HIRSCHMANN
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User Manual

Installation
OWL LTE M12 (Industrial Cellular Router)

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Contents

Important information

Note: Read these instructions carefully, and familiarize yourself with the device before trying to install, operate, or maintain it. The following notes may appear throughout this documentation or on the device. These notes warn of potential hazards or call attention to information that clarifies or simplifies a procedure.

Symbol explanation

This is a general warning symbol. This symbol alerts you to potential personal injury hazards. Observe all safety notes that follow this symbol to avoid possible injury or death.

If this symbol is displayed in addition to a safety instruction of the type “Danger” or “Warning”, it means that there is a danger of electric shock and failure to observe the instructions will inevitably result in injury.

This symbol indicates the danger of hot surfaces on the device. In connection with safety instructions, non-observance of the instructions will inevitably result in injuries.

DANGER

DANGER draws attention to an immediately dangerous situation, which will **inevitably** result in a serious or fatal accident if not observed.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.

CAUTION

CAUTION indicates a possible danger which, if not avoided, **may** result in minor injuries.

NOTICE

NOTE provides information about procedures that do not involve the risk of injury.

About this Guide

This document provides technical specifications for the Industrial Cellular Router and illustrates the hardware installation for a Hirschmann Industrial Cellular Router. It also helps the developers to validate their application design using the Industrial Cellular Router.

The information in this publication contains general descriptions or performance factors which, when applied in an actual situation, do not always correspond with the described form and may be amended by way of further development of products. The desired performance factors shall only be deemed binding if these are expressly agreed on conclusion of the contract. Please note that some characteristics of the recommended accessory parts may differ from the appropriate product. This might limit the possible operating conditions for the entire system.

Legend

The designations used in this manual have the following meanings:

▶	List
☐	Work step
■	Subheading
Link	Cross-reference with link
Note:	A note emphasizes an important fact or draws your attention to a dependency.
`Courier`	ASCII representation in the graphical user interface

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hac-support@belden.com

Safety Instructions

General safety instructions

You operate this device with electricity. The safe operation of the device depends on proper handling during transportation, storage and assembly, and proper use of operation and maintenance procedures. Improper use of this device can cause injury or property damage.

- ☐ Read this documentation, safety instructions and warnings before connecting any cables.
- ☐ Never start an operation with damaged components.
- ☐ The device does not contain any service components. If the device is not functioning correctly, or if it is damaged, turn off the power supply and return the device to Hirschmann for inspection.

⚠ WARNING

UNCONTROLLED MACHINE ACTIONS

To avoid uncontrolled machine actions caused by data loss, configure all the data transmission devices individually.
Before you start any machine which is controlled via data transmission, be sure to complete the configuration of all the data transmission devices.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Qualification requirements for personnel

- ☐ Allow only qualified personnel to work on the device who have the following characteristics:
  - ▶ Properly trained personnel who have practical knowledge and experience. This is the prerequisite for grounding and labeling circuits, devices, and systems in accordance with current technology safety standards.
  - ▶ Qualified personnel are aware of the dangers that exist in their work.
  - ▶ Qualified personnel are familiar with appropriate measures against these hazards in order to reduce the risk for themselves and others.
  - ▶ Qualified personnel receive training on a regular basis.

Intended usage

- ☐ Use the product only for the application cases described in the Hirschmann product information, including this manual.
- ☐ Operate the product according to the technical parameters. See “First Use” on page 28.
- ☐ Connect components which are suitable for the requirements of the specific application to the product.

National and international safety regulations

Verify that the electrical installation meets applicable national and international safety regulations.

Working voltage

- ☐ Connect only a working voltage that corresponds to the type plate of your device.
- ☐ Make sure the following requirements are met every time you connect the electrical conductors:
  - ▶ The power supply conforms to over voltage category I or II.
  - ▶ The power supply has an easily accessible disconnecting device (such as a switch or a plug) which is clearly identified. So in case of an emergency, it is clear which disconnecting device belongs to which power supply cable.
  - ▶ The electrical wires are voltage-free.
  - ▶ The power supply complies with the requirements for a limited power source (LPS) according to IEC 60950-1 or PS2 according to IEC/EN 62368-1.
  - ▶ The power supply complies with the requirements for a safety extra-low voltage (SELV) according to IEC 60950-1 or ES1 according to IEC/EN 62368-1.
  - ▶ The wire diameter of the power supply cable is at least 0.5 mm² (North America: AWG20) on the working voltage input.
  - ▶ The wire diameter of the ground conductor is at least 0.5 mm² (North America: AWG20).
  - ▶ The power supply cables used are permitted for the temperature range required by the application case.
    The power cords should be suitable for ambient air temperatures of at least 75 °C (167 °F).

Turn on the operating voltage for the device only when the following requirements are fulfilled:

- ▶ The housing is closed
- ▶ The terminal block is wired correctly
- ▶ The terminal block for the operating supply is connected

Installation site requirements

- ☐ Verify that there is at least 10 cm (4 in) of space above and below the device.
- ☐ Verify that there is at least 2 cm (0.8 in) of space on the right and left sides of the device.
- ☐ Verify that there is at least a minimum distance of 20 cm (7.9 in) between the antenna and the human body.

Strain relief

Note: If the strain relief is insufficient, there is a potential risk of torsion, contact problems and creeping interruptions.

- ☐ Relieve the connection points of cables and lines from mechanical stress.
- ☐ Design strain reliefs in such a way that they help prevent any mechanical damage to cables, wires or conductors caused by external influences or their own weight.
- ☐ To help prevent damage to device connections, connectors and cables, follow the instructions for proper installation in accordance with DIN VDE 0100-520:2013-06, sections 522.6, 522.7 and 522.13.

Housing

Never insert pointed objects (narrow screwdrivers, wires, etc.) into the device or into the connection terminals for electric conductors. Do not touch the connection terminals.

Please, observe the following instructions:

To prevent injury and damage to the device and to ensure that you comply with the relevant provisions, use original accessories only. Unauthorized modifications or unapproved utilization of accessories can result in damage to the router and in a breach of applicable regulations. Unauthorized modifications or unapproved utilization of accessories can result in the termination of the guarantee.

- ☐ Before handling the SIM card, disconnect the router from the power supply.
- ☐ Do not exceed the maximum voltage of 36 V DC at the power connector of the router.
- ☐ Do not expose the router to extreme ambient conditions. Protect the router against dust, moisture and high temperature. See table 12 on page 30.
- ☐ When cleaning the router, do not use aggressive chemicals, solvents or abrasive cleaners.

- ☐ It is recommended that you should create an appropriate copy or backup of the important settings that are stored in the memory of the device.
- ☐ **Caution!** The SIM card can be swallowed by small children.
- ☐ The SIM card must be handled carefully like a credit card. Do not bend or scratch the SIM card and do not expose the SIM card to static electricity.
- ☐ It is recommended that you do not use the router at petrol filling stations. We recommend observing local restrictions concerning the use of radio-based devices while working with explosive material for example, at petrol filling stations, or in chemical plants.
- ☐ While using the router close to personal medical devices, such as cardiac pacemakers or hearing aids, proceed with heightened caution.

Note: Insert the SIM Card holder in the SIM card slot very carefully. When inserted improperly, you can damage the SIM card slot. Also, the SIM card can fall out of the holder and end up in the router.

SAR coefficient values

The router meets the SAR coefficient values defined by the International Commission on Non-Ionizing Radiation (ICNIRP) and the values described in "About protection of health before non-ionized radiation".

1 Router Description

Hirschmann has designed the OWL router for wireless communication in mobile networks that make use of the following technologies:

- LTE
- HSPA+
- UMTS
- EDGE
- GPRS

Due to the high speed of data transfer up to 150 Mbit/s (download) and up to 50 Mbit/s (upload) is this router an ideal solution for wireless connection of data stream and security camera systems, individual computers, LAN networks, automatic teller machines (ATM) and other self-service terminals.

As a standard, the router is supplied in a metal casing.

The cellular router is also equipped with the following interfaces located on the back panel:

- 2 Fast Ethernet 10/100BaseTX ports, 4-pin D-coded M12 socket
- 1 USB 2.0 Host port
- 2 SMA antenna connectors, Main + Rx Div / MIMO
- 1 GPS connector for the Global Navigation Satellite System (GNSS) antenna
- binary I/O ports (2x input, 2x output)
- 1 RS232 serial interface

The following ports are located on the front panel of the router:

- 2 SIM Cards readers, for 3 V and 1.8 V SIM cards
- 1 microSD card reader
- 1 Reset button

Configuring the cellular router is possible using a graphical user interface which is password protected. The graphical user interface provides, after logging in, detailed statistics about the activities of the router such as, signal strength, and a detailed system log. This device supports the creation of VPN tunnels using technologies such as IPSec, OpenVPN and L2TP for secure communications. The router also supports the following functions:

- DHCP
- NAT
- DynDNS
- IPSec
- OpenVPN
- NTP
- VRRP
- control by SMS
- primary/backup connection

Diagnostic functions, which provide for continuous communication, include an automatic inspection of a PPP connection, offering an automatic restart feature in case of an unexpected termination of the connection. Another diagnostic function is the hardware watchdog, which monitors the status of the router.

Using a special window, the start up script window, you can insert Linux scripts for various actions. For some applications, it is crucial to create several different configurations for a router. You can exchange these configurations as necessary for example, using SMS. The router can automatically upgrade a configuration and firmware from a server. This allows you to configure several routers at a time.

2 Contents of Package

The basic router set available for delivery includes the following items:

- Router
- Safety and general information sheet
- Sheet with the conformity declarations for the European Union and the United Kingdom (UK)
- Open Source Information OWL Family

3 Router Design

3.1 Delivery Identification

Product Name	Product Code	Product Group
OWL LTE M12	OWL LTE M12-S20T5A12221GTDBHHXX.X.XX	Industrial Cellular Router

Table 1: Delivery identification

3.2 Basic Dimensions of Router Box

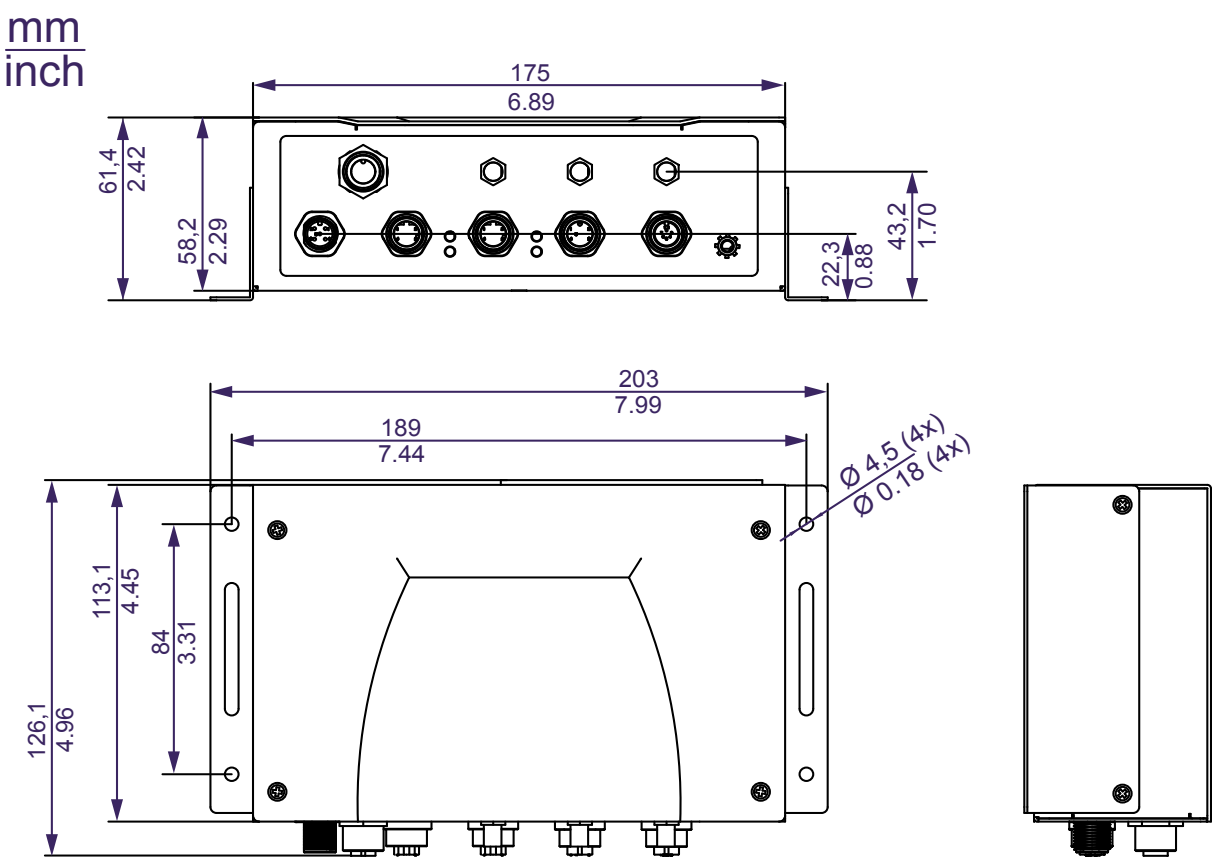


Figure 1: Basic Dimensions of Router Case

3.3 Mechanical Dimensions and Mounting Recommendations

Mounting recommendations:

- Place router on a work surface

We recommend you bind every cable in a bunch. For this use, we recommend to observe the following rules:

- The length of the combination of power supply and data cables can be a maximum of 1.5 m. If the length of data cables or power cable exceeds 1.5 m, we recommend that you install surge protectors.
- Do NOT use data cables which conduct working voltage 230 V / 50 Hz.

Sufficient space must be left before individual connectors for handling of the cables.

For the correct function of the router, use earth-bonding distribution frame for grounding of power supply of router, data cables and antenna.

3.4 Mounting the device with holding brackets

In the delivery state, there are 2 pre-mounted holding brackets on the bottom sides of the device.

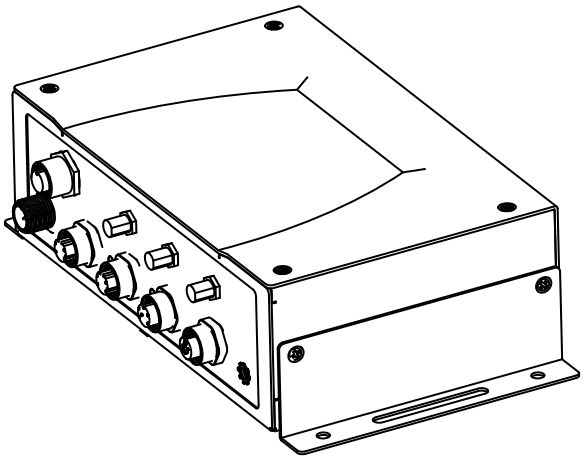


Figure 2: Device with 2 pre-mounted holding brackets on the bottom sides of the device

☐ Mount the device with the 2 holding brackets.

Note: Alternatively, you can mount the holding brackets on the top sides of the device:

☐ Remove the 2 pre-mounted holding brackets from the bottom sides of the device.
☐ Screw the 2 holding brackets to the top sides of the device.

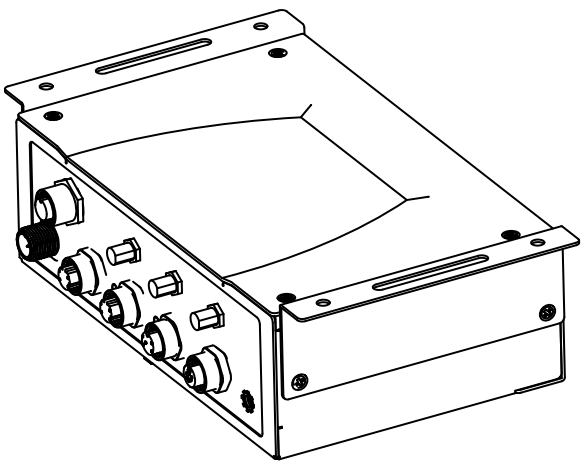


Figure 3: Device with 2 holding brackets on the top sides of the device

3.5 Description of the front panel

3.5.1 SIM Card Reader

There are 2 SIM card readers for 3 V and 1.8 V SIM cards (Standard SIM 15 mm × 25 mm) located on the front panel of the router covered by a metal plate.

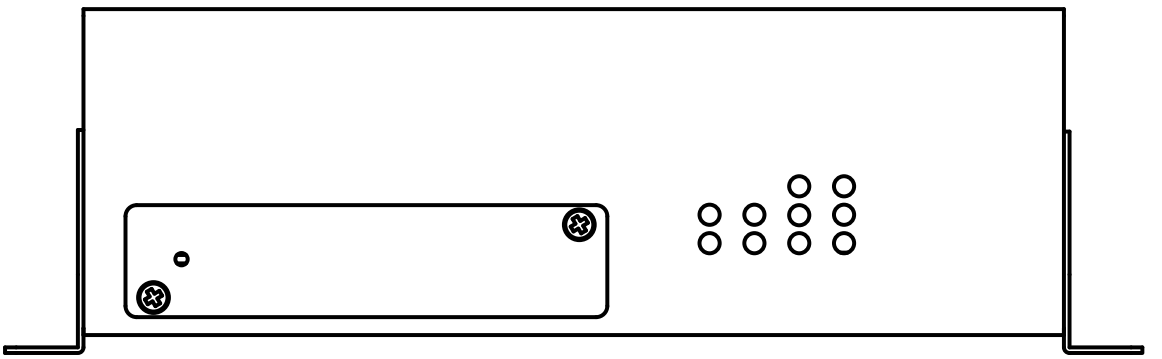


Figure 4: SIM holder covered by a metal plate

☐ To access the SIM card readers, remove the metal plate by removing the screws.

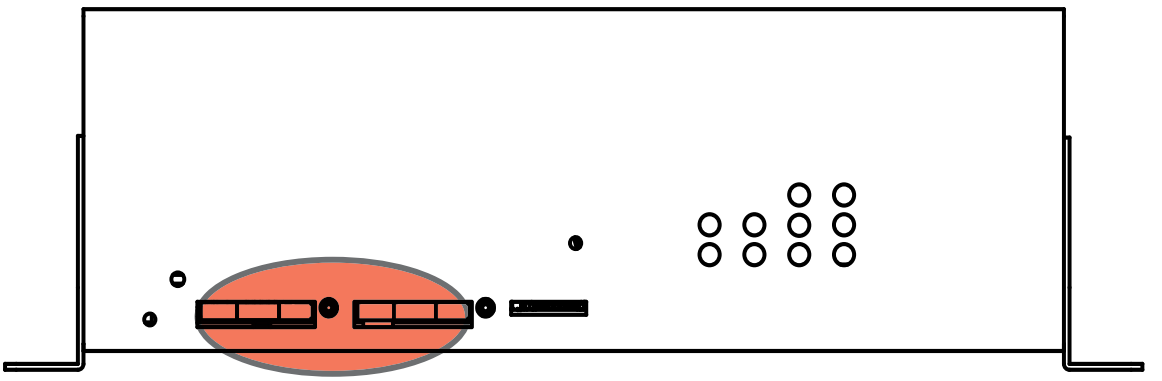


Figure 5: Placement and location of the SIM holder

☐ In order for the router to function properly, insert an activated SIM card with the PIN code unblocked in to the SIM card holder. Each SIM card can have a different APN (Access Point Name).

Note: When changing the SIM Card, pay close attention to the following rules:

- ▶ Before handling the SIM card, disconnect the router from the power supply.
- ▶ Press the small button beneath the SIM card slot to eject the SIM card holder.

- Remove the SIM card and place another SIM card into the holder.
- Very carefully, insert the SIM card holder and SIM card in the slot. Push the SIM card holder into the slot until it clicks in place.

3.5.2 MicroSD card reader

The microSD card reader is located on the front panel of the router, the third slot from the left. This card reader allows the router to operate with microSD memory cards. Technical specifications are stated in the table below.

Technical specifications of microSD card		
Supported technologies	SDHC, SDXC	
Supported capacity	SDHC SDXC	up to 32 GB from 32 GB to 64 GB

Table 2: Technical specifications of microSD card

Changing the microSD card

- Use the flat end of a plastic screwdriver, or your fingernail to press the microSD card slightly deeper into its slot until you hear a click.
- After you hear a click, release the microSD card. The microSD card pops out of the slot.
- Remove the microSD card and push another microSD card into the slot until it clicks in place.

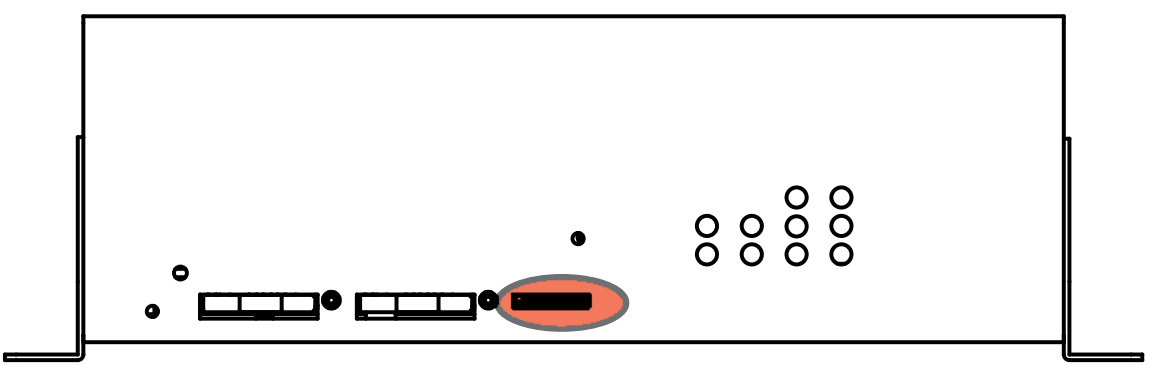


Figure 6: SD card

3.5.3 Reset

When the "Power" LED on the front panel has turned on, it is possible to restore the default configuration of the router by pressing the "Reset" button. After pressing the "Reset" button, the default configuration is restored and the router reboots. During rebooting, the "Power" LED blinks.

Note: We recommend that you back up the router configuration before resetting the router. Resetting the router returns the configuration to the default state.

For detailed information about resetting the router refer to the “Configuration” user manual.
The manual is available for download on the Internet: https://www.doc.hirschmann.com

Use a narrow screwdriver for pressing the "Reset" button.

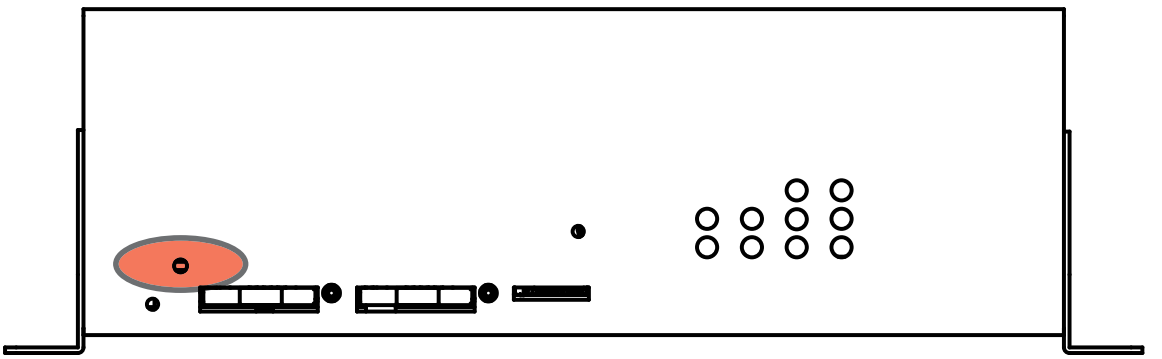


Figure 7: Reset button

It is important to distinguish the difference between resetting and rebooting the router.

Action	Router behavior	Invoking events
Reboot	Turn off and then turn on router.	Disconnect and connect the power.
Reset	Restore default configuration and reboot the router	Press "Reset" button

Table 3: Description of Reset and Restart Router

3.5.4 Status Indication

There are the following LED indicators on the front panel:

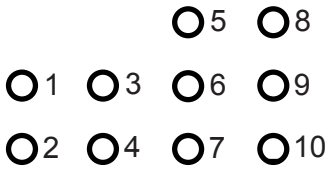


Figure 8: LED indicators on the front panel

LED No.	Caption	Color	State	Description
1	IN0	Green	On	Binary input no. 0 is active
2	IN1	Green	On	Binary input no. 1 is active
3	OUT0	Yellow	On	Binary output is active
4	OUT1	Yellow	On	Binary output is active
5	SIM	Yellow Green	On (Yellow color) On (Green color)	SIM card 1 is active SIM card 2 is active
6	WAN[a]	Yellow	1 × flash per sec. 2 × flash per sec. 3 × flash per sec.	Signal strength is from -50 dBm to -69 dBm Signal strength is from -70 dBm to -89 dBm or difference between neighbors cells is exactly 3 dBm Signal strength is from -90 dBm to -113 dBm or difference between neighbors cells is smaller than 3 dBm
7	DAT	Red	Blinking	Communication in progress on radio channel
8	POE	—	—	— (POE function is not available)
9	USR	Yellow	—	Function of this LED diode can be selected by user
10	Power	Green	On Blinking Fast blinking	Router is ready Starting of the router Updating firmware

Table 4: Router Status Indication

a. The WAN status is updated every 10 seconds. The WAN LED displays the current status.

3.6 Description of the Rear Panel

Note: Tighten the locking screws of the M12 and SMA connectors with the torque specified by the supplier of the connector.

The rear panel of the router contains the following connectors:

Caption	Connector	Description
Power	5-pin A-coded M12	Connector for the power supply adapter
ETH0	4-pin D-coded M12	Connector for connection into the local computer network
ETH1	4-pin D-coded M12	Connector for connection into the local computer network
ANT	SMA	Connector for main antenna
DIV	SMA	Connector for diversity and MIMO DL2+2 antenna
GPS	SMA	Connector for the Global Navigation Satellite System (GNSS) antenna
USB	5-pin A-coded M12	Connector for connection of USB devices to the router. Supports devices with PL-2303 and FTDI USB/RS232 converters.
I/O	8-pin A-coded M12	Connector for connection of the binary inputs and output
RS232	8-pin A-coded M12	Connector for serial RS232 connection

Table 5: Delivery identification

3.6.1 Status Indication

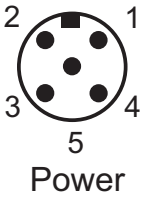
There are 4 LED indicators on the rear panel.

Caption	Color	State	Description
ETH0 ETH1	Green	On Off	Selected 100 Mbit/s Selected 10 Mbit/s
ETH0 ETH1	Yellow	On Blinking Off	The network cable is connected Data transmission The network cable is not connected

Table 6: Router Status Indication

3.6.2 Power Connector

5-pin A-coded M12 socket.



Pin	Function
1	+24V DC
2	0 V
3	0 V
4	+24V DC
5	N.C.

Figure 9: Power connector

Power supply for router must be between +12 V DC to +36 V DC.

Protection against reversed polarity without signaling is built into the router.

You can place the OWL LTE M12 into the low power mode using a special command. When in the low power mode, you can wake the router up for example, with activity on binary input or using an internal timer.

Note: Tighten the locking screws of the power connector with the torque specified by the supplier of the connector.

3.6.3 Grounding the device (functional earth)

The device is grounded via the separate ground screw.

☐ Terminate the ground conductor using a M4 ring cable lug between the screw head and the toothed lock washer.
☐ The wire diameter of the ground conductor is at least 0.5 mm² (North America: AWG20).
☐ Tighten the grounding screw with a tightening torque of 3 Nm ± 0.5 Nm (26.55 lb-in ± 4.43 lb-in).

3.6.4 Antenna Connectors

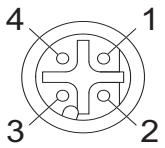
Main and diversity/MIMO antennas are connected to the router using the SMA connector on the front panel. The "ANT" connector is used to connect the main antenna to the router. To connect the diversity/MIMO antenna, use the "DIV" antenna connector. The "GPS" connector is intended for the Global Navigation Satellite System (GNSS) antenna. The router supports an active and passive GNSS antenna.

Note: Do not operate the router without the main antenna connected.

The diversity/MIMO antenna improves radio features of the router at a low signal strength.

3.6.5 Ethernet Ports ETH0 & ETH1

4-pin D-coded M12 socket.



Pin	Function	
1	TD+	Transmission path
2	RD+	Receive path
3	TD−	Transmission path
4	RD−	Receive path
Housing: shield		

Table 7: Pin assignment of 10/100 Mbit/s twisted pair port, M12 socket

3.6.6 USB Port

Panel 5-pin A-coded M12 USB

Pin	Signal Mark	Description	Direction
1	+5 V	Positive pole of 5 V DC supply voltage, 0.5 A	
2	N.C.	Not used	
3	USB data -	USB data signal – negative pole	Input/Output
4	GND	GND Negative pole of DC supply voltage	
5	USB data +	USB data signal – positive pole	Input/Output

Table 8: USB connector pin-outs

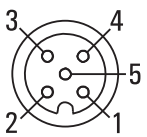


Figure 10: USB connector

The router supports the following USB/RS232 converters:
- FTDI
- Prolific PL2303
- Silicon Laboratories CP210×

Note: We recommend to use the USB port exclusively for service purposes.

3.6.7 I/O Port

Panel 8-pin A-coded M12 socket.

Pin number	Signal mark	Description
1	IN0	Binary input 0
2	IN0	Binary input 0
3	IN1	Binary input 1
4	OUT0	Binary output 0

Table 9: I/O connector pin-outs

Pin number	Signal mark	Description
5	OUT1	Binary output 1
6	OUT0	Binary output 0
7	IN1	Binary input 1
8	OUT1	Binary output 1

Table 9: I/O connector pin-outs

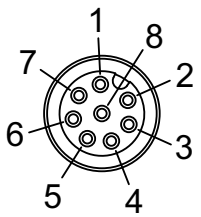


Figure 11: I/O connector

The I/O user Interface is designed for processing binary input and control binary output. The binary output is inactive in the default configuration. The insulation strength is 1.5 kV. The pins are isolated from each other with the same strength.

The input circuits are bipolar and allow connections as needed with a common plus or minus, according to connection of the external voltage.

Binary inputs

Characteristics of inputs:

logical 0 / 1	Voltage	Current
log. 0 max	3 V	0.4 mA
log. 1 min	5 V	0.7 mA
log. 1 type	12 V	2 mA
log. 1 max	60 V	7 mA

Table 10: Characteristics of inputs

To retrieve the binary input status from the Shell use either `io get bin0` or `io get bin1`.

Binary inputs connection with example:

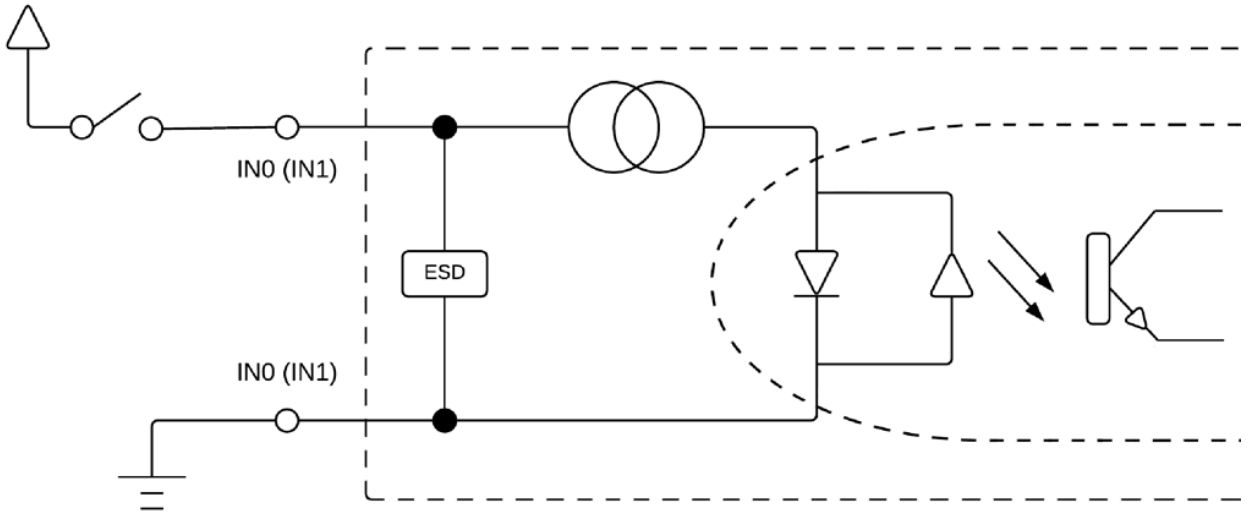


Figure 12: Binary inputs connection

Binary output parameters:

- 60 V AC / 300 mA
- 60 V DC / 300 mA

Current of binary output is limited by a resettable fuse (300 mA)

Binary output connection with example:

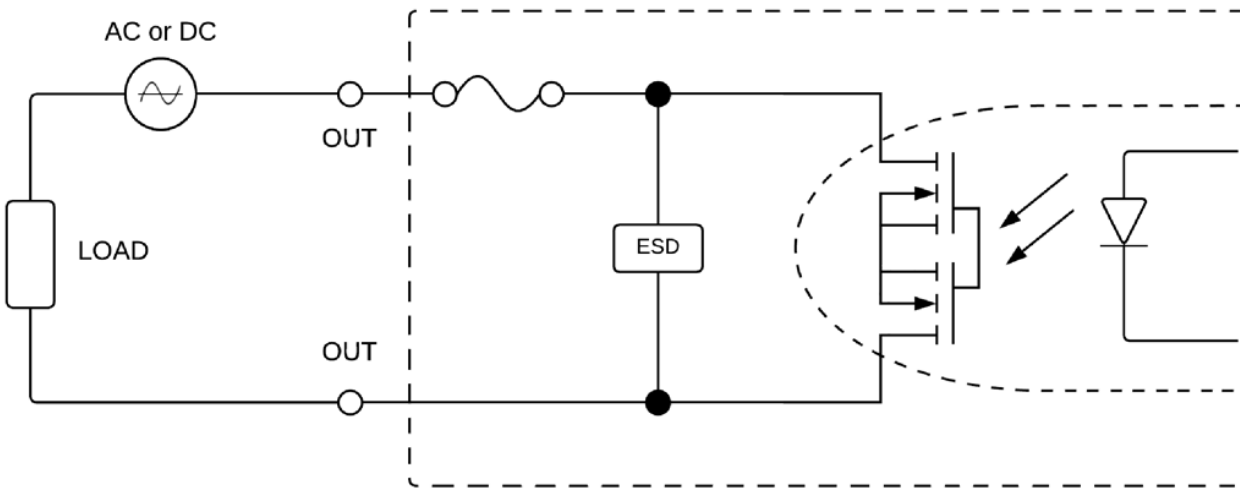


Figure 13: Binary output connection

3.6.8 RS232 interface

The RS232 interface is physically connected on an 8-pin A-coded M12 socket. The insulation strength is up to 2.5 kV. The RS232 converter is protected against an overload on the bus.

Serial Connector Pin outs

Pin	Signal Mark	Description
1	GND	Signal ground
2	DTR	Data terminal ready
3	TXD	Transmit Data
4	RXD	Receive Data
5	DCD	Data carrier detect
6	DSR	Dataset ready
7	RTS	Request to send
8	CTS	Clear to send

Table 11: Serial connector Pin outs, 8-pin A-coded M12 socket

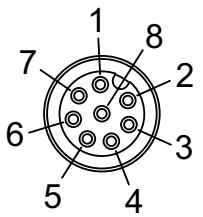


Figure 14: RS232 connector

Note: We recommend to use the RS232 interface exclusively for service purposes.

4 First Use

4.1 Connecting Components before the First Use

Before putting the router into operation, it is necessary to connect the components which are required for your applications. Do not forget to insert at least 1 SIM card.

Note: The router can not operate without connecting the main antenna, at least 1 SIM card and a power supply. If the antenna is not connected, the router can be damaged.

4.2 Start

The router operates when the power supply is connected to the router. By default, the router automatically starts to log in to the default APN. You can change the parameters of the router behavior using the web interface.
You can find a detailed description of the parameters in the “Configuration” user manual.
The manual is available for download on the Internet: https://www.doc.hirschmann.com

4.3 Configuration

Note: Before you apply power to the router, insert at least 1 SIM card in the router, and install the main antenna. Activate the SIM card in the "Administration > Unlock SIM card" dialog, after inserting it into the SIM card reader.

4.3.1 Configuration using a Web Browser

Status monitoring, configuration and administration of the router is available using the graphical user interface (GUI) which can be accessed by entering the IP address of the router into your web browser. The default IP address of the router is 192.168.1.1 netmask 255.255.255.0 on ETH0. The default settings allow only the user `admin` with the default password `private` to configure the router.

Note: Use the HTTPS protocol for secure communication.

After successfully entering the login information a user has access to the router using the Internet browser.

Applies to devices that are delivered without unique default password:

The default settings allow only the user `admin` with the default password `private` to configure the router.

After successfully entering the login information a user has access to the router using the Internet browser.

Applies to devices that are delivered with an unique default password that is located on a label on the device

Perform the following steps:

- ☐ Open the Graphical User Interface the first time you log on to the device.
- ☐ Type in the user name “admin”.
- ☐ Type in the unique default password that is located on a label (“Def. password”) on the device.
- ☐ Click the “Login” button.
  After successfully entering the login information you have access to the router using the Internet browser.
- ☐ **To help maintain the security of your network, change the unique default password of the router.**

Note: Some features may be disabled until you change the default password.

Note: The unique default password will be applied again if you reset the router by the “Reset” button.

5 Technical Parameters

5.1 Basic parameters

OWL LTE M12		
Complies with standards		EN 301 511 EN 301 908-1, -2, -13 EN 301 489-1, -7, -24 EN 62368-1 EN 62311 EN 61000-6-2 EN 61131-2 EN 55032 EN 50155 EN 50121-4 EN 45545-2 HL3
Temperature range	Operation	-40 °C to +70 °C
	Storage	-40 °C to +85 °C
Cold start	-35 °C -40 °C	Data transfers via mobile network are available immediately Data transfers via mobile network are available approximately in five minutes after the start of the router. Everything else is functional immediately.
Humidity	Operating Storage	0 to 95 % relative humidity non condensing 0 to 95 % relative humidity non condensing
Altitude	Operating	2000 m / 70 kPa
Protection		IP40
Supply voltage		12 V DC to 36 V DC
Power loss buffer		10 ms at 24 V DC
Consumption	Idle Average Peak Sleep mode	4 W 6.8 W 11 W 2.8 W
Dimensions		See figure 1 on page 15.
Weight		approximately 950 g
Antenna connectors		SMA – 50 Ω
Use interfaces	2x ETH USB I/O RS232	Ethernet (10/100 Mbit/s) USB 2.0 8-pin A-coded M12 panel socket 8-pin A-coded M12 socket

Table 12: Technical Parameters of the Router

5.2 Type tests and environmental conditions

Phenomena	Test	Description	Test levels
ESD	EN 61000-4-2	Enclosure contact	±6 kV
RF field AM modulated	IEC 61000-4-3	Enclosure	20 V/m (80 – 1000 MHz) 10 V/m (1 GHz – 4 GHz)
Fast transient	EN 61000-4-4	Signal ports Power ports Ethernet ports	±2 kV ±2 kV ±2 kV
Surge	EN 61000-4-5	Ethernet ports Power ports I/O ports	±2 kV, shielded cable ±1 kV, L to L ±2 kV, L to GND ±1 kV, L to L ±2 kV, L to GND
RF conducted	EN 61000-4-6	All ports	10 V/m (0.15 – 80 MHz)
Radiated emission	EN 55032	Enclosure	Class A
Conducted emission	EN 55032	DC power ports Ethernet ports	Class A Class A
Dry heat	EN 60068-2-2	+70 °C, 40 % rel. humidity	
Cold	EN 60068-2-1	-40°C	
Damp heat	EN 60068-2-30	95 % rel. humidity (+55 °C)	

Table 13: Type tests and environmental conditions

5.3 Technical Parameters of the LTE module

LTE module	
LTE parameters	Bit rate 150 Mbps (DL) / 50 Mbps (UL) 3GPP rel. 9 standard Supported frequencies: 800 / 900 / 1800 / 2100 / 2600 MHz
HSPA+ parameters	Bit rate 42 Mbps (DL) / 5.76 Mbps (UL) 3GPP rel. 9 standard Supported frequencies: 900 / 2100 MHz
UMTS parameters	Bit rate 384 kbps (DL) / 384 kbps (UL) Supported frequencies: 900 / 2100 MHz
GPRS/EDGE parameters	Bit rate 236 kbps (DL) / 236 kbps (UL) Supported frequencies: 900 / 1800 MHz

Table 14: Technical parameters of the LTE module

5.4 Technical Parameters of the processor

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

Table 15: Technical Parameters of the processor

5.5 Technical parameters of the Global Navigation Satellite System (GNSS) chip

GNSS chip specifications	
Antenna	Impedance: 50 Ω passive and active (3.3 V, 100 mA max.)
Protocols	NMEA 0183 v3.10, Json
Frequency	1575.42 MHz
Sensitivity	Tracking: -162 dBm Acquisition: -146 dBm Navigation: -158 dBm
Supported GNSS systems	GPS, GLONASS, Beidou, Galileo

Table 16: Technical parameters of the Global Navigation Satellite System (GNSS) chip

Note: A special user module is needed to obtain full functionality (Dead Reckoning and others) of the integrated GNSS chip. Please contact Hirschmann technical support to get the user module for the GNSS system you require.

Note: Current limitations of the Dead Reckoning hardware:
- 2-Dimensional (latitude / longitude) Dead Reckoning
- 1 Hz (10 Hz will be supported later)
- A-GPS only

5.6 Technical parameters of the I/O port

5.6.1 Characteristics of inputs

logical 0 / 1	Voltage	Current
log. 0 max	3 V	0.4 mA
log. 1 min	5 V	0.7 mA
log. 1 type	12 V	2 mA
log. 1 max	60 V	7 mA

Table 17: Characteristics of the inputs

5.6.2 Binary output parameters

- 60 V AC / 300 mA
- 60 V DC / 300 mA

5.7 Other technical parameters

Other technical parameters	
CPU power	2 DMIPS per MHz
Flash memory	256 MB
RAM	512 MB
M-RAM	128 kB

Table 18: Other technical parameters

5.8 Accessories

Designation	Order number
Terminal cable: M12 plug, 8-pin on DB9 socket	942 087-001

Table 19: Accessories

6 Recommended literature

The “Configuration” user manual, Application Notes, and documentation of several OWL user modules can be found as PDF files for downloading on the Internet at:
https://www.doc.hirschmann.com

7 Possible problems

7.1 Solutions

Some network cards are able to be set in a situation, when it is not possible to connect directly to the router. Follow the steps below to solve this problem:

- Manually select the 10 Mbit/s communication rate for the network card
- Connect the computer to the router through a switch
- Start the computer only after the router has completed its boot process

8 FAQ

- When I have NAT enabled, I can't access the equipment from the internet, which is connected to the router.
  - Configure the gateway in the device with the IP address of the router.
- The router resets itself and the Ethernet connection fails.
  - Connect an antenna to the router. Keep the antenna as far as possible away from the power supply.
- I cannot get on the web server at NAT.
  - The remote http access of the router has to be disabled, default server address has to be your web server and the gateway of the web server has to be the IP of router.
- Mobile WAN connection fails. (DAT LED off)
  - Check the signal power. If the signal power is weak, then use a better antenna. If the neighboring cells have a similar signal strength, then use a directional antenna. For proper operation, the signal levels have to be in the range from -50 dBm through -90 dBm.
  - Configure the router to ping the neighbors. The router verifies the connection using the ping function. When the ping fails, the router attempts to re-establish the connection.
- The router can not establish the Mobile WAN connection. (DAT LED off)
  - Recheck GPRS settings – APN, name, password and IP address.
  - Try to enter the PIN – verification if the SIM card has the PIN code set.
  - In private APN, disable the DNS server.
  - Enable the system log and observe where the router detected errors.
- Connection fails on Ethernet or connection not established.
  - It is possible to disable the auto negotiation and set a rate and duplex manually on the Ethernet interface of the router.
- DynDNS is not functioning.
  - In a private APN, the DynDNS function is unavailable.
  - If the same IP address is recorded in your canonic name as a dynamically assign address, it means that the operator is using NAT or firewall.
  - To verify NAT, ping the static server address.
  - Verify Firewall accessing remotely to the GUI interface of the router.
  - The operator does not give out the address of DNS servers and without the address of the DNS servers, it is impossible to connect to the dyndns.org server. The router displays the following messages in the log system:
  - DynDNS daemon started
  - Error resolving hostname: no such file or directory
  - Connect to DynDNS server failed

- FTP does not function.
  - Router does not support the active FTP mode, supports the passive mode only.
- L2TP or IPSec is not established.
  - Verify the reason in the log system.
- I switched the router to the off line mode using an SMS message, but the router is in the online mode after restart.
  - The control SMS message does not change the router configuration. For example, if the router is changed to the off line mode using an SMS message, then the router remains in this mode until the next restart. This behavior is the same for every control SMS message.
- RS-232 is not working.
  - Verify the RS-232 communication settings. To verify the settings, open the appropriate expansion port dialog in "Device Configuration> Expansion Port", and verify the settings.

9 CE marking

The labeled devices comply with the regulations contained in the following European directive(s):

- **2011/65/EU and 2015/863/EU (RoHS)**
  Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
- **2014/53/EU (RED)**
  Directive of the European Parliament and of the council on the harmonization of the laws of the Member States relating to the making available on the market of radio equipment.

CE This product may be operated in all EU (European Union) countries.

In accordance with the above-named EU directive(s), the EU conformity declaration will be available to the relevant authorities at the following address:

Hirschmann Automation and Control GmbH
Stuttgarter Str. 45-51
72654 Neckartenzlingen
Germany

You find the EU conformity declaration as PDF file for downloading on the Internet at: https://www.doc.hirschmann.com/certificates.html

The product can be used in industrial areas only.

Warning! This is a class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.

Note: The assembly guidelines provided in these instructions must be strictly adhered to in order to observe the EMC threshold values.

10 UKCA marking

The labeled devices comply with the following UK regulations:

- **S.I. 2012 No. 3032**
  Restriction of the Use of Certain Hazardous Substances in Electrical and Electronical Equipment Regulations
- **S.I. 2017 No. 1206**
  Radio Equipment Regulations

The UKCA conformity declaration will be available to the relevant authorities at the following address:

Belden UK Ltd.
1 The Technology Centre, Station Road
Framlingham, IP13 9EZ, United Kingdom

You find the UKCA conformity declaration as PDF file for downloading on the Internet at: https://www.doc.hirschmann.com/certificates.html

The product can be used in industrial areas only.

Warning! This is a class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.

Note: The assembly guidelines provided in these instructions must be strictly adhered to in order to observe the EMC threshold values.

A Further support

Technical questions

For technical questions, please contact any Hirschmann dealer in your area or Hirschmann directly.

You find the addresses of our partners on the Internet at http://www.hirschmann.com.

A list of local telephone numbers and email addresses for technical support directly from Hirschmann is available at https://hirschmann-support.belden.com.

This site also includes a free of charge knowledge base and a software download section.

Customer Innovation Center

The Customer Innovation Center is ahead of its competitors on three counts with its complete range of innovative services:

- Consulting incorporates comprehensive technical advice, from system evaluation through network planning to project planning.
- Training offers you an introduction to the basics, product briefing and user training with certification.
  You find the training courses on technology and products currently available at https://www.belden.com/solutions/customer-innovation-center.
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