

ALX-SSB Transceiver Operating Manual

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This is an attempt to collect the main operation features of the ALX-SSB Transceiver. The radio is built on the design of the popular CS-Series radio from CRKITS.com developed by Adam Rong, BD6CR/4.

The radio consists of 3 Main sections:

- 1) Base radio – based on the CS-Series from Adam Rong, BD6CR
- 2) Digital VFO/OLED display developed by Larry Lovell, N7RGW from a modified version of the Sandwich.
- 3) Multi-Band Filter Option for 80, 40, 20, 17, 15, 12 and 10 Meters

Software is installed in the Arduino for proper operation and calibration. Latest software was improved thanks to James Moorehead WF4AC.

Front View of Radio



Rear View of Radio



Specifications based on CS-Series Radio

- Dimension: 153 mm x 97 mm x 40 mm, not including protruding features
- Weight: approximately 500 grams or 1.1 lbs.
- Power Supply: 11~13.8 V, 3 A
- Current consumption: about 70 mA in RX and about 2 A in TX @ 13.8 V
- RF output: about 10 W PEP @ 13.8 V (5 W PEP for the 20m version)
- Spur suppression: better than -43 dBc
- Sensitivity: better than 0.5 μ V at 10 dB SNR
- IF filter: 6 pole crystal ladder filter + 1 pole post IF amplifier crystal filter
- IF bandwidth: about 2.0 kHz
- IF frequency: 8.467 MHz
- Frequency tuning range depending on OPTION:
 - 3.500 MHz – 4.000 MHz
 - 7.000 MHz – 7.300 MHz
 - 14.000 MHz – 14.350 MHz
 - 18.068 MHz – 18.168 MHz
 - 21.000 MHz – 21.450 MHz
 - 24.890 MHz – 24.990 MHz
 - 28.000 MHz – 29.700 MHz
- Frequency stability: crystal controlled PLL
- Frequency display: OLED I2C display
- Connectors:
 - Speaker output: 3.5 mm connector, mono output
 - Microphone input: 8-pin, can be configured to be compatible with electret microphones or speaker microphones
 - DC IN connector: Type 2.1 mm center positive
 - Antenna connector: BNC type
- Controls:
 - IF Gain Control: act as volume control
 - Tune Control with button: act as digital VFO tuning and control

New Software – changes operation slightly.

Changes to the Crystal Calibration Mode – works on Power ON + Press Tune Button.

Operational Controls

Front Panel from left to right

TUNE Control OLED Display Gain Control Band Change Button



Microphone
Connector

Rear Panel from left to right

Power-On Switch External Speaker



DC power in – center positive 12 VDC Antenna

Special Operation Modes

Tune Control

1. Normal –

- a. Turning the control changes the frequency
- b. Momentarily push in the Tune button to increase the resolution of the display. (Quick push will toggle the resolution)
 - i. Normal resolution would be 7.225
 - ii. Increased resolution would be 7.2251

2. BFO



- a. Push and hold the TUNE Button for about 5 seconds
- b. You will see this display (frequency will not display until you adjust the TUNE control.
- c. Adjust TUNE knob for about 0.5 KHz for USB or -0.5 KHz for LSB (first pass)
- d. Momentarily press the TUNE Button and this will store the value (Button must be pushed to store the value in memory)
- e. You then return to normal Frequency Mode or Normal Mode.

You May want to calibrate the accuracy of the Crystal in the Si5351 chip. This affects the LO frequency and BFO frequency accuracy.

You enter Crystal Calibration by turning the radio power OFF. Press and hold the Tune Button in while turning the Power – ON. You will see the following display:

3. Calibration



In the CRYSTAL CAL mode you are now ready to adjust the CAL frequency.

- a. Place the Signal Pin of your Frequency Counter on CLK1 pin located on the back top of the Display PCB as shown in Figure 8.
- b. Remember to Ground the ground pin of the counter (or Oscilloscope).

c. Adjust the TUNE control until the Frequency Counter reads 10.000000 MHz or as close as you can find.



d. Then momentarily press the TUNE Button to store the calibration which will also return you to Frequency Mode or Normal Mode.

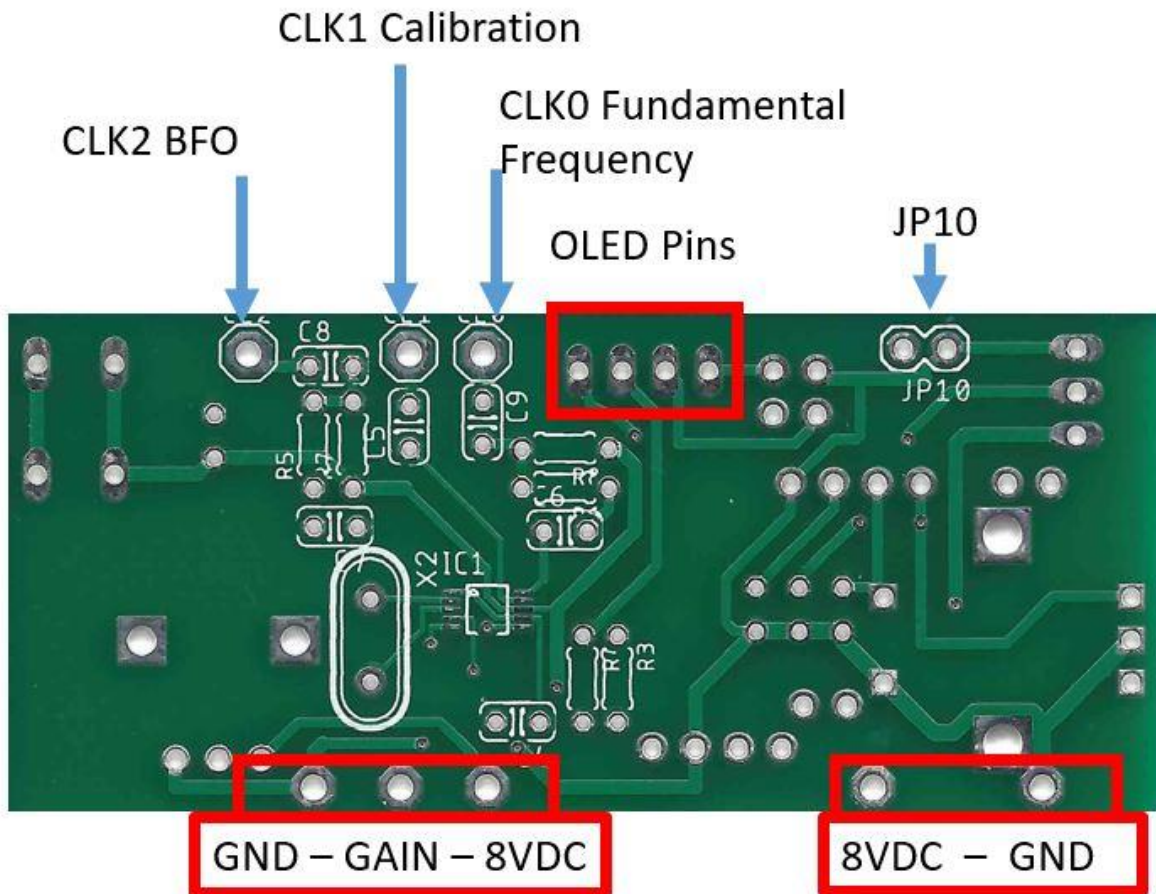
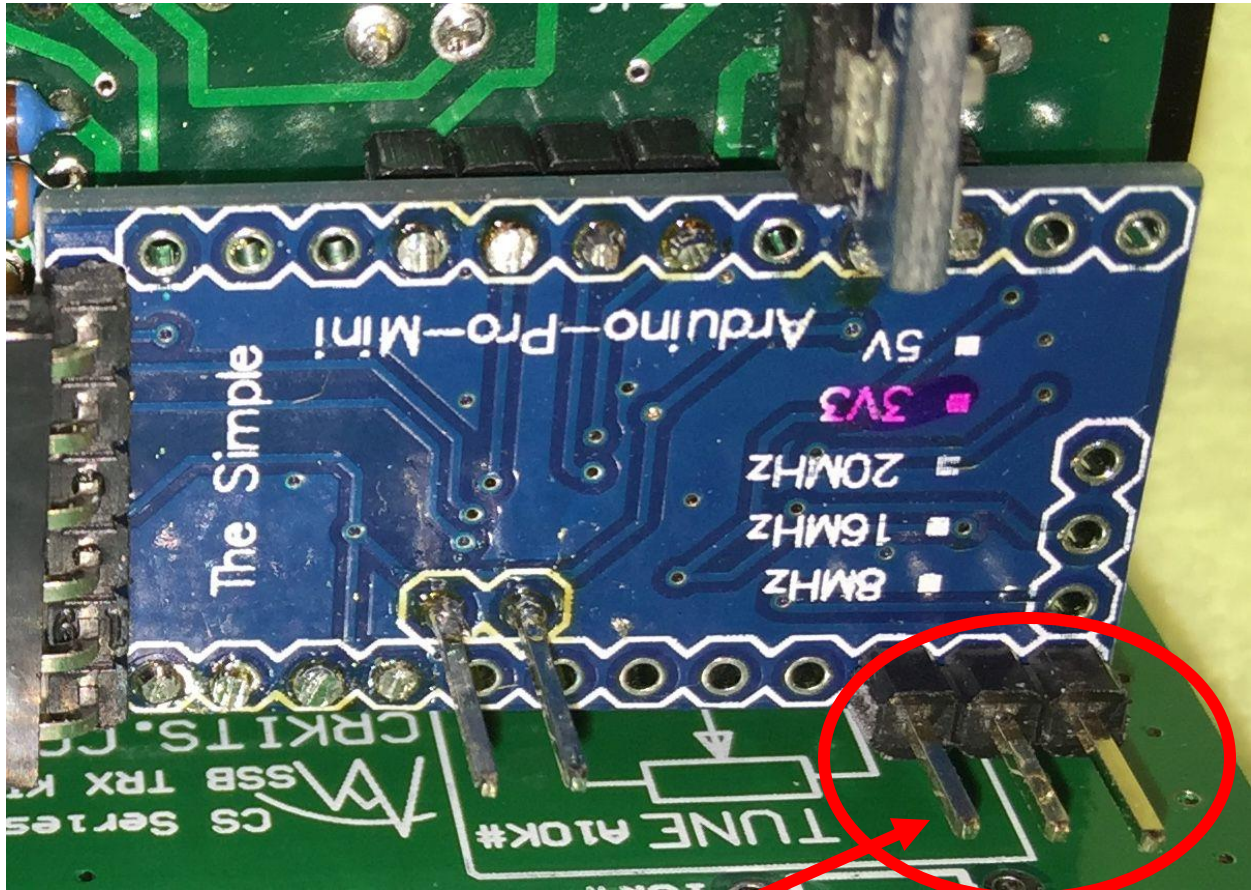


Figure 8

4. Band Change Button

- Pressing the Band Change Button will step the display to the second band, if available.
- Press the Band Change again and nothing should happen.

- c. Press the Band Change button again and you revert to your original frequency.



Connectors for Multi-Band Option control

Band Options

With the purchase of the dual-band option, you can select more than one band.

The band options are as follows:

Optional frequencies are:

Base Radio plus 80 Meters.

Base Radio plus 40 Meters

Base Radio plus 20 Meters

Base Radio plus 17 Meters

Base Radio plus 15 Meters

Dual-Band Option will be discontinued in January 2019 in favor of the Multi-Band Option

With the purchase of the Multi-Band option, you can select one of 7 bands.

80 Meters

40 Meters

20 Meters

17 Meters

15 Meters

12 Meters

10 Meters

This will require a Software Upgrade to the Arduino plus the Band Pass Filter upgrade for the additional bands.

More information will be added to this document as time permits.

Contact: larry@QRVTronics.com