Cyberdeck: Part Three

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A key part of the design is the ability to power the system up just about anywhere. LoRa / Meshtastic and the software defined radios can be used to establish communications during a natural disaster, civil unrest, or any extended power / internet outage.

This requires a design that accepts a variety of power sources:

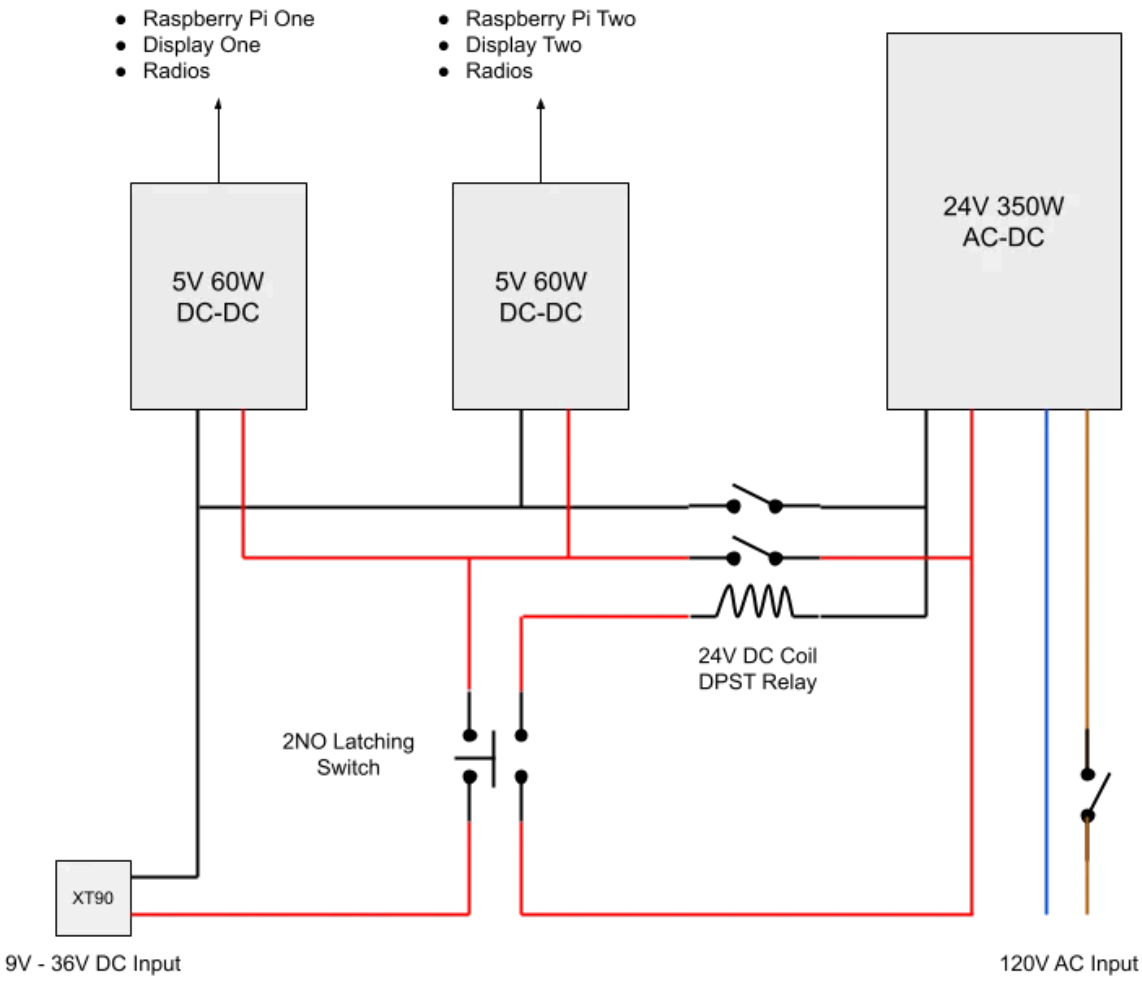
- 100VAC — 120VAC and 200–240VAC 50/60Hz mains for normal operation
- Wide range DC input of 9V — 36V external sources such as vehicles, solar panels, power tool batteries, etc.

All producing stable and clean 5V DC power for the various USB powered computers, radios, and displays. With two power hungry Raspberry Pi 5 (recommended 5A each), two LCD displays, and a selection of radios, a minimum of 100W of power is needed.

The design includes:

- Two 60W DC-DC 5V buck boost power converters. These accept a wide range of DC power and put out a nice clean 5V signal.
- A large 350W 24DC power supply that feeds the 5V supplies when operating off of mains. This supply is internationally rated and can run on power anywhere in the world.
- An external DC input jack for connecting any source. I chose an XT90 connector for durability and because I already own a number of high capacity 4S style 14.8V batteries from a drone project that use this connector. The case will also have an assortment of XT90 cables, including with alligator clips for attaching to car batteries.

One concern when using dual DC inputs is issues that can arise from a common DC ground. While ground sharing is normally ok, it can create ground potential issues when a device is say grounded to a vehicle. To eliminate any possibility of this, the internal DC power supply is disconnected automatically (both 24VDC and ground) from the 5V supplies whenever the selector switch is off or in the external input position. This is done by passing both the +/- of the supply through a DPST relay, and controlling the relay coil with the 24VDC power passed through the selector switch (diagram below).

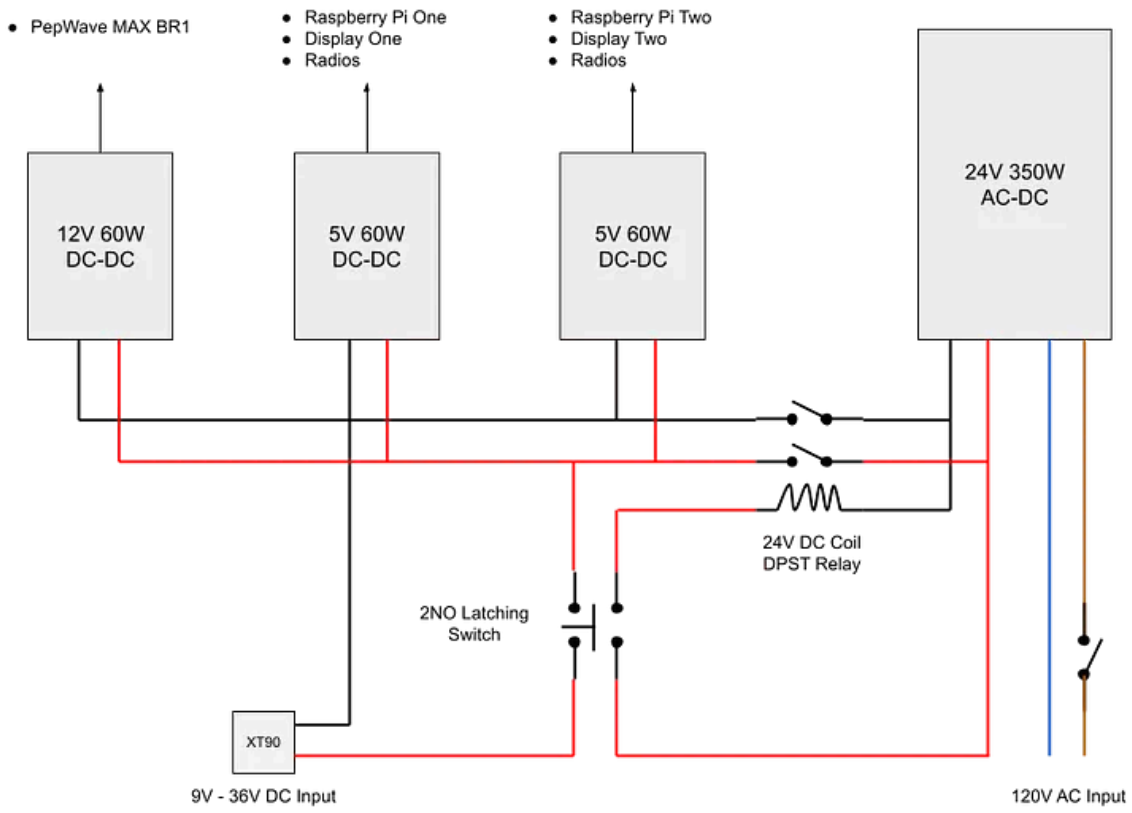


Ground isolation is achieved with a DPST relay and selector switch.

The whole package is fairly lightweight and fits nicely into the Pelican 1500 case (assembly photos coming in a future article). Perhaps the design is a little over-spec'd for a few Raspberry Pi boards and some USB devices? However, it gives me the ability to bring up the system in any setting, anywhere in the world — regardless of power conditions — and that just seems right for such a capable little piece of kit.

Updated Dec 20, 2025

To accommodate the addition of some new radios that require 12V DC power, and third buck boost power supply was added. See the "More Radios" link below.



Addition of a 12V 60W power supply.