

RGONE V6

Shortwave amateur transceiver Operating manual



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1. Introduction

RGO ONE is classic superheterodyne down conversion HAM transceiver covering all HF bands 1.8 - 29.7MHz (160/60m as an option). Due to its modular construction it can be easily modified or redesigned in manner that suits operator. This kit is intended for users that like building their own homemade equipment and constructions.

Here are some of the feature highlights:

QRP/QRO output 5 – 50W

All mode shortwave operation – coverage of all HAM HF bands (160m/60m optional)

High dynamic range receiver design including high IP3 monolithic linear amplifiers in the front end and H-mode first mixer.

Low phase noise first LO – SI570 XO/VCXO chip.

Full/semi (delay) QSK on CW; PTT/VOX operation on SSB. Strict RX/TX sequencing scheme. No click sounds at all!

Down conversion superhet topology with popular 9MHz IF

Custom made crystal filters for SSB and CW and variable crystal 4 pole filter – Jones type bandwidth 200...2200Hz

Fast acting AGC (fast and slow) with 134kHz dedicated IF

Stylish and professional look

Compact and lightweight body

Custom made multicolor backlit FSTN LCD

Custom molded front panel with ergonomic controls.

Silent operation with no clicking relays inside - solid state GaAs PHEMT SPDT switches on RX (BPF and TX to RX switching) and ultrafast rectifying diodes (LPF)

Modular construction – Main board serves as a “chassis” also fits all the external connectors, daughter boards, inter-connections and acts as a cable harness.

Optional modules – Noise Blanker (NB), Audio Filter (AF), ATU, transverter XVRT
PC control via CAT protocol via USB port; Additional TTL CAT port (not available for first batch main boards);

Double CPU circuitry control for front panel and main board – both field programmable via USB interface.

Memory morse code keyer (Curtis A, CMOS B, ULTIMATIC); 4 Memory locations 128 bytes each;

Contest and DX pedition conveniences – XFC function in SPLIT, RIT/XIT function

2. Specifications

Test conditions: Supply voltage 13.8V, temperature 20C, antenna output terminated with 50ohm dummy load

General:

Size:	Cabinet: H 80mm; W 200mm; D 194mm (H 3.2"; W 7.9"; D 7.6") Overall: H 90mm; W 200mm; D268mm (H 3.5"; W 7.9"; D 10.6") (including optional fan cradle)
Weight	2.670kg (5.9lbs.) (including optional fan cradle and weighted tuning knob)
Construction	Rigid steel bottom and top covers. Molded front panel. Aluminum back and heatsink. Collapsible tilt stand and rubber feet.
Supply voltage	11 – 14.5VDC
Current drain	Receive 0.65A with RX preamp ON (without options installed) Transmit 10.5A typical @ 50W output power Current alarm at 12A
Radio topology	Single conversion superheterodyne receiver/transmitter with 9MHz IF
Oscillators	First LO – Silicon Labs SI-570 low phase noise programmable XO/VCXO Second generator – BFO/ PITCH/BEEP tones – SI5351 CMOS clock generator/VCXO
Frequency drift	Less than 50Hz total from cold start at 20°C; Temperature compensation built in
Frequency steps	1Hz, 10Hz, 100Hz, 1kHz. Frequency direct entry via keypad
Main encoder tuning rate	512/256 ppr. (256ppr. is not possible with sw ver.1.xx)
Speed of tuning	5.12kHz per revolution when 10Hz step is selected
RIT/XIT range	±5kHz with step of 10Hz
Bands, MHz*	Basic kit: 3.5-4.0, 7.0-7.3, 10.1-10.15, 14.0-14.35, 18.068-18.168, 21.0-21.45, 24.89-24.99, 28.0-29.7 160m option: 1.8-2.0 60m option: 5.25-5.45
Working modes	LSB, USB, CW, CW-R
Antenna impedance	Unbalanced 50 ohm
Display	LCD type - FSTN positive 149 segments 4 common lines Polarizer type – transreflective
USB UART interface	On board MB microprocessor embed generic USB interface. Speed 9600 - 56300bps. In FLASH mode works as Mass storage device.

Receiver

Sensitivity (MDS)	-135dBm (preamplifier On; VBF filter 2) -129dBm (preamplifier Off; VBF filter 2)
Selectivity	Crystal 8 pole 2.7kHz first roofing filter at 9MHz 0.2-2.2kHz second variable bandwidth filter Jones type 9MHz Crystal 2-pole IF noise filter 9MHz
Dynamic range	Two tones close spaced (2kHz): 96db (Preamplifier On; VBF filter 2) 99db (Preamplifier Off; VBF filter 2)
Audio	2W at 8 ohms internal speaker Rear panel 3.5mm (1/8") jack for external speaker Front panel jack 3.5mm (1/8") for headphones 8 – 32 ohms
IF frequency	9MHz (Other frequencies can be used. Firmware calculate LO&BFO frequencies)
Crystal filters	Three type of filters are used – First roofing filter – 8 pole 9MHz; second (optional) 4 pole variable bandwidth filter Jones type 9MHz; third 2 pole noise filter 9MHz
Noise Blanker	NB is optional plug-in accessory. IF type. 50db blanking range
Audio Filter	AF is optional plug-in accessory. Follows selected bandwidth

Transmitter

Power output	50W on CW; 40W PEP on SSB. Adjustable output 0 – 50W by steps of 1W
T/R switching	Clickless quiet diode switching. PTT/VOX on SSB QSK/Delay (10ms – 1.2s) on CW
CW sidetone	Internally generated – Pure sinusoidal signal formed same manner as the CW signal. Adjustable frequency (400-800Hz) and volume.
SSB method	Balanced modulator with suppressed carrier, 2.7kHz ladder type 8 pole crystal filter (Same filter used on RX). Tracking ALC scheme holds the PEP power in assigned limits.
Microphone	Standard electret microphone with bias
Carrier suppression	45dB minimum
Sideband suppression	50db minimum
Spurious products	less than -47dBc
Harmonic content	less than -45dBc
Intermodulation distortion IMD3 products on SSB @ 40W	-29dBc on 28MHz -31dBc on 14MHz
Duty cycle	50W - 50%; 20W – 100% (with optional fan cradle)
Load mismatch	VSWR<2 safe operation VSWR>2 fold back procedure is initiated VSWR>3 Forward power is turned down to 20W or less and current to 6A maximum

Optional Fans	Mounted on metal bracket screwed to back heatsink. Variable speed control for quiet and optimal operation. Fans run above 35°C and switch off at 32°C
METER	Various parameters during TX can be showed and measured: Current, Forward and Reflected power (SWR), LPF diodes cut voltage, ALC level.
Keyer	
Keying modes	Iambic – Curtis A, CMOS B, Ultimatic modes, Straight key USB keying via DTR and RTS lines (on/off in menu)
Speed range	5 – 45 WPM
CW memory	4 locations 128 bytes each; CW beacon function

*Performance of RGO ONE transceiver degrades significantly outside HAM bands although reception and tuning is continuous.

3. Before operation

3.1. Front panel controls

RGO ONE transceiver is operated by 15 buttons, three mechanical encoders, main dial optical encoder, one dual concentric potentiometer AF/RF (10kohm/logarithmic + 10kohm/linear). The equipment has large custom multicolor backlit FSTN liquid crystal display (LCD) and two red LEDs, so various parameters like frequency, modes, signal strength and others can be displayed. Front panel is shown on fig.1

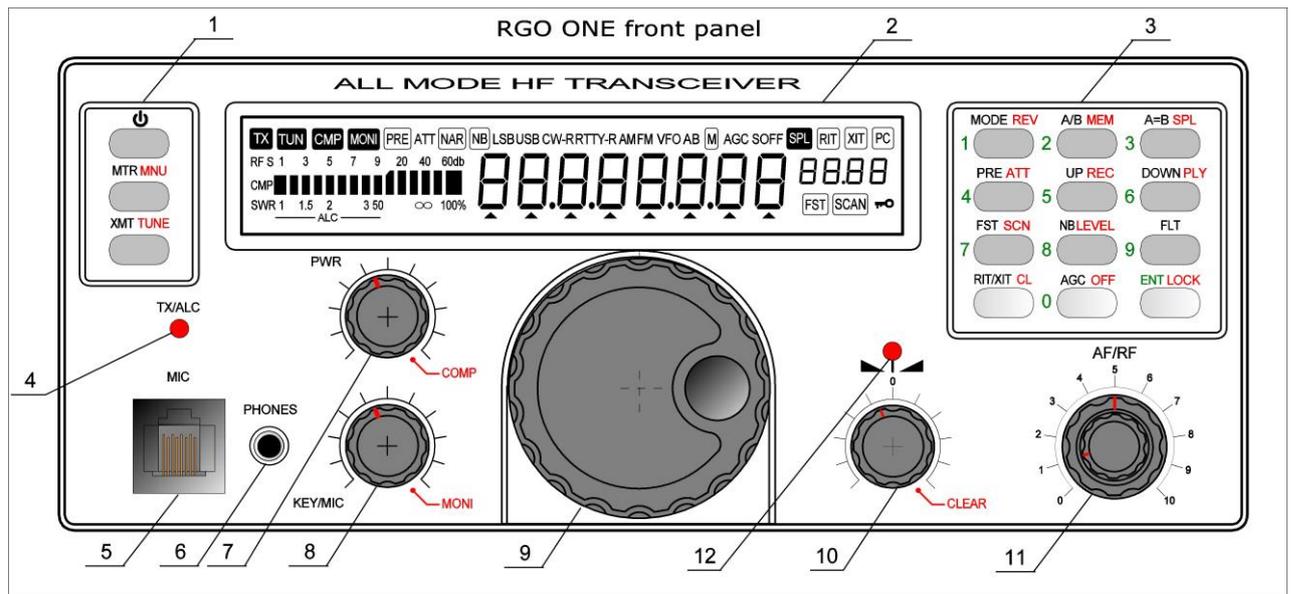


fig.1

1. On/Off/meter/tune buttons
2. LCD
3. Numeric/function buttons
4. TX/ALC LED indicator
5. MIC connector
6. Phones 3.5mm jack
7. Power/Bandwidth/Compression level knob - Encoder 1
8. Key speed/Mic gain/Monitor level knob - Encoder 2
9. Main dial frequency knob – Encoder 4
10. RIT/XIT/Function parameter knob - Encoder 3. Notch filter control if AF option board is installed.
11. Dual concentric potentiometer for audio (AF) volume (inner knob)/RF gain control (outer knob)
12. RIT/XIT LED red indicator. Glows green when CW auto tune function is active. (if optional AF board is installed)

3.2. Rear panel view

The rear panel consist of power supply Anderson power pole connector, SO-239 antenna connector and other interface connectors. Rear panel is shown on fig.2

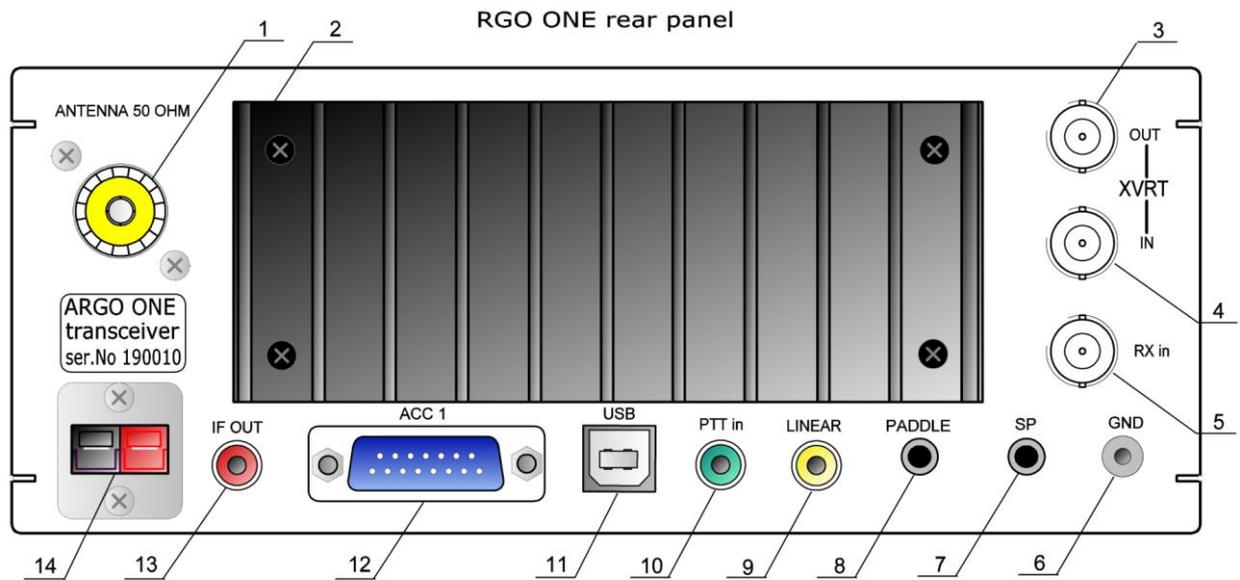


fig.2

1. Antenna socket – SO239
2. Power amplifier heat sink (Optional fan cradle is not shown)
3. Optional XVRT unit output (might be covered if option not installed)
4. Optional XVRT unit input (might be covered if option not installed)
5. RX receive antenna connector (might be covered if option not installed)
6. Ground post
7. External speaker 3.5mm jack
8. Electronic keyer paddle/straight key 3.5mm jack
9. Linear amplifier control line (RCA connector)
10. PTT in control line
11. USB connector
12. Accessory connector ACC1
13. IF out connector for panoramic indicator
14. Power supply 13.8V connector (Anderson power pole)

4. Installation

4.1. General

Choose an operating location that is dry and cool. Allow adequate ventilation around the heat sink on the rear panel and sides of the transceiver.

For normal intermittent transmission, such as casual SSB or CW, natural convection cooling is all that is required. When transmitting for long period of time and with high duty cycle, such as in digi modes, it is recommended optional fan cradle to be installed onto the rear heat sink.

4.2. Connections

4.2.1. Power requirements

Stabilized power supply of 12-14V DC capable of supplying 12A, negative ground is required. Battery operation: RGO ONE can work on battery, when the voltage does not fall below 11V.

4.2.2. Antenna

Any matched 50 ohm unbalanced antenna can be used with RGO ONE. Antennas with open end or random length wire antennas will require matching system or/and good grounding or placing good counterpoises otherwise stray RF energy and/or poor SWR may damage the equipment. Placing proper BALUN between antenna and the feeder is highly recommended (fig.3).

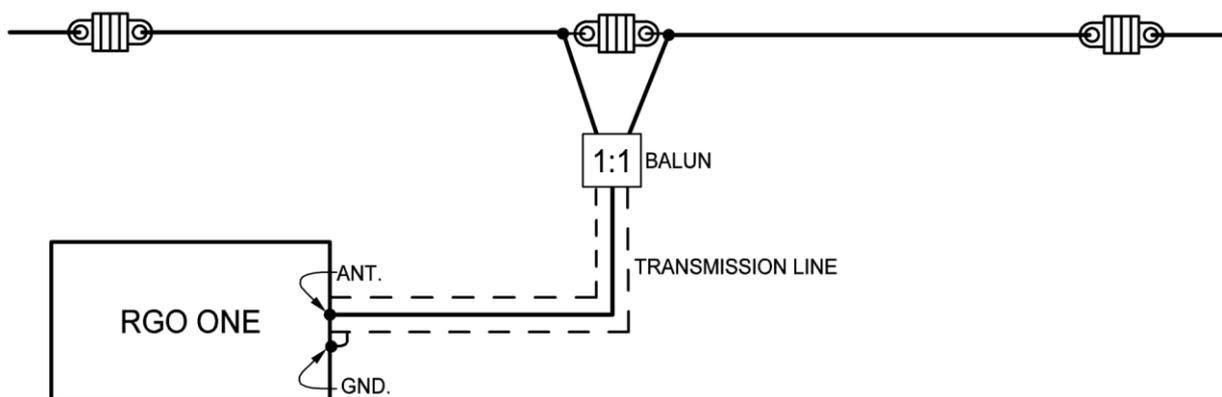


Fig.3

5. Controls and Periphery

5.1. Paddle/straight key – rear panel

Any type of hand key, paddles, or external keyer can be plugged into the 3.5mm stereo KEY jack.(illustrated on rear panel - no.8). Key connections shown on Fig.4

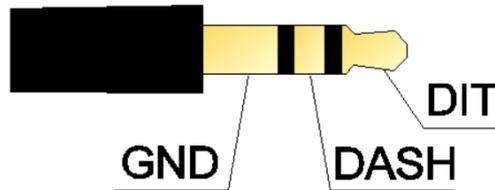


Fig.4

5.2. Microphone

Standard electret microphone with bias is used. It can be connected via RJ-45 socket on the front panel.

MIC socket front view

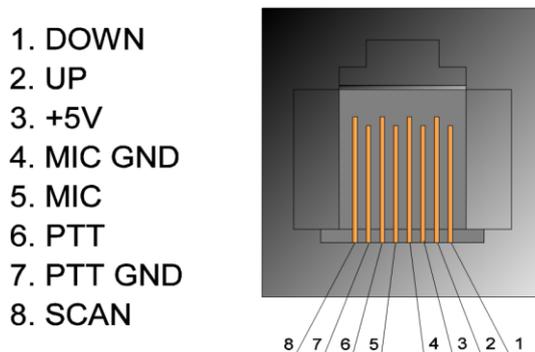


Fig.5

5.3. Headphones – front panel

Any type (4 Ω - 32 Ω) stereo phones with 3.5mm jack can be used

5.4. External speaker – rear panel

RGO ONE has internally built in speaker 4 Ω /5W but external speaker can be connected also via “SP” jack on the rear panel.

5.5. ACC1 - accessory connector – rear panel

ACC1 DB15 connector front view

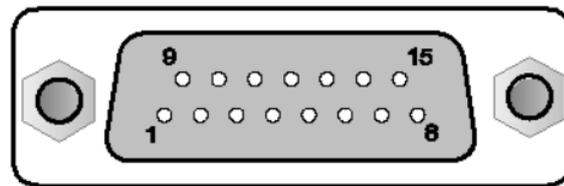


Fig.6

Pins:

- 1 – 13V
- 2 – VC. Front panel supply voltage
- 3 – Not in use
- 4 – TTL CAT port ground
- 5 – TTL CAT port TX line
- 6 – TTL CAT port RX line
- 7 – CWK signal – CW keying from external source (PC)
- 8 – PTT (Push to Talk)
- 9 – LINE IN “-“
- 10 – LINE IN “+“
- 11 – LINE OUT
- 12 – 8V RX
- 13 – 8V TX
- 14 – External Power ON
- 15 – Ground

5.6. Liquid Crystal Display (LCD)

The LCD shows the operating frequency and other parameters like S-meter level on receive, working mode, RF power output, ALC meter on transmit and other (fig.6)

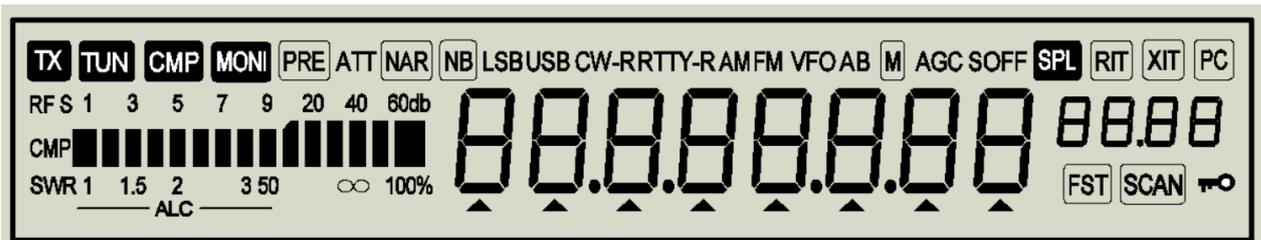


Fig.6

Icons on the LCD (activated when icon is lit)

TX – Indicates transmit mode

TUN – Tuning procedure is initiated or optional tuner is presently working

CMP – Optional SSB compressor unit is activated

MONI – Monitoring own signal on transmit. Can be activated with CW/phone modes

PRE – First receiver preamplifier is switched on

ATT – Receiver 12db attenuator is activated

NAR – Narrow variable bandwidth Jones filter is activated

NB – Optional pulse noise blanker (NB) unit is activated

LSB – lower side band mode

USB – upper side band mode

CW – Continuous wave – morse code (telegraph) mode

CW-R - Continuous wave – morse code (telegraph)mode in reverse mode.(Receives LSB)

RTTY – Digital modes (not active with sw ver. 1.XXX)

RTTY-R Digital modes reverse (not active with sw ver. 1.XXX)

AM – Amplitude modulation mode (not active with s/w ver. 1.XXX)

FM – Frequency modulation mode (not active with s/w ver. 1.XXX)

VFO A – variable frequency oscillator tuning A

VFO B - variable frequency oscillator tuning B

M – memory mode

AGC – Fast acting AGC (automatic gain control) is selected

AGC S – Slow acting AGC (automatic gain control) is selected

AGC OFF – AGC (automatic gain control) is deactivated

SPL – Split frequency mode is used

RIT – Receiver incremental (Fine) tuning. 4 digits sub LCD

XIT - Transmitter incremental (Fine) tuning.

PC – Radio is connected with PC via USB

RF - RF power scale 0 – 100%

S – S-meter scale from S1 to S9 +60db

SWR – Standing wave ratio scale

ALC – Transmitter automatic level control working zone

FST – Fast tuning is activated >100Hz per revolution of main dial

SCAN – Frequency/channel scanning

 – Lock function

5.7. Front Panel buttons

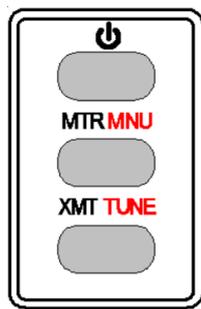
RGO ONE has two keyboards: Left of display for on/off, menu and tune buttons; Right of LCD is situated numeric keypad

Buttons designations have three colors:

Black – The function is activated with short press of a button

Red – Function is activated when the button is pressed and hold for more than a second

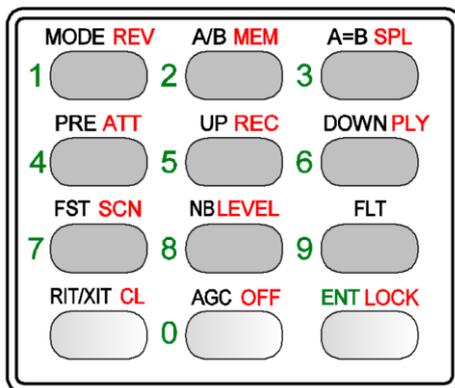
Green – Numeric keypad. Numbers from 0 – 9 can be entered in direct frequency entry mode



Power on/off – Short press  button to switch on the transceiver; Long press this button to switch it off

Meter/Menu – Short press of MTR MNU scrolls different parameter measures. Long press enters in MENU

Transmit/Tune – Short press of XMT TUNE turns the transceiver on transmit; Long press starts tuning procedure



MODE REV – Short press selects between CW and SSB modes; Long press enters reverse mode – CW to CW-R or LSB to USB

A/B MEM – Short press toggles between VFO A and VFO B. Long press enters in MEM mode

A=B SPL – Short press copies contents of the active VFO to the inactive VFO; Long press enters in SPLIT mode operation (SPL icon on LCD is lit)

PRE ATT – Short and long press activates receiver preamplifier and attenuator accordingly (relevant icon on LCD is lit)

UP REC – Short press changes frequency to the next upper band in VFO and to the next upper memory location in memory mode; Long press starts CW memory recording.

DOWN PLY - Short press changes frequency to the next lower band in VFO and to the next lower memory location in memory mode; Long press starts CW memory play (long press DOWN PLY followed by the number of the memory 1 – 4).

FST SCAN – Short press toggles between steps 1Hz-10Hz-100Hz-1kHz. FST icon lights up when 100Hz and 1kHz steps are selected; Long press activated VFO/MEMORY scanning. SCAN icon lights up on LCD (function does not work with firmware ver. 1.XXb)

NB LEVEL – Noise blanker control. Short press toggles NB on/off. Long press adjust blank parameters. (Optional NB unit must be installed)

FLT – Short press toggles optional filter on/off. Long press toggles on/off of APF audio peak filter. (AF module must be installed)

RIT/XIT CL – Short press toggles RIT-XIT-RIT XIT-off and quits without saving when in menu. Long press clears RIT/XIT offset.

AGC OFF – Short press toggles AGC decay time fast and slow. Relevant icons on LCD are lit. Long press disengage receiver automatic gain control – AGC OFF.

ENT LOCK – Short press enters in direct frequency entry mode. Long press locks frequency changes with main encoder 4.

5.8. ENCODER functions and buttons

Encoder 1 – Power control

Adjusts power, filter bandwidth, compression level

Button short press toggles between power and bandwidth.

Button long press toggles between pwr/bandwidth and compression level.

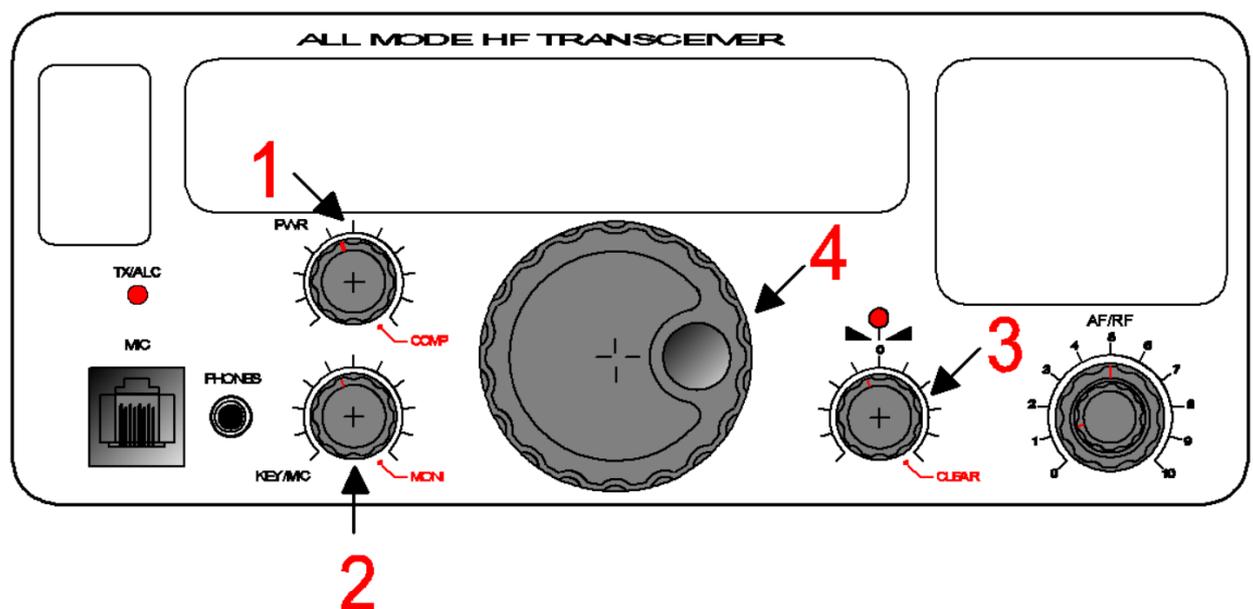


Fig.7

Encoder 2 KEY/MIC MONI controls

Keyer speed control when in CW mode – default (5-45WPM)

MIC gain control when in phone modes – default
Short press toggles between MIC gain and KEYSER speed
Long press sets monitor level control both for CW/phone modes

Encoder 3 RIT/XIT

Adjusts RIT/XIT value (shown on sub display)

Scrolls functions in MENU mode.

Scrolls channel in MEMORY mode.

Controls NOTCH filter frequency (when AF unit is installed).

Scrolls menu entry when in MENU mode

Button short press:

- When in MENU discards changes made and leaves the menu
- When RIT/XIT function is on deletes assigned frequency offset
- When AF unit is installed activates CW AUTOTUNE search feature

Button long press:

- Deletes memory channel when in MENU mode MEM
- When AF unit is installed initiates AUTONOTCH feature

Encoder 4 Main frequency dial

Frequency adjust when in VFO mode. Frequency step is selected with short press of a FST SCAN button.

Scrolls function parameters when in MENU mode

6. MENU structure

Long press of MTR MNU button enters configuration menu. Long press of MTR MNU button stores parameters changed and leaves the menu

Short press of a RIT/XIT CL button discards changes made and leaves menu

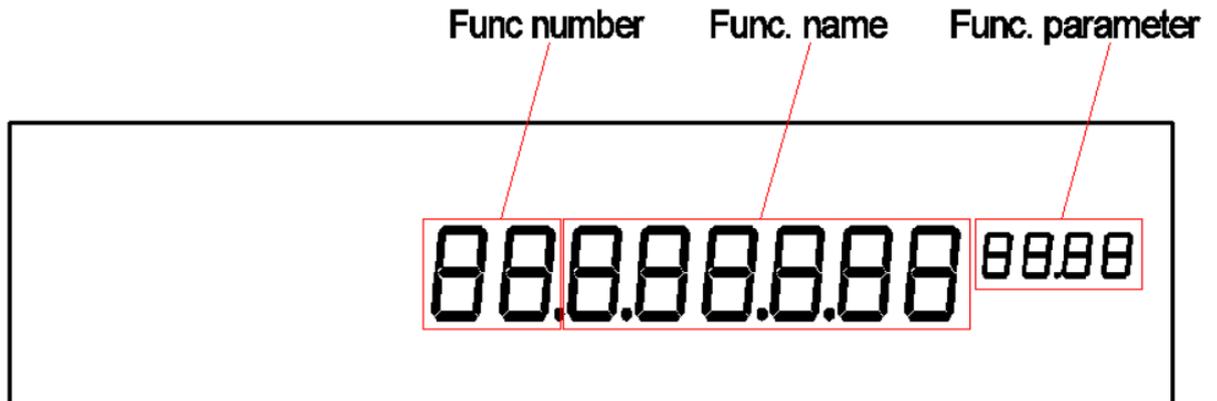


Fig.8

Function selection is controlled by rotating of encoder 3

Parameter selection is controlled by rotating main dial 4

01 TUNE Power

Assigns tune power when manual/auto tune is activated

01 tunEP 5 ——— | 5 — 5 W ← default
Watts

02 LINE IN

Transmitter audio input from external devices enable/disable (see ACC1 connector fig.6). Enables LINE IN 600ohm microphone input from external device (PC), internal USB audio codec or from front panel microphone input. Values are:

oFF – front panel microphone is selected;

int – internal USB_AUD audio codec device is selected;

E – external device is selected;

02 L inE 1 oFF ——— | oFF ← default
oFF int E

03 Channel or Frequency in MEMORY mode

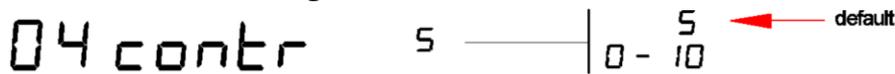
In memory mode LCD shows frequency or channel number

This function is not active in firmware version 1.XXX

03 chFrEQ FrEQ ——— | FrEQ ← default
ch

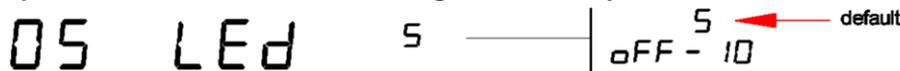
04 CONTRAST/BRIGHTNESS

Sets LCD contrast/brightness



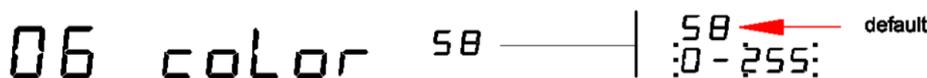
05 LCD LED backlight intensity

Adjusts LED multicolor backlight intensity or switches off



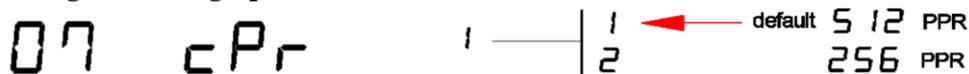
06 LCD backlight color

Selects backlight color 0 - 255



07 MAIN dial knob counts per revolution CPR rate

Assigns tuning speed of the main dial (Not selectable in sw ver.1.XXX)



08 MEMORY WRITE

Stores VFO A/B and other parameters in specified memory location



Memory number blinks if empty

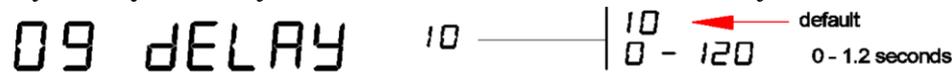
Long press of RIT/XIT CL button or Encoder 3 button clears selected memory location

Long press of Encoder 3 deletes current memory location

Long press of A/B MEM button stores selected memory

09 QSK DELAY TIME/VOX DELAY TIME

Adjusts QSK delay time in CW mode and VOX delay time in Phone modes



Delay times can be adjusted independently per mode (SSB/CW). Default values are 100mS for CW mode and 500mS for phone modes

10 VOX GAIN

Adjusts VOX GAIN in phone modes



Off – switches off VOX circuitry

11 CW KEYER Iambic mode

Selects Curtis A, super CMOS B or Ultimatic keyer mode

11 IAb b ——— | b A b U ← default

12 CW KEYER weight ratio

Sets DOT/SPACE ratio from 0.9 – 1.25

12 rAt 10 1.10 ——— | 1.10 0.9 - 1.25 ← default

13 CW paddle input

Selects paddle type: Normal; Reverse; Hand key

13 PAdDLE nor ——— | nor nor r hAnd ← default

14 - 17 CW Message 1 - 4

Stores a message sent via paddle – up to 48 symbols. The radio reads the symbol sent via paddle and decrease the counter. To store a message long press UP REC button followed by the number of the memory 1-4. To play a message long press DOWN PLY button followed by the number of memory 1-4.

14 codE 1 48 ——— | 48 48 to 0 ← default

18 CW BEACON

Transmits stored CW memories in a beacon style. When finished a new transmission starts after selected time delay. (Not available with firmware ver.1.XXX)

18 bEAcon oFF ——— | oFF 0 - 10 ← default

19 CW PITCH

CW pitch offset/tone set in 10Hz increments

19 P itch 600 ——— | 600 400 - 800 ← default

20 METER Peak hold

Meter peak hold ON and OFF. Freezes the highest lit segment on S-meter/RF meter for certain time

20 P hold on ——— | on oFF ← default

21 SQUELCH level

Adjusts SQL level or swtich OFF the function.(Not active with sw ver.1.XXX)

21 59L OFF | OFF ← default
OFF 1-10

22 CAT port

Sets serial port communication speed. Affects only speed of TTL CAT port led on ACC1 (pin4,5,6) connector on back side of the transceiver. USB communication is not affected by this parameter

22cAt-Pc 1920 | 1920 ← default
1920 - 5760

Available communication rates: 9600bps; 19200bps; 38400bps; 56000bps; 57600bps

23 FILTER 1 Center frequency offset

Main crystal filter center frequency offset adjust (-4.99kHz - +4.99kHz)

23F 1-SEt 0.00 | 0.00 ← default
-4.99 - 4.99

24 FILTER 1 Bandwith

Sets crystal filter bandwidth at -20dbc

24F 1-b 2900 | 2900 ← default
0000 - 9999

25 FILTER 2 Center frequency offset

Optional filter center frequency adjust (-4.99kHz - +4.99kHz; off)

25F2-SEt 0.00 | 0.00 ← default
-4.99 - 4.99 OFF

26 FILTER 2 Bandwith

Sets crystal filter bandwidth at -20dbc

26F2-b 2900 | 2900 ← default
0000 - 9999

27 FILTER A Center frequency offset

Optional filter center frequency adjust (-4.99kHz - +4.99kHz; off)

27FA-SEt -0.90 | OFF ← default
OFF -4.99 - 4.99

28 FILTER A Bandwith

Sets crystal filter bandwidth at -20dbc

28FA-b 1200 | 1200 ← default
0000 - 9999

29 FILTER B Center frequency offset

Optional filter center frequency adjust (-4.99kHz – +4.99kHz; off)

29 Fb-SEt - 1.35 ——— | - 1.35 ← default
-499 - 499 OFF

30 FILTER B Bandwith

Sets crystal filter bandwidth at -20dbc

30 Fb-b 420 ——— | 420 ← default
0000 - 9999

31 Keybard BEEP

Level control and BEEP on/off

31 bEEP 1 ——— | 1 ← default
1- 10 OFF

32 DTR signal – External CW keying on/off

USB port DTR signal can be assigned as a CW keying output

32 dtr OFF ——— | OFF ← default
ON

33 RTS signal – External PTT control on/off

USB port RTS signal can be assigned as a PTT line

33 rts OFF ——— | OFF ← default
ON

34 Optional internal ATU module on/off

34 AtU OFF ——— | OFF ← default
ON

Rotating main dial knob toggles ON/OFF (Engaged/bypass mode) of ATU

35 Noise blanker pulse width selection (See NB manual)

36 Noise blanker threshold value (See NB manual)

37 Software version

Shows current firmware versions

37 SoFt 1.203

38 Software (firmware) update of MB/FP microcontrollers.

Flash update procedure for MB and FP microcontrollers. USB connection to a PC is needed!

38 FLASH NO ——— | NO YES ← default

Connect USB cable between transceiver and the PC , select YES and exit the menu with long press of MTR MNU button.

Green LEDs TX/ALC and RIT/XIT will start blinking. UPLOAD label is shown on LCD!

On the screen on your PC – a new removable hard drive called RGO ONE will appear. Drag and drop (copy) both MB and FP files to this removable disk. Safely eject the drive then disconnect USB cable.

Then switch off the radio and switch on again. TX/ALC and RIT/XIT LEDs will start glow in red. LCD shows “Flashing”. It takes a minute do complete FW upload. Ensure stable power supply and do not turn off the power supply! After successful flash update the radio turns on in normal operation. (See Firmware update manual for more details). After successful flash update menu 37 will show new version of the software.

39 USER Reset

Clears all memories and operator’s adjustments

39 RESEt NO _____ | NO YES  default

Select YES and exit with MTR MNU button in order to complete the function

40 FULL Reset

Clears all settings and user memories to factory default values. This menu entry is not accessible in normal operation. In order to reveal the menu long press ENC.2 button while switching on the transceiver.

40 FULLRES NO _____ | NO YES  default

CAUTION! By this operation some essential adjustments might be erased avoiding the unit to work properly.

41 Transmit prequel time adjust

Adjust transmitter prequel time to ensure safe and reliable work for the external power amplifier. Some tube amplifiers may need longer time to set their circuitry on transmit. In this menu entry you can set this time from 6 – 18 mS which is enough for PA output relay to be set before RF envelope enters amplifier input.

41 trd 10 _____ | 10 6 - 18  default

42 Optional Audio Filter (AF unit) on/off

Switches on and off (bypass) internal DSP audio filter unit. If the board is missing this menu is not active. For more information see RGO ONE AF unit manual.

42 AF OFF _____ | OFF ON OFF  default

43. CW tune autonune function

CW tune (spot) and autotune functions are available via optional AF unit. For more details see RGO ONE AF unit manual.

43 ctune OFF ———| OFF ← default
 on OFF Auto

44 Noise reduction NR

Noise reduction function is available only if optional AF unit is installed. For more details see RGO ONE AF unit manual.

44 nr OFF ———| OFF ← default
 OFF 0d - 5d - 10d - 15d
 :- 20d - 25d - 30d:

45 Audio peak filter APF

APF function is available only if optional AF unit is installed. For more details see RGO ONE AF unit manual.

45 APF OFF ———| OFF ← default
 OFF 8db 10db 12db

46 Notch filter auto notch functions.

Notch filter is available only if optional AF unit is installed. For more details see RGO ONE AF unit manual.

46 notch OFF ———| OFF ← default
 on Auto

47 CW keyer auto-spacing function on/off

Electronic keyer auto-spacing function. When switched on corrects space lag between CW characters .

47 AutoSP OFF ———| OFF ← default
 on

7. Transceiver Operation

7.1. *Switching ON and OFF*

Make sure the transceiver is connected to 13.8V power supply.

Tap shortly  button to switch on the transceiver

Press and hold  button to switch it off

7.2. *VFO A/B mode operation*

RGO ONE has two independent VFO's with many parameters and adjustments stored in. With short press of A/B **MEM** button each of them can be selected. LCD shows VFO selected. Short press of A=B **SPL** copies contents of active VFO to the inactive VFO. In this mode of operation the frequency can be tuned continuously by main dial optical encoder 4 (fig.7). Available steps (tuning rates): 1Hz; 10Hz; 100Hz; 1kHz. At 100Hz and 1kHz steps  icon appears on the LCD. Buttons UP **REC** and DOWN **PLY** moves to the next upper or lower band respectively. Besides using main dial knob for frequency change a direct frequency entry is available via numeric keypad 3 (fig.1). Short press of **ENT LOCK** button activates direct frequency entry mode. Then enter the frequency starting with most significant digit. Then short press **ENT LOCK** again to store and display new frequency. For example if you need to put 14.150.00 Mhz – press **ENT LOCK** shortly then tap **1 4 1 5** buttons on numeric keypad and press **ENT LOCK** again. The new frequency will be displayed on LCD.

7.3. *SPLIT mode operation*

Split mode allows different receive (RX) and transmit (TX) frequencies to be used. Long press A=B **SPL** s and active VFO will display receive frequency. Transmit frequency will be determined from inactive VFO.

XFC tune feature – When in split mode by pressing and holding A/B **MEM** button transmit frequency becomes receive frequency. Then with main dial the frequency can be tuned exactly on the place where the DX station is listening. Then release the button and transmit on that frequency.

7.4. *MEMORY mode*

RGO ONE has 100 memory channels. Long press of A/B **MEM** enters memory mode. All needed parameters like modes, frequency, filters modes etc. are saved in memory locations. Short press of UP **REC** and DOWN **PLY** buttons or rotating encoder 3 scrolls memory channels.

MEMORY write: Exit MEMORY mode if needed by long press of A/B **MEM** button and enter MENU by long press of MTR **MNU** button. Rotate encoder 3 or short press of UP **REC** and DOWN **PLY** buttons until reach menu 8. On the sub display first free memory location will be shown. Select memory location with main encoder 4 and long press A/B **MEM** button

MEMORY delete: To delete memory location go in menu 8 then select needed memory location with main dial encoder 4 and then long press RIT/XIT **CL** or encoder 3 button. Channel number starts blinking.

MEMORY to VFO transfer function. When in MEMORY mode long press of A=B SPL button transfers MEMORY content to the current VFO.

7.5. Receiver operation

Make sure the equipment is connected to 13.8V power supply and proper antenna adjusted for working band. If external headphones are preferred they can be connected via front panel 3.5mm jack 6 on fig.1. External loud speaker can be connected via 3.5mm jack 7 fig.2 on real panel. For convenient work the radio body can be tilted by supplied flipping bail on bottom lid.

Tuning on frequency

Switch on the radio and tune the frequency with main dial knob, push UP **REC** and DOWN **PLY** buttons or direct enter the frequency via numeric pad.

Mode

Choose desired mode of operation – CW, CW-R, USB or LSB. Short press MODE **REV** button toggles between CW and SSB. Long press of the button toggles CW/CW-R and LSB/USB.

Automatic gain control (AGC)

Set proper AGC delay time by short press of AGC**OFF** button. Usually CW modes require using fast AGC. Phone modes require slow AGC. Sometimes operator may need to turn AGC off – by long press of AGC**OFF** button.

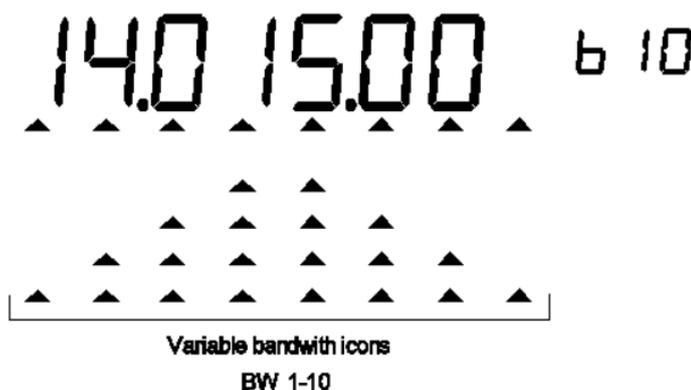
PREamplifier and ATTenuator

For bands higher than 10MHz it is recommended to turn on RF preamplifier with short press of PRE**ATT** button. If the signal is loud and there is too much noises (QRN or QRM) on the band – switching on of internal 12db attenuator is a good decision – long press of PRE**ATT**.

It is not typical to use same time Attenuator and Preamplifier.

Variable bandwidth (Narrow) filter for SSB and CW

Jones 4-pole crystal filter can be switched on by short press of FLT button. A small icon  appears on LCD



Rotating encoder 1 selects various filters from b1 to b10. Also chevron symbols just below operating frequency depicts relatively used bandwidth.

AF/RF gain set

With dual concentric potentiometer 11 (fig.1) adjust proper audio level. Outer knob adjusts receiver RF gain. Inner knob sets audio AF level. Rotating both knobs clockwise increase the gain.

S-meter



Shows signal strength in relative S units:
S1 to S9+60db

7.6. Transmitter operation

It is considered that all receiver adjustments and preferences are done prior transmitting with the equipment.

Connect iambic paddle, straight key 8 fig.2 if you intend to work CW or microphone 5 fig.1 if you intend to work phone.

7.6.1. CW transmit

Key speed – select electronic keyer speed by rotating encoder 2 (5-45WPM). Selected speed in WPM is indicated on sub display.

Side tone (pitch) – Enter menu 19 and adjust desired pitch (default value is 600Hz)

Monitor level – CW sidetone level. Long press encoder 2 until monitor level is shown on subdisplay. Rotate until proper level is adjusted.

Power – short press encoder 1 until power level is indicated on sub display then rotate to set desired output power (5-50W)

Delay – Enter menu 8 and set proper delay time (0 – 1.2S). Full QSK mode is enabled once DELAY time is set to 0.

Start transmitting with the paddle and control RF power output, SWR and ALC level by short press of MTR **MNU** button

7.6.2. SSB transmission

Adjust **MIC gain** level via Encoder 2.

Enter menu 2 - Line In and make sure parameter is OFF

Adjust **monitor level** – Long press encoder 2 button then rotating it adjusts the level between 0 (off) and 10. When value between 1 – 10 is selected **MONI** icon appears on LCD.

Press side button PTT of the microphone and start speaking against the microphone and control ALC level. If TX/ALC LED on front panel flashes too much – reduce mic gain via rotating encoder 2



100%

ALC level must be kept in the zone shown. For better result listen to your signal on control receiver. Excessive drive may cause distortion in the output signal and splatter interference.

VOX operation.

Enable VOX in menu 10. Default value is off. Adjust VOX Gain from 1 – 10. Position 10 is most sensitive and can be activated from surrounding noises.

Enter menu 9 to set the delay on SSB (default is 0.5S)

8. CAT/PC connection.

RGO ONE has built in USB port via MB microcontroller and one TTL CAT UART port led to ACC1 connector on back side of the transceiver that allows PC/CAT connection to various devices as power amplifiers, antenna tuners and other peripheria. USB connection to PC is done via type B connector located on rear panel of the radio 11 (fig.2).

CAT protocol

RGO ONE uses widespread KENWOOD type protocol (modified)

Establish connection.

When the radio and PC are connected check which virtual port has been used (My computer - Device manager – Ports COM and LPT).

Assign same virtual com port in your computer logging/contest program.

If you use TTL port enter menu 22 and select communication speed. Assign same comm speed as in the peripheral device you like to connect to.

DTR, RTS signals

Some logging/contest programs may use UART signals DTR and RTS for CW keying (manipulation) and PTT line control. To enable these functions enter menu32 and 33 and make them ON or OFF. DTR and RTS signals are available only with USB connection. TTL CAT port do not have these lines.

9. Service menu

RGO ONE individual firmware parameters are kept in internal FLASH memory. These bytes of information are sensitive and the unit might not work properly if they are changed without needed knowledge and understanding.

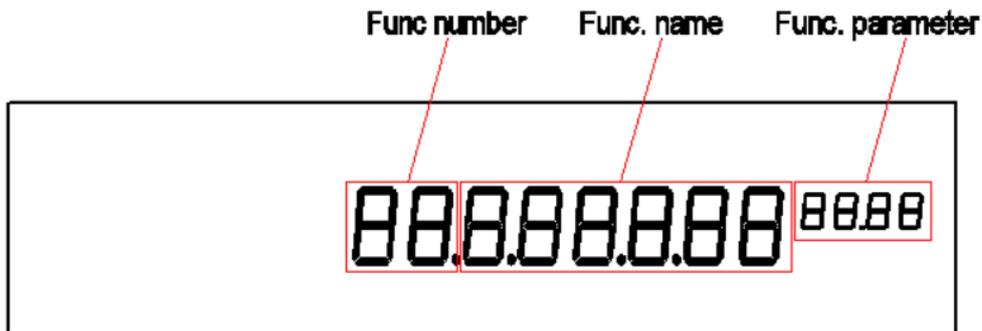
Enter service menu

Press and hold ENC.2 button while switching on the transceiver. Then enter MENU by long press of MTR MNU button. Menu entries between 70 and 83 will be visible now.

Long press of MTR MNU button stores parameters changed and leaves the menu.

Short press of RIT/XIT CL discards changes made and leaves the menu.

It is recommended prior making any changes to the service functions parameters – to write down all values in order to revert the transceiver in factory state.



Function selection is controlled by encoder 3 or UP REC and DOWN PLY buttons. Parameter selection is controlled by encoder 4

70 Frequency calibration (Local Oscillator calibration)

70 F-cAL 654 | 654 ← default
0000 - 9999

71 Center IF frequency

Can be set in steps of 10hz. Default value is 9MHz

71 iF 90 0000 | 900000 ← default
000000 - 999999

72 BFO Frequency calibration

72 bFocAL 906 | 906 ← default
0000 - 9999

73. S-meter FULL scale

73 S-FUL 868 ———— | 868 ← default
0 - 4000

74 S-meter S9

74 S-9 489 ———— | 489 ← default
0 - 4000

75 Final amplifier PA temperature

75 PA-t 26 ———— | 26 ← default
19 - 49

Rotate main encoder 4 to adjust right temperature of the heatsink

76 Current consumption calibration

76 I_c 0.50 ———— | 0.50 ← default

Rotate main dial encoder 4 to adjust right value

77 Supply voltage measured value calibration.

77 U_c 1380 ———— | 1380 ← default

Rotate main encoder 4 to achieve right value

78 Power output 25W calibration. Set power with encoder 1 to 25W

78 P_o-25 371 ———— | 371 ← default
000 - 1000

80 LPF High voltage 210V (Diodes cut off voltage or voltage trippler)

80 210V 14 ———— | 14 ← default

Rotate main encoder 4 until measured value matches displayed value

81. FCAL2 LO (SI570) coarse frequency calibration

81 FCAL2 0 ———— | 0 ← default
-4999 - 4999

Rotate main encoder 4 to calibrate the frequency then use menu 70 to fine tune.

82. LCD test

83. ATU test

10. Operator's practices

10.1. Using CW memories.

RGO ONE has 4 CW Message Slots each holding up to 48 symbols.

CW message store:

Ensure that the radio is in CW or CW-R mode and internal electronic keyer in “n” or “r” mode.

- Long Press the REC button and you see “rEC” message on the display.
- Press Keypad button 1, 2, 3 or 4 which will bring up menu 14, 15, 16 and 17. Max number of characters is 48. This number will decrease as you send each character, number or space. A space character is added if you send just a single character or pause sending between characters.
- Now enter (send/record) the message as normal with your CW key.
- Exit the menu mode by pressing the MNU button.

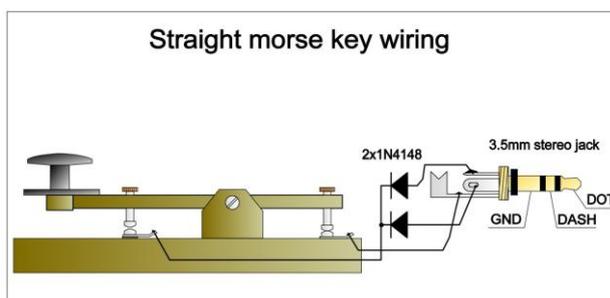
Play a CW message.

- Must be in CW Mode. Long Press PLY.
- Press Keypad number 1, 2, 3 or 4.

The CW message recorded before in that memory will start transmitting. Tapping your CW key will halt the message transmitting.

To replace a CW message - just record over it. If you like to delete it – just exit with MTR MNU button.

10.2. Straight morse key wiring (menu 13 might be “nor” or “r”). If there is a need to connect more than one morse key paddle for example straight key and twin/single lever paddle – user can connect both keys in parallel with simple 3.5mm stereo Y-jack and following the schematic below:



3.5mm stereo Y-jack

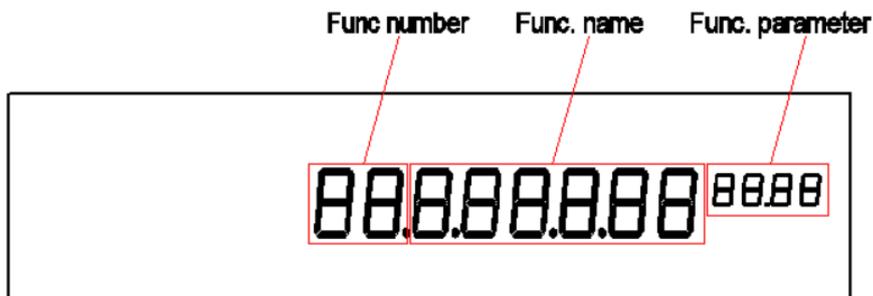
Instead of using straight morse key – keying from external device like PC logging program is possible.

11. Band plan and band limits assignment

RGO ONE has 11 bands that can be turned on and off. Also proper limits of each band can be assigned

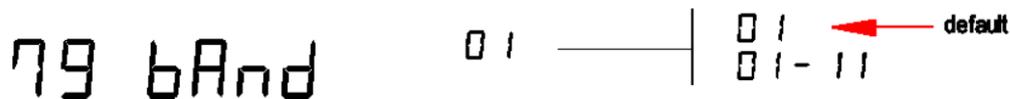
Enter Band plan and band limits menu

Push and hold ENC.1 and ENC.2 buttons while switching on the transceiver. Then enter menu. Menu 79 will be active.



Function selection is controlled by encoder 3 or UP REC and DOWN PLY buttons. Parameter selection is controlled by encoder 4

79 Band plan/limits selection



There are eleven bands available (01-11). Choose which band you like to change with main dial encoder 4.

Then shortly press encoder 3. If you see OFF on main display then this band is not allowed (not active). Short press of encoder 2 and the band will be allowed. Lower limit is shown on display.

L 0 01800

Short pressing of encoder 2 again will turn the band off.

Short press encoder 3 button to scroll between lower, higher limit and function 79.

H , 02000

Change the frequency of higher/lower limits by rotating encoder 4.

Exit the menu with long press of MTR MNU button.

ATTENTION When 160/60m hardware option is not installed and bands 01 and 03 are not OFF, the radio will not function properly on those bands