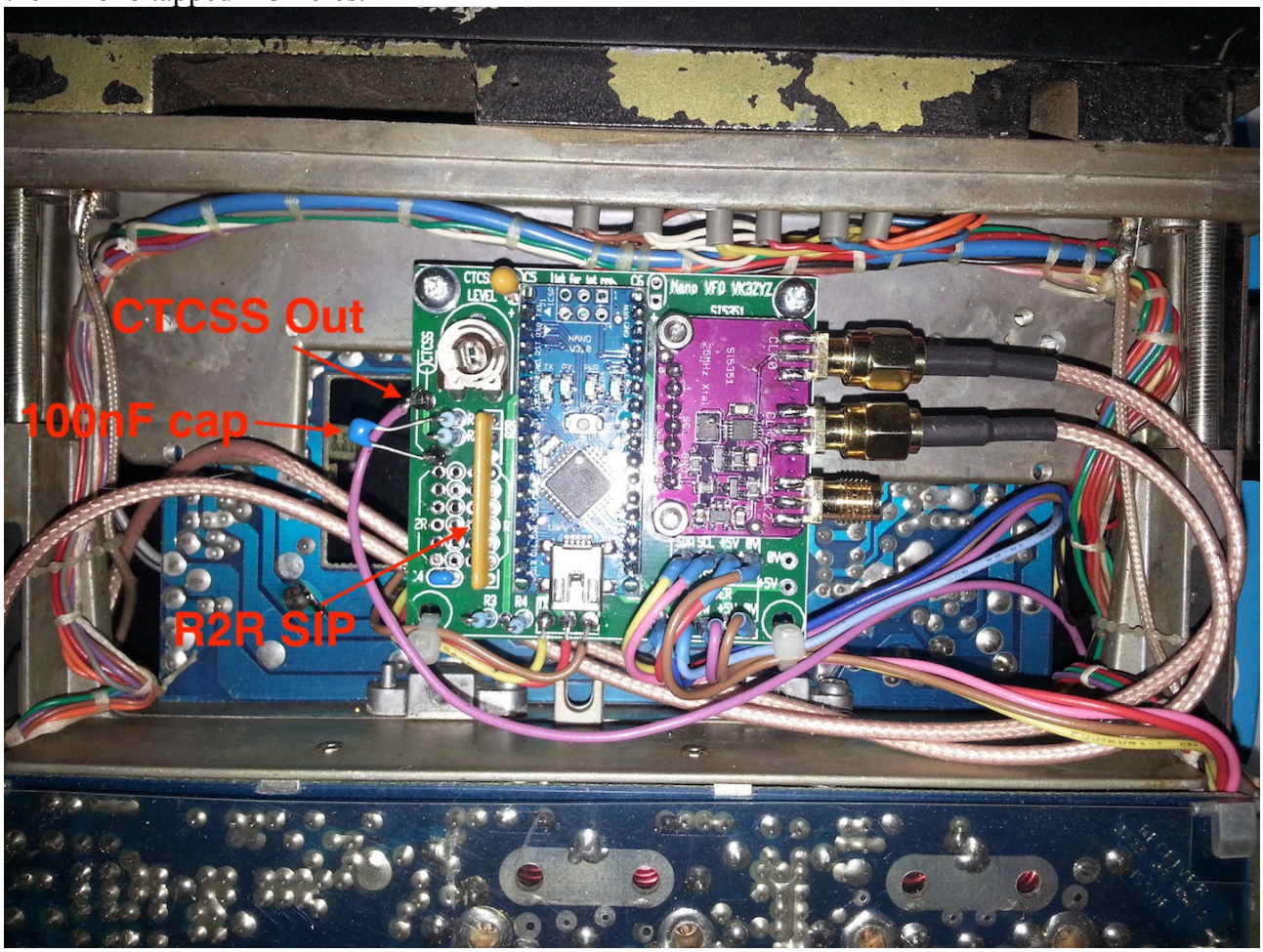
VK3ZYZ Nano VFO Version 1 20220727

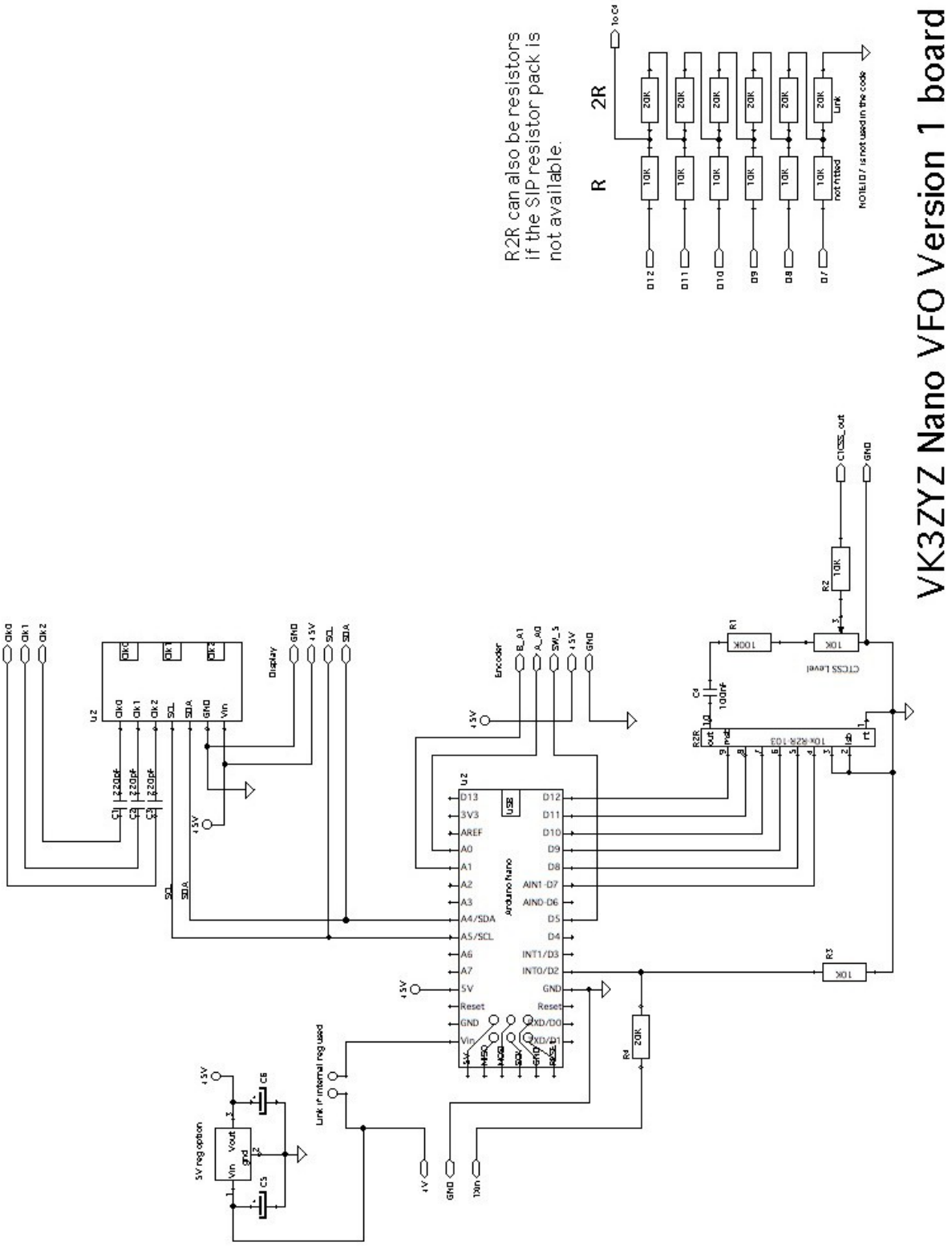
The VK3ZYZ Nano VFO is a handy crystal replacement board for retrofitting into old sets.
It uses an Arduino nano and the Si5351 digital VFO board. This Si5351 board can generate 3 seperate signals. The example below shows the FM828 install on 2M, and only 2 signals are used. The TX and the RX “crystals”. The OLED display chosen has the top 1/3 in yellow and the rest in blue.

Here is the board fitted in the FM828. By pure luck, 2 of the PCB mounting holes match up with the FM828 tapped M3 holes.

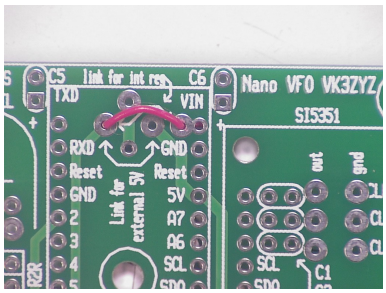


This one has the R2R SIP resistor network installed to produce the CTCSS signal. But resistors can be used instead as the SIP networks are more costly and harder to get.

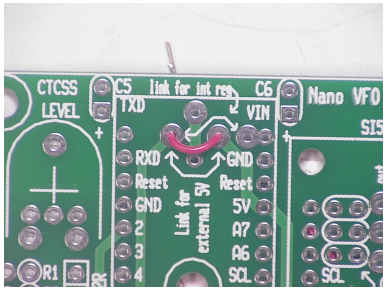
The board can drive an I2C OLED display as shown, or an I2C LCD.
A rotary encoder selects the channel.
Code examples are supplied so you can modify it to suit whatever radio you want to install this VFO in.
As well as driving the Si5351 to generate the frequencies, the Arduino produces the CTCSs signals by writing a series of digital values to an R2R network that changes the digital to an analog voltage. These values come from a table that is a 5 bit representation of a sine wave cycle. The values are written out under a timer interrupt control, and the timer period sets the CTCSS frequency. A trim pot can set the level needed for the set.
Also, Simplex and Duplex operation is supported.
The rotary encoder selects the channel, and there are 3 tables in the code that have an entry for each channel. The first table specifies the RX frequency, second mode (simplex, TX+600 or -600 Duplex) and thirdly, the CTCSS tone used on TX. All these are set in the program source file.
The top of the OLED display indicates channel number, mode and CTCSS tone. The lower part is the frequency. The foreground/background colour of the frequency display inverts on TX.
When a duplex channel is selected, pushing the encoder knob in selects Reverse so you can listen to check if you can hear someone using the repeater as a direct contact.


VK3ZYZ Nano VFO Version 1 board
R2R can also be resistors if the SIP resistor pack is not available.
R
2R
Arduino Nano
Encoder
Display
CTCSS_out
GND
+5V
Link if internal reg used
5V reg option

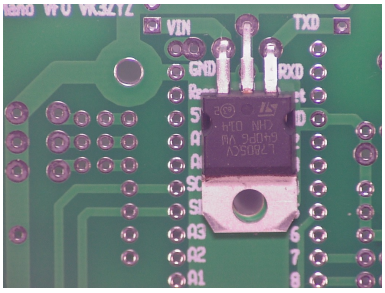
Power options are:
External 5V supply...

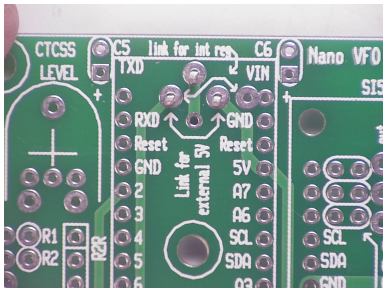


Arduino 5V regulator..

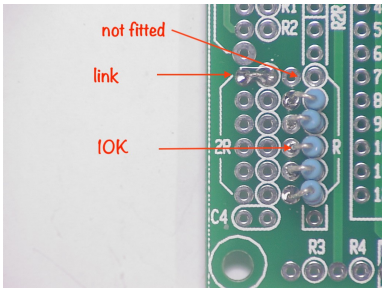


or if you need a bit more current that the Arduino reg can supply, use the 7805 option...





The CTCSS R2R resistors I use are 10K and 20K. But you could use others as long as the 1R and 2R ratio is kept. A design change does not make use of D7 so a resistor is left off and a link added.



This below is the “normal” setup, before the nano and Si5351 boards are installed.