Amateur Radio Group Callsign – WQ5RP

Visit the group website http://www.4sqrp.com/index.php.

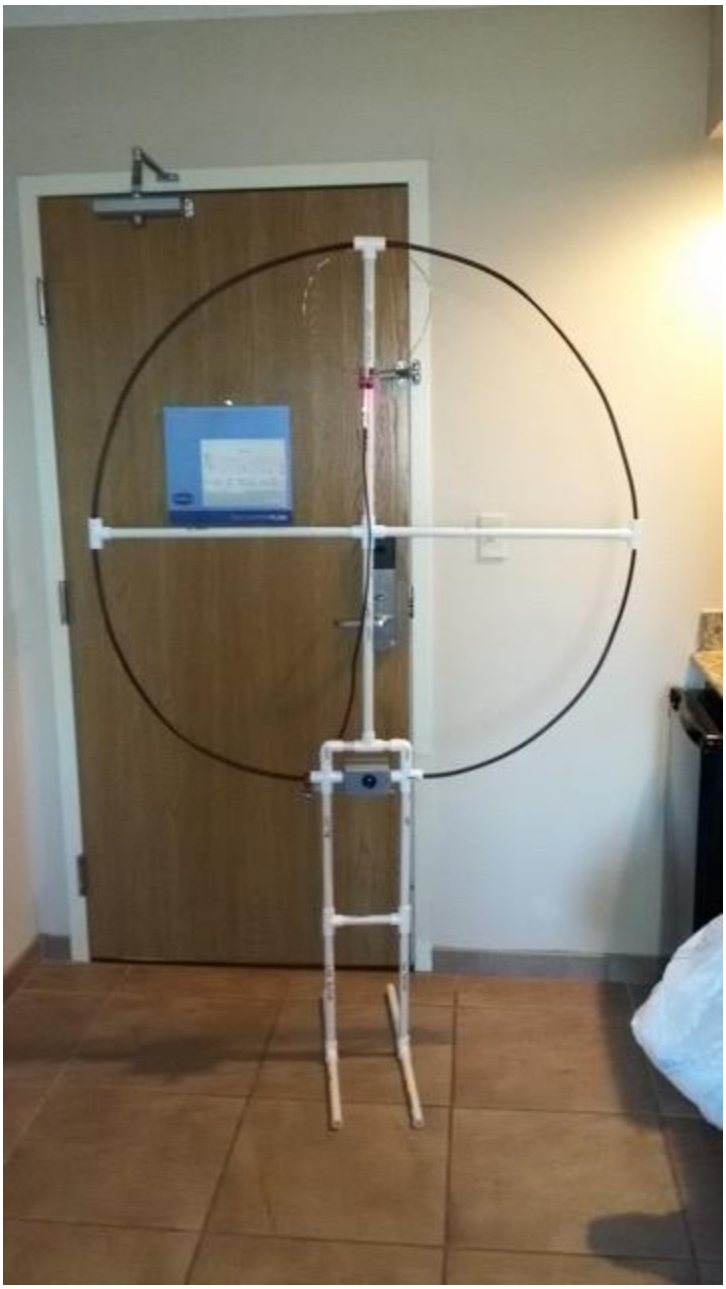
OZARK QRP BANNER

Newsletter – January 2018

Happy New QRP Year

SSS Second Sunday Sprint 2017 Results

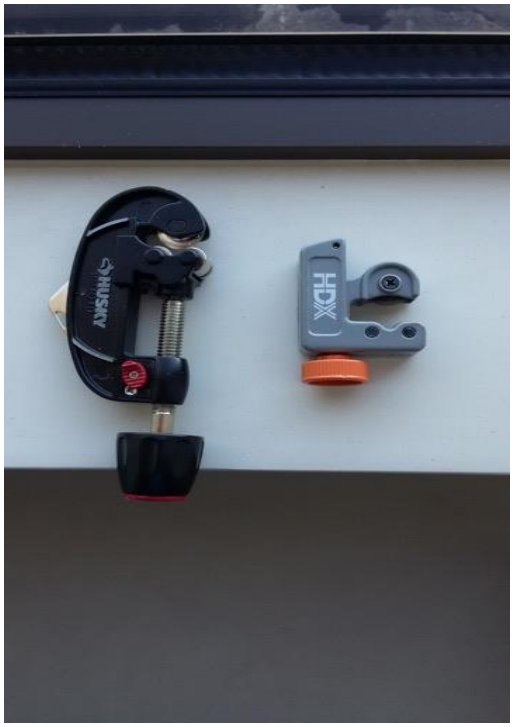
The overall winner for 2017 is Bill, KV6Z, with 177 QSO points.



A Homebrew Magnetic Loop by Chas – NK8O VE3ISD 5H3DX

Writing is not my special skill, but I have been asked to share some information about building a magnetic loop antenna. I assure you this is work in progress, but preliminary results have been encouraging. Although there are trade-offs with any antenna, a magnetic loop offers several advantages. Here are a few: 1. For the size of the antenna, when compared to a dipole, long wire, vertical, or what- have-you, the size is very small. This antenna can be dismantled, packed in a

suitcase or backpack, and transported very easily. 2. The performance is not perfect, but again, it appears to be favorable when compared to other antennas that are far less easily deployed. This antenna can be used indoors or outdoors, in apartments, in settings with CCRs, or in the field. 3. It is made from readily available parts. Some might need to be ordered, scrounged or purloined, but they are not hard to find. Others are available at hardware stores or "big box" stores like Home Depot or Menards. 4. For QRP, no fragile glass vacuum capacitors, nor are any ultra-high voltage capacitors needed. 5. The antenna can be used without a tuner. Magnetic loops are highly tuned resonant circuits, and when properly configured, they can be closely matched to the 50Ω requirement of a QRP transmitter. Materials list: 1. Wide spaced capacitor (Possible source of capacitors: orenelliottproducts.com) 2. 4x4" electrical junction box 3. SO239 connectors x2 4. Knob for tuning – consider a reduction vernier to slow the rate of change 5. Assorted screws and nuts to secure box items 6. 12' length of LMR-400 coax with connectors or according to your desired bands (see calculator above) 7. Assorted elbows, T-connections, and 4-way connections 8. 1/2" PVC for the frame. Length needed varies with frequency and how fancy you want to make the frame.



Tools used: 1. 3/8" drill 2. Various drill bits 3. Screwdrivers 4. Pliers 5. Tube cutter Some good information regarding loop dimensions, circulating voltages, and capacitance needed is available at http://www.66pacific.com/calculators/small_tx_loop_calc.aspx Diameter for a loop is C/π (3.1416 for those of you who have forgotten) where C=circumference, and radius is of course

half of that. I used rough calculations but they were close enough. Coupling loop is 1/5 of circumference of the full loop.

There is no direct connection between the main loop and the coupler. I used 12 gauge copper wire and binding post to BNC connector, but an SO239 could be soldered directly to the coupling loop, provided it can be placed against the main loop. I started with a capacitor salvaged out of a Denton Jr. Tuner. I have no idea what the capacitance might be, but I am guessing it is about 250 pF. This was mounted in a 4”x4” plain gray electrical box. My capacitor has a nylon extension, but it still suffers from some stray capacitance. I also mounted two SO239. The CENTER connector of the jack is not used, only the ground. All was mounted in the 4”x4” electrical box, but I'm sure other creative solutions are available. Layout was crude. I used a 3/8” drill and a variety of bits, but the opening for the inside of the SO239 was done by reaming a smaller opening with a bit. Not pretty, perhaps, but it worked. The slightly sloppy part underneath was hidden by the connector itself and the mounting holes were aligned by drilling with the connector itself as a template. With the 12' length of LMR-400, a coupling loop, and a length of coax to go to the radio, you essentially now have a working magnetic loop antenna. You can hang the loop from a hook and you're on your way.

The problem is that hanging the loop is not often very convenient. I solved the problem by making a frame with 1/2” PVC. Construction was not critical. Some simple calculations (remember C/π ?). From there, you can figure out the length of the support arms. I also created a stand to secure the loop with the PVC. The frame and loop easily come apart to be carried in my backpack or suitcase. I have a suggestion regarding the tube cutter. Do NOT try to save money by buying a cheap, small one. A decent cutter for 1/2” pipe costs less than $20. Spend it if you don't already own a good one. There is nothing difficult about the construction. I did mine on the road in a hotel room. Total construction costs: < $100. Improvements include adding a 6:1 vernier to reduce the rate of change, and placing switches in the box for raw capacitance, and a DPDT switch to add or subtract capacitance by putting a couple of 100 pF 1000V capacitors in parallel or series with the variable capacitor. 72, Chas – NK8O VE3ISD 5H3DX

Using the 4 State QRP Group's Enclosure Kits

One ham's perspective. By: Jim - W0EB

Part 1: The "Indo Ware SSB-6.1

One day, a few months ago, I came across what I thought would be an interesting transceiver kit (the Indo-Ware SSB-6.1) on eBay. This was listed as a "6 band, bare bones, transceiver kit of parts only" and required an external DDS VFO. The SSB-6.1 kit was just under $50 US with freeshipping from a supplier in the United States, so, with some trepidation, I ordered one.

When it arrived, they were really correct, it was a bare PC board with a kit of 0805 size surface mount parts only with absolutely no instructions whatsoever.

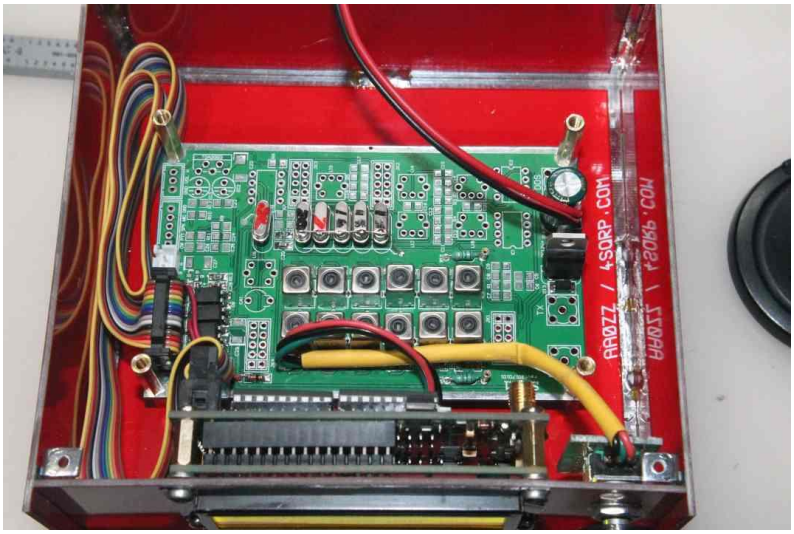
I almost sent it back, but further research on the internet led me to a Facebook group devoted entirely to this kit and one of the "Admins" (G0CWA) of the group had laboriously developed a nearly complete "build it" manual. I also found out that a certain DDS VFO I had purchased and was researching, was designed specifically for the SSB 6.1 and with the right cable, seamlessly interfaced to the main board for power, and control signals – I also discovered (after destroying one) that you cannot connect an optical encoder to the DDS without providing an optically isolated interface or the DDS goes up in smoke.

I designed an interface for it but that's another story and the interface construction manual is on the 4SQRP Yahoo Group in the "Files Section".

Using his manual and asking a few questions for which the answers were either very vague or not in the book, I undertook the build. The front end filter coils and all transformers in this kit are bobbin wound on TOKO 7mm, Ferrite shielded, slug tuned coil forms using extremely fine (.1mm) diameter wire! Definitely not for the faint hearted for sure.

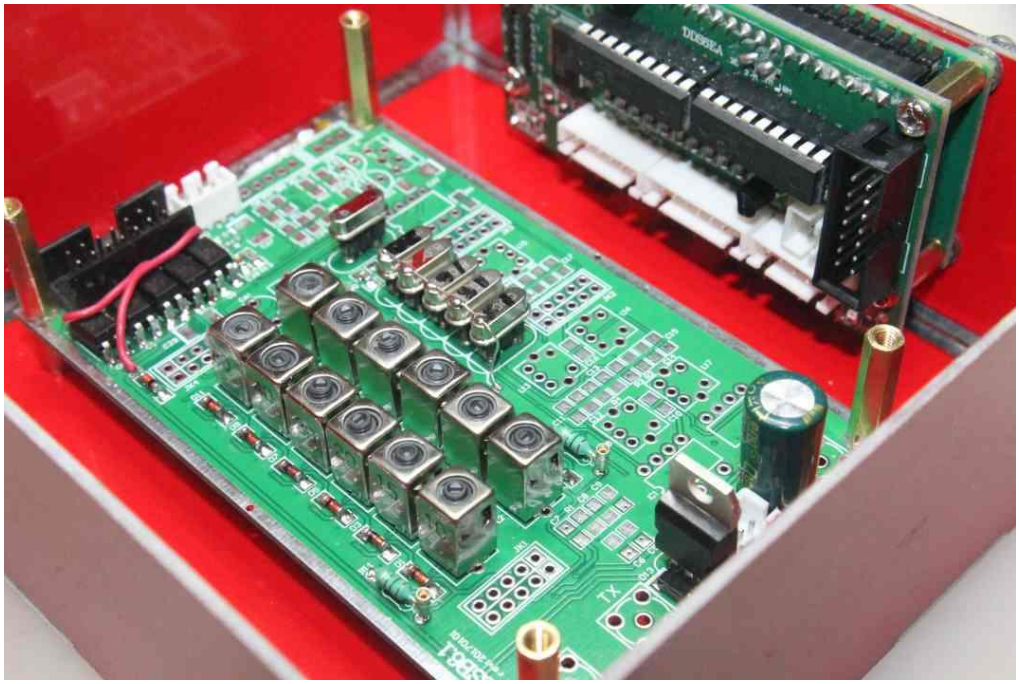
You also have to make your own variable bandwidth crystal filter. They send you a few extra crystals and you are supposed to match them yourself. Well, none were close enough to suit me so I purchased an inexpensive bag of (100) 8.000 MHz crystals on eBay and also purchased and built a Midnight Design Solutions Scalar Network Analyzer. They have plans for a "Crystal Grading Fixture" which I built and ran through the bag of rocks. I needed to get 6 crystals that were within 35Hz of each other and using the MSNA I came up with a group of 6 that were even closer than that. All were within 8 Hz of each other and that gave me 5 for the filter and 1 for the BFO oscillator.

Looking over everything as I was soldering those small 0805 size components on the board, I came to the conclusion that the transmitter was going to be difficult to make conform to the US FCC specifications and the power out of the main board was only 1 milliwatt or less so I decided to built it as a receiver only rather than the full blown transceiver. It took several weeks of adding a few components and then taking a break to keep from going berserk soldering all those (several hundred) components on the PC board but I finally got it done. Once everything was cabled together, I was able to align it satisfactorily enough to operate as a decent 6 band (80, 40, 30, 20, 15 and 10 meters) receiver. At this point it was an ugly lashup looking for some kind of case to put it in.



About then, our fantastic kit designers came up with the AA0ZZ PC material enclosures and I obtained one of each size that was available at the time. The PC board for the SSB 6.1 was a bit too large for the small (Little Blue Box) enclosure, so I did a quick layout to see if it would go into the medium (Little Red Box) enclosure and fortunately there was enough room to put everything in there.

The hardest part was installing the DDS VFO on the front panel as it was going to be very tight! Fortunately since I have a hobby business making Dot Stabilizers for bug type telegraph keys, I have a small Harbor Freight milling machine on my workbench that doubles as a drill press. After several days of careful layout work I milled out the slot for the LCD display (of course it slipped and looked ugly) so I covered the mistakes with a “Lexan” bezel and carefully laid out and drilled the holes in the panel to allow the DDS on board switch buttons to protrude in reasonably elegant form underneath the LCD. Fortunately I didn’t slip on these and they came out right where the plans said they should.



I did get smart and did not solder up the “Little Red Box” until I had all the necessary holes drilled/cut in both the front and back panels. This made the operation much easier and helped me to keep from damaging the finish on the panels by trying to use a hand drill after the box was already assembled. I also did NOT solder the front panel in place to make it easy to remove for modifications or repairs later. If I had finish soldered it, removing things for modifications and/or repairs later would have been next to impossible.

I found a really nice 2 inch diameter, shielded magnet speaker on Amazon for a decent price so I installed one of those in the lid (I used a piece of an old Red tee shirt as the grill cloth to keep dust & other stuff from getting into the box through the speaker holes.

Finally, I labeled everything using my Brother “P-Touch” PT-D210 label maker with “White on Clear” labeling tape. Still looks home brew, but a lot better than using a magic marker and just writing the labels on by hand.

By: Jim - W0EB

Using the 4 State QRP Group's Enclosure Kits

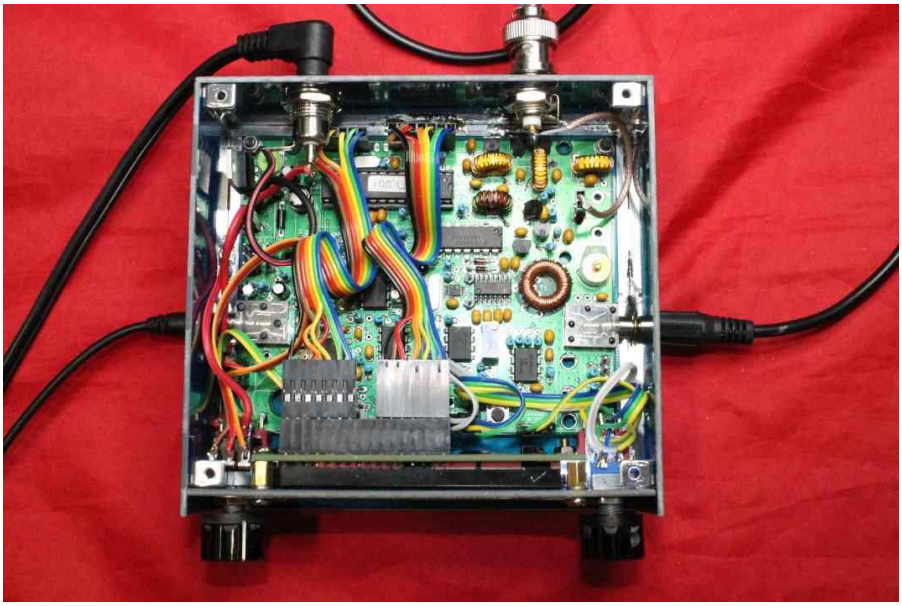
One ham's perspective. By: Jim - W0EB

Part 2: The QRP Labs QCX Single Board CW Transceiver (40 Meter Version)

Several months ago, a local ham friend asked me if I had seen the QRP Labs QCX transceiver. I hadn't, so I looked at it on their website. The price was certainly right considering all the built in features so I ordered one. Of course, the response to their price and feature list caused just about everyone in the world to order one too and that put the shipping of mine out several months. Finally in mid November, it arrived (Serial# 943).

I had already printed and studied the construction manual from their website (www.qrp-labs.com) so I was reasonably well prepared when the kit arrived. It's a relatively easy kit to build with the exception of one toroidal transformer that has multiple windings and it's only a half inch in diameter. One MUST get the windings correct and connected with the proper "sense" (beginning and end wires of each coil in the proper holes) or it won't work right. Fortunately I got mine right thanks to the excellent picture and hand drawn diagram included in the manual.

I built it exactly as shown in the instructions to make sure I was able to get it working and properly aligned before trying to put it in an enclosure. As it comes, it's just a stuffed PC board with all controls, connections and readout LCD out in the open so to keep from dropping tools or other conductive items onto the rig and shorting something out while having power applied, I started looking for an enclosure in which to install it.



The board is 10 by 8 centimeters and the LCD display is a standard sized 16 X 2 character display with a blue back light. The antenna connector is on the right side and protrudes from the board. The key jack is also on the right and protrudes slightly with the earphone jack on the left side

protruding the same amount. The power connection is to a two terminal block with screw clamps and that's on the left as well.

I originally thought about purchasing the 4SQRP "medium" (Red) enclosure I had used for the project in Part 1 of this article, but the QCX was already finished and being the impatient person I am, I figured that would take too long. I already had the one size smaller (Blue) enclosure on hand and I found the QCX PC board would actually fit in that box IF you removed the antenna jack.

I looked carefully at the display dimensions. Having an identical display that was inoperative, I disassembled it and used it as a template to carefully lay out the front panel. I found I had room to put the frequency encoder on the right side of the display, but that the volume control was just too large for the left side of it. I looked through my stock of parts and came up with a 5K miniature volume control that had an ON/OFF switch on it and was just small enough to fit to the left side of the display and keep the front panel symmetrical so I replaced the supplied volume control with my miniature one, and used some nice push button switches I had to replace the ones on the main board for 2 of the 3 function switches. (The third, actually S1 is part of the encoder itself.) I carefully milled out the window for the LCD and had a minor error that made the slot look a bit ugly so again I covered the mistakes with a Lexan bezel.

I removed the screw terminal power connector and put a 5.5/2.1mm coax power jack on the back panel along with a standard panel mount BNC connector for the antenna. I ran some RG-

183 Teflon miniature coax from the QCX board to the antenna jack and power to the On/Off switch on the volume control and back to the PC board. I set up all the other cables with DuPont connectors (they fit header pins) and ribbon cable to include the cables from the rear of the QCX to the display mounted on the front panel.

At this point, I carefully mounted the QCX PC board to the bottom of the 4S Blue enclosure and powered it up to make sure it was still working – OOPS, blank LCD display. I had 2 wires transposed on one of the DuPont connectors going to the display. After I corrected this and everything worked, I proceeded to remove the QCX main board from the enclosure and solder the back and 2 sides to the bottom. I only soldered the back half of the left and right sides to allow them to be slightly springy at the front. This way I could insert the board from the front, connect all the wires and finally snap the front panel in place without soldering it. Leaving the front panel unsoldered allows for removal of it and the QCX PC board for modification or repair. This would be next to impossible if the FP was soldered to the sides and bottom.

Once I had everything set and the sides soldered, I carefully marked and drilled a 3/8 inch hole for both the earphone and key paddle plugs to be inserted through the sides of the case. That way I didn't have to remove the key and earphone jacks to install them on the rear panel of the enclosure. If I had installed them on the rear panel, the wires would have run right across the power amplifier and would have been subject to pickup of RF energy with who knows what kind of results.

Finally, I mounted the "L" brackets, snapped the front panel in place, screwed the top cover on and immediately found out the knobs had skirts that were too wide and they hit the sides of the recessed front of the enclosure. Easy fix! Using appropriate shaft stock, I chucked them in my battery drill and spun them against my small belt sander until the skirts were flush with the rest of the knob. Now they fit properly and don't bind up.

Final labeling of everything with my Brother "P-Touch" PT-D210 label maker using white lettering on clear tape and we have an elegant enclosure for the QCX.

Now for the bad news; I don't recommend using the small Blue box for the QCX as you have to use a smaller volume control than the one supplied with the kit and things are really difficult to lay out and get all the holes in the right place. I think a more appropriate enclosure for the QCX would be the medium Red box which has quite a bit more room in it, you can use the original volume control and there might even be enough room to put a decent battery pack in the enclosure with the rig. I have another QCX on the way (Serial# 2179 which is several months ut.) I will put this one in the Red enclosure and report back on that project when the time comes.

……Jim, W0EB

Ozarkcon 2018

An ARRL approved

Operating Specialty Convention

SSS

Second Sunday Sprint

I am working on a revised set of rules for 2018. **The main difference will be allowing 10 Watts on Sideband.** Also, I'm considering the CW and sideband portions of a band to be separate bands from now on, so if you have a CW QSO with someone on 40M (for example), you can also have a sideband QSO with that person on 40M and it will count as two QSOs. But CW QSO's need to be made in the CW portion of the band and sideband QSO's obviously must be made in the sideband portion. Look for the revised rules on the 4SQRP website well before the January SSS.

72 and happy holidays to all,

John, AA0VE

4SQRP Contest Coordinator

Second Sunday Sprint -

Occurs on the second Sunday of each month, 7 to 9 PM Central
Any mode, any band (except WARC & 60 mtrs) -

- **Suggested frequencies are near the Four State hangouts of 7122 and 3564,**
  as well as the usual QRP watering holes.
- **See** http://www.4sqrp.com/4sqrpOnTheAir.php

OZARK QRP BANNER is a publication of the Four State QRP Group and Ozarkcon

http://www.4sqrp.com/index.php

Editor: Walter Dufrain – K5EST

For news, articles, inquiries for the Banner: editorqrpbanner@gmail.com

Deadline for copy is the middle of the month prior to the next issue.