

BECKER AVIONICS

Remote-Control Unit

RCU6513

**for Transponders of the
BXT6500 Series**

Installation and Operation

Manual DV19200.03

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Approved Production and Maintenance Organization

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

Preface

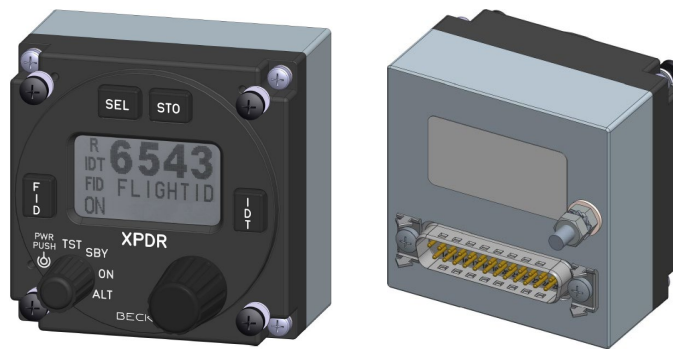
Dear Customer,

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.

Remote-Control Unit RCU6513*



RCU6513 (Remote Control Unit)

* design depends on variant.

* Some figures in this manual are for basic understanding and can be different to the actual design.

List of Effective Pages and Changes

Only technical relevant modifications are described in this table.

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List of Abbreviations

List of Abbreviations

AA	Aircraft Address
ADS-B	Automatic Dependent Surveillance-Broadcast
ALT	Altitude
AS	Altitude Source
AT	Aircraft Type
ATC	Air Traffic Control
AUX	Auxiliary
AWG	American Wire Gauge
BIT	Build-In Test
BRT	Brightness
CBIT	Continuous Build-In Test
EASA	European Aviation Safety Agency
ETSO	European Technical Standard Order
EUROCAE	European Organization for Civil Aviation Equipment
FAA	Federal Aviation Administration
FID	Flight Identifier
IBIT	Initiated Build-In Test
IDT	Identification
GND	Ground

List of Abbreviations

HMI	Human Machine Interface
MA	Maximum Airspeed
NVFR	Night Visual Flight Rules
NVG	Night Vision Googles
NVIS	Night Vision Imaging System
PBIT	Power-on Build-In Test
SBY	Standby
SEL	Selection
SRC	Source
STO	Store
TF	TufLok®, self-locking screws and threads
VFR	Virtual Flight Rules
XPDR	Transponder

Units


Units


A	Ampere
mA	Milliampere
°C	Degree Celsius
cm	Centimeter
cd/m ²	Candela Per Square Meter (1 cd/m ² = 1 nit)
dBm	Power Ratio In Decibel referenced to 1 mW
dB	Decibel
g	Gram
kg	Kilogram
kHz	Kilohertz
km/h	Kilometer Per Hour
kts	Knots
MHz	Megahertz
Mbps	Mega Bits Per Second
mm	Millimeter
mph	Miles Per Hour (statute mile 1 mile = 1609,344 m)
Nm	Newton Meter
NM	Nautical Mile (1NM = 1852,0 m)
Ohm (Ω)	Resistance
s	Second
V	Volt
mV	Millivolt
VDC	Voltage Direct Current
W	Watt
mW	Milliwatt


Units


"	Inch
°	Angular degree


General Safety Definitions

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

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

 **CAUTION** Indicates a hazardous situation which, if not prevented, 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 specified safety-related instructions or procedures.

Disposal

⚠ CAUTION The packaging material is inflammable, by burning toxic fumes may develop.

This product contains materials that fall under the special disposal regulation. We recommend the disposal of such materials in accordance with the current environmental laws.

- Dispose circuit boards by a technical waste dump which is approved 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. Part 145) which shall also examine the installation.

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.
- Install the devices according to the instructions.
We cannot give any guarantee for other methods.

Conditions of Utilization

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 instructions which you ought to follow closely during installation and operation.

Otherwise all claims under the warranty will become void and a decreased 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 19.

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

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This manual describes the Becker Becker Remote Control Unit RCU6513. The type plate on your device shows the part number for identification purposes (see "Type Plate", page 28).

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

Introduction

1.1 Introduction

The technical information in this document applies to the described product and variants of RCU6513-(XXX).

- We also use the term RCU6513 and for the transponder BXT6500 or BXT65XX for descriptions instead writing the complete model number.
- If a description refers to only one of the product variants its full name is used or it is specified accordingly.

The manuals “Maintenance and Repair” (**M&R**) and “Installation and Operation (**I&O**) contain the sections:

Section	DV19200.04 M&R	DV19200.03 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

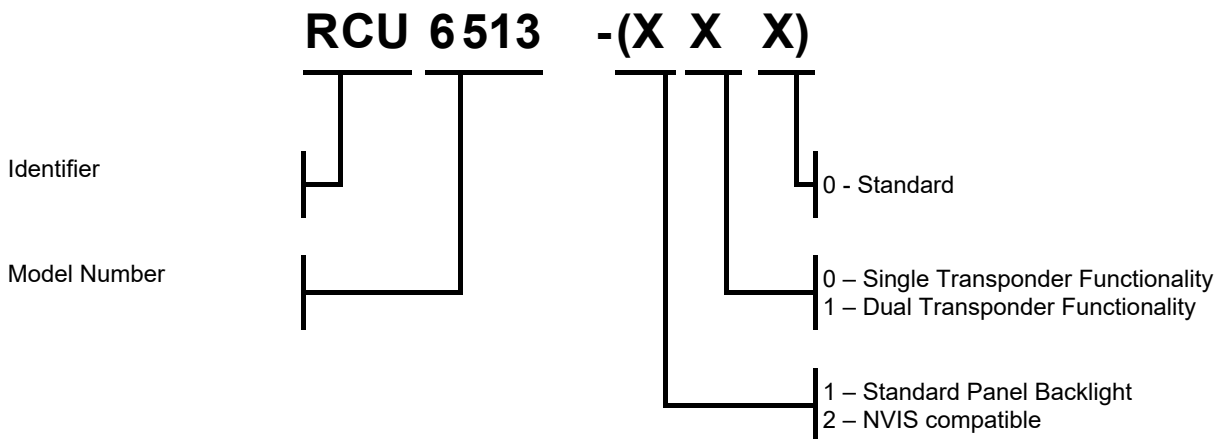
1.2 Purpose of Equipment

The Becker Remote Control Unit RCU6513 is made to operate with the transponders of the BXT6500 series.

Primary intended function of RCU6513 is to provide HMI (Human Machine Interface) for interaction between users and transponder.

- The RCU6513 is made for installation in the instrument panel of an aircraft.
 - The dimensions correspond to the standard for instruments 58 mm (2¼ inch).
- Installation with standard supply 28 VDC.
- The RCU6513 can operate at emergency voltage of 18 V without any degradation of performance.
- Possibility to operate with two RCU6513 in Tandem mode (synchronized operation/view, both show the same information).
- Different built-in tests examine the correct operation of RCU6513 and transponder.

1.3 Variants Overview



1.3.1 Software Status

Descriptions see "Software/Firmware Status – Functionality", page 28.

1.4 Associated Devices

These devices can operate with RCU6513:

Device	Function
BXT6513	Becker Avionics Remote-Controlled Transponder
BXT6553	Becker Avionics Remote-Controlled Transponder

This manual describes the RCU6513 from Becker Avionics. For other devices please refer to the related manuals.

1.4.1 Overview

Example:

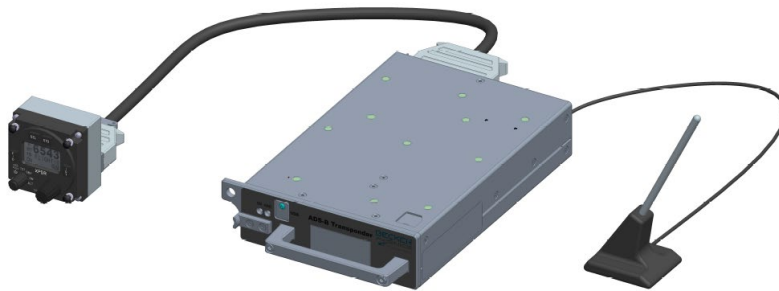


Figure 1: Application - RCU6513 + BXT65XX + Antenna

1.5 Scope of Functionality

- The RCU6513 is a compact and lightweight device.
- All controls and indicators are on the front panel.
- The equipment connector is at the rear side of the device.
- Installation with four screws (rear panel installation).
- The dimensions correspond to the standard instrument diameter of 58 mm (2¼ inch).



Figure 2: RCU6513 Remote Control Unit*

* design depends on variant.

1.5.1 Illumination

The illumination of LCD and push buttons can be controlled.

- Direct control from the front panel (via the user menu).
- External control via the dimming input lines.
 - With external dimming application the illumination curve (brightness to voltage relation) is adjustable in configuration setup.

1.5.2 Emergency Operation

The RCU6513 can operate at emergency voltage of 18 V without any degradation of performance.

1.5.3 Tandem Operation

- The tandem mode is for operation of two controllers at the same time (depends on configuration).
 - Operation of one or two transponder.
- In tandem mode the operation and view are synchronized, both RCU6513 show the same information.
- The data exchanged between the two RCU6513 is done over ARINC 429 interface and dedicated protocol.

1.5.4 Antenna Switch Monitor

The RCU6513 has the function of monitoring the antenna switch. It can be used as an additional status information in installations with two transponders where the antennas are connected with a special RF switch.

- In these installations discrete output(s) of the RCU6513 are used to control antenna switch.
- When the selected transponder does not match RF appropriate switch state, the RCU6513 display shows the transponder number flashing.

1.5.5 Interfaces

ARINC 429:

- The RCU6513 uses the ARINC 429 interface for communication with another RCU6513 and the transponder.
- This interface is capable of receiving and transmitting serial asynchronous data.

RS422:

- The RCU6513 has a RS422 service interface for maintenance work.

1.5.5.1 Status and Control Ports

The RCU6513 has different status and control ports for operation and indication of system states.

Ports to/for e.g.:

- Transponder operation mode on, standby and altitude.
- Self-test of RCU6513 and transponder.
- Transponder ATC code.
- Mode S Address.
- Emergency code.
- Flight ID.
- Identity (IDT).
- Transponder reply status.
- Altimeter data.
- Flight Level.
- Maximum air speed and aircraft category.
- RCU6513 tandem mode.
- Selection of transponder in operation (in dual transponder configuration).
- Error status of RCU6513 and transponder.
- Reset of RCU6513 and transponder errors.

1.5.6 Configuration

The RCU6513 has password protected "Configuration Mode" to do the configuration work.

1.5.7 Built-in Tests (BIT)

The RCU6513 has advanced Built-In-Test to examine the RCU6513 and the transponder. It monitors most of internal circuits against failures. In addition, BIT monitors some external (installation) conditions to increase the reliability of RCU6513 and BXT65XX.

There are different types of BIT:

- PBIT (starts after Power ON the RCU6513 and BXT65XX system).
- IBIT (on-request test initiated by special command).
- CBIT (which continuously examines controller and transponder operation).

1.6 Safety-Conscious Utilization

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

SAFETY INSTRUCTIONS

- The installation of the device into an aircraft may be carried out only by an authorized installation company. The country regulations always have to be obeyed.
- Use the product only in the specified conditions, see "Technical Data", page 20.
- Power supply:
 - Do not connect the device to AC sources.
 - Make sure that the device is connected to the mandatory DC source, see "Technical Data", page 20.
 - Do not connect the device with reversed polarity to the DC source.
- Circuit breaker:
 - Use the applicable fuses in the power supply line for protection of the application, see "Technical Data", page 20.

NOTICE

Cleaning:

- Do not use aggressive cleaning agents e.g. Acetone.
 - These cleaning agents can cause damages.

NOTICE

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

Do not power-on the device during engine start or shutdown.

1.7 Restriction for Use

SAFETY INSTRUCTIONS

The product is to be used inside the declared limits.

Technical Data

1.8 Technical Data**1.8.1 General Characteristics**

RCU6513	Specifications	Variants
Normal power supply	22.0...30.3 VDC	all variants
Extended power supply	20.5...32.2 VDC	all variants
Emergency operation voltage (with BXT65XX)	18.0...20.5 VDC (no performance degradation)	all variants
Typical power consumption Power OFF Max. power consumption	≤ 2 mA ≤ 80 mA	all variants
Dimming control	0...14 VDC or 0...28 VDC	all variants
Illumination color (display and buttons)	White	-(1XX) variants
	NVIS (Green B)	-(2XX) variants
Device protection (internal fuse)	2 A	all variants
Recommended external fuse protection	3 A	all variants
Storage temperature range	-55...+85 °C	all variants
Operating temperature range	-20...+55 °C, short time +70 °C	all variants
Operating altitude	35 000 ft	all variants
Vibration	Category S (Curve M) Category U (Curve G)	all variants
Control interface	ARINC 429	all variants
Status interface (transponder to RCU6513)	ARINC 429 or discrete in-, output	all variants
Dual XPDR control	Control of two XPDR by one RCU6513	-(X1X) variants
Tandem mode	Two RCU6513 control one XPDR	all variants

1.8.2 Dimensions & Weight

RCU6513	Specifications
Dimensions HxW	61 x 61 mm (2.4 x 2.4 inch)
Depth of device	70.7 mm (2.59 inch)
Mounting depth	49.7 mm (1.95 inch)
Weight	0.180 kg (0.40 lbs)
Mounting	Rear panel, Ø 58 mm (2¼ inch)
Material	AlMg/Plastic
Panel color	Control-head coated with black matt paint

1.8.3 Software

In accordance with EUROCAE / RTCA document ED-12C/DO-178B the software is specified as:

LEVEL C

1.8.4 Hardware

The RCU6513 devices do not contain Complex Electronic Hardware (CEH).

1.8.5 Continued Airworthiness

- The RCU6513 maintenance is specified as "on condition" only.

1.8.6 Environmental Conditions

The tests were done in accordance with ED-14G/DO-160G under consideration of the recorded environmental categories and conditions:

Environmental Condition	Section	Cat.	Remarks
Temperature and Altitude	4	C4	
Ground Survival Low Temperature	4.5.1	C4	-55 °C
Short-Time Operating Low Temperature	4.5.1	C4	-20 °C
Operating Low Temperature	4.5.2	C4	-20 °C
Ground Survival High Temperature	4.5.3	C4	+85 °C
Short-Time Operating High Temperature	4.5.3	C4	+70 °C
Operating High Temperature	4.5.4	C4	+55 °C
In-flight Loss of Cooling	4.5.5	-	No forced cooling required
Altitude	4.6.1	C4	35 000 ft
Decompression	4.6.2	C4	N/A
Overpressure	4.6.3	C4	N/A
Temperature Variation	5	B	5 °C per minute
Humidity	6	A	Standard
Shock and Crash Safety	7	B	Fixed-wing and helicopter, standard
Vibration	8	S U	Curve M for fixed-wing aircraft Curve G for helicopters
Explosion Atmosphere	9	-	N/A
Waterproofness	10	Y	-
Fluids Susceptibility	11	-	N/A
Sand and Dust	12	-	N/A
Fungus Resistance	13	-	N/A
Salt Fog	14	-	N/A
Magnetic Effect	15	Z	1° deflection at 0.3 m
Power Input	16	B	28 VDC installations with battery of significant capacity
Voltage Spike	17	A	High degree of protections against voltage spikes

Technical Data

Environmental Condition	Section	Cat.	Remarks
Audio Freq. Conducted Susceptibility	18	B	DC installations with battery of significant capacity
Induced Signal Susceptibility	19	ACX	Primary power DC
Radio Frequency Susceptibility	20	RW	Interim high intensity radiated fields
Emission of Radio Frequency Energy	21	M	Equipment where interference should be controlled to a tolerable level
Lightning Induced Transients Susceptibility	22	A3 E3 XX	Pin test waveform A, level 3 Cable bundle test waveform E, level 3 No cable bundle multiply burst test
Lightning Direct Effects	23	-	N/A
Icing	24	-	N/A
Electrostatic Discharge (ESD)	25		Equipment operated in an aerospace environment
Fire, Flammability	26	-	N/A

1.8.7 Certifications

SAFETY INSTRUCTIONS

Unauthorized changes or modifications to the RCU6513 may void the compliance to the required regulatory agencies and authorization for continued equipment usage.

RCU6513 certification:

Number	Description
EASA.210.10073394	in accordance with Commission Regulation (EU) No. 748/2012, Part 21, Section A, Subpart O and ETSO C112e, C166b

The RCU6513 in functional use with remote controlled Mode S Transponder BXT65XX-() meets the requirements of:

Number	Description
ETSO-C112e	Secondary Surveillance Radar Mode S Transponder
ETSO-C166b	Extended Squitter Automatic Dependent Surveillance-Broadcast (ADS-B) and Traffic Information Services-Broadcast (TIS-B) Equipment Operating on the Radio Frequency of 1090 MHz

NOTICE

The RCU6513 does not influence the receiver and transmitter performance data. By this, corresponding tests were not performed for qualification of RCU6513.

1.9 Order Code

1.9.1 RCU6513

Qty	Device	
1	RCU6513-(100): Single Transponder Functionality	Article-No. 0657.311-915
1	RCU6513-(110): Dual Transponder Functionality	Article-No. 0659.983-915
1	RCU6513-(200): NVIS compatible, Single Transponder Functionality	Article-No. 0658.235-915
1	RCU6513-(210): NVIS compatible, Dual Transponder Functionality	Article-No. 0659.991-915

1.9.2 Accessories

Qty		
1	CK4401-S (soldering version); <ul style="list-style-type: none"> Dsub25-s, Connector housing, Label "XPDR" 	Article-No. 0552.801-954
1	CK4401-C (crimp version); <ul style="list-style-type: none"> Dsub25-c, Connector housing, Label "XPDR" 	Article-No. 0552.798-954

1.9.3 Spare Parts

Qty	Device	
4	PHILLIPS head screw black (for rear panel installation)	Article-No. 0868.590-203

1.9.4 Documentation

Qty	Documentation	
1	(I&O) RCU6513 Installation and Operation manual, English	Article-No. 0668.427-071
1	(M&R) RCU6513 Maintenance and Repair manual, English	Article-No. 0668.435-071

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2 Installation

This manual must be available during performance of all tasks.

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.

Any deviations from the instructions in this document are under own responsibility.

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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.

Keep the packaging material and use it 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 put the device on. The electric connections may not be damaged when placing the device.

First Device Checkup

- Do a check for signs of damages.
- Please make sure that the indications on the type plate agree with your purchase order.
- Make sure that the equipment is complete ("Scope of Delivery", page 27).

Storage

If you do not 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.

Storage temperature see "Technical Data, General Characteristics" page 20.

2.2 Device Assignment

This manual is valid for the devices:

- RCU6513-(XXX) + accessories.

Upwards from Software Version
SCI1109S305 Version 1.04

2.2.1 Scope of Delivery

- Manuals
 - Installation and Operation manual.
- Device as ordered.
- Documents of Certifications Authorized Release Certificate (EASA Form 1).

2.2.2 State of Delivery

- The RCU6513 is delivered with factory default settings.
 - Please configure the device(s) with the help of the configuration menu.

2.2.3 Additional Equipment

- Connector kits.

Details see "Accessories", page 23.

2.2.4 Type Plate

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

Example:

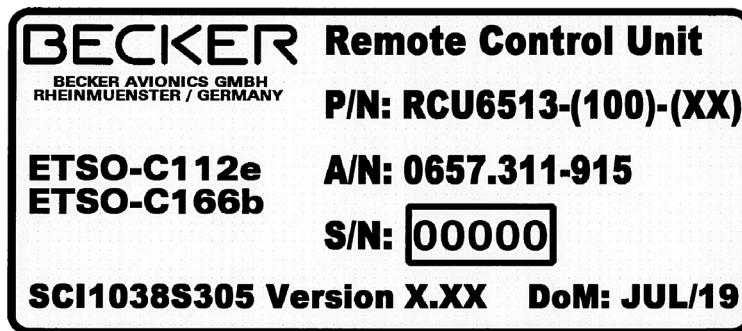


Figure 3: Type plate (example)

Explanation:

P/N:	Type designation: RCU6513 = Remote Control Unit 58 mm (2¼ inch) Options: -(1XX): Standard lighting (white) -(2XX): NVIS compatible illumination (green) -(X0X): Single transponder functionality -(X1X): Dual transponder functionality -(XX0): Standard -(XX): Modification Index e.g. RCU6513-(100)-(06)
S/N:	Unique number of the particular device
A/N:	Article number
DoM:	Date of Manufacturing
	Software: Refer to the version on the device type plate
	Compliance and Certifications: Refer to the text and logos on the device type plate

2.2.5 Software/Firmware Status – Functionality

- The software/firmware version can be checked in the display via the configuration menu.
- The versions are subject to change without notice.

2.3 Installation 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.

SAFETY INSTRUCTIONS

The installation of RCU6513 into an aircraft may be carried out by an authorized installation company. The country regulations always have to be obeyed.

- The device must not be opened.
- The installation area must have a minimum distance of 30 cm from the magnetic aircraft compass, to prevent any interference to the magnetic compass.
- Forced cooling is not required.

SAFETY INSTRUCTIONS

RCU6513 is made for installation in cockpit environment of fixed and rotary wing aircraft.

These limitations apply for the installation:

- The installation must be in accordance with the local aviation authority approved guidelines (e.g. EASA, FAA).
- The personnel installing this device must make sure that the aircraft installation conditions are in the ETSO/TSO standards applicable for the specified type or class of aircraft.
- The equipment is not qualified for installation in areas with fluid contamination.
- 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

- Use only cables which are qualified for aircraft use (self-extinguishing).
- Use AWG 20 for power supply and AWG 22/24 for other cables.
- 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.
- HF cable should not be included in the cable harnesses.
- Use the applicable fuses in the power supply line for the protection of the application, see "Technical Data", page 20.

⚠ CAUTION

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

2.3.1 Rear Panel Installation

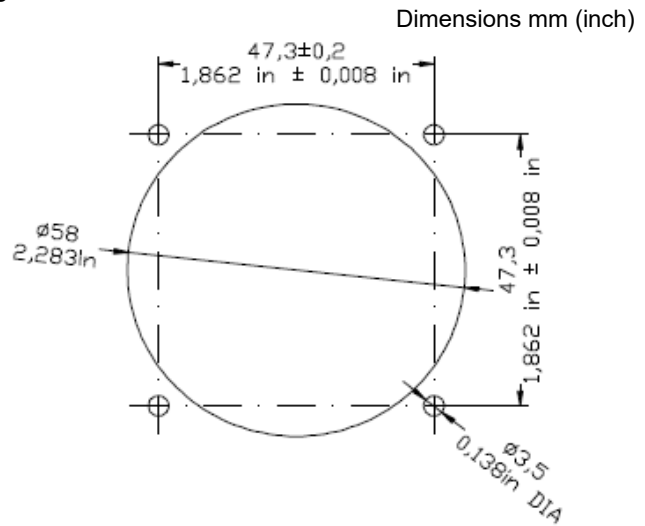
- The RCU6513 is made for rear panel installation.
 - The four screws for installation are already attached at the front of the device.
 - For circular cut out and mounting holes see "Figure 5: Drilling Template -Rear-Panel Installation" page 30.
 - A minimum torque for fixing screws is 0.9 Nm (8 inch-lbs).
 - More information please see: "Dimensions - RCU6513" page 31.



61x61 mm (2.4x2.4 in)

Figure 4: RCU6513 (front view)*

* design depends on variant.



(no scale drawing)

Figure 5: Drilling Template -Rear-Panel Installation

2.4 Dimensions

2.4.1 RCU6513

Dimensions mm (inch)

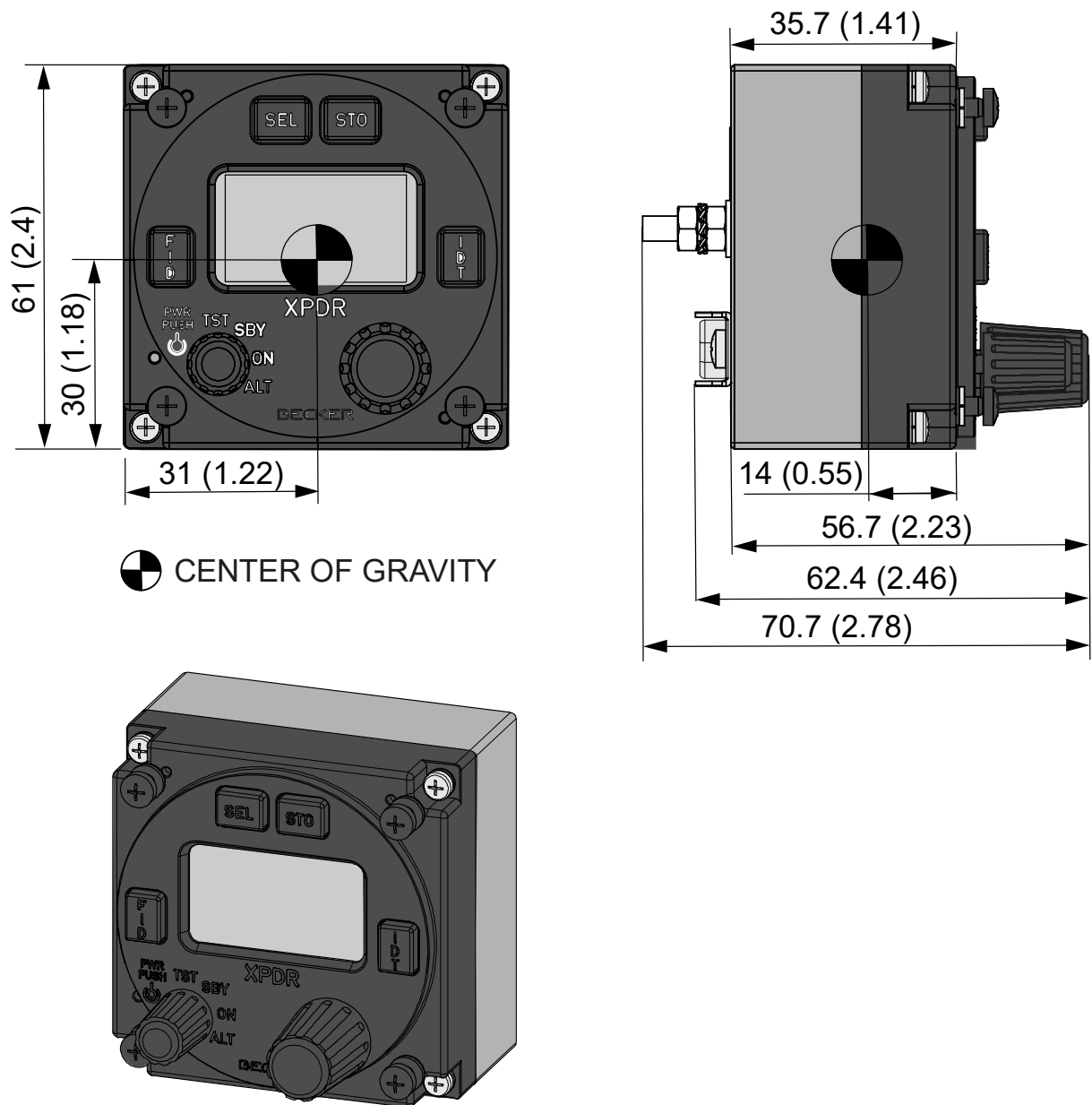


Figure 6: RCU6513*

* design depends on variant.

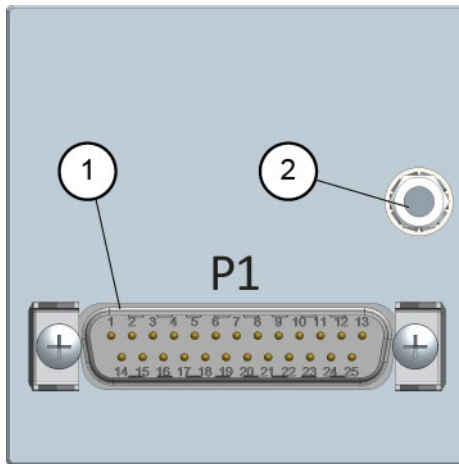
NOTICE "Center of Gravity" Tolerance: ± 5 mm.

Permitted 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 Connector Pin Assignments

2.5.1 Connector P1

- Type: 25pin D-Sub male connector with slide-in fastener.



- ① Device connector (P1)
- ② Grounding bolt

Figure 7: RCU6513 – Connector Layout

P1 Pin	Signal name	Default Function	Function	I/O	Remarks
1	PWR_IN	Supply voltage (+)	--	I	
2	GND_PWR	Supply return (-)	--	--	
3	GPI_AV	XPDR system status input	Applied Voltage /ARINC718/ Discrete	I	Connected to CRDY output from XPDR
4	GND	Ground	--	--	Signal ground for discrete inputs
5	/GPI_1	XPDR reply report input OR Emergency input OR Antenna status input	Switch Closure Discrete	I	Selectable function discrete input.
6	GND	Ground	--	--	
7	/GPI_2	XPDR ADS-B out function status input OR Emergency input OR External Ident	Switch Closure Discrete	I	Selectable function discrete input.
8	GND	Ground	--	--	
9	/GPI_3	Night / Day selector OR External Ident	Switch Closure Discrete	I	Selectable function discrete input.
10	GND	Ground	--	--	Signal ground for discrete inputs

P1 Pin	Signal name	Default Function	Function	I/O	Remarks
11	/SRV_EN	Service mode activation OR Firmware upgrade mode activation	Switch Closure Discrete	I	factory only
12	GND	Ground	--	--	
13	ILLUM	Illumination +	14/28 VDC	I	This signal is referenced to GND
14	/GPO_1	Indicates selected XPDR (antenna transfer out)	Switch Closure	O	Selectable function discrete output.
15	/GPO_2	Indicates selected XPDR (opposite logic in relation to /GPO_1)	Switch Closure	O	Selectable function discrete output.
16	AUX_IN_B	Control interface receive signal B from second XPDR	ARINC 429	I	
17	AUX_IN_A	Control interface receive signal A from second XPDR	ARINC 429	I	not for variant -(X0X)
18	CTRL_OUT_B	Control interface transmitter B output to XPDR	ARINC 429	O	not for variant -(X0X)
19	CTRL_OUT_A	Control interface transmitter A output to XPDR	ARINC 429	O	
20	CTRL_IN_B	Control interface receive signal B from first XPDR	ARINC 429	I	
21	CTRL_IN_A	Control interface receive signal A from first XPDR	ARINC 429	I	
22	SRV_RX+	Service Interface non-inverting input for receiver	TIA-422	I	factory only
23	SRV_RX-	Service Interface inverting input for receiver	TIA-422	I	factory only
24	SRV_TX+	Service Interface non-inverting output for transmitter	TIA-422	O	factory only
25	SRV_TX-	Service Interface inverting output for transmitter	TIA-422	O	factory only

2.6 Installation and Configuration

The minimum installation for the RCU6513 is:

- Power supply.
- BXT65XX transponder.

2.6.1 General Requirements

- For general instruction e.g. installation distance, cable types etc. please see "Installation Requirements" page 29.
- Type-specific cable harnesses are also available for the aircraft wiring (see "Accessories", page 23).
- No RF antenna cables or HF cables should be included in the cable harnesses of the system.
- Prevent routing of the cable harness along with other wiring, which carry audio power or pulses.

⚠ CAUTION

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

2.6.2 Operation Modes

The operation mode of the transponder can be set with the mode encoder (5) on the RCU6513. These modes are available:

- TST: Starts a self-test.
 - The display shows the field "TST" for a short time, after that the indication "IBIT IS RUNNING..." is on display.
 - The display shows "IBIT IS RUNNING..." while the BXT65XX reports test in progress status over ARINC 429 interface.
 - In installations without ARINC 429 interface from BXT65XX to RCU6513, the message disappears after 5 s and the display shows the previously selected mode of operation.
- SBY: Standby, the transponder does not reply any interrogations.
 - The display shows the field "SBY".
 - RCU6513 sends a standby mode command to BXT65XX over ARINC 429 interface.
 - BXT65XX changes to standby mode and do not reply any interrogations.
- ON: The transponder is in operation.
 - The display shows the field "ON".
 - RCU6513 sends an ATC mode command to BXT65XX over ARINC 429 interface.
 - BXT65XX disables the transmission of altitude and location information to the ground stations and is in ATC mode of operation.
- ALT: The transponder sends the altitude information.
 - The display shows the field "ALT".
 - RCU6513 sends an alt mode command to BXT65XX over ARINC 429 interface
 - BXT65XX enables the transmission of altitude to the ground stations.
 - The display shows the selected altitude source and the flight level (reported by BXT65XX, if the data is sent to RCU6513).

2.6.3 ARINC 429 Interface

For installations with an existing ARINC 429 status interface from BXT65XX to RCU6513, the RCU6513 do a data integrity check between the devices.

The test is about:

- Outgoing XPDR mode commands sent by RCU6513.
- Incoming XPDR mode status reported by BXT65XX.

If there are differences between the requested XPDR mode and the reported data, the XPDR mode parameter on the display flashes.

It is the information to show incorrect system behavior. It is applicable for all interchangeable parameters by RCU e.g.: XPDR Mode, ATC Code, Flight ID, Altitude Source, XPDR in operation (XPDR selection in dual XPDR installation).

2.6.4 Discrete In-/Outputs

Discrete inputs:

- Interfaces to give additional discrete information to the RCU6513.
- The functionality of each pin is configurable.

Discrete outputs:

- The discrete outputs are used to control the XPDR antenna switch.
- The discrete outputs can be used as an independent interface to set the standby mode of the XPDR not in operation.
- In RCU6513-(X0X) the discrete outputs have no effect.
- In RCU6513-(X1X) the state of the discrete outputs depends on the selected XPDR.

2.6.5 Illumination

- The push-buttons and LCD display of RCU6513 can be illuminated.
- The illumination can be configured in the configuration setup through front panel or externally via pin P1-13/P1-12.
- For external configuration connect pin P1-12 to system ground and pin P1-13 to dimming voltage bus.

2.6.6 Emergency Code Activation

The RCU6513 can start and send the emergency ATC code 7700 to BXT65XX through ARINC 429 interface (discrete input).

- This function depends on installation and configuration.
- This function must be hardwired.

2.6.7 Antenna Switch

The RCU6513 can monitor the antenna switch (discrete output). It can be used as additional status information in dual transponder installations where the antennas are connected to the related transponder with e.g. a RF switch.

- This function depends on installation and configuration.
- This function must be hardwired.

The transponder indication field on the display flashes when the selected transponder does not match RF related switch state.

2.6.8 Customized Applications

Customized applications and wiring and configuration adjustments.

Applications	Reference
Single RCU6513 and Single BXT65XX	page 51
Dual RCU6513-(X0X) and Single BXT65XX (Tandem)	page 53
Single RCU6513-(X1X) and Dual BXT65XX	page 56
Dual RCU6513-(X1X) and Dual BXT65XX	page 59


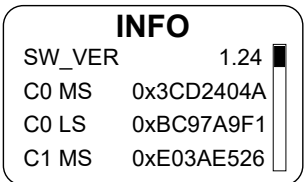
2.7 Configuration

The configuration mode is for the configuration of installation and device parameters.

NOTICE We do not recommend to do changes on the configuration setup in-flight.

NOTICE Some functions and settings are only available through the password-protected "Configuration Mode".

2.7.1 Start Configuration Mode

 <p>Figure 8: Config. - "PASSWORD"</p>	<ul style="list-style-type: none"> • Push and hold the "SEL" key during power up. <ul style="list-style-type: none"> ○ The configuration setup starts. ○ The display shows the screen "PASSWORD". • Insert the 4-digit numerical code password "6435" by turning and pushing the rotary encoder. • Push the "STO" key to confirm the entry.
 <p>Figure 9: Config. - "INFO"</p>	<ul style="list-style-type: none"> • The first page of configuration setup shows the "INFO" screen.

2.7.1.1 Navigate between Pages

- Page Down (next page):** • **Push the rotary encoder or "IDT" key.**
- Page Up (previous page):** • **Push "FID" key.**

Details about the configuration pages see:

"Figure 10: RCU6513 - Configuration Menu (Part01)" page 38 and

"Figure 11: RCU6513 - Configuration Menu (Part02)" page 39.

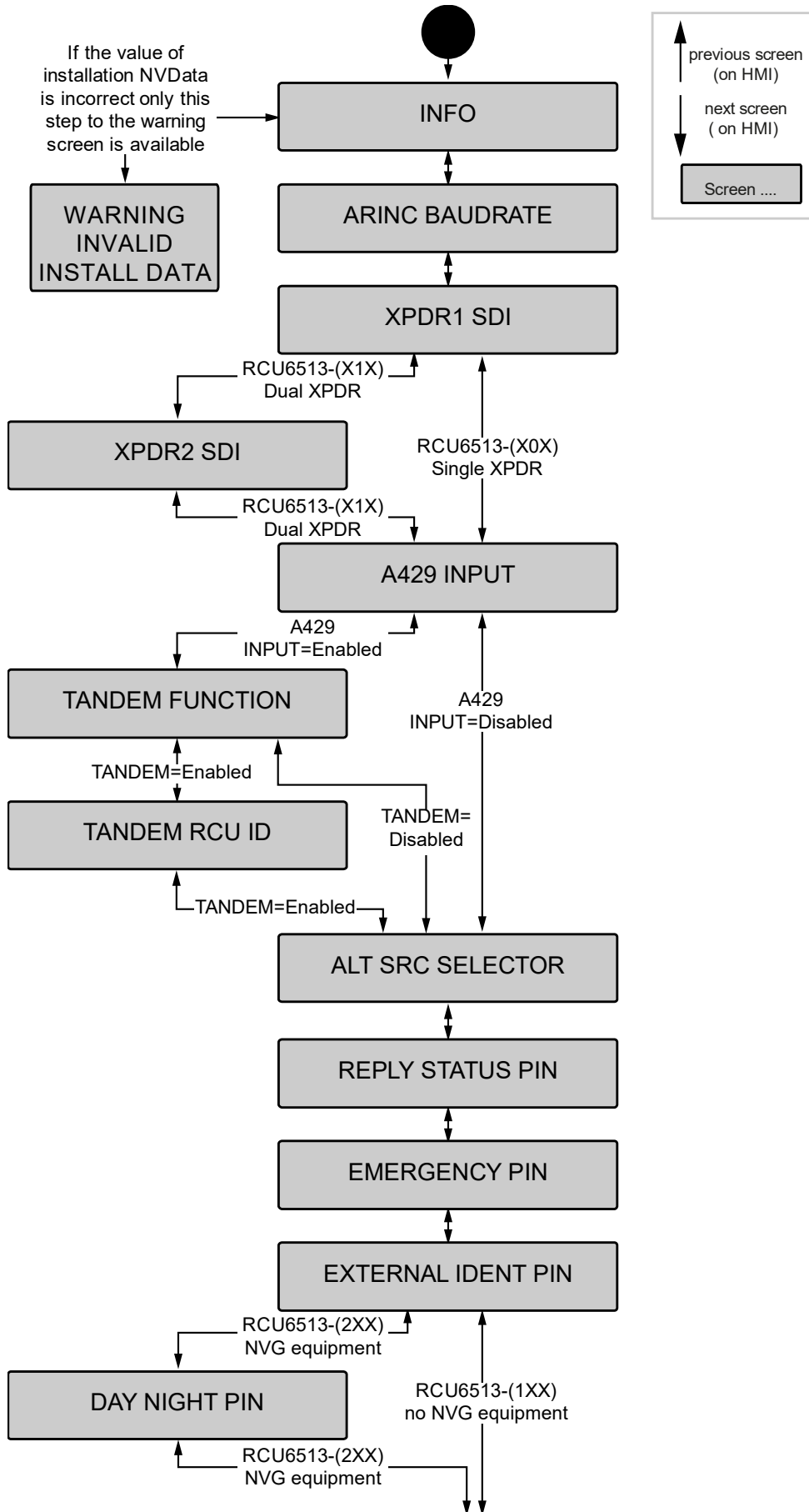


Figure 10: RCU6513 - Configuration Menu (Part01)

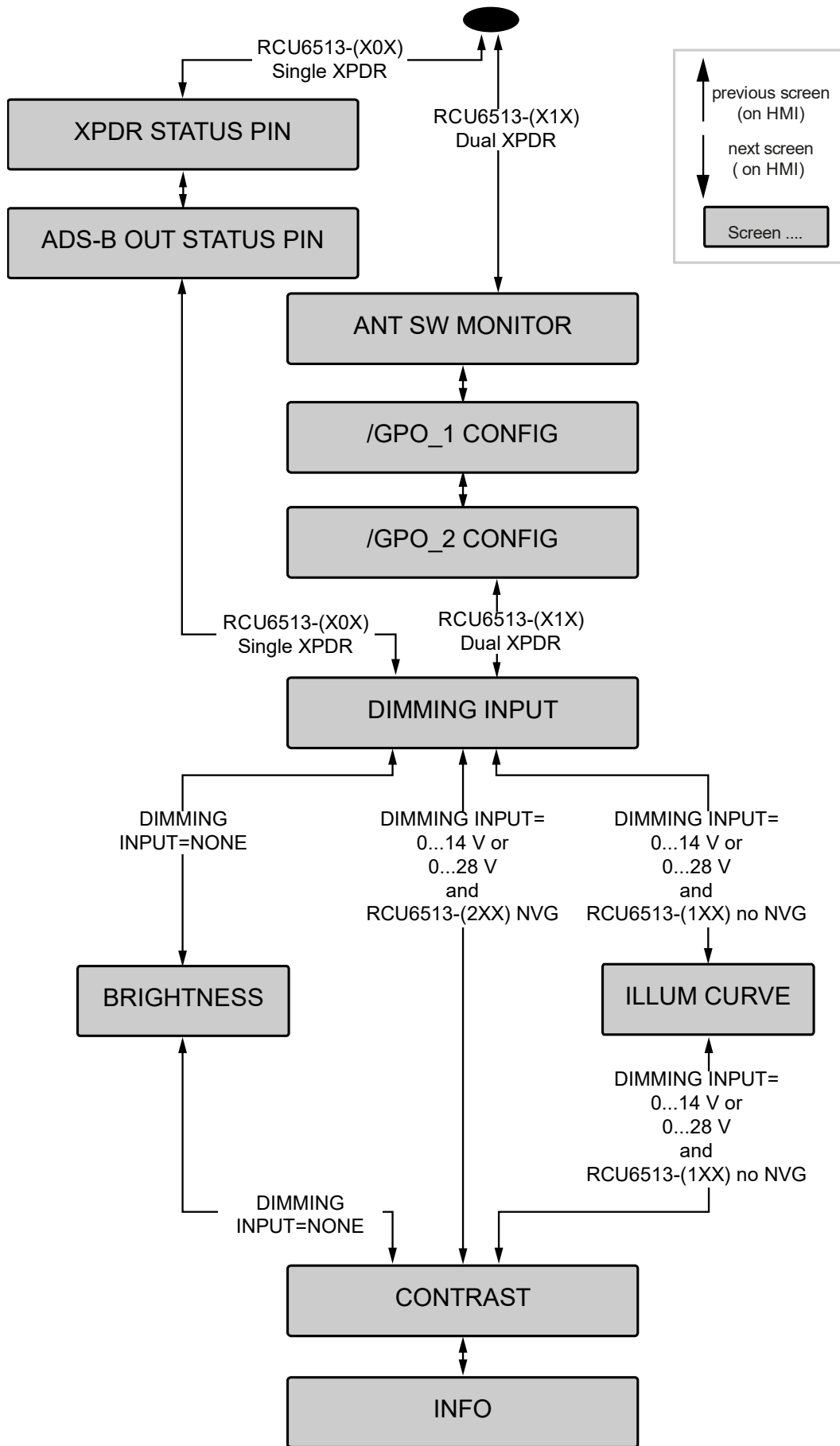
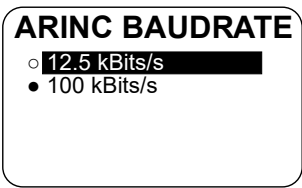
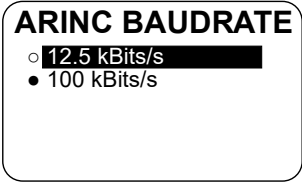
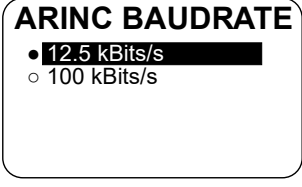


Figure 11: RCU6513 - Configuration Menu (Part02)

2.7.1.2 Select and Store Parameter Values

 <p>Figure 12: Config. - Selected value</p>	<ul style="list-style-type: none"> The change of any parameter is stored immediately. The black filled circle in front of the row shows that this value is selected.
 <p>Figure 13: Config. - New Selection</p>	<ul style="list-style-type: none"> For changes use the rotary encoder and select the necessary value. The selected row is shown with a dark background.
 <p>Figure 14: Config. - New Value</p>	<ul style="list-style-type: none"> Push the "STO" key to complete the selection.

Details about the configuration pages see:

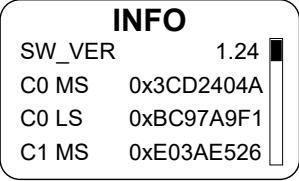
"Figure 10: RCU6513 - Configuration Menu (Part01)" page 38 and

"Figure 11: RCU6513 - Configuration Menu (Part02)" page 39.

2.7.1.3 Leave the Configuration Mode

- Turn "OFF" the device to stop the setup.
 - All changes made up to this time are stored automatically.

2.7.2 Device Info

Display Contents	Description
	<p>"INFO"</p> <ul style="list-style-type: none"> After the confirmation of the password the first page "DEVICE INFO" is shown (see "Start Configuration Mode" page 37). This page shows information about the SW version and the RCU6513 equipment. <p>Example:</p> <ul style="list-style-type: none"> SW version. SW checksum. Hardware variant of internal PCBs. Serial number of the equipment. Part number of the equipment.

2.7.3 ARINC Baudrate

Display Contents	Description
<p>ARINC BAUDRATE</p> <ul style="list-style-type: none"> ○ 12.5 kBits/s ● 100 kBits/s 	<p>"ARINC BAUDRATE"</p> <ul style="list-style-type: none"> • Selection of the ARINC 429 baudrate. • The ARINC 429 baudrate has also an effect on: <ul style="list-style-type: none"> ○ "Control Output Port Interface". ○ "Control Input Port Interface". ○ "Auxiliary Input Port Interface".

2.7.4 SDI B10-9

Display Contents	Description
<p>XPDR1 SDI B10-9</p> <ul style="list-style-type: none"> ○ 00 ● 01 ○ 10 	<p>"XPDR1 SDI B10-9"</p> <ul style="list-style-type: none"> • Selection of the SDI bits (bit 10, bit 9) in ARINC 429 frames, transmitted from RCU6513 to the primary XPDR.
<p>XPDR2 SDI B10-9</p> <ul style="list-style-type: none"> ○ 00 ● 01 ○ 10 	<p>"XPDR2 SDI B10-9"</p> <ul style="list-style-type: none"> • Selection of the SDI bits (bit 10, bit 9) in ARINC 429 frames transmitted from RCU6513) to the secondary XPDR.

2.7.5 A429 Input

Display Contents	Description
<p>A429 INPUT</p> <ul style="list-style-type: none"> ○ DISABLED ● ENABLED 	<p>"A429 INPUT"</p> <ul style="list-style-type: none"> • ARINC 429 interface: DISABLED = not in operation. ENABLED = in operation. • The ARINC 429 baudrate has also an effect on: <ul style="list-style-type: none"> ○ "Control Input Port Interface". ○ "Auxiliary Input Port Interface".

2.7.6 Tandem Function

Display Contents	Description
<p>TANDEM FUNCTION</p> <ul style="list-style-type: none"> ○ DISABLED ● ENABLED 	<p>"TANDEM FUNCTION"</p> <ul style="list-style-type: none"> • Tandem functionality: DISABLED = not in operation. ENABLED = in operation. • Possibility to operate with two RCU6513 in tandem mode (synchronized operation/view, both show the same information).

2.7.7 Tandem RCU ID

Display Contents	Description
TANDEM RCU ID <ul style="list-style-type: none"> ○ 1 ● 2 	"TANDEM RCU ID" <ul style="list-style-type: none"> • When tandem functionality is in operation, each RCU6513 must have the unique identifier. <p>Notice: When one RCU6513 has RCU ID 1, then the RCU ID of the second RCU6513 must be set to 2.</p>

2.7.8 Altitude Source Selector (ALT SRC SELECTOR)

Display Contents	Description
ALT SRC SELECTOR <ul style="list-style-type: none"> ○ SOURCE A ● SOURCE B ○ USER 	"ALT SRC SELECTOR" <ul style="list-style-type: none"> • When set to SOURCE A the RCU6513 always request from XPDR using altitude source PORT A. <ul style="list-style-type: none"> ○ The user cannot change the altitude source port during flight. • When set to SOURCE B the RCU6513 always request from XPDR using altitude source PORT B. <ul style="list-style-type: none"> ○ The user cannot change the altitude source port during flight. • When set to USER: <ul style="list-style-type: none"> ○ The user can change the altitude source port during flight.

2.7.9 Reply Status

Display Contents	Description
REPLY STATUS PIN <ul style="list-style-type: none"> ○ DISABLED ● /GPI_1 	"REPLY STATUS PIN " <ul style="list-style-type: none"> • DISABLED: <ul style="list-style-type: none"> ○ The reply status of the XPDR is examined from ARINC interface. • GPI_1: <ul style="list-style-type: none"> ○ The reply status of the XPDR is read from discrete input /GPI_1. ○ The active state (input connected to GND for a short time) on the discrete input starts reply indicator visible by the user.

2.7.10 Emergency

Display Contents	Description
EMERGENCY PIN <ul style="list-style-type: none"> ○ DISABLED ● /GPI_1 ○ /GPI_2 	"EMERGENCY PIN" <ul style="list-style-type: none"> • DISABLED: <ul style="list-style-type: none"> ○ The emergency ATC Code 7700 cannot be activated by the external switch. • /GPI_1: <ul style="list-style-type: none"> ○ The active state (input connected to GND for a short time) on this discrete input starts emergency ATC Code 7700. • /GPI_2: <ul style="list-style-type: none"> ○ The active state (input connected to GND for a short time) on this discrete input starts emergency ATC Code 7700.

2.7.11 External IDENT

Display Contents	Description
<p>EXTERNAL IDENT</p> <ul style="list-style-type: none"> ○ DISABLED ● /GPI_2 ○ /GPI_3 	<p>"EXTERNAL IDENT"</p> <ul style="list-style-type: none"> ● DISABLED: <ul style="list-style-type: none"> ○ The IDENT request can be started only by a push of the IDT key. ● /GPI_2: <ul style="list-style-type: none"> ○ The IDENT request can be started additionally by an external switch (/GPI_2 discrete input connected to GND for a short time). ● When /GPI_3: <ul style="list-style-type: none"> ○ The IDENT request can be started additionally by an external switch (/GPI_3 discrete input connected to GND for a short time).

2.7.12 Day - Night

Display Contents	Description
<p>DAY NIGHT</p> <ul style="list-style-type: none"> ○ DISABLED ● /GPI_3 NIGHT LO ○ /GPI_3 DAY LO 	<p>"DAY NIGHT"</p> <ul style="list-style-type: none"> ● DISABLED: <ul style="list-style-type: none"> ○ The RCU6513 illumination is set to low intensity mode compliant with the NVIS Green B. ● /GPI_3 NIGHT LO and /GPI_3 discrete input is in active state (connected to GND): <ul style="list-style-type: none"> ○ The RCU6513 illumination is set to low intensity mode compliant with the NVIS Green B. ● /GPI_3 DAY LO and /GPI_3 discrete input is in inactive state (not connected to GND): <ul style="list-style-type: none"> ○ The RCU6513 illumination is set to low intensity mode compliant with the NVIS Green B. ● Otherwise the RCU6513 illumination is set to high intensity mode (illumination is much higher than compliant with the NVIS Green B).

2.7.13 XPDR STATUS PIN

Display Contents	Description
<p>XPDR STATUS PIN</p> <ul style="list-style-type: none"> ○ DISABLED ● /GPI_AV 	<p>"XPDR STATUS PIN"</p> <ul style="list-style-type: none"> ● DISABLED: <ul style="list-style-type: none"> ○ The RCU6513 examines the status of XPDR only on the basis of ARINC 429 data received from XPDR. ● GPI_AV: <ul style="list-style-type: none"> ○ The RCU6513 additionally examines the status of XPDR on the basis of the GPI_AV discrete input (+28 VDC to GPI_AV shows correct operation of XPDR, no voltage to GPI_AV shows XPDR failure).

2.7.14 ADS-B Out Status (ADS-B-OUT STAT)

Display Contents	Description
ADS-B-OUT STAT <ul style="list-style-type: none"> ○ DISABLED ● /GPI_2 	"ADS-B-OUT STAT" <ul style="list-style-type: none"> ● DISABLED: <ul style="list-style-type: none"> ○ The RCU6513 examines the status of the XPDR ADS B OUT subsystem only on the basis of ARINC 429 data received from XPDR. ● /GPI_2: <ul style="list-style-type: none"> ○ The RCU6513 additionally examines the status of XPDR ADS-B OUT subsystem on the basis of the /GPI_2 discrete input (/GPI_2 connected to GND shows correct operation of ADS B OUT subsystem, /GPI_2 not connected to GND shows no operation of ADS-B OUT subsystem).

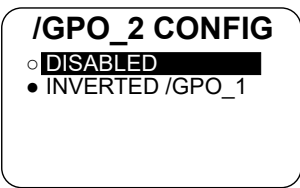
2.7.15 Antenna Switch Monitor (ANT SW MONITOR)

Display Contents	Description
ANT SW MONITOR <ul style="list-style-type: none"> ○ DISABLED ● /GPI_1 	"ANT SW MONITOR" <ul style="list-style-type: none"> ● DISABLED: <ul style="list-style-type: none"> ○ The RCU6513 does not examine the status of the XPDR antenna switch. ● /GPI_1: <ul style="list-style-type: none"> ○ The RCU6513 examines the status of the XPDR antenna switch in these ways: If /GPO_1 CONFIG is set to LO X1 SEL then /GPI_1 connected to GND is used as XPDR1 connected to the aircraft antenna. /GPI_1 not connected to GND is interpreted as XPDR2 connected to the aircraft antenna. If /GPO_1 CONFIG is set to LO X2 SEL then /GPI_1 connected to GND is used as XPDR2 connected to the aircraft antenna. /GPI_1 not connected to GND is used as XPDR1 connected to the aircraft antenna.

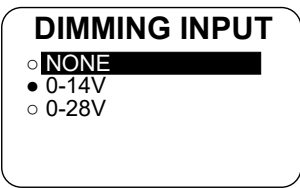
2.7.16 /GPO_1 CONFIG

Display Contents	Description
/GPO_1 CONFIG <ul style="list-style-type: none"> ○ LO X1 SEL ● LO X2 SEL 	"/GPO_1 CONFIG" <ul style="list-style-type: none"> ● LO X1 SEL: <ul style="list-style-type: none"> ○ /GPO_1 output is in: Closed (low) state (connected to GND) if XPDR1 is selected. Open (high) state (not connected to GND) if XPDR2 is selected. ● LO X2 SEL: <ul style="list-style-type: none"> ○ /GPO_1 output is in: Closed (low) state (connected to GND) if XPDR2 is selected. Open (high) state (not connected to GND) if XPDR1 is selected.

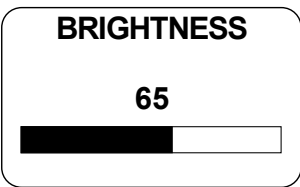
2.7.17 /GPO_2 CONFIG

Display Contents	Description
	<p>"/GPO_2 CONFIG"</p> <ul style="list-style-type: none"> • DISABLED: <ul style="list-style-type: none"> ○ The /GPO_2 output is in open (high) state (not connected to GND) all the time. • INVERTED /GPO_1: <ul style="list-style-type: none"> ○ The /GPO_2 output is in opposite state to the /GPO_1 output.

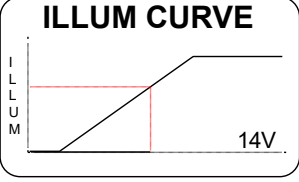
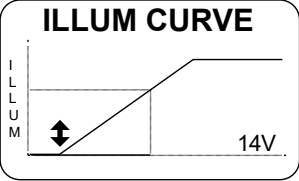
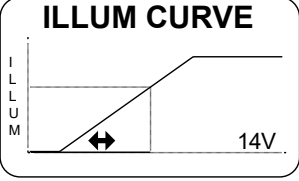
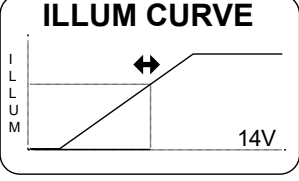
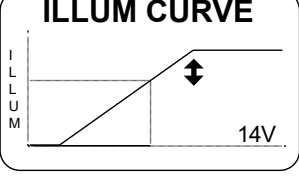
2.7.18 Dimming

Display Contents	Description
	<p>"DIMMING INPUT"</p> <ul style="list-style-type: none"> • NONE: <ul style="list-style-type: none"> ○ The RCU6513 illumination is controlled directly by the user. • 0-14V: <ul style="list-style-type: none"> ○ The RCU6513 illumination is controlled by the 14 V dimming bus connected to illumination input. • 0-28V: <ul style="list-style-type: none"> ○ The RCU6513 illumination is controlled by the 28 V dimming bus connected to illumination input.

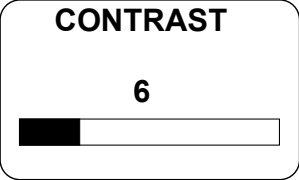
2.7.19 Brightness

Display Contents	Description
	<p>"BRIGHTNESS"</p> <ul style="list-style-type: none"> • Manual adjustment of the RCU6513 illumination. <ul style="list-style-type: none"> ○ Use the rotary encoder to set the brightness. <p>Notice: This setting is available in the user menu and can be changed by the user.</p>

2.7.20 Illumination

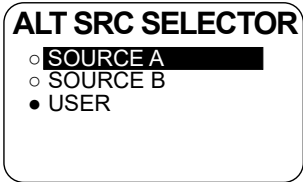
Display Contents	Description
 <p>Sub-page 1</p>	<p>"ILLUM CURVE"</p> <p>Note: This page is shown only when the the DIMMING INPUT is selected for "14 V or 28 V" dimming-bus voltage. It is also not for NVIS compatible devices.</p> <ul style="list-style-type: none"> • There are different steps to adjust the illumination curve. • The dotted lines show the current voltage on the illumination input (x axis) and the corresponding illumination level (y-axis). • The installation voltage (14 V or 28 V) is shown in the lower right corner of the display. • Push the "STO" key to select the related sub-page. • Use the rotary encoder to adjust the value.
 <p>Sub-page 2</p>	
 <p>Sub-page 3</p>	
 <p>Sub-page 4</p>	
 <p>Sub-page 5</p>	

2.7.21 Contrast

Display Contents	Description
 <p>0...16</p>	<p>"CONTRAST"</p> <ul style="list-style-type: none"> • Manual adjustment of the display contrast. • Use the rotary encoder to adjust the value.

2.8 Installation Related Settings

2.8.1 Configuration - RCU6513, BXT65XX

Equipment	Configuration Parameter	Function/Selection
RCU6513		The altitude source can be selected by RCU6513. see notice 1
BXT65XX	Transponder operation on command loss: <ul style="list-style-type: none"> Keep last state (value 0). 	Recommended setting: <ul style="list-style-type: none"> XPDR turns not to standby if no control commands are on the control port. Adjust for your installation.
BXT65XX	Transponder control port monitor: <ul style="list-style-type: none"> Enabled (value 1). 	Recommended setting: <ul style="list-style-type: none"> XPDR finds loss of control commands on control port. Adjust for your installation.
BXT65XX	Air data source configuration: <ul style="list-style-type: none"> Dual source with selection by label 031 (value 3). 	XPDR selects altitude source requested on active control port. see notice 1
BXT65XX	GNSS receiver operation: <ul style="list-style-type: none"> Enabled (value 1). 	GNSS is started to make operation of ADS-B out possible.
BXT65XX	Installation warmup time: <ul style="list-style-type: none"> 5 s minimum (recommended value). 	For Installation warmup time since the XPDR is powered on, the XPDR does not report errors results from the installation sensors (like GPS, altimeter, etc.). <ul style="list-style-type: none"> Adjust this time related to the aircraft installation properties to avoid excessive warnings.

Notice 1:

Other configuration can also be selected – the related RCU6513 and XPDR settings must be adapted.

2.8.2 Wiring - Discrete Input /GPI_AV (optional)

- This is only for RCU6513-(X0X) devices.
- This connection requires the wiring of XPDR STATUS PIN to GPI_AV.
- RCU6513 reads XPDR status from label 350 bit 11.

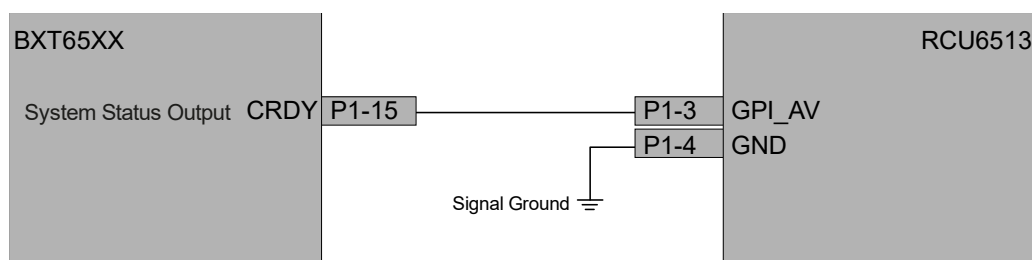


Figure 15: Wiring – Discrete Input /GPI_AV (optional)

2.8.3 Wiring - Discrete Input /GPI_1 (optional)

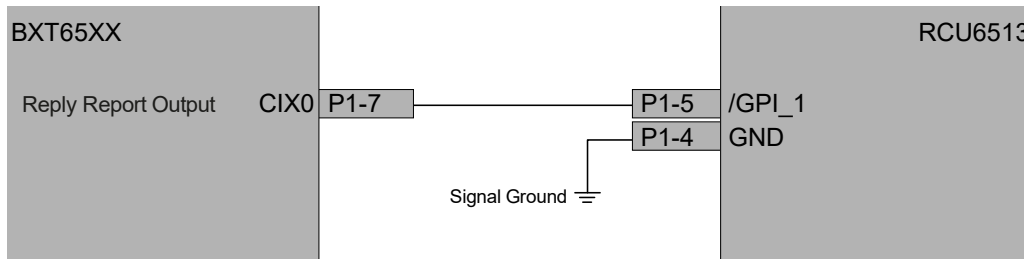


Figure 16: Wiring – Discrete Input /GPI_1 (optional)

2.8.4 Wiring - Discrete Input /GPI_2 (optional, as ADS-B Function Status)

- This is only for RCU6513-(X0X) devices.
- This connection requires the wiring of ADS-B OUT STAT to /GPI_2.
- RCU6513 reads ADS-B status from label 353 bit 20.

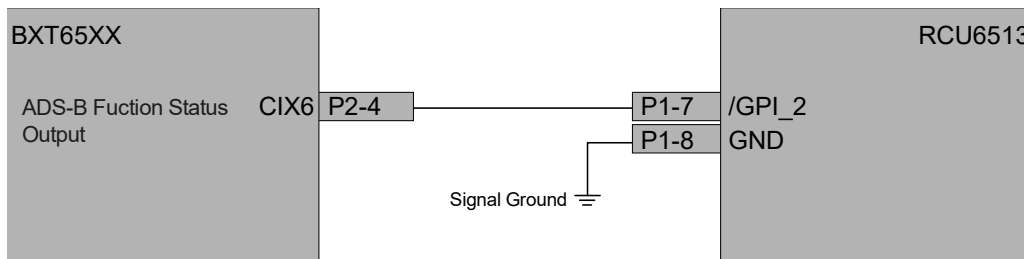


Figure 17: Wiring – Discrete Input /GPI_2 (optional, as ADS-B Function Status)

2.8.5 Wiring - Discrete Input /GPI_2 (optional, as Emergency Input)

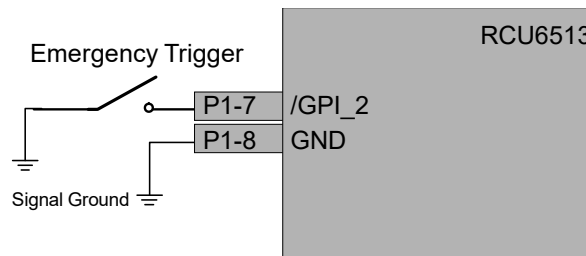


Figure 18: Wiring – Discrete Input /GPI_2 (optional, as emergency Input)

2.8.6 Wiring - Discrete Input /GPI_2 (optional, as External Ident)

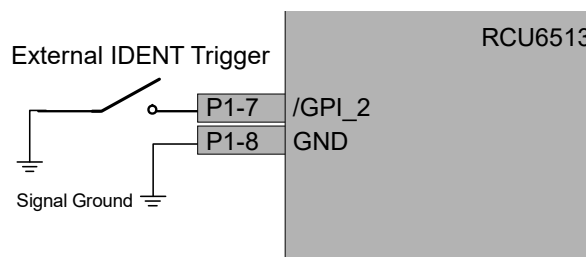


Figure 19: Wiring – Discrete Input /GPI_2 (optional, as External Ident)

2.8.7 Wiring - Discrete Input /GPI_3 (optional)

- This is only for RCU6513-(2XX) devices.
- This connection requires the wiring of DAY NIGHT to /GPI_3 NIGHT LO or /GPI_3 DAY LO.

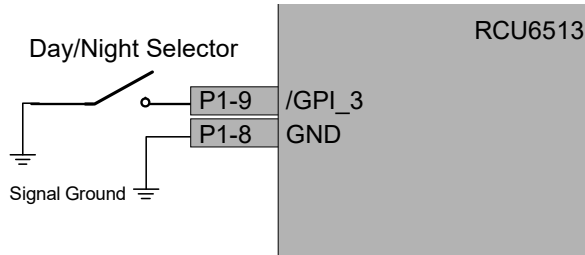


Figure 20: Wiring – Discrete Input /GPI_3 (optional)

2.8.8 Wiring - Illumination Control (optional)

- This connection requires the wiring of DIMMING INPUT to 0-14 V or 0-28 V.

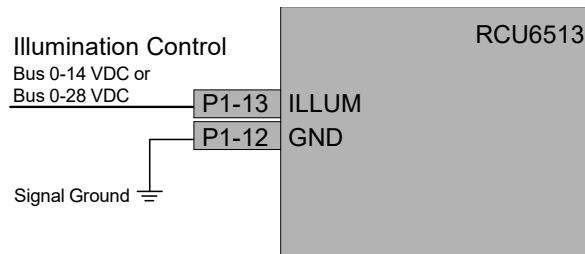


Figure 21: Wiring – Illumination Control (optional)

2.9 Aircraft Wiring

SAFETY INSTRUCTIONS

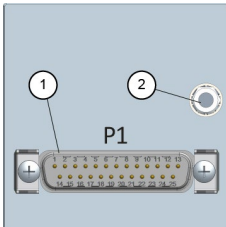
The installation of the device(s) depends on the type of aircraft and its equipment and therefore only general information can be given in this section.

The RCU6513 can be used also with non-Becker transponders. Please contact Becker Avionics for further information.

2.9.1 Electrical Bonding and Grounding

SAFETY INSTRUCTIONS

- Make sure that the device is correctly connected to aircraft ground (structure).
- Make sure that the electrical bonding area is protected in order to prevent corrosion.
- Make sure that the resistance between the bonding component and any point of this item of equipment do not exceed 20 mΩ.



- The device has a M4 threaded grounding bolt at the rear side.
- Use this grounding bolt to do a low impedance grounding of the device.
 - Maximum tightening torque for ground stud screw is 1.5 Nm (14 inch-lbs).
 - Wire cross section: min. 4 mm².
 - Length: max. 150 mm (6 in).

① Device connector

② Grounding bolt

2.9.2 Single RCU6513 and Single BXT65XX

In this configuration the RCU6513 sends commands to the XPDR. The RCU6513 uses the bidirectional ARINC 429 control interface to read out the status of the XPDR.

2.9.2.1 Configuration - Single RCU6513 and Single BXT65XX

Equipment	Configuration Parameter	Function/Selection
RCU6513	<p>ARINC BAUDRATE</p> <ul style="list-style-type: none"> • 12.5 kBits/s ○ 100 kBits/s 	ARINC 429 baudrate: 12.5 kBits/s see notice 1
RCU6513	<p>A429 INPUT</p> <ul style="list-style-type: none"> ○ DISABLED • ENABLED 	ARINC 429 control input interface: ENABLED
RCU6513	<p>TANDEM FUNCTION</p> <ul style="list-style-type: none"> • DISABLED ○ ENABLED 	Tandem function: DISABLED
RCU6513	<p>XPDR1 SDI B10-9</p> <ul style="list-style-type: none"> ○ 0 0 • 0 1 ○ 1 0 <p>or</p> <p>XPDR1 SDI B10-9</p> <ul style="list-style-type: none"> ○ 0 0 ○ 0 1 • 1 0 	Source target identifier bits for XPDR1, agrees with hardwired XPDR1 installation.
BXT65XX	<p>Transponder Control Port A Selection:</p> <ul style="list-style-type: none"> • Transponder Control Input A (value 0) 	Transponder control input A selected.
BXT65XX	<p>C4XXIx0 Transponder Control Input A:</p> <ul style="list-style-type: none"> • Low speed (value 0) 	Speed on XPDR control Input A. see notice 1
BXT65XX	<p>C429Xx0 Transponder Data Output A:</p> <ul style="list-style-type: none"> • Low speed (value 0) 	Speed on XPDR data output A. see notice 1
BXT65XX	<p>Aircraft ID Source:</p> <ul style="list-style-type: none"> • Active Control Port (value 1) 	XPDR accepts flight ID from active control port.

Notice 1:

High speed (100 kBits/s) can also be selected – the related RCU6513 and XPDR settings must be adapted.

2.9.2.2 Wiring - Single Controller and Single Transponder

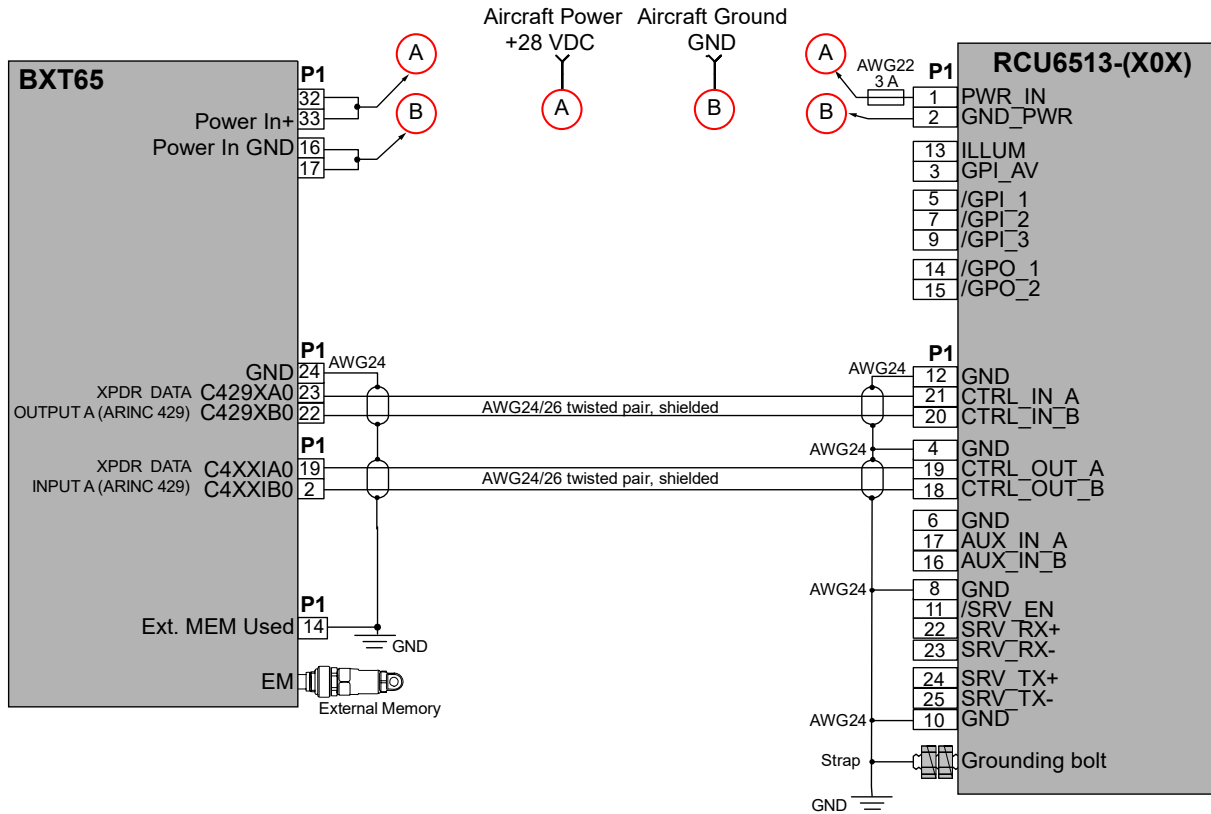


Figure 22: Wiring – Single RCU6513 and Single BXT65XX

2.9.3 Dual RCU6513-(X0X) and Single BXT65XX (Tandem)

In tandem configuration two RCU6513 are connected to one XPDR. Each RCU6513 is connected through a separate bidirectional control interface to the XPDR.


Both RCU6513 communicate with each other through the dedicated protocol routed from XPDR control input interfaces to the XPDR status output interfaces (tandem protocol is transparent to the XPDR, which means that tandem protocol data are not analyzed or modified by the XPDR).

2.9.3.1 Configuration - Dual RCU6513-(X0X) and single BXT65XX

XPDR hardwired configuration:

- XPDR1: Burst Mode Enable input must be enabled.

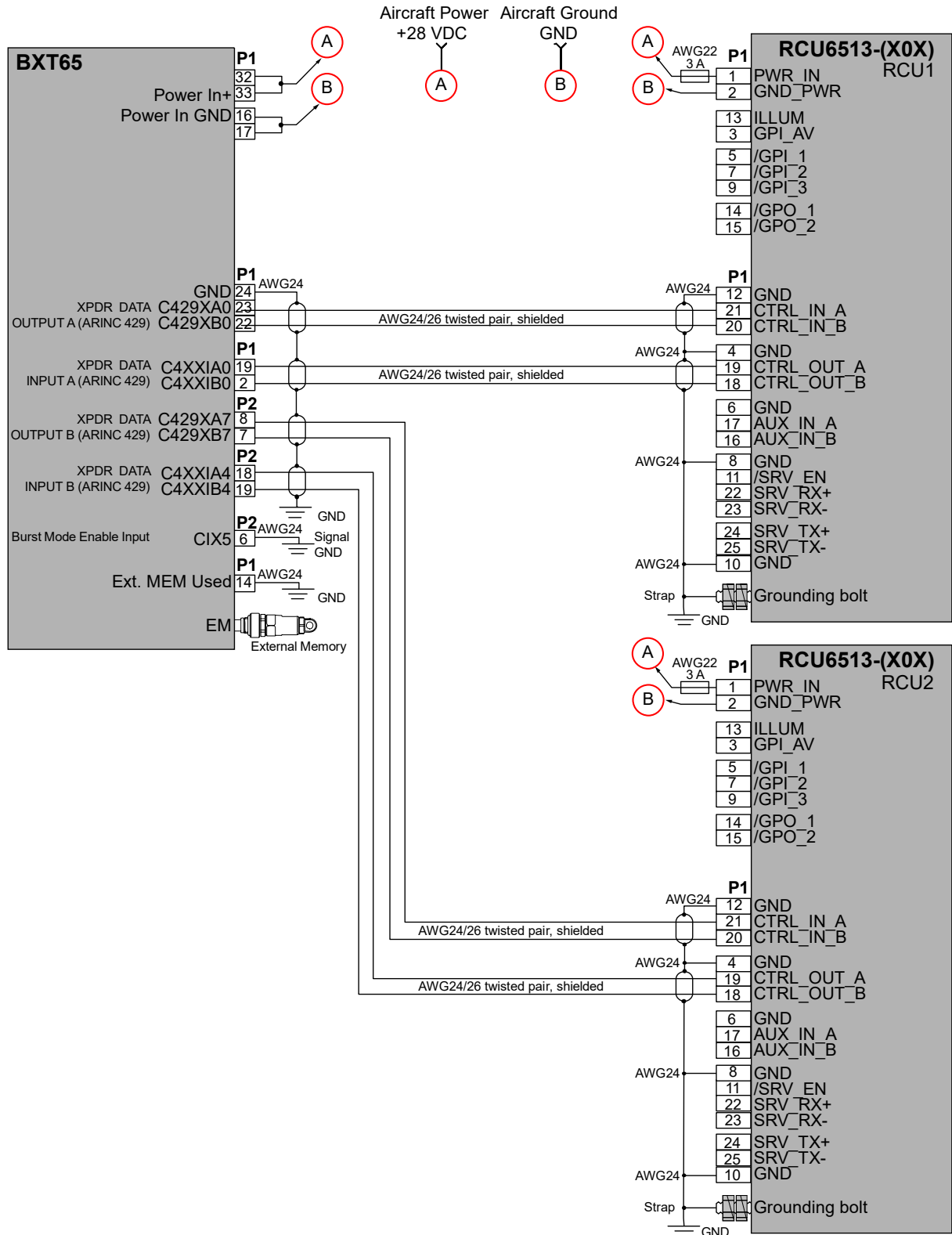
Equipment	Configuration Parameter	Function/Selection
RCU6513	<p>ARINC BAUDRATE</p> <ul style="list-style-type: none"> • <input checked="" type="radio"/> 12.5 kBits/s ○ 100 kBits/s 	ARINC 429 baudrate: 12.5 kBits/s see notice 1
RCU6513	<p>A429 INPUT</p> <ul style="list-style-type: none"> ○ <input checked="" type="radio"/> DISABLED • ENABLED 	ARINC 429 control input interface: ENABLED
RCU6513	<p>TANDEM FUNCTION</p> <ul style="list-style-type: none"> ○ <input checked="" type="radio"/> DISABLED • ENABLED 	Tandem function: ENABLED
RCU6513	<p>XPDR1 SDI B10-9</p> <ul style="list-style-type: none"> ○ <input checked="" type="radio"/> 00 • 01 ○ 10 <p>or</p> <p>XPDR1 SDI B10-9</p> <ul style="list-style-type: none"> ○ <input checked="" type="radio"/> 00 ○ 01 • 10 	Source target identifier bits for XPDR1, agrees with hardwired XPDR1 installation.
RCU6513	<p>TANDEM RCU ID</p> <ul style="list-style-type: none"> ○ <input checked="" type="radio"/> 1 • 2 <p>RCU1 for first RCU. RCU2 for second RCU.</p>	When tandem functionality is in operation, each RCU6513 must have the unique identifier. Notice: When one RCU6513 has RCU ID 1, then the RCU ID of the second RCU6513 must be set to 2.

Equipment	Configuration Parameter	Function/Selection
RCU6513	 <p>ARINC BAUDRATE</p> <ul style="list-style-type: none"> ● 12.5 kBits/s ○ 100 kBits/s 	ARINC 429 baudrate: 12.5 kBits/s see notice 1
BXT65XX	Transponder Control Port A Selection: <ul style="list-style-type: none"> ● Transponder Control Input A (value 0) 	Transponder control input A selected.
BXT65XX	Transponder Control Port B Selection: <ul style="list-style-type: none"> ● Transponder Control Input B (value 0) 	Transponder control input B selected.
BXT65XX	Transponder Burst Mode Control: <ul style="list-style-type: none"> ● Sticky (value 1) 	Single port "STICKY" selected.
BXT65XX	C4XXIx0 Transponder Control Input A: <ul style="list-style-type: none"> ● Low speed (value 0) 	Speed on XPDR control input A. see notice 1
BXT65XX	C4XXIx4 Transponder Control Input B: <ul style="list-style-type: none"> ● Low speed (value 0) 	Speed on XPDR control input B. see notice 1
BXT65XX	C429Xx0 Transponder Data Output A: <ul style="list-style-type: none"> ● Low speed (value 0) 	Speed on XPDR data output A. see notice 1
BXT65XX	Aircraft ID Source: <ul style="list-style-type: none"> ● Active Control Port (value 1) 	XPDR accepts flight ID from active control port.

Notice 1:

High speed (100 kBits/s) can also be selected – the related RCU6513 and XPDR settings must be adapted.

2.9.3.2 Wiring - Dual RCU6513-(X0X) and Single BXT65XX (Tandem)



Notice: It is possible to use one fuse (3A) for both RCU6513.

Figure 23: Wiring – Dual RCU6513-(X0X) and Single BXT65XX (Tandem)

2.9.4 Single RCU6513-(X1X) and Dual BXT65XX

In this configuration the RCU6513-(X1X) is used to control both XPDR.

The ARINC 429 output of the RCU6513-(X1X) is connected to control input interfaces A of both XPDR.

The ARINC 429 output of XPDR1 is connected to CTRL_IN input of RCU6513-(X1X).

The ARINC 429 output of XPDR2 is connected to AUX_IN input of RCU6513-(X1X).

Discrete outputs of the RCU6513-(X1X) are used to drive antenna switch and stand-by discrete inputs of the XPDRs.

Discrete input of RCU6513-(X1X) is used to monitor position of the antenna switch.

2.9.4.1 Configuration - Single RCU6513-(X1X) and Dual BXT65XX

XPDR hardwired configuration:

- XPDR1: SDI must be set to 1.
- XPDR2: SDI must be set to 2.

Equipment	Configuration Parameter	Function/Selection
RCU6513	ARINC BAUDRATE <input checked="" type="radio"/> 12.5 kBits/s <input type="radio"/> 100 kBits/s	ARINC 429 baudrate: 12.5 kBits/s see notice 1
RCU6513	A429 INPUT <input type="radio"/> DISABLED <input checked="" type="radio"/> ENABLED	ARINC 429 control input interface: ENABLED
RCU6513	TANDEM FUNCTION <input checked="" type="radio"/> DISABLED <input type="radio"/> ENABLED	Tandem function: DISABLED
RCU6513	XPDR1 SDI B10-9 <input type="radio"/> 00 <input checked="" type="radio"/> 01 <input type="radio"/> 10	Source target identifier bits for XPDR1, agrees with hardwired XPDR1 installation.
RCU6513	XPDR2 SDI B10-9 <input type="radio"/> 00 <input type="radio"/> 01 <input checked="" type="radio"/> 10	Source target identifier bits for XPDR2, agrees with hardwired XPDR2 installation. Must be different from XPDR1 SDI.
RCU6513	/GPO_1 CONFIG <input type="radio"/> LO X1 SEL <input checked="" type="radio"/> LO X2 SEL	/GPO_1 is in low state when XPDR2 is selected.

Equipment	Configuration Parameter	Function/Selection
RCU6513	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: auto;"> <p>/GPO_2 CONFIG</p> <ul style="list-style-type: none"> ○ DISABLED ● INVERTED /GPO_1 </div>	/GPO_2 is in opposite state to the /GPO_1.
RCU6513	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: auto;"> <p>ANT SW MONITOR</p> <ul style="list-style-type: none"> ○ DISABLED ● /GPI_1 </div>	/GPI_1 is used to monitor position of the antenna switch.
BXT65XX	Transponder Control Port A Selection: <ul style="list-style-type: none"> ● Transponder Control Input A (value 0) 	Transponder control input A selected.
BXT65XX	Transponder Control Port B Selection: Transponder Control Input B (value 0)	Transponder control input B selected.
BXT65XX	C4XXIx0 Transponder Control Input A: <ul style="list-style-type: none"> ● Low speed (value 0) 	Speed on XPDR control Input A. see notice 1
BXT65XX	C4XXIx4 Transponder Control Input B: <ul style="list-style-type: none"> ● Low speed (value 0) 	Speed on XPDR control input B. see notice 1
BXT65XX	C429Xx0 Transponder Data Output A: <ul style="list-style-type: none"> ● Low speed (value 0) 	Speed on XPDR data output A. see notice 1
BXT65XX	Aircraft ID Source: <ul style="list-style-type: none"> ● Active Control Port (value 1) 	XPDR accepts flight ID from active control port.

Notice 1:

High speed (100 kBits/s) can also be selected – the related RCU6513 and XPDR settings must be adapted.

2.9.4.2 Wiring - Single RCU6513-(X1X) and Dual BXT65XX

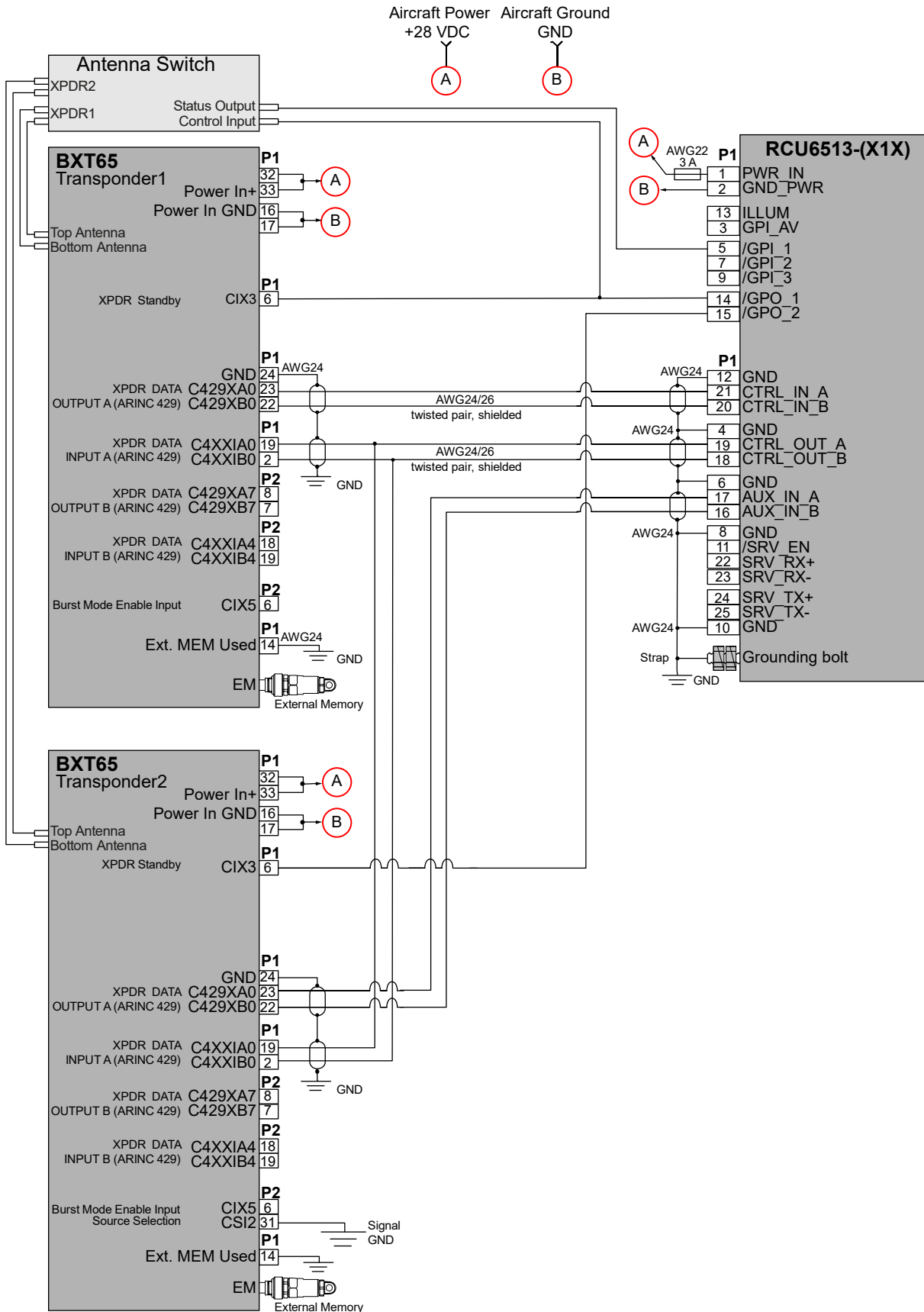


Figure 24: Wiring – Single RCU6513-(X1X) and Dual BXT65XX

2.9.5 Dual RCU6513-(X1X) and Dual BXT65XX

In this configuration two RCU6513-(X1X) are used to control both XPDR.

The ARINC 429 output of the RCU1 is connected to control input interfaces A of both XPDRs.

The ARINC 429 output of the RCU2 is connected to control input interfaces B of both XPDR.

The ARINC 429 output of XPDR1 is connected to CTRL_IN inputs of both RCU6513-(X1X).

The ARINC 429 output of XPDR2 is connected to AUX_IN inputs of both RCU6513-(X1X).

Discrete outputs of the RCU6513-(X1X) are used to drive antenna switch and stand-by discrete inputs of the XPDRs.

Discrete input of RCU6513-(X1X) is used to monitor position of the antenna switch.

2.9.5.1 Configuration - Dual RCU6513-(X1X) and Dual BXT65XX

XPDR hardwired configuration:

- XPDR1, XPDR2: Burst Mode Enable input must be enabled.
- XPDR1: SDI must be set to 1.
- XPDR2: SDI must be set to 2.

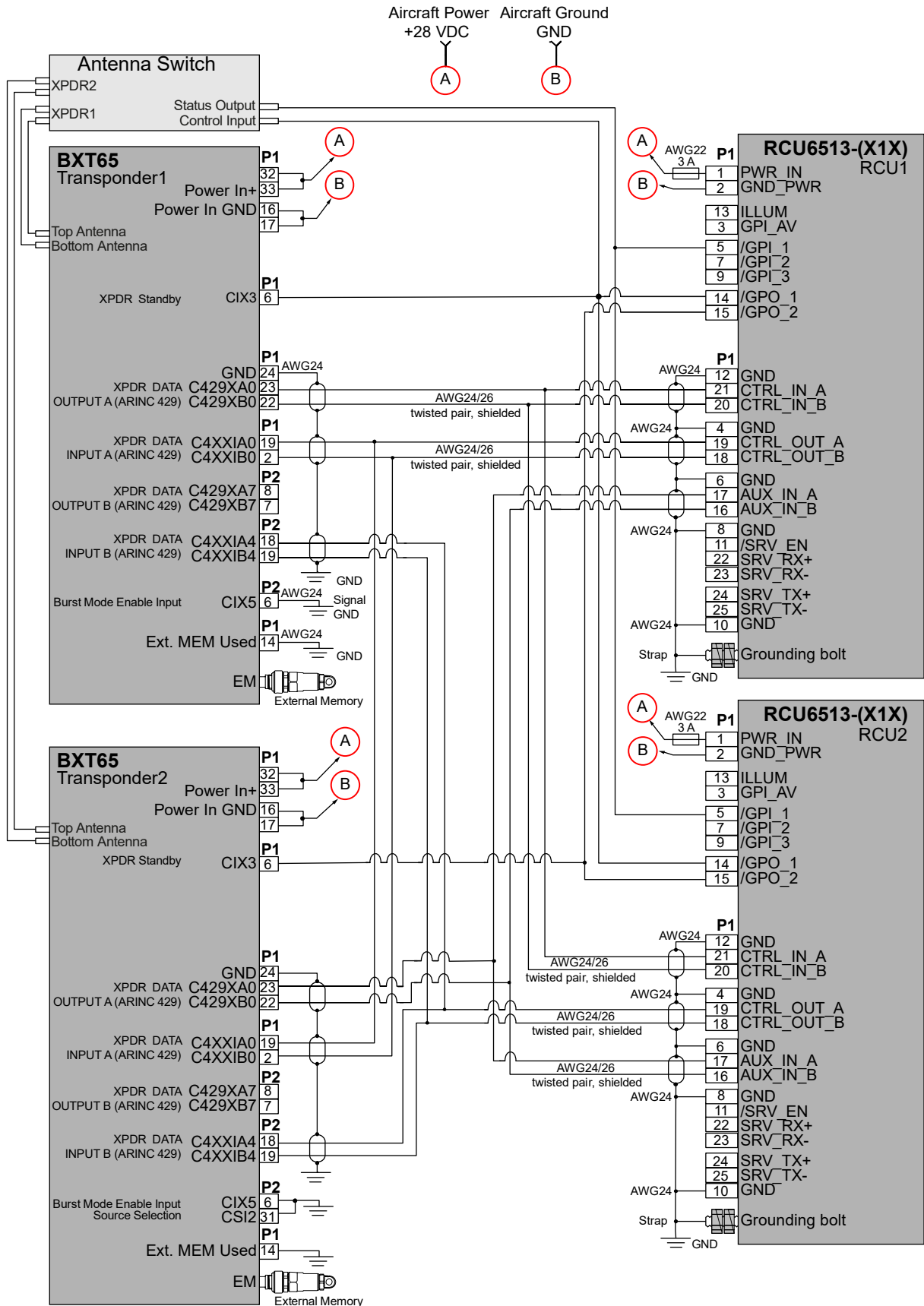
Equipment	Configuration Parameter	Function/Selection
RCU6513	ARINC BAUDRATE <input checked="" type="radio"/> 12.5 kBits/s <input type="radio"/> 100 kBits/s	ARINC 429 baudrate: 12.5 kBits/s see notice 1
RCU6513	A429 INPUT <input type="radio"/> DISABLED <input checked="" type="radio"/> ENABLED	ARINC 429 control input interface: ENABLED
RCU6513	TANDEM FUNCTION <input type="radio"/> DISABLED <input checked="" type="radio"/> ENABLED	Tandem function: ENABLED
RCU6513	XPDR1 SDI B10-9 <input type="radio"/> 0 0 <input checked="" type="radio"/> 0 1 <input type="radio"/> 1 0	Source target identifier bits for XPDR1, agrees with hardwired XPDR1 installation.
RCU6513	XPDR2 SDI B10-9 <input type="radio"/> 0 0 <input type="radio"/> 0 1 <input checked="" type="radio"/> 1 0	Source target identifier bits for XPDR2, agrees with hardwired XPDR2 installation. Must be different from XPDR1 SDI.
RCU6513	/GPO_1 CONFIG <input type="radio"/> LO X1 SEL <input checked="" type="radio"/> LO X2 SEL	/GPO_1 is in low state when XPDR2 is selected.

Equipment	Configuration Parameter	Function/Selection
RCU6513	<div style="border: 1px solid black; padding: 5px;"> <p>/GPO_2 CONFIG</p> <ul style="list-style-type: none"> ○ DISABLED ● INVERTED /GPO_1 </div>	/GPO_2 is in opposite state to the /GPO_1.
RCU6513	<div style="border: 1px solid black; padding: 5px;"> <p>ANT SW MONITOR</p> <ul style="list-style-type: none"> ○ DISABLED ● /GPI_1 </div>	/GPI_1 is used to monitor position of the antenna switch.
RCU6513	<div style="border: 1px solid black; padding: 5px;"> <p>TANDEM RCU ID</p> <ul style="list-style-type: none"> ○ 1 ● 2 <p style="text-align: center;">RCU1 for first RCU. RCU2 for second RCU.</p> </div>	<p>When tandem functionality is in operation, each RCU6513 must have the unique identifier.</p> <p>Notice: When one RCU6513 has RCU ID 1, then the RCU ID of the second RCU6513 must be set to 2.</p>
BXT65XX	<p>Transponder Control Port A Selection:</p> <ul style="list-style-type: none"> ● Transponder Control Input A (value 0) 	Transponder control input A selected.
BXT65XX	<p>Transponder Control Port B Selection:</p> <p>Transponder Control Input B (value 0)</p>	Transponder control input B selected.
BXT65XX	<p>Transponder Burst Mode Control:</p> <ul style="list-style-type: none"> ● Sticky (value 1) 	Single port "STICKY" selected.
BXT65XX	<p>C4XXIx0 Transponder Control Input A:</p> <ul style="list-style-type: none"> ● Low speed (value 0) 	Speed on XPDR control Input A. see notice 1
BXT65XX	<p>C4XXIx4 Transponder Control Input B:</p> <ul style="list-style-type: none"> ● Low speed (value 0) 	Speed on XPDR control input B. see notice 1
BXT65XX	<p>C429Xx0 Transponder Data Output A:</p> <ul style="list-style-type: none"> ● Low speed (value 0) 	Speed on XPDR data output A. see notice 1
BXT65XX	<p>Aircraft ID Source:</p> <ul style="list-style-type: none"> ● Active Control Port (value 1) 	XPDR accepts flight ID from active control port.

Notice 1:

High speed (100 kBits/s) can also be selected – the related RCU6513 and XPDR settings must be adapted.

2.9.5.2 Wiring - Dual RCU6513-(X1X) and Dual BXT65XX



Notice: It is possible to use one fuse (3A) for both RCU6513.

Figure 25: Wiring – Dual RCU6513-(X1X) and Dual BXT65XX

2.10 Post Installation Check

After the device/system is installed completely do a test. Make sure that the compliance with the authority required procedures is obeyed.

The description that follows gives guidance for such tests.

2.10.1 Mechanical Installation and Wiring Check

- Make sure that all cables are attached and the shields are connected to ground.
- Examine the movement of controls to make sure that there is no interference.
- Make sure that all screws are tight and the connectors on the rear side of the device are secured.

2.10.2 Power Supply

- Examine the power supply lines and the correct polarity.
- Make sure that the power supply is in the specified limits, with and without an engine in operation.

2.10.3 Illumination Interface

- Push and hold the "SEL" key during power up see "Start Configuration Mode" page 37.
 - The device starts in configuration mode.

"DIMMING INPUT" (NONE)

- Select the configuration page for dimming "BRIGHTNESS".
- Use the rotary encoder to adjust the illumination brightness in the configuration page "BRIGHTNESS".
- Make sure that the adjustment has an effect to the illumination.

"DIMMING INPUT" (through bus 0-14 V or 0-28 V)

- Select and adjust the dimming curves in the related configuration pages from "ILLUM CURVE".
- Make sure that the adjustment has an effect to the illumination.

2.10.4 HMI Interface

- Power up the RCU6513 in normal mode.
- Examine if the RCU6513 can control these commands of the transponder:
 - ATC code.
 - Flight ID.
 - XPDR mode (SBY/ON/ALT).
 - IDENT activation.
 - Self-test activation.
 - Altitude source selection (if permitted in aircraft installation).

Details see related descriptions in chapter "Operation" page 67.

2.10.5 Tandem Operation

The tandem operation depends on the installation (two RCU6513).

- Power up both RCU6513 in normal mode.
- Examine if both RCU6513 can control these commands of the transponder, see "HMI Interface" page 62.
- Examine that the settings done from one RCU6513 are also shown on the other RCU6513.
- Power off RCU2.
 - Examine that RCU1 can control these commands of the transponder, see "HMI Interface" page 62.
- Power up RCU2 and Power off RCU1.
 - Examine that RCU2 can control these commands of the transponder, see "HMI Interface" page 62.

2.10.6 Dual Transponder Operation

The dual transponder operation depends on the installation (two transponder).

- Power up the RCU6513.
- Power up the both transponders.
- Examine if the RCU6513 can select the active XPDR.
- Examine that each RCU6513 can control these commands of the transponder, see "HMI Interface" page 62, in both cases:
 - When XPDR1 is selected as an active.
 - When XPDR2 is selected as an active.
- Examine that the settings done from one RCU6513 are also shown on the other RCU6513. Do these steps:

RCU1	RCU2	XPDR1	XPDR2	Test	Result (pass/fail)
ON	ON	ON	OFF	Changes on one RCU are shown on the second RCU	
ON	ON	OFF	ON	Changes on one RCU are shown on the second RCU	

Details see related descriptions in chapter "Operation" page 67.

Post Installation Check

2.10.7 Interference Check

- Examine the RCU6513 with BXT65XX while the engine is in operation and power up all other avionics/ electrical systems on the aircraft, to make sure that no significant interference exists.
- Examine that the RCU6513 with BXT65XX do not cause significant interference with other systems.
- The installer's standard test procedure may use for the interference check and the table that follows can be taken as a reference.
- Depending on the individual avionic systems installed in the aircraft, it can be necessary to extend the checklist.

Aircraft System Checklist	Function	
	OK	NOT OK
DME		
Audio		
Generators / Inverters		
GPS System		
Compass 1		
ADF		
VHF / NAV1 all channels		
VHF / NAV 2 all channels		
Marker Receiver		
Motor(s)		
Engine Instruments		
Storm scope		
Transponder		
Air Data Computer		
Autopilot and Servos		

2.11 Error / Failure Indication

It is possible to read out and reset error flags.

For read out and reset see:

- "Bit Error Mode" page 71 or contact Becker Avionics Customer Service.
- Failure description see: "Warning and Failure Indications" page 78.

2.12 Troubleshooting

If you cannot correct the problem stop using the device(s) and contact authorized maintenance shop for assistance, please.

Display	Symptom / Action / Check
FAILURE	Refer to: "Warning and Failure Indications" page 78.

Blank Page

3 Operation

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3.1 General

This section contains general information and instructions for safe operation.

NOTICE

Some functions and adjustments are only available in the password-protected configuration mode*.

* For details please see chapter "Installation", "Configuration" page 37.

3.2 Device Description

- The Becker Remote Control Unit RCU6513 is made to operate with the transponders of the BXT6500 series.
- Primary intended function of RCU6513 is to provide HMI (Human Machine Interface) for interaction between users and transponder.

3.2.1 Device Assignment

This manual is valid for the devices:

- See page 27

3.2.2 Packing, Transport, Storage

- See page 26

3.2.3 Scope of Delivery

- See page 27

3.2.4 State of Delivery

- See page 27

3.2.5 Type Plate

- See page 28

3.2.6 Controls and Indications

3.2.6.1 User Interface

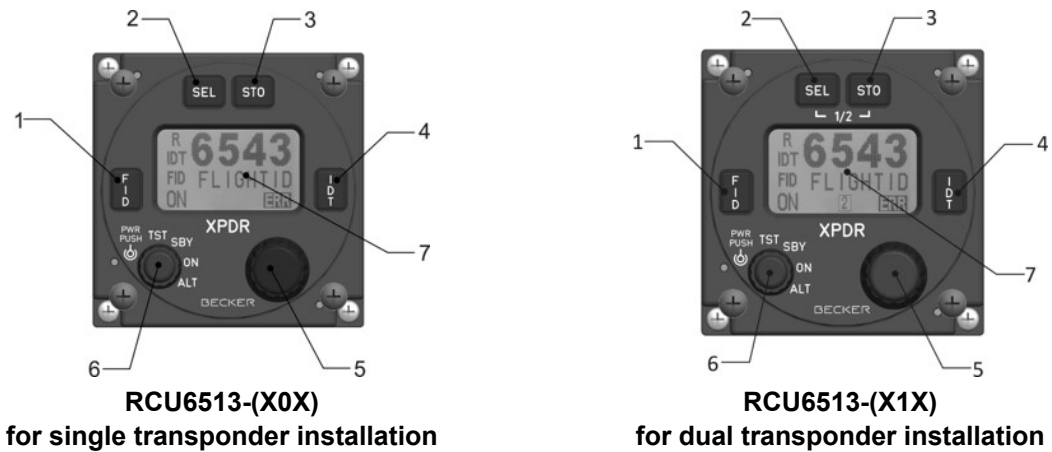


Figure 26: Controls and Indicators

	Symbol	Description	Main Function
1		FID (Flight ID)	<ul style="list-style-type: none"> "Short push" during normal operation shows the Flight ID. The FID parameter can be set.
2		SEL (Select)	<ul style="list-style-type: none"> "Short push" during normal operation starts the SEL mode. Different parameters can be selected and set (VFR, FID, AA, MA, AT, AS, BRT).
3		STO (Store)	<ul style="list-style-type: none"> "Short push" during normal operation stores the new value (ATC code, VFR code, Flight ID).
4		IDT (Identification)	<ul style="list-style-type: none"> "Short push" during normal operation starts the identification mode of the transponder.
5		Rotary encoder	<ul style="list-style-type: none"> Turn the rotary encoder to change the selected parameters (ATC code, VFR code, Flight ID, brightness). Push the rotary encoder to select the digits. Push the rotary encoder to confirm the adjustment.
6		Power ON/OFF and mode encoder	<ul style="list-style-type: none"> "Short push" power up the device. "Long push" power off the device. Different modes are available: <ul style="list-style-type: none"> TST: Starts a self-test. SBY: Standby, the transponder does not reply any interrogations. ON: The transponder is in operation. ALT: The transponder sends the altitude information.
7		Display	LCD: Liquid Crystal Display
			Only RCU6513-(X1X) <ul style="list-style-type: none"> Push and hold the SEL and STO key at the same time for > 2 s to change the active transponder from XPDR1 to XPDR2 and vice versa.

The device detects a:

"Long push": when you push and hold down a key for > 2 seconds.

"Short push": any push < 2 seconds.

3.2.6.2 Symbols on the Display

- The display shows the values which are transmitted from RCU6513 to the transponder.
- The parameter value flashes, if the value requested by the RCU6513 does not agree with the returned value from the transponder.

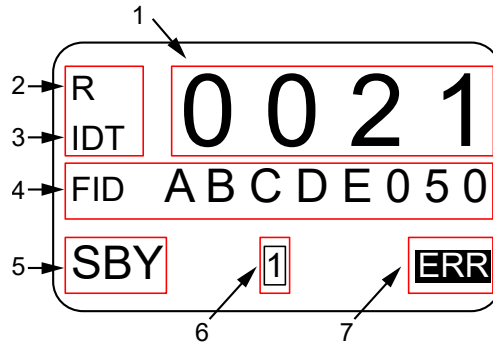


Figure 27: Display - RCU6513

	Symbol (e.g.)	Function
1	0 0 2 1 (right side, top line)	ATC code: <ul style="list-style-type: none"> • Shown in each view of normal mode.
2	R (left side, top line)	Reply: <ul style="list-style-type: none"> • The transponder replies on the interrogation. • Shown for 1 s after the transponder replies the interrogation.
3	IDT (left side, top line)	Transponder identification: <ul style="list-style-type: none"> • Shown when the identification mode of the transponder is activated by the user.
4 (middle line)	Auxiliary field (depends on the selected function): <ul style="list-style-type: none"> • Flight ID (FID) • Flight Level (FL) • Virtual Flight Rules code (VFR) • Aircraft Address (AA) • Maximum Airspeed (MA) • Aircraft Type (AT) • Altitude Source (AS) • Brightness (BRT)
5	TST / SBY / ON / ALT (left side, bottom line)	Operation modes: <ul style="list-style-type: none"> • Shown in each view of normal mode.
6	1 (middle, bottom line)	Active transponder (depends on device variant): <ul style="list-style-type: none"> • Shown in each view of normal mode (only for RCU6513-(X1X)).
7	ERR (right side, bottom line)	Shows that one or more errors are detected in background.

3.3 Main Modes

There are different modes to show information to the user:

- Self-test mode.
- Bit error mode.
- Normal mode.

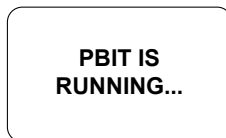
3.3.1 Self-Test Mode

The RCU6513 has advanced Built-In-Test. It monitors most of internal circuits against failures.

There are different types of BIT:

- PBIT (starts after Power ON the RCU6513 and BXT65XX system).
- IBIT (on-request test initiated by special command).
- CBIT (which continuously examines controller and transponder operation).

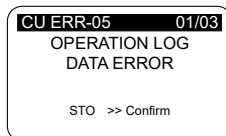
Examples:



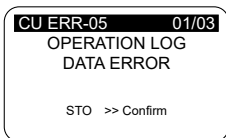
- The RCU6513 starts the self-test mode when a self-test on RCU6513 or transponder is started.
- The RCU6513 changes automatically to normal mode after self-test without error.
- The RCU6513 changes automatically to bit error mode after self-test with error.

3.3.2 Bit Error Mode

The bit error mode shows warnings and errors.



Example



- The user can select each active error.
- A "short push" to STO confirms the error message (not possible for all errors, see "Error List" page 79).
- The RCU6513 changes to normal mode when all error messages are confirmed.
 - The information "ERR" is shown in the display (right side, bottom).
- A long push (> 2 s) to STO changes the view again to bit error view.

Details about error messages see "Warning and Failure Indications" page 78.

3.3.3 Normal Mode

The normal mode shows all relevant information for transponder operation.

- In the operation modes SBY or ON is in the first view the Flight ID (FID).
- In the operation mode ALT is in the first view the Flight Level (FL) and Altitude Source (A- -).

Examples:

Operation mode - SBY	Operation mode - ON	Operation mode - ALT

3.3.3.1 Views in Normal Mode

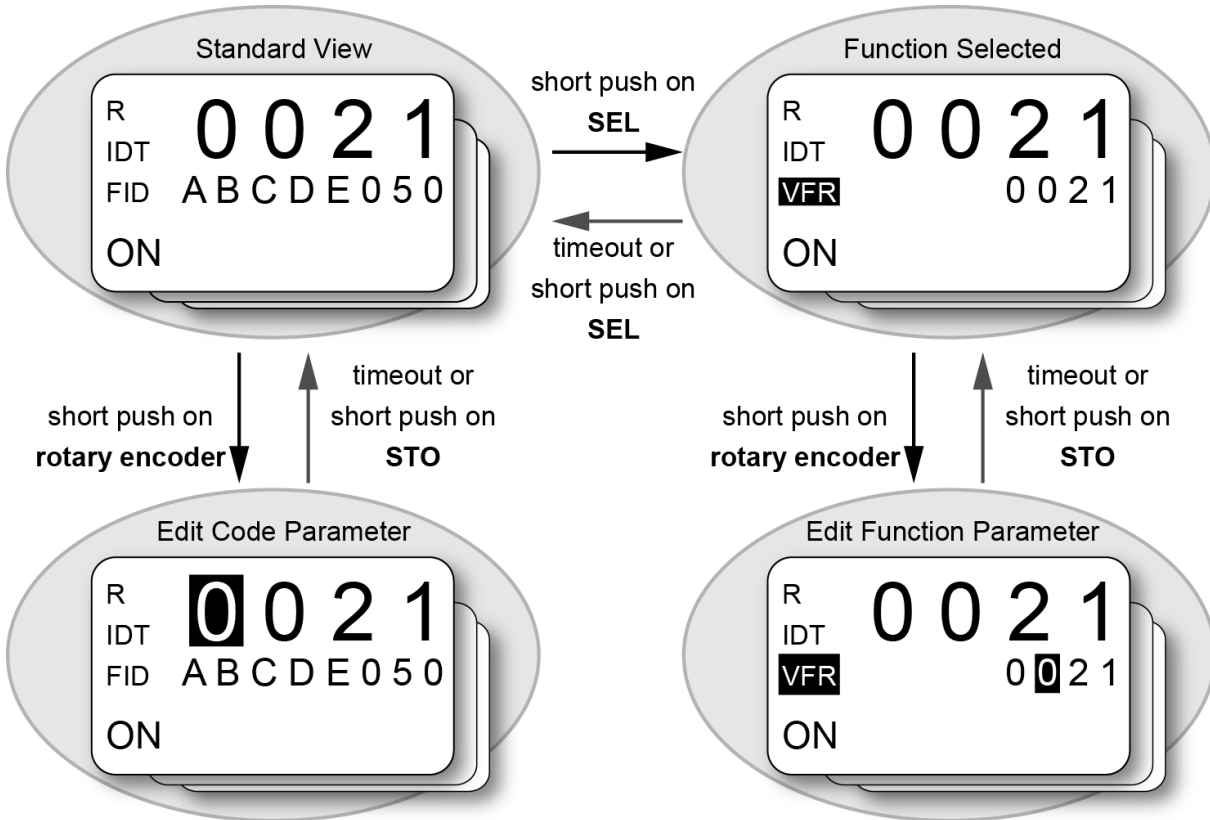


Figure 28: Display - Views in Normal Mode

NOTICE

The display shows the standard view after 5 s without activities.

3.4 Start-Up

NOTICE

- Excessive pulses on the DC bus of the aircraft may cause damage on electrical circuits of any installed instrument.
- Do not turn on the device during engine start or shutdown.
- Turn "ON" the device by a short push to the mode encoder (6) or by power-up the system voltage.
- After power-up, the device starts a self-test (PBIT).
 - The display shows the message "PBIT IS RUNNING...".
- The RCU6513 changes automatically to normal mode after self-test without error.
 - The device is ready to use.
- The RCU6513 changes automatically to bit error mode after self-test with error (see "Bit Error Mode" page 71).



3.5 Operation in Normal Mode

General:

- The display shows the values which are transmitted from RCU6513 to the transponder.
- The parameter value flashes, if the value requested by the RCU6513 does not agree with the returned value from the transponder.

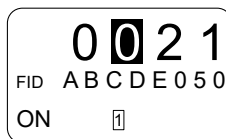
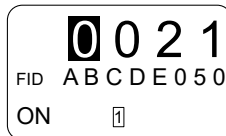
3.5.1 Select Operation Mode



- Rotate the mode encoder (6) to select the operation mode:
 - TST: Starts a self-test.
 - SBY: Standby, the transponder does not reply to any interrogations.
 - ON: The transponder is in operation.
 - ALT: The transponder sends the altitude information.
- The indication field is inverted for 1 s.

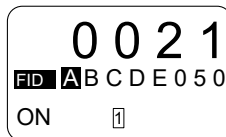
3.5.2 Set the ATC Code

The transponder code is shown in the operation modes SBY, ON, ALT.



- Make a "short push" on the rotary encoder (5) for modification of the ATC code (4digits).
 - The changeable digit is shown inverted.
- Turn the rotary encoder (5) clockwise/counter clockwise to change the value.
- Make another "short push" on the rotary encoder (5) for modification of the next digit.
 - The changeable digit is shown inverted.
- Same procedure as before
- Repeat the procedure for all digits of the ATC code.
- Push the STO key to store the changes or wait 5 s without any activity.
 - The changes are stored.

3.5.3 Set the Flight ID (FID)

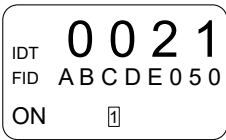


- Make a "short push" on the FID key (8 alphanumeric digits).
 - The FID indication field is shown inverted.
- Make a "short push" on the rotary encoder.
 - The changeable digit is shown inverted.
- Turn the rotary encoder (5) clockwise/counter clockwise to change the value.
- Make another "short push" on the rotary encoder (5) for modification of the next digit.
 - The changeable digit is shown inverted.
- Same procedure as before
- Repeat the procedure for all digits of the flight ID.
- Push the STO key to store the changes or wait 5 s without any activity.
 - The changes are stored.

Note:

A long push on the rotary encoder (5) delete the current selected digit and all further digits.

3.5.4 Start Identification (IDT)



- Make a "short push" on the IDT key (or start IDT with an external input, depends on installation and configuration).
 - A special identifier pulse (SPI) is sent.
 - The IDT indication field is shown while the SPI is sent (min. 1 s).

NOTICE

Some functions and adjustments are only available in the password-protected configuration mode*.

* For details please see chapter "Installation", "Configuration" page 37.

3.5.5 Set Special Code for Air Emergency



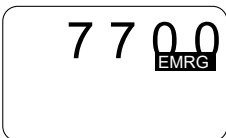
Caution!

Set the codes 7500, 7600, 7700 only in emergency situations.

These special codes, which depend on the type of incident, are reserved for air emergencies:

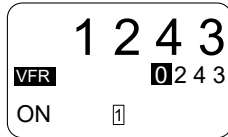
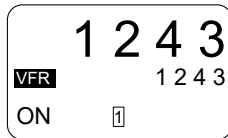
- 7500 Hijacking of the aircraft.
- 7600 Loss of communication.
- 7700 Emergency on board which is an immediate danger to the aircraft.

The code evaluation devices of the radar systems automatically alarm the controllers at the radar screens immediately, if one of these special codes is received.



- The function "Emergency Mode" 7700 is only available if it is released in the configuration mode (depends on installation and configuration).
- The display shows the code 7700 and the field EMRG while the emergency function is on.

3.5.6 Set VFR Code

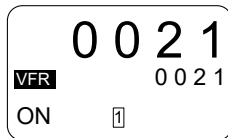
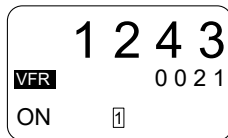


- Make a "short push" on the SEL key.
 - The display is in the function selection view.
 - The VFR indication field is shown inverted.
- Make a "short push" on the rotary encoder (5).
 - The changeable digit is shown inverted.
- Turn the rotary encoder (5) clockwise/counter clockwise to change the value.
- Make another "short push" on the rotary encoder (5) for modification of the next digit.
 - The changeable digit is shown inverted.
- Same procedure as before
- Repeat the procedure for all digits of the VFR.
- Push the STO key to store the changes or wait 5 s without any activity.
 - The changes are stored.

NOTICE

The new code is set but not released/sent at this time as new ATC code to/for the transponder. See next step "VFR Code Activation" page 75.

3.5.7 VFR Code Activation

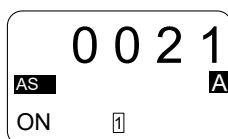
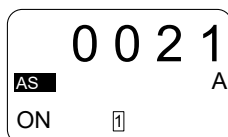


- Make a "short push" on the SEL key.
 - The display is in the function selection view.
 - The VFR indication field is shown inverted.
 - The VFR code is set.
- Make a "long push" on the rotary encoder (5).
 - The display shows the new VFR setting in the top line.
 - The new value is released/sent as new ATC code to/for the transponder.

3.5.8 Set Altitude Source Data (AS)

NOTICE

- The change of the altitude source is only possible if it is released in the configuration mode. If it is not released the display shows the selected data source.

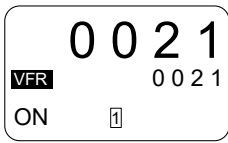


- Make a "short push" on the SEL key.
 - The display is in the function selection view.
 - The VFR indication field is shown inverted.
- Turn the rotary encoder (5) clockwise/counter clockwise until the indication field shows the function AS.
- Make a "short push" on the rotary encoder (5).
 - The changeable digit is shown inverted.
- Turn the rotary encoder (5) clockwise/counter clockwise to change the value.
- Push the STO key to store the changes or wait 5 s without any activity.
- The changes are stored.

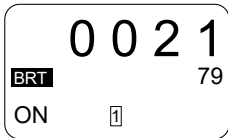
3.5.9 Brightness (BRT)

NOTICE

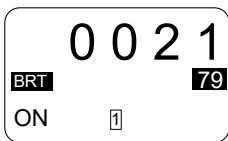
- The interchange of the brightness is only possible if it is released in the configuration mode (depends on installation and configuration).



- Make a "short push" on the SEL key.
 - The display is in the function selection view.
 - The VFR indication field is shown inverted.
- Turn the rotary encoder (5) clockwise/counter clockwise until the indication field shows the function BRT.



- Make a "short push" on the rotary encoder (5).
 - The changeable digit is shown inverted.
- Turn the rotary encoder (5) clockwise/counter clockwise to change the value (0...100).



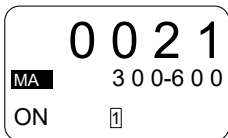
- The changes are stored automatically.

3.5.10 View Aircraft Address (AA)



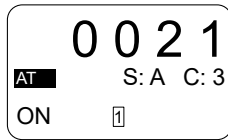
- Make a "short push" on the SEL key.
 - The display is in the function selection view.
 - The VFR indication field is shown inverted.
- Turn the rotary encoder (5) clockwise/counter clockwise until the indication field shows the function AA.
 - The display shows the aircraft address (middle line).
- After 5 s without any activity the RCU6513 changes to standard view.

3.5.11 View Maximum Airspeed (MA)



- Make a "short push" on the SEL key.
 - The display is in the function selection view.
 - The VFR indication field is shown inverted.
- Turn the rotary encoder (5) clockwise/counter clockwise until the indication field shows the function MA.
 - The display shows the max. airspeed in knots (middle line).
- After 5 s without any activity the RCU6513 changes to standard view.

3.5.12 View Aircraft Type (AT)



- Make a "short push" on the SEL key.
 - The display is in the function selection view.
 - The VFR indication field is shown inverted.
- Turn the rotary encoder (5) clockwise/counter clockwise until the indication field shows the function AT.
 - The display shows the aircraft type (middle line).
- After 5 s without any activity the RCU6513 changes to standard view.

Category Set A (S)	Category Set B (S)	Code (C)
unspecified	unspecified	0
Light	Glider / sailplane	1
Small	Lighter than air	2
Large	Parachutist / skydiver	3
High vortex	Ultralight	4
Heavy	-	5
High performance	Unmanned	6
Rotorcraft	Space/ trans atmospheric	7

3.5.13 Select Transponder

Only in installations with two transponders and RCU6513-(X1X).



- The display shows the number of the transponder in operation in the bottom line (1 or 2).
- Push and hold the SEL and STO key at the same time for > 2 s to change the transponder in operation from XPDR1 to XPDR2 and vice versa.

3.5.14 Antenna Switch

The RCU6513 can monitor the antenna switch (discrete output). It can be used as additional status information in dual transponder installations where the antennas are connected to the related transponder with e.g. a RF switch.

- This function depends on installation and configuration.
- This function must be hardwired.

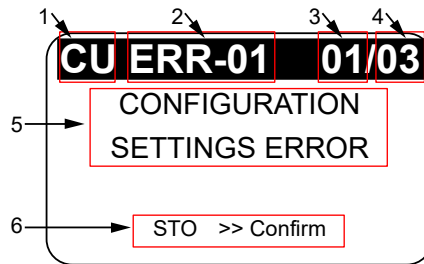
The transponder indication field on the display flashes when the selected transponder does not match RF related switch state.

3.6 Read Out and Reset Error/Failure Flags

- It is possible to read out and reset error flags see "Bit Error Mode" page 71.

3.7 Warning and Failure Indications

3.7.1 Error Message Description



	Description
1	Identification of the error source: CU: RCU6513 X1: Transponder 1 X2: Transponder 2
2	Error number
3	Index of the currently shown error
4	Total number of currently reported errors
5	Error description
6	Information what the user can do

3.7.2 Navigation through Error Menu

Symbol	To do	Description
FID (Flight ID)	short push	<ul style="list-style-type: none"> Shows the previous error from the list if there are more than one error at the same time.
STO (Store)	short push	<ul style="list-style-type: none"> Confirms the current error (not possible for all errors, see "Error List" page 79)
IDT (Identification)	short push	<ul style="list-style-type: none"> Shows the next error from the list if there are more than one error at the same time.
-	short push	Only RCU6513-(X1X) <ul style="list-style-type: none"> The errors related to the transponders can only be shown for the transponder in operation. Push and hold the SEL and STO key at the same time for > 2 s to change the transponder in operation from XPDR1 to XPDR2 and vice versa.

3.7.3 Error List

Display Contents	Description
"INSTALLATION SETTINGS ERROR"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • Failure in configuration settings. <p>Contact maintenance shop for assistance.</p>
"CALIBR/FACTORY SETTINGS ERROR"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • Failure in factory settings. <p>Contact maintenance shop for assistance.</p>
"INTERNAL ERROR"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • Communication error between internal circuits of RCU6513. <p>Contact maintenance shop for assistance.</p>
"CONFIGURATION SETTINGS ERROR"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • Failure in configuration settings. • Long push to STO key in order to restore default settings. • If error occurs frequently please contact maintenance shop for assistance.
"STATUS LINK ERROR"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 does not receive (periodic) status data from transponder over ARINC 429 interface. • Wrong installation or broken lines of transponder status interface (ARINC 429 interface from XPDR to RCU, CTRL_IN_A/B or AUX_IN_A/B lines). • Examine installation for correct connection of ARINC 429 status interface. <p>Contact maintenance shop for assistance.</p>
"XPDR STATUS FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status or discrete input status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. • Discrete input lines short-circuit (if configured as interface in operation). Examine installation for correct connection of discrete input then perform IBIT. <p>Contact maintenance shop for assistance.</p>
"TEMPERATURE FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>

Warning and Failure Indications

Display Contents	Description
"RF HARDWARE FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"MISSING MODE S ADDRESS"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"CONTROL PORT FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. • RCU6513 does not sent periodic control data to XPDR. <ul style="list-style-type: none"> ○ Broken lines of XPDR control interface (ARINC 429 interface from RCU to XPDR, CTRL_OUT_A/B). ○ Examine installation for correct connection of ARINC 29 control interface. <p>Contact maintenance shop for assistance.</p>
"TOP ANTENNA TX FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"BOTTOM ANTENNA TX FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"TOP ANTENNA RX FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>

Display Contents	Description
"BOTTOM ANTENNA RX FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"SQUITTER TRANSMIT FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"TEMPERATURE WARNING"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"TCAS INTERFACE FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"ADLP INTERFACE FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"GNSS INPUT FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"MODE S ADDRESS CHANGE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>

Warning and Failure Indications

Display Contents	Description
"SUPPRESSION BUS STUCK"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"SUPPRESSION BUS I/O FAILURE"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"ALTITUDE SOURCE NO DATA"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"NON-VOLATILE MEMORY CORRUPTED"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"SYSTEM INITIALIZATION"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>
"NO ADS-B OUT FUNCTION"	<p>Possible reasons for indication:</p> <ul style="list-style-type: none"> • RCU6513 receives failure report over ARINC 429 status interface from transponder. <ul style="list-style-type: none"> ○ Push STO key to confirm the message. ○ Details see transponder manual. <p>Contact maintenance shop for assistance.</p>

3.8 Contact Data

In case of additional questions contact your local Becker Avionics dealer or forward your request direct to Becker Avionics "Customer Service".

In the event of damage or a defect, the entire device must be returned for repair. The repair must be done by trained Becker Avionics personnel.

For department and addresses, please see contact info page 2.

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

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