AVIATOR

AVIATOR 200/300/350

Thrane & Thrane

AVIATOR 200/300/350

Installation and maintenance manual

Document number: 98-127093-F

Release date: 16 March 2012

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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.

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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.

Record of revisions

Rev.	Description	Release Date	Initials
A	Original document	12 March 2008	CC
B	General update to version B.	25 September 2008	UFO
C	Configuration of interfaces and network management added. Specifications and DO-160 string of the HLD updated. Editorials.	28 November 2008	UFO
D	Page iii: Disposal added The following chapters have been added: 6.7.7 The following chapters have been edited: 2.1.1, 2.3.4, 5.1.2, 5.2.2-5.2.4, 5.3.3, 5.3.4, 5.3.6, 5.3.7, 5.3.10, 5.4.3, 5.4.5 - 5.4.7, 6.2.2, 6.5, 6.6.1, 6.6.3 - 6.6.5, 6.6.8 - 6.6.13, 6.7.7, 6.8.7, 7.4.2, 7.5.4, 7.7 The following appendices have been added: E, F The following tables have been added: 5-12, 6-3, 6-4 The following tables have been edited: 2-1, 2-3, 2-5, 4-3, 5-21, 5-22, 5-28, B-1, B-2, B-3, The following figures have been added: 2-3, 2-4, 3-7, 5-6, 5-9, 7-5 The following figures have been edited: 3-10, 3-11, 5-16, 6-2, 6-52	7 May 2009	UFO

E	AVIATOR 200 added. The AVIATOR 300 and AVIATOR 350 replace the earlier Thrane & Thrane Aero-SB Lite system. The following chapters have been added: 5.3.5, 6.5.10, 6.5.15, 6.6.8, 6.7.5, 6.7.10, 6.7.11, 6.7.12, A.2.5, B.2.4, Appendix C, Appendix G. The following chapters have been edited: 2.1.1, 2.1.2, 2.2, 2.3, 4.1.3, 4.4.1, 5.2.4, 5.3.2, 5.3.4, 5.3.7, 5.3.11, 5.4.4, 5.5, 6.2.2, 6.3.4, 6.4, 6.6.1, 6.6.4, 6.5.8, 6.5.12, 6.5.12, 6.5.13, 6.5.14, 6.6.6, 6.6.7, 6.7.2, 6.10, 7.2.2, 7.2.3, 7.4 (reorganized), A.1.1 removed, E.1, The following tables have been added: 5-7 The following tables have been edited: 2-3, 5-6, 5-28, A-1, F-1, F-2. The following figures have been added: 3-3, 3-5, 3-10, 3-11, 3-13, 3-14, 5-4. The following figures have been edited: 4-3, 5-1, 6-2, 6-4, 6-23, 6-30, 6-33, 6-46, 6-48, 6-49, 6-54, 6-56, 6-58, 7-3, F-2. The section “Using the Call log” has been moved to the user manual.	29 July 2010	UFO
F	The following chapters have been added: 3.13, 6.1.1, 6.5.9, 6.6.9, 6.7.1, The following chapters have been edited: 1.1, 2.1, 2.1.1, 2.2.2, 3.1, 3.10, 5.2.5, 5.3.7, 5.4.6, 6.3.2, 6.5.4, 6.7.2, 7.1.1, 7.3, A-3, B.2.1, B.3, B.3.1, H.1.2. The following tables have been edited: 1-1, 2-3, 2-7, 5-1, 5-6, 5-9, 5-29, 6-3, A-1, A-2, A-3, A-4, A-5, A-6, A-7, The following figures have been edited: 2-1, 3-1, 3-4, 5-1, 6-9, 6-10, 6-28, 6-30, 6-34.	16 March 2012	UFO

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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

T&T 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 Installation 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 Thrane & Thrane.

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 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:

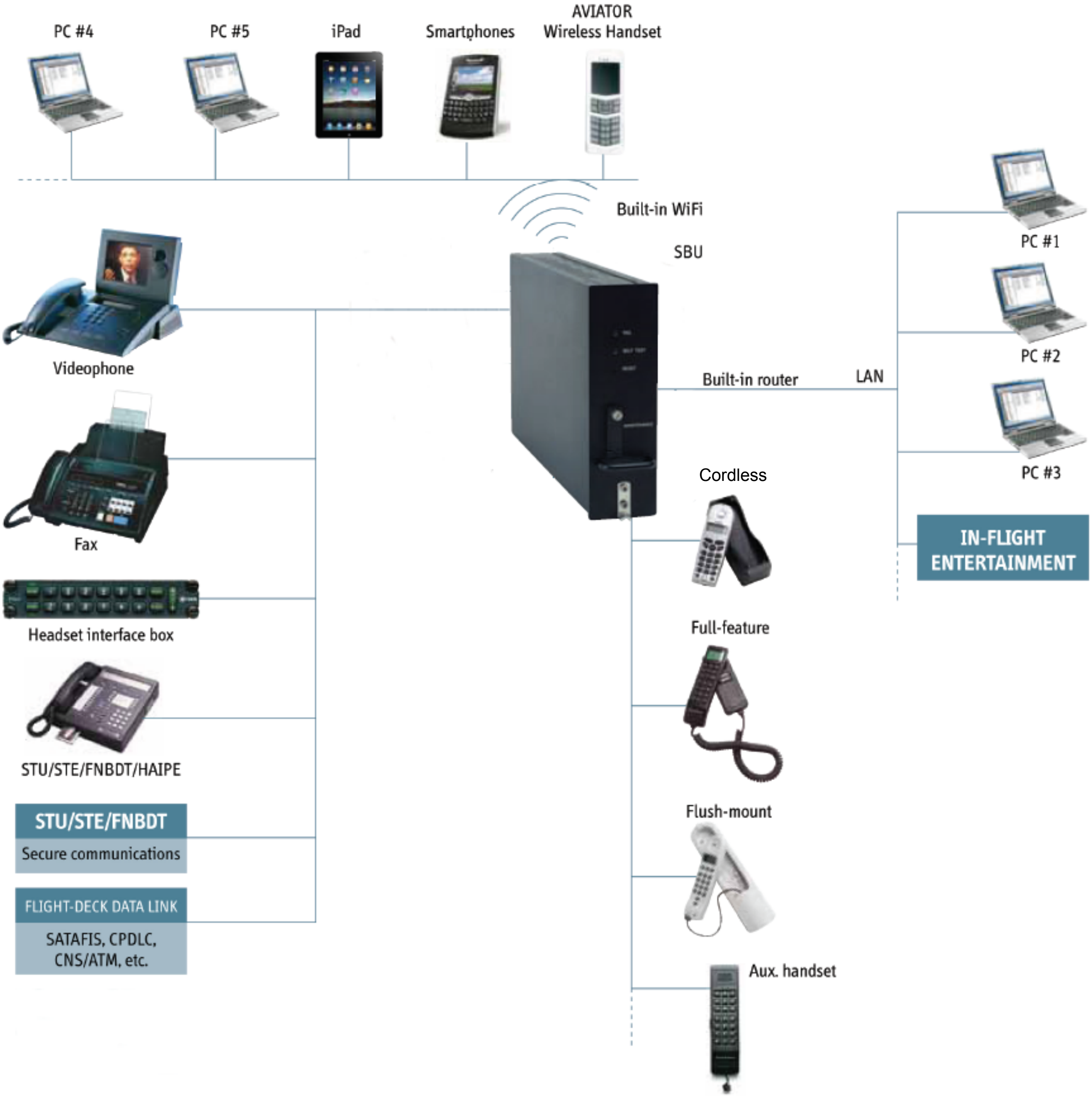


Figure 2-1: Communication devices for the AVIATOR 200/300/350 system (example)

Services

The SwiftBroadband services available depend on the type of satcom 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 LGA (Class 15)[a]	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[b]
Circuit-switched standard voice	Yes	Yes	Yes
ISDN service or 3.1 kHz audio (Premium voice)	No	Elevation > 45°	Yes

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 http://www.inmarsat.com/Services/Aeronautical/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 setup 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 6-1.

Satcom antenna systems

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

Antenna type	AVIATOR 200	AVIATOR 300	AVIATOR 350
Low-gain (LGA)	X		
Intermediate gain (IGA)		X	(X)[a]
High gain (HGA)			X

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 an IGA, then the system is an AVIATOR 300.

You can choose between the following antenna models:

- TT-3002A LGA
- TT-5006A IGA
- IGA 5001
- HGA-6000/HGA-6500
- HGA-7000/HGA-7001
- AMT-50
- AMT-700
- CMA-2102/CMA-2102SB

Contact your Thrane & Thrane sales representative or see http://www.thrane.com/Aero/Products/ApprovedSatcomAntennas.aspx for a list of satcom antennas that have received Inmarsat type approval.

Built-in router and Wireless (WLAN) options

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, these options are 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.

Compatibility with IRIDIUM satellite phones

You can use the AVIATOR 200/300/350 system on aircrafts 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.
- Access to built-in web interface for daily use using LAN and WLAN.
- Built-in web interface for configuration using the Maintenance connector on the SBU front plate.
- Does not affect the operation of an Iridium system.

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.

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 Thrane & Thrane model- and part numbers

This Installation Manual is for the AVIATOR 200/300/350 system and is applicable to the model- and part numbers below:

T&T part number	Model number	Description
405040A	TT-5040A	SwiftBroadband Unit (SBU) [without CM] for AVIATOR 200/300/350
405040A-THD	TT-5040A	SwiftBroadband Unit (SBU) [without CM] for AVIATOR 200D/300D/350D
405040A-001	TT-5040A-001	Configuration Module (CM) for SBU for AVIATOR 200/300/350 and AVIATOR 200D/300D/350D
405040A-002	TT-5040A-002	Built-In Router Option
405040A-003	TT-5040A-003	Built-In Wireless Option
405040A-004	TT-5040A-004	WLAN Antenna, optional (2 pieces recommended)
405040A-006	TT-5040A-006	AVIATOR 350 Key (HGA/IGA)
405040A-007	TT-5040A-007	AVIATOR 300 Key (IGA)
405040A-008	TT-5040A-008	AVIATOR 200 Key (LGA)
405016A	TT-5016A	High Power Amplifier/Low Noise Amplifier/Diplexer (HLD) AVIATOR 200/300/350
405016A-THD	TT-5016A	High Power Amplifier/Low Noise Amplifier/Diplexer (HLD) AVIATOR 200D/300D/350D
403002-001	TT-3002A	Low Gain Antenna (LGA). Original Manufacturer Sensor Systems P/N: S65-8282-101 (listed on FAA 8130-3).
405006A-PMA	TT-5006A-PMA	Intermediate Gain Antenna (IGA). Original Manufacturer Chelton P/N: 677-A0002 (listed on FAA 8130-3).
405621B-THW	TT-5621B	2-Wire Handset (white)
405621B-THR	TT-5621B	2-Wire Handset (black)
405622B-THW	TT-5622B	2-Wire Cradle (white)
405622B-THR	TT-5622B	2-Wire Cradle (black)
405019A	TT-5019A	Iridium Band Reject Filter

Table 2-3: Model and part numbers for the AVIATOR 200/300/350 system (T&T units)

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 breakers

Part number	Recommended aircraft circuit breakers
2TC2-7.5	Klixon 2TC series, 7.5 A current rating (SBU[a])

Table 2-4: Part numbers for Klixon circuit breakers

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

Trays and connectors

Part number	Approved tray
P0299-101	ECS Tray Assembly 1/4-size ATR (for SBU)
MT4-2346-101	EMTEQ Tray Assembly 1/4-size ATR (for SBU)
Part number	**Required Connector Kit for SBU tray**
DPX2NA-67322-500	ITT Cannon Connector, Dual Plug, contact arrangement top: 33C4, bottom: 33C4.

Table 2-5: Part number for connector

Installation kits

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

ECS, a Carlisle IT company, USA	**EMTEQ Inc., USA**
Phone: +1 414-421-5300	Phone: +1 262-679-6170 or +1 888-679-6170
E-mail: sales@ecsdirect.com	E-mail: sales@emteq.com
Home page: www.ecsdirect.com	Home page: www.emteq.com

Table 2-6:

ECS offers an installation kit for the SBU (ECS part number: 120-14973-102).

Item in installation kit
1 ARINC connector, SBU (DPX2NA-67322-500)
1 Tray Assembly, SBU, 1/4-size ATR W/DPX2 (P0299-101)

Table 2-7: 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	**ICG**, USA Phone: 1-800-279-1991 or (757)947-1030 E-mail: sales@icg.aero Home page: www.icg.aero
Sigma[7]	Handset system	**ICG** (see contact info above)
PTA-12	Airborne Telephone Adaptor	**Northern Airborne Technology Ltd.** 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	**MID-CONTINENT INSTRUMENT CO., INC.** 9400 E. 34th. St. North Wichita, KS 67226-2615 Phone: 316-630-0101 Fax: 316-630-0723 Home page: www.mcico.com
AirCell Axxess	Iridium Telephone System	**Aircell Business Aviation Services LLC** 303 south Technology Court, Bldg.A Broomfield, CO 80021 Phone: +1.303.301.3200 Fax: +1.303.301.3201 E-mail: sales@aircell.com

Table 2-8: List of applicable external units

2.3 System block diagrams

In the following block diagrams, and in the wiring diagrams in section 5.3.3, all satcom antennas that can be connected to the AVIATOR 200/300/350 systems are shown.

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 Thrane & Thrane sales/support representative for the latest status on Inmarsat Type Approvals for satcom antennas for the AVIATOR 200/300/350 system.

Contact your Thrane & Thrane sales representative or see http://www.thrane.com/Aero/Products/ApprovedSatcomAntennas.aspx for a list of satcom antennas that have received Inmarsat type approval.

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

2.3.1 AVIATOR 200 system with TT-3002A LGA antenna

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

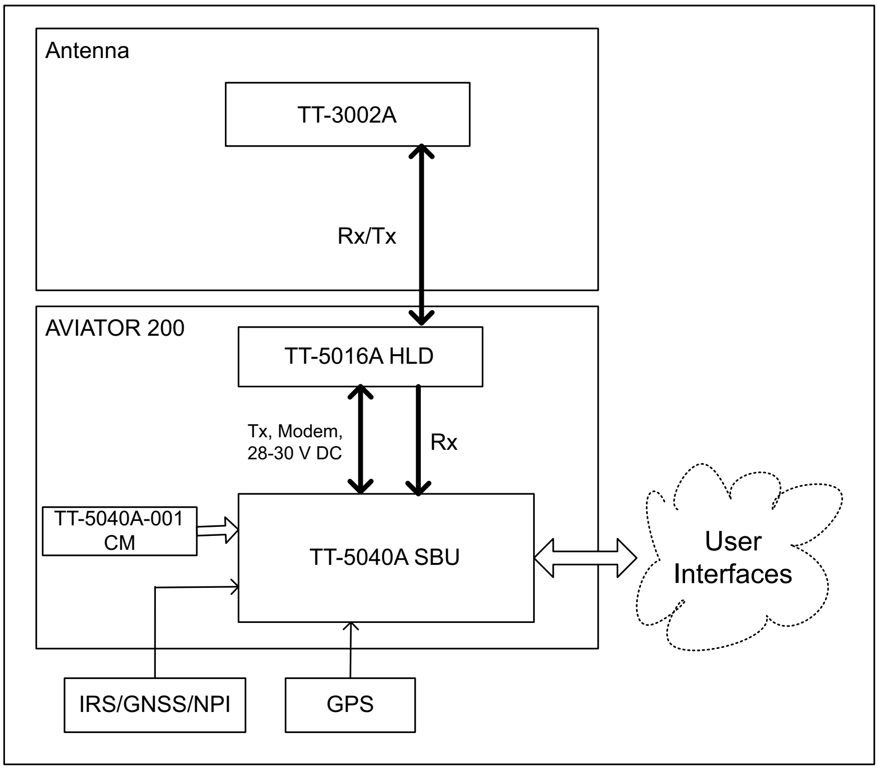


Figure 2-2: System configuration with TT-3002A LGA antenna

2.3.2 AVIATOR 300 system with TT-5006A IGA antenna

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

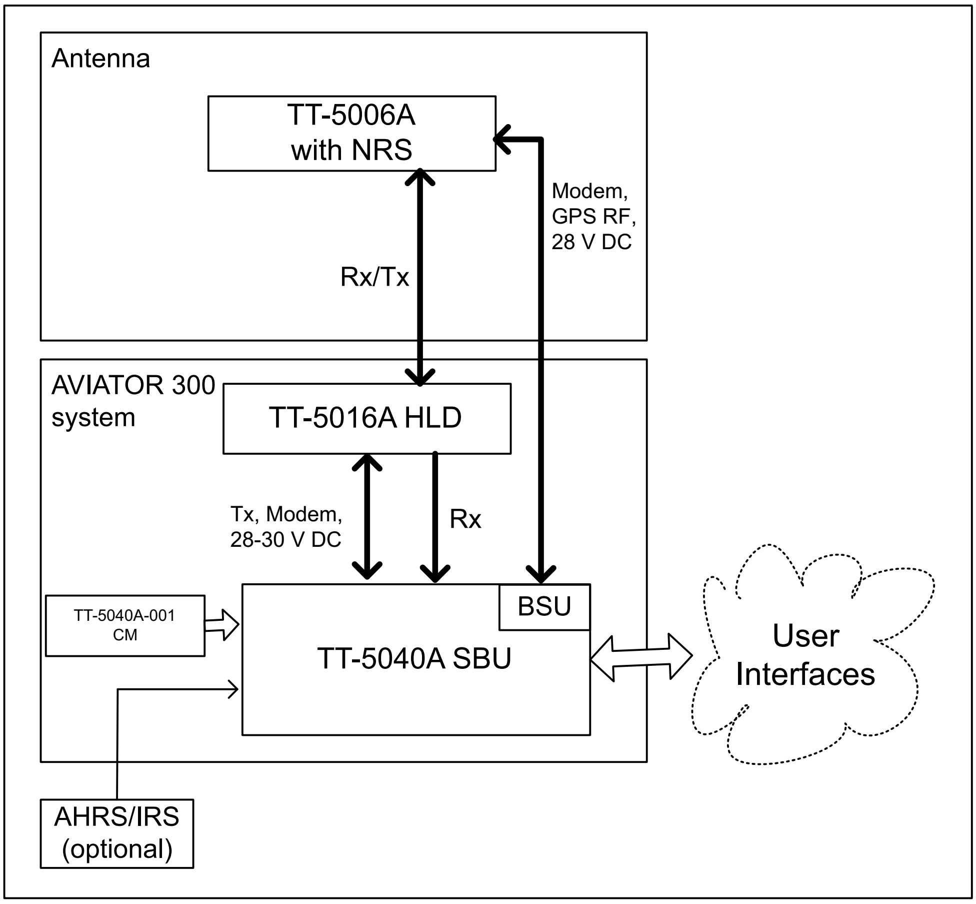


Figure 2-3: System configuration with TT-5006A IGA antenna

2.3.3 AVIATOR 350 system with Chelton antennas

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

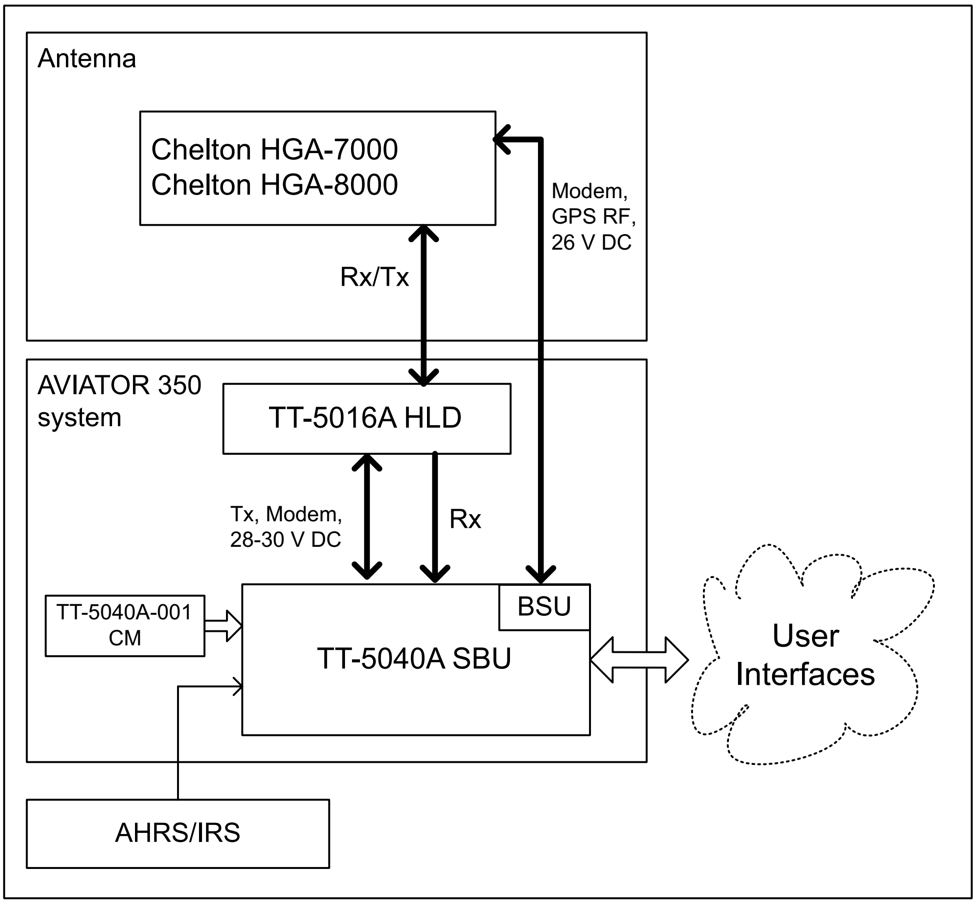


Figure 2-4: System configuration with Chelton antennas

2.3.4 AVIATOR 350 system with ARINC-741/781 antennas

The drawing below shows the AVIATOR 350 system with the HGA-6000/6500 and AMT-50.

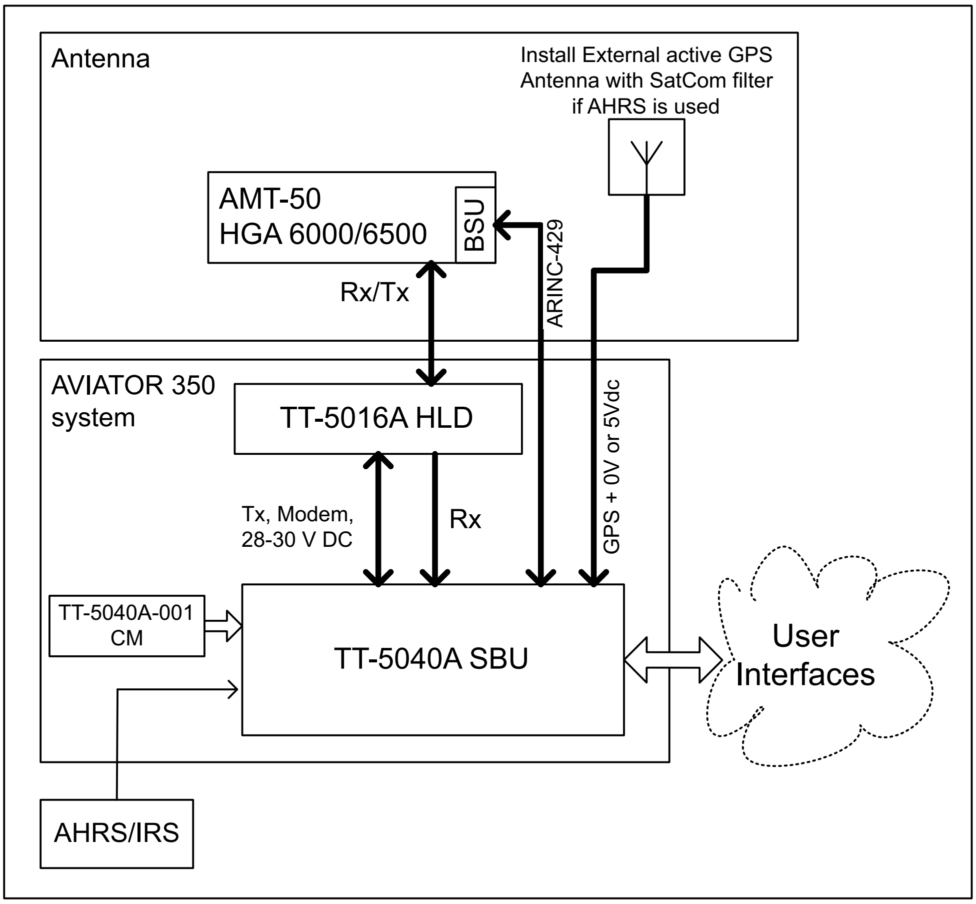


Figure 2-5: System configuration ARINC 429 antennas

For detailed description of the connection of each antenna type, see *Wiring the satcom antenna* on page 5-12.

2.3.5 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)[a]	1
Discrete outputs for annunciators	4

Table 2-9: 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.

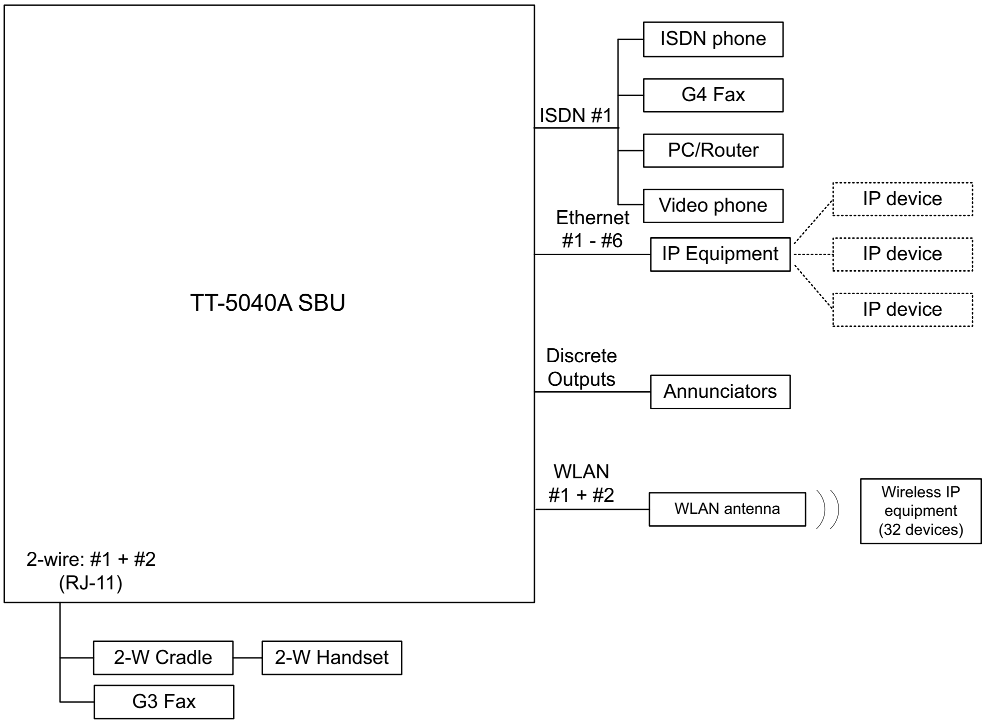


Figure 2-6: AVIATOR 200/300/350 interfaces

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 Thrane & Thrane's Extranet you can get copies of the outline drawings at: http://extranet.thrane.com. 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

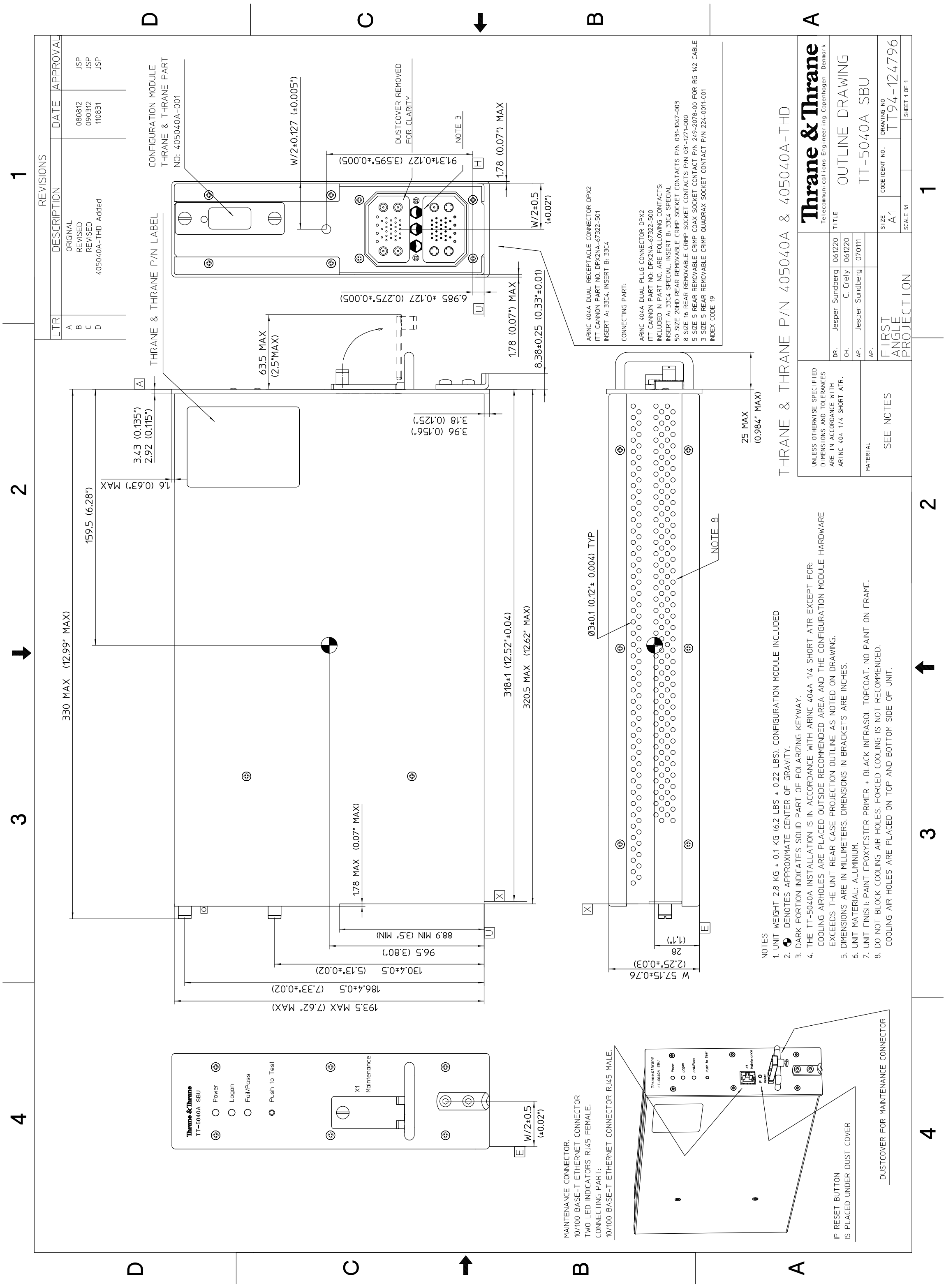


Figure 3-1: Outline drawing: TT-5040A SBU

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

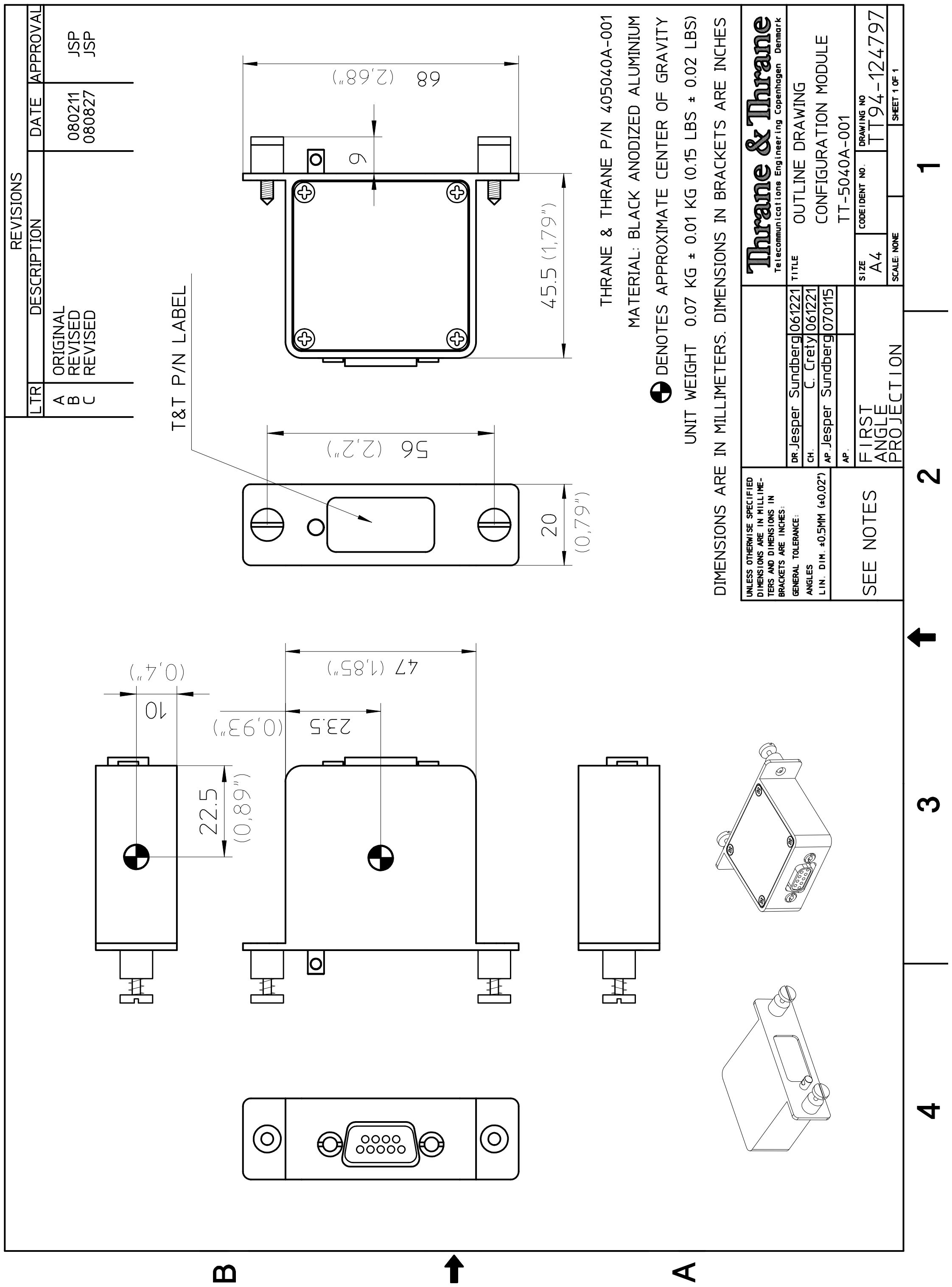


Figure 3-2: Outline drawing: TT-5040A-001 CM, inserted in the SBU

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.

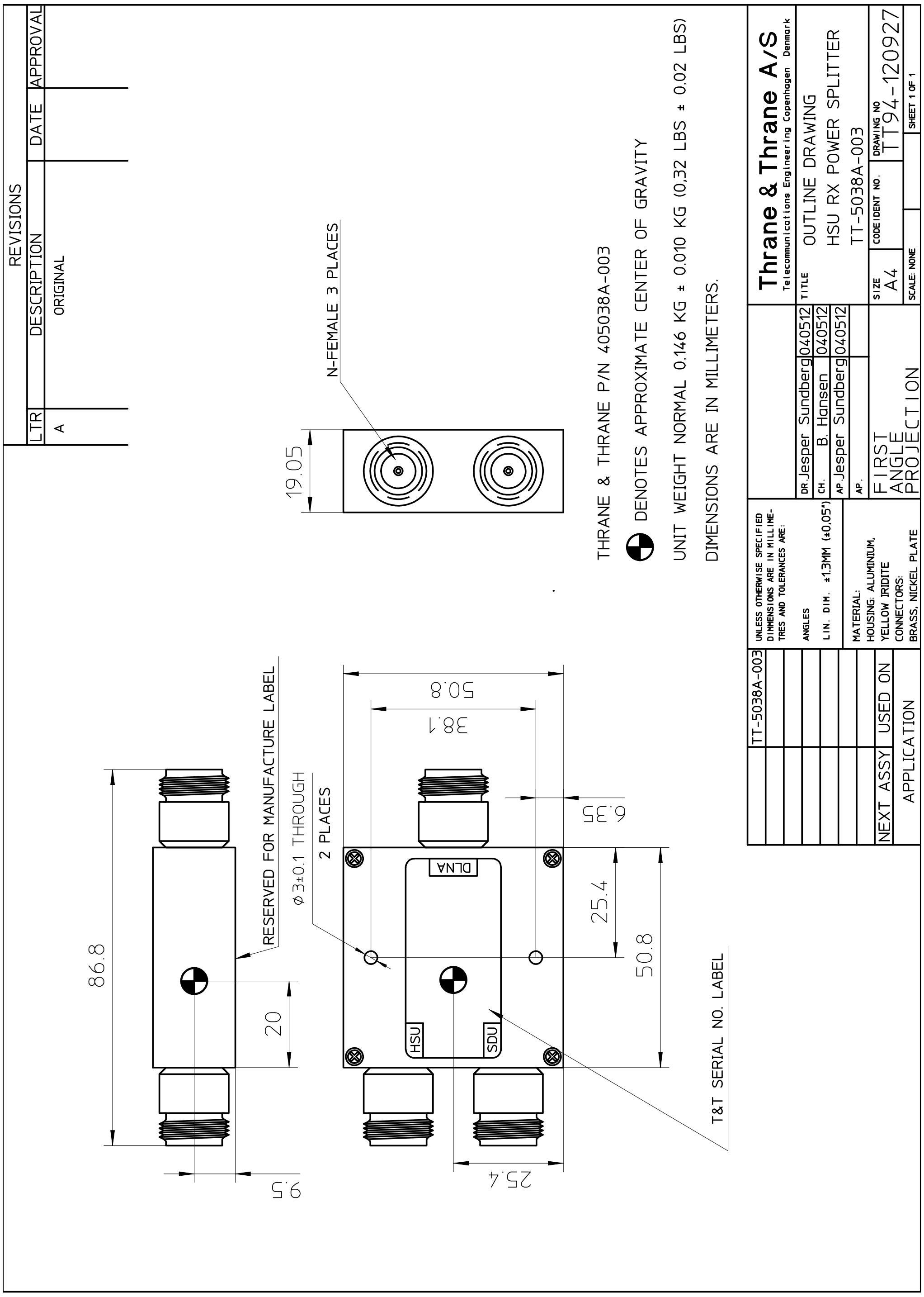


Figure 3-3: Outline Drawing: Rx Power Splitter

3.4 TT-5016A HLD

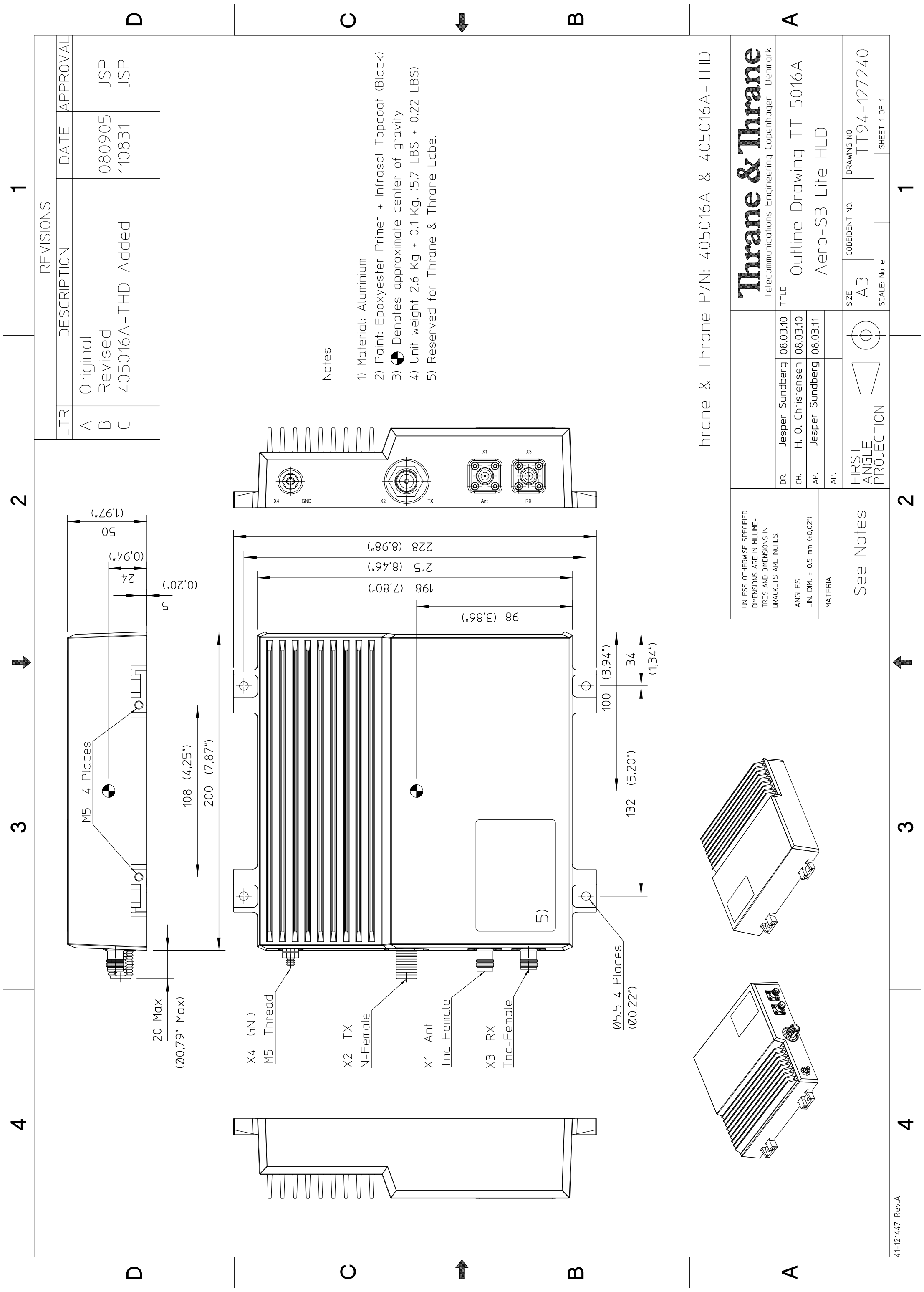
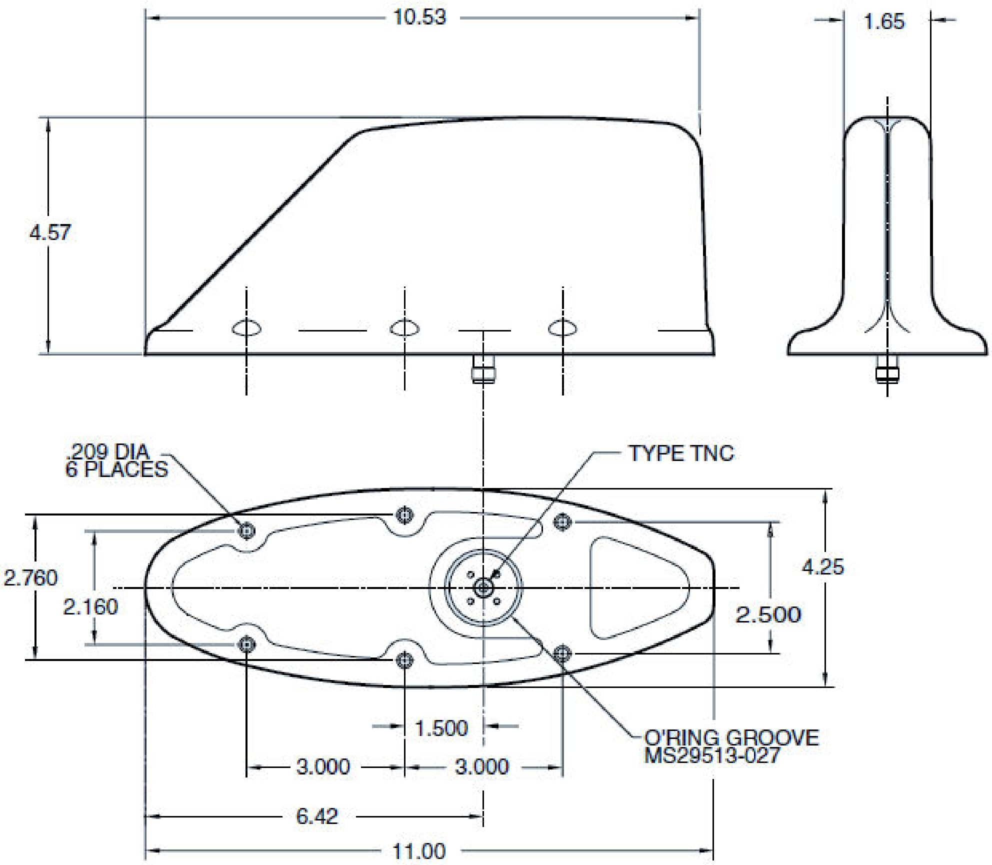


Figure 3-4: Outline drawing: TT-5016A HLD

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 Chelton P/N: 677-A0002 (listed on FAA 8130-3).

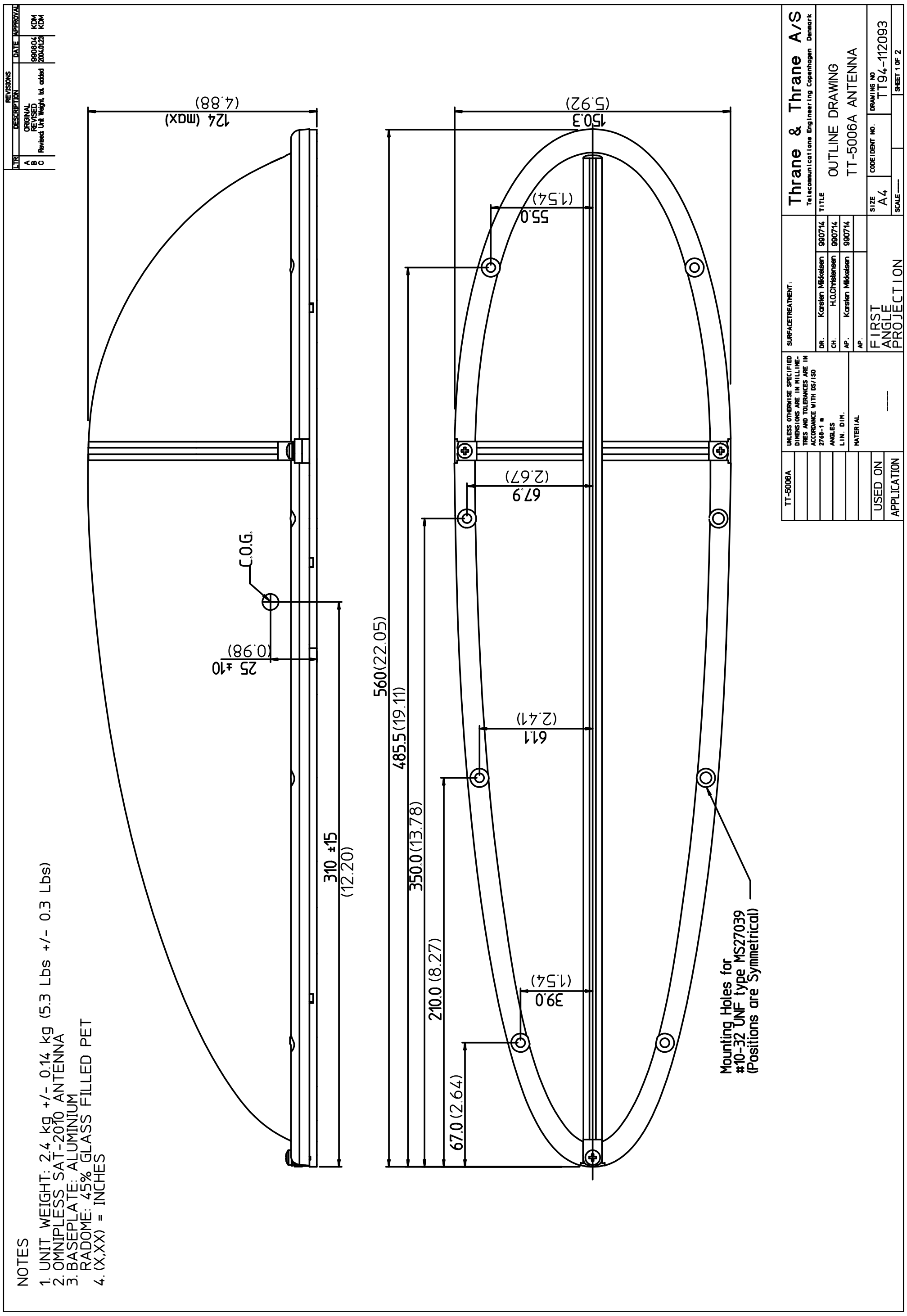


Figure 3-6: Outline drawing: TT-5006A IGA antenna

3.7 TT-5621B 2-Wire Handset

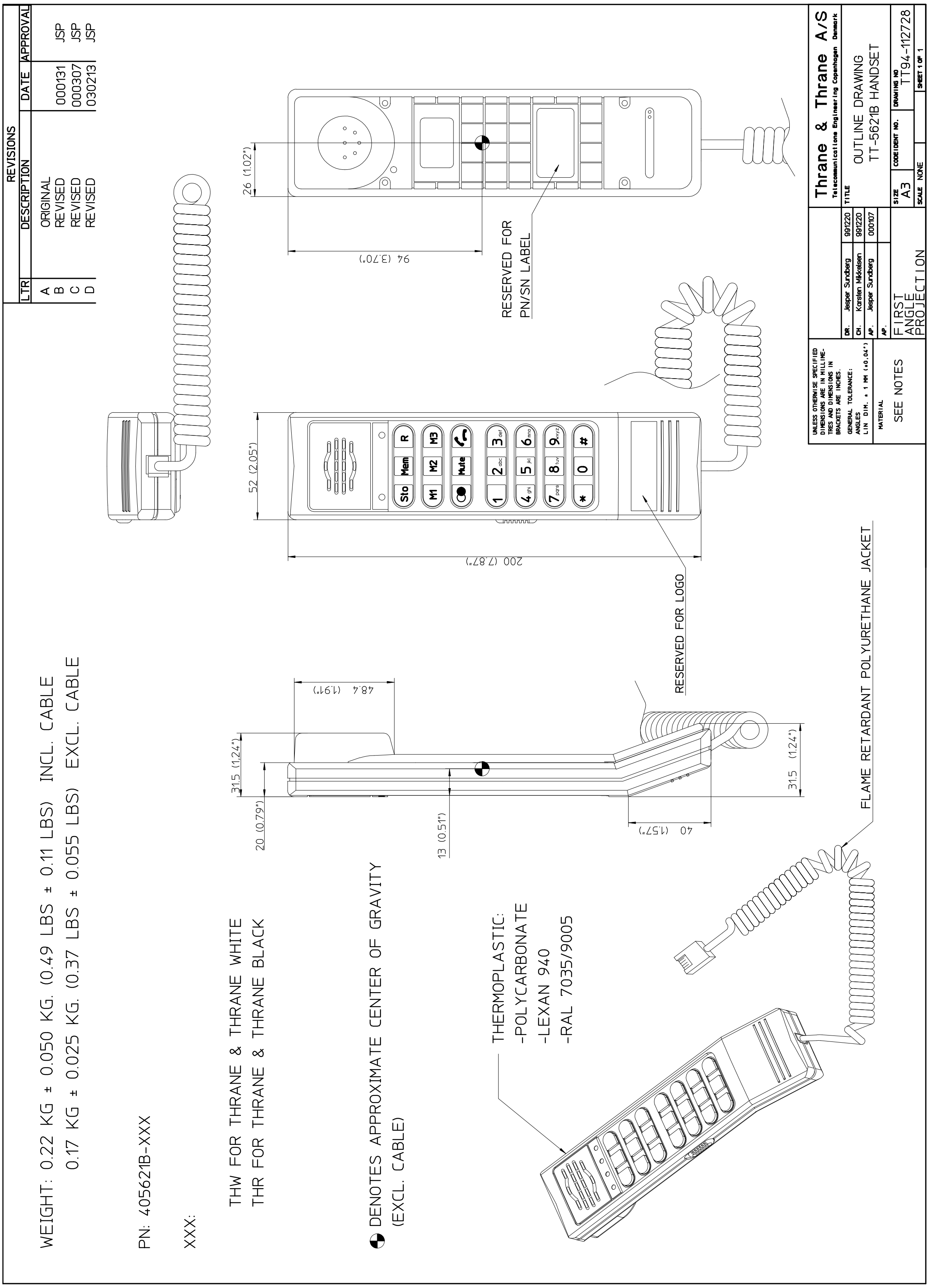


Figure 3-7: Outline drawing: TT-5621B 2-Wire Handset

3.8 TT-5622B 2-Wire Cradle

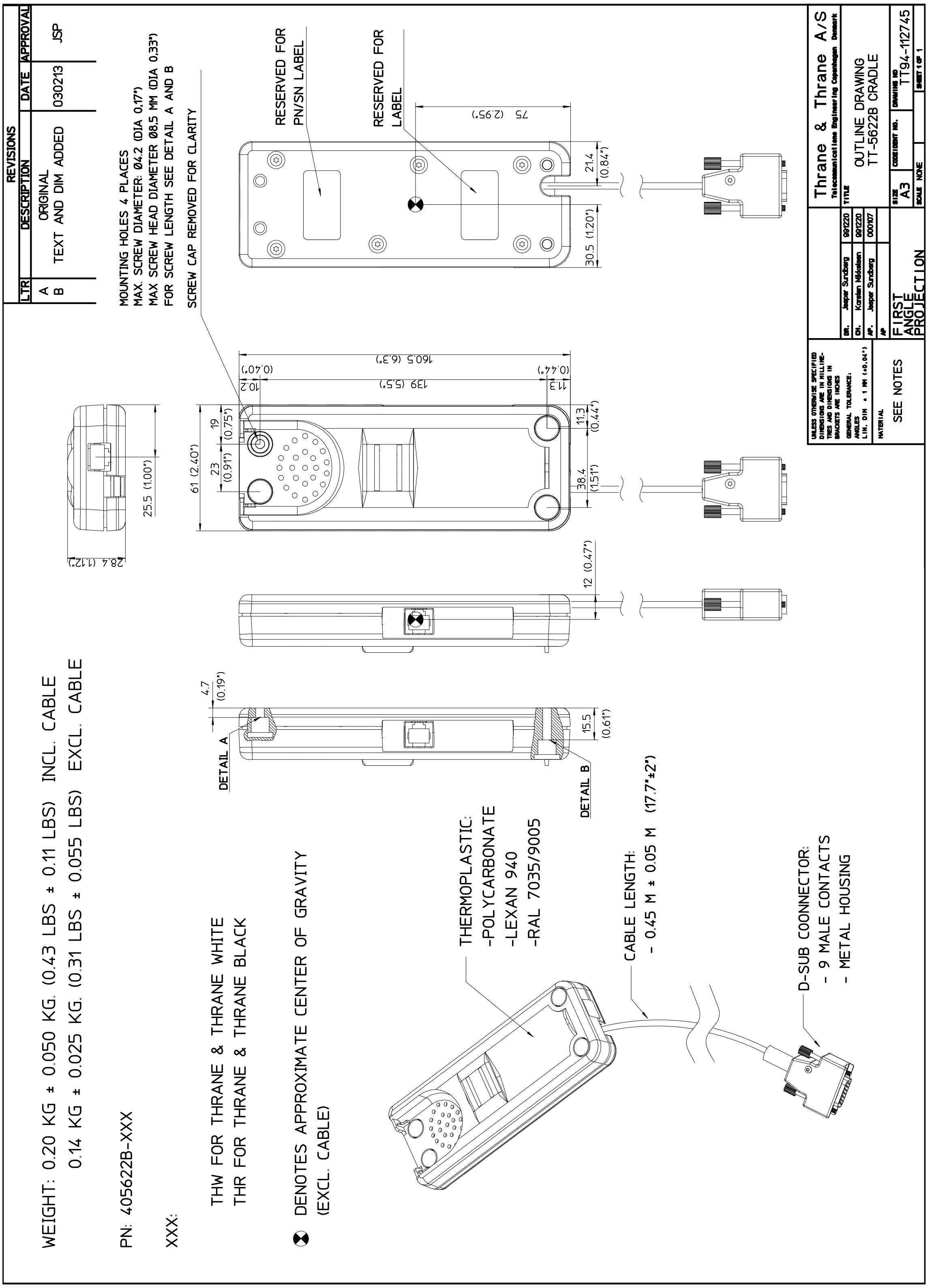


Figure 3-8: Outline drawing: TT-5622B 2-Wire Cradle

3.9 SBU trays

Note The comment OBSOLETE refers to the -102 assembly.

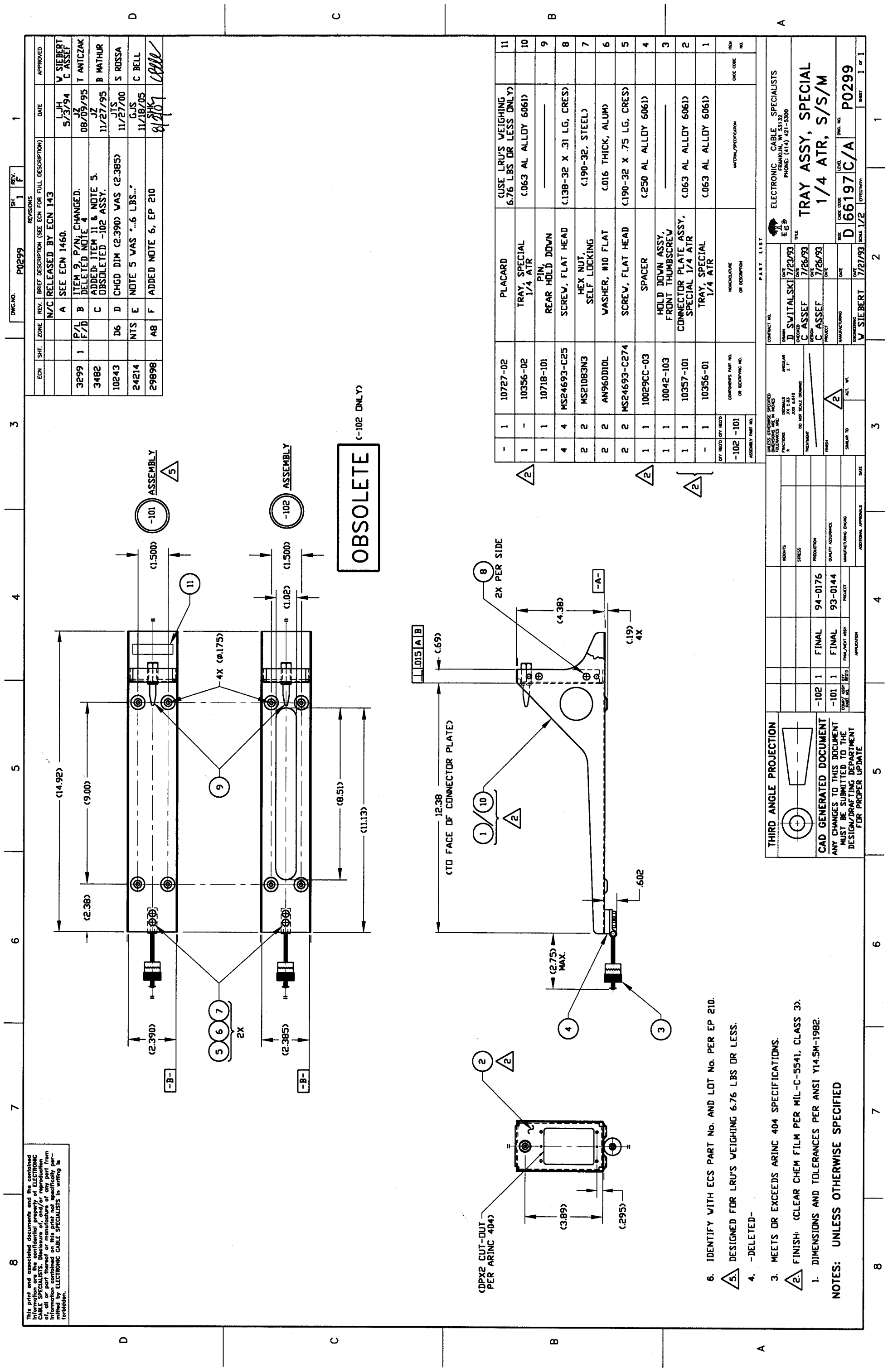


Figure 3-9: Outline drawing: SBU tray: ECS P0299-101

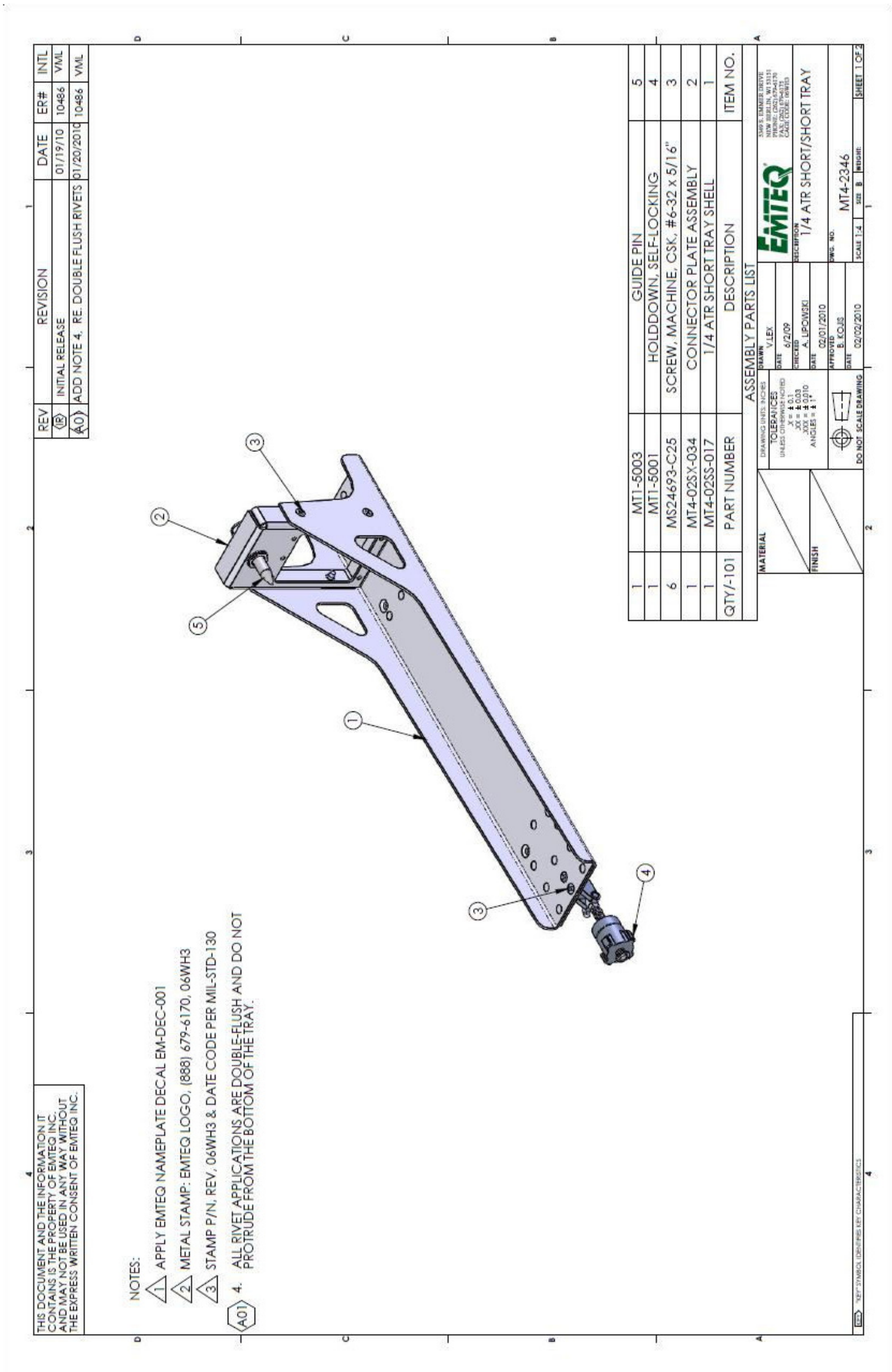


Figure 3-10: Outline drawing: SBU tray: EMTEQ MT4-2346-101 (page 1)

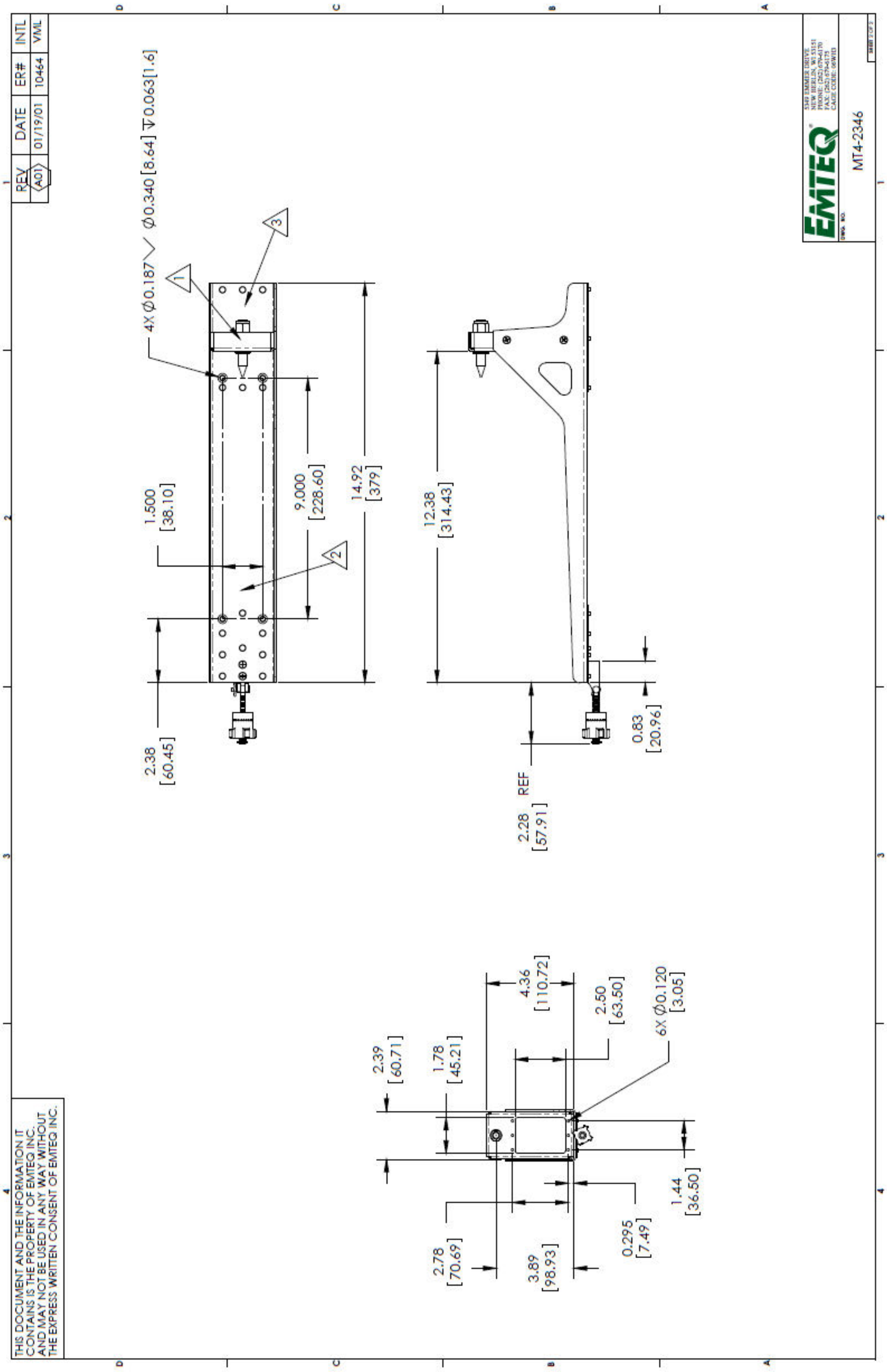


Figure 3-11: Outline drawing: SBU tray: EMTEQ MT4-2346-101 (page 2)

3.10 SBU tray connector

For correct index pin codes for the SBU see **Figure 4-2: SBU rear receptacle, engaging end (Index code: 19)**.

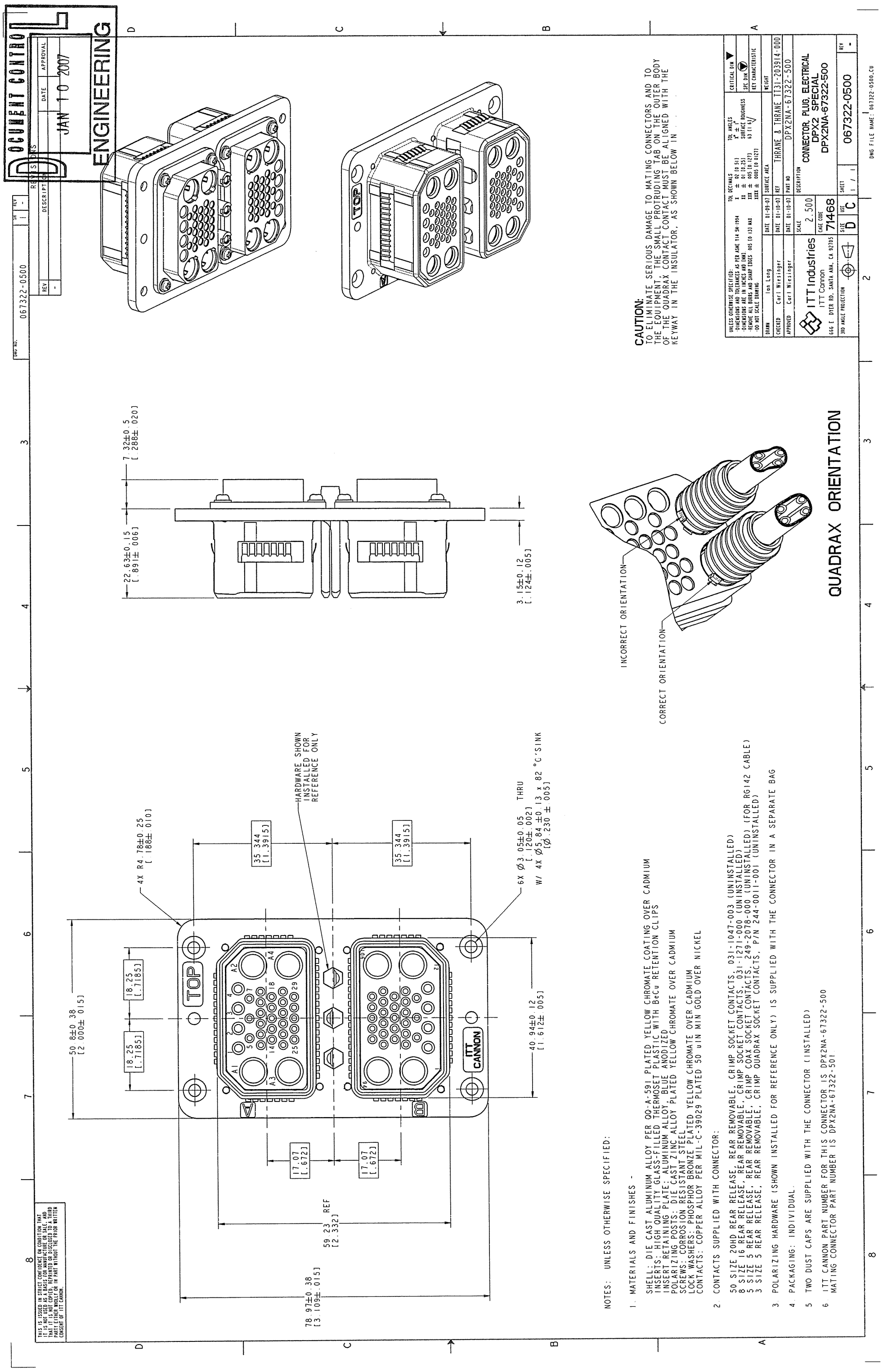


Figure 3-12: Outline drawing: SBU tray connector: ITT Cannon DPX2NA-67322-0500

3.11 Contact Assembly: Quadrax Pin size 5 special

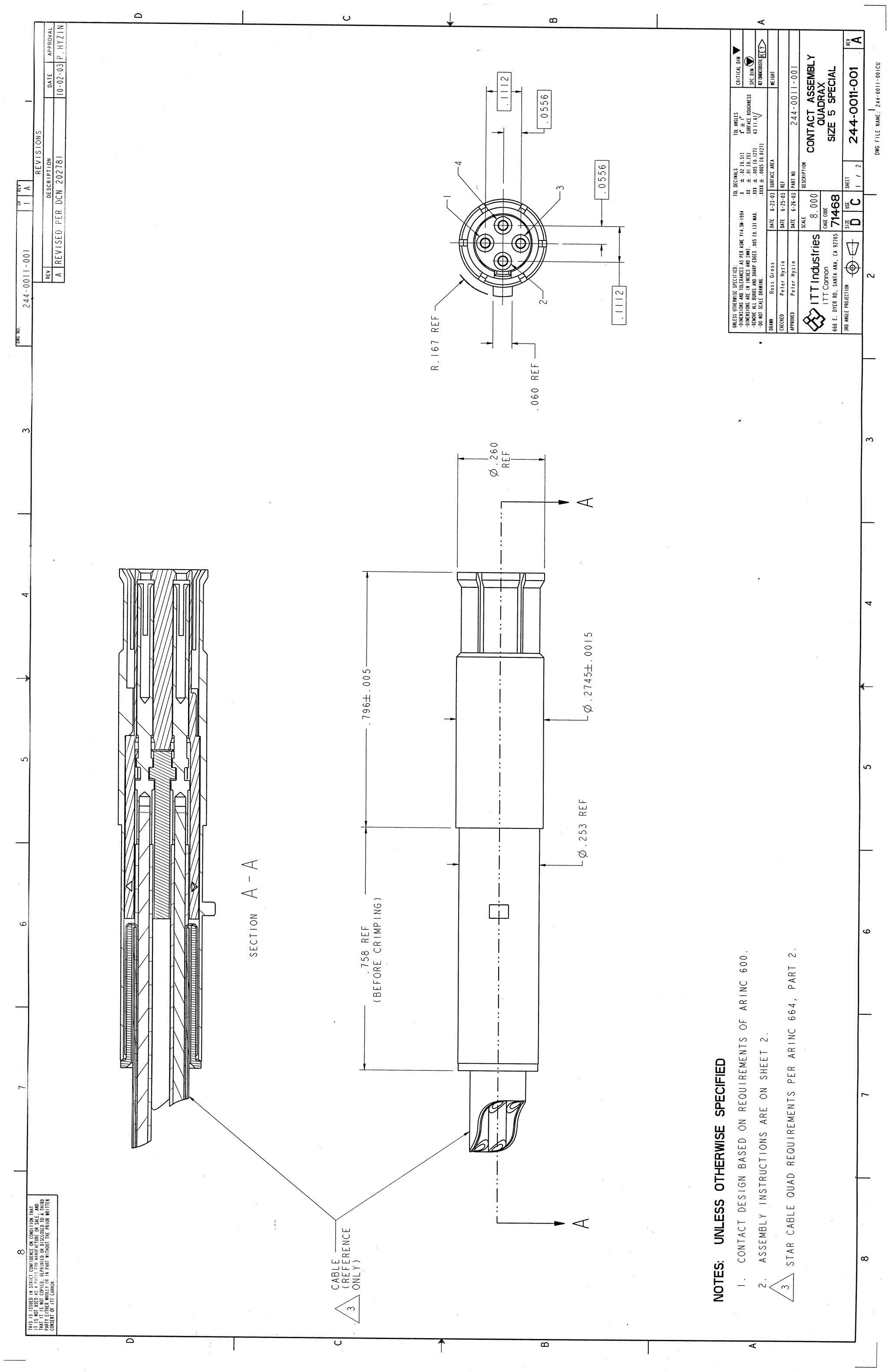


Figure 3-13: Contact Assembly: Quadrax Pin size 5 special: ITT Cannon 244-0011-001

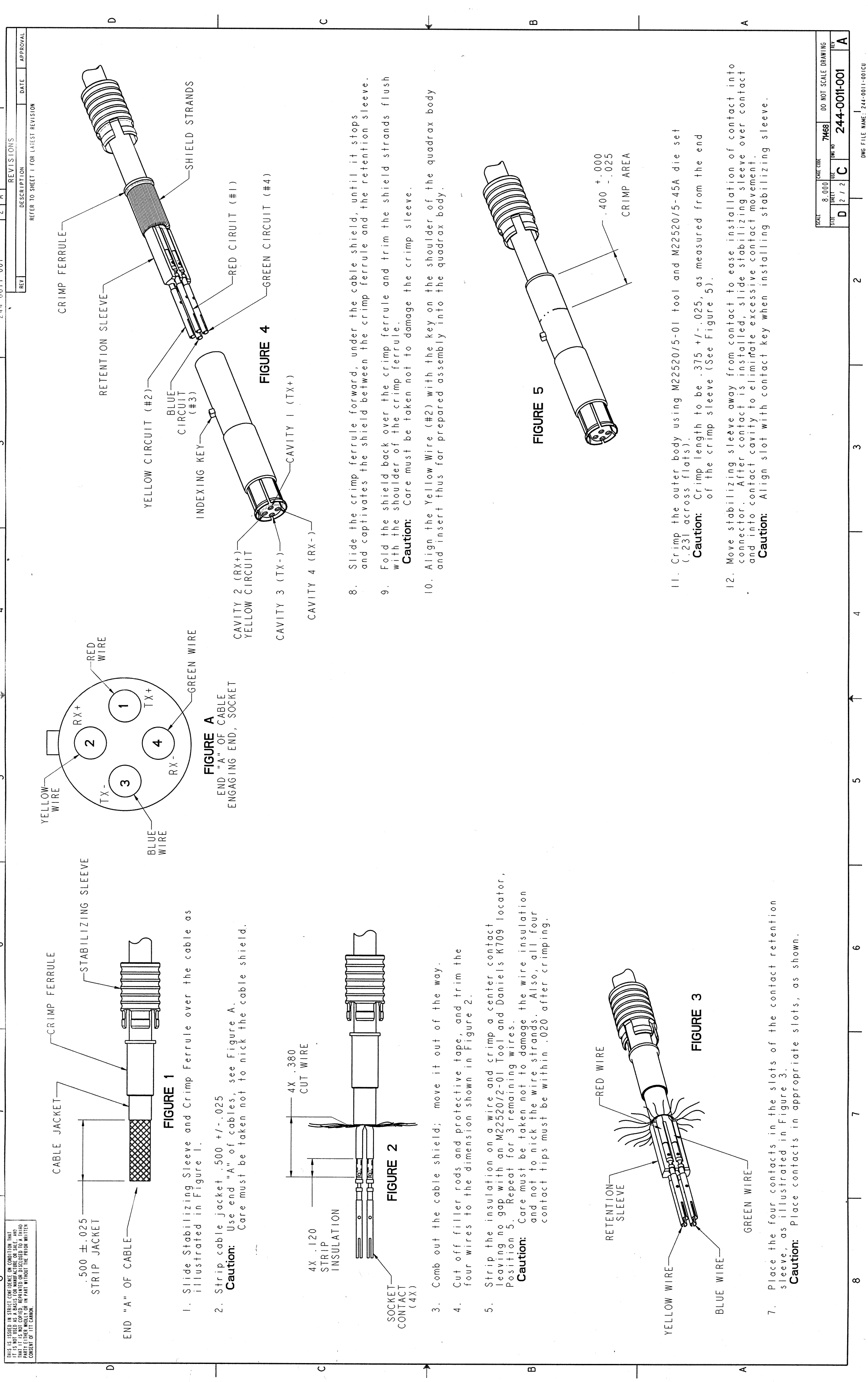
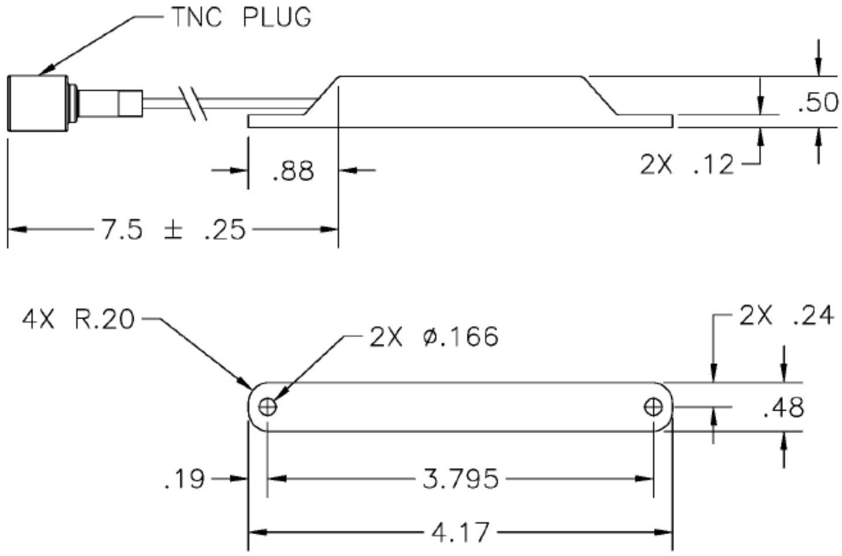


Figure 3-13: Contact Assembly: Quadrax Pin size 5 special: ITT Cannon 244-0011-001 (Continued)

3.12 TT-5040A-004 WLAN antenna

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



() = mm

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

3.13 Switch Annunciator Panel

Original Manufacturer P/N: MD41-1948.

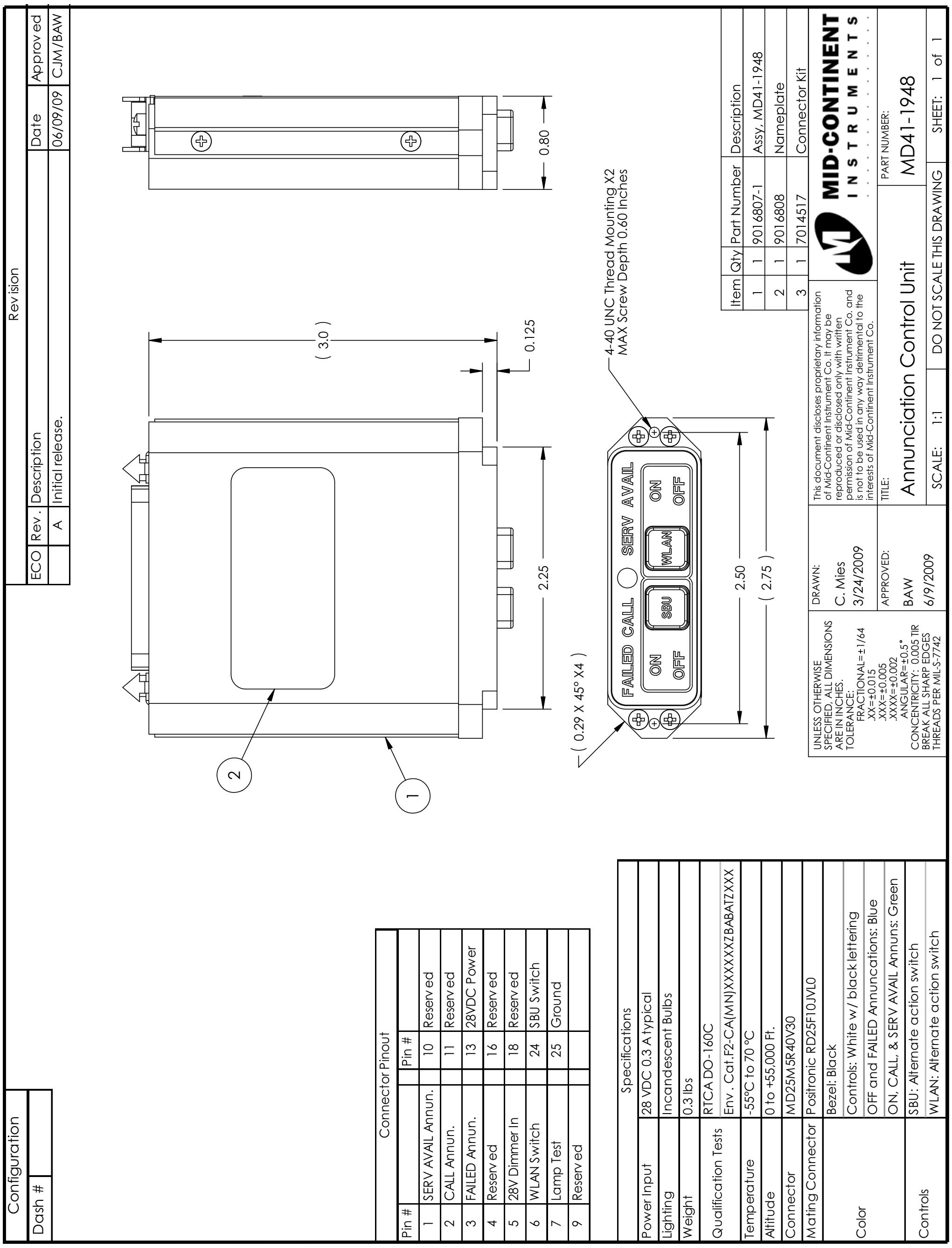


Figure 3-15: Outline drawing: Switch Annunciator panel

Connectors and pin-out

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

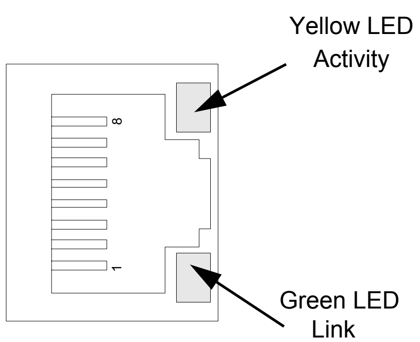


Figure 4-1: SBU Maintenance connector, face view of engaging end

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 6-1.

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.

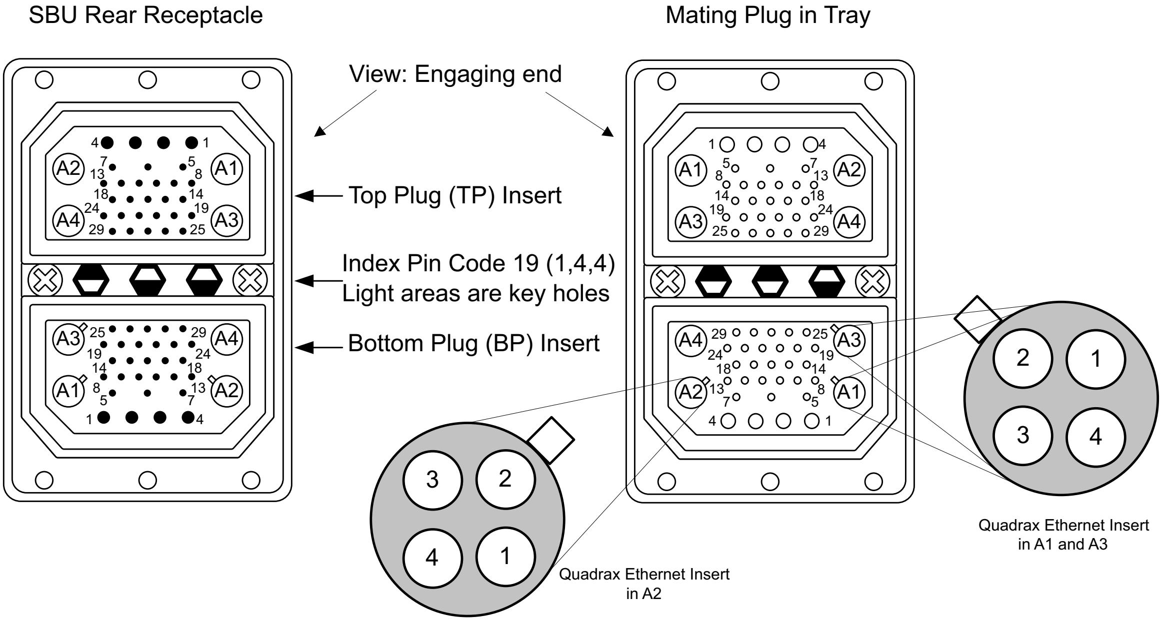


Figure 4-2: SBU rear receptacle, engaging end (Index code: 19)

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 5-9.

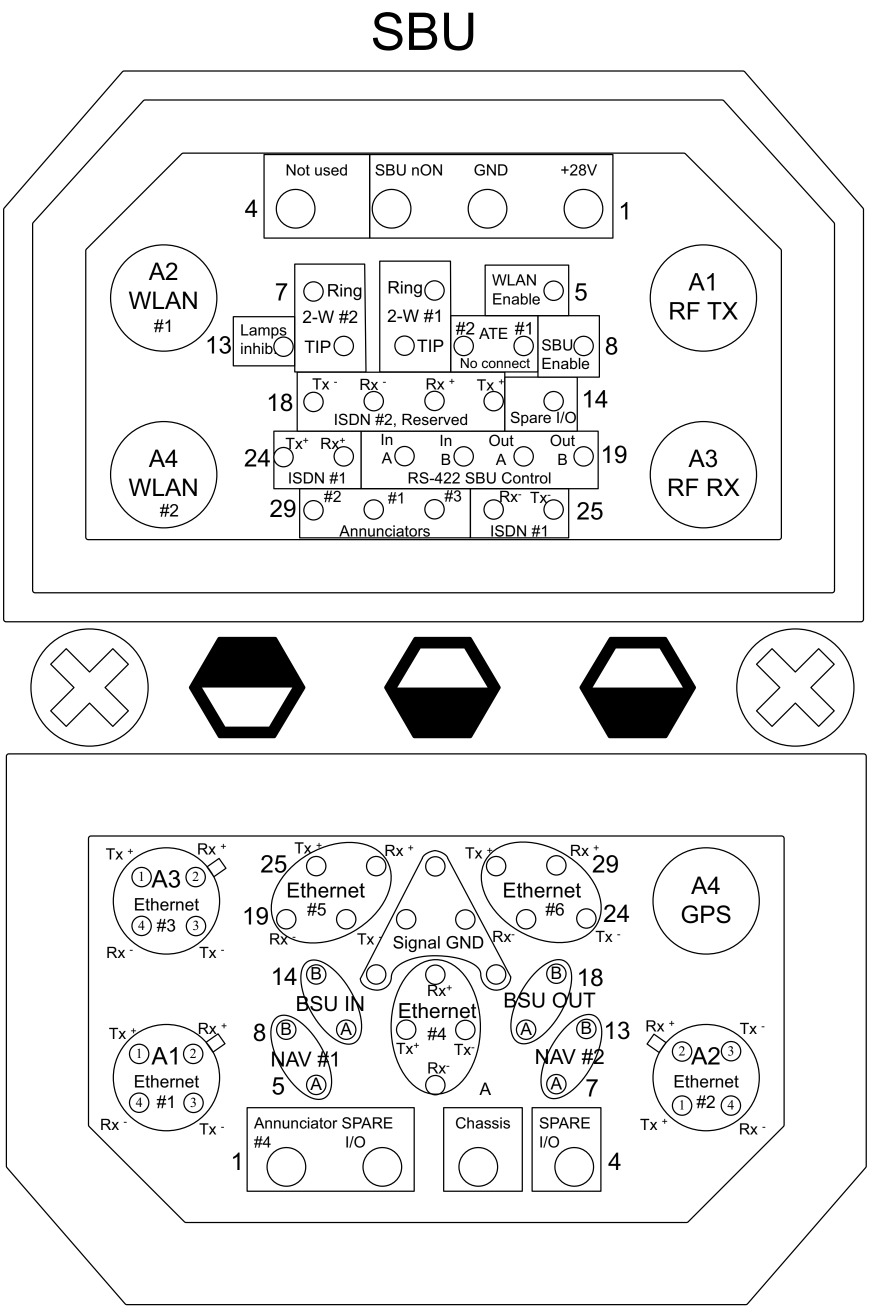


Figure 4-3: SBU rear receptacle with pin functions

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
- 4 configurable Annunciators: #1 ("Incoming call"), #2 ("SBU Failed") and #3 ("Service Available"), #4 ("Message received)
- 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
- 1 Discrete Output: Message received

Pin-out for SBU rear receptacle (top plug)

Pin	Function
TP A1	RF TX output to TT-5016A HLD, DC output and modem interface
TP A2	WLAN antenna #1 (coax)
TP A3	RF RX input from TT-5016A HLD
TP A4	WLAN antenna #2 (coax)
TP1	SBU +28 V DC Power
TP2	SBU GND, Power Return
TP3	SBU nON, Discrete Input
TP4	Not used
TP5	WLAN Enable, Discrete Input
TP6	2-Wire Voice/Fax/Modem #1 (Ring)
TP7	2-Wire Voice/Fax/Modem #2 (Ring)
TP8	SBU Enable, Discrete Input (connect to Chassis ground)
TP9	ATE #1, for factory use - **Do not connect!**
TP10	ATE #2, for factory use - **Do not connect!**
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)

Pin	Function
TP15	ISDN #2 Tx+ (c) output (TE) **Do not connect!**
TP16	ISDN #2 Rx+ (d) input (TE) **Do not connect!**
TP17	ISDN #2 Rx- (e) input (TE) **Do not connect!**
TP18	ISDN #2 Tx- (f) output (TE) **Do not connect!**
TP19	Output B, RS-422 **Do not connect!**
TP20	Output A, RS-422 **Do not connect!**
TP21	Input B, RS-422 **Do not connect!**
TP22	Input A, RS-422 **Do not connect!**
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)
TP27	Annunciator #3, (Discrete I/O, Service available)
TP28	Annunciator #1, (Discrete I/O, Incoming call)
TP29	Annunciator #2, (Discrete I/O, SBU fail)

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

Pin-out for SBU rear receptacle (bottom plug)

Pin no.	Pin name
BP A1.1	Tx+ 10/100BaseT Ethernet #1 (Quadrax pin 1, Input)
BP A1.2	Rx+ 10/100BaseT Ethernet #1 (Quadrax pin 2, Output)
BP A1.3	Tx- 10/100BaseT Ethernet #1 (Quadrax pin 3, Input)
BP A1.4	Rx- 10/100BaseT Ethernet #1 (Quadrax pin 4, Output)
BP A2.1	Tx+ 10/100BaseT Ethernet #2 (Quadrax pin 1, Input)
BP A2.2	Rx+ 10/100BaseT Ethernet #2 (Quadrax pin 2, Output)
BP A2.3	Tx- 10/100BaseT Ethernet #2 (Quadrax pin 3, Input)
BP A2.4	Rx- 10/100BaseT Ethernet #2 (Quadrax pin 4, Output)
BP A3.1	Tx+ 10/100BaseT Ethernet #3 (Quadrax pin 1, Input)
BP A3.2	Rx+ 10/100BaseT Ethernet #3 (Quadrax pin 2, Output)
BP A3.3	Tx- 10/100BaseT Ethernet #3 (Quadrax pin 3, Input)
BP A3.4	Rx- 10/100BaseT Ethernet #3 (Quadrax pin 4, Output)
BP A4	GPS antenna input (coax), Modem, DC out
BP1	Annunciator #4 (Discrete I/O, Message received)
BP2	Spare I/O, (Discrete I/O)
BP3	SBU Chassis Ground
BP4	Spare I/O, (Discrete I/O)
BP5	Data from primary ARINC429 navigational input, A

Pin no.	Pin name
BP6	Rx- 10/100BaseT Ethernet #4, (Output)
BP7	Data from secondary ARINC429 navigational input, A
BP8	Data from primary ARINC429 navigational input, B
BP9	Data from BSU, ARINC 429 A
BP10	Tx+ 10/100BaseT Ethernet #4, (Input)
BP11	Tx- 10/100BaseT Ethernet #4, (Input)
BP12	Data to BSU, ARINC 429 A
BP13	Data from secondary ARINC429 navigational input, B
BP14	Data from BSU, ARINC 429 B
BP15	Common Signal GND for Ethernet
BP16	Rx+ 10/100BaseT Ethernet #4, (Output)
BP17	Common Signal GND for Ethernet
BP18	Data to BSU, ARINC 429 B
BP19	Rx- 10/100BaseT Ethernet #5, (Output)
BP20	Tx- 10/100BaseT Ethernet #5, (Input)
BP21	Common Signal GND for Ethernet
BP22	Common Signal GND for Ethernet
BP23	Rx- 10/100BaseT Ethernet #6, (Output)
BP24	Tx- 10/100BaseT Ethernet #6, (Input)
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)

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

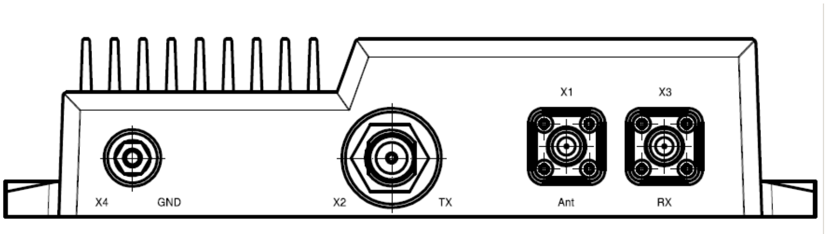


Figure 4-4: TT-5016A HLD connector panel

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:

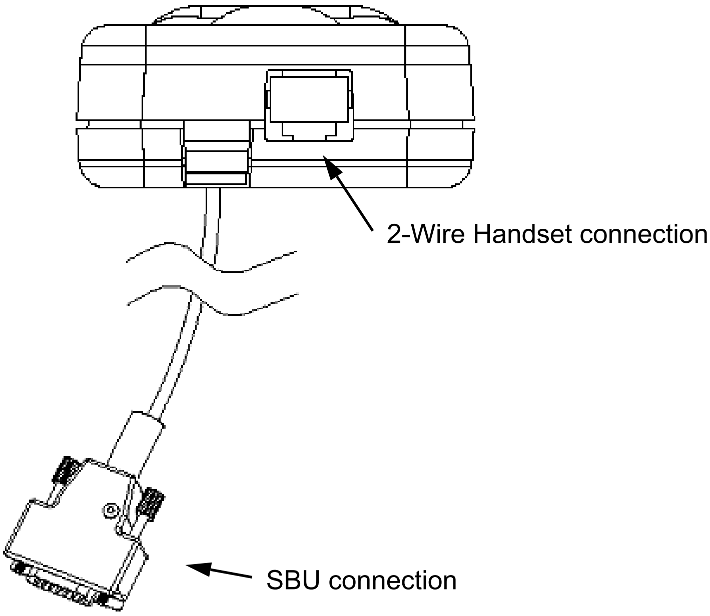


Figure 4-5: 2-Wire Cradle connectors, end view of cradle

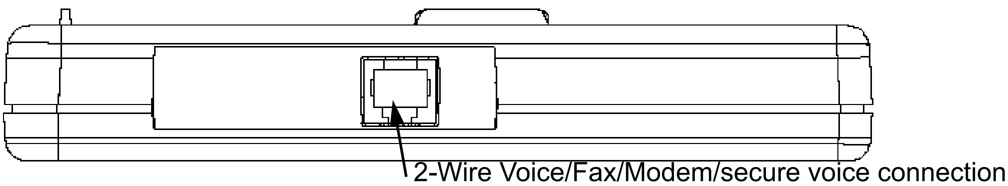


Figure 4-6: TT-5622B 2-Wire Cradle connectors, side view of cradle

4.3.2 2-Wire Cradle connector to SBU

Connector drawing

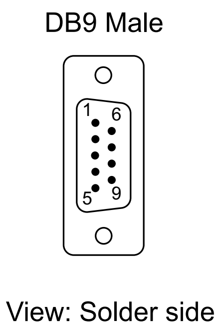


Figure 4-7: 2-Wire Cradle connector (DB9M). View: Solder side

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)	ARINC 404 shell size 2 plug with the following contact arrangements: Insert A (Top Plug): 33C4 • 4 #16 socket contacts • 25 #20 socket contacts • 4 #5 coax sockets Insert B (Bottom Plug): 33C4 • 4 #16 socket contacts • 25 #20 socket contacts • 1 #5 coax sockets • 3 #5 quadrax sockets Part number DPX2NA-67322-500

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 5-28 on page 48 and Table 5-29 on page 48.

Installation

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 2-8.

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

ECS, a Carlisle IT company, USA	**EMTEQ Inc., USA**
Phone: +1 414-421-5300	Phone: +1 262-679-6170 or +1 888-679-6170
E-mail: sales@ecsdirect.com	E-mail: sales@emteq.com
Home page: www.ecsdirect.com	Home page: www.emteq.com

The Installation chapter is organized in the following sections:

- *Mounting considerations.*
  This section provides guidelines for the mechanical installation of the units in the AVIATOR 200/300/350 system.
- *Electrical installation and wiring.*
  This section provides wiring drawings and guidelines for the electrical installation of the AVIATOR 200/300/350 system. It also lists the requirements to the cables.
- *Recommended cables.*
  This section provides lists of recommended cables and maximum cable lengths.
- *Activation of airtime services*
  This section provides information how to activate airtime service and details about the system's SIM card.

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 5-9 and onwards.

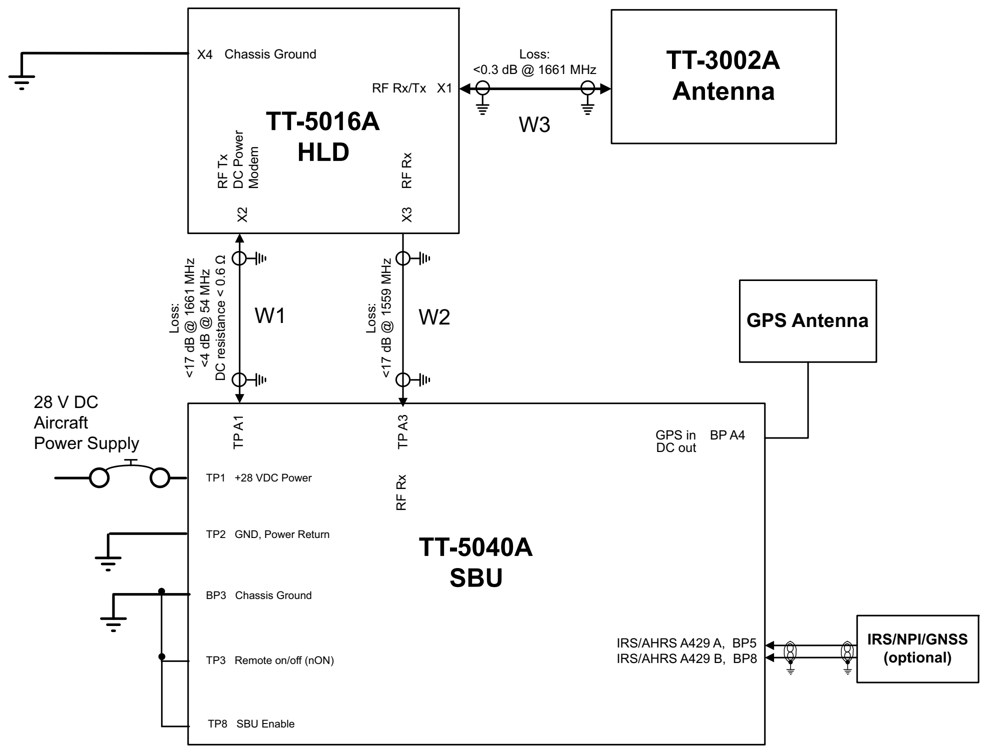


Figure 5-1: AVIATOR 200 minimum system (example with LGA TT-3002A and GPS antenna)

For other navigational input sources see Table 5-1 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 5-9. For information on recommended cable types and lengths, see *Recommended cables* on page 5-46.

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.

- Installation 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.

- Installation 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 5-46.
- 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. If a sufficient ground connection cannot be obtained, use the Ground stud on the HLD.

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 aircrafts 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	X			X	X	X
TT-5006A IGA	X	X	X			
HGA-6000/HGA-6500	X	X				
HGA-7000	X	X				
HGA 7001	X	X				
AMT-50	X	X				
AMT-700	X	X				
IGA-5001	X	X				
CMA-2102/CMA-2102SB	X	X				

Table 5-1: 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 5-11 on page 5-25.
- **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 5-12 on page 5-26.

Satcom antenna types supported

For a list of satcom antenna types supported in the AVIATOR 200/300/350 system see *Satcom antenna systems* on page 2-4.An AVIATOR 200/300/350 system must only be used with satcom antennas that have received type approval by Inmarsat.

Contact your Thrane & Thrane sales representative or see http://www.thrane.com/Aero/Products/ApprovedSatcomAntennas.aspx for a list of satcom antennas that have received Inmarsat type approval.

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 W/m^2 is not exceeded (Recommended by the American National Standards Institute, ANSI/LEEE 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 5-12 and *Recommended cables* on page 5-46.

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 Thrane & Thrane 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.

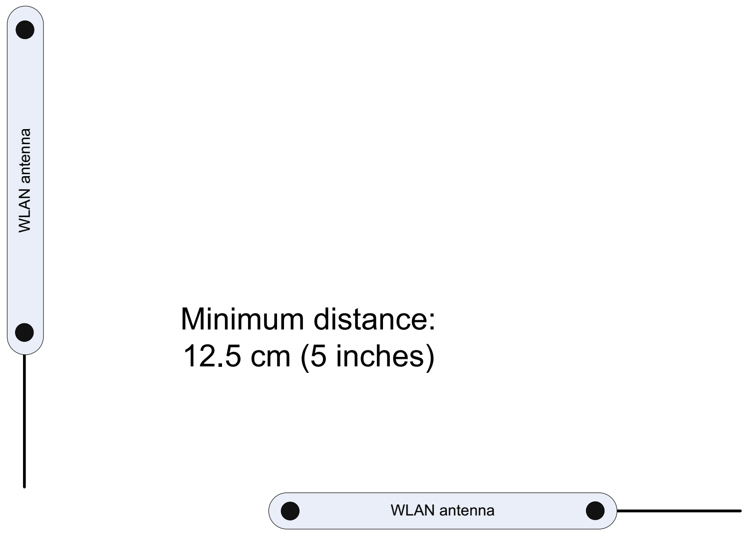


Figure 5-2: Mounting two WLAN antennas for optimum performance

Make sure the cable loss requirements are met, for further details see in the section *Wiring WLAN antenna interface* on page 5-32.

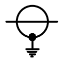
Operating with one WLAN antenna

You can also use a single WLAN antenna. For details how to wire a single WLAN antenna see *Wiring WLAN antenna interface* on page 5-32.

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

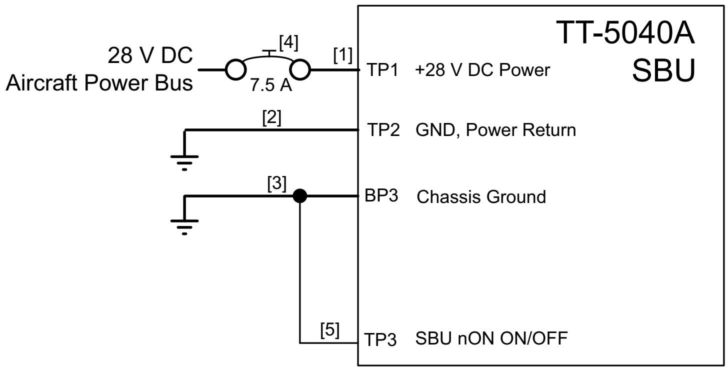
Important Each wiring drawing in this chapter only shows the connections referred to in that particular section. Other connections may be required for the system to work properly.

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 mΩ incl. Circuit Breaker.

[2] Directly to Aircraft Ground with less than 1 m cable. Total resistance max. 25 mΩ.

[3] Directly to installation tray and aircraft chassis, max. 25 mΩ 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 5-2: 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 5-11.

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 5-43.

Cable requirements, SBU power supply

Cable[a]	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 5-3: 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 5-46.

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 *Configuring RF settings* on page 6-41.

Wiring TT-3002A LGA

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

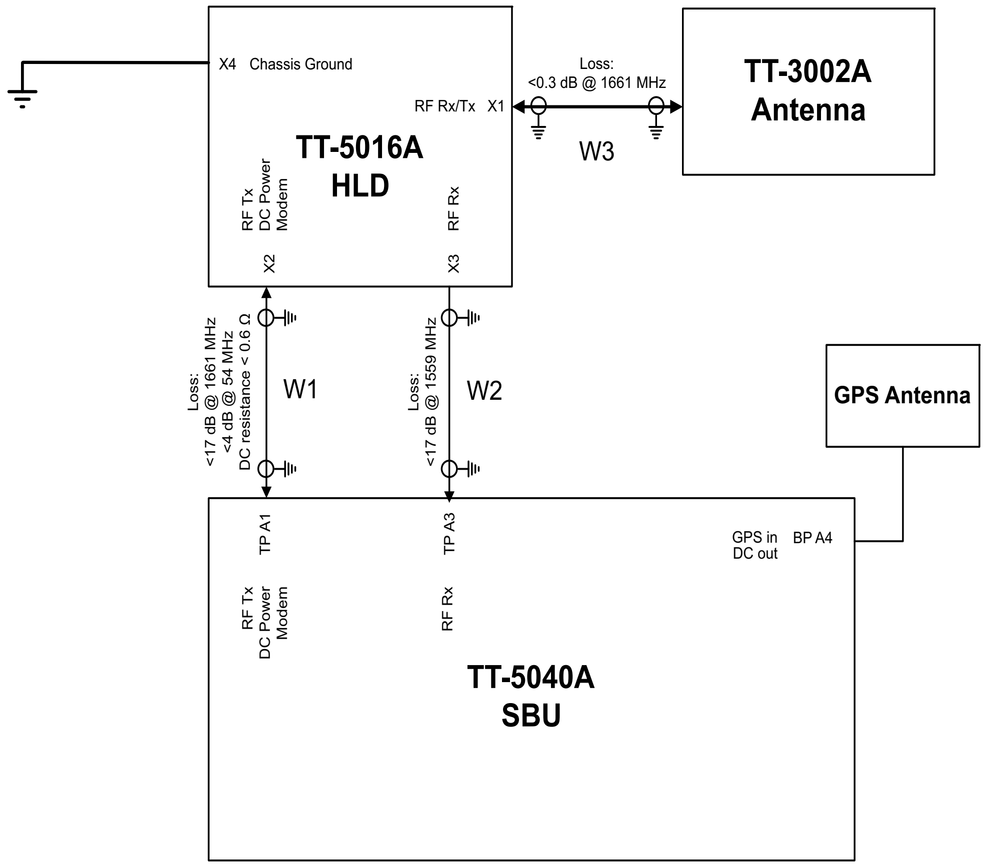


Figure 5-4: Wiring TT-3002A LGA

For the requirements to RF cables W1, W2 and W3 see Table 5-6 on page 5-22.

Wiring TT-5006A IGA

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

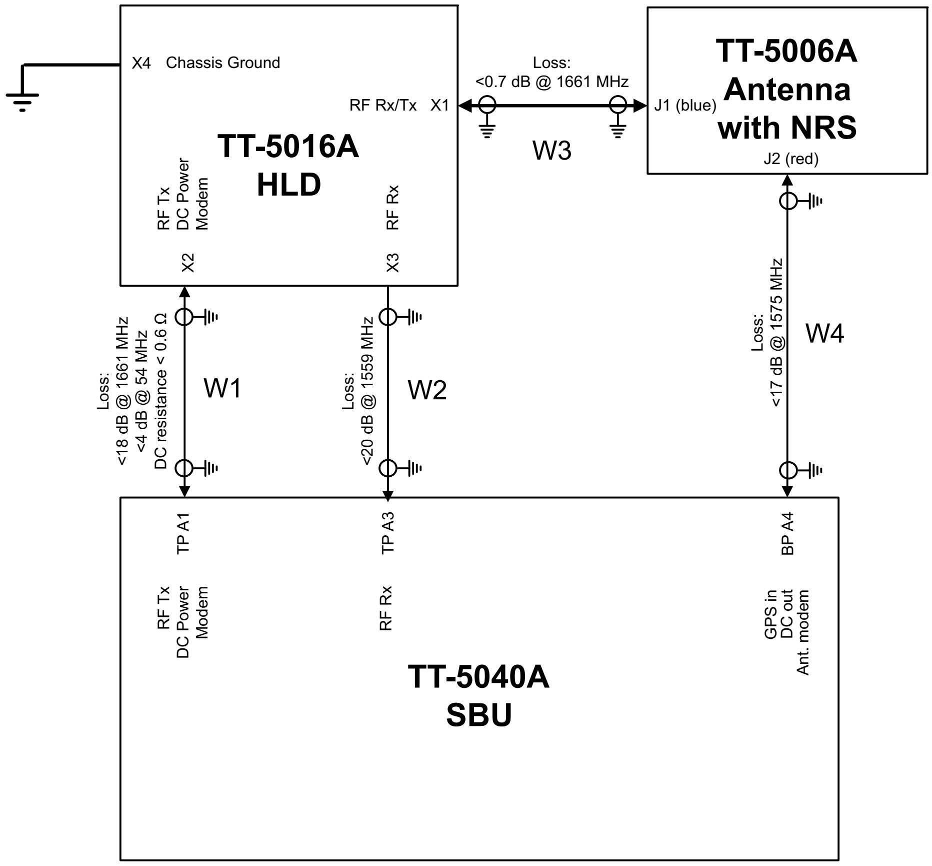


Figure 5-5: Wiring TT-5006A IGA

For the requirements to RF cables W1, W2 and W3 see Table 5-6 on page 5-22.

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.

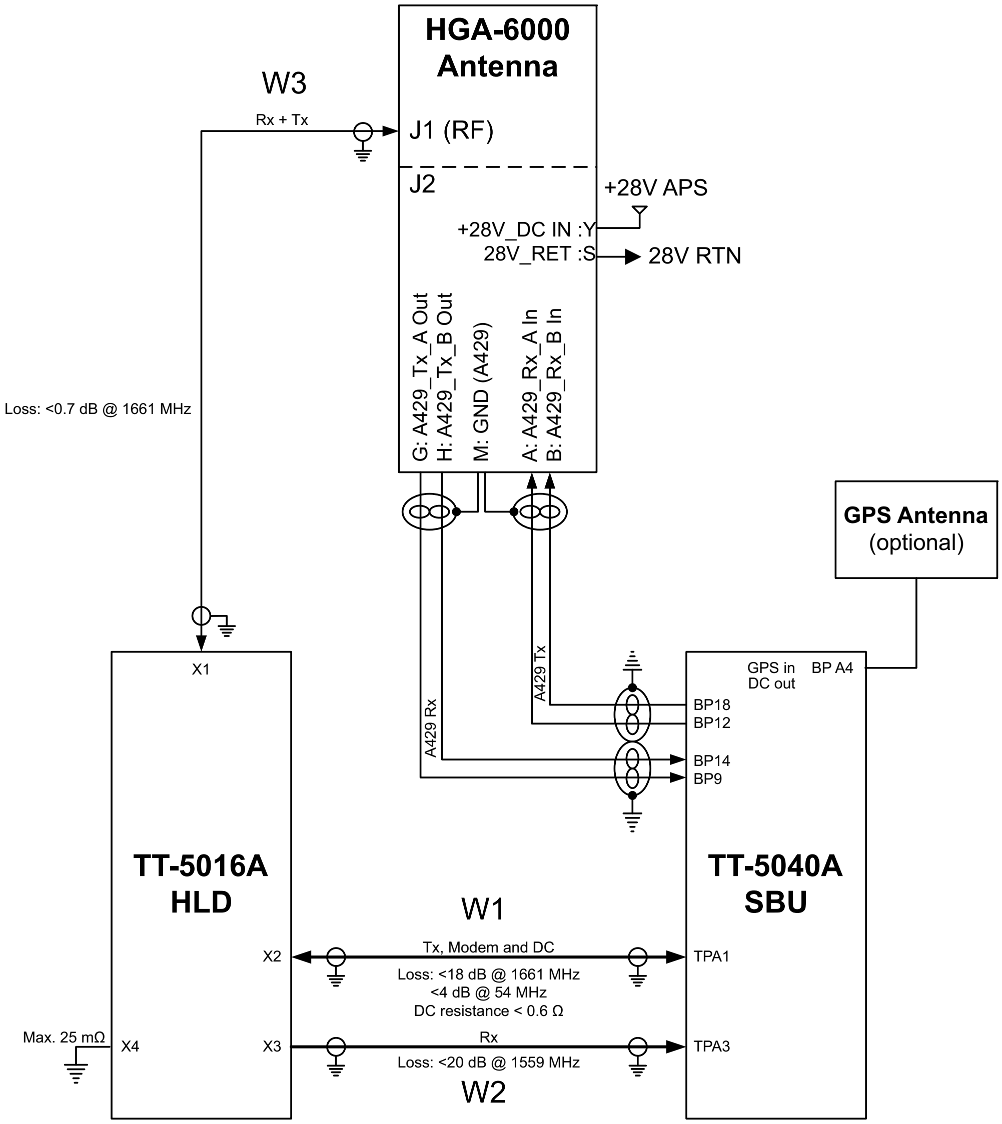


Figure 5-6: Wiring HGA-6000

For the requirements to RF cables W1, W2 and W3 see Table 5-7 on page 5-23.

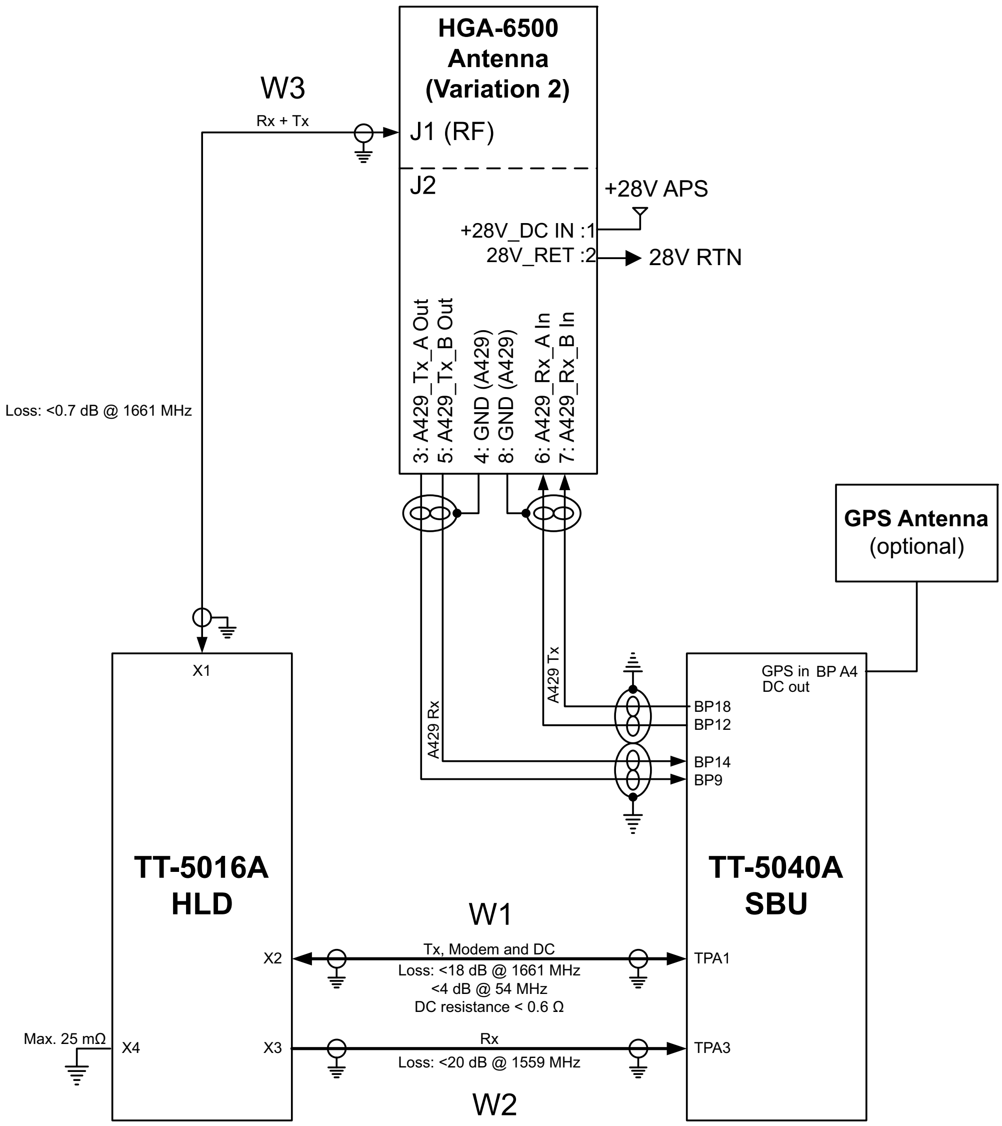


Figure 5-7: Wiring HGA-6500 Antenna (Variation 2, label at antenna plug: 1 and 2)

For the requirements to RF cables W1, W2 and W3 see Table 5-7 on page 5-23.

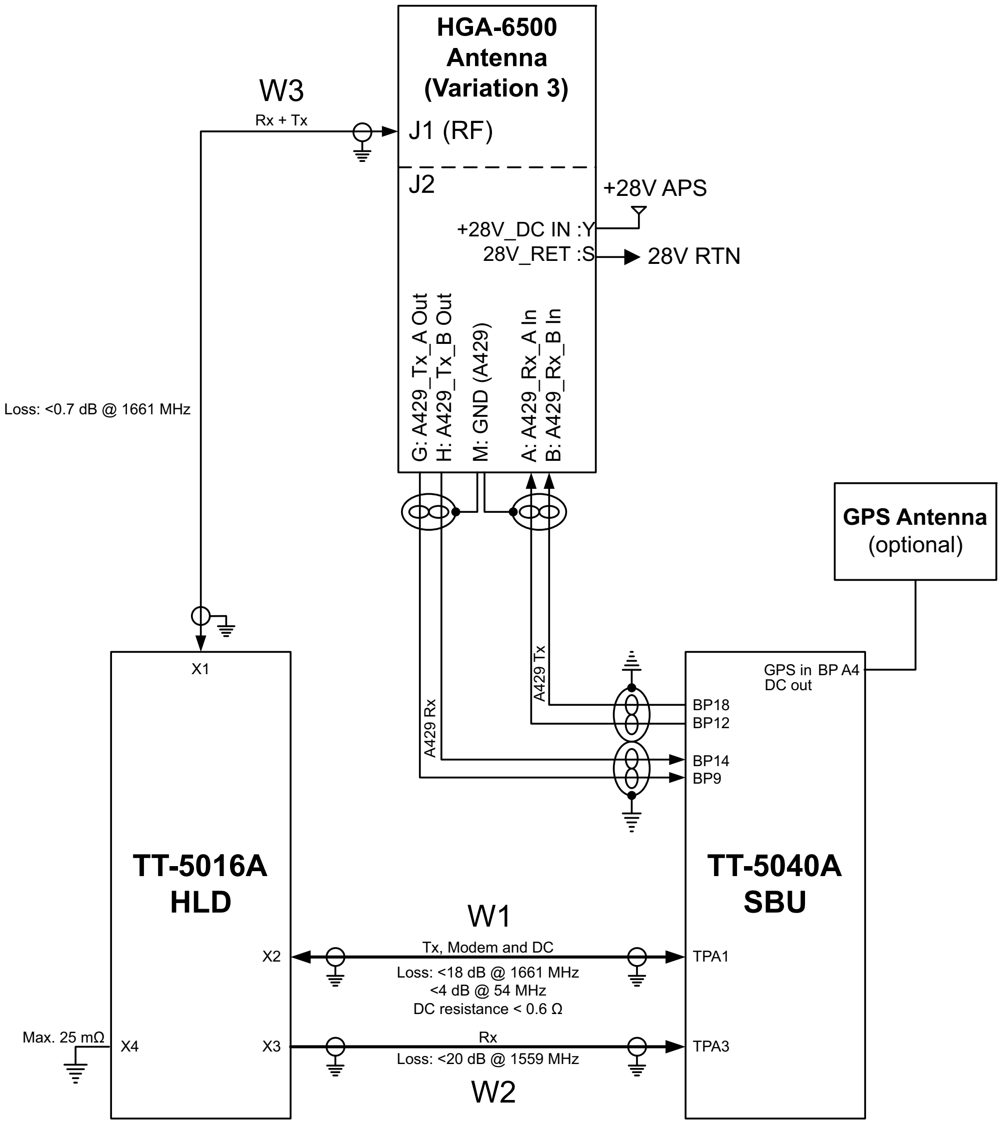


Figure 5-8: Wiring HGA-6500 Antenna (Variation 3 label at antenna plug: Y and S)

For the requirements to RF cables W1, W2 and W3 see Table 5-7 on page 5-23.

Wiring HGA-7001

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

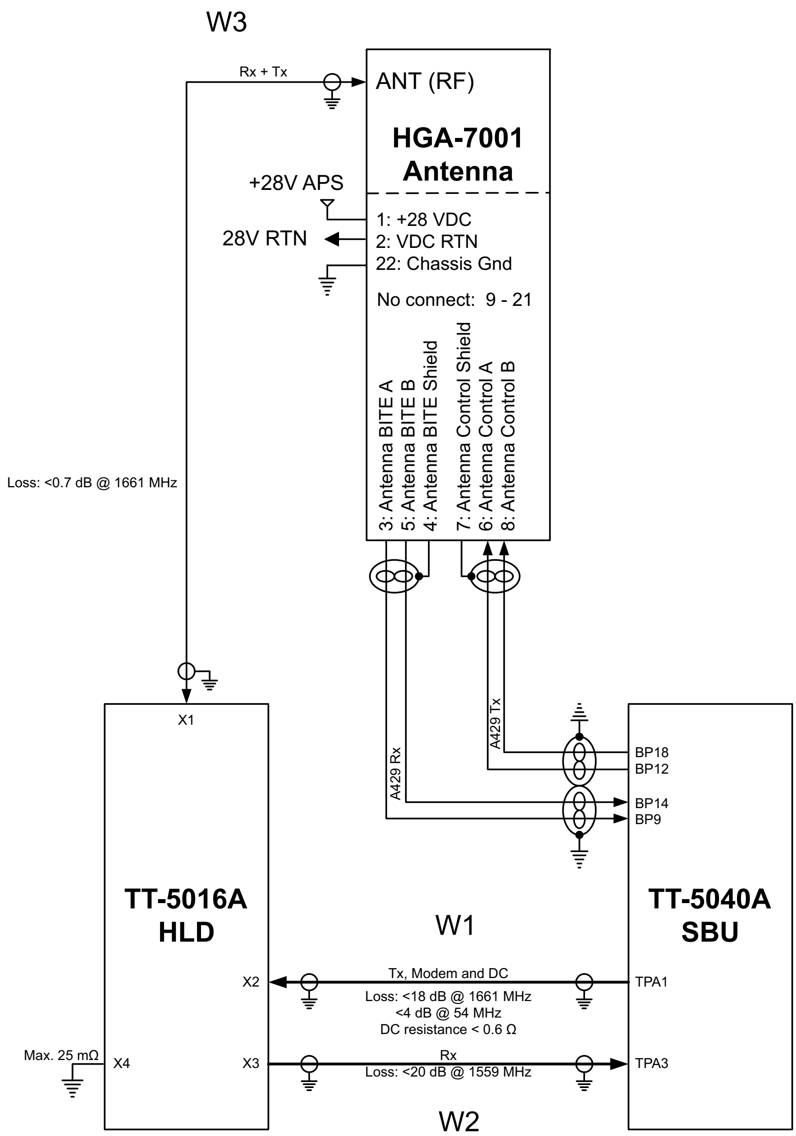


Figure 5-9: Wiring HGA-7001

For the requirements to RF W1, W2 and W3 cables see Table 5-7 on page 5-23.

Wiring AMT-50

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

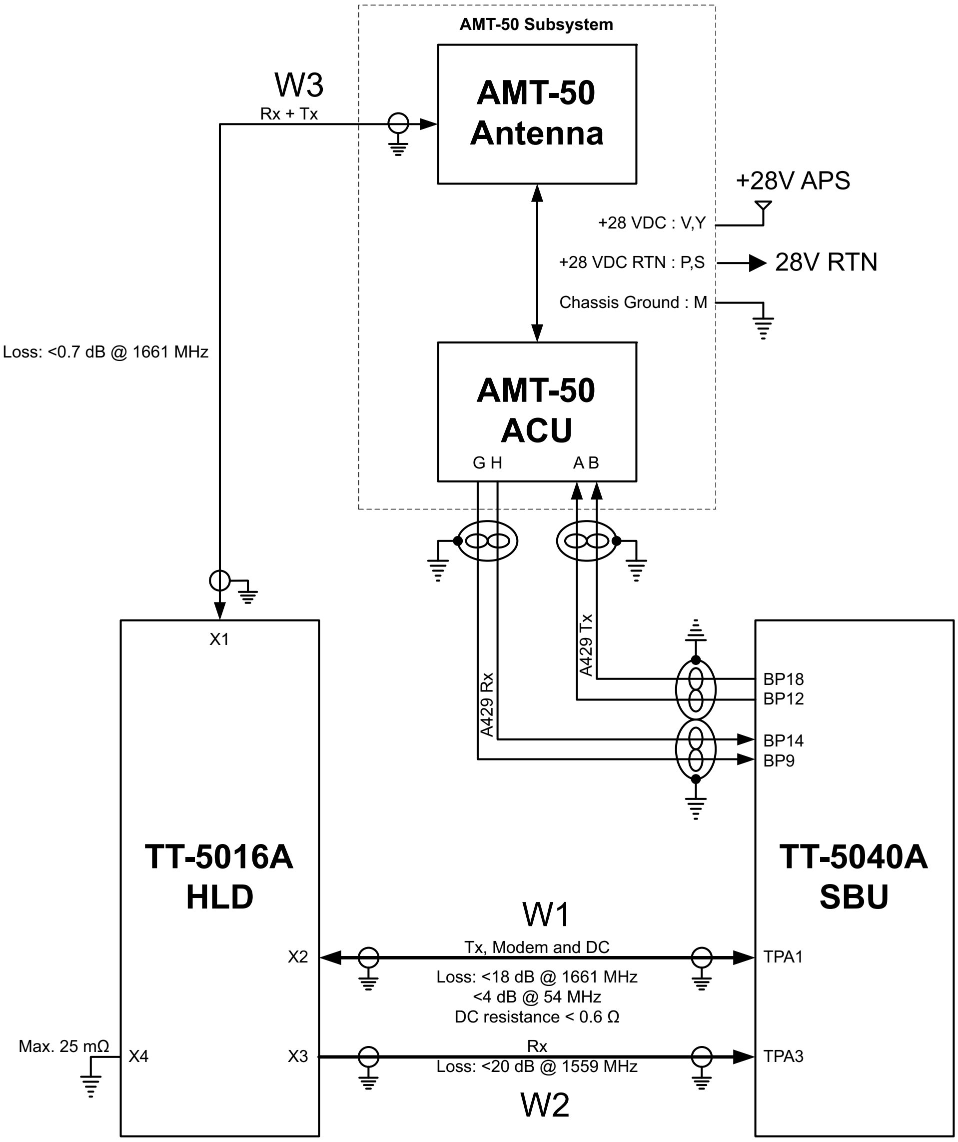


Figure 5-10: Wiring AMT-50

For the requirements to RF cables W1, W2 and W3 see Table 5-7 on page 5-23.

Wiring AMT-700

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

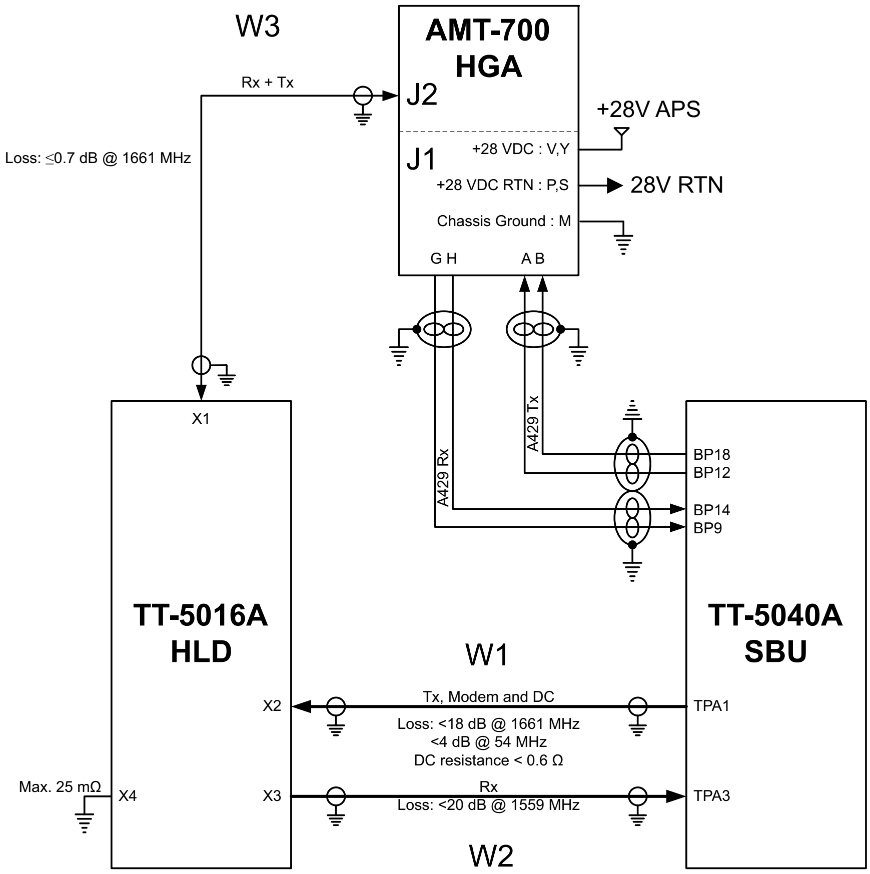


Figure 5-11: Wiring AMT-700

For the requirements to RF W1, W2 and W3 cables see Table 5-7 on page 5-23.

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.

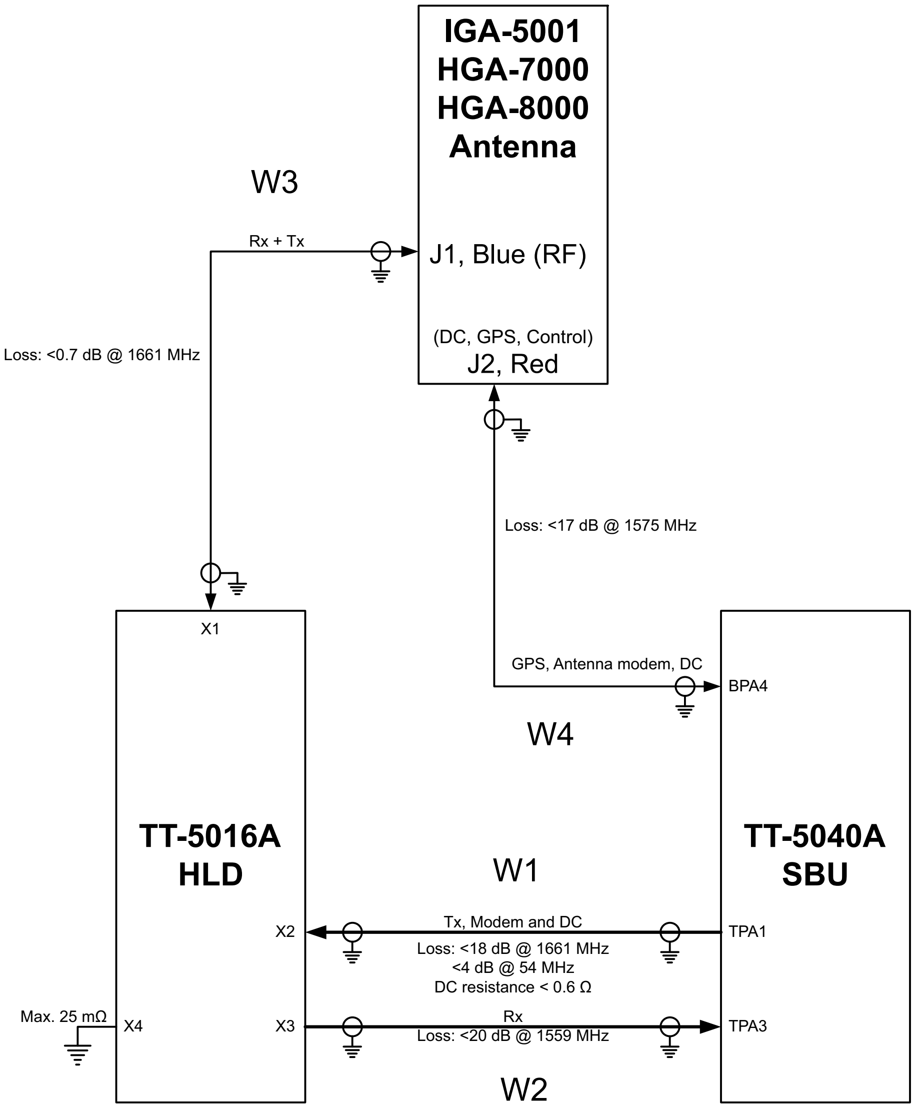


Figure 5-12: Wiring IGA-5001. HGA-7000 and HGA-8000

For the requirements to RF cables W1, W2, W3 and W4 see Table 5-7 on page 5-23.

Wiring CMA-2102/CMA-2102SB

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

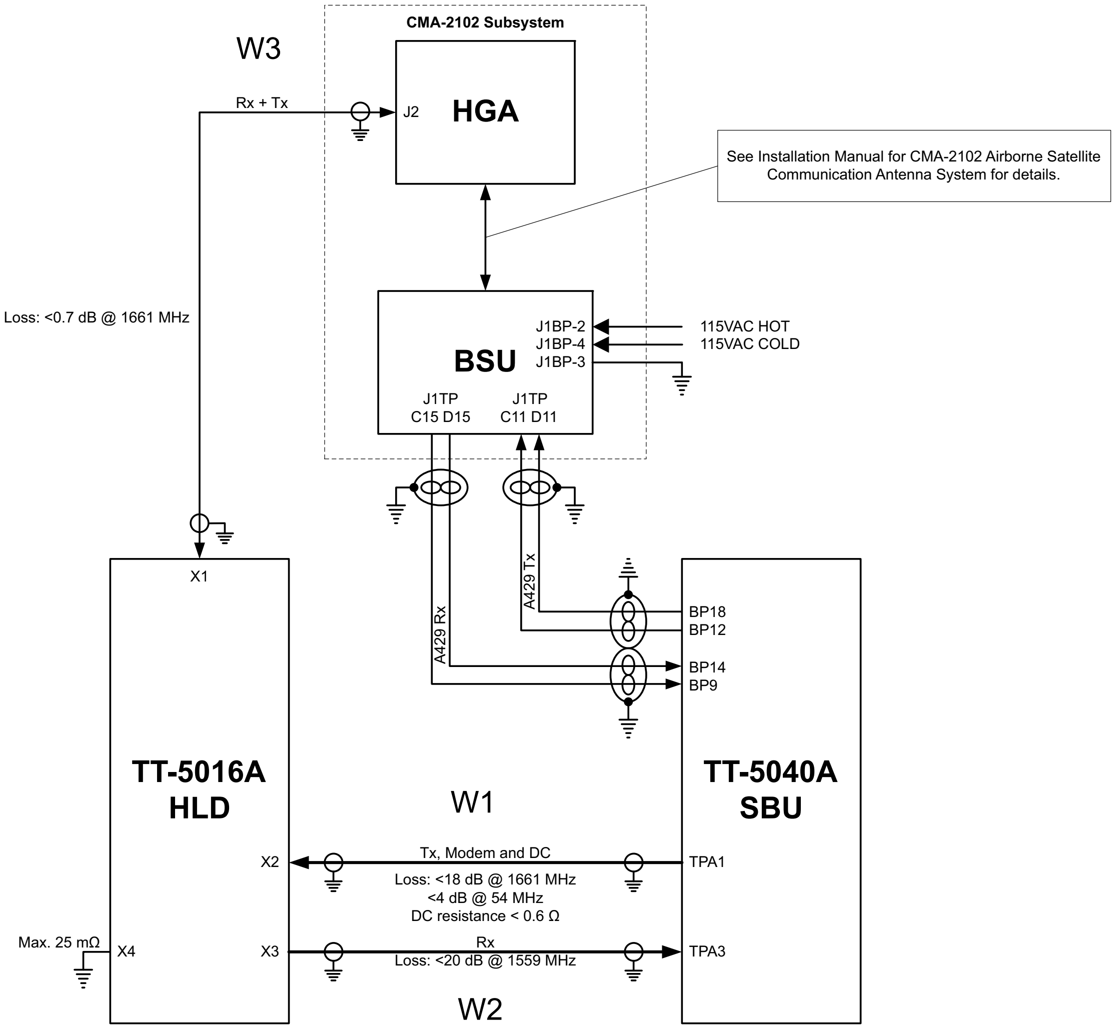


Figure 5-13: Wiring CMA-2102/CMA-2102SB

For the requirements to RF cables W1, W2 and W3 see Table 5-7 on page 5-23.

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.)

Table 5-4: 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 5-5: 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)[a]	0 dB	17 dB	< 0.6 Ω
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 Ω

Table 5-6: 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)[a]	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	n.a.
W4 (SBU to antenna)	0 dB	17 dB	< 1.5 Ω

Table 5-7: 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.

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 5-26.

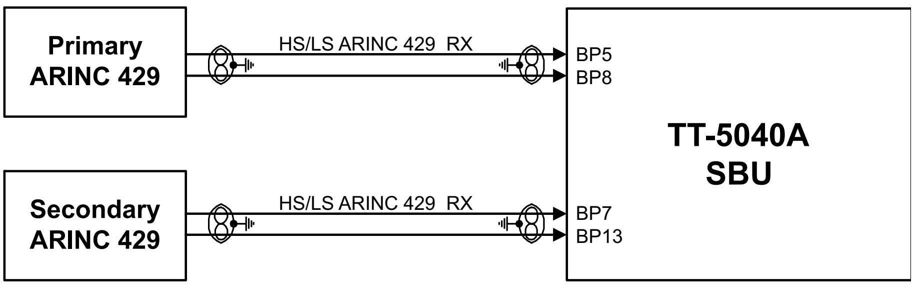


Figure 5-14: Wiring ARINC 429 navigational input

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 5-8: 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 Configuration Module will contain 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)[a]	1 Hz
260	UTC Date (optional)[a]	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

Table 5-9: ARINC data format for IRS

Label (octal)	Name	Minimum Update rate
325	Roll angle	10 Hz
361	Altitude Inertial (optional)[a]	1 Hz

Table 5-9: ARINC data format for IRS (Continued)

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)[a]	10 Hz
337	Inertial roll rate (optional)[a]	10 Hz

Table 5-10: 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)[a]	1 Hz
260	UTC Date (optional)[a]	1 Hz
310	Latitude	1 Hz
311	Longitude	1 Hz
312	Ground speed	1 Hz
313	Track angle True	1 Hz
361	Altitude Inertial (optional)[a]	1 Hz

Table 5-11: 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.

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	1 Hz
110	Latitude	1 Hz
111	Longitude	1 Hz
112	Ground speed	1 Hz
150	UTC Time (optional)[a]	1 Hz
260	UTC Date (optional)[a]	1 Hz
370	Height (optional)[a]	1 Hz

Table 5-12: ARINC data format for GNSS

a. The presence of labels marked optional does not have an effect on the operation of the AVIATOR 200 system, but may increase precision in the time management.

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.

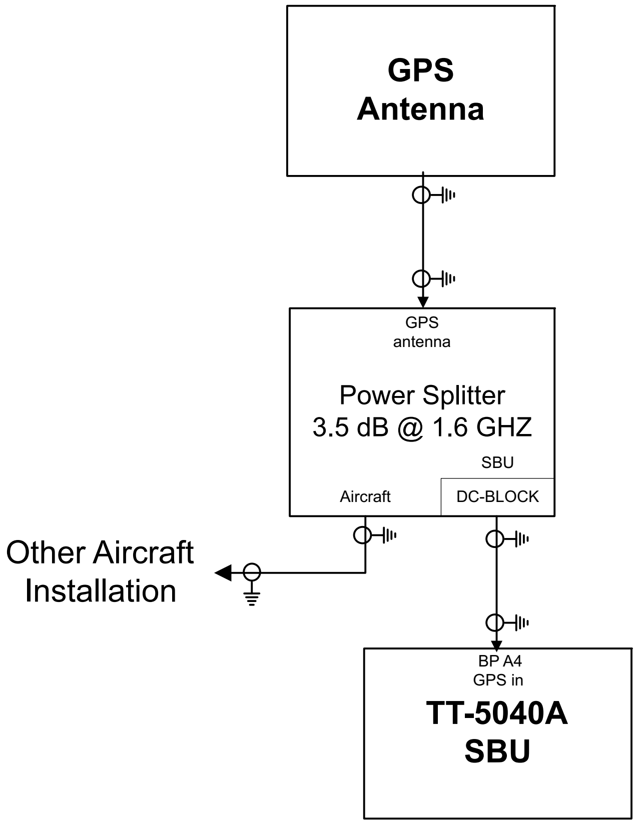


Figure 5-15: Wiring GPS Interface with Power Splitter

PIN for input from the GPS antenna

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

Table 5-13: SBU pins for input from GPS antenna

Description of the GPS interface

The GPS interface can be used to interface with either a GPS antenna or satcom antenna. When interfacing to a satcom antenna the cable is called W4, and the max cable loss must fulfil the requirements in Table 5-6 on page 5-22 (AVIATOR 200) and Table 5-7 on page 5-23 (AVIATOR 300 and AVIATOR 350).

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 5-44.

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

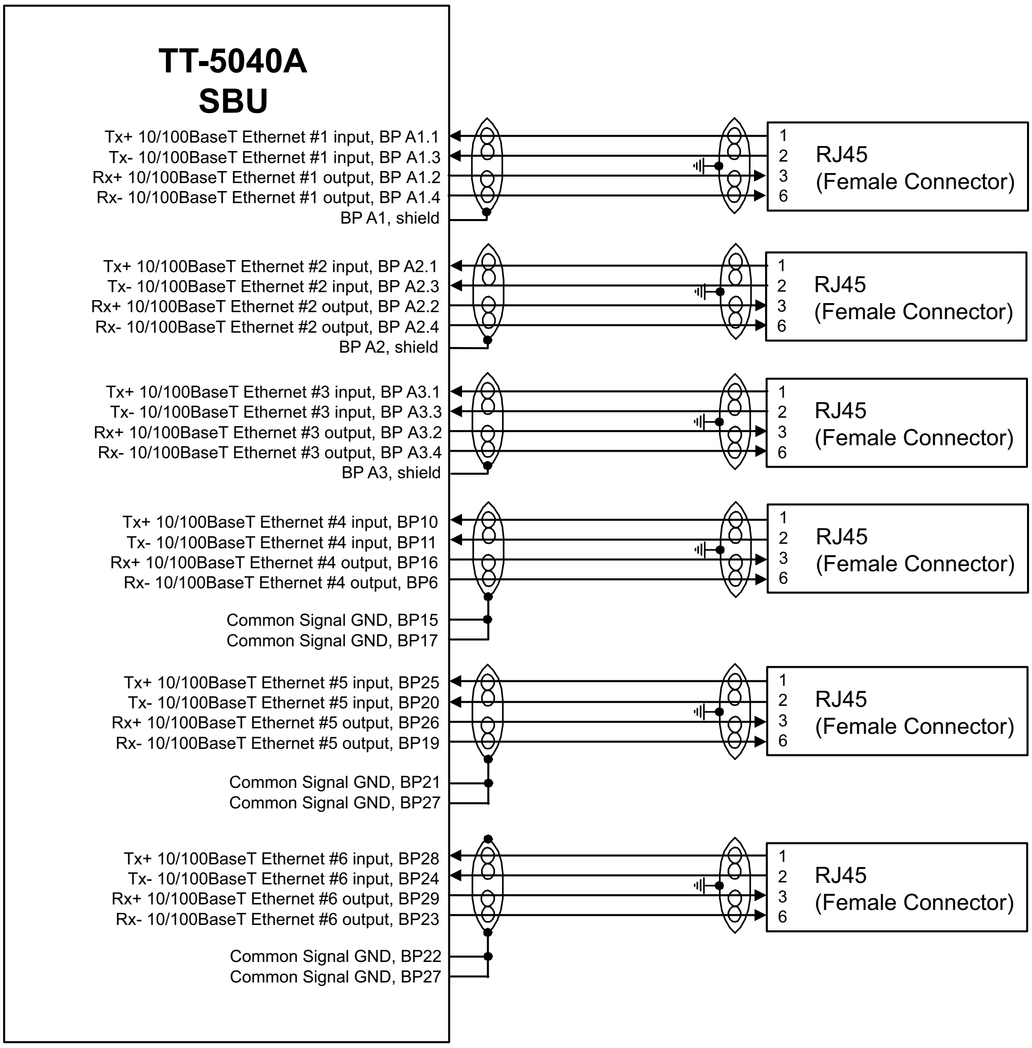


Figure 5-16: Wiring Ethernet

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+
BP26	Rx+ 10/100BaseT Ethernet #5	Output	3	RxD+
BP27	Common Signal GND for Ethernet	GND	Shield	

Table 5-14: SBU Pins for 10/100BaseT Ethernet

SBU pin	Name	Description	RJ45 pin (F)	Name
BP28	Tx+ 10/100BaseT Ethernet #6	Input	1	TxD+
BP29	Rx+ 10/100BaseT Ethernet #6	Output	3	RxD+

Table 5-14: 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.

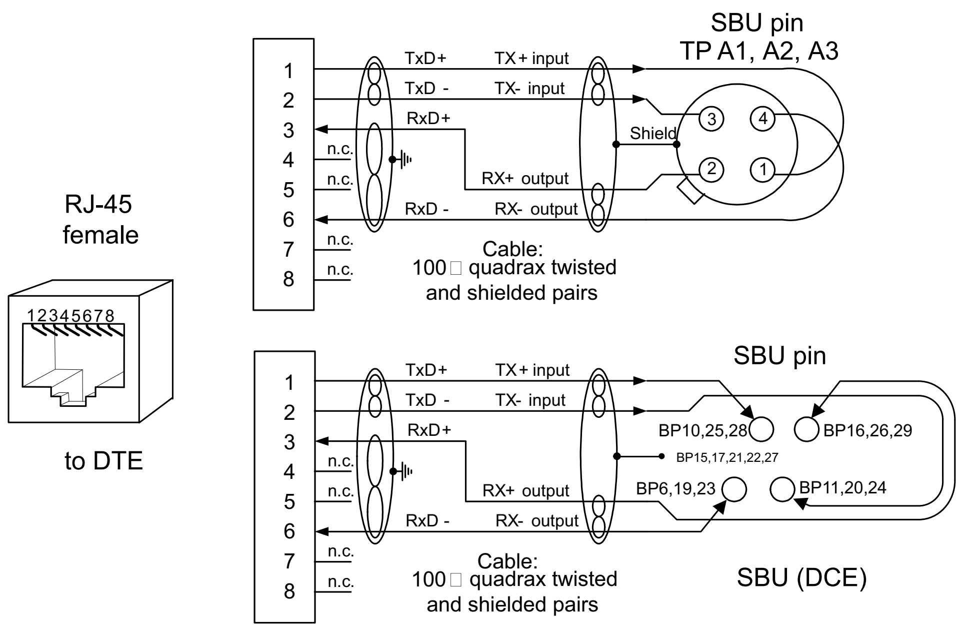


Figure 5-17: Ethernet pin configuration for SBU

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 5-16: 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.

Overview

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

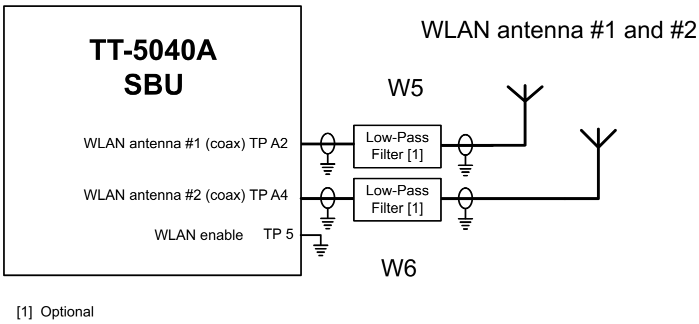


Figure 5-18: Wiring WLAN antenna interfaces #1 and #2

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 5-15: SBU pins for WLAN antenna #1 and #2

Description of 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 A4.

Make sure to set up WLAN interface correctly – Antenna configuration: Main or Aux for single antenna operation – see *WLAN interface* on page 6-21.

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

Table 5-16: 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 5-17: Cable requirements for WLAN

Order information for low pass filter for WLAN

Product name	Product description	Manufacturer	
Coaxial Low Pass Filter SLP-2950+	Low pass filter for WLAN	**Mini-Circuits**	
		P.O. Box 350166,	
		Brooklyn, NY 11235 U.S.A.	
		Phone:	(718) 934-4500
		Home page:	www.minicircuits.com

Table 5-18: 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.

Wiring drawing

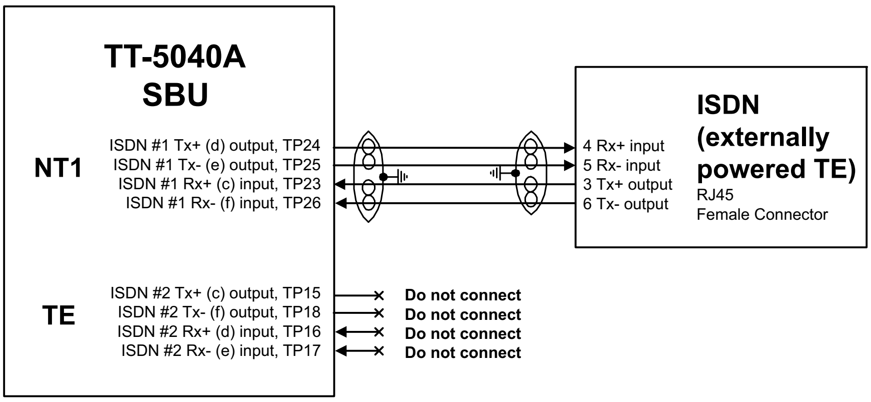


Figure 5-19: Wiring ISDN interface

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 list shows 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). **Do not connect!**
TP16	ISDN #2 Rx+ (d) input (TE). **Do not connect!**
TP17	ISDN #2 Rx- (e) input (TE). **Do not connect!**
TP18	ISDN #2 Tx- (f) output (TE). **Do not connect!**

Table 5-19: 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 Ω termination resistor to support cable lengths up to 100 meters (109 yards). Make sure the other end of the cable is terminated properly.

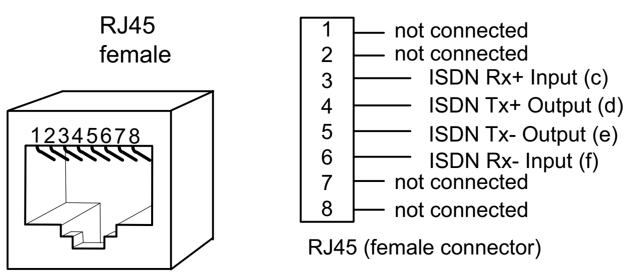


Figure 5-20: ISDN RJ45 connector

Cable requirements, ISDN

- Cable for the ISDN interface: 100 Ω 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.

Note that 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 if 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 as a CS call through the built-in PBX on the Swift Broadband channel. For a detailed description how to setup your phone see *SIP setup for Wifi-enabled phones* on page H-1.

2-wire POTS interface #1 and #2

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
- Sigma7 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 Sigma7 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

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.

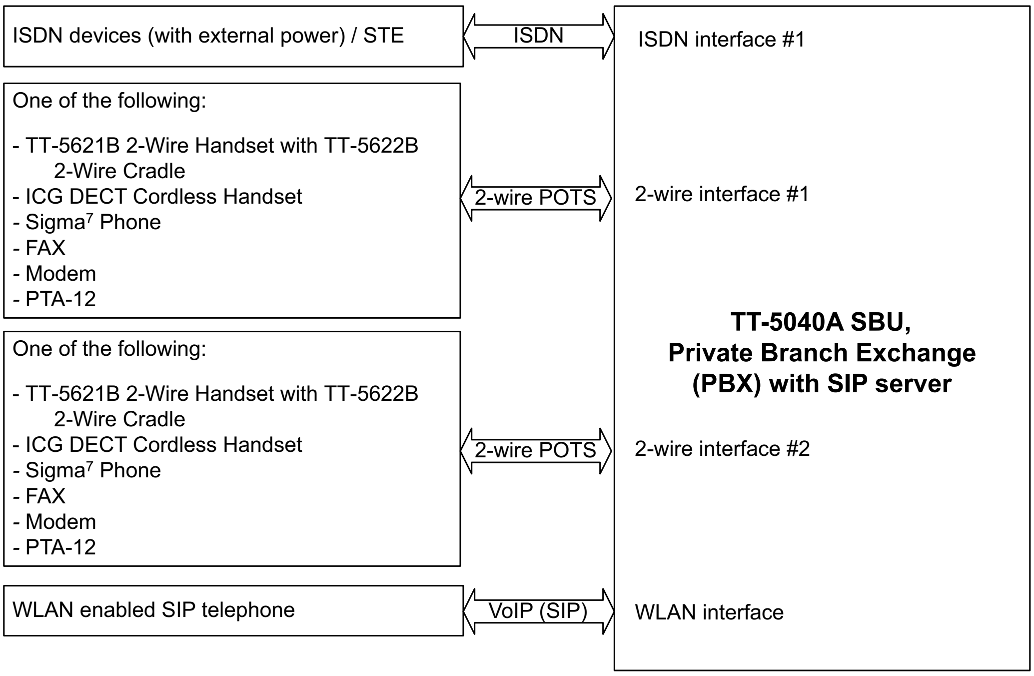


Figure 5-21: Handset interfaces with possible combinations of connected devices.

Wiring 2-Wire Handsets

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

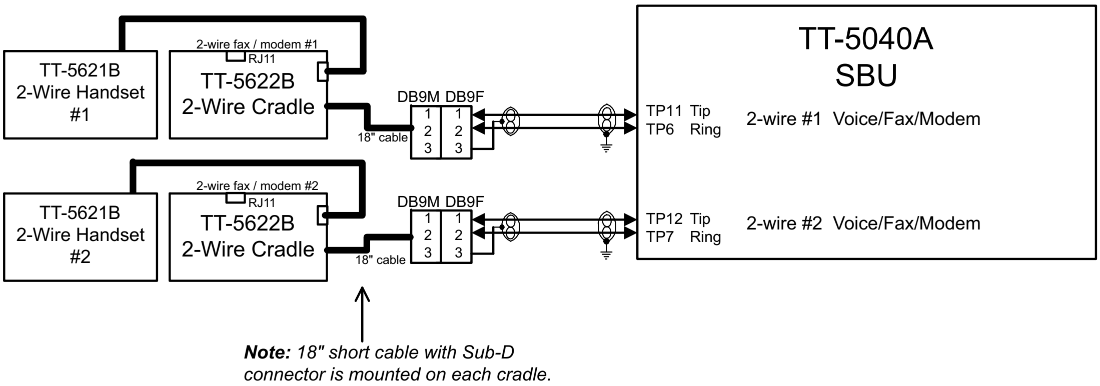


Figure 5-22: Wiring T&T 2-Wire Handset systems

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 5-20: 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[7], ICG DECT Cordless Handset phones, fax, modem or secure devices and PTA-12.

For information on wiring of Sigma[7] phones, see *Wiring Sigma[7] (2-wire) handsets* on page 5-39. For information on wiring of ICG DECT Cordless Handset phones, see *Wiring ICG DECT Cordless Handset (2-wire) phone* on page 5-40.

- Supported cable length: 100 meters (328 feet)

5.3.10 Wiring Sigma7 (2-wire) handsets

The following drawing shows the wiring of Sigma7 handsets.

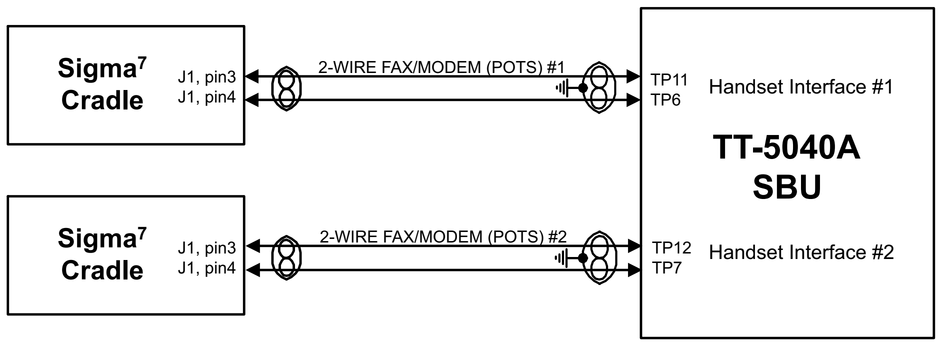


Figure 5-23: Wiring Sigma7 handsets

Note The above wiring shows the connection for the non-backlit Sigma7 handset. The backlit version Sigma7 handset uses pin 6 for Tip 1 and pin 3 for Ring 1.

One or two Sigma7 handsets can be connected to the 2-wire interfaces of the AVIATOR 200/300/350 system.

Connect J1 on the Sigma7 handset to the rear receptacle of the SBU according to the wiring drawing above.

Important In order for the volume in the Sigma7 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 *Sigma7 setup* on page 6-91.

For information on the 2-wire interface, see *Pins for 2-wire interfaces* on page 5-38.

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

The following drawing shows the wiring of ICG DECT Cordless Handset 2-wire phones.

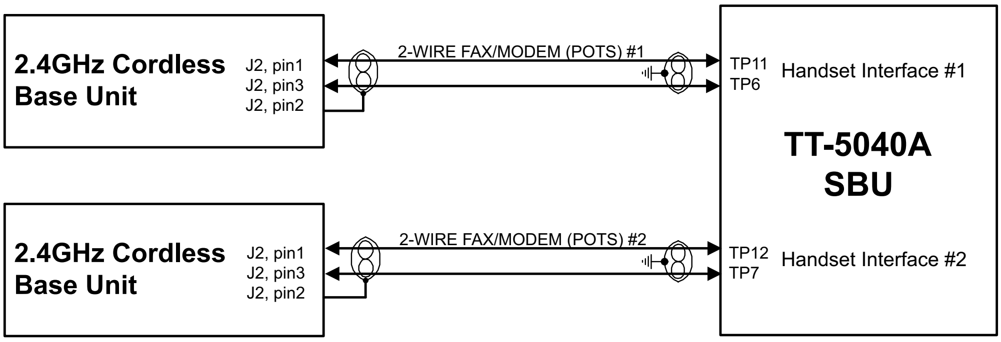


Figure 5-24: Wiring ICG DECT Cordless Handset handsets

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

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 6-92.

For information on the 2-wire interface, see *Pins for 2-wire interfaces* on page 5-38.

5.3.12 Wiring discretes

Discrete annunciators and Chime/Lamps Inhibit

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

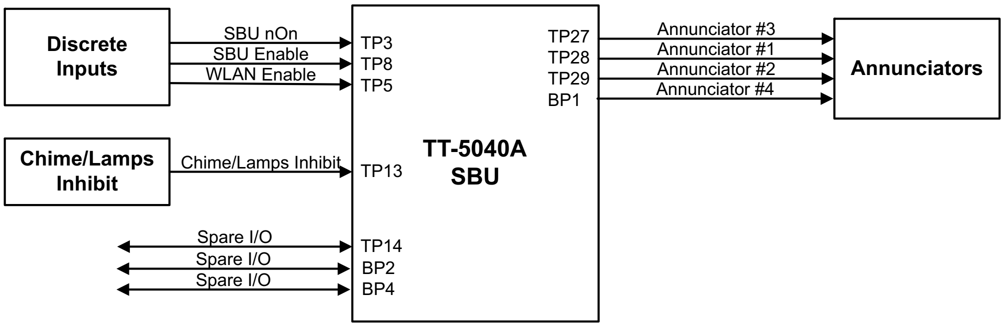


Figure 5-25: Wiring discretes

Pins for discrete annunciators

The following list shows the pins used for discrete annunciators:

SBU pin	Name and description	Discrete type[a]
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 5-21: SBU pins for discrete annunciators

a. The discrete interfaces are described in *Description of the discrete types* on page 5-43.

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 5-22: 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 *Configuring 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 5-23: 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	The output configuration forms a switch closure to ground. The electrical specification for the Lamp type switch is: 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
Discrete input	The discrete input detects the following states: "Open" voltage: 7 V DC to 39.5 V DC or ≥100 kΩ to ground. "Short" voltage: 0 ±3.5 V DC or ≤1500 Ω to ground. Input characteristics: Reaction time is <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.

Table 5-24: 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.

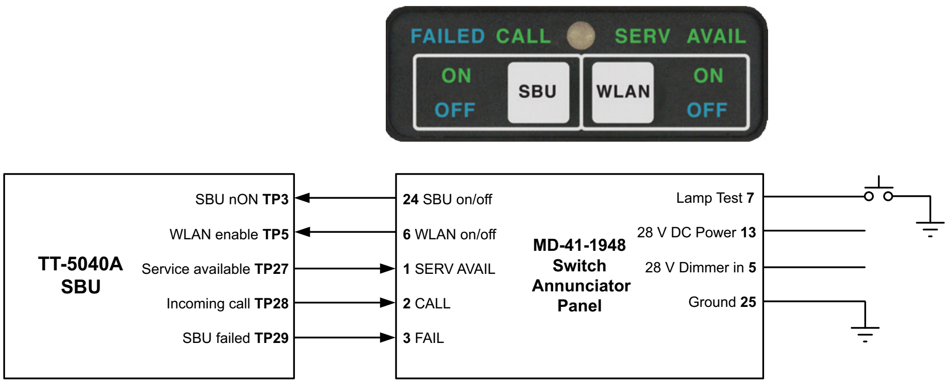


Figure 5-26: Wiring the Switch Annunciator Panel MD-41-1948

5.3.14 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!**)

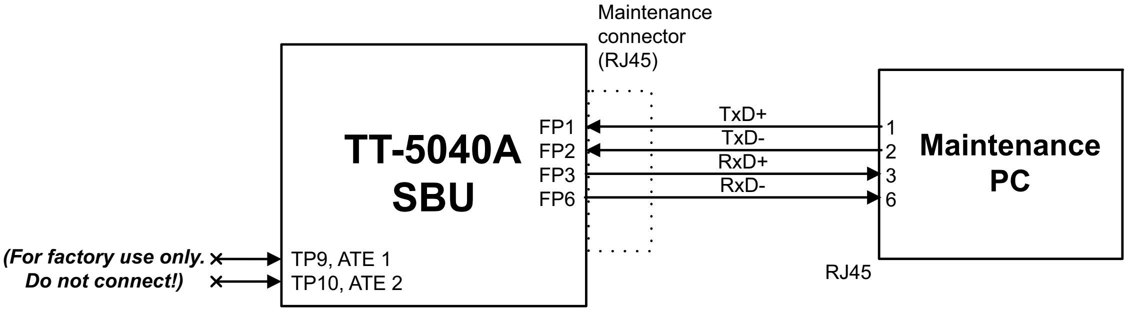


Figure 5-27: Wiring Maintenance PC and Reset

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 5-25: 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 6-1.

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 [a] (250 mΩ-40 mΩ in 7.5 A circuit breaker)	17 ft[a] (5.2 m)	27 ft[a] (8.3 m)	43 ft[a] (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 5-26: Allowed lengths for SBU power cables

a. The max. cable resistance is calculated using the resistance of a Klixon 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 5-27: 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.

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	7.9	n.a.
EMTEQ TFLX480-100	12.2/0.48	57.2 / 2.25	4.5	n.a.

Table 5-28: List of Recommended RF Cables

Contact your cable supplier for other cable types.

Maximum cable lengths for WLAN cables

Cable from SBU to WLAN antenna			W5 and W6 [a]	
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

Table 5-29: Allowed lengths for WLAN cables

Cable from SBU to WLAN antenna			W5 and W6 [a]	
Part number	**Cable diameter (mm/in.)**	**Attenuation (dB/100 ft)**	**Maximum cable length**	**Size 5 contact part number**
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 5-29: Allowed lengths for WLAN cables (Continued)

a. W5 and W6 stand for the cables needed when wiring the TT-5040A SBU, see *Wiring WLAN antenna interface* on page 5-32.

5.4.5 Recommended cables for ARINC 429

ARINC 429 cables shall meet the following standards:

- 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 (Quadrax connectors)

Ethernet cables shall meet the following standards:

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

The following cable types meet the requirements:

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

5.4.7 Cables for Discrete Signals

Cables for discrete wiring shall meet the following standards:

- 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 *Setting 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, Services, How to buy, Aeronautical service providers (http://www.inmarsat.com/Services/Aeronautical/How_to_buy/Service_providers.aspx).

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 7-14.

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

Configuring 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.

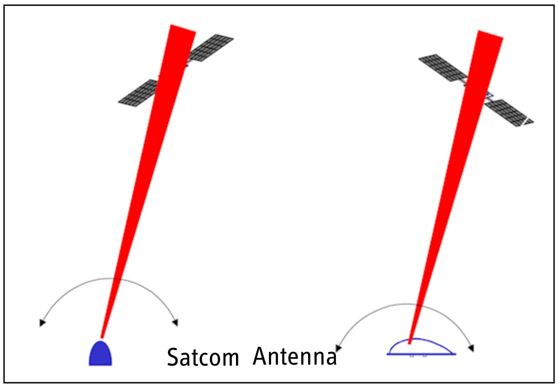


Figure 6-1: Line of sight when communicating with the satellite

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 setup 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 the SBU software version to be 1.05 for Level E and 2.00 or higher for Level D. Verify also that the certification level is correct (Level-D or Level-E). For more information on the individual fields see *Using the Dashboard* on page 6-12.

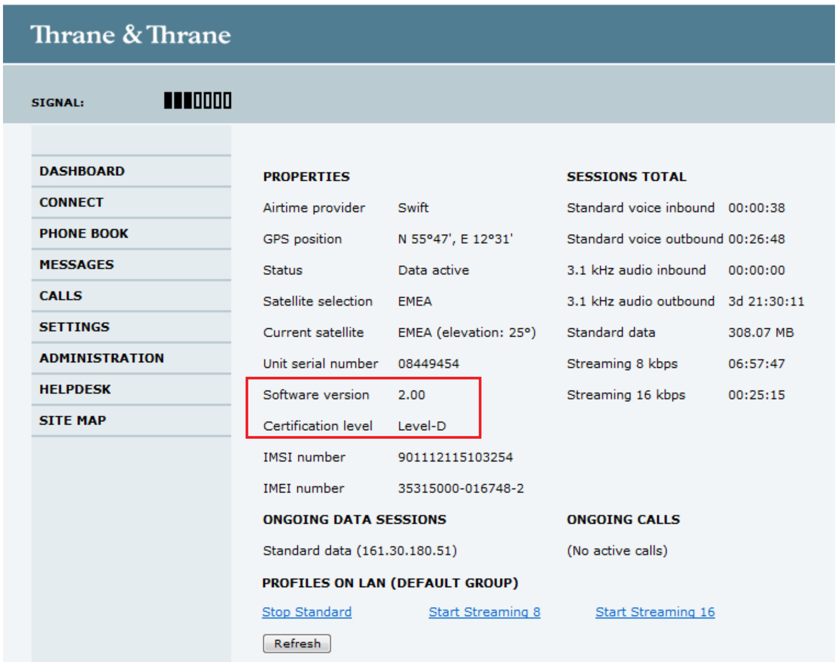


Figure 6-2: Basic configuration of the SBU, step 1/5

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

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!

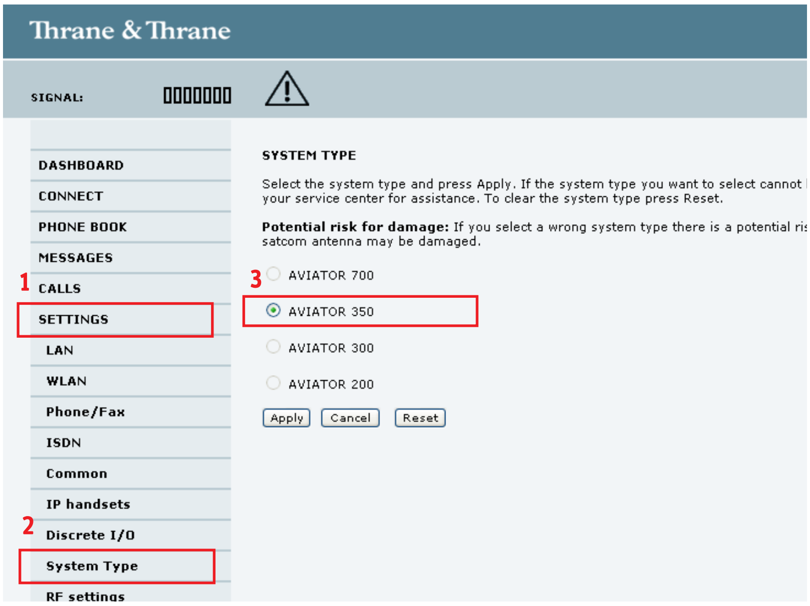


Figure 6-3: Basic configuration of the SBU, step 2/5

3. In **SETTINGS > External systems** enter the values for Navigational input and GPS voltage. For detailed instructions see *Setting up the navigational input* on page 6-43.

Figure 6-4: Basic configuration of the SBU, step 3/5

4. In **SETTINGS > RF settings**, enter the cable losses applicable to the SBU. For detailed instructions see *Configuring RF settings* on page 6-41.

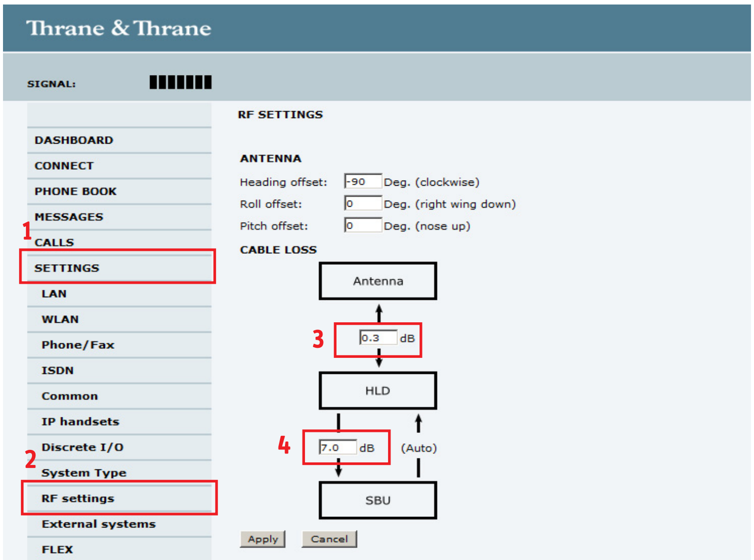


Figure 6-5: Basic configuration of the SBU, step 4/5

5. In **SETTINGS > LAN > Network user groups**, click **Edit** and enter the APN from your service provider. For detailed instructions see *Setting up the network user groups* on page 6-54.

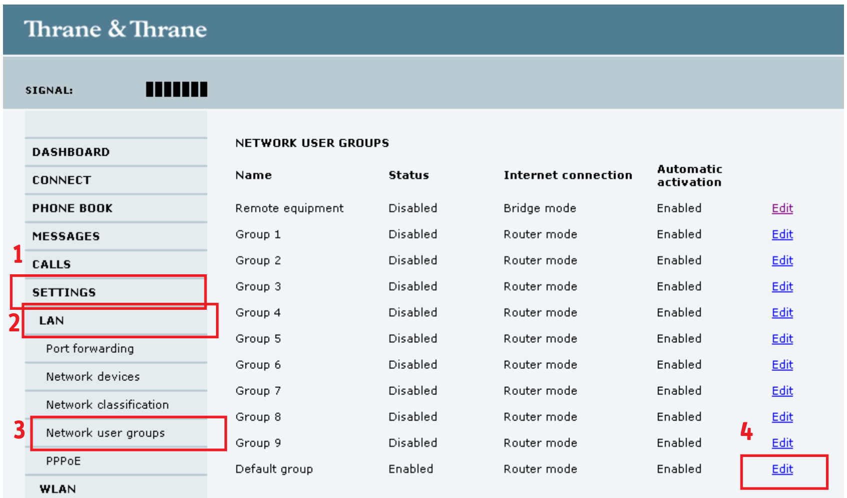


Figure 6-6: Basic configuration of the SBU, step 5/5

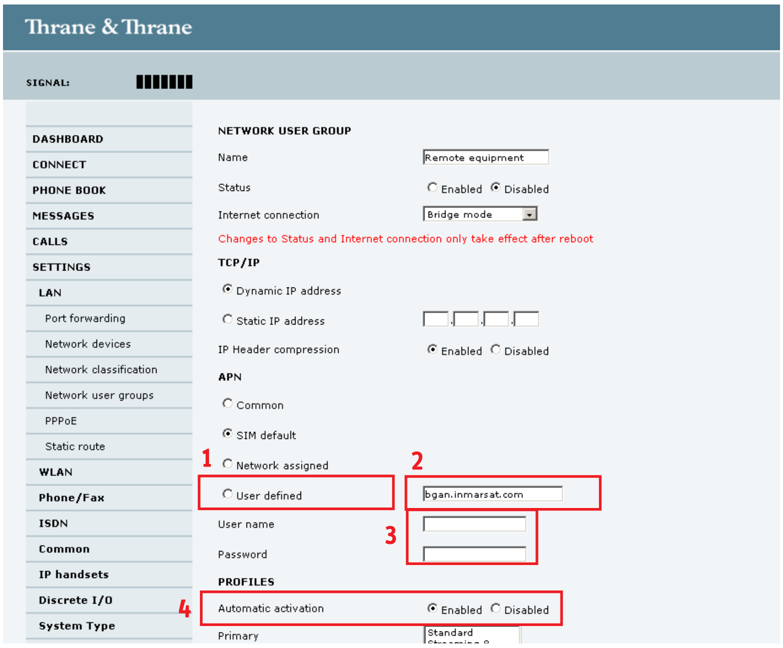


Figure 6-7: Basic configuration of the SBU, step 5/5 continued

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 setup 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.

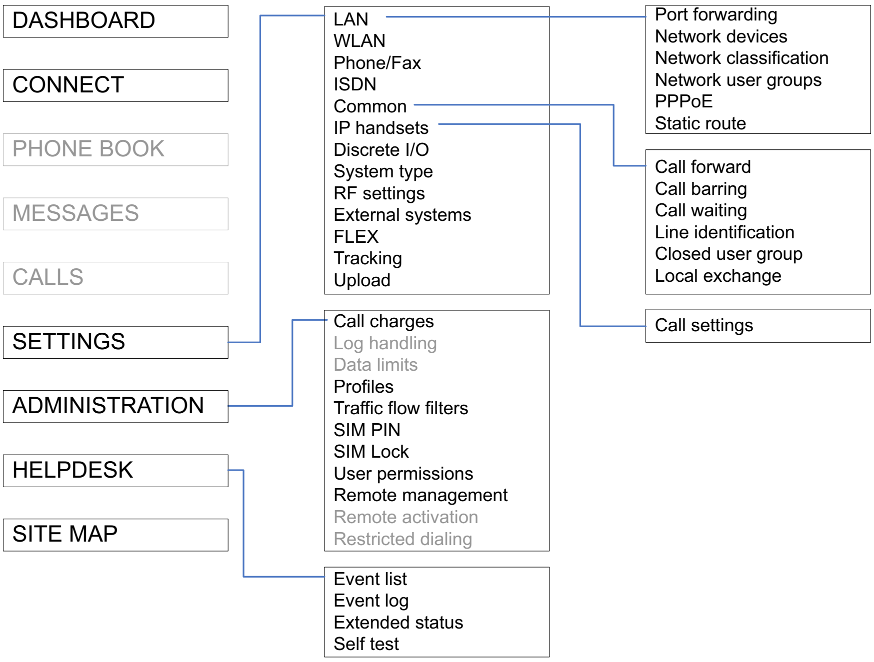


Figure 6-8: Topics in the web interface

6.2.2 Checking 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.

Accessing 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 pressing 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 7-12.

   For further information on the Reset button, see *IP Reset (Default) button* on page 7-11.

   For further information on IP addresses of the SBU see *Setting up the LAN IP addressing* on page 6-18.

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

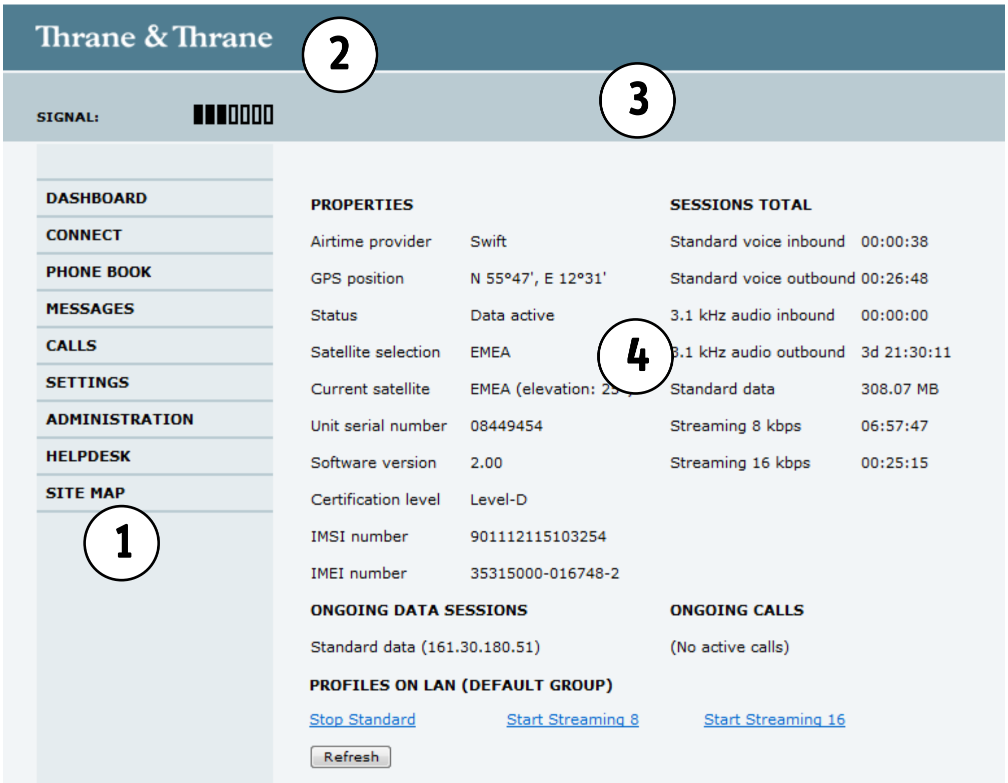


Figure 6-9: Sections of the web interface (example for AVIATOR 350)

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 6-10 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

Navigating 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 *Setting up user permissions* on page 6-86.

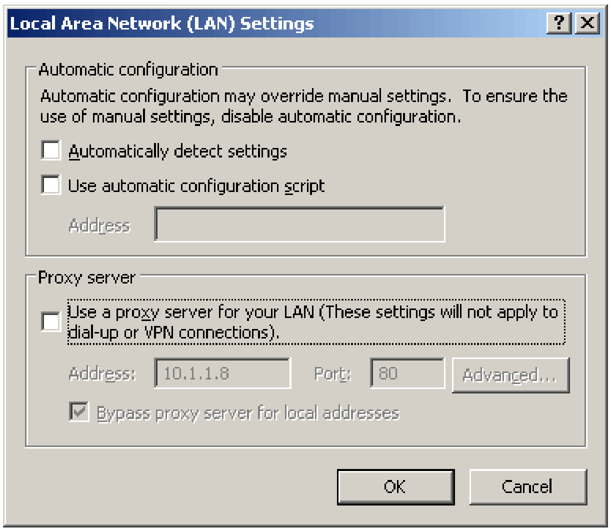
Proxy server settings in your browser

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.

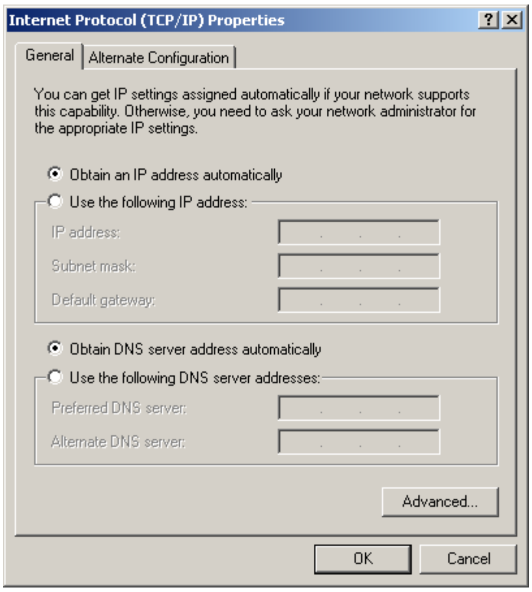
You may need to change this setting back on return to your Internet connection.

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 XP):

1. Go to **Start** > **Settings** > **Control Panel** > **Network Connections**.
2. Right-click on the **LAN connection** you want to use.
3. Select **Properties**, highlight **Internet Protocol (TCP/IP)**.

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.

6.2.3 Setting up the APN (Access Point Name)

If your service provider does not provision your system automatically to use PS services you must enter the APN provided by your service provider.

You need the following items from your service provider:

- APN name

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

6.3 Using 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.

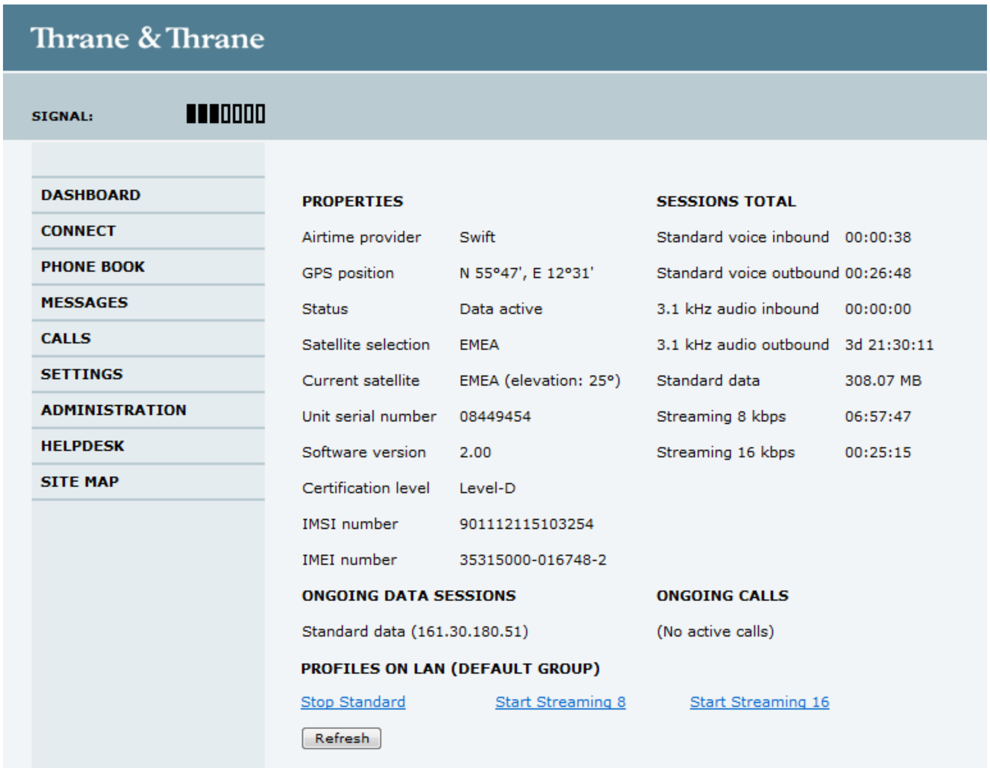


Figure 6-10: Web interface: Dashboard (Example: AVIATOR 350) [a]

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 6-17.
- **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 Viewing 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 6-77.

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 *Managing LAN/WLAN network users* on page 6-52.

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.

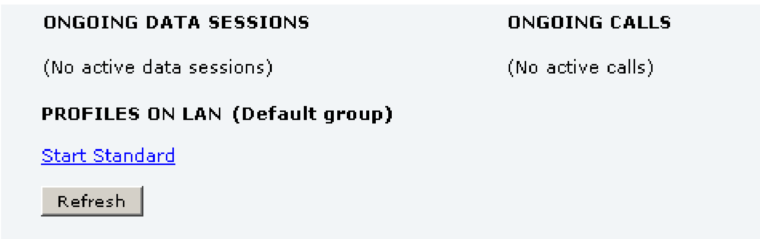


Figure 6-11: Web interface: Start a data connection

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 6-89.

6.4 Using 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 Viewing and editing the mobile numbers

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.

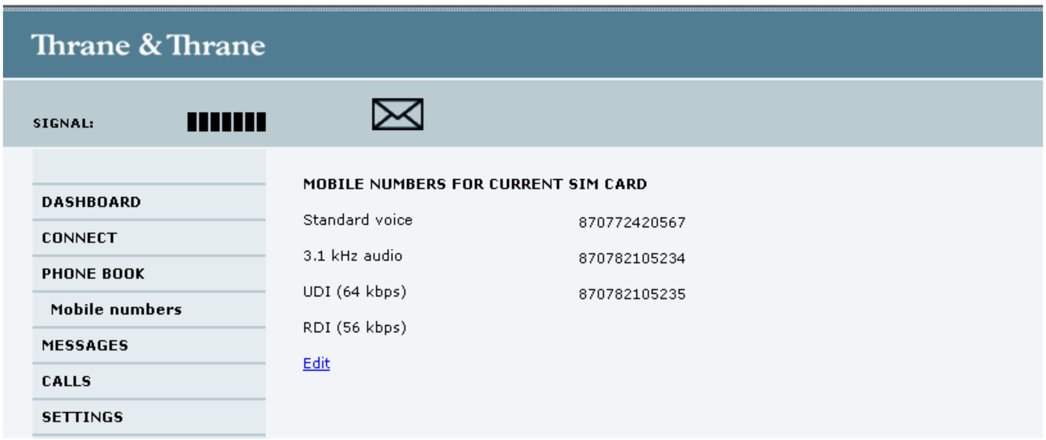


Figure 6-12: Web interface: Phone book, mobile numbers (example)

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**.

6.5 Setting up the interfaces

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 IP 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 and configure the external navigational system.
- **FLEX** for the WLAN and Router option.
- **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.

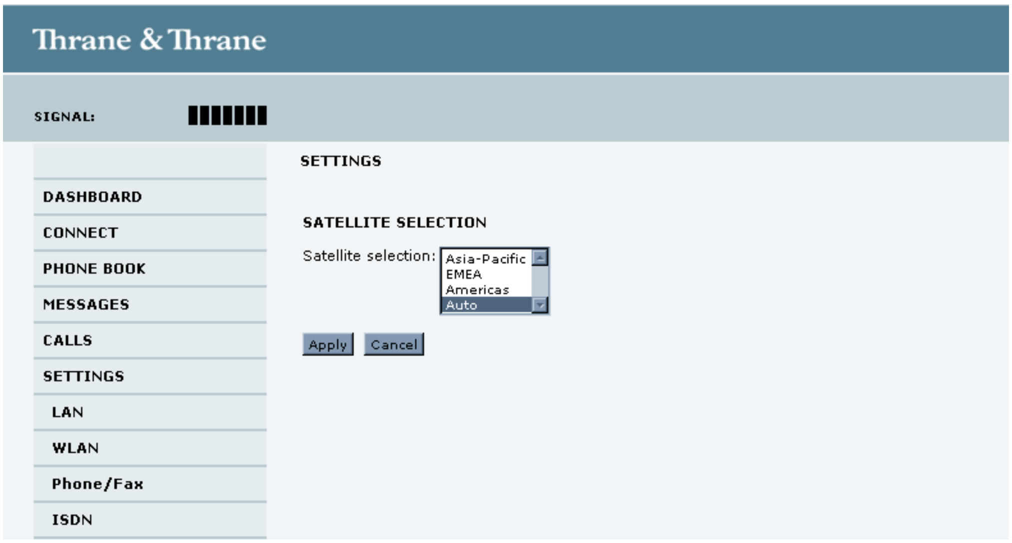


Figure 6-13: Web interface: Settings page with satellite selection field

6.5.2 Selecting 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.

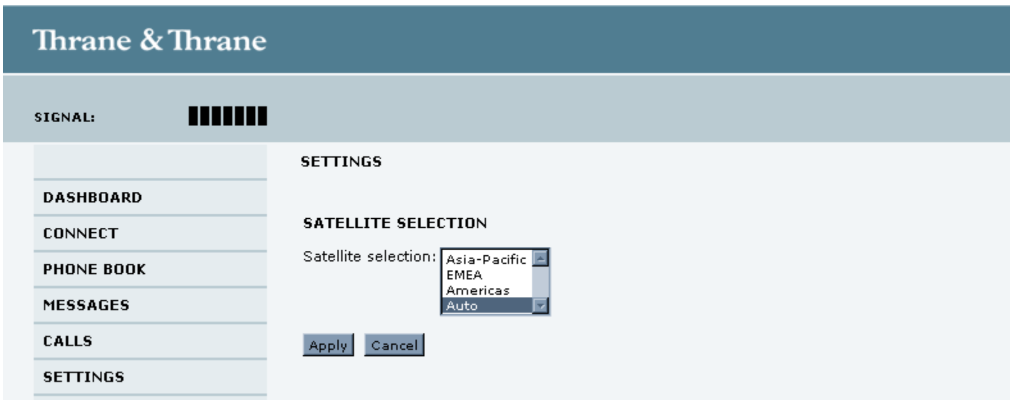


Figure 6-14: Web interface: Settings, satellite selection

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 Configuring 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 administrator password. For information on these settings, refer to *Managing LAN/WLAN network users* on page 6-52.

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 *Setting up user permissions* on page 6-86.

Setting 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.

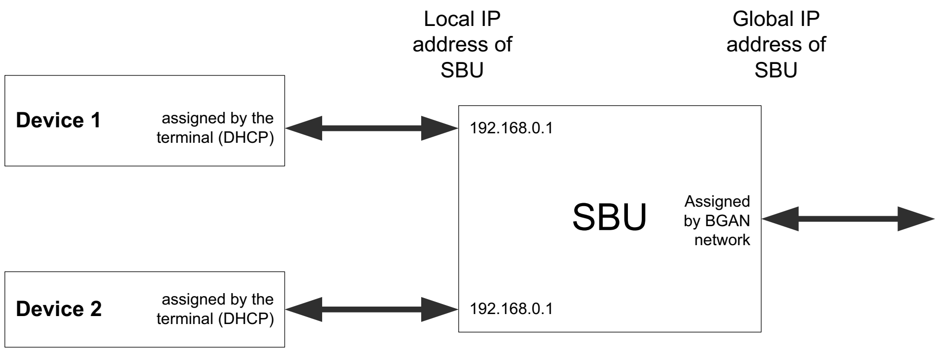


Figure 6-15: SBU IP addresses: Local and global IP addresses, default

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**.

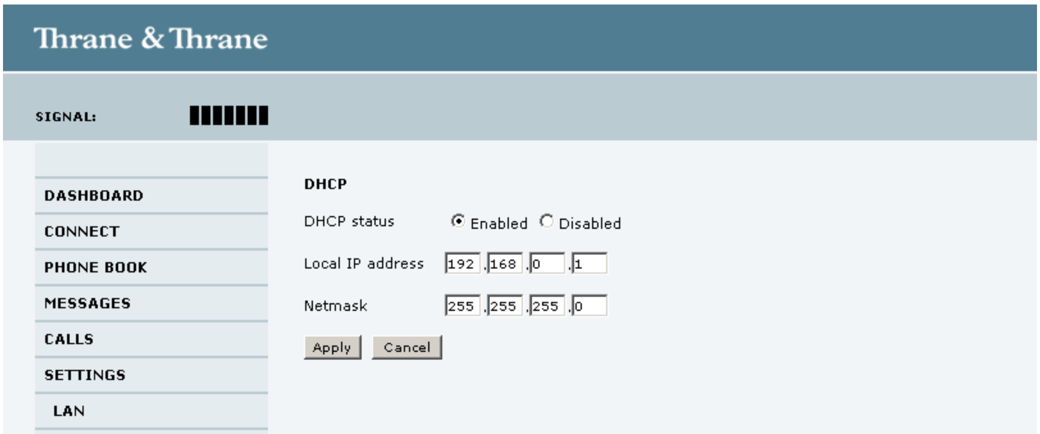


Figure 6-16: Web interface: Settings, LAN

2. At **DHCP status**, select **Enabled** (recommended), or **Disabled**.
   - If you select **Enabled**, the SBU assigns dynamic IP addresses to devices connected to the SBU.
   - If you select **Disabled**, you need to set up a static IP address in the connected device.
3. If you want 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 *Setting up the network user groups* on page 6-54.

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 *Setting up user permissions* on page 6-86.

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.

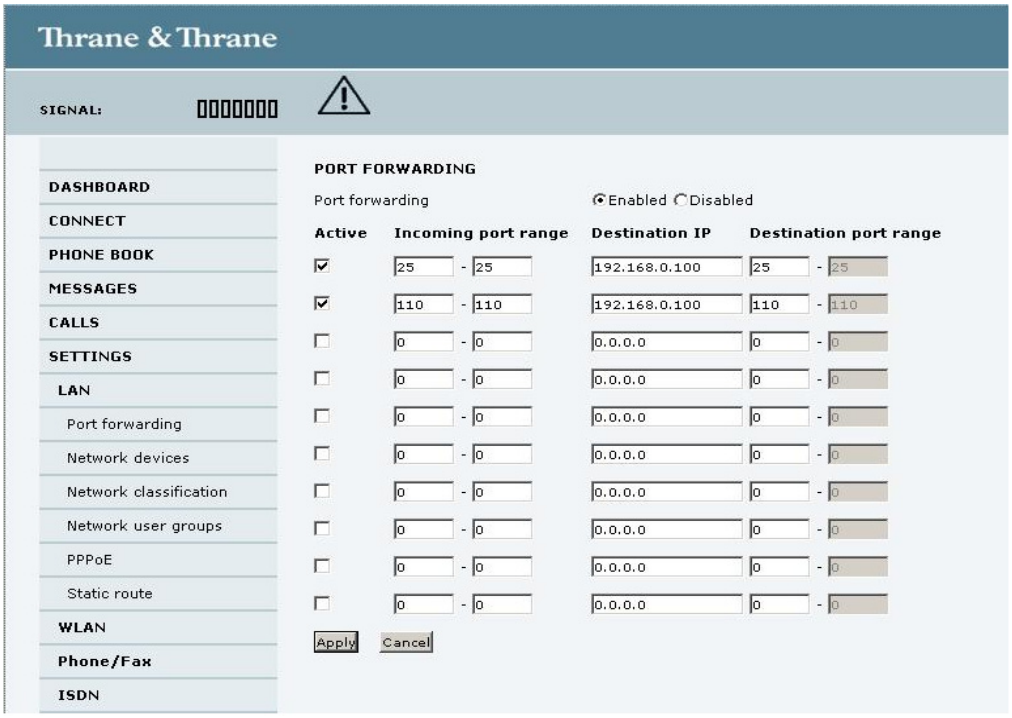


Figure 6-17: Web interface: Settings, LAN, Port forwarding

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 *Editing a network user group* on page 6-54.

6.5.4 WLAN interface

Note that the settings from the LAN window, except Enabled/Disabled, also apply for the WLAN interface. See *Configuring the LAN interface* on page 6-18.

Enabling or disabling 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 5-42 and *WLAN pins* on page 5-32.
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.

Configuring the WLAN interface

To configure the WLAN interface, do as follows:

1. Select **SETTINGS** > **WLAN**.

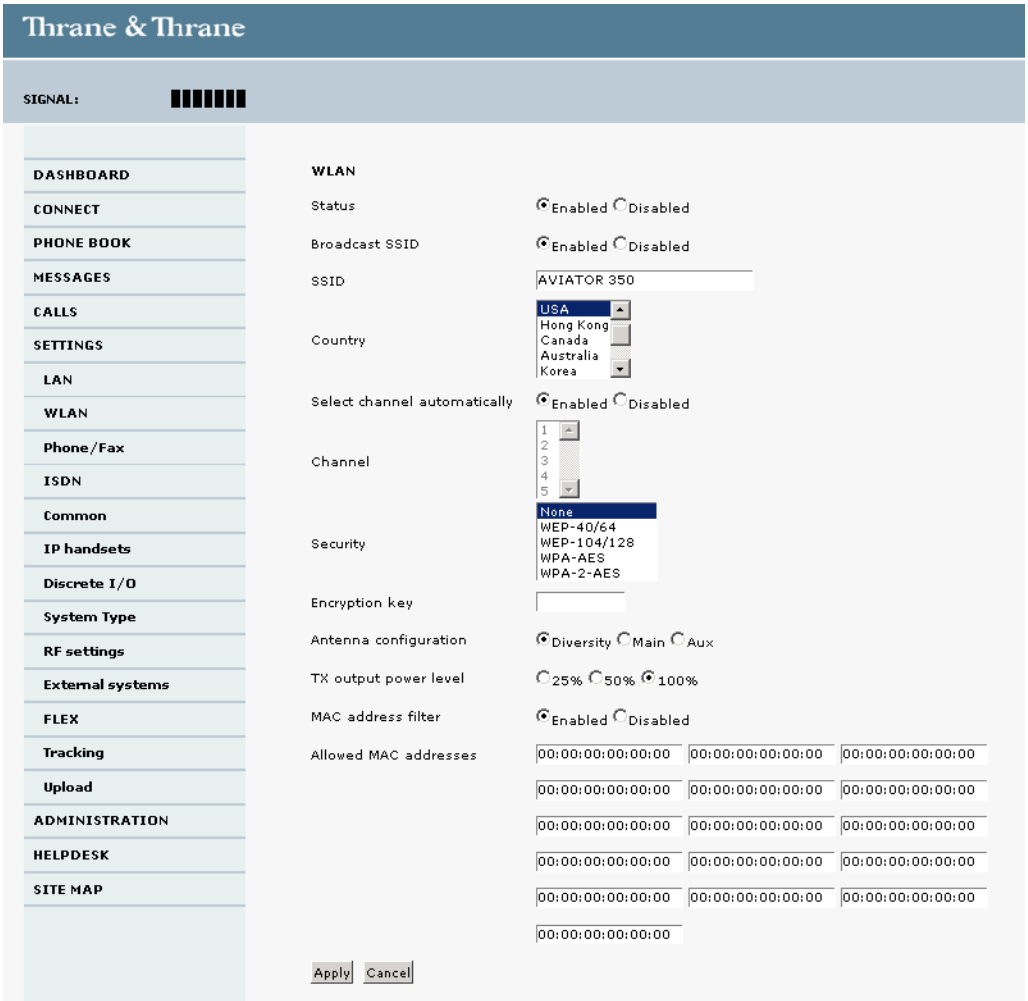


Figure 6-18: Web interface: Settings, WLAN (Example: AVIATOR 350)

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. You may 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.

    If you select 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.

    If you select 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**.

6.5.5 Configuring 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.

To configure this interface do as follows:

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

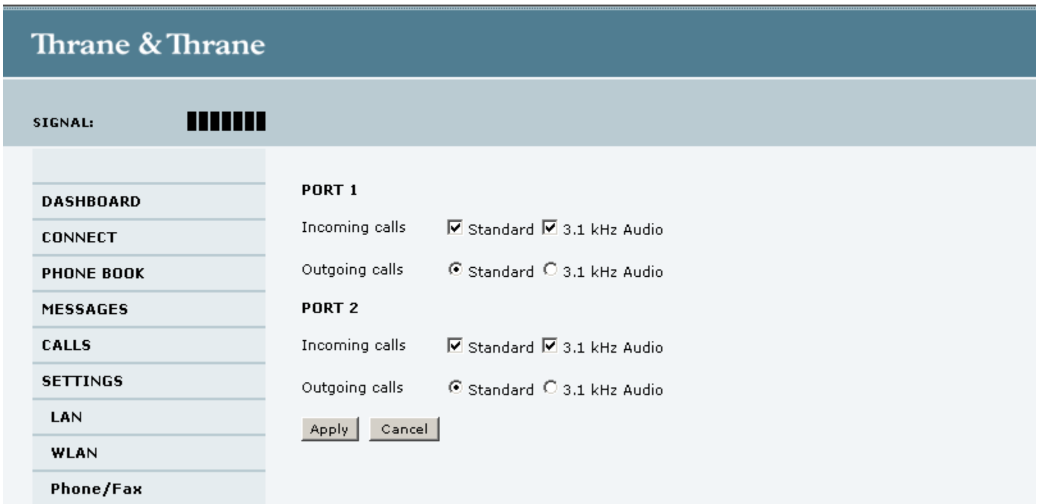


Figure 6-19: Web interface: Settings, Phone/Fax

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 of 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.
     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 Configuring the ISDN interface

Note The AVIATOR 200 does not support ISDN services.

To configure the ISDN interface, do as follows:

1. Select **SETTINGS** > **ISDN**.

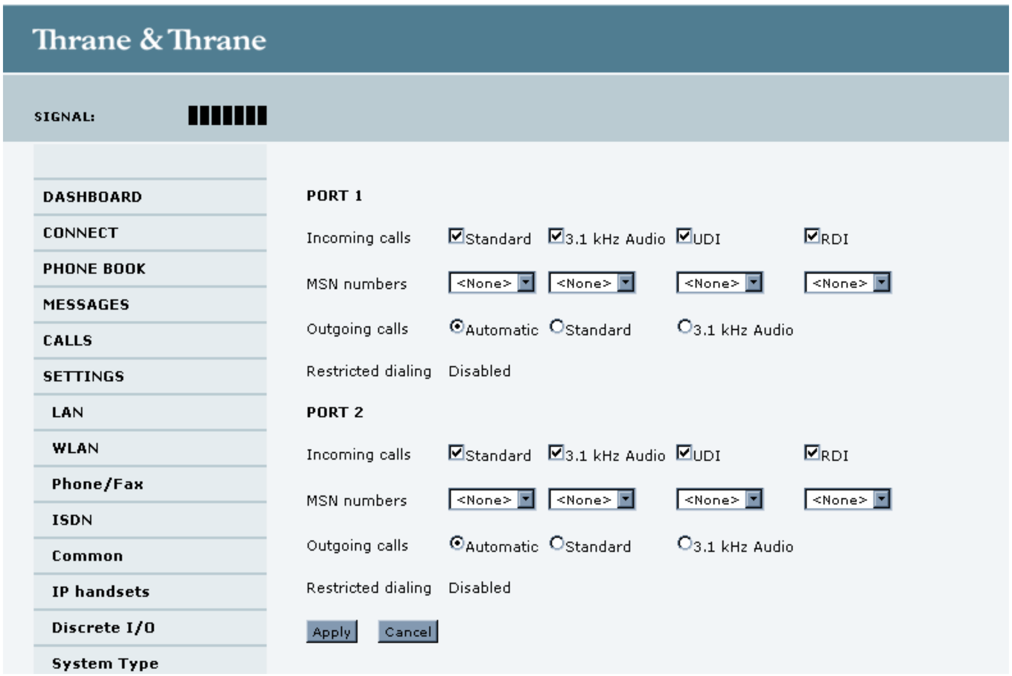


Figure 6-20: Web interface: Settings, ISDN

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

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.

   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. Click **Apply**.

6.5.7 Setting 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**.

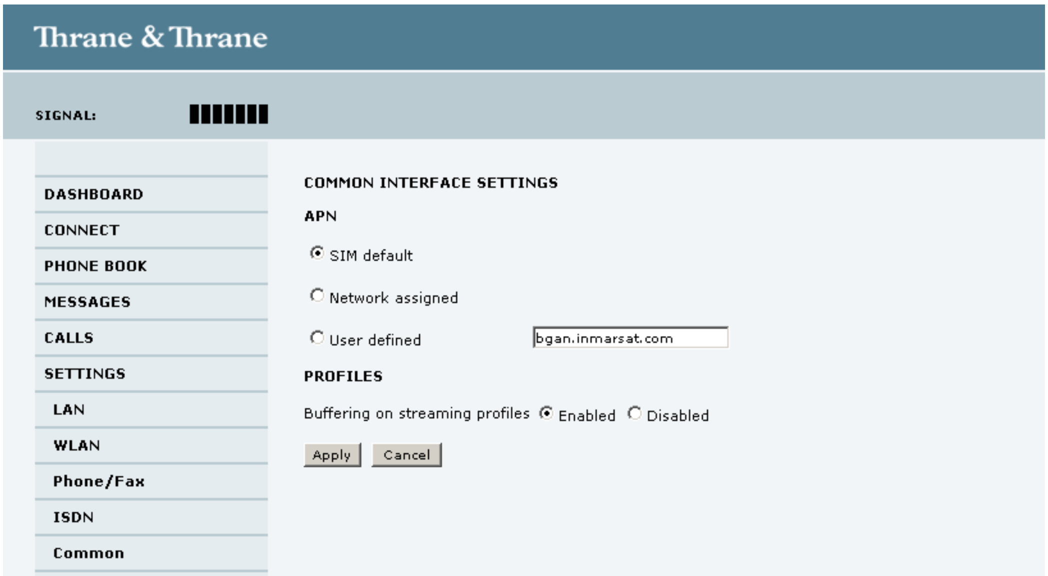


Figure 6-21: Web interface: Settings, Common

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 Setting 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.

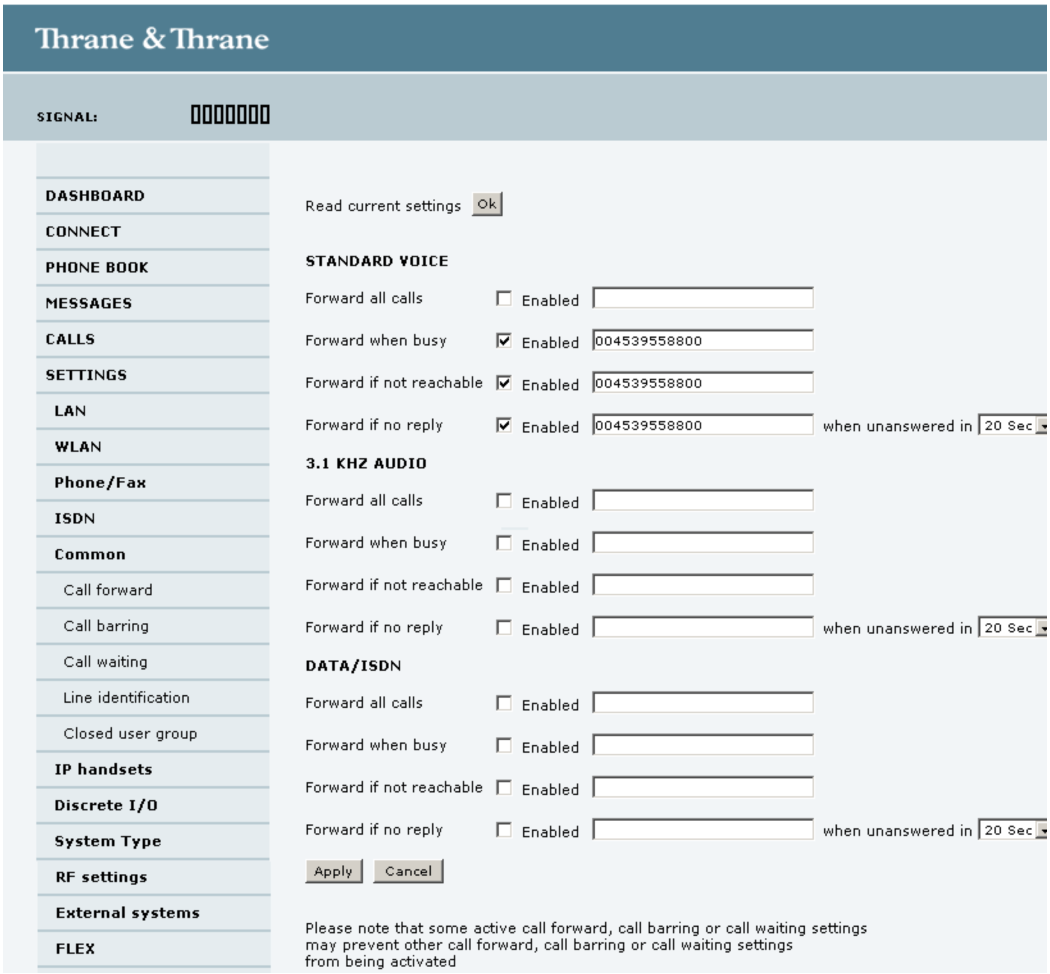


Figure 6-22: Web interface: Settings, Common, Call forward

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.

4. Next to the enabled items, you can type in a phone number you want 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**.

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 6-23: 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.

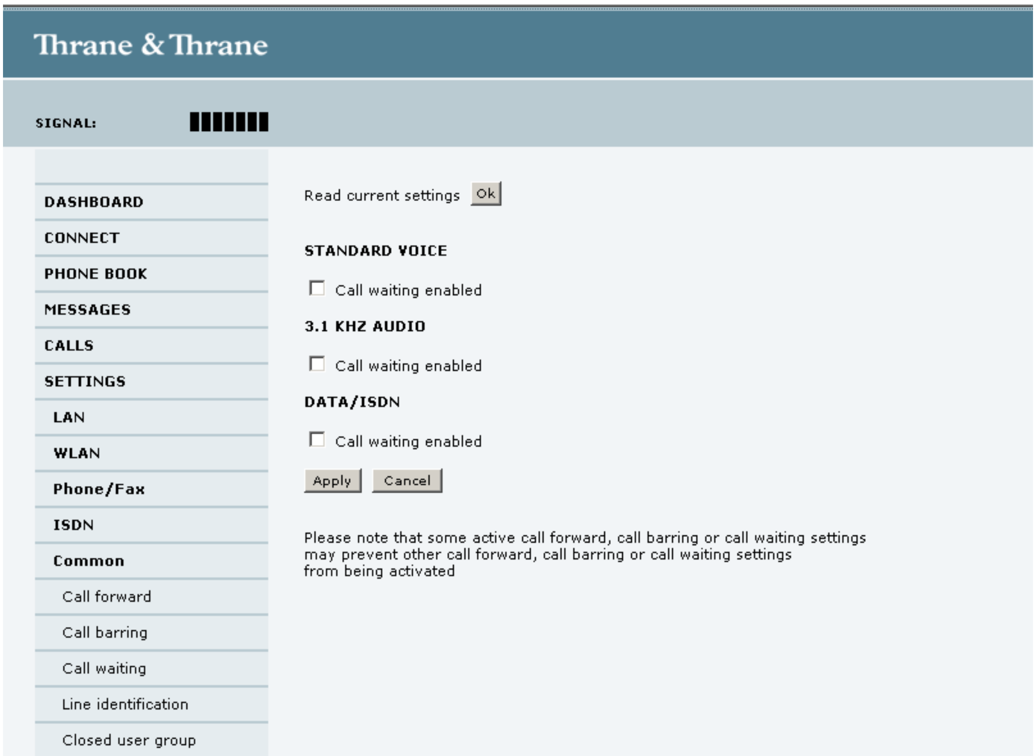


Figure 6-24: Web interface: Settings, Common, Call waiting

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.

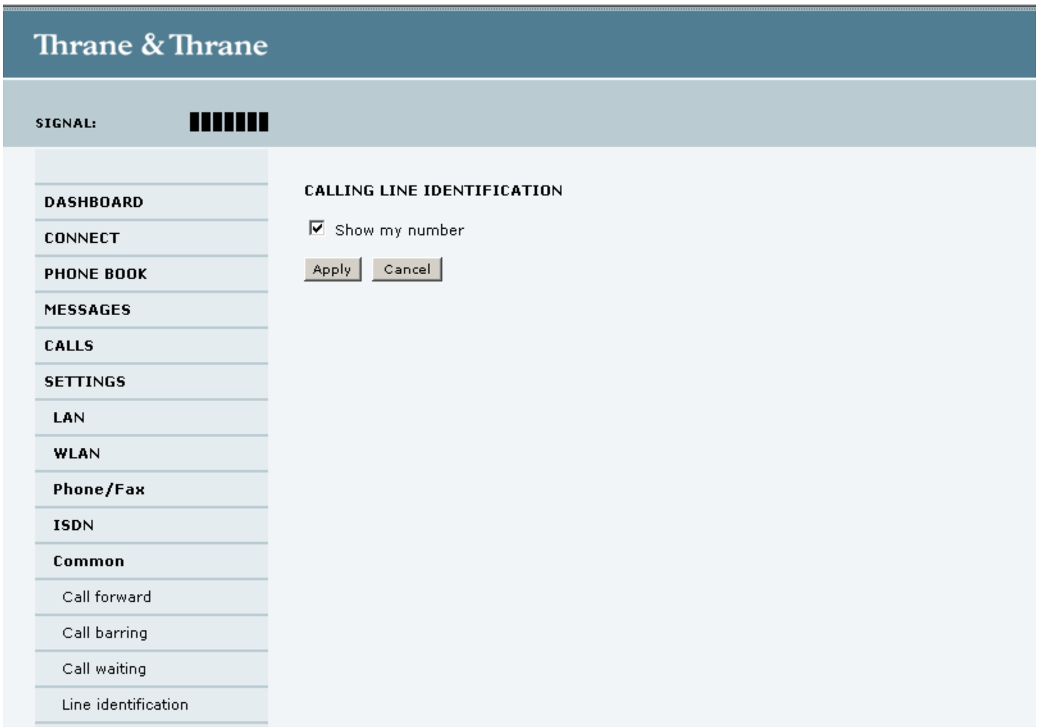


Figure 6-25: Web interface: Settings, Common, Line identification

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.

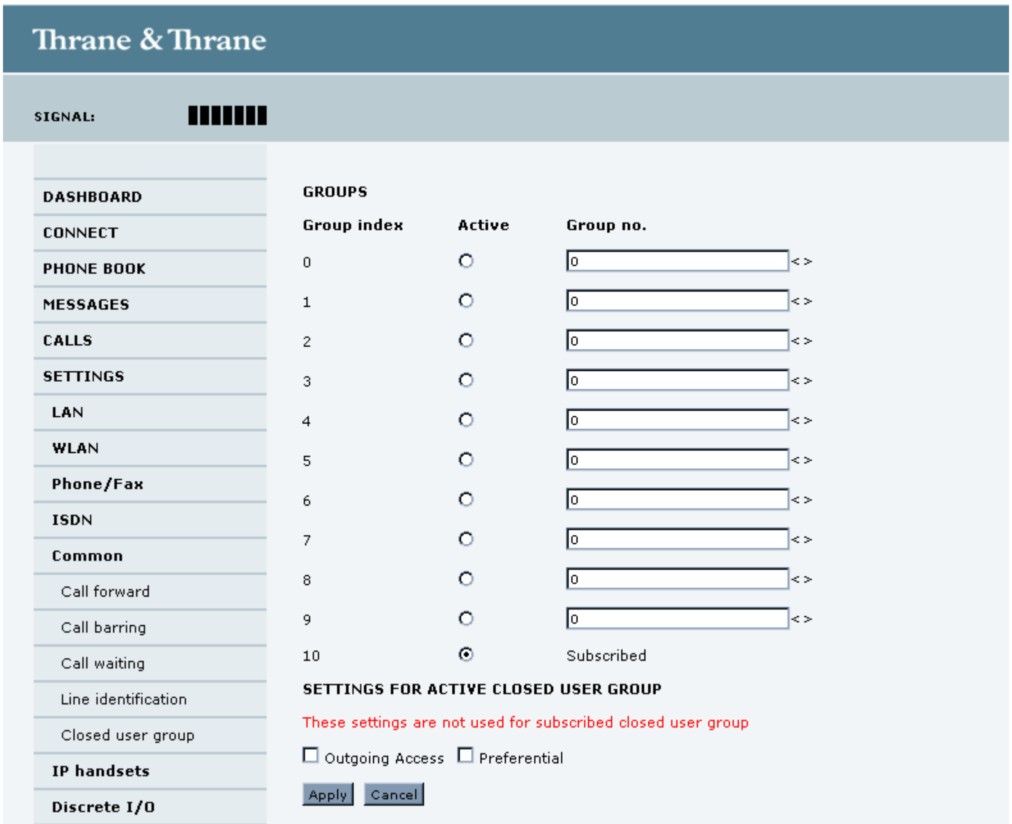


Figure 6-26: Web interface: Settings, Common, Closed user group

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.

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 Managing 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 *Setting up user permissions* on page 6-86 for further information on user permissions.

Connecting a new AVIATOR Wireless Handset

To connect a new AVIATOR Wireless Handset, 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. In the web interface of the SBU, select **SETTINGS > IP handsets**.

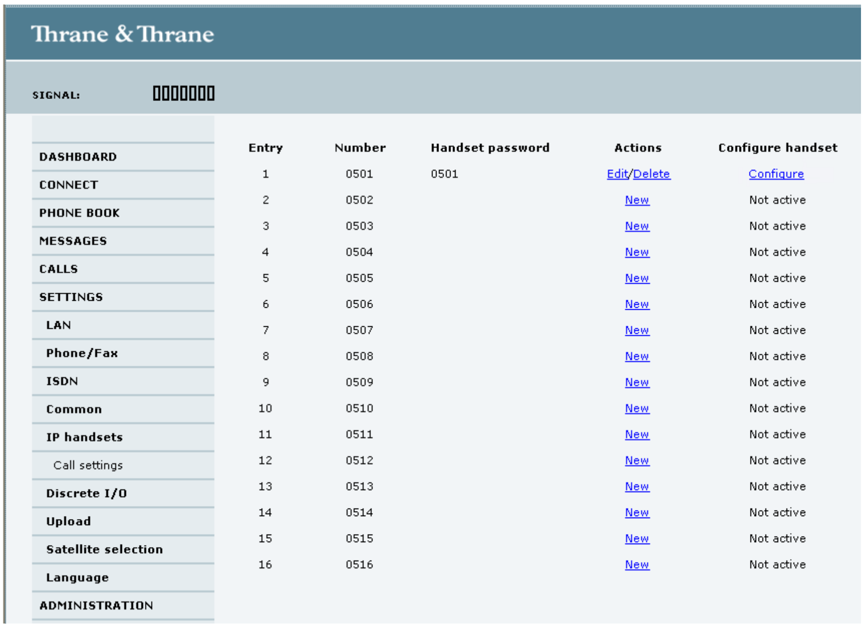


Figure 6-27: Web interface: Settings, IP handsets

3. Next to the local number you wish to use, click **New**.
4. Enter the password you want for the handset.
   Note that the AVIATOR Wireless Handset only supports numbers in the password.
5. 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.

When the SBU and the 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*.

Setting up the AVIATOR Wireless Handset

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

1. Select **SETTINGS > IP handset**.
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.
3. Select **Delete** next to a handset to delete it from the list.

When a handset is deleted 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.

   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*.

Setting 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	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0502	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0503	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0504	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0505	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0506	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0507	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0508	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0509	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0510	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0511	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0512	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0513	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0514	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0515	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled
0516	☑ Standard ☑ 3.1 kHz Audio	◉ Standard ○ 3.1 kHz Audio	Enabled

Apply Cancel

Figure 6-28: 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.
  If, for example, you select Standard, the handset will only react on calls made to the Standard phone 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.

3. Click **Apply**.

6.5.10 Configuring 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.

Setting 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**.

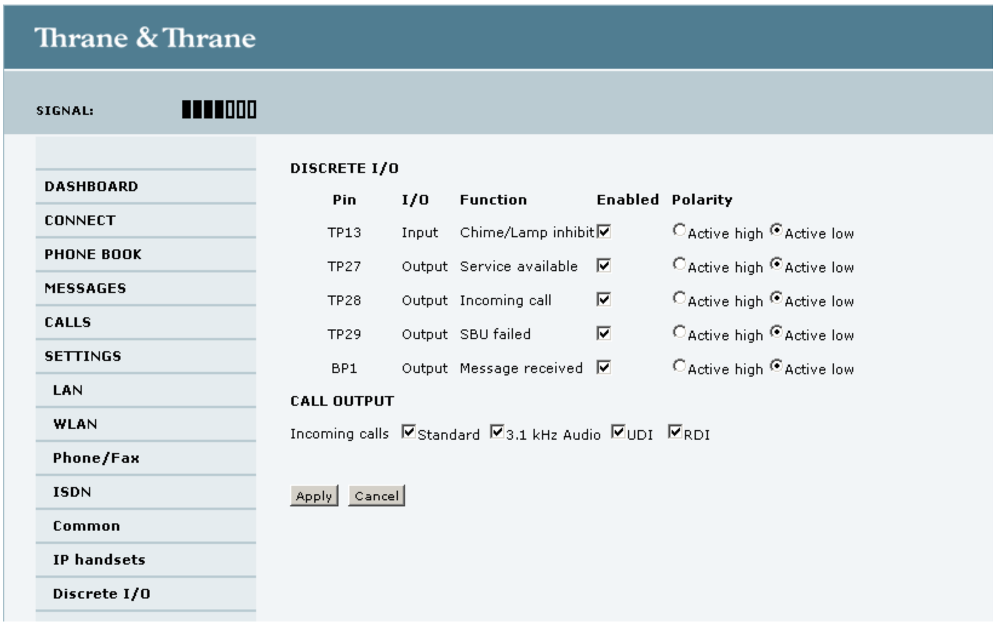


Figure 6-29: Web interface: Settings, Discrete I/O

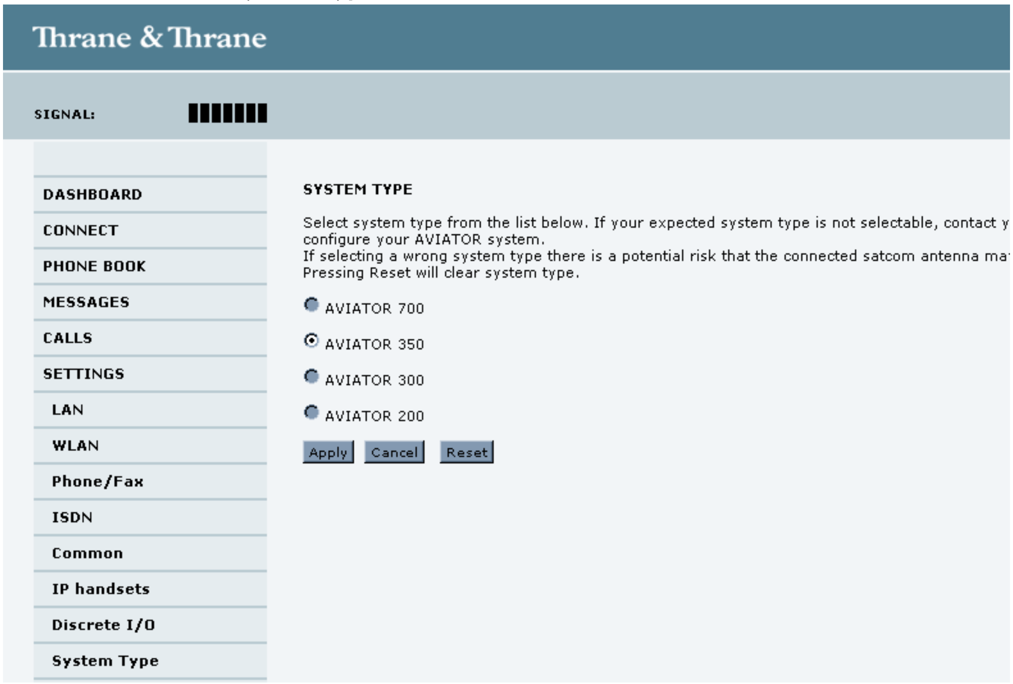
2. For each pin you want to use, select **Enabled**.
3. For each pin, select if the pin should be **Active high** or **Active low**.
4. For Call output you can select which incoming calls will activate the external ringer (Discrete I/O TP28: Incoming call).
5. Click **Apply** to save the new settings.

6.5.11 Setting 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.

To select the system type, do as follows:

1. Select **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.

The **Reset** functionality is mainly used for support purposes.

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 7-2.

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 Reset button	Values in RF Settings	Values in External systems
AVIATOR 300 to AVIATOR 350	No	Not cleared	Not cleared[a]
	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 *Setting up the navigational input* on page 6-43.

Important When upgrading the antenna, it is often necessary to reconfigure the cable loss (see *Configuring RF settings* on page 6-41) and the navigational input (see *Setting up the navigational input* on page 6-43).

6.5.12 Configuring 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**.

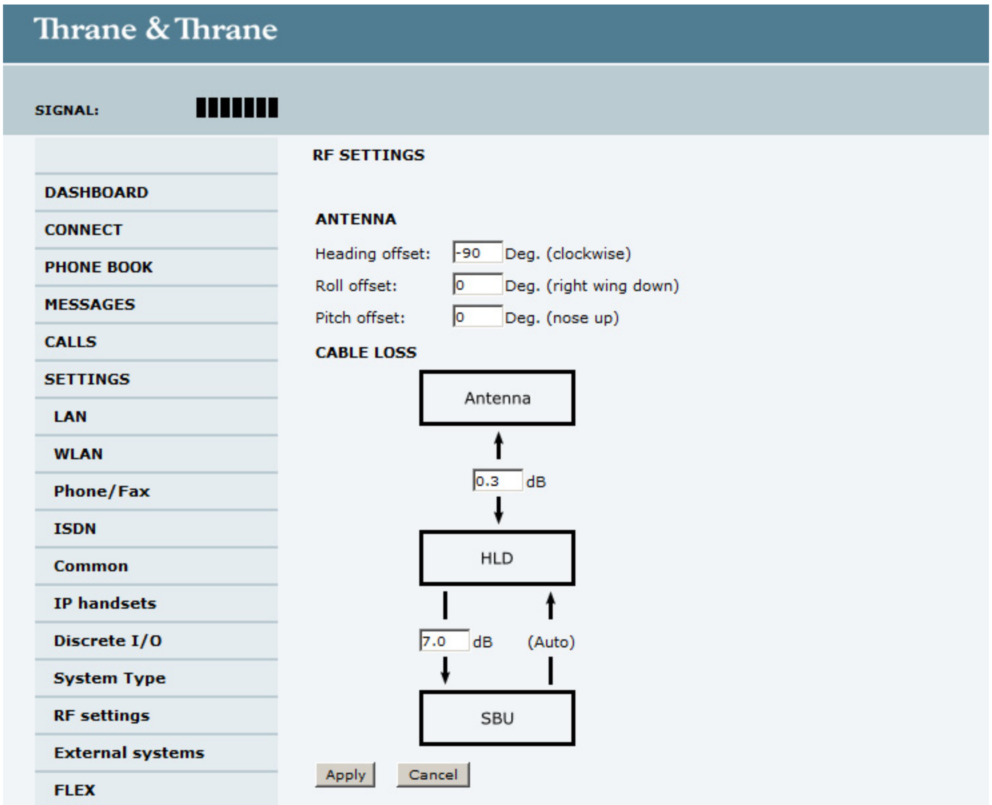


Figure 6-30: Web interface: Settings, RF settings

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 Setting 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	X			X	X	X
AVIATOR 300	TT-5006A IGA	X	X	X			
	IGA-5001	X	X				
AVIATOR 350[a]	HGA-6000/HGA-6500	X	X				
	HGA-7000	X	X				
	HGA-7001	X	X				
	AMT-50	X	X				
	AMT-700	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)

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

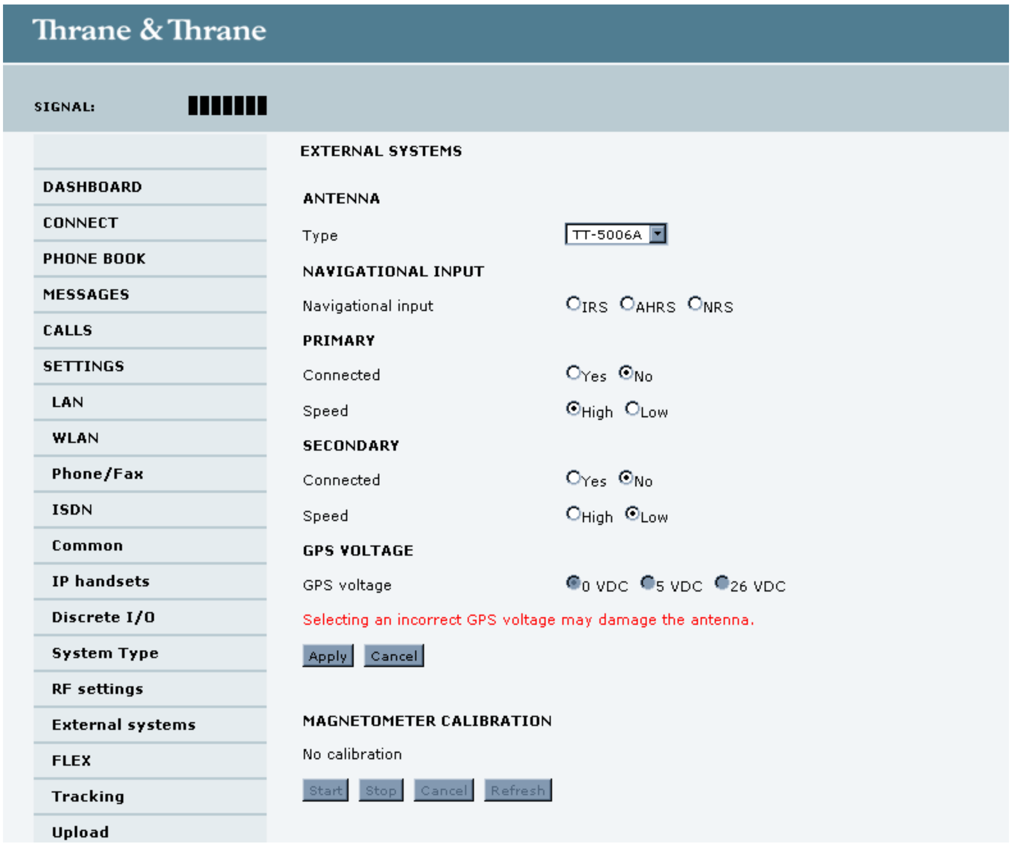


Figure 6-31: Web interface: Settings, External systems (AVIATOR 350 with TT-5006 antenna)

3. Below **Antenna** select in the drop down list next to **Type** the connected antenna. See Table 6-3 on page 6-43 for available selections.
4. For **NAVIGATIONAL INPUT** select one option.Which options are available depends on the installed antenna, see Table 6-3 on page 6-43.
5. Only for ARINC sources[1]: For **Primary** and **Secondary** select **Connected** and **Speed**.
6. Only for ARINC sources: If you do not have second navigational input source available you must set **Connected** of **SECONDARY** input to **No**.
7. 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.
8. 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 *Calibrating the NRS in the TT-5006A IGA*.

For an overview of the supported navigational input sources for the different satcom antennas see Table 5-1 on page 5-4.

6.5.14 Calibrating the NRS in the TT-5006A IGA

For a system with a TT-5006A IGA you can use NRS if IRS/AHRS is not available. When using NRS you must calibrate the integrated NRS to compensate for potential magnetic interference. During the calibration data are provided about the way the antenna is attached to the aircraft 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**.

Figure 6-32: 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.

7. 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.

8. 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.

9. See the following table for guidelines how to evaluate the calibration score.

Calibration quality score	Hard iron interference calibration quality score
9: good	9: <10% Optimum
8: acceptable	8: <20% Good
7: marginal	7: <30% Marginal
6-1: unacceptable	6: <40% Recalibrate
0: complete calibration failure	5: <50% Recalibrate
	4: <60% Recalibrate
	3: <70% Recalibrate
	2: <80% Recalibrate
	1: <90% Recalibrate
	0: >90% Recalibrate

Table 6-4: Evaluation of the magnetometer calibration score

Note With a Hard Iron interference calibration quality score of 6 or less, the system must be recalibrated. Confirm that non-magnetic screwdrivers and non-magnetic screws were used for the antenna installation. Also, ensure that any nearby speakers in the cabin have been properly shielded or that nearby metallic objects are not interrupting the calibration.

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 **DASHBOARD** whether the field **GPS position** shows a valid value.
Could not obtain the matrix of Earth's magnetic field.	Restart the system. If the error persists, contact your Thrane & Thrane partner's support hotline or Thrane & Thrane e-support.
Failure due to memory exhaustion.	Restart the system. If the error persists, contact your Thrane & Thrane partner's support hotline or Thrane & Thrane 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 Thrane & Thrane partner's support hotline or Thrane & Thrane e-support.

Table 6-6: Magnetometer calibration: Error messages at failing Stop procedure

6.5.15 Enabling system options with FLEX keys

On this 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. The following options are currently available:

- **405040A-002 Built-In Router Option**
- **405040A-003 Built-In Wireless Option**

You can also buy the options at later stage and open up for these options by entering a FLEX key sequence for the specific built-in option.

To enable a system option

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**.

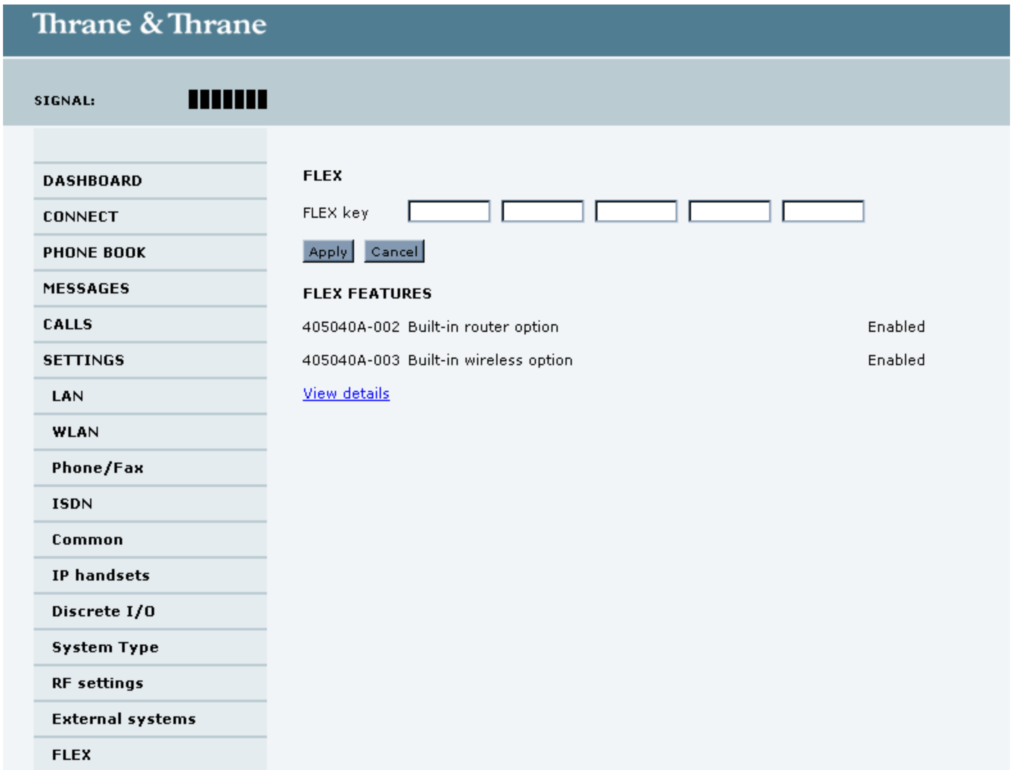


Figure 6-33: Web interface: Settings, FLEX

3. Have the FLEX key ready and enter it into the insert fields.
4. Click **Apply** to enable the new option.

You can click **View details** to display all options and their status (enabled or disabled).

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 5-42 and *WLAN pins* on page 5-32.

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.

6.5.16 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 setup tracking, do as follows:

1. Select **SETTINGS, Tracking**.

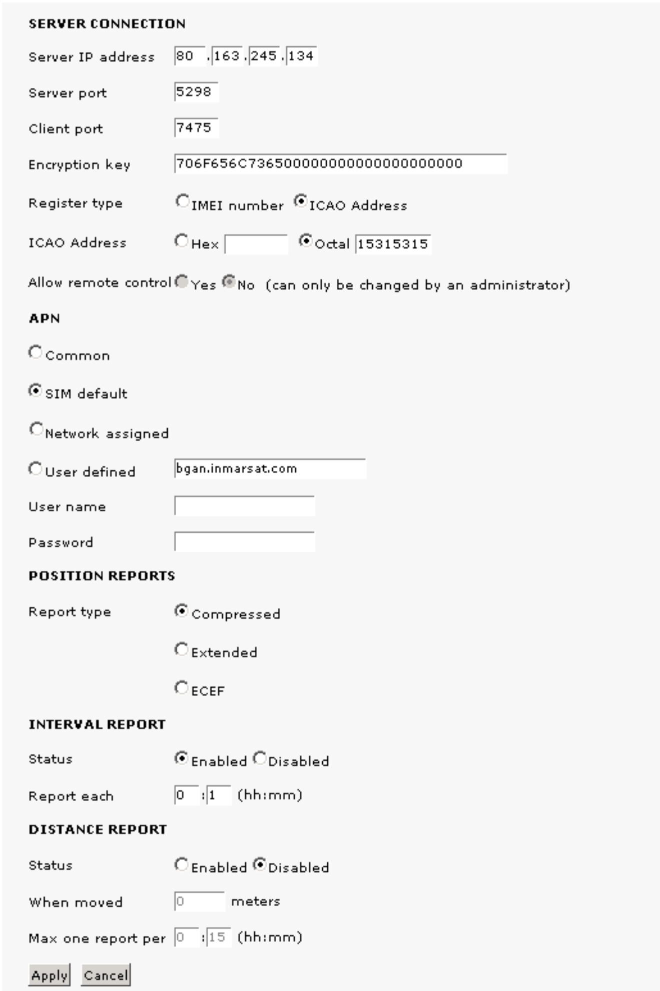


Figure 6-34: Web interface, Settings, Tracking

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.

6.6 Managing 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.

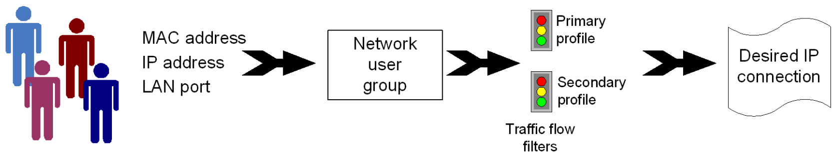


Figure 6-35: Overview over network user groups and traffic flow filters

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 *Setting up the network user groups* on page 6-54.

   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 *Managing network devices* on page 6-59. 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 *Using the network classification table* on page 6-60. 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.

CAUTION! All user connections to the LAN interface may be affected when you change the settings below, including your own current connection.

6.6.2 Setting 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.

Editing 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 6-63.

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.

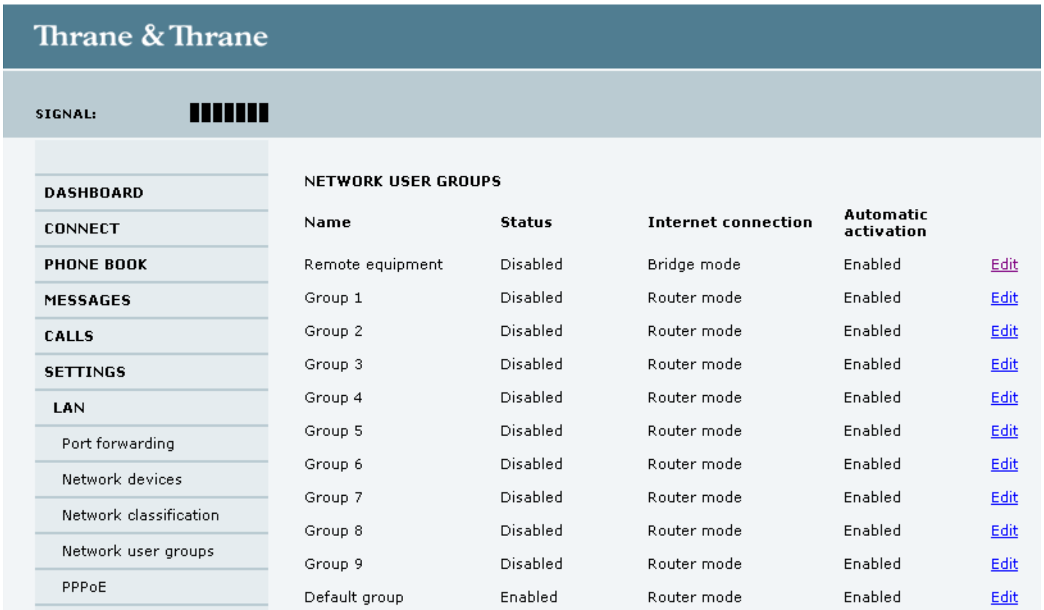


Figure 6-36: Web interface: Settings, LAN, Network user groups

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.

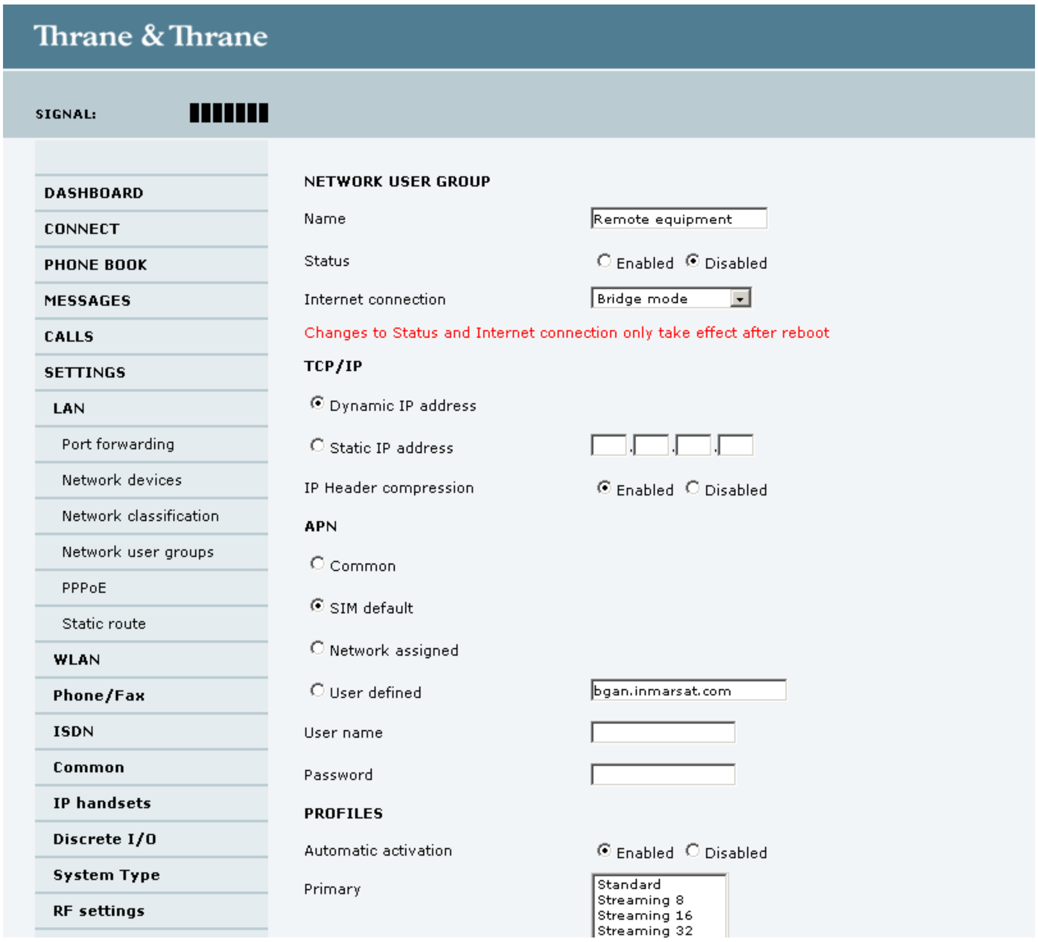


Figure 6-37: Web interface: Settings, LAN, Network user groups, Edit

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 6-63. Use this mode if one or more computers are connected using the LAN interface, and the SBU should acts 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 *Using the network classification table* on page 6-60). The SBU acts a 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 6-63.

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 *Setting 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 *Using profiles* on page 6-78 and *Using 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 Managing 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.

Viewing 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.

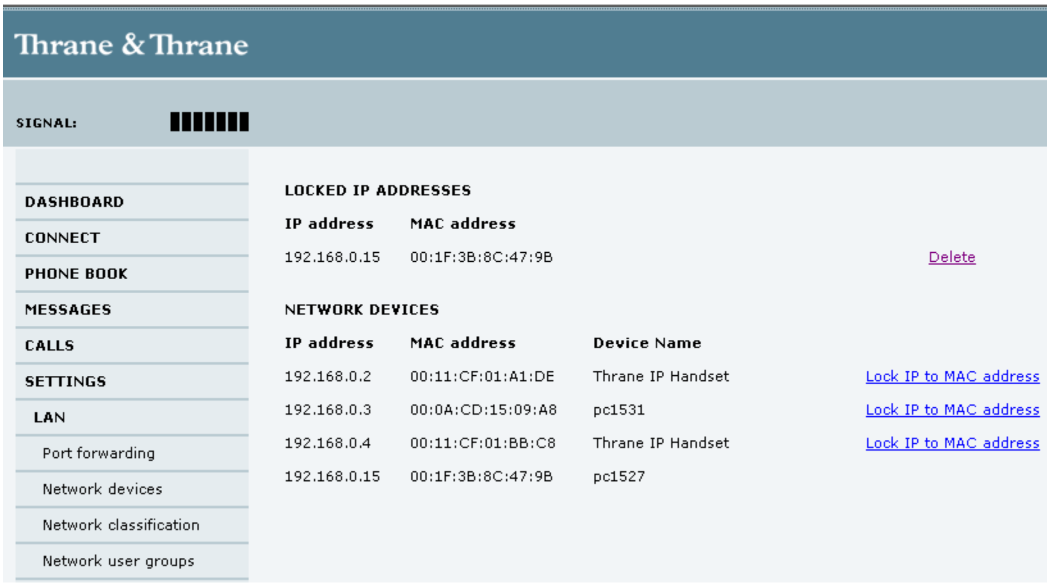


Figure 6-38: Web interface: Settings, LAN, Network devices

Locking 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 Using 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.

Adding or editing 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 table**.

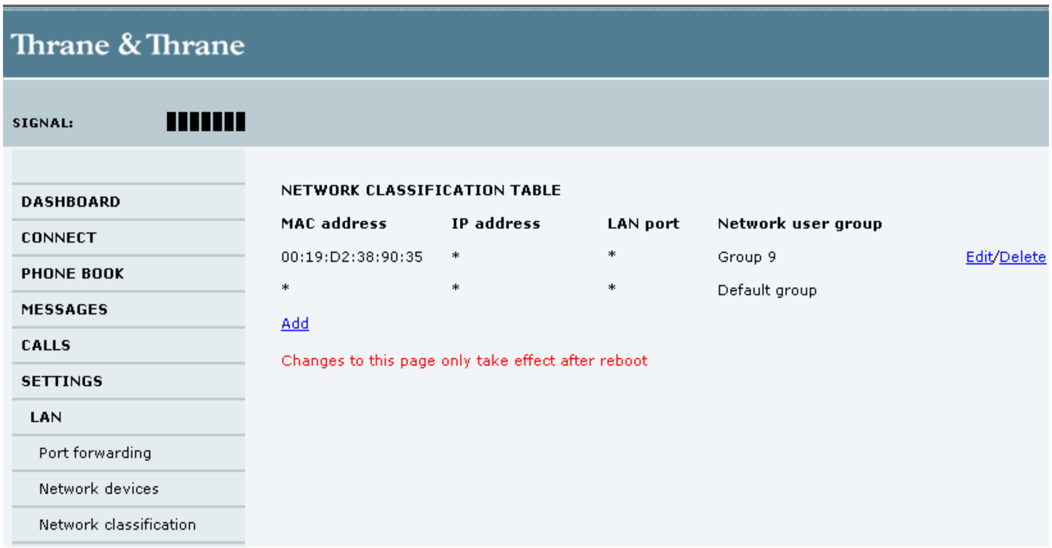


Figure 6-39: Web interface: Settings, LAN, Network classification table

3. Click **Edit** next to the entry you want to edit, or click **Add** at the bottom of the list.

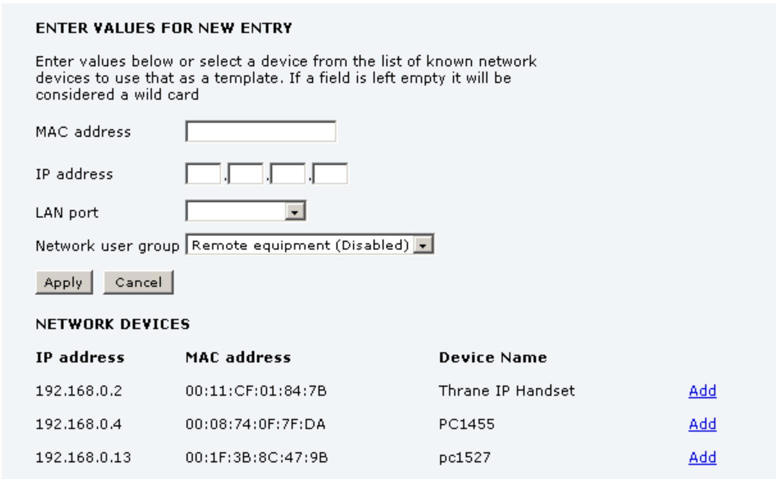


Figure 6-40: Web interface: Settings, LAN, Network classification table, Edit or Add

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 *Setting up the network user groups* on page 6-54.

6. Click **Apply**.

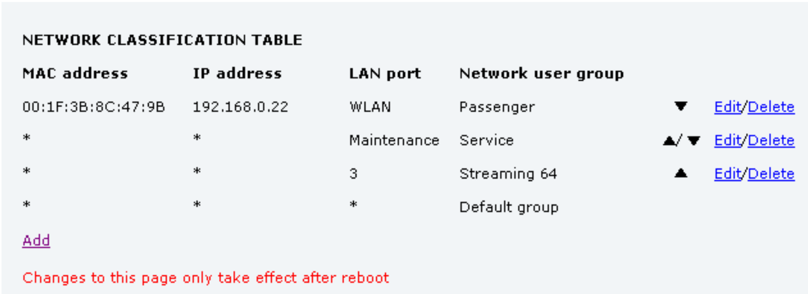
Removing an entry in the network classification table

In the **network classification table**, click **Delete** next to the entry you want to delete.

Changing 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	▼	Edit/Delete
*	*	Maintenance	Service	▲/▼	Edit/Delete
*	*	3	Streaming 64	▲	Edit/Delete
*	*	*	Default group		

Add

Changes to this page only take effect after reboot

Figure 6-41: 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.

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 ist 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.

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.

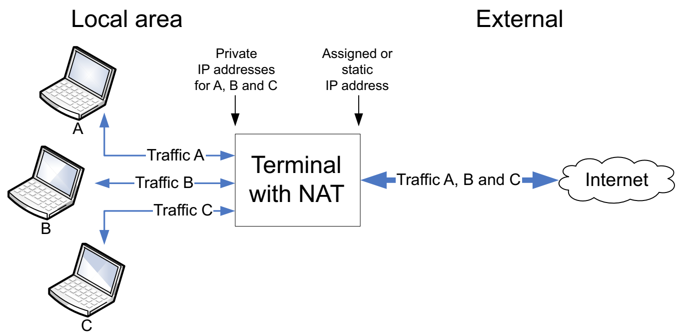


Figure 6-42: NAT (Network Address Translation)

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.

6.6.6 Starting and stopping 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.

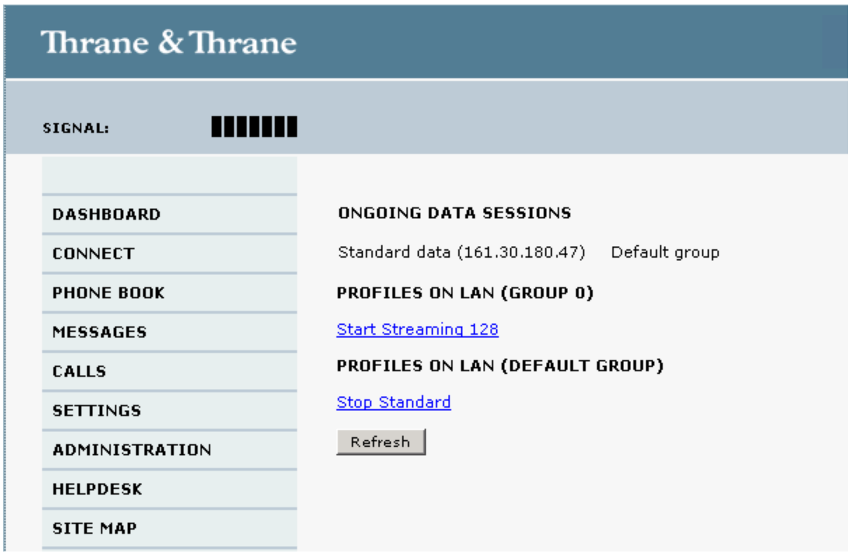


Figure 6-43: Web interface: Connect, to start and stop data sessions

   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.

6.6.7 Establishing 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 Picocell 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.

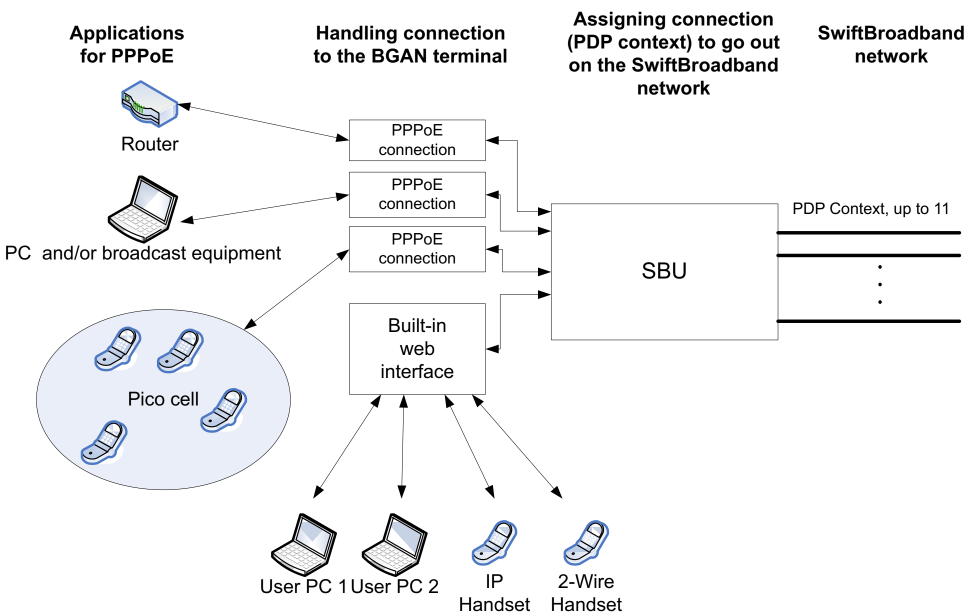


Figure 6-44: Example for PPPoE connections

Enabling 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**

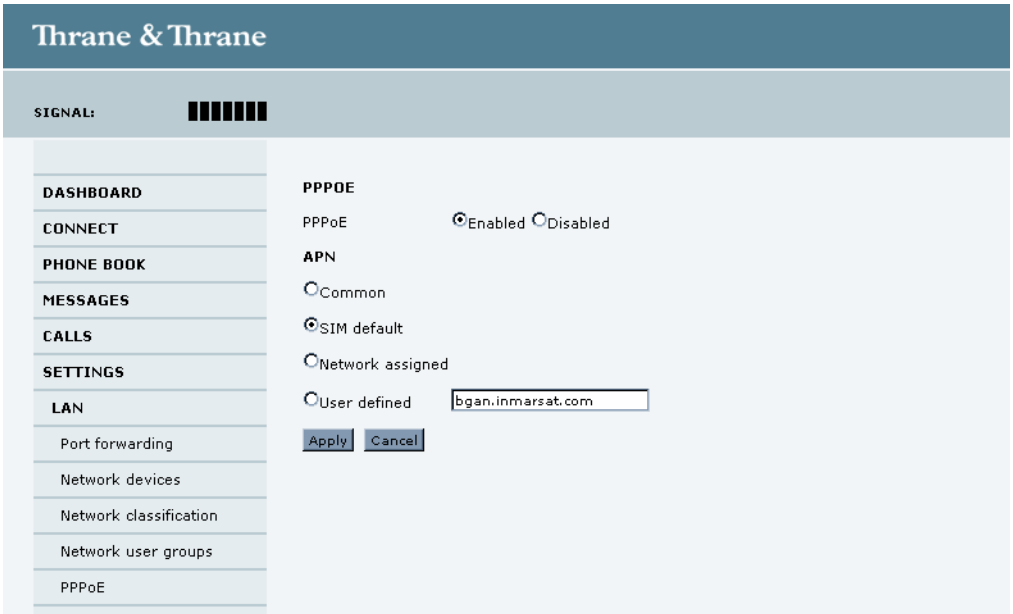


Figure 6-45: Web interface, Settings, LAN, PPPoE

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[a]: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 6-7: PPPoE connection, service names and descriptions

a. For SwiftBroadband the part of the service name “XBB” can be replaced by “SBB”.

PPPoE setup with a non-default APN

You can setup 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[a]: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 6-8: PPPoE connection, service names and descriptions for custom APN

a. For SwiftBroadband the part of the service name “XBB” can be replaced by “SBB”.

Example: To setup 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.

6.6.8 Setting 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.**

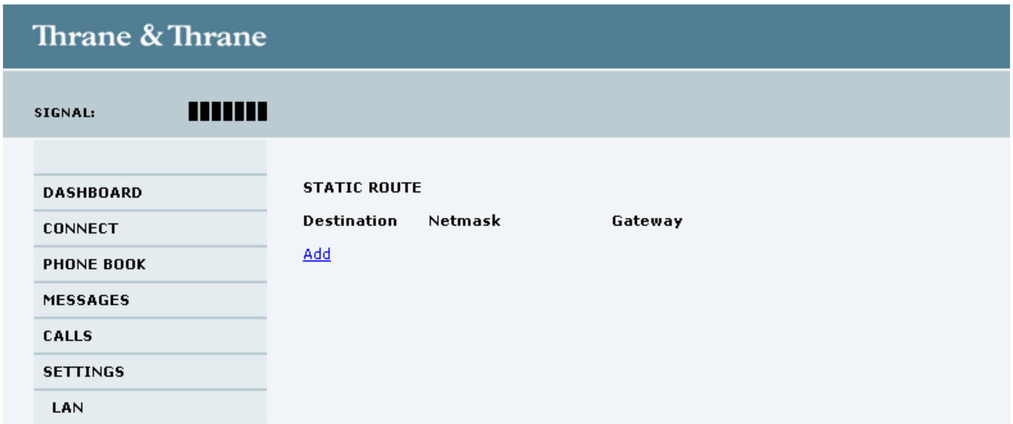


Figure 6-46: Web interface, Settings, LAN, Static route

2. Click **Add**.

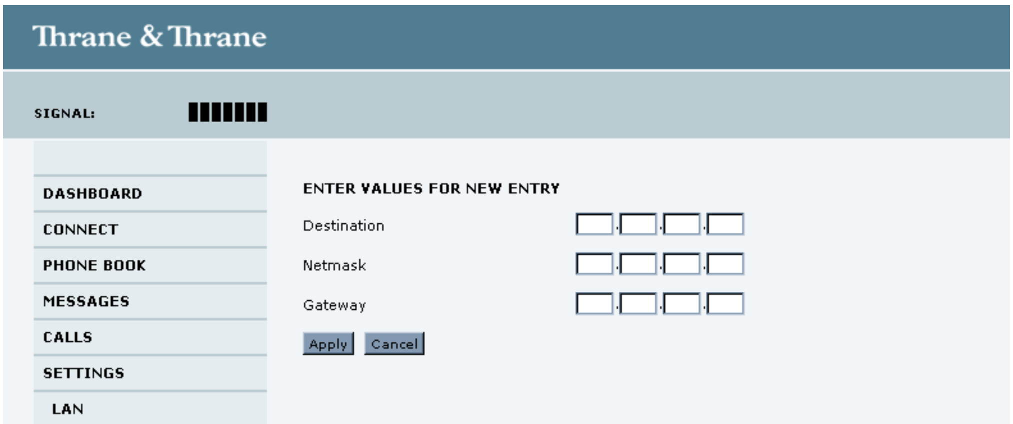


Figure 6-47: Web interface, Settings, LAN, Static route, add

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.

6.6.9 SNMP interface

You can connect equipment to perform SNMP queries on the SBU. For information on the supported subsets of MIB files see *Contact for support* on page 7-1.

6.7 Administration

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

- *Accessing the administration settings*
- *Saving and loading a configuration*
- *Call charges*
- *Log handling*
- *Data limits*
- *Using profiles*
- *Using traffic flow filters*
- *SIM card limitations: SIM PIN and SIM Lock*
- *Setting up user permissions*
- *Remote management*
- *Remote activation of a connection using SMS*
- *Restricted dialing*

6.7.1 Protecting 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 *Changing the administrator password* on page 6-73.
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 *Setting up user permissions* on page 6-86.

6.7.2 Accessing the administration settings

Logging 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**.

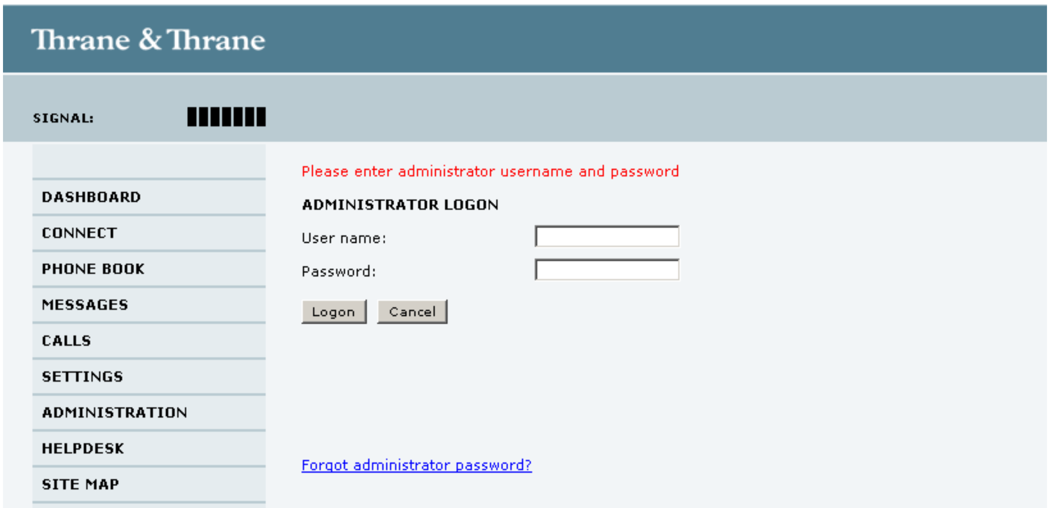


Figure 6-48: Web interface: Administration

   If you have forgotten the administrator password, you can reset the password by clicking the link at the bottom of the page.[1] For further information, see the next section *Resetting 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.

1. The link is only shown when the PC is connected to the Maintenance connector on the SBU front plate.

Resetting 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.
   Please report the serial number and IMEI number of the terminal.
   You can 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).

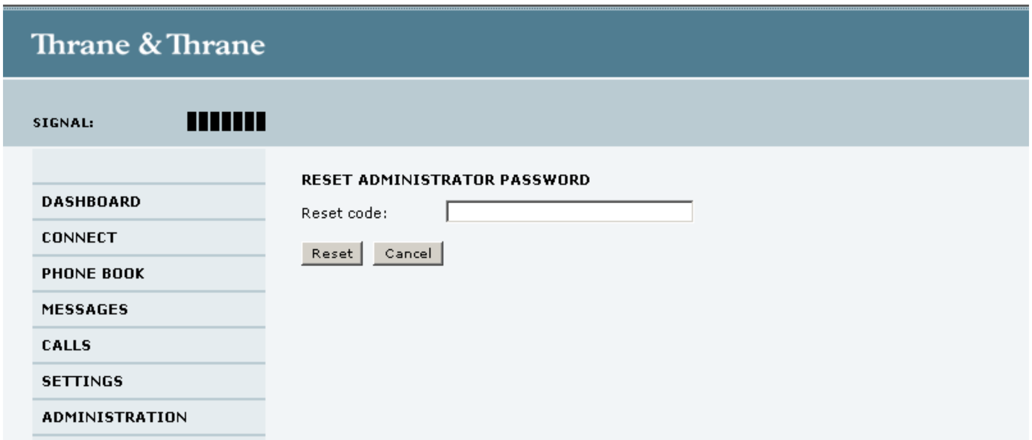


Figure 6-49: Web interface: Administration, Reset administrator password

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 *Changing the administrator password*.

Changing the administrator password

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**.

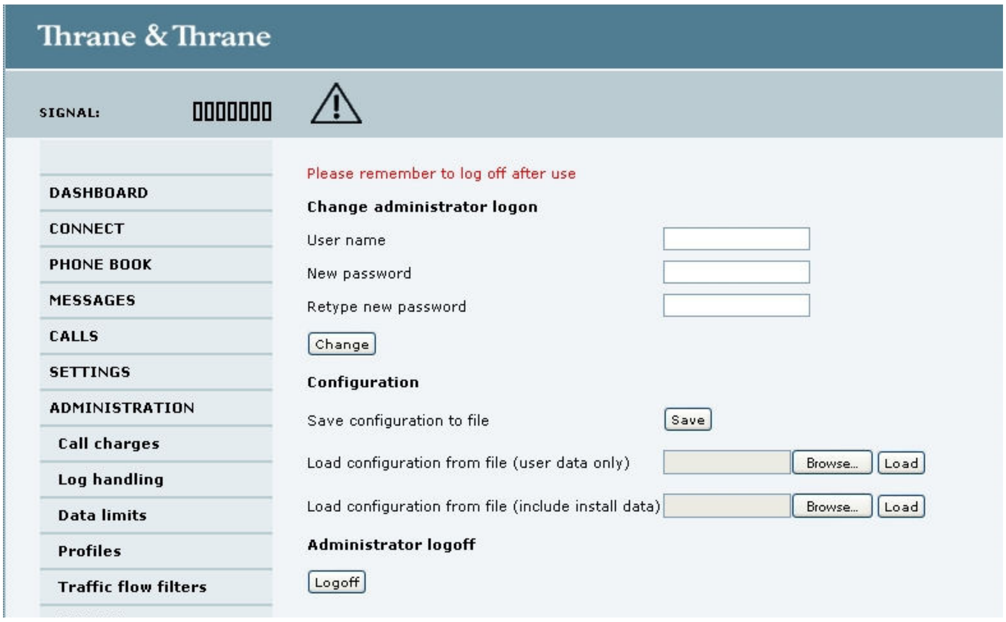


Figure 6-50: Web interface: Administration, change administrator logon

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.

Logging 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 Saving and loading 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!

Saving 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**.

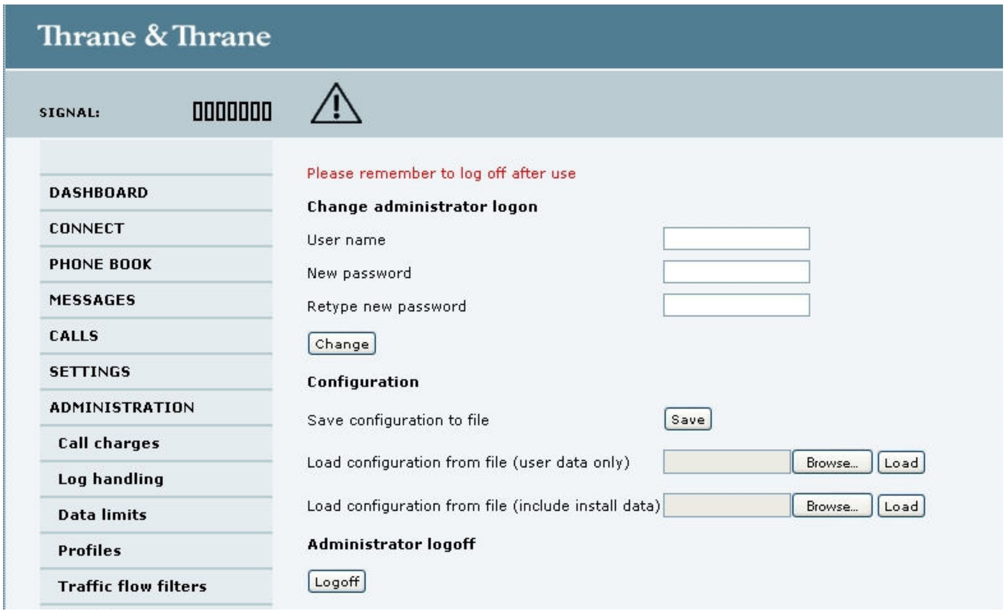


Figure 6-51: Web interface: Administration, saving a configuration file

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.

Loading 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:

1. 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.

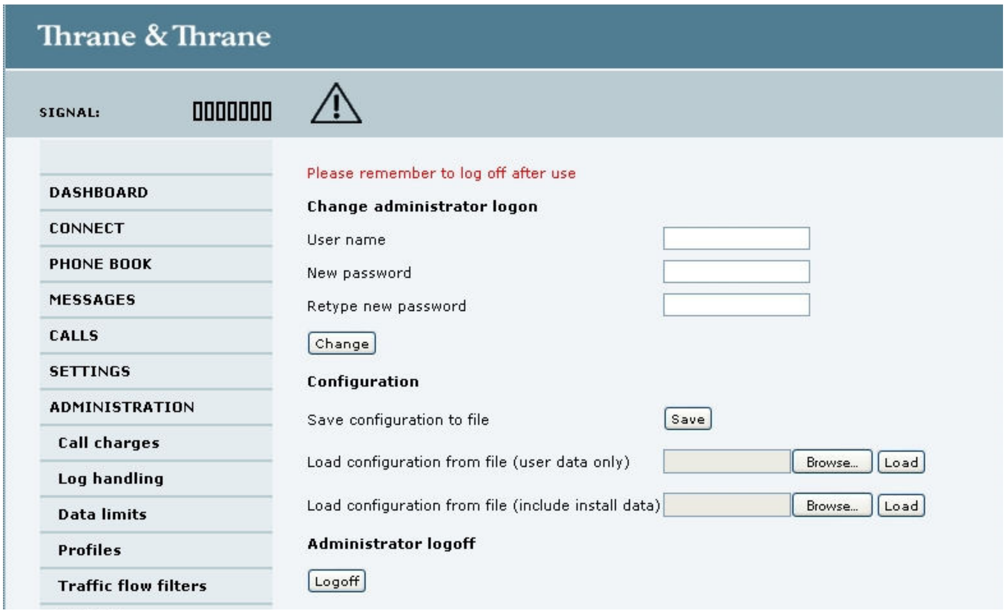


Figure 6-52: Web interface: Administration, saving a configuration file

2. Click **Browse...** to browse to the file you want to import. Then click **Open**.
3. 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!
4. 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.**

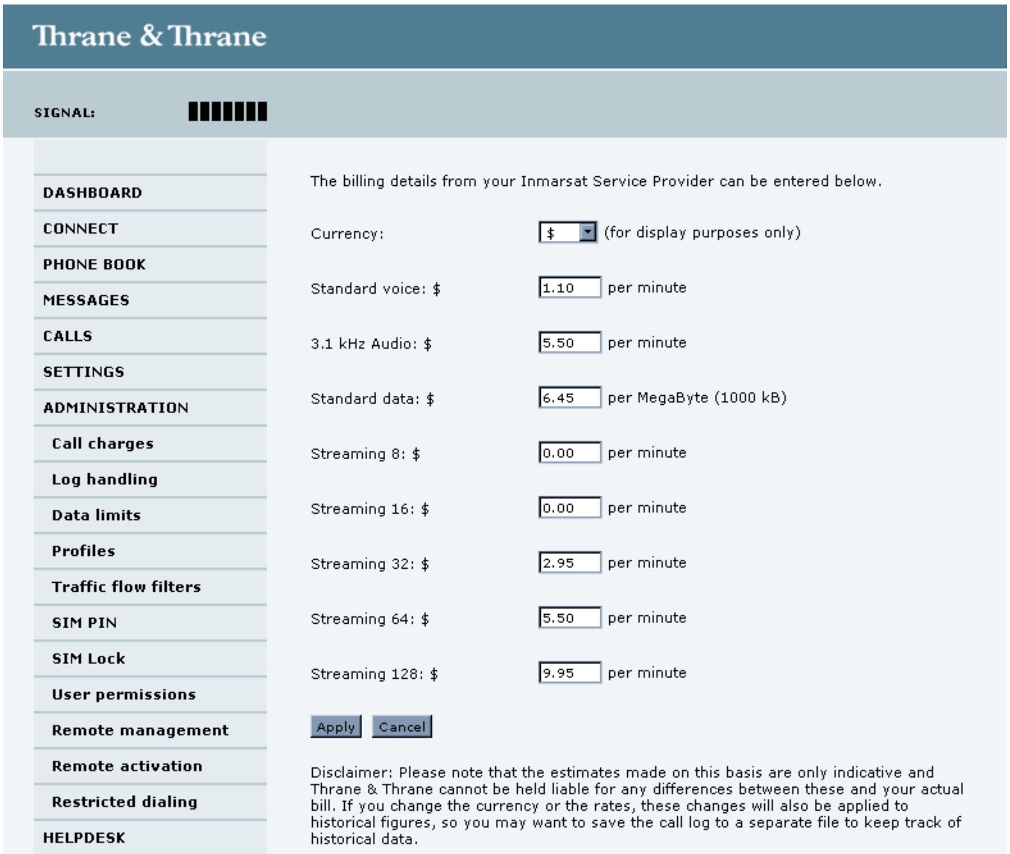


Figure 6-53: Web interface: Administration, Call Charges

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**.

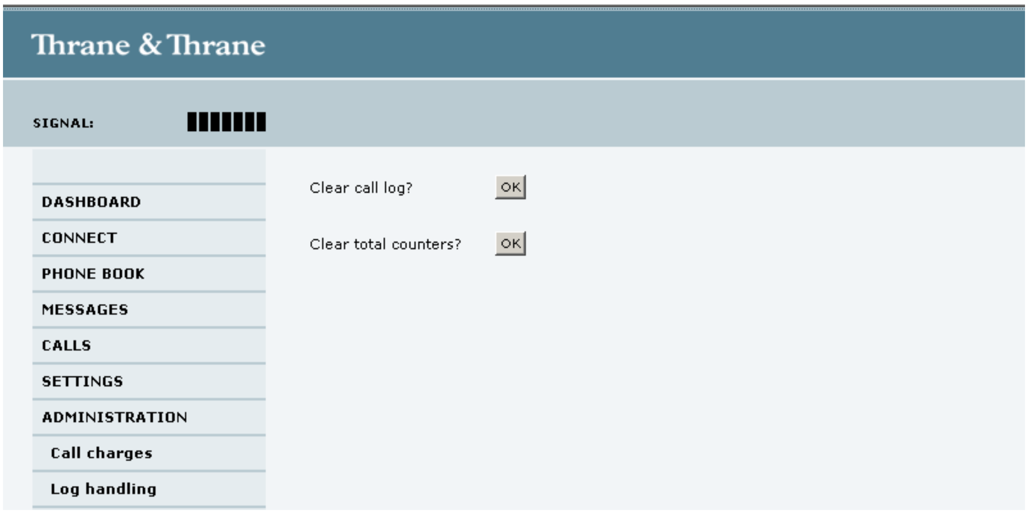


Figure 6-54: Web interface: Administration, Log Handling

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 Using 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.

Selecting 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 *Managing LAN/WLAN network users* on page 6-52.

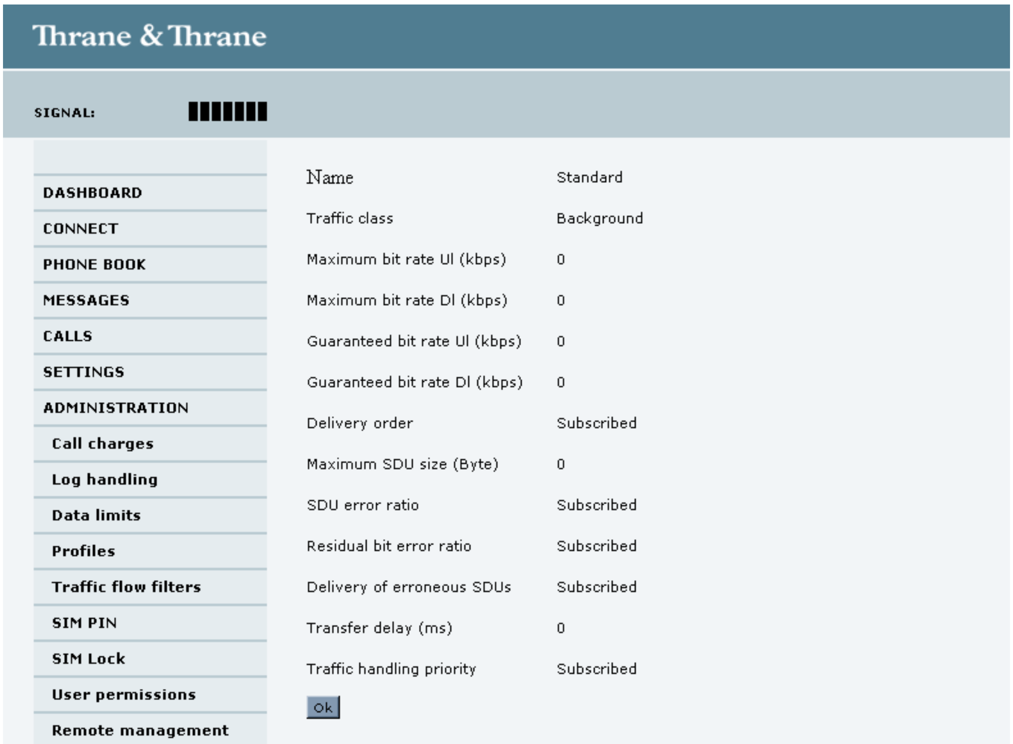


Figure 6-55: Web interface, Administration, Profiles, Example: Standard

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.

Defining 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.

To define a new profile, do as follows:

1. From the left navigation pane, select **ADMINISTRATION** > **Profiles**.

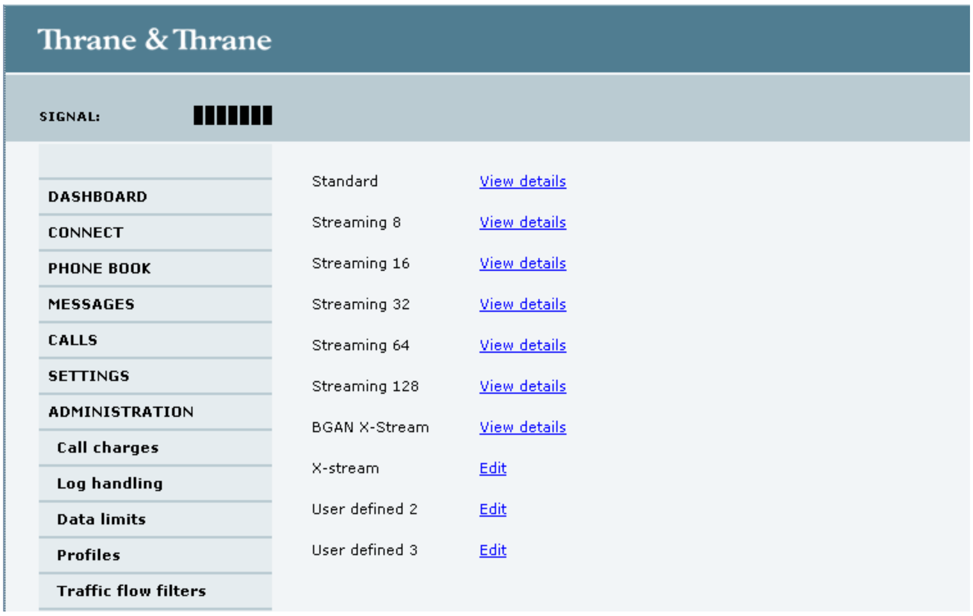


Figure 6-56: Web interface. Administration, Profiles, select profile (Example AVIATOR 350)

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 Ul (kbps)** is the maximum upload bit rate allowed for this profile.
- **Maximum bit rate Dl (kbps)** is the maximum download bit rate allowed for this profile.
- **Guaranteed bit rate Ul (kbps)** is the guaranteed upload bit rate needed for this profile.
- **Guaranteed bit rate Dl (kbps)** is the guaranteed download bit rate needed for this profile.

Note 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 Using 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.

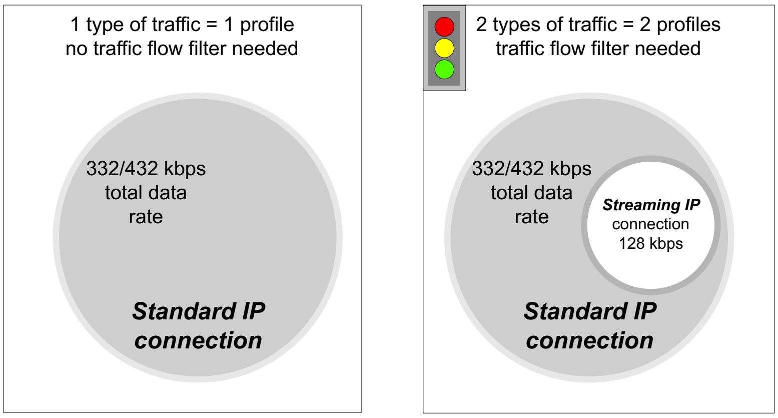


Figure 6-57: Traffic flow filters to filter traffic types

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.

Defining 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.

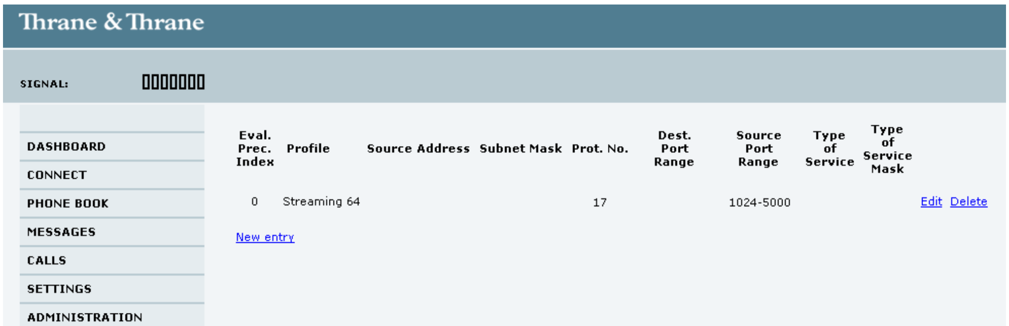


Figure 6-58: Web interface: Administration, Traffic flow filters

2. Click the link **New entry**.

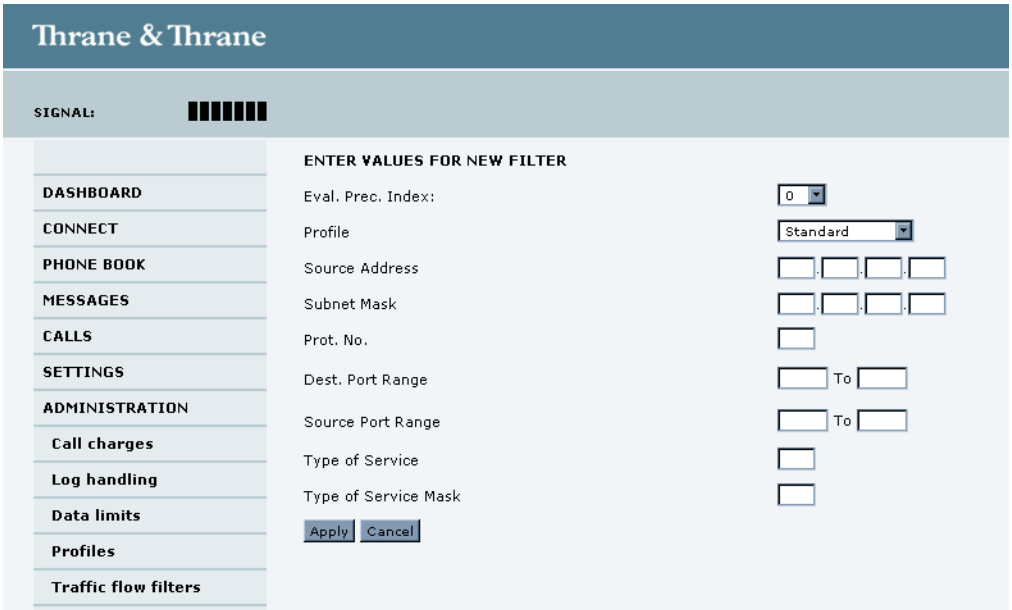


Figure 6-59: Web interface: Administration, Traffic flow filters, New entry

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.

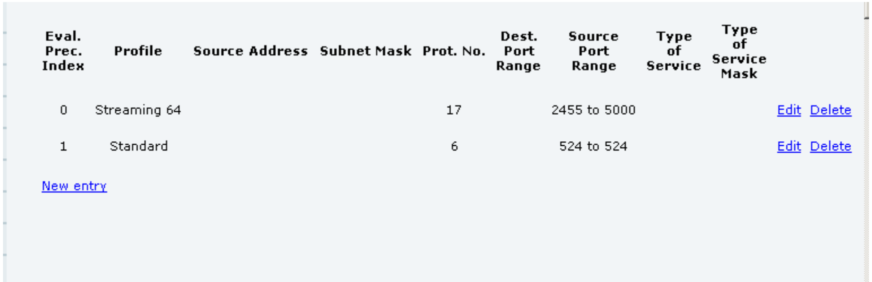
- **Source address + Subnet mask.**
  This is an IPv4 IP address and subnet mask. Only packets received from the specified source are accepted by the filter.
- **Protocol number**.
  This is uniquely assigned for the protocol being used. For TCP (typically Internet, e-mail, FTP) set this to 6, for UDP (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			Edit Delete
1	Standard			6		524 to 524			Edit Delete

New entry

Figure 6-60: 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 limitations: 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 which come with 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 **ADMINSTRATION > 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.

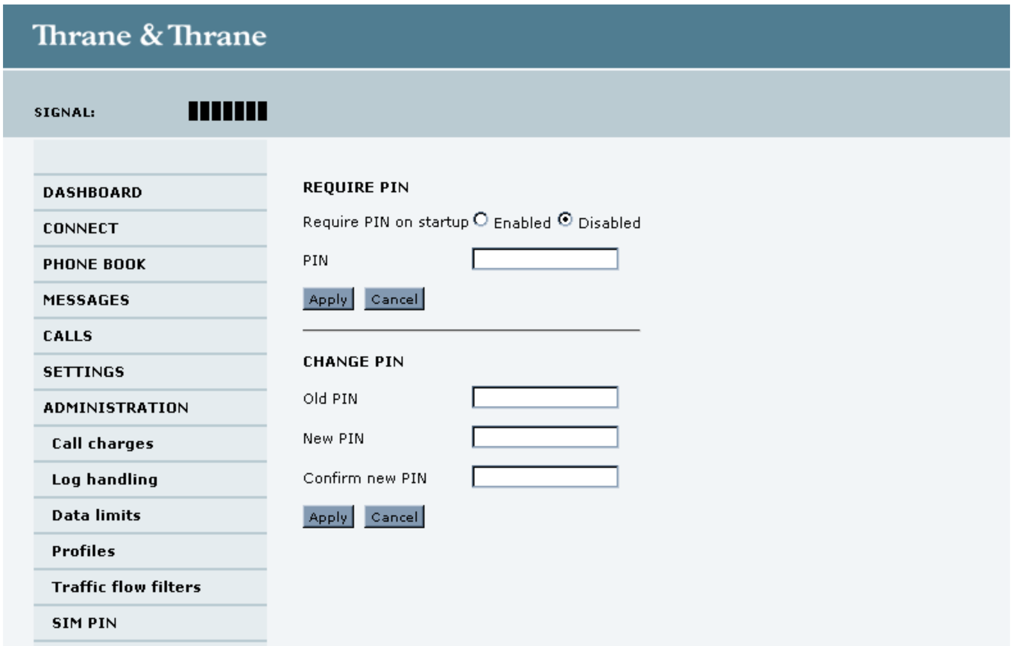


Figure 6-61: Web interface, Administration, SIM PIN

SIM Lock

The supplier may lock the SIM card of the terminal to a specific service provider. For further information contact your supplier. You can unlock the SIM lock.

To unlock the SIM lock of the SIM card from your airtime provider do as follows:

1. From the left navigation pane, select **ADMINSTRATION > SIM LOCK.**
2. Enter the SIM Lock Code.
3. Click **Apply**.

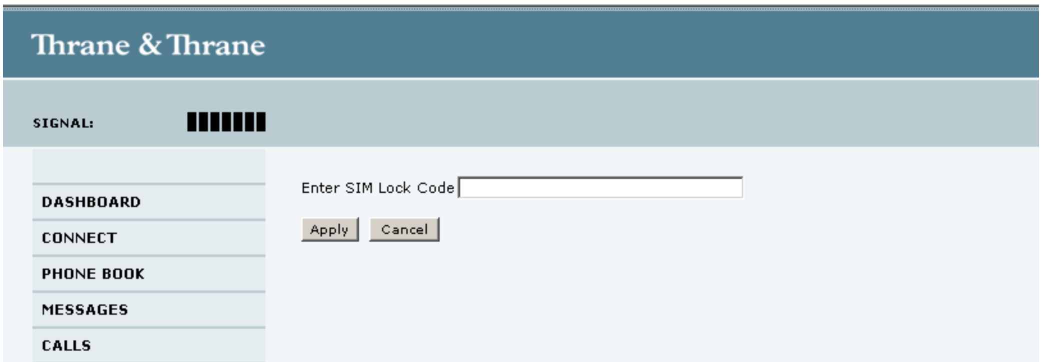


Figure 6-62: Web interface, Administration, SIM LOCK

6.7.10 Setting 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**.

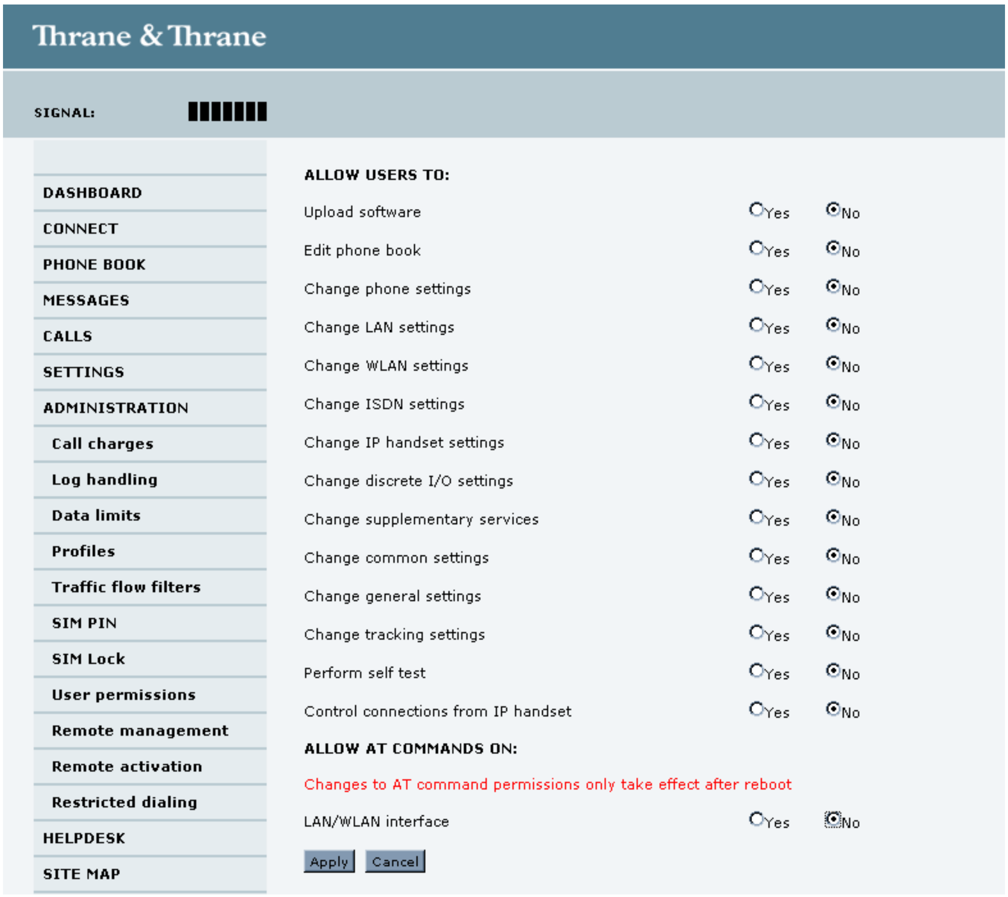


Figure 6-63: Web interface: Administration, User permissions

2. For each item under **ALLOW USERS TO:**, select
   - **yes** to allow access or
   - **no** to block access to the settings. Then the pages are read-only, changes cannot be made.
3. Under **ALLOW AT COMMANDS ON:**, select
   - **yes** to allow the use of AT commands on the LAN/WLAN interface, or
   - **no** to block the use of AT commands on the LAN/WLAN interface.

   AT commands are typically used during maintenance and service.

   Note This setting does not take effect until the SBU is restarted.
4. 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 6-57 in *Editing 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 6-89.

To set up the SBU for remote management, do as follows:

1. From the left navigation pane, select **ADMINISTRATION > Remote management**.

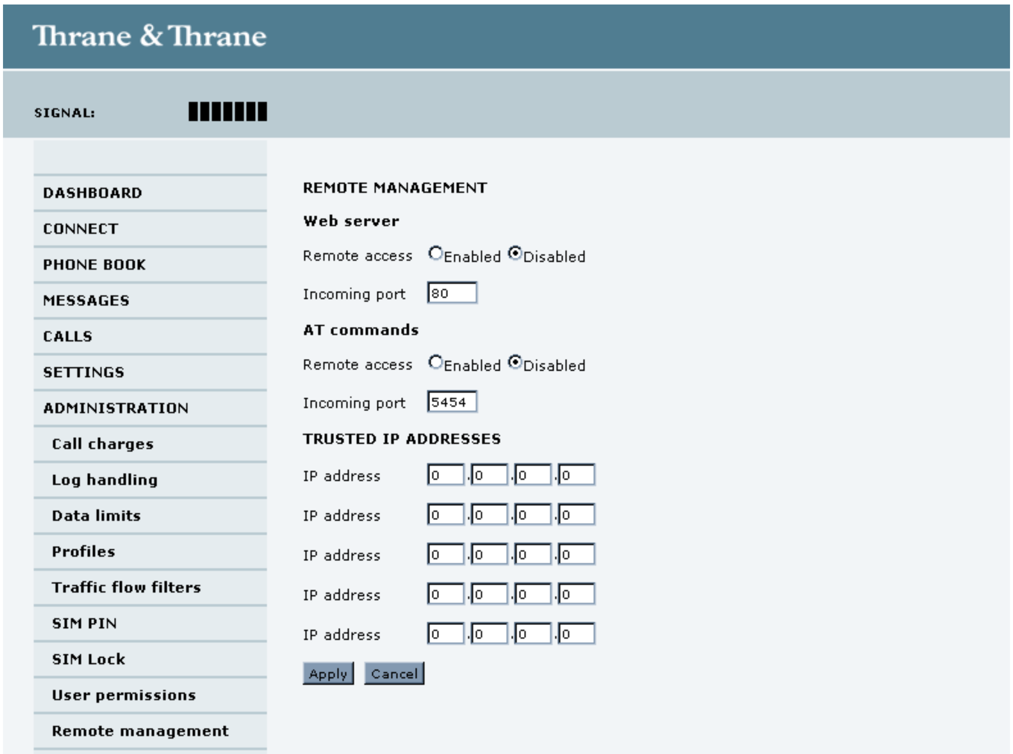


Figure 6-64: Web interface: Administration, Remote management

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 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.

6.8 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.

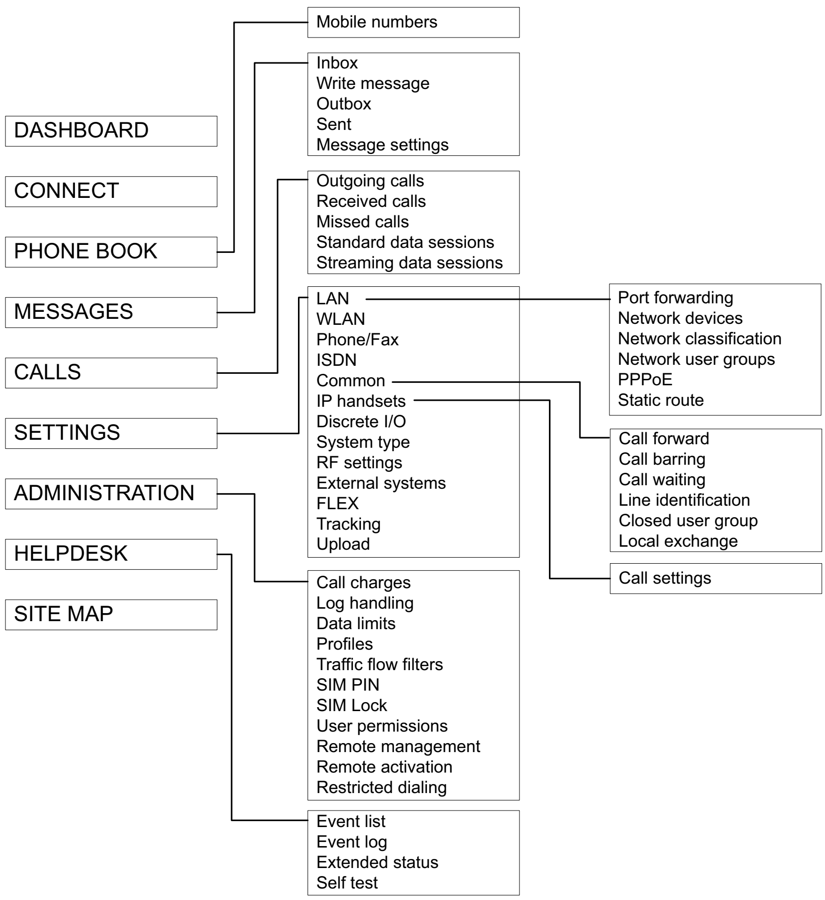


Figure 6-65: Web interface: Site map

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[7] 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[7] handset, refer to the Sigma[7] 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[7] handset, refer to the manual for the Sigma[7] 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.

Setting 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.

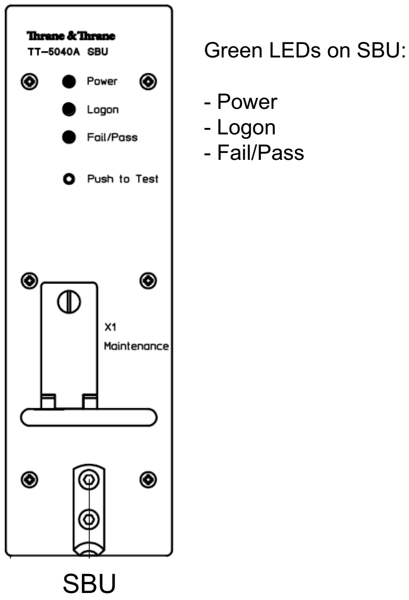


Figure 6-66: AVIATOR 200/300/350 system

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 to 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 Thrane & Thrane distributor**: If you need assistance and you have purchased your system from a Thrane & Thrane distributor, contact the distributor's support line.

AVIATOR 200/300/350 **system purchased directly from Thrane & Thrane**: If you need assistance and you have purchased your system directly from Thrane & Thrane, you can contact Thrane & Thrane by telephone or send an e-mail to the Thrane & Thrane 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 **aerosupport@thrane.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 *Returning units for repair* on page 7-16.

Once repaired, reinstall the unit in the aircraft in accordance with the instructions in this Installation and Maintenance Manual.

7.2 Getting 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, please call the help desk. If you have typed in the help desk number in the web interface you can see it under **HELP DESK**. Otherwise 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 Thrane & Thrane's web site: www.thrane.com. Select **SERVICE**, then **AERONAUTICAL**.

7.2.3 Help desk and diagnostic report

Accessing the Help desk

If you need help **with airtime-related issues** for the SwiftBroadband subscription you may call the Help desk. By default, the Help desk is the phone number for your Airtime Provider.

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[1]

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.

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 pressing 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 7-12.

   For further information on the Reset button, see *IP Reset (Default) button* on page 7-11.

   For further information on IP addresses of the SBU see *Setting up the LAN IP addressing* on page 6-18.

You are now connected to the web interface of the SBU.

Updating the software

1. In the web interface, select **SETTINGS** from the left navigation pane.

2. Click **Upload** from the left navigation pane.

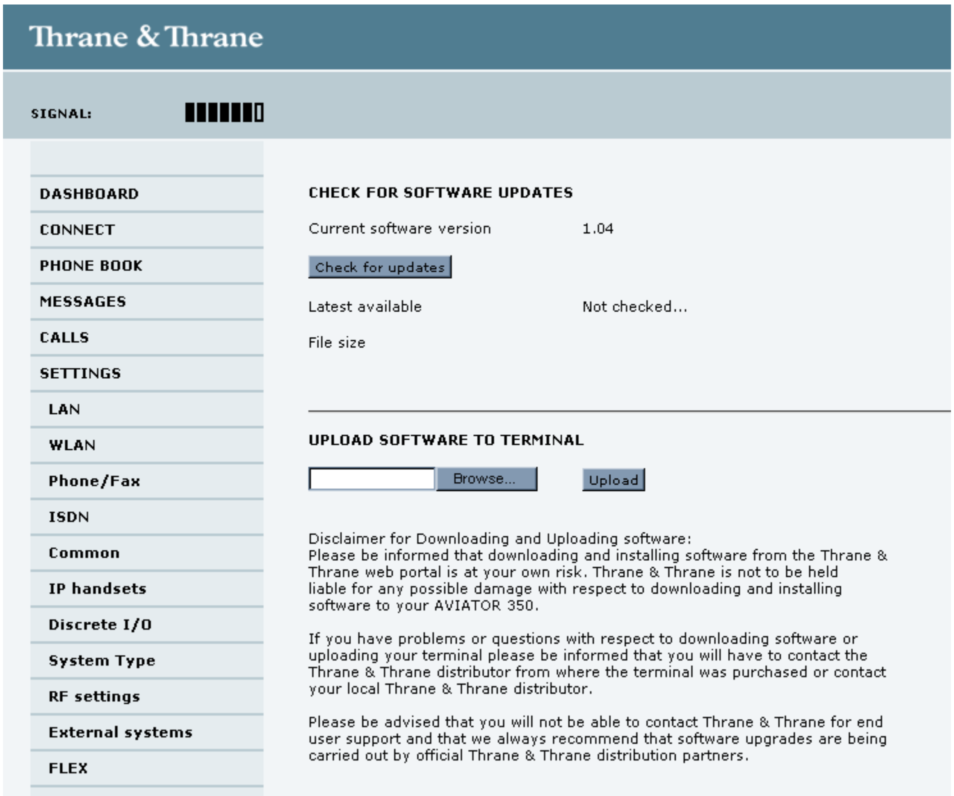


Figure 7-3: Web interface: Settings, Upload

3. The **Current software version** field shows the current software version.
4. 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 7-6.

If software upload still fails, use the IP Reset button as described in *IP Reset (Default) button* on page 7-11 to initiate a software upload from an external server.

7.3.2 Verifying the software update

Testing 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 Pass/Fail LED on the front of the SBU must become steadily green. Verify that the Pass/Fail LED is not red nor flashing orange once every 2 seconds. Wait until the Pass/Fail LED is green.
4. Verify that the software update has been completed successfully. You find the software version number in the **DASHBOARD** window of the web interface.

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.

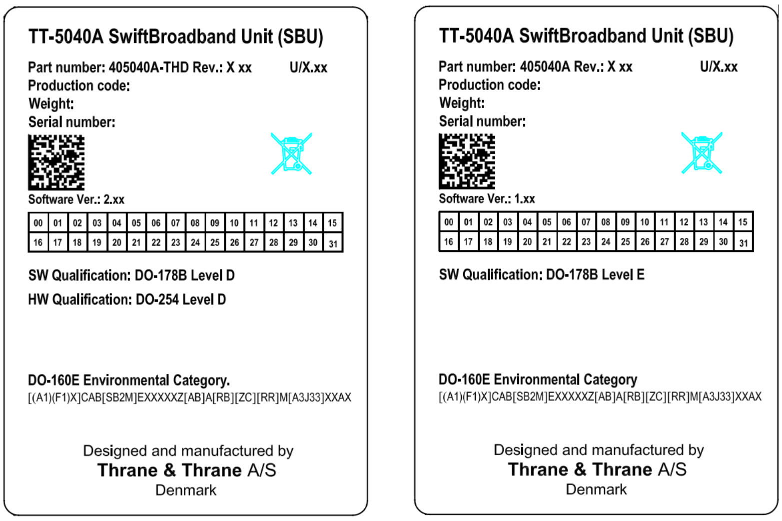


Figure 7-4: Software identification on the SBU label, Level D and Level E

7.4 Troubleshooting

7.4.1 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 pressing 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 *Viewing the Event list, Event log and extended status* on page 7-13.

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).

7.4.2 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

LED on maintenance connector

The function of the LED on the maintenance connector is:

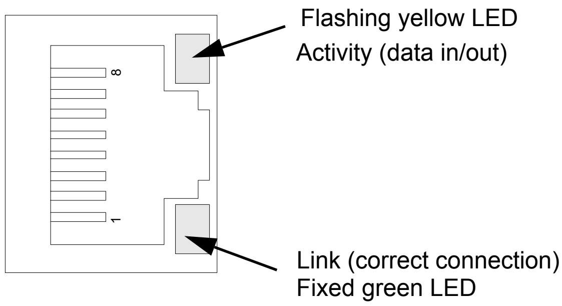


Figure 7-5: LEDs on front maintenance connector

7.4.3 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.

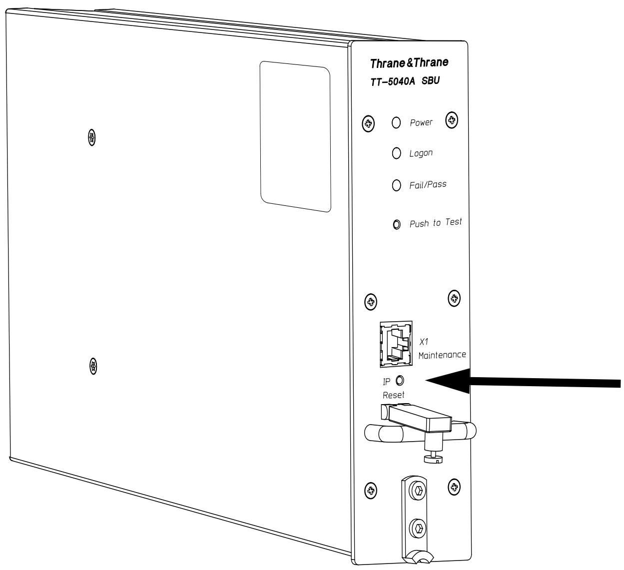


Figure 7-6: IP Reset (Default) button on SBU front

The following table describes how you can use the IP reset button.

Action	Function
With the SBU running, press the Reset button normally.	**Temporary reset to default values:** 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). 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.
With the terminal running, press and hold the Reset button for 30 seconds, until the Power indicator on the SBU front plate flashes orange.	**Reset to factory settings:** The SBU restores factory settings and reboots the system.
While the terminal is booting, press and hold the Reset button.	**For service use only!** 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: 1. Activate or install a TFTP server on a PC. 2. Locate the correct software image (xxx.dl) for the SBU and place it in the TFTP server directory. 3. Rename the image to **ttexp.dl**. 4. Reconfigure the PC LAN interface to use the static address **192.168.0.2/255.255.255.0**. 5. Power off the SBU. 6. Connect the PC LAN Interface to the SBU, 7. Press and hold down the Reset button. 8. Keep the Reset button pressed while powering on the SBU, and through the next step. 9. Monitor the TFTP server window. When the upload starts you can release the Reset button. 10. When the TFTP upload finishes the SBU boots up using the new image.

Table 7-4: How to reset the IP address or the terminal software to default settings

7.4.4 Viewing 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.

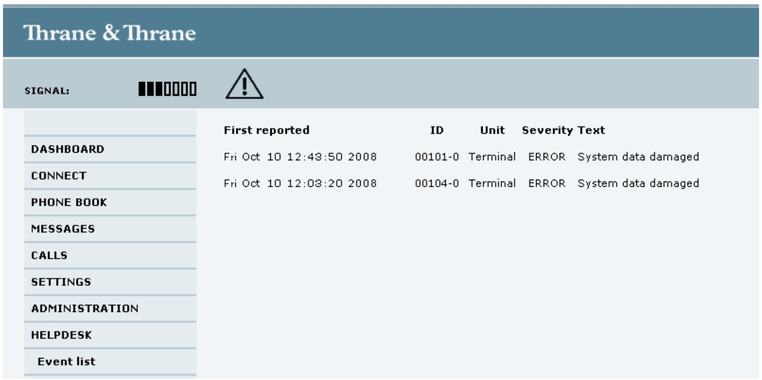


Figure 7-7: Web interface: Help desk, Event list

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-1.

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**.

7.4.5 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**.

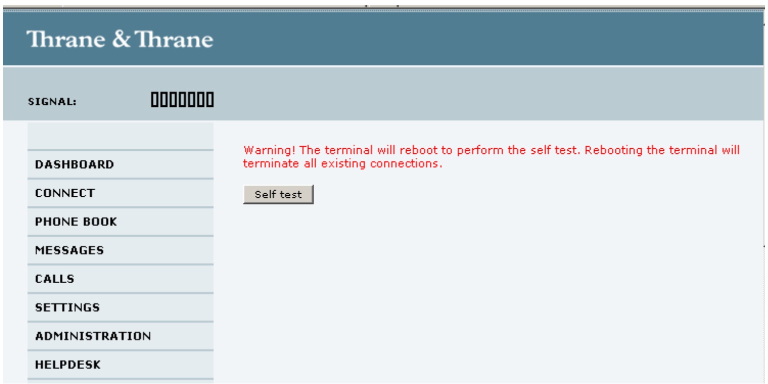


Figure 7-8: Web interface: Help desk, Self test

2. Click **Self test**.
3. Click **OK** in the Warning dialog.
   The SBU now performs a self test and resets the SBU.

7.4.6 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 function of the LEDs, refer to *Status signalling* on page 7-9.
- **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: 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:

- To use the SBU Maintenance connector disconnect or switch off any PC connected to another LAN interface of the SBU.

Problem: 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.

Problem: No registration for voice or data 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.

7.5 Returning units for repair

7.5.1 Return Material Authorization (RMA)

To return equipment to Thrane & Thrane for repair this RMA procedure must be followed. Failure to comply with this procedure may cause shipping delays and additional charges.

All paperwork regarding repair returns must be made via a Thrane & Thrane Partner, and must be registered in the Thrane & Thrane eReport on-line portal in accordance with the Partner manual instructions.

Shipment can be made directly between Thrane & Thrane and any address specified in the eReport RMA documents.

Repairs - warranty as well as non warranty - will be handled in accordance with the Thrane & Thrane repair policies and procedures as outlined on the Thrane & Thrane Extranet (http://extranet.thrane.com/) and in the Partner manual.

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.

RMA procedure for aircraft owners and operators (and other companies than Thrane & Thrane partners)

Before returning units for repair, please follow this procedure:

1. Have the following information ready before calling calling your Thrane & Thrane Partner:
   - T&T part number (example: 405035A SDU)
   - Serial number (example: 00443322).
   - A thorough description of the fault.
   - Aircraft serial number and/or tail number.
2. Contact the Customer Service Center of your Thrane & Thrane Partner or the company from whom you purchased the AVIATOR 200/300/350.
3. Describe the fault as thoroughly as possible and ask for assistance. In some cases, the error may be resolved over the phone.
4. If the unit has to be returned for repair, request an RMA number, or make agreement with the partner on how to proceed.
5. Request replacement/loan unit if required.
6. Pack the equipment or parts to be returned in approved shipping containers.
7. Write the RMA number on the outside of all shipping containers and ship to the following address:
   Thrane & Thrane A/S
   Porsvej 2
   DK-9200 Aalborg SV
   Denmark

RMA procedure for a Thrane & Thrane partner

In case you want loaner or replacement item(s) shipped in advance (i.e. before Thrane & Thrane have received the defective item), please follow this procedure:

1. Have the following information ready before contacting Thrane & Thrane or filling in the eSupport PIA ticket (see your Partner manual for details on eSupport):
   - T&T part number (example: 405035A SDU).
   - Serial number (example: 00443322).
   - A thorough description of the fault.
   - Aircraft serial number and/or tail number.
2. Contact Thrane & Thrane GTAC support team (see your Partner manual or Extranet for details).

3. Describe the fault as thoroughly as possible. In some cases, the error may be resolved over the phone.
4. If the unit has to be returned for repair, make the eReport registration and issue the eReport RMA documents (see your Partner manual and eReport manual for details).
5. Request replacement/loan unit if required, and confirm your request via the eSupport e-mail ticket.
6. Pack the equipment or parts to be returned in approved shipping Containers, and include the eReport RMA documents.
7. Write the RMA number on the outside of all shipping containers and ship to the following address:
   Thrane & Thrane A/S
   Porsvej 2
   DK-9200 Aalborg SV
   Denmark

7.6 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 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

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 *SwiftBroadband unit (SBU)* 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 *SwiftBroadband unit (SBU)* 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	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.
Supply Voltage	The HLD is powered by the SBU.
Heat dissipation	< 40 W
Connectors	Tx input: N-female Rx output: TNC-female Satcom antenna: TNC-female Ground stud
Operating Temperature	-55 °C to +70 °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 *High Power Amplifier/Low Noise Amplifier/Diplexer (HLD)* 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 **Figure 5-2: Mounting two WLAN antennas for optimum performance** in *TT-5040A-004 WLAN antennas* on page 5-8.
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.
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 *Rx Power Splitter* 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 *2-Wire Handset and 2-Wire Cradle* 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 *TT-5621B 2-Wire Handset* 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 *2-Wire Handset and 2-Wire Cradle* 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 Thrane & Thrane 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)

T&T 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[A3]33]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

T&T 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)

T&T 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[A3]33]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

T&T 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

Note 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

T&T 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
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 that may show in the web interface of the SBU.

Event ID	ID range	Severity	Description	Explanation	Remedy
0100	00100 to 00199	ERROR	System data damaged	Important system data is damaged	Do not use the terminal. Contact your Thrane & Thrane partner.
0210	00210 to 00219	ERROR	SIM module error	The SIM interface on the terminal cannot be used.	Contact your Thrane & Thrane partner.
0240	00240 to 00249	ERROR	Temperature sensor error	The terminal is in danger of overheating.	Do not use the terminal. Contact your Thrane & Thrane partner.
0260	00260 to 00269	ERROR	System error	The terminal cannot communicate on the satellite network.	Contact your Thrane & Thrane partner.
0300	00300 to 00309	ERROR	GPS module error	The GPS module is out of function. The terminal cannot obtain a valid GPS position.	Contact your Thrane & Thrane partner.
0310	0310	ERROR	WLAN module error	The WLAN access point failed initialization	Contact your Thrane & Thrane partner if the problem persists.
0330	00330 to 00339	ERROR	ISDN failure	The ISDN interface on the terminal cannot be used.	Contact your Thrane & Thrane partner.
0340	00340 to 00349	ERROR	2-wire failure	The Phone/Fax interface of the terminal cannot be used.	Contact your Thrane & Thrane partner.
0350	00350 to 00359	ERROR	AD9864 calibration data error	Internal error in the receiving part of the terminal.	Contact your Thrane & Thrane partner if the problem persists.
0360	00360 to 00369	WARNING	No antenna found	The terminal cannot communicate with the antenna.	Check antenna cable between terminal and antenna. Reboot the terminal.

Table C-1: SBU events

Event ID	ID range	Severity	Description	Explanation	Remedy
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 fulfills the requirements listed in this document. Check all connectors between SBU and HLD.
0380	0380	ERROR	SNMP agent initialization failed	The SNMP agent failed initialization	Contact your Thrane & Thrane 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 Thrane & Thrane 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.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
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.
1700	01700 to 01709	WARNING	Registration for voice failed	The AVIATOR system has not yet been allowed to register for voice services (Circuit Switched).	Contact your Thrane & Thrane partner if the problem persists.
1800	01800 to 01809	WARNING	Registration for data failed	The AVIATOR system has not yet been allowed to register for data services (Packet Switched).	Contact your Thrane & Thrane partner if the problem persists.
2000	02000 to 02009	WARNING	Satellite signal weak	The signal from the satellite is weak.	Check the line of sight to the satellite. Check in the web interface under SETTINGS > Satellite selection that you have selected Auto, or a satellite covering your current position.
2700	2700	WARNING	Errorlog full	A great deal of system errors has been recorded in the systems error log and has to be reported.	The unit might still be operational but a system diagnostic report has to be initiated and reported for inspection.
2900	02900 to 02909	WARNING	Network failed authentication	The AVIATOR system does not accept the network as a valid BGAN network.	Restart the AVIATOR system. Contact your Thrane & Thrane 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.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
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	03600 to 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 Thrane & Thrane partner
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.
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 Thrane & Thrane partner for further assistance.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
8044	8044	ERROR	Flash on Configuration Module is getting worn out	The Configuration Module is aging and will have less that 10% of the expected lifetime left.	The Configuration Module still works but has to be replaceable in a timely manner
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.
804F	804F	WARNING	ARINC-429 Navigational Input from AHRS or IRS 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.
8050	8050	WARNING	NRS (Mag-netometer) 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 (Mag-netometer) 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.
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.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
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 Thrane & Thrane partner.
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.
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.

Table C-1: SBU events (Continued)

Event ID	ID range	Severity	Description	Explanation	Remedy
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
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* on page 6-21.

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[a]

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

[4] RTCA/DO-160E. Environmental Conditions and Test Procedures for Airborne Equipment. RTCA Inc. December 9, 2004

[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.

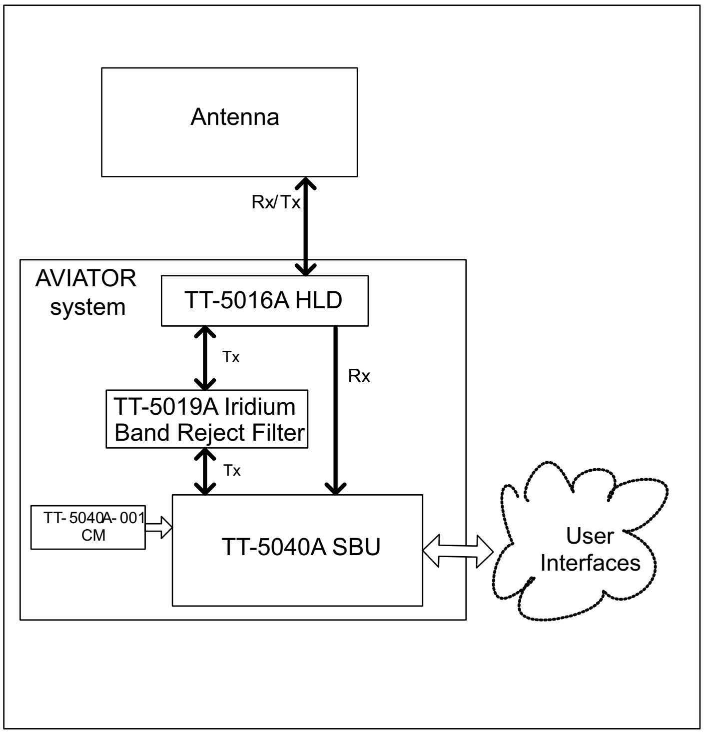


Figure F-1: System configuration with TT-5019A Iridium Band Reject Filter (1)

F.2 Equipment drawing

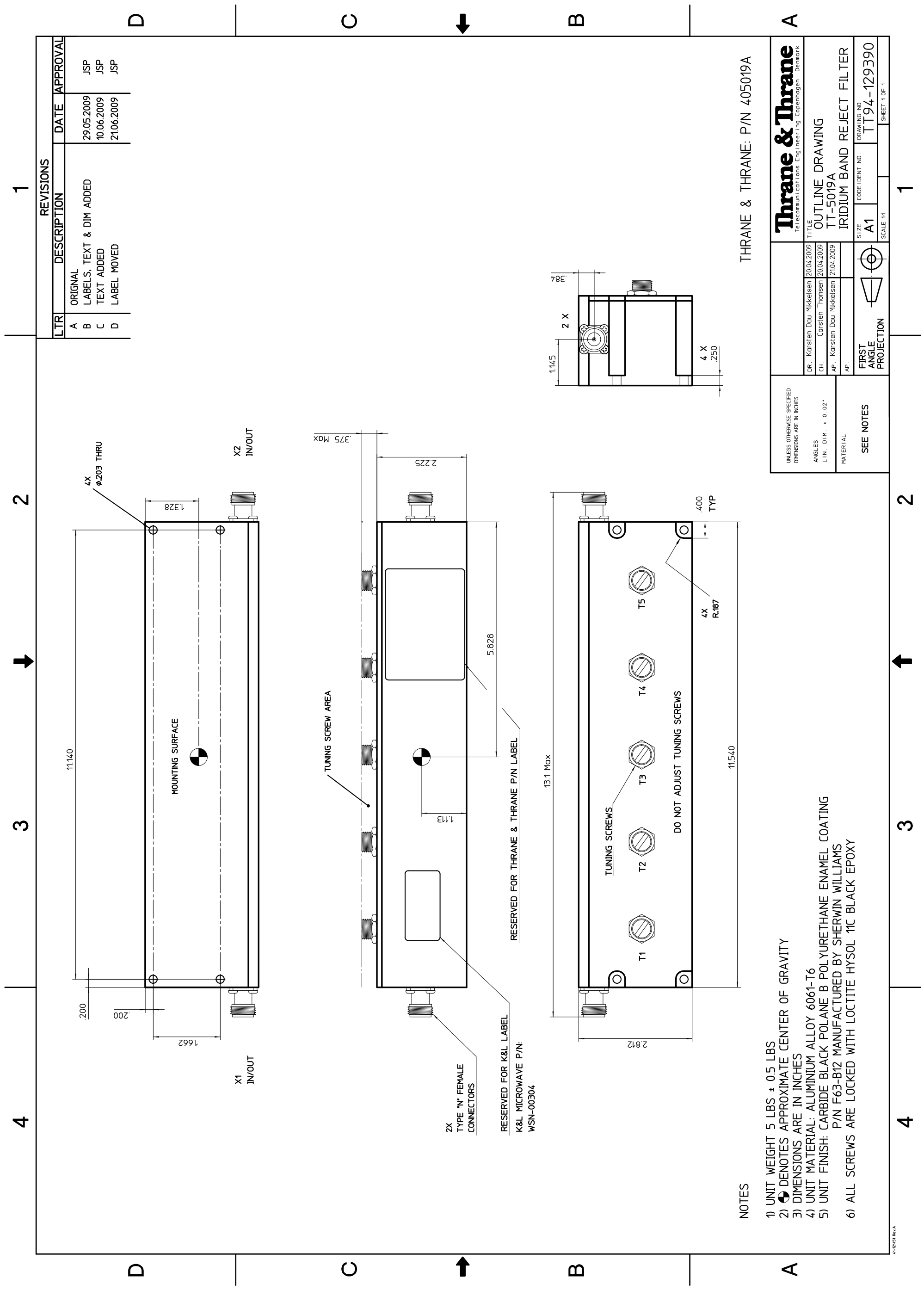


Figure F-2: Outline drawing: TT-5019A Iridium Band Reject Filter

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.

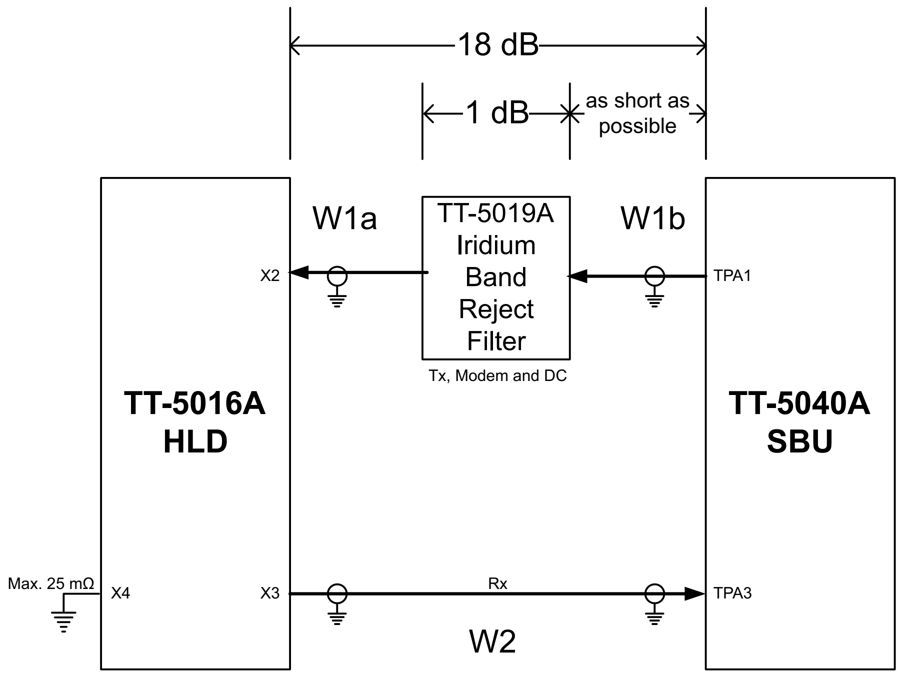


Figure F-3: Wiring TT-5019A Iridium Band Reject Filter

Important

AVIATOR 200: Loss of W1a + loss of W1b < 16 dB

AVIATOR 300 and AVIATOR 350: Loss of W1a + loss of W1b < 17 dB

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	$\leq$0.1 dB at 1627.15 - 1660.5 MHz
Operating Temperature Storage Temperature	-25°C to +70°C -55°C to +85°C
Altitude	55000 ft
Environmental Categories	Refer to Environmental Qualification form in *DO-160 specifications* on page F-5.

Table F-1: 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.
Salt Spray	14.0	X	No test required.

Table F-2: Environmental Qualification Form for Iridium Band Reject Filter

Conditions	DO-160E	Cat.	Comments
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 tested according to FAR 25 Airworthiness Standards: Transport Category Airplanes, Paragraph 25.853(a) and Appendix F - Part I (a)(1)(ii).

Table F-2: Environmental Qualification Form for Iridium Band Reject Filter (Continued)

Using terminal commands

G.1 Getting started

G.1.1 Connecting 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.

Preparing 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 Monitoring 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 *Setting up the navigational input* on page 6-43, **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 date 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:

- *Connecting to the WLAN interface*
- *Setting up a SIP profile*

H.1.1 Connecting 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 Setting 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/)
- Android Market (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

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: Select the codec type that should have the highest priority. You must select G.711 A-LAW.

Realm: When asked for Realm enter the serial number of the SBU.

A

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

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
ETSI	European Telecommunication Standard Institute

F

FAA	Federal Aviation Administration
FNBDT	Future Narrowband Digital Terminal. A US Government standard for secure voice communication.

G

Glonass	GLObal'naya NAvigatsionnaya Sputnikovaya Sistema, Global Navigation Satellite System in English
GNSS	Global Navigation Satellite System
GPS	Global Positioning System

H

HLD	High Power Amplifier, Low Noise Amplifier and Diplexer in one unit

I

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.
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
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

R

RMA	Return Material Authorization

S

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.
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

Numerics

A

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