VHF Transceiver

VHF Ground Transceiver
GT6201

Installation and Operation

Manual DV17001.03
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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 obeyed.
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 obeyed.

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

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

Preface

Dear Customer,

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

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

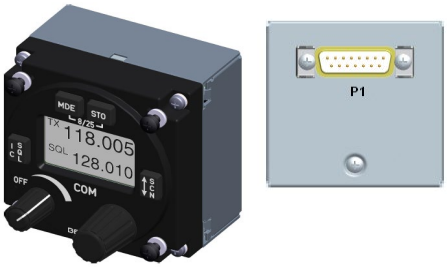
Our competent customer support department will respond on any technical question you may have.

Please do not hesitate to contact us at any time.

VHF Ground Transceiver*

GT6201
(Single Block Transceiver)

GT6201-XX-R
(Remote-Controlled Transceiver)



RCU6201, RCU6211
(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.

Document:	**DV17001.03 issue 06**	**Article Number 0640.093-071**
Cover Page	01/2019	
Introduction	01/2019	
Chapter 1 – 5	01/2019	

Issue	**Page No.:**	**Section / Chapter**	**Description**
06	1-92	all	Changed: Editorial adjustments.
		all	Added: Information about remote-controlled variant.
	--	1.8	Added: Technical information.
	--	1.8.8	Added: Certification information.
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AF	Audio Frequency
ATT	Attenuation
AUX	Auxiliary
AWG	American Wire Gauge
BNC	Bayonet Neill Concelman
CBIT	Continuous Built-In Test
CFG	Configuration
CH	Channel, Control Head
COM	Communication
DC	Direct Current
EASA	European Aviation Safety Agency
EMI	Electro Magnetic Interference
ETSI	European Telecommunications Standards Institute
ETSO	European Transmission System Operators
GCM	Chassis Module (ETIS compliant for ground use)
GND	Ground (Vehicle Ground)
HMI	Human Machinery Interface
HIRF	High Intensity Radiated Fields
HW	Hardware
IC	Intercom (not in use for ground applications)
LCD	Liquid Crystal Display
MTBF	Mean Time Between Failure
MTTR	Mean Time To Repair
N/A	Not Applicable
PBIT	Power-On Built-In Test
PTT	Push To Talk
PWR	Power

List of Abbreviations	
RSSI	Received Signal Strength Indication
RX	Receive
SQL	Squelch
RSSI	Received Signal Strength Indicator
SPKR	Speaker (Loudspeaker)
SRC	Source
SW	Software
TF	TufLok®, self-locking screws and threads
TX	Transmit
VOX	Voice Operated Switch
VHF	Very High Frequency
VSWR	Voltage Standing Wave Ratio
VU	Volume Unit

Units

Units	
A	Ampere
mA	Milliampere
°C	Degree Celsius
cm	Centimeter
dBm	Power Ratio in Decibel referenced to 1 mW
dB	Decibel
g	Gram
Hz	Hertz
kg	Kilogram
kHz	Kilohertz
MHz	Megahertz
mm	Millimeter
Nm	Newton Meter
NM	Nautical Mile (1NM = 1852,0 m)
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 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 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 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

User modifications 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.
- Install the devices according to the instructions.
  We cannot give any guarantee for other 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 notes 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.

1 General Description

In this chapter you can read about:

This manual describes the Becker VHF-Ground-Transceiver GT6201. The type plate on your device shows the part number for identification purposes (see "Type Plate", page 30).

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 product and variants of GT6201.

- We use also the term GT6201 for descriptions instead writing the complete model number.
- If a description refers to only one of the product variants its full name is used.

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

Section	**DV17001.04 M&R**	**DV17001.03 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	X
Attachments	X	N/A

1.2 Purpose of Equipment

The VHF-Ground-Transceivers GT6201 are specified for operations on airports, airfields or airline operation stations.

- The GT6201 is a ground-based equipment made for installation in desk-cabinets, 19-inch racks or cars.
  - The GT6201-XX-R variant is a remote-controlled device, which does not include a control panel. It can receive commands and supplies data through the control unit RCU62X1 or a third-party controller.
- The GT6201 transceiver can operate with ground power but it is also made for applications where low power consumption is required.
  - GT6201 can operate from standard 14 and 28 VDC installations and from 12 or 24 VDC batteries.
- The GT6201 is for voice communication between ground and airborne stations.
  - It uses the band between 118.000...136.9916 MHz respectively 136.9750 MHz with a selectable channel spacing of 8.33 or 25 kHz.
- The sensitive receiver meets the most recent requirements of ETSI EN 300 676.
- The receiver includes SCAN (dual watch) mode. This is for monitoring of two different VHF frequency channels at the same time while the communication on the active frequency is on.
- The GT6201 has a non-volatile memory for the storage of:
  - 99 channels with customized labels for storage of VHF frequencies.
  - 9 recently selected VHF frequencies are automatically stored.
- The GT6201 is easy to install.
  - Installation with four screws (rear panel installation).
  - The dimensions correspond to the standard instrument diameter of 58 mm (2¼ inch).

1.3 General Notes

The word "frequency" is also used in the sense of "channel name", as defined in ICAO Annex 10, Volume II.

In this document the word "memory channel" or "channel" is also used in the sense of a memory position identified by a channel number, where a frequency may be stored for later use.

1.4 Variants Overview

GT 6201 - XX - R

Identifier

Model Number

RF Power Class

05= 6 W RF Power Output

10= 10 W RF Power Output

Options*

R= Remote Controlled (optional)

* only available as component with TG660 or for customer specific applications.

1.4.1 Software Status

Description see "Software/Firmware Status – Functionality", page 30.

1.4.2 Short Description

1.4.2.1 GT6201 Single Block Transceiver

- All controls and indicators are on the front panel.
  The equipment connectors and the antenna socket are at the rear side of the device.
- Installation with four screws (rear panel installation).
  The dimensions agree with the standard instrument diameter of 58 mm (2¼ inch).

Figure 1: GT6201 Single Block Transceiver

1.4.2.2 GT6201-XX-R Remote-Controlled Transceiver

- The GT6201-XX-R is a remote-controlled device. It does not include a control panel.
- It can receive commands and supplies data through the RCU62X1 (Remote Control Unit) or a third-party controller.

Figure 2: GT6201 Remote-Controlled Transceiver

1.4.2.3 RCU62X1 Remote Control Unit

- All controls and indicators are on the front panel.
  The equipment connectors are at the rear side of the device.
- Installation with four screws (rear panel installation).
  The dimensions agree with the standard instrument diameter of 58 mm (2¼ inch).

Figure 3: RCU62X1 Remote Control Unit

1.5 Scope of Functionality

1.5.1 Frequency Indication

- A liquid crystal display (LCD) do the frequency indication.
- The required operating frequency is selectable with a rotary encoder.
- The relation between the real operating frequency and the shown frequency complies with the standards (ICAO Annex 10, Volume II).

Operating frequency MHz	Channel spacing kHz	Frequency shown on the display	
		8.33 + 25 kHz mixed mode	25 kHz mode
118.0000	25	118.000	118.00
118.0000	8.33	118.005	N/A
118.0083	8.33	118.010	N/A
118.0166	8.33	118.015	N/A
118.0250	25	118.025	118.02
etc.	etc.	etc.	etc.
136.9750	25	136.975	136.97
136.9750	8.33	136.980	N/A
136.9833	8.33	136.985	N/A
136.9916	8.33	136.990	N/A

1.5.2 Audio Outputs

The GT6201 has four configurable outputs:

- Headphone 1 output:
  - Rated output power is 300 mW into 75 Ω.
- Headphone 2 output:
  - Rated output power is 200 mW into 75 Ω.
- Speaker output:
  - Rated output power is 4 W into 4 Ω.
- LINE-OUT output:
  - For ground station use only.

Note: Headphone 2 and the speaker output cannot be active at the same time.

1.5.3 Mike Inputs

- The GT6201 has four microphone inputs:
  - Standard microphone input 1 (STD_MIKE1)
  - Standard microphone input 2 (STD_MIKE2)
  - Standard microphone input 3 (STD_MIKE3)
  - Dynamic microphone input (DYN_MIKE)
- Each input can operate with one single microphone or with two microphones of the same type connected in parallel.

1.5.4 AF Auxiliary Input

- The AF auxiliary input is the interface to connect an external audio source (e.g. other radio services, music-player) .
    - The interconnection of multiple external audio sources on this port make an additional external decupling/isolation resistor necessary.
    - The external audio is audible only when the transceiver is in receiving mode.
    - The individual audio volume is set directly at the external equipment.

1.5.5 Sidetone

- The sidetone is available on the headphone output during transmission.
- The sidetone volume depends on to the intercom volume setting.

1.5.6 Squelch Operation

- The squelch (muting) circuit suppresses signals with strong signal noise (when enabled).
- There are two kinds of squelch methods implemented, carrier- and noise-squelch.
    - The carrier-squelch depends on the signal strength and is adjustable in configuration setup.
    - The noise-squelch depends on the noise level and is adjustable in the user menu.

1.5.7 Memory Channels

- You can can store 99+9 frequencies.
    - The user can give a defined text label to each stored frequency.
    - The last recently used 9 (active) frequencies are stored automatically as "LAST" channels.

1.5.8 Scan Mode

- The scan mode is a dual watch function.
    - The device monitors frequencies on two different channels, active & preset frequency at the same time.
    - The signal of the active frequency is always audible it has priority at all times.

1.5.9 Illumination

- The illumination of LCD and keys is controlled from the front panel with the user menu or externally with the dimming input lines.
- If external dimming is selected, the illumination curve (brightness to voltage relation) is adjustable in configuration setup.

1.5.10 LOW BATT Indication

- The transceiver monitors the power supply voltage.
    - If the power supply voltage is less than the adjusted threshold, the display shows the message "LOW BATT".
    - If the power supply voltage decreases further, an emergency operation mode starts.

1.5.11 Emergency Operation

- If the power supply voltage is < 10.25 V, the device continues operation with decreased performance.
- If power supply voltage is < 9.0 V, the device switches off automatically.

1.5.12 Built-In Tests

Power-On Built-In Test

- After power-on, the device starts a self-test (PBIT).
  - The display shows the message "WAIT" and the software versions of the control head and the chassis module.
  - If there is an error the display shows the message "FAILURE, push any key".
  - If there is no error the transceiver changes to the last active mode before power off.

Continuous Built-In Test

- During normal operation, a self-test (CBIT) permanently examine the correct operation of the device.
  - The display shows an error message, if there is an error during CBIT.

1.5.13 Configuration Setup

The configuration setup is for the configuration of installation and device parameters such as mike sensitivity, mike type selection, speaker enable/disable and other parameters.

1.5.14 Service Mode

- The service mode is a special configuration mode.
- You can get access to the service mode through the RS422 interface with a proprietary serial data communication protocol.
- This mode is for use by authorized maintenance organizations only.

1.6 Safety-Conscious Utilization

For safe operation of the product the notes have to be obeyed:

NOTICE

- The installation may be carried out only by authorized personnel. The country regulations always have to be obeyed.
- Use the device only within 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 recommended fuses in the power supply line for the protection of the application, see "Technical Data", page 20.

⚠CAUTION **Cleaning:**

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

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

GT6201	Specifications
Nominal supply voltage range	11.0…30.3 VDC
Extended supply voltage range	10.25…32.2 VDC
Emergency operation	9.0...10.25 VDC
Dimming control voltage	0…14 VDC or 0…28 VDC
Internal fuse protection	7 A
Recommended external fuse protection	5 A
Frequency range	118.000...136.990 MHz
Channel spacing	8.33 / 25 kHz
Number of channels 25 kHz channel spacing 8.33 kHz channel spacing	 760 (118.000…136.975) 2280 (118.000…136.990)
Modulation type 25 kHz 8.33 kHz	AM 6K80A3EJN 5K00A3EJN
Temperature range	Operating: -20...+55 °C Storage: -55...+85 °C
	Power consumption
Power off state @ 12 VDC	GT6201-05 (6 W): ≤ 0.10 mA GT6201-10 (10 W): ≤ 0.10 mA GT6201-05-R (6 W): ≤ 0.10 mA GT6201-10-R (10 W): ≤ 0.10 mA
Power off state @ 24 VDC	GT6201-05 (6 W): ≤ 0.10 mA GT6201-10 (10 W): ≤ 0.10 mA GT6201-05-R (6 W): ≤ 0.10 mA GT6201-10-R (10 W): ≤ 0.10 mA
Reception standby mode @ 12 VDC, panel backlight off	GT6201-05 (6 W): ≤ 140 mA GT6201-10 (10 W): ≤ 140 mA GT6201-05-R (6 W): ≤ 120 mA GT6201-10-R (10 W): ≤ 120 mA
Reception standby mode @ 24 VDC, panel backlight off	GT6201-05 (6 W): ≤ 80 mA GT6201-10 (10 W): ≤ 80 mA GT6201-05-R (6 W): ≤ 80 mA GT6201-10-R (10 W): ≤ 80 mA
Transmission mode @ 12 VDC, VSWR=1:1	GT6201-05 (6 W): 2.0 A @ 85% GT6201-10 (10 W): -- GT6201-05-R (6 W): 2.0 A @ 85% GT6201-10-R (10 W): --

Transmission mode @ 24 VDC, VSWR=1:1	GT6201-05 (6 W): -- GT6201-10 (10 W): 1.5 A @ 85% GT6201-05-R (6 W): -- GT6201-10-R (10 W): 1.5 A @ 85%

Note: GT6201 10 W variants @ 24 VDC and more, decreased TX power to < 24 V

1.8.2 Receiver Data

GT6201 Receiver Data	Specifications
Sensitivity	-101 dBm for a SINAD of 12 dB (nominal) -107 dBm for a SINAD of 6 dB (-101 dBm equals 1.993 µV; -107 dBm equals 1 µV)
Adjacent channel rejection	≥ 60 dB
Spurious response rejection	≥ 70 dB
Intermodulation response rejection	≥ 70 dB
Blocking or desensitization	> 99 dB
Cross modulation rejection	≥ 95 dB
Harmonic distortion (THD)	m = 30% ≤ 5% m = 90% ≤ 10%
Effective bandwidth:	
25 kHz channel spacing	±8.5 kHz
8.33 kHz channel spacing	±2.8 kHz
AGC characteristic	≤ 6 dB in range -101...-1 dBm
Audio frequency response	
25 kHz channel spacing	-4 dB / +2 dB 300...3400 Hz relative to 1000 Hz
8.33 kHz channel spacing	-4 dB /+2 dB 350...2500 Hz relative to 1000 Hz
Squelch	6 dB (S+N)/N up to 12 dB, adjustable
Audio noise	40 dB (S+N)/N
Audio distortion	
at 30%, 50% rated output power	≤ 5%
at 90%, 50% rated output power	≤ 10%

GT6201 Receiver Data	Specifications
Rated output power for speaker	≥ 4 W into 4 Ω
Rated output power for headphone 1	≥ 300 mW into 75 Ω ≥ 100 mW into 600 Ω
Rated output power for headphone 2	≥ 200 mW into 75 Ω ≥ 100 mW into 600 Ω
Audio auxiliary input	50 mV...8 V (adjustable) across 600 Ω
Offset-carrier operation	N/A

1.8.3 Transmitter Data

GT6201 Transmitter Data	Specifications
Output power into 50 Ω (with and without modulation)	GT6201-05: ≥ 6 W GT6201-05-R: ≥ 6 W
	GT6201-10: ≥ 10 W GT6201-10-R: ≥ 10 W
Frequency tolerance	≤ ±1 ppm
Duty cycle	120 s (TX) : 480 s (RX)
Modulation depth	≥ 85%
Modulation distortion	≤ 10%
Audio frequency response	
25 kHz channel spacing	-4 dB / +2 dB in band 300...3400 Hz relative to 1000 Hz ≤ -25 dB above 5000 Hz
8.33 kHz channel spacing	-4 dB / +2 dB in band 350...2500 Hz relative to 1000 Hz ≤ -25 dB above 3200 Hz
Dynamic microphone	0.5…25 mV compressor starting point, adjustable
(with compressor)	Input balanced, 200 Ω Input range up to 20 dB above compressor starting point.
Standard microphone(s)	9…1500 mV compressor starting point, adjustable
(with compressor)	Input unbalanced, 150 Ω Input range up to 20 dB above compressor starting point.
FM deviation with modulation	≤ 3 kHz (≤ 800 Hz typ.)
Sidetone	adjustable
Automatic shutdown of transmit mode	120 s (factory configurable 30…120 s)

1.8.4 Emergency Operation

Emergency Operation: 9.0…10.25 VDC (decreased performance).

SAFETY INSTRUCTIONS

- The display shows "LOW BATT" if the supply voltage is less than the predefined threshold.
  - That is the note for the user, that he should connect a headset because the speaker could be switched "OFF" soon.
- If the supply voltage is < 10.25 V, the device continues operation with decreased performance.
  - The speaker output of the transceiver is automatically set to "OFF" without further indication.
  - A headset is required to continue operation of the transceiver.
- If the supply voltage is < 9.0 Volt, the device is automatically set to "OFF".

GT6201, RCU62X1 (Emergency Operation)	**Specifications**
Panel & Display Backlight	switched off (for saving BATT energy)
TX Output Power	≥ 2 W into 50 Ω (with modulation)
TX Modulation Depth	≥ 50%
RX Sensitivity	≤ -93 dBm for a (S+N)/N ratio of 6 dB

1.8.5 Dimensions & Weight

GT6201	**Specifications**
Device (W x H x D)	61 x 61 x 205.7 mm (2.4 x 2.4 x 8.98 inch)
Installation depth	184.8 mm (7.28 inch)
Installation	Rear-panel standard Ø58 mm (2¼ inch)
Material	AlMg/Plastic
Surface treatment	Control-head coated with black matt paint
Weight	645 g (1.42 lbs)

1.8.6 Software

The design and development processes used for AR6201 family software are in compliance with the rules given in EUROCAE/RTCA Document ED-12B/DO-178B; “Software Considerations in Airborne System and Equipment Certification”. Hereby ‘Design Assurance Level’ (DAL) "C" was followed and the complete software documentation is based on this level.

1.8.7 Hardware

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

1.8.8 Certifications

SAFETY INSTRUCTIONS

Unauthorized changes or modifications to the device(s) may void the compliance to the required regulatory agencies and authorization for continued equipment usage.

GT6201 meets the requirements of ETSI EN 300 676 regulations

Part Number	Article Number	Approval
GT6201-05	0637.351-923	BAF - German Federal Supervisory Office for Air Navigation Services D-0030/2014 Ministero Sviluppo Economico – Dipartimento per le Comunicazioni Registro ufficiale, Prot.n. 0041697-02/07/2014 Austria Notification: BMVIT-640.825/0301-III/BFT/2016
GT6201-10	0637.361-923	
GT6201-05-R	0641.073-923	
GT6201-10-R	0641.081-923	

RCU62X1 meets the requirements of:

Part Number	Article Number	Approval
RCU6201-(012)	0631.469-910	EASA.21O.1249 ETSO-2C37e ETSO-2C38e TSO-C169a
RCU6211-(012)	0662.453-910	pending

1.9 Order Code

1.9.1 GT6201

Qty	VHF-Transceiver	
1	GT6201-05, VHF Ground Transceiver, ≥ 6 Watt RF Power Output	Article-No. 0637.351-923
1	GT6201-10, VHF Ground Transceiver, ≥ 10 Watt RF Power Output	Article-No. 0637.361-923
1	GT6201-05-R, VHF Ground Transceiver, remote-controlled, ≥ 6 Watt RF Power Output	Article-No. 0641.073-923
1	GT6201-10-R, VHF Ground Transceiver, remote-controlled, ≥ 10 Watt RF Power Output	Article-No. 0641.081-923

1.9.2 RCU62X1

Qty	Control Unit	
1	RCU6201-(012), 8.33/25 kHz	Article-No. 0631.469-910
1	RCU6211-(012), 8.33/25 kHz	Article-No. 0662.453-910

1.9.3 Accessories

Qty	Installation	
1	Vehicle Kit VK4201 • 1PM012, Dynamic microphone • 1PL011, Speaker with housing and cables • 1E024, Car installation • 1K044, Cable harness • 1A002-1, Antenna • 1KA003, Antenna cable, length 2.5 m	Article-No. 0892.424-923

1.9.4 Documentation

Qty	Available Documentation	
1	(I&O) GT6201 Installation and Operation manual, English	Article-No. 0640.093-071
1	(M&R) GT6201 Maintenance and Repair manual, English	Article-No. 0640.107-071
1	Quick Start Guide English/German	Article-No. 0646.911-071
1	Quick Start Guide English/French	Article-No. 0648.906-071

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2 Installation

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

The installation of the transceiver depends on the location and its equipment. Therefore, this section only s general information.

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

In this chapter you can read about:

2.1 Limitations

- The GT6201 is made for ground-based transceiver installation for the management of air and ground traffic operations.
- The equipment is not qualified for installation in areas where fluid contamination is quite likely.

SAFETY INSTRUCTIONS Unauthorized changes or modifications to the device(s) may void the compliance to the required regulatory agencies and authorization for continued equipment usage.

2.2 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

- Check the device for signs of transport 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 29).

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.

2.3 Device Assignment

This manual is valid for the devices:

- GT6201-05.
- GT6201-10.
- GT6201-05-R with RCU6201-(012) or RCU6211-(012).
- GT6201-10-R with RCU6201-(012) or RCU6211-(012).

from Software Version
SCI1050S305 Version 3.08 (and higher).
SCI1051S305 Version 1.56 (and higher).

2.3.1 Scope of Delivery

- Manuals:
  - Installation and Operation.
- Device in accordance with your order.

2.3.2 State of Delivery

- The device(s) are ready for use with factory default adjustments.

2.3.3 Additional Required Equipment

- Antenna (VHF COM, with coaxial 50 Ω impedance cable and BNC connector).
- Installation material.
- Connector kits.
- Cable harness.
- Microphone.
- Headphone or speaker.

Details see "Accessories", page 25.

2.3.4 Type Plate

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

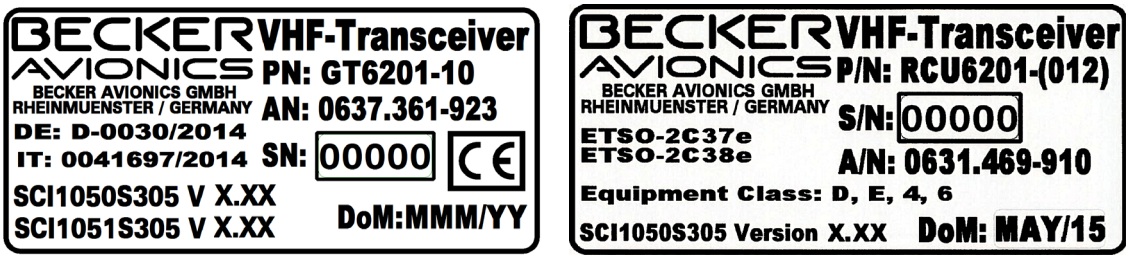


Figure 4: Type Plate (Example)

Explanation:

PN (P/N):	**Example type designation: GT6201-10:**
	GT6201 = Single Block VHF-Ground-Transceiver 58 mm (2¼ inch) **Options:** **-05** 6 Watt transceiver **-10** 10 Watt transceiver -XX-R Remote-controlled transceiver
	Example type designation: RCU6201:
	RCU6201 = Remote Control Uni 58 mm (2¼ inch) **Options:** **0XX** 8.33/25 kHz channel spacing capability **X1X** 6 W @ 14 V / 10 W @ 28 V **XX2** white illumination color on black panel
SN (S/N):	Unique number of the particular device
AN (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

2.3.5 Software/Firmware Status – Functionality

- The software version is shown at the screen for a few seconds after power on.
  This information is also available with the configuration setup → DEVICE INFO.
- The software versions are subject to change without notice.

2.4 Installation Requirements

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

SAFETY INSTRUCTIONS

- The device must not be opened.
- When installing the device, make sure the heat dissipators of the device receive sufficient air.
- Keep an efficient distance of the devices with integrated ventilator fans in order to ensure free circulation of the cooling air.
- Make sure that the mounting plate is not exposed to external temperature influences.
- Keep a distance between GT6201 and other equipment of min. 5 mm for air circulation.
- Forced cooling is usually not required.

Wiring:

The notes have to be obeyed:

- All electrical systems in the vehicle shall be switched off and screened.
- No other leads should be included in the supply lead loop.
- Label all cable terminations to the equipment.
- The cable harness must be able to move freely and thus prevent fracture of the wires.
- The cable harness must be in a position that the individual cables are not abraded on the cabinet or chassis.
- Use twisted, shielded cables for connections to reduce interference from electrical and magnetic fields.
- Use the recommended fuses in the power supply line for the protection of the application, see "Technical Data", page 20.

2.4.1 Installation in a Vehicle

- Find a suitable area to install the device.
- Use the vehicle kit VK4201 for installation (see "Accessories" page 25).
- Make sure that the user has easy access to the controls and indicators.
- More information please see "Dimensions", page 32.

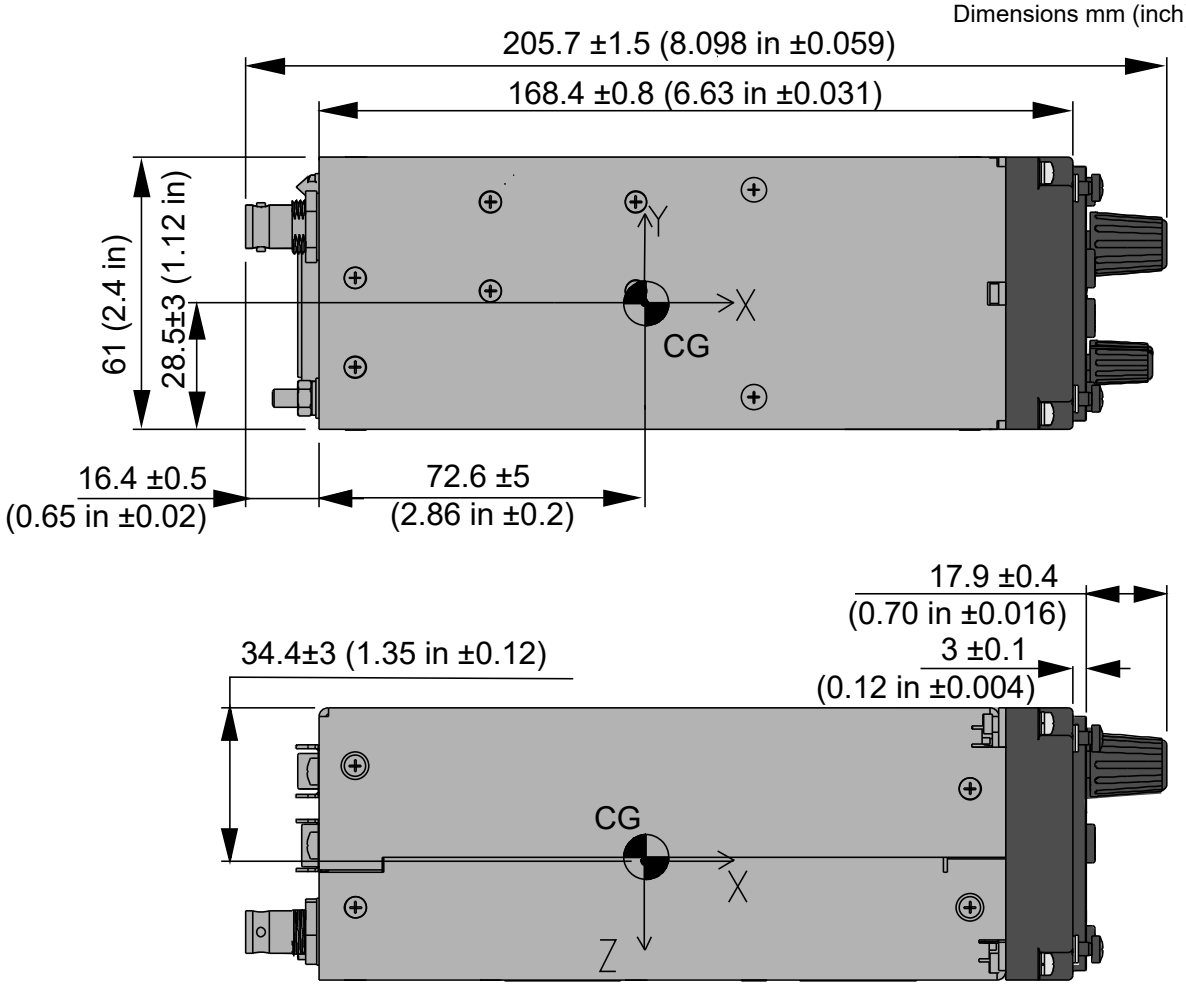
2.4.2 Rear Panel Installation

- The GT6201 single block and the RCU62X1 are for rear panel installation.
  - The four screws for installation are already attached at the front of the device.
  - Circular cut out and the installation holes please see "GT6201, RCU62X1 Rear Panel Installation", page 34.

2.5 Dimensions

2.5.1 GT6201

Dimensions mm (inch)



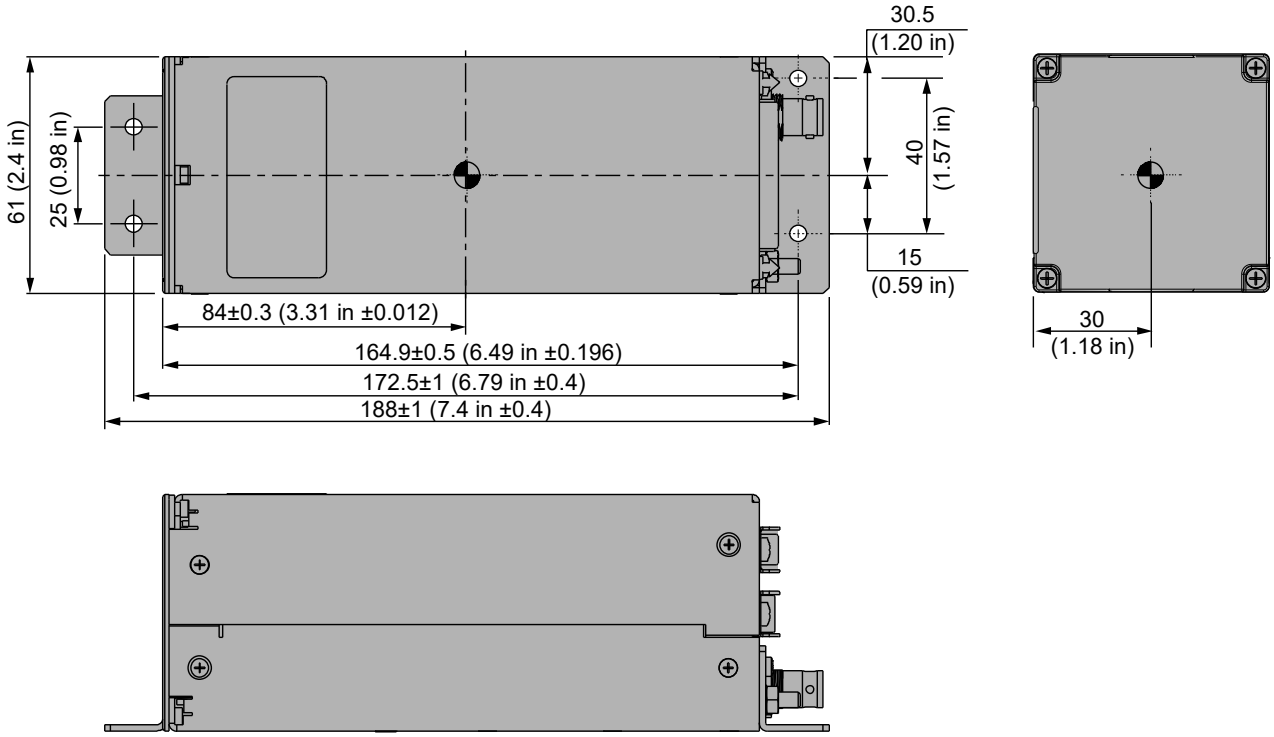
CENTER OF GRAVITY

Figure 5: Dimensions: GT6201 Single Block Transceiver

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)

2.5.2 GT6201-XX-R

Dimensions mm (inch)



CENTER OF GRAVITY

Figure 6: Dimensions: GT6201-XX-R Remote-Controlled Transceiver

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)

2.5.3 RCU62X1

Dimensions mm (inch)

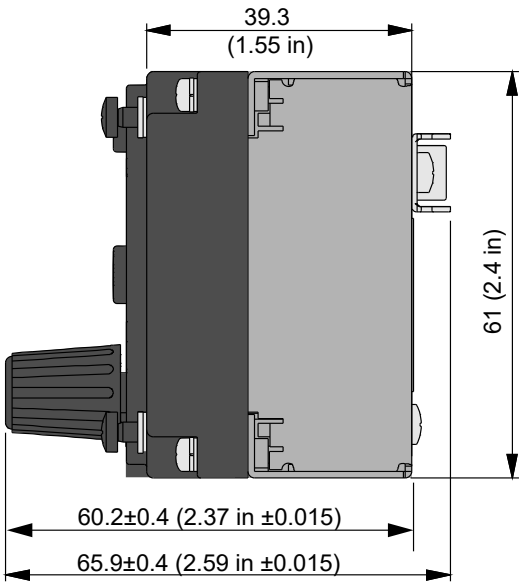


Figure 7: Dimensions RCU62X1 (Side View)

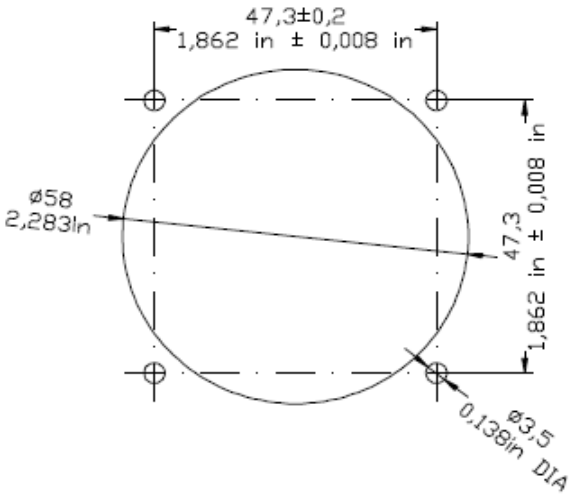
Permitted deviation for dimensions without tolerances: DIN ISO 2768 T1 C (dimensions in mm)		
xx...6 (±0.3)	>30...120 (±0.8)	>400...1000 (±2.0)
>6...30 (±0.5)	>120...400 (±1.2)	>1000...2000 (±3.0)

2.5.4 GT6201, RCU62X1 Rear Panel Installation

Dimensions mm (inch)

61x61 mm (2.4x2.4 in)

Figure 8: GT6201, RCU62X1 Front View



(no scale drawing)

Figure 9: Drilling Template (Rear-Panel Installation)

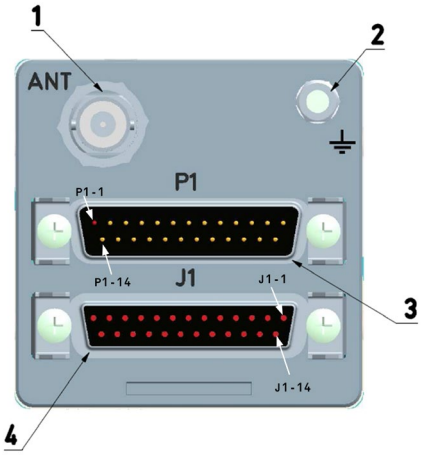
2.6 Connector Pin Assignments

2.6.1 Antenna Connector (GT6201)

- The antenna connector is a BNC type.
- The antenna port is made for operating with a nominal impedance of 50 Ω.

2.6.2 Grounding Bolt (GT6201)

- The transceiver has a M4 threaded grounding bolt to do a low impedance grounding of the device.
  - It is to avoid damage or malfunction in the case of indirect lightning, EMI and HIRF conditions.



1: Antenna connector
2: Grounding bolt
3: P1
4: J1

Figure 10: GT6201 – Connector Layout

2.6.3 Connector P1 (GT6201)

D-SUB male connector with 25 pins and slide-in fastener.

P1 (GT6201) **Pin No.**	**Pin Name**	**Direction**	**Function**
P1-1	SPK_HI	OUT	Speaker output signal (high)
P1-2	HDPH1_A	OUT	Balanced output for headphone(s)1
P1-3	HDPH1_B	OUT	Balanced output for headphone(s)1
P1-4	AF_AUX_IN_HI	IN	Auxiliary audio input (high)
P1-5	MIKE_DYN_HI	IN	Balanced input for dynamic microphone(s)
P1-6	MIKE_DYN_LO	IN	Balanced input for dynamic microphone(s)
P1-7	/IC	IN	Intercom key input; ACTIVE state - closed contact to GND
P1-8	MIKE_STD_LO	-	Standard microphone(s) low (ground) used for STD1, STD2 and STD3
P1-9	MIKE_STD2_HI	IN	Standard microphone 2 High (high)
P1-10	ILL_LO	IN	Illumination low input
P1-11	P_SUPP	IN	Power supply high (positive)
P1-12	P_SUPP	IN	Power supply high (positive)
P1-13	P_SUPP_GND	-	Power supply ground
P1-14	SPK_LO	-	Speaker ground
P1-15	LINE_OUT	OUT	Linear audio output, unbalanced
P1-16	AGC_OUT	OUT	Receiver AGC output

P1 (GT6201) **Pin No.**	**Pin Name**	**Direction**	**Function**
P1-17	/PTT1	IN	Push To Talk key input1 ACTIVE state - closed contact to GND
P1-18	MIKE_STD1_HI	IN	Standard Microphone 1 High (high)
P1-19	MIKE_STD3_HI	IN	Standard Microphone 3 High (high)
P1-20	HDPH2_A	OUT	Balanced Output for headphone(s)2
P1-21	AF_AUX_IN_LO	IN	Auxiliary audio input low
P1-22	HDPH2_B	OUT	Balanced output for headphone(s)2
P1-23	ILL_HI	IN	Illumination high
P1-24	/PWR_EVAL	OUT	Power on monitor output
P1-25	P_SUPP_GND	-	Power supply ground

2.6.4 Connector J1 (GT6201)

D-SUB female connector with 25 sockets and slide-in fastener.

J1 (GT6201) **Pin No.**	**Pin Name**	**Direction**	**Function**
J1-1	CPIN	-	Reserved coding pin
J1-2	TX2+	OUT	Auxiliary control interface
J1-3	RX2+	IN	Auxiliary Control Interface
J1-4	/SQL_EVAL	OUT	Squelch monitor output ACTIVE state - closed contact to GND
J1-5	/PTT2	IN	Push-To-Talk key input 2 ACTIVE state - closed contact to GND
J1-6	SHIELD_1	-	Secondary control & service interface SHIELD
J1-7	TX1+	OUT	Secondary control & service interface
J1-8	RX1+	IN	Secondary control & service interface
J1-9	TX2-	OUT	Auxiliary control interface
J1-10	RX2-	IN	Auxiliary control interface
J1-11	SHIELD_2	-	Auxiliary control interface SHIELD
J1-12	/EXT_SO	IN	External "Exchange" key Falling edge will activate frequency exchange
J1-13	/SRV_EN	IN	Service enable pin ACTIVE state - closed contact to GND
J1-14	TX1-	OUT	Secondary control & service interface
J1-15	RX1-	IN	Secondary control & service interface
J1-16	NC		not connected
J1-17	/SQL_SW	IN	"Squelch Force-OFF" input ACTIVE state - closed contact to GND
J1-18	NC		not connected
J1-19	NC		not connected
J1-20	/ISOL	IN	"ISOL" input ACTIVE state - closed contact to GND

J1 (GT6201) Pin No.	Pin Name	Direction	Function
J1-21	D_GND	-	Discrete lines ground
J1-22	D_GND	-	Discrete lines ground
J1-23	D_GND	-	Discrete lines ground
J1-24	/MIKE_SW	IN	Configuration selector CFG1 and CFG2
J1-25	/EXT_ON	IN	External Power ON input ACTIVE state - closed contact to GND

2.6.5 Inputs / Outputs (GT6201)

Microphone Connection – Standard Microphones

Pin No.	Pin Name	Direction	Function
P1-8	MIKE_STD_LO	-	Standard microphone(s) low (ground) used for STD1, STD2 and STD3
P1-9	MIKE_STD2_HI	IN	Standard microphone 2 high (high)
P1-18	MIKE_STD1_HI	IN	Standard microphone 1 high (high)
P1-19	MIKE_STD3_HI	IN	Standard microphone 3 high (high)

- The transceiver has three unbalanced inputs STD1, STD2 and STD3.
- Each input has an input impedance of 150 Ω and a nominal sensitivity of 110 mV.
- The sensitivity level is adjustable in the configuration setup independently for each of the microphones.
- The power supply from pins P1-9, P1-18 and P1-19 for supply of the connected microphone(s) is > 8 VDC (8.3 V nominal) open circuit with an output impedance of 120 Ω.

Note:

- For common aviation microphones the power supply is able to support two microphones in parallel.
- It is recommended to combine only microphones of the same type / impedance.
- In installations where high interferences were detected, we recommend the use of sensitivity levels between 27...1500 mV.
- We also recommend to install the jacks generally isolated from car frame in order to avoid ground loops.

Microphone Connection - Dynamic Microphone

Pin No.	Pin Name	Direction	Function
P1-5	MIKE_DYN_HI	IN	Balanced input for dynamic microphone(s)
P1-6	MIKE_DYN_LO	IN	Balanced input for dynamic microphone(s)

- Interfacing with dynamic microphones, the transceiver has balanced inputs with an impedance of 140 Ω and a nominal sensitivity of 1.6 mV.
- This sensitivity level is adjustable in the configuration setup.
- Two dynamic microphones in parallel may be connected (identical technical characteristics of the microphones are recommended).

Note:

- In installations where high interferences are detected we recommend the use of sensitivity levels between 2...20 mV.
- We also recommend to install the jacks generally isolated from car frame in order to avoid ground loops.
- Use microphone cables with shielded wires.

Speaker Connection

Pin No.	Pin Name	Direction	Function
P1-1	SPK_HI	OUT	Speaker output signal
P1-14	SPK_LO	-	Speaker ground

- The speaker output supplies nominal 4 W into 4 Ω.

Headphone(s) Connection

Pin No.	Pin Name	Direction	Function
P1-2	HDPH1_A	OUT	Balanced output for headphone(s) 1
P1-3	HDPH1_B	OUT	Balanced output for headphone(s) 1
P1-20	HDPH2_A	OUT	Balanced output for headphone(s) 2
P1-22	HDPH2_B	OUT	Balanced output for headphone(s) 2

- The headphone 1 output is a balanced, transformer-coupled output providing nominal 300 mW into 75 Ω.
  - Use a shielded single wire for headphones requires an unbalanced output configuration. To get this, ground P1-3 (connect pin P1-13 with P1-25).
- The headphone 2 output is a balanced output providing nominal 200 mW into 75 Ω.
- You can connect up to two headphones with phone-impedance of 300 Ω (or higher) in parallel on each circuit, therefore you can connect up to four headphones at the same time.

CAUTION: The headphone 2 output shall be always floating (cannot be connected in unbalance configuration as headphone 1).

Panel Illumination

Pin No.	Pin Name	Direction	Function
P1-10	ILL_LO	IN	Illumination low input
P1-23	ILL_HI	IN	Illumination high input

- The VHF transceiver supplies illumination for the keys and the display.
- It depends on configuration if this illumination is controlled by front panel or externally.
- Connect ILL_LO (pin P1-10) to car ground.
- Connect ILL_HI (pin P1-23) to dimming bus.

"Auxiliary" Audio Input

Pin No.	Pin Name	Direction	Function
P1-4	AF_AUX_IN_HI	IN	Auxiliary audio input high
P1-21	AF_AUX_IN_LO	-	Auxiliary audio input low ground

- The AF auxiliary input is used to connect an external audio source (NAV, music-player, etc.) to the transceiver.
- The external audio is audible only when transceiver is in receive mode.
- The input sensitivity is adjustable in the configuration setup.
- The impedance of this input is 600 Ω.

"LINE_OUT" Audio Output

Pin No.	Pin Name	Direction	Function
P1-14	SPK_LO	-	Speaker ground
P1-15	LINE_OUT_HI	OUT	Linear audio output, unbalanced

- The LINE OUT is used to connect e.g. an external voice recorder to the transceiver when it is used in ground-based installations.
- The LINE OUT output supplies nominal 1 V_{RMS} into 1000 Ω.

External Power ON

Pin No.	Pin Name	Direction	Function
J1-25	/EXT_ON	IN	External Power ON input ACTIVE state - closed contact to GND

- The External Power ON input it is possibility to power "ON" the system when this pin is connected to ground.

Push-To-Talk (/PTT)

Pin No.	Pin Name	Direction	Function
P1-17	/PTT1	IN	Push-To-Talk key input 1 ACTIVE state - closed contact to GND
J1-5	/PTT2	IN	Push-To-Talk key input 2 ACTIVE state - closed contact to GND

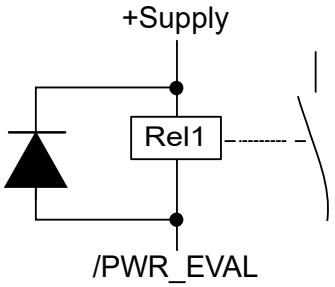
- There are two Push-To-Talk inputs available /PTT1 and /PTT2.
- Each input has an internal pull up.
- While the input is connected to ground a current of < 1 mA flows.
  - The transceiver enters transmit operation, if one or both inputs are connected to ground.
- According to microphone(s) configuration, the signal from particular inputs can or cannot modulate transmissions.

Power Indication (/PWR_EVAL)

Pin No.	Pin Name	Direction	Function
P1-24	/PWR_EVAL	OUT	Power on Monitor output: GT6201 "OFF" - open circuit GT6201 on - closed circuit to GND (max. 100 mA)

- The output internally connects to ground when the device is "ON".
- A current of maximum 100 mA can flow to drive e.g. an external relay.
- The output has high impedance if the device is switched off.

Note: **Connect a protection diode in parallel to the external relay to avoid damage of this output..**



VHF Channel Signal Indication (/SQL_EVAL)

Pin No.	Pin Name	Direction	Function
J1-4	/SQL_EVAL	OUT	Indicates presence of the VHF channel's signal on the audio outputs.

- This output indicates presence of the VHF channel's signal on the audio outputs.
- It is an open collector output type.
- The output internally connects to ground when the device receives signal on the selected VHF channel and this audio signal is available on audio outputs.
- A current of maximum 100 mA can flow to drive e.g. an external relay.
- The output has high impedance if the device is switched off.

External Mike Switch (/MIKE_SW)

Pin No.	Pin Name	Direction	Function
J1-24	/MIKE_SW	IN	Configuration selector CFG1 and CFG2. ACTIVE state - closed contact to GND

- The external mike switch is used for selection between the audio in/out configurations CFG1 and CFG2.
- When /MIKE_SW is active then configuration CFG2 is in use.
- When /MIKE_SW is inactive then CFG1 is in use.
- The configurations CFG1 and CFG2 contain parameters which are set in the configuration setup pages (for details, refer to chapter "Configuration Setup", page 44).
- You can change the configurations during the flight in the configuration setup.

2.6.6 Connector Layout RCU62X1

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

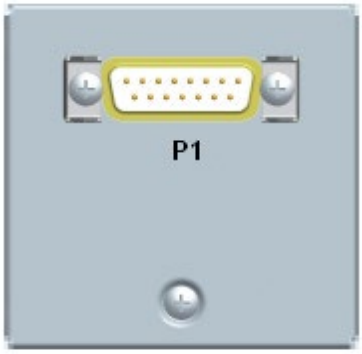


Figure 11: RCU62X1 - Connector Layout

2.6.7 Connector P1 (RCU62X1)

Pin No.	Pin Name	I/O	Function
P1-1	TX0_422+	OUT	Primary Control & Service Interface
P1-2	TX0_422-	OUT	Primary Control & Service Interface
P1-3	RX1_422+	IN	Auxiliary Control Interface
P1-4	RX0_422+	IN	Primary Control & Service Interface
P1-5	RX0_422-	IN	Primary Control & Service Interface
P1-6	ILL_LO	IN	Illumination low input
P1-7	TX1_422-	OUT	Auxiliary Control Interface
P1-8	ILL_HI	IN	Illumination high
P1-9	GND	-	Power supply Ground, shielding for RS422, Ground for discrete lines
P1-10	RX1_422-	IN	Auxiliary Control Interface
P1-11	SUPP_IN	-	Power supply (positive)
P1-12	/SRV_EN	OUT	Service enable pin ACTIVE state - closed contact to GND
P1-13	/EXT_ON	IN	External Power ON input ACTIVE state - closed contact to GND
P1-14	TX1_422+	OUT	Auxiliary Control Interface
P1-15	/EXCH_CH	IN	External "Exchange" key ACTIVE state - closed contact to GND

2.6.8 Inputs / Outputs (RCU62X1)

Panel Illumination

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

- These inputs are used to illuminate the RCU62X1 controller keys and the display.
- You can configure the illumination in the configuration setup with the front panel or externally with P1-6/P1-8.
- For external configuration connect P1-6 to system ground and P1-8 to dimming voltage bus.

External Power ON (/EXT_ON)

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

- This input/output is used to power on the system, for this connect P1-13 to ground.
- You can use this in installations with a central avionics power switch or to power on GT6201.

External Exchange (/EXCH_CH)

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

- This input is used to change active and preset frequency or activate SCAN mode with a switch.

2.7 Wiring

2.7.1 Car Cable Harness 1K044

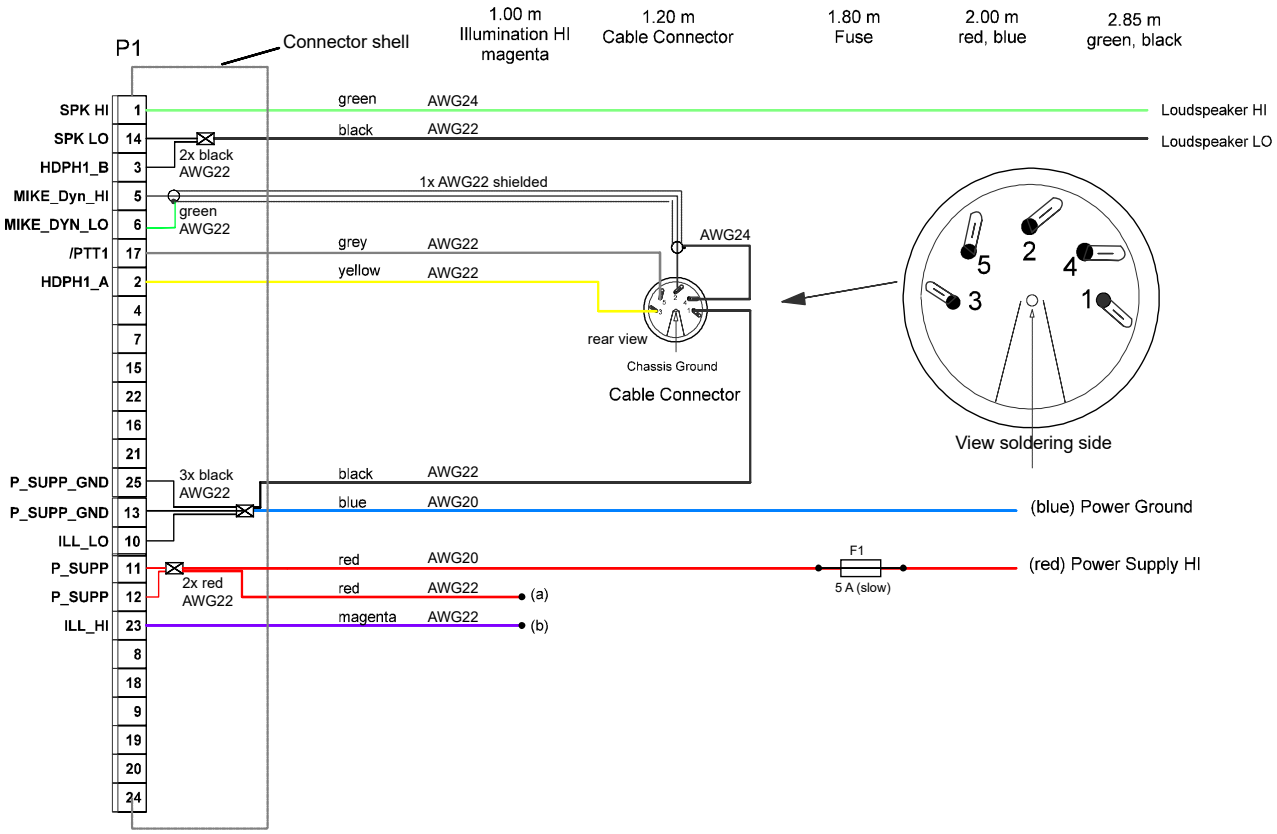


Figure 12: Car Cable Harness 1K044

Notes:

1. GT6201 panel illumination with fix illumination voltage

Connect (a) with (b) to have the vehicle power supply (14 or 28 VDC) on pin 23 "ILL_HI".

Detailed information for illumination supply voltage and brightness see chapter "", page 44.

2. GT6201 panel illumination controlled by vehicle DIM-bus

Connect (b) "ILL_HI" with the vehicle DIM-bus 0...14 VDC or 0...28 VDC for panel illumination adaption with vehicle instrument panel.

If connected this way check if all open cable ends are correct insulated!!

Detailed information for illumination supply voltage see chapter "", page 44.

2.8 Installation and Configuration

Minimum installation for GT6201 transceivers:

- Power supply.
- Antenna.
- Microphone (direct or with external audio panel).
- Headphone or speaker (direct or with external audio panel).
- Push-To-Talk (PTT) switch.

SAFETY INSTRUCTIONS

- Use only cables which are qualified (e.g. 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.
- Use the recommended fuses in the power supply line for the protection of the application, see "Technical Data", page 20.

- Type-specific cable harnesses are also available for the vehicle´s wiring (see "Accessories", page 25 and "Car Cable Harness 1K044", page 42).
- No RF antenna cables or HF cables should be included in the cable harnesses of the system.
- Avoid routing of the cable harness along with other wiring, which carry audio power or pulses.
- Check the wiring carefully before powering up the device and check particularly that power supply lines have not been reversed.

2.8.1 Antenna Installation

- The transceiver requires a standard 50 Ω vertically polarized VHF antenna.
- Follow manufacturer's instructions for antenna installation.

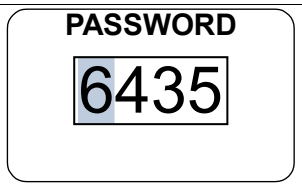
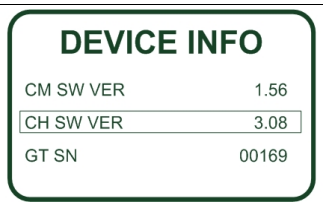
In addition, obey the recommendations:

- The COM antenna shall be on an electrical conductive surface or on a ground plane with an area of approximately 60 x 60 cm installed. (VSWR ≤ 3:1)

2.9 Configuration Setup

The configuration setup enables the technician to set up the equipment configuration.

2.9.1 Start Configuration Setup

 Figure 13: "PASSWORD"	• Push and hold the "MDE" key during power up. ○ 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.
 Figure 14: "DECIVE INFO"	• The first page of configuration setup shows the "DEVICE INFO" screen.

2.9.1.1 Navigate between Pages

Page Down (next page):	• Push"↕/SCN" or use the rotary encoder.
Page Up (previous page):	• Push "IC/SQL" key.
	• Use the rotary encoder for navigation within the sub-pages.

2.9.1.2 Store Setup Data

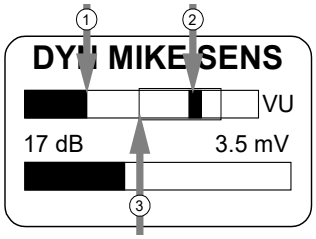
- The change of any parameter is stored immediately.

2.9.1.3 Leave Configuration Setup

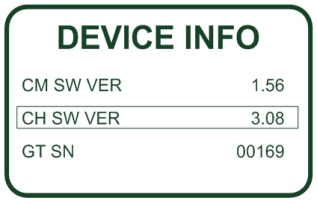
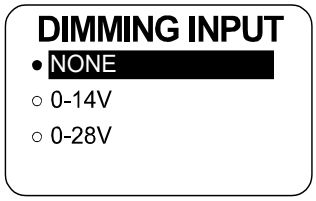
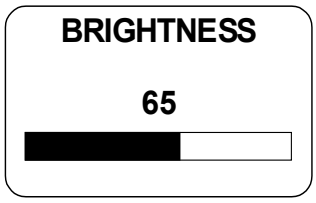
- Turn "OFF" the GT6201 to stop the setup.
  - All changes made up to this time are stored automatically.

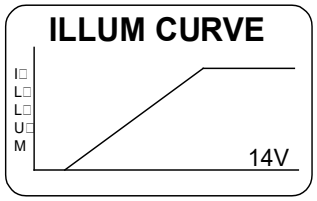
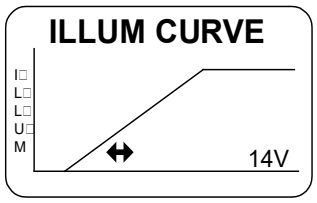
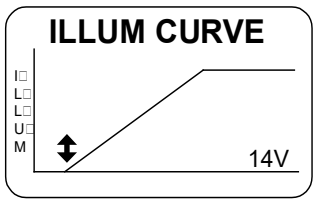
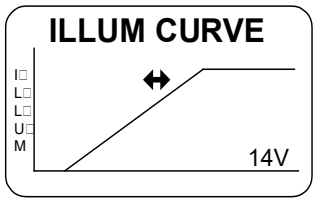
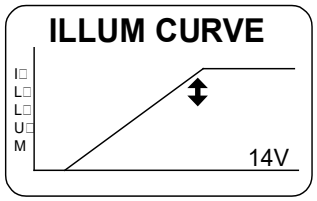
2.9.1.4 Adjust Volume Settings (VU Meter)

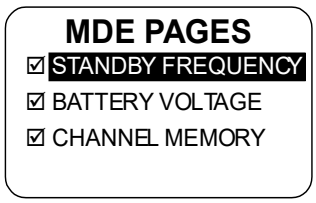
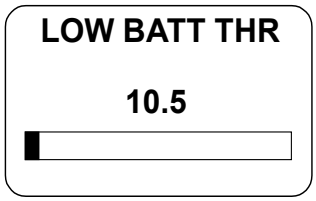
- The VU meter is to correct the adjustment of audio input sensitivity.
  - It is shown on all sensitivity setting menus.

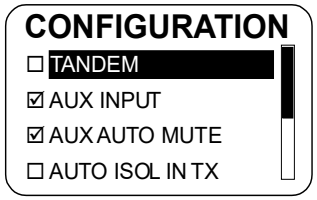
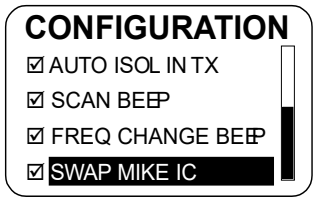
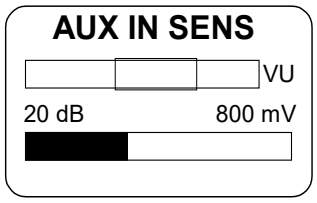
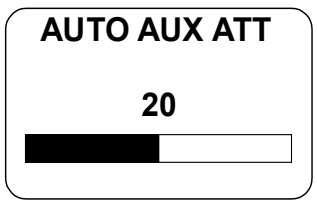
Display Contents	Description
Example:  1: Current audio level 2: Hold max. level 3: Recommended range (inside frame)	• VU Meter, it is shown in the middle below the menu name and above the sensitivity setting bar. • It shows the current audio level value on selected audio input ("Current audio level") • It holds the highest value of active audio level recorded during last 3 seconds (shown as "Hold max level" bar). • Correct sensitivity is achieved when you are speaking normally into the microphone and the "Hold max level" bar stays in "recommended range".

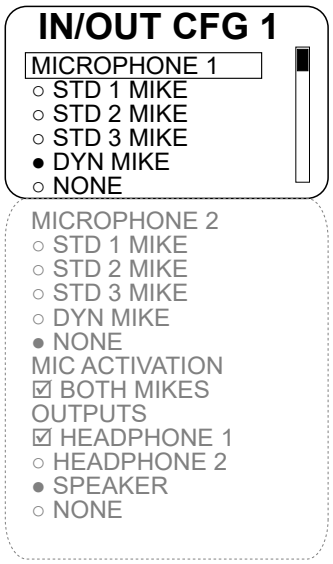
2.9.2 Configuration Setup Pages

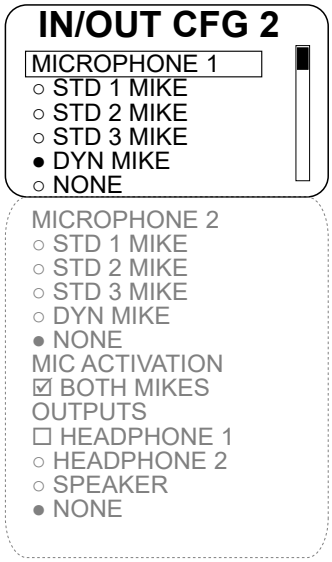
Display Contents	Description
	**"DEVICE INFO":** • After the confirmation of the password the first page "DEVICE INFO" is shown. • This page shows information about the SW version and the serial number of the transceiver. Example: • Transceiver SW version (CM SW VER). • Controller SW version (CH SW VER). • GT620X serial number (GT SN).
	**"DIMMING INPUT":** • Three options are available. • Turn the rotary encoder to change illumination for the keys and the display. • Finalize the selection with a push on "STO" key. **NONE:** • The illumination is controlled with the rotary encoder on the transceiver itself. • The user can adjust the brightness in the user menu. **0…14 V or 0…28 V:** • The background lighting for LCD and keys is controlled by the dimming bus. • The dimming curve is adjustable within the range from 0…14 VDC respectively 0…28 VDC. • Adjustment of the brightness with the rotary encoder is no longer possible after selecting this option.
 0% (off)… 100%	**"BRIGHTNESS":** Note: This page is shown only when the dimming input is set to "NONE". • Use the rotary encoder to set the brightness. • The user can adjust the brightness in the user menu. • The user can change the parameter at any time. • The brightness settings are separate for each controller therefore this menu is available on all controllers.

Display Contents	Description
	**"ILLUM CURVE":** Note: This page is shown only when the the DIMMING input is either selected for "14 V or 28 V" dim-bus voltage. • The illumination curve shows the relation between dimming bus voltage and brightness of the LCD and key illumination. • Two adjustable points V1 and V2 define the illumination curve. • Select the parameter by pushing the "STO" key. • Adjust the value in horizontal (left/right), vertical (up/down) direction with the rotary encoder.
	• (1) This parameter specifies the horizontal parameter V1x (minimum values: 1.5 V for 14 V dimming bus and 4 V for 28 V dimming bus). • Up to this value the brightness is zero. • When reaching V1x the brightness is immediately adjusted to V1y.
	• (2) This parameter specifies the vertical parameter V1y which is the level of brightness that is set when trigger point V1x is reached.
	• (3) This parameter specifies the horizontal parameter V2x (maximum values: 14 V or 28 V depending on selected dimming input) where the illumination curve reaches the maximum brightness level.
	• (4) This parameter specifies the vertical parameter V2y which is the maximum brightness.
	**"MEM OPTIONS":** • Two options are available: • Select the option with the rotary encoder. • Push the "STO" key to enabled/ disabled it. **CHANNEL STORE:** • If this option is enabled the user can store frequencies in any of the 99 available channels. • If this option is disabled the user has access only to previously stored channels. **STORE LAST CHANNELS:** • If this option is enabled, the device automatically stores the last used VHF frequency in the "Last Channel" database and the user has access to these channels. • If this option is disabled the user has no access to these channels.

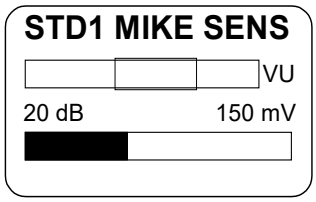
Display Contents	Description
	**"MDE PAGES":** • Three options are available: • The options support different user interfaces for the selection of operating frequency. • Select the option with the rotary encoder. • Push the "STO" key to enabled/disabled it. **STANDBY FREQUENCY:** • Enables/disables "Standard Mode" **BATTERY VOLTAGE:** • Enables/disables "Direct Tune Mode". **CHANNEL MEMORY:** • Enables/disables "Channel Mode". • When "BATTERY VOLTAGE" is disabled the "DIRECT TUNE MODE" page is no longer available in the normal operation. • Store a frequency in a specific channel is possible even if only "BATTERY VOLTAGE" or "STANDBY FREQUENCY" is selected. • It is not possible to disable all options from the "MDE PAGES".
 10…33 V	**"LOW BATT THR":** • On this page you can adjust the threshold for indication of the "LOW BATT" warning page (default setting is 10.5 V). • The low battery threshold depends on battery type. • The low battery threshold is adjustable. • Use the rotary encoder for the adjustment. • The display shows the "LOW BATT" warning if the supply voltage is less than the "LOW BATT THR" value. Recommended values: • "LOW BATT THR" = 11 V for 12 V battery • "LOW BATT THR" = 24 V for 24 V battery

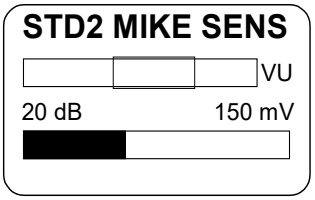
Display Contents	Description
 Options 1...4  Options 4...7	**"CONFIGURATION":** • On this page 6…7 options are available. • Select the option with the rotary encoder. • Push the "STO" key to enabled/ disabled it. **TANDEM:** Not relevant for ground applications. **AUX INPUT:** • If selected, the auxiliary audio signal is audible on headphone / speaker (P1-4 / P1-21). • Is the auxiliary audio input not used, it is recommended to disable "AUX INPUT". **AUX AUTO MUTE:** Note: "AUX AUTO MUTE" is only shown when "AUX INPUT" is enabled. • If selected the auxiliary audio input is muted. • The auxiliary audio input is also muted if the receiver finds a signal (based on squelch evaluation). • When disabled the auxiliary audio input signal and the receiver signal will intermix continuously. **AUTO ISOL IN TX:** Not relevant for ground applications. **SCAN BEEP:** • If selected the transceiver supply a short beep tone to notify a signal presence on the "PRESET FREQUENCY" (only in scan function). • During signal reception on the "ACTIVE FREQUENCY" a change to the "PRESET FREQUENCY" is not possible. • The audio stays on "ACTIVE FREQUENCY" and a short beep tone is audible. • The "PRESET FREQUENCY" value is shown inverted in a sequence of approximately 1 s. **FREQ CHANGE BEEP:** • If selected the transceiver supply a short beep on each change of the "ACTIVE FREQUENCY". **SWAP MIKE IC:** • If selected the /IC input functions as /MIKE_SW input and /MIKE_SW input operates as /IC input.
 50...8000 mV,	**"AUX IN SENS":** • On this page you can adjust the sensitivity of the auxiliary audio input (P1-4 / P1-21). • Use the rotary encoder for the adjustment. • This page is shown only when ENABLE_AUX_IN is activated. • The VU meter shows the current signal level of the aux audio input and the highest signal value from the last 3 s.
 0…40 dB	**"AUTO AUX ATT":** • On this page you can adjust the attenuation of the auxiliary audio input. • Use the rotary encoder for the adjustment. • When intercommunication is started (regardless of the activation: "VOX", or "/IC" discrete input) the signal from auxiliary audio input will be attenuated. • When intercommunication is completed the auxiliary audio changes to its previous level.

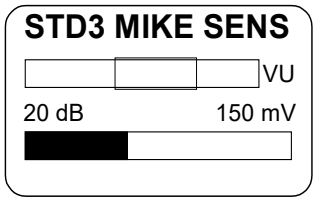
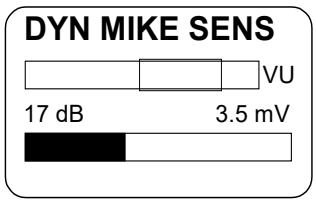
Display Contents	Description
	**"IN/OUT CFG 1":** Note: When MIKE_SW is connected both configurations CFG 1 and CFG 2 must be configured. • On this page you can configure the microphone inputs and headphone outputs for configuration CFG1. • Select the option with the rotary encoder. **"MICROPHONE 1" (set only one of the options):** **STD1 MIKE:** • Standard microphone input 1is selected (P1-18/ P1-8). **STD2 MIKE:** • Standard microphone input 2 is selected (P1-9/ P1-8). **STD3 MIKE:** • Standard microphone input 3 is selected (P1-19/ P1-8). **DYN MIKE:** • Dynamic microphone input is selected (P1-6/ P1-5). **NONE:** • No microphone is used in microphone path 1. **"MICROPHONE 2" (set only one of the options):** **STD1 MIKE:** • Standard microphone input 1 is selected (P1-18/ P1-8). **STD2 MIKE:** • Standard microphone input 2 is selected (P1-9/ P1-8). **STD3 MIKE:** • Standard microphone input 3 is selected (P1-19/ P1-8). **DYN MIKE:** • Dynamic microphone input is selected (P1-6/ P1-5). **NONE:** • No microphone is used in microphone path 2. **"MIC ACTIVATION"** **BOTH MIKES ENABLED:** • Input /PTT1 starts transmission from microphone path 1 and 2 (P1-17). • Input /PTT2 starts transmission from microphone path 2 and path 1 (J1-5). • Input /IC starts intercom from microphone path 1 and 2 (P1-7). **BOTH MIKES DISABLED:** • Input /PTT1 starts transmission only from microphone path 1 (P1-17). • Input /PTT2 starts transmission only from microphone path 2 (J1-5). • Input /IC starts intercom only from microphone path 1 (P1-7). **"OUTPUTS"** **HDPH 1 ENABLED:** • Audio is available on headphone 1 output (P1-2/P1-3). **HDPH 1 DISABLED:** • No audio is available on headphone 1 output. **HDPH 2 ENABLED:** • Audio is available on headphone 2 output (P1-20/P1-22), speaker is not available.

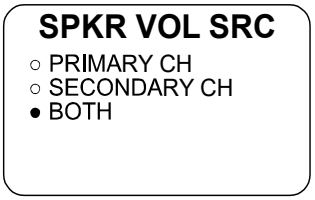
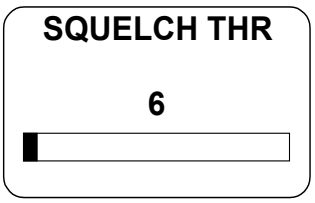
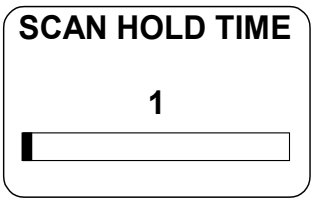
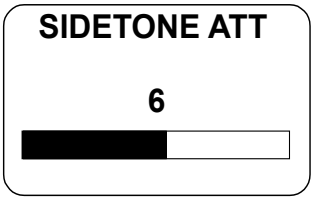
Display Contents	Description
	HDPH 2 DISABLED: • No audio is available on headphone 2 output, speaker is not available. **SPEAKER ENABLED:** • Audio is available on speaker (P1-1/P1-14), headphone 2 is not available. **NONE:** • No audio on headphone 2 output or speaker output.
	**"IN/OUT CFG 2":** Note: "IN/OUT CFG 2" is shown only when the MIKE_SW input has active state (J1-24 is connected to GND). When MIKE_SW is connected both configurations CFG 1 and CFG 2 must be configured. • On this page you can configure the microphone inputs and headphone outputs for configuration CFG2. • Select the option with the rotary encoder. **"MICROPHONE 1" (set only one of the options):** **STD1 MIKE:** • Standard microphone input 1 is selected (P1-18/ P1-8). **STD2 MIKE:** • Standard microphone input 2 is selected (P1-9/ P1-8). **STD3 MIKE:** • Standard microphone input 3is selected (P1-19/ P1-8). **DYN MIKE:** • Dynamic microphone input is selected (P1-6/ P1-5). **NONE:** • No microphone is used in microphone path 1. **"MICROPHONE 2" (set only one of the options):** **STD1 MIKE:** • Standard microphone input 1is selected (P1-18/ P1-8). **STD2 MIKE:** • Standard microphone input 2 is selected (P1-9/ P1-8). **STD3 MIKE:** • Standard microphone input 3 is selected (P1-19/ P1-8). **DYN MIKE:** • Dynamic microphone input is selected (P1-6/ P1-5). **NONE:** • No microphone is used in microphone path 2. **"MIC ACTIVATION"** **BOTH MIKES ENABLED:** • Input /PTT1 starts transmission from microphone path 1 and 2 (P1-17). • Input /PTT2 starts transmission from microphone path 2 and 1 (J1-5). • Input /IC starts intercom from microphone path 1 and 2 (P1-7). **BOTH MIKES DISABLED:** • Input /PTT1 starts transmission only from microphone path 1 (P1-17). • Input /PTT2 starts transmission only from microphone path 2 (Pin J1-5). • Input /IC starts intercom only from microphone path 1(P1-7).

Display Contents	Description
	"OUTPUTS" **HDPH 1 ENABLED:** • Audio is available on headphone 1 output (P1-2/P1-3). **HDPH 1 DISABLED:** • No audio is available on headphone 1 output. **HDPH 2 ENABLED:** • Audio is available on headphone 2 output (P1-20/P1-22), speaker is not available. **HDPH 2 DISABLED:** • No audio is available on headphone 2 output, speaker is not available. **SPEAKER ENABLED:** • Audio is available on speaker (P1-1/P1-14), headphone 2 is not available. **NONE:** • No audio on headphone 2 output or speaker output.

Display Contents	Description
 9...1500 mV Note: This page is shown only when: Standard Mike 1 input is selected in IN/OUT CFG1 and MIKE_SW input pin status is [Inactive] or Standard Mike 1 input is selected in IN/OUT CFG2 and MIKE_SW input pin status is [Active].	**"STD1 MIKE SENS":** • On this page the sensitivity of standard microphone 1 input is adjustable. • Use the rotary encoder for the adjustment. • The factory default setting is 119 mV. • The VU meter shows the current signal level on the audio input and the highest signal value for the last 3 s. • When speaking normally into the microphone the bar graph should stay in the recommended predefined range. **Note: Adjust the microphone sensitivity by keeping the cockpit noise suppression as high as possible, this will ensure correct modulation.** • If the sensitivity value is very small (e.g. 10 mV) more cockpit noise will be heard than if the sensitivity value is set to a higher level (e.g. 100 mV). • If the sensitivity value is very high (e.g. 1000 mV) the cockpit noise is very decreased but the modulation of the transmitter may not be sufficient. • The installer shall do a communication check after modification of this parameter. o It is recommended to do this communication check with and without a running engine. **Note: For installations with high interferences it is recommended to use sensitivity level from 27...1500 mV.**

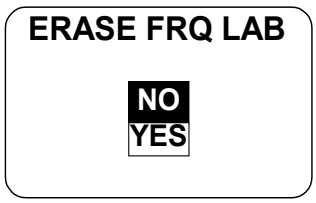
Display Contents	Description
 9...1500 mV Note: This page is shown only when: Standard Mike 2 input is selected in IN/OUT CFG1 and MIKE_SW input pin status is [Inactive] or Standard Mike 2 input is selected in IN/OUT CFG2 and MIKE_SW input pin status is [Active].	**"STD2 MIKE SENS":** • On this page the sensitivity of standard microphone 2 input is adjustable. • Use the rotary encoder for the adjustment. • The factory default setting is 119 mV. • VU meter shows current value of audio level from standard microphone input 2 and the highest value of active audio level recorded during last 3 s. • When speaking normally into the microphone the bar graph should stay in the recommended predefined range. **Note: Adjust the microphone sensitivity by keeping the cockpit noise suppression as high as possible, this will ensure correct modulation.** • If the sensitivity value is very small (e.g. 10 mV) more cockpit noise will be heard than if the sensitivity value is set to a higher level (e.g. 100 mV). • If the sensitivity value is very high (e.g. 1000 mV) the cockpit noise is very decreased but the modulation of the transmitter may not be sufficient. • The installer shall do a communication check after modification of this parameter. • The installer shall do a communication check after modification of this parameter. o It is recommended to do this communication check with and without a running engine. **Note: For installations with high interference it is recommended to use sensitivity level from 27...1500 mV.**

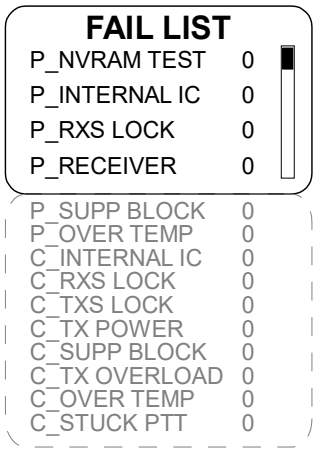
Display Contents	Description
 9...1500 mV Note: This page is shown only when: Standard Mike 3 input is selected in IN/OUT CFG1 and MIKE_SW input pin status is [Inactive] or Standard Mike 3 input is selected in IN/OUT CFG2 and MIKE_SW input pin status is [Active].	**"STD3 MIKE SENS":** • On this page the sensitivity of standard microphone 3 input is adjustable. • Use the rotary encoder for the adjustment. • The factory default setting is 119 mV. • VU meter shows current value of audio level from standard microphone input 3 and the highest value of active audio level recorded during last 3 s. • Correct sensitivity is achieved when you are speaking normally into the microphone and the "Hold max level" bar stays in "recommended range". **Note: Adjust the microphone sensitivity by keeping the cockpit noise suppression as high as possible, this will ensure correct modulation.** • If the sensitivity value is very small (e.g. 10 mV) more cockpit noise will be heard than if the sensitivity value is set to a higher level (e.g. 100 mV). • If the sensitivity value is very high (e.g. 1000 mV) the cockpit noise is very decreased but the modulation of the transmitter may not be sufficient. • The installer shall do a communication check after modification of this parameter. • The installer shall do a communication check after modification of this parameter. o It is recommended to do this communication check with and without a running engine. **Note: For installations with high interferences it is recommended to use sensitivity level 27...1500 mV.**
 0.5...25 mV Note: This page is only shown when: : Dynamic Mike input is selected in IN/OUT CFG1 and MIKE_SW input pin status is [inactive] or Dynamic Mike input is selected in IN/OUT CFG2 and MIKE_SW input pin status is [active].	**"DYN MIKE SENS":** • On this page the sensitivity of dynamic mike sense input is adjustable. • Use the rotary encoder for the adjustment. • The factory default setting is 3.5 mV. • When speaking normally into the microphone the bar graph should stay within the recommended predefined range. **Note: Adjust the microphone sensitivity by keeping the cockpit noise suppression as high as possible, this will ensure correct modulation.** • If the sensitivity value is very small (e.g. 1 mV) the cockpit noises will be heard than if the sensitivity value is set to a higher level (e.g. 25 mV). • If the sensitivity value is very high (e.g. 25 mV), the cockpit noise is very decreased but the modulation of the transmitter may not be sufficient. • The installer shall do a communication check after modification of this parameter. o It is recommended to do this communication check with and without a running engine. **Note: For installations with high interferences it is recommended to use sensitivity level 2...25 mV.**

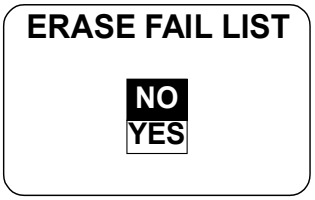
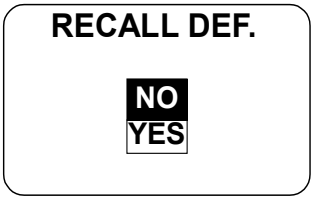
Display Contents	Description
	**"SPKR VOL SRC":** • On this page three options are available. • Select the option with the rotary encoder. • Push the "STO" key to enabled/ disabled it. **PRIMARY CH:** • If "PRIMARY CH" is selected the speaker volume is adjustable by GT6201.
 6...26	**"SQUELCH THR":** Note: The "SQUELCH THR" is available with the "MENU" at any time. • Use the rotary encoder for the adjustment. **Minimum adjustment of 6 means:** • Weak RF signals can trigger the squelch threshold and the voice signal might be low combined with a noisy background. **Maximum adjustment of 26 means:** • Only strong RF signals will trigger the Squelch threshold. The voice signal will be audible very clear with very low background noise. • Weak RF signals may not trigger the squelch threshold and therefore the audio may not be heard by the user.
 1...60 s	**"SCAN HOLD TIME":** • Use the rotary encoder for the adjustment. • The factory default setting is 1. • For normal operation it is recommended to keep this setting at 1.
 0…12 dB	**"SIDETONE ATT":** • Use the rotary encoder for the adjustment. • The attenuation relates to the intercom volume. ○ 0 dB = sidetone as loud as intercom signal. ○ 12 dB = sidetone signal 12 dB less than the intercom signal. Example: If the intercom volume is set to a very low value, then the sidetone volume is decreased in relation to the intercom volume, irrespective of the sidetone value. The "SIDETONE ATT" parameter is an additional attenuation of the sidetone signal in transmit mode.

Display Contents	Description

	**"ERASE CHN MEM":**
	Note: The menu is available on the primary controller.
	• The transceivers of the GT6201 series have two databases to store VHF frequencies.
	  ○ The "User Channels Database" identified by the channels numbers CH01…CH99.
	  ○ The "Last Channels Database" " identified by the channels numbers LAST1…LAST9 (the last used frequencies).
	• You can erase the "User Channels Database" and the "Last Channels Database".
	To erase the data bases:
	• Select "YES" with the rotary encoder.
	• Push the "STO" key to confirm the selection.

	**"ERASE FRQ LAB":** Note: The menu is available on the primary controller. • The transceivers of the 62XX series have a third database. • The "FRQUENCY LABELS DATABASE", it contains the text labels for the channels CH01…CH99. • You can erase the "LABELS DATABASE". To erase the data base: • Select "YES" with the rotary encoder. • Push the "STO" key to confirm the selection.

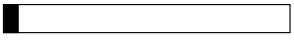
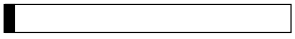
	**"FAIL LIST":**
	• This page shows information for all occurred and stored failures during operation.
	• It is used for troubleshooting and failure isolation.
	• The display can show 4 list entries at the same time.
	  ○ Use the rotary encoder to move the slide bar up/down to view the additional failures.
	• "0" means no failure is occurred.
	• "1" means a failure is occurred once or more times.
	  ○ The failure was stored in the fail list.

Display Contents	Description
	**"ERASE FAIL LIST":** To erase all stored failure entries: • Select "YES" with the rotary encoder. • Push the "STO" key to confirm. **Note: The erase of the failure list must not be done by the installer.** • The failure list will be erased by factory or maintenance shop after a maintenance or repair is completed.
	**"RECALL DEF":** • The factory default settings are settings of the device after production. To restore the factory default settings: • Select "YES" with the rotary encoder. • PUSH the "STO" key to confirm. **Note: The restoring of the factory default settings overwrites all previous, customized configuration settings!**

2.10 Factory Default Settings

☑ Enabled ☐ Disabled ● Selected ○ De-Selected

Setting name	Value
DEVICE INFO	
DIMMING INPUT	NONE
BRIGHTNESS	50%
MEMORY OPTIONS	☑ CHANNEL STORE ☑ STORE LAST CHANNEL
MDE PAGES	☑ STANDBY FREQUENCY ☑ BATTERY VOLTAGE ☑ CHANNEL MEMORY
LOW BATT THR	10.5 V GT6201-05, GT6201-05-R 21.0 V GT6201-10, GT6201-10-R
CONFIG	☐ TANDEM ☐ AUX_IN ☑ AUTO ISOL IN TX ☐ SCAN BEEP ☐ FREQ CHANGE BEEP ☐ SWAP MIKE IC
IN/OUT CFG1	MICROPHONE 1 ● STD 1 MIKE ○ STD 2 MIKE ○ STD 3 MIKE ○ DYN MIKE ○ NONE MICROPHONE 2 ○ STD 1 MIKE

Setting name	Value
	○ STD 2 MIKE ○ STD 3 MIKE ● DYN MIKE ○ NONE MIC ACTIVATION ☑ BOTH MIKES OUTPUTS ☑ HEADPHONE 1 ○ HEADPHONE 2 ● SPEAKER ○ NONE
IN/OUT CFG2	MICROPHONE 1 ● STD 1 MIKE ○ STD 2 MIKE ○ STD 3 MIKE ○ DYN MIKE ○ NONE MICROPHONE 2 ○ STD 1 MIKE ● STD 2 MIKE ○ STD 3 MIKE ○ DYN MIKE ○ NONE MIC ACTIVATION ☑ BOTH MIKES OUTPUTS ☑ HEADPHONE 1 ● HEADPHONE 2 ○ SPEAKER ○ NONE
STD1 MIKE SENS	119 mV
STD2 MIKE SENS	119 mV
STD3 MIKE SENS	119 mV
DYN MIKE SENS	3.5 mV
SPKR VOL SRC	● PRIMARY CH ○ SECONDARY CH ○ BOTH
SQUELCH THR	**12** 
SCAN HOLD TIME	**1** 
SIDETONE ATT	**6** 

Setting name	Value
EREASE CHANNEL MEM	**NO** **YES**
EREASE FREQUENCY LABELS	**NO** **YES**
FAIL LIST	
EREASE FAIL LIST	**NO** **YES**
RECALL DEF.	**NO** **YES**

2.11 Post Installation Check

Once the device/system is installed completely do a test procedure to make sure the system functionality. Make sure that the compliance with the authority required procedures is obeyed.

The description that follows gives guidance for such tests.

2.11.1 Mechanical Installation and Wiring Check

- Make sure that all cables are fixed securely and shields connected properly to signal 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.

2.11.2 Power Supply

- Examine the power supply lines and the correct polarity.
- Make sure that the power supply is within the specified limits.

2.11.3 Receiver / Transmitter Operation

- Power up the 620X and tune it to a local station for a communication test.
- Make sure that the receiver output supplies a clear and readable audio and ask the local station for proper readability for the transmit signal of the 620X.
- Repeat this communication test with an airborne station within ≈ 20-40 NM (Nautical Miles).

2.11.4 Antenna Check

- Examine the VSWR (voltage standing wave ratio) over the complete frequency band (e.g. by using a VHF Reflection-Coefficient Meter).
  The VSWR ratio should be less than 2:1 and is not acceptable when exceeding 3:1.

2.12 Error / Failure Indication

It is possible to read out and reset error flag.

- For read out and reset see: "Configuration Setup Pages" "FAIL LIST" or contact Becker Avionics Customer Service.
- Failure description see: "Warning and Failure Indications" page 77.

2.13 Troubleshooting

Problem	Possible Reason / Proposed Solution
VOX threshold is not adjustable. VOX is always off.	• VOX is inoperative, because the speaker is on. **Proposed Solution** • Turn the speaker off. Refer to "Configuration Setup", page 44).
Too high "cabin" noise during intercom / transmit operation.	• The sensitivity of the microphone input is too sensitive. **Proposed Solution** • Adjust the microphone sensitivity to a higher value to ensure the cabin noise relatively decreases. • Recheck transmit operation and/or intercom function.
No speaker output.	The speaker is off. **Proposed Solution** • Turn the speaker on.
The noise suppression function of the squelch is not working. (Receiver noise is always present).	• Some avionic equipment (especially non ETSO/TSO approved avionic) can cause quite high electromagnetic interference, and the GT6201 device(s) can receive it. **Proposed Solution** • Make the shielding, distance or grounding better to decrease the interference. • Adjust the squelch to a higher value. Note, a higher value will cause a decreased sensitivity.
Error message on the display (e.g. LOW BATT, STUCK PTT, TX HOT, FAILURE)	• An error is occurred. **Proposed Solution** • Refer to "Warning and Failure Indications", page 77).
Antenna VSWR exceeds 3:1.	• Caused by a defective or insufficient counterpoise for the antenna. **Proposed Solution** • Make sure for sufficient size of the counterpoise and make sure there is no mechanical defect on the antenna.
	• The impedance of the antenna cable is significantly different from 50 Ω. **Proposed Solution** • Make sure that the antenna cable has 50 Ω impedance. • Make sure that the cable is not bend on its way from the radio to the antenna
	• Defective BNC connectors on the antenna cable. **Proposed Solution** • Make sure the proper crimp/solder work on the BNC connectors.

For details about adjustments refer to "Configuration Setup", page 44).

3 Operating Instructions

In this chapter you can read about:

3.1 General

The chapter "Operating Instructions" contains information and instructions for the operation of the VHF transceivers.

3.2 Device Description

3.2.1 Device Assignment

This manual is valid for the devices:

- See page 29

3.2.2 Packing, Transport, Storage

- See page 28

3.2.3 Scope of Delivery

- See page 29

3.2.4 Type Plate

- See page 30

NOTICE

- The figures for display content mainly shows the transceiver in 8.33/25 kHz mixed mode (pictures for 25 kHz differ only in number of digits for frequency).
- The user can do the HMI operation on the primary controller or on optional secondary controller RCU62X1.

SAFETY INSTRUCTIONS

A voice communication test shall be done before starting any operation.

- 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 noise.
- Use only microphones or headsets which are suitable for specific installations.

SAFETY INSTRUCTIONS

- If the power supply voltage is less than the adjusted threshold, the display shows the message "LOW BATT".
- If the power supply voltage is < 10.25 V, the device continues operation with decreased performance.
  - The speaker output of the transceiver is automatically switched "OFF"
  - The speaker symbol is no longer shown on LCD display
  - The user must use headphones to continue listening.
- If power supply voltage is < 9.0 Volt, the device switches off automatically.

NOTICE

Some functions and settings are only available in the password-protected configuration setup*.

* For details please see chapter "Installation", "Configuration Setup" page 44.

3.2.5 Controls and Indications

3.2.5.1 User Interface

Figure 15: GT6201, RCU62X1: Controls and Indications

	Symbol	Description	Main Function
1		IC/SQL (Intercom/Squelch)	• "Short push" during normal operation is used for the RX -SQL ON/OFF. • "Long push" during normal operation starts the intercom menu.
2		MDE (Mode)	• "Short push" during normal operation changes to the frequency selection mode. • "Long push" during normal operation starts the user menu.
3		STO (Store)	• "Short push" during normal operation starts the storage procedure.
4		↕/SCN (Exchange/SCAN)	• "Short push" during standard mode or scan mode changes between preset and active frequency. • "Long push" starts the scan mode.
5		Power ON/OFF, Volume Knob	• Turns the transceiver ON/OFF and is used to adjust the volume level of received signals.
6		Rotary encoder	• Turn the rotary encoder to change the selected parameters (frequency, IC-volume, VOX, …). • Push the rotary encoder to select the digits. • Push the rotary encoder to confirm the setting.
	-8/25-	Change of Channel Spacing	• Push and hold the MOD and STO key at the same time for > 2 s to change 8.33 to 25 kHz channel spacing and vice versa.
7		Display	LCD: Liquid Crystal Display
8		Active frequency	Only on the active frequency: • Transmission is possible and the reception has priority, even in scan mode. • Frequency tuning is not possible in standard mode.
9		Preset frequency	• Frequency tuning is possible in standard mode. • In scan mode both frequencies, active and preset are in listening watch. • If no receive signal is detected on the active frequency, receiving signals on the preset frequency will be audible, but will be muted as soon as a signal on the active frequency is detected.

The device detects a:

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

"Short push": any push < 2 seconds.

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

3.2.5.2 Symbols on the Display

Symbol	Function
IC	The intercom operation is started (triggered by VOX or external IC key).
	The intercom operation with VOX is disabled.
TX	The transceiver is in transmit operation.
SQL	The squelch function is started.
SCAN	The transceiver operates in scan mode.
STO	The transceiver is in a storage procedure.
LOW BATT	The battery voltage is less than the predefined threshold.
128.225	Inverted figures or letters on the display are selected to change.
	Speaker is on.

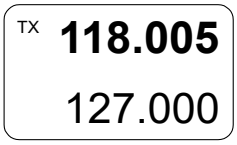
3.3 Start-Up

- Turn "ON" the device by turning the volume knob clockwise.
- After power-on, the device starts a self-test (PBIT).
  - The display shows the message "WAIT".
  - The display shows the software versions of the control head and the chassis module.
  - If there is an error the display shows the message "FAILURE, push any key" (for details see "Warning and Failure Indications", page 77).
  - If there is no error the transceiver changes to the last active mode before power off.
- During normal operation, a self-test (CBIT) permanently examine the correct operation of the device.
  - If there is an error the display shows an error message.

3.4 Receive Mode

- If /PTT1 and /PTT2 (Push To Talk) inputs are inactive, the transceiver stays in receive mode.
- A mixed signal is supplied on the headphone(s) outputs (if enabled), it is mixed of the:
  - Received signal from antenna.
  - Intercom signal from intercom circuit one and two.
  - Signal from auxiliary input.
- A mixed signal is supplied on the speaker output (if enabled)), it is mixed of the:
  - Received signal from antenna.
  - Signal from auxiliary input.
- The signal from the auxiliary input been muted under certain conditions (for details refer to "Auxiliary Audio Input", page 75).

3.5 Transmit Mode



- If PTT input is started (Push To Talk key is pushed) the transceiver is set to transmit mode.
  - The microphone(s) signals can modulate the transmitter.
  - The PTT 1 input starts transmission from microphone path 1.
  - The PTT 2 input starts transmission from microphone path 2.
  - If "BOTH MIKES" are enabled in the configuration setup*, each input (PTT 1 or 2) can start the transmission from both microphone paths at the same time.
- The "TX" symbol shows that the device is in transmit mode.
- The sidetone (demodulated audio of the emitted signal) is available on the headphone output.
- The transmit mode automatically deactivates the speaker.

* (Details see "Configuration Setup" page 44).

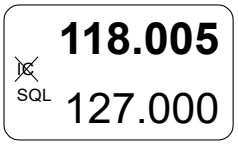
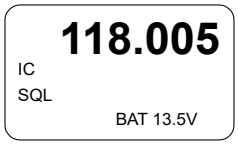
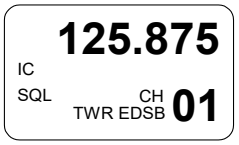
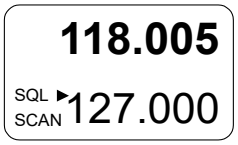
NOTICE

- In transmit mode some user actions are blocked e.g. change the frequency selecting mode or channel spacing mode, which are normally permitted in receive mode.
- Changes in standard mode e.g. the "Preset" frequency are possible even during transmission.
- In transmit mode no intercom operation is possible.
- The transmit mode is automatically terminated (return to receive mode) after 120 s of continuous transmitting.
  - The display shows "STUCK PTT", see "Warning and Failure Indications", page 77.
  - For the start of a new transmission first it is necessary to set the /PTT line inactive.

3.6 Frequency Selection Modes

Available modes:

- Standard mode
- Direct tune mode
- Channel mode
- Scan mode

Standard mode	Direct tune mode	Channel mode	Scan mode
			

NOTICE

- The availability of the modes depends on the settings in the configuration setup*.

* (Details see "Configuration Setup" page 44).

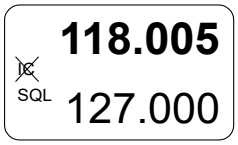
The modes "Standard Mode", "Direct Tune Mode" and "Channel Mode" have different layouts for the selection of the operating frequency..

- The modes are selectable with short push of "MDE" key, one after the other.
  - The display shows one by one: "Standard Mode", "Direct Tune Mode" "Channel Mode", "Standard Mode", and so on.
- During the changes between the modes the active frequency is always the same and active.

The mode SCAN is a sub-mode of standard mode and is used for monitoring two frequencies at the same time.

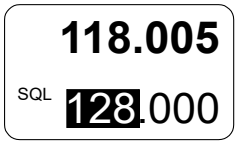
- Push "↕/SCN" key (2 s) to start/stop the scan function.

3.6.1 Standard Mode

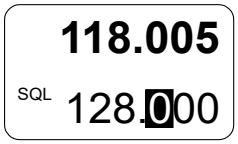


- Push the "MDE" key to change to the standard mode page.
  - The active frequency is shown in the top line and preset frequency in the bottom line.
- The change of the active frequency is not possible in standard mode (only available in direct tune mode).
- The change of the preset frequency is possible.

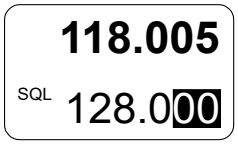
Change the preset frequency in standard mode:



- Make a "short push" on the rotary encoder for modification of the MHz digits.
  - The changeable digits are shown inverted.
- Turn the rotary encoder clockwise/counter clockwise to change the frequency in 1 MHz steps.



- Make another "short push" on the rotary encoder for modification of the 100 kHz digit.
  - The changeable digit is shown inverted.
- Turn the rotary encoder clockwise/counter clockwise to change the frequency in 100 kHz steps.

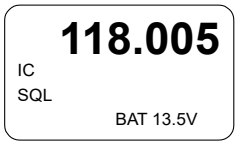


- Make another "short push" on the rotary encoder for modification of the 25/8.33 kHz digits.
  - The changeable digits are shown inverted.
- Turn the rotary encoder clockwise/counter clockwise to change the frequency in 25/8.33 kHz steps.

NOTICE

- A short push of the "↕/SCN" key, exchanges active frequency to preset frequency and vice versa.
  - While the transceiver operates in transmit mode, the exchange function is disabled.
- Push the "STO" key to store the active frequency into the next vacant memory position of the user channel database (see "Frequency Storage Functions", page 71).

3.6.2 Direct Tune Mode

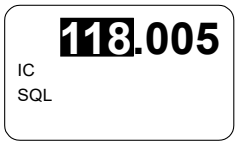


- Push the "MDE" key to change to the direct tune mode page.
  - The active frequency is shown in the top line.
- The battery information is shown.

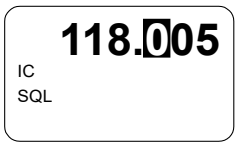
NOTICE The battery information is only shown if BATTERY VOLTAGE is selected in the configuration setup*.

* (Details see "Configuration Setup" page 44).

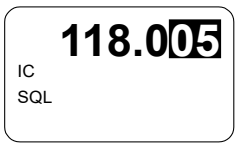
Change the active frequency in direct tune mode:



- Make a "short push" on the rotary encoder for modification of the MHz digits.
  - The changeable digits are shown inverted.
- Turn the rotary encoder clockwise/counter clockwise to change the frequency in 1 MHz steps.



- Make another "short push" on the rotary encoder for modification of the 100 kHz digit.
  - The changeable digit is shown inverted.
- Turn the rotary encoder clockwise/counter clockwise to change the frequency in 100 kHz steps.



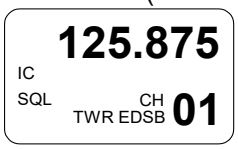
- Make another "short push" on the rotary encoder for modification of the 25/8.33 kHz digits.
  - The changeable digits are shown inverted.
- Turn the rotary encoder clockwise/counter clockwise to change the frequency in 25/8.33 kHz steps.

NOTICE

- The changes are active immediately.
  - While the transceiver transmits, the change of the active frequency is not possible.
- Push the "STO" key to store the active frequency into the next vacant memory position of the user channel database (see "Frequency Storage Functions", page 71).

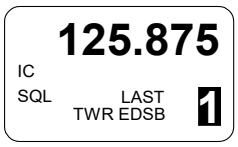
3.6.3 Channel Mode

- The channel mode shows data from the user channels database ("CH"), or last channels database ("LAST").
- The entry shows a customized label (identifier), if applied, for the frequency (max. 10 characters).



The channel database can store frequencies in channels:

- CH01…CH99 and
- LAST 1…LAST 9.

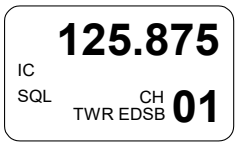


NOTICE

- The functions "LAST" and Store/Restore are only available if they are enabled in the configuration setup* - ("MEM OPTIONS").

* (Details see "Configuration Setup" page 44).

- If the device operates in the 25 kHz mode a selection of stored 8.33 kHz channels is not possible.
- For selection of 8.33 kHz channels, the device must operate in 8.33 + 25 kHz mixed mode.



- Push the "MDE" key to change to the channel mode page.
- Use the rotary encoder to select the channel number/frequency.
  - The top line shows the corresponding frequency and the bottom line the customized label (identifier) and the channel number/frequency.
  - If the active frequency is not yet stored then shows the display "CH--".

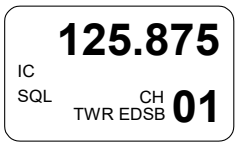
3.6.3.1 Select Channels

NOTICE

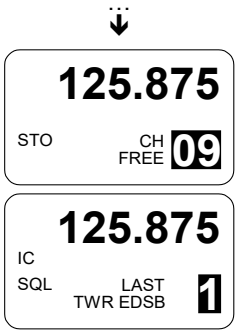
- The functions "LAST" and Store/Restore are only available if they are enabled in the configuration setup* - ("MEM OPTIONS").

* (Details see "Configuration Setup" page 44).

Example: With CH01 user channel shown on display:
In order to select the channel number:



- The first turn clockwise in channel mode starts access to the user channels CH01…CH99.
  - Make a short push on the rotary encoder or:
  - Make one clockwise turn with the rotary encoder.



- The channel number is now highlighted.
- Turn the rotary encoder to select a channel.
- With each step the device tunes immediately to the shown frequency.
  - The first turn counter-clockwise starts access to the channel "LAST 1".
  - The channel number is now highlighted.
  - One of the nine last used channels is selectable.
  - Turn the rotary encoder to select a channel.

NOTICE

- The "LAST" mode is left automatically after a 5 second timeout or stopped by the user with a push on the rotary encoder.
- When leaving the "LAST" channel database and the last shown frequency is not stored in the user channel database, the display shoes "CH__".
- Push "STO" to start the storage process.

Leave channel mode:

- Push the "MDE" key.
  - The channel mode will be closed.
  - The standard mode page is shown.

3.6.4 Frequency Storage Functions

Start store function:

- Push "STO" key.
  (in "Standard", Direct Tune" or "SCAN Mode").
  - ○ The symbol "STO" is shown.

3.6.4.1 Store

NOTICE

- The functions "LAST" and Store/Restore are only available if they are enabled in the configuration setup* - ("MEM OPTIONS").

* (Details see "Configuration Setup" page 44).

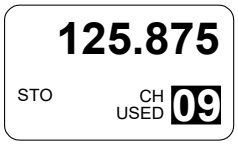
The transceiver has two databases:

- The user channel database - it has 99 channels CH01…CH99 to store frequencies with the possibility to apply a customized label (identifier) with max. 10 alphanumeric characters.
- The last channel database - automatically stores the last used frequencies.
  Named and callable as LAST 1…LAST 9, the customized identifier will be shown (if applied).

- You can store frequencies (within the range 118.000...136.9916 MHz) to any channel with a push the "STO" key.
- All 99 channels are changeable.

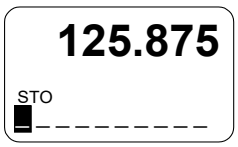
By entering the storage procedure, the device will first propose the next free channel.

- The label "FREE" shows together with the channel number, if the selected channel is vacant.



- A selected channel with an already stored frequency has the label "USED".

- If the same frequency is stored a second time, then the existing data (frequency, label/identifier data) is offered to store.



- If the frequency has no label attached, ten underscore digits are shown to give in a label.
- The cursor automatically shows on the first position.

Overview - The user can store data to:

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

3.6.4.2 Label (Identifier) Data

- Turn the rotary encoder to select the characters.
  - Selection works in both directions (example: blank → A →…Z → 0 → 9 → — → / → blank → A with a turn clockwise or counter clockwise).
  - A short push on the rotary encoder and the cursor is on the next position.
  - A short push on the "STO" key stores the label.
  - A long push on the "STO" key clears the label.
- When the change is stored the transceiver changes to the previous selected mode.
- If no action occurs in label editing mode within 7 seconds, the transceiver changes to the previous selected mode without storage the frequency and label information.
- Stored frequencies are callable in channel mode (see "Channel Mode" page 69).

3.6.5 Automatic Storage Function

The transceiver stores recently selected frequencies. Named and callable as LAST 1…LAST 9 (see "Channel Mode" page 69).

- When changing to a new active frequency, the previous active frequency is stored in memory as LAST 1.
- The frequencies previously stored in LAST 1...LAST 8 are shifted to memory channels LAST 2...LAST 9.

Note: The functions "LAST" and Store/Restore are only available if they are enabled in the configuration setup* - (page "MEM OPTIONS").

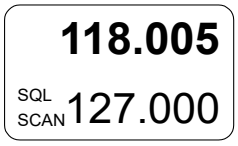
* (Details see "Configuration Setup" page 44).

3.6.5.1 Delete data

The stored content in the user channel database can only be deleted in the configuration setup*. Please note the whole channel database will be reset.

* (Details see "Configuration Setup" page 44).

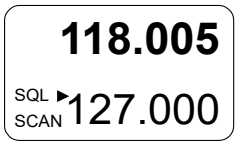
3.6.6 Scan Mode



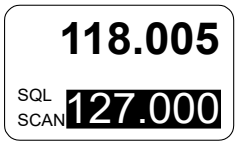
- In scan mode the display shows both frequencies.
  - The active frequency is shown on the top line and the preset frequency on the bottom line.
- The SCAN symbol in the display shows that scan function is started.

In all frequency selection modes:

- A long push (>2 s) of "↕/SCN" key starts the scan function and changes to standard mode, if started from channel or direct tune mode.
- A short push on the "MDE" key or a long push (>2 s) on "↕/SCN" key stops the scan function.
  The device stays in standard mode.



- The arrow symbol "►" in front of the frequency shows that this frequency is audible.

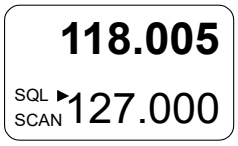


If both the active and preset frequency find a signal at the same time, the active frequency (top) has priority.

- The preset frequency is shown inverted and blinks.
- An audio notification "beep" tone is audible and the preset frequency blinks to show that there is a RX signal on the preset frequency (if enabled in the configuration setup*).

* Details see "Configuration Setups" page 44.

Reception on preset frequency in scan mode

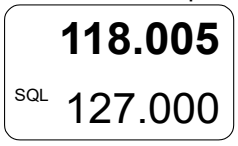


- If the preset frequency finds a signal and no signal is on the active frequency, the transceiver automatically changes to the preset frequency.
- The arrow symbol "►" in front of the frequency shows that this frequency is audible.

Note: **For transmission is always the active frequency used, also if the monitored frequency is currently audible.**
If TX on the preset frequency is required, push the "↕/SCN" key to change active and preset frequency.

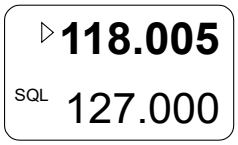
3.7 Squelch (SQL)

- The function is independent from the selected operation menu.
- A short push on "SQL/IC" key changes the function to "ON" or "OFF".



Squelch "ON"

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

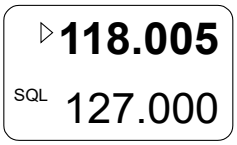
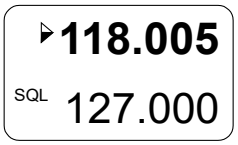
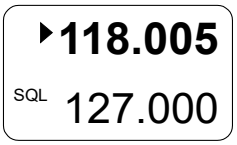


Squelch "OFF"

- If the squelch is "OFF" the arrow symbol "►" in front of the active frequency stay into view all the time.
- The receiver noise is audible as long as the signal is received.
- The squelch threshold is adjustable see "User Menu" page 76.

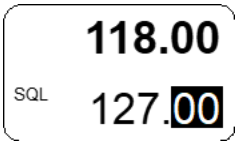
3.8 RX Field Strength Indication

- The field strength is shown with triangle symbol in front of the related frequency (in all frequency selection modes).
- The field strength of a received signal relates to the measured RSSI level ("Received Signal Strength Indication").

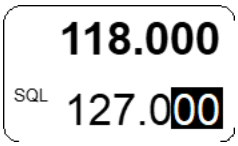
Weak Signal Strength	Good Signal Strength	Excellent Signal Strength
RSSI passing squelch levels (empty triangle)	-88 > RSSI > -80 dBm (half-filled triangle)	RSSI > -80 dBm (fully filled triangle)
		

3.9 Channel Spacing Mode

- The transceiver can operate in 8.33 kHz and 25 kHz frequency channel spacing.
- Push and hold the MOD and STO key at the same time for > 2 s to change 8.33 to 25 kHz channel spacing and vice versa.
- In 25 kHz mode, 5 frequency digits are shown.
  - Only operating frequencies with a channel spacing of 25 kHz are selectable.
  - This mode has a faster tuning, it leaves out the 8.33 kHz frequency steps.



25 kHz
channel spacing



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 from the selected, shown frequency.

3.10 Auxiliary Audio Input (AUX INPUT)

- The auxiliary audio input is used for e.g. MP3 player connection.
  - This function can be enabled/disabled in the configuration setup* - (page "Configuration").
- With AUX INPUT enabled:
  - The auxiliary audio input signal will be mixed with the received signals from antenna (passing squelch) and the intercom signal (when started).
  - When the intercom operates in isolation mode, the auxiliary audio input signal is audible on headphone 2 output, also if radio communication (transmission/receiving) is started.
- The AUX AUTO MUTE function depends on the AUX INPUT.
  - This function can be enabled/disabled in the configuration setup* - (page "Configuration").
  - This function automatically mutes the audio signal from the auxiliary audio input as long as the device detects (based on squelch evaluation) a RX signal or the user stops the squelch manually.
- With auxiliary input disabled:
  - The signal from the auxiliary audio input is permanently audible on the audio output, independently of the received signal or the squelch status.
- Automatic aux attenuation functionality controls the auxiliary audio input.
  - The level of the auxiliary input signal attenuates if intercom is started by VOX or by /IC discrete input.
  - The auxiliary input signal changes to its previous value after intercom deactivation.
  - The attenuation value can be adjusted.

* Details see "Configuration Setup" page 44.

3.11 Menus

During normal operation in a frequency selection mode, these menus are available:

- The user menu is for adjustments of panel brightness and squelch threshold.
- The intercom menu is for adjustments of intercom volume and VOX threshold (not relevant for ground applications).

3.11.1 User Menu

- A long push (>2 s) on "MDE" key starts the user menu.
- The user menu has two pages:
  - BRIGHTNESS
  - SQUELCH TRH
- A short push on "MDE" key or the rotary encoder changes the pages.

BRIGHTNESS:

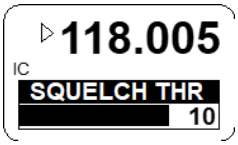
- The display shows the active frequency in the top line.
- The adjustable value is shown as bar graph and as numerical indicator in the bottom line.
- The brightness is adjustable from 0…100 (rotary encoder).
  - 0, illumination is off.
  - 100, maximum brightness.

Note:

This page is not available if the dimming input is set to 14 V or 28 V in the configuration setup*.

For this setting, the dimming circuit controls the brightness parameters.

*Details see "Configuration Setup" page 44.



SQUELCH TRH:

- The display shows the active frequency in the top line.
- The adjustable value is shown as bar graph and as numerical indicator in the bottom line.
- The squelch threshold is adjustable from 6…26 (rotary encoder).
  - 6, very weak signals are audible with high noise content; squelch opens at about -105 dBm.
  - 26, only quite strong signals are audible with low noise content; squelch opens at about -87 dBm. The receiver sensitivity is very decreased.

Leave the menu:

- Automatically after 5 seconds timeout.
- Another long push (>2 s) on "MDE" key.
- A short push on the rotary encoder when the "SQUELCH TRH" page is started.

3.12 Warning and Failure Indications

Display Contents	Description
IC 118.005 **LOW BATTERY** at intervals of 3 s	**"LOW BATTERY":** • The supply voltage of the transceiver is less than the threshold adjusted in the configuration setup. • The device is operable but it can have a decreased performance depending on supply voltage. **Possible reasons for indication:** • Accumulator capacity problems • Power interrupts. • General power supply problems. • Setting for low battery threshold too high.
IC 118.005 **STUCK PTT** at intervals of 3 s	**"STUCK PTT":** • The transmit mode is automatically terminated (return to receive mode) after 120 s of continuous transmitting. • The transceiver goes back to receive mode also if the PTT line is still active (GND). **Possible reasons for indication:** • Transmission lasts more than 120 seconds. • PTT-key is stuck. • PTT line permanently grounded (short circuit in installation). Note: For the start of a new transmission first it is necessary to set the /PTT line inactive (open).
IC 118.005 **TX HOT** at intervals of 3 s	• "TX HOT" is shown if the internal device temperature is > +90 °C. • Transceiver is still operable. The performance of transmitter is decreased. **Possible reasons for indication:** • Very high environmental temperature, long transmissions times and insufficient airflow conditions.
IC 118.005 **FAILURE** at intervals of 3 s	• The transceiver has found an internal failure during normal operation. • Depending on failure reason, the device is operable with decreased performance, or not operable at all. **Possible reasons for indication:** • Specified environmental conditions. • HW or SW failure inside the transceiver.
FAILURE PRESS ANY KEY	• The transceiver has detected an internal failure during start up. • Depending on failure reason, the device is operable with decreased performance or not operable at all. **Possible reasons for indication:** • Outside specified environmental conditions. • HW or SW failure inside the transceiver.
FAILURE	• The transceiver has no communication with the controller. • Depending on failure reason, the device is operable with decreased performance or not operable at all. **Possible reasons for indication:** • Problem with the interwiring.

Contact maintenance shop for assistance, if you cannot find the failure.

3.13 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 relevant department and addresses, please see contact info page 2.

User Conversions and Changes are Not Permitted

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

4 Certificates

In this chapter you can read about:

4.1 Certificate Info

For detailed information about approvals and certifications please see also "Certifications", page 24.

4.2 BAF Approval - GT6201

Bundesaufsichtsamt
für Flugsicherung

Urkunde

Ein(e)	**VHF-Sprechfunkgerät für Bodenfunkstellen des Flugfunkdienstes**
Typ	**GT6201 in den im Anhang zur Zulassungsurkunde aufgeführten Modellvarianten und zugehörigen Hard- / Softwarekonfigurations-ständen**
Frequenzbereich	**118 – 136,975 MHz**
Kanalraster	**8,33 kHz / 25 kHz**
der Firma	**Becker Avionics GmbH Baden Airpark B108 77836 Rheinmünster**
bestehend aus	**Sende-/Empfangseinheit (6 W oder 10 W) in Single Block oder Remote Version ohne Control Head**
für die Betriebsart	**6K80A3EJN (25 kHz) / 5K00A3EJN (8,33 kHz)**

ist auf Einhaltung der Anforderungen an Anlagen und Geräte für Zwecke der Flugsicherung gemäß § 4 Flugsicherungs-Anlagen- und Geräte-Musterzulassungs-Verordnung (FSMusterzulV) geprüft worden.

Die Anlage oder das Gerät entspricht damit den Festlegungen des Bundesministeriums für Verkehr und digitale Infrastruktur hinsichtlich Art, Umfang und Beschaffenheit von flugsicherungstechnischen Einrichtungen gemäß § 32 Abs. 4 des Luftverkehrsgesetzes sowie der Richtlinien und Empfehlungen der Internationalen Zivilluftfahrt-Organisation (ICAO).

Es wird daher als Muster mit den umseitig aufgeführten Auflagen in der Bundesrepublik Deutschland zugelassen.

Der Gerätetyp hat die Zulassungsnummer **D-0030/2014** erhalten.

Bundesaufsichtsamt für Flugsicherung
Langen, den 04.06.2014

Im Auftrag

Bodo Heinzl

Bundesaufsichtsamt
für Flugsicherung

Anhang zur Zulassungsurkunde

D-0030/2014

Konfigurationsstand

Ausgabestand 11.05.2017

VHF-Sprechfunkgerät GT6201

Modellvariante	Artikelnummer	Softwareversion
GT6201-05 (6 W, Single Block Version)	**0637.351-923**	**SCI1050S305 (Control Head)** **SCI1051S305 (Chassis Module)**
GT6201-05-R (6 W, ohne Control Head)	**0641.073-923**	**SCI1051S305 (Chassis Module)**
GT6201-10 (10 W, Single Block Version)	**0637.361-923**	**SCI1050S305 (Control Head)** **SCI1051S305 (Chassis Module)**
GT6201-10-R (10 W, ohne Control Head)	**0641.081-923**	**SCI1051S305 (Chassis Module)**

Für die Nutzung als tragbare VHF-Sprechfunkanlage können die VHF-Sprechfunkgeräte **GT6201-05** und **GT6201-10** in den in **Tabelle 1 aufgeführten Geräteträgern** eingesetzt werden.

Modellvariante	Artikelnummer	Bemerkung
GK615-E	0638.481-923	Für die Nutzung mit GT6201-05. Ausgestattet mit: Microphone 1PM415-1 (0603.120-350), Antenne 1A415 (0884.294-952)
GK615-1E	0638.498-923	Für die Nutzung mit GT6201-05. Ausgestattet mit: Lautsprecher/Microphone 1PH012 (0498.475-951) Antenne 1A415 (0884.294-952)
GK616-E	0638.501-923	Für die Nutzung mit GT6201-10. Ausgestattet mit: Microphone 1PM415-1 (0603.120-350), Antenne 1A415 (0884.294-952)
GK616-1E	0638.511-923	Für die Nutzung mit GT6201-10. Ausgestattet mit: Lautsprecher/Microphone 1PH012 (0498.475-951) Antenne 1A415 (0884.294-952)

Bundesaufsichtsamt für Flugsicherung
Langen, den 11.05.2017

Im Auftrag

Bodo Heinzl

4.3 EC Declaration of Conformity – GT6201-05

EC Declaration of Conformity /
EC Declaration of Suitability for Use

EC Declaration of Conformity / EC Declaration of Suitability for Use for Constituents

Name and address of manufacturer :	Constituent / application area
Becker Avionics GmbH Baden Airpark, Building B108 77836 Rheinmünster Germany	*GT6201-05* *VHF-Transceiver, communication system for ground-to-air communication*
System classification:	*Communication system for ground-to-air communication*

Part 1:General information about the constituent in accordance with Regulation (EC) 552/2004, Annex III

1.1 Regulation Reference Number

Basic requirements in accordance with

- *Regulation (EC) No. 552/2004 Part A and Part B, subchapter 1 and 4.*
- *Implementing Regulation (EC) No. 1079/2012*
- *Directive 2014/53/EU*

1.2 Manufacturer information

Becker Avionics GmbH, Baden Airpark, Building B108, 77836 Rheinmünster, Germany.

1.3 Description of the constituents

The Transceiver Becker GT6201-05 is a mobile VHF-Transceiver station for air traffic management.

Frequency Range :	*118.000 – 136.9916 MHz*	*Channel spacing :*	*8.33 kHz/25 kHz*
Transm. Power Output :	*≥ 6 W*	*Frequency stability :*	*≤ 1 ppm*
Supply Voltage. :	*11 VDC – 30.3 VDC*	*Weight :*	*645 g*
Temperature Range:	*-20 °C - +55 °C*	*Dimensions W x D x H :*	*61.2 x 168.4 x 61.2 mm³* (Front plate till end of antenna connector)

More detailed technical data about the transceiver itself and his physical interfaces as well as the limits of operation are given by the Installation and Operation Manual.

1.4 Description of the procedure followed in order to declare the system´s conformity or suitabiity for use

Conformity is stated and has been verified in accordance with decision 768/2008/EC Annex II, Module A1.

1.5 Relevant regulations

- ***ETSI EN300 676-1 V1.5.2*** : Ground-based VHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the VHF aeronautical mobile service using amplitude modulation Part 1: Technical characteristics and methods of measurement
- ***ETSI EN300 676-2 V1.5.1*** : Ground-based VHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the VHF aeronautical mobile service using amplitude modulation
- ***EN 62311:2008*** : Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)
- ***DIN EN 60950-1 :2006 +A11:2009 + A12:2011 + A1:2010***: Information Technology Equipment – Safety
- ***EN 301 489-1 V1.9.2*** : Electromagnetic compatibility and radio spectrum matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1 : Common technical requirements

Issue 6

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EC Declaration of Conformity /
EC Declaration of Suitability for Use

- ***EN 301 489-22 V1.3.1*** : Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 22 : Specific conditions for ground based VHF aeronautical mobile and fixed radio equipment
- ***SSB FL 024*** : Schnittstellenbeschreibung für Bodenfunkstellen des mobilen Flugfunkdienstes
- ***ICAO Annex 10*** *to the Convention on International Civil Aviation, Volume III and Volume IV*

1.6 Notified body

CETECOM ICT Services GmbH, Untertürkheimer Strasse 6 – 10, 66117 Saarbrücken, Deutschland

1.7 References to the community specifications

The device complies with the regulations and directives :

- ***Regulation (EC) No. 552/2004 Part A and Part B, subchapter 1 and 4.***
  Regulation on the interoperability of the European Air Traffic Management network.
- ***Implementing Regulation (EC) No. 1079/2012***
  Laying down requirements for voice channels spacing for the single European sky.
- ***Directive 2014/53/EU***
  Radio Equipment Directive
- ***Regulation (EC) No. 550/2004***
  Regulation on the provision of air navigation services in the single European sky.

1.8 Information about the authorized signatures

1.) *Dipl.-Ing. Jürgen Schiller, QA-Manager*
Address :
Becker Avionics GmbH
Baden Airpark, Building B108
77836 Rheinmünster, Germany
Tel.: 07229/305-202
e-mail : juergen.schiller@becker-avionics.de

2.) *Dr. Ingo Pletschen, Product Manager*
Address :
Becker Avionics GmbH
Baden Airpark, Building B108
77836 Rheinmünster, Germany
Tel.: 07229/305-104
e-mail : ingo.pletschen@becker-avionics.de

Part 2: Declaration:

Becker Avionics GmbH, 77836 Rheinmünster declares herewith that above mentioned constituents

- *have been assessed in terms of compliance with the above mentioned standards and the compliance has been ascertained;*
- *have been considered in terms of its suitability within the environment of air traffic management and have been classified as suitable.*

Place of issue, Date	1st Signature On behalf :	2nd Signature : On behalf (in representation Peter Fritz)
Rheinmünster *September 18th, 2017*	*Dipl.- Ing. Jürgen Schiller*	*Dr. Ing. Ingo Pletschen*

4.4 EC Declaration of Conformity – GT6201-10

EC Declaration of Conformity /
EC Declaration of Suitability for Use

EC Declaration of Conformity / EC Declaration of Suitability for Use for Constituents

Name and address of manufacturer :	Constituent / application area
Becker Avionics GmbH Baden Airpark, Building B108 77836 Rheinmünster Germany	*GT6201-10* *VHF-Transceiver, communication system for ground-to-air communication*
System classification:	*Communication system for ground-to-air communication*

Part 1:General information about the constituent in accordance with Regulation (EC) 552/2004, Annex III

1.1 Regulation Reference Number

Basic requirements in accordance with

- *Regulation (EC) No. 552/2004 Part A and Part B, subchapter 1 and 4.*
- *Implementing Regulation (EC) No. 1079/2012*
- *Directive 2014/53/EU*

1.2 Manufacturer information

Becker Avionics GmbH, Baden Airpark, Building B108, 77836 Rheinmünster, Germany.

1.3 Description of the constituents

The Transceiver Becker GT6201-10 is a mobile VHF-Transceiver station for air traffic management.

Frequency Range :	*118.000 – 136.9916 MHz*	*Channel spacing :*	*8.33 kHz/25 kHz*
Transm. Power Output :	*≥ 10 W @ ≥ 24 VDC*	*Frequency stability :*	*≤ 1 ppm*
Supply Voltage. :	*11 VDC – 30.3 VDC*	*Weight :*	*645 g*
Temperature Range:	*-20 °C - +55 °C*	*Dimensions W x D x H :*	*61.2 x 168.4 x 61.2 mm³* (Front plate till end of antenna connector)

More detailed technical data about the transceiver itself and his physical interfaces as well as the limits of operation are given by the Installation and Operation Manual.

1.4 Description of the procedure followed in order to declare the system´s conformity or suitabiity for use

Conformity is stated and has been verified in accordance with decision 768/2008/EC Annex II, Module A1.

1.5 Relevant regulations

- ***ETSI EN300 676-1 V1.5.2*** : Ground-based VHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the VHF aeronautical mobile service using amplitude modulation Part 1: Technical characteristics and methods of measurement
- ***ETSI EN300 676-2 V1.5.1*** : Ground-based VHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the VHF aeronautical mobile service using amplitude modulation.
- ***EN 62311:2008*** : Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)
- ***DIN EN 60950-1:2006 + A11:2009 + A12:2011 + A1:2010*** : Information Technology Equipment – Safety
- ***EN 301 489-1 V1.9.2*** : Electromagnetic compatibility and radio spectrum matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1 : Common technical requirements

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EC Declaration of Conformity /
EC Declaration of Suitability for Use

- ***EN 301 489-22 V1.3.1*** : Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 22 : Specific conditions for ground based VHF aeronautical mobile and fixed radio equipment
- ***SSB FL 024*** : Schnittstellenbeschreibung für Bodenfunkstellen des mobilen Flugfunkdienstes
- ***ICAO Annex 10*** *to the Convention on International Civil Aviation, Volume III and Volume IV*

1.6 Notified body

CETECOM ICT Services GmbH, Untertürkheimer Strasse 6 – 10, 66117 Saarbrücken, Deutschland

1.7 References to the community specifications

The device complies with the regulations and directives:

- ***Regulation (EC) No. 552/2004 Part A and Part B, subchapter 1 and 4.***
  Regulation on the interoperability of the European Air Traffic Management network.
- ***Implementing Regulation (EC) No. 1079/2012***
  Laying down requirements for voice channels spacing for the single European sky.
- ***Directive 2014/53/EU***
  Radio Equipment Directive (RED)
- ***Regulation (EC) No. 550/2004***
  Regulation on the provision of air navigation services in the single European sky

1.8 Information about the authorized signatures

1.) *Dipl.- Ing. Jürgen Schiller, QA-Manager*
Address :
Becker Avionics GmbH
Baden Airpark, Building B108
77836 Rheinmünster, Germany
Tel.: 07229/305-202
e-mail : juergen.schiller@becker-avionics.de

2.) *Dr. Ingo Pletschen, Product Manager*
Address :
Becker Avionics GmbH
Baden Airpark, Building B108
77836 Rheinmünster, Germany
Tel.: 07229/305-104
e-mail : ingo.pletschen@becker-avionics.de

Part 2: Declaration:

Becker Avionics GmbH, 77836 Rheinmünster declares herewith that above mentioned constituents

- *have been assessed in terms of compliance with the above mentioned standards and the compliance has been ascertained;*
- *have been considered in terms of its suitability within the environment of air traffic management and have been classified as suitable.*

Place of issue, Date	1st Signature On behalf :	2nd Signature : On behalf (in representation Peter Fritz)
Rheinmünster *September 18th, 2017*	*Dipl.- Ing. Jürgen Schiller*	*Dr. Ing. Ingo Pletschen*

4.5 EC Declaration of Conformity – GT6201-05-R

EC Declaration of Conformity /
EC Declaration of Suitability for Use

EC Declaration of Conformity / EC Declaration of Suitability for Use for Constituents

Name and address of manufacturer :	Constituent / application area
Becker Avionics GmbH Baden Airpark, Building B108 77836 Rheinmünster Germany	*GT6201-05-R* *Remote controlled VHF-Transceiver, communication system for ground-to-air communication*
System classification:	*Remote controlled communication system for ground-to-air communication*

Part 1:General information about the constituent in accordance with Regulation (EC) 552/2004, Annex III

1.1 Regulation Reference Number

Basic requirements in accordance with

- *Regulation (EC) No. 552/2004 Part A and Part B, subchapter 1 and 4.*
- *Implementing Regulation (EC) No. 1079/2012*
- *Directive 2014/53/EU*

1.2 Manufacturer information

Becker Avionics GmbH, Baden Airpark, Building B108, 77836 Rheinmünster, Germany.

1.3 Description of the constituents

The Transceiver Becker GT6201-05-R is a remote controlled mobile VHF-Transceiver station for air traffic management.

Frequency Range :	*118.000 – 136.9916 MHz*	*Channel spacing :*	*8.33 kHz/25 kHz*
Transm. Power Output :	*≥ 6 W*	*Frequency stability :*	*≤ 1 ppm*
Supply Voltage. :	*11 VDC – 30.3 VDC*	*Weight :*	*610 g (without mounting)*
Temperature Range:	*-20 °C - +55 °C*	*Dimensions W x D x H :*	*61 x 188 x 61 mm³ (including mounting devices)*

More detailed technical data about the transceiver itself and his physical interfaces as well as the limits of operation are given by the Installation and Operation Manual.

1.4 Description of the procedure followed in order to declare the system´s conformity or suitabiity for use

Conformity is stated and has been verified in accordance with decision 768/2008/EC Annex II, Module A1.

1.5 Relevant regulations

- ***ETSI EN300 676-1 V1.5.2*** : Ground-based VHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the VHF aeronautical mobile service using amplitude modulation Part 1: Technical characteristics and methods of measurement
- ***ETSI EN300 676-2 V1.5.1*** : Ground-based VHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the VHF aeronautical mobile service using amplitude modulation.
  EN 62311:2008 : Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)
- ***DIN EN 60950-1:2006 + A11:2009 + A12:2011 + A1:2010*** : Information Technology Equipment – Safety
- ***EN 301 489-1 V1.9.2*** : Electromagnetic compatibility and radio spectrum matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1 : Common technical requirements

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EC Declaration of Conformity /
EC Declaration of Suitability for Use

- ***EN 301 489-22 V1.3.1*** : Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 22 : Specific conditions for ground based VHF aeronautical mobile and fixed radio equipment
- ***SSB FL 024*** : Schnittstellenbeschreibung für Bodenfunkstellen des mobilen Flugfunkdienstes
- ***ICAO Annex 10*** *to the Convention on International Civil Aviation, Volume III and Volume IV*

1.6 Notified body

CETECOM ICT Services GmbH, Untertürkheimer Strasse 6 – 10, 66117 Saarbrücken, Deutschland

1.7 References to the community specifications

The device complies with the regulations and directives :

- ***Regulation (EC) No. 552/2004 Part A and Part B, subchapter 1 and 4.***
  Regulation on the interoperability of the European Air Traffic Management network.
- ***Implementing Regulation (EC) No. 1079/2012***
  Laying down requirements for voice channels spacing for the single European sky.
- ***Directive 2014/53/EU***
  Radio Equipment Directive (RED)
- ***Regulation (EC) No. 550/2004***
  Regulations on the provision of air navigation services in the single European sky.

1.8 Information about the authorized signatures

1.) *Dipl.- Ing Jürgen Schiller, QA-Manager*
Address :
Becker Avionics GmbH
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Becker Avionics GmbH, 77836 Rheinmünster declares herewith that above mentioned constituents

- *have been assessed in terms of compliance with the above mentioned standards and the compliance has been ascertained;*
- *have been considered in terms of its suitability within the environment of air traffic management and have been classified as suitable.*

Place of issue, Date	1st Signature On behalf :	2nd Signature : On behalf (in representation Peter Fritz)
Rheinmünster *September 18th, 2017*	*Dipl.- Ing. Jürgen Schiller*	*Dr. Ing. Ingo Pletschen*

4.6 EC Declaration of Conformity – GT6201-10-R

EC Declaration of Conformity /
EC Declaration of Suitability for Use

EC Declaration of Conformity / EC Declaration of Suitability for Use for Constituents

Name and address of manufacturer :	Constituent / application area
Becker Avionics GmbH Baden Airpark, Building B108 77836 Rheinmünster Germany	*GT6201-10-R* *Remote controlled VHF-Transceiver, communication system for ground-to-air communication*
System classification:	*Remote controlled communication system for ground-to-air communication*

Part 1:General information about the constituent in accordance with Regulation (EC) 552/2004, Annex III

1.1 Regulation Reference Number

Basic requirements in accordance with

- *Regulation (EC) No. 552/2004 Part A and Part B, subchapter 1 and 4.*
- *Implementing Regulation (EC) No. 1079/2012*
- *Directive 2014/53/EU*

1.2 Manufacturer information

Becker Avionics GmbH, Baden Airpark, Building B108, 77836 Rheinmünster, Germany.

1.3 Description of the constituents

The Transceiver Becker GT6201-10-R is a remote controlled mobile VHF-Transceiver station for air traffic management.

Frequency Range :	*118.000 – 136.9916 MHz*	*Channel spacing :*	*8.33 kHz/25 kHz*
Transm. Power Output :	*≥ 10 W @ ≥ 24 VDC*	*Frequency stability :*	*≤ 1 ppm*
Supply Voltage. :	*11 VDC – 30.3 VDC*	*Weight :*	*610 g (without mounting)*
Temperature Range:	*-20 °C - +55 °C*	*Dimensions W x D x H :*	*61 x 188 x 61 mm³* (including mounting devices)

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- ***DIN EN 60950-1:2006 + A11:2009 + A12:2011 + A1:2010*** : Information Technology Equipment – Safety
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EC Declaration of Conformity /
EC Declaration of Suitability for Use

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- ***ICAO Annex 10*** *to the Convention on International Civil Aviation, Volume III and Volume IV*

1.6 Notified body

CETECOM ICT Services GmbH, Untertürkheimer Strasse 6 – 10, 66117 Saarbrücken, Deutschland

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  Regulation on the interoperability of the European Air Traffic Management network.
- ***Implementing Regulation (EC) No. 1079/2012***
  Laying down requirements for voice channels spacing for the single European sky.
- ***Directive 2014/53/EU***
  Radio Equipment Directive)RED)
- ***Regulation (EC) No. 550/2004***
  Regulation on the provision of air navigation services in the single European sky.

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Place of issue, Date	1st Signature On behalf :	2nd Signature : On behalf (in representation Peter Fritz)
Rheinmünster *September 18th, 2017*	*Dipl.- Ing. Jürgen Schiller*	*Dr.- Ing. Ingo Pletschen*

4.7 Approval - Telecommunication Office Italy

Ministero dello Sviluppo Economico

DIREZIONE GENERALE PER LA PIANIFICAZIONE E LA GESTIONE DELLO SPETTRO RADIOELETTRICO
ex Divisione II

Ministero Sviluppo Economico
Dipartimento per le Comunicazioni
REGISTRO UFFICIALE
Prot. n. 0041697 - 02/07/2014 - USCITA

Becker Avionics GmbH
Baden-Airpark B, 108
77836 Rheinmunster GERMANIA
e-mail: info@becker-avionics.de

per conoscenza

D.G.P.G.S.R.-Ufficio IV Sede

D.G.A.T
email: dgat.segreteria@mise.gov.it

Fasc. 349022

Ispettorati Territoriali Repubblica Loro Sede

OGGETTO: Notifica di immissione sul mercato ai sensi dell'art.6.4 del decreto legislativo 9 maggio 2001 n. 269, degli apparati marca Becker Avionics modelli GT6201-05, GT6201-05R, GT6201-10 e GT6201-10R destinati al servizio aeronautico di terra.

Si prende atto della notifica pervenute a questa Direzione Generale, in data 23/6/14 e al riguardo si comunica che gli apparati in oggetto, se conformi a tutti i requisiti ed obblighi derivanti dall'applicazione del d.lgs 9.5.01 n.269 possono essere immessi sul mercato e possono essere utilizzati sul territorio nazionale **limitatamente** nella banda di frequenze prevista dal Piano nazionale di Ripartizione delle Frequenze di cui al decreto 13 novembre 2008 come ricetrasmettitori VHF destinati al servizio aeronautico di terra.

Le caratteristiche tecniche dichiarate sono le seguenti:

- Banda di frequenza: 118,0000-136,9916 MHz;
- Spaziatura tra canali: 8,33kHz e 25kHz;
- Modulazione: AM;
- Potenza di uscita: 6W/10W;
- Standard armonizzato di cui all'art.3.2 del d.lgs 9 maggio 2001, n.269: EN 300676-2 V1.5.1;

Ai sensi dell'art. 6.3 del d.lgs citato in oggetto, il costruttore o la persona responsabile dell'immissione sul mercato degli apparati deve fornire all'utente le seguenti informazioni:

1) come stabilito dal decreto legislativo 1° agosto 2003 n. 259 (Codice delle comunicazioni elettroniche), ai sensi degli artt. 104 parag. a), numero 1) e 126 comma 1, l'esercizio degli apparati in questione è subordinato rispettivamente al possesso dell' "autorizzazione generale" e del relativo "diritto individuale di uso";

2) gli apparati sono destinati al servizio aeronautico di terra.

Il Direttore Generale
(dott.ssa Eva Spina)

1

Viale America 201 – 00144 Roma
tel. +39 06 5444 2230
benedetto.attili@mise.gov.it

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