Hardware Manual

5G Industrial Router

ICR-4461

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Document No. MAN-0077-EN, revised on January 28, 2026.

Used symbols

Important

Important — Indicates a risk to personal safety or potential damage to the router. Follow these instructions precisely to prevent injury or equipment damage.

Warning

Warning — Highlights conditions that may cause malfunction, loss of data, or unexpected behavior in specific situations. Read carefully before proceeding.

Info

Info — Provides helpful tips, context, or references that improve understanding but are not strictly required to complete the task.

Code Example

```
Code Example - Copy-pasteable configuration snippets or CLI commands.
```

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1. Product Overview

1.1 Product Introduction

The ICR-4461 is positioned as a **5G NR** (New Radio) / **LTE** (DL Cat 19 / UL Cat 18) router and a powerful edge computing gateway, tailored for the international 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. Models equipped with Wi-Fi offer **Wi-Fi** functionality, utilizing **2x2 MIMO** antennas for enhanced wireless performance.

Housed within a robust metal enclosure, the router features two **SIM card slots** for cellular connection redundancy. It is also outfitted with five **1Gb Ethernet ports** and an **SFP cage**, plus interfaces for **RS232**, **RS485**, and **CAN bus**. Furthermore, it provides two **digital inputs** and two **digital outputs** for comprehensive connectivity and control options. A **microSD card** slot is included to enhance storage options.

The router features a **Low Power Mode** and a **hardware watchdog** for automated status monitoring and system restarts, supplemented by additional diagnostic functionalities to bolster overall reliability.

Router configuration is accessible through a **secure web interface**, offering detailed insights into the entire configuration, statuses, signal strength, and logs.

Basic features include **two-factor authentication**, **IPv6 Dual Stack**, **DHCP**, **NAT**, **NAT-T**, **DynDNS**, **DNS proxy**, **VLAN**, **QoS**, **NTP**, **VRRP**, **SMS control**, **port forwarding**, and **connection backup**, among others. The router supports various VPN protocols, including **IPSec**, **OpenVPN**, **GRE**, **L2TP**, and **PPTP**, ensuring secure communication.

The router allows for the insertion of **Linux scripts** for automated tasks. It supports the definition of up to **four distinct profiles**, switchable via the web interface, SMS, or digital input.

Router Apps enhance router functionality through custom software programs. For Advantech routers, a diverse array of Router Apps is offered, encompassing categories such as connectivity, routing, services, among others, freely accessible on the Advantech *Router Apps* webpage. Additionally, directly from the router web interface, you can use an **Advantech public server** for the Router App or router firmware installation/update.

This model is fully compatible with *WebAccess/DMP*, Advantech's powerful, flexible, and secure remote device management platform. WebAccess/DMP enables comprehensive remote management, monitoring, and troubleshooting of network devices without the need for on-site access. The platform supports features such as VPN management, digital twin functionality, customizable dashboards, multi-tenancy, and strict security controls including PKI, two-factor authentication, auditing, permission management, and alerts.

1.2 Hardware Overview

In this chapter, all components of the router case are described, including links to chapters that provide more details.

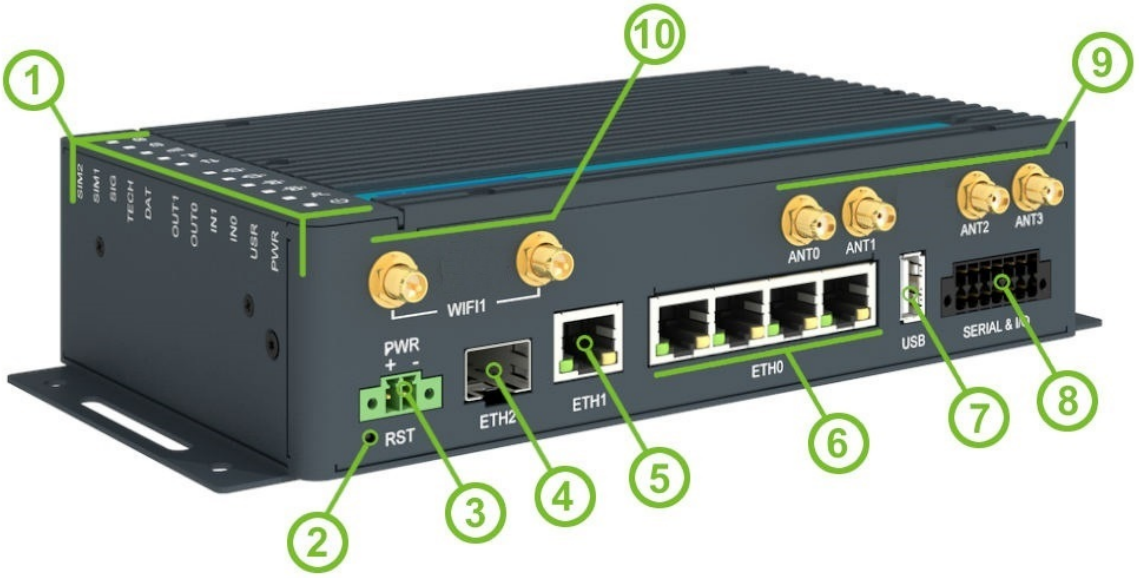


Figure 1: Router hardware overview – front view

#	Item	Type	Description
1	LEDs	—	Status LED indication; see Chapter 2.13.
2	RST	—	Button to reboot the router or to restore the default configuration; see Chapter 2.14.
3	PWR	2-p term.	Power supply socket; see Chapter 2.7.
4	ETH2	SFP cage	SFP cage socket see Chapter 2.6.
5	ETH1	RJ45	1 Gb Ethernet for the second LAN; see Chapter 2.4.
6	ETH0	RJ45	1 Gb Ethernet switched connection (with four ports) for the first LAN; see Chapter 2.4.
7	USB	USB-A	USB 2.0 host port; see Chapter 2.11.
8	SERIAL & I/O	14-pin terminal	RS232, RS485, CAN bus, digital input, and digital output interfaces. See Chapter 2.9 for more information, Chapter 3.8 for I/O parameters, and Chapter 3.9 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 3.4 for cellular module parameters and Chapter 3.5 for GNSS parameters.
10	WIFI1	RP-SMA female	Connectors for the Wi-Fi antennas. See Chapter 2.2 for more information and Chapter 3.6 for Wi-Fi parameters. The Wi-Fi connector located on the right-hand side can be used for a Bluetooth antenna; see Chapter 2.3 for more information and Chapter 3.7 for Bluetooth parameters.

Table 1: Router hardware overview – front view

Figure 2: Router hardware overview – rear view

#	Item	Type	Description
11	Grounding screw	M3	Pay attention to proper grounding; see Chapter 2.7.
12	SIM slots microSD slot	Mini SIM microSD	Two Mini SIM card slots; see Chapter 2.1 for more information and Chapter 3.4 for cellular module parameters. microSD card slot; see Chapter 2.12.
13	Wall clips	—	Wall mounting clips, included as standard accessories; see Chapter 1.7.

Table 2: Router hardware overview – rear view

1.3 Order Codes

The table below provides an overview of the order codes.

Order code	Configuration
ICR-4461	5G NR cellular module, Gb ETH SWITCH, GNSS, SFP cage, USB, microSD card slot, RS232, RS485, CAN bus, two digital inputs, two digital 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 digital inputs, two digital outputs, two SIM readers
ICR-4461**W3**	5G NR cellular module, Gb ETH SWITCH, GNSS, SFP cage, **dual-band Wi-Fi**, USB, microSD card slot, RS232, RS485, CAN bus, two digital inputs, two digital outputs, two SIM readers
ICR-4461**W3S**	5G NR cellular module, Gb ETH SWITCH, GNSS, SFP cage, **PoE PSE**, **dual-band Wi-Fi**, USB, microSD card slot, RS232, RS485, CAN bus, two digital inputs, two digital outputs, two SIM readers
ICR-4461**-1ND**	5G NR cellular module, **FirstNet**, Gb ETH SWITCH, GNSS, SFP cage, USB, microSD card slot, RS232, RS485, CAN bus, two digital inputs, two digital outputs, two SIM readers
ICR-4461**S-1ND**	5G NR cellular module, **FirstNet**, Gb ETH SWITCH, GNSS, SFP cage, **PoE PSE**, USB, microSD card slot, RS232, RS485, CAN bus, two digital inputs, two digital outputs, two SIM readers
ICR-4461**W3-1ND**	5G NR cellular module, **FirstNet**, Gb ETH SWITCH, GNSS, SFP cage, **dual-band Wi-Fi**, USB, microSD card slot, RS232, RS485, CAN bus, two digital inputs, two digital outputs, two SIM readers
ICR-4461**W3S-1ND**	5G NR cellular module, **FirstNet**, Gb ETH SWITCH, GNSS, SFP cage, **PoE PSE**, **dual-band Wi-Fi**, USB, microSD card slot, RS232, RS485, CAN bus, two digital inputs, two digital outputs, two SIM readers

Table 3: Order code overview

1.4 Package Contents

The standard set of router includes items listed in the following table:

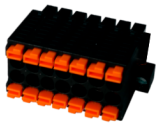
Item#	Description	Figure	Q'ty
1	Router		1 pcs
2	Wall clips for wall-mounting (screwed on the router)		2 pcs
3	2-pin terminal block for power supply (deployed on the router)		1 pcs
4	14-pin terminal block for RS232, RS485, CAN BUS, and I/O (deployed on the router)		1 pcs
5	Printed *Quick Start Guide Leaflet*		1 pcs

Table 4: Package contents

1.5 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

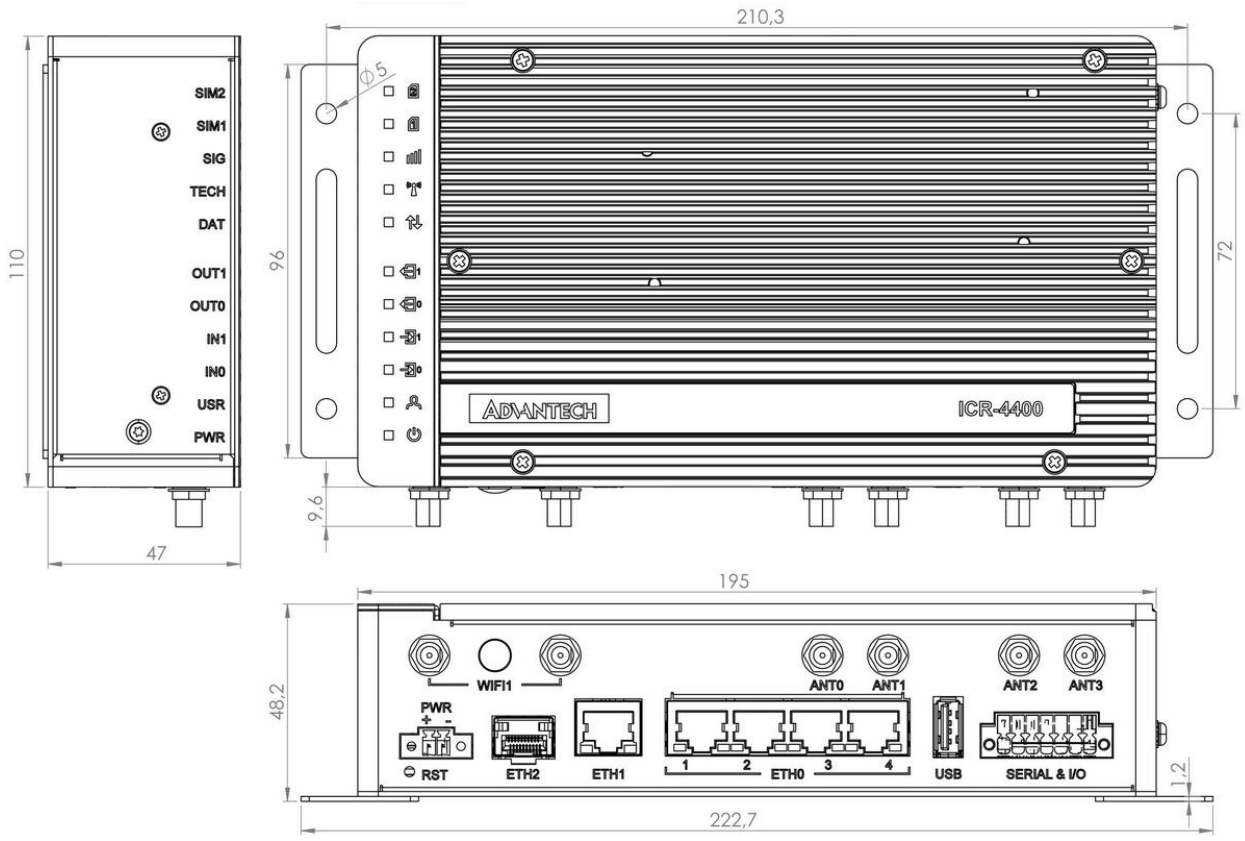


Figure 3: Router dimensions – front, top and right view with wall-mounting holder

Variant with DIN Rail Clip

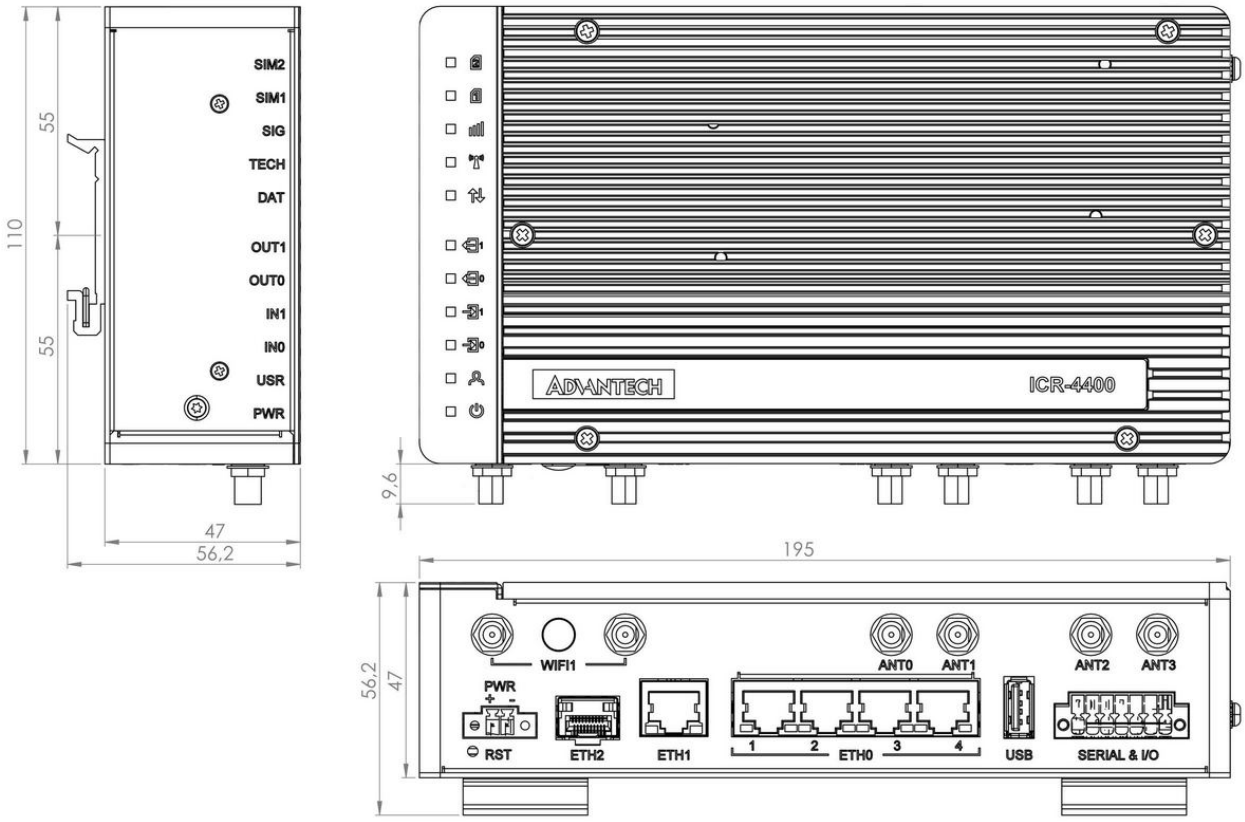


Figure 4: Router dimensions – front, top and right view with DIN rail clip

1.6 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 1.7).
- On a DIN rail EN 60715 with the metal DIN rail clip (refer to Chapter 1.8).

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.

Warning

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 2.7).

1.7 Wall-Mounting

Info

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 5.
Each clip features two holes with a diameter of 5 millimeters for screw placement. For precise mounting dimensions, refer to Figure 3 in Chapter 1.5.

Warning

When attaching the wall-mounting clip, tighten the screws with a maximum torque of 0.4 Nm.

Figure 5: Rotated wall-mounting clips

1.8 DIN Rail Mounting

Info

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 6. If necessary, the clips can also be rotated vertically.

Warning

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

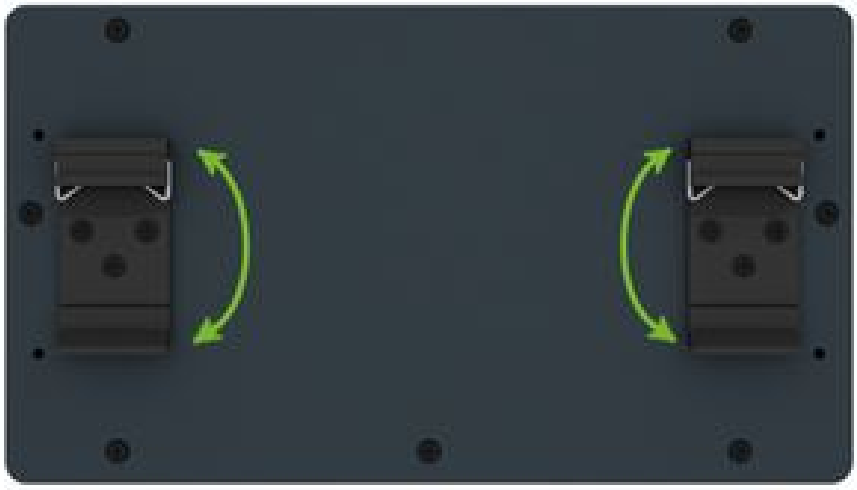


Figure 6: Default position of the DIN rail clips

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 7.

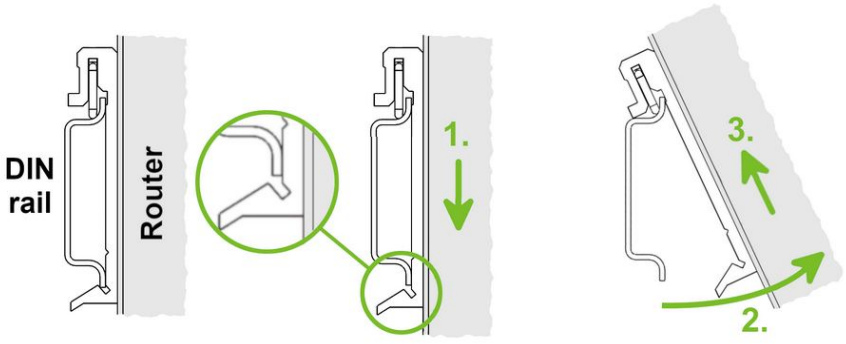


Figure 7: Removing the router from the DIN rail

1.9 Product Label

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

Figure 8: Product label

1.10 First Use

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

Warning

- Before putting the router into operation, ensure that all components required for running your applications are connected. Refer to Chapter *1.2 Hardware Overview* for an overview of the hardware.
- Do not operate the router without an antenna connected to the main antenna connector. Transmitted energy will be reflected by an open connector, which could potentially damage the equipment.
- This device utilizes radio frequency bands that may be subject to specific usage restrictions in certain European Union countries (e.g., indoor use only). Please refer to Appendix C for detailed regulatory information before operation.

The procedure for connecting to a new router is described in the *Configuration Manual* [1], Chapter *Getting Started* → *Configuration Environments* → *Web Interface Initial Setup*. This manual also provides detailed descriptions and examples of router configuration using the web interface.

2. Hardware Functionality

See Chapter 1.2 for an overview of the product's 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 slot.
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*).

Info

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

Warning

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.
- Put the cover back and secure it with the two screws.

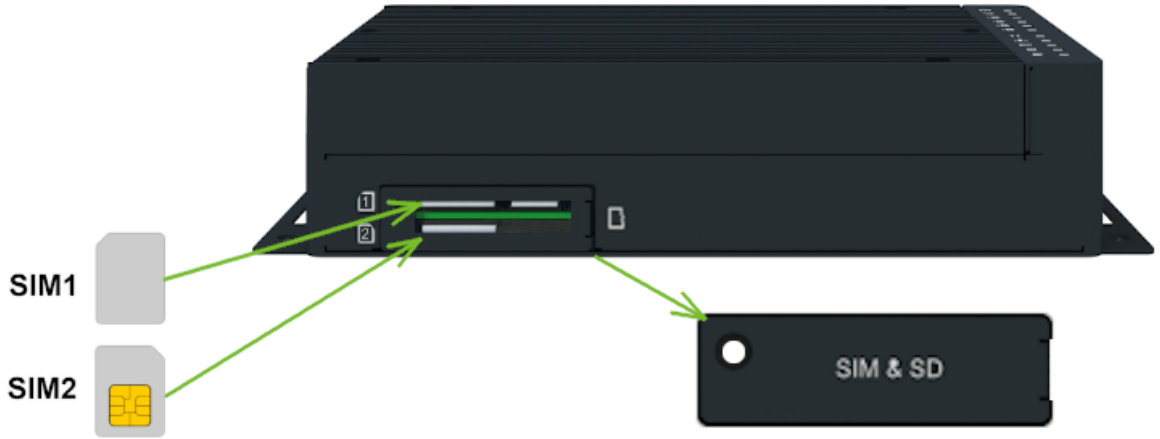


Figure 9: SIM card insertion

2.2 Antennas Interfaces

SMA female connectors (*ANT0*, *ANT1*, *ANT2*, and *ANT3*) are intended for connecting cellular antennas to the router. See Table 20 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 Wi-Fi antennas.

Warning

Always operate the router with a cellular antenna securely connected to the main antenna connector. Transmitting without an antenna attached will cause RF energy to be reflected at the open connector, which can lead to permanent damage to the radio circuitry. Ensure the antenna is properly installed before powering on or transmitting to prevent equipment failure.

Info

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

2.3 Bluetooth

The Wi-Fi connector, situated on the right-hand side of the device, is engineered for compatibility with Bluetooth antennas. For detailed information on the Bluetooth specifications supported by our router, please refer to Chapter 3.7. The integration of Bluetooth functionality within our router encompasses three principal components:

1. **Kernel Support and Drivers:** Integrated into the router's firmware, this includes kernel-level Bluetooth support and the necessary drivers to facilitate Bluetooth connectivity.
2. **Bluetooth Router App:** This application leverages the *BlueZ* Linux Bluetooth stack to extend the router's Bluetooth functionalities. It is not pre-installed on the router. For activation, the *Bluetooth Router App* must be downloaded and installed.
3. **Node-RED Applications:** To achieve advanced Bluetooth functionalities, Node-RED and its Bluetooth node can be employed. Similar to the Bluetooth Router App, *Node-RED* and the *Node-RED Bluetooth* node are available for installation.

2.4 Ethernet Interfaces

The router provides four switched ETH0 ports and one ETH1 Ethernet interface. The physical placement of these ports is shown in Figure 10; when viewed from the front, the first of the ETH0 ports is on the left.

Figure 10: ETH0 ports layout

The RJ45 pinout of the socket is shown in Figure 13 and described in Table 5.

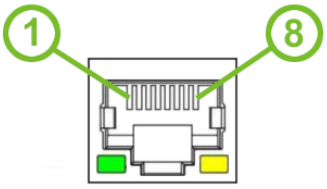


Figure 11: Ethernet connector pinout

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 5: Ethernet connector pinout

Info

- 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 2.5; for technical parameters, see Chapter 3.10.
- The isolation barrier of the Ethernet ports against the ground is 1500 V.

2.5 Power over Ethernet (PoE) PSE

Info

- Available only for models with the PoE PSE feature; see Chapter 1.3 for the order codes.
- The router supports the *IEEE 802.3af/PoE* (Type 1) and *IEEE 802.3at/PoE+* (Type 2) standards and is Mode B compliant.
- To control the PoE functionality, you can use the `pse` command. For detailed information, please refer to the *Command Line Interface* application note.

Warning

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 12.

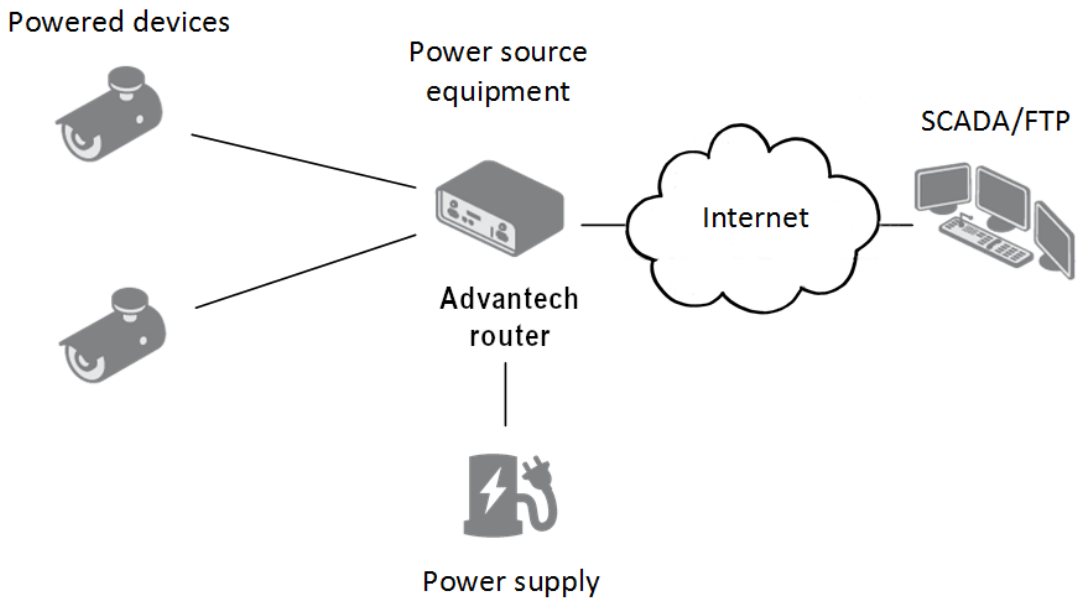


Figure 12: PoE PSE funcional scheme

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 2.4.
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.

Item	Value
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 6: 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 3.1. 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.

Warning

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.

2.6 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 13 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 13: SFP module installation

See Table 7 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 7: Tested SFP modules

2.7 Power Supply

A two-pin terminal connector (pitch 3.5 mm) is utilized to power the router. The corresponding connector is included as a standard accessory with the router.

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 8: Power connector pinout

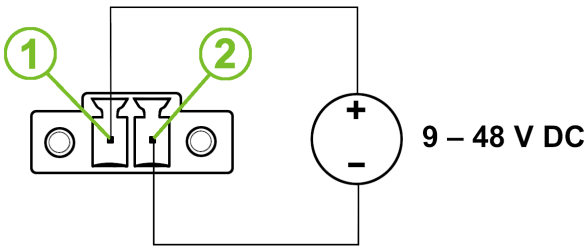


Figure 14: Power connector pinout

The required power supply voltage for the router ranges between +9 V and +48 V DC. Refer to the connection scheme in Figure 14 for proper setup. The router is equipped with built-in protection against reversed polarity, functioning without signaling. To guarantee correct operation, the power source must be capable of providing a sufficient amount of energy, as detailed in the consumption section of Chapter 3.1.

Warning

- Grounding the router using the grounding screw eliminates the protection against reversed polarity. Ensure the negative pole of the DC power supply shares the same voltage reference as the grounding screw. A voltage difference between these points may damage the router, necessitating repairs exclusively by an authorized service center.
- 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 interconnected 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 depicted in Figure 15. The maximum tightening torque for the grounding screw is 1 Nm.

Figure 15: Grounding screw position

2.8 Low Power Mode

Warning

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 3.1. 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 *Command Line Interface* application note.

2.9 I/O Port Interfaces

The I/O user interface is designed for digital input processing and digital output control. The pinout of the I/O interface is described in Figure 16 and Table 9. For detailed electrical parameters see Chapter 3.8. The functional scheme of connection for the digital input and digital output is in Figure 17.

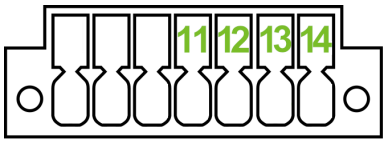


Figure 16: I/O connector pinout

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

Table 9: I/O connector pinout

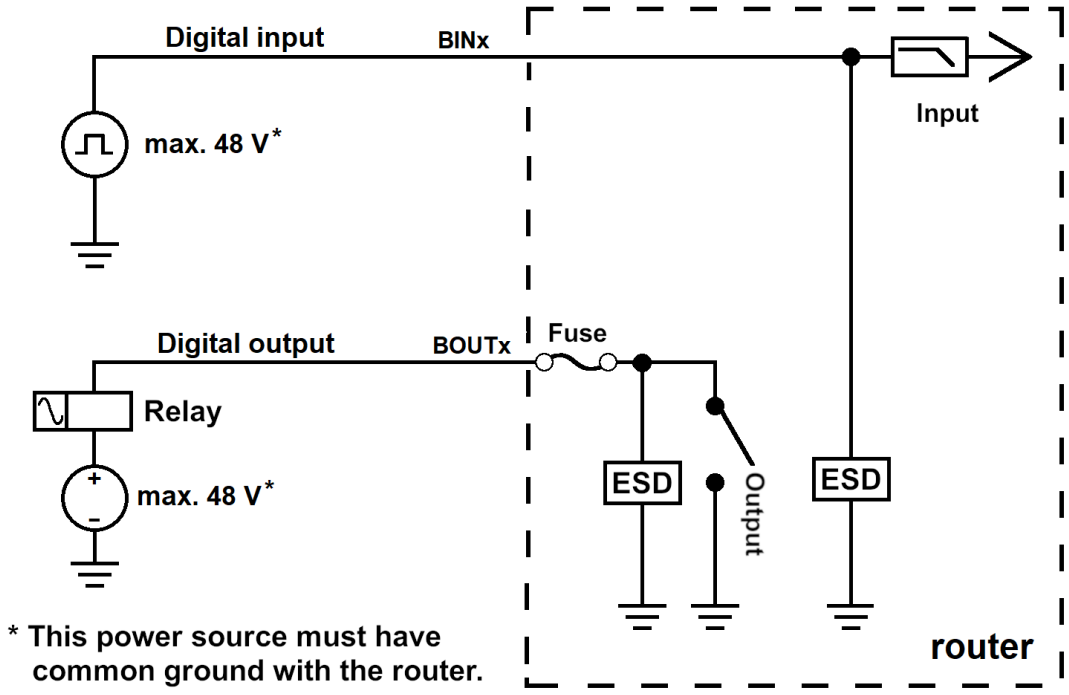


Figure 17: Functional block diagram of the digital interface

2.10 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 18 and the tables below.

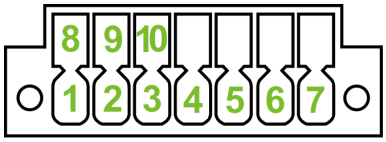


Figure 18: Serial connector pinout

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 10: RS232 connector pinout

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

Table 11: Connection of CAN bus

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

Table 12: RS485 connector pinout

2.11 USB Port

The router is equipped with a single USB 2.0 host port featuring a USB-A type socket. The pinout details of the USB socket are illustrated in Figure 19 and further described in Table 13.

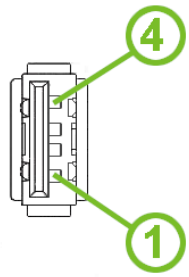


Figure 19: USB connector pinout

Pin 1	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 13: USB connector pinout

For detailed USB port configuration options, refer to the configuration manual [1], Chapter *Configuration → USB Port*.

2.12 microSD Card Reader

The microSD card reader is located under the SIM cover on the router. This card reader enables the router to utilize microSD memory cards. The technical specifications are presented in table below.

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

Table 14: microSD card technical specifications

Warning

Inserting the microSD card:

- To remove an inserted microSD card, use the flat end of a spudger, or your fingernail, and 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.

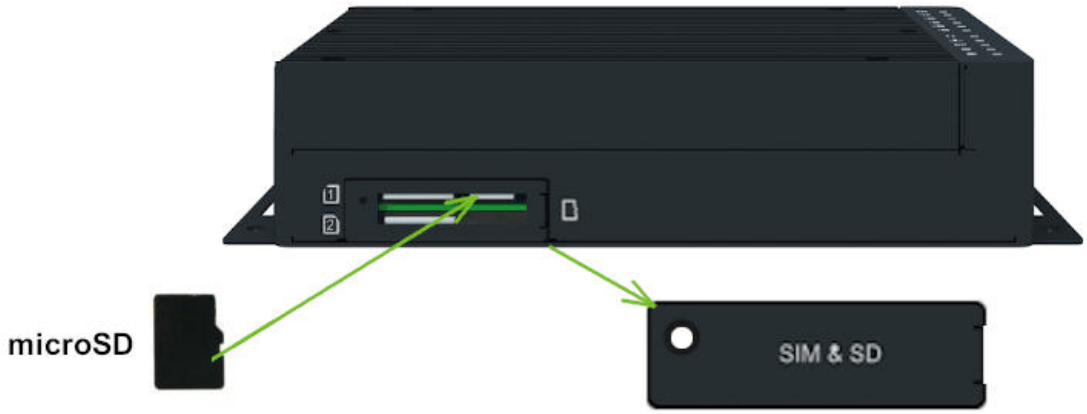


Figure 20: microSD card insertion

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`

Info

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 Filesystem Utilities* router app.

2.13 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.
	IN0	Green	On	The first digital input is active.
	IN1	Green	On	The second digital input is active.
	OUT0	Green	On	The first digital output is active.
	OUT1	Green	On	The second digital output is active.
	DAT	Green	Blinking	Cellular communication is in progress.
	SIG	Green Orange Red	On On On	Good cellular signal. Fair cellular signal. Poor cellular signal.
	TECH	Green Orange Red	On On On	The active SIM uses 5G technology. The active SIM uses 4G technology. The active SIM uses 3G technology.
	SIM1	Green Red	On Fast blinking	SIM1 is active for the cellular connection. A SIM1 issue (missing card or PIN not entered).
	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 Brief off blinks Off	The network cable is connected. Data transmission. The network cable is not connected.

Table 15: LED status indication

2.14 Reset Functions

The *RST* button has multiple functions. For more details, refer to the configuration manual [1], Chapter *Introduction* → *Device* → *Reset*.

Info

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

Figure 21: Resetting the router

3. Technical Parameters

3.1 Basic Technical Parameters

Parameter	Conditions	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-Wi-Fi / Wi-Fi 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 clips)		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)

Table 16: Basic technical parameters

[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.

3.2 Standards and Regulations

Parameter	Description
Radio	ETSI EN 301 908-1, ETSI EN 301 908-2, ETSI EN 301 908-13, ETSI EN 301 908-25, ETSI EN 303 413, ETSI EN 301 893, ETSI 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, EN 55032, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-6-2, EN 61000-6-3
Safety	EN IEC 62368-1, EN IEC 62311, IEEE 802.3
Carrier approvals	FirstNet Capable[1], AT&T, Verizon[2], T-Mobile[2]
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, NEMA TS2
Transportation	E-Mark (E8), homologation number: 10R - 06 11459
Cybersecurity	EN 18031-1
National	CE, UKCA, FCC, IC compliant
Environmental	REACH, RoHS3 and WEEE compliant

Table 17: Standards and regulations

[1] Deddicated models only, refer to *1.3 Order Codes*
[2] Certification is issued for a specific project only.

3.3 Type Testing and Environmental Conditions

Phenomena	Test	Description	Test levels
ESD	EN 61000-4-2	Enclosure contact	± 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	± 1 kV (crit. A) ± 2 kV (crit. A) ± 1 kV (crit. A)
Surge	EN 61000-4-5	Ethernet ports Power ports	± 1 kV (crit. A), shielded cab. ± 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	
Low Temperature	NEMA TS2 chap. 2.1.5.1	storage -45 °C (-49 °F)	
High Temperature	NEMA TS2 chap. 2.1.5.1	storage +85 °C (185 °F)	
Low Temperature	NEMA TS2 chap. 2.2.7.3 chap. 2.2.7.4	operation -34 °C (-30 °F)	
High Temperature	NEMA TS2 chap. 2.2.7.5 chap. 2.2.7.6	operation +74 °C (165 °F)	
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 18: Type testing and environmental conditions

3.4 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)
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)

Table 19: Technical parameters of cellular module

Parameter	Description
Antenna	• Connector type: SMA (4 pcs) • Input impedance: 50 Ω • VSWR: ≤ 3 • Efficiency: > 30 %
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 19: (continued)

3.4.1 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 20: Cellular module antenna mapping

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

3.5 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 21: Technical parameters of GNSS

3.6 Parameters of Wi-Fi

Warning

The 5 GHz Wi-Fi interface operates in frequency bands (specifically 5150–5350 MHz) that are restricted to **indoor use only** in certain EU member states. Please refer to Appendix C for detailed regulatory information.

Parameter	Description
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 (2 chains)[1]	Max. 20 dBm @ 2.4 GHz Max. 16 dBm @ 5 GHz

Table 22: Technical parameters of Wi-Fi

[1]The maximum transmit power is determined by the *Country* setting in the router's GUI; for more details, please refer to the *Configuration Manual*.

3.7 Parameters of Bluetooth

Item	Description
Bluetooth Standards	V5.0 , V4.2 , V4.1 LE , V3.0+HS , V2.1+EDR
Antenna	Shared with right RP-SMA connector
Frequency Range	2.412GHz 2.484GHz 5.150GHz 5.850GHz
Data Rates Supported	300 Mps @ 802.11n 867 Mps @802.11ac
Receive Sensitivity	3 Mbps: <0.1% BR,BER at -70dBm
Output Power	3 Mbps: +6 $\leq$ Output Power $\leq$ +10dBm

Table 23: Technical parameters of Bluetooth

3.8 Parameters of I/O Ports

Electrical characteristics of the digital input are in Table 24. Status of the digital 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 *Command Line Interface* 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 24: Technical parameters of digital input

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

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

3.9 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 25.

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 25: Technical parameters of serial interfaces

3.10 Parameters of PoE

For more information about the PoE PSE feature, including the parameters, see Chapter 2.5.

3.11 System Configuration

The main parametes of the system are listed in Table 26.

Parameter	Description
CPU architecture	64-bit 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 • The remaining space is reserved for the system.
RAM size	1 024 MB
Watchdog	HW watchdog
RTC	Battery backup RTC
TPM	Trusted Platform Module (TPM) 2.0
SIM Slots	2× SIM (Mini SIM – 2FF) 1× Chip SIM (MFF2)[1]

Table 26: System configuration

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

Appendix A: Troubleshooting

Warning

If you cannot connect to the router from your PC, your network card may be configured in a way that prevents a connection. Try one or more of the following steps to resolve the issue:

- Ensure your PC's network card is configured to obtain an IP address automatically from a DHCP server (the router's DHCP server is enabled by default).
- Connect the router to the PC via a network switch.
- Connect the PC directly to the router, but start the router first and wait for it to initialize completely before starting the PC.

Ethernet Connection Fails or Is Unstable

- On the router's *Configuration* → *LAN* page, you can disable auto-negotiation and manually set a specific link speed and duplex mode. This can resolve compatibility issues with some network devices.

Mobile WAN Connection Fails or Is Intermittent

- Check the signal strength on the *Status* → *Mobile WAN* page. If the signal is weak, a more powerful antenna is required. If neighboring cells have similar signal strength, a directional antenna may be necessary to lock onto the optimal cell tower.
- Enable the connection check feature on the *Configuration* → *Mobile WAN* page in the *Check connection* section. Select the *Enable + bind* option. This will send periodic pings to check connectivity and restart the connection if it fails. The "bind" option ensures the ping is always sent through the Mobile WAN interface.

Cannot Establish Mobile WAN Connection

- Verify all settings on the *Configuration* → *Mobile WAN* page, including the *APN*, *username*, *password*, and *IP address*. For many public networks, these fields can be left blank.
- Check if the SIM card requires a PIN. If so, enter it on the *Administration* → *Unlock SIM Card* page.
- For private APN networks, it is often not recommended to obtain DNS server addresses from the operator. Disable this option on the *Configuration* → *Mobile WAN* page.
- Check the *Status* → *System Log* for error messages that can help diagnose the issue.

Cannot Connect to a Device Behind the Router from the Internet (NAT)

- The device behind the router must be configured to use the router's IP address as its default gateway.

Cannot Access a Web Server Behind the Router via NAT

- Remote HTTP access to the router itself must be disabled. This can be done on the *Configuration* → *NAT* page.
- On the same page, enable the *Send all remaining incoming packets to default server* feature and enter the IP address of your web server.
- Ensure the web server's default gateway is set to the router's IP address.

✍ DynDNS Does Not Work

- DynDNS will not work with a private APN if the router's IP address is not publicly accessible.
- If your DynDNS hostname resolves to the same private IP address that is assigned to the router, it means your mobile operator is using NAT or a firewall, preventing direct connections.
- You can verify operator NAT by pinging a server with a static public IP and comparing the source IP (seen by the server) with the IP address shown on the router's status page.
- You can test for a firewall by trying to access the router's web interface remotely.
- The operator may not be providing DNS server addresses. Without DNS, the router cannot resolve the DynDNS service hostname. The System Log would show errors like:
  - `Error resolving hostname: no such file or directory`
  - `Connect to DynDNS server failed`

✍ L2TP or IPsec Tunnel Fails to Establish

- Check the *Status* → *System Log* for specific error messages related to the VPN tunnel negotiation.

✍ IPsec Tunnel Establishes, but No Data Is Transferred

- This is typically caused by incorrect routing rules or a misconfigured default gateway on either the client device or the remote network.

✍ Router Reverts to Online Mode After a Reboot, Despite Being Set to Offline via SMS

- State changes made via SMS commands are temporary and do not alter the saved configuration. They remain in effect only until the router is rebooted.

✍ Serial Communication Is Not Working

- Verify that your router model is equipped with a serial port. Check the serial communication settings on the *Configuration* → *Expansion Port* page.

✍ Is the Router Cisco Compatible?

- No. The router's operating system (ICR-OS) is based on Linux, not Cisco IOS. Therefore, Cisco configuration commands cannot be used.
- However, since all network connections are based on open standards, the router is fully compatible and can be connected to Cisco devices or any other standard networking equipment.

✍ FTP or SFTP Does Not Work

- **FTP** is available on v2 platform routers only. Ensure it is enabled in *Configuration* → *Services* → *FTP*. Connect using any FTP client to port `21` with the same username and password as the web interface.
- **SFTP** (SSH File Transfer Protocol) is available on all routers. Ensure SSH is enabled in *Configuration* → *Services* → *SSH*. Connect using any SFTP-capable client (like FileZilla or WinSCP) to port `22` with the same credentials as the web interface.

✍ How to Access the Router's Command Line

- You can connect to the router's command line using SSH (all routers) or Telnet (v2 routers only).
- **SSH** is enabled by default. You can verify this in *Configuration* → *Services* → *SSH*. Use any SSH client to connect to the router's IP address on port `22` .
- **Telnet** can be enabled on v2 routers in *Configuration* → *Services* → *Telnet*.
- For both methods, use the same username and password as for the web interface.

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 North America
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.iiot.ana@advantech.com
Web: www.advantech.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

For your safety and proper operation of the device, please observe the following instructions:

- The router must comply with all applicable international, national, and local regulations, including any specific restrictions concerning its use in designated applications and environments.
- To avoid personal injury or damage to the device, use only accessories that are approved or supplied by the manufacturer. Unauthorized modifications or the use of non-approved accessories may damage the router, violate regulations, and void the warranty.
- Do not attempt to open the router enclosure under any circumstances.
- Before handling the SIM card, always switch off the router and disconnect it from the power supply. Handle the SIM card with care to avoid damage or electrostatic discharge.

Important

This equipment is not suitable for use by or near young children. Small children could accidentally swallow the SIM card.

- Always ensure that the power supply voltage does not exceed 48 V DC.
- Do not expose the router to harsh environmental conditions. Protect it from dust, moisture, and excessive temperatures.
- Use only routers with proper certifications and markings in areas containing flammable or explosive materials (such as gas stations, chemical plants, or locations with explosives). In these environments, always follow the applicable restrictions regarding the use of radio devices.
- When traveling by airplane, always switch off the router. Using the router on board may endanger flight safety, interfere with mobile networks, and violate local regulations. Non-compliance can result in suspension or cancellation of telecommunications services or legal penalties.
- Take special care when operating the router in close proximity to personal medical devices such as cardiac pacemakers or hearing aids. If in doubt, consult the manufacturer of the medical device or your physician.
- This device may cause interference if used near television sets, radio receivers, or personal computers.
- Maintain a minimum separation distance of at least 20 cm between the router and the human body during operation.
- It is strongly recommended to regularly back up all critical configuration data stored in the router's memory.
- **Specific Usage Restrictions for 5 GHz Wi-Fi:** This device operates in the 5150–5350 MHz frequency band, which is restricted to **indoor use only** within the European Union, EFTA countries, and Northern Ireland. Outdoor use in this frequency band is prohibited to prevent harmful interference with other radio services.

AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	
FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	
PT	RO	SE	SI	SK	IS	LI	NO	CH	TR	UK	

Product Disposal Instructions

The WEEE directive (Waste Electrical and Electronic Equipment: 2012/19/EU) ensures the environmentally responsible recycling and recovery of electronic products. This device contains high-quality materials and components suitable for recycling. At the end of its life, **do not dispose of this product with ordinary commercial waste**. The router also contains a battery. Remove the battery before disposing of the device, and ensure the battery is disposed of separately and in accordance with local regulations. For detailed information on product and battery disposal, consult your supplier's terms and conditions.

Appendix D: Related Documents

[1] *ICR-4400 Configuration Manual* (see *Documents to download* → *Manuals* section)

[EP] Product-related documents and applications can be obtained on **Engineering Portal** at *https://icr.advantech.com/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.com/doc*