A Portable Pi “Shack”

Field Day 2020 Adventure

Objectives

- Deploy a portable “digital modes” station capable of FT-8 (and others)
- Run entirely off 12V DC power sources
- Complete a “socially-distanced” Field Day

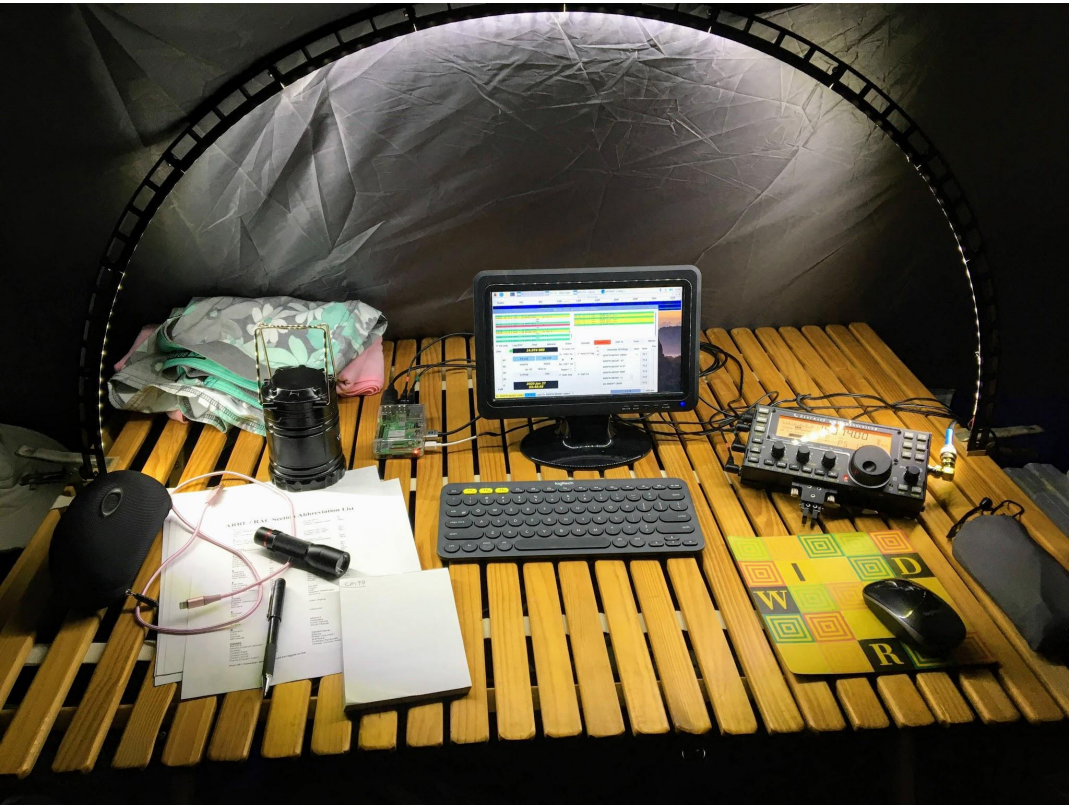
The 2020 Field Day Plan

Fly to “camper-friendly” airport (Santa Ynez) and setup operations adjacent to airport office.

The Campsite

Nice lawn and shade trees!

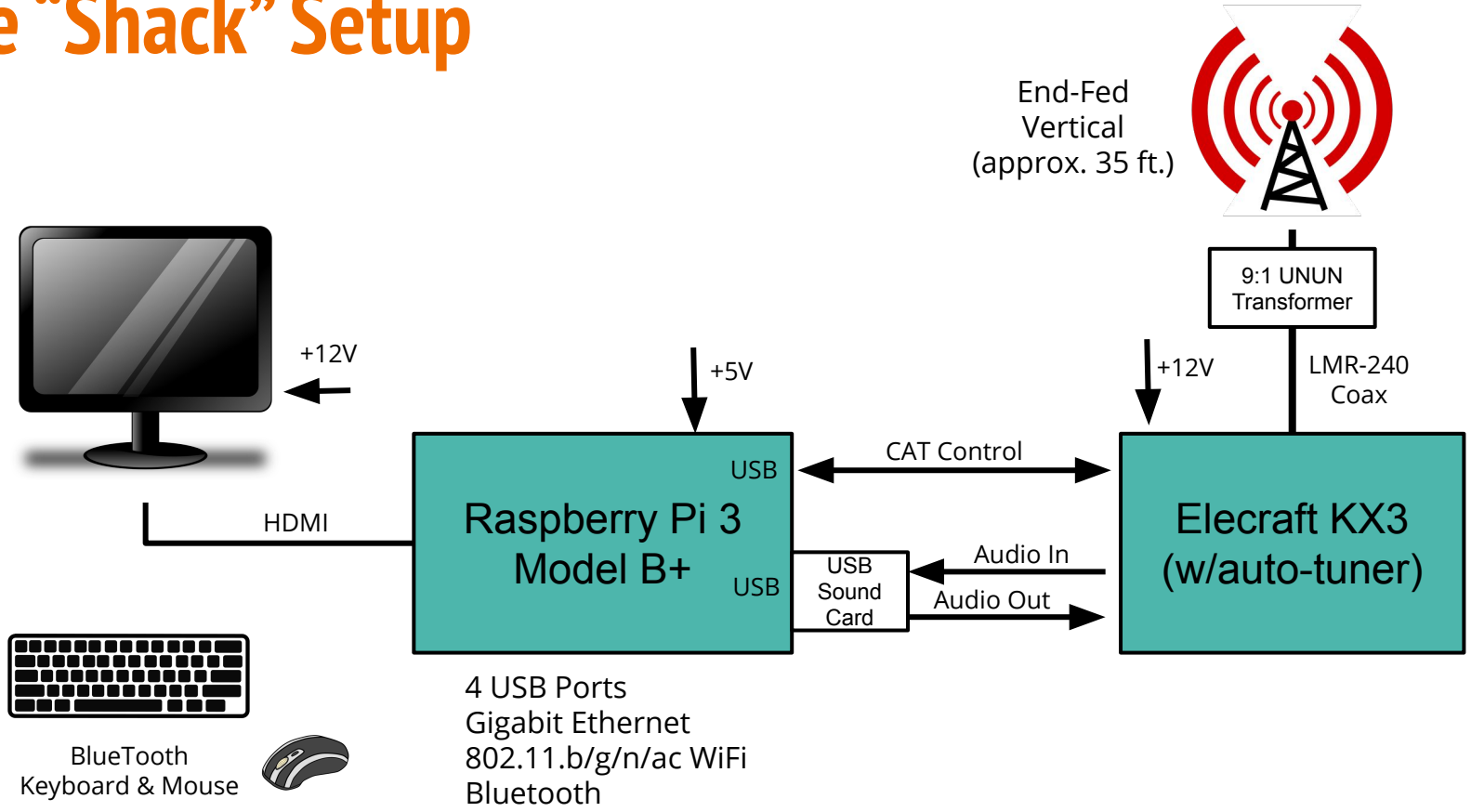
Night-Time Operations



Complete setup running under an LED light arch

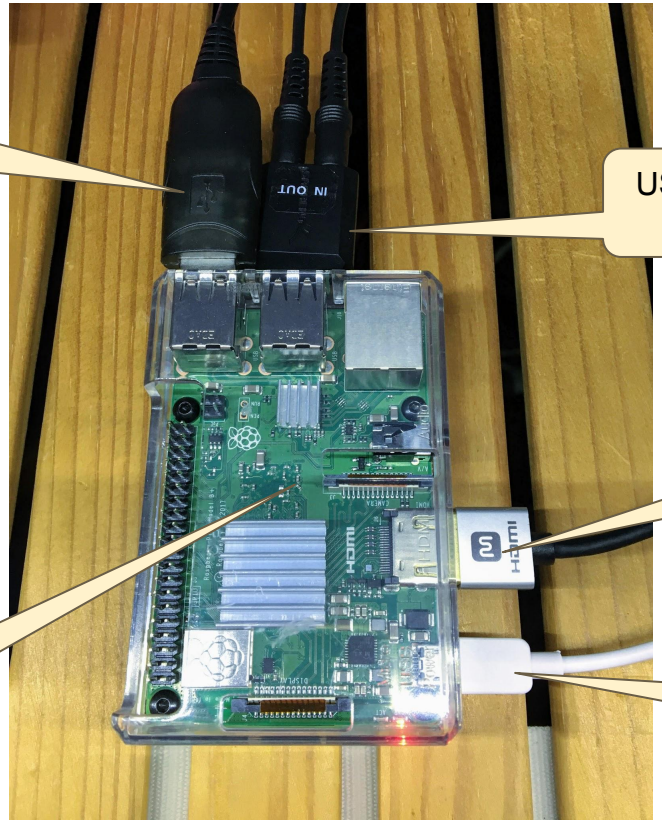
- Custom designed, scaled and 3D-printed to fit table

The "Shack" Setup



Raspberry Pi Details

- Raspbian Linux OS (“Buster”)
- WSJT-X (ARMv6 Build)
- WiFi configured for local hotspot
- Keyboard & mouse paired to BT
- USB Sound Card (Sabrent)



Other Details

Generic LED Monitor (12V)

Elecraft KX3 Transceiver

Dual Bandwidth Roofing Filters (KXFL3)
Automatic Antenna Tuner (KXAT3)
NiMH Battery Charger (KxBC3)
Attached Keyer Paddle (KXPD3)

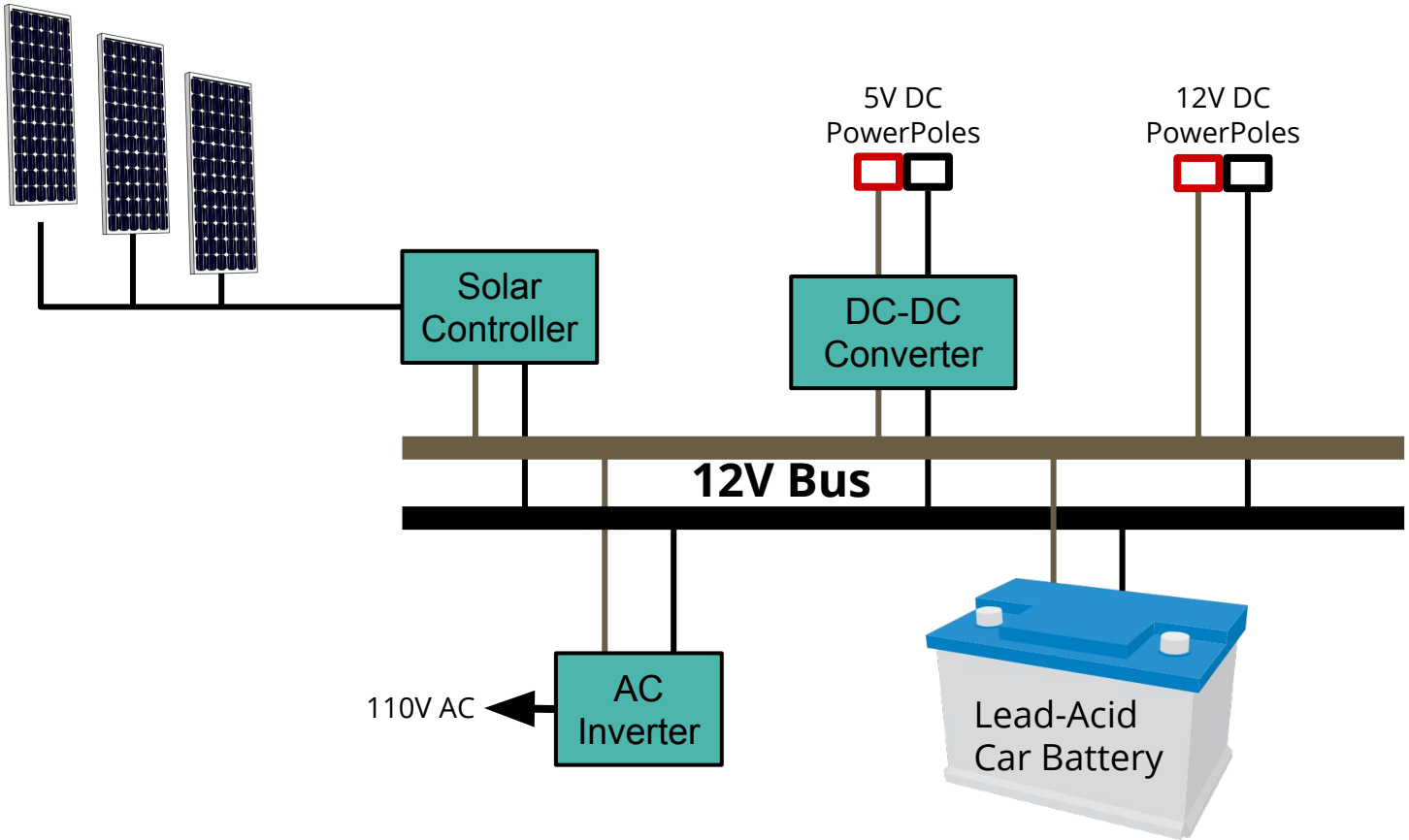
Multi-Band End-Fed Antenna

- Homebrew version of a design published by the Honolulu Emergency Amateur Radio Club (EARC)
- Box contains a 9:1 UNUN transformer to reduce high impedance of end-fed wire to a range a tuner can handle
  - A tuner is required
- Box designed and printed to be as small as practical
- Deployed successfully both vertically and horizontally

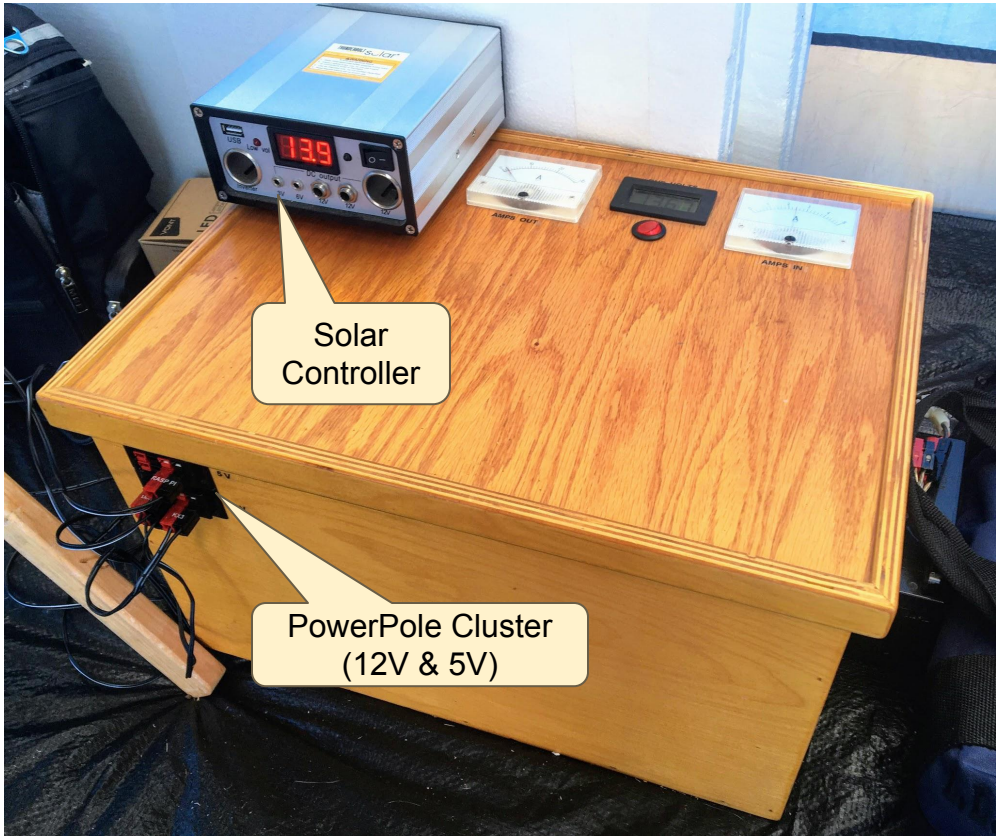
(Details in Resources that follow)

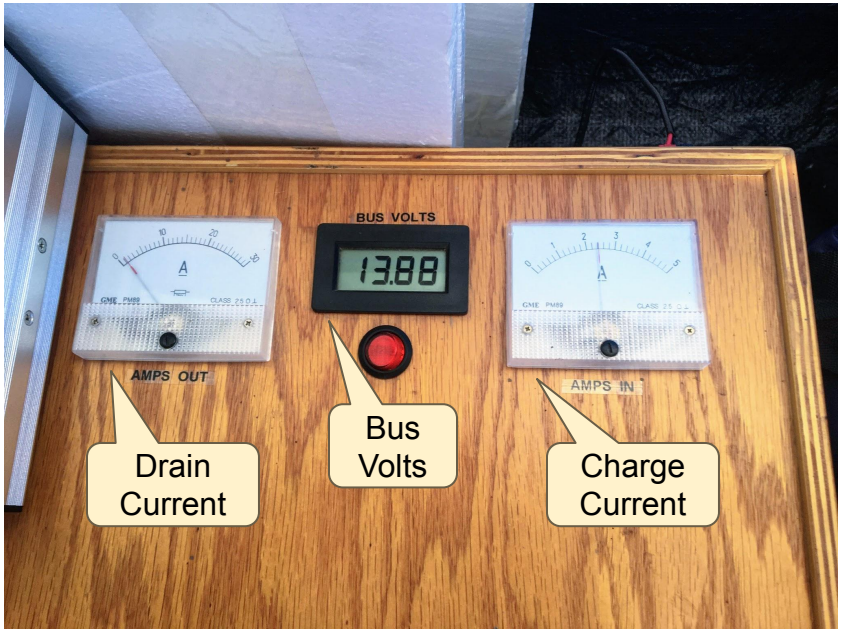
Simple design & construction, highly portable

Power System - Schematic



Power System - Deployed





Operation Details

- 82 Total QSOs - most on 20m, some on 40m
- WSJT-X internal log used - no external logger
  - Cabrillo format exported and uploaded to ARRL
- Raspberry Pi time synchronized to Internet via convenient WiFi hotspot
- KX3 configured for Data A mode, 3K audio bandpass
  - 12W RF output when solar panels active (13+V bus voltage)
  - 10W RF output when on battery, only (11-12V bus voltage)
- Internal tuner easily tunes end-fed vertical (80m - 10m)

Summary

- Raspberry Pi performed well, generally!
  - Struggled occasionally to decode heavy FD traffic quickly enough for next exchange cycle
  - Will compare with operations on higher-performance Pi 4 in the future
- Display smaller than laptop, but crisp and easily readable
  - Fine-tuned window layout to maximize preferred views

A very viable portable setup which I'll be using on future fly-in camping adventures!

Resources

Raspberry Pi Model B+	https://www.raspberrypi.org/products/raspberry-pi-3-model-b-plus/
USB Sound Card	https://www.amazon.com/gp/product/B00IRVQ0F8/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1
KX3 Transceiver	https://elecraft.com/products/kx3-all-mode-160-6-m-transceiver
6M-40M End-Fed Antenna	http://www.earchi.org/92011endfedfiles/Endfed6_40.pdf
WSJT-X	https://physics.princeton.edu/pulsar/K1JT/wsjtx.html