COBHAM

EXPLORER 540

User & integrator's manual

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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.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Keep away from live circuits
Operating personnel must not remove equipment covers, other than the cover for the interface enclosure. Component replacement and internal adjustment must be made by qualified maintenance personnel. 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
Because of the danger of introducing additional hazards, do not substitute parts or perform any unauthorized modification to the equipment.

Keep away from antenna front
This device emits radio frequency energy when switched on. To avoid injury, keep a minimum safety distance of 1 m from the antenna front when the EXPLORER 540 is on.

Garder à l'écart de l'avant de l'antenne
Le présent appareil émet des radiofréquences lors de son utilisation. Afin d'éviter tout risque pour la santé, une distance minimale de 1 m est nécessaire entre l'utilisateur et l'avant de l'EXPLORER 540.

Observe marked areas
Under extreme heat conditions do not touch areas of the EXPLORER 540 that are marked with this symbol, as it may result in injury.

C1D2
This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D OR non-hazardous locations only.

This equipment must be installed using wiring methods as required for Class I, Division 2 as per the NEC and/or CEC.

WARNING! EXPLOSION HAZARD – Do not connect or disconnect equipment unless power has been removed or the area is known to be non-hazardous.

Antenna safety instructions

Use only manufacturer supplied antennas.
Antenna minimum safe distance: 1 m

Antenna gain

Directional, with maximum gain of 11.25 dBi (with reference to isotropic).

The Federal Communications Commission has adopted a safety standard for human exposure to RF (Radio Frequency) energy which is below the OSHA (Occupational Safety and Health Act) limits.

Antenna mounting

The antenna supplied by the manufacturer must be located such that during radio transmission, no person or persons can come closer than the above indicated minimum safe distance to the front face of the antenna, i.e. 1 m.

L'antenne fournie par le fabricant doit être placée de telle sorte que, durant les transmissions radio, personne ni aucun groupe de personnes ne puisse s'approcher à une distance inférieur à la distance de sécurité minimal indiquée ci-dessus, c.-à-d., 1 m.

To comply with current FCC RF Exposure limits, the antenna must be installed at or exceeding the minimum safe distance shown above, and in accordance with the requirements of the antenna manufacturer or supplier.

Radiation warning

WARNING! Maintain a separation distance of at least 1 m from the front face of the antenna to a person.

You, as the qualified end-user of this radio device, must control the exposure conditions of bystanders to ensure the minimum separation distance (above) is maintained between the antenna and nearby persons, for satisfying RF Exposure compliance. The operation of this transmitter must satisfy the requirements of General Population/ Uncontrolled Environment. Only use the terminal when persons are at least the minimum distance from the front face of the antenna.

About this manual

Intended readers

This manual is a user and integrator's manual for the EXPLORER 540. The manual is intended for anyone who is using or intends to use the EXPLORER 540, including system integrators. No specific skills are required to operate the EXPLORER 540. However, it is important that you observe all safety requirements listed in the **Safety summary** in the beginning of this manual, and operate the EXPLORER 540 according to the guidelines in this manual.

Related documents

The following documents are related to this manual and to the EXPLORER 540 system.

Title and description	Document number
EXPLORER 540 Installation guide (English)	98-148231
EXPLORER 540 Installation guide (German)	98-150246
EXPLORER 540 Installation guide (French)	98-150247
EXPLORER 540 Installation guide (Spanish)	98-150248
EXPLORER 540 Installation guide (Russian)	98-150249
EXPLORER 540 Installation guide (Japanese)	98-150250
EXPLORER 540 Installation guide (Chinese)	98-150251

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 antenna front during pointing".
- To indicate what the user should select in the user interface.
  Example: "Select **Control panel** > **LAN** and click **Enable**".

Italic is used to emphasize the paragraph title in cross-references.
Example: "For further information, see *Connecting Cables* on page...".

`Courier` is used to indicate low level commands, e.g. AT commands.

Table of contents

Chapter 4 Configuration with web interface

Chapter 5 Maintenance and troubleshooting

App. A Technical specifications

Introduction to EXPLORER 540

General description

The EXPLORER 540 is a small and light BGAN M2M terminal, with the option to operate on both Inmarsat and cellular networks. The durable casing and a dust and water resistant design makes the EXPLORER 540 the perfect choice for any kind of fixed outside installation.

Depending on your airtime subscription, the EXPLORER 540 either operates as an M2M (machine-to-machine) terminal or as a BGAN class 2 terminal.

With the optional EXPLORER 540 LTE Modem, the EXPLORER 540 provides unique flexibility and M2M data communication cost-control, as it ensures the most cost-effective communication service can be chosen depending on location. The dual-mode operation delivers significant fail-over capabilities with the automatic switching between the BGAN network and the cellular network. For organizations transferring critical real-time data within their M2M networks, the dual mode of the EXPLORER 540 can provide unmatched service availability.

Features and interfaces of the EXPLORER 540

Features

- M2M or BGAN class 2, depending on airtime subscription (SIM card)
- Automatic installation function
- Standard data up to 464/448 kbps (download/upload)
- Remote management
- SMS for remote management
- Power save functions with various “wake on” methods (timer, input pin and wake-on-LAN)
- Software upgrade and file transfer over-the-air
- 2 watchdog functions
  - Connection watchdog (Link monitoring)
  - Advanced watchdog that continuously monitors the operational condition of the terminal
- Automatic Context Activation (ACA)
- For the **M2M** version only:
  - Inmarsat M2M Access Platform
  - Access to Inmarsat FTP server for firmware upgrade
- For the **non-M2M** version: only
  - Streaming data rates of 32, 64 and 128 kbps
  - Voice over IP (Standard voice 4 kbps AMBE+2 codec or Premium voice 3.1 kHz audio 64 kbps)
- IP66 protection
- Built-in web interface allowing you to manage connections and customize the terminal to your specific needs, using a computer
- Support for GPS, GLONASS and BeiDou navigation systems
- Optional cellular modem for dual mode operation

Interfaces

There are no external connectors on the EXPLORER 540. The following interfaces are contained inside the compartment at the back of the EXPLORER 540:

- LAN interface with Power over Ethernet (PoE) input
- I/O ports for control of power save mode and for remote control/status
- Power input from:
  - PoE+ (IEEE 802.3at type 2 class 4, 25 W) or
  - separate DC power source, e.g. a battery (max. range 10.5-32 VDC)
- USB interface for connection to EXPLORER 540 LTE Modem

For specifications on the interfaces, see *Interfaces specifications* on page 108.

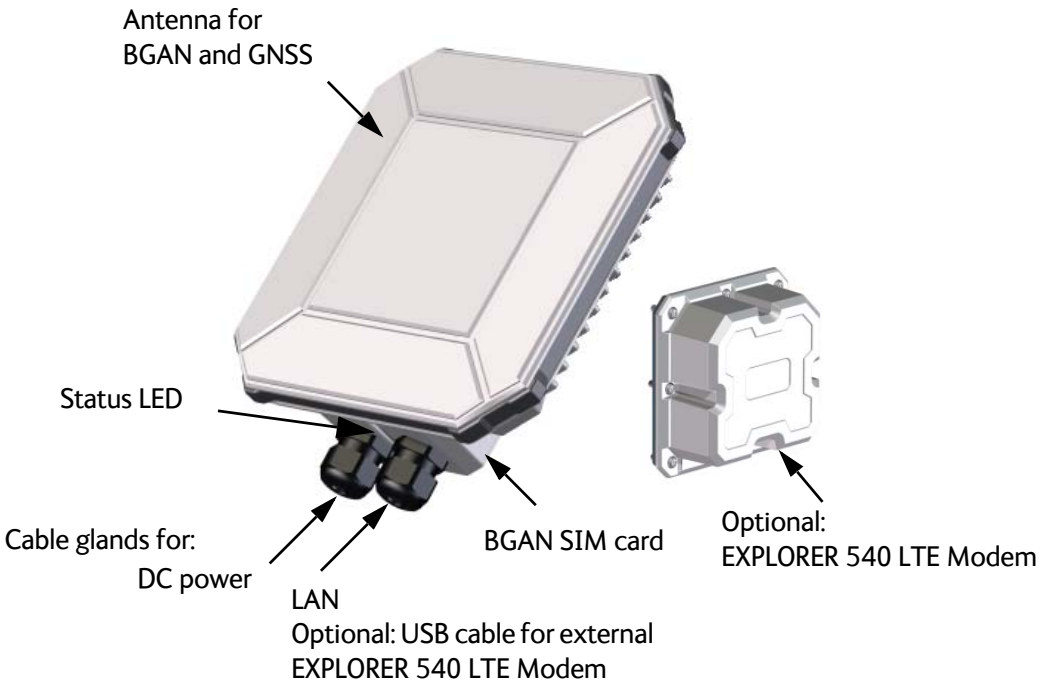
Approvals/certificates

Country	Approval / certificate
EU	CE
US	FCC
Canada	IC
Australia / New Zealand	RCM
Russia	Type approval certificate in the field of communications
Japan	Radio Law
International	GMPCS
International	C1D2
International	Inmarsat Class 2 Type Approved and BGAN M2M Certified

Your EXPLORER 540 terminal

EXPLORER 540 overview

The EXPLORER 540 is a small, compact unit comprising transceiver and antenna in one unit.



User interfaces

The **web interface** is a built-in web interface for easy configuration. The web interface is accessed from a computer connected to the EXPLORER 540, using an Internet browser. No installation of software is needed on the computer. For further information on the web interface, see *The web interface* on page 48.

With **AT commands** you can configure and control the EXPLORER 540 from a computer using a Telnet session, or from connected equipment, e.g. in M2M applications. For further details see *To access the terminal using AT commands* on page 25.

With **SMS commands** you can configure and control the EXPLORER 540 remotely. For details, see *Remote access with SMS* on page 26.

The distributors may have their own Graphical User Interface, which could be built on e.g. Inmarsat's M2M API (M2MAP) or similar. Contact your distributor for information.

Antenna

The light-colored front of the EXPLORER 540 holds the antenna part comprising:

- GNSS (Global Navigation Satellite System) antenna supporting GPS, GLONASS and BeiDou.

- BGAN antenna.
- **Cellular modem**: If you have purchased the EXPLORER 540 LTE Modem option, you may have the cellular modem installed either on top of the compartment on the back of the EXPLORER 540, or as a standalone unit connected to the EXPLORER 540 with a USB cable. The EXPLORER 540 LTE Modem provides connection to cellular networks (2G, 3G and 4G).

SIM card

The EXPLORER 540 requires a SIM card to go online with BGAN. Without a SIM card you can still configure the terminal, but you cannot make calls nor access the internet.

Your SIM card determines whether your EXPLORER 540 is operating as an M2M terminal or as a BGAN class 2 terminal.

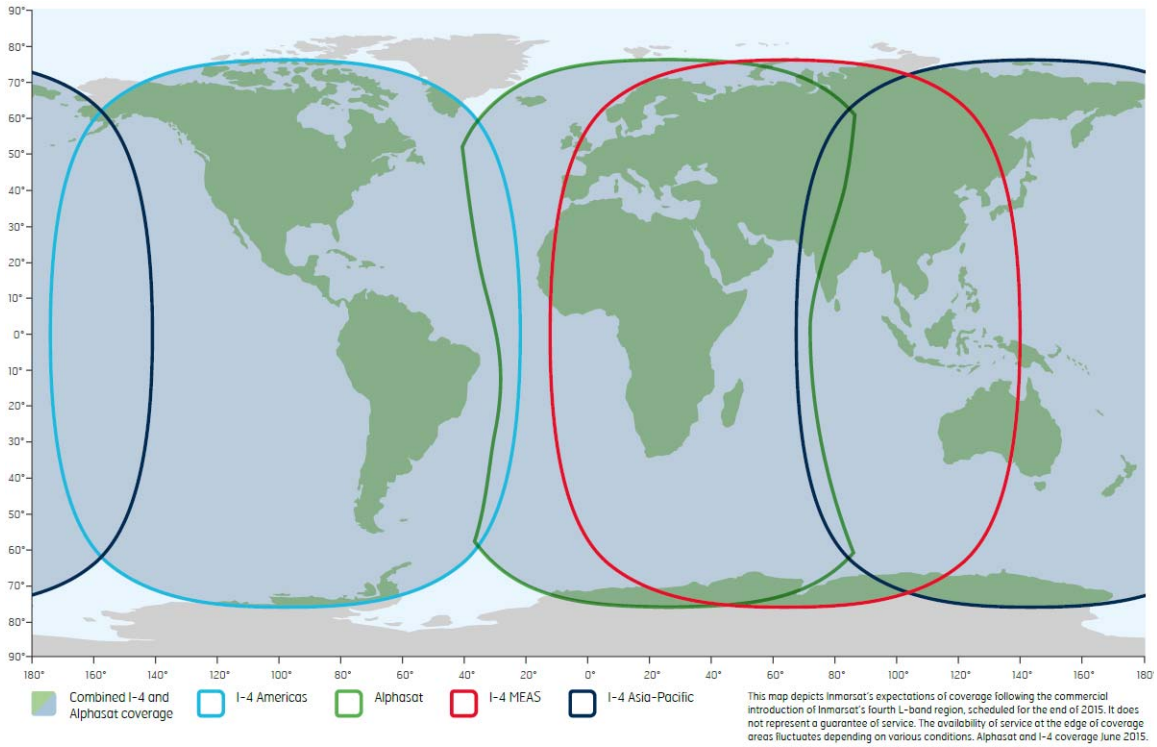
Note If you are going to use the cellular modem option, a SIM card for cellular network must be installed in the EXPLORER 540 LTE modem.

SIM lock: The supplier may have locked the SIM card to a specific provider. For further information, contact your supplier.

Services

BGAN services

The Inmarsat BGAN services are based on the BGAN I4 geostationary satellites and the Alphasat satellite. The map below shows the coverage area.



Note The services available depend on the SIM card installed in the EXPLORER 540. You can have A BGAN M2M subscription or a BGAN class 2 subscription.

BGAN M2M services

BGAN M2M gives you a data connection to remote equipment and applications. With a BGAN M2M SIM card you have the following data capabilities:

- Standard data (background and interactive) up to 464 kbps/448 kbps.
- SMS for remote management.

Not supported: Streaming and voice calls.

BGAN class 2 services

With a BGAN Class 2 SIM card you have the following data capabilities:

- Standard data (background and interactive) up to 464 kbps/448 kbps.
- Streaming data rates of 32, 64 and 128 kbps.

Via the EXPLORER 540 LAN interface, a SIP client (in a phone or M2M equipment) has the following voice capabilities:

- Standard voice 4 kbps AMBE+2 codec
- Premium voice 3.1 kHz audio 64 kbps

Additionally:

- SMS for remote management

For details about non-M2M functions, see *BGAN non-M2M functions* on page 134.

Services with optional cellular modem

With the EXPLORER 540 LTE Modem installed and "Cellular modem preferred" selected you have the following data capabilities:

- 2G, 3G or 4G data. Up to 150 Mbps (download) with LTE Cat. 4.
  For specifications see *Optional EXPLORER 540 LTE Modem* on page 114.

Not supported:

Voice calls and SMS for remote management are not supported via cellular connection, but will run on the standby BGAN connection when the EXPLORER 540 is in Cellular modem preferred mode.

For details, see *Optional: To use a cellular network* on page 7.

Optional: To use a cellular network

The EXPLORER 540 is a BGAN terminal by default. However, if you are within coverage of a cellular network, you may want to acquire an EXPLORER 540 LTE Modem and use the cellular network as your primary connection. Note that you need a separate SIM card for the EXPLORER 540 LTE Modem to access the cellular network, the EXPLORER 540 SIM card can only be used for the BGAN network.

You can install the EXPLORER 540 LTE Modem as an integrated part of the EXPLORER 540, or you can install it as a separate unit connected to the EXPLORER 540 with a USB cable (standalone).

EXPLORER 540 LTE Modem (standalone)

Note Some LTE Bands require that the LTE modem is installed in an external housing. See specifications in *Optional EXPLORER 540 LTE Modem* on page 114

For installation of the EXPLORER 540 LTE Modem, see the Installation guide that comes with the EXPLORER 540 LTE Modem.

For configuration, see *Optional: To set up cellular network for data* on page 89.

EXPLORER 540 operation in “Cellular modem preferred” mode

Normal operation

When **Cellular modem preferred** is selected under **Terminal settings**, the Automatic Context Activation (ACA) is mandatory and the EXPLORER 540 will persistently attempt to establish a data connection for both the cellular modem and the BGAN air interface.

If both data connections are successfully established, the cellular data connection will be used as the primary connection (indicated on the Web interface under **Terminal status**, **Network in use**). The BGAN data connection will be ready as backup.

The EXPLORER 540 will now route all traffic via the cellular connection. It will monitor the status of both the cellular and backup BGAN connections. If the Connection watchdog or the Advanced watchdog is enabled, this function will also be used to monitor and verify connectivity of the Cellular connection.

Limitations in "Cellular modem preferred" mode

- ACA is mandatory for both Cellular and BGAN connections.
- Streaming is not allowed as a BGAN backup connection.
- Remote Activate/Deactivate of BGAN connections is not supported.
- AT command control of the Cellular connection is not supported.
- PPPoE control of the Cellular connection is not supported.
- Use of Data limits is not supported for the Cellular connection.

Note If the Cellular connection is to be used for remote access to the E540 (or attached equipment) the Cellular USIM should have a "Static/Global IP address" that can be accessed from the WAN side. If not, once the EXPLORER 540 is connected to the cellular network, you can get the global IP address with the SMS command GETINFO, see *GETINFO: Get information from the EXPLORER 540* on page 28.

If the cellular connection fails

Note After terminal start-up or initial activation of Cellular modem preferred mode, the EXPLORER 540 will allow the Cellular connection a period of 3 min. to become operational before it is considered failing and the EXPLORER 540 switches to the BGAN connection.

If the EXPLORER 540 detects that the cellular connection is failing, it will immediately switch the traffic to the BGAN connection, which now becomes the "Network in use".

After a switch to the BGAN backup connection the EXPLORER 540 will try to recover the Cellular data connection. If the Cellular data connection is successfully re-established, the EXPLORER 540 will start to monitor and validate the Cellular connection. The EXPLORER 540 will monitor and verify connectivity for 20 min. before the Cellular connection is considered stable and ready for use again. The EXPLORER 540 will now prepare a switch back to the Cellular connection but will monitor the traffic volume in order to avoid switching while traffic volume is high. The EXPLORER 540 will monitor the traffic volume at regular intervals in order to switch back to the Cellular connection. If the traffic volume remains high the EXPLORER 540 will eventually switch back to the Cellular connection after 30 min.

If recovery of the Cellular data connection continues to fail, the EXPLORER 540 will continue to use the BGAN connection as "Network in use" until the EXPLORER 540 is restarted or the BGAN connection fails.

If the BGAN connection fails while it is "Network in use" or if the backup BGAN connection is down or fails when the EXPLORER 540 attempts to switch to the backup BGAN connection, the EXPLORER 540 will reboot in order to attempt to recover both the Cellular and BGAN connections.

If the BGAN connection fails while it is operating as standby connection, the EXPLORER 540 will try to re-establish the BGAN connection without rebooting the terminal.

System overview

Power supply and additional equipment

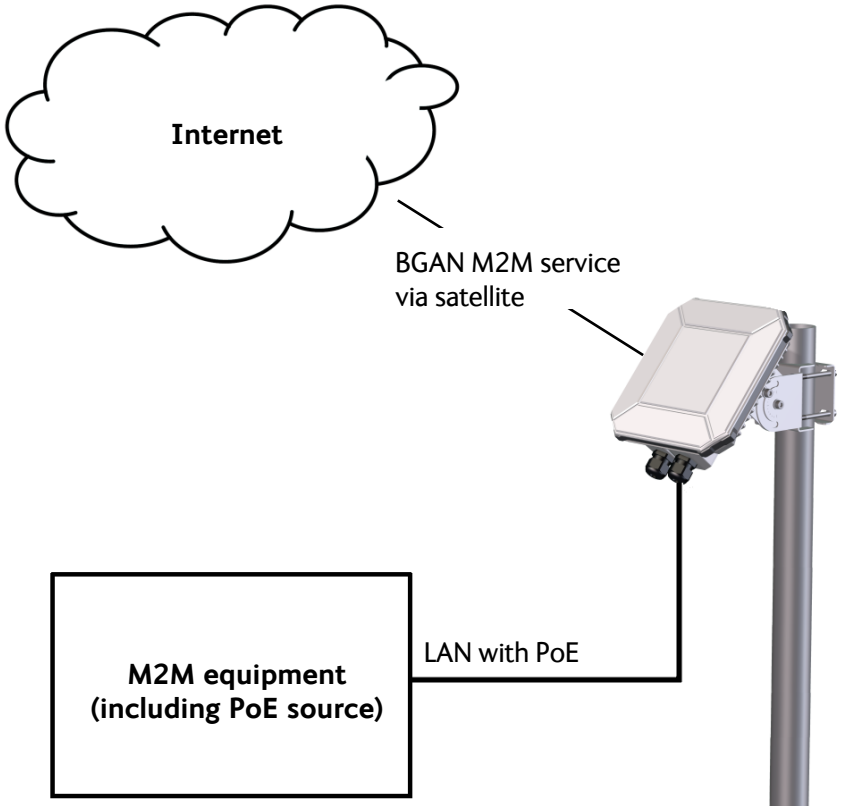
There is one LAN interface and one DC power input on the EXPLORER 540.

Note The EXPLORER 540 works as a Powered Device (PD), that is it may be powered by PoE, but it does not supply PoE.

Depending on your configuration, you may have to use a PoE switch or a PoE injector connected to the LAN interface or a battery connected to the DC input in order to provide power to the EXPLORER 540. For examples, see *M2M application examples* on page 19. You may also need to provide a switch to be able to accommodate more than one LAN connection, e.g. for local access to the web interface during installation or service.

M2M overview, example

In the example below, the M2M system has a built-in PoE switch, providing the power to the EXPLORER 540 together with the M2M communication through the LAN interface.



To get started

This chapter describes:

- *To unpack the EXPLORER 540*
- *SIM card*
- *Cable connections*
- *Fixed installation of the EXPLORER 540*
- *To power the EXPLORER 540*
- *Installation process*
- *To access the web interface*
- *M2M application examples*

To unpack the EXPLORER 540

Initial inspection

Inspect the shipping carton immediately upon receipt for evidence of damage during transport. If the shipping carton is severely damaged or water stained, request that the carrier's agent be present when opening the carton. Save the carton packing material for future use.

WARNING! To avoid electric shock, do not apply power to the system if there is any sign of shipping damage to any part of the front or rear panel or the outer cover. Read the safety summary at the front of this manual before installing or operating the system.

After unpacking the system, inspect it thoroughly for hidden damage and loose components or fittings. If the contents are incomplete, if there is mechanical damage or defect, or if the system does not work properly, notify your dealer.

What's in the delivery

The following items are included in the delivery:

- EXPLORER 540 terminal
- Pole mount kit
- 2 Cable glands and 1 Blind plug
- Torx bit for mounting/dismounting the cover for the interface enclosure
- Installation guide for EXPLORER 540

SIM card

SIM card for BGAN operation

The BGAN SIM card determines whether the terminal operates as an M2M terminal or a BGAN class 2 terminal.

Important Do not insert or remove the SIM card while the EXPLORER 540 is powered!

You insert the SIM card before installing the EXPLORER 540. The picture below shows the location of the SIM card holder, in the interface enclosure at the back of the terminal.

For details on how to insert the SIM card, see the installation guide.

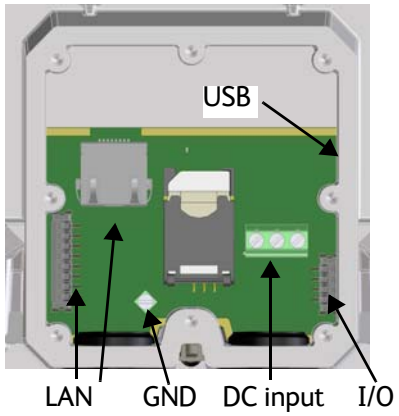
Optional: SIM card for cellular operation

The EXPLORER 540 LTE Modem must also have a SIM card installed. For details, see the Installation guide that comes with the EXPLORER 540 LTE modem.

Cable connections

There are no external connectors on the EXPLORER 540. All cable connections on the EXPLORER 540 are made during installation.

Remove the small cover at the back of the terminal and connect the cables to the relevant terminals or connectors. Two ATEX approved cable glands with gaskets are provided for the cables.



Note For C1D2 operation, use cable glands that comply with NEC501.10b.

See *Interfaces specifications* on page 108 for specifications and pin-out for the interfaces.

See the section below for instructions specific to the DC input.

See the EXPLORER 540 Installation guide for details on how to connect cables in the EXPLORER 540.

Note If you are going to use the optional EXPLORER 540 LTE Modem, connect the modem to the USB connector. For details see the installation guide included with the EXPLORER 540 LTE modem.

Instructions for power input

Requirements for DC input

Observe the following requirements for connecting to the DC input:

- Power supply: Use only fused or current limiting power supply.
- Cable requirements:
  - Wire size 1.5 mm^2, copper
  - Torque for screw terminals: 4.5 lbf in
  - Temperature rating: Min. 105 ˚C
  - Max. length: 12 m at 12 VDC, 200 m at 24 VDC
  - UV resistant cable

Requirements for LAN (PoE) input

Observe the following requirements for connecting power to the LAN input:

- Must comply with the requirements for **PoE+ IEEE 802.3at type 2 class 4**.
- Cable requirements:
  - Temperature rating: Min. 95 ˚C

To connect to the DC input

CAUTION! Make sure there is no power on the cables while you connect them to the EXPLORER 540.

Use a flat blade screw driver (max. 3.5 mm wide) to unscrew and fasten the screw terminals. Do as follows:

1. Lead the cable through the cable gasket at the DC input.
2. If the DC cable is shielded, insert the end of the shield into the terminal marked 3-GND in the DC terminal block and tighten the screw to torque 4.5 lbf in.
3. Insert the negative wire into the terminal marked 2-DCIN- in the DC terminal block and tighten the screw to torque 4.5 lbf in.

4. Insert the positive wire into the terminal marked 1-DCIN+ in the DC terminal block and tighten the screw to torque 4.5 lbf in.
5. Tighten the cable gland.

Fixed installation of the EXPLORER 540

To install the EXPLORER 540 in a fixed installation, use the pole mount kit included in the delivery.

For details on how to install the EXPLORER 540, see the included installation guide.

Important Make sure all cables are connected and the *Installation process for satellite operation* is completed before you fasten the EXPLORER 540 in your fixed installation.

To power the EXPLORER 540

The EXPLORER 540 has no power switch, but is automatically switched on when power is applied to the DC input or the LAN interface (PoE).

Use one of the following power sources (connected at installation, see the Installation guide):

- PoE+ via the LAN interface
- 12 or 24 VDC nominal, e.g. from a battery (absolute maximum rating 10.5-32 VDC)

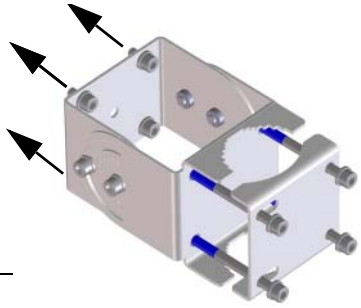
Note When you use the EXPLORER 540 with the LTE modem, a separate DC supply is recommended instead of PoE in order to supply sufficient power for the LTE modem as well as the EXPLORER 540.

Installation process

Physical installation

See also the supplied Installation guide.

A pole mount kit is included in the delivery. To mount the EXPLORER 540 on a pole, do as follows:



1. Attach the base of the pole mount bracket to the EXPLORER 540 using the included Hex L key on the 4 screws.

   CAUTION! Max. length of the screws is 9 mm! Longer screws can damage the EXPLORER 540.

2. Unscrew two of the long screws from the pole mount kit to leave one side open for the pole.
3. Place the pole mount kit with the EXPLORER 540 around the pole as shown.
4. Remount the two remaining long screws. Do not tighten the screws completely until you have pointed the antenna.

BGAN or cellular network

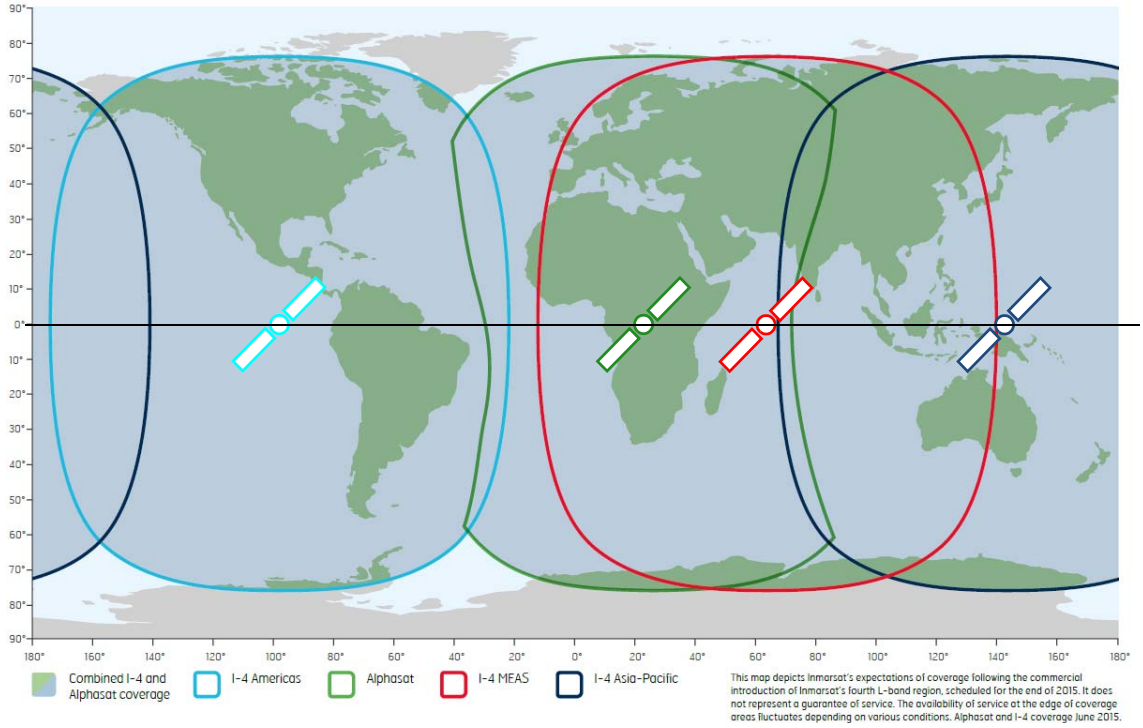
The EXPLORER 540 is a BGAN terminal. However, if you have purchased the EXPLORER 540 LTE modem option, you can use the cellular network when it is available, with BGAN as backup. See *Optional: To use a cellular network* on page 7.

To use the BGAN network, you must first point the antenna in the direction of the satellite and find the best possible signal strength. For fixed installation you only have to do this once. See the next sections for details.

Pointing

Before pointing the antenna you can use the coverage map below to find your approximate location in relation to the satellites. Pointing is part of the Installation procedure described in the next section.

The Inmarsat satellites are positioned above the equator, at the centre of each “footprint”.



Installation process for satellite operation

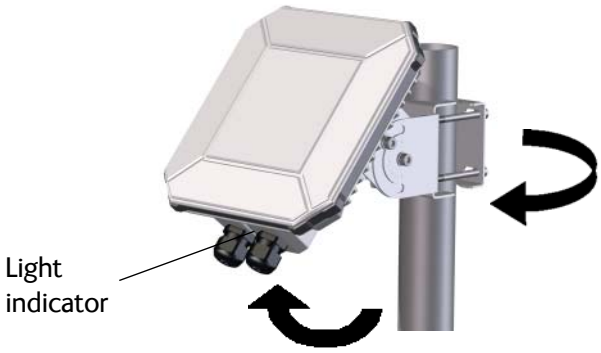
Note

PIN code: Normally you are not required to enter a PIN code for the BGAN service, because the SIM PIN is either disabled or set up for automatic validation. However, if the PIN is enabled and not set up for auto validation, you have to enter the PIN before you can access the BGAN network. For details, see *To enter the SIM PIN in the web interface* on page 87.

Note **APN**: By default, the terminal is set up to use the APN from the SIM card. However, if the SIM card requires a user defined APN, the installation process will fail, because the APN is not defined. If this is the case, use the web interface to enter the APN and restart the installation. For details, see *To change the APN for a connection package* on page 52 and *To restart the installation process (BGAN)* on page 56.

The installation process starts up automatically when you apply power to the EXPLORER 540. The process is as follows:

1. Apply power to the EXPLORER 540 from a separate power supply or from a PoE source. The light indicator between the two cable glands shows the status during startup.[1]
   - Green flashing rapidly: Starting up
   - Yellow flashing: BGAN pointing
2. When the indicator flashes yellow and you hear the pointing sound, you can start pointing the antenna.
3. Turn and tilt the EXPLORER 540 until you have obtained the highest possible signal strength (when the pointing sound is continuous you have the optimum signal, see the next section *Audio assisted pointing*).



4. Tighten the screws to fix the EXPLORER 540 in the pointed position.
   When the signal has been stable for about 60 seconds[2] the pointing procedure automatically ends, and the terminal attempts to register on the network and verify the satellite connection (indicator flashing green).

> **CAUTION!** When the connection is established, keep the minimum safety distance of **1 m from the antenna front face**. The antenna radiates microwave power as soon as the pointing procedure is completed.

5. When installation is completed successfully, the light indicator turns steady green and then, after a few minutes, the light goes off. If you have enabled Automatic Context Activation, the data connection is established automatically.

Note The LED is **always off** after successful installation, even after reboot! The LED only comes on again if you restart installation.

Note If the LED is steady yellow after pointing, it means the installation failed. See *Troubleshooting* on page 95.

1. If you have a computer connected to the EXPLORER 540, you can follow the process in the web interface, see *To restart the installation process (BGAN)* on page 56.
2. If the terminal detects a signal but the signal is not stable, it will stop the pointing process after 8 minutes and proceed with the installation process. If no signal is detected within 10 minutes, the pointing and installation process will stop and the installation status will be shown as failed.

6. The EXPLORER 540 is now ready for use. For details on how to access the EXPLORER 540 from a remote location, see *To access the terminal from a remote location* on page 26.

After successful installation, the EXPLORER 540 will automatically register on the BGAN network at every power-up and, if Automatic Context Activation is enabled, establish a data connection again. This is also the case following one of the "wake-on" actions after power save.

Audio assisted pointing

By default, the EXPLORER 540 uses a pointing sound to indicate the signal level during the pointing procedure (Audio assisted pointing). The sound pattern is as follows:

- Poor signal strength: • • • •
- Good signal strength: ••••••••••••••••••
- Optimum signal strength: ▬▬▬▬▬▬▬▬ (continuous sound instead of single "beeps")

You can disable the pointing sound using the web interface. For details, see *To enable or disable the pointing sound* on page 63.

To repoint the antenna

You may need to point the antenna again later, e.g. if the terminal has been moved or the signal is blocked.

To start the installation process again, you can do one of the following:

- Use the web interface ((Control panel) and then **Installation)**. See *To restart the installation process (BGAN)* on page 56.
- Reset the EXPLORER 540 using the Reset button inside the interface enclosure on the back of the terminal. See *Reset button* on page 94.

Do you need a PIN? (BGAN)

Important If your EXPLORER 540 is used in an unmanned M2M system, you will not be able to enter a PIN code. In this case we strongly recommend enabling **Auto SIM PIN validation** in the web interface before using the system. See below.

To avoid having to enter a PIN at startup, you have two options:

- Enable **Auto SIM PIN validation**. See *Auto SIM PIN validation* on page 75.
  With this option enabled, the EXPLORER 540 automatically sends the PIN to the SIM card at every startup. Note that if you later want change the SIM card, you should first disable Auto SIM PIN validation.
- Disable the use of a SIM PIN. See *To enable or disable the use of a SIM PIN* on page 75.
  When the SIM PIN is disabled, the SIM can be used by other terminals without a PIN.

If you are using a SIM PIN in your system, you can enter the SIM PIN from the built-in web interface. For details, see *To enter the SIM PIN* on page 87.

Note If you are asked for a PIN in the web interface and you select **Cancel**, you cannot communicate on the network, but you can access all settings.

To access the web interface

You can use the built-in web interface for configuration and operation of the EXPLORER 540. To access the web interface, do as follows:

1. Start up the terminal.
2. Connect your computer to the LAN interface of the terminal. If the terminal is already installed in your system, you must connect via a router or switch, because there is only one LAN interface on the EXPLORER 540.
3. Open your browser and enter the IP address of the terminal in the address bar. The default IP address of the terminal is **192.168.0.1**.
4. Log in as user or administrator. Default user names and passwords are:
   - **user**: User name = **user**, password = **<serial number of the EXPLORER 540>**
   - **administrator**: User name = **administrator**, password = **admin**

Important Remember to change the administrator password! See *To change the administrator password* on page 73.

If the terminal is not yet installed, it will automatically start the installation procedure and the web interface will show the progress. Otherwise the web interface will show the dashboard.

For more information on the web interface, see *The web interface* on page 48.

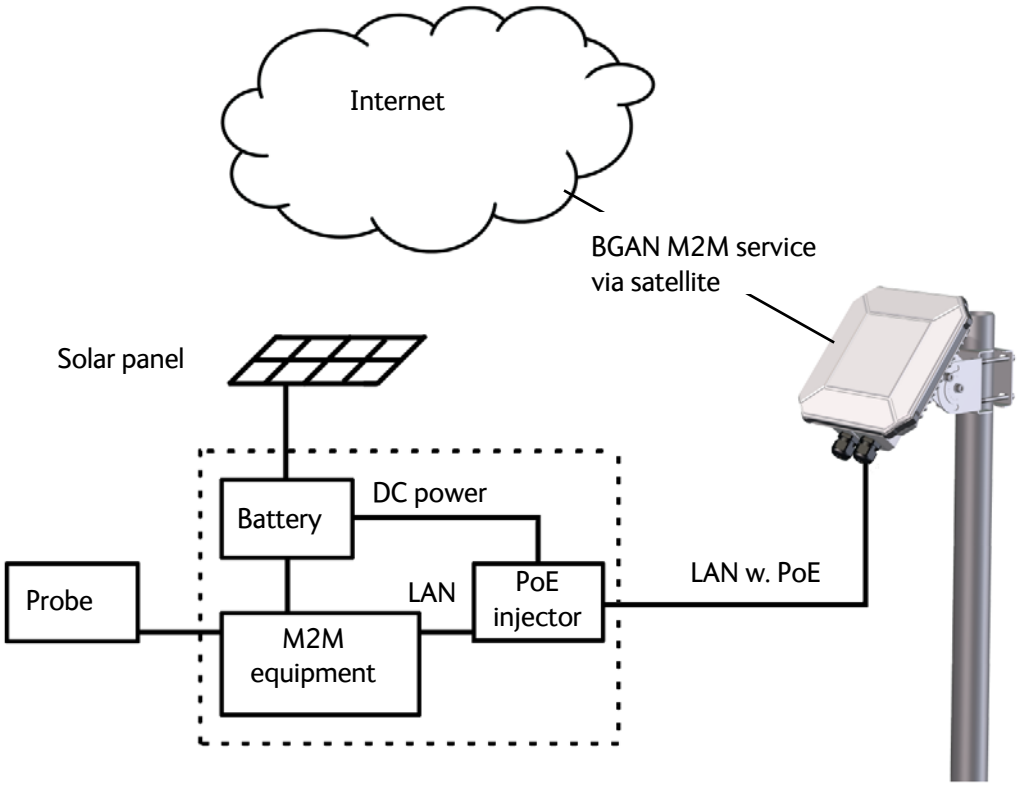
M2M application examples

When an M2M SIM card is installed, the EXPLORER 540 uses the BGAN M2M service (see *BGAN M2M services* on page 6).

If a PoE switch is not included in the connected M2M equipment, you must provide power either through the LAN interface with a PoE injector or a PoE switch connected, or from a battery connected to the DC input. The following sections show examples.

PoE injector

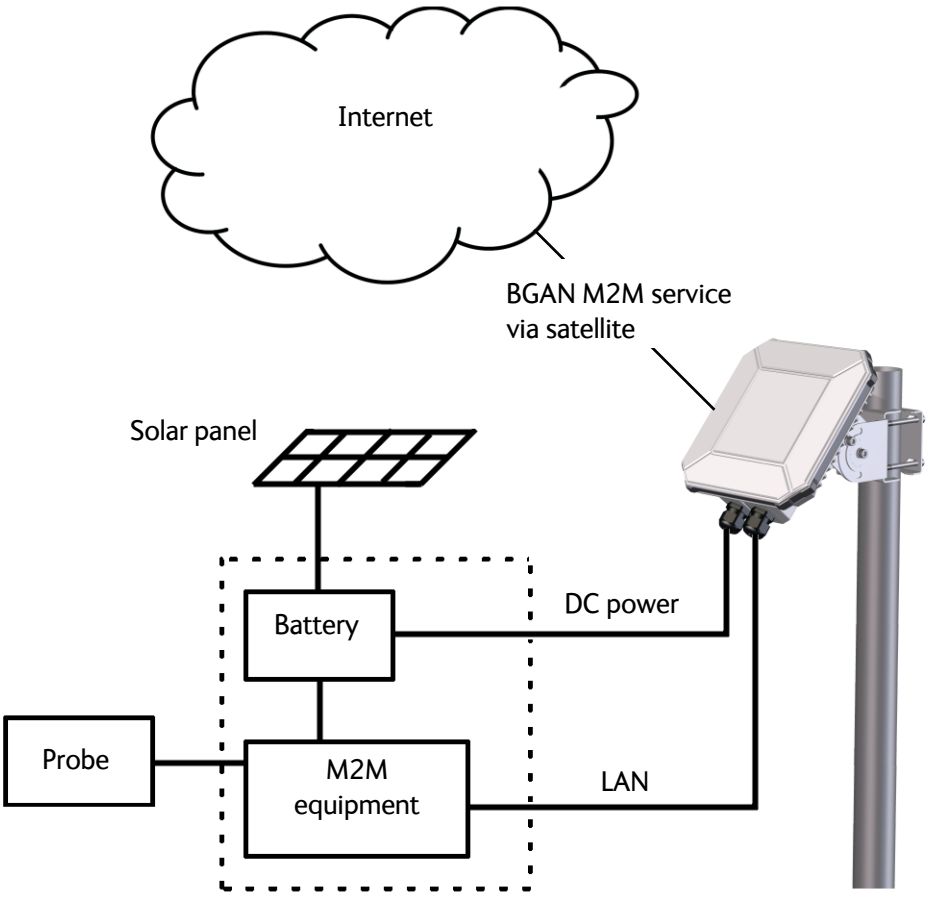
The picture below shows an example of an M2M application using a PoE injector to provide the power to the EXPLORER 540 through the LAN interface. Note that the PoE injector must comply with the requirements for **PoE+ IEEE 802.3at type 2 class 4**. The PoE injector is connected to a power supply and "adds" power to the LAN connection for the EXPLORER 540. For specifications and pinout for the LAN interface on the EXPLORER 540, see *LAN interface (X1 or X2)* on page 108.



Separate battery supply

Another example is the scenario below, where power is supplied from a separate battery connected to the DC input of the EXPLORER 540. This solution may be used e.g. if you want to limit the power consumption, or if a PoE source is not available. For specifications and pinout for the DC input on the EXPLORER 540, see *DC power input (X4)* on page 109.

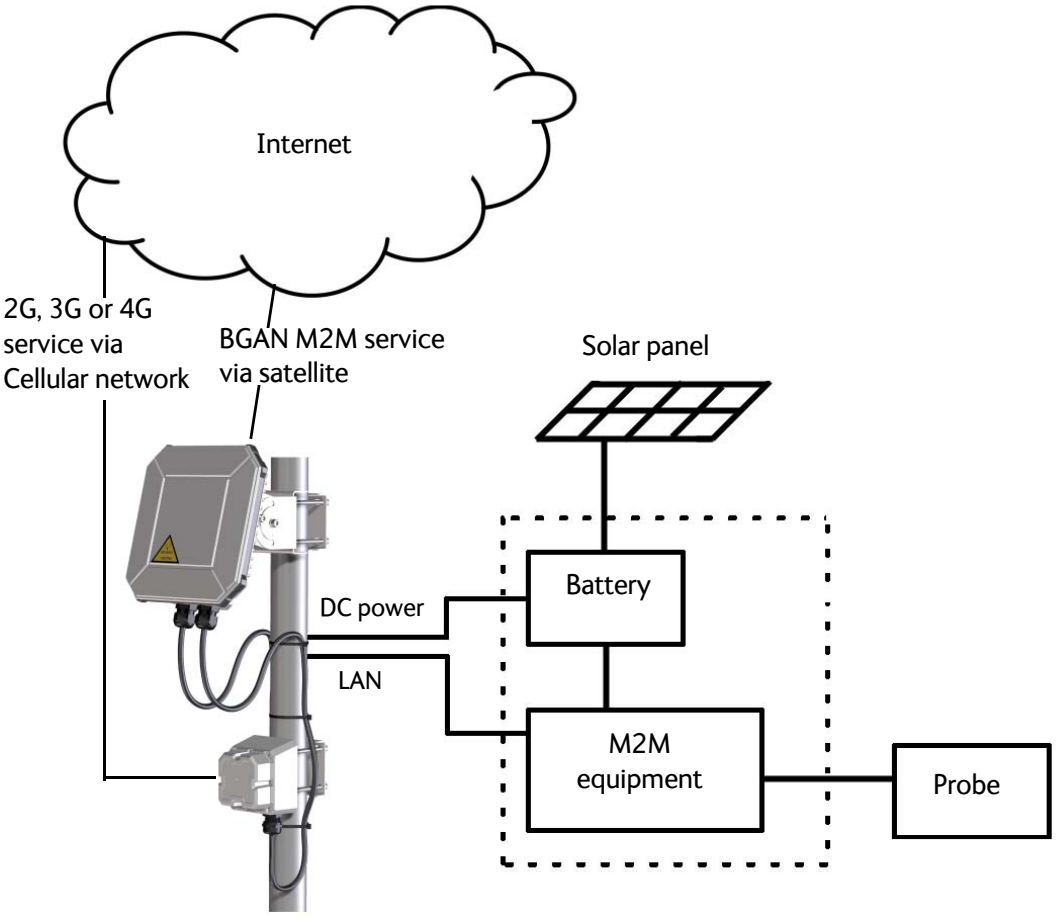
For installation instructions, see the supplied EXPLORER 540 Installation guide. Note that you must use a fused or current-limiting DC power supply (battery).



Dual operation

In the scenario below, an EXPLORER 540 LTE Modem is used to provide connection to a cellular network while the BGAN connection is used for backup. Power is supplied from a separate battery connected to the DC input of the EXPLORER 540, in order to provide enough power for both the EXPLORER 540 and the LTE Modem.

- For specifications and pinout for the DC input on the EXPLORER 540, see *DC power input (X4)* on page 109.
- For installation instructions, see the supplied EXPLORER 540 Installation guide. Note that you must use a fused or current-limiting DC power supply (battery).
- For installation instructions for the EXPLORER 540 LTE Modem, see the guide included with the EXPLORER 540 LTE Modem.

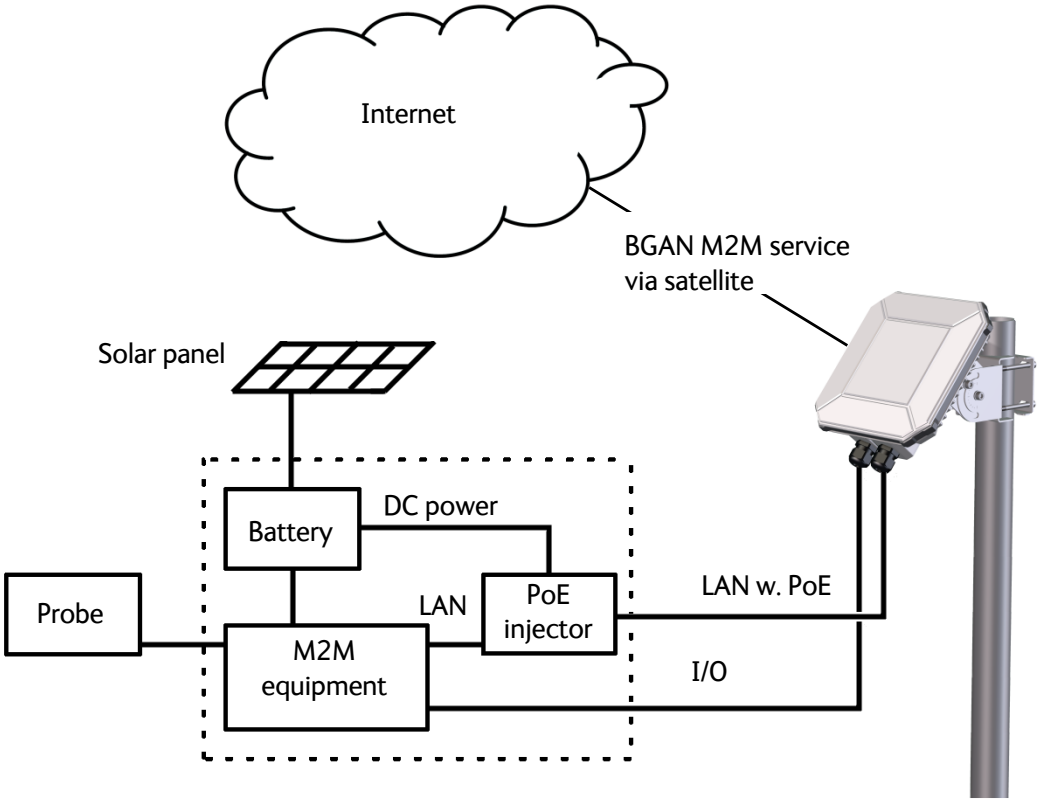


I/O pins

The EXPLORER 540 has 3 I/O pins, two assigned pins and 1 general purpose pin.

- Request wake up (input)
- Terminal ready (output)
- Control/Status input/output

The Control/Status input/output can be configured (input/output and high/low) using the web interface, and with AT commands you can control or read the status of the pin. For details on the I/O pins, see *I/O pins (Settings)* on page 85 and *I/O connector (X5)* on page 109.



Operation

This chapter describes operation and basic setup, primarily for M2M use.

For information on **configuration** with the web interface, see *Configuration with web interface* on page 47.

This chapter describes:

- *Local or remote control*
- *To access the terminal using AT commands*
- *To access the terminal from a remote location*
- *Security setup*
- *To control data connections (PDP contexts)*
- *Power-saving*
- *Remote software upgrade*
- *File transfer*
- *Status of the EXPLORER 540*

For information on functions that are **not** available with an M2M subscription but only with a standard BGAN subscription, see *BGAN non-M2M functions* on page 134.

Local or remote control

The EXPLORER 540 can be controlled both locally using the LAN interface and from a remote location over the BGAN network or optionally the cellular network. For M2M operation, remote control is essential, since the EXPLORER 540 is most likely installed in a remote location where local human access is rare and maybe difficult.

Note that different levels of access control apply to different means of access. See *Security setup* on page 34.

You have the following options:

Local control:

- web interface: Connect a computer to the LAN interface and use a browser to access the built-in web interface. See *Configuration with web interface* on page 47.
- AT-commands: Connect equipment capable of issuing AT commands to the EXPLORER 540 (e.g. in an M2M application) or connect a computer to the LAN interface and use a terminal program to send commands to the EXPLORER 540. See *To access the terminal using AT commands* on page 25.

Remote control:

- SMS commands: You can use SMS commands e.g. to start and stop your data connection and send and receive AT commands to and from the terminal. See *Remote access with SMS* on page 26.

  Note The SMS commands will always use the BGAN connection, even if the terminal is in Cellular modem preferred mode.

  If the terminal is in Cellular modem preferred mode you cannot start and stop data connections.

- AT commands: When a data connection is established you can control the EXPLORER 540 with AT commands over the BGAN satellite network or optionally the cellular network. See *To access the terminal from a remote location* on page 26 and *To access the terminal using AT commands* on page 25.

  Note In Cellular modem preferred mode you cannot use the context management AT commands.

- web interface: When a data connection is established you can control the EXPLORER 540 over the BGAN satellite network or optionally over a cellular network by accessing the built-in web interface. See *Remote access to the web interface* on page 32.
- The distributors may have their own Graphical User Interface, which could be built on e.g. Inmarsat's M2M API or similar. Contact your distributor for information.

To access the terminal using AT commands

Important Before putting the EXPLORER 540 into operation, remember to set up the security features in order to avoid unintended use. See *Security setup* on page 34.

The EXPLORER 540 supports a number of M2M specific AT commands as well as a set of general AT commands. For a list of the most common commands, see *AT commands* on page 125.

AT commands can also be encapsulated in an SMS sent to (and from) the terminal's phone number. See *Remote access with SMS* on page 26.

1. Connect your computer (or M2M equipment) to the EXPLORER 540 terminal.
   You may connect locally to the terminal or use a remote connection.
2. On the connected computer, start a Telnet session.
3. Select TCP/IP and type in the IP address and port number.
   - For **local connection**, use the local IP address of the EXPLORER 540 (default 192.168.0.1) and port number 5454.
   - For **remote connection**, use the external IP address[1] of the terminal. The port number for AT commands is normally 5454 but can be changed in the web interface **Remote management** page under **AT commands** (see *Remote management* on page 81).
4. When the connection is established, type in your AT commands. Note that you have to enter the administrator password using the AT_ICLCK command. See *Security setup* on page 34.

1. The external IP address is found in one of the following ways:
   1. If you are using SMS activation, you will receive an SMS with the IP address.
   See *ACTIVATE: Activate a data connection with an SMS (BGAN only)* on page 27
   2. Otherwise, you can use the GETINFO (ALL) command to obtain the external IP address, if you already have a session running.
   This is the IP address you must use to access the terminal.
   Note: If Static IP is included in your airtime subscription, we recommend using this static public IP address for the terminal in order to provide easy access to the terminal. To use the static IP address, you must set the APN source to SIM default. For details, see *To change the APN for a connection package* on page 52.

To access the terminal from a remote location

Remote access with SMS

Important By default, any phone number can access the EXPLORER 540 with an SMS, if they have the phone number of the terminal and the remote SMS password. Before installing the EXPLORER 540 you should set up the security measures for the terminal. See *Security setup* on page 34 and *To set up remote access with SMS* on page 82.

You can perform a number of actions and some configuration on the EXPLORER 540 using SMS commands.

Note If you are using a cellular connection as your primary network connection, the SMS commands will be sent over the BGAN backup connection.

Send an SMS to the mobile number of the terminal. The text in the SMS must start with the SMS command and follow the syntax for the SMS commands. Note that the remote SMS password (default: **remote**) must be included with every command.

For an explanation of syntax and parameters, see *SMS remote commands* on page 120. Note that the remote SMS function is password protected.

The following SMS commands are supported.

SMS command	Function
ACTIVATE[a]	Activates BGAN data connections for the device(s) connected to the EXPLORER 540.
DEACTIVATE[a]	Deactivates some or all the BGAN data connections for devices connected to the EXPLORER 540.
CLEAR	Deletes SMS messages in the EXPLORER 540.
GETINFO	Gets current information from the EXPLORER 540 such as call time, data usage, GPS position and global IP address.
RESTART	Restarts the EXPLORER 540.
WATCHDOG	Gets or allows you to set the current Connection watchdog parameters (Link monitoring).
ADVWATCHDOG	Gets or allows you to set the current Advanced watchdog parameters.
ATCO	Allows you to send M2M related AT commands to the EXPLORER 540 which returns the response in an SMS.
ADPWRST	Resets the EXPLORER 540 admin password to **admin**.
WANMODE	Gets or allows you to set the WAN connection mode (BGAN only or Cellular modem preferred)

a. These commands cannot be used in Cellular modem preferred mode.

The next sections show examples of each SMS command.

Note The following examples use the default remote SMS password, which is **remote**. the password may be different in your EXPLORER 540.

ACTIVATE: Activate a data connection with an SMS (BGAN only)

The text in the activation SMS must have the following format for activating a connection:

```
ACTIVATE 1 {DHCP|STATIC|<name>|<IP addr>|ANY} {NA|<apn>}
{NA|<apn_user>} {NA|<apn_pwd>} <rsms_pwd>
```

Example: To activate one or more connections for remote management for connected equipment with IP address(es) assigned by DHCP, using default settings (NA) for APN, APN user name and APN password, send an SMS to the terminal with the text: **`ACTIVATE 1 DHCP NA NA NA remote`**

Response:
You receive a response with the IP address you must use to access the terminal from a remote location.

Example: A confirmation SMS after sending an activation SMS may look like this:

```
IP: 161.30.181.31 (192.168.128.104)
SMS-Free: 88/100
WARNING: Ensure SMS-free > 5. Cleanup old msgs for
orderly remote-SMS-control
```

The first IP address is the global IP address assigned to the PDP context by the network, and the second IP address (in parenthesis) is the IP address (or host name, if the device was identified by host name) of the device connected on the local LAN, for which the PDP context was created.

DEACTIVATE: Deactivate a data connection (BGAN only)

The text in the deactivation SMS must have the following format for deactivating a connection:

```
DEACTIVATE 1 {DHCP|STATIC|AWO|<name>|<IP addr>|ANY} <rsms_pwd>
```

Example: To deactivate connections for all DHCP IP addresses, send an SMS to the terminal with the text: **`DEACTIVATE 1 DHCP remote`**

Response:
You receive a response showing the IP address(es) for which the connection was deactivated.

Example: A confirmation SMS after sending a deactivation SMS may look like this:

```
LOCAL IP 192.168.128.104 DEACTIVATED
SMS-Free: 77/100
WARNING: Ensure SMS-free > 5. Cleanup old msgs for
orderly remote-SMS-control
```

CLEAR: Delete SMS messages in the EXPLORER 540

The text in the CLEAR SMS must have the following format:

```
CLEAR <category> SMS <rsms_pwd>
```

Example: To delete all SMS messages from the EXPLORER 540, send an SMS to the terminal with the text: **`CLEAR 4 SMS remote`**

Response:
No response is sent for this command.

GETINFO: Get information from the EXPLORER 540

The text in the GETINFO SMS must have the following format:

```
GETINFO <info_mode> {GPS|ALL|USAGE} <rsms_pwd>
```

Example: To request all information with titles, send an SMS with the text:
`GETINFO 1 ALL remote`

Response: The response depends on the requested format (GPS/ALL/USAGE) and info mode. For the command in the example, the response would have the titles shown below.

Example:
```
IMSI: 901112112456789
IMEI: 35393803001003
LAT: 32.89495
LON:-117.20205
SW: 1.0
C/N0: 66
Beam: 84
Uptime: 59483
GIP: 161.30.23.43
```

The Uptime is in seconds, and GIP is the global IP address of the first active PDP context (BGAN or cellular, depending on the network in use).

RESTART: Restart the EXPLORER 540

The text in the RESTART SMS must have the following format:

```
RESTART 1 BGAN <rsms_pwd>
```

Example: To restart the EXPLORER 540, send an SMS with the text:
`RESTART 1 BGAN remote`

Response:
No response is sent for this command.

WATCHDOG: Get or set watchdog parameters

Request: The text in the WATCHDOG SMS must have the following format:
WATCHDOG 1 <rsms_pwd>

Modify: The text in the WATCHDOG SMS must have the following format:
WATCHDOG 2 {<ping1>|NA} {<ping2>|NA} {<ping3>|NA} <ping_always> {<ping_interval>|NA} <wdog_enable> <rsms_pwd>

Example: WATCHDOG 2 100.100.100.130 100.100.100.110 NA 0 20 1 remote

In this example, the Connection watchdog is set up as follows:
2: Set watchdog parameters.
100.100.100.130: Primary IP address.
100.100.100.110: Secondary IP address.
NA: Tertiary IP address is left unchanged.
0: Send ping only if no IP data traffic.
20: Ping interval (number of minutes between pings).
1: Enable watchdog.
remote: Remote SMS password.

Response:
You do not get an OK response. You can use the **WATCHDOG 1** command to get the status of the WATCHDOG feature.

See also *Connection watchdog (Link monitoring)* on page 36 and *SMS remote command summary* on page 121.

ADVWATCHDOG: Get or set advanced watchdog parameters

Request: The text in the ADVWATCHDOG SMS must have the following format:
ADVWATCHDOG 1 <rsms_pwd>

Response:
IMEI: <IMEI>
Advanced Watchdog enabled = <YES/NO>
Wake up = <YES/NO>
Interval = <days, hours>
IP = <ping1/NA> <ping2/NA> <ping3/NA>
APN type = “SIM default”, “Network assigned” or “User defined”
APN name = <APN> (only present if APN type is “User defined”)
APN username = <apn_user>
APN password = <apn_passwd>
Next run: <yyyy-mm-dd hh:mm/NA> (NA if AWD is not enabled) **Note: UTC time!**
Position SMS response = <YES/NO>
Position SMS number = <sms_number>

Modify: The text in the ADVWATCHDOG SMS must have the following format:
ADVWATCHDOG 2 {<enabled>|NA} {<wake_up>|NA} {<interval>|NA} {<ping1>|NA} {<ping2>|NA} {<ping3>|NA} {<apn_type>|NA} {<apn>|NA|CLR} {<apn_user>|NA|CLR} {<apn_pwd>|NA|CLR} {<pos_response>|NA} {<sms_number>|NA} <rsms_pwd>

Example: ADVWATCHDOG 2 1 1 24 100.100.100.130 100.100.100.110 200.247.237.254 0 NA CLR CLR NA NA remote

In this example, the Advanced watchdog is set up as follows:
2: Set Advanced watchdog parameters.
1: Enable Advanced watchdog.

1: Wake up the terminal from power save.
24: Run the Advanced watchdog once a day (24 hours).
100.100.100.130: Primary IP address.
100.100.100.110: Secondary IP address.
200.247.237.254: Tertiary IP address.
0: Set the APN type to SIM default (0 = SIM default, 1 = Network assigned, 2 = User defined).
NA: When the APN type is SIM default, the APN name is ignored.
CLR: The user name is cleared. When the default APN is used, any previous user name and password should be cleared, unless a new manual user name is entered (NA would maintain any previous setting).
CLR: The password is cleared. When the default APN is used, any previous user name and password should be cleared, unless a new manual password is entered (NA would maintain any previous setting).
NA: Position SMS response is not applicable (see note below).
NA: Number for position SMS response is not applicable (see note below).

Note | Position SMS response is for future use, and should be set to NA.

Response:
You do not get an OK response. You can use the **ADVWATCHDOG 1** command to get the settings of the ADVWATCHDOG feature.

See also *Advanced watchdog* on page 37 and *SMS remote command summary* on page 121.

ADPWRST: Reset the administrator password

To reset the administrator password you need the IMEI number of your terminal. If you can access the web interface, you can find the IMEI number under **Support > Extended status**, see *To view extended status* on page 71.

The text in the ADPWRST SMS must have the following format:

```
ADPWRST 1 <imei> <rsms_pwd>
```

Example: To reset the administrator password of a terminal with the IMEI number 363833-09-012345, send an SMS with the text:
`ADPWRST 1 36383309012345 remote`

Response:
You receive a response with the result of the action.

Example: A response for a successful ADPWRST command, could be:

```
ADMIN RESET SUCCESS
SMS-Free: 88/100
WARNING: Ensure SMS-free > 5. Cleanup old msgs for
orderly Remote SMS Control
```

WANMODE: Get or set the WAN connection mode

The text in the WANMODE SMS must have the following format:

```
WANMODE <cmd_op> {<wanmode>}
```

Example: To set the connection mode to Cellular modem preferred, send an SMS with the text:
`WANMODE 2 4 remote`

In this example, the WAN connection mode is set up as follows:
2: Set WANMODE parameters.
4: Select Cellular modem preferred.

Response:
You receive a response with the result of the action.

Example: The response to the command in the example above would be:
`WANMODE=4`

ATCO: Send AT commands to the EXPLORER 540

The text in the ATCO SMS must have the following format:

```
ATCO <resp_mode> <rsms_pwd> <at_cmd>
```

Example: To command the EXPLORER 540 to download new software from the default FTP server via the default APN and upgrade to the new version immediately, send an SMS with the text:
`ATCO 2 remote _IGETFW=1`

Response:
You receive a response with the result of the action. In this example we have chosen to see only the final response (`<resp_mode>` = 2) and we have chosen immediate upgrade (`<mode>` =1), so the final (and only) response will be related to the upgrade of the EXPLORER 540.

Example: For a successful completion of the command in the above example, the response would then be: `_IUPDFW: 0, Complete`

See also *ATCO response codes* on page 128.

List of supported ATCO commands:

The following AT commands are supported using the ATCO command in an SMS. For syntax and parameters, see *ATCO commands* on page 126.

- **_IGETFW** Get new firmware (and optionally install it)
  See *Remote software upgrade* on page 42
- **_IUPDFW** Update the terminal with new firmware
  See *Remote software upgrade* on page 42
- **_ISENDFILE** Send a file from the terminal to an FTP server
  See *File transfer* on page 43
- **_IGETFILE** Retrieve a file from an FTP server to the terminal
  See *File transfer* on page 43
- **_IUPDCFG** Update to a new configuration file
  See *File transfer* on page 43

- **_IREMWEB** Open a connection for remote access to the terminal's Web interface
  See *Remote access to the web interface* on page 32
- **_ICPWD** Change the terminal's admin password
  See *Security setup* on page 34
- **_IATCROBST** Configure 3GGP LTE robustness feature

Remote access with AT commands

Access the terminal as described in *To access the terminal using AT commands* on page 25. You must use the global IP address of the EXPLORER 540.

Remote access to the web interface

Note When using remote access, the web interface may take a long time to load the pages, because the Internet connection may be slow.

There are two methods of getting remote access to the web interface:

- Using the AT command _IREMWEB, e.g. sent in an SMS (ATCO command).
- Using an EXPLORER 540 that is pre-configured with trusted IP addresses.

The following sections describe these two methods.

Note Only one PDP context at a time can be used for remote web interface access.

To use AT commands to get remote access to the web interface

You can send the AT commands encapsulated in an SMS (ATCO commands). For details, see *Remote access with SMS* on page 26.

Note If remote SMS command access has been disabled, you can enable it either using the web interface or using AT commands. See *To set up remote access with SMS* on page 82 and *To set up the security with AT commands* on page 34 (step 4.).

Relevant commands:

_IREMWEB

See *ATCO commands* on page 126 for syntax and parameters.

1. To use an SMS to allow access to the web interface for specific IP addresses, send the following command:
   ATCO <resp_mode> <rsms_pwd> _IREMWEB=1,<ip address>[,<ip address>]

   Example: ATCO 2 remote _IREMWEB=1, 214.123.189.119

   In this example the command specifies no immediate response, only when the global IP address is sent along (2). The remote SMS password is **remote** and the IP address 214.123.189.119 can get remote access to the web interface (if two IP addresses are listed, it is interpreted as a range of IP addresses).

2. The EXPLORER 540 should now return an SMS response with the external IP address of the terminal.

   Example: _IREMWEB:81, GlobalIP:161.30.181.31

   81 is the response code for a remote web connection that was set up successfully. It is followed by the global IP address, which is the IP address to enter in your browser to access the web interface from the remote device with the IP address you specified in the command.

3. On the remote computer, open your web browser.

4. In the address bar of your browser, enter the global IP address of the EXPLORER 540 (received in the response above).

You should now be connected to the built-in web interface of the terminal.

Note Access to the EXPLORER 540 web interface is restricted with a password. See *Security setup* on page 34 and *Passwords* on page 73.

To get remote access to the web interface from a trusted IP address (preconfigured)

Note This method requires that you initially have local access to the EXPLORER 540. If not, use the **_IREMWEB** command described in the previous section.

1. Connect a computer to the EXPLORER 540 and access the web interface locally.

2. Prepare the terminal as described in *Remote management* on page 81.

3. Make sure your remote computer has access to the Internet.

4. On the remote computer, open your web browser.

5. In the address bar of your browser, enter the IP address of the terminal followed by a colon and the port number
   http://<ip address>:<incoming port>.
   - <ip address> is the external IP address of the EXPLORER 540. The external IP address can only be obtained when a data connection (PDP context) is established. If a data connection is started. you can get the external IP address with the GETINFO SMS command, see *GETINFO: Get information from the EXPLORER 540* on page 28.
   - <incoming port> is the port you defined in *Remote management* on page 81 (Incoming port for web application, default port 80).

Example: If the IP address of the terminal is 161.30.180.12 and the incoming port number defined in the Remote management page in the web interface is 80, enter **http://161.30.180.12:80**.

You should now be connected to the built-in web interface of the terminal.

Note Access to the EXPLORER 540 web interface is restricted with a password. See *Security setup* on page 34 and *Passwords* on page 73.

Security setup

Important By default any phone number can access the EXPLORER 540 with an SMS! To protect against unauthorized access, change the remote SMS password and make a list of trusted phone numbers. See *To set up remote access with SMS* on page 82 and *To set up the security with AT commands* below.

Overview of security measures

Since the EXPLORER 540 is most likely placed in remote areas without direct supervision, it is important to protect it against unauthorized access.

The EXPLORER 540 has the following security measures:

- User and administrator passwords for the web interface.
- Admin password for AT shell and SMS control.
- White list for SMS control (list of trusted phone numbers).
- MAC filtering.
- SIM personalization.
  Optional SIM lock (lock to provider) and optional PIN lock (lock to EXPLORER 540 terminal).
- Disable Reset button.
  One of the functions of the Reset button is to reset to factory default, which also resets the administrator password. This function can be disabled using the web interface.

You can set up these security measures in the web interface or with AT commands. see the next sections for details.

To set up the security with AT commands

For details on how to send AT commands to the EXPLORER 540, see *To access the terminal using AT commands* on page 25.

For details on syntax and parameters for the AT commands, see *AT commands* on page 125.

Do as follows:

1. Disable administration lock:
   AT_ICLCK=AD,0,<password>

   Example: AT_ICLCK=AD,0,admin

   When you get an OK reply you have administrator access to the AT shell.

2. Set new administrator password:
   AT_ICPWD=AD,<old password>,<new password>

   Note The password must be 5 to 15 characters long and cannot contain spaces. Avoid special characters. Accepted characters are: A through Z (uppercase characters), a through z (lowercase characters) and 0 through 9 (numeric characters).

Example: AT_ICPWD=AD,admin,myadmpwd

When you get an OK reply the administrator password is set to the new password (myadmpwd in the example).

3. Set new password for remote SMS:
   AT_ICPWD=RS,<old password>,<new password>

   Note The password must be 5 to 15 characters long and cannot contain spaces. Avoid special characters. Accepted characters are: A through Z (uppercase characters), a through z (lowercase characters) and 0 through 9 (numeric characters).

   Example: AT_ICPWD=RS,remote,mysmspwd

   When you get an OK reply the password for remote SMS access is set to the new password (mysmspwd in the example).

4. Disable/enable remote SMS commands:
   Disable: AT_ISMSRMT=0
   Enable: AT_ISMSRMT=1

   Important If you disable remote SMS commands there is no way to access the terminal remotely, unless you have an open data connection (PDP context)! Instead we recommend to define a set of trusted phone numbers, see *To set up remote access with SMS* on page 82.

5. Specify a white list of trusted MAC addresses:

   Note Until MAC address filtering is enabled, all MAC addresses are allowed and the white list has no effect.

   AT_IMACLOCAD=1,0,<MAC address>[,<MAC address> (etc.)]

   Example: AT_IMACLOCAD=1,0,00:B5:E0:76:FD:C2,00:B5:A0:84:F9:E2

   When you get an OK reply, the specified MAC addresses are added to the white list.

   Important Remember to add the MAC address of your own device. Enabling the MAC address locking without adding your own device MAC address will block for any local access to the Terminal!

6. Turn on MAC address filtering:
   AT_IMACLOC=1,0
   When you get an OK reply, MAC address filtering is enabled for Ethernet, and only the MAC addresses specified in the white list can get access (previous step).

7. Enable administration lock:
   AT_ICLCK=AD,1,<password>

   Example: AT_ICLCK=AD,1,myadmpwd

   When you get an OK reply, the system is protected with the administrator password.

To set up the security with the web interface

If you want to setup the security with the web interface, see the following sections:

- User and administrator passwords for web interface: *Passwords* on page 73.
- Admin password for AT shell (same as for web interface): *Passwords* on page 73.
- Password for remote SMS access: *To set up remote access with SMS* on page 82.
- Trusted phone numbers for SMS control: *To set up remote access with SMS* on page 82.
- MAC filtering: *To manage connected devices (Traffic control)* on page 65.
- SIM personalization: *Auto SIM PIN validation* on page 75 and *SIM lock* on page 76.
- Disable Reset button: *Reset button* on page 86.

To control data connections (PDP contexts)

Automatic Context Activation (ACA)

In the web interface you can set up the EXPLORER 540 to automatically establish a data connection when it is registered on the satellite network. See *To set up the connection mode* step 3. on page 62. Automatic Context Activation also applies to the "wake-on" actions after power save mode (see *Power-saving* on page 40) and by recovery after e.g. loss of power.

If the terminal is in Cellular modem preferred mode, ACA is mandatory on both the cellular and the BGAN connection, i.e. a data connection is automatically established on both networks.

Connection watchdog (Link monitoring)

If you are not using the Advanced watchdog function, it is strongly recommended to use the Connection watchdog function to monitor your locally established IP connection, as it enables you to test the BGAN connectivity and to keep your PDP context alive.

With this feature activated, the terminal will send out ping commands to up to three servers of your choice. When a data session is started, the terminal will start sending ping commands to the Primary IP address the number of times specified. If no response is received, it will send the same number of ping commands to the Secondary and then Tertiary IP address, if available. If no response is received from any of the IP addresses, the terminal will eventually restart.

For configuration with the web interface, see *Connection watchdog (Link monitoring)* on page 77.

For configuration with SMS command, see *WATCHDOG: Get or set watchdog parameters* on page 28.

Note The Connection watchdog only works when the data connection is started locally by equipment connected to the EXPLORER 540. Data connections started with the SMS command ACTIVATE cannot be monitored with the Connection watchdog.

Advanced watchdog

The Advanced watchdog monitors the terminal to ensure that it remains operational. It continuously monitors valid system time (UTC) and CS attach (the BGAN circuit-switched connection) status. Additionally, at regular intervals set by the user, the Advanced watchdog can wake up the terminal from power save, start a data connection and verify a positive response to a ping request.

For configuration with the web interface, see *Advanced watchdog* on page 78.

For configuration with SMS command, see *ADVWATCHDOG: Get or set advanced watchdog parameters* on page 29 and *SMS remote commands* on page 120.

Manual activation of data connections

You can manually activate a data connection in the following ways:

- Remote: Send an SMS to the EXPLORER 540. See *ACTIVATE: Activate a data connection with an SMS (BGAN only)* on page 27.
- Local (EXPLORER 540 LAN interface):
  - Access the web interface locally and click the tile for the data connection on the dashboard. See *To start and stop data connections* on page 51 or
  - Send an AT command to the terminal. See *To configure the connected equipment for PPPoE* on page 38 (the example), *To access the terminal using AT commands* on page 25 and *Context management AT commands* on page 131.

Cellular connection: If you are using the optional cellular connection with the EXPLORER 540 Modem, the data connection is started automatically when the cellular connection is established. For details, see *Optional: To set up cellular network for data* on page 89.

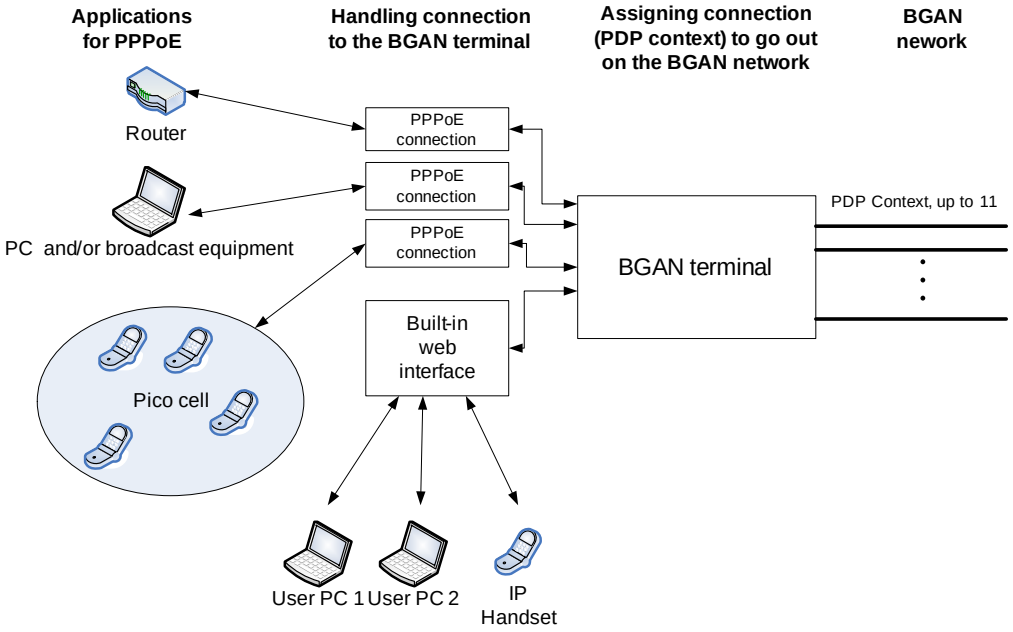
PPPoE (Point-to-Point Protocol over Ethernet), BGAN only

Overview

You can establish a PPPoE connection to the BGAN network using the EXPLORER 540 system. Use PPPoE if you want to control your connection independently of the web interface.

Note You cannot use PPPoE to control a cellular connection.

The following drawing shows connections managed through PPPoE and web interface respectively.



To configure the connected equipment for PPPoE

How to configure your equipment depends on the type of equipment. Refer to the user documentation of the equipment. As a minimum, you need to configure the **user name and password** in your equipment in order to make PPPoE work with the terminal

The user name and password can be left blank (or insert user name: void and password: void). Then the registration on the Access Point is most commonly done in such a way that the data connection is established with a dynamic IP address from the airtime provider.

To request a static IP (if subscribed to) from the Access Point you must type in the user name and password from your airtime subscription.

Note for MAC OS: User name and password are required. For some ISPs you can use user name void and password void. Contact your airtime provider for further information.

To send commands with PPPoE

You can use the command **`XBB:<AT String>`** to send AT commands over PPPoE.

Example: To start a Standard data connection with the Context identifier "1", type
`XBB:AT+CGDCONT=1,ip,bgan.inmarsat.com;+CGEQREQ=1,3`

Note that there are two commands involved, +CGDCONT and +CGEQREQ.

+CGDCONT defines the context ID (1), the connection type (IP) and the APN (bgan.inmarsat.com).

+CGEQREQ starts a data connection for the defined context ID (1) using traffic class Standard data (3).

Note that because the traffic class is 3 (Standard data), the remaining parameters (max. and guaranteed bit rates etc.) are omitted. See also *Context management AT commands* on page 131.

No further configuration is needed to make a Standard IP data connection to the Internet.

See the table below for information on how to configure specific services for your PPPoE connection.

If you need a certain service, for example a Streaming class (not available in M2M subscription), you must type in a specified text string when asked for a service name. The following table shows the service names supported by the terminal.

Text to type in the Service Name field	Function
(Blank)	Initiates a Primary Standard Data connection (default)
XBB:BACKGROUND	Initiates a Primary Standard Data connection (same as blank)
XBB:STREAM32K[a]	Initiates a Primary Streaming 32 kbps connection
XBB:STREAM64K[a]	Initiates a Primary Streaming 64 kbps connection
XBB:STREAM128K[a]	Initiates a Primary Streaming 128 kbps connection
XBB:<AT String>	This allows the PPPoE clients to enter a full AT context activation string. Examples: XBB:AT+CGDCONT=1,ip,"bgan.inmarsat.com" XBB:AT+CGEQREQ=1,1,64,64,64,64

a. Streaming is not available for M2M subscription

Power-saving

Power save mode

In Power save mode, the terminal deregisters and gracefully closes down the terminal to save power.

Note The following conditions will prevent the terminal from entering Power save mode:

- The web interface is open
- Data/SMS traffic
- Software update ongoing
- Incoming/outgoing calls
- LAN activity
- Wake up input pin (GPI-1) active

To use the Power save mode you must configure one or more "wake up" methods:

- Wake up on daily basis
- Wake-on-LAN
- Wake up on input pin (dedicated I/O pin)

General power save settings:

- Set the number of minutes without any activity (Idle time) before the terminal enters power save mode.
- Set whether or not the power save function should be prevented when a satellite connection (PDP context) is open (only configurable with web interface).

You can also configure the wake up methods and the general power save settings in the web interface. See *Power save (Settings)* on page 84.

To set the idle time before power save

If you are using Power save mode and none of the conditions that prevent Power save mode are present (mentioned in the note above), the system will go into Power save mode after a defined idle time.

Note If the Idle time is set to "0", the Power save function is disabled!

For configuration with AT commands, use the AT command _IPWSAVSCHD as follows:

1. Set the idle time before power save:
   AT_IPWSAVSCHD=<psmode>,<psvalue>

   Example: AT_IPWSAVSCHD=IDLE_TRG,15

   In this example, the power save mode is idle time (IDLE_TRIG), and the idle time before the terminal enters power save mode is 15 minutes.

Important Remember to configure minimum one of the wake up functions described below - otherwise the EXPLORER 540 will not be able to enter power save mode.

For configuration with the web interface, see *Power save (Settings)* on page 84.

Wake up on daily basis

Note The EXPLORER 540 operates with UTC time.

Daily wake up is a method to save power by setting a timer to regularly wake up the terminal. When this is used in combination with the output pin that reflects whether the terminal is awake, it allows for power efficient regular operation of M2M equipment, e.g. for transmission of environmental probe measurements. For information on the "Terminal ready" output pin see *I/O connector (X5)* on page 109.

To configure wake up on daily basis

Note If the wake-up time of day is set to "0", the "Wake up time of day" function is disabled!

For configuration with AT commands, use the AT command _IPWSAVSCHD as follows:

1. Set the time of day that the terminal must wake up from power save:
   AT_IPWSAVSCHD=<psmode>,<psvalue>

   Example: AT_IPWSAVSCHD=TOD_TRG,24:00

   In the example above, the power save mode is the Time Of Day (TOD), and the time of day to wake up from power save is 24:00 UTC time.

For configuration with the web interface, see *Power save (Settings)* on page 84.

Wake-on-LAN

Wake-on-LAN is a method to wake up the terminal from power save mode by sending a so-called magic packet from the locally connected equipment to the LAN interface in the terminal.

In the web interface you can enable or disable the Wake-on-LAN function. See *Power save (Settings)* on page 84.

Wake up on input pin (GPI)

The **Request wake up** pin (pin 1, input) allows the M2M equipment to signal to the terminal whether it should wake up (active) or attempt to go into power save mode.

In the web interface you can:

- Enable/disable the input pin
- Select the polarity of the input pin (Active high/low)

See *Power save (Settings)* on page 84 and *I/O connector (X5)* on page 109.

Remote software upgrade

User initiated software upgrade

You can initiate a remote software upgrade with an AT command, either from the command interface or encapsulated in an SMS (ATCO command).

_IGETFW tells the terminal to get software from an FTP server and either upgrade the terminal software or download the software file to the terminal for later upgrade.

Note FTP server: With M2M subscription you can use Inmarsat's M2M FUP server (default FTP server for software upgrade). This is not available for Non-M2M subscriptions.

_IUPDFW tells the terminal to upgrade its software to the downloaded file.

For Syntax and parameters, see *ATCO commands* on page 126.

To upgrade the software

If you have an M2M subscription, the EXPLORER 540 should be available from the Inmarsat FTP server. If not, download the new software[1] or acquire the software from Cobham SATCOM and place it on your FTP server.

1. To access the EXPLORER 540, use one of the following:
   - a computer connected to the Internet, see *Remote access with AT commands* on page 32, or
   - equipment connected to a cellular network, see *Remote access with SMS* on page 26.

   Note that you need a password for both access methods. For AT commands, use the AT_ICLCK command with the admin password, for SMS, use the remote SMS password.

2. Use the command **_IGETFW** to initiate the software download (and maybe upgrade) from the specified FTP server. If you are using default APN and default FTP server these can be left out.

   Example: AT_IGETFW=1

   In this example, the terminal will get the software from the default FTP server via the default APN and download and then upgrade the software in the terminal.

   Note The Inmarsat FTP server for firmware upgrade is only available with M2M subscription. If you have a non-M2M subscription you must specify a third party FTP server for the software upgrade.

3. The terminal prepares for software update, connects to the specified FTP server and downloads the software image.
   If you have selected **Deferred update** (_IGETFW=0), you have to use the command **_IUPDFW** followed by the file name when you want the terminal to upgrade the software.

1. You can download the software from the "Cobham SYNC Partner Portal" at www.cobham.com/satcom, select **Cobham SYNC Partner Portal** > **Downloads**. Locate the EXPLORER 540 software.

4. If you have selected **Immediate update** (_IGETFW=1), the terminal updates the system, reboots, installs the update and verifies the online connection.

5. When the software upgrade is successfully completed you get an AT or SMS command response with the message **Complete**.

   Example:_IUPDFW: 0, Complete

For configuration with the web interface, see *To update software* on page 71.

File transfer

Using AT commands, you can transfer a configuration file or a log file between the EXPLORER 540 (local directory in EXPLORER 540 is "/") and an FTP server over the satellite network.

_IGETFILE tells the terminal to get a file from an FTP server (e.g. a configuration file).

_ISENDFILE tells the terminal to send a file to an FTP server (e.g. a log file).

_IUPDCFG tells the terminal to update the EXPLORER 540 configuration with the contents of the previously downloaded configuration file.

For Syntax and parameters, see *ATCO commands* on page 126.

Configuration file

If you need to reuse a configuration in other terminals of the same type, you can save your current configuration to a file, which can then be loaded into the other terminal(s).

Note Be aware that if the terminals have different software versions, some of the settings may be different than expected. If possible, use the same software version in the terminals.

Save configuration

To command the EXPLORER 540 to save its configuration to a file and transfer it to an FTP server, do as follows:

1. To access the EXPLORER 540, use one of the following:
   - a computer connected to the Internet, see *Remote access with AT commands* on page 32, or
   - equipment connected to a cellular network, see *Remote access with SMS* on page 26.

   Note that you need a password for both access methods. For AT commands, use the AT_ICLCK command with the admin password, for SMS, use the remote SMS password.

2. Send the command **_ISENDFILE** to the EXPLORER 540 to make it send the configuration file to the specified destination on your FTP server.

   Example: **AT_ISENDFILE="/","config.txt","ftpdirectory","ftp.myftpserver.com","ftp-username","ftp-password"**

In this example. the terminal will look for a file named **config.txt** in the local directory (**/**) in the terminal, and send the file to the directory **ftpdirectory** on the FTP server named **ftp.myftpserver.com**. The user name **ftp-username** and password **ftp-password** give access to the FTP server. The default APN is used (APN info is left out).

3. You get a response command that the file was transferred successfully.

   Example: `_ISENDFILE: 0, Complete`

Load configuration

To command the EXPLORER 540 to update its configuration, do as follows:

1. Place the configuration file on your FTP server.
2. To access the EXPLORER 540, use one of the following:
   - a computer connected to the Internet, see *Remote access with AT commands* on page 32, or
   - equipment connected to a cellular network, see *Remote access with SMS* on page 26.

   Note that you need a password for both access methods. For AT commands, use the AT_ICLCK command with the admin password, for SMS, use the remote SMS password.
3. Send the command **_IGETFILE** to the EXPLORER 540 to download the configuration file from the specified FTP server.
   Leave out APN information if you are using default APN.

   Example: AT_IGETFILE=**"**ftpdirectory**"**,**"**config.txt**"**,**"/"**,**"**ftp.myftpserver.com**"**, **"**ftp-username**"**,**"**ftp-password**"**

   In this example. the terminal will look for a file named **config.txt** in the directory **ftpdirectory** on the FTP server named **ftp.myftpserver.com** and download the file to the directory named **/** in the terminal. The user name **ftp-username** and password **ftp-password** give access to the FTP server. The default APN is used (APN info is left out).
4. Use the command **AT_IUPDCFG** to upgrade the EXPLORER 540 configuration using the file downloaded in step 3.

   Example: AT_IUPDCFG=config.txt

   This command will take the downloaded configuration file named **config.txt** and use it to update the configuration of the EXPLORER 540.

   Note The terminal will reboot when the configuration is updated.
5. You get a response command that the configuration was successfully upgraded.

   Example:`_IGETFILE: 0, Complete`

To save or load a configuration using the web interface, see *To save or load a configuration* on page 76.

Log file(s)

Using AT commands, you can command the EXPLORER 540 to send the following log files to an FTP server:

- Diagnostics report: **diagreport.tar.gz**. A report containing useful information for troubleshooting (includes the logs below as well as other information).
- Event log: **event.csv**. A log of events that are signalled to the user.
- System log: **syslog.log**. A log of internal events in the EXPLORER 540.
- AT command log: **at_log.txt**. A log of all AT commands sent and received by the EXPLORER 540.

To command the EXPLORER 540 to send a log file to an FTP server, do as follows:

1. To access the EXPLORER 540, use one of the following:
   - a computer connected to the Internet, see *Remote access with AT commands* on page 32, or
   - equipment connected to a cellular network, see *Remote access with SMS* on page 26.

   Note that you need a password for both access methods. For AT commands, use the AT_ICLCK command with the admin password, for SMS, use the remote SMS password.
2. Send the command **_ISENDFILE** to the EXPLORER 540 to make it send a log file to the specified destination on your FTP server.

   Example: _ISENDFILE="/","syslog.log","ftpdirectory","ftp.myftpserver.com","ftp-username","ftp-password"

   In this example. the terminal will look for a file named **syslog.log** in the local directory **/** in the terminal, and send the file to the directory **ftpdirectory** on the FTP server named **ftp.myftpserver.com**. The user name **ftp-username** and password **ftp-password** give access to the FTP server. The APN is left out to indicate that the default APN is used.
3. You get a response command that the file was transferred successfully.

   Example: `_ISENDFILE: 0, Complete`

Using the web interface you can see the Event log and create a diagnostics report. See *Log files* on page 104.

Status of the EXPLORER 540

There are basically three ways of getting status from the EXPLORER 540:

- Access the built-in web interface. The Status page shows information such as terminal status, network status, position status and ongoing communication. See *Status information* on page 54.
- Send the SMS command **GETINFO** to the EXPLORER 540. This commands retrieves information from the EXPLORER 540 such as call time, data usage, GPS position and global IP address. For details, see *ATCO commands* on page 126.
- I/O pins
  - I/O pin 2 (Terminal ready output). If you connect to this pin you can get information on whether or not the terminal is ready to communicate with connected equipment. See *Power save (Settings)* on page 84 and *I/O connector (X5)* on page 109.
  - GPIO pin 3, see next section.

Additionally, until installation is completed you can use the LED to follow the status. See *Light indicator* on page 99.

Control or status with GPIO pin 3

The GPIO pin 3 is configurable in the web interface to be input or output, and active low or active high. You can use the AT command _ITGPIO to activate or deactivate the pin (if configured as output) or read the status of the pin (if configured as input).

For configuration, see *I/O pins (Settings)* on page 85.

For specifications, see *I/O connector (X5)* on page 109.

To read the status of GPIO pin 3 (input)

Do as follows:

1. Configure GPIO pin 3 in the web interface to be input.
2. Send the command **_ITGPIO?** to the terminal.
3. You get a response saying whether the pin is active or inactive (1 is active, 0 is inactive). Note that the setting in the web interface determines whether the pin is active high or low.

   Example: **_ITGPIO: 1**
   OK

To activate or deactivate GPIO pin 3 (output)

Do as follows:

1. Configure GPIO pin 3 in the web interface to be output.
2. Send the command **_ITGPIO=1** (activate) or **_ITGPIO=0** (deactivate) to the terminal.
3. You get an **OK** response when the pin is successfully activated or deactivated.

Configuration with web interface

This chapter describes how to use the **web interface** to operate, set up and configure your system. It has the following sections:

- *The web interface*
- *To control data connections from web interface*
- *Status information*
- *The Control panel*
- *To restart the installation process (BGAN)*
- *To use the logs*
- *To manage connected devices (Traffic control)*
- *Support features*
- *Terminal settings*
- *To set up your data connection packages (BGAN M2M)*
- *To set up tracking*
- *Advanced settings*
- *To enter the SIM PIN in the web interface*
- *Optional: To set up cellular network for data*

The web interface

What is the web interface?

The web interface is built into the terminal and is used for operating, setting up and configuring the system.

You can access the web interface from a computer with a standard Internet browser.

To access and navigate the web interface

To access the web interface

To access the web interface, do as follows:

1. Start up the terminal.
2. Connect your computer to the terminal.
   You can connect locally to the LAN interface or use a remote connection. See *Remote access to the web interface* on page 32.
3. Open your browser and enter the IP address of the terminal in the address bar.
   For local connection, the default IP address of the terminal is **192.168.0.1**.
   For remote connection, see *Remote access to the web interface* on page 32.
4. Enter user name and password. You can log in as user or as administrator.
   - Default for user: User id = user, Password = <serial number of the EXPLORER 540>
   - Default for admin: User id = administrator, Password = admin

   Note If the same user enters a wrong password 5 times in a row, he is locked out for 15 minutes (other users can still access the login page). After 15 minutes he can try again.

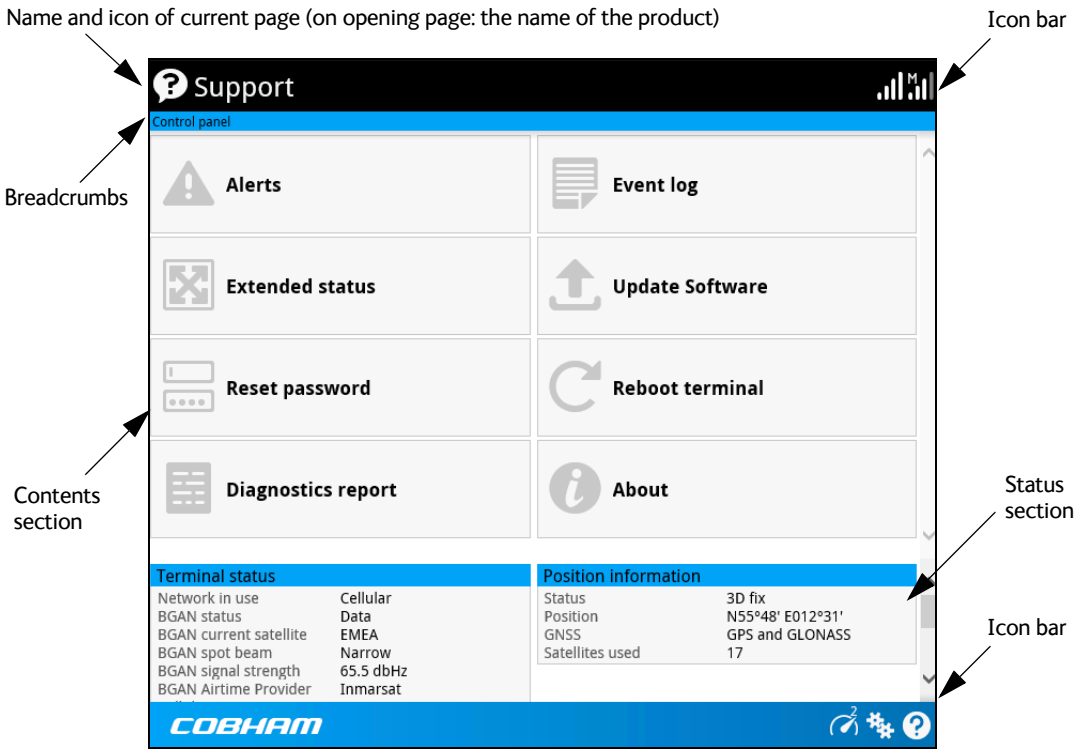
Note Some parts of the web interface may not be accessible if the user permissions are limited. For information on how to set up user permissions, see *To set up user permissions* on page 74.

If the installation process is ongoing, the web interface will show a popup window with the progress of the installation process.

You can change the language to **French**, **German**, **Russian**, **Spanish**, **Chinese** or **Japanese**. See *To select the language* on page 63.

Overview of the web interface

When the web interface opens, the title bar shows the name of the product. The example below shows the Support page.



The web interface consists of the following sections.

- **Name** of current page. Tap or click to refresh the page.
- **Icon bars** at the top and bottom are present on all pages and hold icons that give access to status such as signal level as well as active alerts, when relevant. It also holds the icon for the Control panel. For explanations of the icons, see the next section, *Icons in the icon bars*.
- **Breadcrumbs** right below the icon bar show the current location in the menu system and gives access to the higher levels in the menu.
- **Contents section** shows the contents of the selected page. This section is used for viewing or changing settings, or for performing actions. On the opening page, this section is used to start and stop data connections.
- **Status section** shows the status of the terminal and the network connection (BGAN and Cellular if used), position information, ongoing calls and data sessions etc. The Status section is not shown on small screens. If the screen is small (e.g. on a smartphone), you can show/hide the status by clicking at the bottom of the page.

Icons in the icon bars

The icon bars are always available at the top and bottom of the web interface. Some of the icons are permanent while others are temporary.

Icon	Explanation
	Signal level of the external network (BGAN).
	Signal level of the external network (Cellular).
	Help. Click to get context-sensitive help for the current page.
	Control panel. Click to access the settings.
	Startup page where you can start and stop data connections. Click to go to the startup page.
	The "1" at the icon shows that a BGAN data connection package is running.
	Status. If the screen is not large enough to show the status field, this icon appears at the bottom of the page. Click the icon to see status of the terminal and satellite connection. Click again to exit the status page.
	An alert is active. Click the icon to see a list of active alerts. Note that this icon will remain in the icon bar as long as the alert is still active.

To navigate the web interface

- **To access status and settings**, tap or click the relevant icon in the icon bar or select to access the **Control panel**. The status or settings are displayed in the contents section.
- **To see your current location and to move back through the Control Panel menu**, use the breadcrumbs just below the icon bar.
- **To scroll through longer pages**, use the scroll bar or swipe.
- **To refresh the current page**, press Ctrl+F5 (PC) or Apple+R (Apple) or Cmd+R (Apple).

To control data connections from web interface

The startup page of the web interface is used to start and stop data connections and to set up the data connections.

Note With a non-M2M subscription you have more options for the data connection. See Appendix C, *BGAN non-M2M functions*.

To start and stop data connections

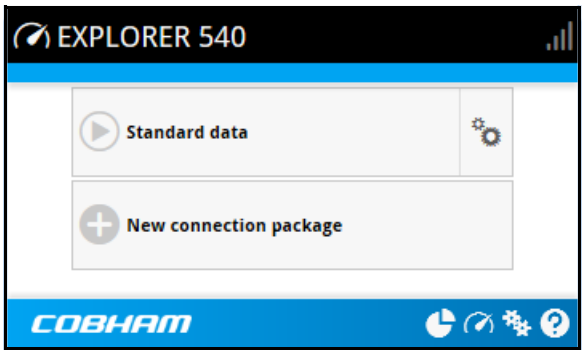
By default, you must activate your data connection before you can access the Internet. However, you can enable Automatic Context Activation, see step 3. on page 62.

Note The icons for starting ▶ and stopping ■ connections are only active if the terminal is ready and registered on the BGAN network. Otherwise the text is greyed out and you cannot start data connections.

If you have a cellular modem installed and the EXPLORER 540 is in Cellular modem preferred mode, you cannot start and stop data connections. For details, see *Limitations in "Cellular modem preferred" mode* on page 7 and *To set up the connection mode* on page 60.

To start and stop data connections on your EXPLORER 540, do as follows:

1. In the opening page, locate the connection package you want to start.



2. Click ▶ to start the connection. The connections icon at the bottom of the page shows 1 when a BGAN data connection package is running.
3. Click ■ to stop the connection.

If the connection fails, the connection tile shows an exclamation mark ⓘ and an error message. The error message is also shown in the data log, see *Data log* on page 58.

When a connection is active, the icon changes to ■ and the tile for the active connection shows:

- IP address: The external IP address that has been assigned by the service provider to this session. If the connection was started by remote SMS, the local IP address is also shown.
- Transferred data: For Standard data, the tile shows the total amount of transmitted and received data since the connection was established.

To set up your data connection packages (BGAN M2M)

Note This section only describes the Standard data connection available with M2M subscriptions. For information on BGAN class 2 subscription, see *To set up data connections* on page 136.

Note You must be logged in as administrator to be able to change the settings for a data package.

To change the name of a connection package

To change the name of a connection package, click in the right side of the tile with the connection package.

Click **Properties**, type in the new name and click **Save**. The new name is shown on the tile on the startup page.

To change the APN for a connection package

By default a connection package is set to use no IP Header compression and to use the APN (Access Point Name) from the SIM card. This is suitable for most applications.

Note It is recommended to leave **IP Header compression** disabled. This means that the data packets are transmitted more reliably with less data loss.

If you want to use a different APN, do as follows:

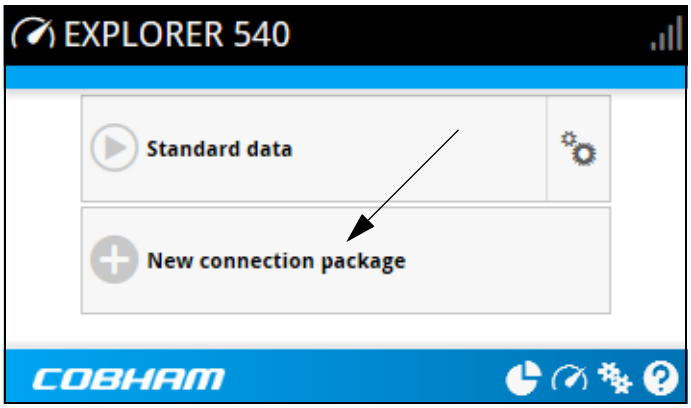
1. Click in the right side of the tile with the connection package that you want to change.
2. Select **Parameters**.
3. Next to **APN**, select the source of the APN.
   - **SIM default** (default and recommended setting): The APN is taken from the SIM card.
   - **Network assigned**: The APN is assigned from the network.
   - **User defined**: APNs are provided from the Airtime Provider. Type in the APN next to **User defined name**.
4. If your APN uses a password, type in the **User name** and **Password** provided from the Airtime Provider.
5. Click **Save**.

To create a new connection package

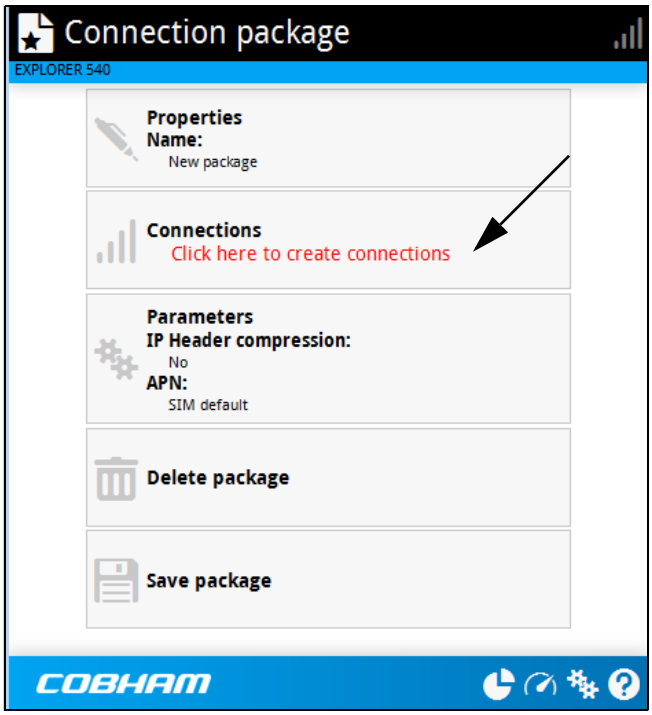
Note You must be logged in as administrator to be able to create connection packages.

Do as follows:

1. Click **New connection package**.



2. Type a name for the new package and click **Save**.
3. Click **Click here to create connections**.

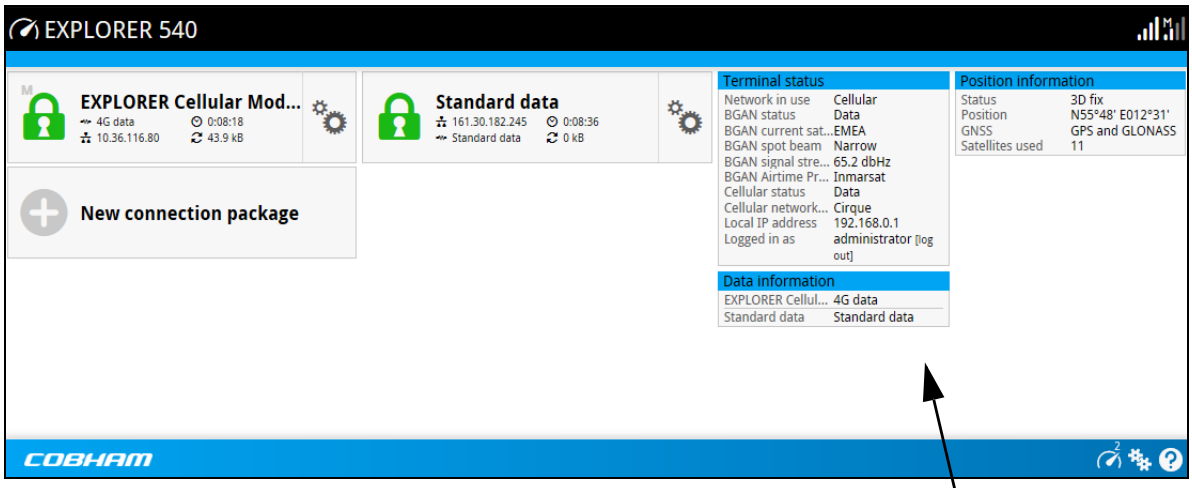


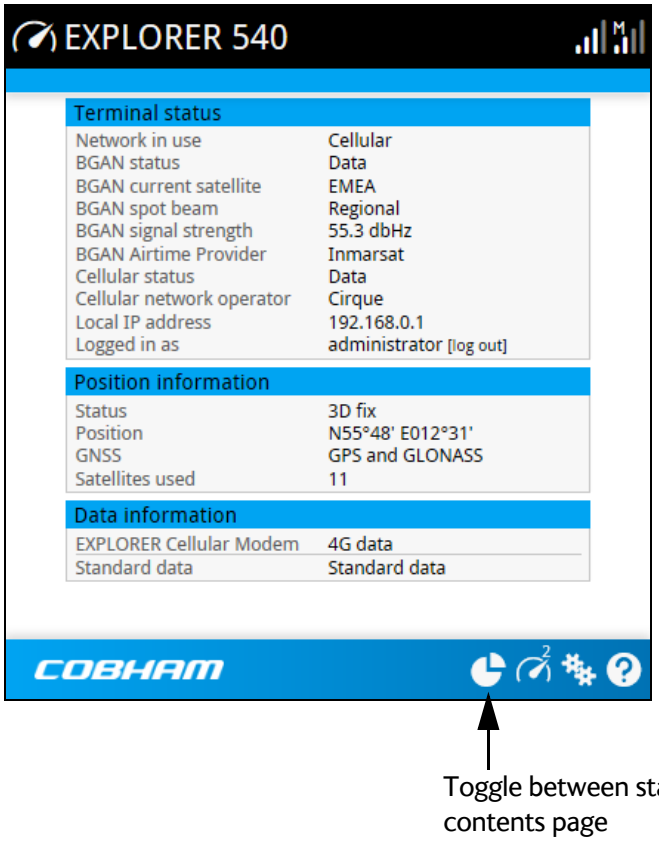
4. Select the connection type you want for your new connection package.
   For M2M subscription, you can only select **Standard**.
5. Click **Save package**.

The new package should now appear as a new tile on the startup page. For details on **Parameters** (APN and IP Header compression) see *To change the APN for a connection package* on page 52.

Status information

If the window is large enough, it shows a status field at the bottom of the page or in the right side of the page. If not, click at the bottom of the page to show the status page. Click again to return to the previous page.





The following status is available:

Terminal status:

Note If the terminal is running as BGAN only, the cellular status fields are not shown.

- Network in use: The network currently used (BGAN or Cellular).
- BGAN status: The current status of the BGAN network. In the example in the previous page, “Data” means a data connection is running. The status could also be e.g. “Registering” or “Ready”.
- BGAN current satellite: The satellite to which the EXPLORER 540 is currently registered.
- BGAN spot beam: The type of spot beam currently used, e.g. “Regional” or “Narrow”.
- BGAN signal strength: The signal strength of the BGAN connection.
- BGAN Airtime Provider: The provider of the BGAN services.
- Cellular status: The current status of the cellular network. In the example, a data connection is running.
- Cellular network operator: The operator (or provider) of the Cellular network.
- Local IP address: The local IP address of the EXPLORER 540. E.g. used to connect to the web interface.
- Logged in as: You can log in as User or Administrator. this field shows how you are logged in.

Position information:

- Status: Shows the status of the GNSS connection, e.g. if there is 2D fix, 3D fix or no fix.
- Position: The geographic position of the EXPLORER 540.
- GNSS: Shows which GNSS systems are currently used to obtain the position.
- Satellites used: Shows how many GNSS satellites are used to obtain the position.

Data information (only shown if a data connection is running)

- EXPLORER Cellular Modem: Shows which type of data is running on the cellular connection.
- Standard data: Shows that a Standard data connection is running on the Standard data connection package. This is the only option when the terminal is running in Cellular preferred mode,

Call information (only shown if a voice call is ongoing)

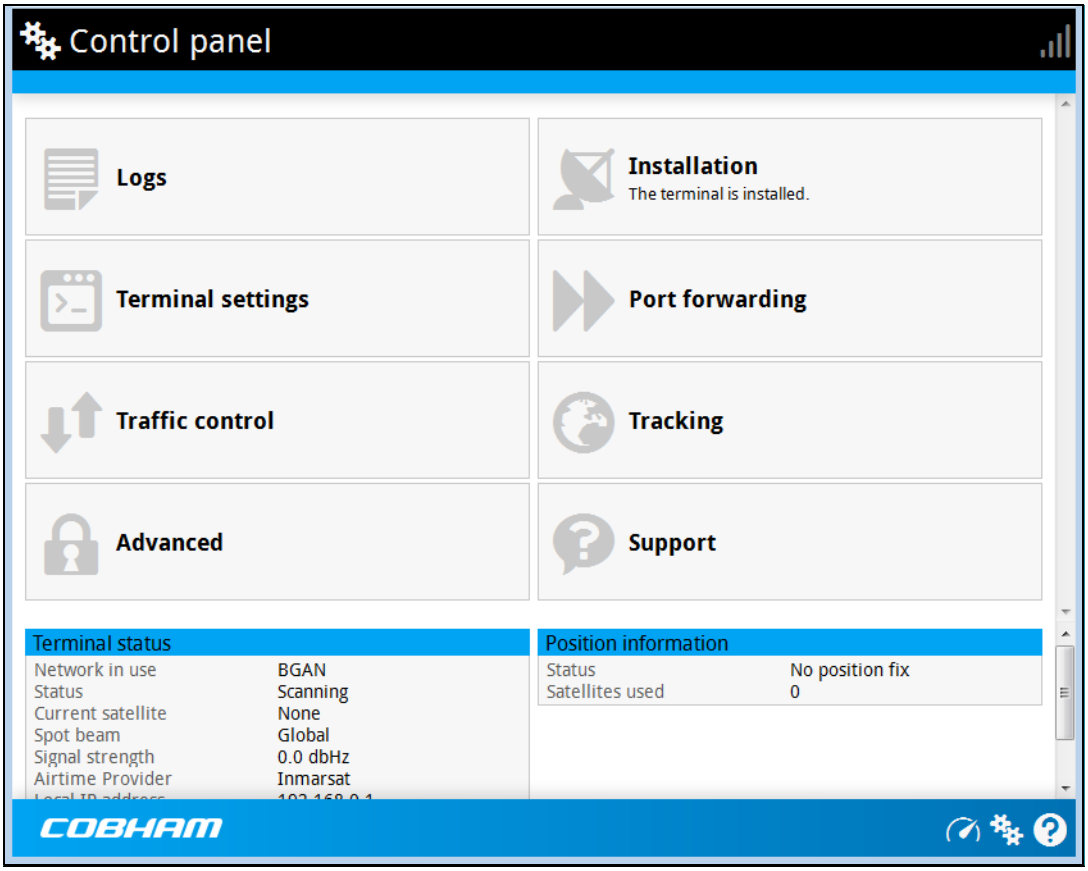
- Status: The status of the call, e.g. “Connected” or “Ringing”.
- Call type: Shows whether the call type is Standard voice or Premium voice (3.1 kHz Audio).
- Call duration: The duration of the call.
- Originator: The phone number from which the call was made.
- Receiver: The phone number that receives the call.

The Control panel

The **Control panel** is used for accessing the settings and functions of your EXPLORER 540.

To open the **Control panel**, click from the bottom right corner of the web interface.

Note IP handsets: The M2M subscription does not support Voice over IP (VoIP). For details on VoIP and voice calls with BGAN class 2 subscription, see Appendix C, *BGAN non-M2M functions*.



To restart the installation process (BGAN)

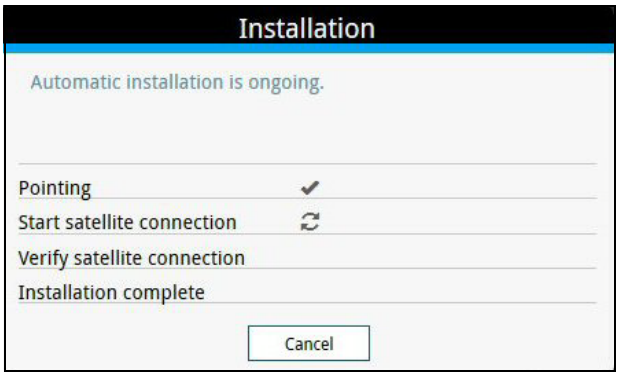
If you need to restart the installation process, e.g. because the EXPLORER 540 has been moved to another location, click the **Installation tile** in the Control panel. This will reboot the terminal and restart the installation process. For details about the installation process, see *Installation process* on page 14.

To start the installation process from the web interface, do as follows:

1. Select (Control panel) and then **Installation**.
2. Select **OK** to reboot the terminal and start the installation process. Note that you must log into the web interface with user name and password after reboot.
   The BGAN signal strength is shown on the screen during the pointing process.

3. Turn and tilt the antenna slowly until you have obtained the highest possible signal strength. You can use the pointing sound as well as the signal strength shown on screen. For details, see *Installation process for satellite operation* on page 15.

4. When the EXPLORER 540 has detected a stable BGAN signal it automatically exits the pointing process and starts to connect to the BGAN network.

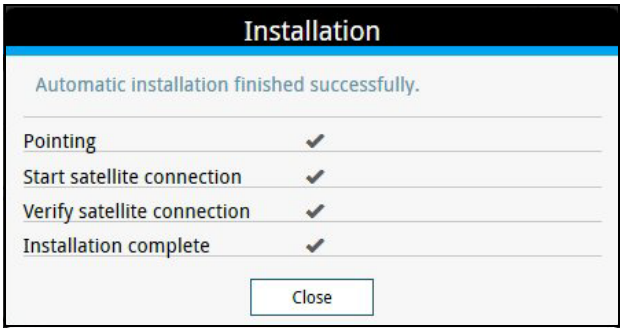


   - If you do nothing, the EXPLORER 540 automatically connects to the BGAN network (if possible) and then completes the installation process.
   - If you want to cancel installation and start over at next power-up, click **Cancel**. You can still configure the EXPLORER 540, and the LED will be active.

   If there are problems with the installation, the web interface will show a warning icon next to the failing step in the installation window. The LED on the EXPLORER 540 will be yellow (warning). See *Troubleshooting guide* on page 95.

5. Tighten the screws to fix the EXPLORER 540 in the pointed position.

6. When the installation process has ended, click **Close** to close the **Installation** window.



To use the logs

To access the logs

To access the Logs, select and select **Logs** from the menu. The Logs page contains:

- **Call log**: A list of all incoming, outgoing and missed calls since the log was last cleared.
- **Data log**: A list of all data sessions since the log was last cleared.
- **Total counters**: Totals for each type of service since the log was last cleared.

Date and time is the international UTC time, received from the satellite.

Call log (Non-M2M only)

With Non-M2M subscription the Call log shows:

- **Outgoing calls** shows the start time, receiving end phone number, duration, type (Standard voice or 3.1 kHz audio), termination cause and, if Call charges have been entered, estimated charge of each outgoing call.
- **Received calls** shows the start time, calling phone number, duration, type (Standard voice or 3.1 kHz audio) and termination cause of each incoming call.
- **Missed calls** shows the start time, calling phone number, type (Standard voice or 3.1 kHz audio) and termination cause of each incoming call that was not received.

To clear the Call log, click the **Clear call log** button at the top.

Data log

The Data log shows:

- **Standard data** shows data usage, date and time, termination cause and estimated charge of each Standard data session (if Call charges have been entered).
- **For Non-M2M only**: **Streaming data** shows the duration and type (such as 64 kbps, 128 kbps), date and time, termination cause and estimated charge of each Streaming data session (if Call charges have been entered).
- **Cellular modem data** (only present if the optional cellular modem is used) shows data usage, date and time and termination cause of each cellular data connection.

To clear the Data log, click the **Clear data log** button at the top.

Total counters

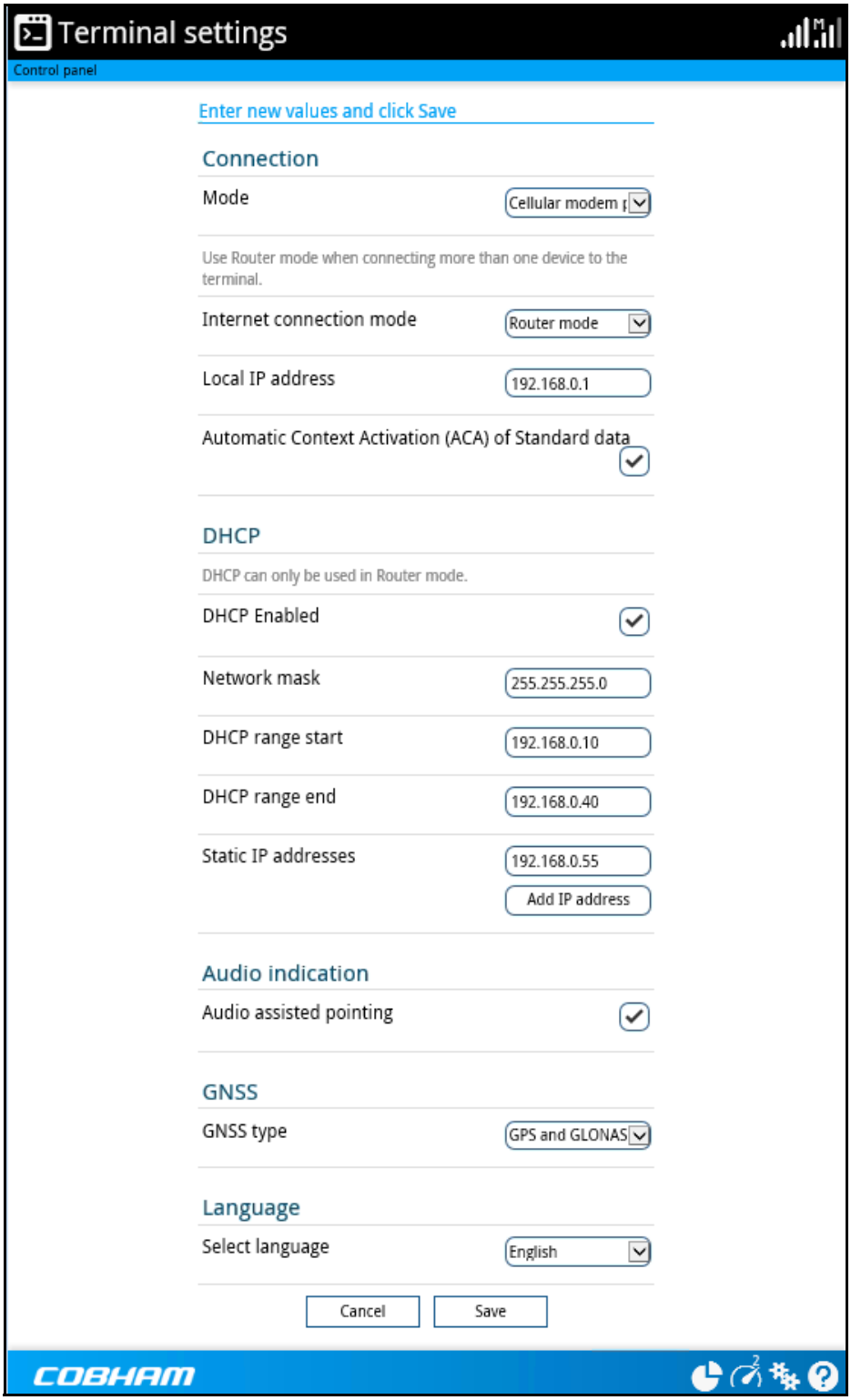
The total counters show:

- **For Non-M2M only**: **Call session totals** shows the total duration (hh:mm:ss) for each call type since the log was last cleared. It also shows the estimated call charge for each call type (if Call charges have been entered).
- **Data session totals** shows totals for each data connection type since the log was last cleared. For Standard data the totals are shown as amount of data transferred (kB) and for Streaming connections the totals are shown in duration (hh:mm:ss). It also shows the estimated charge for each data type (if Call charges have been entered).
- **Cellular session totals (**only present if the optional cellular modem is used) shows totals for each cellular data connection since the log was last cleared.

To reset the Total counters, click the **Reset total counters** button at the top.

Terminal settings

To configure the terminal settings, select (Control panel) **> Terminal settings**.



To set up the connection mode

Select network (Mode)

The EXPLORER 540 can use a **cellular network** as an alternative to the BGAN network, if you have installed an EXPLORER 540 LTE Modem. For details, see *Optional: To set up cellular network for data* on page 89.

To set up which network you want to use, do as follows:

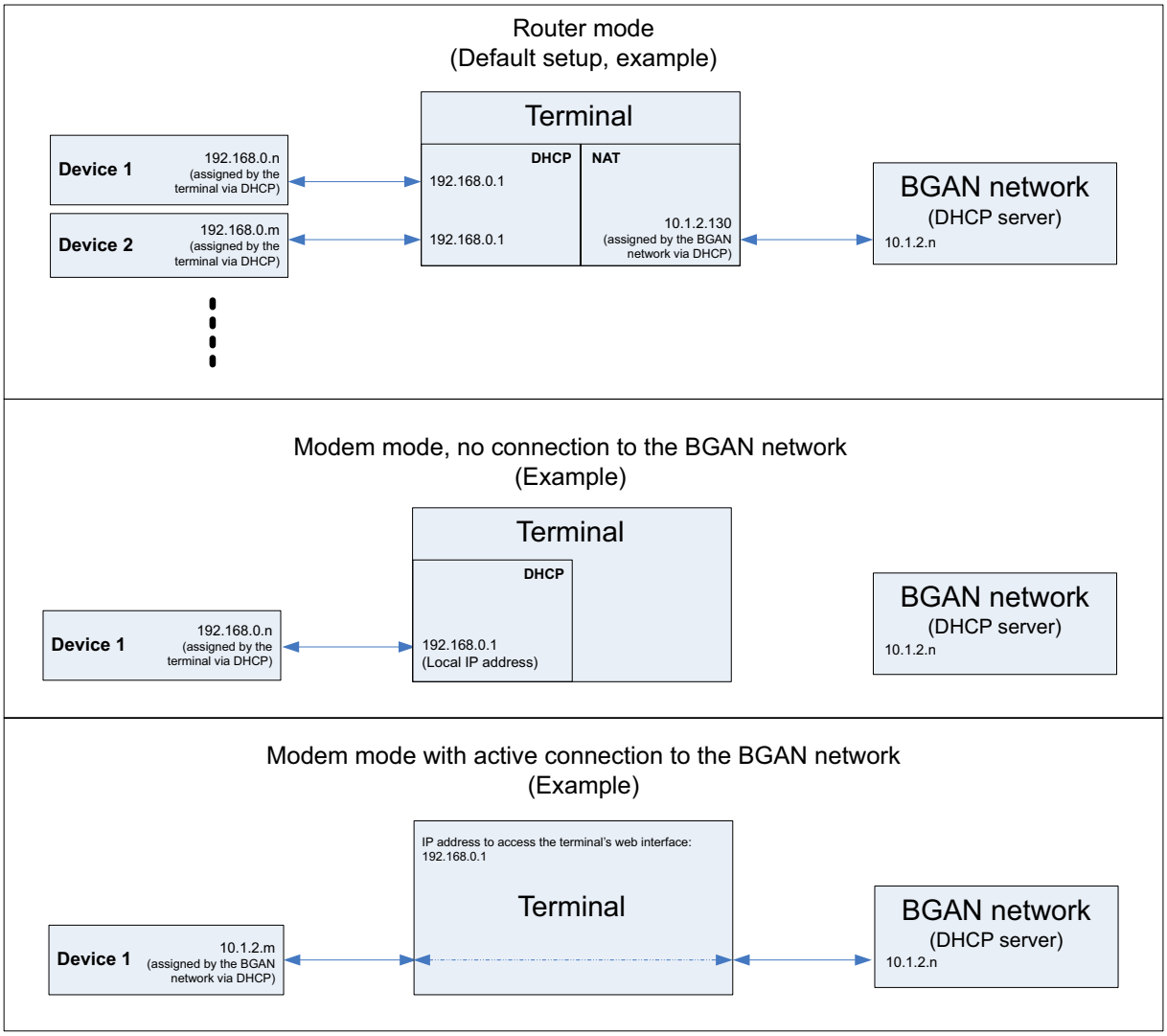
1. In the **Terminal settings** page, locate **Connection**.
2. At **Mode**, select from the drop-down list which mode you want for the EXPLORER 540. You have the following options:
   - **BGAN only** (default): The EXPLORER 540 uses BGAN.
   - **Cellular modem preferred**: The EXPLORER 540 uses the cellular network when it is available, with BGAN as backup. BGAN is running in the background and is still used for e.g. remote access with SMS. If an EXPLORER 540 Modem is not connected, or if the cellular network does not work for some reason, the BGAN connection is used. For details, see *EXPLORER 540 operation in "Cellular modem preferred" mode* on page 7.

   Note If you have selected Cellular modem preferred you must enable Automatic Context Activation (ACA). See step 3. on page 62.
3. Click **Save**.

Internet and LAN connection modes

In the web interface you can set up the Internet connection mode and the IP addressing between the EXPLORER 540 and devices connected to the EXPLORER 540. The EXPLORER 540 has a built-in DHCP server which can be used to dynamically assign IP addresses to devices connected to the EXPLORER 540.

The drawing below shows examples of the IP addressing in router mode (default setup) and modem mode.



To set up the connection mode of the EXPLORER 540, do as follows:

1. In the **Terminal settings** page, at **Internet connection mode**, select **Modem mode** or **Router mode**. Router mode is the default setting and is recommended for most purposes.
   - Select **Router mode** if one or more computers are connected and the EXPLORER 540 should act as a router. When Router mode is selected, the EXPLORER 540 uses the built-in NAT module for making the necessary address translations.
   - Select **Modem mode** if only one computer is connected, and the EXPLORER 540 should act as a modem, or more than one computer is connected using an external router.

   Note Do **not** connect more than one computer in Modem mode, unless you have an external router.

2. Under **Local IP address**, type in a new IP address if you want to change the Local IP address of the terminal. This is the address used to access the web interface. The default IP address is **192.168.0.1**.

   Important Do **not** use any of the reserved IP addresses listed in *List of reserved IP subnets* on page 106.

3. To enable Automatic Context Activation of your data connection, select **Automatic Context Activation (ACA) of Standard data**.
   - When you **select** ACA, the data connection is automatically established after restart as soon as the EXPLORER 540 and its BGAN connection are ready.
     This setting is mandatory when the terminal is in Cellular modem preferred mode.

     Note You are charged for the data transferred. You may want to disable automatic updates in your LAN device to avoid unnecessary charges.

   - When you **disable** ACA (default), you can control the data connection manually from the startup page or with the SMS command ACTIVATE.

4. Under **DHCP**, select **DHCP Enabled** (recommended for most purposes).
   - If you select **DHCP Enabled**, the terminal assigns dynamic IP addresses to devices connected to the terminal.
   - If you select **disable DHCP**, you need to set up a static IP address in the connected device.

5. If you want to change the **Network mask** for the local network of the terminal, type in the new network mask. The default network mask is **255.255.255.0**.

6. Under **DHCP range start** and **DHCP range end**, type in the range of IP addresses that should be assigned to locally connected equipment.

7. Under **Static IP addresses** add any static IP addresses used by locally connected equipment. This is necessary in order to be able to access the equipment remotely.

   Note The static IP addresses must be outside the DHCP range set in the previous step.

8. Click **Save**.

To enable or disable the pointing sound

The EXPLORER 540 can make a sound to guide you through the pointing procedure (default enabled). To enable or disable the pointing sound, do as follows:

1. In the **Terminal settings** page, locate the **Audio indication** section.
2. Select **Audio assisted pointing** if you want to use a pointing sound to assist your pointing process.
3. Click **Save**.

To select the type of navigation system (GNSS)

To select which navigation system to use with your EXPLORER 540, do as follows:

1. In the **Terminal settings** page, locate the GNSS section (Global Navigation Satellite System).
2. Select **GPS**, **GLONASS**, **GPS and GLONASS** or **BeiDou-1**.
3. Click **Save**. Note that it may take some minutes for the EXPLORER 540 to change the navigation system.

To select the language

The default language of the web interface is **English**. You can change the language to **French**, **German**, **Russian**, **Spanish**, **Chinese** or **Japanese**.

To change the language, do as follows:

1. In the **Terminal settings** page, locate the **Language** section.
2. Select a language from the list and click **Save**.

Port forwarding

Note Make the port forwarding configuration before starting the data session.

Port forwarding enables you to set up a server connected to the terminal while the terminal is in Router mode. Without port forwarding it would not be possible to contact the server from the Internet. We recommend using a static public IP address for the terminal in order to provide easy access to the terminal. To use the static IP address, it must be included in your subscription and you must set the APN source to SIM default. For details, see *To change the APN for a connection package* on page 52.

Do as follows:

1. From the **Control panel** ⚙, select **Port forwarding**.
2. Select **Forward port** to add a new port forwarding.
3. Select **Active** to activate the port forwarding.
4. Type in the **Incoming port start** and the **Incoming port end**.
   This is the range of port numbers on the EXPLORER 540 for which incoming traffic to the EXPLORER 540 will be forwarded.
5. Type in the **Destination IP address**, which in this example is the IP address of the mail server: 192.168.0.100.
   This is the IP address to which the incoming traffic is forwarded.
6. Type in the **Destination port start** and the **Destination port end**.
   This is the range of port numbers at the server, to which the incoming traffic will be forwarded. If only a single port is used, type the same port for **Destination port start** and **Destination port end**.
7. Click **Save**.

When you have activated a data connection, you can now access the server from the Internet, using the external IP address of the terminal. If you are using the web interface, you can see the external IP address in the tile with the data connection you have started. For information on how to activate your data connection, see *To control data connections (PDP contexts)* on page 36.

To manage connected devices (Traffic control)

By default, traffic control is disabled, which means that all traffic is allowed.

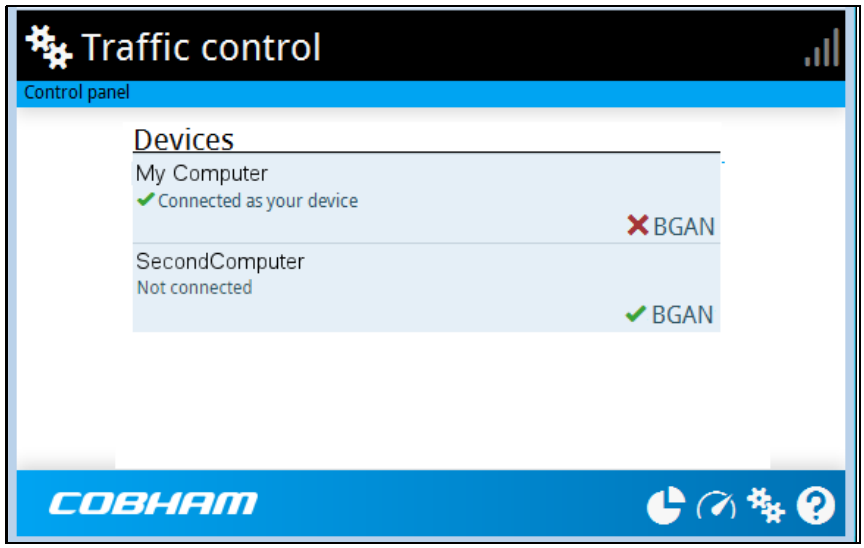
With the Traffic control function you can get an overview of devices connected locally to your EXPLORER 540 and control which devices you want to connect. You can also select whether or not they should be allowed to use the BGAN or cellular network. Note that the available settings depend on whether or not you are logged in as administrator.

Note The cellular modem setting is only displayed if an EXPLORER 540 Modem is installed in the EXPLORER 540.

Traffic control (Non-administrator user)

To set up traffic control, do as follows:

1. In the **Control panel**, click **Traffic control**.
   A list of connected and added devices appears.



2. Click your connected device to see MAC address and IP address and to change the name or block/allow the use of BGAN or Cellular network. See the next section.

To block BGAN or cellular traffic or edit the name for your device

Note You can only change these settings if traffic control is enabled. If the administrator has disabled traffic control, all traffic is allowed.

1. In the **Traffic control** page, click your connected device.
   The page shows the name, MAC address, IP address and traffic rule for the device.
2. Select **Block BGAN traffic** or **Block cellular modem traffic** (if available), if you want to deny access to the BGAN or cellular network for your device.

   Note If it is already blocked by the administrator, this setting is not editable.

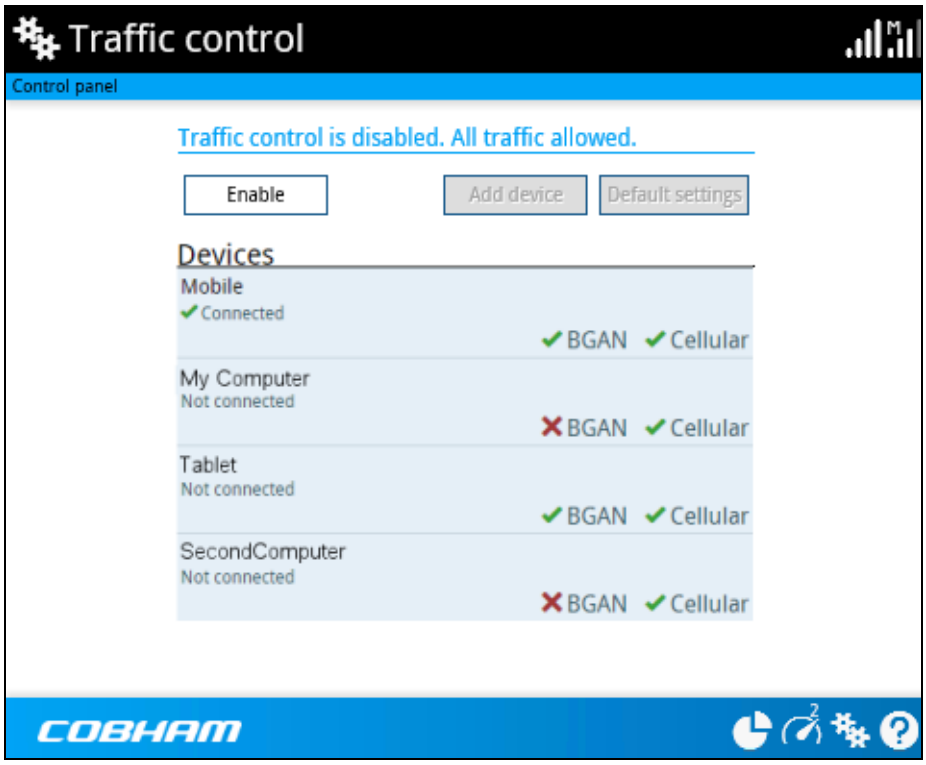
3. At **Name**, type in the name you want for your device.
4. Click **Save**.

Traffic control (administrator)

When you are logged in as administrator, the Traffic control setup offers more options. To set up traffic control as administrator, do as follows:

1. Log in as administrator.
2. In the **Control panel**, click **Traffic control**.
   A list of connected and added devices appears.
3. Click the **Enable** button to enable Traffic control.
   By default Traffic control is disabled, which means all devices are allowed access.

Note When you enable traffic control, BGAN is blocked by default for all new devices. To change the default settings, see the next section.



To change the default settings for all devices

Important | All devices in the list are updated with the default settings when you click Save.

1. Click the button **Default settings**.
2. Select **Block BGAN traffic** or **Block Cellular modem traffic** (if available) if you want to deny access to BGAN or cellular network for all devices. With this option selected, only the administrator will be able to allow access for selected or all devices.
3. Click **Save**.
   All devices in the list will now have the new default settings.

To block or allow BGAN or cellular traffic or edit the name for a device

1. In the **Traffic control** page, click the device you want to set up.
   The page shows the name, MAC address, IP address and traffic rule for the device.
2. Select **Block BGAN traffic** or **Block Cellular traffic**, if you want to deny access to the BGAN or cellular network for the selected device.
   If you want to allow access, clear the box. The selected device will then be able to access the network, even if it is blocked in the default settings (see previous section).
3. At **Name**, type in the name you want for your device.
4. Click **Save**.

To Add a device

When you connect a device, it is automatically added to the list using the default settings. If you want to add a device for later use, do as follows:

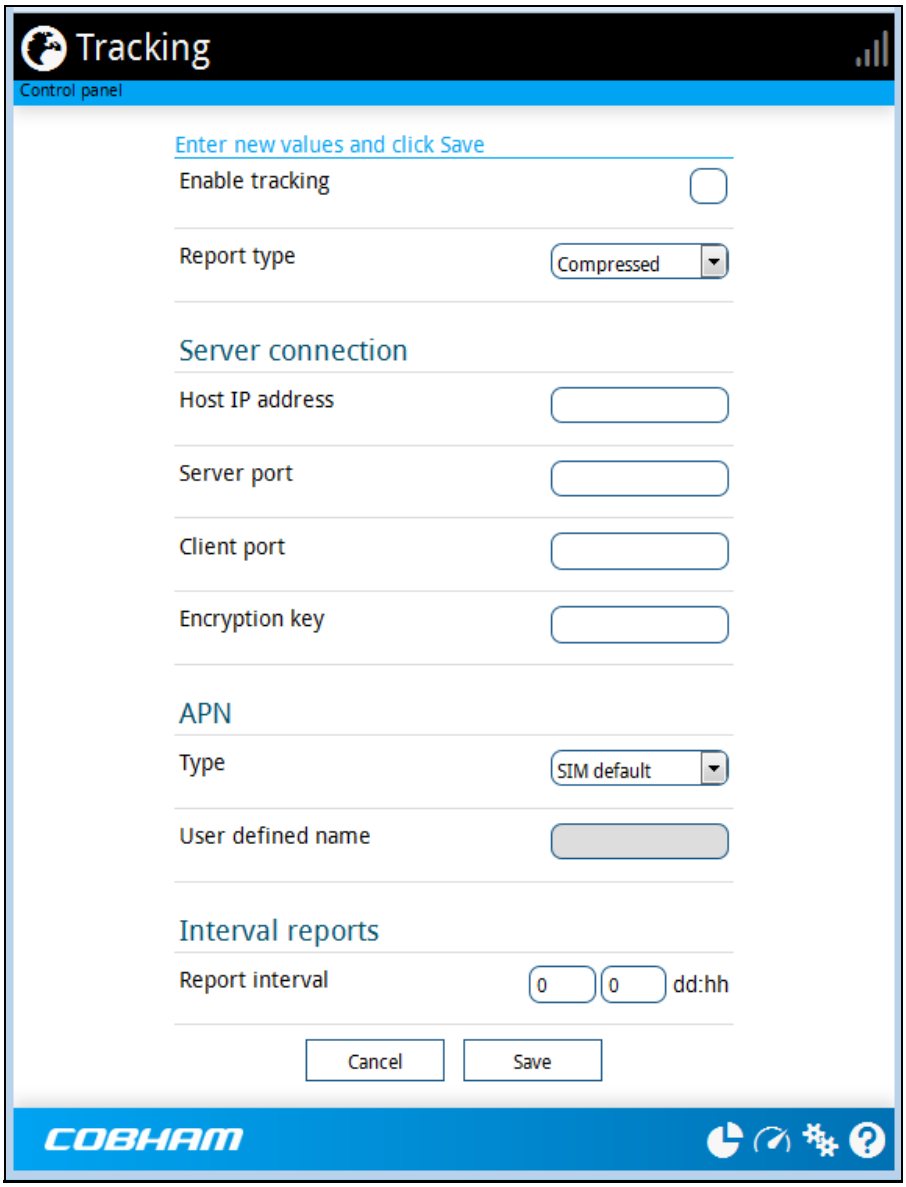
1. In the **Devices** page, click the **Add device** button.
2. Type in the **Name** and the **MAC address** for the device.
3. Select **Block BGAN traffic** or **Block Cellular modem traffic**, if you want to deny access to BGAN or cellular network for the selected device.
   If you want to allow access, clear the box. The device will then be able to access the network, even if it is blocked in the default settings (see previous section).
4. Click **Save**.

When the device with this MAC address is connected, it will appear with the entered name in the list, and access will be allowed or denied depending on the setting in this page.

To set up tracking

You can set up the EXPLORER 540 to report to a server at certain time intervals. To set up tracking, do as follows:

1. From the Control panel, select **Tracking**.



2. To enable tracking of the EXPLORER 540, select **Enable tracking**.

   Note Tracking runs on its own BGAN connection, and is independent of the connection mode (Cellular or BGAN).

3. Select the **Report type**.
   - **Compressed**. Only latitude and longitude are reported.
   - **Extended**. Apart from latitude and longitude, heading and altitude are also included.
   - **ECEF**. The same information as Extended, but position and speed data are 3D (ECEF coordinates).

4. Under **Server connection**, type in the following details:
   - **Host**: The IP address of the server that the EXPLORER 540 will report to.
   - **Server port**: Port number on the server. Default number is 7474.
   - **Client port**: Port number on the EXPLORER 540. Default number is 7475.
   - **Encryption key**: A 128 bit key which must match on both the client and server side. Supplied from the server manager.
5. Under **APN**, select the source of the APN.
   - **SIM default** (recommended): The APN is taken from the SIM card.
   - **Network assigned**: The APN is assigned from the network.
   - **User defined**: APNs are provided from the Airtime Provider. Type in the APN next to **User defined name**.
6. Type in the **Report interval** in days (dd) and hours (hh).

   Example: If you type in "01" and "12", the EXPLORER 540 will send a report for every 1½ day.

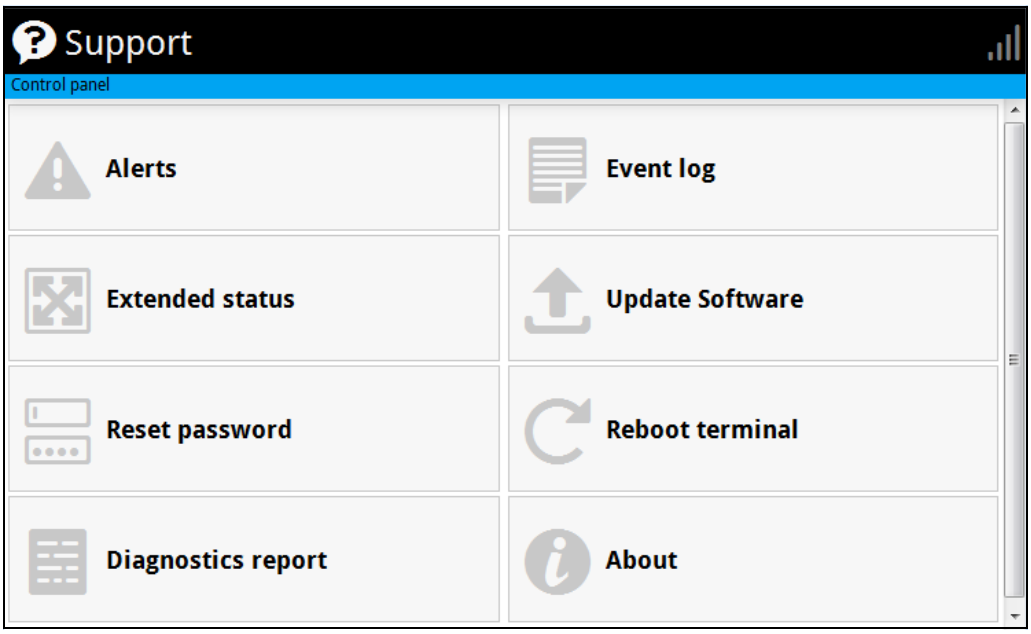
   Note | If the EXPLORER 540 is in power save mode, no report is sent!
7. Click **Save**.

You can see the status of the tracking link in the status area of the web interface. If the status area is not shown, click to see it.

Note | You can set up whether or not you want to allow the tracking server to control these settings. See *Remote control of tracking* on page 83.

Support features

To open the Support page, select (Control panel) > **Support**.



To view the Alerts

When an alert is registered, the web interface shows a warning icon in the icon bar as long as the alert is active. The **Alerts** list only shows alerts that are currently active.

1. To view the alerts, click from the icon bar at the top of the web interface, or select **Alerts** from the **Support** page.

The **Alerts** page shows a list of active events. For more information on the event messages, refer to *List of messages* on page 100.

To view the Event log

The Event log shows events that occurred in the past and are no longer active. It includes events of informational character describing normal phases of operation for the terminal, and also alerts that have appeared in the Alerts list.

To view the event log, select **Event log** from the **Support** page.

To create a diagnostics report

The diagnostic report contains relevant information for troubleshooting. When contacting your supplier for support, please enclose this file. To generate a diagnostic report, do as follows:

1. From the **Support** page, click **Diagnostics report**.
2. Click **Generate report**.

Note | It may take a few minutes to generate the report.

3. Select **Download report**.
4. Choose a location for the file and save it.

To update software

To update the software in the EXPLORER 540 using the web interface, do as follows:

1. Download the new software[1] or acquire the software from Cobham SATCOM and save it on your computer.
2. Open the web interface and enter the Control panel .
3. Click **Support > Update software**.
4. Click **Update software...**
5. Browse to the new software version and click **Open**. The software file has the extension ".tiif".
6. The terminal restarts and completes the software update.

> **Note** The update procedure takes some minutes to complete. If the installation process has not yet been completed, the Status LED flashes blue during the software update.

You can check the software version under **Control panel** > **Support** > **About**.

To view extended status

To see the Extended status page, select **Support > Extended status**.

To view updated information on the **Extended status page**, click the icon in the top left corner to refresh the page.

The Extended Status page shows information such as IAI-2 status, IMSI number and IMEI number.

1. You can download the software from the "Cobham SYNC Partner Portal" at www.cobham.com/satcom, select **Cobham SYNC Partner Portal** > **Downloads**. Locate the EXPLORER 540 software.

To reset the administrator password

If you have forgotten the administrator password, do as follows:

Note If you have physical access to the EXPLORER 540, you can also use the Reset button. For details, see *Reset button* on page 94.

1. Contact your supplier for a reset code.
   Report the serial number and IMEI number of the terminal.
   You can find the serial number under **Control panel > Support > About** and the IMEI number under **Control panel > Support > Extended status**.
2. After receiving the reset code from your supplier, select **Reset password** from the **Support** page.
3. Type in the reset code obtained from your supplier and click **Reset**.
4. The password is reset to **admin**.

To restart the terminal

If you want to restart the terminal, do as follows:

1. From the **Support** page, select **Reboot terminal**.
2. Click to confirm the reboot.
   The terminal restarts. Note that this is the equivalent to switching the terminal off and on again. It is **not** the same as pushing the Reset button, the installation process will not restart.

About

The **About** page shows the **Serial number** and **software version** of your EXPLORER 540 and legal information. It also shows your **Help desk** information, if it has been entered under Advanced > Help desk.

To access the About page, select **Support > About**.

Advanced settings

Passwords

The EXPLORER 540 web interface is password protected at two levels: A user password and an administrator password. You will always be prompted for a password when you access the web interface. Default settings are:

- **User**: User name: **user**, Password: <serial number of the EXPLORER 540>
- **Administrator**: User name: **administrator**, Password: **admin**

You can change the passwords if you are logged in as administrator, see the next sections.

To log in as administrator

Access to the Advanced settings requires an administrator password. If you are already logged in as user and you want to access the **Advanced** settings, do as follows:

1. From the Control panel , select **Advanced**.
   If you are not logged in as administrator you are now prompted to log in.
2. Enter the administrator password.
   If you have forgotten the administrator password, you can reset the password. For details, see *To reset the administrator password* on page 72. The old user name and password will apply until you have finished the reset procedure.
3. Click **OK**.

To change the user password

To change the user password, do as follows:

1. Log in as administrator.
2. Under **Advanced**, select **Passwords**.
3. Select **Change user password**.
4. Type in the **User id** (default: **user**).
5. Type in the **New password** and retype it on the next line.
6. Click **Save**.
   At the next login the new password is required.

To change the administrator password

To change the administrator password, do as follows:

1. Log in as administrator.
2. Under **Advanced**, select **Passwords**.

3. Select **Change administrator password**.
4. Type in the **Old password**.
5. Type in the **New password** and retype it on the next line.

> **Note** The password must be 5 to 15 characters long and cannot contain spaces.
>
> Avoid special characters. Accepted characters: A through Z (uppercase characters), a through z (lowercase characters) and 0 through 9 (numeric characters).

6. Click **Save**.
   At the next login the new password is required.

To log out as administrator

If you close the web interface, you are logged out automatically after 30 seconds. To log out manually, click **Logout administrator** in the **Advanced** page.

To set up user permissions

You can allow or deny users access to certain functions and make these pages read-only. This is useful if you want to protect the system against unintended changes. Study this screen thoroughly and decide to which areas of the system you want to give non-administrator users access. To set up the user permissions, do as follows:

1. Under **Advanced**, select **User permissions**.
2. Under **Allow users to:**, select the settings you want to **allow** users to access.
3. Under **Allow AT commands on:**, select **LAN interface** if you want to allow the use of AT commands.
4. Under **Allow user accounts:**, select **Service user account** if you want to enable the use of a service user account.
5. Click **Save**.

The settings without a check mark can only be viewed but not changed by the non-administrator user.

To restore factory settings

To restore the factory settings of the EXPLORER 540, do as follows:

1. Under **Advanced**, select **Factory reset**.

> **Important** All configuration will be lost and the EXPLORER 540 will return to the default configuration.

2. Click **OK**.
   The terminal will now restart and start up with the factory settings. The installation process is also restarted.

SIM PIN for BGAN

To enable or disable the use of a SIM PIN

To enable or disable the use of a PIN to access the BGAN network, do as follows:

1. Under **Advanced**, select **SIM**.
2. Select **Enable/disable SIM PIN**.
3. Under **Enable/Disable PIN** select or clear the box next to **Require PIN on startup**.
   - If you clear the box, you can access and use the terminal without entering a PIN
   - If you select the box, you must enter a PIN on startup before you can make calls or data sessions
4. If you selected Require PIN on startup, type in the PIN next to **Enter current PIN**.
5. Click **Save**.
   The new PIN settings will take effect at next power on.

To change the SIM PIN

To change the PIN used to access the BGAN network, do as follows:

1. Under **Advanced**, select **SIM**.
2. Select **Change SIM PIN**.

   Note | The SIM PIN must be enabled before you can change it.
3. Under **Change PIN** type in the **Current PIN**.
4. Type in the **New PIN** and retype it on the next line.
5. Click **Save**. The new PIN settings will take effect at next power on.

Auto SIM PIN validation

The Auto SIM PIN validation feature allows the EXPLORER 540 to automatically send the PIN to the SIM at power up. This enables the SIM to be PIN locked (to prevent unauthorised re-use of the SIM elsewhere), while still allowing the EXPLORER 540 to connect to the BGAN network without using a PIN.

When this feature is enabled, the PIN you enter when setting the Auto SIM PIN validation feature is encrypted and stored locally in the EXPLORER 540. The next time the EXPLORER 540 restarts, the terminal decrypts the PIN and automatically sends it to the SIM without user intervention.

Note | The SIM PIN must be enabled before you can use this feature. See *To enable or disable the use of a SIM PIN* on page 75.

To set up the Auto SIM PIN validation feature, do as follows:

1. Under **Advanced**, select **SIM**.
2. Select **Auto SIM PIN validation**.
3. Select **Automatically validate SIM PIN on startup**.
4. Type in the PIN.
5. Click **Save**.

Note: If the SIM PIN is changed either using the web interface or AT commands, the Auto SIM PIN validation feature is disabled and must be reenabled manually.

Note: If the SIM card is replaced without disabling the Auto SIM PIN validation feature, and the first verification of the SIM PIN fails, the Auto SIM PIN validation feature will disable itself to avoid locking the SIM card.

SIM lock

The SIM lock feature can be used by suppliers to lock your SIM card to a specific provider or distribution partner. For further information, contact your supplier.

SIM PIN for cellular network

See *Optional: To set up cellular network for data* on page 89.

To save or load a configuration

If you need to reuse a configuration in other terminals of the same type, you can save your current configuration to a file, which can then be loaded into the other terminal(s).

Note: Be aware that if the terminals have different software versions, some of the settings may be different than expected. If possible, use the same software version in the terminals.

To save a configuration to a file

To save the current configuration of your EXPLORER 540 to a file on your computer, do as follows:

1. In the **Advanced** page, click **Load/save configuration**.
2. Click **Save configuration**.
   The configuration file is saved in the EXPLORER 540.
3. Click **Download configuration...**
   The configuration is downloaded from the EXPLORER 540 to the downloads section of your computer.

To load a configuration from a file

To load a configuration from a file into your EXPLORER 540, do as follows:

1. In the **Advanced** page, click **Load/save configuration**.
2. Click **Load configuration**.
3. Browse to the configuration file and click **Open**.

The configuration is now loaded into your EXPLORER 540. When the configuration is loaded successfully, the EXPLORER 540 restarts with the new configuration.

Connection watchdog (Link monitoring)

If you are not using the Advanced watchdog function (see *Advanced watchdog* on page 78), it is strongly recommended to use the Connection watchdog to monitor your locally established IP connection, as it enables you to test the satellite (or cellular) connectivity and to keep your PDP context alive.

The function is slightly different if you are using the cellular network with the optional EXPLORER 540 LTE Modem installed. The function is described below for BGAN only and then for cellular connection.

Function with BGAN only

With the connection watchdog activated, the terminal will send out ping commands to up to three servers of your choice. When a data session is started, the terminal will start sending ping commands to the Primary IP address the number of times specified. If no response is received, it will send the same number of ping commands to the Secondary and then the Tertiary IP address, if available. If no response is received from any of the IP addresses, the terminal will first try to reconnect. If it fails again the terminal will eventually restart.

Note The data connection must be activated before the Connection watchdog can start. See *To start and stop data connections* on page 51.

Function with optional Cellular network

When using the cellular network with the connection watchdog activated, the terminal will send out ping commands to up to three servers of your choice. When a data session is started, the terminal will start sending ping commands to the Primary IP address the number of times specified. If no response is received, it will send the same number of ping commands to the Secondary and then the Tertiary IP address, if available. If no response is received from any of the IP addresses, the terminal will switch to the BGAN connection and repeat the pinging over the BGAN network. If it still fails, the terminal will eventually restart.

To set up the Connection watchdog

Do as follows:

1. Under **Advanced**, select **Connection watchdog**.

2. Select **Enable Connection watchdog**.
3. At **Ping interval (minutes)** select the interval in minutes between the ping commands.
4. Select the **Number of retries** before the terminal restarts.
5. Select the **Ping mode**.
   - **Ping always**: Always send ping, regardless of data traffic.
   - **Ping when no traffic**: Send ping only if no data traffic is ongoing.
6. Type in the Primary and optionally the Secondary and Tertiary IP address.
   This is the IP address of the server(s) to which the terminal will send ping commands.

   Note | Use a server that is reliable and that responds to ICMP Echo Requests.
7. Click **Save**.

Advanced watchdog

The Advanced watchdog continuously monitors the operational status of the terminal and allows you to perform the following actions at regular intervals (set by the user):

- Wake up the terminal from power save mode
- Start a data connection (PDP context)
- Check your IP connection (ping - similar to Connection watchdog)

The terminal continuously monitors:

- The time (monitors that UTC time is received from GPS at startup)

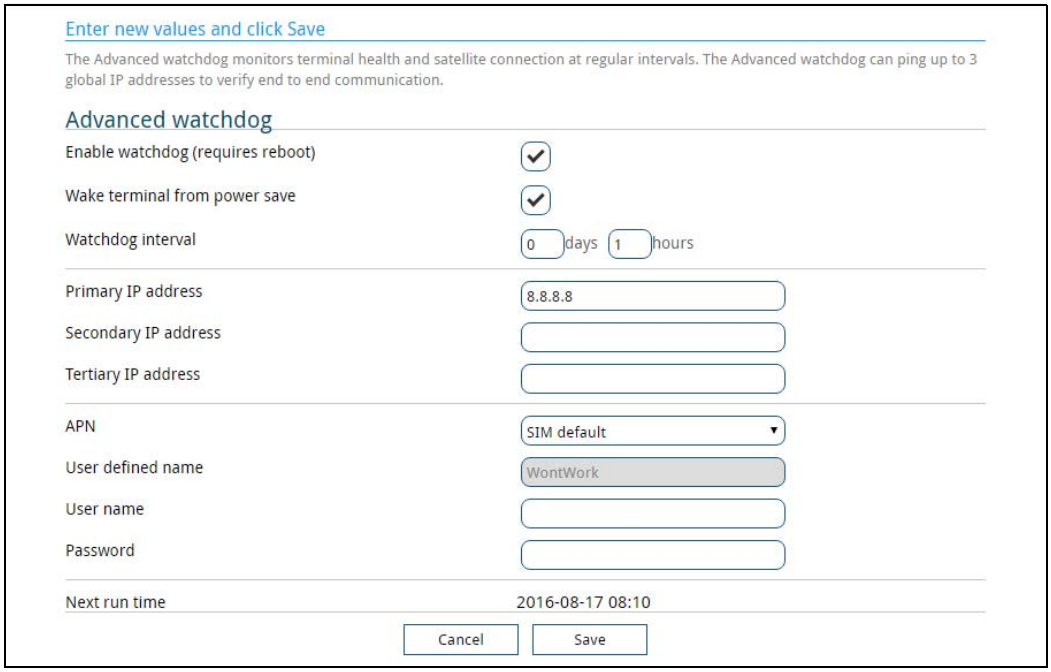
  Note | The EXPLORER 540 operates with UTC time, local time is not available.
- CS-attach (the status of circuit-switched connection)

If any of the actions fail, the terminal restarts.

Set up Advanced watchdog

To set up the Advanced watchdog, do as follows:

1. Under **Advanced**, select **Advanced watchdog**.



2. Select **Enable watchdog**.
3. Select **Wake terminal from power save** if you want the terminal to wake up from power save mode each time the watchdog interval has passed.
   If this option is not selected, the Advanced watchdog will only run when the terminal is awake.
4. Select the **Watchdog interval**.
   The interval can be from one hour up to 21 days.
5. Type in the **Primary** and optionally the **Secondary** and **Tertiary IP address**.
   This is the IP address(es) of the server(s) to which the terminal will send ping commands. The terminal will start sending ping commands to the Primary IP address. If there is no response after 10 attempts, the terminal will send up to 10 ping commands to the Secondary and then the Tertiary IP address, if available. If no response is received from any of the IP addresses, the terminal will eventually restart.

   Note If no IP addresses are entered pinging is skipped, but the other actions still apply.
6. Enter the **APN** (and user name and password if required) to use for the data connection.
7. Click **Save**.

   Note When the Watchdog is enabled, you must reboot the terminal before the Watchdog settings are activated.

Next run time: This field at the bottom of the page shows what time the Advanced watchdog will run next (UTC time).

Data limits (BGAN only)

You can set a limit for the use of the BGAN data services with the EXPLORER 540 system.

If you have entered the call charges in the menu **Call charges**, the system automatically calculates and displays the estimated maximum charges for your data sessions.

Note Thrane & Thrane A/S does not take responsibility for the correctness of the estimated charges. This calculation is only a rough estimate of the charge, based on the tariff entered by the user. Also, the airtime provider may have different methods of calculating the charge.

Once the entered limit is reached, the connection is automatically stopped. This is recorded in the data log. To continue using the data service you must start a new connection by clicking on the desired connection on the startup page.

Note If you have enabled automatic context activation of the Standard data connection and you set a data limit for the Standard data connection, automatic context activation is **disabled**.

To set data limits, do as follows:

1. Under **Advanced**, select **Data limits**.
2. Select the type of connection you want to limit.
3. Type in the amount of data or time allowed and select the appropriate units.
4. Select **Enable**.
5. Click **Save** to save the settings.

Call charges (BGAN only)

Note Thrane & Thrane A/S does not take responsibility for the correctness of the estimated charges. This calculation is only a rough estimate of the charge, based on the tariff entered by the user. Also, the Airtime Provider may have different methods of measuring the airtime used.

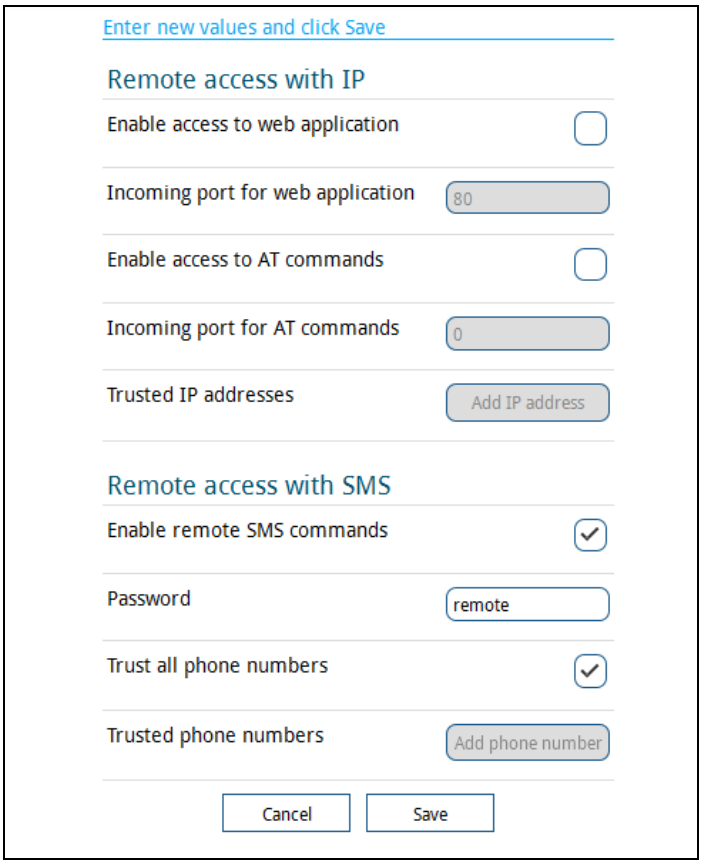
If you know the tariff for your subscribed BGAN services, you can enter these tariffs in the web interface and automatically calculate the estimated charges for your calls and data sessions. To enter the call tariffs, do as follows:

1. Under **Advanced**, select **Call Charges**.
2. Select the currency from the **Displayed currency** drop-down list.
3. Enter the tariff for each of the services.
4. Click **Save**.
   The entered tariffs are used for estimating the charges for calls and data sessions. For further information, see *Call log (Non-M2M only)* on page 58.

Remote management

You can set up the terminal so that it can be controlled from a remote location.

To set up the terminal for remote management, select **Advanced** > **Remote management** from the **Control panel**.



To set up remote access with IP

Note The settings for Remote access with IP are **not** relevant if you are using the **_IREMWEB** command. See *To use AT commands to get remote access to the web interface* on page 32.

1. From the **Remote management** page, select **Enable access to web application** and/or **Enable access to AT commands**.
2. Type in the **Incoming port** numbers to use for the web server and for AT commands. The default port numbers are:
   - web server: 80
   - AT commands: 5454

   Note If you type another port number, the port number must be available at your service provider.

3. Under **Trusted IP addresses**, click **Add IP address** and type in the IP address of the device you want to give access to the terminal.

4. To add more IP addresses, click **Add IP address** again.

Note To be able to access the terminal you must have an active data connection.

After preparing the terminal and activating the connection you can access the terminal from one of the trusted IP addresses, using the incoming port defined in the Incoming port field.

- For information on how to prepare the terminal for remote activation of a data connection, see the next section *To set up remote access with SMS*.
- For information on how to access the terminal, see *To access the terminal from a remote location* on page 26.

If Static IP is included in your airtime subscription, we recommend using this static public IP address for the terminal in order to provide easy access to the terminal. To use the static IP address, it must be included in your airtime subscription and you must set the APN source to SIM default. For details, see *To change the APN for a connection package* on page 52.

To set up remote access with SMS

Note The terminal must be registered to the satellite services to receive and accept an SMS.

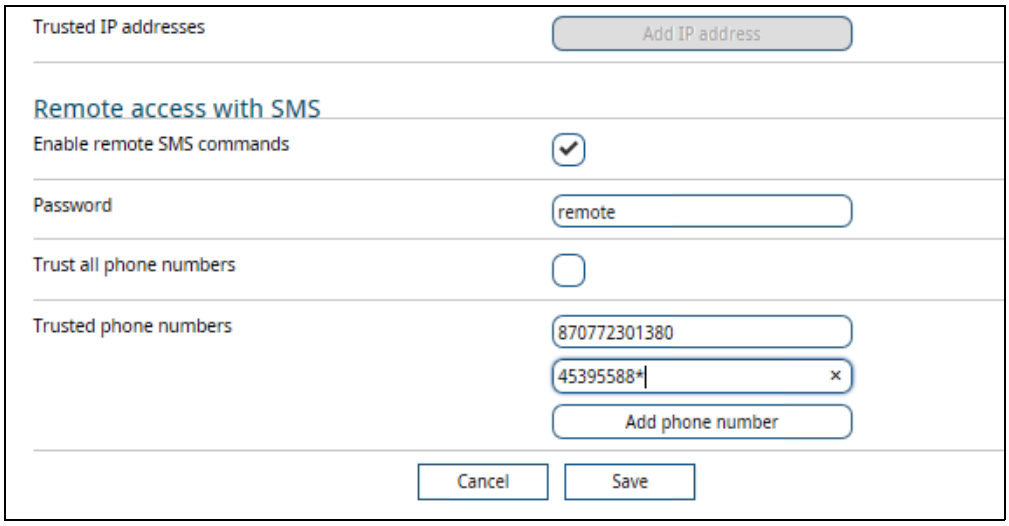
1. From the **Remote management** page, select whether you want to **Enable remote SMS commands**.

   Note If you are using a cellular connection as your primary network connection, the SMS commands will be sent over the BGAN backup connection. Note that some SMS commands will not work, see *Remote access with SMS* on page 26.

2. Enter the password for remote SMS. It can be 5 to 15 characters long. The characters 0-9, a-z and A-Z are allowed. **The password is mandatory**. This password must be entered every time you send an SMS command. Default password is **remote**.

3. Clear the box **Trust all phone numbers** and enter at least one trusted mobile number from which the terminal accepts an SMS. Use the wild card * to accept a range of trusted numbers. Leave out the prefix before the country code (example: for “+45” write only “45”)

Entered mobile number with wild card	Mobile numbers accepted
453955880*	+4539558800 to +4539558809
45395588*	+4539558800 to +4539558899



4. To add more phone numbers, click **Add phone number** again.

5. Click **Save**.

For information on how to send SMS commands, see *Remote access with SMS* on page 26.

Remote control of tracking

When you are using the tracking function of the EXPLORER 540, you can set up the terminal so that the tracking server can access the EXPLORER 540 e.g. to start or stop tracking or to change reporting intervals.

To allow the tracking server to control the tracking settings, do as follows:

1. Under **Advanced**, select **Tracking settings**.

2. Select **Allow remote control of tracking**.

3. Click **Save**.

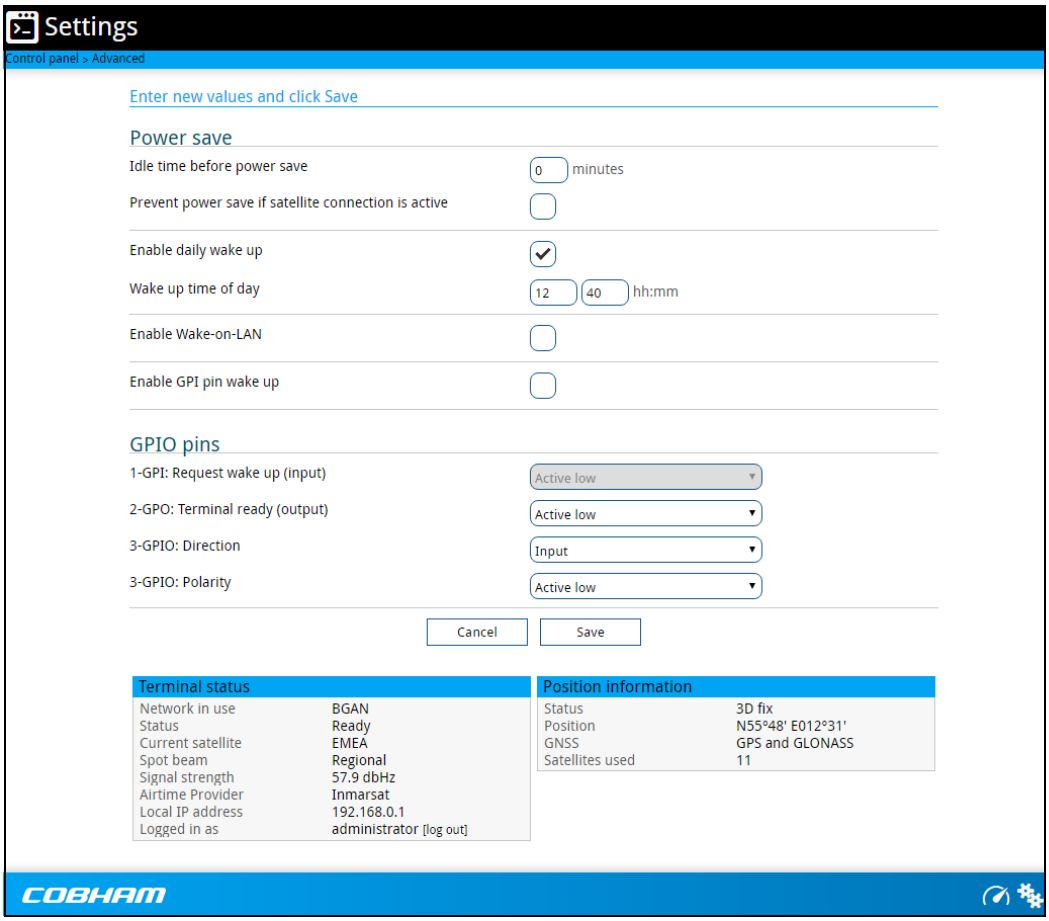
The EXPLORER terminal will now accept commands from the specified tracking server, for example to change reporting intervals or start/stop reporting.

Power save (Settings)

There are a number of options to save power in the EXPLORER 540. For a general description of the power save options, see *Power-saving* on page 40.

To set up the power save options, do as follows:

1. Under **Advanced**, select **Settings**.



2. Select how many minutes with no (local) activity before the terminal should enter power save mode (Idle time).

   Note If you select 0 (zero), the power save function is disabled and the terminal will never enter power save mode.

3. Select **Prevent power save if satellite connection is active** if you do not want the terminal to enter power save mode when a data connection (PDP context) is opened on the satellite connection.

   Note With this option selected, the terminal will not enter power save mode if there is a PDP context open, even if it is not currently used to send or receive data.

4. Select **Enable daily wake up** and enter the **Wake up time of day** if you want the terminal to "wake up" from power save mode at a specific time every day.

   Note Local time must be converted to UTC time!

5. Select **Enable Wake-on-LAN** if you want the terminal to wake up from power save when the LAN port receives a magic packet from locally connected equipment.

6. Select **Enable GPI pin wake up** if you want to use the dedicated I/O pin on the EXPLORER 540 to wake up the terminal from power save mode. See the next section *I/O pins (Settings)* on page 85.

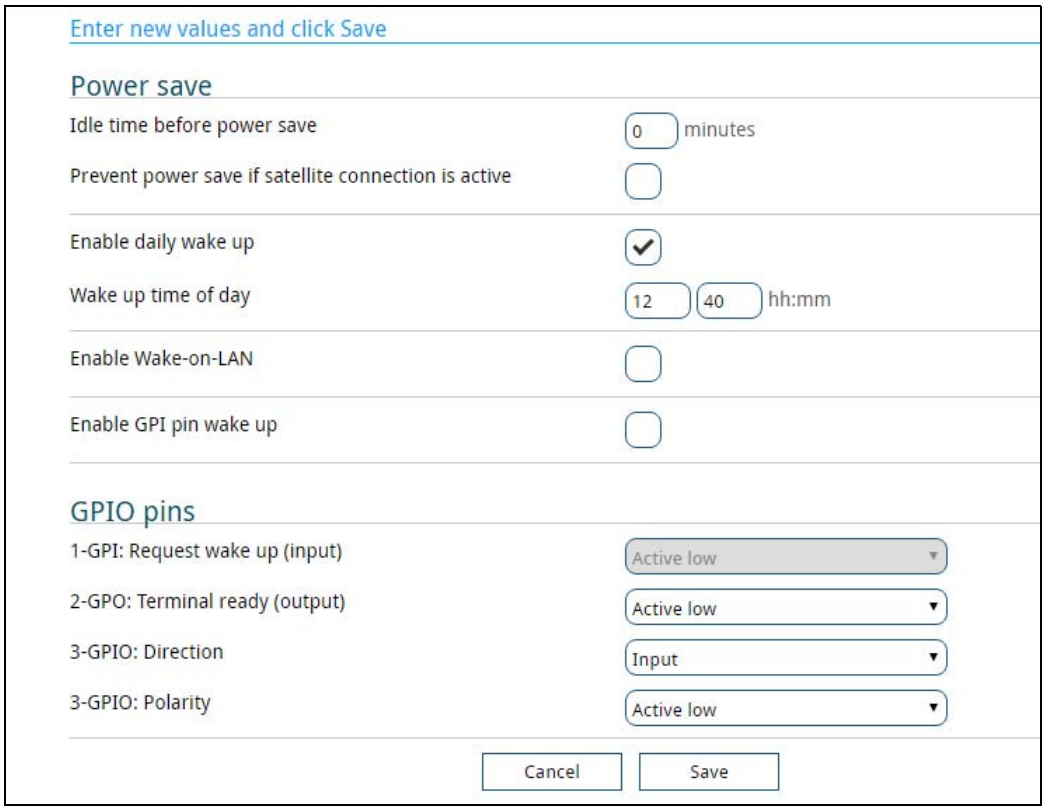
7. Click **Save**.

I/O pins (Settings)

The EXPLORER 540 has 3 I/O pins, two assigned pins and 1 general purpose pin.

- Request wake up (input)
- Terminal ready (output)
- Control/Status (input/output)

1. Under **Advanced**, select **Settings**.



2. If you have enabled GPI pin wake up, select whether the **Request wake up** input should be active high or low.

3. Select whether the **Terminal ready** output should be active high or low. This output signals when the EXPLORER 540 is ready to communicate with connected equipment.

Note "Terminal ready" only signals that the terminal is awake and ready to communicate with connected equipment. It does **not** show whether or not the terminal is registered on the network, or a data connection is established. See *Power-saving* on page 40 and *Automatic Context Activation (ACA)* on page 36.

4. If you want to use GPIO pin 3, select the direction and polarity.
   Pin 3 does not have a predefined function, but can be used for remote control/status of connected M2M equipment using AT command **_ITGPIO**. See *Control or status with GPIO pin 3* on page 46.
5. Click **Save**.

Help desk

Under Help desk you can enter the contact information you want for your EXPLORER 540. The Help desk contact information is empty by default. You must provide the contact information, e.g. the phone number for your Airtime Provider. Do as follows:

1. In the **Advanced** page, select **Help desk**.
2. Type in the contact information you want.
3. select **Save**.

The Help desk information is now available from (Control panel) > **Support > About**.

Reset button

You can change the function of the Reset button. See *Reset button* on page 94. Do as follows:

1. From the **Advanced** page, select **Reset Button**.
2. Select the behavior you want for the Reset button.
   - **Enabled**: Short push: The EXPLORER 540 restarts (power cycle) and begins the installation process again., Long push: Reset to factory default.
   - **Long press disabled**: The Reset button will not be able to reset to factory default, but the short push function (power cycle) will still work.
   - **Disabled**: The Reset button will not have any function.
3. Click **Save**.

To enter the SIM PIN in the web interface

Note Whether you are using the BGAN network or a cellular network, you need a SIM card to access the network. If you are using BGAN, the SIM is inserted in the terminal and if you are using the EXPLORER 540 LTE Modem the SIM card is inserted in the modem.

The method for entering the PIN is the same for both types of network.

Do you need a SIM PIN?

Note You may not have to enter a SIM PIN to access the terminal. This depends on whether or not the use of a SIM PIN is enabled on your SIM card and whether or not the Auto SIM PIN validation is used.

The administrator can enable and disable the use of a SIM PIN and set up Auto SIM PIN validation. For details, see

- *To enable or disable the use of a SIM PIN* on page 75
- *Auto SIM PIN validation* on page 75

If a computer is connected when you start up the terminal, you can access the web interface and enter the SIM PIN here.

Important If your EXPLORER 540 is used in an unmanned M2M system, you will normally not be able to enter a PIN code. In this case we strongly recommend enabling **Auto SIM PIN validation** in the web interface before using the system. See *Auto SIM PIN validation* on page 75.

To enter the SIM PIN

If your SIM card requires a PIN and the PIN has not yet been entered, you must enter it before you can make calls or access the Internet. Until you have entered the PIN you cannot access the network, but you can still configure your terminal.

To enter the PIN, do as follows:

1. Access the web interface.
   If the terminal needs a PIN, a popup window tells you to enter PIN.
2. Type in your PIN and click **OK**.

When pointing is completed and the correct PIN is entered, you are ready to make calls or access the Internet.

To cancel the SIM PIN

If you select **Cancel** when you are asked for a PIN, you can use the web interface as normal, but you will not be able to access the network to make calls or data sessions.

To enter the PIN later, after cancelling the first time, do as follows:

1. From the icon bar at the top, click ⚠.
   The **Alerts** list opens.
2. Click **Resolve** next to **Enter PIN for BGAN** or **Enter PIN for cellular modem**.
3. Type in your PIN and click **OK**.

Optional: To set up cellular network for data

The EXPLORER 540 is a BGAN terminal by default. However, if you are within coverage of a cellular network, you may want to acquire an EXPLORER 540 LTE Modem as an alternative to the BGAN network. Note that you need a separate SIM card for the EXPLORER 540 LTE Modem to access the cellular network, the EXPLORER 540 SIM card can only be used for the BGAN network.

For general information of the EXPLORER 540 function with the EXPLORER 540 LTE Modem, see *Optional: To use a cellular network* on page 7.

To set up the EXPLORER 540 for cellular operation

To enable the EXPLORER 540 to use the cellular network, do as follows:

1. Acquire an EXPLORER 540 LTE Modem from Cobham SATCOM.
2. Install the modem as described in the installation guide supplied with the modem.
3. Connect your computer to the EXPLORER 540.
4. Access the web interface and set up the EXPLORER 540 as described in the next sections.

To disable the use of a SIM PIN

To disable the use of a PIN to access the cellular network, do as follows:

1. Under **Advanced**, select **EXPLORER Cellular Modem**.
2. Select **Enable/disable SIM PIN**.
3. Under **Enable/Disable PIN** clear the box next to **Require PIN on startup**.
   - If you clear the box, you can access and use the terminal without entering a PIN. **Recommended for M2M operation!**
   - If you select the box, you must enter a PIN before you can use the cellular network.
4. If you selected Require PIN on startup, type in the PIN next to **Enter current PIN**.
5. Click **Save**. The new PIN settings will take effect at next power on.

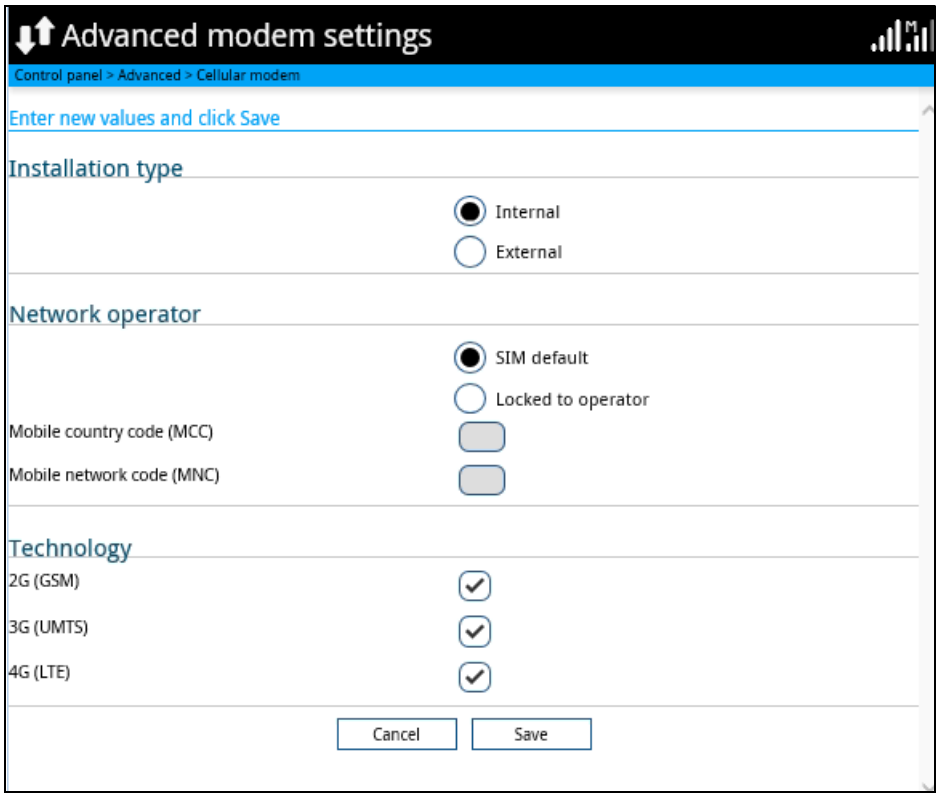
To change the SIM PIN

To change the PIN used to access the cellular network, do as follows:

1. Under **Advanced**, select **EXPLORER Cellular Modem**.
2. Select **Change SIM PIN**.
3. Under **Change PIN** type in the **Current PIN**.
4. Type in the **New PIN** and retype it on the next line.
5. Click **Save**. The new PIN settings will take effect at next power on.

To set up the EXPLORER 540 LTE Modem

1. Under **Advanced**, select **EXPLORER Cellular Modem**.
2. Select **Advanced modem settings**.



3. Select the Installation type
   - **Internal**: The modem is installed in the back of the EXPLORER 540.
   - **External**: The modem is installed as an external unit connected to the EXPLORER 540 by a USB cable.
     In certain geographic areas and in certain frequency bands it is recommended to move the LTE modem away from the EXPLORER 540 in order not to interfere with the BGAN signal. For details, see *Optional EXPLORER 540 LTE Modem* on page 114.
4. Select the Network operator mode.
   - **SIM default**: The cellular modem uses the operator from the SIM card.
   - **Locked to operator**: Type in the **MCC** and **MNC** for the operator you want to use. The cellular modem will only use this operator.
5. Select the technology of the cellular network (2G, 3G and/or 4G).
   For details, see *Optional EXPLORER 540 LTE Modem* on page 114.
6. Click **Save**.

To set or change the APN for your cellular connection

If the APN for your cellular connection is not set up automatically, you must set it up before you can connect to the cellular network. Do as follows:

1. Select on the tile with the cellular connection.
2. Type in the new name for your connection.
3. Type in the name of the APN you are going to use for your cellular connection.
4. If required, type in user name and password for your APN.
5. Click **Save**.

To select the cellular network

6. Select (Control panel) > **Terminal settings**.
7. Under **Connection**, **Mode**, select **Cellular modem preferred**.
8. Make sure **Automatic Context Activation (ACA)** is enabled and click **Save**.
9. When the modem is connected, the opening page of the web interface shows a new tile with the cellular connection. The "M" on the tile for the cellular modem indicates that it is a cellular modem and not a BGAN connection.

   Note The Standard data connection on the BGAN network is still running in the background and cannot be stopped.

10. If required, select on the tile to set or change the name or the APN of your cellular connection. For details, see the next section.

When the connection is established, an "M" on the signal bar in the top right corner indicates that it is a cellular (Modem) connection, and the tile shows details about the connection.

The data connection is automatically established when set up correctly, so you cannot start and stop connections from the tiles as you can when the terminal is in BGAN mode.

Note You may have to enter a PIN before you can use the cellular network, see *To enter the SIM PIN in the web interface* on page 87.

You can now access the Internet through the cellular network from a device connected to the EXPLORER 540. Note that the BGAN connection is still running in the background on standby.

Note You cannot make calls on the cellular network through the EXPLORER 540. Only data connection is possible.

Maintenance and troubleshooting

Support

Contact information

Should your Cobham SATCOM product fail, please contact your dealer or installer, or the nearest Cobham SATCOM partner. You will find the partner details on www.cobham.com/satcom, **Technical Service Partner List**. You can also access the Partner Portal at www.cobham.com/satcom, **Cobham SYNC Partner Portal**, which may help you solve the problem. Your dealer, installer or Cobham SATCOM partner will assist you whether the need is user training, technical support, arranging on-site repair or sending the product for repair. Your dealer, installer or Cobham SATCOM partner will also take care of any warranty issue.

To repack for shipment

Should you need to send the product for repair, please read the below information before packing the product.

The shipping carton has been carefully designed to protect the EXPLORER 540 and its accessories during shipment. This carton and its associated packing material should be used when repacking for shipment. Attach a tag indicating the type of service required, return address, part number and full serial number. Mark the carton FRAGILE to ensure careful handling.

Note Correct shipment is the customer's own responsibility.

If the original shipping carton is not available, the following general instructions should be used for repacking with commercially available material.

1. Wrap the defective unit in heavy paper or plastic. Attach a tag indicating the type of service required, return address, part number and full serial number.
2. Use a strong shipping container, e.g. a double walled carton.
3. Protect the front- and rear panel with cardboard and insert a layer of shock-absorbing material between all surfaces of the equipment and the sides of the container.
4. Seal the shipping container securely.
5. Mark the shipping container FRAGILE to ensure careful handling.

Failure to do so may invalidate the warranty.

Software update

Remote software update

See *Remote software upgrade* on page 42.

To update software locally with the web interface

To update the software in the EXPLORER 540, do as follows:

1. Download the new software[1] or acquire the software from Cobham SATCOM and save it to your computer.
2. Connect your computer to the EXPLORER 540.

   Note Connect to the LAN interface of the EXPLORER 540. Depending on your system configuration, you may have to connect through a router or a switch.

3. Open the web interface in your browser.
   For details on how to access the web interface, see *To access and navigate the web interface* on page 48.
4. Click (Control panel) at the bottom of the page.
5. Click **Support > Update software**.
6. Click **Update software...**
7. Browse to the new software version and click **Open**. The file has the extension ".tiif".
8. The EXPLORER 540 now restarts and completes the software update.

   Note The update procedure takes a couple of minutes.

You can check the software version under **Control panel** > **Support** > **About**.

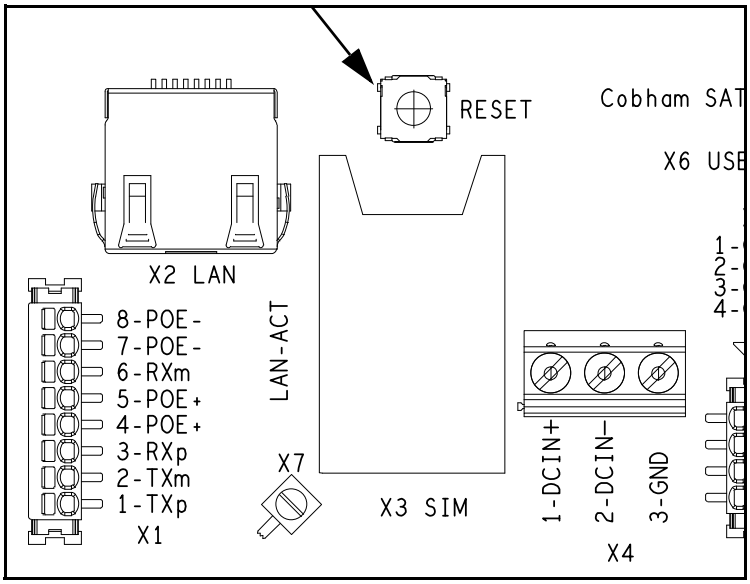
1. You can download the software from the "Cobham SYNC Partner Portal" at www.cobham.com/satcom, select **Cobham SYNC Partner Portal** > **Downloads**. Locate the EXPLORER 540 software.

Reset button

The EXPLORER 540 has a Reset button that has two functions: To restore all settings to factory settings, or to restart the EXPLORER 540.

Note You can disable or limit the function of the Reset button using the web interface. See *Reset button* on page 86.

The Reset button is located inside the interface enclosure at the back of the terminal and can only be accessed when the cover is removed.



Do as follows:

1. Use the included Torx bit to unscrew the screws holding the cover for the interface enclosure.
2. Locate the Reset button.
3. Use a pointed device to push the Reset button.

Action	Function
Push and hold the Reset button for 2 seconds	The EXPLORER 540 restarts (power cycle) and begins the installation process again.
Push and hold the Reset button for > 10 seconds	The EXPLORER 540 restores factory settings and restarts the system. All changes to the configuration are lost and the administrator password is reset to **admin**.

4. Close the cover and tighten the screws carefully.
   This is important in order to maintain the IP grade of the EXPLORER 540.

Maintenance

Cleaning the EXPLORER 540

Clean the exterior of the EXPLORER 540 with a damp cloth.

Disposal of the EXPLORER 540

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.

Troubleshooting

Troubleshooting guide

Problem	Possible cause	Remedy
Installation process: The pointing process fails.	The view to the satellite is blocked.	Make sure the EXPLORER 540 has a clear view to the satellite. Reboot the terminal to run installation again.
	The antenna is pointed in the wrong direction.	Check that the antenna is pointed according to the position data. Adjust the position to the highest possible signal strength.
Installation process: "Start satellite connection" fails.	Missing SIM. SIM error. Missing PIN. Poor satellite signal.	Insert SIM. Replace SIM card. Enter or cancel PIN, see *To enter the SIM PIN in the web interface* on page 87. Check that the antenna is pointed according to the position data, and that nothing is blocking the line of sight. Adjust the position to the highest possible signal strength.

Problem	Possible cause	Remedy
Installation process: "Verify satellite connection" fails.	Wrong APN.	Enter correct APN or select **SIM default** (if allowed by SIM card). See *To change the APN for a connection package* on page 52.
	APN is set to SIM default, but the SIM requires a user defined APN	Enter the user defined APN in the web interface. See link above.
	Wrong watchdog IP addresses.	Enter correct watchdog IP addresses, or disable watchdog to skip ping verification. See *Connection watchdog (Link monitoring)* on page 77.
	Network issues.	Try again later. To skip ping verification, disable watchdog.
The EXPLORER 540 is not operational.	Software error.	Restart the terminal. If the problem persists, you can restore to factory defaults as described in *Reset button* on page 94. Note: This will reset the configuration of your terminal to factory default!
The web interface shows **Insert SIM**.	The SIM card is not present.	Remove power and Insert the SIM card in the SIM slot according to the instructions in the installation guide.
	The SIM card is not inserted properly.	Remove power and then remove the SIM card and re-insert it according to the instructions in the installation guide.

Problem	Possible cause	Remedy
The web interface shows **No position fix**.	The EXPLORER 540 is unable to register on the network, because the GNSS position is unknown.	Make sure the view to the GNSS satellites is not blocked. To obtain position fix, the EXPLORER 540 should be placed flat on an even surface pointing straight upwards, with a clear view to as much of the sky as possible. When the EXPLORER 540 has obtained position fix, you can point the antenna towards the BGAN satellite. You can see position status in the Dashboard of the web interface (status section).
The web interface shows **Not registered**.	The EXPLORER 540 cannot register on the BGAN network.	Check that your SIM card is valid for communication on the BGAN network. Check your subscription with the Airtime Provider.
The web interface shows **External control**.	The EXPLORER 540 is currently controlled by an external application, e.g. LaunchPad or an AT command interface.	If you want to use the built-in web interface, stop the external application and restart the EXPLORER 540. Then open your browser and access the web interface.
The EXPLORER 540 cannot obtain its position using GNSS.	There is no GNSS signal, or the signal is weak. If the EXPLORER 540 has not been used recently within the same location, it can take up to 10 minutes to obtain the position.	Check the position status in the web interface. To help the EXPLORER 540 obtain position fix, it should be placed flat on an even surface pointing straight upwards, with a clear view to as much of the sky as possible. When the EXPLORER 540 has obtained position fix, you can point the antenna towards the BGAN satellite.

Problem	Possible cause	Remedy
No signal or weak signal from the BGAN satellite.	The view to the satellite is blocked.	Make sure the EXPLORER 540 has a clear view to the satellite. Be aware that window glass may reduce the signal level.
	The antenna is pointed in the wrong direction.	Check that the antenna is pointed according to the position data. Adjust the position to the highest possible signal strength.
Connection to the Internet cannot be established.	The signal strength is too low.	Check that the antenna is pointed according to the position data. Adjust the position to the highest signal strength you can obtain. As a rule of thumb, you should have a a signal strength of 45 dBHz or more to be able to make a call or data session.
The web interface cannot be accessed.	The browser is configured to use a proxy server.	For Microsoft Internet Explorer, select **Tools > Internet Options > Connections > LAN Settings** and uncheck **Use a proxy server for your LAN**.
	You have entered a wrong IP address.	Check the IP address and re-enter it. The default IP address is **192.168.0.1**.
A LAN connection cannot be established.	The cable is not properly connected.	Connect the cable.
	The cable type is not correct.	Use Ethernet Min. Cat 5 Solid copper wire, STP. Max. length: 100 m.

Status signalling

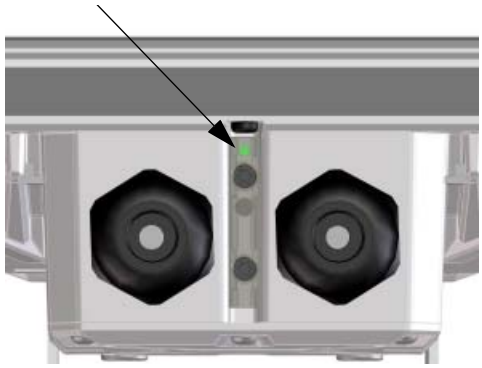
Means of signalling

The EXPLORER 540 system provides two methods for signalling the status of the system.

- **Light indicator** between the cable glands.
- **Messages** shown in the web interface.

Light indicator

The EXPLORER 540 has one light indicator showing status before and during installation. The Status indicator (LED) is located between the two cable glands.



Note: The LED is only in use until installation is completed, and is **automatically disabled** 10 minutes after the connection is established. The LED is **not enabled again** until you restart the installation process.

Status indicator

Indicator pattern		Meaning
●	Green flashing rapidly	Starting up.
●	Yellow flashing	BGAN pointing.
●	Green flashing	Verify network connectivity.
●	Green constant	Ready.
●	Yellow flashing rapidly	Closing down.
●	Yellow constant	Warning (user recoverable). See web interface for the warning text.
●	Red constant	Error. See the web interface.
●	Blue flashing	Uploading software to the terminal. **Note**: The indicator will only flash blue if software upgrade is done before installation. After installation the indicator is disabled.
○	Off	Power off **or** light indicator has been disabled.

Event messages and status messages

In the web interface of the EXPLORER 540 you can see status messages and alerts that are currently active.

When a warning or error event is active, the web interface shows a warning symbol ⚠. Select it to see a list of currently active alerts.

List of messages

The following list explains some of the messages that may show in the web interface of the EXPLORER 540.

Displayed text	Explanation	Remedy
`Standard data speed limited due to high temperature`	The bit rate of the data channel is reduced because the temperature is too high.	None.
`Connection closed. Data or time limit exceeded.`	The data connection is closed because a data limit defined in the web interface is exceeded. The data limit may be set to avoid unintentional use of bandwidth, e.g. if you forget to close a connection after use.	Restart the connection e.g. from the Dashboard in the web interface. See *Manual activation of data connections* on page 37. You can change the data limits in the web interface under Advanced > Data limits.
`Automatic activation failed. Reconnecting...`	The terminal failed to automatically activate a Standard data connection at start-up, even though it was configured to do so.	Wait for the terminal to reconnect.
`Connection failed`	The terminal failed to establish a connection.	Restart the connection e.g. from the Dashboard in the web interface. See *Manual activation of data connections* on page 37.
`Connection lost`	The data connection was lost.	Restart the connection e.g. from the Dashboard in the web interface. See *Manual activation of data connections* on page 37.
`Network failure`	There is a problem, with the network, e.g. congestion.	Try again later. If the problem persists, contact your airtime provider.
`Network failure. Reconnecting...`	There is a problem, with the network, e.g. congestion. The terminal tries to reconnect because it is set up for Automatic Context Activation.	Wait for the terminal to reconnect. If the problem persists, contact your airtime provider.

Displayed text	Explanation	Remedy
`Unknown connection problem`	There is an unknown problem with the connection.	Restart the connection e.g. from the Dashboard in the web interface. See *Manual activation of data connections* on page 37. If the problem persists, contact your airtime provider.
`Not registered to the network`	The terminal is not registered on the satellite network.	You can only make a connection if the terminal is registered on the satellite network. Make sure that: • The SIM card is present. • The PIN has been entered (if used). • The terminal is pointed. See *To get started* on page 10 for details.
`Data connections not possible due to high temperature`	Critically high temperature is causing the terminal to shut down. The internal temperature has reached 84 degrees Celsius.	None. For information on ambient temperature, see *General specifications* on page 107. Contact your distributor if the problem persists.
`Satellite signal lost`	The system no longer receives a signal from the satellite.	Make sure the antenna has a clear view to the satellite.
`Registration for voice failed`	The system has not yet been allowed to register for voice services (Circuit Switched).	If the problem persists, contact your airtime provider.
`Registration for data failed`	The system has not yet been allowed to register for data services (Packet Switched).	If the problem persists, contact your airtime provider.
`Preparing for software update`	The terminal is preparing to update the software.	Wait for the software update to complete.
`Error opening software file`	A wrong file name may have been entered with the AT command _IUPDFW.	Use the command **_IUPDFW?** to show the correct file name before updating.

Displayed text	Explanation	Remedy
`Software update is already ongoing`	You tried to start a software update when someone else had already started one.	Wait until the software update is completed.
`Software version is already installed`	You are trying to update the software to a version that is already installed.	Check your existing software version, e.g. in the web interface under **Control panel** > **Support** > **About**.
`Online software update failed`	Remote software update failed.	Try again later. If the problem persists, contact your distributor.
`Online software update failed. Could not establish PDP context.`	Remote software update failed because the data connection could not be established. The reason may be: • no network resources, • wrong APN, or • no line of sight to the satellite.	Check the status of the terminal, e.g. in the web interface. Make sure there is line of sight to the satellite and that the APN is correct.
`Online software update failed. Could not connect to URL.`	Remote software update failed because the terminal could not connect to the URL.	Check that you have specified the correct URL in your AT command, or enter the correct IP address instead.
`Software update transfer error`	An error occurred while trying to transfer the file for software update to the terminal.	Try again later. If the problem persists, contact your distributor.
`Software update transfer timeout`	The system timed out before the software file was transferred to the terminal.	Try again later.
`The terminal is not installed`	The terminal has failed in the installation process, or the installation process was cancelled.	If you want to restart the installation process, restart the terminal or access the web interface and select **Control panel** > **Installation**.

Displayed text	Explanation	Remedy
`Cellular modem error`	There is an error with the EXPLORER 540 LTE Modem. The text in the web interface will normally show more details on the type of error, e.g. unknown APN.	Check that the APN for the cellular connection is set up correctly. You can set up the APN in the web interface: In the Dashboard click ⚙ in the right side of the tile with the EXPLORER Cellular Modem.

Log files

With AT commands you can command the EXPLORER 540 to send a diagnostics report or the Event log, System log or AT command log to a specified FTP server. See *Log file(s)* on page 45.

To create a diagnostics report

The diagnostic report contains relevant information for troubleshooting. When contacting your distributor for support, please enclose this file. To generate the report, do as follows:

1. Access the web interface.
2. Select (Control panel) at the bottom of the page.
3. Select **Support**.
4. From the **Support** page, select **Diagnostics report**.
5. Select **Generate report**.

   Note | It may take a few minutes to generate the report.

6. Select **Download report**.
7. Choose a location for the file and save it.

Call log and data log

The log holds detailed information on each call or data session to and from the EXPLORER 540, including date and time, phone numbers, duration, amount of data transferred etc. Date and time is UTC time, received from the satellite.

To see the log in the web interface, select (Control panel) > **Logs**. See *To use the logs* on page 57.

Event log

The Event log shows events that occurred in the past and are no longer active. It includes events of informational character describing normal phases of operation for the terminal, and also alerts that have appeared in the Alerts list.

To view the event log in the web interface, select **Event log** from the **Support** page.

To view extended status

To see the Extended status page, select (Control panel) > **Support > Extended status**.

To view updated information on the **Extended status page**, select the icon in the top left corner to refresh the page.

The Extended Status page shows IAI-2 status, IMSI number and IMEI number.

To reset the administrator password

If you have forgotten the administrator password, do as follows:

1. Contact your supplier for a reset code.
   Report the serial number and IMEI number of the terminal.
   You can find the serial number on the label on the EXPLORER 540 or under (Control panel) > **Support > About** and the IMEI number in the web interface under (Control panel) > **Support > Extended status**.
2. After receiving the reset code from your supplier, select **Reset password** from the **Support** page.
3. Type in the reset code obtained from your supplier and select **Reset**.
4. The password is reset to **admin**.

Help desk

Under Help desk you can enter the contact information you want for your EXPLORER 540. The Help desk contact information is empty by default. You must provide the contact information, e.g. the phone number for your Airtime Provider under **Advanced > Help desk**. For details on how to enter the information, see *Help desk* on page 86.

The Help desk information is then available from the About page ((Control panel) > **Support > About**)

List of reserved IP subnets

Some IP subnets are reserved for internal use in the terminal. If any of these addresses are assigned to external equipment connected to the terminal, the terminal and connected equipment will not be able to communicate.

The following local IP subnets are reserved for internal use in the terminal:

192.168.1.x and

192.168.2.x

-where x can be any number from 0 to 255. The netmask for these subnets is 255.255.255.0.

Furthermore the following local IP addresses are reserved:

192.168.61.1

192.168.61.2

192.168.61.3

192.168.61.4

192.168.61.5

192.168.61.6

192.168.61.7

192.168.61.8

192.168.61.9

192.168.61.10

192.168.61.11

192.168.50.1

192.168.51.1

192.168.52.1

192.168.53.1

192.168.54.1

192.168.55.1

192.168.56.1

192.168.57.1

192.168.58.1

192.168.59.1

192.168.60.1

Technical specifications

General specifications

Item	Specification
Type	EXPLORER 540, BGAN M2M terminal/ BGAN Class 2 terminal
Max. IP data rate, Rx/Tx[a] Streaming data[b]	464 kbps/448 kbps (simultaneously) 32, 64, and 128 kbps
Voice[b]	Standard voice 4 kbps Premium voice 3.1 kHz audio, 64 kbps
Physical dimensions	202 x 202 x 51.8 mm 8.0 x 8.0 x 2.0 inches
Weight	1.6 kg / 3.5 lbs (excl. cellular modem)
Operating temperature, Hazardous locations, C1D2 Non-Hazardous locations Storage temperature	 -40 to +55˚C -40 to 75˚C, reduced operation[c] -40 to 55˚C, full operation -40 to 75˚C
Water & Dust	IP66
Environment condition	Outdoor mounting and use in harsh environment
Max. altitude for Hazardous locations	2000 m
Relative humidity	95% humidity non-condensing at 40˚C
Pollution degree	Pollution degree 2
Supported web browsers (Others may be supported, these have been tested.)	Safari 5.1.7 and above Internet Explorer 9.0 and above Google Chrome 23 and above Mozilla Firefox 16 and above
Approvals	CE, FCC, IC, RCM, GMPCS, C1D2, Russia (Type approval certificate in the field of communication), Japan (Radio law), Inmarsat Class 2 Type Approval and BGAN M2M Certified.

a. Performance depends on a wide range of factors and actual usage.
b. Not available for M2M subscription.
c. When the internal temperature reaches 84˚C, the terminal closes down. An event message is recorded in the event log.

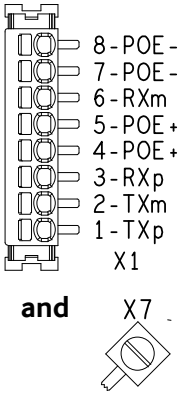
Interfaces specifications

LAN interface (X1 or X2)

Connector pin-out

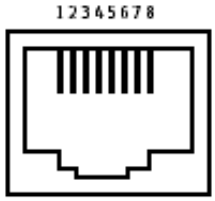
Important There are two LAN connectors, but **only one at a time can be used!**

X1: Terminal block and **X7** (GND)



or

X2: RJ-45 connector



Female (receptacle)

Pin	Function
1	TXp
2	TXm
3	RXp
4	POE+
5	POE+
6	RXm
7	POE-
8	POE-

Note If you connect to the terminal block X1 you must connect the shield of the cable to the screw terminal X7 (GND).

To insert the wires in X1 use a screwdriver (max. 2mm wide) to push each terminal open.

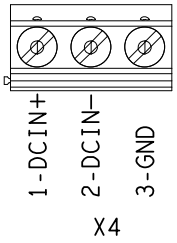
Specifications

Item	Specification
Number of connectors	2: X1 **or** X2 - only one at a time available! The two connectors are on the same electrical interface.
Connector types	RJ-45 female **or** spring loaded terminals
Standard	ISO/IEC 8877:1992 and PoE+ IEEE 802.3at type 2 class 4 (PD[a])
Max. data rate	10/100 Mbps
Max. cable length	100 m / 328 ft with Cat5 UTP
Typical power consumption (excluding PoE injector)[b]	Power save mode (wake on GPIO or timer): 2.4 W Power save mode (wake on LAN): 2.3 W Standby: 3.5 W Transmitting: 19 W

a. The EXPLORER 540 is a **Powered Device (PD)**, that is it may be powered by PoE from external Power Sourcing Equipment (PSE), but it **cannot supply PoE**.
b. If you are using the optional EXPLORER 540 LTE Modem, do not use the LAN interface to power the EXPLORER 540. Use the DC power input instead.

DC power input (X4)

Connector pin-out



Screw terminal

Pin	Function
1	DCIN+
2	DCIN-
3	GND

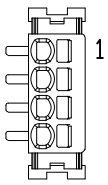
To unscrew and fasten the screws in X4 use a screwdriver (max. 3.5 mm wide). If the DC cable is shielded, connect the shield to pin 3, GND. Otherwise leave GND unconnected.

Specifications

Item	Specification
DC input range (min-max) DC input, nominal	10.5 to 32 VDC 12 or 24 VDC
Transient overvoltage	Overvoltage category II
Typical power consumption @12 VDC supply	Power save mode (wake on GPIO or timer): 0.1 W Power save mode (wake on LAN): 0.9 W Standby: 1.9 W Transmitting: 19 W (+ max. 5 W for EXPLORER 540 LTE Modem)
Connector type	Screw terminals

I/O connector (X5)

Connector pin-out



Pin	Function
1	Request wake up (input)
2	Terminal ready (output)
3	Control/Status Input/output
4	GND

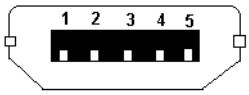
To insert the wires in X5 use a screwdriver (max. 2mm wide) to push each terminal open.
For configuration of the I/O pins, see *Power save (Settings)* on page 84

USB (Host) interface (X6)

The USB interface is used for connecting the optional EXPLORER 540 LTE Modem for cellular operation.

Connector pin-out

USB Micro B



Pin	Function
1	+5V
2	Dm
3	Dp
4	ID
5	GND

Specifications

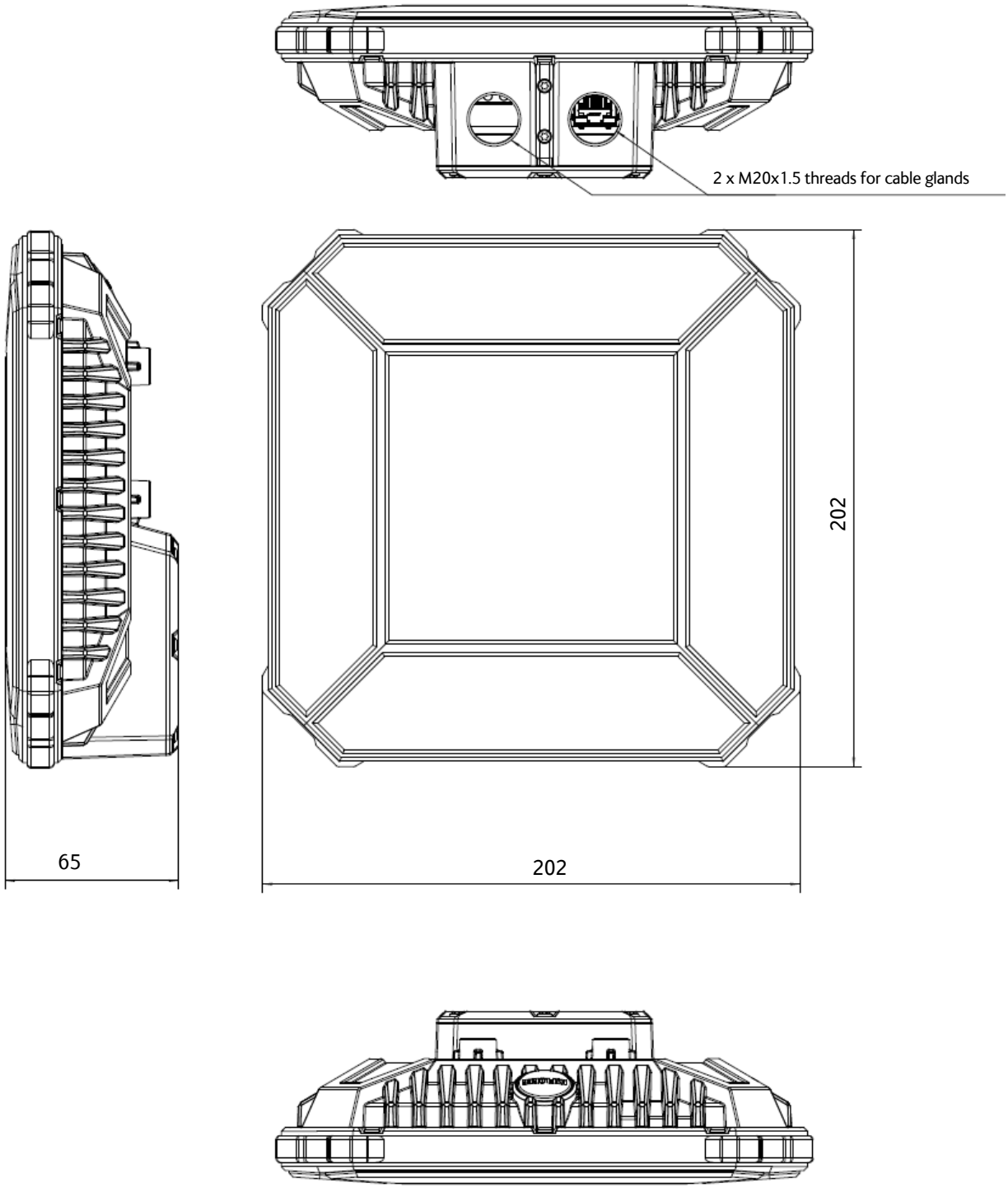
Item	Specification
Version	USB v2.0 Host
Connector type	Type Micro B

Built-in BGAN antenna

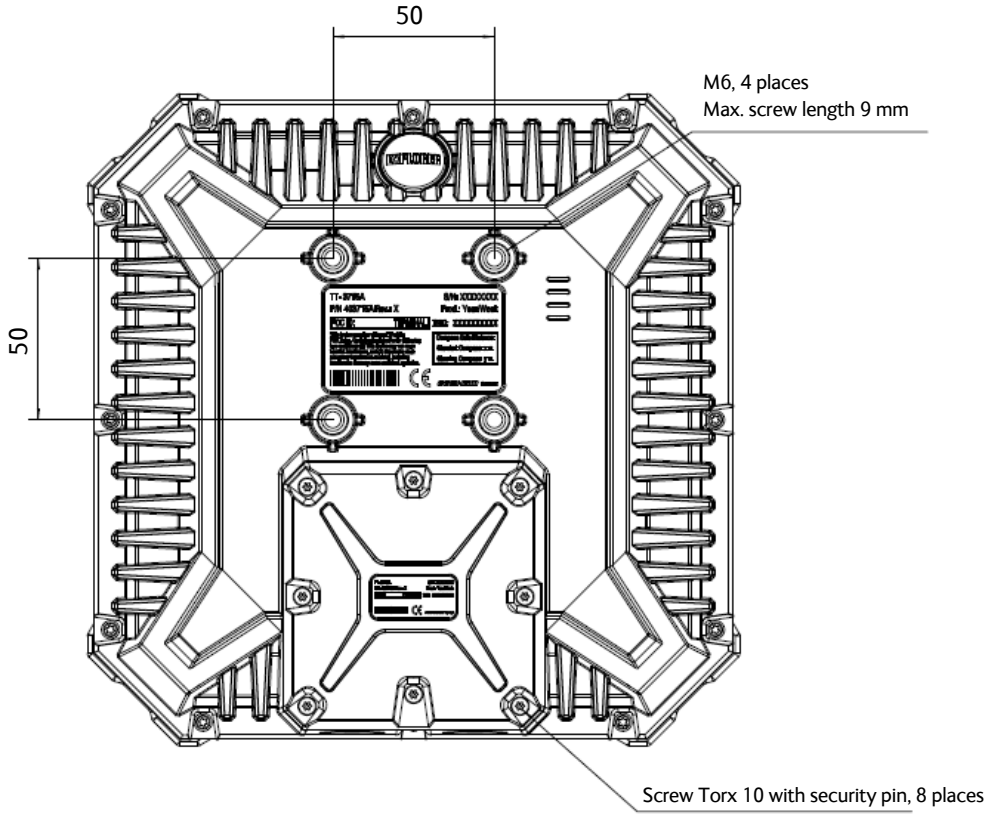
Item	Specification
Type	Directional patch array, manually adjustable
Polarization	RHCP, Right-hand circular polarization for both tx and rx
Frequencies Inmarsat I-4 Transmit Receive Inmarsat Alphasat (EMEA) Transmit Receive GNSS	 1626,5 MHz - 1660,5 MHz 1525 MHz - 1559 MHz Extended L-band (XL)[a]: 1626,5 MHz - 1660,5 MHz and 1668 MHz - 1675 MHz 1518 MHz - 1559 MHz GPS, GLONASS, Beidou
EIRP	Nominal: 15.1 dBW ±1dB, Class 2
Gain	11.25 dBi

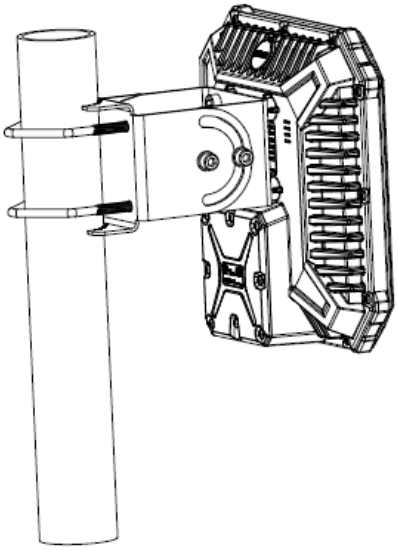
a. Only available within Alphasat coverage (EMEA). See *BGAN services* on page 5.

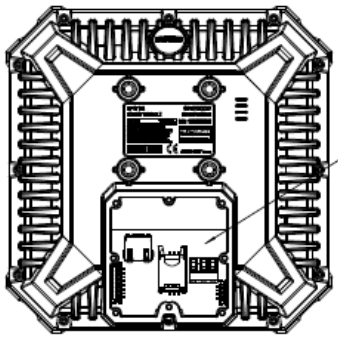
Outline drawing



Dimensions are in millimeter







Dimensions are in mm

Optional EXPLORER 540 LTE Modem

Specifications

Product numbers

Part number	Product
403715A-101	EXPLORER 540 LTE Modem (North America)
403715A-102	EXPLORER 540 LTE Modem (Europe / APAC)
403715A-110	LTE Modem Extension Kit - For mounting the LTE Modem outside the EXPLORER 540

Technology and frequency bands

Item	Specification
LTE (4G)	150 Mbps downlink, 50 Mbps uplink (Cat. 4) Channel Bandwidths: 1.4 - 20 Mhz MIMO 2x2
UMTS/DC-HSPA+ (3G)	42 Mbps downlink, 5.76 Mbps uplink
GSM (2G)	GPRS & EDGE Class 12

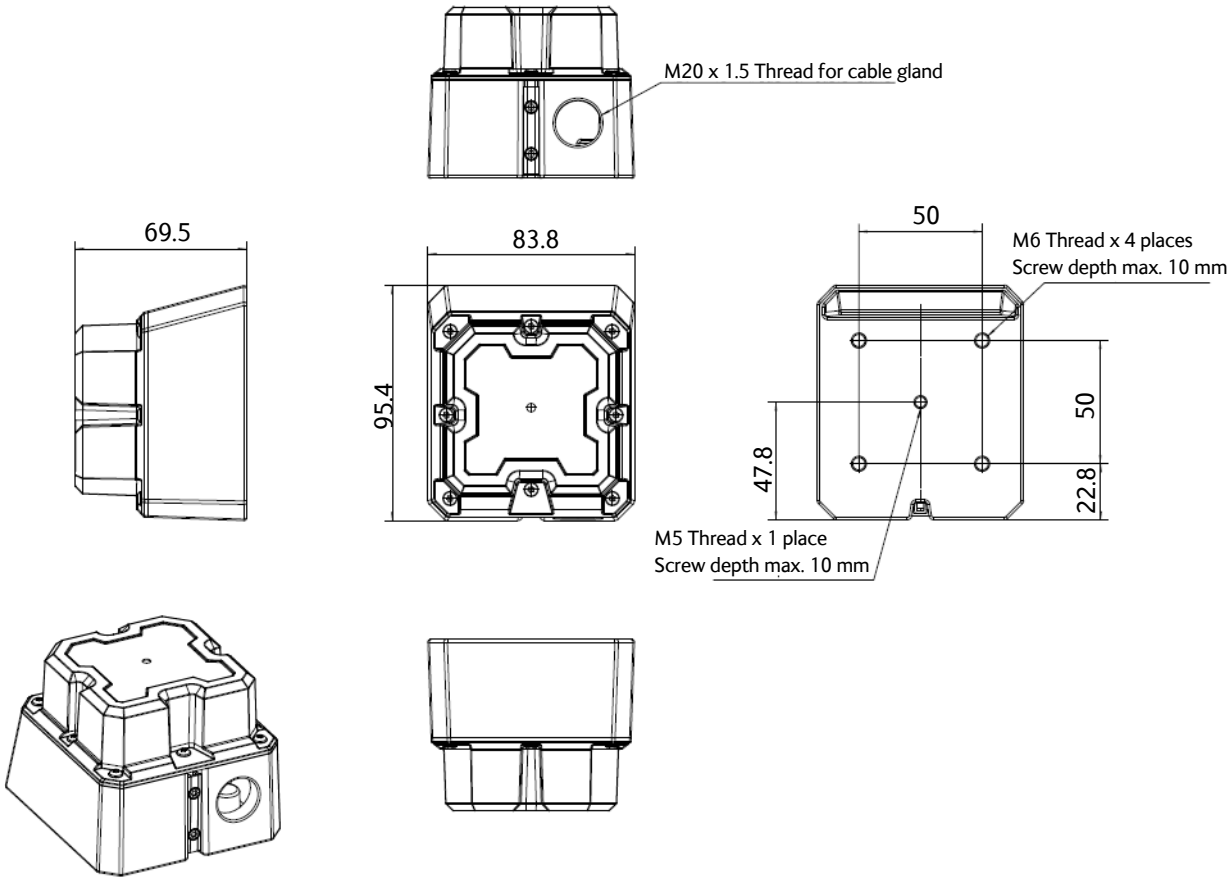
Model	LTE module	Region	Access Technology		
			LTE Bands	UMTS Bands	GSM Bands
403715A-101	ublox TOBY-L200	North America	2,4[a],5,7	850/900/AWS/ 1900/2100	850/900/ 1800/1900
403715A-102	ublox TOBY-L210	Europe / APAC	1,3[a],5,7,8,20	850/900/ 1900/2100	850/900/ 1800/1900

a. Operation in this LTE band requires that the EXPLORER 540 LTE Modem is installed in the external housing.

Environmental and mechanical specifications

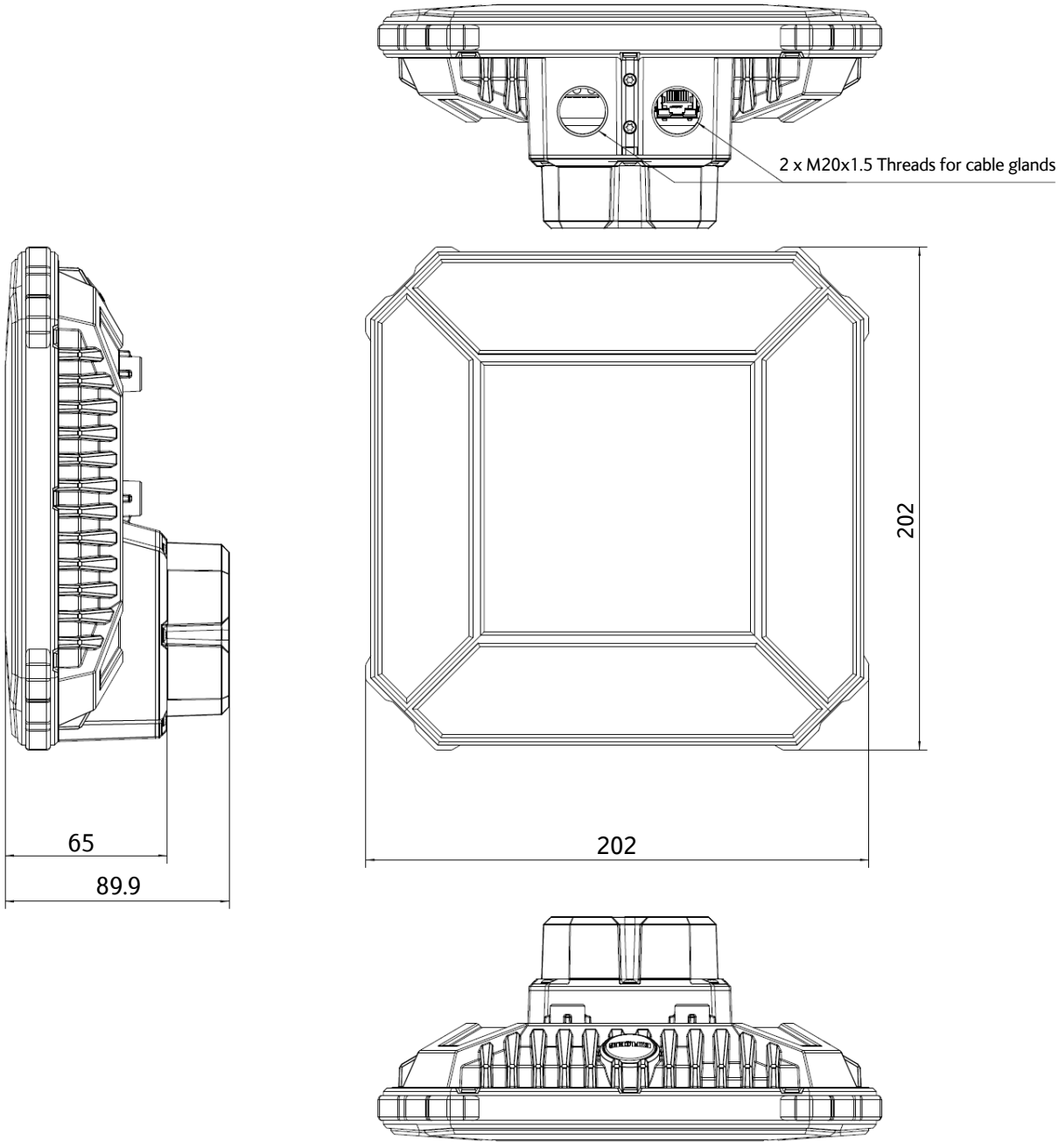
Item	Specification
Weight	380 g
Dimensions	85 mm x 85 mm x 40 mm
Operating Temperature	–40 to +85˚C (extended range)
Industrial Grade	Automotive
Ingress Protection	IP66

Outline drawing, external modem

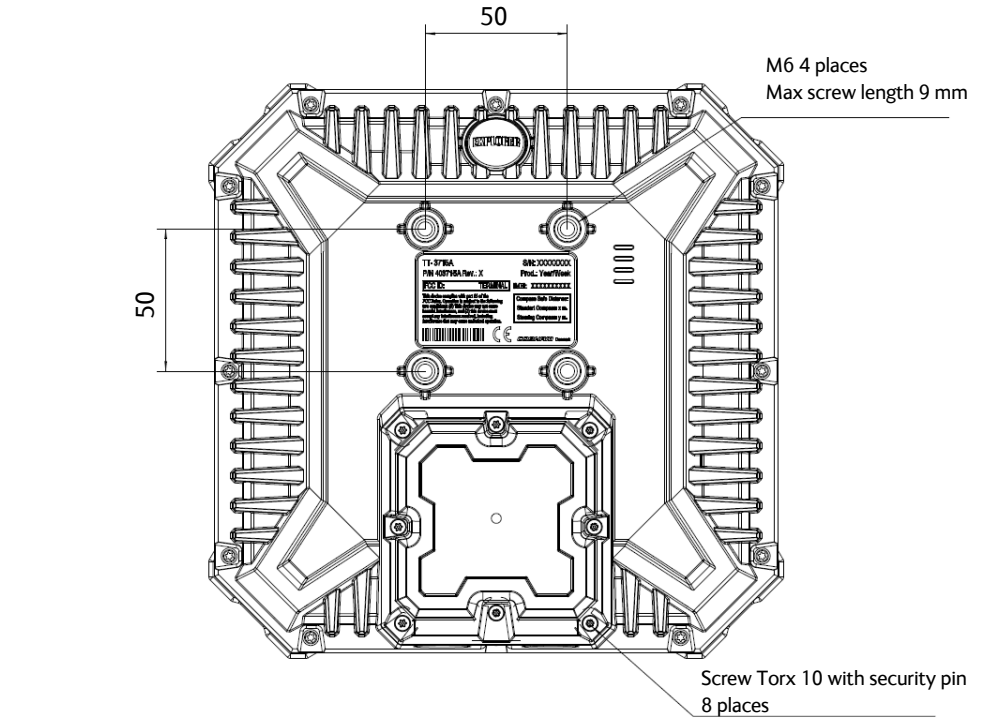


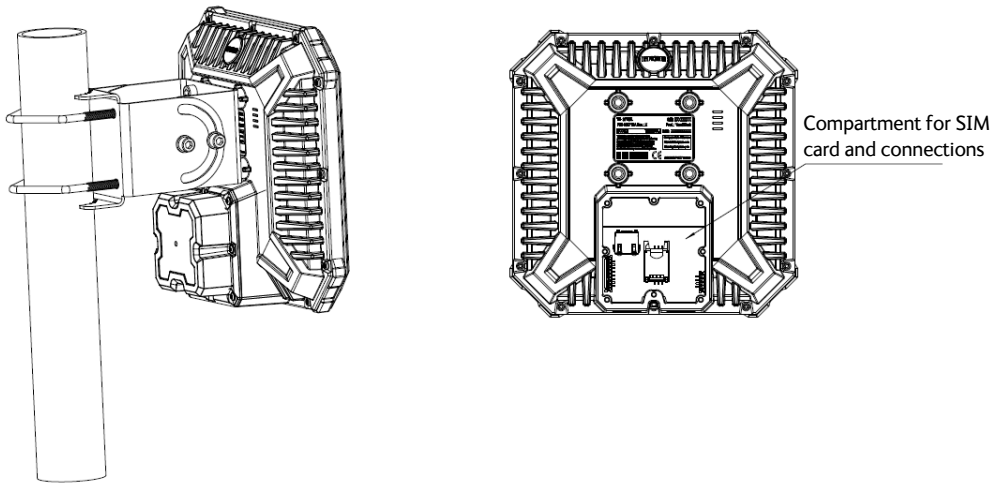
Dimensions are in millimeter

Outline drawing, EXPLORER 540 with integrated LTE modem



Dimensions are in millimeter





Dimensions are in millimeter

Command reference

This appendix lists the function, syntax and parameters for commands used with the EXPLORER 540. You can send commands to the EXPLORER 540 either with an SMS or with AT commands. SMS is very useful for remote operation, because you only need the terminal's mobile number to access the terminal. This appendix has the following sections:

- *Overview of M2M AT and SMS commands*
- *SMS remote commands*
- *AT commands*

Overview of M2M AT and SMS commands

The table below shows an overview of the commands available for M2M operation:

Function	Command	Interface		
		AT shell	ATCO SMS	SMS
Lock and unlock AT shell	_ICLCK	X		
Control MAC address locking	_IMACLOC	X		
Configuration of MAC address list	_IMACLOCAD	X		
Control remote SMS commands	_ISMSRMT	X		
Reset passwords	_ICPWD	X	X	
Control remote access to web interface	_IREMWEB	X	X	
Download and update SW	_IGETFW	X	X	
Install new SW	_IUPDFW	X	X	
Send file from terminal to FTP server	_ISENDFILE	X	X	
Get file from FTP server to terminal	_IGETFILE	X	X	
Update configuration file	_IUPDCFG	X	X	
Power Save configuration	_IPWSAVSCHD	X		
Enable LTE robustness	_IATCROBST	X	X	
Activate/deactivate GPIO pin 3 or get the status of the pin	_ITGPIO	X	X	
Get input voltage of the EXPLORER 540	_ITDCIV	X	X	
Administrator password control	ADPWRST			X
Activate PDP context	ACTIVATE			X
Deactivate PDP context	DEACTIVATE			X
Delete SMS messages	CLEAR			X
Get terminal information	GETINFO			X
Restart the terminal	RESTART			X
Configuration of Watchdog function	WATCHDOG			X
Configuration of Advanced Watchdog function	ADVWATCHDOG			X
Configuration of WAN mode	WANMODE			X

SMS remote commands

This section describes syntax and parameters for the SMS commands. For examples of use, see *Remote access with SMS*. The following SMS commands are supported:

- *ACTIVATE*
- *DEACTIVATE*
- *CLEAR*
- *GETINFO*
- *RESTART*
- *WATCHDOG*
- *ADVWATCHDOG*
- *ATCO*
- *ADPWRST*
- *WANMODE*

Syntax conventions

Syntax definitions use the following conventions:

- <parm> indicates that a parameter (without **<** and **>**) can be filled in by the user.
- { <opt1> | <opt2> | ... | NA } indicates that one of various options must be chosen by the user. Use **NA** when no value is defined.
- Keywords and parameters are separated by the space (ASCII 32) character.
- The command name and all keywords must be in upper case; most user-provided parameters are case sensitive but may be either case.
- **TE** means Terminal Equipment - the equipment connected locally to the EXPLORER 540.

SMS remote command summary

Commands

The table below summarizes the available SMS remote commands. The password comes just after the last parameter (except for the ATCO command, see below). For examples, see *Remote access with SMS* on page 26.

Command	Parameters	Password
ACTIVATE	<qos> <PC/TE type> <apn> <user> <pwd>	<rsms_pwd>
ADPWRST	1 <imei>	<rsms_pwd>
ADVWATCHDOG	<get/set> <wdog_enable> <wakeup> <interval> <ping1> <ping2> <ping3> <apn_type> <apn> <user> <pwd> <pos_response> <sms_number>	<rsms_pwd>
CLEAR	<category> SMS	<rsms_pwd>
DEACTIVATE	<qos> <PC/TE type>	<rsms_pwd>
GETINFO	<info_mode> <dataset>	<rsms_pwd>
RESTART	<reset_type> BGAN	<rsms_pwd>
WATCHDOG	<wdog_op> <ping1> <ping2> <ping3> <ping_always> <ping_interval> <wdog_enable>	<rsms_pwd>
WANMODE	<cmd_op> {<wanmode>}	<rsms_pwd>
ATCO	<resp_mode> <rsms_pwd> <at_cmd>	

Parameters

The table below summarizes the available parameters for the SMS remote commands.

Parameter	Values	Meaning
<apn_type>	SIM default	Read the APN from the SIM card.
	Network assigned	Use the APN assigned by the network.
	User defined	Specify another APN to use.
	NA	Placeholder when no value is specified. The existing setting applies.
<apn>	<APN>	APN name, e.g. **bgan.inmarsat.com**.
	NA	Placeholder when no APN is specified. Note that any previously entered APN is maintained.
	CLR	No APN is used.
<at_cmd>	<at_cmd>	AT command, without prefix AT. For supported AT commands, see *ATCO commands* on page 126.

Parameter	Values	Meaning
<category>	1 2 3 4	Delete only Read SMS messages. Delete Read and Sent. Delete All except Unread. Delete All SMS messages.
<cmd_op>	1 2	Get WANMODE setting Set WANMODE configuration
<dataset>	GPS USAGE ALL	GPS position. Cumulative call time and data usage. GPS position plus call time and data usage.
<get_set>	1 2	Get parameters. Set parameters.
<imei>	<14 digits>	IMEI of the EXPLORER 540, without dashes or check digit.
<info_mode>	1 2	For GPS query: position data only. For other queries: use verbose mode (with titles). For GPS query: position data plus SMS usage. For other queries: use terse mode (no titles).
<interval>	<integer> NA	The number of hours between the Advanced watchdog sessions (1-504). Placeholder when no value is specified. The existing setting applies.
<PC/TE type>	DHCP STATIC AWO <name> <IP addr> ANY	All TEs known via DHCP. All TEs known via Terminal settings. Always On, deactivate all PDP contexts including context established with ACA. Name of specific TE, as known by DHCP server. IP Address of specific TE (or Global IP for DEACTIVATE). Any/all TEs attached (DEACTIVATE: all except PDP context established with ACA).
<ping_always>	0 1 NA	Send ping only if no traffic. Always send ping, regardless of data traffic. Placeholder when no value is specified. Note that the existing setting applies.
<ping_interval>	<integer> NA	Interval between pings (minutes). Placeholder when no value is specified. Note that the existing setting applies.
<ping[1/2/3]>	<IP addr> NA	Three ping destination IP addresses. **Note**: You must fill in all three places. **0.0.0.0** means any previously entered IP address in this position is deleted. Placeholder when no IP address is specified. Note that any previously entered IP address is maintained.
<pos_response>	0 1 NA	Send an sms response[a]. Do not send an sms response[a]. Placeholder when no value is specified.

Parameter	Values	Meaning
<pwd>	<APN password> NA CLR	Password associated with APN username. Placeholder when no APN password is specified. Note that any previously entered password is maintained. Password is not used.
<qos>	1	Standard/background data (currently the only qos available for M2M).
<reset_type>	1	Normal delay restart.
<resp_mode>	0 1 2 3	None – send no responses to AT commands. Immediate - immediate responses, but not unsolicited. Final – suppress immediate if OK, plus unsolicited. All – send both immediate and unsolicited responses.
<rsms_pwd>	<rsms_pwd>	Remote SMS password. The password must be 5 to 15 characters long and cannot contain spaces. Avoid special characters. Accepted characters are: A through Z (uppercase characters), a through z (lowercase characters) and 0 through 9 (numeric characters).
<sms_number>	<sms_number> NA	The phone number to be used for sms response Placeholder when no value is specified.
<user>	<APN user name> NA CLR	User name associated with APN. Placeholder when no APN user name is specified. Note that any previously entered user name is maintained. User name is not used.
<wakeup>	0 1 NA	Do not wake up the terminal. Wake up the terminal at the specified intervals. Placeholder when no value is specified. The existing setting applies. Used if you want to change one of the other parameters without changing the wake-up setting.
<wanmode>	0 1 2 3 4	Not valid for EXPLORER 540 Not valid for EXPLORER 540 BGAN only Not valid for EXPLORER 540 Cellular preferred
<wdog_enable>	0 1 NA	Disabled. Enabled. Placeholder when no value is specified. The existing setting applies. Used if you want to change one of the other parameters without changing the enabled/disabled setting.
<wdog_op>	1 2	Get watchdog configuration. Set watchdog parameters.

a. Position SMS response is only for future use, and should be set to NA

SMS reject responses

Reject Response SMS	Possible Cause
ACT/DEACT PARM PROBLEM	The <IP addr> provided for an ACTIVATE or DEACTIVATE command is incorrect (for ACTIVATE, it must be in same subnet as the EXPLORER 540 IP and not be the EXPLORER 540 IP; for DEACTIVATE, it must exist as a local or global IP address in the existing PDP table).
ATCO ERROR	Unable to send AT command to ATC handler.
COMMAND NOT SUPPORTED	Attempt to use an SMS command not supported by the EXPLORER 540.
ERROR: TERMINAL BUSY	An ACTIVATE or DEACTIVATE command is in progress.
INVALID RESTART REQUEST	Attempt to perform restart before EXPLORER 540 has been running for at least 15 minutes.
INVALID WANMODE REQUEST	The requested WAN mode is not supported by the EXPLORER 540.
INVALID WATCHDOG PING ADDRESS	Entered Ping address is out of range (0.0.0.0 – 255.255.255.254).
INVALID WATCHDOG PING FREQUENCY	Requested Ping Frequency is less than the minimum (5 minutes).
INVALID WATCHDOG REQUEST	"Ping required" or "wdog enabled" fields incorrect in remote SMS message, or watchdog request other than "get" attempted.
WRONG CONNECTION TYPE(NO DHCP TE)	No DHCP TEs connected to the Remote Unit.
WRONG CONNECTION TYPE(NO STATIC TE)	No Static TEs added in Terminal settings.
WRONG CONNECTION TYPE(NO TEs)	No TEs are connected to the Remote Unit.
WRONG PASSWORD	Authentication Failure.
WRONG QOS	Invalid QoS Requested (only a QoS of 1 is valid).

AT commands

The following most used AT commands are explained in this manual. Other AT commands not mentioned here may still be supported.

Note | AT commands related to data connections are only applicable to the BGAN connection, not to the optional cellular connection.

Syntax conventions

Syntax definitions use the following conventions:

- <parm> indicates that a parameter (without **<** and **>**) can be filled in by the user.
- { <opt1> | <opt2> | ... | NA } indicates that one of various options must be chosen by the user. **NA** means no value is defined.
  [<options>] indicates that <options> may or may not be included in the command.
- String parameters must be enclosed in double-quotes (ASCII 34) and numeric parameters must not be. Only the ASCII double-quote is recognized; slanted quotes, e.g. from the Windows-1252 or UTF-8 character sets, are not valid.
- Keywords and parameters are separated by commas.
- The command name and all keywords must be in upper case; most user-provided parameters are case sensitive but may be either case.
- **TE** means Terminal Equipment - the equipment connected locally to the EXPLORER 540.

M2M related AT commands

The following tables summarize some of the most used AT commands for M2M operation. Parameters are explained in *Parameters for ATCO commands* on page 126 and *Parameters for other M2M related AT commands* on page 130.

ATCO commands

The table below summarizes the ATCO commands, i.e. AT commands that can be used in the SMS command **ATCO**.

Note | SMS commands always use the BGAN network, regardless of the selected connection mode (Cellular or BGAN).

Command	Parameters
_IATCROBST[a]	<enable>
_ICPWD	<type> <old passwd> <new passwd>
_IGETFILE	<ftp dir> <filename> <local dir> <ftp server> <ftp uname> <ftp passwd> [<apn>] [<apn uname>] [<apn passwd>]
_IGETFW	<mode> [<ftp server>] [<ftp uname>] [<ftp passwd>] [<apn>] [<apn uname>] [<apn passwd>]
_IREMWEB	<enable> <ip_addr_lo> [<ip_addr_hi>] [<apn>] [<apn uname>] [<apn passwd>]
_ISENDFILE	<local dir> <filename> <ftp dir> <ftp server> <ftp uname> <ftp passwd> [<apn>] [<apn uname>] [<apn passwd>]
_IUPDCFG	<filename>
_IUPDFW	<filename>

a. Robustness for 3GPP LTE signals, not ATC

Parameters for ATCO commands

Parameter	Values	Meaning
<apn passwd>	<apn passwd> NA	Password for the APN. Placeholder when no APN is specified.
<apn uname>	<apn uname> NA	User name for the APN. Placeholder when no APN is specified.
<apn>	<apn> NA	APN name. Placeholder when no APN is specified. The default APN from the SIM is used.
<enable>	0 1	Disable. Enable.
<filename>	<filename>	The name of the file to use, including extension.

Parameter	Values	Meaning
<ftp dir>	<ftp dir>	The name of the directory on the ftp server to use for getting or saving a file.
<ftp passwd>	<ftp passwd> NA	Password for the ftp server. Placeholder when no ftp server is specified.
<ftp server>	<ftp server> NA	Host name or IP address of the ftp server. Placeholder when no ftp server is specified. Default ftp server is used.
<ftp uname>	<ftp uname> NA	User name for the ftp server. Placeholder when no ftp server is specified.
<ip_addr_hi>	<ip_addr_hi>	The upper IP address of a range of allowed IP addresses. This parameter is optional; if omitted, only the specified single IP address <ip_addr_lo> may access the EXPLORER 540.
<ip_addr_lo>	<ip_addr_lo>	IP address of the HTTP client that should be allowed remote access to the EXPLORER 540, or, the lowest address in a range of IP addresses, if a range of addresses is allowed.
<local dir>	<local dir>	The name of the local directory in the EXPLORER 540 to use for getting or saving a file.
<mode>	0 1	Deferred activation. Immediate activation.
<new passwd>	<new passwd>	The new password to be used after this command. The password must be 5 to 15 characters long and cannot contain spaces. Avoid special characters. Accepted characters: A through Z (uppercase characters), a through z (lowercase characters) and 0 through 9 (numeric characters).
<old passwd>	<old passwd>	The old password that is already in the system.
<type>	AD RS	The type of password is administrator password. The type of password is remote SMS password.

ATCO response codes

The following response codes apply to the AT commands supported by SMS.

Code	Text	Explanation
General codes		
0	Complete	Operation completed successfully.
1	Unexpected software error	Software error.
2	Local file open error	_IGETFILE: could not open local file after download. _ISENDFILE: could not open local file. _IUPDCFG: Loading configuration failed. Incompatible file format.
3	Directory not found	Could not find specified directory on local file system.
4	File not found	Could not find specified file name on local file system.
5	Error renaming file	Could not restore after failed upgrade.
Context Management codes		
13	Context activation error	Context activation failed. Could be problem with PS attach, SIM subscription, APN, network or connectivity.
FTP Management codes		
20	FTP hookup fail	Connection to FTP server failed. Problem could be server unreachable or specified IP address or server name invalid, or connectivity failure.
21	FTP login fail	FTP user name or password incorrect.
23	FTP 'cwd' fail	Could not change to working directory on FTP server.
24	FTP data connection fail	Could not establish an FTP data connection with the server.
26	FTP xfer command fail	Could not initiate data transfer on an established connection. May be caused if filename not found.
29	FTP socket fail	Error while reading or writing FTP data socket.
31	FTP xfer timed out	FTP client timed out waiting for socket ready (read or write), e.g. due to loss of connectivity during transfer.
_IGETFW command codes		
40	File in use, cannot download	The file to be downloaded is the same as the image currently in use.
41	Starting immediate upgrade...	Normal success. File downloaded successfully, now starting immediate update.

Code	Text	Explanation
_IUPDFW command codes		
50	New firmware file not found	Could not find specified filename.
51	New firmware file corrupt	New firmware file corrupt.
52	New firmware file failure	The new firmware failed to run or failed to acquire the network and the unit fell back to the old release.
54	Upgrade status file error	Previous update has not finished yet.
_IREMWEB command codes		
81	Global IP: <ip_addr>	Remote connection to web interface is set up successfully. Indicates global IP address assigned to the EXPLORER 540's own PDP context, to which an HTTP connection may be made.

Other M2M related AT commands

Command	Parameters
_ICLCK	<type> <enable> <passwd>
_IMACLOC	<enable> <interface> [<interface>]
_IMACLOCAD	<action> <interface> <MAC Address> [<MAC Address>][a]
_IPWSAVSCHD	<psmode> <psvalue>
_ISMSRMT	<enable>
_ITGPIO	<active>
_ITDCIV	No parameters[b]

a. Up to 10 MAC addresses may be specified.
b. Type **_ITDCIV?** to get the input voltage of the EXPLORER 540

Parameters for other M2M related AT commands

The table below summarizes the available parameters for the AT commands for M2M operation.

Parameter	Values	Meaning
<action>	0 1	Delete. Add.
<active>	0 1	Inactive. The GPIO pin is in its inactive state. Active. The GPIO pin is in its active state.
<enable>	0 1	Disable. Enable.
<interface>	0	0 means Ethernet interface. This is the only option.
<MAC Address>	<MAC Address>	MAC address(es) for MAC locking. Up to 10 MAC addresses are permitted.
<passwd>	<passwd>	The existing administrator password.
<psmode>	IDLE_TRG TOD_TRG	The power save mode to be set up is “idle trigger”, that is the time with no activity before entering power save mode. The power save mode to be set up is “time of day”, that is a specific time of day (UTC time) where the EXPLORER 540 wakes up from power save mode.
<psvalue>	<idle-minutes> <HH:MM>	Used with IDLE_TRG (above). Number of minutes (e.g. 15). Used with TOD_TRG (above). Time of day in UTC time (e.g. 23:30).

Context management AT commands

The table below summarizes some of the most used AT commands for context management. Parameters are explained in the table in the next section.

Note The context management AT commands can only be used over a BGAN connection and will not work on a cellular connection.

Command	Parameters
+CGACT	<state> <cid>
+CGDCONT	<cid> <protocol> <apn> <apn uname> <apn_passwd>
+CGDSCONT	<cid> <p_cid>
+CGEQMIN	<cid> <Traffic Class> <Max bitrate UL> <Max bitrate DL> <Guaranteed bitrate UL> <Guaranteed bitrate DL>
+CGEQREQ	<cid> <Traffic Class> <Max bitrate UL> <Max bitrate DL> <Guaranteed bitrate UL> <Guaranteed bitrate DL>
+CGPADDR	<cid>
+CGTFT	<cid> <packet filter identifier> <evaluation precedence index> <source addr & subnet> <protocol number> <destination port range> <source port range>

Parameters for context management AT commands

The table below summarizes the available parameters for the AT commands for context management.

Parameter	Values	Meaning
<apn passwd>	<apn passwd> NA	Password for the APN. Placeholder when no APN is specified.
<apn uname>	<apn uname> NA	User name for the APN. Placeholder when no APN is specified.
<apn>	<apn> NA	APN name. Placeholder when no APN is specified. The default APN from the SIM is used.
<cid>	<cid>	The Context Identifier (1 – 11) for the PDP context.
<destination port range>	<destination port range>	Destination port range in the form **From.To** To indicate only one port number, type in the same port number under From and To. **Example:** 65333.65338 indicates port numbers from 65333 to 65338, both included.

Parameter	Values	Meaning
<evaluation precedence index>	<evaluation precedence index>	The evaluation precedence index defines the order in which the traffic flow filters are applied to packets. 0 is first, then 1, 2 etc.
<Guaranteed bitrate DL>	<Guaranteed bitrate DL> NA	The guaranteed bit rate down link (32, 64, 128). Placeholder when Standard data is selected.
<Guaranteed bitrate UL>	<Guaranteed bitrate UL> NA	The guaranteed bit rate up link (32, 64, 128). Placeholder when Standard data is selected.
<Max bitrate DL>	<Max bitrate DL> NA	The maximum bit rate down link (32, 64, 128). Placeholder when Standard data is selected.
<Max bitrate UL>	<Max bitrate UL> NA	The maximum bit rate up link (32, 64, 128). Placeholder when Standard data is selected.
<p_cid>	<p_cid>	The primary context to which the secondary context is related.
<packet filter identifier>	<packet filter identifier>	The packet filter identifier (1 – 8).
<protocol number>	<protocol number>	This number is uniquely assigned for the protocol being used. TCP is set to 6, and UDP is set to 17. The protocol number determines which protocol is used by the traffic flow filter (0-255).
<protocol>	<protocol>	The transport protocol (IP or PPP).
<source addr & subnet>	<source addr & subnet>	This is an IPv4 IP address and subnet mask (0.0.0.0.0.0.0.0 to 255.255.255.255.255.255.255.255).
<source port range>	<source port range>	Source port range in the form **From**.**To**. See above for example.
<state>	0 1	Deacativate. Activate.
<Traffic Class>	1 3	Streaming (not available for M2M subscription). Standard data (Background).

Message (SMS) configuration AT commands

The following AT commands are used for configuration of SMS.

Note For details on parameters for the message configuration commands, see the 3GPP standard ETSI TS 127 005 V4.2.1.

Command	Parameters	Function
+CMGD	<index>	Delete Message.
+CMGF	<mode>	Message Format.
+CMGL	<stat>	List Messages.
+CMGR	<index>	Read Messages.
+CMGS	<da/mr> [<toda/scts>]	Send Message.
+CNMI	[<mode> [<mt> [<bm> [<ds>]]]]	New Message Indications to TE.
+CPMS	<mem1> [<mem2> [<mem3>]]	Preferred Message Storage.
+CSCA	<sca> [<tosca>]	Service Center Address.
+CSDH	<show>	Show Text Mode Parameters.
+CSMP	[<fo> [<vp> [<pid> [<dcs>]]]]	Set Text Mode Parameters.
+CSMS	<service>	Select Message Service.

BGAN non-M2M functions

This appendix includes the features and functions in the EXPLORER 540 that are **not** available with an M2M subscription, but only with a BGAN Class 2 subscription.
These functions are:

- Streaming
- VoIP

To control data connections from web interface (BGAN)

The startup page of the web interface is used to start and stop data connections and to set up the data connections.

Note If you are using the EXPLORER 540 LTE Modem you cannot start and stop data connections.

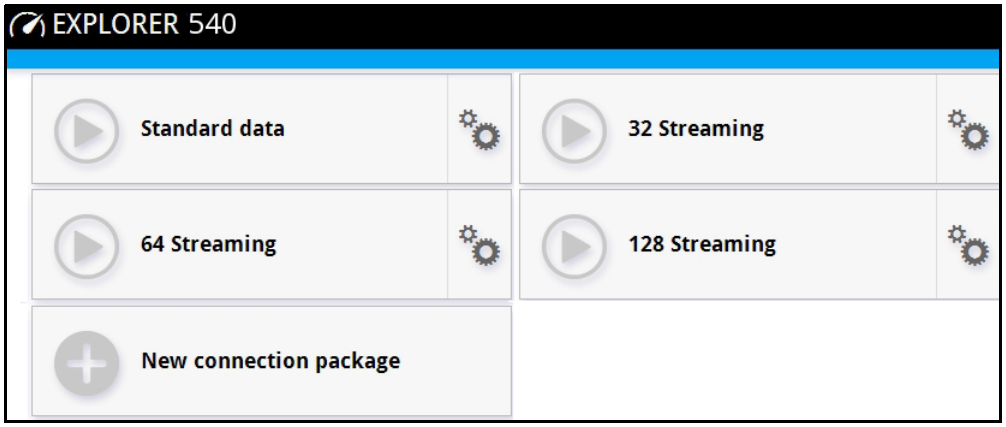
The difference from the M2M version is, that Streaming connections are supported and can be configured.

To start and stop data connections

Note The icons for starting ▶ and stopping ■ connections are only displayed if the terminal is ready and registered on the BGAN network. Otherwise you cannot start data connections.

To start and stop data connections on your EXPLORER 540, do as follows:

1. In the opening page, locate the connection package you want to start.



2. Click ▶ to start the connection. If more connections are included in the connection package, this will start all included connections. The connections icon at the bottom of the page shows 1 when a BGAN data connection package is running.

   Note Once a Streaming connection is started, the connection will run until you stop it. You will be charged for the time you are connected.

3. Click ■ to stop the connection.

If the connection fails, the connection tile shows an exclamation mark ⓘ and an error message. The error message is also shown in the data log, see *Data log* on page 58.

When a connection is active, the icon changes to ■ and the tile for the active connection shows:

- IP address: The IP address that has been assigned by the service provider to this session.
- Transferred data: For Standard data, the tile shows the total amount of transmitted and received data since the connection was established.
- Connection duration: For Streaming data, the tile shows the total time the connection has been active.
- Bit rate: For Streaming connections, the tile shows the fixed bit rate.

Default data connection types

By default, the following connections are available:

Name	Type of connection
Standard data	Several users can share the data connection. This type of connection is ideal for TCP/IP traffic such as e-mail, file transfer, and Internet/intranet access. The user pays for the amount of data sent and received.
Streaming data The following Streaming classes are available: 32, 64, or 128 Streaming	An exclusive, high-priority connection, ensuring seamless transfer of data. This type of connection is ideal for time critical applications like live video over IP. The user pays for the duration of the connection. **Note that Streaming is not available in M2M subscriptions.**

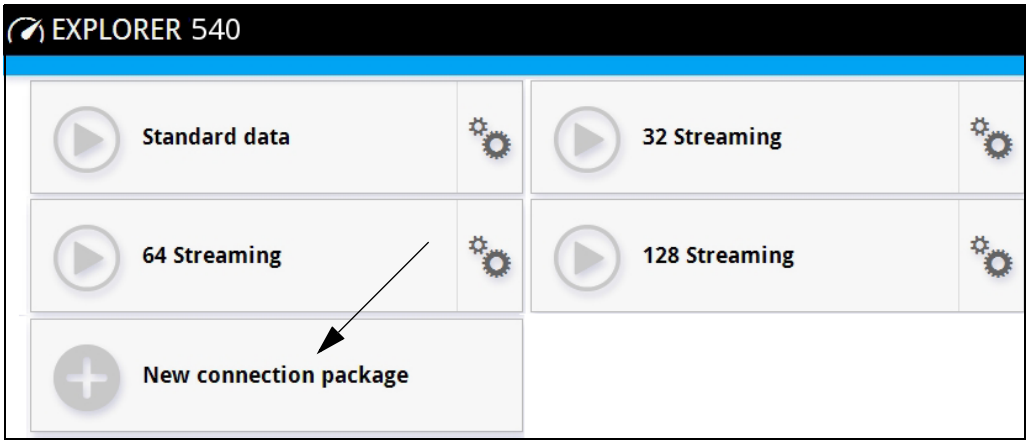
You can use these connections as they are or build your own connection packages. For set up of the connection packages, see the next section.

To set up data connections

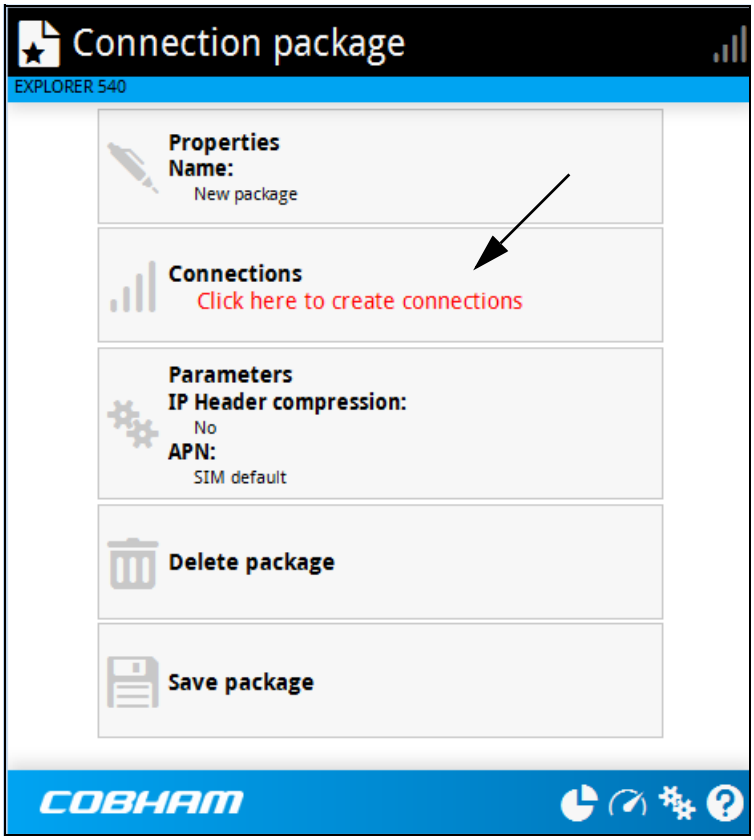
To create a new connection package

Do as follows:

1. Click **New connection package**.



2. Type a name for the new package and click **Save**.
3. Click **Click here to create connections**.



4. Select the connection type you want for your new connection package.
   You can select Standard, Streaming 32 kbps, Streaming 64 kbps or Streaming 128 kbps.

5. Click **Save package**.

The new package should now appear as a new tile on the startup page.

For details on **Parameters** (APN and IP Header compression) see *To change the APN for a connection package* on page 52.

To make phone calls over BGAN (not M2M version)

Note Phone calls are only possible if the airtime subscription is a BGAN class 2 subscription (not M2M).

To connect a VoIP phone or smartphone

Your VoIP phone or smartphone can be set up to make and receive calls over the BGAN network, using the terminal's phone number.

Note Make sure your VoIP phone has an integrated SIP client. The EXPLORER 540 has an integrated SIP server.

To connect your phone for making calls

For details on initial setup of your VoIP phone and the EXPLORER 540, see

- The documentation for your handset
- *First time SIP setup* on page 138
- *To manage VoIP phones or smartphones* on page 140

To connect a VoIP phone, do as follows:

1. Start up the EXPLORER 540 terminal.
2. Connect your phone via a router/switch to the LAN interface on the EXPLORER 540[1].

When the VoIP phone is powered and ready, you are able to make and receive calls over BGAN.

1. Since there is only the one LAN interface and the EXPLORER 540 cannot provide power, you must connect the phone(s) via external equipment such as a router (wired or wireless) or a switch.

First time SIP setup

If it is the first time you connect your phone to the EXPLORER 540 for making calls, you must first set up the SIP server details in your phone. For information how, see the user documentation for your phone. You may be asked to enter some of the following details:

- SIP server address and port: Default address: 192.168.0.1, Port: 5060
- User name: Local number in EXPLORER 540 (0501 to 0516)
- Password: Default same as user name
- Codec priority: Highest priority codec type: G.711

Note: The user name and password must match the IP handset settings in the EXPLORER 540. See *To manage VoIP phones or smartphones* on page 140.

Call types

Definition

The phone connection can be a **Standard voice** connection or a **3.1 kHz audio** connection.

- For **outgoing calls**, the call type is **Standard voice** by default.
  You can change the call type for your call to 3.1 kHz audio by dialling **2*** before the number.

  Example: 2*004539558800
- For incoming calls, you can set up in the web interface (IP handset page) which call types you want to receive on your smartphone or IP handset. Only the call types selected for a smartphone/IP handset are received. By default all, call types are accepted.

When receiving calls, the mobile number determines which call type is used. In your airtime subscription you have one number for 3.1 kHz audio and one number for Standard voice. Remember that the call is only received on your phone if the call type used is selected for that phone (called IP handset in the web interface).

For information on how to set up the call types in the web interface, see *To manage VoIP phones or smartphones* on page 140.

To make or receive a phone call with EXPLORER 540

Connect your smartphone or IP handset as described in *To connect a VoIP phone or smartphone* on page 137.

To make a call from the EXPLORER 540

To make a call, dial **00 <country code> <phone number>** followed by off-hook key.

Example: To call Cobham SATCOM in Denmark (+45 39558800), dial **00 45 39558800**

If there was an error establishing the connection, the web interface of the EXPLORER 540 shows an error message.

To receive a call

By default, all phones connected to the EXPLORER 540 will ring when one of the mobile numbers is called. Note however, that this depends on the call type settings. See *Call types* on page 138.

Information on missed calls is stored in the call log. You can see the call log in the web interface (**Control panel > Logs > Call log**).

To make a call to the EXPLORER 540

To make a call to a phone connected to the EXPLORER 540, dial **+ <Mobile number>**

- + is the prefix used in front of the country code for international calls. This is **00** when calling from countries in Europe and from many other countries.
- **Mobile number**. The first part of the mobile number is always 870, which is the "country code" for the BGAN system. For information on the mobile numbers, refer to your airtime subscription.

Note: There are two mobile numbers, one for **3.1 kHz audio** and one for **Standard voice**.

Local numbers and special functions

Overview

There are a number of local numbers and dialing functions available in the EXPLORER 540.

The following list shows the allocated local numbers and special-purpose numbers for the EXPLORER 540.

Number	Function
0 followed by one of the numbers 501-516 and off-hook key	Local call to one smartphone or IP handset.
0900 followed by off-hook key	Local call broadcast to all connected phones.

Apart from the numbers above, the EXPLORER 540 uses the following dialing prefixes:

- **1*** before the phone number will force the connection to use **Standard voice**.
- **2*** before the phone number will force the connection to use **3.1 kHz audio**.
- **#31#** before the phone number will hide the callers phone number to the recipient.
- ***31#** before the phone number will show the callers phone number to the recipient where it would otherwise be hidden, e.g. because the number is an ex-directory number.

To manage VoIP phones or smartphones

Overview

This section describes how to manage VoIP phones or smartphones connected to the EXPLORER 540.

The terminal supports connection of up to 16 phones through the LAN interface. Each phone must have a local number in the range 0501 to 0516 as well as a unique password. For details, see the next section.

For details on SIP settings and how to connect your phone to the LAN interface, see *To connect a VoIP phone or smartphone* on page 137.

To manage VoIP phones or smartphones in your EXPLORER 540

Do as follows:

1. Connect your smartphone or your VoIP phone via a router/switch to the LAN interface. For details, see *To connect a VoIP phone or smartphone* on page 137.
2. In the web interface, select (Control panel) **> IP handsets**.
3. Click the tile for the handset number you want to manage.
4. Select **Enable** to enable the handset.

   Note It may take some seconds to enable the handset.

   - on the tile for your handset means the handset is **disabled**.
   - on the tile for your handset means the handset is **enabled**.
5. To change the **Password**, simply type in the new number.
6. Set the call type for incoming calls.
   You can select **Standard voice** or **3.1 kHz audio** or both.
   - If you select both, the handset will react (ring) on incoming calls.
   - If you select e.g. Standard voice, the handset will only react on calls made to the Standard voice phone number.
7. Select the **Preferred outgoing call type**.
   The selected type will be used by default, if possible, for any outgoing call from this handset.
8. Click **Save**.
9. In the smartphone or IP handset, enter the local number and the password you just entered in the EXPLORER 540. See the documentation for your handset for details.

   Note The user name is also the local number for the handset.

The handset remains in the list after disconnecting. When the handset is connected again, it is automatically recognized and ready for use, if enabled.

Conformity

CE (R&TTE)

The EXPLORER 540 is CE certified as stated in the EU Declaration of Conformity enclosed in electronic copy at the end of this appendix.

IC

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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

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

FCC

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

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

NOTICE:
This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

NOTICE:
Changes or modifications made to this equipment not expressly approved by Cobham SATCOM may void the FCC authorization to operate this equipment.

Japanese Radio Law and Japanese Telecommunications Business Law Compliance.

This device is granted pursuant to the Japanese Radio Law (電波法)
and the Japanese Telecommunications Business Law (電気通信事業法)

This device should not be modified (otherwise the granted designation number will become invalid)

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

Equipment included in this declaration

Model	Description	Part no.
TT-3715A	EXPLORER 540 Terminal	403715A

The full text of the EU declaration of conformity is available at the following internet address:

http://sync.cobham.com/satcom/support/downloads

Document no.: 99-157451-A

A

ACA	Automatic Context Activation
AMBE	Advanced Multi-Band Excitation. A speech coding standard.
APN	Access Point Name. The Access Point Name is used by the terminal operator to establish the connection to the required destination network.
AT commands	A command set used for controlling modems.

B

BeiDou	Chinese satellite navigation system
BGAN	Broadband Global Area Network. A satellite network based on geostationary satellites, delivering broadband data and telephony to virtually any part of the earth, with full UMTS.

C

C1D2	Class 1 Division 2 (C1D2) is a certification issued to a specific product that allows it to be used in potentially hazardous environments.
CE	Conformité Européenne. This term signifies that a CE certified product conforms to European health, environmental, and safety regulations. In short, it makes the product legal to be sold in the European Union.
CS	Circuit Switched. Circuit-switched networks require dedicated point-to-point connections during calls.

D

DHCP	Dynamic Host Configuration Protocol. A protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network.

E

ECEF	The Earth-Centered Earth-Fixed or conventional terrestrial coordinate system rotates

	with the Earth and has its origin at the centre of the Earth. The X axis passes through the equator at the prime meridian. The Z axis passes through the north pole but it does not exactly coincide with the instantaneous Earth rotational axis. The Y axis can be determined by the right-hand rule to be passing through the equator at 90 degrees longitude.
EIRP	Effective Isotropically-Radiated Power. The amount of power that would have to be emitted by an isotropic antenna (that evenly distributes power in all directions) to produce the peak power density observed in the direction of maximum antenna gain.

F

FCC	Federal Communications Commission. An independent agency of the United States government, created by Congressional statute to regulate interstate communications by radio, television, wire, satellite, and cable in all 50 states, the District of Columbia and U.S. territories. The FCC works towards six goals in the areas of broadband, competition, the spectrum, the media, public safety and homeland security.
FTP	File Transfer Protocol. A standard network protocol used to transfer computer files between a client and server on a computer network.
FUP	Firmware Upgrade Process

G

GLONASS	GLObal'naya NAvigatsionnaya Sputnikovaya Sistema. Global Navigation Satellite System in English.
GMPCS	Global Mobile Personal Communications Services
GND	Ground
GNSS	Global Navigation Satellite System. A navigation satellite system using the GPS, GLONASS, Galileo or Beidou system.
GPS	Global Positioning System. A system of satellites, computers, and receivers that is able to determine the latitude and longitude of a receiver on Earth by calculating the time difference for signals from different satellites to reach the receiver.

I

I/O	Input/Output
IAI-2	Inmarsat Air Interface-2. The air interface used for BGAN.
IC	Industry Canada (French: Industrie Canada) is the department of the Government of

	Canada with a mandate of fostering a growing, competitive, knowledge-based Canadian economy.
ICMP	Internet Control Message Protocol. An Internet protocol mostly used for diagnostics.
IEEE	Institute of Electrical and Electronics Engineers. IEEE is a nonprofit organization and the world's leading professional association for the advancement of technology.
IMEI	International Mobile Equipment Identity. A unique number identifying your terminal.
IMSI	International Mobile Subscriber Identity. A unique number used to identify a mobile subscriber on a wireless network.
IMSO	International Maritime Satellite Organisation. An intergovernmental body established to ensure that Inmarsat continues to meet its public service obligations, including obligations relating to the GMDSS.
IP	Ingress Protection. An international classification system for the sealing effectiveness of enclosures of electrical equipment against the intrusion into the equipment of foreign bodies (i.e. tools, dust, fingers) and moisture. This classification system uses the letters "IP"
IP	Internet Protocol

K

kbps	kilobits per second

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

M

M2M	Machine-to-Machine. Direct communication between unmanned devices using any communications channel, including wired and wireless.
MAC	Media Access Control address. A hardware address that uniquely identifies each node of a network.

N

NAT	Network Address Translation. An Internet standard that enables a local-area network to use one set of IP addresses for internal traffic and a second set of addresses for external traffic. A NAT module makes all necessary address translations.

O

OS	Operating System
OSHA	Occupational Safety and Health Act. The primary federal law which governs occupational health and safety in the private sector and federal government in the United States. Its main goal is to ensure that employers provide employees with an environment free from recognized hazards, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions.

P

PDP	Packet Data Protocol. A network protocol used by external packet data networks that communicate with a GPRS network.
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.
PPPoE	Point-to-Point Protocol over Ethernet. A network protocol for encapsulating Point-to-Point Protocol (PPP) frames inside Ethernet frames. By using PPPoE, users can virtually "dial" from one machine to another over an Ethernet network, establish a point to point connection between them and then securely transport data packets over the connection.

R

RCM	Regulatory Compliance Mark. The RCM is a symbol signifying that a supplier has taken the necessary steps to have the product comply with the electrical safety and/or electromagnetic compatibility (EMC) legislative requirements of Australia and New Zealand.
RF	Radio Frequency. Electromagnetic wave frequencies between about 3 kHz and about 300 GHz including the frequencies used for communications signals (radio, television, cell-phone and satellite transmissions) or radar signals.
RHCP	Right-Hand Circular Polarization

S

SIM	Subscriber Identity Module. The SIM provides secure storing of the key identifying a mobile phone service subscriber but also subscription information, preferences and storage of text messages.
SIP	Session Initiation Protocol. An application-layer control (signaling) protocol for creating, modifying, and terminating sessions with one or more participants. Used e.g. for Internet telephony.
SMS	Short Message Service
STP	Shielded Twisted Pair

T

TCP/IP	The basic communication language or protocol of the Internet. It can also be used as a communications protocol in a private network (either an intranet or an extranet).
TE	Terminal Equipment - the equipment connected locally to the EXPLORER 540.

U

USB	Universal Serial Bus. A specification to establish communication between devices and a host controller (usually personal computers). USB is intended to replace many varieties of serial and parallel ports. USB can connect computer peripherals such as mice, keyboards, digital cameras, printers, personal media players, flash drives, and external hard drives.
UTC	Coordinated Universal Time. The International Atomic Time (TAI) with leap seconds added at irregular intervals to compensate for the Earth's slowing rotation. Leap seconds are used to allow UTC to closely track UT1, which is mean solar time at the Royal Observatory, Greenwich.
UTP	Unshielded Twisted Pair
UV	UltraViolet.

V

VoIP	Voice Over IP. The routing of voice conversations over the Internet or through an IP-based network.

W

WAN	Wide Area Network. A telecommunications network or computer network that extends over a large geographical distance. In this manual, WAN is the external network via BGAN or cellular connection, whereas LAN is used for the local connection of equipment to the EXPLORER 540.

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