EXPLORER 6100 Ku

User & installation manual

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Disposal

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

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

Safety summary

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

This equipment is not suitable for use in locations where children are likely to be present.

Power supply
The voltage range for the EXPLORER 6100 Ku is 24-48 VDC nominal. We recommend to use the EXPLORER 6000 Series power Supply (403160P) from Cobham SATCOM

WARNING! Before disassembling or performing any maintenance or upgrades, unplug the unit from the power source.

Note | When you use a transportable and/or temporary power supply, e.g. a generator, refer to the national legislation for correct safety ground connection.

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

Keep away from live circuits
Operating personnel must not remove equipment covers. 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.

WARNING! Be aware of pinch points while the antenna is being positioned, deployed or stowed.

Service
User access to the interior of the antenna is not allowed. Only a technician authorized by Cobham SATCOM may perform service - failure to comply with this rule will void the warranty.

Microwave radiation hazards

During transmission the antenna radiates Microwave Power.This radiation may be hazardous to humans close to the antenna. During transmission, make sure that nobody gets closer than the recommended minimum safety distance.

WARNING! This device emits radio frequency energy. **Do not place your head or other body parts** in front of the feed horn and reflector when the system is operational.

The minimum safety distance in front of the antenna reflector depends on the BUC mounted in the VSAT terminal. For **8W BUC: 29 m** and for **20W BUC: 48 m** when in the focal line (a straight line between the feed horn and satellite) based on a radiation level of 10 W/m^2. No hazard exists at the back of the reflector

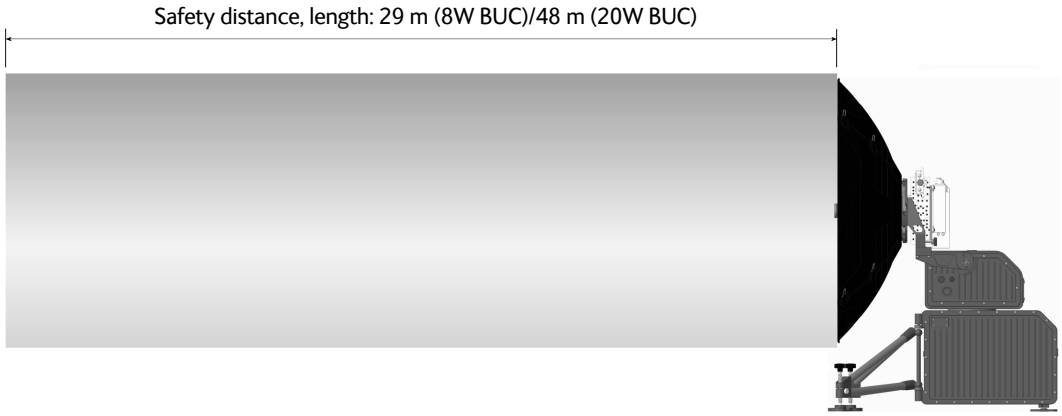

Figure 1: Radiation area

Failure to comply with the rules above will void the warranty and may compromise safety!

FCC §15.105: Information to the User

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.

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About this manual

1.1 Manual overview

This manual has the following chapters:

- *Introduction*
- *Assembly & start up*
- *Setup and operation*
- *Service*

This manual has the following appendices:

- *Technical specifications*
- *VSAT modem cables*
- *VSAT modem settings*
- *Command line interface*
- *System messages*
- *Approvals*

1.1.1 Intended readers

This is a user and installation manual for the EXPLORER 6100 Ku, intended for users of the system and service personnel. It is important that you observe all safety requirements listed in the beginning of this manual, and install the system according to the guidelines in this manual.

1.1.2 Software version

This manual is intended for the EXPLORER 6100 Ku with **software version 2.00**.

1.1.3 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”.

To indicate what the user should select in the user interface.
Example: “Select **SETTINGS** > **Satellite profiles**”.

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

1.2 Precautions

Text marked with “Warning”, “Caution”, “Note” or “Important” show the following type of data:

- **Warning**: A Warning is an operation or maintenance procedure that, if not obeyed, can cause injury or death.
- **Caution**: A Caution is an operation or maintenance procedure that, if not obeyed, can cause damage to the equipment.
- **Note**: A Note gives information to help the reader.
- **Important**: A text marked Important gives information that is important to the user, e.g. to make the system work properly. This text does not concern damage on equipment or personal safety.

All personnel who operate equipment or do maintenance as specified in this manual must know and follow the safety precautions. The warnings and cautions that follow apply to all parts of this manual.

WARNING! Before using any material, refer to the manufacturers’ material safety data sheets for safety information. Some materials can be dangerous.

CAUTION! Do not use materials that are not equivalent to materials specified by Cobham SATCOM. Materials that are not equivalent can cause damage to the equipment.

Introduction

This chapter has the following sections:

- *EXPLORER 6100 Ku 1 m Stabilized Auto-Acquire Fly-Away Antenna System*
- *Description of the system components*
- *Part numbers*

2.1 EXPLORER 6100 Ku 1 m Stabilized Auto-Acquire Fly-Away Antenna System

2.1.1 Overview

The EXPLORER 6100 Ku is a stabilized auto-acquire fly-away VSAT antenna system, designed for operation in Ku-band. Its user friendly design allows operators with little satellite experience to access the Ku-band satellite services within minutes.

The EXPLORER 6100 Ku is easy to install, set up and commission by a non-specialist technician. Cobham's unique Dynamic Pointing Correction technology ensures that the antenna stays locked on to the satellite, even in strong wind.

DYNAMIC POINTING CORRECTION

System features

- Easy to set up and use
- Dynamic Pointing Correction technology
- 1.0 m axis-symmetric carbon reflector, 7-piece
- WLAN access point and local IP interface
- LCD display and web-based user interface
- 2-case solution, airline checkable

System units

The system has the following system units:

1. One 2-axis motorized antenna positioner with Inter-Facility Link and cabling interface ports for BUC power.
2. Reflector and RF assembly including the BUC (depending on the purchased variant) and the RF-pack containing OMT, Polarizer, encoder, ZRM and LNB.
3. Base Unit with antenna control unit, keypad, display and local IP ports.

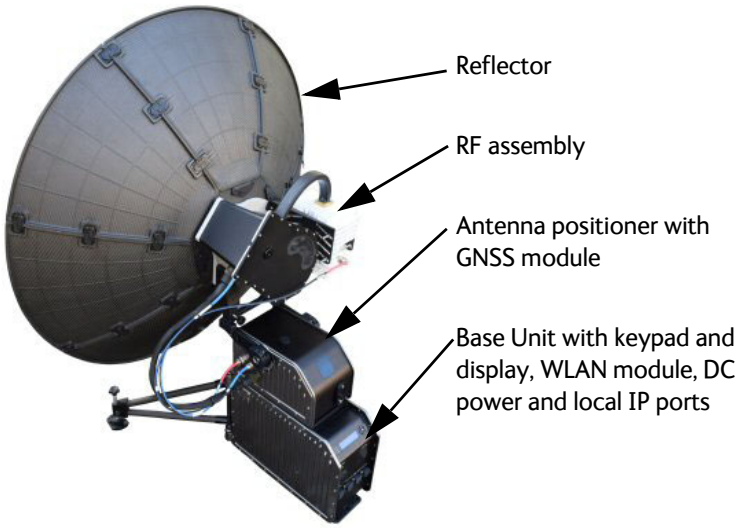


Figure 2-1: Major system components

The antenna provides a stable RF link and the modem provides IP services on the RF link.

2.1.2 Satellite service

The EXPLORER 6100 Ku operates in Ku-band (10.7 to 14.5 GHz).

Service capabilities are determined by the connected VSAT modem.

Service activation

The service is activated by your service provider. For details, contact your service provider.

2.2 Description of the system components

2.2.1 Antenna positioner

The auto-acquire antenna positioner can accommodate 0˚ to 88˚ of angular movement in the elevation axis and ±95˚ in the azimuth axis. The mechanical assemblies rely on two independent axes to allow for precise antenna pointing. A ground gradient of up to 10˚ can be accommodated by the terminal. The antenna positioner can stay outside in rainy weather..

Note If the elevation angle is less than 10 degrees it is important to level the terminal.

2.2.2 RF assembly

The EXPLORER 6100 Ku RF assembly includes the BUC, reflector hub, polarizer, OMT, LNB and Ku feed horn. It also contains a waveguide to connect the BUC with the rest of the RF pack and brackets that are attached to mounting blocks on the elevation arms. Once the RF assembly is mounted, the thumbscrews beneath the blocks hold the brackets securely in place. This design allows for quick assembly and disassembly of the RF assembly from the positioner.

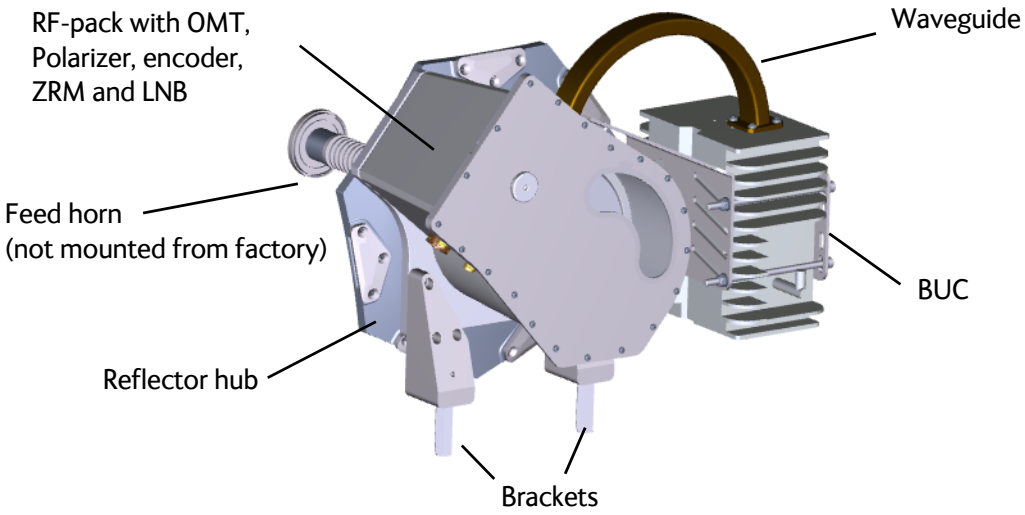


Figure 2-2: Ku-band RF assembly

2.2.3 Reflector

The reflector is a 100 cm reflector, consisting of a center hub and 7 interchangeable petals. The petals are made entirely of carbon-fiber composite with the exception of the metallic latches. Latches along the edge of the petals attach the reflector petals to each other. The reflector has been designed to meet wind load and thermal distortion requirements; see *Technical specifications* on page A-1 for more detail.

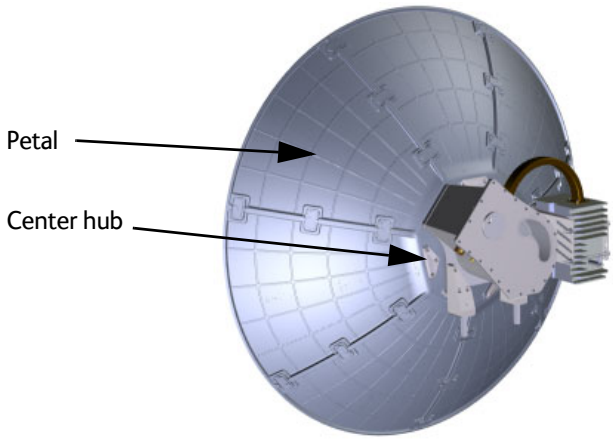


Figure 2-3: Assembled 100 cm reflector with center hub and 7 petals

2.2.4 Base Unit and support legs

The Base Unit contains many subcomponents including the antenna control unit, GNSS (Global Navigation Satellite System) module, DC power supply, sensors and WLAN module, in addition to environment-sensing technology that self-regulates system temperature and atmospheric pressure equalization. Five local IP ports are available, Port 1 (Service port) or Port 4 (Management) is used for system control via the web interface and Port 5 is used for connection to the external modem.

The Base Unit has an embedded keypad and display to provide access to configuration, control, and system monitoring tools.The antenna positioner is hard-mounted to the Base Unit, and is class IP65 protected against dust and water ingress.

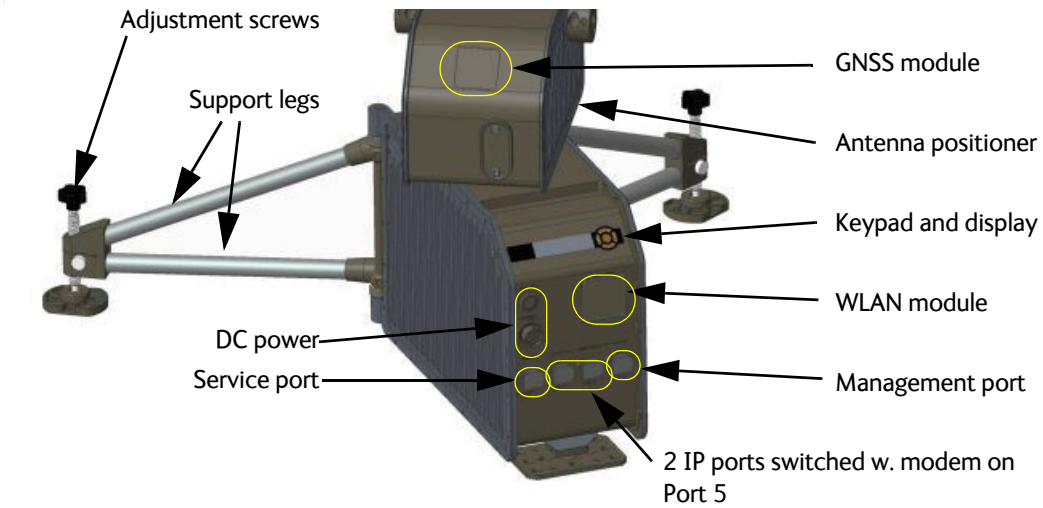


Figure 2-4: Base Unit and support legs

Keypad and display

The display has a two line menu system and two status lines (Upper and Lower) for satellite and antenna information. Using the keypad and display you can deploy, stow and stop the antenna and monitor the system (warnings, errors and information). Signal strength is indicated on the display as 7 blocks. The signal strength is also displayed as a number during manual pointing.

See *The menu tree* on page 4-19 for a list of menus. The menus show how the system has been configured.

The three LED light indicators are described in *LEDs on the keypad of the EXPLORER 6100 Ku* on page 5-10.

Figure 2-5: Keypad and display (example)

2.2.5 Web interface for setup and troubleshooting

The EXPLORER 6100 Ku has a built-in web interface, which has two levels:

- **Mobile web interface**, used for basic operations and status. Accessed from a smartphone or tablet via WLAN. For details see *Mobile web interface* on page 4-1

  Note WLAN must first be configured using the Computer web interface via the Service connector (Port 1) on the Base Unit.

- **Computer web interface**, used for configuration, line-up, troubleshooting, extended status information etc. Accessed from a computer connected to Port 1 on the Base Unit. For details see *Configuration web interface* on page 4-2.

Guest or administrator login

By default, when you access the web interface you have guest access without login. There are two types of login:

- **Guest**: By default you have access as guest without login. If the web interface is configured to use a guest login, enter **User name**: **guest** and the guest password.

  Note Before you can log in as guest for the first time, the administrator must first create a guest password. See *To change the guest login password (User administration)* on page 4-23.

- **Administrator**: To access the web interface as administrator (full access to all settings in web interface), enter User name: **admin** and the administrator password.

  Note Before you can log in as administrator for the first time, you must use the local administrator function, see *New installation or forgotten password* on page 4-4.

Under **ADMINISTRATION > User permissions** you can change the settings so that a password is required to access the guest part of the web interface. The administrator password however, is mandatory.

For details, see:

- *To change the guest login password (User administration)* on page 4-23
- *User permissions (for guest user)* on page 4-23
- *Administrator access to the web interface (user name, password)* on page 4-22

2.2.6 Local IP ports and WLAN

The Base Unit has five local IP connectors (type RJ45) for connecting a PC/laptop or similar and for connecting the external modem.

Note For connection to the Internet, connect your LAN cable to the User LAN interface of the modem, or to Port 2 or Port 3 on the Base Unit. Refer to the documentation for your modem.

- Service port on the left-hand side (Port 1) for system control via the web interface.

  Important Port 1 is configured as DHCP server by default. If you are connecting a corporate network, use Port 4 instead.

- Two connectors (Port 2 and Port 3) are switched with LAN Port 5, that is they are always on the same network and have the same IP settings as LAN Port 5.
- Management port (Port 4), e.g. for system control from a PC on a corporate network. Port 4 is configured as DHCP client by default.
- Modem port (LAN5) for connection to the external modem.

The VSAT terminal has a WLAN module. Access to one of the Local IP ports using WLAN must be set up in the web interface, see *To configure the LAN network* on page 4-6.

2.2.7 Power supply

The internal power supply supplies power to the Base Unit, LNB and BUC. Power input is specified as 24 VDC to 48 VDC nominal, for more details see *Technical specifications* on page A-1. We recommend using the EXPLORER 6000 Series Power Supply (403160P) to supply the DC power for the EXPLORER 6100 Ku if you are using one of the Cobham-supplied BUCs. Note, however, that if you are using a 3d party BUC, the voltage of the system power supply must match the voltage specifications for the BUC. See *Requirements to power supply and cables* on page 3-10.

2.3 Part numbers

2.3.1 System part numbers

The EXPLORER 6100 Ku system has the following part number and consists of the following units:

Part number	Description	Base Unit	RF-package	Modem
406627A-50014	EXPLORER 6100 Ku System (No BUC)	EXPLORER 6000 Base Unit	EXPLORER Ku RF Package (No BUC) w. 1m reflector	Ku modem Not included
406627A-50214	EXPLORER 6100 Ku System (8W BUC)	EXPLORER 6000 Base Unit	EXPLORER Ku RF Package (8W BUC) w. 1m reflector	Ku modem Not included
406627A-50314	EXPLORER 6100 Ku System (20W BUC)	EXPLORER 6000 Base Unit	EXPLORER Ku RF Package (20W BUC) w. 1m reflector	Ku modem Not included

2.3.2 Accessories

The following accessories are available from Cobham SATCOM:

Part number	Description
403160P	EXPLORER 6000 Series Power Supply
403160P-010	EXPLORER 6000 Series Power Supply Extension cable (10 m)
406627A-070	EXPLORER 6100 Feed Horn
406627A-014	EXPLORER 6100 Ku Waveguide for No BUC version

2.3.3 Spare parts

For information on available spare parts, log into https://sync.cobham.com/ and select the top menu **Spare Parts**.

Assembly & start up

This chapter has the following sections:

- *What's in the box*
- *To assemble the EXPLORER 6100 Ku*
- *Initial setup*
- *Power on and auto-pointing*
- *To disassemble and pack the antenna*

3.1 What's in the box

3.1.1 To unpack

Two transit cases contain the VSAT terminal:

- Case with RF assembly and three reflector petals (left)
- Case with Base Unit, antenna positioner and four reflector petals (right)

Figure 3-1: Transit cases

CAUTION! Be careful when handling the feed horn and the RF assembly. After mounting the feed horn on the RF assembly, do not carry the RF assembly by the feed horn. The subreflector can be easily damaged.

The cases contain the following items:

- Base Unit with antenna positioner
- RF package
- One Ku feed horn
- One set of reflector petals (7 pcs. in two separate bags) for 100 cm reflector
- One DC input cable 2.5 m w. open leads
- RF cables: Transmit (Red, Tx) & Receive (Blue, Rx) and Pol motor encoder cable
- Quick guide
- Safety summary page

3.1.2 Initial inspection

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

3.2 To assemble the EXPLORER 6100 Ku

3.2.1 Prerequisites

Wind speed considerations

The antenna is designed to operate under the wind speeds given in the specifications in *General specifications* on page A-2.

Note that the antenna may point away from the satellite in winds blowing faster than the operational wind speed limit. At higher wind speeds drive the antenna manually to the stow position. See *To stow the antenna manually* on page 3-14.

Important Do not assemble or operate the terminal at wind speeds exceeding the operational wind speeds. In case the wind speeds exceed the operational wind speed limit while the antenna is assembled or operational, stop the antenna and remove the petals and the feed horn. In case the wind speeds exceed the survival wind speed limit while the antenna is assembled or operational, disassemble and pack the antenna.

3.2.2 Assembly

To assemble the VSAT terminal, do as follows:

1. Unpack the Base Unit and place it upon level ground.
2. Deploy the two support legs. Make sure they are far apart to obtain more stability.
3. Turn the adjustment screws to move the feet up and down to level the base and achieve stability.

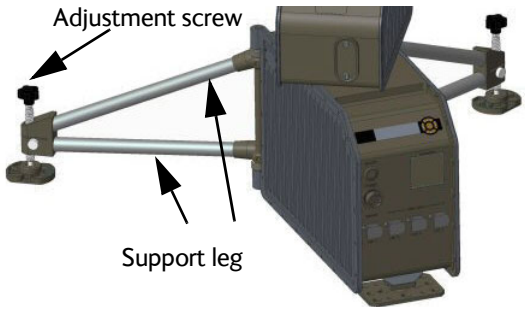


Figure 3-2: Base Unit and support legs

WARNING! The VSAT terminal may fall over if it is not stable. Anchor the terminal to the ground for further stability, e.g. in situations with high wind. For anchoring you may add extra weight, e.g. sand bags, to the support legs or insert stakes through the holes in the support feet.

4. Unpack the RF assembly.

Note If you have purchased the No-BUC version of the RF pack, see *BUC installation* on page 5-16.

5. Retract the thumb screws on the mounting blocks, located on the elevation arms on the antenna positioner.

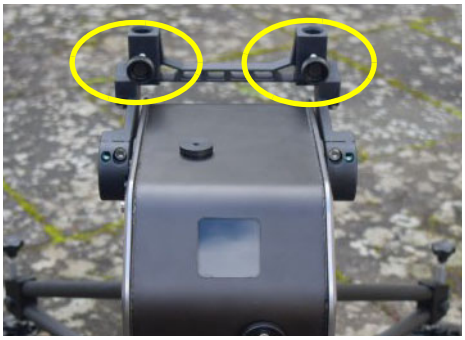


Figure 3-3: Brackets with thumb screws for mounting RF assembly

6. Insert the brackets of the RF assembly down into the mounting blocks on the elevation arms.

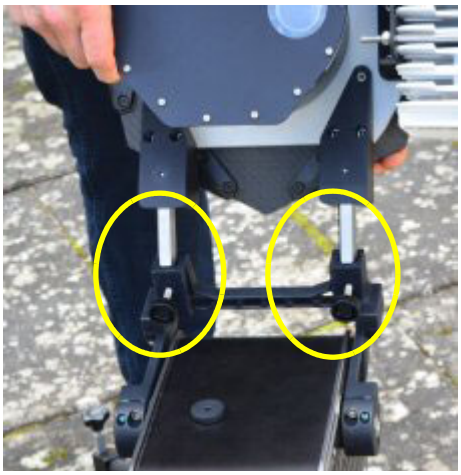


Figure 3-4: RF assembly, mounting

7. Re-engage the thumb screws and work the RF assembly slightly back and forth until the brackets engage completely, while tightening the thumb screws.

Figure 3-5: RF assembly, thumb screws

8. Unpack the seven interchangeable reflector petals (in two bags).

9. Insert the bottom petals into the dedicated grooves and latch them along the edge of each petal to carefully secure the reflector petals into place.

Figure 3-6: Mount the first petals

10. Insert and latch the upper petals.

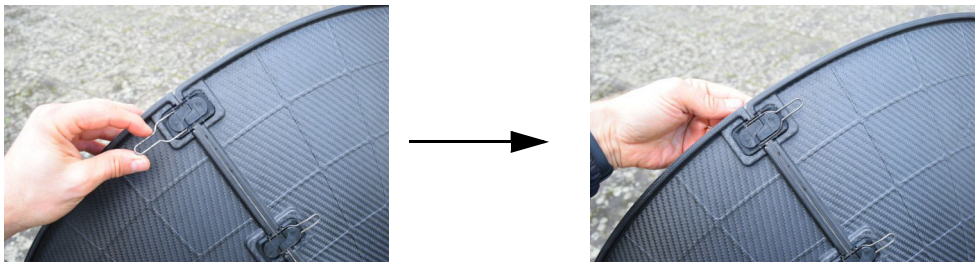


Figure 3-7: Reflector, latches

11. Unpack the feed horn and screw it onto the reflector hub.

CAUTION! Take care when handling the feed horn. The feed's subreflector can be easily damaged. Only touch the lower part of the feed horn as shown in Figure 3-8.

Figure 3-8: Feed horn, mount

3.2.3 Cable connections

Connector overview

The EXPLORER 6100 Ku has the following connectors:

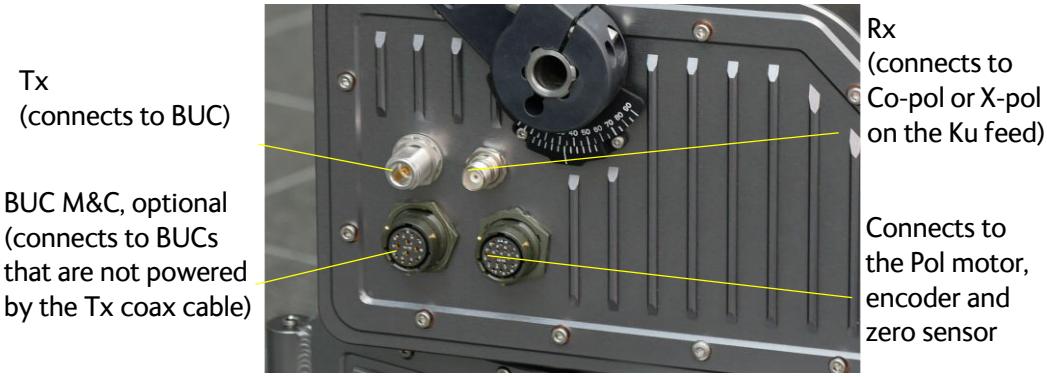


Figure 3-9: Connectors on antenna positioner

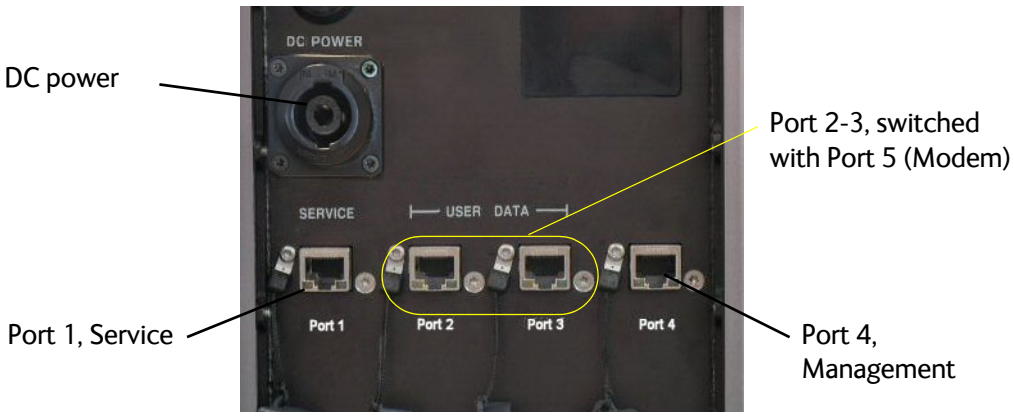


Figure 3-10: Connectors on Base Unit front

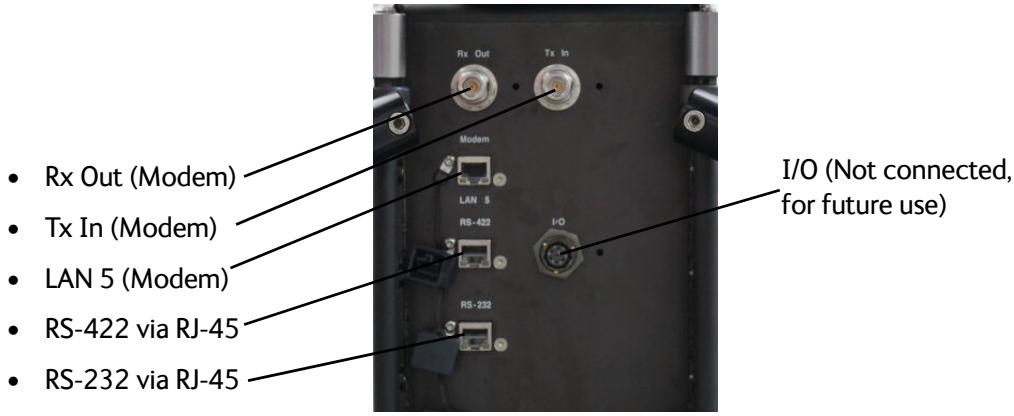


Figure 3-11: Connectors on Base Unit back

Connect cables

1. Connect the RF cables:
   (1) **Pol motor encoder** cable (with braided sleeve) between the Pol connector on the antenna positioner and the Pol-connector on the Ku feed.
   (2) **Transmit** (Red, Tx) cable between the N connector on the BUC and the N-connector marked Tx on the antenna positioner.
   (3) **Receive** (Blue, Rx) cable between the connector marked Co-pol or X-pol on the Ku feed and the TNC connector marked Rx on the antenna positioner.
   (4) **Waveguide** between the Waveguide interface on the BUC and the waveguide interface on the RF pack. The waveguide should already be mounted on the RF pack unless you have the No-BUC version of the RF-pack. For BUC installation, see *BUC installation* on page 5-16.

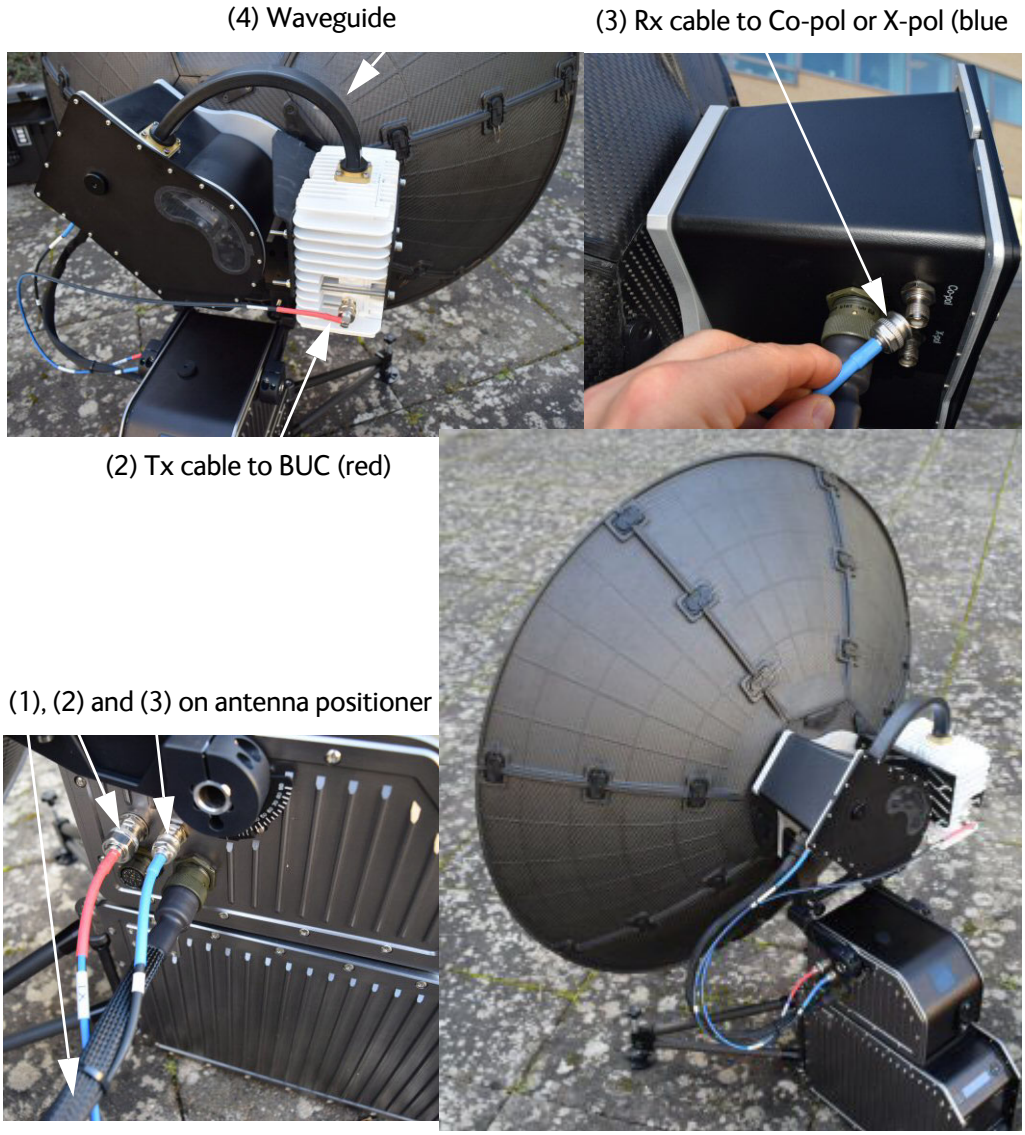


Figure 3-12: EXPLORER 6100 Ku: System cable connections

2. Connect your power supply to the **DC Power** connector on the front of the Base Unit as described in the next section *To connect power*.

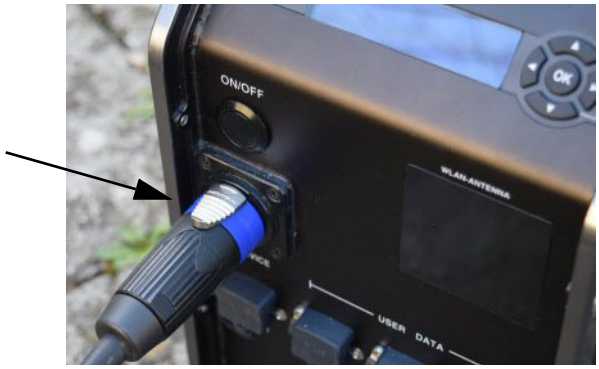


Figure 3-13: DC power connector

3. Connect the Ethernet cables as described below.
   Cable type: Use shielded LAN cable.
   LAN ports: There are five RJ-45 ports for making IP-data connections.
   - *Service port on the left-hand side (Port 1) for system control via the web interface.*
   - *Two connectors (Port 2 and Port 3) are switched with LAN Port 5, that is they are always on the same network and have the same IP settings as LAN Port 5*. See the documentation from your service provider.
   - *Management port (Port 4), e.g. for system control from a PC on a corporate network*.
   - *Modem port (LAN5) for connection to the external modem.* (placed on the back of the Base Unit)
     For details how to connect and set up, see the documentation for your modem and the appendix *VSAT modem settings* on page C-1.

Note **By default, the web interface can only be accessed via Port 1 or Port 4**. The WLAN connection must be configured, see *To configure the LAN network* on page 4-6 and *WLAN settings* on page 4-9.

To connect power

We recommend using **the EXPLORER 6000 Series Power Supply** (part number 403160P), which is a **48 V** power supply suitable for all Cobham supplied EXPLORER 6100 Ku variants. Note, however, that you must always use a power supply that matches the specifications for your BUC. This means that if you have e.g. a 24 V BUC, you must use another power supply.

To connect the EXPLORER 6000 Series Power Supply:

Note The Enable signal (2-) is connected to GND (2+) in the cable connector on the EXPLORER 6000 Series Power Supply, which means that power to the VSAT terminal is controlled only by the ON/OFF button on the Base Unit. There is no remote on/off function.

For pinout, see Figure 3-14.

1. Connect the circular connector from the EXPLORER 6000 Series Power Supply to the DC Power connector on the Base Unit.

   Note If you need a longer cable, an extension cable (10 m) is available from Cobham SATCOM (part number 403160P-010).

2. Connect the line cord on the EXPLORER 6000 Series Power Supply to a standard AC outlet (90-305 VAC). The connector is a Schuko (EU) connector. A Schuko to US adapter is included with the power supply.

To connect using the included power cable:

For applications where you cannot use the EXPLORER 6000 Series Power Supply, an open-ended cable (2.5 m) is supplied with your VSAT terminal

Note The Enable signal (**2-** in Figure 3-14) is connected to GND (2+) in the cable connector, mounted on the included power cable. This means that power to the VSAT terminal is controlled only by the ON/OFF button on the Base Unit. There is no remote on/off function.

1. Connect the circular connector on the supplied cable to the DC Power connector on the Base Unit.
2. Connect the **black wire to GND** and the **red wire to V+ from the DC power supply**.
3. If you are not using the supplied cable, or you need to extend the cable, use minimum **AWG14** for the power supply wires. Refer to the table below for requirements to cables and power supply.

Important If you are making your own power cable, you **must connect the Enable signal (2-)**, otherwise you cannot switch on the EXPLORER 6100 Ku! You have two options:

- Connect pin **2-** (Enable) to GND (pin **2+**). This means you can only switch the EXPLORER 6100 Ku on and off using the Power switch on the Base Unit.

Connect a **remote on/off switch** between pin **2-** (Enable) and pin **2+** (GND). This means that when the Power switch on the Base Unit is on, you can use your own remote switch to turn the unit on and off.

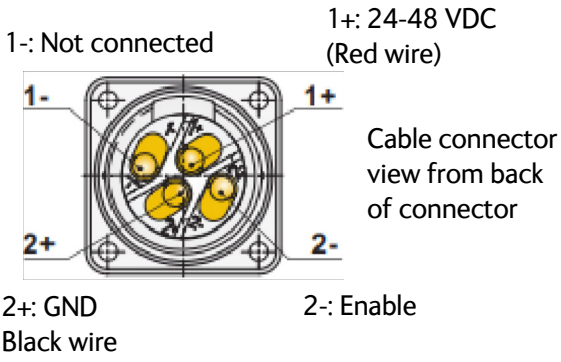


Figure 3-14: DC power, cable connector pinout.

Requirements to power supply and cables

BUC type	Total power consumption	Voltage range of power supply, Nom. (abs. max)	Min. output current from power supply, Nom. (abs max)	Min. output power from power supply	Max. cable impedance
Ku 8 W	165 W	24-48 (19-56) VDC	9 A @ 24 VDC (12 A @ 19 VDC)	200 W	< 200 mOhm
Ku 20 W[a]	275 W	24-48 (19-56) VDC	13 A @ 24 VDC (17 A @ 19 VDC	300 W	< 120 mOhm
Ku 40 W[b]	470 W	36-48 (36-56)	15 A @ 36 VDC	500 W	< 200 mOhm

Table 3-1: Requirements to power supply and cable

a. 20 W BUC: If the power supply voltage is below 27 VDC, the BUC M&C interface must be used to supply power to the BUC.
b. 40 W BUC: The BUC M&C interface must be used to supply power to the BUC

Note For BUC M&C interface, see *BUC power:* on page 5-20.

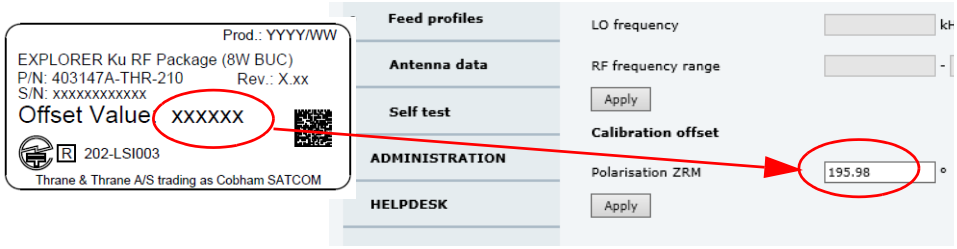
3.3 Initial setup

After you have installed and connected the antenna, Base Unit and modem, you must make some initial configuration in the web interface before you can use the system. Go through the following steps to set up your VSAT system:

1. Connect a computer to LAN Port 1, open your browser and log into the web interface at http://192.168.0.1 (by default). For details, see *To access the configuration web interface* on page 4-2.
2. Go to **SERVICE** > **Feed profile** and select the feed you are using. If you have a custom BUC, enter the details for your BUC. For details, see *Configure RF assembly* on page 5-5.

   Important By default, the system will assume that you have a No-BUC version of the Ku feed. This means there will be no power on any of the connectors for the BUC connection until you have configured the system in the web interface.

3. Click **Apply**.
4. In the **SERVICE** > **Feed profile** page, locate **Calibration offset**, and check that the **Polarization ZRM** number entered here is the same as the **Offset value** number in the label on the Ku feed. If not, **type in the value** from the label.



5. Click **Apply**.
6. Create satellite profiles and modem profiles. See *Satellite profiles* on page 4-8 and *Modem profiles* on page 4-7.
7. If you want to control the system using a WLAN connection, you must first set up the use of WLAN in the Base Unit. See *To configure the local IP network* on page 4-12 and *To configure WLAN* on page 4-14.

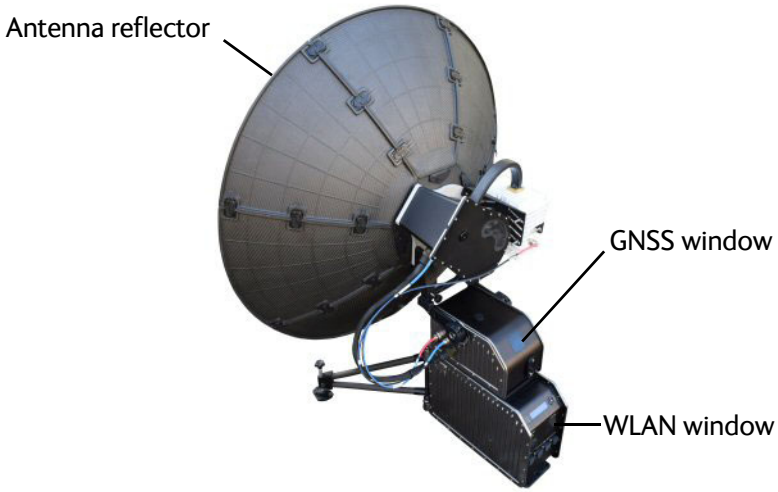
After creation of satellite profiles and modem profiles you can start the antenna as described in the next section.

3.4 Power on and auto-pointing

The system is set to automatically point and acquire a connection (default), when initial configuration is done and a satellite profile is activated.

WARNING! Stay clear of the antenna! Be aware of movements and pinch points, especially while the antenna is being positioned, deployed or stowed.

Important The antenna must have full line of sight from the front of the reflector. Also do not cover the GNSS window, located in the top of the antenna positioner, nor the WLAN window, located in the front of the Base Unit, below the display.



3.4.1 To start up the antenna

To start up the antenna, do as follows:

1. Position the antenna:
   Northern hemisphere: position the antenna so the display faces North.
   Southern hemisphere: position the antenna so the display faces South.

   Note If there is magnetic interference near the Base Unit it may cause the internal compass to give a wrong reading. If in doubt, enter the heading information manually, see *Navigation* on page 4-20.

2. Press the On/Off button and step away from the antenna. Wait for the auto-acquisition process to finish.

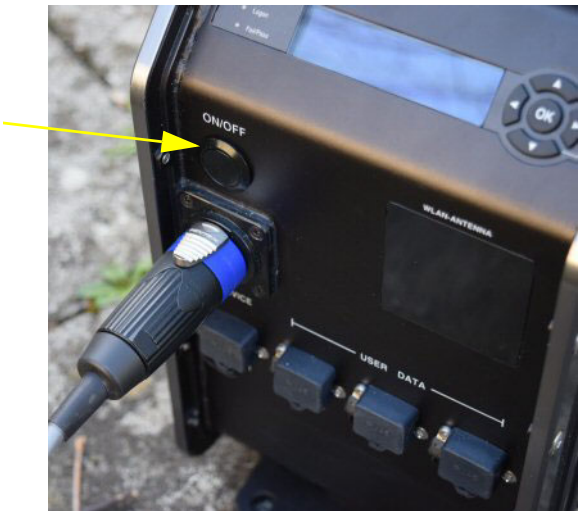


Figure 3-15: On/Off button

The antenna is fully operational when the display shows **TRACKING** and the modem is ready. The indications may differ depending on the modem type, refer to the documentation for your modem.
If the system has previously been set to manual pointing, auto acquisition is disabled and you must disable manual pointing in the keypad or the web interface, see *The menu tree* on page 4-19 or *Antenna mode* on page 4-11.

Auto-acquisition overview

The following points describe the typical auto-pointing algorithm. The EXPLORER 6100 Ku performs the following actions:

1. Detects mechanical home position for azimuth and elevation.
2. Calculates the azimuth/elevation look angles using the inputs from GNSS (GPS, Glonass etc.), compass, accelerometer and gyroscope.
3. Sets elevation and azimuth to the calculated look angle.
4. Proceeds to maximum value on the satellite signal and achieve LOCK status.

The modem then enters the network and begins passing user traffic.

Note As a safety precaution, the modem is automatically inhibited from transmitting until the unit has locked on to the satellite and acquired the network.

Error situation: The azimuth gear has disengaged

To protect mechanical components from damage, the azimuth gear is designed to disengage, if it moves beyond +/- 95 deg. This may happen when manually handling the VSAT terminal, or if an error occurs.

To re-engage the azimuth gear, do as follows:

1. Turn off the VSAT terminal.

2. Manually turn the azimuth gear, while gently pushing the positioner head towards the center position.
3. Having re-engaged the azimuth gear, power on the VSAT terminal.

If the disengagement was caused by an error condition in the auto-pointing procedure and the error comes again, contact your local dealer.

3.4.2 To stow the antenna

WARNING! Stay clear of the antenna! Be aware of movements and pinch points, especially while the antenna is being positioned, deployed or stowed.

To stow the antenna using the keypad and display

To learn how to use the keypad see *Navigating the menus* on page 4-19.

Shortcut to stow the antenna: Press and hold ▼ for 5 seconds. Otherwise:

1. Press **OK** and scroll to the **OPERATION** menu.
2. Press **OK** again to access the menu.
3. Press ▼ until **STOW** is selected, and press **OK**.
4. Wait until the status shows **STOWED**.

To stow the antenna using the web interface

1. Connect a PC to the connector marked **Port 1**, **Service** (or Port 4, Management).
2. Open your Internet browser and enter the IP address of the VSAT terminal. The default IP address is http://192.168.0.1.
3. Type in the user name **admin** and the admin password or press ◀ on the keypad for 5 seconds and enter the user name admin to access the Dashboard as an administrator.
4. Click the button **Stow**.

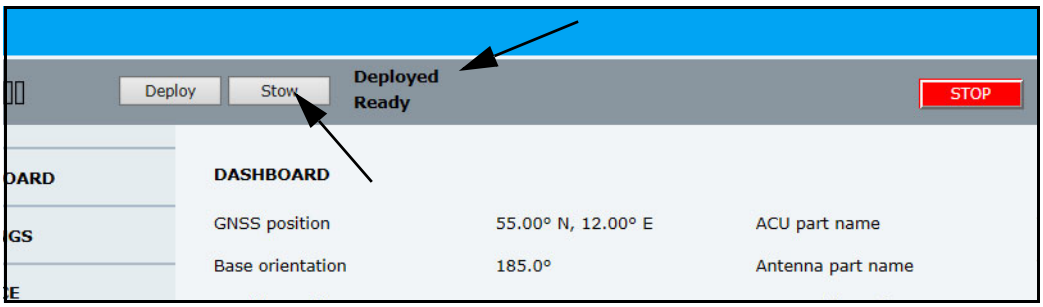


Figure 3-16: To stow the antenna using the web interface

5. Wait until the status shows **Stowed**.

To stow the antenna manually

See *To stow the antenna manually* on page 5-15.

3.5 To disassemble and pack the antenna

1. Press the ON/OFF button on the unit to power it off.

   WARNING! The Base Unit may get very hot in sunny and hot weather conditions. Do not move the unit! Touching the hot unit may cause bodily harm. Wait until the unit has cooled down.

2. Remove all cables.
3. Dismantle the seven reflector petals.
4. Unscrew the feed horn from the Rf assembly and place it carefully in the dedicated cutout in the transport case for the RF assembly.

   CAUTION! Take care when handling the feed horn. The feed's subreflector can be easily damaged.

5. Loosen the thumb screws and remove the RF assembly from the antenna positioner.
6. Put all parts into the dedicated cutouts in the two transport cases.

Setup and operation

This chapter has the following sections:

4.1 The web interface

The VSAT system has a built-in web interface, which has two levels:

- **Mobile web interface**, used for basic operations and status. Accessed from a smartphone or tablet.

  Note WLAN must first be configured using the Computer web interface via the service connector (Port 1) on the Base Unit.

- **Configuration web interface**, used for configuration, line-up, troubleshooting, extended status information etc. Accessed from a computer.

4.1.1 Mobile web interface

When you access the web interface from a smartphone or tablet you get access to the mobile web interface, which offers the following basic operations and status:

- Deploy, stow and stop the antenna,
  see *To deploy, stow or stop the antenna* on page 4-15.
- Activate satellite profile,
  see *To select and activate a satellite profile* on page 4-2.
- See status and events
- Access the configuration web interface,
  Enter the menu and tap **Desktop**

To access the mobile web interface of the EXPLORER 6100 Ku

1. Power up the VSAT system, i.e. switch on the Base Unit. Wait until the LEDs on the front plate of the Base Unit show that the system is ready to be accessed.
   - Power LED: Green
   - Fail/Pass LED: Steady green.
2. Connect your smartphone or tablet to the WLAN of the Base Unit. For details on WLAN setup, see *To configure WLAN* on page 4-14.
3. Open your Internet browser and enter the IP address of the Base Unit. The default IP address is http://192.168.0.1.
4. When prompted, enter the user name and password.
   - For first time use, see *New installation or forgotten password* on page 4-4.
   - For details, see *Administrator access to the web interface (user name, password)* on page 4-22.

The mobile web interface opens. The deploy, stow and stop functions are described in *To deploy, stow or stop the antenna* on page 4-15.

To access the menu, tap the icon in the top right corner.

Menu:

- **Status** shows information such as system status, host name, position, heading (base orientation), selected satellite profile, modem etc.
- **Satellites** lets you select which satellite to activate, see the next section.
- **Eventlist** shows a list of currently active events (if any).
- **Desktop** gives access to the full version of the web interface.
- **Help** opens the user & installation manual for the EXPLORER 6100 Ku VSAT system.

To select and activate a satellite profile

1. From the menu, select **Satellites**.
2. Select the satellite profile you want to activate and tap **Activate**.

4.1.2 Configuration web interface

Use the built-in web interface of the Base Unit to make a full configuration of the VSAT system. You can use a standard Internet browser.

Note The settings specifically related to service are described in Chapter 5, *Service*.

To access the configuration web interface

To access the web interface of the Base Unit do as follows:

1. Power up the VSAT system, i.e. switch on the Base Unit. Wait until the LEDs on the front plate of the Base Unit show that the system is ready to be accessed.
   - Power LED: Green

- Fail/Pass LED: Steady green.

2. Connect a PC to **Port 1** (Service port, standard Ethernet) of the Base Unit. You can also connect to the WLAN interface if configured.

   Note If you are connecting a PC which is on a corporate network, do not connect to Port 1 (configured as DHCP server). Connect to Port 4 instead (configured as DHCP client).

3. Open your Internet browser and enter the IP address of the Base Unit. The default IP address is http://192.168.0.1. When the login page is displayed, you know that the connection to the VSAT system can be established.

4. When prompted, enter user name and password.
   - For first time use, see *New installation or forgotten password* further down.
   - For details, see *Administrator access to the web interface (user name, password)* on page 4-22.

When you have entered the user name and password, the web interface is ready for use. You can continue to configure the system.

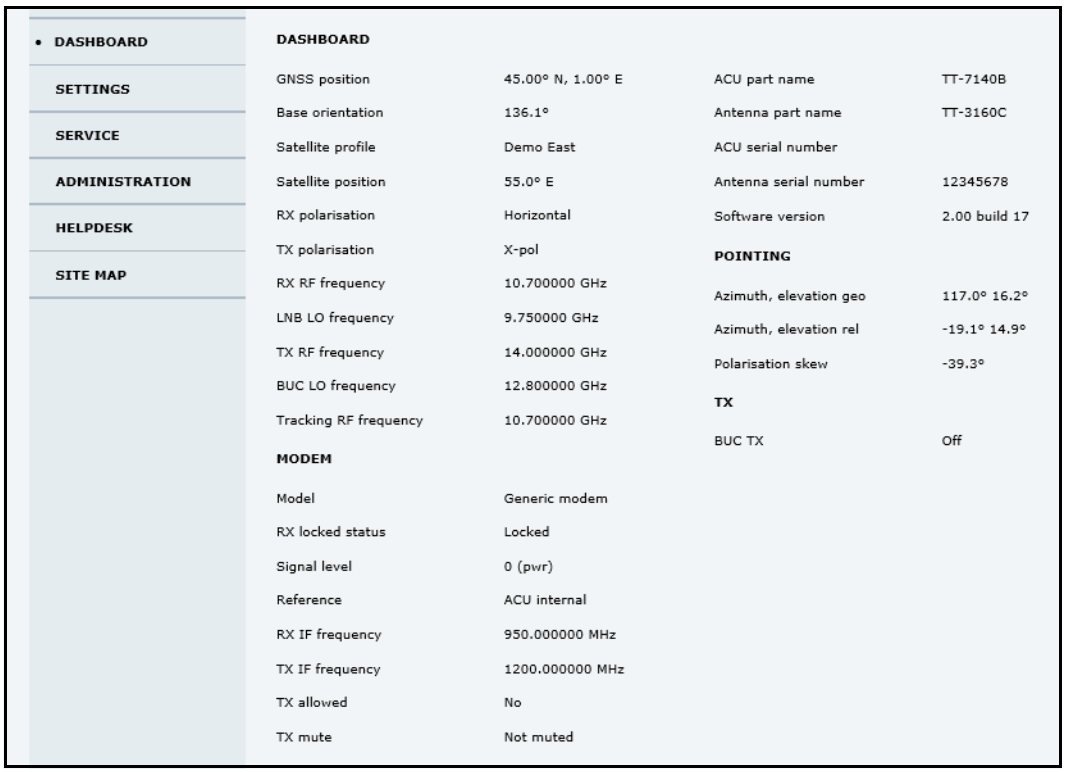


Figure 4-1: Web interface > Dashboard

If you cannot establish a connection there might be problems with the Proxy server settings of your PC ("Use proxy server" must be disabled in your PC).

If you want to use another IP port you must configure it according to your network requirements. For information how to configure the local IP connectors see *To configure the local IP network* on page 4-12.

New installation or forgotten password

To get temporary administrator access to the EXPLORER 6100 Ku, do as follows:

1. On the ACU keypad, push and hold the left arrow key for 5 seconds.
2. Wait for the very short display of **Local administration**, followed by the event text: **0807F-0 WARNING Local administration enabled**.
   This will give you temporary administrator access **for 1 hour or until next restart**.
3. Open your browser and access the web interface.
4. Enter user name: **admin** (no password is required).
   The **DASHBOARD** is displayed.

   Note Accessing the ACU with the local administration function does not change the current administrator password.

5. To create or change the password select **ADMINISTRATION > User login** and locate the section **Change Login**.
6. Type in the new password (minimum 8 characters) and click **Change**. No old password is required.

After 1 hour or a restart the new administrator password is required.

Information and controls in the top bar of the web interface

The top bar, which is independent of the selected page, shows the signal strength, the deployed status, the system status, and, if an event is active, a warning icon.

The buttons **Deploy**, **Stow** and **Stop** are also available from the top bar. For details on these functions, see *To deploy, stow or stop the antenna* on page 4-15.

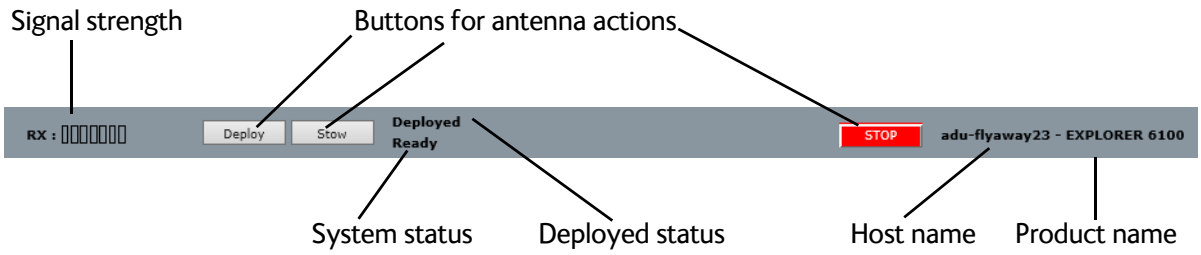


Figure 4-2: Top bar in Dashboard, example

Examples of system status:

- Antenna SW upload
- Antenna POST (Power-On Self Test)
- Ready (waiting for data from the modem or no satellite profile selected)
- Tracking (antenna is locked to the satellite signal and ready to send/receive.
- Manual pointing (the antenna is set up for manual pointing and will not auto-acquire)
- Safe mode (error, followed by an error description)
- <active event message>

Information fields on the Dashboard

Note The information on the Dashboard varies depending on the used satellite and modem profiles.

DASHBOARD	Description
GNSS position	Position reported by the GNSS module or entered manually
Base orientation	Orientation of the mounting base relative to estimated North
Satellite profile	Name of the currently active satellite profile
Satellite position	Position of the satellite selected in Satellite profile
RX polarization	Horizontal or Vertical
TX polarization	X-pol or Co-pol
RX RF frequency	Receiving frequency
LNB LO frequency	The LNB Local Oscillator frequency
TX RF frequency	Transmitting frequency
BUC LO frequency	The BUC Local Oscillator frequency
Tracking RF frequency	Current RF tracking frequency
ACU part name, Antenna part name, ACU serial number, Antenna serial number, Software version	Part names, serial numbers for Base Unit and antenna, software version of the VSAT system
POINTING	**Description**
Azimuth, elevation geo	Current value for geographic azimuth and elevation
Azimuth, elevation rel	Current value for relative azimuth and elevation
MODEM	**Description**
Model	VSAT modem name, entered in SETTINGS > Modem profiles.
RX locked status	Shows whether or not the system has locked to the incoming signal.
Signal level	Current input signal level from VSAT modem. iDirect openAMIP modem: (PWR) 0-500, delivered by the connected modem. For values <250 the antenna searches after a new signal. Other modem: Signal level in dB.

Status	Any status information received from the modem
RX IF frequency	Rx IF frequency read from the VSAT modem
TX allowed	Shows whether the VSAT modem allows the system to transmit.
TX allowed	Yes or No. Indicates if the VSAT modem supplies the reference signal on its TX connector (Yes) and if an iDirect OpenAMIP modem indicates modem Locked and TX ON in the OpenAMIP message L (L 1 1).
TX Mute	Muted or Not muted.
Polarization skew	Current value for polarization skew
TX	Description
BUC TX	On or Off. Shows if the VSAT system has enabled the BUC or not. It is the same TX ON/TX OFF that is shown in the display of the Base Unit, see *Keypad and display menus* on page 4-25.
BUC output power	Shows whether or not the BUC is transmitting and the power level. At the P1dB compression point, 4 bars are filled.

4.2 Satellite and modem profiles

4.2.1 Modem profiles

A modem profile contains all VSAT modem settings that are necessary for a successful connection to the satellite. The data you have to fill in are provided by your VSAT service and modem provider. You must add at least one modem profile.

Modem profile – New entry and Edit

On the page **Modem profiles** you create, edit or delete modem profiles.

To add or edit a modem profile, do as follows:

1. Select **SETTINGS > Modem profiles** and click **New entry** or **Edit**.
2. Fill in a modem profile name of your own choice.
3. Select one of the supported modems from the drop down list. Once you have selected a VSAT modem, entry fields required for this VSAT modem are displayed.
   Generic OpenAMIP: If you have an OpenAMIP modem that is not included in the list, select Generic OpenAMIP.
   Generic modem: If you have another modem that is not included in the list, select the generic modem. With this modem profile you enter all information about the modem manually.
   Service modem: This is mainly used for reference satellites[1] and for troubleshooting purposes.
4. Fill in or edit the data provided by your VSAT service provider.
   - Enter the passwords, if needed.
   - Select the modem baud rate
   - Select whether you want to use the reference signal from the Base Unit (Internal) or the VSAT modem (VMU). “Cleaned” means that any noise on the reference signal is removed before using the reference.

     Important The VSAT system can work either using the Rx or TX reference signals provided by the modem or using its own built-in reference (RX only). **The setting in the Base Unit must match the setting in the modem**.

   - **GNSS output**: Some modems need the current GNSS position from the Base Unit. If the modem needs the GNSS position, you must select the baud rate for the RS-232 interface from the **GNSS output** drop-down list. Otherwise select **Disabled**.
   - **For generic modem**: Select the RSSI Lock Type and type in the RSSI Lock Level.
   - **For OpenAMIP IP address**: Make sure that you have entered this IP address also for the LAN connector that is used for the OpenAMIP modem, see *To configure the local IP network* on page 4-12.
5. Click **Apply** to add the new profile to the list of modem profiles or to accept the edits.

1. For details on how to use a reference satellite profile, see *To use a reference satellite* on page 4-10.

4.2.2 Satellite profiles

On the page **Satellite profiles** you add, edit, delete and activate satellite profiles. A satellite profile contains all settings that are necessary for a successful connection to the satellite, including a modem profile. Most of the data you have to fill in are provided by your VSAT service provider.

You must activate one satellite profile.

To activate a satellite profile, click **Activate** next to the profile name.

Note You must add at least one modem profile before you can add a satellite profile. See *Modem profile – New entry and Edit* on page 4-7.

To select a reference satellite (Ku only)

If you are going to use a reference satellite, select the satellite from the drop-down list and click **Apply**.

Note First you have to create a reference satellite profile that uses the Service modem profile.[a]

a. For details on how to use a reference satellite profile, see *To use a reference satellite* on page 4-10.

Satellite profiles – New entry and Edit

Note You cannot edit nor delete an active profile. Make sure the profile is not active before you edit or delete it.

1. Select **SETTINGS** or **Satellite profiles**.
2. Click **Edit** or **New entry**.
   Each satellite profile has one assigned modem profile. The parameters vary depending on the selected modem profile.
   For a Generic modem you enter all parameters in the satellite profile manually.
3. Enter or edit the Satellite profile name.

   Note It is helpful to assign a name containing the location where the Satellite profile is to be used (e.g. **Central America**) and possibly the provider.
4. Select a modem profile. The page automatically displays the parameters available for the selected modem profile.
   For instruction how to add a modem profile see *Modem profile – New entry and Edit* on page 4-7.
5. Enter the data for the satellite that you want to use. See the table on the next page. For Ku satellite data see www.lyngsat.com. If you have selected a satellite from the list, some of the information is filled in automatically.
6. Click **Apply** to save the settings for the satellite profile.

Depending on the selected modem profile, some or all of the below settings may be available. You get most of the information from your VSAT provider.

Setting	Values	Explanation
Predefined satellites	User defined data or selection of satellites	Select a satellite from the list, or select **User defined data** and enter all information manually.
Use reference satellite	Checkbox	Select **Use reference satellite** if you are going to use a reference satellite. See *To use a reference satellite* on page 4-10.
Satellite position	degrees E or W	Position of the satellite
Polarisation skew	degrees	See documents from VSAT provider
Maximum inclination	degrees	Sets the satellite search window size to match inclined orbit satellites.
Elevation cutoffl	degrees	The minimum elevation angle for the antenna to function. According to FCC (FCC §25.205) regulations the Elevation cutoff must be minimum **5 degrees**.
RX polarisation	Horizontal or Vertical	Polarization of the desired RX signal
TX polarisation	X-pol or Co-pol	Polarization of the TX signal - relative to the desired RX signal.
RX IF frequency	MHz	RX IF frequency from the VSAT modem
LNB LO frequency	9.75 or 10.75 GHz	Select **9.75** if the RX frequency is between 10.7 GHz and11.7 GHZ Select **10.75** if the RX frequency is between 11.7 GHz and 12.75 GHZ
RX RF frequency	GHz	Receiving frequency
TX RF frequency	GHz	Transmitting frequency
Tracking type	Narrow band, VSAT modem RSSI, DVB-S/DVB-S2 or Wideband power	Select which signal should be used for tracking.
RX frequency	Modem or User defined	Select **Modem** to use the modem RX frequency or select **User defined** and enter the RX frequency manually.

To use a reference satellite

If your VSAT modem cannot communicate to the antenna that it is locked to the correct satellite, you can initially use a reference satellite that the antenna can identify without the modem.

To use a reference satellite, do as follows:

1. On the Modem profiles page, create and save a modem profile using the Service modem. For details, see *Modem profile – New entry and Edit* on page 4-7.
2. On the Satellite profiles page, create and save a reference satellite profile that uses the Service modem profile. For details, see *Satellite profiles – New entry and Edit* on page 4-8.
3. Create your real satellite profile for the connected modem.
4. In the real satellite profile, select **Use reference satellite**.
5. In the **Satellite profiles** page under **Reference satellites**, select the reference satellite profile from step 2 above and click **Apply**.
6. Activate the real satellite profile.

With this satellite profile activated, every time you start up the antenna it will first use the reference satellite and then automatically switch to the real satellite when possible.

4.3 Antenna mode

The EXPLORER 6100 Ku is an auto-acquire antenna, which means it automatically searches for the satellite and logs on without user intervention. However, you may want to use the antenna in a different manner. In the SETTINGS > Antenna page you can set up manual pointing or fixed installation.

The antenna also has Dynamic Pointing Correction (stabilization feature) that ensures that the antenna stays locked on to the satellite, even in strong wind or if moved.

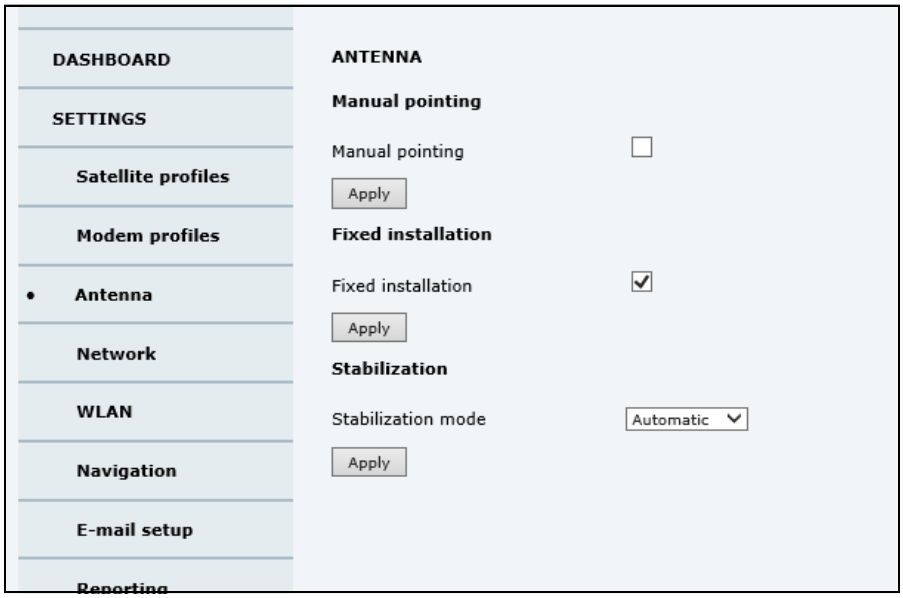


Figure 4-3: Web interface SETTINGS > Antenna, example

1. Select **SETTINGS** > **Antenna**.
2. If you want to point the antenna manually, select **Manual pointing** and click **Apply**. This turns off the motors in the antenna and you must make a manual pointing. See *Manual pointing* on page 5-12.

   Note In order to ensure that the EXPLORER 6100 Ku is pointed correctly, make sure that **Fixed installation** is **not** selected while you are pointing the antenna manually.

3. If you want to leave the antenna in a fixed installation, select **Fixed installation** and click **Apply**.
   This means the EXPLORER 6100 Ku automatically logs on to the network after reboot in case of a temporary power loss. No user action is required. Fixed installation is allowed after the EXPLORER 6100 Ku has been pointed to the satellite.
4. Select the **Stabilization mode** (Dynamic Pointing Correction).
   - **Continuous**: The antenna continuously compensates for movements to keep a stable position in relation to the satellite.
   - **Off**: Antenna stabilization is not used.
   - **Automatic** (Default setting): The antenna periodically adjusts the position to compensate for movements.

4.4 Local IP and WLAN

4.4.1 To configure the local IP network

On this page you can set up the local IP ports and enter a host name. The host name helps identifying the VSAT system. To configure the local IP ports, do as follows:

1. Select **SETTINGS > Network**.

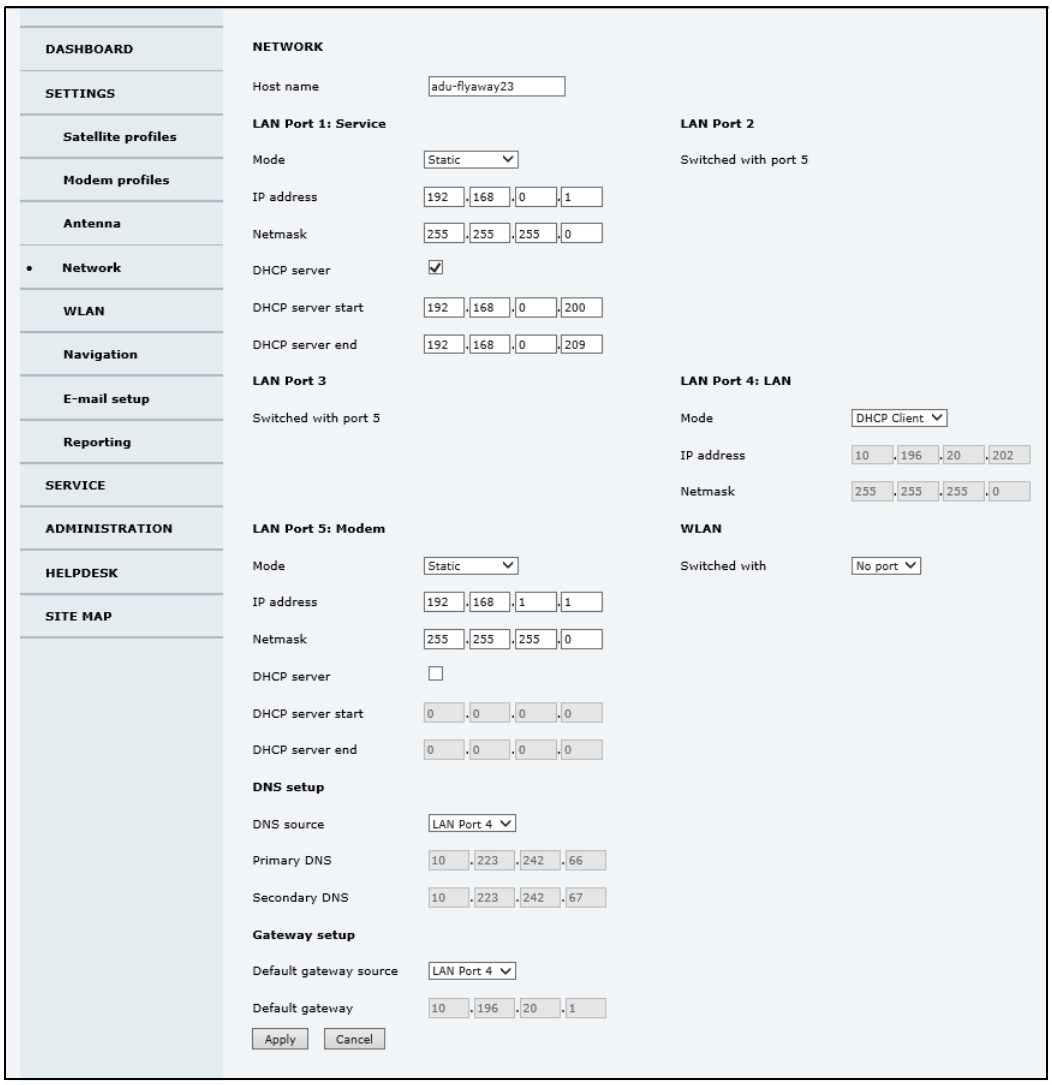


Figure 4-4: Web interface: SETTINGS > Network (example)

2. Make the necessary changes on this page and click **Apply**.
   For available options for the network configuration, see the table on the next page.

CAUTION! The VSAT system is not designed to be connected directly to the Internet. It must be located behind a dedicated network security device such as a firewall. You must change the passwords as anyone with access and malicious intent can render the system inoperable!

Important Make sure that the networks do not use IP address ranges that overlap. Do **not** connect units with the IP address **192.168.1.3** to the Base Unit. This IP address is reserved.

Sections	Preferred use
NETWORK Host name	The host name is used for identifying the VSAT system, and is displayed in the web interface (right side of top line, next to the product name). The default host name is **ACU**. You can change the name. Letters (a-z), digits (0-9) and hyphen (-) are allowed as legal characters. Note: The host name must start with a letter.
LAN Port 1	Port 1 is the service port and is used to access the web interface. By default this port is configured as **DHCP server** and has the static IP address http://192.168.0.1; the current value can be shown in the Base Unit display (NETWORK > PORT 1 IP). If you want a different setup for Port 1, you can change the IP settings. You get the default settings back by resetting to factory default.
LAN Port 2 and 3	LAN Port 2 and 3 are switched with LAN Port 5, that is they are always on the same network and have the same IP settings as LAN Port 5.
LAN Port 4	Port 4 is a Management port and is configured to be a DHCP client. It can be used e.g. to connect a PC on a corporate network to the web interface. You can change the IP settings according to your needs, e.g. to use Port 4 for user data instead.
LAN Port 5	Port 5 is used for connection to the modem: See Appendix C, *VSAT modem settings*, and the documentation for the modem.
WLAN	The wireless port can be connected to one of the other ports. Set here which of the ports 1 to 4 you want to access with WLAN. If you want to access the web interface with WLAN, select the port used for accessing the web interface (Port 1 or Port 4 by default). For details on WLAN setup, see *To configure WLAN* on page 4-14.

Static IP or DHCP Client

Important For Port 1, the DHCP server is enabled by default. This means the EXPLORER 6100 Ku will act as server when you connect to Port 1!

If you select **DHCP client** the network IP address and sub-net mask must be provided by a DHCP server on that network. If you select **Static** you must specify a unique IP address and a subnet mask.

DHCP Server Settings

When **Mode** is set to **Static**, you can select to let the port act as a **DHCP server**.

The DHCP start and end addresses must be on the same subnet as the port's static IP.

DNS setup

If you have access to a Domain Name Server (DNS) you can specify the address of the email server by using the server name instead of its IP address. This can be used in Outgoing mail server in *E-mail setup* on page 4-16.

You may statically specify the address of one or two DNS servers. Select the DNS source as static and fill in IP address or addresses.

Alternatively, if your DHCP server can provide a DNS address and you have selected DHCP client above, then select the same LAN as your DNS source.

Gateway setup

If the Base Unit needs to communicate with network units outside the specified sub-nets, you must specify a default gateway (typically a router). The default gateway can be set as a static IP address. Then set the default gateway source to static and enter the IP address of the default gateway. To remove the default gateway set it to 0.0.0.0.

Alternatively, if your DHCP server is able to provide a default gateway address and you have selected DHCP client above, then select the same LAN as your default gateway source.

4.4.2 To configure WLAN

On the **WLAN** page you can enable and set up the WLAN access point. Do as follows:

1. First, on the **SETTINGS > NETWORK** page, link the WLAN interface to one of the local IP interfaces. Typically, you link WLAN to Port 1, which is used to access the web interface of the VSAT system. See *To configure the local IP network* on page 4-12.
2. Select **SETTINGS > WLAN** from the left navigation pane.
3. Enable or disable the WLAN (default: **Disabled**).
4. Select the **Country** for your present location.
5. **WLAN channel** can be changed, channels depend on the setting for **Country**.
6. For **Broadcast SSID**, select **Enabled** (default) or **Disabled.**
   Enabled: WLAN access point is shown to other users.
   Disabled: WLAN access point is hidden.
7. Type in the **SSID** of your choice or accept the default SSID, which is **Cobham**. The SSID is the name of the wireless local area network. It is maximum 32 characters.

   Note We recommend changing the SSID name to something meaningful for your installation.

8. Select the **Security** standard. Select one of the following encryption standards:
   - **Disabled** (default)
   - **WEP64**, enter the encryption key in hexadecimal format.
   - **WEP128**, enter the encryption key in hexadecimal format.
   - **WPA-PSK**, enter the encryption key in hexadecimal or text format.

- **WPA2-PSK**, enter the encryption key in hexadecimal or text format.

Important We strongly recommend adding encryption to the WLAN connection, in order to protect your network!

9. Select the **Key type** (hexadecimal or ascii) and type in the **Encryption key** for the selected Security standard. This is not applicable if you have selected **Disabled**.
10. Click **Apply**.

4.5 To deploy, stow or stop the antenna

You can deploy, stow and stop the antenna using the web interface. Do as follows:

1. Click the button **Deploy**, **Stow** or **Stop** in the top bar of the Configuration web interface, or in the start screen of the Mobile web interface.
   - **Deploy**: Prepare the antenna for pointing after it has been stowed.
   - **Stow**: Stow the antenna e.g. before disassembly.
   - **Stop**: Stop the antenna immediately in the current position.
     The Stop button changes into **Start**, click **Start** to restart the antenna.

You can also use the keypad and display to deploy, stow or stop the antenna. See *Menu shortcuts* on page 4-26 and *Menu descriptions* on page 4-28.

4.6 Reporting

4.6.1 E-mail setup

To be able to send diagnostics reports and other system information using e-mail you must set up a couple of parameters. Contact your IT department for the specific data.

To configure the e-mail setup, do as follows:

1. Select **SETTINGS > E-mail setup** from the left navigation pane.
2. Enter the data for Outgoing mail server (SMTP), SMTP port number, SMTP type, SMTP authentication, User name and password. This data is typically provided by your IT department.

Note | You must set **Outgoing mail server** to an IP address if DNS has not been set up in **DNS setup** in *To configure the local IP network* on page 4-12.

4.6.2 Reports, syslog and SNMP traps

You can set up the system to send the following reports and messages:

- Diagnostics report
- Remote syslog
- SNMP traps

To send a diagnostics report

You can send automatically generated diagnostic reports at fixed intervals. The diagnostic report contains information relevant for the service personnel during troubleshooting.

To set up sending a diagnostics report, do as follows:

Note | You must first set up the Email. See the previous section, *E-mail setup*.

1. Select **SETTINGS > Reporting** from the left navigation pane.

Important | Note that the diagnostics report also shows the WLAN key.

2. Under Diagnostics report, enter the following:
   - E-mail sender
   - E-mail recipients (comma separated)
   - Send interval: Select **e-mail disabled** (default), **day** with 2-minute samples, **week** with hourly samples or **month** with hourly samples. The report contains statistics data for the selected intervals.
3. Click **Apply**.

You can also send the report at any time by clicking **Send now**. Use **Send now** to validate the e-mail setup. See also *Help desk and diagnostics report* on page 5-2.

Remote syslog

You can set up the antenna to send each syslog message to a syslog server to advise the system administrator of the current status of the antenna.

To set up sending syslog messages to a syslog server, do as follows:

1. Select **SETTINGS > Reporting**.
2. In the section **Remote syslog** select **On** to enable remote syslog (default: Off).
3. Enter the IP address of the syslog server to which the syslog messages will be sent.
4. Click **Apply**.

SNMP traps

SNMP traps, or notifications, are network packets which advise the system administrator about significant events in the antenna, e.g. alarms and system error messages. They are generated by the antenna and can be sent automatically to an SNMP trap receiver/manager.

To set up reporting SNMP traps to an SNMP server, do as follows:

1. Select **SETTINGS > Reporting**.
2. In the section **SNMP traps** select **On** to enable sending of SNMP traps (default: Off).
3. Enter the IP address of the SNMP trap receiver/manager to which the SNMP traps will be sent.
4. Enter the Community name. This is the name of the SNMP trap receiver/manager. This is needed for authentication of the SNMP trap request.
5. Click **Apply**.

See also *SNMP support* on page 4-32.

4.7 To line up or jog the antenna

You can use the Lineup/Jog function to deliberately offset the antenna position. This is useful for testing and troubleshooting and sometimes also during commissioning.

1. Connect a PC to the **Port 1** connector at the Base Unit.
   You may also use WLAN, if it is configured.
2. Open an Internet browser and type the default IP address: http://192.168.0.1.
3. If the antenna is not already deployed, click **Deploy** in the top bar of the web interface.
4. Navigate to the page **SERVICE** > **Jog** and click **Activate Jog** or **Activate Lineup**.
   - Lineup is typically used during commissioning of your Ku system. If you selected Lineup, the antenna will be able to transmit during the Lineup procedure. You can enter offsets for the position coordinates of the active profile, but you cannot change the coordinates of the active profile.
   - If you selected Jog, the antenna will not be transmitting, and you can enter any position coordinates.

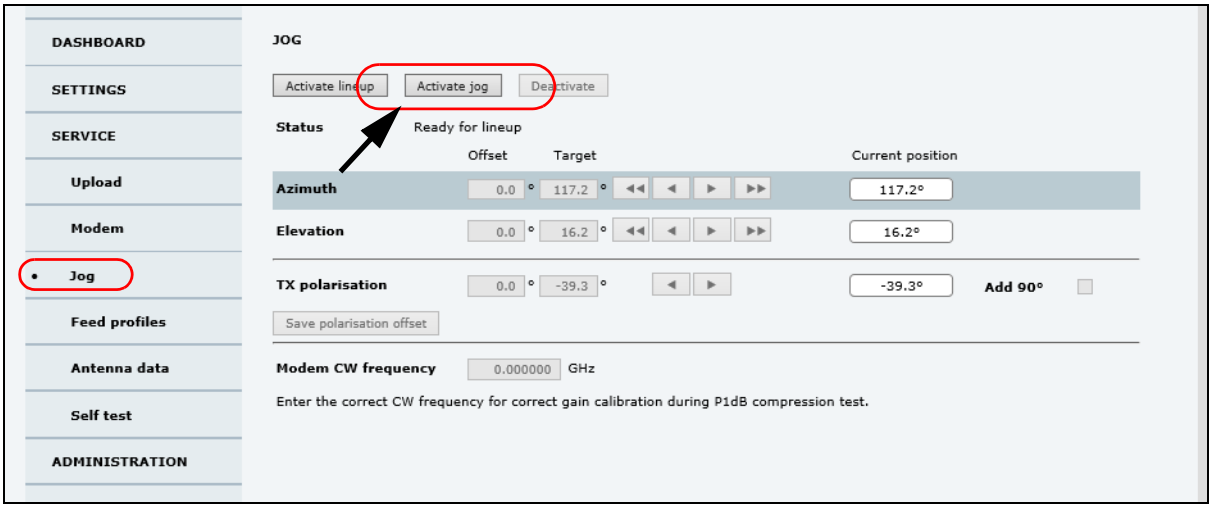


Figure 4-5: To line up or jog the antenna using the web interface

5. When the status field shows **Jogging** or **Lineup**, click the arrow buttons for Azimuth or Elevation to change the offset, or type in specific values.
   ◀ and ▶ change the offset with 0.1˚ increments.
   ◀◀ and ▶▶ change the offset with 1.0˚ increments.
   The current position as well as the offset is shown on the screen.

   Note There may be slight deviations (or “random walk”) of a few tenths degrees.

6. Click the arrow buttons for **TX polarisation** to change the offset, or type in a specific value. You may also select **Add 90˚**.
   The current position as well as the offset is shown on the screen.
7. Click **Save polarisation offset**.
8. Enter the correct **Modem CW frequency**.

This is provided by the satellite operator, typically when talking to the satellite operator on the phone before doing a P1dB compression measurement.

9. When the lineup or jog procedure is ended, select **Deactivate** to return to normal operation and reactivate the selected satellite profile.

For information on the submenus **Modem**, **Feed profiles** and **Antenna data**, see chapter 5, *Service*.

4.8 Navigation

In this section you can set Heading and Position.

- **Heading**: You can enter a fixed base heading if magnetic disturbances in the area cause a misreading of the internal compass.
- **Position**: You can enter a fixed position if the position provided by the internal GNSS module is not sufficiently good or you do not want to wait for a GPS fix. If you select GNSS mode you can select between a number of different positioning systems.

Do as follows:

1. Select **SETTINGS > Navigation** from the left navigation pane.

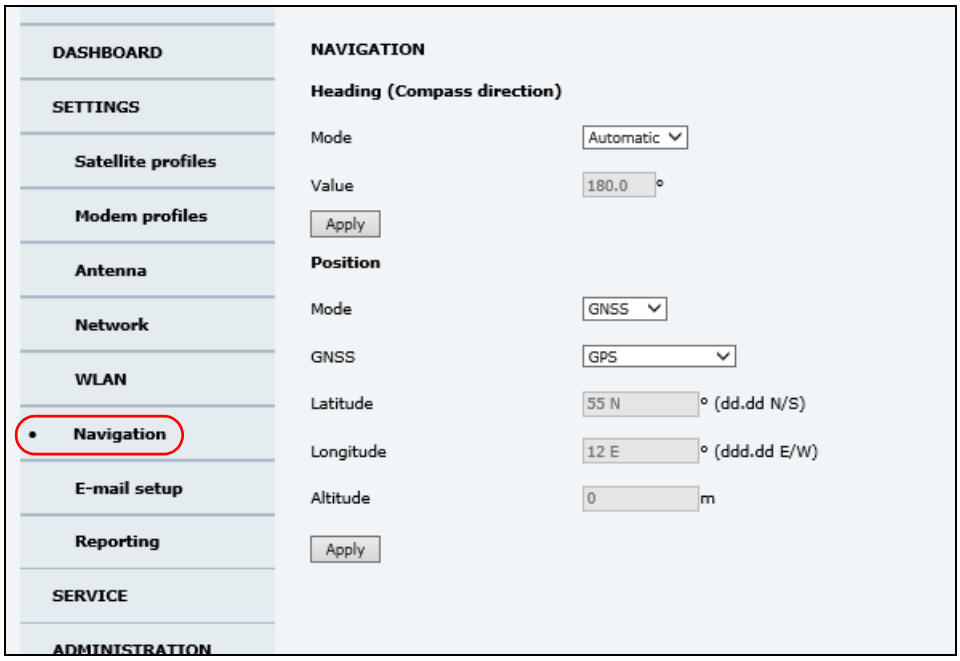


Figure 4-6: Web interface: SERVICE > Navigation

2. Set the **Heading (Compass direction)** mode:

Heading (Compass direction) mode	Description
Automatic	Magnetic heading (internal compass) is used (default).
Manual	Enter a value for the direction of the VSAT terminal as an alternative to the magnetic heading (0 to 360 degrees, precision ±20˚). 0 degrees points North, 180 degrees points South.

3. Set the **Position** mode:

Position mode	Description
GNSS	GNSS module is used for current position (default). At **GNSS**, select one of the following from the drop-down list: • GPS (default) • BEIDOU • GPS + BEIDOU • GLONASS • GPS + GLONASS
Manual	Allows you to manually enter values from other position source. (Accuracy should be better than 50 m). Enter: • **Latitude** • **Longitude** • **Altitude**

4. Click **Apply** to save the new settings.

4.9 Administration

In this section of the web interface you can configure the following administrative settings:

- *Administrator access to the web interface (user name, password)*
- *User permissions (for guest user)*
- *To import and export a system configuration*

4.9.1 Administrator access to the web interface (user name, password)

You can log on as guest (**user name**: **guest**, password configured by administrator) or as an administrator. The Administration settings require an Administration user name and password.

To log on as administrator

1. Open an Internet browser and type the IP address (default http://192.168.0.1**)**.
2. Enter the Administration user name and password.
   If you do not know the password, see *New installation or forgotten password* on page 4-4.
3. Click **Login**.
4. Select **ADMINISTRATION**.
   The Administration page is now updated to let you change the user name and password or log off Administration.

To change the administrator password

1. In the **ADMINISTRATION > User login** page, type in the current password.
2. Type in the New password and retype it on the next line.

   Note | The password must be minimum 8 characters long.

3. Click **Change**. At the next login the new password is required.

To log out of Administration

If you have entered nothing for 30 minutes under **ADMINISTRATION**, you are logged out automatically. To log out manually, click **Logout** in the **ADMINISTRATION** page.

4.9.2 To change the guest login password (User administration)

Note By default the guest user has direct access to a limited part of the web interface without login. The administrator must create a user password before the guest login can be used.

When you are logged in as administrator you can create or change the guest login password as follows:

1. Select **ADMINISTRATION > User administration**.
2. Type in the new guest password.
3. Retype the new guest password on the next line.
4. Click **Change**.

4.9.3 User permissions (for guest user)

You can manage user access to certain functions of the VSAT system. You can allow or deny users that are not administrators access to certain functions and make these pages read-only. This is useful if you want to protect the system against unintended changes or tampering of the system.

Important Study this screen thoroughly and decide which areas of the VSAT system you want to give non-administrator users access to.

To set up the user permissions for guest users, do as follows:

1. Select **ADMINISTRATION > User permissions**.
2. For each item under **Allow users to**: select
   - **Yes** to allow the **guest user** access
   - **No** to block the **guest user** access to the settings. Then the pages are read-only, changes cannot be made by the guest user.

   Most of the items in the list are self-explaining, others are explained in the table below.

Item	Description
Change network	Change settings in the page SETTINGS > Network. On this page you can change IP configuration of the local IP connectors of the Base Unit. For further information see *To configure the local IP network* on page 4-12.
Change e-mail settings	Change settings in the page SETTINGS > E-mail setup. On this page you can change the e-mail addresses used for sending reports. See *E-mail setup* on page 4-16.
Modify antenna data	Change settings in the page SERVICE > Antenna data. Only used during service. See *To return units for repair* on page 5-21.
Control modem	Allow to reset or restart the modem.

3. Click **Apply**.

4.9.4 To import and export a system configuration

If you need to reuse a configuration in another VSAT system, you can save the current configuration to a file, which can then be loaded into another VSAT system. You can also use this feature for backup purposes.

Important Load and save configurations can only be done with the same software version in the units involved.

The configuration file contains all the settings you have entered during system setup: satellite profiles, modem profiles, local IP setup, user permissions etc.

To save a configuration to a file, do as follows:

1. Select **ADMINISTRATION > Export/import config**.
2. Click the button **Export**. Follow the download instructions on the screen. You can use this configuration file for upload to another VSAT system,

To load a configuration from a file, do as follows:

1. Select **ADMINISTRATION > Export/import config**.
2. Click the button **Browse** and locate the configuration file (.cfg file) you want to upload. Then click the button **Open**.
3. In the web interface click the button **Upload**.

To clone a system configuration, do as follows:

1. Reset to factory default, see next section for details.
2. Import a configuration from file, see section above.

4.9.5 Reset to factory default

To reset to factory default settings, do as follows:

1. Select **ADMINISTRATION > Factory default**.

   Important Reset to factory default will delete or reset all the settings listed below!

   - Navigation settings
   - All added satellite profiles
   - All added modem profiles
   - Changes in the network setup
   - User permissions
   - Base Unit display: brightness setting

2. Click **Reset to factory default**.

You can also power cycle the VSAT terminal, see *Power cycle* on page 5-3.

4.10 Keypad and display menus

4.10.1 Keypad and display

With the display menu you can do basic operations such as deploy, stow and stop the antenna. You can also select which satellite profile to use and see the current status of the system.

In the menu system you can also see how the system has been configured. To configure the system, use a connected PC and the web interface.

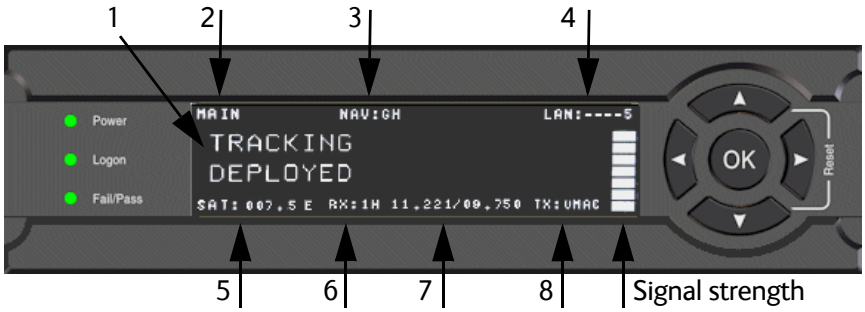


Figure 4-7: Display and keypad of the Base Unit (example)

1. Current status of the VSAT system (examples):
   TRACKING (tracking the current satellite)
   ANTENNA SW UPLOAD (uploading software to the antenna)
   ANTENNA POST (Power-On Self Test)
   READY (waiting for data from the modem or no satellite profile is selected)
   SAFE MODE (used e.g. for software recovery)
2. Current menu, see *The menu tree* on page 4-27.
3. **NAV**: Navigational information
   First letter: **G** (Valid position signal received from the GNSS module) or **g** (No valid GNSS fix)
   Second letter: **H** (Valid heading data) or **h** (No valid heading data).
4. **LAN**: LAN connectors used, **1**, **2**, **3**, **4**, **5**, – (not in use).
5. **SAT**: Longitude, satellite position of the currently active satellite profile.
6. **RX**:
   1 (RX Lock, - or 1),
   H (RX polarization of currently active satellite profile: **H** (Horizontal, **V** (Vertical)).
7. RF tracking frequency in GHz and LNB LO Frequency.
8. **TX**: <TX mute> <Modem TX> <ODU TX> <TX pol>
   - <TX mute> = [U,u], **U** (unmuted) or **u** (muted).
   - <Modem TX> = [m,M], **M** (valid TX signal on modem) or **m** (no valid TX signal on modem)
   - <ODU TX> = [a,A] **A** (valid TX signal on antenna) or **a** (no valid TX signal on antenna)
   - <TX pol> = [-, X, C] (TX polarization of currently active satellite profile: X (X-pol), C (Co-pol) or - (unknown)).

After 1 hour the display is dimmed to lowest intensity. Press any key to light up the display.

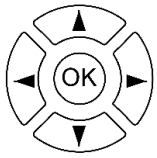
4.10.2 Brightness of the display

To adjust the brightness do the following:

1. Press and hold **OK** for a short moment until **BRIGHTNESS XXX%** is displayed (XXX is the current brightness value).
2. Hold **OK** + press ▲ to brighten or ▼ to darken display.
3. Release **OK** to leave the brightness menu.

4.10.3 Navigating the menus

Use the keypad to navigate the menus.



- Press **OK** or ▶ to select a menu item.
- Use the arrow keys ▲ and ▼ to go through the menu items or enter a number, digit by digit.
- Use the arrow keys ◀ and ▶ to go through the settings and move from one digit to the next.
- Press **OK** to select a setting.
- Press ◀ to move one level up. If applicable, confirm to store the new setting by pressing **OK**.

Menu shortcuts

- **Deploy**: Press and hold ▲ to deploy the antenna after it has been stowed.
- **Stow**: Press and hold ▼ to Stow the antenna
- **Administrator access**: Press and hold ◀ for 5 seconds to get temporary administrator access **for 1 hour or until next restart**. For details, see *New installation or forgotten password* on page 4-4.

4.10.4 The menu tree

The menu tree below shows the available menus in the Base Unit display menu system.

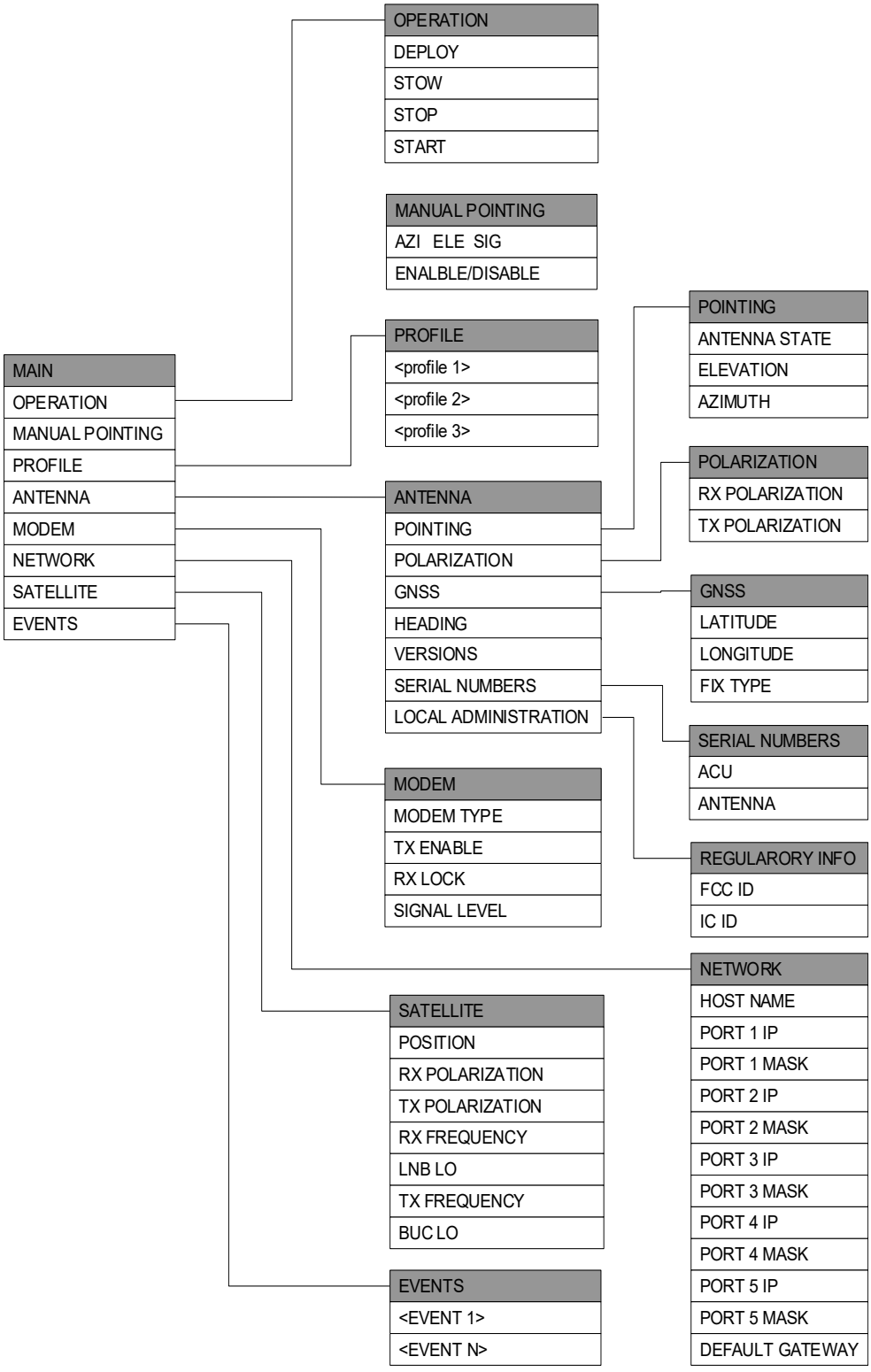


Figure 4-8: Menu tree in the display

Top-level menu

Top-level menu	Description
MAIN	View with current status of the VSAT system. The status screen is displayed again after a time out of 10 minutes. New events are shown in this display. If an event is displayed, press **OK** to jump directly to **EVENTS** for viewing the currently active events. Press any key (except left arrow) to go to **MAIN**.
OPERATION	Allows you to deploy, stow or stop the antenna.
MANUAL POINTING	Allows you to enable or disable manual pointing
PROFILE	Allows you to select which satellite profile to use.
ANTENNA	Shows the current antenna parameters, position, polarization, software version and serial numbers of the antenna and Base Unit.
MODEM	Modem information, including modem type and status for TX enable and Rx Lock.
NETWORK	Shows the IP addresses and netmasks of the local IP ports on the Base Unit, and the default gateway.
SATELLITE	Current satellite information. This information is configured using the web interface.
EVENTS	View system events. Number of active events are shown as: X ACTIVE EVENTS in the **MAIN** display. Press **OK** to see the list. See Appendix E, *System messages*, for a list of event messages that may appear in the display and the web interface.

Menu descriptions

OPERATION	Description
DEPLOY	Press **OK** to deploy the antenna
STOW	Press **OK** to stow the antenna
STOP	Press **OK** to stop the antenna immediately. The status shows STOPPED
START	Press **OK** to start the antenna when it has been stopped. The antenna will automatically deploy.

MANUAL POINTING	Description
AZI ELE SIG	Current values for azimuth, elevation, signal strength indicator
ENABLE/DISABLE	Current status: enabled or disabled

PROFILE	Description
<PROFILE>	Lists the available satellite profiles. Use ▲ and ▼ to go through the profiles and press **OK** to select the profile you want to activate.

ANTENNA	Description
POINTING	ANTENNA STATE: Current state of the antenna, e.g. TRACKING ELEVATION: Current elevation angle of the antenna AZIMUTH: Current azimuth of the antenna, with reference to North
POLARIZATION	RX POLARIZATION: HORIZONTAL, VERTICAL TX POLARIZATION: X-POL, CO-POL
GNSS	LATITUDE: current latitude, read from GNSS module LONGITUDE: current longitude, read from GNSS module FIX TYPE: NONE, 2D, 3D or USER (USER: the position is entered manually)
HEADING	Orientation of the mounting base in relation to estimated North (base orientation).
VERSIONS	Current software version of the antenna
SERIAL NUMBERS	Serial numbers of the antenna and the Base Unit
LOCAL ADMINISTRATION	Select LOCAL ADMINISTRATION to get administrator access for 1 hour or until next reboot. For details, see *New installation or forgotten password* on page 4-4.

MODEM	Description
MODEM TYPE	Current modem type.
TX ENABLE	On or off, information delivered by the connected VSAT modem.
RX LOCK	On or off, information delivered by the connected VSAT modem.
SIGNAL LEVEL	Current input signal level from the VSAT modem, in dB.

NETWORK	Description
HOST NAME	Define a name for the VSAT system
PORT 1 IP	Current IP address for Port 1 (service port)
PORT 1 MASK	Current netmask for Port 1
PORT 2 IP	Current IP address for LAN 2
PORT 2 MASK	Current netmask for LAN 2
PORT 3 IP	Current IP address for LAN 3
PORT 3 MASK	Current netmask for LAN 3
PORT 4 IP	Current IP address for Port 4
PORT 4 MASK	Current netmask for Port 4
PORT 5 IP	Current IP address for LAN 5
PORT 5 MASK	Current netmask for LAN 5
DEFAULT GATEWAY	Current default gateway

SATELLITE	Description
POSITION	Current satellite position
RX POLARIZATION	HORIZONTAL, VERTICAL
TX POLARIZATION	CO_POL, X-POL
RX FREQUENCY	Current Rx frequency
LNB LO	LNB LO frequency
TX FREQUENCY	Current TX frequency
BUC LO	BUC LO frequency

EVENTS	Description
<EVENT>	In this menu all active events are listed. Use ▲ and ▼ to go through the active events. Events can be of the type WARNING or ERROR. If a new event occurs or there is a change in the event list while you are in the **EVENTS** menu, a * is shown in the upper left corner of the display, next to the menu name. Press **OK** to update the EVENTS list, the * will be removed. A **>** means the event text is longer than the display. Press **>** to see the remaining text.

Example: **EVENT 1/4***: This is the first event out of a list of 4 and there has been a change in the list. EVENT 1/4 will always be shown, the * indicates a change.

4.11 SNMP support

The EXPLORER 6100 Ku supports SNMP v2 requests to retrieve configuration and present settings. SNMP is always enabled on all Ethernet interfaces. The SNMP community string is public. The EXPLORER 6100 Ku offers via SNMP most of the data that are available from the DASHBOARD web pages. Detailed documentation about supported OIDs can be found in the MIB file for your VSAT system.

The MIB entries are grouped as shown below:

- System configuration
- Navigation coordinates
- Antenna pointing
- Dashboard and profile
- Tracking receiver

Note None of the SNMP values need to be polled more often than once a minute. Polling SNMP values more frequently will impact the performance of the Base Unit.

You can download the Base Unit MIB file directly from the Base Unit:

1. Go to the **HELPDESK** page.
2. Click the link **Download MIB file**
3. Save the file on your computer.

Service

This chapter has the following sections:

- *General support*
- *Software update*
- *Status signaling with LEDs and status messages*
- *Manual pointing*
- *BUC installation*
- *To return units for repair*

5.1 General support

If this manual does not provide the remedies to solve your problem, contact your service provider.

5.1.1 Preventative maintenance

The EXPLORER 6100 Ku is constructed to require a minimum amount of regular maintenance.

WARNING! Potentially hot surface when the system is operated in hot environments without the possibility for ventilation. Contact may cause burn. Allow to cool before servicing.

Make the following checks on a regular basis:

- Inspect the reflector front surface for physical damage including chips and cracks. Any substantial damage can affect antenna performance and may require a portion of the reflector to be replaced.
- Check the feed horn for cracks or damage.
- Use low-pressure washing and soft scrubbing to rinse off grit and reduce wear.

5.1.2 Help desk and diagnostics report

On this page you can enter the support contact for this installation, download the user and installation manual and download a diagnostics report.

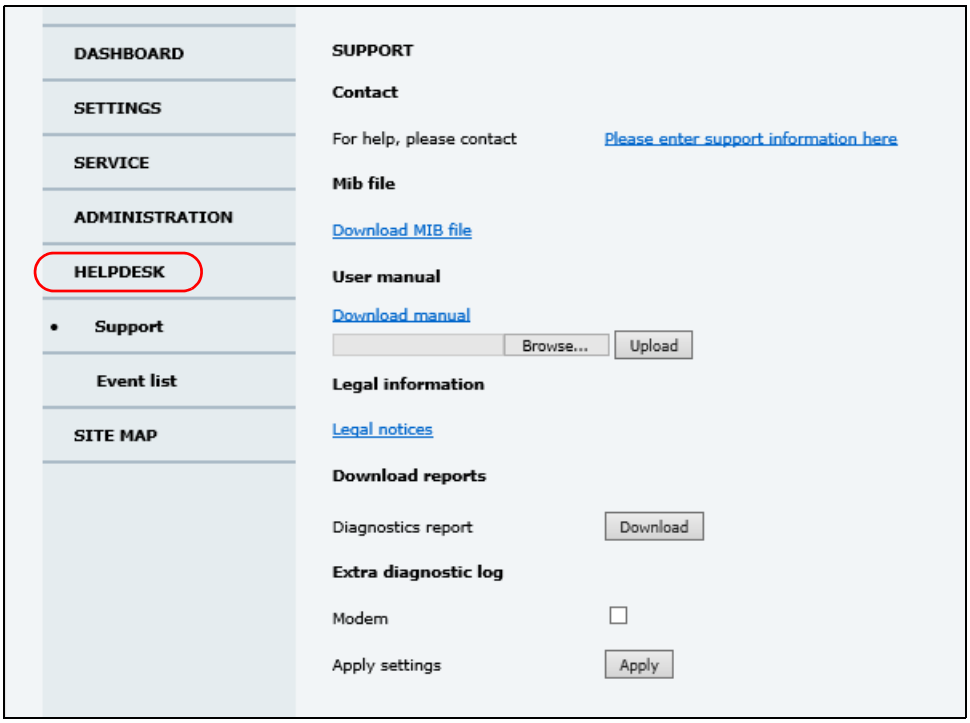


Figure 5-1: Web interface: HELPDESK

1. Select **HELPDESK** from the left navigation pane.
2. Click the link, enter support contact information and click **Apply**.
3. To download the user and installation manual (this manual) click **Download manual**.
4. To upload an updated manual to the antenna click **Browse** and locate the new file, then click **Upload**.
   Check for a newer version at www.cobham/satcom, Service and Support, Cobham Satcom Service and Support, Technical Downloads.
5. Click **Legal notices** to display the license text for the source code of the parts of the EXPLORER 6100 Ku software that fall under free and open source software.
6. In the section **Download Reports** click the button **Download**. The diagnostics report (txt file) is downloaded to your computer.
   The diagnostics report contains information relevant for the service personnel. It is also useful documentation of the current setup. The report contains all parameters set during configuration. The main sections are:
   - Software
   - System
   - Hardware
   - Setup - System data
   - Network - LAN and WLAN configuration
   - Modems

- Satellites - Satellite profiles
- Operation - Current modem and navigation parameters.
- POST - results of the Power-On-Self-Test
- Active Events - lists the currently active events
- Events - List of all cleared events.
- System log

7. If you want the diagnostics report to include data from the connected modem select **Extra diagnostic log**, **Modem** and click **Apply**. This will only apply until next reboot where the extra modem log is disabled again

Note | The amount of modem data is usually significant and may fill the log quickly.

Event list

When an event (system message) is registered, the web interface shows an event icon ⚠ in the icon bar as long as the event is active. The Base Unit display shows also active events. To view the event list with active events, click the event icon from the icon bar at the top of the web interface, or select **HELPDESK > Event list** from the left navigation pane.

The **Event list** page shows a detailed list of active events and notifications including the time of the first occurrence, ID and severity of the event message, and a short text describing the error. Active events are cleared from the event list when the error is cleared. They are moved to the section **Notifications** and are displayed for 24 hours. All entries in the section **Notifications** are cleared automatically after 24 hours and after restart of the system. For a list of all events with description, error code (ID), explanation and remedy see *System messages* on page E-1.

5.1.3 Power cycle

To power-cycle the antenna do the following:

1. Press and hold ▲ and ▼ until the Base Unit display shuts down and the antenna reboots.

Figure 5-2: To reset the system

2. Wait until the antenna has rebooted and is operational again. The last active satellite profile will be used.

Modem access configuration

If an external modem is connected via Ethernet and supports the available access types, you can access the modem's web interface via the Base Unit using port forwarding.

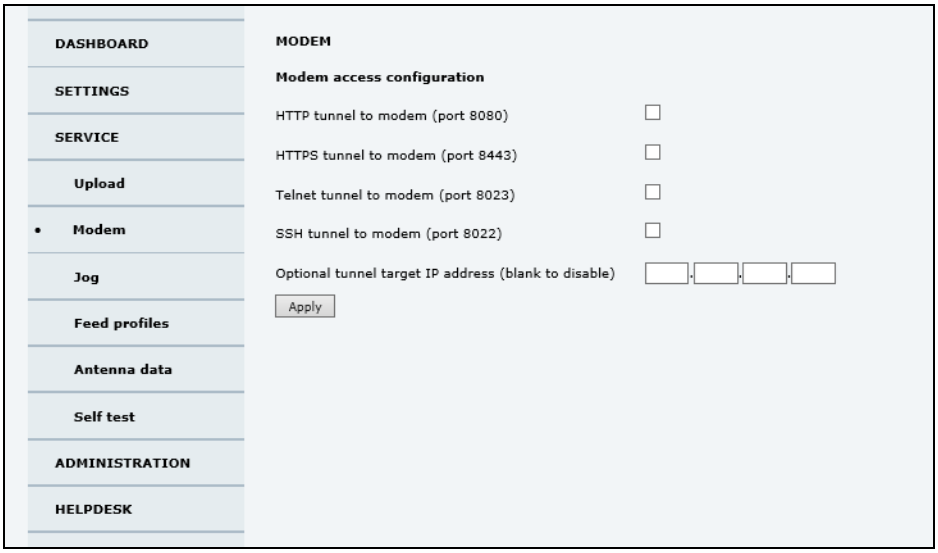


Figure 5-3: Web interface: SERVICE > Modem access configuration

Do as follows:

1. In the web interface, select **SERVICE**.
2. Select **Modem**.
3. Select one of the following methods to access the modem.
   - HTTP tunnel to modem (port 8080)
   - HTTPS tunnel to modem (port 8443), this is the HTTPS tunnel to the web interface of the modem.
   - Telnet tunnel to modem (port 8023)
   - SSH tunnel to modem (port 8022)
   - Optional tunnel target IP address
4. Click **Apply**.

CAUTION! If you remove all the check marks, there is no access to the modem.

Example: To access the web interface of the modem using HTTPS, select **HTTPS tunnel to modem (port 8443)** and click **Apply**.
In the address bar of your browser, enter:
https://<Base Unit IP address or hostname>:8443
You should now see the web interface of your modem in your browser.

5.1.4 Configure RF assembly

First time an RF assembly, or just a new BUC, is connected to a Base Unit you must register the new RF assembly.

Note All Base Units are delivered with a default configuration as a No-BUC antenna and with BUC power disabled. This is to protect a newly installed BUC until the system is configured.

To register the newly mounted RF assembly, do as follows:

1. Select **SERVICE > Feed profiles**.

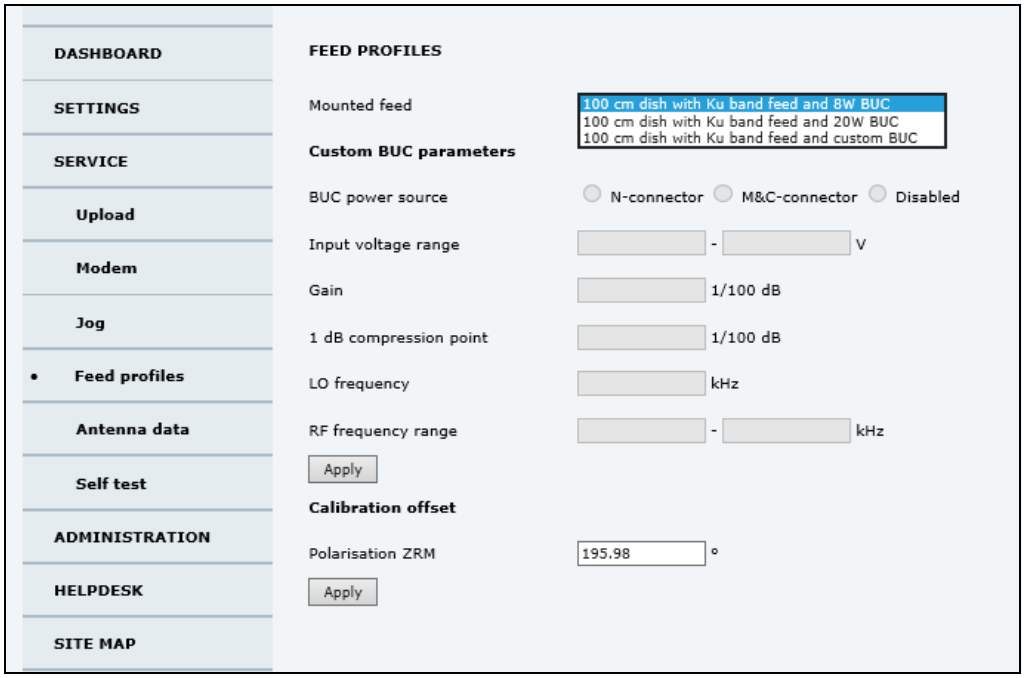


Figure 5-4: Web interface: SETTINGS > Feed profiles

2. Select the newly mounted feed from the list.
   If you have one of the default feeds (8W BUC or 20W BUC), you can skip the next steps and simply click **Apply** to register the new feed.
   If you have a feed with a custom BUC, fill in the **Custom BUC parameters** as described in the next steps.
3. Select the **BUC power source**: **N-connector**, **M&C connector** or **Disabled**.

   Note If you select **Disabled** there will be no power for the BUC, unless you supply the BUC power separately.

4. Type in the **Input voltage range**.
5. Type in the **Gain**, the **1 dB compression point**, the **LO frequency** and the **RF frequency range**. Refer to the BUC specifications.
6. Click **Apply**.
   The VSAT system will restart as the newly selected antenna type.
7. Under **Calibration offset**, check that the number matches the **Offset value** number on the label on the Ku feed. If not, type in the value from the label.

5.1.5 Self test

You can start a self test of the antenna alone or of the complete VSAT system.

Important The VSAT terminal will reboot to perform the self test. Rebooting the Base Unit will terminate all existing connections.

1. Select **SERVICE > Self test**.
2. Select **Restart antenna** or **Restart terminal**, depending on whether you want to test the antenna alone or the system.
3. Wait until the field **MDM**: in the upper status line shows **NETOK**.

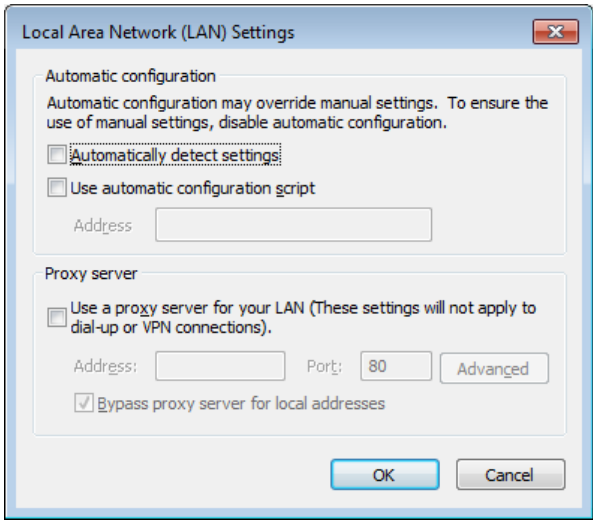
5.1.6 Proxy server settings in your browser

If you are connecting your computer using a LAN or WLAN interface, the **Proxy server** settings in your browser must be disabled before accessing the web interface. Most browsers support disabling of the Proxy server settings for one specific IP address, so you can disable Proxy server settings for the web interface only, if you wish. Consult your browser help for information.

To disable the use of a Proxy server completely, do as follows:

Note The following description is for **Microsoft Internet Explorer**. If you are using a different browser, the procedure may be different.

1. In Microsoft Internet Explorer, select **Tools > Internet Options > Connections > LAN Settings**.



2. Clear the box labeled **Use a proxy server for your LAN**.
3. Click **OK**.

When the proxy server settings are disabled, close and restart your browser. You may need to change this setting back on return to your Internet connection.

5.2 Software update

5.2.1 Prerequisites

You need the following items to make a software update:

- One computer with a standard LAN port available.
- A standard Internet browser.
- 1024×768 pixels or higher display resolution (best viewed with small fonts).
- One straight LAN cable.
- Access to the file with the new software.

5.2.2 Software update procedure

VSAT terminal

1. Power up the VSAT terminal.
2. Connect a PC to Port 1 (Service port, standard).
3. Open your Internet browser and enter the IP address of the VSAT terminal. The default IP address is http://192.168.0.1.
4. Type in the user name **admin** and the admin password
   or
   press and hold the left arrow key for 5 seconds and enter the user name **admin**.
5. The web interface shows the **DASHBOARD** page.
6. Click **SERVICE** in the navigation pane. The **UPLOAD** page is displayed.

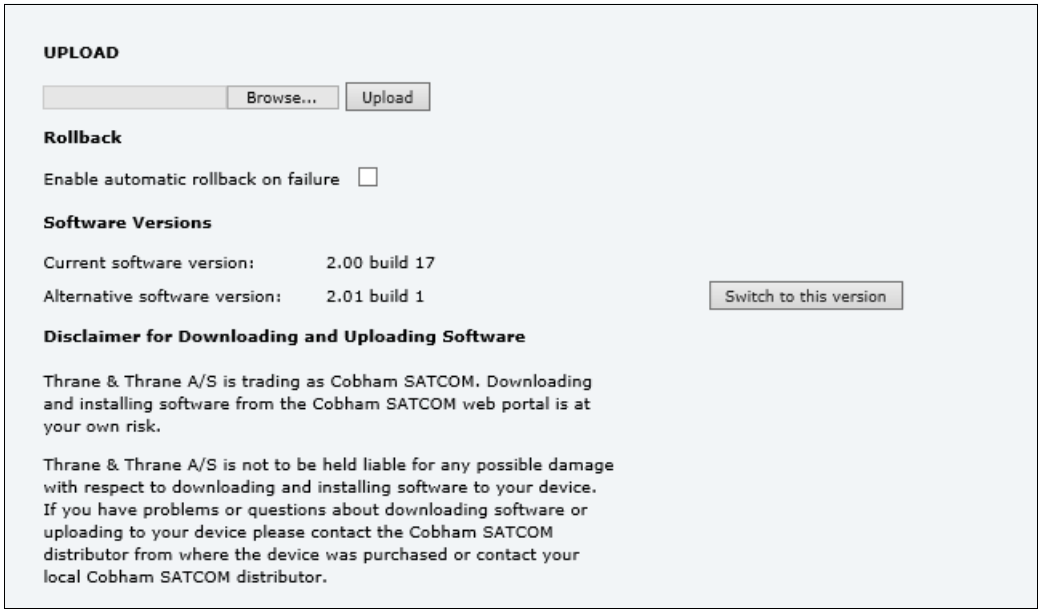


Figure 5-5: Software update with the web interface (example)

7. Click **Browse...** and locate the new software file.
8. Click **Upload**.

   Important Do not browse away from the upload page. This will terminate the upload process. Wait for the browser to reload automatically.

9. You can select **Enable automatic rollback on failure**, then the system returns to the previous software if the installed software fails.
10. Click **Switch to this version** if you want to force the system to use the alternative software version stated in the display.
    Note that the upload procedure takes a couple of minutes. When done, the Base Unit automatically restarts with the new software version.
    The start-up procedure after a software upload takes longer than the usual start-up time, as the software in the antenna must also be updated. The display shows: **ANTENNA SW UPLOAD**.

If software upload fails - how to recover

To recover from a failed software upload, turn off the Base Unit and turn it on again. Then repeat the upload procedure as described in *Software update* on page 5-7.

To verify the software update

1. The software version can be viewed in the **DASHBOARD** window of the web interface.
2. After completing the software update procedure, the VSAT terminal will perform a POST (Power On Self Test).
3. When the POST has finished, the green Pass/Fail LED on the keypad must become steadily green. Verify that the Pass/Fail LED is not red nor flashing orange once every 2 seconds. Wait until the Pass/Fail LED is green.
4. Verify that the software update has been completed successfully. You find the software version number in the **DASHBOARD** window of the web interface.

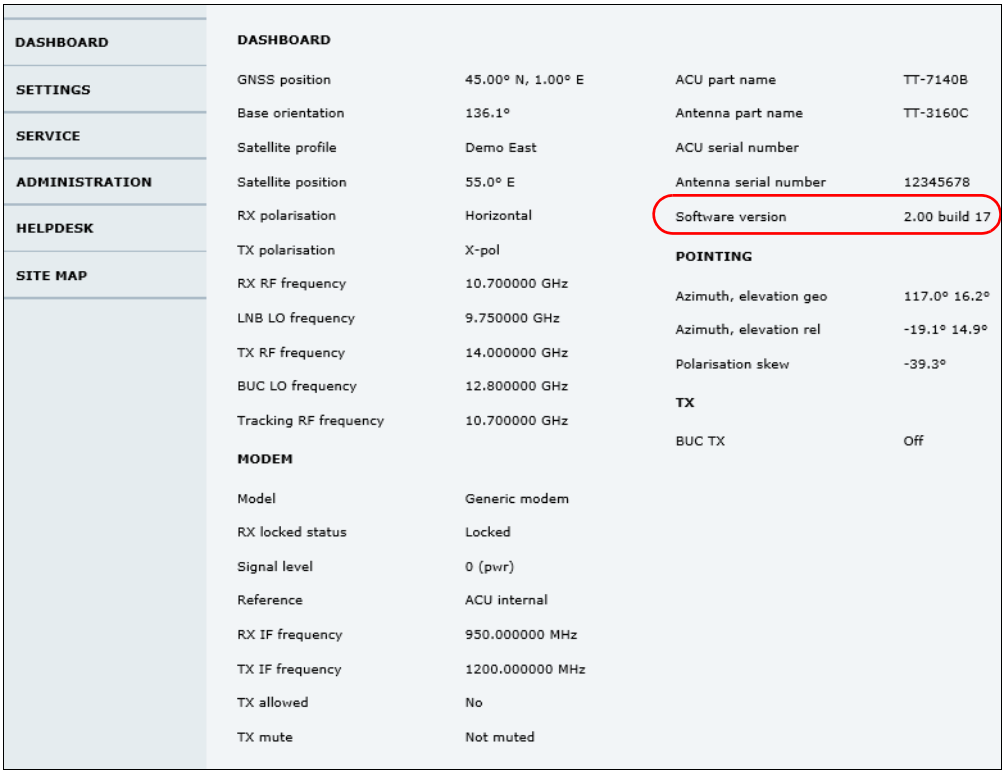


Figure 5-6: Verifying software update

Software update (modem)

For software update of the modem, see the documentation from the modem provider.

Software recovery (safe mode)

If the VSAT terminal has become inoperative, a software recovery update may bring it back into an operational state.

To make a software recovery, do as follows:

1. During reboot push and hold the arrow keys ◀ and ▶ on the keypad. The text **safe mode** is shown in the display. The network settings are reset to factory default (http://192.168.0.1).
2. Open an Internet browser and enter the address http://192.168.0.1. A web interface is displayed.
3. Upload new software or reset to factory default.
4. Reboot the VSAT terminal.

5.3 Status signaling with LEDs and status messages

Built-In Test Equipment

The VSAT terminal has a Built-In Test Equipment (BITE) function in order to make fault diagnostics easy during service and installation. The BITE test is performed during:

- Power On Self Test (POST), which is automatically performed each time the system is powered on.
- Person Activated Self Test (PAST), which is initiated by starting a self test in the web interface **SERVICE > Self test**.

For details on error messages after a POST or a self test see *Event list* on page 5-3 and *System messages* on page E-1.

Means of signaling

The VSAT terminal provides various methods for signaling the system status. There are **LEDs** on the front panel of the Base Unit to signal Power on/off, Logon and Fail/Pass. There is also the built-in web interface of the Base Unit which shows any events (BITE error codes) with a short message describing each error. This is also displayed in the Base Unit.

In an error situation, one of the following system status messages may be shown:

- ACU POST error
- ADU POST error
- SAFE MODE (plus information about the specific error, see *System messages* on page E-1).

5.3.1 LEDs on the keypad of the EXPLORER 6100 Ku

There are 3 LEDs: Power, Logon and Fail/Pass LED.

LED	Behavior	Description
Power	Steady green	Power supply OK
	Steady red	Power supply failure
	Off	No power
Logon	Flashing green	Current status is displayed: • Searching satellite • Identifying satellite • Carrier lock & Tx enabled from modem
	Steady green	Satellite link established
	Off	No satellite link acquired

LED	Behavior	Description
Fail/Pass LED	Steady red	A fault which prevents operation is present in the system (ACU, ODU, MODEM).
	Flashing green	A Power On Self Test (POST) or Person Activated Self Test (PAST) in progress. The current status is displayed.
	Flashing red	Active BITE failure or warning. The event is shown in the Base Unit display.
	Steady green	No faults.

5.4 Manual pointing

5.4.1 To point the antenna manually

If auto-acquisition is not possible you can manually bring the antenna into the correct position.

Important Before manually pointing the antenna make sure it is placed on level ground and with secured support legs as described in *Assembly* on page 3-3.

Do as follows:

1. Press ▼ on the keypad to go to the page **MANUAL POINTING** and press **OK**.

   Note Using the inputs from GNSS, the system calculates the azimuth and elevation look angles for the target satellite.

2. Press ▼ until **ENABLE/DISABLE** is selected, press **OK** to initiate **MANUAL POINTING**.
3. On the manual point page, the terminal displays target elevation (**ELE**) and azimuth (**AZI**) angles. Point the antenna coarsely towards the satellite by turning the base of the antenna. Make sure the antenna is level after movement. Use a compass to find the pointing direction.

Figure 5-7: Display, coarse adjustment

4. Unscrew the cover for the azimuth adjustment port.

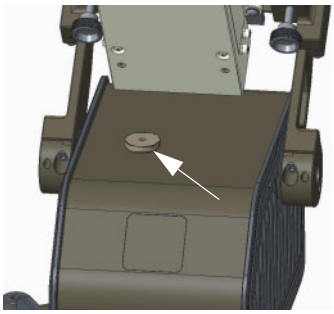


Figure 5-8: Manual pointing, azimuth adjustment

5. Take out the adjustment tool (supplied with the Base Unit).

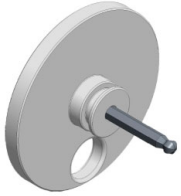


Figure 5-9: Adjustment tool for azimuth and elevation adjustment

6. Insert the adjustment tool into the elevation adjustment port. Press down until it is completely engaged
7. Fine tune the azimuth angle by turning the tool clockwise or counterclockwise while you observe the display for best possible signal strength.
8. Unscrew the two screws for the cover for the elevation adjustment port.

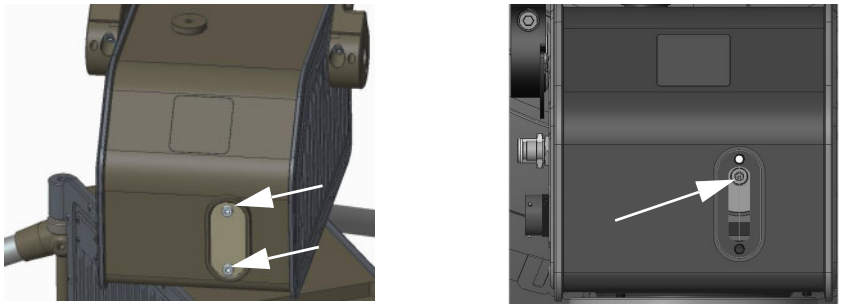


Figure 5-10: Manual pointing, elevation adjustment

9. Remove the adjustment tool from the azimuth adjustment port.
10. Locate the elevation adjustment port in the slot and insert the adjustment tool.
11. Turn the adjustment tool to obtain the calculated elevation look angle shown in the display. You can see the current elevation next to the calculated elevation in the display and on the mechanic scale on the side of the antenna positioner.

> **Note** The value for current elevation (third number from the left) is only valid if the VSAT terminal is level.

12. Observe the display for appearing signal strength bars. When the signal is detected, slowly scan the azimuth angle back and forth to maximize the signal strength (the number **SIG** in the display). Make sure to scan at least ±3˚ after the initial signal indication.
13. Once the azimuth angle is adjusted, slowly scan the elevation angle up and down until the signal strength is at its maximum.
14. Unscrew the cover for the polarization skew adjustment port on the RF-pack.

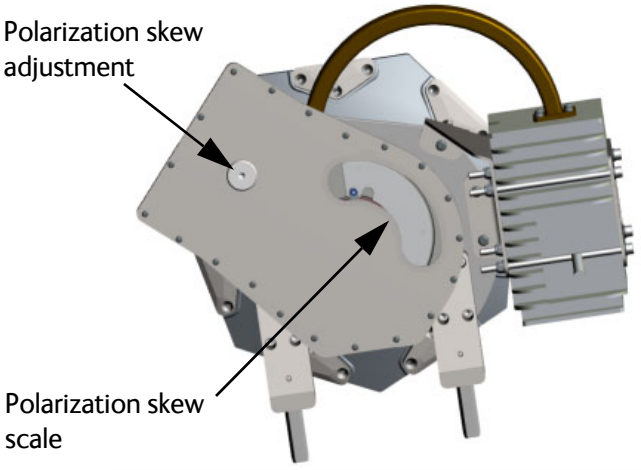


Figure 5-11: Manual pointing, polarization skew adjustment

15. Use the adjustment tool to adjust the polarization skew.
    Start with the nominal value shown in the web interface in the **POINTING** section of the Dashboard, see *The web interface* on page 4-1 for information on how to connect to the web interface.

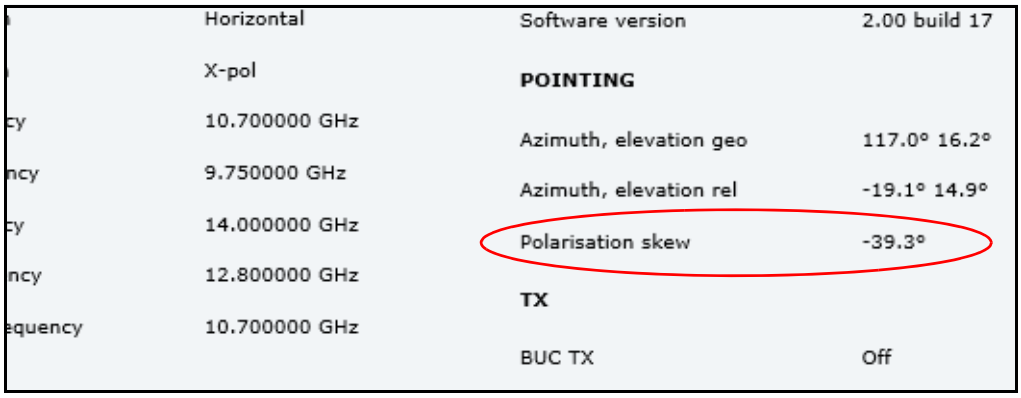


Figure 5-12: Web interface, Polarization skew

16. Slowly scan the polarization skew up and down until the signal strength is at its maximum.

17. Repeat steps 12 and 13 and 16 until the signal strength is at its maximum.

18. At the peak of the signal press **OK**. This sends a command to the modem to allow the transmission of data.

Figure 5-13: Display, confirm manual pointing direction

19. When the connection is established, the display shows **ACQUISITION OK**.

20. Remount the covers for the elevation adjustment port and the polarization skew adjustment port

Important

Leave the adjustment tool inserted in the azimuth adjustment port until you have finished using the antenna with manual pointing. It keeps the antenna positioner in place (holds the current azimuth) and protects the azimuth adjustment port against rain and dust.

When you have finished, take out the adjustment tool and reinsert the cover that was initially removed.

When you have finished using the antenna, stow the antenna as described in the next section.

5.4.2 To stow the antenna manually

1. Make sure the power is switched off (or you have switched to Manual pointing).
2. Align the antenna positioner with the Base Unit.
3. Unscrew the cover for the elevation adjustment port.
   Keep the cover for later.

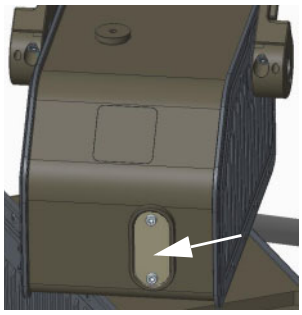
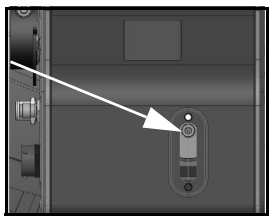


Figure 5-14: Manual stow, elevation adjustment

4. Take out the adjustment tool.
   (A plastic disc with a hex key, supplied with the Base Unit).
5. In the slot, locate the opening that matches the adjustment tool. This is the elevation adjustment port, see picture.



   Note The position of the elevation adjustment port changes depending on the elevation, so it may be located elsewhere in the slot.

6. Insert the adjustment tool and turn it clockwise to bring the antenna reflector down to stowed position.
7. Take out the adjustment tool and remount the cover.

5.5 BUC installation

You may need to install a BUC on the antenna if you have purchased the No BUC antenna version or you want to replace the BUC e.g. with a more powerful BUC.

If you are using a 3rd party BUC, make sure it complies with the electrical and mechanical specifications stated in the following sections.

- Check the form factor: *Mechanical specifications for 3rd party BUCs*.
- Check the electrical specifications: *Electrical specifications for BUC*.
- Install and configure the BUC: *To install the BUC*

5.5.1 Mechanical specifications for 3rd party BUCs

If you are mounting a 3rd party BUC on the EXPLORER 6100 Ku, make sure that the BUC complies with the following specifications:

Maximum weight of BUC: 5 kg

Maximum size using the included brackets:
With the included M6 screws, the space between the two brackets can accommodate a BUC height of **115 mm**. For higher BUCs you may need to use longer screws and/or maybe customize your own bracket.

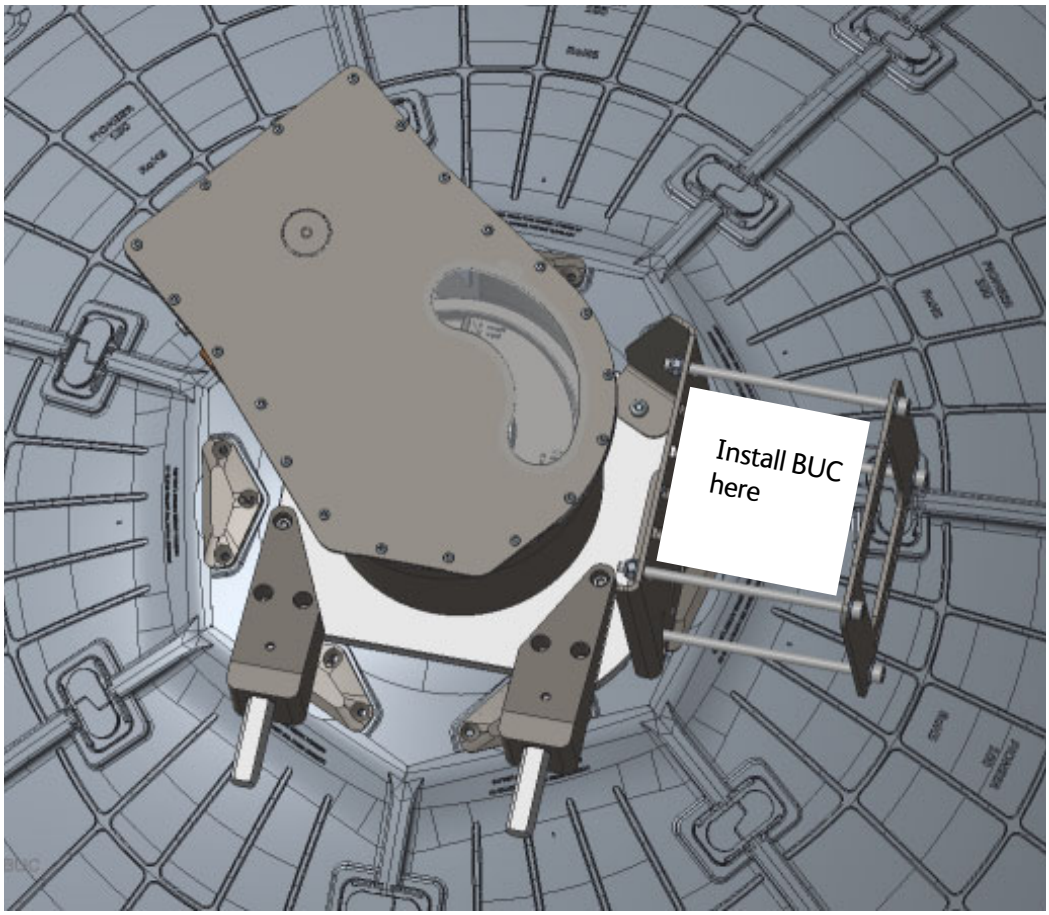


Figure 5-15: Area for installation of BUC with included brackets

Note that the size of the BUC may exceed the installation area, if the screws that connect the two brackets can pass between the cooling fins. This is the case for the standard 8 W BUC from Cobham SATCOM shown in Figure 5-16.

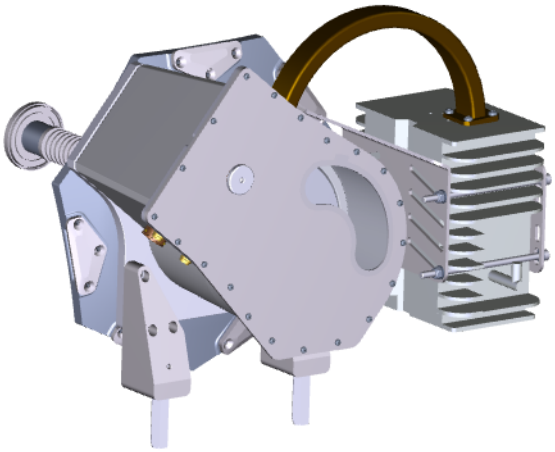


Figure 5-16: Installed 8W BUC

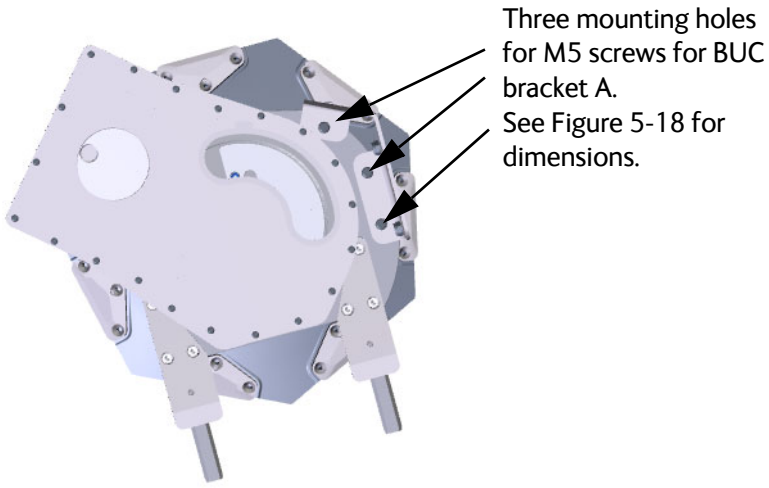


Figure 5-17: Mounting place for BUC bracket A on Ku feed assembly.

The drawing below shows the dimensions of the bracket to be mounted on the Ku feed. If you are customizing your brackets, make sure the mounting holes are positioned with the same dimensions, so that they match the mounting holes on the Ku feed assembly.

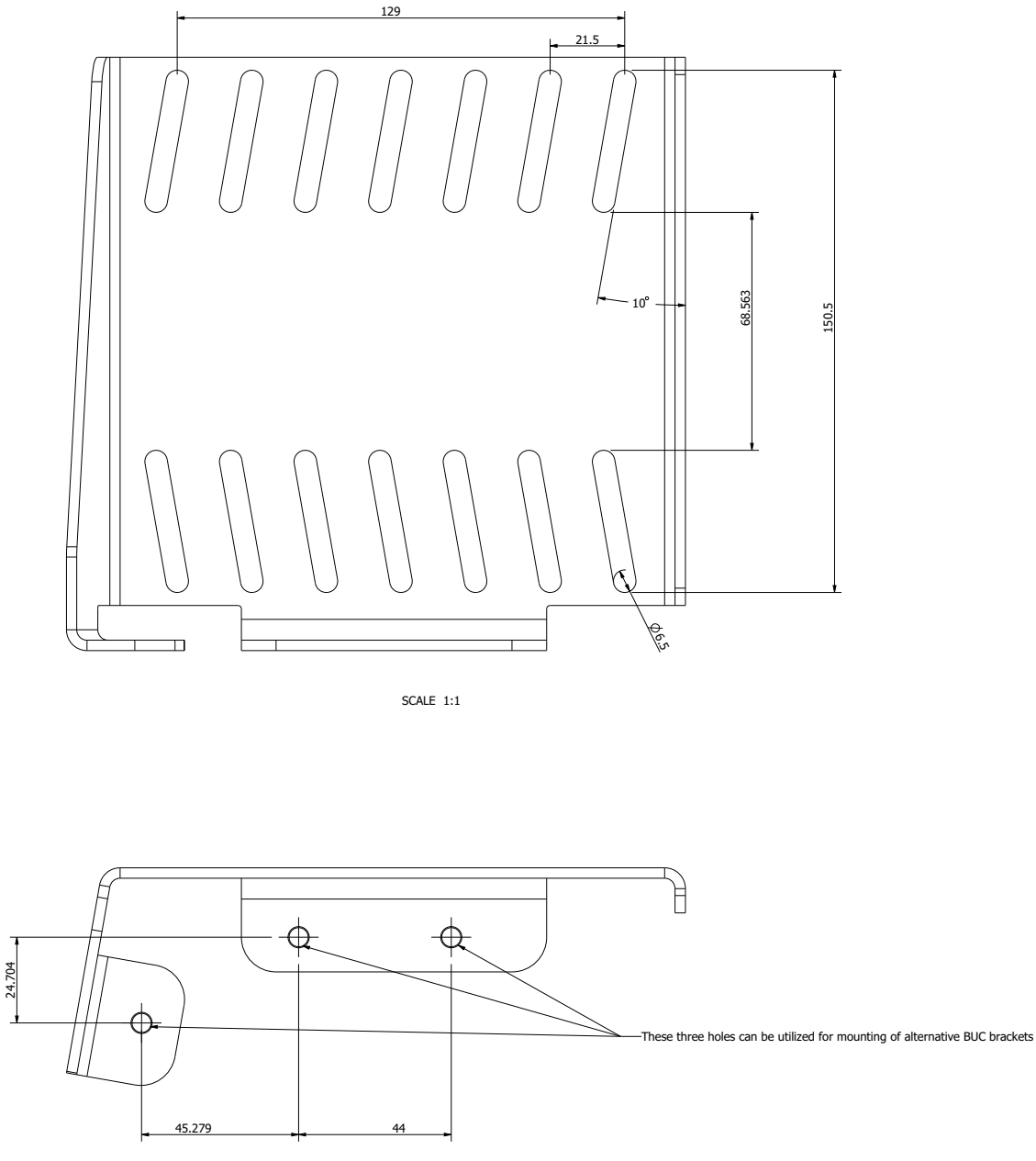


Figure 5-18: Dimensions for BUC bracket A

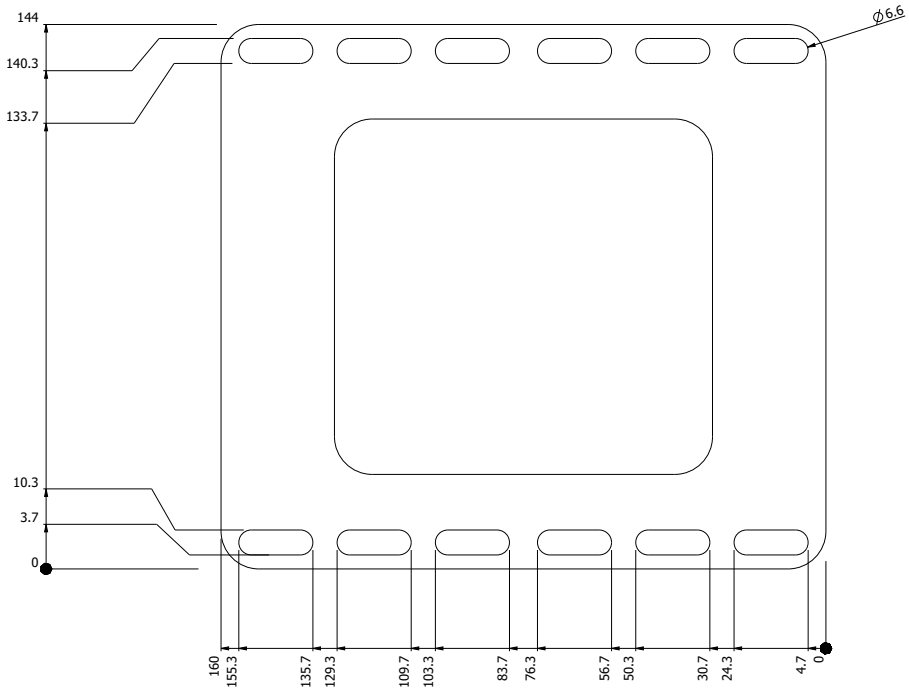


Figure 5-19: Dimensions for BUC bracket B

5.5.2 Electrical specifications for BUC

BUC connectors

When you connect the installed BUC to the antenna you may use the BUC TX (N-connector) alone or the BUC M&C (circular connector) together with the BUC TX connector. For details on the BUC connectors, see page 3-6 and the electrical specifications below.

Use the BUC M&C connector if:

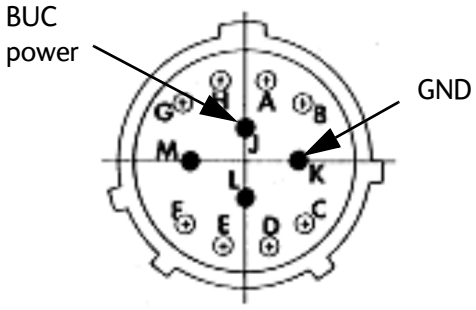
- Your BUC requires a BUC M&C connection.
- Your system requires more power than the BUC TX connector alone supports See *Electrical specifications for installation of 3rd party BUCs* below and *Requirements to power supply and cables* on page 3-10.[1]

Cables

The BUC Tx cable is included with the RF assembly.

BUC power:

If you are using the BUC M&C connection, make your own cable with a connector at one end matching your BUCs M&C interface, and a connector at the other end matching the BUC M&C connector on the antenna positioner of the EXPLORER 6100, e.g. an **Amphenol connector**, **part number 62GB-16F14-12PN**.



Pinout on matching BUC M&C connector

Electrical specifications for installation of 3rd party BUCs

- **Maximum current** using the N-connector: 7 A
- **Maximum current** using the BUC M&C (GTC C3) connector: 14 A
- **Minimum unloaded supply voltage:** Depends on BUC specifications and power supply. Antenna DC input voltage is almost equal to available voltage for BUC, with an internal resistance of 100 mOhm in the antenna.

Power for BUC: You can calculate the available power for the BUC from the max current on the used connector (above) and the input voltage.

1. If you are using the BUC TX connector alone, DC power is provided together with the RF signal on the same connector. If you are using the BUC M&C connector, the BUC TX connector provides only the RF signal and the BUC M&C connector provides the DC power for the BUC.

5.5.3 To install the BUC

The mounting method may differ slightly depending on the BUC and brackets used. Make sure the requirements in the previous sections are met.

The brackets that come with the RF-pack (see Figures 5-18 and 5-19) will fit most BUCs.

To install the BUC, do as follows:

1. Mount BUC bracket A (Figure 5-18 or similar custom bracket for your BUC) on the RF-pack, using the three mounting holes on the RF-Pack (see Figure 5-17 and 5-18). Tighten the screws to torque 4.5 Nm.
2. Place the BUC between the two brackets and install the BUC on the RF assembly, using the four long screws. See Figures 5-15 and 5-16.
3. Tighten the long screws for the brackets.
4. Connect the Waveguide between the Ku feed and the BUC. Make sure the gaskets for the waveguide connectors in both ends are in place before mounting the screws for the Waveguide.
5. Tighten the screws at both ends of the Waveguide to torque 2.5 Nm.
6. Mount the RF assembly on the Base Unit as described in *Assembly* on page 3-3.
7. Connect all cables as described in *Cable connections* on page 3-6.

   Note Depending on your BUC type and your power supply you may have to connect both the BUC Tx cable and BUC M&C. Check the requirements to the power supply in *Requirements to power supply and cables* on page 3-10 and the requirements to the BUC interface in *Electrical specifications for BUC* on page 5-20.

8. **Before you activate the antenna**, use the web interface page **SERVICE > Feed profiles** to enter the data for the new BUC. See *Configure RF assembly* on page 5-5.

5.6 To return units for repair

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 **Cobham SYNC Partner Portal** at https://sync.cobham.com/satcom, 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.

Technical specifications

This appendix has the following sections:

- *General specifications*
- *VSAT 8W BUC Data Sheet (Extended)*
- *VSAT 20W BUC Data Sheet (Extended)*
- *Outline drawings*

A.1 General specifications

EXPLORER 6100 Ku

1m Stabilized Auto-Acquire Fly-Away Antenna System for Ku-band Operation

Antenna Characteristics		
Feed		2 Port Linear (Rx Co- or X-pol)
Frequency (GHz)	Rx	10.7 - 12.75
	Tx	13.75 - 14.5
Gain (dBi ± 0.2) @ Midband	Rx	39.9
	Tx	41.6
Cross Pol Isolation (dB) within 1dB contour	Rx	>30
	Tx	>30
G/T - Comm @ 30° EL, Midband (dB/°K)		19.5
EIRP @ Midband (dBW)		50.6 / 54.6
Standard BUC options (Watts)		No BUC / 8 / 20 Watt

Environmental		
Wind Speed	- Operational - Survival	45 km/h / 28 mph (anchored) 118 km/h / 73 mph (anchored)
Temperature	- Operational - Survival	-33° to +55°C (-27.4° to +131°F) -40° to +80°C (-40° to +176°F)
Water & Dust	IP 65 rated	
Humidity	0 to 100% (condensing)	

Assembly Time	Approximately 5 Minutes

Reflector	
Size	1.0m
Optics	Axis-Symmetric
Construction	7-Piece Segmented Carbon Fiber

Mechanical	
Axis Drive System	3-Axis Positioner
Mount Geometry	Elevation over Azimuth
Travel - Azimuth - Elevation	 ± 95° from stow position 0° to 88°

Electrical		
RF on Base Unit	Rx	Female Type TNC (50-Ohm)
	Tx	Female Type N (50-Ohm)
Max. Power Consumption (excl. BUC)		50W
Max. BUC Power	Via Coax	250W / 7A*
	Via M&C Connector	600W / 13A*
Power Requirement - Nominal - Absolute max. rating		 24 - 48 VDC 19 - 56 VDC

* Power consumption is limited by the current, i.e. max. BUC power requires max. input voltage of 48VDC

Weights & Measures (approximate)	
System weight (assembled)	28 kg / 61.7 lbs (incl. BUC)
Packaging (2 Peli 1637 Air Cases) - Case size (L/W/D)	Airline checkable 67.6 / 52.5 / 37.8 cm 26.6 / 20.7 / 14.9 inches
Weight in transport cases: **Case 1**: Base Unit, 4 reflector panels **Case 2:** RF Package, 3 reflector panels	 24 kg / 52.9 lbs 18.1 kg / 39.9 lbs (No BUC) 20.8 kg / 45.9 lbs (8W) 20.5 kg / 45.2 lbs (20W)

User Interface
Embedded web server for configuration, control and management using external PC

Product Numbers	
406627A-50014	EXPLORER 6100 Ku (No BUC)
406627A-50214	EXPLORER 6100 Ku (8W BUC)
406627A-50314	EXPLORER 6100 Ku (20W BUC)

Accessories	
403160P	EXPLORER 6000 Power Supply - 48 VDC, 320 Watt, - Weight: 2.4 kg / 5.3 lbs
403160P-010	EXPLORER 6000 Power Supply Extension cable - 10m extension cable with Neutrik connectors
406627A-070	EXPLORER 3100 / 6100 Ku Feed Horn - Field replaceable Feed Horn for Ku-band - Used in EXPLORER 3100 Ku and 6100 Ku
406627A-014	EXPLORER 6100 Ku Waveguide - 12" Waveguide for EXPLORER 6100 Ku (No BUC)

Shipping
EXPLORER 6100 Ku will be available for shipping late March 2020

For further information please contact:

Cobham SATCOM Land
Lundtoftegaardsvej 93 D
DK-2800 Kgs. Lyngby, Denmark
Tel: +45 3955 8800

71-169200-DRAFT 03.20 LMBU

A.2 VSAT 8W BUC Data Sheet (Extended)

Interface	Model	Specification
Input, IF	-	N (50 Ohm)
Output, Ku-band	8 W	WR75 waveguide (39.0 dBm min)
Spectrum	-	Non inverting
LO type	-	Locked to 10 MHz external reference over IF interface or ACU internal
LO frequency	Extended	12.80 GHz
TX ON/OFF	-	10 MHz reference ON/OFF
Cooling	-	External temperature controlled fan - not incl. in BUC

Table A-1: Technical specifications for VSAT 8 W BUC 1/3

Parameter	Condition/remark	Unit	Min.	Typical	Max.
Output frequency range	VSAT Ext. TX	GHz	13.75		14.50
Input (IF) frequency range	Extended	MHz	950		1700
VSWR	Input (10, 950 - 1700 MHz)	-			2.0 : 1
	Output (13.75 - 14.50 GHz)	-			2.0 : 1
Output power at P1dB	Worst case	dBm	39.0		
Output power 10 MHz ref OFF	TX band, at -35 dBm ref.	dBm			-60
Gain (absolute linear)	Over output freq. range	dB	61	65	69
Gain (relative)	Over 500 MHz BW	dB	-2.5	0,0	2.5
Gain (relative)	Over 36 MHz BW	dB	-1.0	0,0	1.0
Spurious	RX band	dBm			-60
	TX band	dBm			-15

Table A-2: Technical specifications for VSAT 8 W BUC 2/3

Parameter	Condition/remark	Unit	Min.	Typical	Max.
Phase noise	10 Hz	dBc/Hz			-50
	100 Hz	dBc/Hz			-60
	1 kHz	dBc/Hz			-70
	10 kHz	dBc/Hz			-80
	100 kHz	dBc/Hz			-90
	1 MHz	dBc/Hz			-110
IMD3	At 2 x +33 dBm carriers	dBc			-26
External ref. freq. (input)	Nominal	MHz		10,000000	
External reference freq. (input)	Deviation	Hz	-100	0	100
Power supply voltage	DC	V	20		50.0
Supply power	DC	W			85

Table A-2: Technical specifications for VSAT 8 W BUC 2/3 (Continued)

Parameter	Condition/remark	Unit	Min.	Typical	Max.
Temperature range	Operation w. external forced cooling				
		˚C	-30		75
	Storage	˚C	-40		85
Dimensions	L	mm			176
	W	mm			170
	H	mm			102
Weight	Total	g			2790

Table A-3: Technical specifications for VSAT 8 W BUC 3/3

A.3 VSAT 20W BUC Data Sheet (Extended)

Interface	Model	Specification
Input, IF	-	N (50 Ohm)
Output, Ku-band	20 W	WR75 waveguide (43.0 dBm min. $T_{amb} \leq 55^{\circ}C$)
Spectrum	-	Non inverting
Stability	-	Stable with any passive load on input and output
LO type	-	Locked to 10 MHz external reference over IF interface
LO frequency	Extended	12.80 GHz
TX ON/OFF	-	10 MHz reference ON/OFF
Cooling	-	Internal temperature controlled fan (S)
Protection	-	TX shutdown at over-temperature not required (>70˚C ambient air)

Table A-4: Technical specifications for VSAT 20 W BUC 1/3

Parameter	Condition/remark	Unit	Min.	Typical	Max.
Output frequency range	VSAT Ext. TX	GHz	13.75		14.50
Input (IF) frequency range	Extended	MHz	950		1700
VSWR	Input (10, 950 - 1700 MHz)	-			2.0 : 1
	Output (13.75 - 14.50 GHz)	-			2.0 : 1
Output power at P1dB	Worst case, $T_{amb} \leq 55^{\circ}C$	dBm	43.0		
	Worst case, $T_{amb} > 55^{\circ}C$	dBm	42.5		
Output power 10 MHz ref OFF	TX band, at -35 dBm ref.	dBm			-60
Gain (absolute linear)	Over output freq. range, Min.	dB	64	68	
	Over output freq. range, Max.	dB		68	72
Gain (relative)	Over 500 MHz BW	dB	-2.5	0,0	2.5
Gain (relative)	Over 36 MHz BW	dB	-1.0	0,0	1.0
ACPR at Pout 43.0 dBm, 5 Msym/s	8PSK, α=0.2, Δf=6Mz, $\leq 55^{\circ}C$	dBc			-24
	8PSK, α=0.2, Δf=6Mz, $< 55^{\circ}C$	dBc			-24

Table A-5: Technical specifications for VSAT 20 W BUC 2/3

Parameter	Condition/remark	Unit	Min.	Typical	Max.
Spurious/harmonics out	RX band 10.70 - 12.75 GHz	dBm			-56
	13.50 - 13.75 GHz band	dBm			-15
	TX band 13.75 - 14.50 GHz	dBm			-15
	14.50 - 14.80 GHz band	dBm			-17
	Carrier ±10 MHz to 9.99 MHz	dBm			-30
	Carrier ±10 MHz to 50 MHz	dBm			-30
	Out of band[a]	dBm			-26
External ref. freq. (input)	Nominal	MHz		10	
External reference freq. (input)	Deviation	Hz	-100	0	100
LO phase noise (output), SSB	10 Hz	dBc/Hz			-50
	100 Hz	dBc/Hz			-60
	1 kHz	dBc/Hz			-70
	10 kHz	dBc/Hz			-80
	199 kHz	dBc/Hz			-90
	≥1 MHz	dBc/Hz			-110

Table A-5: Technical specifications for VSAT 20 W BUC 2/3 (Continued)

a. Out of band frequencies: 0.10 - 10.70 GHz & 12.75 - 13.50 GHz & 14.80 - 26.00 GHz

Parameter	Condition/remark	Unit	Min.	Typical	Max.
Power supply voltage	DC	V	39.0		50
Supply power	DC	W			185
Temperature range	Operation w. internal forced cooling (no sun)	˚C	-30		70
	Storage	˚C	-40		85
Dimensions (incl. connector) overall, fan included (waveguide port on WxH side)	L	mm			190
	W	mm			125
	H	mm			110
Weight, fan included	Total	g	2500		2900

Table A-6: Technical specifications for VSAT 20 W BUC 3/3

A.4 Outline drawings

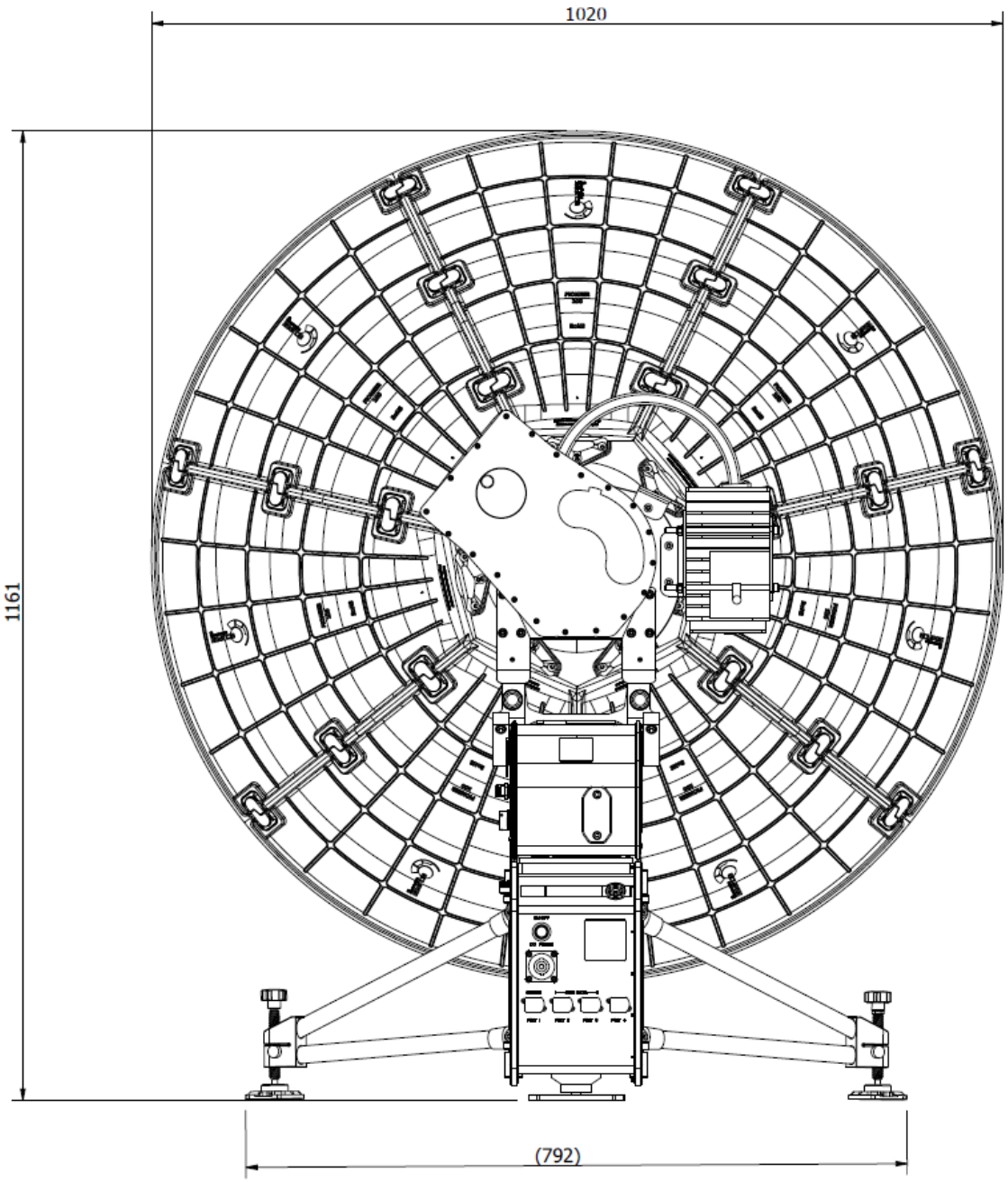


Figure A-1: Rear view, EXPLORER 6100 Ku

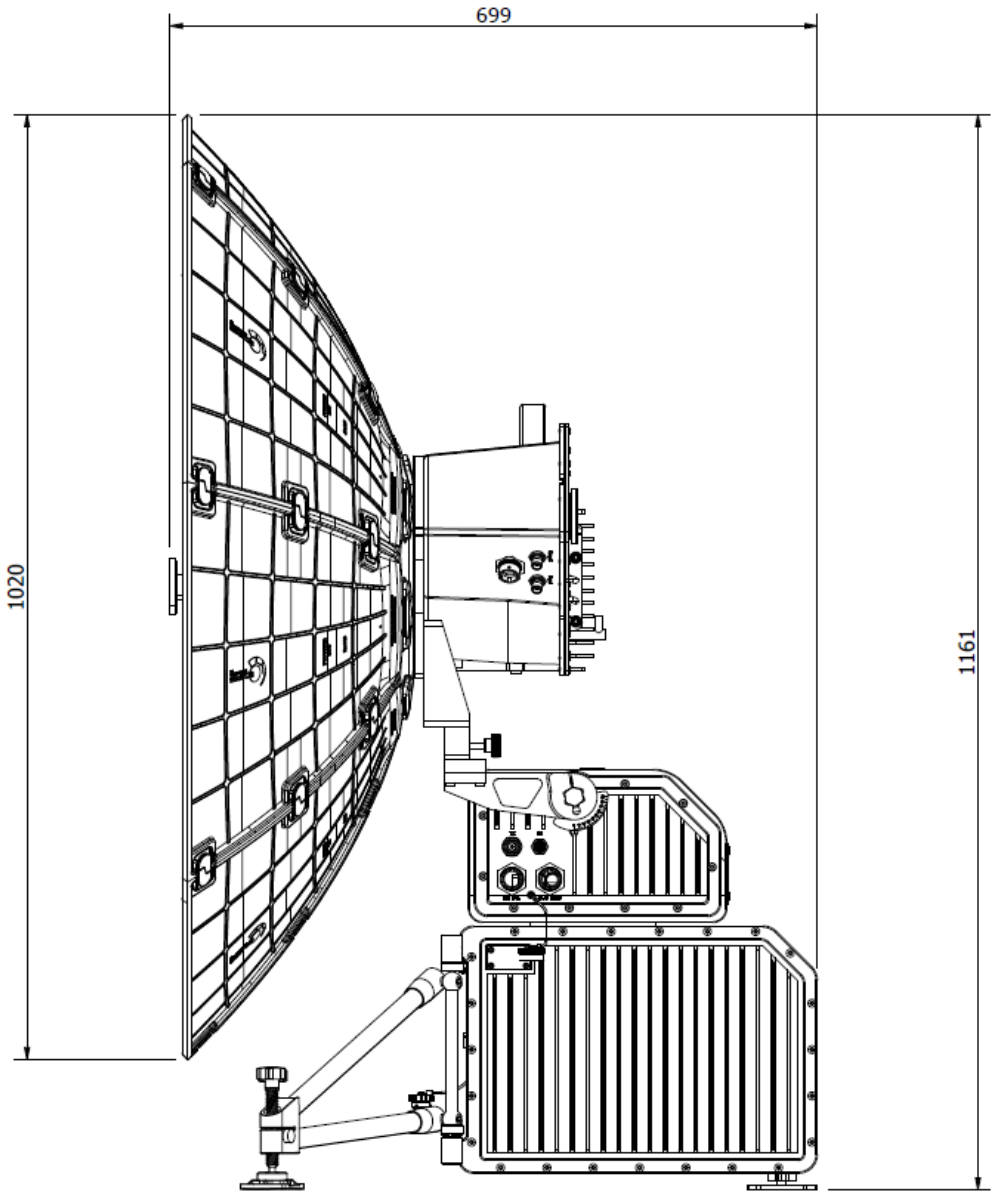


Figure A-2: Side view, EXPLORER 6100 Ku

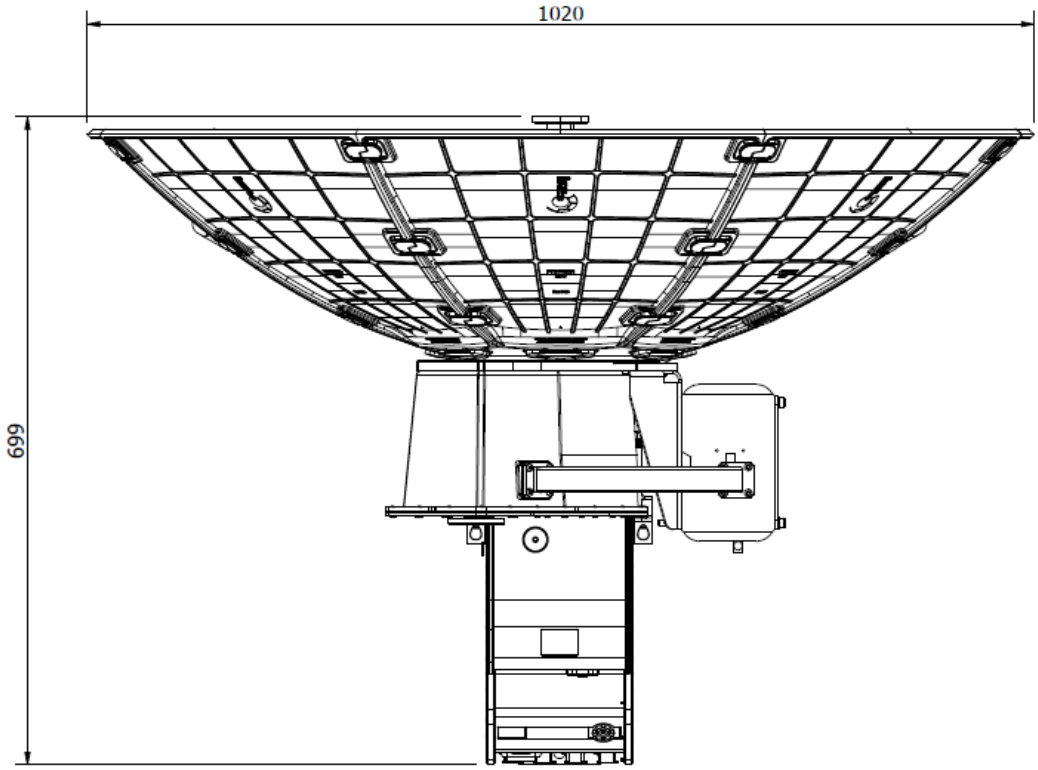


Figure A-3: Top view, EXPLORER 6100 Ku

VSAT modem cables

This appendix contains cable specifications for cables between the Base Unit and a VSAT modem.

- *Modem Cable COMTECH Serial & RSSI TT7016A*
- *iDirect & SkyEdge II VSAT modem serial cable*
- *X7 Modem BUC & Console to ACU cable*

B.1 Modem Cable COMTECH Serial & RSSI TT7016A

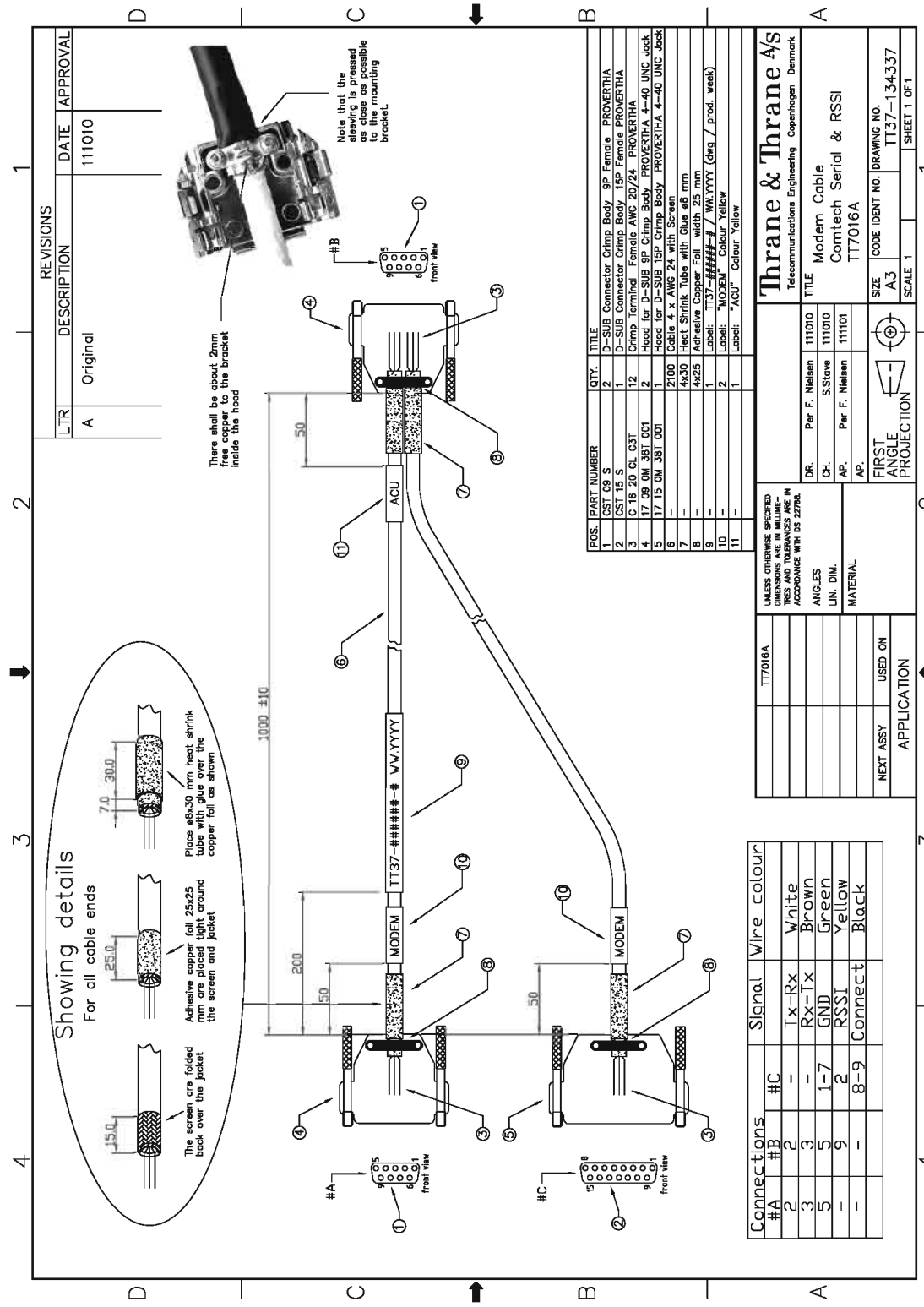


Figure B-1: Modem Cable COMTECH Serial & RSSI TT7016A

B.2 iDirect & SkyEdge II VSAT modem serial cable

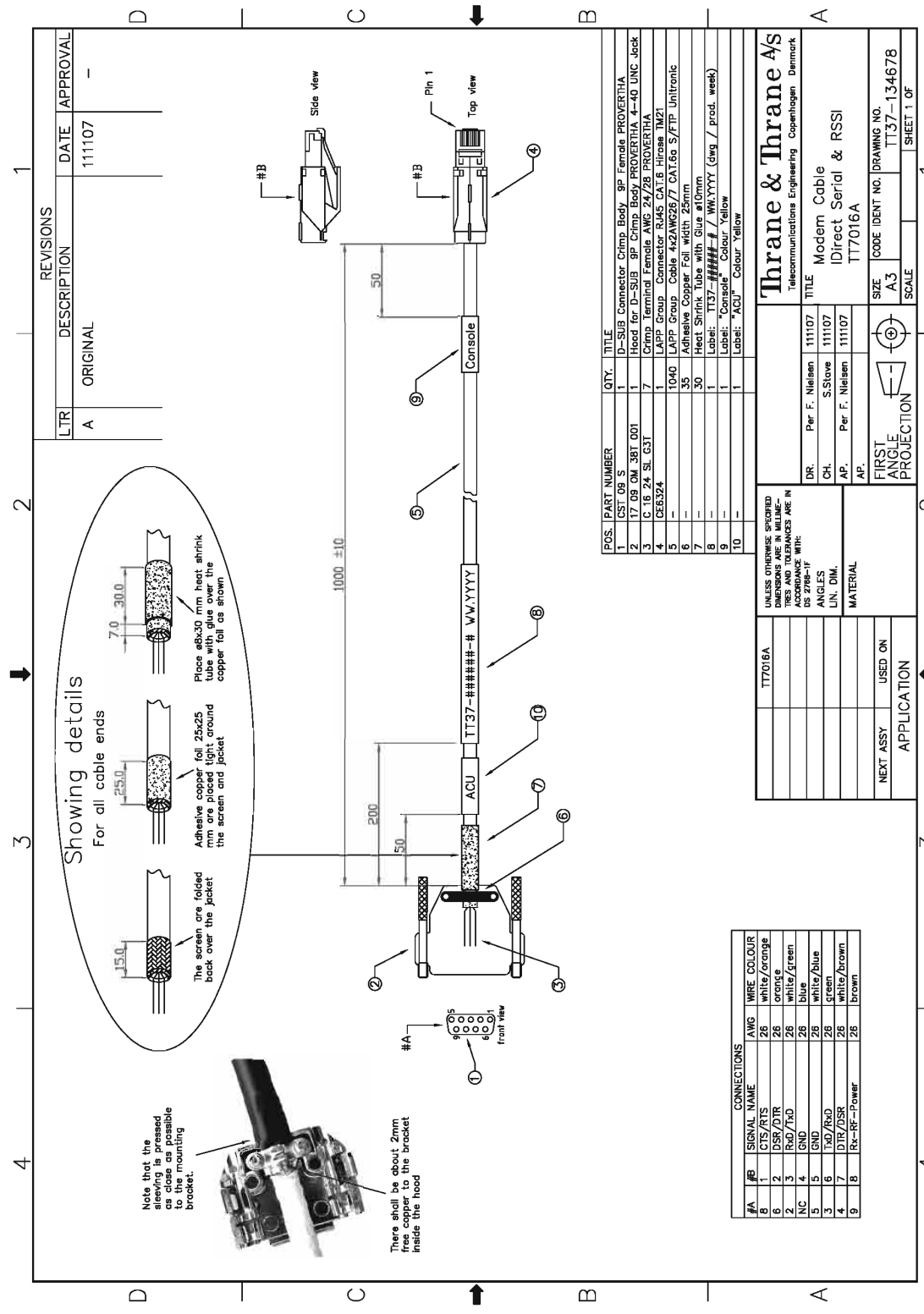


Figure B-2: Modem Cable iNFINITI iDirect VSAT modem

B.3 X7 Modem BUC & Console to ACU cable

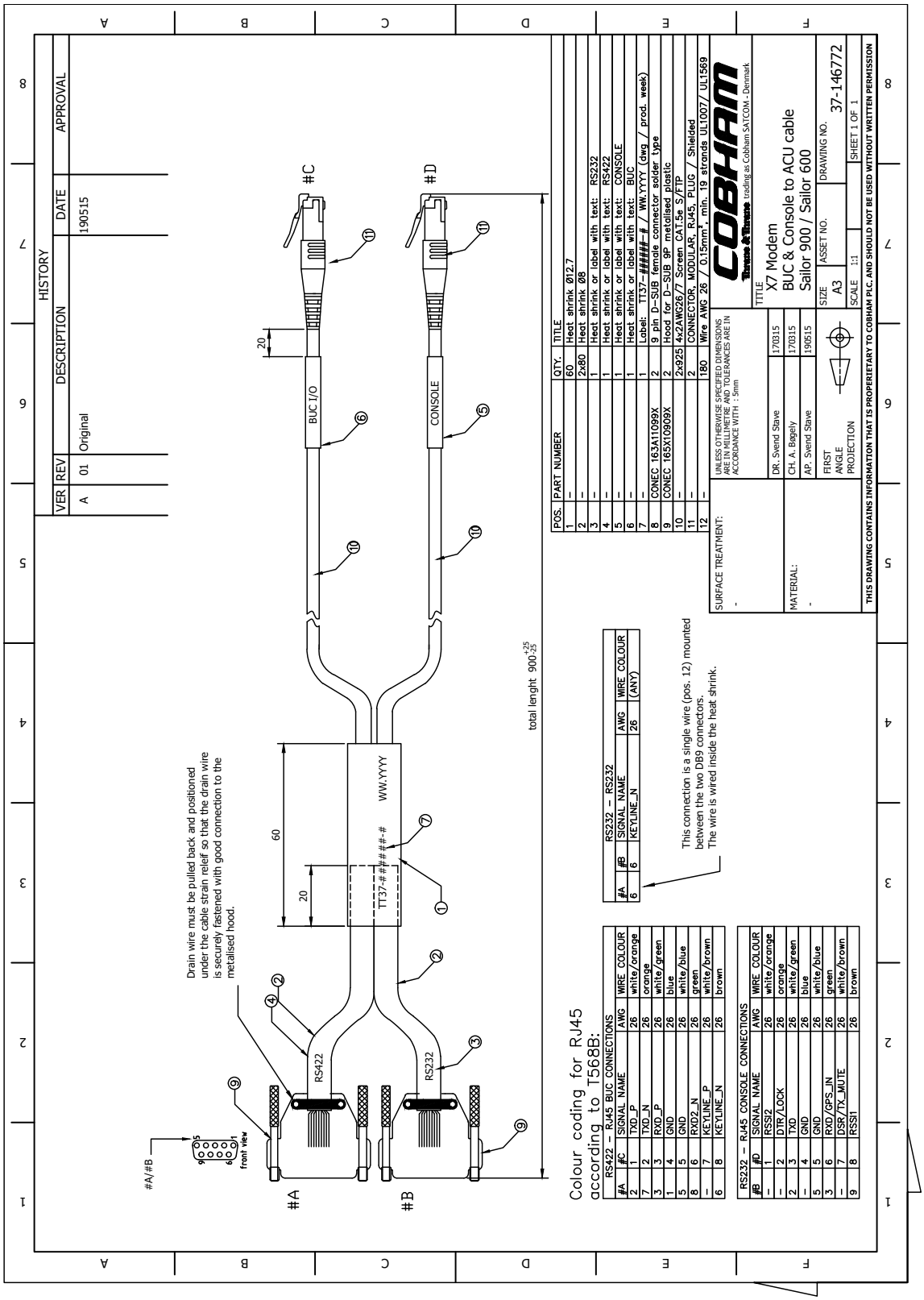


Figure B-3: X7 Modem BUC & Console to ACU cable

VSAT modem settings

In this appendix you find detailed information on how to set up supported VSAT modems.

Important

The information in this appendix may not be up to date. The VSAT modems are 3rd party products in relation to Cobham SATCOM, and Cobham SATCOM has no influence on the functionality of these products.

The following information is only a guideline based on the functionality of the modems at the time of writing.

The appendix has the following sections:

- *OpenAMIP setup for iDirect iNFINITI & Evolution*
- *OpenAMIP setup for Generic OpenAMIP VSAT modems*
- *Serial setup for iDirect iNFINITI & Evolution*
- *COMTECH 570L*
- *STM SatLink 2900 VSAT modem*
- *Gilat SkyEdge II VSAT modem*
- *iDirect X7 Modem*

C.1 OpenAMIP setup for iDirect iNFINITI & Evolution

C.1.1 Protocol and interfaces

Introduction

The following sections describe the protocol and interface between the Base Unit and an iDirect OpenAMIP VSAT modem. OpenAMIP operation is normally used by service providers offering global VSAT service because the protocol supports roaming between satellites (Automatic Beam Switching).

OpenAMIP, an ASCII message based protocol invented and Trademarked by iDirect is a specification for the interchange of information between an antenna controller (Base Unit) and a VSAT modem. This protocol allows the VSAT modem to command the Base Unit to search and lock to a particular satellite as well as allowing exchange of information necessary to permit the VSAT modem to initiate and maintain communication via the antenna and the satellite. In general, OpenAMIP is not intended for any purpose except to permit a modem and the Base Unit to perform synchronized automatic beam switching.

Connections

Connect the Base Unit and iDirect modem with the following cables:

- Ethernet cable for TCP/IP data communication
- RS-232 console cable for signal strength indication (part number: 407090A-020)

  Important It is important to connect this cable to achieve satisfactory acquisition of the satellite. This is due to missing information in the iDirect OpenAMIP software before version 3.1.1.2/13.0.1.2. RSSI information on the dashboard will only be available with this cable connected.

- 2 pcs. 75 Ohm RF cables F-F connectors for Rx and Tx frequencies (included with Base Unit)

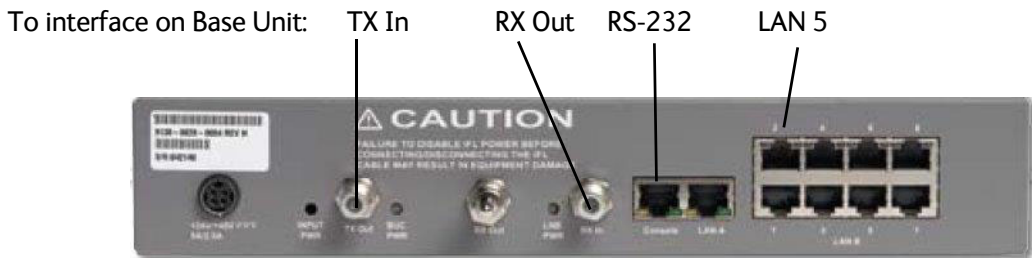


Figure C-1: Connecting iDirect iNFINITI 5000 series to the Base Unit (OpenAMIP)

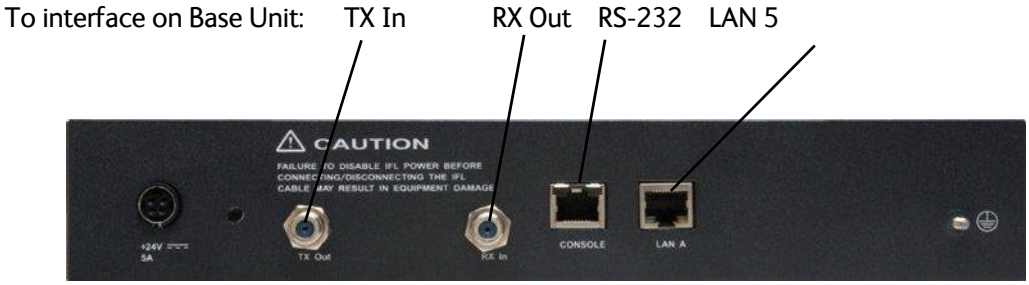


Figure C-2: Connecting iDirect Evolution X5 to the Base Unit (OpenAMIP)

The pin allocation for the RS-232 Console cable is shown below. See also Appendix B on page B-1 for a cable drawing.

Console port (DTE)	RJ-45 pin	Color code	RJ-45 to DB-9 adapter pin	Console device
RTS	1	Blue	8	CTS
DTR	2	Orange	6	DSR
TxD	3	Black	2	RxD
GND	4	Red	NC	GND
GND	5	Green	5	GND
RxD	6	Yellow	3	TxD
DSC	7	Brown	4	DTR
Rx-RF Power	8	White/Grey	9	--

Table C-1: RS-232 Console cable for iDirect VSAT modem

Protocol

The Base Unit supports all OpenAMIP commands except the X command which is optional. All the supported OpenAMIP commands are shown in the following figure.

	Messages Sent from Remote				Messages Sent from Antenna	
iDS/iDX Release	Message	# Para-meters	Mapped to Options File Keys	Options File Group	Message	# Para-meters
iDX 2.0.x	A		keepalive_interval Default value of 15 seconds. Will not appear in Options file unless overwritten.	[ANTENNA]	a	
	B	2	rx_lcl_osc, tx_lcl_osc	[SATELLITE]		
	H	2	hunt_frequency, hunt_bandwidth	[SATELLITE]		
	K	1	max_skew Maximum skew of the beam short axis to the geosynchronous arc.	[SATELLITE]		
	P	2	polarity, tx_polarity	[SATELLITE]		
	S	3	longitude, max_lat, pol_skew	[SATELLITE]	s	2
	T	2	tx_frequency, tx_bandwidth	[SATELLITE]		
	W	1	latlong_interval Message contains single value in seconds. Does not generate Options file key.	[MOBILE]	w	4

Figure C-3: Supported OpenAMIP commands

Messages sent from VSAT modem	Explanation
S -15.000000 0.000000 0.000000	Longitude, Max_lat, Pol_skew
H 1451.815000 1.905000	Hunt_frequency, Hunt_bandwidth
P H V	Rx_polarity, Tx_polarity
B 11250.000000 12800.00000	Rx-lcl_osc, Tx_lcl_osc
T 1403.290000 0.618000	Tx_frequency, Tx_bandwidth
A 15	Keepalive_interval in mS [Base Unit: s message]
W 300	latlong_interval in seconds [Base Unit: w message]
L 1 1	Rx lock, Tx allowed
K 90.000000	Max_skew

Table C-2: Messages sent from the VSAT modem to the ACU (examples)

Messages sent from the Base Unit to the VSAT modem	Explanation
s 1 1	Functional, Tx OK
w 1 55.794010 12.52272 985523005	GNSS valid, Latitude, Longitude, Time

Table C-3: Messages sent from the ACU to the VSAT modem (examples)

Note The iDirect modems only sends the satellite information once when booting. If the Base Unit has not received the information for some reason, the system cannot point. In that case the modem will automatically boot after 5 minutes and send the satellite information again.

The signal strength from the modem is measured on RS-232 pin 9. It is a DC voltage in the range of 0 - 5 VDC.

Ranges for signal strength	
VDC	Antenna status
0-2.5	RF energy is detected, but from a wrong or unidentified satellite.
2.6-5.0	Carrier lock, correct satellite.

Table C-4: Ranges for signal strength for iDirect OpenAMIP VSAT modem

The signal strength is displayed in the web interface on the Dashboard as 0 – 500. The minimum value for an Internet connection is 250 - 260.

C.1.2 Sample options file

The following section presents a sample iDirect OpenAMIP Options File. The highlighted parameters in bold are important and needed for the VSAT system to function correctly.

See comments in brackets for explanation of the use.

```
[ANTENNA]
  addr = 10.1.6.2
    (ACU LAN1 IP setting)
  connect_timeout = 30
  dedicated_interface = ixp0
  manufacturer = OpenAMIP
  max_skew = 90.000000
  model = OpenAMIP
  port = 2000
    (ACU Modem Profile setting)
```

```
[BEAMS]
  beam_88 = E36B
  maxbeam = 88
[BEAMS_LOCAL]
  inhibit_tx_ifzero = 0
[BTP]
  device_mode = tdma
  device_name = btp
  device_path = /dev
[BTP_REQ]
  device_mode = tdma
  device_name = btp_req
  device_path = /dev
[COMPRESSION]
  Threshold = 90
[DEBUG]
  cpu_util_test_enabled = 0
[DVBS2]
  frame_length = 125.000000
  frame_size = short
  mode = acm
  ncr_interval = 3375000
  pilot = 1
  rc_roll_off = 0.200000
[ENC]
  auth_level_required = 0
  enc_enabled = 0
  enc_layer_enabled = 0
  enc_mode = 0
  peer_mode = 1
[ETH0]
  interface = ixp0
  phy_count = 1
[ETH0_1]
  address = 10.1.6.1
  netmask = 255.255.255.128
    (ACU LAN1 subnet setting)
  rip_enabled = 0
  web_server_enabled = 0
```

```
[FREQ_TRANS]
  down_translation = 11300.000000
  up_translation = 12800.000000
    (BUC LO)
[GUI_SERVER_PROXY]
  port = 14599
[LAN]
  lan_gw_ip = 0.0.0.0
  lan_ip = 10.1.6.1
  lan_subnet_ip = 255.255.255.128
[MAPSERVER_0]
  hostname = 172.28.1.11
  port = 5003
[MOBILE]
  gps_input = 2
    (2 => GPS via OpenAMIP)
  gps_validation_active = 1
  init_tx_power_offset = 0.000000
  is_mobile = 1
  latlong_acq_interval = 300
  latlong_fail_interval = 10
  latlong_interval = 300
  tx_handshake_enabled = 0
    (BUC mute/unmute is handled by the VSAT terminal!)
[MODEM_INSTALLATION]
  reflector_offset_angle = 0.000000
  remote_lat = 35.890000
  remote_long = 14.480000
  spacecraft_long = 35.900000
[MODEM_PARAMETERS]
  ref_carrier_fec_block_size = 100
  ref_carrier_modcod_coding_rate = 2
  ref_carrier_modcod_modulation = 1
  ref_carrier_symbol_rate = 360000.000000
  rx_acqrange = 100000
  rx_diff = 0
  rx_freq = 1263381999
  rx_mode = 2
  rx_only = 0
  rx_scram = 1
  rx_specinv = 0
  rx_symrate = 2778000.000000
  tx_bitrate = 1
```

```
  tx_power_in_dbm = -32.000000
  tx_specinv = 0
[NET_ENC]
  id = 10
  is_encrypted = 0
[NMS]
  broadcast_ip = 172.28.1.11
  download_monitor_credentials = 1
  download_monitor_group = 239.192.0.0
  download_monitor_port = 9000
  event_server_ip = 172.28.1.11
  event_server_port = 2860
  generated_by = NMS-14.0.2
  is_nms_managed = 1
  keep_alive_port_number = 2860
  NRD_remote_status_port_number = 2859
  NRD_server_ip = 172.28.1.11
  server_ip = 172.28.1.11
  service_monitor_interval = 1000
  timeout = 20000
[ODU]
  lnb_dc_voltage = 18
  lnb_tone_enable = 0
  music_present = 0
  odu_disable_tx_pwm = 0
  odu_rx_10_mhz = 0
  odu_rx_dc_power = 1
  odu_tx_10_mhz = 1
    (10 MHz Reference to enable BUC unmute)
  odu_tx_dc_power = 1
[OOB]
  mem_high_percent = 90
  mem_low_percent = 75
[OPTIONS_FILE]
  carrier_type = 0
  code_version = 14.0.2.7
  did = 117491203
  disable_options_flash_command = 0
  generated_by = NMS-14.0.2
  is_mesh = 0
  mobile_remote_type = 1
  modem_hardware = X5
  modem_sn = 123456
  modem_type = Remote
```

```
  product_mode = dvbs2
  upstream_product_mode = idirect_tdma
[POWER_MANAGEMENT]
  enable = 0
  sleep_timeout = 0
[ROUTE_1_0]
  gateway = 0.0.0.0
  interface = sat0
  metric = 1
  netmask = 0.0.0.0
  network = 0.0.0.0
[RX1]
  device_mode = scpc
  device_name = rx1
  device_path = /dev
[SAT0_1]
  address = 10.0.0.13
  netmask = 255.255.240.0
  rip_enabled = 0
  web_server_enabled = 0
[SATELLITE]
  channelname = E36B
  hunt_bandwidth = 0.000000
  hunt_frequency = 1233.660000
  longitude = 35.900000
  max_lat = 0.000000
  max_skew = 90.000000
  min_look_angle = 0.000000
  name = E36B
  noise_reference_frequency = 0.000000
  pol_skew = 0.000000
  polarity = V
  rx_lcl_osc = 11300.000000
  skew_margin = 90.000000
  tx_bandwidth = 0.000000
  tx_frequency = 1234.560000
    (Correct tx freq. ensures same P1dB @ all frequencies!)
  tx_lcl_osc = 12800.000000
    (BUC LO)
  tx_polarity = X
```

```
[SECURITY]
  admin_password =
  $idi3$0oAshW$01pJQAAWxgQxLnasMrdrUygxRQ8UHrLjCWW8AwRJuYd1
  JvhpLjZ3QZZNufOT46pY.bzzsX0VH0jaaXcdGDEVsS
  os_password = $1$/K.qAA$oBJORr9q34ycG7juIu60I.
  password =
  $idi3$/B2K3p$.gpGIC9BkGi/lPPh0b90OfwvFmSmEVFTyWKhqa3X.w9h
  Q2oDeXpsYt3qCmJO1H7B.oYElSxyF0ja0AiKStaxTV
[SOF]
  device_mode = tdma
  device_name = sof
  device_path = /dev
[SYSTEM_TRAY]
  interval = 5000
  mode = 1
  port = 2859
  server = 172.28.1.11
  service_monitor_group = 239.255.255.1
  service_monitor_port = 9001
[TDMA]
  tx_watchdog_timeout_in_frames = 2
[TX]
  device_mode = tdma
  device_name = tx
  device_path = /dev
[TX_SOF]
  device_mode = tdma
  device_name = tx_sof
  device_path = /dev
[UCP]
  max_power_level_in_db = -25.000000
  power_uplink_control_processing = 1
[UDP]
  force_rtp_fullheader = 1
  force_udp_fullheader = 1
  max_hdr_comp_packet_size = 180
  passthru = 1
  payload_comp = 0
[VLAN]
  mode = 0
  vid = 1
```

The option file must use the following information:

Section in the option file	Requirements
[SATELLITE]	The modem provides RX and TX frequency information via a data connection to the VSAT system. The VSAT system has an extended 8 Watt BUC with LO up conversion frequency of 12.8 GHz. — Example: “tx_lcl_osc = 12800.000000”
[MOBILE]	The iDirect modem must be set to mobile unit and receive the GNSS information from the Base Unit with the command “w <Valid> <Lat> <Lon> <Time>”. **Example**: “is_mobile = 1” Tx handshake must not be enabled in the iDirect modem. **Example**: “tx_handshake_enabled = 0”
[ODU]	The VSAT system can work either using the Rx or Tx reference signals provided by the modem or using its own built-in reference signal. It is recommended to use the Tx reference signal from the modem. See also page 4-7 (setup of modem profiles). **Example**: “odu_rx_10_mhz = 1” The VSAT system needs the Tx 10 MHz reference signal in order to allow TX ON. **Example**: “odu_tx_10_mhz = 1”

Table C-5: Information in the VSAT modem option file

C.1.3 Configuration example (OpenAMIP)

Examples of modem profile and satellite configuration from the Base Unit web interface are shown in the figures below.

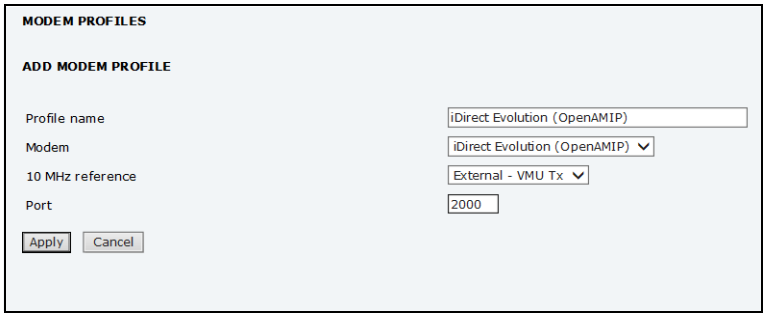


Figure C-4: Modem profile, OpenAMIP (example)

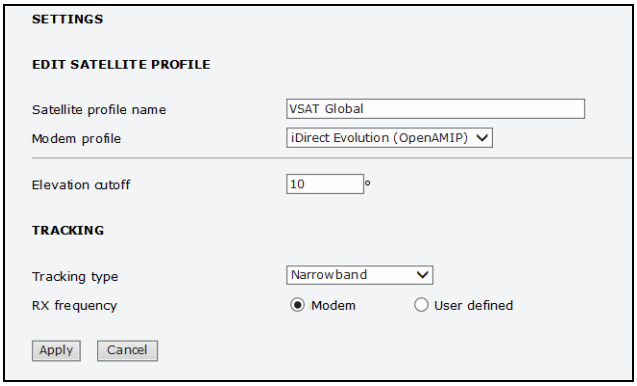


Figure C-5: Satellite profile, OpenAMIP (example)

Simple OpenAMIP protocol in iDS 8.0.2.7 is **NOT** supported by the EXPLORER 6100 Ku.

Full OpenAMIP protocol from iDX 2.0 and up is supported by the EXPLORER 6100 Ku.

OpenAMIP protocol version 15 (iDX 3.2): The option file content in some categories has changed:

- Using console command "options set" is not possible.
- command "tx freq" cannot be used.
- editing the option file must be done manually.

C.1.4 Troubleshooting

It is expected that the modem has been connected with cables to the Base Unit and that an iDirect OpenAMIP modem profile and satellite profile have been configured in the web interface of the VSAT system and has been activated. For further details see *Configuration example (OpenAMIP)* on page C-12.

It is recommended to connect the service PC to LAN port 1 of the Base Unit in order to have access to the web server and IP connection to the attached iDirect OpenAMIP modem.

A telnet or ssh client and Internet browser is needed in order to go through the troubleshooting guidelines. It is recommended to use the telnet/ssh client program called PuTTy, which is available for free on the Internet (http://www.putty.org/).

1. Default login to iDirect modems are: User name: admin, Password: P@55w0rd!
2. Every time a setting is changed in the iDirect modem, it must be stored in flash using the following command line command:
   `options flash`
3. After changing a setting and storing the new setting the modem has to boot its application in order to read and use the new setting. This is done with the command line command:
   `reset application`

The iDirect options file is divided into sections; the section name is always CAPITAL letters. Each section has several parameters, and each parameter has a value. See the following example:

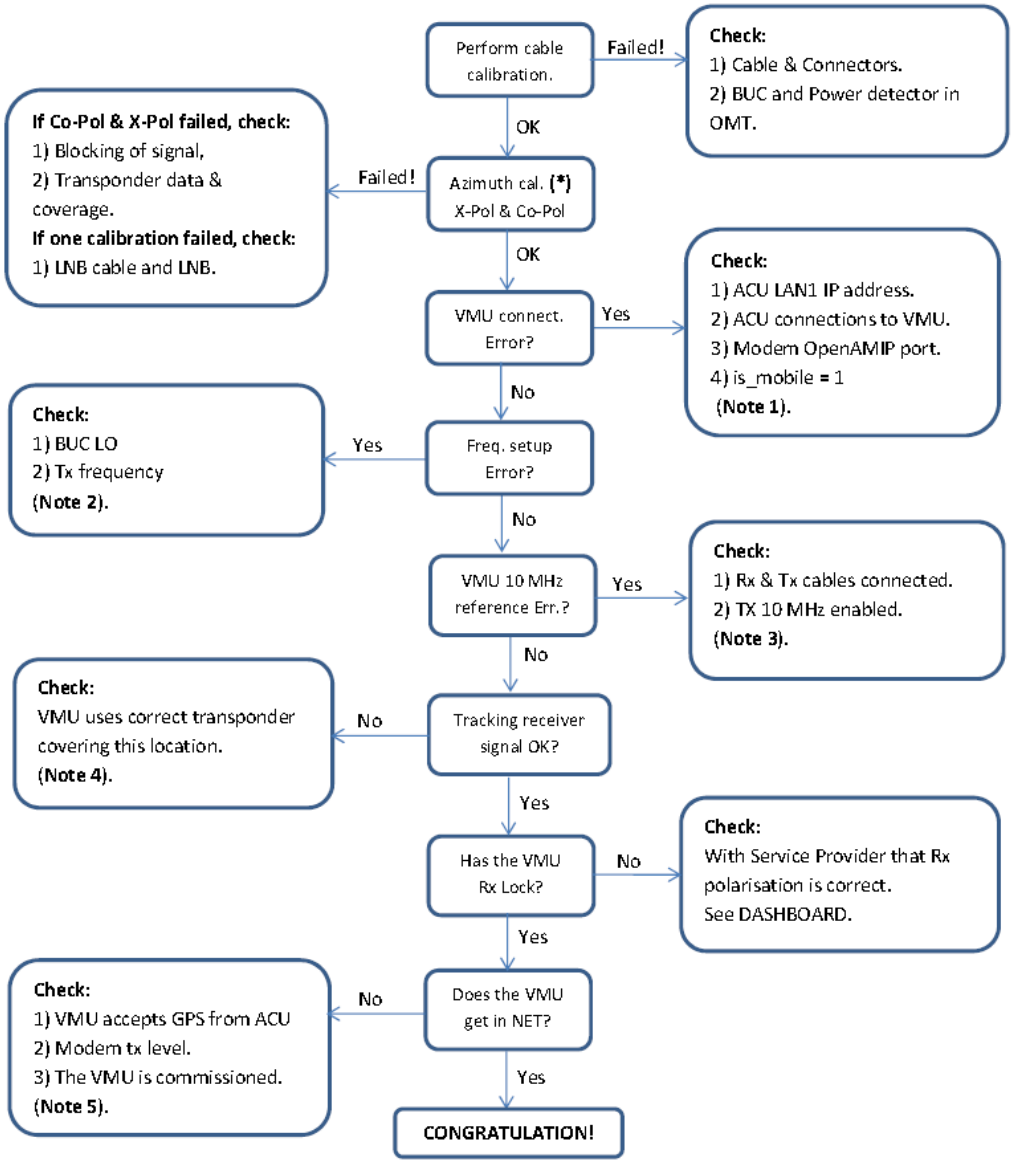
```
[MOBILE]
        gps_input = 2
        init_tx_power_offset = 0.000000
        is_mobile = 1
        latlong_interval = 60
        tx_handshake_enabled = 0
```

To change a setting in the MOBILE section use the `options set` command. See example of command here:

```
options set MOBILE gps_input 2
```

Note that setting the `gps_input` parameter to value 2 is written without an equal sign but only with a space character between parameter name and the value.

You can use the following flow chart and the instructions in the notes later in this appendix.



* Use same transponder polarity with both calibrations.

Figure C-6: iDirect OpenAMIP troubleshooting

Note 1: Connect to modem with Telnet or serial and issue the following commands:

`options show ANTENNA`
Check: IP address, port # and manufacturer = OpenAMIP.
`options show MOBILE`
Check: is_mobile = 1

Note 2: Connect to modem with telnet and issue command:

`options show SATELLITE`
Check: tx_lcl_osc = 12800.000000,
Check: tx_frequency is between: 950.000000 to 1700.000000
Check: rx_lcl_osc + hunt_frequency is between: 10.7 GHz to 12.75 GHz

Note 3: Connect to the modem with Telnet and issue commands:

```
options show ODU
```
Check: odu_tx_10_mhz = 1
```
options show MOBILE
```
Check: tx_handshake_enabled = 0

Note 4: Connect to the modem with Telnet and issue command:

```
beamselector list
```
Write down the transponder number for one of the beams that has line of sight.
Use the command: beamselector switch <number> -f to force the VSAT modem to use this transponder. E.g:
```
beamselector switch 323 -f
```
Use the command: beamselector lock to lock the VSAT modem to this transponder and stay there (until power cycle or reset application).

Note 5: Connect to the modem with Telnet and issue commands:

```
options show MOBILE
```
Check: gps_input = 2
```
tx power
```
Try to increase the tx power step by step up to max. -5 dBm, which is around the P1dB level. E.g. tx power -10

Examples of commands

```
options set SATELLITE tx_frequency 1450
options set MOBILE gps_input 2
options set MOBILE is_mobile 1
options set MOBILE tx_handshake_enabled 0
options set ODU odu_tx_10_mhz 1
options flash
```
If this fails then the options file is write protected!
Change disable_options_flash_command = 0 first!
```
options set OPTIONS_FILE disable_options_flash_command 0
reset application
```
Starts the VSAT modem application (soft boot)

- Notice that changing options file locally can help determine wrong settings. The settings will probably be changed back to original settings when the VSAT modem gets synchronized with the hub.
- Tell the NOC about the faulty settings so they can correct configuration.

C.2 OpenAMIP setup for Generic OpenAMIP VSAT modems

C.2.1 Interfaces and VSAT modem configuration

The following sections describe how to connect an ACU to an OpenAMIP VSAT modem using the Newtec MDM3100 as an example.

Connections

Connect the ACU and Newtec MDM3100 (OpenAMIP modem) with the following cables:

- 2 pcs. 75 Ohm RF cables F-F connectors for Rx and Tx frequencies (included with Base Unit)
- Ethernet cable for communication with the modem. Connect the Ethernet cable between the OpenAMIP modem and **LAN 5 (Control)** on the ACU.

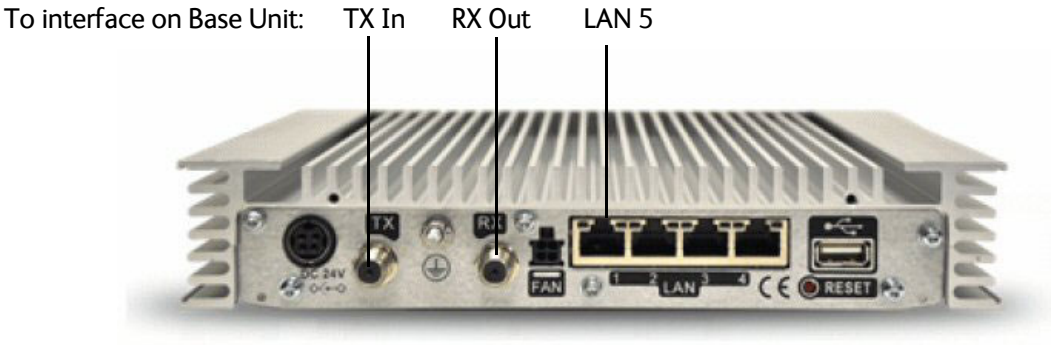


Figure C-7: Connecting Newtec MDM3100 to the Base Unit (OpenAMIP)

Modem configuration requirements (Newtec MDM3100)

1. Connect a PC with an Ethernet cable to any free LAN port on the VSAT modem.
2. Set the PC to static IP address: 192.168.1.2
3. Start an Internet browser (e.g. Internet Explorer) and go to URL://192.168.1.1 in order to get access to the web interface of the VSAT modem. For complete configuration possibilities, it may be necessary to log in using the expert login. To log in as Expert enter the following URL in the web browser:
   http://192.168.1.1/cgi-bin/modem_status?login
4. Log in using the Expert password. Contact your Service Provider for the Expert password.

5. Go to **Terminal Configuration** > **Antenna Controlling**.

Parameter	Settings
Automatic Pointing	In the **General** section, enable the option **Automatic Pointing** for the VSAT modem to work with the EXPLORER VSAT system.
ACU IPv4 Address	In the **ACU Interface Configuration** section, set the **ACU IPv4 Address** to the IP address configured for LAN Port 5 on the ACU. See *To configure the local IP network* on page 4-12.
ACU TCP Port	Enter a valid **ACU TCP Port**. Use this port on the ACU when creating the appropriate modem profile.
Use L-Band Frequency	Enable this option for the VSAT modem to work with the EXPLORER VSAT system.
TX Polarization	Select the TX Polarization based on the RX polarization configuration from the Service Provider. The valid options are **Horizontal** and **Vertical**. **Note**: The VSAT system does not support Co-pol TX Polarization.

Table C-6: Newtec MDM3100 (OpenAMIP) configuration of Antenna Controlling

6. Save the **Antenna Controlling** settings.
7. Go to **Outdoor Unit** under **Terminal Configuration**.
8. If no Outdoor Unit is configured, create one to match your EXPLORER VSAT system.

Parameter	Settings
BUC and Modem Frequency Synchronized	In the **General** section, enable the option **BUC and Modem Frequency Synchronized** for the VSAT modem to transmit a reference signal on the TX port.
ODU Type ID	ODU Type ID can be 1 up to 64. Enter an **ODU Type ID** not in use.
ODO Description	Enter a description so the defined Outdoor Unit is recognizable.
22 kHz Tone	Set this option to **Off**.
Voltage	Set this option to **Off**.
Receive L.O.	Select the **Receive L.O**. to be either **9.75 GHz** or **10.75 GHz** as these are the supported LNB LO frequencies of the VSAT system. **Note**: If the entered Receive L.O. frequency is different, the VSAT system will be in an inoperable state.
Receive L.O. RF Start	Select the **Receive L.O**. RF Start frequency to be in the range from **10.7 GHz to 12.75 GHz** as this is the supported RX frequency range.

Table C-7: Newtec MDM3100 (OpenAMIP) configuration of Outdoor Unit

Parameter	Settings
Receive L.O. RF Stop	Select the **Receive L.O. RF Stop** frequency to be in the range from **10.7 GHz to 12.75 GHz** as this is the supported RX frequency range.
Transmit L.O.	Select the **Transmit L.O.** to be **12.8 GHz** as this is the BUC LO of the EXPLORER 6100 Ku. Remember to inform the hub operator about this when doing line up and commissioning.
Transmit L.O. RF Start	Select the **Transmit L.O. RF Start** frequency to be in the range from **13.75 GHz to 14.5 GHz** as this is the supported TX frequency range.
Transmit L.O. RF Stop	Select the **Transmit L.O. RF Stop** frequency to be in the range from **13.75 GHz to 14.5 GHz** as this is the supported TX frequency range.

Table C-7: Newtec MDM3100 (OpenAMIP) configuration of Outdoor Unit (Continued)

9. Save the ODU Configuration settings.
10. Go to **Terminal Configuration > Satellite Interface**.
11. Configure a **Beam** (if not already configured). Contact your Service Provider for correct configuration settings.

C.2.2 ACU configuration

To set up the ACU to work with a Generic OpenAMIP modem, do as follows:

1. Add a modem profile with the Generic OpenAMIP modem. See *Modem profile – New entry and Edit* on page 4-7.
2. Add a satellite profile using the Generic OpenAMIP modem profile just created. See *Satellite profiles – New entry and Edit* on page 4-8.
3. Edit the network settings for LAN Port 5 and input the IP information supplied with the modem. See *To configure the local IP network* on page 4-12.
4. Activate the satellite profile.

See also the configuration example in the following section.

C.2.3 Configuration example (Newtec MDM3100)

Examples of modem profile and satellite configuration from the Base Unit web interface are shown in the figures below.

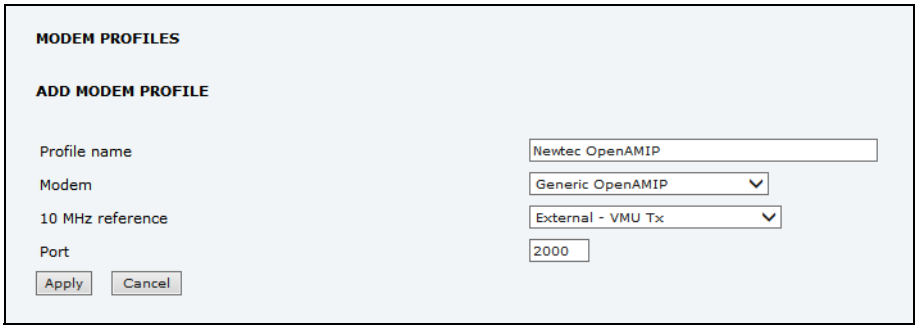


Figure C-8: Modem profile, Generic OpenAMIP (example)

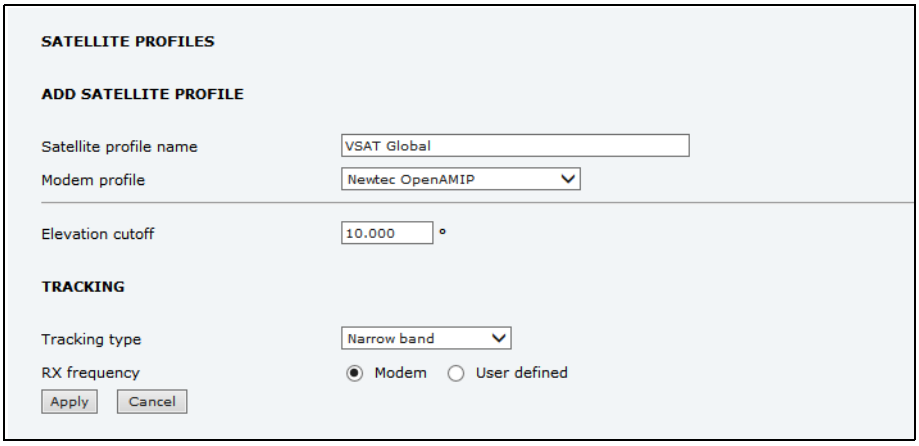


Figure C-9: Satellite profile, Generic OpenAMIP (example)

C.3 Serial setup for iDirect iNFINITI & Evolution

C.3.1 Protocol and interfaces

Introduction

The following sections describe the protocol and interface between the Base Unit and an iDirect Serial modem. Serial operation is normally used by service providers offering regional VSAT service.

Connections

Connect the Base Unit and iDirect modem with the following cables:

- RS-232 console cable for control communication (part number: 407090A-020)
- 2 pcs. 75 Ohm RF cables F-F connectors for Rx and Tx frequencies (included with Base Unit)

Figure C-10: Connecting iDirect iNFINITI 5000 series to the Base Unit (Serial)

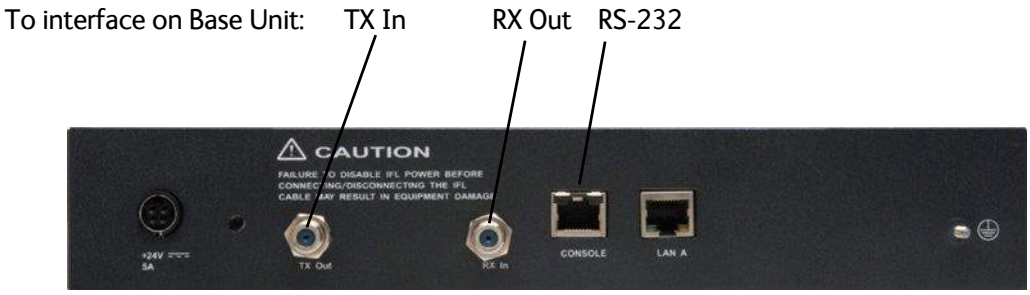


Figure C-11: Connecting iDirect Evolution X5 to the Base Unit (Serial)

The pin allocation for the RS-232 Console cable is shown in Table C-1 on page C-3. See also Appendix B on page C-1 for a cable drawing.

C.3.2 Console port settings

The iDirect modem must be configured to use the following console port settings:

- Baud rate: 4800 or 9600
- Data bits: 8
- Parity: None
- Stop bit: 1

Passwords

The Base Unit will log in to the modem using root and user passwords. The default passwords are:

- Root: P@55w0rd!
- User: iDirect

Supported commands

After login to the modem the Base Unit will issue commands to the modem every second. The following commands are supported by the Base Unit:

- rx snr
- options show FREQ_TRANS
- rx freq
- tx freq[2]
- latlong <lat> <long>

The signal strength command: rx snr is issued every 2 seconds. The rest of the commands are issued one by one every 2 seconds between each signal strength command. Meaning each of the other commands is issued every 8 seconds.

The signal strength in the Base Unit display and web interface is shown as dB., e.g: 8.5 dB. The minimum value for Internet connection is around 2-3 dB.

2. Not supported from version 15 (iDirect). Causes a TX frequency warning on the EXPLORER VSAT system

VSAT modem option file

The option file of the VSAT modem must also include the following information:

Section in option file	Description
Satellite information	Receive frequency of the transponder. Used with “rx freq” command Transmit frequency if known, otherwise just a dummy tx frequency (e.g. 1.450 MHz). Used with “tx freq” command.
VSAT system information	The modem provides RX and TX frequency information via a data connection to the EXPLORER VSAT system. The VSAT system has an extended 8 Watt BUC with LO up conversion frequency of 12.8 GHz.
GPS	The iDirect modem must be set to mobile unit and receive the GPS information from the Base Unit with the command “latlong <lat> <long>”. Tx handshake must be disabled in the iDirect modem.
Rx 10 MHz	The VSAT system can work either using the Rx or Tx 10 MHz reference signals provided by the modem or using its own built-in 10 MHz reference signal. It is recommended to use the Tx 10 MHz reference signal from the modem. See also page 4-7 (setup of modem profiles).
Tx 10 MHz	The VSAT system needs the Tx 10 MHz reference signal in order to allow TX ON.

Table C-8: Requirements for VSAT modem option file, Serial

C.3.3 Configuration example (Serial)

Examples of modem profile and satellite configuration from the Base Unit web interface are shown in the figures below.

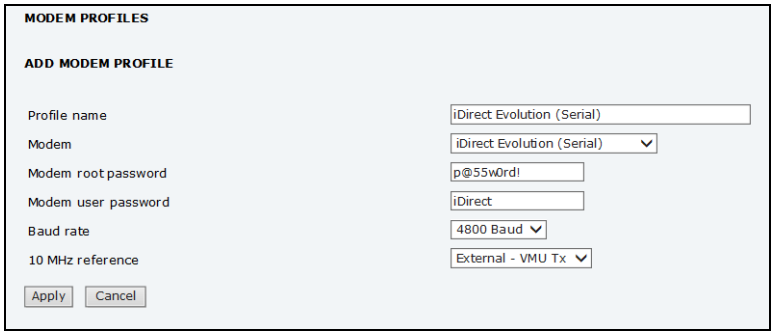


Figure C-12: Modem profile, Serial (example)

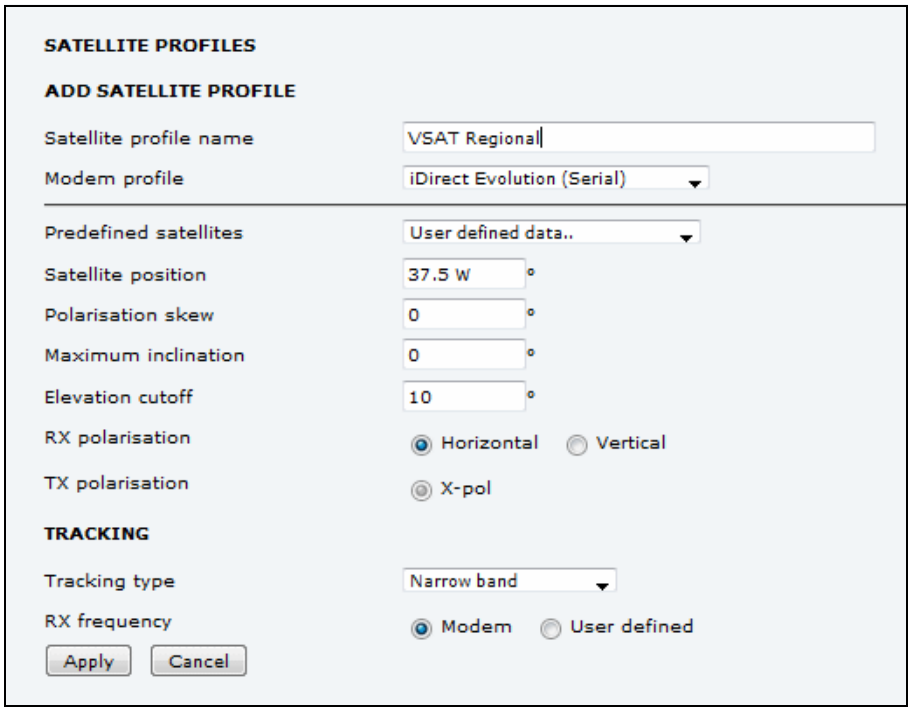


Figure C-13: Satellite profile, Serial (example)

C.4 COMTECH 570L

C.4.1 Protocol and interfaces

The following sections describe how to connect the Base Unit to a COMTECH 570L VSAT modem.

Protocol

The Base Unit supports 4800 or 9600 baud on the serial port. You can set the baud rate of the COMTECH 570L at its front MMI.

The Base Unit issues the following commands on the serial interface to the COMTECH 570L modem:

- 0000/EBN?
- 0000/TFQ?
- 0000/LLO?
- 0000/BLO?
- 0000/RFQ?

An example of the serial communication between the Base Unit and the COMTECH 570L modem is shown below:

```
0000/EBN?
0000EBN=11.8
0000/TFQ?
0000/TFQ=1310.7956
0000/EBN?
0000/EBN=11.8
0000/LLO?
0000/LLO=10000+
0000/EBN?
0000/EBN=11.9
0000/BLO?
0000/BLO=12800-
0000/EBN?
0000/EBN=11.8
0000/RFQ?
0000/RFQ=1367.5500
```

Command	Description
EBN?	This command is used to show the signal strength in the web interface and on the display of the VSAT system to determine if the COMTECH 570L modem is in Rx Lock. The signal strength goes from 0dB - 16dB, +16dB indicates a signal greater than 16dB, 99.9dB indicates no Rx Lock.
TFQ?	TFQ (Transmit Frequency) is used to calibrate the Tx chain in real time, in order to have same output power independent of frequency, temperature and antenna cable length.
LLO?	LLO (LNB LO) is used to set up the LNB LO frequency for the system.
BLO?	BLO (BUC LO) is used to read the BUC LO. This makes the ADU compatible with future VSAT products using a different BUC LO.
RFQ?	RFQ (Receive Frequency) is used as tracking frequency for VSAT.

Table C-9: COMTECH 570L, commands for serial communication

Connections

Connect the Base Unit and the COMTECH 570L with the following cables:

- Standard RS-232 serial cable (using 300KHz Narrow Band tracking receiver)
- Or COMTECH Serial & RSSI cable (using Modem RSSI tracking)
- 2 pcs. 75 Ohm RF cables F-F connectors for rx and tx frequencies.

Figure C-14: Connecting COMECH 570L to the Base Unit (example)

In most cases it is recommended to use the antenna that is built into the 300 kHz narrow band tracking receiver to track the satellite, and you can connect the Base Unit to the VSAT modem with a standard RS-232 serial cable.

For Modem RSSI tracking use a cable according to the specifications at *Modem Cable COMTECH Serial & RSSI TT7016A* on page B-2 (Cobham part number: 407090A-021).

C.4.2 Configuration example (COMTECH 570L)

Examples of the modem profile and satellite configuration from the Base Unit web interface are shown in the figures below.

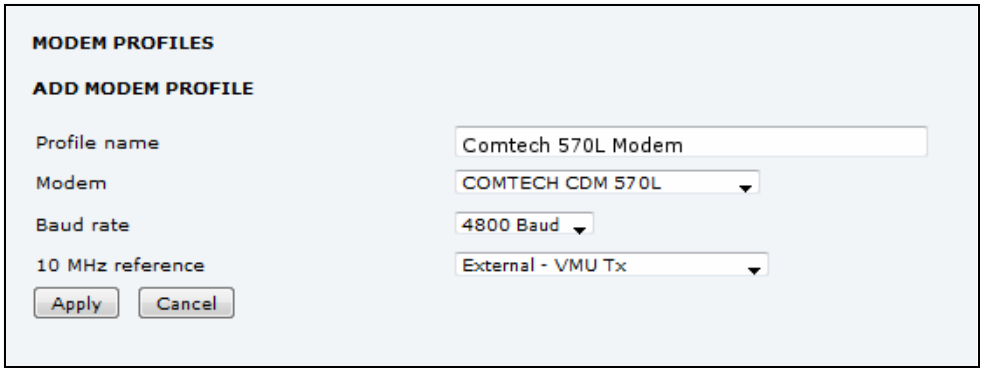


Figure C-15: Modem profile, COMTECH 570L (example)

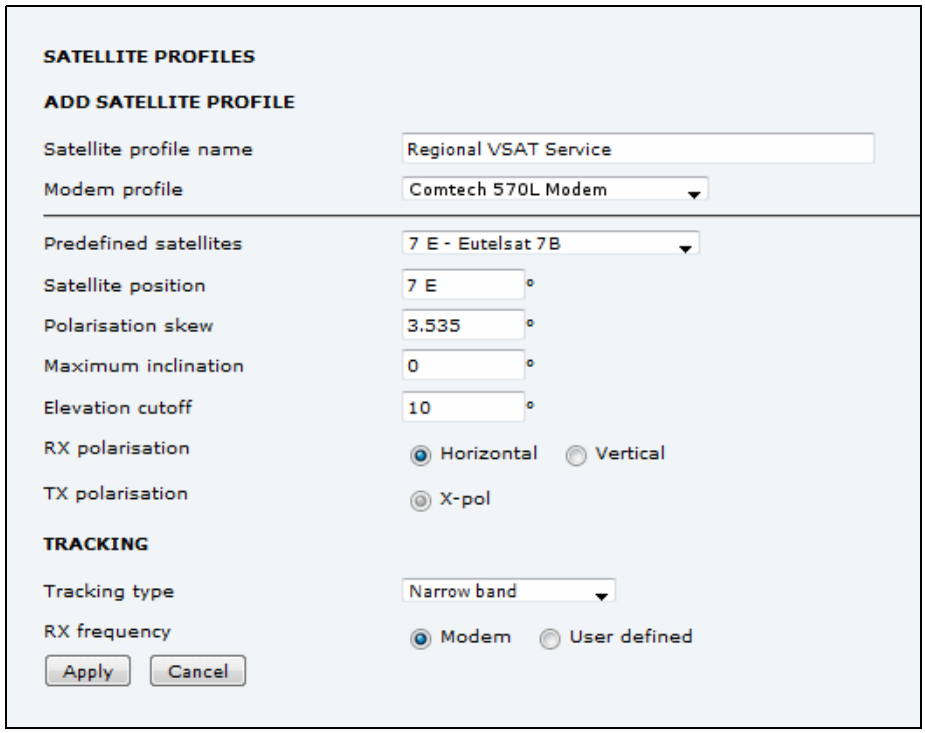


Figure C-16: Satellite profile, COMTECH 570L (example)

C.5 STM SatLink 2900 VSAT modem

C.5.1 Interfaces and VSAT modem configuration

The following sections describe how to connect an Base Unit to an STM SatLink 2900 VSAT modem. The STM SatLink 2900 and the EXPLORER VSAT system are fully integrated and require almost no user setup.

STM SatLink 2900 software version required: 14.2.0 or higher.

Connections

Connect the Base Unit and STM SatLink 2900 with the following cables:

- Ethernet cable for TCP/IP data communication. Connect LAN A on the VSAT modem to LAN 1 on the Base Unit.
- 2 pcs. 75 Ohm RF cables F-F connectors for RX and TX frequencies

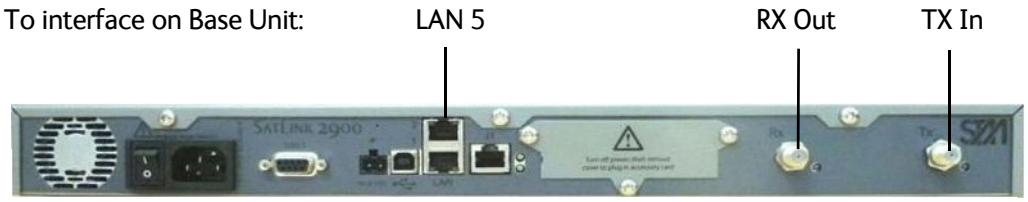


Figure C-17: Connecting STM SatLink 2900 VSAT modem to the Base Unit

Modem configuration requirements

Type the following command in a modem console to set up the STM Satlink 2900 modem to use the EXPLORER VSAT system:

```
odu antenna <antenna id>
odu txtype 62
odu lnb 62
```

To display the antenna setup for the STM Satlink 2900 modem, type:

```
odu antctrl show
```

Example:

```
odu antctrl show
Antenna Controller Configuration
--------------------------------
Type                      : Thrane & Thrane EXPLORER 6100
Enabled                   : All
IP address                : 10.110.2.226
Polling frequency         : 5 sec
Antenna Stability Tries   : 300

Antenna Controller Status
--------------------------------
Controller detected     : no
Packets sent            : 0
Packets received        : 0
```

C.5.2 Base Unit configuration

To set up the Base Unit to work with an STM Satlink 2900 VSAT modem, do as follows:

1. Add a modem profile with the STM Satlink 2900 modem. See *Modem profile – New entry and Edit* on page 4-7.
2. Add a satellite profile using the STM Satlink modem profile just created. See *Satellite profiles – New entry and Edit* on page 4-8.
3. Edit the network settings and input the IP information supplied with the modem. See *To configure the local IP network* on page 4-12.
4. Activate the satellite profile.

C.5.3 Configuration example (STM Satlink 2900)

Examples of modem profile and satellite configuration from the Base Unit web interface are shown in the figures below.

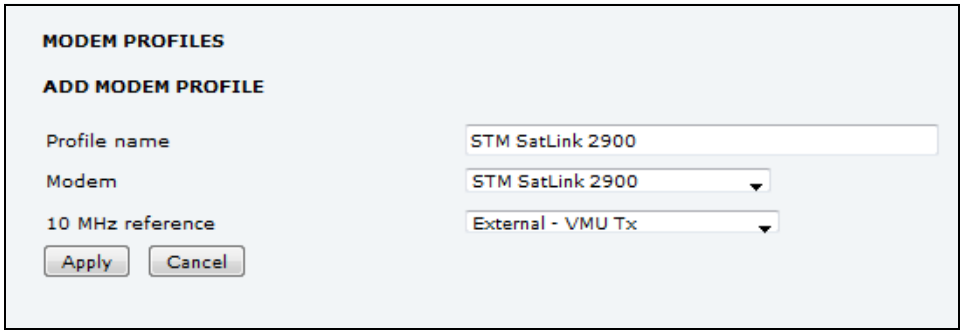


Figure C-18: Modem profile, STM SatLink 2900 (example)

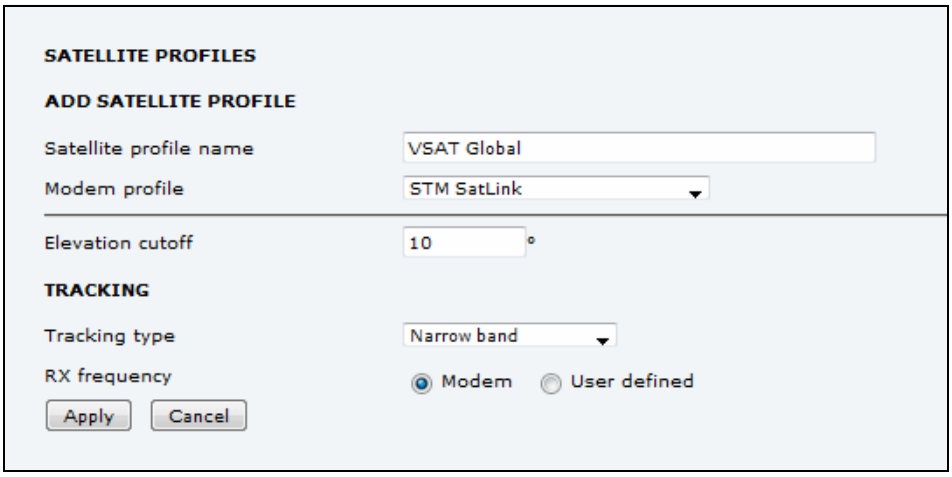


Figure C-19: Satellite profile, STM SatLink 2900 (example)

C.6 Gilat SkyEdge II VSAT modem

C.6.1 Interfaces and VSAT modem configuration

The following sections describe how to connect an Base Unit to a Gilat SkyEdgeII VSAT modem. The Gilat SkyEdge II and the VSAT system are fully integrated and require only little user setup.

Connections

Connect the Base Unit and Gilat SkyEdge II with the following cables:

- 2 pcs. 75 Ohm RF cables F-F connectors for RX and TX frequencies (included with the ACU)
- RS-232 console cable for communication with the modem (part number: 407090A-020). Connect SERIAL on the VSAT modem to RS-232 on the Base Unit.

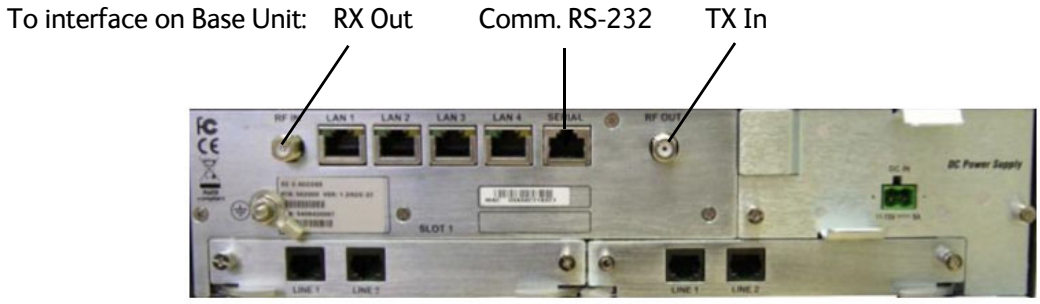


Figure C-20: Connecting Gilat SkyEdge II VSAT modem to the Base Unit

Modem configuration requirements

1. Connect a PC with an Ethernet cable to LAN port 1 of the VSAT modem.
2. Set the PC to static IP address: 192.168.1.2
3. Start an Internet browser (e.g. Internet Explorer) and go to URL://192.168.1.1 in order to get access to the web server of the VSAT modem.
4. Login with: User name: inst and Password: $Sat2598$
5. Go to the menu **Installer**.

Parameter	Settings
RF Downlink frequency	In the section **General** the RF Downlink frequency is shown. Write it down as it is going to be used for the selection of LNB LO. Further down on the page you find the BUC and LNB LO frequencies.
LNB LO	Depending on the RF Downlink frequency select an appropriate LNB LO of 9.75 or 10.75 GHz which will result in an L-band frequency between 1070 and 1275 MHz which is within the operating frequency band of the SkyEdge II Access modem.
BUC LO	Select the BUC to be 12.8 GHz as this is the BUC LO of the EXPLORER VSAT system. Remember to inform the hub operator about this when doing line up and commissioning.
BUC 10MHz Reference Signal	The BUC 10MHz Reference Signal must be configured to ON, otherwise the VSAT system will never allow TX. Scroll further down to enable GPS for the Location Coordinates. This enables the serial protocol of the modem so it can communicate with the ACU.

Table C-10: Configuration of Gilat SkyEdge II VSAT modem

6. Go to the top of the page and press the **Submit** button and **OK** to save the new settings.

The VSAT modem is now configured to be used with the EXPLORER VSAT system.

C.6.2 Base Unit configuration

To set up the Base Unit to work with a Gilat SkyEdge II VSAT modem, do as follows:

1. Add a modem profile with the Gilat SkyEdge II modem. See *Modem profile – New entry and Edit* on page 4-7.
2. Add a satellite profile using the Gilat SkyEdge II modem profile just created. See *Satellite profiles – New entry and Edit* on page 4-8.
3. Edit the network settings and input the IP information supplied with the modem. See *To configure the local IP network* on page 4-12.
4. Activate the satellite profile.

See also the configuration example in the following section.

C.6.3 Configuration example (Gilat SkyEdge II)

Examples of modem profile and satellite configuration from the ACU web MMI are shown in the figures below.

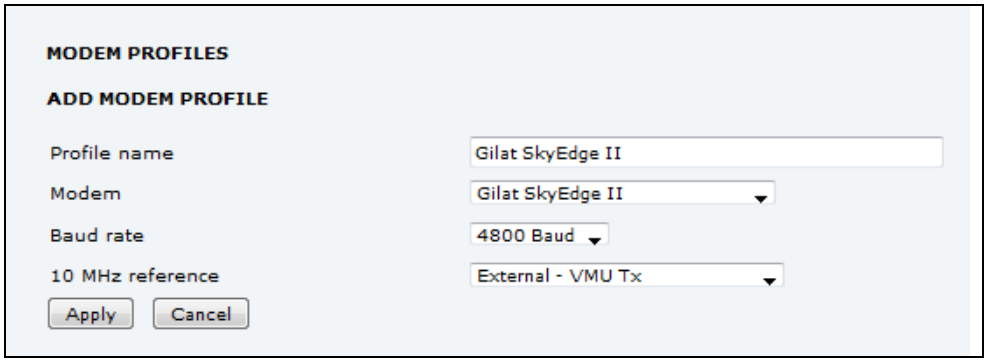


Figure C-21: Modem profile, Gilat Sky Edge II (example)

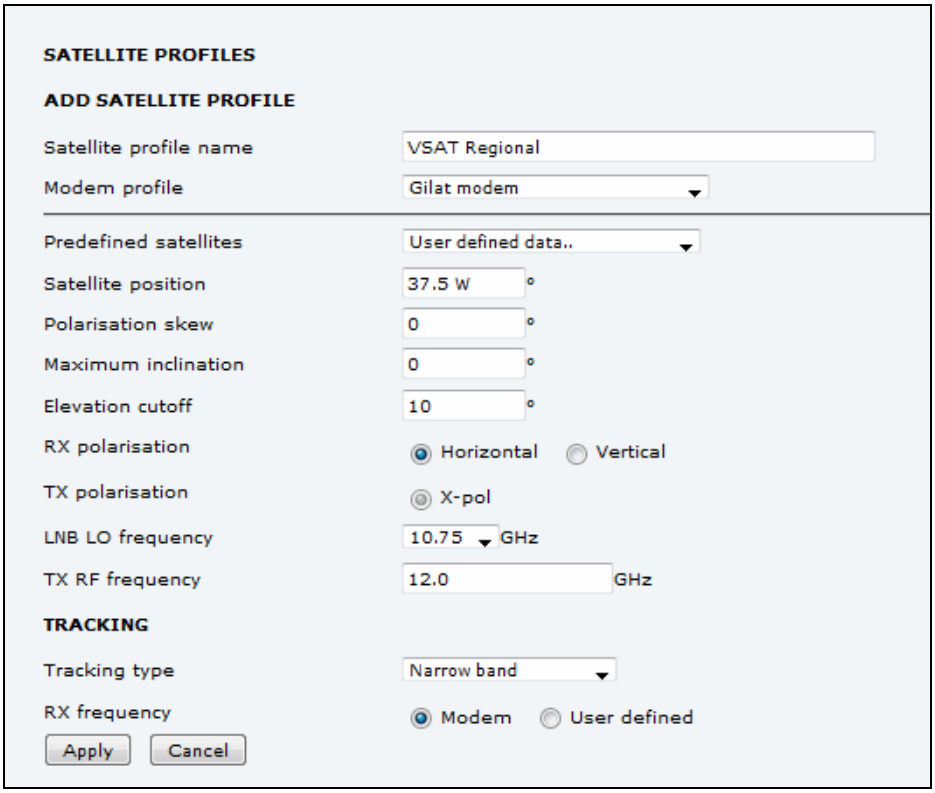


Figure C-22: Satellite profile, Gilat Sky Edge II (example)

C.7 iDirect X7 Modem

C.7.1 Interfaces

The following sections describe how to connect the Base Unit to an iDirect X7 Modem.

Connections

Connect the iDirect X7 Modem and the Base Unit with the following cables:

- Ethernet cable for TCP/IP data communication. Connect **LAN 1** on the VSAT modem to **LAN 5** on the Base Unit.
- 2 pcs. 75 Ohm RF cables F-F connectors for **RX** and **TX** frequencies (included with Base Unit)
- X7 Modem BUC & Console to ACU cable (see *X7 Modem BUC & Console to ACU cable*). Use the cable to connect **Console** on the VSAT modem to **RS-232** on the Base Unit and **BUC I/O** on the VSAT modem to **RS-422** on the Base Unit.

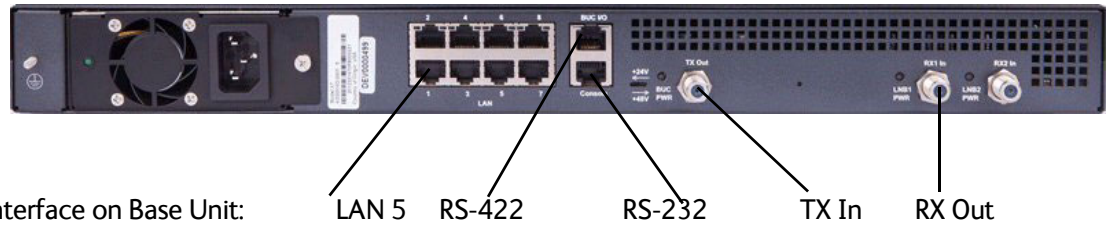


Figure C-23: Connecting iDirect X7 Modem to the Base Unit

No initial configuration should be necessary for the X7 modem to Base Unit connection, but you must activate the satellite profile with the X7 modem (see *To select and activate a satellite profile* on page 4-2 or *Menu descriptions* on page 4-28).

C.7.2 ACU configuration

To set up the Base Unit to work with an iDirect X7 modem, do as follows:

1. Connect a computer to LAN 1 on the Base Unit and access the web interface.
2. Under **SETTINGS > Network**, make sure that **LAN 5** is set up for **Static IP** and the IP address **192.168.1.2**. See *To configure the local IP network* on page 4-12.
3. Under **SETTINGS > Satellite profiles**, activate the satellite profile using the X7 Modem.

Command line interface

This appendix contains a description of the command line interface for the EXPLORER 6100 Ku VSAT terminals and a command reference for supported commands.

- *Introduction*
- *Supported commands*

D.1 Introduction

After you have done the initial configuration and connected the VSAT system to your network, you can use Telnet to configure the VSAT system. You can also set up VSAT modem parameters. Note that the following sections cover the command line interface for all EXPLORER 6000 series and EXPLORER 8000 series VSAT terminals. Some of the commands may not be relevant for your terminal.

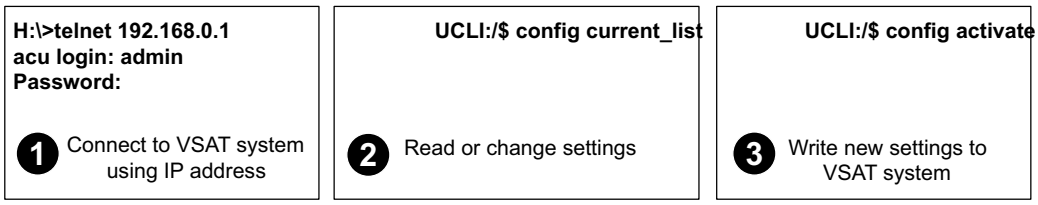


Figure D-1: How to use the command line interface (example for telnet)

After successful login you can read and change settings. Use the command **`config activate`** to activate the new settings in the Base Unit. You will need to refresh the browser window before the changed settings become visible.

Note Every change is performed on the active satellite profile or the active VSAT modem profile. Parameter identifiers are case sensitive.

D.1.1 Telnet connection

You can access the command line interface via Telnet.

User name and password

Access to the VSAT system system is protected by a user name and password. This is the same user name and password that is used in the web interface under **ADMINISTRATION**.

Telnet

The interface is on the standard Telnet port 23 or SSH port 22.

Connect to LAN 1 or LAN 4 on the Base Unit and use the corresponding IP address of the Base Unit.

To start a telnet session do as follows:

1. Open a Telnet client of your choice.
2. At the prompt, enter the IP address of the Base Unit, default login **admin** and the administrator password. If you do not know the administrator password, see *New installation or forgotten password* on page 4-4.

D.1.2 Help

If you enter **`help`** directly at the prompt **`UCLI:/$`** all available commands are listed. Additionally any command will take **`help`** as first argument and display detailed information of the specific command.

D.1.3 Conventions

The command description below uses the following special typography:

Convention	Description
`Courier font`	Information that is displayed on the screen.
`Bold Courier font`	Text the user must enter.
`<argument>`	Required argument
`[argument]`	Optional argument

Example:
```
satellite lon [longitude]
zone <id> active <yes | no>
```

D.2 Supported commands

The following commands are described in detail. They are listed in alphabetical order.

- *exit*
- *help*
- *system*
- *antenna_data*
- *antenna_buc*
- *antenna_lnb*
- *calib*
- *test*
- *trace*

D.2.1 exit

Command	Description
exit	Exits the connection to the VSAT system.

D.2.2 help

Command	Description
help	Shows a list of commands available, including a short description.

D.2.3 system

Command	Description
system	Shows the sub commands available, including a short description.
system restart	Sends a command to the Base Unit to restart the system instantaneously. It makes a power-on self test and then points to the last used satellite.
system info	Shows the software version, part names and serial numbers of the VSAT system.
system type <antenna type> <OEM ID>	Sets system antenna and OEM ID type
system deactivate	Disables the active satellite profile

D.2.4 antenna_data

Command	Description
antenna_data	Shows the sub commands, unit and description for the command antenna_data
antenna_data select [pcm | backup]	Use antenna data from the specified unit. To copy antenna data from the PCM to the ACU and use these as primary data, enter: **antenna_data select pcm**
antenna_data type	Shows the antenna type
antenna_data type [<type> [<pol_zero>]]	Sets the antenna type Valid range: **<type> = Ku, eTRIA, GX or Ka** (Ku must be followed by <**pol_zero**>) **<pol_zero> =** Pol axis zero value **[0-36000]**
antenna_data pol_type	Sets Ku polarization unit variant. Used when an early Ku antenna model is updated with a new Ku X-Pol unit. Valid range: 0 (old Pol unit) or 1 (new Pol unit)
antenna_data serial	Shows Inmarsat serial numbers
antenna_data serial <acu> <ant>	Sets Inmarsat serial numbers Valid range: <acu> = Inmarsat serial number of the ACU <ant> = Inmarsat serial number of the antenna

D.2.5 antenna_buc

Command	Description
antenna_buc	Shows BUC type and parameters.
antenna_buc [<type> [<parameters>]]	Sets the BUC type and parameters. Valid range: **<type>**[a] **= std6W,std8W, std20W, std5W,** or **custom** (<parameters> required) **<parameters> = <power_source> <1dB_compress> <buc_gain> <buc_lo_freq> <rf_freq_low> <rf_freq_high>** • **<power_source>: 0 (N-connector), 1 (M&C connector) or 2 (Disabled)** • **<1dB_compress>:** 3000-5000 (30-50 dBm) • **<buc_gain>:** 2500-8000 (25-80 dB) • **<buc_lo_freq>:** BUC LO frequency [9000000-30000000] in kHz • **<rf_freq_low>:** BUC RF low frequency [9000000-30000000] in kHz • **<rf_freq_high>:** BUC RF high frequency [9000000-30000000] in kHz

a. For Ku-band, <type> can be: std6W,std8W, std20W or custom
For Ka/GX, <type> can only be std5W.

D.2.6 antenna_lnb

Command	Description
antenna_lnb	Shows the lnb type and parameters
antenna_lnb [<type> [<parameters>]]	Sets the lnb data. Valid range: **<type> = philtech, cobham, njr2825, njr2841** or **custom (<parameters>** required) **<parameters> = <lnbparam> [<lnbparam>]** **<lnbparam> = <tone> <vol> <lo> <band_l> <band_h>** • **<tone>:** LNB tone **[0-1]** • **<vol>:** LNB voltage **[130-185]** in 0.1 V steps • **<lo>:** LNB LO **[9000000-18000000]** in kHz • **<band_l>:** LNB band low limit **[9000000-30000000]** in kHz • **<band_h>:** LNB band high limit **[9000000-30000000]** in kHz

D.2.7 calib

Command	Description
calib	Shows the sub commands, unit and description for the command `calib`
calib aenc <mask>	Starts absolute encoder calibration **<mask>** defines axes to calibrate, subset of aep
calib compass[a]	Starts compass calibration

a. Before starting the calibration procedure, disable the active satellite profile. Then reboot the terminal and run the command calib compass, while following the instructions to turn the terminal 90 degrees for each step.

D.2.8 test

Command	Description
test	Shows the sub commands, unit and description for the command `test`
test past <mask>	Starts EXPLORER PAST (Person Activated Self Test). **<mask>** defines axes to test, subset of aep

D.2.9 trace

Command	Description
trace	Trace debug

System messages

This appendix has the following sections:

- *Event messages – overview*
- *List of events*

E.1 Event messages – overview

Note Your VSAT terminal will **only show a subset of the listed events**. The following lists are a total list for a range of VSAT terminals (including maritime terminals) from Cobham SATCOM.

The EXPLORER 6100 Ku detects events during

- POST (Power On Self Test) – a self test performed at every power-up.
- PAST (Person Activated Self test) – started in the web interface
- CM (Continuous Monitoring) – automatically performed while the system is in operation.

When the EXPLORER 6100 Ku detects an event that requires your action, it issues an event message and the red Fail/Pass LED in the LED panel of the Base Unit is lit. As long as an event is active, it is shown in the Base Unit display and in the web interface (in HELPDESK > Event list or click the event icon on the DASHBOARD).

Note Active events and notifications are shown. As soon as the event is cleared, it is not displayed any longer. It is then moved to the Notifications section. Notifications are cleared after 24 hours.

State the Event ID when contacting your service partner.

The event description might contain a number of digits in brackets, e.g. (00000005). This is supplemental information and used for service and diagnostics purposes.

E.2 List of events

E.2.1 Events from Base Unit

Event ID	Severity	Description	Explanation
08060-0	WARNING	Antenna modem	ACU/Antenna communication error detected (framing and parity). If the situation is persistent, check if cable specifications comply (length and attenuation).
08061-0	WARNING	VMU linux shell password	The specified password (root) for the satellite modem is not accepted by the modem.
08062-0	WARNING	VMU debug shell password	The specified password (user) for the satellite modem is not accepted by the modem.
08063-0	ERROR	Antenna connection	The ACU has lost connection with the antenna.
08064-0	ERROR	ADM PLL lock	The intermediate frequency PLL is not in lock. Check the external reference signal.
08065-0	WARNING	GNSS data	Missing GNSS data (fix).
08066-0	WARNING	Heading data	Missing heading information. Check cable and heading provider device.
08067-0	ERROR	PCB temperature	ADM temperature too high. Make sure there is compliance with the environmental specifications.
08068-0	ERROR	PSM power	The PSM fails to provide the requested supply voltage.
08069-0	WARNING	Blocking Zone	The antenna has entered a blocking zone.
0806A-0	WARNING	VMU connection	The ACU has lost connection to the satellite modem.
0806B-0	WARNING	ROSS connection	The ACU has lost connection with the ROSS device.
0806C-0	ERROR	VMU frequency setup	There is a mismatch in the frequency setup. Probably the satellite modem is not configured correctly to match the requirements of the ACU and antenna. A common mismatch is the absence of Rx or Tx LO parameter in the satellite modem.
0806D-0	ERROR	Antenna power	The antenna supply voltage is outside the allowed limits. This may happen if the PSM fails to provide the requested supply voltage.

Table E-1: Events from Base Unit

Event ID	Severity	Description	Explanation
0806E-0	ERROR	VMU reference signal	There is no VMU Rx or Tx reference signal. Whether this is Rx or Tx reference depends on the user's selection on the modem profile page in the web interface. Make sure the VMU Rx/Tx cable is connected and that the VMU is configured to output the RX/TX reference signal.
0806F-0	WARNING	ROSS synchronization	The ACU has become out of sync with the ROSS device, most likely because the ACU has been replaced, or the ROSS satellite profile is new. A manual (forced) handoff sequence must be initiated from the ROSS, refer to the ROSS manual.
08073-0	WARNING	Slave connection	The system is configured as a dual antenna master, but no dual antenna slave is connected to it. Either disable the dual antenna master in the web interface or configure a another system as a dual antenna slave.
08074-0	WARNING	Master connection	The system is configured as a dual antenna slave, but it was not possible to connect to the dual antenna master. Check that the IP address entered in the modem profile is correct and check that the master and slave systems are physically connected as described in the manual.
08075-0	WARNING	Rx cable calibration	The calibration of the ACU-antenna cable failed. The cable could be defective, too long, of too poor quality, not properly connected, or the VIM or ACU hardware could be defective.
08076-0	WARNING	Dual mode configuration	The system is configured as a dual antenna system, but the system setup is invalid. The dual mode function may not work properly or performance could be degraded. Info code: xxxxxxx1 = Antenna types are different, they must be identical xxxxxxx2 = Master or Slave hardware does not support dual mode operation. xxxxxxx3 = Software version on master and slave are different, they must be identical.
08078-0	WARNING	VMU TX frequency invalid	The satellite modem did not provide a Tx frequency, or it is invalid. A default Tx frequency is assumed, but this may degrade Tx performance. To remove this warning re-configure the modem to provide the correct Tx frequency.
08079-0	WARNING	ACU Fan	Internal fan is malfunctioning.

Table E-1: Events from Base Unit (Continued)

Event ID	Severity	Description	Explanation
0807A-0	WARNING	Automatic azimuth calibration pending	Automatic azimuth calibration mode is enabled. The system tries to perform an azimuth calibration using the target satellite whenever satellite data is received from the modem. After successful calibration the feature is automatically disabled and the system returns to normal operation. WARNING: If a system has not completed azimuth calibration after the installation, the blocking zones may appear to be at wrong angles.
0807C-0	ERROR	System configuration	Invalid ACU / antenna combination.
0807D-0	WARNING	TRIA communication	The SurfBeam modem cannot communicate with the TRIA. Try power cycling the modem.
0807F-0	WARNING	Local administration enabled	Local administration mode is currently enabled. This allows login without providing the admin password. Will be disabled after 1 hour or next reboot.
08082-0	WARNING	Modem configuration load	Unable to load configuration on modem. Info: 0x00000001: Configuration index invalid 0x00000002: Changing parameter not permitted 0x00000004: Modem not in Remote Mode
08083-0	WARNING	Friction test timeout	Friction test timeout. Info code format: 0xaaaatttt, where aaaa = axis under test (0=Azi, 1=XEL, 2=EL) and tttt = timeout type. Info: 0xaaaa0001: Axis aaaa did not get ready for test in time Info: 0xaaaa0002: Axis aaaa test did not finish in time
08100-0	ERROR	PSM low voltage (22 V)	The ADM measures a different antenna voltage than expected. If the problem is not solved by a restart, and the PSM is not reporting any errors, the ADM is probably defective.
08101-0	ERROR	PSM high voltage (48 V)	The ADM measures a different antenna voltage than expected. Check for short circuit of the antenna coax connector. If the problem is not solved by a restart, and the PSM is not reporting any errors, the ADM is probably defective.
08102-0	ERROR	PSM 5 V power	Internal voltage supply error of the ADM.
08103-0	ERROR	ADM hotswap	The ACU is not able to supply the correct voltage to the antenna. Check for short circuits in coax cable and the antenna
08104-0	ERROR	Antenna communication	The ACU cannot communicate with the antenna. Check cable and antenna.

Table E-1: Events from Base Unit (Continued)

Event ID	Severity	Description	Explanation
08107-0	ERROR	ADM FPGA load	The ADM FPGA cannot be initialised and loaded.
08108-0	ERROR	TX Power Detector calibration	The power detector calibration is not valid.
08109-0	ERROR	Antenna XIM data	There is a mismatch in the antenna configuration data. Either the PCM or the VIM in the antenna are malfunctioning or one of them has been replaced. In the latter case, select which is the original device in the web interface and restart the system.
0810A-0	ERROR	ADM production data	Production data has been corrupted.
0810B-0	ERROR	Antenna software version	An error has occurred during upload of software to the antenna, the antenna software version is not as expected. Either the software in the ACU does not meet the minimum version required by the antenna, the software image in the ACU is corrupted or the upload procedure failed because of a communication error.
0810C-0	ERROR	File system integrity	One or more file system partitions are corrupt. You may have lost your settings and collected statistics. If restarting the system does not help, contact your service partner.
0810E-0	ERROR	RF calibration	The RF calibration is not valid.
08840-0	WARNING	Master PLL lock	The master PLL has lost lock. Check the input reference signal.
09000-0	ERROR	KDM 3V3 supply	Internal 3V3 voltage supply error in the KDM.
09001-0	ERROR	KDM 12V supply	Internal 12V voltage supply error in the KDM.
09002-0	ERROR	KDM display	Display hardware error in the KDM.
09010-0	ERROR	KDM link/SW version	Link to the KDM module could not be established. Either the KDM board is malfunctioning, or - if the system software has just been updated - the software is too old and is not compatible with the KDM hardware.
0B000-0	ERROR	PSM production data	Missing or invalid production data in the PSM. Replace it.
0B001-0	ERROR	NMEA 2000 identifier	Missing or invalid production data in the PSM. Replace it.

Table E-1: Events from Base Unit (Continued)

Event ID	Severity	Description	Explanation
0B010-0	ERROR	PSM link/SW version	Link to the PSM module could not be established. Either the PSM board is malfunctioning, or - if the system software has just been updated - the software is too old and is not compatible with the PSM hardware.
0B060-0	WARNING	NMEA 0183 parse error	Parse errors detected on the NMEA 0183 interface. Check NMEA 0183 cable, signal levels etc.
0B061-0	WARNING	Power supply temperature	ACU Power supply temperature is high. Improve ventilation or move to a cooler area. Info: 00000000 = Temperature warning, system still operational, but will shut down eventually if temperature keeps rising. 00000001 = Temperature critical, system has shut down to protect the hardware from overheating.

Table E-1: Events from Base Unit (Continued)

E.2.2 Events from antenna

Event ID	Severity	Description	Explanation
0A001-0	ERROR	Production data	Production data is invalid.
0A002-0	ERROR	XIM internal	Antenna configuration data stored in the PCM module is invalid.
0A003-0	ERROR	XIM external	Antenna configuration data stored in the VIM module is invalid.
0A004-0	ERROR	XIM I/X match	Antenna configuration data stored in the PCM module does not match the configuration data stored in the VIM module.
0A005-0	ERROR	Antenna type	The configured antenna type is not supported or unknown.
0A006-0	ERROR	PCM FPGA load	The PCM FPGA cannot be initialised and loaded correctly.
0A007-0	ERROR	XIM FPGA load	The VIM FPGA cannot be initialised and loaded correctly.
0A008-0	ERROR	XIM production	Production/calibration data stored in the VIM module is invalid.
0A00A-0	ERROR	GNSS initialisation	The GNSS device cannot be initialised. Check cable and GNSS device.
0A014-0	ERROR	AMB device discovery	Missing one or more of the following devices: ISM, DDM/DMD/FDM and PMM. Check cables.
0A015-0	ERROR	Azi DDM ABS device	Cannot initialise the azimuth DDM/DMD/FDM. Info: 0x00000000: Device not found (possible cabling problem) 0x0000bbaa: Device internal error (replace device) aa=status, bb=state.
0A016-0	ERROR	Xel DDM ABS device	Cannot initialise the cross-elevation DDM/DMD/FDM. Info: See 0A015-0.
0A017-0	ERROR	Ele DDM ABS device	Cannot initialise the elevation DDM/DMD/FDM. Info: See 0A015-0.
0A018-0	ERROR	ISM ABS device	Cannot initialise the ISM Info: 0x00000000: Device not found (possible cabling problem) 0x000cbbaa: Device internal error (replace device) aa=status, bb=state, c=calibration data error.
0A019-0	ERROR	PMM ABS device	Cannot initialise the PMM. Info: See 0A015-0.
0A01A-0	ERROR	BCM ABS device	Cannot initialise the BCM. Info: See 0A015-0.

Table E-2: Events from antenna

Event ID	Severity	Description	Explanation
0A01E-0	ERROR	Sensor sanity	Too many invalid values measured by the ISM during initialisation. Check for vibrations or malfunctioning ISM.
0A021-0	ERROR	Azi axis calibration	Azimuth axis zero reference not found. Check belt and zero reference module. Info: 0x00000001: Timeout (operation did not complete in time) 0x00000010: Encoder or mechanical problem 0x00000020: Zero reference not found 0x00000040: End stop not found.
0A022-0	ERROR	Xel axis calibration	Cross-elevation axis zero reference or end stops not found at expected locations. Check belt, zero reference module, and end stops. Info: See 0A021-0.
0A023-0	ERROR	Ele axis calibration	Elevation axis zero reference or end stops not found at expected locations. Check belt, zero reference module, and end stops. Info: See 0A021-0.
0A024-0	ERROR	Pol axis calibration	Polarisation axis zero reference or end stops not found at expected locations. Check movement of the polarisation unit and the zero reference module. Info: See 0A021-0.
0A025-0	ERROR	Antenna calibration	One or more errors occurred during antenna start-up Info: 0x00000001: Timeout (calibration did not complete in time) 0x00000010: Azimuth axis 0x00000020: Cross-elevation axis 0x00000040: Elevation axis 0x00000080: Polarisation axis
0A028-0	ERROR	Demodulator load	The second receiver demodulator cannot be initialised and loaded correctly.
0A029-0	ERROR	XIM PLL lock	The PLL on the VIM does not lock.
0A02B-0	ERROR	ABS software version	The ABS software version in the antenna is too old to match the hardware requirements. Upload new software via the web interface.
0A034-0	WARNING	ACU communication	The communication link between ACU and antenna is not working.
0A035-0	WARNING	ISM data valid	Sensor measurements from the ISM are invalid. This indicates a malfunctioning ISM.
0A036-0	WARNING	ISM data range	Sensor measurements from the ISM are out of range.

Table E-2: Events from antenna (Continued)

Event ID	Severity	Description	Explanation
0A037-0	WARNING	GNSS communication	Lost connection to the GNSS device.
0A038-0	WARNING	GNSS data range	Received information from the GNSS device which is out of range.
0A039-0	WARNING	GNSS device warning	Local GNSS device warning.
0A03A-0	WARNING	GNSS device error	Local GNSS device error.
0A03B-0	ERROR	Azi DDM shutdown	The azimuth motor control has detected one of the following situations: Extreme temperature, voltage, current or velocity. The motor was then shut down. This is usually a temporary situation and is probably fixed by a restart of the system.
0A03C-0	ERROR	Xel DDM shutdown	As Azi DDM/DMD/FDM shutdown but detected by the cross-elevation motor control.
0A03D-0	ERROR	Ele DDM shutdown	As Azi DDM/DMD/FDM shutdown but detected by the elevation motor control.
0A03E-0	ERROR	PMM shutdown	As Azi DDM/DMD/FDM shutdown but detected by the polarisation motor control.
0A03F-0	WARNING	AMB timing	This indicates a busy situation. It may occur during installation procedures. No user interaction is required unless it occurs repeatedly.
0A040-0	WARNING	VIM cable attn	The output power cannot be controlled correctly. Check the Tx chain.
0A041-0	WARNING	BUC voltage low	The voltage for the BUC is too low, probably caused by a malfunctioning VIM or BUC.
0A042-0	WARNING	BUC voltage high	The voltage for the BUC is too high probably caused by a malfunctioning VIM.
0A043-0	WARNING	LNB voltage low	The voltage for the LNB is too low probably caused by a malfunctioning VIM or LNB.
0A044-0	WARNING	LNB voltage high	The voltage for the LNB is too high probably caused by a malfunctioning VIM.
0A045-0	WARNING	PMM fan	The fan is not working or the tacho input from the fan is not connected. Check fan cable and fan.
0A046-0	WARNING	Antenna temperature	The temperature of the antenna is too high. Check if the fan is working.

Table E-2: Events from antenna (Continued)

Event ID	Severity	Description	Explanation
0A047-0	ERROR	VIM PLL lock	The PLL of the VIM is out of lock. Check the 10 MHz reference signal.
0A048-0	WARNING	VIM tuner lock	The PLL of the second receiver (DVB) is out of lock. Check the 10 MHz reference signal.
0A049-0	WARNING	Azi encoder slip	A slip of the azimuth encoder has been detected. If this event is not resolved by itself after some time, check the belt and encoder of the azimuth axis.
0A04A-0	WARNING	Xel encoder slip	A slip of the cross-elevation encoder has been detected. If this event is not resolved by itself after some time, check the belt and encoder of the cross-elevation axis.
0A04B-0	WARNING	Ele encoder slip	A slip of the elevation encoder has been detected. If this event is not resolved by itself after some time, check the belt and encoder of the elevation axis.
0A04C-0	WARNING	Pol encoder slip	A slip of the polarisation encoder has been detected. If this event is not resolved by itself after some time, check the belt and encoder of the polarisation axis.
0A04D-0	WARNING	GNSS position	No position available from the GNSS device or position too old.
0A04E-0	WARNING	GNSS velocity	No velocity available from the GNSS device.
0A04F-0	WARNING	Heading data	Heading information is missing in the antenna.
0A050-0	ERROR	Azi DDM communication	Communication error between PCM and azimuth DDM/DMD/FDM. Check SUB-D connectors and cables.
0A051-0	ERROR	Xel DDM communication	Communication error between PCM and cross-elevation DDM/DMD/FDM. Check SUB-D connectors and cables.
0A052-0	ERROR	Ele DDM communication	Communication error between PCM and elevation DDM/DMD/FDM. Check SUB-D connectors and cables
0A053-0	ERROR	ISM communication	Communication error between PCM and ISM. Check SUB-D connectors and cables.
0A054-0	ERROR	PMM communication	Communication error between PCM and PMM. Check SUB-D connectors and cables.

Table E-2: Events from antenna (Continued)

Event ID	Severity	Description	Explanation
0A055-0	WARNING	Azi DDM warning	The azimuth motor controller has temporarily observed an unusual situation for temperature, voltage, current or velocity. No user interaction required.
0A056-0	WARNING	Xel DDM warning	The cross-elevation motor controller has temporarily observed an unusual situation for temperature, voltage, current or velocity. No user interaction required.
0A057-0	WARNING	Ele DDM warning	The elevation motor controller has temporarily observed an unusual situation for temperature, voltage, current or velocity. No user interaction required.
0A058-0	WARNING	PMM warning	The polarisation motor controller has temporarily observed an unusual situation with regards to temperature, voltage, current or velocity. No user interaction required.
0A059-0	WARNING	Azi cal. limits	Check limits of the calibration result for the azimuth axis are exceeded. Pointing performance may be degraded. Info: 0x00000040: End stop detected before expected limit 0x00000100: Zero width is low 0x00000200: Zero width is high 0x00000400: Zero slack is high 0x00001000: Friction average is high 0x00002000: Friction peak is high 0x00004000: Friction asymmetry is high Zero width low/high: Zero reference module placement may be incorrect. Zero slack high: Mechanical slack may be too high. Friction average/peak high: Mechanical friction is higher than expected. Friction asymmetry high: Mechanical imbalance may be too high.
0A05A-0	WARNING	Xel cal. limits	Check limits of the calibration result for the cross-elevation axis are exceeded. Pointing performance may be degraded. Info: See 0A059-0.
0A05B-0	WARNING	Ele cal. limits	Check limits of the calibration result for the elevation axis are exceeded. Pointing performance may be degraded. Info: See 0A059-0.
0A05C-0	WARNING	Pol cal. limits	Check limits of the calibration result for the polarisation axis are exceeded. Pointing performance may be degraded. Info: See 0A059-0.

Table E-2: Events from antenna (Continued)

Event ID	Severity	Description	Explanation
0A05D-0	WARNING	ISM warning	The ISM has temporarily observed an unusual situation for temperature or voltage. No user interaction required. If repeated after cooldown and reboot, check if the ISM or cables around it are defective.
0A05E-0	WARNING	Low elevation	The antenna is not allowed to transmit because the elevation is too low.
0A05F-0	WARNING	Heading range	Heading data range error. External heading unit supplies unreliable data.
0A062-0	WARNING	High elevation	The antenna cannot perform acquisition in gyro-free mode because the elevation is too high.
0A065-0	ERROR	Deploy/Stow	Deploy/stow error. The antenna did not properly unlock (deploy), or the stow switch never closed (stow).
0A066-0	ERROR	OMT error	Problem with OMT. Temperature out of range or OMT cable may be broken.
0A067-0	WARNING	Automatic stow	The antenna automatically stowed because it detected significant movement.
0A068-0	WARNING	Polarisation tuning	Polarisation tuning was not successful. Polarisation may be incorrect.
0A069-0	ERROR	BCM error	The BCM PLL failed to initialize.
0A06B-0	WARNING	mpTRIA communication	Communication from the mpTRIA has failed.
0A06C-0	FATAL	Antenna base tilt	Antenna base tilted beyond limit.
0A06E-0	WARNING	Antenna orientation	The terminal is oriented in a way that prevents it from pointing to the selected satellite.

Table E-2: Events from antenna (Continued)

Approvals

This appendix lists the approvals for EXPLORER 6100 Ku.

F.1 CE

The EXPLORER 6100 Ku 1 m Stabilized Auto-Acquire Fly-Away Antenna System is CE certified as stated in the simplified EU Declaration of Conformity in the Safety sheet supplied with the EXPLORER 6100 Ku system.
Note that the simplified EU Declaration of Conformity covers a series of EXPLORER 6000 products. The full Declarations of Conformity can be found on the Cobham SATCOM web site as described in the simplified EU Declaration of Conformity.

F.2 FCC

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

Part 15.21

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC ID: F4AAPPN551

F.3 IC

This device complies with Industry Canada license-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.

IC: 3913A - APPN551

A

ACU	Antenna Control Unit. Another name for the Base Unit in the VSAT system.
ADU	Above Deck Unit. Another name for antenna.

B

BeiDou	Chinese satellite navigation system.
BITE	Built-In Test Equipment
BUC	Block Up Converter - The BUC can be thought of as the “transmitter”, and its actions are effectively the direct opposite to the LNB. The BUC consists of the Up Converter and HPA.

C

CM	Continuous Monitoring

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.
DNS	Domain Name System. A system translating server names (URLs) to server addresses.
DVB	Digital Video Broadcasting, a set of standards relating to digital television.

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.
FPGA	Field Programmable Gate Array

G

GLONASS	GLObal’naya NAvigatsionnaya Sputnikovaya Sistema. A Russian Global Navigation Satellite System.
GND	Ground
GNSS	Global Navigation Satellite System, e.g. GPS.
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.

H

HTTP	Hyper Text Transfer Protocol

HTTPS	Hyper Text Transfer Protocol Secure

I

IFL	Inter-Facility Link
IMSO	International Mobile Satellite Organisation. An intergovernmental organisation that oversees certain public satellite safety and security communication services provided via the Inmarsat satellites.
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" followed by two or three digits. An "x" is used for one of the digits if there is only one class of protection; e.g. IPX4 which addresses moisture resistance only.
IP	Internet Protocol. The method or protocol by which data is sent from one computer to another on the Internet.

K

KDM	Keyboard and Display Module of the ACU

L

LAN	Local Area Network
LED	Light Emitting Diode
LNB	Low Noise Blockdown converter. A device used to amplify or boost the weak received signal without amplifying the noise signals (hence the “low noise” part of LNB) and to convert the high frequencies of the signal into lower frequencies, a process called down converting, for conveyance to the indoor equipment (demodulator) for processing.

M

MDM	Modem
MIB	Management Information Base. A Formal description of a set of network objects that can be managed using the Simple Network Management Protocol (SNMP).

O

ODU	OutDoor Unit. Another word for antenna.
OID	Object Identifier, in the context of the Simple Network Management Protocol (SNMP), consists of the object identifier for an object in a Management Information Base (MIB).
OMT	Ortho Mode Transducer

P

PAST	Person Activated Self Test
PC	Personal Computer
POST	Power On Self Test. A system test that is activated each time the system is powered on.

R

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.
Rx	Receive

S

SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol. An Internet-standard protocol for managing devices on IP networks. It is used mostly in network management systems to monitor network-attached devices for conditions that warrant administrative attention.
SSH	Secure SHell. A network protocol for secure data communication, remote shell services or command execution and other secure network services between two networked computers that it connects via a secure channel over an insecure network.
SSID	Service Set IDentifier. An SSID is the name of a wireless local area network (WLAN). All wireless devices on a WLAN must use the same SSID in order to communicate with each other.

T

TNC	Threaded Neill-Concelman. A type of RF connector used for terminating coaxial cables. The TNC connector is a threaded version of the BNC connector. The connector has a 50 Ohm impedance and operates best in the 0-11 GHz frequency spectrum.
Tx	Transmit

V

VSAT	Very Small Aperture Terminal. An earthbound station used in satellite communications of data, voice and video signals, excluding broadcast television. A VSAT system consists of a two-way satellite ground station and a stabilized VSAT antenna with a dish antenna that is smaller than 3 meters.

W

WLAN	Wireless LAN, wireless network

Z

ZRM	Zero Reference Module

Numerics

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