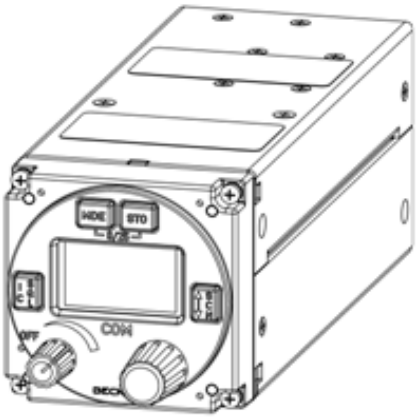

VHF-Ground-Transceiver

GT6201-05
GT6201-10

Software Versions:

SCI1050S305 Version 3.08

SCI1051S305 Version 1.56

and upwards

Installation and Operation Manual

Manual	DV 17001.03
Issue 4	January 2015

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DV 17001.03 / Article Number 0640.093-071

Preface

Dear Customer,

Thank you for purchasing this BECKER AVIONICS product. We are confident that our **GT6201 VHF-Ground-Transceiver** will meet your expectations.

GT6201 VHF Ground-Transceivers are a modern family of communication equipment that have comprehensive capabilities and significantly extend the typical aeronautical transceivers. All GT6201 VHF Ground-Transceivers variants are not approved for flight!
For airborne use the BECKER **AR6201** series perfectly corresponds to the **GT6201**.

Despite its small size and weight GT6201 include inter alia:

- A sensitive receiver which meets the most recent requirements of ETSI EN 300 676.
- A receiver that includes SCAN (dual watch) mode which allows simultaneous monitoring of two different VHF frequency channels without interrupting communication on the active frequency.
- A high efficiency transmitter which delivers more than 10W modulated or un-modulated RF output power at 28V supply voltage or 6W at 12V supply voltage. The general low power consumption of the unit allows longer operation time from a back-up battery.
- Non-volatile frequency (channel) memory:
    - 99 VHF frequencies, stored in dedicated channels, can manually be labeled with up to 10 characters for easy identification which service is related to the currently selected channel. (“TWR”, “ATIS”, “APPROACH”, etc.)
    - 9 recently selected VHF channels are automatically stored.

GT6201 Certification: **Bundesaufsichtsamt für Flugsicherung**

Approval No.: **D-0030/2014**

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Table of Contents

List of Abbreviations

AF ..... Audio Frequency
ATT ..... Attenuation
AUX ..... Auxiliary
AWG ..... American Wire Gauge
BNC ..... Bayonet Neill Concelman
CBIT ..... Continuous Built-In Test
CFG ..... Configuration
CH ..... Channel
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)*
I&O ..... Installation & Operation
LCD ..... Liquid Crystal Display
M&R ..... Maintenance & Repair
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
RSSI ..... Received Signal Strength Indication
RX ..... Receive
SQL ..... Squelch
RSSI ..... Received Signal Strength Indicator
SN ..... Serial Number
SPKR ..... Speaker (Loudspeaker)
SRC ..... Source
SW ..... Software

TSO ..... Technical Standard Order

TX ..... Transmit

VOX ..... Voice Operated IC Threshold *(not in use for ground applications)*

VHF ..... Very High Frequency

VDC ..... Voltage Direct Current

VSWR ..... Voltage Standing Wave Ratio

VU ..... Volume Unit

Units

V ..... Volt

mV ..... Millivolt

A ..... Ampere

mA ..... Milliampere

W ..... Watt

mW ..... Milliwatt

Hz ..... Hertz

kHz ..... Kilohertz

MHz ..... Megahertz

s ..... Second

dBm ..... Power level related to 1 Milliwatt in decibels

dB ..... Decibel

Ω ..... Ohm

g ..... Gramm

kg ..... Kilogram

°C ..... Degree Celsius

mm ..... Millimeter

cm ..... Centimeter

ppm ..... Parts per Million

Section 1 GENERAL DESCRIPTION

1.1 Introduction

This manual describes the operation and installation of the GT6201 VHF Transceiver Family. The ID label on your device shows the part number for identification purposes.

Before starting to operate the unit(s), please read this manual carefully with particular attention to the description referring to your device. This manual also contains several optional elements of the system (second controller for example), that may not be contained in your delivery package and in that case are not applicable.

The manuals DV 17001.03 **I&O** ("Installation and Operation") and DV 17001.04 **M&R** ("Maintenance and Repair") contain the following sections:

Section		DV 14307.03 I&O	DV 14307.04 M&R
1	General	X	X
2	Installation	X	X
3	Operation	X	X
4	Theory of Operation	N/A	X
5	Maintenance and Repair	N/A	X
6	Illustrated Parts List	N/A	X
7	Modification and Changes	N/A	X
8	Circuit Diagrams	N/A	X

1.2 Purpose of Equipment

The GT6201 enables voice communication between ground and airborne station, using the very high frequency band between 118.000 and 136.9916 MHz respectively 136.9750 with a selectable channel spacing of 8.33 kHz or 25 kHz. The GT6201 VHF Ground-Transceiver is ground-based equipment.

The GT6201 Transceiver can operate using ground power when installed in desk-cabinets or

19 inch racks, but is also dedicated to applications where low power consumption is required. GT6201 is capable to operate from standard 14V DC and 28V DC installations and from 12V DC or 24V DC batteries.

1.3 General Notes

On the following pages the GT6201 transceiver is named in two different senses. The common model name GT6201 is used in such cases a description applies for all variants of the GT6201, otherwise the applicable models are typed with its complete model name

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

1.3.1 GT6201 Single Block Transceiver

Air traffic services require efficient, secure, modern and user friendly communication equipment. Becker´s radio systems offer well-proportioned solutions for small to medium-sized airports, airfields or airline operations stations.

Assembled with quality-proven components, engineered with state-of-the-art technology and driven with a customer focused philosophy, our radio-communications solutions provide high flexibility and scalability.

In continuation of the very successful portable/mobile VHF transceiver BECKER AR4201, the new VHF Transceiver GT6201 for ground applications offers latest standards and is ideally suited for vehicle installations and constitutes the basis element for a variety of other products like the GK61X portable system or the TG660 (19 inch) series.

Designed for operations at airfields and airports in a very demanding environment, the GT6201 offers latest technology and comfortable operation on all frequency channels in the aeronautical VHF frequency band, adjustable in 25 kHz steps as well as in 8.33 kHz steps. The user friendly operator menu and the extensive setup possibilities allow a very personal setup for the user. The large, clear and dazzle-free LC display shows the active frequency and either the standby frequency or memory channel.

With an output power of 6W or 10W, the transmitter is strong enough for medium range communications, ensuring a low cost of ownership for the customer.

Derived from its airborne counterpart AR6201, the GT6201 is the robust, reliable and flexible solution for your ground operations.

Available models:

GT6201-05 VHF Ground Transceiver, 6 Watt *(at 11 …30.3 V/DC)*

Article-No. 0637.351-923

GT6201-10 VHF Ground Transceiver, 10 Watt *(at 24 …. 30.3 V/DC)*

Article-No. 0637.361-923

Figure 1-1: GT6201-XX Single Block Transceiver; 58 mm (2 ¼ inch) standard instrument cut-out

1.4 Features Overview

Frequency Indication

A liquid crystal display (LCD) provides the frequency indication. The required operating frequency is set by means of the rotary knob. The relation between the real operating frequency and the displayed frequency is according to standard (ICAO Annex 10, Volume II). For an overview, refer to the table below.

Operating Frequency (MHz)	Channel Spacing (kHz)	Displayed Frequency	
		8.33 / 25 kHz mixed Mode	25 kHz only 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

Audio Outputs

The GT6201 VHF Transceiver includes four fully configurable outputs:

- Headphone 1 output, rated output power is 300 mW into 75 Ohm, (*with floating transformer output)*
- Headphone 2 output, rated output power is 200 mW into 75 Ohm, (*differential output DC coupled)*
- Speaker output, rated output power is 4 W into 4 Ohm, *(asymmetric AC-coupled output)*
- LINE-OUT output intended for ground station use only. *(asymmetric AC-coupled output)*

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

Mike Inputs

GT6201 has an input for dynamic microphone (DYN_MIKE) and an input for standard microphone (STD_MIKE).

The GT6201 VHF Transceiver provides 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 is able to operate with one single microphone or with two microphones of the same type connected in parallel.

AF Auxiliary Input

The AF auxiliary input is an interface to connect external audio (e.g. other radio services, music-player) to the transceiver. Interconnection of multiple external audio sources on this particular port requires additional external decupling/isolation resistors. The external audio is audible only when the transceiver is in the receive mode.

The individual audio volume is set directly at the particular external equipment.

Sidetone

The sidetone is available on the headphone output during transmission. The sidetone volume automatically adapts to the intercom volume setting.

Squelch Operation

When enabled the squelch (muting) circuit suppresses weak signals. There are two kinds of squelch methods implemented: carrier squelch and noise squelch. The carrier squelch depends on received signal strength and is adjustable in the installation setup; the noise squelch depends on detected signal to noise ratio and is adjustable in the user setup.

Memory Channels

The memory function allows storage of up to 99+9 frequencies. This memory can contain up to 99 user defined frequencies stored manually that can be labeled with channel numbers and assigned text label.

Generally the last recently used (active) 9 frequencies are stored automatically as “LAST” channels. If any of the last used frequencies is also stored in the 99 user channels and a text label is attached, this text will appear on the display too.

Scan Mode

In scan mode a dual watch function is provided. The device is capable of monitoring frequencies on two channels, active & preset simultaneously. The signal of the active frequency will always be audible, since it will have priority at all times.

Illumination

The illumination of LCD and push buttons can be controlled either directly from the front panel via the users menu or externally via the dimming input lines. If the external dimming is selected, the illumination curve (brightness to voltage relation) can be adjusted in the installation setup.

LOW BATT Indication

The VHF transceiver monitors power supply voltage. If the supply voltage drops below the adjustable threshold, the display indicates the message “LOW BATT”. If the power supply voltage drops further, emergency operation mode is entered.

Emergency Operation

If the power supply voltage drops below 10.25 V, the VHF transceiver continues operation with degraded performance. In case the power supply drops below 9.0V the unit is automatically switched off.

Built-in Tests PBIT and CBIT

After power-up, the unit performs a self-test (power-up built-in test / PBIT). During PBIT the transceiver displays “WAIT” and the corresponding software versions of both, the control head and chassis module.

If faults are detected during PBIT, the error message “FAILURE, press any key” is displayed. If no faults are detected the transceiver automatically activates the mode set before last power-off.

During normal operation a continuous built-in test (CBIT) permanently verifies the correct operation of the unit. If a problem is detected during CBIT, an error message will be displayed.

Installation Setup

Via the installation setup the configuration of the installation parameters, such as mike sensitivity, mike type selection, speaker enable/disable plus other parameters is available.

Service Mode

The service mode is a special configuration mode accessible via RS422 interface with a proprietary serial data communication protocol. This mode is for use by authorized maintenance personnel only.

1.5 Technical Data

1.5.1 Power Supply Data

For GT6201 units the following data applies:

Nominal supply voltage range ..... 11.0 … 30.3 V

Extended supply voltage range ..... 10.25 V … 32.2V

Emergency operation ..... 9.0 V to 10.25 V

Dimming control ..... 0…14 V or 0…28 V

Typical Power Consumption

	GT6201-05 6 Watt	GT6201-10 10 Watt *
Nominal supply voltage range	11.0 … 30.3 V DC	11 … 30.3 V DC
Extended supply voltage range	10.25 … 32.2 V DC	10.25 … 32.2 V DC
Emergency operation	9.0 V	9.0 V
Dimming control	0…14 V DC or 0…28 V DC	0…14 V DC or 0…28 V DC
Typical current consumptions		
Power off state @ 12 VDC	≤ 0.10 mA	--
Power off state @ 24 VDC	≤ 0.10 mA	≤ 0.10 mA
Reception stand-by mode @ 12 VDC, panel backlight off	≤ 140 mA	≤ 140 mA
Reception stand-by mode @ 24 VDC, panel backlight off	≤ 80 mA	≤ 80 mA
Transmission mode @ 12 VDC, VSWR=1:1	2.0A at 85% 1.7A at 0%	--
Transmission mode @ 24 VDC, VSWR=1:1	--	1.5A at 85% 1.25A at 0%

1.5.2 General Data

	GT6201-05 6 Watt	GT6201-10 10 Watt *
Frequency range	118.000 MHz to 136.9916 MHz	
Channel spacing	8.33/25 kHz	
Number of channels	2280 + 760	
Storage temperature range	-55°C to +85°C	
Operating temperature range	-20°C to +55°C	

*: 6 to 10 W TX power between 11 … 24 V/DC, 10 W at 24 V/DC and above.

1.5.3 Dimensions & Weight

	GT6201-XX
Front panel	61.2 mm x 61.2 mm
Depth of unit	187.8 mm (front plate till end of antenna connector)
Mounting	(back panel) standard 58 mm diameter (2 1/4 inch)
Material of Case	ALMg
Surface treatment	control head coated with black matt paint
Weight	645g

1.5.4 Receiver Data

	GT6201
Sensitivity	≤ -101 dBm for a SINAD of 12 dB (nominal) ≤ -95 dBm for a SINAD of 12 dB (under extended and extreme environmental conditions) (measured with psophometric filter)
Effective bandwidth (8.33 kHz channel spacing)	±2.8 kHz
Effective bandwidth (25 kHz channel spacing)	±8.5 kHz
Squelch	trigger level adjustable
AGC characteristic	≤ 6 dB in range -101 dBm to -1 dBm
Distortion	≤ 5% at 30%, 50% of rated output power ≤ 10% at 90%, 50% of rated output power
Audio frequency response (8.33 kHz channel spacing)	+2 dB / -4 dB 350 Hz to 2500 Hz relative to 1000 Hz
Audio frequency response (25 kHz channel spacing)	+2 dB / -4 dB 300 Hz to 3400 Hz relative to 1000 Hz
Audio Noise	≥ 40 dB at 90%
Rated output for speaker operation	≥ 4 W into 4 Ohm
Rated output power for headphone 1 operation	≥ 300 mW into 75 Ohm ≥ 100 mW into 600 Ohm
Rated output power for headphone 2 operation	≥ 200 mW into 75 Ohm ≥ 100 mW into 600 Ohm
Audio auxiliary input	50 mV to 8 V (adjustable) across 600 Ohm
Offset-Carrier operation	N/A

1.5.5 Transmitter Data

	GT6201-05	GT6201-10
Output power into 50 Ohm (with and without modulation)	≥ 6 W	≥ 10 W
Frequency tolerance	≤ ±1 ppm	
Duty cycle	120 sec (TX) : 480 sec (RX)	
Type of modulation	6K80A3EJN 5K00A3EJN	
Modulation capability	≥ 85%	
Distortion	≤ 10%	

	GT6201
Audio frequency response (8.33 kHz channel spacing)	-4 dB / +2 dB in band 350 Hz to 2500 Hz relative to 1000 Hz ≦ -25 dB above 3200 Hz
Audio frequency response (25 kHz channel spacing)	-4 dB / +2 dB in band 300 Hz to 3400 Hz relative to 1000 Hz ≤ -25 dB above 5000 Hz
Dynamic microphone (with compressor)	1 … 20 mV compressor starting point, adjustable Input balanced, 140 Ω Input range up to 20 dB above compressor starting point.
Standard microphone(s) (with compressor)	10 … 1000 mV compressor starting point, adjustable Input unbalanced, 110 Ω Input range up to 20 dB above compressor starting point.
FM deviation with modulation	≤ 3 kHz (</= 800Hz typically)
Sidetone	Adjustable
Automatic shutdown of transmit mode	120 sec (Factory configurable 30 sec … 120 sec)

1.5.6 Emergency Operation

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

1.5.7 Regulatory Compliance

Note: Unauthorized changes or modifications to the GT6201 VHF transceivers may void the compliance to the required regulatory agencies and authorization for continued equipment usage.

GT6201 complies with ETSI EN 300 676 regulations

Part Number	Article Number
GT6201-10	0637.361-923
GT6201-05	0637.351-923

1.5.8 Accessories

Available accessories for GT6201 can be purchased with the following Article Numbers. The connector kit or mounting kit as required for equipment installation is normally included in the delivery of your purchased Transceiver. The following information is needed for spare part order.

Vehicle Kit VK4201	Article-No.: 0892.424-923
1PM012	Article-No.: 0344.214-951
Dynamic Microphone	
1PL011	Article-No.: 0524.352-882
Speaker with housing and cables	
1E024	Article-No.: 0499.226-953
Car mounting	
1K044	Article-No.: 0892.513-950
Cable harness	
1A002	Article-No.: 0267.015-952
Antenna	
1KA003	Article-No.: 0267.082-950
Antenna cable, length 2.5 m	

Available Documentation:

Operating Instructions (DV 17001.03)	Article No.: 0640.093-071
GT6201-XX and GT6201-XX-R	
Maintenance and Repair Manual (DV 17001.04)	Article No.: 0640.107-071
GT6201-XX and GT6201-XX-R	

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Section 2 INSTALLATION

The installation of the VHF transceiver depends on the type of application. Therefore, only general information can be given in this section.

2.1 Limitations

GT6201 VHF Ground-Transceiver is designed been installed as ground based transceiver for management of air and ground traffic operations.

The equipment design do not allow for installation in areas contaminated with fluids regularly.

Note: Unauthorized changes or modifications to the GT6201 VHF transceivers may void the compliance to the required regulatory agencies and authorization for continued equipment usage.

2.2 Unpacking the Equipment and Preparation for Installation

General

Visually inspect the package contents for signs of transport damage. Carefully unpack the equipment and check for completeness. Retain all packaging material in case reshipment becomes necessary.

Additional Required Equipment

The GT6201 VHF Transceiver is intended for use with standard aviation accessories. The following equipment is required for installation:

- VHF COM Antenna with coaxial 50 Ω impedance cable and BNC connector
- Microphone and headphone or speaker

2.3 Mechanical Installation

For unit dimensions, refer to Figure 2-1 and Figure 2-2. Leave a clearance of minimum 5 mm between the GT6201 and other devices to allow air circulation. Forced cooling is usually not required.

For installation via back-panel mounting, four screws already attached to the unit front. The circular cut out and the mounting holes have to be prepared in accordance with Figure 2-3.

Installation using Vehicle Kit VK4201.

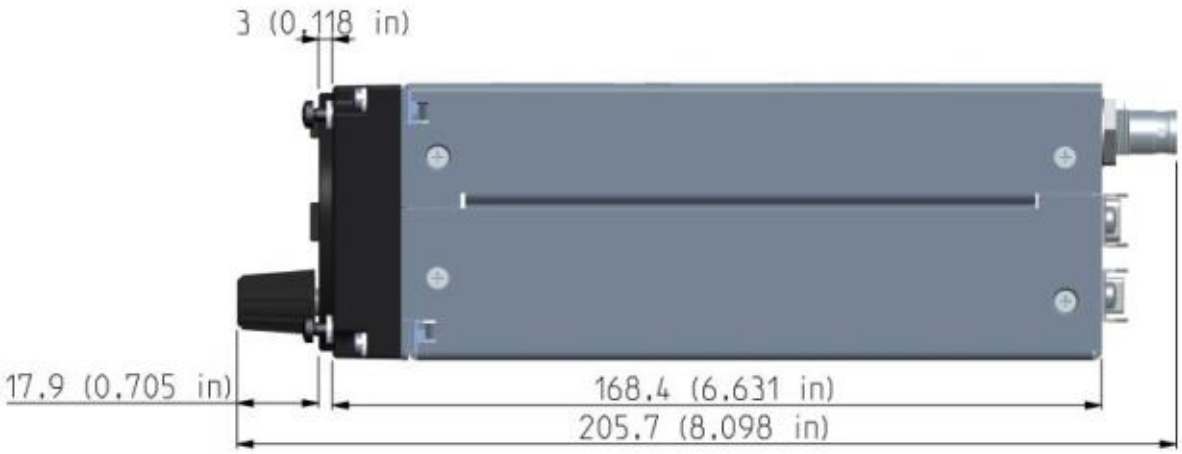


Figure 2-1: GT6201-XX side view, dimensions in mm and (inches)

Figure 2-2: GT6201 front view, dimensions in mm and (inches)

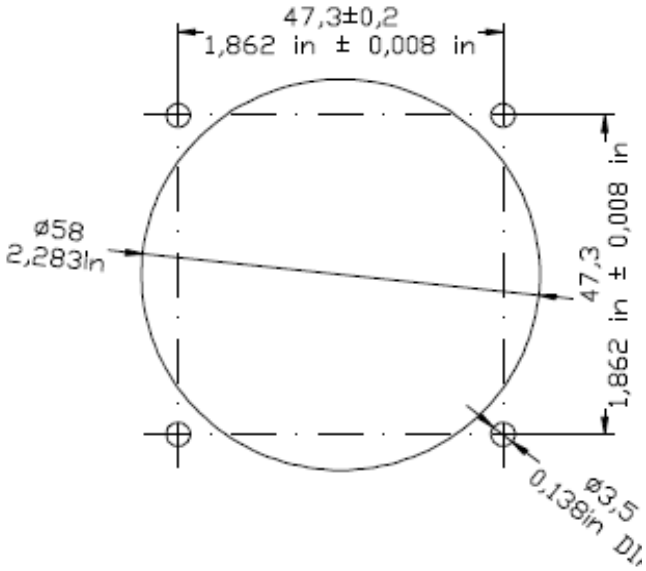


Figure 2-3: Drilling jig for back-panel mounting; dimensions in mm and (inches)

2.4 Electrical Installation

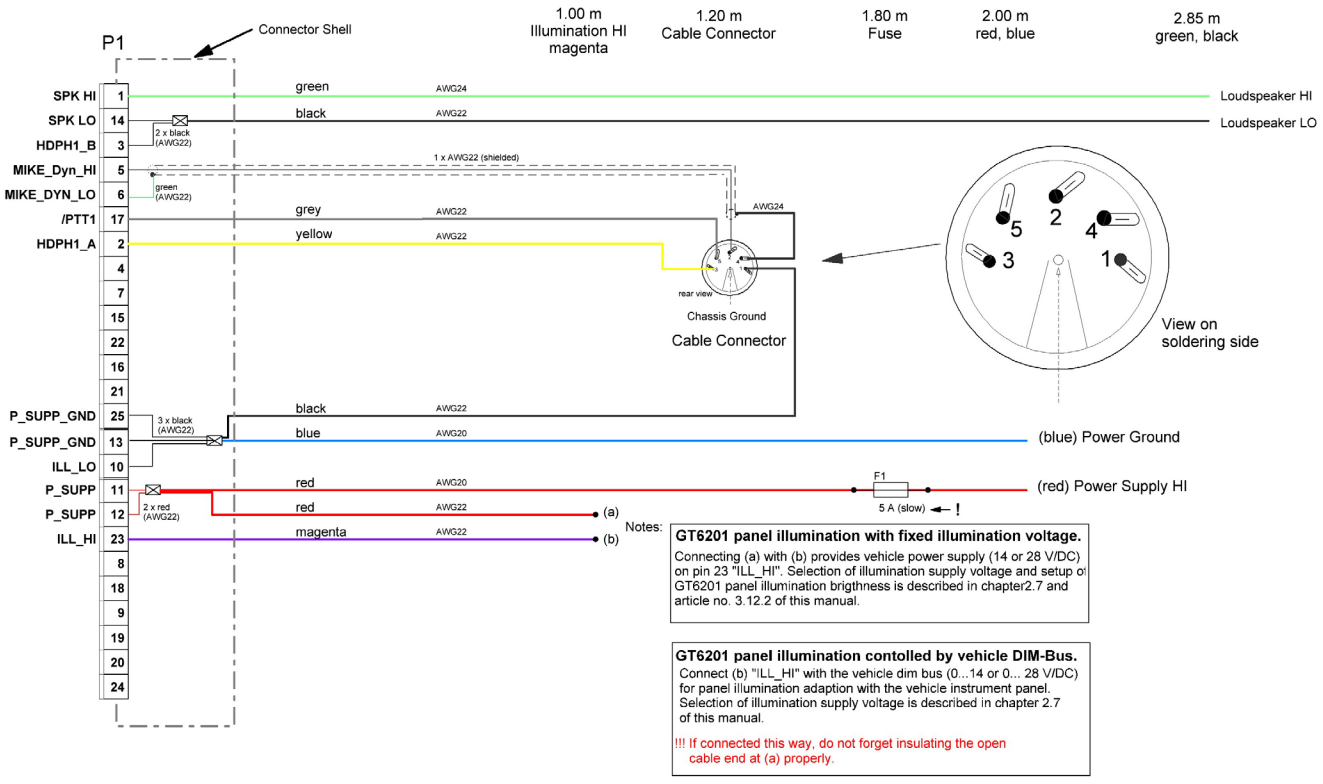


Figure 2-4: Car Cable Harness 1K044

Electrical Interface

2.4.1 Connectors and Pin Assignment for GT6201

Antenna Connector (Position 1)

The antenna connector (Figure 2-5, position 1) is a BNC type. The antenna port is designed for operating with a nominal impedance of 50 Ohm.

Grounding Bolt (Position 2)

The transceiver has a M4 threaded grounding bolt (Figure 2-5, position 2) allowing a low impedance grounding of the unit, which is essential to avoid damage or malfunction in the case of indirect lightning, EMI and HIRF conditions.

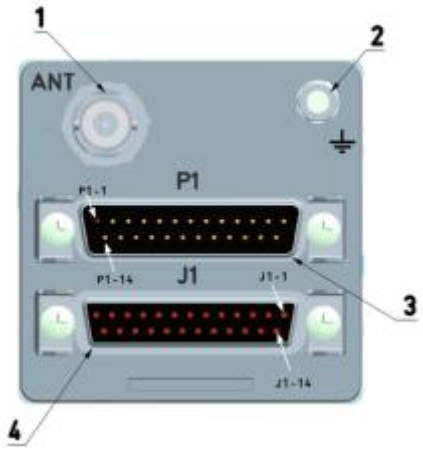


Figure 2-5: Male P1 and female J1 connectors on back plate GT6201

P1 Connector (Position 3) System Interfaces for GT6201

The P1 connector (Figure 2-5) is a DSUB male connector with 25 pins and slide-in fastener.

Pin No.	Pin Name	Direction	Function
P1-1	SPK_HI	OUT	Speaker output signal (hot)
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 (hot)
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/return) used for STD1, STD2 and STD3
P1-9	MIKE_STD2_HI	IN	Standard microphone 2 High (hot)
P1-10	ILL_LO	IN	Illumination low input
P1-11	P_SUPP	IN	Power supply hot (positive)

Pin No.	Pin Name	Direction	Function
P1-12	P_SUPP	IN	Power supply hot (positive)
P1-13	P_SUPP_GND	-	Power supply ground (return)
P1-14	SPK_LO	-	Speaker ground (return)
P1-15	LINE_OUT	OUT	Linear audio output, unbalanced
P1-16	AGC_OUT	OUT	Receiver AGC output
P1-17	/PTT1	IN	Press To Talk key input1 ACTIVE state - closed contact to GND
P1-18	MIKE_STD1_HI	IN	Standard Microphone 1 High (hot)
P1-19	MIKE_STD3_HI	IN	Standard Microphone 3 High (hot)
P1-20	HDPH2_A	OUT	Balanced Output for headphone(s)2
P1-21	AF_AUX_IN_LO	IN	Auxiliary audio input low (ground/return)
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 (return)

J1 Connector (Position 4) Serial Interfaces and Discrete I/O's

The J1 connector is a D_SUB female connector with 25 sockets and slide-in fastener.

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	Press-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

Pin No.	Pin Name	Direction	Function
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
J1-21	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

2.4.2 Inputs / Outputs Detailed Description

Microphone Connection – Standard Microphones

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

The transceiver has three unbalanced inputs STD1, STD2 and STD3. Each input has an input impedance of 110 Ohm and a nominal sensitivity of 110 mV.

This sensitivity level can be adjusted in the installation setup from 9 mV to 1500 mV independently for each of the microphones. The power supply delivered from pins P1-9, P1-18 and P1-19 for supply of the connected microphone(s) is > 8 V DC (8.3 V nominal) open circuit with an output impedance of 120 Ohm.

Note:

1. **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.**
2. **For installations with high interferences it is recommended to use sensitivity level 27 mV to 1500 mV.**
3. **It is highly recommended to mount the jacks isolated from car´s 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)

For interfacing with dynamic microphone(s), the transceiver has a balanced input with an impedance of 140 Ohm and a nominal sensitivity of 1.6 mV. This sensitivity level of 1 mV to 20 mV is adjustable in the installation setup. Two dynamic microphones may be connected in parallel (identical technical characteristics of the microphones are preferable).

Note:

1. **For installations with high interferences it is recommended to use sensitivity level 2 mV to 20 mV.**
2. **It is highly recommended to mount the jacks isolated from car´s frame in order to avoid ground loops.**
3. **Use microphone cables with shielded microphone wires.**

Speaker Connection

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

The speaker output provides nominal 4 W into 4 Ohm.

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 Ohm. For the use of a single shielded wire for headphone a unbalanced output configuration is recommended. To achieve this P1-3 can be grounded (connection to pin P1-13/P1-25).

The headphone 2 output is balanced output providing nominal 200 mW into 75 Ohm.

Up to two headphones with self-impedance of 300 Ohm (or higher) may be connected in parallel on each circuit, therefore up to four headphones can be connected 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 provides illumination for push-buttons and LC Display. In the installation setup it can be configured if this illumination is controlled via front panel or externally via pins P1-10 and P1-23

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 hot
P1-21	AF_AUX_IN_LO	-	Auxiliary audio input low ground/return

“LINE_OUT” Audio Output

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

The LINE OUT enables to connect e.g. an external voice recorder to the transceiver in ground-based installations. The LINE OUT output provides nominal 1 VRMS into 1000 Ohm.

External Power ON

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

External Power ON input provides possibility to power on system by connecting this pin to the 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 /PTT1 and /PTT2.

Each input has an internal pull up. If input is connected to ground a current of less than 1 mA will flow. The transceiver enters transmit operation, if one or both inputs are connected to ground.

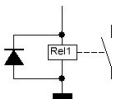
According to microphone(s) configuration, signal from particular inputs can or cannot modulate transmissions.

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)

This output indicates if the transceiver is switched on or switched off. It is an open collector output type. The output is internally connected to ground when the unit is switched on. In this case a current of maximum 100 mA can flow into the transceiver to drive for example an external relay. The output has high impedance when the unit is switched off.

Note: In order to avoid damage of this output, a protection diode parallel to the external relay shall be connected.



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 is internally connected to the ground when the unit receives signal on the selected VHF channel. This audio signal is available on audio outputs. In this case a current of maximum 100 mA can flow into the transceiver to drive an external relay for example. The output has high impedance when the unit 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 provides selection between the two available audio in/out configurations: CFG1 and CFG2. Configurations can also be switched during operation in installation setup.

- When /MIKE_SW is active then configuration CFG1 is used.
- When /MIKE_SW is inactive then CFG2 is used.

Each configuration CFG1 and CFG2 stores several parameters that can be set in installation setup pages. (For details refer to chapter 2.7).

2.5 Installation and Configuration of GT6201 Transceivers

Connection to the following equipment is required as minimum for GT6201 VHF transceivers:

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

Note:

1. **Use only qualified cables (self-extinguishing).**
2. **Use AWG 20 for power supply and AWG 22/24 for other cables.**
3. **Fit sleeves over the solder joints on the equipment connector. Crimp connectors are also available from BECKER.**
4. **Protect the power supply with a 7.5 A fuse.**

The VHF transceiver is protected internally by a 7 A SMD not resettable fuse.

- Type-specific cable harnesses are also available for the vehicle´s wiring (contact BECKER for detailed information).
- No RF antenna cables or HF cables should be included in the cable harnesses of the system. Avoid routing of the cable loom along with other wiring, which carry audio power or pulses.
- Check the wiring carefully before powering up the unit and check particularly that power supply lines have not been reversed.

Installation of GT6201 transceivers requires correct wiring and configuration. All necessary information for common installations including wiring diagrams and recommended installation setup configurations are provided in this document.

2.6 Antenna Installation

The transceiver requires a standard 50 Ohm vertically polarized VHF antenna. Follow the antenna manufacturer's installation instructions. In addition consider the following recommendations:

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

2.7 Installation Setup for GT6201

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

2.7.1 Entering Installation Setup

Hold down the “MDE” key during power up to access the installation setup menu. The “PASSWORD DIALOG” screen will then appear.

Figure 2-6: “PASSWORD DIALOG”

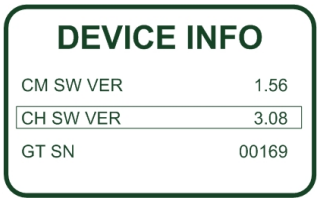


Figure 2-7: “DECIVE INFO”

Insert the 4-digit numerical code password “6435” by turning and pushing the “ROTARY ENCODER”. Confirm by a short press on ”STO” key. Now the first page of installation setup shows the “DEVICE INFO” screen.

2.7.2 Leaving Installation Setup

The installation setup can be left just by switching off the GT6201. All changes done up to that point been stored automatically.

2.7.3 Page Up / Page Down in the Installation Setup

The installation setup consists of several pages. Navigation within main pages:
Page Down (next page): pressing “↕/SCN” or the “ROTARY ENCODER”.
Page Up (previous page): pressing “IC/SQL” key.
Within the sub-pages of the installation setup use the “ROTARY ENCODER” for navigation.

2.7.4 Storage of Setup Data

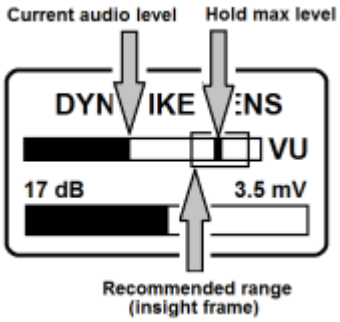
The setting of any parameter is stored immediately after changing the parameter.

2.7.5 Terminate Installation Setup

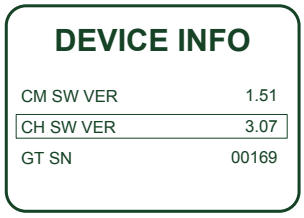
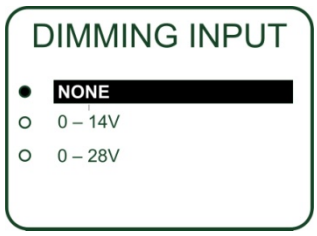
Switch “OFF” the GT6201 to terminate the setup. All changes made up to this point will be stored automatically. No special action is required before leaving setup page.

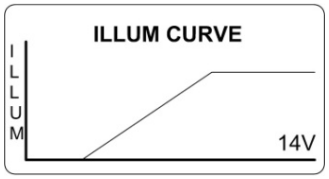
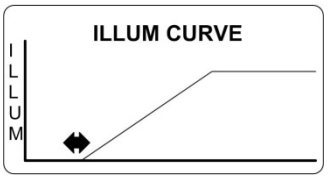
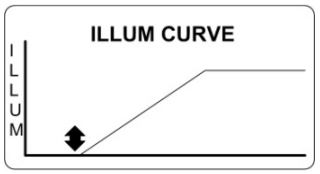
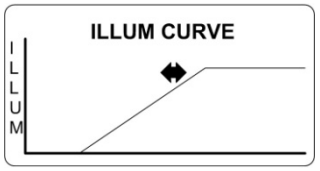
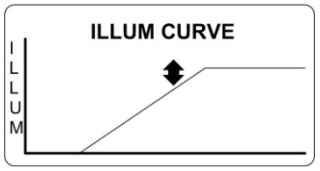
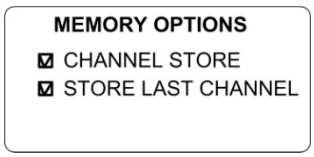
2.7.6 VU Meter

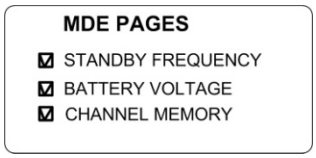
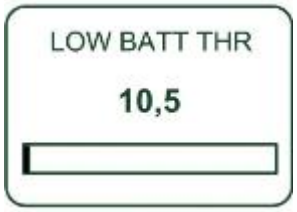
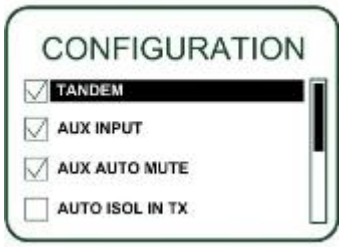
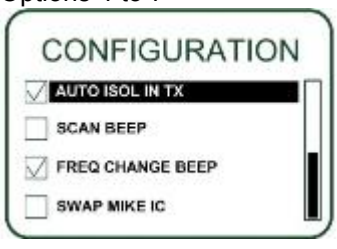
The VU Meter allows correct adjustment of audio input sensitivity.

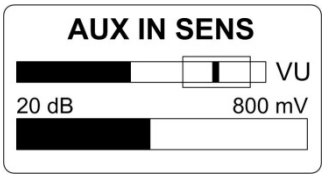
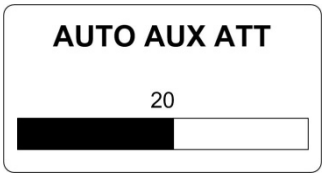
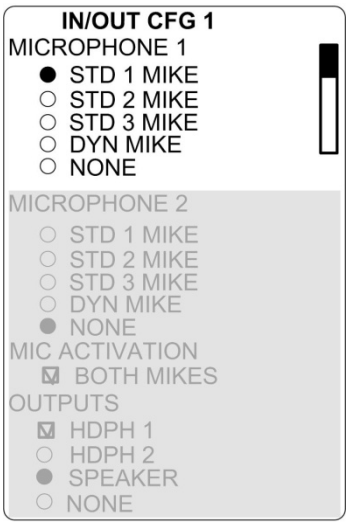
Display Contents	Description
	VU Meter is displayed on all sensitivity setting menus, it is located in the middle below the menu name and above the dedicated sensitivity setting bar It displays the current audio level value on selected audio input (“Current audio level”) and holds the highest value of active audio level recorded during the last 3 seconds (displayed as “Hold max level” bar). Correct sensitivity is achieved if most of the time, while you are speaking normally into the microphone, the “Hold max level” bar remains in the “Recommended range”.

2.7.7 Installation Setup Pages - Data Description

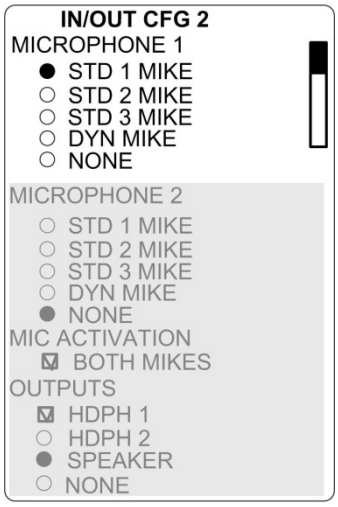
Display Contents	Description
GT6201 “DEVICE INFO”: 	After entering the “Installation Setup” the first page “DEVICE INFO” is displayed. This page shows information about the SW version and the serial number of the transceiver. For GT6201 “DEVICE INFO” displays information about; • Transceiver SW version (GCM SW VER), • Controller SW version (CH SW VER), • GT6201 serial number (GT SN).
	One of three options can be selected by turning the “ROTARY ENCODER” to dim display illumination and push-button background lighting. Finalize the selection by pressing “STO” push-button. **NONE**: The illumination for LCD and push-buttons is controlled via the “ROTARY ENCODER” on the transceiver itself. The user can adjust the brightness in the users menu.
	The brightness of the LCD and push-button illumination can be adjusted between 0% (off) and 100%. Select your brightness by turning the “ROTARY ENCODER”. The BRIGHTNESS settings can also be adjusted in the user setup menu. Users can change the parameter at any time. **Note: This page is displayed only if dimming input is set to “NONE”.**

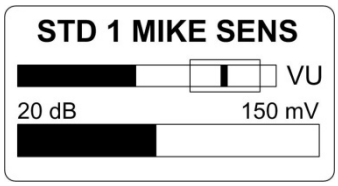
Display Contents	Description
	The page “ILLUM CURVE” is displayed only if the DIMMING input is either selected for “14V or 28V” dim-bus voltage. The illumination curve shows the relation between dimming bus voltage and brightness of the LCD and push-button illumination. Two adjustable points V1 and V2 define the illumination curve. Select the respective parameter by pushing the “STO” button and then adjust the value in horizontal (left/right) respectively vertical up/down) direction using the “ROTARY ENCODER”.
	(1) This parameter defines the horizontal parameter $V1_X$ (minimum values: 1.5V for 14V dimming bus and 4V for 28V dimming bus). Up to this value the brightness is zero. When reaching $V1_x$ the brightness is immediately adjusted to $V1_y$.
	(2) This parameter defines the vertical parameter $V1_Y$ which is the level of brightness that is set when trigger point $V1_x$ is reached.
	(3) This parameter defines the horizontal parameter $V2_X$ (maximum values: 14 or 28 V depending on selected dimming input) where the illumination curve reaches the maximum brightness level.
	(4) This parameter defines the vertical parameter $V2_Y$ which is the maximum brightness. **Note: Menu available on primary and secondary controller**
	Two options can be selected on “MEMORY OPTIONS” page. By means of the “ROTARY ENCODER” one option can be highlighted and enabled/ disabled by pushing the “STO” button. **CHANNEL STORE:** If this option is enabled frequencies can be stored in any of the 99 available channels. Even if the “CHANNEL STORE” option is disabled the user has access to previously stored “User Channels”. **STORE LAST CHANNEL** If this option is enabled, the device automatically stores the last used VHF frequency in “Last Channel” database and user has a read access to this database. If this option is disabled the stored data in the “LAST CHANNEL” database is not accessible. **Note: Menu available on primary and secondary controller**

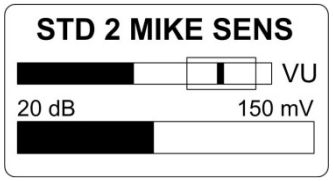
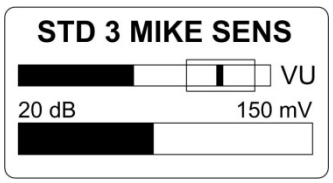
Display Contents	Description
	On “MDE PAGES” page three options are selectable by means of the “ROTARY ENCODER”. The three frequency selection modes provide different user interfaces for operating frequency selection. Enabling/Disabling can be toggled by pushing the “STO” button. **STANDBY FREQUENCY** enables/disables “Standard Mode”. **BATTERY VOLTAGE** enables/disables “Direct Tune Mode”. **CHANNEL MEMORY** enables/disables “Channel Mode”. After deselecting “BATTERY VOLTAGE” the “DIRECT TUNE MODE” page is no longer available in the normal operation. Storing a frequency in a specific channel will be possible even if only “BATTERY VOLTAGE” or “STANDBY FREQUENCY” remain selected. At least one page will remain active. Deselecting all options from the “MDE PAGES” is not possible.
	On “LOW BATT THR” page the threshold for indication of the “LOW BATT” warning page can be adjusted (default setting is 10.5 V). The low battery threshold depends on battery type in use and should be adjusted within 10V…33V by the installer turning the “ROTARY ENCODER”. “LOW BATT” warning page is displayed if the supply voltage drops below 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 **Note: Menu available on primary and secondary controller**
Options 1 to 4  Options 4 to 7 	On “CONFIGURATION” page 6 or 7 options can be selected. (refer to the note under **AUX AUTO MUTE.** Use the “ROTARY ENCODER” to scroll up and down, then push the “STO” button for selection. **AUX INPUT** - if selected, the auxiliary audio signal applied to pins P1-4 / pin P1-21 is audible on headphone / speaker. **Note: If the auxiliary audio input is not used it is recommended to deselect “AUX INPUT”.** **AUX AUTO MUTE** – if selected the auxiliary audio input will be muted. The auxiliary audio input is also muted if the receiver detects (based on squelch evaluation) a signal. When deselected the auxiliary audio input signal and the receiver signal will intermix continuously. **Note: “AUX AUTO MUTE” is only displayed when “AUX INPUT” is enabled.** **SCAN BEEP** - if selected the transceiver generates (only in scan function) a short beep tone to notify a signal presence on the “PRESET FREQUENCY”.

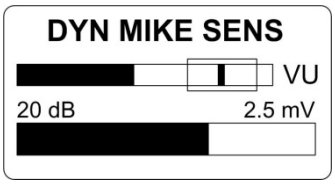
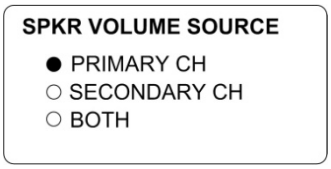
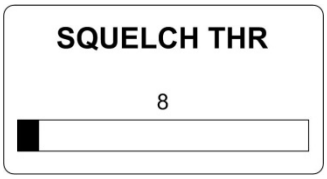
Display Contents	Description
	During signal reception on the “ACTIVE FREQUENCY”, a switch over to the “PRESET FREQUENCY” is not possible. The audio remains on “ACTIVE FREQUENCY” and a short beep tone is audible. Additionally the “PRESET FREQUENCY” will appear contrast inverted in a sequence of approximately one second. **FREQ CHANGE BEEP** - if selected the transceiver generates 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.
	On “AUX IN SENS” page the sensitivity adjustment of the auxiliary audio input (Pin P1-4 / Pin P1-21), in the range 50mV to 8000mV, can be set by turning the “ROTARY ENCODER”. This page is displayed only if ENABLE_AUX_IN is activated. The VU meter shows the current signal level of the aux audio input and always displays the highest detected signal value from the last 3 seconds. **Note: Menu available on primary controller.**
	On “AUTO AUX ATT” page the attenuation for the auxiliary audio input can be adjusted between 0 to 40 dB by turning the “ROTARY ENCODER”. When intercommunication is initiated (regardless of the intercom activation: “VOX”, or “/IC” discrete input) the signal from auxiliary audio input will be attenuated. After intercommunication is finished the auxiliary audio will revert to its previous level. **Note: Menu available on primary controller**
	On “IN/OUT CFG 1” page the microphone inputs and headphone outputs for configuration CFG1 can be configured. To scroll the page turn the “ROTARY ENCODER”. “MICROPHONE 1” (one option can be selected at one time only): **STD1 MIKE** - standard microphone input 1 (Pins P1-18/ P1-8) is selected. **STD2 MIKE** - standard microphone input 2 (Pins P1-9/ P1-8) is selected. **STD3 MIKE** - standard microphone input 3 (Pins P1-19/ P1-8) is selected. **DYN MIKE** - dynamic microphone input (Pins P1-6/ P1-5) is selected. **NONE** - No microphones is used in microphone path 1. “MICROPHONE 2” (one option can be selected at one time only): **STD1 MIKE** - standard microphone input 1 (Pins P1-18/ P1-8) is selected. **STD2 MIKE** - standard microphone input 2 (Pins P1-9/ P1-8) is selected.

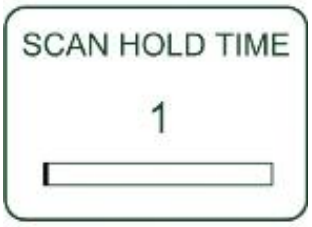
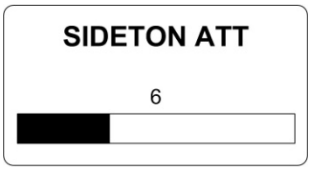
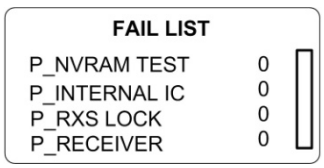
Display Contents	Description
	STD3 MIKE - standard microphone input 3 (Pins P1-19/ P1-8) is selected. **DYN MIKE** - dynamic microphone input (Pins P1-6/ P1-5) is selected. **NONE** - No microphones is used in microphone path 2. "MIC ACTIVATION": **BOTH MIKES** ENABLED: • input /PTT1 (Pin P1-17) activates transmission from microphone path 1 and 2. • input /PTT2 (Pin J1-5) activates transmission from microphone path 2 and path 1. • input /IC (Pin P1-7) activates intercom from microphone path 1 and 2. **BOTH MIKES** DISABLED: • input /PTT1 (Pin P1-17) activates transmission only from microphone path 1. • input /PTT2 (Pin J1-5) activates transmission only from microphone path 2. • input /IC (Pin P1-7) activates intercom only from microphone path 1. "OUTPUTS" **HDPH 1** ENABLED - audio available on headphone 1 output (Pins P1-2/P1-3). **HDPH 1** DISABLED - no audio available on headphone 1 output. **HDPH 2** ENABLED - audio is available on headphone 2 output (Pins P1-20/P1-22), speaker not available. **HDPH 2** DISABLED – no audio available on headphone 2 output, speaker not available. **SPEAKER** ENABLED - audio is available on speaker (Pins P1-1/P1-14), headphone 2 not available. **NONE** - no audio on headphone 2 output or speaker output. **Note: Displayed only if MIKE_SW input (Pin J1-24) has Inactive state.**

Display Contents	Description
	On “IN/OUT CFG 2” page the microphone inputs and headphone outputs for configuration CFG2 can be configured. This page is displayed only if MIKE_SW input (Pin J1-24) has active state. Please remember, when MIKE_SW connected in installation both configurations for IN/OUT CFG1 and IN/OUT CFG2 shall be configured To scroll the page turn the “ROTARY ENCODER”. “MICROPHONE 1” (one option can be selected at one time only): **STD1 MIKE** - standard microphone input 1 (Pins P1-18/ P1-8) is selected. **STD2 MIKE** - standard microphone input 2 (Pins P1-9/ P1-8) is selected. **STD3 MIKE** - standard microphone input 3 (Pins P1-19/ P1-8) is selected. **DYN MIKE** - dynamic microphone input (Pins P1-6/ P1-5) is selected. **NONE** - No microphones is used in microphone path 1. “MICROPHONE 2” (one option can be selected at one time only): **STD1 MIKE** - standard microphone input 1 (Pins P1-18/ P1-8) is selected. **STD2 MIKE** - standard microphone input 2 (Pins P1-9/ P1-8) is selected. **STD3 MIKE** - standard microphone input 3 (Pins P1-19/ P1-8) is selected. **DYN MIKE** - dynamic microphone input (Pins P1-6/ P1-5) is selected. **NONE** - No microphones is used in microphone path 2. “MIC ACTIVATION” **BOTH MIKES** ENABLED: • input /PTT1 (Pin P1-17) activates transmission from microphone path 1 and 2. • input /PTT2 (Pin J1-5) activates transmission from microphone path 2 and 1. • input /IC (Pin P1-7) activates intercom from microphone path 1 and 2. **BOTH MIKES** DISABLED: • input /PTT1 (Pin P1-17) activates transmission only from microphone path 1. • input /PTT2 (Pin J1-5) activates transmission only from microphone path 2.

Display Contents	Description
	• input /IC (Pin P1-7) activates intercom only from microphone path 1. "OUTPUTS" **HDPH 1** ENABLED - audio available on headphone 1 output (Pins 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 (Pins P1-20/P1-22), speaker not available. **HDPH 2** DISABLED – no audio available on headphone 2 output, speaker not available. **SPEAKER** ENABLED - audio is available on speaker (Pins P1-1/P1-14), headphone 2 not available. **NONE** - no audio on headphone 2 output or speaker output. **Note: Displayed only if MIKE_SW input (Pin J1-24) has Inactive state.**
 *Note: This page is only displayed if :* *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]***	The sensitivity of standard microphone 1, "STD 1 MIKE SENS", input is adjustable within the range 9 mV to 1500 mV by turning the "ROTARY ENCODER". The factory setting is 110 mV. The VU meter displays the current signal level on the audio input and also displays the highest signal value for the last 3 seconds. When speaking normally into the microphone the bar graph should remain within the recommended predefined range. **Note:** Adjust the microphone sensitivity by keeping the ambient noise suppression as high as possible, this will ensure correct modulation. If the sensitivity is adjusted to a smaller value (e.g. 10 mV) the ambient noises may become louder than for a higher adjustment (e.g. 100 mV). Otherwise, adjusting the sensitivity to a very high value (e.g. 1000 mV), the ambient noise is very much reduced, but the modulation of the transmitter might not be sufficient. The installer shall perform a communication check after modification of this parameter. Recommended is to perform this check with and without a running engine. **Note:** For installations with high interferences it is recommended to use sensitivity level 27 mV to 1500 mV.

Display Contents	Description
 Note: *This page is only displayed if :* *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**]*	The sensitivity of Standard Microphone 2 Input can be adjusted in range from 9 mV to 1500 mV by turning the rotary knob. The default setting is 110 mV. VU meter displays current value of Audio Level from standard microphone input **2** and displays the highest value of Active Audio Level recorded during the last 3 seconds. Correct sensitivity is achieved when you are speaking normally into the microphone, this is confirmed by the “Hold max level bar” remaining in “Recommended range”. **Note 1:** The microphone sensitivity shall be adjusted to achieve a correct modulation by keeping the ambient noise suppression as high as possible. If the sensitivity value is very small (e.g. 10 mV) more ambient noise will be heard than if the sensitivity value is set to a higher level (e.g. 100 mV). Alternatively if the sensitivity value is very high (e.g. 1000 mV) the ambient noise will significantly be reduced but the modulation of the transmitter may not be sufficient. After modifying this parameter a communication check shall be done by the installer. It is recommended to perform this communication check with and without engine running. **Note 2:** For installations with high interference it is recommended to use sensitivity level 27 mV to 1500 mV.
 Note: This page is only displayed if : 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]	The sensitivity of the Standard Microphone 3 Input can be adjusted in range from 9 mV to 1500 mV by turning the rotary knob. The default setting is 110 mV. VU meter displays current value of Audio Level from the Standard microphone input 3 and displays the highest value of Active Audio Level recorded during the last 3 seconds. Correct sensitivity is achieved when you are speaking normally into the microphone, this is confirmed by the “Hold max level bar” remaining in “Recommended range”. **Note 1:** The microphone sensitivity shall be adjusted to achieve a correct modulation by keeping the ambient noise suppression as high as possible. If the sensitivity value is very small (e.g. 10 mV) more ambient noise will be heard than if the sensitivity value is set to a higher level (e.g. 100 mV). Alternatively if the sensitivity value is very high (e.g. 1000 mV) the ambient noise will significantly be reduced but the modulation of the transmitter may not be sufficient. After modifying this parameter a communication check shall be done by the installer. It is recommended to perform this communication check with and without engine running. **Note 2:** Menu available on primary controller. **Note 3:** For installations with high interferences it is recommended to use sensitivity level 27mV to 1500 mV.

Display Contents	Description
 *Note: This page is only displayed if :* *Dynamic 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]***	The sensitivity of the Dynamic Mike, “DYN MIKE SENS”, input is adjustable within a range of 0.5 mV to 25 mV by turning the “ROTARY ENCODER”. The factory setting is 3.5 mV. When speaking normally into the microphone the bar graph should remain within the recommended predefined range. **Note:** The microphone sensitivity shall be adjusted to achieve a correct modulation by keeping the ambient noise suppression as high as possible. If the sensitivity is adjusted to a smaller value (e.g. 1 mV) the ambient noises may become louder than for a higher adjustment (e.g. 25 mV). Otherwise, adjusting the sensitivity to a very high value (e.g. 25 mV), the ambient noise is significantly reduced but the modulation of the transmitter may not be sufficient. The installer shall perform a communication check after modification of this parameter. Recommended is to perform this check with and without a running engine. **Note:** For installations with high interferences it is recommended to use sensitivity level 2 mV to 25 mV.
	One of the three following options may be selected for speaker volume source, “SPKR VOL SRC”, by pressing the “STO” button: PRIMARY CH If “PRIMARY CH” is selected the speaker volume will be adjustable by GT6201.
	The noise squelch threshold “SQUELCH THR” is adjustable within a range of 6 to 26 by turning the “ROTARY ENCODER”. 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. **Note:** Adjustment of the “SQUELCH THR” is available via the “MENU” at any time.

Display Contents	Description
	The “SCAN HOLD_TIME” is adjustable within the range of 1 to 60 seconds by turning the “ROTARY ENCODER”. **Note:** 1. For normal operation it is recommended to leave the setting at 1. 2. The default factory setting is 1.
	The sidetone attenuation “SIDETONE ATT” is adjustable within the range 0…12 dB by turning the “ROTARY ENCODER”. 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 will be reduced 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. **Note:** This Menu is available on primary controller only.
	The GT6201 Transceiver provides two databases to store up to 99 VHF frequencies identified by channel numbers (CH01 to CH99). Both data bases, the “User Channels Database” and “Last Channels Database” can be erased. To erase the data bases; 1. Select “YES” via the “ROTARY ENCODER” 2. Press the “STO” push-button to confirm the selection. **Note:** Menu available on primary controller only
	The GT6201 provides a third database, “FRQUENCY LABELS DATABASE”, containing 99 text labels of max 10 characters each. A text label can be assigned to any of the channels (CH01 to CH99), the Labels are stored manually. The “LABELS DATABASE” can be erased. To Erase the data base; 1. Select “YES” via the “ROTARY ENCODER” 2. Press the “STO” push-button to confirm the selection. **Note:** Menu available on primary controller only
	This page automatically stores and displays information from all failures that occur during operation of the GT6201. Used for trouble shooting and failure isolation. **Note:** 1. The display can only show 4 (GT6201) monitored failures types (more are available).

Display Contents	Description
	2. Move the slide bar via the “ROTARY ENCODER” to view any additional failures. 3. “0” means, no failure has been detected and stored. 4. “1” means, a failure has been detected once or several times and stored.
	To erase all stored failures. 1. Selecting “YES” via the “ROTARY ENCODER”. 2. Press the “STO” push-button to confirm. Erasing the failure list should not be undertaken by the installer. The failure list will normally be deleted by factory or maintenance shop after a repair is completed. **Note:** Menu available on primary controller only.
	The factory default settings are the settings of the GT6201 when it left the factory after production. To restore the factory settings; 1. Select “YES” via the “ROTARY ENCODER”. 2. PRESS the “STO” push-button to confirm. **Note:** Restoring the factory default settings will overwrite all previous and customized installation settings!

2.8 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 21.0 V GT6201-10
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

Setting name	Value
	○ 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
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 (visible depending on MIKE configuration of external MIKE Switch)
STD2 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
EREASE CHANNEL MEM	NO YES

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

2.9 Typical Post Installation Checks

2.9.1 Mechanical Installation and Wiring Check

Verify all cables are stored securely and shields connected properly to signal ground.

Verify all screws are tight and the connectors on the rear side of the unit are secured.

2.9.2 Power Supply

Check the power supply lines and confirm correct polarity. Confirm that the power supply is within the specified limits.

2.9.3 Receiver / Transmitter Operation

Power up the GT6201 and tune it to a local station for a communication test. Verify that the receiver output produces a clear and readable audio and ask the local station for proper readability of the GT6201´s transmit signal. Repeat this communication test with an airborne station within ≈ 20-40 NM (Nautical Miles).

2.9.4 Antenna Check

Check 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.

2.10 Trouble Shooting

Problem	Possible Reason	Proposed Solution
The VOX threshold cannot be adjusted at all. VOX is always off.	VOX is forced off, because speaker is on.	Switch speaker “OFF”. Refer to chapter 2.7.
Too high cabin noise during transmit operation.	The sensitivity of the microphone input is too sensitive.	Adjust the microphone sensitivity to a higher value to ensure the surrounding noise is reduced. Recheck transmit operation function. Refer to chapter 2.7.
Speaker output is not working.	Speaker is switched off	Switch Speaker “ON. Refer to chapter 2.7.
The noise suppression function of the squelch is not working. (Receiver noise is always present).	Other electrical systems, installed inside the vehicle or in the near vicinity, can produce quite high electromagnetic interference, which may be received by GT6201.	Reduce the interference emitted by the systems around by improving shielding, distance or grounding. The interference may also be suppressed by adjusting the squelch to a higher value. Refer to chapter 2.7. **Note, that a higher value will cause a reduced sensitivity.**
The display shows a warning or failure message (LOW BATT, STUCK PTT, TX HOT, FAILURE)	Refer to “Warning and Failure Indications” in chapter 3.13	Refer to “Warning and Failure Indications” in chapter 3.13
The Antenna VSWR exceeds 3:1.	Possibly caused by a defective or insufficient counterpoise for the antenna.	Check for sufficient size of the counterpoise and make sure there is no mechanical defect on the antenna.
	The impedance of the antenna cable deviates significantly from 50 Ohm.	Make sure the used antenna cable has 50 Ω impedance and the cable is not pinched or kinked on its way from the radio to the antenna
	Faults on the BNC connectors of the antenna cable.	Check for proper crimp/solder work on the BNC connectors and rectify as far as necessary.

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Section 3 OPERATION

Note 1: In this section the figures for illustrating display content mainly show transceivers working in 8.33 + 25 kHz mixed mode. Dedicated pictures for 25 kHz mode are not explicitly shown, as the display content is very similar (They differ only in number of digits for frequency).

Note 2: The HMI actions described in this section can be performed on the unit control head.

Note 3: The following graphics of the GT6201-XX display content show the 8.33 kHz channel spacing for all possible operation modes.

3.1 Safety Instructions

This chapter contains general operating instructions for the GT6201 to ensure safe operation of the VHF transceiver.

Use only microphones or headsets which are suitable for use in the specific installation.

If the power supply voltage drops below the “Low Battery Threshold” (default value is 10.5 V), the “LOW BATTERY” message will appear each 3 seconds in the lower part of the display.

3.2 Controls and Indications

Figure 3-1: Controls and indications on GT6201-XX

3.2.1 Controls

	Symbol	Description	Main Function
1		IC/SQL (Intercom/Squelch)	A ”Short press” during normal operation toggles the RX -SQL ON/OFF. A “Long press” during normal operation activates Intercom Menu.
2		MDE (Mode)	“Short press” during normal operation changes the frequency selection mode. “Long press” during normal operation activates the users menu.
3		STO (Store)	”Short press” during normal operation activates storage procedure.
4		↕/SCN (Exchange/SCAN)	”Short press” during standard mode or scan mode toggles between preset and active frequency. “Long press” activates scan mode.
5		Volume Knob	Switches the transceiver ON/OFF and adjusts volume level of received signal.
6		Rotary encoder	Turning “ROTARY ENCODER” changes the settings of several parameters (frequency, IC-volume, VOX …). Pushing the “ROTARY ENCODER” toggles between the digits and acts as an enter key.
7		Display	

When pressing and holding down a key for at least 2 seconds, the GT6201 detects a “long press”. Otherwise a “short press” is assumed.

If any action by the user is invalid the whole display is inverted for a short time. For example when pressing a key and the operation is not allowed at that time.

3.2.2 Symbols Shown on the Display

Symbol	Function
IC	Intercom operation active (triggered by VOX or external IC key).
	Intercom operation via VOX is disabled.
TX	The transceiver is in transmit operation.
SQL	The squelch function is active. Weak signals will be suppressed.
SCAN	Transceiver operates in scan mode.
STO	The transceiver performs a storage operation.
LOW BATT	
128.225	Inverted figures or letters on display ready to edit.

3.3 Start-Up

CAUTION: Do not switch ON the GT6201 VHF transceiver during engine start or shut-down because excessive pulses on the DC bus of the vehicle may cause damage on electrical circuits of any installed instrument.

a. Turn “ON” the VHF transceiver by turning the volume knob clockwise.

b. During PBIT the display indicates the message ”WAIT”, the software version of “Control Head” (CH) and the software version of “Chassis Module” (GCM) are indicated.

c. If the PBIT has detected error(s), the display shows ”FAILURE” (for details see chapter 3.13).

3.4 Receive and Transmit Mode

3.4.1 Receive Mode

If /PTT1 and /PTT2 inputs are inactive, the transceiver remains in receive mode.

In receive mode the headphone(s) outputs (if enabled) provide a mixed signal consisting of:

- Received signal from antenna,
- Intercom signal from intercom circuit one and two,
- Signal from auxiliary input.

In receive mode the speaker output (if enabled) provides a mixed signal consisting of:

- received signal from antenna
- signal from auxiliary input

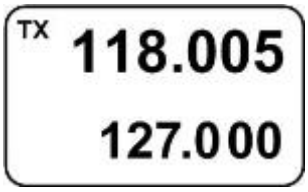
The signal from the auxiliary input can be muted under certain conditions. For details refer to chapter 3.10.

3.4.2 Transmit Mode

If /PTT input is active (PTT key is pressed) the transceiver switches to transmit mode. Microphone(s) signals can modulate the transmitter.

- PTT 1 input activates transmission from microphone path 1.
- PTT 2 input activates transmission from microphone path 2.
- If BOTH MIKES are active (enabled) in the installation setup, each input (PTT 1 or 2) activates the transmission from both microphone paths simultaneously.

The “TX” symbol in the left upper corner of the display indicates the GT6201 is in transmit-mode.



In transmit mode several user actions such as changing frequency selection mode or channel spacing mode, which are normally allowed in receive mode, are blocked. (As an exception in standard mode the “Preset” frequency may still be changeable, even during transmission.)

Side-tone (demodulated audio of the emitted signal) is available on the headphone output. The transmit mode automatically deactivates the speaker.

Note: **Transmit mode terminates automatically (returns to receive mode) after 120 seconds of continuous transmitting, even if PTT is still pressed. In this case “STUCK PTT” is indicated (refer chapter 3.13). For initiation of a new transmission, /PTT line first needs to become inactive.**

3.5 Frequency Selection Modes

Following frequency selection modes are available on GT6201:

- Standard mode,
- Direct tune mode,
- Channel mode,
- Scan mode (sub-mode within standard mode).

The first three modes (standard mode, direct tune mode and channel mode) provide different user interfaces for convenient selection of the operating frequency. The three frequency selection modes can be toggled by consecutive short pressing of “MDE” key. They will be toggled in the following order: standard mode, direct tune mode, channel mode, standard mode, and so on. When toggling between the three modes the active frequency always remains the same.

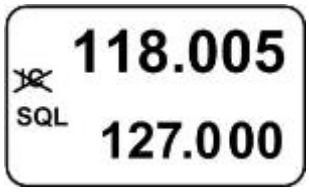
The forth mode is a special mode called SCAN-Mode. Scan mode is a sub-mode of standard mode and is used for monitoring two frequencies at the same time. A 2 seconds press on “↕/SCN” key activates/deactivates the scan function.

Out of the three pages from the frequency selection modes any page can be enabled or disabled in the installation setup but at least one page must remain selected.

3.5.1 Standard Mode

Press the “MDE” key until the standard mode page appears.

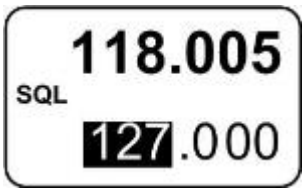
The standard mode page displays the active frequency in the top line and preset frequency in the bottom line.



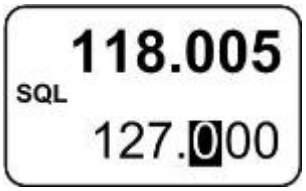
Changing the active frequency is not possible in standard mode (only available in direct tune mode) but changing the preset frequency is possible.

To change the preset frequency

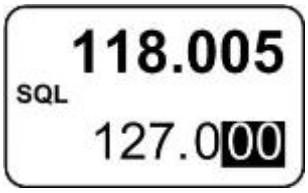
1. Press “ROTARY ENCODER“ first time to select the 100 MHz digits. Then rotate the “ROTARY ENCODER” clockwise/counter clockwise to change the frequency.



2. Press “ROTARY ENCODER“ again to select the 100 kHz digits. Then rotate the “ROTARY ENCODER” clockwise/counter clockwise to change the frequency.



3. Press the “ROTARY ENCODER“ once again to select the 25/8.33 kHz digits. Then rotate the “ROTARY ENCODER” clockwise/counter clockwise to change the frequency.



Each short press on the “↕/SCN” key interchanges the active and preset frequency.

Note: While the transceiver is in transmission mode, this toggle function is disabled.

Press the “STO” key to store the active frequency into the next vacant memory place in the user channels database.

3.5.2 Direct Tune Mode

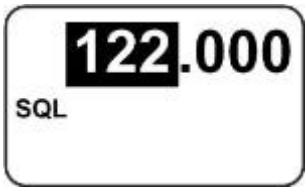
Press the “MDE” key until the direct tune mode page appears.

Note: If BATTERY VOLTAGE in the installation setup is deselected, this mode is not accessible! Only standard or channel mode are accessible.

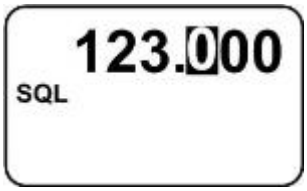
In direct tune mode the active frequency is indicated in the top line. It can be edited by means of the “ROTARY ENCODER” following the procedure. The battery voltage, indicated in the bottom line shows the current value of the supply voltage.

To change the active frequency when in direct tune mode;

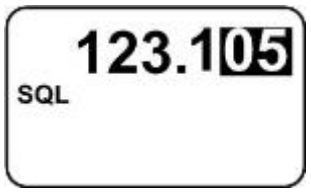
1. Press the “ROTARY ENCODER“ to select the 100 MHz digits. Then rotate the “ROTARY ENCODER” clockwise/counter clockwise to change the frequency.



2. Press the “ROTARY ENCODER“, again to select the 100 kHz digits. Then rotate the “ROTARY ENCODER” clockwise/counter clockwise to change the frequency.



3. Press the “ROTARY ENCODER“, again to select the 25/8.33 kHz digits. Then rotate the “ROTARY ENCODER” clockwise/counter clockwise to change the frequency.



Notes:

1. **The changes immediately become active.**
2. **Changing the active frequency is only possible when the transceiver is not transmitting.**

If wanted press the “STO” key to store the active frequency into the next vacant memory place in the user channels database.

3.5.3 Channel Mode

Note: The channel database provides storage of CH01 to CH99 and LAST1 to LAST9.

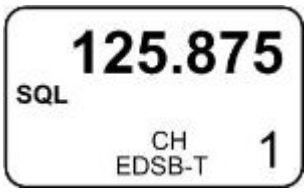
Press the “MDE” key until the channel mode page appears.

The channel mode shows data from user channels database (indicated by “CH”), or last channels database (indicated by “LAST”) and labels database on the display.

After selecting channel mode, the active frequency stays indicated in the top line. If this frequency has an already assigned channel number, channel number and the text label appear in the bottom line of the display. If the active frequency has no assigned channel number the indication in the bottom line is “CH--”.

By means of channel number (CH01 to CH99 or LAST1 to LAST9) stored VHF frequencies can be selected. Then the top line shows the corresponding VHF frequency assigned to the specific channel number.

If the same frequency is stored a second time, then the existing stored label for that frequency will automatically be reassigned to the new channel number.



User Channel Database

In order to select a new channel number from **USER** channels database either;

- Make a short press of the “ROTARY ENCODER“

  or,

- Make one clockwise turn of the “ROTARY ENCODER“.

The channel number becomes highlighted now and the channel can be changed turning the “ROTARY ENCODER“, either clockwise or counter clockwise. At each step the receiver tunes immediately to the displayed VHF frequency.

Note: If user channel CH01 is displayed the first turn counter-clockwise of the “ROTARY ENCODER” will enter to the “LAST” channel no.1. The first turn clockwise in channel mode allow for navigation up and down between the user channels CH01 to CH99.

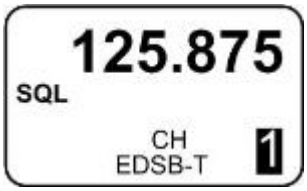
The channel mode can be deselected by repeated pressing of the “ROTARY ENCODER” or the mode is left automatically after a 5 second timeout.

Last Channel Database

In order to select the new channel number from **LAST** channels database make a counter clockwise turn on the “ROTARY ENCODER“. The channel number is now highlighted and one of the nine last used channels is selectable by turning the “ROTARY ENCODER“, either clockwise or counter clockwise. The mode of channel number selection can be left manually by repeated pressing of the “ROTARY ENCODER“, or the mode is left automatically after a 5 seconds timeout.

When leaving the **LAST** channels database and the last shown frequency is not stored in one of the **USER** cannels database, “CH--”will appear on the display.

Accessing the last channels database will be possible if “STORE LAST CHANNEL” is selected on MEMORY OPTIONS page in the installation setup, otherwise the recently stored VHF frequencies will not be available.



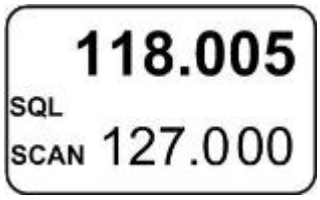
Note: **If the device operates in 25 kHz mode, a selection of an earlier stored 8.33 kHz channel is not possible. For selection of 8.33 kHz channels, the device must operate in 8.33 + 25 kHz mixed mode.**

3.5.4 Scan Mode

In all frequency selection modes;

1. A long press of “↕/SCN” key activates the scan function and changes to STANDARD MODE if activated from CHANNEL or DIRECT TUNE mode.
2. A short push on the “MDE” key or a long press on “SCN” key terminates scan function. After leaving scan function, the device will remain in standard mode (chapter 3.5.1).

In scan mode the display shows both the active frequency on the top line and the preset frequency on the bottom line. The SCAN sign in the display indicates that scan function is active.



If both the active frequency and preset frequency simultaneously detect a signal, the active frequency takes priority. The preset frequency then inverts and blinks. The arrow sign “►” in front of the active frequency indicates that this frequency is audible. The figure below shows a sample.

Blinking

If selected in the installation setup an audio notification “beep” tone becomes audible in addition to the blinking preset frequency to indicate the presence of an RX signal on the preset frequency.

Reception on Preset Frequency in Scan Mode

If the preset frequency detects a signal while no signal is present on the active frequency, the transceiver automatically switches over to the preset frequency.

The arrow sign now appears in front of the preset frequency and the signal is audible. The picture below shows a sample display.

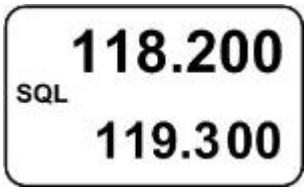
Note: **Transmission always uses the active frequency, even if the monitored frequency is currently audible.**

If TX on the pre-set frequency is required push the "↕/SCN" key to swap active and pre-set frequency.

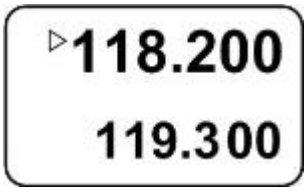
3.6 Squelch

Independent of the selected operation menu, squelch can be toggled "ON" or "OFF" by a short press on "SQL/IC" key.

- If the squelch function is active ("ON") the receiver noise is muted.
- If the Squelch is "OFF" the arrow sign "►" in front of the Active Frequency stay visible all the time and receiver noise will be audible as long as signal is received.



Squelch "ON"



Squelch "OFF"

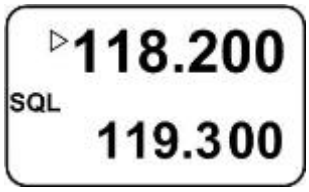
In the users menu, the squelch threshold is adjustable to a convenient trigger level.

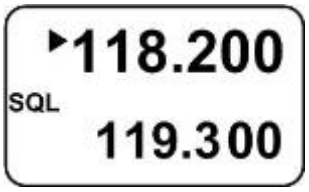
3.7 RX Field Strength Indication

The field strength indicator is represented by triangle on the left upper corner of the corresponding frequency and will appear next to the active or preset frequency in all frequency selection modes.

The field strength of the indicated incoming signals is based on measured RSSI level. The three levels displayed are:

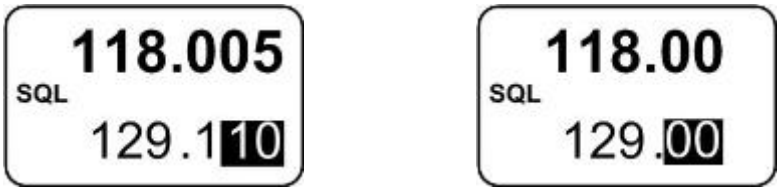
Weak Signal Strength	Good Signal Strength	Excellent Signal Strength
RSSI passing squelch level (empty triangle)	-88 > RSSI > -80dBm (half-filled triangle)	RSSI > -80dBm (fully filled triangle)





3.8 Channel Spacing Mode

The transceiver provides two frequency channel spacing operation modes (8.33 kHz and 25 kHz), selectable by means of pressing “STO” and “MDE” keys simultaneously for at least 2 seconds.



8.33 kHz channel spacing (left) / 25 kHz channel spacing (right)

In 25 kHz mode 5 frequency digits are shown. Only operating frequencies with a channel spacing of 25 kHz are selectable. If 8.33 kHz channels are not in use this mode provides the advantage of faster tuning since the 8.33 kHz frequency steps are skipped.

In 8.33 and 25 kHz mixed mode 6 frequency digits are shown. The transceiver tunes to all possible frequencies within the aviation VHF frequency band. The channel spacing and operating frequency is derived automatically from the selected and displayed frequency (refer chapter 1.4).

3.9 Storage Function

The VHF transceiver provides two databases:

1. **User channels database** - provides 99 channels identified as CH01 to CH99 or with individual labels with up to 10 characters. Any frequency can be assigned to any CH within the VHF range from 118.000 MHz to 136.9916 MHz by simply pressing the “STO” button. All 99 channels are editable, when selected, after the “STO” button is pressed.
2. **Last channels database** - automatically stores nine last used frequencies, identified and easy to recall as LAST1 to LAST9.

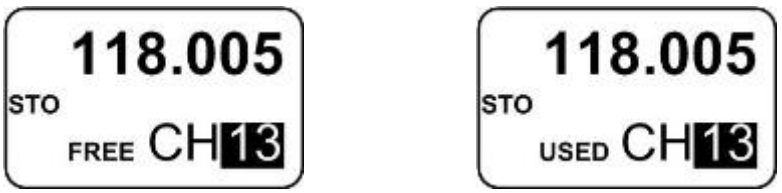
The user channels database can be edited manually by the users or, uploaded/edited by using a PC-application connected to an interface port on connector J1 of the GT6201.

3.9.1 Manual Storage Function

To modify the database select CHANNEL STORE option in the MEMORY OPTIONS page in installation setup.

Press the “STO” key to activate the database modification in standard mode, direct tune mode, or channel mode.

During this procedure the display looks similar to the channel mode with the difference “STO” is displayed on the left side of the display. The display top line displays the active frequency and the bottom line displays the already assigned or next vacant channel number. The channel number can be selected by means of the “ROTARY ENCODER“. If the selected channel number is vacant, label ”FREE” appear in front of “CHXX”. If the selected channel number contains an already stored frequency ”USED” appears on the display.



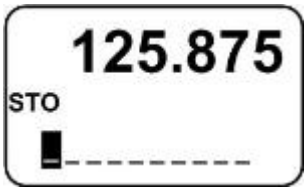
“FREE” and “USED” channel indication.

By entering the storage procedure, the transceiver will first propose the next free channel for storing the active frequency. Beside the proposed channel, any other channel in range 1 to 99 can be selected by turning the rotary knob. For every selected channel “USED” or “FREE” is indicated.

Pressing the “STO” key once again assigns the Active Frequency to the selected channel number, regardless of the channel is “FREE” or “USED” indicated.

The transceiver automatically stores the alphanumeric label assigned to the active frequency.

If the frequency has no label attached, ten underscore digits allow the operator to insert a label. The cursor automatically appears on the first position (see figures below).



By turning the “ROTARY ENCODER” characters can be selected. Selection works in both directions (example: blank → A → B → C” by turning clockwise and “C → B → A → blank by turning counter clockwise).

Each press on the “ROTARY ENCODER“ pushes the cursor to the next position.

A short press of the “STO” key stores the label and a long press of the “STO” key clears the currently edited label.

After storing labels, the transceiver returns back to the previous frequency selection mode (standard mode / direct tune mode / scan function).

If no action occurs in label editing mode within 7 seconds, the transceiver returns to the previous frequency selection mode without storing the frequency and label information.

Stored frequencies can be recalled in channel mode (see chapter 3.5.3).

3.9.2 Automatic Storage Function

The transceiver contains storage function, which automatically stores 9 recently selected VHF frequencies and updates the last channels database during operation in standard mode, direct tune mode and scan-mode. To use this function the STORE LAST CHANNEL option must be enabled in installation setup on the MEMORY OPTIONS page.

When changing to a new active frequency, the previous active frequency is stored “LAST” in memory channel CH1. The frequencies previously located in CH1, CH2 … CH8 are shifted to memory channels CH2, CH3, … CH9. This algorithm ensures the last 9 used active frequencies are stored. Last used frequencies “LAST” can be recalled in channel mode (see chapter 3.5.3).

3.10 Auxiliary Audio Input

The transceiver has a dedicated auxiliary audio input e.g. for MP3 player connection.

When auxiliary input is enabled in the installation setup, the auxiliary audio input signal is mixed with the received signal from antenna (passing squelch) and the intercom signal (when activated).

When intercom works in ISOLATION mode, then auxiliary audio input signal is provided on headphone 2 output even if radio communication (transmission/receiving) is active.

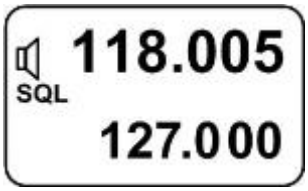
AUX AUTO MUTE function depends on the AUX INPUT. It is selected via the CONFIGURATION page in the installation setup. This function automatically mutes the audio signal from the auxiliary audio input as long as the GT6201 detects (based on squelch evaluation) a RX signal or the user deactivates the squelch manually. If this function is 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 is coupled with the auxiliary audio input. The level of the auxiliary input signal attenuates if intercom is activated by VOX or by /IC discrete input. The auxiliary input signal reverts to its previous value after intercom deactivation. The attenuation value can be adjusted within the range from 0 to 40dB.

3.11 VOX & Speaker Operation *(not used for ground applications)*

Depending on the wiring and installation setup, speaker may always be enabled, or speaker can be enabled/disabled by switching configurations using the external switch /MIKE_SW.

When speaker is enabled and is not muted the display will show the sign.



With active speaker enabled in audio configuration, the VOX is always forced “OFF” and intercom via VOX is not possible (to avoid oscillation of VOX due to acoustical feedback). The GT6201 disables VOX if enabling speaker in active audio configuration.

For ground applications VOX should be set to OFF permanently.

With the transceiver in transmission mode the speaker output is muted (switched “OFF”) even if speaker is enabled in current audio configuration in one of the following cases:

- Intercom is activated by external intercom switch (I/C input),

3.12 Menus

During normal operation in one of the frequency selection modes the following menus can be activated:

- Intercom menu for adjustment of intercom volume and VOX threshold,
- Users menu for adjustment of panel brightness and squelch threshold.

3.12.1 Intercom Menu *(not used for ground applications)*

A long press (2sec) on “IC/SQL” key activates the intercom menu starting with intercom volume menu as first page after entering this menu. A short press on “IC/SQL” key provides toggling between the pages.

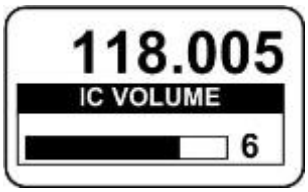
A long press on “MDE” key terminates intercom menu, or the menu automatically terminates after 5 seconds timeout.

The intercom menu consists of two pages:

- Intercom volume (first page),
- Intercom VOX (second page).

Intercom Volume Menu *(not used for ground applications)*

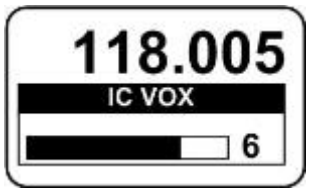
The active frequency is indicated in the top line of the display, while the “IC VOLUME” label and below this a bar graph with numerical value are show in the bottom line.



By means of the “ROTARY ENCODER“ the intercom volume can be changed from 0 (minimum volume) to 46 (maximum volume). The intercom volume setting affects the intercom audio signal and sidetone signal routed to the headphone.

Intercom VOX Menu *(not used for ground applications)*

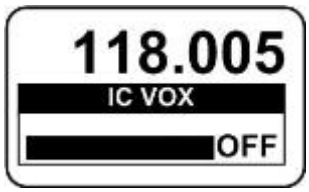
The active frequency is indicated in the top line of the display, while the “IC VOX” label and below this a bar graph with numerical value are shown in the bottom line.



By means of the “ROTARY ENCODER“ the intercom VOX threshold can be changed from -30 (most sensitive, even a very low microphone signal already triggers the VOX threshold for Intercom operation) to +10 (VOX is less sensitive and only high microphone signals trigger the VOX threshold for intercom operation).

Note: At a setting for VOX threshold of -15 a convenient behavior of the VOX should be achieved in most vehicles. This requires that mike sensitivity had been correct adjusted (installation setup). If the mike sensitivity is incorrect adjusted, VOX may work not satisfying.

By changing the VOX threshold level to above +10, VOX can be switched “OFF”. In this case, “OFF” replaces the numerical value indication (see figure below):



With VOX switched “OFF”, activation of intercom operation using the external intercom switch (/IC discrete input) is still possible at any time.

The VOX threshold level cannot be adjusted if the VOX is forced to be “OFF” (due to Enabled speaker in current audio configuration).

3.12.2 Users Menu

Press the “MDE” key for 2 seconds to enter the users menu starting with BRIGHTNESS menu as first page after entering this menu. Toggling between the pages is provided by a quick press of the “MDE” key, or by a quick press of the “ROTARY ENCODER“.

To exit the users menu either

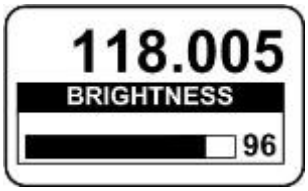
- Wait 5 seconds without any switch selections,
- Press the “MDE” key again for 2 second,
- Press the “ROTARY ENCODER“ when the SQUELCH setting page is visible.

The users menu consists of two pages:

- BRIGHTNESS (first page),
- SQUELCH (second page).

BRIGHTNESS

The active frequency is indicated in the top line of the display. Underneath the active frequency, the “BRIGHTNESS” label appears in combination with a bar graph and the selected value.



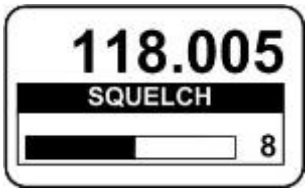
The panel brightness for display illumination and pushbuttons can be changed from 0 (illumination off) to 100 (maximum brightness) by turning the “ROTARY ENCODER“.

Note: This page is not available if in installation setup the dimming input is set to 14 V or 28 V. For this setting the vehicle or control desk dimming circuit controls the brightness parameters.

SQUELCH

By a short press of the push button of the “ROTARY ENCODER” the next page “SQUELCH” is displayed. The active frequency is indicated in the top line of the display. On the bottom line is indicated ”SQUELCH” with a bar graph and a value.

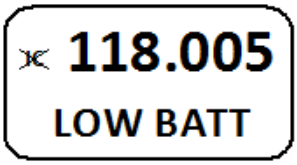
By another press on the “MDE” key change to SQUELCH and by means of the “ROTARY ENCODER“, the setting can be changed. The active frequency stays indicated in the top line of the display and on the bottom line “SQUELCH” label appears together with a bar graph and the current value.

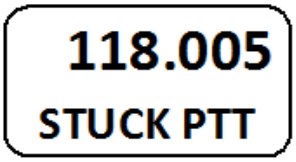
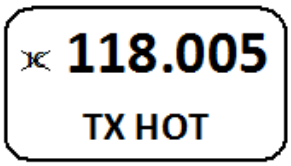
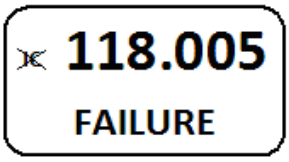


By turning the “ROTARY ENCODER” the squelch threshold can be adjusted:

- from 6 (very weak signals are audible with high noise content; squelch opens at about -105 dBm),
- to 26 (only quite strong signals are audible with low noise content; Squelch opens at about -87 dBm).

3.13 Warning and Failure Indications

Display Contents	Description
 Reappear every 3 seconds.	“LOW BATT” is indicated if the supply voltage of the transceiver is below the threshold defined in the installation setup. The transceiver is still operable but may have a reduced performance depending on supply voltage. **Possible reasons for indication:** • Accumulator capacity problems (gliders), • Power interrupts, • General power supply problems, • Setting for low battery threshold is too high.

Display Contents	Description
 Reappear every 3 seconds.	"STUCK PTT" is indicated after 120 seconds of continued transmission. The transceiver goes back to receive mode even if the PTT line is still active (GND). For initiating a new transmission, the PTT line needs first to become inactive (open). **Possible reasons for indication:** • Transmission lasts more than 120 seconds, • PTT-key is stuck, • PTT line permanently grounded (short circuit in installation).
 Reappear every 3 seconds.	"TX HOT" is indicated if the internal device temperature exceeds +90°C. Transceiver is still operable. Performance of transmitter is reduced. **Possible reasons for indication:** • Very hot environmental temperature, long transmissions times and insufficient airflow conditions.
 Reappear every 3 seconds.	The transceiver has detected an internal failure during normal operation. Depending on failure reason, the device may be still operable with degraded performance or not operable at all. **Possible reasons for indication:** • Outside specified environmental conditions, • HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**
	The transceiver has detected an internal failure during start up. Depending on failure reason, the device may be still operable with degraded performance or not operable at all. **Possible reasons for indication:** • Outside specified environmental conditions, • HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**
	The transceiver has no communication with the control head or the remote control system. Depending on failure reason, the device may be still operable with degraded performance or not operable at all. **Possible reasons for indication:** • Problem with inter-wiring **Contact maintenance shop for assistance.**

Section 4 Certification Document

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

Ergänzende Bestimmungen

1. Jede Anlage oder jedes Gerät mit der Bezeichnung **GT6201** in den im Anhang zur Zulassungsurkunde aufgeführten Modellvarianten und zugehörigen Hard-/ Softwarekonfigurationsständen, dass mit der Zulassungsnummer **D-0030/2014** versehen ist, muss in seinen mechanischen und elektrischen Charakteristika sowie in der Softwarekonfiguration mit dem vom Bundesaufsichtsamt für Flugsicherung geprüften Muster übereinstimmen.

2. Die Musterzulassung stellt keinen Ersatz für die durch den Betreiber durchzuführenden Werksabnahmen und technischen/betrieblichen Abnahmen dar. Die Einhaltung der im operationellen Betrieb zu beachtenden gesetzlichen und technischen Vorgaben durch die Anlage ist durch den Betreiber auf Grundlage der Abnahmen zu validieren.
   Davon unbenommen ist die dauerhafte Sicherstellung der für den operationellen Betrieb notwendigen Signale und Zuverlässigkeiten durch den Betreiber zu gewährleisten.

3. Jede Änderung oder Ergänzung des Aufbaus oder der Schaltung der Anlage/des Gerätes sowie der Softwarekonfiguration gegenüber dem Muster macht eine Nachprüfung durch das Bundesaufsichtsamt für Flugsicherung erforderlich.

4. Das Bundesaufsichtsamt für Flugsicherung kann die Einhaltung der Anforderungen gemäß § 4 Flugsicherungs-Anlagen- und Geräte-Musterzulassungs-Verordnung durch Produktkontrollen überprüfen (§8 FSMusterzulV).

5. Diese Urkunde alleine berechtigt nicht zum Betrieb einer Anlage oder eines Gerätes. Das Einrichten, Errichten und Betreiben einer Funkstelle unter Verwendung dieser Anlage oder des Gerätes, auch wenn es sich um eine Vorführung handelt, ist vom Vorhandensein einer Frequenzzuteilung der Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen abhängig.

6. Diese Zulassung befreit nicht von der Verpflichtung zur Abnahme von flugsicherungstechnischer Einrichtungen durch das Bundesaufsichtsamt für Flugsicherung gemäß §27c Luftverkehrsgesetz.

7. Aus dieser Zulassung können keine Ansprüche auf Zulassung gegenüber anderen Zertifizierungsstellen abgeleitet werden.

8. Aus der Ausstellung dieser Urkunde können keine Forderungen patentrechtlicher Art hergeleitet werden. Sie befreit in keinem Fall von der Beachtung fremder Schutzrecht und stellt keinen Rechtschutz, ähnlich dem im Patentgesetz vorgesehenen, dar.

Bundesaufsichtsamt
für Flugsicherung

Anhang zur Zulassungsurkunde

D-0030/2014

Konfigurationsstand

Ausgabestand 04.06.2014

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)

Bundesaufsichtsamt für Flugsicherung
Langen, den 04.06.2014

Im Auftrag

Bodo Heinzl

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