Cyberdeck: Part One

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Over the years I've collected all kinds of interesting little radios, from LoRa Meshtastic, to Software Defined Radios (RTL-SDR), and had a few days of fun with each. But over time, most end up on a shelf or in a storage container when I need space on my desk for another project (which is currently a mobile Kubernetes cluster project).

The other day an ad made it into my feed for the Clockwork uConsole that caught my eye. It's an interesting little handheld device that hosts a Raspberry Pi compute module, a touchscreen, and has an optional board for an SDR. This almost became my next impulse buy gadget, but between the cost of the pieces and the several week lead time, I thought I would do a little more looking around in this "Cyberdeck" world. What else are people building in this space?

Rabbit hole… deep…

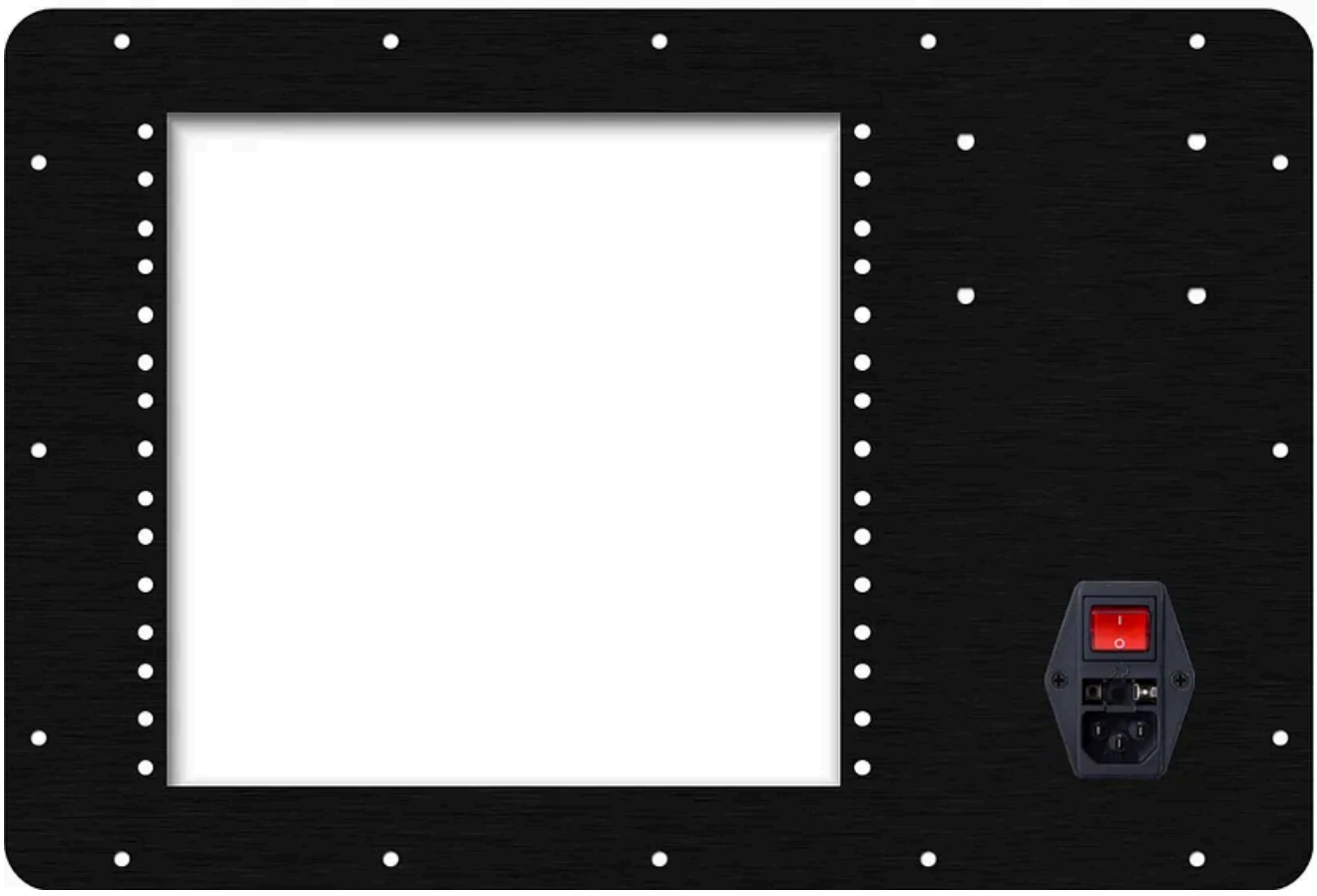
Inspired by some pretty cool builds out there, I turned to one of my favorite suppliers of luggage for my diving equipment, Pelican. Beside making complete indestructible cases, they also make some very cool mounting options for projects like this with their Special Application Panel Frames.

With a Pelican 1500 case size in mind, I turned to the good folks at DataPro International who allow you to custom design plates online specifically for the Pelican frames. After a few hours of browsing a variety of LCD screens, mounts, and antennas on Amazon, I started to realize that I didn't want to invest in a plate with a custom hole in it for a specific size screen, only for it to not be available for replacement or upgrade late, leaving me to buy another custom plate (which can get a bit pricey). I wanted something more configurable that I could change around later and re-use the same plate and case.

Then I remembered another ad I had seen recently for a growing trend in home servers, the 10" format rack. Most of these home servers are single board computer based, and many include small touchscreen LCD displays mounted in the rack.

Perfect.

So, I grabbed my morning coffee, found the specs for the drill pattern, and before long had placed an order for what is basically a 5U 10" format rack in a Pelican case. A few extra holes for SMA bulkheads for antenna, and a power inlet and switch, and we have the beginnings of a pretty great build.



DataPro International custom plate for Pelican 1500

The overall plan is to have two Raspberry Pi 5 boards, each with a touch screen LCD and a host of USB radios attached. The “primary” node will have a larger screen but will be able to control the secondary via VNC. The “secondary” node will mostly serve as a dedicated radio controller, and will have a wide LCD showing the SDR frequency spectrum and waterfall displays.

GeeekPi 9" 2U touch screen for 10" racks.

GeeekPi 6.9" 1U touch screen for 10" racks.

Plenty of USB-C power will be supplied by two 60w 5V DC-DC power supplies, each capable of running off of an external 9V — 36V wide range DC input (car battery, Lipo drone batteries, Dewalt power tool batteries, solar panels) or the built-in 24V DC power supply from the mains input, with the flip of a selector switch.

So here's the bill of materials so far:

- Pelican Protector 1500 case ()
- Pelican 1500PF frame ()
- Two Raspberry Pi 5 with 16GB of memory ()
- GeeekPi 1U mount for Raspberry Pi ()
- GeeekPi 3U 9" LCD display ()
- GeeekPi 1U 6.9" LCD display ()
- Waveshare SX1262 LoRaWAN module ()
- Alfa Network AXE3000 WiFi adapter ()
- Two Mean Well RSD-60G-5 DC to DC power supplies ()
- Mean Well LRS-350–24 DC power supply ()
- 3 position power selector switch ()
- XT90 panel mount DC input ()

Stay tuned over the next few weeks for future articles:

- Assembling the case
- The power supply design (dual inputs)
- Selecting and configuring the OS (Ubuntu, Kali?)
- Configuring the applications