5G Industrial Router

ICR-4461

USER MANUAL

ADVANTECH

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.

C E   UK CA   TÜVRheinland COTI ISO 9001

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1. Product Overview

1.1 Product Introduction

The ICR-4461 is an Ultra-high-speed **5G NR** (New Radio) Router and **Powerful Edge Computing Gateway** focused on the global market, including the NAM region.

Thanks to its ultra high-speed data transfer capabilities, offering up to **3.4 Gbps for downloads** and **900 Mbps for uploads**, this router is an ideal solution for demanding IoT applications, including industrial routers and gateways, digital signage, industrial computers, and tablets, among others.

For optimal performance on the cellular network, the router utilizes **4x4 MIMO** technology. Two antennas for **GNSS** can be connected to the router using shared SMA connectors with the cellular antennas.

The router is housed in a robust metal enclosure and features five **1Gb Ethernet ports**, one **SFP cage**, and interfaces for **RS232**, **RS485**, and **CAN bus**. It also includes two **binary inputs** and two **binary outputs**.

To ensure cellular connection redundancy, the router provides two **SIM card readers** on the rear side, conveniently located under the SIM cover. Additionally, there is a slot for a **microSD card** under this cover. Select router models can be equipped with a **WiFi module** featuring **3x3 MIMO** antennas.

Configuration of the router can be performed through a password-protected web interface, which provides detailed statistics about the router's activities, signal strength, and a comprehensive system log. The router offers support for VPN tunnels using various protocols including **IPSec**, **OpenVPN**, **GRE**, **L2TP**, or **PPTP**, ensuring secure communication.

Other supported features include **IPv6 Dual Stack**, **DHCP**, **NAT**, **NAT-T**, **DynDNS**, **DNS proxy**, **VLAN**, **QoS**, **NTP**, **VRRP**, control via **SMS**, port forwarding, primary connection backup, and many more.

The router provides diagnostic functions including automatic monitoring of the PPP connection, automatic restart in case of connection losses, **Low Power Mode**, and a **hardware watchdog** that monitors the router's status.

Users can insert **Linux scripts** that are triggered by various actions. It's possible to create up to four different configurations for the same router, and these configurations can be switched when needed through the web interface, SMS, or binary input status.

The router can automatically upgrade its configuration and firmware from your central server. Support is also provided for the WebAccess/DMP and WebAccess/VPN remote device management platforms.

Examples of possible applications

- mobile office
- remote monitoring
- security system
- vending and dispatcher machines
- fleet management
- telematic
- telemetric

1.2 Product Usage Examples

The router is primarily intended for these basic situations:

I. Access to the Internet from LAN
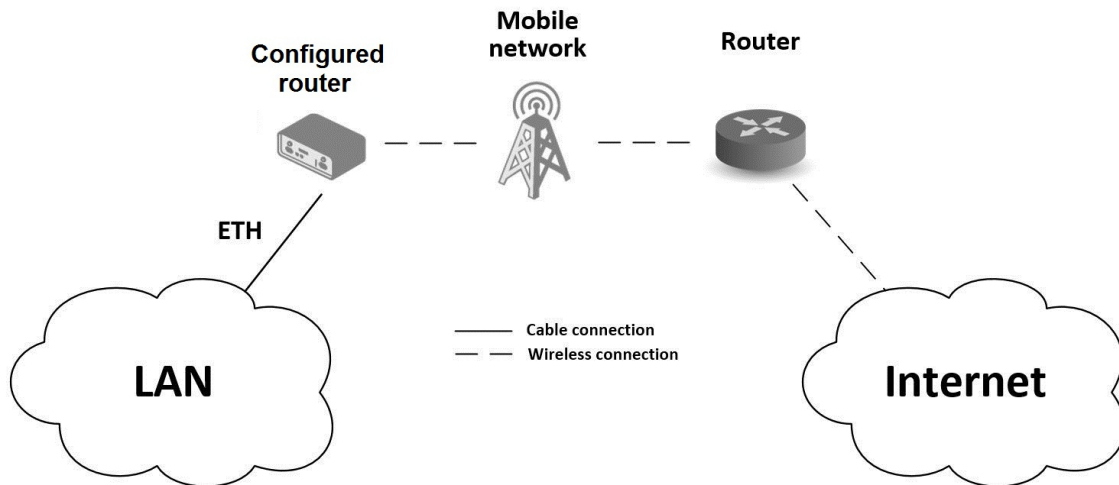
Figure 1: Access to the Internet from LAN

II. Backed up access to the Internet (from LAN)
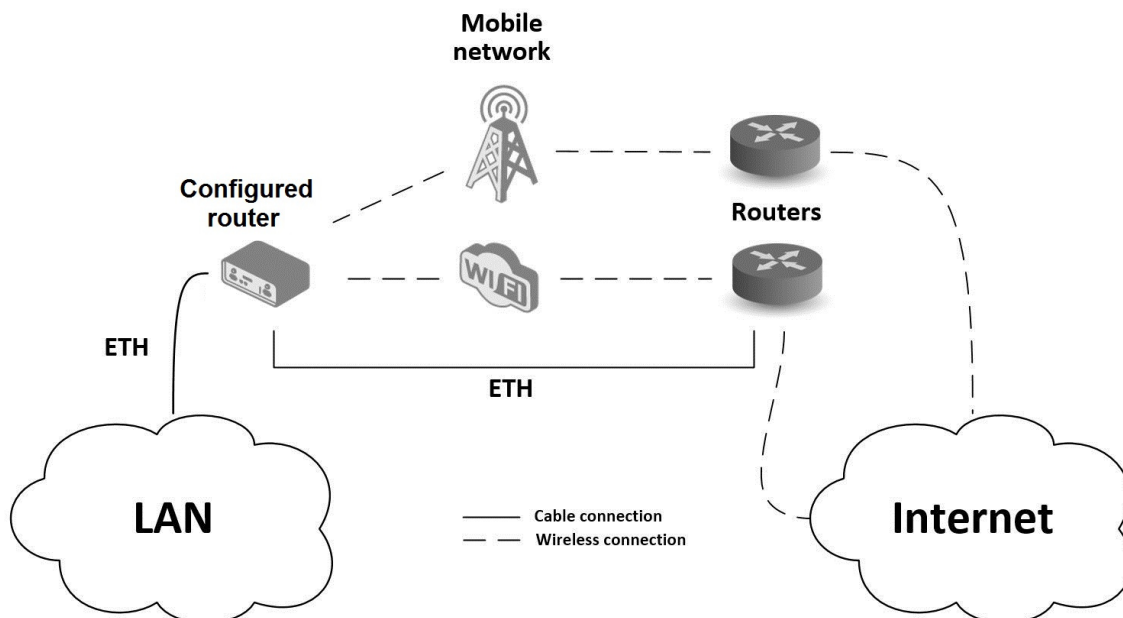
Figure 2: Backed up Access to the Internet

III. Secure networks interconnection or using VPN
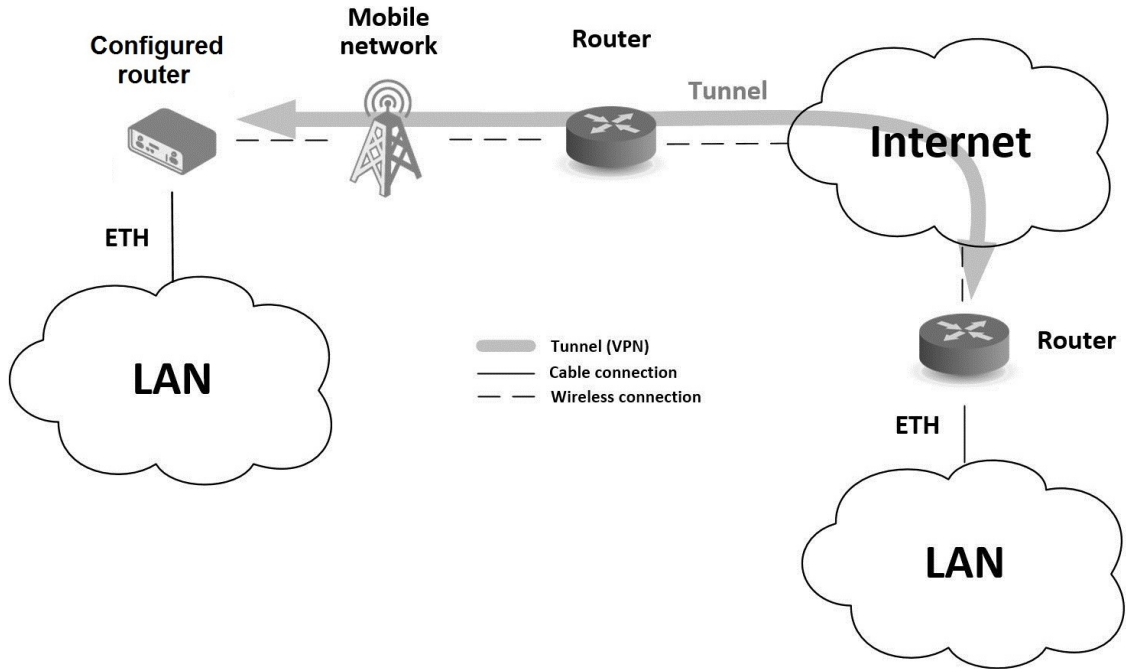
Figure 3: Using VPN Tunnel

IV. Serial Gateway
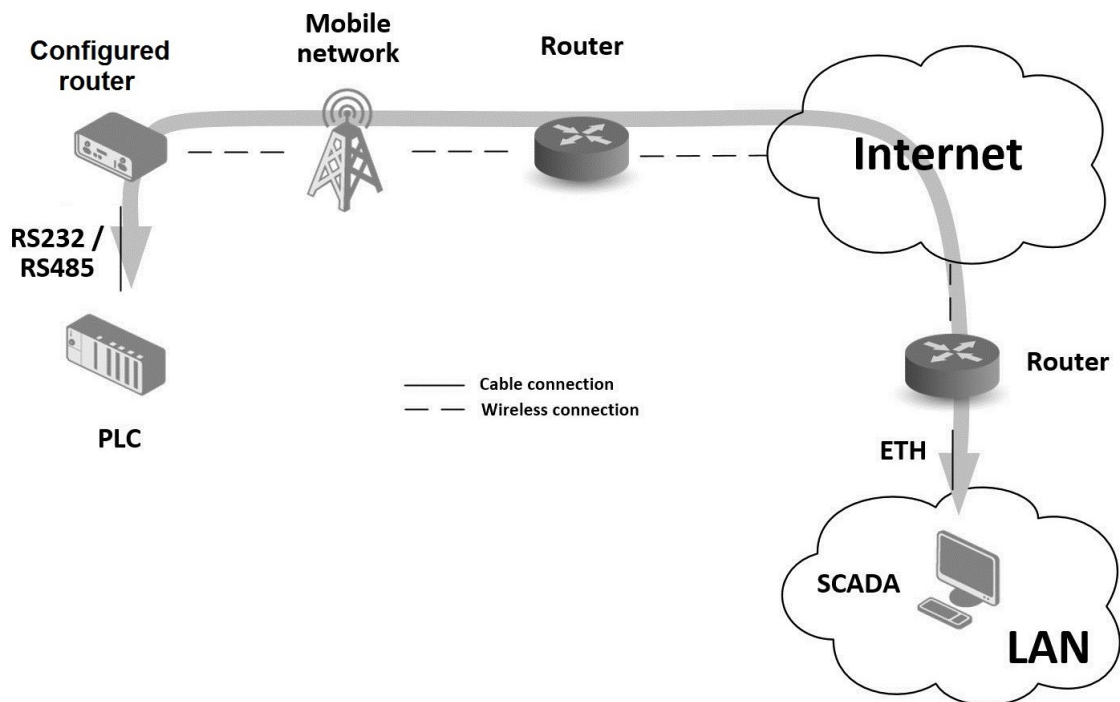
Figure 4: Serial Gateway

1.3 Hardware Overview

The router case preview is shown in Figure 5. A short description of hardware parts of the router is listed in Table 1, including the links to the chapters with a detailed description.

Figure 5: Hardware Overview of the Router

#	Item/Caption	Type	Description
1	LEDs	—	Status LED indication; see Chapter 2.12.
2	RST	—	Button to reboot the router or to restore the default configuration; see Chapter 2.13.
3	PWR	2-pin terminal	Power supply socket; see Chapter 2.6.
4	ETH2	SFP cage	SFP cage socket for modules with speed up to 10 Gbps; see Chapter 2.5.
5	ETH1	RJ45	1 Gb Ethernet connection for the second LAN; see Chapter 2.3.
6	ETH0	RJ45	1 Gb Ethernet switched connection (with four ports) for the first LAN; see Chapter 2.3.
7	USB	USB-A	USB 2.0 host port; see Chapter 2.10.
8	SERIAL & I/O	14-pin terminal	RS232, RS485, CAN bus, binary input, and binary output interfaces. See Chapter 2.8 for more information, Chapter 4.7 for I/O parameters, and Chapter 4.8 for serial interface parameters.
9	ANT0, ANT1, ANT2, ANT3	SMA female	Cellular module antenna connectors. ANT1 and ANT3 are shared with GNSS. See Chapter 2.2 for more information, Chapter 4.4 for cellular module parameters and Chapter 4.5 for GNSS parameters.
10	WIFI1	RP-SMA female	Connectors for the WiFi antennas. Connector on the right can be used for a Bluetooth 5.0 antenna. See Chapter 2.2 for more information and Chapter 4.6 for WiFi parameters.
11	Grounding screw	M3	Pay attention to proper grounding; see Chapter 2.6.
12	SIM slots microSD slot	Mini SIM microSD	Two Mini SIM card slots; see Chapter 2.1 for more information and Chapter 4.4 for cellular module parameters. MicroSD card slot; see Chapter 2.11.
13	Wall clips	—	Wall mounting clips, included as standard accessories; see Chapter 1.8.

Table 1: Hardware Overview of the Router

1.4 Order Codes

Order codes overview is shown in the table below.

Order code	Configuration
ICR-4461	5G NR cellular module, Gb ETH SWITCH, GNSS, SFP cage, USB, microSD card slot, RS232, RS485, CAN bus, two binary inputs, two binary outputs, two SIM readers
ICR-4461**S**	5G NR cellular module, Gb ETH SWITCH, GNSS, SFP cage, **PoE PSE**, USB, microSD card slot, RS232, RS485, CAN bus, two binary inputs, two binary outputs, two SIM readers
ICR-4461**W3**	5G NR cellular module, Gb ETH SWITCH, GNSS, SFP cage, **Dual-Band WiFi**, USB, microSD card slot, RS232, RS485, CAN bus, two binary inputs, two binary outputs, two SIM readers
ICR-4461**W3S**	5G NR cellular module, Gb ETH SWITCH, GNSS, SFP cage, **PoE PSE**, **Dual-Band WiFi**, USB, microSD card slot, RS232, RS485, CAN bus, two binary inputs, two binary outputs, two SIM readers

Table 2: Order Codes Overview

1.5 Package Contents

The standard set of router includes items listed in the following table:
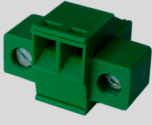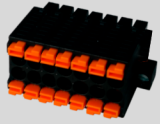
Item#	Description	Figure	Q'ty
1	Router		1 pcs
2	Wing for wall mounting (screwed on the router)		2 pcs
3	2-pin terminal block for power supply (deployed on the router)		1 pcs
4	14-pin terminal block for RS232, RS485, CAN BUS, and I/O (deployed on the router)		1 pcs
5	Printed *Quick Start Guide Leaflet*		1 pcs

Table 3: Contents of Package

1.6 Product Dimensions

For the dimensions of the router see the figures below. Note that all sizes are measured in millimeters.

Variant with Wall Mounting Clip
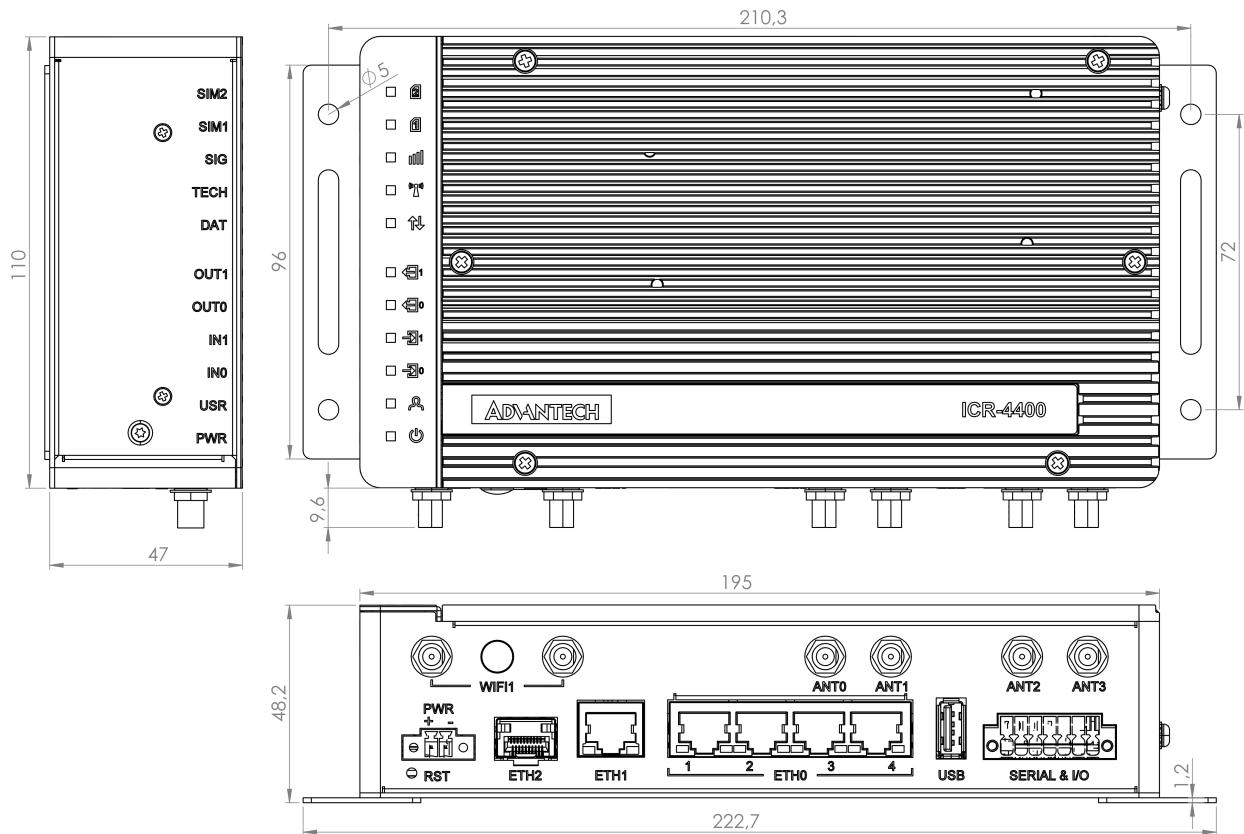
Figure 6: Router Dimensions – Front, Top and Right view with Wall Mounting holder

Variant with DIN Rail Clip
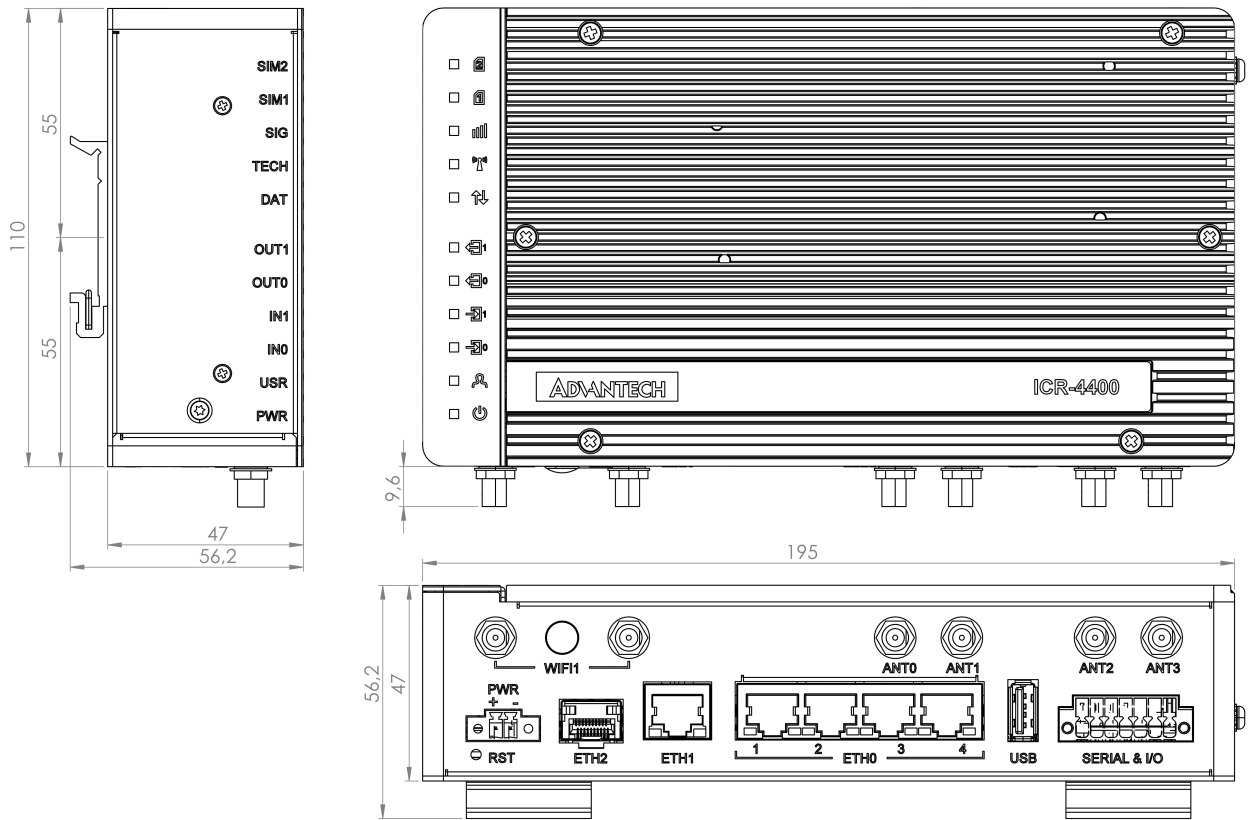
Figure 7: Router Dimensions – Front, Top and Right view with DIN holder

1.7   Mounting Recommendations

The router can be placed in the following ways:

- On a flat surface.
- On a wall using the wall mounting clip (refer to Chapter 1.8).
- On a DIN rail EN 60715 with the metal DIN rail clip (refer to Chapter 1.9).

For most applications involving a built-in router within a switchboard, two types of environments are typically encountered:

- A non-public industrial environment with low voltage but high interference.
- A public environment with low voltage and without high interference.

For both of these environments, it's feasible to mount the router to a switchboard, eliminating the need for immunity examination or EMC-related issues as per EN 61439-1:2011 standards.

> To comply with the EN 61439-1:2011 specification, follow these assembly instructions when attaching a router to a switchboard:

- When using whip antennas, maintain a minimum distance of 6 cm from cables and metal surfaces on all sides to avoid interference. If an external antenna is used apart from the switchboard, a lightning conductor is necessary.

- When mounting a router on sheet steel, consider using a cable antenna.

For all cables, it's recommended to bundle them, following these guidelines:

- The combined length of the cable bundle (power supply and data cables) should not exceed 1.5 m. If data cable length surpasses 1.5 m or if the cable runs toward the switchboard, installing surge protectors is advisable.

- Data cables must not be bundled with mains voltage cables (230 V/50 Hz or 120 V/60 Hz).

- Ensure sufficient space is left between each connector for cable handling.

- For proper router functionality, use an earth-bonding distribution frame to ground the grounding screw (refer to Chapter 2.6).

1.8 Wall Mounting

The wall mounting clip is included as a standard accessory with the router.

The router can be affixed to a wall or another surface using the wall mounting clips. Two wall mounting clips are pre-assembled to the router during production and need to be rotated as shown in Figure 8.
Each clip features two holes with a diameter of 5 millimeters for screw placement. For precise mounting dimensions, refer to Figure 6 in Chapter 1.6.

When attaching the wall mounting clip, tighten the screws with a maximum torque of 0.4 Nm.
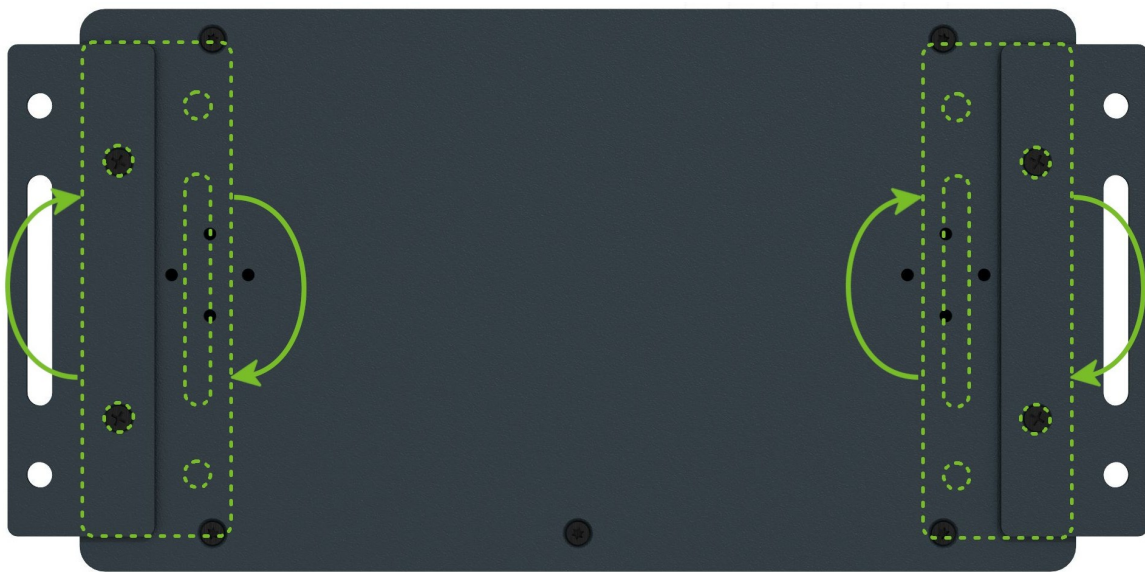
Figure 8: Rotated Wall Mounting Clips

1.9 DIN Rail Mounting

The DIN rail clips are not included as standard accessories with the router. However, they can be ordered using the order code *BB-DIN-ICR32* (two pieces for one router).

You can attach two DIN rail clips to the router for mounting it onto a DIN rail that complies with the 60715 standards. The default position of the clips is depicted in Figure 9. If necessary, the clips can also be rotated vertically.

When attaching the clips, tighten the screws with a maximum torque of 0.4 Nm.

Figure 9: Default Position of the DIN Rail Clips

To remove the router from the DIN rail, lightly push down on the router to disengage the bottom part of the DIN rail clip from the rail. Then, pivot the bottom part of the router away from the DIN rail, as demonstrated in Figure 10.
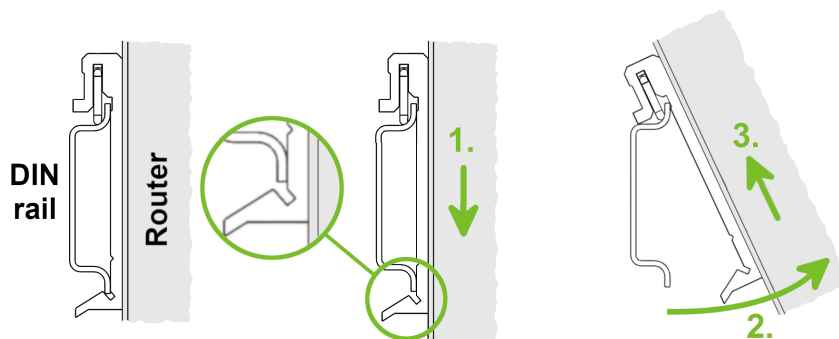
Figure 10: Removing Router from the DIN Rail

1.10   Product Label

The figure below shows an example of the product labels with all the information printed on them.

ICR − 4461
Industrial Cellular Router
9-48V === 1.6A MAX

CE   UK CA

E8

10R − 06 11459

Advantech Czech s.r.o., Sokolska 71
56204 Usti nad Orlici, Czech Republic

P/N: **ICR − 4461**   **Rev.X.X**

S/N: **ACZ1100123456785**

MAC: **01:23:45:67:89:AB**

IMEI: **123456789012345**

Def. password: **P23456785h**

Contains:
  FCC ID XMR2022RM520NGL
  IC ID 10224A-022RM520NGL

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Figure 11: Product Label

2. Hardware Functionality

See Chapter 1.3 for an overview of the product's hardware. Table 1 provides a concise description of the hardware, along with links to chapters offering detailed explanations.

2.1 SIM Card Slots

Slots for two SIM cards are located on the router beneath a metal cover. If you plan to use this device for cellular network communication, insert an activated data-provisioned SIM card into the SIM card reader.

You have the option to install two SIM cards simultaneously for utilizing the switching feature. The SIM cards can have different Access Point Names (APNs) configured. The procedure for changing SIM cards is outlined below. If the SIM requires a PIN, input it in the router's web interface (*Administration -> Unlock SIM Card*).

(i) Type of SIM card: Mini SIM (2FF) 25.0 x 15.0 x 0.76 mm.

> **Inserting the SIM card:**
>
> - Always disconnect the router from the power supply before handling the SIM card.
> - Unscrew the two screws on the SIM card cover and remove the cover.
> - To remove an inserted SIM card, use the flat end of a spudger or your fingernail to press the SIM card slightly into its slot until you hear a click. Upon hearing the click, release the card, and it will pop out of its slot.
> - To insert a SIM card, push the card into the slot until it clicks into place.
> - Replace the cover and secure it with the two screws.
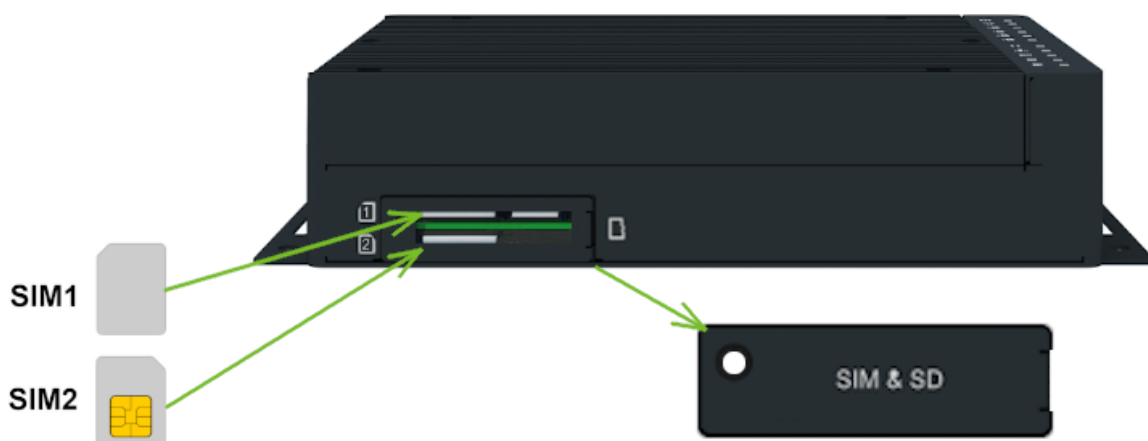
Figure 12: SIM Cards Insertion

2.2 Antennas Interfaces

SMA female connectors (*ANT0*, *ANT1*, *ANT2*, and *ANT3*) are intended for connecting cellular antennas to the router. See Table 19 for module antenna mapping. The GNSS antenna's SMA female connectors are shared with the cellular connectors and can be connected to the *ANT3* for the L1 band and to the *ANT1* for the L5 band. In addition, RP-SMA female connectors *WIFI1* are available for the connecting the WiFi antennas. Connector on the right can be used for a Bluetooth 5.0 antenna.

> Do not run the router without connected cellular antennas as the energy from the transmission is effectively reflected by the open end and can damage the equipment.

Recommended tightening moment for screwing the antenna to the SMA connector is 0.9 Nm.

2.3 Ethernet Interfaces

The RJ45 panel socket is used for four ETH0 (switched) and one ETH1 Ethernet interfaces. The pinout of the socket is shown in Figure 15 and described in Table 4.
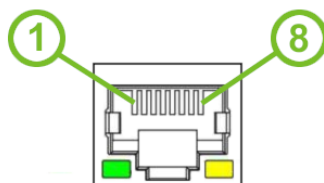
Figure 13: Ethernet Connector Pinout of RJ45 Socket

Pin	10base-T & 100base-T	1000base-T	PoE PSE (Mode B)
1	Tx+ (Transmit Data+)	BI_DA+ (BiDirectional pair A+)	—
2	Tx- (Transmit Data-)	BI_DA- (BiDirectional pair A-)	—
3	Rx+ (Receive Data+)	BI_DB+ (BiDirectional pair B+)	—
4	—	BI_DC+ (BiDirectional pair C+)	PoE PSE+ (positive pole)
5	—	BI_DC- (BiDirectional pair C-)	PoE PSE+ (positive pole)
6	Rx- (Receive Data-)	BI_DB- (BiDirectional pair B-)	—
7	—	BI_DD+ (BiDirectional pair D+)	PoE PSE- (negative pole)
8	—	BI_DD- (BiDirectional pair D-)	PoE PSE- (negative pole)

Table 4: Ethernet Connector Pinout Description of RJ45 Socket

All four ETH0 ports can be used for **PoE PSE** if the router is equipped with this feature. For more information about the PoE, see Chapter 2.4; for technical parameters, see Chapter 4.9.

The isolation barrier of the Ethernet ports against the ground is 1500 V.

2.4   Power over Ethernet (PoE) PSE

i   Available only for models with the PoE PSE feature; see Chapter 1.4 for the order codes.

i   The router supports the *IEEE 802.3af/PoE* (Type 1) and *IEEE 802.3at/PoE+* (Type 2) standards and is Mode B compliant.

i   To control the PoE functionality, you can use the `pse` command. For detailed information, please refer to the Commands and Scripts application note.

!   Please note that the router's power supply must be 48 V DC to operate as the PoE PSE device.

The PoE PSE feature enables the router to provide power to other devices over the Ethernet socket. You can refer to the functional scheme in Figure 14.
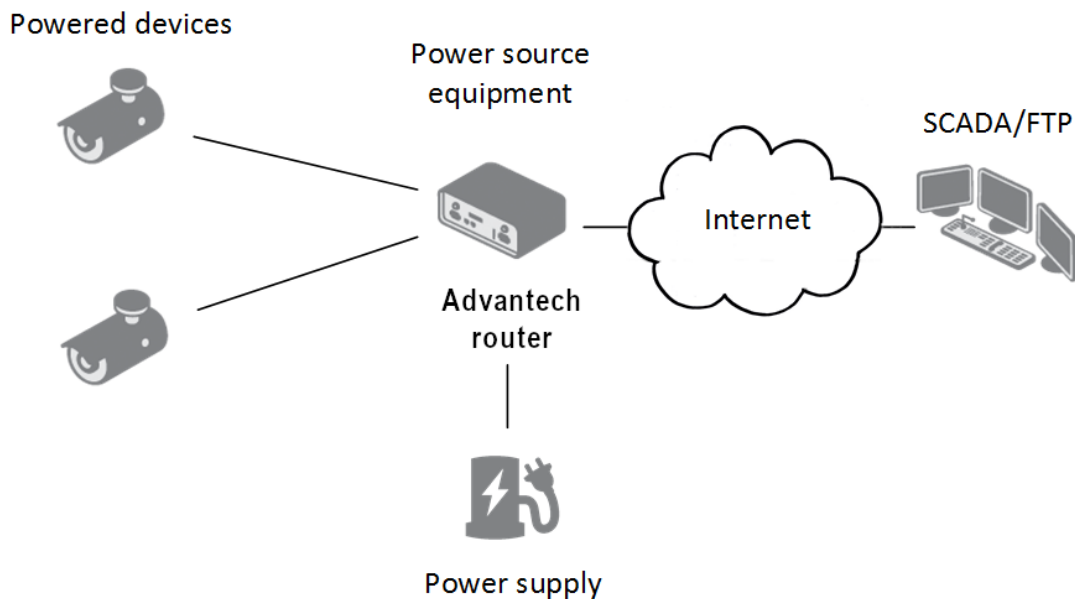
Figure 14: PoE PSE Funcional Scheme

The PoE PSE feature is supported by all four ETH0 network sockets and can be individually enabled in the *Ethernet* configuration pages. Detailed instructions can be found in the router configuration manual [1], specifically in Chapter *Configuration -> Ethernet Configuration*. For information about the Ethernet socket pinout, please refer to Chapter 2.3.

To monitor the current PoE state, navigate to the *General* status page in the GUI. When PoE is enabled and an external device is being powered, you can access information about current, voltage, power, and power class here.

The following table summarizes the PoE parameters.

PoE PSE parameters	
Required power supply parameters	48 V / up to 135 W
Power available to a PoE device	12.95 W / per port
Required power supply wattage for a PoE device	15.40 W / per port
Power available to a PoE(+) device	25.50 W / per port
Required power supply wattage for a PoE(+) device	30.0 W / per port

Table 5: PoE PSE Parameters

PoE Power Budget Examples

Example #1

This example is for the Advantech RPS-ICR4-WR2-PSE power supply, which can supply a power of **65 W**. We will use 15 W as the maximum router power consumption; see Chapter 4.1. You can use this power supply to power:

- up to **three PoE devices** (3×15.4 W + 15 W = 61.2 W < 65 W),

- just **one PoE+ device** (1×30 W + 15 W = 45 W < 65 W).

Example #2

To power four PoE+ devices, you should use a power supply with a minimum rating of 135 W. You can calculate this as follows:

- Required power supply wattage = 4×30 W + 15 W = 135 W.

> Ensure that the power supply you use can provide enough power to cover the required power consumption of all connected PoE devices, including the router itself. We recommend using a power supply with some power reserve.

2.5 SFP Cage

A hot-pluggable (SFP) network interface module with a speed of up to 10 Gbps can be settled into the ETH2 SFP cage.

Installing an SFP Module

To install an SFP module, please refer to Figure 15 and follow these steps:

- If the SFP module is equipped with a bale clasp, ensure it is closed before inserting the SFP module.

- Hold the SFP module with the hardware label facing up.

- Gently insert the SFP module into the ETH2 slot and push it until it securely snaps into place.

Figure 15: SFP Module Installation

See Table 6 for a list of successfully tested SFP modules on the product.

Model	Manufacturer
SFP-GSM-20K	Advantech
ML-S+31Dout-10	MaxLink
S-3553LC20D	MikroTik
SFP-PLUS-LR10-HPE	Hewlett Packard
SFP-TXCIS	OEM
TXM431-LR(UN)	TP-Link
UF-RJ45-1G	Ubiquiti

Table 6: Tested SFP Modules

2.6 Power Supply

Two pin terminal connector with 3.5 mm pitch is used to power the router. Corresponding connector is supplied with the router as a standard accessories.

Pin	Signal mark	Description
1	VCC(+)	Positive pole of DC supply voltage (+9 to +48 V DC)
2	GND(-)	Negative pole of DC supply voltage

Table 7: Power connector pinout
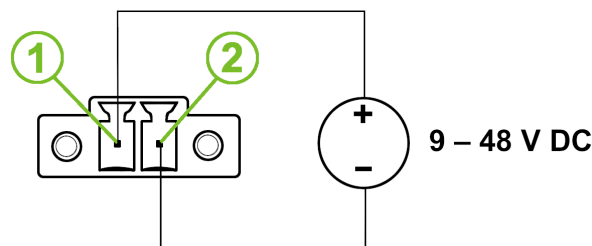
Figure 16: Power Connector Pinout

The required power supply voltage for the router is between +9 V and +48 V DC. Refer to the connection scheme in Figure 16. The router includes built-in protection against reversed polarity without signaling. To ensure correct operation, the power source must be capable of supplying 18 W of power (for the non-PoE version).

> If the router is grounded using the grounding screw, there is no protection against reversed polarity. The negative pole of the DC power supply must be at the same voltage reference as the grounding screw. Failure to do so may result in a voltage difference between these two points, which could damage the router. In such cases, only an authorized service center can perform the necessary repairs.

> The power voltage for the PoE router version must be 48 V DC for it to function as a PoE PSE device.

All metal parts, including the box, are connected together with the negative pole of the power supply (common pole). If recommended for the installation environment, protect the router by properly grounding it using the grounding screw, as shown in Figure 17.

Figure 17: Position of the Grounding Screw

2.7   Low Power Mode

> ⚠ In applications requiring low power consumption, such as solar power (not 24/7 mode), it is strongly recommended to use the Low Power Mode (LPM) before shutting down the entire router.

LPM (Low Power Mode) is a router mode in which the router enters a sleep state with minimal power consumption; you can find details about LPM power consumption in Chapter 4.1. The router can be awakened from this mode either by applying a signal to the BIN1 input or after a predefined period of time. To put the router into LPM mode, you can use the `lpm` command; for more information, refer to the Commands and Scripts application note.

2.8   I/O Port Interfaces

The I/O user interface is designed for binary input processing and binary output control. The pinout of the I/O interface is described in Figure 18 and Table 8. For detailed electrical parameters see Chapter 4.7. The functional scheme of connection for the binary input and binary output is in Figure 19.
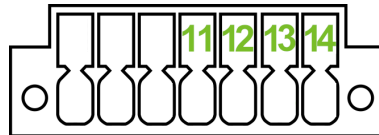
Figure 18: I/O Connector Pinout

Pin	Signal mark	Description
11	BIN0	The first binary input
12	BOUT0	The first binary output
13	BIN1	The second binary input
14	BOUT1	The second binary output

Table 8: Connection of I/O Ports
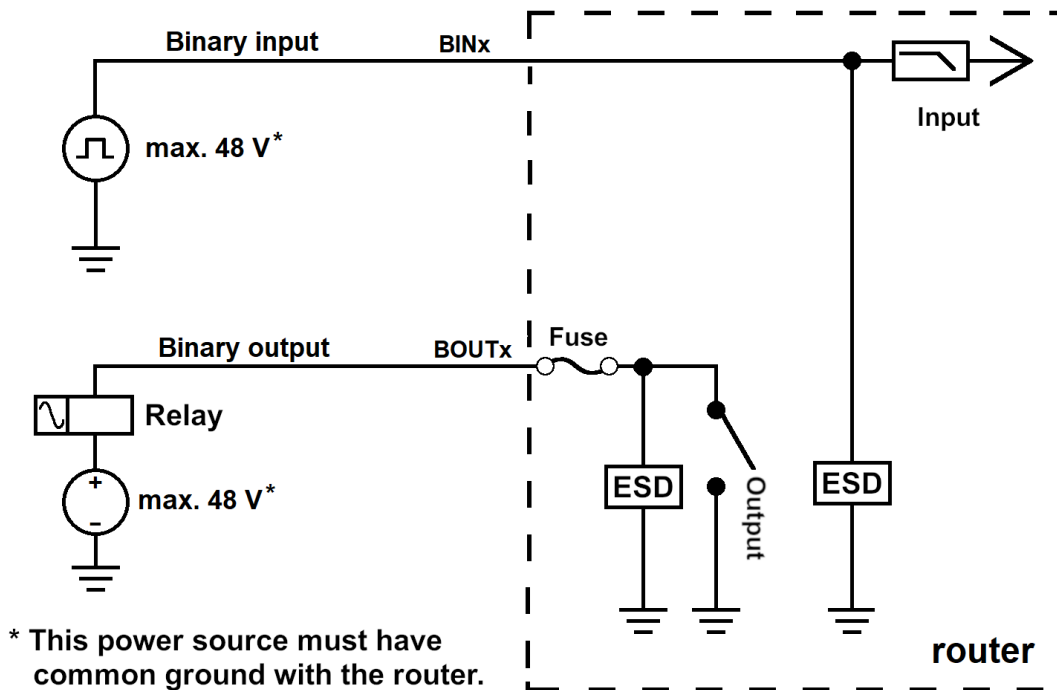
Figure 19: Functional Scheme of the Binary Interface

2.9 Serial Interfaces

The RS232, RS485 CAN serial interfaces together with the two I/O interfaces are physically connected to the 14-pin terminal block panel socket. All these interfaces are not isolated from the router. The pinout of this connector is described in Figure 20 and the tables below.
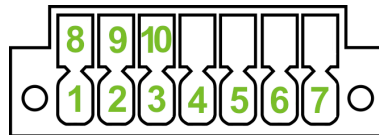
Figure 20: Serial Connector Pinout

Pin	Signal mark	Description
1	RXD	Received Data
2	CTS	Clear to Send
3	GND	Ground
4	RTS	Request to Send
5	TXD	Transmit Data

Table 9: Connection of RS232

Pin	Signal mark	Description
6	CAN_H	CAN High
7	CAN_L	CAN Low

Table 10: Connection of CAN Bus

Pin	Signal mark	Description
8	B (+)	In/Out
9	A (-)	In/Out
10	GND	Ground

Table 11: Connection of RS485

2.10 USB Port

There is one USB 2.0 host port with a USB-A type socket. The router supports USB Mass Storages and FTDI serial converters. For guidance on how to address an unsupported FTDI chip, refer to the Commands and Scripts application note, specifically the chapter on *How to Use Unsupported FTDI Chip*.

The USB port is designed to disable on overload to prevent potential damage (occurs when a connected device draws excessive current). The port is re-enabled after the router is rebooted.

Mounting USB Flash Drive to the System

To access a USB flash drive in the router's system, it must be mounted. Follow these steps to mount the drive:

- Use the *dmesg* command to view the list of recently connected devices.

- Identify the entry for the USB flash drive in the command's output, for example:
  ```
  sda: sda1
  ```

- To mount the drive to the *mnt* directory, use the *mount* command:
  ```
  mount /dev/sda1 /mnt
  ```

For more information about the commands for creating, mounting, checking, and unmounting a file system on a USB Flash Drive, consult the application note for the Ext4_tools router app.

USB Socket Pinouts

The USB socket pinouts are described in Figure 21 and Table 12.
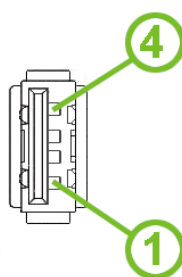
Figure 21: USB Connector Pinout

Pin	Signal mark	Description	Data flow direction
1	+5 V	Positive pole of 5 V DC supply voltage, 0.5 A	
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 12: USB Connector Pinout

2.11 MicroSD Card Reader

The microSD card reader is located on the router's rear panel under a metal cover. This card reader allows the router to operate with microSD memory cards. The technical specifications are presented in the table below. The procedure for changing the microSD card is described below.

Technical specifications of microSD card		
Supported technologies		SD, SDHC, SDXC
Supported capacity	SDHC	up to 32 GB
	SDXC	from 32 GB to 512 GB
Supported microSD card filesystems		vfat, ext2, ext3, ext4

Table 13: Technical Specifications of MicroSD Card

Inserting the microSD card:

- To remove an inserted microSD card, use the flat end of a spudger, or your fingernail, press the card slightly into its slot until you hear a click. Release the card, and it will pop out of its slot.
- To insert a microSD card, push the card into the slot with the correct orientation as shown in the picture until it clicks into place.
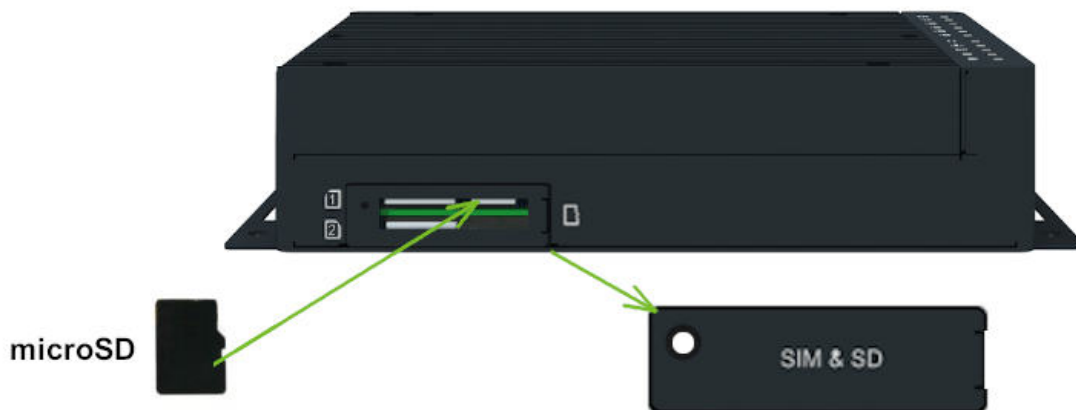
Figure 22: MicroSD Card Insertion

Mounting microSD Card to the System

To access the microSD card within the router's system, it must be mounted. Follow these steps to mount the card:

- Use the *dmesg* command to view the list of recently connected devices.

- Identify the entry for the microSD card in the command's output, for example:
  ```
  mmcblk0: p1
  ```

- To mount the card to the *mnt* directory, use the *mount* command:
  ```
  mount /dev/mmcblk0p1 /mnt
  ```

For more information about the commands for creating, mounting, checking, and unmounting a file system on a microSD card, refer to the application note for the Ext4_tools router app.

2.12   LED Status Indication

There are status LEDs on the top side of the router to provide router status information. Moreover, ETH0 and ETH1 connectors, located on the front panel, have two additional LEDs providing information about the port status.

	Caption	Color	State	Description
⏻	PWR	Green Green Green	On Blinking Fast blinking	The router is booting up. The router booted up and is ready. The router firmware is being updated.
👤	USR	Green	—	The function of this LED is user-defined.
⬕0	IN0	Green	On	The first binary input is active.
⬕1	IN1	Green	On	The second binary input is active.
⬔0	OUT0	Green	On	The first binary output is active.
⬔1	OUT1	Green	On	The second binary output is active.
↑↓	DAT	Green	Blinking	Cellular communication is in progress.
ı|||	SIG	Green Orange Red	On On On	Good cellular signal. Fair cellular signal. Poor cellular signal.
"ɪ"	TECH	Green Orange	On On	The active SIM uses 4G technology. The active SIM uses 3G technology.
①	SIM1	Green Red	On Fast blinking	SIM1 is active for the cellular connection. A SIM1 issue (missing card or PIN not entered).
②	SIM2	Green Red	On Fast blinking	SIM2 is active for the cellular connection. A SIM2 issue (missing card or PIN not entered).
	ETH0 ETH1	Green Green	On Off	Selected 1 Gbps bit rate. Selected 100/10 Mbps bit rate.
	ETH0 ETH1	Yellow Yellow Yellow	On Blinking Off	The network cable is connected. Data transmission. The network cable is not connected.

Table 14: LED Status Indication

2.13 Reset Functions

> ⚠ Before initiating a factory reset on the router, consider creating a backup of its configuration.

The *RST* button serves three different purposes:

- **Reset**: Hold the *RST* button for **less than 4 seconds**; the router will reboot, applying its customized configuration. You can also trigger the router reset by selecting the *Reboot* menu option in the router web GUI.

- **Factory Reset**: To restore the router to its default factory configuration, press and hold the *RST* button for **more than 4 seconds**. The *PWR* LED will turn off and then back on. It's recommended to hold the *RST* button for an additional 1 second after the PWR LED comes on.

- **Emergency Factory Reset**: If the router fails to boot due to incorrect configuration, power off the router by disconnecting its power supply. Then, while holding the *RST* button, power on the router and continue holding the *RST* button for **at least 10 seconds**. This action will reset the router's configuration to the default settings.

ⓘ Use a narrow screwdriver or any small tool to press the *RST* button.

Figure 23: Resetting the Router

3. First Use

3.1 Accessories Connection

Before putting the router into operation, make sure to connect all the components required for running your applications. Refer to Chapter 1.3 for an overview of the hardware. Also, remember to insert a SIM card for the cellular connection as explained in Chapter 2.1.

> ⚠ Ensure you do not operate the router without an antenna connected to the main antenna connector. Transmitting energy is effectively reflected by the open end, which could potentially damage the equipment.

3.2 Router Configuration

You can perform the initial configuration of the router using a web browser on your PC. This interface allows for router monitoring, configuration, and administration.

Begin by connecting the power supply to the router (refer to Chapter 2.6). The router will initiate its boot process. By default, the router will automatically establish a connection to the default Access Point Name (APN) of the inserted SIM card. Ensure your PC is configured to obtain IP settings automatically from the network. Connect your PC's network card to the default LAN interface of the router, Ethernet port ETH0. The DHCP server will assign an IP address to your PC.

To access the router's web interface, enter the following address in your web browser: `https://192.168.1.1`. Please note that using the HTTPS protocol for secure communication over the network is mandatory.

There is just the `root` **user account** created on the router by default. Check the **product label** on the router for the **default password**[1] Access the web interface by logging in with the `root` user and the corresponding password. Successful login grants access to the router's web interface. Consult the router **Configuration Manual** [1] for detailed descriptions and examples of router configuration.

> ⚠ After logging on to the device for the first time, we strongly recommend changing the default password due to security reasons.

> ⚠ For security reasons, we recommend regularly updating the router's firmware to the latest version. Downgrading the firmware to an older version than the production version or uploading firmware intended for a different device may cause the device's malfunction.

> ⚠ All routers have the *WebAccess/DMP* client pre-installed by default. The activated client periodically uploads router identifiers and configuration to the *WebAccess/DMP* server. See the configuration manual [1], chapter *Basic Information -> WebAccess/DMP Configuration*, for more information.

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[1]If the router's label lacks a unique password, use the password `root`.

4. Technical Parameters

4.1 Basic Parameters

Parameter		Description
Temperature range	Operating Storage	-40 °C to +75 °C (-40 °F to +167 °F) -40 °C to +85 °C (-40 °F to +185 °F)
Humidity	Operating Storage	5 to 95 % relative humidity non condensing 5 to 95 % relative humidity non condensing
Altitude	Operating	2000 m / 70 kPa
Degree of protection		IP30
Supply voltage		9 – 48 V DC
Battery for RTC		CR1225
Consumption for non-WiFi (WiFi) version	Idle Average Maximum LPM mode	5.6 W (6.5 W) 6.5 W (8.8 W) 10.9 W (14.2 W) / 142 W[1] 3 mW / 170 mW[2]
Dimensions of device (w/o wings)		195 × 110 × 47 mm (7.68" × 4.33" × 1.85")
DIN rail clip specification		2 pcs of DIN 35 mm, EN 60715
Total weight		1275 g (2.81 lbs)
Antenna connectors	ANT1, ANT3 ANT2, ANT4 WIFI1	shared SMA female connectors for 5G/GNSS – 50 Ω SMA female connectors for 5G – 50 Ω RP-SMA female connectors for WiFi – 50 Ω
Interfaces	ETH0 ETH1 ETH2 USB SERIAL & I/O	RJ-45 socket for 1Gb Ethernet SWITCH RJ-45 socket for 1Gb Ethernet SFP cage for up to 10 Gbps SFP modules USB-A 14-pin panel socket terminal block for RS232, RS485, CAN bus and I/O interfaces

Table 15: Basic Parameters

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[1]Maximal power consumption for model with the PoE PSE (for maximal power load on all ETH0 ports).
[2]For device equipped with the PoE PSE.

4.2 Standards and Regulations

Parameter	Description
Radio	EN 301 908-1, EN 301 908-2, EN 301 908-13, EN 301 908-25, EN 303 413, EN 301 893, EN 300 328, FCC part 22H, FCC part 24E, FCC part 27, FCC part 90R, PTCRB
EMC	ETSI EN 301 489-1, ETSI EN 301 489-17, ETSI EN 301 489-19, ETSI EN 301 489-52, FCC Part 15.B, IEC 61000-6-2, IEC 61000-6-3, EN 55032, EN 61000-4-2, EN IEC 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN IEC 61000-4-11
Safety	EN 62368-1, IEEE 802.3
Carrier approvals	AT&T, Verizon[1], T-Mobile[1]
Mechanical	EN 60068-2-27, EN 60068-2-64, MIL-STD-810G, SAE J1455, EN 60529
Climatic	EN 60068-2-1, EN 60068-2-2, EN 60068-2-14, MIL-STD-810G, SAE J1455
Transportation	E-Mark (E8), homologation number: 10R - 06 11459
National	CE, UKCA, FCC, IC compliant
Environmental	REACH, RoHS3 and WEEE compliant

Table 16: Standards and Regulations

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[1]Certification is issued for a specific project.

4.3 Type Tests and Environmental Conditions

Phenomena	Test	Description	Test levels
ESD	EN 61000-4-2	Enclosure contact	$\pm$ 6 kV (crit. A)
RF field AM modulated	EN 61000-4-3	Enclosure	20 V/m (crit. A) (80 – 1000 MHz) 10 V/m (crit. A) (1 – 6 GHz)
Fast transient	EN 61000-4-4	Signal ports Power ports Ethernet ports	$\pm$ 1 kV (crit. A) $\pm$ 2 kV (crit. A) $\pm$ 1 kV (crit. A)
Surge	EN 61000-4-5	Ethernet ports Power ports	$\pm$ 1 kV (crit. A), shielded cab. $\pm$ 1 kV (crit. A)
RF conducted	EN 61000-4-6	All ports	10 V/m (crit. A) (0.15 – 80 MHz)
Radiated emission	EN 55032	Enclosure	Class B
Conducted emission	EN 55032	Signal ports Power ports Ethernet ports	Class B Class B Class B
Dry heat	EN 60068-2-2	Test Bb, storage +85 °C, operation +75 °C	
Cold	EN 60068-2-1	Test Ab, storage -40 °C, operation -40 °C	
Damp heat	EN 60068-2-78	95 % rel. humidity (+40 °C)	
Dry heat, cyclic	EN 60068-2-30	+55 °C / +25 °C, rel. humidity 95 %, 12 h - 12 h	
Dry heat	EN 60068-2-2	Test Bb, storage +85 °C, operation +75 °C	
Thermal shock/ temp. variation	EN 60068-2-14	Test Nb, -40 °C/+75 °C, 3h/3h, 2 cycles, 3 K/min	
Degrees of protection provided by enclosures	EN 60529	IP30	
Vibration, broadband random	EN 60068-2-64	Spectrum A.3 cat 1, breakpoints A.6 cat 1	
Shock	EN 60068-2-27	50 m/s^2, 11 ms, half sine, 10 in each dir.	

Table 17: Type Tests and Environmental Conditions

4.4   Parameters of Cellular Module

Parameter	Description
Antenna	• Connector type: SMA (4 pcs) • Input impedance: 50 Ω • VSWR: ≤ 3 • Efficiency: > 30 %
5G NR parameters	• 3GPP Relelase 16 • Supported modulations: π/2-BPSK, QPSK, 16QAM, 64QAM and 256QAM for uplink; QPSK, 16QAM, 64QAM and 256QAM for downlink • UL 2 x 2 MIMO: n38, n41, n48, n77, n78, n79 • DL 4 x 4 MIMO 5G NR SA: n1, n2, n3, n7, n25, n30, n38, n40, n41, n48, n66, n70, n77, n78, n79 • DL 4 x 4 MIMO 5G NR NSA: n1, n2, n3, n7, n25, n30, n66, n38, n40, n41, n48, n70, n77, n78, n79 • Supporting SCS 15 kHz[1] and 30 kHz[1] • SA[2] and NSA[2] operation modes on all the 5G bands • Option 3x, 3a, and Option 2 • Supported 5G NR SA & NSA bands: n1 (2100), n2 (1900 PCS), n3 (1800), n5 (850), n7 (2600), n8 (900), n12 (700 a), n13 (700 c), n14 (700 PS), n18 (800 Lower), n20 (800), n25 (1900+), n26 (850+), n28 (700 APT), n29 (700 d), n30 (2300 WCS), n38 (TD 2600), n40 (TD 2300), n41 (TD 2600+), n48 (TD 3600), n66 (AWS), n70 (AWS-4), n71 (600), n75 (DL 1500+), n76 (DL 1500-), n77 (TD 3700), n78 (TD 3500), n79 (TD 4700) • NSA TDD: max. 3.4 Gbps(DL), max. 550 Mbps (UL) • SA TDD: max. 2.4 Gbps(DL), max. 900 Mbps (UL) • Max. output power: 5G NR bands: 23 dBm ±2 dB (Class 3) 5G NR HPUE bands (n38/n40/n41/n77/n78/n79): 26 dBm +2/-3 dB (Class 2)

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[1]5G NR FDD bands only support 15 kHz SCS, and NR TDD bands only support 30 kHz SCS.
[2]Supported bandwidth in the NSA and SA modes may differ for each frequency band.

Continued from previous page

Parameter	Description
LTE parameters	• 3GPP Relelase 16 (DL Cat 19 / UL Cat 18) • Supported modulations: QPSK, 16QAM, 64QAM and 256QAM (uplink/downlink) • 4 x 4 MIMO downlink for B1, B2, B3, B4, B7, B25, B30, B38, B40, B41, B42, B43, B48, B66 • Supported FDD bands: B1 (2100), B2 (1900 PCS), B3 (1800+), B4 (AWS-1), B5 (850), B7 (2600), B8 (900 GSM), B12 (700 a), B13 (700 c), B14 (700 PS), B17 (700 b), B18 (800 Lower), B19 (800 Upper), B20 (800 DD), B25 (1900+), B26 (850+), B28 (700 APT), B29 (700 d), B30 (2300 WCS), B32 (1500 L-band), B66 (AWS), B71 (600) • Supported TDD bands: B34 (TD 2000), B38 (TD 2600), B39 (TD 1900+), B40 (TD 2300), B41 (TD 2500+), B42 (TD 3500), B43 (TD 3700), B46 (TD Unlicensed), B48 (TD 3600) • Bandwidth: 1.4, 3, 5, 10, 15 and 20 MHz RF bandwidth • Bit rates: max. 1.6 Gbps (DL), max. 200 Mbps (UL) • Max. output power: LTE bands: 23 dBm ±2 dB (Class 3) LTE HPUE (for single carrier) bands (B38/B41/B42/B43): 26 dBm ±2 dB (Class 2)
UMTS parameters	• 3GPP Release 9, DC-HSDPA, HSPA+, HSDPA, HSUPA and WCDMA • Supported modulations: QPSK, 16QAM and 64QAM • Supported bands: B19 (800 MHz), B5 (850 MHz), B8 (900 MHz), B4 (AWS A-F 1700 MHz), B2 (PCS A-F 1900 MHz), B1 (2100 MHz) • DC-HSDPA: max. 42 Mbps (DL) • HSUPA: max. 5.76 Mbps (DL) • WCDMA: 384 kbps (DL) / 384 kbps (UL) • Max. output power: 24 dBm +1/-3 dB (Class 3)

Table 18: Technical Parameters of Cellular Module

4.4.1 Antenna Mapping

SMA	Description
ANT0	Antenna 0 interface: 5G NR: • Refarmed: LB_TX0/PRX & MHB_TX0/PRX & UHB_TX1/DRX • n41_TX0/PRX • n77/n78/n79_TX1/DRX LTE: LB_TX0/PRX & MHB_TX0/PRX & UHB_TX1/DRX WCDMA: LMB_TRX
ANT1	Antenna 1 interface: 5G NR: • Refarmed: MHB_PRX MIMO & UHB_PRX MIMO • n41_PRX MIMO • n77/n78/n79_PRX MIMO LTE: MHB_PRX MIMO & UHB_PRX MIMO & LAA_PRX GNSS: L5
ANT2	Antenna 2 interface: 5G NR: • Refarmed: MHB_TX1[1]/DRX MIMO & UHB_TX0/PRX • n41_TX1/DRX MIMO • n77/n78/n79_TX0/PRX LTE: MHB_TX1[1]/DRX MIMO & UHB_TX0/PRX
ANT3	Antenna 3 interface: 5G NR: • Refarmed: LB_TX1/DRX & MHB_DRX & UHB_DRX MIMO • n41_DRX • n77/n78/n79_DRX MIMO LTE: LB_TX1/DRX & MHB_DRX & UHB_DRX MIMO & LAA_DRX WCDMA: LMB_DRX GNSS: L1

Table 19: Cellular Module Antenna Mapping

---

[1]MHB TX1 will be active when supporting Sub 2.6 GHz EN-DC.

4.5   Parameters of GNSS

Parameter	Description
GNSS Systems	GPS, GLONASS, BDS, Galileo, QZSS

Antenna	Connector type: SMA
	Input impedance: 50 Ω
	Antenna connection:
	   • shared with cellular SMA connectors
	   • ANT3 for L1 band
	   • ANT1 for L5 band
	Frequency range:
	   • L1: 1559–1609 MHz
	   • L5: 1166–1187 MHz
	Polarization: RHCP or linear
	VSWR: < 2 (Typ.)
	Power mode: pasive antenna only
	Passive antenna gain: > 0 dBi

Features	Protocol: NMEA 0183 Data update rate: 1 Hz
Frequency	GPS/Galileo/QZSS (L1): 1575.42 ± 1.023 MHz GPS/Galileo/QZSS (L5): 1176.45 ± 10.23 MHz Galileo (E1): 1575.42 ± 2.046 MHz QZSS (L1): 1575.42 MHz GLONASS: 1597.5–1605.8 MHz BDS 1561.098 ± 2.046 MHz
Sensitivity (autonomous)	Acquisition: -147 dBm Reacquisition: -160 dBm Tracking: -160 dBm
TTFF (autonomous)	Cold start: 27.93 s Warm start: 11.55 s Hot start: 1.09 s
Accuracy (CEP-50) (autonomous)	1.35 m (at open sky)

Table 20: Technical Parameters of GNSS

4.6 Parameters of WiFi

Parameter	Description
Short Module Description	802.11ac/a/b/g/n Dual-Band 2T2R
Supported Standards	IEEE 802.11ac/a/b/g/n (2T2R)
Antenna Connectors	2x2 MIMO RP-SMA Input impedance: 50 Ω
Data Rate	802.11b: 11 Mbps 802.11a/g: 54 Mbps 802.11n: up to 300 Mbps (MCS0˜15) 802.11ac: up to 867 Mbps (MCS0˜9)
Frequency Ranges	2.412 – 2.484 GHz 5.150 – 5.850 GHz
Spectrum Widths	20/40MHz @ 2.4GHz 20/40/80MHz @ 5GHz
Modulation	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11a: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11ac: OFDM(BPSK,QPSK,16-QAM,64-QAM,256-QAM)
Type of Device	Access point (AP) Station (STA) Multi-role (AP & STA)
Security – Standards	WPA, WPA2, WPA3, 802.1X
Security – Encryption	WEP, TKIP, AES
Security – EAP Types	EAP–FAST, EAP–TLS, EAP–TTLS, PEAP–GTC, PEAP–MSCHAPv2, PEAP–TLS, LEAP
TX Power	Max. 18 dBm @ 2.4 GHz Max. 14 dBm @ 5 GHz

Table 21: Technical Parameters of WiFi

4.7 Parameters of I/O Ports

Electrical characteristics of the binary input are in Table 22. Status of the binary input can be retrieved in the router's web interface (on the *General Status* page) or by the `status ports` and `io get` commands, see Commands and Scripts application note.

Logical[1]	Voltage	Current	Status[2]
1	3 V	0.5 mA	Off
0	5 V	0.8 mA	On
0	12 V	1.6 mA	On
0	48 V	3.4 mA	On

Table 22: Electrical Characteristics of Binary Input

The maximum binary output load is **500 mA** at **48 V**.

4.8 Parameters of Serial Interfaces

Supported parameters of the RS232 and RS485 interfaces, which can be configured in *Expansion Port 1* resp. *Expansion Port 2* menu items, are in Table 23.

Parameter	Description
Baudrate	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400.
Data Bits	5, 6, 7, 8.
Parity	none, even, odd.
Stop Bits	1, 2.
Flow Control	none, hardware.

Table 23: Parameters of Serial Interfaces

---

[1]The binary status returned by the `io get` shell command.
[2]The binary status returned by the `status ports` shell command and displayed on the *General Status* page.

4.9   Parameters of PoE

For more information about the PoE PSE feature, including the parameters, see Chapter 2.4.

4.10   System Configuration

The main parametes of the system are listed in Table 24.

Parameter	Description
CPU architecture	Quad-Core ARMv8-A (core Cortex-A72)
CPU frequency	1200 MHz
CPU power	4.72 DMIPS/MHz
Flash memory	4 MB of NOR 4 096 MB of eMMC • 838 MB for Router Apps • 512 MB for customer data
RAM size	1 024 MB
Watchdog	HW watchdog
RTC	Battery backup RTC
TPM	Trusted Platform Module (TPM) 2.0
eSIM[1]	Embedded SIM module

Table 24: System Configuration

---

[1]Not assembled by default, for dedicated customer orders only.

Appendix A: 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).
> - 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.

✍ **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".*

Appendix B: Customer Support

Customer Support for Europe

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

Phone: +353 91 792444
Fax: +353 91 792445
E-mail: iiotcustomerservice@advantech.eu
Web: www.advantech.com

Customer Support for NAM

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

Phone: +1-800-346-3119 (Monday – Friday, 7 a.m. to 5:30 p.m. CST)
Fax: +1-815-433-5109
E-mail: support@advantech-bb.com
Web: www.advantech-bb.com

Customer Support for Asia

Phone: +886-2-2792-7818 #1299 (Monday – Friday, 9 a.m. to 5:30 p.m. UTC+8)
Fax: +886-2-2794-7327
E-mail: icg.support@advantech.com.tw
Web: www.advantech.com

Appendix C: Regulatory & Safety Information

Safety Notices

Please, observe the following instructions:

- The router must adhere to all relevant international and national laws, including any specific restrictions governing its use in designated applications and environments.

- To prevent potential injury and appliance damage, ensure compliance with regulations by using only authorized accessories. Unauthorized modifications or use of unapproved accessories could damage the router, violate regulations, and void the warranty.

- Do not attempt to open the router.

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

- **Caution!** This equipment is not suitable for use in areas with children. Small children could swallow the SIM card.

- Ensure the power supply does not exceed 48 V DC maximum.

- Avoid exposing the router to extreme ambient conditions. Safeguard it against dust, moisture, and high temperatures.

- Only deploy routers with appropriate certification and labeling in environments containing flammable or explosive materials, such as gas stations, chemical plants, or areas involving explosives. Users must observe restrictions pertaining to radio device usage in such settings.

- When traveling by plane, switch off the router. Using it onboard could jeopardize flight operations, disrupt mobile networks, and potentially violate regulations. Non-compliance may result in telephone service suspension, cancellation, or legal repercussions.

- Exercise heightened caution when operating the router near personal medical devices like cardiac pacemakers or hearing aids.

- The router may cause interference when operated in close proximity to TV sets, radio receivers, or personal computers.

- It's advisable to create a suitable backup of all critical settings stored in the device's memory.

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 to minimize the environmental impact. This product contains high quality materials and components which can be recycled. At the end of it's life this pro- duct MUST NOT be mixed with other commercial waste for disposal. The device contains a battery. Remove the battery from the device before disposal. The battery in the device needs to be disposed of apart accordingly. Check the terms and conditions of your supplier for disposal information.

Appendix D: Related Documents

[1] ICR-4400 Configuration Manual

[EP] Product-related documents and applications can be obtained on **Engineering Portal** at `https://icr.advantech.cz/download` address.

We, Advantech Czech s.r.o., declare that the radio equipment narrated in this user's manual complies with Directive **2014/53/EU**.

We, Advantech Czech s.r.o., declare that the radio equipment narrated in this user's manual complies with Radio Equipment Regulations 2017 (**S.I. 2017 No. 1206**).

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