

## BITX40 Mods for USB and Raduino BFO

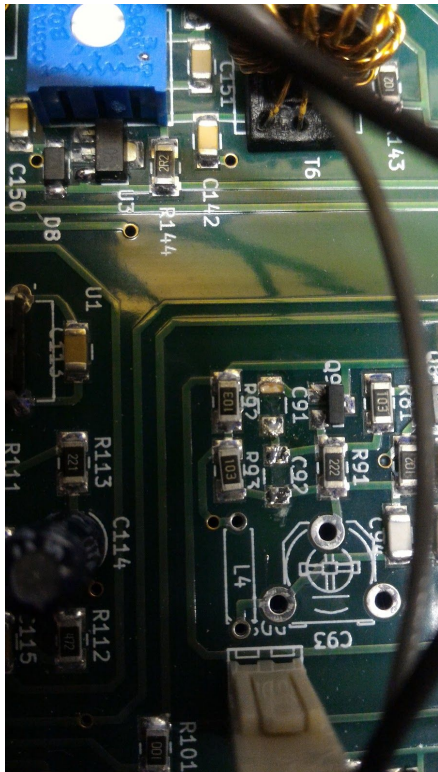
First off thanks to Ken G4IIB's post on the solder smoke blog. He was kind enough to share his raduino code and answer my questions.

<http://soldersmoke.blogspot.com/2017/02/ken-g4iibs-bitx-journey.html>

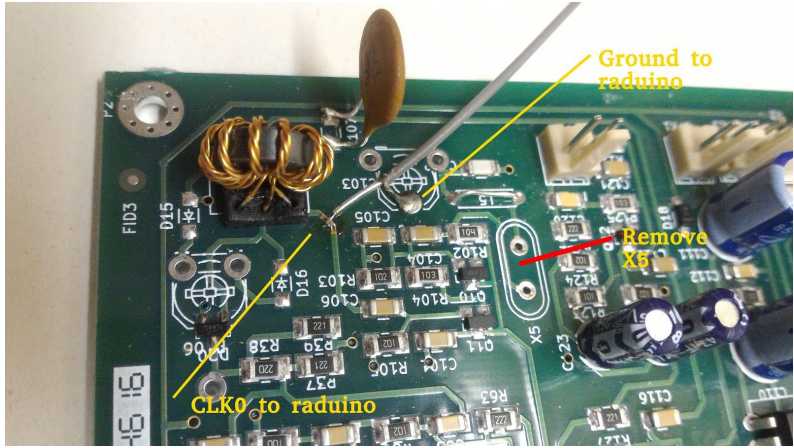
The main goal of this mod is to flip between LSB/USB using the BFO. The BITX code mentions flipping modes by changing the VFO from low side to high side mixing. This means for LSB the VFO is around 4.9MHz (12MHz bfo - 4.9MHz vfo = 7.1MHz). For USB this would be flipped so that (19.1MHz vfo - 12MHz bfo = 7.1MHz). This is explained better in the code but that's the main idea. I believe the only drawback to this is the audio is inverted and would be a problem for some digital modes.

Another way to switch between LSB/USB would to use an extra channel on the raduino to generate the bfo. This way the bfo can also be adjusted and the resulting audio should not be inverted.

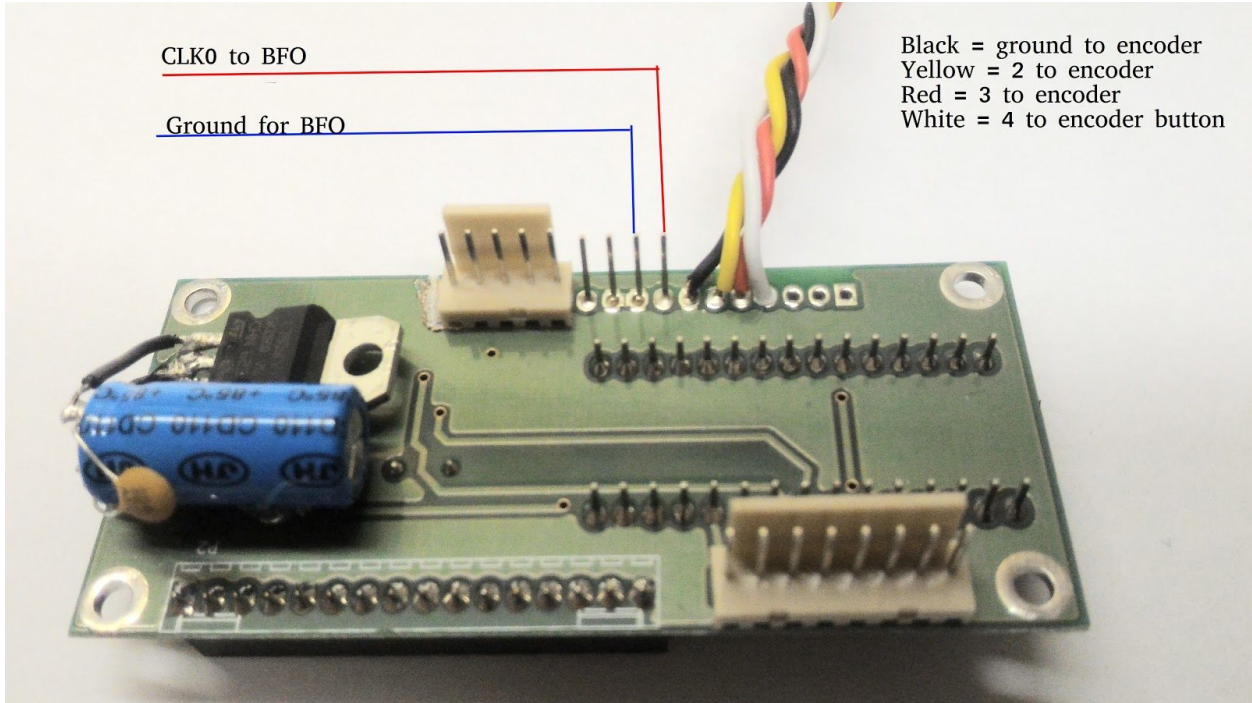
If you use either method above you will need to remove c91 and c92. I could not get the BITX to use a VFO above 10MHz probably due to the caps shorting out the signal. Here is a picture of my caps removed.



Next I removed X5 from the BFO and attached a small 50 ohm coax to the board back to the raduino's CLK0 which I used for the BFO. I used an exacto knife to remove the insulation from the trace so I could solder the coax.



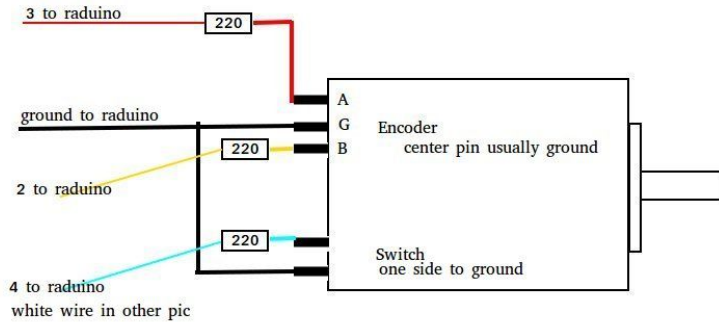
This coax goes back to the raduino here



The other 4 wires go to a rotary encoder. The encoder I used was taken from a 2005 Dodge stock radio, it seems to have around 20 detents. The code uses this kind of encoder so you will either have to wire one up or mod it to use the pot.

The schematic of the encoder end. Note the 220 ohm resistors, I added those to limit current from the raduino.

Use 220 ohm resistors for 2, 3, and 4 to raduino



The code can be found here <http://petefleming.com/bitx.ino>

You will need the latest Etherkit and Rotary-master libs.

<https://github.com/brianlow/Rotary>

You will need to change the BFO settings for your rig. I did this by trial and error. A better way may be to use a sdr dongle and hdsdr?

```
volatile uint32_t LSB = 1199400000ULL;  
volatile uint32_t USB = 1199634000ULL;  
volatile uint32_t bfo = 1199400000ULL;//start in lsb
```

I added some code so that you can adjust the BFO on the fly by shorting the red A2 wire coming out if the 8 pin raduino connector. When shorted the second line on the LCD shows the current BFO frequency when adjusting the encoder. When you get it right, write it down and update the code above, it will not save your values when you shut it off.

There is also a frequency correction set manually in the code at lines 280, 284, 334 and 337. Its set to 145000 which matches my BITX. You will have to set this for your BITX by tuning in to a known frequency and note the difference.