The Story of an Ugly 432 MHz Low Pass Filter

This project was motivated by an article written by Paul Wade, W1GHZ, in 2019: **432 MHz Transverter for an SDR**. Part of Paul's article described a low pass filter for 432 MHz. I wanted to build a 432 low pass filter for my Elecraft XV432 transverter because I found the transverter had significant harmonic output after I got my new spectrum analyzer. Unfortunately, Paul's filter required winding tiny coils and used chip capacitors which I didn't have. It also used a very well made pc board which I couldn't possibly reproduce. So, I found another way to implement the filter.

I used 1/32" sheet teflon and 3/4" wide flat brass plate to make two parallel plate capacitors and straight #12 solid copper wire to make the inductors. I used the internet to find calculators which helped me determine how big the plates of the capacitors needed to be and how long the wires needed to be to give the required inductance. The plates to make a 10 pF capacitor needed to be 0.67797 square inches which is a 3/4" by 29/32" piece of brass with a hole in the middle for the #6 nylon screw to hold everything together. I calculated that the wires for the inductors need to be 1" for 15 nH and 1.5" for 27 nH. I used a piece of single sided glass epoxy pc to which I mounted two female N-type RF connectors and the parallel plate capacitors. Then, I soldered the three wires as required between the RF connectors and the capacitors to create the inductors. There were three iterations of the 27 nH inductor because it was hard to mount the inductor to the two capacitors and keep its length correct. Between each iteration of the 27 nH inductor there was a round of testing with the antenna analyzer and the spectrum analyzer. The third time was a charm, and I got the results I was shooting for.

The following are pictures and tests results for Paul's filter. Pictures and test results for my filter follow Paul's.

This is the schematic for the filter in Paul's article:

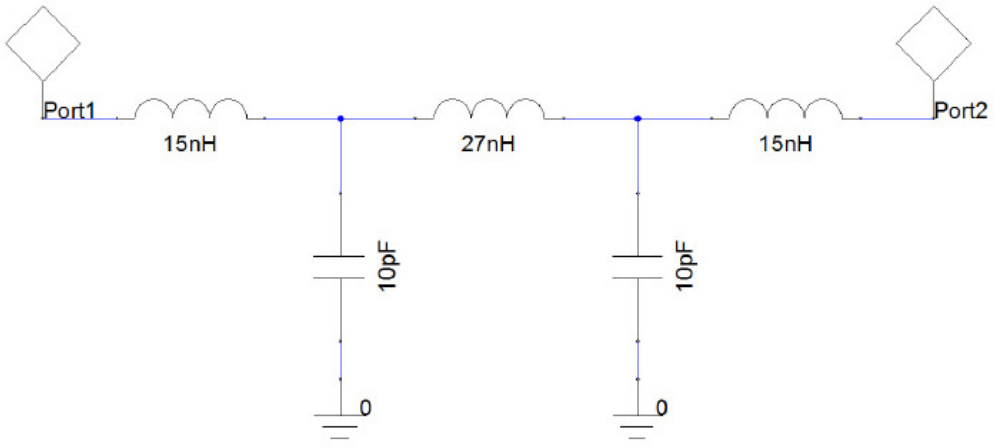
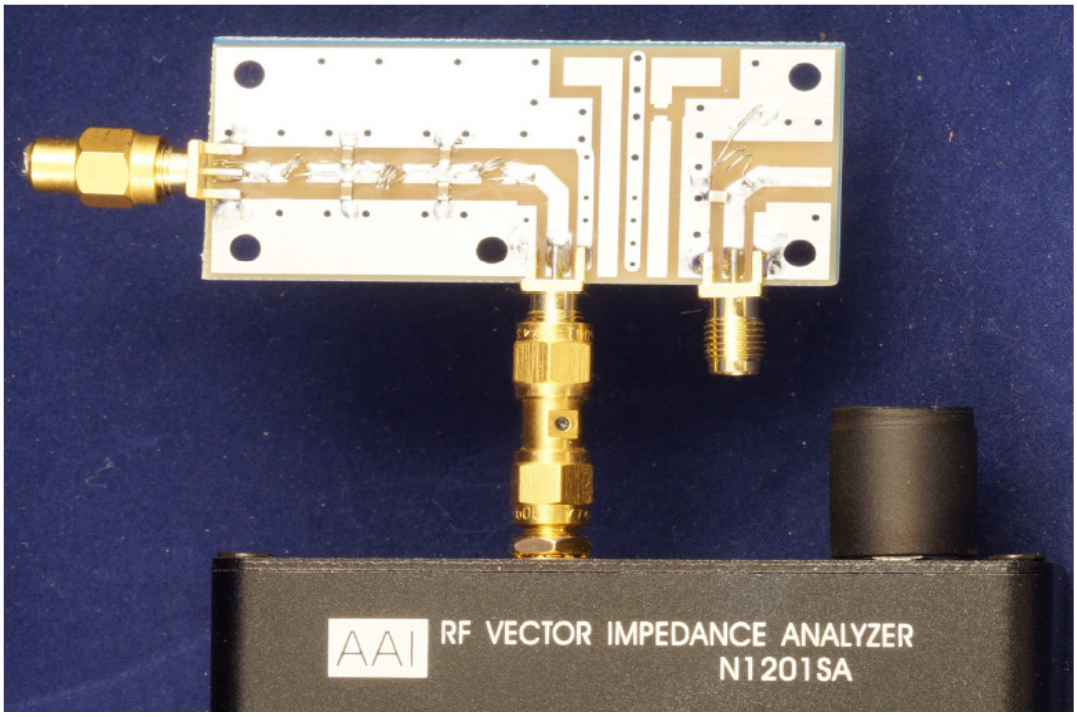


Figure 10 – Schematic diagram of 432 MHz Low-Pass-Filter

This is a picture of Paul's implementation of the filter above (note the very small inductors and chip capacitors):



This is the SWR curve for Paul's filter(note that his SWR reading is the same as mine and the shape of the SWR curve is the same):

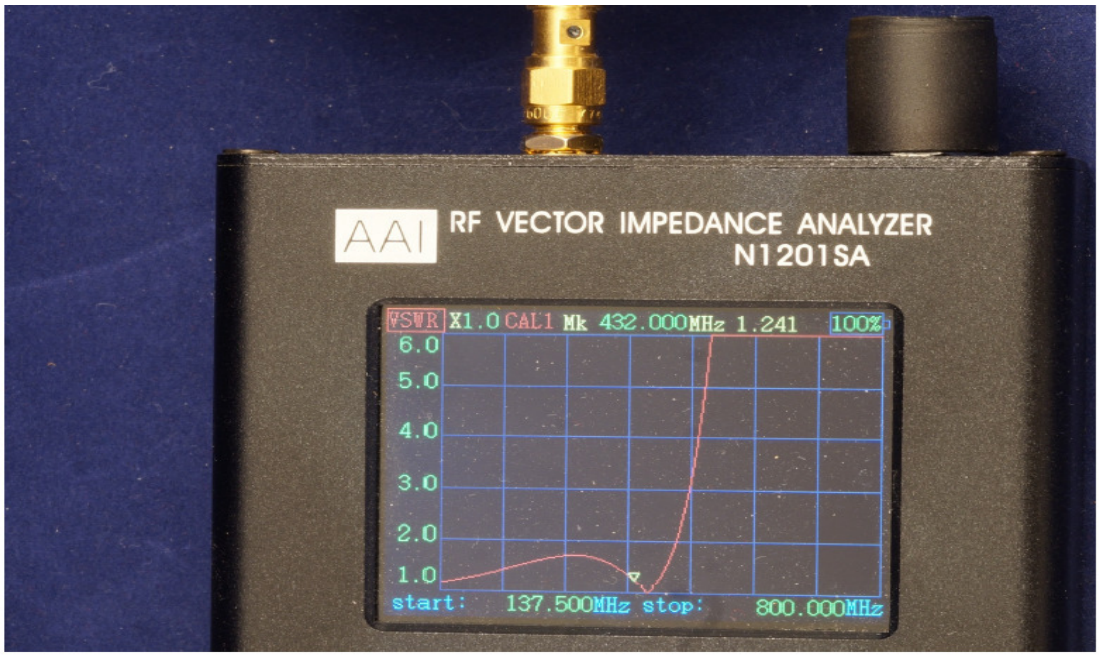
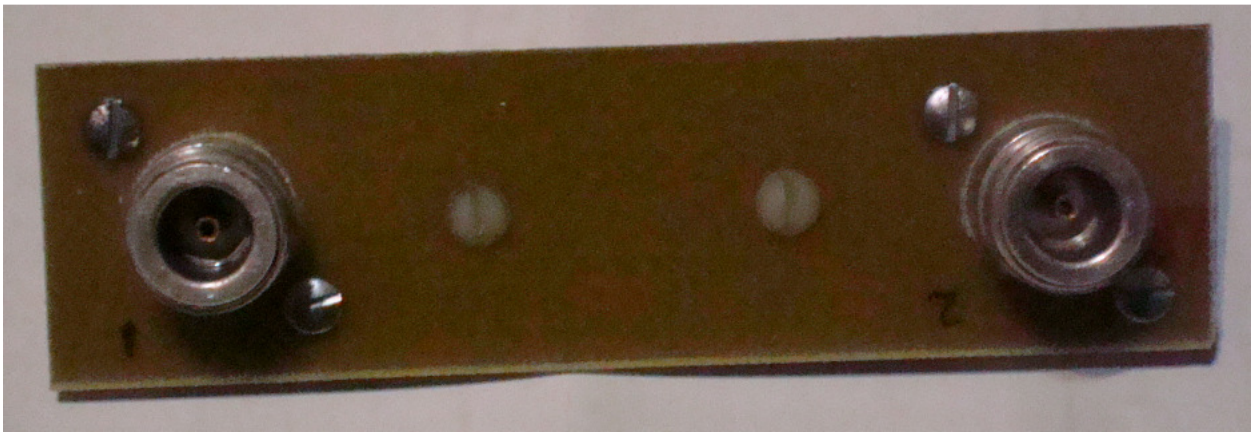
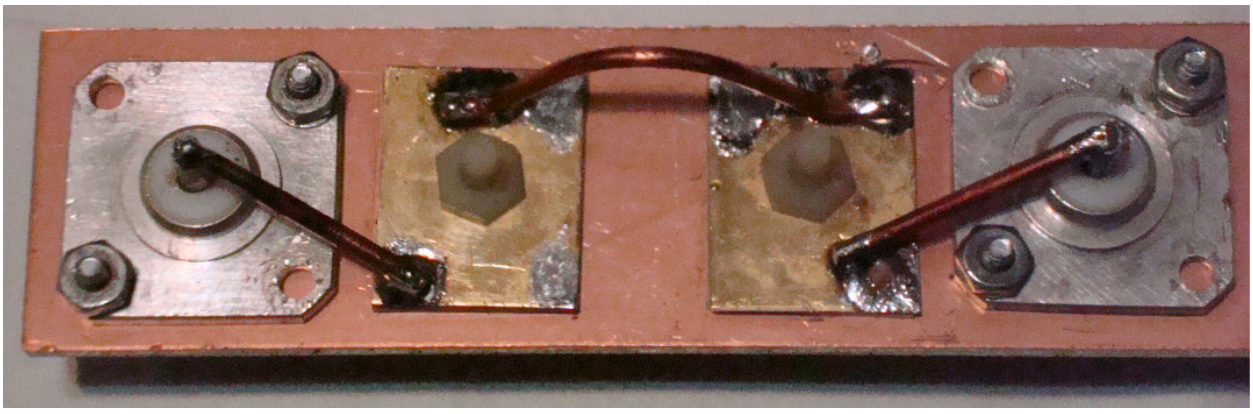


Figure 12 – Measuring VSWR of Low-Pass-Filter with 50-ohm termination using Antenna Analyzer

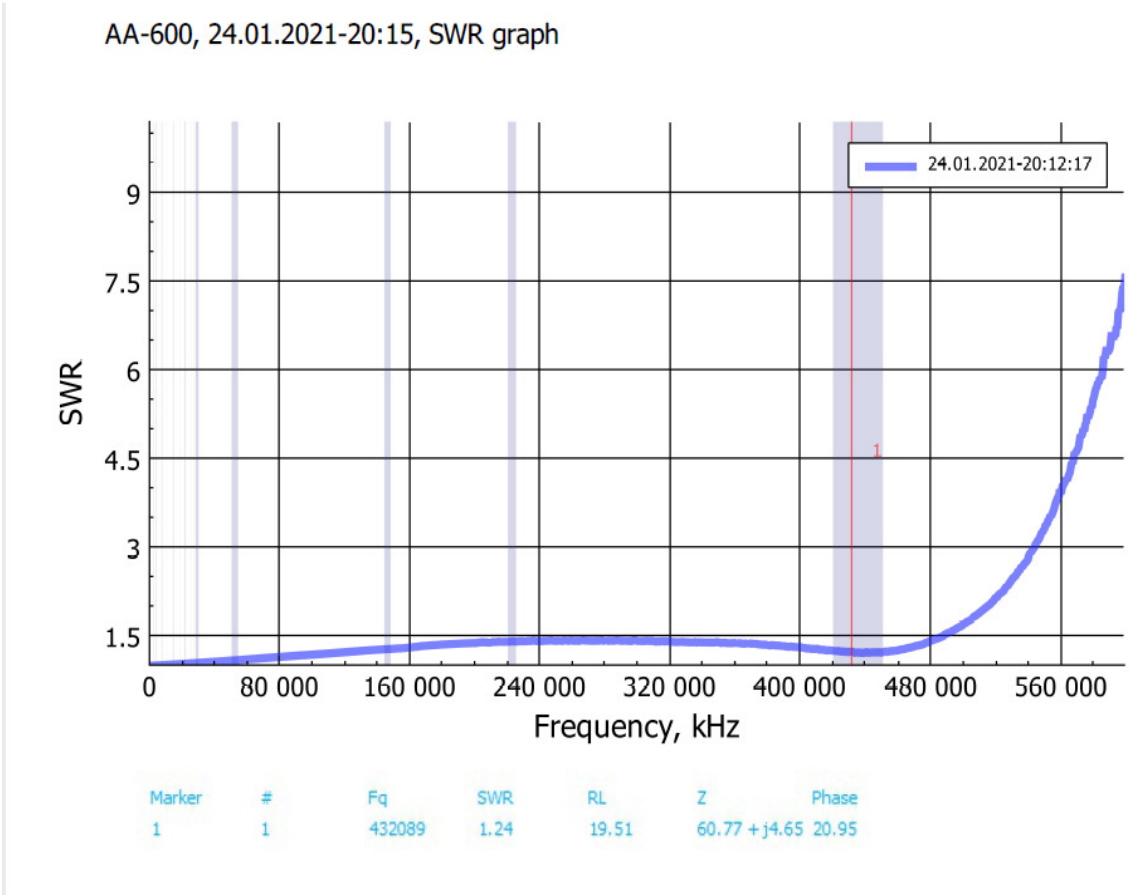
K5VIP – 432 Low Pass Filter (Front)



K5VIP – 432 Low Pass Filter (Back)

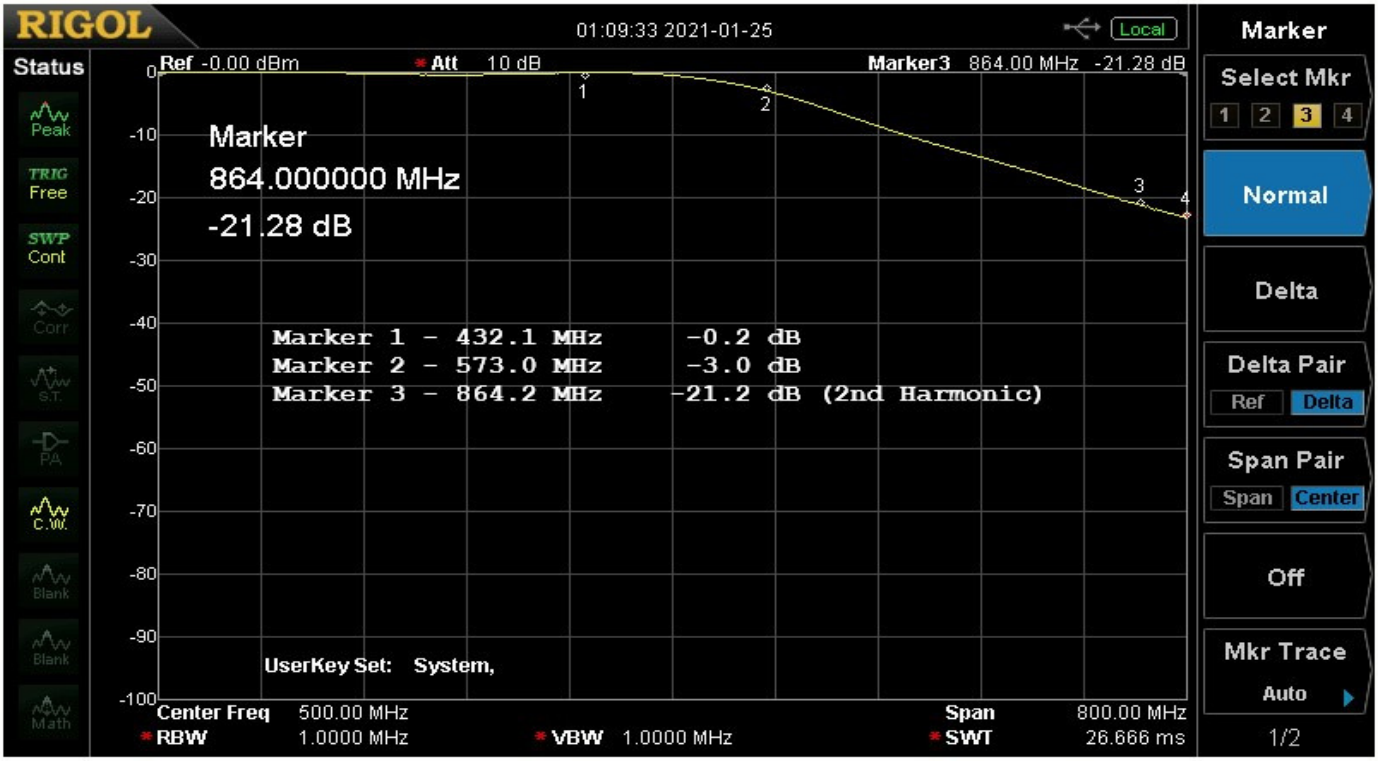


SWR plot of 432 MHz low pass filter (built 23 – 24 Jan 2021)



SWR measured with Rigexpert AA-600 Antenna analyzer at the input of filter, and a Bird 50 Ohm dummy load at the output of the filter.

Spectrum Plot of 432.1 MHz low pass filter (built 23-24 Jan 2021)



Spectrum measured with Rigol DSA815 – TG Spectrum Analyzer with tracking generator.