Remote Control Unit for VHF Transceiver

RCU6512

Installation and Operation

Manual DV17551.03
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WARNING - USER RESPONSIBILITY

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

- This document and other information from Becker Avionics GmbH provide product or system options for further investigation by users having technical knowledge.
- The user is responsible for making the final selection of the system and components. The user has to assure that all performance, endurance, maintenance, safety requirements of the application are met and warnings be observed.
  For this the user has to include all aspects of the application to be compliant with the applicable industry standards and the requirements of the responsible aviation authority. The product documentations from Becker Avionics GmbH have to be observed.
- To the extent that Becker Avionics GmbH provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

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

Preface

Dear Customer,

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

For development and manufacturing of our product, the guidelines for highest quality and reliability have been borne in mind, supplemented by selection of high quality material, responsible production and testing in accordance to the ISO 9001 and DIN EN 9100 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.

Control Unit for VHF-Transceiver

RCU6512 (Remote Control Unit)

List of Effective Pages and Changes

Only technical relevant modifications are described in this table.

Document:	**DV17551.03 / issue 01**		**Article Number 0645.230-071**
Cover Page	03/2017		
Introduction	03/2017		
Chapter 1 – 04	03/2017		
Issue	**Page No.:**	**Section / Chapter**	**Description**
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List of Abbreviations

List of Abbreviations	
AF	Audio Frequency
ATT	Attenuation
AUX	Auxiliary
AWG	American Wire Gauge
CBIT	Continuous Built-In Test
CFG	Configuration
CH	Channel
COM	Communication
EASA	European Aviation Safety Agency
EMI	Electro Magnetic Interference
ETSO	European Technical Standard Order
EUROCAE	European Organisation for Civil Aviation Equipment
FAA	Federal Aviation Administration
GND	Ground (Aircraft Ground)
GPS	Global Positioning System
HIRF	High Intensity Radiated Fields
HMI	Human Machine Interface
IC	Intercom
LCD	Liquid Crystal Display
N/A	Not Applicable
PBIT	Power-On Built In Test
PTT	Push To Talk
PWR	Power
RCU	Remote Control Unit
RT	Remote Transceiver
RX	Receive
SQL	Squelch
SRC	Source
SW	Software
TSO	Technical Standard Order
TX	Transmit
VDC	Voltage Direct Current
VHF	Very High Frequency
VSWR	Voltage Standing Wave Ratio

Units

Units	
A	Ampere
mA	Milliampere
°C	Degree Celsius
cm	Centimeter
dBm	Power Ratio In Decibel
dB	Decibel
g	Gram
kg	Kilogram
MHz	Megahertz
mm	Millimeter
Nm	Newton Meter
Ohm (Ω)	Resistance
s	Second
V	Volt
mV	Millivolt
W	Watt
mW	Milliwatt
"	Inch
°	Angular degree

General Safety Definitions

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

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

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

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

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

Disposal

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

This product contains materials that fall under the special disposal regulation, which corresponds to the EC directive for dangerous disposal material. We recommend disposing of the respective materials in accordance with the respectively valid environmental laws. The following table states the materials suitable for recycling and the materials which have to be disposed of separately.

Material	Suitable for recycling	Disposal
Metal	yes	no
Plastics	yes	no
Circuit boards	no	yes

Dispose of the circuit boards:

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

Warranty Conditions

⚠CAUTION The device(s) may be installed only if further evaluation by the user/installer documents an acceptable installation that is approved by the appropriate airworthiness authority.

User Conversions and Changes are Not Permitted.

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

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

Conditions of Utilization

General introductory notes

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

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

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

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

Additional Conditions of Utilization

Please refer to "Safety-Conscious Utilization", page 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

In this chapter you can read about:

This manual describes the installation and operation of the Remote Control Unit RCU6512 from Becker. The ID label on your device shows the part number for identification purposes (see "Type Plate", page 27).

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

1.1. Introduction

The technical information in this document applies to the described product(s) RCU6512-(XXX).
For further descriptions we are using the term RCU6512 instead writing the complete model number.

The manual "Installation and Operation (**I&O**) contain the following sections:

	Section	DV17551.03 I&O
	General	X
	Installation	X
	Operation	X
	Theory of Operation	N/A
	Maintenance and Repair	N/A
	Illustrated Parts List	N/A
	Modification and Changes	N/A
	Circuit Diagrams	N/A
	Certifications	N/A
	Attachments	N/A

1.2. Purpose of Equipment

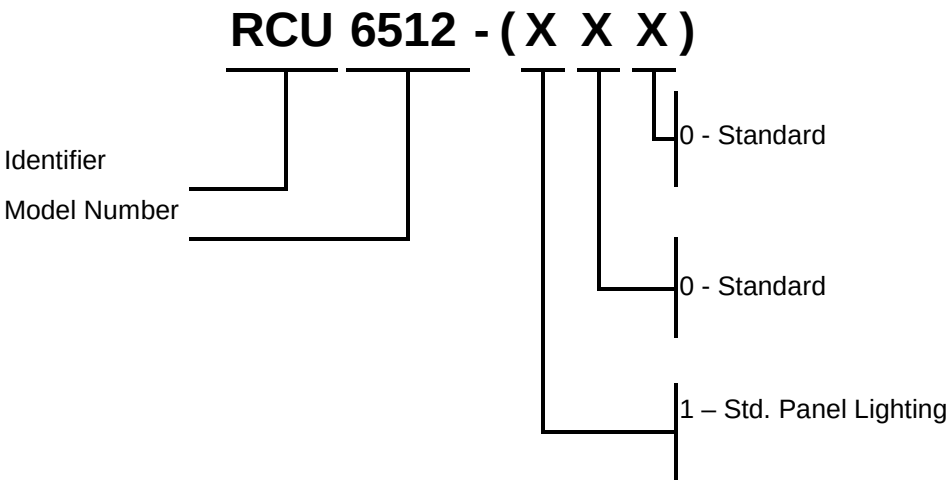
The Becker Remote Control Unit RCU6512 is designed to operate with Becker VHF Transceiver RT6512. Primary intended function of RCU6512 is to provide HMI (Human Machine Interface) for interaction between users and VHF transceiver.

The system of RCU6512 and transceiver enables voice communication between aircraft or between an aircraft and ground stations, using the very high frequency band between 118.000...155.975 MHz.

- RCU6512 is intended 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 or with 24 VDC batteries possible.
- Channel spacing of 25 kHz or 8.33 kHz.
- Non-volatile memory for storing up to 40 frequencies/channels.
- Squelch functionality, RCU6512 enables switching ON/ OFF for squelch function of controlled transceiver.
- RCU6512 can operate at emergency voltage 18 V without any degradation of performance.
- The data exchange between RCU6512 and VHF transceiver is accomplished via a RS422 serial interface.
- Various built-in tests are available to verify the correct operation of RCU6512 and transceiver.

1.3. Variants Overview

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



1.3.1. Software Status

Descriptions see "Software/Firmware Status – Functionality", page 27.

1.4. Associated Devices

Following devices can operate with RCU6512

Device	Function
RT6512	Becker Avionics Remote-Controlled VHF Transceiver

1.4.1. Short Description

Here the most commonly used combination:

Figure 1: Application - RCU6512 + RT6512 + Antenna

1.5. Scope of Functionality

- The RCU6512 is a compact and light-weight device and is designed for installation in the instrument panel of aircraft.
- All controls and indicators are located on the front panel.
  The equipment connector (1x D-Sub) are located at the rear of the unit.
- Mounting via four screws (rear panel mounting).
  The dimensions correspond to the standard instrument diameter of 58 mm (2¼ inch).

Figure 2: RCU6512 Remote Control Unit

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. Channel Spacing / Frequency Range

RCU6512 together with RT6512 enables voice communication between aircraft or between an aircraft and ground stations using the VHF band between 118.000...155.975 MHz (depending on RT6512 variant).

- 8.33 kHz channel spacing: from 118.000...136.990 MHz.
- 25 kHz channel spacing: from 118.000...136.975 MHz.
- Extended frequency from: 118.000...155.975 MHz.
- The RCU6512 supports all frequency band variants of RT6512 transceiver series.

1.5.3. Memory Channels / Frequency Storage

The RCU is capable to store up to 40 frequencies assigned to channel numbers in two banks.

- 20 memories reserved for 25 kHz channels spacing mode.
- 20 memories reserved for 8.33/25 kHz channel spacing mode.

NOTICE

The word "frequency" also used in the sense of "channel name", as defined in EUROCAE, document ED-23C chapter 1.3.2.

In this document the word "memory channel" or "channel" means a memory place identified by a channel number, where a frequency may be stored for later use.

1.5.4. **Squelch Operation**

The squelch (muting) circuit suppresses weak signals.

- RCU6512 enables switching ON/ OFF for squelch function of controlled transceiver.
- Squelch threshold is adjustable via the configuration mode.

1.5.5. **Sidetone**

- The sidetone level is available on the line output of controlled transceiver during transmission.
- The sidetone level is adjustable via the configuration mode.

1.5.6. **Emergency Operation**

If the power supply voltage drops below 18 V, the RCU6512 stops operating. If power supply further drops below 9.0 Volt, the unit automatically switches off.

1.5.7. **Configuration Mode**

Configuration of diverse parameters is provided via the "Configuration Mode".

1.5.8. **Installation Mode**

This mode is password-protected and for use by authorized maintenance organizations during aircraft service on ground only.

1.5.9. **Interface**

RCU6512 provides a RS422 interface for communication with the transceiver. This interface is capable of receiving and transmitting serial asynchronous data.

1.5.10. **Built In Tests (BIT)**

The RCU6512 has advanced Built-In-Test. It monitors most of internal circuits against failures. In addition BIT monitors some external (installation) conditions to increase the reliability of RCU6512 and RT6512.

There are three types of BIT implemented:

- PBIT (performed after Power ON the RCU6512 and RT6512 system).
- IBIT (on-request test of remote transceiver initiated by special command via serial protocol).
- CBIT (which continuously checks controller and transceiver operation).

1.6. Safety-Conscious Utilization

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

⚠CAUTION The device(s) may be installed only if further evaluation by the user/installer documents an acceptable installation that is approved by the appropriate airworthiness authority.

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 observed.
- Use the product only within the specified conditions, see "Technical Data", page 20.
- Power supply:
  - Do not connect the unit to AC sources.
  - Make sure that the unit is connected to the mandatory DC source, see "Technical Data", page 20.
  - Do not connect the unit with reversed polarity to the DC source.
- Circuit breaker:
  - Use the recommended fuses in the power supply line to protect the application, see "Technical Data", page 20.

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

Do not switch 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.

1.8. Technical Data

1.8.1. General Characteristics

RCU6512	
Nominal supply voltage	13.75…27.5 VDC
Extended supply voltage	9.0...32.2 VDC
Emergency operation voltage (with RT6512)	18...20.5 VDC
Maximum Power Consumption	≤ 20 mA
Switch OFF Power Consumption	≤ 100 µA
Frequency Range	118.000...155.975 MHz (depends on RT6512 variant)
Channel Spacing	25 kHz 8.33/25 kHz (up to 136.9916 MHz)
Device protection (internal fuse)	1 A
Recommended external fuse protection	
with separate fuse for RCU6512	5 A
with common fuse for RCU6512+RT6512	10 A
Dimming control	0…5 V, 0…14 V or 0…28 V
Storage temperature range	-55...+85 °C
Operating temperature range	-20...+55 °C, short-time +70 °C
Operating altitude	35 000 ft

1.8.2. Dimensions & Weight

Product	Specifications
Dimensions HxW	61 x 61 mm (2.4 x 2.4 inch)
Depth of unit	65.9 mm (2.59 inch)
Mounting depth	39.3 mm (1.55 inch)
Weight	0.200 kg (0.44 lbs)
Material	AlMg/Plastic
Panel color	Control-head coated black matt

1.8.3. Software

The design and development processes used for Remote Control Unit RCU6512 software are in compliance with the rules given in EUROCAE/RTCA Document ED-12C/DO-178C.

Design Assurance Level' (DAL) "C".

1.8.4. Hardware

The RCU6512 devices do not contain complex hardware.

1.8.5. Continued Airworthiness

- The RT6512 maintenance is defined as "on condition" only.
- No scheduled or regular maintenance of this product is required.

1.8.6. Environmental Conditions

RCU6512 was tested in accordance with EUROCAE/RTCA Document ED-14G/DO-160G under consideration of below listed environmental categories and conditions:

Conditions	Section	Cat.	
Temperature and Altitude	4.0	C4	--
Ground Survival Low Temperature	4.5.1	C4	-55 °C
Low Operating Temperature	4.5.2	C4	-20 °C
High Ground Survival Temperature	4.5.3	C4	+85 °C
High Short-Time Operating Temperature	4.5.3	C4	+70 °C
High Operating Temperature	4.5.4	C4	+70 °C
In-flight Loss of Cooling	4.5.5	Z	No forced cooling required
Altitude	4.6.1	C4	35 000 ft
Decompression	4.6.2	X	no test performed
Overpressure	4.6.3	X	no test performed
Temperature Variation	5.0	B	5 °C per minute
Humidity	6.0	A	Standard
Operational Shock and Crash Safety	7.2 7.3	B	--
Vibration	8.0	S U	Category S - M Category U - Curve G
Explosion Proofness	9.0	X	no test performed
Water Proofness	10.0	X	no test performed
Fluids Susceptibility	11.0	X	no test performed
Sand and Dust	12.0	X	no test performed
Fungus Resistance	13.0	X	no test performed
Salt Spray	14.0	X	no test performed
Magnetic Effect	15.0	Z	1 degree deflection at < 0.3 m
Power Input	16.0	BXX	--
Voltage Spike	17.0	A	--
Audio Freq. Conducted Susceptibility	18.0	B	--
Induced Signal Susceptibility	19.0	ACX	--
Radio Frequency Susceptibility	20.0	SW	
Emission of Radio Frequency Energy	21.0	B	
Lightning Induced Transients Susceptibility	22.0	A1X E3X	Pin test waveform A, level 1 Cable bundle test waveform E, level 3
Lightning Direct Effects	23.0	X	no test performed
Icing	24.0	X	no test performed
Electrostatic Discharge	25.0	A	--
Fire, Flammability	26.0	X	no test performed

1.8.7. **Certifications**

RCU6512 certification is pending.

RCU6512 meets the requirements of:

Number	Description
ETSO-2C169a	VHF Radio Communication Transceiver Equipment Operating within Radio Frequency Range 117.975 to 137.000 MHz
TSO-C169a	VHF Radio Communication Transceiver Equipment Operating within Radio Frequency Range 117.975 to 137.000 MHz

Considered EUROCAE documents:

Number	Description
EUROCAE ED-23C	MOPS for Airborne VHF Receiver-Transmitter Operating in the Frequency Range 117.975 - 137.000 MHz
EUROCAE ED-12C	Software Considerations in Airborne Systems and Equipment Certifications
EUROCAE ED-94C	Supporting Information for ED-12C and ED-109

NOTICE The RCU6512 does not influence the receiver and transmitter performance data (despite the used channel frequency). By this, corresponding tests were not performed for qualification of RCU6512.

1.9. Order Code

1.9.1. RCU6512

Qty	Device	
1	RCU6512-(100), Remote Control Unit	Article No. 0637.297-910

1.9.2. Accessories

Qty	Connector Kit	Article-No.
1	CK5000-S (soldering version); • D-Sub15-s, Connector housing, Label "COMM", Label "NAV", Label "ADF", Label "XPDR"	Article No. 0511.791-954
1	CK5000-C (crimp version); • D-Sub15-s, Connector housing, Label "COMM", Label "NAV", Label "ADF", Label "XPDR"	Article No. 0511.781-954

Qty	Available Documentation	
1	RCU6512 Installation and Operation, English	Article-No. 0645.230 071

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2. Installation

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

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

In this chapter you can read about:

2.1. Packaging, Transport, Storage

Visually inspect the package contents for signs of transport damage.

Packaging Material and Transport

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

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

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

First Device Checkup

- Check the device for signs of transport damages.
- Please verify if the indications on the type plate correspond to your purchase order.
- Check if the equipment is complete ("Scope of Delivery", page 26).

Storage

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

2.2. Device Assignment

This manual is valid for the following devices:

- RCU6512-(100)

  Upwards from Software Version:
  SCI1038S305 Version 12

2.2.1. Scope of Delivery

- Manuals
  - Installation & Operation
- Device in accordance with your order
- Documents of Certifications if available

2.2.2. State of Delivery

- RCU is ready for use with factory default settings
  - No programming procedures required
  - Default settings see "Factory Default Settings" page 42

2.2.3. Additional Required Equipment

- Transceiver
- Connectors + cables
- PTT switch
- Antenna

Details see "Accessories", page 23.

2.2.4. Type Plate

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

Figure 3: Type plate (example)

Explanation:

PN:	**Example Type designation: RCU6512-(100)** **RCU6512** = Remote Control Unit 58 mm (2¼ inch) **Options:** **100:** Factory Standard
SN:	Unique number of the particular device
AN:	Article number
DoM:	Date of Manufacturing
	Software Corresponding to the displayed version
	Compliance and Certifications Corresponding to the displayed text and logos

2.2.5. Software/Firmware Status – Functionality

- The implemented firmware version can be checked in the display via the configuration menu.
- The software version is subject to change without notice.
- Please contact our Customer Service Department for detailed information about software modification.

2.3. Mounting Requirements

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

For connection the following equipment are required as minimum for RCU6512 controller:

- Power supply.
- VHF transceiver RT6512.
- PTT switch
- Antenna

SAFETY INSTRUCTIONS

The installation of RCU6512 into an aircraft may be carried out by an authorized installation company. The country regulations always have to be observed.

- The device must not be opened.
- Keep an efficient distance of the devices with integrated ventilator fans in order to ensure free circulation of the cooling air.
- The mounting place shall be at least 30 cm from the magnetic aircraft compass, to avoid any interference to the magnetic compass.
- Forced cooling is not required.

SAFETY INSTRUCTIONS

RCU6512 design allows installation in cockpit environment of general aviation aircraft including helicopters.

Following limitations apply for the installation of the unit:

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

SAFETY INSTRUCTIONS

- Use only cables which are qualified for aircraft use (self-extinguishing).
- Use AWG 20 for power supply and AWG 22/24 for other cables.
- Fit sleeves over the solder joints on the equipment connector.
- Crimp connectors are also available from Becker.
- Protect the power supply in the application with an external fuse (recommendation for fuse please see "Technical Data" page 20).

⚠CAUTION

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

2.3.1. RCU6512 Installation (Rear Panel Mounting)

- Use the four screws already attach to the front of the RCU6512 for installation.
- The circular cut out and the mounting holes have to be prepared in accordance with Figure 5: Drilling template (rear panel mounting).
- For dimensions refer to Figure 6: RCU6512-(XXX).

Dimensions mm (inch)

61x61 mm (2.4x2.4 in)

Figure 4: Dimensions RCU6512 (front view)

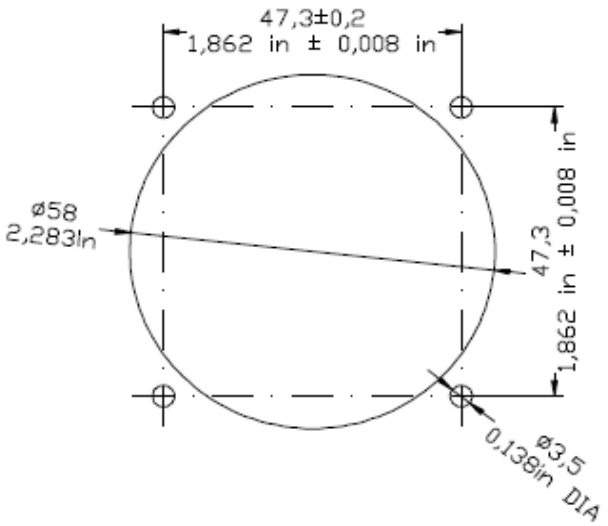


Figure 5: Drilling template (rear panel mounting)

2.4. Dimensions

2.4.1. RCU6512-(XXX)

Dimensions mm (inch)

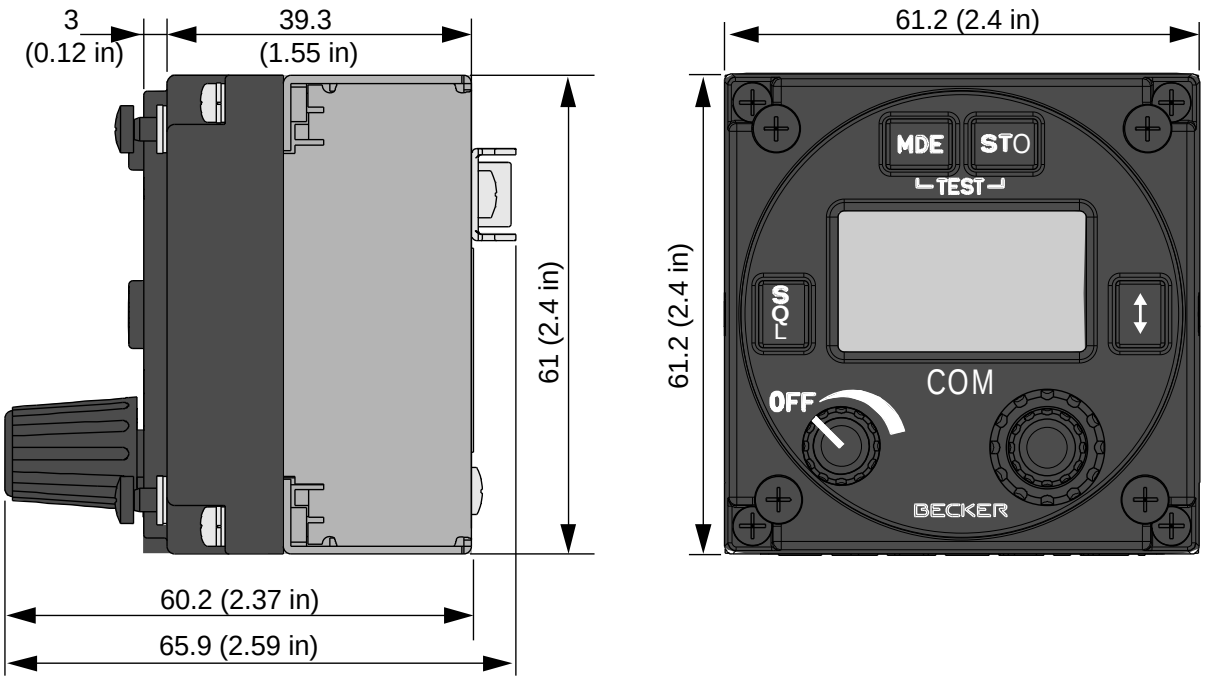


Figure 6: RCU6512-(XXX)

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

2.5. Connector Pin Assignments

Connector P1

- Type: 15pin D-Sub male connector with slide-in fastener.

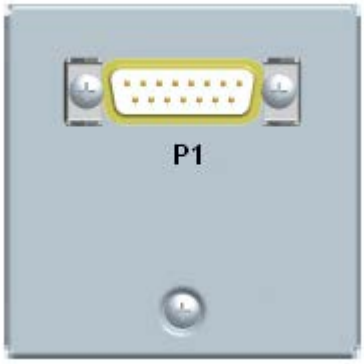


Figure 7: RCU6512-(XXX) - Connector Layout

2.5.1. Connector P1

P1 Pin	Pin Name	I/O	Function
1	TX0_422+	OUT	Primary Control & Service Interface
2	TX0_422-	OUT	Primary Control & Service Interface
3	Reserved	-	factory only
4	RX0_422+	IN	Primary Control & Service Interface
5	RX0_422-	IN	Primary Control & Service Interface
6	ILL_LO	IN	Illumination low
7	Reserved	-	factory only
8	ILL_HI	IN	Illumination high
9	GND	-	Power supply Ground, shielding for RS422, Ground for discrete lines
10	Reserved	-	factory only
11	SUPP_IN	-	Power supply (positive)
12	/6512	IN	RT6512 support only
13	/EXT_ON	IN/OUT	External Power ON input Active state - closed contact to GND
14	Reserved	-	factory only
15	/EXCH_CH	IN	External "Exchange" key Active state - closed contact to GND

2.5.2. Discrete In-/Outputs

Discrete inputs characteristics:	
Input type:	asymmetrical, DC coupled
Closed contact to GND:	≤ 100 Ω
Open contact to GND:	≥ 100 kΩ
Resistance activation:	Active state: closed contact to GND
Voltage activation:	Active state: < 3.5 V
	Inactive state: > 4.5 V

The input shall withstand connection of external relay (R = 200 Ω) to PSUPP line.

Discrete outputs characteristics:	
Output type:	asymmetrical, “open drain”
	Active state - output line closed to GND: I_{OUT}_C ≥ 100 mA, U_{OUT}_C ≤ 0.3 V
	Inactive state - output line open: I_{OUT}_O ≤ 100 µA, U_{OUT}_O ≤ 30 V

2.5.3. Panel Illumination

The RCU6512 controller push-buttons and LCD display can be illuminated. The illumination can be configured in the configuration setup.

- Via front panel or externally via P1-6/P1-8.

For external configuration:

- Connect P1-6 to system ground and P1-8 to dimming voltage bus.

Pin No.	Pin Name	I/O	Function
P1-6	ILL_LO	IN	Illumination low input
P1-8	ILL_HI	IN	Illumination high input

2.5.4. External Power ON (/EXT_ON)

The External Power "ON" line provides the possibility to power on the system.

- Active when contact to GND.
- This can be implemented in installations with a central avionics power switch or to power on RT6512.

Pin No.	Pin Name	I/O	Function
P1-13	/EXT_ON	IN/OUT	External Power ON input/output ACTIVE state - closed contact to GND

2.5.5. External Exchange (/EXCH_CH)

The External "Exchange" input provides possibility to change active and preset frequency.

- RCU6512 provides a discrete input /EXCH_CH_IN accepting an external contact or open collector to ground

Pin No.	Pin Name	I/O	Function
P1-15	/EXCH_CH	IN	External "Exchange" key ACTIVE state - closed contact to GND

2.6. Equipment Configuration Samples

2.6.1. RCU6512 with RT6512

RT6512 transceiver operated by RCU6512 controller using the RS422 interface.

Figure 8: RCU6512 with RT6512

2.7. Aircraft Wiring

SAFETY INSTRUCTIONS

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

2.7.1. Installation Switch (INS_SW)

It is necessary to install a switch to get access to the RT6512 installation parameters.

Access to RT6512 installation parameters is only possible when RT6512 /SERV_EN line is connected to ground.

- RT6512, connector P1/28 → turnkey (INS_SW) → GND

NOTICE

- Setting of RT6512 installation parameters are available only when installation switch* (INS_SW) is closed.
- Otherwise settings of RCU6512 installation parameters only will be possible.

* For details see "Figure 9: RT6512 with RCU6512 as Primary Controller", page 34).

2.7.2. RT6512 with RCU6512 as Primary Controller

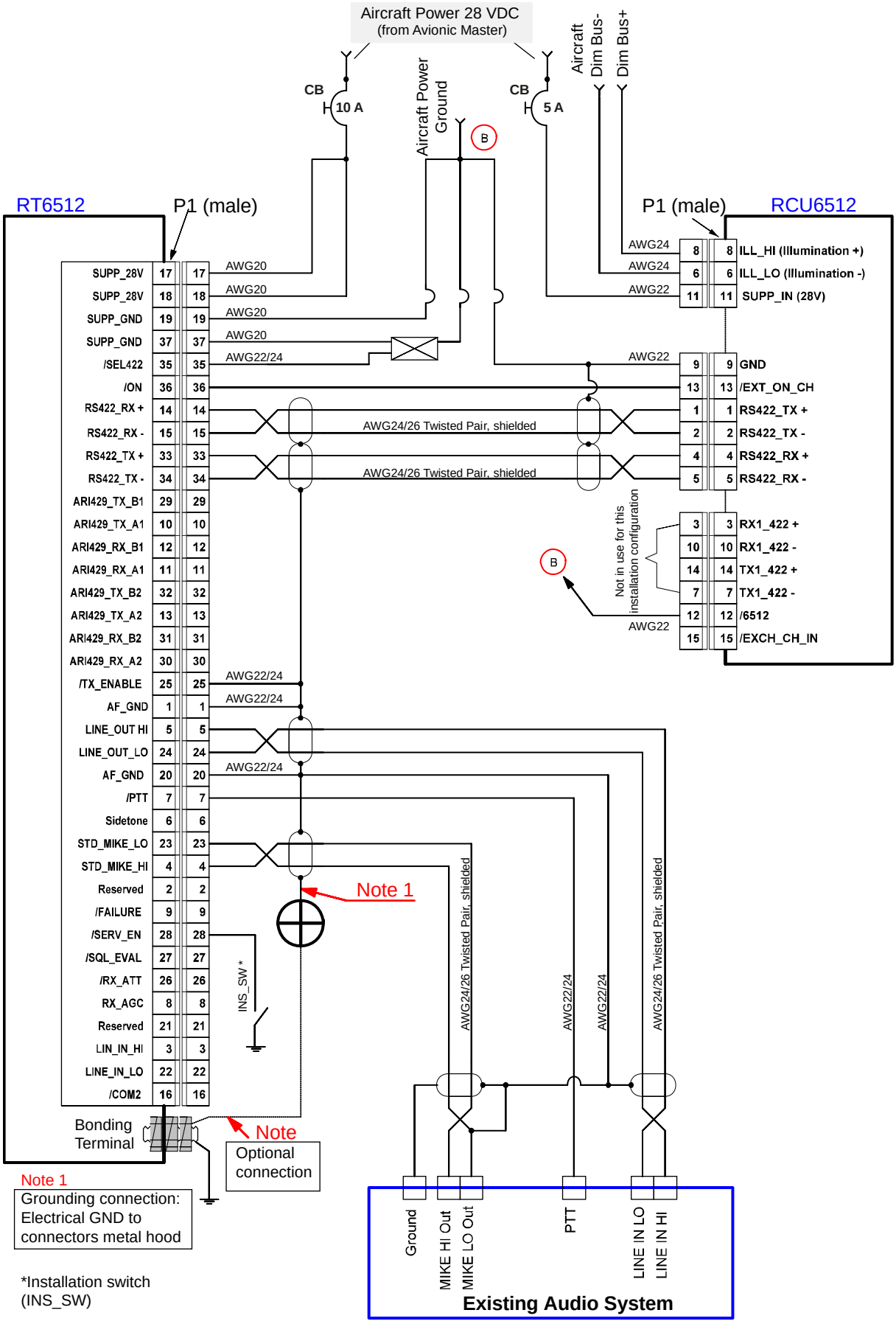


Figure 9: RT6512 with RCU6512 as Primary Controller

2.8. Configuration-Setup

The configuration setup enables the avionics technician to set up the equipment configuration on ground.

NOTICE Several functions and settings are only available via the password-protected "Installation Mode" and active installation switch* (INS_SW).

* For details see wiring "Figure 9: RT6512 with RCU6512 as Primary Controller", page 34).

SAFETY INSTRUCTIONS We do not recommend performing changes on the configuration setup in-flight.

2.8.1. Installation Mode

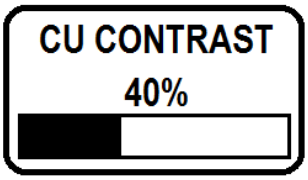
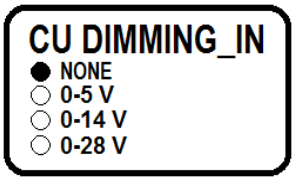
NOTICE

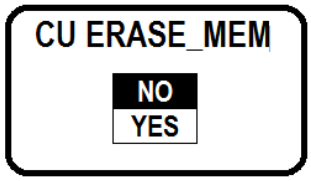
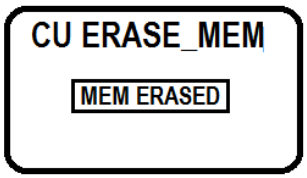
- Setting of RT6512 installation parameters are available only when installation switch* (INS_SW) is closed.
- Otherwise settings of RCU6512 installation parameters only will be possible.

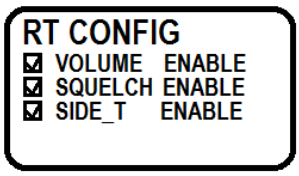
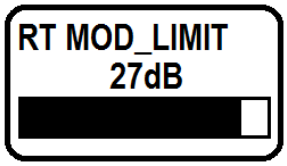
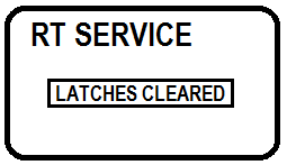
* For details see wiring "Figure 9: RT6512 with RCU6512 as Primary Controller", page 34).

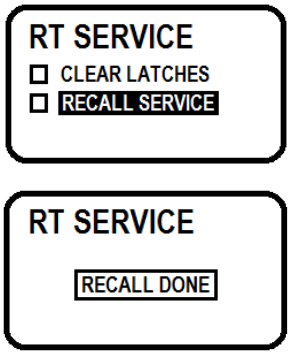
2.8.1.1. Start Installation Mode

Display Contents	Description
	• Activate installation switch (INS_SW). • Hold down the "MDE" key during power up to access the configuration/installation mode.
 Figure 10: "CFG MODE"	• The "CFG MODE" screen appears. • Press “MDE” key.
 Figure 11: "INS MODE"	• The "INS MODE" screen appears. • Press "ROTARY ENCODER" push button.

Display Contents	Description
 Figure 12: "PASSWORD 0000"	• The "PASSWORD" screen appears. • Enter password by means of rotary encoder.
 Figure 13: "PASSWORD"	• Insert the 4-digit code "6435" by turning and pushing the rotary encoder (push to toggle between digits). • Press “STO” key to accept password.
	Setting of RCU parameters
 Figure 14: "CU CONTRAST"	• "CU CONTRAST" screen appears. • Set proper contrast level by means of "ROTARY ENCODER". • Press "ROTARY ENCODER" push button.
 Figure 15: "DIMMING_INPUT"	• "DIMMING_INPUT" screen appears. • Select required "DIMMING_INPUT". o NONE: A dimming voltage at the Illumination input lines will be ignored and "CU BRIGHTHESS" will be available via "Configuration Mode" o +5 VDC, +14 VDC or +28 VDC: RCU6512 illumination will be controlled remotely by illumination input lines. o Maximum illumination level will be achieved for dimming voltage +5 V, +14 V or +28 V respectively. • Press "STO" key to confirm selection. • Press “ROTARY ENCODER” push button.

Display Contents	Description
 Figure 16: "CU MEMORY"	• "CU MEMORY" screen appears. • By selecting "STORE CHN_ON" storing function of memory channels will be enabled. • Use "STO" key to select/deselect check box. • Press "ROTARY ENCODER" push button.
 Figure 17: "CU ERASE_MEM"	• "CU ERASE_MEM" screen appears. To erase memory channels: • Select "YES" via the "ROTARY ENCODER" • Press "STO" key to confirm selection. **Note:** Only one memory bank, the memory channels for current selected channel spacing has been erased.
 Figure 18: "Erase confirmation"	• Erase confirmation screen appears. **Note:** Only one memory bank, the memory channels for current selected channel spacing has been erased. To erase the second memory bank, the channel spacing needs to be changed and then the erase procedure has to be repeated. * For details please refer to: "Start Configuration Mode" page 39 → Channel Spacing.

Display Contents	Description
	Setting of RT6512 parameters
	Note: Setting of RT6512 parameters are only available when installation switch* (INS_SW) is closed. * For details see wiring "Figure 9: RT6512 with RCU6512 as Primary Controller", page 34).
 Figure 19: "RT CONFIG"	• Press "ROTARY ENCODER" push button. • "RT CONFIG" screen appears. By selecting or deselecting check boxes relevant setting will be allowed or blocked. • Use "ROTARY ENCODER" to navigate between the functions. o Use "STO" key to select/deselect check boxes. • Press "STO" key to confirm selection.
	• Press "ROTARY ENCODER" push button.
 Figure 20: "RT MOD_LIMIT"	• "RT MOD_LIMIT" screen appears. **Note:** "RT MOD_LIMIT" screen appears only when installation switch* (INS_SW) is closed. * For details see wiring "Figure 9: RT6512 with RCU6512 as Primary Controller", page 34). • The "RT MOD_LIMIT" setting allows adjusting audio input sensitivity at proper level. o Minimum value of 5 dB correspond to minimum sensitivity (approx. 3 V_{RMS} at MIKE_IN and 6 V_{RMS} at LINE_IN to achieve 70% on modulation) o Maximum value of 31 dB corresponds to maximum sensitivity (100 mV_{RMS} at MIKE_IN and 200 mV_{RMS} at LINE_IN).
 Figure 21: "RT SERVICE" 	• Press “ROTARY ENCODER” push button. • "RT SERVICE" screen appears. • "CLEAR LATCHES": All error flags stored in RT6512 memory will be cleared. • Use "ROTARY ENCODER" to navigate between the functions. • Press “STO” key to confirm selection. o The confirmation will be displayed on the screen.

Display Contents	Description
 	• "RECALL SERVICE": All installer settings will be recovered to the factory default settings*. • Use "ROTARY ENCODER" to navigate between the functions. • Press “STO” key to confirm selection. o The confirmation will be displayed on the screen. *Factory default please see "Factory Default Settings" page 42.

2.8.2. Configuration Mode

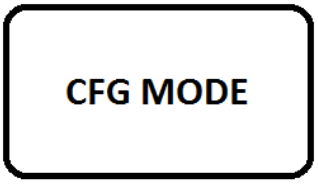
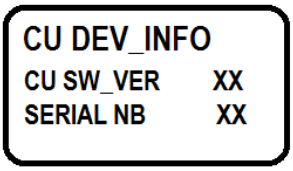
2.8.2.1. Navigate between Pages

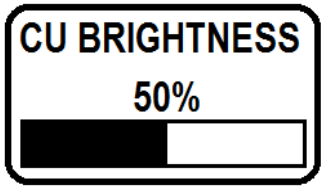
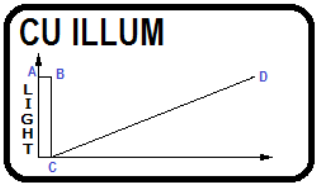
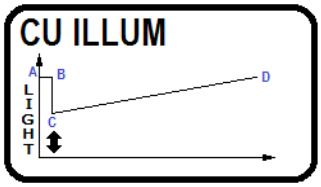
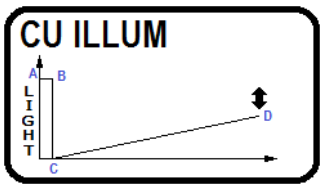
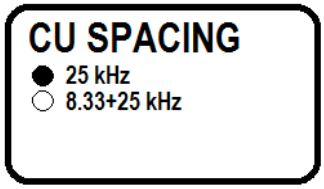
- The configuration mode consists of several pages.
- For navigation within main pages of the configuration mode, use the "ROTARY ENCODER" push button.

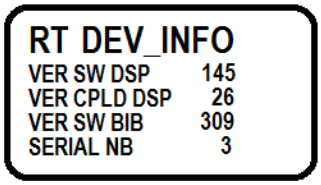
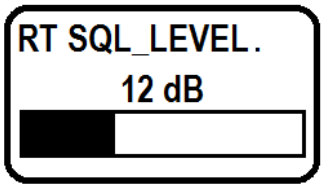
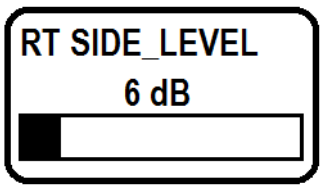
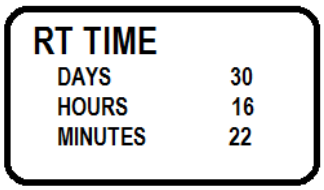
2.8.2.2. Leave Configuration Mode

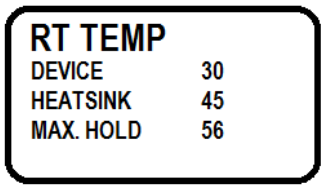
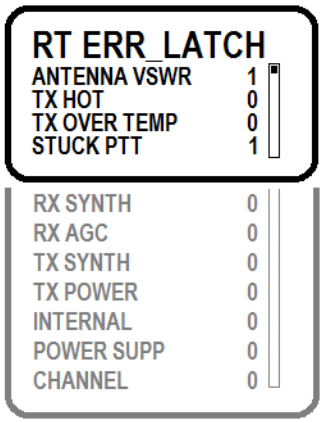
- Switch "OFF" the RCU6512 to terminate the setup.
  - o All changes made up to this time will be stored automatically.
- No special action is required before leaving setup pages.

2.8.2.3. Start Configuration Mode

Display Contents	Description
	• Hold down the "MDE" key during power up to access the configuration mode.
 Figure 22: "CFG MODE"	• The "CFG MODE" screen appears. • Press “ROTARY ENCODER” push button.
 Figure 23: "CU DEV_INFO"	• "CU DEV_INFO" screen appears. Device info about: o RCU6512 software version. o RCU6512 serial number.

Display Contents	Description
	Configuration Mode (RCU6512)
 Figure 24: "CU BRIGHTNESS"	**"BRIGHTNESS":** The brightness of the LCD and push-button illumination can be adjusted between 0% (off) and 100%. • Select your brightness by means of "ROTARY ENCODER". **Note:** "CU BRIGHTNESS" screen appears only if dimming input is set to "NONE". Otherwise the aircraft dimming bus will control the brightness.
 Figure 25: "CU ILLUM"  	**Illumination ("CU ILLUM")** The illumination curve shows the relation between dimming bus voltage and brightness of the LCD and push-button illumination. • Two adjustable points C and D define the illumination curve. • Select the respective parameter by pushing the "STO" button • Then adjust the value in vertical (up/down) direction by means of "ROTARY ENCODER". **Note:** "CU ILLUM" screen appears only if the DIMMING_IN is selected for 5 V, 14 V or 28 V dim-bus voltage. If the dimming voltage is not provided (0 V or high impedance), brightness of display backlight and switches illumination becomes maximum (100%) • Parameter “C” is the level of minimum brightness that is set when related trigger point of dimming voltage is reached. • Parameter “D” is the level of maximum brightness when maximum dimming voltage is applied to the illumination Input.
 Figure 26: "CU SPACING"	**Channel spacing ("CU SPACING")** "CU SPACING" setting provides selection between the supported frequency channel spacing modes. • Select spacing by means of "ROTARY ENCODER". • Confirm by “STO” key.

Display Contents	Description
	Configuration Mode (RT6512)
 Figure 27: "RT DEV_INFO"	• "RT DEV_INFO" screen appears. Device info (main information) about the controlled RT6512 transceiver.
	**Squelch threshold level ("RT SQL_LEVEL")** The noise squelch threshold "RT SQL_LEVEL" is adjustable within a range of 6...23 by turning the "ROTARY ENCODER". • Minimum adjustment of 6 (very weak signals are audible with high noise content; squelch opens at about -105 dBm) means: o Weak RF signals can trigger the squelch threshold o The voice signal might be low combined with a noisy background. • Maximum adjustment of 23 (only quite strong signals are audible with low noise content; squelch opens at about -87 dBm) means: o Only strong RF signals will trigger the squelch threshold. o The voice signal will be audible very clear with very low background noise. o Weak RF signals may not trigger the squelch threshold and therefore the audio may not be heard by the pilots. **Note:** For very weak RF signals receiver audio level might be reduced
	**Sidetone level ("RT SIDE_LEVEL")** The attenuation relates to the received volume setting. • 0 dB = sidetone as loud as received signal. • 12 dB = sidetone signal 12 dB less than the received signal.
 Figure 28: "RT TIME"	**Operating time ("RT TIME")** Information about operating time of RT6512 transceiver.

Display Contents	Description
 Figure 29: "RT TEMP"	**Temperature ("RT TEMP")** Information about temperature of RT6512 transceiver.
 Figure 30: "RT ERR_LATCH""	**Failure history ("RT ERR_LATCH")** The display can only show 4 rows of monitored failures types (scroll bar for more). • Move the scroll bar via the "ROTARY ENCODER" to view additional failures. o 0 means no failure were detected and stored. o 1 means that a failure was detected and stored once or several times.

2.9. Factory Default Settings

☑ Enabled ☐ Disabled ● Selected ○ De-Selected

Setting name	Value
CU BRIGHTNESS	50%
CU SPACING	○ 25 kHz ● 8.33/25 kHz
CU CONTRAST	40%
CU DIMMING_IN	● NONE ○ 0-5 V ○ 0-14 V ○ 0-28 V
CU MEMORY	☑ STORE CHN_ON
CU ERASE_MEM	No channels stored

2.10. Post Installation Check

Note: It is assumed that the "Configuration Setup" has been done before the Post Installation Tests will be carried out.

- Once the RCU6512 is installed completely perform a test procedure to verify system functionality.
- Ensure compliance with authority required procedures. Refer to the installation order of the minor change document or use an own approved test protocol for VHF units. The following description provides guidance for such tests.

2.10.1. Mechanical Installation and Wiring Check

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

2.10.2. Power Supply

- Check the power supply lines and confirm correct polarity. Don´t apply reverse voltage!
- Confirm that the aircraft power supply is within the specified limits, with and without a running engine.

2.10.3. Receiver / Transmitter Operation

- Power up the RCU6512 and RT6512 and tune it to a local station for a communication test.
- Verify that the receiver output produces a clear and readable audio and ask the local station for proper readability for the transmit signal of the controlled RT6512.

2.10.4. Flight Test Check

It is highly recommended to perform flight test as final installation verification.

The performance of the RCU6512 with controlled RT6512 may be verified by contacting a ground station at a range of at least 50 NM while maintaining an appropriate altitude and over all normal flight attitudes.

- Check the performance in the low, mid and high band frequencies.

2.11. Trouble Shooting

Problem	Proposed Solution
Display shows "FAILURE"	Please refer to: "Warning and Failure Indications" page 58.

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3. Operating Instructions

In this chapter you can read about:

This chapter contains general information and instructions to ensure safe operation of the VHF transceiver RT6512 controlled by Remote RCU6512.

The system of RCU6512 and transceiver enables voice communication between aircraft or between an aircraft and ground stations, using the very high frequency band between 118.000...155.975 MHz with a selectable channel spacing of 25 kHz respectively 8.33 kHz.

NOTICE

Several functions and settings are only available via the password-protected "Installation Mode" and "Configuration Mode"*.

* For details please refer to: "Installation Mode" page 35 and "Configuration Mode" page 39.

NOTICE

- The figures for illustrating display show transceivers working in 8.33/25 kHz mixed mode.
- Dedicated pictures for 25 kHz mode are not explicitly shown (they differ only in number of digits for frequency).
- The HMI actions described in this section can be performed on RCU6512 controlling VHF transceiver RT6512.
- The word "frequency" also used in the sense of "channel name", as defined in EUROCAE, document ED-23C chapter 1.3.2.
  - In this document the word "memory channel" or "channel" means a memory place identified by a channel number, where a frequency may be stored for later use.

3.1. Device Description

3.1.1. Device Assignment

This manual is valid for the following devices:

- See page 26

3.1.2. Packing, Transport, Storage

- See page 25

3.1.3. Scope of Delivery

- See page 26

3.1.4. State of Delivery

- See page 26

3.1.5. Type Plate

- See page 27

3.1.6. Safety-Conscious Utilization

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

Do not switch ON the device during engine start or shutdown.

SAFETY INSTRUCTIONS A voice communication test shall be performed before starting the engine.

It should be noted that, if the communication test is carried out close to a ground station, the results may be positive even if the antenna cable is broken or short-circuited. In such a case, at a distance of 5 to 10 km and above, communication might not be possible.

- Speak always loud, clear and not too fast for optimal voice communication.
- Keep the microphone always close to the lips otherwise a special suppressing circuit in the VHF COM will not be capable to suppress normal cabin noise.
- Use only microphones or headsets which are suitable for use in an aircraft.
  - In aircraft made of wood, synthetic materials or in gliders or helicopters, incoming radiation can affect the integrated amplifier of the microphone (feedback), noticeable in the ground station by whistling and/or heavy distortion.

SAFETY INSTRUCTIONS If the power supply voltage drops below 18 V the system stops operating.

3.1.7. **Controls and Indications**

Figure 31: RCU6512-(XXX) - Controls and Indications

	Symbol	Description	Function
1		Power ON/OFF, Volume Knob	• Switches the transceiver ON/OFF and adjusts volume level of received signal.
2		SQL (Squelch)	• "Short press" during normal operation toggles the RX - SQL ON/OFF.
3		MDE (Mode)	• "Short press" during normal operation changes the frequency selection mode.
4		STO (Store)	• "Short press" during normal operation activates storage procedure.
	-TEST-	IBIT Activation	• Keeping the MDE and STO button pressed simultaneously > 2 s changes activates IBIT when RT6512 is in RX-mode.
5		Active frequency	• Only on the active frequency, transmitting is possible. Active frequency tuning is not possible in standard mode.
6		↕ (Exchange)	• "Short press" during standard mode toggles between preset and active frequency.
7		Preset frequency	• Frequency tuning is possible in standard mode.
8		Rotary encoder	• Turning "ROTARY ENCODER" changes the settings of several parameters (frequency, channel number …). • Pushing the "ROTARY ENCODER" toggles between the digits and acts as an enter key.

The device detects a:

"Long press": when pressing and holding down a key for at least 2 seconds (≥ 2s).

"Short press": any pressing below 2 seconds (< 2 s).

If any action by the user is invalid, the whole display inverting for a short time.

Symbols shown on the display

Symbol	Function
TX	Transceiver is in transmit operation.
SQL	Squelch function is active, weak RX signals suppressed.
STO	Transceiver performs a storage operation.
128.225	Inverted figures or letters on display ready to edit.
CH	An already used channel is indicated with capital letters.
ch	A free channel is indicated with small letters.

3.2. Start-Up

SAFETY INSTRUCTIONS

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

Do not switch ON the device during engine start or shutdown

- Turn "ON" the device by turning the volume knob clockwise.
- During PBIT (Power-On Built In Test) the display indicates the message "WAIT".
- If the PBIT has detected error(s),"FAILURE" appears on the display.
  Details see "Warning and Failure Indications", page 58.

3.3. Receive and Transmit Mode

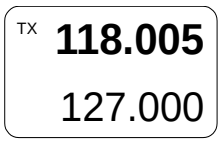
3.3.1. Receive Mode

If /PTT (Push To Talk) input is inactive, the transceiver remains in receive mode.

In receive mode the line output provides signal consisting of:

- Received signal from antenna.

3.3.2. **Transmit Mode**



- If PTT input is active (PTT=Push To Talk key is pressed) the transceiver switches to transmit mode.
  - o Microphone or LINE_IN signal can modulate the transmitter.
- The "TX" symbol indicates the device is in transmitting mode.
- The sidetone (demodulated audio of the emitted signal) is available on the headphone output.

SAFETY INSTRUCTIONS

- In transmit mode several user actions such as changing frequency selection mode or channel, which are normally allowed in receive mode, are blocked. (As an exception in standard mode the "Preset" frequency may still be changeable, even during transmission).
- Note:
  Transmit mode is automatically terminated (return to receive mode) after 30 s of continuous transmitting.
  "FAILURE" is indicated, see "Warning and Failure Indications", page 58.

3.4. **Frequency Selection Modes**

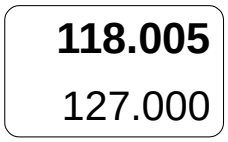
Following frequency selection modes are available on RCU6512:

- Standard Mode
- Direct Tune Mode
- Channel Mode

The modes "Standard Mode", "Direct Tune Mode" and "Channel Mode" provide different user interfaces for the selection of the operating frequency.

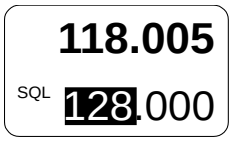
- The modes are selectable by consecutive short pressing of "MDE" key.
- One by one appear: "Standard Mode", "Direct Tune Mode" "Channel Mode" and again "Standard Mode", etc.
- When toggling from "Standard" to "Direct Mode" active frequency remains the same.
- When toggling from "Direct" to "Channel" last selected memory channel is selected.
- When toggling from "Channel" to "Standard Mode" previous active and preset channels are selected.

3.4.1. Standard Mode

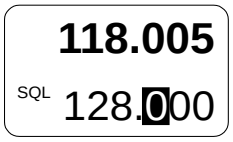


- Press the "MDE" key until the standard mode page appears.
  - The active frequency is displayed in the top line and preset frequency in the bottom line.
- Changing the active frequency is not possible in standard mode (only available in direct tune mode).
- Changing the preset frequency is possible.

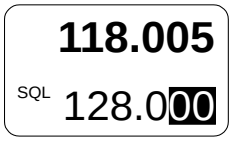
Changing the preset frequency in standard mode:



- Make a "short press" on the "ROTARY ENCODER" to edit the MHz digits.
  - The editable digits are shown inverted.
- Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 1 MHz steps.



- Make another "short press" on the "ROTARY ENCODER" to edit the 100 kHz digit.
  - The editable digit is shown inverted.
- Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 100 kHz steps.



- Make another "short press" on the "ROTARY ENCODER" to edit the 25/8.33 kHz digits.
  - The editable digits are shown inverted.
- Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 25/8.33 kHz steps.

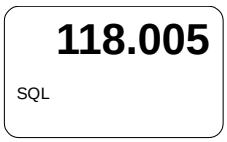
Leaving preset frequency setting:

- Wait 5 seconds for timeout.
- Press and hold "ROTARY ENCODER" button > 2 seconds.

SAFETY INSTRUCTIONS

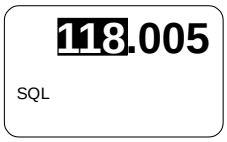
- A short press of the "↕" key, exchanges active frequency to preset frequency and vice versa.
  - While the transceiver operates in transmit mode, the toggle function is disabled.
- A press the "STO" key stores the active frequency into the next vacant memory place of the user channel database (see "Frequency Storage Functions", page 53).

3.4.2. Direct Tune Mode

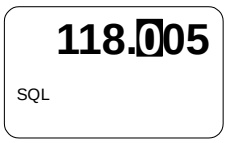


- Press the "MDE" key until the direct tune mode page appears.
  - o The active frequency is displayed in the top line.

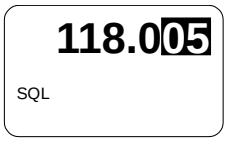
Changing the active frequency in direct tune mode:



- Make a "short press" on the "ROTARY ENCODER" to edit the MHz digits.
  - o The editable digits are shown inverted.
- Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 1 MHz steps.



- Make another "short press" on the "ROTARY ENCODER" to edit the 100 kHz digit.
  - o The editable digit is shown inverted.
- Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 100 kHz steps.



- Make another "short press" on the "ROTARY ENCODER" to edit the 25/8.33 kHz digits.
  - o The editable digits are shown inverted.
- Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 25/8.33 kHz steps.

Leaving active frequency setting:

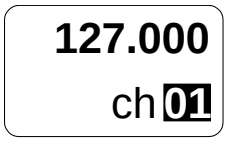
- Wait 5 seconds for timeout.
- Press and hold "ROTARY ENCODER" button > 2 seconds.

SAFETY INSTRUCTIONS

- The changes become active immediately.
- Changing the active frequency is possible only when the transceiver is not transmitting.
- A press the "STO" key stores the active frequency into the next vacant memory place of the user channel database (see "Frequency Storage Functions", page 53).

3.4.3. **Channel Mode**

The channel mode allows operating with stored data from memory.



RCU6512 provides storage of 2x 20 channels:

- Channel CH01...CH20 reserved for storing frequencies in 25 kHz channels spacing.
- Channel CH01...CH20 reserved for storing frequencies in 8.33/25 kHz channel spacing.

NOTICE

- When the device is operating in the 25 kHz mode a selection of stored 8.33 kHz channels/frequencies is not possible.
- For selection of 8.33 kHz channels/frequencies, the device must operate in 8.33 + 25 kHz mixed mode.

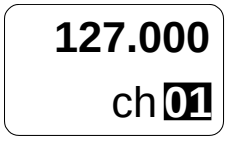
NOTICE

The word "frequency" also used in the sense of "channel name", as defined in EUROCAE, document ED-23B chapter 1.3.2.

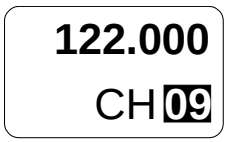
In this document the word "memory channel" or "channel" means a memory place identified by a channel number, where a frequency may be stored for later use.

NOTICE

- CH: An already used channel is indicated with capital letters (CH).
- ch: A free channel is indicated with small letters (ch).



- Press the "MDE" key until the channel mode page appears.
- The top line shows the frequency corresponding to the selected channel number.
- If channel memory is empty:
  - Toggling from Direct Mode to Channel Mode does not change active frequency.
  - The bottom line shows channel number "ch01".

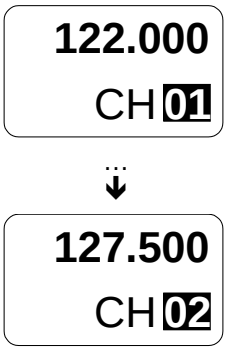


- If any frequency is already stored:
  - The top line shows the stored frequency to the last selected channel number.
  - The bottom line shows the corresponding channel number "CH..".

- By means of channel number stored frequencies can be selected.

3.4.3.1. **Select Channels**

In order to select the channel number:



- Make a short press of the "ROTARY ENCODER".
  - o The channel number is now highlighted and the channel can be changed turning the "ROTARY ENCODER".
  - o With each step the receiver tunes immediately to the displayed frequency.

Leaving channel number setting:

- Wait 5 seconds for timeout.
- Press and hold "ROTARY ENCODER" button > 2 seconds.

Leaving Channel Mode:

- Press the "MDE" key.
  - o The channel mode will be closed.
  - o The standard mode page appears.

3.5. **Frequency Storage Functions**

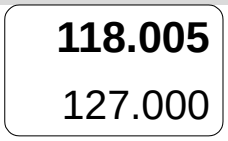
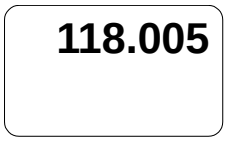
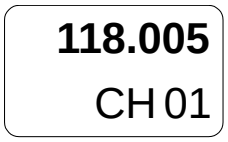
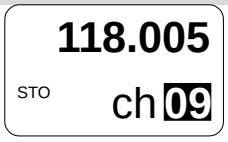
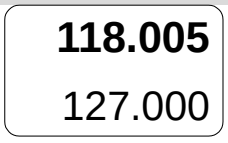
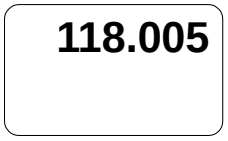
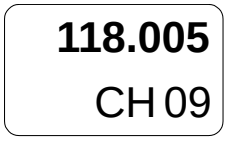
Two storage methods are provided:

- Store "Active Frequency".
- Store "Preset Frequency".

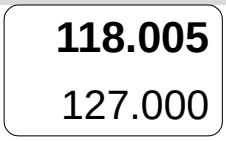
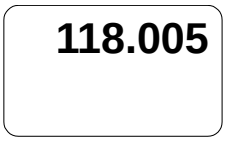
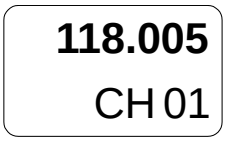
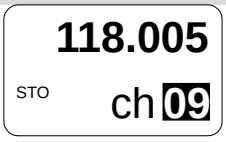
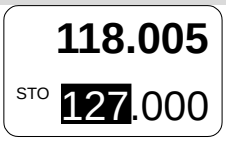
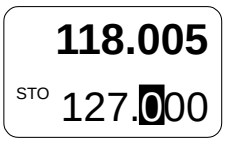
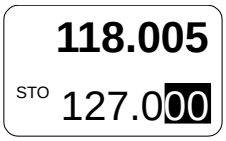
NOTICE The functions store/restore are only available if they are activated in the "Installation Mode*".

* For details please refer to: "
Start Installation Mode" page 35.

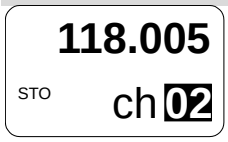
3.5.1. Store "Active Frequency"

	Step A
 "Standard Mode"	• Press "STO" key (in "Standard Mode", "Direct Tune Mode" or "Channel Mode"). •
 "Direct Tune Mode"	
 "Channel Mode"	
	Step B
	• The symbol "STO" appears on the left side. • The first empty memory channel is selected. o Select the offered free channel number or another channel number for storage. • Press "STO" key. o The frequency is stored in the memory and available via the selected channel number. o The storage procedure will be left.
	Step C
 "Standard Mode"	• RCU turns back into previous operating mode (when procedure was started from "Standard" or "Direct Mode"). • RCU turns to new stored channel number (when procedure was started from "Channel Mode").
 "Direct Tune Mode"	
 "Channel Mode"	
NOTICE	• Frequencies can be stored with an already occupied channel number. • **Please note: Previous data will be overwritten.**
NOTICE	During transmission in channel mode the STO function is not possible/available.

3.5.2. Store "Preset Frequency"

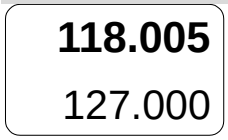
	Step A
 "Standard Mode"	• Press "STO" key (in "Standard Mode", "Direct Tune Mode" or "Channel Mode"). •
 "Direct Tune Mode"	
 "Channel Mode"	
	Step B
	• The symbol "STO" appears on the left side. • The first empty memory channel is selected. o Select the offered channel number or another free channel for storage.
	Step C...E
	• Make a "short press" on the "ROTARY ENCODER" to edit the MHz digits. o The editable digits are shown inverted. • Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 1 MHz steps.
	• Make another "short press" on the "ROTARY ENCODER" to edit the 100 kHz digit. o The editable digit is shown inverted. • Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 100 kHz steps.
	• Make another "short press" on the "ROTARY ENCODER" to edit the 25/8.33 kHz digits. o The editable digits are shown inverted. • Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 25/8.33 kHz steps.

Step F



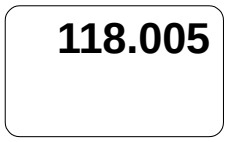
- Make a "short press" on the "ROTARY ENCODER" to edit the digits of the memory channel number.
- Press "STO" key.
  - The frequency is stored in the memory and available via the selected channel number.
- The storage procedure will be left.

Step G

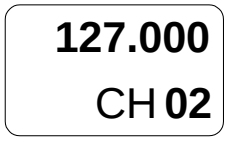


"Standard Mode"

- RCU turns back into previous operating mode (when procedure was started from "Standard" or "Direct Mode").
- RCU turns to new stored channel number (when procedure was started from "Channel Mode").



"Direct Tune Mode"



"Channel Mode"

NOTICE

- Frequencies can be stored with an already occupied channel number.
- **Please note: Previous data will be overwritten.**

NOTICE

During transmission in channel mode the STO function is not possible/available.

Overview - The data can be stored to:

- Next free channel (offered from system).
- A self-selected free channel.
- A selected used channel (the existing data will be overwritten).

3.5.3. Delete Data

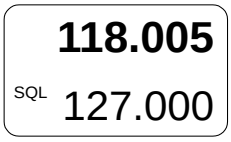
- The stored content in channel memory can only be deleted in "Installation Mode*".
  - Please note only one memory bank, the memory channels for current selected channel spacing will be deleted.
  - To delete the second memory bank, the channel spacing needs to be changed and then the procedure has to be repeated.
    * For details please refer to: "Start Configuration Mode" page 39 → Channel Spacing.

* For details please refer to: "Installation Mode" page 35.

3.6. SQUELCH

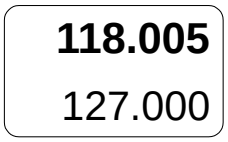
This function is independent of the selected operation menu.

- By a short press on "SQL" key squelch can be toggled "ON" or "OFF".



Squelch "ON"

- If the squelch function is active ("ON") the receivers noise is muted.



Squelch "OFF"

- If the squelch is "OFF" the receiver noise will be audible as long as weak signal is receiving.

3.6.1. SQUELCH Threshold

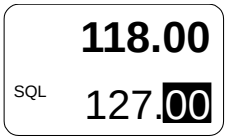
- The squelch threshold is adjustable* to a convenient trigger level.

* For details please refer to: "Start Configuration Mode" page 39 → Squelch threshold level ("RT SQL_LEVEL").

3.7. Channel Spacing Mode

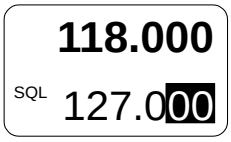
- The transceiver provides 25 kHz and mixed 8.33/25 kHz frequency channel spacing.
- The frequency channel spacing is selectable in "Configuration Mode"*.

* For details please refer to: "Start Configuration Mode" page 39 → "Channel spacing ("CU SPACING").



25 kHz
channel spacing

- In 25 kHz mode, 5 frequency digits are shown.
  - Only operating frequencies with a channel spacing of 25 kHz are selectable. This mode provides the advantage of faster tuning since skipping the 8.33 kHz frequency steps.



8.33 kHz
channel spacing

- In 8.33 /25 kHz mixed mode 6 frequency digits are shown.
  - The transceiver tunes to all possible frequencies within the aviation VHF frequency band.
    The channel spacing and operating frequency is derived automatically from the selected and displayed frequency.

NOTICE

- Selecting 8.33 kHz channels is possible up to 136.99166 MHz (channel name 136.990).
- For frequencies above 136.99166 MHz only 25 kHz channels could be selected.

3.8. BRIGHTNESS

- The brightness of RCU6512 is adjustable in "Configuration Mode"*.

* For details please refer to: "Start Configuration Mode" page 39 → "BRIGHTNESS"

3.9. Warning and Failure Indications

Display Contents	Description
WAIT	"WAIT" screen appears during start-up. Normally "WAIT" screen disappears within maximum 5 seconds.
TEST	"TEST" screen appears during Initiated Built-In-Test (IBIT).
FAILURE	"FAILURE" is indicated if **ANTENNA VSWR** error is detected. **Possible reasons for indication:** • Disconnected or defected Antenna cable of Antenna itself. • HW or SW failure inside the controller. • HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**
FAILURE	"FAILURE" is indicated if heatsink temperature exceeds +85 °C (TX HOT error). This failure disappears when heatsink temperature falls below +75 °C Transceiver is still operable. Performance of transmitter is reduced. **Possible reasons for indication:** • Very hot environmental temperature, long transmissions times and insufficient airflow conditions.
FAILURE	"FAILURE" is indicated if heatsink temperature exceeds +95 °C (TX OVER TEMP error). This failure disappears when Heatsink temperature falls below +85 °C Transceiver is operable only in receive mode. Transmission is blocked. **Possible reasons for indication:** • Very hot environmental temperature, long transmissions times and insufficient airflow conditions.
FAILURE	"FAILURE" is indicated after 30 seconds of continued transmission (STUCK PTT Error detected). The transceiver goes back to receive mode even if the PTT line is still active (GND). "FAILURE" screen disappears after pressing any key of “ROTARY ENCODER” button and appears back after 5 seconds if no action. This "FAILURE" disappears permanently only if PTT line becomes inactive (open). **Possible reasons for indication:** • Transmission lasts more than 30 seconds. • PTT-key is stuck. • PTT line permanently grounded (short circuit in installation).
FAILURE	"FAILURE" is indicated if **RX SYNTH** error is detected. **Possible reasons for indication:** • HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**
FAILURE	"FAILURE" is indicated if **RX AGC** error is detected. **Possible reasons for indication:** • HW or SW failure inside the transceiver.

Display Contents	Description
	Contact maintenance shop for assistance.
FAILURE	"FAILURE" is indicated if **TX SYNTH** error is detected. **Possible reasons for indication:** • HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**
FAILURE	"FAILURE" is indicated if **TX POWER** error is detected. **Possible reasons for indication:** • HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**
FAILURE	"FAILURE" is indicated if **INTERNAL** error is detected. **Possible reasons for indication:** • HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**
FAILURE	"FAILURE" is indicated if **POWER SUPP** error is detected. **Possible reasons for indication:** • HW or SW failure inside the controller. • HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**
FAILURE	"FAILURE" is indicated if **CHANNEL** error is detected. **Possible reasons for indication:** • HW or SW failure inside the controller. • HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**

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 made by trained Becker Avionics personnel.

Becker Avionics GmbH • Baden-Airpark B108 • 77836 Rheinmünster • Germany

☎ +49 (0) 7229 / 305-0 • Fax +49 (0) 7229 / 305-217

Customer Service:

Sales

Email: sales@becker-avionics.com

Support in German or English

Email: support@becker-avionics.com

Support in French

Email: FR-sales@becker-avionics.com

User Conversions and Changes are Not Permitted

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

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4. Index

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