

Cyberdeck: Part Ten

[Medium.com/@jagould2012/cyberdeck-part-ten-2958a534caa5](https://medium.com/@jagould2012/cyberdeck-part-ten-2958a534caa5)

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The build is complete! Well, almost...

Final Parts Arrived

The last missing pieces arrived and was able to get the case fully assembled! The Geeek Pi 1U LCD looks really good, and will look even better when it has SDR++ running with an analysis and waterfall display going (more on that configuration in a later article).



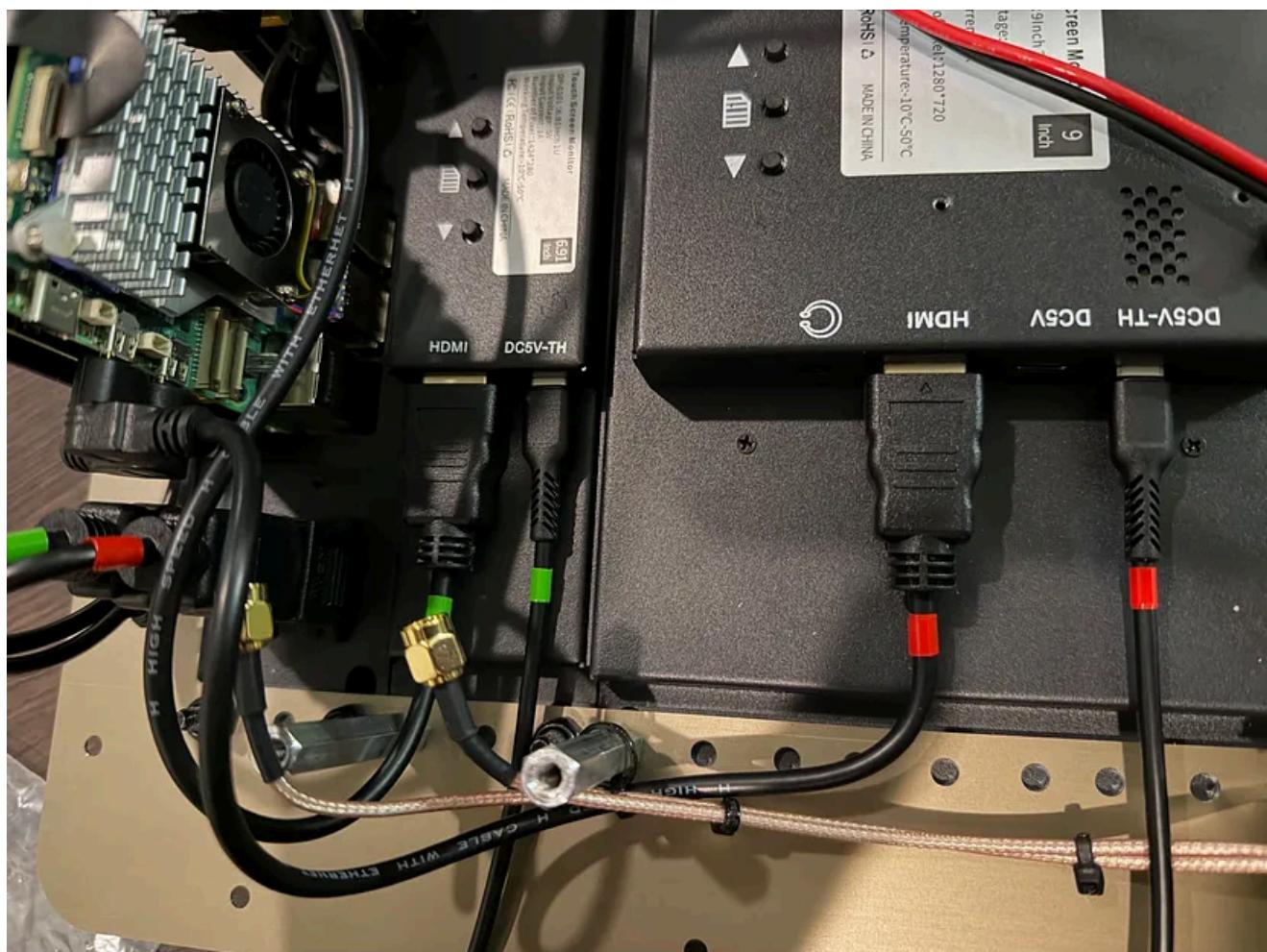
First boot with both LCD installed.

Redundant Compute

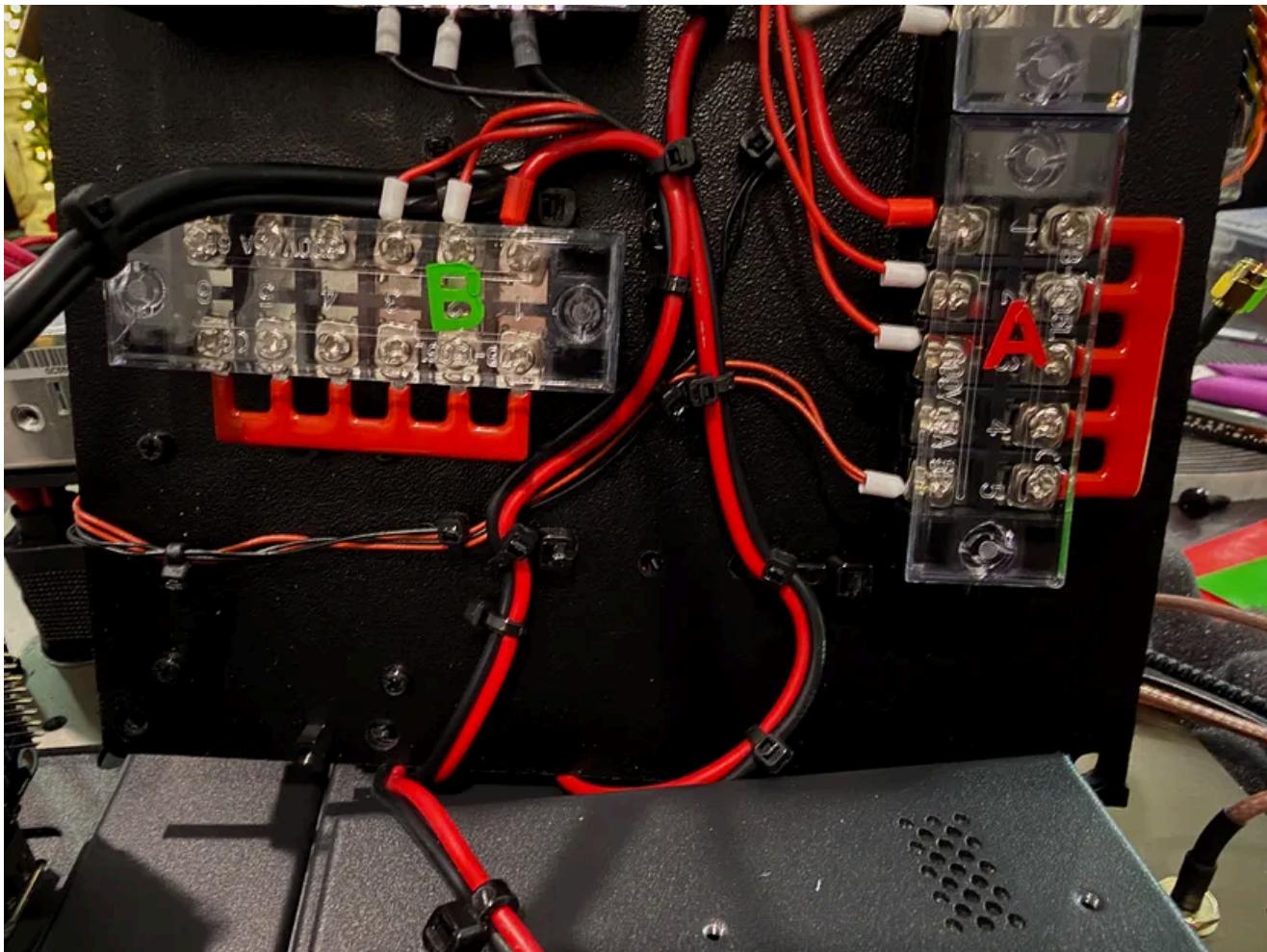
With two Raspberry Pi boards, two LCD touch screens, and two 5v power supplies, the design has redundancy built-in:

- If a component fails, the other board can take over the responsibilities of the other.
- A simple move of the right angle UBS cable on the front panel swaps the USB radios over.
- All software is loaded on both computers, so Pi 2's launch scripts can be run easily on Pi 1 in a failure mode.

This does lead to a bit of confusion when working on the panels as there are two of every cable, and you constantly find yourself tracing it back to the Pi to know which one you have. I solved this with a very simple set of vinyl tags cut on the vinyl cutter, red for Pi 1 (the A circuit) and green for Pi 2 (the B circuit). Major components such as the power terminals or USB hubs are labeled with a colored letter also.



Vinyl wire tags help identify which Raspberry Pi a cable routes to.



A and B circuit power labeled.

Right Angle N-Connector

I was finally able to locate a low-profile panel mount [N-connector](#) that fits in the approx. 1" space between the front panel and the power supplies. Previous version had bent the RF cable at too tight of an angle when using a straight connector similar to the SMA ones seen above.



Surprisingly difficult to find panel mount N-conector.

Other Finishing Touches

- I lined the lid of the case with 1/8" to protect the keyboard and cut two sheets of to sit between the keyboard and the screens when the case is packed up.
- Found a very nice ribbon style for the Mayhem Portapak, with a down-angle connector, so you can easily charge to unit as well as connect to it from Pi 1.
- The thin cable to the Mayhem allowed me to install the GPS antenna from the on the front panel just below the N-connector.
- Purchased two small , which are made for pens and pencils, that work perfectly for holding all the antennas when packed up.



Antenna cases, power cable, and neoprene sheets under the keyboard.



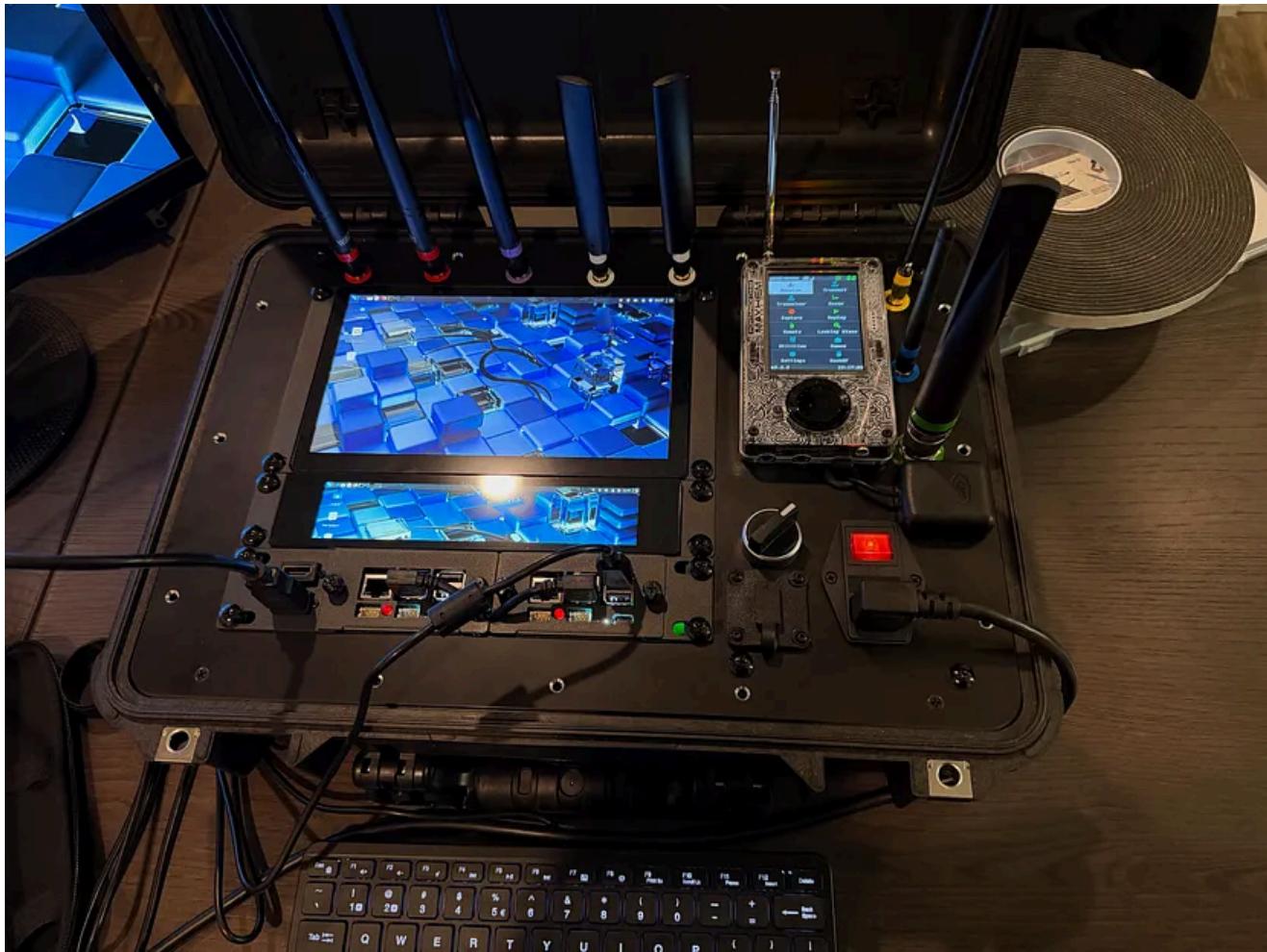
Adhesive neoprene lining on the case lid.

Build Complete! Almost... Well, probably never...

The case build is now finished — or at least for a week or so (see below). I'm really happy with how it turned out and am excited to move on to the software portion of the build. Though I am realizing this might never actually be finished? If you remember, the whole concept of the panels and the 10" rack design was for it to be flexible for future upgrades, and I think I really achieved that goal:

- The whole assembly is built off the back of the front panel. Fairly simple to remove from the case with no attachments to the Pelican except the bezel screws.
- Modular panels allow me to remove sub-systems (power, USB) and work on those individually.
- The ABS panels are very low cost, so in the future they could be replaced completely when a new layout is required and the old panels are a bit too full of holes. No redesign of the much more expensive aluminum front panel would be required.
- 10" format rack makes the front facing equipment easy to swap (new generation Pi boards, LCDs, etc).

I am very satisfied with the hardware choices I made though, so upgrades are probably in a distant future (after all, my wife does read these articles).



5V Power Problems (cont.)

In a previous [article](#) I addressed the issue I was having with the Raspberry Pi 5 and how it doesn't like a lot of current draw through its USB ports. The recommended solution was a USB "y cable" that disconnected the power pins from Pi and injected power after the USB port.

Well, that worked... mostly. The `dmesg` errors that indicated a power issue went away, and all of the USB devices were happy — except the Gigabit Ethernet ports on the USB hubs. It's unclear exactly what is causing this, some people say it's a floating ground issue, others a quality issue with these types of cables, but any USB 3.x "SuperSpeed" devices do not like this arrangement.

Back to the drawing board...

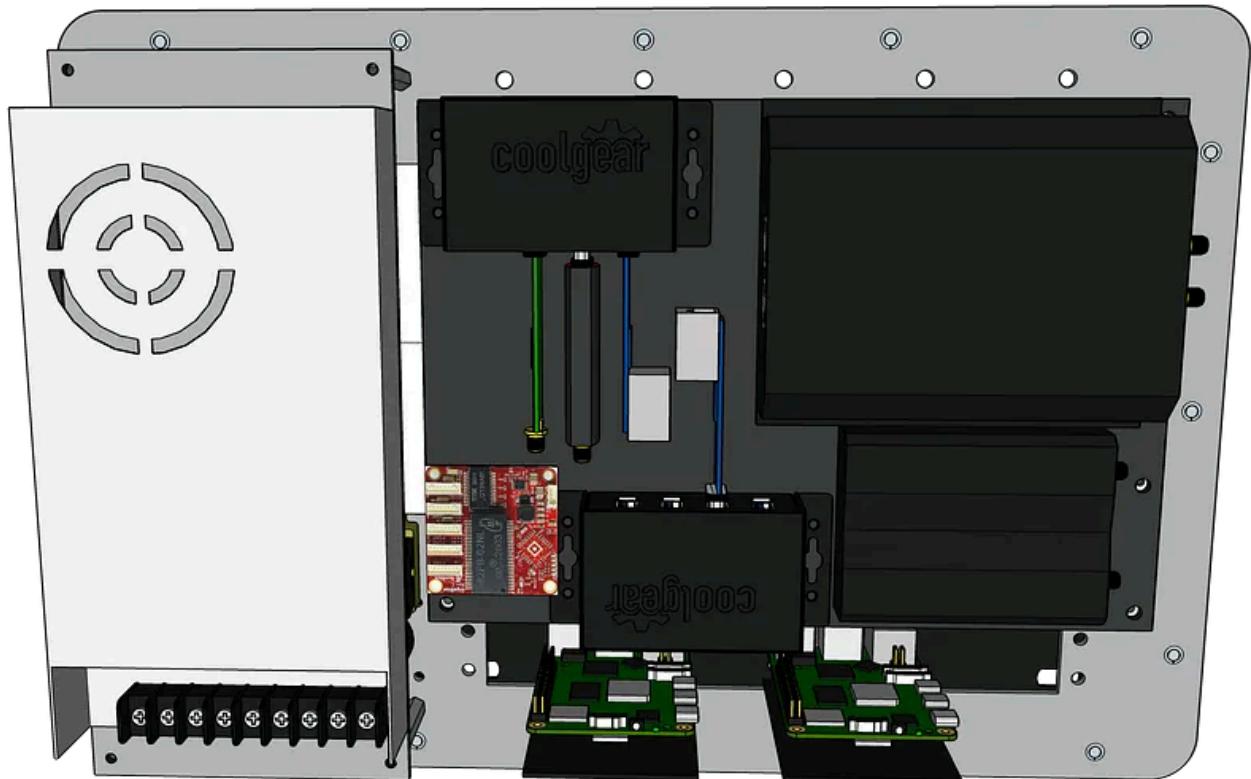
I've redesigned the USB portion of the system with two more robust USB [hubs](#):

- USB 3.2 SuperSpeed with speeds up to 5Gbps

- 5v power input providing up to 4A of power to the ports
- Built-in 5 to 3.3V and 5 to 1.2V regulator
- ESD & surge protection
- Relatively compact design 2.86"(L 3.8" w/ears) x 1.85(W) x 1.16(H)

With these replacing the existing hubs, and not having built-in Gigabit, I had to find a USB stick solution for the Ethernet. Fortunately our friends over at [Waveshare](#) make exactly that with a Linux friendly Realtek RTL8153 chipset.

The USB panel will need to be re-arranged, a few different cables ordered with the right down-angle connectors, but I expect this will be a much more reliable sub-system for all our USB radios. In fact, the first review of Amazon of the Coolgear hub was someone running four RTL-SDR radios on one.



Redesign of the USB hubs layout.

Sketchup drawings and bill of materials have been updated on the [Github](#) project. Now on to the software...