CRKITS Sandwich Digital VFO Manual
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Part List

For Ctrl and OSC boards:
- R1, R3, R4, R5, R6 = 1k
- R2, R7, R8 = 330 ohm
- C1~C7 = 104
- X1 = 27 MHz crystal
- D1 = 3 mm dual color LED, see kit building video to identify the polarity
- IC1 = si5351a, pre-mounted
- SW1 = rotary encoder with push-on button, 20 pulses per rev.
- JP10 = Jumper to select band high limit, BFO and default operation frequencies

Extra parts for radio assembly:
- 104 x 2 for VFO and BFO wiring
- 15 pF x 1 for optional VFO filtering (might remove from kit later)
- 1N4148 x 1 for optional power line current leaking prevention (might remove from kit later)

Arduino Pro Mini ATmega328 3.3V/8MHz board with firmware pre-programmed (optional)
FTDI Serial Programmer based on FT232RL chip, default VCC=3.3V (optional)

Kit Building

Please refer to YouTube video at https://youtu.be/J3V1BIvdlFk
Pay attention to the pin headers on the Arduino board stacked in the middle:
- Serial programmer pins must be installed on the bottom side, or it will have interference with GAIN potentiometer in radio assembly
- Inter-board pins must be soldered on Arduino board first. Pay close attention to which side they should be installed, top or bottom

Function and Calibration

Please refer to YouTube video at https://youtu.be/8v3NiCrCNrY
- The only control is the rotary encoder and its push-on button. Button click will switch mode and memorize the configuration into the EEPROM inside the MCU. There is no long or short click definition, both are the same.
- The only display is the dual color LED. It has been clearly explained in the video.
- The only jumper is JP10. You can change the settings in Arduino sketch and upload to your Arduino board at any time to meet your own need.

JP10	40-meter	20-meter
OPEN	band high limit = 7200 kHz default frequency = 7100 kHz BFO range = around 8467.2 kHz	band high limit = 14350 kHz default frequency = 14200 kHz BFO range = around 4194.3 kHz
SHORT	band high limit = 7300 kHz default frequency = 7200 kHz BFO range = around 8192 kHz	band high limit = 14350 kHz default frequency = 14300 kHz BFO range = around 4096 kHz

- You will need to calibrate crystal first, press the button to memorize into EEPROM, remove and apply power again, then calibrate BFO, and press the button to memorize into EEPROM.

Radio Assembly

Must use 104 capacitors to connect VFO (JP7) and BFO (JP9) output to your radio. Connect 15 pF to ground if necessary on VFO line to help spurious filtering. You can find pads near NE602.