



SOARA Workshop 5.0 to 5.5 MHz VFO Final Design By Hal Silverman WB6WYO SOARA Education Director

Since the last issue of *Ham Radio 101* I have had some time to add some enhancements to the VFO project. There have been two major changes to the original project. I added an output stage using the same FET (2N5484) as I used for the oscillator. I also found a four gang air-variable capacitor on the surplus market. The variable cap is suitable for panel mounting.

Once I had tested the improved circuit on the solderless breadboard, I put together an assembly soldered to a "Global Specialties" solderable breadboard. There were some output differences from the two versions. This is probably due to part tolerances and the fact that the results from the solderable breadboard are not always 100% repeatable.

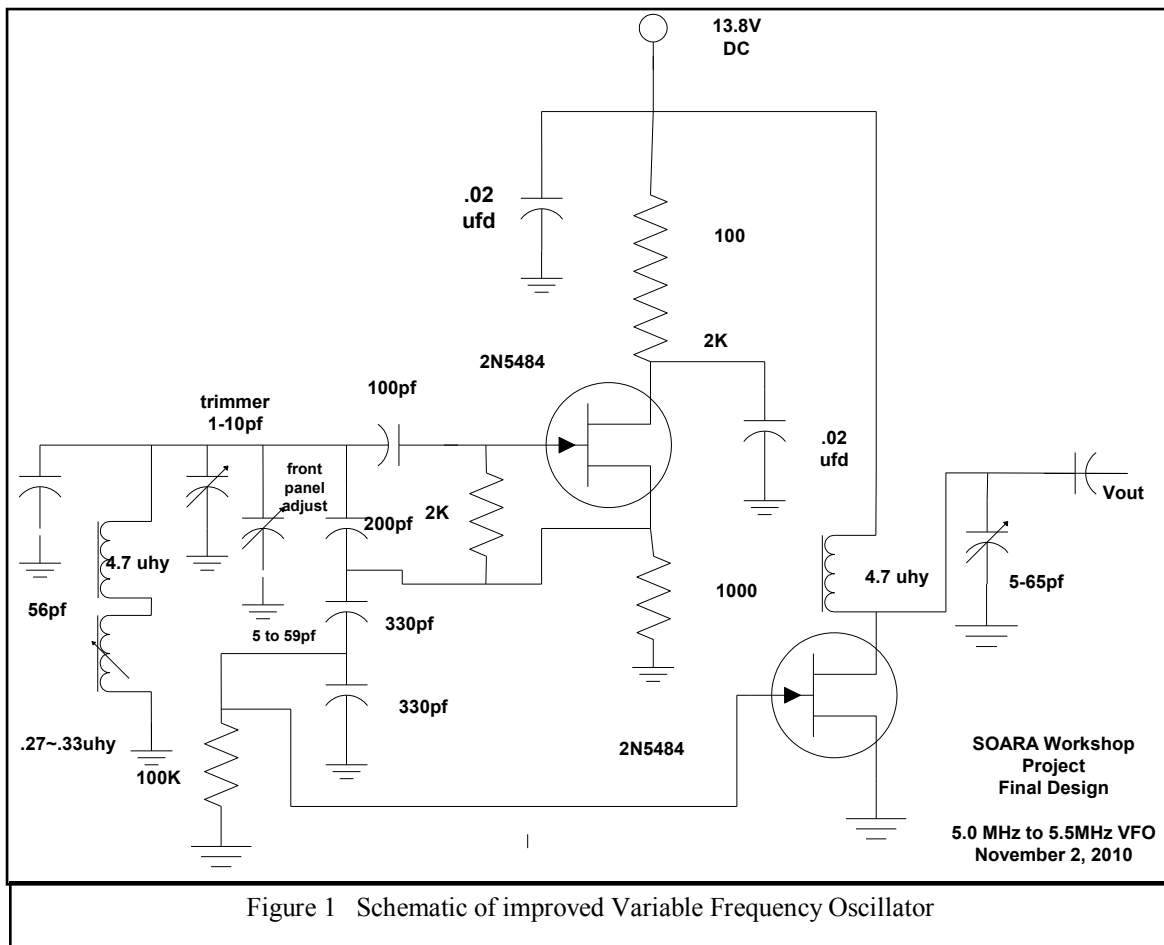


Figure 1 Schematic of improved Variable Frequency Oscillator

The capacitor trimmer is located on the side of the air variable cap and the variable inductor was found at **JK Electronics** in Westminster. There is also a second trimmer use to peak the output voltage of the output circuit. This too was also found at **JK Electronics** in Westminster

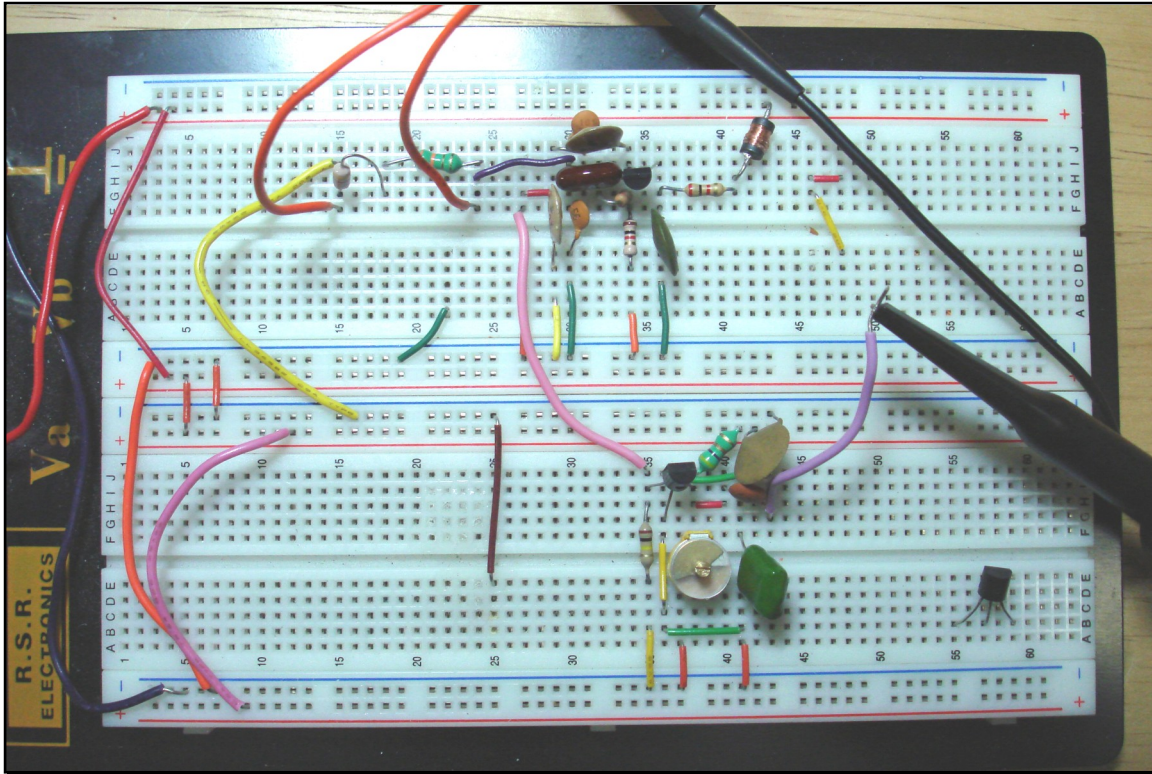


Figure 2 Final Design on Solderless Breadboard

The results of testing the solderless breadboard were that the VFO tuned from 5.07 MHz to 5.988 MHz. The output voltage averaged 2.7V p/p.

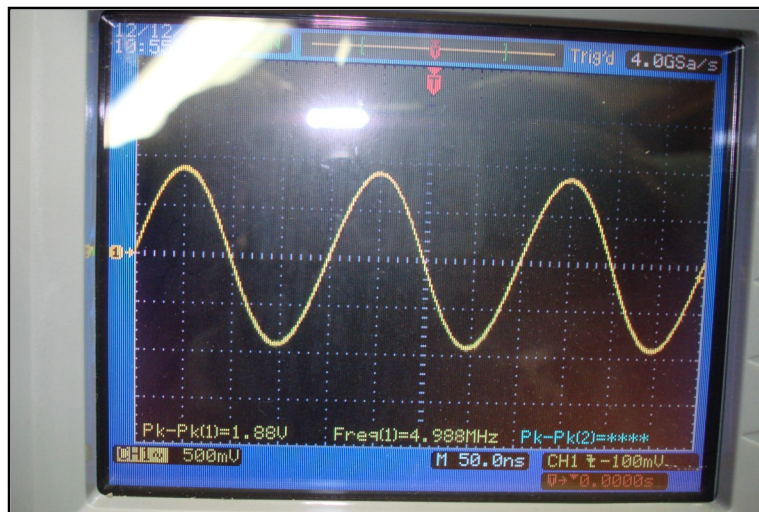


Figure 3 Oscilloscope Waveform from Soldered Breadboard

Figure 3 represents the output of the soldered breadboard. The output is 1.9V p/p and the VFO tunes from 4.64 MHz to 5.7 MHz. The scope display was taken at 4.988 MHz. In either case there is enough output voltage to drive a dual gate MOSFET as a mixer.

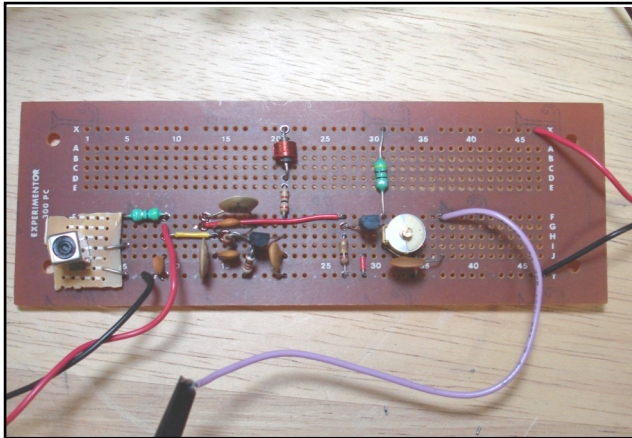


Figure 4
Soldered Breadboard

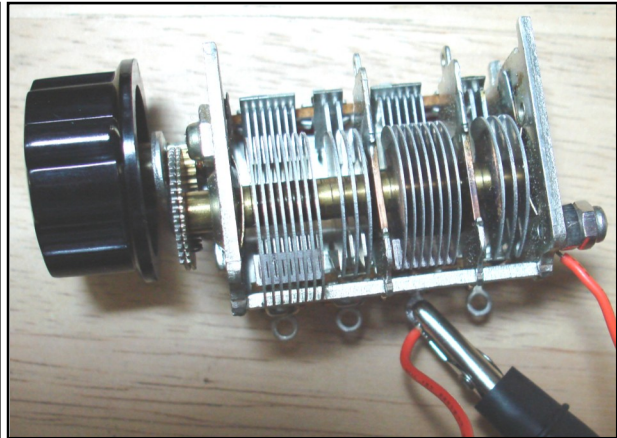


Figure 5
Four Ganged Air Variable Cap

Figure 4 is a picture of the soldered breadboard. With a judicious layout of a PCB, even more space can be conserved. Not seen in this picture is the ganged four stage variable capacitor.

The air variable is a surplus capacitor originally designed to go into a commercial radio. There are four separate capacitors and three of the capacitors have a trimmer mounted where the alligator clip is shown in figure 5.

I tried several combinations in parallel (capacitance in parallel adds like resistors in series) and found that the one shown in Figure 5 gave the best performance. The capacitor is available from **Antique Electric Radio**. The cost of the capacitor is \$2.95 plus shipping.

The next step is to do two things. The first is to complete the 1.5W QRP transmitter by adding a side tone generator to the solderless breadboard. I have almost completed this.

After that, I want to build a 9.0Mhz crystal oscillator and a mixer. That would give me either 3.5Mhz to 4.0Mhz or 14.0Mhz to 14.35Mhz. This would be the makings of a QRP transmitter. I have a web site and ordered two 9.0Mhz crystals for this project.

This will give me projects to work on for the next meeting of the workshop. This will be the first Saturday in February.

If there are any comments, please feel free to contact me at WB6WYO@SOARA.org