

## Usdgrp instruction manual

<http://www.hgeek.com>

This is a short-wave QRP SSB/CW transceiver. Ultra-small size is easy to carry outdoors, built-in 4000mAh lithium battery, 1602N LCD screen, built-in speaker, support to connect to PC, use FT8, JS8, FT4 and other digital mode software control, and support CW automatic decoding.



### Features:

1. 8 band covers 80m/60m/40m/30m/20m/17m/15m/10m.

2. Excellent PCB wiring design conforming to the principle of high-frequency circuit design, ensuring excellent performance.
3. Whether using internal battery or external 13.8v power supply, it can achieve 3-5W power in 8 bands, and reserved SOT-223 and TO-220 package pads needed for upgrading.
4. High emission efficiency, 80m/60m/40m/30m/20m efficiency higher than 80%, 17m efficiency higher than 70%, 15m/10m efficiency higher than 60%.
5. High-precision KDS brand TCXO, frequency accuracy is better than 1PPM, frequency stability is better than 0.5PPM.
6. Ultra-small volume: 83\*38\*124mm (excluding protruding parts).
7. Rich interfaces (CAT, PTT OUT, MIC/KEY, K-headset).
8. LPF part adopts 100V COG/NPO capacitors.
9. Use original genuine Omron magnetic latching relay.
10. use an operational amplifier chip with lower noise than LM4562.
11. Built-in speaker with cavity.
12. Built-in 11.1v(12.6v) lithium battery
13. BNC Antenna connector

## Functions:

1. Full-mode support: USB, LSB, CW, AM, FM(SSB mode has good receiving effect and poor transmitting effect. And AM FM mode are given power, and the effect is poor).

*2. DSP filter: 4000, 2500, 1700, 500, 200, 100 and 50 Hz pass bands*

*3. DSP functions: automatic gain control (AGC), noise reduction (NR), voice trigger Xmit (VOX), RX attenuator (ATT), TX noise gate, TX drive control, volume control, dBm/S meter*

4. SSB suppresses transmission to side band/carrier: better than-45dBc, IMD3 (dual tone)-33dBc, and reception: better than-50dBc.

5. Multi-band support, continuously adjustable through 80m- 10m band (from 20kHz..99MHz, performance loss)

6. Open source firmware, built with Arduino IDE; Allow experiments, you can add new functions, you can use Github Contribution, software complexity: 2000 lines of code

7. Software-based VOX can be used as fast full control (QSK and semi-QSK operation) or auxiliary RX/TX switching. In order to operate in digital mode (without CAT or PTT interface), external PTT output/PA control with TX

8. All-digital and software-based SSB transmitter stage: by controlling the phase of SI5351 PLL

9. Digital and software-based SDR receiver stage (optional): Sampling from quadrature sampling detector digital mixer I/Q (complex number) signal, and mathematically perform 90-degree phase shift (Hilbert transform) in the software and cancel one by adding side band

10. Three independent switchable analog front-end receiver attenuators (0dB, -13dB, -20dB, -33dB, -53dB, -60dB, -73dB)

11. Receiver noise floor MDS: -135dBm at 28MHz (200HzBW)

12. Receiver front-end selectivity: +/-2kHz steep -45dB/decade roll-off from the tuning frequency

13. Blocking dynamic range: 20kHz offset 123dB, 2kHz offset 78dB

14. CW decoder, Straight/Iambic-A/B key controller

15. VFOA/B+RIT and Split, and the corresponding relay with filter switch through I2C

16. CAT support (using Kenwood TS-480 protocol)

## Operation:

Currently, the following functions have been assigned to shortcut buttons (L = left, E = encoder, R = right) and menu items: Menu item function button

- 1.1 Volume audio level (0..16) and turn off/on the power (turn left) Rotate
- 1.2 Mode modulation (LSB, USB, CW, AM, FM) R
- 1.3 Filtering Audio passband (complete, 300..3000, 300..2400, 300..1800, 500, R doubler bandwidth 200, 100, 50Hz), which also controls SSB TX BW. Click the band to switch to the pre-defined CW/FT8 frequency E dual
- 1.4 belt (80, 60, 40, 30, 20, 17, 15, 12, 10, 6m) Click E
- 1.5 Adjust the step length 10M, 1M, 0.5M, 100k, 10k, 1k, 0.5k, 100, 10, E length rate 1 Press
- 1.6 VFO 2 times to choose different VFO or RX/TX Separate VFO (A, B, separate) mode R length R length
- 1.7 RIT transmission RX (open, close) Press
- 1.8 Automatic gain control Automatic gain control (on, off) System

- 1.9 Noise reduction Noise reduction level (0-8), pass and smooth
- 1.10 ATT analog attenuator (0, -13, -20, -33, -40, -53, -60, -73dB)
- 1.11 CIC level (0-16) digital attenuator, step length is 6dB ATT2 1.12SS -Meter type (OFF, dBm, S, S-bar)
- 1.12 Types of SS-Meter (OFF, dBm, S, S-bar)

## **Menu item Function button**

- 2.1 CW enable/disable CW decoder (ON, OFF) decoder
- 2.2 CW continuous wave filter + sidetone (600, 700) tone
- 2.3 CW CW RX filter offset alignment (QCX only) Offset
- 2.4 Half on TX, mute RX on CW symbol and word space QSK
- 2.5 Keying Speed of CW keyer in WPM in Paris (1..35) Speed
- 2.6 Keying Keyer type (Iambic-A, -B, straight key) Mode
- 2.7 Key exchange keyer DIH, DAH input (ON, OFF) exchange
- 2.8 Practice Disable TX (ON, OFF) for practice purposes
- 3.1VOX voice activated Xmit (ON, OFF)
- 3.2 Noise SSB TX and VOX audio threshold (0-255) gate
- 3.3TX transmits audio gain in steps of 6dB (0-8), 8=SSB constant amplitude driver
- 3.4TX Delay TX to allow the PA relay to be fully turned on before TX (0-255 milliseconds delay) Menu item Function Button
- 3.5MOX monitor on Xmit (audio remains unchanged during transmission)
- 4.1 CQ Idle time (in seconds) before giving a new CQ message (0-60) Interval
- 4.2 CQ CQ message text, press the left button in the menu to start sending L message
- 4.3 CW CW message text, press the left button in the menu to start sending L message 2
- 4.4 CW CW message text, press the left button in the menu to start sending L message 3
- 4.5 CW CW message text, press the left button in the menu to start sending L message 4
- 4.6 CW CW message text, press the left button in the menu to start sending L
  
- 5.1 PA deviation maximum PA amplitude PWM level (0-255), representing 0% of RF output small value
- 5.2 PA bias maximum PA amplitude PWM level (0-255), representing 100% of the maximum RF output
- 5.3 Reference si5351 actual crystal frequency, used for frequency calibration frequency
- 5.4 IQ RX I/Q phase shift, in degrees (0..180 degrees) Phase menu item Function Button
- 5.5 IQ test/calibration CW filter alignment (QCX only)
- 6.1 Sampling is used for debugging, testing and experimental purposes
- 6.2 CPU is used for debugging, testing and experimental purposes

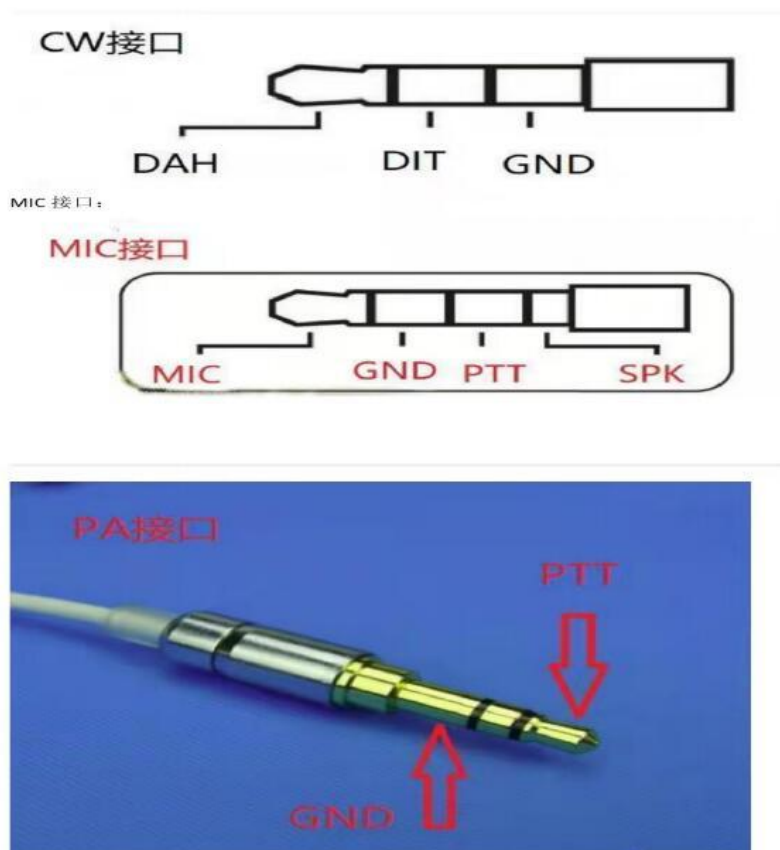
6.3 Parameters For debugging, testing and experimental purposes A

6.4 Parameters Used for debugging, testing and experimental purposes B

6.5 Parameters Used for debugging, testing and experiment purposes. C10.1 back display backlight (on, off), long power on, reset to factory settings, press MAIN tone frequency (20kHz..99MHz), turn L+E MAIN quick menu

Rotate the MAIN menu to enter L RIT RIT to return to the R menu to return to the R menu

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UART接口

