Digital HTs

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Ham Radio Gear

- World Wide is mostly HF (Rig is $1000+) - 110Vac
- VHF/UHF local, mobile (vehicle): APRS, Emergency, Shelter usage - $200-$500, 12v battery operated.
- VLF, EHF experimental - Out of Scope for this discussion
- Current HT's are very capable. GPS, Color LCD Display, Menu to program it. No longer just analog local P2P/ Repeater - worldwide via digital Gateway/Hotspot. Analog HT: ($25+), Digital HT: $100+ (typical $200-$300)

HT Advantages

- Better Battery life - but carry a spare battery anyway
- Very clear sound - even world wide. Has error correction in protocol
- In emergency Communication, has GPS, best portability.
- Also: Air, Marine, FM, WX frequencies RX
- Aux Speaker/Mic, Bluetooth headsets as Acc.

Digital HT Component Options

- DStar (F2D) - Icom, Kenwood - was 1st for us 2005 - Japan
- System Fusion (C4FM) - Yaesu - was 2nd for us 2013 - Japan
- DMR (FXE/TDMA) - Bridgecom, Chinese - Baofeng. Low Cost. Been around as a European standard for years, (since early 2000) but only available to us recently.
- All HT types are proprietary, incompatible with each other (P2P). Other digital solutions: P25 (Phase I & II), TETRA, etc.
- Need Hotspots/Gateways/Reflectors to interconnect.
- Each solution uses Internet to connect it's users world wide. There are World Wide Nets each week. Reflectors, Rooms, Talk Groups, etc.
- A little RF and a lot of VOIP, distance wise
- Digital allows for Extra Signaling (Messaging, Position, Caller ID, etc) - Out of band.
- Generally 6 KHz bandwidth per channel (narrow) vs 25KHz FM Wideband (today)

System Fusion (C4FM)

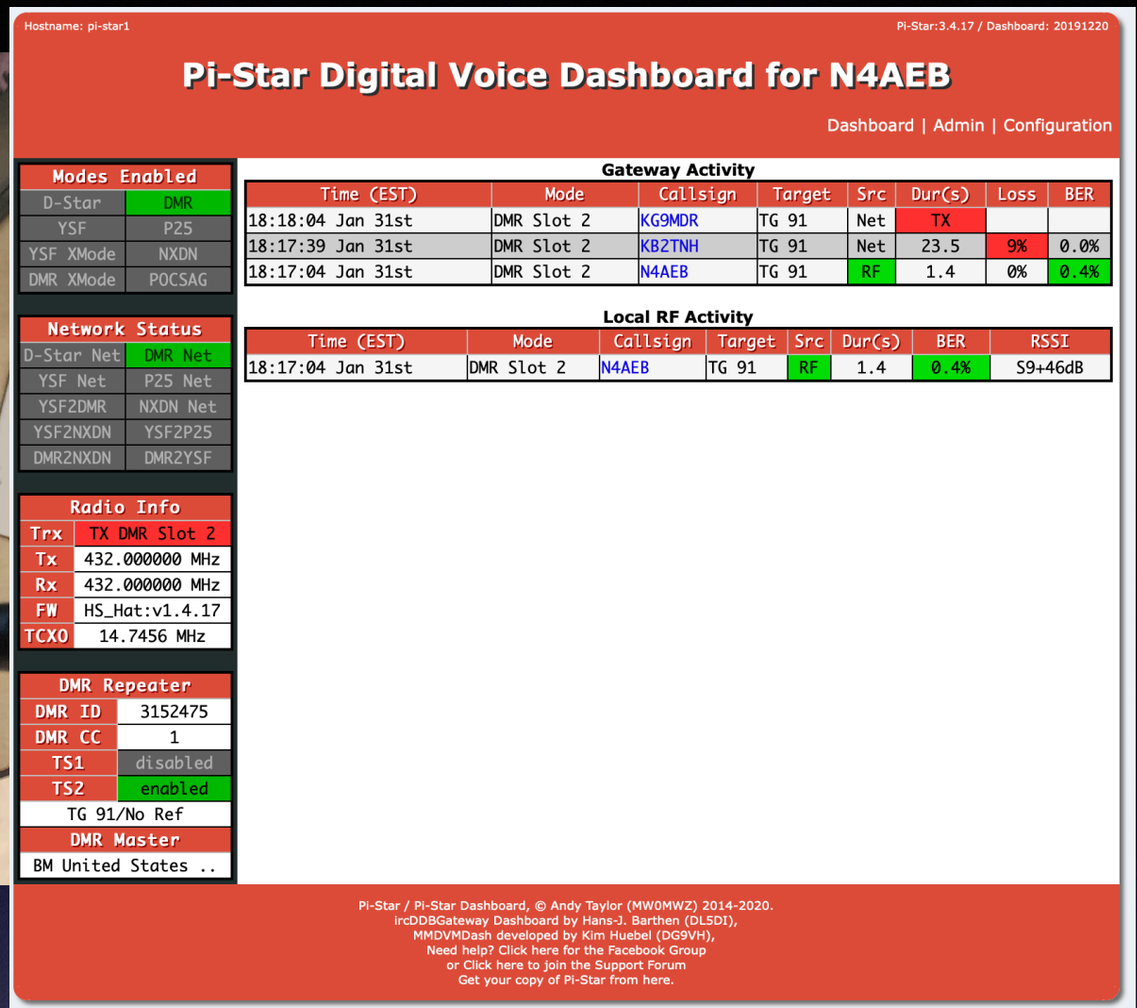
- Repeater/Hotspot Room controlled by Trustee
- RF to Repeater/Hotspot, internet after that using Wires-X
- BARC Primary repeater .91 will be DR2X soon.
- Fall back to Analog - “Fusion” of digital and analog

DStar

- UR: Call Mode (Local/Echo/Gateway/Link/Unlink to Reflector)
- R1: To (Repeater/Reflector)
- R2: From (Repeater/Client if P2P) - “Optional”
- MY: <Your Call> / <Your Info>

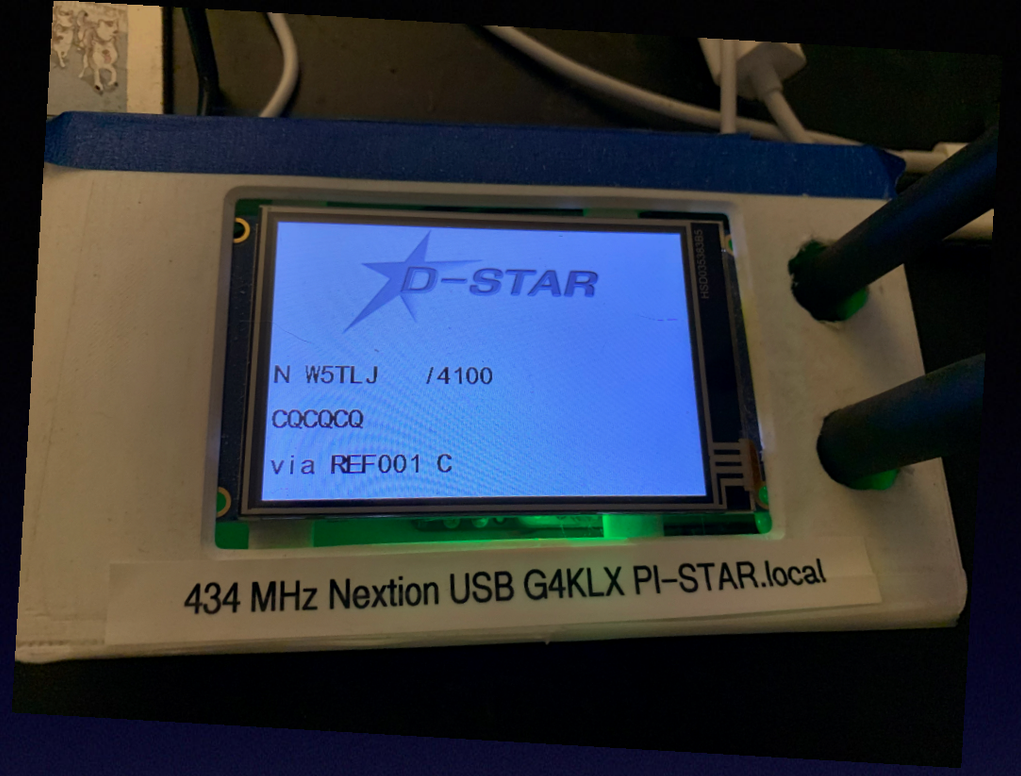
- Secondary BARC repeater at 442.450, Digital only. HT finds repeaters via GPS
- Repeater controlled by HT. Single TG use at a time. Remember to Unlink.
- Required Registration for Radio ID, Hotspot - security stronger than others.

DMR



- Repeater controlled by HT
- Protocol is dual channel usage with “wait” list, thousands of Talk Groups. HT is single channel. Remember to Disconnect - TG 4000
- Cheapest out of box ($150 to start)
- Motorola (W4MOT) & Gold Coast (W4BUG) UHF repeater(s)
- Required to register radios and hotspots
- Some Hotspot Hardware can be used for DMR Repeater controllers as well.
- DMR-MARC vs Brandmeister Talk Groups, Time Slots, single channel HT, CPS Software

Hotspots
In your home



- MMDVM - $50-$100 to build, $100-$200 to buy assembled. (Pi Zero + MMDVM vs 3B+ & Dual)
- Openspot 1/2/3 by SharkRF is $200+
- May do a BARC meeting to assemble a bunch of hotspots. Can be a chore - so we'll build all same type. Sign up to pre-order -> 3-6 weeks, ebay, for parts. Maybe members only.
- Usage much more common then repeaters. Can remain linked - it's yours.
- Web Interface to configure
- Hotspots solve the limited range/Faraday HT problem - in home, only 30 ft away.
- Networking is UDP. Watch for BER, %Loss. Could be your local router, ISP.

Current Issues

- Various digital schemes don’t directly talk to one another; except via hotspots and/or internet, which would not be guarantied in an emergency. Repeaters/Schemes can be digital only (D-Star, DMR)
- Local EOC would need to be all same digital scheme, so will remain analog for near future. All YSF HT’s and repeaters fall back to analog. Working on a dual a+d solution from YSF (Fusion). Maybe dual Rx/Tx mobile units. YSF HT a/d setting is TX, will receive both - so digital HT will hear analog Net Control.
- I can’t tell you with certainty, which digital solution(s) will be implemented in a year - so the HT choice is yours. Mike will sell and support a nice DMR radio for you.

What I ask of you

- Buy a/upgrade to Digital HT and/or Hotspot
- Get on the air (Practice), exercise local repeaters to get the bugs out of them before we need them, in an emergency. Thanks to everybody exercising the BARC D-Star.
- Get on a Net (America Link Sat night, REF001 Sun night, DMR on W4Bug/ Sat morning)
- Club Sponsored events/nets/etc.
- Think about HAM radio digital (like HF has FT8). If you only have one rig, make it a digital HT. Get out there and call CQ. Tech license is all you need to use.
- For Field Day, VHF & UHF same points as HF - Phone contact, outside, battery power.

At Home Pile Up

Hotspot build cost /w some assembly required.

- Raspberry Pi Zero W - $10 + $5 shipping (Vilros, AdaFruit, CanaKit special, qty 1). Avoid 1st Gen ($5/ V1.3/2015) - no WiFi. Need to solder headers from MMDVM. Tough to get cheaply on Amazon (wants /w kit for $25)
- MMDVM kit (PCB + Antennas + Header) - $22 (+/- $5). Some part quality risk from China.
- 8GB SD Card - $5 (+/- $2)
- USB Micro Charger (Android) - $5 (+/- $2)
- OLED Display - $6 (+/- $3). Note different types, /w power pins swapped.
- Case - 3D Print for Pi Zero - $0 (N4AEB special)
- Hardware: $2 (+/- $1)
- Total: $55 ($50 for paid BARC members), ebay.com, 3-6 weeks out. Prices go up for local stock, quicker shipping. I.E: if you wait until the last minute. Kits with various components can reduce cost. (Metal case + Display + MMDVM for $30 is popular). YouTube, Bridgecom videos. “Cheapest” solution - you can get real Raspberry Pi + Dual + Nextion Display, but it will cost you 2X.
- Note: eBay PayPal issues, shipping came postage due. All parts from China. Anticipate delays in the coming months.