COBHAM SATCOM

EXPLORER Mobile Gateway

Installation and user manual

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Disposal

Old electrical and electronic equipment marked with this symbol can contain substances hazardous to human beings and the environment. Never dispose these items together with unsorted municipal waste (household waste). In order to protect the environment and ensure the correct recycling of old equipment as well as the re-utilization of individual components, use either public collection or private collection by the local distributor of old electrical and electronic equipment marked with this symbol.

Contact the local distributor for information about what type of return system to use.

Safety summary

The following general safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the equipment. Thrane & Thrane A/S assumes no liability for the customer's failure to comply with these requirements.

Ground the equipment
For EMC reasons, the equipment must be connected to an electrical ground and the cable instructions must be followed.

Do not operate in an explosive atmosphere
Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Keep away from live circuits
Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

Do not substitute parts or modify equipment
Only qualified personnel may install internal LTE modules and connect wires internally in the EXPLORER Mobile Gateway. Because of the danger of introducing additional hazards, do not substitute any other parts or perform any unauthorized modification to the equipment.

Power supply
The equipment must be supplied by external power sources with output compliance with SELV or ES1 requirements, rated 10.8-31.2 VDC (nominal 12-24 VDC).

About this manual

Features not supported in software version 5.0

The following features described in this manual are **not supported in software version 5.0** for the EXPLORER Mobile Gateway, but will be available in software version **5.1**:

Feature	Software version 5.0	Software version 5.1
Use without a Control Speaker Microphone (CSM)	Not supported	Supported
Built-in WLAN	Not supported	Supported
Built-in LTE modems	Not supported	Supported
External USB GNSS module	Not supported	Supported

Table 0-1: Feature support in software version 5.0 and 5.1.

Intended readers

This is an installation and user manual for the EXPLORER Mobile Gateway, intended for installers of the system, service personnel and users.

Personnel installing or servicing the system must be properly trained and authorized by Cobham Satcom. It is important that you observe all safety requirements listed in the beginning of this manual, and install the system according to the guidelines in this manual and in the included Installation guide.

Manual overview

This manual has the following chapters and appendices:

- *Introduction*
- *Installation*
- *To get started*
- *Maintenance and troubleshooting*
- *Specifications*
- *Conformity*

Related documents

The below list shows the documents related to this manual and to the EXPLORER Mobile Gateway system.

Refer to the PRISM PTT+ Portal or the SYNC Partner Portal for additional documentation, tech notes etc.

Title and description	Document number
EXPLORER Mobile Gateway Installation guide	98-179711
EXPLORER 323 User & Installation manual	98-169085
Customer Manual for PRISM PTT+ Portal	98-180853
Reseller Manual for PRISM PTT+ Portal	98-180854

Table 0-2: Related documents

Typography

In this manual, typography is used as indicated below:

Bold is used for the following purposes:

- To emphasize words.
  Example: “Do **not** touch the terminal during transmission”.
- To indicate what the user should select in the user interface.
  Example: “Select **Terminal settings**”.

Italic is used to emphasize the paragraph title in cross-references.

Example: “For further information, see *Connecting Cables* on page...”.

`COURIER` is used for the following purposes:

- To indicate text appearing in a display.
  Example: “the Main screen shows `READY`”.
- To indicate low level commands such as AT commands.
  Example: “In your terminal program, type **`ATD`**”.

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Introduction

1.1 What is the EXPLORER Mobile Gateway?

EXPLORER Mobile Gateway is an AES-256 encrypted IP-based data communications device designed for use in a vehicle. It supports 3G/LTE/WLAN/satellite backhaul and Land Mobile Radio (LMR) integration to provide automatic switching between available networks in any situation. It is a cost effective system designed to expand and augment traditional LMR systems widely used in the Public Safety, Utility, Mining, and Oil & Gas sectors.

1.1.1 Features and interfaces

The EXPLORER Mobile Gateway has the following features and interfaces:

- Optimized for use with EXPLORER 323 satellite terminal.
  Also suitable for other Cobham Satcom BGAN terminals, such as EXPLORER 325 and EXPLORER 727 and, for fixed installations, EXPLORER 540.
- Connects to EXPLORER 6205 Control Speaker Microphone (CSM)
- Interoperability with Land Mobile Radio (LMR).
- Support for 2 internal LTE modems, integrated in the EXPLORER Mobile Gateway (Nimbelink or M.2 Key B compliant modems).
- WLAN, both client and access point. Configurable in the PRISM PTT+ Portal.
- 4 Ethernet ports, one with PoE (Power over Ethernet). Configurable in the PRISM PTT+ Portal.
- USB interface for software update or diagnostics report, or connecting an LTE modem.
- Audio, balanced and unbalanced, for radio integration.
- Output for connection to external speakers.
- Connection management with PRISM.
- AES-256 encryption.

1.1.2 Overview of a typical EXPLORER Mobile Gateway system

There are a number of possible system configurations. The example below shows an EXPLORER Mobile Gateway system using a built-in LTE modem and an EXPLORER 323 satellite terminal to create a unified network using PRISM (refer to the next section).

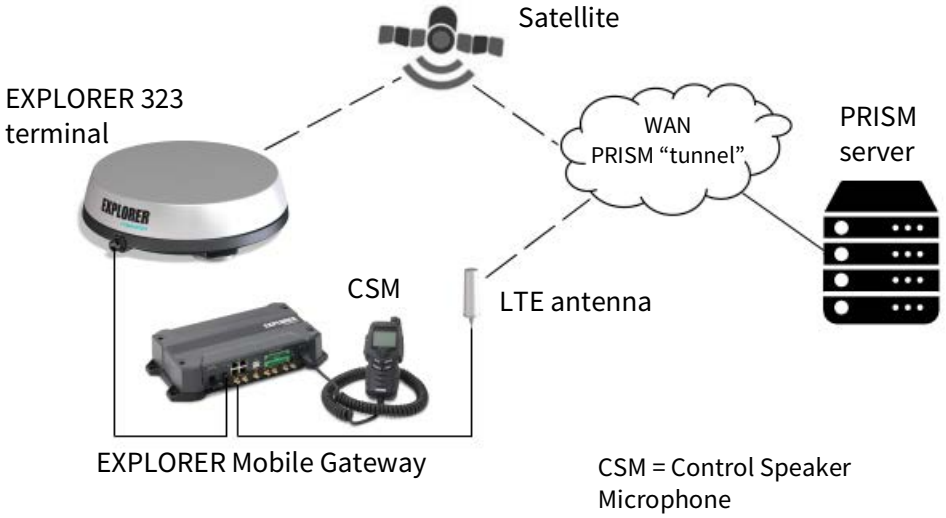


Figure 1-1: System overview (example)

1.1.3 Combining external networks with PRISM

Private Routing and Intelligent System Management (PRISM) is a hybrid communications system combining LTE and satellite connectivity to increase resilience and coverage. It is a user-friendly voice and data solution turning LMR (Land Mobile Radio), LTE (cellular) and Satellite networks into one unified network.

PRISM routes all traffic to and from the EXPLORER Mobile Gateway through an AES-256 encrypted multi-path tunnel between the terminal and a server, using cellular or BGAN satellite or even WLAN connectivity. Devices connected locally to the EXPLORER Mobile Gateway will be immediately reachable from server applications, regardless of the network technology (cellular, BGAN or WLAN), using the same IP address. Depending on server routing, devices attached to the EXPLORER Mobile Gateway will likewise have direct access to services on the server and beyond.

1.1.4 Local and external connections to the EXPLORER Mobile Gateway

The EXPLORER Mobile Gateway communicates externally on the Internet through the PRISM server. It has the following means of communication:

External connection to Internet	**Local connections**
Satellite terminal, e.g., EXPLORER 323	EXPLORER 6205 Control Speaker Microphone
Cellular antenna with internal cellular modem	Land Mobile Radio (LMR)
WLAN (configured as client and within reach of a WLAN access point)[1]	WLAN (configured as access point)
LAN connected to a router with access to the Internet[1]	LAN connected to e.g., a PC or IP Handset
USB cellular modem	USB local device

Table 1-1: Local and external connections to EXPLORER Mobile Gateway

1. Note that if the router is DHCP enabled (acts as a DHCP server), this will disable the router functionality of the EXPLORER Mobile Gateway, which means that the connected router will be your only data connection to the external IP network. Voice is not affected.

1.1.5 Configuration

The administrator of your EXPLORER Mobile Gateway system prepares the system configuration on the server, using the PRISM PTT+ Portal. When the EXPLORER Mobile Gateway connects to the Internet for the first time, it will go through an authentication process and will contact the server to get its configuration.

PRISM PTT+ Portal

The PRISM PTT+ Portal is the access point for configuration, provisioning etc. of your EXPLORER Mobile Gateway system.

The system administrator can create different users with different access levels. See the manuals for the PRISM PTT+ Portal for information on how to use the portal (manual number *98-180853* or *98-180854*).

We recommend connecting to the server for authentication and initial configuration **before** installing the EXPLORER Mobile Gateway units in the vehicles.

Control Speaker Microphone

Apart from PTT communication, you can use the EXPLORER 6205 Control Speaker Microphone to switch the system on and off and for minor setup and status.

The following information is accessible on the CSM display:

- LTE and satellite modem state and signal level.
- Current Call Group in Call Group mode.
- List of Call Groups in Call Group mode.
- Phone book with list of users that can be dialed directly.
- Connectivity state.
- Current Speaker if any.
- CSM Volume level.
- CSM background light level.
- CSM Key Lock status.
- Active Events. Severity and description.
- External Audio and External Speaker state.
- Secondary Call Group state.
  Indicates whether Call Groups with priority 2 is enabled.
- Configured Alias.
- Serial Number.
- Firmware Version.

Configuration of connected equipment

For Cobham Satcom equipment, e.g., EXPLORER 323 or other BGAN satellite terminals, and for Cobham Satcom approved internal LTE modems, the system configuration is done from the PRISM PTT+ Portal.

For 3rd party external equipment, refer to the SYNC Partner Portal at www.cobhamsatcom.com (select **SYNC Partner Portal**).

1.2 The EXPLORER Mobile Gateway unit

1.2.1 Overview of the unit

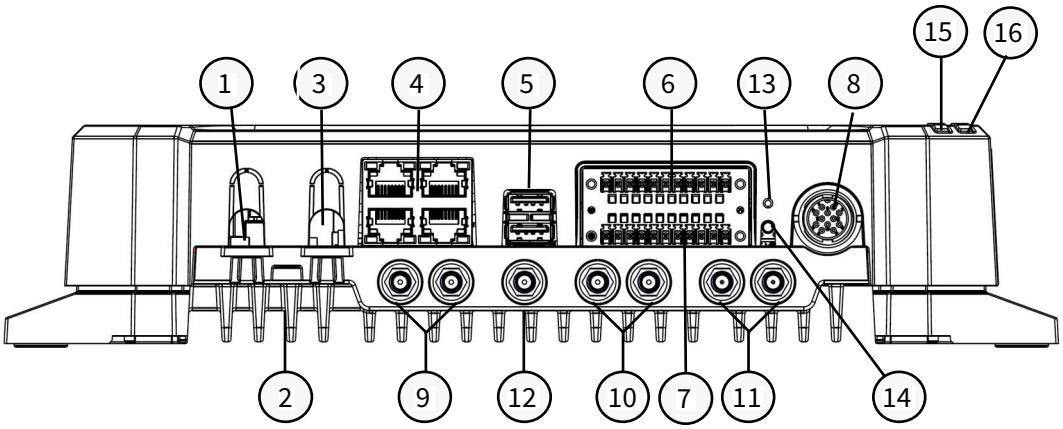


Figure 1-2: Buttons, LEDs and connectors

Connectors/cable entrances:

1. DC-Input (12-24 VDC nominal): Input from the vehicle's DC supply and Ignition. You need to remove the cover and connect to the terminal block as shown in *To connect input power* on page 2-4.
2. Ground connection (chassis): Connection to vehicle ground.
3. SAT: Connection of a satellite terminal. You need to remove the cover and connect to the terminal blocks (Power & Ignition and Ethernet) as shown in *To connect to a satellite terminal* on page 2-13.
4. Eth 1-4: Ethernet interface 1 to 4. Number 1 is with Power over Ethernet (PoE).
5. USB 1 and 2: USB interface e.g., for software update, saving the configuration or a diagnostic report, or connecting an LTE modem.
6. Radio: Audio and I/O connection e.g., to VHF radio.
7. I/O: Connection to speakers. Future use: CAN and GPIO pins.
8. MIC: Connects to the EXPLORER 6205 Control Speaker Microphone.
9. Cellular 1, Main/ Div: Connects 1 or 2 LTE antennas to the internal LTE modem 1.
10. Cellular 2, Main/ Div: Connects 1 or 2 LTE antennas to the internal LTE modem 2.
11. Wi-Fi, Main/ Div: Connects the internal WLAN module to one or two WLAN antennas.
12. GNSS: Connects an internal LTE modem to a GNSS antenna.

Push-buttons:

13. Reset. Reboots or resets the EXPLORER Mobile Gateway to factory defaults. You need a pointed device to access the button inside the chassis.
14. Diagnostic. Creates a diagnostics report to be saved on a connected USB flash drive or uploaded to the server. See *To create a diagnostics report* on page 4-9.

Light indicators:

15. CONN: Shows the status of the communications connections and diagnostics and reset buttons.
16. PWR. Shows the power status of the EXPLORER Mobile Gateway (On, Off, powering up, powering down, error, etc.)

For details of the LED functions, see *LED functions* on page 4-3

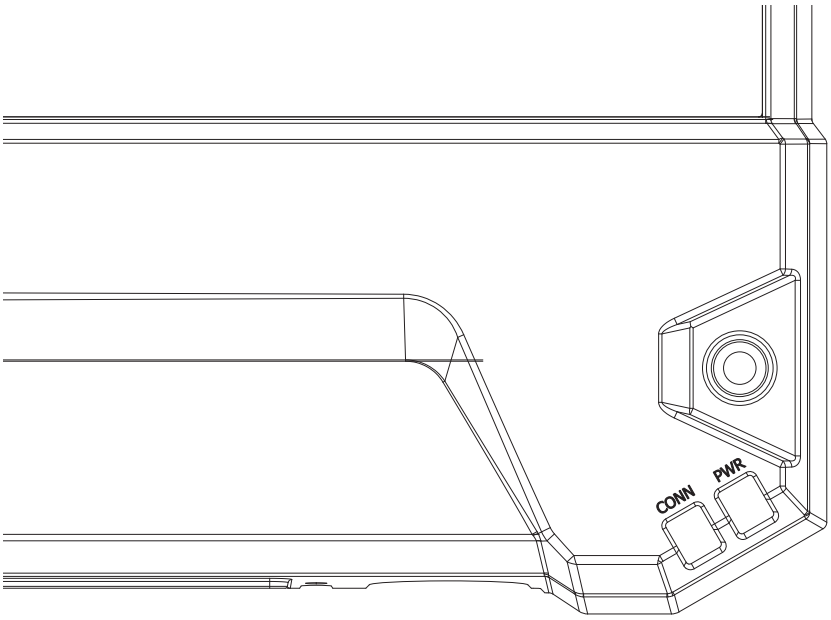


Figure 1-3: LEDs

1.2.2 Overview of internal connectors

A number of interfaces are accessible when you remove the cover from the EXPLORER Mobile Gateway.

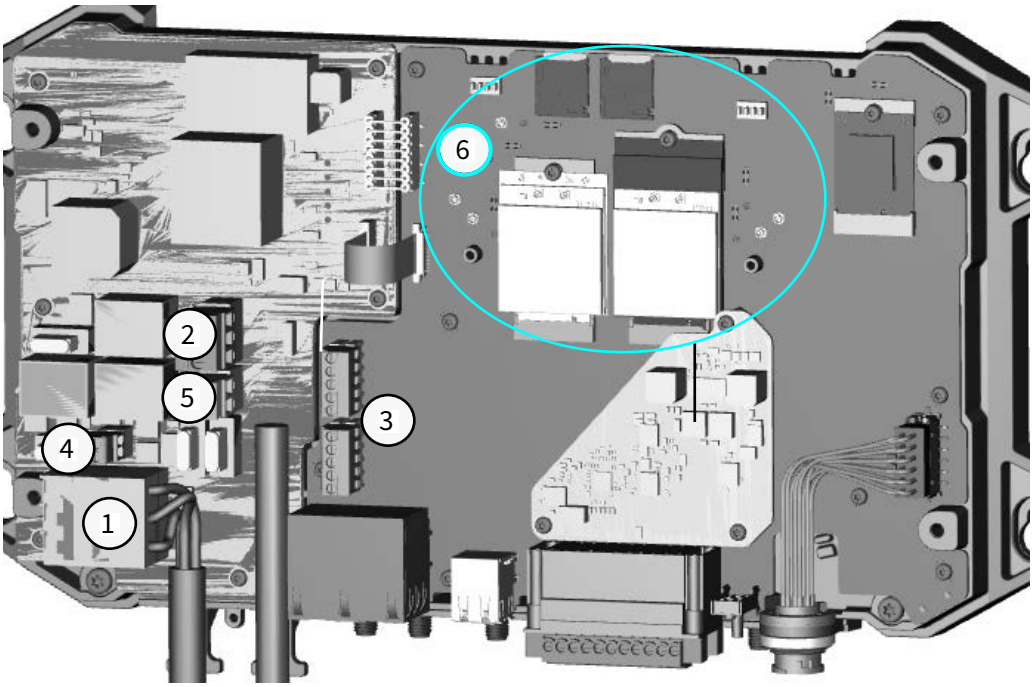


Figure 1-4: Internal connections

1. DC power input. See *To connect input power* on page 2-4.
2. Power and Ignition output for EXPLORER 323, See *To connect to a satellite terminal* on page 2-13.
3. Ethernet, 2 ports. For pinout and connection to EXPLORER 323, see *To connect to a satellite terminal* on page 2-13. You can use any of the two or both Ethernet connectors.
4. EXPLORER 325 satellite terminal connection (On/Off control).
5. Aux. power. Power output for external equipment (max. 2 A).
6. Cellular modems with associated connectors and SIM cards. See *To install LTE modules (optional)* on page 2-5.

Installation

2.1 What's in the box

The following items are included in the delivery of your EXPLORER Mobile Gateway:

- EXPLORER Mobile Gateway unit
- Power cable with bullet connectors for V+, V- and ignition, mating bullet connectors and ring terminal, screw and washer for grounding.
- Kit with connectors:
  - I/O and Radio connectors, 2 pcs (one black, one green)
  - EXPLORER 323 power and ignition (3 Pin terminal block)
  - Ethernet, 2 pcs (5 Pin terminal block)
  - Aux power (2 Pin terminal block)
  - EXPLORER 325 (2 Pin terminal block)
- Modem installation parts (connection cables, gap pads, modem bracket and screws in a bag)
- Installation guide

2.2 Before installation in the vehicle

2.2.1 Configuration

Before installation, the administrator of your EXPLORER Mobile Gateway system must prepare the system configuration on the server, using the PRISM PTT+ Portal. When the EXPLORER Mobile Gateway connects to the network for the first time, it goes through an authentication process and contacts the server to get its configuration. For details, see *Authentication and initial configuration* on page 3-1.

Note Before installing the EXPLORER Mobile Gateway in the vehicle, we recommend connecting it via the Ethernet interface to a DHCP-enabled router to authenticate and get the initial configuration from the server, so that it is ready for use when installed in the vehicle.

2.2.2 Physical installation

We recommend installing the Power cable and especially the internal LTE modem(s) (if used) before mounting the EXPLORER Mobile Gateway in the vehicle. The LTE modems and associated wires may be difficult to access once the EXPLORER Mobile Gateway is installed in the vehicle.

2.2.3 To remove the cover of the EXPLORER Mobile Gateway

In order to connect the power wires and install cellular modems, you must first remove the cover.

1. Use a Torx 20 screwdriver to losen the four screws on the front of the EXPLORER Mobile Gateway.

   Note Reuse the screws **maximum 5 times**. The screws are secured with Tuflok® to keep the screws in place during vibration, this function is reduced after 5 times reuse.

2. Gently remove the cover.

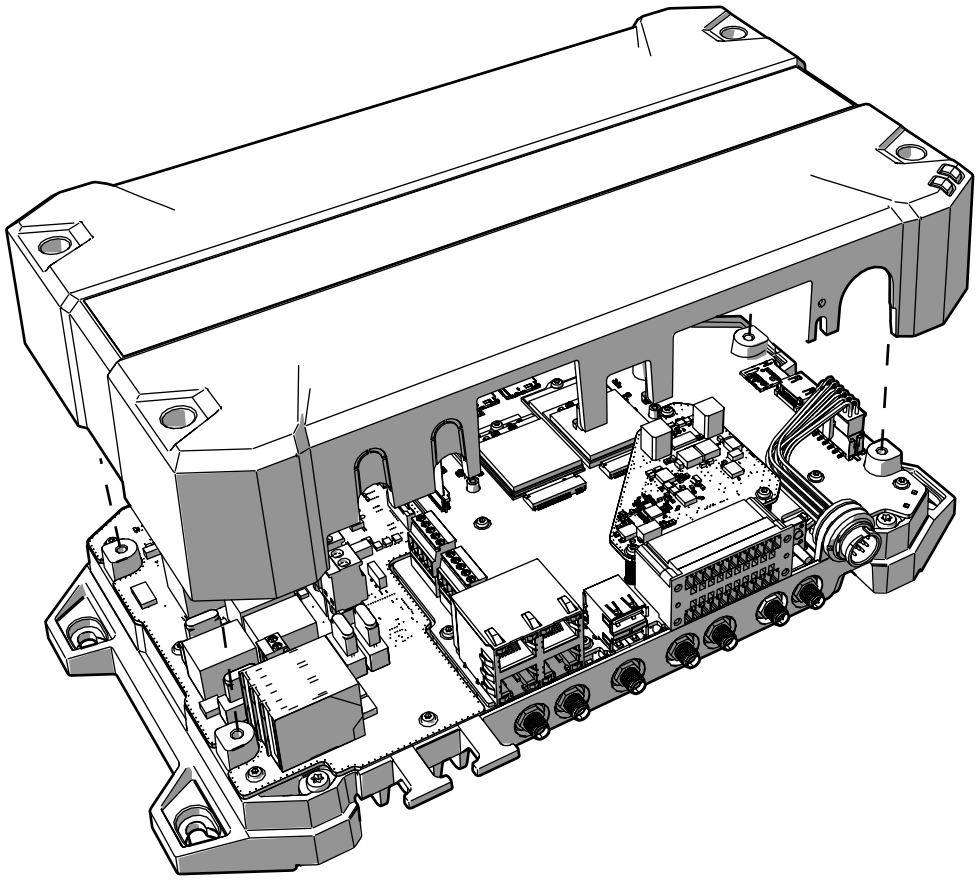


Figure 2-1: Remove the cover of the EXPLORER Mobile Gateway

2.2.4 To connect input power

The terminals for input power connection are internal in the EXPLORER Mobile Gateway. The delivery includes a short power cable for connection to the vehicle DC power and ignition.

CAUTION! The equipment must be supplied by external power sources with output compliance with SELV or ES1 requirements, rated 10.8-31.2 VDC (nominal 12-24 VDC).

Requirements to cable width:

- Wires for V+ and V-: AWG 12 to AWG 10
- Wire for Ignition: AWG 22 to AWG 16

1. Remove the cover for the EXPLORER Mobile Gateway as shown in *To remove the cover of the EXPLORER Mobile Gateway* on page 2-3.
2. Take the power cable included with your EXPLORER Mobile Gateway.
3. Use a flat blade screwdriver to push the spring above each wire in the terminal block while you insert the wire (Red wire: V+, black wire: V-, white wire: Ignition). Make sure the insulation is not gripped by the contacts when you remove the screwdriver.

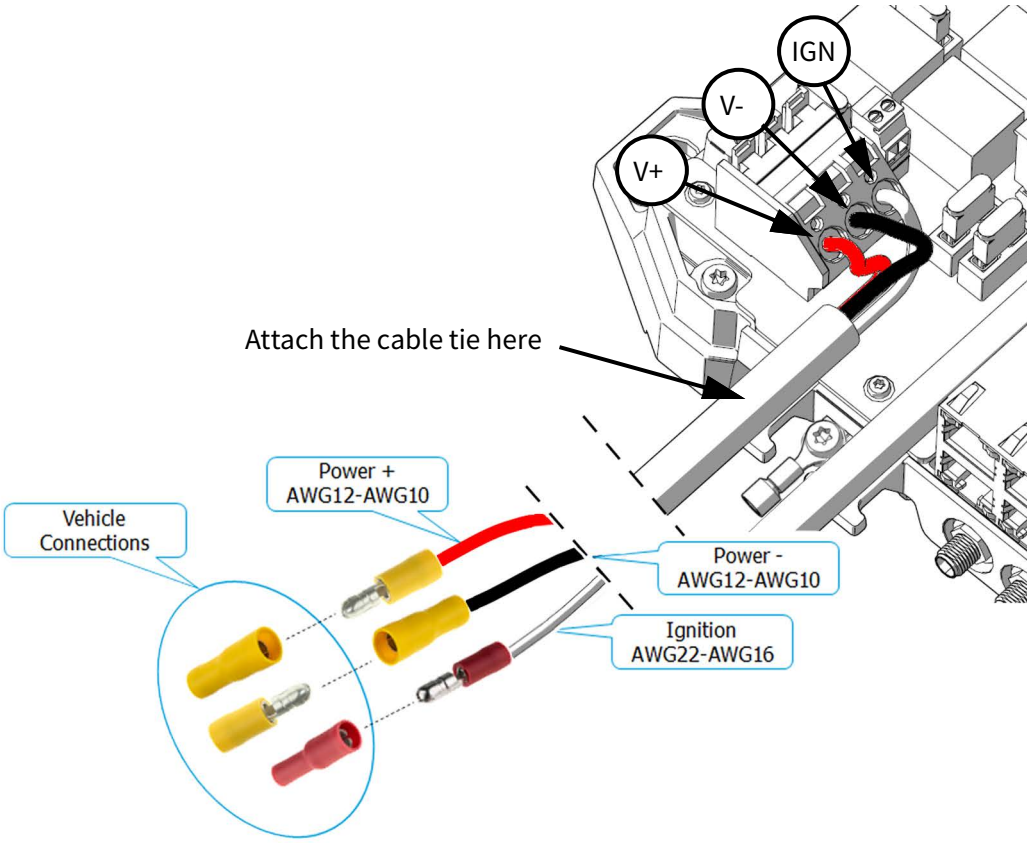


Figure 2-2: DC input connection

4. Use a cable tie to attach the short power cable to the cable support at the DC Input entry.

5. Prepare the wires **from the vehicle power and Ignition** and mount the matching crimp terminals. Remember the requirements of cable width at the start of this section.

> **CAUTION!** Do not connect directly to the vehicle battery! Connect to the dedicated 12 or 24 VDC output and ignition signal in the vehicle.

   - On the red wire from V+, mount and crimp a yellow 5mm **Female** crimp terminal
   - On the black wire from V-, mount and crimp a yellow 5mm **Male** crimp terminal
   - On the wire from Ignition, mount and crimp a red 4mm **Female** crimp terminal
6. When your installation is ready, connect your wires from the vehicle 12 or 24 VDC supply and Ignition to the matching crimp terminals on the cable from the EXPLORER Mobile Gateway.

2.2.5 To install LTE modules (optional)

The EXPLORER Mobile Gateway can hold two Nimbelink or M.2 Key B compliant internal LTE modules for cellular communication (Supported from software version 5.1).

For information on supported LTE modules, refer to the SYNC Partner Portal at www.cobhamsatcom.com > **SYNC Partner Portal**.

Note Apart from the LTE module and SIM card, you must acquire one or two LTE antennas to be able to connect to the cellular network. You may also need to connect a GNSS antenna. For details, see *To connect LTE antenna(s) for internal modem modules* on page 2-16 and *To connect a GNSS antenna* on page 2-17.

The instructions below are common installation instructions for all applicable LTE module types, and may not show exactly how your modem should be installed. Refer to the SYNC Partner Portal for more information.

1. Remove the cover for the EXPLORER Mobile Gateway as shown in *To remove the cover of the EXPLORER Mobile Gateway* on page 2-3.
2. Insert the LTE SIM card.
   - For **Nimbelink** modems, insert the SIM card in the modem before mounting the modem in the EXPLORER Mobile Gateway.
   - For **M.2 Key B compliant** modems, insert the SIM card at the corresponding SIM holder on the EXPLORER Mobile Gateway (see Figure 2-4 on page 2-7).
3. Connect the small antenna cables to the corresponding connectors on the LTE modules.

Note For some LTE modules, you can connect the cables on the EXPLORER Mobile Gateway directly to the modem module. In case the cables are not long enough, the delivery includes additional wires, which connect the small connectors on the PCB with the modem module. See Figure 2-3 on page 2-6 for information on which connectors to use.

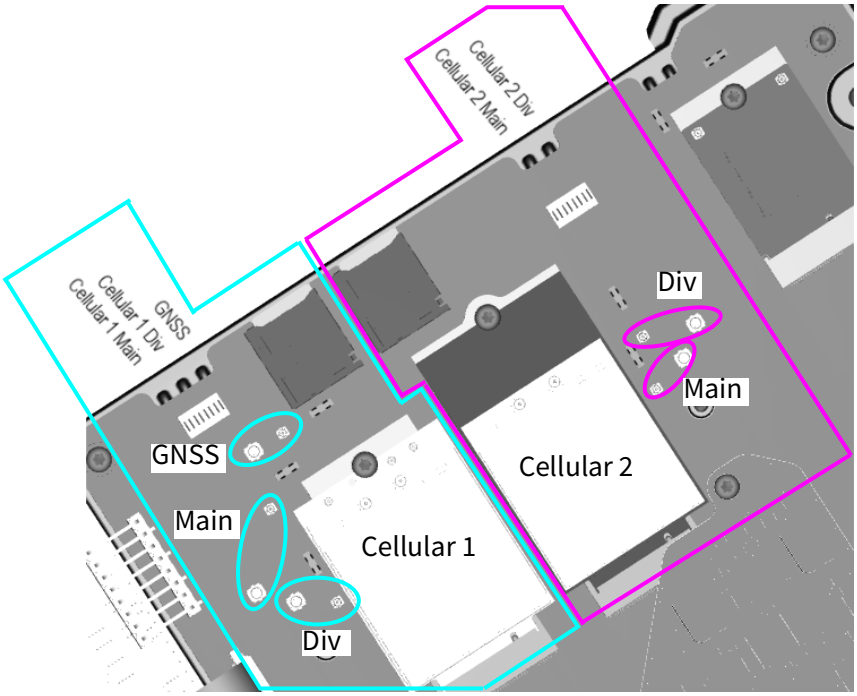


Figure 2-3: Connect small wires for internal LTE modules.

Note If you have an LTE module with GNSS, remember to connect the small wire between the GNSS connector on the LTE module and the GNSS connector on the EXPLORER Mobile Gateway shown in Figure 2-3.

4. Depending on the form factor of the LTE module, place it at **Cellular 1** or **Cellular 2**.

Important If you are using an **M.2 Key B compliant** modem, you must place a cooling pad under the modem (included with the EXPLORER Mobile Gateway).

If you are using a **Nimbelink** modem, **do not** use a cooling pad under the modem. The cooling pad may prevent the pins on the modem from being inserted properly into the PCB.

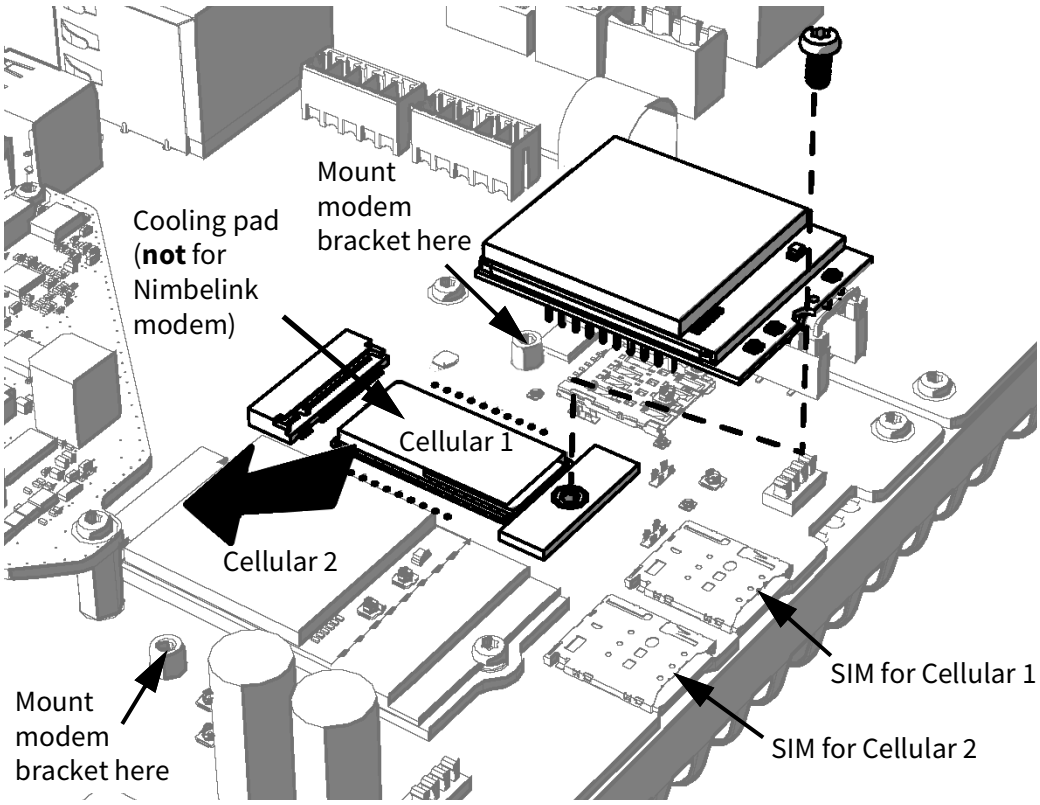


Figure 2-4: Insert cellular modem in EXPLORER Mobile Gateway

Note If you need to use the Cellular 2 slot for a Cellular 1 form factor, you can use the small screw adapter that is included with the EXPLORER Mobile Gateway. Mount it in the position where the mounting screw is to be inserted (similar to Cellular 1).

- For **Nimbelink** modems, fit the connector pins of the cellular modem into the interface board of the EXPLORER Mobile Gateway.

Important Make sure the modem module is oriented correctly; the end with the small antenna connectors must be closest to the edge of the EXPLORER Mobile Gateway PCB.

- For **M.2 Key B compliant** modems, insert the modem into the connector (marked with a large arrow in Figure 2-4).

5. Fasten the modem to the PCB
   - For modems with a mounting hole, mount the screw as shown in Figure 2-4 and fasten the modem to the EXPLORER Mobile Gateway.
   - For modems without a mounting hole, mount the small modem bracket over both modems and use the included screws to fasten the bracket to the 2 threaded nuts marked in Figure 2-4. The bracket is included in the modem installation parts that are provided with the EXPLORER Mobile Gateway.
6. When cellular modem(s), SIM card(s) and power cables are all connected, put the cover back on. Lead the cable for DC power through the opening marked DC-Input and the cable from EXPLORER 323 terminal (if any) through the opening marked SAT.
7. Check that nothing is caught between the cover and the base of the EXPLORER Mobile Gateway.

8. Tighten the four screws to fasten the cover.
9. After installation in the vehicle, install and connect the LTE antenna(s) as described in *To connect LTE antenna(s) for internal modem modules* on page 2-16 and, if applicable, the GNSS antenna as described in *To connect a GNSS antenna* on page 2-17.
10. Fasten the DC Input cable and the EXPLORER 323 cable to the cable support using cable ties.

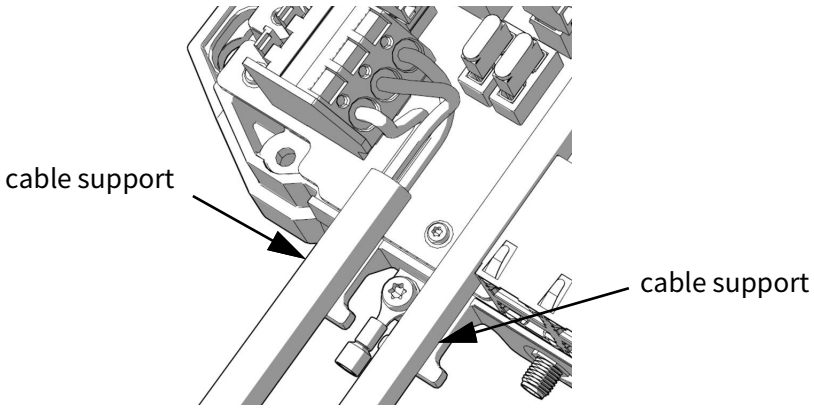


Figure 2-5: Cable support on EXPLORER Mobile Gateway

Note If you have additional cables that need to be fixed, you can purchase a cable relief bracket from Cobham Satcom (part number 403667A-010).

2.3 Physical installation in the vehicle

The EXPLORER Mobile Gateway is designed to be mounted on a wall in a vehicle.

Note In order to maintain an IP grade of IP21, mount the EXPLORER Mobile Gateway vertically on a wall with the connectors facing downwards.

When placing the EXPLORER Mobile Gateway, make sure there is enough space to access cables and to see the status of the LEDs. You can find the dimensions of the EXPLORER Mobile Gateway in Figure 2-7 and Figure 2-8.

Mount the EXPLORER Mobile Gateway with 4 pcs. M5 screws (or 4.8 mm self-tapping screws) through the 4 mounting holes.

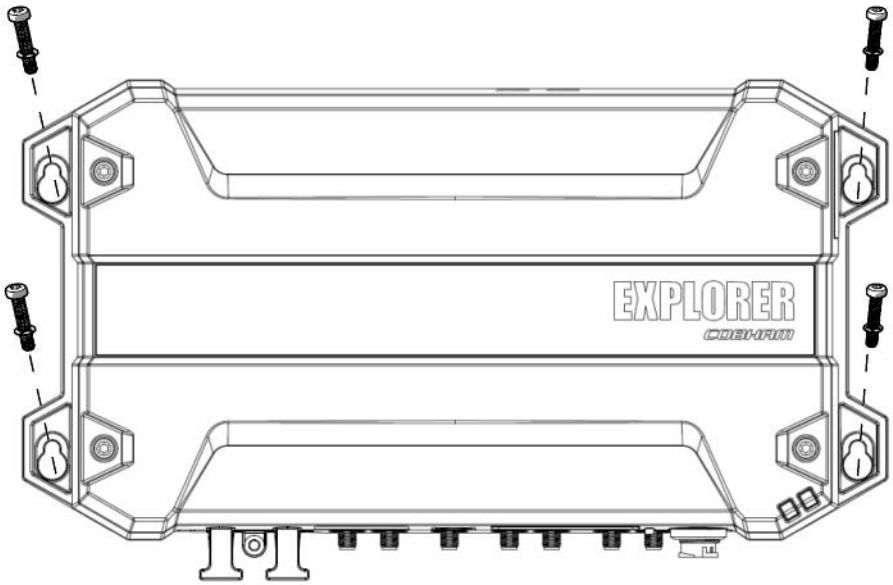


Figure 2-6: Physical installation in the vehicle

2.3.1 Outline drawing with dimensions

Front, top and bottom

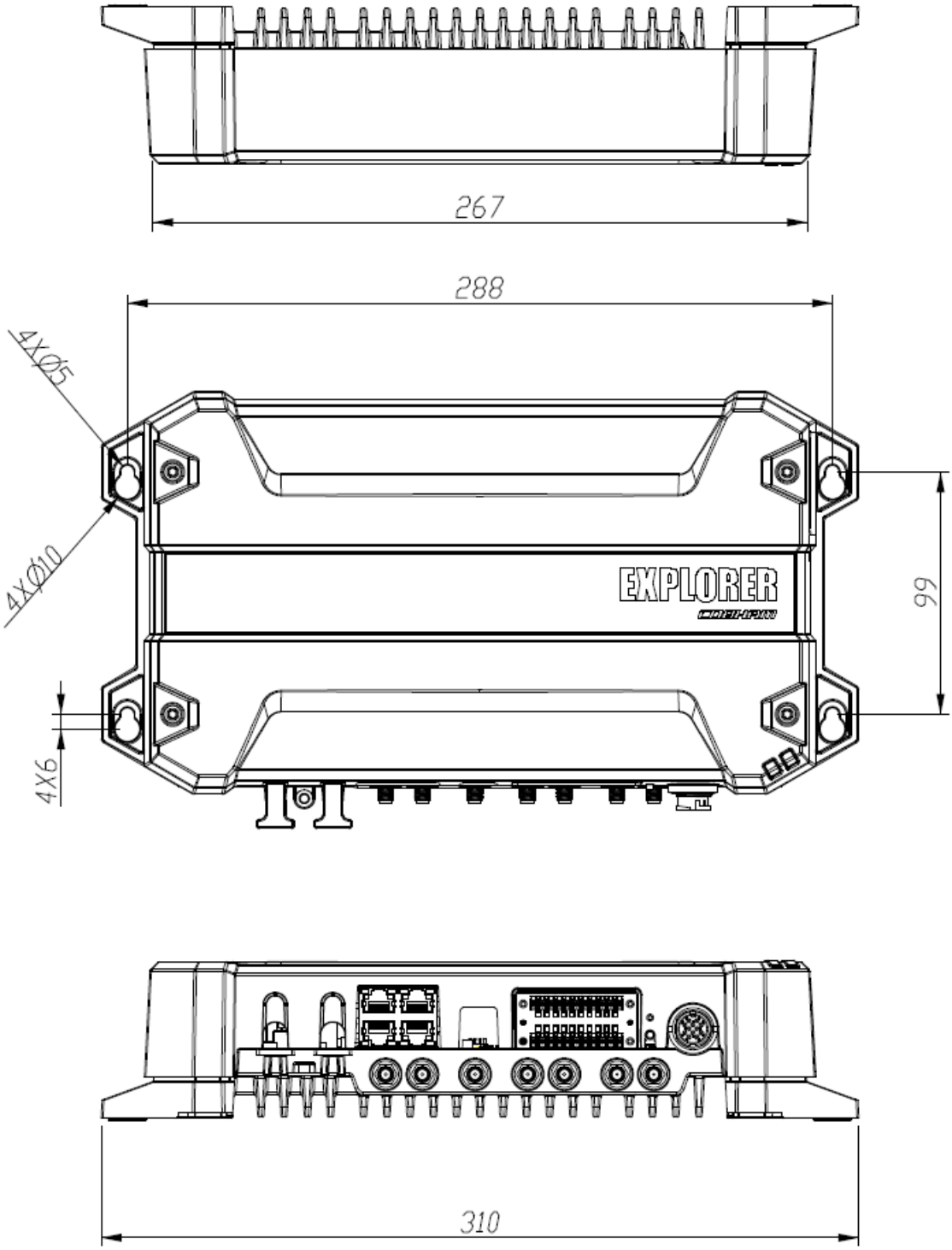


Figure 2-7: Outline drawing with dimensions, front, top and bottom

Sides and back

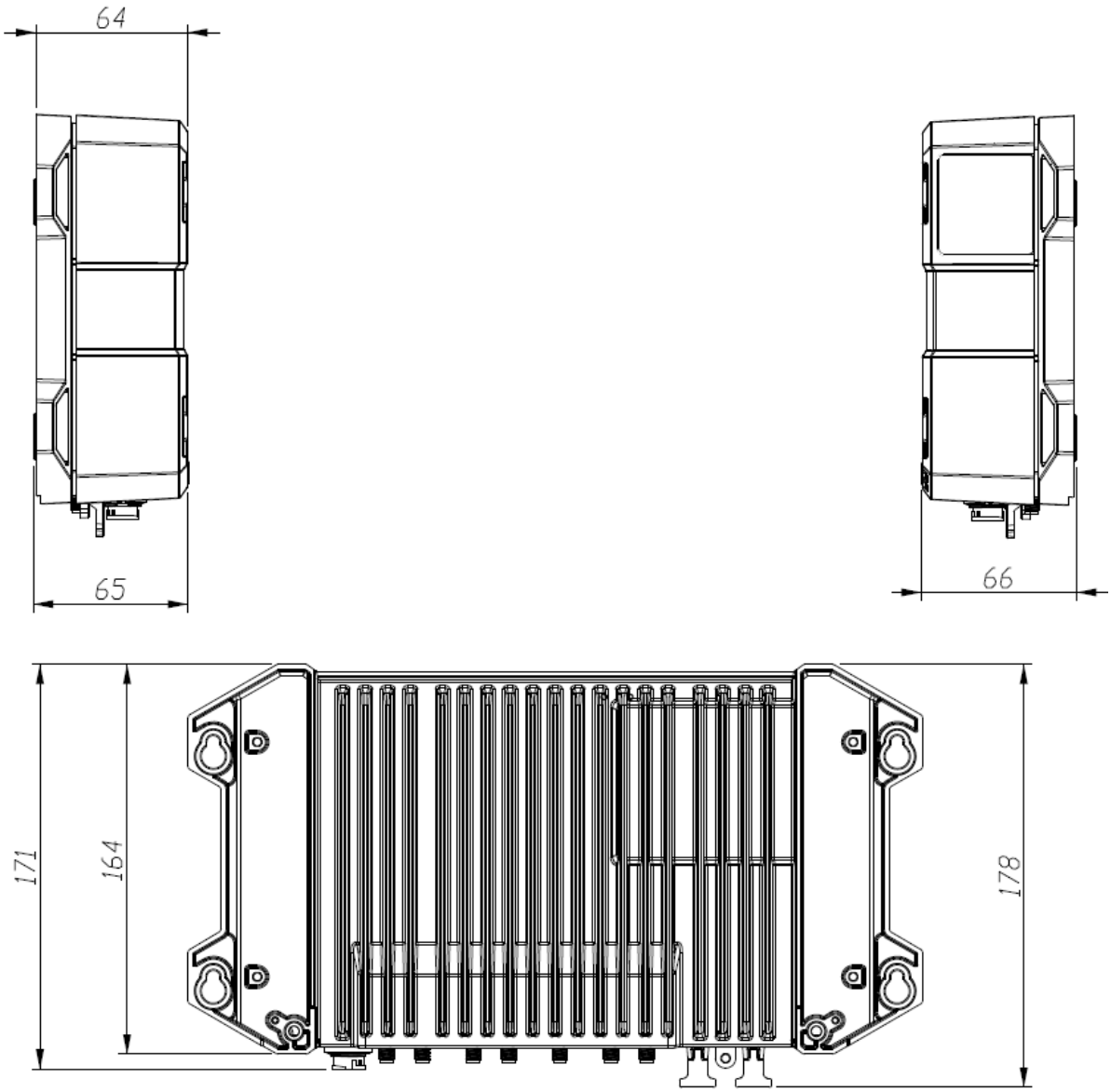


Figure 2-8: Outline drawing with dimensions, sides and back

2.3.2 To connect ground

The EXPLORER Mobile Gateway has a ground connection point between the **DC In** and **SAT** cable entrances. Do as follows to connect your ground cable:

1. Crimp the included grounding ring terminal to your grounding cable (AWG17-AWG16 cable).
2. Use a Torx 20 screwdriver to attach the ring terminal to the ground connection point with the included M4 locking screw and spring washer.
3. Connect the other end of the grounding cable to chassis ground of the vehicle.

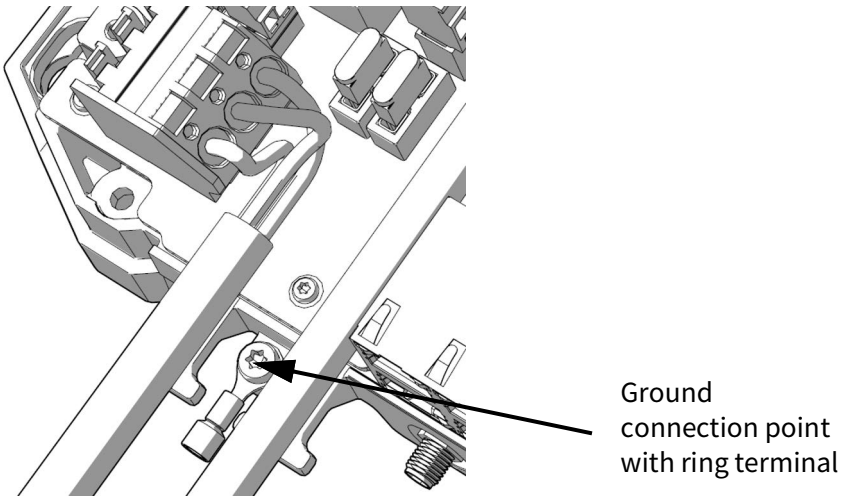


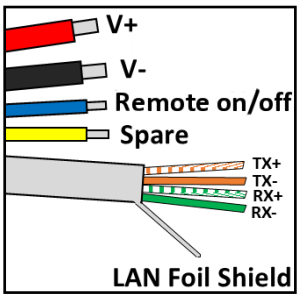
Figure 2-9: Vehicle ground connection

2.3.3 To connect to a satellite terminal

EXPLORER 323 satellite terminal

CAUTION! Do **not** connect an EXPLORER 325 satellite terminal to this interface - use the AUX PWR OUT and AUX ON/OFF instead.

To connect an EXPLORER 323 terminal, use the cable that comes with the EXPLORER 323.



1. Install the EXPLORER 323 terminal on the roof of the vehicle as described in the manual for the EXPLORER 323.
2. Remove the cover for the EXPLORER Mobile Gateway as shown in *To remove the cover of the EXPLORER Mobile Gateway* on page 2-3.
3. Insert the wires at the open end of the EXPLORER 323 cable into the terminal blocks as shown below and fasten them with the associated screws using a flat blade screwdriver.

Important

1. The wires must be twisted as shown below (Tx+ with Tx-, Rx+ with Rx-).
2. Cut off unused wires, e.g. the yellow Spare wire and the outer foil shield, as close as possible to the cable insulation. If necessary, cover the unused wire ends with insulating tape.
3. Make sure the cable is shielded as far into the box as possible, that is, remove insulation as close as possible to the terminal blocks.

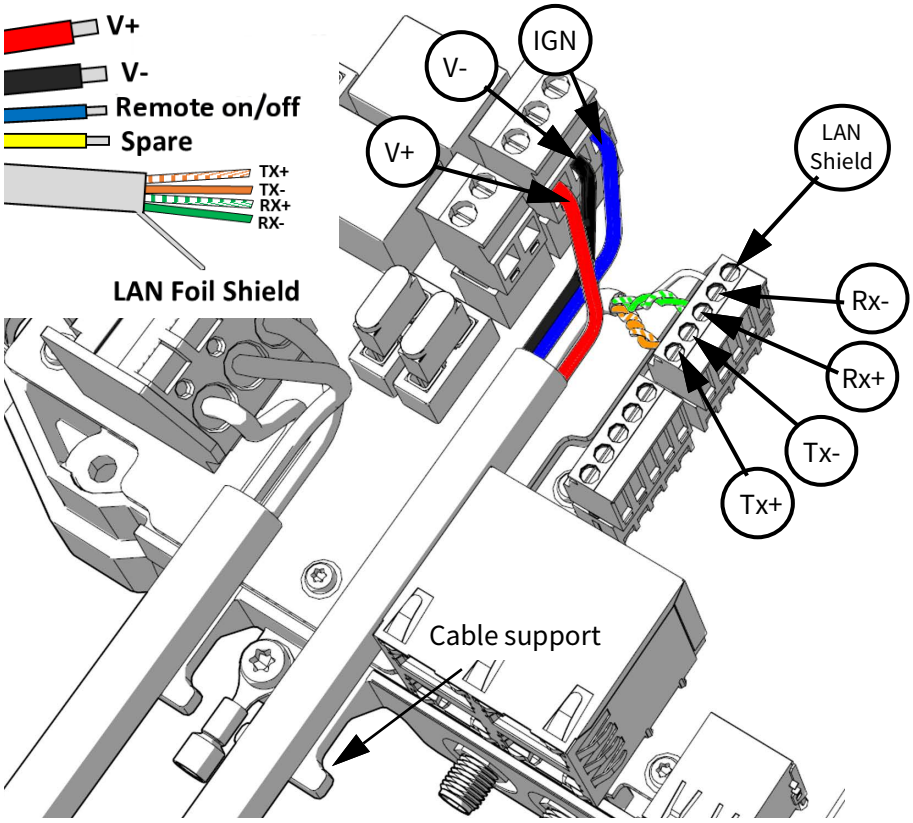


Figure 2-10: Connect cables from EXPLORER 323 satellite terminal

4. Fasten the EXPLORER 323 cable to the cable support with a cable tie.
5. Put the cover back on and fasten the screws with a Torx 20 screwdriver.

2.3.4 USB interface

The EXPLORER Mobile Gateway has two USB 2.0 Type A connectors for:

- connecting a USB stick for diagnostics report
  (see *To create a diagnostics report* on page 4-9)
- connecting a USB stick for software upload
  (see *To update software via USB* on page 4-1)
- connecting a USB LTE modem or
- connecting a USB GNSS module (e.g., an LS2303x-G GNSS Mouse Receiver).
  (Supported from software version 5.1)

The two USB connectors are identical and interchangeable.

The USB connectors on the EXPLORER Mobile Gateway have a latching mechanism and support latching Type A connectors as well as normal Type A connectors.

Figure 2-11: USB connectors

2.3.5 Ethernet interface

External Ethernet connectors

The EXPLORER Mobile Gateway has 4 Ethernet connectors. Eth 1 supplies PoE e.g., for an IP handset. See specification in *External interfaces* on page A-2.

The Ethernet interface can be used e.g., for connection to a PC, an external LTE modem with Ethernet interface, an IP handset or other IP equipment. The interfaces must be configured in the PRISM PTT+ Portal.

Note If you connect the Ethernet interface to a DHCP-enabled router, be aware that this will **disable the data routing functionality** of the EXPLORER Mobile Gateway, which means that all data traffic from local units will go through the DHCP-enabled router, and **not** through any connected LTE modems or satellite terminals. This only applies to data, voice is not affected.

Figure 2-12: External Ethernet connectors

Internal Ethernet connectors

There are also two internal terminal blocks for Ethernet connection.

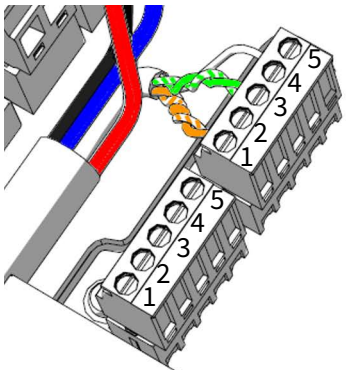


Figure 2-13: Internal Ethernet connectors

Pin number	Function
1	Tx+
2	Tx-
3	Rx+
4	Rx-
5	LAN Shield

Table 2-1: Internal Ethernet pin assignment

The internal Ethernet connectors can be used to connect an EXPLORER 323 terminal as shown in *To connect to a satellite terminal* on page 2-13, or to other IP equipment.

2.3.6 To connect external LTE modems

You can connect an external USB LTE modem to one of the USB connectors or an LTE modem with Ethernet interface to one of the Eth connectors on the EXPLORER Mobile Gateway. For applicable modems, refer to the SYNC Partner Portal at www.cobhamsatcom.com (select **SYNC Partner Portal** in the top right corner).

2.3.7 To connect LTE antenna(s) for internal modem modules

(Supported from software version 5.1)

If you have installed LTE modem modules inside the EXPLORER Mobile Gateway, you must connect one or two corresponding LTE antennas. For requirements to LTE antennas, **refer to the documentation for the LTE modem**.

1. Check if the installed LTE module requires one or two LTE antennas.
2. Find a suitable place to install the antenna(s) and install them according to the documentation for the antenna. For best performance, mount the antenna(s) on the outside of the vehicle.
3. Connect the antenna(s) to the SMA connector(s) **CELLULAR 1** (**Main** and **Div**) or **CELLULAR 2** (**Main** and **Div**) on the EXPLORER Mobile Gateway, depending on which module you have installed and where (see *To install LTE modules (optional)* on page 2-5).
   If only one antenna is used, connect it to the connector marked **Main**.

   Note If only one antenna is used, the modem must be configured to no diversity.

Figure 2-14: Connectors for cellular antennas

2.3.8 To connect WLAN

(Supported from software version 5.1)

The EXPLORER Mobile Gateway has a built-in WLAN module for wireless communication devices. To use the WLAN interface, you must first connect one or two WLAN antennas to the connectors marked **Wi-Fi** (**Main** and **Div**).
If only one antenna is used, connect it to the connector marked **Main**.

For requirements to the antenna(s) refer to the WLAN interface specifications in *External interfaces* on page A-2 and Table A-3, *WLAN antennas approved for use with EXPLORER Mobile Gateway*, on page A-3.

For details on how to install the antenna(s), see the documentation for your WLAN antenna. For best performance, mount the antenna on the outside of the vehicle.

Note The WLAN module can be configured in the PRISM PTT+ Portal to be

- an **access point** to which you can connect wireless devices
- a **WLAN client** that can be connected to an external WLAN access point.

2.3.9 To connect a GNSS antenna

If you need position information e.g., for tracking, there are different options depending on your installation:

- If you have a satellite terminal connected you may not have to connect a GNSS antenna, because the satellite terminal has its own GNSS receiver.
- If you have a Nimbelink NL-SW-LTE-TC4NAG internal LTE module installed, you can connect a GNSS antenna to the GNSS SMA connector on the EXPLORER Mobile Gateway. The GNSS antenna must be an **active antenna**.
  Nimbelink recommends a Taoglas AP.17E.07.0064A or a Taoglas AA.108.301111.
- If you have a Telit LN920A12 internal LTE module installed, the GNSS antenna must be a **passive antenna**, connected to the GNSS SMA connector on the EXPLORER Mobile Gateway.
- If you don't have an internal LTE modem with GNSS support nor a satellite terminal, you may connect a GNSS receiver to the USB interface of the EXPLORER Mobile Gateway (Supported from software version 5.1).

Note If you are using the LTE modem GNSS interface, **remember to connect the small wire** from the GNSS interface on the LTE modem to the GNSS connector on the EXPLORER Mobile Gateway PCB. See Figure 2-3 on page 2-6.

1. Place the GNSS antenna on the vehicle. For best performance, place the antenna on the outside of the vehicle with good visibility.

   CAUTION! If the GNSS antenna is to be used with an internal LTE module, check the documentation for the LTE modem - some LTE modems require an active GNSS antenna and can be damaged if you connect a passive antenna!

2. Connect your GNSS antenna to the EXPLORER Mobile Gateway.
   - If you are using the GNSS interface of an internal LTE module, connect to the SMA connector marked **GNSS** on the EXPLORER Mobile Gateway unit.

- If you are using a USB GNSS receiver, connect to one of the **USB** connectors on the EXPLORER Mobile Gateway unit.

2.3.10 To connect the EXPLORER 6205 Control Speaker Microphone

The Control Speaker Microphone can be used for communication in PTT systems, and for showing status for the system.[1] The EXPLORER 6205 Control Speaker Microphone is a Cobham Satcom option that you can purchase from Cobham Satcom under the part number 406205B-00501.

1. Connect the cable from the EXPLORER 6205 Control Speaker Microphone to the connector marked **MIC** on the EXPLORER Mobile Gateway.

   Note If the cable is too short, a 5 m extension cable for EXPLORER 6205 CSM is available from Cobham Satcom (part number 406204-940).

Figure 2-15: Where to connect EXPLORER 6205 Control Speaker Microphone

2. When the EXPLORER Mobile Gateway is switched on, the CSM automatically turns on and shows the status of the system.

1. From software version 5.1, if you have an attached LMR system used for PTT you do not need to have a CSM connected. However, without a CSM you will not have a power button, and you can only switch the system on and off with the ignition signal.

2.3.11 To connect a radio

You can connect a radio for e.g., transmission of PTT calls.

Connect to the **Radio** connector on the EXPLORER Mobile Gateway. A mating connector is included in the connector kit that comes with the EXPLORER Mobile Gateway.

Figure 2-16: Where to connect a radio

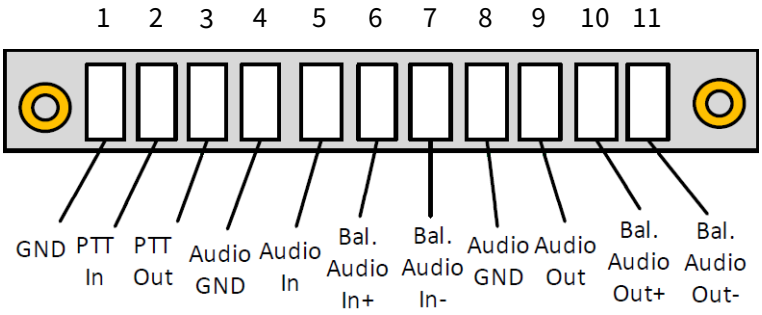


Figure 2-17: Radio connector pinout

1. Connect the Audio wires from the radio as follows:
   - For **balanced audio**, connect:

Signal in connected radio	Pin in EXPLORER Mobile Gateway Radio connector
Balanced audio output +	Pin 6: Bal. Audio In+
Balanced audio output -	Pin 7: Bal. Audio In-
Balanced audio GND	Pin 4: Audio GND
Balanced audio input +	Pin 10: Bal. Audio Out+
Balanced audio input -	Pin 11: Bal. Audio Out-
Balanced audio GND	Pin 8: Audio GND

Table 2-2: Radio connections for balanced audio

- For **unbalanced** audio, connect:

Signal in connected radio	Pin in EXPLORER Mobile Gateway Radio connector
Audio output +	Pin 5: Audio In
Audio output -	Pin 4: Audio GND
Audio input +	Pin 10: Audio Out
Audio GND	Pin 8: Audio GND

Table 2-3: Radio connections for unbalanced audio

2. Connect the radio's PTT interface as follows:

Signal in connected radio	Pin in EXPLORER Mobile Gateway Radio connector
PTT output	Pin 2: PTT In
PTT input	Pin 3: PTT Out
GND	Pin 1: GND

Table 2-4: Radio connections for PTT

For specifications for the Radio interface, see *Radio* on page A-2, under *External interfaces*.

For guides and other documentation, refer to www.cobhamsatcom.com > **SYNC Partner Portal**.

2.3.12 To connect an IP handset

Connect your IP handset to one of the Ethernet connectors. Use **Eth 1 PoE** if the IP handset is to be powered by PoE from the EXPLORER Mobile Gateway.

Note Your system must be connected to the BGAN network (e.g., via an EXPLORER 323 satellite terminal) in order to be able to use an IP handset with the EXPLORER Mobile Gateway.

2.3.13 To connect a speaker

For specifications for the Speaker interface, see *Speaker* on page A-2.

1. Connect your external speaker to the Speaker pins in the IO connector:
   - Pin 10 (Speaker Out+) and
   - Pin 11 (Speaker Out-).

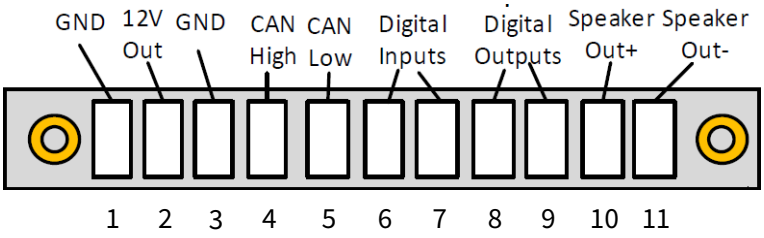


Figure 2-18: I/O connector pinout

The remaining I/O pins are for future use.

2.4 PTT connection examples

2.4.1 Basic PTT example

Below is an example of a basic PTT system with an EXPLORER 323 satellite terminal, an EXPLORER 6205 Control Speaker Microphone and an EXPLORER Mobile Gateway.

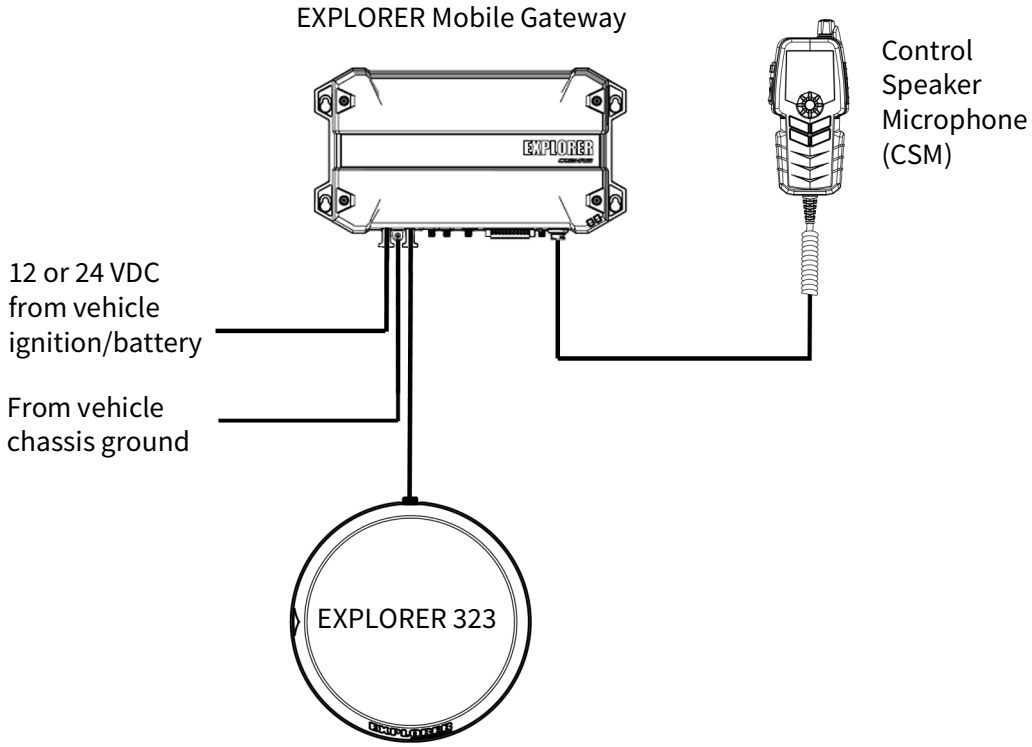


Figure 2-19: Simple PTT connection example

With this setup you can use your PTT communication over satellite, using the EXPLORER 323 satellite terminal.

1. Connect the power wires between vehicle ignition and the EXPLORER Mobile Gateway as described in *To connect input power* on page 2-4.
2. Connect the cable from the EXPLORER 323 to the EXPLORER Mobile Gateway as described in *To connect to a satellite terminal* on page 2-13.
3. Connect the Control Speaker Microphone to the MIC connector in the right side of the connector panel on the EXPLORER Mobile Gateway.
4. When the EXPLORER Mobile Gateway is powered, authenticated and connected to the satellite network, you are ready to use your PTT system.

2.4.2 Extended PTT example

Below is an example of an extended PTT system with an EXPLORER 323 satellite terminal, two LTE connections, one WLAN connection, an EXPLORER 6205 Control Speaker Microphone, an LMR, an IP handset and an EXPLORER Mobile Gateway.

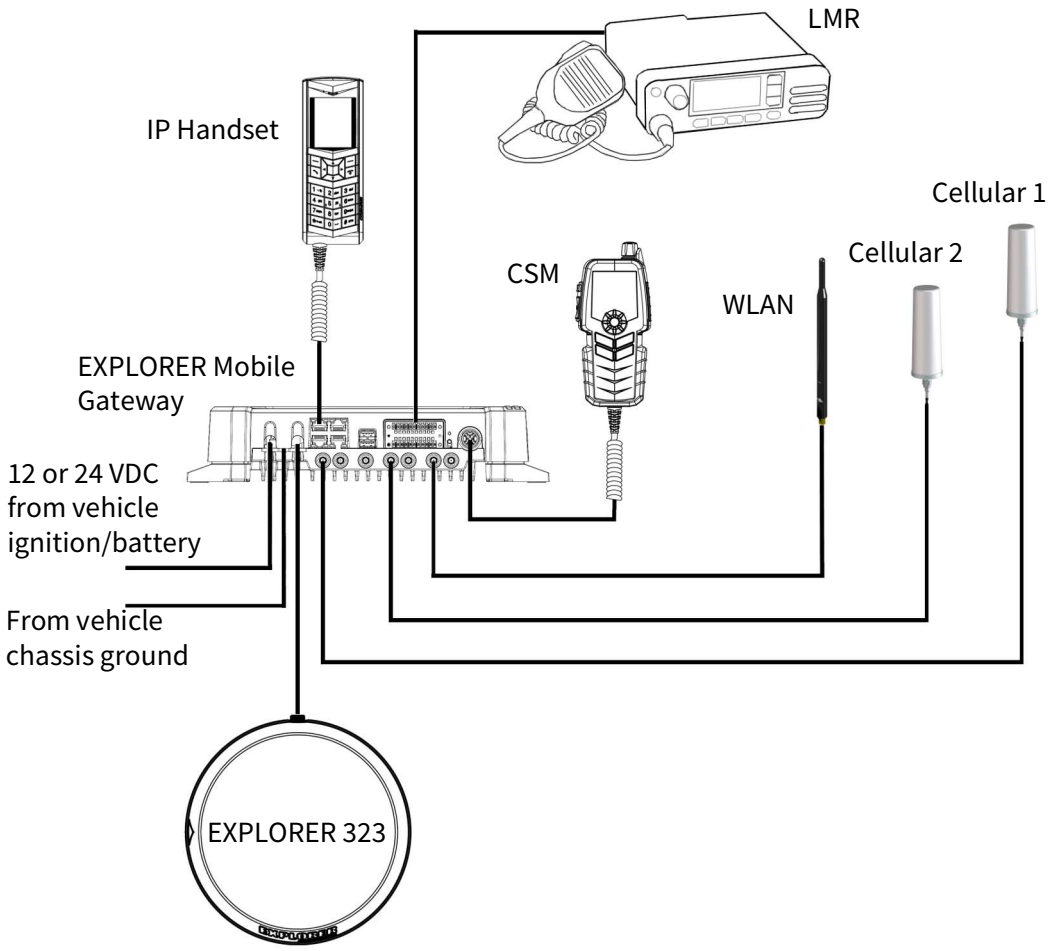


Figure 2-20: Extended PTT connection example

With this setup example you have several options for communication. In the PRISM PTT+ Portal you set up prioritization and interconnection of the different units and networks in the system.

1. Connect the power wires between vehicle ignition and the EXPLORER Mobile Gateway as described in *To connect input power* on page 2-4.
2. Connect the cable from the EXPLORER 323 to the EXPLORER Mobile Gateway as described in *To connect to a satellite terminal* on page 2-13.
3. Connect your cellular antennas as described in *To connect LTE antenna(s) for internal modem modules* on page 2-16.
4. Connect your WLAN antenna(s) as described in *To connect WLAN* on page 2-17.
5. Connect the Control Speaker Microphone to the MIC connector in the right side of the connector panel on the EXPLORER Mobile Gateway.
6. Connect your IP handset to Eth 1 (PoE) if the handset is powered by PoE.

7. Connect your Land Mobile Radio to the Radio connector as described in *To connect a radio* on page 2-19.
8. When the EXPLORER Mobile Gateway is powered, authenticated and connected to the satellite network, you are ready to use your PTT system.

To get started

3.1 Authentication and initial configuration

Before starting up the system, the initial configuration must be done on the server using the PRISM PTT+ Portal. Usually the administrator of the system takes care of this in cooperation with the Cobham Satcom partner supplying the system.

When the system is configured on the PRISM PTT+ Portal and the EXPLORER Mobile Gateway is turned on, the EXPLORER Mobile Gateway will automatically search for a DHCP server on the Ethernet interface. If a DHCP server is not found, it will search for a connected Cobham Satcom satellite terminal. When the DHCP server or satellite terminal is found, the EXPLORER Mobile Gateway will contact the server for authentication and initial configuration.

Important

For the first server contact and after a factory reset you **cannot** use an LTE modem to contact the server. Only Ethernet or a connected Cobham Satcom satellite terminal can be used to get the first configuration, which also includes activation of LTE modems (if any). Before installing the system, it is recommended to connect the EXPLORER Mobile Gateway to the server using Ethernet with a DHCP-enabled router if possible.

3.2 To start up the system

3.2.1 To switch on the system

- Turn on the ignition of the vehicle to switch on the system, or
- If you have a Control Speaker Microphone (CSM) connected, push the power button at the top of the CSM to switch on the CSM and the EXPLORER Mobile Gateway system.

When the system is switched on, it goes through a startup sequence, as shown on the next page.

3.2.2 Startup sequence

When the EXPLORER Mobile Gateway is switched on, the PWR LED flashes and then turns steady green when EXPLORER Mobile Gateway is ready. The connection status is shown in the CONN LED and in the Control Speaker Microphone (if connected) as follows:

Status	**Control Speaker Microphone, display**	**CONN LED**
Initiating (after boot)	Startup icon "`System init`" (briefly)	On, White
Searching for new software on USB	"`Search USB for new software`" If new software is found: "`Install vX.YY-Z?`"	-
Setting up modems	"`Setting up modems`"	On, yellow
Getting configuration from server.	"`Get config`"	On, light blue
Waiting for PTT network	"`Setting up network`"	On, blue
Ready	<Call group> (`Ready-Ring`...)	On, green
Connected	<Call group> "`Conn`"	On, green

Table 3-1: Startup sequence in CSM and CONN LED

Connection ready

If you have connected a Control Speaker Microphone, it will show the status and signal strength of the LTE and/or satellite connection.

The CONN LED on the EXPLORER Mobile Gateway is green when a connection (LTE, satellite, WLAN and/or LAN) is ready for communication.

3.3 To test the system

3.3.1 Audio test

1. Check that there are no warnings, e.g. in the display of the Control Speaker Microphone.
2. Make a PTT call to an established PTT call group or client and check that audio is coming through.
3. Remove all external network connections except one and check that you still get audio through the system.
4. Repeat step 3 with every external network connection (satellite, LTE etc.) to check that they are all working.

3.3.2 Data test

1. Connect a PC to one of the **Eth** connectors on the EXPLORER Mobile Gateway.
2. Check that you can get data through the system. The method to do this depends on your configuration, whether you have special data routing, access to the Internet or not, etc. E.g., if you have configured your system to have access to the Internet, you can open a browser and access a dependable Internet site.
3. Remove all external network connections except one and check that you can still get data through the system.
4. Repeat step 3 with every external network connection to check that they are all working.

Maintenance and troubleshooting

4.1 Software update of EXPLORER Mobile Gateway

4.1.1 Policy for software download and installation

On the PRISM PTT+ Portal you can set up policies for download and installation of software. For example, you can set up the EXPLORER Mobile Gateway to only download software when it is connected via cellular network or a local connection.

If you want the software to be installed immediately after download, you can set a “Force software update” flag in the PRISM PTT+ Portal. When this flag is set, the software will be downloaded and installed immediately after.

If this flag is **not** set, you will be prompted in the CSM to confirm installation of the software. When you have confirmed, the software will be installed. If you do not confirm, the software will be installed at next reboot of the EXPLORER Mobile Gateway.

4.1.2 To update software over the air

1. If there is a new software version on the server, the EXPLORER Mobile Gateway will automatically download the software when it connects to the network, if the policy defined in the PRISM PTT+ Portal allows it.
2. If a CSM is connected, you may be asked if you want to install the software immediately. If you ignore this message, or if a CSM is not connected, the downloaded software is automatically installed next time the EXPLORER Mobile Gateway is rebooted.

If needed, you can also force an immediate software update from the PRISM PTT+ Portal.

4.1.3 To update software via USB

Note You can only install software from USB if you have a CSM connected, because the system needs confirmation from the user.

1. If a USB flash drive is connected to one of the USB connectors when the EXPLORER Mobile Gateway starts up, the EXPLORER Mobile Gateway will automatically look for software on the USB flash drive.

   Note The USB flash drive must be using **FAT32** format, and the software file name must be **ptt.tiif**.

2. If the software version in the USB flash drive is different from the currently active software version, you will be prompted in the CSM to confirm installation of the software.
3. Confirm the software update.

The software will now be installed.

4.2 Software update of satellite terminal

Software update of the Cobham Satcom satellite terminals, e.g., EXPLORER 323, EXPLORER 540 or EXPLORER 325, is set up on the PRISM PTT+ Portal.

1. The software for the satellite terminal is automatically downloaded by the EXPLORER Mobile Gateway if the policy allows it (See *Policy for software download and installation* on page 4-1).
2. The EXPLORER Mobile Gateway will handle the upgrade of the satellite terminal.
3. If a CSM is connected, you may be asked if you want to install the software immediately. If you ignore this message, or if a CSM is not connected, the downloaded software is automatically installed next time the EXPLORER Mobile Gateway is rebooted.

4.3 Status signaling

4.3.1 LED functions

There are two LEDs on the EXPLORER Mobile Gateway.

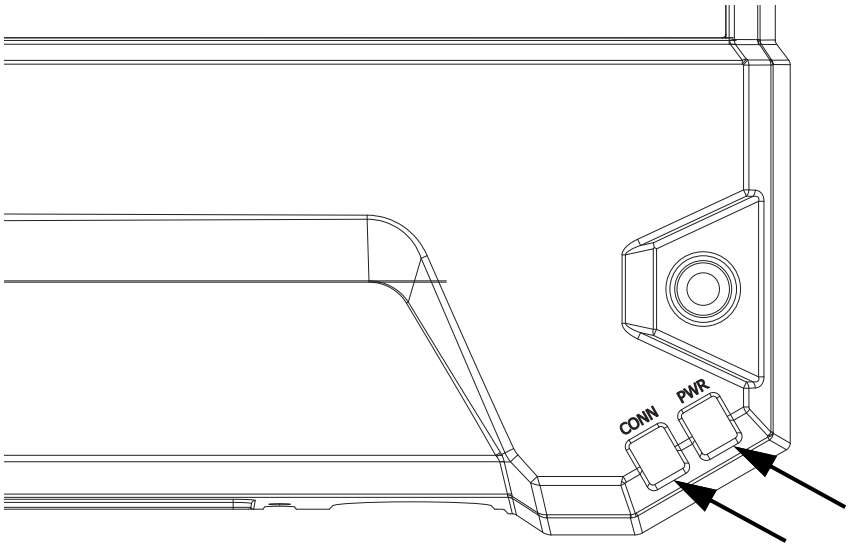


Figure 4-1: LEDs

The tables below show the functions of the LEDs.

PWR LED:

LED status	Description
Off	Unit is off
On, green	Unit is on, normal operation
Slow Flash pattern, green	Startup in progress
Fast Flash pattern, green	Shutdown in progress
Flashing, yellow	High-temperature warning
On, yellow	Input voltage warning 1.input voltage too low to start unit. 2.input voltage has dropped below threshold during operation.
On, red	Error

Table 4-1: PWR LED functions

CONN LED:

LED status	Description
Off	Unit is off or booting
On, white	Initiating (after boot process)
On, yellow	Setting up modems
On, light blue	Getting configuration
On, blue	Waiting for PTT network
On, green	Ready
1 green flash	Diagnostics button pressed - diagnostic report generated OK.
1 red flash	Diagnostics button pressed - diagnostic report failed.
Flashing white	Factory reset - press and hold the Reset button (again) to confirm the reset, or confirm the reset in a connected handset. See *To reset the EXPLORER Mobile Gateway* on page 4-8.

Table 4-2: CONN LED functions

4.3.2 Messages in CSM display

To see a list of current messages:

1. Push the **Shift** button on the CSM until **INFO** is highlighted in the display.
2. Push the center button to see the list of messages.

The following list shows the error messages that can appear in the display of the Control Speaker Microphone (CSM).

Note All configuration is done in the PRISM PTT+ Portal. For configuration issues, check in the portal that the system is set up correctly.

Display	Severity	Description
`Config, No modems`	Warning	No modems are configured.
`SIM card error`	Error	There is an error with the LTE SIM card.
`No PIN code found`	Warning	PIN is missing for either LTE modem or satellite terminal.
`PUK code required`	Error	PUK code required for either LTE modem or satellite terminal.
`IMSI not found`	Error	The IMSI for the LTE modem is missing.

Table 4-3: List of CSM display messages

Display	Severity	Description
Modem response err.	Warning	There is a problem with the LTE modem response.
Ethernet cable disc.	Warning	Ethernet cable not connected. Please check cable and connected devices.
SW Update of BGAN	Information	Update of BGAN firmware started. The BGAN terminal will reboot when done.
Modem SIM locked	Error	SIM locked. Please check configuration. Reboot to try again.
Config, No IMSI	Error	Configuration error. IMSI required.
Config, No APN	Error	Configuration error. APN required.
Config, no BGAN sat.	Error	The “BGAN sat” setting is missing in the configuration.
Config, no Name	Error	Configuration error. Modem name required.
Config, no Type	Error	Configuration error. Modem type required.
No telnet IP	Warning	Configuration error. Telnet IP required for PPPoE modem.
Telnet logon failure	Warning	Unable to login to PPPoE modem using telnet.
Network stalled	Warning	Network stalled. No data can be sent on any modem. Might be locked or out of coverage.
Poor LAN quality!	Warning	LAN connection is too unstable and cannot be used.
Establish secure tunnels	Information	Establishing secure MPP tunnels using available online modems. If modems comes online after the tunnels are established, they will still be used.
No serial number	Error	Info of serial number missing in the unit.
No device type	Error	Info of device type missing in the unit.
Config Server Err.	Error	Unable to fetch configuration from either primary or secondary server.

Table 4-3: List of CSM display messages (Continued)

Display	Severity	Description
Fetch Stage 1 config	Information	Fetching new SSL certificate and Stage 2 server IP address from Stage 1 server. A LAN connection or a BGAN terminal is required.
Check Stage 2 config	Information	Check if configuration has been changed on the primary Stage 2 server and download if it has.
Check Stage 2 config	Information	Check if configuration has been changed on the secondary Stage 2 server and download if it has.
Synchronizing time	Information	Fetch NTP time from Stage 2 or Stage 1 server. Correct system time is necessary for SSL to succeed.
Invalid config	Error	Invalid configuration
FW update blocked	Warning	Over the air firmware update is not allowed on any modems. Please use USB update or change the configuration.
FW update failed	Error	Firmware update failed
Ext. 12V overload	Warning	Overload on the 12 V output in the I/O connector.
New FW ready	Notice	New firmware ready
New BGAN FW	Notice	New BGAN satellite terminal firmware
Modems	Information	Local configuration found. The specified modems will be used. The first modem that comes online will be used for initial check/download of configuration.
Using modem	Information	Using specified modem to update system time and check/download configuration.
System Information	Information	Overview of current system configuration and status
Invalid BGAN	Error	Invalid BGAN terminal detected. PTT Can be used with following EXPLORER terminals: 323,325,727,500,700,510,710,540 and following SAILOR terminals: Fleet One,250,500

Table 4-3: List of CSM display messages (Continued)

Display	Severity	Description
BGAN download fail	Warning	Error downloading BGAN firmware:
FW download failed	Error	Error downloading firmware:
BGAN update failed	Warning	Firmware update of BGAN terminal failed. Retrying after next reboot.

Table 4-3: List of CSM display messages (Continued)

4.4 Troubleshooting

If an error occurs, first check if there are any error messages e.g., in the display of the Control Speaker Microphone. See *Messages in CSM display* on page 4-4 for explanations for the error messages.

If you cannot solve the problem, you can create a diagnostics report, see *To create a diagnostics report* on page 4-9, to help you troubleshoot the problem.

4.5 Tracking and location reporting

You can set up the EXPLORER Mobile Gateway to report its position to a server at certain time intervals or after moving a given distance.

To use the tracking feature you must either set up a tracking server or get a tracking solution from your service provider. The EXPLORER Mobile Gateway must be set up in the PRISM PTT+ Portal to match this server. Once set up on both sides, the EXPLORER Mobile Gateway will send position reports to the server as specified.

4.6 To reset the EXPLORER Mobile Gateway

You can reset the EXPLORER Mobile Gateway using the **Reset** button in the connector panel, or using the EXPLORER 6205 Control Speaker Microphone.

Note After reset to factory defaults, the EXPLORER Mobile Gateway must connect to the server to authenticate and get the configuration. This procedure is the same as for a new unit. See *Authentication and initial configuration* on page 3-1.

4.6.1 Reset with the EXPLORER 6205 Control Speaker Microphone

To reset the EXPLORER Mobile Gateway to factory defaults from the CSM, do as follows:

1. **During startup** of the EXPLORER Mobile Gateway, hold down the **Shift** button on the CSM until you are asked whether you want to reset to factory defaults.
   The **CONN** LED on the EXPLORER Mobile Gateway will be flashing white.
2. Push the **center selector button** on the CSM to confirm the reset.
   The EXPLORER Mobile Gateway will reset to factory defaults. This means that any configuration downloaded, including the Stage 2 server IP addresses will be deleted.
   If you do not confirm the reset within 10 seconds, the system will return to normal operation without resetting.
   If you push the **Home** button instead of confirming, the reset will also be canceled.

4.6.2 Reboot/Reset with Reset button

Use a pointed device to push the **Reset** button, which is located inside the small hole marked **Reset** in the connector panel.

Figure 4-2: Reset button

To reboot the EXPLORER Mobile Gateway using the **Reset** button, push the button briefly. The EXPLORER Mobile Gateway reboots and keeps the current configuration.

To reset to factory defaults using the **Reset** button, do as follows:

1. Push and hold the **Reset** button for 5 seconds.
   The **CONN** LED on the EXPLORER Mobile Gateway will be flashing white.
2. Push and hold the **Reset** button again for 5 seconds to confirm the reset.
   The Mobile Gateway is reset to factory defaults. This means that any configuration downloaded, including the Stage 2 server IP addresses will be deleted.

4.7 To create a diagnostics report

The diagnostics report contains relevant information for troubleshooting. When contacting your supplier for support, enclose this file.

The Diagnostics report takes 7-8 seconds to generate. While generating the report, the **CONN** LED is off. When done, the **CONN** LED flashes once (green = Diagnostics report OK or red = Diagnostics report failed).

You can create a diagnostics report from the EXPLORER Mobile Gateway in two ways:

- **Short** push on the **Diagnostic** button: If a USB flash drive[1] is connected to the EXPLORER Mobile Gateway when you press the **Diagnostic** button, the diagnostics report will be saved to the USB flash drive.

  Important Do **not** remove the USB flash drive while the report is being generated and the LED is off. Wait until the CONN LED flashes once, red or green.

- **Long** push (more than 3 seconds) on the **Diagnostic** button: The diagnostics report will be sent to the server.

The Diagnostic button is located between the MIC connector and the I/O connector.

Figure 4-3: Diagnostic button

1. The USB flash drive must be a FAT32 formatted key.

4.8 Certificates

For information on the PRISM PTT+ Portal, see the manuals for the PRISM PTT+ Portal (manual number *98-180853* or *98-180854*).

4.8.1 To acquire and renew the certificate

When the EXPLORER Mobile Gateway connects to the server for the first time, it sends information about itself and acquires a certificate from the server over a TLS (HTTPS) connection. This certificate is used for provisioning. The certificate is automatically renewed at regular intervals, when the EXPLORER Mobile Gateway connects to the server.

4.8.2 Replacement of a unit

The configuration of each EXPLORER Mobile Gateway unit is saved on the server. When you need to replace a unit, your administrator uses the PRISM PTT+ Portal to enter the new unit as a duplicate of the existing unit in the system. When the EXPLORER Mobile Gateway unit is replaced, the new terminal is automatically recognized as a duplicate and receives a new certificate from the server.

Note The old unit is not revoked automatically when the new unit is installed. If you want the old unit revoked, the administrator must log into the PRISM PTT+ Portal and revoke the unit.

4.8.3 Revocation

If an EXPLORER Mobile Gateway is lost, the certificate can be revoked, so that this EXPLORER Mobile Gateway can no longer connect to the server and identify itself. This is done in the PRISM PTT+ Portal.

Appendices

Specifications

A.1 General specifications

Item	Specifications
Dimensions	Height: 65.5 mm Width: 309.6 mm Depth: 178.5 mm
Weight	1785 g (4 lbs) (without LTE modem module and cable relief bracket)
Operating temperature	-25°C to +55°C
Storage temperature	-40°C to +80°C
Ingress Protection	IP21, when mounted vertically with connectors facing downwards
Power consumption	10 W (without LTE modem, and without any units connected) 115 W with LTE modem and all outputs loaded

Table A-1: EXPLORER Mobile Gateway specifications

A.2 Interface specifications

A.2.1 External interfaces

Specifications of the external connectors on the EXPLORER Mobile Gateway.

External interface	Specifications
Ethernet 1-4	4 x RJ-45 connectors with status LEDs. Ethernet 1 is with PoE: IEEE 802.3af Power Class 2 (7W output @44V). Supported speed 1000/100/10 Mbps Full duplex. Status LEDs: • Yellow LED indicates 1000 Mbps • Green LED indicates 100 Mbps • Yellow+Green LED indicates 10 Mbps
USB	2 x USB-A 2.0 (host) connectors. 1 A @ 5 V, current limited to 1000 mA per connector
Radio (Audio In/Out, Balanced Audio In/Out, PTT In/Out)	11-pin connector **All Input/output are balanced with**: Line Out: 600 Ohm / Range: 250-750 mV RMS Line In: 10 kOhm / Range: 5 mV-750 mV RMS Bandwidth: 300 Hz to 3 kHz Frequency response: +1 dB to -3 dB (300-3 kHz, 0 dB@1 kHz) SNR > 40 dB @ Ref = 94 dBA THD+N < 5%
I/O • Speaker • CAN, GPIO	11-pin connector Min. 5 W, 4 to 16 Ohm N/A (future use)
MIC	12-pin LTW connector for EXPLORER 6205 Control Speaker Microphone.
Cellular antennas	2 x 2 SMA Female connectors (Cellular 1 Main and Div and Cellular 2 Main and Div) For requirements to the antennas, refer to the documentation for the installed LTE module(s).

Table A-2: External interfaces, specifications

External interface	Specifications
WLAN antennas (for applicable antennas, see Table A-3 below)	2 x SMA Male connectors (Main and Div) 802.11ac/a/b/g/n - bidirectional (2T2R) 2.4 GHz ISM Band: • Frequency range: 2.400GHz to 2.4835GHz. • Max input level from the antenna: -10 dBm for 802.11b and -20 dBm for 802.11g/n. 5 GHz ISM Band: • Frequency range: 5.150GHz to 5.850GHz. • Max input level from the antenna: -30 dBm for 802.11a/n/ac.
GNSS	SMA Female connector for connection of external GNSS antenna to internal LTE module. Antenna types depend on internal LTE module type, for example: • For Nimbelink NL-SW-LTE-TC4NAG, the GNSS antenna must be **active**, e.g. Taoglas AP.17E.07.0064A or Taoglas AA.108.301111. • For Telit LN920A12, the GNSS antenna must be **passive.** Refer to the documentation for the LTE modem.

Table A-2: External interfaces, specifications (Continued)

Applicable WLAN antennas

The following antennas are approved for use with the EXPLORER Mobile Gateway:

Manufacturer	Product Code	Peak Antenna Gain (2.4GHz)	Peak Antenna Gain (5GHz)
Wireless Solutions	WS-MGBR-7-58	3	3
Panorama-antennas	LP[G]M[T]M[B]-7-27-[24-58]	2	2

Table A-3: WLAN antennas approved for use with EXPLORER Mobile Gateway

A.2.2 Internal interfaces

Specifications for the internal connectors of the EXPLORER Mobile Gateway (when the cover is removed).

Internal interface	Specifications
DC In and Ignition	Terminal block, 3-pin: • DC In: 10.8-31.2 VDC (nominal 12-24 VDC) • Ignition: Input from vehicle Ignition signal External power source output must comply with SELV or ES1 requirements, rated 10.8-31.2 VDC (nominal 12-24 VDC).
Power and Ignition Out for EXPLORER 323	Terminal block, 3-pin: Output, same as DC In and Ignition from the vehicle.
Ethernet x 2	2 pcs terminal blocks, 5-pin, with two separate Ethernet ports (marked ETH1/CN33 and ETH2/CN30) Supported speed 1000/100/10 Mbps Full duplex.
AUX ON/OFF	Terminal block, 2-pin: Relay to switch an EXPLORER 325 satellite terminal on or off (Remote on/off).
AUX PWR OUT	Terminal block, 2-pin: Power for other connected equipment. Voltage: Same as DC In, Current: max. 2 A.
Cellular antennas to LTE modems	4 pcs Ipex mhf4 mini coax connectors for connecting internal LTE modules with the external SMA connectors for LTE antennas.
GNSS to LTE modem	Ipex mhf4 mini coax connector for connecting internal LTE modules with the external SMA connector for GNSS antenna.
2 x Interface for LTE modem modules	Nimbelink and M.2 Key B compliant

Table A-4: Internal interfaces, specifications

Conformity

B.1 EU (CE)

The EXPLORER Mobile Gateway is CE certified as stated in the simplified EU Declaration of Conformity, which is enclosed in electronic copy at the end of this appendix. The complete EU Declaration of Conformity can be found on the Cobham SYNC Partner Portal:
https://sync.cobham.com/satcom/support/downloads/Declarations of Conformity.
Search for EXPLORER Mobile Gateway.

B.2 UKCA

The EXPLORER Mobile Gateway is UKCA certified. The complete CE and UKCA Declaration of Conformity can be found on the Cobham SYNC Partner Portal:
https://sync.cobham.com/satcom/support/downloads/Declarations of Conformity.
Search for EXPLORER Mobile Gateway.

B.3 Canada (ISED)

CAN ICES-003(A) / NMB-003(A)

Contains IC ID: 11883A-M26398SV (Wi-Fi module M2-6398SV)

This Class [A] digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe [A] est conforme à la norme NMB-003 du Canada.

Canada, Industry Canada (IC) Notices
This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Canada, avis d'Industry Canada (IC)
Cet appareil contient un ou des émetteurs/récepteurs exempts de licence conformes aux RSS exempts de licence d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes:

1. Cet appareil ne doit pas causer d'interférences.
2. Cet appareil doit accepter toutes les interférences, y compris les interférences pouvant entraîner un fonctionnement indésirable de l'appareil.

Radio Frequency (RF) Exposure Information
The radiated output power of the Wireless Device is below the Innovation, Science and Economic Development Canada (ISED) radio frequency exposure limits. The Wireless

Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the IC RF Exposure limits under mobile exposure conditions. (Antennas are greater than 20cm from a person's body).

Informations concernant l'exposition aux fréquences radio (RF)
La puissance de sortie rayonnée de l'appareil sans fil est inférieure aux limites d'exposition aux radiofréquences d'Innovation, Sciences et Développement économique Canada (ISDE). L'Appareil sans fil doit être utilisé de telle manière que le potentiel de contact humain pendant le fonctionnement normal soit minimisé.

Cet appareil a également été évalué et démontré conforme aux limites d'exposition RF IC dans des conditions d'exposition mobile. (Les antennes sont à plus de 20 cm du corps d'une personne).

Caution
The maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit.

Le gain maximal d'antenne permis pour les dispositifs utilisant les bandes 5 250-5 350 MHz et 5 470-5 725 MHz doit se conformer à la limite de p.i.r.e.

WLAN antenna types approved for use with the EXPLORER Mobile Gateway:

This radio transmitter IC: **11883A-M26398SV** has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Cet émetteur radio IC: **11883A-M26398SV** a été approuvé par Industrie Canada pour fonctionner avec les types d'antennes énumérés ci-dessous avec le gain maximal admissible et impédance d'antenne requise pour chaque type d'antenne indiqué. Types d'antennes n'est pas inclus dans cette liste, ayant un gain supérieur au gain maximal indiqué pour ce type, sont strictement interdits pour une utilisation avec cet appareil.

Important The validity of this regulatory conformity is granted only by using one of the antennas listed in Table A-3 on page A-3, or similar **with the same or lower gain**. Using other antennas will violate the Suppliers Declaration of Conformity.

B.4 USA (FCC)

Contains FCC ID: ZWM-M2-6398SV (Wi-Fi module M2-6398SV)

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WLAN antenna types approved for use with the EXPLORER Mobile Gateway:

Important The validity of this regulatory conformity is granted only by using one of the antennas listed in Table A-3 on page A-3, or similar **with the same or lower gain**. Using other antennas will violate the Suppliers Declaration of Conformity.

B.5 Other approvals

All relevant approvals/certification for the EXPLORER Mobile Gateway can be found in the Cobham SYNC Partner Portal: https://sync.cobham.com/satcom/support/downloads/Declarations of Conformity.

EU Declaration of Conformity

Hereby **Thrane & Thrane A/S trading as Cobham SATCOM** declares that the following equipment complies with the specifications of:

RED directive 2014/53/EU concerning Radio Equipment
RoHS directive 2011/65/EU concerning Restriction of Harzardous Substances including delegated directive (EU) 2015/863.

Equipment included in this declaration

Model	Description	Part no.
TT-3667A	**EXPLORER Mobile Gateway**	**403667A-xxxxx**

where x represents the digits 0-9 describing variants depending on configuration not impacting this declaration.

The full text of the EU declaration of conformity is available at the following internet address:
http://sync.cobham.com/satcom/support/downloads

Glossary

A

AES-256	AES stands for Advanced Encryption Standard and is a specification for the encryption of electronic data established by the U.S. National Institute of Standards and Technology (NIST) in 2001. The -256 part is the key length in bits.
APN	Access Point Name. The Access Point Name is used by the terminal operator to establish the connection to the required destination network.
AWG	American Wire Gauge. An American standardized wire gauge system for the diameters of round, solid, nonferrous, electrically conducting wire.

B

BGAN	Broadband Global Area Network

C

CONN	Connection. The LED marked CONN shows connection status.
CSM	Control Speaker Microphone

D

Div	Diversity. If you are using two antennas for either LTE or WLAN, the second antenna should be connected to the connector marked Div. If you are only using one antenna, connect to Main.

E

EMC	Electromagnetic Compatibility

F

FW	Firmware

G

GND	Ground
GNSS	Global Navigation Satellite System.
GPIO	General Purpose Input/Output

I

IGN	Ignition
IMSI	International Mobile Subscriber Identity. A unique number used to identify a mobile subscriber on a wireless network.
IP	Internet Protocol

L

LAN	Local Area Network. A computer network covering a small physical area, like a home,

	office, school or airport. The defining characteristics of LANs, in contrast to wide-area networks (WANs), include their usually higher data-transfer rates, smaller geographic area, and lack of a need for leased telecommunication lines.
LED	Light-Emitting Diode
LMR	Land Mobile Radio. a person-to-person voice communication system consisting of two-way radio transceivers which can be stationary (base station units), mobile (installed in vehicles), or portable (handheld walkie-talkies). Public land mobile radio systems are made for use exclusively by public safety organizations such as police, fire, and ambulance services, and other governmental organizations, and use special frequencies reserved for these services.
LTE	Long-Term Evolution, a standard for wireless communication of high-speed data for mobile phones and data terminals.

P

PCB	Printed Circuit Board.
pcs	pieces
PIN	Personal Identification Number. A code number used to provide access to a system that has restricted access.
PoE	Power over Ethernet. A standard for combining power supply with transmission of data over the Ethernet. The source unit injects power into the Ethernet cable and the power is picked up at the connected device.
PRISM	Private Routing & Intelligent System Management. A technology used for dual operation with cellular and BGAN network to obtain seamless and transparent data transfer independent of the network used (Cellular or BGAN backup connection).
PTT	Push-To-Talk. A means of instantaneous communication commonly employed in wireless cellular phone services that uses a button to switch a device from voice transmission mode to voice reception mode. Multiple parties to the conversation may also be included.
PUK	Pin Unblocking Key. An eight-digit code used to unblock a SIM card after three incorrect pin codes have been entered. The PUK code is supplied with the SIM card.
PWR	Power

R

Rx	Receive

S

SIM	Subscriber Identity Module.
SMA	Sub Miniature version A. A semi-precision coaxial RF connector developed as a minimal connector interface for coaxial cable with a screw-type coupling mechanism. The connector has a 50 Ω impedance.
SW	Software

T

Tx	Transmit

U

USB	Universal Serial Bus. An industry standard that specifies cables, connectors and protocols for connection, communication and power supply (interfacing) between computers, peripherals and other computers.

V

VHF	Very High Frequency. 30-300 MHz, a "straight-line" signal used for short-distance terrestrial communication and navigation.

W

WAN	Wide Area Network. A telecommunications network or computer network that extends over a large geographical distance. In this context mostly used for a satellite or cellular network as opposed to e.g., a LAN.
WLAN	Wireless LAN

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