

## Alachua Ham Building Project Round 2: Late September LabNLunch Packaging the Arduino Winkeyer Emulators

On Saturday, September 21, 2024, our intrepid crew re-assembled to attempt finishing our Arduino CW Winkeyers, including mounting them in plastic project boxes with access to the connectors, and building cables to connect to ham transceivers. We had the usual issues with folks out sick etc, but still had a rowdy crew of six working together -- and Eric Pleace concluded he wanted to build his own Winkeyer as well as having helped Wendell. This is amazing -- we have actually used up ALL TEN of the boards I ordered from PCBWAY.COM



I had a "drilling instruction" document - <https://www.nf4rc.club/how-to-docs/arduino-winkeyer-packaging-instructions/> and we had the xeroxed "template" for drilling. This helped a lot. Some of our members were apprehensive about handling the Ryobi portable drill -- but they turned out to do quite well!

A fair bit of "soldering work" still had to go on to get boards to completed status. The command and memory buttons were designed for "point to point" hand-wiring, and this proved to be confusing, as our members have trouble reading schematics and understanding how to translate into wires between objects. Great learning opportunity! Several needed a refresher course on resistor color codes and how they work ("Better Be Right Or Your Great Big Venture Goes West" 0-Black 1-Brown 2-Red 3-Orange 4-Yellow 5-Green 6-Blue 7-Violet 8-Green 9-White) ; Eric Pleace KO4ZSD was great at teaching this! Hugh Minnich was a very patient instructor helping people with the point-to-point wiring.



In a future edition, I should work on putting surface-mount pressure buttons on the "back" side of the board -- this isn't hard at all and I should have thought about it.

Participants learned about brass standoffs, and picked ones to get the input/output connectors low enough to be on the bottom part of the project box. Then our participants learned how to use machinists' calipers to measure the proper depth for holes to access the connectors. We drilled "pilot holes" with 1/8" bits, and then used wood-spade bits to make 1/2" holes for phono-plugs and 3.5mm jacks. 1/4" bits with a bit of "wobble" admitted the speed potentiometer and the push-buttons. A ton of learning went on here!

Cutting the rectangular hole for the 2x16 character LCD display was yet another learning experience -- for me as well! We used a small circular cutter on a mini-dremel tool to cut each of four straight lines and then pushed out the cutout. Errors can be covered up with an electrical-tape "bezel" or Eric may make up 3-D printed bezels in the future.

We had a minor boo-boo on my part when we discovered that no matter how many memory buttons you wanted (1, 2 or 3) -- you still needed 4K worth of resistance from the "buttons" pad to ground. Some of the keyers appeared "haunted" with only 3K.....problems disappeared when we added in the right number of 1K ohm resistors. I corrected an error in the schematics and in the instructions as a result.

When all was said and done, we were able to send pretty much everyone home with a working keyer and some left with loaned-out "paddles" until they can make or buy their own. I have learned how to make an acceptable \$7 Paddle out of a stamped steel tie part from Home Depot -- we may have yet another LabNLunch to build some of these. Our members learned a lot about how to wire up 3.5mm and 1/4" phone plugs also! This was one of our best hardware projects ever!