

bintec H2 Automotive+

Installation Manual

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Chapter 1 About this Manual

This is the installation manual for the **bintec H2 Automotive+** router. It contains instructions on how to install the device in a working environment.

1.1 Supported devices

The information in this manual only applies to the **bintec H2 Automotive+** router.

1.2 Who should read this manual?

This manual should be read by support personnel who need to install, configure, maintain and monitor the device.

1.3 When should you read this manual?

Read this guide as soon as you are ready to familiarize yourself with the device and its components.

The information contained in this manual will help you operate your device and understand its capabilities.

1.4 What is in this manual?

This installation manual contains the following:

- A description of the features available on the **bintec H2 Automotive+** router.
- A description of the technical specifications.
- A detailed description of the power supply requirements.
- A description of the LEDs and connectors on the device.
- Troubleshooting information.

1.5 What is not in this manual?

This manual does not contain information on device software or configuration. For information on how to configure the device, please read the relevant protocol manuals at <http://www.bintec-elmeg.com>.

1.6 How is the information organized?

Each chapter focuses on a specific hardware component or part thereof. All the information about a particular component (such as its technical specification, description, etc.) can be found in the section covering that particular component.

1.7 Technical support

bintec elmeg GmbH offers a technical support service. Regular software upgrades are available for maintenance and new features.

Contact information:

Web: <http://www.bintec-elmeg.com>

Tel. N°: +49 - 911 - 9673 0

Fax: +49 - 911 - 688 0725

Email: support@bintec-elmeg.com

1.8 Related documentation

bintec Dm704-I Configuration and Monitoring.

bintec Dm748-I Software Updating.

bintec-Dm771-I Wireless LAN Interface.

bintec Dm781-I Cellular Interface.

bintec Dm812-I GPS.



Note

The manufacturer reserves the right to change and/or improve the software and hardware of this product or change the specifications in this manual without notice.

The images showing the front and rear panels of the device are included for information purposes only. The actual device may differ slightly from what is shown.

Chapter 2 bintec H2 Automotive+

2.1 Introduction

This manual explains how to install and connect the **bintec H2 Automotive+** router.



Fig. 1: **bintec H2 Automotive+**

2.1.1 Power supply

For further information on the **bintec H2 Automotive+** power supply, please see [Power source](#) on page 9.

2.1.2 Hardware monitoring

The LEDs on the front panel are used to monitor the hardware in the **bintec H2 Automotive+**. These LEDs provide visual status information on the hardware components, indicating whether there is connectivity, data flow, etc.

For further information on said panel, please see [LEDs](#) on page 5.

Chapter 3 Components and Power Supply

This chapter describes the chassis and components of the **bintec H2 Automotive+**. The following topics are covered:

- Components
- Assembly instructions
- Power supply
- RESET button
- Data connection
- SIM card installation

3.1 Components

3.1.1 Front panel

The following image shows the front panel of the device.

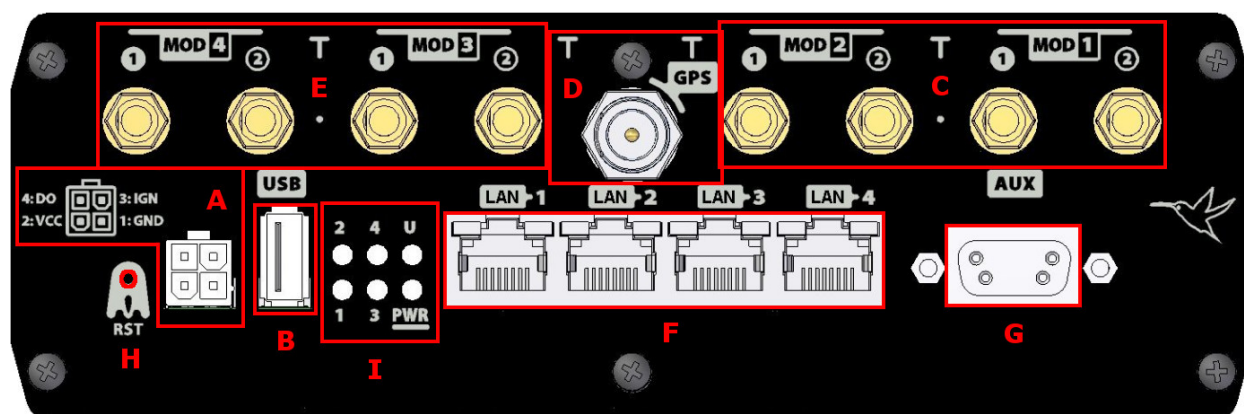


Fig. 2: **bintec H2 Automotive+**: Front panel

The following table describes the front panel components:

Table 1: Front panel components

Item	Description
A	Power connection. For further information on the power connection, please see Power source on page 9
B	USB. Slot for an external USB modem.
C	MOD1, MOD2. WWAN/WLAN antenna connectors. Specifically, cellular1/x or wlan1/0 for MOD 1, and cellular2/x or wlan2/0 for MOD2. Each slot is configured for a specific type of device and depends on the commercial configuration.
D	GPS antenna connector.
E	MOD3, MOD4. WWAN/WLAN antenna connectors. Specifically, cellular3/x or wlan3/0 for MOD 3, and cellular4/x or wlan4/0 for MOD4. Each slot is configured for a specific type of device and depends on the commercial configuration.

F	LAN1 to LAN4 connectors for 4-port Gigabit Ethernet switch.
G	AUX. DB9 connector providing access to the device's local console for configuration and monitoring purposes.
H	RST. Reset button. For further information on how the reset button works, please see RESET button on page 12
I	LED panel.

The LED panel provides status information on the various components (showing whether they are enabled or disabled) and on network activity.

3.1.1.1 LEDs

The following image shows the position of the LED indicators on the front panel of the device:

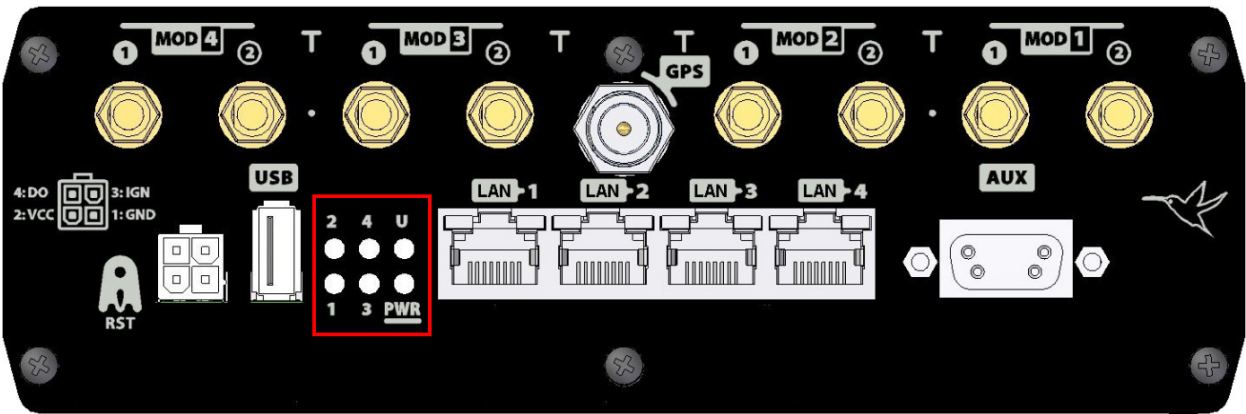


Fig. 3: bintec H2 Automotive+: LEDs

The meaning of each LED depends on the modules installed. Each LED indicator belongs to one of four possible modules.

The following table describes the meaning of each:

LEDs 1..4	When a WWAN module is installed in one of the slots, the "X" LED provides status information as follows: Off -> system stopped. Red -> the interface is unavailable because it is being installed, it is disabled (shutdown), or it has failed a self-test. Amber -> idle. • Rapid blinking. The device has not, or cannot, register with the network. • Slow blinking. GSM connection (GPRS). • Steady. WCDMA (UMTS / HSDPA) connection. Green -> connected. Blinking: connection data activity.
LEDs 1..4	When a WLAN module is installed in one of the slots, the "X" LED provides status information as follows: Red -> interface down. Green -> interface up. Blinking (green/red) -> activity/maintenance.
U	USB status LED. When an external dongle is used, this LED provides status in-

	formation as follows: Off -> system stopped. Red -> the interface is unavailable because it is being installed, it is disabled (shutdown), or it has failed a self-test. Amber -> idle. • Rapid blinking. The device has not, or cannot register, with the network. • Slow blinking. GSM connection (GPRS). • Steady. WCDMA (UMTS / HSDPA) connection. Green -> connected. Blinking: connection data activity.
PWR	Red -> device on. Off -> device off.

The following figure shows the router's Ethernet switch LED indicators:



Fig. 4: Switch LEDs
Switch LED indicators

LED	Description
Yellow	OFF -> The interface is either unavailable, not installed or not registered. ON -> Connected to 10 M: - Steady: Not transferring data. - Blinking: Transferring data.
Yellow + Green	OFF -> The interface is either unavailable, not installed or not registered ON -> Connected to 100 M: - Steady: Not transferring data. - Blinking: Transferring data.
Green	OFF -> The interface is either unavailable, not installed or not registered ON -> Connected to 1000 M: - Steady: Not transferring data. - Blinking: Transferring data.

3.1.2 Rear panel

The following image shows the remaining connectors on the rear panel of the **bintec H2 Automotive+**.

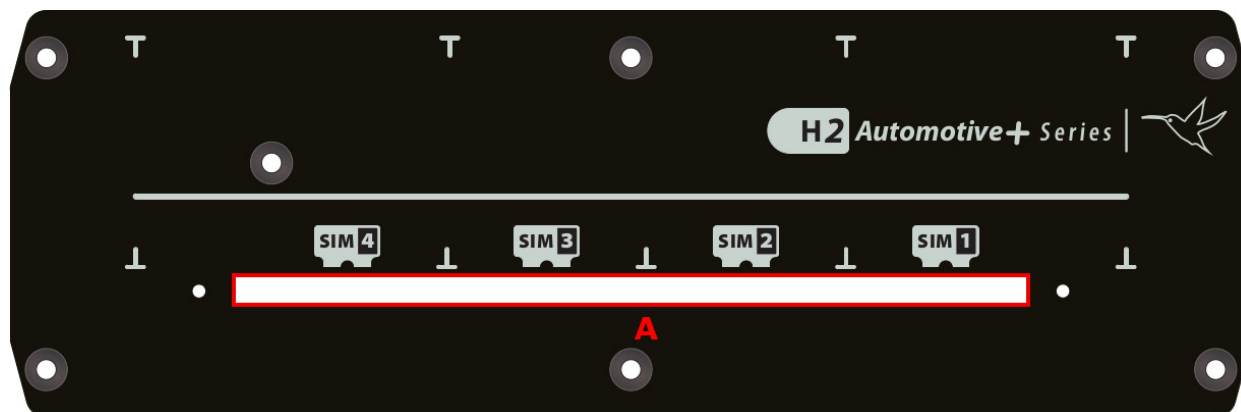


Fig. 5: bintec H2 Automotive+: Rear panel

The rear panel components include:

Table 3: Rear panel components

Item	Description
A	SIM trays (1 to 4). For more information on how to install SIM cards and assign them to each module, see SIM card installation on page 18

3.2 Mounting options

The bintec H2 Automotive+ device can be vehicle-mounted or placed on a wall, ceiling or horizontal surface.



Fig. 6: bintec H2 Automotive+: Front panel mounting bracket

3.2.1 Assembly: Recommendations

We recommend securing the device to a horizontal surface by means of a mounting bracket.

We recommend using the following screws to secure the device:

- For sheet metal installation, use #8 self-drilling screws.
- For tapped holes, use M4 machine screws.

**Warning**

If the screws are not properly anchored, the strain of the cables connected to the router could pull the router out.

**Note**

Mounting screws are not provided with the router and must be purchased separately.

**Warning**

This device is designed to operate in a wide range of temperatures (up to 70°C or 158°F). At high temperatures, the metal surface can get dangerously hot and cause injuries.

If the ambient temperature exceeds 50°C (122°F), the unit must be placed in a Restricted Access Location (RAL) with access granted to trained service personnel only. Access to the RAL should be restricted through the use of a special tool, lock, key or other means of security. The RAL should be strictly monitored by the relevant authorities.

Any spaces or cavities inside the vehicle, which are only accessible to trained service personnel via a tool, lock, key or other security means, are considered RALs. The vehicle trunk is not considered a Restricted Access Location.

If you intend to install the device in a non-Restricted Access Location that can be accessed by untrained service personnel, you must place it in a separate secure compartment such as a Security Lock Box.



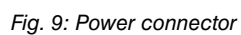
Fig. 7: Security Lock Box

3.2.2 Outline drawing

Here is a simple outline drawing of the unit with data pertinent to proper installation.



The **bintec H2 Automotive+** is powered through direct current (DC).



Workplace Conditions. Main Characteristics

- Avoid moist and/or dusty locations.
- Avoid direct exposure to sunlight and any other heat sources. Do not place the device among papers, magazines or other items that could hinder natural air circulation.
- Do not place the device near strong electromagnetic fields such as those produced by speakers, motors, etc.
- The device should not be placed too close to the driver or in areas where it might cause a distraction.
- Avoid knocks and/or strong vibrations during operation, storage and transport.
- The device should be mounted in accordance with accepted after-sales practices and materials.



Warning

The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, be sure to connect and disconnect the cables following the instructions provided in [Connecting](#) on page 11 and [Disconnecting](#) on page 11 before installing, handling or opening any of the device's covers.

3.3.1 Connecting the power cable to the vehicle

The device's power supply cable must be connected to the vehicle's fuse box. When connecting electrical accessories, always follow the recommendations of the vehicle's manufacturer.

Here are some general tips:

- Disconnect the positive battery cable from the vehicle's battery post.
- Find an empty fuse slot with 5 A - 10 A fuse ratings.
- Seal the cable conductors with suitable crimp connectors, fuse tap or bare wires (depending on the fuse box connectors).
- Connect the BATTERY (+) conductor to the fuse connector.
- Connect the GND conductor to a battery ground connector (-).
- Alternatively, the IGNITION conductor can be connected to the vehicle's ignition switch (if available). If this feature is not going to be used or there is another device controlling the system's power, connect the IGNITION signal to the BATTERY (+).
- We recommended installing an approved vehicle circuit breaker.
- Insert the new fuse into the fuse box's fuse slot.
- Connect the positive battery cable to the vehicle's battery post.

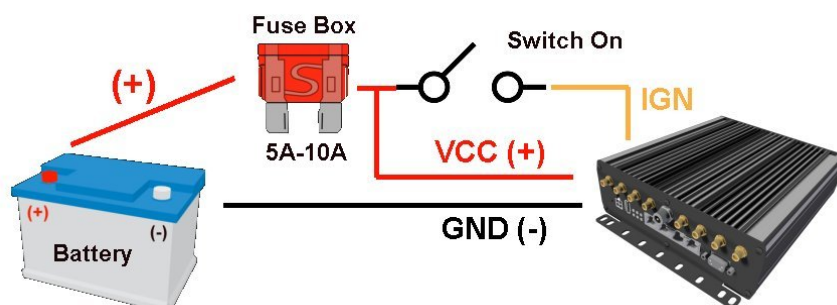


Fig. 10: Cable Connection to vehicle power source

All components used in the connection to the vehicle should be UL listed and comply with the regulations applicable in the country where they are installed.

The cabling should be separated from other vehicle wiring and should not rest against any sharp edges.

The power supply cable goes from the fuse panel to the router along the vehicle wall (ALWAYS inside the vehicle)

cabin and NOT crossing the vehicle's firewall protection).

3.3.2 Connecting the power cable to the device

3.3.2.1 Connecting

- Ensure the power supply cable is disconnected from the device.
- Connect the data cables.
- Locate the power connector on the front of the device.
- Insert the power cable connector.

3.3.2.2 Disconnecting

- Disconnect the power supply cable from the device.
- Disconnect the data cables.

3.3.2.3 Power connector pinout

PIN	Signal	Description
1	GND	GND
2	VCC	Battery. +12V to +24V
3	ACC / IGNITION	Ignition control. Input signal.
4	DO (Digital Output)	Digital output capable of sinking 250mA

3.3.3 Cable features

In the United States and Canada, the cable should be a UL listed, SAE type GPT cable (min. 18AWG).



Note

The cable features may vary depending on the recommendations in the country in which the equipment is installed. The cable must always be 18 AWG or above.

3.3.3.1 Power cord pinout

bintec elmeg GmbH provides a 100cm 23 AWG power cord with the following pin assignment.

PIN	Color	Signal
1	Black	GND / BATTERY (-)
2	Red	VCC / BATTERY (+)
3	Yellow	ACC / IGNITION
4	Green	DO (Digital Output)

3.3.4 Power management

The power management system in the **bintec H2 Automotive+** is always ON.

In this operating mode, the device expects to be constantly powered and the ACC / IGNITION signal operates as a

switch. When power is applied to the device - BATTERY (+) /VCC -, the device remains off. It will not turn on until the ignition pin - ACC / IGNITION - sends a signal (+12 V or +24 V).

Similarly, if the ignition signal deactivates after the device has been turned on, the device will remain on for the period of time configured through the “**set ignition-off-powerdown-timer <value>**” command.

```
*
*p 4

Config>set ?
  application-active      Permits you to select the code used to boot the router
  console                 Set console configuration
  contact-person          Assign a name or identification to the contact-person
  data-link               Type of data link for a WAN line
  default-conf            Restores the default configuration
  file-cfg                Configure a configuration file as active
  ftp                     Permits you to access the FTP configuration menu
  host-location            Physical location of the router
  hostname                Assign a name to a device
  ignition-off-powerdown-timer  Configure the time to router power down after car
                                ignition off
  inactivity-timer        Configure the maximum inactivity time
  login                   Configure login options
  password                 Configure the device access password
  pool                    Number of bytes assigned to each memory pool
  schedule-restart        Allows to configure router reset schedule
  telnet                  Access the TELNET protocol configuration
  web-probe                Access the Web probe configuration
Config>set ignition-off-powerdown-timer ?
  <1..1440>               Power down timeout in minutes
  disabled                Disable ignition off power down timer
Config>set ignition-off-powerdown-timer 10
Config>
```

For further information on this command, please see the following manual: bintec Dm704-I Configuration and Monitoring.



Note

The Power Management feature is always enabled.

In order to disable the Power Management feature, connect the IGNITION signal to the VCC / BATTERY (+). For further information see [Connecting the power cable to the vehicle](#) on page 10 and [Power cord pinout](#) on page 11

3.4 RESET button

The following sections describe the RESET button features.

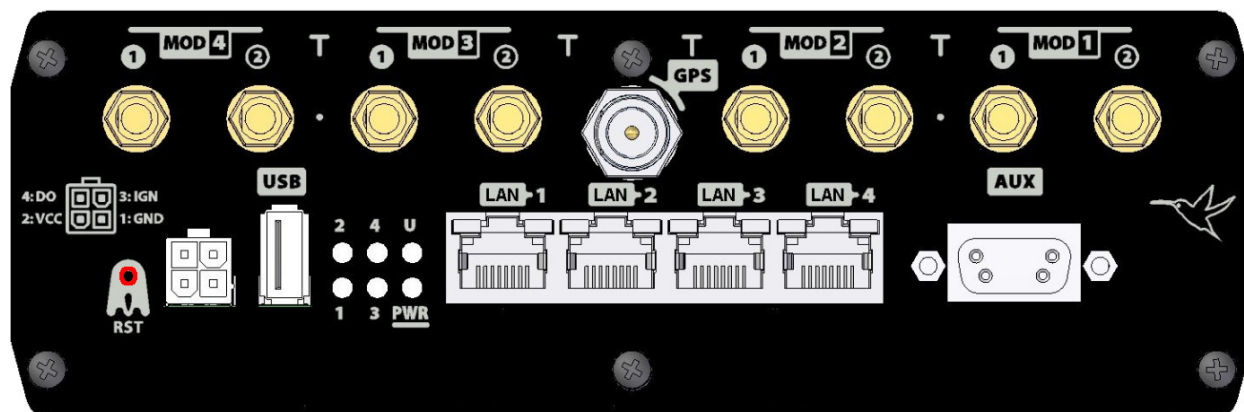


Fig. 11: Reset button

3.4.1 Rebooting the device

Once the device is operating normally, press the RST button to reboot.

3.4.2 Default configuration

The RST button allows you to restore your router to its default configuration. Follow these steps to reset your router:

- With the device turned off, press and hold down the RST button while you turn the router on using the ON/OFF switch (1).
- The PWR LED (red) will light up and the U-LED will start blinking (amber). It will blink for 10 seconds.
- To reboot the device with the default configuration, let go of the RST button while the U-LED is still blinking (i.e., before the 10-second period expires).

The default configuration sets up the device with the following IP address and access mask:

- IP address: 192.168.1.1
- IP mask: 255.255.255.0



Note

Bear in mind that some devices come with customized settings, so your router's default configuration may be different from the one shown above.

3.5 Plug-in Modules

The device only accepts 3G USB modems at present. Please refer to the following website for a list of supported 3G modems: <http://www.bintec-elmeg.com>.

3.5.1 Installation

To install the USB modem, simply insert it in the USB connector (as shown in the following figure):

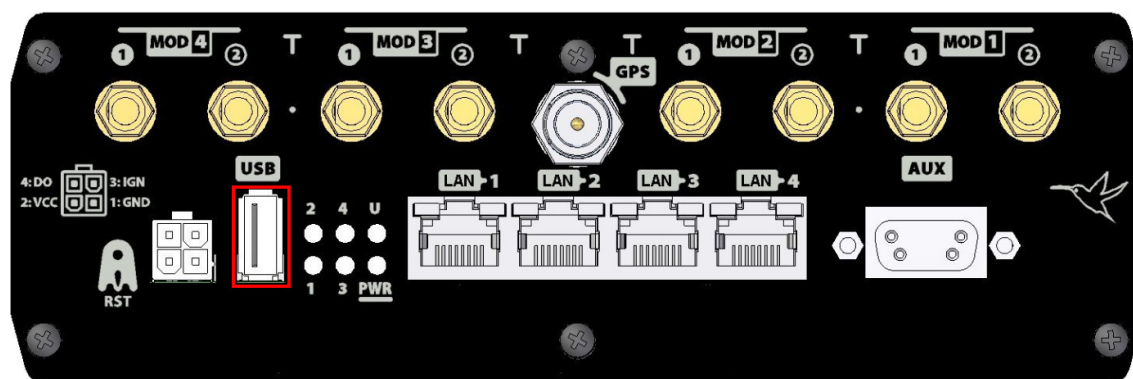


Fig. 12: USB modem slot

3.5.2 Uninstall

To remove the device, gently pull it out of the slot where it was inserted.

3.6 Connecting the data

The **bintec H2 Automotive+** has the following data connections.

3.6.1 4-port Ethernet switch

The **bintec H2 Automotive+** incorporates a 4-port 10/100/1000 BaseT switch with automatic MDI/MDIX support to connect to a local area network (LAN).

Please pay careful attention to the labeling to avoid mixing up the switch with other port types.

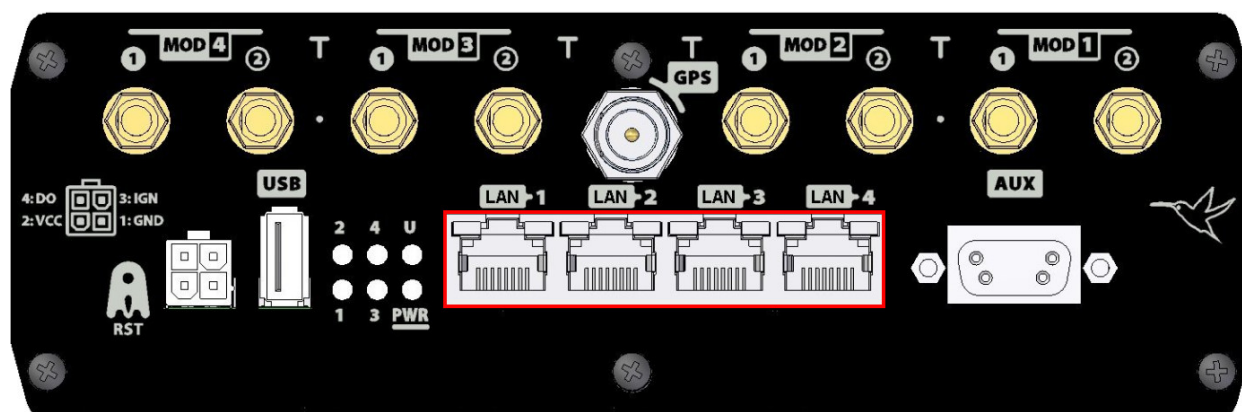


Fig. 13: LAN Switch ports (4)



Note

During booting and in BIOS mode, only the LAN 1 connector is available.



Warning

The equipment is intended for installation and handling by qualified service personnel only. Failure to follow this advice could result in the device becoming damaged or malfunctioning.

3.6.2 Connecting to a WLAN antenna

The **bintec H2 Automotive+** is equipped with up to eight SMA-RP connectors for WLAN (Wi-Fi) antennas (on models with this interface).

Name	WLAN Module	Antenna Function
MODx 1	MD1 to MD4	CH0 antenna connector
MODx 2	MD1 to MD4	CH1 antenna connector

Since the router doesn't have any internal antennas, external antennas must be installed on the **bintec H2 Automotive+** to improve WLAN signal quality.

The cable used to connect the antennas must be valid for RF signal communications of up to 2.4 GHz (5.7 GHz for 802.11a) frequencies and impedances of 50 Ohm. Please note, the quality and length of an antenna cable can affect the RF signal quality (transmitted and received), which, in turn, will affect the device coverage and data exchange rates.



Note

- For optimum performance, always install the WLAN antennas.
- The WLAN interface only works if you have installed the relevant software license.

Each WLAN module has two antenna connectors, **labeled 1 (CH0) and 2 (CH1)**.

The following image shows the position of the WLAN antenna connectors.

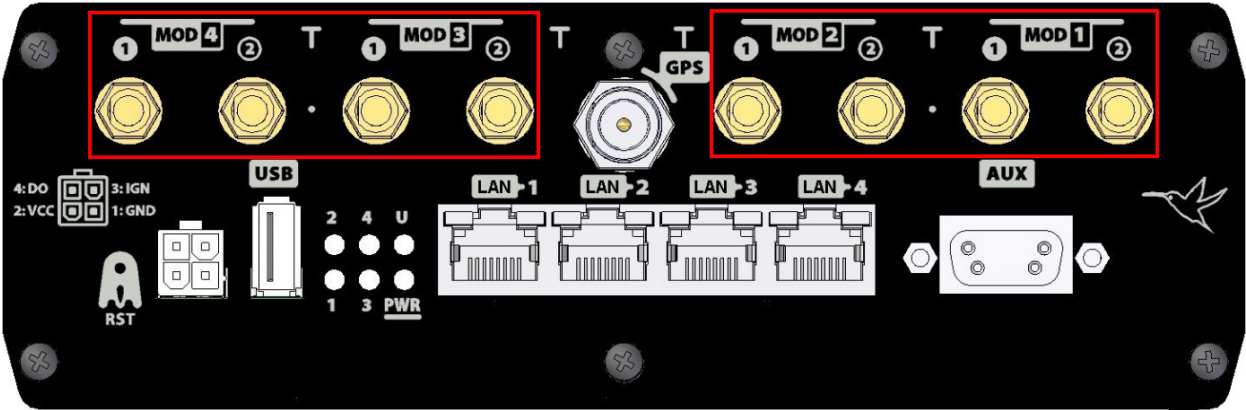


Fig. 14: WLAN antenna connectors

For further information on WLAN interfaces, please see the bintec-Dm771-I Wireless LAN Interface manual.

3.6.3 Connecting to a WWAN antenna

The **bintec H2 Automotive+** is equipped with up to eight SMA connectors for WWAN antennas.

Name	WWAN Module	Antenna Function
MODx 1	MD1 to MD4	Main antenna connector
MODx 2	MD1 to MD4	Diversity antenna connector

The router does not have any internal antennas. Antennas must be installed on the **bintec H2 Automotive+** to improve the quality of the signal received and transmitted by the Wireless WAN module (GPRS, UMTS, HSDPA, HSUPA, HSPA+, LTE, etc.).

The cable used to connect the antennas must be valid for radio frequency (RF) signal communications of up to 2.6 GHz and an impedance of 50 Ohms. Please note that the quality and length (loss) of an antenna cable can affect the RF signal quality (transmitted and received), which, in turn, will affect device coverage and data exchange rates.

**Note**

- For optimum performance, always install the WWAN antennas.
- The *Wireless WAN* interface only works if you have installed the relevant software license.

Each WWAN module has two antenna connectors, labeled **1** (Main) and **2** (Diversity).

Depending on the technology used, you can either use one antenna connector (e.g., for GPRS connection) or both (e.g., for LTE).

Installing an antenna in the **Main (1)** connector is mandatory. The second connector (**2, Diversity**) may not need one. If you are not planning on using the second connector, disable the antenna (through configuration) for optimum performance.

If you install both the Main and Diversity antennas, they *must* be at least 7 cm apart. The maximum recommended distance is 25 cm.

For optimum performance, please use the radio frequency accessories (antennas and cables) recommended by bintec elmeg GmbH

bintec elmeg GmbH has a range of accessories that allow **bintec H2 Automotive+** routers to be installed at different locations.



Note

Antennas must not be directly connected to the **bintec H2 Automotive+** router. They should be at least 50 cm away.

The following image shows the position of the WWAN antenna connectors.

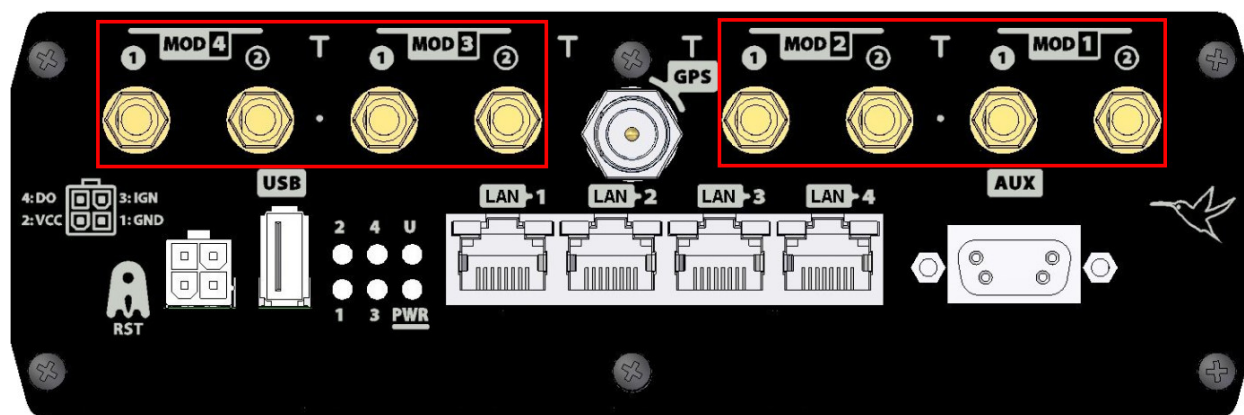


Fig. 15: WWAN antenna connectors

For further information on WWAN interfaces, please see the following manual: bintec Dm781-I Cellular Interface.

3.6.4 Positioning the antennas

Antenna placement with respect to other wireless devices or other radiation sources (such as communication devices, personal computers, etc.) can have a significant impact on device performance.

Antennas transmit and receive radio signals. Performance is also affected by environmental factors (such as the distance between a device and a base station), physical obstacles and other radio frequency (RF) interference sources.

For optimum coverage, follow these recommendations:

- Whenever possible, place the antenna away from physical obstacles. Obstacles between the antenna and the base station degrade the wireless signal. Place the antenna above ground level facing the nearest base station.
- Antennas are also affected by material density. Place them away from walls, metal screens, mirrors, etc.
- Do not place the antenna near columns, which may cast a shadow and reduce the coverage area.
- Keep the antenna away from metal objects such as metal duct work or metal pipes used in heating, air-conditioning, etc.
- Please bear in mind that other wireless devices (such as telephones, microwaves, etc.) can temporarily interfere with the quality of the wireless signal.
- Installing antennas in racks alongside communication devices, computers, etc., is not recommended. Use an extension cable and place the antenna outside.

The following recommendations are applicable to all wireless devices:

- Do not touch or move the antenna while the device is transmitting or receiving.
- Do not touch any equipment containing radiating devices if the antenna is very close to, or touching, any part of the body (particularly the face and eyes) and is transmitting.
- Do not install the device in areas where the atmosphere is potentially explosive.
- Wireless devices can cause interference in other devices. Do not use them in areas where medical equipment is installed.

3.6.5 Connecting a 3G USB device (USB connector)

The **bintec H2 Automotive+** has a USB HOST 2.0 Type A connector interface, compatible with 3G USB modems. You activate the interface by purchasing the relevant software license.

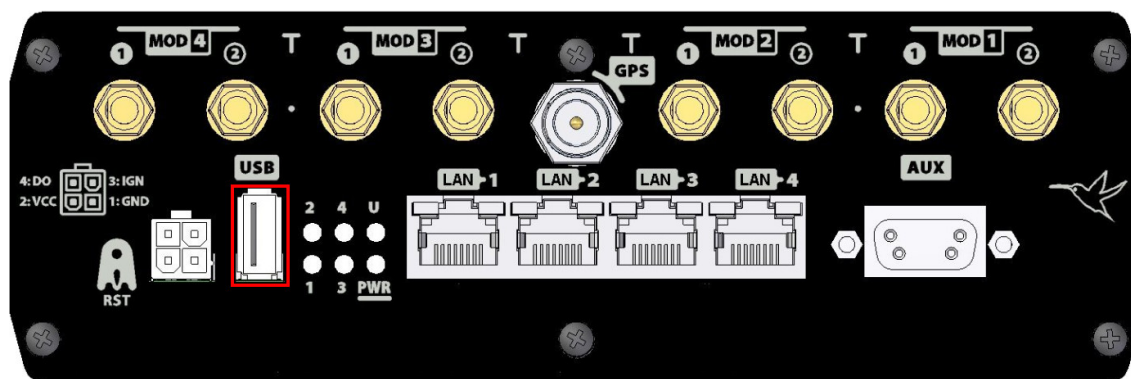


Fig. 16: 3G USB Connector



Note

To see a list of compatible external USB modems, please visit:

<http://www.bintec-elmeg.com>

3.6.6 Connecting the GPS antenna

The **bintec H2 Automotive+** has an FME connector to connect an active GPS antenna (on models equipped with this interface).

Since the router doesn't have any internal antennas, an active 3.3V external antenna must be connected to the **bintec H2 Automotive+** to optimize the GPS signal quality.

The cable used to connect the antennas must be valid for radio frequency (RF) signal communications of up to 1.5 GHz and impedances of 50 Ohms. Please note that the quality and length of an antenna cable can affect the RF signal quality (transmitted and received), which, in turn, will affect the device coverage and data exchange rates.

The following image shows the position of the GPS antenna connector.

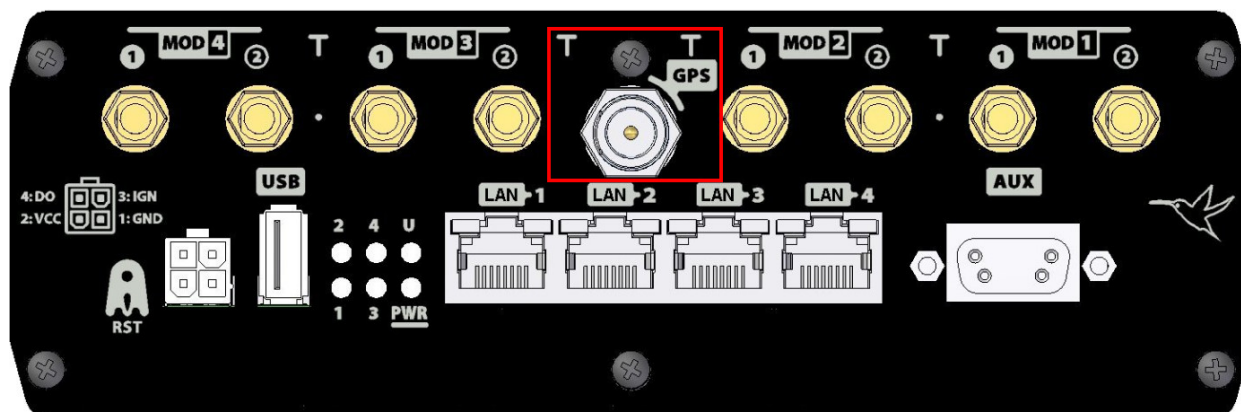


Fig. 17: GPS antenna connector



Note

The GPS will not work properly unless you install a valid SIM card.

For further information on GPS configuration, please see the following manual: bintec Dm812-I GPS.

3.6.7 Configuration connection

The front panel of the **bintec H2 Automotive+** router includes a DB9 female connector labeled **AUX** that can be used as a router configuration port or as a V.24 asynchronous serial port (using a configuration command). The behavior or functionality of this interface must be preconfigured. By default, the interface is configured as a configuration port. Therefore, this section explains how to configure the connector to operate in asynchronous port mode.

This interface allows you to connect asynchronous serial devices that do not need hardware control signals. This means external modems or an asynchronous PPP WAN can be connected.

This interface only operates in accordance with the V24 norm. It cannot control hardware flow because it only has data signals and lacks control signals. It does, however, allow for software flow control (XON/XOFF).

You cannot configure parity in MARK and SPACE modes.

To do this, you need to connect the **AUX** port to an asynchronous terminal (or to a PC with terminal emulation).

To use the port as a router configuration port, please see *Connecting a 3G USB device (USB connector)* on page 16

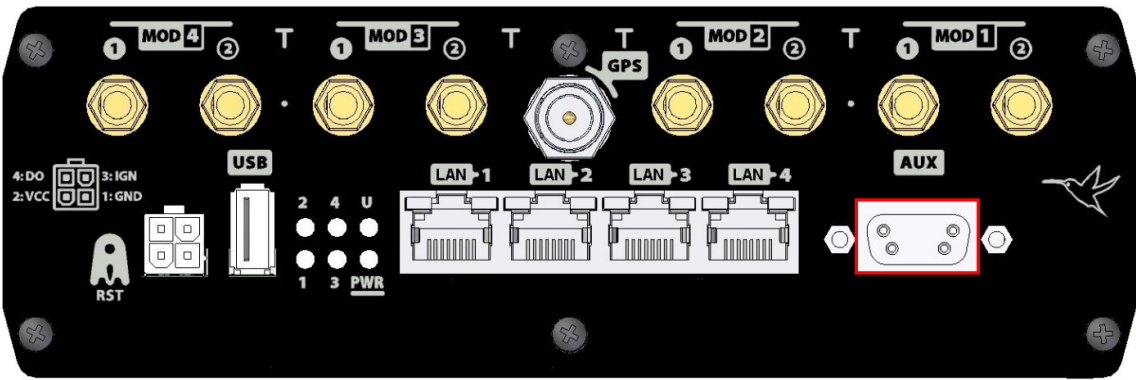


Fig. 18: AUX connector

3.7 SIM card installation

The **bintec H2 Automotive+** is equipped with up to four WWAN interfaces that require SIM cards to operate. Some carriers in certain countries provide services (CDMA) that do not require SIM cards. However, in routers where a SIM card is required, at least one must be inserted.

The **bintec H2 Automotive+** has four SIM trays located at the rear of the device.

SIM assignment depends on the WWAN modules installed and their configuration. For further information about SIM configuration and assignment, please see the following manual: bintec Dm781-I Cellular Interface.

Installed Modules	SIM assignment
MOD1	SIM1 and/or SIM3 (DualSIM option).
MOD1, MOD2	SIM1 and/or SIM3 can be assigned to MOD1; SIM2 and/or SIM4 can be assigned to MOD2.
MOD1, MOD2, MOD3 and MOD4	One SIM is automatically assigned to each module: SIMx to MODx.



Warning

This router is compatible with 1.8 V and 3 V SIM cards. Do not install SIMs that do not support these voltages.

Never install a SIM card when the device is switched on.

Always disconnect the router from the main power supply before installing a SIM card.

Always disconnect the device before removing the casing to access the trays.

Protect yourself against electrostatic discharges (ESD) when inserting a SIM card.

Do not touch the SIM card connectors.

3.7.1 Installing the SIM

To insert a SIM card into a SIM tray, first place the router on a stable surface with the rear panel facing towards you (as shown in the following figure) and then follow the instructions given below:

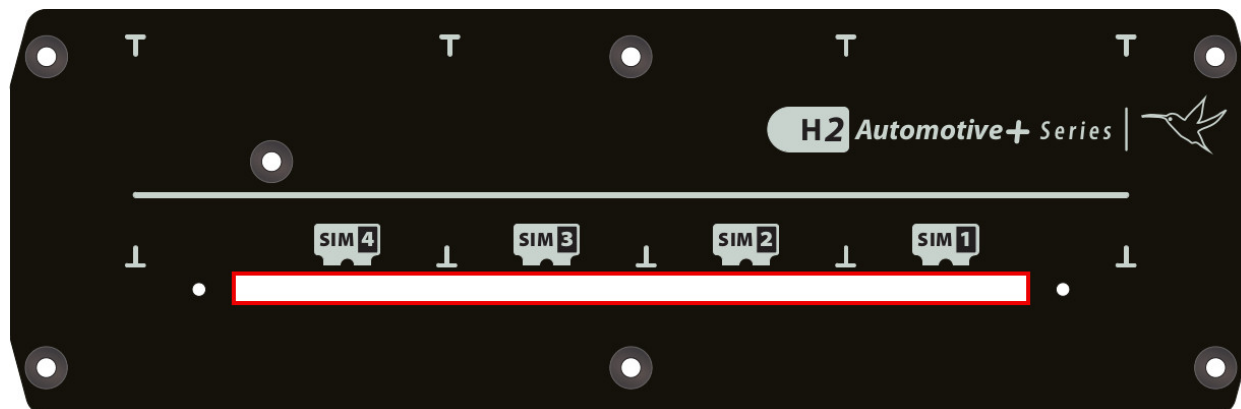


Fig. 19: SIM trays

Unscrew the protective cover to access the SIM trays.

To install the SIM, follow these steps:

- (1) Press the button until the SIM tray slides out of the slot.
- (2) Flip horizontally.
- (3) Place the SIM card on the tray. Make sure the SIM card is properly inserted in its tray.
- (4) Flip horizontally.
- (5) Slide the tray into the slot by pushing it in.

Finally, screw the protective cover back in place.

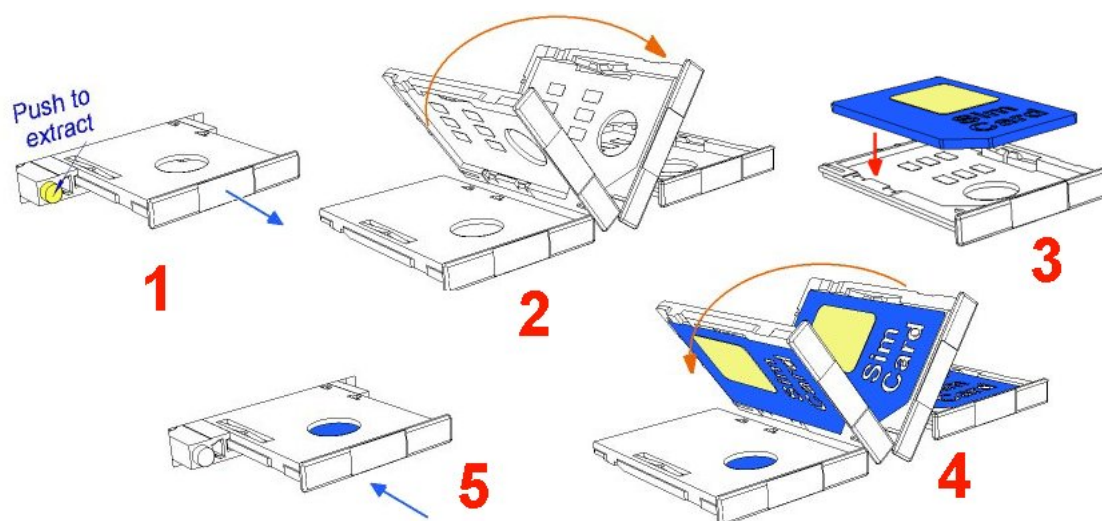


Fig. 20: Inserting the SIMs

Chapter 4 Compliance

4.1 Manufacturer information

Brand	bintec
Manufacturer	bintec elmeg GmbH
Country	Germany
Postal Address	Suedwestpark 94 90449 Nuremberg Germany
International Phone	+49 - 911 - 9673 0

4.2 Risk identification

	WARNING: Signal word used to designate a potentially dangerous situation that may cause severe injuries or death if not avoided.
--	--

4.3 Safety warnings

	This equipment has been designed to run in a wide range of room temperatures, up to 70 °C (158 °F). Under these conditions, the metal surface can reach dangerously high temperatures that may cause injuries.
	Este equipo ha sido diseñado para funcionar con una temperatura ambiente de rango extendido de hasta 70 °C (158 °F) y bajo estas condiciones la superficie metálica puede alcanzar temperaturas que pueden causar daños.
	Dieses Gerät ist für den Betrieb in einem großen Temperaturbereich - bis zu 70°C (158°F) - ausgelegt. Unter diesen Bedingungen können Metalloberflächen gefährlich hohe Temperaturen annehmen, die zu Verletzungen führen können.
	The equipment is intended to be installed by service personnel and only handled by qualified personnel. If not, the device may be damaged and malfunction.
	El equipo está diseñado para ser instalado por personal del servicio técnico y su manejo debe realizarlo personal cualificado. De lo contrario, el equipo puede resultar dañado y quedar inservible.
	Das Gerät ist für eine Montage durch Servicepersonal ausgelegt und darf nur von qualifiziertem Personal gehandhabt werden. Andernfalls kann es zur Beschädigung des Geräts und zu Fehlfunktionen kommen.

	This device is compatible with 1.8 V and 3 V SIM cards. Do not install SIM cards that do not support these voltages.
	Este equipo es compatible con SIMs de 1.8V y 3V. No instale SIMs que no soporten estas tensiones.
	Das Gerät ist mit 1,8V- und 3V-SIM-Karten kompatibel. Installieren Sie keine SIM-Karten, die diese Spannung nicht unterstützen.
	Never install SIM cards when the device is switched on. Always disconnect the device from the main power supply before installing a SIM card. Always disconnect the device before removing the casing to access the trays. When inserting a SIM card, please protect yourself against electrostatic discharge (ESD). Do not touch the SIM card connectors.
	No instale nunca las tarjetas SIM con el equipo encendido. Desconecte siempre el equipo de la red antes de instalar las tarjetas SIM. Desconecte siempre el equipo antes de desmontar la carcasa para acceder a las bandejas. Al insertar las tarjetas SIM, protéjase contra descargas electroestáticas (ESD). No toque los conectores de las tarjetas SIM.
	Installieren Sie keine SIM-Karten, solange das Gerät eingeschaltet ist. Trennen Sie das Gerät immer von der Stromversorgung, bevor Sie eine SIM-Karte installieren. Trennen Sie das Gerät immer von der Stromversorgung, bevor Sie das Gehäuse für einen Zugang zu den SIM-Halterungen öffnen. Schützen Sie sich gegen elektrostatische Entladung (ESD), wenn Sie eine SIM-Karte installieren. Berühren Sie die SIM-Karten-Kontakte nicht.
	If the screws are not properly anchored, the strain of the cables connected to the router could pull the router out.
	Si los tornillos no están bien anclados, la tensión de los cables del router podría hacer que el router se cayera.
	Wenn die Schrauben nicht ordnungsgemäß verankert sind, kann Zug auf die mit dem Router verbundenen Kabel den Router aus der Wand reißen.

	The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables following the steps set forth in Connecting the data on page 13.
	La tensión eléctrica de los cables de alimentación, de los cables de la línea telefónica y de los cables de comunicación es peligrosa. Para evitar descargas, antes de instalar, mover o abrir las cubiertas de este equipo, conecte y desconecte los cables siguiendo el orden que se detalla en los apartados “Conectar” y “Desconectar”.
	Der elektrische Strom in Stromkabeln, Telefonleitungen und Datenleitungen ist gefährlich. Um einen elektrischen Schock zu vermeiden, verbinden und trennen Sie die Kabel vor der Installation, der Handhabung oder dem Öffnen der Abdeckungen immer wie in Connecting the data on page 13 beschrieben.
	The spaces and cavities in the vehicle secured through locks, keys, tools or other means only accessible to trained personnel are considered Restricted Access Locations. The vehicle trunk is a non-Restricted Access Location. If the equipment is going to be installed in a non-Restricted Access Location that untrained service personnel can access, the equipment must be mounted inside a separate compartment like a Security Lock Box.
	Considere como lugar de acceso restringido a los espacios y cavidades en el vehículo cerrados con llave u otros sistemas de seguridad, donde sólo personal capacitado pueda acceder. El maletero no se considera como una zona de acceso restringido. Si el equipo va a ser instalado en una zona de acceso público donde personal no capacitado pueda acceder, ha de montarse dentro de un compartimento separado como una caja de seguridad.
	Alle Bereiche des Fahrzeugs, die mit Schlössern, Schlüsseln, Werkzeug oder anderen Vorrichtungen gesichert und nur für geschultes Personal zugänglich sind, sind als zugangsbeschränkt zu betrachten. Der Kofferraum des Fahrzeugs ist nicht zugangsbeschränkt. Wenn das Gerät in einem nicht zugangsbeschränkten Bereich installiert werden soll, das nicht geschultem Personal zugänglich ist, so muss es in einem gesonderten Fach wie z. B. einer Sicherheitsbox installiert werden.

4.4 WEEE information



The crossed-out wheeled bin symbol indicates that when the device comes to the end of its useful service life, it must be disposed of separately from normal domestic waste at an appropriate waste disposal facility.

El símbolo del contenedor con la cruz, que se encuentra en el aparato, significa que cuando el equipo haya llegado al final de su vida útil, deberá ser llevado a los centros de recogida previstos, y que su tratamiento debe estar separado del de los residuos urbanos.

Das auf dem Gerät befindliche Symbol mit dem durchgekreuzten Müllcontainer bedeutet, dass das Gerät am Ende der Nutzungsdauer bei den hierfür vorgesehenen Entsorgungsstellen getrennt vom normalen Hausmüll zu entsorgen ist.

4.5 REACH

In compliance with the REACH Candidate List, the delivered product and product packaging do not contain any chemical substances in a concentration above 0.1 percent weight by weight (w/w). This declaration will be updated as soon as any changes occur or new relevant substances are added to the REACH Candidate List.

4.6 EC declaration of conformity

English (EN)	Hereby, bintec elmeg GmbH declares that the bintec H2 Automotive+ radio equipment is in compliance with: Directive 1999/5/EC (until 12 June 2017) and Directive 2014/53/EU (from 13 June 2017) Directive 2011/65/EU (RoHS)
Spanish (ES) Español	Por la presente, bintec elmeg GmbH declara que el tipo de equipo radioeléctrico bintec H2 Automotive+ es conforme con: Directiva 1999/5/EC (hasta el 12 de junio de 2017) y Directiva 2014/53/EU (desde el 13 de junio 2017) Directiva 2011/65/UE (RoHS)
German (DE) Deutsch	Hiermit erklärt bintec elmeg GmbH, dass der Funkanlagentyp bintec H2 Automotive+ der Richtlinie: Richtlinie 1999/5/EU (bis 12. Juni 2017) und Richtlinie 2014/53/EU (ab 13. Juni 2017) Richtlinie 2011/65/EU (RoHS)

The full text of the EU Declaration of Conformity is available at the following Internet address:

<http://www.bintec-elmeg.com/en/Publications-Declarations-of-Conformity-1942.html>.

In addition to this conformity, Harmonized Standards have been applied to the TLDPH00J1.C hardware and 11.01 OS version, in order to meet the essential requirements of the Directives.

4.7 National restrictions

In accordance with Article 10 of the Radio Equipment Directive 2014/53/EU, we inform you that national restrictions and requirements may apply when it comes to authorization. Not all countries have implemented the harmonized use of 5 GHz for the implementation of Wireless Access Systems/Radio Local Area Networks (WAS//RLANs) yet.

Since countries set their own regulations, bintec elmeg GmbH recommends that local authorities are consulted as regulations may change from time to time.

This product is supplied without antennas. The choice of antennas is left to the discretion of the operator, who shall be responsible for ensuring that they comply with local regulations.

Please be aware of the regulations in the country where the equipment will be installed and ensure the characteristics of the antennas are in compliance with those regulations prior to installation.

4.8 FCC statements

4.8.1 Interference

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by doing one of the following:

- Reorienting or relocating the receiving antenna.
- Increasing the separation between the equipment and receiver.
- Connecting the equipment to an outlet on a different circuit, i.e., not the one to which the receiver is connected.
- Consulting the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's Authority to operate this equipment.

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.

The specific FCC is based on Grant Conditions of the Certified Wireless Modules (Single Modular Approval). The integrated Radio modules meet FCC with own ID numbers:

- Contains FCC ID: N7NMC7455
- Contains FCC ID: N7NMC7355
- Contains FCC ID: TK4WLE600VX
- Contains FCC ID: PKRNVWE362
- Contains FCC ID: XMR201808EC25AF

4.8.2 Radiation exposure

This equipment is compliant with FCC exposure limits for uncontrolled environments.

For the purposes of assessing RF exposure, this device is considered a transmitting device to be used while keeping a separation distance of at least 20 centimeters between the transmitter's radiating structures (the antenna) and the body of the user (or that of nearby persons).

4.8.3 Radio frequency interference requirements

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range.

The FCC requires this product to be used indoors to reduce the potential for harmful interference to co-channel Mobile Satellite systems.

High power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz bands. These radar stations can cause interference with and/or damage this device.

4.9 Operating frequency

To find out more about operating frequencies and the maximum radio-frequency power transmitted in the frequency bands in which the radio equipment operates, see [FCC Radio Information](#) on page 41 and [CE Radio Information](#) on page 37.

4.9.1 WWAN antenna

This device is restricted to mobile and fixed applications. In order to comply with CE regulations, it must be installed to provide a separation distance of at least 30 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter. The device is tested with antenna gain 3dBi to evaluate its conformity with the CE Radio standards.

Antenna gains exceeding the ERP and EIRP power limits should not be used under any circumstances. For mobile and fixed operating configurations, the WWAN antenna gain (including cable loss) must not exceed 6 dBi at 700 MHz, 850 MHz, 1700 MHz and 1900 MHz, 9 dBi at 2500/2600 MHz, and 1 dBi at 2300 MHz, in order to comply with RF exposure limits.

4.9.2 WLAN antenna

The antennas used by the WLAN transmitter must be installed to provide a separation distance of at least 30 cm from all persons in order to comply with CE regulations and must not be co-located or operated in conjunction with any other antenna or transmitter. The device is tested with an antenna gain of 2dBi to evaluate its conformity with CE Radio standards.

Only antennas with gains equal to or below 5dBi for 2.4GHz, 7dBi for 5.15~5.35GHz & 5.47~5.725GHz and 10dBi for 5.725~5.85GHz may be used with this transmitter to comply with RF exposure limits.

Appendix A Technical Information

A.1 Troubleshooting

The following table lists common problems and potential solutions to help you when installing your router. Please contact your dealer for further information if you are unable to solve a problem.

Problem	Solution
None of the LEDs on the router light up.	Check the power supply to the router (power supply cable, main power outlet).
The LAN LEDs do not light up.	Check the Ethernet cable and the network connection.
LED 1, 2, 3 or 4 (WWAN modules) remains OFF.	Check that the SIM card has been inserted correctly, or Check you have entered the correct SIM PIN, or Check the antenna is properly installed (make sure it is screwed in correctly), or Check that the SIM tray configuration is correct.

A.2 Maintenance

Given that **bintec H2 Automotive+** routers are designed to be highly available and durable, they have no moving parts. *This design makes maintenance unnecessary.*

A.2.1 Software updates

bintec H2 Automotive+ routers can be updated to newer versions. Please contact your dealer for information about new versions.

Our routers can be updated in several ways. For further information , please see the following manual: bintec Dm748-I Software Updating.

The software required to update one of our routers is supplied in a format known as **distribution**. This consists of a single file which contains the complete set of files for updating your device plus in-depth information on the contents of each file.

The **bintec H2 Automotive+** incorporates independent modules for the Wireless WAN interface. The module firmware is usually independent of the router's software. There is an UPGRADE file for each Wireless LAN module. Please ask your dealer for the appropriate UPGRADE file (which will depend on the module in your device). The Cellular Interface manual (bintec Dm 781-I) shows you how to UPGRADE the module.

A.2.2 Connecting to the device

There are two ways to access the CLI:

- Through the AUX connector.
- Through the Telnet protocol.

A.2.2.1 Configuration using the local console (AUX connector)

The front panel of the **bintec H2 Automotive+** includes a DB9 female connector labeled **AUX**. This provides access to the router's local console and can operate as an asynchronous serial port. The behavior or functionality of this interface must be configured in advance. By default, it is configured as a local console. This section explains how to configure the connector to operate in local console mode.

To configure the local console mode, connect the **AUX** port to an asynchronous terminal (or to a PC with terminal emulation).



Note

The terminal must be configured as follows:

- Speed: 9600 bps
- Eight data bits
- One stop bit
- No parity bit
- No flow control



Fig. 25: Connection for configuration

A.2.2.2 Configuration using the IP terminal (LAN1..4 connectors)

The **bintec H2 Automotive+** has a default configuration that activates if the device has not been configured in advance.

The router default configuration sets up the device with the following IP access address and mask:

- IP Address: 192.168.1.1
- IP Mask: 255.255.255.0



Note

Bear in mind that some devices come with customized settings, so your router's default configuration may be different from the one shown above.

This initial configuration lets you access the router's configuration console through the Telnet IP protocol. To do this, follow these steps:

- Configure the Ethernet interface on the IP terminal (usually a PC) using an IP address that falls within the following

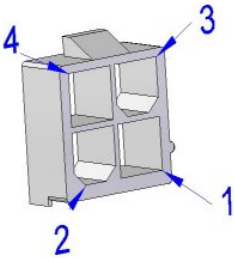
range [192.168.1.2, 192.168.1.254] and mask 255.255.255.0. For example, 192.168.1.2, 255.255.255.0.

- Connect the IP terminal Ethernet interface to a **bintec H2 Automotive+** Ethernet switch port (LAN1..4 connectors).
- Start a Telnet session from the IP terminal to IP address 192.168.1.1 (**bintec H2 Automotive+** default address).
- The default configuration does not ask for login credentials (user/password) to access the console.

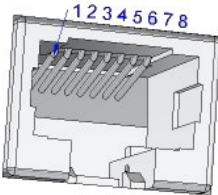
For additional information on configuring your device, refer to the user manuals provided by bintec elmeg GmbH on the documentation CD or website.

A.3 Connectors

A.3.1 POWER connector

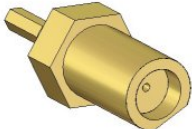
MOLEX 2x2	PIN	SIGNAL
	1	GND
	2	VCC
	3	IGNITION (Input)
	4	DO (Output)

A.3.2 LAN connector

RJ45 LAN	RJ45 PIN	FE Signals	GE Signals
	1	BI-DA+	BI-DA+
	2	BI-DA-	BI-DA-
	3	BI-DB+	BI-DB+
	4	--	BI-DC+
	5	--	BI-DC-
	6	BI-DB-	BI-DB-
	7	--	BI-DD+
	8	--	BI-DD-

A.3.3 WWAN connector

The WWAN connector installed is an SMA female coaxial.

SMA Female	PIN	ANT
	Internal	RF in/out
	External	GND

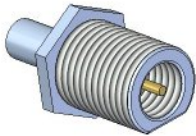
A.3.4 WLAN connector

Devices equipped with this interface have an SMA-RP female coaxial WLAN connector installed.

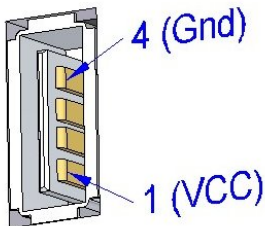
SMA-RP Female	PIN	ANT
	Internal	RF in/out
	External	GND

A.3.5 GPS connector

Devices equipped with this interface have an FME male GPS connector installed.

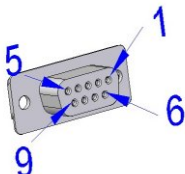
RF FME Male	PIN	ANT
	Internal	RF In
	External	GND

A.3.6 USB connector

USB Type A	PIN	USB
	1	VCC
	2	DATA-
	3	DATA+
	4	GND
	Shell	Shield

A.3.7 Configuration connector

The configuration connector installed is a DB9 female.

DB 9 female	PIN	Signal
	2	TxD (Output)
	3	RxD (Input)
	5	GND

A.4 Technical specifications

A.4.1 Hardware architecture

PROCESSORS	Freescale QorIQ processor.
MEMORY	256 MB in DDR3.
STORAGE UNIT	FLASH Memory (32 Mbytes).

A.4.2 LAN interface

PROTOCOLS	Ethernet (802.3).
PORTS	4-port switch managed through MDI/MDX self-detection.
SPEED	10/100/100 Mbps (BaseT).
CONNECTOR	RJ45 Female.

A.4.3 Wireless WAN interface

WWAN Standard/Bands	MC7455: • LTE: • FDD: B1-B5, B7, B12, B13, B17, B20, B25, B26, B29, B30 • TDD: B41 • WCDMA: B1, B2, B3, B4, B5, B8 MC7430: • LTE: • FDD: B1, B3, B5, B7, B8, B18, B19, B21, B28 • TDD: B38-B41 • WCDMA: B1, B5, B6, B8, B9, B19 • TD-SCDMA: B39 MC7354: • LTE: B2, B4, B5, B13, B17, B25 • WCDMA: B1, B2, B4, B5, B8 • CDMA 1xRTT/EV-DO Rev A: BC0,BC1,BC10 • GSM/GPRS/EDGE: Quad-band EC25-E: • LTE: • FDD: B1, B3, B5, B7, B8, B20 • TDD: B38, B40, B41 • WCDMA: B1, B5, B8 • GSM/GPRS/EDGE: 900/1800 MHz EC25-AF: • LTE: • FDD: B2, B4, B12, B13, B14, B66 • WCDMA: B2, B4 , B5 E362: • LTE: B13 • WCDMA: B1, B2, B5, B8 • CDMA 1xRTT/EV-DO Rev A: BC0, BC1 • GSM/GPRS/EDGE: Quad-band
Speed (DL/UL)	MC7455: • LTE Cat 6. • FDD: 300Mbps/50Mbps • TDD: 222Mbps/26Mbps • HSPA+ Cat 24/6: 42Mbps/5.76Mbps MC7430: • LTE Cat 6. • FDD: 300Mbps/50Mbps • TDD: 222Mbps/26Mbps

	• HSPA+ Cat 24/6: 42Mbps/5.76Mbps MC7304: • LTE Cat 3: 100Mbps/50Mbps • HSPA+ Cat 24/6: 42Mbps/5.76Mbps • EDGE: 236Kbps MC7354: • LTE Cat 3: 100Mbps/50Mbps • HSPA+ Cat 24/6: 42Mbps/5.76Mbps • CDMA 1xRTT: 153Kbps, EV-DO: 3.1Mbps/1.8Mbps • EDGE: 236Kbps EC25-E: • LTE Cat 4. • FDD: 150Mbps/50Mbps • TDD: 130Mbps/35Mbps • HSPA+ Cat 24/6: 42Mbps/5.76Mbps • EDGE: 236Kbps EC25-AF: • LTE Cat 4. • FDD: 150Mbps/50Mbps • HSPA+ Cat 24/6: 42Mbps/5.76Mbps E362: • LTE Cat 3: 100Mbps/50Mbps • HSPA+ Cat 24/6: 42Mbps/5.76Mbps • CDMA 1xRTT: 153Kbps, EV-DO: 3.1Mbps/1.8Mbps • EDGE: 236Kbps
CONNECTOR	Up to eight SMA female connectors.
SIM Slots	4 Mini-SIM (2FF) ISO/IEC 7810:2003, ID-000 (1.8V / 3V)

A.4.4 Wireless LAN interface

WLAN standards	IEEE 802.11ac compliant and backward compatible with 802.11a/b/g/n.
CONNECTOR	Up to eight SMA-RP female connectors.
Frequency range	2.4 GHz: 2412 ~ 2472 MHz. 5 GHz: 5180 ~ 5825 MHz.
WLAN modes	2,4 GHz Operation: 802.11b only; 802.11g only, 802.11b/g; 802.11b/g/n; 802.11g/n; 5 GHz Operation: 802.11a only; 802.11a/n; 802.11a/n/ac.
Modulation Techniques	OFDM: BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM.
Automatic Rate Selection (ARS)	Available.
Transmission rate	Automatic.
Data rates	802.11a: 6~54 Mbps 802.11b: 1~11 Mbps. 802.11g: 6~54 Mbps. 802.11n (HT20): MCS0 ~ MCS15. 802.11n (HT40): MCS0 ~ MCS15. 802.11ac (HT20): MCS0 ~ MCS9. 802.11ac (HT40): MCS0 ~ MCS9. 802.11ac (HT80): MCS0 ~ MCS9.
Data rates for 802.11n, Long Guard (800ns), 20 MHz	MCS0 6,5 Mbps; MCS1 13 Mbps; MCS2 19,5 Mbps; MCS3 26 Mbps; MCS4 39 Mbps; MCS5 52 Mbps; MCS6 58,5 Mbps; MCS7 65 Mbps; MCS8 13 Mbps; MCS9 26 Mbps; MCS10 39 Mbps; MCS11 52 Mbps; MCS12 78 Mbps; MCS13 104 Mbps; MCS14 117 Mbps; MCS15 130 Mbps.
Data rates for 802.11n, Short Guard (400ns), 20 MHz	MCS0 7,2 Mbps; MCS1 14,4 Mbps; MCS2 21,7 Mbps; MCS3 28,9 Mbps; MCS4 43,3 Mbps; MCS5 57,8 Mbps; MCS6 121,5 Mbps; MCS7 135 Mbps; MCS8 27 Mbps; MCS9 54 Mbps; MCS10 81 Mbps; MCS11 108 Mbps; MCS12 162 Mbps; MCS13 216 Mbps; MCS14 243 Mbps; MCS15 270 Mbps.
Data rates for 802.11n, Long Guard (800ns), 40 MHz	MCS0 13,5 Mbps; MCS1 27 Mbps; MCS2 40,5 Mbps; MCS3 54 Mbps; MCS4 81 Mbps; MCS5 108 Mbps; MCS6 121,5 Mbps; MCS7 135 Mbps; MCS8 27 Mbps; MCS9 54 Mbps; MCS10 81 Mbps; MCS11 108 Mbps; MCS12 162 Mbps; MCS13 216 Mbps; MCS14 243 Mbps; MCS15 270 Mbps.
Data rates for 802.11n, Short Guard (400ns), 20 MHz	MCS0 15 Mbps; MCS1 30 Mbps; MCS2 45 Mbps; MCS3 60 Mbps; MCS4 90 Mbps; MCS5 120 Mbps; MCS6 135 Mbps; MCS7 150 Mbps.
Data rates for 802.11ac, Long Guard (800ns), 20 MHz with two spatial streams	MCS0 13 Mbps; MCS1 26 Mbps; MCS2 39 Mbps; MCS3 52 Mbps; MCS4 78 Mbps; MCS5 104 Mbps; MCS6 117 Mbps; MCS7 130 Mbps; MCS8 156 Mbps.
Data rates for 802.11ac, Short Guard (400ns), 20 MHz with two spatial streams	MCS0 14,4 Mbps; MCS1 28,9 Mbps; MCS2 43,3 Mbps; MCS3 57,8 Mbps; MCS4 86,7 Mbps; MCS5 115,6 Mbps; MCS6 130,3 Mbps; MCS7 144,4 Mbps; MCS8 173,3 Mbps.

Data rates for 802.11ac, Long Guard (800ns), 40 MHz with two spatial streams	MSC0 27 Mbps; MSC1 54 Mbps; MCS2 81 Mbps; MCS3 108 Mbps; MCS4 162 Mbps; MSC5 216 Mbps; MCS6 243 Mbps; MCS7 270 Mbps; MCS8 324 Mbps; MCS9 360 Mbps.
Data rates for 802.11ac, Short Guard (400ns), 40 MHz with two spatial streams	MSC0 30 Mbps; MSC1 60 Mbps; MCS2 90 Mbps; MCS3 120 Mbps; MCS4 180 Mbps; MSC5 240 Mbps; MCS6 270 Mbps; MCS7 300 Mbps; MCS8 360 Mbps; MCS9 400 Mbps.
Data rates for 802.11ac, Long Guard (800ns), 80 MHz with two spatial streams	MSC0 58,5 Mbps; MSC1 117 Mbps; MCS2 175,5 Mbps; MCS3 234 Mbps; MCS4 351 Mbps; MSC5 468 Mbps; MCS6 526,5 Mbps; MCS7 585 Mbps; MCS8 702 Mbps; MCS9 780 Mbps.
Data rates for 802.11ac, Short Guard (400ns), 80 MHz with two spatial streams	MSC0 65 Mbps; MSC1 130 Mbps; MCS2 195 Mbps; MCS3 260 Mbps; MCS4 390 Mbps; MSC5 520 Mbps; MCS6 585 Mbps; MCS7 650 Mbps; MCS8 780 Mbps; MCS9 866,7 Mbps.
Receive Sensitivity	802.11 bg: <-80dBm ± 2dBm@54Mbps. 802.11n HT20: <-77dBm ± 2dBm@MCS15. 802.11n HT40: <-75dBm ± 2dBm@MCS15. 802.11 a: <-80dBm ± 2dBm@54Mbps. 802.11a/n/ac HT20: <-71dBm ± 2dBm@MCS9 two spatial streams 802.11n/ac HT40: <-71 dBm ± 2dBm@MCS9 two spatial streams. 802.11ac HT80: <-68 dBm ± 2dBm@MCS9 two spatial streams.
Data rates for 802.11ac, Short Guard (400ns), 40 MHz with two spatial streams	MSC0 15 Mbps; MSC1 30 Mbps; MCS2 45 Mbps; MCS3 60 Mbps; MCS4 90 Mbps; MSC5 120 Mbps; MCS6 135 Mbps; MCS7 150 Mbps; MCS8 30 Mbps; MCS9 60 Mbps; MCS10 90 Mbps; MCS11 120 Mbps; MCS12 180 Mbps; MCS13 240 Mbps; MCS14 270 Mbps; MCS15 300 Mbps.
Output power limitation (without antenna gain)	Adjustable in dBm. Maximum power varies depending on the data rate, frequency band and country settings.
Output Power	802.11 bg: 18dBm ± 2dBm@54Mbps. 802.11n HT20: 18dBm ± 2dBm@MCS15. 802.11n HT40: 18dBm ± 2dBm@MCS15. 802.11 a: 20dBm ± 2dBm@54Mbps. 802.11a/n/ac HT20: 18dBm ± 2dBm@MCS9 two spatial streams. 802.11n/ac HT40: 17 dBm ± 2dBm@MCS9 two spatial streams. 802.11ac HT80: 17 dBm ± 2dBm@MCS9 two spatial streams.
Bandwidth (802.11n)	20 MHz 40 MHz (bundling two adjoining 20 MHz channels into one 40 MHz channel).
Bandwidth (802.11ac)	20MHz 40 MHz (bundling two adjoining 20 MHz channels into one 40 MHz channel). 80 MHz (bundling four adjoining 20 MHz channels into one 80 MHz channel).

A.4.5 GPS interface

STANDARDS	NMEA.
SATELLITE CHANNELS	Maximum 30-channel (16 GPS, 14 GLONASS) simultaneous tracking.
CONNECTOR	RF FME male.
ANTENNA	3.3 V Active. Passive.

A.4.6 USB interface

3G USB MODEMS	Please visit the bintec elmeg GmbH website (http://www.bintec-elmeg.com) for a list of supported 3G USB modems.
SPEED	The interface complies with the USB 2.0 (480 Mbps) standard; the end speed depends on the 3G USB modem used.
CONNECTOR	USB Type A.

A.4.7 Configuration interface

INTERFACES	This can be configured in two modes: <i>Asynchronous Port:</i> V24 DCE. Hardware flow control is not permitted. <i>Local Console:</i> V.24 DCE only 8-N-1, without flow control.
PROTOCOLS	<i>Asynchronous Port:</i> AT, PPP, GPS-DATA.
SPEED	<i>Asynchronous Port:</i> 300 at 115,200 bps. <i>Local console:</i> 9,600 bps (configurable up to 115,200).
CONNECTOR	DB9 female located on the front panel of the device.

A.4.8 Power

INPUT VOLTAGE	Input: 9-36 V DC Nominal: 12-24 V DC
INPUT CURRENT	2 A @ 12Vdc
MAXIMUM POWER	With a WWAN module installed: 12 W With a WWAN+WIFI module installed: 15 W With two WWAN+WIFI modules installed: 19 W
ACC/IGNITION	Input voltage: +12 - 24 V DC Current: 7 mA @ 12Vdc, 14mA @ 24Vdc Control Levels: - ON: the same level as the INPUT VOLTAGE (+12 or +24 V DC) - OFF: GND or not connected.
DO	Digital output capable of sinking 250 mA.
CONNECTOR	4 Pin polarized connector

A.4.9 Dimensions and weight

TYPE	Ruggedized casing with multiple support positions.
LENGTH x WIDTH x HEIGHT	237 x 180 x 59 mm
WEIGHT	2.5 kg

A.4.10 Environmental specifications

TEMPERATURE	Operating: -25°C to 70°C. (-22°F to 185°F) Storage: -40°C to 80°C. (-13°F to 176°F)
HUMIDITY	Operating: 5% to 95% relative humidity (non-condensing) Storage: 5% to 95% relative humidity (non-condensing)



Note

If the device is installed in a room where the ambient temperature exceeds 55 °C, the area must be restricted and the device must have a "hot surface" warning label attached.



Appendix B CE Radio Information

This section contains information on some of the European radio frequencies that are currently in force across Europe. Country-specific bands are available upon request.

B.1 RF WAN specifications

LTE/WCDMA/GSM connectivity is provided by Sierra Wireless modules. The exact modules installed will depend on your particular router model.

This product is supplied without antennas. The choice of antennas is left to the discretion of the operator, who is responsible for ensuring that they comply with local regulations.

Technology: LTE. MC7304 specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz	+23 dBm $\pm$ 1 dB
	Rx: 2110-2170 MHz	
Band 3	Tx: 1710-1785 MHz	+23 dBm $\pm$ 1 dB
	Rx: 1805-1880 MHz	
Band 7	Tx: 2500-2570 MHz	+22 dBm $\pm$ 1 dB
	Rx: 2620-2690 MHz	
Band 20	Tx: 832-862 MHz	+23 dBm $\pm$ 1 dB
	Rx: 791-821 MHz	

Technology: LTE. MC7455 specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz	+23 dBm $\pm$ 1 dB
	Rx: 2110-2170 MHz	
Band 3	Tx: 1710-1785 MHz	+23 dBm $\pm$ 1 dB
	Rx: 1805-1880 MHz	
Band 7	Tx: 2500-2570 MHz	+22 dBm $\pm$ 1 dB
	Rx: 2620-2690 MHz	
Band 20	Tx: 832-862 MHz	+23 dBm $\pm$ 1 dB
	Rx: 791-821 MHz	

Technology: LTE. MC7430 specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz	+23 dBm $\pm$ 1 dB
	Rx: 2110-2170 MHz	

Band 3	Tx: 1710–1785 MHz	+23 dBm $\pm$ 1 dB
	Rx: 1805–1880 MHz	
Band 7	Tx: 2500–2570 MHz	+22 dBm $\pm$ 1 dB
	Rx: 2620–2690 MHz	

Technology: LTE. EC25-E specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz	+23 dBm $\pm$ 2 dB
	Rx: 2110-2170 MHz	
Band 3	Tx: 1710–1785 MHz	+23 dBm $\pm$ 2 dB
	Rx: 1805–1880 MHz	
Band 7	Tx: 2500–2570 MHz	+23 dBm $\pm$ 2 dB
	Rx: 2620–2690 MHz	
Band 20	Tx: 832–862 MHz	+23 dBm $\pm$ 1 dB
	Rx: 791–821 MHz	

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+. MC7304 specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz	+23 dBm $\pm$ 1 dB
	Rx: 2110-2170 MHz	
Band 8	Tx: 880–915 MHz	+23 dBm $\pm$ 1 dB
	Rx: 925–960 MHz	

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+. MC7455 specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz	+23 dBm $\pm$ 1 dB
	Rx: 2110-2170 MHz	
Band 3	Tx: 170–1785 MHz	+23 dBm $\pm$ 1 dB
	Rx: 1805–1880 MHz	
Band 8	Tx: 880–915 MHz	+23 dBm $\pm$ 1 dB
	Rx: 925–960 MHz	

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+. MC7430 specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920–1980 MHz	+23 dBm $\pm$ 1 dB
	Rx: 2110–2170 MHz	

Band 8	Tx: 880–915 MHz	+23 dBm $\pm$ 1 dB
	Rx: 925–960 MHz	

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+. EC25-E specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz	+24 dBm +1/-3 dB
	Rx: 2110-2170 MHz	
Band 8	Tx: 880–915 MHz	+24 dBm +1/-3 dB
	Rx: 925–960 MHz	

Technology: GSM / GPRS / EDGE. MC7304 specifications.

Bands	Frequencies	Conducted Transmit Power
EGSM 900 (900 MHz)	Tx: 880–915 MHz	+32 dBm $\pm$ 1 dB
	Rx: 925–960 MHz	+27 dBm $\pm$ 1 dB
DCS 1800 (1800 MHz)	Tx: 1710–1785 MHz	+29 dBm $\pm$ 1 dB
	Rx: 1805–1880 MHz	+26 dBm $\pm$ 1 dB

Technology: GSM / GPRS / EDGE. EC25-E specifications.

Bands	Frequencies	Conducted Transmit Power
EGSM 900 (900 MHz)	Tx: 880–915 MHz	+33 dBm $\pm$ 2 dB
	Rx: 925–960 MHz	+27 dBm $\pm$ 3 dB
DCS 1800 (1800 MHz)	Tx: 1710–1785 MHz	+30 dBm $\pm$ 2 dB
	Rx: 1805–1880 MHz	+26 dBm $\pm$ 3 dB

B.2 WLAN specifications

WLAN modules provide WLAN connectivity.

This product is supplied without antennas. The choice of antennas is left to the discretion of the operator, who is responsible for ensuring they comply with local regulations.

Technology: WLAN 802.11a/b/g/n/ac. WLE600VX specifications.

Frequency Range	802.11b/g/n-HT20: 2412 ~ 2472MHz; 802.11n-HT40: 2422 ~ 2462MHz; 802.11a /n-HT20/ac-VHT20: 5180~5240 MHz, 5260~5320 MHz, 5500~5700 MHz; 802.11n-HT40/ac-VHT40: 5190~5230 MHz, 5270~5310 MHz, 5510~5670 MHz; 802.11ac-VHT80: 5210 MHz, 5290 MHz, 5530 MHz, 5610 MHz.
Number of Channels	802.11a/n-HT20/ac-VHT20: 19 802.11n-HT40/ac-VHT40: 9 802.11ac-VHT80: 4

Type of modulation	2.4 GHz: 802.11b: DSSS 802.11g/n: OFDM. 5.0 GHz: 802.11a/n/ac: OFDM.
Conducted Output Power. (tolerance ± 2 dB)	<i>Note: The maximum RF power setting may vary depending on country-specific regulations.</i> 802.11 bg: 18dBm @54Mbps. 802.11n HT20: 18dBm @MCS15. 802.11n HT40: 18dBm @MCS15. 802.11 a: 20dBm @54Mbps. 802.11a/n/ac HT20: 18dBm @MCS9 two spatial streams. 802.11n/ac HT40: 17 dBm @MCS9 two spatial streams. 802.11ac HT80: 17 dBm @MCS9 two spatial streams.

Appendix C FCC Radio Information

This section contains information on the requirements set by the U.S. Federal Communications Commission (FCC).

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or data losses are rare when wireless devices are used properly in a well-constructed network, the equipment should not be used when failures to transmit or receive data could result in damage to the user or any other party (regardless of its nature, including personal injuries, death, or loss of property). bintec elmeg GmbH accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the equipment, or for failure of the Radio Wireless module to transmit or receive such data.

The FCC has a strict EIRP limit for mobile and portable stations transmitting in Band 30. The goal is to protect adjacent satellite radio transmissions, aeronautical mobile telemetry, and deep space network operations. Mobile and portable stations transmitting in Band 30 must keep maximum antenna gain under 1 dBi.

The FCC also prohibits the use of external vehicle-mounted antennas for mobile and portable stations transmitting in this band.

Fixed stations transmitting in Band 30 may have a higher antenna gain due to FCC's relaxed EIRP limits on stationary antennas. When this device is used as a fixed CPE station in the United States, antenna gain can reach 10 dBi in Band 30. However, outdoor antennas and outdoor station deployments are forbidden unless installation is carried out by professionals in locations that are at least 20 meters away from roads (or in locations where ground power levels of -44 dBm per 5 MHz in the 2305–2315 MHz and 2350–2360 MHz bands, or -55 dBm per 5 MHz in the 2315–2320 MHz and 2345–2350 MHz bands, will not be exceeded).

For the purposes of this notice, roads shall include highways, streets, avenues, parkways, driveways, squares, places, bridges, viaducts or trestles designed, or intended to be used by the general public, for the passage of vehicles. Mobile carriers often have limits on the total radiated power (TRP), meaning an efficient antenna is crucial.

The end product (equipped with an embedded module) must output sufficient power to meet TRP requirements but not exceed the FCC EIRP limit.

C.1 LTE MC7455 WWAN frequency requirements

This device contains FCC ID: N7NMC7455.

This device is restricted to mobile and fixed applications and must not be co-located or operated in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures as documented in this filing.

This device has 5 MHz and 10 MHz bandwidth modes for LTE Bands 13 and 30 (700/2300 MHz); 1.4 MHz, 3 MHz, 5 MHz and 10 MHz bandwidth modes for LTE Bands 5 and 12 (850/700 MHz); 1.4 MHz, 3 MHz, 5 MHz, 10 MHz and 15 MHz modes for LTE Band 26 (850 MHz); 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz and 20 MHz bandwidth modes for LTE Bands 2, 25 and 4 (1900 and 1700 MHz); 5 MHz, 10 MHz, 15 MHz and 20 MHz bandwidth modes for LTE Bands 7 and 41 (2500/2600 MHz).

The following table shows the output power conducted at the antenna terminal:

FCC Rule Part	Frequency Range	Output
22H	824.0 - 849.0 MHz	0.224 W
27	1710.0 - 1755.0 MHz	0.221 W
24E	1850.0 - 1910.0 MHz	0.225 W
27	699.0 - 716.0 MHz	0.251 W
27	699.0 - 716.0 MHz	0.248 W
27	699.0 - 716.0 MHz	0.215 W

27	777.0 - 787.0 MHz	0.247 W
27	777.0 - 787.0 MHz	0.227 W
27	1710.0 - 1755.0 MHz	0.249 W
27	1710.0 - 1755.0 MHz	0.217 W
27	1710.0 - 1755.0 MHz	0.218 W
24E	1850.0 - 1915.0 MHz	0.247 W
24E	1850.0 - 1915.0 MHz	0.227 W
24E	1850.0 - 1915.0 MHz	0.251 W
27	2305.0 - 2315.0 MHz	0.191 W
27	2305.0 - 2315.0 MHz	0.175 W
27	2305.0 - 2315.0 MHz	0.197 W
27	2496.0 - 2690.0 MHz	0.185 W
27	2496.0 - 2690.0 MHz	0.159 W
27	2496.0 - 2690.0 MHz	0.196 W
90	814.0 - 824.0 MHz	0.242 W
90	814.0 - 824.0 MHz	0.199 W
22H	824.0 - 849.0 MHz	0.249 W
22H	824.0 - 849.0 MHz	0.205 W
22H	824.0 - 849.0 MHz	0.25 W

C.2 LTE MC7354 WWAN frequency requirements

This device contains FCC ID: N7NMC7355

This device is restricted to mobile and fixed applications and must not be co-located or operated in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures as documented in this filing.

The following table shows the output power conducted at the antenna terminal:

FCC Rule Part	Frequency Range	Output
22H	824.0 - 849.0 MHz	1.959 W
22H	824.0 - 849.0 MHz	0.428 W
24E	1850.0 - 1910.0 MHz	1.159 W
24E	1850.0 - 1910.0 MHz	0.392 W
90	816.0 - 823.975 MHz	0.275 W
22H	824.0 - 849.0 MHz	0.275 W
24E	850.0 - 1910.0 MHz	0.275 W
22H	824.0 - 849.0 MHz	0.217 W
24E	1850.0 - 1910.0 MHz	0.205 W

27	1710.0 - 1755.0 MHz	0.202 W
24E	1850.0 - 1910.0 MHz	0.224 W
24E	1850.0 - 1910.0 MHz	0.224 W
24E	1850.0 - 1910.0 MHz	0.219 W
24E	1850.0 - 1910.0 MHz	0.217 W
22H	824.0 - 849.0 MHz	0.228 W
22H	824.0 - 849.0 MHz	0.224 W
24E	1850.0 - 1915.0 MHz	0.221 W
24E	1850.0 - 1915.0 MHz	0.217 W
24E	1850.0 - 1915.0 MHz	0.216 W
24E	1850.0 - 1915.0 MHz	0.217 W
27	1710.0 - 1755.0 MHz	0.226 W
27	1710.0 - 1755.0 MHz	0.222 W
27	1710.0 - 1755.0 MHz	0.222 W
27	1710.0 - 1755.0 MHz	0.224 W
27	704.0 - 716.0 MHz	0.22 W
27	704.0 - 716.0 MHz	0.216 W
27	777.0 - 787.0 MHz	0.229 W
27	777.0 - 787.0 MHz	0.224 W

C.3 WLE600VX WLAN frequency requirements

This device contains FCC ID: TK4WLE600VX

This device is to be used in mobile configurations and must not be co-located or operated in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

For mobile devices in the 2412-2462 MHz, 5.15-5.25 GHz, 5.25-5.35 GHz, 5.47-5.725 GHz and 5.725-5.85 GHz bands, the maximum gain of a directional antenna must not exceed 6 dBi. If an antenna used has a higher gain than 6 dBi, the peak power spectral density must be reduced by the amount in dB that the antenna gain exceeds 6 dBi.

This device has 10, 20, 40 and 80 MHz bandwidth modes.

The following table shows the output power conducted at the antenna terminal:

FCC Rule Part	Frequency Range	Output
15E	5180.0 - 5240.0 MHz	0.153 W
15E	5260.0 - 5320.0 MHz	0.195 W
15E	5500.0 - 5720.0 MHz	0.195 W
15E	5745.0 - 5825.0 MHz	0.290 W
15C	2412.0 - 2462.0 MHz	0.264 W

C.4 LTE E362 WWAN frequency requirements

The device complies with the relevant sections of the FCC rules:

- FCC CFR47 Part 24 (Narrow and wideband PCS modules)
- FCC CFR47 Part 22 (Cellular Service)
- FCC CFR47 Part 27 (Wireless Communications Services)

This device contains FCC ID: PKRNVWE362-D

The power output listed below is conducted at the antenna terminal:

FCC Rule Part	Frequency Range	Output
22H	824.2 - 848.8 MHz	1.321 W
22H	824.2 - 848.8 MHz	0.494 W
22H	826.4 - 846.6 MHz	0.201 W
22H	824.7 - 848.31 MHz	0.261 W
24E	1850.2 - 1909.8 MHz	0.662 W
24E	1850.2 - 1909.8 MHz	0.323 W
24E	1852.4 - 1907.6 MHz	0.181 W
24E	1851.25 - 1908.75 MHz	0.23 W
27	779.5 - 784.5 MHz	0.233 W
27	779.5 - 784.5 MHz	0.232 W
27	782.0 - 782.0 MHz	0.232 W
27	782.0 - 782.0 MHz	0.231 W

C.5 LTE EC25-AF WWAN frequency requirements

The device complies with the relevant sections of the FCC rules:

- FCC CFR47 Part 24 (Narrow and wideband PCS modules)
- FCC CFR47 Part 22 (Cellular Service)
- FCC CFR47 Part 27 (Wireless Communications Services)

This device contains FCC ID: XMR201808EC25AF

This device supports LTE of 1.4, 3, 5, 10, 15 and 20 MHz bandwidth modes for FDD LTE bands 2, 4 and 66; LTE of 1.4, 3, 4, and 10 MHz bandwidth modes for FDD LTE bands 5 and 12; LTE of 5 and 10 MHz bandwidth modes for FDD LTE bands 13 and 14; LTE of 5, 10, 15 and 20 MHz bandwidth modes for LTE B71. This device contains functions that are not operational in U.S. Territories.

The power output listed below is conducted at the antenna terminal:

FCC Rule Part	Frequency Range	Output
22H	826.4 - 846.6 MHz	0.209 W
22H	824.7 - 848.3 MHz	0.254 W
22H	824.7 - 848.3 MHz	0.252 W

22H	824.7 - 848.3 MHz	0.222 W
22H	824.7 - 848.3 MHz	0.219 W
24E	1852.4 - 1907.3 MHz	0.208 W
24E	1850.7 - 1909.3 MHz	0.243 W
24E	1850.7 - 1909.3 MHz	0.24 W
24E	1850.7 - 1903.3 MHz	0.202 W
24E	1850.7 - 1903.3 MHz	0.199 W
27	1712.4 - 1752.6 MHz	0.222 W
27	1710.7 - 1754.3 MHz	0.236 W
27	1710.7 - 1754.3 MHz	0.231 W
27	1710.7 - 1754.3 MHz	0.219 W
27	1710.7 - 1754.3 MHz	0.216 W
27	699.7 - 715.3 MHz	0.237 W
27	699.7 - 715.3 MHz	0.234 W
27	699.7 - 715.3 MHz	0.211 W
27	699.7 - 715.3 MHz	0.195 W
27	779.5 - 784.5 MHz	0.243 W
27	779.5 - 784.5 MHz	0.219 W
27	1710.7 - 1779.3 MHz	0.241 W
27	1710.7 - 1779.3 MHz	0.238 W
27	1710.7 - 1779.3 MHz	0.194 W
27	1710.7 - 1779.3 MHz	0.19 W
27	665.5 - 695.5 MHz	0.222 W
27	665.5 - 695.5 MHz	0.221 W

C.6 Antenna requirements

The following antenna gains must not be exceeded in order to meet the RF exposure requirements set by the FCC rules:

Frequency	Antenna Gain	Remarks
600 MHz	6dB	E371 models (TLDPH05J1) must not exceed 1 dB E371 models (TLDPH05J1) must not exceed 3.5 dB
700 MHz	6dB	
800 MHz	5 dB	
1700 MHz	5 dB	
1800 MHz	3 dB	
1900 MHz	3 dB	
2300 MHz	1 dB	

2500 MHz	9 dB	
Wi-Fi 2.4 GHz	2 dB	
Wi-Fi 5 GHz	2 dB	