

# AVIATOR 200/300/350

## Installation manual





# AVIATOR 200/300/350

## Installation & maintenance manual

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

# Record of revisions

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# About this manual

## 1.1 Purpose

The purpose of this manual is to provide information for installation, maintenance and troubleshooting of the AVIATOR 200/300/350 system. This manual covers AVIATOR 200/300/350 and AVIATOR 200D/300D/350D.

**Important**

The information, drawings and wiring diagrams contained in this manual are intended as a reference for engineering planning only. The drawings and wiring diagrams contained herein do not represent any specific Supplemental Type Certificate (STC). It is the installer's responsibility to compose installation drawings specific to the aircraft. This manual and the drawings and wiring diagrams contained herein may not be used as a substitute for an STC package.

## 1.2 Organization

The chapters of this Installation Manual provide the following information:

- **Introduction.** A short overview of the AVIATOR 200/300/350 system and services.
- **Equipment Drawings**  
Outline drawings of the units and connectors of the AVIATOR 200/300/350 system.
- **Connectors**  
Drawings and pin-out for the connectors, and a description of the required mating connectors.
- **Installation**  
Wiring drawings and detailed installation and wiring requirements.
- **Configuration**  
An introduction to the SwiftBroadband Unit's web interface, and a description of how to configure the AVIATOR 200/300/350 system. A procedure how to calibrate the Satcom antenna and a short description of how to configure some of the 3rd party handsets.
- **Maintenance and Troubleshooting**  
Descriptions of Airworthiness, help desk, software update, LEDs, BITE test and how to return units for repair.
- **Appendices**  
Equipment specifications, DO-160 Forms, installation of an Iridium Band Reject Filter, WLAN country codes, SIP setup for Wifi enabled phones and a list of applicable standards.

## 1.3 Related documentation

Part number	Description
98-127719	AVIATOR 200/300/350 User Manual
98-127720	AVIATOR 200/300/350 Quick Guide
98-129599	AVIATOR Wireless Handset and Cradle User Manual
98-129600	AVIATOR Wireless Handset and Cradle Installation & Maintenance Manual
98-128279	Intermediate Gain Antenna Installation Manual

Table 1-1: List of Related Documentation

## 1.4 Precautions: Warnings, Cautions and Notes

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, or jeopardize the flight safety on the aircraft.
- **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, flight safety nor personal safety.

### General precautions

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!** The AVIATOR 200/300/350 system contains items that are electrostatic discharge sensitive. Use approved industry precautions to keep the risk of damage to a minimum when you touch, remove or insert parts or assemblies.

# Introduction to the AVIATOR 200/300/350

## 2.1 General description

This manual describes the administrative and technical aspects, features, functions and components of the AVIATOR 200/300/350 system. All comments or recommendations regarding the installation, acceptance or operation of the system or its accessories and components should be directed to Cobham SATCOM.

**Note**

The AVIATOR 200/300/350 system is available in two versions:

- AVIATOR 200/300/350 approved to RTCA specification DO-178B level E and DO-254 level E
- AVIATOR 200D/300D/350D approved to RTCA specification DO-178B level D and DO-254 level D.

In general descriptions the nomenclature AVIATOR 200/300/350 covers both versions. Where necessary, the Level D system is specified as AVIATOR 200D/300D/350D.

### 2.1.1 The AVIATOR 200/300/350 system

#### Overview of the AVIATOR 200/300/350 system

The AVIATOR 200/300/350 system is a compact, light-weight aeronautical satcom system that uses Inmarsat's SwiftBroadband services.

The AVIATOR system consists of the following units:

- TT-5040A SBU (SwiftBroadband Unit)
- TT-5040A-001 or TT-4050A-8xy CM (Configuration Module), inserted in the SBU. The CM also holds the SIM card, which provides access to the SwiftBroadband services. The SIM card is included in the delivery.
- TT-5016A HLD (High Power Amplifier, Low Noise Amplifier and Diplexer in one unit).

These units are to be connected to a satcom antenna. See section *Satcom antenna systems* on page 2-4 for supported antenna types and model numbers.

The following drawing shows the AVIATOR 200/300/350 cabin installation with connected communication devices and available options:

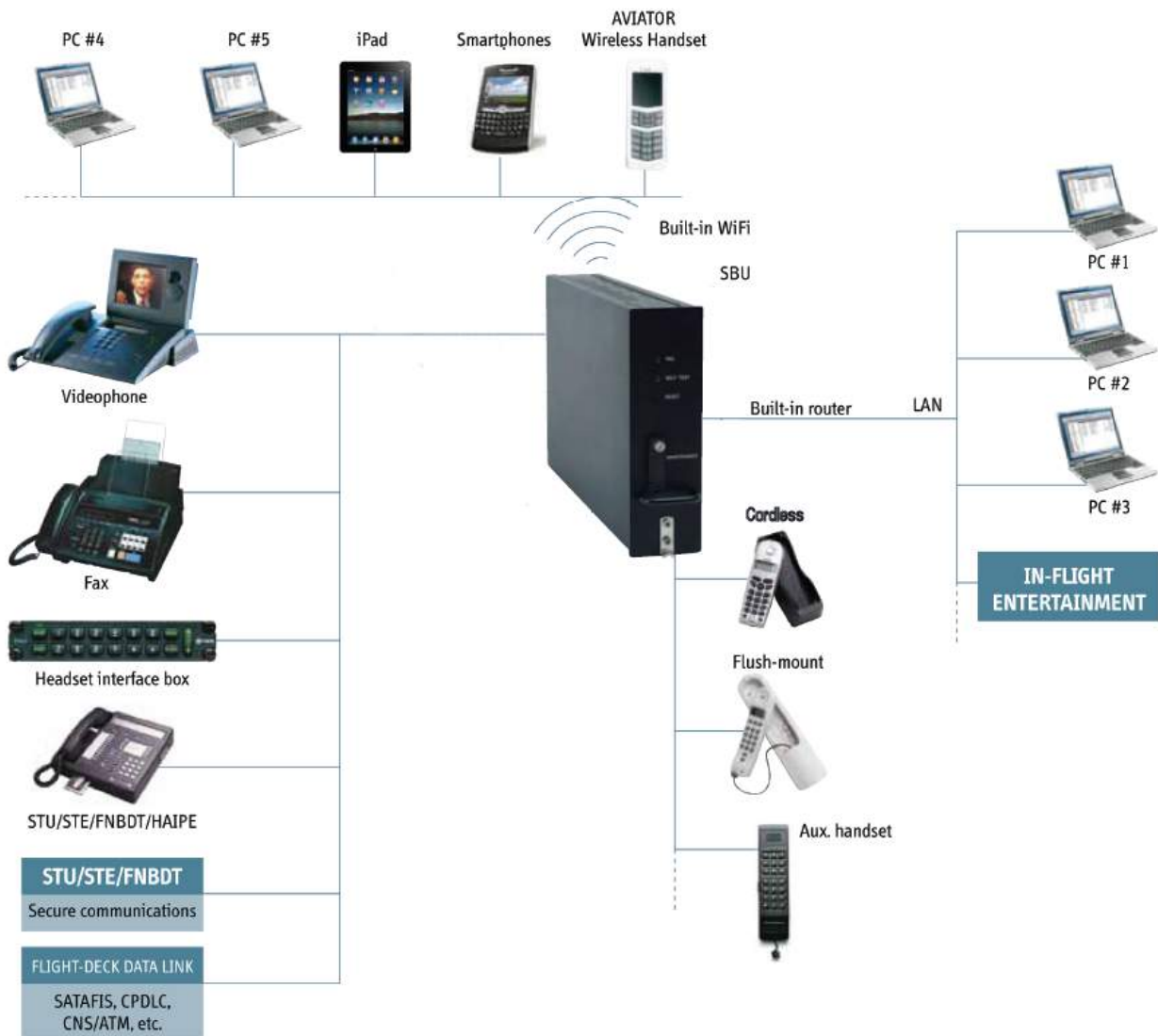


Figure 2-1: Communication devices for the AVIATOR 200/300/350 system (example for a Level E system)



## Services

The SwiftBroadband services available depend on the type of antenna installed and the current elevation angle to the satellite. The following table shows the services available for the supported antenna types.

SwiftBroadband service	Satcom antenna		
	AVIATOR 200	AVIATOR 300 IGA (Class 7)	AVIATOR 350 HGA (Class 6)
Standard IP background	Up to 200 kbps	Up to 332 kbps	Up to 432 kbps
IP streaming classes	8/16	8/16/32/64/128 kbps	8/16/32/64/128 kbps/X-Stream <sup>b</sup>
Circuit-switched standard voice	Yes	Yes	Yes
ISDN service or 3.1 kHz audio (Premium voice)	No	Elevation > 45°	Yes
Multi-voice: Number of voice calls	1+1 (best effort quality)	1+Up to 8 (best effort quality)	1+Up to 8 (best effort quality)

Table 2-1: SwiftBroadband services for supported antenna types

- a. The elevation needed for services with this antenna type is > 20°.
- b. Data rates are up to 512 kbps. Check with your service provider for activation.

For current support of Inmarsat services check at

[www.inmarsat.com/aviation/complete-aviation-connectivity/swiftbroadband](http://www.inmarsat.com/aviation/complete-aviation-connectivity/swiftbroadband).

The current elevation angle is shown in the web interface of the AVIATOR 200/300/350.

For ISDN service or 3.1 kHz audio and IGA the elevation angle must be larger than 45 degrees. Note that the ISDN phone service cannot be used by the AVIATOR 200 or the AVIATOR 200D.

## PBX telephone exchange

The built-in PBX telephone exchange unit of the SBU connects two direct 2-wire POTS interfaces for faxes, auxiliary phones, headset interface boxes etc., as well as an ISDN interface for ISDN phones, fax machines or Secure communication. The built-in PBX of the SBU can route VoIP calls that are terminated in the SIP server of the SBU.

## Configuration Module (CM)

The Configuration Module (CM) for the SBU is inserted in the SBU and holds system and user settings. It is designed as a “plug-in” module for the SBU, so the SBU can be replaced while retaining all SBU and user settings. The SBU CM contains a permanently built-in SIM card for access to the SwiftBroadband services.

## Web interface for configuration

Use the built-in web interface of the SBU to access the SBU configuration settings in the CM. A subset of the configuration settings are stored in a write-protected area of the CM. This subset contains the physical settings for the antenna, cabling and other external input.

To set up or change the settings of the write-protected area you must connect a PC to the connector marked **Maintenance** on the SBU front plate. You can view all settings from any LAN or WLAN interface. For further information on the web interface, see *Configuration tasks* on page 6-2.

## Satcom antenna systems

The AVIATOR 200/300/350 system can be used with a wide range of satcom antennas. The following table shows the Cobham SATCOM antennas that are compatible with the AVIATOR 200/300/350.

System type	Satcom antenna type
AVIATOR 200	TT-3002A LGA/LGA-3000
AVIATOR 300	TT-5006A IGA
	IGA-5001
AVIATOR 350 <sup>a</sup>	HGA-6000/HGA-6500
	HGA-7000/HGA-7001

Table 2-2: Satcom antenna types for the AVIATOR 200/300/350 system

- a. For backwards compatibility with previous Aero-SB Lite systems, the AVIATOR 350 can also be used with TT-5006 IGA or IGA 5001, then the system is an AVIATOR 300.

An AVIATOR 200/300/350 system must only be used with satcom antennas that have received type approval by Inmarsat.

## Built-in router and Wireless (WLAN) option

The AVIATOR 200/300/350 system offers a built-in router as an option. With this option multiple users and applications can use the system simultaneously. Without this option only the first device that connects to the SBU will be allowed on the Internet.

The system also offers a built-in WLAN option for wireless communication devices and a WLAN antenna approved for aeronautical use. This includes full WLAN routing functionality.

If ordered, this option is enabled in the AVIATOR 200/300/350 from the factory. If these options are not included from the start, the system can be upgraded at a later stage. Then

you receive the FLEX key for the purchased options and enter it in the AVIATOR 200/300/350 web interface.

### Built-in Multi-voice option<sup>1</sup>

The AVIATOR 200/300/350 system offers a built-in Multi-voice option. With this option multiple calls can be made to and from the system simultaneously. Normally, the BGAN system only supports one call at a time. With the built-in, optional Multi-voice service enabled in your system, you can make multiple calls. The maximum number of concurrent calls depends on your system, see Table 2-1 on page 2-3. If ordered, this option is enabled in the AVIATOR 200/300/350 from the factory. If this option is not included from the start, the system can be upgraded at a later stage. Then you receive the FLEX key for the purchased options and enter it in the AVIATOR 200/300/350 web interface.

**Note** You must have Multi-voice in your airtime subscription, AVIATOR Wireless Handset software version minimum 1.03 and SBU software version minimum AVIATOR 200/300/350 (Level E): 1.07, AVIATOR 200D/300D/350D (Level D): 2.01, in order to support the Multi-voice function.

For information on how to set up Multi-voice, see *Multi-voice (option)* on page 6-91.

### Built-in CMU/ACARS option<sup>1</sup>

The AVIATOR 200/300/350 system offers a built-in CMU/ACARS option. With this option it is possible to connect a CMU or equivalent equipment to the SBU via A429 and send/receive ACARS messages over SwiftBroadband. If ordered, this option is enabled in the AVIATOR 200/300/350 from the factory. If this option is not included from the start, the system can be upgraded at a later stage. Then you receive the FLEX key for the purchased option(s) and enter it in the AVIATOR 200/300/350 web interface. For information on how to set up CMU/ACARS, see *Set up CMU/ACARS (option)* on page 6-51.

### SB-Safety Voice option<sup>2</sup>

With the SB-Safety (ICAO) Voice option you can make priority calls (priority level 1, 2 or 3) to and from the cockpit. The 2-wire POTS connection is used for an external dialer and a headset. The SB-Safety Voice service includes:

- Selecting the priority level before placing outgoing calls
- External pre-programmed speed dial numbers with embedded priority (optional)
- Handling priority level for active call
- Handling priority level for incoming call
- Annunciate the call status and SB-Safety Voice service availability via discrete outputs

To be able to use the SB-Safety Voice you must disable the WLAN access point and Multi-Voice in the web interface. ISDN and the second 2-wire POTS interface are disabled when using SB-Safety Voice. If this option is not included from the start, the system can be upgraded at a later stage. Then you receive the FLEX key for the purchased option(s) and enter it in the AVIATOR 200/300/350 web interface.

1. Supported from software version 1.07 for AVIATOR 200/300/350 (Level E) and 2.01 for AVIATOR 200/300/350D (Level D).
2. Supported from software version 4.00 for AVIATOR 200/300/350 (Level D).

**Priority levels with an external dialer**

If an external dialer is connected to the SBU, you can specify the priority level of outgoing calls when entering phones numbers in the dialer’s directory.

Priority Level	Application Category	SATVOICE Call Examples
1 (highest) Safety of Flight	Distress and Urgency	Inflight Emergency, Rapid Emergency Descent, Urgent Sidestep for Weather
2 Operational High (second highest) Safety of Flight	Flight Safety	Altitude Request, ATC Clearance/Instruction
3 Operational Low (third highest) Safety of Flight	Regularity of Flight, Meteorological Administrative	Air Traffic Information Service, AOC, Redispach, Maintenance

Table 2-3: Priorities for SATVOICE calls (SB-Safety Voice)<sup>a</sup>

a. Advisory Circular AC No.20-150B of U.S. Department of Transportation Federal Aviation Administration

The priority level of a call can be part of the phone number. When dialing numbers, the international call prefix can be changed to state the priority level: 01 for priority level 1, 02 for priority level 2 and 03 for priority level 3. Then the phone numbers look as follows (example with 45 country code for Denmark):

- Priority level 1: 01 45 XX XX XX XX
- Priority level 2: 02 45 XX XX XX XX (or 00 45 XX XX XX XX)
- Priority level 3: 03 45 XX XX XX XX

No matter which priority level an outgoing phone call has, the phone number transferred to the PBX is converted to the standard phone number using 00 as international call prefix. The priority can be displayed on a connected annunciator panel.

**Compatibility with IRIDIUM satellite phones**

You can use the AVIATOR 200/300/350 system on aircraft with IRIDIUM satellite phones. As Inmarsat satcom systems and Iridium satcom systems are using adjacent frequency bands, there is a potential risk of interference when the Iridium system is used at the same time as the Inmarsat system. To avoid this, two filters are needed:

- An Iridium Band Reject Filter, TT-5019A, must be inserted between the SBU and the HLD.
- An INMARSAT Dual RF Filter, Aircell P/N P13167, must be inserted in the antenna coax of the Iridium system.

For further information on installing the Iridium Band Reject Filer see *TT-5019A Iridium Band Reject Filter* on page F-1.

## 2.1.2 AVIATOR 200/300/350 features

The AVIATOR 200/300/350 system has the following features:

- SwiftBroadband channel providing an 'always on' data connection of up to 432 kbps.
- Full duplex, single or multi-user.
- Automatic satellite selection.
- Built-in PBX in the SBU interfacing to two 2-wire connections, one ISDN interface and WLAN in the SBU, and integrated SIP server for VOIP telephony.
- Standard voice.
- 3.1 kHz audio for modems, G3 fax, 14.4 kbps high quality voice etc.
- ISDN voice for Secure communication, G4 fax etc.
- ISDN data for video conferences etc.
- Built-in Router option with DHCP, NAT for six Ethernet interfaces.
- Built-in Wireless option (WLAN) IEEE 802.11 b/g.
- Built-in Multi-voice option, up to 1+8 concurrent calls
- Access to built-in web interface for daily use using LAN and WLAN.
- Built-in CMU/ACARS option
- Built-in web interface for configuration using the Maintenance connector on the SBU front plate.
- Does not affect the operation of an Iridium system.
- SB-Safety Voice (cockpit voice) option (from software 4.00)

**Note**

The availability of some services depends on the satcom antenna type of the system. Check the section *Services* on page 2-3 for an overview of services available for LGA, IGA and HGA.

## Software versions

The AVIATOR 200/300/350 is shipped with software version 2.02. Software versions 2.03 and 4.00 are also available. The following tables show the features that are supported for each software version.

Software version	Router	Wifi	CMU/ACARS	Multi-voice	A429 via RS422	SB-Safety Voice
4.00	Yes	Yes <sup>a</sup>	Yes	Yes <sup>a</sup>	Yes	Yes
2.03	Yes	Yes	Yes	Yes	Yes	-
2.02	Yes	Yes	Yes	Yes	-	-

Table 2-4: Available features for software versions (Level D)

- a. Not together with SB-Safety voice.

For Level E, the latest software version covered by this manual is version 1.09.

## 2.2 Application

### 2.2.1 Minimum system

A minimum working system has at least:

- one TT-5040A SBU
- one TT-5040A-001 CM
- one TT-5016A HLD
- one satcom antenna: LGA, IGA or HGA

The minimum wiring required for an AVIATOR 200/300/350 system is described in the section *Minimum system drawing* on page 5-2.

The CM, HLD and some satcom antennas are powered by the SBU.

### 2.2.2 Part numbers

#### Applicable part numbers

This installation manual is for the AVIATOR 200/300/350 system and is applicable to the part numbers in the following tables.

Part number	Unit description
405040A	SwiftBroadband Unit (SBU) [without CM] for AVIATOR 200/300/350
405040A-THD	SwiftBroadband Unit (SBU) [without CM] for AVIATOR 200D/300D/350D
405040A-838	Configuration Module (CM) for SBU for AVIATOR 200/200D
405040A-001	Configuration Module (CM) for SBU (no key and no options)
405040A-002	Built-in Router option
405040A-003	Built-in Wireless option
405040A-004	WLAN Antenna, optional (2 pieces recommended)
405040A-009	Built-in ACARS/SB Safety (ICAO) voice option
405040A-010	Built-in Multi-voice option
405040A-006	AVIATOR 350 Key (HGA/IGA)
405040A-007	AVIATOR 300 Key (IGA)
405040A-008	AVIATOR 200 Key (LGA)

Table 2-5: Part numbers

Part number	Unit description
405016A	High Power Amplifier/Low Noise Amplifier/Diplexer (HLD) AVIATOR 200/300/350
405016A-THD	High Power Amplifier/Low Noise Amplifier/Diplexer (HLD) AVIATOR 200D/300D/350D
403002-001	Low Gain Antenna (LGA). Original Manufacturer Sensor Systems P/N: S65-8282-101 (listed on FAA 8130-3).
405006A-PMA	Intermediate Gain Antenna (IGA). Original Manufacturer Cobham P/N: 677-A0002 (listed on FAA 8130-3).
405621B-THW	2-Wire Handset (white)
405621B-THR	2-Wire Handset (black)
405622B-THW	2-Wire Cradle (white)
405622B-THR	2-Wire Cradle (black)
405019A	Iridium Band Reject Filter

Table 2-5: Part numbers (Continued)

Part number	Configuration module description
405040A-838	CM for SBU with A200 key
405040A-828	CM for SBU with A200 key, Router option(s)
405040A-818	CM for SBU with A200 key, WiFi option(s)
405040A-808	CM for SBU with A200 key, Router, WiFi option(s)
405040A-837	CM for SBU with A300 key
405040A-827	CM for SBU with A300 key, Router option(s)
405040A-817	CM for SBU with A300 key, WiFi option(s)
405040A-807	CM for SBU with A300 key, Router, WiFi option(s)
405040A-836	CM for SBU with A350 key
405040A-826	CM for SBU with A350 key, Router option(s)
405040A-816	CM for SBU with A350 key, WiFi option(s)
405040A-806	CM for SBU with A350 key, Router, WiFi option(s)
405040A-878	CM for SBU with A200 key, Multi voice option(s)

Table 2-6: Part numbers for configuration modules and options



Part number	Configuration module description
405040A-868	CM for SBU with A200 key, Router, Multi voice option(s)
405040A-858	CM for SBU with A200 key, WiFi, Multi voice option(s)
405040A-848	CM for SBU with A200 key, Router, WiFi, Multi voice option(s)
405040A-876	CM for SBU with A350 key, Multi voice option(s)
405040A-866	CM for SBU with A350 key, Router, Multi voice option(s)
405040A-856	CM for SBU with A350 key, WiFi, Multi voice option(s)
405040A-846	CM for SBU with A350 key, Router, WiFi, Multi voice option(s)
405040A-8B6	CM for SBU with A350 key, ACARS/SB Safety (ICAO) voice option(s)
405040A-8A6	CM for SBU with A350 key, Router, ACARS/SB Safety (ICAO) voice option(s)
405040A-896	CM for SBU with A350 key, WiFi, ACARS/SB Safety (ICAO) voice option(s)
405040A-886	CM for SBU with A350 key, Router, WiFi, ACARS/SB Safety (ICAO) voice option(s)
405040A-8F6	CM for SBU with A350 key, Multi voice, ACARS/SB Safety (ICAO) voice option(s)
405040A-8E6	CM for SBU with A350 key, Router, Multi voice, ACARS/SB Safety (ICAO) voice option(s)
405040A-8D6	CM for SBU with A350 key, WiFi, Multi voice, ACARS/SB Safety (ICAO) voice option(s)
405040A-8C6	CM for SBU with A350 key, Router, WiFi, Multi voice, ACARS/SB Safety (ICAO) voice option(s)

Table 2-6: Part numbers for configuration modules and options (Continued)

The flex keys for A350 can also be used in A300 systems.

The SwiftBroadband Unit (SBU) and the High Power Amplifier, Low Noise Amplifier and Diplexer (HLD) must all be level E or level D approved. **No mismatch is allowed.**

## Circuit breaker

Part number	Recommended aircraft circuit breakers
2TC2-7.5	Klixon 2TC series, 7.5 A current rating (SBU <sup>a</sup> )

Table 2-7: Part numbers for Klixon circuit breaker

- a. The CM, HLD and some satcom antennas are powered by the SBU.

## Trays and connectors

Part number	Approved tray
PO299-101	ECS Tray Assembly 1/4-size ATR (for SBU)
MT4-2346-101	EMTEQ Tray Assembly 1/4-size ATR (for SBU)
DPX2NA-67322-606 (old number: DPX2NA-67322-500)	Required Connector Kit for SBU tray: ITT Cannon Connector, Dual Plug, contact arrangement top: 33C4, bottom: 33C4.

Table 2-8: Part number for connector

## Installation kits

For installation kits for the AVIATOR 200/300/350 system contact:

<p><b>ECS, a Carlisle IT company, USA</b>            Phone (Franklin, WI): +1 800-327-9473            Phone (Kent, WA): +1 800-227-5953            E-mail: <a href="mailto:sales@CarlisleIT.com">sales@CarlisleIT.com</a>            Home page: <a href="http://www.CarlisleIT.com">www.CarlisleIT.com</a></p>	<p><b>EMTEQ (B/E Aerospace)</b>            Home page: <a href="http://www.emteq.com">www.emteq.com</a>            Contact info: <a href="http://www.emteq.com/contact-us.php">www.emteq.com/contact-us.php</a></p>
--	--

Table 2-9: Installation kits, contact information

ECS offers an installation kit for the SBU (ECS part number: 120-20027-102).

Item in installation kit
1 ARINC connector, SBU (DPX2NA-67322-606)
1 Tray Assembly, SBU, 1/4-size ATR W/DPX2 (P0299-101)

Table 2-10: Basic installation kits from ECS for the SBU

### 2.2.3 Applicable external units

The AVIATOR 200/300/350 system can be used with the external units listed below. Note that the AVIATOR 200/300/350 system may also be able to interface to other units not listed below.

Product name	Product description	Manufacturer	
ICG DECT Cordless Handset	Cordless handset system	<b>ICG, USA</b>	
		Phone:	1-800-279-1991 or (757)947-1030
		E-mail: Home page:	<a href="mailto:sales@icg.aero">sales@icg.aero</a> <a href="http://www.icg.aero">www.icg.aero</a>

Table 2-11: List of applicable external units

Product name	Product description	Manufacturer
Sigma <sup>7</sup>	Handset system	<b>ICG</b> (see contact info above)
PTA-12	Airborne Telephone Adaptor	<b>Northern Airborne Technology Ltd.</b> 1925 Kirschner Road Kelowna, BC Canada V1Y 4N7  Phone: (250) 763-2232 Toll Free: (888) 763-2232 Fax: (250) 762-3374
MD41-1948	Switch Annunciator Panel	<b>MID-CONTINENT INSTRUMENT CO., INC.</b> 9400 E. 34th. St. North Wichita, KS 67226-2615  Phone: 316-630-0101 Fax: 316-630-0723 Home page: <a href="http://www.mcico.com">www.mcico.com</a>
AirCell Axxess	Iridium Telephone System	<b>Aircell Business Aviation Services LLC</b> 303 south Technology Court, Bldg.A Broomfield, CO 80021  Phone: +1.303.301.3200 Fax: +1.303.301.3201 E-mail: <a href="mailto:sales@aircell.com">sales@aircell.com</a>
AIS 380 Aircraft Interface Module	Converter RS-422 to A429	<b>Shadin Avionics</b> 6831 Oxford St St Louis Park MN 55426 <a href="http://www.shadin.com/">www.shadin.com/</a>  Manufacturer part number: 833640-00 Cobham SATCOM part number: 405017A-801

Table 2-11: List of applicable external units

## 2.3 System block diagrams

The following block diagrams and the wiring diagrams in section 5.3.3 show examples of satcom antennas that can be connected to the AVIATOR 200/300/350 systems.

In order to use the satcom antenna with the AVIATOR 200/300/350 systems, the specific antenna type and the AVIATOR 200/300/350 system must be *Type Approved* by Inmarsat as a combined system. The satcom antenna types supported are listed in *Satcom antenna systems* on page 2-4. AVIATOR 200/300/350 systems will be Inmarsat Type Approved with more antennas as requested by market requirements. Contact your Cobham SATCOM sales/support representative for the latest status on Inmarsat Type Approvals for satcom antennas for the AVIATOR 200/300/350 system.

The following block diagrams show the basic system component interconnection and the user interfaces.

### 2.3.1 AVIATOR 200 system with LGA-3000 antenna

The drawing below shows the AVIATOR 200 system with an LGA antenna.

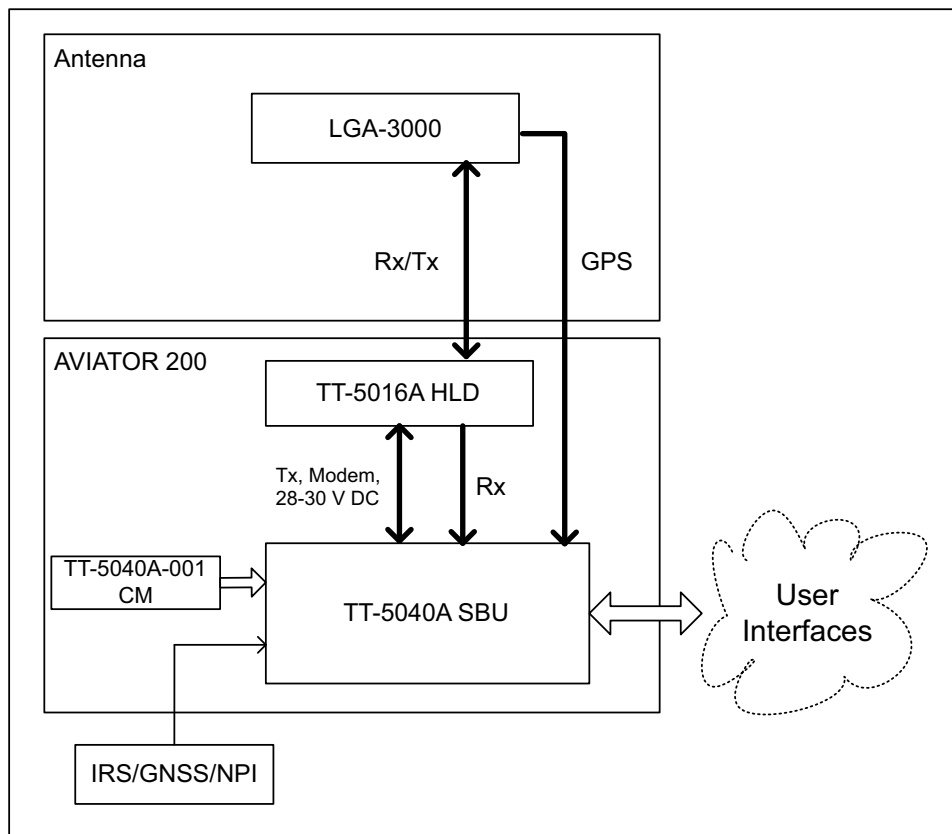


Figure 2-2: System configuration with LGA-3000 antenna

### 2.3.2 AVIATOR 300 system with TT-5006A IGA antenna

The drawing below shows the AVIATOR 300 system with in IGA antenna.

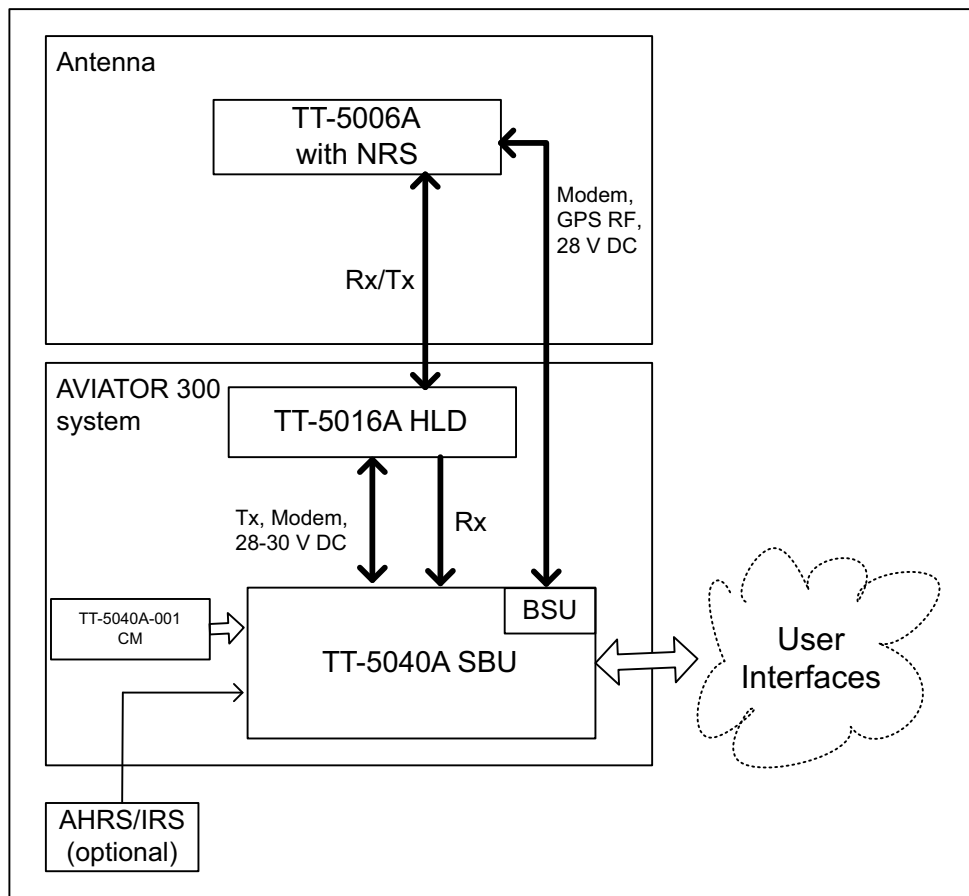


Figure 2-3: System configuration with TT-5006A IGA antenna

### 2.3.3 AVIATOR 350 system with Cobham antennas

The drawing below shows the AVIATOR 350 system with Cobham antennas.

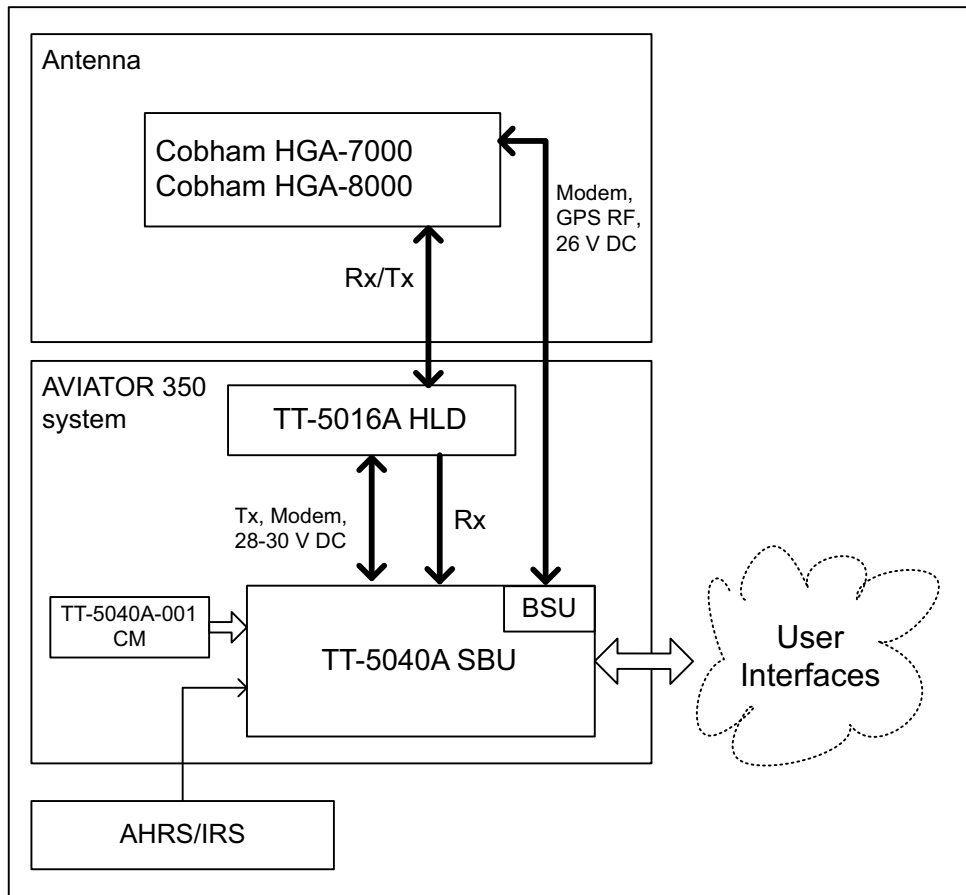


Figure 2-4: System configuration with Cobham antennas

### 2.3.4 AVIATOR 350 system with ARINC-741/781 antennas

The drawing below shows the AVIATOR 350 system with an ARINC-741/781 HGA.

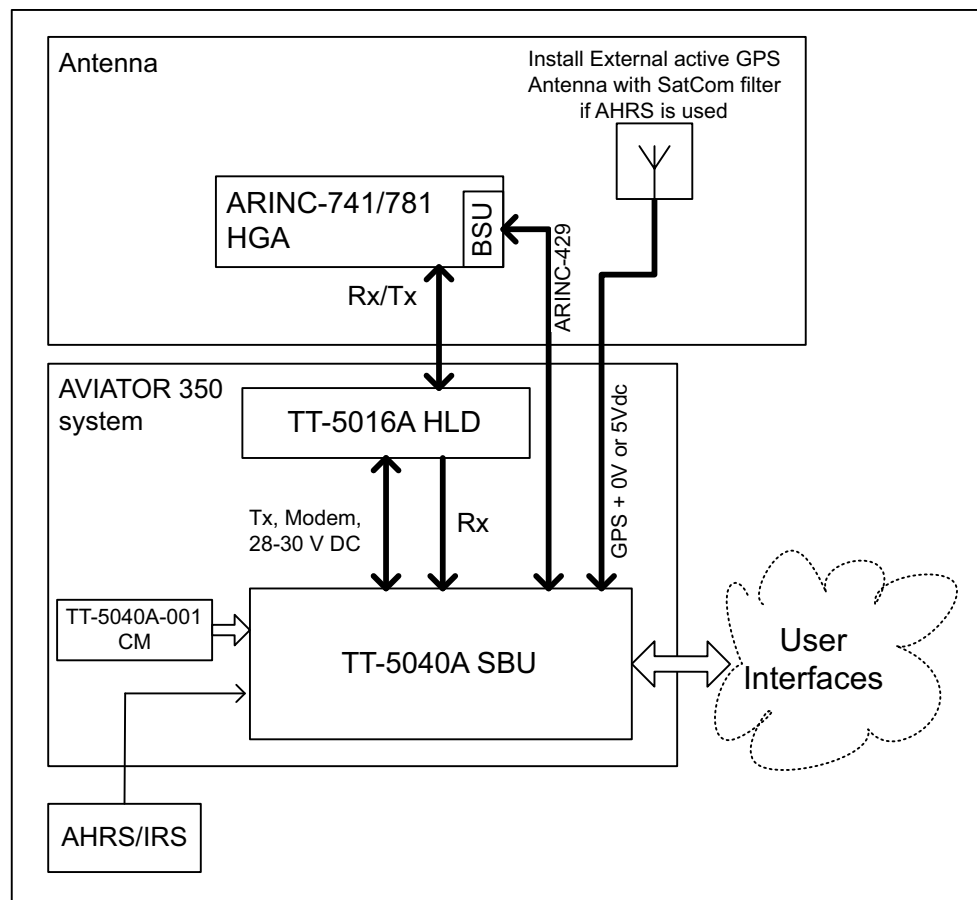


Figure 2-5: System configuration ARINC 429 antennas

For detailed description of the connection of each antenna type, see *Wiring the satcom antenna* on page 5-10.

### 2.3.5 AVIATOR 350D system with ACARS option and ARINC-741/781 ant.

The drawing below shows the AVIATOR 350 system with the HGA-6000/6500 and AMT-50 and ACARS/B Safety (ICAO) voice.

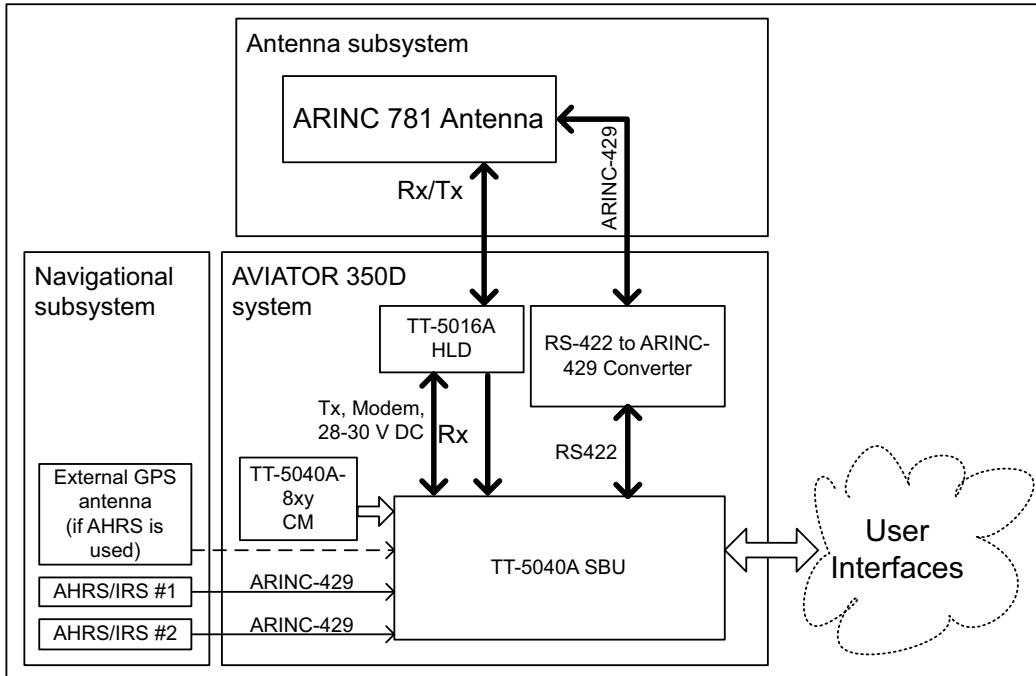


Figure 2-6: System configuration ARINC 429 antennas

For detailed description of the connection of each antenna type, see *Wiring the satcom antenna* on page 5-10.



## 2.3.6 User interfaces

The AVIATOR 200/300/350 system has the following user interfaces:

Interfaces	Number
2-wire POTS interface This interface can be used for the TT-5621B 2-Wire Handset and TT-5622B 2-Wire Cradle or other POTS handsets. The TT-5622B 2-Wire Cradle has an RJ11 connector to which additional 2-wire terminals can be connected, e.g. for fax or modem data.	2
10/100BaseT Ethernet interfaces for connecting IP equipment. Note that the SBU has a Built-in Router option. The SBU has an additional Ethernet interface for system configuration (Maintenance connector on the SBU front plate, not shown in the following figure).	6
Built-in Wireless Option with two WLAN antenna interfaces for diversity operation to connect WiFi-enabled equipment like lap tops, PDAs or VOIP handsets.	1 (32 devices)
Euro ISDN S-bus interface for PC, Fax or STE (without DC power support) <sup>a</sup>	1
Discrete outputs for annunciators	4

Table 2-12: AVIATOR 200/300/350 user interfaces

- a. Note that the ISDN data service (UDI/RDI) cannot be used by the AVIATOR 200 nor the AVIATOR 200D.

The following figure shows most of the possible user interfaces.

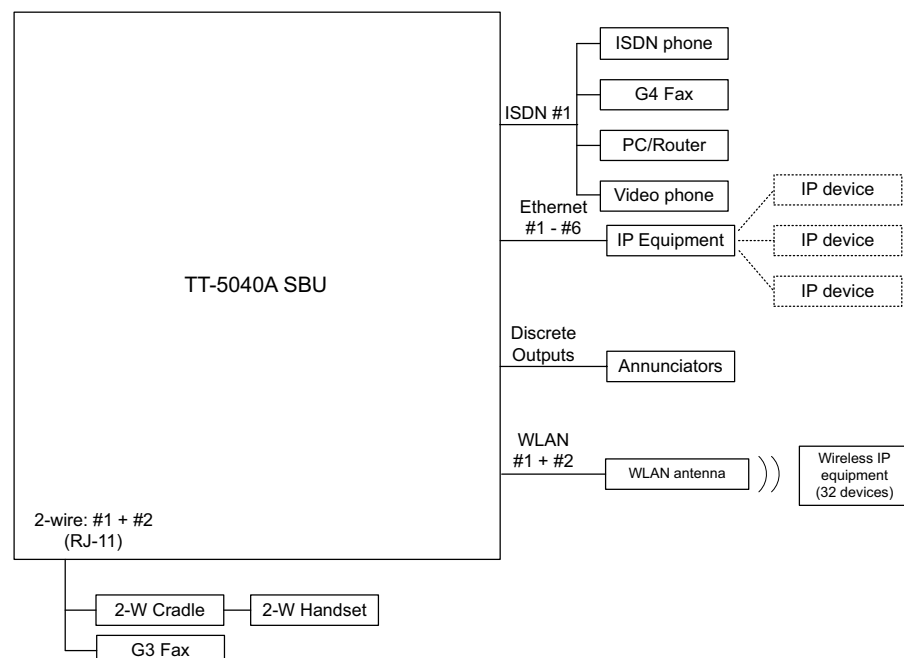


Figure 2-7: AVIATOR 200/300/350 interfaces

Note that the ISDN data service (UDI/RDI) cannot be used by the AVIATOR 200 nor the AVIATOR 200D.



# Equipment drawings

## 3.1 Introduction

The following pages show copies of outline drawings of important system units relevant for an installation.

**Important**

The drawings in this manual are for reference only. If you have access to the partner platform Cobham SYNC, you can get copies of the outline drawings at: <https://sync.cobham.com/satcom/support/downloads>. You can download the drawings as PDF files. There are also 3D models of selected units.

**Note**

For equipment drawings of the AVIATOR Wireless Handset and Cradle see *AVIATOR Wireless Handset and Cradle Installation & Maintenance Manual (98-129600)*.

# 3.2 TT-5040A SBU

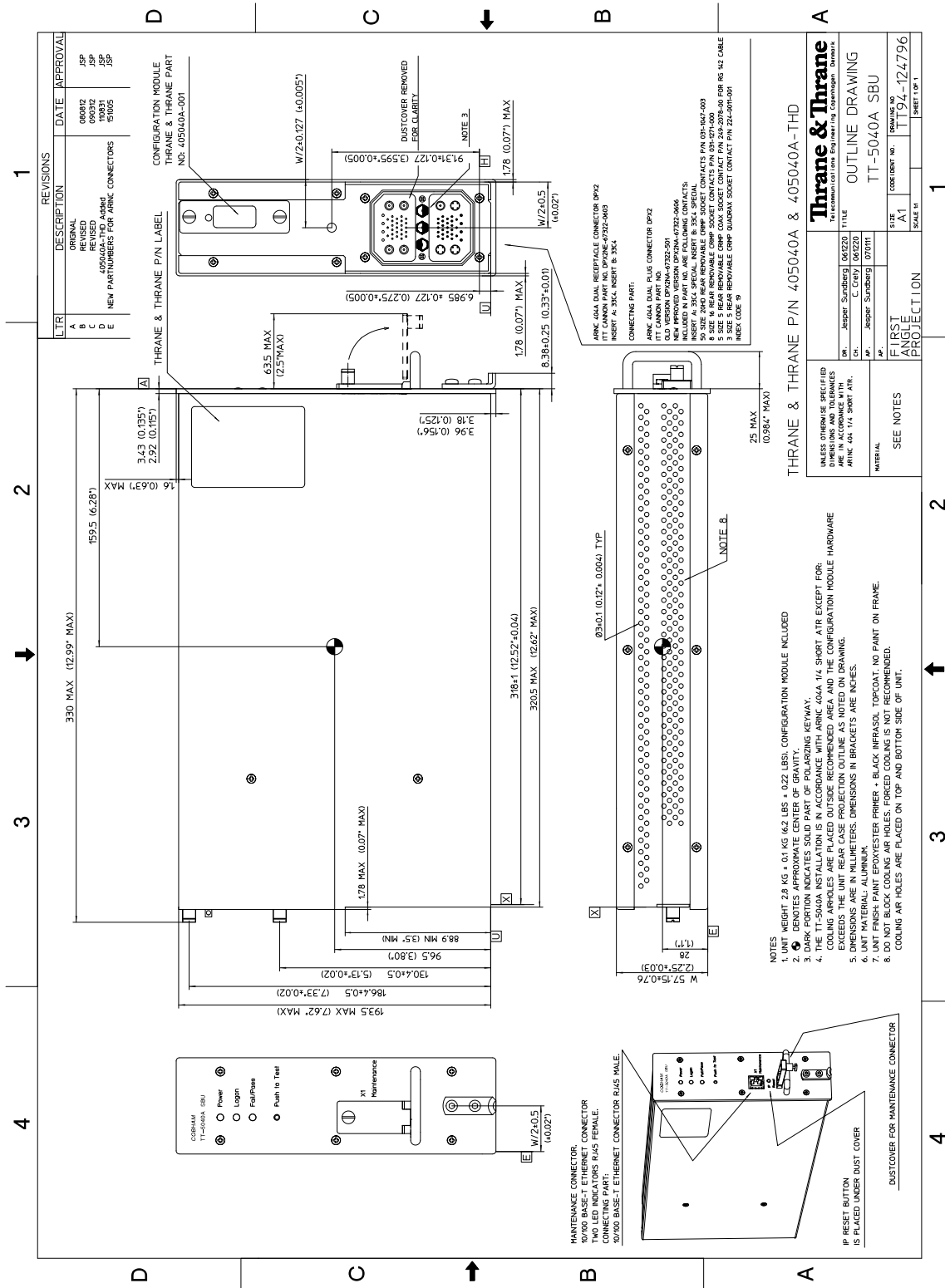


Figure 3-1: Outline drawing: TT-5040A SBU

### 3.2.1 TT-5040A-001 CM (inserted in the SBU)

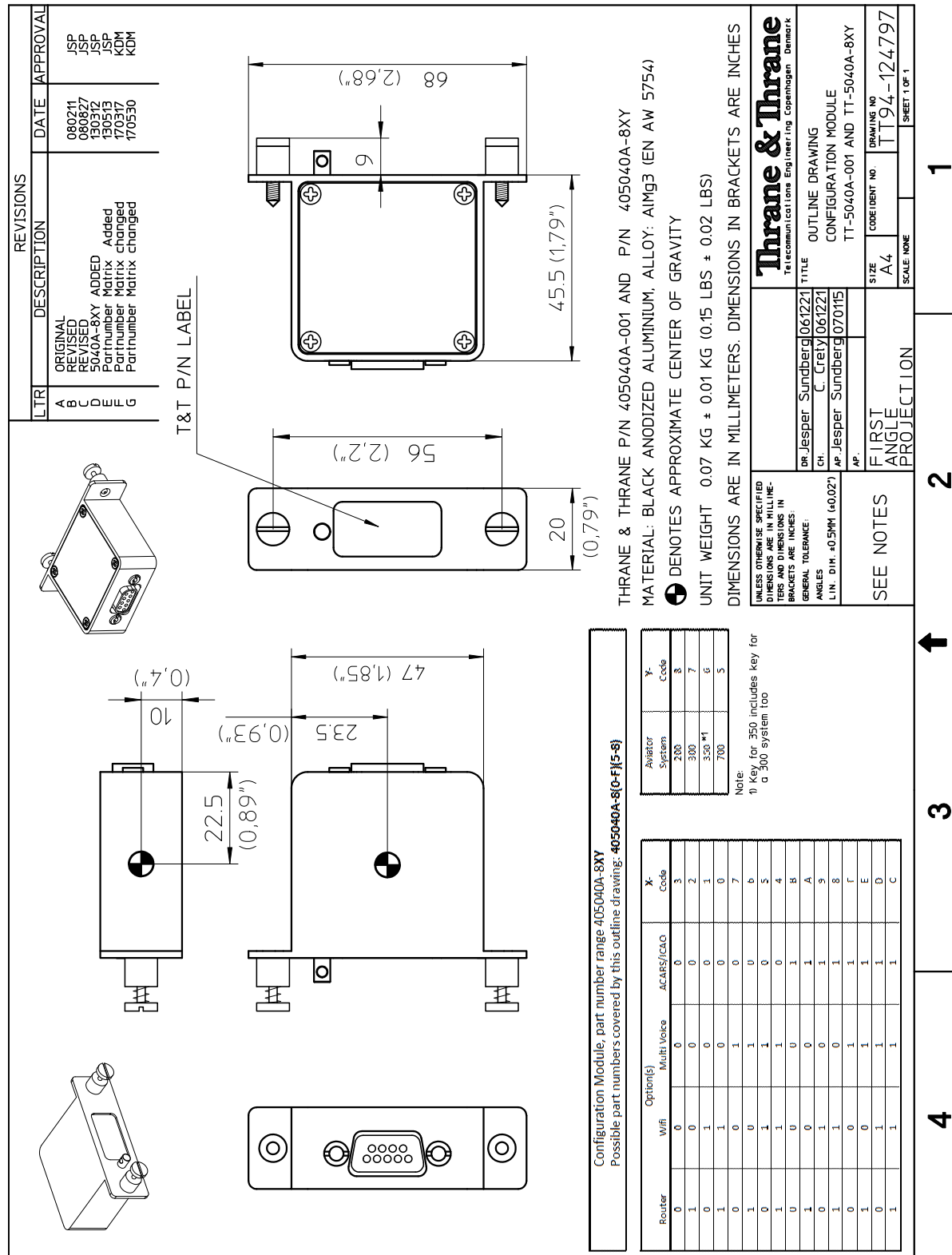


Figure 3-2: Outline drawing: TT-5040A-001 CM, inserted in the SBU

### 3.3 TT-5038A-003 Rx Power Splitter

**Note** If the Rx Power Splitter is to be mounted on a flat surface, mount it on a 3 mm mounting plate to provide enough space for mounting of the connectors.

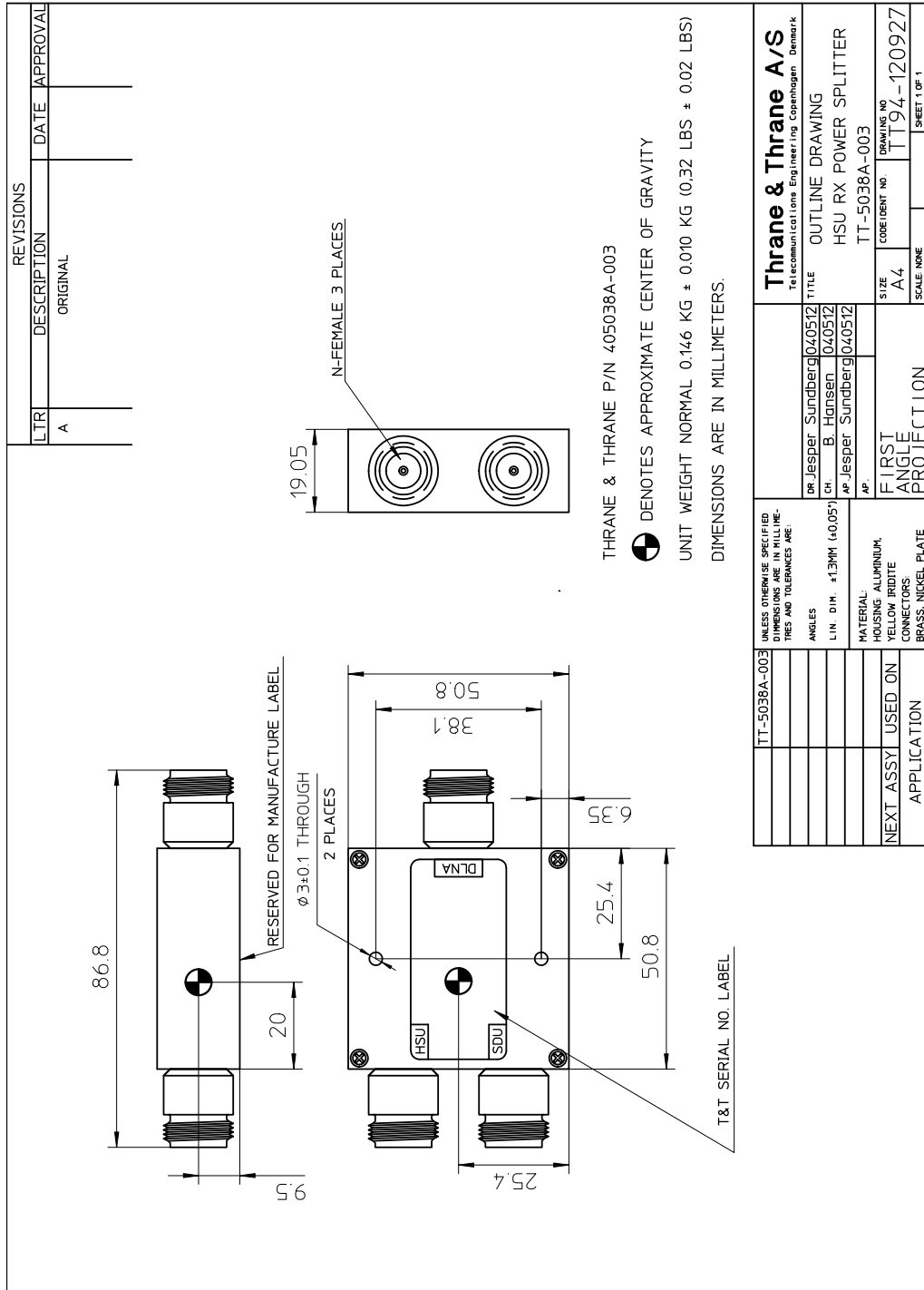


Figure 3-3: Outline Drawing: Rx Power Splitter

### 3.4 TT-5016A HLD

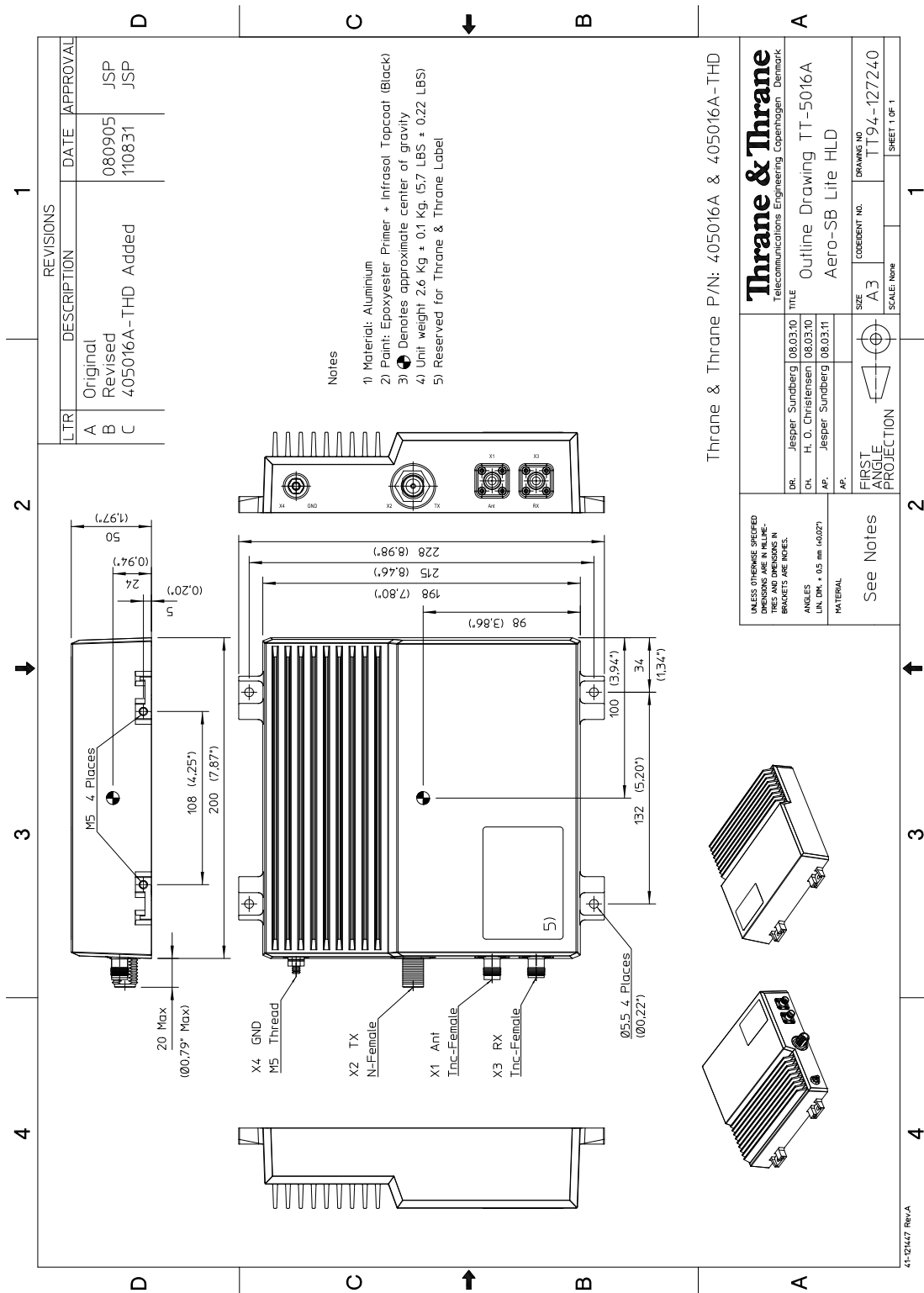
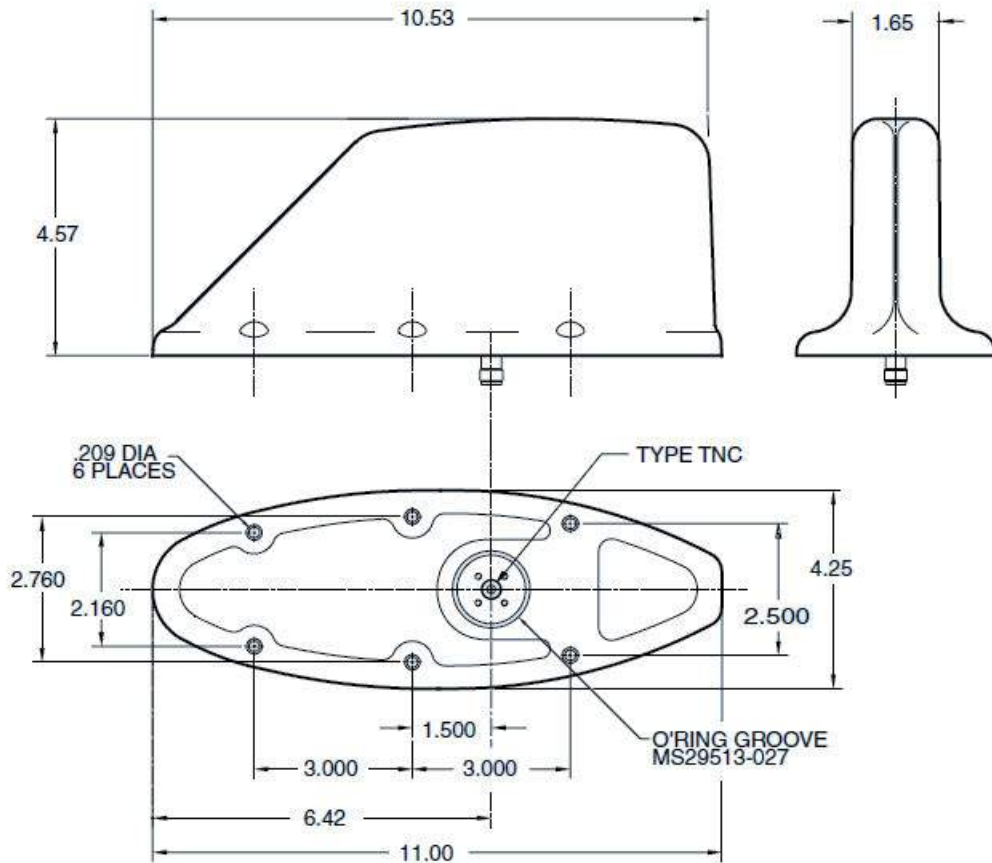


Figure 3-4: Outline drawing: TT-5016A HLD

### 3.5 TT-3002A LGA

Original Manufacturer Sensor Systems P/N: S65-8282-101 (listed on FAA 8130-3).



Dimensions in inch.

Figure 3-5: Outline drawing: TT-3002A LGA

For newest revision check at <http://www.sensorantennas.com>.



### 3.6 TT-5006A IGA

Original Manufacturer Cobham P/N: 677-A0002 (listed on FAA 8130-3).

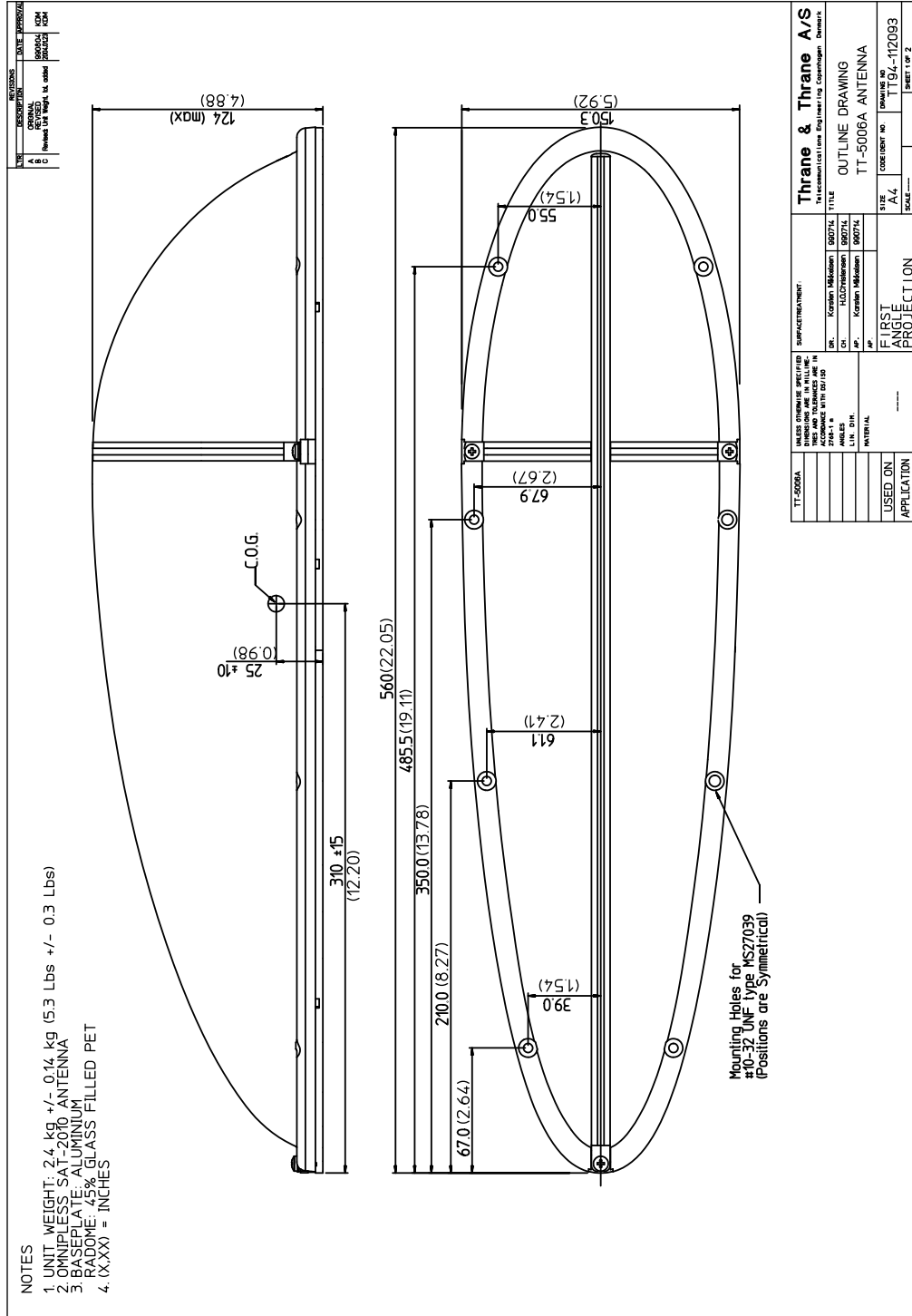


Figure 3-6: Outline drawing: TT-5006A IGA antenna

### 3.7 TT-5621B 2-Wire Handset

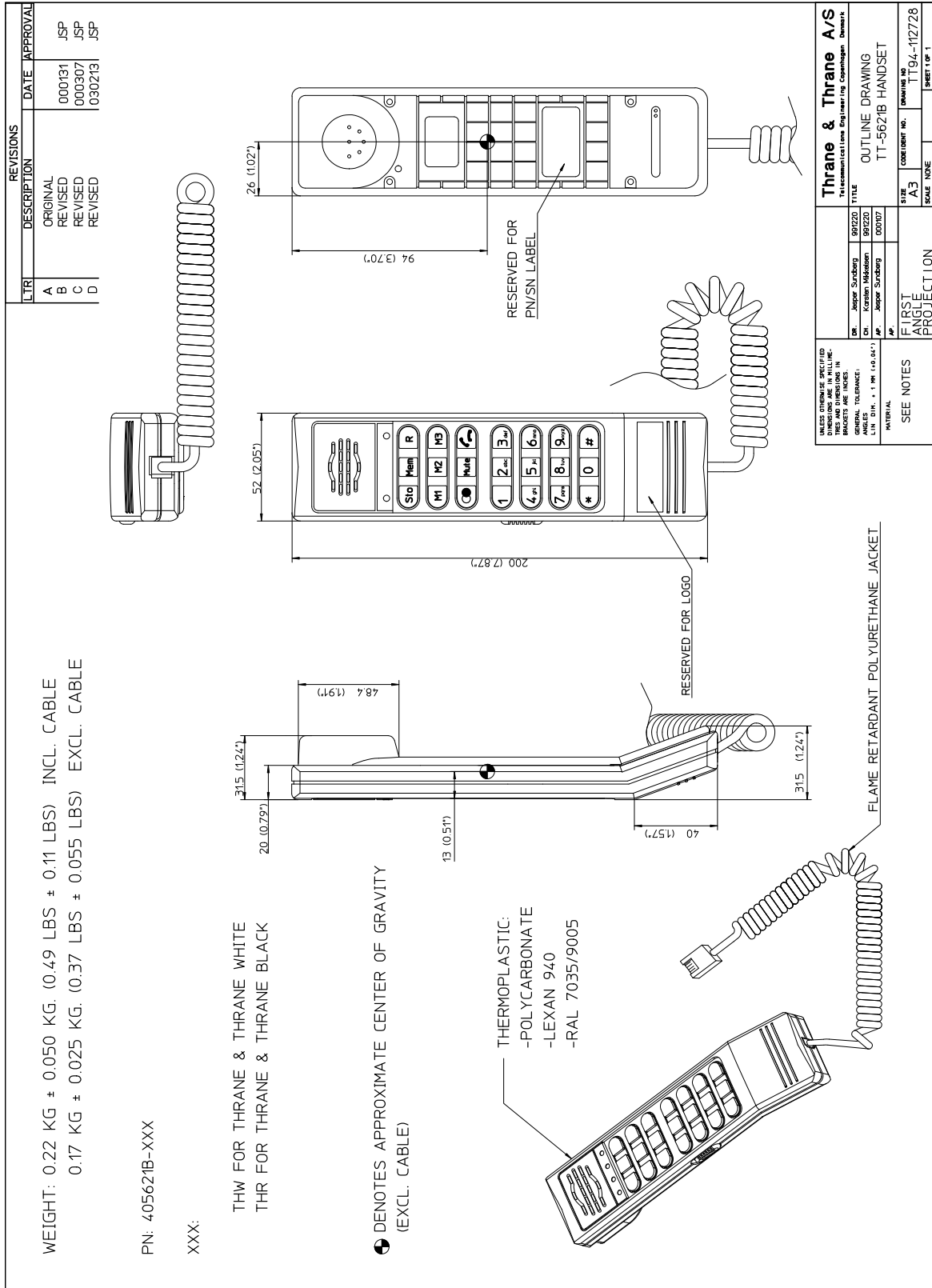


Figure 3-7: Outline drawing: TT-5621B 2-Wire Handset

### 3.8 TT-5622B 2-Wire Cradle

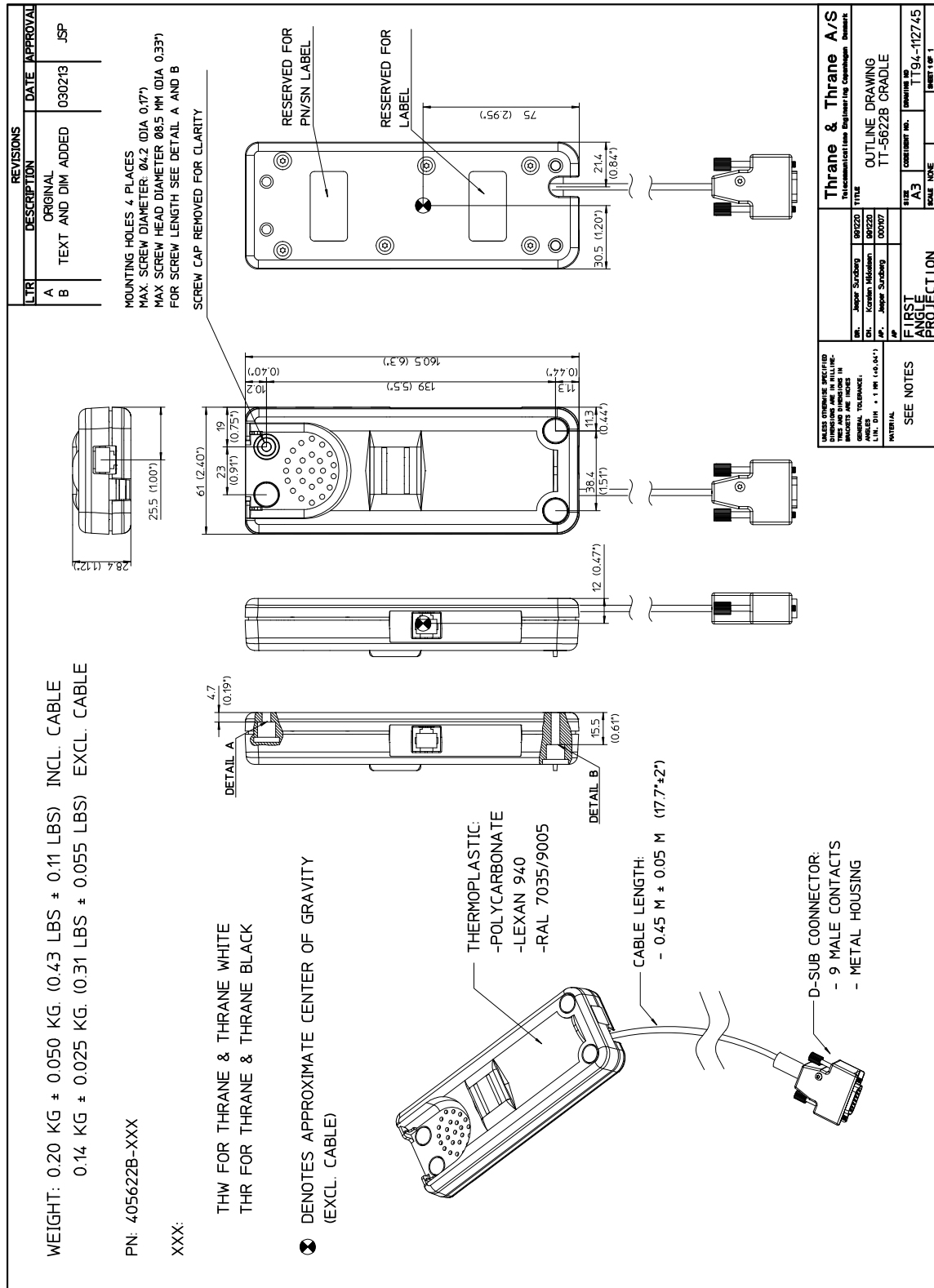


Figure 3-8: Outline drawing: TT-5622B 2-Wire Cradle



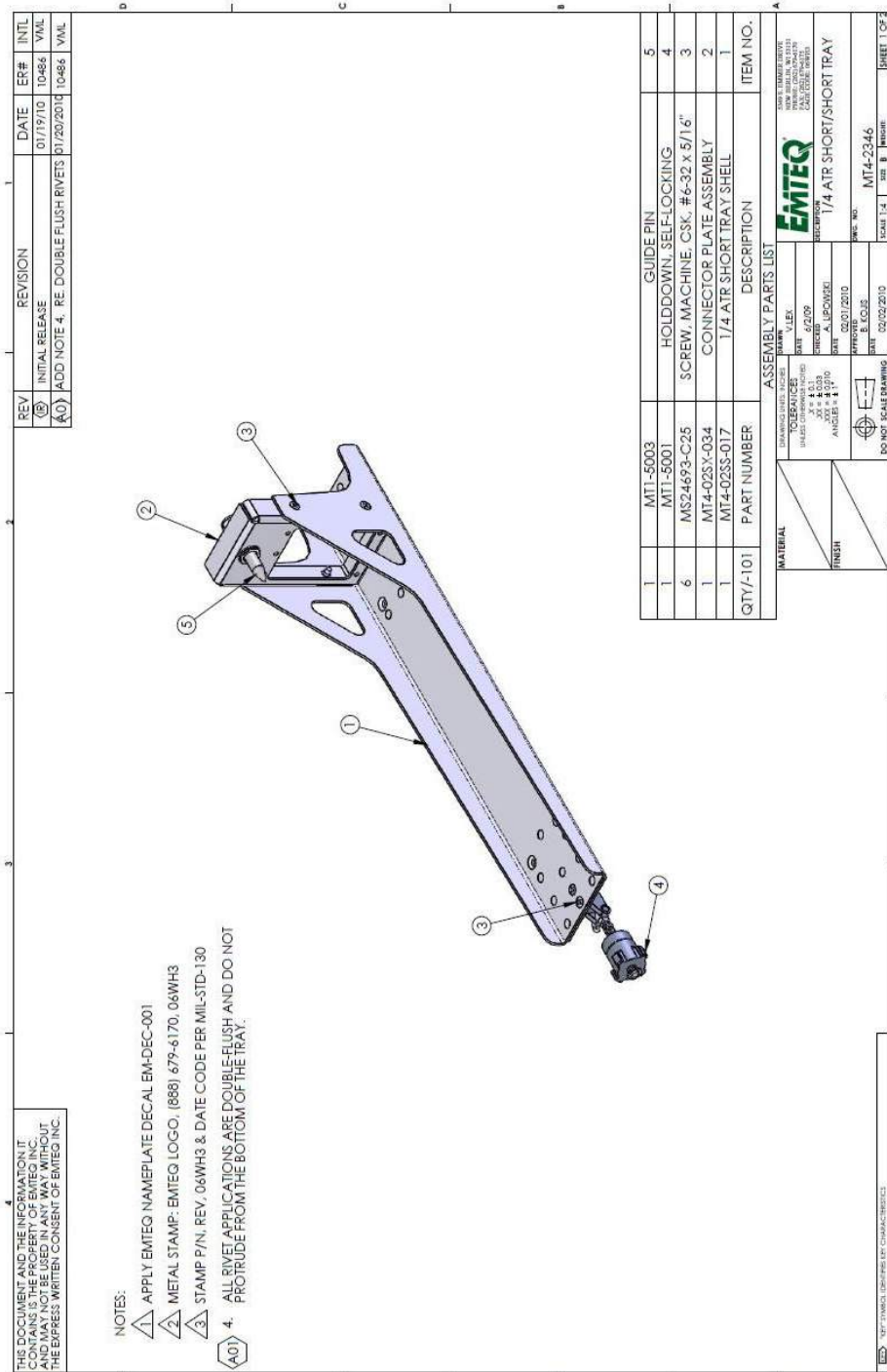


Figure 3-10: Outline drawing: SBU tray: EMTEQ MT4-2346-101 (page 1)

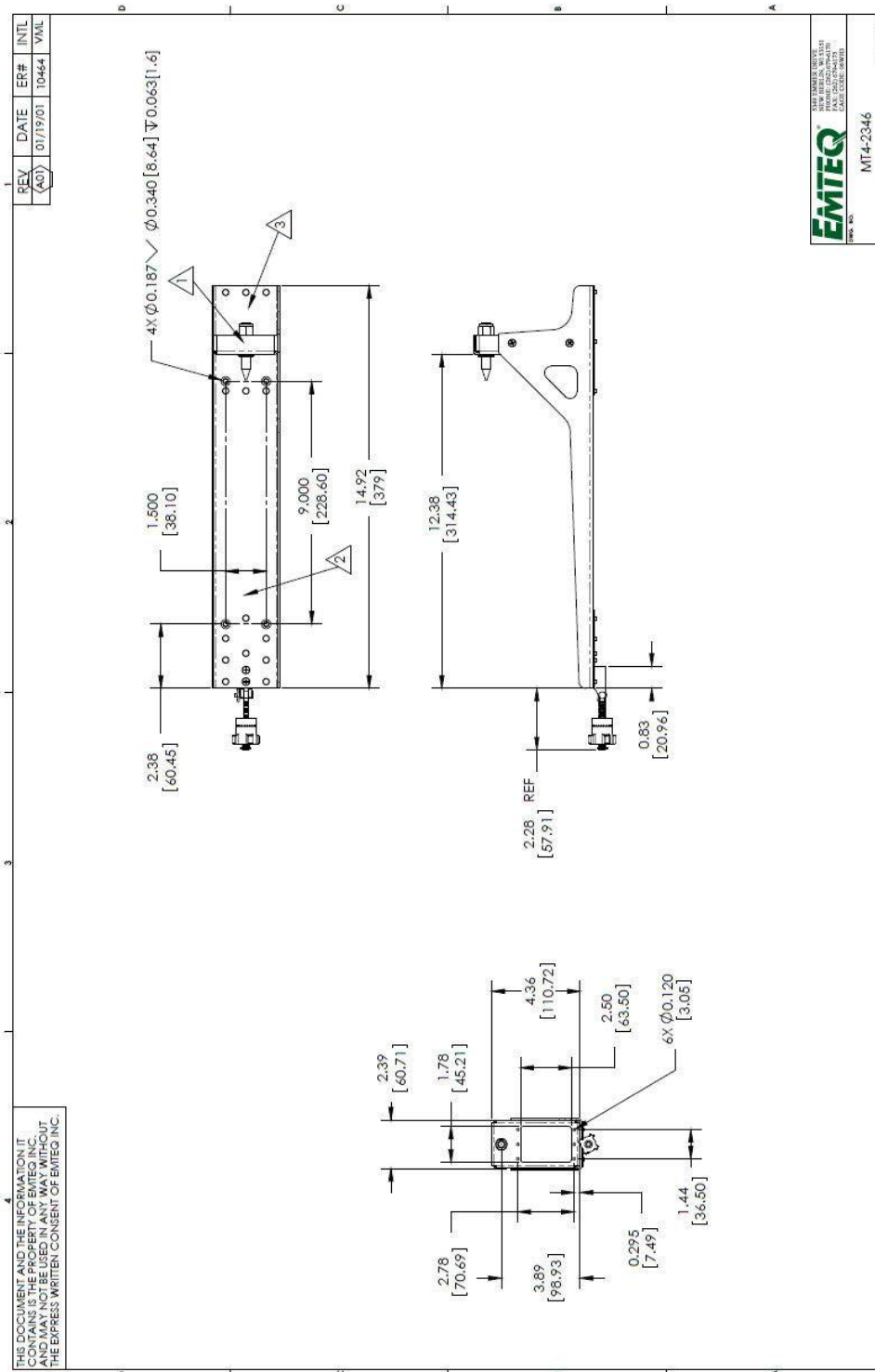


Figure 3-11: Outline drawing: SBU tray: EMTEQ MT4-2346-101 (page 2)



### 3.11 Contact Assembly: Quadrax Pin size 5 special

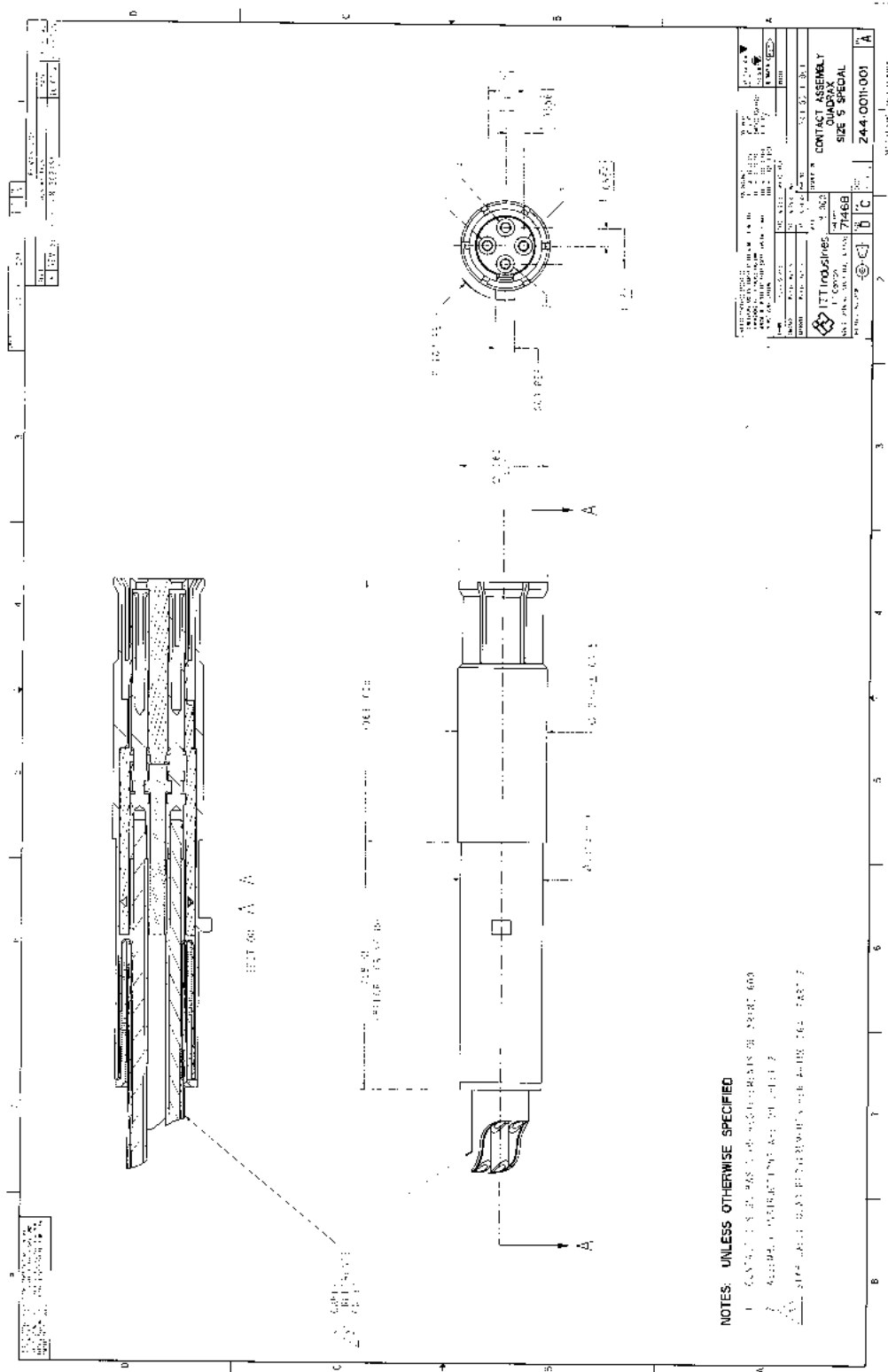


Figure 3-13: Contact Assembly: Quadrax Pin size 5 special: ITT Cannon 244-0011-001



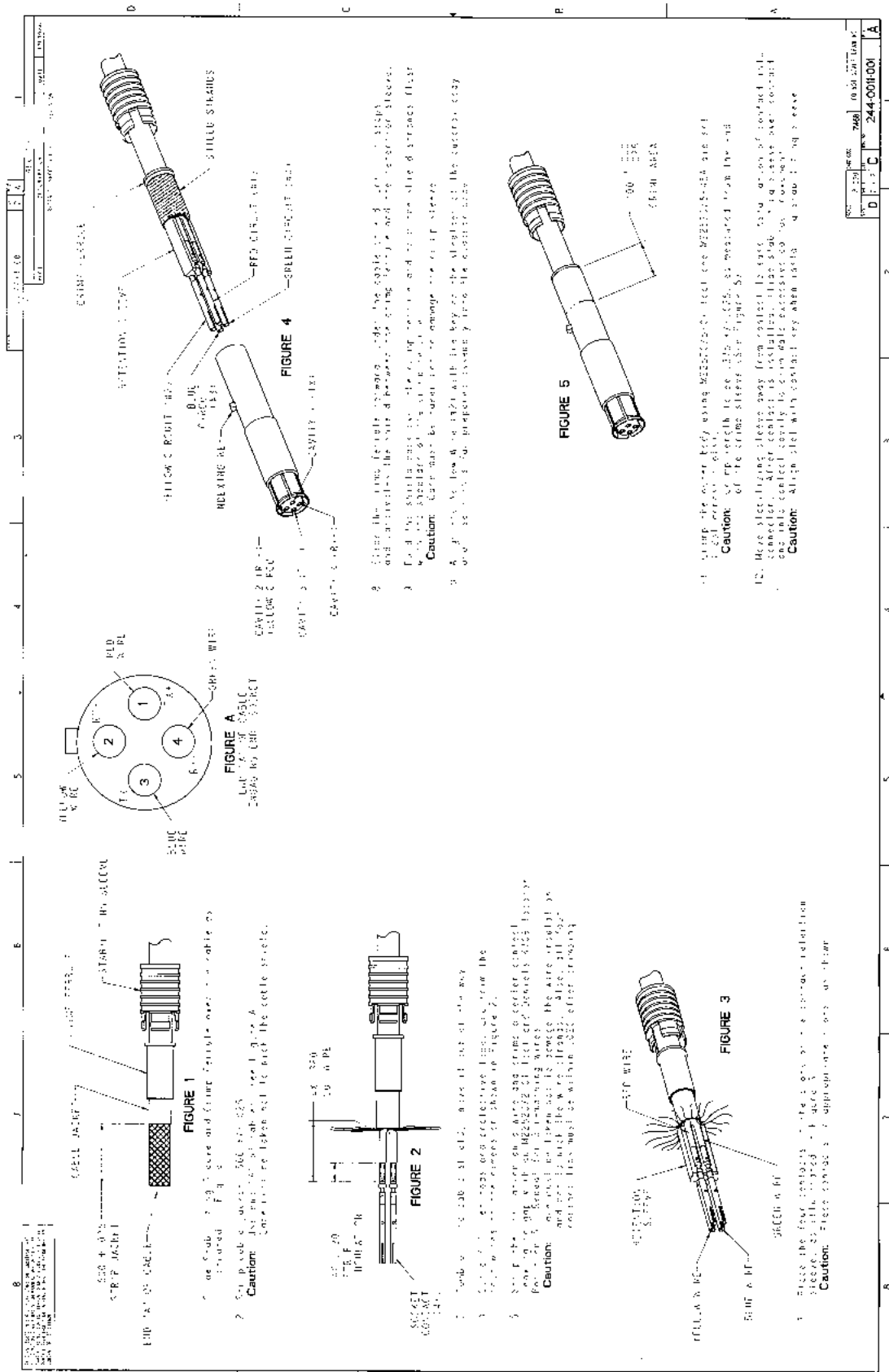
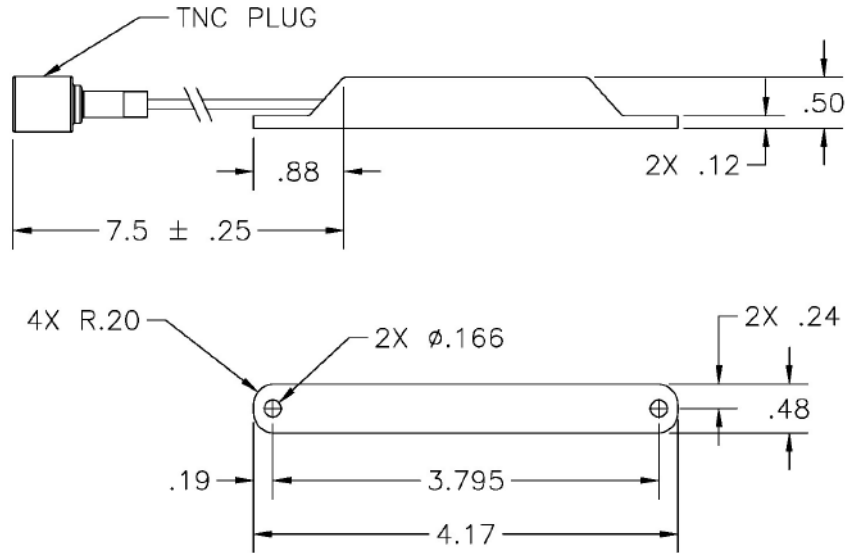


Figure 3-13: Contact Assembly: Quadrax Pin size 5 special: ITT Cannon 244-0011-001 (Continued)

### 3.12 TT-5040A-004 WLAN antenna

Original Manufacturer P/N: VT Miltope 901167-2.



Measures are in inches.

Figure 3-14: Outline drawing: TT-5040A-004 WLAN antenna

# 3.13 Switch Annunciator Panel

Original Manufacturer P/N: MD41-1948.

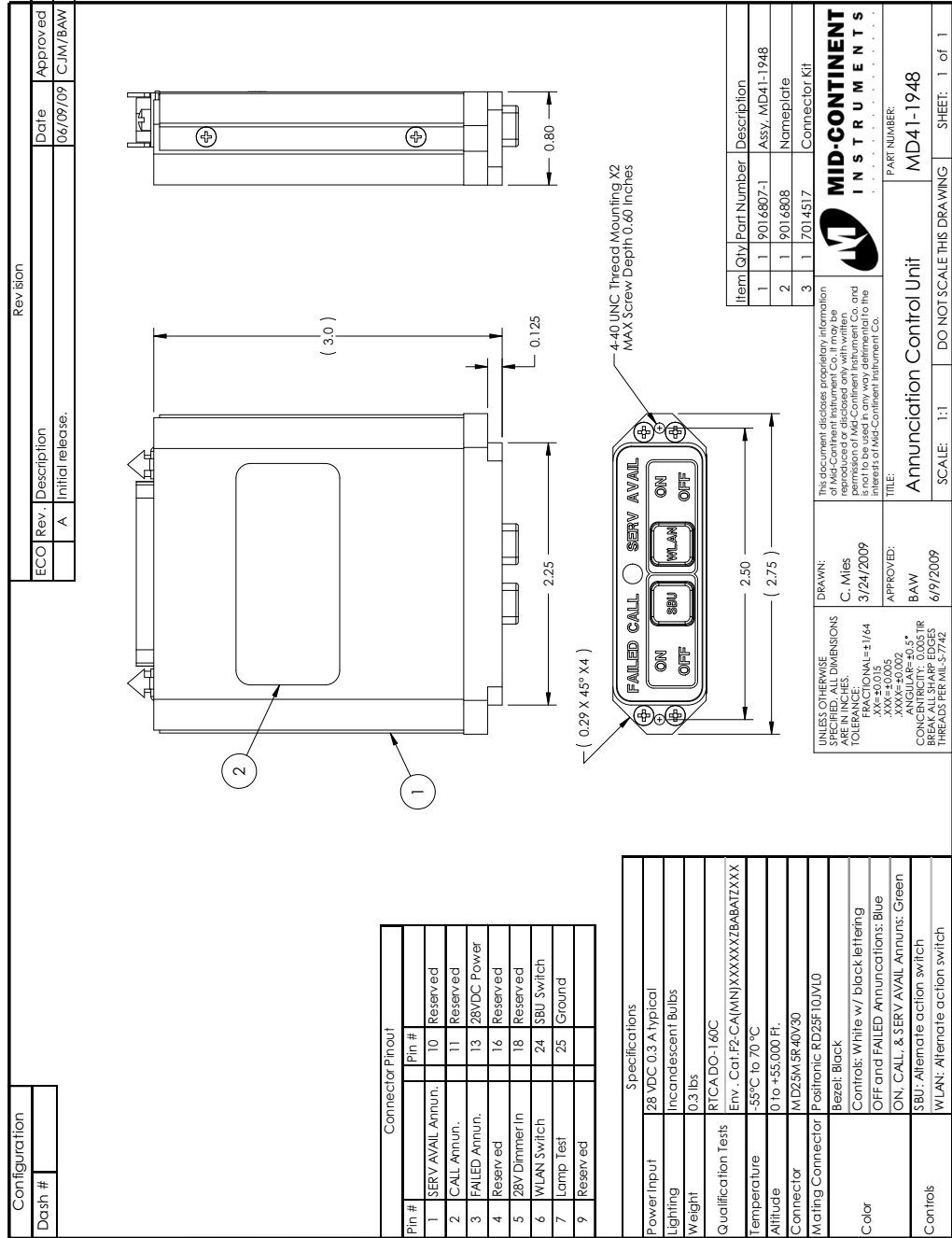


Figure 3-15: Outline drawing: Switch Annunciator panel



# Connectors and pin-out

This chapter has the following sections:

- *TT-5040A SBU*
- *TT-5016A HLD*
- *TT-5622B 2-Wire Cradle*
- *Mating connectors in aircraft*

## 4.1 TT-5040A SBU

The TT-5040A SBU provides interfaces for configuration, Aircraft and satcom interconnections and for the CM.

### 4.1.1 Connectors on SBU

There are three connectors on the SBU:

- SBU Maintenance connector (front):  
Interface to PC for configuration and maintenance purposes.  
A 10/100BaseT Ethernet connector with two LED indicators, RJ45 female.
- SBU rear receptacle (top plug and bottom plug):  
Interface to Aircraft and satcom interconnections.  
An ARINC 404 Shell Size 2 Receptacle.
- Connector for CM (rear, inside connector):  
Internal connector used only as interface to the CM.  
A female 9-pin Sub-D Connector.

### 4.1.2 SBU Maintenance connector

#### Connector drawing

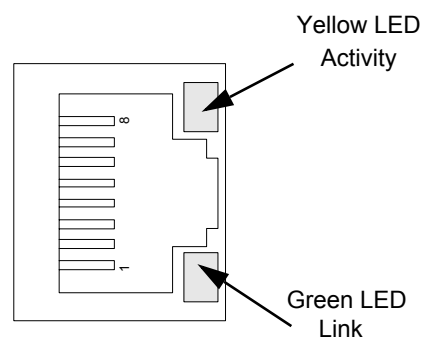


Figure 4-1: SBU Maintenance connector, face view of engaging end

## Connector functions

The front Maintenance interface is 10/100BaseT Ethernet, IEEE802.3.

Use this interface for the following purposes:

- AVIATOR 200/300/350 system configuration
- Maintenance
- System software upgrade

**Important**

For systems without the Built-in Router option enabled, i.e. the basic version or the version with Wireless option: To use the SBU Maintenance connector disconnect or switch off any PC connected to another LAN interface of the SBU.

Use a standard straight network cable.

For instructions how to configure the AVIATOR 200/300/350 system see *Configuration tasks* on page 6-2.

## Pin-out for SBU Maintenance connector

Pin no.	Pin Name
FP1	TxD+ input
FP2	TxD- input
FP3	RxD+ output
FP4	Not Used
FP5	Not Used
FP6	RxD- output
FP7	Not Used
FP8	Not Used

Table 4-1: Pin-out for SBU Maintenance connector  
(standard Ethernet)

### 4.1.3 SBU rear receptacle

#### Connector drawing

The following drawing shows the SBU rear receptacle and mating plug.

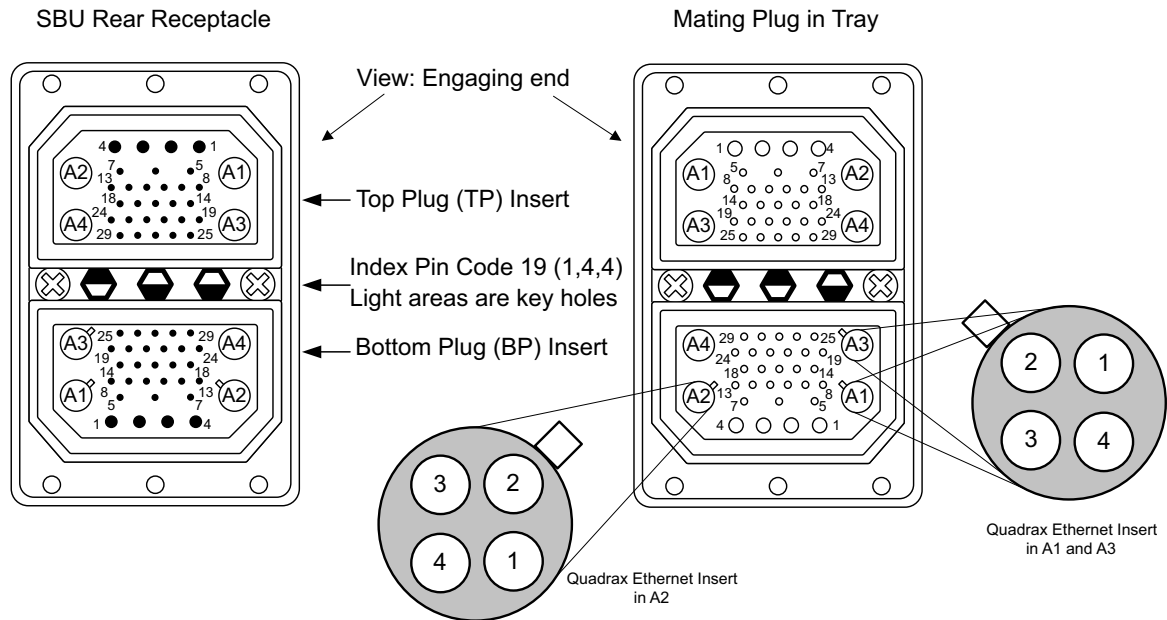


Figure 4-2: SBU rear receptacle, engaging end (Index code: 19)

### Connector drawing with functions

The following drawing shows the SBU rear receptacle with pin functions. For wiring details of this interface see *Electrical installation and wiring* on page 5-8.

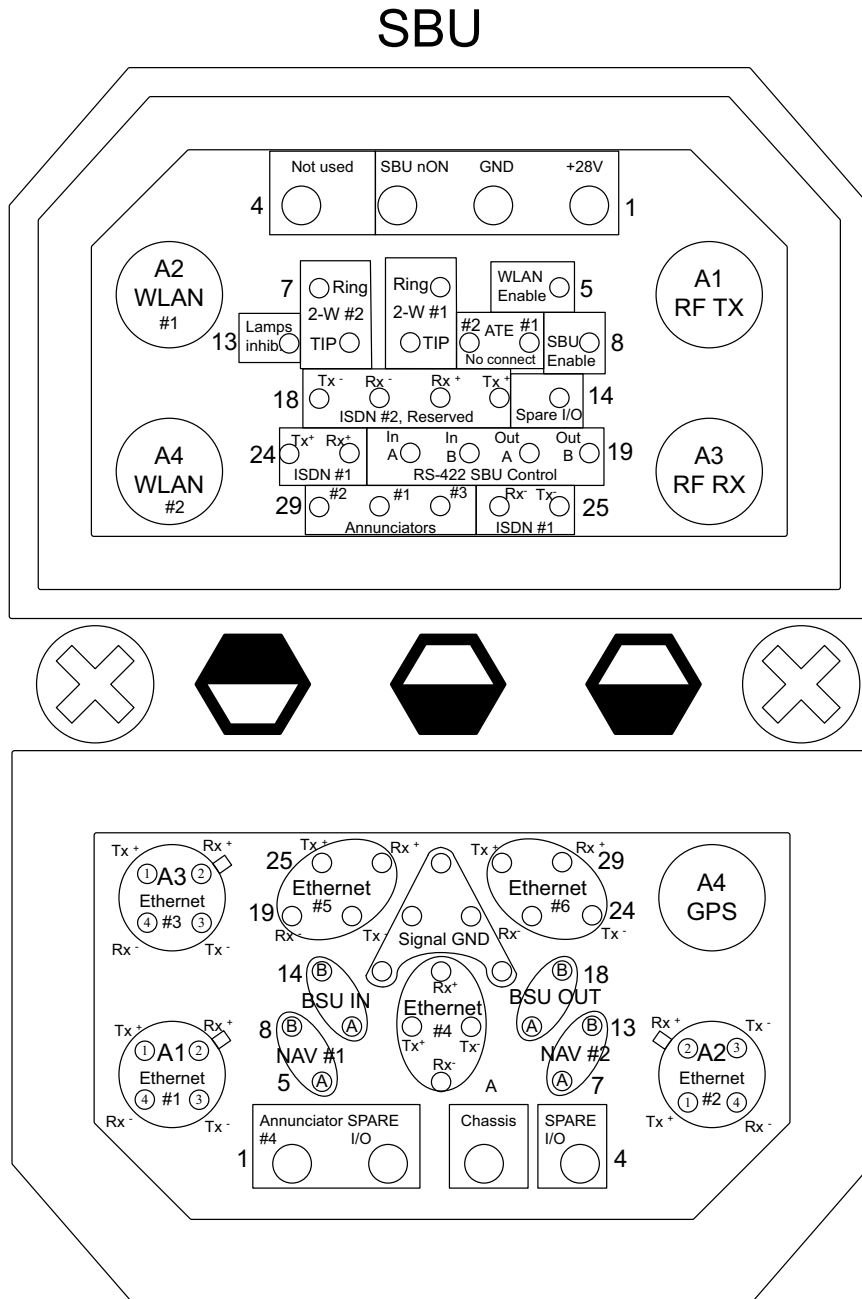


Figure 4-3: SBU rear receptacle with pin functions



## Connector functions, top plug

The top plug of the SBU rear receptacle connects the following signals:

### Power & RF Interfaces:

- +28 V DC and GND, Power return
- RF Tx signal to TT-5016A HLD and Modem interface and DC power to HLD
- RF Rx signal from TT-5016A HLD
- Two RF WLAN antenna connectors (2.4 GHz)

### User Interfaces:

- One ISDN, 4-wire connection
- Two analogue 2-wire standard POTS interfaces for Voice/Fax/Modem/secure voice

### Control & Maintenance Interfaces:

- Discrete SBU nON input
- Discrete WLAN Enable input
- Discrete Chime/Lamps Inhibit Input
- 3 configurable Annunciators: #1 (“Incoming call”), #2 (“SBU Failed”) and #3 (“Service Available”)
- Two ATE Discrete inputs for factory use - **Do not connect**
- One Discrete Spare I/O
- ISDN #2, Reserved - **Do not connect**
- RS-422, Reserved - **Do not connect**

## Connector functions, bottom plug

The bottom plug of the SBU rear receptacle connects the following signals:

### **Power & RF Interfaces:**

- GPS antenna input
- Chassis ground

### **User Interfaces:**

- Six 10/100BaseT Ethernet

### **Aircraft interfaces:**

- Two high or low speed ARINC 429 navigational input
- One high or low speed ARINC 429 BSU output
- One high or low speed ARINC 429 BSU input

### **Control & Maintenance Interfaces:**

- Two Discrete Spare I/O
- One Discrete Output: Annunciator #4 (“Message received”)

### Pin-out for SBU rear receptacle (top plug)

Pin	Function	Pin	Function
TP A1	RF TX output to TT-5016A HLD, DC output and modem interface	TP16	ISDN #2 Rx+ (d) input (TE) <b>Do not connect!</b>
TP A2	WLAN antenna #2 (coax) <sup>a</sup>	TP17	ISDN #2 Rx- (e) input (TE) <b>Do not connect!</b>
TP A3	RF RX input from TT-5016A HLD	TP18	ISDN #2 Tx- (f) output (TE) <b>Do not connect!</b>
TP A4	WLAN antenna #1 (coax) <sup>a</sup>	TP19	Output B, RS-422 <b>Do not connect!</b> <sup>c</sup>
TP1	SBU +28 V DC Power	TP20	Output A, RS-422 <b>Do not connect!</b> <sup>c</sup>
TP2	SBU GND, Power Return	TP21	Input B, RS-422 <b>Do not connect!</b> <sup>c</sup>
TP3	SBU nON, Discrete Input	TP22	Input A, RS-422 <b>Do not connect!</b> <sup>c</sup>
TP4	Not used	TP23	ISDN #1 Rx+ (c) input (NT)
TP5	WLAN Enable, Discrete Input	TP24	ISDN #1 Tx+ (d) output (NT)
TP6	2-Wire Voice/Fax/Modem #1 (Ring)	TP25	ISDN #1 Tx- (e) output (NT)
TP7	2-Wire Voice/Fax/Modem #2 (Ring)	TP26	ISDN #1 Rx- (f) input (NT)
TP8	SBU Enable, Discrete Input (connect to Chassis ground)	TP27	Annunciator #3, (Discrete I/O, Service available) <sup>b</sup>
TP9	ATE #1, for factory use - <b>Do not connect!</b>	TP28	Annunciator #1, (Discrete I/O, Incoming call)
TP10	ATE #2, for factory use - <b>Do not connect!</b>	TP29	Annunciator #2, (Discrete I/O, SBU fail)
TP11	2-Wire Voice/Fax/Modem #1 (Tip)		
TP12	2-Wire Voice/Fax/Modem #2 (Tip)		
TP13	Chime/Lamps Inhibit Input, (Discrete I/O)		
TP14	Spare I/O, (Discrete I/O) <sup>b</sup>		
TP15	ISDN #2 Tx+ (c) output (TE) <b>Do not connect!</b>		

a. Do not connect if SB-Safety voice is to be enabled.  
b. This pin has an alternate function when SB-Safety Voice is enabled, refer to *Configure the discrete I/O interfaces* on page 6-37.  
c. Software 2.03 and higher: Can be used for AIS 380 Aircraft Interface Module.

Table 4-2: Pin-out for SBU rear receptacle, top plug

**Pin-out for SBU rear receptacle (bottom plug)**

Pin no.	Pin name	Pin no.	Pin name
BP A1.1	Tx+ 10/100BaseT Ethernet #1 (Quadrax pin 1, Input)	BP7	Data from secondary ARINC429 navigational input, A
BP A1.2	Rx+ 10/100BaseT Ethernet #1 (Quadrax pin 2, Output)	BP8	Data from primary ARINC429 navigational input, B
BP A1.3	Tx- 10/100BaseT Ethernet #1 (Quadrax pin 3, Input)	BP9	Data from BSU or CMU, ARINC 429 A
BP A1.4	Rx- 10/100BaseT Ethernet #1 (Quadrax pin 4, Output)	BP10	Tx+ 10/100BaseT Ethernet #4, (Input)
BP A2.1	Tx+ 10/100BaseT Ethernet #2 (Quadrax pin 1, Input)	BP11	Tx- 10/100BaseT Ethernet #4, (Input)
BP A2.2	Rx+ 10/100BaseT Ethernet #2 (Quadrax pin 2, Output)	BP12	Data to BSU or CMU, ARINC 429 A
BP A2.3	Tx- 10/100BaseT Ethernet #2 (Quadrax pin 3, Input)	BP13	Data from secondary ARINC429 navigational input, B
BP A2.4	Rx- 10/100BaseT Ethernet #2 (Quadrax pin 4, Output)	BP14	Data from BSU or CMU, ARINC 429 B
BP A3.1	Tx+ 10/100BaseT Ethernet #3 (Quadrax pin 1, Input)	BP15	Common Signal GND for Ethernet
BP A3.2	Rx+ 10/100BaseT Ethernet #3 (Quadrax pin 2, Output)	BP16	Rx+ 10/100BaseT Ethernet #4, (Output)
BP A3.3	Tx- 10/100BaseT Ethernet #3 (Quadrax pin 3, Input)	BP17	Common Signal GND for Ethernet
BP A3.4	Rx- 10/100BaseT Ethernet #3 (Quadrax pin 4, Output)	BP18	Data to BSU or CMU, ARINC 429 B
BP A4	GPS antenna input (coax), Modem, DC out	BP19	Rx- 10/100BaseT Ethernet #5, (Output)
BP1	Annunciator #4 (Discrete I/O, Message received)	BP20	Tx- 10/100BaseT Ethernet #5, (Input)
BP2	Spare I/O, (Discrete I/O) <sup>a</sup>	BP21	Common Signal GND for Ethernet
BP3	SBU Chassis Ground	BP22	Common Signal GND for Ethernet
BP4	Spare I/O, (Discrete I/O) <sup>a</sup>	BP23	Rx- 10/100BaseT Ethernet #6, (Output)
BP5	Data from primary ARINC429 navigational input, A	BP24	Tx- 10/100BaseT Ethernet #6, (Input)
BP6	Rx- 10/100BaseT Ethernet #4, (Output)	BP25	Tx+ 10/100BaseT Ethernet #5, (Input)
		BP26	Rx+ 10/100BaseT Ethernet #5, (Output)
		BP27	Common Signal GND for Ethernet
		BP28	Tx+ 10/100BaseT Ethernet #6, (Input)
		BP29	Rx+ 10/100BaseT Ethernet #6, (Output)

a. This pin has an alternate function when SB-Safety Voice is enabled, refer to *Configure the discrete I/O interfaces* on page 6-37.

Table 4-3: Pin-out for SBU rear receptacle, bottom plug

## 4.2 TT-5016A HLD

The HLD is installed between the SBU and the satcom antenna.

### 4.2.1 Connectors on HLD

#### Connector drawing

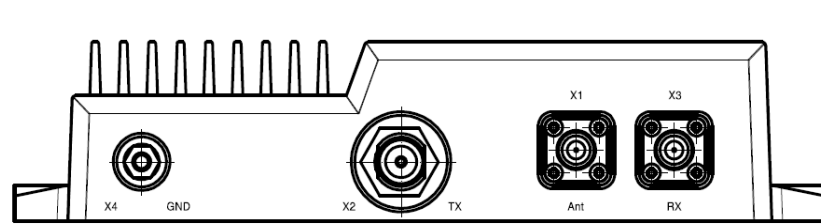


Figure 4-4: TT-5016A HLD connector panel

#### Connector functions

There are three connectors and a Ground stud on the HLD:

- X1: Antenna connector for L-Band Rx/Tx interface to the satcom antenna, TNC-female.
- X2: Tx connector for L-Band Tx interface, modem interface and 28 V DC from the SBU N-female
- X3: Rx connector for L-Band Rx interface to the SBU, TNC-female
- X4: Chassis Ground stud for connecting the HLD chassis to the aircraft chassis.

## 4.3 TT-5622B 2-Wire Cradle

The TT-5622B 2-Wire Cradle provides the analogue 2-wire standard POTS interface for Voice/Fax/Modem/secure voice and serves as a holder for the 2-Wire Handset.

### 4.3.1 Connectors on 2-Wire Cradle

There are three connectors on the 2-Wire Cradle, one at the side and two at the end:

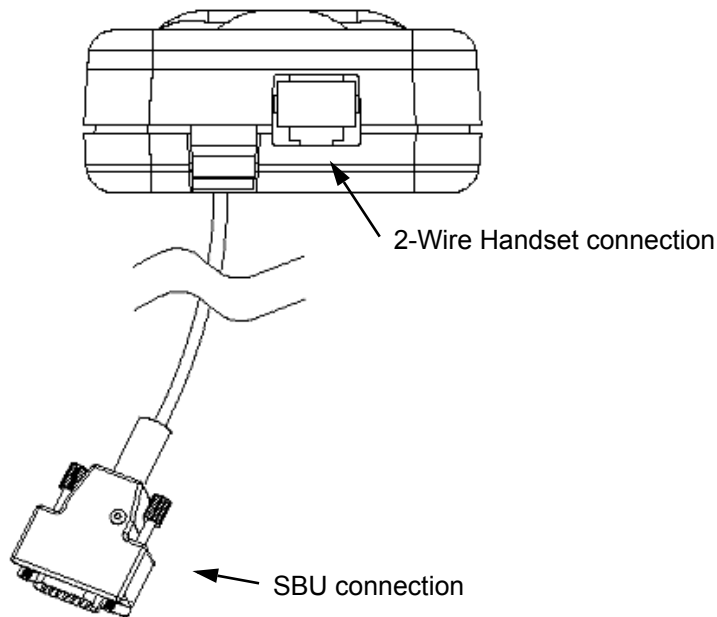


Figure 4-5: 2-Wire Cradle connectors, end view of cradle

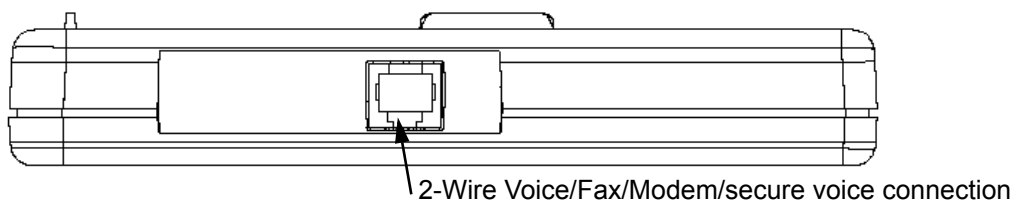
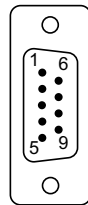


Figure 4-6: TT-5622B 2-Wire Cradle connectors, side view of cradle

### 4.3.2 2-Wire Cradle connector to SBU

#### Connector drawing

DB9 Male



View: Solder side

Figure 4-7: 2-Wire Cradle connector (DB9M). View: Solder side

#### Connector functions

The 9 pin Sub-D male connector on the short cable at the end of the 2-Wire Cradle connects the following signals on the SBU:

- Analogue 2-wire standard POTS interface for Voice/Fax/Modem/secure voice.

#### Pin-out for 2-Wire Cradle connector to SBU

The 2-Wire Cradle connector to connect to the SBU has the following pin-out:

Pin	Function
1	Auxiliary Tip
2	Auxiliary Ring
3	Shield
4	Not connected
5	Not connected
6	Not connected
7	Not connected
8	Not connected
9	Not connected

Table 4-4: Pin-out for 9 pin Sub-D male connector in TT-5622B 2-Wire Cradle

The other two connectors are standard POTS RJ11 connectors.

## 4.4 Mating connectors in aircraft

### 4.4.1 Connection with SBU

Note that the SBU tray holds the mating connector for the SBU rear connector.

Connector	Mating connector type
SBU Maintenance connector (on front panel)	RJ45 male
SBU rear receptacle (rear connector in the SBU tray)	<p>ARINC 404 shell size 2 plug with the following contact arrangements:</p> <p><u>Insert A (Top Plug): 33C4</u></p> <ul style="list-style-type: none"> <li>• 4 #16 socket contacts</li> <li>• 25 #20 socket contacts</li> <li>• 4 #5 coax sockets</li> </ul> <p><u>Insert B (Bottom Plug): 33C4</u></p> <ul style="list-style-type: none"> <li>• 4 #16 socket contacts</li> <li>• 25 #20 socket contacts</li> <li>• 1 #5 coax sockets</li> <li>• 3 #5 quadrax sockets</li> </ul> <p>Part number: DPX2NA-67322-606</p>

Table 4-5: Mating connectors in aircraft for SBU

Size 5 coax contacts fit for cable type RG-142. For other cable types you must order suitable contact inserts. For part numbers see Table 5-32 on page 5-48 and Table 5-33 on page 5-49.



# Installation

This chapter has the following sections:

- *General installation information*
- *Mounting considerations*
- *Electrical installation and wiring*
- *Recommended cables*
- *Activation of airtime services*

## 5.1 General installation information

### 5.1.1 Overview

This chapter contains considerations and recommendations for installation of the AVIATOR 200/300/350 System. Interconnect harness wiring and physical mounting must satisfy all applicable regulations.

**Note** Installation kits including wiring can be obtained through ECS (Electronic Cable Specialists, Inc.) or EMTEQ Inc. For details and order numbers see *Installation kits* on page 2-12.

For installation kits for the AVIATOR 200/300/350 system contact:

<p><b>ECS, a Carlisle IT company, USA</b>            Phone (Franklin, WI): +1 800-327-9473            Phone (Kent, WA): +1 800-227-5953            E-mail: <a href="mailto:sales@CarlisleIT.com">sales@CarlisleIT.com</a>            Home page: <a href="http://www.CarlisleIT.com">www.CarlisleIT.com</a></p>	<p><b>EMTEQ (B/E Aerospace)</b>            Home page: <a href="http://www.emteq.com">www.emteq.com</a>            Contact info: <a href="http://www.emteq.com/contact-us.php">www.emteq.com/contact-us.php</a></p>
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Table 5-1: Installation kits, contact information

The information, drawings and wiring diagrams contained in this manual are intended as a reference for engineering planning only. The drawings and wiring diagrams contained herein do not represent any specific STC. It is the installer's responsibility to compose installation drawings specific to the aircraft. This manual and the drawings and wiring diagrams contained herein may not be used as a substitute for an STC.

**Note** To ensure optimal performance from the AVIATOR 200/300/350 system, you must maintain strict adherence to the installation guidelines in this chapter.

### 5.1.2 Minimum system components

A minimum working system has at least:

- one TT-5040A SBU
- one TT-5040A-001 CM
- one TT-5016A HLD
- one satcom antenna, LGA, IGA, or HGA antenna, see also *Satcom antenna systems* on page 2-4.

The CM, HLD and some satcom antennas are powered by the SBU. The following drawing shows the minimum installation.

#### Minimum system drawing

This drawing is an overview of which units to connect as a minimum.

**Note** For information on other satcom antenna types supported and wiring of the individual antenna types, refer to the appropriate section of *Electrical installation and wiring* on page 5-8 and onwards.

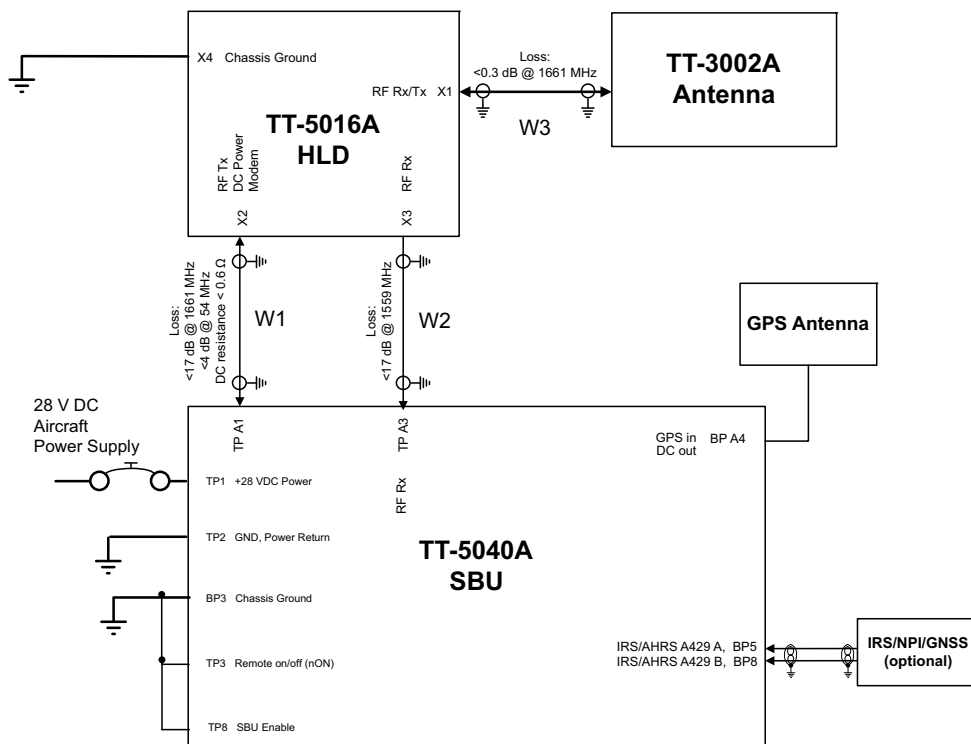


Figure 5-1: AVIATOR 200 minimum system (example with LGA TT-3002A and GPS antenna)

For other navigational input sources see Table 5-2 on page 5-4.

## 5.2 Mounting considerations

### 5.2.1 Overview

For optimum system performance, some guidelines on where to install or mount the components of the AVIATOR 200/300/350 system must be followed. Mounting and placement details are included in this section.

For information on requirements to cables, see the individual sections in *Electrical installation and wiring* on page 5-8. For information on recommended cable types and lengths, see *Recommended cables* on page 5-47.

**Note** When mounting the units, allow enough space to provide a sufficient bend radius for the cables. See the cable data sheet for minimum bend radius.

### 5.2.2 TT-5040A SBU

Forced cooling is not required and not recommended.

- Install the SBU in temperature controlled areas and inside or outside pressurized locations (e.g. avionics bay).
- Mount the SBU in an ARINC 404A 1/4 ATR short tray as shown in **Figure 3-9: Outline drawing: SBU tray: ECS PO299-101** or see *SBU trays* on page 3-10 for allowed SBU trays.

### 5.2.3 TT-5016A HLD

Forced cooling is not required for the HLD.

- Install the HLD in non-temperature controlled locations and inside or outside pressurized locations.
- Make sure the cable loss requirements are met, for further details see *Recommended cables* on page 5-47.
- Place the HLD with sufficient contact to the mounting surface for proper grounding, respecting the maximum cable resistance. The HLD can be mounted on a shelf or directly on the fuselage.
- Ground the HLD through the 4 threaded mounting holes or by using the ground stud.

**Note** The HLD can heat up to 20 degrees above ambient temperature after a long period of intense use. To avoid internal overheating the HLD automatically reduces activity. Place the HLD with as much free space around it as possible to keep the temperature down and optimize performance.

- Place the HLD unit close to the top-mounted satcom antenna to minimize the cable length. Place the HLD preferably between the fuselage ribs in the cabin ceiling. In this location there may be a risk for reduced heat dissipation, so make sure that the HLD can dissipate the heat to the aircraft structure.

For aircraft with very little ceiling space you may install the HLD unit in the rear avionics bay, the luggage compartment or other suitable locations inside or outside of pressurized areas.

## 5.2.4 Satcom antenna

In order to steer the satcom antenna towards the satellite, the AVIATOR 200/300/350 system needs to know the position and attitude of the aircraft. Several methods are available to achieve this.

The following table gives an overview of the supported navigational input sources for the different satcom antenna types.

Satcom antenna type	Navigational input					
	IRS (A429)	AHRS + GPS (A429+coax)	NRS (coax)	NPI (A429)	GNSS (A429)	GPS only (coax)
TT-3002A LGA/LGA-3000	X			X	X	X
TT-5006A IGA	X	X	X			
IGA-5001	X	X				
AMT-3500	X	X				
HGA-6000/HGA-6500	X	X				
HGA-7000/HGA-7001	X	X				
AMT-50/700/3800	X	X				
CMA-2102/CMA-2102SB	X	X				

Table 5-2: Navigational input for satcom antennas

### About satcom antenna steering for IGA and HGA (AVIATOR 300 and AVIATOR 350)

- IRS:** If IRS is used, the antenna positioning data is computed from the IRS data alone. All necessary data is available from the IRS.
- AHRS + GPS:** AHRS does not include all the necessary data, therefore a GPS RF signal must be sent to the SBU. A GPS module is built into the SBU, it computes the necessary position and speed information.  
 In case the TT-5006A IGA is used, a GPS antenna is built into the antenna, and the GPS-RF is fed to the SBU.  
 If another satcom antenna is used, e.g. a HGA, the GPS RF signal may be obtained from a GPS antenna already installed on the aircraft.  
 The GPS RF signal enters the SBU at the SBU rear receptacle (bottom plug) BPA4 GPS antenna input.
- NRS:** A special way to steer the antenna, without the need for on-board IRS/AHRS systems, is to use the NRS system. This is ONLY possible with the TT-5006A antenna. The NRS system consists of two parts: a 3-D magnetometer built in to the TT-5006A, and a GPS module built into the SBU. The 3-D magnetometer in the antenna senses the magnitude and direction of the magnetic field. This information is sent to the SBU, where it is compared to the expected magnetic vector at the current position received from the GPS. The expected magnetic vector is obtained from a mathematical model of Earth's magnetic field, and the knowledge of the current position, calculated in the GPS module. In this way the system can calculate the attitude of the aircraft.

The advantage of this system is that it is *stand-alone* and does not require any interaction with other avionics systems. The disadvantage is that it requires a fairly clean magnetic environment, where the antenna is placed. There may not be any magnetic items such as screws, loudspeakers or DC cables near the antenna. See also *Magnetic interference considerations (only for TT-5006A IGA)* on page 5-6.

**Note** If possible, always use IRS or AHRS. IRS and AHRS give better precision. Only use NRS as a last option.

### Position and velocity information for LGA (AVIATOR 200)

The position and velocity information is used for spot-beam selection and Doppler compensation. The following navigational inputs can only be used together with the TT-3002A low-gain antenna, where attitude data are not required:

- **GPS only:** The built-in GPS receiver provides all the necessary navigation data if the SBU receives an RF signal from a GPS antenna on the pin BP A4 of the SBU rear receptacle, bottom plug (see Table 4-3 on page 4-8).
- **NPI:** NPI (Navigation Position Information, a Thrane abbreviation) is similar to IRS but there is no requirement for attitude information. The navigation data can be obtained from other sources than an IRS. Note that the navigation data must be coded exactly as for IRS. For detailed information see Table 5-13 on page 5-27.
- **GNSS** can be used together with the TT-3002A low-gain antenna. Since this antenna does not have any antenna steering mechanisms that must be controlled, the GNSS can provide all necessary navigational data. GNSS is compliant with ARINC-743A [14]. For detailed information see Table 5-14 on page 5-27.

### Satcom antenna types supported

For a list of Cobham SATCOM antenna types supported in the AVIATOR 200/300/350 system see *Satcom antenna systems* on page 2-4.

### General mounting considerations

Refer to the satcom antenna manual for instructions and details on mounting the antenna. Make sure all requirements in the antenna mounting instructions are met.

Place the antenna with unobstructed view to the satellite.



**WARNING!** Keep a safety distance of minimum 30 cm (1 ft) for LGA and IGA and 90 cm (3 ft) for HGA to the antenna when the system is transmitting, unless the antenna manual or the specific system configuration presents different requirements. This safety distance ensures that a maximum radiation power density of maximum  $10 \text{ W/m}^2$  is not exceeded (Recommended by the American National Standards Institute, ANSI/IEEE C95.1-1992).

**Note** The antenna installation must be in accordance with the aircraft manufacturers requirements and/or FAA AC 43.13 - 1B/2A and approved by the appropriate Civil Aviation Authorities.

## Magnetic interference considerations (only for TT-5006A IGA)

You may use the NRS antenna steering system if the TT-5006A IGA is mounted on the aircraft in an area free of magnetic interference.

**Note** | The following paragraphs are only applicable if you use NRS functionality.

The TT-5006A IGA contains sensitive magnetometers. These can be adversely influenced by ferrous materials, magnets or large currents in cables close to the antenna. Therefore you must obey the following mounting considerations.

- Do not mount speakers or other equipment containing a magnet within 48 cm (18 inches) of this satcom antenna. If this cannot be avoided, install shielded speakers.
- Avoid mounting close to strong magnetic fields from the aircraft's power wiring (DC cables).
- Use non-magnetic screws and tools for mounting.

## Distance between GPS antenna and satcom antenna

Make sure the GPS antenna is installed with sufficient distance to the satcom antenna. For requirements to the radiation distance, refer to the manual for the GPS system.

**Important** | However, always keep the following distances between the satcom antenna and the GPS antenna:  
– Minimum 30 cm (11.8 inches) for LGA and IGA  
– Minimum 50 cm (19.7 inches) for HGA

If the existing GPS antenna on board the aircraft does not provide sufficient filtering of the satcom antenna signal to give a usable GPS signal, you must replace the existing GPS antenna with a GPS antenna that has a satcom filter.

## Distance between Glonass antenna and satcom antenna

Make sure your Glonass antenna is installed with sufficient distance to the satcom antenna. For requirements to the radiation distance, refer to the manual for the Glonass system.

**Important** | However, always keep the following distances between the satcom antenna and the Glonass antenna:  
– Minimum 120 cm (47.2 inches) for LGA and IGA  
– Minimum 210 cm (82.7 inches) for HGA

If the existing Glonass antenna on board the aircraft does not provide sufficient filtering of the satcom antenna signal to give a usable Glonass signal, you must replace the existing Glonass antenna with a Glonass antenna that has a satcom filter.

## Cables between TT-5016A HLD and satcom antenna

We recommend to keep the cable length as short as possible.

Do not bend the cables to a radius smaller than the minimum bend radius stated for the cables. For further information on cables, see *Wiring the satcom antenna* on page 5-10 and *Recommended cables* on page 5-47.

## 5.2.5 TT-5040A-004 WLAN antennas

The recommended WLAN antenna to use with the AVIATOR 200/300/350 system is the TT5040A-004 Wireless Antenna. The WLAN antenna is PMA approved by VT Miltope (P/N 901167-2). You may also use other WLAN antennas approved for aeronautical use.

**Note** Cobham SATCOM recommends to use 2 WLAN antennas to get optimum performance on board.

1. Mount the WLAN-antennas in the aircraft cabin. Install the 2 WLAN antennas in the same plane (surface).
2. Install the two WLAN antennas with a distance of minimum 12.5 cm (5 inches) between the two antennas.
3. For optimum performance mount the two antennas at an angle of 90° to each other.

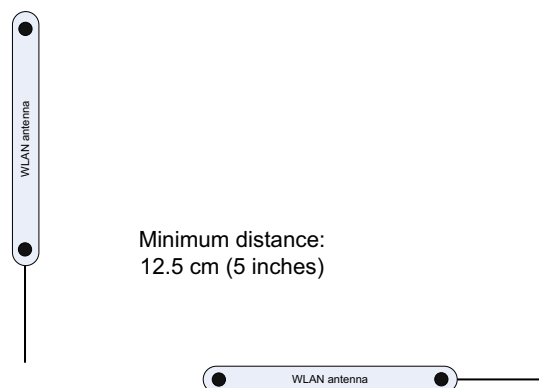


Figure 5-2: Mounting two WLAN antennas for optimum performance

Make sure the cable loss requirements are met, for further details see in the section *Wiring WLAN antenna interface* on page 5-34.

### Operating with one WLAN antenna

You can also use a single WLAN antenna. For details how to wire a single WLAN antenna see *Wiring WLAN antenna interface* on page 5-34.

## 5.3 Electrical installation and wiring

### 5.3.1 Wiring symbols

Throughout the wiring section these common symbols are used:






	Coax
	Shield
	Ground (fuselage)
	Twisted
	Twisted and shielded

Table 5-3: Wiring symbols

**Important**

Each wiring drawing in this chapter only shows the connections referred to in that particular section. Other connections may be required for the system to work properly.

The following subsections are available:

- *Wiring power supply*
- *Wiring the satcom antenna*
- *Wiring ARINC 429 interfaces*
- *Wiring GPS interface*
- *Wiring Ethernet*
- *Wiring WLAN antenna interface*
- *Wiring ISDN*
- *Wiring telephone systems*
- *Wiring Sigma7 (2-wire) handsets*
- *Wiring ICG DECT Cordless Handset (2-wire) phone*
- *Wiring discretes*
- *Wiring the Switch Annunciator Panel*
- *Wiring the Switch Annunciator Panel*
- *Wiring the maintenance interface*

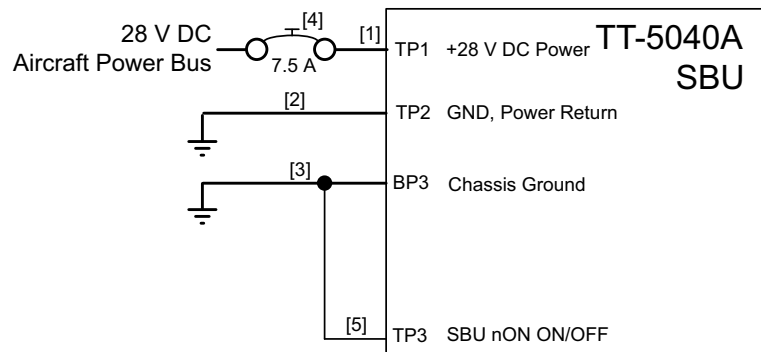


## 5.3.2 Wiring power supply

### Wiring the TT-5040A SBU

The Aircraft power bus interfaces supply the electric power required to operate the SBU. They also supply a chassis connection to the aircraft chassis and the installation tray for EMC purposes. The +28 V DC Power wire must include a circuit breaker capable of carrying the required current continuously under the required environmental conditions.

The following drawing shows the wiring of the SBU to the Aircraft Power Bus.



- [1] Total resistance max. 250 mOhm incl. Circuit Breaker.
- [2] Directly to Aircraft Ground with less than 1 m cable. Total resistance max. 25 mOhm.
- [3] Directly to installation tray and aircraft chassis, max. 25 mOhm resistance.
- [4] Recommended circuit breaker: Klixon 2TC series, 7.5 A current rating.
- [5] If SATCOM On/Off switch is required, TP3 is routed to an external switch to ground

Figure 5-3: Wiring SBU power supply

### SBU maximum power consumption

The CM, HLD and some satcom antennas are powered by the SBU. Therefore the total power consumption of the SBU depends on which satcom antenna type is connected to the SBU. See Table A-1 on page A-2 for the total power consumption of the SBU for the satcom antenna types available.

### Pins for SBU power supply

The following list shows the pins used for the SBU power supply.

SBU pin	Name	Description
TP1	+28 V DC Power	+28 V DC Power input from Aircraft power bus.
TP2	GND, Power Return	Aircraft Ground connection
BP3	Chassis Ground	Chassis connection, connected to installation tray and Aircraft chassis.
TP3	SBU nOn, Discrete Input	Power On/Off for the SBU and units powered by the SBU

Table 5-4: Pins for SBU power supply

## Description of SBU power supply

### +28 V DC Power

It is essential to keep the line impedance below the specified limits. See *Cable requirements, SBU power supply* on page 5-10.

Reverse polarity protection is only guaranteed if the suggested circuit breaker is used. A suitable circuit breaker with sufficiently low resistance would be Klixon 2TC series with 7.5 A current rating.

### Chassis Ground (BP3)

The Chassis connection ensures that the SBU cabinet and the installation tray have the same potential, and that there is a connection from the cable shields to the cabinet to comply with EMC requirements.

Connect the wire directly to the installation tray and to aircraft chassis.

### Remote ON/OFF - SBU nON, Discrete Input (TP3)

The nON input is used to turn the SBU on and off. Connection of this input to ground turns on the SBU and all units powered by the SBU.

The electrical specifications are defined in *Description of the discrete types* on page 5-44.

## Cable requirements, SBU power supply

Cable <sup>a</sup>	Max. resistance	Other requirements
[1] (+28 V DC Power)	250 mΩ, incl. circuit breaker	
[2] (GND, Power Return)	25 mΩ	The cable should be as short as possible, max. 1 m.
[3] (Chassis Ground)	25 mΩ	Connect directly to aircraft chassis.

Table 5-5: Requirements to SBU power cables

- a. The cable numbers refer to the numbers stated on the wiring drawing in the section **Figure 5-3: Wiring SBU power supply**.

**Note** For maximum allowed cable lengths, see *Power cables, allowed cable lengths* on page 5-47.

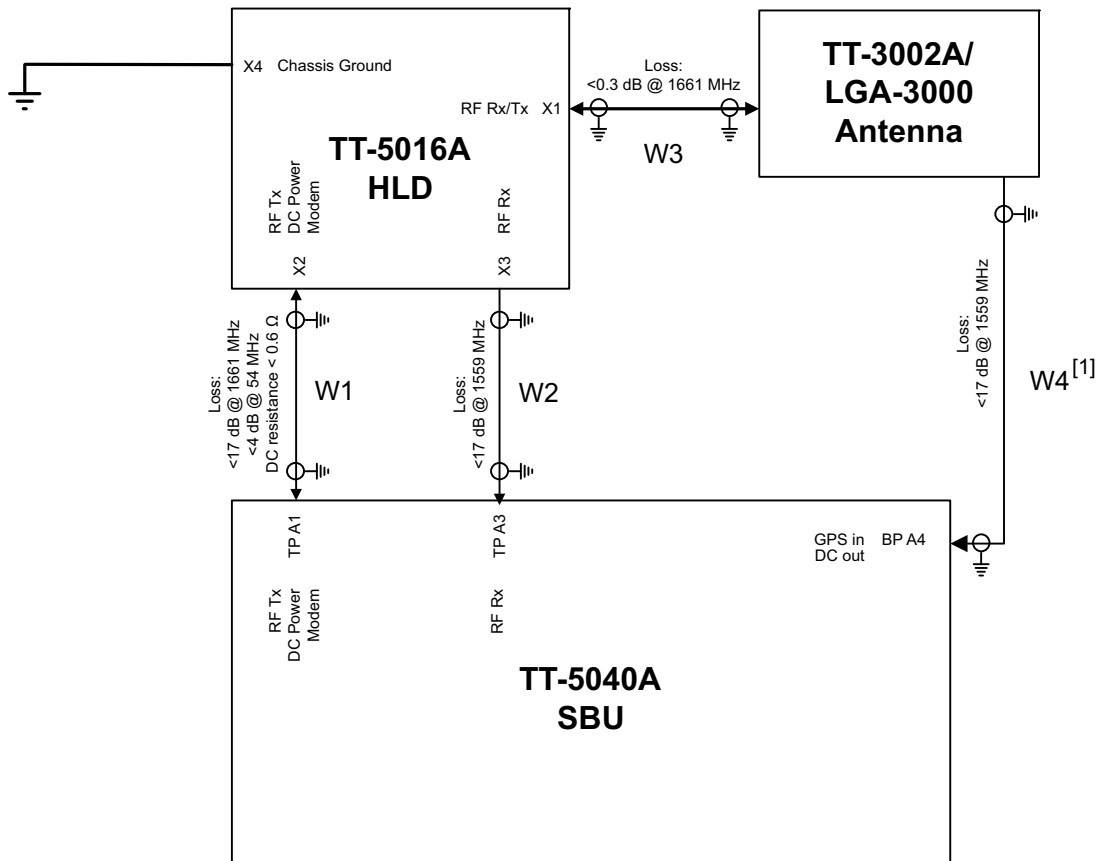
### 5.3.3 Wiring the satcom antenna

#### Cable losses

**Note** During installation, measure and write down the cable loss of the RF cables. You need these values later on in the web interface during configuration of the system. For further details see *Configure RF settings* on page 6-43.

## Wiring TT-3002A LGA/LGA-3000

The following drawing shows the wiring for an AVIATOR 200 system using a TT-3002A low gain antenna.



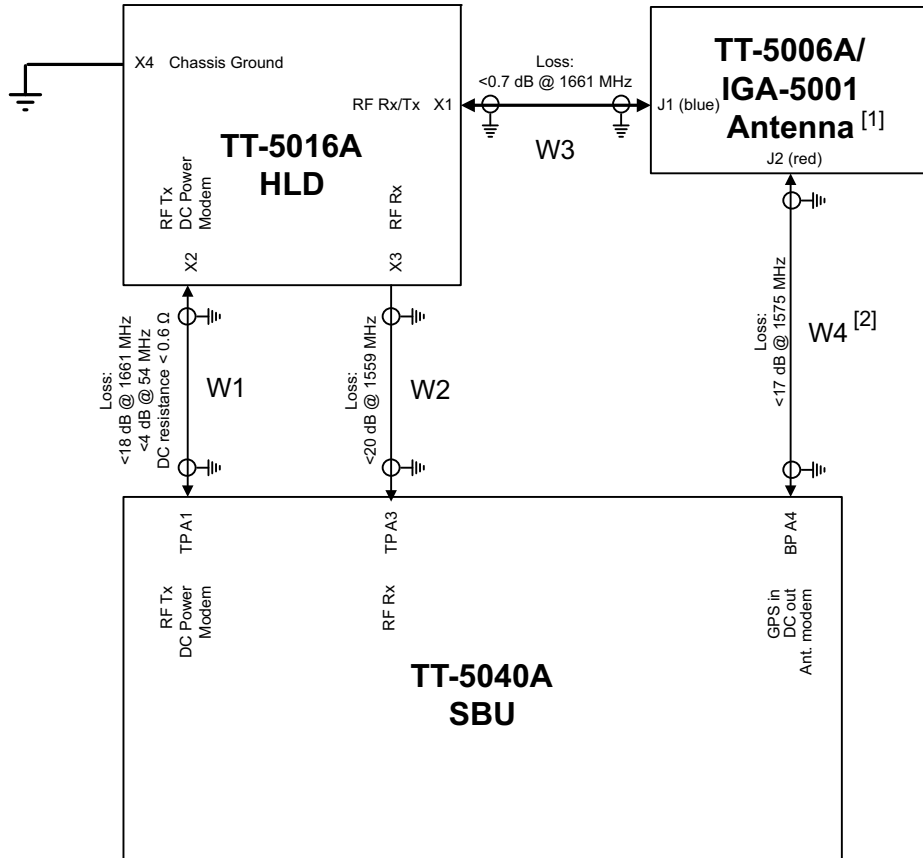
[1] GPS only available on LGA-3000

Figure 5-4: Wiring TT-3002A LGA/LGA-3000

For the requirements to RF cables W1, W2 and W3 see Table 5-8 on page 5-23.

### Wiring TT-5006A IGA/IGA-5001

The following drawing shows the wiring for an AVIATOR 300 system using a TT-5006A or IGA-5001 intermediate gain antenna.



[1] Only TT-5006A supports NRS.

[2] This cable must be wired even if GPS is not used.

Figure 5-5: Wiring TT-5006A IGA or IGA-5001

For the requirements to RF cables W1, W2 and W3 see Table 5-8 on page 5-23.

### Wiring HGA-6000 or HGA-6500

The following drawing shows the wiring for an AVIATOR 350 system using an HGA-6000 or an HGA-6500 high gain antenna.

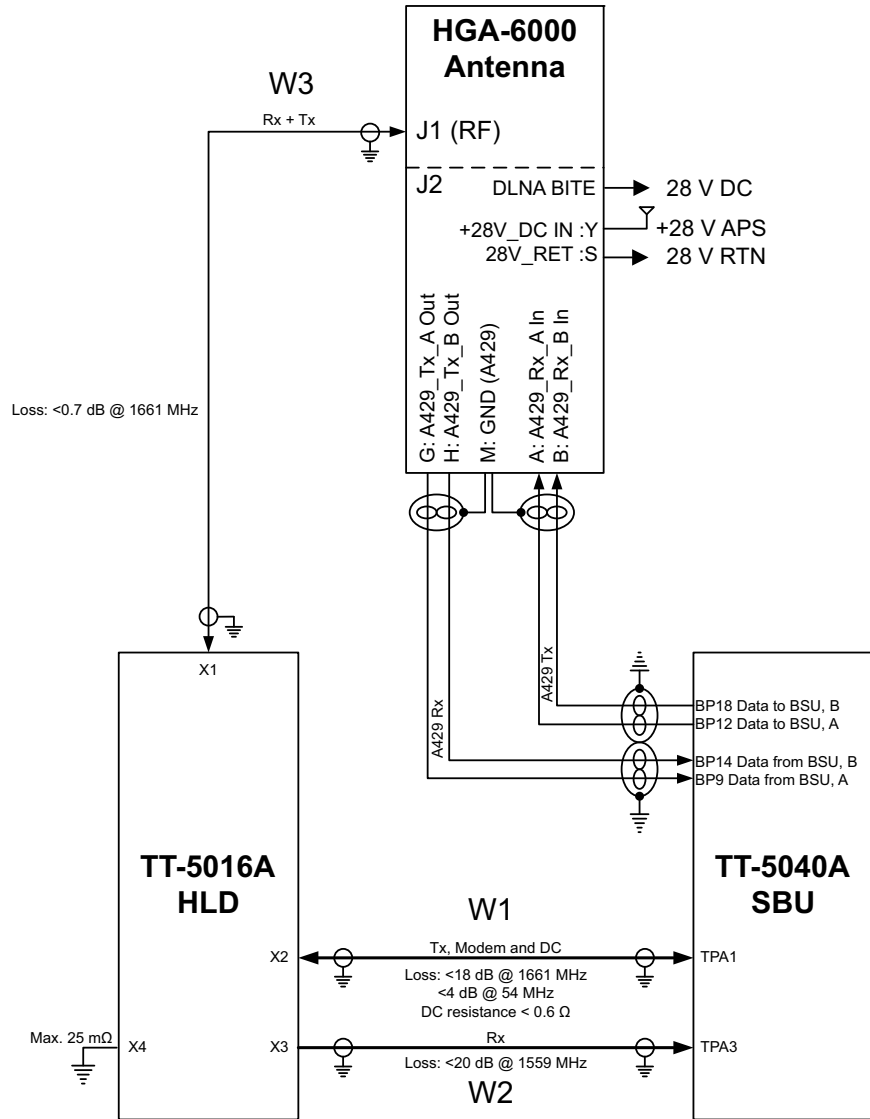


Figure 5-6: Wiring HGA-6000

For the requirements to RF cables W1, W2 and W3 see Table 5-9 on page 5-24.

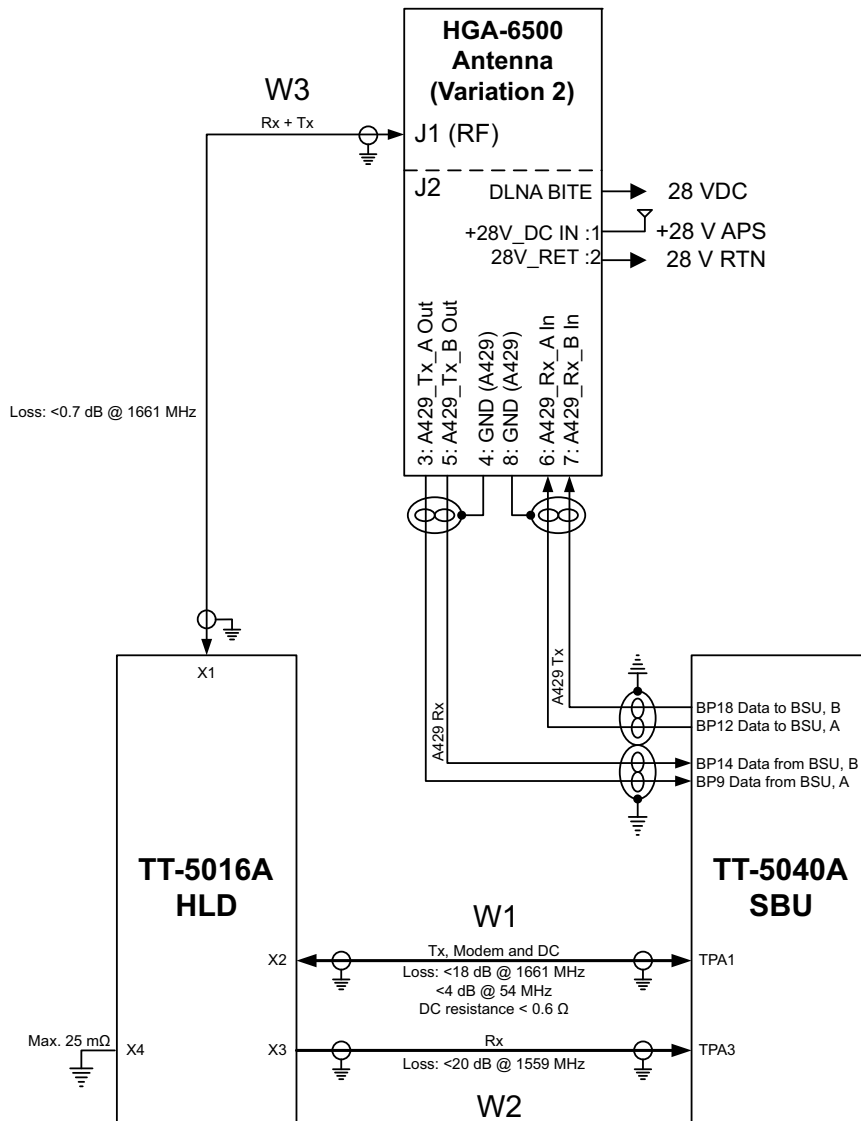


Figure 5-7: Wiring HGA-6500 Antenna (Variation 2, label at antenna plug: 1 and 2)

For the requirements to RF cables W1, W2 and W3 see Table 5-9 on page 5-24.

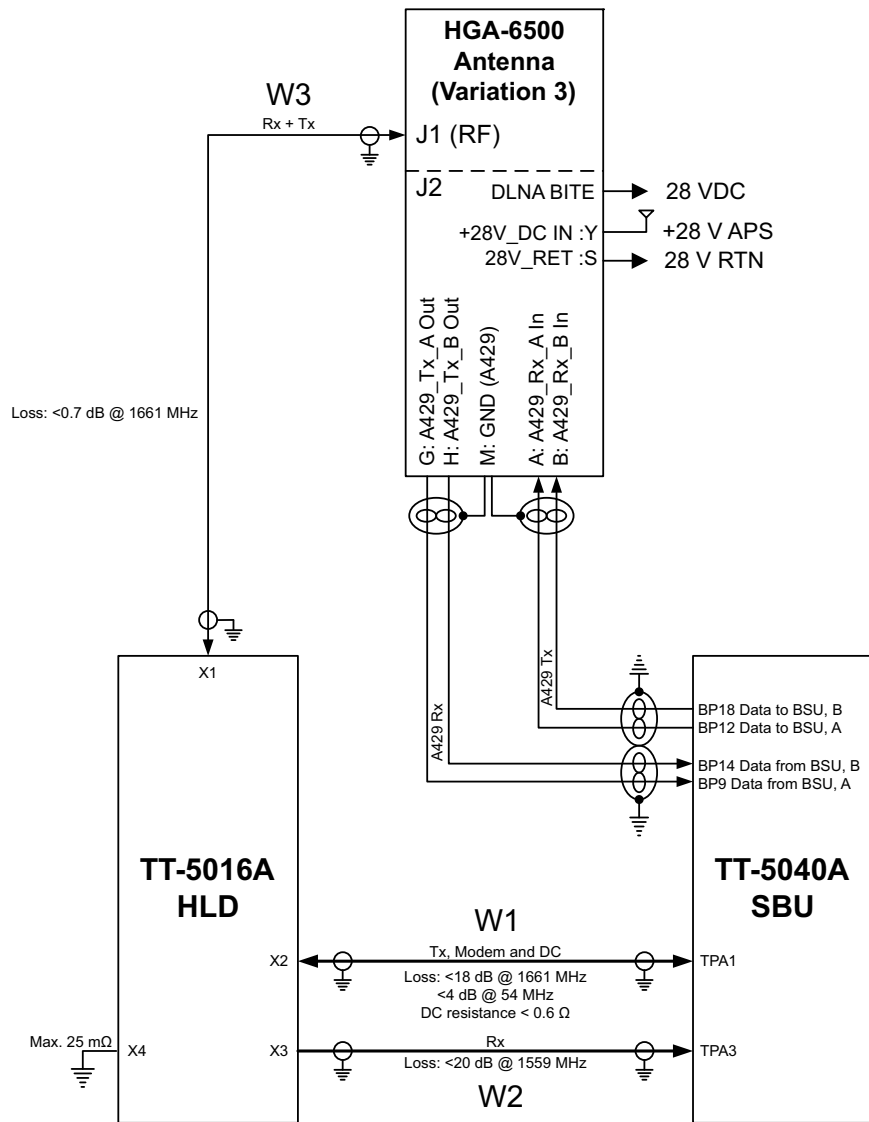


Figure 5-8: Wiring HGA-6500 Antenna (Variation 3 label at antenna plug: Y and S)  
 For the requirements to RF cables W1, W2 and W3 see Table 5-9 on page 5-24.

### Wiring HGA-7001

The following drawing shows the wiring for an AVIATOR 350 system using an HGA-7001 high gain antenna.

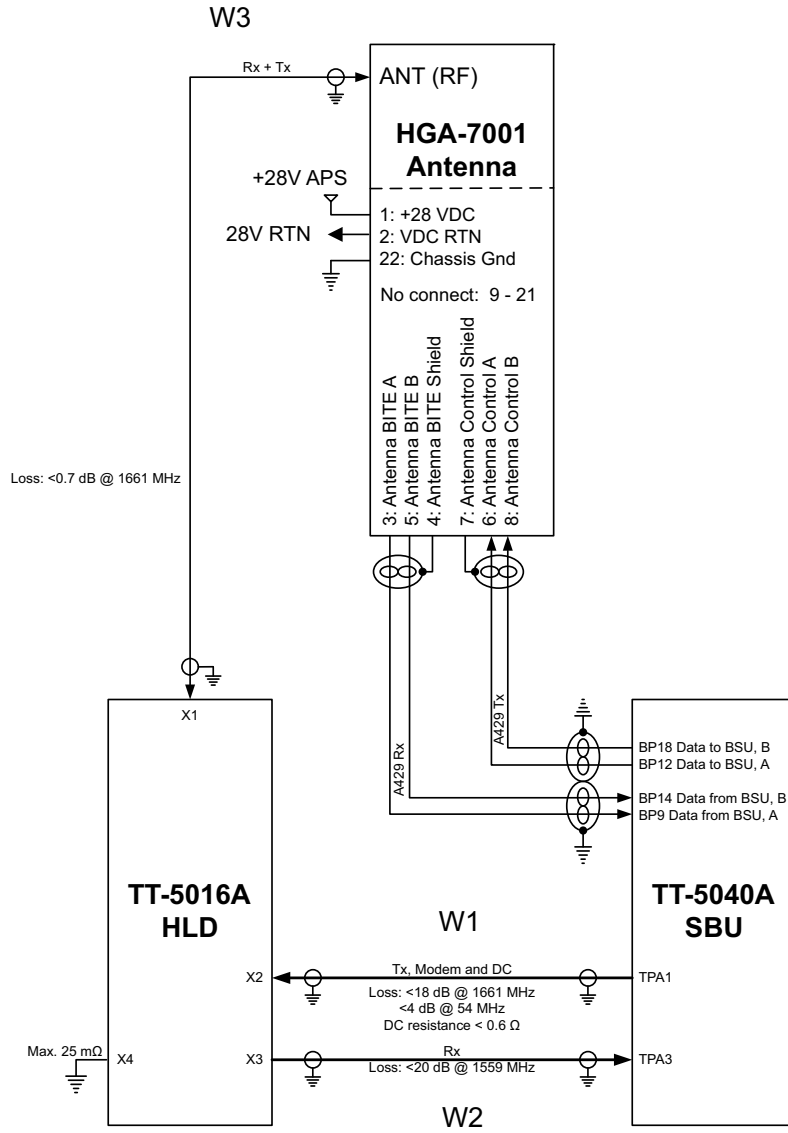


Figure 5-9: Wiring HGA-7001

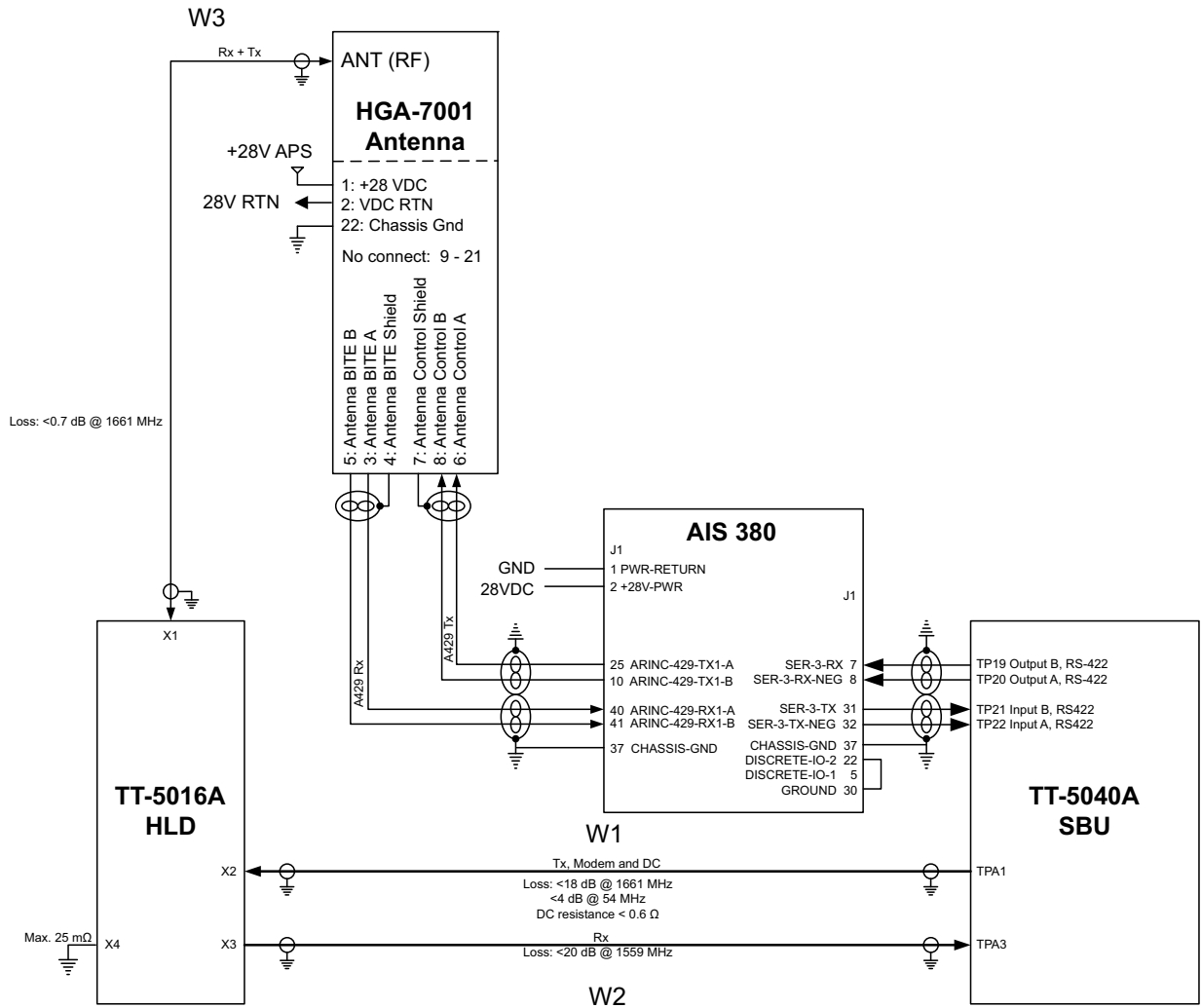
For the requirements to RF W1, W2 and W3 cables see Table 5-9 on page 5-24.



## AVIATOR 350: Wiring HGA-7001 with AIS 380 Aircraft Interface Module

**Important** To use this feature the SBU must have software 2.03 or higher.

The following drawing shows the wiring for an AVIATOR 350 system using an HGA-7001 high gain antenna and an AIS 380 Aircraft Interface Module.



**Note for AIS-380:**

Pin 5 DISCRETE-IO-1 Discrete TX Speed Select Open = ARINC HI  
 Pin 22 DISCRETE-IO-2 Discrete RX Speed Select GND = ARINC LO

Figure 5-10: Wiring HGA-7001 with AIS 380 Aircraft Interface Module

For the requirements to RF W1, W2 and W3 cables see Table 5-9 on page 5-24.

### Wiring AMT-50

The following drawing shows the wiring for an AVIATOR 350 system using an AMT-50 high gain antenna.

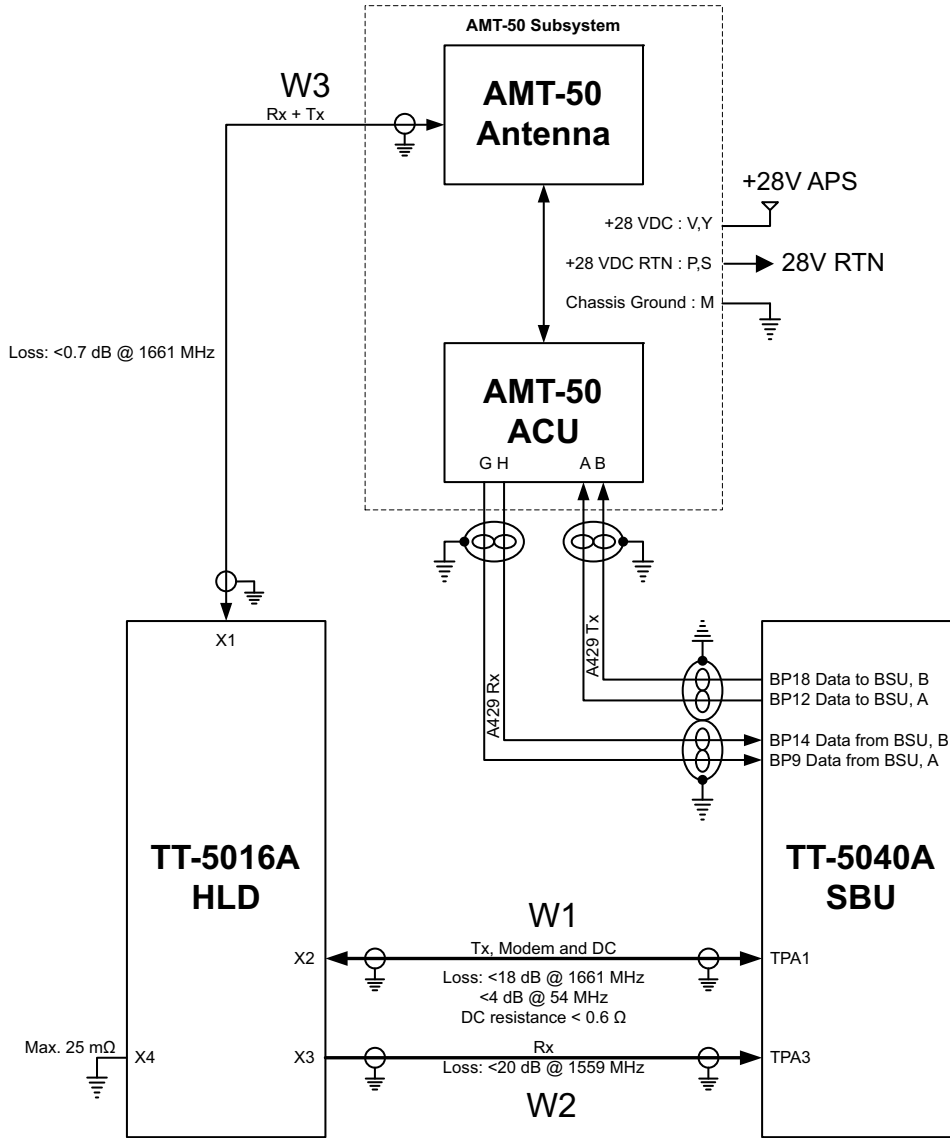


Figure 5-11: Wiring AMT-50

For the requirements to RF cables W1, W2 and W3 see Table 5-9 on page 5-24.

### Wiring AMT-700

The following drawing shows the wiring for an AVIATOR 350 system using an AMT-700 high gain antenna.

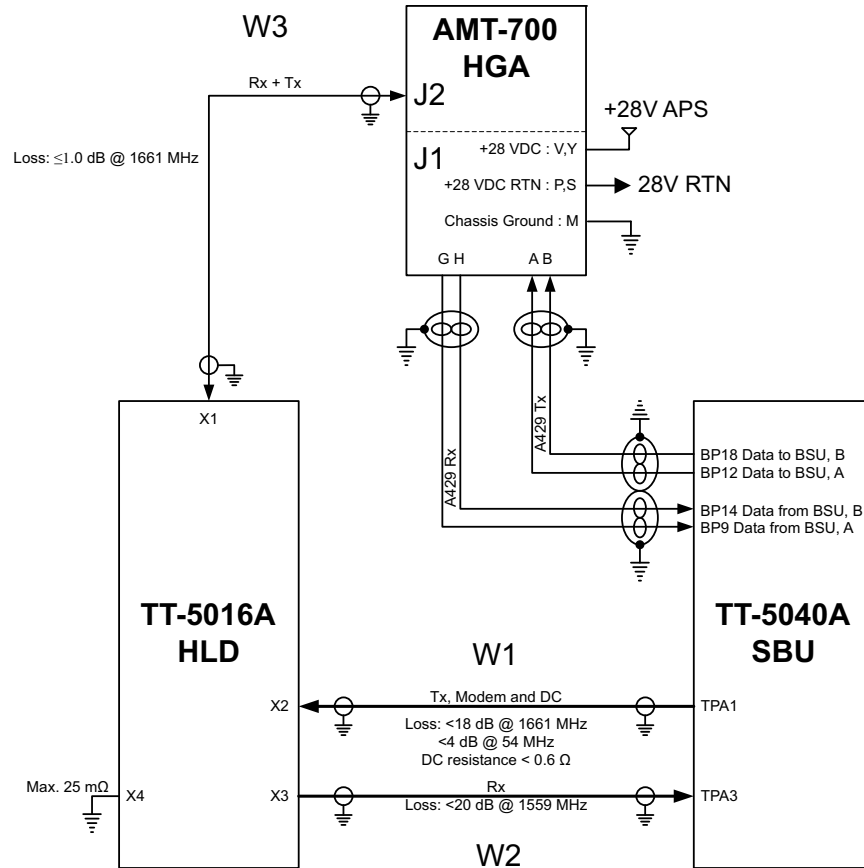


Figure 5-12: Wiring AMT-700

For the requirements to RF W1, W2 and W3 cables see Table 5-9 on page 5-24.

### Wiring AMT-3500/3800

The following drawing shows the wiring for an AVIATOR 300 system using an AMT-3500 intermediate gain antenna or an AVIATOR 350 using an AMT-3800 high gain antenna.

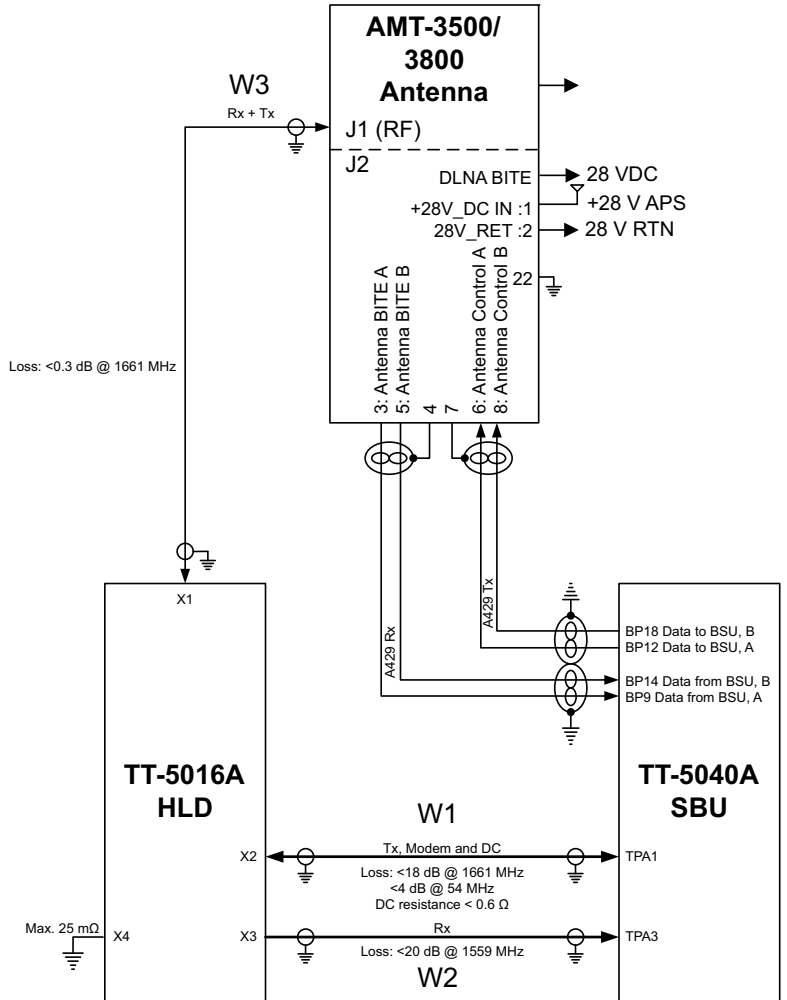


Figure 5-13: Wiring AMT-3500/3800

For the requirements to RF W1, W2 and W3 cables see Table 5-9 on page 5-24.

### Wiring IGA-5001, HGA-7000 and HGA-8000

The following drawing shows the wiring for an AVIATOR 300 system using an IGA-5001 or an AVIATOR 350 system using a HGA-7000 or HGA-8000.

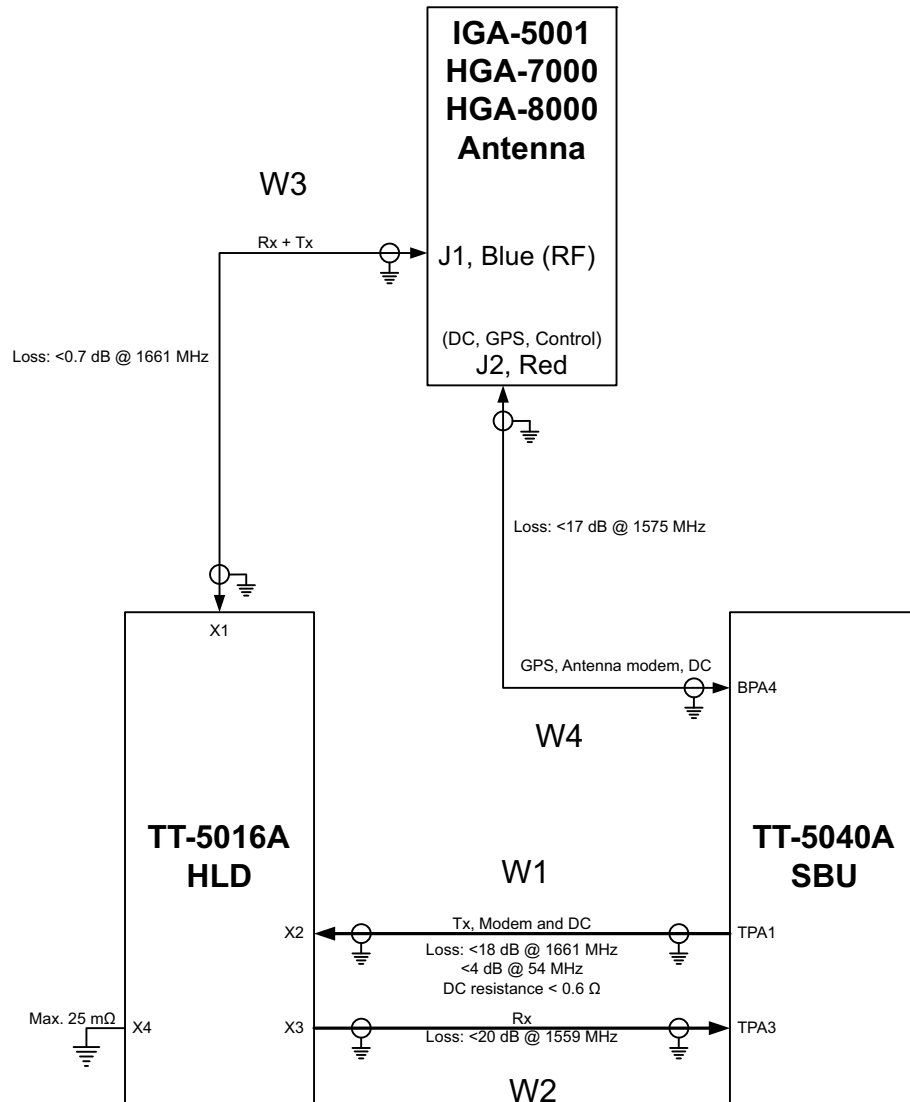


Figure 5-14: Wiring IGA-5001. HGA-7000 and HGA-8000

For the requirements to RF cables W1, W2, W3 and W4 see Table 5-9 on page 5-24.

### Wiring CMA-2102/CMA-2102SB

The following drawing shows the wiring for an AVIATOR 350 system using a CMA-2102SB antenna.

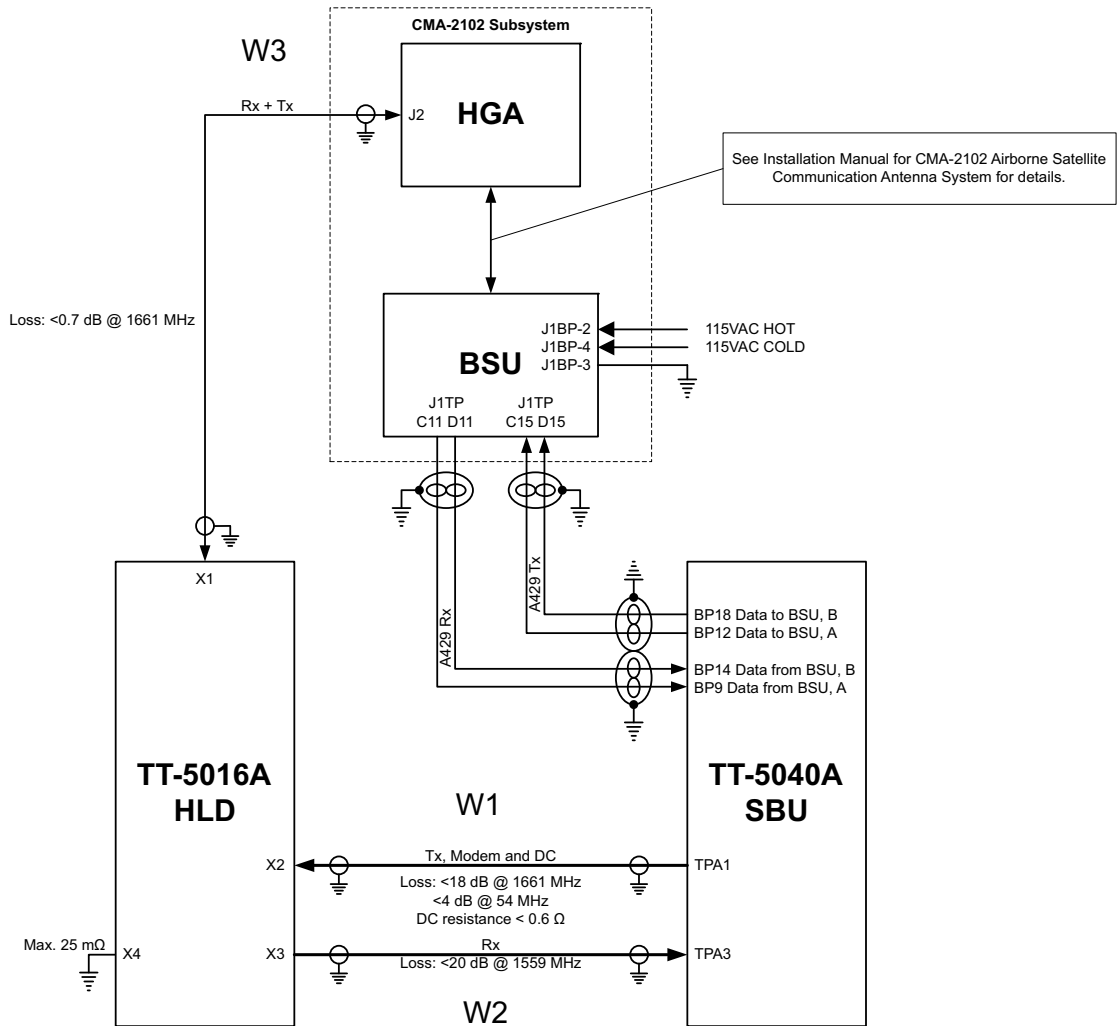


Figure 5-15: Wiring CMA-2102/CMA-2102SB

For the requirements to RF cables W1, W2 and W3 see Table 5-9 on page 5-24.

## Pins for connecting to HLD and SBU

The following list shows the pins used in the AVIATOR 200/300/350 system for connecting the satcom antenna to the HLD and SBU.

SBU pin	Description
TP A1	RF Tx output to HLD
TP A3	RF Rx input from HLD
BP A4	GPS input, DC out, Modem (coax.)
BP12	Data to BSU or CMU, ARINC 429A
BP18	Data to BSU or CMU, ARINC 429 B
BP9	Data from BSU or CMU, ARINC 429A
BP14	Data from BSU or CMU, ARINC 429 B

Table 5-6: SBU pins for satcom antenna system

HLD connector	Description
X1	L-Band Rx/Tx interface to antenna
X2	RF Tx input from SBU
X3	RF Rx output to SBU
X4	Chassis Ground

Table 5-7: HLD connectors for satcom antenna system

The following tables show the requirements to cable losses for cables between the satcom antenna, the HLD and the SBU. The cable loop DC resistance is the sum of the resistance in the shield and the center conductor.

RF cable requirements for AVIATOR 200	Min. cable Loss @1.6 GHz	Max. cable Loss @1.6 GHz	Cable loop DC resistance
W1 (SBU Tx to HLD Tx) <sup>a</sup>	0 dB	17 dB	< 0.6 $\Omega$
W2 (HLD Rx to SBU Rx)	0 dB	17 dB	n.a.
W3 (HLD to antenna)	0 dB	0.3 dB	n.a.
W4 (SBU to antenna)	0 dB	17 dB	< 1.5 $\Omega$

Table 5-8: RF cable requirements for satcom antenna systems, AVIATOR 200

- a. Additional requirements: Antenna cable modem-attenuation: at 54 MHz: max. 4 dB, at 36 MHz: max. 3 dB.

RF cable requirements for AVIATOR 300 and AVIATOR 350	Min. cable Loss @1.6 GHz	Max. cable Loss @1.6 GHz	Cable loop DC resistance
W1 (SBU Tx to HLD Tx) <sup>a</sup>	0 dB	18 dB	< 0.6 Ω
W2 (HLD Rx to SBU Rx)	0 dB	20 dB	n.a.
W3 (HLD to antenna)	0 dB	0.7 dB <sup>b</sup>	n.a.
W4 (SBU to antenna)	0 dB	17 dB	< 1.5 Ω

Table 5-9: RF cable requirements for satcom antenna systems, AVIATOR 300/350

- a. Additional requirements: Antenna cable modem-attenuation at 54 MHz: max. 4 dB, at 36 MHz: max. 3 dB.
- b. 0.3 dB for AMT-3500/3800.



### 5.3.4 Wiring ARINC 429 interfaces

**Note** The source for navigational data over ARINC 429 can be either an IRS, AHRS, NPI, GNSS or another navigational input compatible with the requirements in this section.

#### Wiring an ARINC 429 source system

The SBU has two ARINC 429 input interfaces for two navigational inputs.

**Important** For instructions how to install and set up the IRS, AHRS, NPI or GNSS system see the respective installation manual.

The following drawing shows the wiring of a navigational input. Requirements to the cables are stated in the section *Cable requirements, ARINC 429* on page 5-29.

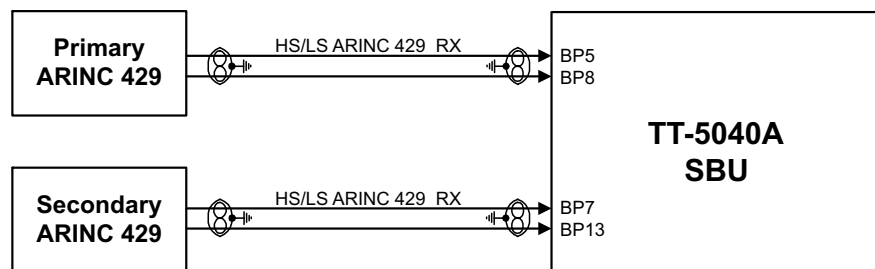


Figure 5-16: Wiring ARINC 429 navigational input

#### Pins for input from ARINC 429 sources

The pins for navigational input are located in the bottom plug of the SBU rear receptacle.

SBU pin	Name/description
BP5	Data from primary ARINC 429 navigational input A
BP8	Data from primary ARINC 429 navigational input B
BP7	Data from secondary ARINC 429 navigational input A
BP13	Data from secondary ARINC 429 navigational input B

Table 5-10: SBU pins for input from a navigational ARINC 429 source

#### Description of the interface for navigational input

When the system is configured with the web interface, the CM contains the information:

- Which navigational input is selected: IRS, AHRS, NPI or GNSS.
- Whether primary or secondary input or both are installed.

**Note** If primary and secondary ARINC 429 navigational input are both installed, they must be of the same type (IRS, AHRS, NPI or GNSS).

- ARINC 429 Speed (High or Low). The primary and secondary navigational inputs can individually be set to high or low speed, depending on your configuration.

## ARINC data format for IRS

The required ARINC data format for IRS is listed in the following table:

Label (octal)	Name	Minimum update rate
150	UTC Time (optional) <sup>a</sup>	1 Hz
260	UTC Date (optional) <sup>a</sup>	1 Hz
310	Latitude	1 Hz
311	Longitude	1 Hz
312	Ground speed	1 Hz
313	Track angle True	1 Hz
314	True heading	10 Hz
324	Pitch angle	10 Hz
325	Roll angle	10 Hz
361	Altitude Inertial (optional) <sup>a</sup>	1 Hz

Table 5-11: ARINC data format for IRS

- a. The labels marked optional do not have an effect on the operation of the AVIATOR 200/300/350 system, but may increase precision in the antenna pointing and time management.

## ARINC data format for AHRS

The required ARINC data format for AHRS is listed in the following table:

Label (octal)	Name	Minimum update rate
320	Magnetic heading	10 Hz
324	Pitch angle	10 Hz
325	Roll angle	10 Hz
336	Inertial pitch rate (optional) <sup>a</sup>	10 Hz
337	Inertial roll rate (optional) <sup>a</sup>	10 Hz

Table 5-12: ARINC data format for AHRS

- a. The labels marked optional do not have an effect on the operation of the AVIATOR 200/300/350 system, but may increase precision in the antenna pointing.

## ARINC data format for NPI

**Note** NPI can only be used together with the AVIATOR 200 (TT-3002A LGA).

The required ARINC data format for NPI is listed in the following table:

Label (octal)	Name	Minimum update rate
150	UTC Time (optional) <sup>a</sup>	1 Hz
260	UTC Date (optional) <sup>a</sup>	1 Hz
310	Latitude	1 Hz
311	Longitude	1 Hz
312	Ground speed	1 Hz
313	Track angle True <sup>b</sup>	1 Hz
361	Altitude Inertial (optional) <sup>a</sup>	1 Hz

Table 5-13: ARINC data format for NPI

- a. The labels marked optional do not have an effect on the operation of the AVIATOR 200 system, but may increase precision in the time management.
- b. The SBU software only checks for the track angle when the ground speed is above 100 knots. This is applicable from version AVIATOR 200/300/350 (Level E): 1.07 and above, AVIATOR 200D/300D/350D (Level D): 2.01 and above.

## ARINC data format for GNSS

**Note** GNSS can only be used together with the AVIATOR 200 (TT-3002A LGA).

The required ARINC data format for GNSS is listed in the following table:

Label (octal)	Name	Minimum update rate
103	Track angle <sup>a</sup>	1 Hz
110	Latitude	1 Hz
111	Longitude	1 Hz
112	Ground speed	1 Hz
150	UTC Time (optional) <sup>b</sup>	1 Hz
260	UTC Date (optional)	1 Hz
370	Height (optional)	1 Hz

Table 5-14: ARINC data format for GNSS

- a. The SBU software only checks for the track angle when the ground speed is above 100 knots. This is applicable from version AVIATOR 200/300/350 (Level E): 1.07 and above, AVIATOR 200D/300D/350D (Level D): 2.01 and above.
- b. The labels marked optional do not have an effect on the operation of the AVIATOR 200 system, but may increase precision in the time management.

### Wiring CMU

The following figure shows the wiring of the SBU to a CMU via ARINC 429 Tx / Rx interface.

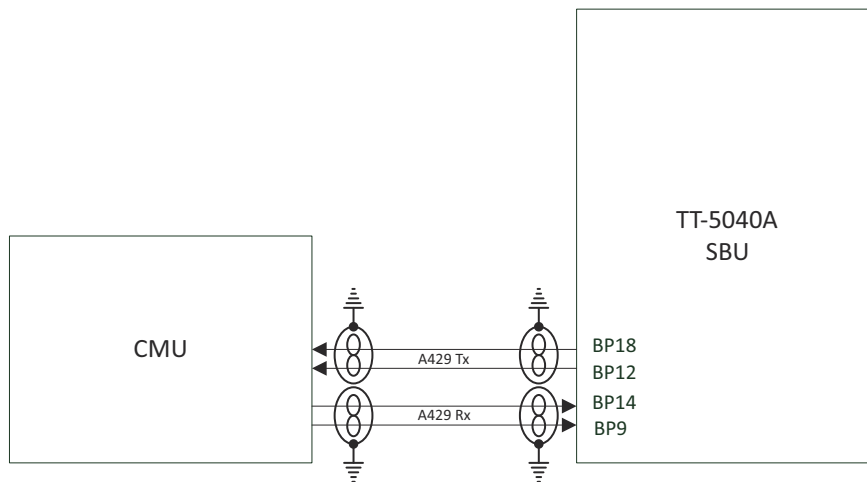


Figure 5-17: Wiring the CMU

### Pins for CMU

SBU pin	Name/description
BP9	Data from BSU or CMU, ARINC 429A
BP14	Data from BSU or CMU, ARINC 429B
BP12	Data to BSU or CMU, ARINC 429A
BP18	Data to BSU or CMU, ARINC 429B

Table 5-15: SBU pins for input from GPS antenna

## Description

To configure installation parameters for ACARS/CMU in the web interface of the SBU see *Set up CMU/ACARS (option)* on page 6-51.

### Important

When using the SBU/ACARS interface for SBB Safety Services (e.g. CPDLC traffic) and/or SB-Safety Voice is enabled, note that additional user traffic and interface connections to the SBU shall be addressed in the Security Safety Assessment (SSA) of the particular aircraft. The SBU does not comply to the ARINC-781 attachment 8, Security Considerations. There is no segregation between the user interfaces. All interfaces of the SBU shall be considered as 'Aircraft Control Domain'.

## Cable requirements, ARINC 429

The cables for the ARINC 429 interfaces must be twisted and shielded. They must conform to the standards for aeronautical use.

For recommended cable types, see *Recommended cables for ARINC 429* on page 5-49.

## 5.3.5 Wiring GPS interface

### Wiring the GPS antenna

The following figure shows the wiring of the GPS interface when using a power splitter. You can use the power splitter shown in *TT-5038A-003 Rx Power Splitter* on page 3-4. In this configuration, the other GPS receiver must power the antenna.

The SBU also has the ability to power an antenna with either 5 VDC or 26 VDC if a separate GPS antenna is connected directly to the SBU.

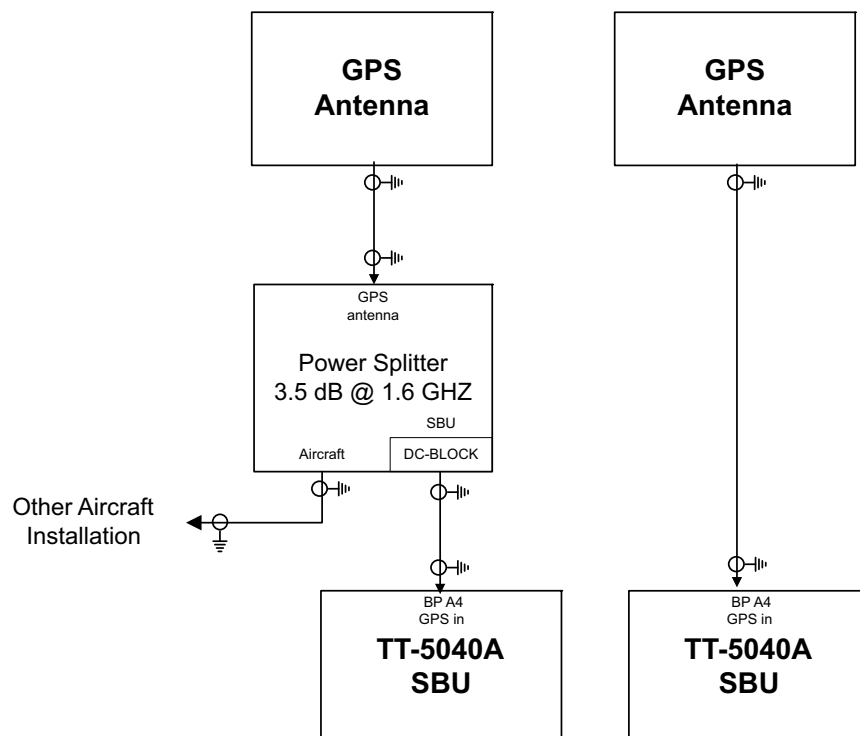


Figure 5-18: Wiring GPS Interface with Power Splitter

The cable loss limit between the GPS Antenna and the SBU depends on the active gain in the GPS antenna. The gain, minus the total loss in the cable(s) and Power Splitter must be in the range of 10 to 35 dB.

**Satcom Rejection:** The GPS antenna must comply with DO-310. In particular section 2.2.6.3 and the requirement to withstand +8 dBm at frequencies above 1625 MHz. Antennas that are approved under TSO-C144 or TSO-C190 meet this requirement.

### Pin for input from the GPS antenna

SBU pin	Name/description
BP A4	GPS antenna input (coax), modem, DC out

Table 5-16: SBU pins for input from GPS antenna

### Description of the GPS interface

This section describes the GPS interface when used to interface with a standalone GPS antenna. This interface is also used when connecting to a satcom antenna with built-in GPS antenna. For info on this, please see *Wiring the satcom antenna* on page 5-10.

The GPS interface has 3 functions:

- Reception of the GPS RF signal
- Supply DC power to the GPS antenna or satcom antenna
- Coax modem communication with the satcom antenna

## 5.3.6 Wiring Ethernet

### Overview

The SBU has six 10/100BaseT Ethernet interfaces, plus the interface on the front of the SBU described in *Wiring the maintenance interface* on page 5-45.

The following drawing shows the wiring of the rear SBU Ethernet interfaces.

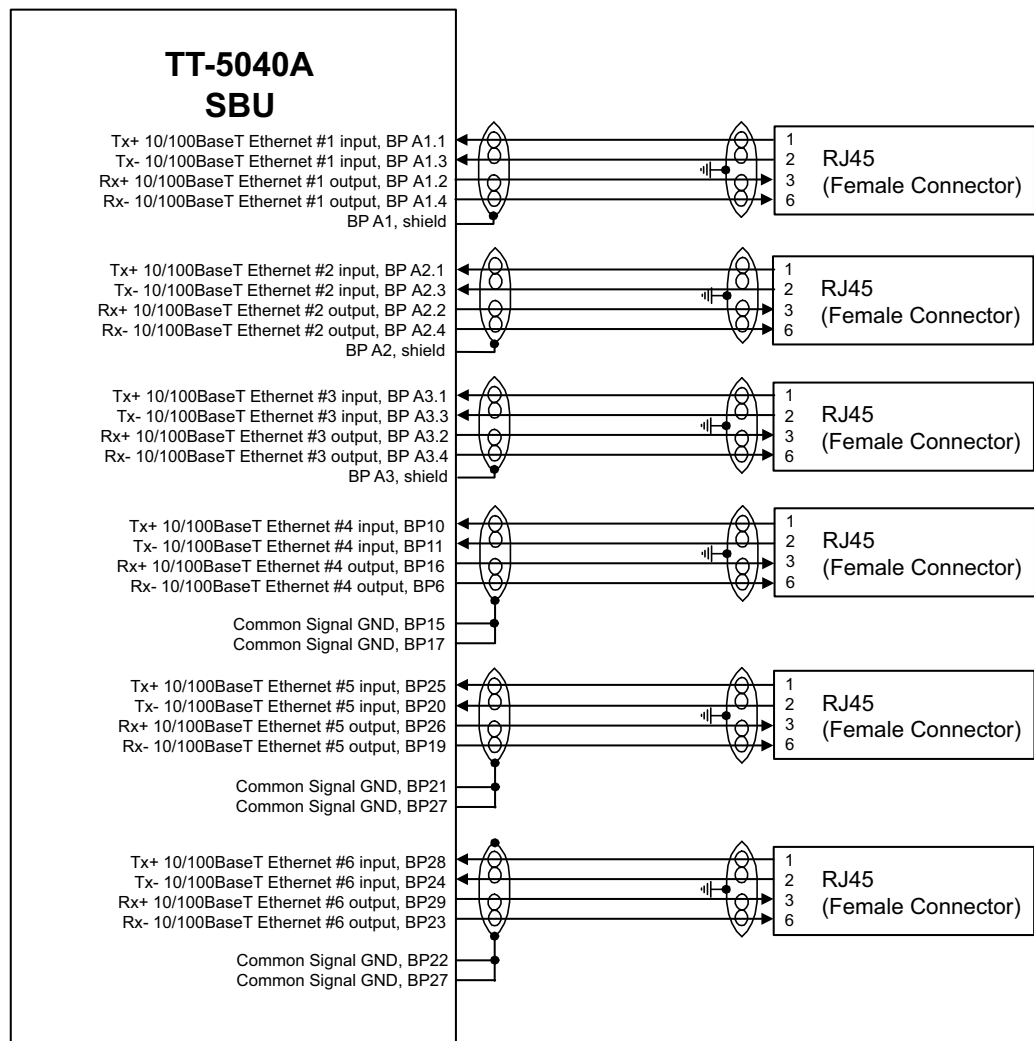


Figure 5-19: Wiring Ethernet

The RJ45 Ethernet interfaces match a standard straight network cable. You can freely select which of the Ethernet connections you want to use.

The supported cable length is up to 100 meters (328 feet).

## Pins for 10/100BaseT Ethernet

The following list shows the pins used for the Ethernet interface.

SBU pin	Name	Description	RJ45 pin (F)	Name
BP A1.1	Tx+ 10/100BaseT Ethernet #1	Input	1	TxD+
BP A1.2	Rx+ 10/100BaseT Ethernet #1	Output	3	RxD+
BP A1.3	Tx- 10/100BaseT Ethernet #1	Input	2	TxD-
BP A1.4	Rx- 10/100BaseT Ethernet #1	Output	6	RxD-
BP A2.1	Tx+ 10/100BaseT Ethernet #2	Input	1	TxD+
BP A2.2	Rx+ 10/100BaseT Ethernet #2	Output	3	RxD+
BP A2.3	Tx- 10/100BaseT Ethernet #2	Input	2	TxD-
BP A2.4	Rx- 10/100BaseT Ethernet #2	Output	6	RxD-
BP A3.1	Tx+ 10/100BaseT Ethernet #3	Input	1	TxD+
BP A3.2	Rx+ 10/100BaseT Ethernet #3	Output	3	RxD+
BP A3.3	Tx- 10/100BaseT Ethernet #3	Input	2	TxD-
BP A3.4	Rx- 10/100BaseT Ethernet #3	Output	6	RxD-
BP6	Rx- 10/100BaseT Ethernet #4	Output	6	RxD-
BP10	Tx+ 10/100BaseT Ethernet #4	Input	1	TxD+
BP11	Tx- 10/100BaseT Ethernet #4	Input	2	TxD-
BP15	Common Signal GND for Ethernet	GND	Shield	
BP16	Rx+ 10/100BaseT Ethernet #4	Output	3	RxD+
BP17	Common Signal GND for Ethernet	GND	Shield	
BP19	Rx- 10/100BaseT Ethernet #5	Output	6	RxD-
BP20	Tx- 10/100BaseT Ethernet #5	Input	2	TxD-
BP21	Common Signal GND for Ethernet	GND	Shield	
BP22	Common Signal GND for Ethernet	GND	Shield	
BP23	Rx- 10/100BaseT Ethernet #6	Output	6	RxD-
BP24	Tx- 10/100BaseT Ethernet #6	Input	2	TxD-
BP25	Tx+ 10/100BaseT Ethernet #5	Input	1	TxD+

Table 5-17: SBU Pins for 10/100BaseT Ethernet



SBU pin	Name	Description	RJ45 pin (F)	Name
BP26	Rx+ 10/100BaseT Ethernet #5	Output	3	RxD+
BP27	Common Signal GND for Ethernet	GND	Shield	
BP28	Tx+ 10/100BaseT Ethernet #6	Input	1	TxD+
BP29	Rx+ 10/100BaseT Ethernet #6	Output	3	RxD+

Table 5-17: SBU Pins for 10/100BaseT Ethernet (Continued)

### Wiring of RJ45 connector to Quadrax connector

The physical layer conforms to IEEE standard 802.3 [1], Chapter 14: “Twisted Pair medium attachment unit”, except for the connector type. To be compliant with [1], use an RJ45 female connector for the user interface. The below drawing shows the corresponding RJ45 connection. The SBU is configured as Data communication Equipment (DCE), i.e. TX +/- are input and RX +/- are outputs.

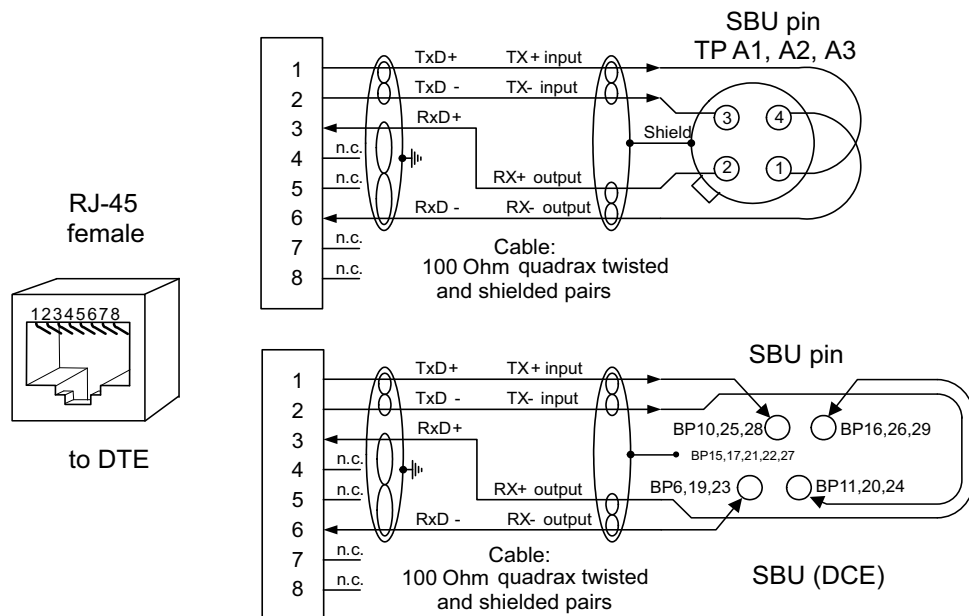


Figure 5-20: Ethernet pin configuration for SBU

### Common Signal GND (BP15, BP17, BP21, BP22 and BP27)

Common Signal GND is used to connect the shield of the Ethernet cables for Ethernet #4, #5 and #6 on the SBU. The shield for each cable is connected according to **Figure 5-19: Wiring Ethernet**. The shield of the Ethernet cables for Ethernet #1, #2 and #3 is connected to the shield of the Quadrax connectors.

### 5.3.7 Wiring WLAN antenna interface

Before wiring the WLAN antenna interface make sure that your system has the Built-in Wireless Option TT-5040A-003.

**Important** With software 4.00 and SB-Safety voice the WLAN access point must be disabled in the configuration software.

#### Overview

The following drawing shows the wiring of the SBU WLAN antenna interfaces.

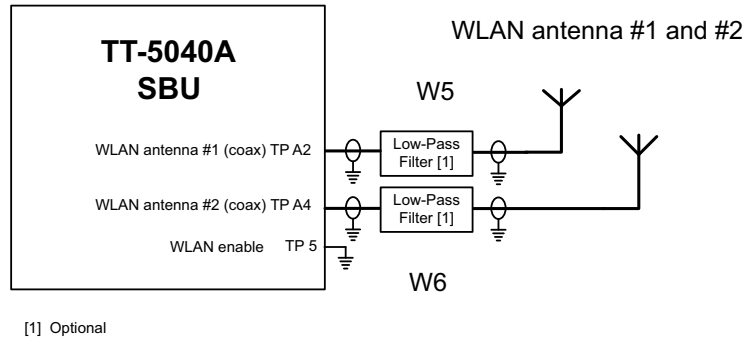


Figure 5-21: Wiring WLAN antenna interfaces #1 and #2

#### WLAN low pass filter

The WLAN module in the SBU can in theory transmit in the 5 GHz (802.11a) frequency range. This is inhibited permanently by the software in the SBU. If the aircraft cannot be tested to be immune to 5 GHz signals, you can optionally insert a 2.4 GHz low pass filter into the WLAN Coax to safeguard the aircraft against transmission in the 5 GHz frequency range.

#### WLAN pins

The following list shows the pins used for the WLAN antenna interface on the SBU.

SBU pin	Name/description
TPA2	WLAN antenna #1 (coax)
TPA4	WLAN antenna #2 (coax)
TP5	WLAN Enable, Discrete Input (active low)

Table 5-18: SBU pins for WLAN antenna #1 and #2

## Description of the WLAN interface

The WLAN interface on the SBU supports operation according to the IEEE 802.11b and 802.11g standards. The WLAN (2.4GHz) frequency band is divided into 14 channels.

Not all countries allow full use of all channels. Also, some countries do not allow operation according to the 802.11g standard. Therefore the WLAN interface must be set up to the right country code. For further information, see *WLAN country codes* on page D-1.

The maximum EIRP output level for WLAN 802.11b and 802.11g is 100 mW for indoors use. To prevent the EIRP output power from exceeding this limit, the maximum antenna gain must not exceed the cable loss between the antenna and the SBU.

## Operating with a single WLAN antenna

If operating with a single WLAN antenna, it is recommended to use the WLAN pin TP A2.

Make sure to set up WLAN interface correctly — Antenna configuration: Main or Aux for single antenna operation — see *WLAN interface (option)* on page 6-22.

Antenna configuration	SBU TP A2	SBU TP A4
Diversity (antenna #1 and #2)	TX/RX	RX
Main (antenna #1)	TX/RX	–
Aux (antenna #2)	–	TX/RX

Table 5-19: WLAN antenna configuration

## RF cable requirements for WLAN

To achieve optimal performance for the WLAN system select a cable type with a minimal cable loss when cabling the TT5040A-004 WLAN antenna. For a table with cable types and cable losses see *Recommended RF cables* on page 5-48.

Cable	Min. cable loss @2.4 GHz	Max. cable loss @2.4 GHz
From TP A2 to TT5040A-004 WLAN antenna and TP A4 to TT5040A-004 WLAN antenna	0 dB	5 dB

Table 5-20: Cable requirements for WLAN

## Order information for low pass filter for WLAN

Product name	Description	Manufacturer	
Coaxial Low Pass Filter SLP-2950+	Low-pass filter for WLAN	<b>Mini-Circuits</b> P.O. Box 350166, Brooklyn, NY 11235 U.S.A.	
		Phone: Home page:	(718) 934-4500 <a href="http://www.minicircuits.com">www.minicircuits.com</a>

Table 5-21: Low pass filter for WLAN, order information

### 5.3.8 Wiring ISDN

**Note** The AVIATOR 200 does not support ISDN services. The interface can be used for standard voice services.

**Important** With software 4.00 and SB-Safety voice ISDN is forced disabled.

#### Wiring drawing

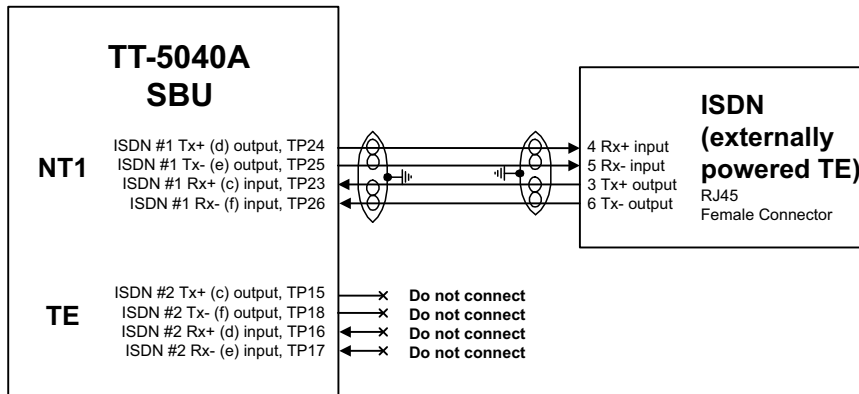


Figure 5-22: Wiring ISDN interface

Note that even though the AVIATOR 200/300/350 system supports connection of several ISDN devices, the satellite channel only supports transmission on one ISDN channel.

#### Pins for ISDN

The following lists show the pins used for the ISDN interfaces on the SBU.

SBU pin	Name/description
TP23	ISDN #1 Rx+ (c) input (NT)
TP24	ISDN #1 Tx+ (d) output (NT)
TP25	ISDN #1 Tx- (e) output (NT)
TP26	ISDN #1 Rx- (f) input (NT)
TP15	ISDN #2 Tx+ (c) output (TE). <b>Do not connect!</b>
TP16	ISDN #2 Rx+ (d) input (TE). <b>Do not connect!</b>
TP17	ISDN #2 Rx- (e) input (TE). <b>Do not connect!</b>
TP18	ISDN #2 Tx- (f) output (TE). <b>Do not connect!</b>

Table 5-22: SBU pins for ISDN

## Description of SBU ISDN interface

The SBU has one ISDN interface. The ISDN of the SBU uses the SwiftBroadband service. The Euro ISDN S-bus interface is configured as the network side of the NT1 interface i.e. Rx is an input and Tx is an output.

The ISDN interface on the SBU can address up to 8 ISDN devices. The ISDN interface supports 56/64kbps data rate and G4 Fax on the SwiftBroadband connection. You can also use the SBU ISDN interface to make an AMBE2 or 3.1 kHz audio call.

### Important

The SBU does not provide DC power on the ISDN interface of the SBU. All ISDN devices connected to the SBU must be powered externally.

To be compliant with ISO8877 [2] and the ISDN connector specification defined by ITU I.420 [6], an RJ45 Female Connector must be connected to the four-wire ISDN lines from the SBU.

The SBU includes an internal 100  $\Omega$  termination resistor to support cable lengths up to 100 meters (109 yards). Make sure the other end of the cable is terminated properly.

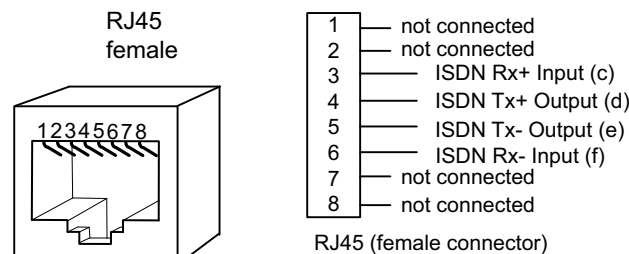


Figure 5-23: ISDN RJ45 connector

## Cable requirements for ISDN

- Cable for the ISDN interface: 100  $\Omega$  4-wire shielded cable.
- The conductors must be twisted in pairs.
- Supported cable lengths: up to 100 meters (328 feet).

## 5.3.9 Wiring telephone systems

### Built-in Private Branch Exchange (PBX)

The built-in PBX of the SBU controls the 2-wire POTS interfaces #1 and #2 and one ISDN interface. The built-in PBX can also route VoIP calls that are terminated in the SIP server of the SBU.

Without the Multi-voice option the AVIATOR 200/300/350 system supports one external call at a time. When the circuit-switched connection is in use by another phone, you have to wait until the line is free.

### VoIP calls and SIP telephony

You can use phones with a SIP client and the WLAN interface to make calls. These calls are terminated in the SIP server of the SBU and routed through the built-in PBX on the Swift Broadband channel. For a detailed description how to set up your phone see *SIP setup for*

*Wifi-enabled phones* on page H-1.

## 2-wire POTS interface #1 and #2

**Important** | With software 4.00 and SB-Safety voice, the 2-wire POTS interface #2 is forced disabled.

The 2-wire interfaces may be connected and configured to the 2-wire systems listed below:

- TT-5621B 2-Wire Handset / TT-5622B 2-Wire Cradle
- ICG DECT Cordless Handset with POTS interface
- Sigma<sup>7</sup> phone with POTS interface
- Fax or Modem data with POTS interface
- Headset interface box PTA-12 Airborne telephone adapter
- Secure devices with POTS interface (STU/FNBDT)

The maximum number of telephones on each 2-wire POTS interface is:  
Two TT-5621B 2-Wire Handset / TT-5622B 2-Wire Cradle or two Sigma<sup>7</sup> phones.

Note that the AVIATOR 200/300/350 system supports one external call at a time. When one phone is in use, you cannot use the other phone on the same 2-wire POTS interface.

## ISDN interface

**Important** | With software 4.00 and SB-Safety voice, the ISDN interface is forced disabled.

The ISDN interface on the SBU may be used with an ISDN phone or fax machine and/or an ISDN data modem. A maximum of 8 ISDN units (ISDN phones, ISDN fax or ISDN data modem) may be connected to the ISDN interface, but only one unit may be active at a time. Secure device is supported with ISDN interface (STE).

## Configuration of wired handset interfaces

The following drawing shows the possible combinations of devices connected to the handset interfaces.

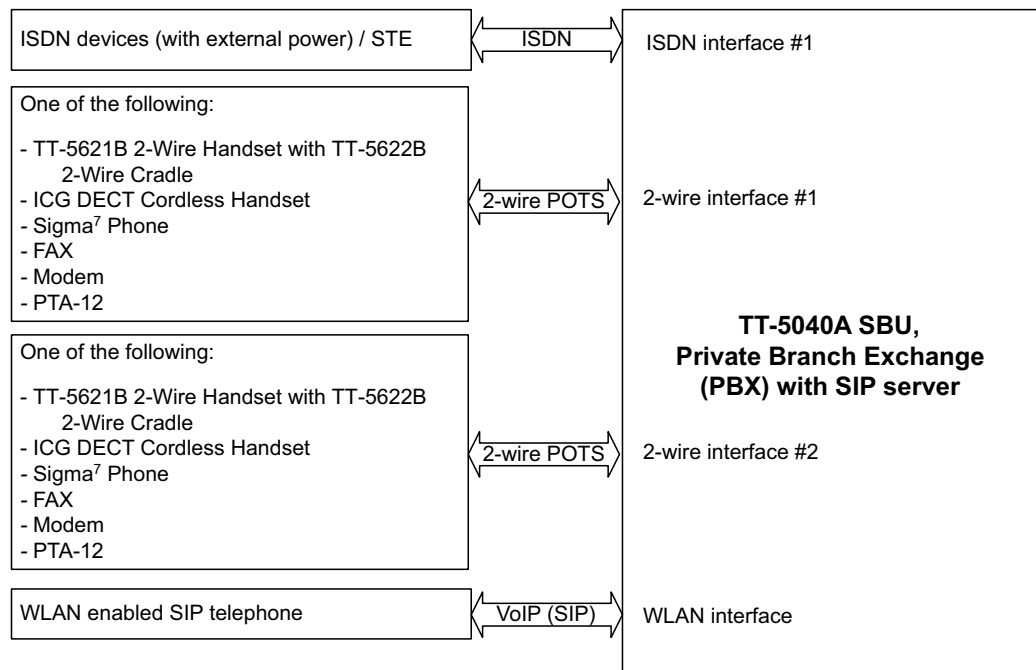


Figure 5-24: Handset interfaces with possible combinations of connected devices.

### Wiring 2-Wire Handsets

The following drawing shows the wiring of the TT-5621B 2-Wire Handset / TT-5622B 2-Wire Cradle.

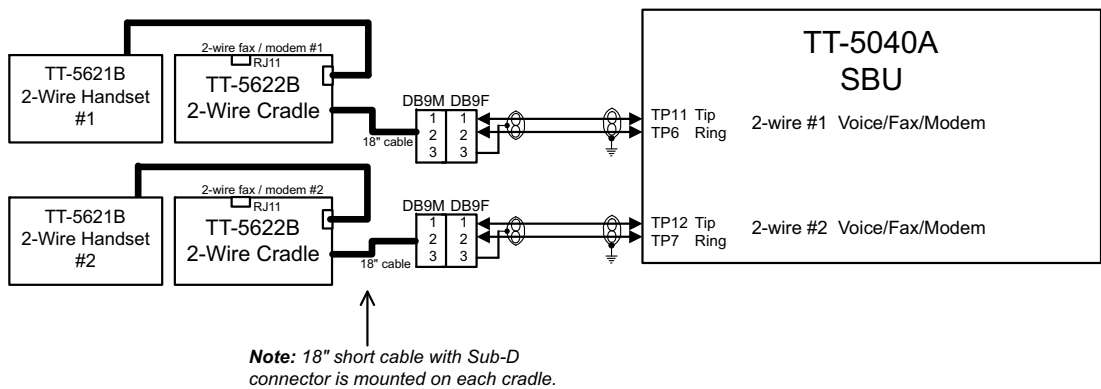


Figure 5-25: Wiring T&T 2-Wire Handset systems

### Pins for 2-wire interfaces

The below lists show the pins used for the 2-wire interfaces of the SBU.

SBU pin	Name/Description
TP6	2-Wire Voice/Fax/Modem #1 (Ring)
TP7	2-Wire Voice/Fax/Modem #2 (Ring)
TP11	2-Wire Voice/Fax/Modem #1 (Tip)
TP12	2-Wire Voice/Fax/Modem #2 (Tip)

Table 5-23: SBU pins for 2-Wire interface

### Description of 2-wire interfaces #1 and #2

The SBU has two 2-wire Voice/Fax/Modem POTS interfaces connected to the PBX. The interfaces comply with 2-wire 600 Ω standard US DTMF telephones. The 2-wire interfaces are not galvanically isolated from the aircraft frame. Galvanic isolation is required at the external 2-wire terminal.

Two TT-5621B 2-Wire Handset phones can be connected in parallel on each interface. These interfaces are used for the TT-5621B/ TT-5622B Thrane & Thrane aeronautical handset system, but may also be used for e.g. the Sigma<sup>7</sup>, ICG DECT Cordless Handset phones, fax, modem or secure devices and PTA-12.

For information on wiring of Sigma<sup>7</sup> phones, see *Wiring Sigma<sup>7</sup> (2-wire) handsets* on page 5-40. For information on wiring of ICG DECT Cordless Handset phones, see *Wiring ICG DECT Cordless Handset (2-wire) phone* on page 5-41.

**Supported cable length:** 100 meters (328 feet)

### 5.3.10 Wiring Sigma<sup>7</sup> (2-wire) handsets

One or two Sigma<sup>7</sup> handsets can be connected to the 2-wire interfaces of the AVIATOR 200/300/350 system. The following drawing shows the wiring of Sigma<sup>7</sup> handsets.

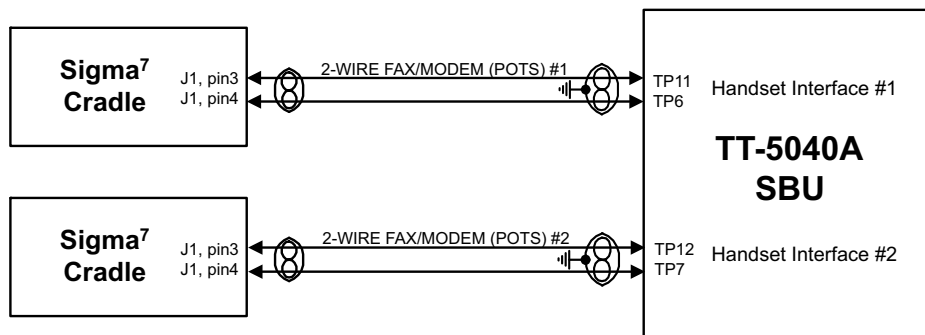


Figure 5-26: Wiring Sigma<sup>7</sup> handsets

**Note** The above wiring shows the connection for the non-backlit Sigma<sup>7</sup> handset. The backlit version Sigma<sup>7</sup> handset uses pin 6 for Tip 1 and pin 3 for Ring 1.

Connect J1 on the Sigma<sup>7</sup> handset to the rear receptacle of the SBU according to the wiring drawing above.

**Important** In order for the volume in the Sigma<sup>7</sup> handset to be sufficient, it is normally necessary to adjust the “ear volume” using the menu system of the handset. For information on how to do this, see *Sigma<sup>7</sup> setup* on page 6-99.

For information on the 2-wire interface, see *Pins for 2-wire interfaces* on page 5-39.



### 5.3.11 Wiring ICG DECT Cordless Handset (2-wire) phone

One or two ICG DECT Cordless Handset phones can be connected to the 2-wire interfaces of the AVIATOR 200/300/350 system. The following drawing shows the wiring of ICG DECT Cordless Handset 2-wire phones.

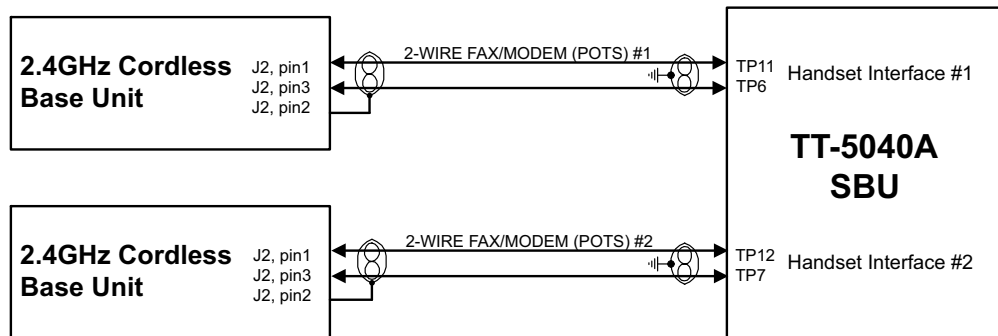


Figure 5-27: Wiring ICG DECT Cordless Handset handsets

Connect J2 on the base station of the ICG DECT Cordless Handset phone to the rear receptacle of the SBU according to the wiring drawing above. The base station is supplied together with the handset and cradle.

**Important**

In order for the ICG DECT Cordless Handset phone to work properly, it is normally necessary to make a few initial adjustments of the handset. For information on how to do this, see *ICG DECT Cordless Handset setup* on page 6-99.

For information on the 2-wire interface, see *Pins for 2-wire interfaces* on page 5-39.

### 5.3.12 Wiring discretetes

#### Discrete annunciators and Chime/Lamps Inhibit

The following drawing shows the wiring of discrete annunciators and Chime/Lamps Inhibit.

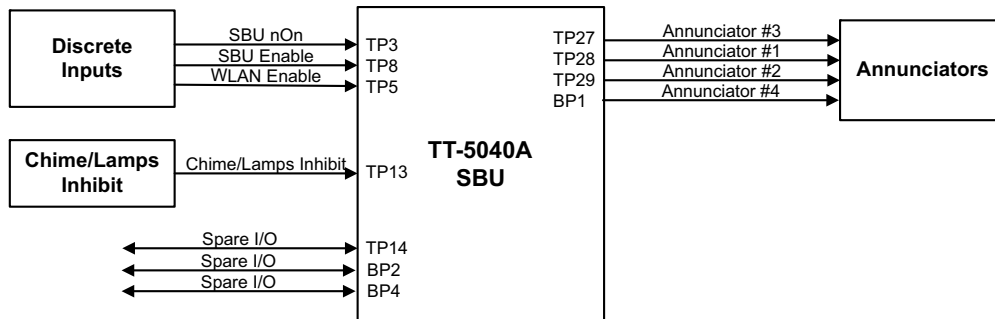


Figure 5-28: Wiring discretetes

#### Pins for discrete annunciators

The following list shows the pins used for discrete annunciators:

SBU pin	Name and description	Discrete type <sup>a</sup>
TP27	Annunciator #3 “Service available” (Discrete I/O)	Output: Lamp Driver
TP28	Annunciator #1 “Incoming call” (Discrete I/O)	Output: Lamp Driver
TP29	Annunciator #2 “SBU failed” (Discrete I/O)	Output: Lamp Driver
BP1	Annunciator #4 “Message received” (Discrete I/O)	Output: Lamp Driver

Table 5-24: SBU pins for discrete annunciators

a. The discrete interfaces are described in *Description of the discrete types* on page 5-44.

#### Function of discrete annunciators

The function of the annunciators is as follows:

- Annunciator #1 “Incoming call” (TP28)  
Default behavior: Active (low) when a handset is ringing.
- Annunciator #2 “SBU Failed” (TP29).  
Default behavior: Active (low) whenever a BITE with severity essential or fatal is active on the SBU.
- Annunciator #3 “Service available” (TP27).  
Default behavior: Active (low) when the SwiftBroadband Service is available.
- Annunciator #4 “Message received” (BP1).  
Default behavior: Active (low) when a Message is received in the SBU.

## Pins for Chime/Lamps Inhibit input

Pins used for the Chime/Lamps Inhibit input:

SBU pin	Name/description	Specification of discrete type
TP13	Chime/Lamps Inhibit	Discrete input (default: active low)

Table 5-25: SBU pin for Chime/Lamps Inhibit input

## Description of the Chime/Lamps Inhibit interfaces

The SBU has one discrete input for the Chime/Lamps Inhibit function. This input is used to inhibit Satcom activation of the chime and call lights during take-off and landing. The Inhibit function is activated by connecting this input to ground.

## Polarity of the discrete annunciators and Chime/Lamps Inhibit input

In the web interface you can change the polarity of the discrete annunciators and the Chime/Lamps Inhibit input from Active low (default) to Active high. For instructions how to do this see *Configure the discrete I/O interfaces* on page 6-37.

## Pins for non-configurable discrete inputs on the SBU

The SBU has two non-configurable discrete inputs: one for SBU nON, one for WLAN Enable. The below table shows the pin-out for the discrete inputs:

SBU pin	Name/description
TP3	SBU nON input
TP8	SBU Enable input
TP5	WLAN Enable input

Table 5-26: SBU pins for discrete inputs

**SBU nON (TP3):** The SBU nON input is used to power the SBU on and off. Connect this input to ground to turn on the SBU. The electrical specification is defined in Description of the discrete types below.

**SBU Enable (TP8):** The SBU Enable discrete input is active low and must be connected to ground. The input is used to inhibit the transmitter output signal and to reset the SBU, when the input is released to either open circuit or to high state. When pulled low the SBU is enabled (active). The electrical specification is defined in the following section, Description of the discrete types.

**WLAN Enable (TP5):** WLAN Enable input is used to enable the WLAN interface. The input is active low and the WLAN interface is kept disabled and reset as long as the input is at the high state. When the input is connected to ground or to low state the WLAN interface will be initialized and ready for use. When the WLAN interface is not enabled no RF is emitted from the interface.

### Description of the discrete types

Discrete type and description:

Discrete type	Description
Lamp Driver	<p>The output configuration forms a switch closure to ground. The electrical specification for the Lamp type switch is:</p> <p>Open switch hold-off voltage: max. +39.5 V DC                      Closed switch voltage: max. 1 V DC at 500 mA                      Open switch resistance (OFF): min. 100 kΩ</p>
Discrete input	<p>The discrete input detects the following states:                      “Open” voltage: 7 V DC to 39.5 V DC or <math>\geq 100\text{ k}\Omega</math> to ground.                      “Short” voltage: <math>0 \pm 3.5\text{ V DC}</math> or <math>\leq 1500\ \Omega</math> to ground.</p> <p>Input characteristics:                      Reaction time: &lt;500 ms.                      The internal interface is diode-isolated for parallel connection externally to any other LRU(s), with at least 200 kΩ of isolation, when power is not applied.</p>

Table 5-27: Specification of discrete types

### 5.3.13 Wiring the Switch Annunciator Panel

The following drawing shows the wiring of discrete inputs/annunciators and the Switch Annunciator Panel MD-41-1948.

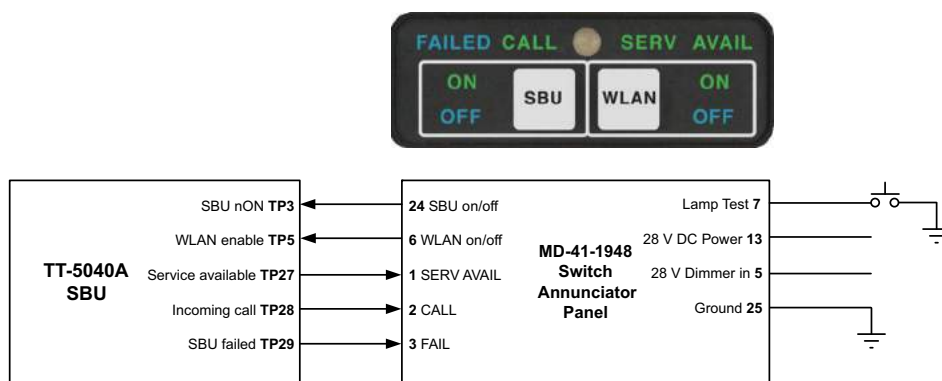


Figure 5-29: Wiring the Switch Annunciator Panel MD-41-1948

### 5.3.14 Wiring an SB-Safety Voice Annunciator Panel

**Important**

To use this feature the SBU must have software 4.00 and CMU/ACARS/SB-Safety voice option.

The SBU can be connected to an SB-Safety Voice Annunciator Panel. This panel then shows the SB-Safety call status, that is priority and an SB-Safety Voice fail button. The pins for connecting the panel are located in the top plug (TP) and the bottom plug (BP) of the SBU rear receptacle. To connect such a panel see the following table.

SBU pin	Name/description	Polarity	Use without SB-Safety Voice service
TP14	Lamp for priority 1	Active low	Spare I/O
BP4	Lamp for priority 2	Active low	Spare I/O
BP2	Lamp for priority 3	Active low	Spare I/O
TP28	Lamp for SB-Safety Voice call	Active low	Incoming call
TP27	Lamp for SB-Safety Voice fail	Active high	Service available <sup>a</sup>

Table 5-28: SBU pins for discrete inputs

- a. When SB-Safety Voice is not enabled, this output is an indicator for Service Available which shows the availability on either PS or CS connections. When SB-Safety Voice is enabled, SB-Safety Voice Fail is indicated after manually changing the polarity through configuration in the web interface to Active high. Note that there is no visual indication on fail of the PS availability when SB-Safety Voice is enabled, the output only shows the availability of a CS connection. If also ACARS is installed, you can find this information via the ACARS pages on the MCDU.

#### Chime/Lamps Inhibit discrete input behavior with SB-Safety Voice

You can use the Chime/Lamps Inhibit discrete input (TP13, default: active low) to control the chime signals. When this input is active, the following is affected:

- The Call indicator will not indicate an incoming call.
- There will be no ring signal on the POTS interface on an incoming call. However the priority indicator will flash and the call can be answered as normal.

### 5.3.15 Wiring the maintenance interface

**Important**

Make sure that there is no cable connected to the SBU Maintenance connector when the aircraft is airborne.

#### Maintenance PC and ATE

The following drawing shows the wiring of:

- the LAN Maintenance PC connection on the SBU,
- ATE interface (for factory use only - **do not connect!**)

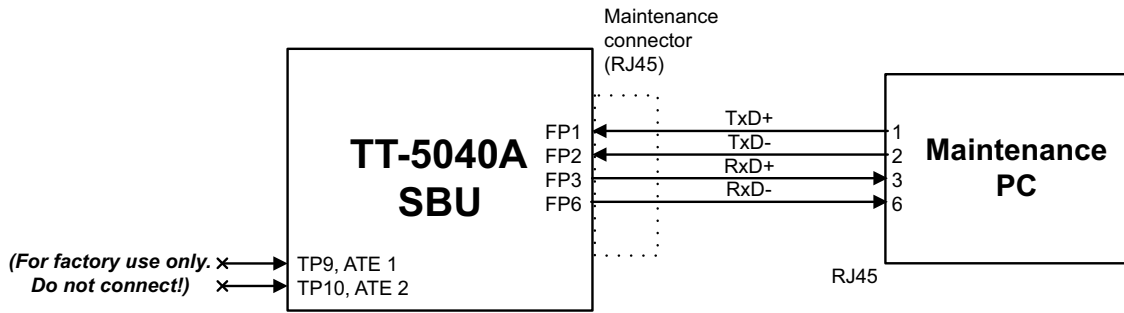


Figure 5-30: Wiring Maintenance PC and Reset

### Pins for the Maintenance interface on SBU

The following list shows the pins used for the Maintenance interface on the SBU.

SBU pin	Name/Description
FP1	TxD+
FP2	TxD-
FP3	RxD+
FP6	RxD-

Table 5-29: SBU pins for Maintenance interface

### Description of the Maintenance interface on the SBU

Use the Maintenance interface on the front of the SBU for configuration and maintenance purpose, i.e. for tasks like configuring RF cable settings for the installation, satcom antenna setup, navigational input and software upgrades.

The interface is a 10/100BaseT Ethernet and can be accessed from a PC with Ethernet interface. The PC is connected using a standard straight network cable.

The maintenance interface has the following characteristics:

- 100 Base-T / 10 Base-T Ethernet
- IEEE 802.3

To access the configuration settings, use a PC with a browser and open the built-in web interface of the SBU. For further information, see *Configuration tasks* on page 6-2.

### Pins for Automatic Test Equipment (ATE)

The SBU has two pins for Automatic Test Equipment (ATE): ATE #1 (TP9) and ATE #2 (TP10). The ATE pins are for factory use only.

**Important** Do not connect anything to the ATE pins, not even ground! Connecting the ATE pins can cause unintended function of the system.

## 5.4 Recommended cables

### 5.4.1 Introduction

This section lists recommended cables and allowed cable lengths for the cables in the AVIATOR 200/300/350 system.

**Important**

For specific requirements to the cables, see the applicable section in **5.3 Electrical installation and wiring**.

### 5.4.2 Power cables, allowed cable lengths

#### Allowed cable lengths, SBU

The following table shows the allowed SBU cable lengths for selected AWG types. If other AWG types are used, make sure the contact type supports the AWG type.

**Note**

It is generally recommended to keep cable lengths as short as possible, specially on cables for **Chassis GND**.

Description	Pin	Contact type	Max. resistance	Max length (at 70°C)			
				AWG20	AWG18	AWG16	AWG14
SBU +28 V DC Power	TP1	16	210 mΩ <sup>a</sup> (250 mΩ-40 mΩ in 7.5 A circuit breaker)	17 ft <sup>a</sup> (5.2 m)	27 ft <sup>a</sup> (8.3 m)	43 ft <sup>a</sup> (13.2 m)	(not suitable for this contact size)
SBU GND, Power Return	TP2	16	25 mΩ The cable should be as short as possible, max. 1 m.	2 ft (0.6 m)	3 ft (0.9 m)	5 ft (1.5 m)	(not suitable for this contact size)
SBU Chassis Ground	BP3	16	25 mΩ Connect directly to aircraft chassis.	2 ft (0.6 m)	3 ft (0.9 m)	3.3 ft (1.0 m)	(not suitable for this contact size)

Table 5-30: Allowed lengths for SBU power cables

- a. The max. cable resistance is calculated using the resistance of a Klaxon 2TC circuit breaker. If another circuit breaker is used, the max. resistance and cable length may differ from these values.

#### Allowed cable lengths, HLD

The following table shows the allowed HLD cable lengths for selected AWG types. If other AWG types are used, make sure the contact type supports the AWG type.

**Note**

It is generally recommended to keep the Chassis GND cable lengths as short as possible.

Description	Pin	Contact type	Max. resistance	Max length (at 70°C)			
				AWG20	AWG18	AWG16	AWG14
HLD Chassis Ground	X4	M5 threaded stud	25 mΩ (additional req.: max. length 1 m)	2 ft (0.6 m)	3 ft (0.9 m)	3.3 ft (1.0 m)	(not suitable for this contact size)

Table 5-31: Allowed lengths for HLD Chassis Ground cable

### 5.4.3 Recommended Power cables

The cable types shall meet the following standards:

- M27500 for shielded wire.
- M22759 for single wire.

### 5.4.4 Recommended RF cables

The following cable types are recommended for the RF cables. Contact your cable supplier for other cable types.

**Note** Equivalent cable types, which meet the requirements, may also be used.

CABLE TYPE	SPECIFICATIONS			
Part number	Diameter (mm/in.)	Minimum Bend Radius (mm/ in.)	Attenuation (dB/100ft) @ 1.6 GHz	Size 5 contact part number
ECS 3C142B	4.95/0.19	25.4/1.0	18.1	620021
PIC S22089	11.0/0.43	63.5 / 2.5	4.8	n.a.
PIC S33141	6.9/0.27	35.6 / 1.4	8.6	n.a.
ECS 310801	11.48/0.452	57.4 / 2.26	4.6	n.a.
ECS 311201	8.05/0.317	40.6 / 1.6	6.7	n.a.
ECS 311501	5.82/0.229	30.5 / 1.2	9.1	P922
EMTEQ TFLX165-100	4.19/0.17	21.6 / 0.85	16.8	A45165-1
EMTEQ PFLX195-500	5.08/0.2	12.7/0.5	14.0	A45195-1
EMTEQ TFLX295-100	7.95/0.31	40.6 / 1.6	7.6	n.a.
EMTEQ TFLX480-100	12.2/0.48	57.2 / 2.25	4.8	n.a.

Table 5-32: List of Recommended RF Cables



## Maximum cable lengths for WLAN cables

Cable from SBU to WLAN antenna		W5 and W6 <sup>a</sup>		
Part number	Cable diameter (mm/in.)	Attenuation (dB/100 ft)	Maximum cable length	Size 5 contact part number
RF specification @2.4 GHz: 5 dB				
PIC S22089	11.0/0.43	6.7 dB	75 ft (23 m)	n.a.
PIC S33141	6.9/0.27	11.0 dB	46 ft (14 m)	n.a.
ECS 3C142B	4.95/0.19	22.2 dB	22 ft (6 m)	620021
ECS 310801	11.48/0.452	6.5 dB	75 ft (23 m)	n.a.
ECS 311201	8.05/0.317	8.9 dB	56 ft (17 m)	n.a.
ECS 311501	5.82/0.229	10.7 dB	46 ft (14 m)	P922
EMTEQ PFLX195-500	5.08/0.2	16.81	30 ft (9 m)	A45195-1
EMTEQ TFLX165 100	4.19/0.17	21.16 dB	23 ft (7 m)	A45165-1
EMTEQ TFLX295 100	7.95/0.31	9.8 dB	52 ft (16 m)	n.a.
EMTEQ TFLX480 100	12.2/0.48	5.8 dB	85 ft (26 m)	n.a.

Table 5-33: Allowed lengths for WLAN cables

- a. W5 and W6 stand for the cables needed when wiring the TT-5040A SBU, see *Wiring WLAN antenna interface* on page 5-34.

### 5.4.5 Recommended cables for ARINC 429

Use ARINC 429 cables that meet the following standard:

- M27500 for shielded wire

The cables for the ARINC 429 interfaces must be twisted and shielded and conform to the standards for aeronautical use.

### 5.4.6 Recommended cables for Ethernet

#### Cables for Ethernet on SBU (Quadrx connectors)

Use an Ethernet cable that meets one of the following standards:

- TIA/EIA568-A CAT5 Requirements
- FAR 25.869(a)

The following cable types meet the requirements:

- Part number: 422404, Quadrx 24 Awg from ECS
- Part number: F 4704-4 from Draka Fileca

### 5.4.7 Cables for Discrete Signals

Use cables for discrete wiring that meet the following standard:

- M27500 for shielded wire

## 5.5 Activation of airtime services

Before the AVIATOR 200/300/350 system becomes operational, the aircraft owner or operator must settle a contract with an Inmarsat Service Provider (ISP) so the system can be activated. The airtime provider handles terminal activation, billing and technical support that is related to the communication network.

The activation process may take some time, so to make sure it is ready in time, start the activation procedure some time **before the installation on the aircraft** begins.

### SwiftBroadband

The AVIATOR 200/300/350 system is delivered with the SIM card permanently installed in the CM of the SBU, but not activated. The SIM card is pre-authenticated by Inmarsat and identified by its unique IMSI number (International Mobile Subscriber Identity). The IMSI is usually 15 digits long.

**Note** | The IMSI number is printed on the part number label of the CM. It is also printed on the Certificate of Conformity letter belonging to the CM.

You need the IMSI to activate the Satellite communication service.

**For details how to activate the SIM card please contact your airtime Provider.**

The contract for SwiftBroadband services with your airtime provider contains among other items the following phone numbers and identifiers:

- Direct phone number that is associated with the IMSI number of the installation.

Typically the service provider provisions the SIM card automatically to open up for the circuit-switched and packet switched services.

**Note** | To use the packet switched services you may have to enter the APN (Access Point Name), make sure that you have received this information from your service provider.

For step-by-step instructions how to enter the APN see *Set the common interface settings* on page 6-27.

### Making calls and using the Internet

For information on how to make a call to and from the system or go on the Internet etc. see the User Manual (part number: 98-127719).

### Service providers

You find a list of Service providers on Inmarsat's web site, Partner search (<http://www.inmarsat.com/partners/search-for-partner/>).

## To retrieve the SIM card ID (IMSI)

With the system you receive the IMSI number of the SIM card that is installed in the Configuration Module of your AVIATOR system.

**Important** | The SIM card is permanently installed in the CM of the SBU. Do not take out and replace the SIM card.

You can read out the IMSI number from the web interface that is used to configure and control the AVIATOR system. It is listed on the page **Dashboard**. You can also retrieve the IMSI number in the diagnostic report that the system can generate. For instructions how to access the web interface see *Tool for setup and use: Built-in web interface* on page 6-6. For instructions how to generate a diagnostic report see under *Initial troubleshooting* on page 7-18.

**Note** | The IMSI number is also printed on the part number label of the CM.



# Configuration of the AVIATOR 200/300/350 system

**Note** Line of sight during operation

You can configure the system while the aircraft is in the hangar. Note that you cannot typically check the satellite communication while the aircraft is still in the hangar. There must be a line of sight between the Satcom antenna and the satellite in order to use the satellite service.

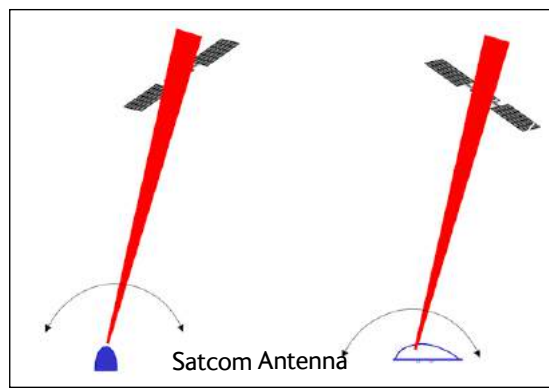


Figure 6-1: Line of sight when communicating with the satellite

This chapter has the following sections:

- *Configuration tasks*
- *Tool for setup and use: Built-in web interface*
- *The Dashboard*
- *The phone book*
- *To set up the interfaces*
- *SB-Safety Voice (option)*
- *LAN/WLAN network users*
- *Administration*
- *Site map*
- *Configuration of 3rd party phone systems*
- *AVIATOR 200/300/350 system ready for use*

## 6.1 Configuration tasks

Having installed the AVIATOR 200/300/350 System you must configure the SwiftBroadband Unit properly for use with the current antenna setup, including cable losses for the installation, and select the correct navigational input. Furthermore the interfaces have to be set up and configured to the specific aircraft installation and application requirements. IP connections, network user groups and profiles for IP data usage including LAN/WLAN network management must be configured so the required applications run smoothly on the system. For this purpose you use the built-in web interface of the AVIATOR system.

**Note** Before you start configuring the SBU make sure that the Configuration Module is mounted in the SwiftBroadband Unit.

### 6.1.1 Basic configuration of the SBU

As a minimum, you need to set up the following parameters in the built-in web interface of the SBU:

1. On the **DASHBOARD** verify that you have the latest SBU software version (see [cobham.com/satcom](http://cobham.com/satcom), Service and support). Verify also that the certification level is correct (Level-D or Level-E). For more information on the individual fields see *The Dashboard* on page 6-12.

<b>DASHBOARD</b>	<b>PROPERTIES</b>	<b>SESSIONS TOTAL</b>
<b>CONNECT</b>	Airtime provider Swift	Standard voice inbound 03:45:47
<b>PHONE BOOK</b>	GPS position N 55°47', E 12°31'	Standard voice outbound 1d 15:09:03
<b>MESSAGES</b>	Status Ready	3.1 kHz audio inbound 00:33:06
<b>CALLS</b>	Satellite selection EMEA	3.1 kHz audio outbound 00:01:36
<b>SETTINGS</b>	Current satellite EMEA (elevation: 25°)	Standard data 955.72 MB
<b>ADMINISTRATION</b>	Unit serial number 09437606	Streaming 8 kbps 00:00:00
<b>HELPDESK</b>	Software version 1.09	Streaming 16 kbps 00:00:00
<b>SITE MAP</b>	Certification level Level-E	Streaming 32 kbps 00:00:00
	IMSI number 901112115103255	Streaming 64 kbps 00:04:38
	IMEI number 35872303-000031-4	
	<b>ONGOING DATA SESSIONS</b>	<b>ONGOING CALLS</b>
	(No active data sessions)	(No active calls)

Figure 6-2: Basic configuration of the SBU (AVIATOR 300 example), step 1/6

2. In **SETTINGS > System type**, select your AVIATOR system and click **Apply**.



**CAUTION!** Selecting a wrong system type may cause damage to the satcom antenna or GPS antenna. If the system type purchased can not be selected, please contact the supplier of your AVIATOR 200/300/350 system.

**Do not try to use a different system type!**

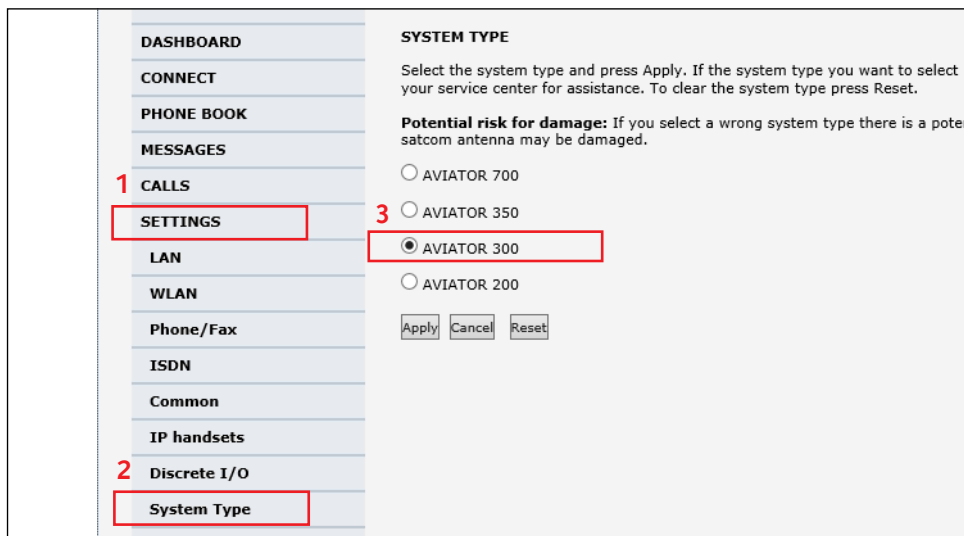


Figure 6-4: Basic configuration of the SBU, step 2/6

For SBU software version 4.00 and SB-Safety voice flex key enabled see page 6-56.

3. In **SETTINGS > External systems** enter the values for Navigational input. For detailed instructions see *Set up the navigational input* on page 6-44.

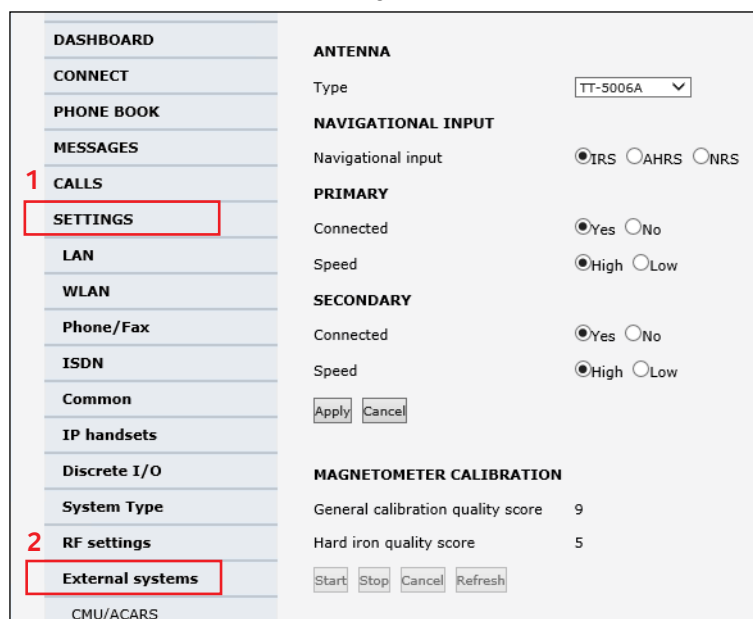


Figure 6-5: Basic configuration of the SBU, step 3/6

4. In **SETTINGS > RF settings**, enter the cable losses applicable to the SBU. For detailed instructions see *Configure RF settings* on page 6-43.

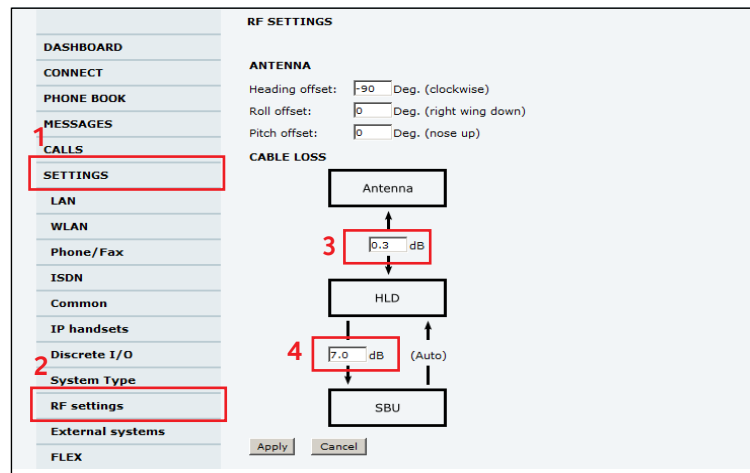


Figure 6-6: Basic configuration of the SBU, step 4/6

5. In **SETTINGS > LAN > Network user groups**, click **Edit**.

NETWORK USER GROUPS		Name	Status	Internet connection	Automatic activation	
DASHBOARD CONNECT PHONE BOOK MESSAGES CALLS SETTINGS (1) LAN (2) Port forwarding Network devices Network classification Network user groups (3) PPPoE Static route WLAN	Remote equipment	Enabled	Bridge mode	Enabled	<a href="#">Edit</a> (4)	
	Group 1	Disabled	Router mode	Enabled	<a href="#">Edit</a>	
	Group 2	Disabled	Router mode	Enabled	<a href="#">Edit</a>	
	Group 3	Disabled	Router mode	Enabled	<a href="#">Edit</a>	
	Group 4	Disabled	Router mode	Enabled	<a href="#">Edit</a>	
	Group 5	Disabled	Router mode	Enabled	<a href="#">Edit</a>	
	Group 6	Disabled	Router mode	Enabled	<a href="#">Edit</a>	
	Group 7	Disabled	Router mode	Enabled	<a href="#">Edit</a>	
	Group 8	Disabled	Router mode	Enabled	<a href="#">Edit</a>	
	Group 9	Disabled	Router mode	Enabled	<a href="#">Edit</a>	
Default group	Enabled	Router mode	Disabled	<a href="#">Edit</a>		

Figure 6-7: Basic configuration of the SBU, step 5/6



6. Enter the APN from your service provider. For detailed instructions see *Set up the network user groups* on page 6-59.

**NETWORK USER GROUP**

Name: Remote equipment

Status:  Enabled  Disabled

Internet connection: Bridge mode

Changes to Status and Internet connection only take effect after reboot

**TCP/IP**

Dynamic IP address

Static IP address: . . . .

IP Header compression:  Enabled  Disabled

**APN**

Common

SIM default

1  Network assigned

2  User defined: bgan.inmarsat.com

3 User name:   
Password:

**PROFILES**

4 Automatic activation:  Enabled  Disabled

Figure 6-8: Basic configuration of the SBU, step 6/6

## 6.2 Tool for setup and use: Built-in web interface

Use the built-in web interface of the SBU to access the SBU configuration settings in the CM. A subset of the configuration settings are stored in a write-protected area of the CM. This subset contains the physical settings for the antenna, cabling and other external input.

**Important**

To set up or change the settings of the write-protected area you must connect a PC to the connector marked **Maintenance** on the SBU front plate. You can view all settings from any LAN or WLAN interface.

The CM also contains the SIM card for accessing the SwiftBroadband service. The settings that can only be changed when connected to the SBU maintenance connector are:

- **Discrete I/O** settings
- **System type**
- Cable loss data in **Settings, RF settings,**
- Input from navigational systems in **Settings, External systems**
- Enabling options (Router, WLAN) in **Settings, Flex.**

**Note**

For information on daily use of the AVIATOR 200/300/350 system refer to the AVIATOR 200/300/350 User Manual.

No installation of software is necessary because the web interface is built into the SBU.

### Browsers supported

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

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

## 6.2.1 Topics in the web interface

The following drawing shows the topics available in the web interface. The topics in grey are mainly used during daily use of the system, they are described in detail in the AVIATOR 200/300/350 User Manual.

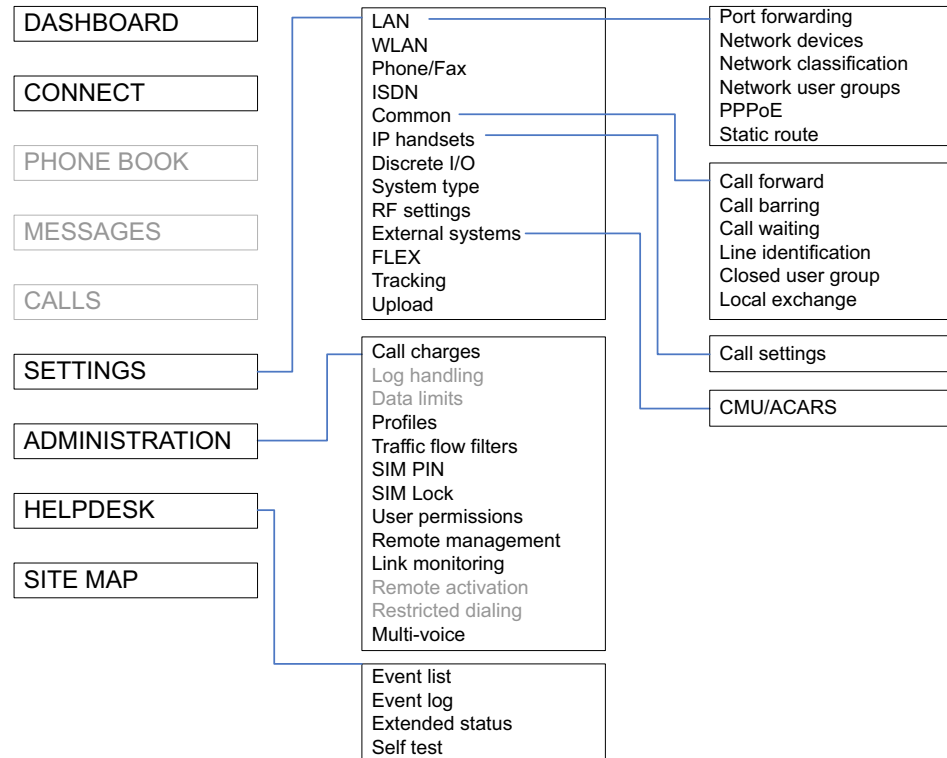


Figure 6-9: Topics in the web interface

## 6.2.2 Check the connection to the web interface

To check whether you can connect to the web interface of the SBU do as follows:

1. Power up the AVIATOR 200/300/350 system. Wait until the LEDs on the front plate show that the system is ready to be configured.
  - Power LED: Green, then wait for approximately one minute.
2. Connect a PC to the Maintenance interface (standard Ethernet) on the front plate of the SBU.

If you want to change the setup of the user interfaces and change network usage you can use any of the terminal LAN interfaces (up to 6) installed in the aircraft cabin or the Wireless connection, if available. If you want to change the physical settings for the antenna, cabling and other external input you must use the SBU maintenance connector at the front of the SBU.

### Important

For systems without the built-in router option enabled, i.e. the basic version or the version with Wireless option only: To use the SBU Maintenance connector disconnect or switch off any PC connected to another LAN interface of the SBU.

## Access the web interface

To access the web interface, do as follows:

1. Open your browser and enter the IP address of the SBU. The standard IP address is **192.168.0.1**.

**Note**

If the local IP address of the SBU has been changed and you do not have the new address, you can temporarily set the IP address to the default value by pushing the **Reset** button on the front plate of the SBU. For detailed instructions see *How to reset the IP address or the terminal software to default settings* on page 7-15.

For further information on the Reset button, see *IP Reset (Default) button* on page 7-14.

For further information on IP addresses of the SBU see *Set up the LAN IP addressing* on page 6-19.

2. The web interface opens directly with the **DASHBOARD** page. The web interface consists of the following sections:

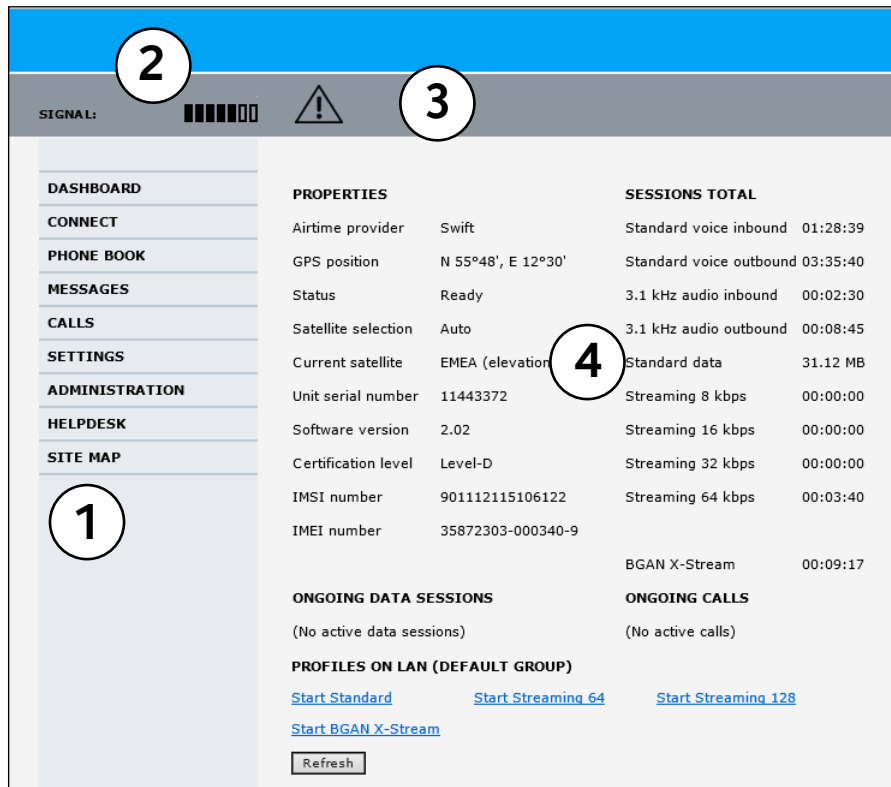


Figure 6-10: Sections of the web interface (example for AVIATOR 350)

1. The **navigation pane** holds the main menu. Clicking an item in the menu opens a submenu in the navigation pane or a new page in the contents section.
2. The **signal status field** shows the signal strength. The signal strength can vary during operation, depending on the current position relative to the Inmarsat satellite and the call or data session activity.

3. The **icon bar** shows icons for new SMS messages and for active events, when relevant. For explanations of the icons, see the next section, *Icons in the icon bar*.
4. The **contents section** shows the page selected in the navigation pane. This section is used for viewing or changing settings, or for performing actions.

When the Dashboard is displayed you have verified that the connection to the SBU can be established. The web interface is ready for use. You can continue to configure the system.

If you cannot establish a connection to the SBU there might be problems with the Proxy server settings of your PC. See *Proxy server settings in your browser* on page 6-9 for further information.

## Icons in the icon bar

The following icons may appear in the icon bar in the web interface:



Icon	Explanation
	A new SMS message, or information of Voice mail, has arrived. Click the icon to see new messages or information of Voice mail. For further information, see the AVIATOR 200/300/350 User Manual.
	An event is active. Click the icon to see a list of active events. For explanations of the event messages, see the AVIATOR 200/300/350 User Manual. Note that this icon will remain in the icon bar as long as the event is still active.

Table 6-1: Web interface: Icons

## Navigate the web interface

- **To expand a menu**, click the menu in the navigation pane.
- **To access status and settings**, click the relevant subject in the navigation pane or click the relevant icon in the icon bar. The status or settings are displayed in the contents section.
- **To get an overview over the submenus available use the site map**, click **SITE MAP** in the navigation pane. Click on items in the site map to go directly to the relevant location.

**Note** You can limit access to some parts of the web interface for certain users. Then the parts are grayed out. For information on how to set up user permissions, see *Set up user permissions* on page 6-87.

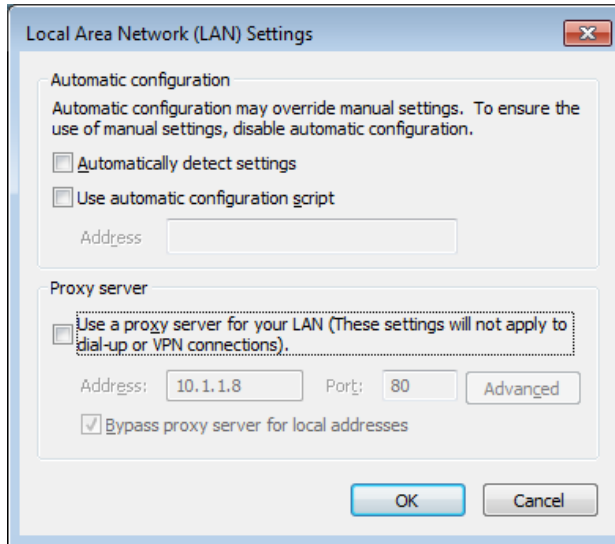
## Proxy server settings in your browser

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**.



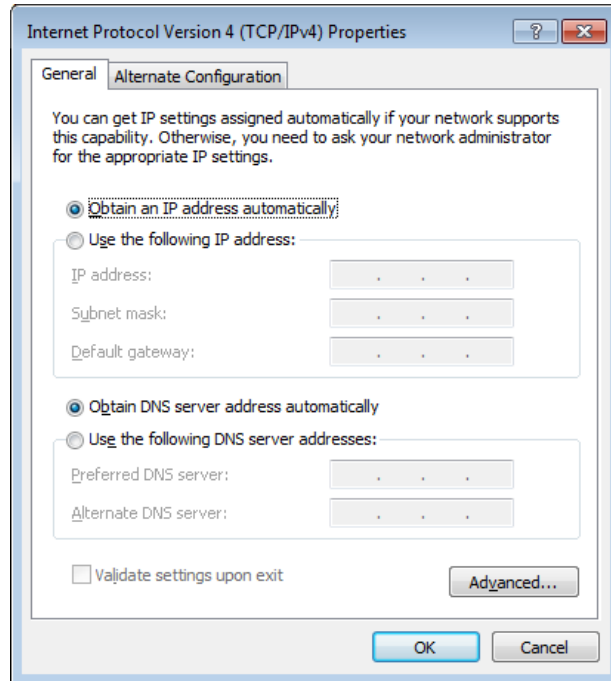
2. Clear the box labeled **Use a proxy server for your LAN**.
3. Click **OK**.

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.

## IP address and DNS server address setup

To check whether automatic IP address and DNS server address is obtained automatically for your computer, do as follows (example for Windows 7):

1. Go to **Control Panel > Network and Internet > Network and Sharing Center**.
2. Click on the **LAN connection** you want to use.
3. Select **Properties**, highlight **Internet Protocol Version 4 (TCP/IPv4)**.
4. Click **Properties**.
5. Make sure that the following is selected:
  - Obtain an IP address automatically
  - Obtain DNS server address automatically



Allocating IP addresses and DNS server lookups are handled by the SBU.

## 6.3 The Dashboard

### 6.3.1 Overview

The Dashboard is the first screen that is displayed when the user or administrator enters the IP address of the web interface. The Dashboard is used for control and inspection of ongoing communication and for viewing properties and status of the SBU and antenna.

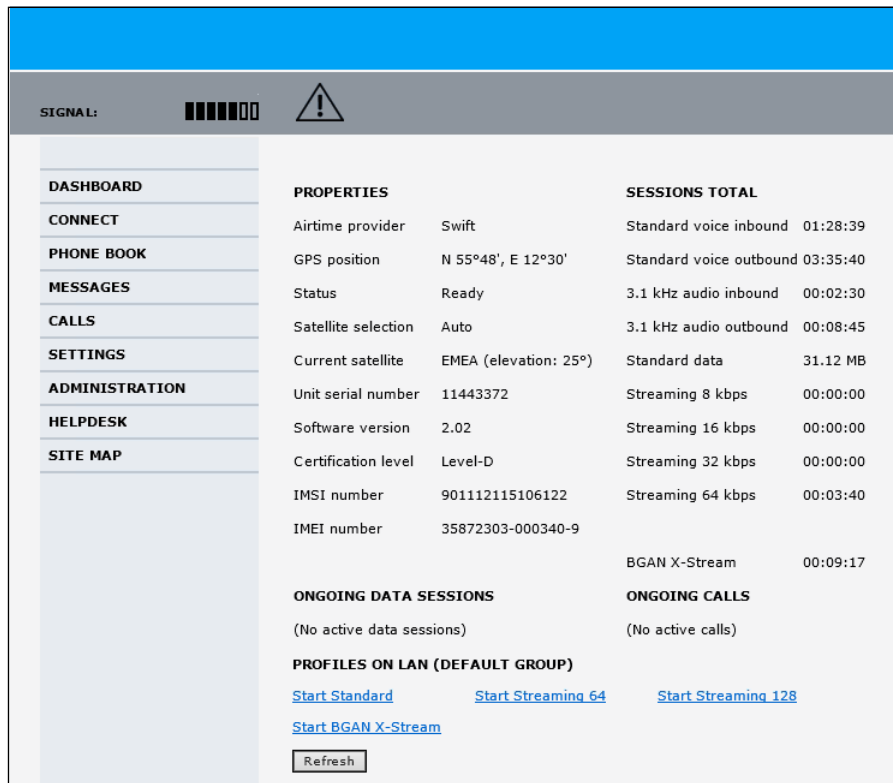


Figure 6-11: Web interface: Dashboard (Example: AVIATOR 350) <sup>a</sup>

- a. For I3 coverage the Status field shows: Logged off. When I4 coverage is available again, the system logs automatically on.

### 6.3.2 Properties

The **PROPERTIES** section of the **DASHBOARD** shows the following information:

- **Airtime provider.** The name of your Airtime Provider.
- **GPS position.** The GPS position of your AVIATOR 200/300/350 system.

**Note**

In some cases, the BGAN network does not allow the position to be displayed to the user. If this is the case, the display may just show **GPS acquired**. This means that the GPS position is received, but the user is not allowed to see it.

This also applies if the AVIATOR 200/300/350 is not yet registered on the BGAN network, but the GPS position is received.

- **Status.** The status of the SBU and antenna.  
Examples of status information are: Scanning, Ready and Data active.



- **Satellite selection.** The satellite selected for logon. For further information, see *To select the preferred BGAN satellite* on page 6-18.
- **Current satellite.** The currently used satellite and elevation angle.
- **Unit serial number.** The serial number of the SBU.
- **Software version.** The version of the software embedded in the SBU.
- **Certification level.** This field shows whether the system is Level-D or Level-E certified.

**Important**

If **Inconsistent** is displayed, it means there is a mismatch with Level-D and Level-E certified units or software. This is not allowed.

- **IMSI number.** The IMSI number (International Mobile Subscriber Identity) of the SBU. This is a unique number that identifies the SIM card of your SBU.
- **IMEI number.** The IMEI number (International Mobile Equipment Identity) of the SBU. This is a unique number that identifies your SBU.

### 6.3.3 View information on calls and data sessions

The following sections in the **Dashboard** show information on calls and data sessions.

- **ONGOING DATA SESSIONS** is a list of data profiles that are currently active, including the external IP address that is assigned to each profile.
- **ONGOING CALLS** is a list of calls that are currently active. The list shows the call type and the time connected for each call.
- **SESSIONS TOTAL** lists the totals for each session type. The list shows the session type with accumulated time for voice and Streaming data, and MB transferred for Standard data.

The counters show totals for sessions since the counters were last cleared. For information on how to clear the counters, see *Log handling* on page 6-78.

### 6.3.4 Profiles on the dashboard

There is also a section on the dashboard showing the network user group and the profile(s) available for the current user. Here you can start the connections allowed for the current network user group. For more information on network user groups and profiles see *LAN/WLAN network users* on page 6-57.

#### Start or stop a standard data connection

On the Dashboard you can see under PROFILES ON LAN whether a standard connection is active or not.

To start or stop a Standard connection for your Network user group do as follows:

1. Open your Internet browser and enter the IP address of the AVIATOR 200/300/350 SBU (default: <http://192.168.0.1>) to access the Dashboard of the web interface.
2. Locate **PROFILES ON LAN** at the bottom of the page.
3. Click **Start <name of profile>**, in this case: **Start Standard**, or **Stop <name of profile>** to stop the connection.

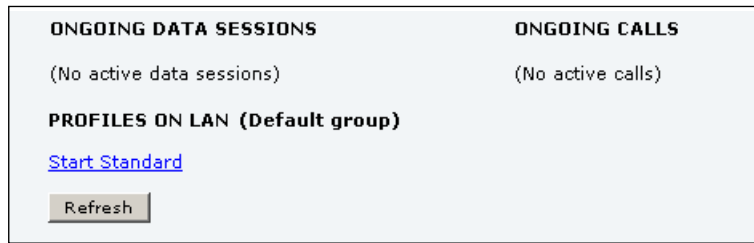


Figure 6-12: Web interface: Start a data connection

4. Click **Refresh** to update the current state of the connection(s). Note that there might be some latency when updating the connection status, you might have to wait and click **Refresh** again to update the Dashboard to the current state.

#### Note

The PDP context for a data session is not activated before any unit in the LAN tries to communicate, e.g. sends a DHCP request. You can also remotely start a data connection, see *Remote activation of a connection using SMS* on page 6-90.

## 6.4 The phone book

### 6.4.1 General usage

The phone book is stored in the Configuration module. In the phone book you can:

- Add new names and phone numbers.
- Modify or delete existing names and phone numbers.
- Look up phone numbers.
- Look up short-dial numbers for easy dialing from a handset.

For information how to access the phone book and how to add, edit and delete phone book entries see the AVIATOR 200/300/350 User Manual.

### 6.4.2 View and edit the mobile and additional numbers<sup>1</sup>

The mobile numbers are the phone numbers to use when making a call to the terminal.

**Note** These numbers are not listed at delivery. Enter the numbers received from the Service and Airtime Provider.

#### To view the mobile numbers

To view the mobile numbers of the SBU, select **PHONE BOOK > Mobile numbers** from the left navigation pane.

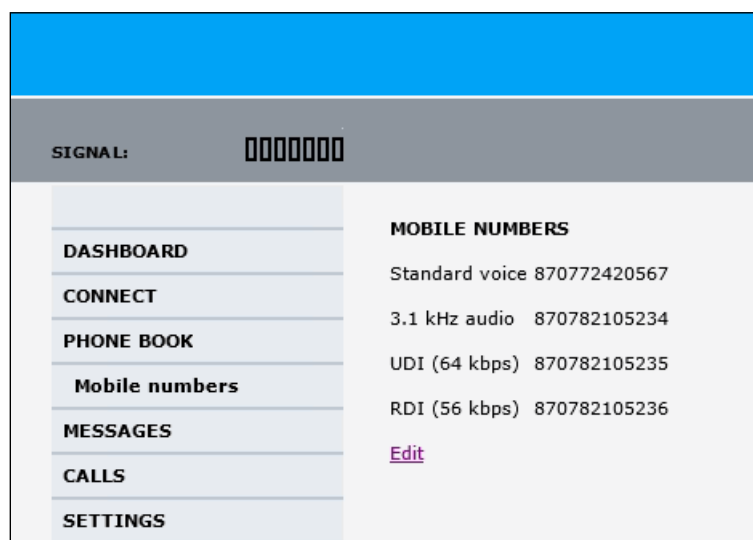


Figure 6-13: Web interface: Phone book, mobile numbers (example, no Multi-voice)

1. Available for systems with Multi-voice and subscriptions with additional numbers.

### To enter or edit the mobile numbers

To enter or edit the mobile numbers, click **Edit** at the bottom of the page, type in the numbers received from your Airtime Provider and click **OK**. If Multi-voice is part of your system, the additional numbers from your airtime provider can be entered in the web interface.

MOBILE NUMBERS	
Standard voice	<input type="text" value="870772420567"/>
3.1 kHz audio	<input type="text" value="870782105234"/>
UDI (64 kbps)	<input type="text" value="870782105235"/>
RDI (56 kbps)	<input type="text" value="870782105236"/>

ADDITIONAL NUMBERS	
Standard voice #2	<input type="text" value="870444555666"/>
Standard voice #3	<input type="text" value="870444555667"/>
Standard voice #4	<input type="text" value="870444555668"/>
Standard voice #5	<input type="text"/>
Standard voice #6	<input type="text"/>
Standard voice #7	<input type="text"/>
Standard voice #8	<input type="text"/>
Standard voice #9	<input type="text"/>
Standard voice #10	<input type="text"/>
Standard voice #11	<input type="text"/>
Standard voice #12	<input type="text"/>
Standard voice #13	<input type="text"/>

Figure 6-14: Web interface: Phone book, mobile numbers (example, with Multi-voice)

## 6.5 To set up the interfaces

The following subsections are available:

- *The **SETTINGS** page*
- *Select the preferred BGAN satellite*
- *Configure the LAN interface*
- *WLAN interface (option)*
- *Configure the Phone/Fax interface (2-Wire)*
- *Configure the ISDN interface*
- *Set the common interface settings*
- *Set up call services*
- *Manage AVIATOR Wireless Handsets*
- *Configure the discrete I/O interfaces*
- *Set the system type*
- *Configure RF settings*
- *Set up the navigational input*
- *Calibrate the NRS magnetometer in the TT-5006A IGA*
- *Set up CMU/ACARS (option)*
- *Enable system options with FLEX keys*
- *Tracking*
- *SB-Safety Voice (option)*

### 6.5.1 The **SETTINGS** page

From the **SETTINGS** page you have access to the submenus for system settings and configuration.

- **LAN** to configure the settings of the local area network.
- **WLAN** to configure the wireless network adapter.
- **Phone/Fax** to configure the phone and fax interfaces.
- **ISDN** to configure the ISDN interface.
- **Common** to configure settings that are common for all interfaces.
- **IP handsets** to configure connected AVIATOR Wireless Handsets.
- **Discrete I/O** to configure the discrete inputs/outputs of the installation.
- **System type** to select the AVIATOR 200/300/350 system
- **RF settings** to configure the cable losses of the installation.
- **External systems** to select antenna type, configure the external navigational system and set up the ACARS/CMU connection.

- **FLEX** for the viewing and enabling options and AVIATOR systems.
- **Tracking** to send position information to a server
- **Upload** to upload new application software to the SBU.

A text message on the screen informs you if you need to reboot the system to activate a new setting or configuration.

To access this page, select **SETTINGS** from the left navigation pane.

## 6.5.2 Select the preferred BGAN satellite

By default the SBU is set up to automatically find the most appropriate satellite to connect to (**Auto** mode). However, if you are located in an area with more than one BGAN satellite available, you can select the satellite you prefer to use when registering on the BGAN network.

### To select the preferred BGAN satellite

To select the preferred BGAN satellite, do as follows:

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

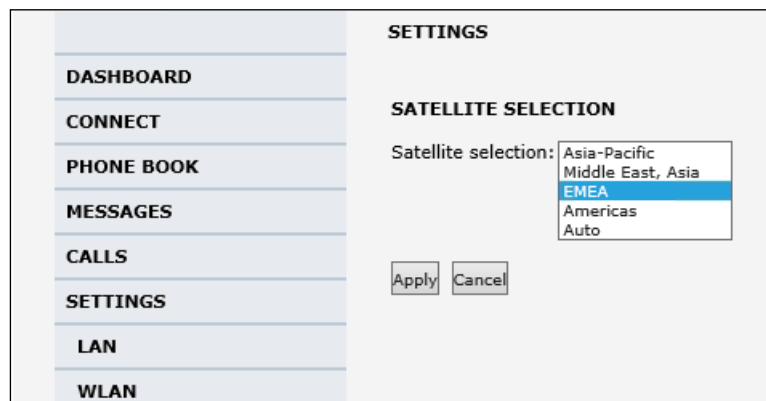


Figure 6-15: Web interface: Settings, satellite selection

2. Select the satellite you prefer to use.  
If you select **Auto** (default setting) the AVIATOR 200/300/350 system automatically uses the most appropriate satellite.

**Important** If you have any ongoing calls or data sessions, they will be terminated when you click Apply to change the satellite.

3. Click **Apply**.  
The AVIATOR 200/300/350 terminates all ongoing connections and de-registers from the current satellite before registering on the new satellite.

**Note** If you have selected a specific satellite, the AVIATOR 200/300/350 system will only try to establish a connection to the selected satellite. This means that if the antenna is outside the coverage area for that satellite, the AVIATOR 200/300/350 system will not be able to register with the BGAN network.

## 6.5.3 Configure the LAN interface

### Overview

The SBU has 6 LAN connectors plus 1 LAN maintenance connector on the SBU front plate.

The major part of the LAN parameters are set up in the network management pages, which require an administrator password. For information on these settings, refer to *LAN/WLAN network users* on page 6-57.



**CAUTION!** All connections to the LAN interface may be affected when you change the settings below. This also includes your own current connection.

This page is by default not protected by an admin password. You can limit access to this page for certain user groups, for further details see *Set up user permissions* on page 6-87.

### Set up the LAN IP addressing

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

You can also set up the local IP address used by the connected devices to access the SBU. The Local IP address is the IP address of the SBU. It is used for accessing the web interface. The IP address towards the BGAN network is assigned by Inmarsat and visible on the Dashboard when the connection is active.

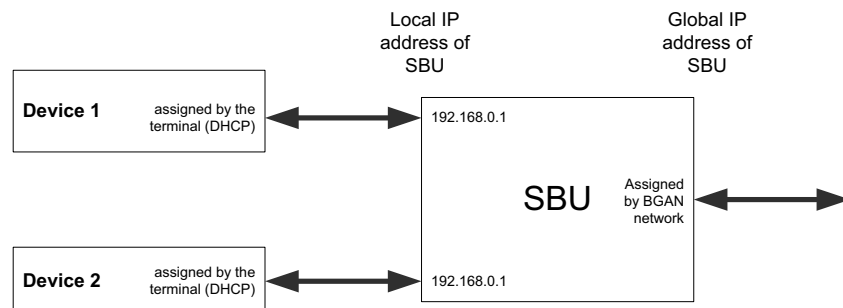


Figure 6-16: SBU IP addresses: Local and global IP addresses, default

#### Note

**No router option:** If the SBU does not have the router option and works in single-user mode, only one device can be connected to it. This device cannot have a static IP address, it must use the DHCP server of the SBU.

To change the local IP address of the SBU do as follows:

1. From the left navigation pane, select **SETTINGS > LAN**.

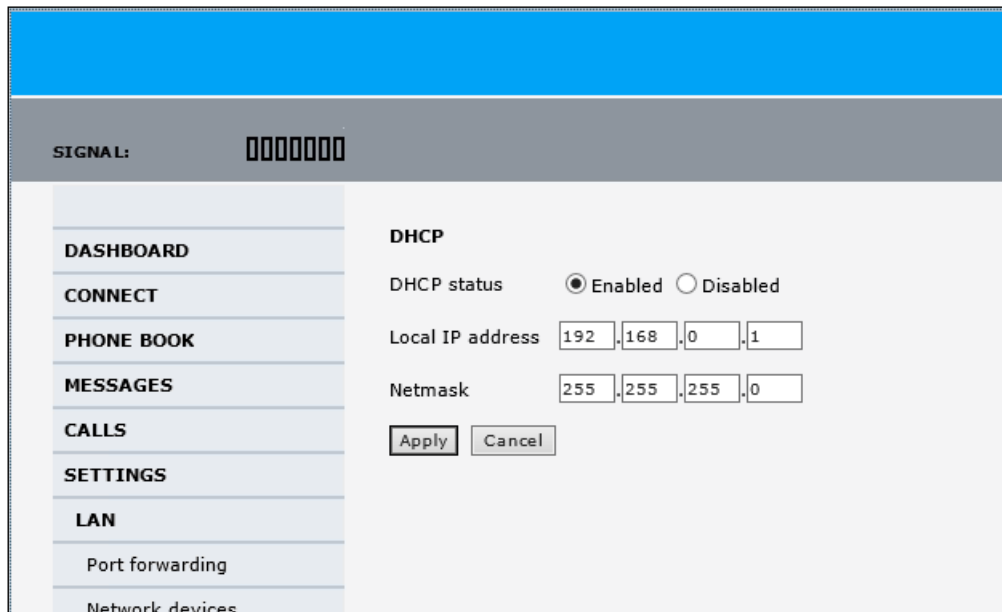


Figure 6-17: Web interface: Settings, LAN

2. At **DHCP status**, select **Enabled** (recommended), or **Disabled**.
  - **Enabled:** The SBU assigns dynamic IP addresses to devices connected to the SBU.
  - **Disabled:** You need to set up a static IP address in the connected device.
3. To change the **Local IP address** and the **Netmask**, type in the new address and netmask. By default, the address is 192.168.0.1 and the netmask is 255.255.255.0.
4. Click **Apply**.

## Port forwarding

Port forwarding enables you to set up a server connected to the SBU while the terminal is in Router mode. Without port forwarding it would not be possible to contact the server from the Internet. If you want to use port forwarding, the global IP address of the SBU should be a static IP address. Check with your service provider for availability of a static global IP address. Note that if not agreed otherwise, the global IP address of the SBU will be dynamically assigned as the SBU signs on to the BGAN network.

For information on how to set the terminal in Router mode, see *Set up the network user groups* on page 6-59.



**CAUTION!** This page is by default not protected by an admin password. You can limit access to this page for certain user groups, for further details see *Set up user permissions* on page 6-87.

The following example shows how to allow internet access to a mail server (smtp) connected to the terminal.



The mail server in this example has the IP address 192.168.0.100.

1. Select **SETTINGS > LAN > Port forwarding** in the left navigation pane.

PORT FORWARDING		Port forwarding <input checked="" type="radio"/> Enabled <input type="radio"/> Disabled	
Active	Incoming port range	Destination IP	Destination port range
<input checked="" type="checkbox"/>	25 - 25	192.168.0.100	25 - 25
<input checked="" type="checkbox"/>	110 - 110	192.168.0.100	110 - 110
<input type="checkbox"/>	0 - 0	0.0.0.0	0 - 0
<input type="checkbox"/>	0 - 0	0.0.0.0	0 - 0
<input type="checkbox"/>	0 - 0	0.0.0.0	0 - 0
<input type="checkbox"/>	0 - 0	0.0.0.0	0 - 0
<input type="checkbox"/>	0 - 0	0.0.0.0	0 - 0
<input type="checkbox"/>	0 - 0	0.0.0.0	0 - 0
<input type="checkbox"/>	0 - 0	0.0.0.0	0 - 0
<input type="checkbox"/>	0 - 0	0.0.0.0	0 - 0
<input type="checkbox"/>	0 - 0	0.0.0.0	0 - 0
<input type="checkbox"/>	0 - 0	0.0.0.0	0 - 0

Apply Cancel

Figure 6-18: Web interface: Settings, LAN, Port forwarding

2. Select **Enabled** to generally enable port forwarding.
3. Type in the **Incoming port range**.
4. Type in the **Destination IP** address, which in this example is the IP address of the mail server: 192.168.0.100.
5. Type in the **Destination port range**.
6. Repeat step 3 to step 5 to set up port forwarding to additional servers.
7. In the **Active** column, select which ports should have port forwarding activated.
8. Click **Apply**.

You can now access the mail server from the Internet, using the external IP address of the SBU. For more information on setting an external IP address see step 6 in *Edit a network user group* on page 6-59.

## 6.5.4 WLAN interface (option)

Note that the settings from the LAN window, except Enabled/Disabled, also apply for the WLAN interface. See *Configure the LAN interface* on page 6-19.

### Enable the WLAN interface

To enable the WLAN interface, do as follows:

1. Make sure that the discrete input, i.e. **TP5 WLAN Enable** input, is wired correctly for WLAN enable. Read more about this in *Pins for non-configurable discrete inputs on the SBU* on page 5-43 and *WLAN pins* on page 5-34.
2. In the web interface on the page **SETTINGS > WLAN** select the status **Enabled**.

For systems without the built-in Wireless option (WLAN) the submenu will still be available in the web interface and the screen will show that the WLAN option is not enabled. To enable the WLAN option enter the FLEX key for this option in the submenu **Settings > FLEX**. The WLAN interface functions properly if both of the above conditions are fulfilled. To configure the WLAN interface, do as follows:



For software 4.00 and higher and SB-Safety Voice: Do not enable WLAN.

1. Select **SETTINGS > WLAN**.

Figure 6-19: Web interface: Settings, WLAN (Example: AVIATOR 350)

2. You can enable or disable the WLAN (default setting: **Enabled**).

3. For **Broadcast SSID**, select **Enabled** (default) or **Disabled**.  
Enabled: your WLAN access point is shown to other users.  
Disabled: your WLAN access point is hidden.
4. Type in the **SSID** of your choice or accept the default SSID, which is the name of the installed system: AVIATOR 200, AVIATOR 300 or AVIATOR 350.  
The SSID (Service Set IDentifier) is the name of the wireless local area network. It is text with maximum 32 characters.  
All wireless devices on a WLAN must use the same wireless local area network in order to communicate with each other.
5. Select the **Country** for your present location. The default setting is USA. For a list of countries that can use WLAN with the setting USA see *Countries where the "US" country code applies* on page D-2.
6. If you want to let the system automatically find a channel set **Select channel automatically** to **Enabled**. Then the **Channel** list will be grayed out.  
If you have set **Select channel automatically** to **Disabled** you can set the **Channel** used for communication on the WLAN interface.
7. Select the **Security** standard. Select one of the following encryption standards:
  - None (default)
  - WEP-40/64, enter the encryption key in hexadecimal format.
  - WEP-104/128, enter the encryption key in hexadecimal format.
  - WPA-TKIP, enter the encryption key in text format.
  - WPA2-AES, enter the encryption key in text format.
8. Type in the **Encryption key** for the selected Security standard. This is not applicable if you have selected **Security mode None**.
9. In **Antenna configuration** you set whether you have two or one WLAN antennas, and how a single WLAN antenna is connected to the SBU:
  - **Diversity**: 2 WLAN antennas are connected
  - **Main**: A single WLAN antenna is connected to SBU TP A4
  - **Aux**: A single WLAN antenna is connected to SBU TP A2
10. **TX output power level**: You can control the maximum transmitted output power from the SBU rear receptacle TP A2 or TP A4:
  - 100% – 20 dBm, 100 mW
  - 50% – 17 dBm, 50 mW
  - 25% – 14 dBm, 25 mW
11. Select **Enabled** or **Disabled** next to MAC address filters.  
**Enabled**: You can set up a list of MAC addresses that are allowed access to your WLAN. Any device whose MAC address is not on the list will be denied access.  
**Disabled**: There will be no restrictions on MAC addresses.
12. If you have enabled MAC address filters, type in the **Allowed MAC addresses**.  
The list may contain up to 16 MAC addresses.
13. Click **Apply**.

## To disable the WLAN interface

To disable the built-in WLAN interface, do as follows:

- Disable the WLAN interface using the **TP5 WLAN Enable** discrete input. Read more about this in *Pins for non-configurable discrete inputs on the SBU* on page 5-43 and *WLAN pins* on page 5-34.

or

- In the web interface go to **Settings > WLAN** and select **Disable**.

If the WLAN option is not enabled the page **Settings > WLAN** will still be available and the screen will show information that the WLAN option is not enabled.

## 6.5.5 Configure the Phone/Fax interface (2-Wire)

**Note** By default all handsets connected to the system will ring on incoming calls. If you have connected a fax, set the incoming call type on that 2-wire interface to 3.1 kHz Audio to avoid that the fax rings and answers an incoming Standard call.

**Important** With software 4.00 or higher and SB-Safety voice enabled, the 2-wire POTS interface #2 is forced disabled.

To configure this interface do as follows:

1. Select **SETTINGS > Phone/Fax** from the left navigation pane.

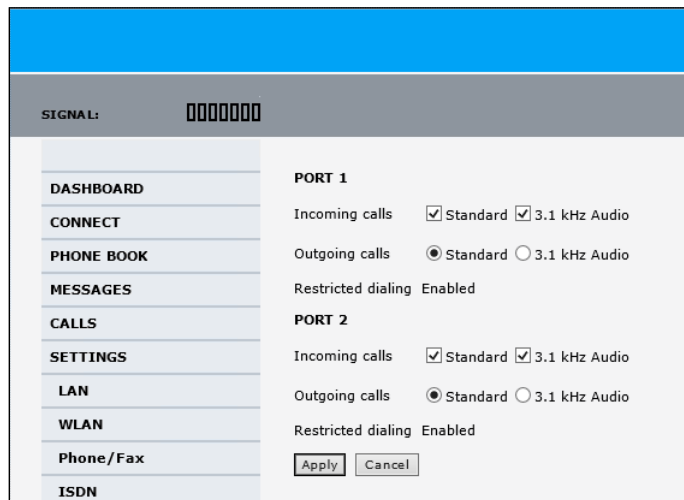


Figure 6-20: Web interface: Settings, Phone/Fax

2. For each Phone/Fax port, set the call type for incoming and outgoing calls.

**Note** To identify Port 1 and Port 2 see the drawings of your specific installation. Mark the connectors in the air cabin accordingly.

The call types are described in more detail in the AVIATOR 200/300/350 User Manual in the chapter Using a phone or fax machine.

- For **Incoming calls**, you can check Standard or 3.1 kHz Audio or both. If you check both, any device connected to the Phone/Fax interface will react (ring) on incoming calls.<sup>1</sup> If you select only Standard, the Phone/Fax interface will only react on calls made to the Standard phone number, and not on calls to the 3.1 kHz Audio number.
- For **Outgoing calls**, you can select either Standard or 3.1 kHz Audio. The selected type will be used by default, if possible, for any outgoing call. Note, however, that fax machines and modems must use 3.1 kHz Audio.

**Note** You can override the default setting for outgoing calls by dialing 1\* (force the call to Standard) or 2\* (force the call to 3.1 kHz Audio) before the number. For further information, see the AVIATOR 200/300/350 User Manual.

3. Click **Apply**.

## 6.5.6 Configure the ISDN interface

**Note** The AVIATOR 200 does not support ISDN services.

**Important** With software 4.00 or higher and SB-Safety voice enabled ISDN is forced disabled.

To configure the ISDN interface, do as follows:

1. Select **SETTINGS > ISDN**.

Figure 6-21: Web interface: Settings, ISDN

1.If Multi-voice is enabled and you have entered additional numbers in the phone book, you can assign an additional number to this interface. For more information see *Multi-voice (option)* on page 6-91.

2. Set the call type(s) for incoming calls.  
You can select Standard, 3.1 kHz Audio, UDI and/or RDI.<sup>1</sup>

**Note** Connected devices will only receive incoming calls with the call types that are selected here. For example, if only Standard is selected, and a G4 fax call (using call type UDI) arrives, a fax connected to the ISDN port will not receive the incoming call.

3. Set the MSN (Multiple Subscriber Numbering) numbers that are to be assigned to each call type. In most pieces of ISDN equipment you can program multiple subscriber numbers. The number programmed into the equipment should be the dial-in number that you wish that piece of equipment to answer.

**Important** If you set an MSN number to anything other than <None>, connected devices must be programmed with these MSN numbers.

Note that this setting only applies to the call type selected above the MSN number, and only if the connected device supports the call type used.

You have the following options with the MSN numbers:

- **<None>**. No MSN numbers are used. An incoming call is accepted in all devices connected to this port.
- **1\*, 2\*, 3\* or 4\***: If, for example, you select 1\* at Standard call type, an incoming Standard call is accepted by all devices that are programmed with the number 1\* and connected to the ISDN interface.
- **0401, 0402**: These are local numbers for separate devices connected to the ISDN interface.  
An incoming call is accepted by devices that are programmed with the selected number and connected to the ISDN interface.

You can combine the MSN settings.

**Example:** You have two devices connected to the ISDN interface. One is programmed with the numbers 1\* and 0401, the other is programmed with 1\* and 0402.  
In the web interface, you select the MSN number 1\* under **Standard**.  
If an incoming Standard call arrives, both devices will accept the call.  
If you make a local call to one of the local numbers 0401 or 0402, only the called device will accept the call.

4. Set the call type for outgoing calls.
  - If you select **Automatic**, the call type will be determined by the calling device.
  - If you select **Standard**, all outgoing calls, except UDI/RDI, will use the call type Standard. If you make a 3.1 kHz Audio call it will be converted to a Standard call. Outgoing UDI or RDI sessions will be not be influenced by this setting.
  - If you select **3.1 kHz Audio**, all outgoing calls, except UDI/RDI, will use the call type 3.1 kHz Audio. If you make a Standard call it will be converted to a 3.1 kHz Audio call. Outgoing UDI or RDI sessions will be not be influenced by this setting.

---

<sup>1</sup>.If Multi-voice is enabled and you have entered additional numbers in the phone book, you can assign an additional number to this interface. For more information see *Multi-voice (option)* on page 6-91.

**Note**

You can override the call type setting for outgoing calls by dialing one of the following prefixes before the number:

- 1\* (force the call to Standard)
- 2\* (force the call to 3.1 kHz Audio)

5. If you hear an echo in your handset and the handset does not have its own echo canceller, enable the **Audio echo canceller**.
6. Click **Apply**.

## 6.5.7 Set the common interface settings

The settings under COMMON are common for all interfaces. Note, however, that in order to use the common Access Point Name for an interface, you must select **Common** for the APN setting when setting up the network user group.

### Definition of Access Point Name (APN)

The APN is used by the network user to establish a connection to the required external network. This means that the SBU must know the APN in order to be able to connect to the external network. APNs are provided from the Airtime Provider. They may also be defined on the SIM card.

### The common APN

The common APN setting is defined here and can be selected for each network user group. If you are using the same APN for many network user groups, it is easier to define it once, and then simply select it for the relevant network user groups. Also, if you change the common APN at a later stage, it is automatically updated for all network user groups where the Common setting is selected.

### To set up the common interface settings

To set up the Common interface settings do as follows:

1. Select **SETTINGS > Common**.

Figure 6-22: Web interface: Settings, Common

2. Select the **APN**. You have the following options:
  - **SIM default**. The APN is taken from the SIM card. This is the recommended option, unless you have special requirements, i.e. your service provider does not automatically provision for PS services.
  - **Network assigned**. The APN is assigned from the network.
  - **User defined**. Type in the APN. APNs are provided from the service provider.

**Note**

Use User defined if your service provider does not automatically provision your SIM card. Contact your service provider for an APN or check the documentation received from the service provider for an APN.

3. At **Buffering on Streaming profiles**, select **Enabled** or **Disabled**.
  - If you select **Enabled**, your Streaming connection will be buffered. This means that the transmission is slightly delayed in order to ensure a precise and continuous data stream.
  - If you select **Disabled**, the Streaming connection will not be buffered. This means the data is delivered immediately, but may vary slightly in transmission speed.
4. Click **Apply**.

### How to use the common APN

When you configure the APN for your individual network user group, select **Common** to use the setting from this page.

Where Common is selected in the individual network user groups, the setting will automatically be updated when the Common APN is changed.

## 6.5.8 Set up call services

The setup of call services is also common for all interfaces.

**Note**

The SBU must be registered on the BGAN network before you can set up the call services in the web interface.

In the web interface you can set up the following supplementary services:

- *Call forwarding*
- *Call barring*
- *Call waiting*
- *Line identification*
- *Closed user group*
- *Local exchange*

Note that, depending on the network, some of these call service settings may prevent others from being activated.

The settings apply for all connected devices using a circuit-switched service.



## Call forwarding

You can set up the SBU to automatically forward incoming calls to another phone number. To forward incoming calls do as follows:

1. Select **SETTINGS > Common > Call forward** from the left navigation pane.

The screenshot shows the 'Call forward' configuration page. On the left is a navigation menu with 'Settings' selected, and 'Call forward' highlighted. The main area is titled 'STANDARD VOICE' and contains three rows of settings, each with an 'Enabled' checkbox and a text input field:

- Forward all calls:  Enabled [ ]
- Forward if not reachable:  Enabled [ ]
- Forward if no reply:  Enabled [ ] when unanswered in [ 20 Sec v ]

Below this is the '3.1 KHZ AUDIO' section with similar settings:

- Forward all calls:  Enabled [ ]
- Forward when busy:  Enabled [ ]
- Forward if not reachable:  Enabled [ ]
- Forward if no reply:  Enabled [ ] when unanswered in [ 20 Sec v ]

The 'DATA/ISDN' section also has similar settings:

- Forward all calls:  Enabled [ ]
- Forward when busy:  Enabled [ ]
- Forward if not reachable:  Enabled [ ]
- Forward if no reply:  Enabled [ ] when unanswered in [ 20 Sec v ]

At the bottom are 'Apply' and 'Cancel' buttons. A note states: 'Please note that some active call forward, call barring or call waiting settings may prevent other call forward, call barring or call waiting settings from being activated.'

Figure 6-23: Web interface: Settings, Common, Call forward

2. Click **OK** next to **Read current settings** to display the phone numbers for call forwarding for the subscription. These numbers are operator controlled and come with your airtime subscription (default). A message saying **Operation in progress, please wait.** is displayed.

**Note** Allow sufficient time for the system to read the current settings over the satellite connection.

3. For each call type, select **Enabled** next to the situation(s) in which you want to forward incoming calls.<sup>1</sup>
4. Next to the enabled items, you can type in a phone number to forward the call to.
5. If you have selected **Forward if no reply**, select from the drop-down list the period of time the system should wait before forwarding the call.
6. Click **Apply**.

<sup>1</sup> When Multi-voice is enabled, the “Forward when busy” setting is not available for Standard voice.

## Call barring

Do as follows to bar incoming and/or outgoing calls to and from the SBU:

1. Select **SETTINGS > Common > Call barring** from the left navigation pane.

Figure 6-24: Web interface: Settings, Common, Call barring

2. Click **OK** next to **Read current settings**. A message saying **Operation in progress, please wait.** is displayed.

**Note** Allow sufficient time for the system to read the current settings over the satellite connection.

3. For each call type, select which calls should be barred.
4. In the **Barring PIN** field, type in a PIN for your call barring setup.

**Note** This is **not** the SIM PIN entered at startup, but a network PIN. Contact your airtime provider for a Barring PIN.

5. Click **Apply**.

## Call waiting

You can set up whether or not you want to receive notification of waiting calls while you are making a call or transmitting data.

To receive a notification of waiting calls do as follows:

1. Select **SETTINGS > Common > Call waiting** from the left navigation pane.

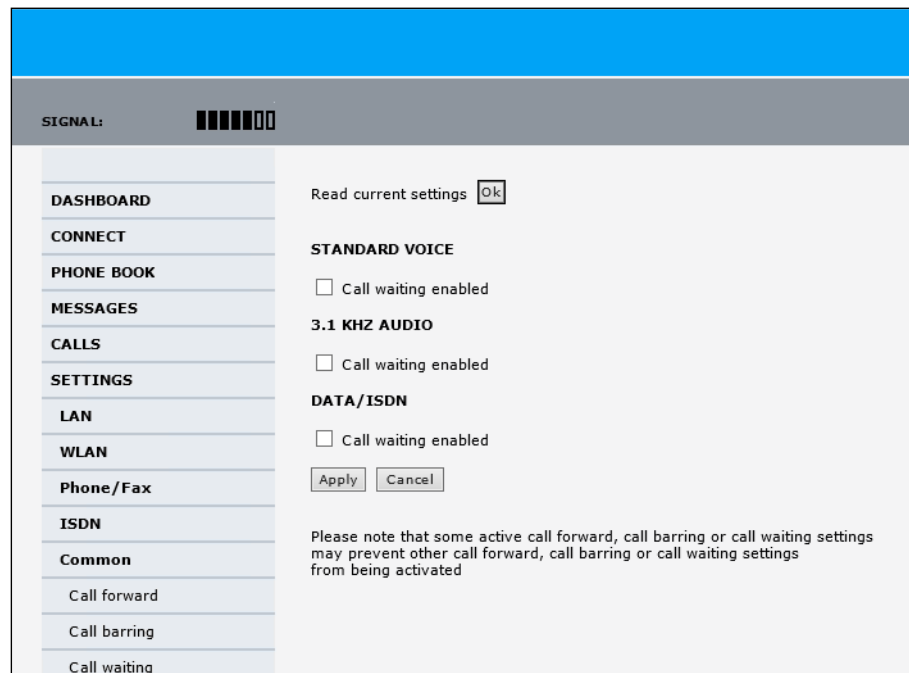


Figure 6-25: Web interface: Settings, Common, Call waiting

2. Click **OK** next to **Read current settings**. A message saying **Operation in progress, please wait.** is displayed.

**Note** Allow sufficient time for the system to read the current settings over the satellite connection.

3. For each call type, select **Call waiting enabled** if you want to get notification of waiting calls while you are making a call or transmitting data.
4. Click **Apply**.

## Line identification

You can set up the terminal to show your number when you are making a call or transmitting data. The number shown is the standard voice number of the airtime subscription.

To show the number when making a call or transmitting data do as follows:

1. Select **SETTINGS > Common > Line identification** from the left navigation pane.

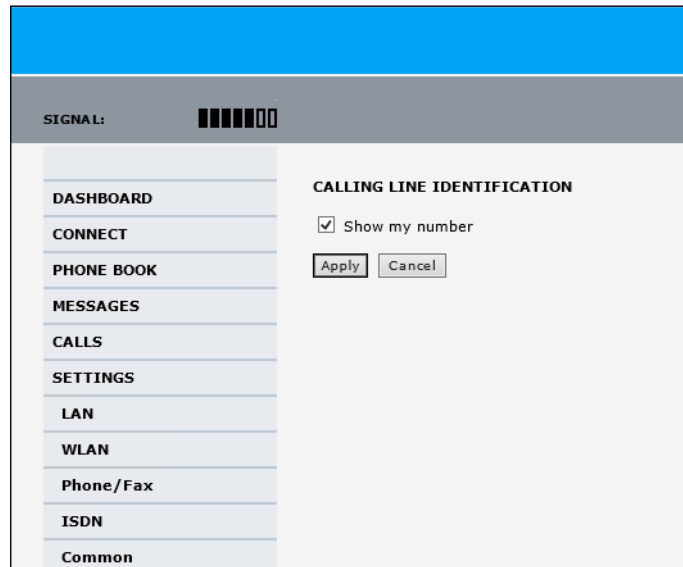


Figure 6-26: Web interface: Settings, Common, Line identification

2. Select **Show my number** and click **Apply**.

## Closed user group

Your subscription may include one or more closed user groups. A closed user group is a group of users permitted to make calls to each other but not to users outside the group. To define the settings for these user groups, do as follows:

1. Select **SETTINGS > Common > Closed user group** from the left navigation pane.

SIGNAL: [Signal strength indicator]			
GROUPS			
	Group index	Active	Group no.
DASHBOARD	0	<input checked="" type="radio"/>	65535
CONNECT	1	<input type="radio"/>	0
PHONE BOOK	2	<input type="radio"/>	0
MESSAGES	3	<input type="radio"/>	0
CALLS	4	<input type="radio"/>	0
SETTINGS	5	<input type="radio"/>	0
LAN	6	<input type="radio"/>	0
WLAN	7	<input type="radio"/>	0
Phone/Fax	8	<input type="radio"/>	0
ISDN	9	<input type="radio"/>	0
Common	10	<input type="radio"/>	Subscribed

**SETTINGS FOR ACTIVE CLOSED USER GROUP**

Outgoing Access    Preferential

Figure 6-27: Web interface: Settings, Common, Closed user group

2. Type in your user group number(s) under **Group no.**  
Your airtime subscription lists your user group number(s).
3. Select which group(s) should be active.  
If you select **Active** for **Subscribed**, the group(s) included in your subscription will be active.
4. To allow outgoing access for the activated user group(s), select **Outgoing Access** under **SETTINGS FOR ACTIVE CLOSED USER GROUP**. Note that if you selected **Subscribed** above, this setting will not be used.
5. Select **Preferential** if you want the activated user group to be selected when a member of a user group does not specify the group number during call set up. Note that if you selected **Subscribed** above, this setting will not be used.
6. Click **Apply**.

## Local exchange

If you want to call a specific phone connected to the terminal, use the local exchange function. With this function enabled, when you dial the mobile number of the terminal, a recorded message instructs you to dial the number for the local phone you want to call. Your call is then transferred to the requested phone and only the requested phone rings. If the local exchange is not used, incoming calls will per default cause all connected phones to ring.

**Note** | The Local exchange function is not available if you have enabled the Multi-voice option.

For a detailed description how to set up the local exchange function of the SBU from a remote location see the AVIATOR 200/300/350 user manual.

## 6.5.9 Manage AVIATOR Wireless Handsets

### Overview

The SBU uses WLAN to connect AVIATOR Wireless Handsets or other IP equipment. The AVIATOR 200/300/350 supports connection of up to 16 AVIATOR Wireless Handsets.


Each handset must have a local number in the range 0501 to 0516 as well as a unique password.

**Note** | The handset with the local number 0501 is the master handset. This means you can start/stop data sessions from the SBU with this handset, if the function is allowed in the User permissions page. See *Set up user permissions* on page 6-87 for further information on user permissions.

### Connect a new AVIATOR Wireless Handset

**Note** | By default, a handset connected to the WLAN interface on the terminal is automatically registered in the terminal and assigned the first available local number.

Do as follows:

1. Connect the handset to the WLAN interface of the SBU. For a step-by-step procedure see the *AVIATOR Wireless Handset and Cradle User Manual*, section *Connecting the AVIATOR Wireless Handset to a wireless access point*.
2. When the handset display shows  in the upper right corner, the handset is ready to make a call. If you want to configure the handset or change the password, see the next section.

When the SBU and the AVIATOR Wireless Handset have recognized each other, a **Configure** link appears next to the handset in the **IP handsets** page of the web interface. This link provides direct access to the built-in web interface of the AVIATOR Wireless Handset. For further information, refer to the *AVIATOR Wireless Handset and Cradle User Manual*.

## Set up the AVIATOR Wireless Handset

To set up an AVIATOR Wireless Handset, do as follows:

1. Select **SETTINGS > IP handset**.

	Entry	Number	Handset password	Actions	Configure handset
DASHBOARD	1	0501	0501	<a href="#">Edit</a>	<a href="#">Configure</a>
CONNECT	2	0502	0502	<a href="#">Edit</a>	Unreserved
PHONE BOOK	3	0503	0503	<a href="#">Edit/Release</a>	Reserved
MESSAGES	4	0504	0504	<a href="#">Edit/Release</a>	Reserved
CALLS	5	0505	0505	<a href="#">Edit/Release</a>	Reserved
SETTINGS	6	0506	0506	<a href="#">Edit</a>	Unreserved
LAN	7	0507	0507	<a href="#">Edit/Release</a>	Reserved
WLAN	8	0508	0508	<a href="#">Edit/Release</a>	Reserved
Phone/Fax	9	0509	0509	<a href="#">Edit</a>	Unreserved
ISDN	10	0510	0510	<a href="#">Edit</a>	Unreserved
Common	11	0511	0511	<a href="#">Edit</a>	Unreserved
IP handsets	12	0512	0512	<a href="#">Edit</a>	Unreserved
Call settings	13	0513	0513	<a href="#">Edit</a>	Unreserved
Discrete I/O	14	0514	0514	<a href="#">Edit</a>	Unreserved
System Type	15	0515	0515	<a href="#">Edit</a>	Unreserved
RF settings	16	0516	0516	<a href="#">Edit</a>	Unreserved

Figure 6-28: Web interface: Settings, IP handsets

2. Select **Edit** next to a handset to change the password of the handset. Remember that you must enter the same password and local number (user name) in the handset. Use the display menu system to enter the local number and the password you just entered in the web interface. Do as follows:
  1. Enter the menu system and select **SIP** to get the list of profiles.
  2. Select the **BGAN** profile and select **Options**.
  3. Select **Edit/View** and change the user name and password. Note that the user name is also the local number for the handset.
3. If you want to remove a handset from the list, click **Release** under **Actions** (the Release link only appears when the handset is disconnected). When a handset is removed from the list, you can no longer access the SBU with this handset.
4. Select **Configure** next to a handset to access the built-in web interface of the AVIATOR Wireless Handset.

**Note** You can only access the web interface of the handset if **Web server** is enabled under **Settings > Web server** in the handset menu (default enabled).

The web interface of the handset opens. It is very similar to the web interface of the SBU, but has a handset icon in the top left corner.

With the web interface of the IP handset you can access the internal settings of the handset. For further information, refer to the *AVIATOR Wireless Handset and Cradle User Manual*.

## Set the call types for AVIATOR Wireless Handsets

On this page you set the call type and you can see whether **Restricted dialing** is enabled for each handset. For information how to set up restricted dialing see the AVIATOR 200/300/350 user manual.

To set the call types for AVIATOR Wireless Handsets, do as follows:

1. Select **SETTINGS > IP handsets > Call settings**.

	Number	Incoming calls	Outgoing calls	Restricted dialing
	0501	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0502	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0503	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0504	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0505	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0506	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0507	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0508	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0509	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0510	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0511	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0512	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0513	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0514	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0515	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
	0516	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	<input type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled

Figure 6-29: Web interface: Settings, IP handsets, Call settings

2. For each handset, select the call types you want to enable for incoming and outgoing calls.

The call types are described in more detail in the User Manual.

- For **Incoming calls**, you can check Standard or 3.1 kHz Audio or both. If you check both, the handset will react (ring) on any incoming call. Example: If you select Standard, the handset will only react on calls made to the Standard phone number.<sup>1</sup>
- For **Outgoing calls**, you can select either Standard or 3.1 kHz Audio. The selected type will be used by default, if possible, for any outgoing call.

3. Click **Apply**.

<sup>1</sup>If Multi-voice is enabled and you have entered additional numbers in the phone book, you can assign an additional number to each IP handset. For more information see *Multi-voice (option)* on page 6-91.



## 6.5.10 Configure the discrete I/O interfaces

### Overview

The SBU has 4 annunciators, 1 chime/lamp inhibit and 5 non-configurable discrete inputs. The non-configurable discrete inputs are SBU nOn (remote on/off), SBU Enable, WLAN Enable and two for Automatic Test Equipment (ATE). The ATE inputs are only for factory use, do not connect them.

Each I/O pin that can be configured is displayed in the web interface. For more information on the pins TP (Top Plug) and BP (Bottom Plug) see *Pin-out for SBU rear receptacle (top plug)* on page 4-7 and *Pin-out for SBU rear receptacle (bottom plug)* on page 4-8.

The functions of the I/O pins are as follows:

- **Pin TP13: Input. Chime/Lamps Inhibit Input.**  
This discrete input is used to inhibit Satcom activation of the chime and call lights during take-off and landing.
- **Pin TP27: Output. Annunciator #3 “Service Available”.**  
Default behavior: Active low when the SwiftBroadband Service is logged on
- **Pin TP28: Output. Annunciator #1 “Incoming call”.**  
Default behavior: Active low when a handset is ringing.
- **Pin TP29: Output. Annunciator #2 “SBU Failed”.**  
Default behavior: Active low whenever a BITE with severity essential or fatal is active on the SBU.
- **Pin BP1: Output. Annunciator #4 “Message received”**  
This discrete output can be used to indicate that there is an unread message in the SBU.  
Default behavior: Active low.

## Set the discrete I/O interfaces

You can enable and set some of the discrete I/Os in the web interface. To set these, do as follows:

1. Select **SETTINGS > Discrete I/O**.

Pin	I/O	Function	Enabled	Polarity
TP13	Input	Chime/Lamp inhibit	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low
TP27	Output	Service available	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low
TP28	Output	Incoming call	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low
TP29	Output	SBU failed	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low
BP1	Output	Message received	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low

**CALL OUTPUT**

Incoming calls  Standard  3.1 kHz Audio  UDI  RDI

Figure 6-30: Web interface: Settings, Discrete I/O (without SB-Safety Voice)

2. For each pin you want to use, select **Enabled**.
3. For each pin, select if the pin should be **Active high** or **Active low**.
4. For Call output you can select which incoming calls will activate the external ringer (Discrete I/O TP28: Incoming call).
5. Click **Apply** to save the new settings.

## Set the discrete I/O interfaces for SB-Safety Voice

When SB-Safety Voice is enabled, the following changes apply:

- Pin TP13 Chime/Lamps Inhibit also disables ringing on the 2-wire handset.
- Pin TP27 Service Available must be inverted to indicate failure of Voice service (connect to SBB FAIL light)
- Pin TP14 is Call Priority 1 annunciator.
- Pin BP4 is Call Priority 2 annunciator.
- Pin BP2 is Call Priority 3 annunciator.

To set the discrete I/Os in the web interface, do as follows:

1. Select **SETTINGS > Discrete I/O**.

Pin	I/O	Function	Enabled	Polarity
TP13	Input	Chime/Lamp inhibit	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low
TP27	Output	SB-safety voice service available	<input checked="" type="checkbox"/>	<input checked="" type="radio"/> Active high <input type="radio"/> Active low
TP28	Output	Incoming call	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low
TP29	Output	SBU failed	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low
BP1	Output	Message received	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low
The following pins have predefined functions in SB-Safety Voice mode and cannot be modified.				
TP14	Output	Call Priority 1	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low
BP4	Output	Call Priority 2	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low
BP2	Output	Call Priority 3	<input checked="" type="checkbox"/>	<input type="radio"/> Active high <input checked="" type="radio"/> Active low

Figure 6-31: Web interface: Settings, Discrete I/O (with SB-Safety Voice)

Pin TP27 Service Available must be inverted to indicate failure of Voice service (connect to SBB FAIL light).

## 6.5.11 Set the system type

During the initial configuration of the system you must assign the system type, that is the AVIATOR 200/300/350 system that you have bought. You can typically only select the system type purchased. The **Reset** functionality is mainly used for support purposes or when the system type is changed. For systems with SB-Safety Voice (software 4.00 or higher) see the separate section *SB-Safety Voice (option)* on page 6-55.

To select the system type, do as follows:

1. Select **SETTINGS > System Type**.

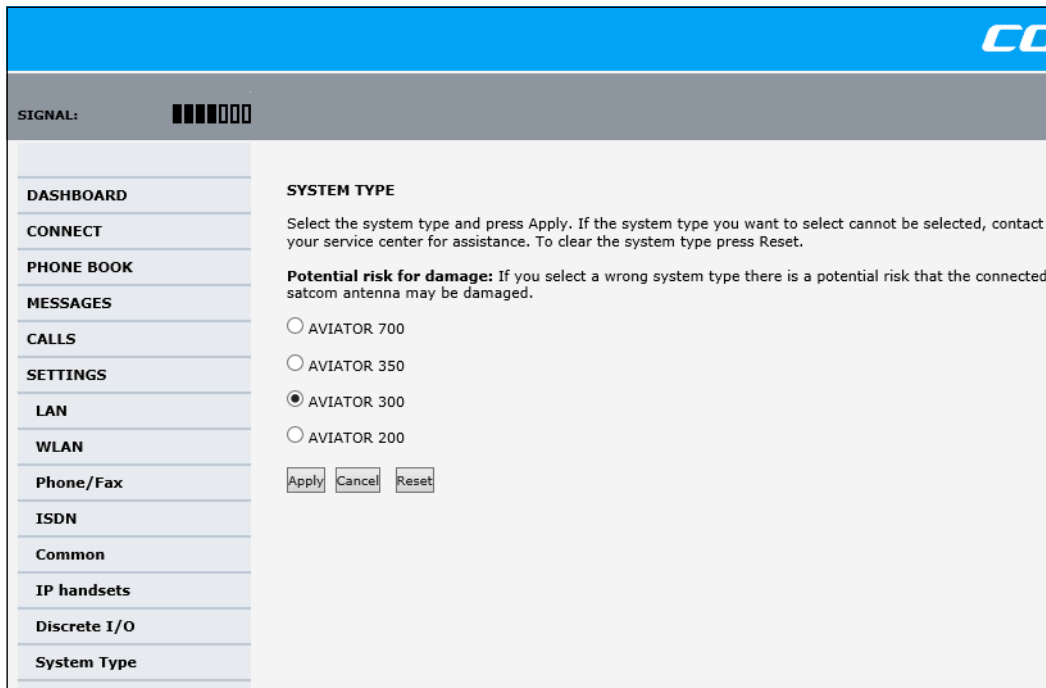


Figure 6-32: Web interface: Settings, System type

2. Select the system type for the installation.



**CAUTION!** Selecting a wrong system type may cause damage to the satcom antenna or GPS antenna. If the system type purchased can not be selected, please contact the supplier of your AVIATOR 200/300/350 system.

**Do not try to use a different system type!**

3. Click **Apply** to save the new setting.

## Changing the system type

You can change the system type if there are major changes to the installation (like upgrading from an IGA antenna to an HGA antenna) or the satcom system is moved from one plane to another.

**Note**

You can replace the SBU, HLD or the satcom antenna (same type) without the need to reconfigure the system. This is possible because all system settings are stored in the Configuration Module. Therefore there is no need to select a new system type when replacing the SBU, HLD or the satcom antenna (same type). For instructions how to remove the SBU alone see *Inoperative units* on page 7-1.

**Important**

To avoid potential damage to the satcom or GPS antenna, it is strongly recommended to follow this procedure **before you remove the satcom system** from one plane for installation in another

Before upgrading with a new antenna type or removing the satcom system do as follows:

1. Select **SETTINGS > System Type**.
2. Click **Reset** to erase the system type and all settings from the pages **RF Settings** and **External systems**.
3. Power off the system and make the necessary changes (install new antenna or move the entire satcom system).

If changing the system type directly without clicking the Reset button, the contents of the pages **RF Settings** and **External systems** are erased and must be entered again. This does not apply when changing between AVIATOR 300 and AVIATOR 350, in which case only the antenna type is erased.

Changing the system type	Click the <b>Reset</b> button	Values in <b>RF Settings</b>	Values in <b>External systems</b>
AVIATOR 300 to AVIATOR 350	No	Not cleared	Not cleared <sup>a</sup>
	Yes	Cleared	Cleared
AVIATOR 200 to AVIATOR 350	No	Cleared	Cleared
	Yes	Cleared	Cleared

Table 6-2: Changing the System type, use of Reset button

- a. Note that the field ANTENNA Type on the page SETTINGS > External systems is cleared.

## Upgrading AVIATOR 300 to AVIATOR 350

To upgrade an AVIATOR 300 system with IGA antenna to an AVIATOR 350 system with HGA antenna, use the following procedure to change the system type:

1. Select **SETTINGS > System Type**.
2. Select AVIATOR 350.
3. Click **Apply**.
4. Continue with the setup of the navigational input, for information on how to configure the antenna see *Set up the navigational input* on page 6-44.

**Important**

When upgrading the antenna, it is often necessary to reconfigure the cable loss (see *Configure RF settings* on page 6-43) and the navigational input (see *Set up the navigational input* on page 6-44).

## 6.5.12 Configure RF settings

Before you can configure the RF settings you must select the system type.

You must configure the AVIATOR 200/300/350 installation with the specific cable losses of the installation. For AVIATOR 300 and AVIATOR 350 you can also enter heading, roll and pitch offset of the satcom antenna of the installation, if the antenna for any reason is installed in a position that deviates from the position recommended in the installation instructions, i.e. the position is not aligned with the aircraft.

To configure the RF settings, do as follows:

1. Connect to the Maintenance connector on the front panel of the SBU and enter the web interface (default: <http://192.168.0.1>)
2. From the left navigation pane select **SETTINGS > RF settings**.

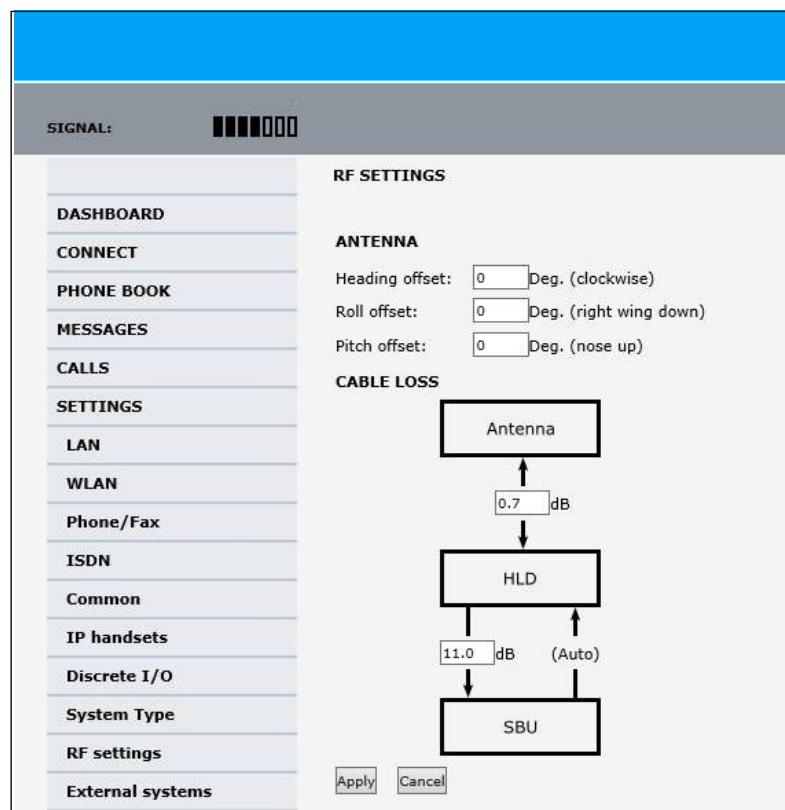


Figure 6-33: Web interface: Settings, RF settings

3. Below **Antenna** insert in **Heading Offset: Deg. (Clockwise)**, **Roll Offset: Deg. (Right Wing Down)** and **Pitch Offset: Deg. (Nose up)** the degrees by which the current installation deviates from the antenna position recommended in the antenna installation instructions. These settings are greyed out for the AVIATOR 200.
4. Below **CABLE LOSS** enter the cable loss for the cables between the
  - Antenna and the HLD, allowed range for AVIATOR 200: 0 to 0.3 dB, for AVIATOR 300 and AVIATOR 350: 0 to 0.7 dB
  - HLD and the SBU, allowed range for AVIATOR 200: 0 to 17 dB, for AVIATOR 300 and AVIATOR 350: 0 to 20 dB
5. Click **Apply** to save the new settings.

### 6.5.13 Set up the navigational input

Before you can configure the navigational input you must select the system type.

The AVIATOR 200/300/350 supports input from several sources to retrieve navigational information, depending on the installed satcom antenna type. The following table gives an overview of the supported navigational input sources for the different satcom antenna types.

System type	Satcom antenna type	Navigational input					
		IRS	AHRS+GPS	NRS	NPI	GNSS	GPS only
AVIATOR 200	TT-3002A LGA/LGA-3000	X			X	X	X
AVIATOR 300	TT-5006A IGA	X	X	X			
	IGA-5001	X	X				
	AMT-3800	X	X				
AVIATOR 350 <sup>a</sup>	HGA-6000/HGA-6500	X	X				
	HGA-7000/HGA-7001	X	X				
	AMT-50/700/3800	X	X				
	CMA-2102/CMA-2102SB	X	X				

Table 6-3: Navigational input for system types and satcom antennas

- a. AVIATOR 350 can also be used with TT-5006 IGA or IGA 5001, then the system is an AVIATOR 300.

For further information on supported navigational systems see *About satcom antenna steering for IGA and HGA (AVIATOR 300 and AVIATOR 350)* on page 5-4.

When using IRS, AHRS, NPI or GNSS, ARINC 429 Speed can individually be set to high or low speed on the primary and secondary input, depending on your configuration. For redundancy reasons the system supports a secondary source, in case the primary source fails.

**Note** If you use IRS, AHRS, NPI or GNSS, make sure that you configure the primary and secondary IRS or AHRS to the correct speed in your configuration. This is essential to provide the necessary navigation data needed for the correct positioning of the antenna.

To set up the navigational input, do as follows:

1. Connect to the Maintenance connector on the front panel of the SBU and enter the web interface (default address: <http://192.168.0.1>)



- From the left navigation pane select **SETTINGS > External systems**.

Figure 6-34: Web interface: Settings, External systems (AVIATOR 350 with TT-5006 antenna)

- Below **Antenna** select in the drop down list the connected antenna. See Table 6-3 on page 6-44 for available selections.

**Note** Check in Table 6-7 on page 6-51 that CMU/ACARS is disabled for antennas supporting BSU.

- For **NAVIGATIONAL INPUT** select one option. Which options are available depends on the installed antenna, see Table 6-3 on page 6-44.
- Only for ARINC sources<sup>1</sup>: For **Primary** and **Secondary** select **Connected** and **Speed**.
- Only for ARINC sources: If you do not have second navigational input source available you must set **Connected** of **SECONDARY** input to **No**.
- Only AHRS+GPS and GPS only: **GPS VOLTAGE** is needed if you have selected AHRS+GPS as a navigation source and HGA-6000 or AMT-50 as an antenna. In this case you have a separate GPS antenna that needs to be powered by the SBU. Use **GPS VOLTAGE** to set the voltage to the correct value for the GPS antenna. It is not used for the TT-5006A antenna. The TT-5006A antenna has an integrated GPS antenna, then you do not need to set the GPS voltage.
- Click **Apply** to apply the new settings.

1. ARINC sources are IRS, AHRS + GPS, GNSS and NPI.

## 9. MAGNETOMETER CALIBRATION

**Note**

This is only necessary for TT-5006A IGA and NRS selected.

If you use the satcom antenna TT-5006A with NRS you must do a **MAGNETOMETER CALIBRATION** to compensate for potential magnetic interference on the navigational input signal. This procedure is described in the following section *Calibrate the NRS magnetometer in the TT-5006A IGA*.

For an overview of the supported navigational input sources for the different satcom antennas see Table 5-2 on page 5-4.

### 6.5.14 Calibrate the NRS magnetometer in the TT-5006A IGA

For a system with a TT-5006A IGA you can use the built-in NRS if no IRS/AHRS are available.

The NRS system consists of a 3D magnetometer, a pitch sensor and a GPS receiver. The magnetometer measures the strength and direction of the magnetic field (the magnetic vector), and compares it to what is expected at the current GPS position (values from a database). Based on these values, the orientation of the aircraft can be calculated.

For the NRS system to work properly, it is essential that the magnetic environment around the TT-5006A antenna is without too much magnetic influence from the aircraft. If magnetic sources are present (e.g. loudspeakers, iron screws, nuts etc.), remove these or encapsulate them as much as possible.

Remaining magnetic influence can be compensated for by means of the calibration procedure. Note that the calibration can only be used to compensate for influence from STATIC magnetic components. If the magnetic influence is from a source which may vary, e.g. a DC-current in a cable running near the antenna, then a change in the current will make the calibration inaccurate.

When using NRS, you must calibrate the integrated magnetometer to compensate for potential magnetic interference. During the calibration, data is collected about the orientation of the antenna installation on the aircraft (pitch, roll and heading offset) and about local magnetic fields. A proper calibration is essential to track the satellites correctly. Failure to calibrate the system may cause the system not to work properly.

Note that you must repeat the calibration procedure if you exchange the antenna or if the magnetic environment inside the aircraft changes (mounting of loudspeakers close to the satcom antenna etc.). The calibration data is stored in the CM.

You start and stop the magnetometer calibration procedure using a PC connected to the maintenance connector of the SBU and the web interface.

## Magnetometer calibration procedure

To calibrate the magnetometer do as follows:

1. Connect a PC to the Maintenance connector of the SBU and enter the web interface.
2. Find a suitable location where the AVIATOR system can obtain GPS synchronization and where there is sufficient space for the aircraft to complete a turn of at least 360°. Make sure that a full circle of 360° is covered, 370° is fine too. 350° is not sufficient to produce a valid calibration result.

**Note**

Make sure that the aircraft is away from large buildings or vehicles which could disturb the terrestrial magnetic field. Preferably use the compass calibration field in the airport area.

3. Power up all aircraft systems, including the engines. This is to create the aircraft magnetic environment as it is in in-flight condition.
4. Wait until the GPS of the aircraft is operational. Check on the page **DASHBOARD** whether the field **GPS position** shows a valid value.
5. From the left navigation pane select **SETTINGS > External systems**.

The screenshot shows the 'EXTERNAL SYSTEMS' configuration page. On the left is a navigation menu with 'External systems' highlighted. The main content area is divided into several sections:

- ANTENNA**: Type is set to 'TT-5006A'.
- NAVIGATIONAL INPUT**: 'IRS' is selected.
- PRIMARY**: 'Connected' is 'Yes', 'Speed' is 'High'.
- SECONDARY**: 'Connected' is 'Yes', 'Speed' is 'High'.
- MAGNETOMETER CALIBRATION**: 'General calibration quality score' is 9, 'Hard iron quality score' is 5. Buttons for 'Start', 'Stop', 'Cancel', and 'Refresh' are present.

Figure 6-35: Web interface: Settings, External systems, Magnetometer Calibration

6. Advise the pilot to make a slow 360° circle on a smooth, flat, and level surface. Make sure that the turn rate is between 1 and 2° per second, i.e. one circle should take minimum 3 minutes, maximum 10 minutes, to produce valid calibration results. Keep

the movement as even as possible, avoid sudden movements or changes in speed. The start direction of the turn is not relevant.

**Note** It is recommended for the calibration to succeed, that the turn is performed in a constant direction. If the aircraft e.g. turns a bit counterclockwise before completing a full turn clockwise, this might bring the calculations of calibration parameters to fail. Make the turn radius as small as possible.

- In the section for magnetometer calibration click the button **Start** to start the calibration procedure.

**Important** When a calibration is completed successfully, any previously stored calibration data is overwritten without further notice.

- When a turn is complete, click **Stop**. The system initiates a calculation in the background that may take between 10 seconds and a few minutes. Click optionally the button **Refresh** until the result is shown. The resulting calibration score is shown as two digits.
- See the following table for guidelines how to evaluate the calibration score.

Calibration quality score	Hard iron interference calibration score
9: Good	9: <10% Good
8: Good	8: <20% Good
7: Good	7: <30% Good
6: Acceptable	6: <40% Acceptable
5: Acceptable	5: <50% Acceptable
4: Marginal	4: <60% Acceptable
3: Marginal	3: <70% Investigate
2: Unacceptable	2: <80% Investigate
1: Unacceptable	1: <90% Investigate
0: Unacceptable	0: >90% Investigate

Table 6-4: Evaluation of the magnetometer calibration score

## Investigate a low Hard Iron score

The hard iron score is an indication of how much magnetic flux (Tesla) the magnetometer inside the antenna has measured, compared to what was expected at the current latitude and longitude based on the Earth's magnetic model stored inside the SBU. In other words, it is an indication of how big a static magnetic disturbance is present from the aircraft structure itself (magnetic screws etc.).

The lower the number, the more unwanted flux and the more difficult it will be for the system to correctly calculate heading, pitch and roll. While a high hard iron score is not a strict requirement, since the purpose of the calibration is to map this disturbance so it can be compensated for later, a low score should always be investigated and fixed if possible:

1. Confirm that non-magnetic screwdrivers and non-magnetic screws were used for the antenna installation.
2. Ensure that any nearby speakers in the cabin have been properly shielded.
3. Ensure that nearby metallic objects do not interrupt the calibration.

DC cables with high current will also generate flux and can cause low hard iron score.

All though the calibration procedure is done to counter this unwanted magnetic flux, you must determine if the disturbance comes from a wire where the current may change during flight. If this DC current changes, the disturbance will also change, and hence the calibration will no longer be accurate.

There are a couple of different ways to investigate hard iron disturbance. The area around the antenna can be surveyed with a simple Boy Scout compass, making sure there is only a slight deflection of the needle, when the compass is moved to and from and around the antenna. If there are more than 10-15 degrees, investigate what the cause is.

Another way is to use the values from the magnetometer inside the antenna itself. This is especially useful if you suspect disturbance from DC cables, e.g. from generators, which can be impractical to measure outside the aircraft, with engines running. These values can be read out once at a time via the command line with the `stat -m tt5006a` command or printed every second with the following two commands:

- `trace -m tt5006A:cno -c 1 set <enter>`
- `console_set <enter>`

See Appendix G, *Terminal commands*, for information on how to use terminal commands.

The magnetometer gives 3 values named Bx, By and Bz, shown in nT (nano Tesla).

Monitor these values, while high current systems with cables near the antenna are turned on and off, and make sure the values don't vary significantly. If they do, reroute the cables to make the NRS work reliable.

## Error messages during magnetometer calibration

Error messages at failing START procedure	How to proceed
Failure due to missing GPS satellite fix.	Wait some time to get a GPS fix, check that there is free line of sight to GPS satellites, i.e. the plane must be outside the hangar. Check on the page <b>DASHBOARD</b> whether the field <b>GPS position</b> shows a valid value.
Could not obtain the matrix of Earth's magnetic field.	Restart the system. If the error persists, contact your Cobham SATCOM partner's support hotline or Cobham SATCOM e-support.
Failure due to memory exhaustion.	Restart the system. If the error persists, contact your Cobham SATCOM partner's support hotline or Cobham SATCOM e-support.
Could not communicate with antenna.	Check the satcom antenna and cables to the satcom antenna.
Unknown start error.	Restart the system. If the error persists, contact your Thrane & Thrane partner's support hotline or Thrane & Thrane e-support.

Table 6-5: Magnetometer calibration: Error messages at failing Start procedure

Error messages at failing STOP procedure	How to proceed
Calibration stopped outside allowed time interval (min. 3 minutes, max. 10 minutes).	Rerun the calibration within the allowed time interval.
Calibration convergence error, possibly due to the aircraft being rotated less than 360 degrees.	Rerun the calibration within the allowed time interval.
Unknown calibration error.	Rerun the calibration. Try to follow the instructions how to perform the 360° turn more carefully. If this does not help, restart the system. If the error persists, contact your Cobham SATCOM partner's support hotline or Cobham SATCOM e-support.

Table 6-6: Magnetometer calibration: Error messages at failing Stop procedure

## 6.5.15 Set up CMU/ACARS (option)

The AVIATOR 200/300/350 supports ACARS communication over Swift Broadband. The connection to the CMU uses the same A429 lines as the ACU/BSU of the antenna system or an AIS 380 Aircraft Interface Module<sup>1</sup>. This option is only available with certain types of antennas, i.e. antennas controlled via modem on the coax cable or LGAs without control. For a list of antenna that support the CMU/ACARS option see the table below.

**Note** You must have SBU software version minimum AVIATOR 200/300/350 (Level E): 1.07, AVIATOR 200D/300D/350D (Level D): 2.01, in order to support the CMU/ACARS option.

Satcom antenna system	CMU support
TT-3002A/LGA-3000	Yes
TT-5006A	Yes
IGA-5001	Yes
AMT-50/700	No <sup>a</sup>
AMT-3500	No <sup>a</sup>
AMT-3800	No <sup>a</sup>
HGA-6000/6500/7000	Yes, if coax modem is used
HGA-7001	No <sup>a</sup>
HGA-8000	Yes
CMA-2102SB/2200SB	No <sup>a</sup>

Table 6-7: Satcom antennas in AVIATOR systems supporting CMU

- a. CMU support possible with the converter RS-422 to A429 (AIS 380 Aircraft Interface Module)

**Important** When using the SBU/ACARS interface for SBB Safety Services (e.g. CPDLC traffic) note that additional user traffic and interface connections to the SBU shall be addressed in the Security Safety Assessment (SSA) of the particular aircraft. The SBU does not comply to the ARINC-781 attachment 8, Security Considerations. There is no segregation between the user interfaces. All interfaces of the SBU shall be considered as 'Aircraft Control Domain'.

The setup of CMU/ACARS is divided into 3 areas:

- ACARS Aircraft Gateway (AAGW)
- Aircraft
- ACARS Ground Gateway (AGGW)

1. For software version 2.03.

To set up CMU/ACARS, do as follows:

1. Select **SETTINGS > External systems > CMU/ACARS**.

The screenshot shows the 'CMU/ACARS' configuration page. On the left is a sidebar menu with items: DASHBOARD, CONNECT, PHONE BOOK, MESSAGES, CALLS, SETTINGS (highlighted), LAN, WLAN, Phone/Fax, ISDN, Common, IP handsets, Discrete I/O, System Type, RF settings, External systems, CMU/ACARS, FLEX, and Tracking. The main content area is titled 'CMU/ACARS' and includes a signal strength indicator. It is divided into three sections:

- ACARS AIRCRAFT GATEWAY (AAGW)**:
  - ACARS:  Enabled  Disabled
  - CMU Speed:  High  Low
  - CMU SAL:  Automatic  User
  - SBU SAL:
  - Position Report:  Enabled  Disabled
  - Satellite Switch (logoff to AGGW):  Yes  No
- AIRCRAFT**:
  - ICAO Address:  Automatic  User
  - Tail No:
  - Type:
- ACARS GROUND GATEWAY (AGGW)**:
  - APN Name:
  - AGGW Name:

At the bottom of the main content area are 'Apply' and 'Cancel' buttons.

Figure 6-36: Web interface: CMU/ACARS

2. At **ACARS** Select **Enabled**. Check in the table above that your system supports CMU.
3. At **CMU Speed** select **High** or **Low**, depending on the CMU.
4. At **CMU SAL** select **Automatic** (default) or **User**. Allowed octal range: 0-377. This number is used for identification of the CMU in the installation.
5. At **SBU SAL** select **Default** or type in the number. Allowed octal range: 0-377. This number is used for identification of the SBU in the installation.
6. At **Position report** you can select whether to include the aircraft's GPS position to the AGGW (Enabled) or not (Disabled).
7. At **Satellite Switch** you can select whether the hand over to the new satellite is done after a logoff to the ACARS Ground Gateway (Yes) or the switch happens instantaneously (No).
8. At **ICAO Address** you can select to send the aircraft's address automatically or you can enter it manually. Allowed octal range: 0-77777777
9. At **Tail No** and **Type** you can enter the aircraft's tail number and type. You must at least enter multiple blank spaces. These 2 fields cannot stay empty.
10. At **APN Name** and **AGGW Name** keep the default values or enter new data received from your service provider.
11. Click **Apply** to save the settings.



## 6.5.16 Enable system options with FLEX keys

On the FLEX page you can view the options for your system that are currently enabled or disabled. Enabling the purchased options is typically done at the factory. You can buy options at a later stage and open up for them by entering a FLEX key sequence for the specific built-in option. The available options are listed in Table 2-6 on page 2-10.

To enable a built-in option, do as follows:

1. Connect to the Maintenance connector on the front panel of the SBU and enter the web interface (default: <http://192.168.0.1>).
2. From the left navigation pane select **SETTINGS > FLEX**.

FLEX FEATURES			
405040A-002	Built-in router option		Enabled
405040A-003	Built-in wireless option		Enabled
405040A-009	Built-in CMU/ACARS/SB-Safety Voice option		Enabled
405040A-010	Built-in Multi-voice option		Enabled

Figure 6-37: Web interface: Settings, FLEX (example)

3. Have the FLEX key ready and enter it into the insert fields.
4. Click **Apply** to enable the new option.
5. Click **Show System Types** to display the system types and their status (enabled or disabled).

## 6.5.17 Tracking

With tracking you can set the SBU to send reports with current position information at specified time intervals or distances to a server address. To set up tracking, do as follows:

1. Select **SETTINGS, Tracking**.

**SERVER CONNECTION**

Server IP address: 80 .163 .245 .134

Server port: 5298

Client port: 7475

Encryption key: 706F656C7365000000000000000000

Register type:  IMEI number  ICAO Address

ICAO Address:  Hex  Octal |15315315

Allow remote control:  Yes  No (can only be changed by an administrator)

**APN**

Common

SIM default

Network assigned

User defined: bgan.inmarsat.com

User name:

Password:

**POSITION REPORTS**

Report type:  Compressed  Extended  ECEF

**INTERVAL REPORT**

Status:  Enabled  Disabled

Report each: 0 :1 (hh:mm)

**DISTANCE REPORT**

Status:  Enabled  Disabled

When moved: 0 meters

Max one report per: 0 :15 (hh:mm)

Figure 6-38: Web interface, Settings, Tracking

2. The information in the sections **SERVER CONNECTION** and **APN** must be provided by your airtime provider.
3. In **POSITION REPORTS** you can select among the following:
  - **Compressed:** Aircraft's position with latitude and longitude.
  - **Extended:** Aircraft's position latitude, longitude, heading, speed and UTC time.
  - **ECEF:** Aircraft's position in x,y,z coordinates and a velocity vector.
4. In **INTERVAL REPORT** and **DISTANCE REPORT** you can enable the respective report and set a report interval or distance.
5. Click **Apply** to save the settings.

## 6.5.18 SB-Safety Voice (option)

To use the SB-Safety Voice service, the SBU must have software version 4.00 or higher. Note that the POTS#1 configuration cannot be changed and the POTS#2 and ISDN are forcibly disabled.

### Important

When using the SBU/ACARS interface for SBB Safety Services (e.g. CPDLC traffic) and/or SB-Safety Voice is enabled, note that additional user traffic and interface connections to the SBU shall be addressed in the Security Safety Assessment (SSA) of the particular aircraft. The SBU does not comply to the ARINC-781 attachment 8, Security Considerations. There is no segregation between the user interfaces. All interfaces of the SBU shall be considered as 'Aircraft Control Domain'.

The software version is shown on the DASHBOARD.

DASHBOARD	PROPERTIES	SESSIONS TOTAL
CONNECT	Airtime provider: Swift	Standard voice inbound: 01:28:39
PHONE BOOK	GPS position: N 55°48', E 12°30'	Standard voice outbound: 03:35:40
MESSAGES	Status: Ready	3.1 kHz audio inbound: 00:02:30
CALLS	Satellite selection: Auto	3.1 kHz audio outbound: 00:08:45
SETTINGS	Current satellite: EMEA (elevation: 25°)	Standard data: 31.12 MB
ADMINISTRATION	Unit serial number: 11443372	Streaming 8 kbps: 00:00:00
HELPDESK	Software version: 4.00	Streaming 16 kbps: 00:00:00
SITE MAP	Certification level: Level-D	Streaming 32 kbps: 00:00:00
	IMSI number: 901112115106122	Streaming 64 kbps: 00:03:40
	IMEI number: 35872303-000340-9	BGAN X-Stream: 00:09:17
	ONGOING DATA SESSIONS	ONGOING CALLS

Figure 6-39: Web interface, DASHBOARD software version 4.00

To set-up SB-Safety Voice, do as follows:

1. Check that the SBU has software version 4.00.
2. Check that the option for Built-in ACARS/SB-Safety Voice is enabled.

DASHBOARD	FLEX
CONNECT	FLEX key: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
PHONE BOOK	<input type="button" value="Apply"/> <input type="button" value="Cancel"/>
MESSAGES	FLEX FEATURES
CALLS	405040A-002 Built-in router option: Enabled
SETTINGS	405040A-003 Built-in wireless option: Enabled
LAN	405040A-009 Built-in CML/ACARS/SB-Safety Voice option: Enabled
WLAN	405040A-010 Built-in Multi-voice option: Enabled
Phone/Fax	<a href="#">Hide System Types</a>
ISDN	

Figure 6-40: Web interface, SETTINGS, Flex key, software version 4.00

3. If it is not in the list and enabled, request the flex key and see *Enable system options with FLEX keys* on page 6-53.

4. Click the menu **SETTINGS, System Type**.



Figure 6-41: Web interface, SETTINGS, System Type, software version 4.00

5. At **SB-SAFETY VOICE**, select **Enabled**.
6. Click **Apply**.  
When SB-Safety Voice is enabled, make sure that the following settings are as follows:
  - Multi-Voice is disabled
  - WLAN is disabled
  - Discrete output TP27 set to **Active high**

**Important** Do not enable Multi-Voice and WLAN in the web interface. Multi-Voice and WLAN are not allowed together with SB-Safety Voice.

7. Restart the SBU.

## 6.6 LAN/WLAN network users

### 6.6.1 Introduction

With the built-in router functionality the system offers a flexible use of the data channel of the BGAN service. You can configure the use of the data channel by defining network user groups and profiles. The following picture gives an overview of the parameters involved.

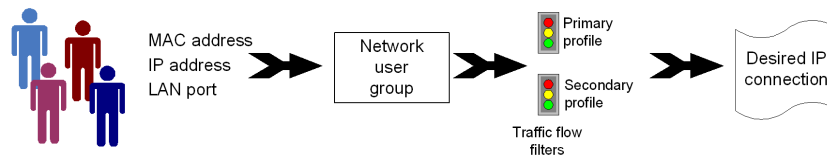


Figure 6-42: Overview over network user groups and traffic flow filters

The network user group you belong to is determined by one or more of the following:

- the IP address of the device you are using
- the MAC address of the device you are using
- the LAN port you connect to

A connected IP device will automatically be assigned to the default network user group, if it is not specified otherwise.

For specific purposes like video streaming, a server on the network, a fixed IP address on the connected device or changing the startup mode of a connection, you must set up network groups with specific primary and/or secondary profiles. How to do this is described in the following sections.

#### Network user groups

The network management system divides the users of the SBU into network user groups. Each network user group has a profile which determines how the users connect to the Inmarsat BGAN network. The network user groups can allow or restrict certain services for different users.

For example, you may want to define:

- one network user group allowing both Standard and Streaming connections,
- one network user group for Internet, e-mail and VPN, allowing Standard connections,
- one network user group for Remote management of systems. This would be a direct Standard connection (Bridge mode).

You can have up to 11 network user groups and global IP addresses.

#### Necessary steps when managing network users

The steps necessary for managing network users include:

1. **Defining a network user group.** See *Set up the network user groups* on page 6-59. The network user groups determine settings such as:
  - QoS (Standard/Streaming),

- IP addressing (Static or Dynamic, this is decided by the SIM card setup and the service provider)
  - Internet access mode (Router Mode, Bridge Mode or No Internet Access)
2. **Identifying a network device.** See *Manage network devices* on page 6-62. The network devices are identified by their IP address, MAC address and (optionally) device name.
  3. **Associating the network user group and the network device.** See *The network classification table* on page 6-63. The network classification table determines which devices should belong to which network user group. When a network device is connected, the SBU runs through the network classification table to check if the new connection matches any of the entries in the table. When a match is found, the SBU establishes a packet data connection (PDP context) with the settings determined for the belonging network user group, and the device is ready for use with the SBU.

### Access to the network management settings

Access to the network management settings requires an administrator password. The default user name is **admin** and the default password is **1234**.

The administrator can create and manage network user groups and set up a network classification table defining priorities for devices, network user groups and LAN ports.

**Important**

All user connections to the LAN interface may be affected when you change the settings below, including your own current connection.

## 6.6.2 Set up the network user groups

### Overview

A network user group, in this context, is a group of network users sharing the same Quality of Service profile and network parameters.

There are 11 configurable network user groups. For the Default network user group, certain settings are locked, to make sure there is always one functional network user group available. For example, the Default network user group does not allow you to select a Bridge mode connection.

**Note** You cannot delete network user groups. If you do not want to use them, click **Edit** and select **Disabled** at **Status** in the **NETWORK USER GROUP** field.

### Edit a network user group

The default setting of this network user group is a standard IP data connection with automatic IP address allocation and automatic activation of the connection.

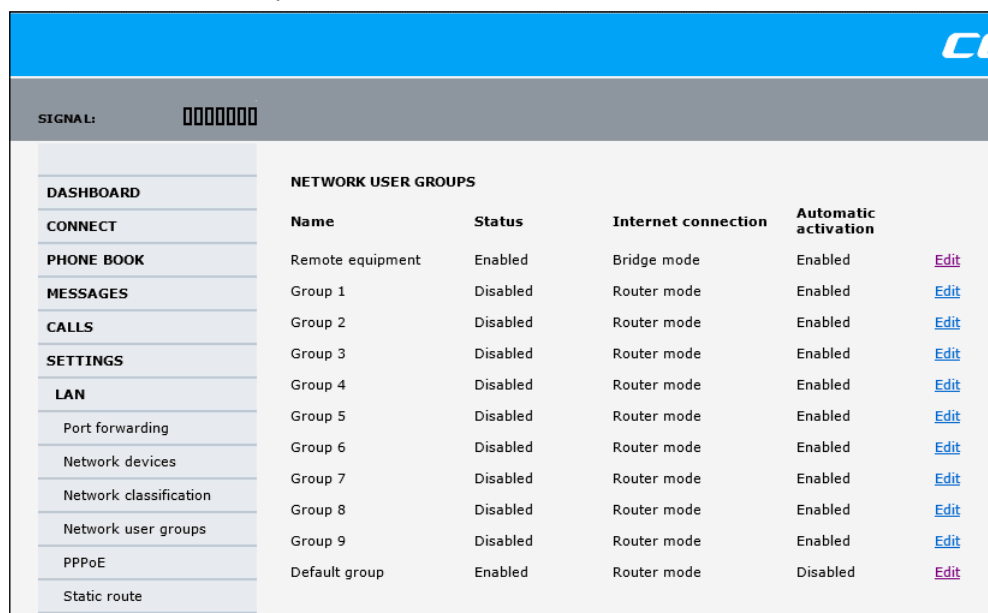
**Note** For further explanation of the terms used below, see *Definitions for network terms* on page 6-65.

To edit a network user group, do as follows:

1. Select **SETTINGS > LAN > Network user groups**.

If prompted, enter the administrator user name and password. The default user name is **admin** and the default password is **1234**.

The following screen shows the 11 user groups available and their current status, Internet connection type, and whether automatic activation is enabled or disabled.



NETWORK USER GROUPS				
Name	Status	Internet connection	Automatic activation	
Remote equipment	Enabled	Bridge mode	Enabled	<a href="#">Edit</a>
Group 1	Disabled	Router mode	Enabled	<a href="#">Edit</a>
Group 2	Disabled	Router mode	Enabled	<a href="#">Edit</a>
Group 3	Disabled	Router mode	Enabled	<a href="#">Edit</a>
Group 4	Disabled	Router mode	Enabled	<a href="#">Edit</a>
Group 5	Disabled	Router mode	Enabled	<a href="#">Edit</a>
Group 6	Disabled	Router mode	Enabled	<a href="#">Edit</a>
Group 7	Disabled	Router mode	Enabled	<a href="#">Edit</a>
Group 8	Disabled	Router mode	Enabled	<a href="#">Edit</a>
Group 9	Disabled	Router mode	Enabled	<a href="#">Edit</a>
Default group	Enabled	Router mode	Disabled	<a href="#">Edit</a>

Figure 6-43: Web interface: Settings, LAN, Network user groups

2. Click **Edit** next to the network user group you want to set up.

**Note**

Changes to the status and internet connection only take effect after reboot of the SBU. This is also valid if a user wants to change the network user group, then the SBU must be restarted before the user has access to the new network user group.

The screenshot shows the 'NETWORK USER GROUP' configuration page. The left sidebar lists various system settings. The main configuration area includes:

- NAME:** Remote equipment
- STATUS:**  Enabled  Disabled
- INTERNET CONNECTION:** Bridge mode (dropdown menu)
- WARNING:** Changes to Status and Internet connection only take effect after reboot
- TCP/IP:**  Dynamic IP address,  Static IP address (with input fields for IP address)
- IP HEADER COMPRESSION:**  Enabled  Disabled
- APN:**  SIM default,  Network assigned,  User defined (with input field: bgan.inmarsat.com)
- USER NAME:** (input field)
- PASSWORD:** (input field)
- PROFILES:**  Automatic activation,  Disabled
- PRIMARY:** Standard (dropdown menu)

Figure 6-44: Web interface: Settings, LAN, Network user groups, Edit

3. Type in a name for the group.
4. Select **Enabled** or **Disabled**.
5. Select the type of **Internet connection**.
  - **Router mode** means the connection will be shared with other users, and the NAT module of the SBU will make the necessary address translations. Read more about NAT in *NAT (Network Address Translation)* on page 6-66. Use this mode if one or more computers are connected using the LAN interface, and the SBU should act as a router.
  - **Bridge mode** is an exclusive connection, it is not shared with other users and NAT is disabled. Use the Bridge mode together with a network classification entry that selects a single computer (see *The network classification table* on page 6-63). The SBU acts as a bridge for this network user group. This mode is not available in the Default network user group.
  - **No internet access** means no connection to the Internet is allowed. Use this setting e.g. for IP handsets, where an Internet connection is not required. The external voice connection is still available; this setting only affects communication over the Internet.



6. Select **Dynamic IP address**.

This is the IP address used externally on the satellite network.

If you want to use a **static IP address**, and your subscription allows it, you must still leave this setting at **Dynamic**. Then select **SIM default** in step 8 and type in the APN user name and password from your provider in step 9.

Your SBU will then use the static IP address set up for your SIM card.

**Note** | Typing in a static IP address is currently not supported by the SwiftBroadband network.

7. Set **IP Header compression** to **Enabled** or **Disabled**.

For information on IP Header compression, see *Header compression* on page 6-65.

8. Select the source of the **APN** (Access Point Name).

You have the following options:

- **Common.** The APN is taken from the Common APN defined under SETTINGS > Common. Refer to *Set the common interface settings* on page 6-27.
- **SIM default.** The APN is taken from the SIM card. If you want to use a static IP address on the external network, select this option either here or in the Common setting.
- **Network assigned.** The APN is assigned from the network.
- **User defined. This is the preferred option.** Type in the APN. APNs are provided from the Airtime Provider. Use this option if there is no automatic provisioning for a static IP address from the service provider.

9. If your APN uses a password, type in the user name and password provided from the Airtime Provider.

**Note** | If you are going to use the static IP address from your SIM card, the user name and password are mandatory! See the documentation for the airtime subscription from the service provider. See step 6 above.

10. At **Automatic activation** select whether the profile selected in the next step should be activated automatically or manually.

**Note** | If the selected primary profile is a Streaming profile, this setting has no effect. Streaming profiles must always be activated manually from the Dashboard.

- **Disabled** means you can activate/deactivate the profile from the Dashboard.
- **Enabled** means the profile is activated automatically.

11. Select the **Primary profile**.

Select a profile from the **Primary** scroll list. This profile is used by this network user group as a first choice, when possible.

There are several predefined profiles: Standard, Streaming 8, Streaming 16, Streaming 32, Streaming 64 and Streaming 128. Additionally, you can define your own custom profiles or any newer ones, Inmarsat defines.

**Important** | If you have selected and started a Streaming connection as your primary profile, the LAN interface will be running a Streaming connection until you stop it or disconnect the interface.

For further information on profiles and traffic flow filters, see *To use profiles* on page 6-78 and *To use traffic flow filters* on page 6-82.

12. Select the **Secondary profile**.

To select more than one secondary profile, press and hold **Ctrl** or **Shift** while selecting.

**Note** | If you have selected both a primary and one or more secondary profiles you must define a traffic flow filter before you can establish a valid connection.

The Context Identifiers (CIDs) for the selected primary and secondary profiles are listed under **Profile CIDs**.

13. Click **Apply**.

Note that changes to the status and the Internet connection type of a network user group first take effect after rebooting the AVIATOR 200/300/350 SBU.

### 6.6.3 Manage network devices

#### Overview

A network device, in this context, is an Ethernet hardware device, identified by its unique MAC address.

When a network device with dynamic IP address is connected to the SBU, it is automatically listed in the Network devices list.

#### View the list of network devices

To view the list of network devices, select **SETTINGS > LAN > Network devices**. All network devices that have been connected to the SBU are listed here.

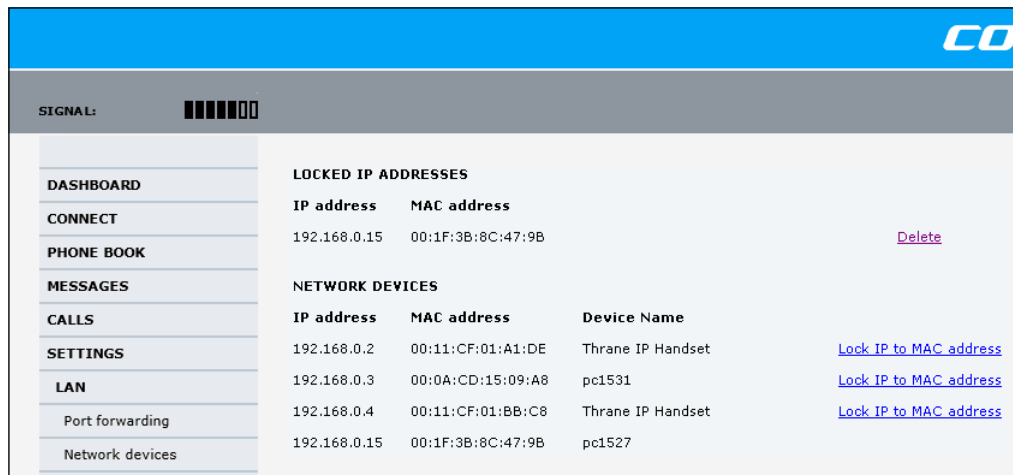


Figure 6-45: Web interface: Settings, LAN, Network devices

## Lock an IP address to a MAC address

When the device is locked to an IP address, the SBU will always assign this IP address to the device with this MAC address (if DHCP is enabled and the Internet connection is in Router mode, and not a Bridge mode connection).

To lock an IP address to a MAC address, do as follows:

1. If prompted, log in as an administrator. The default user name and password are **admin** and **1234**.
2. To lock a device to its current IP address, click the link next to the device. The device is then locked to the current IP address and added to the list of locked IP addresses at the top of the page.
3. To unlock a device from the IP address, click **Delete** next to the device in the **LOCKED IP ADDRESSES** list.

## 6.6.4 The network classification table

### Overview

The network classification table is used to define which network devices, IP addresses and/or LAN ports are associated with which network user groups.

Each entry in the table shows MAC address, IP address, LAN port and network user group.

When a network device is connected, the SBU runs through the network classification table to check if the new connection matches MAC address, IP address and LAN port in any of the entries in the table. When a match is found, the SBU establishes a PDP context with the settings of the network user group assigned in the matching entry. The device is now ready for use with the SBU.

### Add or edit an entry in the network classification table

The network classification table shows which devices are associated with which LAN ports and network user groups. An Asterisk (\*) is a “wild card”, meaning that any value is accepted.

You can add, edit and delete entries in the network classification table.

To add a new entry to the table or to edit an existing entry, do as follows:

1. If prompted, log in as an administrator. The default user name and password are **admin** and **1234**.

2. Select **SETTINGS > LAN > Network classification**.

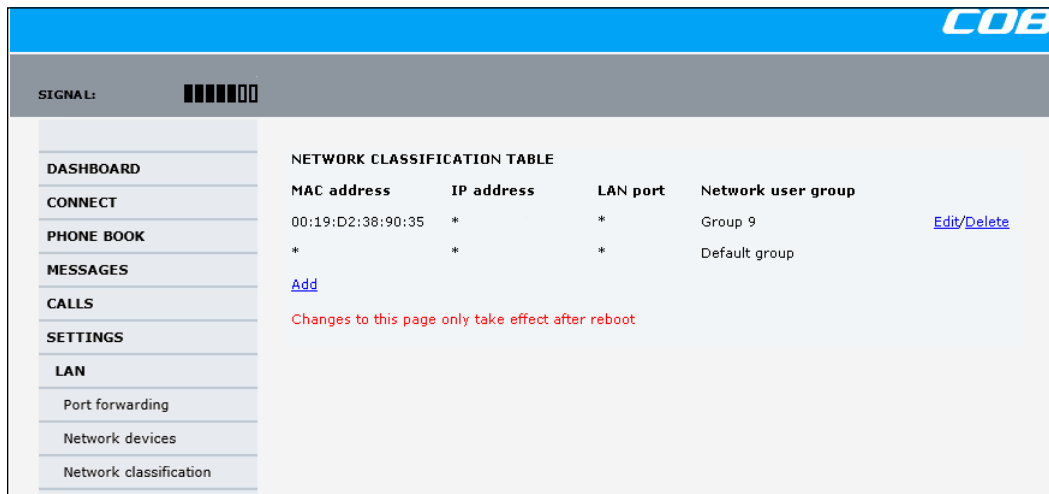


Figure 6-46: Web interface: Settings, LAN, Network classification table

3. Click **Edit** next to the entry you want to edit, or click **Add** at the bottom of the list.

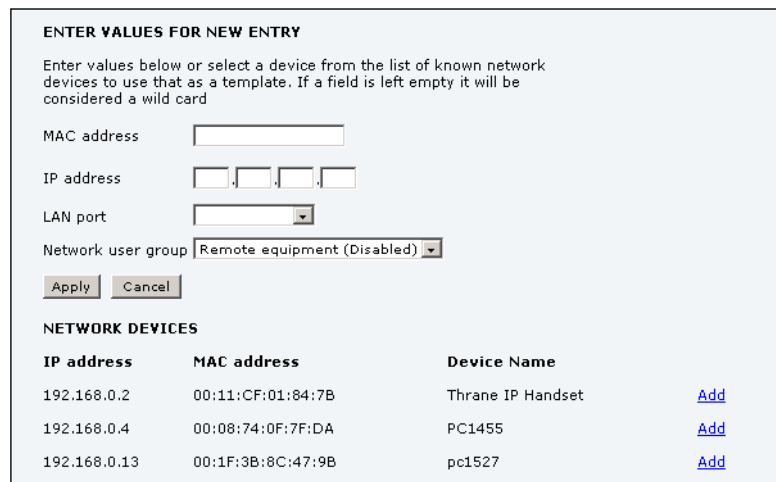


Figure 6-47: Web interface: Settings, LAN, Network classification table, Edit or Add

4. Click **Add** next to a network device you want to use, or type in the MAC address manually at the top of the page.

**Note** If you leave a field empty, it is the same as a “wild card” and it will be shown as an Asterisk in the Network classification table. Unless you are using a Static IP address, the IP address field should always be left empty.

5. Select the **LAN port** and **Network user group** you want to associate with the device. Network user groups are created and defined in the Network user group page. See *Set up the network user groups* on page 6-59.
6. Click **Apply**.

## Change the priority in the network classification table

Connections are evaluated in the order they are listed. The first entry (and **only** the first entry) that matches the properties of the connected device is applied, meaning that the connection will be using the settings of the network user group assigned to that entry.

To change the priority of an entry, click the up or down arrow next to the entry.

NETWORK CLASSIFICATION TABLE				
MAC address	IP address	LAN port	Network user group	
00:1F:3B:8C:47:9B	192.168.0.22	WLAN	Passenger	▼ <a href="#">Edit/Delete</a>
*	*	Maintenance	Service	▲/▼ <a href="#">Edit/Delete</a>
*	*	3	Streaming 64	▲ <a href="#">Edit/Delete</a>
*	*	*	Default group	

[Add](#)

Changes to this page only take effect after reboot

Figure 6-48: Web interface: Settings, LAN, Network classification table, change priority

The Default network user group is always last, so it is only used if none of the other entries match the properties of the connected device.

## Remove an entry in the network classification table

In the **network classification table**, click **Delete** next to the entry you want to delete.

## 6.6.5 Definitions for network terms

### Header compression

The header of a data packet contains control information belonging to that specific packet. The information in the header can take up a considerable amount of bandwidth. In order to use the bandwidth more efficiently, you can enable Header Compression, meaning the header information is compressed, leaving some of the information out. With disabled header compression the full header is transmitted with each data packet. This takes up bandwidth and means a more reliable data transmission with less data loss.

You can select whether or not to use Header Compression for your data transmission.

- **Header Compression enabled:** More efficient use of the bandwidth available, recommended typically for Internet, e-mail, ftp applications etc.
- **Header Compression disabled:** More reliable data transmission. Recommended for time-critical applications like VoIP and streaming applications, as well as other applications where packet loss is to be minimized.

If there are problems with packet loss you might want to disable header compression and see whether the header compression is the reason for the packet loss.

## 6.6.6 NAT (Network Address Translation)

NAT enables a local-area network to use one set of private IP addresses for internal traffic and an assigned or static IP address for external traffic. The built-in NAT module in the SBU makes all necessary address translations between the local-area traffic and the external traffic.

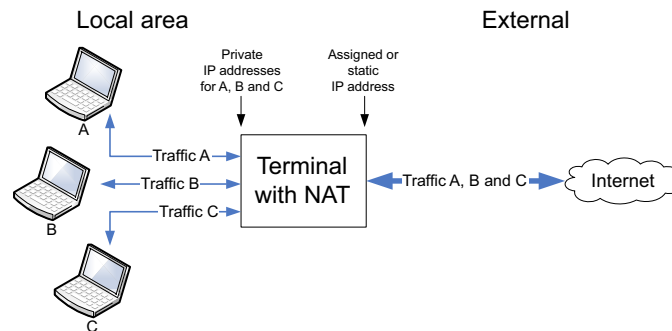


Figure 6-49: NAT (Network Address Translation)

If more than one user is connected, you must select a network user group with **Router mode** to use the NAT functionality of the SBU.

## 6.6.7 Start and stop any data session

The administrator can start and stop data sessions for all network user groups connected to the SBU.

To start or stop a data session, do as follows:

1. Select **CONNECT**.  
If prompted, enter the administrator user name and password. The default user name is **admin** and the default password is **1234**.  
Under **ONGOING DATA SESSIONS** at the top you can see which data sessions are currently active.

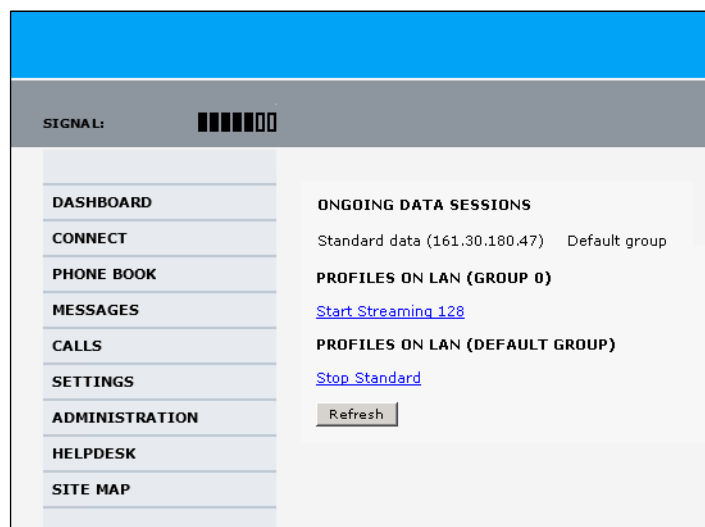


Figure 6-50: Web interface: Connect, to start and stop data sessions (example)

In the example above you can manually start the **Streaming 128** connection of GROUP 0 and stop the **Standard** connection of the DEFAULT GROUP.

2. Click on the session you want to start or stop.
3. Click **Refresh** to update the current state of the connection(s). Note that there might be some latency when updating the connection status, you might have to wait and click **Refresh** again to update the Dashboard to the current state.

**Note** The PDP context for the data session is not activated before any unit in the LAN tries to communicate, e.g. sends a DHCP request.

## 6.6.8 Establish a PPPoE connection

### Overview

You can establish a Point-to-Point-over-Ethernet (PPPoE) connection to the BGAN network using the AVIATOR 200/300/350 system. Use this connection type if you want to control start and stop of the connection independently from the built-in web interface of the SBU.

Possible applications for this type of connection are as follows:

- Connecting a router
- Connecting broadcast equipment, optionally through a PC
- Establishing a Pico cell for the use of cell phones

**Note** Without the built-in Router option the AVIATOR 200/300/350 system is limited to one PPPoE connection.

The following drawing shows how the PPPoE connection and the built-in web interface handle connections to the SwiftBroadband network.

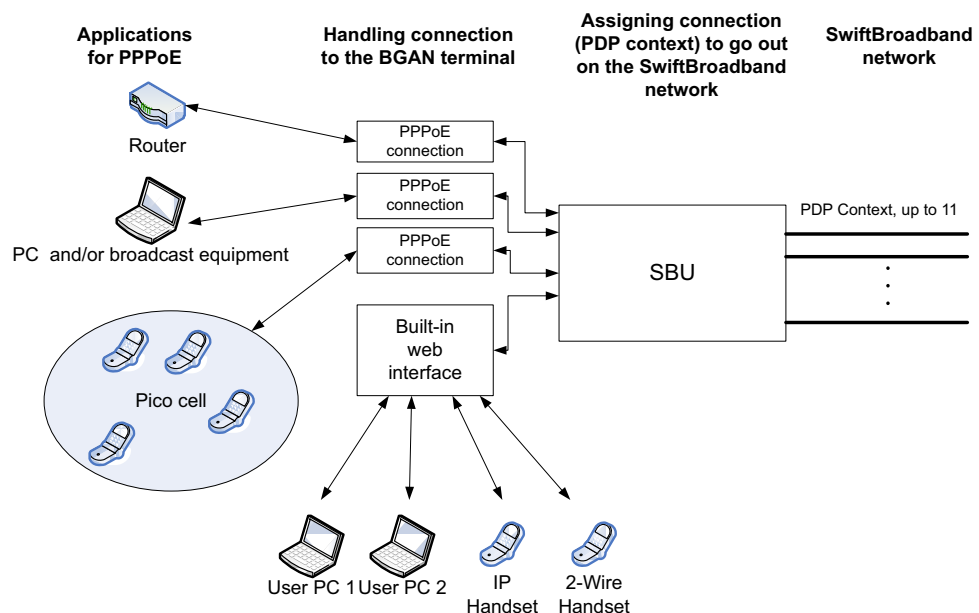


Figure 6-51: Example for PPPoE connections

## Enable PPPoE network connections in the AVIATOR 200/300/350 system

During the configuration of the system you can configure whether the system should allow and handle PPPoE network connections.

To enable or disable the system to support PPPoE network connections do as follows:

1. Select **SETTINGS > LAN > PPPoE**

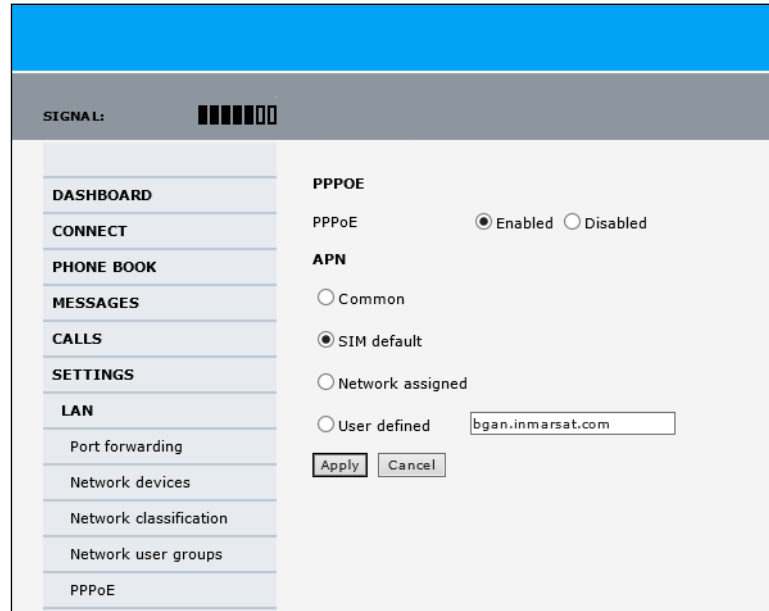


Figure 6-52: Web interface, Settings, LAN, PPPoE

2. Select **Enabled** or **Disabled** (default).
3. Check with your airtime provider what your **APN** is and select accordingly.
4. Click **Apply** to send the settings to the terminal.

## How to configure the connected PC, router or other equipment

You must configure the equipment correctly to establish a network connection using PPPoE. How to set up a new network connection depends on the type of equipment, refer to the user documentation of the equipment.

You need the following parameters:

- **User name and password**  
The user name and password can be left blank. Then the registration on the APN is most commonly done in a way that the data connection will be established with a dynamic IP address from the airtime provider.  
To request a static IP (if subscribed to) from the APN you must type in the user name and password from your airtime subscription.  
Note for **MAC OS**: User name and password are required. Use user name void and password void. This works for some ISPs. Contact your airtime provider for further information.
- For setups that have a check box for **Enable LCP extensions**, deselect this.



- **Service name:** For certain services, i.e. a streaming class, you must type in a specified text string when asked for a service name. The following table shows the service names and descriptions that are supported by the terminal.

Service name	Description
Blank	default, primary standard IP data connection
XBB <sup>a</sup> :BACKGROUND	default, primary standard IP data connection
XBB:STREAM8K	primary streaming IP data connection 8 kbps
XBB:STREAM16K	primary streaming IP data connection 16 kbps
XBB:STREAM32K	primary streaming IP data connection 32 kbps
XBB:STREAM64K	primary streaming IP data connection 64 kbps
XBB:STREAM128K	primary streaming IP data connection 128 kbps
XBB:X-STREAM	primary streaming IP data connection up to 512 kbps.

Table 6-8: PPPoE connection, service names and descriptions

- For SwiftBroadband the part of the service name "XBB" can be replaced by "SBB".

### PPPoE setup with a non-default APN

You can set up a network connection using PPPoE for another APN than the default APN. Check the documentation from the Service provider for the new APN name. Enter the following commands in the field **Service name** when setting up the network connection:

Service name for custom APN	Description
XBB <sup>a</sup> :AT+CGDCONT=1,ip,"<APN name>"; +CGEQREQ=1,3	Standard IP data connection
XBB:AT+CGDCONT=1,ip,"<APN name>"; +CGEQREQ=1,1,8,8,8,8,2,0,"0E0","0E0",3,0,0	Streaming IP data connection 8 kbps
XBB:AT+CGDCONT=1,ip,"<APN name>"; +CGEQREQ=1,1,16,16,16,16,2,0,"0E0","0E0",3,0,0	Streaming IP data connection 16 kbps
XBB:AT+CGDCONT=1,ip,"<APN name>"; +CGEQREQ=1,1,32,32,32,32,2,0,"0E0","0E0",3,0,0	Streaming IP data connection 32 kbps
XBB:AT+CGDCONT=1,ip,"<APN name>"; +CGEQREQ=1,1,64,64,64,64,2,0,"0E0","0E0",3,0,0	Streaming IP data connection 64 kbps
XBB:AT+CGDCONT=1,ip,"<APN name>"; +CGEQREQ=1,1,128,128,128,128,2,0,"0E0","0E0",3,0,0	streaming IP data connection 128 kbps
XBB:AT+CGDCONT=1,ip,"<APN name>"; +CGEQREQ=1,1,512,512,512,512,2,0,"0E0","0E0",3,0,0	streaming IP data connection X-Stream

Table 6-9: PPPoE connection, service names and descriptions for custom APN

- For SwiftBroadband the part of the service name "XBB" can be replaced by "SBB".

**Example:** To set up a standard background data connection using the APN “bgan.inmarsat.com” enter:  
**XBB:AT+CGDCONT=1,ip,”bgan.inmarsat.com”;+CGEQREQ=1,3**

For more information about the command syntax see the standard 3GPP TS 27.007.

### 6.6.9 To set up static routing

When you have an external gateway connected to your SBU, the SBU is not automatically able to “see” the network on the other side of the gateway. However, you can set up your SBU to communicate with a device on the other side of a gateway, by using Static routing.

To set up a new device for static routing, do as follows:

1. Select **SETTINGS > LAN > Static route**.



Figure 6-53: Web interface, Settings, LAN, Static route

2. Click **Add**.

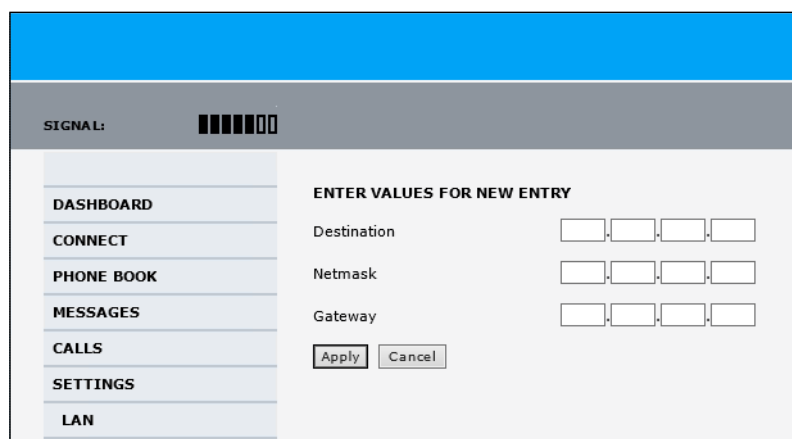


Figure 6-54: Web interface, Settings, LAN, Static route, add

3. Enter the values for your device.
  - Destination: The IP address you want to route to.
  - Netmask: The netmask you want to route to.
  - Gateway: The gateway, e.g. the address of a wireless access point or router to which the destination device is connected.

4. Click **Apply**.  
The values for the new entry are now in the list. This means that the SBU can communicate with the destination IP address on the other side of the gateway.

### 6.6.10 SNMP interface

You can connect equipment to perform SNMP queries on the SBU in order to retrieve configuration and present settings.

Contact [AVIATOR.support@cobham.com](mailto:AVIATOR.support@cobham.com) to obtain the MIB files.

## 6.7 Administration

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

- *Access the administration settings*
- *Save and load a configuration*
- *Call charges*
- *Log handling*
- *Data limits*
- *To use profiles*
- *To use traffic flow filters*
- *SIM card access protection: SIM PIN and SIM Lock*
- *Set up user permissions*
- *Remote management*
- *Remote activation of a connection using SMS*
- *Link monitoring (SwiftBroadband only)*
- *Restricted dialing*
- *Multi-voice (option)*

### 6.7.1 Protect the SBU against unintended configuration changes

You can protect the SBU against unintended changes of the setup:

1. Change the administrator password from user name: admin and password: 1234 to a user name and password of your choice. For further details see *Change the administrator password* on page 6-72.
2. You can deny non-administrator users access to certain functions and make the respective pages in the web interface read-only. For further details see *Set up user permissions* on page 6-87.

## 6.7.2 Access the administration settings

### Log on as administrator

The Administration settings require an Administration user name and password. You must also login as an administrator in the sections for **SETTINGS**, **LAN**, **Network Devices**, **Network classification**, **Network user groups** and **PPPoE**.

To log on as administrator, do as follows:

1. Select **ADMINISTRATION** from the left navigation pane.
2. Enter the Administration user name and password.  
The default user name is **admin** and the default password is **1234**.

Figure 6-55: Web interface: Administration

If you have forgotten the administrator password, you can reset the password by clicking the link at the bottom of the page.<sup>1</sup> For further information, see the next section *Reset the administrator password*.

3. Click **Logon**.  
The Administration page is now updated to let you change the user name and password, Save/load a configuration or log off Administration.

### Change the administrator password

If you have a Level D system with the Built-in CMU/ACARS option and the ACARS service is enabled, the admin password must fulfill the following requirements:

- have at least 8 characters
- must contain letters, figures and special characters (<>;,:-\_\*-+!.#Â¤%&()=?@Â£\$([]|)

The default password 1234 is allowed, but it will trigger a warning that is displayed after each reboot of the system.

1. The link is only shown when the PC is connected to the Maintenance connector on the SBU front plate.

To change the administrator password, do as follows:

1. After entering the administrator user name and password in the **ADMINISTRATION** page, locate the section **Change administrator logon**.

Figure 6-56: Web interface: Administration, change administrator logon

2. Type in the existing user name.
3. Type in the new password and retype it on the next line.
4. Click **Change**. At the next logon the new password is required.

## Reset the administrator password

### Important

To reset the administrator password you must connect the PC to the Maintenance connector on the SBU front plate. If not, the link **Forgot administrator password?** on the ADMINISTRATOR LOGON page will not be visible.

If you have forgotten and need to reset the administrator password, do as follows:

1. Contact your supplier for a reset code.  
Report the serial number and IMEI number of the terminal.  
You find the serial number and IMEI number in the **Dashboard**.

2. Click the link **Forgot administrator password?** at the bottom of the **ADMINISTRATOR LOGON** page (see the previous section).

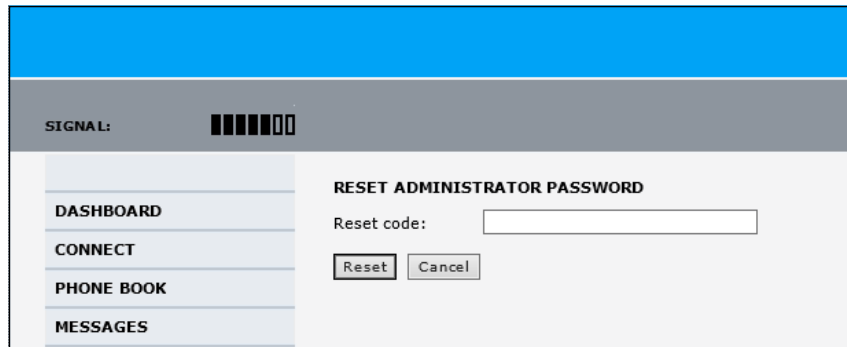


Figure 6-57: Web interface: Administration, Reset administrator password

3. Type in the reset code obtained from your supplier and click **Reset**.
4. Type in the user name **Admin** and the default password **1234**.
5. Click **Logon**.  
For information on how to change the password, see the next section *Change the administrator password*.

### Log off administration

If you have not entered anything for 30 minutes under ADMINISTRATION, you are logged off automatically. To log off manually, click **Logoff** under administrator logoff in the **ADMINISTRATION** page.

### 6.7.3 Save and load a configuration

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

**Note** Configuration files can only be exchanged between SBUs with the same software version!

#### Save a configuration to a file

The settings from the following pages of the web interface are saved in the configuration file:

- SETTINGS
- ADMINISTRATION
- PHONE BOOK

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

1. In the **ADMINISTRATION** page, under **Configuration**, click **Save**.

The screenshot shows the Administration page of a web interface. On the left is a navigation menu with items: DASHBOARD, CONNECT, PHONE BOOK, MESSAGES, CALLS, SETTINGS, ADMINISTRATION (highlighted), Call charges, Log handling, Data limits, Profiles, and Traffic flow filters. The main content area has a blue header bar at the top. Below it, there's a 'SIGNAL:' indicator with five bars. A red warning message says 'Please remember to log off after use'. Under 'Change administrator logon', there are input fields for 'User name', 'New password', and 'Retype new password', along with a 'Change' button. The 'Configuration' section contains a 'Save configuration to file' button, and two 'Load configuration from file' options: one for 'user data only' and one for 'include install data', each with a 'Browse...' button and a 'Load' button. At the bottom, there's an 'Administrator logoff' section with a 'Logoff' button.

Figure 6-58: Web interface: Administration, saving a configuration file

2. Accept the default destination file name or type in the destination file name and location.
3. Click **OK**. The configuration is now saved to a file. This file is used to load the configuration into another SBU.

## Load a configuration from a file

In this example the PC is connected to the SBU front maintenance connector. To load a configuration from a file, do as follows:

- In the **ADMINISTRATION** page, under **Configuration**, select the upload type:
  - Load configuration from file (include install data)**, available when connected to the SBU front maintenance connector.  
The install data are the pages **Discrete I/O**, **RF settings** and **External systems**.

**Note**

This feature can only be used with systems of the same system type, for example one AVIATOR 200 SBU to another AVIATOR 200 SBU. To use this upload type the PC must be connected to the SBU front maintenance connector.

- Load configuration from file (user data only)**. This upload type is available on any other LAN/WLAN interface of the SBU.

The screenshot shows the Administration web interface. On the left is a navigation menu with items: DASHBOARD, CONNECT, PHONE BOOK, MESSAGES, CALLS, SETTINGS, ADMINISTRATION (highlighted), Call charges, Log handling, Data limits, Profiles, and Traffic flow filters. The main content area has a blue header with 'SIGNAL:' and a signal strength indicator. Below this is a red warning: 'Please remember to log off after use'. The 'Change administrator logon' section contains three input fields for 'User name', 'New password', and 'Retype new password', with a 'Change' button. The 'Configuration' section has a 'Save configuration to file' button and two 'Load configuration from file' options: one for '(user data only)' and one for '(include install data)'. Each 'Load' option has a 'Browse...' button and a 'Load' button. The 'Administrator logoff' section has a 'Logoff' button.

Figure 6-59: Web interface: Administration, saving a configuration file

- Click **Browse...** to browse to the file you want to import. Then click **Open**.
- Click **Load**.

The new configuration is now loaded into your SBU.

**Note**

Configuration files can only be exchanged between SBUs with the same software version!

- Restart the SBU to activate the new configuration.



## 6.7.4 Call charges

In this section you can enter the call charges so you at all times can see the current charges for the services used. Consult the documentation from your service provider for the subscribed services, then enter these tariffs in the web interface. The system automatically calculates the charges for your calls and data sessions. The entered tariffs are used for estimating the charges for calls and data sessions. The estimated charge is listed for each call or data session in the call log. For further information, see the AVIATOR 200/300/350 user manual.

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

To enter the call tariffs, do as follows:

1. From the left navigation pane, select **ADMINISTRATION > Call Charges**.

SIGNAL: ■■■■■■

The billing details from your Inmarsat Service Provider can be entered below.

<b>DASHBOARD</b>	Currency:	\$	(for display purposes only)
<b>CONNECT</b>	Standard voice: EUR	0.00	per minute
<b>PHONE BOOK</b>	3.1 kHz Audio: EUR	0.00	per minute
<b>MESSAGES</b>	Standard data: EUR	0.00	per MegaByte (1000 kB)
<b>CALLS</b>	Streaming 8: EUR	0.00	per minute
<b>SETTINGS</b>	Streaming 16: EUR	0.00	per minute
<b>ADMINISTRATION</b>	Streaming 32: EUR	0.00	per minute
<b>Call charges</b>	Streaming 64: EUR	0.00	per minute
<b>Log handling</b>	Streaming 128: EUR	0.00	per minute
<b>Data limits</b>	BGAN X-Stream: EUR	0.00	per minute
<b>Profiles</b>			
<b>Traffic flow filters</b>			
<b>SIM PIN</b>			
<b>SIM Lock</b>			
<b>User permissions</b>			
<b>Remote management</b>			
<b>Link monitoring</b>			
<b>Remote activation</b>			
<b>Restricted dialing</b>			
<b>Multi-voice</b>			
<b>HELPDESK</b>			

Apply Cancel

Disclaimer: Please note that the estimates made on this basis are only indicative and Thrane & Thrane cannot be held liable for any differences between these and your actual bill. If you change the currency or the rates, these changes will also be applied to historical figures, so you may want to save the call log to a separate file to keep track of historical data.

Figure 6-60: Web interface: Administration, Call Charges

2. Select the currency from the **Currency** drop-down list.
3. Enter the tariff for each of the services.
4. Click **Apply**.

## 6.7.5 Log handling

To clear the logs of the SBU and/or reset the counters for the time connected, do as follows:

1. From the left navigation pane in the **ADMINISTRATION** page, select **Log Handling**.

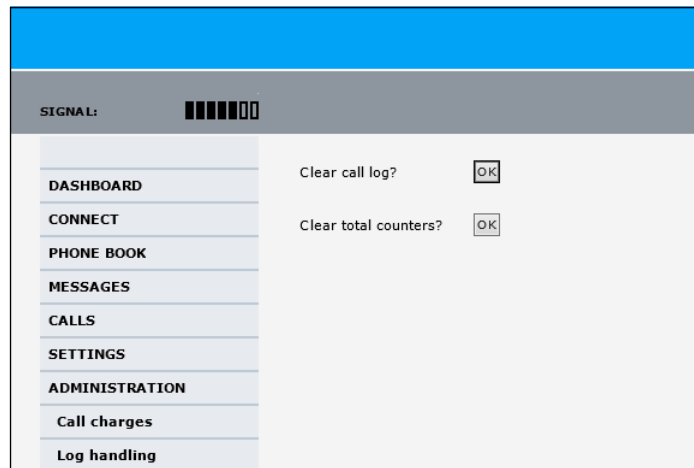


Figure 6-6 1: Web interface: Administration, Log Handling

2. To clear the Call log, click **OK** next to **Clear call log?**
3. To clear the total counters, click **OK** next to **Clear total counters?**  
This will reset the **Time connected** counters on the Calls page.

## 6.7.6 Data limits

You can set a limit for the use of data services that can be downloaded over the AVIATOR 200/300/350 system. You either specify a maximum number of MB for the standard data connection, and/or a time interval from start to end for a streaming connection.

For a detailed description how to access the SBU from a remote location see the AVIATOR 200/300/350 user manual.

## 6.7.7 To use profiles

The profiles are used in the network user groups. You select one or several profiles when setting up a network user group. You need an administrator password to define profiles and traffic flow filters.

Together with traffic flow filters the profiles are used as a tool to manage the traffic flow.

**Note** If you have selected more than one profile (one primary and one or more secondary profiles) for an interface, you must define traffic flow filter(s) before you can establish a valid connection.

## What is a profile?

A profile is a collection of Quality of Service (QoS) settings and other settings defining the mode in which data is transmitted on an interface. For example, a profile is used to define whether the connection is a Streaming connection or a Standard connection.

You can select between a number of predefined profiles or define your own profiles for your data transmission. For further information on profiles, refer to the 3GPP standard TS 23.107 “Quality of Service (QoS) concept and architecture”.

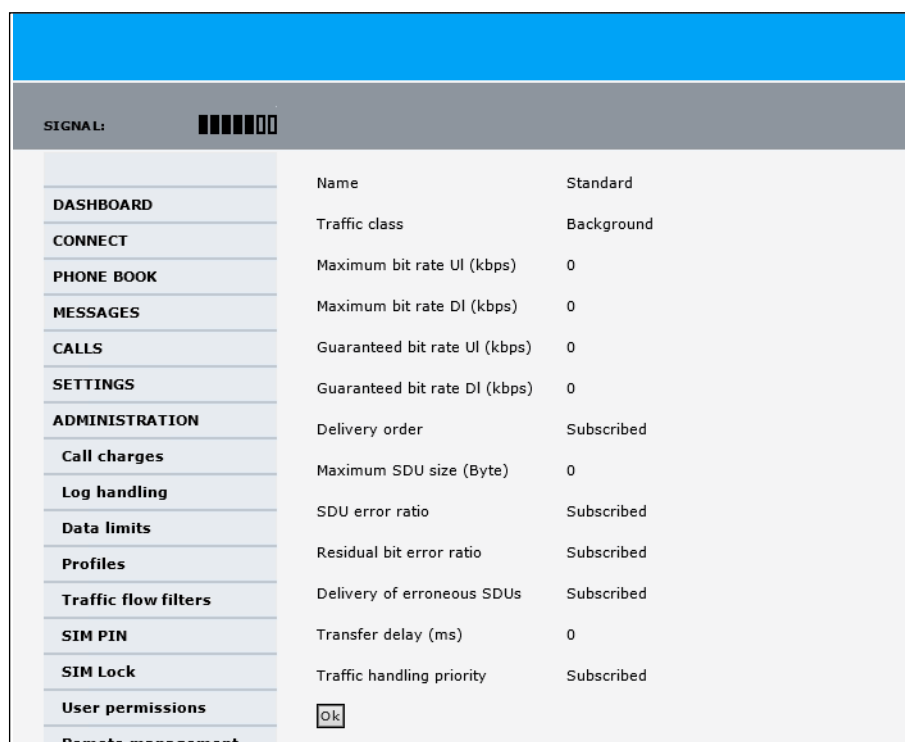
**Note** If no traffic flow filters are defined, the Primary profile for a network user group is used for all traffic from that network user group. Then the secondary profile will not become active.

To learn more about traffic flow filters see *What are traffic flow filters?* in the next section.

## Select the profiles for a network user group

When you set up a network user group, you typically select one of the predefined profiles to use as a Primary profile for that network user group. You select optionally one or more Secondary profiles.

For further information on how to select the profiles, see *LAN/WLAN network users* on page 6-57.



	Name	Standard
<b>DASHBOARD</b>	Traffic class	Background
<b>CONNECT</b>	Maximum bit rate UI (kbps)	0
<b>PHONE BOOK</b>	Maximum bit rate DI (kbps)	0
<b>MESSAGES</b>	Guaranteed bit rate UI (kbps)	0
<b>CALLS</b>	Guaranteed bit rate DI (kbps)	0
<b>SETTINGS</b>	Delivery order	Subscribed
<b>ADMINISTRATION</b>	Maximum SDU size (Byte)	0
<b>Call charges</b>	SDU error ratio	Subscribed
<b>Log handling</b>	Residual bit error ratio	Subscribed
<b>Data limits</b>	Delivery of erroneous SDUs	Subscribed
<b>Profiles</b>	Transfer delay (ms)	0
<b>Traffic flow filters</b>	Traffic handling priority	Subscribed
<b>SIM PIN</b>		
<b>SIM Lock</b>		
<b>User permissions</b>		
<b>Remote management</b>		

Figure 6-62: Web interface, Administration, Profiles, Example: Standard

You typically do not need to define new profiles, the predefined profiles cover the most common applications. You can customize a user profile and set up several user-defined profiles.

## Define new profiles

When you define your profiles you can select **Subscribed** for many of the settings. If you select Subscribed, the value given in your Airtime subscription is automatically used.

**Note** For AVIATOR 200/300/350, the maximum Streaming bit rate is 128 kbps. AVIATOR 350 with an HGA can also handle the X-Stream service (up to approximately 450 kbps).

To define a new profile, do as follows:

1. From the left navigation pane, select **ADMINISTRATION > Profiles**.

SIGNAL: [Signal Strength]		
DASHBOARD	Standard	<a href="#">View details</a>
CONNECT	Streaming 8	<a href="#">View details</a>
PHONE BOOK	Streaming 16	<a href="#">View details</a>
MESSAGES	Streaming 32	<a href="#">View details</a>
CALLS	Streaming 64	<a href="#">View details</a>
SETTINGS	Streaming 128	<a href="#">View details</a>
<b>ADMINISTRATION</b>	BGAN X-Stream	<a href="#">View details</a>
Call charges	User defined 1	<a href="#">Edit</a>
Log handling	User defined 2	<a href="#">Edit</a>
Data limits	User defined 3	<a href="#">Edit</a>
<b>Profiles</b>		
Traffic flow filters		

Figure 6-63: Web interface. Administration, Profiles, select profile (Example AVIATOR 350)

2. Click **Edit** for the profile you want to define.
3. Fill in the top field with the name for your profile.
4. In the **Traffic class** row of your new profile, select a class from the drop-down list.

**Important** For best performance, choose the right traffic class for your application. In general, Standard IP (Background) is best suited for TCP/IP applications, e.g. web browsing, e-mail, file transfer, VPN. Streaming IP is best suited for UDP traffic, e.g. live video or audio.

You may select one of the following:

- **Conversational** is real-time two-way conversation. It is primarily used for voice over IP and video conferences.
- **Streaming** is real-time one-way communication. It is primarily used for video and audio.
- **Interactive** is two-way communication (not real-time). It is used for communication that is not very delay-sensitive, such as web browsing, data base retrieval and server access. Examples of machines interaction with remote equipment are: polling for measurement records and automatic data base enquiries (tele-machines).

- **Background** is used for data which is not delay-sensitive, such as E-mail, SMS, download of databases and reception of measurement records.
5. Type in the bit rates in kbps in the following rows:
    - **Maximum bit rate UI (kbps)** is the maximum upload bit rate allowed for this profile.
    - **Maximum bit rate DI (kbps)** is the maximum download bit rate allowed for this profile.
    - **Guaranteed bit rate UI (kbps)** is the guaranteed upload bit rate needed for this profile.
    - **Guaranteed bit rate DI (kbps)** is the guaranteed download bit rate needed for this profile.



When you click Apply, the bit rate values you typed in may be rounded off because only certain values are allowed.

6. In the **Delivery order** row, select from the scroll list whether or not data should be delivered in the same order it was sent.
  - **Yes** means the data packets are delivered in the same order they were sent.
7. In the **Maximum SDU size (byte)** row, type in the maximum allowed packet size in Bytes (rounded off to nearest 10). The maximum packet size possible is 1520.
8. In the **Delivery of erroneous SDUs** row, select one of the following from the list:
  - **Yes** means packets are allowed to contain errors. This setting is suitable for delay-sensitive transmission, because the need for retransmission is limited. The SDU Error settings in step 9 and step 10 will apply.
  - **No** means packets are not allowed to contain errors, and the SDU Error setting in step 9 will **not** be applied. This setting is suitable where error-free transmission is important and delays are accepted.
  - **No detect** means that errors will not be detected, and the SDU Error setting in step 9 will **not** be applied.
9. If you selected **Yes** in step 8, select from the **SDU error ratio** drop-down list the fraction of a packet allowed to be lost or erroneous.
10. Select from the **Residual bit error ratio** drop-down list the undetected bit error ratio of a packet. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered packets.
11. In the **Transfer delay (ms)** row, type in the delay in ms. This is the delay from the time data is received in the SBU until it arrives at the receiving end.
  - If the Transfer delay is 500 ms, error correction is disabled.
  - If the Transfer delay is 4000 ms, error correction is applied.
12. In the **Traffic handling priority** row, select from the drop-down list which priority this connection should have.
13. Click **Apply**.

The new profile is now added, and can be selected from the lists of primary and secondary profiles when you set up your interfaces.

## 6.7.8 To use traffic flow filters

### Purpose of the traffic flow filters

The purpose of the traffic flow filters is to assign different priorities to different types of traffic, in order to optimize performance.

**Example:** When you are browsing the Internet, a Standard IP connection is normally sufficient. However, to have a video conference you may need a Streaming IP connection in order to obtain a direct connection without interruptions. Your traffic flow filters can define these priorities, so that your connection automatically switches to Streaming e.g. when you have a video conference. Note that you have to activate a streaming connection in the web interface.

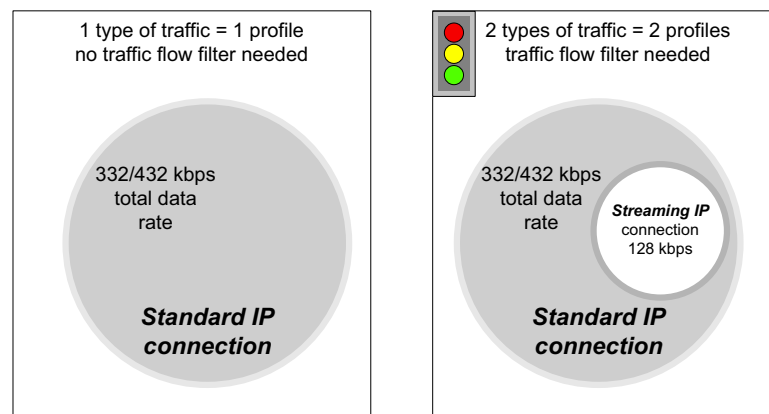


Figure 6-64: Traffic flow filters to filter traffic types

### What are traffic flow filters?

When more than one type of traffic is needed, you must use both a primary and one or more secondary profiles. A traffic flow filter provides preferred treatment of a data packet. The traffic flow filter classifies data packets for the BGAN core network and the SBU received from the external network into the proper profile.

**You can define up to eight traffic flow filters.** Each packet filter has an evaluation precedence index that is unique within all traffic flow filters associated with the profiles that share the same PDP (Packet Data Protocol) address. The evaluation precedence index determines the order in which the filters are applied; 0 is applied first, then 1 and so forth. Information of source, destination, type of service etc. is combined in each packet filter in the list.

## Define traffic flow filters

To define the traffic flow filters, do as follows:

1. From the left navigation pane, select **ADMINISTRATION > Traffic flow filters**. The example below shows one traffic flow filter.

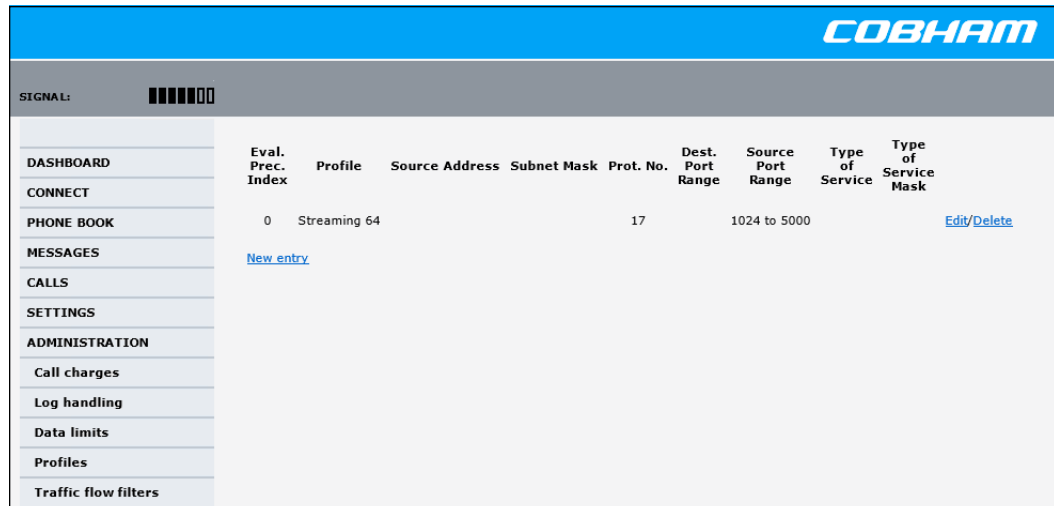


Figure 6-65: Web interface: Administration, Traffic flow filters

2. Click the link **New entry**.

Figure 6-66: Web interface: Administration, Traffic flow filters, New entry

3. Select a number in the **Eval.Prec. Index** drop-down list.  
The evaluation precedence index defines the order in which the traffic flow filters are applied to packets. 0 is first, then 1, 2 etc.
4. Select the **Profile** from the drop-down list.  
The available profiles are the profiles listed under ADMINISTRATION > Profiles. The selected profile is applied to all traffic that matches the conditions entered in step 5.

5. Fill in one or more of the following fields to define the filter.  
The allowed ranges appear in hover text when you pass the mouse over the fields.
  - **Source address + Subnet mask.**  
This is an IPv4 IP address and subnet mask. Only packets received from the specified source are accepted by the filter.
  - **Protocol number.**  
This is uniquely assigned for the protocol being used. For TCP (typically Internet, e-mail, FTP) set this to 6, for UDP (typically streaming) to 17. The protocol number determines which protocol is used by the traffic flow filter.
  - **Destination port range (From and To).** This parameter requires knowledge of ports being used by the selected applications. Note that Source and Destination are relative to the BGAN core network. This means that Destination is your SBU.
  - **Source port range (From and To).** This parameter requires knowledge of ports being used by the selected applications. Note that you must fill in both From and To, even if there is only one port.
  - **Type of Service + Type of Service mask.**  
Set this value to a number between 0 and 255.  
Type of Service (TOS) is an 8-bit field in a packet header, with associated mask, that is used to define Quality of Service.

For further information on the principles and parameters of the traffic flow filters, refer to the 3GPP standards TS27.007 V4.2.0 and TS 23.060 V4.7.0.
6. Click **Apply** at the bottom of the page.

### Example of a list of traffic flow filters

Below is an example of a list with two traffic flow filters.

Eval. Prec. Index	Profile	Source Address	Subnet Mask	Prot. No.	Dest. Port Range	Source Port Range	Type of Service	Type of Service Mask
0	Streaming 64			17		2455 to 5000		<a href="#">Edit</a> <a href="#">Delete</a>
1	Standard			6		524 to 524		<a href="#">Edit</a> <a href="#">Delete</a>
<a href="#">New entry</a>								

Figure 6-67: Web interface: Example of two traffic flow filters

In this example, data packets are filtered in the following order:

1. The filter with evaluation precedence index 0 checks for UDP packets (protocol number 17), in the port range 2455-5000. When these packets are identified, they are assigned a 64 kbps Streaming channel (the Streaming 64 profile).
2. The filter with evaluation precedence index 1 checks remaining packets for TCP packets (protocol number 6), on port 524. These packets are routed to the standard IP connection (the Standard profile).
3. Remaining traffic is routed to the standard IP connection.



## 6.7.9 SIM card access protection: SIM PIN and SIM Lock

**Note** There is typically no SIM PIN needed for the AVIATOR 200/300/350 system. The following functions might apply for special airtime subscriptions that have a SIM PIN.

### SIM PIN

To avoid unauthorized use of the system you can enable the SIM PIN. Then the user has to enter the SIM PIN before being able to use the system. The SIM PIN is disabled per default. You enable the SIM PIN in the web interface. You can also specify a new SIM PIN in the web interface. To do this you have to enter the original SIM PIN and then specify a new one.

To manage the SIM PIN of the terminal do as follows:

1. From the left navigation pane, select **ADMINISTRATION > SIM PIN**.
2. If you want to protect the system with a system SIM PIN select **Enabled**.
3. You can enter a new PIN or change the existing PIN.
4. Click **Apply** to save the changes.



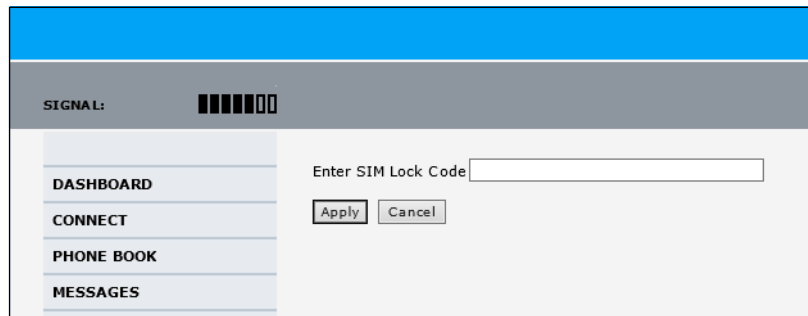
The screenshot shows a web interface for SIM PIN configuration. At the top, there is a blue header bar. Below it, a grey bar displays 'SIGNAL:' followed by a signal strength indicator. The main content area is divided into two columns. The left column is a navigation menu with the following items: DASHBOARD, CONNECT, PHONE BOOK, MESSAGES, CALLS, SETTINGS, ADMINISTRATION (highlighted), Call charges, Log handling, Data limits, Profiles, Traffic flow filters, and SIM PIN. The right column contains the configuration options for the SIM PIN. Under the heading 'REQUIRE PIN', there is a label 'Require PIN on startup' followed by two radio buttons: 'Enabled' (unselected) and 'Disabled' (selected). Below this is a text input field for 'PIN' and two buttons: 'Apply' and 'Cancel'. A horizontal line separates this section from the 'CHANGE PIN' section. Under 'CHANGE PIN', there are three text input fields labeled 'Old PIN', 'New PIN', and 'Confirm new PIN', followed by 'Apply' and 'Cancel' buttons.

Figure 6-68: Web interface, Administration, SIM PIN

## SIM Lock

The supplier may lock the SIM card of the terminal to a specific service provider. For further information contact your supplier. To unlock the SIM lock of the SIM card from your airtime provider do as follows:

1. From the left navigation pane, select **ADMINISTRATION > SIM LOCK**.
2. Enter the SIM Lock Code and click **Apply**.



The screenshot shows a web interface for SIM Lock configuration. At the top, there is a blue header bar. Below it, a grey bar displays 'SIGNAL:' followed by a signal strength indicator consisting of six vertical bars of varying heights. On the left side, there is a navigation menu with the following items: DASHBOARD, CONNECT, PHONE BOOK, and MESSAGES. The main content area contains the text 'Enter SIM Lock Code' followed by a text input field. Below the input field are two buttons: 'Apply' and 'Cancel'.

Figure 6-69: Web interface, Administration, SIM LOCK

## 6.7.10 Set up user permissions

You can manage user access to certain functions of the AVIATOR 200/300/350 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**

Protect the SBU against unintended change of setup. We recommend to study the following screen thoroughly and decide which areas of the AVIATOR 200/300/350 system you want to give non-administrator users access to.

To set up the user permissions, do as follows:

1. From the left navigation pane, select **ADMINISTRATION > User permissions**.

Navigation Item	Permission	Yes	No
DASHBOARD	ALLOW USERS TO:		
CONNECT	Upload software	<input checked="" type="radio"/>	<input type="radio"/>
PHONE BOOK	Edit phone book	<input checked="" type="radio"/>	<input type="radio"/>
MESSAGES	Change phone settings	<input checked="" type="radio"/>	<input type="radio"/>
CALLS	Change LAN settings	<input checked="" type="radio"/>	<input type="radio"/>
SETTINGS	Change WLAN settings	<input checked="" type="radio"/>	<input type="radio"/>
ADMINISTRATION	Change ISDN settings	<input checked="" type="radio"/>	<input type="radio"/>
Call charges	Change IP handset settings	<input checked="" type="radio"/>	<input type="radio"/>
Log handling	Change discrete I/O settings	<input checked="" type="radio"/>	<input type="radio"/>
Data limits	Change supplementary services	<input checked="" type="radio"/>	<input type="radio"/>
Profiles	Change common settings	<input checked="" type="radio"/>	<input type="radio"/>
Traffic flow filters	Change general settings	<input checked="" type="radio"/>	<input type="radio"/>
SIM PIN	Change tracking settings	<input checked="" type="radio"/>	<input type="radio"/>
SIM Lock	Change ACARS settings	<input type="radio"/>	<input checked="" type="radio"/>
User permissions	Perform self test	<input checked="" type="radio"/>	<input type="radio"/>
Remote management	Control connections from IP handset	<input checked="" type="radio"/>	<input type="radio"/>
Link monitoring	ALLOW AT COMMANDS ON:		
Remote activation	Changes to AT command permissions only take effect after reboot		
Restricted dialing	LAN/WLAN interface	<input type="radio"/>	<input checked="" type="radio"/>
Multi-voice	ALLOWED SERVICES:		
HELPDESK	SMS (MESSAGES)	<input checked="" type="radio"/>	<input type="radio"/>
SITE MAP			

Figure 6-70: Web interface: Administration, User permissions

2. For each item under **ALLOW USERS TO:**, select
  - **Yes** to allow access

- **No** to block access to the settings. Then the pages are read-only for non-administrators. The settings on the page cannot be changed.
3. Under **ALLOW AT COMMANDS ON**: select
    - **Yes** to allow the use of AT commands on the LAN/WLAN interface
    - **No** to block the use of AT commands on the LAN/WLAN interfaceAT commands are typically used during maintenance and service.

**Note** | This setting does not take effect until the SBU is restarted.
  4. Under **ALLOWED SERVICES** select:
    - **Yes** to allow that the user can send and receive text messages
    - **No** to block sending and receiving text messages. Note that the menu item **MESSAGES** is not displayed any longer.
  5. Click **Apply**.

The settings to which access is denied are now greyed out for the non-administrator user.

## 6.7.11 Remote management

You can set up the SBU for control from a remote location.

**Note** If you want to remotely control the SBU, it must have activated a connection. This can be done in several ways:

- Automatic activation of a Standard data connection, see step 10 on page 6-61 in *Edit a network user group*.
- Manual start of a data connection (Standard data or Streaming, see *Start or stop a standard data connection* on page 6-14)
- Remote start of a data connection with an SMS, see *Remote activation of a connection using SMS* on page 6-90.

To set up the SBU for remote management, do as follows:

1. From the left navigation pane, select **ADMINISTRATION > Remote management**.

Figure 6-71: Web interface: Administration, Remote management

2. Select whether remote access using a web server should be **Enabled** or **Disabled** and enter the **Incoming port** number.
3. Select whether **AT commands** should be **Enabled** or **Disabled** and enter the **Incoming port** number.
4. Under **TRUSTED IP ADDRESSES**, type in the IP addresses of the devices you want to give access to the SBU.
5. Click **Apply** to save the new settings.

You can now access the SBU from one of the trusted IP addresses, using the incoming port defined in the **Incoming port** field. For a detailed description how to access the SBU from a remote location see the AVIATOR 200/300/350 user manual.

## 6.7.12 Remote activation of a connection using SMS

If you want to remotely control the SBU, it must have activated a connection. You can do this by sending an SMS to the SBU. The SBU must be powered up and logged on to the satellite services to receive the SMS and then start the connection. For a detailed description how to activate a connection using SMS see the AVIATOR 200/300/350 user manual.

**Note** The SBU must be logged on to the satellite services to receive and accept an activation SMS. If the SMS is considered too old or sent before the SBU has been switched on and has logged on, the SMS will be ignored.

## 6.7.13 Link monitoring (SwiftBroadband only)

You can monitor the external SwiftBroadband IP connection of the AVIATOR system using the link monitoring feature. With this feature activated, the terminal will send out ping commands (ICMP Echo Requests) to a server of your choice.

To set up link monitoring, do as follows:

**Note** Link monitoring is only performed on data connections with the Default network user group (see *Set up the network user groups* on page 6-59). This data connection must be activated before link monitoring can start.

1. From the left navigation pane, select **ADMINISTRATION > Link monitoring**.

Figure 6-72: Web interface: Administration, Link monitoring

2. Select **Enabled** if you want to enable Link monitoring.
3. Select the **Interval** between each ping.
4. Select the number of **Retries** before the terminal reboots.
5. Type in the **Primary** and optionally the **Secondary IP address**.  
This is the IP address of the server(s) to which the terminal will send ping commands.

**Note** Use a server that is reliable and that supports and responds to ICMP Echo Requests.

6. Click **Apply**.

When a data session is started with the Default network user group, the terminal will start sending ping commands to the Primary IP address the number of times specified at **Retries**. If no response is received, it will send the same number of ping commands to the Secondary IP address, if available. If no response is received here either, the terminal will reboot.

## 6.7.14 Restricted dialing

In order to manage the use of the AVIATOR 200/300/350 system efficiently you can set up the SBU to limit all calls to allowed numbers or numbers in the phone book. This feature can be enabled for each connected handset separately. For a detailed description how to restrict dialing see the AVIATOR 200/300/350 user manual.

## 6.7.15 Multi-voice (option)

You can subscribe to Multi-voice with or without additional numbers. Multi-voice is disabled per default.

**Note** You must have Multi-voice in your airtime subscription, AVIATOR Wireless Handset software version minimum 1.03 and SBU software version minimum AVIATOR 200/300/350 (Level E): 1.07, AVIATOR 200D/300D/350D (Level D): 2.01, in order to support the Multi-voice function.

Multi-voice	AVIATOR 200 LGA (Class 15)	AVIATOR 300 IGA (Class 7)	AVIATOR 350 HGA (Class 6)
Number of voice calls	2 (best effort quality)	Up to 9 (best effort quality)	Up to 9 (best effort quality)

Table 6-10: Multi-voice, number of calls

**Important** For software 4.00 and higher and SB-Safety Voice: Do not enable Multi-voice. Multi-voice is disabled automatically when enabling SB-Safety Voice.

To enable Multi-voice, do as follows:

1. Enter the web interface of your terminal.
2. Select **Administration > Multi-voice**.
3. Select **Multi-voice**.  
If you want to use an external PBX, select **Using external Multi-voice PBX** and select the interface used to connect the PBX to the terminal

You are now ready to use Multi-voice. For more detailed information about configuring Multi-voice see *Configure Multi-voice* on page 6-95.

## Rules for concurrent calls (without cockpit reserve)

- First call initiated: You can use any connected handset and any call type for incoming as well as outgoing calls.
- Second and subsequent calls: You can only use handsets connected to the WLAN interface for calls initiated/received while another call is active. The call type for the second and subsequent calls is always Standard Voice.

**Note** If you have additional numbers in your airtime subscription, you must set up how the system should use them. See the sections *Handset contexts* on page 6-92.

## Additional numbers for Multi-voice

**Note** You must have Multi-voice with additional numbers in your airtime subscription to be able to use this feature.

In addition to the phone numbers for incoming Standard Voice, and 3.1 kHz Audio and UDI/RDI, your subscription may include extra phone numbers that can be assigned to specific handsets. If you want to use the additional phone numbers in your subscription, you must set up the following in the web interface:

- Enable the use of additional numbers in the web interface under **ADMINISTRATION > Multi-voice**. See *Configure Multi-voice* on page 6-95.
- Add the additional numbers from your airtime subscription under **PHONE BOOK > MOBILE NUMBERS > ADDITIONAL NUMBERS**.
- Assign the numbers to handsets. Depending on the handset interface you want to use, see the pages **SETTINGS > Phone/Fax**, **SETTINGS > ISDN** or **SETTINGS > IP handsets** in the web interface.

Check with your service provider for individual billing of an additional number.

## Handset contexts

Calls to the SBU are treated differently depending on the handset context. If additional numbers are used, there are 3 possible handset contexts, which are explained in this section:

- *Call type groups*
- *Directly assigned handsets*
- *Unassigned handsets*

## Call type groups

The handsets are called using one of the mobile numbers for either Standard Voice or 3.1 kHz audio. All handsets in a group will ring when the belonging number is called.

For information on how to associate a handset with a group, see

- *Set the call types for AVIATOR Wireless Handsets* on page 6-36
- *Configure the Phone/Fax interface (2-Wire)* on page 6-24
- *Configure the ISDN interface* on page 6-25



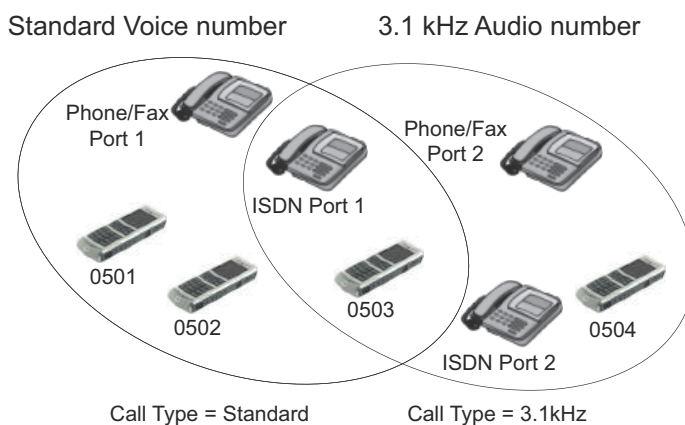


Figure 6-73: Multi-voice, call type groups (example)

### Directly assigned handsets

The mobile numbers are assigned to individual handsets. Only the assigned handset will ring when the associated number is called.

**Note** To use this feature you must have additional numbers in your airtime subscription and enable the use of additional numbers in the web interface. Then you can assign the numbers to individual handsets. For details on additional numbers, see *Additional numbers for Multi-voice* on page 6-92.

For information on how to assign a number to a handset, see the pages **SETTINGS > Phone/Fax**, **SETTINGS > ISDN** or **SETTINGS > IP handsets** in the web interface.

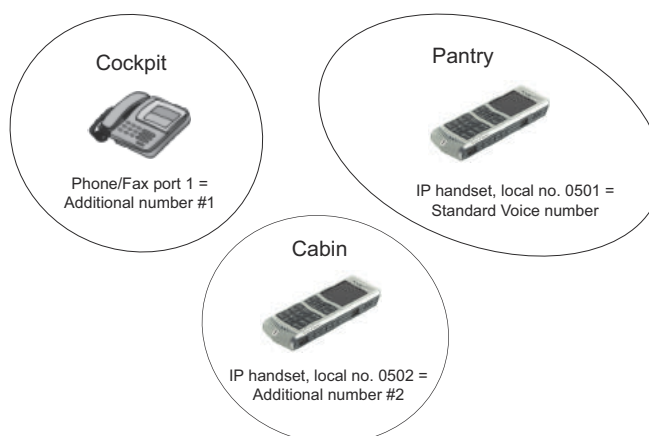


Figure 6-74: Multi-voice, example of directly assigned handsets (example)

Note that you can also assign the call type numbers directly (in the example above, the Standard Voice number is assigned to IP handset number 0501). If you do so, be aware that only the assigned handset can receive a call to this number. The handset connected to the Phone port 1 and the IP handset no. 0502 are each assigned an additional number.

### Unassigned handsets

These are IP handsets that are not assigned a number, and that do not belong to a call type group. Use this handset context if you want to create a group of IP handsets that can be called together. All unassigned IP handsets will ring when you call a mobile number which has not been assigned to a handset.

To make an IP handset unassigned, clear all call types and the Assigned number field when setting up the handsets in the web interface. See *Set the call types for AVIATOR Wireless Handsets* on page 6-36.

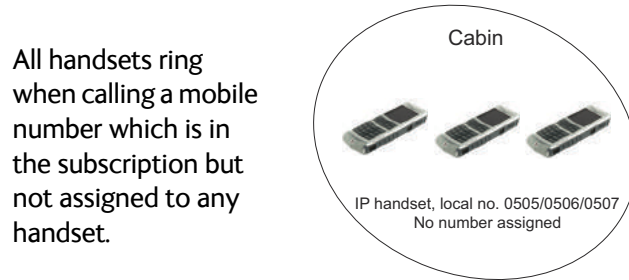


Figure 6-75: Multi-voice, example of unassigned handsets

### Cockpit reserve

With Cockpit reserve enabled, is it possible to reserve at least one call line to the handsets in the cockpit. The free call line is reserved for all handsets not assigned an additional Multi-voice number.

In the following example of a Multi-voice configuration with cockpit reserve, all handsets in the cabin have been assigned an additional number while the handsets in the cockpit belong to the standard call type group.

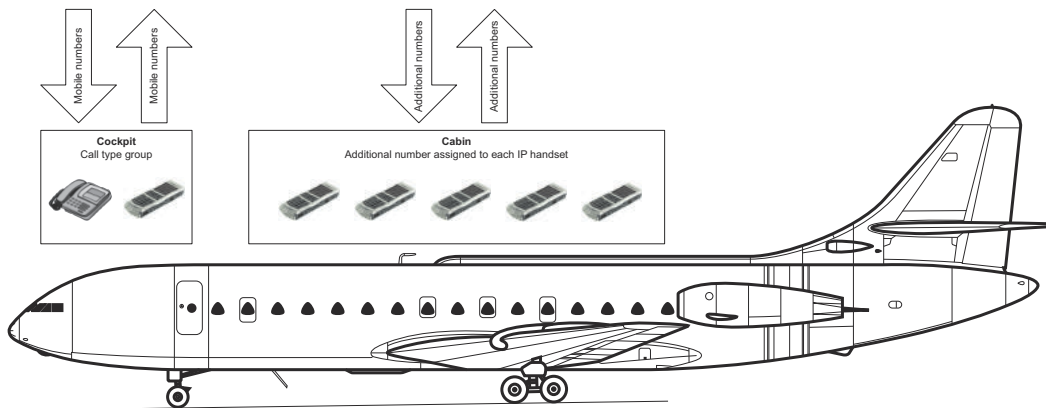


Figure 6-76: Multi-voice, example for a configuration with Cockpit reserve.

## Configure Multi-voice

To enable and configure Multi-voice, do as follows:

1. From the left navigation pane, select **Administration > Multi-voice**.

The screenshot shows the 'MULTI-VOICE' configuration page. On the left is a navigation menu with items: DASHBOARD, CONNECT, PHONE BOOK, MESSAGES, CALLS, SETTINGS, ADMINISTRATION (highlighted), Call charges, Log handling, Data limits, Profiles, and Traffic flow filters. The main area is titled 'MULTI-VOICE' and contains the following settings:

- Multi-voice:** Radio buttons for Disabled, Multi-voice (selected), and Using external Multi-voice PBX.
- Multi-voice PBX connected to:** A dropdown menu currently showing 'ISDN Port 1'.
- Use additional numbers:** Radio buttons for Yes and No (selected).
- Cockpit reserve:** Radio buttons for Yes and No (selected).
- APN:** A text input field containing 'multivoice.sbb.inmarsat.com'.

At the bottom of the main area are 'Apply' and 'Cancel' buttons.

Figure 6-77: Web interface: Administration, Multi-voice

2. To use the AVIATOR 200/300/350 terminal for Multi-voice, select **Multi-voice**. You can also use an external Multi-voice PBX. If so, select **Using external Multi-voice PBX** and select the interface used to connect the PBX to the terminal. Refer to the manufacturer documentation for your Multi-voice PBX.
  3. If you want to assign additional numbers, select **Use additional numbers**. You must have additional numbers in your subscription and enter the additional numbers under **PHONE BOOK > Mobile numbers**. (See also *Set up additional numbers* on page 6-96.)  
Then you can use the setup page for the handset interface, e.g. **SETTINGS > IP handsets > Call settings**, to assign the additional numbers to the handsets you want to be able to call directly. (See also *Assign additional numbers* on page 6-97).
  4. You can configure a reserved line for the handsets in the cockpit by selecting **Use additional numbers** and **Cockpit reserve Yes**.
    - There will at all times be a free line for the handsets in the cockpit so a call can be made and received regardless the use of other handsets. Set up a call type group to assign handsets to the cockpit-reserved group, see *Set the call types for AVIATOR Wireless Handsets* on page 6-36, *Configure the Phone/Fax interface (2-Wire)* on page 6-24 and *Configure the ISDN interface* on page 6-25.
    - Use the additional numbers for other handsets, e.g. in the cabin.
- Note** | The handsets using additional numbers must be AVIATOR Wireless Handsets or other SIP phones, a normal 2-wire handset cannot be used.
5. Type in the VoIP **APN** used for Multi-voice. You find the Multi-voice APN name in your subscription documentation.
  6. Click **Apply**.

## Set up additional numbers

Enter the additional numbers under **PHONE BOOK > Mobile numbers**.

MOBILE NUMBERS	
Standard voice	<input type="text" value="870772420567"/>
3.1 kHz audio	<input type="text" value="870782105234"/>
UDI (64 kbps)	<input type="text" value="870782105235"/>
RDI (56 kbps)	<input type="text" value="870782105236"/>

ADDITIONAL NUMBERS	
Standard voice #2	<input type="text" value="870444555666"/>
Standard voice #3	<input type="text" value="870444555667"/>
Standard voice #4	<input type="text" value="870444555668"/>
Standard voice #5	<input type="text"/>
Standard voice #6	<input type="text"/>
Standard voice #7	<input type="text"/>
Standard voice #8	<input type="text"/>
Standard voice #9	<input type="text"/>
Standard voice #10	<input type="text"/>
Standard voice #11	<input type="text"/>
Standard voice #12	<input type="text"/>
Standard voice #13	<input type="text"/>

Figure 6-78: Web interface: Phone book, mobile numbers (example, Multi-voice)

## Assign additional numbers

Assign additional numbers under **SETTINGS > IP handsets > Call settings**.

The screenshot shows the COBHAM web interface for configuring IP handset call settings. The interface includes a sidebar menu on the left with categories like DASHBOARD, CONNECT, PHONE BOOK, MESSAGES, CALLS, SETTINGS, LAN, WLAN, Phone/Fax, ISDN, Common, IP handsets, Discrete I/O, System Type, RF settings, External systems, FLEX, Tracking, Upload, ADMINISTRATION, and HELPDESK. The main content area displays a table of handset settings for numbers 0501 through 0516. Each row includes checkboxes for 'Incoming calls' (Standard and 3.1 kHz Audio), a dropdown for 'Assigned number', radio buttons for 'Outgoing calls' (Standard and 3.1 kHz Audio), and a 'Restricted dialing' status. At the bottom, there are 'Apply' and 'Cancel' buttons.

Number	Incoming calls	Assigned number	Outgoing calls	Restricted dialing
0501	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	870444555666	<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0502	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	870444555667	<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0503	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio	870444555668	<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0504	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0505	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0506	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0507	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0508	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0509	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0510	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0511	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0512	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0513	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0514	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0515	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled
0516	<input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> 3.1 kHz Audio		<input checked="" type="radio"/> Standard <input type="radio"/> 3.1 kHz Audio	Enabled

Figure 6-79: Web interface: Settings, IP handsets, Call settings (with Multi-voice, example)

## 6.8 Site map

The web interface offers a site map page. Use this page to get an overview over the menus, submenus and topics. The following drawing shows the site map.

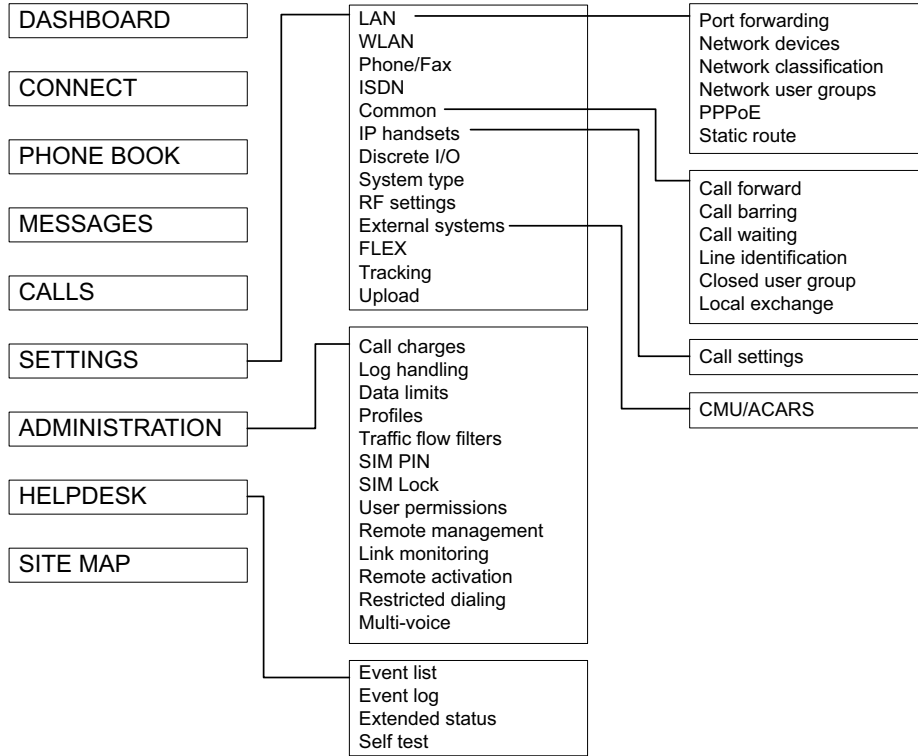


Figure 6-80: Web interface: Site map

To access the site map, select **SITE MAP** from the left navigation pane. You can click on each menu in the site map to go directly to the page or display the respective submenu.

## 6.9 Configuration of 3rd party phone systems

### 6.9.1 Sigma<sup>7</sup> setup

There are a few adjustments that are typically made at the time of installation testing. Normally it is necessary to set the ear volume of the handset initially, in order to obtain sufficient volume in the ear piece.

**Note** The information in this section is only meant as a guideline. For complete information on the function of the Sigma<sup>7</sup> handset, refer to the Sigma<sup>7</sup> manual.

#### To set up the ear volume

To set up the ear volume of the handset, do as follows:

1. Take the handset out of the cradle and enter the menu system of the handset.
2. Use the volume control keys to scroll to the EARVOL setting.
3. Press the **Flash** key to select EARVOL.
4. Change the volume setting to **4** using the volume control keys.
5. Press **#** to store the setting. To adjust other settings, press **Flash** to return to the menu.
6. Place the handset back into the cradle.

For further information on the Sigma<sup>7</sup> handset, refer to the manual for the Sigma<sup>7</sup> handset.

### 6.9.2 ICG DECT Cordless Handset setup

It is sometimes necessary to adjust the volume of the ICG DECT Cordless Handset, in order to have sufficient volume in the ear piece. Also, you may want to change the setting of the handset from pulse to tone, if this is not already set.

**Note** The information in this section is only meant as a guideline. For complete information on the function of the ICG DECT Cordless Handset phone, refer to the manual for your ICG DECT Cordless Handset phone.

#### To set the volume

To change the volume setting, enter the handset menus and do as follows:

1. Scroll to **Audio Sett** and press **OK**.
2. Select **H/Set Vol** and press **OK**. The current volume is heard in the ear piece and the level is displayed.
3. Scroll to the desired volume and press **OK**.

#### To switch to Tone dialing

To change the dialing mode, do as follows:

1. Open the handset menu.
2. Scroll to **Temp Tone** and press **OK**. Tone dialing is now active.

## 6.10 AVIATOR 200/300/350 system ready for use

Having installed the AVIATOR 200/300/350 system, activated the SIM card and configured the system you can verify whether the system is fully operational. Check that all LEDs on the SBU front panel are green.

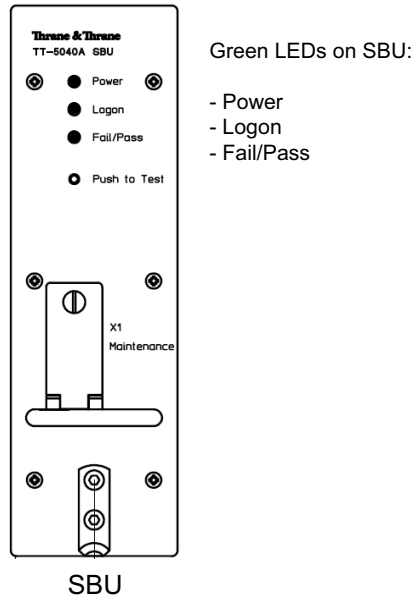


Figure 6-81: AVIATOR 200/300/350 system

**Note**

**Line of sight during operation!**

Make sure that there is a line of sight between the Satcom antenna and the satellite in order to logon and use the satellite service.



# Maintenance and troubleshooting

## 7.1 Continued Airworthiness

### 7.1.1 General

#### Maintenance

The AVIATOR system requires no periodic scheduled servicing tasks.

**Note**

When replacing the **TT-5040A SwiftBroadband Unit (SBU)**, it is important to leave the TT-5040A-001 Configuration Module behind, attached to the airframe with a wire.

#### Contact for support

**AVIATOR 200/300/350 system purchased from a Cobham SATCOM distributor:** If you need assistance and you have purchased your system from a Cobham SATCOM distributor, contact the distributor's support line.

**AVIATOR 200/300/350 system purchased directly from Cobham SATCOM:** If you need assistance and you have purchased your system directly from Cobham SATCOM, you can contact Cobham SATCOM by telephone or send an e-mail to the Cobham SATCOM esupport.

Telephone numbers:

For urgent technical support please contact us at one of the following numbers:

- One Dial Phone: **+45 39 88 89 89**
- US, Virginia Beach office: **+1 757 463 9557** or **+1 866 SATCOMS**.

The eSupport e-mail address is [AVIATOR.support@cobham.com](mailto:AVIATOR.support@cobham.com).

### 7.1.2 Instructions

#### Documentation

Maintenance information for the AVIATOR 200/300/350 System is contained in this manual. Place the wiring diagram information in this manual in the aircraft operator's appropriate aircraft wiring diagram manuals.

#### Inoperative units

If a system component is inoperative, remove or replace the unit.

**Important**

If a level-D certified system detects an inconsistent hardware unit (level E) or software image (level E), it enters failure mode and the system will not be operational. Inconsistency messages are displayed to clearly inform the service personnel about the reason for this failure mode.

If an inoperative SBU is removed, take out the TT-5040A-001 CM and fasten the CM and wiring to the air frame. Secure all cables, collect applicable switches and circuit breakers, and label them inoperative. Revise the equipment list and weight and balance as applicable prior to flight and make a log book entry that the unit was removed.

For information on how to return a unit for repair, see *Return units for repair* on page 7-19. Once repaired, reinstall the unit in the aircraft in accordance with the instructions in this Installation and Maintenance Manual.

## 7.2 Get support: HELPDESK

If this manual does not provide the remedies to solve your problem, you may want to contact your Airtime Provider or your local distributor.

### 7.2.1 Airtime support

If you need assistance from your Airtime Provider, call the help desk, click **HELP DESK** or check your Airtime subscription for a contact number.

### 7.2.2 System support

If you need assistance with problems caused by the SBU or the antenna, please call a distributor in your area. A list of certified partners and distributors is available on Cobham SATCOM web site: [www.cobham.com/satcom](http://www.cobham.com/satcom). Select **Where to buy**, then **AVIATOR**, **EXPLORER**, **SAILOR** and **Sea Tel branded products resellers**.

### 7.2.3 Help desk and diagnostic report

#### Help desk

If you need help **with airtime-related issues** for the SwiftBroadband subscription you may call the Help desk. Enter the phone number for your Airtime Provider on this page. To access the Help desk, select **HELP DESK** from the left navigation pane.

Figure 7-1: Web interface: Help desk

If you have entered the Help desk number, it is displayed as a link. To change the number, click the link, change the number and click **Apply**. If you need help **with SBU- or antenna-related issues** call your local distributor.

## Generating a diagnostic report

When contacting your distributor for support, please include a diagnostic report. The diagnostic report contains information relevant for the service personnel during troubleshooting. When contacting your distributor for support, please enclose this file.

To generate a diagnostic report with valuable information for the service team, do as follows:

1. Reboot the system.
2. Establish the problem or situation in which the error occurred, or
3. Make a CS call (if possible), i.e. making a call with a handset connected to the SBU.
4. Make a PS call (if possible), i.e. establish a data connection.
5. Click **Generate report** from the **HELP DESK** page.  
In some browsers the file may open directly in your browser. If it does, choose **File > Save As** to save the file.
6. Choose a location for the file and save it on your computer.

## Extended status

Click **Extended status** in the **HELP DESK** page to display further status information on logon status, ongoing data sessions and ongoing calls.



Figure 7-2: Web interface: Help desk, Extended status

## 7.3 Software update

**Important****Level-D and Level E consistency!**

A level-D certified system detecting an inconsistent hardware unit or software image enters failure mode, and the system will not be operational. Inconsistency messages clearly inform the service personnel about the reason for this failure mode.

Pay great attention to selecting the correct software file: Level D or Level E. **A mismatch of Level D and Level E software is not allowed and will result in a non-functioning system.** A mismatch will be displayed in the built-in web interface.

**Minimum Software Version required for AVIATOR 200/300/350 (Level E):**

- SBU: AVIATOR 200/300/350: Swift\_broadband-E\_105.zip  
File: Swift\_broadband-E\_105.dl<sup>1</sup>

**Minimum Software Version required for AVIATOR 200D/300D/350D (Level D):**

- SBU: AVIATOR 200D/300D/350D: Swift\_broadband-D\_200.zip  
File: Swift\_broadband-D\_200.dl

**Hardware and software requirements**

The following items are required before the software can be updated:

- One computer with a standard Ethernet port available.
- A standard Internet browser.
- 1024×768 pixels or higher display resolution. The program is best viewed using small fonts.
- One straight LAN cable.
- The zipped file containing the new software.
- Select **Product software > Aeronautical > Satcom Systems** to narrow the search.

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1. For Level E, this software version is not mandatory, but recommended.

## 7.3.1 SBU software update

### Preparing the software update

**Note** Software update should only be done by qualified service personnel.

1. On the PC, unzip the zip file containing the new software. Remember or write down which folder you extracted the file to.
2. Connect the SBU to the PC LAN port, using the SBU maintenance connector and a straight LAN cable.
3. Power on the AVIATOR 200/300/350 system.
4. Open your browser and enter the IP address of the SBU. The standard IP address is **192.168.0.1**.

**Note** If the local IP address of the SBU has been changed and you do not have the new address, you can temporarily set the IP address to the default value by pushing the **Reset** button next on the front plate of the SBU. For detailed instructions see *How to reset the IP address or the terminal software to default settings* on page 7-15.

For further information on the Reset button, see *IP Reset (Default) button* on page 7-14.

For further information on IP addresses of the SBU see *Set up the LAN IP addressing* on page 6-19.

You are now connected to the web interface of the SBU.

## Updating the software

1. In the web interface of the SBU, select **SETTINGS** from the left navigation pane.
2. Click **Upload** from the left navigation pane.

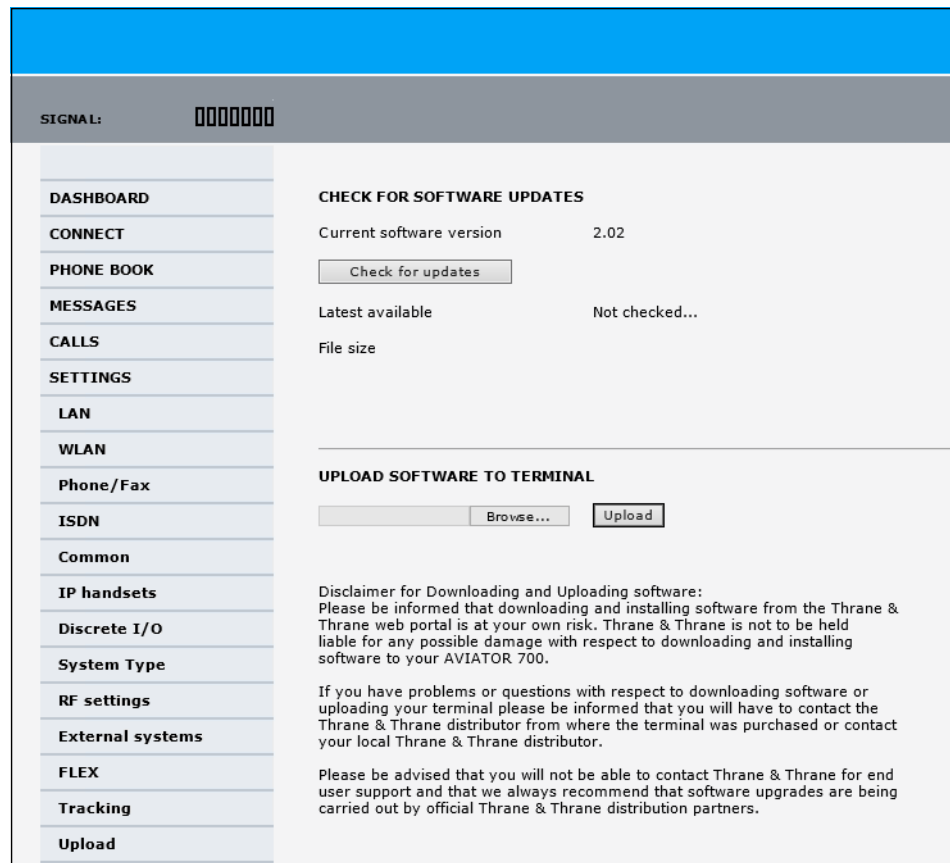


Figure 7-3: Web interface: Settings, Upload

3. The **Current software version** field shows the current software version.
4. To automatically find new software available click **Check for updates**.

**Note** | This works from software 1.06 (Level D) and 2.01 (Level E).

or click **Browse...**

5. Browse to the new software version and accept it.
6. Click the **Upload** button.  
Note that the upload procedure takes a couple of minutes. When done, the SBU automatically restarts with the new software version.

### If software upload fails - how to recover

To recover from a failed software upload, turn off the SBU and turn it on again. Then repeat the upload procedure as described in *Updating the software* on page 7-7.

If software upload still fails, use the IP Reset button as described in *IP Reset (Default) button* on page 7-14 to initiate a software upload from an external server.

## 7.3.2 Verify the software update

### Test procedure

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

### Software identification procedure

On the PartNumber / SerialNumber identification label on the SBU make a cross mark in the **Software Ver.** field number according to the new software version.

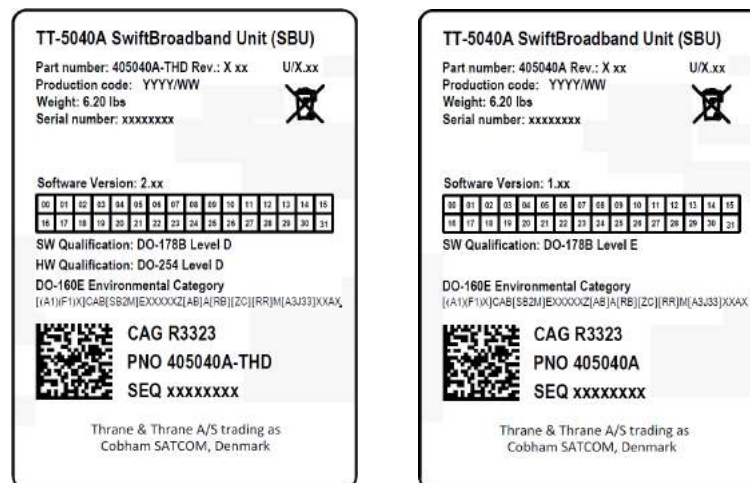


Figure 7-4: Software identification on the SBU label, Level D and Level E



## 7.4 To exchange LRUs

This document describes the procedures for removal and re-installation of an AVIATOR 200/300/350 LRU:

- SBU (405040A-THD).

### 7.4.1 Time consumption

The time consumption for removal and re-installation of an LRU is estimated to 15 minutes.

### 7.4.2 Tools

No tools required.

### 7.4.3 Removal and re-installation of the SBU

1. Ensure that power is removed from the satcom system before removing any LRU!
2. Pull and turn to loosen the knurled knob(s) that retain(s) the LRU in the tray.



Figure 7-5: Exchanging an LRU (example)

3. Pull the LRU straight out from the tray by the handle. Be careful not to drop the unit.

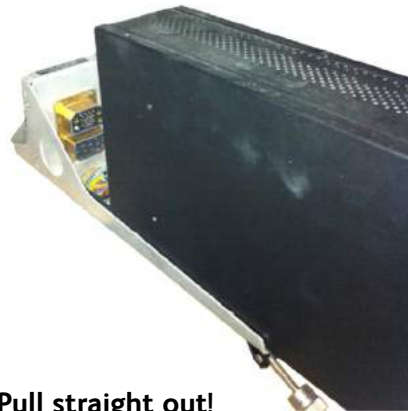


Figure 7-6: Pull out the LRU

4. If the LRU has a Configuration Module (CM), unscrew it and pull it out from the rear of the LRU.

**Important**

Make sure that the Configuration Module is attached to the airframe.



Figure 7-7: Attach CM to the airframe

## Re-installation

Follow the procedure above in reverse order. Make sure that the LRU is completely seated against the mating A404 connector.

---

## 7.5 Troubleshooting

### 7.5.1 Status signalling

#### Built-In Test Equipment

The SBU provides 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 pushing the Push To Test button on the SBU front panel.

Also, during operation a Continuous Monitoring BITE function is performed.

Details on error messages after a POST or PAST for the SBU can be found in the event list of the SBU, see *View the Event list, Event log and extended status* on page 7-16.

#### Means of signalling

The AVIATOR 200/300/350 system provides various methods for signalling the status of the system.

- **LEDs** on the front panel of the SBU are used to signal:
  - Power on/off
  - Logon
  - Fail/Pass
- The built-in web interface of the SBU shows any BITE error codes with a short message describing each error.

#### Push to Test button on SBU

The SBU has a hardware reset/test button placed on the front panel for BITE purposes. Use the button on the SBU to activate a self test (PAST).

## 7.5.2 Status signalling with LEDs

### LEDs on SBU

During the power-up procedure all LEDs on the front plate are orange. If all 3 LEDs on the front stay orange after power up, check that TP8 of the SBU is connected to ground. If the wiring is good, the SBU software is corrupted. Contact your local distributor for instructions how to proceed.

Power LED on SBU	
Behavior	Description
Green	Power OK
Orange	During upstart procedure
Off	No power

Table 7-1: Function of the SBU Power LED

Logon LED on SBU	
Behavior	Description
Red	Acquiring satellite network
Orange	Network synchronization
Green	Network logon
Off	No acquired satellite/logged off

Table 7-2: Function of the SBU Logon LED

Fail/Pass LED on SBU	
Behavior	Description
Steady red	A fault which may degrade the system operation is present in the SBU
Flashing: short green/ long pause	Power On Self Test (POST) or Person Activated Self Test (PAST) in progress
Flashing: long green/ short orange	No current failure, but a BITE failure / warning is logged in the error log
Steady green	No faults

Table 7-3: Function of the SBU Fail/Pass LED

**LEDs on maintenance connector**

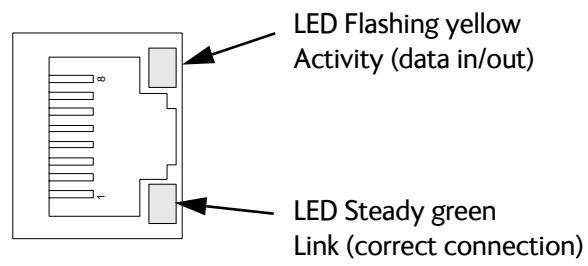


Figure 7-8: Function of the LEDs on the front maintenance connector

### 7.5.3 IP Reset (Default) button

The SBU has an IP Reset (Default) button next to the front LAN maintenance connector below the metal cover. The button has two functions: To reset the terminal's IP address and netmask to the default value, 192.168.0.1 and to reset the terminal to factory default settings.

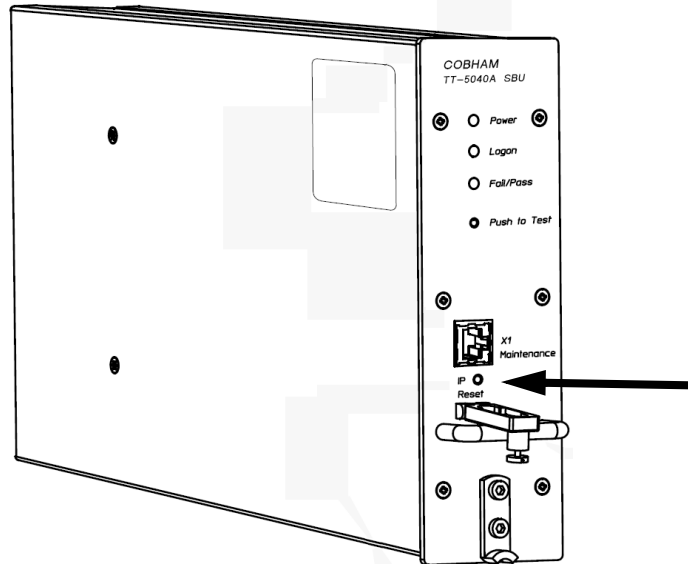


Figure 7-9: IP Reset (Default) button on SBU front


The table on the next page describes how you can use the IP reset button.

Action	Function
With the SBU running, push the IP Reset button normally.	<p><b>Temporary reset to default values:</b> The SBU's IP address and IP netmask are temporarily set to the default value (default IP address: 192.168.0.1, default netmask: 255.255.255.0).</p> <p>With this function, even if the IP address has been changed and you do not remember the new IP address, you can still access the web interface and see your current configuration. The default value is not saved in the configuration, but is only valid until next reboot.</p>
With the terminal running, push and hold the IP Reset button for 30 seconds, until the Power indicator on the SBU front plate flashes orange.	<p><b>Reset to factory settings:</b> The SBU restores factory settings and reboots the system. All settings are reset to factory default, incl. the IP address of the SBU and the administrator password.</p> <p><b>Exception:</b> The settings that are specific for the installation are <b>not</b> reset. These are the settings on the pages:</p> <ul style="list-style-type: none"> <li>• SETTINGS &gt; System Type</li> <li>• SETTINGS &gt; RF Settings</li> <li>• SETTINGS &gt; External Systems (including ACARS)</li> <li>• SETTINGS &gt; Flex</li> <li>• ADMINISTRATOR &gt; User permission &gt; SMS</li> </ul>
While the terminal is booting, push and hold the IP Reset button.	<p><b>For service use only!</b></p> <p>This firmware upload procedure is only to be used if the other procedures fail due to missing or corrupted firmware. This setup uploads software to the SBU from a TFTP server via the LAN connection. The procedure is as follows:</p> <ol style="list-style-type: none"> <li>1. Activate or install a TFTP server on a PC.</li> <li>2. Locate the correct software image (xxx.dl) for the SBU and place it in the TFTP server directory.</li> <li>3. Rename the image to <b>ttexp.dl</b>.</li> <li>4. Reconfigure the PC LAN interface to use the static address <b>192.168.0.2/255.255.255.0</b>.</li> <li>5. Power off the SBU.</li> <li>6. Connect the PC LAN Interface to the SBU,</li> <li>7. Push and hold down the Reset button.</li> <li>8. Keep the Reset button pushed while powering on the SBU, and through the next step.</li> <li>9. Monitor the TFTP server window. When the upload starts you can release the Reset button.</li> <li>10. When the TFTP upload finishes the SBU boots up using the new image.</li> </ol>

Table 7-4: How to reset the IP address or the terminal software to default settings

## 7.5.4 View the Event list, Event log and extended status

### Overview

When an event is registered, the web interface shows an event icon  in the icon bar as long as the event is active. The **Event list** only shows events that are currently active, whereas the **Event log** shows the history of events that have occurred.

### Event list

To view the event list, 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.

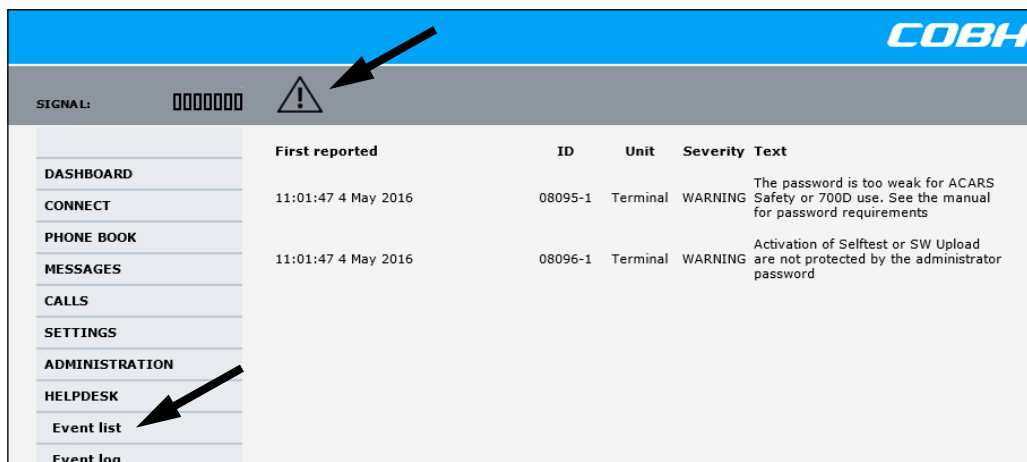


Figure 7-10: Web interface: Help desk, Event list

The Event list page shows a detailed list of active events including the time of the first occurrence, ID and severity of the event message, and a short text describing the error. For a list of events with description, ID, explanation and remedy see *List of events* on page C-2.

### Event log

The **Event log** shows the same information as the Event list, but also includes events that occurred in the past and are no longer active. Additionally, it lists events of informational character, describing normal phases of operation for the SBU. The event log holds information of events registered in the SBU or antenna. The same events are also indicated in the Antenna and Terminal LEDs on the SBU LED panel. The log includes the time of the occurrence, a short description, location of the error etc. This information can help troubleshooting errors in the system. You can see the event log in the web interface.

To view the Event log, select **HELPDESK > Event log** from the left navigation pane.

### Extended status

The Extended Status page shows the following information:

- The antenna Product ID.
- The status of the connection to the air interface (IAI-2). This field should normally show “Registered”, unless the system is still in the startup process.
- Ongoing data sessions (IP address) and connection status, e.g. Active or Suspended.



- Ongoing calls and their connection status.

To update the information on the **Extended status page**, click **Refresh**.

## 7.5.5 Self test

The Self test performs system test on the AVIATOR 200/300/350 system, similar to the tests that are performed during the Power On Self Test (POST).

**Important**

The SBU will reboot when performing the self test. All ongoing calls or data sessions will be terminated.

To activate a Self test, do as follows:

1. Select **HELPDESK > Self test**.

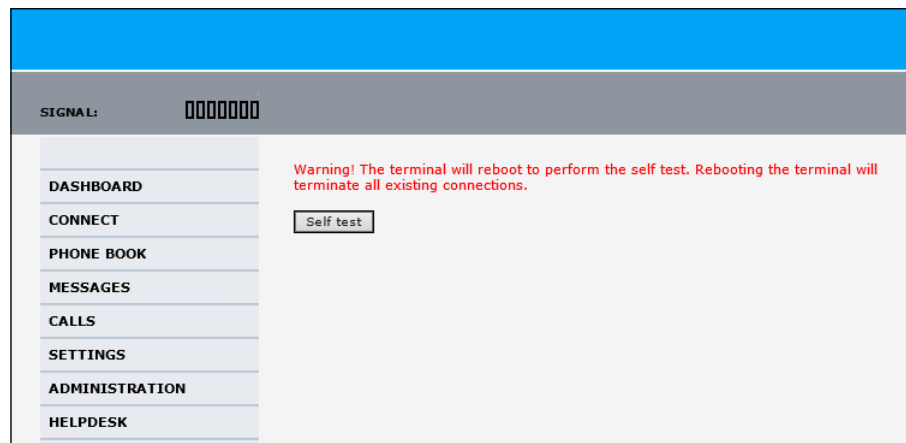


Figure 7-11: Web interface: Help desk, Self test

2. Click **Self test**.
3. Click **OK** in the Warning dialog.  
The SBU now performs a self test and resets the SBU.

## 7.5.6 Initial troubleshooting

This section describes an initial check of the primary functions of the AVIATOR 200/300/350 system.

### Means available for troubleshooting

The following means are available for troubleshooting:

- **LEDs.** Generally, if a fault occurs without any obvious reason, it is always recommended to observe the LEDs. For information on the LEDs, refer to *Status signalling* on page 7-11.
- **Web interface.** For troubleshooting errors in the SBU, you may connect to the front LAN interface on the SBU and use the web interface to inspect any alarm messages. For information on the web interface refer to *Tool for setup and use: Built-in web interface* on page 6-6.
- **Diagnostic report.** You can generate a diagnostic report that can be used for troubleshooting errors in the AVIATOR 200/300/350 system. To generate the diagnostic report, access the web interface and select **HELPDESK**. then click **Generate report**. Save the report on your PC.
- Enclose the diagnostic report and the service log when requesting support.

Problem	What to do
No connection to the SBU maintenance connector	Depending on the options in your system you might experience limitations when using an Ethernet interface of the AVIATOR 200/300/350. For systems without the built-in router option enabled, i.e. the basic version or the version with Wireless option, note the following limitation: <ul style="list-style-type: none"> <li>• To use the SBU Maintenance connector disconnect or switch off any PC connected to another LAN interface of the SBU.</li> </ul>
No GPS signal: Interference from satcom antenna on GPS antenna	If the existing GPS antenna on board the aircraft does not provide sufficient filtering of the satcom antenna signal to provide a usable GPS signal, you must replace the existing GPS antenna with a GPS antenna that has a satcom filter.
Registration for voice or data not possible	In case the system cannot register properly for voice or data service, check with your Service provider that the SIM card in the Configuration module of the SBU is not blocked.

Table 7-5: Initial troubleshooting

## 7.6 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](http://www.cobham.com/satcom), **Technical Service Partner List**. You can also access the Partner Portal at [www.cobham.com/satcom](http://www.cobham.com/satcom), **Cobham SYNC Partner Portal**, which may help you solve the problem. Your dealer, installer or Cobham SATCOM partner will assist you whether the need is user training, technical support, arranging on-site repair or sending the product for repair. Your dealer, installer or Cobham SATCOM partner will also take care of any warranty issue.

### Repackaging requirements

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

The shipping carton has been carefully designed to protect the AVIATOR 200/300/350 and its accessories during shipment. This carton and its associated packing material should be used when repacking for shipment. Attach a tag indicating the type of service required, return address, part number and full serial number. Mark the carton FRAGILE to ensure careful handling.

**Note** | Correct shipment is the customer's own responsibility.

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

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

Failure to do so may invalidate the warranty.

## 7.7 Disposal of electrical and electronic equipment

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.

# Appendices



# Equipment specifications

## A.1 Introduction

### Important note!

The information, drawings, and wiring diagrams contained in this manual are intended as a reference for engineering planning only. It is the installer's responsibility to compose installation drawings specific to the aircraft.

**Note** | Cables and connectors are not included.

For specifications of the antenna please see the documentation provided with the antenna.

**Note** | For equipment drawings of the AVIATOR Wireless Handset and Cradle see *AVIATOR Wireless Handset and Cradle Installation & Maintenance Manual (98-129600)*.

## A.2 AVIATOR 200/300/350 system components

### A.2.1 TT-5040A SwiftBroadband Unit (SBU)

Characteristics	Specification
Dimensions (L x W x H)	ARINC 404A 1/4 ATR short 320.5 mm x 193.5 mm x 57.15 mm (12.62" x 7.62" x 2.25")
Weight	2.8 kg ±0.1 kg (6.2 lbs ±0.22 lbs) including TT-5040-001 CM
Mounting	Mount in an ARINC 404A 1/4 ATR short tray in a temperature controlled location. Forced cooling is not required and not recommended.
Supply Voltage	Nominal: +28.0 V DC Voltage range, continuous operation: +20.5 V DC to 32.2 V DC short time operation: +18.0 V DC to 32.2 V DC
Power Hold-up	200 ms. Fully operational: 5 ms.
Typical Power Consumption (idle) (SBU, CM, HLD & satcom antenna)	30 W
Total Maximum Power Consumption (SBU, CM, HLD and satcom antenna)	See examples: With LGA-3000 (LGA, RF + GPS): Max. 84 W With TT-3002A (LGA, RF only): Max. 83 W With TT-5006A (IGA, Coax Modem): Max. 98 W With AMT-50, HGA-6000 (HGA, ARINC-781): Max. 83 W With HGA-7000 (HGA, Coax Modem): Max. 107 W
Maximum Heat Dissipation (SBU & CM)	<33 W
Connectors	Rear: ARINC 404A Front: RJ45 Female.
Operating Temperature	-25 °C to +55 °C
Ground Survival Temperature	-55 °C to +85 °C
Shelf life	7 years at 35°C in original packing

Table A-1: Equipment specifications for TT-5040A SBU



Characteristics	Specification
Altitude	Non pressurized (Cat. F1): 55,000 ft Pressurized (Cat. A1): 15,000 ft Decompression (Cat. A1): 55,000 ft Overpressure (Cat. A1): -15,000 ft
Relative humidity	95% non-condensing at +50°C
Environmental Categories	Refer to Environmental Qualification form in <i>SwiftBroadband unit (SBU)</i> on page B-2 in Appendix B.

Table A-1: Equipment specifications for TT-5040A SBU (Continued)

## A.2.2 TT-5040A-001 Configuration Module (CM) for SBU

Characteristics	Specification
Dimensions (L x W x H)	47 mm x 45.5 mm x 20.0 mm (1.85" x 1.79" x 0.79")
Weight	0.07 kg ±0.01 kg (0.15 lbs ±0.02 lbs)
Mounting	The CM is inserted in the TT-5040A SBU
Supply Voltage	The CM is powered by the SBU.
Heat dissipation	Included in TT-5040A SBU
Connector	9-pin Sub-D connector
Operating Temperature	-25 °C to +55 °C
Ground Survival Temperature	-55 °C to +85 °C
Altitude	Non pressurized (Cat. F1): 55,000 ft Pressurized (Cat. A1): 15,000 ft Decompression (Cat. A1): 55,000 ft Overpressure (Cat. A1): -15,000 ft
Relative humidity	95% non-condensing at +50°C
Environmental Categories	Refer to Environmental Qualification form in <i>SwiftBroadband unit (SBU)</i> on page B-2 in Appendix B.

Table A-2: Equipment specifications for TT-5040A-001 CM

### A.2.3 TT-5016A High Power Amp./Low Noise Amplifier/Diplexer (HLD)

Characteristics	Specification
Dimensions (L x W x H)	228.0 mm x 200.0 mm x 50.0 mm (8.98" x 7.87" x 1.97")
Weight	2.6 kg ±0.1 kg (5.7 lbs ±0.22 lbs)
Mounting	<p>Can be installed in a non-temperature controlled location.                      Forced cooling is not required.                      Should be mounted as close to the Antenna unit as possible for minimum cable loss.                      Place the HLD with sufficient contact to the surface, respecting the max. resistance of 25 mΩ. The HLD can be mounted on a shelf or directly on the fuselage.</p>
Supply Voltage	The HLD is powered by the SBU.
Heat dissipation	< 40 W
Connectors	<p>Tx input: N-female                      Rx output: TNC-female                      Satcom antenna: TNC-female                      Ground stud</p>
Operating Temperature	-55 °C to +70 °C
Ground Survival Temperature	-55 °C to +85 °C
Altitude	<p>Non pressurized (Cat. F1): 55,000 ft                      Pressurized (Cat. A1): 15,000 ft                      Decompression (Cat. A1): 55,000 ft                      Overpressure (Cat. A1): -15,000 ft</p>
Relative humidity	95% non-condensing at +50°C
Environmental Categories	Refer to Environmental Qualification form in <i>High Power Amplifier/Low Noise Amplifier/Diplexer (HLD)</i> on page B-4 in Appendix B.

Table A-3: Equipment specifications for TT-5016A HLD

### A.2.4 TT-5040A-004 WLAN antenna

Characteristics	Specification
Dimensions (L x W x H)	12 mm x 119 mm x 13 mm (0.48" x 4.7" x 0.5")
Weight	28.3 g (1 ounce)
Mounting	For mounting instructions for WLAN antennas see <b>Figure 5-2: Mounting two WLAN antennas for optimum performance</b> in <i>TT-5040A-004 WLAN antennas</i> on page 5-7.
Connector	Male TNC
Operating Temperature	-40 °C to +71 °C
Ground Survival Temperature	-55 °C to +85 °C
Altitude	Pressurized (Cat. A1): 15,000 ft Decompression (Cat. A1): 45,000 ft Overpressure (Cat. A1): -15,000 ft
Relative humidity	95% non-condensing at +50°C
Cable type	Plenum, RG-316U coaxial
Cable length (including connector)	7.5" ± 0.25" (190.5 ± 6.4 mm)

Table A-4: Equipment specifications for WLAN antenna

### A.2.5 TT-5038A-003 Rx Power Splitter

Characteristics	Specification
Dimensions (L x W x H)	86.8 mm x 50.8 mm x 19.1 mm (3.42" x 2.00" x 0.75") including connectors.
Weight	146 g ± 10 g (0.32 lbs ± 0.02 lbs)
Mounting	If the Rx Power Splitter is to be mounted on a flat surface, mount it on a 3 mm mounting plate to provide enough space for mounting of the connectors. Can be mounted in an unpressurized but temperature controlled location.
Connectors	3 x N-connector, Female. Built-in DC-block on the HSU (SBU) port.

Table A-5: General specifications for Rx Power Splitter

Characteristics	Specification
Operating Temperature	-25 °C to +55 °C
Ground Survival Temperature	-55 °C to +85 °C
Altitude	55000 ft
Environmental Categories	Refer to Environmental Qualification form in <i>Rx Power Splitter</i> on page B-6 in Appendix B.

Table A-5: General specifications for Rx Power Splitter

## A.3 AVIATOR 200/300/350 handsets and cradles

**Note** For specifications of the AVIATOR Wireless Handset see *AVIATOR Wireless Handset and Cradle Installation & Maintenance Manual* (part number: 98-129600)

### A.3.1 TT-5621B 2-Wire Handset

Characteristics	Specification
Dimensions (L x W x H)	200.0 mm x 52.0 mm x 31.5 mm (7.87" x 2.05" x 1.24")
Weight	0.22 kg ±50 g (0.49 lbs ±0.11 lbs) incl. cable.
Mounting	Mount in a pressurized and temperature controlled location.
Power consumption	Max. 750 mW for handset and cradle (included in SBU power consumption).
Operating Temperature	-25 °C to +55 °C
Ground Survival Temperature	-40 °C to +80 °C
Altitude	55,000 ft
Environmental Categories	Refer to Environmental Qualification form in <i>2-Wire Handset and 2-Wire Cradle</i> on page B-8 in Appendix B.

Table A-6: Equipment specifications for 2-Wire Handset

### A.3.2 TT-5622B 2-Wire Cradle

Characteristics	Specification
Dimensions (L x W x H)	160.5 mm x 61.0 mm x 28.4 mm (6.30" x 2.40" x 1.12")
Weight	0.20 kg ±50 g (0.43 lbs ±0.11 lbs) incl. connector cable.
Mounting	Mount in a pressurized and temperature controlled location.
Power consumption	See <i>TT-5621B 2-Wire Handset</i> on page A-7.
Operating Temperature	-25 °C to +55 °C
Ground Survival Temperature	-40 °C to +80 °C
Altitude	55,000 ft
Environmental Categories	Refer to Environmental Qualification form in <i>2-Wire Handset and 2-Wire Cradle</i> on page B-8 in Appendix B.

Table A-7: Equipment specifications for 2-Wire Cradle



# DO-160 specifications

## B.1 General

### B.1.1 Certifying agency

Approval of the installation of the AVIATOR 200/300/350 system is not authorized by this installation manual. Acceptance for the installation and use of the AVIATOR 200/300/350 system and its associated components must be obtained through the appropriate offices of the FAA or other certifying agency. It is recommended that all proposed installations be coordinated with the local jurisdiction of the FAA or other certifying agency prior to performing the installation.

### B.1.2 Environmental Qualification Forms

The Environmental Qualification Forms list the environmental categories under which all Cobham SATCOM components of the AVIATOR 200/300/350 system are approved.

Please refer to RTCA DO-160D/E for further details on the following Environmental Qualification Forms.

## B.2 AVIATOR 200/300/350 system components

### B.2.1 SwiftBroadband unit (SBU)

Part Number: 405040A (AVIATOR 200/300/350) or 405040A-THD  
(AVIATOR 200D/300D/350D)

**DO-160E string: [(A1)(F1)X]CAB[SB2M]ExxxxxZ[AB]A[RB][ZC][RR]M[A3J33]XXAX**

Conditions	DO-160E	Cat.	Comments
Temperature and Altitude	4.0	A1, F1	Installation in temperature controlled areas and inside or outside pressurized locations.
Low Temperature	4.5.1 & 4.5.2		Short time operating low is -40°C. Unit is active, but inoperable until the unit temperature is > -30°C. Min. operational temperature is -25°C.
High Temperature	4.5.3 & 4.5.4		Short time operating high (30 min.): +70°C Max. operating high temperature is +55°C
In-Flight Loss of Cooling	4.5.5	X	Forced cooling is not required and not recommended.
Altitude	4.6.1		Max. altitude: 55000 ft
Decompression	4.6.2		Decompression test at 55000 ft
Overpressure	4.6.3		Overpressure at -15000 ft
Temperature Variation	5.0	C	Installation within temperature controlled areas: 2°C/min.
Humidity	6.0	A	Standard Humidity: 95% relative humidity at 38°C to 50°C for 48 hours. Installation within environmentally controlled zones
Operational Shocks and Crash Safety	7.0	B	Equipment tested to: Standard operational shock and crash safety.
Vibration	8.0	S, B2, M	Equipment tested without shock mounts to Category S, Curve B2 and Curve M.
Explosion Proofness	9.0	E	Not hermetically sealed equipment
Waterproofness	10.0	X	No test required
Fluids Susceptibility	11.0	X	No test required

Table B-1: Environmental Qualification Form for SBU



Conditions	DO-160E	Cat.	Comments
Sand and Dust	12.0	X	No test required
Fungus Resistance	13.0	X	No test required
Salt Spray	14.0	X	No test required
Magnetic Effect	15.0	Z	Magnetic deflection distance: < 0.3 m
Power Input	16.0	AB	Power supply: +28 V DC. Reconnection of voice and data calls is not required, if a power interrupt less than 200 ms occurs during transfer of power sources.
Voltage Spike	17.0	A	Power supply: +28 V DC.
Audio Susceptibility	18.0	RB	Power supply: +28 V DC.
Induced Susceptibility	19.0	ZC	Equipment intended for operation in systems where interference-free operation is required.
Radio Frequency Susceptibility	20.0	RR	High Intensity Radiated Field (HIRF) associated with normal environment.
Emission of Radio Frequency Energy	21.0	M	Installation in areas with significant electromagnetic apertures.
Lightning Induced Transient Susceptibility	22.0	A3J33	Equipment and wiring in moderately exposed environment in an all metal airframe.  The Configuration Module is an integrated part of the SBU, and so the pin injection tests are not required for the Configuration Module interface.
Lightning Direct Effects	23.0	X	No test required
Icing	24.0	X	No test required
Electrostatic Discharge ESD	25.0	A	Operation, installation and repair in an aerospace environment.
Fire, Flammability	26.0	X	Equipment is tested according to FAR 25 Airworthiness Standards: Transport Category Airplanes, Paragraph 25.853(a) and Appendix F - Part I (a)(1)(ii) and Paragraph 25.869(a)(4) and Appendix F - Part I (a)(3).

Table B-1: Environmental Qualification Form for SBU (Continued)

### B.2.2 Configuration Module (CM) for SBU

Part Number: 405040A-001

DO-160E string: Please refer to the section *SwiftBroadband unit (SBU)* on page B-2, as the Configuration Module is an integral part of the SBU during normal operation and tests. However, the section 25 Category A test is performed on the Configuration Module as an individual LRU.

### B.2.3 High Power Amplifier/Low Noise Amplifier/Diplexer (HLD)

Part Number: 405016A (AVIATOR 200/300/350) + 405016A-THD (AVIATOR 200D/300D/350D)

**DO-160E string: [(A2)(F2)X]BBB[SCL]E[(Y)(W)]XXFXZXXX[ZC][RR]M[A3J33]XXAX**

Conditions	DO-160E	Cat.	Comments
Temperature and Altitude	4.0	A2, F2	Installation in non-temperature controlled locations and inside or outside pressurized locations.
Low Temperature	4.5.1 & 4.5.2		Min. operational temperature is -55°C. Short time operating low is -55°C.
High Temperature	4.5.3 & 4.5.4		Max. operating high temperature: +70°C Short time operating high: +70°C
In-Flight Loss of Cooling	4.5.5	X	Forced cooling is not required and not recommended.
Altitude	4.6.1		Max. altitude: 55000 ft.
Decompression	4.6.2		Decompression at 55000 ft.
Overpressure	4.6.3		Overpressure at -15000ft.
Temperature Variation	5.0	B	Installation in a non-temperature-controlled or partially temperature controlled internal section of the aircraft.
Humidity	6.0	B	Severe Humidity: 95% relative humidity at 38°C to 65°C for 240 hours. Installation within environmentally controlled zones.
Operational Shocks and Crash Safety	7.0	B	Equipment tested to: Standard operational shocks and crash safety.
Vibration	8.0	SCL	Fixed wing turbojet & turboprop/fuselage zone: Category S, Curve C & L.

Table B-2: Environmental Qualification Form for HLD

Conditions	DO-160E	Cat.	Comments
Explosion Proofness	9.0	E	Not hermetically sealed equipment.
Waterproofness	10.0	Y, W	Tested to condensing and dripping water.
Fluids Susceptibility	11.0	X	No test required.
Sand and Dust	12.0	X	No test required.
Fungus Resistance	13.0	F	Equipment tested to Category F.
Salt Spray	14.0	X	No test required.
Magnetic Effect	15.0	Z	Magnetic deflection distance: < 0.3 m.
Power Input	16.0	X	No test required (power from SBU).
Voltage Spike	17.0	X	No test required (power from SBU).
Audio Frequency Conducted Susceptibility - Power Inputs	18.0	X	No test required (power from SBU).
Induced Signal Susceptibility	19.0	ZC	Equipment intended for operation in systems where interference-free operation is required.
Radio Frequency Susceptibility	20.0	RR	High Intensity Radiated Field (HIRF) associated with normal environment.
Emission of Radio Frequency Energy	21.0	M	Installation in areas with significant electromagnetic apertures.
Lightning Induced Transient Susceptibility	22.0	A3J33	Equipment and wiring in moderately exposed environment in an all metal airframe.
Lightning Direct Effects	23.0	X	No test required.
Icing	24.0	X	No test required.
Electrostatic Discharge (ESD)	25.0	A	Operation, installation and repair in an aerospace environment.
Fire, Flammability	26.0	X	Equipment is tested according to FAR 25 Airworthiness Standards: Transport Category Airplanes, Paragraph 25.853(a) and Appendix F - Part I (a)(1)(ii) and Paragraph 25.869(a)(4) and Appendix F - Part I (a)(3).

Table B-2: Environmental Qualification Form for HLD (Continued)

## B.2.4 Rx Power Splitter

Part Number: 405038A-003

DO-160D string: [(A1)(F1)X]CBB[SCL]EXXXXXZXXXZ[RR]M[A3E3]XXA

RTCA/DO-160D Change Numbers			
Change Number	Date of Issue	Title	Section
Change No. 1	Dec. 14, 2000	Vibration	8.0
		Radio Frequency Susceptibility	20.0
Change No. 2	June 12, 2001	Power Input	16.0
		Audio Frequency Conducted Susceptibility - Power Inputs	18.0

Table B-3: RTCA/DO-160D Change Numbers, Tx Coupler and Rx Power Splitter

Conditions	DO-160D	Cat.	Comments
Temperature and Altitude	4.0	A1 and F1	Installation in controlled temperature locations and inside or outside pressurized locations.
Low Temperature	4.5.1		Min. operating low temperature: -25°C
High Temperature	4.5.2 & 4.5.3		Max. operating high temperature: +55°C
In-Flight Loss of Cooling	4.5.4	X	Forced cooling is not recommended.
Altitude	4.6.1		Max. altitude: 55000 ft
Decompression	4.6.2		Decompression at 55000 ft
Overpressure	4.6.3		Overpressure at -15000 ft
Temperature Variation	5.0	C	Installation within controlled temperature locations: 2°/min.
Humidity	6.0	B	Severe humidity: 95% relative humidity at 38°C to 65°C for 240 hours. Installation within non-environmentally controlled zones.
Operational Shocks and Crash Safety	7.0	B	Equipment tested to: Standard operational shocks and crash safety.
Vibration	8.0	SCL	Standard sinusoidal and random vibration: Aircraft type: Fixed wing. Turbojet, turbofan, reciprocating or turbo propeller engines. Aircraft zone: Fuselage

Table B-4: Environmental Qualification Form for Tx Coupler and Rx Power Splitter

Conditions	DO-160D	Cat.	Comments
Explosion Proofness	9.0	E	
Waterproofness	10.0	X	No test required
Fluids Susceptibility	11.0	X	No test required
Sand and Dust	12.0	X	No test required
Fungus Resistance	13.0	X	No test required
Salt Spray	14.0	X	No test required
Magnetic Effect	15.0	Z	Magnetic deflection distance: < 0.3 m
Power Input	16.0	X	No test required
Voltage Spike	17.0	X	No test required
Audio Frequency Conducted Susceptibility - Power Inputs	18.0	X	No test required
Induced Signal Susceptibility	19.0	Z	Equipment intended for operation in systems where interference-free operation is required
Radio Frequency Susceptibility	20.0	RR	High Intensity Radiated Field (HIRF) associated with normal environment.
Emission of Radio Frequency Energy	21.0	M	
Lightning Induced Transient Susceptibility	22.0	A3E3	Equipment and wiring in moderately exposed environment in an all metal airframe.
Lightning Direct Effects	23.0	X	No test required
Icing	24.0	X	No test required
Electrostatic Discharge (ESD)	25.0	A	Operation, installation and repair in an aerospace environment.

Table B-4: Environmental Qualification Form for Tx Coupler and Rx Power Splitter (Continued)

## B.3 AVIATOR 200/300/350 handsets and cradles



For DO-160 specifications of the AVIATOR Wireless Handset see *AVIATOR Wireless Handset and Cradle Installation & Maintenance Manual* (part number: 98-129600)

### B.3.1 2-Wire Handset and 2-Wire Cradle

Part Number: 405621B-THW / 405621B-THR / 405622B-THW / 405622B-THR

**DO-160C String: [A1X]CAB[(SMB2)(SM)(UFF1)]XXXXXXAXXXB[RR]M[A2E3]XXA**

Conditions	DO-160D	Cat.	Comments
Temperature and Altitude	4.0	A1	Installation in controlled temperature and pressurized location.
Low Temperature	4.5.1		Min. operating low temperature: -25°C
High Temperature	4.5.2 & 4.5.3		Max. operating high temperature: +55°C
In-Flight Loss of Cooling	4.5.4	X	No forced cooling required.
Altitude	4.6.1		Max. altitude: 55000 ft
Decompression	4.6.2		Decompression at 55000 ft
Overpressure	4.6.3		Overpressure test at -15000 ft
Temperature Variation	5.0	C	Installation within controlled temperature locations: 2°/min.
Humidity	6.0	A	Standard Humidity: 95% relative humidity at 38°C to 50°C for 48 hours. Installation within environmentally controlled zones.
Operational Shocks and Crash Safety	7.0	B	Equipment tested to: Standard operational shocks and crash safety.

Table B-5: Environmental Qualification Form for 2-Wire Handset and Cradle

Conditions	DO-160D	Cat.	Comments
Vibration	8.0	S2B2	Standard random vibration: Aircraft type: Fixed wing. Turbojet or turbofan engines.
		SM	Standard sinusoidal vibration: Aircraft type: Fixed wing. Reciprocating or turbo propeller engines.
		UFF1	Robust Sine-on-Random vibration: Aircraft type: Helicopter. Turbojet or reciprocating engines.  Aircraft zone: Instrument panel, console or equipment rack.
Explosion Proofness	9.0	X	No test required
Waterproofness	10.0	X	No test required
Fluids Susceptibility	11.0	X	No test required
Sand and Dust	12.0	X	No test required
Fungus Resistance	13.0	X	No test required
Salt Spray	14.0	X	No test required
Magnetic Effect	15.0	A	Magnetic deflection distance: 0.3 m to 1 m
Power Input	16.0	X	No test required
Voltage Spike	17.0	X	No test required
Audio Frequency Conducted Susceptibility	18.0	X	No test required
Induced Signal Susceptibility	19.0	B	Installation where interference is controlled to a tolerable level.
Radio Frequency Susceptibility	20.0	RR	High Intensity Radiated Field (HIRF) associated with normal environment.
Emission of Radio Frequency Energy	21.0	M	
Lightning induced Transient Susceptibility	22.0	A2E3	Cable bundle test: Equipment and wiring in moderately exposed environment in an all metal airframe.
Lightning Direct Effects	23.0	X	No test required

Table B-5: Environmental Qualification Form for 2-Wire Handset and Cradle (Continued)

Conditions	DO-160D	Cat.	Comments
Icing	24.0	X	No test required
Electrostatic Discharge (ESD)	25.0	A	Operation, installation and repair in an aerospace environment.

Table B-5: Environmental Qualification Form for 2-Wire Handset and Cradle (Continued)



## System messages

### C.1 Types of messages

The AVIATOR 200/300/350 system announces messages in the built-in web interface of the SBU.

## C.2 List of events

The following list explains the events (warnings and errors) that may show in the web interface of the SBU.

Event ID	ID range	Severity	Description	Explanation	Remedy
0100	00100to 00199	ERROR	System data damaged	Important system data is damaged	Do not use the terminal. Contact your Cobham SATCOM partner.
0210	00210to 00219	ERROR	SIM module error	The SIM interface on the terminal cannot be used.	Contact your Cobham SATCOM partner.
0240	00240to 00249	ERROR	Temperature sensor error	The terminal is in danger of overheating.	Do not use the terminal. Contact your Cobham SATCOM partner.
0260	00260to 00269	ERROR	System error	The terminal cannot communicate on the satellite network.	Contact your Cobham SATCOM partner.
0300	00300to 00309	ERROR	GPS module error	The GPS module is out of function. The terminal cannot obtain a valid GPS position.	Contact your Cobham SATCOM partner.
0310	0310	ERROR	WLAN module error	The WLAN access point failed initialization	Contact your Cobham SATCOM partner if the problem persists.
0330	00330to 00339	ERROR	ISDN failure	The ISDN interface on the terminal cannot be used.	Contact your Cobham SATCOM partner.
0340	00340to 00349	ERROR	2-wire failure	The Phone/Fax interface of the terminal cannot be used.	Contact your Cobham SATCOM partner.
0350	00350to 00359	ERROR	AD9864 calibration data error	Internal error in the receiving part of the terminal.	Contact your Cobham SATCOM partner if the problem persists.
0360	00360to 00369	WARNING	No antenna found	The terminal cannot communicate with the antenna.	Check antenna cable between terminal and antenna. Reboot the terminal.
0370	0370	ERROR	No HLD found	The SBU (TT-5040A) cannot detect the HLD (TT-5016A).	Check that the cable between SBU and HLD (cable W1) is correctly mounted and fulfils the requirements listed in this document. Check all connectors between SBU and HLD.

Table C-1: SBU events

Event ID	ID range	Severity	Description	Explanation	Remedy
0380	0380	ERROR	SNMP agent initialization failed	The SNMP agent failed initialization	Contact your Cobham SATCOM partner if the problem persists.
1010	01010 to 01019	WARNING	Temperature too low (critical)	Low ambient temperature is causing the performance of the terminal to be degraded or halted.	Move the terminal to a warmer location. For information on ambient temperature limits, see the installation manual.
1020	01020 to 01029	WARNING	Too low temperature warning	Low ambient temperature is causing the performance of the terminal to be degraded or halted. The terminal will assume radio silence if the problem is in the HLD.	Move the terminal to a warmer location. For information on ambient temperature limits, see the installation manual.
1110	01110 to 01119	WARNING	Temperature too high (critical)	Terminal: Critically high temperature is causing the terminal to shut down. HLD: Critically high temperature is causing the HLD to stop transmission.	If possible, move the failing unit to a cooler location. For information on ambient temperature limits, see the installation manual. Contact your Cobham SATCOM partner if the problem persists.
1120	01120 to 01129	WARNING	Too high temperature warning	High ambient temperature is causing the performance of the terminal to be degraded or halted.  If the problem is in the terminal: All PoE ports are shut down, except port 1 and the bit rate for Standard data is reduced. If the problem is in the HLD: The bit rate is reduced.	Move the terminal to a cooler location. For information on ambient temperature limits, see the installation manual.
1400	01400 to 01409	WARNING	Satellite signal lost	The AVIATOR system no longer receives a signal from the satellite.	Make sure the antenna has a free line of sight to the satellite. Check the Rx cables W2 between the SBU and the HLD and W3 between the satcom antenna and the HLD.
1600	01600 to 01609	WARNING	SOS call only	The SIM card is not accepted by the network. Only emergency calls are allowed.	Enter the PIN and wait for network approval. If the problem persists, contact your Airtime Provider.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
1700	01700to 01709	WARNING	Registration for voice failed	The AVIATOR system has not yet been allowed to register for voice services (Circuit Switched). Your SIM card may be blocked by the service provider.	Contact your service provider if the problem persists.
1800	01800to 01809	WARNING	Registration for data failed	The AVIATOR system has not yet been allowed to register for data services (Packet Switched). Your SIM card may be blocked by the service provider.	Contact your service provider if the problem persists.
2900	02900to 02909	WARNING	Network failed authentication	The AVIATOR system does not accept the network as a valid BGAN network.	Restart the AVIATOR system. Contact your Cobham SATCOM partner if the problem persists.
3100	3100	ERROR	Antenna cable loss calibration failed	The TX cable calibration between the SBU (TT-5040A) and HLD (TT-5016A) has failed.	Check that the cable between SBU and HLD (cable W1) is correctly mounted and fulfills the requirements listed in this document. Check all connectors between SBU and HLD.
3500	3500	ERROR	2-wire calibration failure	2-wire calibration failed on the Phone/Fax interface, because of: Common mode balance error. The phone is off hook. Wires are shorted to each other or shorted to ground.	Check the wires to your phone or fax. Put the phone on hook. Check the wires.
3600	03600to 03609	ERROR	2-wire operational failure	The Phone/Fax interface fails to operate, for one of the following reasons: Ground shorted. Power overload. Temperature overload.	Check the wires. Wait until the event is cleared; then try again. Wait until the event is cleared; then try again.
3900	3900	ERROR	Air link error	Problems related to TX and Rx DSPs. Example: PLL out of lock.	Contact your Cobham SATCOM partner
801D	801D	WARNING	Uploading firmware to antenna	New firmware is being uploaded to the antenna. The event will be cleared when upload has finished.	Contact your Cobham SATCOM partner if the event is not cleared within 5 minutes.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
801F	801F	WARNING	Power Hold-up - the input voltage has dropped	A power glitch was detected, the length of the glitch exceeds what the power supply can absorb. This event could have negative influence on ongoing connections.	Check external power connection.
8020	8020	ERROR	Power Hold-up - the terminal has lost power for more than 200 ms	The terminal has lost power for more than 200 ms.	Check the external power connection.
802C	802C	FATAL	Firmware update still fails after several retries	The terminal was unable to upload new firmware to the HLD, even after several retries.	Contact your Cobham SATCOM partner
802E	802E	FATAL	Firmware is older than current antenna version	The firmware in the HLD is newer than expected by the terminal.	Update the terminal software.
802F	802F	ERROR	Antenna main image could not be loaded	HLD failed to start up normally.	Restart the terminal. Contact your Cobham SATCOM partner if the problem persists.
8030	8030	FATAL	Antenna could not enter main application mode	HLD failed to start up normally.	Restart the terminal. Contact your Cobham SATCOM partner if the problem persists.
8031	8031	ERROR	Failed to enter normal operation	HLD failed to start up normally.	Restart the terminal. Contact your Cobham SATCOM partner if the problem persists.
8035	8035	ERROR	Unable to open port for HPA burst monitoring	There was an error communicating with the HLD.	Restart the terminal. Contact your Cobham SATCOM partner if the problem persists.
8040	8040	WARNING	Excessive writes to the flash memory	Wrong APN name or user name/ password for a connection which is set to auto-activate.	Check that the APN name, user name and password are set up correctly for your connections.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
8041	8041	ERROR	Flex key is missing or corrupt	The license system has detected a corrupt or missing Flex Key.	Re-install your Flex key. Please find your Flex key on the Certificate of Conformity (CoC) of the TT-5040A-001 Configuration Module.
8042	8042	ERROR	Can not read from Configuration Module	This error occurs when the TT-5040A-001 Configuration Module has not been inserted into the back of the TT-5040A SBU.	Insert the TT-5040A-001 Configuration Module into the back of the TT-5040A SBU.
8043	8043	ERROR	Flash on Configuration Module corrupt	The AVIATOR system has detected corrupt data on the TT-5040A-001 Configuration Module.	Please contact your Cobham SATCOM partner for further assistance.
8044	8044	ERROR	Flash on Configuration Module is getting worn out	The Configuration Module is aging and will have less than 10% of the expected lifetime left.	The Configuration Module still works but has to be replaceable in a timely manner
8049	8049	WARNING	Data rate reduction due to high temperature	The bit rate of the data channel is reduced because the temperature is too high.	None (if possible, provide cooling for the SBU)
804A	804A	WARNING	Flash on Configuration Module is worn out	The Configuration Module is completely worn-out and will have to be replaced.	The Configuration Module might still be operational but can fail at any time since the expected lifetime has been exceeded.
804C	804C	WARNING	The chosen satellite is not visible at current GPS position	The terminal is set up to use a satellite that is not visible at the current GNSS position.	Enter the web interface and select <b>SETTINGS &gt; Satellite selection</b> . Then select <b>Auto</b> to let the terminal automatically find the satellite with the best signal, or select a satellite visible from your current position.
804F	804F	WARNING	ARINC-429 Navigational input is missing or not yet ready	None of the navigational inputs receive valid data for one of the following reasons: Wiring is broken. The navigational source is not switched on or power-on sequence takes longer time than expected.	Check the wiring. Wait until power-on sequence has completed for the external navigational data source. Check if the external unit has been configured properly.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
8050	8050	WARNING	NRS (Magnetometer) Calibration is missing	Calibration of the TT-5006A antenna Magnetometer has not yet been done.	Calibrate the TT-5006A antenna Magnetometer as described in your AVIATOR installation manual.
8051	8051	WARNING	NRS (Magnetometer) Calibration was performed on different antenna than current	The AVIATOR system has detected that the TT-5006A antenna has been replaced. This requires a new calibration of the TT-5006A antenna Magnetometer.	Calibrate the TT-5006A antenna Magnetometer as described in your AVIATOR installation manual.
8052	8052	ERROR	HLD is operating below minimum specified temperature - TX is turned off	The temperature sensor in the HLD has detected a cooling below minimum threshold. To avoid operation outside of certified temperature range, all transmission has ceased.	When the temperature of the HLD increases above the minimum temperature, the system will automatically recover and enable transmission.
8054	8054	WARNING	Transmission aborted due to extreme temperature	The system stops all transmission because the temperature is critically high or critically low.	None. The system must operate within the allowed temperature range to work properly. For information on ambient temperature limits, see the installation manual.
8056	08056	WARNING	USIM rejected	The type of USIM card inserted in the terminal is not correct for your terminal.	Make sure you have the correct type of USIM card.
8060	8060	WARNING	NAT session table full	There are too many open connections through NAT - typically too many users generating too much web traffic.	Do not establish new connections until the load has been reduced.
8062	8062	WARNING	No connection to network. Voice Distress unavailable.	SB-Safety Voice is enabled, and the SBU could not establish contact to the satellite network within the expected time.	Check that satellite selection is either Auto or a visible satellite. If problem persists, contact your service provider.
8065	8065	WARNING	Voice Distress Supplementary Service (eMLPP) subscription failure	SB-Safety Voice is enabled, but the SBU could not register the enhanced Multi Level Priority and Preemption service on the network.	Contact your service provider.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
8066	8066	WARNING	Voice Distress Supplementary Service (Call Waiting) subscription failure	SB-Safety Voice is enabled, but the Call Waiting supplementary service is not available.	Contact your service provider.
8075	08075	ERROR	DO-178B or DO-254 certification level is inconsistent	The system consists of mixed Level-E and Level-D units.	The system is not operational. Contact your Cobham SATCOM partner.
8077	8077	WARNING	Multi-voice control connection config failure	Data write procedure failed when making a connection.	Reboot the SBU or make a reset to factory default settings. If this does not help contact your Cobham SATCOM partner.
8079	8079	WARNING	Multi-voice control connection error	Not possible to establish connection to Multi-voice server.	Check that Multi-voice is included in your airtime subscription. Check that the Multi-voice APN entered in the web interface under ADMINISTRATION > Multi-voice matches the Multi-voice APN from your airtime subscription.
807C	807C	WARNING	Multi-voice register failed	Not possible to register on the Multi-voice server.	Check that Multi-voice is included in your airtime subscription.
808D	808D	WARNING	ACARS failed, cannot create PDP context	The SBU cannot open ACARS PDP context. A unique PDP context is used for the transfer of ACARS data and this PDP context cannot be opened.	Check with the service provider that the SBU is allowed to logon to the ACARS APN. Use the default ACARS APN name if not instructed otherwise.
808E	808E	WARNING	ACARS failed, cannot perform DNS lookup	The SBU cannot lookup the IP address for the AGGW. The SBU has created an ACARS PDP context and tries to find the IP address for the AGGW.	Use the default AGGW name if not instructed otherwise. Check with your service provider that the AGGW name is correct.

Table C-1: SBU events (Continued)



Event ID	ID range	Severity	Description	Explanation	Remedy
808F	808F	WARNING	ACARS failed, logon to AGGW rejected	The AAGW in the SBU cannot log in to the AGGW.	Check with your service provider that your SBU (IMSI and ICAO) has been registered in the AGGW. Try again later. This can be a temporary error in the AGGW.
8090	8090	WARNING	ACARS failed, lost contact with Ground Gateway (AGGW).	The connection between AAGW and AGGW has been lost. The AAGW in the SBU has had contact with the AGGW but it has been lost. The AAGW in the SBU and AGGW on the ground can no longer communicate.	This is typically a temporary problem. The signal can be lost or blocked. Try to make a normal voice call or data session. You cannot expect ACARS traffic to work if you can not make a normal voice or data call. Check if other alarms have been reported. Reboot the system.
8091	8091	WARNING	CMU link failure	The connection between CMU and SBU is not working. The CMU and SBU cannot communicate.	Check the cabling between CMU and SBU. Check that the CMU is powered on.
8092	8092	WARNING	WLAN failure or power off	WLAN Failure The WLAN interface is not working.	Check that the WLAN is not disabled with a discrete input (TP5).
8093	8093	ERROR	Selected Antenna cannot coexist with CMU/ACARS units	Mismatch between CMU and antenna configuration. The CMU interface is enabled together with an ARINC 741/781 antenna. It is not allowed since they are using the same ARINC 429 interface.	Change configuration to use an antenna that does not use the ARINC 429 interface.
8094	8094	WARNING	Enabling ACARS Position reporting violates discrete operation	Mismatch between ACARS position reporting and discrete USIM. The SBU has a discrete USIM installed so that the airplane position is hidden, but at the same time can report if position reporting is enabled in ACARS.	Disable position reporting in ACARS.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
8095	8095	WARNING	The password is too weak for ACARS Safety or 700D use. See the manual for password requirements.	Administrator password too weak. The administrator password is too weak when ACARS is enabled, it creates a safety risk. The SBU is probably using the default administrator password.	<ul style="list-style-type: none"> <li>Change the administrator password following the guidelines provided in <i>Change the administrator password</i> on page 6-72.</li> </ul>
809F	809F	ERROR	Aero basic config is not initialised	The basic configuration of the system is not complete.	Check the configuration in the web interface, see <i>Configuration tasks</i> on page 6-2.
80A0	80A0	ERROR	Tracking register failed	The system fails to register on the Tracking server.	Check with your Airtime provider that you have registered with the correct IMSI and IMEI/ICAO address. See <i>Tracking</i> on page 6-54.
80A2	80A2	ERROR	Tracking unregistered	The system has not yet registered on the tracking server even though tracking is enabled.	Check that you have the correct IP address, port numbers and encryption key. See <i>Tracking</i> on page 6-54.
9400	9400	ERROR	Antenna failure	The antenna has reported an error and may not work properly.	Try to reset the system and antenna. If the failure persists then replace the antenna.
9401	9401	ERROR	TT-5006A, Inclinometer Failure	The software in the TT-5006A antenna has detected a problem with the inclinometer sensor, and the antenna is not working.	Try to reset the system and antenna. If the failure persists then replace the antenna.
9402	9402	ERROR	TT-5006A, Magnetometer Failure	The software in the TT-5006A antenna has detected a problem with the magnetometer, and the antenna is not working.	Try to reset the system and antenna. If the failure persists then replace the antenna.
9403	9403	ERROR	TT-5006A, Motor Failure	The software in the TT-5006A antenna has detected a problem with the motor, and the antenna is not working.	Try to reset the system and antenna. If the failure persists then replace the antenna.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
9404	9404	ERROR	TT-5006A, Motor Temperature Failure	The antenna is too hot.	Try to power off the system and antenna for a longer period of time, i.e. park the airplane in the shade such that the antenna can cool down. If the failure persists then replace the antenna.
9405	9405	ERROR	TT-5006A, Endstop Sensor Failure	The software in the TT-5006A antenna has detected a problem with the endstop sensor and the antenna is not working.	Try to reset the system and antenna. If the failure persists then replace the antenna.
9406	9406	ERROR	TT-5006A, Flash Failure	The software in the TT-5006A antenna has detected a problem with the flash test and the antenna is not working.	Try to reset the system and antenna. If the failure persists then replace the antenna.
9407	9407	ERROR	TT-5006A, SRAM Failure	The software in the TT-5006A antenna has detected a problem with the SRAM test and the antenna is not working.	Try to reset the system and antenna. If the failure persists then replace the antenna.
9408	9408	ERROR	TT-5006A, EEPROM Failure	The software in the TT-5006A antenna has detected a problem with the EEPROM test and the antenna is not working.	Try to reset the system and antenna. If the failure persists then replace the antenna.
9409	9409	ERROR	TT-5006A, Supplied Power Failure	The software in the TT-5006A antenna has detected a problem with the supplied power from the SBU and the antenna is not working.	Check cabling between SDU and TT5006A antenna (cable W4). Measure the voltage on the inner core of the antenna cable (cable W4), the voltage should be 28 V. Check that system is configured to a TT-5006A antenna.
940A	940A	ERROR	TT-5006A, Floating Point Failure	The software in the TT-5006A antenna has detected a floating point error and the antenna is not working.	Try to reset the system and antenna. If the failure persists then replace the antenna

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
940B	940B	ERROR	TT-5006A, Flash Checksum Failure	The software in the TT-5006A antenna has detected a problem with the flash checksum and the antenna is not working.	Try to reset the system and antenna. If the failure persists then replace the antenna
940C	940C	ERROR	TT-5006A, EEPROM Checksum Failure	The software in the TT-5006A antenna has detected a problem with the EEPROM. The antenna is not working.	Try to reset the system and antenna. If the failure persists then replace the antenna.

Table C-1: SBU events (Continued)

# WLAN country codes

## D.1 Restrictions in WLAN use

Not all countries allow full use of all channels. Also, some countries do not allow operation according to the 802.11g standard. Therefore the WLAN interface must be set up to the right country code.

By default, the SBU is set up to the US country code that allows the WLAN interface to operate according to the 802.11b and 802.11g standards on the channels 1 to 11. If the equipment is used in the countries listed in Table D-1 on page D-2, the default country code "US" can be used. In other countries the country code "other countries" must be used, allowing the interface to operate only according to the 802.11b standard on channels 4-9.

To set up the country code, use the WLAN page of the built-in web interface in the SBU. For further information see *WLAN interface (option)* on page 6-22.

## D.2 Countries where the “US” country code applies

The below table shows the countries in which country code “US” applies.

Antigua and Barbuda	Estonia	Latvia	Singapore
Aruba	El Salvador	Kuwait	Saudi Arabia
Australia	EU Countries	Latin America	Serbia and Montenegro
Austria	Finland	Liechtenstein	Slovenia
Bahamas	France	Luxembourg	South Africa
Barbados	Germany	Malaysia	South Korea
Belgium	Greece	Malta	Spain
Bermuda	Guam	Mexico	Sweden
Bulgaria	Guatemala	Morocco	Switzerland
Canada	Haiti	Netherlands	Taiwan
Cayman Islands	Honduras	Netherlands Antilles	Thailand
China	Hong Kong	New Zealand	Turkey
Colombia	Hungary	Norway	UK
Costa Rica	Iceland	Oman	Ukraine
Cyprus	Indonesia	Peru	United Arab Emirates
Czech Republic	Ireland	Poland	US
Denmark	Israel	Portugal	Venezuela
Dominican Republic	Italy	Puerto Rico	Virgin Islands / British
Ecuador	Japan	Romania	Virgin Islands / US
Egypt	Jordan	Russia	XA <sup>a</sup>

Table D-1: Countries that accept the country code “US” for WLAN indoor operation

- a. The two letter code XA is available for individual use and will not be allocated to countries. (ISO 3166-1, Codes for the representation of names of countries and their subdivisions – Part 1: Country codes)

# References

## E.1 Applicable standards

- [1] IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications. IEEE Std 802.3, 2000 Edition (Incorporating IEEE Std 802.3, 1998 Edition, IEEE Std 802.3ac-1998, IEEE Std 802.3ab-1999, and IEEE Std 802.3ad-2000) [Adopted by ISO/IEC and re-designated as ISO/IEC 8802-3:2000(E)].
- [2] ISO/IEC 8877:1992 Information technology -- Telecommunications and information exchange between systems -- Interface connector and contact assignments for ISDN Basic Access Interface located at reference points S and T
- [3] RTCA/DO-160D. Environmental Conditions and Test Procedures for Airborne Equipment. RTCA Inc. July 29, 1997
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- [5] Integrated Services Digital Network (ISDN). Basic User-Network Interface (UNI). ETSI EN 300 012-1 V1.2.2 (ITU I.430)
- [6] Integrated Services Digital Network (ISDN). ISDN User Network Interfaces. ITU-T Recommendation I.420
- [7] ARINC 429. Mark 33 Digital Information Transfer Systems (DITS)
- [8] ARINC 404A. Air Transport Equipment Cases and Racking
- [9] CCITT Rec. G.473. Standard US DTMF Telephone
- [10] RTCA/DO-178B. Software Considerations in Airborne Systems and Equipment Certification, December 1, 1992
- [11] RTCA/DO-254. Design Assurance Guidance for Airborne Electronic Hardware, April 19, 2000
- [12] ARINC CHARACTERISTIC 704A. Inertial Reference System
- [13] ARINC CHARACTERISTIC 705. Attitude and Heading Reference System
- [14] ARINC CHARACTERISTIC 743A. GNSS Sensor

- [15] ARINC CHARACTERISTIC 741P1. Aviation Satellite Communication System Part 1. Aircraft installation provisions
  
- [16] ARINC CHARACTERISTIC 781. Mark 3 Aviation Satellite Communication Systems



# TT-5019A Iridium Band Reject Filter

## F.1 Introduction

You can use the AVIATOR 200/300/350 system on aircrafts with installed IRIDIUM satellite phones. To have the SwiftBroadband and IRIDIUM service working smoothly next to each other an Iridium Band Reject Filter must be installed between the SBU and the HLD unit.

An INMARSAT Dual RF Filter (Aircell P/N P13167) must also be inserted in the antenna coax cable of the Iridium system.

### F.1.1 System block diagram

The following block diagrams show the location of the Iridium Band Reject Filter between the SBU and the HLD.

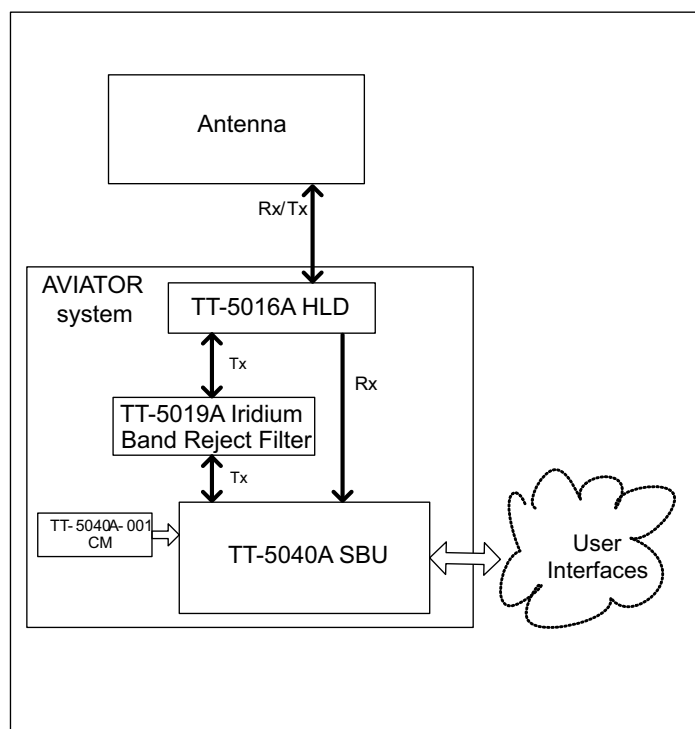


Figure F-1: System configuration with TT-5019A Iridium Band Reject Filter (1)

# F.2 Equipment drawing

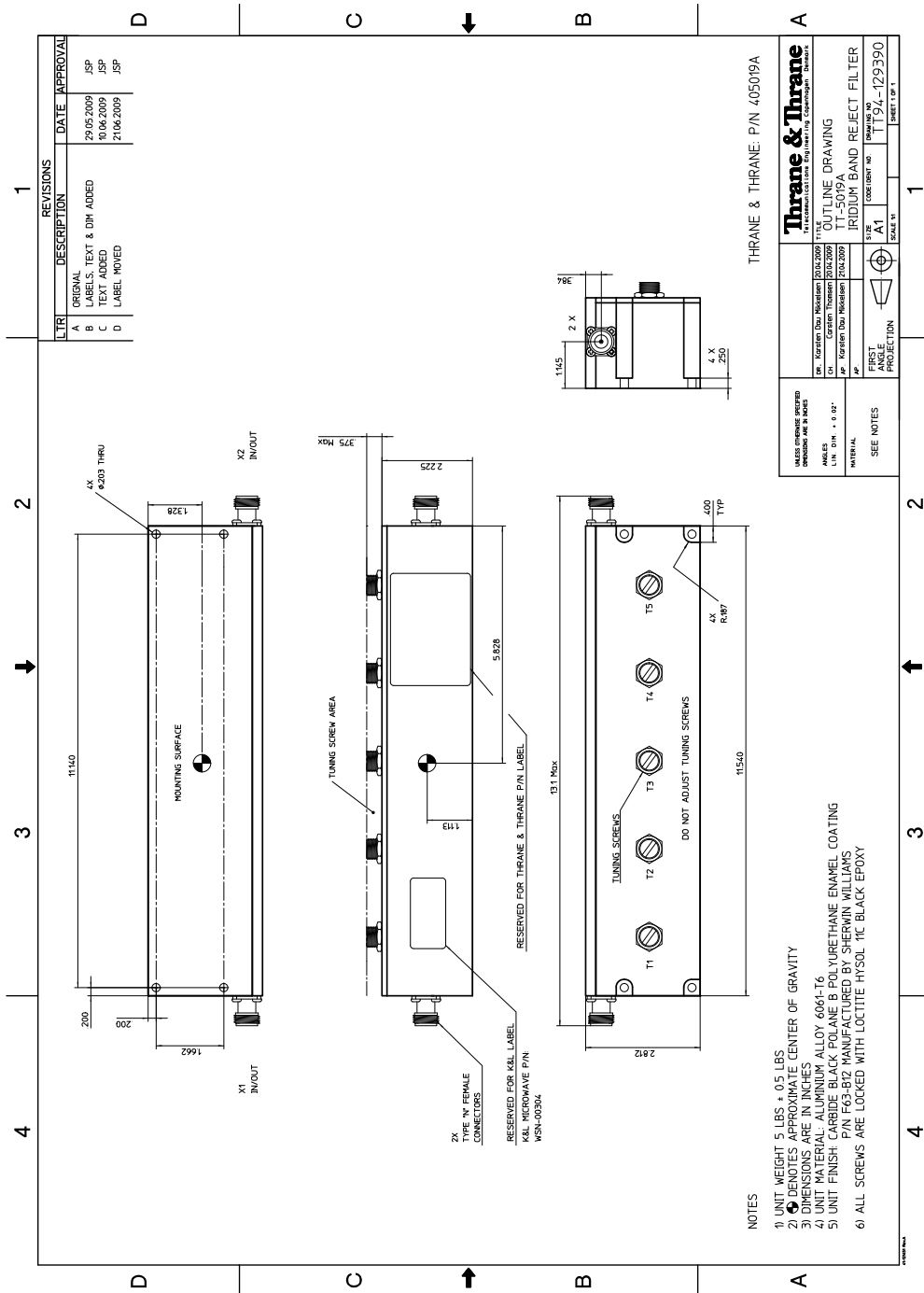


Figure F-2: Outline drawing: TT-5019A Iridium Band Reject Filter

## F.3 Installation

### F.3.1 Mounting considerations

Forced cooling is not required for the Iridium Band Reject Filter.

Mount the TT-5019A Iridium Band Reject Filter on the Tx connection between the SBU and the HLD. The filter works in both directions.

- Install the Iridium Band Reject Filter in non-temperature controlled locations and inside or outside pressurized locations.
- If possible mount the Iridium Band Reject Filter in a temperature controlled location to ensure optimum performance.
- The Iridium Band Reject Filter has an attenuation of 1 dB, consider this during wiring.
- For grounding purposes, you may remove the paint around the mounting holes of the Iridium Band Reject Filter.

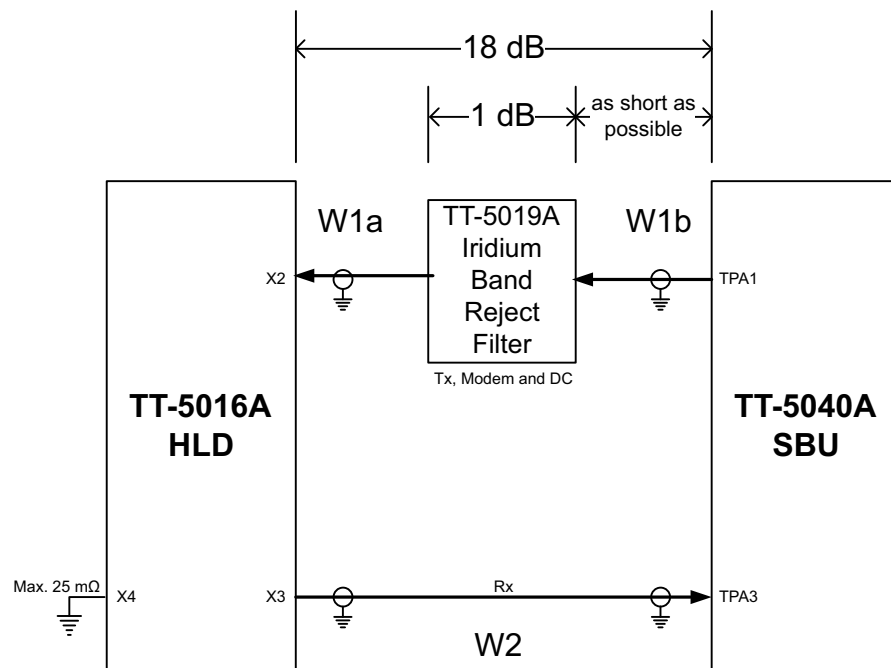


Figure F-3: Wiring TT-5019A Iridium Band Reject Filter

#### Important

AVIATOR 200: Loss of W1a + loss of W1b < 16 dB

AVIATOR 300 and AVIATOR 350: Loss of W1a + loss of W1b < 17 dB

### Safe distance to Inmarsat satcom

Using Iridium and Inmarsat satcom systems on the same aircraft will normally cause problems, because the two systems use frequency bands next to each other. The problem is that the transmit signal from the Inmarsat satcom system will overload the receiver section of the Iridium system. This is due to the fact that Iridium systems in general have no filters,

which could ensure resilience against transmissions in adjacent bands. Appropriate filtering, in the Inmarsat and in the Iridium systems allows having both systems. The filtering reduces the impact to an acceptable minimum.

The following table shows the minimum distances between the two systems for various antenna types and degrees of acceptable impact.

Probability of interference / Distance between antennas		
Antenna type	Very low	Low
LGA	1.9 m	1.3 m
IGA	3 m	2 m
HGA	7 m	4.5 m

Table F-1: Distance to Iridium

### F.3.2 Electrical installation and wiring

The filter works in both directions. Connect it to the SBU and HLD to provide the best fit in the current installation.

## F.4 Configuration

No configuration is necessary for the TT-5019A Iridium Band Reject Filter.

## F.5 Specifications

Characteristics	Specification
Dimensions (L x W x H)	293.12 mm x 71.37 mm x 66.04 mm (11.54" x 2.81" x 2.6")
Weight	5 lbs +/- 0.5 lbs (2.28 kg +/- 0.23 kg)
Mounting holes	4 x 5 mm (0.2") diameter
Insertion loss	≤0.1 dB at 1627.15 - 1660.5 MHz
Operating Temperature	-25°C to +70°C
Storage Temperature	-55°C to +85°C
Altitude	55000 ft
Environmental Categories	Refer to Environmental Qualification form in <i>DO-160 specifications</i> on page F-5.

Table F-2: Equipment specifications for TT-5019A Iridium Band Reject Filter

## F.6 DO-160 specifications

T&T Part Number: 405019A

DO-160E string: [(A1)(F1)X]BAB[SCLM]EXXXXXZXXXXXXXXXXAX

Conditions	DO-160E	Cat.	Comments
Temperature and Altitude	4.0	A1, F1	Installation in temperature controlled areas and inside or outside pressurized locations.
Low Temperature	4.5.1 & 4.5.2		Short time operating low temp.: -40°C. Min. operational temperature: -25°C.
High Temperature In-Flight Loss of Cooling	4.5.3 & 4.5.4		Short time operating high temperature: +70°C. Max. operational high temp.: +55°C.
In-Flight Loss of Cooling	4.5.5	X	Forced cooling is not required and not recommended.
Altitude	4.6.1		Max. altitude: 55000 ft.
Decompression	4.6.2		Decompression at 55000 ft.
Overpressure	4.6.3		Overpressure at -15000ft.
Temperature Variation	5.0	B	Installation within non-controlled temperature locations: 5°/min.
Humidity	6.0	A	Standard Humidity: 95% relative humidity at 38°C to 50°C for 48 hours. Installation within environmentally controlled zones.
Operational Shocks and Crash Safety	7.0	B	Equipment tested to: Standard operational shocks and crash safety.
Vibration	8.0	SCLM	Fixed wing turbojet & turboprop/fuselage and equipment rack: Category S, Curve C, L & M.
Explosion Proofness	9.0	E	Not hermetically sealed equipment.
Waterproofness	10.0	X	No test required.
Fluids Susceptibility	11.0	X	No test required.
Sand and Dust	12.0	X	No test required.
Fungus Resistance	13.0	X	No test required.

Table F-3: Environmental Qualification Form for Iridium Band Reject Filter

Conditions	DO-160E	Cat.	Comments
Salt Spray	14.0	X	No test required.
Magnetic Effect	15.0	Z	Magnetic deflection distance: < 0.3 m.
Power Input	16.0	X	No test required (passive device).
Voltage Spike	17.0	X	No test required (passive device).
Audio Susceptibility	18.0	X	No test required (passive device).
Induced Susceptibility	19.0	X	No test required.
Radio Frequency Susceptibility	20.0	X	No test required.
Emission of Radio Frequency Energy	21.0	X	No test required.
Lightning Induced Transient Susceptibility	22.0	X	No test required.
Lightning Direct Effects	23.0	X	No test required.
Icing	24.0	X	No test required.
Electrostatic Discharge (ESD)	25.0	A	Operation, installation and repair in an aerospace environment.
Fire, Flammability	26.0	X	Equipment is compliant with FAR 25 Airworthiness Standards: Transport Category Airplanes, Paragraph 25.853(a) and Appendix F - Part I (a)(1)(ii).

Table F-3: Environmental Qualification Form for Iridium Band Reject Filter (Continued)

# Terminal commands

## G.1 Get started

### G.1.1 Connect to the SBU

#### Hardware and software requirements

The following items are required to run terminal commands:

- One IBM compatible PC with an Ethernet port available.
- One standard Ethernet cable. RJ-45<->RJ-45.
- A suitable Telnet client. In Windows XP and previous versions of Windows, you can use the included HyperTerminal. In Windows Vista and Windows 7 you can use the included DOS-based client, but this is not optimal. A 3rd party client that supports logging to a file is recommended.

#### Prepare the telnet client

Do as follows to set up the telnet client:

1. Connect the SBU front connector to the PC Ethernet port.
2. Open the Telnet client, and make a TCP/IP (winsock) connection to IP address (host) 192.168.0.1 and port 23 (default).
3. Login with **admin** and 1234 (default) and press <Enter> a couple of times and confirm that the SBU prompt **telnet:/\$** appears.

**Option:** If you need to save the output from HyperTerminal, go to the **Transfer** menu and select **Capture text...** In other clients, the menus will be different.

## G.2 Commands for troubleshooting the SBU

### G.2.1 Monitor the ARINC interfaces on the SBU

Below is an example on how to get a status for the ARINC interfaces. After the debug command for getting the status report (first line, bold) the status report is shown.

**stat -m arinc**

```

STAT Report
Module: ARINC, Status: Ok, Message:
REPORT: SHORT
CONFIGURATION
Primary Receiver : ARINC 704-7 Inertial Reference System (IRS), speed: High
Secondary Receiver: Disabled, speed: Low
Antenna Modem : ARINC AMT-50/HGA-6000, speed: Split

STATUS ARINC DRIVER
Current Time : Thu Jan 01 00:00:54 1970
Primary Receiver : 6 RO_6_IRS_CONNECTED Qualified Forwarding forwardingPeriods:1
Secondary Receiver: 0 RO_0_NULL Await-Label Standby forwardingPeriods:0
Antenna Modem : 1 RT_1_INIT Await-Label

Primary Receiver:
Label Status Error Active Age Value Name
101 No Label 422 0 0 0.000000 HDOP
150 No Label 422 0 0 00:00:00 gnss UTC Time
260 No Label 422 0 0 00/00/00 UTC Date
273 Normal 353 69 158 Self Test GNSS Sensor Status
274 Normal 353 69 158 Self Test GPIRS Status
310 Normal 353 69 158 55.794067 N Latitude
311 Normal 353 69 158 12.523041 E Longitude
312 Normal 353 69 158 0.000000 Knots Ground Speed
313 Normal 353 69 158 0.000000 Deg Track Angle True
314 Normal 353 69 158 0.000000 E True Heading
324 Normal 353 69 158 0.010986 Deg Pitch Angle
325 Normal 353 69 159 0.120850 Deg Roll Angle
336 Normal 353 69 159 -0.015625 Deg/Sec Inertial Pitch Rate
337 Normal 353 69 159 0.000000 Deg/Sec Inertial Roll Rate
361 Normal 353 69 159 167.250000 Feet Altitude Inertial
377 Plus 353 69 159 0x004 IRS (704) Equipment Identification

Details:
273 Satellites-Tracked:0 Visible:0
273 IRS/FMS : Present Source: Primary
273 DADC/FMS: Present Source: Primary
274 Satellites-Tracked: 0
274 Primary GPSSU Validity: Valid
274 Secondary GPSSU Validity: Valid
274 GPSSU Source: Primary
377 Source Identifier: Primary

Antenna Modem:
Label Status Error Active Age Value Name
144 No Label 0 0 0 0.000000 dB Tx Gain Antenna Status
152 No Label 0 0 0 Azimu:0 Eleva:0 Open Loop Steering
    
```



```

350 No Label          0          0          0 Bit 25-11: 0x0      Antenna Maintenance
Details:
 144 OperationalStatus: OmnidirectionalMode SDI:ALL_CALL
 144 EqId:0 TrackingMode:Open HGA/IGA LNA Status:Disabled AntennaType:HGA
AntennaLocation:PORT/TOP
 350 SDI: ALL_CODE
Errors / Warnings
  None

COUNTERS ARINC-429:  Primary  Secondary  Ant-Rx  Ant-Tx
allocation           20         0         0
wordsA429            6752        0         0         0
discardError         0          0         0         0
framingError         0          0         0
parityError          0          0         0
overflowError        0          0         0
regStatusRead        422         0         0         FPGA Status Read
regTimeTagRead       422         0         0         FPGA TimeTag Read
regCtrlWrite         2          0         5         FPGA Control Write
interrupt            0          0         0         FPGA Interrupt
reset                0          0         0         0 Debug only
clearCounters        0          0         0         0

```

## G.2.2 Description of the status report

The status report consists of up to seven parts:

1. Report header
2. ARINC driver configuration
3. The overall status for the ARINC driver
4. Status for the Primary ARINC Receiver
5. Status for the Secondary ARINC Receiver, if configured
6. Status for the ARINC Antenna modem, if configured
7. Low level ARINC-429 counters

Below is a detailed description of each part of the status report.

### STAT Report

The following lines are part of the standard system header, there is no information relevant for the ARINC interfaces present in the header, you may just ignore these lines:

```

STAT Report
Module: ARINC, Status: Ok, Message:
REPORT: SHORT

```

### CONFIGURATION

The configuration part is a mirror of the ARINC information already available at *Set up the navigational input* on page 6-44, **SETTINGS > External systems** of the SBU.

## STATUS ARINC DRIVER

**Current Time:** This is the current UTC time, if available. In this example the year 1970 indicates that the UTC time not yet is available.

Read the following overview information in the following way:

Interface	State number and name	Status	Source	Source Activations
Primary Receiver	6 RO_6_IRS_CONNECTED	Lost-Label	Forwarding	forwardingPeriods:1
Secondary Receiver	0 RO_0_NULL	Await-Label	Standby	forwardingPeriods:0
Antenna Modem	1 RT_1_INIT	Await-Label		

Table G-1: Status ARINC driver, overview

The states for receivers have the following purpose:

State name	Description
RO_0_NULL	The receiver is not configured and therefore not started.
RO_1_INIT	The receiver is in the progress of starting up.
RO_2_LOOPBACK	A loop back test command has been running and a power-cycle is needed.
RO_4_AHRS_CONNECTED	The AHRS driver is running.
RO_6_IRS_CONNECTED	The IRS driver is running.

Table G-2: Purpose of the states for receivers

The states for the antenna modem can be used for the following purpose:

State name	Description
RT_0_NULL	The antenna modem is not configured and therefore not started.
RT_1_INIT	Awaits the BSU (Beam Steering Unit) start sending the status word.
RT_2_LOOPBACK	A loop back test command has been running and a power-cycle is needed.
RT_3_AMT50	The ARINC AMT-50 / HGA-6000 driver is running.

Table G-3: Purpose of the states for the antenna modem

**Status:** This reflects the overall status considering all mandatory labels on the interface in question.

Status	Description
Await-Label	At least one mandatory label has never showed up on the interface.
Lost-Label	A label previously received is now missing on the interface.
Unreliable	May be used in the future for selecting between two channels where one of them is more degraded than the other.
Degraded	One or more of the labels is degraded.
Evaluation	All mandatory labels are operational and has to be stable for a period of time before they can be qualified.
Qualified	All mandatory labels are operational and this port can now be forwarded.

Table G-4: Status for all mandatory labels on the interface in question

**Source:**

Source	Description
Forwarding	This ARINC receiver is forwarding valid navigational data to the SBU. Forwarding means that the data on the interface is used by the system.
Standby	This ARINC receiver is on standby and not forwarding data to the SBU. Standby means that the data on the interface are not used by the system.

Table G-5: Status ARINC driver: Source

**Forwarding Periods:** The number of periods the interface has being forwarding data to the system.

## RECEIVER

Header	Description
Label	The label number in octal number system.
Status	Take status of the label word according to bit 30 and 31 Sign/Status Matrix. See table directly below.
Error	The number of 100mS interval the label has not been operational.
Active	The number of 100mS interval the label has been operational.
Age	The age of the label in ms sampled every 100 ms.

Table G-6: Receiver: Header line for the table

Header	Description
Value	The decoded value of the label
Name	The name of the label according to ARINC-429

Table G-6: Receiver: Header line for the table (Continued)

The specific label type (BCD/BNR/DISC) can be looked up in the ARINC-429 Specification.

Status	BCD	BNR	DISC
0	Plus	Failure	Normal
1	No Data	No Data	No Data
2	Test	Test	Test
3	Minus	Normal	Failure

Table G-7: Status for label types

The underlined status is the operational state for the specific label type.

# SIP setup for Wifi-enabled phones

## H.1 Introduction

The built-in PBX of the AVIATOR 200/300/350 can route VoIP calls that are terminated in the SIP server of the SBU. If you have a phone with a SIP client and WLAN interface you can connect to the SBU via WLAN and configure the SIP client in your phone to communicate with the SBU. After successful configuration you can use your phone to make calls through the AVIATOR 200/300/350 system.

There are two tasks you have to do:

- *Connect to the WLAN interface*
- *Set up a SIP profile*

### H.1.1 Connect to the WLAN interface

To connect to the WLAN interface of the SBU, do as follows:

1. Refer to the user documentation of your phone for instructions how to connect to a wireless access point.
2. You can see the name of the wireless network in the web interface at **SETTINGS > WLAN, SSID**. The default value is the name of the system type, for example 'AVIATOR 200'.

### H.1.2 Set up a SIP profile

#### SIP telephony and SIP profiles

If your phone has an integrated SIP (Session Initiation Protocol) client you can use SIP telephony between your phone and the SBU, which has an integrated SIP server.

How to set up the SIP profile in your phone depends on your subscription, the SIP server in the terminal and the network which your phone is connected to, in this case the WLAN network on board the aircraft.

#### Where to get a SIP client application

If your smartphone does not have a SIP client, you can download one from one of the links below:

- Apple iPhone App store ([www.apple.com/iphone/from-the-app-store/](http://www.apple.com/iphone/from-the-app-store/))
- Android Market ([www.android.com/market/](http://www.android.com/market/))

**Note**

The SIP client is a third party application. Thrane & Thrane dose not offer technical support for it.

## To setup a SIP profile

Setup a SIP profile if you want to connect the SIP client of your phone to the SIP server of the terminal. You need to enter several network specific values so your phone can communicate with the SIP server.

Depending on your phone, some or all of the following parameters may have to be set up in the SIP profile of your phone:

- Profile name
- SIP server and port
- User name
- Password
- Codec priority
- Realm
- Audio configuration, Silence support

**User name:** When connecting to the AVIATOR 200/300/350, the user name should be a local number, i.e. 05xx. This must be configured in the built-in web interface under **SETTINGS > IP handsets**.

**Password:** When connecting to the AVIATOR 200/300/350, the password must match the IP Handset password entered in the web interface of the AVIATOR 200/300/350 on the page **SETTINGS > IP handsets**.

**Codec priority:** The SIP client must have G.729A as highest priority codec and G.711 A-LAW as second highest priority. The G.729A codec is required for the Multi-voice option.

**Realm:** When asked for Realm enter the serial number of the SBU.

**Audio configuration, Silence support enable:** Set to **No**. The phone should not stop sending data packets even though there is silence and no one speaks.

## A

ACARS	Airborne Communications Addressing and Reporting System
AHRS	Attitude and Heading Reference System
APN	Access Point Name. The Access Point Name is used by the terminal operator to establish the connection to the required destination network.
ARINC	Aeronautical Radio, Incorporated. A provider of transport communications and systems engineering solutions
AT	AT commands are used for controlling modems.
AWG	American Wire Gauge

## B

BGAN	Broadband Global Area Network, simultaneous voice and broadband data
BITE	Built-In Test Equipment. A BITE error is a hardware error detected by the automatic error detection system in the AVIATOR 700 System.
BSU	Beam Steering Unit

## C

CID	Context Identifier
CM	Configuration Module
CMU	Communications Management Unit
CPDLC	Controller-Pilot Data Link Communications, a method for air traffic controllers to communicate with pilots over a datalink system. , ,

## D

dB	decibel ,
DC	Direct Current
DCE	Data Communication Equipment. Equipment that does not generate data, but only relays data generated by someone else.
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.
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency. The signal to the phone company that is generated when you press an ordinary telephone's touch keys. DTMF has generally replaced loop disconnect (pulse) dialing.

## E

ECS	Electronic Cable Specialists, Inc., a Carlisle IT company
-----	---

EIRP	Effective Isotropic Radiated Power
EMC	Electromagnetic Compatibility
eMLPP	enhanced Multi-Level Precedence and Pre-emption
ETSI	European Telecommunication Standard Institute
<b>F</b>	
FAA	Federal Aviation Administration
FNBDT	Future Narrowband Digital Terminal. A US Government standard for secure voice communication.
<b>G</b>	
Glonass	GLObal'naya NAvigatsionnaya Sputnikovaya Sistema, Global Navigation Satellite System in English
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
<b>H</b>	
HLD	High Power Amplifier, Low Noise Amplifier and Diplexer in one unit
<b>I</b>	
I/O	Input/Output
IAI-2	Inmarsat Air Interface-2. The air interface used for BGAN. IAI-2 is an evolution of MPDS with new bearer types, which give a wide range of data rates from 16 kbps up to 492 kbps. By utilizing different modulation schemes, variable coding rate and power adjustment, it is possible to change the bearer type to give optimum throughput with efficient use of the satellite resources.
ICAO	International Civil Aviation Organization
ICG	International Communications Group
IEEE	Institute of Electrical and Electronics Engineers
IMEI	International Mobile Equipment Identity. A unique number identifying your terminal
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IP	Internet Protocol, used for communicating data across a packet-switched internetwork.
IRS	Inertial Reference System
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ITU	International Telecommunication Union



---

**L**

LAN	Local Area Network
LED	Light Emitting Diode
LGA	Low Gain Antenna ,
LLC	Limited Liability Company
LRU	Line Replaceable Unit. A separate unit or module which can easily be replaced. Examples are the SDU and the HPA.

**M**

MIB	Management Information Base
MOD	Modification
MSN	Multiple Subscriber Numbering. In most pieces of ISDN equipment you can program multiple subscriber numbers. The number programmed into the equipment should be the dial-in number that you wish that piece of equipment to answer.

**N**

NAT	Network Address Translation. An Internet standard that enables a local-area network to use one set of IP addresses for internal traffic and a second set of addresses for external traffic. A NAT module makes all necessary address translations.
NC	No Connect
nON	Power-on control signal, active low
NPI	Navigation Position Information, a Thrane abbreviation
NRS	Navigation Reference System
NT	Network Termination. A device connecting the customer's data or telephone equipment to the local ISDN exchange carrier's line. It provides a connection for terminal equipment (TE) and terminal adaptor (TA) equipment to the local loop.

**P**

PAST	Person Activated Self Test
PBX	Private Branch Exchange, telephone exchange that serves a particular business or office.
PC	Personal Computer
PDF	Portable Document Format, a file format created by Adobe Systems for document exchange
PDP	Packet Data Protocol. A network protocol used by external packet data networks that communicate with a GPRS network.
POST	Power On Self Test. A system test that is activated each time the system is powered on.
POTS	Plain Old Telephone Service
PS	Packet switched

**Q**

QoS            Quality of Service

**S**

SAL            System Address Level

SATCOM        Satellite Communications

SB              Swift Broadband, based on BGAN and offers similar services, simultaneous voice and broadband data.

SBU            SwiftBroadband Unit. Unit in the system providing access to the aeronautical BGAN service, SwiftBroadband.

SDU            Service Data Unit. Also known as a data packet.

SIM            Subscriber Identity Module

SIP            Session Initiation Protocol. An application-layer control (signaling) protocol for creating, modifying, and terminating sessions with one or more participants. Used e.g. for Internet telephony.

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.

SSA            Security Safety Analysis , ,

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.

STC            Supplemental Type Certificate. FAA or EASA certification document issued to companies that perform significant modifications on an aircraft.

STE            Secure Terminal Equipment

STU            Secure Telephone Unit

**T**

TE            Terminal Equipment

TFTP          Trivial File Transfer Protocol. A very simple file transfer protocol, with the functionality of a very basic form of FTP. Since it is so simple, it is easy to implement in a very small amount of memory.

TP            Top Plug

**W**

WLAN         Wireless Local Area Network

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