Mode S Transponder with ADS-B

BXT6500 Series

Installation and Operation

Manual DV15104.03
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WARNING - USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Becker Avionics GmbH provide product or system options for further investigation by users having technical knowledge.

The user is responsible for making the final selection of the system and components. The user has to assure that all performance, endurance, maintenance, safety requirements of the application are met and warnings be observed.
For this the user has to include all aspects of the application to be compliant with the applicable industry standards and the requirements of the responsible aviation authority. The product documentations from Becker Avionics GmbH have to be observed.

To the extent that Becker Avionics GmbH provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Term definition: User in the sense of user, installer, installation company.

Preface

Dear Customer,

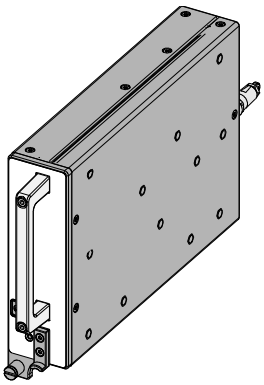
Thank you for purchasing a Becker Avionics product. We are pleased that you have chosen our product and we are confident that it will meet your expectations.

For development and manufacturing of our product, the guidelines for highest quality and reliability have been borne in mind, supplemented by selection of high quality material, responsible production and testing in accordance to the standards.

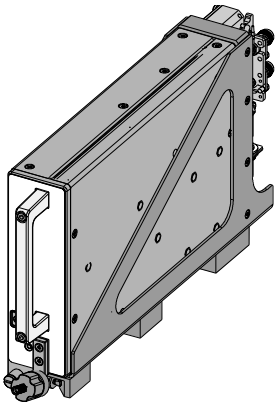
Our competent customer support department will respond on any technical question you may have.

Please do not hesitate to contact us at any time.

Transponder Design*



BXT65 Series
with EM module



BXT65 Series
with mounting tray and backshell

* design depends on variant

List of Effective Pages and Changes

Only technical relevant modifications are described in this table.

Document:	**DV15104.03 / issue 06**	**Article Number 0647.255-071**
Cover Page	09/2018	
Introduction	09/2018	
Chapter 1 – 4	09/2018	

Issue	**Page No.:**	**Section / Chapter**	**Description**
06	1-76	all	Updated: Editorial adjustments.
	--	all	Added: Descriptions about new variants and extended temperature
	--	1.8.8	Updated: Certification state.
	--	2.7.8	Updated: Configuration example.
	--	2.10	Added: Wiring examples.
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List of Abbreviations

List of Abbreviations	
A/D	Analog to Digital
AA	Aircraft Address (24-bit ICAO)
AC	Advisory Circular Alternating Current Altitude Code
ACAS	Airborne Collision Avoidance System
ADC	Air Data Computer
ADLP	Airborne Data Link Processor
ADS-B	Automatic Dependent Surveillance-Broadcast
ARINC	Aeronautical Radio Inc.
ATC	Air Traffic Control
ATCRBS	Air Traffic Control Radar Beacon System
AWG	American Wire Gauge
BIT	Built-In Tests
CAN	Controller Area Network
CBIT	Continuous Built-In Test
DAC	Digital to Analog Converter
DC	Direct Current
DF	Downlink Format
DME	Distance Measurement Equipment
DSP	Digital Signal Processor
EEPROM	Electrically Erasable Programmable Read Only Memory
EM	External Memory
EMC	Electro-Magnetic Compatibility
EMI	Electro-Magnetic Interferences
ES	Extended Squitter
ESD	Electrostatic Sensitive Device
EUROCAE	European Organisation for Civil Aviation Equipment
FAA	Federal Aviation Administration
FCC	Flight Control Computer
FLS	Field Loadable Software
FMC	Flight Management Computer
FMS	Flight Management System
FRAM	Ferroelectric Random Access Memory
FRUIT	False Reply Uncoordinated in Time
GND	Ground (electrical)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HF	High frequency
I/O	Inputs/Outputs
IBIT	Initiated Built-In Test
ICAO	International Civil Aviation Organization

List of Abbreviations

ID	Identifier
IF	Intermediate Frequency
II	Interrogation Identifier
IP	Internet Protocol
IRS	Inertial Reference System
LED	Light Emitting Diode
LVDS	Low Voltage Differential Signaling
MCP	Mode Control Panel
MSL	Mean Sea Level
NAV	Navigation
OEM	Original Equipment Manufacturer
PBIT	Power-On Built-In Test
PC	Personal Computer
PCB	Printed Circuit Board
PLD	Programmable Logic Device
RF	Radio Frequency
RFB	RF-Board
RTCA	Radio Technical Commission for Aeronautics Inc.
RX	Receiver, Receive
SDRAM	Synchronous Dynamic Random Access Memory
SI	Surveillance Identifier
SW	Software
TCAS	Traffic Alert and Collision Avoidance System
TF	TufLok®, self-locking screws and threads
TX	Transmitter
USB	Universal Serial Bus
VHF	Very High Frequency

Units

Units	
A	Ampere
mA	Milliampere
°C	Degree Celsius
cm	Centimeter
dBm	Power Ratio In Decibel, referenced to 1 mW
dB	Decibel
ft	Foot, feet
g	Gram
kg	Kilogram
kHz	Kilohertz
km/h	Kilometer Per Hour
kt	Knots
MHz	Megahertz
Mbps	Mega Bits Per Second
mm	Millimeter
Nm	Newton Meter
Ohm (Ω)	Resistance
s	Second
V	Volt
mV	Millivolt
W	Watt
mW	Milliwatt
"	Inch

General Safety Definitions

⚠DANGER Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE Is used to address practices not related to physical injury.

SAFETY INSTRUCTIONS Safety instructions (or equivalent) signs indicate specific safety-related instructions or procedures.

Disposal

⚠CAUTION The packaging material is inflammable, if it is disposed of improperly by burning, toxic fumes may develop.

This product contains materials that fall under the special disposal regulation, which corresponds to the EC directive for dangerous disposal material. We recommend disposing of the respective materials in accordance with the respectively valid environmental laws.

Dispose circuit boards via a technical waste dump which is allowed to take on e.g. electrolytic aluminium capacitors. Do under no circumstances dump the circuit boards with normal waste dump.

Warranty Conditions

⚠CAUTION The device(s) may be installed on an aircraft only by an approved aeronautical company (e.g. EASA Part 145) which shall also examine and verify the installation.

User conversions and changes are not permitted.

Any change made by the user excludes any liability on our part (excluding the work described in this manual).

- The device must not be opened.
- Do not make any modifications to the device, except for those described in the manual.
- Make connections to the inputs, outputs and interfaces only in the manner described in the manual.
- Fix the devices according to the mounting instructions.
  We cannot provide any guarantee for other mounting methods.

Conditions of Utilization

General introductory notes

With this device you bought a product which was manufactured and tested before delivery with the utmost care.

Please take your time to read the following notes which you ought to follow closely during installation and operation.

Otherwise all claims under the warranty will become void and a reduced service life or even damages must be expected.

⚠CAUTION The user is responsible for protective covers and/or additional safety measures in order to prevent damages to persons and electric accidents.

Additional Conditions of Utilization

Please refer to "Safety-Conscious Utilization", page 23.

Non-Warranty Clause

We checked the contents of this publication for compliance with the associated hard and software. We can, however, not exclude discrepancies and do therefore not accept any liability for the exact compliance. The information in this publication is regularly checked, necessary corrections will be part of the subsequent publications.

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1 General Description

In this chapter you can read about:

This manual describes the Becker remote controlled Mode S transponder of the BXT6500 series. The type plate on your device shows the part number for identification purposes (see "Type Plate", page 37).

Before starting operation of the device(s) please read this manual carefully, with particular attention to the description referring to your device(s).

1.1 Introduction

The technical information in this document applies to the described product "BXT65XX-(XXX)-(XX). Details for variants please see "Variants Overview" page 16.
For further descriptions we are using the term "BXT65 series" or "BXT65XX".

If a description refers to only one product variants its full name, e.g. "BXT6513-(000)-(06)", will be used.

The manuals "Maintenance and Repair" (**M&R**), "Installation and Operation **(I&O)** contain the following sections:

Section	**DV15104.04 M&R**	**DV15104.03 I&O**
General	X	X
Installation	X	X
Operation	X	X
Theory of Operation	X	N/A
Maintenance and Repair	X	N/A
Illustrated Parts List	X	N/A
Modification and Changes	X	N/A
Circuit Diagrams	X	N/A
Certifications	X	N/A
Attachments	X	N/A

1.2 Purpose of Equipment

The BXT65XX transponder is designed as a remote-controlled single block device and is intended for installation in aircraft avionics bay.

BXT65XX is a transponder which provides to other stations Mode A/C/S messages as well ADS-B Extended Squitter functionality (ES).

BXT65XX is a remote-controlled device, which does not include a control panel. It can receive commands and provides data through a set of standard interfaces.

Features:

- Control Interface ARINC 429.
- Mode A - in this mode, the 4096 character code is sent as a reply to interrogation from a ground station.
- Mode C - in this mode, the encoded altitude is sent with 100 ft resolution.
- Mode S - interrogations are selective and Mode S transponders will respond to an interrogation from ground stations or another aircraft with a reply containing its ICAO 24bit address.
- ADS-B Broadcast-Only System, transmit:
  - Airborne Position Message.
  - Surface Position Message.
  - Airborne Velocity Message.
  - Aircraft Identification and Category Message.
  - Aircraft Operational Status Message.
  - Extended Squitter Aircraft Status Message.
- ADS-B receiver subset captures Extended Squitter messages from aircraft and ground vehicles (ADS-B IN functionality not certified).
- Single Antenna Operation (bottom antenna).
- Diversity - operation with two antennas (top and bottom)
  - This is required for TCAS Ⅱ equipped aircraft.
  - Additionally, in Europe for installation in aircraft with gross mass in excess of 5700 kg or a maximum cruising true airspeed in excess of 250 kt (463 km/h).
- Support of the SI code (Surveillance Identifier).
- Elementary surveillance (ELS) and enhanced surveillance (EHS).
- Data link capability.
- GPS receiver connection capability.
- Selftests (BITs) are integrated in the transponder.

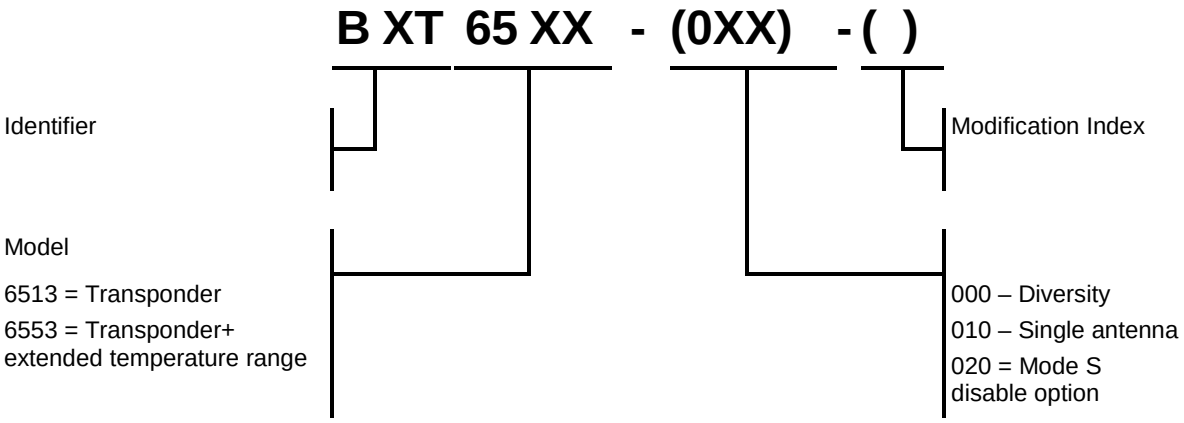
NOTICE

Actual generation of each ADS-B message type and data within each message depends on availability of navigation data and GPS capabilities.

Actual provision of ELS and EHS data depends of availability of these data from external equipment and configuration.

1.3 Variants Overview

Within the part number, the meaning of "XX-(0XX)-()" is:



1.3.1 Variants Availability

	Diversity	sCloaking (Mode S disable option)	Extended Temperature (-55 °C)	Design Assurance Level
BXT6513-(000)	**x**			**C**
BXT6513-(010)				**C**
BXT6513-(020)	**x**	**x**		**C**
BXT6553-(000)	**x**		**x**	**B**

1.3.2 Software Status

Details please see "Software Data Plate", page 38.

1.4 Associated Devices

Following devices can operate with BXT65 series. For wiring diagrams please see "Aircraft Wiring" page 66. For other devices please contact Becker Avionics.

Manufacturer	Device	Function
BendixKing	KFS 578A	Control Device
Gables	G7614	Control Device
Freeflight	1201	GPS
Freeflight	1203C	GPS
Garmin	GTN750	GPS
Genesys	GPS-WAAS Rx	GPS

This manual describes the BXT65 series from Becker Avionics. For other devices please refer to the corresponding manuals.

1.5 Scope of Functionality

BXT6513-(0XX):

- Operates on radar frequencies; receiving ground radar and ACAS interrogations and replies via its transmitter with coded pulse packages on 1090 MHz.
- A special position identification pulse (SPI) can be added for a period of 18 seconds to each pulse package after activation of the dedicated discrete signal input on the device.
- Meets Mode S Enhanced Surveillance (EHS) requirements.
  - EHS parameters require additional interface with other aircraft systems and the BXT6513-(0XX).
  - Aircraft that can provide the list of eight Downlink Aircraft Parameters (DAPs) listed in BDS registers 4.0, 5.0 and 6.0 are considered to be Mode S EHS capable.
  - Aircraft that cannot provide these parameters will be considered as not EHS capable.

BXT6513-(000):

- Provides downlink of aircraft information and supporting 2 antennas; one shall be installed on top side, and the other on the bottom side of the aircraft fuselage (detailed type description see "Type Plate", page 37).

BXT6513-(010):

- Provides downlink of aircraft information and supporting a single antenna which shall be installed on the bottom side of the aircraft fuselage (detailed type description see "Type Plate", page 37).

BXT6513-(020):

- Is a transponder which has in addition to the BXT6513-(000) also the possibility to switch to Mode A/C only. If the transponder is switched to this Mode it does not supply Mode S replies.

BXT6553-(000):

- Is a transponder which has in addition to the BXT6513-(000) an extended temperature range and its Software and Complex Hardware is designed according to Design Assurance Level B.

1.5.1 Fixed and Non-Volatile Data

The BXT65XX configuration is stored in a non-volatile memory. There are two possibilities where to store configuration data:

- Use the internal memory.
- Use the external memory module EM6100.

The selection of equipment configuration source is done by hardware configuration (see "Data Source Configuration", page 56).

1.5.2 Diversity

Antenna diversity reduce the potential for antenna "shading" and helps to prevent target drop out in each situation.

BXT65XX-(000) is capable to operate with two antennas (top and bottom), required for installation in aircraft with gross mass in excess of 5700 kg or a maximum cruising true airspeed in excess of 250 kt (463 km/h).

1.5.3 Mode C, Mode S

Mode C - in this mode, the encoded altitude is sent in addition to the mode A reply.

- Mode C - in this mode, the encoded altitude is sent with 100 ft resolution.
  - Data range for 100 ft resolution: -1000…126 750 ft.
  - The altitude information must be delivered from an external device.

BXT65 series as Mode S transponder is an airborne part of Mode S Secondary Surveillance Radar system which detects ground interrogations arriving at 1030 MHz signal frequency, processes them and generates responses at 1090 MHz signal frequency.

- Mode S - interrogations are selective and Mode S transponders will respond to an interrogation from ground stations or another aircraft with a reply containing its ICAO 24 bit address.
  - Data range for 25 ft resolution: -1000…50 187 ft.
  - Data range for 100 ft resolution: -1000…126 750 ft.
  - The altitude information must be delivered from an external device.

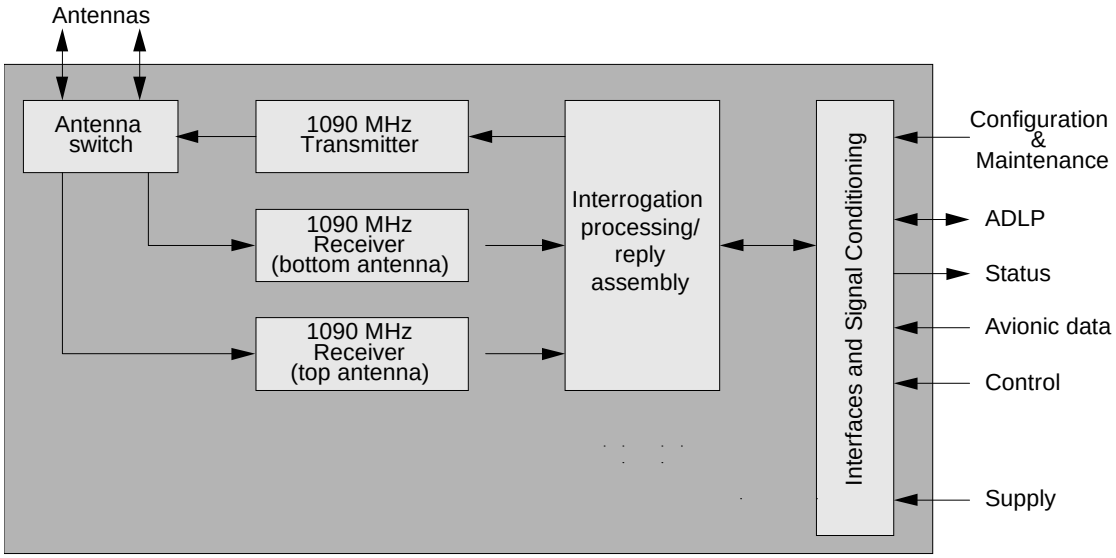


Figure 1: Block Diagram – Mode S Transponder Concept (diversity example)

1.5.4 ADS-B (Automatic Dependent Surveillance-Broadcast)

ADS-B is a GPS based technology to define and provide aircraft relevant data. To support ADS-B Out, the aircraft needs a certified GPS receiver as the position source, and this device to send the ADS-B data. This data can be received by other air- and ground stations.

The Automatic Dependent Surveillance-Broadcast Out (ADS-B Out) function provides position, velocity and status data on the transponder for broadcasting as extended squitter (ES). When data is available, it is transmitted at specific periods and enable other participants to determine current position, velocity and status of the aircraft without interrogation.

BXT65 series is an ADS-B class B1 or B1S (aircraft broadcast only) Mode S transponder capable for automatically sending out ADS-B data like:

- (BDS 0,5) Airborne Position Message.
  - Special Position Identification (SPI).
  - Emergency Indicator.
  - Barometric Altitude.
  - Quality Indicator (NIC).
  - Latitude (Airborne Position).
  - Longitude (Airborne Position).

- (BDS 0,6) Surface Position Message.
  - Quality Indicator (NIC).
  - Latitude (Surface Position).
  - Longitude (Surface Position).
  - Surface Ground Speed.
  - Surface Ground Track.

- (BDS 0,8) Aircraft ID and Category Message.
  - Aircraft Identification & Category.

- (BDS 0,9) Airborne Velocity.
  - Airborne Ground Velocity.
  - Geometric to Barometric Altitude Difference.
  - Geometric Vertical Speed.

- (BDS 6,1) Emergency/Priority Status.
  - Squawk Code.
  - Emergency Status.

- (BDS 6,5) Aircraft Operational Status Message, Airborne and Surface.
  - Quality Indicator (NACp, NACv and GVA).
  - Quality Indicator (SIL and SDA).
  - Version Indicator.
  - Surface Length/Width.
  - Surface Antenna Offset.

1.5.5 Supported Transponder Messages

BXT65 series supports the following Binary Data Selector (BDS) registers.

General Mode S Registers:

- (BDS 1,0) Data Link Capability Report.
- (BDS 1,7) Common Usage GICB Capability Report.
- (BDS 1,8 to 1,C) Mode S Specific Services GICB Capability Report.

Elementary Surveillance Registers:

- (BDS 2,0) Flight ID.
- (BDS 2,1) Aircraft Registration.

Enhanced Surveillance Registers:

- (BDS 4,0) Selected Vertical Intention Report (except Vertical Mode).
- (BDS 5,0) Track and Turn Report.
- (BDS 6,0) Heading and Speed Report.

Extended Squitter/ADS-B Registers:

- (BDS 0,5) Airborne Position Message.
- (BDS 0,6) Surface Position Message.
- (BDS 0,8) Aircraft ID and Category Message.
- (BDS 0,9) Airborne Velocity.
- (BDS 6,1) Emergency/Priority Status.
- (BDS 6,5) Aircraft Operational Status Message, Airborne.
- (BDS 6,5) Aircraft Operational Status Message, Surface.

1.5.6 ADS-B Receiver Subset

The ADS-B receiver subset operates at 1090 MHz band and detects, captures and decodes Extended Squitter messages from aircraft and ground vehicles (DF=17, 18 and optional 19 are supported). Received ADS-B messages are formed in message reports and transmitted through LAN interface. This ADS-B IN functionality is not part of the certification.

NOTICE Processing received messages into a track file containing information about surrounding aircraft and ground vehicles is not implemented yet.

1.5.7 Extended Temperature

The BXT6553 variant provides features like:

- Extended temperature range.
- Low operating temperature is extended to -55 °C.
- It achieves ED-14G/DO-160G Section 4 Category F2.
- It is intended for installation in non-pressurized and non-controlled temperature locations on an aircraft that is operated at altitudes up to 55 000 ft.

1.5.8 Interfaces

1.5.8.1 ARINC 429

The ARINC 429 specification is a standard how avionics equipment and systems communicate on aircraft. The specification defines:

- Electrical characteristics.
- Word structures.
- Protocol for bus communication.

Electrical and data format characteristics are defined for a two-wire serial bus with one transmitter and up to 20 receivers. This simple architecture provides a highly reliable transfer of data. The bus is capable of operating at a speed of 12.5 kbit/s (low speed) or 100 kbit/s (high speed).

For detailed information about ARINC 429 specifications please refer to: www.arinc.com.

Copyright Note ARINC: ARINC429 is a privately copy written specification developed to provide interchange ability and interoperability of line replaceable devices (LRUs) in commercial aircraft. ARINC stands for Aeronautical Radio, Inc.

1.5.8.2 Logical Inputs/Outputs

The hardware design of BXT65 series provides a subset of inputs and outputs required for transponder operation.

1.5.8.3 Status and Control Ports

The hardware design of BXT65 series provides a subset of ports for provide information about transponder status and for controlling.

1.5.8.4 Internal and External Memory

An internal or external memory is used as configuration data source, saving aircraft data installation and configuration data.

On start-up BXT65 series reads from this non-volatile memory configuration data which include parameters specific to the actual aircraft and installation. Typically, an external memory (EM) is used. If BXT65 series is replaced e.g. for maintenance, so the new BXT65XX can be connected with the external memory module in this way it is guaranteed that all relevant data is available for fast & easy exchange.

NOTICE We recommend the usage of the External Memory module EM6100 as data source.

1.5.9 Built-In Test

BXT65 series has advanced Built-In-Test. It monitors most of internal circuits against failures.

1.5.10 Summary of Operational Description

- The BXT65 series is continuously monitoring incoming RF signals at frequency of 1030 MHz for radar interrogations.
- When an interrogation is detected and decoded, the transponder processes it and generates a reply which is transmitted at radio frequency of 1090 MHz.
- Transponder replies allow an ATC ground station to locate, identify and track an aircraft.
- With use of interrogations and replies it is also possible to send data to and from an aircraft.
- The device provides transponder functionality for Mode A/C and Mode S operation.
- The BXT65 series periodically transmits squitter, which are transmitted independent on interrogations from ground stations.

Two types of squitter are generated:

- An acquisition squitter carries 56-bit data allowing acquisition of the aircraft is transmitted approximately once per second.
- Extended squitter carries 112 bits of data and are used by ADS-B transmitter function.

BXT65XX-(0XX)	**Specifications**
Transmit Frequency	1090 MHz ±1 MHz
Modulation (Mode A/C)	PAM (Pulse Amplitude Modulation)
Modulation (Mode S)	DPSK (Differential Phase Shift Keying)
Bandwidth (Mode A/C)	8.4 MHz
Bandwidth (Mode S)	8 MHz
Data rate	Depends on the number of interrogations of the ground station

1.6 Safety-Conscious Utilization

For safe operation of the product the following notes have to be observed:

⚠CAUTION The device(s) may be installed on an aircraft only by an approved aeronautical company (e.g. EASA Part 145) which shall also examine and verify the installation.

SAFETY INSTRUCTIONS

- The installation of the BXT65 series into an aircraft may be carried out only by an authorized installation company. The country regulations always have to be observed.
- Use the product only within the specified conditions, see "Technical Data" page 24.
- Circuit breaker:
  - Use the recommended fuses in the power line to protect the application, see "Technical Data", page 24.

SAFETY INSTRUCTIONS Excessive pulses on the DC bus of the aircraft may cause damage on electrical circuits of any installed instrument.

SAFETY INSTRUCTIONS It is the responsibility of the installer to ensure the ADS-B Out system is compliant with current national regulations e.g. AC 20-165B and to ensure compatibility between the BXT65 series and the ADS-B Out position source equipment.

1.7 Restriction for Use

SAFETY INSTRUCTIONS

- BXT65 series is to be used inside the declared limits.

1.8 Technical Data

1.8.1 General Characteristics

BXT65 series	Specifications		
Supply voltage	BXT6513: 28 VDC (18.0...32.2 VDC) BXT6553: 28 VDC (22.0...32.2 VDC)		
Emergency voltage	BXT6513: 18 VDC min. BXT6553: 22 VDC min.		
Current/Power consumption			
BXT6513	Typical current consumption @ 28 V	Typical power consumption @ 28 V	Max. current consumption
operation	0.5 A	14 W	0.95 A
BXT6553	Typical current consumption @ 28 V	Typical power consumption @ 28 V	Max. current consumption
operation	0.5 A	14 W	0.95 A
warmup, no operation	2.0 A	56 W	2.5 A
warmup + operation	2.4 A	67 W	3.4 A
Recommended external fuse protection	BXT6513: 3 A BXT6553: 5 A		
RF port			
Impedance	50 Ω		
Transmitter frequency	1090 ± 1 MHz		
Transmitter power	> 125 W at antenna terminal (> 250 W at transponder output)		
Receiver frequency	1030 MHz		
Mode A/C sensitivity	-73 ± 4 dBm at antenna terminal		
Mode S sensitivity	-74 ± 3 dBm at antenna terminal		
Interrogations - Mode	Mode A, C, A/S All Call, C/S All Call, Mode S (DF=0, 4, 5, 11, 16, 20, 21)		
Reply rate capability			
Mode A/C	Continuous: 500 replies per second Peak (100 ms): 1200 replies per second		
Mode S	60 long replies per second 12 short and 6 long replies in 100 ms 4 short and 4 long replies in 25 ms 2 short and 2 long replies in 1.6 ms		
Squitter	Short (56 bits): Acquisition Long (112 bits): Identification and Category Airborne Position		

BXT65 series	Specifications
	Airborne Velocity Surface Position Aircraft Operational Status Extended Squitter Aircraft Status
Interface	
Control Interface	ARINC 718A, 3x ARINC 429 In
Air Data Computer	ARINC 706, 2x ARINC 429 In
ADLP	ARINC 718A, 1x ARINC 429 In, 1x ARINC 429 Out
FCC	ARINC 701, 1x ARINC 429 In
FMC	ARINC 702, 1x ARINC 429 In
IRS	ARINC 704, 1x ARINC 429 In
GNSS	ARINC 743A, 1x ARINC 429, 1x Time Mark (differential) or RS232/RS422
TCAS	ARINC 735B, 1x ARINC 429 In, 1x ARINC 429 Out
Radio Altimeter	ARINC 707, 1x ARINC 429 In
Data concentrator	2x ARINC 429 In
Data output	ARINC 718A, 2x ARINC 429 Out
Field Loadable Software	ARINC 826, 1x CANbus, 1x Discrete In
Mutual Suppression	ARINC 718A
IDENT	1x Discrete In
Standby	1x Discrete In
Control Port select	1x Discrete In
ADC select	1x Discrete In
Weight on Wheels	1x Discrete In
Ext. Squitter disable	1x Discrete In
Burst Mode	1x Discrete In
Reply indication	1x Discrete Out
Status	3x Discrete Out
Maintenance	1x USB (front panel)
ADS-B IN data	1x Ethernet

1.8.2 Dimensions & Weight

BXT65 series		Specifications
BXT65XX only (HxWxD)		171 x 47.4 x 276 mm (6.73 x 1.87 x 10.87 in)
BXT65XX depth with EM module		310 mm (12.21 in)
BXT65XX with mounting + backshell (HxWxD)		172.5 x 52.4 x 331 mm (6.79 x 2.06 x 13.03 in)
Weight	Transponder BXT6513	≤ 1.6 kg (3.53 lb)
	Transponder BXT6553	≤ 2.0 kg (4.4 lb)
	Mounting tray MT6533-(000)	≤ 0.50 kg (1.10 lb)
	Backshell BS6533-(100)	≤ 0.3 kg (0.66 lb)
	External memory module EM6100	≤ 0.018 kg (0.04 lb)

1.8.3 Software

BXT6513:

The "Failure Condition Classification" given by the relevant ETSO for this class of devices is MAJOR.

The "Design Assurance Level" (DAL) of BXT6513 according DO-178C is:

Level C

BXT6553:

The "Failure Condition Classification" given by the relevant ETSO for this class of devices is MAJOR.

The "Design Assurance Level" (DAL) of BXT6553 according DO-178C is:

Level B

1.8.4 Hardware

BXT6513:

The Complex Electronic Hardware (CEH) included into BXT6513-(0XX) has been designed in accordance with EUROCAE/RTCA Document ED-80/DO-254; "Design Assurance Guidance for Airborne Electronic Hardware" and satisfy criteria of:

Hardware Assurance Level (HAL) C

BXT6553:

The Complex Electronic Hardware (CEH) included into BXT6553 has been designed in accordance with EUROCAE/RTCA Document ED-80/DO-254; "Design Assurance Guidance for Airborne Electronic Hardware" and satisfy criteria of:

Hardware Assurance Level (HAL) B

1.8.5 Continued Airworthiness

For continued airworthiness please do a check and obey the local regulations.

- For Germany:
  - Do a functional test of the device(s) every two years.
    We recommend a ramp tester as test equipment.

1.8.6 Environmental Conditions - BXT6513

BXT6513-(0XX) was tested in accordance with ED-14G/DO-160G under consideration of listed environmental categories and conditions:

Characteristics	Section	Cat.	Condition
Temperature and Altitude	4	B2	
Ground Survival Low Temperature	4.5.1	B2	-55 °C
Operating Low Temperature	4.5.2	B2	-45 °C
Ground Survival High Temperature	4.5.3	B2	+85 °C
Short-Time Operating High Temperature	4.5.3	B2	+70 °C
Operating High Temperature	4.5.4	B2	+70 °C
In-flight Loss of Cooling	4.5.5	Z	No cooling required
Altitude	4.6.1	F1	55 000 ft
Decompression	4.6.2	X	No test performed
Overpressure	4.6.3	X	No test performed
Temperature Variation	5	B	Non-temperature controlled or partially temperature controlled internal sections of the aircraft
Humidity	6	B	Severe humidity environment
Operational Shocks and Crash Safety	7	B	Tested for standard operational shock and crash safety
Vibration	8	SMB2	Standard vibrations test: • sine vibration curve M • random vibration curve B2
	8	U2FF1	Robust vibrations test: Helicopters with unknown frequencies, Zone 1a and 2: fuselage, instrument panel, console and equipment rack
Explosion Proofness	9	X	No test performed
Water Proofness	10	X	No test performed
Fluids Susceptibility	11	X	No test performed
Sand and Dust	12	X	No test performed
Fungus Resistance	13	F	Fungus Resistance Compliance performed by Analysis
Salt Spray	14	X	No test performed
Magnetic Effect	15	Z	Deflection for magnetic compass is ≤ 1°, if device is installed with a distance of ≤ 0.3 m

Characteristics	Section	Cat.	Condition
Power Input	16	B	28 VDC equipment installed in aircraft supplied with engine-driven alternator/rectifiers or DC generators where a battery of significant capacity is floating on DC bus all the time
DC current ripple	16	X	No test performed
Inrush current	16	X	No test performed
Voltage Spike	17	A	High degree of protection against damage by voltage spikes
Audio Freq. Conducted Susceptibility	18	Z	28 VDC equipment with no battery or battery small compared with the capacity of the DC generator
Induced Signal Susceptibility	19	CCX	Equipment for which interference-free operation is required; installed on aircraft where severe coupling occurs due to long wire runs
Radio Frequency Susceptibility	20	RR	Compliant to high intensity radiated fields associated with the normal environment
Emission of Radio Frequency Energy	21	M	Located in areas where apertures are significant and not directly in view of radio receiver's antenna
Lightning Induced Transients Susceptibility	22	A3E3XX	Pin test waveform set A, level 3. Cable bundle test waveform set E, level 3
Lightning Direct Effects	23	X	No test performed
Icing	24	X	No test performed
Electrostatic Discharge	25	A	Installed, repaired or operated in an aerospace environment
Fire, Flammability	26	X	No test performed

BXT6513-(0XX) is fulfilling the related requirements of AC20-158A and AC20-136B.

1.8.7 Environmental Conditions - BXT6553

BXT6553-(000) was tested in accordance with ED-14G/DO-160G under consideration of listed environmental categories and conditions:

Characteristics	Section	Cat.	Condition
Temperature and Altitude	4	F2	
Ground Survival Low Temperature	4.5.1	F2	-55 °C
Operating Low Temperature	4.5.2	F2	-55 °C
Ground Survival High Temperature	4.5.3	F2	+85 °C
Short-Time Operating High Temperature	4.5.3	F2	+70 °C
Operating High Temperature	4.5.4	F2	+70 °C
In-flight Loss of Cooling	4.5.5	Z	No cooling required
Altitude	4.6.1	F1	55 000 ft
Decompression	4.6.2	X	No test performed
Overpressure	4.6.3	X	No test performed
Temperature Variation	5	B	Non-temperature controlled or partially temperature controlled internal sections of the aircraft
Humidity	6	B	Severe humidity environment
Operational Shocks and Crash Safety	7	B	Tested for standard operational shock and crash safety
Vibration	8	SMB2	Standard vibrations test: • Sine vibration curve M • Random vibration curve B2
	8	U2FF1	Robust vibrations test: Helicopters with unknown frequencies, Zone 1a and 2: fuselage, instrument panel, console and equipment rack
Explosion Proofness	9	E	
Waterproofness	10	X	No test performed
Fluids Susceptibility	11	X	No test performed
Sand and Dust	12	X	No test performed
Fungus Resistance	13	F	Fungus Resistance Compliance performed by Analysis
Salt Spray	14	X	No test performed
Magnetic Effect	15	Z	Deflection for magnetic compass is ≤ 1°, if device is installed with a distance of ≤ 0.3 m
Power Input	16	B	28 VDC equipment installed in aircraft supplied with engine-driven alternator/rectifiers or DC generators where a battery of significant capacity is floating on DC bus all the time
DC current ripple	16	X	No test performed
Inrush current	16	X	No test performed
Voltage Spike	17	A	High degree of protection against damage by voltage spikes
Audio Freq. Conducted Susceptibility	18	Z	28 VDC equipment with no battery or battery small compared with the capacity of the DC generator

Characteristics	Section	Cat.	Condition
Induced Signal Susceptibility	19	CCX	Equipment for which interference-free operation is required; installed on aircraft where severe coupling occurs due to long wire runs
Radio Frequency Susceptibility	20	RR	Compliant to high intensity radiated fields associated with the normal environment
Emission of Radio Frequency Energy	21	M	Located in areas where apertures are significant and not directly in view of radio receiver's antenna
Lightning Induced Transients Susceptibility	22	A3E3XX	Pin test waveform set A, level 3. Cable bundle test waveform set E, level 3
Lightning Direct Effects	23	X	No test performed
Icing	24	X	No test performed
Electrostatic Discharge	25	A	Installed, repaired or operated in an aerospace environment
Fire, Flammability	26	X	No test performed

BXT6553-(000) is fulfilling the related requirements of AC20-158A and AC20-136B.

1.8.8 Certifications

The remote-controlled Mode S Transponder BXT65XX is certified.

Part Number	EASA Approval
BXT6513-(000)-()	EASA.21O.10061875 Rev. A
BXT6513-(010)-()	EASA.21O.10061875 Rev. A
BXT6513-(020)-()	pending
BXT6553-(000)-()	pending

BXT65 series meets the requirements of:

	Specifications
ETSO	C112e – Level 2 adens, Class 1 (single antenna: Level 2 ens) C166b Class B1 (single antenna: Class B1S)
ED12C / DO178C	BXT6513: DAL C BXT6553: DAL B
ED80 / DO-254	BXT6513: DAL C BXT6553: DAL B
ICAO	Annex 10, Vol IV
MOPS	EUROCAE ED-14G/RTCA/DO-160G, EUROCAE ED-73E, EUROCAE ED-102A

1.8.8.1 FCC Approval

Radiofrequency radiation exposure information:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 50 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTE:

This device complies with Part 15 of the FCC Rules [and with Industry Canada licence-exempt RSS standard(s)].

Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

NOTE:

Changes or modifications made to this equipment not expressly approved by Becker Avionics may void the FCC authorization to operate this equipment.

1.9 Order Code

1.9.1 BXT65 Series

Qty	Transponder	
1	BXT6513-(000)-(): XPDR (class1, Level 2 adens) /ADS-B Out (B1)	Article No. 0645.141-915
1	BXT6513-(010)-(): XPDR (class1, Level 2 ens) /ADS-B Out (B1S)	Article No. 0649.732-915
1	BXT6513-(020)-(): XPDR (class1, Level 2 adens) /ADS-B Out (B1)	Article No. 0657.948-915
1	BXT6553-(000)-(): XPDR (class1, Level 2 adens) /ADS-B Out (B1) + extended Temperature	Article No. 0652.414-915

1.9.2 Accessories

Qty	External Memory	
1	EM6100-(000) External Memory for BXT6513	Article-No. 0608.270-921
1	EM6100-(010) External Memory-Extended Temperature for BXT6553	Article-No. 0661.015-921

Qty	Software	
1	EMP6100-BXT, External Memory Programming Set • Programming module • EM Programmer (software on USB stick) • USB cable • EMP Extended Memory Programmer User Manual (on USB stick)	Article-No. 0649.961-954
1	FLS6500-BXT Kit, Field Loadable Software Kit BXT65 Series • CAN USB-adapter • EM Programmer & ARINC Data Loader (on USB stick) • FLS Manual (on USB stick)	Article-No. 0659.517-919
1	SSW6500-BXT, Service Software • Service Software (on CodeMeter USB stick) • BXT65 Series M&R Manual (on CodeMeter USB stick)	Article-No. 0659.495-919

Qty	Mounting Equipment	
1	Mounting Tray MT6533-(000)	Article-No. 0635.952-264
1	Backshell BS6533-(100) for MT6533	Article-No. 0645.168-284
1	Backshell BS6533-(110) single antenna for MT6533	Article-No. 0649.767-284

Qty	Antenna	
-	BXT65XX-(0XX) accept all types of transponder antennas. Please use only antennas which are certified to one of the following TSOs: (E)TSO-C66() (E)TSO-C74() (E)TSO-C112()	--

Qty	Connector Kit	
1	CK6513-(100): 90°TNC connector kit for 311201 ECS coax cable (other suitable TCN connectors can be used)	Article-No. 0647.551-954

Qty	Available Documentation	
1	BXT65 Series Installation and Operation, English	Article-No. 0647.225-071
1	BXT65 Series Maintenance and Repair, English	Article-No. 0647.233-071
1	EMP Extended Memory Programmer User Manual, English	Article-No. 0648.655-071
1	FLS Manual, English	on request
1	ARINC 826 Data Loader Manual	on request

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2 Installation

This manual must be available close to the device during the performance of all tasks.

Careful planning should be applied to achieve the desired performance and reliability from the product. Any deviations from the installation instructions prescribed in this document are under own responsibility.

In this chapter you can read about:

2.1 Packaging, Transport, Storage

Visually inspect the package contents for signs of transport damage.

⚠CAUTION The packaging material is inflammable, if it is disposed of improperly by burning, toxic fumes may develop.

The packaging material can be kept and reused in the case of a return shipment. Improper or faulty packaging may lead to transport damages.

Make sure to transport the device always in a safe manner and with the aid of suitable lifting equipment if necessary. Do never use the electric connections for lifting. Before the transport, a clean, level surface should be prepared to place the device on. The electric connections may not be damaged when placing the device.

First Device Checkup

- Check the device for signs of transport damages.
- Please verify if the indications on the type plate correspond to your purchase order.
- Check if the equipment is complete ("Scope of Delivery", page 36).

Storage

If you do not wish to mount and install the device immediately, make sure to store it in a dry and clean environment. Make sure that the device is not stored near strong heat sources and that no metal chippings can get into the device.

2.2 Device Assignment

This manual is valid for the following devices:

- BXT6513-(0XX)-() + accessories.
- BXT6553-(XXX)-() + accessories.

2.2.1 Scope of Delivery

- Manuals.
  - Installation and Operation manual.
- Transponder.
  - Device of the BXT65 series in accordance with your order.
- Authorized Release Certificate (EASA Form 1).

2.2.2 Additional Required Equipment

- Mounting kit MT6533, mandatory to meet the conditions for certification.
- Backshell BS6533, mandatory to meet the conditions for certification.
- Connectors + cables.
- Antennas + antenna cables.
- External Memory module (depends on configuration).
- Configuration set.
- Control device (controlling and operating the BXT65XX).

Details see "Accessories", page 32.

2.2.3 Type Plate

The device type is defined by the type plate (on the housing):
Example:

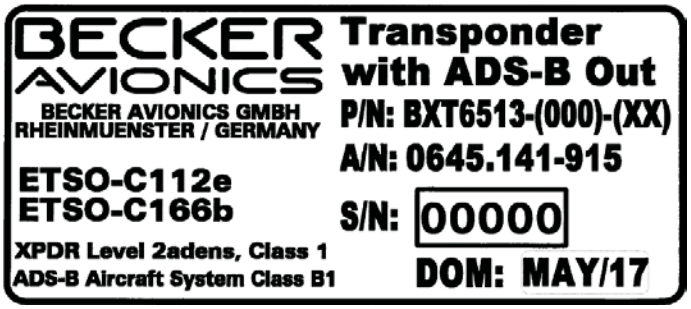


Figure 2: Type Plate (example)

Explanation:

P/N:	**Example Type designation:** **BXT** = Remote Controlled Transponder with ADS-B out **6513 =** Mode S Transponder, basic equipment **6553 =** Mode S Transponder, basic equipment+extended temperature range **Options:** **-(000):** Diversity **-(010):** Single antenna **-(020):** sCloaking (Mode S disabled) **-(XX):** Modification Index e.g. BXT6513-(000)-(06) **Functionality:** XPDR class 1: Output power at antenna ≥125 W Level 2: Surveillance and Comm-A/B a: TCAS interface d: Diversity e: Extended squitter n: Enhanced surveillance s: Surveillance identifier code (SI) **ADS-B class** B1: Aircraft broadcast only B1S: Aircraft broadcast only, single antenna
S/N:	Unique number of the particular device
A/N:	Article number (=order number)
DOM:	Date of Manufacturing
	Compliance and Certifications Corresponding to the displayed text and logos

2.2.4 Software Data Plate

The software state is defined by the software data plate (on the housing):
Example:

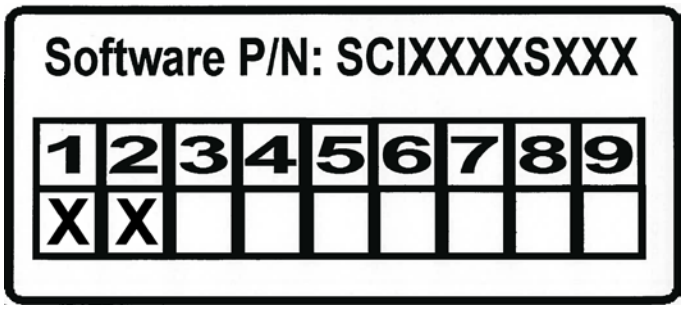


Figure 3: Software Data Plate (example)

Explanation:

X	Example description: The labelling on this data plate example shows: Software status of the device = software package version 2.

The software version and FPGA program version of new deliveries are subjects to change without notice.

For detailed information about modifications you may contact our Customer Service Department.

2.2.5 Meaning of Status LEDs

The two front panel LEDs indicate basic information about overall equipment status.

Device Status	ERR (LED yellow)	OK (LED green)
Off	off	off
Initializing	off	off
Failure of basic function(s) [1]	**on**	off
Failure of periphery [2]	**on**	**on**
Operating, no error	off	**on**
Software load mode	off	**blinking**

1) Typical examples for this failure case are listed in the following:
antenna transmission error, receiver error, incorrect configuration source, no Mode S address, interface error of TCAS or control port or ADLP, overtemperature alert.

2) Typical examples for this failure case are listed in the following:
error of mutual suppression line, altimeter input error, GNSS input error or invalid position, overtemperature warning, Change of Mode S address observed.

In case of failure:

- Check installation and see "
- Post Installation Check" page 70.
- Read out error list see "Read Out and Reset Error Flags" page 74.
- In the event of damage or a defect, the entire device must be returned for repair. The repair must be made by trained Becker Avionics personnel.

2.3 Mounting Requirements

The installation of the device(s) depends on the type of aircraft and its equipment and therefore only general information can be given in this section.

NOTICE

The installation of the BXT65 series into an aircraft may be carried out only by an authorized installation company. The country regulations always have to be observed.

Antenna and cable installations on pressurized cabin aircraft require FAA/EASA approved installation design and engineering substantiation data whenever such installations incorporate alteration (penetration) of the cabin pressure vessel by connector holes and/or mounting arrangements.

Use of existing bulkhead connectors previously approved by other means is permissible without additional approval.

SAFETY INSTRUCTIONS

- The device must not be opened.
- When installing the device, make sure the heat dissipators of the device receive sufficient air. Ensure air circulation gaps as specified, see "Mounting Distance", page 40.
- The mounting place shall be at least 30 cm from the magnetic aircraft compass, to avoid any interference to the magnetic compass.
- Make sure that the mounting plate is not exposed to external temperature influences.

SAFETY INSTRUCTIONS

BXT65 series design allows installation in environment of fixed and rotary wing aircraft including helicopters.

Following limitations apply for the installation of the device:

- Installations must be in accordance with appropriate EASA or FAA approved guidelines.
- The personnel installing this device must ensure that the aircraft installation conditions are within the ETSO/TSO standards applicable for the specific type or class of aircraft.
- The conditions and tests for ETSO/TSO approval of this article are minimum performance standards.
- The equipment is not qualified for installation in areas where fluid contamination is quite likely.
- Changes or modifications made to this equipment not expressly approved in written form by Becker may void the authorization to operate this equipment.

SAFETY INSTRUCTIONS

- Protect the power supply in the application with an external fuse (recommendation for fuse please see "Technical Data" page 24).

⚠CAUTION

- Check the wiring carefully before power up the device(s) and check particularly correct connection of the power supply lines.

2.3.1 Mounting Distance

Dimensions mm (inch)

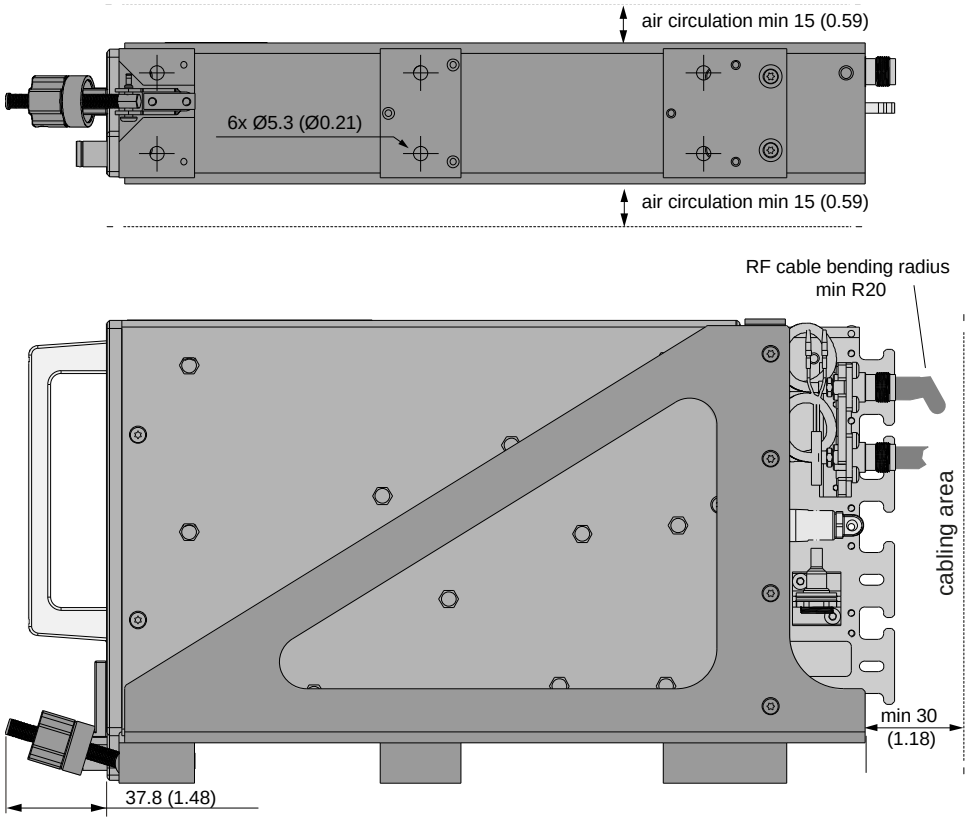


Figure 4: BXT65 Series Mounting Area

2.3.2 Mounting Tray MT6533

Install the BXT65 series with the dedicated mounting parts which consists of a mounting tray (MT6533) and a backshell (BS6533). The mounting tray provides fixing the BXT65 series to the aircraft structure. The backshell provides fixing for cable harness. Details see "Dimensions", page 44.

- Install the mounting tray MT6533 in the aircraft avionics bay.
- Use six M5 (metric) or size 10 (imperial) screws with countersunk head.
  - Minimum torque for fixing screws is 3 Nm (28 inch-lbs).

2.3.3 Grounding

SAFETY INSTRUCTIONS

Make sure that the grounding contact area is adequate and that the connection has low resistance and low inductance. Never use a grounding point on paint-coated surfaces!

The mounting tray (MT6533) must be connected to the aircraft electrical frame:

- Use the grounding stud at the rear part of the mounting.
- Use a ground strap fixed to the ground stud on the mounting tray and to the airframe.
  - Maximum tightening torque for ground stud screw is 1.5 Nm (14 inch-lbs).
  - Wire cross section: min. 4 mm^2.
  - Length: max.150 mm (6 in).

2.3.4 Cable Installation

- General requirements (except power wires).
  - Use only shielded cables.
  - Connect each shield to the ground individually (no series connections).
  - Connect all cable shields at both ends, ensuring large contact areas!
  - Use only cables which are qualified for aircraft use (self-extinguishing).
  - Interface lines TX-A/TX-B and RX-A/RX-B are each to be laid as 2-core twisted and shielded cables.
  - Fit sleeves over the solder joints on the equipment connector.
  - Cable routing should be kept as short and as direct as practical.
  - Avoid sharp bends to prevent cable break and defects of insulation.
  - Avoid routing close to sharp edges to prevent cable break and defects of insulation due to vibration handling the cable.
  - Avoid routing cables near power sources.
  - Avoid routing cables near aircraft control cables.
    HF cable should not be included in the cable harnesses.
  - Avoid routing antenna cables near DME, TCAS, radar altimeter, and ADF antenna cables (allow ≥ 12 inch separation).
- Power supply cables.
  - Wire cross section (cable shield – ground): AWG 24…20.
- Shielded cables.
  - Wire cross section (cable shield – ground): AWG 24…20.
  - Shield connection length: max. 75 mm (3 in).
- Signal cables for configuration inputs.
  - Wire cross section (signal cables – ground): AWG 24…20.
  - Length: max. 150 mm (6 in).

2.3.5 Recommended Crimp Tools

NOTICE Cable cross section – Crimp tool

Please always verify the use of the suited positioner (insert) in the crimping pliers to guarantee a reliable wired connection.

	Connector / cable cross section
Crimp tool category	(for the D-Sub connectors)
Crimps	CONEC part number: 360X10329X
Positioner	for CONEC pins – part number 360X20069X
Insertion/Removal tool	CONEC part number: 360X12009X

2.3.6 Antenna Cables

The antenna installation needs to comply with following limitations:

- The total attenuation of a connection between any antenna and the equipment, including cables, connectors, microwave switch (if used), etc. shall not be more than 3 dB.
- The connection attenuation difference between antennas shall not be greater than 0.5 dB.
- The signal delay of a connection between any antenna and the equipment shall not be greater than 75 ns.
- The signal delay difference between antennas shall not be greater than 20 ns.

NOTICE

It is recommended that "Top" & "Bottom" antenna cables have similar length.

In case of different antenna cable length for bottom and top antenna it may be conceivable that different kinds of cable types are used.

2.3.6.1 Attenuation: Cable length vs coax cable type

Data below shall be used as guideline only.

cable type	max. loss	delay
RG400	0.5 dB/m	4.7 ns/m
RG142	0.42 dB/m	4.7 ns/m
RG393	0.29 dB/m	4.6 ns/m
ECS310801	0.11 dB/m	4.1 ns/m
ECS310701	0.10 dB/m	4.1 ns/m

2.3.7 Antenna Installation

For antenna installation, refer always to the manufacturer´s maintenance documentation for the aircraft. Carry out the antenna installation in accordance with AC 43.12-2A Chapter 3.

NOTICE Penetration of the pressurised cabin on a pressurised aircraft requires additional data, which are not contained in this installation manual.

⚠CAUTION Radiation risk:

A safe distance to the installed antenna must be ensured by corresponding installation measures around human body damage (e.g. at the eyes) and/or avoid the inflammation of combustible materials by radiated energy.

The picture shows a typical location for top and bottom antenna installation for Diversity Mode S transponder. For single antenna device install only the bottom antenna.

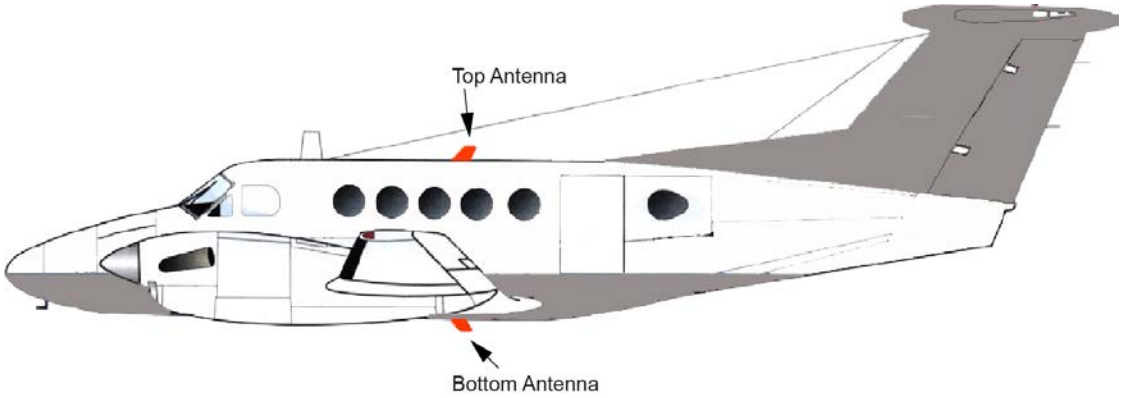


Figure 5: Antenna Installation (diversity)

Transponder antennas should be installed as far away as practical from:

- Other antennas.
- Shadowing produced by other installations on the surface of the aircraft body.
- Exhaust path of the engine(s).
- Landing gear doors or other openings.
- Check the skin panels for sufficient bonding before the antenna installation.
- Separate the transponder antennas from DME and TCAS as much as possible (approx. 1.8 m or 6 feet as guideline).
- Generally, transponder antennas should not be installed closer than 3 ft to the transponder. Otherwise RF interference may occur.
- Mount the main antenna on the bottom of the aircraft fuselage in a vertical position, same as the top antenna. Horizontal separation of both antennas should not exceed 7.6 meters (25 ft).
- Follow the manufacturer´s installation instruction for the antenna to ensure achieving maximum performance of the BXT65 series.
- If existing antennas on the aircraft will be used an inspection of the area between antenna and the aircraft skin is highly recommended to avoid negative effects of possible corrosion in this area.
- On composite aircraft, add sufficient ground plane material.

2.4 Dimensions

2.4.1 Transponder BXT65 Series

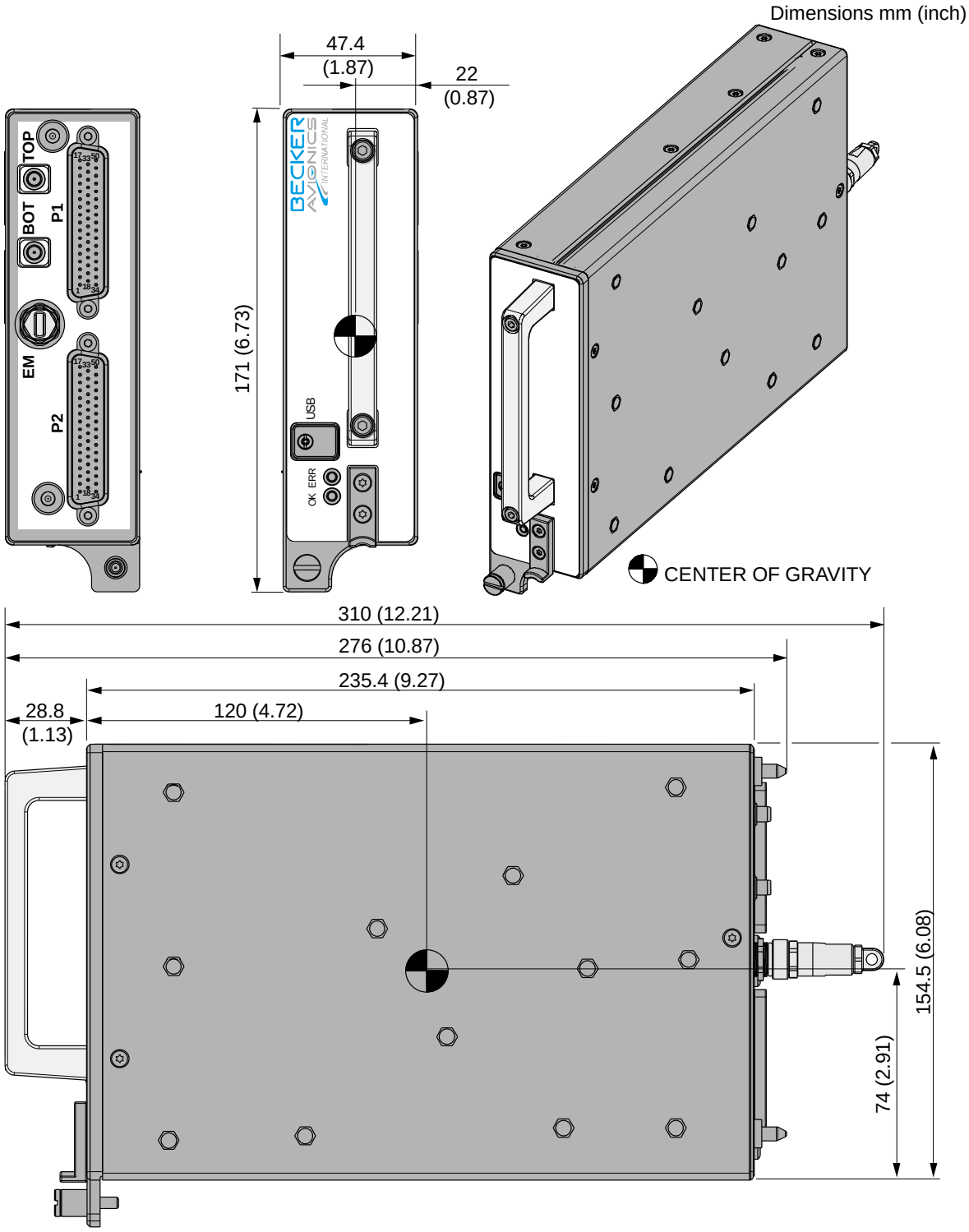


Figure 6: BXT65 Series

NOTICE "Center of Gravity" for BXT65 series with EM module.

Allowable deviation for dimensions without tolerances: DIN ISO 2768 T1 C (dimensions in mm)		
xx...6 (±0.3)	>30...120 (±0.8)	>400...1000 (±2.0)
>6...30 (±0.5)	>120...400 (±1.2)	>1000...2000 (±3.0)

2.4.2 BXT65 Series with Mounting MT6533

Dimensions mm (inch)

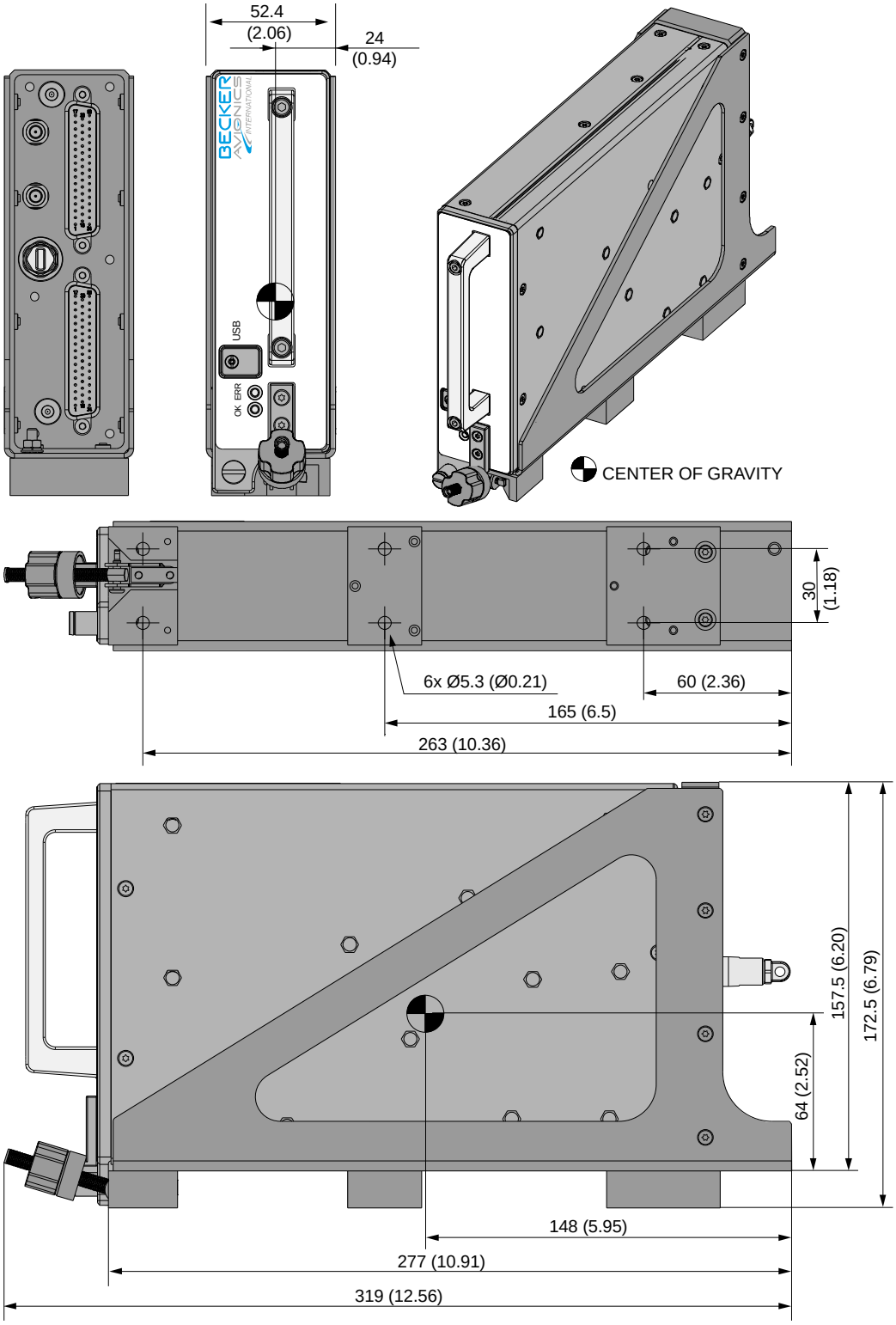


Figure 7: BXT6565 Series with Mounting Tray MT6533

NOTICE "Center of Gravity" for BXT65 series with EM module and mounting.

Allowable deviation for dimensions without tolerances: DIN ISO 2768 T1 C (dimensions in mm)		
xx...6 (±0.3)	>30...120 (±0.8)	>400...1000 (±2.0)
>6...30 (±0.5)	>120...400 (±1.2)	>1000...2000 (±3.0)

2.4.3 BXT65 Series with Mounting MT6533 and Backshell BS6533-(100)

Dimensions mm (inch)

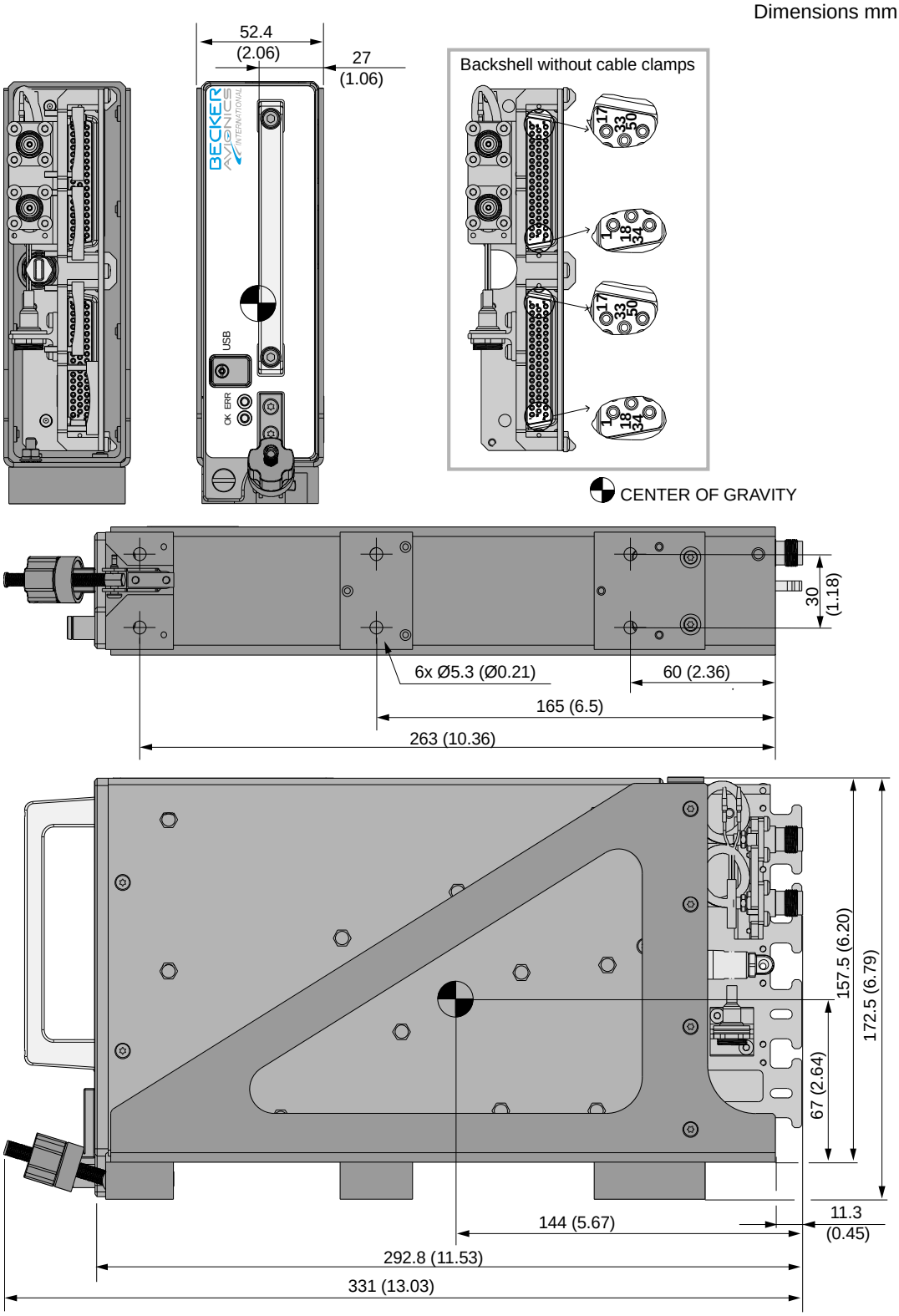


Figure 8: BXT65 Series with Mounting Tray MT6533 and Backshell BS6533-(100)

NOTICE "Center of Gravity" for BXT65 series with EM module, mounting and backshell.

Allowable deviation for dimensions without tolerances: DIN ISO 2768 T1 C (dimensions in mm)		
xx...6 (±0.3)	>30...120 (±0.8)	>400...1000 (±2.0)
>6...30 (±0.5)	>120...400 (±1.2)	>1000...2000 (±3.0)

2.5 Electrical Installation

NOTICE For installations in a more severe electromagnetically environment use shielded cable connectors and a common shielding for the transponder interwiring.

Detailed information according electrical signals and wiring; please see "Mounting Requirements" page 39 and "Aircraft Wiring" page 66.

Transponder rear side

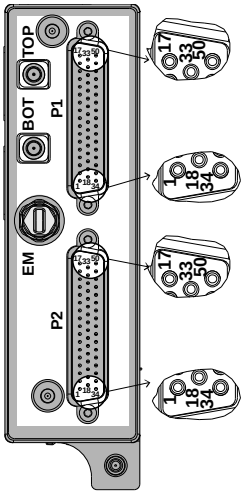


Figure 9: BXT65 series Connector Layout

Backshell for antenna diversity

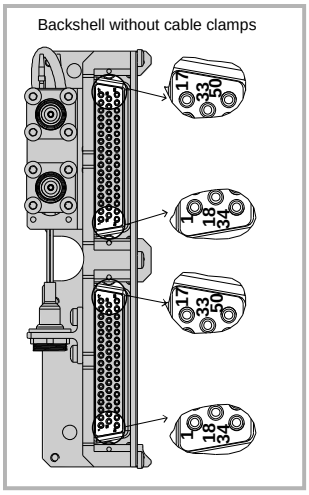


Figure 10: BS6533-(100) Connector Layout

Backshell for single antenna

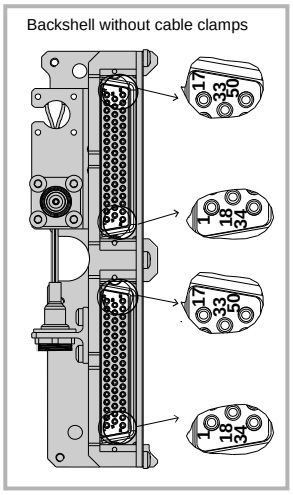


Figure 11: BS6533-(110) Connector Layout

SAFETY INSTRUCTIONS Reserved pins shall not be connected.

2.5.1 Connector P1

P1 Pin	Signal name	Pin Name	Function	I/O	Remarks
1	CAX0B	Reserved		-	factory only
2	C4XXIB0	XPDR Control, Port A, Line B	ARINC 429	I	
3	C4XXIB1	GNSS Data, Line B	ARINC 429/RS422	I	configurable
4	C4XXIB2	ADC/Altitude Encoder, Port A, Line B	ARINC 429/RS422	I	configurable
5	CIX2	Reserved		-	factory only
6	CIX3	XPDR Standby	Discrete	I	Low active, < 3.5 V GND= Standby Open=ON
7	CIX0	XPDR Reply	Discrete	O	Low active, ≈ 200 ms after every generated reply.
8	CIX1	Ident Activation	Discrete	I	Low active, < 3.5 V
9	C429IA0	FMC, Line A	ARINC 429	I	
10	C429IB0	FMC, Line B	ARINC 429	I	
11	C429IA1	Reserved		-	factory only
12	C422IN0	Time Mark, inverting	RS422	I	Line B
13	C422IP0	Time Mark, non-inverting	RS422	I	Line A

P1 Pin	Signal name	Pin Name	Function	I/O	Remarks
14	CSI1	Configuration Source Select	Discrete	I	data source configuration
15	CRDY	System Status	Discrete	O	High active, > 15.0 V
16	PGND	Ground	Supply Return	-	
17	PGND	Ground	Supply Return	-	
18	CAX0A	Reserved		-	factory only
19	C4XXIA0	XPDR Control, Port A, Line A	ARINC 429	I	
20	C4XXIA1	GNSS Data, Line A	ARINC 429/RS422	I	configurable
21	C4XXIA2	ADC/Altitude Encoder, Port A, Line A	ARINC 429/RS422	I	configurable
22	C429XB0	XPDR Data, Port A, Line B	ARINC 429	O	
23	C429XA0	XPDR Data, Port A, Line A	ARINC 429	O	
24	GND	Ground	Signal Return	-	
25	C429XB1	Reserved		-	factory only
26	C429XA1	Reserved		-	factory only
27	C429XB2	Reserved		-	factory only
28	C429XA2	Reserved		-	factory only
29	GND	Ground	Signal Return	-	
30	CSI0	Configuration Source Selection	Discrete	I	data source configuration
31	CSI2	XPDR Source/Destination select	Discrete	I	device number (No.1, No.2) in dual installations
32	SUPP	DC Power Supply	28 VDC aircraft power	I	
33	SUPP	DC Power Supply	28 VDC aircraft power	I	
34	C3V3	External Memory Module supply	Supply	I	
35	CSDA	External Memory Module data	Data	I/O	
36	CSCL	External Memory Module clock	Clock	O	
37	GND	Ground	Signal Return	-	
38	CCANN0	CAN Bus, Port 0, Low	CAN	I/O	
39	CCANP0	CAN Bus, Port 0, High	CAN	I/O	
40	C4XXIA3	ADC/Altitude Encoder, Port B, Line A	ARINC 429/RS422	I	configurable
41	C4XXIB3	ADC/Altitude Encoder, Port B, Line B	ARINC 429/RS422	I	configurable
42	GND	Ground	Signal Return	-	
43	CSIX	Mutual Suppression	ARINC 718A	I/O	
44	CIHL0	Weight on Wheel Sensor	Discrete	I	active State configurable, (High or Low active)

P1 Pin	Signal name	Pin Name	Function	I/O	Remarks
45	C429IB1	Reserved		-	factory only
46	GND	Ground	Signal Return	-	
47	CSI3	Transmitter Test Inhibit	Discrete	I	active if strapped to GND.
48	CI10	ADC/Altitude Encoder Port Select	Discrete	I	Source selection Low = Port B High= Port A
49	CI11	Reserved		-	factory only
50	CILLI	Reserved		-	factory only

2.5.2 Connector P2

P2 Pin	Signal name	Pin Name	Function	I/O	Remarks
1	CAX1B	Reserved		-	factory only
2	CI9	Reserved		-	factory only
3	CIX7	Reserved		-	factory only
4	CIX6	ADS-B Function Status	Discrete	I/O	Closed = ADS-B position data receiving, (max. drain = 100 mA) Open = No valid position data available
5	CIX4	Reserved		-	factory only
6	CIX5	Burst mode enable	Discrete	I	Low = Enabled High = Disabled
7	C429XB7	XPDR Data, Port B, Line B	ARINC 429	O	
8	C429XA7	XPDR Data, Port B, Line A	ARINC 429	O	
9	C429XB6	TCAS Interface, Line B	ARINC 429	O	Output to TCAS
10	C429XA6	TCAS Interface, Line A	ARINC 429	O	Output to TCAS
11	C429XB5	ADLP Output, Line B	ARINC 429	O	
12	C429XA5	ADLP Output, Line A	ARINC 429	O	
13	C232X	Reserved		-	factory only
14	C429XB4	Reserved		-	factory only
15	C429XA4	Reserved		-	factory only
16	C429XB3	Reserved		-	factory only
17	C429XA3	Reserved		-	factory only
18	C4XXIA4	XPDR Control, Port B, Line A	ARINC 429	I	
19	C4XXIB4	XPDR Control, Port B, Line B	ARINC 429	I	
20	C4XXIB5	XPDR Control, Port C, Line B	ARINC 429	I	
21	C4XXIB6	Reserved		-	factory only
22	CI8	XPDR Control Port Select		I	
23	C4XXIB7	Reserved		-	factory only

P2 Pin	Signal name	Pin Name	Function	I/O	Remarks
24	GND	Ground	Signal Return	-	
25	CLRXN	Ethernet Receive	10/100BASE-TX	I/O	
26	CLTXN	Ethernet Transmit	10/100BASE-TX	I/O	
27	C429IA7	Data Concentrator, Port A, Line A	ARINC 429	I/O	
28	C429IA6	Radio Altimeter/Data Concentrator, Port B, Line A	ARINC 429	I/O	configurable
29	GND	Ground	Signal Return	-	
30	C429IA5	IRS, Port A	ARINC 429	I	
31	C429IA4	TCAS Data, Port A	ARINC 429	I	Input from TCAS
32	C429IA3	FCC/MCP Data, Port A	ARINC 429	I	
33	C429IA2	ADLP, Port A	ARINC 429	I	Data from ADLP
34	CAX1A	Reserved		-	factory only
35	GND	Ground	Signal Return	-	
36	C4XXIA5	XPDR Control, Port C, Line A	ARINC 429	I	
37	C4XXIA6	Reserved		-	factory only
38	CIX13	Extended Squitter Disable	Discrete	I	Low = Disabled High = Enabled
39	C4XXIA7	Reserved		-	factory only
40	CIX14	Software Update Enable	Discrete	I	High = Normal operation Low = Update enabled
41	CLRXP	Ethernet Receive	10/100BASE-TX	I	
42	GND	Ground	Signal Return	-	
43	CLTXP	Ethernet Transmit	10/100BASE-TX	O	
44	C429IB7	Data Concentrator, Port A, Line B	ARINC 429	I/O	
45	C429IB6	Radio Altimeter/Data Concentrator, Port B, Line B	ARINC 429	I/O	configurable
46	GND	Ground	Signal Return	-	
47	C429IB5	IRS, Port B	ARINC 429	I	
48	C429IB4	TCAS Data, Port B	ARINC 429	-	Input from TCAS
49	C429IB3	FCC/MCP Data, Port A	ARINC 429	I	Data from FCC/MCP
50	C429IB2	ADLP, Port B	ARINC 429	I	Data from ADLP

2.5.3 Connector TOP, BOT (Antenna)

- Type: BMA female at the rear side of the device (transformed into TNC by the backshell BS6533).
- Antenna cable: low-loss cable.
- Signal: bi-directional.

2.5.4 Connector USB

- Only for service operation.
- Type: USB 2.0 Micro B.
- Cable: Max. cable length: 5 m (15 ft).
- Data transfer: Bidirectional data exchange.

2.5.5 Connector EM

Connection for external memory, if installed.

NOTICE

- Please mount a dust cup on EM connector (BXT rear side) if this connector is not used.

For example:

- Internal memory is used.
- External memory module EM6100 connection is done via backshell.

2.5.6 Service Connector (optional)

Becker Avionics recommend the installation of a service connector. This allows the configuration of the BXT65 series and software updates after installation inside the aircraft.

2.5.6.1 Service connector inside the aircraft

Pinout service connector (Dsub, 9pol.) see "Figure 13: Wiring Diagram (diversity example, external memory)" page 55.

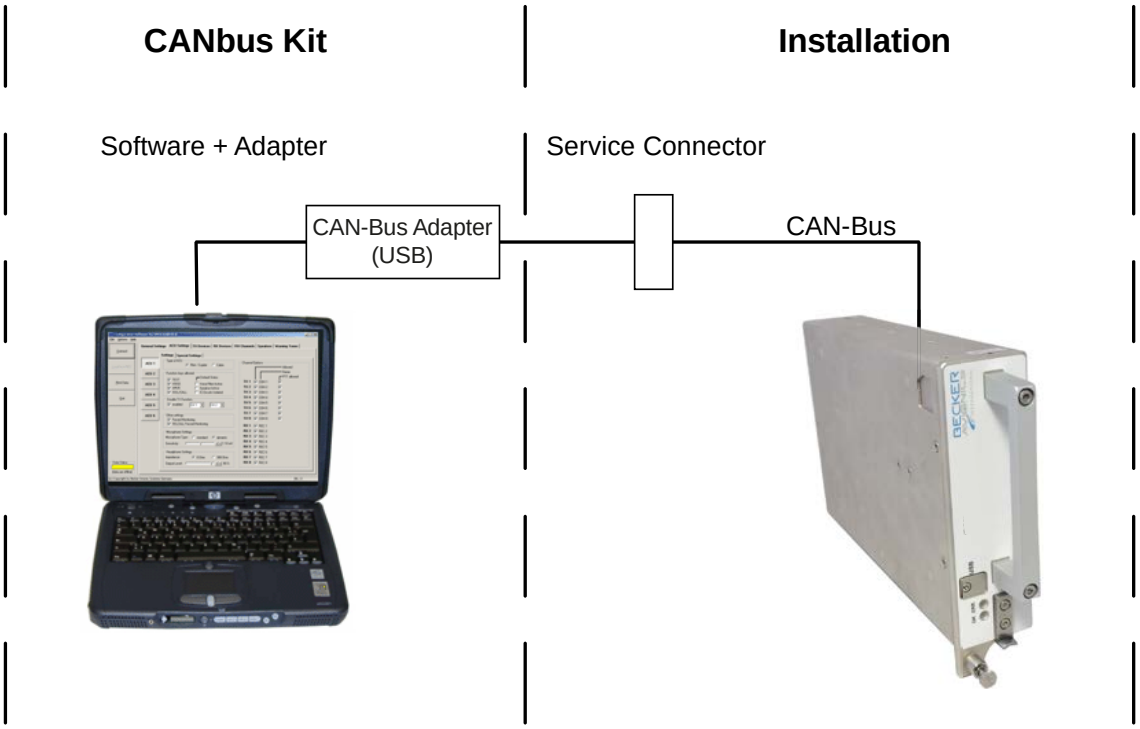


Figure 12: Service Connector inside the Aircraft

2.6 Interfaces

2.6.1 ARINC 429 Input Labels

Parameter	Label
XPDR control	016 or 031
Selected altitude	102
GNSS track angle	103
GNSS latitude	110
GNSS longitude	111
GNSS ground speed	112
GNSS latitude fine	120
GNSS longitude fine	121
GNSS horizontal integrity limit	130
GNSS vertical figure of merit	136
UTC fine	140
UTC	150
Radio altitude	164
GNSS vertical velocity	165
North-south velocity	166
East-west velocity	174
Altitude	203
Mach number	205
Indicated airspeed	206
True airspeed	210
Altitude rate	212
Flight ID	233…237 or 360
Baro correction	234
GNSS horizontal figure of merit	247
Ground speed	312
True track angle	313
True heading	314
Magnetic heading	320
Roll angle	325
Track angle rate	335
Inertial vertical velocity	365
GNSS altitude, HAE	370

2.6.2 ARINC 429 Output Labels

Parameter	Label
TCAS Display Control	013
Display Altitude Limits	015
Display Altitude Limits	016
Transponder Status	031
Event-Driven Message Status	155
Altitude	203
Baro Corrected Altitude	204
Flight ID, Part 1	233
Flight ID, Part 2	234
Flight ID, Part 3	235
Flight ID, Part 4	236
Flight ID, Part 5	237
Mode S Address, Part 1	275
Mode S Address, Part 2	276
Maintenance Data 0	350
Maintenance Data 3	353
Maintenance Data 4	354
GA Equipment Identification	371
Equipment Identification	377

2.7 Configuration

The figure "General Architecture (example)", page 55 shows an example of a single device installation including:

- Power supply without separate switch.
- Configuration from internal memory.
- Single ADC conformant to ARINC 706.
- FMC.
- ADLP.
- GNSS sensor conformant to ARINC 743A.
- Weight-on-wheels switch, active low.
- Indicators for system status and transponder reply.
- Standby switch.
- Dual antenna (Diversity).
- Service Connector (optional).

Relevant configuration settings:

Configuration	Set to
Air Data Source Configuration	Single
Air Data Format and Resolution	ARINC 429
Air Data Port A Selection	Dedicated port
Ground Sensor Enable	Enable, active low
XPDR Control Port A Selection	Dedicated port
TCAS Interface Enable	Disable
ADLP Interface Enable	Enable
FMC Input Selection	Dedicated port
GNSS Receiver Input Selection	Dedicated port
GNSS Data Format	ARINC 743A

NOTICE

The figures of the wiring examples are designed with a BXT6513-(XXX) but the examples are applicable to all variants of BXT65XX corresponding to the extension level.

If an example refers to only one product variant or preclude variants it will be pointed out.

2.7.1 General Architecture (example)

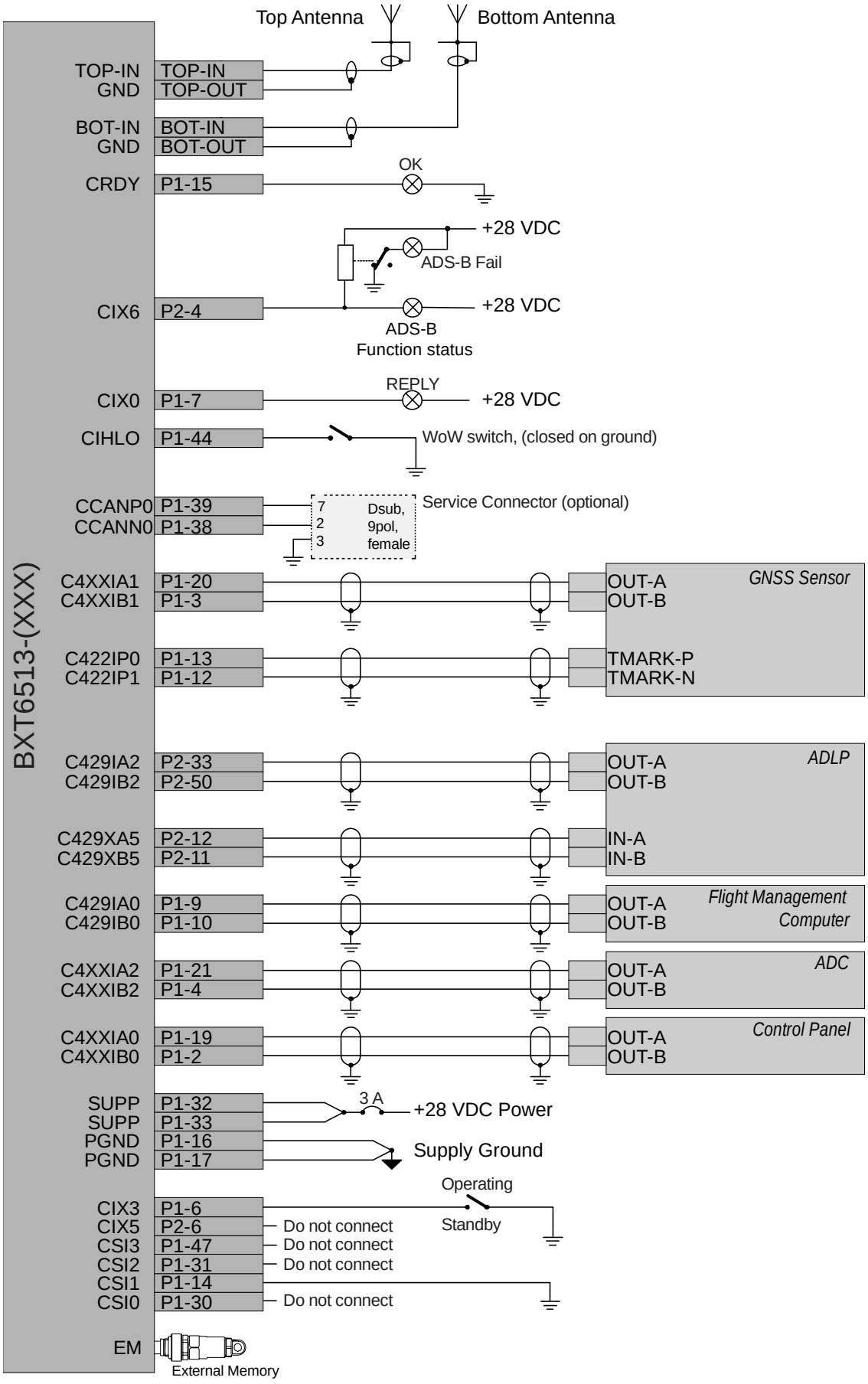


Figure 13: Wiring Diagram (diversity example, external memory)

2.7.2 Single Device Installation

Electrical connections:

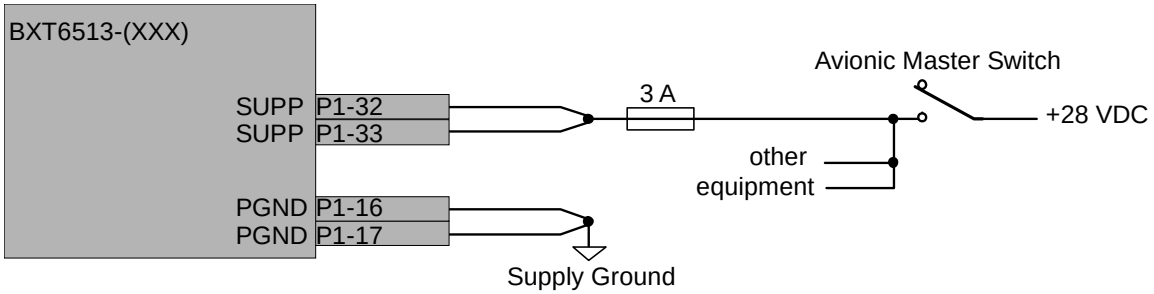


Figure 14: Single Device Installation

2.7.3 Dual Device Installation

Electrical connections:

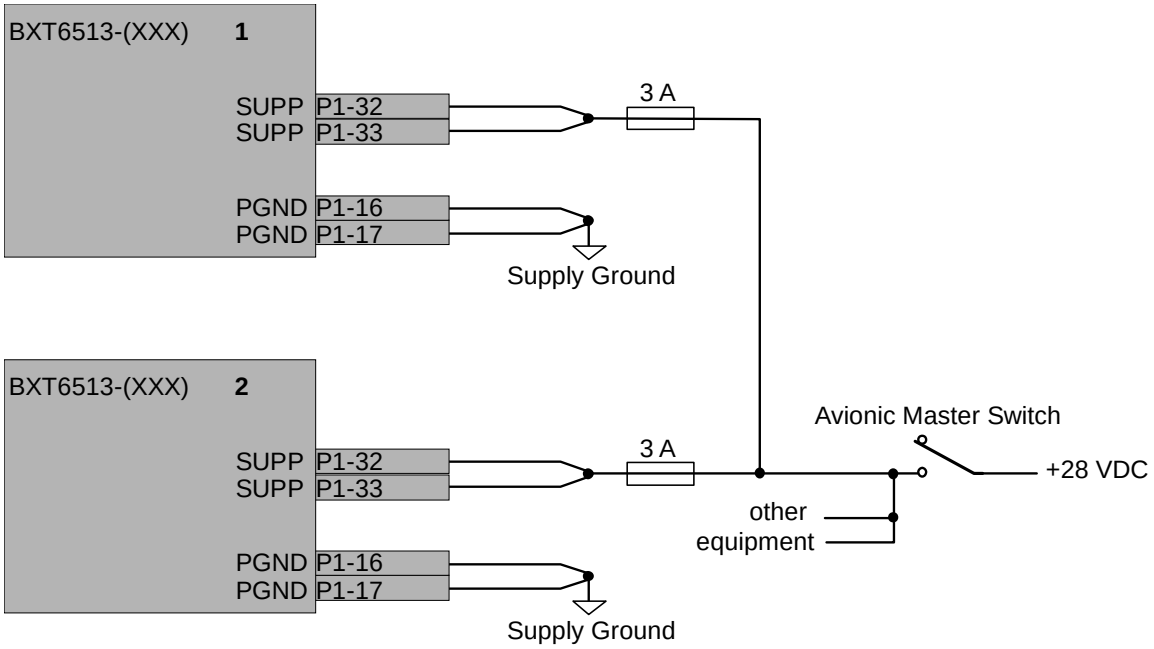


Figure 15: Dual Device Installation

2.7.4 Device Installation Number

- In a single device installation set the installation number to 1.
- In a dual device installation set the installation number for one device to 1 and for the other device to 2.

Device installation number	device 1	device 2
P1 pin31	do not connect	GND

2.7.5 Data Source Configuration

Select the data source:

Data source	Internal memory	External memory
P1 pin14	do not connect	GND
P1 pin30	GND	do not connect

2.7.5.1 External Memory Module

External memory interface signals are available at P1 connector and EM connector.

If the External Memory module EM6100 is used as configuration data source the mechanical installation is as per description:

- Backshell installation
  (fix the EM6100 module to the pre-assembled connector at the backshell. Please note, use a cable connection as short as practical but not longer than 150 mm).

NOTICE Do not install two External Memory modules at same device. The External Memory module must always be installed when it is defined as configuration data source (see "Data Source Configuration", page 56.

NOTICE In dual device installations with External Memory module as a configuration data source, each device needs its own External Memory module.

In case of dual device installation, it is the responsibility of the installer to provide correlated data to each device.
Please make sure that configuration data of both devices match to the aircraft and installation. Aircraft properties include:

- Mode S address.
- Maximum airspeed.
- Aircraft registration.
- Aircraft category.
- Length and width code.

Electrical connections:

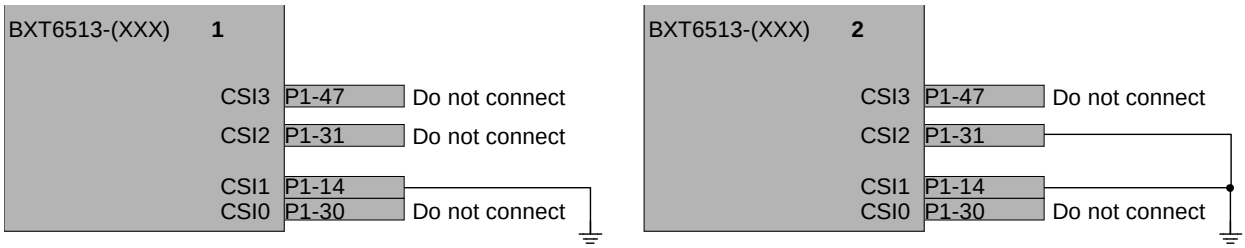


Figure 16: Dual Device Installation, Data Source = External Memory Module

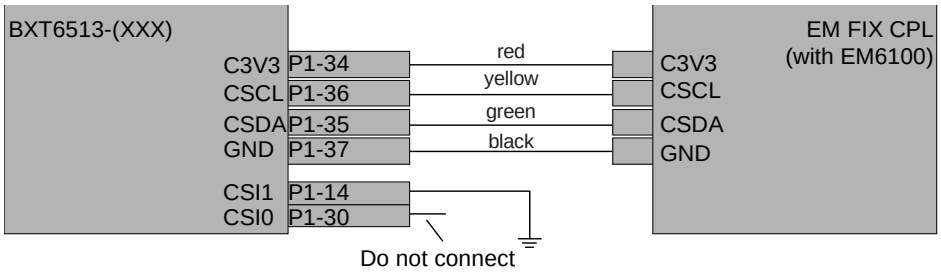


Figure 17: External Memory Module via Backshell

2.7.5.2 Internal Memory

Electrical connections:

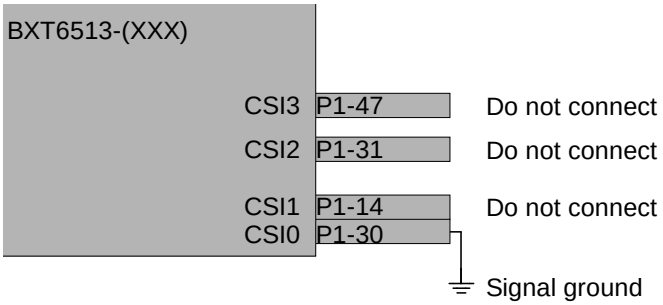


Figure 18: Single Device Installation, Data Source = Internal Memory

2.7.6 Single Device Installation - Antenna Diversity

Electrical connections:

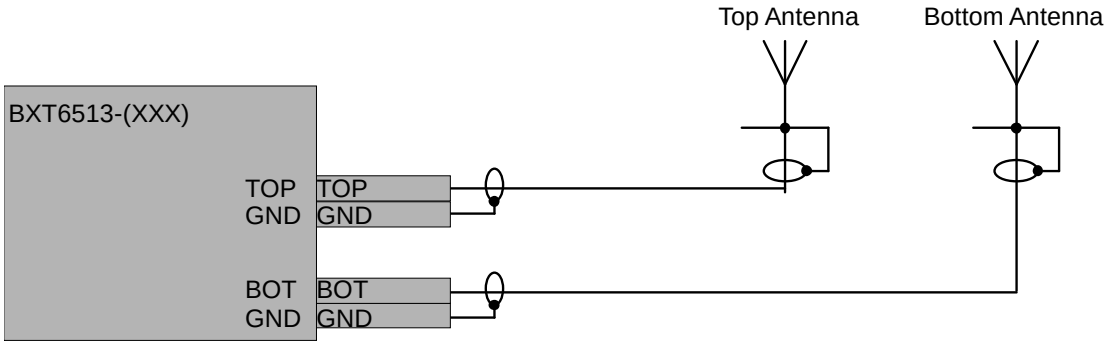


Figure 19: Single Device Installation - Antenna Diversity

2.7.7 Single Device Installation – Single Antenna

Electrical connections:

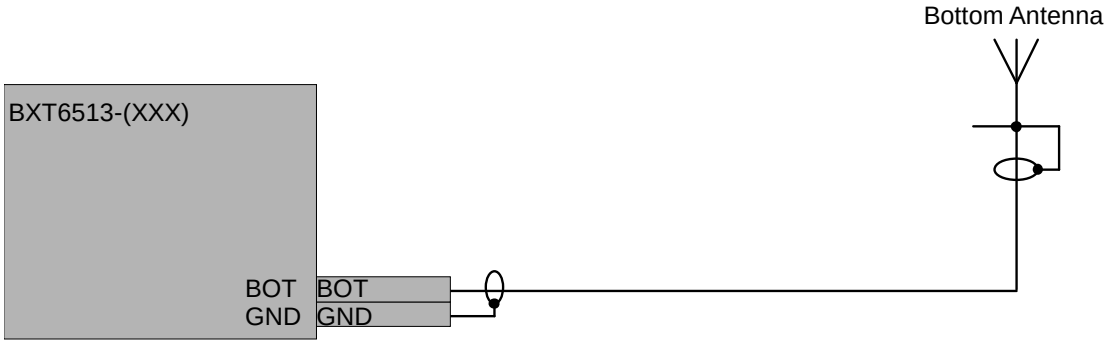


Figure 20: Single Device Installation – Single Antenna

2.7.8 Dual Device Installation - Antenna Diversity

Electrical connections:

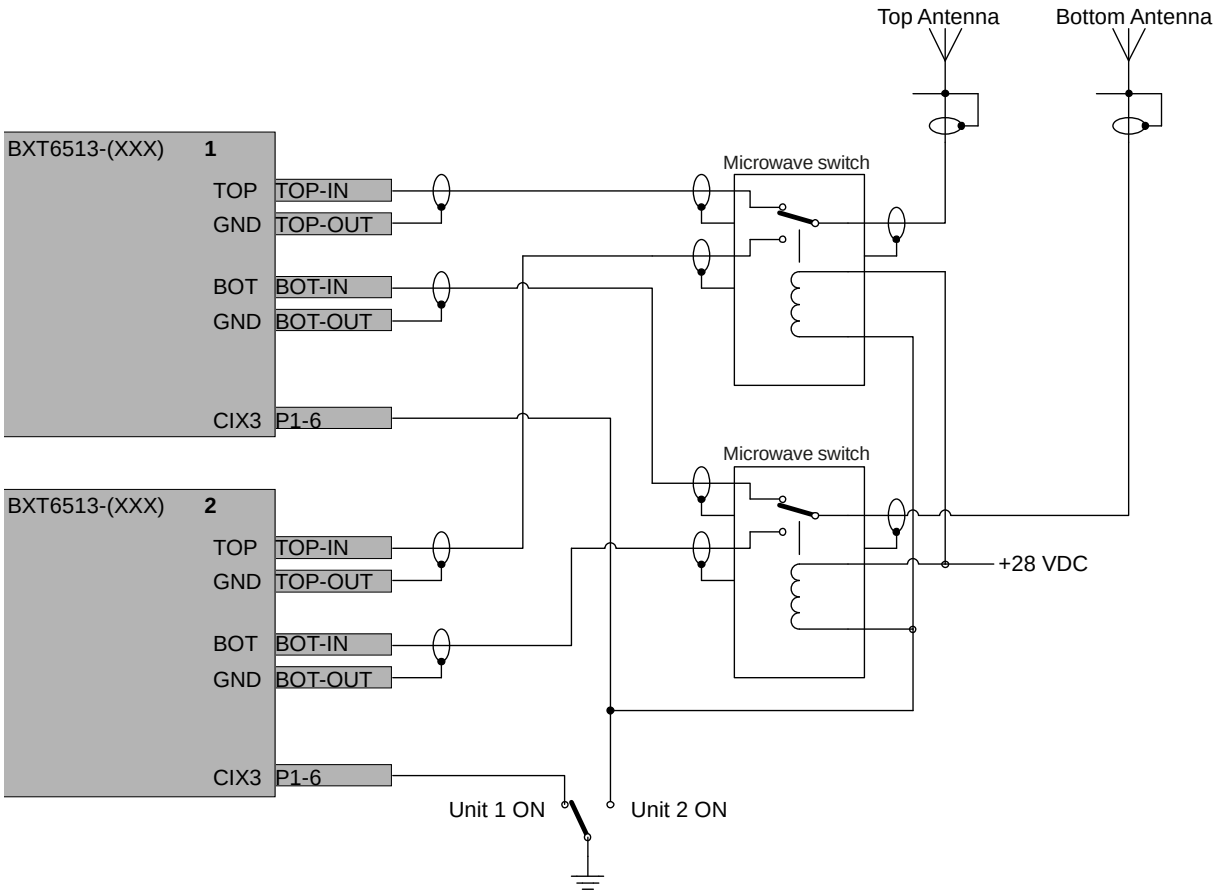


Figure 21: Dual Device Installation - Antenna Diversity

Note: Example for antenna switch model: D2-729B003.

2.7.9 Single Device Installation – Single Controller

Relevant configuration settings:

Option	Set to
XPDR Control Port A Selection	Dedicated Port

Electrical connections:

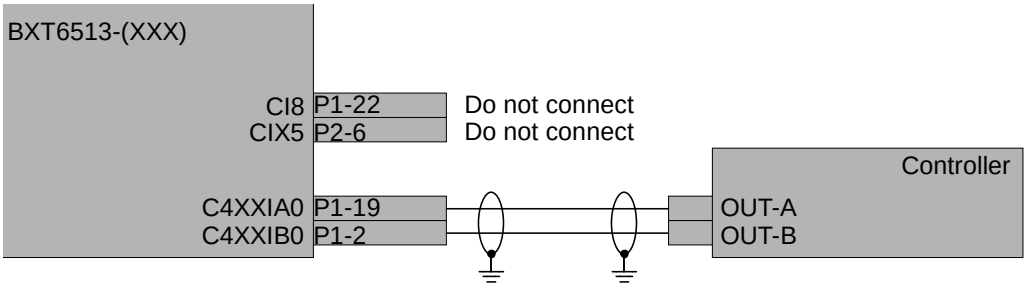


Figure 22: Single Device Installation - Single Controller

2.7.10 Single Device Installation – Dual Controller (Selection by Switch)

Relevant configuration settings:

Option	Set to
XPDR Control Port A Selection	Dedicated Port
XPDR Control Port B Selection	Dedicated Port

Electrical connections:

With open switch, Controller 1 controls the transponder function.
With closed switch, Controller 2 controls the transponder function.

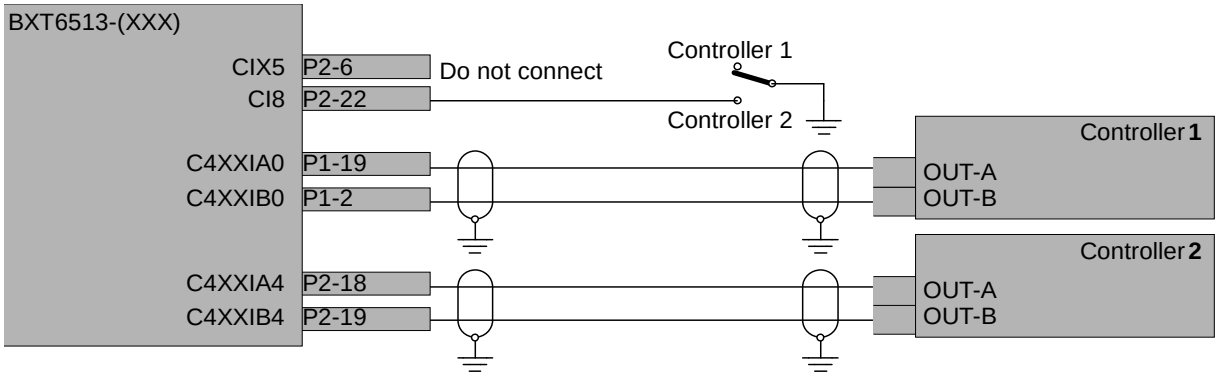


Figure 23: Single Device Installation – Dual Controller

2.7.11 Single Device Installation – Dual Controller (Burst Mode)

The burst mode allows for up to three sources to control the transponder operation. The selection of the active source is dynamic. The operation in burst mode depends on "XPDR Burst Mode Control" option.

Relevant configuration settings:

Option	Set to
XPDR Control Port A Selection	Dedicated Port
XPDR Control Port B Selection	Dedicated Port

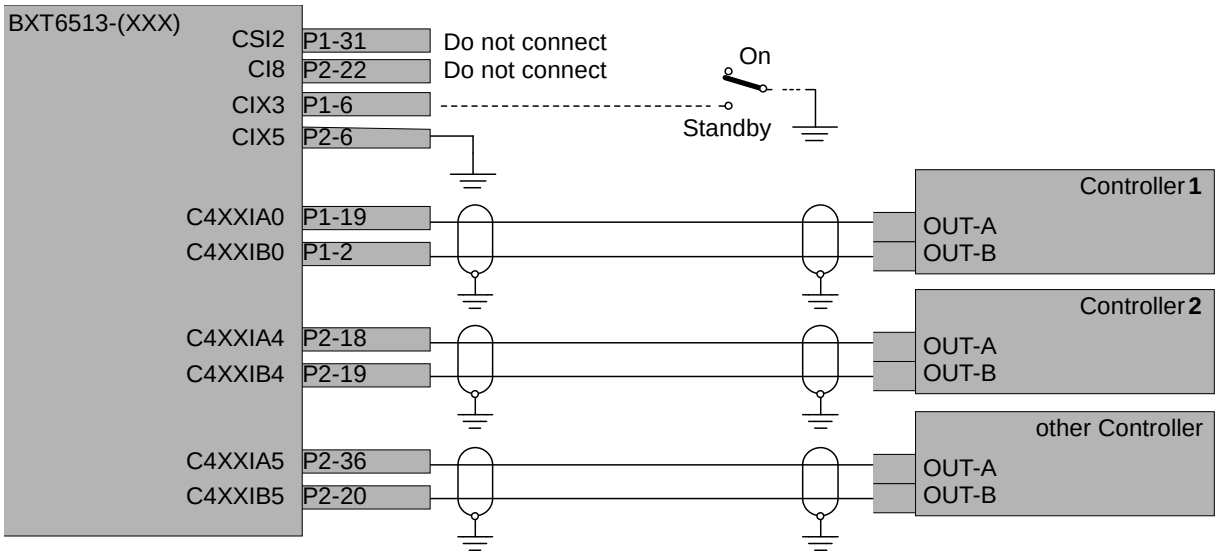


Figure 24: Single Device Installation – Dual Controller (Burst Mode)

2.7.11.1 Burst Mode - Sticky Mode Operation

The device scans all control inputs for presence of control words. Once a command word is received from an input, the device "sticks" to this input - accepts command from this input and ignores other inputs for as long as the selected input provides commands periodically. Once commands stop to arrive, the device restarts the input scanning process.

Relevant configuration settings:

Option	Set to
XPDR Burst Mode Control	Sticky

2.7.11.2 Burst Mode - Concentrator Mode Operation

The device processes commands from each controller with a "last command wins" principle. This mode should typically be used with controllers operating in bursts, with "XPDR Operation on Command Loss" set to "Continue".

Relevant configuration settings:

Option	Set to
XPDR Burst Mode Control	Concentrator

2.7.12 Transmitter Disable

This input is relevant for several tests during shop maintenance.

Leave this input open in all installations.

Relevant configuration settings:

	Operation		Remarks
P1 pin47	enable	do not connect	Normal configuration
P1 pin47	disabled	GND	No transmissions from equipment – for tests only

2.7.13 GNSS Wiring

- BXT65XX supports ARINC429/ARINC743 GNSS sensors and RS232 GNSS sensors with Freeflight protocol (RS232 GNSS sensors are supported with BXT6513 software version 5 or higher, BXT6553 software version 1 or higher).
  - o GNSS data format (protocol) is selectable via configuration.

Relevant configuration settings:

Option	Set to
GNSS Receiver Enable	Enabled
GNSS Receiver Input Selection	Dedicated Port
GNSS Data Format	ARINC 743 or FreeFlight Systems

Electrical connections:

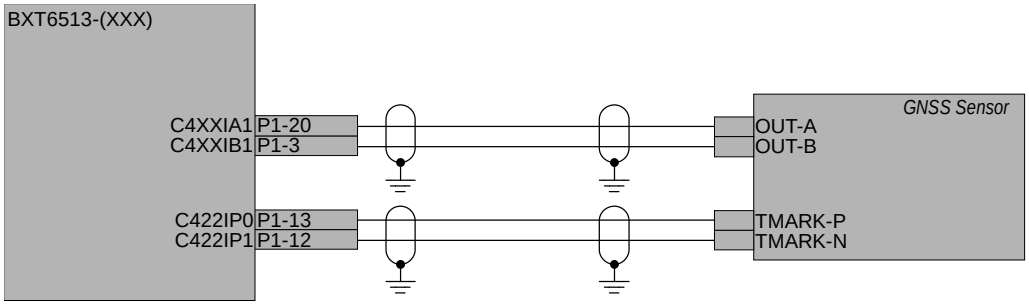


Figure 25: Single Device Installation - GNSS Wiring

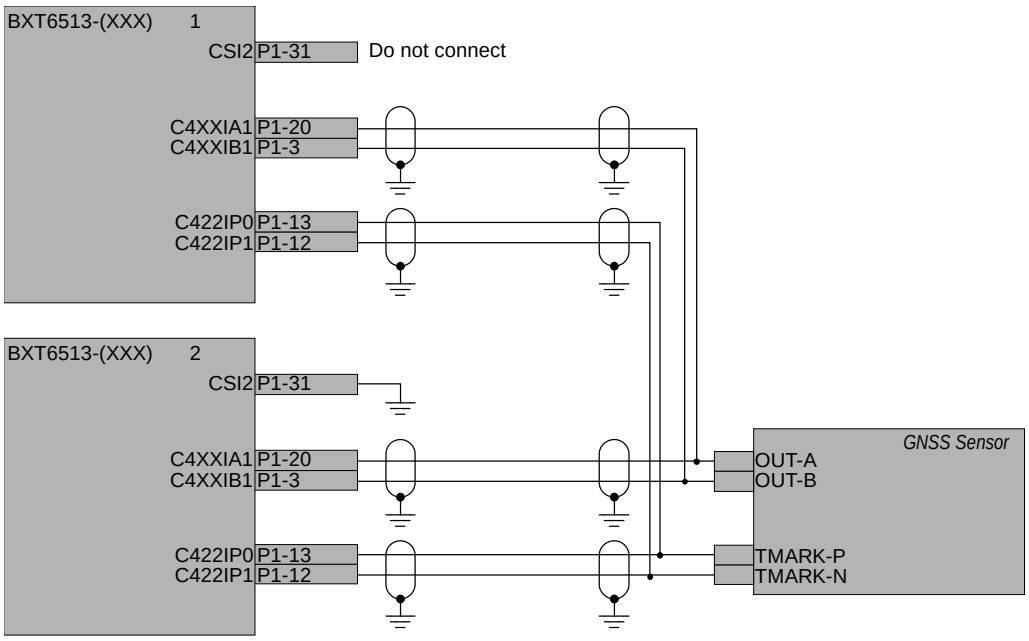


Figure 26: Dual Device Installation - GNSS Wiring

2.8 Configuration Data

The BXT65 series must be configured with the characteristic aircraft data.

The BXT65 series configuration is stored in a non-volatile memory.

There are two possibilities where to store or load configuration data (see "Data Source Configuration" page 56):

- Usage of the internal memory or
- Usage of an external memory module.

NOTICE

- We recommend the usage of the External Memory module EM6100 as data source.

2.8.1 Configuration of BXT65XX with EM module

The configuration parameters of the BXT65XX with EM module can be set directly by PC via "EMP Kit" and the corresponding software program.

Detailed information is available in "EMP Extended Memory Programmer User Manual", please see "Order Code", "Available Documentation" page 32.

2.8.2 Configuration of BXT65XX with internal memory

SAFETY INSTRUCTIONS

- The usage of the internal memory as configuration data storage can only be approved when customers have and maintain an own configuration data base.
  - o It is a condition to store the current configuration data in the configuration data base.
- If the internal memory is used it is necessary to install a service connector at a suitable place inside the aircraft to be able to configure the device without removing it.

For detailed information please contact Becker Avionics.
For relevant department and addresses, please see contact info page 2.

For wiring example - service connection - see also "Figure 27: Software Update – Aircraft Installation" page 64.

2.9 Software Update

The BXT65 series provides an interface for Field Loadable Software (FLS). This interface enables in-field loading of equipment software and device configuration.

Details see "FLS Manual" (Field Loadable Software) included in accessories FLS6500-BXT Kit; see "Order Code" page 32.

SAFETY INSTRUCTIONS

- A software update may be carried out only by authorized aircraft maintenance personnel.
- Aircraft maintenance personnel are responsible for proper marking of performed changes.

2.9.1 PC Requirements

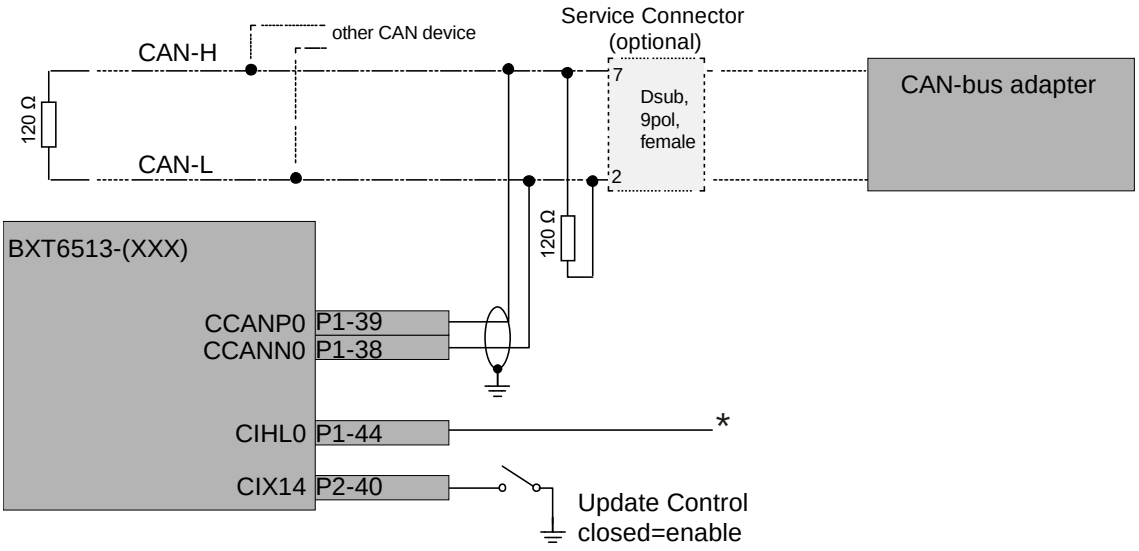
- MS Vista SP2 or newer with installed .NET Framework 4.5.
- ARINC 665 Data Loader application
  (recommended ARINC 826 Data Loader version 3.6.34.0 or higher, available on request).
- CAN interface - PCAN USB
  (details how to install PCAN USB interface see http://www.peak-system.com).

Windows Vista, Windows .NET Framework are trademarks of Microsoft Corporation.

2.9.2 Software Update Installation

2.9.2.1 Software Update – Aircraft Installation

- The BXT65 series software update can be done without removing equipment from installation.
- The installer should follow CAN bus installation recommendations provided by ARINC 825 document.
- Provide that the device and the software data loader match with CANbus speed settings.

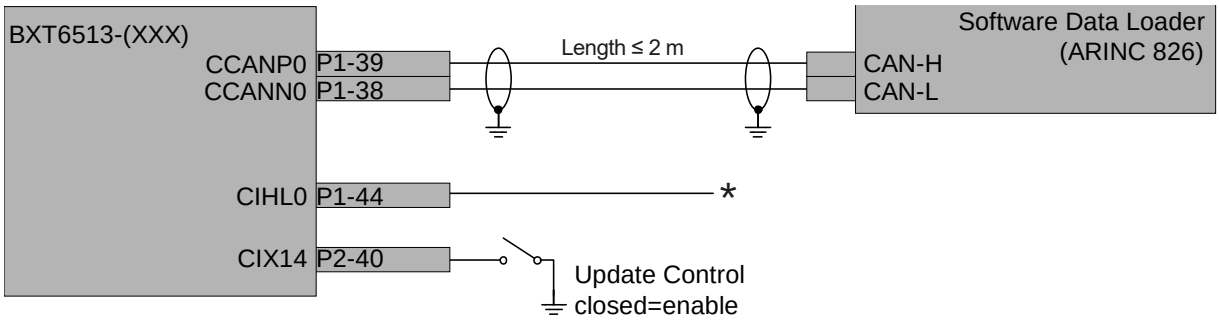


* Ground sensor: Provide the ground sensor connection depending on ground sensor configuration see "Figure 29: Table – Ground Sensor Connection for Software Update (Laboratory)" page 65.

Figure 27: Software Update – Aircraft Installation

Note: If only one BXT65XX and one PC with cable length < 2 m is used, the 120 Ω resistor may be omitted.

2.9.2.2 Software Update – Laboratory Installation



* Ground sensor: Provide the ground sensor connection depending on ground sensor configuration see "Figure 29: Table – Ground Sensor Connection for Software Update (Laboratory)", page 65.

Figure 28: Software Update – Laboratory Installation

- Provide that the device and the software data loader match with CANbus speed settings.
- Detailed information about required equipment, wiring, FLS interface and update procedure can you find in "FLS Manual" (Field Loadable Software) included in accessories FLS6500-BXT Kit; see "Order Code" page 32.
- It is recommended as a minimum to perform "Mode S ground test (for details see "Mode S Ground Test", page 71).

Value	Option	Description	Connect P1-44 to
0	Disable	Use with installations where Weight-on-Wheels sensor, strut switch, etc. is not installed.	GND
1	Enable, active low	Use with installations where Weight-on-Wheels sensor, strut switch, etc. provides a "contact to electrical ground" state when on the ground.	GND
2	Enable, active high	Use with installations where Weight-on-Wheels sensor, strut switch, etc. provides a "contact to electrical power" state when on the ground.	supply (+28 V)

Figure 29: Table – Ground Sensor Connection for Software Update (Laboratory)

Details see "FLS Manual" (Field Loadable Software) included in accessories FLS6500-BXT Kit; see "Order Code" page 32.

The equipment enables Field Loadable Software (FLS) only at power-on when following conditions are provided:

- FLS function enable input is active.
- If "Weight-on-Wheels" input reports "on-the-ground" state see "Figure 29: Table – Ground Sensor Connection for Software Update (Laboratory) page 65.

NOTICE When in-field loading of software is enabled, the equipment does not perform normal operations.

To return to normal operation, deactivate FLS input and restart the device.

Details see "FLS Manual" (Field Loadable Software) included in accessories FLS6500-BXT Kit; see "Order Code" page 32.

2.10 Aircraft Wiring

SAFETY INSTRUCTIONS

Installation of the device varies according to aircraft and equipment design. It is therefore only possible to provide general guidelines in this section.

It is in the installers responsibility to verify pin numbers on equipment manufactured by other than Becker Avionics.

2.10.1 BXT65XX (dual) with Control Device G7614

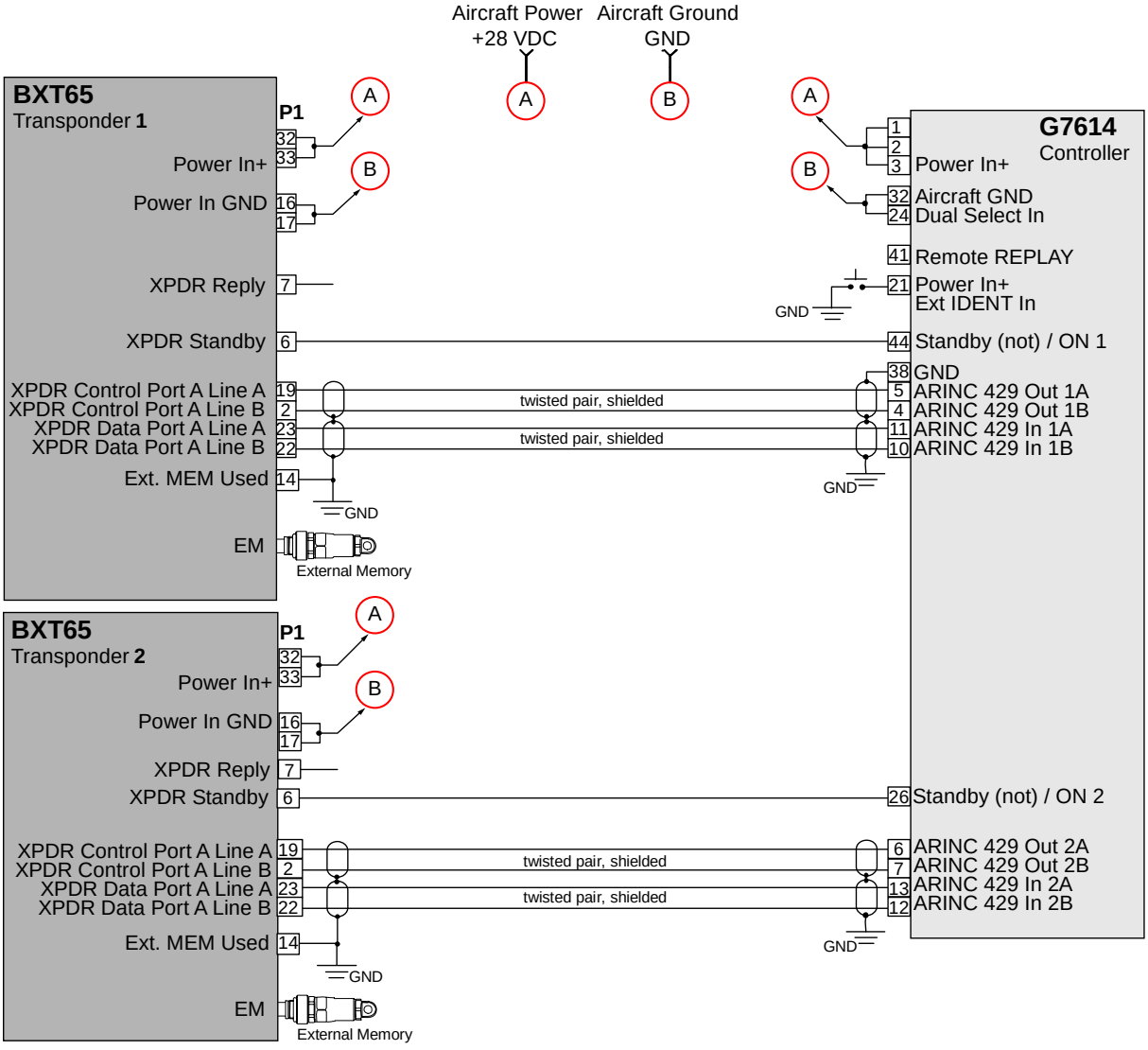


Figure 30: BXT65XX (dual) with Control Device G7614 (Gables)

2.10.2 BXT65XX with Control Device KFS 578A

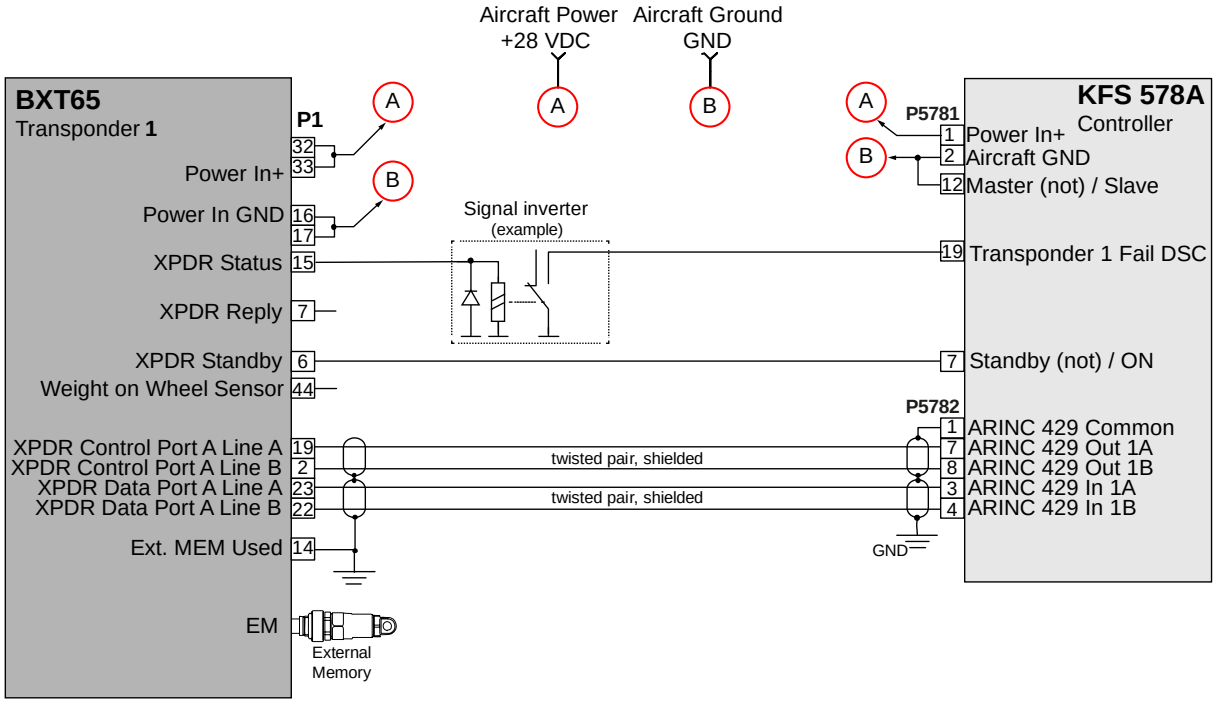


Figure 31: BXT65XX with Control Device KFS 578A (BendixKing)

2.10.3 BXT65XX with GPS Device GTN750

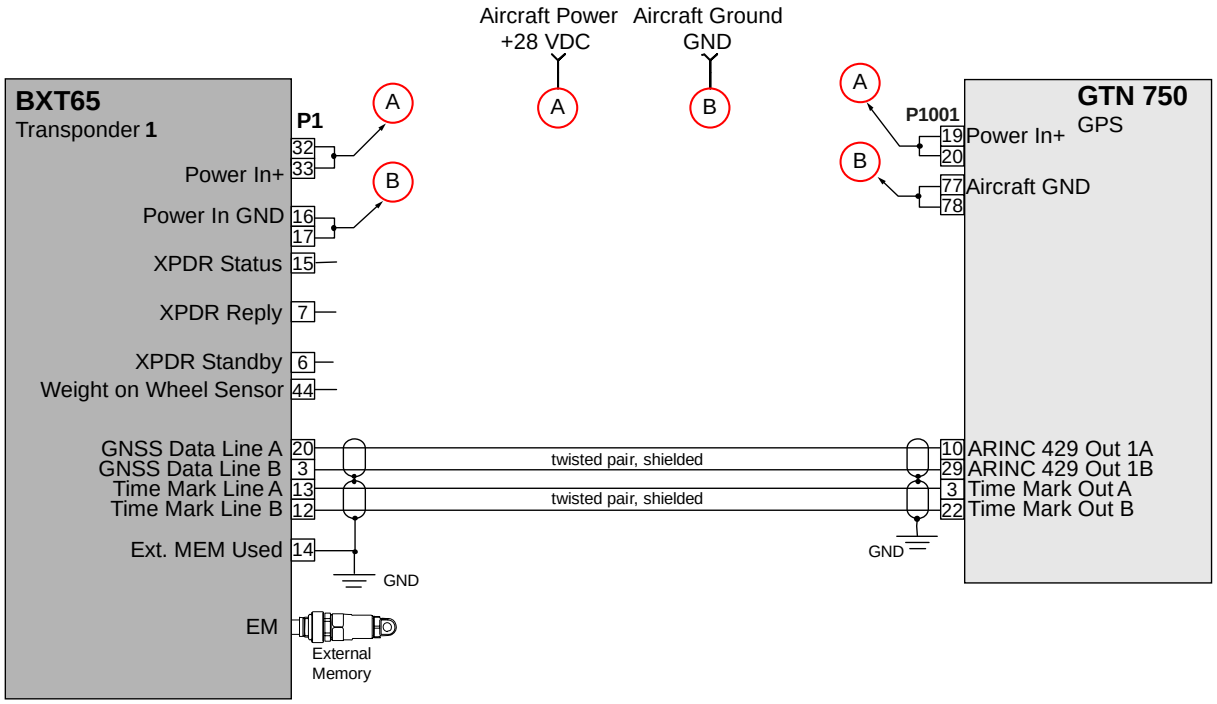


Figure 32: BXT65XX with GPS Device GTN750 (Garmin)

2.10.4 BXT65XX (dual) with GPS Devices 1203C

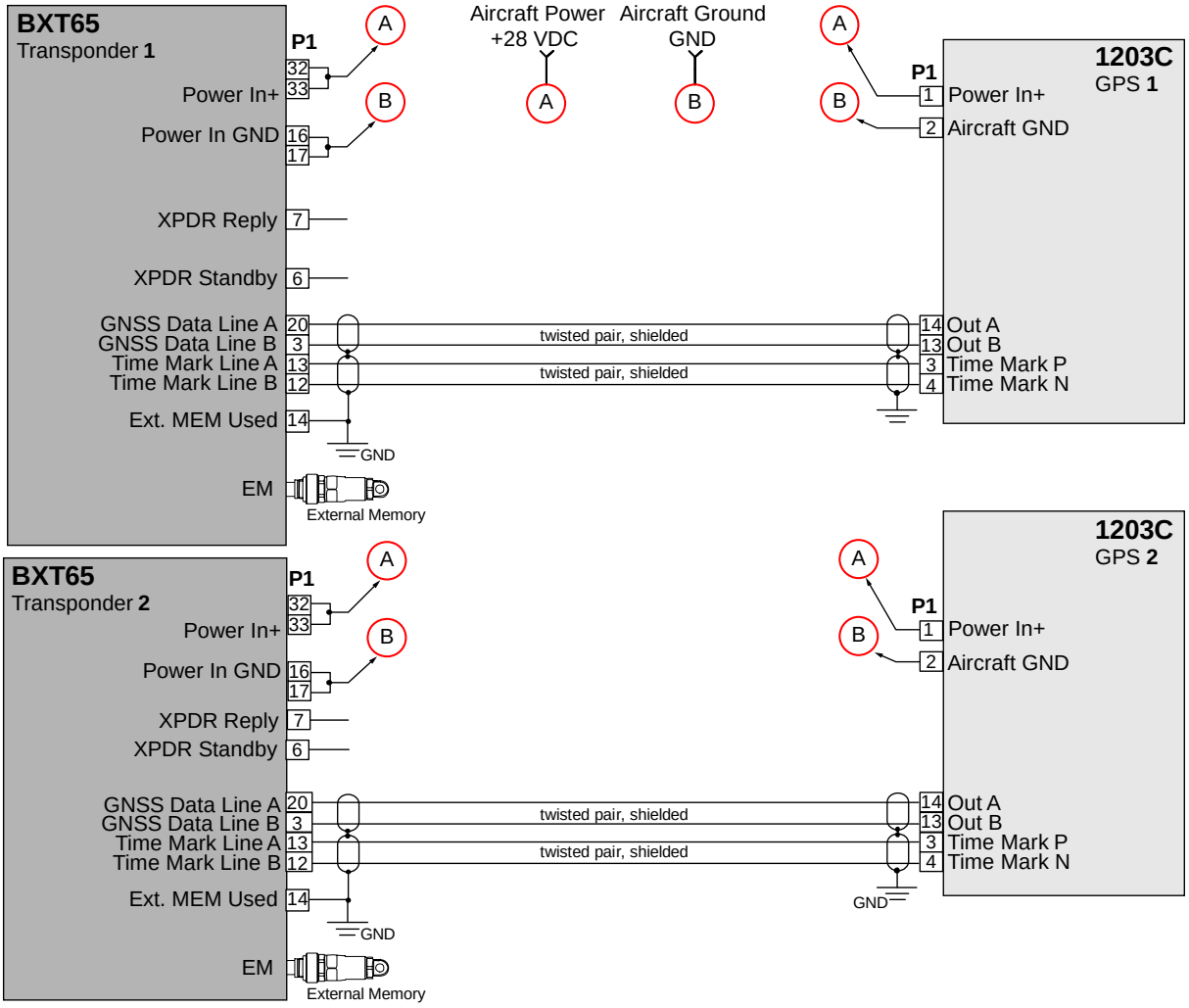


Figure 33: BXT65XX (dual) with GPS Devices 1203C (Freeflight)

2.10.5 BXT6553 (dual) with Control & TCAS Device CTA-81A, TPA-81A

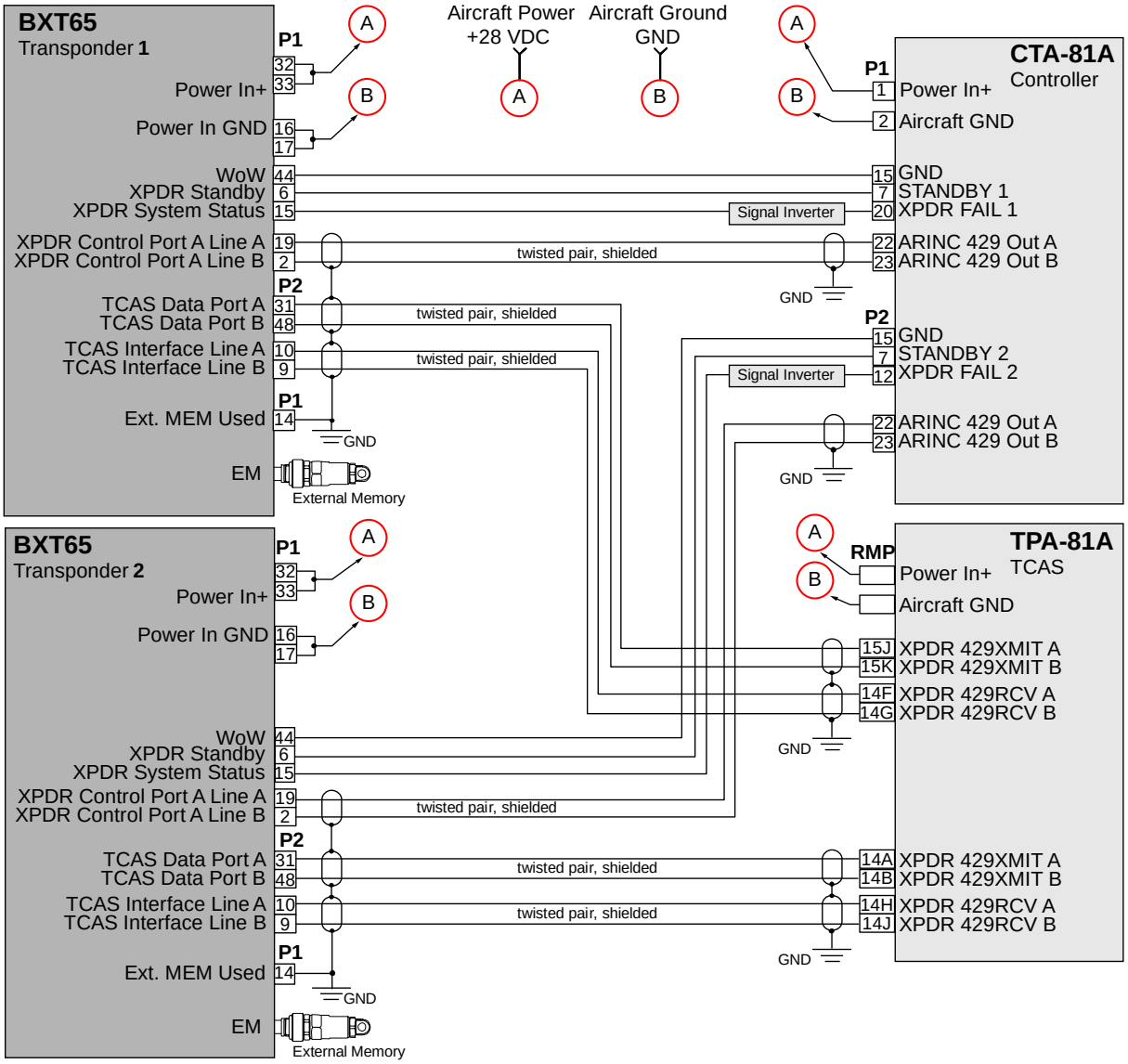


Figure 34: BXT6553 (dual) with Control & TCAS Device CTA-81A, TPA-81A

2.11 Post Installation Check

Once the device is installed completely a test procedure shall be started to verify system functionality. Ensure compliance with authority required procedures. The following text provides guidance for such tests.

2.11.1 Mechanical Installation and Wiring Check

- Verify all cables are securely fixed and shields connected properly to signal ground.
- Check the movement of aircraft controls to verify there is no interference.
- Verify all screws are tight, check if all connections are mechanically secured.

2.11.2 Power Supply

- Check the power supply lines and confirm correct polarity. Don´t apply reverse voltage!
- Confirm that the aircraft power supply is within the specified limits, with and without a running engine.
- Check LEDs (see "Meaning of Status LEDs" page 38).

2.11.3 Antenna Check

- Applying portable reflectometer or network analyzer measure the voltage standing wave ratio (VSWR) at the transponder end of antenna aircraft installation.
- The measured VSWR at frequencies 1030 MHz and 1090 MHz shall not exceed 1.5:1.

2.11.4 Interference Check

- Check the device while engine is running and powered on all other avionics/ electrical systems on the aircraft, to verify that no significant interference exists.
- Check also that the device does not cause significant interference with other systems.

The installer´s standard test procedure may be used for the interference check and the following table can be taken as a reference. Depending on the individual avionic systems installed in the aircraft, it might be necessary to extend the following checklist accordingly.

Aircraft System	**Function**	
	OK	**NOT OK**
DME		
Audio		
Generators / Inverters		
GPS System		
Compass 1		
ADF		
VHF / NAV 1 all channels		
VHF / NAV 2 all channels		
Marker Receiver		
Motor(s)		
Engine Instruments		
Storm scope		
Air Data Computer		
Autopilot and Servos		

For the remaining avionic equipment repeat all interference checks during a flight and include all equipment not previously checked out on ground.

2.11.5 Mode S Ground Test

After successful completion of the previously described post installation checks perform a Mode S ground test. (Refer to FAR 43 Appendix F or EASA CS-ACNS). The part 145 company approved test protocol shall finally be used.

An experienced test setup configuration shall also be arranged, otherwise refer to the user instruction of your specific test equipment.

2.11.6 Error / Failure Indication

It is possible to read out and reset error flags. For details contact Becker Avionics Customer Service.

For details about **Error / Failure List** contact Becker Avionics Customer Service.

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3 Operating Instructions

In this chapter you can read about:

3.1 Device Description

BXT65XX is a remote-controlled device, which does not include a control panel. It can receive commands and provides data through a set of interfaces.

3.1.1 Device Assignment

This manual is valid for the following devices:

- See page 36

3.1.2 Packing, Transport, Storage

- See page 35.

3.1.3 Scope of Delivery

- See page 36.

3.1.4 Type Plate

- See page 37.

3.2 Start-up

3.2.1 Built In Tests (BIT)

BXT65 series has advanced Built-In-Test. It monitors most of internal circuits against failures. In addition BIT monitors some external (installation) conditions to increase reliability. There are three types of BIT implemented:

- PBIT (performed after Power ON the device).
  The test routine PBIT checks:
  - System integrity,
  - Software integrity,
- IBIT (initiated by special command via ARINC protocol).
  The test routine IBIT checks:
  - Transmitter operation
- CBIT (which continuously check operation).
  The test routine CBIT checks:
  - Reply transmissions,
  - Squitter transmissions,
  - Transponder receiver operation,
  - Interfaces operation,
  - System integrity,
  - Equipment temperature,
  - Internal voltages.

3.2.2 Extended Temperature

The BXT6553 contains an internal heater which heats the device(s) at low temperatures.

- In case the internal temperature is below -40 °C during power-on of the device(s), the transponder remains switched off.
- As soon as the heater has increased the temperature above -40 °C the transponder is switched on.
  - During this period the transponders is inoperable and will supply an XPDR Fail signal.
- This period takes at maximum 20 minutes at nominal supply voltage.

3.3 Operating

3.3.1 Operating with OEM Controller

For detailed information please refer to the manual of the respective OEM product.

3.4 Read Out and Reset Error Flags

It is possible to read out and reset error flags.

This can be done by the connected OEM product, for detailed information please refer to the manual of the respective connected OEM product.

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4 Index

We reserve the right to make technical changes.
The data correspond to the current status at the time of printing.

***** End of the Document *****