Raspberry Pi
For Ham Radio

A NFARL Presentation
Aaron Melton, KK4LOV
20 October 2015

Raspberry Pi – What is it?

- Not your momma's raspberry pie!

- Low-cost ($20-$35) single-board computer

- Small – the footprint is the size of a credit card

- Popular among Schools, Hobbyists, Hackers and Makers

History

- Created by several Academics at the University of Cambridge to promote Computer Science (who later created the Raspberry Pi Foundation)

- First model released February 2012

- Now 5 different models, each with slightly different specifications

- Over 6 million units sold

RPi Model A

RPi Model B (Rev 2)

RPi 2 Model A+

RPi 2 Model B+

Specifications (RPi 2 Model B+)

- 900MHz quad-core ARM Coretex-A7 processor
- 1GB RAM (shared with GPU)
- 4 USB 2.0 Ports
- HDMI output; Composite video via 3.5mm TRRS jack
- Audio output via HDMI or 3.5mm jack
- On-board storage via MicroSD slot
- 100Mbit Ethernet
- 40 GPIO pins
- Power consumption: 800mA 4W
- Power input: 5v via MicroUSB or GPIO

Specifications (RPi 2 Model B+)

- Limitations:

  - No Real Time Clock

  - No audio input

  - Memory shared between CPU/GPU

  - USB shared bus

  - GPIO are digital only; Have current limitations

Hardware/Accessories

- Most any USB device supported by the software (drivers): keyboards, mice, Wi-Fi adapters, flash drives, external hard drives, sound cards, etc. etc.

- HATs (Hardware Attached on Top): Displays, Servos/Motor control, LED indicators, development boards

- Raspberry Pi Camera Board

Software

- Runs multiple types of Operating Systems:

  - Linux (Arch, Debian, Ubuntu distributions)

  - RISC OS

  - Windows 10 IoT

- Any software package compiled or ported to run on ARM architecture
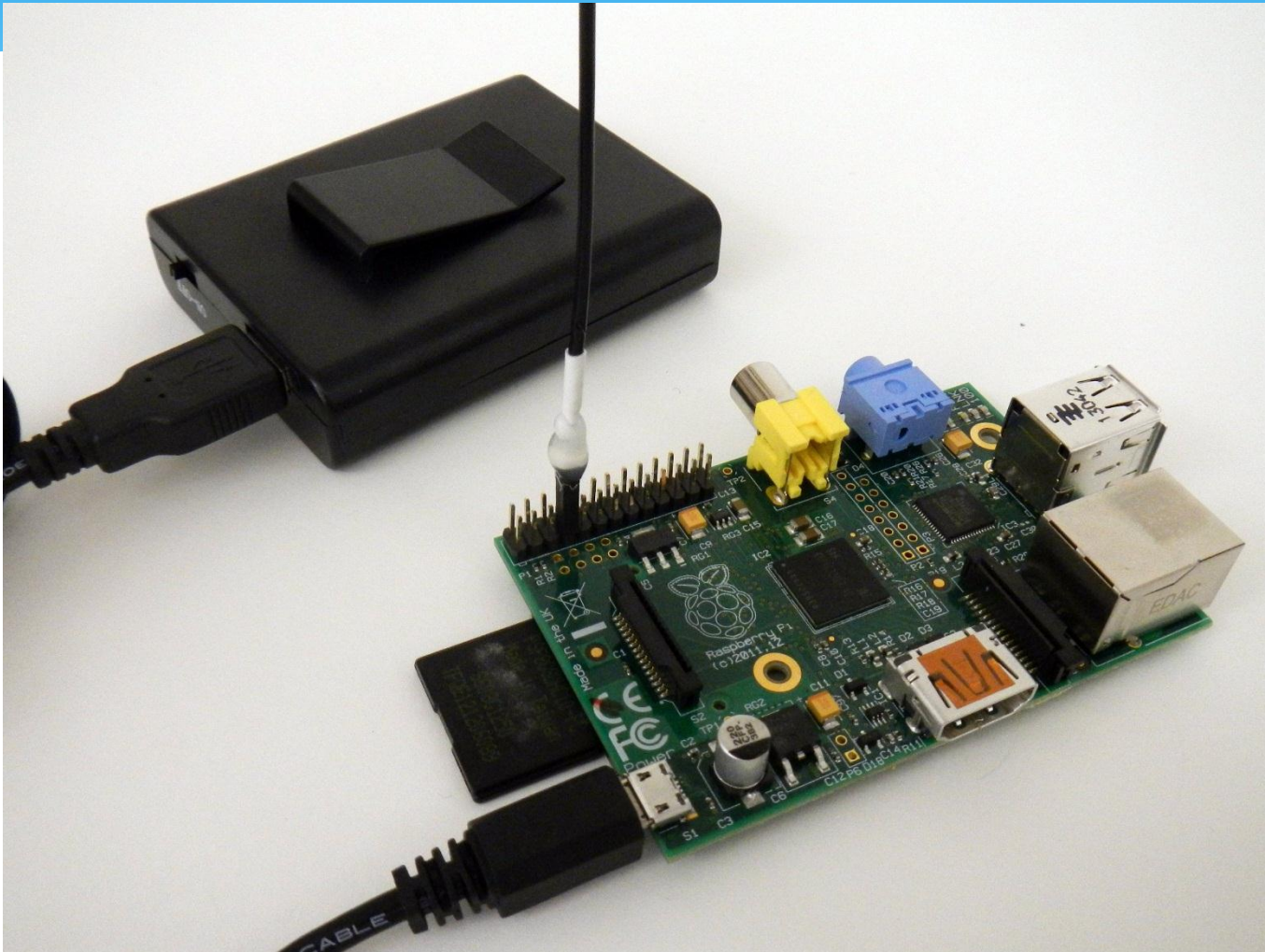
Software (Ham Radio)

- Radio programming: Chrip
- Logging: CQRLOG, Klog, xlog
- CW trainers
- Exam study tools
- Rig control
- Digital modes: fldigi, wsjt (many more!)
- APRS
- Even sign/upload your LoTW logs

Getting Started

- Raspberry Pi, $35 retail (RPi2 Model B+)

- Case, $10

- MicroSD Card, $5-$6 for 16GB Class 10

- 5v power via Micro USB or powered USB hub, $0-$25

- HDMI cable, $10

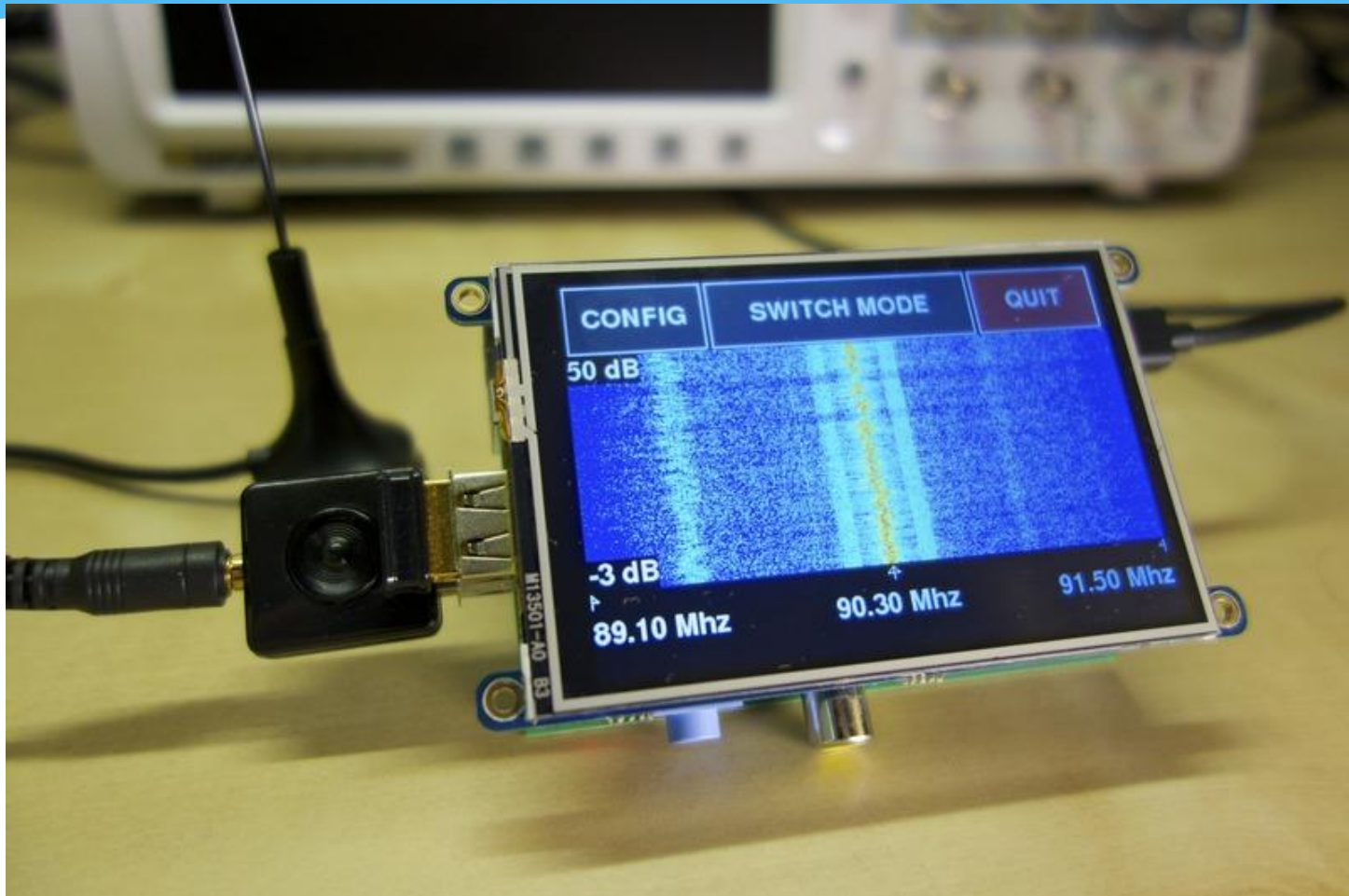- Wi-Fi dongle, $10

So what about Raspberry Pi and Ham Radio?

FM Transmitter

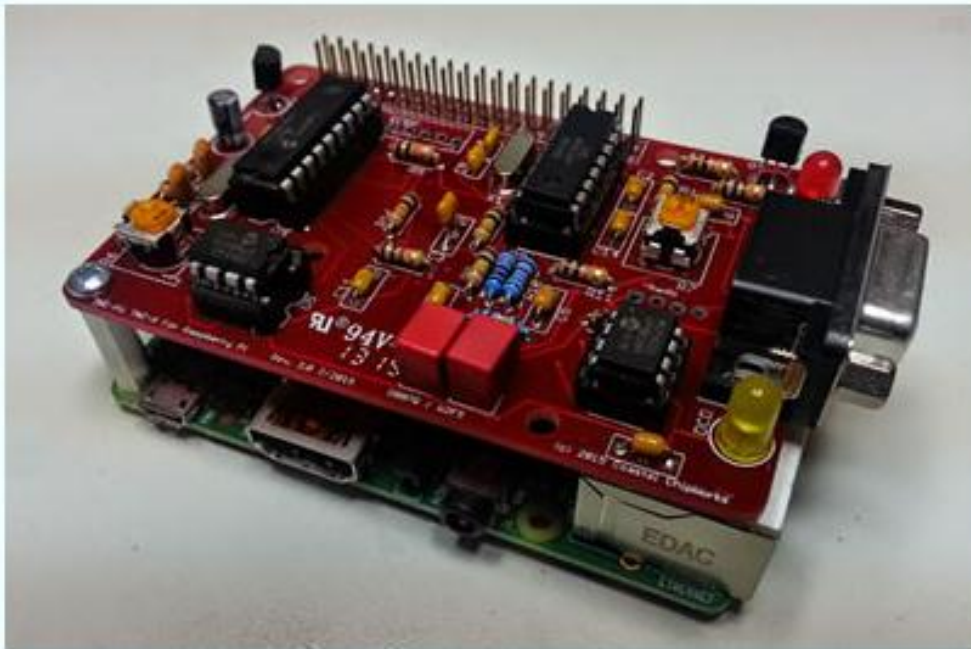Source: http://cdn.makezine.com/uploads/2014/01/pifmbattery.jpg

ADS-B Receiver
+RTL-SDR Dongle

Source: https://uk.flightaware.com/adsb/piaware/

SDR Scanner
+RTL-SDR, TFT Display

APRS Applications
+TNC-Pi, TFT Display

Source: http://tnc-x.com/TNCPi.htm

APRS Digipeater
+2x TNC-Pi

Source: http://tnc-x.com/TNCPi.htm

WSPR Beacon

Source: https://gerolfziegenhain.wordpress.com/2013/04/13/raspi-as-wspr-transmitter/
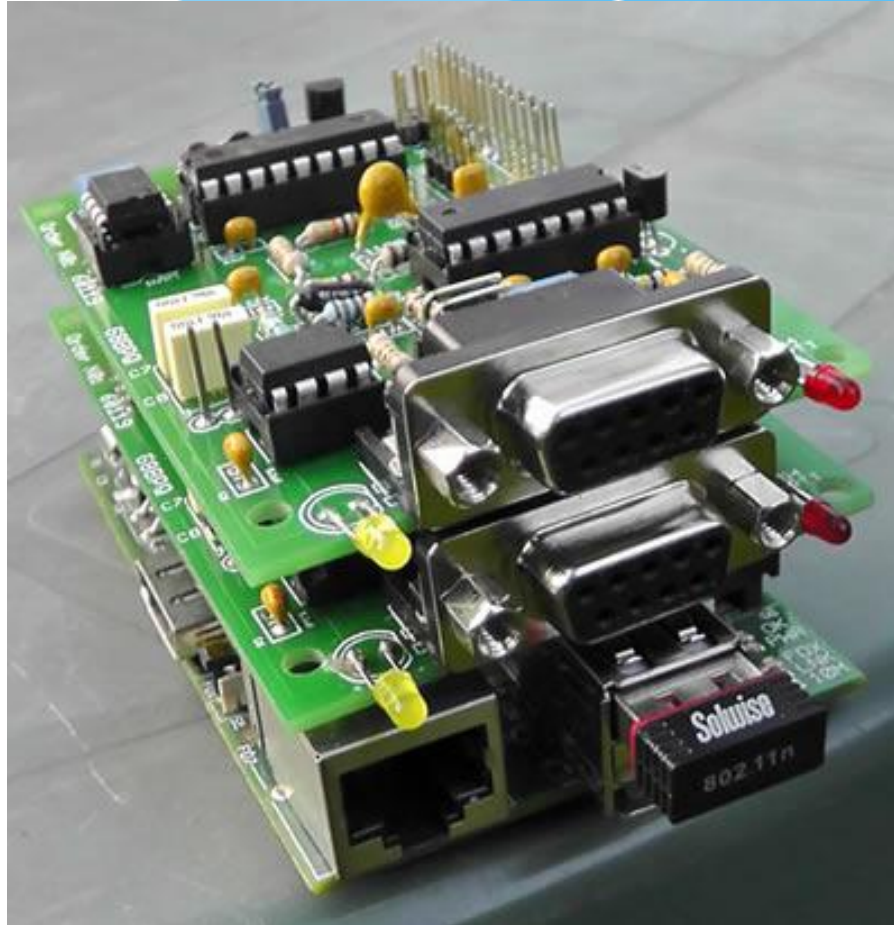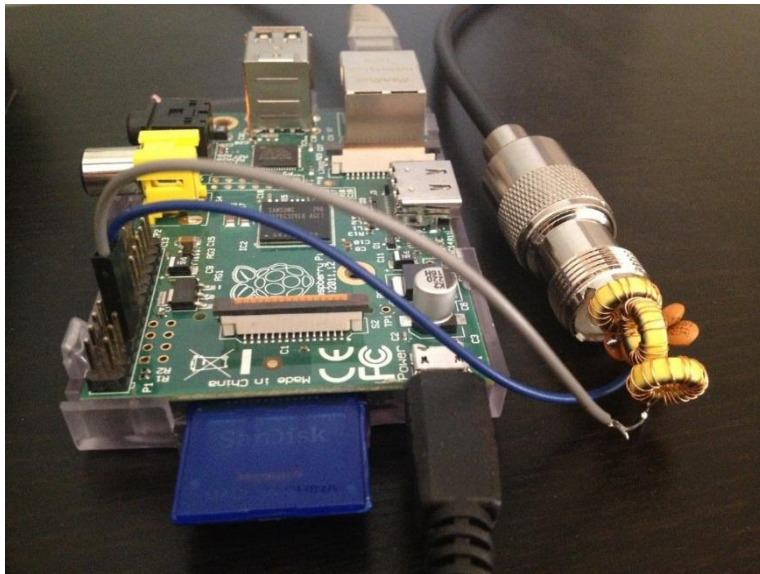
DV Access Point (DVAP) Dongle
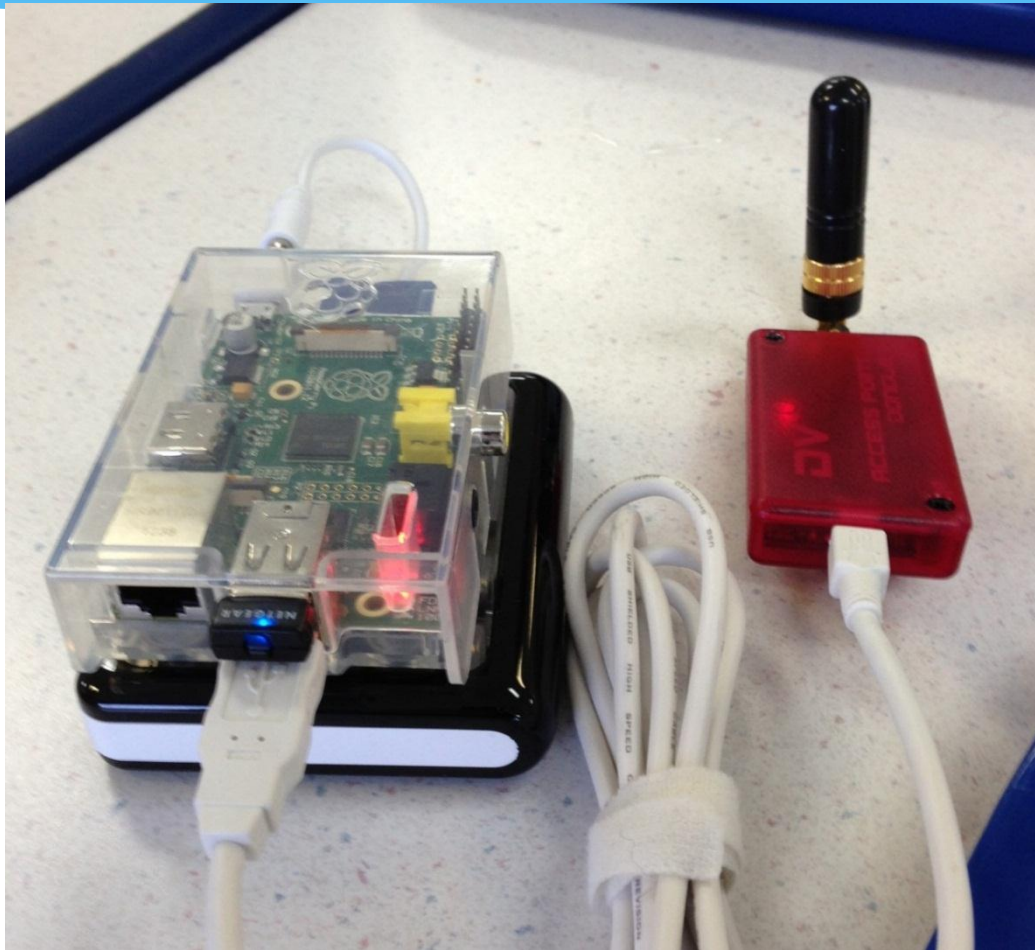
Pan Adapter for Electraft KX3
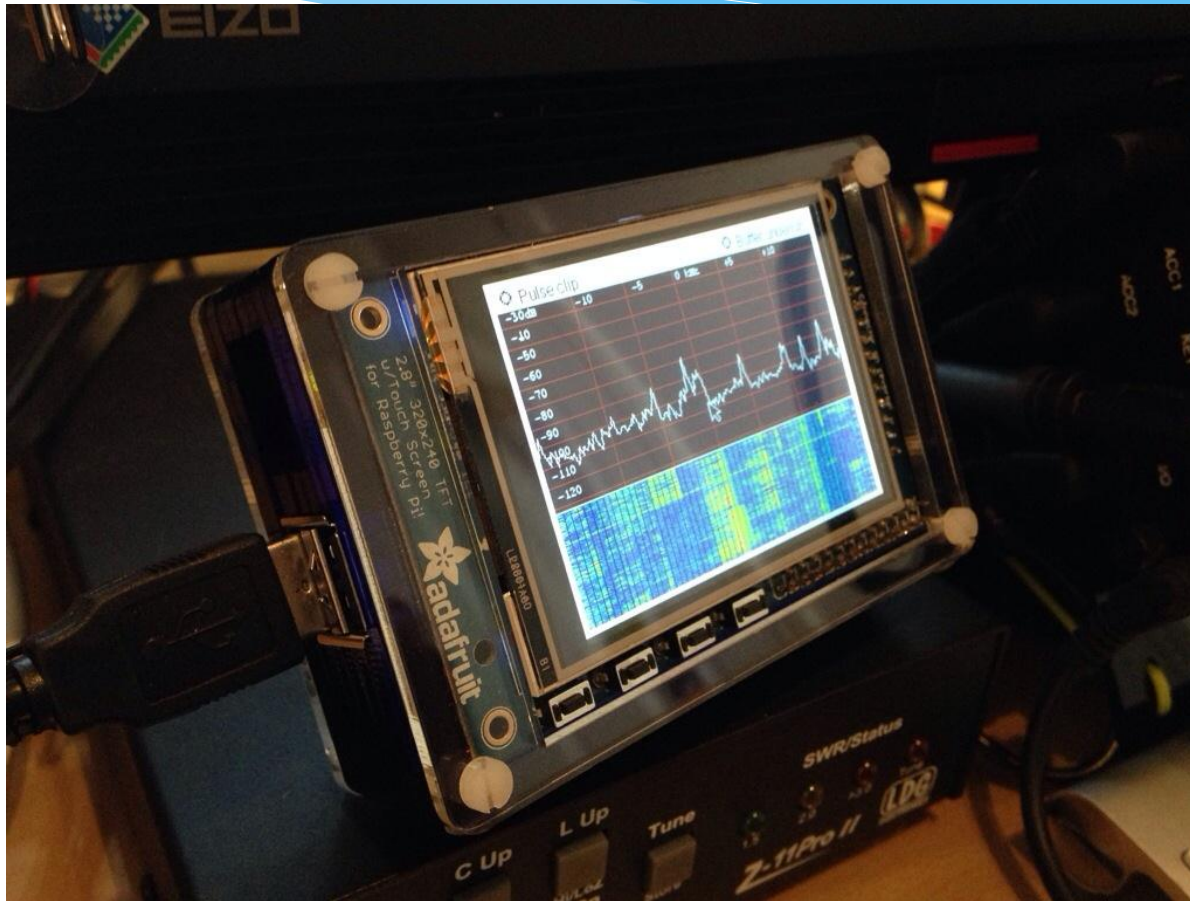
Other Raspberry Pi Projects

- SSTV Beacons

- Echo Link Nodes

- IRLP Nodes

- RMS Gateway

- Open Repeater Project

- APRS iGate

But Wait, There's More!

- Dedicated Shack Computer

- CW Beacon

- Cheap replacement for your broken antenna rotator controller

- Record radio transmissions

- Monitor DX Clusters for that ONE station you need for your Worked-All-The-Things Award and send you an Email/TXT

What About ARES or EMCOMM?

- Standardize your team's hardware/software
  - Hardware is cheap
  - Low power requirements
  - Small size
  - Light-weight
  - Operating System/Software easily cloned as many times as required

- Same attributed hold true for other field use

Where To Buy?

- Micro Center carries most every accessory you can purchase online. (They're an Adafruit & Element 14 reseller)

- Adafruit.com

- Sparkfun.com

- SeeedStudio.com

- Amazon.com (compare pricing to other online vendors 1st)

Resources

- Google!

- Raspberry_Pi_4-Ham_RADIO Yahoo! Group
  https://groups.yahoo.com/neo/groups/Raspberry_Pi_4-Ham_RADIO/info

- NFARL Linux Special Interest Group (SIG)
  Send blank Email to linuxsig-subscribe@linuxsig.com

- The MagPi
  https://www.raspberrypi.org/magpi/

72 de KK4LOV