DMR – PART 2

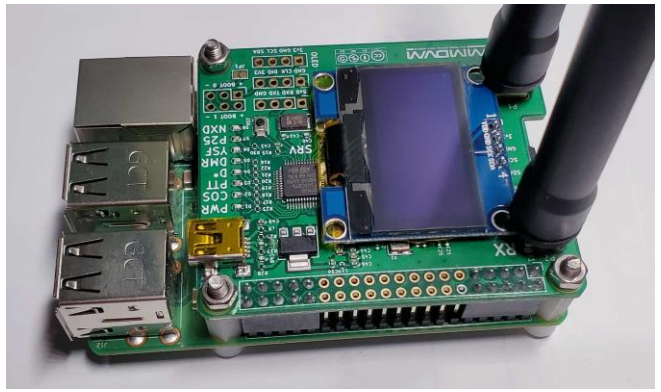
TONTO AMATEUR RADIO ASSOCIATION

OCTOBER 14, 2023 – RICK LOVDAHL KJ7ROX

N7TAR.ORG

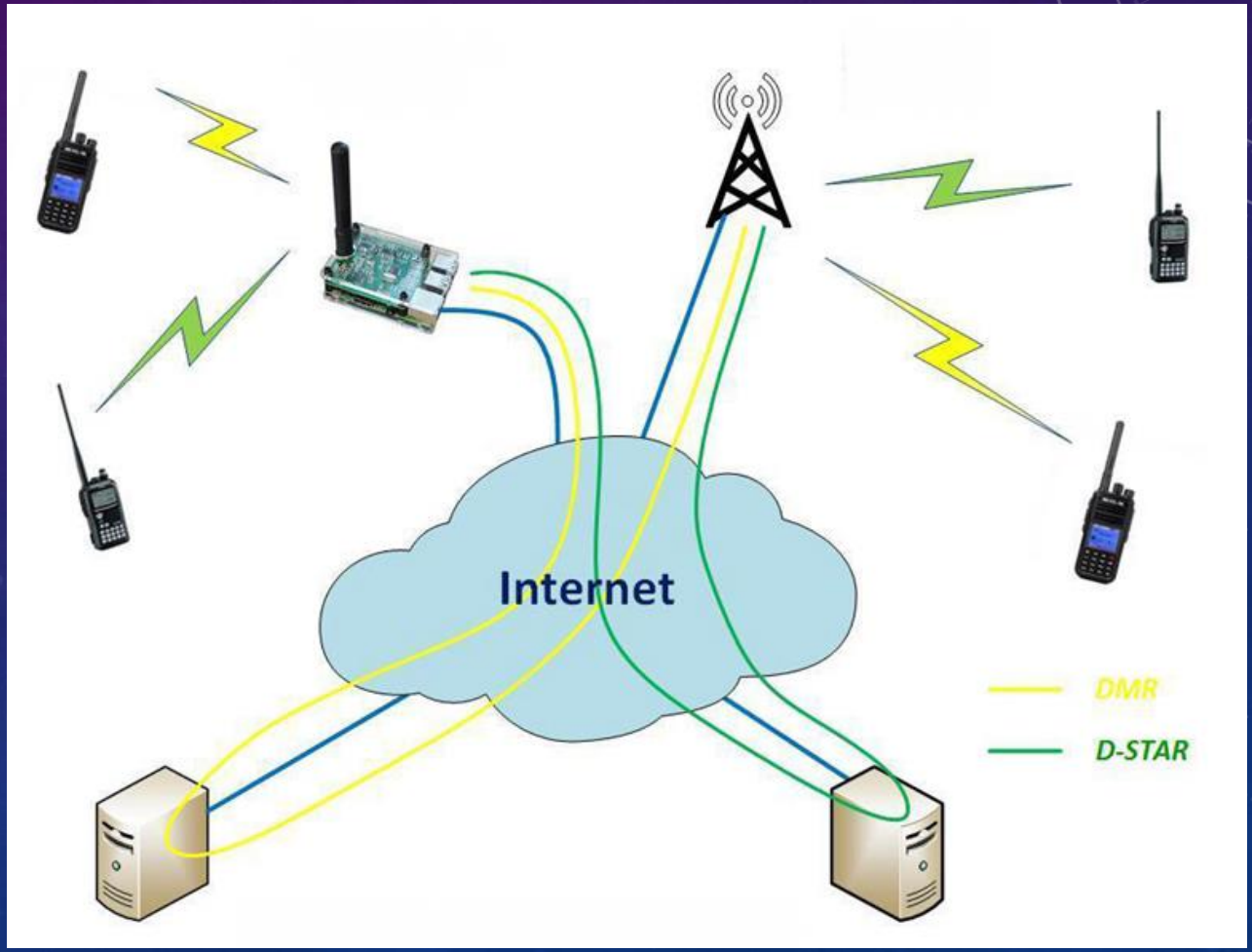
WHAT IS DMR?

(DIGITAL MOBILE RADIO)



THERE ARE MULTIPLE DIGITAL NETWORKS

- DMR (Today's Focus)
- D-Star
- YSF/Wires-X



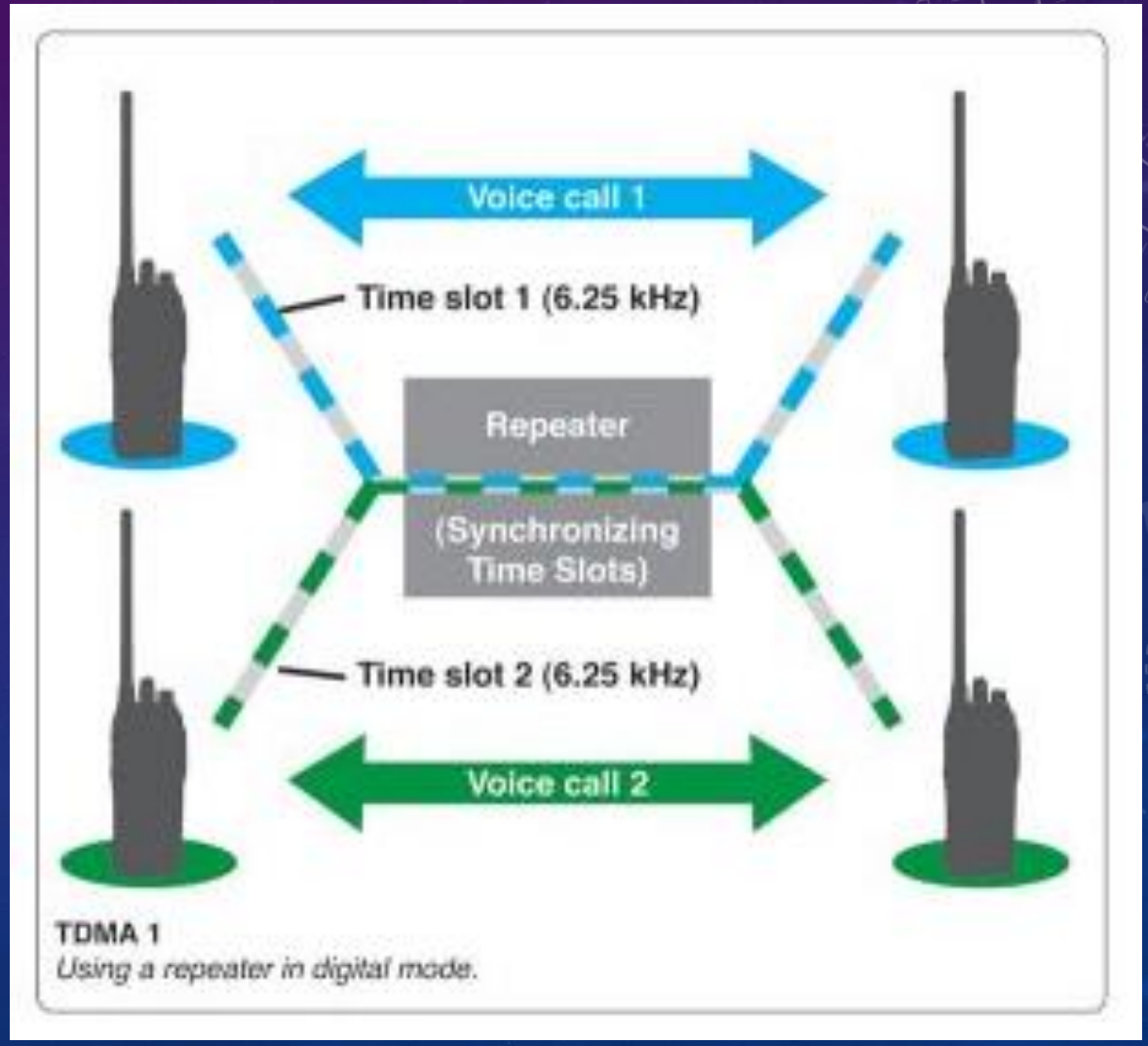
DMR RADIOS

- DMR ht’s typically 5-7w
  - Anytone
  - TYT
  - Radioddity
  - Baofeng & BTech
- DMR Mobile Radios up to 50w
  - Anytone
  - Btech
  - TYT
  - Radioddity
  - There are others…
- All DMR radios allow use of TGs and usually are dual band analog also
- Additional features vary
  - GPS/APRS
  - Crossband
  - Mesh
  - Audio Recording
  - Greater memory capacity






HOW DOES DIGITAL MOBILE RADIO WORK?



TDMA 1
Using a repeater in digital mode.

TALKGROUPS

- A Talkgroup acts like a repeater channel where multiple callers can interact
- There are **1633** available TalkGroups on the BrandMeister network.
- Talkgroups can be based on a geographic location or an interest group or…
- Talkgroup # 311568 is TARA_DMR

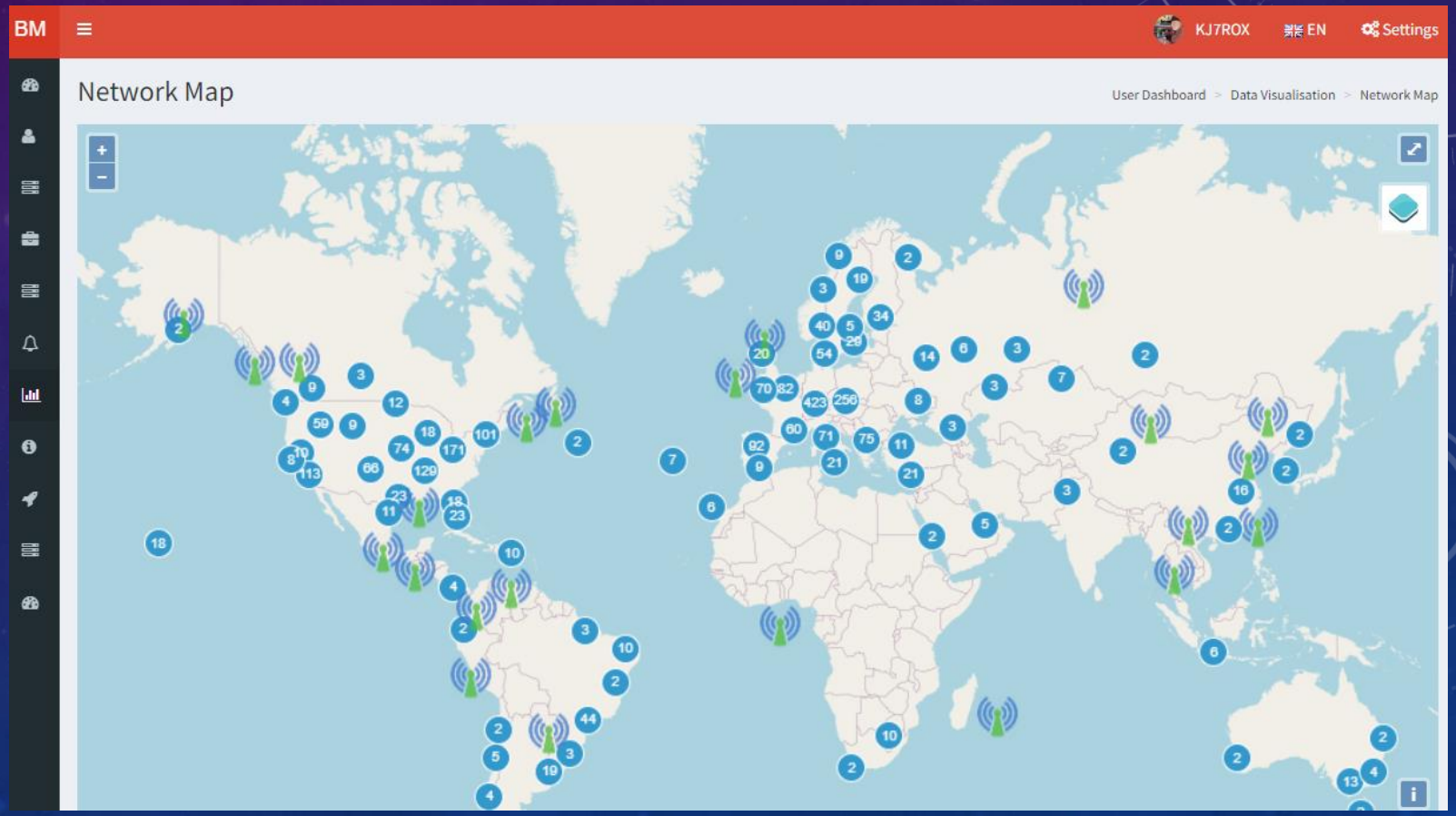
TG 3100	USA Bridge
TG 3101	Alabama - 10 Minute Limit
TG 3102	Alaska - 10 Minute Limit
TG 3104	Arizona - 10 Minute Limit
TG 3105	Arkansas - 10 Minute Limit
TG 3106	California - 10 Minute Limit
TG 3108	Colorado - 10 Minute Limit
TG 3109	Connecticut - 10 Minute Limit
TG 3110	Delaware - 10 Minute Limit
TG 3111	D.C. - 10 Minute Limit
TG 3112	Florida - 10 Minute Limit
TG 3113	Georgia - 10 Minute Limit
TG 3115	Hawaii - 10 Minute Limit
TG 3116	Idaho - 10 Minute Limit
TG 3117	Illinois - 10 Minute Limit
TG 3118	Indiana - 10 Minute Limit
TG 3119	Iowa - 10 Minute Limit
TG 3120	Kansas - 10 Minute Limit
TG 3121	Kentucky - 10 Minute Limit
TG 3122	Louisiana - 10 Minute Limit
TG 3123	Maine - 10 Minute Limit
TG 3124	Maryland - 10 Minute Limit
TG 3125	Massachusetts - 10 Minute Limit
TG 3126	Michigan - 10 Minute Limit
TG 3127	Minnesota - 10 Minute Limit
TG 3128	Mississippi - 10 Minute Limit
TG 3129	Missouri - 10 Minute Limit
TG 3130	Montana - 10 Minute Limit
TG 3131	Nebraska - 10 Minute Limit
TG 3132	Nevada - 10 Minute Limit

DMR NETWORKS

- Brandmeister
- DMR-MARC
- DMR+
- TGIF
- AZ-TrboNet
- Others…

WHO CAN I TALK TO ON DMR?

Brandmeister Network Map (repeaters)

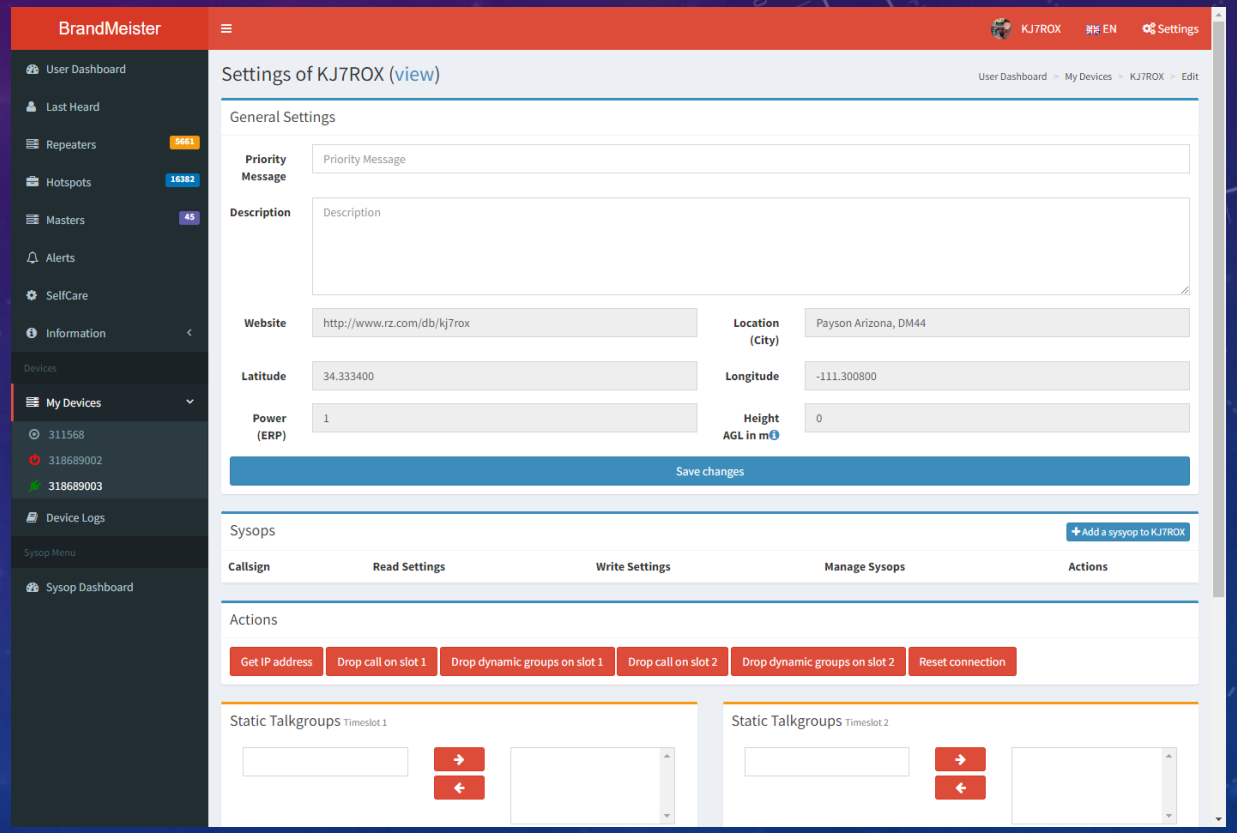


BRANDMEISTER DASHBOARD

Demonstration: Brandmeister Dashboard

Brandmeister account setup:

- Callsign
- DMR ID
- Setup ‘Selfcare’ password
- Activate a hotspot/repeater
- APRS setup



REPEATER OR HOTSPOT?

- DMR via a Repeater does not require Internet (at the radio)
  - Limited by the repeater's range
- DMR via Hotspot can be used anywhere there is WiFi/Internet
  - DMR Hotspots can be
    - Simplex (only 1 Timeslot TS1 or TS2)
    - Duplex (both Timeslots TS1 + TS2)

WHAT IS A HOTSPOT?

Internet

Simplex vs. Duplex hotspots

Duplex hotspots:

- Have two antennas (TX & RX like a repeater)
- Can manage 2 Timeslots
- Can have 2 active Talkgroups at the same time
- Can be built on Raspberry Pi Zero or 3B/4B full size

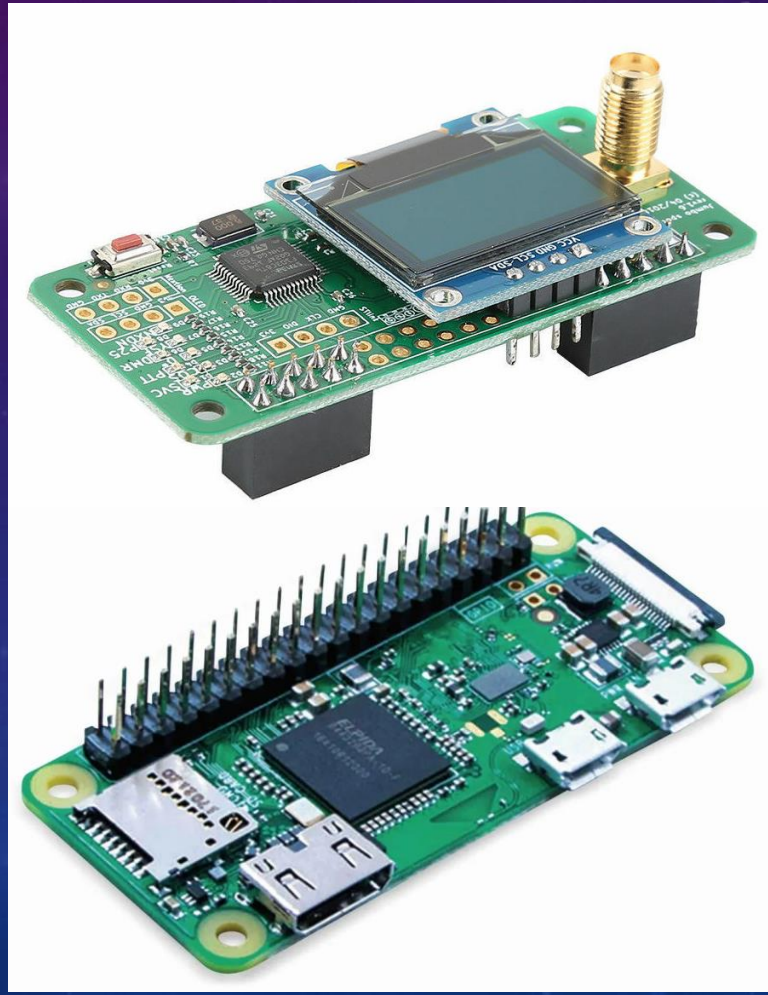
Simplex hotspots:

- Have a single antenna (and single freq)
- Manage only 1 Timeslot
- Can only have one active Talkgroup at a time
- Usually built on Raspberry Pi Zero or Zero 2

BUY A HOTSPOT
…OR
BUILD A HOTSPOT

BUILD A JUMBOSPOT HOTSPOT

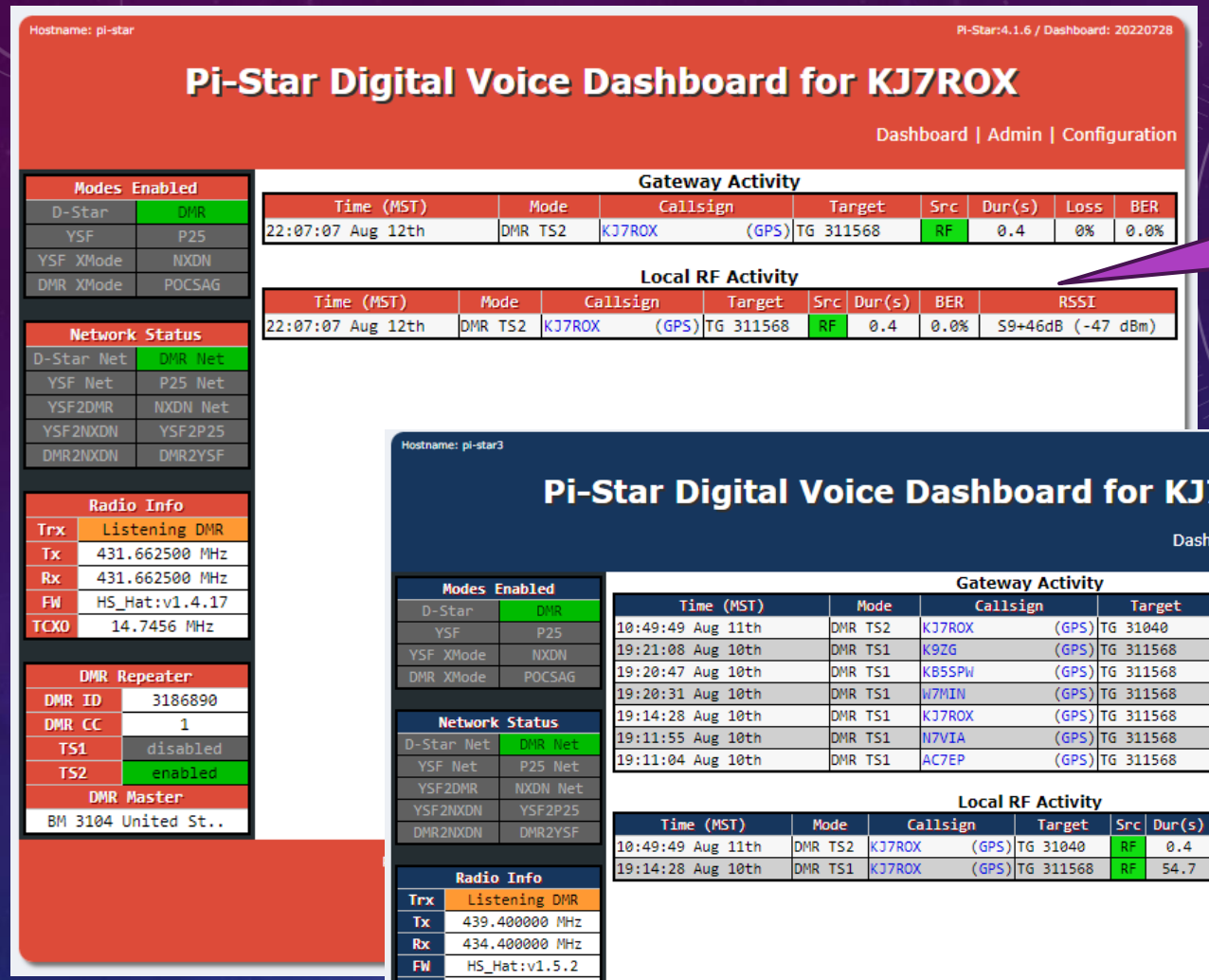
- Buy a RaspberryPi Zero 2 W
- Buy a MMDVM Modem “Hat”
- Solder a header on the Zero 2 W
- Assemble
- Load the Pi-Star OS on a SD-micro card



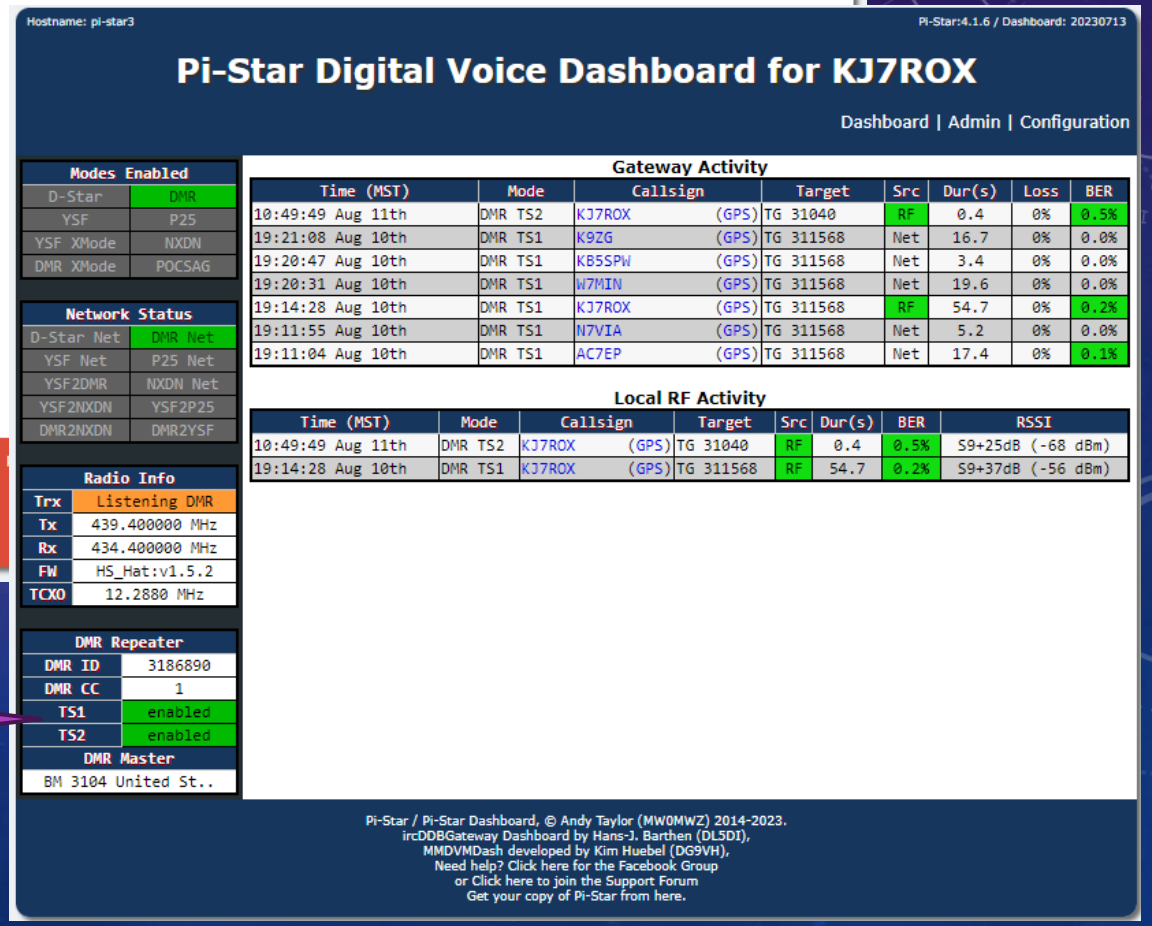
PI-STAR

Pi-Star's Dashboard gives you important information about your signal quality and connections you have made

http://pistar.uk



Simplex (1-Timeslot)

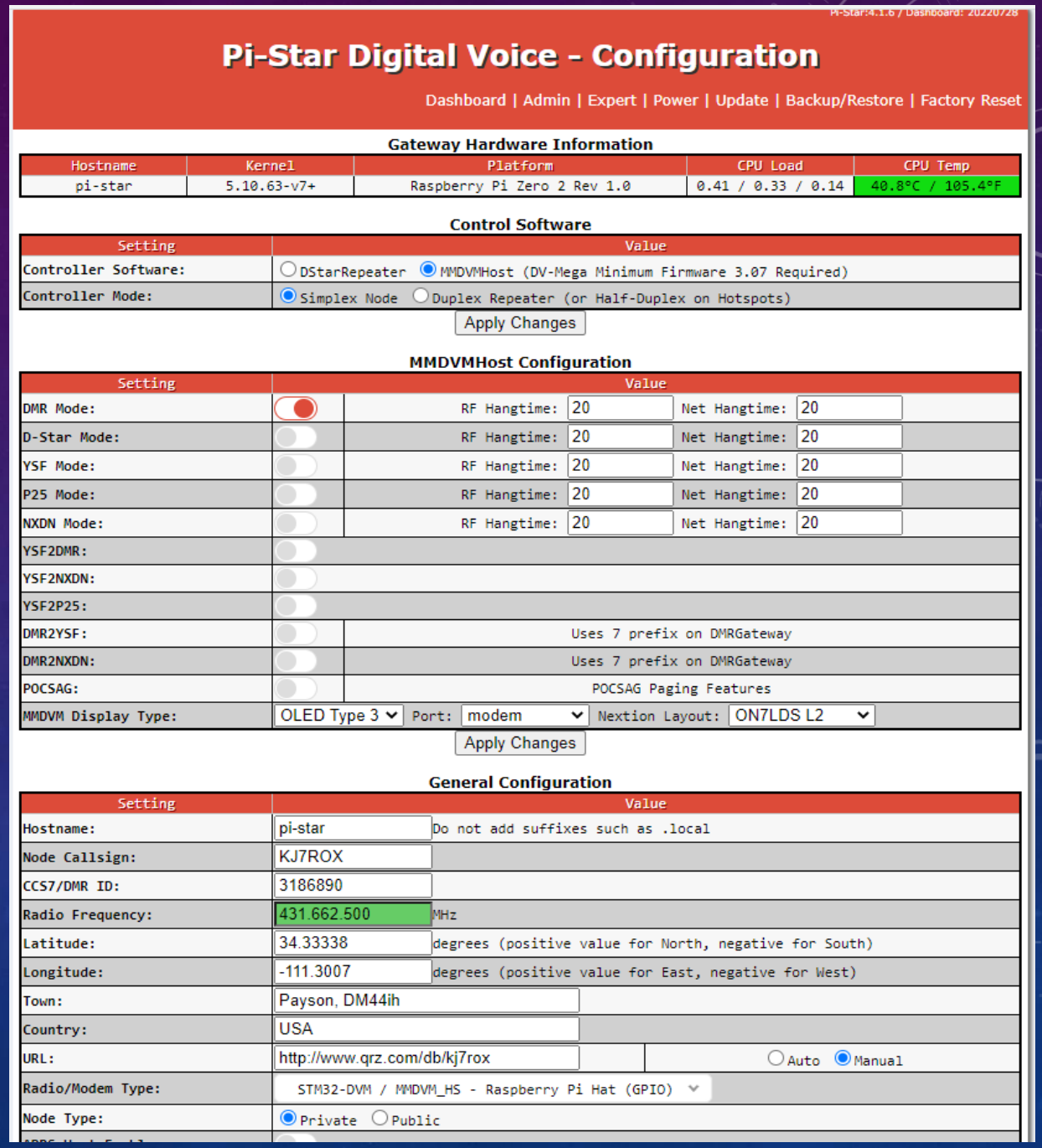


Duplex (2-Timeslots)

PI-STAR CONFIGURATION

Pi-Star can be configured for:

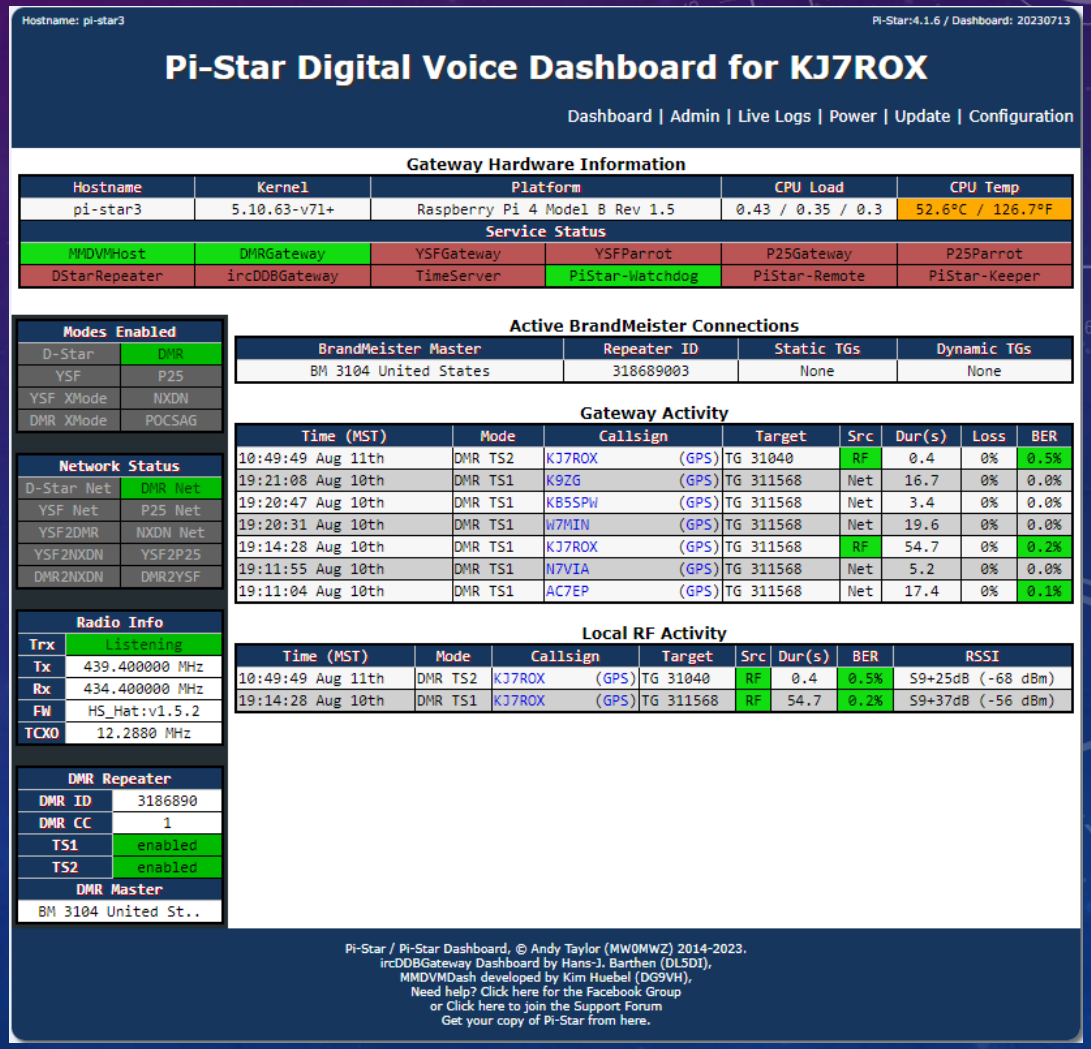
- DMR
- D-Star
- Yaesu System Fusion/Wires-X
- P25
- NXDN



Demonstration: Pi-Star Dashboard & Configuration

Pi-Star configuration:

- Particulars of MMDVM modem
- General Config (your info)
- Enable Service (DMR, YSF, etc)
- DMR Configuration
- WiFi Configuration

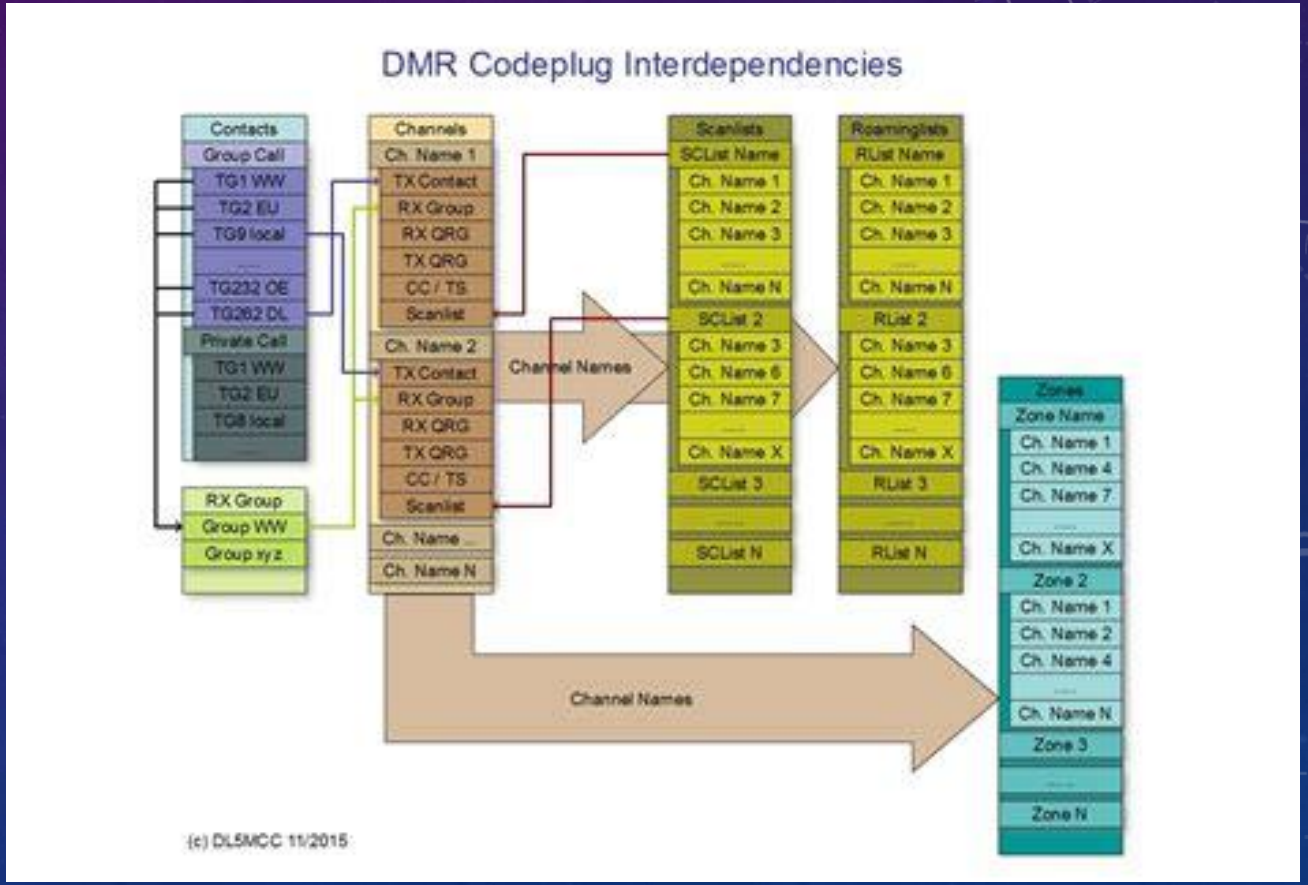


WHAT IS A CODEPLUG?

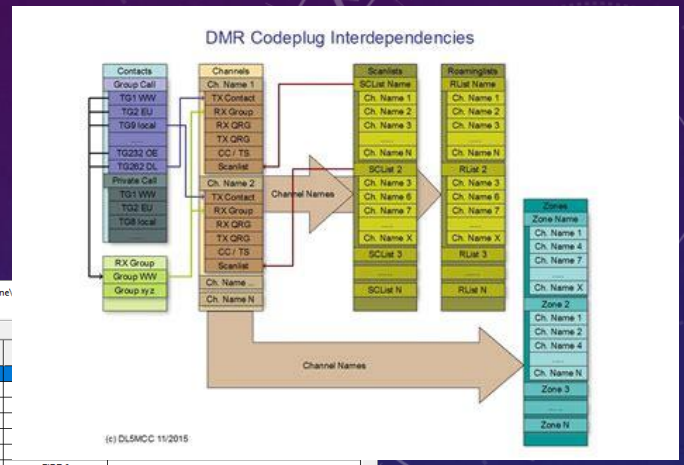
The term ‘Codeplug’ comes from back when there was actually a module that plugged-in to a Motorola radio running MotoTurbo.

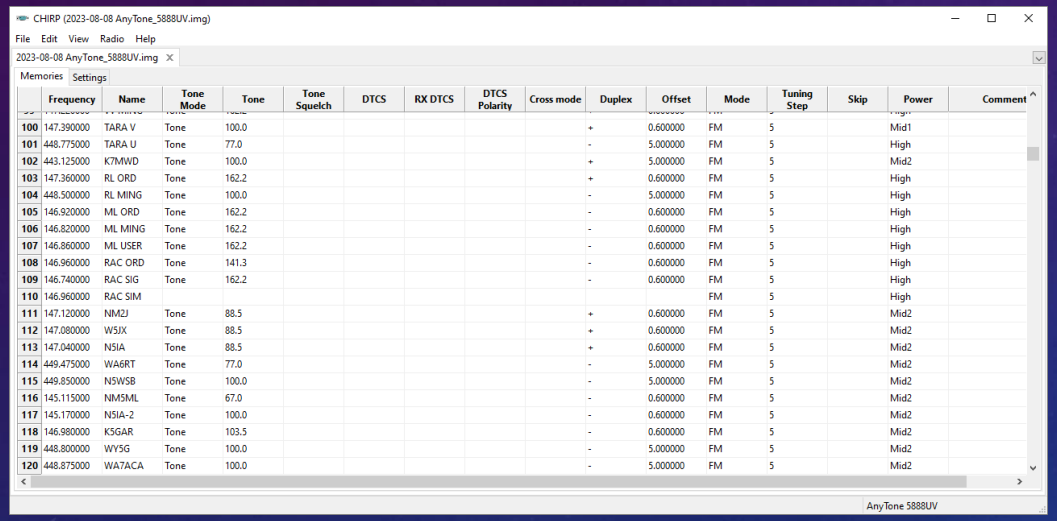
Now it refers to the collection of information that must be programmed into a DMR radio to enable it to select audio from a talkgroup

- Contacts (TG’s and individual DMR IDs)
- Channels (freq & PL tones to access a TG)
- Zones (groups of channels)
- Scanlists (groups of channels to scan)
- Radio settings

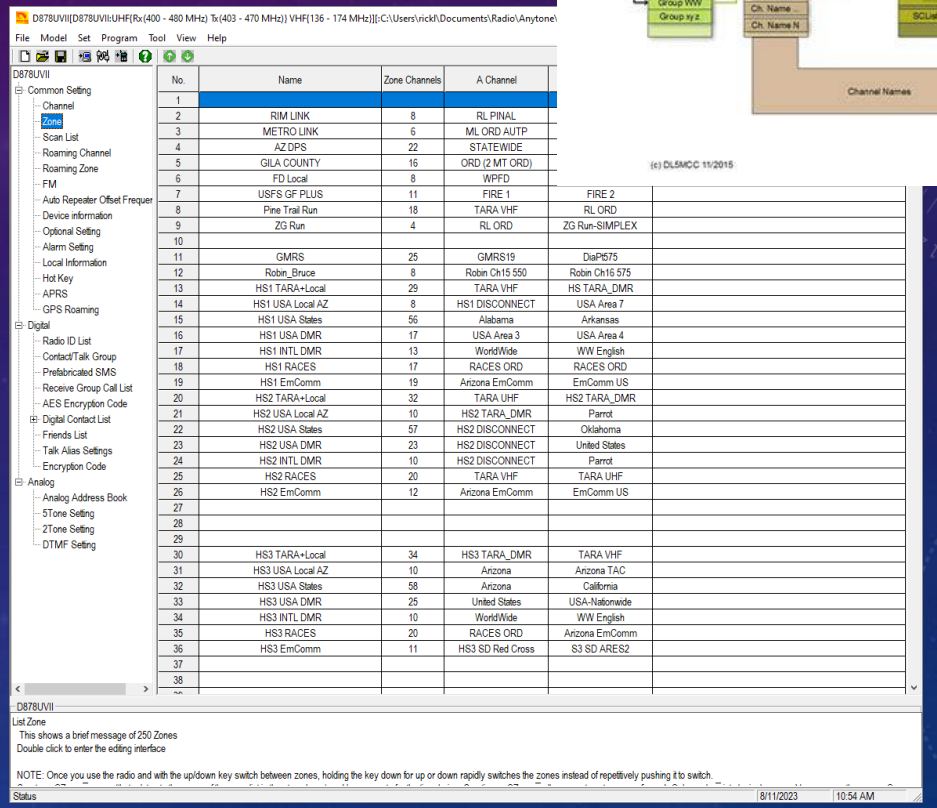


ANALOG VS DMR RADIO PROGRAMMING





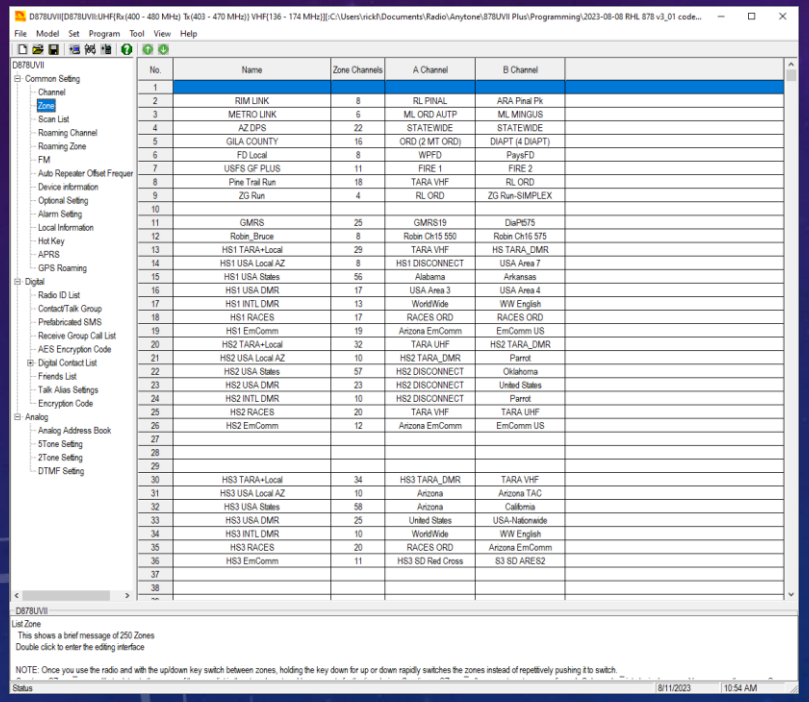
Simple table of freq, offset, PL



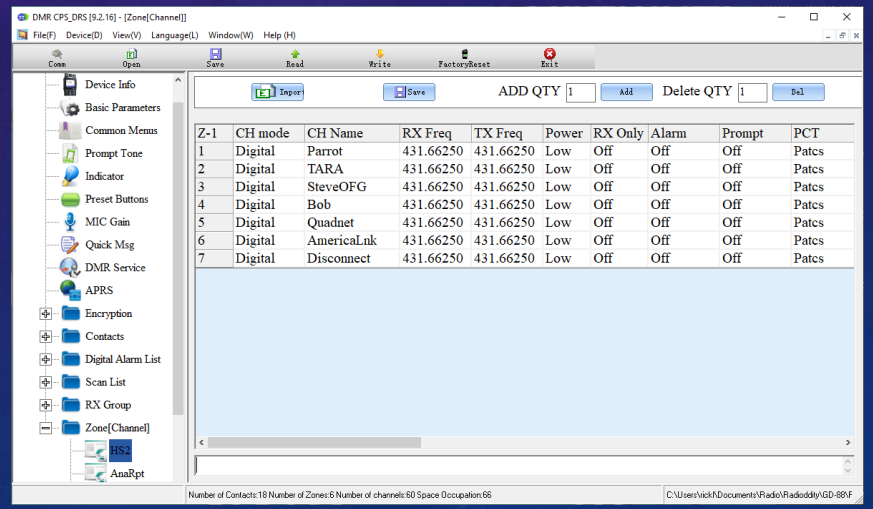
Several linked tables of freqs, linked TG, Zone, etc.

Demonstration: DMR Radio Programming Via CPS (Customer Programming Software)

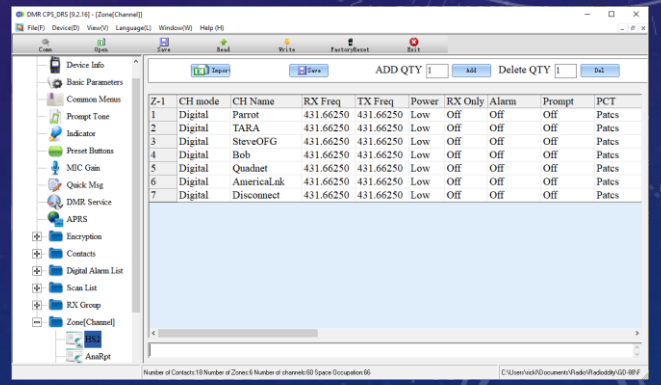
Anytone

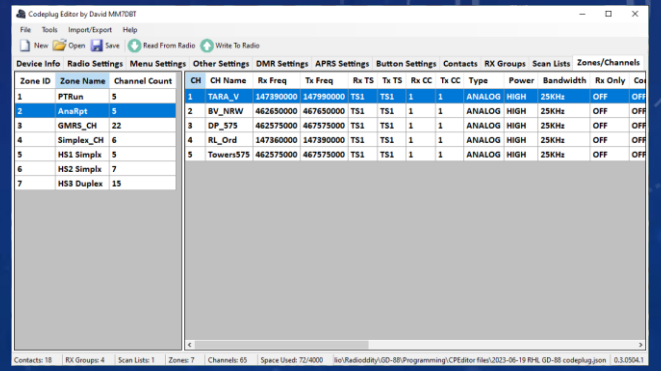


TYT MD UV380



Radioddity GD-88





STEPS TO GET STARTED IN DMR:

1. Get a DMR ID (free) – Requires that you send a pdf of your FCC Ham License https://www.radioid.net/register
2. Get a DMR radio (not free)
3. Setup your account on the Brandmeister Network (free)
4. Find a DMR repeater or get a DMR Hotspot (or both)
5. Program your radio with the DMR TalkGroups that you want to use (codeplug)
6. Get talking!

SOME HELPFUL DMR LINKS:

- https://www.dmrfordummies.com/library/
- https://www.radioid.net/register
- https://brandmeister.network/
- http://w0wc.com/resources/brandmeister-dmr-nets/
- https://www.pistar.uk/index.php
- https://www.pishop.us/