

SETTINGS&USER MANUAL

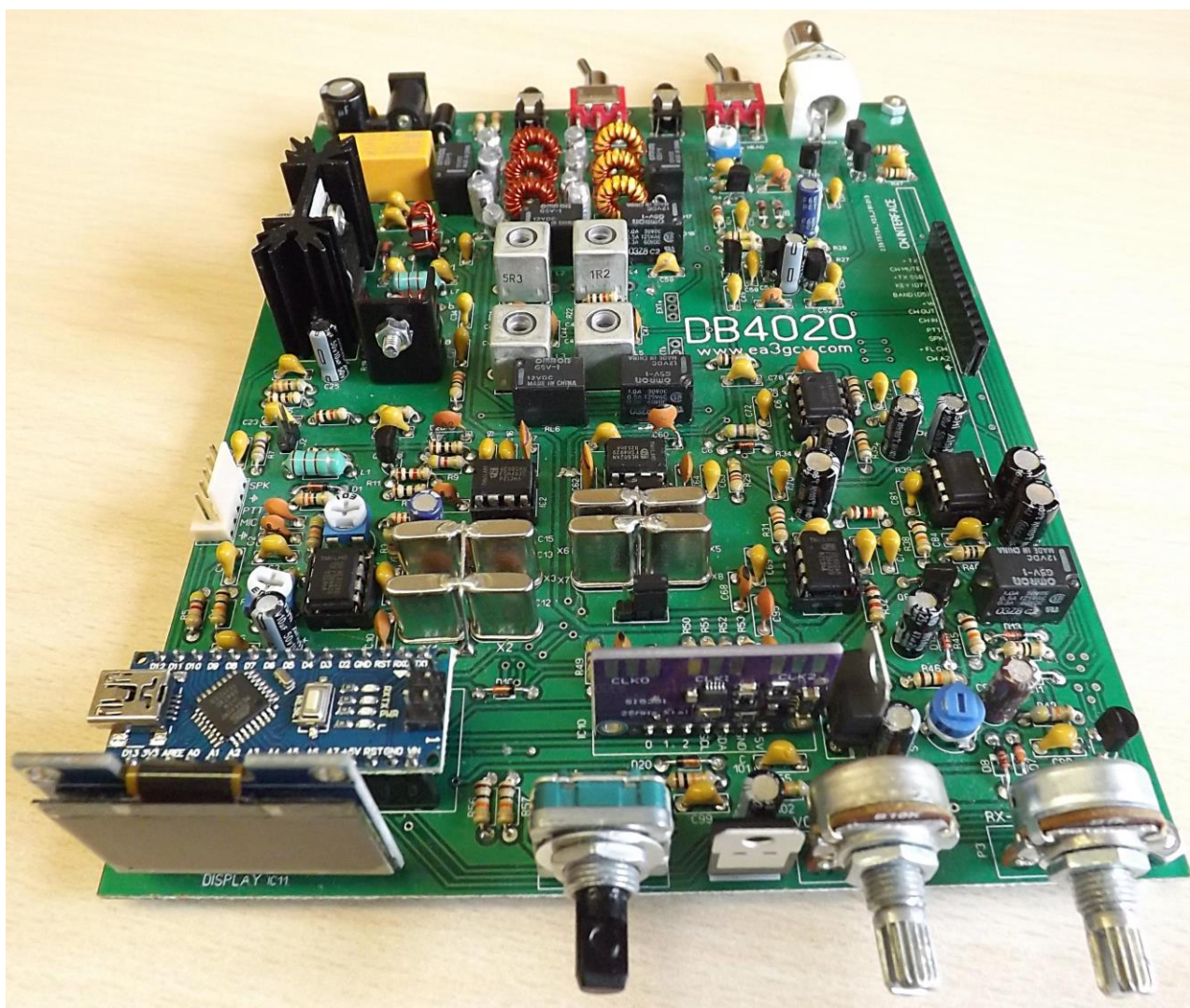
DB4020

Dual Band 40&20m QRP SSB transceiver KIT

Firmware version V2.1 Last update February 10, 2021

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Latest updates and news in: www.ea3gcy.com



INTRODUCTION

Using the *DB4020* transceiver is very easy. It has no frills. But it has all the necessary functions to enjoy QRP with a device built in your home.

Efforts have been made to make changes to menu functions as quick and comfortable as possible.

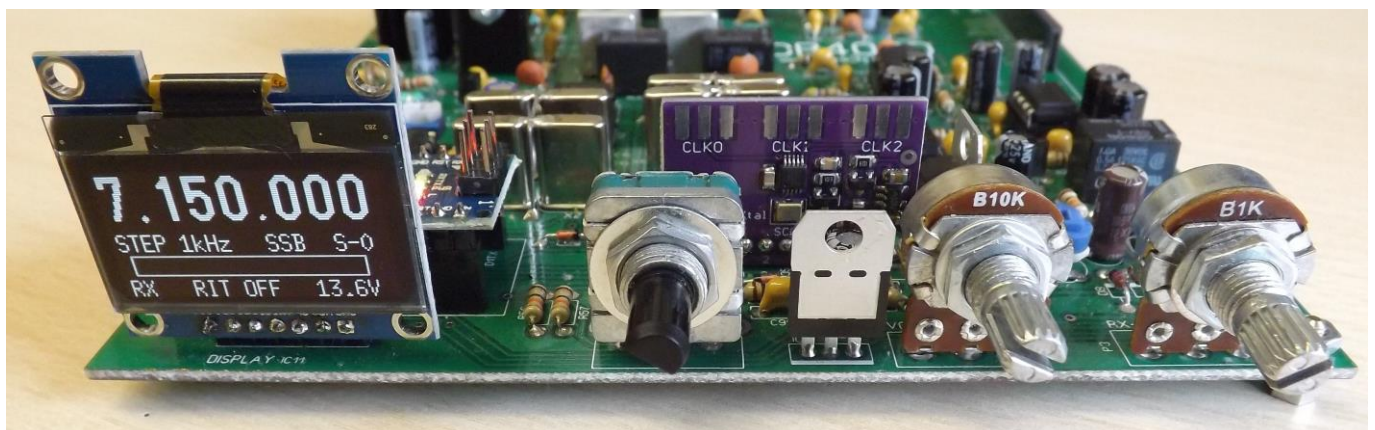
Tuning, step changes, adjustments and all other functions are performed using a rotary encoder with a built-in push button.

A single knob for all functions!

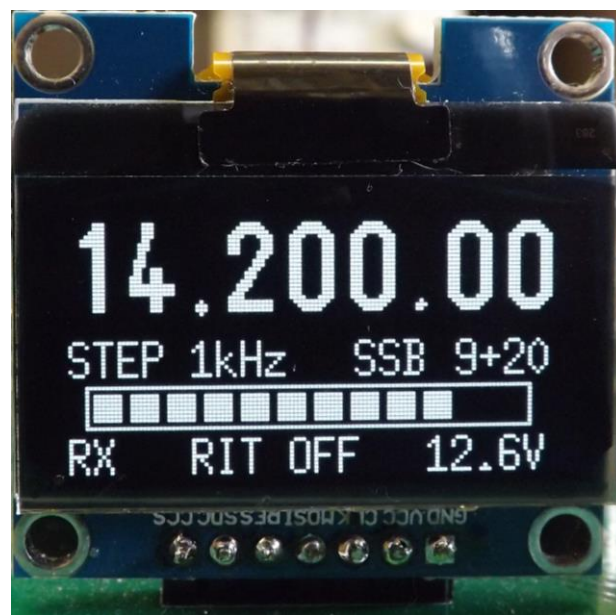
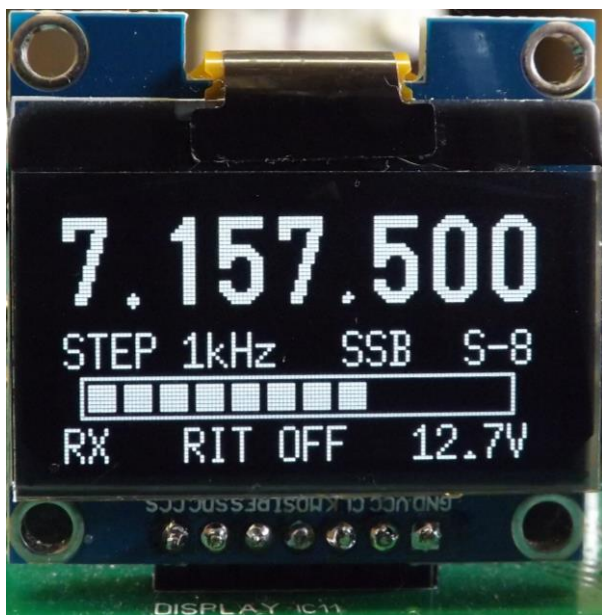
The “Arduino UNO” module is already programmed at the factory. There are initial values and frequency settings that will help get you up and running. **With the default values, your *DB4020* will be able to start working.** However for each assembly some slight re-adjustments must be made in the display settings menu.

The default settings are:

- **LSB** = 4.913.5 MHz. (Almost always correct)
- **USB** = 4.916.5 MHz. (Almost always correct)
- **CALIBRATE XTAL** = 150 (User must adjust according to *SI5351* module Xtal)
- **CALIBRATE VOLTS** = User must adjust.
- **S-METER function**: On
- **RIT ON/OFF**: OFF



DIAL DISPLAY



On the working dial display, you can see the tuned frequency, the current step, the mode (USB, LSB or CW), the S-Meter, the current status (RX or TX), the RIT status (ON / OFF) and the supply voltage.

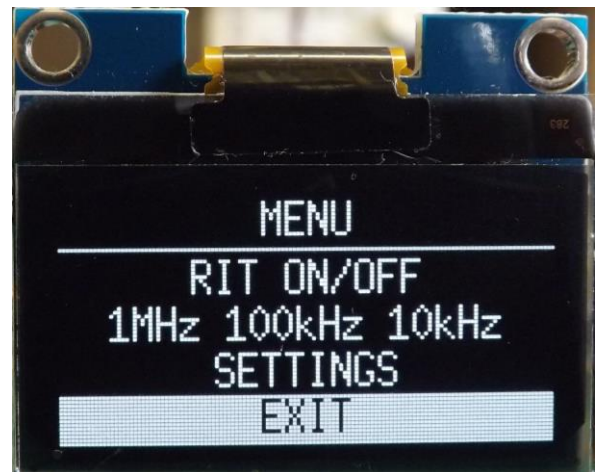
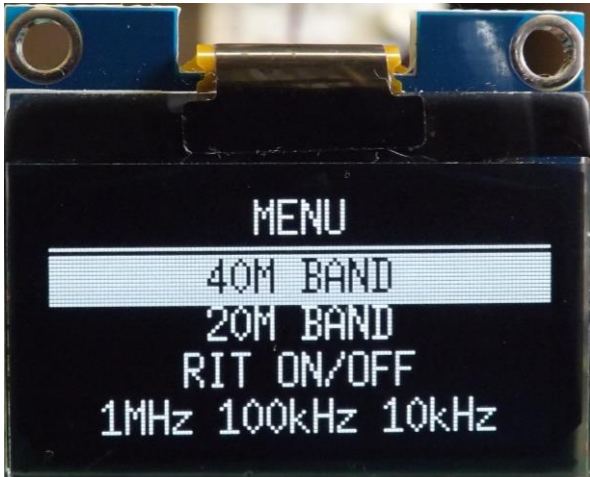
By turning right or left the rotary encoder the frequency respectively increases or decreases by the current "step". A quick push on the encoder will change the step.

There are two ranges of steps. The default range is 10Hz - 100Hz - 1kHz. To change to the second range of steps, go to main menu.

The current band, frequency and step are stored in a non-volatile memory automatically every 4 seconds (only if there has been any change). When you start it, you will always recover the frequency where it was last time.

MAIN MENU

To enter the main menu, you must push and hold the encoder pushbutton for >1 second. Then, you can move through the menu lines by turning the encoder. The last line is "EXIT" to exit without change.



⇒ **Band change:**

To change the band, go to main menu and select the line "40M BAND" or "20M BAND" and a short press on switch encoder.

⇒ **Step range change:**

There are two ranges of steps. The default range is "1kHz - 100Hz - 10Hz" To change to the second range of steps, go to main menu and select the line "1MHz 100kHz 10kHz" and push switch encoder again. To return to the previous range, repeat the same operation.

⇒ **RIT on/off:**

To activate the RIT, select the "RIT ON / OFF" line and press the encoder switch. Then, "RIT ON" will appear on the main screen. If the frequency increases, "RX+" will appear or if it decreases, "RX-" will appear. If the frequency does not change, "RX=" will appear.

When transmitting, the frequency will always return to the initial one.

To deactivate the RIT, proceed as in activation.

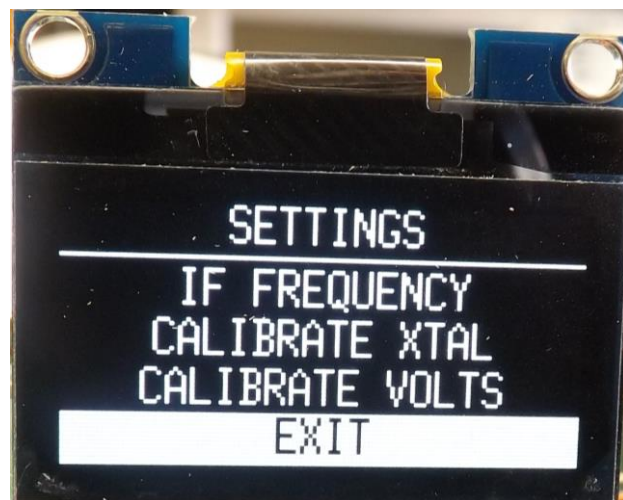
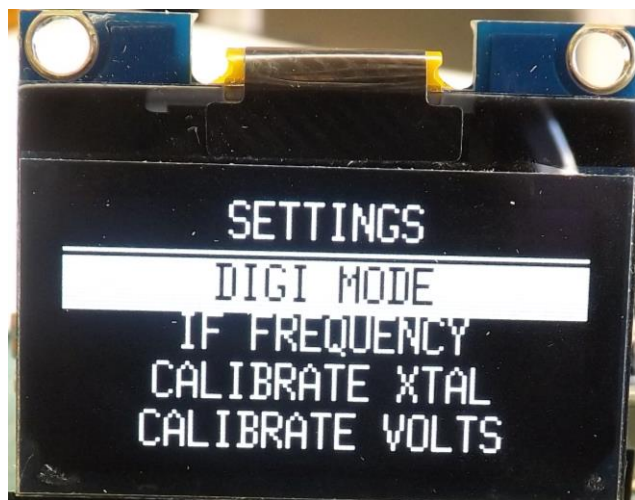
⇒ **SETTINGS:**

Select this line, press push-button to enter the "SETTINGS" menu.

⇒ **EXIT:**

Return to the main tuning screen.

SETTINGS MENU



⇒ **DIGIMODE:**

This function keeps the USB mode fixed for the 40m band to be able to work in FT8 digital modes etc. both in 20m and 40m. Press the encoder button to enter the "DIGIMODE" sub-menu. OK or CANCEL will appear, select the desired option.



Note: This function is not maintained when the power is turned off.

⇒ **CALIBRATE XTAL:**

IMPORTANT: This setting is essential to adapt the SI5351 module to your assembly.

**It is recommended to make this setting before “IF Frequency”.
IF frequencies are modified (shifted within the IF filter)**

Press the push-button to enter “CALIBRATE XTAL” sub-menu.

You can calibrate the frequency of the clock crystal oscillator of the SI5351 module. It has a range of adjustment -2000 to +2000. This value not is Hz and is inverse to the output frequency, that is, when it is increased, the frequency decreases and vice versa.

To make this adjustment you should use a professional frequency meter or a good quality receiver to read the output frequency of the SI5351 (use the CLK1 output on the SI5351 module) and for example make the adjustment in 40m so that the output frequency it should be 4,913,500MHz. Adjust until the frequency meter reads that reading.

As an alternative, this adjustment could even be performed in reception listening to a signal of known frequency, although this procedure would be more complex for you

This adjustment is essential, and compensates for the crystal tolerances of each SI5351 module. Notable differences can be observed in modules with crystals from different manufacturers.



⇒ IF FREQUENCY:

IMPORTANT: This setting is essential to suit your assembly.

The “LSB FREQ” and “USB FREQ” settings are used to suit the tolerances of the IF crystal filter for each setup. These adjustments will affect the quality of reception and transmission (they will also affect power slightly).

Press the push-button to enter “SELECT IF” sub-menu.



- The “MAIN FREQUENCY” changes automatically according to the current band, not user adjustable.
- “LSB FREQ” it is by default 4,913,500. This is the correct frequency. If desired, you vary slightly. To finish, hold > 1sec pressed and "SAVE / CANCEL" will appear, you can change it or leave it as it was before.
- “USB FREQ” it is by default 4,916,500. This is the correct frequency. If desired, you vary slightly. To finish, hold > 1sec pressed and "SAVE / CANCEL" will appear, you can change it or leave it as it was before.

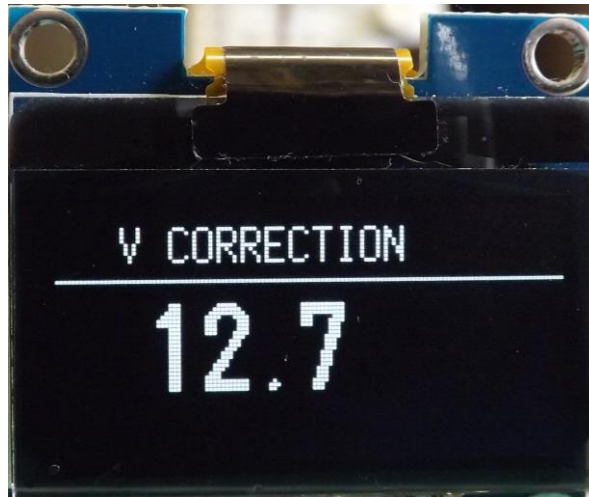
Note: A quick push on the encoder will change the step (all steps available from 1Hz to 1MHz).



This screen always appears after making a value or frequency adjustment. You can record the changes "OK" or "CANCEL" them.

⇒ **CALIBRATE VOLTS:**

Press the push-button to enter "CALIBRATE VOLTS" sub-menu. You can calibrate the dial display voltmeter. Use a quality multimeter in the volts function. Measure the input voltage of the *DB4020*. Turn the encoder until the same reading is displayed as on the multimeter. The measurement resolution is 0.1V.



⇒ **EXIT:**

Returns to the previous menu screen.

RESET function

If necessary you can perform a “RESET” to return to factory default values.

To perform the RESET, turn on the power while keeping the encoder button pressed until the “RESET PERFORMED” screen appears, immediately afterwards release the encoder button.

Important note: When you do a RESET, then you have to redo all the settings.



S-METER ON/OFF function

To enable or disable the S-Meter function, turn on the power while keeping the encoder pushbutton depressed. Then the “RESET PERFORMED” screen will appear, DO NOT release the button, keep it until the normal work screen appears.

The ARDU-5351 will always keep the last state until you change it again.

To reactivate the S-Meter, repeat the RESET function.