COBHAM

AVIATOR 700/700D

Installation & maintenance manual

AVIATOR 700/700D

Installation & maintenance manual

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Disposal

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

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

Record of revisions

Rev.	Description	Release Date	Initials
A	Original document	28 March 2007	CC
B	General update	4 January 2010	UFO
C	The following figures have been edited: 2-5, 5-1, 6-7, 6-43, 6-45, 6-53 and 6-55. Table 2-4 added. Section 6.10.8 Remote management added.	25 March 2010	UFO
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About this manual

1.1 Purpose

The purpose of this manual is to provide information for installation, maintenance and troubleshooting of the AVIATOR 700 system. This manual covers AVIATOR 700 and AVIATOR 700D.

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

1.2 Organization

- **Introduction.** A short overview of the AVIATOR 700 system and services.
- **Equipment Drawings**
  Outline drawings of the units, trays and connectors of the AVIATOR 700 system.
- **Connectors**
  Drawings and pin-out for the connectors, and a description of the required mating connectors.
- **Installation**
  Wiring drawings and detailed installation and wiring requirements.
- **Configuration**
  An introduction to the Aero-SDU Configuration Program and the SwiftBroadband Unit's web interface, and a description of how to configure the AVIATOR 700 system. A short description of how to configure some of the 3rd party handsets.
- **Check Procedures.** An overview of the recommended check procedures and checklists.
- **Maintenance and Troubleshooting**
  Descriptions of Airworthiness, help desk, software update, LEDs, BITE test and how to return units for repair. Also flow charts how to perform initial troubleshooting.
- **Appendices**
  Equipment specifications, DO-160 Forms, procedure to upgrade an HSD$^+$ system to AVIATOR 700, lists of error messages, WLAN country codes, SIP setup for Wifi enabled phones and a list of applicable standards.

1.3 Related documentation

Part number	Description
98-130578	AVIATOR 700 User Manual
98-130554	AVIATOR 700 Quick Guide
98-129599	AVIATOR Wireless Handset and Cradle User Manual
98-129600	AVIATOR Wireless Handset and Cradle Installation & Maintenance Manual
98-132721	Swift64 and H+ Data Service, Supplement to AVIATOR 700 and Aero-HSD+ User Manual (available for download)
95-160581	Vendor Service Information Letter: Service migration from Inmarsat I-3 to I-4 satellite constellation (available for download)

Table 1-1: List of Related Documentation

1.4 Precautions: Warnings, Cautions and Notes

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

- **Warning**: A Warning is an operation or maintenance procedure that, if not obeyed, can cause injury or death, or jeopardize the flight safety on the aircraft.
- **Caution**: A Caution is an operation or maintenance procedure that, if not obeyed, can cause damage to the equipment.
- **Note**: A Note gives information to help the reader.
- **Important**: A text marked Important gives information that is important to the user, e.g. to make the system work properly. This text does **not** concern damage on equipment, flight safety nor personal safety.

General precautions

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

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

CAUTION! The AVIATOR 700 system contains items that are electrostatic discharge sensitive. Use approved industry precautions to keep the risk of damage to a minimum when you touch, remove or insert parts or assemblies.

Introduction to the AVIATOR 700

This chapter has the following sections:

- *General description*
- *Application*
- *System block diagrams*
- *Operation overview*

2.1 General description

This manual describes the administrative and technical aspects, features, functions and components of the AVIATOR 700 system. All comments or recommendations regarding the installation, acceptance or operation of the system or its accessories and components should be directed to Cobham.

Note The AVIATOR 700 system is available in two versions:

- AVIATOR 700 approved to RTCA specification DO- 178B level E and DO-254 level E
- AVIATOR 700D approved to RTCA specification DO-178B level D and DO-254 level D.

In general descriptions the nomenclature AVIATOR 700 covers both versions. Where necessary, the Level D system is specified as AVIATOR 700D.

2.1.1 The AVIATOR 700 system

Important for AVIATOR 700 (Level E)!

The design of the system is **not** intended to support flight communication for safety purposes, in particular for Air Traffic Services (ATS) or Aeronautical Operational Control (AOC), during flight time.

Important The software used to control the unit operation complies with **RTCA specification DO-178B level E** application software.

Important The firmware used to control the unit operation complies with **RTCA specification DO-254 level E** firmware.

The Satellite Data Unit (SDU), the SwiftBroadband Unit (SBU) and the High Power Amplifier (HPA) must all be level E approved. **No mismatch is allowed.**

Important for AVIATOR 700D (Level D)!

The design of the system is intended to support flight communication for safety purposes, including Air Traffic Services (ATS) and Aeronautical Operational Control (AOC), during flight time.

Important The software used to control the unit operation complies with **RTCA specification DO-178B level D** application software.

Important The firmware used to control the unit operation complies with **RTCA specification DO-254 level D** firmware.

The Satellite Data Unit (SDU), the SwiftBroadband Unit (SBU) and the High Power Amplifier (HPA) must all be level D approved. **No mismatch is allowed.**

Non-Safety interfaces for AVIATOR 700 (Level E)

The following interfaces in the AVIATOR 700 system are strictly for non-safety usage:

- Cockpit voice
- ACARS/AFIS/CMU (information and management systems)
- MCDU (Multifunction Control and Display Unit)

Safety interfaces for AVIATOR 700D (Level D)

The following interfaces in the AVIATOR 700D system are approved for safety usage:

- Cockpit voice
- ACARS/AFIS/CMU (information and management systems)
- MCDU (Multifunction Control and Display Unit)

Wiring safety interfaces

Important When wiring safety interfaces for voice and data from a unit to cockpit equipment, you must make sure that you do not wire other interfaces of the same unit to equipment located in the cabin.

Use another unit for wiring non-safety interfaces to equipment located in the cabin.

Overview of the AVIATOR 700 system

The AVIATOR 700 system offers the classical aeronautical communications services and the SwiftBroadband service. The TT-5035A Satellite Data Unit (SDU) provides multi-channel voice and fax and data (Swift 64), while the SwiftBroadband Unit (SBU) provides access to SwiftBroadband, the aeronautical BGAN service. The SDU is the controlling unit of the system and the SBU works as a slave unit to the SDU. The data services available depend on the satellite coverage, read more about satellite coverage at *Services* on page 2-4.

The AVIATOR 700 system provides a wide range of user interfaces: several 4-wire and 2-wire interfaces, ISDN, WLAN and Ethernet interfaces available on the SDU and SBU.

The following drawing shows the AVIATOR 700 cabin installation with connected communication devices and available options:

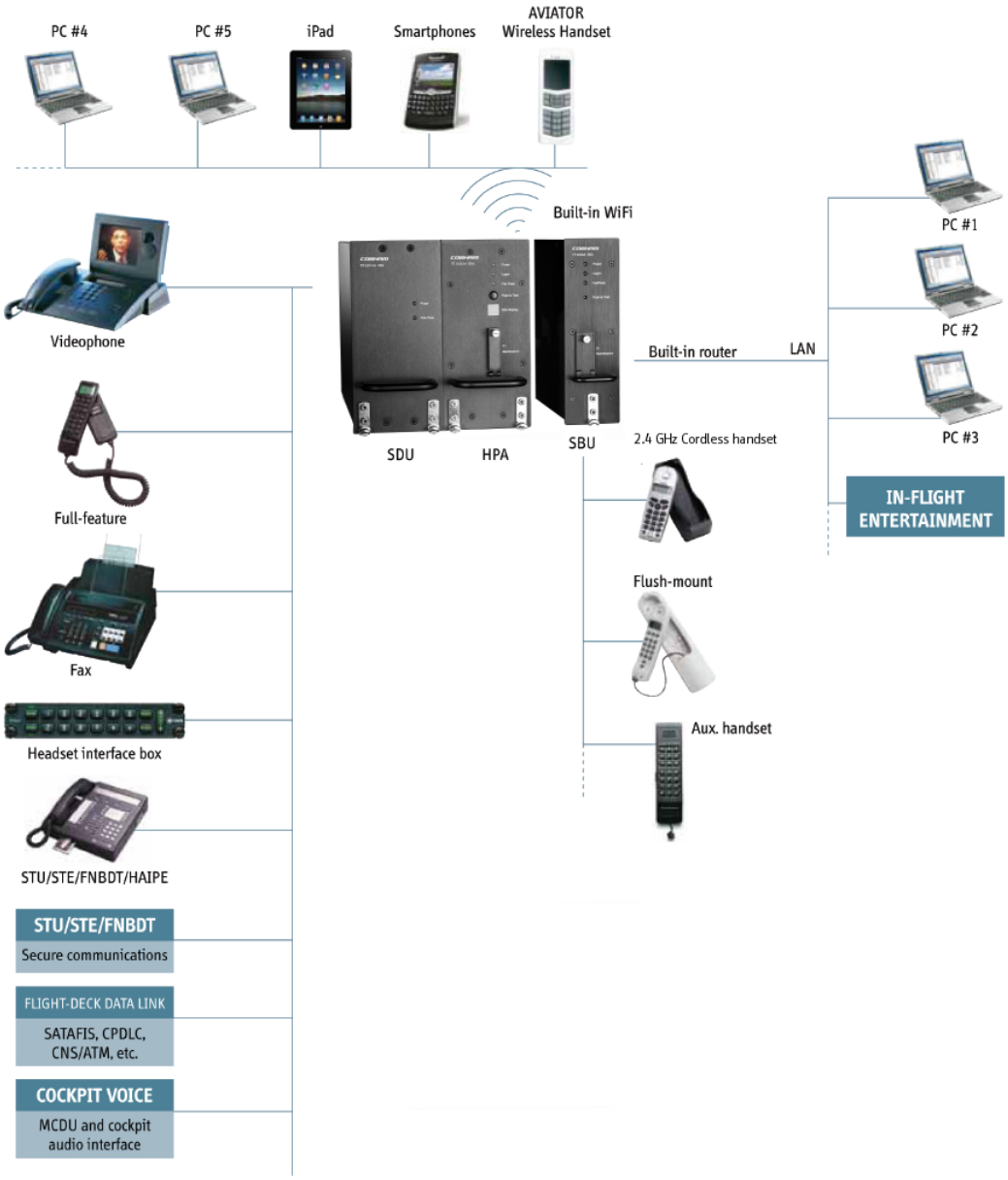


Figure 2-1: Communication devices for the AVIATOR 700 system (example for a Level E system)

The basic units in the AVIATOR 700 system are:

- TT-5035A SDU
- TT-5035A-001 Configuration Module (inserted in the SDU)
- TT-5014A HPA
- TT-5040A SBU
- TT-5040A-001 Configuration Module (inserted in the SBU)
  The SBU Configuration Module holds permanently installed SIM card, which provides access to the BGAN network.
- TT-5040A-005 SDU to SBU Software Interface

Services

In the AVIATOR 700 system the classic aeronautical communication services H+ and Swift64 are combined with the aeronautical BGAN service, SwiftBroadband.

Note

At the time of writing the services on the Inmarsat I3 satellites are in the process of being migrated to the I4 satellites. For details on the migration process, see https://www.inmarsat.com/support/i-3-to-i-4-services-migration.

See also the I3 to I4 Satellite Service Migration - Service Information Letter on the Cobham SYNC Partner Portal.

After migration, I3 will still remain in the AVIATOR 700 user interface as virtual satellites.

To see how the AVIATOR 700 system handles the communication with Inmarsat's satellites I4 and I3 that support these services see the following figure.

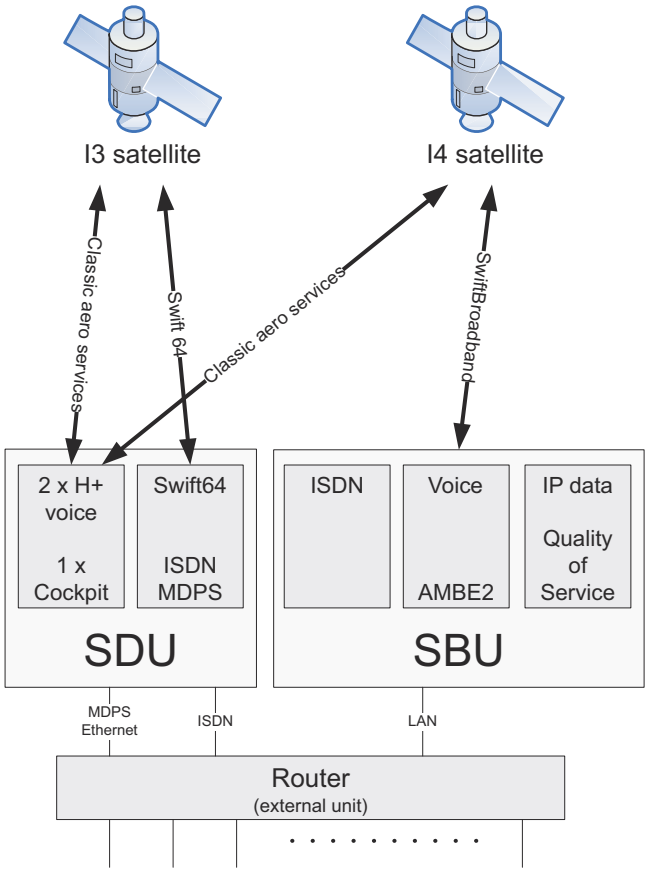


Figure 2-2: Satellite coverage of data and voice services

- The SwiftBroadband service provides a channel dedicated to high-speed data using the BGAN service, operated on Inmarsat's I4 satellites. SwiftBroadband allows for IP-based data transfer up to 432 kbps with an HGA (Class 6) and Integrated Services Digital Network (ISDN @ 64 kbps) circuit-switched data. The SwiftBroadband service may also be used for speech or 3.1 kHz audio, it accommodates simultaneous voice and data. You can use the AVIATOR 700 cabin installation for IP background data, IP data streaming at 8/16/32/64/128 kbps and X-stream full-channel streaming > 250 kbps, and standard AMBE 2 voice.
- The Aero-H$^+$ classic services provide two channels for global voice, fax or PC modem data and one low-speed channel for cockpit communication.
- The Swift64 service provides a 64 kbps backup channel for areas where there is no I4 satellite coverage. The Swift64 channel may operate using ISDN or packet data mode, it may also be used for speech or for 3.1 kHz audio e.g. for fax.

The following figures show the coverage maps for SwiftBroadband, Swift64 and classic services available worldwide.

Note The coverage maps below show the **coverage before migration of the services** from the I3 satellites to the I4 satellites. For details on the migration, see https://www.inmarsat.com/support/i-3-to-i-4-services-migration/

Inmarsat's I4 satellite coverage (AMER, Alphasat, MEAS, APAC)

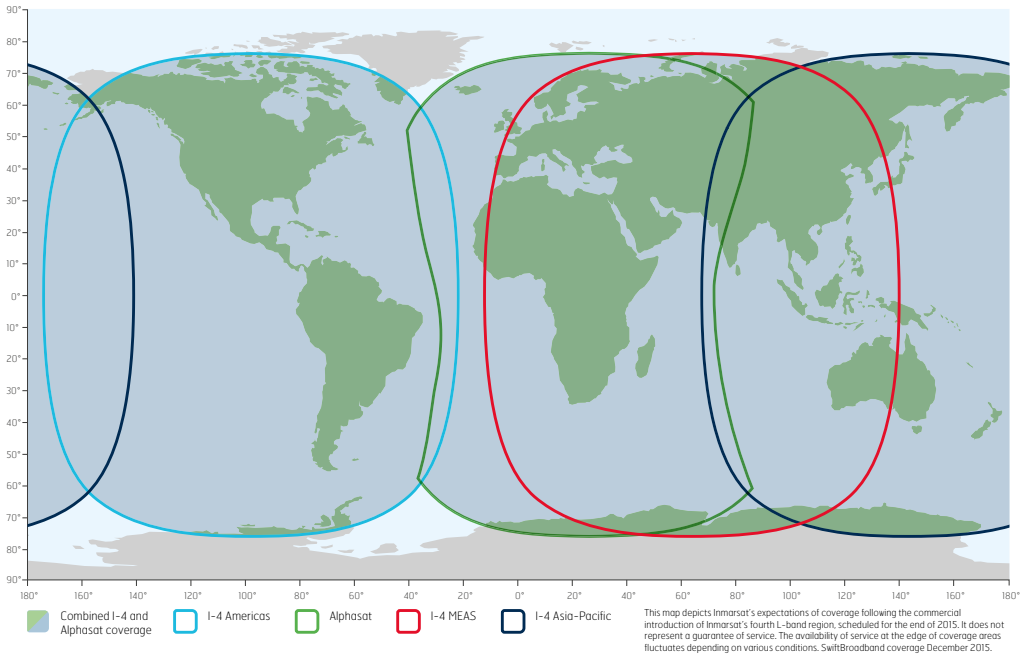


Figure 2-3: SwiftBroadband and classic aeronautical services coverage on I4 satellite

Swift64 and Classic aeronautical services coverage (IOR, POR, AORE, AORW)

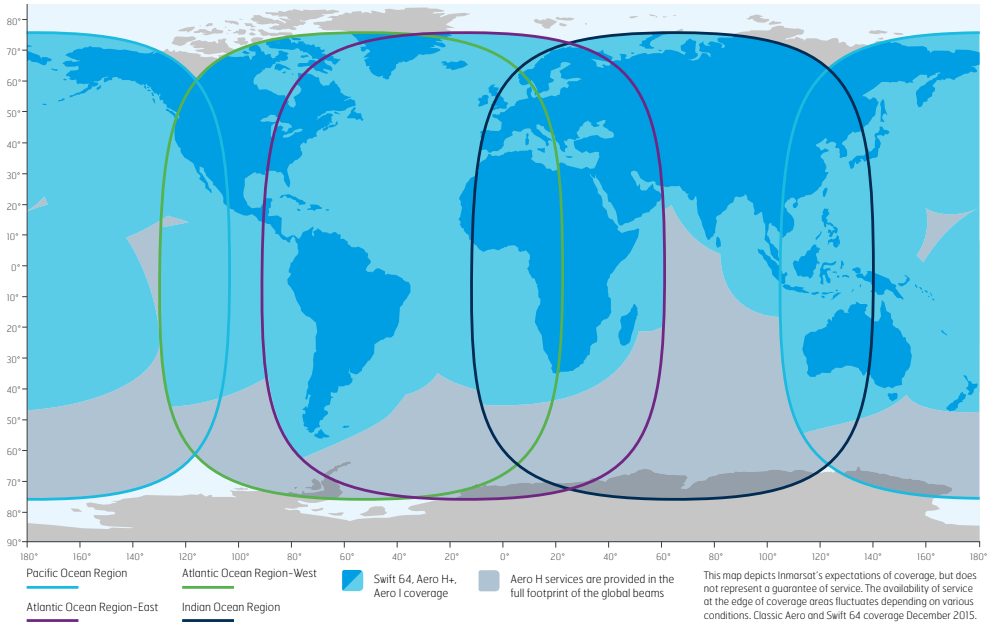


Figure 2-4: Swift64 and classic aeronautical services coverage on I3 satellite

PBX telephone exchange

The AVIATOR 700 system has two built-in PBX units: One in the SDU and one in the SBU, making the AVIATOR 700 capable of connecting in total four 4-wire handsets and four 2-wire devices.

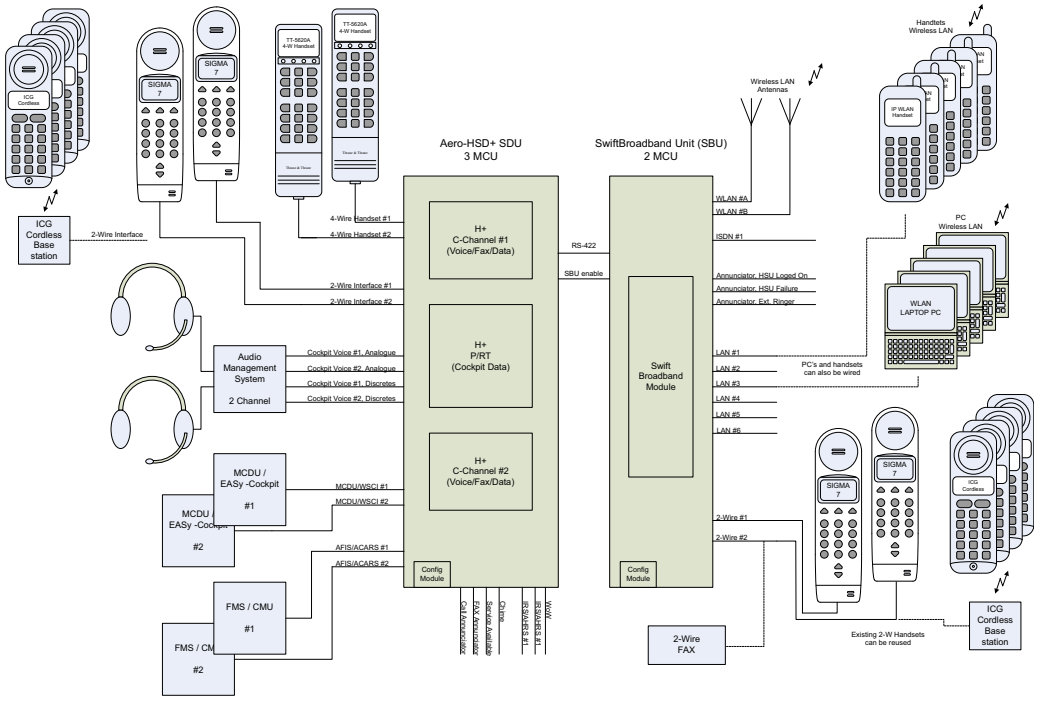


Figure 2-5: PBX functionality in SDU and SBU

The built-in PBX of the SDU connects up to four 4-wire handsets, two direct 2-wire POTS interfaces for faxes, PC modems, auxiliary phones, headset interface boxes etc. and one ISDN interface for ISDN phones, fax machines or Secure communication.

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

Note There is no routing between the PBX of the SDU and the PBX of the SBU.

Configuration Modules (CM)

There are two Configuration Modules in the AVIATOR 700 system:

- SDU Configuration Module
- SBU Configuration Module

The Configuration Module (CM) for the SDU contains system and user settings for easy replacement of the Satellite Data Unit (SDU). To access these settings use the Aero-SDU Configuration Program. For further information on the configuration program, see *Configure the basic system* on page 6-2. Different layers of write protection protect the CM contents; this includes hardware protection of installation settings and optional pin code protection of user data. The SDU Configuration Module is designed as a “plug-in”

module for the SDU, making it easier to replace the SDU while retaining all system and user settings.

The Configuration Module (CM) for the SBU is inserted in the SBU and holds system and user settings for easy replacement of the SwiftBroadband Unit (SBU). Different layers of write protection protect the CM contents; this includes hardware protection of installation settings and optional pin code protection of user data. It is designed as a “plug-in” module for the SBU, so the SBU can be replaced while retaining all SBU and user settings. The SBU CM contains a permanently built-in SIM card for access to the SwiftBroadband services.

Configuration of the AVIATOR 700 system

The AVIATOR 700 system is configured with two tools:

- The Aero-SDU Configuration Program to set up and configure the SDU.
- SBU web interface to set up and configure the SBU.

Use the Aero-SDU Configuration Program to access the SDU and antenna settings that must be configured. The configuration settings are stored in the CM of the SDU. To set up or change a configuration you must connect a PC to the connector marked **Maintenance** on the SDU front plate. For further information how to install the configuration program see *Aero-SDU Configuration Program for the SDU* on page 6-2.

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

To set up or change the settings of the write-protected area you must connect a PC to the connector marked **Maintenance** on the SBU front plate. You can view all SBU settings from any LAN or WLAN interface. For further information on the web interface, see *SBU Configuration tasks* on page 6-13.

The TT-5040A-005 SDU to SBU Software Interface is part of the basic AVIATOR 700 system. It activates the software code that enables the interface between the SDU and the SBU. The SDU to SBU Software Interface is pre-configured at the factory when ordering the basic AVIATOR 700 system.

Satcom antenna systems

The AVIATOR 700 system can be used with a wide range of satcom antennas. An AVIATOR 700 system must only be used with satcom antennas that have received type approval by Inmarsat.

The following ARINC 781 compatible antennas from Cobham have received Inmarsat type approval:

- HGA-6000
- HGA-6500
- HGA-7000
- HGA-7001

Built-in router and Wireless (WLAN) option

The AVIATOR 700 system offers a built-in router as an option. With this option multiple users and applications can use the system simultaneously. Without this option only the first device that connects to the SBU will be allowed on the Internet.

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

If ordered, this option is enabled in the AVIATOR 700 from the factory. If these options are not included from the start, the system can be upgraded at a later stage. Then you receive the FLEX key for the purchased options and enter it in the AVIATOR 700 web interface.

Built-in Multi-voice option[1]

The AVIATOR 700 system offers a built-in Multi-voice option. With this option multiple calls can be made to and from the system simultaneously. Normally, the BGAN system only supports one call at a time. With the built-in, optional Multi-voice service enabled in your system, you can make multiple calls. The maximum number of concurrent calls is 1+ 8. If ordered, this option is enabled in the AVIATOR 700 from the factory. If this option is not included from the start, the system can be upgraded at a later stage. Then you receive the FLEX key for the purchased options and enter it in the AVIATOR 700 web interface.

Note You must have Multi-voice in your airtime subscription, AVIATOR Wireless Handset software version minimum 1.03 and SBU software version minimum AVIATOR 700 (Level E): 1.07, AVIATOR 700D (Level D): 2.01, in order to support the Multi-voice function.

For information on how to set up Multi-voice, see *Multi-voice (option)* on page 6-88.

Interface to MCDU

The Multifunction Control and Display Unit (MCDU) can be used to control and operate the SATCOM equipment from the cockpit. The MCDU has the same menus and functions as the 4-wire cabin handsets. Using the cockpit voice interface which connects to the pilot headset via the cockpit Audio Management System the pilot can then make satcom calls from the cockpit without using a handset. He can also read status messages of the **AVIATOR 700** system in the MCDU display.

1. Supported from software version 1.07 for AVIATOR 700 (Level E) and 2.01 for AVIATOR 700D (Level D).

2.1.2 AVIATOR 700 features

The AVIATOR 700 system has the following features:

- Unique multi-channel solution, combining the Inmarsat Aero-H+, Swift64 and SwiftBroadband services with the following channels available:
  - one spot beam SwiftBroadband channel, providing access to the BGAN system with data rates up to 432 kbps.
  - one spot beam High Speed Data (HSD) channel (Backup ISDN)
  - two CS (circuit switched) mode H^+ channels for voice, G3 fax or PC modem data for global or spot beam operation.
  - one global H^+ packet data channel for cockpit communications
- Full duplex, single or multi-user.
- Automatic satellite selection.
- Built-in PBX in the SDU interfacing to four 4-wire and two 2-wire connections and one ISDN connection.
- Built-in PBX in the SBU interfacing to two 2-wire connections, one ISDN interface and WLAN in the SBU, and integrated SIP server for VOIP telephony.
- Standard voice.
- 3.1 kHz audio for modems, G3 fax, 14.4 kbps high quality voice etc.
- ISDN voice for Secure communication, G4 fax etc.
- ISDN data for video conferences etc.
- Built-in Router option in the SBU with DHCP, NAT for six Ethernet interfaces.
- Built-in Wireless option (WLAN) IEEE 802.11 b/g in the SBU.
- Built-in Multi-voice option, up to 1+8 concurrent calls
- Access to built-in web interface for daily use using SBU LAN and WLAN.
- Aero-SDU Configuration Program
- Built-in web interface for SBU configuration using the Maintenance connector on the SBU front plate.
- ARINC 741 and ARINC 781 antenna compatibility
- HGA-7000 antenna compatibility

Software versions

The AVIATOR 700 is shipped with the following software versions (at the time of writing):

For Level E:

SBU software version 1.09
SDU software version 1.15.

For Level D:

SBU software version 2.02
SDU software version 2.01

2.2 Application

2.2.1 Minimum system

A minimum working system has at least:

- one TT-5035A SDU
- one TT-5035A-001 CM
- one TT-5014A HPA
- one TT-5040A SBU
- one TT-5040A-001 CM
- one TT-5040A-005 SDU to SBU Software interface
- one TT-5038A-002 Tx Coupler
- one TT-5038A-003 Rx Power Splitter
- one handset and cradle, e.g. a TT-5620A 4-Wire Handset and a TT-5622A 4-Wire Cradle (optional)
- one antenna system with TT-5013A DNLA type F. As antenna system, use either an ARINC 741 or ARINC 781 antenna system.

The minimum wiring required for an AVIATOR 700 system is described in the section *Minimum system drawing* on page 5-3.

2.2.2 Part numbers

Applicable part numbers

This installation manual is for the AVIATOR 700 system and is applicable to the part numbers in the following tables.

Part number	Unit description
405035A	Satellite Data Unit (SDU) [without CM] AVIATOR 700
405035A-THD	Satellite Data Unit (SDU) [without CM] AVIATOR 700D
405035A-001	Configuration Module (CM) for SDU for AVIATOR 700 and AVIATOR 700D
405040A	SwiftBroadband Unit (SBU) [without CM] for AVIATOR 700
405040A-THD	SwiftBroadband Unit (SBU) [without CM] for AVIATOR 700D
405040A-001	Configuration Module (CM) for SBU (no key and no options)
405040A-002	Built-in Router option
405040A-003	Built-in Wireless option
405040A-004	WLAN Antenna, optional (2 pieces recommended)
405040A-009	Built-in ACARS+SB-Safety (ICAO) voice option
405040A-010	Built-in Multi-voice option
405040A-005	SDU to SBU Software Interface
405038A-002	Tx Coupler
405038A-003	Rx Power Splitter
405014A	High Power Amplifier (HPA) AVIATOR 700
405014A-THD	High Power Amplifier (HPA) AVIATOR 700D
405013A	DLNA Type F
405620A-THW	4-Wire Handset (white)
405620A-THR	4-Wire Handset (black)
405622A-THW	4-Wire Cradle (white)
405622A-THR	4-Wire Cradle (black)
405621B-THW	2-Wire Handset (white)
405621B-THR	2-Wire Handset (black)

Table 2-1: Part numbers

Part number	Unit description
405622B-THW	2-Wire Cradle (white)
405622B-THR	2-Wire Cradle (black)
TT 37-112940	Maintenance Cable (SDU Front Connector Maintenance to PC)
TT 83-119958	CD with Aero-SDU Configuration Program

Table 2-1: Part numbers (Continued)

Part number	Configuration module description
405040A-835	CM for SBU with A700 key
405040A-825	CM for SBU with A700 key, Router option(s)
405040A-815	CM for SBU with A700 key, WiFi option(s)
405040A-805	CM for SBU with A700 key, Router, WiFi option(s)
405040A-875	CM for SBU with A700 key, Multi voice option(s)
405040A-865	CM for SBU with A700 key, Router, Multi voice option(s)
405040A-855	CM for SBU with A700 key, WiFi, Multi voice option(s)
405040A-845	CM for SBU with A700 key, Router, WiFi, Multi voice option(s)
405040A-8B5	CM for SBU with A700 key, ACARS+SB-Safety (ICAO) voice option(s)[a]
405040A-8A5	CM for SBU with A700 key, Router, ACARS+SB-Safety (ICAO) voice option(s)[a]
405040A-895	CM for SBU with A700 key, WiFi, ACARS+SB-Safety (ICAO) voice option(s)[a]
405040A-885	CM for SBU with A700 key, Router, WiFi, ACARS+SB-Safety (ICAO) voice option(s)[a]
405040A-8F5	CM for SBU with A700 key, Multi voice, ACARS+SB-Safety (ICAO) voice option(s)[a]
405040A-8E5	CM for SBU with A700 key, Router, Multi voice, ACARS+SB-Safety (ICAO) voice option(s)[a]
405040A-8D5	CM for SBU with A700 key, WiFi, Multi voice, ACARS+SB-Safety (ICAO) voice option(s)[a]
405040A-8C5	CM for SBU with A700 key, Router, WiFi, Multi voice, ACARS+SB-Safety (ICAO) voice option(s)[a]

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

a. By default, SB-Safety voice is not supported by the AVIATOR 700 system. If SB-Safety voice is required, contact your sales representative.

The Satellite Data Unit (SDU), the SwiftBroadband Unit (SBU) and the High Power Amplifier (HPA) must all be level E or level D approved. **No mismatch is allowed**.

Circuit breaker

Part number	Recommended aircraft circuit breakers
2TC2-4	Klixon 2TC series, 4 A current rating (SDU)
2TC2-7.5	Klixon 2TC series, 7.5 A current rating (SBU)
2TC2-20	Klixon 2TC series, 20 A current rating (HPA)

Table 2-3: Part numbers for Klixon circuit breaker

Trays and connectors

Part number	Approved tray
PO299-101	ECS Tray Assembly 1/4-size ATR (for SBU)
MT4-2346-101	EMTEQ Tray Assembly 1/4-size ATR (for SBU)
200-86686-101	ECS Tray Assembly 3/8-size ATR (for HPA and SDU)
MT4-3300-110	EMTEQ Tray Assembly 3/8-size ATR (for HPA and SDU)
Part Number	Required Connector Kit for SDU Tray
DPX2NA-67322-605 (old number: DPX2NA-67322-463)	ITT Cannon Connector, Dual Plug, contact arrangement top:33C4, bottom:106.
Part Number	Required Connector Kit for HPA Tray
616 697 173	RADIALL Dual Plug Connector, contact arrangement top: MC2, bottom: 32C2.
DPX2NA-67322-606 (old number: DPX2NA-67322-500)	Required Connector Kit for SBU tray: ITT Cannon Connector, Dual Plug, contact arrangement top: 33C4, bottom: 33C4.

Table 2-4: Part numbers for trays and connectors

Installation kits

For installation kits for the AVIATOR 700 system contact:

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

Table 2-5: Installation kits, contact information

ECS offers two installation kits, one for AVIATOR 700 (ECS part number: 120-14973-101) and one for the SBU (ECS part number: 120-14973-102).

Item in installation kit	AVIATOR 700	Upgrade from HSD+ to AVIATOR 700
ARINC connector, SBU (DPX2NA-67322-500 or DPX2NA-67322-606)	1	1
Tray Assembly, SBU, 1/4-size ATR W/DPX2 (P0299-101)	1	1
ARINC connector, SDU (DPX2NA-67322-463 or DPX2NA-67322-605)	1	—
ARINC connector, HPA (616697173)	1	—
Tray Assembly, HPA and SDU, 3/8-size ATR W/ DPX2 (200-86686-101)	2	—

Table 2-6: Basic installation kits from ECS

2.3 System block diagrams

2.3.1 Introduction

Overview

The following block diagrams and the wiring diagrams in section 5.3.3 show examples of satcom antennas that can be connected to the AVIATOR 700 system.

In order to use the satcom antenna with the AVIATOR 700 system, the specific antenna type and the AVIATOR 700 system must be *Type Approved* by Inmarsat as a combined system. AVIATOR 700 systems will be Inmarsat Type Approved with more antennas as requested by market requirements. Contact your Cobham sales/support representative for the latest status on Inmarsat Type Approvals for satcom antennas for the AVIATOR 700 system.

The following block diagrams show the basic system component interconnection.

The first diagrams show the wiring differences according to antenna choice and antenna steering source. The following system block diagrams show the user interfaces and the system interface to the MagnaStar system PBX communication.

Selection of DLNA

Important Whether the antenna system is ARINC 741 or ARINC 781, **the DLNA must be ARINC 781 Type F compliant** and contain extra TX-filtering for protection of the GNSS and Iridium band.

2.3.2 ARINC 741 compatible High Gain Antenna

The AVIATOR 700 system supports ARINC 741 compatible antenna systems, such as a HGA-6000 antenna or an HGA-7000 antenna with an HGA-7000 BSU.

Note In an AVIATOR 700 system, there are extra requirements to the DLNA. For further information, see *Selection of DLNA* on page 2-16.

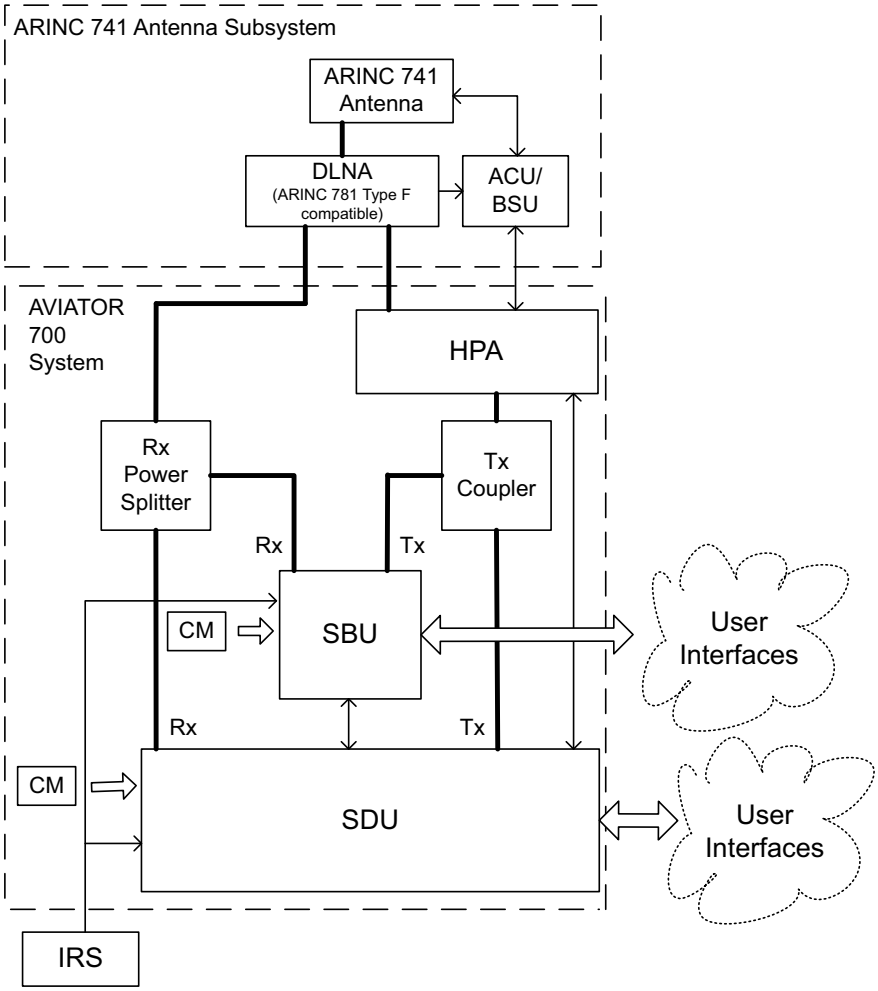
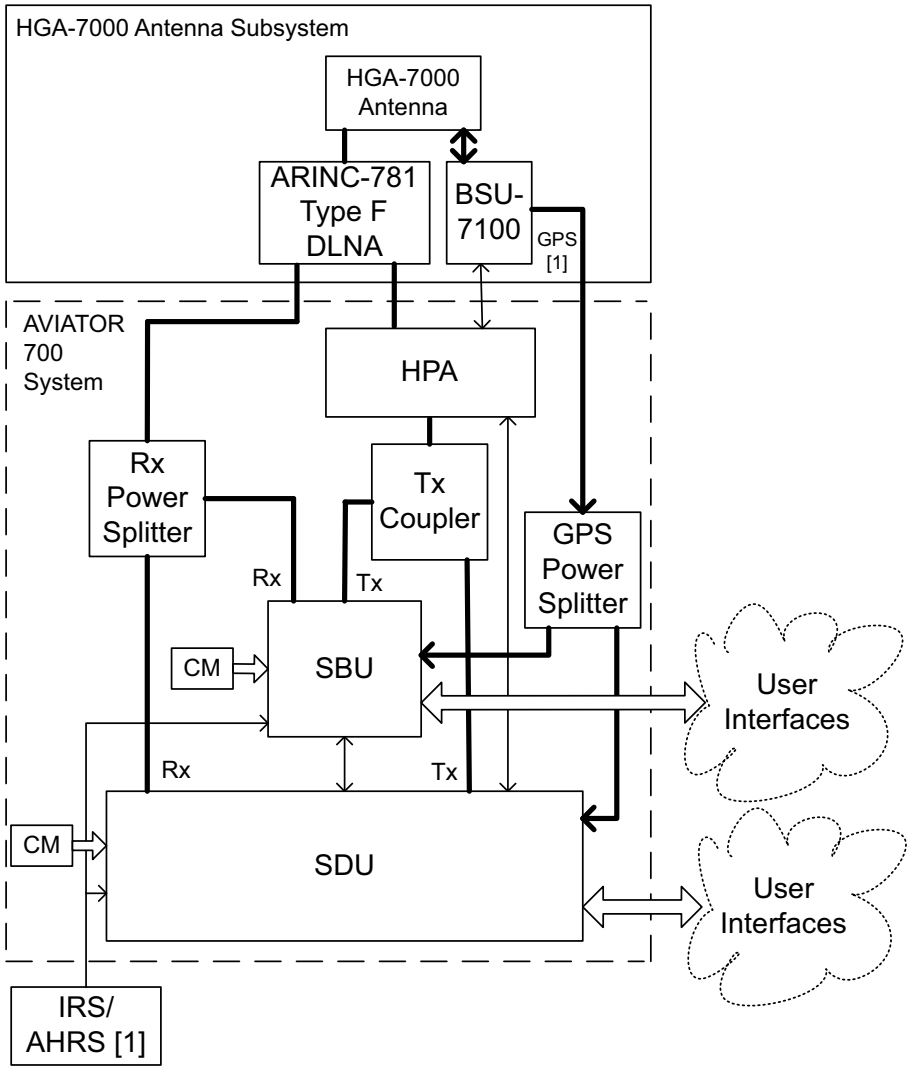


Figure 2-6: System Configuration with ARINC 741 Compatible HGA and IRS

You can also configure the system with AHRS/GPS.



[1] : AHRS can only be used when GPS signal is routed from the BSU-7100

Figure 2-7: System Configuration with HGA 7000

2.3.3 Dual side panel antenna system

An ARINC 741 dual side panel antenna system may be installed, in order to improve the view to the satellite.

Note In an AVIATOR 700 system, there are extra requirements to the DLNA. For further information, see *Selection of DLNA* on page 2-16.

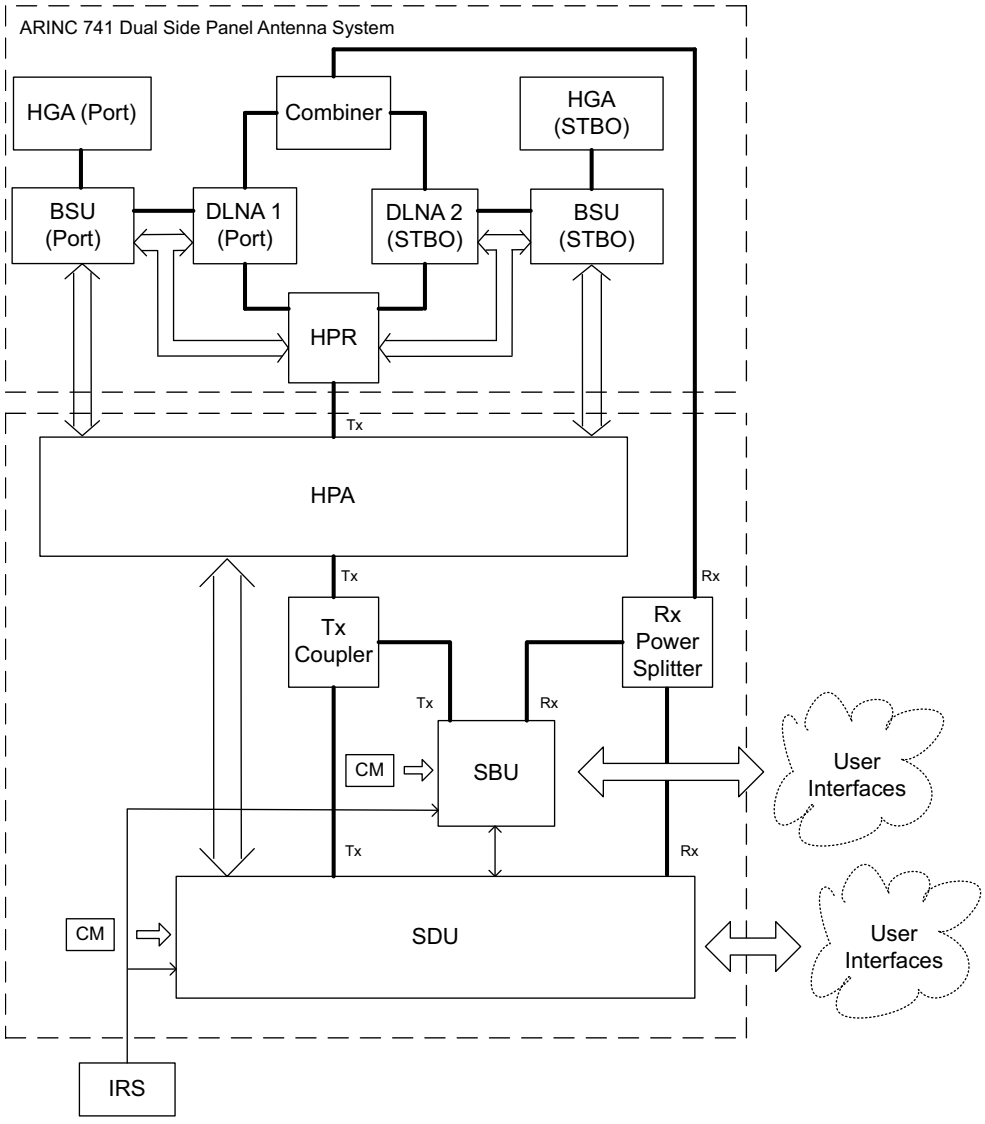


Figure 2-8: System Configuration with Dual Side Panel Antenna System & IRS

2.3.4 ARINC 781 compatible High Gain Antenna

The AVIATOR 700 system supports ARINC 781 compatible antenna systems.

Note In an AVIATOR 700 system, there are extra requirements to the DLNA. For further information, see *Selection of DLNA* on page 5-16.

You can also configure the system with AHRS/GPS.

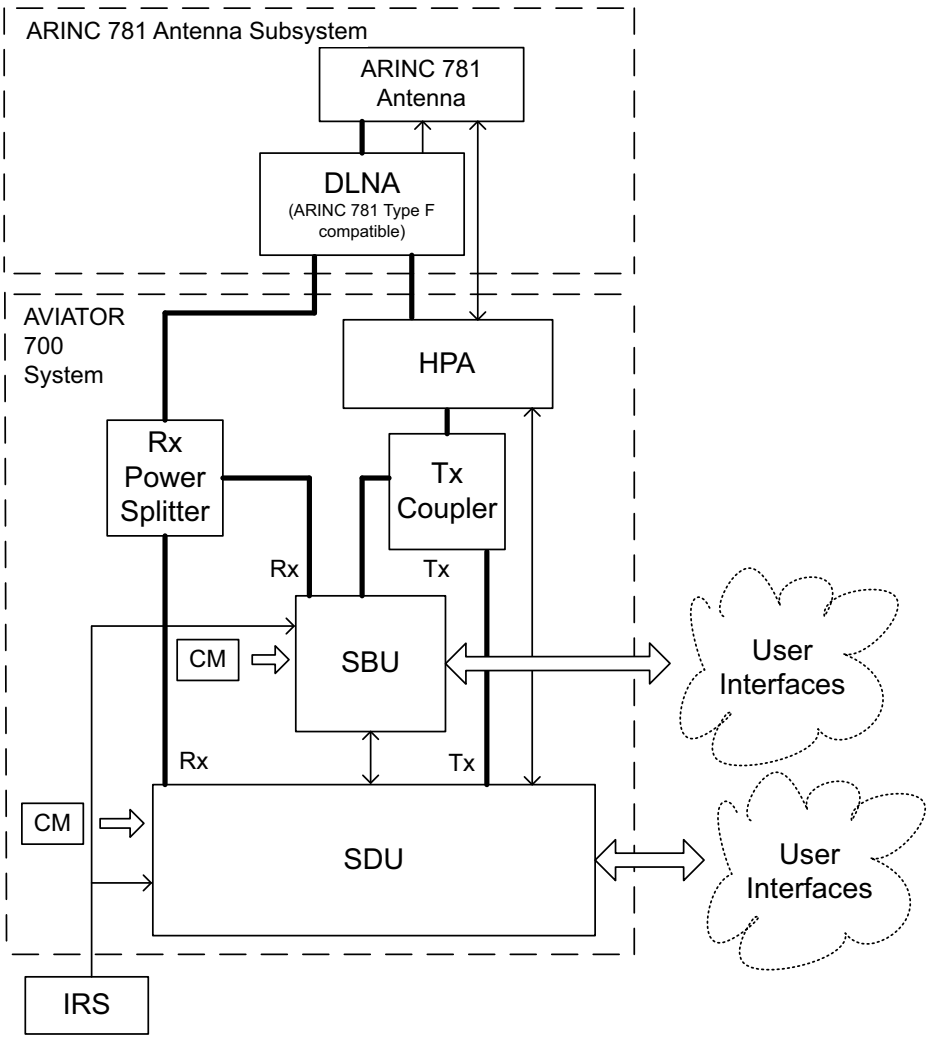


Figure 2-9: System Configuration with ARINC 781 Compatible HGA with IRS

2.3.5 User interfaces

The AVIATOR 700 system has the following user interfaces:

Interfaces	SDU	SBU
4-wire PBX interfaces This interface can be used e.g. for the TT-5620A 4-Wire Handset and TT-5622A 4-Wire Cradle. For additional information on the use of the 4-wire interfaces see *Wiring telephone systems* on page 5-46.	4	0
2-wire POTS interface This interface can be used for the TT-5621B 2-Wire Handset and TT-5622B 2-Wire Cradle or other POTS handsets. The TT-5622B 2-Wire Cradle has an RJ11 connector to which additional 2-wire terminals can be connected, e.g. for fax or modem data.	2	2
10/100BaseT Ethernet interfaces for connecting IP equipment. Note that the SBU has a Built-in Router option. The SBU has an additional Ethernet interface for system configuration (Maintenance connector on the SBU front plate, not shown in the following figure)	1	6
Built-in Wireless Option with two WLAN antenna interfaces for diversity operation to connect WiFi-enabled equipment like lap tops, Smart phones or VOIP handsets.	0	1
Euro ISDN S-bus interface for PC, Fax or STE)	1	1[a]
ARINC 429 interfaces for e.g. ACARS/AFIS/CMU (2 x) or MCDU (2 x).	4	0
Discrete outputs for annunciators	3	4

Table 2-7: User interfaces, overview

a. Without DC power support.

The following figure shows most of the possible user interfaces.

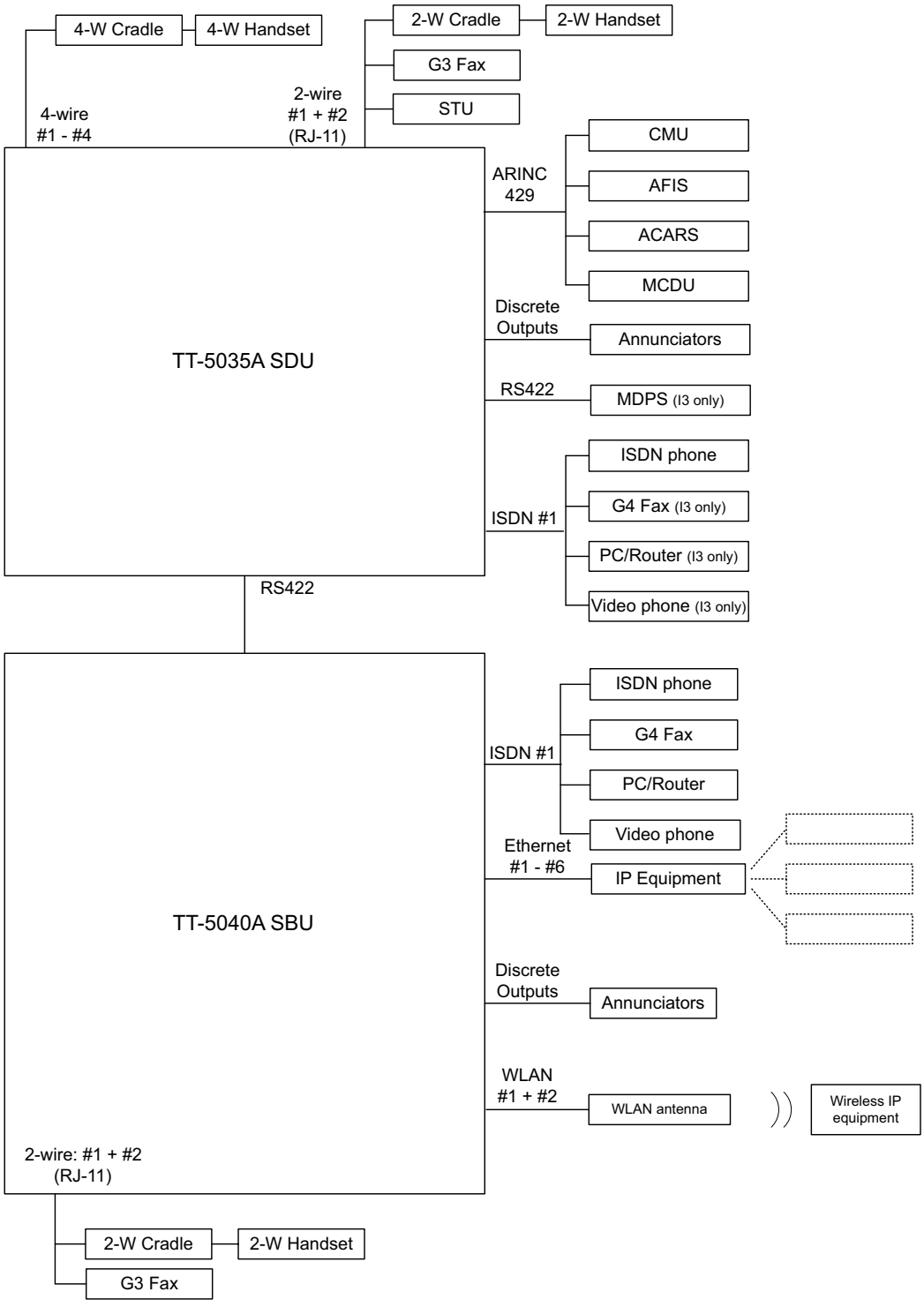


Figure 2-10: System Configuration showing the user interfaces

2.4 Operation overview

2.4.1 Configuration

There are two configuration tools for the AVIATOR 700 system:

- Aero-SDU Configuration Program for the SDU
  The configuration tool for the SDU is the Aero-SDU Configuration Program. It is launched from a standard PC connected to the front connector of the SDU (RS232) with the maintenance cable (see *Figure 5-35: TT 37-112940 maintenance cable for front connector on SDU and PC*). For further information, see *Configure the basic system* on page 6-2.
- Web interface for the SBU
  The configuration tool for the SBU is the built-in web interface, which can be accessed from a standard PC connected to the Maintenance connector of the SBU. Note that the configuration settings can only be accessed from the Maintenance connector (Ethernet) on the front of the SBU. For further information, see *SBU Configuration tasks* on page 6-13.

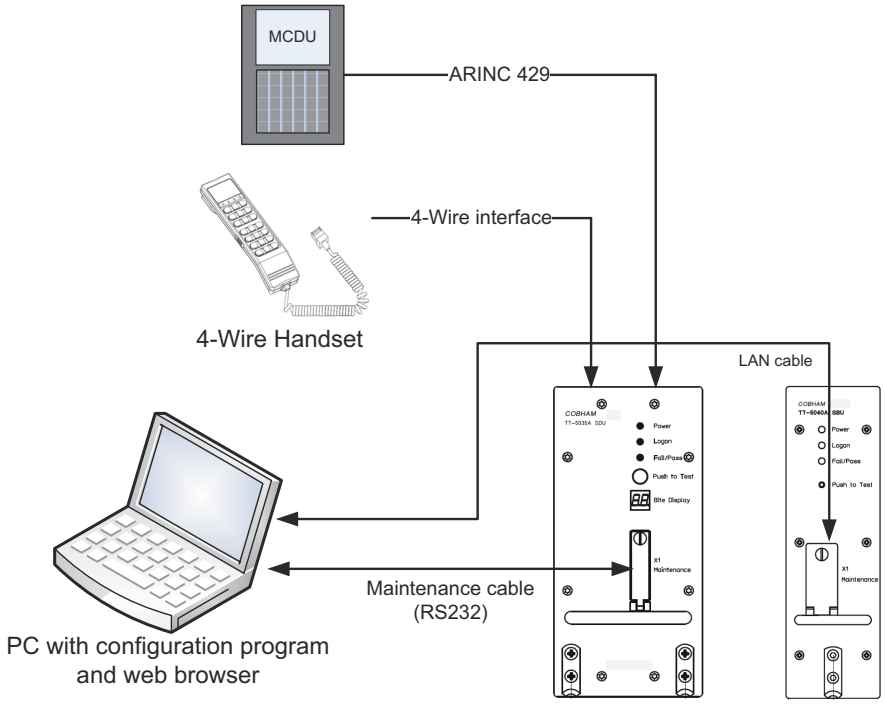


Figure 2-11: Configuration of the SDU and SBU, overview

2.4.2 Operation

The core components of the AVIATOR 700 System are the SDU with the classic aero services and the SBU providing SwiftBroadband services. These two units share the same satcom antenna and HPA. When installing the system you must bear in mind at which unit the handsets and PC equipment are connected, so you prepare the installation for the future use of various handsets and computers in the cabin.

You can operate the AVIATOR 700 System from several user interfaces:

- A 4-Wire Handset connected to the SDU. The display and keypad of the handset give access to the menu system of the SDU.
- The MCDU connected to the SDU. The display and keys of the MCDU give access to a menu system to control the SDU.
- The web interface of the SBU. It is used to for Internet access, e-mail, IP streaming and FTP services. It gives also access the SBU phone book, call log and SBU settings. used for daily operation of the SBU. The settings can be accessed from any of the LAN interfaces, including WLAN.

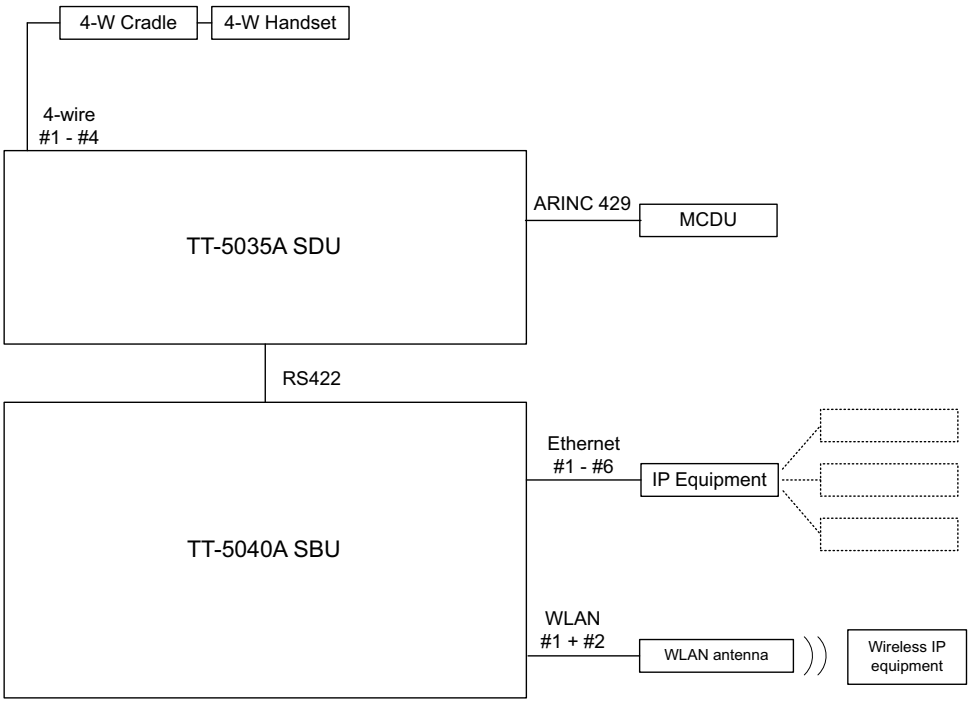


Figure 2-12: Interfaces for operating the AVIATOR 700 system

Refer to the AVIATOR 700 User Manual for detailed operating procedures. The AVIATOR 700 User Manual introduces and explains system capabilities and features, handset controls and functions, placing and receiving calls, accessing the Internet, streaming sessions and use of the menu system.

Equipment drawings

3.1 Introduction

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

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

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

3.2 TT-5035A Satellite Data Unit

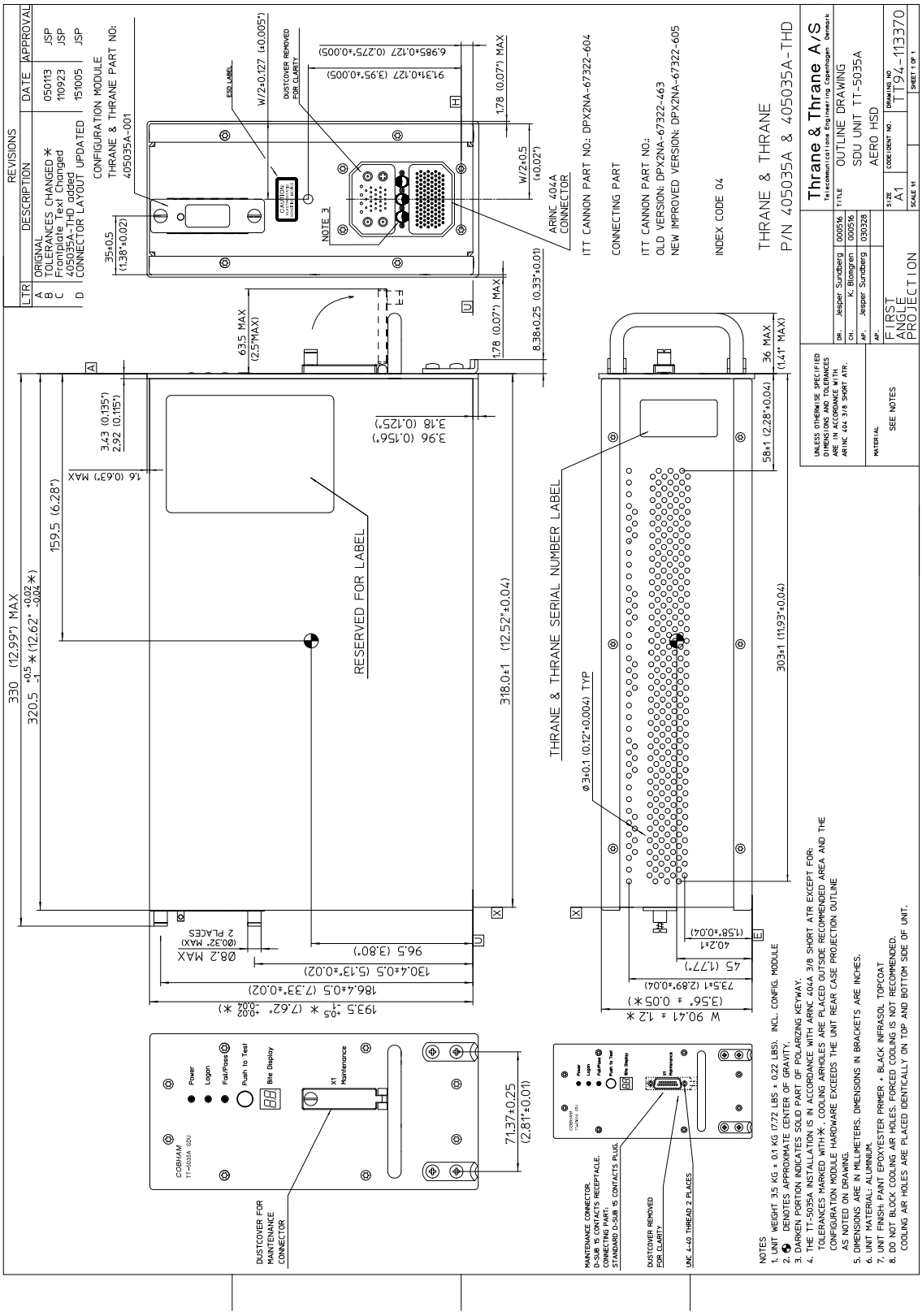


Figure 3-1: Outline Drawing: Satellite Data Unit

3.2.1 TT-5035A-001 Configuration Module (inserted in the SDU)

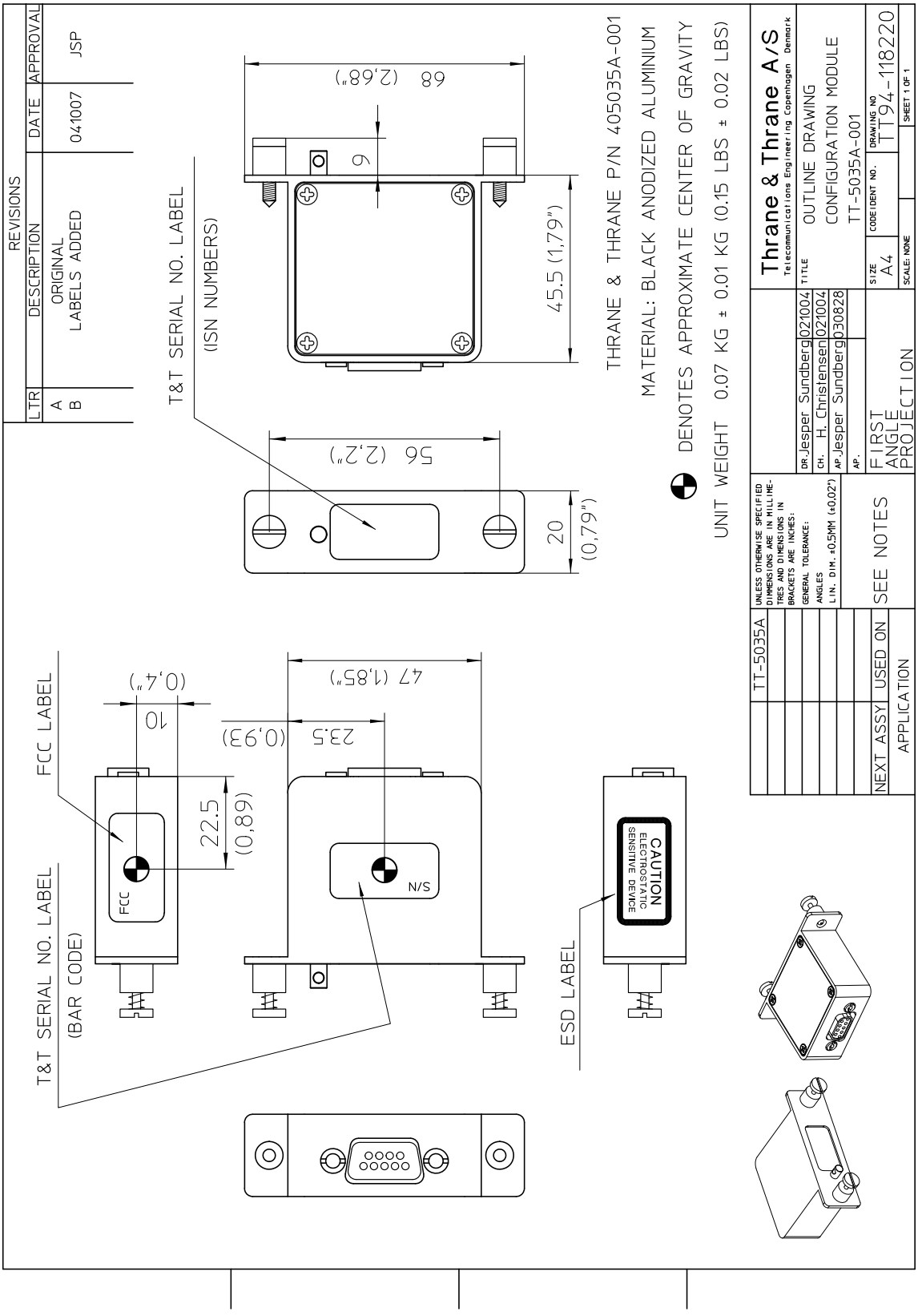


Figure 3-2: Outline Drawing: Configuration Module

3.3 TT-5014A High Power Amplifier

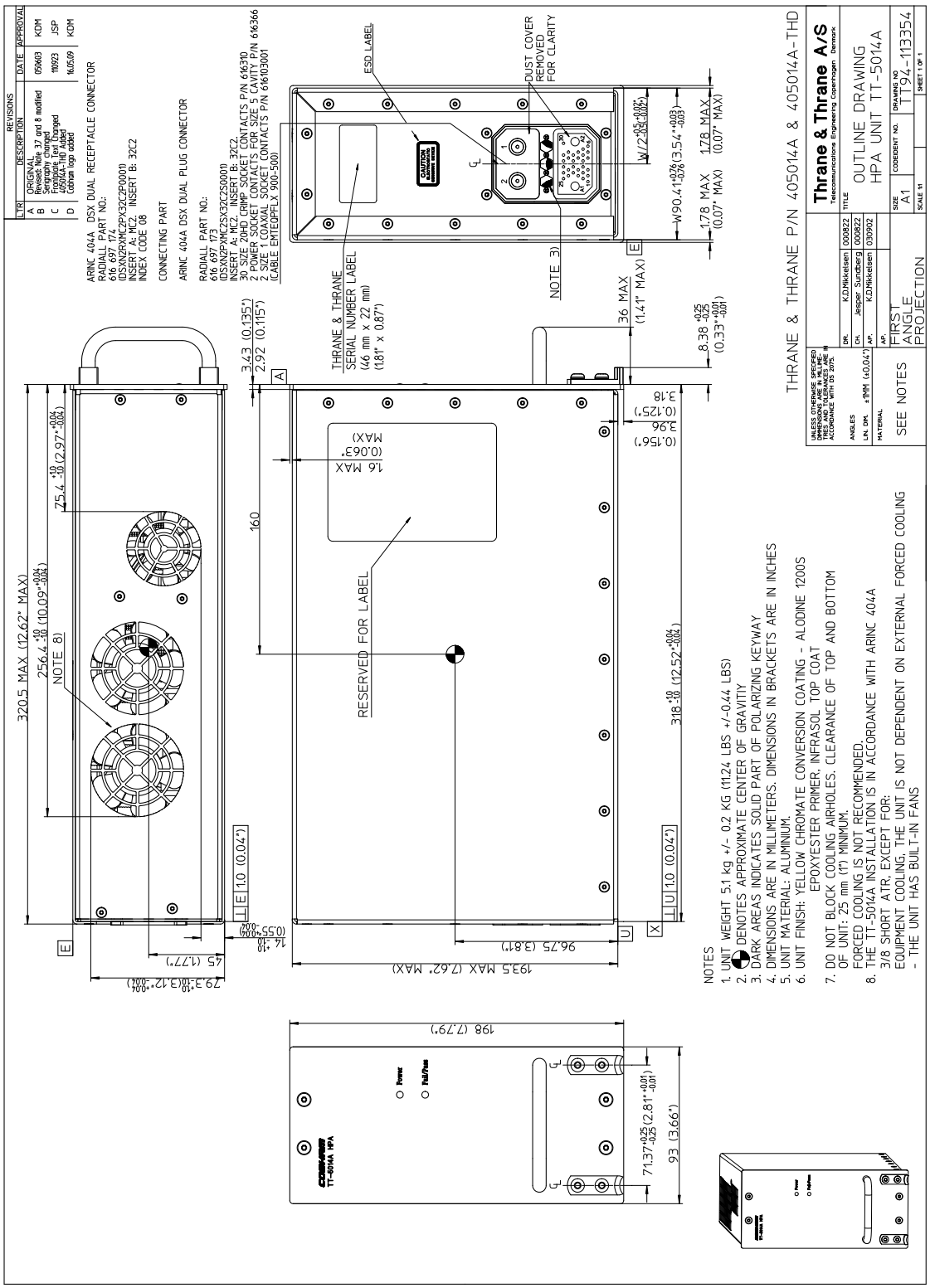


Figure 3-3: Outline Drawing: High Power Amplifier

3.4 TT-5040A SBU

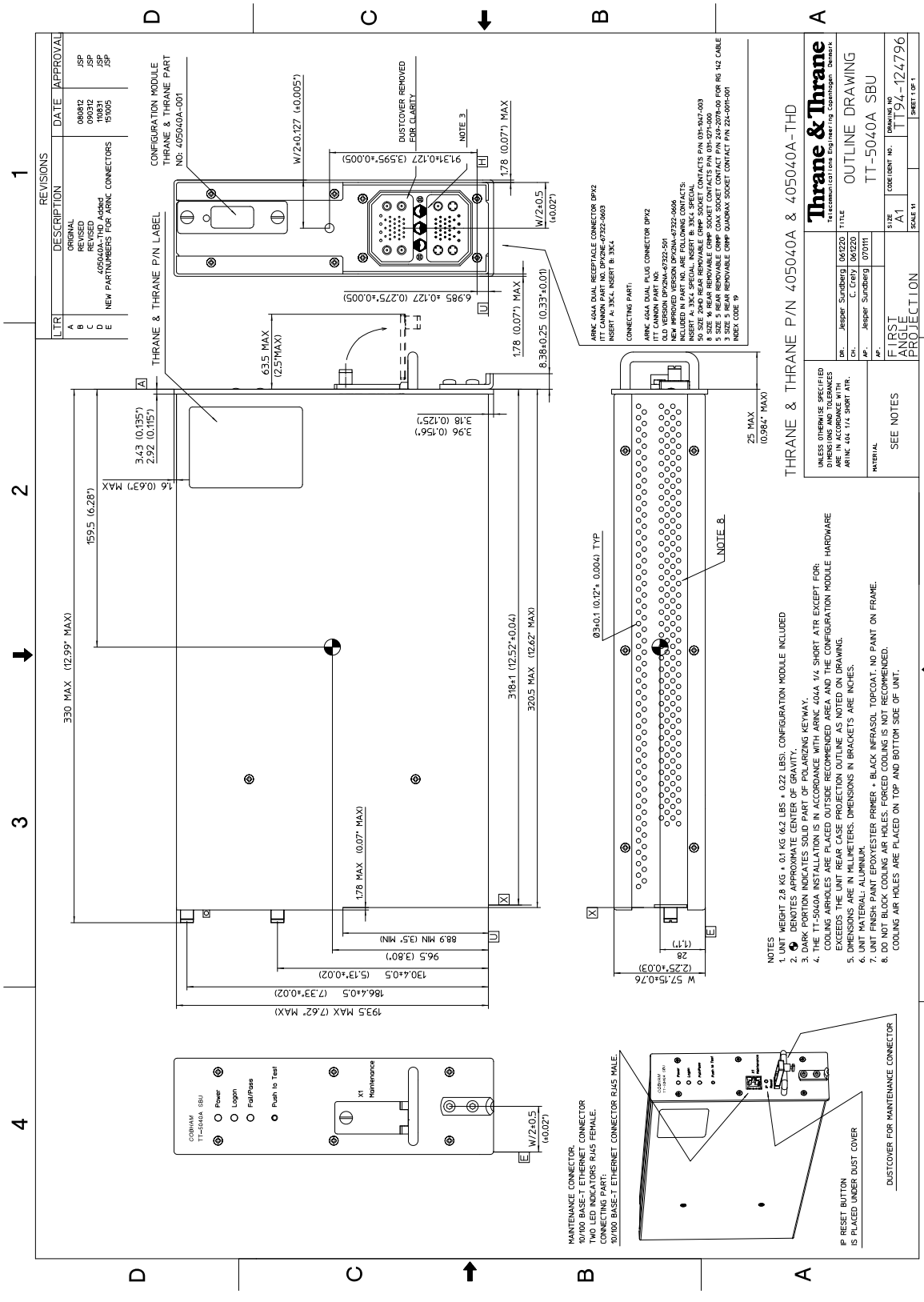


Figure 3-4: Outline drawing: TT-5040A SBU

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

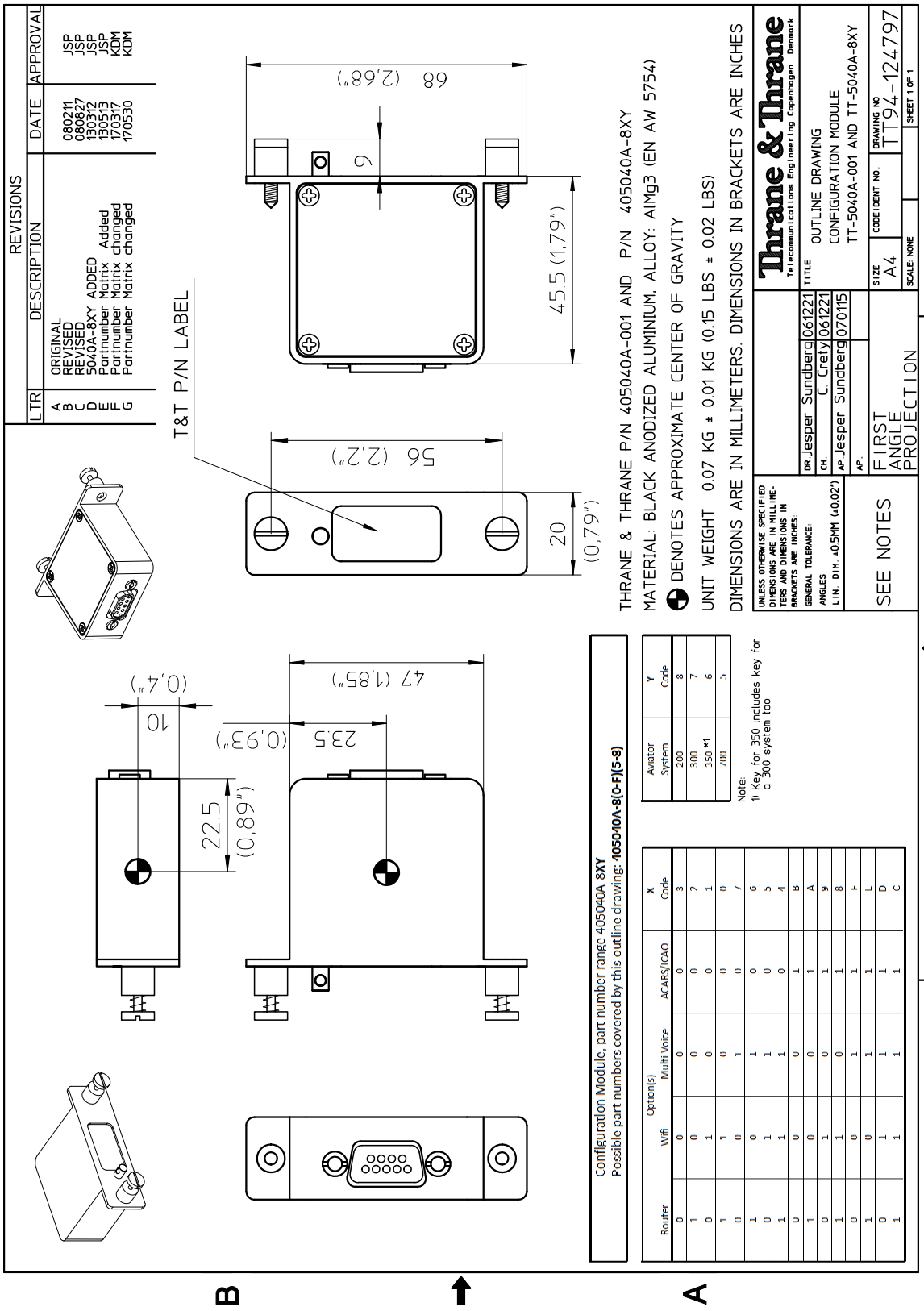


Figure 3-5: Outline drawing: TT-5040A-001 CM, inserted in the SBU

3.5 TT-5038A-002 Tx Coupler

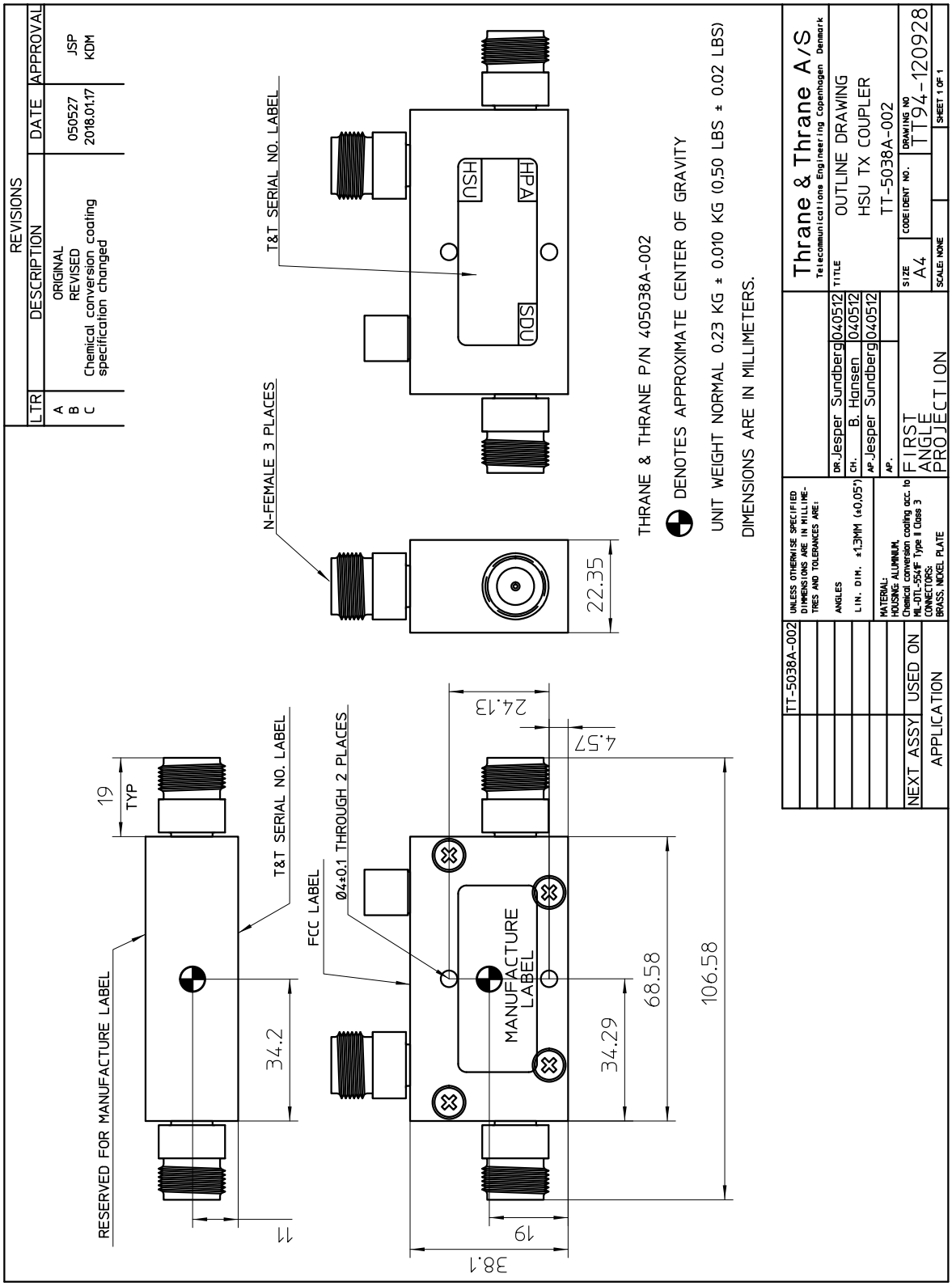


Figure 3-6: Outline Drawing: Tx Coupler

3.6 TT-5038A-003 Rx Power Splitter

Note If the Rx Power Splitter is to be mounted on a flat surface, mount it on a 3 mm mounting plate to provide enough space for mounting of the connectors. For further information see *Rx Power Splitter* on page 5-5.

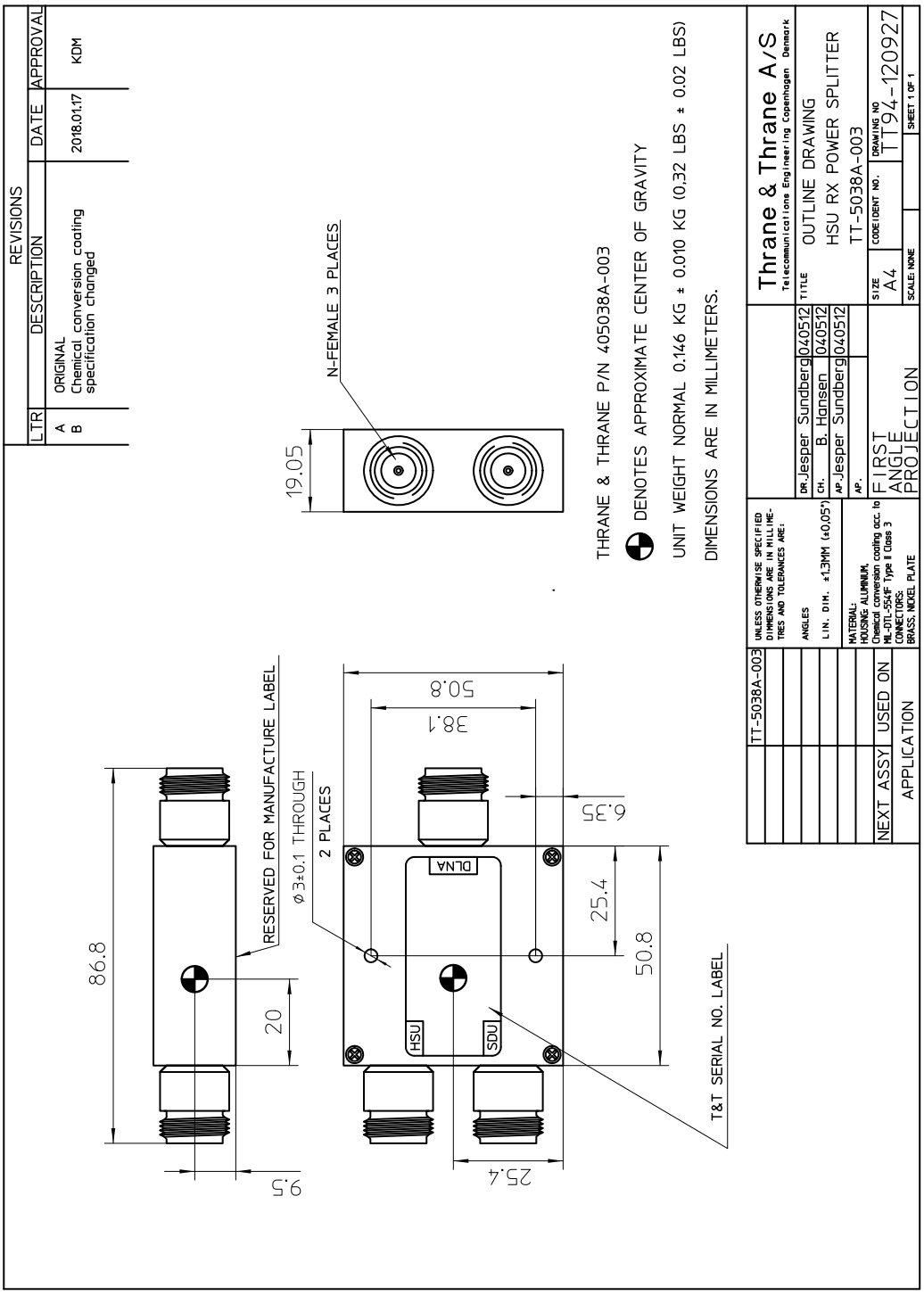


Figure 3-7: Outline Drawing: Rx Power Splitter

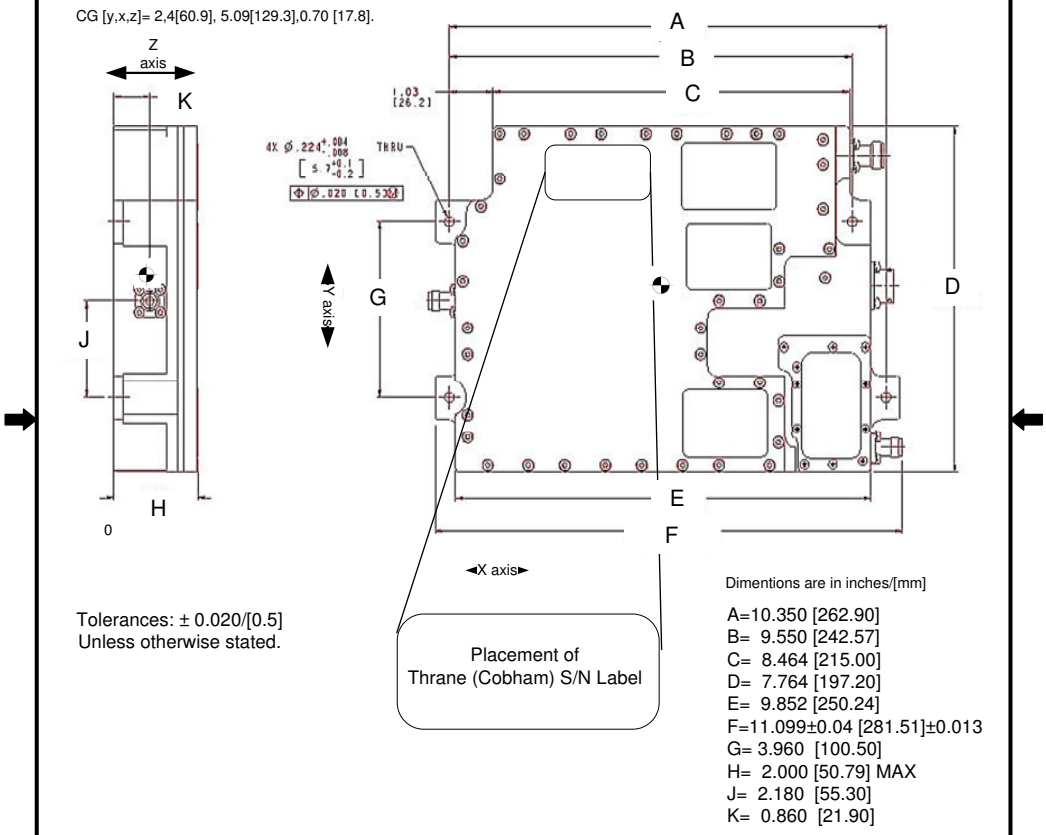
3.7 TT-5013A DLNA Type F

Original Manufacturer P/N: COMDEV 173628-101

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVAL
405013A	405013A	A	ORIGINAL	28-01-2010	HN
		B	mm [inches] indication swoped	01-12-2010	HN
		C	405013A OEM from comdev	14-08-2015	JCJ

The 405013A DLNA is identical to the COMDEV 173628-101 Type-F DLNA and the COMDEV 173628-101 MOD 01 Type-F DLNA.

Finish: mil-prf-85285 type 1, polyurethane #37038, cannoflage black
Surface roughness [1.6 micron] 63 microinch



Tolerances: ± 0.020/[0.5]
Unless otherwise stated.

Dimentions are in inches/[mm]

A=10.350 [262.90]
B= 9.550 [242.57]
C= 8.464 [215.00]
D= 7.764 [197.20]
E= 9.852 [250.24]
F=11.099±0.04 [281.51]±0.013
G= 3.960 [100.50]
H= 2.000 [50.79] MAX
J= 2.180 [55.30]
K= 0.860 [21.90]

REV STATUS OF SHEETS	REV LTR	A	B	C							
	SHEET NO.	1	1	1							

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 22768.

ANGLES

LIN.DIM.

MATERIAL

DR.	Hans Norring	28-01-10
CH.	BMA	28-01-10
AP.	BMA	28-01-10
AP.	PT	21-09-11

FIRST ANGLE PROJECTION

Thrane & Thrane A/S
Telecommunications Engineering Copenhagen Denmark

TITLE
405013A DLNA Type-F
Outline drawing

SIZE	CODE IDENT NO.	DRAWING NO.
A4	94-130854-C.VSD	TT94-130854

SCALE 2:1 | SHEET 1 OF 1

Figure 3-8: Outline drawing: DLNA Type F

3.8 TT-5620A 4-Wire Handset

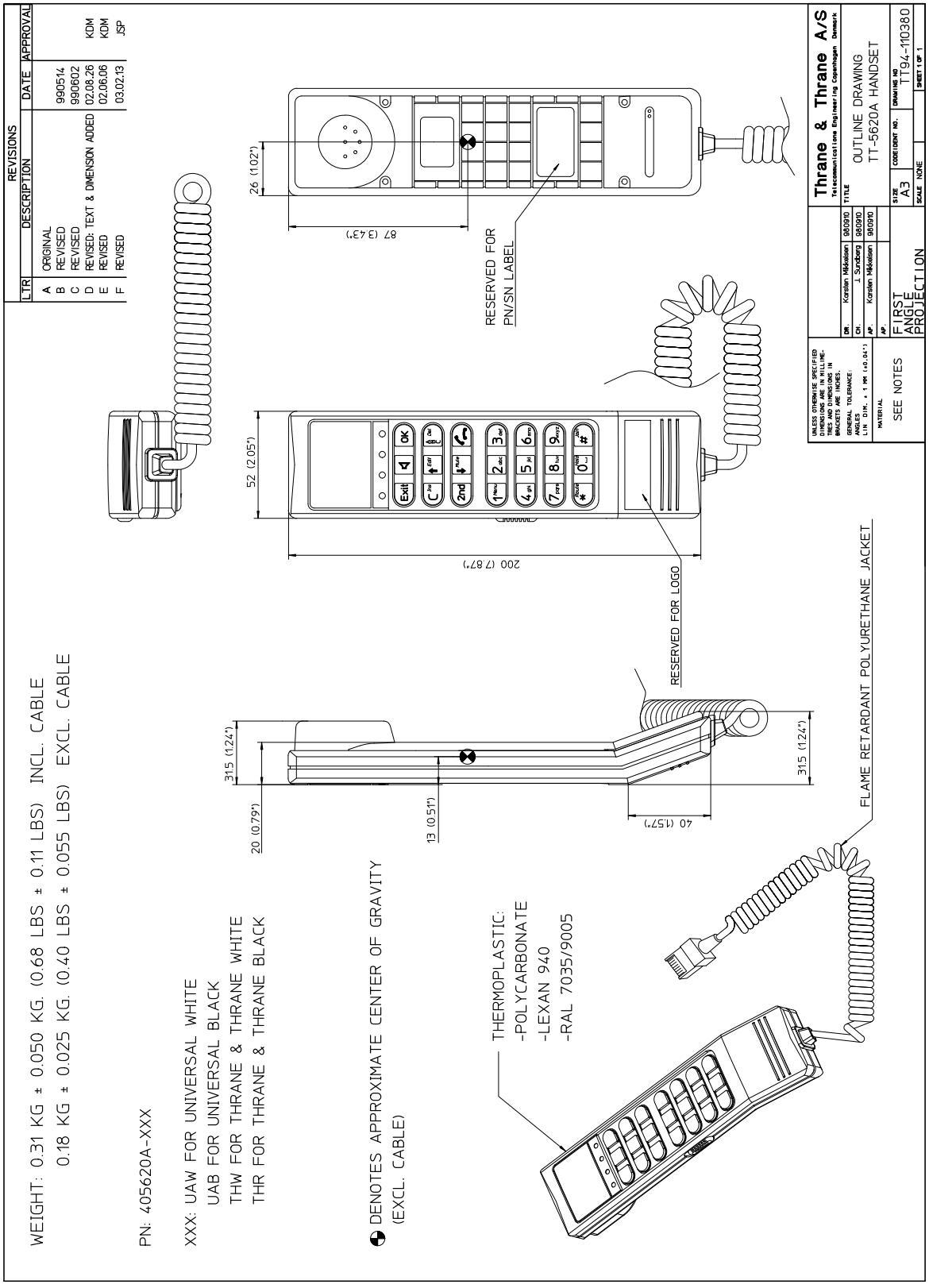


Figure 3-9: Outline Drawing: 4-Wire Handset

3.9 TT-5622A 4-Wire Cradle

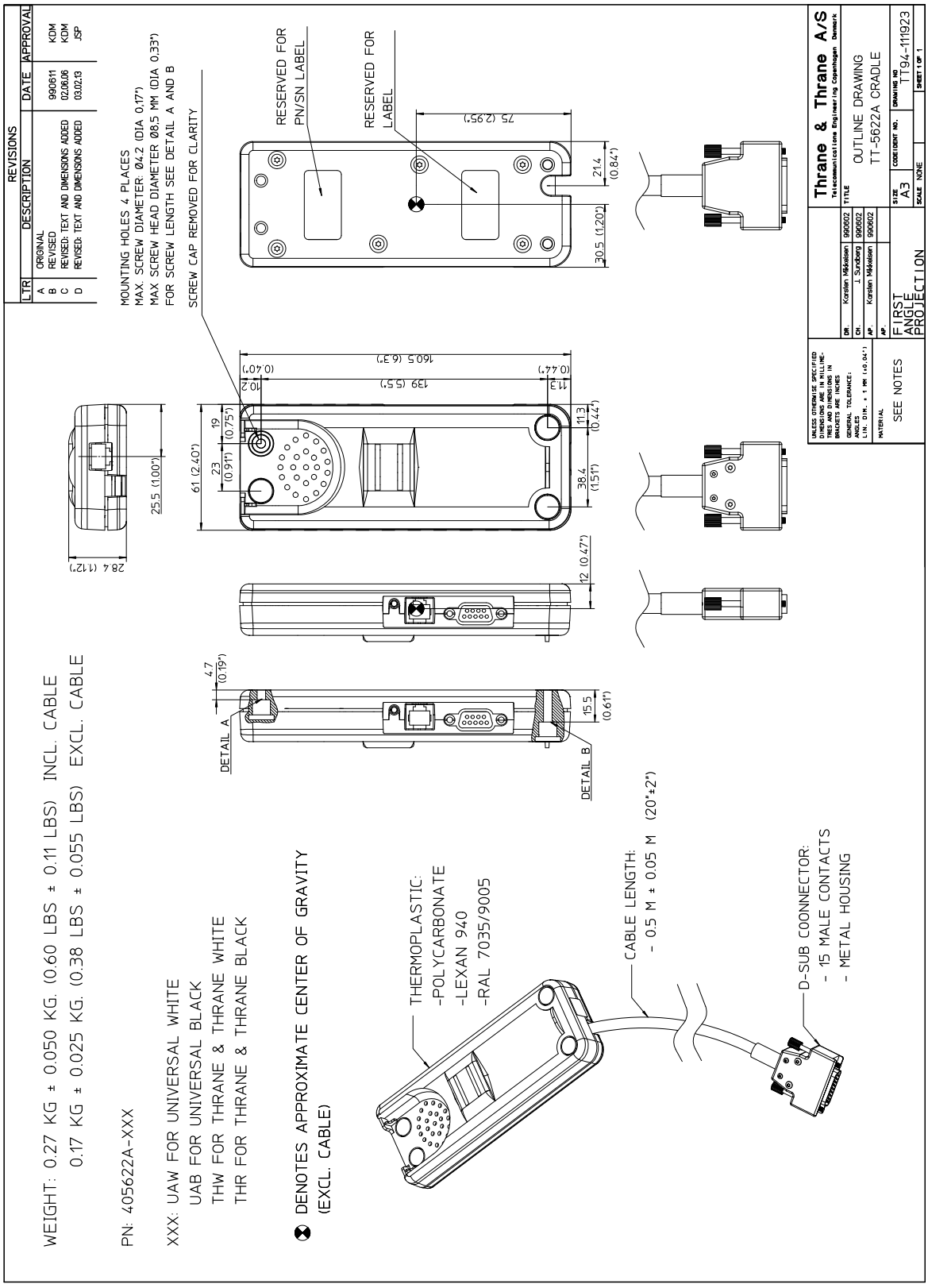


Figure 3-10: Outline Drawing: 4-Wire Cradle

3.10 TT-5621B 2-Wire Handset

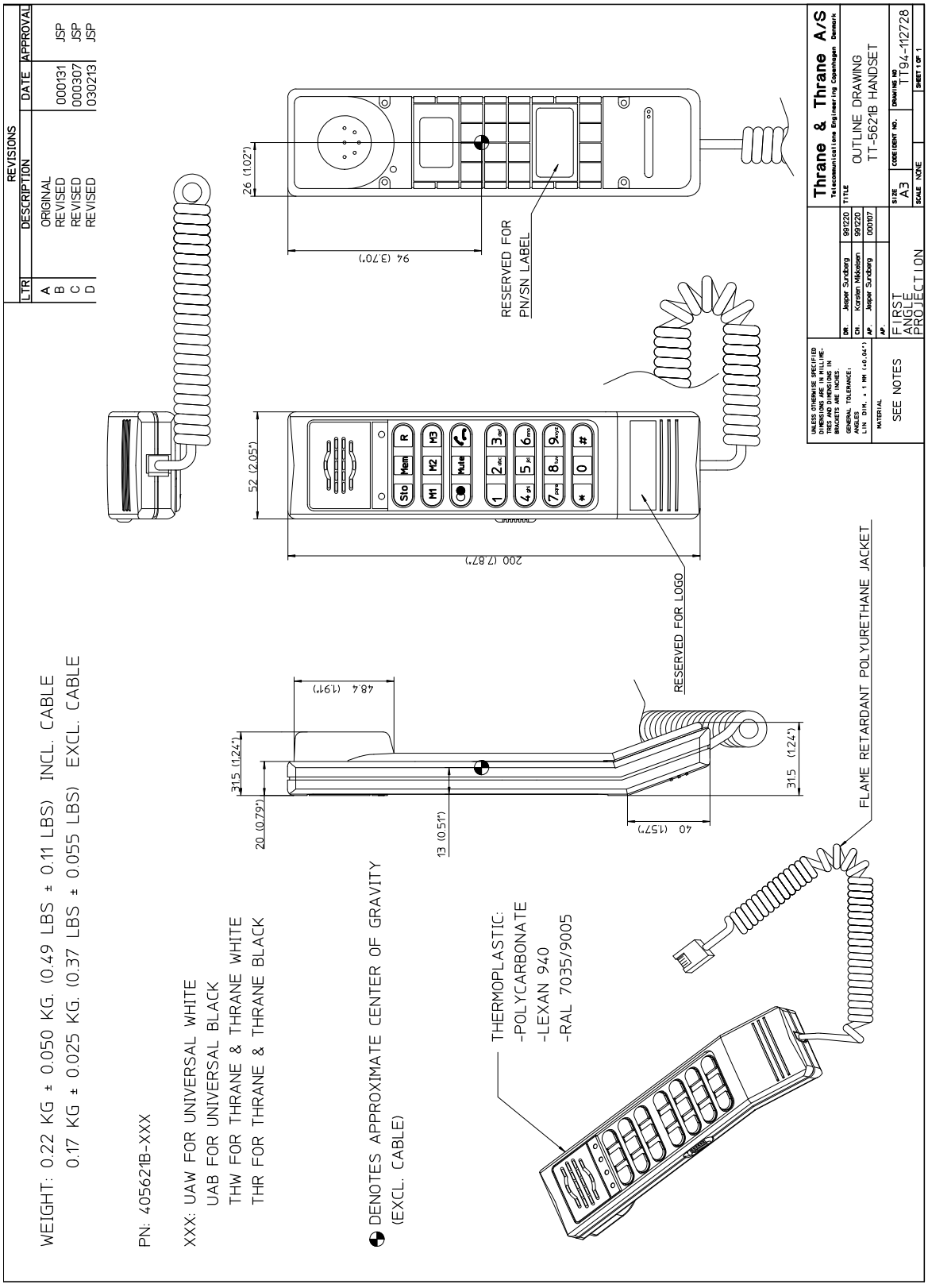


Figure 3-11: Outline drawing: TT-5621B 2-Wire Handset

3.11 TT-5622B 2-Wire Cradle

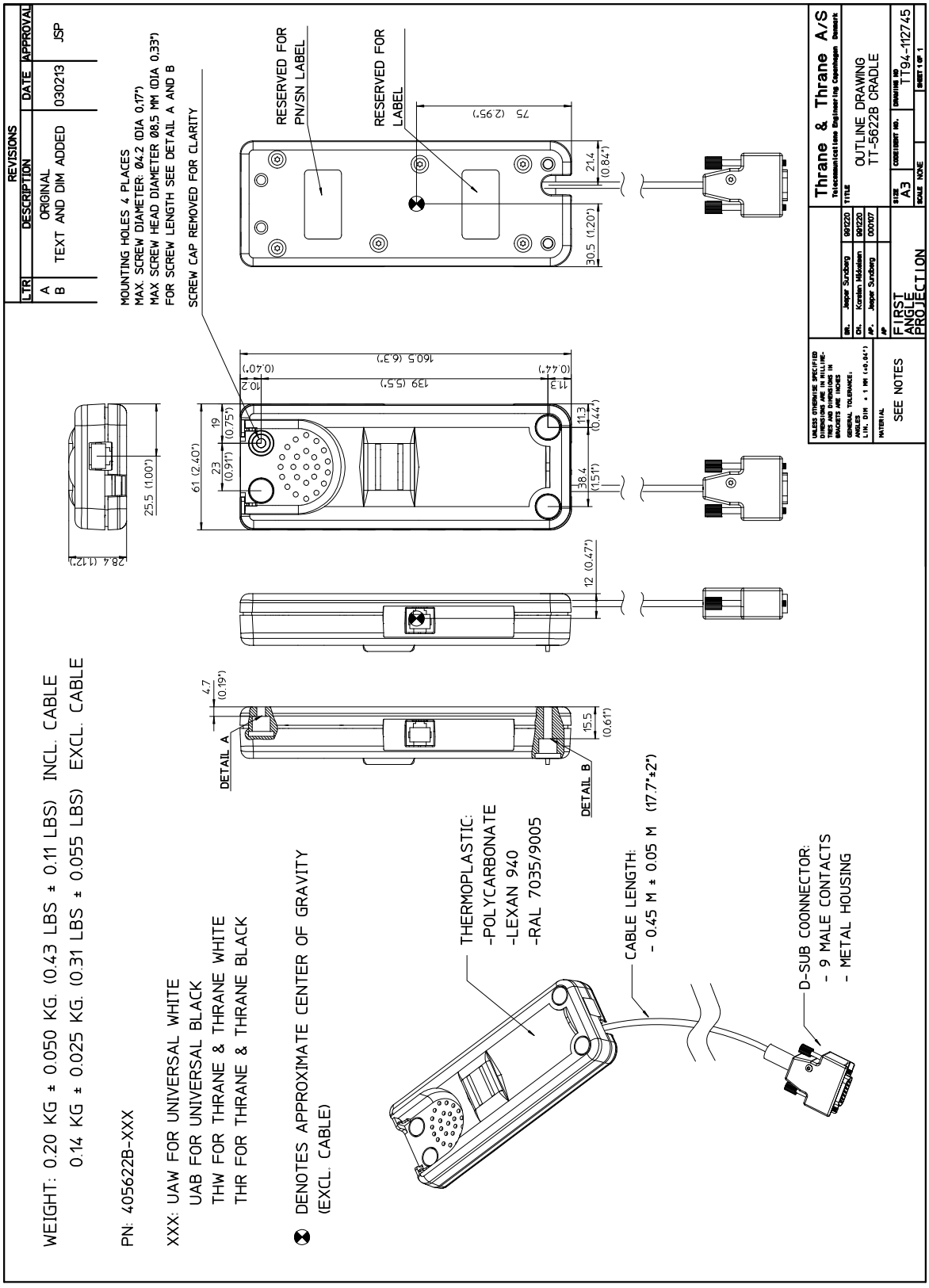


Figure 3-12: Outline drawing: TT-5622B 2-Wire Cradle

3.12 SBU trays

Note The comment OBSOLETE refers to the -102 assembly.

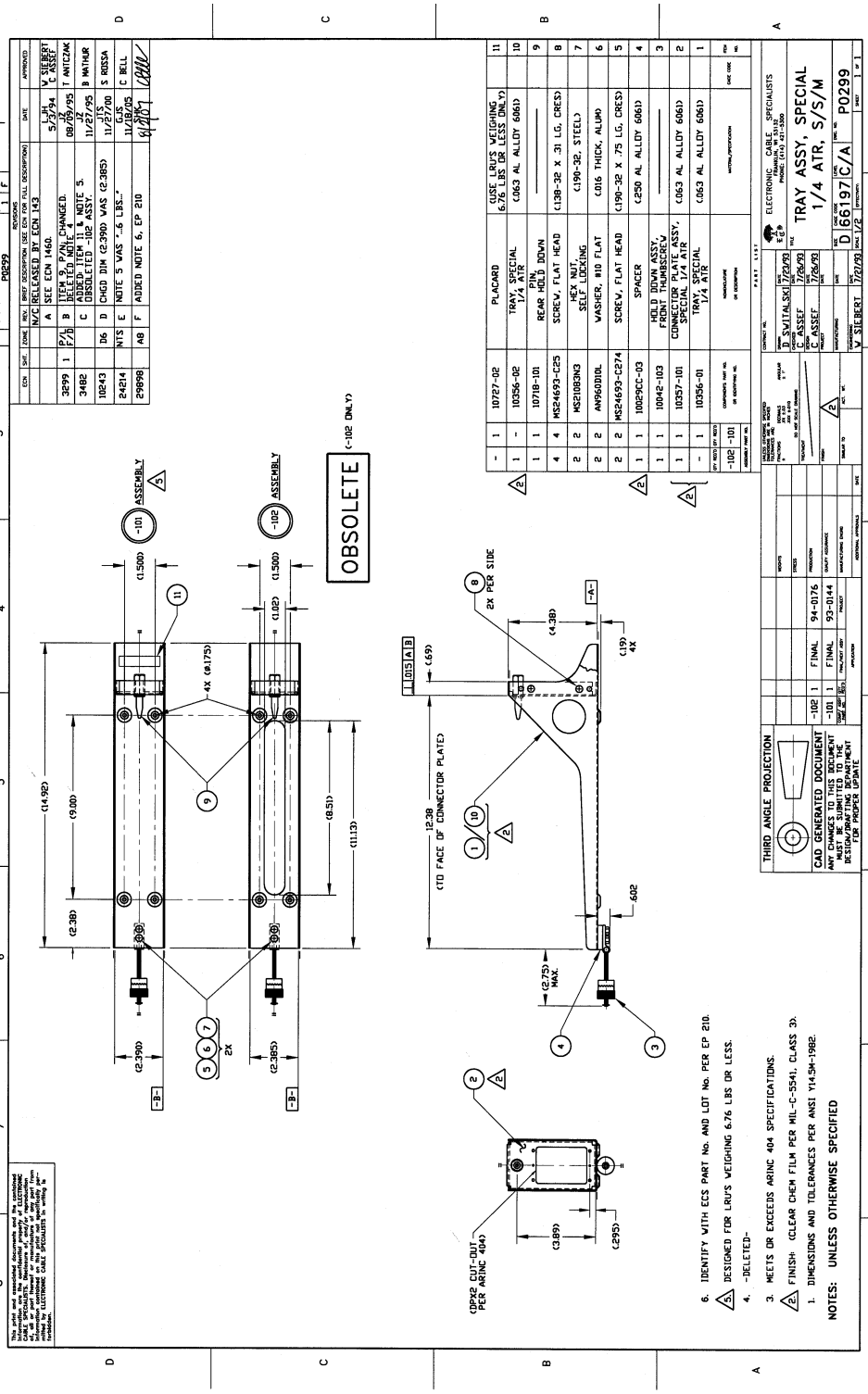


Figure 3-13: Outline drawing: SBU tray: ECS PO299-101

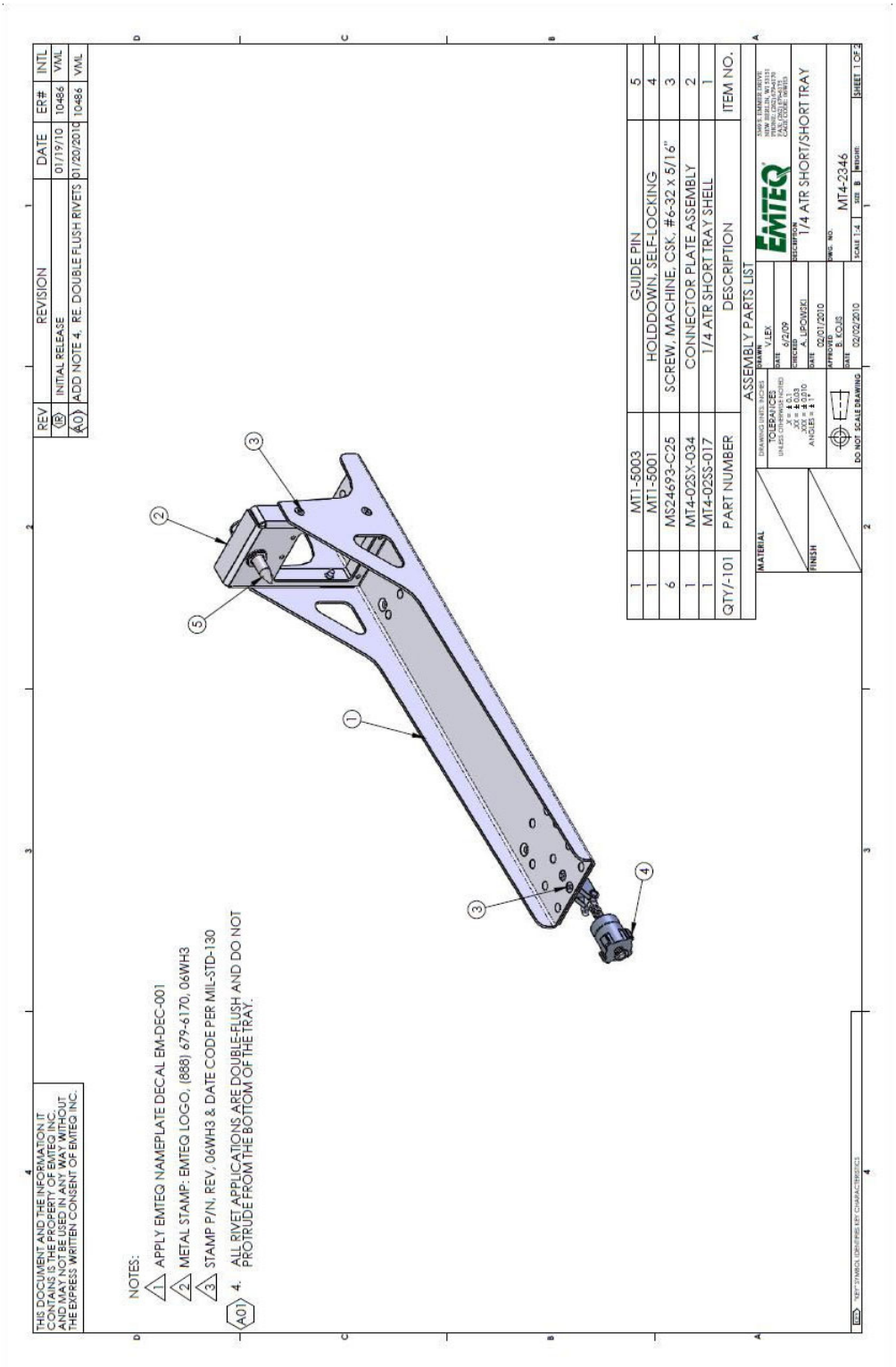


Figure 3-14: Outline drawing: SBU tray: EMTEQ MT4-2346-101 (page 1)

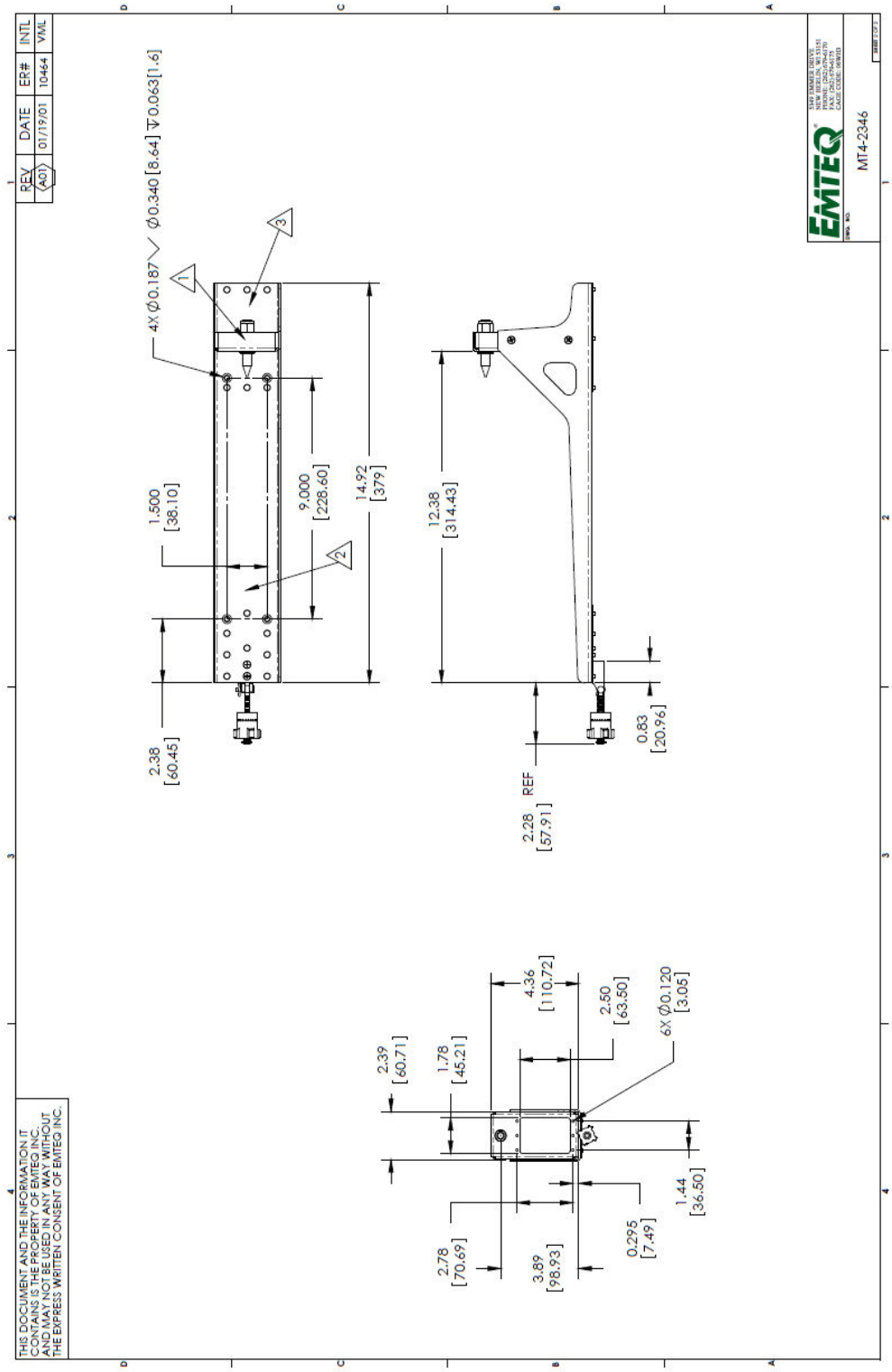


Figure 3-15: Outline drawing: SBU tray: EMTEQ MT4-2346-101 (page 2)

3.12.1 SDU and HPA tray

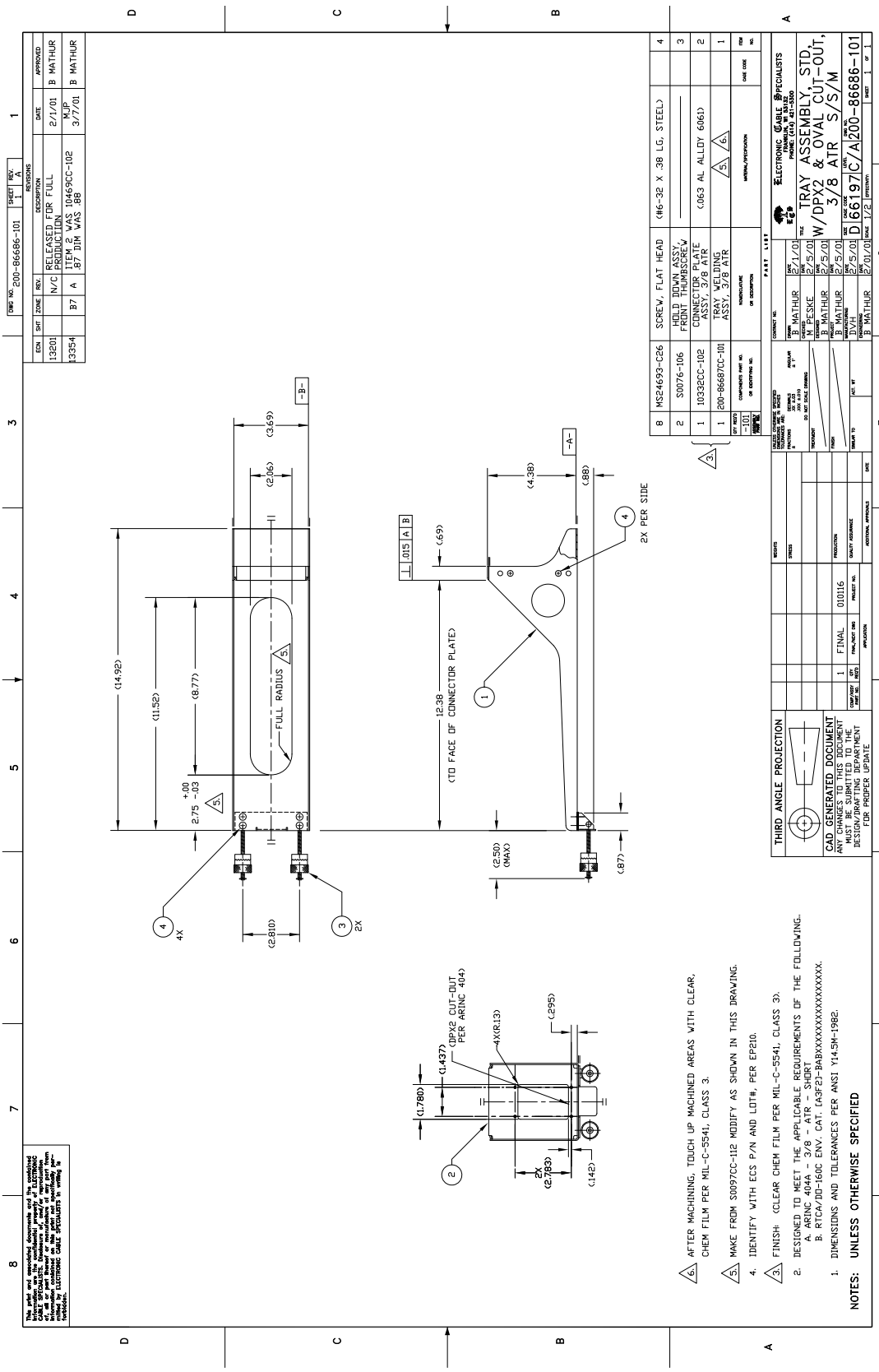


Figure 3-16: Outline Drawing: Tray for SDU and HPA.

3.13 SDU tray connector

For correct index pin codes for the SDU see Figure 4-2 on page 4-4.

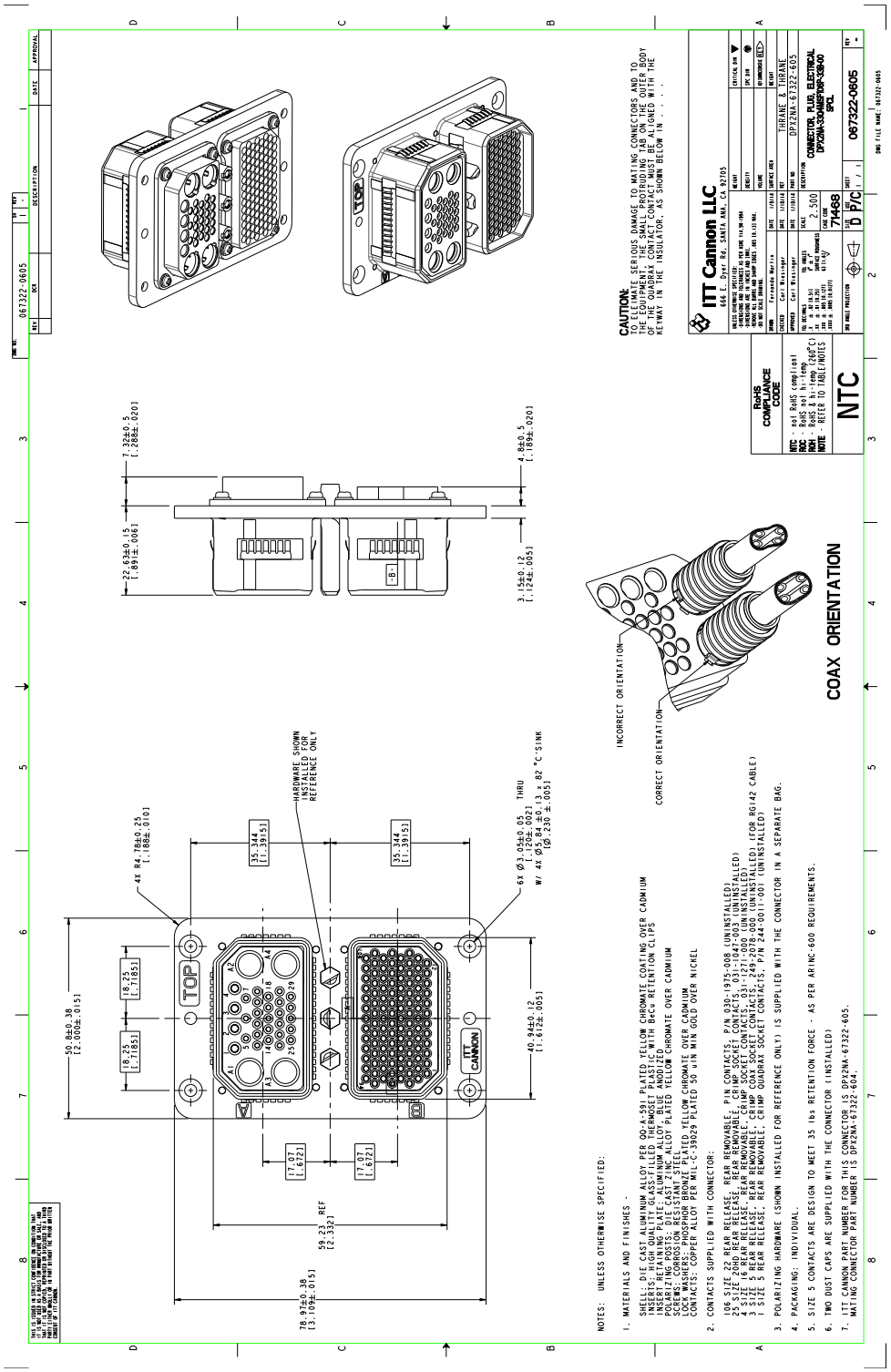


Figure 3-17: SDU Tray Connector: ITT Canon DPX2NA-67322-605

3.14 HPA tray connector

For correct index pin codes for the HPA see Figure 4-3 on page 4-10.

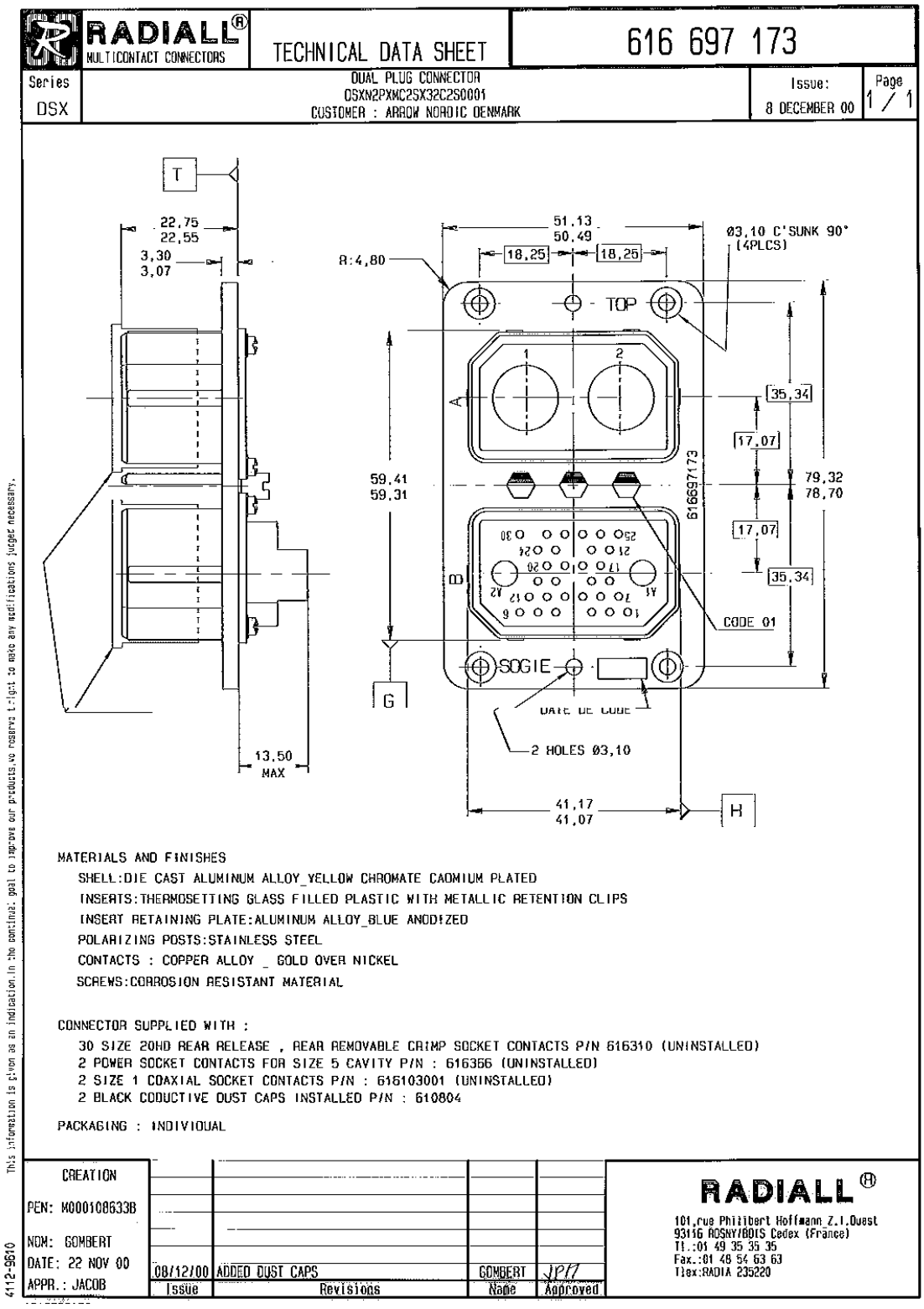


Figure 3-18: HPA Tray Connector

3.15 SBU tray connector

For correct index pin codes for the SBU see Figure 4-5 on page 4-14.

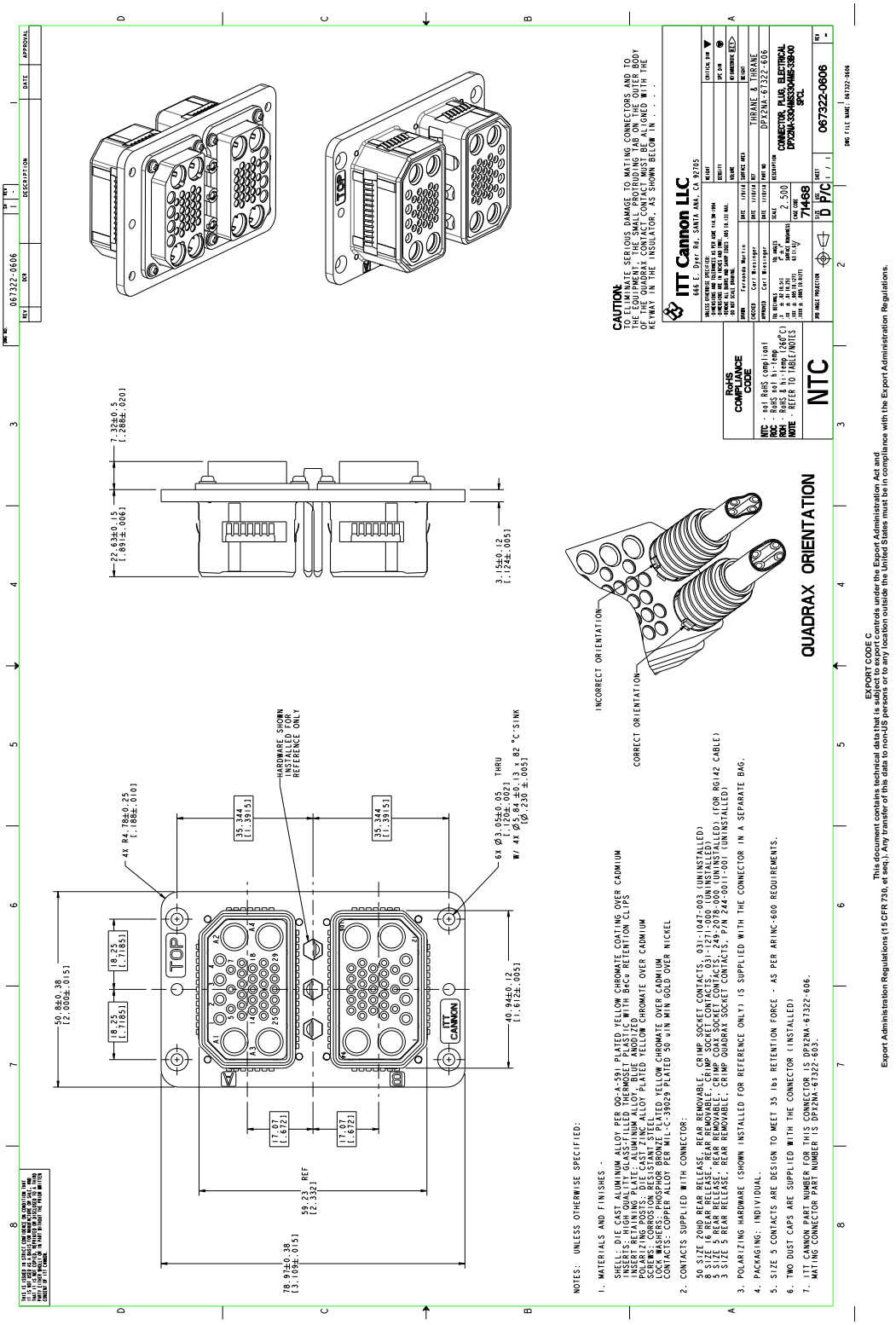


Figure 3-19: Outline drawing: SBU tray connector: ITT Cannon DPX2NA-67322-606

3.16 Contact Assembly: Quadrax Pin size 5 special

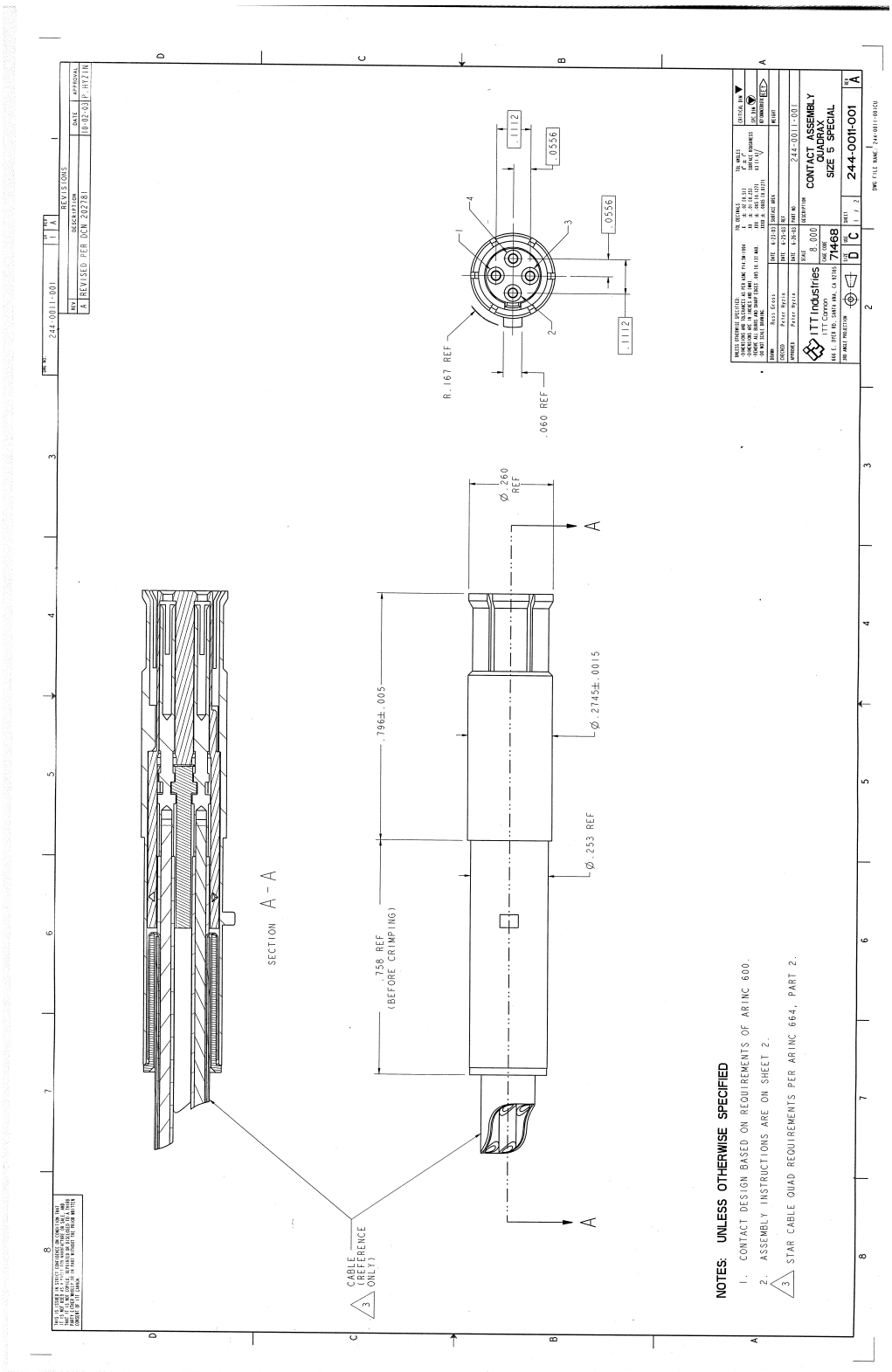


Figure 3-20: Contact Assembly: Quadrax Pin size 5 special: ITT Cannon 244-0011-001

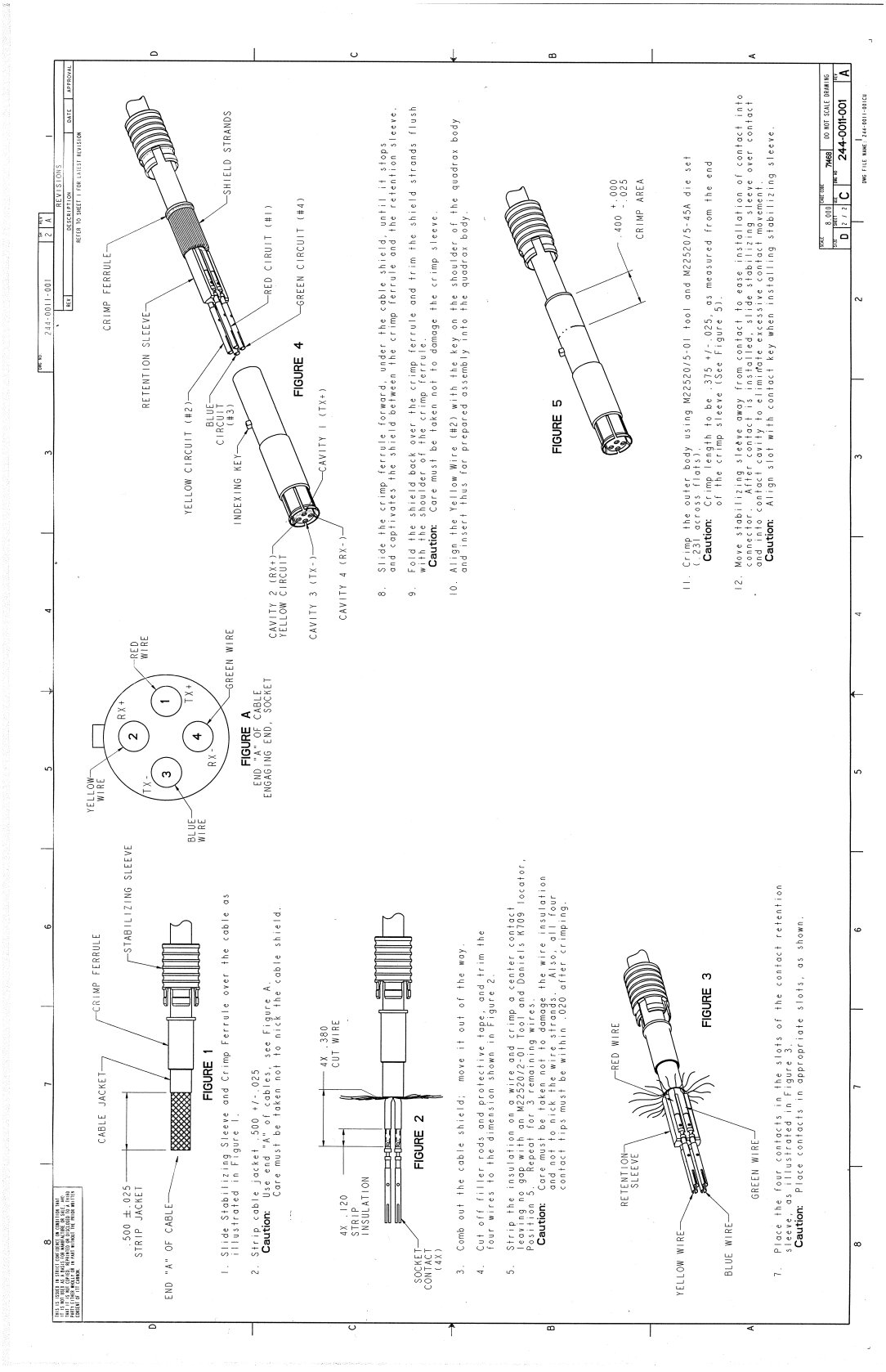
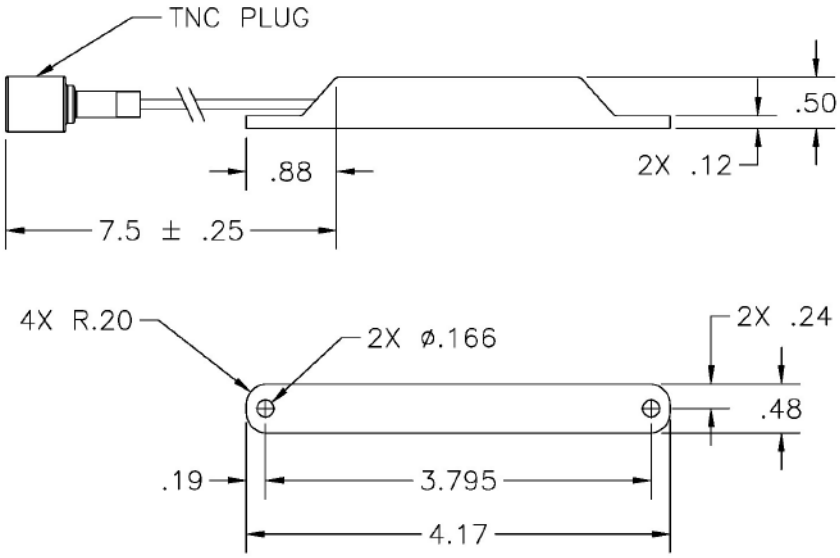


Figure 3-20: Contact Assembly: Quadrax Pin size 5 special: ITT Cannon 244-0011-001 (Continued)

3.17 TT-5040A-004 WLAN antenna

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



Measures are in inches.

Figure 3-21: Outline drawing: TT-5040A-004 WLAN antenna

Connectors and pin-out

This chapter has the following sections:

- *TT-5035A Satellite Data Unit*
- *TT-5014A High Power Amplifier*
- *TT-5040A SBU*
- *Cradle connectors for handsets*
- *Mating connectors in aircraft*

4.1 TT-5035A Satellite Data Unit

4.1.1 Connectors on SDU

There are three connectors on the SDU:

- Maintenance (front connector):
  Interface to PC and Handset for configuration and maintenance purposes.
  A 15 pin Female Sub-D Filter connector
- ARINC 404 (rear connector):
  Interfaces to Aircraft and SATCOM interconnections.
  An ARINC 404 Shell Size 2 Receptacle.
- Configuration Module (rear, inside connector):
  A 9 pin Sub-D Female Connector. This is an internal connector used only as interface to the Configuration Module.

4.1.2 SDU Maintenance front connector

Connector drawing

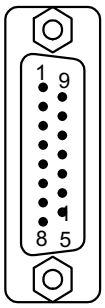


Figure 4-1: SDU Front Connector, Face View of Engaging End. (DB15F)

Functions

The front connector is a 15 pin Female Sub-D Filter connector, and contains the following interfaces:

- EIA/TIA-232-E PC port to connect to PC with Aero-SDU Configuration Program
- 4-Wire Thrane & Thrane Handset
- RS-485 Data interface for 4-Wire Thrane & Thrane Handset
- +12 V DC for powering the Handset
- Write Enable Input for Configuration Module.

Pin-out for SDU front connector

Pin. No.	Pin Name
FP1	Maintenance Handset Audio In Hi
FP2	Maintenance Handset Audio In Lo
FP3	Maintenance Handset Audio Out Hi
FP4	Maintenance Handset Audio Out Lo
FP5	Signal Ground SGND
FP6	Maintenance Handset RS-485 Data A
FP7	Maintenance Handset RS-485 Data B
FP8	+12 V DC/120 mA
FP9	GND, Power Return (for +12 V DC)
FP10	PC EIA/TIA-232-E RxD Output
FP11	PC EIA/TIA-232-E TxD Input
FP12	PC EIA/TIA-232-E CTS Output
FP13	PC EIA/TIA-232-E RTS Input
FP14	GND
FP15	Configuration Module Write Enable In

Table 4-1: Pin-out for SDU Front Connector

4.1.3 SDU rear receptacle

Connector drawing

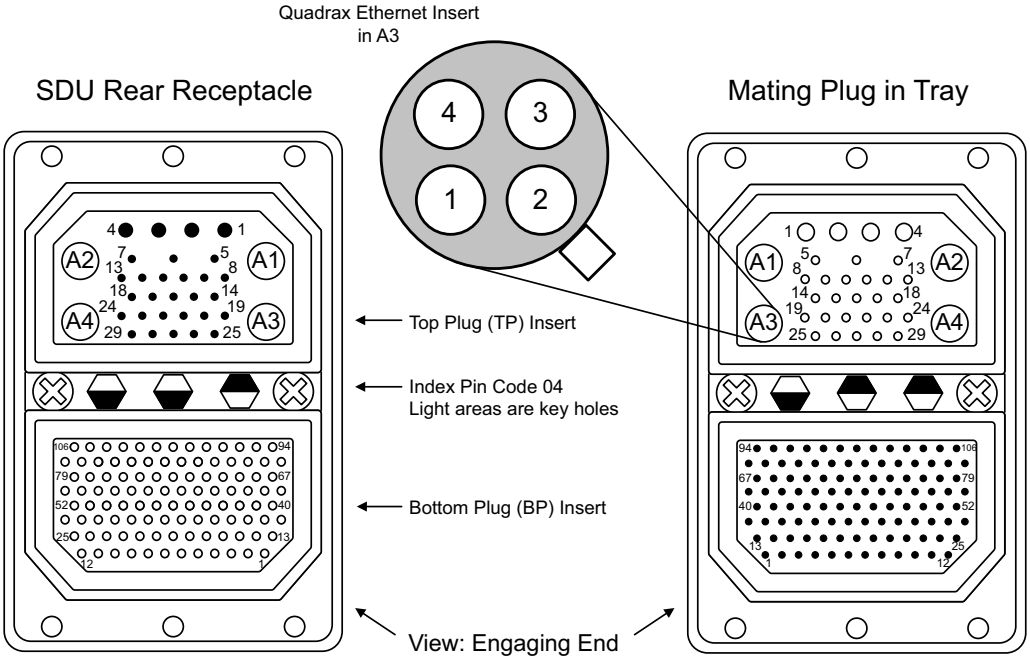


Figure 4-2: SDU Rear Receptacle and Mating Plug in Tray, Engaging End

Functions, top plug

The Top Plug (TP) connects the following signals:

Power, RF Interfaces and Antenna Modem:

- +28 V DC Power + chassis ground
- +28 V DC/600 mA 4-wire handset supply
- Remote ON/OFF (nON)
- RF Tx signal to HPA
- RF Rx signal from DLNA
- GPS/Antenna modem interface

Handset interfaces (analog):

- Four analog 4-wire interfaces for Thrane & Thrane Handset Systems (including +28 V DC handset supply with nON/OFF power supply control)

Voice/Fax/Modem interfaces:

- Two Voice/Fax/Modem/STU-III, analog 2-wire standard POTS interfaces

Functions, bottom plug

The Bottom Plug (BP) connects the following signals:

Aircraft Avionics Interfaces:

- 24 bit discrete hardwire strapped ICAO address
- Two high speed ARINC 429 Inertial Reference System (IRS) or
- Two high or low speed ARINC 429 Attitude and Heading Reference System (AHRS)
- Two high or low ARINC 429 Communication Management Units (ACARS/AFIS/CMU)
- Three high or low speed ARINC 429 MCDU (1 output, 2 inputs)
- Two Discrete inputs for “Weight On Wheels”
- Discrete Inputs/Outputs for WH-10/MagnaStar AIU control or Cockpit Voice

SATCOM Interfaces:

- One RS-422 SBU control interface
- One RS-422 Multi Control HPA Interface (Tx)
- One RS-422 BITE/Status HPA Interface (Rx)
- One Discrete HPA Remote nON/OFF output

Maintenance Interfaces:

- One Discrete SDU Hardware Reset

Handset interfaces (digital):

- Four RS-485 data interfaces for Thrane & Thrane Handsets

Other interfaces:

- Three Annunciators: #1 “Call”, #2 “Fax” and #3 “Service Available”
- Three ATE pins (Automatic Test Equipment) - **Do not connect!**

Pin-out for SDU rear receptacle (top plug)

Pin No.	Pin Name
TP A1	RF Rx input from power splitter
TP A2	RF Tx output to coupler (Coax)
TP A3.1	Tx + 10BaseT Ethernet (Swift64 MPDS)
TP A3.2	Rx + 10BaseT Ethernet (Swift64 MPDS)
TP A3.3	Tx - 10BaseT Ethernet (Swift64 MPDS)
TP A3.4	Rx - 10BaseT Ethernet (Swift64 MPDS)
TP A4	GPS/Antenna Modem Interface (Coax)
TP1	+28 V DC Power
TP2	GND, Power Return
TP3	Chassis Ground and Handset Power Return
TP4	+28 V DC/600 mA Handset Supply
TP5	Remote ON/OFF (nON)
TP6	2-Wire Voice/Fax/Modem #5 (Ring)
TP7	2-Wire Voice/Fax/Modem #6 (Ring)
TP8	2-Wire Voice/Fax/Modem #6 (Tip)
TP9	Not Connected
TP10	Handset #1 Audio In Hi / Cockpit Voice Audio #1 In Hi
TP11	Handset #1 Audio In Lo / Cockpit Voice Audio #1 In Lo

Pin No.	Pin Name
TP12	Handset #1 Audio Out Hi / Cockpit Voice Audio #1 Out Hi
TP13	Handset #1 Audio Out Lo / Cockpit Voice Audio #1 Out Lo
TP14	Not Connected
TP15	Handset #2 Audio In Hi / Cockpit Voice Audio #2 In Hi
TP16	Handset #2 Audio In Lo / Cockpit Voice Audio #2 In Lo
TP17	Handset #2 Audio Out Hi / Cockpit Voice Audio #2 Out Hi
TP18	Handset #2 Audio Out Lo / Cockpit Voice Audio #2 Out Lo
TP19	2-Wire Voice/Fax/Modem #5 (Tip)
TP20	AGND
TP21	Handset #3 Audio In Hi
TP22	Handset #3 audio In Lo
TP23	Handset #3 audio Out Hi
TP24	Handset #3 audio Out Lo
TP25	Do not connect! (+12 V DC / 25 mA)
TP26	Handset #4 audio In Hi
TP27	Handset #4 audio In Lo
TP28	Handset #4 audio Out Hi
TP29	Handset #4 audio Out Lo

Table 4-2: Pin-out for SDU Rear Receptacle (Top Plug)

Pin-out for SDU rear receptacle (bottom plug)

Pin No.	Pin Name
BP1	ICAO Address Bit #1 (MSB)
BP2	ICAO Address Bit #2
BP3	ICAO Address Bit #3
BP4	ICAO Address Bit #4
BP5	ICAO Address Bit #5
BP6	ICAO Address Bit #6
BP7	ICAO Address Bit #7
BP8	ICAO Address Bit #8
BP9	ICAO Address Bit #9
BP10	ICAO Address Bit #10
BP11	ICAO Address Bit #11
BP12	ICAO Address Bit #12
BP13	ICAO Address Bit #13
BP14	ICAO Address Bit #14
BP15	ICAO Address Bit #15
BP16	ICAO Address Bit #16
BP17	ICAO Address Bit #17
BP18	ICAO Address Bit #18
BP19	ICAO Address Bit #19
BP20	ICAO Address Bit #20
BP21	ICAO Address Bit #21
BP22	ICAO Address Bit #22
BP23	ICAO Address Bit #23
BP24	ICAO Address Bit #24
BP25	ICAO Address Common
BP26	Data from primary IRS 429 A / Data from primary AHRS 429 A
BP27	Data from primary IRS 429 B / Data from primary AHRS 429 B
BP28	Data from second IRS 429 A / Data from second AHRS 429 A
BP29	Data from second IRS 429 B / Data from second AHRS 429 B
BP30	Data bus from MCDU #2 input 429 A
BP31	Data bus from MCDU #2 input 429 B
BP32	Spare #1 429 A
BP33	Spare #1 429 B
BP34	Spare #1 429 A
BP35	Spare #1 429 B
BP36	Spare #2 429 A
BP37	Spare #2 429 B
BP38	Spare #2 429 A
BP39	Spare #2 429 B
BP40	Data bus from ACARS / AFIS / CMU #1 429 A
BP41	Data bus from ACARS / AFIS / CMU #1 429 B
BP42	Data bus to ACARS / AFIS / CMU #1 & #2 429 A
BP43	Data bus to ACARS / AFIS / CMU #1 & #2 429 B
BP44	Data bus from ACARS / AFIS / CMU #2 429 A
BP45	Data bus from ACARS / AFIS / CMU #2 429 B

Pin No.	Pin Name
BP46	Data bus from MCDU #1 429 A
BP47	Data bus from MCDU #1 429 B
BP48	Data bus to MCDU #1 & #2 429 A
BP49	Data bus to MCDU #1 & #2 429 B
BP50	Reserved for Weight-On-Wheels Input #1
BP51	Reserved for Weight-On-Wheels Input #2
BP52	CP Voice Chime Signal Contact #1; Current from Chime
BP53	CP Voice Chime Signal Contact #2; Current to Chime
BP54	MagnaStar/ICS-200: Satcom Service Unavailable
BP55	WH-10/MagnaStar Hook switch #3 or ICS-200 Ringer Input #3
BP56	SBU Enable output
BP57	HPA remote nON/OFF output
BP58	**Spare** TxD-B RS-422 (I)
BP59	**Spare** TxD-A RS-422 (I)
BP60	**Spare** RxD-B RS-422 (O)
BP61	**Spare** RxD-A RS-422 (O)
BP62	**Spare** RTS-B RS-422 (I)
BP63	**Spare** RTS-A RS-422 (I)
BP64	**Spare** CTS-B RS-422 (O)
BP65	**Spare** CTS-A RS-422 (O)
BP66	ISDN RxP (c)
BP67	ISDN TxP (d)
BP68	ISDN TxN (e)
BP69	ISDN RxN (f)

Pin No.	Pin Name
BP70	Data bus output to SBU; Output B, RS-422
BP71	Data bus output to SBU; Output A, RS-422
BP72	Data bus input from SBU; Input B, RS-422
BP73	Data bus input from SBU; Input A, RS-422
BP74	ATE 1 **Do not connect!**
BP75	ATE 2 **Do not connect!**
BP76	ATE 3 **Do not connect!**
BP77	SDU Reset, Active Low
BP78	HPA Control Output A, RS-422
BP79	HPA Control Output B, RS-422
BP80	HPA Data/BITE Input A, RS-422
BP81	HPA Data/BITE Input B, RS-422
BP82	WH-10/MagnaStar Hook Switch #1 or ICS-200 Ringer Input #1 or CP Voice Call Cancel Input #1 (Discrete I)
BP83	WH-10/MagnaStar Ringer Output A1 or ICS-200 Chan avail or CP Voice Mic On Input #1 (Discrete I/O)
BP84	WH-10/MagnaStar Ringer Output B1 or ICS-200 Hook Switch Output #1 or CP Voice Call Light Output #1 (Discrete O)
BP85	WH-10/MagnaStar Hook Switch #2 or ICS-200 Ringer Input #2 or CP Voice Call Cancel Input #2 (Discrete I)
BP86	WH-10/MagnaStar Ringer Output A2 or ICS-200 Chan avail or CP Voice Mic On Input #2 (Discrete I/O)

Pin No.	Pin Name
BP87	WH-10/MagnaStar Ringer Output B2 or ICS-200 Hook Switch Output #2 or CP Voice Call Light Output #2 (Discrete O)
BP88	Chime/ Lamps Inhibit Input (Discrete I)
BP89	WH-10/MagnaStar Ringer Output A3 or ICS-200 Chan avail or Annunciator #3 (Discrete I/O)
BP90	WH-10/MagnaStar Ringer Output B3 or ICS-200 Hook Switch Output #3
BP91	CP Voice Chime Reset Input #1 (Discrete I)
BP92	Annunciator #1 (Discrete I/O)
BP93	Annunciator #2 (Discrete Output)
BP94	4-Wire Handset #1 RS-485 Data A
BP95	4-Wire Handset #1 RS-485 Data B

Pin No.	Pin Name
BP96	4-Wire Handset #2 RS-485 Data A
BP97	4-Wire Handset #2 RS-485 Data B
BP98	4-Wire Handset #3 RS-485 Data A
BP99	4-Wire Handset #3 RS-485 Data B
BP100	4-Wire Handset #4 RS-485 Data A
BP101	4-Wire Handset #4 RS-485 Data B
BP102	**Spare** DTR-B RS-422 (I)
BP103	**Spare** DTR-A RS-422 (I)
BP104	**Spare** DCD-B RS-422 (O)
BP105	**Spare** DCD-A RS-422 (O)
BP106	Port 1 GND

Table 4-3: Pin-out for SDU Rear Receptacle (Bottom Plug)

4.2 TT-5014A High Power Amplifier

4.2.1 HPA rear receptacle

The HPA has one connector: An ARINC 404, shell size 2, rear receptacle, used for connection to the antenna system and the SDU.

Connector drawing

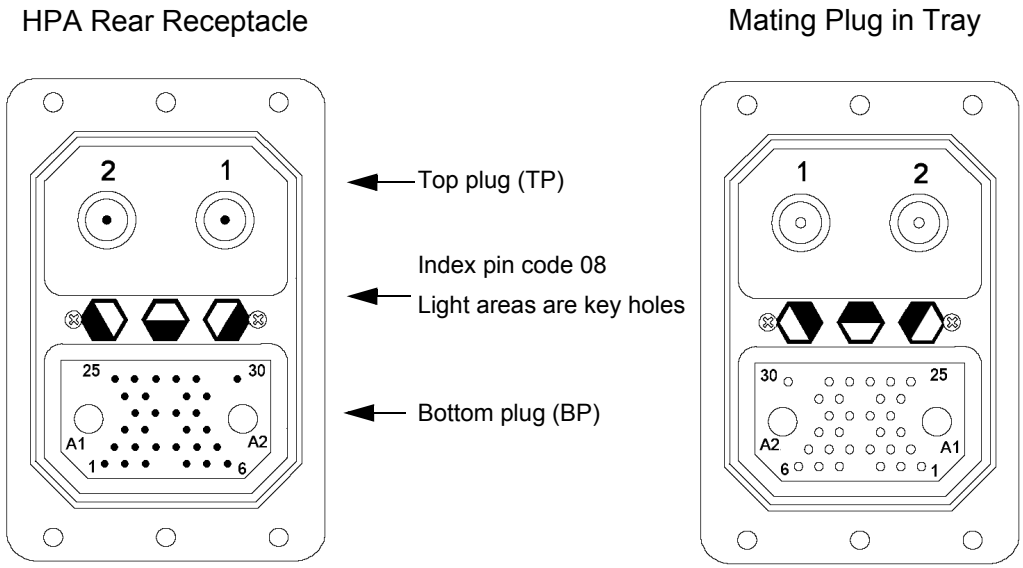


Figure 4-3: HPA Receptacle, Face View of Engaging End. Index Code is 08

Functions

The **Top Plug** connects the following signals:

- RF Tx signal to DLNA
- RF Tx signal from SDU

The **Bottom Plug** connects the following signals:

- +28 V DC Power (Aircraft Power Bus)
- Chassis ground
- ARINC 429 Tx and Rx connections for interfacing to ARINC 741 antennas
- Remote ON/OFF (nON) from SDU
- RS-422 data interface to SDU

Pin-out for HPA receptacle

Top Pin	Pin Name
TP1	RF Tx output to DLNA
TP2	RF Tx input from coupler

Table 4-4: Pin-out for HPA Receptacle (Top Plug)

Bottom Pin	Pin Name
BP A1	+28 V DC Power
BP A2	GND, Power Return
BP1	ATE 1 **Do not connect!**
BP2	ATE 2 **Do not connect!**
BP3	ATE 3 **Do not connect!**
BP4	ATE 4 **Do not connect!**
BP5	Spare
BP6	nON
BP7	Spare
BP8	A429 Tx1 A
BP9	A429 Tx1 B
BP10	A429 Tx2 A
BP11	A429 Tx2 B
BP12	Spare
BP13	A429 Rx1 A
BP14	A429 Rx1 B
BP15	A429 Rx2 A
BP16	A429 Rx2 B

Bottom Pin	Pin Name
BP17	HPA Mute 1 A
BP18	HPA Mute 1 B
BP19	HPA Mute 2 A
BP20	HPA Mute 2 B
BP21	Spare
BP22	Spare
BP23	Spare
BP24	Spare
BP25	RS-422 Tx A, HPA Data/BITE Output A, from HPA to SDU
BP26	RS-422 Tx B, HPA Data/BITE Output B, from HPA to SDU
BP27	RS-422 Rx A, HPA Control Input A, from SDU to HPA
BP28	RS-422 Rx B, HPA Control Input B, from SDU to HPA
BP29	Spare
BP30	Chassis

Table 4-5: Pin-out for HPA Receptacle (Bottom Plug)

4.3 TT-5040A SBU

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

4.3.1 Connectors on SBU

There are three connectors on the SBU:

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

4.3.2 SBU Maintenance connector

Connector drawing

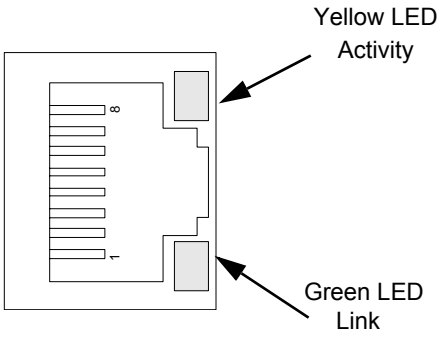


Figure 4-4: SBU Maintenance connector, face view of engaging end

Connector functions

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

Use this interface for the following purposes:

- AVIATOR 700 system configuration
- Maintenance
- System software upgrade

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

Use a standard straight network cable.

For instructions how to configure the AVIATOR 700 system see *SBU Configuration tasks* on page 6-13.

Pin-out for SBU Maintenance connector

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

Table 4-6: Pin-out for SBU Maintenance connector (standard Ethernet)

4.3.3 SBU rear receptacle

Connector drawing

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

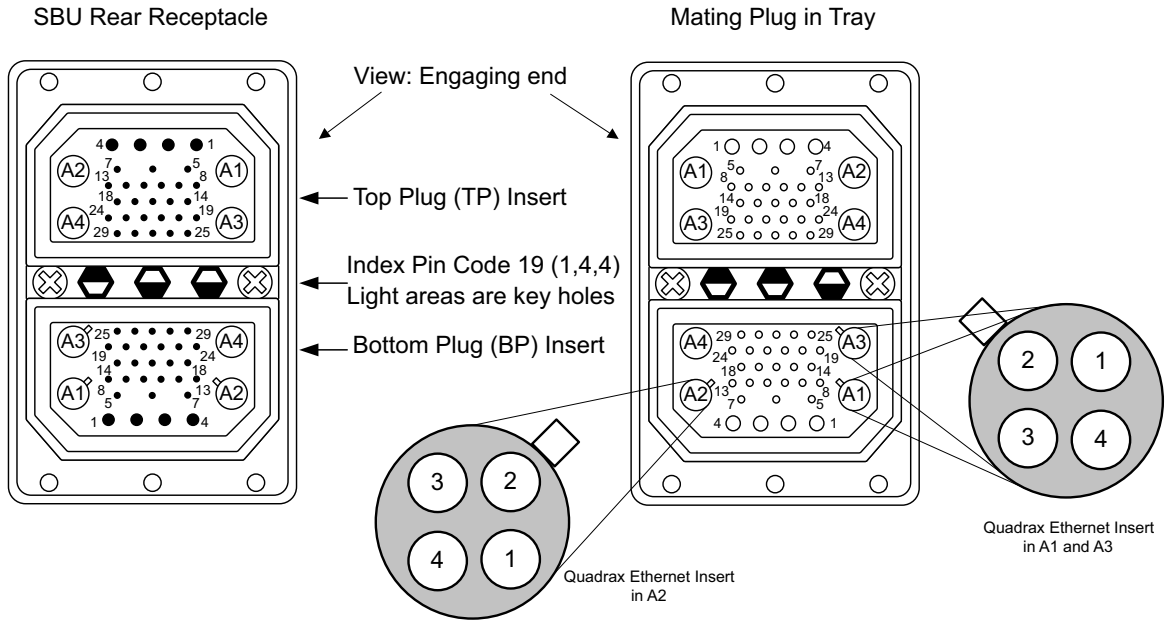


Figure 4-5: SBU rear receptacle, engaging end (Index code: 19)

Connector drawing with functions

The following drawing shows the SBU rear receptacle with pin functions. For wiring details of this interface see *Electrical installation and wiring* on page 5-9.

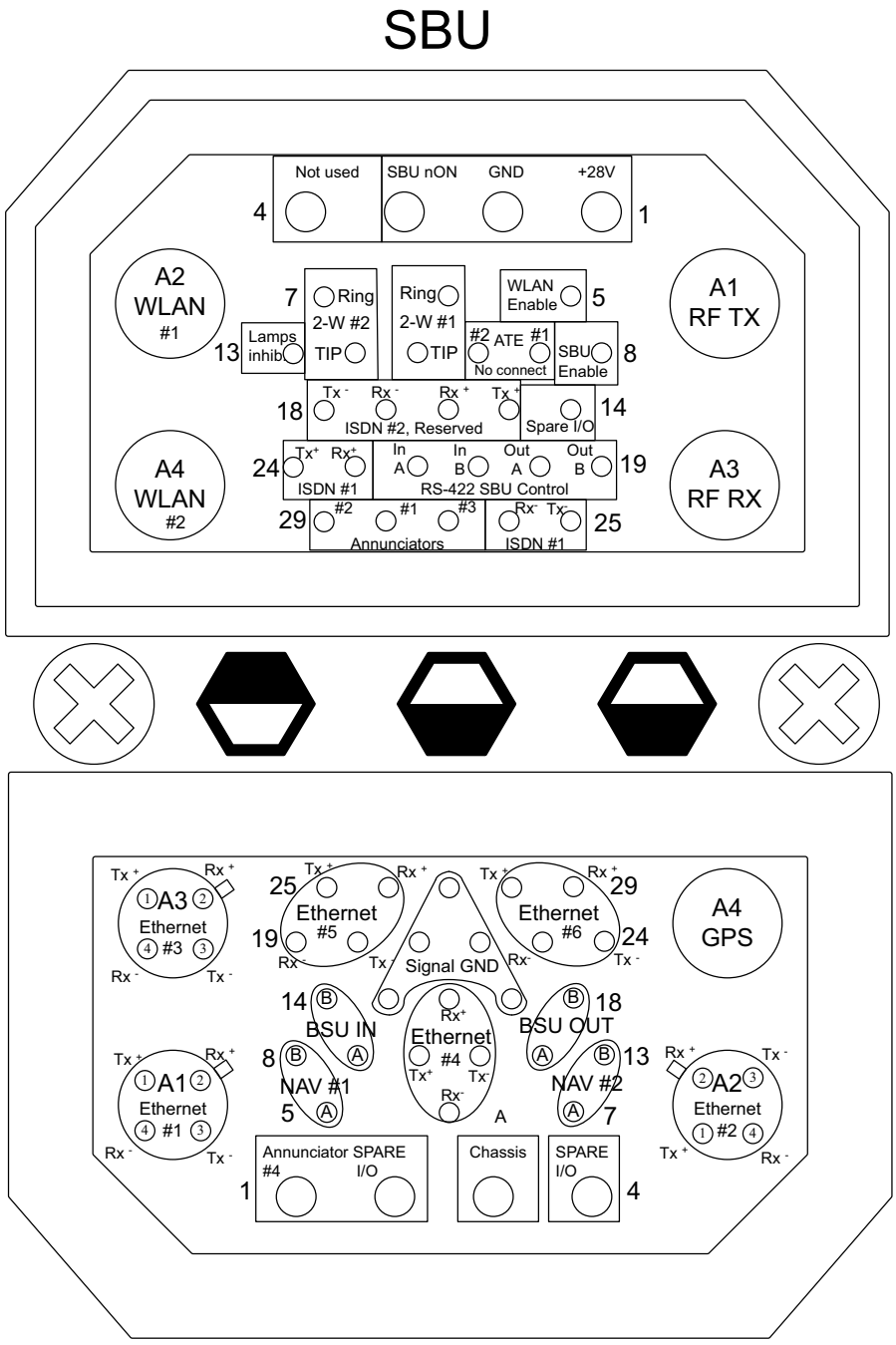


Figure 4-6: SBU rear receptacle with pin functions

Connector functions, top plug

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

Power & RF Interfaces:

- +28 V DC and GND, Power return
- RF Tx signal to 405038A-002 HSU Tx Coupler
- RF Rx signal from 405038A-003 HSU Rx Power Splitter
- Two RF WLAN antenna connectors (2.4 GHz)

User Interfaces:

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

Control & Maintenance Interfaces:

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

Connector functions, bottom plug

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

Power & RF Interfaces:

- GPS antenna input
- Chassis ground

User Interfaces:

- Six 10/100BaseT Ethernet

Aircraft interfaces:

- Two high or low speed ARINC 429 navigational input

Control & Maintenance Interfaces:

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

Pin-out for SBU rear receptacle (top plug)

Pin	Function
TP A1	RF TX output to 405038A-002 HSU TX Coupler
TP A2	WLAN antenna #2 (coax)
TP A3	RF RX input from 405038A-003 HSU RX Power Splitter
TP A4	WLAN antenna #1 (coax)
TP1	SBU +28 V DC Power
TP2	SBU GND, Power Return
TP3	SBU nON, Discrete Input
TP4	Not used
TP5	WLAN Enable, Discrete Input
TP6	2-Wire Voice/Fax/Modem #1 (Ring)
TP7	2-Wire Voice/Fax/Modem #2 (Ring)
TP8	SBU Enable, Discrete Input (active low)
TP9	ATE #1, for factory use - **Do not connect!**
TP10	ATE #2, for factory use - **Do not connect!**
TP11	2-Wire Voice/Fax/Modem #1 (Tip)
TP12	2-Wire Voice/Fax/Modem #2 (Tip)
TP13	Chime/Lamps Inhibit Input, (Discrete I/O)

Pin	Function
TP14	Spare I/O, (Discrete I/O)
TP15	ISDN #2 Tx+ (c) output (TE) **Do not connect!**
TP16	ISDN #2 Rx+ (d) input (TE) **Do not connect!**
TP17	ISDN #2 Rx- (e) input (TE) **Do not connect!**
TP18	ISDN #2 Tx- (f) output (TE) **Do not connect!**
TP19	Data bus output to SDU; Output B, RS-422
TP20	Data bus output to SDU; Output A, RS-422
TP21	Data bus input from SDU; Input B, RS-422
TP22	Data bus input from SDU; Input A, RS-422
TP23	ISDN #1 Rx+ (c) input (NT)
TP24	ISDN #1 Tx+ (d) output (NT)
TP25	ISDN #1 Tx- (e) output (NT)
TP26	ISDN #1 Rx- (f) input (NT)
TP27	Annunciator #3, (Discrete I/O, Service available)[b]
TP28	Annunciator #1, (Discrete I/O, Incoming call)
TP29	Annunciator #2, (Discrete I/O, SBU fail)

Table 4-7: Pin-out for SBU rear receptacle, top plug

Pin-out for SBU rear receptacle (bottom plug)

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

Table 4-8: Pin-out for SBU rear receptacle, bottom plug

4.4 Cradle connectors for handsets

For details on **AVIATOR Wireless Handset** cradle connectors, see AVIATOR Wireless Handset and Cradle Installation & Maintenance Manual, 98-129600.

4.4.1 Connectors on 4-Wire Cradle

There are four connectors on the 4-Wire Cradle, two on the side of the cradle and two at the end:

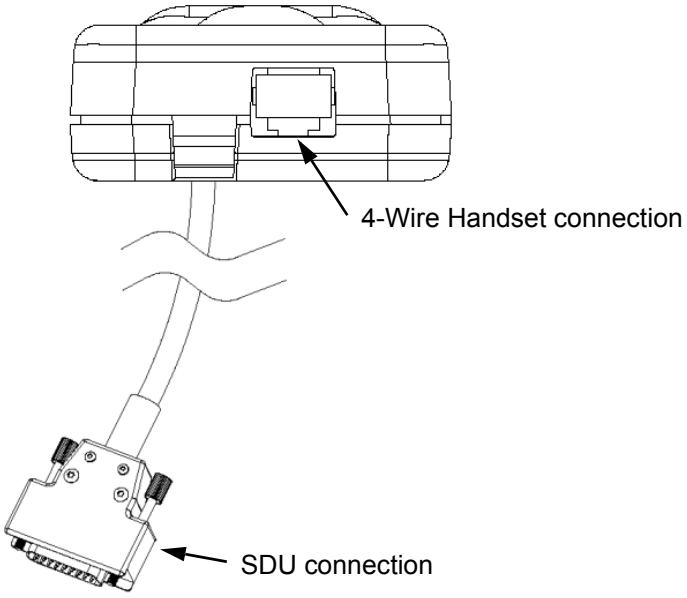


Figure 4-7: 4-Wire Cradle Connectors, End View of Cradle

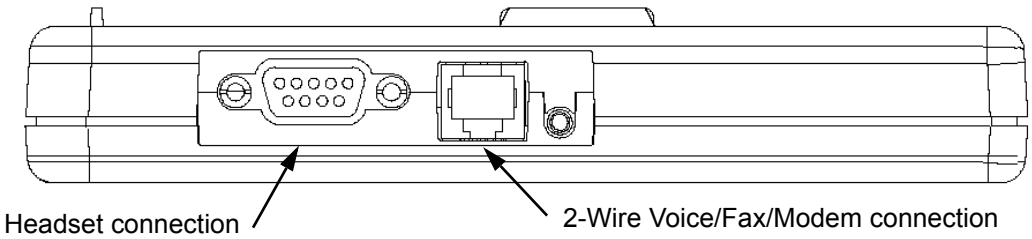


Figure 4-8: 4-Wire Cradle Connectors, Side View of Cradle

4.4.2 4-wire connector to SDU

Connector drawing

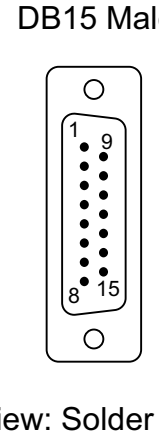


Figure 4-9: 4-Wire Cradle Connector (DB15M). View: Solder Side

Functions

The 15 pin Sub-D male connector on the short cable at the end of the 4-Wire Cradle connects the following signals on the SDU:

Handset interface (analog):

- analog 4-wire interface (including +28 V DC Handset supply)

Handset interface (digital):

- RS-485 data interface

Voice/Fax/Modem interface:

- Voice/Fax/Modem/STU-III, analog 2-wire standard POTS interface

OR

Maintenance handset interface:

- Maintenance 4-wire handset connection to SDU front connector

Pin-out for DB15 connector

The 4-Wire Cradle connector for connection to the SDU has the following pin-out:

Pin	Function
1	2-Wire Tip (Fax/PC_modem/Auxiliary)
2	2-Wire Ring (Fax/PC_modem/Auxiliary)
3	GND
4	+28 V DC
5	GND, Power Return
6	SDU Audio in +
7	SDU Audio in -

Pin	Function
8	GND
9	GND
10	RS-485 Data A
11	RS-485 Data B
12	GND
13	SDU Audio out +
14	SDU Audio out -
15	NC

Table 4-9: Pin-out for 15 Pin Sub-D Male Connector on short cable in 4-Wire Cradle

4.4.3 Connectors on 2-Wire Cradle

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

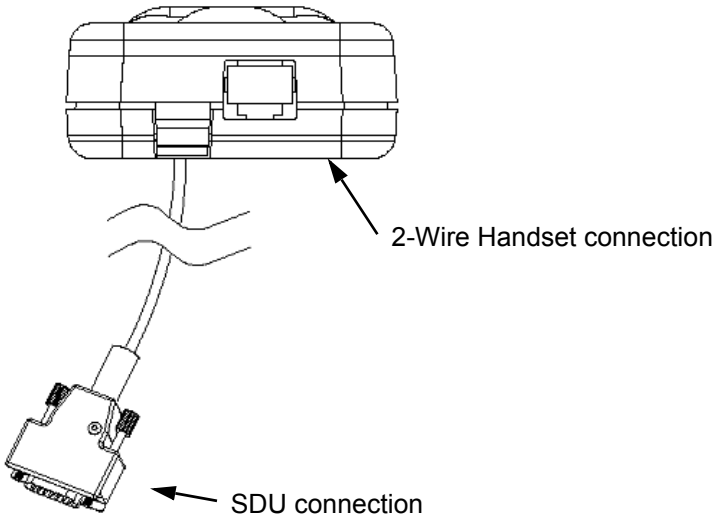


Figure 4-10: 2-Wire Cradle connectors, end view of cradle

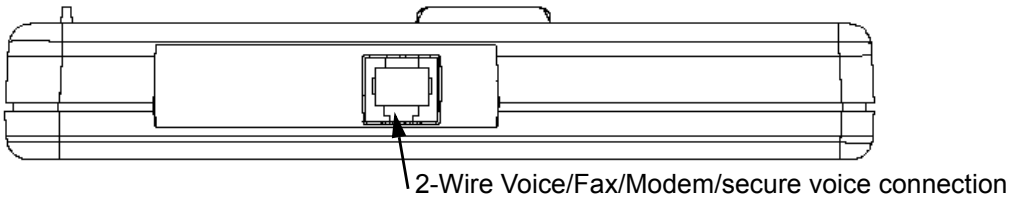


Figure 4-11: TT-5622B 2-Wire Cradle connectors, side view of cradle

4.4.4 2-Wire Cradle connector to SDU or SBU

Connector drawing

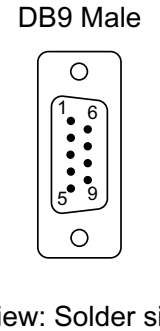


Figure 4-12: 2-Wire Cradle connector (DB9M). View: Solder side

Connector functions

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

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

Pin-out for 2-Wire Cradle connector to SBU

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

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

Table 4-10: Pin-out for 9 pin Sub-D male connector in TT-5622B 2-Wire Cradle

The other two connectors are standard POTS RJ11 connectors.

4.5 Mating connectors in aircraft

4.5.1 Connection with SDU

The installation requires the following mating connectors in the aircraft. Note that the SDU tray holds the mating connector for the SDU rear connector.

Connector	Mating Connector Type
Front Panel Connector	15 pin SUB-D male
Rear Connector	ARINC 404 shell size 2 plug with the following contact arrangements: Insert A (Top Plug): 33C4 • 4 #16 pin socket contacts • 25 #20HD socket contacts • 3 #5 coax socket contacts • 1 #5 Quadrax socket contact Insert B (Bottom Plug): 106 • 106 #22 pin contacts ITT Cannon Part number DPX2NA-67322-605

Table 4-11: Mating Connectors in Aircraft for SDU

4.5.2 Connection with HPA

The installation tray for the HPA is equipped with the following connector:

Connector	Mating Connector Type
Rear Connector	ARINC 404 shell size 2 plug with the following contact arrangements: Insert A (Top Plug): MC2 • 2 #1 coax socket contacts for RG214 Insert B (Bottom Plug): 32C2 • 2 #5 socket contacts for AWG 8-10 • 30 #20 HD socket contacts for AWG 20-24 Radiall part number 616 697 173

Table 4-12: Mating Connector in Aircraft for HPA

4.5.3 Connection with SBU

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

Connector	Mating connector type
SBU Maintenance connector (on front panel)	RJ45 male
SBU rear receptacle (rear connector in the SBU tray)	ARINC 404 shell size 2 plug with the following contact arrangements: Insert A (Top Plug): 33C4 • 4 #16 socket contacts • 25 #20 socket contacts • 4 #5 coax sockets Insert B (Bottom Plug): 33C4 • 4 #16 socket contacts • 25 #20 socket contacts • 1 #5 coax sockets • 3 #5 quadrax sockets Part number: DPX2NA-67322-606

Table 4-13: Mating connectors in aircraft for SBU

Size 5 coax contacts fit for cable type RG-142. For other cable types you must order suitable contact inserts. For part numbers see Table 5-63 on page 5-83 and Table 5-64 on page 5-83.

Installation

This chapter has the following sections:

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

5.1 General installation information

5.1.1 Overview

This chapter contains considerations and recommendations for installation of the AVIATOR 700 System. Interconnect harness wiring and physical mounting must satisfy all applicable regulations.

Note Installation kits including wiring can be obtained through ECS (Electronic Cable Specialists, Inc.) or EMTEQ Inc. For details and order numbers see *Installation kits* on page 2-15.

For installation kits for the AVIATOR 700 system contact:

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

Table 5-1: Installation kits, contact information

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

Note To ensure optimal performance from the AVIATOR 700 system, you must maintain strict adherence to the installation guidelines in this chapter.

5.1.2 Minimum system components

A minimum working system has at least:

- one TT-5035A SDU
- one TT-5035A-001 CM
- one TT-5014A HPA
- one TT-5040A SBU
- one TT-5040A-001 CM
- one TT-5040A-005 SDU to SBU Software interface
- one TT-5038A-002 Tx Coupler
- one TT-5038A-003 Rx Power Splitter
- one handset and cradle, e.g. a TT-5620A 4-Wire Handset and a TT-5622A 4-Wire Cradle (optional)
- one antenna system with DNLA type F. As antenna system, use either an ARINC 741 or ARINC 781 compatible system or an HGA-6000, HGA-6500 or HGA-7000 antenna system.

The following drawing shows the minimum installation required in the AVIATOR 700 system.

Minimum system drawing

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

Note For information on other satcom antenna types supported and wiring of the individual antenna types, refer to the appropriate section of *Electrical installation and wiring* on page 5-9 and onwards.

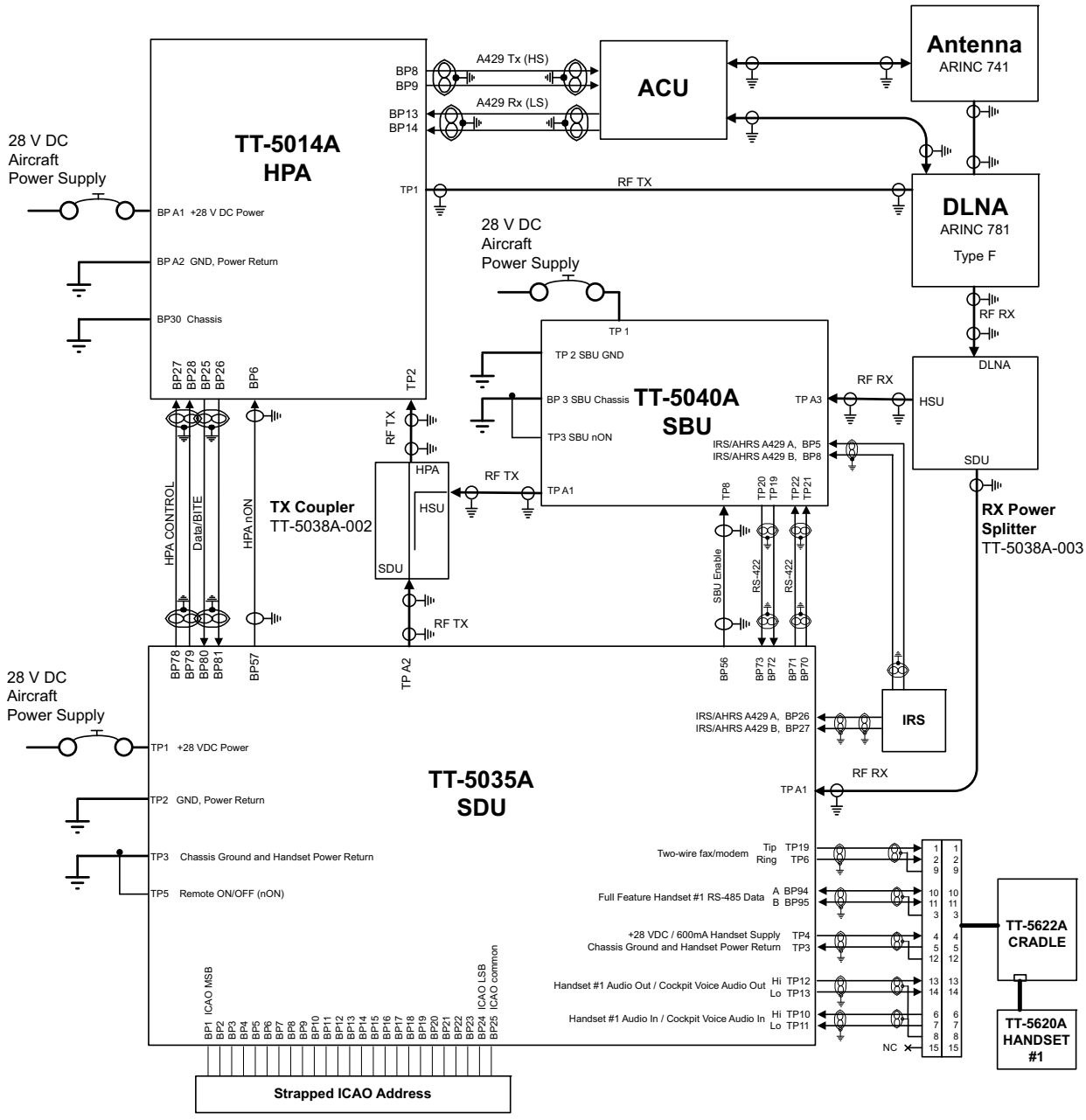


Figure 5-1: AVIATOR 700 minimum system

For navigational input we recommend to use input from an IRS/AHRS navigation system.

Note This example includes an ARINC 741 antenna system, but the antenna system may as well be e.g. an ARINC 781 system or an HGA-7000 antenna.

Note For easy access to the system configuration and troubleshooting it is recommended to connect a Thrane & Thrane 4-Wire Handset.

5.1.3 To upgrade your installation from Aero-HSD+ to AVIATOR 700

The Aero-HSD+ system can be upgraded to an AVIATOR 700 system. To make the upgrade you replace the HSU with an SBU. The upgrade procedure is described in detail in the appendix *Upgrade from Aero-HSD+ to AVIATOR 700* on page C-1.

5.2 Mounting considerations

5.2.1 Overview

For optimum system performance, some guidelines on where to install or mount the components of the AVIATOR 700 system must be followed. Mounting and placement details are included in this section.

For information on requirements to cables, see the individual sections in *Electrical installation and wiring* on page 5-9. For information on recommended cable types and lengths, see *Recommended cables* on page 5-80.

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

5.2.2 SDU

Forced cooling is not required and not recommended.

- Installation in temperature controlled areas and inside or outside pressurized locations (e.g. avionics bay).
- Mount the SDU where the cooling air holes are not blocked. Note that cooling air holes in the SDU are placed outside the recommended area for ARINC 404A 3/8 ATR short units.
- Mount the SDU in an ARINC 404A 3/8 ATR short tray with oval cut-out as shown in Figure 3-16 on page 3-17
- AVIATOR 700D: **For safety reasons do not install the 4-wire handset in the cabin.** see also *Wiring safety interfaces* on page 2-2. Control of the AVIATOR 700D system is done with the MCDU or via the 4-wire handset installed in the cockpit. It is possible to log-off the AVIATOR 700D system or change the satellite etc. using the 4-wire handset. Hereby it is possible to disable the cockpit Data2 functionality using the 4-wire handset.

5.2.3 SBU

Forced cooling is not required and not recommended.

- Install the SBU in temperature controlled areas and inside or outside pressurized locations (e.g. avionics bay).
- Mount the SBU in an ARINC 404A 1/4 ATR short tray as shown in Figure 3-13 on page 3-14 or see *SBU trays* on page 3-14 for allowed SBU trays.

5.2.4 Rx Power Splitter

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

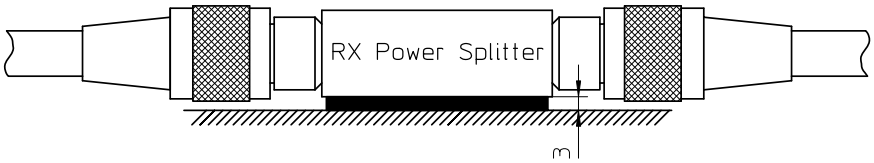


Figure 5-2: Mounting the Rx Power Splitter

5.2.5 HPA

The HPA can be installed in a non-temperature controlled area.

The HPA is designed with built-in forced cooling (fans).
Internal temperature monitoring prevents damage caused by overheating.

Important Respect the minimum clearance of 25 mm from top and bottom.

- Mount the HPA vertically on a panel to ensure maximum cooling. Mount the HPA in an ARINC 404A 3/8 ATR short tray with oval cut-out as shown in Figure 3-16 on page 3-17
- Install the HPA as close to the DLNA as possible.
  The cable between the HPA and the DLNA must be a special low-loss coax cable. See *Wiring the satcom antenna* on page 5-16 and the wiring drawings on page 5-17 and page 5-24.

5.2.6 Satcom antenna

In order to steer the satcom antenna towards the satellite, the AVIATOR 700 system needs to know the position and attitude of the aircraft. Several methods are available to achieve this.

About satcom antenna steering

- **IRS**
  If IRS is used, the antenna positioning data is computed from the IRS data alone. All necessary data is available from the IRS. The IRS signal must be connected to both the SBU and the SDU.
- **AHRS & GPS**
  AHRS does not include all the necessary data, therefore a GPS RF signal must also be sent to the SBU/SDU. A GPS module is built into the SBU/SDU, it computes the necessary position and speed information.
  AHRS must be connected only to the SDU.

In case the HGA-7000 antenna is used, a GPS antenna is built into the antenna, and the GPS-RF signal can be fed to the SBU/SDU via the Chelton BSU. See Figure 5-10: *Wiring HGA-7000 antenna system* on page 5-27

If another satcom antenna is used, the GPS RF signal may be obtained from a GPS antenna already installed on the aircraft.

Satcom antenna types supported

For a list of Cobham antenna types supported in the AVIATOR 700 system see *Satcom antenna systems* on page 2-8.

An AVIATOR 700 system must only be used with satcom antennas that have received type approval by Inmarsat.

General mounting considerations

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

Place the antenna with unobstructed view to the satellite.

WARNING! Keep a safety distance of minimum 1.2 m for HGA to the antenna when the system is transmitting, unless the antenna manual or the specific system configuration presents different requirements. This safety distance ensures that a maximum radiation power density of maximum 10 W/m^2 is not exceeded (Recommended by the American National Standards Institute, ANSI/LEEE C95.1-1992).

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

Distance between GPS or Glonass antenna and satcom antenna

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

Important However, always keep the following distance between the satcom antenna and the GPS or Glonass antenna:
5.1 m (200 inches)

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

Cables between TT-5014A HPA and satcom antenna

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

Do not bend the cables to a radius smaller than the minimum bend radius stated for the cables. For further information on cables, see *Wiring the satcom antenna* on page 5-16 and *Recommended cables* on page 5-80.

5.2.7 WLAN antennas

The recommended WLAN antenna to use with the AVIATOR 700 system is the TT5040A-004 Wireless Antenna. The WLAN antenna is PMA approved by VT Miltope (P/N 901167-2). You may also use other WLAN antennas approved for aeronautical use.

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

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

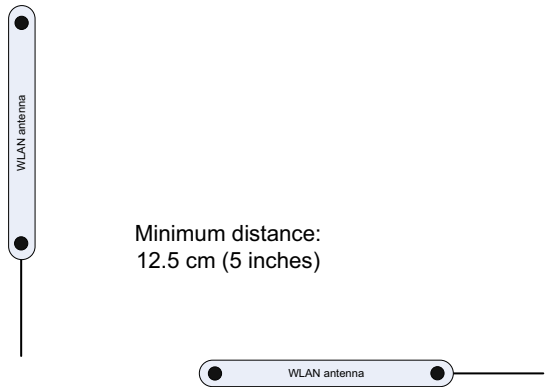


Figure 5-3: Mounting two WLAN antennas for optimum performance

Make sure the cable loss requirements are met, for further details see in the section *Wiring WLAN antenna interface* on page 5-42.

Operating with one WLAN antenna

You can also use a single WLAN antenna. For details how to wire a single WLAN antenna see *Wiring WLAN antenna interface* on page 5-42.

5.3 Electrical installation and wiring

5.3.1 Wiring symbols

Throughout the wiring section these common symbols are used:

	Coax
	Shield
	Ground (fuselage)
	Twisted
	Twisted and shielded

Table 5-2: Wiring symbols

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

The following subsections are available:

- *Wiring SDU to SBU*
- *Wiring power supply*
- *Wiring the satcom antenna*
- *Wiring ARINC 429 interfaces*
- *Wiring GPS interface*
- *Wiring ICAO address*
- *Wiring Ethernet at the SBU*
- *Wiring WLAN antenna interface*
- *Wiring ISDN*
- *Wiring telephone systems*
- *Wiring WH-10 handsets*
- *Discretes for WH-10 handset systems*
- *Wiring ICS-200 telephone system*
- *Wiring 2.4GHz Cordless (4-wire) phone*
- *Wiring Sigma[7] (2-wire) handsets*
- *Wiring ICG DECT Cordless Handset (2-wire) phone*
- *Wiring discretes*
- *Wiring Cockpit Voice interface*
- *Wiring the maintenance interfaces and Reset*

5.3.2 Wiring SDU to SBU

SDU pin	SBU pin	Description with reference to SDU
BP56	TP8	SBU Enable
BP73	TP20	Data bus input from SBU; Input A, RS422
BP72	TP19	Data bus input from SBU; Input B, RS422
BP71	TP22	Data bus output to SBU; Output A, RS422
BP70	TP21	Data bus output to SBU; Output B, RS422

Table 5-3: Pins for Wiring SDU to SBU

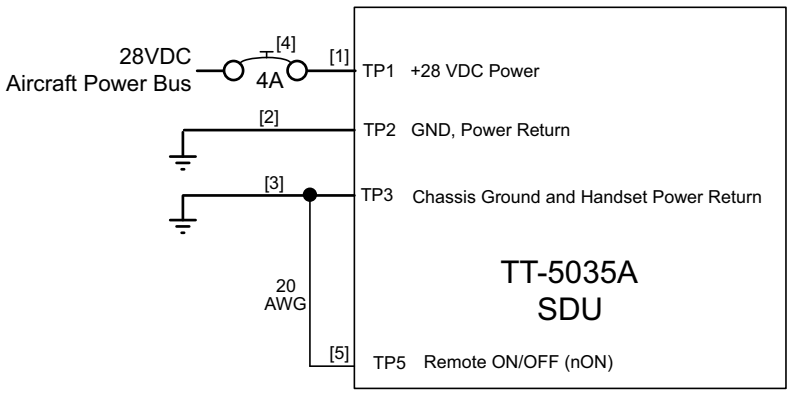
5.3.3 Wiring power supply

Important Do not use the same 20 A circuit breaker for both the HPA and the SDU/SBU. Use a separate circuit breaker for each unit as described in this section, and with the current rating stated here.

Wiring the Satellite Data Unit

The Aircraft Power Bus provides the electric power required to operate the SDU, and a chassis connection to the aircraft chassis and the installation tray. The +28 V DC Power wire must include a circuit breaker capable of carrying the required current continuously under the required environmental conditions.

The following drawing shows the wiring of the SDU power supply.
Requirements to the wiring are stated in the notes on the drawing and in the section *Cable requirements, SDU power supply* on page 5-12.



[1] Total resistance max. 200 mOhm incl. Circuit Breaker.

[2] Total resistance max. 25 mOhm.

[3] Directly to Aircraft chassis, max. 1 m cable length to prevent EMC problems and max. 25 mOhm

[4] Recommended circuit breaker: Klixon 2TC series, 4 A current rating

[5] If SATCOM On/Off switch is required, TP5 is routed to an external switch to ground

Figure 5-4: Wiring SDU power supply

Pins for SDU power supply

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

SDU pin	Name	Description
TP1	+28 V DC Power	+28 V DC Power input from Aircraft power bus.
TP2	GND, Power Return	Aircraft Ground connection
TP3	Chassis Ground and Handset Power Return	Chassis connection, connected to installation tray and Aircraft chassis. Also used for handset power return.
TP5	Remote ON/OFF (nON)	Power On/Off for the SDU and handsets.

Table 5-4: Pins for SDU power supply

Description of SDU power supply

+28 V DC Power (TP1)

It is essential to keep the line impedance below the specified limits. See *Cable requirements, SDU power supply* on page 5-12.
Reverse polarity protection is only guaranteed if the suggested circuit breaker is used.

Required current capability for the Circuit Breaker: 48 W @ 17.3 V DC which equals 2.8 A DC at the required environmental conditions. A suitable circuit breaker would be **Klixon 2TC series** with 4 A current rating.

Important Use a separate 4 A circuit breaker for the SDU.

Chassis Ground / Handset Power Return (TP3)

The Chassis connection makes sure that the HPA cabinet and the installation tray has the same potential, and that there is a connection from the wiring shields to the cabinet for EMC purposes.

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

TP3 also connects to the Handset Power Return.

Remote On/Off (nON) input (TP5)

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

The electrical specifications are defined like the discrete WOW input type. Please refer to *Discrete type and description:* on page 5-67.

Note that when you switch off the SDU, the SBU is indirectly also switched off.

Cable requirements, SDU power supply

Cable[a]	Max. Resistance	Other Requirements
[1] (+28 V DC)	200 mΩ, incl. circuit breaker	
[2] (GND, Power Return)	25 mΩ	The cable should be as short as possible.
[3] (Chassis Ground)	25 mΩ	Connect directly to aircraft chassis.

Table 5-5: Requirements to SDU power cables

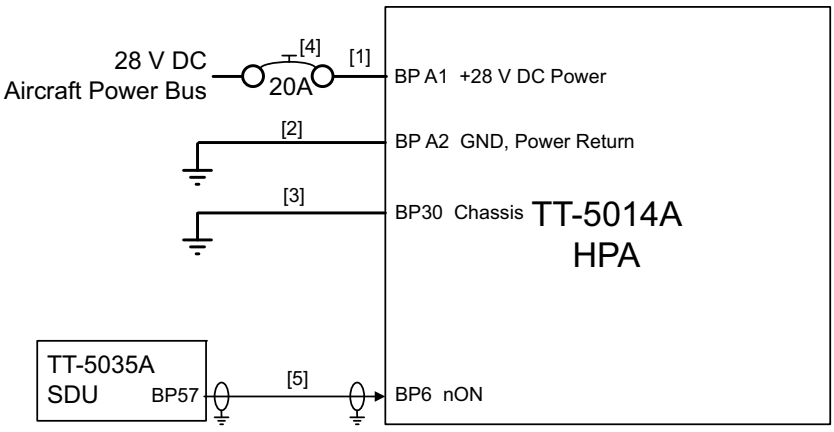
a. The cable numbers refer to the numbers stated on the wiring drawing in the section *Wiring the Satellite Data Unit* on page 5-10.

Note Maximum cable lengths are calculated and listed in the section *Power cables, allowed cable lengths* on page 5-80.

Wiring the High Power Amplifier

The Aircraft power bus provides the electric power required to operate the HPA, and a chassis connection to the aircraft chassis and the installation tray. The +28 V DC Power wire must include a circuit breaker capable of carrying the required current continuously under the required environmental conditions.

The following drawing shows the wiring of the HPA power supply.
Requirements to the wiring are stated in the notes on the drawing and in the section *Cable requirements, HPA power supply* on page 5-14.



[1] Total resistance max. 100 mOhm incl. Circuit Breaker.

[2] Total resistance max. 25 mOhm.

[3] Directly to Aircraft chassis, max. 0.6 m cable length (AWG 20) to prevent EMC problems and max. resistance 25 mOhm.

[4] Recommended circuit breaker: Klixon 2TC series, 20 A current rating.

[5] Must be shielded to prevent EMC problems.

Figure 5-5: Wiring HPA power supply

Pins for HPA power supply

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

HPA pin	Name	Description
BP A1	+28 V DC Power	+28 V DC Power input from Aircraft power bus.
BP A2	GND, Power Return	Aircraft ground connection.
BP30	Chassis	Chassis connection, connected to installation tray and Aircraft chassis.
BP6	nON	HPA power on/off controlled by the SDU.

Table 5-6: Pins for HPA power supply

SDU pin	Name	Description
BP57	HPA remote nON/OFF output	Power On/Off control for the HPA.

Table 5-7: Pin for Remote HPA Power on/off by SDU

Description of HPA power supply

This section describes the installation requirements for HPA power supply interface. The connection from the HPA to the Aircraft power bus normally goes through the tray connector. The connector also supports other signals. For information on pin-out, please refer to *TT-5014A High Power Amplifier* on page 4-10.

+28 V DC Power

It is essential to keep the line impedance below the specified limits. See *Cable requirements, HPA power supply* on page 5-14.
Reverse polarity protection is only guaranteed if the suggested circuit breaker is used.

Required current capability for the Circuit Breaker: 235 W @ 15.7 V DC, which equals 15 A DC, at the required environmental conditions.A suitable circuit breaker would be **Klixon 2TC series** with 20 A current rating.

Important Use a separate 20 A circuit breaker for the HPA.

Chassis (BP30)

The Chassis connection makes sure that the HPA cabinet and the installation tray has the same potential, and that there is a connection from the wiring shields to cabinet for EMC purposes.

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

nON (BP6)

The nON input is used by the SDU (BP57) to turn the HPA on and off. The SDU connects this input to ground to turn on the HPA.

Cable requirements, HPA power supply

Cable[a]	Max. Resistance	Other Requirements
[1] (+28 V DC Power)	100 mΩ, incl. circuit breaker	
[2] (GND, Power Return)	25 mΩ	
[3] (Chassis)	25 mΩ	Connect directly to aircraft chassis.
[5] (nON)	-	Must be shielded to avoid EMC problems.

Table 5-8: Requirements to HPA power cables

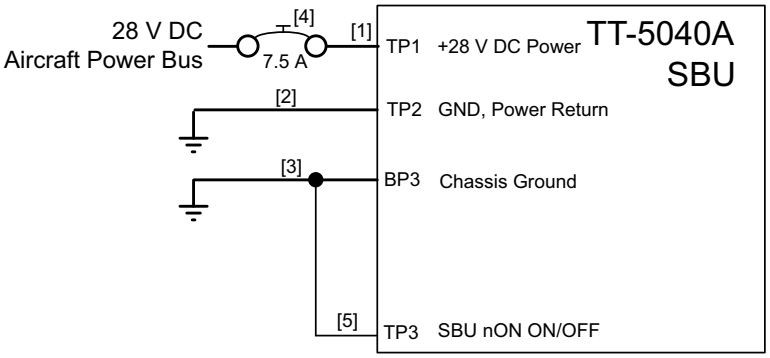
a. The cable numbers refer to the numbers stated on the wiring drawing in the section *Wiring the High Power Amplifier* on page 5-12.

Note Maximum cable lengths are calculated and listed in the section *Power cables, allowed cable lengths* on page 5-80.

Wiring the SwiftBroadband Unit

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

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



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

Figure 5-6: Wiring SBU power supply

SBU maximum power consumption

In the AVIATOR 700 system the SBU does not supply power for neither the HPA nor external satcom antennas. See Table A-3 on page A-6 for the total power consumption of the SBU (including CM).

Pins for SBU power supply

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

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

Table 5-9: Pins for SBU power supply

Description of SBU power supply

+28 V DC Power

It is essential to keep the line impedance below the specified limits. See *Cable requirements, SBU power supply* on page 5-16.

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

Important Use a separate 7.5 A circuit breaker for the SBU.

Chassis Ground (BP3)

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

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

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

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

The electrical specifications are defined in *Description of the discrete types* on page 5-67.

Cable requirements, SBU power supply

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

Table 5-10: Requirements to SBU power cables

a. The cable numbers refer to the numbers stated on the wiring drawing in the section Figure 5-6 on page 5-14.

Note For maximum allowed cable lengths, see *Power cables, allowed cable lengths* on page 5-80.

5.3.4 Wiring the satcom antenna

Cable losses

Note During installation, measure and write down the cable loss of the RF cables. You need these values later on for the SDU in the Aero-SDU Configuration Program and for the SBU in the web interface during configuration of the system. For further details see *Basic configuration of the SDU* on page 6-10 or the online help in the Aero-SDU Configuration Program and *Configure RF settings of the SBU* on page 6-50.

Selection of DLNA

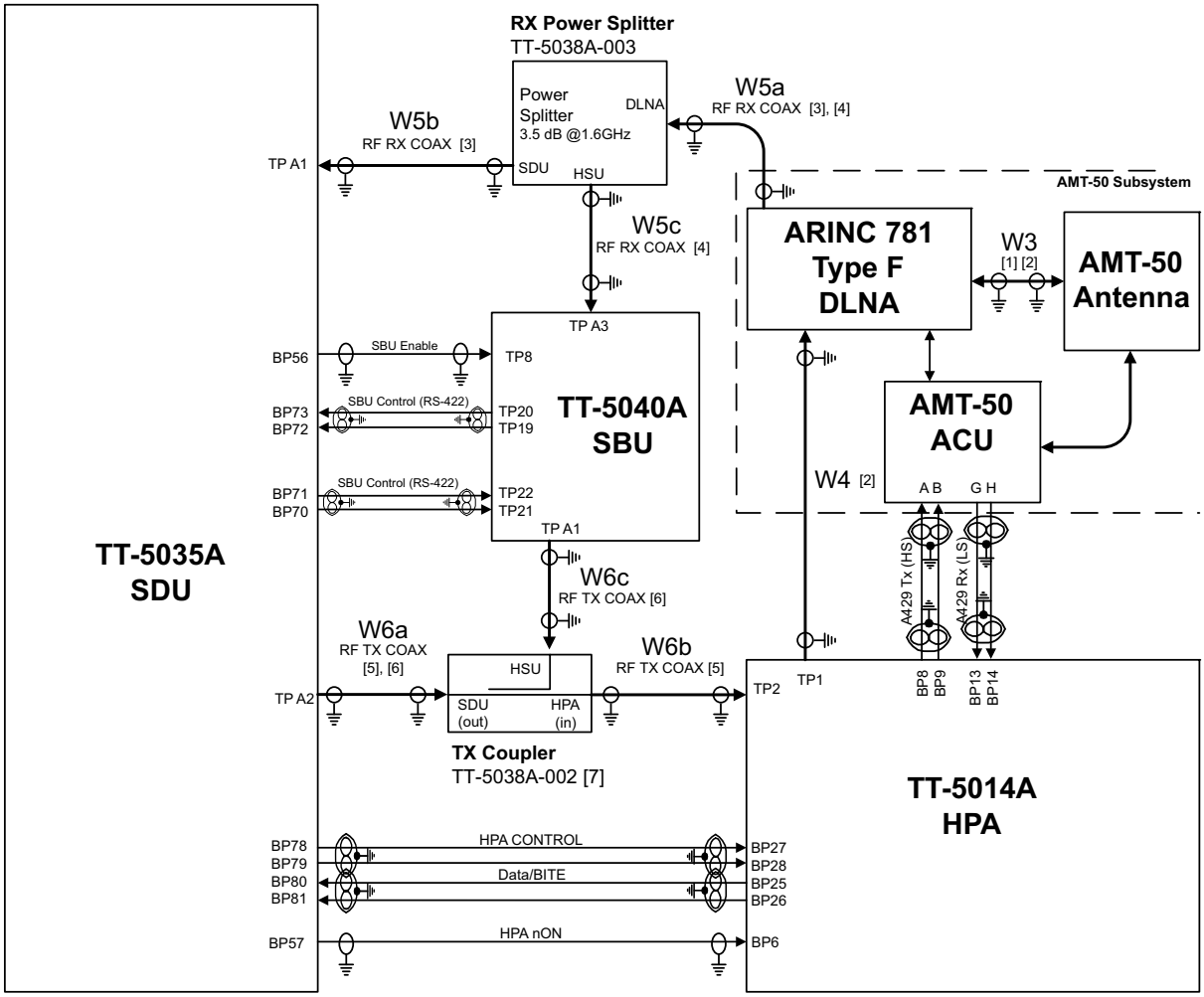
Use the **405013A DLNA Type F**.

Important The DLNA used in the AVIATOR 700 system must contain improved Tx-filtering for protection of the GNSS and Iridium band.

Wiring ARINC 741 antenna systems

An example of an ARINC 741 antenna system is the AMT-50 system. The following drawing shows the wiring for an AVIATOR 700 system using an AMT-50 antenna.

Note In an AVIATOR 700 system, the DLNA must be ARINC 781 Type F compatible and contain extra TX-filtering for protection of the GNSS and Iridium band.



[1] The cable loss of W3 (between DLNA and antenna) must be: 0.0 to 0.3 dB @ 1.6 GHz

[2] The total cable loss of W3+DLNA loss+W4 must be: 0.0 to 2.6 dB @ 1.6 GHz

[3] The total cable loss of W5a + Splitter loss + W5b must be: 6.0 to 29.0 dB @ 1.6 GHz

[4] The total cable loss of W5a + Splitter loss + W5c must be: 6.0 to 25.0 dB @ 1.6 GHz

[5] The total cable loss of W6a + W6b must be: 0.0 to 11.0 dB @ 1.6 GHz

[6] The cable losses of W6a and W6c must be equal within ±2.5 dB @ 1.6 GHz

[7] Note that (in) and (out) are wired inverse.

Figure 5-7: Wiring AMT-50 Subsystem

Pins for ARINC 741 antenna system

The following lists show the SBU, SDU and HPA pins in the AVIATOR 700 system used for connecting an ARINC 741 antenna system.

SBU pin	Description
TP A1	RF Tx output to Tx Coupler (HSU port)
TP A3	RF Rx input from Rx Power Splitter (HSU port)
TP8	SBU Enable input (active low)
TP19	Data bus output to SDU; Output B, RS-422
TP20	Data bus output to SDU; Output A, RS-422
TP21	Data bus input from SDU; Input B, RS-422
TP22	Data bus input from SDU; Input A, RS-422

Table 5-11: SBU Pins for AMT-50 antenna subsystem

SDU pin	Description
TP A1	RF Rx input from Rx Power Splitter (SDU port)
TP A2	RF Tx output to Tx Coupler (SDU port)
BP70	Data bus output to SBU; Output B, RS-422
BP71	Data bus output to SBU; Output A, RS-422
BP72	Data bus input from SBU; Input B, RS-422
BP73	Data bus input from SBU; Input A, RS-422
BP56	SBU Enable output
BP57	HPA remote nOn/Off output
BP78	HPA Control Output A, RS-422
BP79	HPA Control Output B, RS-422
BP80	HPA Data/BITE Input A, RS-422
BP81	HPA Data/BITE Input B, RS-422

Table 5-12: SDU Pins for AMT-50 antenna subsystem

HPA pin	Description
TP1	RF Tx output to DLNA
TP2	RF Tx input from Tx Coupler
BP6	Remote nOn/Off input from SDU
BP8	A429 Tx A output to ACU/BSU
BP9	A429 Tx B output to ACU/BSU
BP13	A429 Rx1 A input from ACU/BSU
BP14	A429 Rx1 B input from ACU/BSU
BP25	Tx Data/BITE Output A, RS-422, to SDU
BP26	Tx Data/BITE Output B, RS-422, to SDU
BP27	Rx Control Input A, RS-422, from SDU
BP28	Rx Control Input B, RS-422, from SDU

Table 5-13: HPA Pins for ARINC 741 antenna system

Description of control interfaces

SBU control interface (TP19-TP22)

The RS-422 control interface on SBU pins TP19-TP22 is used by the SDU to control the SBU. The SBU operates as a slave to the SDU.

HPA ARINC 429 interface (BP8, BP9, BP13, BP14 on HPA)

An ARINC 429 high speed Tx interface and an ARINC 429 low speed Rx interface is used for communication between the HPA and the AMT-50 ACU.

SBU Enable (TP8)

The SDU uses the SBU Enable input to reset and inhibit the transmitter output signal from the SBU. The electrical specification is defined as for the discrete Weight-On-Wheels input type. If TP8 is not connected to the SDU pin, the SBU stays in reset state.

RF cable requirements, ARINC 741 antenna system

Cable[a]	Min. Cable Loss @1.6 GHz	Max. Cable Loss@1.6 GHz
W3 (DLNA to Antenna)	0 dB	0.3 dB
W3 + DLNA loss + W4	0 dB	Total: 2.6 dB
W5a + Splitter loss + W5b	6 dB	29 dB
W5a + Splitter loss + W5c	6 dB	25 dB
W6a + W6b	0 dB	11 dB
W6a, W6c	The cable losses of W6a and W6c must be equal within ±2.5 dB	

Table 5-14: Requirements to RF Cables, ARINC 741 antenna systems

a. The "W" cable numbers refer to the numbers stated on the wiring drawing in Figure 5-7 on page 5-17.

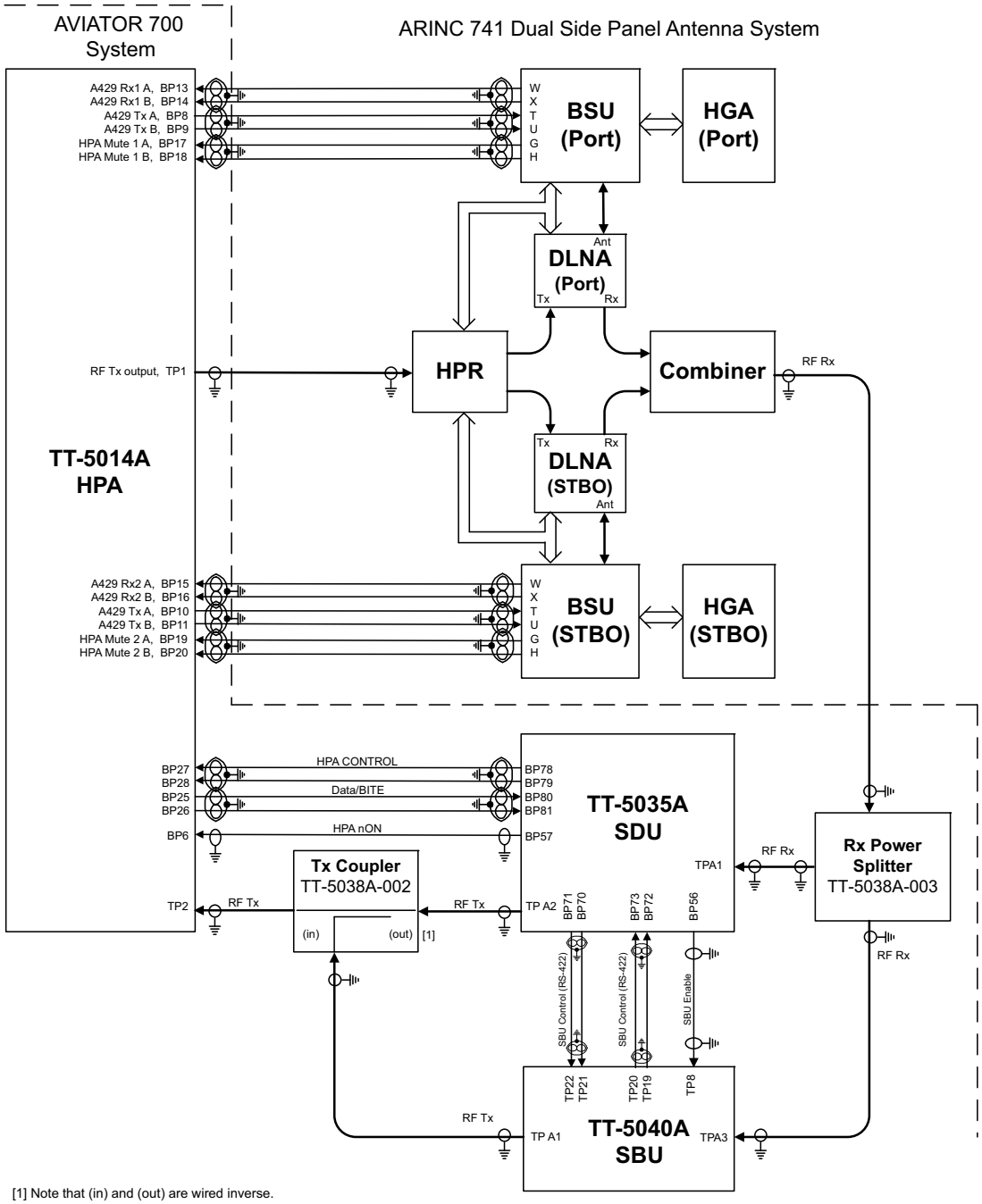
ARINC 429 cable and RS-422 SBU control interface cable requirements

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

For recommended cable types, see *Recommended cables for ARINC 429* on page 5-84 and *Recommended cables for RS-422 SBU control interface* on page 5-84.

Wiring ARINC 741 dual side panel antenna system

The following drawing shows the wiring of an ARINC 741 dual side panel antenna system.



[1] Note that (in) and (out) are wired inverse.

Figure 5-8: Wiring ARINC 741 dual side panel antenna system

Important Remember to select **ARINC741 Dual Panel Antenna** in the Configuration program under **Installation > RF > Antenna > Type**, and to write down the cable losses. See *Cable losses* on page 5-16.

Pins for Dual Side Panel antenna system

The following list shows the pins in the AVIATOR 700 system used for connecting a Dual Side Panel antenna system.

HPA pin	Name/Description
TP1	RF Tx output to HPR
TP2	RF Tx input from SDU
BP6	Remote nOn/Off input from SDU
BP8	A429 Tx A output to BSU (Port)
BP9	A429 Tx B output to BSU (Port)
BP10	A429 Tx A output to BSU (STBO)
BP11	A429 Tx B output to BSU (STBO)
BP13	A429 Rx1 A input from BSU (Port)
BP14	A429 Rx1 B input from BSU (Port)
BP15	A429 Rx2 A input from BSU (STBO)
BP16	A429 Rx2 B input from BSU (STBO)
BP17	HPA Mute 1 A input from BSU (Port)
BP18	HPA Mute 1 B input from BSU (Port)
BP19	HPA Mute 2 A input from BSU (STBO)
BP20	HPA Mute 2 B input from BSU (STBO)
BP25	Tx Data/BITE Output A, RS-422, to SDU
BP26	Tx Data/BITE Output B, RS-422, to SDU
BP27	Rx Control Input A, RS-422, from SDU
BP28	Rx Control Input B, RS-422, from SDU

Table 5-15: HPA pins for dual side panel antenna system

SDU pin	Name/Description
TP A1	RF Rx input from RX Power Splitter (SDU port)
TP A2	RF Tx output to Tx Coupler (SDU port)
BP56	SBU Enable output (active low)
BP57	HPA remote nOn/Off output
BP70	Data bus output to SBU; Output B, RS-422
BP71	Data bus output to SBU; Output A, RS-422
BP72	Data bus input from SBU; Input B, RS-422
BP73	Data bus input from SBU; Input A, RS-422
BP78	HPA Control Output A, RS-422
BP79	HPA Control Output B, RS-422
BP80	HPA Data/BITE Input A, RS-422
BP81	HPA Data/BITE Input B, RS-422

Table 5-16: SDU pins for dual side panel antenna system

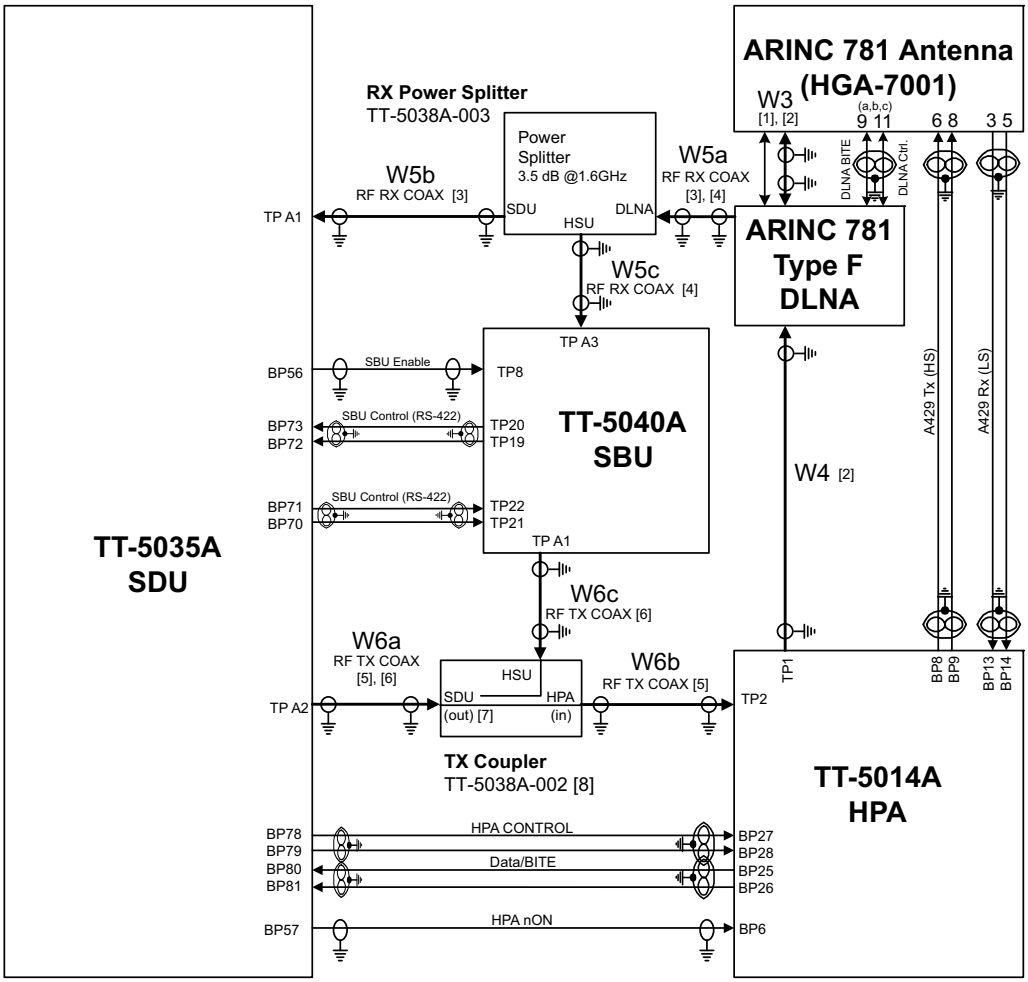
SBU pin	Description
TP A1	RF Tx output to Tx Coupler (HSU port)
TP A3	RF Rx input from Rx Power Splitter (HSU port)
TP8	SBU Enable input
TP19	Data bus output to SDU; Output B, RS-422
TP20	Data bus output to SDU; Output A, RS-422
TP21	Data bus input from SDU; Input B, RS-422
TP22	Data bus input from SDU; Input A, RS-422

Table 5-17: SBU pins for dual side panel antenna system

Wiring ARINC 781 antenna systems

The following drawing shows the wiring for an AVIATOR 700 system using an ARINC 781 antenna system.

Requirements to the cables are stated on the drawing and in the next section **RF cable requirements**, **ARINC 781 antenna systems**.



[1] The cable loss of W3 (between DLNA and antenna) must be:	0.0 to 0.3 dB @ 1.6 GHz
[2] The total cable loss of W3+DLNA loss+W4 must be:	0.0 to 2.6 dB @ 1.6 GHz
[3] The total cable loss of W5a + Splitter loss + W5b must be:	6.0 to 29.0 dB @ 1.6 GHz
[4] The total cable loss of W5a + Splitter loss + W5c must be:	6.0 to 25.0 dB @ 1.6 GHz
[5] The total cable loss of W6a + W6b must be:	0.0 to 11.0 dB @ 1.6 GHz
[6] The cable losses of W6a and W6c must be equal within:	±2.5 dB @ 1.6 GHz
[7] Note that (in) and (out) are wired inverse.	

(a) The total resistance of the DLNA Ctrl wire and DLNA Ctrl screen must be < 8 Ω.
(b) The resistance of the DLNA BITE wire must be < 1.0 kΩ.
(c) It is recommended to screen and ground the DLNA BITE/CTrl wires on both sides.

Figure 5-9: Wiring ARINC 781 antenna system

Pins for ARINC 781 antenna system

The following lists show the SBU, SDU and HPA pins in the AVIATOR 700 system used for connecting an ARINC 781 antenna system.

SBU pin	Description
TP A1	RF Tx output to Tx Coupler (SBU port)
TP A3	RF Rx input from Rx Power Splitter (SBU port)
TP8	SBU Enable input (active low)
TP19	Data bus output to SDU; Output B, RS-422
TP20	Data bus output to SDU; Output A, RS-422
TP21	Data bus input from SDU; Input B, RS-422
TP22	Data bus input from SDU; Input A, RS-422

Table 5-18: SBU pins for ARINC 781 antenna system

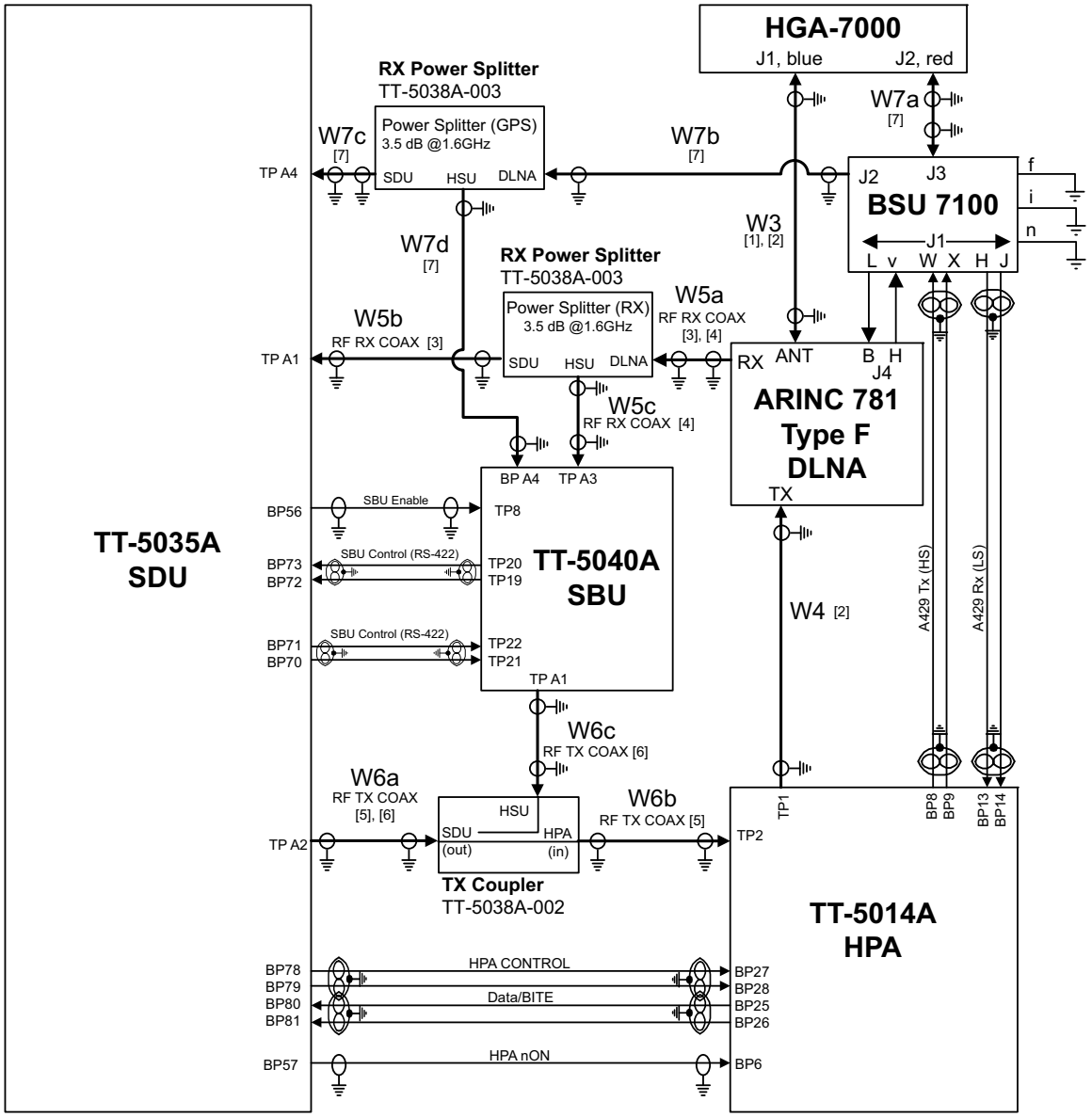
SDU pin	Description
TP A1	RF Rx input from Rx Power Splitter (SDU port)
TP A2	RF Tx output to Tx Coupler (SDU port)
BP70	Data bus output to SBU; Output B, RS-422
BP71	Data bus output to SBU; Output A, RS-422
BP72	Data bus input from SBU; Input B, RS-422
BP73	Data bus input from SBU; Input A, RS-422
BP56	SBU Enable output
BP57	HPA remote nOn/Off output
BP78	HPA Control Output A, RS-422
BP79	HPA Control Output B, RS-422
BP80	HPA Data/BITE Input A, RS-422
BP81	HPA Data/BITE Input B, RS-422

Table 5-19: SDU pins for ARINC 781 antenna system

HPA pin	Description
TP1	RF Tx output to DLNA
TP2	RF Tx input from Tx Coupler (HPA port)
BP6	Remote nOn/Off input from SDU
BP8	A429 Tx A output to ARINC 781 antenna
BP9	A429 Tx B output to ARINC 781 antenna
BP13	A429 Rx1 A input from ARINC 781 antenna
BP14	A429 Rx1 B input from ARINC 781 antenna
BP25	Tx Data/BITE Output A, RS-422, to SDU
BP26	Tx Data/BITE Output B, RS-422, to SDU
BP27	Rx Control Input A, RS-422, from SDU
BP28	Rx Control Input B, RS-422, from SDU

Table 5-20: HPA pins for ARINC 781 antenna system

Wiring HGA 7000 antenna system



[1] The cable loss of W3 (between DLNA and antenna) must be: 0.0 to 0.3 dB @ 1.6 GHz

[2] The total cable loss of W3+DLNA loss+W4 must be: 0.0 to 2.6 dB @ 1.6 GHz

[3] The total cable loss of W5a + Splitter loss + W5b must be: 6.0 to 29.0 dB @ 1.6 GHz

[4] The total cable loss of W5a + Splitter loss + W5c must be: 6.0 to 25.0 dB @ 1.6 GHz

[5] The total cable loss of W6a + W6b must be: 0.0 to 11.0 dB @ 1.6 GHz

[6] The cable losses of W6a and W6c must be equal within ±2.5 dB @ 1.6 GHz

[7] GPS cables W7b, W7c and W7d must be wired if AHRS is used instead of IRS.
Cable W7a must be wired in both cases.

The total cable losses of W7a + W7b + W7c must be: 0 to 11.0 dB @ 1.6 GHz
The total cable losses of W7a + W7b + W7d must be: 0 to 11.0 dB @ 1.6 GHz

Figure 5-10: Wiring HGA-7000 antenna system

Pins for HGA-7000 antenna system

The following lists show the SBU, SDU and HPA pins in the AVIATOR 700 system used for connecting an HGA 7000 antenna system.

SBU pin	Description
TP A1	RF Tx output to Tx Coupler (SBU port)
TP A3	RF Rx input from Rx Power Splitter (SBU port)
TP8	SBU Enable input (active low)
TP19	Data bus output to SDU; Output B, RS-422
TP20	Data bus output to SDU; Output A, RS-422
TP21	Data bus input from SDU; Input B, RS-422
TP22	Data bus input from SDU; Input A, RS-422
BP A4	Input from Power Splitter (GPS) (HSU port)

Table 5-21: SBU pins for HGA 7000 antenna system

SDU pin	Description
TP A1	RF Rx input from Rx Power Splitter (SDU port)
TP A2	RF Tx output to Tx Coupler (SDU port)
BP70	Data bus output to SBU; Output B, RS-422
BP71	Data bus output to SBU; Output A, RS-422
BP72	Data bus input from SBU; Input B, RS-422
BP73	Data bus input from SBU; Input A, RS-422
BP56	SBU Enable output
BP57	HPA remote nOn/Off output
BP78	HPA Control Output A, RS-422
BP79	HPA Control Output B, RS-422
BP80	HPA Data/BITE Input A, RS-422
BP81	HPA Data/BITE Input B, RS-422

Table 5-22: SDU pins for HGA 7000 antenna system

HPA pin	Description
TP1	RF Tx output to DLNA
TP2	RF Tx input from Tx Coupler (HPA port)
BP6	Remote nOn/Off input from SDU
BP8	A429 Tx A output to ARINC 781 antenna
BP9	A429 Tx B output to ARINC 781 antenna
BP13	A429 Rx1 A input from ARINC 781 antenna
BP14	A429 Rx1 B input from ARINC 781 antenna
BP25	Tx Data/BITE Output A, RS-422, to SDU
BP26	Tx Data/BITE Output B, RS-422, to SDU
BP27	Rx Control Input A, RS-422, from SDU
BP28	Rx Control Input B, RS-422, from SDU

Table 5-23: HPA pins for HGA 7000 antenna system

Description of control interfaces

SBU control interface (TP19-TP22)

The RS-422 control interface on SBU pins TP19-TP22 is used by the SDU to control the SBU. The SBU operates as a slave to the SDU.

HPA ARINC 429 interface (BP8, BP9, BP13, BP14 on HPA)

An ARINC 429 high speed Tx interface and an ARINC 429 low speed Rx interface is used for communication between the HPA and the internal BSU of the ARINC 781 antenna.

SBU Enable (TP8)

The SDU uses the SBU Enable input to reset and inhibit the transmitter output signal from the SBU. The electrical specification is defined as for the discrete Weight-On-Wheels input type. If TP8 is not connected to the SDU pin, the SBU stays in reset state.

RF cable requirements, ARINC 781 antenna systems

Cable[a]	Min. Cable Loss @1.6 GHz	Max. Cable Loss@1.6 GHz
W3 (DLNA to Antenna)	0 dB	0.3 dB
W3 + DLNA loss + W4	0 dB	Total: 2.6 dB
W5a + Splitter loss + W5b	6 dB	29 dB
W5a + Splitter loss + W5c	6 dB	25 dB
W6a + W6b	0 dB	11 dB
W6a, W6c	The cable losses of W6a and W6c must be equal within ±2.5 dB	

Table 5-24: Requirements to RF cables, ARINC 781 antenna systems

a. The "W" cable numbers refer to the numbers stated on the wiring drawing in Figure 5-9 on page 5-24.

ARINC 429 cable and RS-422 SBU control interface cable requirements

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

For recommended cable types, see *Recommended cables for ARINC 429* on page 5-84 and *Recommended cables for RS-422 SBU control interface* on page 5-84.

RF GPS input on SBU (for use with HGA7000)

Systems without IRS data can use AHRS data instead. In that case the RF GPS input (BPA4) must be connected to the BSU7100 J2 via Rx Power Splitter (see *Figure 5-10: Wiring HGA-7000 antenna system*).

5.3.5 Wiring ARINC 429 interfaces

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

Wiring an ARINC 429 source system

The SDU has two ARINC 429 input interfaces for 2 NAV sources. The SBU has two ARINC 429 input interfaces for two navigational inputs.

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

The following drawing shows the wiring of a navigational input. Requirements to the cables are stated in the section *Cable requirements, ARINC 429* on page 5-35.

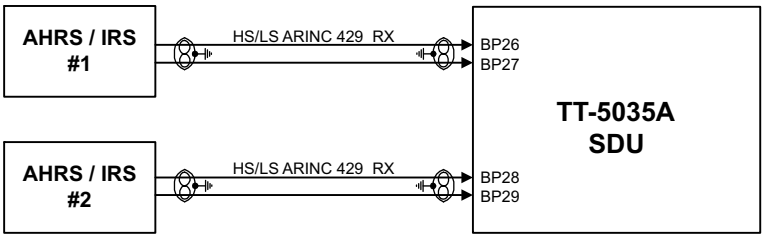


Figure 5-11: Wiring AHRS/IRS to SDU

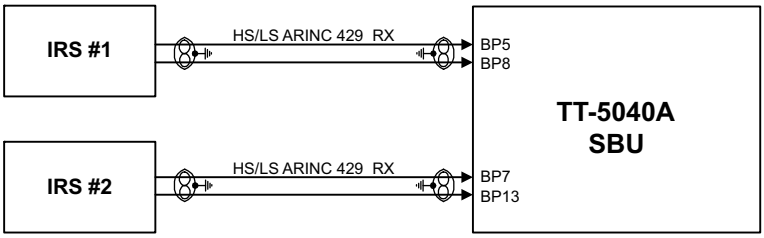


Figure 5-12: Wiring IRS to SBU

For more information on AHRS/IRS see *About satcom antenna steering* on page 5-6.

Pins for AHRS/IRS for SDU

The following list shows the pins used for AHRS or IRS:

SDU Pin	Name/Description
BP26	Data from primary IRS 429 A /Data from primary AHRS 429 A
BP27	Data from primary IRS 429 B /Data from primary AHRS 429 B
BP28	Data from secondary IRS 429 A /Data from secondary AHRS 429 A
BP29	Data from secondary IRS 429 B /Data from secondary AHRS 429 B

Table 5-25: SDU pins for IRS and AHARS

Pins for input from ARINC 429 sources for SBU

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

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

Table 5-26: SBU pins for input from a navigational ARINC 429 source

Description of the interface for navigational input

For SDU: When the system is configured with the Aero-SDU Configuration Program, the Configuration Module will contain the information of:

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

Note If #1 and #2 are both installed, they must be of the same type (IRS or AHRS).

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

Note AHRS can only be used with the HGA 7000 antenna, which contains a built-in GPS antenna.

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

- Which navigational input is selected: IRS or GPS.

- Whether primary or secondary input or both are installed.

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

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

ARINC data format for IRS

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

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

Table 5-27: ARINC data format for IRS

a. The labels marked optional do not have an effect on the operation of the AVIATOR 700 system, but may increase precision in the antenna pointing and time management.

ARINC data format for AHRS

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

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

Table 5-28: ARINC data format for AHRS

a. The labels marked optional do not have an effect on the operation of the AVIATOR 700 system, but may increase precision in the antenna pointing.

Wiring ACARS/AFIS/CMU

The SDU has ARINC 429 interfaces for 2 high or low speed (HS/LS) ACARS/AFIS/CMU including one output port and 2 input ports.

The following drawing shows the wiring of ACARS/AFIS/CMU. Requirements to the cables are stated in the section *Cable requirements, ARINC 429* on page 5-35.

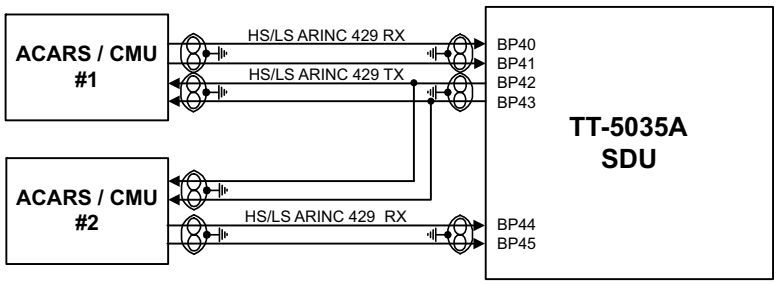


Figure 5-13: Wiring ACARS/AFIS/CMU

Pins for ACARS/AFIS/CMU

The following list shows the pins used for an Airborne Communications Addressing and Reporting System (ACARS), Airborne Flight Information System (AFIS) or a Communications Management Unit (CMU):

SDU Pin	Name/Description
BP40	Data bus from ACARS/AFIS/CMU #1 429 A
BP41	Data bus from ACARS/AFIS/CMU #1 429 B
BP42	Data bus to ACARS/AFIS/CMU #1 & #2 429 A
BP43	Data bus to ACARS/AFIS/CMU #1 & #2 429 B
BP44	Data bus from ACARS/AFIS/CMU #2 429 A
BP45	Data bus from ACARS/AFIS/CMU #2 429 B

Table 5-29: SDU pins for ACARS/AFIS/CMU

The data speed can be configured to high or low (HS/LS), defined by the Configuration Module.

Wiring MCDU

The SDU has interfaces prepared for two high or low speed ARINC 429 interfaces for communication with MCDU #1 and MCDU #2. One common output and two inputs.

The following drawing shows the wiring of MCDU. Requirements to the cables are stated in the section *Cable requirements, ARINC 429* on page 5-35.

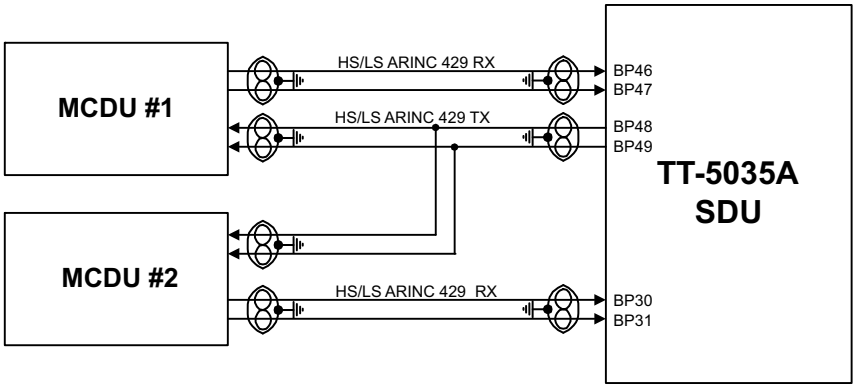


Figure 5-14: Wiring MCDU

The Configuration Module contains information if the MCDU is installed, and which data rate is used (high or low).

Cable requirements, ARINC 429

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

For recommended cable types, see *Recommended cables for ARINC 429* on page 5-84.

5.3.6 Wiring GPS interface

Wiring the GPS antenna

The following figure shows the wiring of the GPS interface when using a power splitter. You can use the power splitter shown in *TT-5038A-003 Rx Power Splitter* on page 3-8.

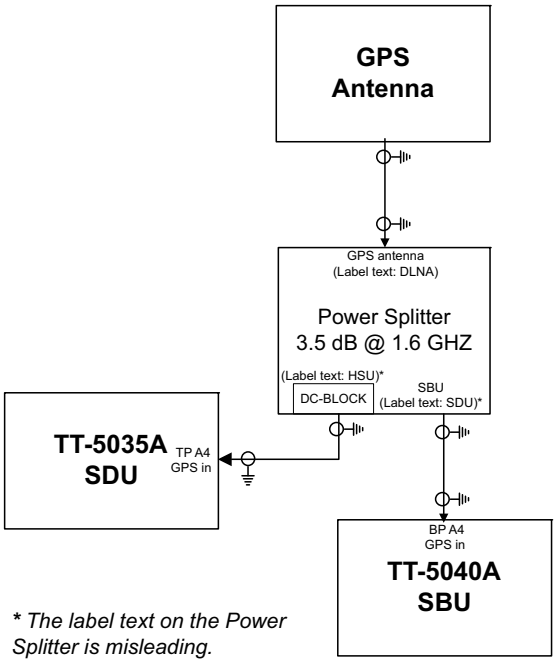


Figure 5-15: Wiring GPS Interface with Power Splitter

Pins for input from the GPS antenna

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

Table 5-30: SBU pins for input from GPS antenna

SDU pin	Name/description
TP A4	GPS/Antenna modem interface (coax)

Table 5-31: SDU pins for input from GPS antenna

5.3.7 Wiring ICAO address

Strapped ICAO address

A unique aircraft identification code (ICAO address) must be assigned at installation. The national authority of aeronautical identification coordinates assignment of the code.

The ICAO address must be entered in the Configuration Module, using the Aero-SDU Configuration Program.

The SDU obtains the ICAO address from the 24 bit discrete address (must be hardware strapped using the 24 discrete inputs on the SDU).

The strapped ICAO address is compared to the ICAO address entered in the Configuration Module of the SDU. If they do not match, the AVIATOR 700 system suspends all RF communication.

Wiring ICAO address

The following drawing shows the wiring of the 24 bit discrete ICAO address.

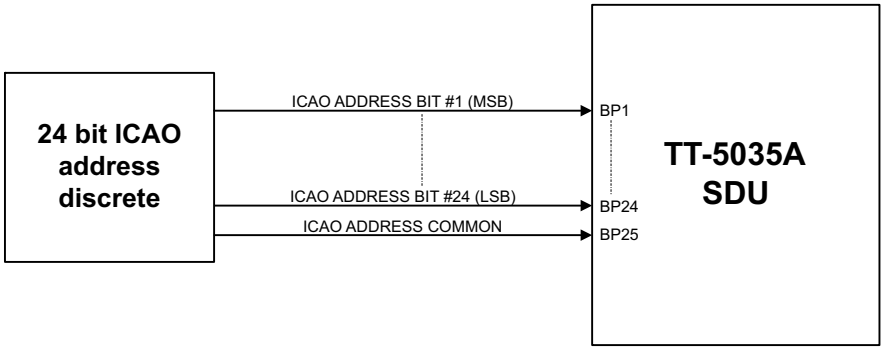


Figure 5-16: Wiring ICAO

Wiring 24 bit discrete ICAO address

The SDU has 24 discrete inputs used to encode the 24-bit ICAO address, in which the SDU is installed.

Each ICAO address consists of eight digits, and each digit value is determined by strapping 3 bits (octal).

Note The Aero-SDU Configuration Program shows which pins to connect if you type in the wanted ICAO address in the Config Module field in the Identification window.

Do as follows to strap the ICAO address:

1. Leave pins assigned to the binary "one" state open (internal pull up).
   Binary "one" (open circuit) is ≥100 kΩ.
2. Strap pins assigned to the binary "zero" state to BP25 (ICAO Address Common) on the airframe side of the connector.
   Binary "zero" (strapped to BP25) is ≤10 Ω.

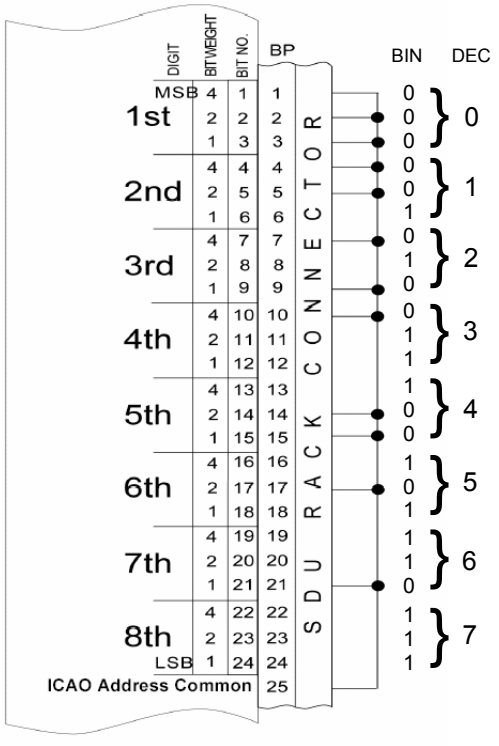


Figure 5-17: Example of wiring the fictional ICAO address 01234567

3. Enter the ICAO address in the Aero-SDU Configuration Program.
   If the aircraft uses a US N-type registration number, the Aero-SDU Configuration Program can calculate the ICAO address from this number. Use the **US N-Type Calculator** button in the Identification window of the Aero-SDU Configuration Program.

When the system is powered, the SDU reads the strapped ICAO address from the SDU rack connector and compares it to the ICAO address entered in the Configuration Module. If the SDU does not detect or recognize the strapped ICAO address, the AVIATOR 700 system suspends all RF communication until the error is corrected.

5.3.8 Wiring Ethernet at the SBU

Overview

The SBU has six 10/100BaseT Ethernet interfaces, plus the interface on the front of the SBU described in *Wiring the maintenance interfaces and Reset* on page 5-75.

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

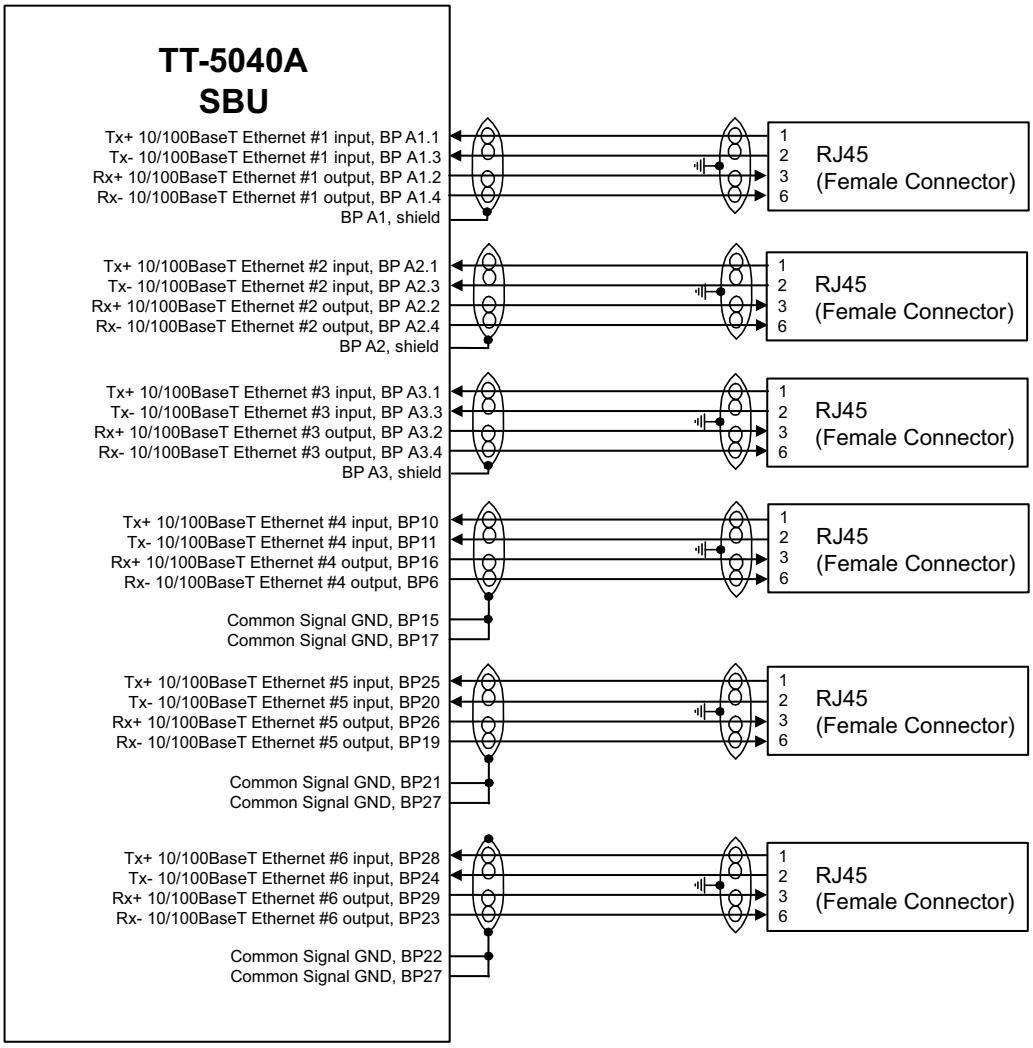


Figure 5-18: Wiring Ethernet

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

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

Pins for 10/100BaseT Ethernet

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

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

Table 5-32: SBU Pins for 10/100BaseT Ethernet

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

Table 5-32: SBU Pins for 10/100BaseT Ethernet (Continued)

Wiring of RJ45 connector to Quadrax connector

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

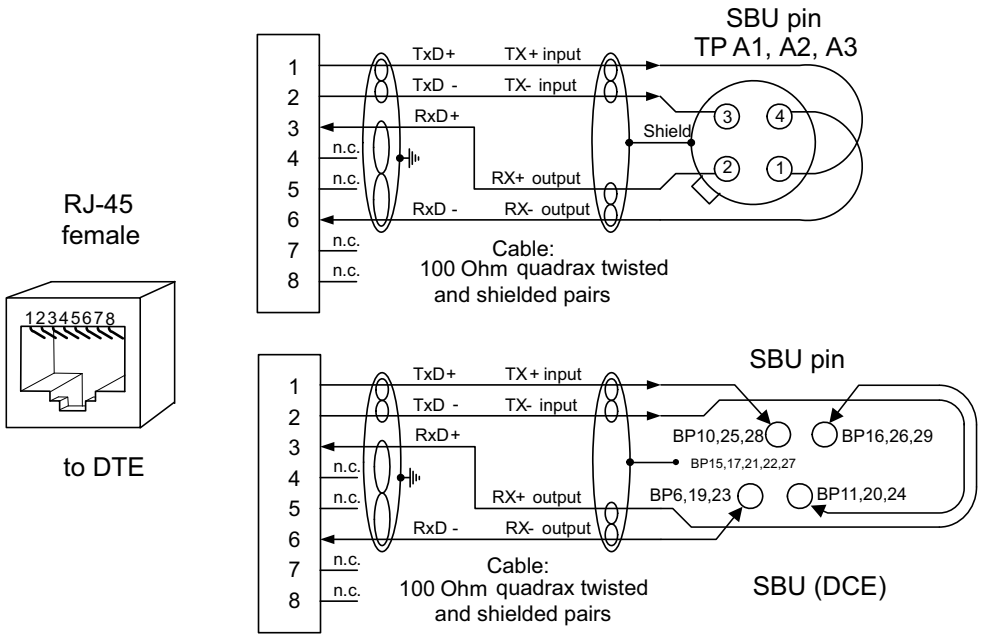


Figure 5-19: Ethernet pin configuration for SBU

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

Common Signal GND is used to connect the shield of the Ethernet cables for Ethernet #4, #5 and #6 on the SBU. The shield for each cable is connected according to *Figure 5-18: Wiring Ethernet*. The shield of the Ethernet cables for Ethernet #1, #2 and #3 is connected to the shield of the Quadrax connectors.

5.3.9 Wiring WLAN antenna interface

Before wiring the WLAN antenna interface make sure that your system has the Built-in Wireless Option 405040A-003.

Overview

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

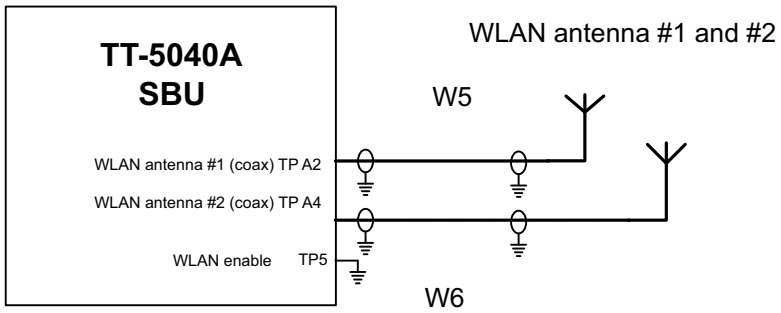


Figure 5-20: Wiring WLAN antenna interfaces #1 and #2

Note If you have installed the wireless option 405040A-003, and TP5 (WLAN enable) is **not** connected to Ground at startup, the Pass/Fail LED of the SBU will be flashing yellow, Annunciator #2 "SBU failed" (TP29) will be activated and you will get a warning in the SBU web interface.

WLAN low pass filter

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

WLAN pins

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

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

Table 5-33: SBU pins for WLAN antenna #1 and #2

Description of the WLAN interface

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

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

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

Operating with a single WLAN antenna

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

Make sure to set up WLAN interface correctly — Antenna configuration: Main or Aux for single antenna operation — see *WLAN interface of the SBU (option)* on page 6-32.

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

Table 5-34: WLAN antenna configuration

RF cable requirements for WLAN

To achieve optimal performance for the WLAN system select a cable type with a minimal cable loss when cabling the TT5040A-004 WLAN antenna. For a table with cable types and cable losses see *Recommended RF cables* on page 5-83.

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

Table 5-35: Cable requirements for WLAN

5.3.10 Wiring ISDN

Wiring drawing

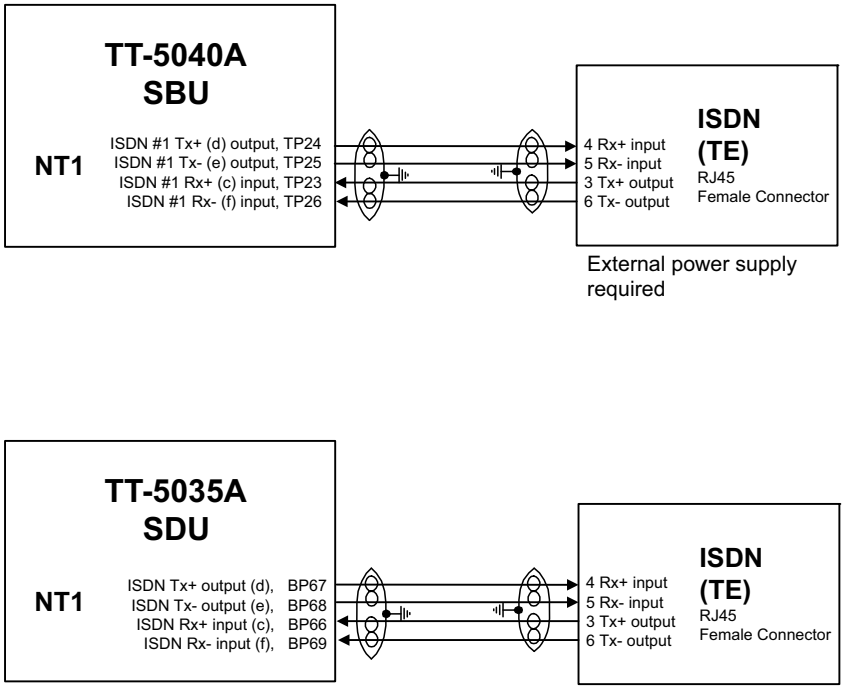


Figure 5-21: Wiring ISDN

Note that even though the AVIATOR 700 system supports connection of several ISDN devices, the satellite channel only supports transmission on one ISDN channel.

Pins for ISDN

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

SBU pin	Name/description
TP23	ISDN #1 Rx+ (c) input (NT)
TP24	ISDN #1 Tx+ (d) output (NT)
TP25	ISDN #1 Tx- (e) output (NT)
TP26	ISDN #1 Rx- (f) input (NT)
TP15	ISDN #2 Tx+ (c) output (TE), reserved for future use
TP16	ISDN #2 Rx+ (d) input (TE), reserved for future use
TP17	ISDN #2 Rx- (e) input (TE), reserved for future use
TP18	ISDN #2 Tx- (f) output (TE), reserved for future use

Table 5-36: SBU pins for ISDN

SDU pin	Name/Description
BP67	ISDN Tx+ output (d)
BP68	ISDN Tx- output (e)
BP66	ISDN Rx+ input (c)
BP69	ISDN Rx- input (f)

Table 5-37: SDU pins for ISDN

Description of SBU and SDU ISDN interface

The SBU and SDU have one ISDN interface each. The ISDN of the SDU uses the Swift64 service, the ISDN of the SBU uses the SwiftBroadband service. Each interface has its own ISDN controller and front end. The Euro ISDN S-bus interface is configured as the network side of the NT1 interface i.e. Rx is an input and Tx is an output Please note that this configuration of input and output differs from the configuration of the 10BaseT Ethernet, RS-422 and RS-232 PC interface input/output (valid for SBU and SDU).

The ISDN interface can address up to 8 ISDN devices. The SBU ISDN interface supports 56/64kbps data rate and G4 Fax on the SwiftBroadband connection. You can also use the SBU ISDN interface to make an AMBE2 or 3.1 kHz audio call. The SDU interface supports 56/64kbps data rate and G4 Fax on Swift64.

Important There is no DC power on the ISDN interface of the SBU. All ISDN devices connected to the SBU must be powered externally.

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

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

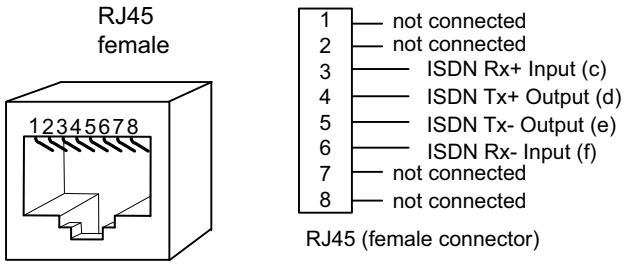


Figure 5-22: ISDN RJ45 connector

Cable requirements for ISDN

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

5.3.11 Wiring telephone systems

Built-in Private Branch Exchange (PBX)

The AVIATOR 700 system has two built-in PBX systems: one in the SDU and one in the SBU.

- The PBX of the SDU controls four 4-wire audio interfaces, two 2-wire POTS interfaces and one ISDN interface.
- The built-in PBX of the SBU controls the 2-wire POTS interfaces #1 and #2 and one ISDN interface.

The built-in PBX of the SBU can also route VoIP calls that are terminated in the SIP server of the SBU.

Without the Multi-voice option the AVIATOR 700 system supports one external call at a time going through the SBU and two external calls going through the SDU.

VoIP calls and SIP telephony

You can use phones with a SIP client and the WLAN interface to make calls. These calls are terminated in the SIP server of the SBU and routed through the built-in PBX on the Swift Broadband channel. For a detailed description how to set up your phone see *SIP setup for Wifi-enabled phones* on page G-1.

For information on how to connect the AVIATOR Wireless Handset, see AVIATOR Wireless Handset and Cradle Installation & Maintenance Manual, 98-129600.

4-wire audio

The 4-wire interfaces can be connected and configured to the 4-wire systems listed below:

- TT-5620A/TT-5622A Handset/Cradle system
- Up to two MagnaStar AIU (Analog Interface Units)
- One Iridium ICS telephone system
- Up to three 2.4 GHz Cordless handset base stations with WH-10 Satcom interface
- Up to three WH-10 handsets
- Up to two Cockpit Voice Interfaces

The four 4-wire handset interfaces are numbered handset interface #1 to #4.

- Handset interface #1 and #2 may interface to all systems mentioned above.
- Handset interface #3 may interface to all systems mentioned above except Cockpit Voice.
- Handset interface #4 may only interface to TT-5620A/TT-5622A Handset/Cradle system.

The TT-5620A/TT-5622A 4-wire Handset/Cradle system is also used for configuration of the handsets, phone book etc., and as a BITE and Satcom Status display. In order to use these features, the SDU must be connected to at least one TT-5620A/TT-5622A Handset/Cradle system (typically handset #4).

Important Do not use the 4-wire handset for cabin installation! Some of the functions of the 4-wire handset are for cockpit use only.

2-wire POTS interface #1 and #2

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

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

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

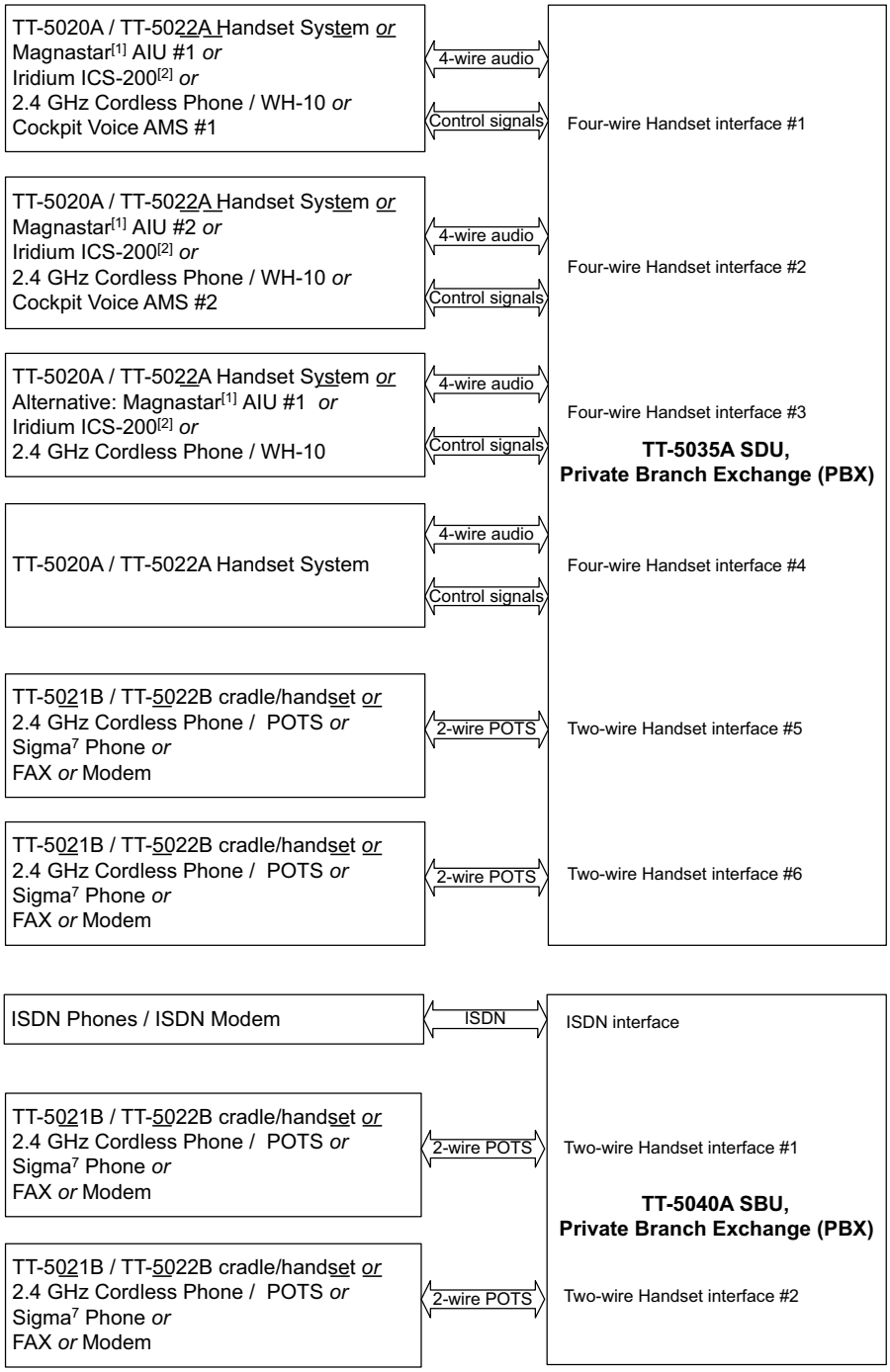
The AVIATOR 700 system supports 3 external call at a time: 2 calls on H$^+$, 1 call on SwiftBroadband.

ISDN interface

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

Configuration of wired handset interfaces

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



[1]: Maximum two MagnaStar AIUs may be installed. The preferred installation of AIU #1 is to the four-wire Handset #1 interface, but AIU #1 may alternatively be connected to the four-wire Handset #3 interface instead.

[2]: Two handset interfaces from the ICS-200 system can be connected to two of the three 4-wire interfaces #1, #2 and #3.

Figure 5-23: Handset interfaces, possible combinations of connected devices.

Wiring 4-Wire Handsets

The following drawing shows the wiring of the TT-5622A/TT-5620A 4-Wire Handsets.

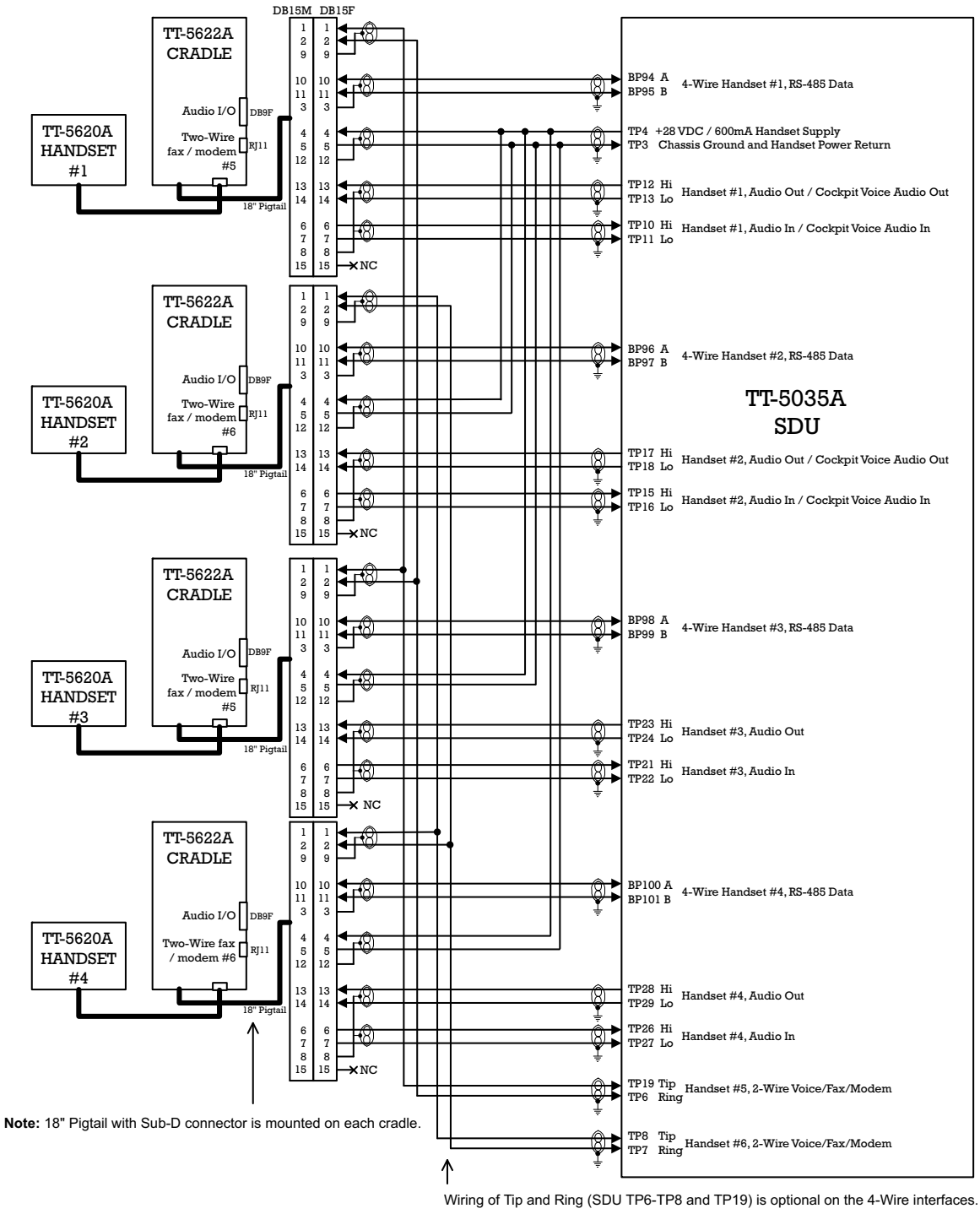


Figure 5-24: Wiring T&T 4-Wire Handset systems

SDU pins for 4-wire interfaces

Pin no.	Name/Description
TP10	Handset #1 Audio In Hi / Cockpit Voice Audio #1 In Hi
TP11	Handset #1 Audio In Lo / Cockpit Voice Audio #1 In Lo
TP12	Handset #1 Audio Out Hi / Cockpit Voice Audio #1 Out Hi
TP13	Handset #1 Audio Out Lo / Cockpit Voice Audio #1 Out Lo
BP94	Handset #1 RS-485 Data A
BP95	Handset #1 RS-485 Data B
TP15	Handset #2 Audio In Hi / Cockpit Voice Audio #2 In Hi
TP16	Handset #2 Audio In Lo / Cockpit Voice Audio #2 In Lo
TP17	Handset #2 Audio Out Hi / Cockpit Voice Audio #2 Out Hi
TP18	Handset #2 Audio Out Lo / Cockpit Voice Audio #2 Out Lo
BP96	Handset #2 RS-485 Data A
BP97	Handset #2 RS-485 Data B
TP21	Handset #3 Audio In Hi
TP22	Handset #3 Audio In Lo
TP23	Handset #3 Audio Out Hi
TP24	Handset #3 Audio Out Lo
BP98	Handset #3 RS-485 Data A
BP99	Handset #3 RS-485 Data B
TP26	Handset #4 Audio In Hi
TP27	Handset #4 Audio In Lo
TP28	Handset #4 Audio Out Hi
TP29	Handset #4 Audio Out Lo
BP100	Handset #4 RS-485 Data A
BP101	Handset #4 RS-485 Data B
TP4	+28 V DC / 600 mA Handset supply, remote On/Off control by TP5 (nON)
TP3	Handset Power Return
TP25	+12 V DC Spare Supply for test only - do not connect!

Table 5-38: SDU pins for 4-wire interface

Description of 4-wire interfaces

The SDU has four 4-wire analog interfaces for the TT-5620A/ TT-5622A Thrane & Thrane aeronautical handset system on the rear connector. The handsets use an RS-485 data bus for on/off hook signalling, display control, keyboard control, background light, etc.

Important AVIATOR 700D: For safety reasons do not install the 4-wire handset in the cabin, see also *Mounting considerations*, *SDU* on page 5-5.

Three of the 4-wire interfaces, #1, #2 and #3, can alternatively be used for connection of other supported phones (MagnaStar, WH-10 phones, Iridium ICS-200 telephone system, FONE). For information on possible combinations, see *Configuration of wired handset interfaces* on page 5-48. You must configure the handset interfaces must be configured in the Aero-SDU Configuration Program.

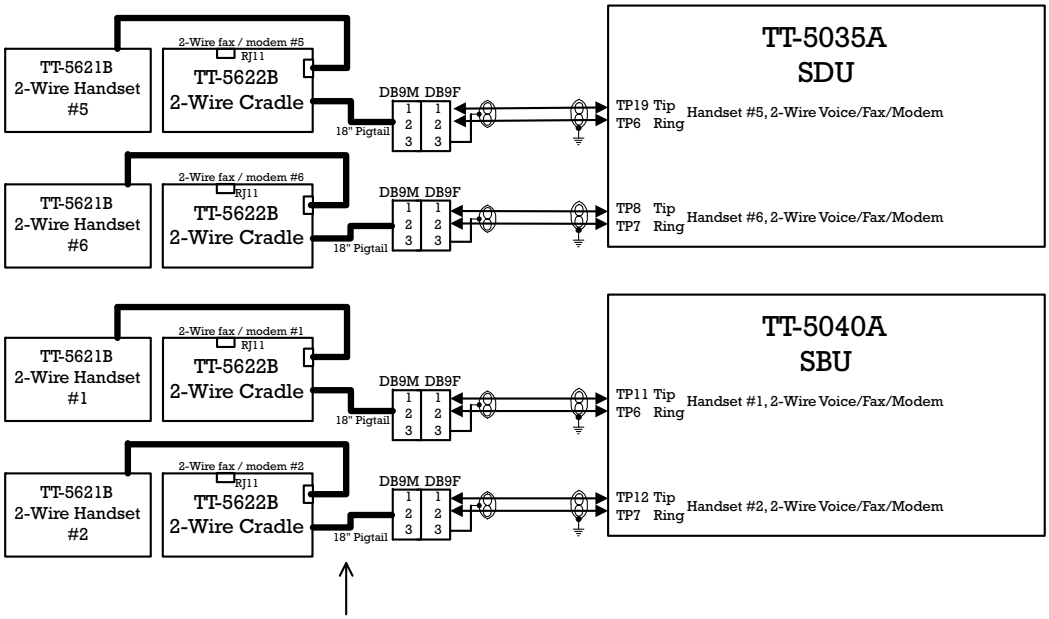
For information on wiring of WH-10 phones, refer to *Wiring WH-10 handsets* on page 5-53.

For information on wiring of ICS-200 telephone system, refer to *Wiring ICS-200 telephone system* on page 5-56.

For information on wiring of 2.4GHz Cordless phones, refer to *Wiring 2.4GHz Cordless (4-wire) phone* on page 5-59.

Wiring 2-Wire Handsets

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



Note: 18" Pigtail with Sub-D connector is mounted on each cradle.

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

Pins for 2-wire interfaces

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

SDU pin	Name/Description
TP6	2-Wire Voice/Fax/Modem #1 (Ring)
TP7	2-Wire Voice/Fax/Modem #2 (Ring)
TP8	2-Wire Voice/Fax/Modem #2(Tip)
TP19	2-Wire Voice/Fax/Modem #1 (Tip)

Table 5-39: SDU pins for 2-wire interface

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

Table 5-40: SBU pins for 2-Wire interface

Description of 2-wire interfaces

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

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

For information on wiring of Sigma[7] phones, see *Wiring Sigma[7] (2-wire) handsets* on page 5-62.

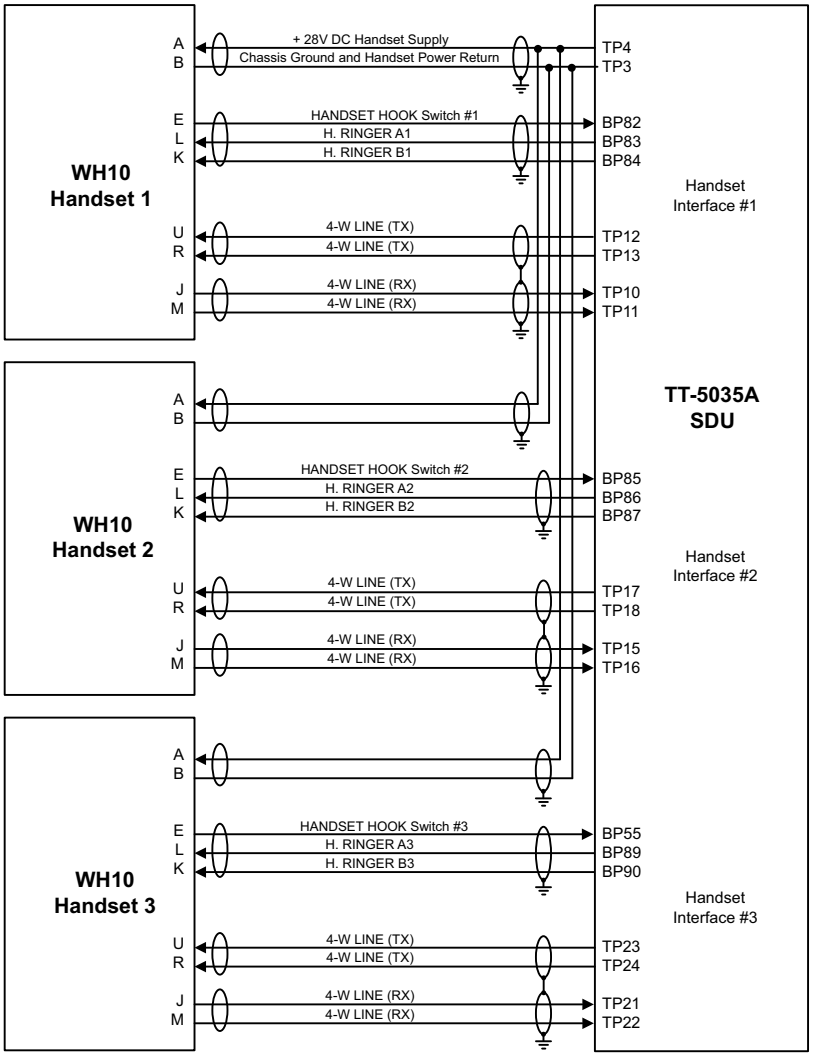
For information on wiring of ICG DECT Cordless Handset phones, see *Wiring ICG DECT Cordless Handset (2-wire) phone* on page 5-63.

Supported cable length: 100 meters (328 feet)

5.3.12 Wiring WH-10 handsets

Overview

The following drawing shows the wiring of WH-10 handsets.



Note: + 28 V and Chassis Ground must be connected as close as possible to TP3/TP4

Figure 5-26: Wiring WH-10 handsets

WH-10 pins

The below list shows the pins used for the WH-10 interfaces on the SDU.

Pin no.	Name/Description
TP3	Chassis Ground and Handset Power Return
TP4	+28 V DC/600 mA Handset Supply
TP10	Handset #1 Audio In Hi / Cockpit Voice Audio #1 In Hi
TP11	Handset #1 Audio In Lo / Cockpit Voice Audio #1 In Lo
TP12	Handset #1 Audio Out Hi / Cockpit Voice Audio #1 Out Hi
TP13	Handset #1 Audio Out Lo / Cockpit Voice Audio #1 Out Lo
BP82	WH-10/MagnaStar Hook Switch #1. Discrete input.
BP83	WH-10/MagnaStar Ringer Output A1. Discrete I/O.
BP84	WH-10/MagnaStar Ringer Output B1. Discrete output.
TP15	Handset #2 Audio In Hi
TP16	Handset #2 Audio In Lo
TP17	Handset #2 Audio Out Hi
TP18	Handset #2 Audio Out Lo
BP85	WH-10/MagnaStar Hook Switch #2. Discrete input.
BP86	WH-10/MagnaStar Ringer Output A2. Discrete I/O.
BP87	WH-10/MagnaStar Ringer Output B2. Discrete output.
TP21	Handset #3 Audio In Hi
TP22	Handset #3 Audio In Lo
TP23	Handset #3 Audio Out Hi
TP24	Handset #3 Audio Out Lo
BP55	WH-10/MagnaStar Hook switch #3
BP89	WH-10/MagnaStar Ringer Output A3. Discrete I/O.
BP90	WH-10/MagnaStar Ringer Output B3

Table 5-41: SDU pins for WH-10 interface

Description of WH-10 interfaces

Up to three WH-10 systems can be connected to the AVIATOR 700 system, using the interfaces #1, #2 or #3.

Note The 4-wire handset system #1, #2 and #3 interfaces are used for either the 4-Wire Handset system, MagnaStar, ICS-200, 2.4GHz Cordless or WH-10 phones, as configurations share the same interface. For information on possible combinations, see *Configuration of wired handset interfaces* on page 5-48.

The handset interfaces must be configured in the Aero-SDU Configuration Program.

For further information on the interfaces, see *SDU pins for 4-wire interfaces* on page 5-50.

Apart from the handset interfaces, the SDU has a number of discrete inputs/outputs used for MagnaStar/WH-10 systems. For information on these interfaces, see *Discretes for WH-10 handset systems* on page 5-55.

5.3.13 Discretes for WH-10 handset systems

The below list shows the discretes used for the MagnaStar/WH-10 interfaces on the SDU. For more information on the discrete types, refer to *Description of the discrete types* on page 5-67.

Pin no.	Name/Description	Discrete Type
BP54	MagnaStar: Satcom Service Unavailable	Lamp Driver output
BP55	WH-10/MagnaStar Hook switch #3	WOW input
BP82	WH-10/MagnaStar Hook Switch #1	WOW input
BP83	WH-10/MagnaStar Ringer Output A1	Lamp Driver output
BP84	WH-10/MagnaStar Ringer Output B1	Lamp Driver output
BP85	WH-10/MagnaStar Hook Switch #2	WOW input
BP86	WH-10/MagnaStar Ringer Output A2	Lamp Driver output
BP87	WH-10/MagnaStar Ringer Output B2	Lamp Driver output
BP89	WH-10/MagnaStar Ringer Output A3	Lamp Driver output
BP90	WH-10/MagnaStar Ringer Output B3	Lamp Driver output

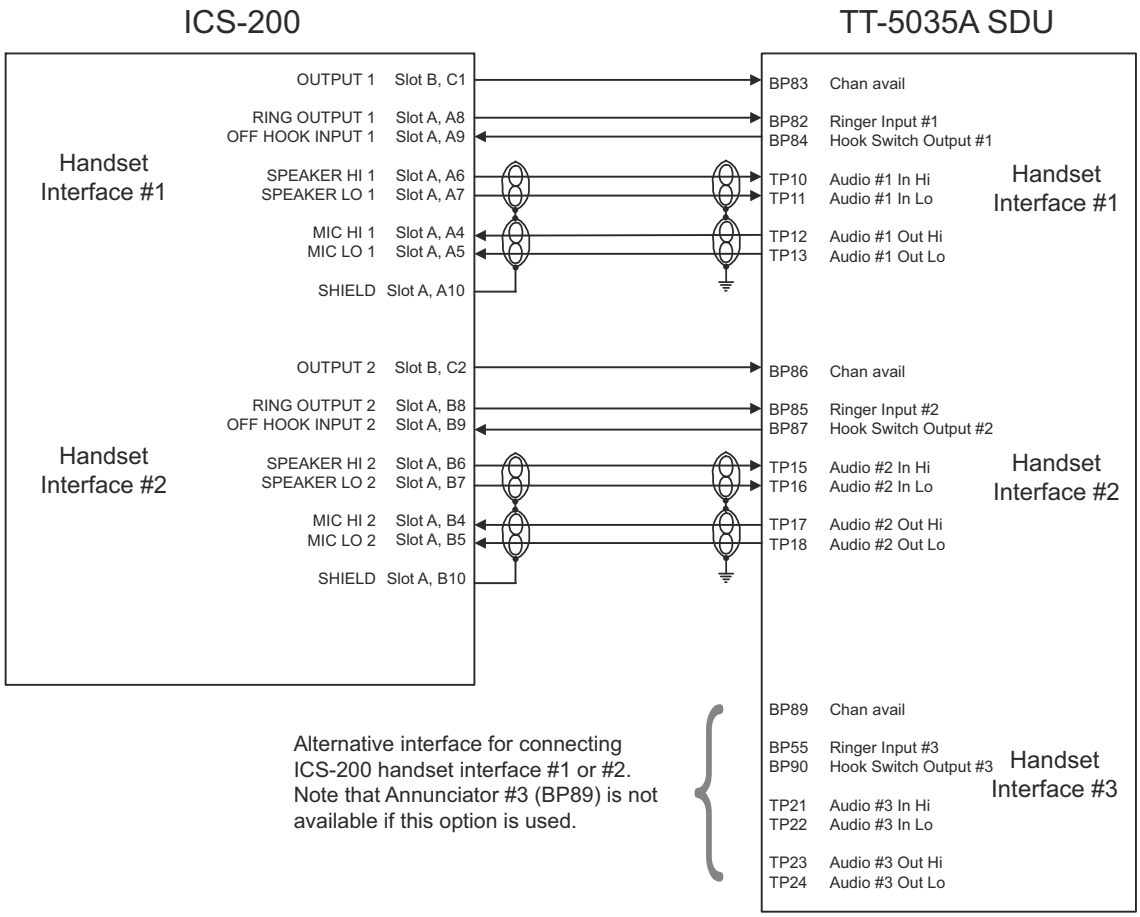
Table 5-42: SDU discretes for MagnaStar/WH-10 systems

5.3.14 Wiring ICS-200 telephone system

Important When simultaneously operating the AVIATOR 700 over the Inmarsat network and the ICS-200 there is a potential risk of interference.

Overview

The following drawing shows the wiring of the ICS-200 telephone system.



NOTE
This wiring diagram only addresses the ICS-200 interfaces to the TT-5035A SDU. For any additional ICS-200 installation information refer to the applicable ICS-200 installation documentation.

Figure 5-27: Wiring ICS-200 Iridium Communication System interface

Pins on SDU for ICS-200 telephone system

The below list shows the pins used for the ICS-200 interface on the SDU.

Pin no.	Name/Description
TP10	Handset #1 Audio In Hi
TP11	Handset #1 Audio In Lo
TP12	Handset #1 Audio Out Hi
TP13	Handset #1 Audio Out Lo
BP82	ICS-200 Ringer Input #1
BP83	ICS-200 Chan avail
BP84	ICS-200 Hook Switch Output #1
TP15	Handset #2 Audio In Hi
TP16	Handset #2 Audio In Lo
TP17	Handset #2 Audio Out Hi
TP18	Handset #2 Audio Out Lo
BP85	ICS-200 Ringer Input #2
BP86	ICS-200 Chan avail
BP87	ICS-200 Hook Switch Output #2
BP54	Satcom Service Unavailable
TP21	Handset #3 Audio In Hi
TP22	Handset #3 Audio In Lo
TP23	Handset #3 Audio Out Hi
TP24	Handset #3 Audio Out Lo
BP55	ICS-200 Ringer Input #3
BP89	ICS-200 Chan avail
BP90	ICS-200 Hook Switch Output #3

Table 5-43: SDU pins for ICS-200 interface

Description of Iridium ICS-200 interface

The Iridium Communication System ICS-200 can be connected to the SDU, providing the possibility of routing calls from the AVIATOR 700 system to the Iridium satellite network.

Note

The 4-wire handset system #1, #2 and #3 interfaces are used for either the 4-Wire Handset system, MagnaStar, ICS-200, 2.4GHz Cordless or WH-10 phones, as configurations share the same interface. For information on possible combinations, see *Configuration of wired handset interfaces* on page 5-48.

The handset interfaces must be configured in the Aero-SDU Configuration Program.

For further information on the handset interfaces, see *SDU pins for 4-wire interfaces* on page 5-50.

Apart from the handset interfaces, the SDU uses the discrete input/output Satcom Service Unavailable.

5.3.15 Wiring 2.4GHz Cordless (4-wire) phone

Overview

The following drawing shows the wiring of 2.4GHz Cordless 4-wire phones.

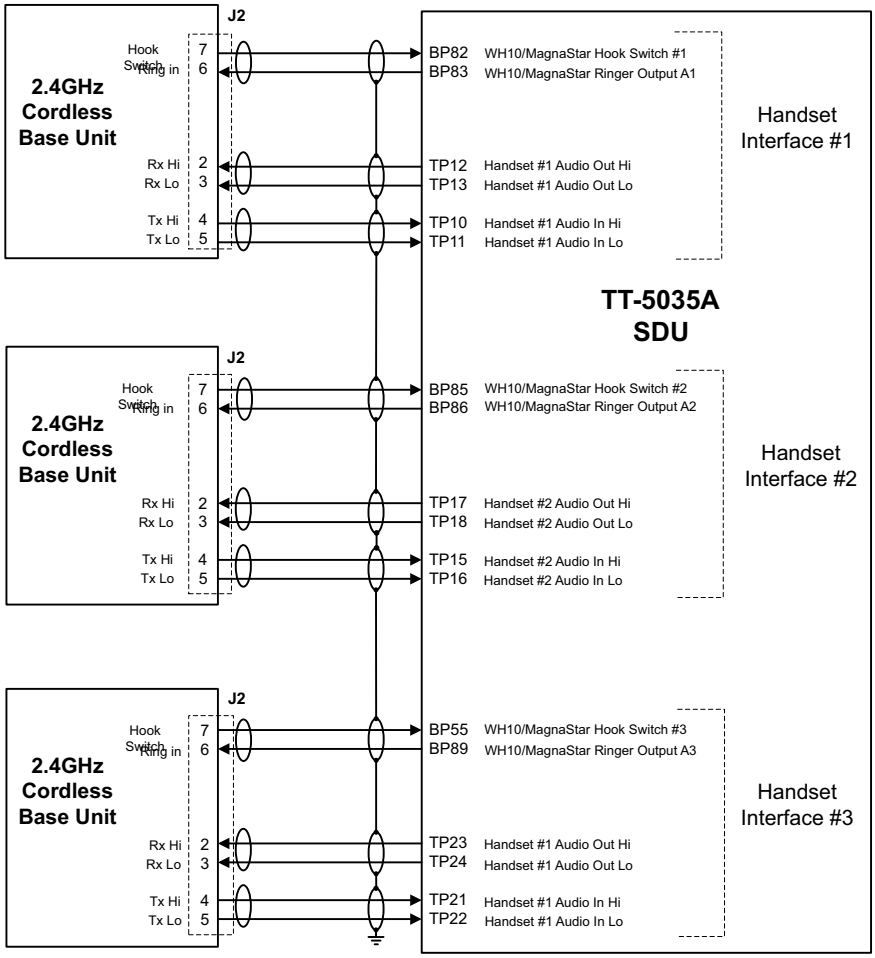


Figure 5-28: Wiring 2.4GHz Cordless 4-wire phones

Note The power for the 2.4GHz Cordless base unit must be supplied from an external power supply. See the 2.4GHz Cordless manual for details.

Pins for 2.4GHz Cordless (WH-10) interfaces

The below list shows the pins used for the 2.4GHz Cordless (WH-10) interfaces on the SDU.

Pin no.	Name/Description
TP10	Handset #1 Audio In Hi
TP11	Handset #1 Audio In Lo
TP12	Handset #1 Audio Out Hi
TP13	Handset #1 Audio Out Lo
BP82	WH-10/MagnaStar Hook Switch #1
BP83	WH-10/MagnaStar Ringer Output A1
TP15	Handset #2 Audio In Hi
TP16	Handset #2 Audio In Lo
TP17	Handset #2 Audio Out Hi
TP18	Handset #2 Audio Out Lo
BP85	WH-10/MagnaStar Hook Switch #2
BP86	WH-10/MagnaStar Ringer Output A2
TP21	Handset #3 Audio In Hi
TP22	Handset #3 Audio In Lo
TP23	Handset #3 Audio Out Hi
TP24	Handset #3 Audio Out Lo
BP55	WH-10/MagnaStar: Hook switch #3
BP89	WH-10/MagnaStar Ringer Output A3

Table 5-44: SDU pins for 2.4GHz Cordless (WH-10) interface

Description of 2.4GHz Cordless interfaces

Up to three 2.4GHz Cordless Handsets can be connected to the AVIATOR 700 system, using the interfaces #1, #2 or #3.

Note The 4-wire handset system #1, #2 and #3 interfaces are used for either the 4-Wire Handset System, MagnaStar, 2.4GHz Cordless or WH-10 phones, as configurations share the same interface. For information on possible combinations, see *Configuration of wired handset interfaces* on page 5-48. Handset interface #4 can only be used for the 4-Wire Handset System.

The handset interfaces must be configured in the Aero-SDU Configuration Program.

For further information on the interfaces, see *SDU pins for 4-wire interfaces* on page 5-50.

Apart from the handset interfaces, the SDU has a number of discrete inputs/outputs used for MagnaStar/WH-10 systems. For information on these interfaces, see *Discretes for WH-10 handset systems* on page 5-55.

5.3.16 Wiring Sigma^7 (2-wire) handsets

One to four Sigma^7 handsets can be connected to the 2-wire interfaces of the AVIATOR 700 system. The following drawing shows the wiring of Sigma^7 handsets.

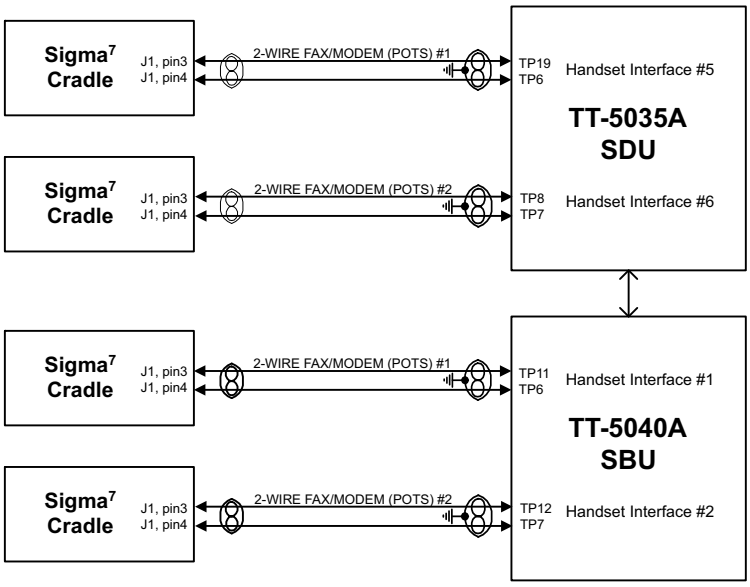


Figure 5-29: Wiring Sigma^7 handsets

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

Connect J1 on the Sigma^7 handset to the rear receptacle of the SDU and/or SBU according to the wiring drawing above.

Important In order for the volume in the Sigma^7 handset to be sufficient, it is normally necessary to adjust the "ear volume" using the menu system of the handset. For information on how to do this, see *Sigma7 setup* on page 6-95.

For information on the 2-wire interface, see *Pins for 2-wire interfaces* on page 5-52.

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

One to four ICG DECT Cordless Handset phones can be connected to the 2-wire interfaces of the AVIATOR 700 system. The following drawing shows the wiring of ICG DECT Cordless Handset 2-wire phones.

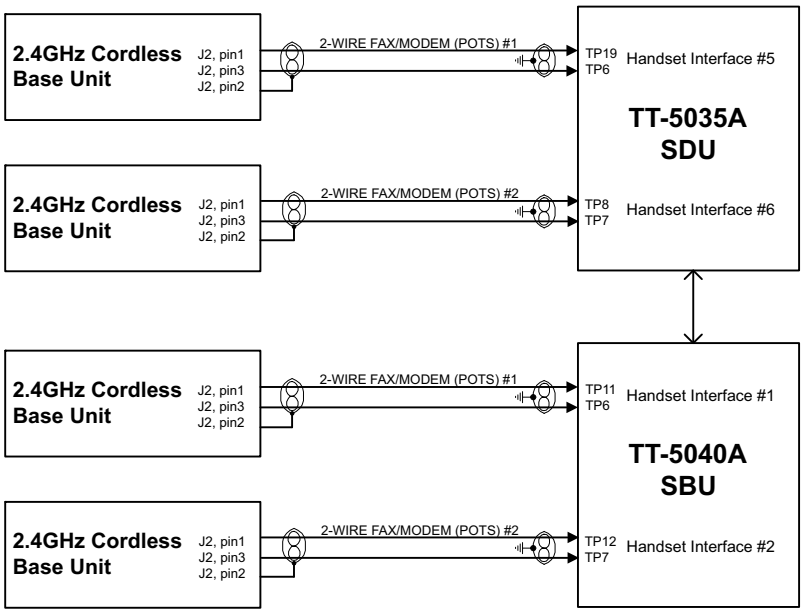


Figure 5-30: Wiring 2.4GHz Cordless handsets

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

Important In order for the ICG DECT Cordless Handset phone to work properly, it is normally necessary to make a few initial adjustments of the handset. For information on how to do this, see *ICG DECT Cordless Handset setup* on page 6-95.

For information on the 2-wire interface, see *Pins for 2-wire interfaces* on page 5-52.

5.3.18 Wiring discretes

Discrete annunciators, Chime/Lamps Inhibit and WOW

The following drawing shows the wiring of discrete annunciators, Chime/Lamps Inhibit and Weight-on-Wheels (WOW).

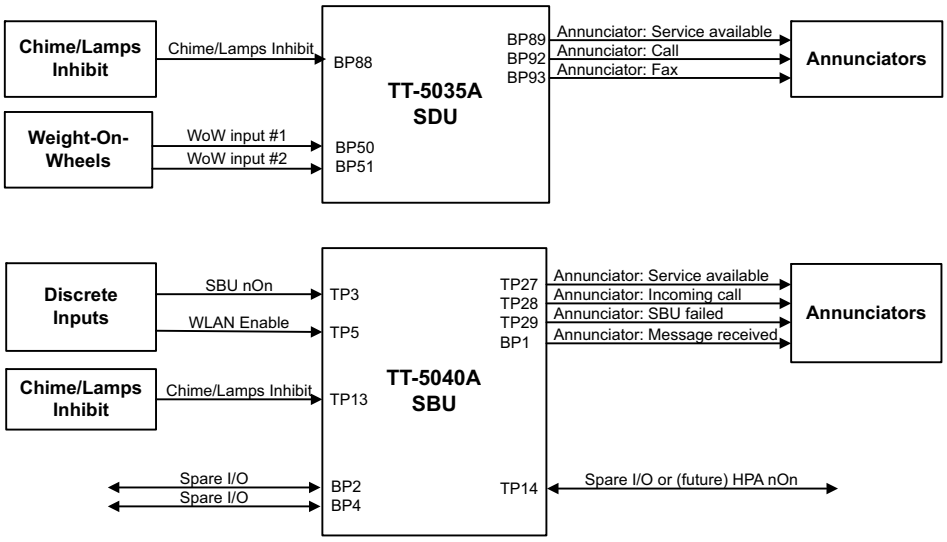


Figure 5-31: Wiring discrete annunciators and Weight-on-Wheels

Pins for discrete annunciators

The following list shows the pins used for discrete annunciators:

SDU Pin	Name/Description	Specification of discrete type[a]
BP89	Annunciator #3 “Service Available” (Discrete I/O)	Output: Lamp Driver
BP92	Annunciator #1 “Call” (Discrete I/O)	Output: Lamp Driver
BP93	Annunciator #2 “Fax” (Discrete Output)	Output: Lamp Driver

Table 5-45: SDU pins for discrete annunciators

a. The discrete interfaces are described in *Description of the discrete types* on page 5-67.

Note Annunciator #3 on pin BP89 is not available if you are using handset interface #3 for MagnaStar, 2.4GHz Cordless (4-wire) or WH-10 Handsets.

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

Table 5-46: SBU pins for discrete annunciators

a. The discrete interfaces are described in *Description of the discrete types* on page 5-67.

Function of discrete annunciators

The function of the **SDU** Annunciators is as follows:

- Annunciator #1 “Call”.
  This Annunciator is used for signalling incoming voice calls. The Annunciator is “flashing” like the Connection LED on a 4-Wire Handset (default setting) and is turned off when the call is answered or terminated by the initiator.
- Annunciator #2 “Fax”.
  This Annunciator is used for signalling incoming fax. The Annunciator is “steady ON” until a receipt for the fax has been given in the handset (default setting).
- Annunciator #3 “Service Available”.
  This Annunciator is used for indicating satcom service availability. The Annunciator is “steady ON” when H^+ service is available (default setting).

You can configure the behavior of the annunciators. To do this use the Aero-SDU Configuration Program. While in the **configuration** select **Ring Profiles**, **Annunciator Behavior** and select for each annunciator.

The function of the **SBU** annunciators is as follows:

- Annunciator #1 “Incoming call” (TP28)
  Default behavior: Active (low) when a handset is ringing.
- Annunciator #2 “SBU Failed” (TP29).
  Default behavior: Active (low) whenever a BITE with severity essential or fatal is active on the SBU. (Fatal in this context means fatal locally on the SBU. When displayed at the SDU any fatal error on the SBU will only cause an essential BITE to be raised at the SDU).
- Annunciator #3 “Service available” (TP27).
  Default behavior: Active (low) when the SwiftBroadband Service is available.
- Annunciator #4 “Message received” (BP1).
  Default behavior: Active (low) when a Message is received in the SBU.

Pins for Chime/Lamps Inhibit input

Pins used for the Chime/Lamps Inhibit input:

SDU Pin	Name/Description	Specification of discrete type[a]
BP88	Chime/Lamps Inhibit Input	Input: WOW (active low)

Table 5-47: SDU Pin for Chime/Lamps Inhibit input

a. The discrete interfaces are described in *Description of the discrete types* on page 5-67.

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

Table 5-48: SBU pin for Chime/Lamps Inhibit input

Description of the Chime/Lamps Inhibit interfaces

The SDU and the SBU each have one discrete input for the Chime/Lamps Inhibit function. This input is used to inhibit Satcom activation of the chime and call lights during take-off and landing. The Inhibit function is activated by connecting this input to ground. The Inhibit function of the SDU also activates the ring profile "TakeOfLandng".

Polarity of the discrete annunciators and Chime/Lamps Inhibit input

The ring profiles are defined using the Aero-SDU Configuration Program where call inhibit/non-inhibit is set up for each of the 4-wire and 2-wire interfaces and annunciators.

In the web interface you can change the polarity of the discrete annunciators and the Chime/Lamps Inhibit input from Active low (default) to Active high. For instructions how to do this see *Configure the discrete I/O interfaces of the SBU* on page 6-47.

Weight-On-Wheels (not currently in use)

The following list shows the pins used for Weight-On-Wheels (WOW):

SDU Pin	Name/Description	Specification of discrete type[a]
BP50	Weight-on-Wheels Input #1	Input: WOW
BP51	Weight-on-Wheels Input #2	Input: WOW

Table 5-49: SDU pins for WOW

a. The discrete interfaces are described in *Description of the discrete types* on page 5-67.

The SDU has 2 discrete inputs for Weight-On-Wheels (WOW), which can detect whether the aircraft is airborne or not. Currently this information is not used in the SDU.

The interpretation of the polarity (airframe DC ground or open circuit) of the input is defined by the Configuration Module (WOW Active Polarity).
The Configuration Module also defines if WOW is installed or not. For further information, see the online help in the Aero-SDU Configuration Program.

Pins for non-configurable discrete inputs on the SBU

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

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

Table 5-50: SBU pins for discrete inputs

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

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

Description of the discrete types

Discrete type and description:

Discrete type	Description
Lamp Driver	The SDU and SBU have several discrete Lamp Driver outputs. The output configuration forms a switch closure to ground. The electrical specification for the Lamp type switch is: Open switch hold-off voltage: max. +39.5 V DC Closed switch voltage: max. 1 V DC at 500 mA Open switch resistance (OFF): min. 100 kΩ
Discrete input	The discrete input detects the following states: “Open” voltage: 7 V DC to 39.5 V DC or ≥100 kΩ to ground. “Short” voltage: 0 ±3.5 V DC or ≤1500 Ω to ground. Input characteristics: Reaction time: <500 ms. The internal interface is diode-isolated for parallel connection externally to any other LRU(s), with at least 200 kΩ of isolation, when power is not applied.

Table 5-51: Specification of discrete types

5.3.19 Wiring Cockpit Voice interface

Introduction

The Cockpit Voice interface must be wired to the Audio Management System (AMS) and an Audio Control Panel (ACP) or similar. Figure 5-32: shows a typical Cockpit Voice installation. Pay attention to the drawing notes:

NOTES:

[1] The balanced audio outputs from the SDU (TP10, TP11, TP17 and TP18) are not transformer coupled. Do not connect HI or LO output to ground.

[2] Off-hook is signalled in 3 ways (per configuration). Use either

- Push-To-Talk (PTT) switch
- Latched Audio Control Panel switch
- MCDU line switch

[3] If the AMS has unbalanced audio inputs or outputs, transformers should be inserted in the audio lines, to convert the balanced signals to unbalanced and vice versa. Figure 5-33: shows a typical installation for an AMS with unbalanced audio inputs/ outputs. The *Universal Interface Amplifier* model 270-16 from *Northern Airborne Technology* (NAT) has built-in transformers. Alternatively the model AA34-300 may be used (with the same I/O pin configuration). The settings of the Universal Interface Amplifier are listed in Table 5-53 on page 5-71 and Table 5-54 on page 5-72.

Northern Airborne Technology (NAT) part numbers

Part name	Part number
Universal Interface Amplifier	Model 270-16
Universal Radio Interface	Model AA34-300

Table 5-52: Northern Airborne Technology (NAT) part numbers.

Typical Cockpit Voice installation

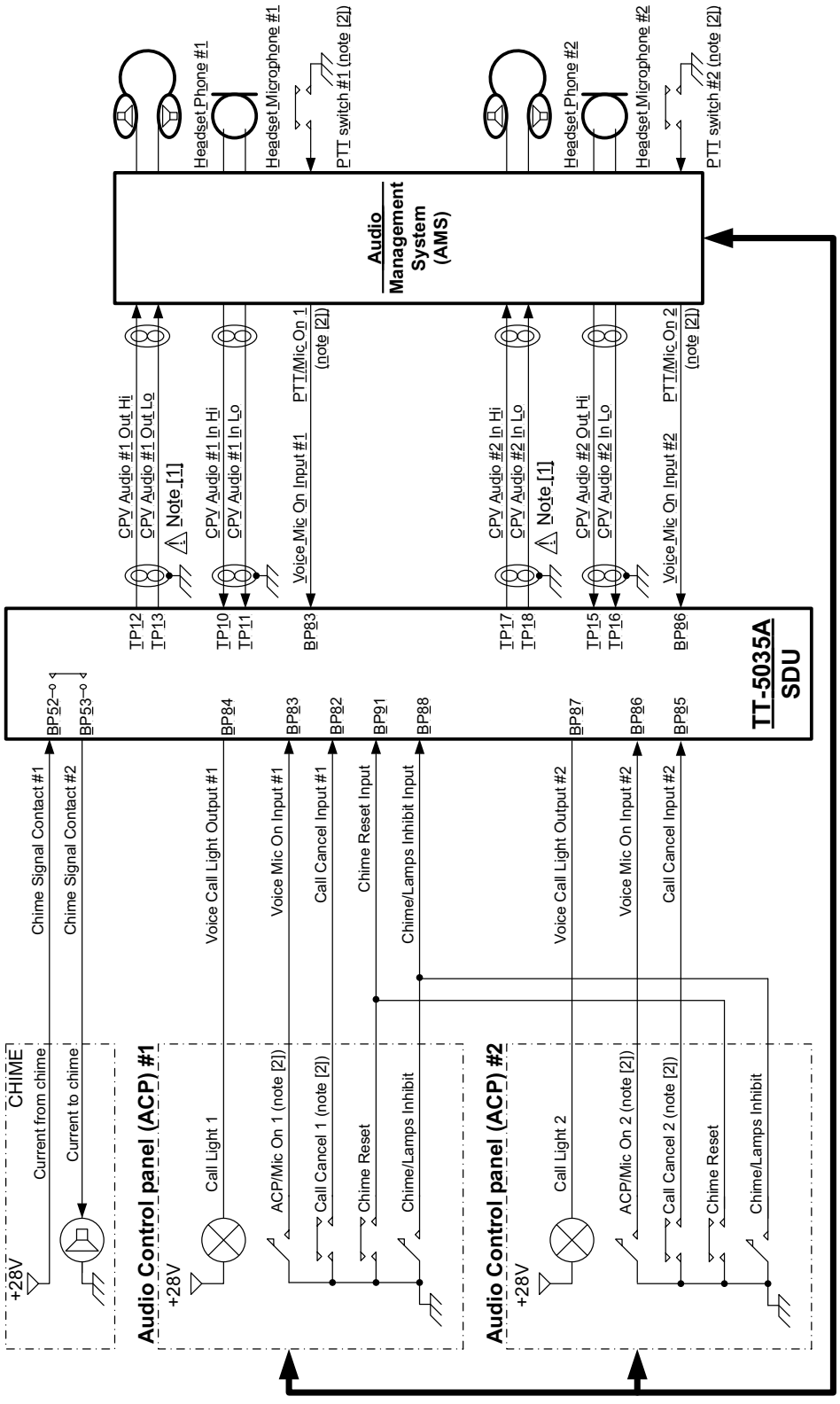


Figure 5-32: Typical Cockpit Voice installation

Cockpit Voice with unbalanced AMS audio interface

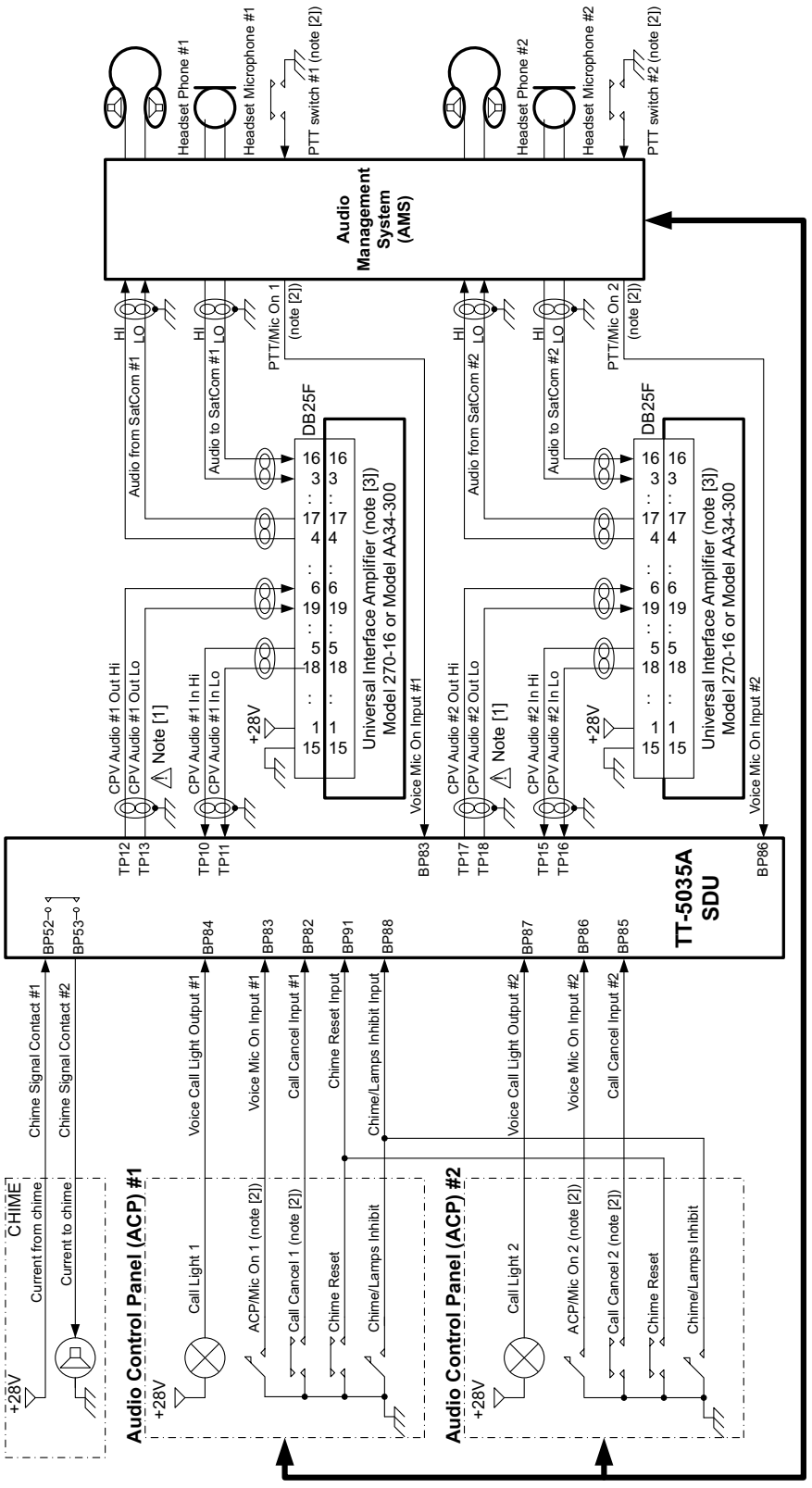


Figure 5-33: Typical Cockpit Voice installation with unbalanced AMS audio interface

NAT, Universal Interface Amplifier model 270-16 settings

Switch/Jumper/ Adjustment ID	NAT, Universal Interface Amplifier model 270-16 settings
9V bias, MS3	The SDU does not provide microphone DC power. If the microphone needs DC-power, and if the AMS does not provide DC power this switch shall be set to "9V bias".
Load Sel. MS4	Set switch to 600 Ohm (Audio output channel to AMS Audio Input).
Load Sel. MS5	Set switch to 600 Ohm (Mic. output channel to SDU Audio Input).
Mic SDTN	Set mic. side tone level to minimum (side tone is handled by the SDU).
Mic. Gain	The mic. gain can be adjusted, but it is preferred to use the SDU adjustment capability (approximately 18dB). As starting point the mic. gain should be set to maximum.
Rcvr. level	The receiver level (headset phone level) can be adjusted, but it is preferred to use the SDU adjustment capability (approximately 18dB). As starting point the Rcvr. level should be set to maximum, and the audio output from the SDU should be adjusted to match other system components (VHF radios etc).

Table 5-53: Universal Interface Amplifier model 270-16 settings

NAT, Universal Interface Amplifier model AA34-300 settings

Switch/Jumper/ Adjustment ID	NAT, Universal Interface Amplifier model AA34-300 settings
Microphone DC bias, S1	The SDU does not provide microphone DC power. If the microphone needs DC-power, and if the AMS does not provide DC power this switch shall be set to "closed".
Microphone gain C1/C2	Set switch to "C2" in order to select the microphone amplifier and the transformer coupling.
Mic. output impedance, JP1	Set jumper JP1 to 150 Ohm, position "B-C" (Mic. output channel to SDU Audio Input).
Audio Output Impedance JP2	Set jumper JP2 to 600 Ohm position "B-C" (Audio output channel to AMS Audio Input).
Mic S/T level	Set mic. side tone level to minimum (side tone is handled by the SDU).
Mic. Level	The mic. gain can be adjusted, but it is preferred to use the SDU adjustment capability (approximately 18dB). As starting point the mic. gain should be set to maximum.
RX level	The receiver level (headset phone level) can be adjusted, but it is preferred to use the SDU adjustment capability (approximately 18dB). As starting point the RX level should be set to maximum, and the audio output from the SDU should be adjusted to match other system components (VHF radios etc).

Table 5-54: Universal Interface Amplifier model AA34-300 settings

SDU pins for Cockpit Voice

SDU Pin	Name/Description	Specification
BP52	CP Voice Chime Signal Contact #1; Current from Chime	Relay type, forms a circuit closure between BP52 and BP53 [a]
BP53	CP Voice Chime Signal Contact #2; Current to Chime	Relay type, forms a circuit closure between BP52 and BP53 [a]
BP82	CP Voice Call Cancel Input #1 (Discrete I)	Input: WOW (active low) [b]
BP83	CP Voice Mic On Input #1 (Discrete I/O)	Input: WOW (active low) [b]
BP84	CP Voice Call Light Output #1 (Discrete O)	Output: Lamp driver [b]
BP85	CP Voice Call Cancel Input #2 (Discrete I)	Input: WOW (active low) [b]
BP86	CP Voice Mic On Input #2 (Discrete I/O)	Input: WOW (active low) [b]
BP87	CP Voice Call Light Output #2 (Discrete O)	Output: Lamp driver [b]
BP88	Chime/Lamps Inhibit Input (Discrete I)	Input: WOW (active low) [b]
BP91	CP Voice Chime Reset Input (Discrete I)	Input: WOW (active low) [b]
TP10	Cockpit Voice Audio #1 In Hi	Balanced input. Impedance > 35 kOhm [c]
TP11	Cockpit Voice Audio #1 In Lo	Balanced input. Impedance > 35 kOhm [c]
TP12	Cockpit Voice Audio #1 Out Hi	Balanced output. Impedance < 20 Ohm [d]
TP13	Cockpit Voice Audio #1 Out Lo	Balanced output. Impedance < 20 Ohm [d]
TP15	Cockpit Voice Audio #2 In Hi	Balanced input. Impedance > 35 kOhm [c]
TP16	Cockpit Voice Audio #2 In Lo	Balanced input. Impedance > 35 kOhm [c]
TP17	Cockpit Voice Audio #2 Out Hi	Balanced output. Impedance < 20 Ohm [d]
TP18	Cockpit Voice Audio #2 Out Lo	Balanced output. Impedance < 20 Ohm [d]

Table 5-55: SDU pins for Cockpit Voice interface

a. Chime relay contact specification (BP52,BP53):
   Maximum current: 1.0 A.
   Maximum hold-off voltage (open circuit): 36.0 V.
b. The discrete interfaces are described in *Description of the discrete types* on page 5-67.
c. Dynamic input range: 0.12 V_{RMS} to 1.5V_{RMS}.
d. Rated output power into 600 Ohm: > 40mW (4.9VRMS).
   The outputs are NOT transformer coupled, and must not be shorted to ground.
   Minimum load impedance: >= 250 Ohm.

Description of the Cockpit Voice interface

CP Voice Chime Signal Contact #1/#2 (BP52, BP53)

The solid state relay drives a chime, that is sounded on incoming calls (ground-to-air call), and per configuration on outgoing calls (air-to-ground calls), when the line is connected and ready (single stroke or multi stroke chime).

CP Voice Call Light Output #1/#2 (BP84, BP87)

The discrete outputs drive the call lights, that are turned on at incoming and outgoing calls. The lamps are either flashing or steady on (per configuration), until off-hook.

CP Voice Mic On Input #1/#2 (BP83, BP86)

The discrete inputs are used for entering the off-hook state on incoming and outgoing calls. The input may be wired (per configuration) to the Push-To-Talk (PTT) switch, or the latched **Mic On** switch on the Audio Control Panel (ACP).

PTT switch wiring: The off-hook state is entered on the first high-to-low transition.

ACP switch wiring: When the input is low, the state is off-hook. When the input is high the state is on-hook.

CP Voice Call Cancel Input #1/#2 (BP82, BP85)

If the above Mic. On inputs are configured to PTT switch wiring, the Call Cancel inputs may be used for entering on-hook state. The input reacts on a high-to-low transition.

CP Voice Chime Reset Input (BP91)

The discrete input is used for silencing the chime, but off-hook state will not be entered. The input reacts on a high-to-low transition.

Chime/Lamps Inhibit Input (BP88)

The discrete input is used for inhibiting the Call Lamps and the Chime from becoming active, and is typically used during take-off and landing. The inhibit function is active as long as the input is kept low.

5.3.20 Wiring the maintenance interfaces and Reset

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

Maintenance PC, CM Write Enable, SDU Reset and ATE

The following drawing shows the wiring of:

- the RS-232 Maintenance PC connection on the SDU,
- the LAN Maintenance PC connection on the SBU,
- SDU Reset,
- Write enable for the SDU Configuration Module and
- ATE interface (for factory use only - **do not connect!**)

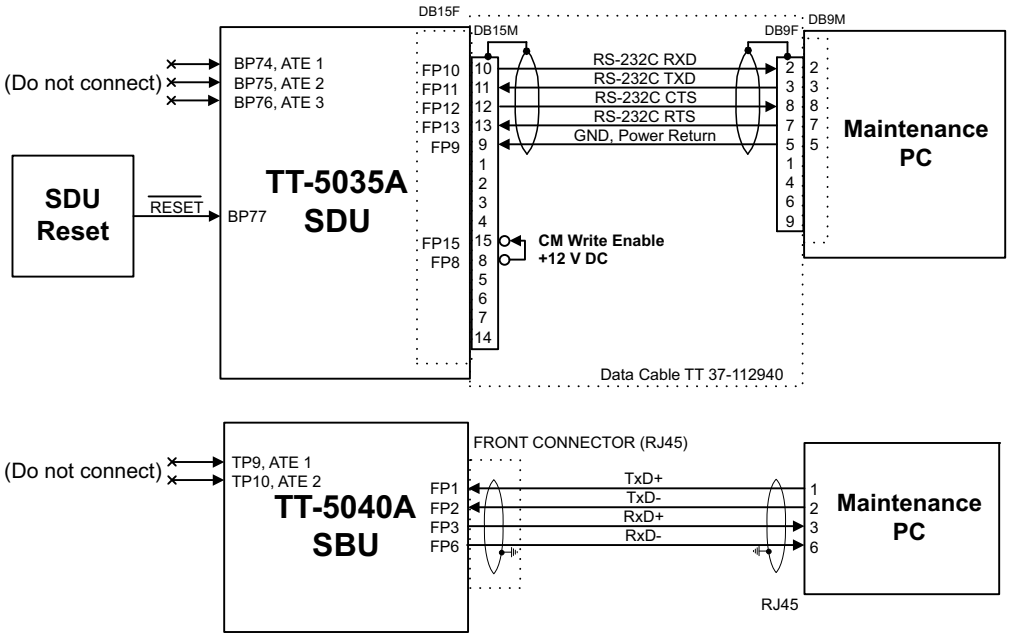


Figure 5-34: Wiring Maintenance PC and Reset

Pins for SDU RS-232 Maintenance PC interface and CM Write Enable (SDU)

The following list shows the SDU pins used for RS-232 PC interface and for CM Write Enable. Both interfaces are included in the TT 37-112940 data cable described at the end of this section.

SDU Pin	Name/Description
FP10	TxD Input
FP11	RxD Output
FP12	RTS Input
FP13	CTS Output
FP9	GND, Power Return (for +12 V DC)
FP8	+12 V DC/120 mA
FP15	Configuration Module Write Enable In

Table 5-56: SDU pins for RS-232 PC interface

Description of SDU RS-232 Maintenance PC interface and CM Write Enable

The SDU has a PC interface at the front connector, supporting the RS-232 standard. The front PC interface can also be used for uploading software.
The interface is configured as DCE on the SDU (i.e. TxD + RTS are inputs and RxD + CTS are outputs).

The PC interface has the following characteristics:

- Baud rate: 115.2 kbps fixed
- Data bits: 8
- Parity: None
- Stop bit: 1
- Flow control: Hardware (RTS/CTS only)

The Write Enable Input - FP15 - enables write cycles to the write protected area in the Configuration Module. FP15 must be connected to +12 V DC (FP8) in order to have access to the write protected area. Electrical specifications:

Enable Write cycles: $+10.0\ V \leq V_{FP15} \leq +13.0\ V$

Write Protected: $V_{FP15} \leq +1.9\ V$

The following drawing shows the wiring of the maintenance cable for the SDU front connector.

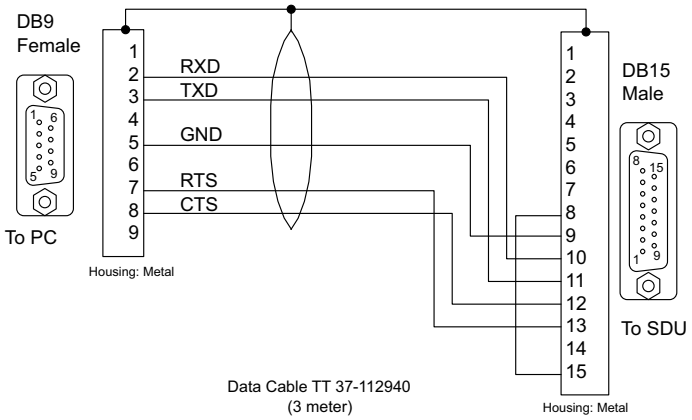


Figure 5-35: TT 37-112940 maintenance cable for front connector on SDU and PC

Pins for the Maintenance interface on SBU

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

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

Table 5-57: SBU pins for Maintenance interface

Description of the Maintenance interface on the SBU

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

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

The maintenance interface has the following characteristics:

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

To access the configuration settings, use a PC with a browser and open the built-in web interface of the SBU. For further information, see *SBU Configuration tasks* on page 6-13.

Reset

The SDU has a discrete input (BP77) on the rear connector, which can be used for SDU hardware reset. The specification complies with the discrete WOW input.

Note You only need to connect this input if you have special requirements to the reset function. For normal use, the push-button on the front panel of the SDU should be sufficient.

SDU hardware reset is initiated by connecting the input to ground. This input is filtered carefully, and the input must be activated for approximately 5 s before the reset procedure takes action. It is highly recommended to use a guarded switch to avoid accidental operation of the switch.

Electrical DC characteristics: WOW Input type, refer to *Description of the discrete types* on page 5-67.

Pins for Automatic Test Equipment (ATE)

The ATE pins are for factory use only.The SDU and the SBU both have pins for Automatic Test Equipment (ATE).

- SDU rear connector Bottom Plug (BP) pins: ATE 1 (BP74), ATE 2 (BP75) and ATE 3 (BP76).
- SBU rear connector Top Plug (TP) pins: ATE #1 (TP9) and ATE #2 (TP10).

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

Maintenance handset interface

The following drawing shows the wiring of the maintenance handset interface to the front connector of the SDU.

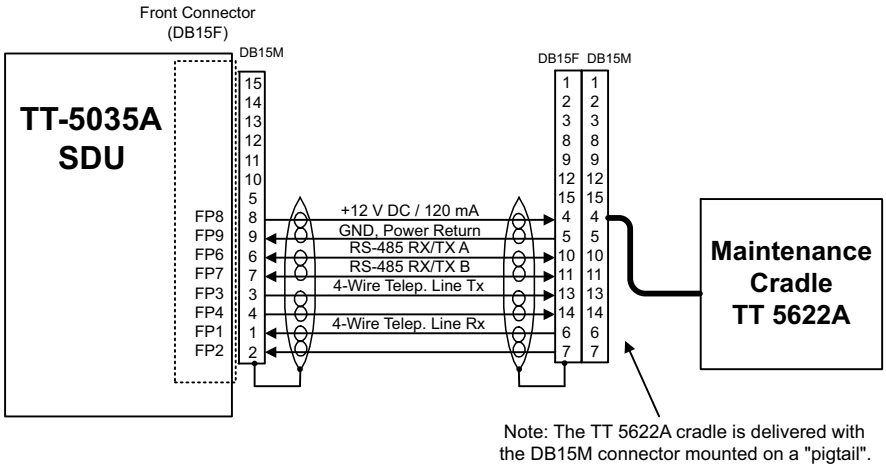


Figure 5-36: Wiring maintenance handset

Pins for Maintenance handset interface

The following list shows the pins used for maintenance handset interface.

SDU Pin	Function: Handset Interface
FP1	Maintenance Handset Audio In Hi
FP2	Maintenance Handset Audio In Lo
FP3	Maintenance Handset Audio Out Hi
FP4	Maintenance Handset Audio Out Lo
FP6	Maintenance Handset RS-485 Data A
FP7	Maintenance Handset RS-485 Data B
FP8	+12 V DC/120 mA
FP9	GND Power Return (for +12 V DC)

Table 5-58: SDU pins for Maintenance handset interface

Description of the Maintenance handset interface

The SDU has a handset interface for the TT-5620A Handset for maintenance use. This interface can be used to access the menu system using a 4-Wire Handset.

The front connector provides +12 V DC handset power (FP8). The RS-485 bus on the front connector is common with the RS-485 bus for Handset #4 on the rear connector. The Maintenance handset provides a common mode voltage (2.5 V DC) on the Audio In lines to the SDU. This voltage is used to detect the presence of the handset on the front connector, so the RS-485 #4 can be redirected to the front connector.

5.4 Recommended cables

5.4.1 Introduction

This section lists recommended cables and allowed cable lengths for the cables in the AVIATOR 700 system.

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

5.4.2 Power cables, allowed cable lengths

Allowed cable lengths, SDU

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

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

Description	Pin	Contact Type	Max. resistance	Max Length (at 70°C)			
				AWG20	AWG18	AWG16	AWG14
SDU +28 V DC Power	TP1	16	87.5 mΩ [a] (200 mΩ-112.5 mΩ in circuit breaker)	7 ft[a] (2.1 m)	11 ft[a] (3.4 m)	18 ft[a] (5.4 m)	(not suitable for this contact size)
SDU GND, Power Return	TP2	16	25 mΩ	2 ft (0.6 m)	3 ft (0.9 m)	5 ft (1.5 m)	(not suitable for this contact size)
SDU Chassis Ground	TP3	16	25 mΩ (additional requirement: max. length 1 m)	2 ft (0.6 m)	3 ft (0.9 m)	3 ft (1.0 m)	(not suitable for this contact size)

Table 5-59: Allowed lengths for SDU power cables

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

Allowed cable lengths, HPA

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

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

Description	Pin	Contact Type	Max. resistance	Max Length (at 70°C)		
				AWG12	AWG10	AWG8
HPA +28 V DC Power	BP A1	5	87.5 mΩ [a] (100 mΩ-12.5 mΩ in circuit breaker)	(not suitable for this contact type)	71 ft[a] (21.6 m)	126 ft[a] (38.4 m)
HPA GND, Power Return	BP A2	5	25 mΩ	(not suitable for this contact type)	20 ft (6.1 m)	36 ft (11.0 m)

Table 5-60: Allowed lengths for HPA power cables

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

Description	Pin	Contact Type	Max. resistance	Max Length (at 70°C)	
				AWG20	AWG18
HPA Chassis	BP30	20HD	25 mΩ	2 ft (0.6 m)	(not suitable for this contact size)

Table 5-61: Allowed lengths for HPA chassis cable

Allowed cable lengths, SBU

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

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

Description	Pin	Contact type	Max. resistance	Max length (at 70°C)			
				AWG20	AWG18	AWG16	AWG14
SBU +28 V DC Power	TP1	16	210 mΩ [a] (250 mΩ-40 mΩ in 7.5 A circuit breaker)	17 ft[a] (5.2 m)	27 ft[a] (8.3 m)	43 ft[a] (13.2 m)	(not suitable for this contact size)
SBU +28 V DC Power	TP1	16	137.5 mΩ[a] (250 mΩ-112.5 mΩ in 4 A circuit breaker)	11 ft[a] (3.4 m)	18 ft[a] (5.5 m)	28 ft[a] (8.5 m)	(not suitable for this contact size)
SBU GND, Power Return	TP2	16	25 mΩ The cable should be as short as possible, max. 1 m.	2 ft (0.6 m)	3 ft (0.9 m)	5 ft (1.5 m)	(not suitable for this contact size)
SBU Chassis Ground	BP3	16	25 mΩ Connect directly to aircraft chassis.	2 ft (0.6 m)	3 ft (0.9 m)	3.3 ft (1.0 m)	(not suitable for this contact size)

Table 5-62: Allowed lengths for SBU power cables

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

5.4.3 Recommended Power cables

The cable types shall meet the following standards:

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

5.4.4 Recommended RF cables

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

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

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

Table 5-63: List of Recommended RF Cables

Maximum cable lengths for WLAN cables

Cable from SBU to WLAN antenna		W5 and W6 [a]		
Part number	Cable diameter (mm/in.)	Attenuation (dB/100 ft)	Maximum cable length	Size 5 contact part number
RF specification @2.4 GHz: 5 dB				
PIC S22089	11.0/0.43	6.7 dB	75 ft (23 m)	n.a.
PIC S33141	6.9/0.27	11.0 dB	46 ft (14 m)	n.a.
ECS 3C142B	4.95/0.19	22.2 dB	22 ft (6 m)	620021
ECS 310801	11.48/0.452	6.5 dB	75 ft (23 m)	n.a.
ECS 311201	8.05/0.317	8.9 dB	56 ft (17 m)	n.a.

Table 5-64: Allowed lengths for WLAN cables

Cable from SBU to WLAN antenna		W5 and W6 [a]		
Part number	Cable diameter (mm/in.)	Attenuation (dB/100 ft)	Maximum cable length	Size 5 contact part number
ECS 311501	5.82/0.229	10.7 dB	46 ft (14 m)	P922
EMTEQ PFLX195-500	5.08/0.2	16.81	30 ft (9 m)	A45195-1
EMTEQ TFLX165 100	4.19/0.17	21.16 dB	23 ft (7 m)	A45165-1
EMTEQ TFLX295 100	7.95/0.31	9.8 dB	52 ft (16 m)	n.a.
EMTEQ TFLX480 100	12.2/0.48	5.8 dB	85 ft (26 m)	n.a.

Table 5-64: Allowed lengths for WLAN cables (Continued)

a. W5 and W6 stand for the cables needed when wiring the TT-5040A SBU, see *Wiring WLAN antenna interface* on page 5-42.

5.4.5 Recommended cables for ARINC 429

Use ARINC 429 cables that meet the following standard:

- M27500 for shielded wire

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

5.4.6 Recommended cables for RS-422 SBU control interface

The interface is designed to be terminated with the characteristic impedance of the twisted shielded cable: M27500-22SB2T23 from RAYCHEM.

5.4.7 Recommended cables for Ethernet

Cables for Ethernet on SBU (Quadrax connectors)

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

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

The following cable types meet the requirements:

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

5.4.8 Cables for Discrete Signals

Use cables for discrete wiring that meet the following standard:

- M27500 for shielded wire

5.5 Verifying the installation

Certain check procedures must be performed during and after installation of the AVIATOR 700 system. The first check procedures are performed after wiring, but before inserting LRUs.For information on the required and recommended check procedures, see *Check procedures* on page 7-1.

5.6 Activation of airtime services

Before the AVIATOR 700 system becomes operational, the aircraft owner or operator must settle a contract with an Inmarsat Service Provider (ISP) so the system can be activated. The airtime provider handles terminal activation, billing and technical support that is related to the communication network. The activation process may take some time, so to make sure it is ready in time, start the activation procedure some time **before the installation on the aircraft** begins.

5.6.1 The 3 ID numbers for the AVIATOR 700 system

The AVIATOR 700 system is a hybrid system with 3 individual parts. Each part uses different Inmarsat services and therefore has its own ID number in the Inmarsat network.

Service name	ID	Format (example)	Obtained from
Classic Aero (H+)	ICAO aka AES ID	52535714	CAA or tail number
SwiftBroadband	IMSI	123456789009876	SBU CM label or Dashboard
Swift64	ISN	76TT12AABBCC	SDU CM label or Aero-SDU Configuration Program

Table 5-65: ID numbers in the Inmarsat network

ICAO address

The ICAO address (International Civil Aviation Organization) is a unique 24-bit number assigned to an aircraft by the civil aviation authority of the state in which the aircraft is registered. This number is the same number used for the Mode S transponder and the TCAS system and in some countries it's calculated from the tail no. In the Inmarsat world, this is also referred to as the AES ID (Airborne Earth Station ID). The ICAO is normally noted in Oct (octal), but in some cases Hex is also used.

- Enter the aircraft's ICAO number in the Aero-SDU Configuration Program.
- Strap pins BP1-25 according to the ICAO. For further guidelines see *Wiring ICAO address* on page 5-37.

ISN

The Inmarsat Serial Number (ISN) is the ID of the Swift64 part of AVIATOR 700. It has a format like 76TT12AABBCC, where 76TT12 indicates a Cobham Swift64 system and the AABBCC is the actual 24 bit ID, also called forward ID. The ISN is pre-assigned to the system by Cobham and is printed on the label of the SDU configuration module (CM). Note the CM has 2 ISN. Make sure to use the one marked **SDU ISN** for AVIATOR 700. The ISN can also be seen in the Aero-SDU Configuration Program under the **Commissioning IDs**.

IMSI

The IMSI (International Mobile Subscriber Identity) is the ID for the SwiftBroadband service and is tied to the SBU Configuration Module (CM). The IMSI can be found either on the label on the SBU CM or on the Dashboard of the SBU web interface.

Other Classic Aero numbers

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

- IMN (Inmarsat Mobile Number) on Swift64
- DDI (Direct Dial-In) on Aero H+
- Direct phone number to call the AVIATOR 700 system from the ground without specifying the satellite region the terminal is located in (this is supported by a few providers).

SwiftBroadband

The AVIATOR 700 system is delivered with the SIM card permanently installed in the CM of the SBU, but not activated. The SIM card is pre-authenticated by Inmarsat and identified by its unique IMSI number (International Mobile Subscriber Identity). The IMSI is usually 15 digits long.

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

You need the IMSI to activate the Satellite communication service. **For details how to activate the SIM card please contact your airtime Provider.** The contract for SwiftBroadband services with your airtime provider contains among other items the following phone numbers and identifiers:

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

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

Note To use the packet switched services you may have to enter the APN (Access Point Name), make sure that you have received this information from your service provider. For step-by-step instructions how to enter the APN see *Set the common interface settings of the SBU* on page 6-37.

Making calls and using the Internet

For information on how to make a call to and from the system or go on the Internet etc. see the User Manual.

Service providers

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