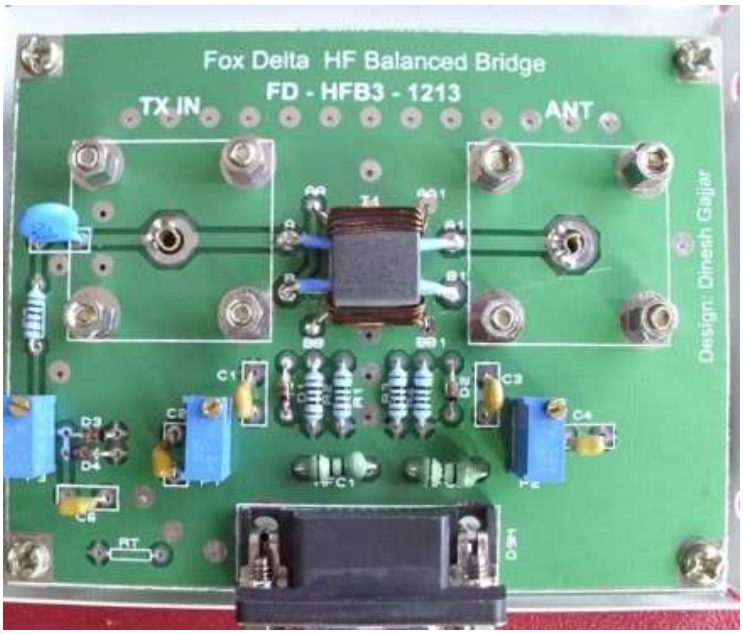
SWR Bridge/Meter – Simon VK2KU

So I have a crack at making a SWR bridge a few times and have never really been successful at making one that could handle any kind of power above QRP.

Looking around at the different designs, looked at the FOX Delta balanced bridge.



This design utilises a binocular core toroid. Easier than two separate cores.

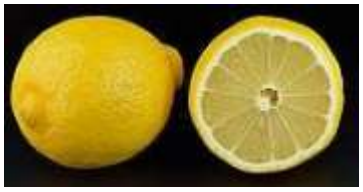
The set up comprises of 3 parts.

- RF Bridge
  - Designed using Eagle Cad
  - This is a dual hole Type 43 core. Good to 100W. May get hot at higher powers.
  - Use of two BAT54 diodes to rectify forward and reflected voltages.
  - Use of two trim pots to accurately calibrate the output to the maximum input for the ADC on the Arduino.
  - Use of on-board BNC connectors. These can be used to mount the bridge into
- Controller
  - An Arduino based simple circuit that reads to analog voltages from the RF bridge. This then via formulas in the program can back calculate the voltages into power.
  - Uses a 20x4 LCD display to create a polished readout
  - LM7805 Reg onboard so can use with rig supply
- 20x4 LCD Display
  - Utilised an I2C Backpack to simplify communications to the display

The controller design I chose is completely non-related to the RF bridge. This was for a QRP SWR meter.

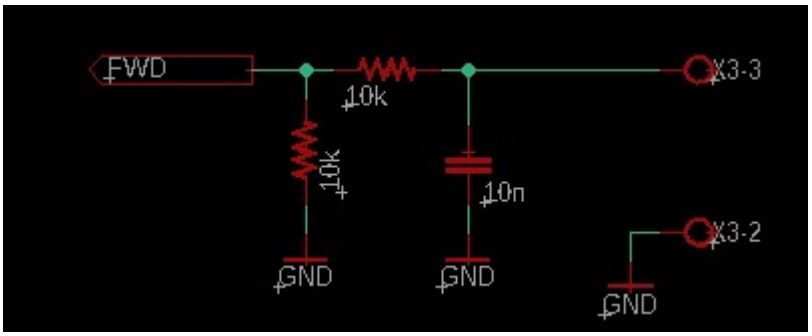
Changed to the program and circuit have been made to accommodate the higher power.

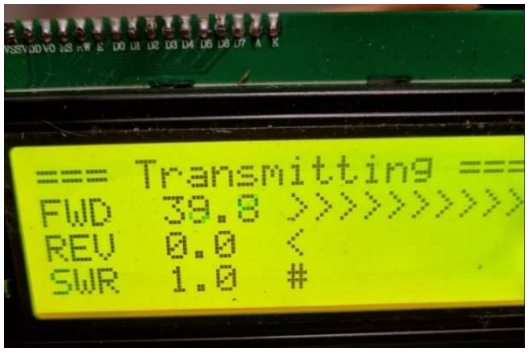
No board of mine ever gets made without a few lemon though….



On the inputs for the FWD and REV voltages on the controller board, I used a double 10K voltage divider to accommodate the higher voltage from the new RF bridge.

MISTAKE HERE – I can turn the voltage down with the trim pots. Have accommodated this in code this time but will fix this in the next version of the controller board.

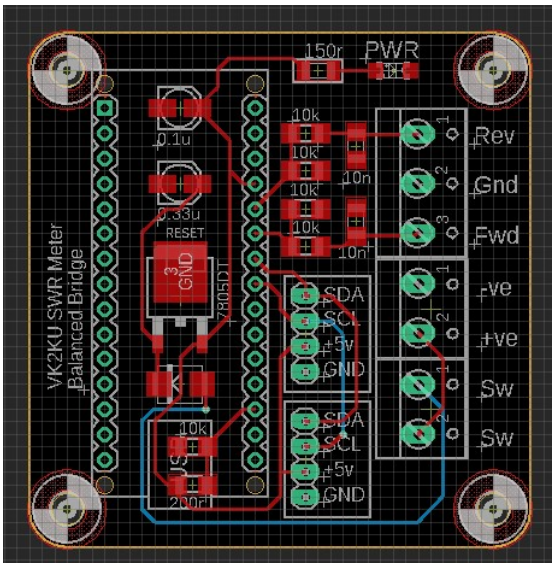


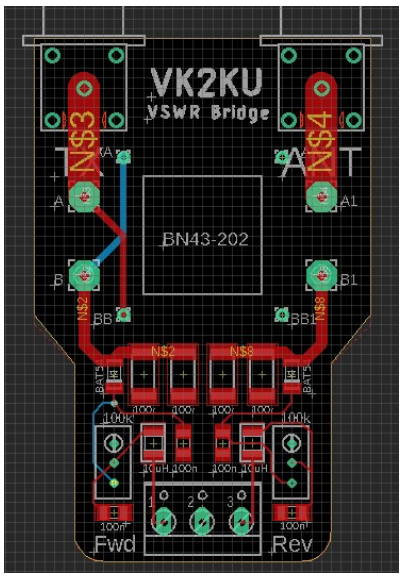


Calibrating is carried out by applying forward power (100W) into a 50 ohm load and adjusting the trim pot on the board so the output is 5.00v. Same steps for adjusting reverse power, only this time the TX and Antenna coax is reversed.

The readings are not quite linear, where the forward power at 5W displays 1W, and 100W displays 105W. More work to be done on this, however it is accurate forward and reverse.

All you need to do here is Bring Your Own enclosures. I do suggest the control board and display in one clear lid enclosure, and the bridge in a separate enclosure (possibly diecast)





All code is done in the Arduino Environment and easily uploaded to an Arduino Nano.

Display shows FWR / REV/ SWR with average and peak hold values when **not** transmitting, and instantaneous values and bar graphs when transmitting.

All in all a pretty successful stab and making a half decent SWR meter