AVIATOR 200/300/350 training
Who is Thrane & Thrane?
Thrane & Thrane

The world’s leading mobile satellite communications provider
Largest Manufacturer of Inmarsat Terminals and Ground Stations

700 Employees World Wide

300 R&D Engineers working with Inmarsat Related Products

Has delivered 2/3 of all Inmarsat Terminals for Land, Sea and Air

Has developed and delivered the entire Ground Infrastructure for the Global Inmarsat Broadband System
Thrane & Thrane
Global Communication Solutions for Aircraft
Tracking, Voice and Text Systems

Aero-C

- Tracking and Text Messaging
  - Global Tracking System
  - Text Messaging and Fax

Aero-M

- Voice Solution
  - Single Voice or Fax Channel

Aero-I

- Voice and Cockpit Data System
  - 2 Voice Channels
  - 1 Cockpit Data Channel
Voice, High Speed or Broadband Data Systems

**AVIATOR 300/350**
- Compact cabin solution
  - High Quality Voice Channel
  - SwiftBroadband
  - Built-in router and WiFi

**Aero-HSD+**

**AVIATOR 700**
- Full Cockpit and Cabin Solution
  - 2 Voice Channels
  - Swift64 (x 2)
  - Cockpit Data Channel

- Full Cockpit and Cabin Solution
  - 3 Voice Channels
  - SwiftBroadband
  - Built-in router and WiFi
  - Cockpit Data Channel
And now AVIATOR 200 — The smallest ever

Compact/lightweight cabin solution
- 1 x SwiftBroadband
- Built-in PBX, router and WiFi
- Small antenna — Easy installation
The new **AVIATOR** Brand

<table>
<thead>
<tr>
<th>New name</th>
<th>Former name</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVIATOR 200</td>
<td>New!</td>
</tr>
<tr>
<td>AVIATOR 300</td>
<td>Aero SB-Lite w IGA</td>
</tr>
<tr>
<td>AVIATOR 350</td>
<td>Aero SB-Lite w HGA</td>
</tr>
<tr>
<td>AVIATOR 700</td>
<td>Aero SB+</td>
</tr>
</tbody>
</table>
Aero-HSD+
Aero-HSD+

Â 2 Voice Channels
Â 1 Cockpit Data Channel
Â Up to two Swift64 Channels
Â Built-in PBX (2/4-wire and ISDN)
Â Cockpit voice interface
Aero-HSD\(^+\) Installation

- 2 x H+ voice
- 1 x Cockpit data channel
- 2 x Swift64

Cockpit Data

MCDU / Cockpit Audio

HGA Antenna System

SDU  HPA  HSU

Router

Up to 6 Handsets: Wired or wireless OR Fax.

Ethernet

Wireless Ethernet
Aero SB-Lite

Now AVIATOR 300/350
AVIATOR 300/350 (Aero-SB Lite)

- Data rates up to 332/432 kbps
- High quality, low cost voice
- Built-in router
- Wireless functionality
- Supports WiFi handheld Devices
- Supports T&T wireless VoIP handsets
- ISDN and 2-wire interfaces
- Integrates with AirCell Axxess
- Total system below 17 lbs!
Aero-SB Lite with Built-in Router and WiFi

- IGA or HGA Antenna System
- Channels
  - 1 x SwiftBroadband

HLD          SBU

6 x Wired Ethernet

Wireless Ethernet
Aero-SB+

Now AVIATOR 700
AVIATOR700 (Aero-SB+)

- Data rates up to 432 kbps
- High quality, low cost voice
- Multi user capability
- Built-in router
- Wireless functionality
- Built-in PBX (2/4-wire and ISDN)
- Supports WiFi handheld devices
- Supports T&T wireless VoIP handsets
- Cockpit voice interface
Aero-SB+ with Build-in Router, PBX and WiFi

Channels
- 2 x H+ voice
- 1 x Cockpit data channel
- 1 x SwiftBroadband
- 1 x Low Cost voice

Cockpit Data

MCDU / Cockpit Audio

HGA Antenna System

SDU HPA SBU

Up to 6 Handsets: Wired, wireless or fax

6 x Wired Ethernet

Wireless Ethernet

Up to 6 Handsets: Wired, wireless or fax
<table>
<thead>
<tr>
<th></th>
<th>Aviator 200</th>
<th>Aviator 300</th>
<th>Aviator 350</th>
<th>Aviator 700</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inmarsat Class:</strong></td>
<td>Class 15</td>
<td>Class 7</td>
<td>Class 6</td>
<td>Class 6 + Classic H+</td>
</tr>
<tr>
<td><strong>Antenna type:</strong></td>
<td>Low Gain TT-3002A “Shark fin”</td>
<td>Intermediate Gain TT5006, AMT-3500</td>
<td>High Gain TT5006, AMT-3500</td>
<td>High Gain TT5006, AMT-3500</td>
</tr>
<tr>
<td><strong>Services:</strong></td>
<td>SwiftBroadband 200</td>
<td>SwiftBroadband</td>
<td>SwiftBroadband</td>
<td>SwiftBroadband /H+</td>
</tr>
<tr>
<td><strong>Bandwidth:</strong></td>
<td>Max. 200 kbps</td>
<td>Max. 332 kbps</td>
<td>Max 432 kbps</td>
<td>Max. 432 kbps</td>
</tr>
<tr>
<td><strong>Max Streaming:</strong></td>
<td>16 kbps</td>
<td>128 kbps</td>
<td>X-Stream</td>
<td>X-Stream</td>
</tr>
<tr>
<td><strong>Coverage:</strong></td>
<td>I4 &gt;20 deg. Elevation</td>
<td>I4 ISDN/3.1K &gt; 45 deg</td>
<td>I4</td>
<td>I4 (I3 back up S64)</td>
</tr>
<tr>
<td><strong>Cockpit Data:</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Voice:</strong></td>
<td>1 (AMBE-2)</td>
<td>1 AMBE-2 , 3.1 kHz</td>
<td>1 AMBE-2, 3.1 kHz, ISDN</td>
<td>3 AMBE-2, 3.1 kHz, ISDN H+</td>
</tr>
<tr>
<td><strong>Fax/STU:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight/Size:</strong></td>
<td>Approx. 6.2 kg incl. Antenna, Excl. 2 MCU + flat box (2.3 kg)</td>
<td>Approx. 7.8 kg incl. Antenna, Excl. 2 MCU + flat box (2.3 kg)</td>
<td>Approx. 10.4 kg incl. 18 kg (dep. on antenna)</td>
<td>Approx.16.8 kg- 24 kg (dep. on antenna)</td>
</tr>
</tbody>
</table>
Introduction to Inmarsat
• Inmarsat
• The Satellites
  • Inmarsat-2
  • Inmarsat-3
  • Inmarsat-4
• Network Operation
• Service Providers/Gateway Operators
Inmarsat - Background

- Inmarsat - formed in 1982 initially to provide maritime satellite services
- Inmarsat became a limited company in May 1999 with HQ in London UK - now provides service to Maritime, Land and Aeronautical mobile terminals worldwide
- Inmarsat develops, launches and maintains a global network of geostationary satellites. It defines and specifies the communication systems that use these satellites
- Access to Inmarsat services is through LESOs - Land Earth Station Operators and their associated service providers, ISPs
- Inmarsat does not manufacturer user equipment or offer service directly to end-users
- More than 300,000 mobile systems in operation
Inmarsat - Satellites

<table>
<thead>
<tr>
<th>Satellites</th>
<th>Launch Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>I2 (4) 1 global beam</td>
<td>1990-92</td>
</tr>
<tr>
<td>I3 (5) 7 spotbeams</td>
<td>1996-98</td>
</tr>
<tr>
<td>I4 (3) 228 narrow spot</td>
<td>2005-08</td>
</tr>
</tbody>
</table>
Inmarsat 4th Generation Satellites

- 3 Geostationary Satellites
- High orbit, 36000 KM, 22000 miles
- Launched during 2005-2008
- Expected lifetime: 13+ years
- Have been re-clocked to cover the continents rather than ocean

Supports these T&T Product:
  - Aero SB Lite and later SB+
  - Explorer
    - 110/300/500/700/727
  - Sailor 150/250/500
Geostationary locations

North Pole

Equator

South Pole

36,000 KM
(Ocean) Regions:
- Americas @ 98W
- Asia-Pacific @ 25E
- EMEA @ 143.5E

Footprint = Ocean Region

Max. 78° North

Max. 78° South
Inmarsat 4: Global coverage

Note: This is after the reclocking
Regional Beams.
Spot beams.
Some of the F1s Narrow Beams — a closer look
The SB-Lite supports handover between spotbeams.

Packet-Switched handover is "lossless" and hence connectivity is maintained throughout the handover for both background and streaming class services.

Circuit-Switched handover is "lossy" and hence full connectivity performance is not maintained throughout the handover although the circuit is still in place at the end of the handover. Only few hundred millisecond drop out.

Note: Satellite handover is not supported.

Handover algorithm runs every **TU7** minutes = (5 minutes for SBB)
Practical maximum number of channels per narrow spot beam = 10.

Spacecraft specification maximum number of channels per narrow spot beam = 25.

Inmarsat BGAN Service Offering is 492 kbps per channel in each direction (forward and return). Total in the forward and return directions per channel is 984 kbps.

Calculations (total forward and return directions):

Practical maximum capacity in a single narrow spot beam = 10 channels x 984 kbps = 9,840 kbps or 9.84 Mbps

Spacecraft specification maximum capacity in a single narrow spot beam = 25 channels x 984 kbps = 24,600 kbps or 24.6 Mbps
APN important for correct routing. Must be setup in the SBU.
## SBU Interfaces and services

<table>
<thead>
<tr>
<th>Service</th>
<th>Interface on the system</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phone/Fax (RJ 11)</td>
</tr>
<tr>
<td><strong>Circuit Switched</strong></td>
<td></td>
</tr>
<tr>
<td>3.1 kHz Audio(^a)</td>
<td>Analog telephone</td>
</tr>
<tr>
<td></td>
<td>G3 Fax machine</td>
</tr>
<tr>
<td></td>
<td>Secure telephone STU/FNBDT</td>
</tr>
<tr>
<td>Standard Voice (AMBE)</td>
<td>Analog telephone</td>
</tr>
<tr>
<td>Data, UDI or RDI(^a)</td>
<td>Data, UDI or RDI</td>
</tr>
<tr>
<td><strong>Packet Switched</strong></td>
<td>Data multi-user</td>
</tr>
<tr>
<td></td>
<td>Data single-user</td>
</tr>
<tr>
<td><strong>SMS</strong></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) For IGA (Class 7): Elevation angle must be larger than 45°.
The observed performance or speed of the IP data connection is influenced by many factors.

The two different antenna sizes of the two classes will mean achievable data rates will differ. Essentially, the larger the antenna the greater the achievable bit rate, particularly in the uplink or return direction. Larger antennas will also enable higher bit rates in more demanding edge of beam locations and should provide service to lower elevations to the satellite and in conditions of high fading (e.g. flight over calm ocean). In addition the performance of the antenna in terms of gain, G/T and ability to reject multipath will also affect the achievable bit rate. End users should also appreciate the number of users sharing the bearer at any particular time, will also impact achievable bit rate, along with at low elevation angles for a specific terminal/link conditions.

Each 512kbps bearer needs to accommodate some system overheads, meaning the maximum theoretical bandwidth available for users will be 432kbps. As has been said previously, many factors will influence the achieved bit rate experienced by end users.

Maximum 432 kbps RX: Maximum 432 kbps TX. High gain antenna (HGA)

Maximum 332 kbps RX: Maximum 332 kbps TX. Intermediate gain antenna (IGA)
I4 coverage / Elevation bands
Figure 2  Forward bearer maximum user data throughput for aeronautical BGAN UEs
Figure 3  Return bearer maximum user data throughput for aeronautical BGAN UEs
Important numbers

- **IMEI**: Id on the terminal.
  - International Mobile Equipment Identity
- **IMSI**: Id on the SIM card
  - International Mobile Subscriber Identity
- **ICC-ID**
  - (Integrated Circuit Card ID)
- **Serial no.**
  - Terminal serial no.
- **Phone no.**
  - **MSISDN**
    - Primary phone no. Voice / Text
  - **AMSISDN2 / ISDN64**
    - 64kbps UDI
  - **AMSISDN5 / CSFax**
    - 3,1kHz audio voice / fax
(ADDITIONAL) Mobile System International Integrated System Digital Network Number
A twelve digit number used for additional BGAN Circuit Switched services other than the 4kbps voice service. These include 56k and 64k ISDN for Voice or Data usage, and FAX.
In the BGAN LaunchPad, these are referred to as ‘Alternative Numbers’(5/09/05), which can be read from the number entered onto the SIM by the DP.
Standard Data, Packet Switched

- Up to 332/432 Kbps via Shared channel
- Type of connection, Shared/NAT
- Connection controlled by user profiles
- Dynamic / Static IP assign to the terminal by network
- User pays for amount of data sent and received (per MB)
A variable bit rate IP service. Capacity is allocated dynamically by the network on the basis of the user's demand, the user's current link quality and the competing demands of other users sharing the same channel. Users are typically charged on the basis of data transmitted and received rather than duration of connection. The background class connection provides default a reliable in-order delivery over the satellite (i.e. any data lost due to random errors on the radio link is automatically retransmitted and re-ordered). BER = $10^{-3}$

Background class IP data offers users access to the shared, contended IP 512kbps channel.

**There will be no guarantees associated with the service** other than the SwiftBroadband contention ratio. If the link is *busy* with many active users then the observed bit rate will be lower than if the link is *quiet* with little traffic. This standard service will suit most office type applications, internet access, file transfer, email, etc.
- **Guaranteed bandwidth of** 8, 16, 32, 64, 128 Kbps (symmetrically)
- Type of connection, Direct
- Controller by User Profiles
- Dynamic / Static IP assign by network
- User pays for **duration** of connection (per minute)
- Suitable for Video, Audio, VoIP, timing critical, applications

**UT**

Server → LAN → 128 kbps streaming → SGSN/GGSN → 128 kbps
Application Specific Connection. Multiple PDPs

- Primary PDP I, Std data
- Secondary PDP II, 128kbps streaming
- Type of connection Shared/NAT
- Controller by User Profiles
- Dynamic / Static IP assign to the "terminal" by network
- User pays for amount of data sent and received (per MB) PDP I. User pays for duration of connection (per minute) PDP II
- A Traffic Flow Template (TFT), made for a dedicated connection, will restrict other traffic types than video on the streaming connection. (A dedicated connection is typical a secondary PDP with a link to a TFT)

- A TFT filter is necessary for requesting a secondary PDP.
The TFT (Traffic Flow Template) is used by the GGSN (Gateway GPRS Support Node) and the UT, to discriminate between different types of traffic (payload).

The TFT incorporates a filter, which discriminates the traffic based on IP address, protocols, ports, and TOS. Using the TFT filters the UT and GGSN maps the incoming traffic into the correct Profile (PDP Context).

Whenever using one or more Secondary Profile (PDP Context), a TFT filter has to be linked to the Profile.
The TFT (Traffic Flow Template) is used by the GGSN (Gateway GPRS Support Node) and the UT, to discriminate between different types of traffic (payload).

The TFT incorporates a filter, which discriminate the traffic based on Dest. IP address, Protocols, Dest. & Source Ports, and TOS.

<table>
<thead>
<tr>
<th>Filter 1</th>
<th>Eval. Prec. Index</th>
<th>Source Address</th>
<th>Subnet Mask</th>
<th>Prot. No.</th>
<th>Dest. Port Range From</th>
<th>Dest. Port Range To</th>
<th>Source Port Range From</th>
<th>Source Port Range To</th>
<th>Type of Service</th>
<th>Type of Service Mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter 2</td>
<td>2</td>
<td>213.83.151.9</td>
<td></td>
<td>17</td>
<td>64535</td>
<td>20</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter 3</td>
<td>3</td>
<td>213.83.151.9</td>
<td>255.255.255</td>
<td>6</td>
<td>1</td>
<td>64535</td>
<td>80</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Whenever using multiple Profile(s) (PDP Contexts), a TFT filer has to be linked to the Profile.

One or more TFTs can be linked to a Profile.

A TFT can be linked more profiles.

Start & Stop of streaming connections

<table>
<thead>
<tr>
<th>ONGOING DATA SESSIONS</th>
<th>ONGOING CALLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard data (161.30.188.143)</td>
<td>(No active calls)</td>
</tr>
</tbody>
</table>

STREAMING PROFILES ON LAN

Start Streaming 64  Start Streaming 128  Start Streaming 256

Traffic Flow Templates

<table>
<thead>
<tr>
<th>Filter 1</th>
<th>Filter 2</th>
<th>Filter 3</th>
<th>Filter 4</th>
<th>Filter 5</th>
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<td></td>
<td></td>
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<td>□</td>
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</tr>
<tr>
<td>□</td>
<td>□</td>
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</table>

LAN profiles

<table>
<thead>
<tr>
<th>PROFILES</th>
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</thead>
<tbody>
<tr>
<td>Primary</td>
<td>Streaming 32</td>
<td>Streaming 64</td>
</tr>
<tr>
<td></td>
<td>Streaming 128</td>
<td>Streaming 256</td>
</tr>
<tr>
<td></td>
<td>User defined 1</td>
<td>User defined 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROFILES</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary</td>
<td>Streaming 32</td>
<td>Streaming 64</td>
</tr>
<tr>
<td></td>
<td>Streaming 128</td>
<td>Streaming 256</td>
</tr>
<tr>
<td></td>
<td>User defined 1</td>
<td>User defined 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROFILE CIDs</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile</td>
<td>cid</td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Streaming 64</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Streaming 128</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Streaming 256</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>
Voice and Data, Circuit Switched

- Standard or Premium Voice
  - 4,0 kbps - 64 kbps
- 3,1 khz audio
  - Fax - Modem
- 64 kbps UDI
  - DUN / RAS
- Only one Circuit switched service at the time
- Do not create a PDP context
- User pays for **duration** of connection (per minute)
Theory of Operation
Overview of the Aero-SB Lite system

The Aero-SB Lite system is a compact, light-weight aeronautical satcom system that uses Inmarsat’s SwiftBroadband services.

The Aero-SB Lite system consists of the following units:

Å ÅTT-5040A SBU (SwiftBroadband Unit)

Å ÅTT-5040A-001 CM (Configuration Module),
   Å inserted in the SBU and holds the SIM card.

Å ÅTT-5016A HLD (High Power Amplifier, Low Noise Amplifier and Diplexer in one unit).
Minimum system

- A minimum working system has at least:
  - One TT-5040A SBU
  - One TT-5040A-001 CM
  - One TT-5016A HLD
  - One IGA or HGA antenna, e.g. the TT-5006A IGA

- The minimum wiring required for an Aero-SB Lite system is described in the section *Minimum system drawing* on page 5-3 of the installation manual.

- The CM, HLD and IGA antenna are powered by the SBU.
Figure 2-1: System configuration with TT-5006A antenna
Communication devices that can be connected to the SBU

The following drawing shows the Aero-SB Lite system with connected communication devices and available options:
The CM is inserted in the SBU and holds all system and user settings for easy replacement of the SBU.

The CM contains a SIM card providing access to the Swift Broadband services.

The CM is delivered with the SIM card installed.

The SIM should never be removed from the CM.
Standard features

- 1 SwiftBroadband channel providing a symmetric 'always on' data connection of up to 332 kbps for IGA and 432 kbps for an HGA.
- Modular design.
- Extremely small, compact and lightweight.
- 3.1 kHz audio (14.4 kbps) for modems, G3 fax, high quality voice etc.
- ISDN voice for Secure communication, G4 fax etc.
- ISDN data for video conferences etc, (only with HGA antenna).
Standard features
(cont)

Â Built-In Router option with six Ethernet interfaces.
Â Web interface for system configuration using the Maintenance connector on the SBU front plate.
Â Built-In Wireless option, WLAN interface (WLAN) IEEE 802.11 b/g.
Â Built-in PBX.
Web interface for configuration

- Use the built-in web interface of the SBU to access the configuration settings in the CM.
- The configuration settings are stored in a write protected area of the CM.
- To change the configuration settings you must connect a PC to the connector marked Maintenance on the SBU front plate.
- You can view the configuration settings from any LAN interface.
FLEEx options: Built-in router and WiFi (WLAN)

- The Aero-SB Lite system offers a built-in router as an option. With this option multiple users and applications can use the system simultaneously.
- The system also offers a built-in WLAN option for wireless communication devices and a WLAN antenna approved for aeronautical use.
PBX telephone exchange

- The built-in PBX telephone exchange unit of the SBU connects
  - Two 2-wire POTS interfaces
    - Faxes, aux phones, headset interface boxes.
  - Two ISDN interface
    - ISDN phones, fax machines or Secure communication
  - 16 VoIP handsets via SIP server & WLAN connection
    - IP Handset, iPhone w SIP client etc.
Applicable Thrane & Thrane model- and part numbers

This Installation Manual is for the Aero-SB Lite system and is applicable to the model- and part numbers below:

<table>
<thead>
<tr>
<th>T&amp;T part number</th>
<th>Model number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>405040A</td>
<td>TT-5040A</td>
<td>SwiftBroadband Unit (SBU) [without CM]</td>
</tr>
<tr>
<td>405040A-001</td>
<td>TT-5040A-001</td>
<td>Configuration Module (CM) for SBU</td>
</tr>
<tr>
<td>405040A-002</td>
<td>TT-5040A-002</td>
<td>Built-In Router Option</td>
</tr>
<tr>
<td>405040A-003</td>
<td>TT-5040A-003</td>
<td>Built-In Wireless Option</td>
</tr>
<tr>
<td>405040A-004</td>
<td>TT-5040A-004</td>
<td>WLAN Antenna, optional (2 pieces recommended)</td>
</tr>
<tr>
<td>405016A</td>
<td>TT-5016A</td>
<td>Aero-SB Lite High Power Amplifier/Low Noise Amplifier/Diplexer (HLD)</td>
</tr>
<tr>
<td>405006A-PMA</td>
<td>TT-5006A</td>
<td>Intermediate Gain Antenna (IGA)</td>
</tr>
<tr>
<td>405621B-THW</td>
<td>TT-5621B</td>
<td>2-Wire Handset (white)</td>
</tr>
<tr>
<td>405621B-THR</td>
<td>TT-5621B</td>
<td>2-Wire Handset (black)</td>
</tr>
<tr>
<td>405622B-THW</td>
<td>TT-5622B</td>
<td>2-Wire Cradle (white)</td>
</tr>
<tr>
<td>405622B-THR</td>
<td>TT-5622B</td>
<td>2-Wire Cradle (black)</td>
</tr>
</tbody>
</table>

Table 2-1: Model and part numbers for the Aero-SB Lite system (T&T units)
Aero-SB Lite Installation
Antennas

AMT-50 HGA

TT-5006A IGA

HGA-6000 HGA

IGA-5001 IGA
IGA or HGA

- The SBU Lite can use either an Intermediate Gain or a High Gain antenna.
- Background data rates can be up to 332Kbp/s with an Intermediate Gain antenna.
- Background data rates can be up to 432Kbp/s with a High Gain antenna.
<table>
<thead>
<tr>
<th></th>
<th>Aviator 200</th>
<th>Aviator 300</th>
<th>Aviator 350</th>
<th>Aviator 700</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inmarsat Class:</strong></td>
<td>Class 15</td>
<td>Class 7</td>
<td>Class 6</td>
<td>Class 6 + Classic H+</td>
</tr>
<tr>
<td><strong>Antenna type:</strong></td>
<td>Low Gain TT-3002A 'Shark fin'</td>
<td>Intermediate Gain TT5006, AMT-3500</td>
<td>High Gain</td>
<td>High Gain</td>
</tr>
<tr>
<td><strong>Services:</strong></td>
<td>SwiftBroadband 200</td>
<td>SwiftBroadband</td>
<td>SwiftBroadband</td>
<td>SwiftBroad /H+</td>
</tr>
<tr>
<td><strong>Bandwidth:</strong></td>
<td>Max. 200 kbps</td>
<td>Max. 332 kbps</td>
<td>Max 432 kbps</td>
<td>Max. 432 kbps</td>
</tr>
<tr>
<td><strong>Max Streaming:</strong></td>
<td>16 kbps</td>
<td>128 kbps</td>
<td>X-Stream</td>
<td>X-Stream</td>
</tr>
<tr>
<td><strong>Coverage:</strong></td>
<td>I4 &gt;20 deg. Elevation</td>
<td>I4 ISDN/3.1K &gt; 45 deg Elevation</td>
<td>I4</td>
<td>I4 (I3 back up S64)</td>
</tr>
<tr>
<td><strong>Cockpit Data:</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Voice:</strong></td>
<td>1 (AMBE-2)</td>
<td>1 AMBE-2, 3.1 kHz</td>
<td>1 AMBE-2, 3.1 kHz, ISDN</td>
<td>3 AMBE-2, 3.1 kHz, ISDN H+</td>
</tr>
<tr>
<td><strong>Fax/STU:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight/Size:</strong></td>
<td>Approx. 6.2 kg</td>
<td>Approx. 7.8 kg</td>
<td>Approx. 10.4 kg (dep. on antenna)</td>
<td>Approx.16.8 kg- 24 kg (dep. on antenna)</td>
</tr>
</tbody>
</table>
TT5006A Intermediate Gain Antenna
<table>
<thead>
<tr>
<th>Type</th>
<th>HGA-8000</th>
<th>T-4220</th>
<th>HGA-7000</th>
<th>AMT-3800</th>
<th>CMC-2102</th>
<th>T-4000</th>
<th>HGA-2100</th>
<th>HGA-6000</th>
<th>HGA-50</th>
<th>Racal</th>
<th>Ball</th>
<th>SatLite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount</td>
<td>Phased Array</td>
<td>Hatch</td>
<td>Phased Array</td>
<td>Hatch</td>
<td>Fuselage</td>
<td>Phased Array</td>
<td>Fuselage</td>
<td>Fuselage</td>
<td>Fuselage</td>
<td>Presided</td>
<td>Fuselage</td>
<td>Mechanically Steered</td>
</tr>
<tr>
<td>Inmarsat Approved</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>T&amp;T Tested</td>
<td>May '05</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Planned</td>
</tr>
<tr>
<td>BSU/ACU</td>
<td>Built into Aero-HSD+</td>
<td>External</td>
<td>Built into Aero-HSD+</td>
<td>External</td>
<td>External</td>
<td>External</td>
<td>Built into Antenna</td>
<td>Built into Antenna</td>
<td>External</td>
<td>External</td>
<td>External</td>
<td>Built into Antenna</td>
</tr>
<tr>
<td>Size</td>
<td>20.5&quot; Dia</td>
<td>6.0&quot; H x</td>
<td>6.0&quot; H x</td>
<td>6.0&quot; H x</td>
<td>6.0&quot; H x</td>
<td>6.0&quot; H x</td>
<td>6.0&quot; H x</td>
<td>6.0&quot; H x</td>
<td>6.0&quot; H x</td>
<td>6.0&quot; H x</td>
<td>6.0&quot; H x</td>
<td>6.0&quot; H x</td>
</tr>
<tr>
<td>Weight</td>
<td>17.7 lbs</td>
<td>35 Lbs</td>
<td>18.7 Lbs</td>
<td>19.8 Lbs</td>
<td>61.5 Lbs</td>
<td>102 Lbs</td>
<td>18 Lbs</td>
<td>4.3 Lbs</td>
<td>7 Lbs</td>
<td>41.8 Lbs</td>
<td>103 Lbs</td>
<td>16.8 Lbs</td>
</tr>
<tr>
<td>Gain</td>
<td>12-16 dBi</td>
<td>12-16 dBi</td>
<td>9-17 dBi</td>
<td>9-17 dBi</td>
<td>12.7 dBi</td>
<td>12 dBi</td>
<td>12.7 dBi</td>
<td>12 dBi</td>
<td>12-17 dBi</td>
<td>12-17 dBi</td>
<td>12-17 dBi</td>
<td>12-17 dBi</td>
</tr>
<tr>
<td>ARINC STD</td>
<td>741</td>
<td>741</td>
<td>741</td>
<td>741</td>
<td>741</td>
<td>741</td>
<td>741</td>
<td>741</td>
<td>741</td>
<td>741</td>
<td>741</td>
<td>781</td>
</tr>
</tbody>
</table>
AERO-SB Lite Antenna
Installation Considerations
Caution: Antenna Radiation

During Transmission, the antenna radiates micro wave energy from all sides. High levels of radio frequency radiation is considered harmful. When transmitting, personnel should stay a minimum of 4 feet from the antenna.
Antenna mounting location
Use ONLY Stainless Steel Non-Magnetic Screws

Breathing Holes

Note 1: Actual hole locations are determined by the drill template which is shipped with the adapter plate. Refer to the installation and wiring section for drill template details.
Ensure that sealant does not obstruct drainage channels
There are 8 breathing channels that must remain unobstructed.
Make sure the GPS is installed with sufficient distance to the antenna.

For requirements to the radiation distance, refer to the manual for the GPS system.

However, always keep the GPS system min. 30 cm (11.8 in) from IGA antennas and min. 50 cm (19.7 in) from HGA antennas.
Satcom filter

- If the GPS antenna for the existing GPS receiver on board the aircraft does not provide sufficient filtering it may be necessary to install a Satcom filter for the GPS antenna.

- Consult GPS manufacture for appropriate filter.
Glonass distance from antenna

• Make sure your Glonass is installed with sufficient distance to the antenna.

• For requirements to the radiation distance, refer to the manual for the Glonass system.

• However, always keep the Glonass system min. 120 cm (47.2 in) from IGA antennas and min. 210 cm (82.7 in) from HGA antennas.
Cables to the antennas

- Be aware that the shorter the cable is, the better the system performance is.
- 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 antenna systems* on page 5-10 and *Recommended cables* on page 5-31 in the installation manual.
Wiring antenna systems

- **Cable losses**

- During installation, write down the cable losses of the RF cables. The cable losses must be registered in the web interface during configuration of the system.

- For further information, see **Configuring the system** on page 6-1 of the installation manual.
# RF cable requirements for TT-5006A antenna system

<table>
<thead>
<tr>
<th>Cable</th>
<th>Min. cable Loss @1.6 GHz</th>
<th>Max. cable Loss@1.6 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1 (SBU Tx to HLDTx)</td>
<td>0 dB</td>
<td>20 dB</td>
</tr>
<tr>
<td>W2 (HLD Rx to SBU Rx)</td>
<td>0 dB</td>
<td>20 dB</td>
</tr>
<tr>
<td>W3 (HLD to antenna)</td>
<td>0 dB</td>
<td>0.7 dB</td>
</tr>
<tr>
<td>W4 (SBU to antenna)</td>
<td>0 dB</td>
<td>17 dB</td>
</tr>
</tbody>
</table>
# Recommended RF cables

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Diameter (mm/ in.)</th>
<th>Minimum bend radius (mm/ in.)</th>
<th>Attenuation (dB/100 ft) @ 1.6 GHz</th>
<th>DC resistance (Ω/100 ft)</th>
<th>W1 a (SBU Tx to HLD Tx)</th>
<th>W2 a (HLD Rx to SBU Rx)</th>
<th>W3 a (HLD to antenna)</th>
<th>W4 a (SBU to antenna, GPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF spec. @1.6 GHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20 dB</td>
<td>20 dB</td>
<td>0.7 dB</td>
<td>17 dB</td>
</tr>
<tr>
<td>DC specification</td>
<td></td>
<td></td>
<td></td>
<td>0.6 Ω</td>
<td>n.a.</td>
<td>n.a.</td>
<td>1.5 Ω</td>
<td></td>
</tr>
<tr>
<td>RG 142</td>
<td>5.0 / 0.2 b</td>
<td>b</td>
<td>18.0</td>
<td>2.2</td>
<td>26 ft (8 m)</td>
<td>112 ft (34 m)</td>
<td>4 ft (1.2 m)</td>
<td>69 ft (21 m)</td>
</tr>
<tr>
<td>RG 400</td>
<td>5.0 / 0.2 b</td>
<td>b</td>
<td>18.0</td>
<td>1.15</td>
<td>52 ft (16 m)</td>
<td>112 ft (34 m)</td>
<td>4 ft (1.2 m)</td>
<td>95 ft (29 m)</td>
</tr>
<tr>
<td>PIC S22089</td>
<td>11.0 / 0.45</td>
<td></td>
<td>63.5 / 2.5</td>
<td>4.8</td>
<td>230 ft (70 m)</td>
<td>417 ft (127 m)</td>
<td>14 ft (4.4 m)</td>
<td>354 ft (108 m)</td>
</tr>
<tr>
<td>PIC S33141</td>
<td>6.9 / 0.27</td>
<td></td>
<td>35.6 / 1.4</td>
<td>8.6</td>
<td>115 ft (35 m)</td>
<td>233 ft (71 m)</td>
<td>8 ft (2.5 m)</td>
<td>197 ft (60 m)</td>
</tr>
<tr>
<td>ECS 310601</td>
<td>11.5 / 0.452</td>
<td></td>
<td>57.4 / 2.26</td>
<td>4.6</td>
<td>436 ft (133 m)</td>
<td>436 ft (133 m)</td>
<td>15 ft (4.6 m)</td>
<td>371 ft (113 m)</td>
</tr>
<tr>
<td>ECS 311201</td>
<td>8.1 / 0.319</td>
<td></td>
<td>40.6 / 1.6</td>
<td>6.7</td>
<td>299 ft (91 m)</td>
<td>299 ft (91 m)</td>
<td>10 ft (3.2 m)</td>
<td>253 ft (77 m)</td>
</tr>
<tr>
<td>ECS 311501</td>
<td>5.8 / 0.228</td>
<td></td>
<td>30.5 / 1.2</td>
<td>9.1</td>
<td>200 ft (61 m)</td>
<td>220 ft (67 m)</td>
<td>8 ft (2.3 m)</td>
<td>187 ft (57 m)</td>
</tr>
<tr>
<td>E MTEQ TLX165 100</td>
<td>4.2 / 0.17</td>
<td></td>
<td>21.6 / 0.85</td>
<td>16.8</td>
<td>69 ft (21 m)</td>
<td>118 ft (36 m)</td>
<td>4 ft (1.3 m)</td>
<td>102 ft (31 m)</td>
</tr>
<tr>
<td>E MTEQ TLX295 100</td>
<td>7.5 / 0.3</td>
<td></td>
<td>40.6 / 1.6</td>
<td>7.6</td>
<td>262 ft (80 m)</td>
<td>262 ft (80 m)</td>
<td>9 ft (2.8 m)</td>
<td>223 ft (68 m)</td>
</tr>
<tr>
<td>E MTEQ TLX480 100</td>
<td>12.2 / 0.48</td>
<td></td>
<td>57.2 / 2.25</td>
<td>4.8</td>
<td>262 ft (128 m)</td>
<td>420 ft (128 m)</td>
<td>15 ft (4.5 m)</td>
<td>358 ft (109 m)</td>
</tr>
</tbody>
</table>

Table 5-21: Recommended RF cables with maximum cable lengths

a. W1, W2, W3 and W4 stand for the cables needed when wiring the TT-5066A IGA, see Wiring TT-5066A IGA on page 5-10.

b. In some applications, the cable type RG142 or RG 400 may be used where strict attenuation requirements are not an issue. Cable specifications may vary depending on the manufacturer.
Mounting considerations Quadrax connector

Be sure the lock-PIN is at its correct place

☆
**WLAN antennas**

- Use WLAN antennas approved for aeronautical use, e.g. the Cabin Dual Band Antenna, part no. 901167-2, from Miltope.

- For best performance, mount the antennas with 8 to 12 cm space between them.

- Make sure the cable loss requirements are met.
AMT-50

TT-5016A
HLD

TT-5040A
SBU

Rx + Tx -> AMT-50 Ant.

AMT-50 Subsystem

AMT-50 ACU

X1 -> TT-5016A

X2 -> TT-5040A

X3 -> TT-5040A

Rx, TP3, BP18, BP12, BP14, BP9
Aero-SB Lite system with TT-5006A IGA

The drawing below shows the Aero-SB Lite system with the TT-5006A IGA.

Figure 2-2: System configuration with TT-5006A IGA
AHRS/IRS
ARINC 429

- The SBU has two ARINC 429 input interfaces for high speed IRS #1 and IRS #2 or high or low speed AHRS #1 and AHRS #2.

- If AHRS is used, a GPS antenna must also be connect

- See IM page 5-18
ARINC-429 for AHRS

Figure 5-5: Wiring AHRS/IRS system
ARINC Labels requires for AHRS

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

<table>
<thead>
<tr>
<th>Label (octal)</th>
<th>Name</th>
<th>Minimum update rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>320</td>
<td>Magnetic heading</td>
<td>10 Hz</td>
</tr>
<tr>
<td>324</td>
<td>Pitch angle</td>
<td>10 Hz</td>
</tr>
<tr>
<td>325</td>
<td>Roll angle</td>
<td>10 Hz</td>
</tr>
<tr>
<td>336</td>
<td>Optional (Pitch rate)</td>
<td>10 Hz</td>
</tr>
<tr>
<td>337</td>
<td>Optional (Roll rate)</td>
<td>10 Hz</td>
</tr>
</tbody>
</table>

Table 5-8: ARINC data format for AHRS
ARINC Labels requires for IRS

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

<table>
<thead>
<tr>
<th>Label (octal)</th>
<th>Name</th>
<th>Minimum Update rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>310</td>
<td>Latitude</td>
<td>1 Hz</td>
</tr>
<tr>
<td>311</td>
<td>Longitude</td>
<td>1 Hz</td>
</tr>
<tr>
<td>312</td>
<td>Ground speed</td>
<td>1 Hz</td>
</tr>
<tr>
<td>313</td>
<td>Track angle</td>
<td>1 Hz</td>
</tr>
<tr>
<td>314</td>
<td>True heading</td>
<td>10 Hz</td>
</tr>
<tr>
<td>324</td>
<td>Pitch angle</td>
<td>10 Hz</td>
</tr>
<tr>
<td>325</td>
<td>Roll angle</td>
<td>10 Hz</td>
</tr>
<tr>
<td>336</td>
<td>Pitch rate (optional)</td>
<td>10 Hz</td>
</tr>
<tr>
<td>337</td>
<td>Roll rate (optional)</td>
<td>10 Hz</td>
</tr>
<tr>
<td>361</td>
<td>Altitude</td>
<td>1 Hz</td>
</tr>
</tbody>
</table>
IRS/AHRS Configuration

- When the system is configured with the web interface, the Configuration Module will contain the information of:
  - IRS or AHRS is installed.
  - IRS/AHRS #1 or #2 or both are installed.
  - ARINC 429 Speed (High or Low).
- If IRS is used, the antenna positioning data is computed from the IRS data alone.
- If AHRS is used, the GPS must provide the SBU with 3D ECEF position and speed.
Built in NRS

Only with TT-5006A
For a system with a TT-5006A IGA in the installation, you can use Built in NRS if IRS or AHRS is not available.
Magnetic environment

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 18 inches (48 cm) 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.
- Use non-magnetic screws and tools for mounting.
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.

• You **must** calibrate the integrated NRS. You **must** repeat the calibration procedure if you:

• Exchange the antenna or if you change the magnetic environment of the aircraft.

• The calibration data is stored in the CM.
Magnetometer calibration procedure

To calibrate the magnetometer do as follows:

1. Find a suitable location where the Aero-SB Lite system can obtain GPS synchronization and where there is sufficient space for the aircraft to complete a 360° turn.

2. Power up all aircraft systems, including the engines. This is to create the aircraft magnetic environment as it would be during flight.

3. Wait until the GPS of the aircraft is operational.

4. Connect a PC with the web interface to the Maintenance connector of the SBU and enter the web interface.
Magnetometer calibration procedure (Cont)

5. From the left navigation pane select SETTINGS > External systems.

6. Enter the section for magnetometer calibration.

7. Click the button Start Calibration to start the calibration procedure.

8. Start turning the aircraft in a 360° circle. Make sure that the turn rate is greater than 1° per second. The time span for one turn should be between 3 and 10 minutes.

9. When the turn is complete, click the button Stop calibration.

10. Click Apply to apply the new settings.
## Thrane & Thrane

### SIGNAL:

<table>
<thead>
<tr>
<th>DASHBOARD</th>
<th>CONNECT</th>
<th>PHONE BOOK</th>
<th>MESSAGES</th>
<th>CALLS</th>
<th>SETTINGS</th>
<th>LAN</th>
<th>WLAN</th>
<th>Phone/Fax</th>
<th>ISDN</th>
<th>Common</th>
<th>IP handsets</th>
<th>Discrete I/O</th>
<th>RF settings</th>
<th>External systems</th>
<th>FLEX</th>
<th>Upload</th>
<th>ADMINISTRATION</th>
</tr>
</thead>
</table>
### ANTENNA
- **Type**: TT-S006A
### NAVIGATIONAL INPUT
- **Navigational input**: IRS, AHRS, NRS
### PRIMARY
- **Connected**: Yes, No
- **Speed**: High, Low
### SECONDARY
- **Connected**: Yes, No
- **Speed**: High, Low
### GPS VOLTAGE
- **GPS voltage**: 0 VDC, 5 VDC, 26 VDC
### MAGNETOMETER CALIBRATION
- **Calibration quality score**: 8
- **Hard iron calibration quality score**: 9

**See IM page 6-39**
Analyzing the magnetometer calibration score

- Having made the magnetometer calibration you must examine the quality of it.
- Use the following table to examine the calibration score:

<table>
<thead>
<tr>
<th>Quality of calibration (first digit)</th>
<th>Hard iron interference factor in percent of the local magnetic field (second digit)</th>
<th>Number of calibrations done (third digit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9: good</td>
<td>9: &lt;10%</td>
<td>“0” means that no calibration has been done and the default values are used.</td>
</tr>
<tr>
<td>8: acceptable</td>
<td>8: &lt;20%</td>
<td>This digit advances in single increments upon the completion of each calibration. After a count of “9” the counter resets to “1”.</td>
</tr>
<tr>
<td>7: marginal</td>
<td>7: &lt;30%</td>
<td></td>
</tr>
<tr>
<td>6-1: unacceptable</td>
<td>6: &lt;40%</td>
<td></td>
</tr>
<tr>
<td>0: complete calibration failure</td>
<td>5: &lt;50%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4: &lt;60%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: &lt;70%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: &lt;80%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1: &lt;90%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0: &gt;90%</td>
<td></td>
</tr>
</tbody>
</table>

Table 6-2: Analysis of the magnetometer calibration score
Temp Specs

See IM page A-1
# SBU DO-160 Specs

<table>
<thead>
<tr>
<th>Conditions</th>
<th>DO-160E</th>
<th>Cat.</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature and Altitude</td>
<td>4.0</td>
<td>A1, F1</td>
<td>Installation in temperature controlled areas and inside or outside pressurized locations.</td>
</tr>
<tr>
<td>Low Temperature</td>
<td>4.5.1 &amp; 4.5.2</td>
<td></td>
<td>Short time operating low is -40°C. Unit is active, but inoperable until the unit temperature is &gt; -30°C. Min. operational temperature is -25°C.</td>
</tr>
<tr>
<td>High Temperature</td>
<td>4.5.3 &amp; 4.5.4</td>
<td></td>
<td>Short time operating high (30 min.): +70°C Max. operating high temperature is +55°C</td>
</tr>
<tr>
<td>In-Flight Loss of Cooling</td>
<td>4.5.5</td>
<td>X</td>
<td>Forced cooling is not required and not recommended.</td>
</tr>
<tr>
<td>Altitude</td>
<td>4.6.1</td>
<td></td>
<td>Max. altitude: 55000 ft</td>
</tr>
<tr>
<td>Decompression</td>
<td>4.6.2</td>
<td></td>
<td>Decompression test at 55000 ft</td>
</tr>
<tr>
<td>Overpressure</td>
<td>4.6.3</td>
<td></td>
<td>Overpressure at -15000 ft</td>
</tr>
<tr>
<td>Temperature Variation</td>
<td>5.0</td>
<td>C</td>
<td>Installation within temperature controlled areas: 2°C/min.</td>
</tr>
<tr>
<td>Humidity</td>
<td>6.0</td>
<td>A</td>
<td>Standard Humidity: 95% relative humidity at 38°C to 50°C for 48 hours. Installation within environmentally controlled zones</td>
</tr>
<tr>
<td>Operational Shocks and Crash Safety</td>
<td>7.0</td>
<td>B</td>
<td>Equipment tested to: Standard operational shock and crash safety.</td>
</tr>
<tr>
<td>Vibration</td>
<td>8.0</td>
<td>S, B2, M</td>
<td>Equipment tested without shock mounts to Category S, Curve B2 and Curve M.</td>
</tr>
<tr>
<td>Explosion Proofness</td>
<td>9.0</td>
<td>E</td>
<td>Not hermetically sealed equipment</td>
</tr>
<tr>
<td>Waterproofness</td>
<td>10.0</td>
<td>X</td>
<td>No test required</td>
</tr>
<tr>
<td>Fluids Susceptibility</td>
<td>11.0</td>
<td>X</td>
<td>No test required</td>
</tr>
</tbody>
</table>

Table B-1: Environmental Qualification Form for SBU
## SBU DO-160 Specs (cont)

<table>
<thead>
<tr>
<th>Conditions</th>
<th>DO-160E</th>
<th>Cat.</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand and Dust</td>
<td>12.0</td>
<td>X</td>
<td>No test required</td>
</tr>
<tr>
<td>Fungus Resistance</td>
<td>13.0</td>
<td>X</td>
<td>No test required</td>
</tr>
<tr>
<td>Salt Spray</td>
<td>14.0</td>
<td>X</td>
<td>No test required</td>
</tr>
<tr>
<td>Magnetic Effect</td>
<td>15.0</td>
<td>Z</td>
<td>Magnetic deflection distance: &lt; 0.3 m</td>
</tr>
<tr>
<td>Power Input</td>
<td>16.0</td>
<td>AB</td>
<td>Power supply: +28 V DC</td>
</tr>
<tr>
<td>Voltage Spike</td>
<td>17.0</td>
<td>A</td>
<td>Power supply: +28 V DC</td>
</tr>
<tr>
<td>Audio Susceptibility</td>
<td>18.0</td>
<td>RB</td>
<td>Power supply: +28 V DC</td>
</tr>
<tr>
<td>Induced Susceptibility</td>
<td>19.0</td>
<td>ZC</td>
<td>Equipment intended for operation in systems where interference-free operation is required.</td>
</tr>
<tr>
<td>Radio Frequency Susceptibility</td>
<td>20.0</td>
<td>RR</td>
<td>High Intensity Radiated Field (HIRF) associated with normal environment.</td>
</tr>
<tr>
<td>Emission of Radio Frequency</td>
<td>21.0</td>
<td>M</td>
<td>Installation in areas with significant electromagnetic apertures.</td>
</tr>
<tr>
<td>Energy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lightning Induced Transient</td>
<td>22.0</td>
<td>A3</td>
<td>33</td>
</tr>
<tr>
<td>Susceptibility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lightning Direct Effects</td>
<td>23.0</td>
<td>X</td>
<td>No test required</td>
</tr>
<tr>
<td>Icing</td>
<td>24.0</td>
<td>X</td>
<td>No test required</td>
</tr>
<tr>
<td>Electrostatic Discharge ESD</td>
<td>25.0</td>
<td>A</td>
<td>Operation, installation and repair in an aerospace environment.</td>
</tr>
<tr>
<td>Fire, Flammability</td>
<td>26.0</td>
<td>C</td>
<td>Installation in non-fire zone</td>
</tr>
</tbody>
</table>

Table B-1: Environmental Qualification Form for SBU (Continued)
## HLD DO-160 Specs

<table>
<thead>
<tr>
<th>Conditions</th>
<th>DO-160E</th>
<th>Cat.</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature and Altitude</td>
<td>4.0</td>
<td>A2, F2</td>
<td>Installation in non-temperature controlled locations and inside or outside pressurized locations.</td>
</tr>
<tr>
<td>Low Temperature</td>
<td>4.5.1 &amp; 4.5.2</td>
<td></td>
<td>Min. operational temperature is -55°C. Short time operating low is -55°C.</td>
</tr>
<tr>
<td>High Temperature</td>
<td>4.5.3 &amp; 4.5.4</td>
<td></td>
<td>Max. operating high temperature: +70°C. Short time operating high: +70°C.</td>
</tr>
<tr>
<td>In-Flight Loss of Cooling</td>
<td>4.5.5</td>
<td>X</td>
<td>Forced cooling is not required and not recommended.</td>
</tr>
<tr>
<td>Altitude</td>
<td>4.6.1</td>
<td></td>
<td>Max. altitude: 55000 ft.</td>
</tr>
<tr>
<td>Decompression</td>
<td>4.6.2</td>
<td></td>
<td>Decompression at 55000 ft.</td>
</tr>
<tr>
<td>Overpressure</td>
<td>4.6.3</td>
<td></td>
<td>Overpressure at -15000ft.</td>
</tr>
<tr>
<td>Temperature Variation</td>
<td>5.0</td>
<td>B</td>
<td>Installation within controlled temperature locations: 5°/min.</td>
</tr>
<tr>
<td>Humidity</td>
<td>6.0</td>
<td>B</td>
<td>Severe Humidity: 95% relative humidity at 38°C to 65°C for 240 hours. Installation within environmentally controlled zones.</td>
</tr>
<tr>
<td>Operational Shocks and Crash Safety</td>
<td>7.0</td>
<td>B</td>
<td>Equipment tested to: Standard operational shocks and crash safety.</td>
</tr>
<tr>
<td>Vibration</td>
<td>8.0</td>
<td>SCL</td>
<td>Fixed wing turbojet &amp; turboprop/fuselage zone: Category S, Curve C &amp; L.</td>
</tr>
<tr>
<td>Explosion Proofness</td>
<td>9.0</td>
<td>E</td>
<td>Not hermetically sealed equipment.</td>
</tr>
<tr>
<td>Conditions</td>
<td>DO-160E</td>
<td>Cat.</td>
<td>Comments</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>---------</td>
<td>------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Power Input</td>
<td>16.0</td>
<td>X</td>
<td>No test required (power from SBU).</td>
</tr>
<tr>
<td>Voltage Spike</td>
<td>17.0</td>
<td>X</td>
<td>No test required (power from SBU).</td>
</tr>
<tr>
<td>Audio Frequency</td>
<td>18.0</td>
<td>X</td>
<td>No test required (power from SBU).</td>
</tr>
<tr>
<td>Conducted Susceptibility - Power Inputs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Induced Signal Susceptibility</td>
<td>19.0</td>
<td>ZC</td>
<td>Equipment intended for operation in systems where interference-free operation is required.</td>
</tr>
<tr>
<td>Radio Frequency Susceptibility</td>
<td>20.0</td>
<td>RR</td>
<td>High Intensity Radiated Field (HIRF) associated with normal environment.</td>
</tr>
<tr>
<td>Emission of Radio Frequency Energy</td>
<td>21.0</td>
<td>M</td>
<td>Installation in areas with significant electromagnetic apertures.</td>
</tr>
<tr>
<td>Lightning Induced Transient Susceptibility</td>
<td>22.0</td>
<td>A3J33</td>
<td>Equipment and wiring in moderately exposed environment in an all metal airframe.</td>
</tr>
<tr>
<td>Lightning Direct Effects</td>
<td>23.0</td>
<td>X</td>
<td>No test required.</td>
</tr>
<tr>
<td>Icing</td>
<td>24.0</td>
<td>X</td>
<td>No test required.</td>
</tr>
<tr>
<td>Electrostatic Discharge (ESD)</td>
<td>25.0</td>
<td>A</td>
<td>Operation, installation and repair in an aerospace environment.</td>
</tr>
<tr>
<td>Fire, Flammability</td>
<td>26.0</td>
<td>C</td>
<td>Installation in non-fire zone.</td>
</tr>
</tbody>
</table>

Table B-2: Environmental Qualification Form for HLD (Continued)
Configuration Module
Purpose and function of the CM

- The CM is inserted in the back of the SBU and holds all system and user settings for easy replacement of the SBU.
- The CM contains a SIM card providing access to the Swift Broadband services.
- The CM is delivered with the SIM card installed.
- Antenna calibration data is stored in the CM.
- Configuration Data is stored in the CM.
- The CM Must be removed and retained with the aircraft in the event an SBU is returned for service.
Handsets
Description of 2-wire interfaces #1 and #2

• The SBU has two 2-wire Voice/Fax/Modem POTS interfaces connected to the internal 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.
Two Wire Ports
2-Wire Handsets

Thrane 2W
ICG DECT cordless
Sigma-7
PTA-12
New T&T VoIP handset

- Large Colour display
- Noise Cancellation
- Wireless (WiFi)
- Configuration via Web interface
Thrane Cordless IP Handset (WIFI)
External PBX

An external PBX can be connected to the SBU utilizing the two wire ports if more handsets are desired.
Aerocom 1100 to Thrane and Thrane Aero-SB Lite Satcom System

Thrane and Thrane Aero-HSD+ System

2-Wire CO 1
2-Wire CO 2

Aerocom 1100

Inmarsat Satellite

Earth Station

2-Wire Phones

Sigma 7 Phones

DECT Cordless Phones

Jetphones

Terrestrial Telephone Network

Fax

Up to Eight 2-wire Phones and Two 4-wire Phones may be connected to the Aerocom 1100 CTU
Aerocom-3000 CTU
Option Features

- Two or four channels of Iridium Voice
- Options: Airshow update, AFIS or fax
- CTR has built in Wi-Fi and router functions
- CTR & SBU have DHCP enabled, and the DHCP in the ST4200 is disabled.
- In this configuration, Swift Broadband system provides Data only (No Voice)
Iridium Band Reject Filter (IBRF)
Description of the problem

Å Iridium is being jammed by Inmarsat Satcom systems active on the same aircraft.

Å Two problems:

1. Iridium does not have enough filtering to protect its receiver from "seeing" the Inmarsat transmit carrier. Iridium LNA saturates and the received signal degrades.

2. Inmarsat systems are transmitting unwanted (legal) out-of-band noise. Some of this noise falls in the Iridium band, and increases the noise seen by the Iridium receiver.

Å Whichever problem is worse, dictates the lower limit for the distance between Inmarsat and Iridium antennas
Iridium/Inmarsat spectrum

Inmarsat Tx at Iridium terminal

Iridium susceptibility

-200
-150
-100
-50
0
50
1615,00 1625,00 1635,00 1645,00 1655,00

Iridium Rx/Tx

1626.5

1660.5
### Result summary

<table>
<thead>
<tr>
<th>Antenna Type</th>
<th>Voice Quality Affected</th>
<th>Call Lost/Call Setup not Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IGA antenna</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test carrier (100% duty)</td>
<td>42m</td>
<td>29m</td>
</tr>
<tr>
<td>and noise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real life test</td>
<td>25m</td>
<td>16m</td>
</tr>
<tr>
<td>(background data)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HGA antenna (tail mount)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test carrier (100% duty)</td>
<td>&gt;100m</td>
<td>80m</td>
</tr>
<tr>
<td>and noise</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Iridium + Inmarsat Issue: Revolutionary Filter

The problem:
- No safety band between the Inmarsat transmit and the Iridium receive bands.
- The Inmarsat system can saturate the Iridium receiver.

The solution:
- Remove the noise from the Inmarsat transmit signal.

Unique Thrane & Thrane solution!
Conclusion

- Noise problem is a little bit worse than carrier problem.

- To ensure good Iridium performance, two filters are required.
  - A SATCOM filter on the Iridium terminal
  - An Iridium filter in the Inmarsat system

- Filters are required for IGA and HGA installations.
Aero-SB Lite Configuration & use
Minimum configuration

- Select antenna type and Nav source (Ext system page, IM sec 6.6.11)
- Set Antenna offset and cable loss (RF Settings page IM sec 6.6.10)
- Set APN and Profiles (Network User Group page IM sec 6.7.2)
External systems

Thrane & Thrane

**SIGNAL:**

**DASHBOARD**
**CONNECT**
**PHONE BOOK**
**MESSAGES**
**CALLS**
**SETTINGS**
**LAN**
**WLAN**
Phone/Fax
ISDN
Common
IP handsets
Discrete I/O
RF settings
External systems
**FLEX**

**ANTENNA**

Type

**NAVIGATIONAL INPUT**

Navigational input

**PRIMARY**

Connected
Speed

**SECONDARY**

Connected
Speed

**GPS VOLTAGE**

GPS voltage

Selecting an incorrect GPS voltage may damage the antenna

Apply | Cancel

**MAGNETOMETER CALIBRATION**

No calibration

Start | Stop | Cancel | Refresh
## Network User Group

### Network User Groups

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>Internet connection</th>
<th>Automatic activation</th>
<th>Edit</th>
</tr>
</thead>
<tbody>
<tr>
<td>bridge maintport</td>
<td>Enabled</td>
<td>Bridge mode</td>
<td>Enabled</td>
<td></td>
</tr>
<tr>
<td>Group 1</td>
<td>Disabled</td>
<td>Router mode</td>
<td>Enabled</td>
<td>Edit</td>
</tr>
<tr>
<td>Group 2</td>
<td>Disabled</td>
<td>Router mode</td>
<td>Enabled</td>
<td>Edit</td>
</tr>
<tr>
<td>Group 3</td>
<td>Disabled</td>
<td>Router mode</td>
<td>Enabled</td>
<td>Edit</td>
</tr>
<tr>
<td>Group 4</td>
<td>Disabled</td>
<td>Router mode</td>
<td>Enabled</td>
<td>Edit</td>
</tr>
<tr>
<td>Group 5</td>
<td>Disabled</td>
<td>Router mode</td>
<td>Enabled</td>
<td>Edit</td>
</tr>
<tr>
<td>Group 6</td>
<td>Disabled</td>
<td>Router mode</td>
<td>Enabled</td>
<td>Edit</td>
</tr>
<tr>
<td>Group 7</td>
<td>Disabled</td>
<td>Router mode</td>
<td>Enabled</td>
<td>Edit</td>
</tr>
<tr>
<td>Group 8</td>
<td>Disabled</td>
<td>Router mode</td>
<td>Enabled</td>
<td>Edit</td>
</tr>
<tr>
<td>Default group</td>
<td>Enabled</td>
<td>Router mode</td>
<td>Enabled</td>
<td>Edit</td>
</tr>
</tbody>
</table>

### SETTINGS

1. Port Forwarding
2. Network devices
3. Network classification
4. Network user groups
The web interface

What is the web interface?

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

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

Internet Explorer 6.0, Mozilla Firefox 1.0 and Apple Safari 2.0 were tested successfully with the web interface. You may be able to use other browser versions as well.
Connecting to the SBU

- Connect your computer to the terminal, using the LAN interface.
- Open your internet browser and go to: http://192.168.0.1 (default)
Use `ipconfig` to find default gateway.
Browser settings

Å If you are connecting your computer using the LAN interface, the Proxy server settings in your browser must be disabled before accessing the web interface.

Å 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.

Å Consult your browser help for information.

Å To disable the use of a Proxy server completely, do as follows:
1. In Microsoft Internet Explorer, select: **Tools > Internet Options > Connection > LAN Settings.**

2. Uncheck the box labeled **Use a proxy server for your LAN.**

3. Click **OK.**

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

Å If the IP address is changed and you do not have the new address, you can temporarily set the IP address to the default value by:

Å Pressing the **Reset** button next to the Ethernet jack under the front connector panel of the terminal. You can then access the web interface and change the IP address.

Å **Note** that if you do not change the IP address, the default IP address will only be valid until the terminal is powered off. Then the terminal returns to the IP address from before the Reset button was pressed.
# Using the Dashboard

![Dashboard Image](image.png)

## Signal:

<table>
<thead>
<tr>
<th>Property</th>
<th>Status</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satellite</td>
<td>Auto</td>
<td>3.1 kHz audio inbound 08:30:00</td>
</tr>
<tr>
<td>GPRS activation</td>
<td>Acquiring</td>
<td>Standard voice outbound 08:45:06</td>
</tr>
<tr>
<td>Call Status</td>
<td>Streaming</td>
<td>3.1 kHz audio inbound 08:30:00</td>
</tr>
<tr>
<td>Call Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Call Duration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Settings:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit serial number</td>
<td>05746519</td>
<td>Standard data 0.00 MB</td>
</tr>
<tr>
<td>MAC address</td>
<td>00:11:CF:01:12:84</td>
<td>Streaming 128 kbps 19:08:00</td>
</tr>
<tr>
<td>Antenna</td>
<td>FRRSS (Sky scan)</td>
<td>Streaming 256 kbps 00:00:00</td>
</tr>
</tbody>
</table>

## Ongoing Data Sessions:

<table>
<thead>
<tr>
<th>Session Type</th>
<th>Status</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streaming</td>
<td>32 kbps</td>
<td>00:00:00</td>
</tr>
<tr>
<td>Streaming</td>
<td>44 kbps</td>
<td>00:00:00</td>
</tr>
</tbody>
</table>

## Ongoing Calls:

<table>
<thead>
<tr>
<th>Call Type</th>
<th>Status</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streaming</td>
<td>128 kbps</td>
<td>19:08:00</td>
</tr>
<tr>
<td>Streaming</td>
<td>256 kbps</td>
<td>00:00:00</td>
</tr>
</tbody>
</table>
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 system.

Status. The status of the terminal and antenna.

Examples of status information are: Scanning, Ready and Data active.

Satellite selection. The satellite selected for logon.

Unit serial number. The serial number of the terminal.
**Properties cont.**

**Software version.** The version of the software embedded in the terminal.

**Local IP address.** The local IP address of the terminal. This is the IP address used to access the terminal from a device connected to the terminal.

**IMEI number.** The IMEI number (International Mobile Equipment Identity) of the terminal. This is a unique number that identifies your terminal.

**MAC address** for the LAN interface in the terminal.

**Antenna.** The type of antenna connected to the terminal, and the status of the antenna.
Managing data sessions
Overview

Data sessions are displayed under PROFILES ON LAN or STREAMING PROFILES ON LAN at the bottom of the Dashboard.
Primary profiles are listed in the left side and secondary profiles (if any) are listed to the right.

Profiles that are currently active are displayed as a link with the text "Stop <name of profile>".

Profiles that are ready to be activated are displayed as a link with the text "Start <name of profile>".
Start/stop a Streaming session on the LAN interface

- **Note** Before starting a Streaming session, make sure you have set up a Streaming profile for your user group in the SETTINGS > LAN > Network user groups page.

- **Note** that if another primary profile is active you must stop it before you can start your new profile!

- **Important** If you have selected a Streaming connection as your primary profile, the LAN interface will be running a Streaming connection until you stop it or disconnect the interface. However, if you select one or more secondary profiles, you can set up your traffic flow filter so that it will only use the Streaming profile for certain types of traffic.
To start or stop a Streaming session

To start or stop a Streaming session, click the link with the name of your Streaming profile under STREAMING PROFILES ON LAN.
Start/stop Standard data on the LAN interface

By default, Standard data is always activated on the terminal. If you only want Standard data to be activated when you have specifically enabled it, you can disable automatic activation using the SETTINGS > LAN > Network user groups page.
Setting up the interfaces

1. From the left navigation pane, select SETTINGS > LAN.
Setting up the interfaces Cont.

2. At **DHCP status**, select **Enabled** (recommended), or **Disabled**.
   - If you select **Enabled**, the terminal assigns dynamic IP addresses to devices connected to the terminal.
   - If you select **Disabled**, you need to set up a static IP address in the connected device.

3. Type in the **Local IP address** and the **Netmask**.
   - The Local IP address is the IP address used for accessing the web interface.

4. Click **Apply**.
Port forwarding

- Port forwarding enables you to set up a server connected to the terminal while the terminal is in Router mode. Without port forwarding it would not be possible to contact the server from the internet.

- 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 **LAN > Port forwarding** in the left navigation pane.
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**.

Å You can now access the mail server from the Internet, using the external IP address of the terminal.
Configuring the Phone/Fax interface

1. Select SETTINGS > Phone/Fax from the left navigation pane.
Configuring the Phone/Fax interface cont.

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

**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 e.g. Standard, the Phone/Fax interface 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.

Note, however, that fax machines and modems must use 3.1 kHz Audio.
Configuring the Phone/Fax interface cont.

- **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.

3. Click **Apply**.
Configuring the ISDN interface

To configure the ISDN interface, do as follows:

1. Select **SETTINGS > ISDN**.
Configuring the ISDN interface cont.

2. Set the call type(s) for incoming calls.

You can select Standard, 3.1 kHz Audio, UDI 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 numbers that are to be assigned to each call type.
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.
Important If you set an MSN number to anything other than <None>, connected devices must be programmed with these MSN numbers.

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.
Configuring the ISDN interface cont.

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 not be influenced by this setting.

5. Click **Apply**.

**Note** You can override the call type setting for outgoing calls by dialing one of the following prefixes before the number:
- Å1* (force the call to Standard)
- Å2* (force the call to 3.1 kHz Audio)
Setting the common interface settings

The common APN (Access Point Name)

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 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.
The common APN cont.

To set up the common interface settings, Do as follows:

1. Select SETTINGS > Common.
2. Select the **APN**. You have the following options:

**ÅSIM default.** The APN is taken from the SIM card located inside of the configuration Module. This is the recommended option, unless you have special requirements.

**ÅNetwork assigned.** The APN is assigned from the network.

**ÅUser defined.** Type in the APN. APNs are provided from the Airtime Provider.
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**, your 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 groups, the setting will automatically be updated when the Common APN is changed.
Setting up call services overview

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

- Call forwarding
- Call barring
- Call waiting
- Line identification
- Closed user group

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.
Setting up the network user groups

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 user group.

Certain settings are locked, to make sure there is always one functional user group available. For example, the Default user group does not allow you to select a Bridge mode connection.

Note The network user groups cannot be deleted. 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

Do as follows:

1. Select **SETTINGS > Network user groups**.

When you are prompted, enter the Administrator user name and password. The default user name is **admin** and the default password is **1234**.
2. Click **Edit** next to the user group you want to set up.

<table>
<thead>
<tr>
<th>SETTINGS</th>
<th>NETWORK USER GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dashboard</td>
<td>Name: Group 6</td>
</tr>
<tr>
<td>Calls</td>
<td>Status: Enabled</td>
</tr>
<tr>
<td>Messages</td>
<td>Internet connection: router mode</td>
</tr>
<tr>
<td>Calls</td>
<td>Changes to Status and Internet connection only take effect after reboot</td>
</tr>
<tr>
<td>Settings</td>
<td>TCP/IP</td>
</tr>
<tr>
<td>Satellite selection</td>
<td>Dynamic IP address:</td>
</tr>
<tr>
<td>Administration</td>
<td>Static IP address:</td>
</tr>
<tr>
<td>Modem</td>
<td>IP Interface settings: Enabled Disabled</td>
</tr>
<tr>
<td>Common</td>
<td>APN</td>
</tr>
<tr>
<td>IP handle</td>
<td>Common</td>
</tr>
<tr>
<td>Upload</td>
<td>From default</td>
</tr>
<tr>
<td>Satellite selection</td>
<td>Network assigned</td>
</tr>
<tr>
<td>Network classification</td>
<td>User defined</td>
</tr>
<tr>
<td>Users</td>
<td>User name:</td>
</tr>
<tr>
<td>Password</td>
<td></td>
</tr>
<tr>
<td>Profiles</td>
<td>Automatic activation: Enabled Disabled</td>
</tr>
<tr>
<td>Helpdesk</td>
<td></td>
</tr>
<tr>
<td>Site map</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Streaming 120</td>
</tr>
<tr>
<td></td>
<td>User-defined 3</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
</tr>
<tr>
<td></td>
<td>Streaming 120</td>
</tr>
<tr>
<td></td>
<td>Streaming 256</td>
</tr>
<tr>
<td></td>
<td>User-defined 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROFILES</th>
<th>Edit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Streaming 256</td>
</tr>
<tr>
<td></td>
<td>Streaming 120</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply/Cancel</td>
<td></td>
</tr>
</tbody>
</table>
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 terminal will make the necessary address translations. Use this mode if one or more computers are connected using the LAN interface, and the terminal should act as a router.

**Bridge mode** is an exclusive connection, with NAT disabled. Use this mode together with a network classification entry that selects a single computer. This mode is not available in the Default 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.
Editing a network user group cont.

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 terminal 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 BGAN network.
**Editing a network user group cont.**

7. Set **IP Header compression** to **Enabled** or **Disabled**.

8. Select the source of the **APN** (Access Point Name).

   There are four options for setting the APN. Unless you have special requirements, it is recommended to use the SIM default, or to set the common APN to SIM default, and then select Common here. 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” in the previous slides.
Editing a network user group cont.

**ÅSIM 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.

**ÅNetwork assigned.** The APN is assigned from the network.

**ÅUser defined.** Type in the APN. APNs are provided from the Airtime 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 step 6 above.
10. At **Automatic activation** select whether the profile selected in the next step should be activated automatically or manually.

- **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 4 predefined profiles in the AERO SBU:

  * Standard, Streaming 32 kbps, Streaming 64 kbps and Streaming 128 kbps.

* Additionally, you can define your own custom profiles.
Editing a network user group cont.

Important: If you have selected a Streaming connection as your primary profile, the LAN interface will be running a Streaming connection until you stop it or disconnect the interface. However, if you select one or more secondary profiles, you can set up your traffic flow filter so that it will only use the Streaming profile for certain types of traffic.

For further information on profiles and traffic flow filters, see Using profiles in the users manual.
Editing a network user group cont.

12. Select the **Secondary profile**.

- To select more than one secondary profile, press and hold **Ctrl** or **Shift** while selecting.

- The Context Identifiers (CID) for the selected primary and secondary profiles are listed under **Profile CID**s.

13. Click **Apply**.
Managing network devices

- A network device, in this context, is an Ethernet hardware device, identified by a unique MAC address.

- When a network device with dynamic IP address is connected to the terminal, it is automatically listed in the Network devices list.
Viewing the list of network devices

To view the list of network devices, select **SETTINGS > Network devices**.

All network devices that have been connected to the terminal are listed here.

<table>
<thead>
<tr>
<th>Device</th>
<th>IP Address</th>
<th>MAC Address</th>
<th>Delete Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locked IP Addresses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>192.168.11.4</td>
<td>00:18:F8:09:09:09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>192.168.11.11</td>
<td>00:10:F8:09:BF:0A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>192.168.11.12</td>
<td>00:18:F8:09:09:0C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Network Devices</th>
<th>IP Address</th>
<th>MAC Address</th>
<th>Device Name</th>
<th>Delete Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.11.4</td>
<td>00:18:F8:09:BD:D4</td>
<td>device-0</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.1</td>
<td>00:18:F8:09:09:06</td>
<td>device-1</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.2</td>
<td>00:18:F8:09:09:07</td>
<td>device-2</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.3</td>
<td>00:18:F8:09:09:08</td>
<td>device-3</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.4</td>
<td>00:18:F8:09:09:09</td>
<td>device-4</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.5</td>
<td>00:18:F8:09:09:OA</td>
<td>device-5</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.6</td>
<td>00:18:F8:09:BF:07</td>
<td>device-6</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.7</td>
<td>00:18:F8:09:BF:06</td>
<td>device-7</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.8</td>
<td>00:18:F8:09:BE:07</td>
<td>device-8</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.9</td>
<td>00:18:F8:09:BF:03</td>
<td>device-9</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.10</td>
<td>00:18:F8:09:0A:07</td>
<td>device-10</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.11</td>
<td>00:18:F8:09:BF:0A</td>
<td>device-11</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
<tr>
<td>192.168.11.12</td>
<td>00:18:F8:09:09:0C</td>
<td>device-12</td>
<td>[Lock ip to mac address]</td>
<td></td>
</tr>
</tbody>
</table>
Locking an IP address to a MAC address

- When the device is locked to an IP address, the terminal will always assign this IP address to the MAC address of this device (if DHCP is enabled and the Internet connection is not a Bridge mode connection).

- **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.

- **To unlock a device from the IP address**, click **Delete** next to the device in the **LOCKED IP ADDRESSES** list.
Using the network classification table

The network classification table is used for making an association between network devices and 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 terminal 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 terminal establishes a PDP context and the device is ready for use with the terminal.
Adding or editing an entry in the network classification table

To add a new entry to the table or to edit an existing entry, do as follows:

1. Select **SETTINGS > Network classification table**.
**Adding or editing an entry in the network classification table cont.**

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.

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

3. Click **Add** next to a network device you want to use, or type in the MAC address manually at the top of the page.

4. Select the **LAN port** and **Network user group** you want to associate with the device.

5. 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

To change the priority of an entry, click the up or down arrow next to the entry.
Changing the priority in the network classification table cont.

• 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 user group assigned to that entry.

• The Default user group is always last, so it is only used if none of the other entries match the properties of the connected device.
Å This presentation is intended to be used as a basic training aid only.

Å There are other configuration considerations that will need to be entered such as antenna types, handset types, Programmed cable losses, as well as Navigation sources; depending on whether AHRS, IRS or NRS is connected.

Å Those additional considerations will be discussed in greater detail in the installation and users manuals for the AERO-SB Lite.
Thrane SIP Handset Configuration
IP Handset Installation and Configuration
Features

- Voice communications over IP based network
- Stored contact list with up to 100 entries
- Built-in web interface (Windows CE 6.0)
- Color TFT screen (Thin-film transistor)
- Menu options for SBB terminals
- SIP to low cost voice or SIP to ground
Getting started with the wireless IP handset
Providing external power to the cradle

- The cradle serves as a charger when it is connected to a external power source
- 12-24 V DC, 7 Watts
- Connect Power Source to J101
- Ensure cable relief matches size of the cable
Handset Keypad

- Keypad is used to navigate menu systems
- In number mode you get the number of the key pressed. Only * has two functions
  - Press * once: The display shows *
  - Press * twice, or press and hold: The display shows +
- In text mode the * switches between numeric, lowercase and uppercase characters
Configuring the terminal for a SIP handset

- Connect to the SBB Lite via any of the ethernet ports
- Browse to the terminal IP address. (Default is 192.168.0.1)
- Select Settings\IP handsets
- Select new from the actions column.
# Configuring the terminal for a SIP handset

<table>
<thead>
<tr>
<th>Entry</th>
<th>Number</th>
<th>Handset password</th>
<th>Actions</th>
<th>Configure handset</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0501</td>
<td>1234</td>
<td>Edit/Delete</td>
<td>Not active</td>
</tr>
<tr>
<td>2</td>
<td>0502</td>
<td>1234</td>
<td>Edit/Delete</td>
<td>Not active</td>
</tr>
<tr>
<td>3</td>
<td>0503</td>
<td>503</td>
<td>Edit/Delete</td>
<td>Not active</td>
</tr>
<tr>
<td>4</td>
<td>0504</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>5</td>
<td>0505</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>6</td>
<td>0506</td>
<td>506</td>
<td>Edit/Delete</td>
<td>Not active</td>
</tr>
<tr>
<td>7</td>
<td>0507</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>8</td>
<td>0508</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>9</td>
<td>0509</td>
<td></td>
<td>New</td>
<td>Not active</td>
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<tr>
<td>10</td>
<td>0510</td>
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<tr>
<td>11</td>
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<td>Not active</td>
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<tr>
<td>12</td>
<td>0512</td>
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<tr>
<td>13</td>
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<tr>
<td>14</td>
<td>0514</td>
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<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>15</td>
<td>0515</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>16</td>
<td>0516</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
</tbody>
</table>

**IP handsets**

- Call settings
- Discrete I/O
- RF settings
- External systems

---

**SIGNAL:**

- - - - -

---
Enter a 4 character unique password

Select the "save" tab.

You will need to remember the password and handset ID number. This information will be entered into the Thrane IP Handset to complete setup.
Configuring the terminal for SIP handset continued

<table>
<thead>
<tr>
<th>Number</th>
<th>Handset password</th>
<th>Actions</th>
<th>Configure han</th>
</tr>
</thead>
<tbody>
<tr>
<td>0501</td>
<td>1234</td>
<td>Edit/Delete</td>
<td>Not active</td>
</tr>
<tr>
<td>0502</td>
<td>1234</td>
<td>Edit/Delete</td>
<td>Not active</td>
</tr>
<tr>
<td>0503</td>
<td>503</td>
<td>Edit/Delete</td>
<td>Not active</td>
</tr>
<tr>
<td>0504</td>
<td>password</td>
<td>Save entry</td>
<td>Not active</td>
</tr>
<tr>
<td>0505</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>0506</td>
<td>506</td>
<td>Edit/Delete</td>
<td>Not active</td>
</tr>
<tr>
<td>0507</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>0508</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>0509</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>0510</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>0511</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>0512</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
<tr>
<td>0513</td>
<td></td>
<td>New</td>
<td>Not active</td>
</tr>
</tbody>
</table>
The first step is to connect to the SBB Lite wireless connection.

Ensure the system is powered on and the proper flex key is entered to allow for Wi-Fi.

From the Phone menu select network\wireless network.

A list appears with wireless access points within reach.

- Means the handset already has a profile for this access point
- Means access point uses encryption
- Means access point does not use encryption
• If you are using encryption and it is the first time you connect, you will be prompted for security settings.

• Select OK to enter the profile settings

• Enter the required security settings based on the setup of the SBB Lite
  1. WEP
  2. WPA-PSK-TKIP
  3. WPA2-PSK-AES
  4. No Security
Making a Call with the SIP Handset

- Ensure the status field shows "Ready"
- Dial the required prefix and number. Remember to include country code
  1. 00 = Refer to call routing in the terminal
  2. 1* = Standard Voice Call
  3. 2* = 3.1kHz Audio Call
- To place a call from the contacts list press the right select key from the main menu and move to the contact you want to call. Then press the off hook key
- To place a call from the recent call list (incoming, outgoing and missed) press from the main screen. Press again to call the number
Receiving a call with the SIP handset

- On an inbound call, the phone will display the caller's ID if known.
- Answer the call by pressing the off hook key (on hook symbol) or by removing the handset from the cradle.
- If the handset is in the cradle while you answer the call, the mode will automatically be hands-free.
- To end a call, select the hang up symbol.
By Default all handsets connected to the terminal will ring on incoming calls

Dial +870<Mobile Number>

Refer to the information provided with your airtime subscription for mobile numbers

There are two voice numbers, One for Standard Voice and one for 3.1kHz audio
The display has a night mode for operation in low light areas. In night mode, the colors are changed to make the display more suitable for night operation.

Select options \night mode
VIP Passenger Requirements

- Web Browsing Using Background Data
- Video Conference Using 32k QOS
- End To End VoIP call (Cisco, Skype, Soft Phone etc.) Using 16k QOS
Create Network User Group

**NETWORK USER GROUP**

- **Name**: VIP User
- **Status**: Enabled
- **Internet connection**: Router mode

*Changes to Status and Internet connection only take effect after reboot*

**TCP/IP**

- **Dynamic IP address**
- **Static IP address**: [Input field]
- **IP Header compression**: Enabled

**APN**

- **Common**
- **SIM default**
- **Network assigned**
- **User defined**: bgan.inmarsat.com

**User name**: [Input field]
**Password**: [Input field]
# Create Network User Group

## PROFILES

**Automatic activation**
- Enabled
- Disabled

### Primary
- Standard
- Streaming 8
- Streaming 16
- Streaming 32
- Streaming 64
- Streaming 128
- Video Conference
- VoIP Call
- User defined 3

### Secondary
- Standard
- Streaming 8
- Streaming 16
- Streaming 32
- Streaming 64
- Streaming 128
- Video Conference
- VoIP Call
- User defined 3

## PROFILE CIDS

<table>
<thead>
<tr>
<th>Profile</th>
<th>Cid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>1</td>
</tr>
<tr>
<td>Streaming 16</td>
<td>11</td>
</tr>
</tbody>
</table>

[Apply] [Cancel]
Create Network Class

<table>
<thead>
<tr>
<th>SIGNAL:</th>
</tr>
</thead>
</table>

### DASHBOARD

### CONNECT

### PHONE BOOK

### MESSAGES

### CALLS

### SETTINGS

### LAN

- Port forwarding
- Network devices
- Network classification
- Network user groups
- PPPoE

### EDIT ENTRY

Enter values below or select a device from the list of known network devices to use that as a template. If a field is left empty it will be considered a wild card.

- **MAC address**: 
- **IP address**: 
- **LAN port**: WLAN
- **Network user group**: VIP User

### NETWORK DEVICES

<table>
<thead>
<tr>
<th>IP address</th>
<th>Device Name</th>
<th>Add</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.0.10</td>
<td>us12</td>
<td></td>
</tr>
<tr>
<td>192.168.0.11</td>
<td>US36</td>
<td></td>
</tr>
</tbody>
</table>
Create Network Class

NETWORK CLASSIFICATION TABLE

<table>
<thead>
<tr>
<th>MAC address</th>
<th>IP address</th>
<th>LAN port</th>
<th>Network user group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>WLAN</td>
<td>VIP User</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Default group</td>
</tr>
</tbody>
</table>

Add

Changes to this page only take effect after reboot
### Thrane & Thrane

**Create TFT Filter Voip**

<table>
<thead>
<tr>
<th>SIGNAL:</th>
<th>Enter Values for New Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eval. Prec. Index: 0</td>
</tr>
<tr>
<td></td>
<td>Profile Voip Call</td>
</tr>
<tr>
<td></td>
<td>Source Address</td>
</tr>
<tr>
<td></td>
<td>Subnet Mask</td>
</tr>
<tr>
<td></td>
<td>Prot. No. 17</td>
</tr>
<tr>
<td></td>
<td>Dest. Port Range: 5060-5065</td>
</tr>
<tr>
<td></td>
<td>Source Port Range: 5060-5065</td>
</tr>
<tr>
<td></td>
<td>Type of Service</td>
</tr>
<tr>
<td></td>
<td>Type of Service Mask</td>
</tr>
<tr>
<td></td>
<td>Apply</td>
</tr>
</tbody>
</table>

**Thrane & Thrane** 203
<table>
<thead>
<tr>
<th>SIGNAL:</th>
<th>!</th>
<th>EDIT FILTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASHBOARD</td>
<td></td>
<td>Eval. Prec. Index: 1</td>
</tr>
<tr>
<td>CONNNECT</td>
<td></td>
<td>Profile: Video Conference</td>
</tr>
<tr>
<td>PHONE BOOK</td>
<td></td>
<td>Source Address:</td>
</tr>
<tr>
<td>MESSAGES</td>
<td></td>
<td>Subnet Mask:</td>
</tr>
<tr>
<td>CALLS</td>
<td></td>
<td>Prot. No: 17</td>
</tr>
<tr>
<td>SETTINGS</td>
<td></td>
<td>Dest. Port Range: 1719 To 1729</td>
</tr>
<tr>
<td>ADMINISTRATION</td>
<td></td>
<td>Source Port Range: 1719 To 1729</td>
</tr>
<tr>
<td>Call charges</td>
<td></td>
<td>Type of Service:</td>
</tr>
<tr>
<td>Log handling</td>
<td></td>
<td>Type of Service Mask:</td>
</tr>
<tr>
<td>Profiles</td>
<td></td>
<td>Traffic flow filters:</td>
</tr>
<tr>
<td>SIM PIN</td>
<td></td>
<td>Apply</td>
</tr>
</tbody>
</table>

Throne & Thrane
### Thrane & Thrane

**SIGNAL:**

<table>
<thead>
<tr>
<th>Eval. Prec. Index</th>
<th>Profile</th>
<th>Source Address</th>
<th>Subnet Mask</th>
<th>Prot. No.</th>
<th>Dest. Port Range</th>
<th>Source Port Range</th>
<th>Type of Service</th>
<th>Type of Service Mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Voip Call</td>
<td></td>
<td></td>
<td>17</td>
<td>5060 to 5065</td>
<td>5060 to 5065</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Video Conference</td>
<td></td>
<td></td>
<td>17</td>
<td>1719 to 1729</td>
<td>1719 to 1729</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Video Conference</td>
<td></td>
<td></td>
<td>6</td>
<td>1024 to 65535</td>
<td>1024 to 65535</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Call charges [New entry]*

![Diagram](image)
Dashboard

Throne & Thrane

SIGNAL: weak

<table>
<thead>
<tr>
<th>PROPERTIES</th>
<th>SESSIONS TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airtime provider</td>
<td>Standard voice inbound 00:00:00</td>
</tr>
<tr>
<td>GPS position</td>
<td>Standard voice outbound 00:01:56</td>
</tr>
<tr>
<td>Status</td>
<td>3.1 kHz audio inbound 00:00:00</td>
</tr>
<tr>
<td>Satellite selection</td>
<td>3.1 kHz audio outbound 00:00:00</td>
</tr>
<tr>
<td>Current satellite</td>
<td>Standard data 4130.59 MB</td>
</tr>
<tr>
<td>Unit serial number</td>
<td>Streaming 8 kbps 00:00:01</td>
</tr>
<tr>
<td>Software version</td>
<td>Streaming 16 kbps 00:00:16</td>
</tr>
<tr>
<td>IMSI number</td>
<td>Streaming 32 kbps 00:03:40</td>
</tr>
<tr>
<td>IMEI number</td>
<td>Streaming 64 kbps 00:00:37</td>
</tr>
<tr>
<td></td>
<td>Streaming 128 kbps 00:04:36</td>
</tr>
</tbody>
</table>

ONGOING DATA SESSIONS
Standard data (0.0.0.0)

ONGOING CALLS
(No active calls)

STREAMING PROFILES ON LAN (VIP USER)

Start Voip Call
Start Video Conference

Refresh
Video Surveillance

- Stream Video from a onboard camera 128k QOS
- Encrypted
Create Network Class

EDIT ENTRY

Enter values below or select a device from the list of known network devices to use that as a template. If a field is left empty it will be considered a wild card.

MAC address

IP address

LAN port

Network user group Video Surveillance

Apply Cancel

NETWORK DEVICES

<table>
<thead>
<tr>
<th>IP address</th>
<th>MAC address</th>
<th>Device Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.0.10</td>
<td>00:1D:7E:D2:B3:17</td>
<td>us12</td>
</tr>
<tr>
<td>192.168.0.11</td>
<td>00:1D:E0:00:21:7D</td>
<td>US36</td>
</tr>
</tbody>
</table>

Add

Add
Create TFT Filter  Video Surveillance

**SIGNAL:**

**ENTER VALUES FOR NEW FILTER**

- **Eval. Prec. Index:** 0
- **Profile:** Video Surveillance
- **Source Address:**
- **Subnet Mask:**
- **Prot. No.:** 17
- **Dest. Port Range:**
- **Source Port Range:**
- **Type of Service:**
- **Type of Service Mask:**

[Apply]  [Cancel]
### Create TFT Filter  Video Surveillance

**Thrane & Thrane**

<table>
<thead>
<tr>
<th>SIGNAL:</th>
<th>Eval. Prec. Index</th>
<th>Profile</th>
<th>Source Address</th>
<th>Subnet Mask</th>
<th>Prot. No.</th>
<th>Dest. Port Range</th>
<th>Source Port Range</th>
<th>Type of Service</th>
<th>Type of Service Mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASHBOARD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONNECT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHONE BOOK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MESSAGES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CALLS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SETTINGS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADMINISTRATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

0  Video surveillance  17

[New entry](#)
Hands on Configuration and Troubleshooting
Configuration

- Configure the system for use with an IGA
- Configure the system for use with an HGA
- Configure the system for use with an IRS
- Configure the system for use with an AHRS
- Set RF cable loss parameters
- Set incoming phone call types
- Set out going phone call types
- Set user groups
- Set TFTs
- Software Upload
## Settings Tab

The image shows a webpage interface with a section labeled "SATELLITE SELECTION". The satellite selection options are Asia-Pacific, ENTA, Americas, and India. Below these options, there are buttons labeled "Apply" and "Cancel". The interface also includes a menu with various sections such as Dashboard, Connect, Phone Book, Messages, Calls, Settings, LAN, WLAN, Phone/Fax, ISDN, Common, IP handsets, Discrete I/O, RF settings, External systems, FLEX, Upload, Administration, Helpdesk, and Site Map.
Software Upload
Aero-SB Lite

The world’s most compact flying broadband solution

Office mobility in the air

Broadband is an integral part of most forms of communications today. When traveling the globe, you often need to be able to swiftly log-on to your corporate network, use your PDA, surf the Internet, and talk on the phone. This is why Thrane & Thrane now introduces the Aero-SB Lite broadband solution.

Full featured office mobility at low cost

With the Aero-SB Lite you can take your office anywhere at speeds up to 332 kbps. Though a light version of the Aero-SB+ SwiftBroadband solution, the Aero-SB Lite is also a complete solution for both Voice and Data, with a wide array of embedded features, including:

- VoIP connectivity
- High speed internet
- Low cost voice
- Built-in router for intelligent connectivity support and multiple user support
- Built-in Ethernet switch for supporting numerous wired laptops and/or ETBs
- Built-in wireless LAN for supporting numerous wireless laptops and/or PDAs (this function can be disabled)
- Built-in GSM for supporting numerous handsets
- ISDN connectivity
- Secure communications capable (STE, STU, TIV and HAPR compatible)

All these features in a light-weight and compact package offer a highly competitive, feature rich communications suite at low cost.

Innovation is always key –

Aero-SB Lite shares technology with Aero SB+

With a pioneering outlook and a fixed focus on new technology development, Thrane & Thrane has put more than 225 man years into creating the core technology for the very best mobile broadband systems in the market. This has resulted in numerous cutting edge solutions, e.g. Aero-SB+ – and now Aero-SB Lite.

The Aero-SB Lite is based on the same SwiftBroadband technology and basic design as Aero SB+, which means that you get most of the features from the more expensive Aero-SB+ in the Aero-SB Lite.
# Software Upload

### Checking for Software Updates

| Current software version | 0.00 |

### Check for updates

| Latest available | Not checked... |

| File size | |

### Upload Software to Terminal

| Browse... | Upload |

---

**Disclaimer for Downloading and Uploading Software**

Please be informed that downloading and installing software from the Thrane & Thrane web portal is at your own risk. Thrane & Thrane is not to be held liable for any possible damage with respect to downloading and installing software to your Aero-55 Lite.

If you have problems or questions with respect to downloading software or uploading your terminal please be informed that you will have to contact the Thrane & Thrane distributor from where the terminal was purchased or contact your local Thrane & Thrane distributor.

Please be advised that you will not be able to contact Thrane & Thrane for end user support and that we always recommend that software upgrades are being carried out by official Thrane & Thrane distribution partners.
Troubleshooting

- Help Desk
- Diagnostic report
- Event list
- Event log
- Self test
- Bite codes
- Debug commands
# Help Desk Tab

<table>
<thead>
<tr>
<th>Help Desk Tab</th>
<th>SUPPORT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For help, please contact:</td>
<td>Please enter support information here</td>
</tr>
<tr>
<td>Generate diagnostic report to file?</td>
<td>Generate report</td>
</tr>
</tbody>
</table>

**Signal Level:** 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡 📡
Diagnostic Report

date
Thu Jan 01 00:39:32 1970
debug/$ var
Software : 0.50, build BUILD-swift_broadband-S05, UTC Thu Mar 26 22:36:07 2009
EQ FPGA : 0.5-2
eCos TPR10A HAL version 0.60 (eCos for Monroe Main Application compiled Feb 6 2009, 10:37:16) running at 168.002 MHz
BBX2C1 ID : 12B, Rev 1.1 (ASIC-B)
EQ DSP : 1.5-S05
AVR 12C : 1.14
Part Name : TT-5040A
Unit BOM : 0A02
Product Rev. : Unknown
MARVELL : 2.00
CLK PLL U2500 : 5.00
CLK PLL U2502 : 2.00
PSU BOM (37) : 0DC1
PSU BOM (60) : YYYV
PSU PCB ID : 000000F5701409080003
WLAN hw : Unknown (init not completed)
WLAN rw : Unknown (init not completed)
Product ID : 5
Product name : Aero-SB Lite
CM Unit SN : 50135002
CM Unit BOM : 405040A-001 A01
CM PCB SN : 304060016
CM PCB BOM : TT 57-124562 C
Bootloader : 7.00 build 1139-1215026600
Platform ID : 4
ROM (37) : 0B11
BOM (60) : -
FPGA - CORE : 0.18
NPA : TT-5016A - Mod connected
Vc, Main : 1.30, build 2, UTC Wed Mar 25 09:22:17 2009
debug/$ sysconf
LMEI : 359350000170205
MAC Address : 00:41:0f:00:00:23
Unit Serial number: 09430684
PCB ID : 0000000000000334920015
Type of device : 5, SBU
Class of device : 7, IDA
debug/$ errorlog
Error Log for Unit Serial number: 09430684
Error Log from previous power cycles
Version: 0.90, build BUILD-swift_broadband-S05, UTC Thu Mar 26 22:36:07 2009

Thrane & Thrane
## Event List (Current faults)

<table>
<thead>
<tr>
<th>First reported</th>
<th>ID</th>
<th>Unit</th>
<th>Severity</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time unavailable</td>
<td>00351-0</td>
<td>Terminal</td>
<td>WARNING</td>
<td>No antenna found</td>
</tr>
<tr>
<td>Time unavailable</td>
<td>09400-1</td>
<td>Antenna</td>
<td>ERROR</td>
<td>Antenna Failure</td>
</tr>
</tbody>
</table>

**Red LED on front = 🔴**
Event Log (Historic Faults)

<table>
<thead>
<tr>
<th>First reported</th>
<th>ID</th>
<th>Unit</th>
<th>Severity</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:42:10 3 Apr 2009</td>
<td>08022-0</td>
<td>Terminal</td>
<td>INFO</td>
<td>IAI-2 Adaptation Layer: Searching for network</td>
</tr>
<tr>
<td>11:42:13 3 Apr 2009</td>
<td>08027-0</td>
<td>Terminal</td>
<td>INFO</td>
<td>IAI-2 Adaptation Layer: Handover</td>
</tr>
<tr>
<td>11:42:13 3 Apr 2009</td>
<td>08028-0</td>
<td>Terminal</td>
<td>INFO</td>
<td>IAI-2 Adaptation Layer: Terminal camped on PSAB, ready for registration procedure</td>
</tr>
<tr>
<td>11:42:13 3 Apr 2009</td>
<td>08022-0</td>
<td>Terminal</td>
<td>CLEARED</td>
<td>IAI-2 Adaptation Layer: Searching for network</td>
</tr>
<tr>
<td>11:42:13 3 Apr 2009</td>
<td>08023-0</td>
<td>Terminal</td>
<td>INFO</td>
<td>IAI-2 Adaptation Layer: Network Found</td>
</tr>
<tr>
<td>11:42:13 3 Apr 2009</td>
<td>08023-0</td>
<td>Terminal</td>
<td>CLEARED</td>
<td>IAI-2 Adaptation Layer: Network Found</td>
</tr>
<tr>
<td>11:42:13 3 Apr 2009</td>
<td>08024-0</td>
<td>Terminal</td>
<td>INFO</td>
<td>IAI-2 Adaptation Layer: Registering</td>
</tr>
<tr>
<td>11:42:16 3 Apr 2009</td>
<td>08024-0</td>
<td>Terminal</td>
<td>CLEARED</td>
<td>IAI-2 Adaptation Layer: Registering</td>
</tr>
<tr>
<td>11:42:16 3 Apr 2009</td>
<td>08025-0</td>
<td>Terminal</td>
<td>INFO</td>
<td>IAI-2 Adaptation Layer: Registered</td>
</tr>
</tbody>
</table>
Self Test (reboots the system and performs self test)
Debug Command

- Telnet to 192.168.0.1 or use a HyperTerminal to connect to the terminal

- User Name = admin

- Password = 1234
Status = stat <enter>
429 data = stat í m arinc <enter>
Arinc words received from primary nav source
=ARbroadcast ï i pri
Arinc words received from secondary nav source = AR broadcast ï i sec
TT-5006a status = stat ĭ m tt5006a <enter>
AMT-50 status = stat í m amt50 <enter>
Current WLAN settings = stat ï m wlan
Won't display a wireless connection?
Check that wireless is enabled on your lap top
Check that the WIFI option has been purchased and enabled
Check that broadcast SSID is enabled and proper country is selected

<table>
<thead>
<tr>
<th>SIGNAL:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DASHBOARD</td>
<td><strong>WLAN</strong></td>
</tr>
<tr>
<td>CONNECT</td>
<td>Broadcast SSID</td>
</tr>
<tr>
<td>PHONE BOOK</td>
<td>SSID</td>
</tr>
<tr>
<td>MESSAGES</td>
<td>Country</td>
</tr>
<tr>
<td>CALLS</td>
<td>Select channel automatically</td>
</tr>
<tr>
<td>SETTINGS</td>
<td>Channel</td>
</tr>
<tr>
<td>LAN</td>
<td>Security</td>
</tr>
<tr>
<td>WLAN</td>
<td>Encryption key</td>
</tr>
<tr>
<td>Phone/Fax</td>
<td>MAC address filter</td>
</tr>
<tr>
<td>ISDN</td>
<td>Allowed MAC addresses</td>
</tr>
<tr>
<td>Common</td>
<td></td>
</tr>
<tr>
<td>IP handsets</td>
<td></td>
</tr>
<tr>
<td>Discrete I/O</td>
<td></td>
</tr>
<tr>
<td>RF settings</td>
<td></td>
</tr>
<tr>
<td>External systems</td>
<td></td>
</tr>
<tr>
<td>FLEX</td>
<td></td>
</tr>
<tr>
<td>Upload</td>
<td></td>
</tr>
<tr>
<td>ADMINISTRATION</td>
<td></td>
</tr>
<tr>
<td>HELPDESK</td>
<td></td>
</tr>
<tr>
<td>SITE MAP</td>
<td></td>
</tr>
</tbody>
</table>

Apply | Cancel
Won’t connect to the internet?
Check for data active, full signal bar and IP address on the dashboard

<table>
<thead>
<tr>
<th>SIGNAL:</th>
<th>PROPERTIES</th>
<th>SESSIONS TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASHBOARD</td>
<td>Airtime provider: Swift</td>
<td>Standard voice inbound: 00:04:01</td>
</tr>
<tr>
<td>PHONE BOOK</td>
<td>GPS position: N 36°50', W 76°03'</td>
<td>Standard voice outbound: 00:13:50</td>
</tr>
<tr>
<td>MESSAGES</td>
<td>Status: Data active</td>
<td>3.1 kHz audio inbound: 00:00:00</td>
</tr>
<tr>
<td>CALLS</td>
<td>Satellite selection: Auto</td>
<td>3.1 kHz audio outbound: 00:00:00</td>
</tr>
<tr>
<td>SETTINGS</td>
<td>Current satellite: Americas (elevation: 41°)</td>
<td>Standard data: 4137.62 MB</td>
</tr>
<tr>
<td>ADMINISTRATION</td>
<td>Unit serial number: 00000029</td>
<td>Streaming 8 kbps: 00:00:01</td>
</tr>
<tr>
<td>HELPDESK</td>
<td>Software version: 0.90, build 505</td>
<td>Streaming 16 kbps: 00:00:16</td>
</tr>
<tr>
<td>SITE MAP</td>
<td>IMSI number: 901112115103238</td>
<td>Streaming 32 kbps: 00:03:40</td>
</tr>
<tr>
<td></td>
<td>IMEI number: 35160101-001816-6</td>
<td>Streaming 64 kbps: 00:00:37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Streaming 128 kbps: 00:04:36</td>
</tr>
</tbody>
</table>

**ONGOING DATA SESSIONS**
Standard data (10.166.105.69)

**PROFILES ON LAN (DEFAULT GROUP)**
Stop Standard
Start Streaming 128

**ONGOING CALLS**
(No active calls)
Check internet options in laptop
Check the APN, User Name and Password
Select user defined and enter Access Point Name, User Name and Password provided from the service provider.

<table>
<thead>
<tr>
<th>Network classification</th>
<th>APN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Common</td>
</tr>
<tr>
<td></td>
<td>SIM default</td>
</tr>
<tr>
<td></td>
<td>Network assigned</td>
</tr>
<tr>
<td></td>
<td>User defined</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phone/Fax</th>
<th>User name</th>
<th>R369926</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISDN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common</td>
<td>Password</td>
<td>********</td>
</tr>
</tbody>
</table>