

Winlink in a Box

Alternate Title: A Love Letter to Amateur Radio

RMHAM University Nerdfest

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Yes, I have a project I want to show you, but more than that, I want to talk about why I love amateur radio

Your Host





Chris Keller, K0SWE. Active in RMHAM and Colorado ARES R1D6, as well as software development for amateur radio



Past

PiPat

https://k0swe.radio/pipat





One of my first deep dives in amateur radio was Winlink, which led me to put together a "recipe" I called PiPat. (I presented it at RMHAM-U Nerdfest 2020!) I sought to build a simple AX.25 packet station from inexpensive, available hardware in a small package. Using a Raspberry Pi and a TNC-Pi taught me a lot about VHF AX.25 and the Winlink ecosystem. PiPat has instructions for keeping time with an RTC module or GPS, it can either connect to a known WiFi network or create its own... All things considered, it was a nice little project. Ultimately, the TNC-Pi using dated hardware-based decoding was just too limited and unreliable.

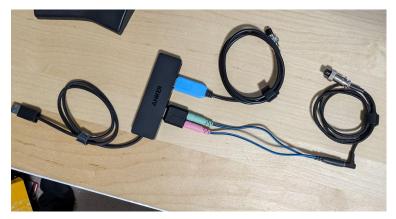


Sound Card Interfaces









I started looking at sound card interfaces, first for more VHF AX.25 with Direwolf, then expanding into things like HF FT8 and JS8. But for HF, it's useful to have CAT control, and having separate sound card and CAT control is a lot to set up. How hard would it be to build them into one device? The Yaesu SCU-17 exists, but it's not really compact enough for SOTA.

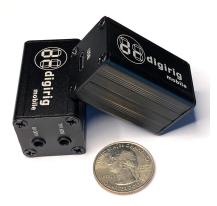


It's just a USB hub chip, sound chip and serial chip thrown on a PCB, how hard could it be? Six months later...

This was only my second PCB project, and the first with SMD parts, so there was a learning curve. But hey, it worked, and it's only the size of a deck of cards!

DigiRig Mobile







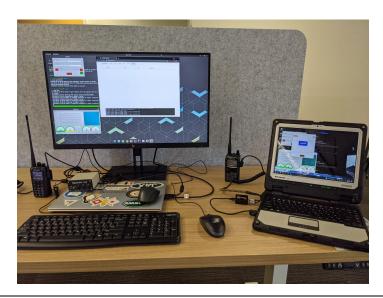
Denis K0TX, an actual electrical engineer, made pretty much the same thing, only smaller and probably designed better. But hey, I learned something!



Present

Problem: Portable VHF Winlink RMS





Switching back from HF to Winlink. I'm helping to integrate the Pat Winlink client with VARA, and it as a test platform, VARA FM over VHF is more accessible to me than VARA HF. I started hauling around 2 Winlink stations around with me so I could test both client and server side, but getting all of the knobs tuned every time started to become a huge PITA.

Solution: Winlink in a Box



An Evolution of PiPat

- Power it on & it works
- Could be configured as:
 - o an RMS with linbpq, or
 - o a client with Pat



I want a portable Winlink RMS. I want the outside of the box to be a power plug and an antenna connection. Plug it in and it just works.

Solution: Raspberry Pi with LinBPQ, sound card interface, and an HT. Uses a lot of lessons learned from PiPat, e.g. auto-hotspot to connect to known WiFi or create its own AP.



Future

Raspberry Pi Compute Module



- Raspberry Pi 4 + Signalink takes up quite a bit of space
- Custom device with CM4?



Raspberry Pi Compute Module is a RPi without the usual connectors. Instead it has some sub-micro cell-phone-internal-type connectors. It's meant for custom use cases like industrial and IoT.

We could make a CM4 carrier board with sound card, serial for PTT/CAT, RTC. What about GPS, either on-board or USB port to plug one in? What about safe shutdown with a small battery? Ham-optimized!

Unfortunately, right now (early 2022) happens to be a bad time to experiment with RPi because the chip shortage has hit RPi inventory hard.



Amateur Radio is a nerd's playground

Even in just this little slice of the hobby, I've broadened my horizons and learned a lot of neat new skills. Before I got into amateur radio, I wouldn't have dreamed of making my own PCBs, mostly because I didn't have any use cases. Amateur radio is a vehicle for engineering and scientific creativity and discovery! And it's great meeting and working with like-minded individuals!



Contact Me

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