Information in this manual is subject to change without notice, and does not represent a commitment on the part of Advantech.

Advantech Czech s.r.o. shall not be liable for incidental or consequential damages resulting from the furnishing, performance, or use of this manual.

All brand names used in this manual are the registered trademarks of their respective owners. The use of trademarks or other designations in this publication is for reference purposes only and does not constitute an endorsement by the trademark holder.

Used symbols

Danger – Information regarding user safety or potential damage to the router.

Attention – Problems that can arise in specific situations.

Information, notice – Useful tips or information of special interest.

GPL licence

Source codes under GPL licence are available free of charge by sending an email to:

techSupport@advantech-bb.com.

Please see http://ep.advantech-bb.cz/devzone for more information.

Advantech Czech s.r.o., Sokolska 71, 562 04 Usti nad Orlici, Czech Republic
Document No. MAN-0015-EN, revision from May 19, 2020. Released in the Czech Republic.

Contents

1 Safety Instructions **2**

2 WEEE directive **3**

3 Router description **4**

4 Contents of package **5**

5 Router Design **6**

5.1 Router versions . . . 6
5.2 Delivery identification . . . 7
5.3 Order codes . . . 8
5.3.1 Order code structure . . . 8
5.3.2 Order code examples . . . 8
5.4 Basic dimensions of plastic box . . . 9
5.5 Basic dimensions of metal box . . . 9
5.6 Mechanical dimensions and mounting recommendations . . . 10
5.7 Removal from the DIN rail . . . 12
5.8 Description of the front panel . . . 13
5.8.1 Status indication . . . 14
5.8.2 Power connector PWR . . . 15
5.8.3 Antenna connector ANT (and AUX) . . . 16
5.8.4 SIM card reader . . . 17
5.8.5 Ethernet port . . . 17
5.8.6 PORT1 . . . 19
5.8.7 PORT2 . . . 19
5.8.8 USB Port . . . 20
5.8.9 I/O Port . . . 21
5.8.10 Reset . . . 23

6 First use **24**

6.1 Connecting the router before first use . . . 24
6.2 Start . . . 25
6.3 Configuration . . . 25
6.3.1 Configuration over web browser . . . 25
6.3.2 Configuration over Telnet . . . 25

7 Technical parameters **26**

7.1 Technical parameters of router 26
7.2 Technical parameters of module 26
7.3 Technical parameters of processor 27
7.4 Technical parameters I/O port 27
7.5 Technical parameters of expansion port 27

8 Related Documents **28**

9 Troubleshooting **29**

9.1 FAQ 29

10 Customers Support **32**

10.1 Customer Support for NAM 32
10.2 Customer Support for Europe 32
10.3 Customer Support for Asia 32

List of Figures

1 Contents of package . . . 5
2 Front panel RR75i v2B . . . 6
3 Front panel RR75i v2F . . . 6
4 Front panel RR75i v2B SL . . . 6
5 Front panel RR75i v2F SL . . . 6
6 Label examples . . . 7
7 Basic dimensions of plastic box . . . 9
8 Basic dimensions of metal box . . . 9
9 Space around antennas . . . 10
10 Space around antennas for SL . . . 10
11 Cable routing . . . 11
12 Cable routing for SL version . . . 11
13 Space in front of connectors . . . 11
14 Space in front of connectors – SL . . . 11
15 Default position of plastic and metal DIN rail clip . . . 12
16 Removal from the DIN rail . . . 12
17 Front panel RR75i v2F . . . 13
18 Front panel RR75i v2F . . . 13
19 Power connector . . . 15
20 Connection of power supply connector . . . 15
21 Connection of power supply . . . 15
22 External antenna . . . 16
23 Connecting of the antenna . . . 16
24 Ejected SIM holder . . . 17
25 Ethernet connector . . . 18
26 Connection of ethernet cable . . . 18
27 Example of router connection . . . 18
28 PORT1 cable connection . . . 19
29 PORT2 cable connection . . . 20
30 USB connector . . . 20
31 Connection PLC to the router . . . 21
32 Connection flash memory to the router . . . 21
33 I/O connector . . . 21
34 Connection of I/O cable . . . 22
35 Connection of input and output to the router . . . 22
36 Router reset . . . 23
37 Router connection . . . 24

List of Tables

1 Router versions . . . 6
2 Delivery identification . . . 7
3 Type of port #1 . . . 8
4 Type of power supply . . . 8
5 Order code examples . . . 8
6 Front panel description . . . 13
7 Router status indication . . . 14
8 Connection of power connector . . . 15
9 Connection of Ethernet connector . . . 17
10 Connection of USB connector . . . 20
11 Connection of I/O port . . . 21
12 Description of reset and restart router . . . 23
13 Technical parameters of router . . . 26
14 Technical parameters of module . . . 26
15 Technical parameters of processor . . . 27
16 Technical parameters I/O port . . . 27

1. Safety Instructions

Please, observe the following instructions:

- The router must be used in compliance with all applicable international and national laws and in compliance with any special restrictions regulating the utilization of the router in prescribed applications and environments.
- To prevent possible injury and damage to appliances and to ensure compliance with all relevant provisions, use only the original accessories. Unauthorized modifications or the use of unapproved accessories may result in damage to the router and / or a breach of applicable regulations. Unauthorized modifications or use of unapproved accessories may void the warranty.
- The router can not be opened.
- Turn off the router and disconnect it from power supply before handling the SIM card.
- **Caution!** The SIM card could be swallowed by small children.
- Input voltage must not exceed 36 V DC max.
- Do not expose the router to extreme ambient conditions. Protect the router against dust, moisture and high temperature.
- Only routers with appropriate certification and labelling should be used in locations where flammable and explosive materials are present, including gas stations, chemical plants, or locations in which explosives are used. We remind users of the duty to observe the restrictions concerning the utilization of radio devices at such places.
- Switch off the router when traveling by plane. Utilization of the router on a plane may endanger the operation of the plane or interfere with the mobile telephone network, and may be unlawful. Failure to observe these instructions may result in the suspension or cancellation of telephone services for the respective client and / or may result in legal sanctions.
- When using the router in close proximity to personal medical devices, such as cardiac pacemakers or hearing aids, you must proceed with heightened caution.
- The router may cause interference when used in close proximity to TV sets, radio receivers or personal computers.
- It is recommended that you create an appropriate copy or backup of all important settings that are stored in the memory of the device.

2. Product Disposal Instructions

The WEEE (Waste Electrical and Electronic Equipment: 2012/19/EU) directive was introduced to ensure that electrical/electronic products are recycled using the best available recovery techniques in order to minimize impact on the environment. This product contains high quality materials and components which can be recycled. At the end of it's life this product MUST NOT be mixed with other commercial waste for disposal. The device contains the battery. Remove the battery from the device before disposal. The battery in the device needs to be disposed apart accordingly. Check the terms and conditions of your supplier for disposal information.

3. Router description

GSM-R router RR75i v2 is used to wirelessly connect various equipments and devices via Ethernet interface 10/100 to the internet or intranet. Thanks to the support of an international wireless communications standard for railway communication (GSM-R, Global System for Mobile Communications – Railway) this router is used for secure and highly reliable communication in the railway network. Among the main advantages of RR75i v2 router includes high modularity – router offers a number of serial or wireless interfaces for connecting user devices.

As a standard, this industrial router is equipped with one Ethernet 10/100, one USB Host port, one binary input/output (I/O) port and one SIM card. To save and backup communication data a version with two SIM cards is available. The wide range of interface options of the router further expands expansion Port1 and Port2, which are selected by the customer. For Port1 are available: Ethernet port 10/100, serial interface ports RS232/RS485/RS422/MBUS or inputs/outputs (I/O – CNT). Port2 may be equipped with serial interfaces RS232/RS485/RS422/MBUS, wireless interfaces WIFI/WMBUS, SDH expansion port or inputs/outputs (I/O – CNT). Both of ports can be fitted with internal switch (exp. port SWITCH). This wireless router is supplied either in a plastic or metal casing, based on the requirements of the customer.

Configuration is done via web interface protected by password. The GPRS/EDGE router supports creation of VPN tunnels using technologies IPsec, OpenVPN and L2TP to ensure safe communication. Web interface provides detail statistics about the wireless router activities, signal strength, detailed log, etc. Router supports functions: DHCP, NAT, NAT-T, DynDNS, NTP, VRRP, control by SMS and many other functions.

Other diagnostic functions ensuring continuous communication include automatic inspection of PPP connection offering an automatic restart feature – in case of connection losses, or hardware watchdog which monitors the status of the router. With the help of a special window (start up script window) you may insert Linux scripts for various actions. For some applications the key option to create several different configurations for one wireless GPRS/EDGE router, the so-called profiles (maximum of 4), and the option to switch between them (for example via SMS, binary input status, etc.) is essential. Cellular wireless routers may automatically upgrade configuration and firmware from server. This allows mass reconfiguration of many routers in one time.

For easy use additional software may be used – communication VPN server Digicluster and software for router monitoring R-SeeNet.

4. Contents of package

Basic delivered set of router includes:

- router,
- power supply,
- crossover UTP cable,
- external antenna,
- clip for the DIN rail,
- installation CD containing instructions,
- paper start guide.

Figure 1: Contents of package

Note: The router box and DIN mount are supplied in a metal case in the SL version.

The router can also be supplied as expansion accessories:

- One (Basic version) or two (Full version) expansion ports: RS232, RS485/422, MBUS, ETHERNET, CNT, SWITCH, WIFI, WMBUS or SDH. Separation columns for mounting expansion boards are included.

5. Router Design

5.1 Router versions

RR75i v2 router is supplied in the following versions:

	Box	SIM1	SIM2	I/O	USB	PORT1	PORT2	ETH
RR75i v2B	Plastic	X		X	X	X		X
RR75i v2B SL	Metal	X		X	X	X		X
RR75i v2F	Plastic	X	X	X	X	X	X	X
RR75i v2F SL	Metal	X	X	X	X	X	X	X

Table 1: Router versions

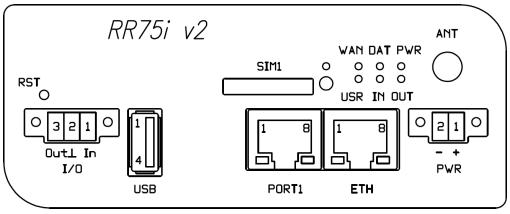


Figure 2: Front panel RR75i v2B

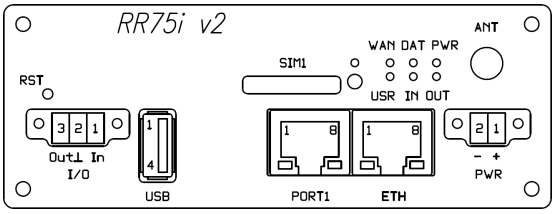


Figure 4: Front panel RR75i v2B SL

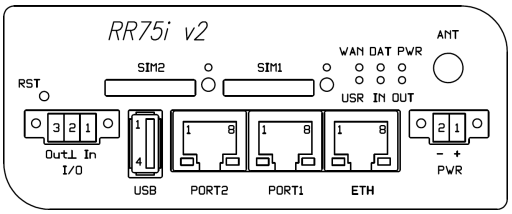


Figure 3: Front panel RR75i v2F

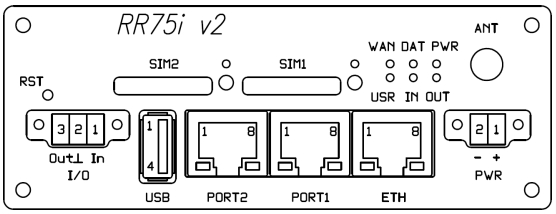


Figure 5: Front panel RR75i v2F SL

5.2 Delivery identification

Trade name	Type name	Other
RR75i v2B	RR-75i-v2	Basic version
RR75i v2B SL	RR-75i-v2	Basic version in the metal box
RR75i v2F	RR-75i-v2	Full version
RR75i v2F SL	RR-75i-v2	Full version in the metal box

Table 2: Delivery identification

Figure 6: Label examples

5.3 Order codes

5.3.1 Order code structure

Order code for **full** version has following structure:

BB-RR2F52v02y, where:

v = port #1,
y = type of power supply.

Letter "v" – port #1

Port type	Letter "v" in code
none	0
ETH	1
SWITCH	9

Table 3: Type of port #1

Type of power supply	Letter "y" in code
none	0
Europe	1

Table 4: Type of power supply

5.3.2 Order code examples

Examples of order codes are listed in the table bellow:

Order code	Features – interfaces	Box	Power supply
BB-RR2F520021	EDGE module – 2x SIM reader, 1x ETH, 1x USB, 1x BIN IN, 1x BIN OUT	metal	Europe
BB-RR2F521020	EDGE module – 2x SIM reader, 2x ETH, 1x USB, 1x BIN IN, 1x BIN OUT	metal	none
BB-RR2F521021	EDGE module – 2x SIM reader, 2x ETH, 1x USB, 1x BIN IN, 1x BIN OUT	metal	Europe

Table 5: Order code examples

5.4 Basic dimensions of plastic box

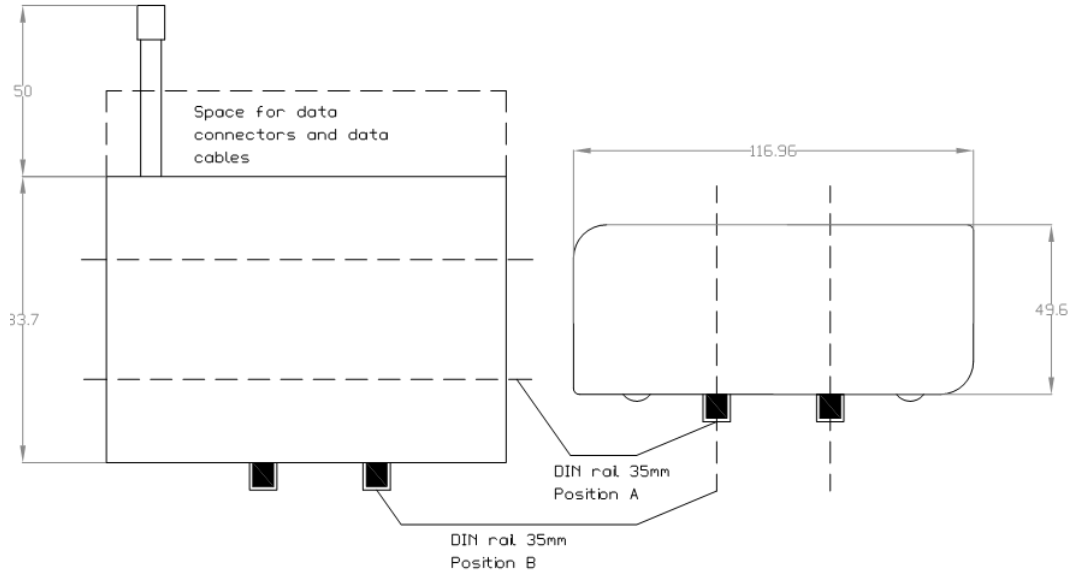


Figure 7: Basic dimensions of plastic box

5.5 Basic dimensions of metal box

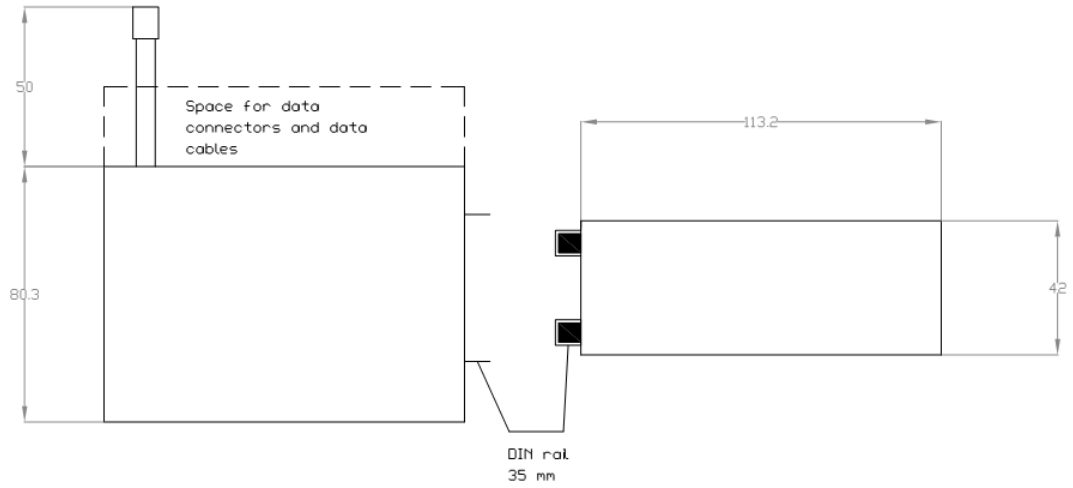


Figure 8: Basic dimensions of metal box

5.6 Mechanical dimensions and mounting recommendations

Mounting recommendations:

- possibility to be put on a work surface,
- DIN rail with clips CPD2 (ELPAC clip SL for metal version) are included.

For the most of applications with a built-in router in a switch board it is possible to recognize two kinds of environments:

- no public and industry environment of low voltage with high interference,
- public environment of low voltage without high interference.

For both of these environments it is possible to mount router to a switch board, the following there is no need to have examination immunity or issues in connection with EMC according to EN 60439-1 ed.2:00 + A1:04.

For compliance of EN 60439-1 ed.2:00 + A1:04 specification it is necessary to observe next assembly of the router to the switch – board:

- for whip antennas we recommend to observe a distance of 6 cm from cables and metal surfaces on every side according to the next picture due to the elimination of interference, while using an external antenna except for the switch-board it is necessary to fit a lightening conductor,
- before mounting a router on sheet-steel we recommend using an external antenna,

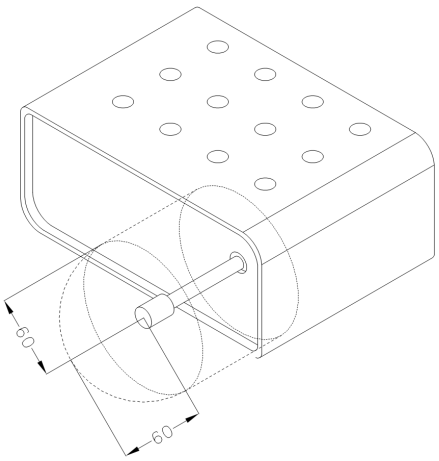


Figure 9: Space around antennas

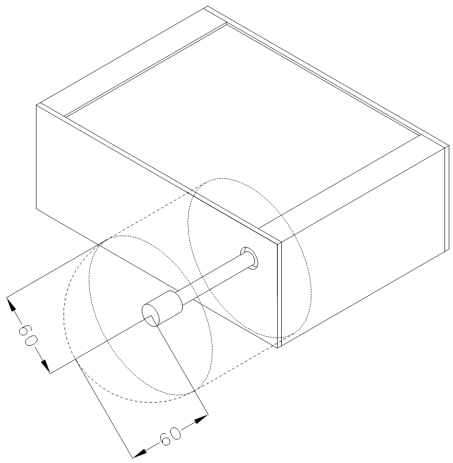


Figure 10: Space around antennas for SL

- For every cables we recommend to bind the bunch according to the following picture, we recommend for this use:
  - Length of the bunch (combination of power supply and data cables) can be maximum 1,5 m. If the length of data cables exceeds 1,5 m or in the event of, the cable leads towards the switch – board. We recommend installing over – voltage protectors (surge suppressors).
  - With data cables they mustn't carry cables with reticular tension ∼ 230 V/50 Hz.
  - All signals to sensors must be twisted pairs.

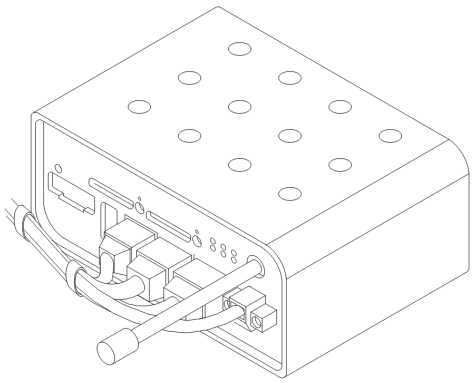


Figure 11: Cable routing

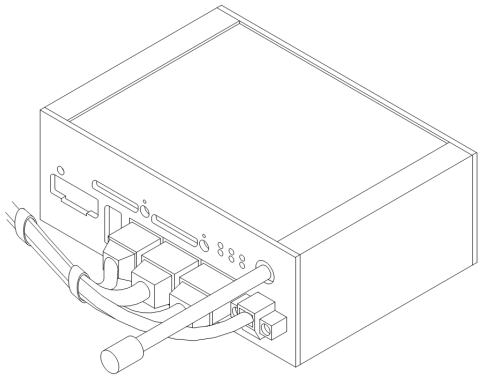


Figure 12: Cable routing for SL version

- Sufficient space must be left before individual connectors for handling of cables,

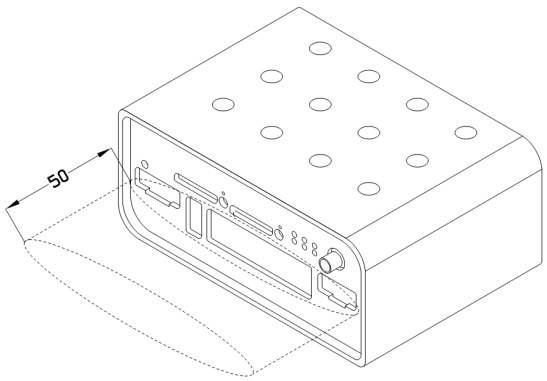


Figure 13: Space in front of connectors

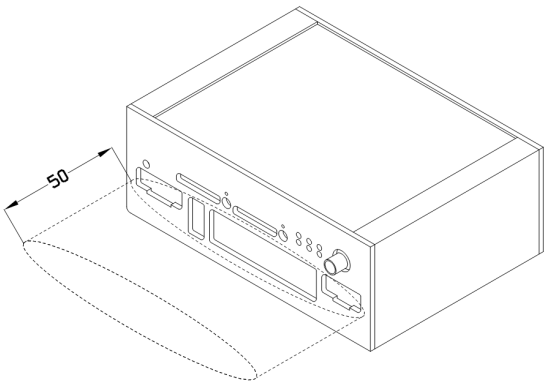


Figure 14: Space in front of connectors – SL

- For correct function of the router we recommend to use in the switch-board earth-bonding distribution frame for grounding of power supply of router, data cables and antenna.

5.7 Removal from the DIN rail

The DIN rail clip is suitable for a DIN rail according to EN 60715 standard only. The default position of plastic or metal rail clip, which is used for mounting the router on a DIN rail, is shown in the following figure. Its position can be changed on some models (back or bottom). When changing the position of the DIN rail clip, tighten the screws with max. 0.4 Nm torque.

Figure 15: Default position of plastic and metal DIN rail clip

To remove the router from the DIN rail, push the router down lightly, so the bottom part of the DIN rail clip (hitched to the DIN rail) gets out of the rail and then pull out the bottom part of the router away from the DIN rail.

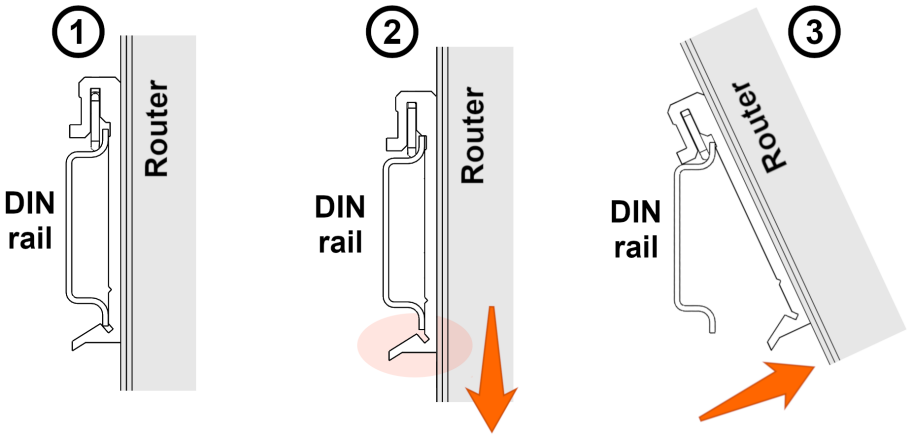


Figure 16: Removal from the DIN rail

5.8 Description of the front panel

On the front panel is located:

Caption	Connector	Description
PWR	2-pin	Connector for the power supply adapter.
ETH	RJ45	Connector for connection into the local computer network.
PORT1	RJ45	Connector for expansion port RS232, RS458/422, MBUS, ETHERNET, CNT or SWITCH.
PORT2	RJ45	Connector for expansion port RS232, RS485/422, MBUS, SWITCH, WIFI, WMBUS or SDH (only FULL version).
ANT	SMA	Connector for main antenna.
USB	USB-A Host	Connector for connection of USB devices to the router. Supports devices with PL-2303 and FTDI USB/RS232 converters.
I/O	3-pin	Connector for connection of the binary input and output.
SIM1	—	Holder for the first SIM card.
SIM2	—	Holder for the second SIM card (only FULL version).

Table 6: Front panel description

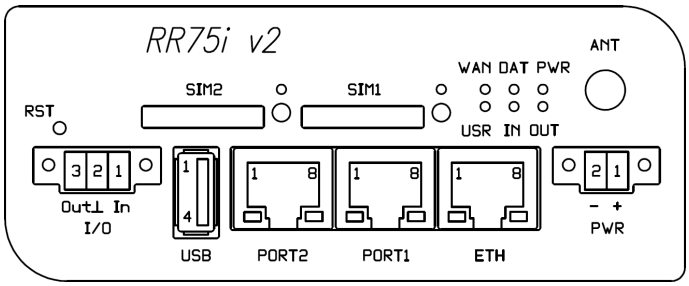


Figure 17: Front panel RR75i v2F

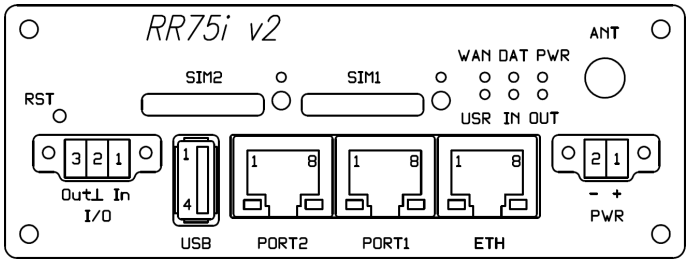


Figure 18: Front panel RR75i v2F

5.8.1 Status indication

About router status inform eight LED indicators on the front panel and on every port are two LED indicators, which inform about port status.

Caption	Color	State	Description
PWR	Green	Blinking On Fast blinking	Router is ready Starting of the router Updating firmware
DAT	Red	Blinking	Communication in progress on radio channel
WAN	Yellow	1x flash per second 2x flash per second 3x flash per second	Signal strength is from –50 dBm to –69 dBm Signal strength is from –70 dBm to –89 dBm or difference between neighbours cells is exactly 3 dBm Signal strength is from –90 dBm to –113 dBm or difference between neighbours cells is smaller than 3 dBm
USR	Yellow	Function selected by user	
OUT	Green	On	Binary output active
IN	Green	On	Binary input active
ETH	Green	On Off	Selected 100 Mbit/s Selected 10 Mbit/s
ETH	Yellow	On Blinking Off	The network cable is connected Data transmission The network cable is not connected
PORT	Green	Depends on the expansion port (see user's guide of used port)	
PORT	Yellow	Depends on the expansion port (see user's guide of used port)	
SIM1	Yellow	On	SIM card 1 is active
SIM2	Yellow	On	SIM card 2 is active

Table 7: Router status indication

State indication of WAN LED is updated every 10 seconds.

5.8.2 Power connector PWR

Panel socket 2-pin.

Pin number	Signal mark	Description
1	VCC(+)	Positive pole of DC supply voltage (+10 to +30 V DC)
2	GND(-)	Negative pole of DC supply voltage

Table 8: Connection of power connector

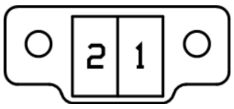


Figure 19: Power connector

Power supply for router is required between +10 V to +30 V DC supply. Protection against reversed polarity without signaling is built into the router.

The power consumption during receiving is 2 W. The peak power consumption during data sending is 5,5 W. However, values of consumption can be increased, if some expansion port is eqquipped. For correct operation it is necessary that the power source is able to supply a peak current of 1 A.

Connector on the power cable connects into the power connector on the router head and tightens locking screws (see the figure below).

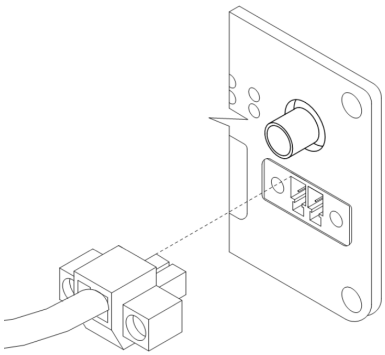


Figure 20: Connection of power supply connector

Circuit example:

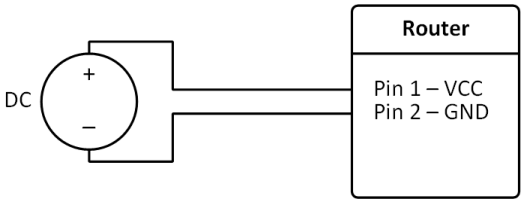


Figure 21: Connection of power supply

The positive pole VCC is marked by a red socket on the power.

5.8.3 Antenna connector ANT (and AUX)

Main antenna is connected to the router using the SMA connector on the front panel (ANT). If WIFI or WMBUS expansion port is eqquiped on customer's request, on the front panel is also available the second SMA antenna connector (AUX), through which the additional antenna can be connected (it is reverse connector R-SMA in case of the WIFI expansion port).

The router can not operate without the main antenna connected labeled as ANT.

Example of antenna:

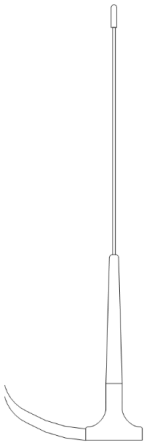


Figure 22: External antenna

For connection the antenna is used SMA connector. The antenna is connected by screwing this antenna to the SMA connector on the front panel of the router (see the figure below).

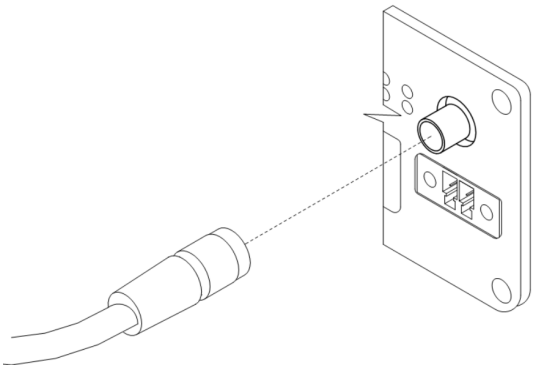


Figure 23: Connecting of the antenna

5.8.4 SIM card reader

The SIM card reader for 3 V and 1,8 V SIM cards is located on the front panel of the router. To initiate the router into operation it is necessary to insert an activated SIM card with unblocked PIN in the reader. The SIM cards might be of different adjusted APN (Access Point Name).

Supported type of SIM cards: **Mini SIM** (2FF), dimensions 25.0 x 15.0 x 0.76 mm.

Changing the SIM card:

Before handling of the SIM card turn off the router and disconnect it from power supply.

Press the small yellow button to eject the reader holder. Insert the SIM card into the reader holder and slide it in the reader (see the figure below).

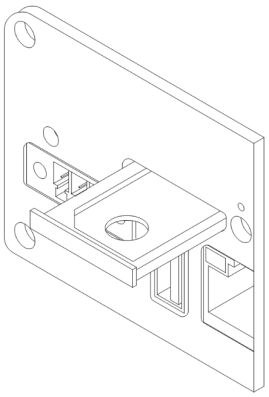


Figure 24: Ejected SIM holder

5.8.5 Ethernet port

Panel socket RJ45.

Pin	Signal mark	Description	Data flow direction
1	TXD+	Transmit Data – positive pole	Input/Output
2	TXD-	Transmit Data – negative pole	Input/Output
3	RXD+	Receive Data – positive pole	Input/Output
4	—	—	
5	—	—	
6	RXD-	Receive Data – negative pole	Input/Output
7	—	—	
8	—	—	

Table 9: Connection of Ethernet connector

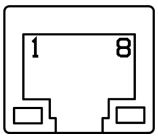


Figure 25: Ethernet connector

ATTENTION! Port ETH is not POE (Power Over Ethernet) compatible!

Ethernet cable plug into the RJ45 connector labeled as ETH (see the figure below).

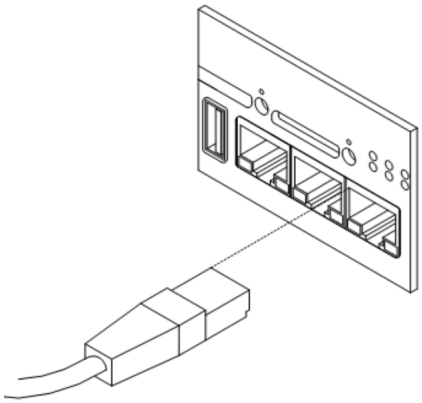


Figure 26: Connection of ethernet cable

Example of the ETH router connection:

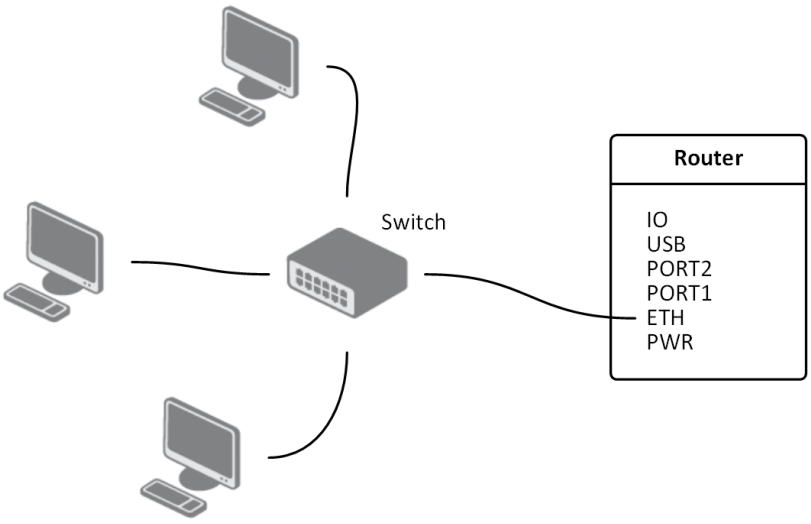


Figure 27: Example of router connection

5.8.6 PORT1

The PORT1 is equipped on customer's request with one of the offered expansion ports:

- RS232
- RS485
- RS422
- ETHERNET
- MBUS
- CNT
- SWITCH (together with PORT2)

Description and examples of expansion ports connection can be found in user's guide for corresponding expansion port.

PORT1 cable plug into the RJ45 connector labeled as PORT1 (see the figure below).

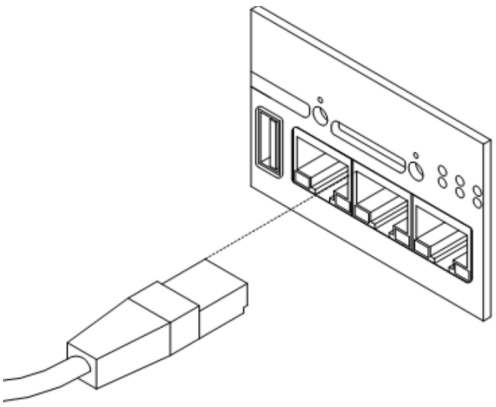


Figure 28: PORT1 cable connection

5.8.7 PORT2

The PORT2 is equipped on customer's request with one of the offered expansion ports:

- RS232
- RS485
- RS422
- MBUS
- SDH
- SWITCH (together with PORT1)
- WIFI
- WMBUS

PORT2 is available only in the Full version of the router! Description and examples of expansion ports connection can be found in user's guide for corresponding expansion port.

PORT2 cable plug into the RJ45 connector labeled as PORT1 (see the figure below).

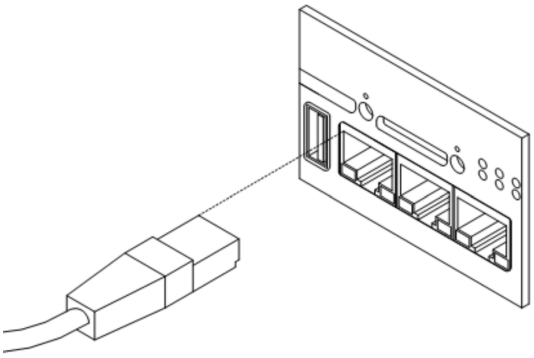


Figure 29: PORT2 cable connection

5.8.8 USB Port

Panel socket USB-A.

Pin	Signal mark	Description	Data flow direction
1	+5 V	Positive pole of 5 V DC supply voltage	
2	USB data -	USB data signal – negative pole	Input/Output
3	USB data +	USB data signal – positive pole	Input/Output
4	GND	Negative pole of DC supply voltage	

Table 10: Connection of USB connector

Figure 30: USB connector

Example of connecting devices with serial interface to the USB:

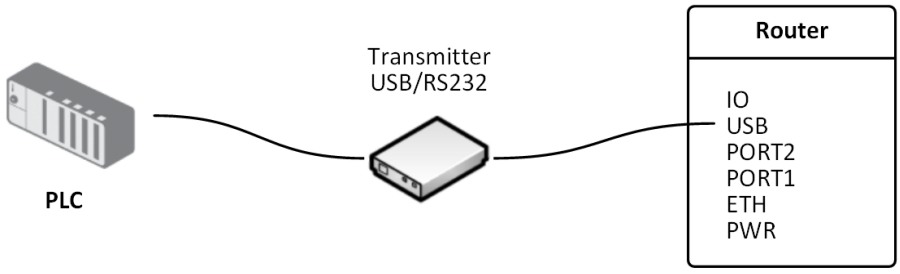


Figure 31: Connection PLC to the router

Example of connecting of USB flash disk to the USB:

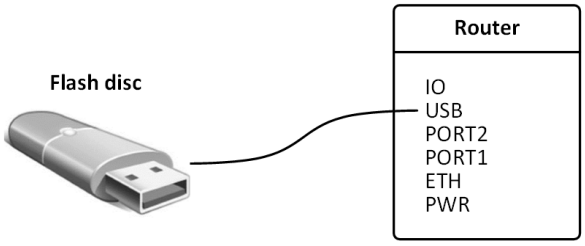


Figure 32: Connection flash memory to the router

Mounting USB flash drive to the system: To use the USB flash drive in the Linux system of the router, it is necessary to mount it. Use `dmesg` command to see the name of recently connected device (E. g. `sda: sda1`) and then use `mount` command. Example:
`mount /dev/sda1 /mnt`

5.8.9 I/O Port

Panel socket 3pin.

Pin	Ozn. signálu	Popis	Směr toku dat
1	BIN0	Binary input	Input
2	GND	Signálová zem	
3	OUT0	Binary output	Output

Table 11: Connection of I/O port

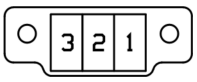


Figure 33: I/O connector

The user interface I/O is for processing of binary input signal and to control (settings) of binary output signal. Binary output is not switched to ground in the default configuration.

Maximum load binary output is 30 V / 100 mA. The constant current supplied by the binary input is 3 mA.

Connector I/O cable connect into the I/O connector on the router head and tighten locking screws (see the figure below).

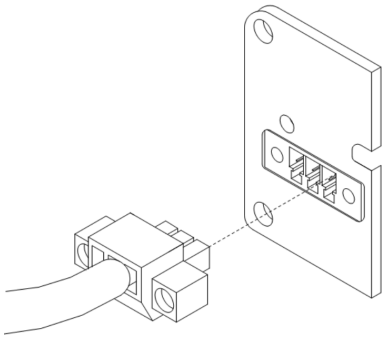


Figure 34: Connection of I/O cable

Circuit example of a binary input or output equipment with router:

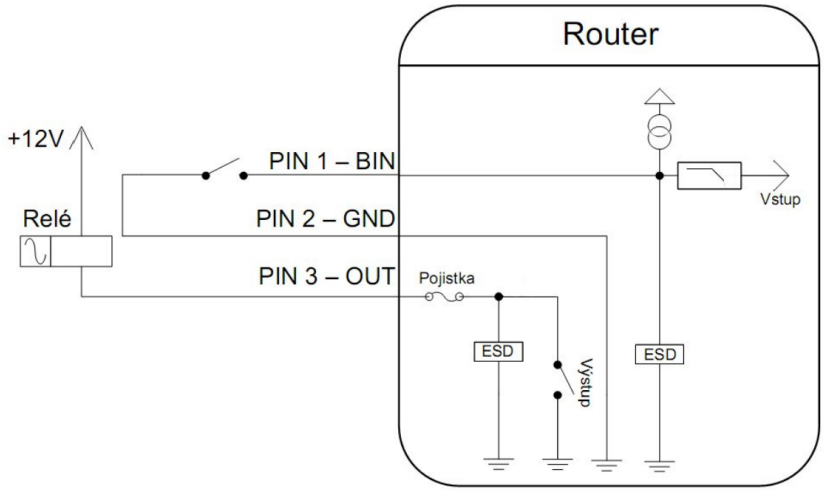


Figure 35: Connection of input and output to the router

5.8.10 Reset

It is important to distinguish between reset and reboot the router.

Action	Router behavior	Invoking events
Reboot	Turn off and then turn on router	Disconnect and connect the power, Press the *Reboot* button in the web configuration
Reset	Restore default configuration and reboot the router	Press RST button

Table 12: Description of reset and restart router

After green LED starts to blink it is possible to restore initial settings of the router by pressing button RST on front panel. After press button RST it is restoration of default configuration and reboot (green LED will be on).

For pressing the RST button could be used a narrow screwdriver.

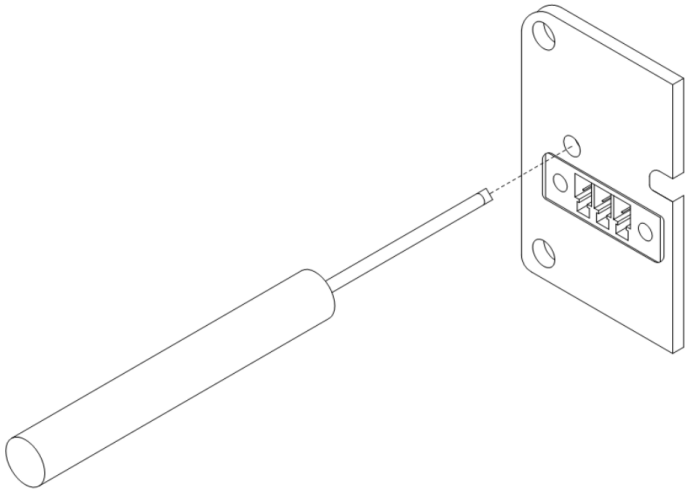


Figure 36: Router reset

We recommend to backup your router configuration (see Configuration manual), because after reset router set configuration to the initial state.

6. First use

6.1 Connecting the router before first use

Before you give up the router, it is necessary to connect all components needed for the operation of your applications and the SIM card must be inserted (see the figure below).

The router can not operate without connected antenna, SIM card and power supply. If the antenna is not connected, router can be demaged.

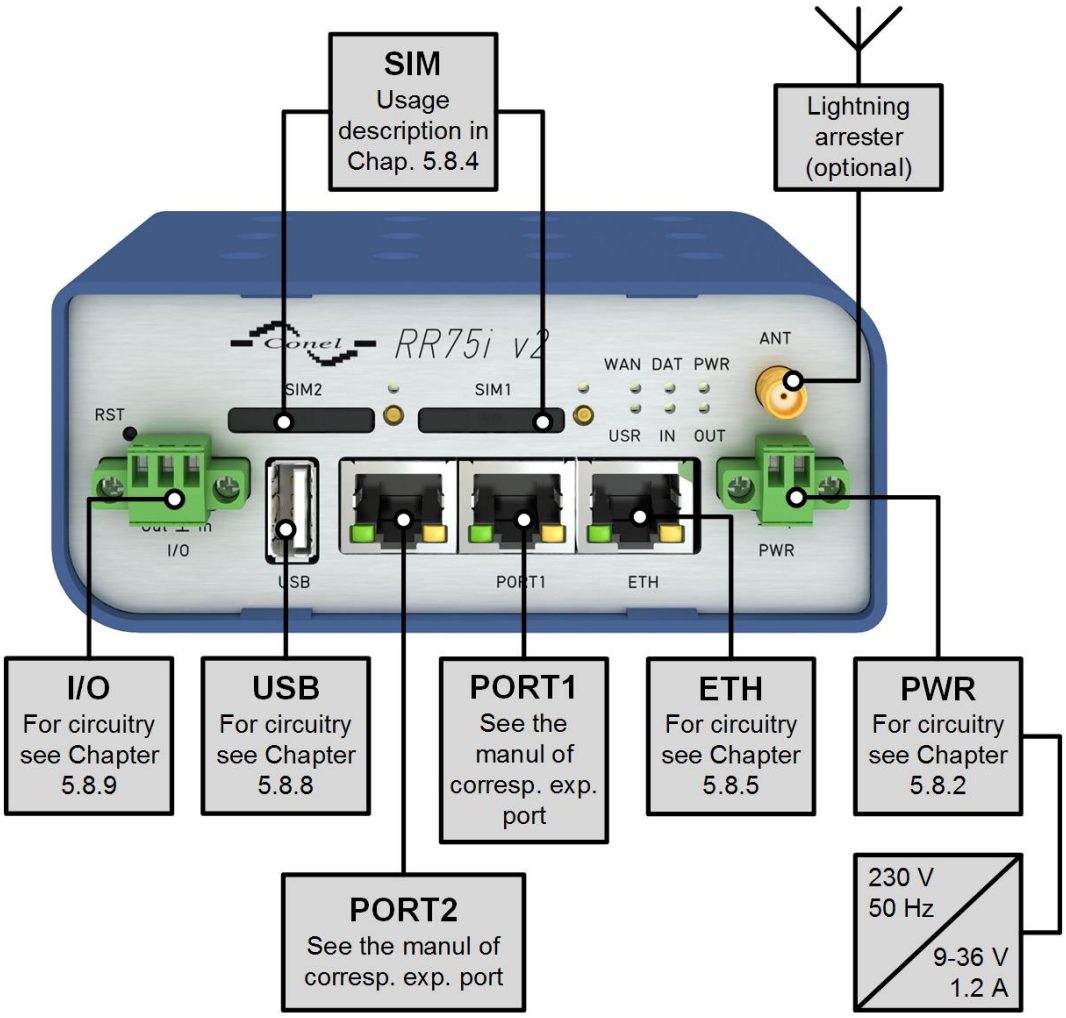


Figure 37: Router connection

6.2 Start

The router is set up connecting the power supply to the router. In the default setting the router starts to login automatically to the preset APN. Device on the Ethernet port DHCP server will assign addresses. The behavior of the router can be modified by means of the web or Telnet interface, which is described in the configuration manual.

The power consumption during receiving is 1 W. The peak power consumption during data sending is 5,5 W. However, values of consumption can be increased, if some expansion port is eqquipped. For correct operation it is necessary that the power source is able to supply a peak current of 1 A.

6.3 Configuration

Attention! If the SIM card is not inserted in the router, then it is impossible to operate.

6.3.1 Configuration over web browser

Monitoring of the status, configuration and administration of the router can be performed by means of the web interface, which is available after insertion of IP address of the router into the web browser. The default IP address of the router is 192.168.1.1. Configuration may be performed only by the user "root". The default password is printed on the router's label.[1] Change the default password as soon as possible!

A detailed description of the router settings via the Web interface can be found in the configuration manual.

6.3.2 Configuration over Telnet

Monitoring of status, configuration and administration of the router can be performed by means of the Telnet interface. After IP address entry to the Telnet interface it is possible to configure the router by the help of commands. The default IP address of the router is 192.168.1.1. Configuration may be performed only by the user "root".

A detailed description of the router settings via the Telnet interface can be found in the configuration manual.

[1] If the router's label does not contain a unique password, use the password "root".

7. Technical parameters

7.1 Technical parameters of router

RR75i v2		
Complies with standards		EN 301 511, v9.0.2, EN 301 489-1 v1.8.1, EN 301 489-7 v1.3.1, EN 60950-1:06 ed.2 + A11:09 + A1:10
Temperature range	Function Storage	-30 °C to +60 °C -40 °C to +85 °C
Protection	Freely In switch board	IP20 IP56
Supply voltage		9 to 36 V DC
Battery for RTC		CR1225
Consumption	Reception Transmission	2 W 5.5 W
Dimensions		42 x 76 x 113 mm (DIN lišta 35 mm)
Weight		RR75i v2 – 150 g RR75i v2 SL – 280 g
Antenna connector		SMA – 50 Ohm
User interface	ETH USB PORT1 PORT2	Ethernet (10/100 Mbit/s) USB 2.0 type A host On customer's request On customer's request

Table 13: Technical parameters of router

7.2 Technical parameters of module

GSM-R module	
Frequency bands	Quad-band: GSM-R / EGSM 900 / GSM 1800 / GSM 1900 (GSM Phase 2/2+)
Transmit power	Class 4 (2 W) for GSM-R / EGSM 900 Class 1 (1 W) for GSM 1800 / GSM 1900

Table 14: Technical parameters of module

7.3 Technical parameters of processor

32b ARM mikroprocesor	
Memory	512 Mb DDR SDRAM 128 Mb FLASH 1 Mb MRAM
Interface	Serial interface RS232 Ethernet interface 10/100 Mbit/s USB 2.0 interface

Table 15: Technical parameters of processor

7.4 Technical parameters I/O port

I/O port		
Input/Output	Binary input Binary output	Reed contact with trigger level 1,3 up to 1,4 V 120 mA / max. 30 V

Table 16: Technical parameters I/O port

7.5 Technical parameters of expansion port

Technical parameters of the expansion ports are specified in separate manuals for expansion ports.

8. Related Documents

[1] Advantech Czech: **Rychlá příručka pro v2 routery**,
[2] Advantech Czech: **Konfigurační manuál pro v2 routery**,
[3] Advantech Czech: **Aplikační příručka – Programátorská příručka**.

9. Troubleshooting

If you cannot connect to the router from your PC, your network card may be configured in such a way that it is not possible to connect to the router. Take one or more of the following steps in order to solve the problem:

- Make sure your PC's network card is configured to obtain the IP address form the DHCP server (by default the DHCP server is running in the router).
- Set the communication rate to 10 MB/s in the properties of your network card.
- Connect the router to the PC via Switch.
- Connect the router to the PC, start the router first and then start the PC after the router's initialization.

9.1 FAQ

✍ **The router reboots itself and the Ethernet connection fails.**

- *The router will not work well without an antenna. Keep the antenna as far as possible from the power supply.*

✍ **Ethernet connection fails or is not establishing.**

- *It is possible to turn auto negotiation off and set a rate and duplex manually on the Ethernet interface of the router. Available on "LAN Configuration" page in the router.*

✍ **Mobile WAN connection fails.**

- *Check the signal power ("Mobile WAN status" page). If the signal power is weak, you will have to use a better antenna. If the neighbouring cells have a similar signal strength, you will need to use a directional antenna. For proper operation, the signal levels have to be good.*
- *Try to enable automatic ping from the router, which will check the connection when there are no data running and in the case of a failed ping, restart the connection. This can be done on the "Mobile WAN Configuration" page in the router in the "Check connection" section. "Enable + bind" option is to ensure the ping goes always through Mobile WAN network interface.*

✍ **Mobile WAN connection cannot be established.**

- *Check the "Mobile WAN Configuration" – APN, name, password and IP address (all can be blank).*
- *Try to enter the SIM card PIN – verify that the SIM card has the PIN code entered. Available on "Unlock SIM Card" page in the "Administration" section.*

- *In a private APN it is not recommended to get the DNS settings from operator (on "Mobile WAN" page)*
- *Go to "System Log" page in "Status" section and observe where the error occurs.*

✍ **I cannot connect from the Internet to the device behind the router. I have NAT enabled.**

- *The device's gateway has to be configured so it points to the router.*

✍ **I can't access my Web server placed behind the router over NAT.**

- *The remote HTTP access to the router has to be disabled on "NAT Configuration" page in the router. Also enable "Send all remaining incoming packets to default server" feature and fill in the IP address of your Web server. On the Web server, the default gateway has to be the IP address of the router.*

✍ **DynDNS doesn't work.**

- *With private APN this will not work.*
- *If the same IP address is recorded in your canonic name as a dynamically assigned address, it means that the operator is using NAT or a firewall.*
- *You can verify NAT using ping to your server with static address and then compare with router's IP address.*
- *You can verify a Firewall by accessing remotely to the router's Web interface.*
- *The operator may not provide the address of DNS server and without DNS server's address it is impossible to connect to the dyndns.org server. The following messages will be shown in the System Log:*
  - *DynDNS daemon started*
  - *Error resolving hostname: no such file or directory*
  - *Connect to DynDNS server failed*

✍ **L2TP or IPSec isn't establishing.**

- *Check the "System Log" page for error messages.*

✍ **IPSec tunnel establishes but the communication does not run.**

- *Probably there are bad routing rules defined in the connected devices, or the default gateway.*

✍ **I switched the router to offline mode by SMS message, but the router is in online mode after reboot.**

- *SMS messages do not change the router configuration. They remain in effect only until the router is rebooted.*

✍ **Serial communication is not working.**

- *Verify that the router model supports serial communications. Also verify the serial communication settings. To do so, open the router's configuration menu via the web browser, select the appropriate "Expansion Port" from "Configuration" part of the menu and verify the settings.*

✍ **Is the router Cisco compatible? Can I use the Cisco configuration?**

- *No, the Firmware in the router (Conel OS) is based on Linux with BusyBox. Thus the Cisco configuration cannot be used. But network connections are defined by standards so connecting the router to the Cisco or other networking devices is possible and will be compatible.*

✍ **FTP or SFTP does not work**

- *FTP will work on v2 routers only. You can use SFTP on all routers to transfer files to/from the router. If having troubles with FTP on v2 routers, make sure you have FTP enabled: "Configuration" section, "Services", "FTP". Then you can connect with any client on port 21 with name and password same as for the Web interface. If having troubles with SFTP, make sure you have SSH enabled: "Configuration" section, "Services", "SSH". Then you can connect with any client on port 22 with name and password same as for the Web interface.*

✍ **How can I connect to the router's command line? (SSH, Telnet)**

- *You can use SSH on all routers or Telnet on v2 routers only. SSH is enabled by default, but you can verify in Web interface in "Configuration" section, "Services", "SSH". Then connect with any SSH client on port 22 of the router. User and password is the same as for the Web interface. Telnet on v2 routers can be enabled here: "Configuration" section, "Services", "Telnet".*

10. Customers Support

10.1 Customer Support for NAM

E-mail: support@advantech-bb.com
Web: www.advantech-bb.com

10.2 Customer Support for Europe

E-mail: iiotcustomerservice@advantech.eu
Web: www.advantech-bb.com

10.3 Customer Support for Asia

E-mail: icg.support@advantech.com.tw
Web: www.advantech.com

Upkeep – Advices:

- The SIM-card must be handled carefully as with a credit card. Don't bend, don't scratch on this and do not expose to static electricity.
- During cleaning of the router do not use aggressive chemicals, solvents and abrasive cleaners!

CE Hereby, Advantech Czech s.r.o. company declares that the radio equipment narrated in this user's guide is in compliance with EU Directive **2014/53/EU**.

The full text of the EU Declaration of Conformity is available at the following internet address: www.advantech-bb.cz/eudoc