Enhancing D-STAR
3rd Party & DIY

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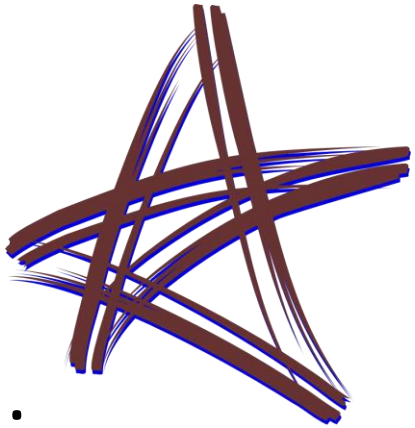
Dayton D-STAR Forum

May 20 2016

Topics

- My experiences with D-STAR Add-ons
- My Favorite D-STAR Extensions
- Enhancing ICOM Repeaters

My Own Experiences With D-STAR Add-ons



- Some may think it's a closed system.
- It's not. (REF linking, DVAPs, Dongles…)
- I got my 1st D-STAR radio in 2007.
- In 2010 I built a D-STAR Hotspot and things have never been the same.
- Today I'm talking about my favorite devices and projects.
- I'm Sorry if I Don't Mention Your Favorite

My Favorite D-STAR Extensions

D-STAR QSOs with an AMBE "Dongle"

Software links to Reflectors over Internet,
talk using computer's Speaker & Mike

- **DV Dongle** and **DV3K** – Internet Labs created this category. I've had lots of fun w/DV Dongle
- **ThumbDV** from NW Digital Radio – works great & nice see-through case.
- **Star*DV** – includes onboard codec, just plug in Speaker/Mike. Soundcard on pc not needed.
- With the right software, some people adapt analog HF radios for D-STAR QSOs.

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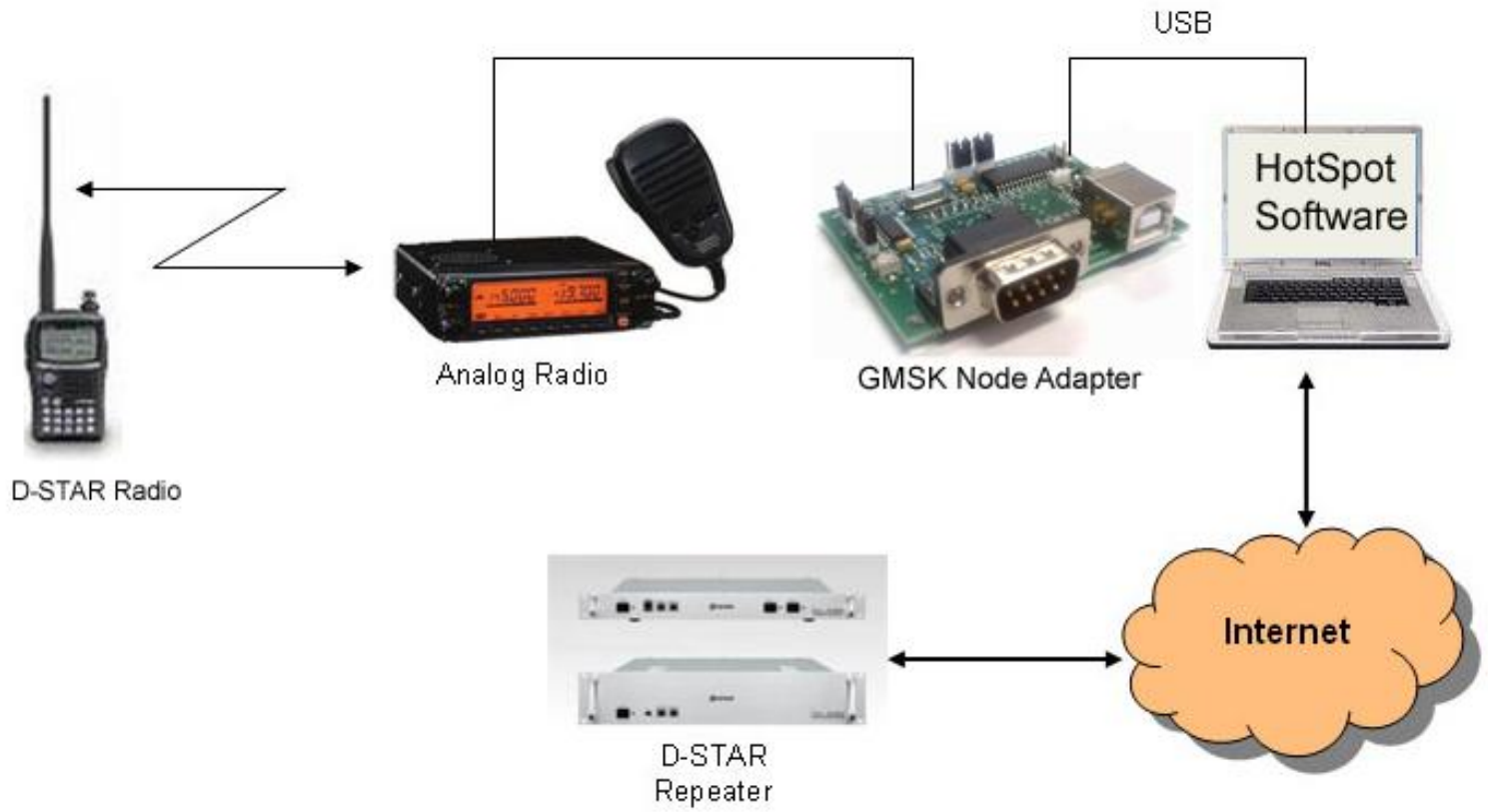
My Favorite D-STAR Extensions

Hotspots



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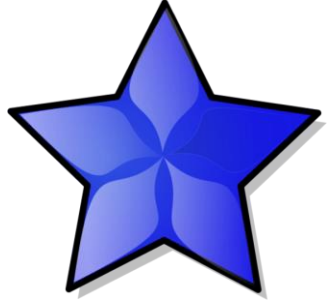
My Favorite D-STAR Extensions

Medium/Hi Power Hotspots



"Extends D-STAR Network to Your Neighborhood"
Needs D-STAR radio. Can build simplex Hotspot or full duplex repeater (including 220MHz)

GMSK Modems

Satoshi Yasuda invented them
Uses CMX589 IC for modem functions

- I have used modems from Satoshi, Mark Phillips and Fred Van Kempen. Favorite was Fred's **HSA modem**.
- **Star*Board** (which my company sells; uses DUTCH*Star firmware)
- **DVMEGA GMSK Modem** Shield – fits on Arduino, which runs firmware written by Guus Van Dooren

My Favorite D-STAR Extensions

Medium/Hi Power Hotspots

"Extends D-STAR Network to Your Neighborhood"
Uses D-STAR radio to talk through analog radio to D-STAR network of reflectors and repeaters

DSP Modems

Firmware and CPU handle modem functions

– **DVRPTR_V1** is my absolute favorite – firmware by Jan Alte, co-designer of this DSP Modem

Note: There are several other DSP Modems, including the DVRPTR_V2 and V3, but I have not had the time yet to try them.

My Favorite D-STAR Extensions

Low Power Hotspots

Nearby Coverage, Simpler & Easier

- **DVAP** by Internet Labs – again, Robin & Moe invented the category. Great hardware, software and support
- **DVMEGA** by Guus Van Dooren, is available in 2 forms:
  - DVMEGA RF Board Shield – this is what I have and I love it. Mine fits onto an Arduino Uno (tiny) and works flawlessly, either with Win PC or Linux (Pi)
  - DVMEGA RPI Radio has equivalent of Arduino processor on the board and fits on the Pi. Simple

My Favorite D-STAR Extensions

Multi-Mode

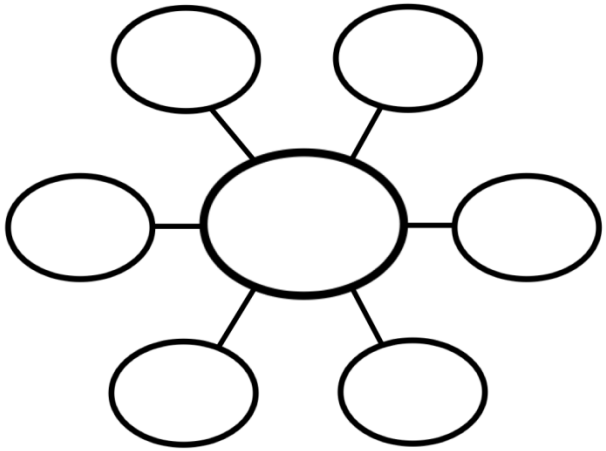
D-STAR and More

- **DV4mini**
  - From German team who created DVRPTR_V2 & V3. Low Power Hotspot that supports D-STAR, DMR, Fusio, P25
  - Mode is set during configuration. Software links to new DMR “reflectors” and Fusion “rooms”.
- **DVMEGA** RF Boards support multi-mode firmware supported by G4KLX software. Easy!
- **MMDVM** – Modem proposed by G4KLX. Designed by Jim KI6ZUM. Prototypes available from Bruce Given: dvrptr.net. Evolving but very promising.

Enhancing ICOM Repeaters

- D-Star lets users decide who they want to link to
- Most ICOM repeaters allow users to link and unlink DPlus REF reflectors
- Users who buy DV Dongles, DVAPs or build Hotspots can link nearly anywhere, anytime
- This is the real fun of the new digital modes

What's New



- Optional software allows linking not only to REF (DPlus) reflectors, but XRF (DExtra) & DCS
- This software also supports a new kind of Callsign Routing called CCS7
- This allows you to connect to a given ham if their callsign is set up with a CCS7 id
- The system finds them anywhere in the world and connects you to where they were last heard

Is that good?

- DCS is very popular in Europe and growing in the US
- XRF has some very interesting reflectors too, including experimental servers that bridge with other systems
- CCS7 is fun because it doesn‘t require hitting special buttons (e.g. callsign capture)

Now ICOM Repeaters Can Do That Too!

- If you are the Admin for your club‘s D-Star Gateway, and if club members agree, you can make the change that we did at W6CX
- If you are a user of a repeater, you can give feedback to the club or repeater owner, and they may decide to make the enhancement

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Two Ways to Enhance ICOM Repeater Gateways

- **#1: Stop ICOM Gateway program but leave the Callsign Registration program running**
  - Then install G4KLX program ircDDBGateway
  - This is the recommendation in blog by D-STAR guru John Hays K7VE
  - Pro: Multiple Reflector handling is integrated
  - Con: No longer run genuine DPlus, so your repeater is no longer a DPlus Gateway and linking to it is more difficult

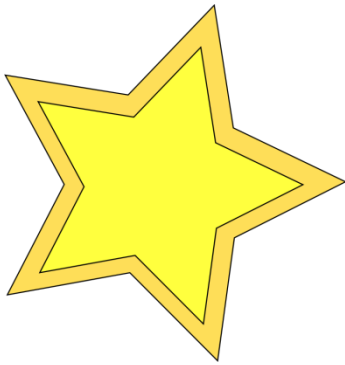
Two Ways to Enhance ICOM Repeater Gateways

- **#2 Run both ICOM G2 and G4KLX Gateways**
  - Mt. Diablo ARC in NorCal W6CX D-STAR did this
  - G2 handles all normal D-STAR activity
  - Genuine DPlus handles links to REF reflectors
  - ircDDBGateway is enabled for DCS, XRF and CCS7
  - At W6CX, we also run Monlink to maintain a default REF reflector
  - How did we do this? We are grateful to Adrian VK4TUX for his help in integrating ICOM G2 and G4KLX software seamlessly

How does this work?

- Linking to another REF is normal: Unlink, then link using URCall memory or DR Mode
- Linking to XRF or DCS reflector: First unlink, then issue a URCall link, e.g. XRF005BL using URCall, or send DTMF tones

What about CCS7 Connections?



- First unlink (URCall = U in position 8), hit PTT
- If user‘s radio has DTMF keys, enter 7-digit #
- Or, use URCall memory to send C + 7-digit #
- If your friend has been heard recently on a CCS7-enabled DVAP/Dongle/Hotspot or ICOM Repeater, the system will link the repeater to that
- Call your friend and mention you are using CCS7
- He or she should then unlink from reflectors if needed
- To unlink the CCS7 connection, set URCall to CA – Simple!

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In Conclusion:
Do It (Yourself)

- This is the **Golden Age of Digital Voice**
- D-STAR is exensible, and you can do that on your own systems with Hotspots, Access Points, Dongles and more
- You can encourage your club or repeater owner to enhance their Gateway to support not only REF reflectors, but XRF and DCS – as well as CCS7 Callsign Routing

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