BECKER AVIONICS INTERNATIONAL

VHF Transceiver

AR6201, AR6203, RT6201, RCU6201

Software Versions:

from Software Version
SCI1050S305 Version 4.06
SCI1051S305 Version 2.06

Operating Instructions

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List of Abbreviations

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FAA	Federal Aviation Administration
AC	Alternating Current
AF	Audio Frequency
AR	Airborne Radio
ATT	Attenuation
AUX	Auxiliary
AWG	American Wire Gauge
BNC	Bayonet Neill Concelman
CBIT	Continuous Built-In Test
CFG	Configuration
CH	Channel
CM	Chassis Module
COM	Communication
DC	Direct Current
EASA	European Aviation Safety Agency
EMI	Electro Magnetic Interference
ETSO	European Transmission System Operators
EUROCAE	European Organisation for Civil Aviation Equipment
GND	Ground (Aircraft Ground)
GPS	Global Positioning System
HMI	Human Machinery Interface
HIRF	High Intensity Radiated Fields
IC	Intercom
I&O	Installation & Operation
LCD	Liquid Crystal Display
MFD	Multi-Function Display
M&R	Maintenance & Repair
N/A	Not Applicable
NAV	Navigation
PBIT	Power-On Built In Test
PTT	Push To Talk
PWR	Power
RCU	Remote Control Unit
RSSI	Received Signal Strength Indication

Operating Instructions

List of Abbreviations

RT	Remote Transceiver
RX	Receive
SQL	Squelch
SPKR	Speaker (Loudspeaker)
SRC	Source
SW	Software
TSO	Technical Standard Order
TX	Transmit
VOX	Voice Operated IC Threshold
VHF	Very High Frequency
VDC	Voltage Direct Current
VSWR	Voltage Standing Wave Ratio
VU	Volume Unit

Units

Units

V	Volt
mV	Millivolt
A	Ampere
mA	Milliampere
W	Watt
mW	Milliwatt
kHz	Kilohertz
MHz	Megahertz
s	Second
dBm	Power ratio in Decibel
dB	Decibel
Ohm (Ω)	Resistor
kg	Kilogram
°C	Degree Celsius
mm	Millimetre
cm	Centimetre

1. Introduction

Before use of the VHF Transceiver it is recommended to study this instruction manual carefully because it contains safety as well as operating instructions.

Include this manual to the documentation carried on board the aircraft.

For further descriptions we are using following terms for VHF transceivers, VHF remote transceiver and remote control unit, instead writing their complete model number.

620X   in general for the device family

AR620X for: AR6201, AR6203 (Single Block Transceiver)

RT   for: RT6201 (Remote Transceiver)

RCU   for: RCU6201 (Remote Control Unit)

1.1. General Safety Definitions

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

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

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

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

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

1.2. Warranty Conditions

User Conversions and Changes are Not Permitted

Any change made by the user excludes any liability on our part (excluding updates for the navigation data base).

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

1.3. Conditions of Utilization

General introductory notes

With this device you bought a product which was manufactured and tested before delivery with the utmost care. Please take your time to read the following notes which you ought to follow closely during installation and operation. Unless, all claims under the warranty will become void and a reduced service life or even damages must be expected.

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

1.3.1. Purpose of Equipment

The VHF transceiver enables voice communication in the very high frequency band between 118.000 to 136.9916 MHz (radio communication part of air-band) with a selectable channel spacing of 25 or 8.33 kHz.

1.3.2. Additional Conditions of Utilization

Please refer to "Safety-Conscious Utilization", page 9.

1.4. Non Warranty Clause

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

2. Operating Instructions

The chapter "Operating Instructions" contains general information and instructions to ensure safe operation of the VHF transceivers.

2.1. Device Description

| NOTICE | 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 (they differ only in number of digits for frequency). The HMI actions described in this section can be performed on primary controller or on optional secondary controller RCU6201. The following graphics of the display content show the 8.33 kHz channel spacing for all possible operation modes. |

2.1.1. Device Assignment

This manual is valid for the following devices:

- AR6201-(XX2)
- AR6203-(XX2)
- RT6201-(XX0) with RCU6201-(X12)

    from Software Version
    SCI1050S305 Version 4.06
    SCI1051S305 Version 2.06

2.1.2. Type Plate

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

Figure 2-1: Type plate (example)

Explanation:

PN:	**Type designation:** **AR6201 =** Single Block VHF Transceiver 58 mm (2¼ inch) **AR6203 =** Single Block VHF Transceiver 160 mm (6.3 inch) **RT6201 =** Remote VHF Transceiver **RCU6201 =** Remote Control Unit 58 mm (2¼ inch) **Options:** **0XX:** 8.33/25 kHz channel spacing capability **1XX:** 25 kHz channel spacing capability only **X1X:** 10 W at 28 V **X2X:** 6 W at 12 V **XX2:** white illumination colour on black panel
SN:	Unique number of the particular device
AN:	Article number
DoM:	Date of Manufacturing
	Software: Corresponding to the displayed version
	Compliance and Certifications Corresponding to the displayed text and logos

2.1.3. **Safety-Conscious Utilization**

| **NOTICE** | Switch OFF the device before starting or shutting down engines. |

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

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

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.

| **SAFETY INSTRUCTIONS** | If the power supply voltage drops below 10 V the system enters power saving mode: |

- Speaker output of the transceiver is automatically switched "OFF"
- Speaker sign will no longer be presented on LCD display
- The pilot must use headphones to continue listening.
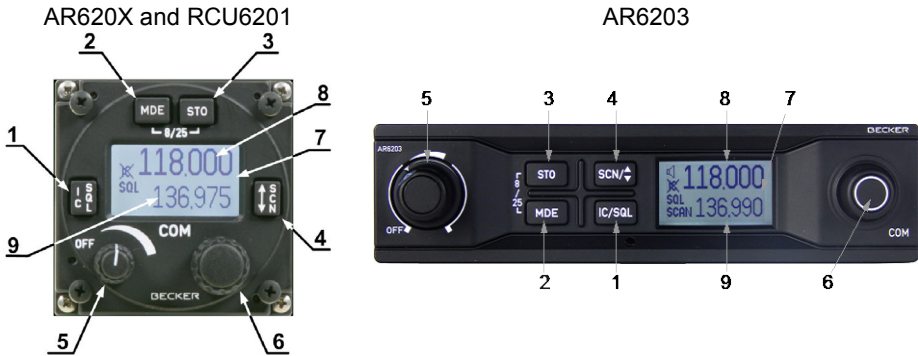
2.2. Controls and Indicators

AR620X and RCU6201　　　　　　　　　　　　　AR6203

Figure 2-2: Controls and indicators

	Symbol	Description	Main Function
1	I S C Q L	IC/SQL (Intercom/Squelch)	"Short press" during normal operation toggles the RX -SQL ON/OFF. "Long press" during normal operation activates Intercom Menu.
2	MDE	MDE (Mode)	"Short press" during normal operation changes the frequency selection mode. "Long press" during normal operation activates the pilots menu.
3	STO	STO (Store)	"Short press" during normal operation activates storage procedure.
4	↕ S C N	↕/SCN (Exchange/SCAN)	"Short press" during standard mode, or scan mode toggles between preset and active frequency. "Long press" activates scan mode.
5	OFF	Power ON/OFF, 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.

	-8/25-	Change of Channel Spacing	Keeping the MOD and STO button pressed simultaneously longer than 2 seconds changes 8.33 to 25 kHz channel spacing and vice versa.
7		Display	LCD: Liquid Crystal Display
8		Active frequency	Only on the active frequency, transmitting is possible and receiving has priority, even in scan mode. Frequency tuning is not possible in standard mode.
9		Preset frequency	Frequency tuning is possible in standard mode. In scan mode both frequencies, active and preset are in listening watch. If no receive signal is detected on the active frequency, receiving signals on the preset frequency will be audible, but will be muted as soon as a signal on the active frequency is detected.

The device detects a:

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

"Short press": any pressing below 2 seconds.

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

Symbols shown on the Display

Symbol	Function
IC	Intercom operation is 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 RX signals suppressed.
SCAN	Transceiver operates in scan mode
STO	The transceiver performs a storage operation.
LOW BATT	Battery below predefined low threshold
128.225	Inverted figures or letters on display ready to edit

2.3. Start-Up

NOTICE	Excessive pulses on the DC bus of the aircraft may cause damage on electrical circuits of any installed instrument.
	Do not switch ON the device during engine start or shutdown

- Turn "ON" the device by turning the volume knob clockwise.
- During PBIT (Power-On Built In Test) the display indicates the message "WAIT", the software version of "Control Head" (CH) and the software version of "Chassis Module" (CM).
- If the PBIT has detected error(s),"FAILURE" appears on the display (for details see page 30).

2.4. Receive and Transmit Mode

2.4.1. Receive Mode

If /PTT1 and /PTT2 (Push To Talk) 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 been muted under certain conditions (For details refer to "Intercom Operation", page 24).

The signal from intercom can be attenuated, or muted, under certain conditions (For details refer to "VOX & Speaker Operation", page 26).

2.4.2. Transmit Mode

If /PTT input is active (PTT=Push To Talk 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 device is in transmitting mode.

^{TX} **118.005**

127.000
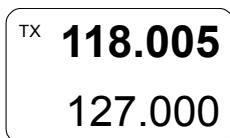
In transmit mode several user actions such as changing frequency selection mode or channel spacing mode, which are normally allowed in receive mode, are blocked. (As an exception in standard mode the "Preset" frequency may still be changeable, even during transmission).

No intercom operation is possible in transmit mode.

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

Note: **Transmit mode is automatically terminated (return to receive mode) after 120 seconds of continuous transmitting even if PTT is still pressed. In this case "STUCK PTT" is indicated (refer to page 30). For initiation of a new transmission, /PTT line needs first to become inactive.**

2.5. Frequency Selection Modes

Following frequency selection modes are available on AR620X and RCU6201:

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

The "Standard Mode", "Direct Tune Mode" and "Channel Mode" provide different user interfaces for convenient selection of the operating frequency. These three frequency selection modes are selectable by consecutive short pressing of "MDE" key.

They appear 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 and active.

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

The availability of the modes depends on enabling or disabling in the "Configuration Settings".

2.5.1. 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.

118.005

SQL 127.000

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

Changing the preset frequency in standard mode:

- Make a "short press" on the "ROTARY ENCODER" for modification of the 100 MHz digits.
  Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 1 MHz steps.

```
   118.005
SQL 128.000
```

- Make another "short press" on the "ROTARY ENCODER" for modification of the 100 kHz digits.
  Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 100 kHz steps.

```
   118.005
SQL 128.000
```

- Make another "short press" on the "ROTARY ENCODER" for modification of the 25/8.33 kHz digits.
  Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 25/8.33 kHz steps.

```
   118.005
SQL 128.000
```

Press the "STO" key to store the active frequency into the next vacant memory place of the user channels database.

A short press of the "↕/SCN" key, exchanges active frequency to preset frequency and vice versa.

Note: **While the transceiver operates in transmit mode, the toggle function is disabled.**

2.5.2. Direct Tune Mode

Press the "MDE" key until the direct tune mode page appears.

118.005
IC
SQL
BAT 13.5V
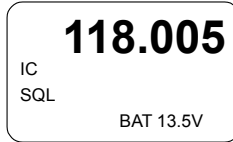
Note: **The battery information is only displayed if BATTERY VOLTAGE in the installation setup is selected.**

In direct tune mode, the active frequency appears in the top line. It can be edited by means of the "ROTARY ENCODER" following the procedure.
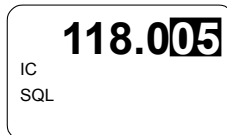
Changing the active frequency when in direct tune mode;

- Make a "short press" on the "ROTARY ENCODER" for modification of the 100 MHz digits.
  Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 1 MHz steps.

118.005
IC
SQL

- Make another "short press" on the "ROTARY ENCODER" for modification of the 100 kHz digits.
  Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 100 kHz steps.

118.005
IC
SQL

- Make another "short press" on the "ROTARY ENCODER" for modification of the 25/8.33 kHz digits.
  Rotate the "ROTARY ENCODER" clockwise/counter clockwise to change the frequency in 25/8.33 kHz steps.

118.005
IC
SQL
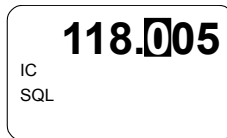
Note:

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

Press the "STO" key to store the active frequency into the next vacant memory place of the user channels database.

2.5.3. Channel Mode

The channel mode shows data from User Channels Database (indicated by "CH"), or Last Channels Database (indicated by "LAST") and shows if applied a customized label (identifier) for the channels (max. 10 characters).

The channel database provides storage of:

- CH01 to CH99 and
- LAST 1 to LAST 9.

Note   **The functions "LAST" and Store/Restore are only available if these options are activated in "Configuration Settings" - "MEM OPTIONS".**

Note: **If the device is operating in the 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.**

Press the "MDE" key the channel mode page appears.

By means of channel number stored frequencies can be selected. The top line shows the corresponding frequency and the bottom line the channel number and customized label (identifier).

If the active frequency has no assigned channel number the indication is "CH--".
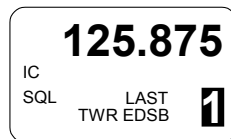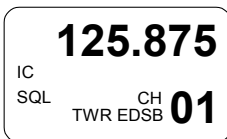
2.5.3.1. Select/Deselect Channels:

Example: **With CH01 user channel shown on display:**

In order to select the channel number:

- The first turn clockwise in channel mode provides navigation up user channels CH01 to CH99.
- Make a short press of the "ROTARY ENCODER", or:
- Make one clockwise turn of the "ROTARY ENCODER".

The channel number is now highlighted, the channel can be changed turning the "ROTARY ENCODER". At each step the receiver tunes immediately to the displayed frequency.

- The first turn counter-clockwise will enter to the channel "LAST 1.

The channel number is now highlighted and one of the nine last used channels is selectable by turning the "ROTARY ENCODER" either counter clockwise or clockwise.

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

When leaving the "LAST" channel database and the last shown frequency is not stored in the User channel database, "CH__" appear on the display. Press "STO" to start the storage process.

Leave Channel Mode:

Press the "MDE" key the standard page appears.

2.5.4. Frequency Storage Functions

Start store function by pressing:

- "STO" key in "Standard Mode", "Direct Tune Mode" and "SCAN Mode".
  During this procedure, the display looks similar to the channel mode with one difference that "STO" appears on the left side of the display.
- "ROTARY ENCODER" key in "Channel Mode"

2.5.4.1. Store/Restore

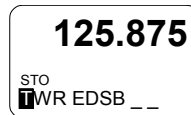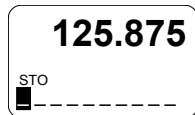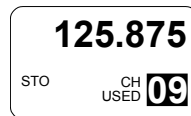The transceiver provides two databases:

- User channels database - provides 99 channels CH01 to CH99 to store frequencies with the possibility to apply a customized label (identifier) max. 10 alphanumeric characters.

- Last channels database - automatically stores 9 last used frequencies with customized identifier if applied, easy to recall as LAST 1 to LAST 9.

Any frequency can be assigned to any channel within the range from 118.000...136.9916 MHz by simply pressing the "STO" button. All 99 channels are editable. By entering the storage procedure, the device will first propose the next free channel for storing the active frequency. The label "FREE" appears together with the channel number, if the selected channel is vacant. A selected channel with an already stored frequency, has the label "USED".

If the same frequency is stored a second time, then the existing data (frequency, label/identifier data) is offered to store. If the frequency has no label attached, ten underscore digits allows inserting a label. The cursor automatically appears on the first position.

The data can be stored:

- to next free channel (offered from system).
- to a selected free channel.
- to a selected used channel (the existing data will be replaced).

125.875	125.875
STO CH **09** FREE	STO CH **09** USED

125.875	125.875
STO ■ _ _ _ _ _ _ _ _ _	STO **T**WR EDSB _ _

Label (Identifier) Data:

By turning the "ROTARY ENCODER" characters can be selected. Selection works in both directions (example: A→...→Z→0→...→9→— →/→blank→A" by turning clockwise and vice versa by turning counter clockwise).

Each "short press" on the "ROTARY ENCODER", the cursor is passed to the next position. A short press of the "STO" key stores the label a long press of the "STO" key clears the currently edited label. After storing the transceiver returns back to the previous frequency selection mode.

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 are recallable in Channel Mode (see "Channel Mode" page 17).

2.5.5. Automatic Storage Function

The transceiver stores 9 recently selected frequencies and updates the last channels database during operation in "Standard Mode", "Direct Tune Mode" and "Scan Mode".

When changing to a new active frequency, the previous active frequency is stored "LAST" in memory LAST 1. The frequencies previously located in LAST 1…LAST 8 are shifted to memory channels LAST 2…LAST 9. This algorithm ensures the last 9 used active frequencies are available. Last used frequencies "LAST" can be recalled in channel mode (see "Channel Mode" page 17).

Note   **The functions "LAST" and Store/Restore to channels are only available if these options are activated in "Configuration Settings" - "MEM OPTIONS".**

2.5.5.1. Delete data:

The stored content in User Channel Database can only be deleted in "Configuration Settings". Please note the whole channel database will be reset.

2.5.6. Scan Mode

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.
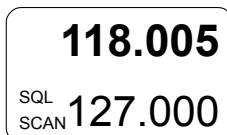
In all frequency selection modes;

- A long press of "↕/SCN" key activates the scan function and changes to STANDARD MODE if activated from CHANNEL or DIRECT TUNE mode.

- A short press 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.

The arrow sign "►" in front of the active frequency indicates that this frequency is audible.

If both the active frequency and preset frequency simultaneously detect a signal, the active frequency (top) takes priority. The preset frequency then inverts and blinks.
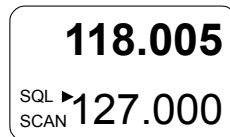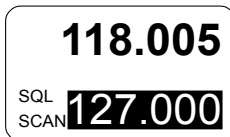

If selected in the installation setup an audio notification "beep" tone becomes audible in addition to the blinking preset frequency to indicate the presence of an RX signal on the preset frequency.

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.
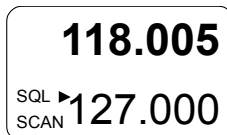
Note: **Transmission always uses the active frequency, even if the monitored frequency is currently audible.**
If TX on the preset frequency is required, push the "↕/SCN" key to swap active and preset frequency.

2.6. 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 receivers 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 receiving.

| **118.005**	▷**118.005**
ˢᵠᴸ 127.000	ˢᵠᴸ 127.000
Squelch "ON"	Squelch "OFF"

In the pilots menu, the squelch threshold is adjustable to a convenient trigger level. See "Pilots Menu", page 28.

2.7. RX Field Strength Indication

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

The field strength of an incoming signal relates to the measured RSSI level. The three levels displayed are:

Weak Signal Strength	Good Signal Strength	Excellent Signal Strength
RSSI passing squelch levels (empty triangle)	-88 > RSSI > -80 dBm (half-filled triangle)	RSSI > -80 dBm (fully filled triangle)
▷**118.005** ˢᵠᴸ 127.000	▸**118.005** ˢᵠᴸ 127.000	▶**118.005** ˢᵠᴸ 127.000
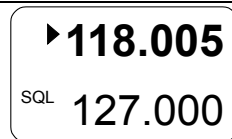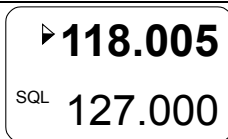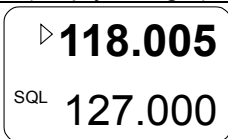
2.8. Channel Spacing Mode

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

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 skipping the 8.33 kHz frequency steps.

In 8.33 kHz 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.

118.000	118.00
SQL 127.0**00**	SQL 127.**00**

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

Toggling between the frequency channel spacing modes is only available for 620X-(0XX) variants. The 620X-(1XX) variants provide operation in 25 kHz Mode only.

2.9. Auxiliary Audio Input

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

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

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

AUX AUTO MUTE function depends on the AUX INPUT, selectable via the CONFIGURATION page in the installation setup. This function automatically mutes the audio signal from the auxiliary audio input as long as the AR620X-(XXX) 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 controls 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...40 dB.

2.10. Intercom Operation

Intercom operation may be triggered automatically via VOX (with adjustable threshold) or externally via intercom switch.

The setting of VOX-threshold and intercom volume is accessible in the pilot intercom menu, in tandem configuration on primary controller only.

For a single block, the primary controller is the one directly connected to VHF transmitter. For a remote VHF transmitter the primary controller is the one connected to primary control interface.

VOX-threshold and intercom volume for the second intercom circuit are controllable from secondary controller RCU6201 (secondary controller is the one connected to secondary control interface).

The transceiver has two internal built in intercom circuits. Therefore, up to four headsets are connectable. Pilot and co-pilot connect to the first intercom circuit. When intercom is active, both microphone signals are mixed and amplified with each other and will be audible on both headphone outputs. This enables internal communication via headsets between both pilots. Passenger headsets are connecting to the second intercom circuit.

ALL mode - Everyone connected to the intercom will hear all communications (pilots hear passengers and passengers hear pilots).

ISOL mode - Provides separate intercoms for the pilots (intercom circuit one) and the passengers (intercom circuit two). This allows pilots to communicate with each other, and air traffic, while the passengers are isolated. The passengers on the intercom circuit two can hear auxiliary audio (for example from mp3 player) and can communicate with each other.

External "ISOL" input provides possibility to switch between ALL mode and ISOL mode. If the /PTT1 input is active and ISOL is active the passenger intercom operation on second intercom circuit is still possible.

While transmit mode intercom operation is degraded. During receive mode the intercom operation activates automatically via VOX (with adjustable threshold), or using the external intercom switch.

If intercom operation is active, the "IC" sign appears in the display.

```
 ┌──────────────────┐
 │     118.005      │
 │ IC               │
 │ SQL  127.000     │
 └──────────────────┘
```
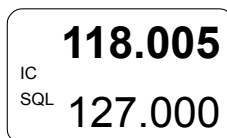
Intercom Operation via VOX

Via VOX, the intercom operation is automatically activated (threshold adjustable in the intercom menu). With additional RCU6201, VOX threshold for the first intercom circuit is adjustable from primary controller (AR620X or RCU6201) and for the second intercom circuit from second controller RCU6201.

Intercom activation via VOX is not possible if:

- It is enabled
- User switched the VOX off

In both cases, VOX is disabled and the display shows the ✗ sign to indicate that activation via VOX is not possible.

Intercom Operation via Intercom Switch

Via intercom switch (pin P1-7) independent of VOX or speaker status (enabled/disabled) the intercom operation can be activated externally. The external intercom switch has priority. During intercom operation the speaker output is disabled.

2.11. VOX & Speaker Operation

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

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

```
◁     118.005
◁
SQL   127.000
```

With active enabled speaker in audio configuration, VOX is always forced to "OFF" and intercom via VOX is not possible (to avoid oscillation of VOX due to acoustical feedback).

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).
- Power is below 10 V.

2.12. Menus

During normal operation in one of the frequency selection modes, the following menus are available:

- The Intercom menu allows adjustment of intercom volume and VOX threshold.
- The Pilots menu allows adjustment of panel brightness and squelch threshold.

2.12.1. Intercom Menu

A long press (2 s) on "IC/SQL" key activates the intercom menu. In this menu a short press on "IC/SQL" key provides toggling between the pages.
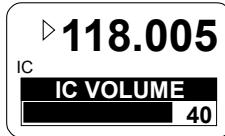
The intercom menu consists of two pages:

- IC VOLUME,
- IC VOX.

A long press on "MDE" key terminates intercom menu, otherwise the menu automatically terminates after 5 seconds timeout.

Intercom Volume Menu

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

▷**118.005**
IC
IC VOLUME
40

By means of the "ROTARY ENCODER", the intercom volume is changeable from zero to 46. The intercom volume setting affects the intercom audio and side tone signal, routed to the headphone.

The changes become active immediately.

Intercom VOX Menu

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

▷**118.005**
IC
IC VOX
6
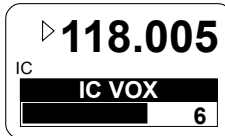
By means of the "ROTARY ENCODER" the intercom VOX threshold can be changed from -30 (most sensitive, even a very low microphone signal already triggers the VOX threshold for Intercom operation) to +10 (VOX is less sensitive and only high microphone signals trigger the VOX threshold for intercom operation).

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

By changing VOX threshold level to above +10, VOX switches "OFF". In this case, "OFF" replaces the numerical value indication.

The changes become active immediately.

▷118.005

IC

IC VOX

OFF

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 is not adjustable if VOX forced to be "OFF" (due to enabled speaker in current audio configuration).

In tandem installation the "first" controller adjust VOX threshold for first intercom circuit, and the second controller RCU6201 adjust VOX threshold for second intercom circuit.

2.12.2. Pilots Menu

Press the "MDE" key for 2 seconds to start the pilots menu. Toggling between the pages by a short press of the "MDE" key, or by a short press of the "ROTARY ENCODER".

The pilots menu consists of two pages:

- BRIGHTNESS.
- SQUELCH TRH,

To exit the pilots 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,

BRIGHTNESS

The active frequency appears in the top line of the display "BRIGHTNESS" label appears in combination with a bar graph and the selected value.

▷118.005

IC

BRIGHTNESS

96

The panel brightness for display illumination and push buttons 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 aircraft dimming circuit controls the brightness parameters.**

SQUELCH

A short press on the "ROTARY ENCODER" provides "SQUELCH" trigger level adjustment. The active frequency appears in the top line of the display. On the bottom line "SQUELCH" with bar graph and value is indicated.
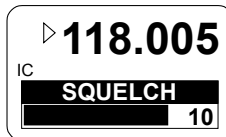
By means of the "ROTARY ENCODER", the squelch threshold is adjustable:

- At a setting to 6 (very weak signals are audible with high noise content; squelch opens at about -105 dBm).
- At a setting to 26 (only quite strong signals are audible with low noise content; squelch opens at about -87 dBm). With this adjustment the receiver sensitivity is significant reduced.

2.13. Warning and Failure Indications

Display Contents	Description
118.005 IC **LOW BATTERY** Appear in 3-second cycle	"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:** Accumulator capacity problems (gliders), Power interrupts, General power supply problems, Setting for low battery threshold too high
118.005 IC **STUCK PTT** Appear in 3-second cycle	"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:** Transmission lasts more than 120 seconds. PTT-key is stuck. PTT line permanently grounded (short circuit in installation).
118.005 IC **TX HOT** Appear in 3-second cycle	"TX HOT" is indicated if the internal device temperature exceeds +90 °C. Transceiver is still operable. Performance of transmitter is reduced. **Possible reasons:** Very hot environmental temperature, long transmissions times and insufficient airflow conditions.
118.005 IC **FAILURE** Appear in 3-second cycle	The transceiver has detected an internal failure during normal operation. Depending on failure reason, the device may still be operable with degraded performance, or not operable at all. **Possible reasons:** Specified environmental conditions HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**

Display Contents	Description
FAILURE PRESS ANY KEY	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:** Outside specified environmental conditions HW or SW failure inside the transceiver. **Contact maintenance shop for assistance.**
FAILURE	The transceiver has no communication with the controller. Depending on failure reason, the device may be still operable with degraded performance or not operable at all. **Possible reasons:** Problem with inter-wiring **Contact maintenance shop for assistance.**

In case of additional questions contact your local BECKER dealer or forward your request direct to BECKER "Product Support Department".
In the event of damage or a defect, the entire device must be returned for repair. The repair must be made by trained BECKER personnel.

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3. Index

We reserve the right to make technical changes.
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*** End of the Document ***