

ZUMspot &

MMDV
MULTIMODE DIGITAL VOICE MODEM

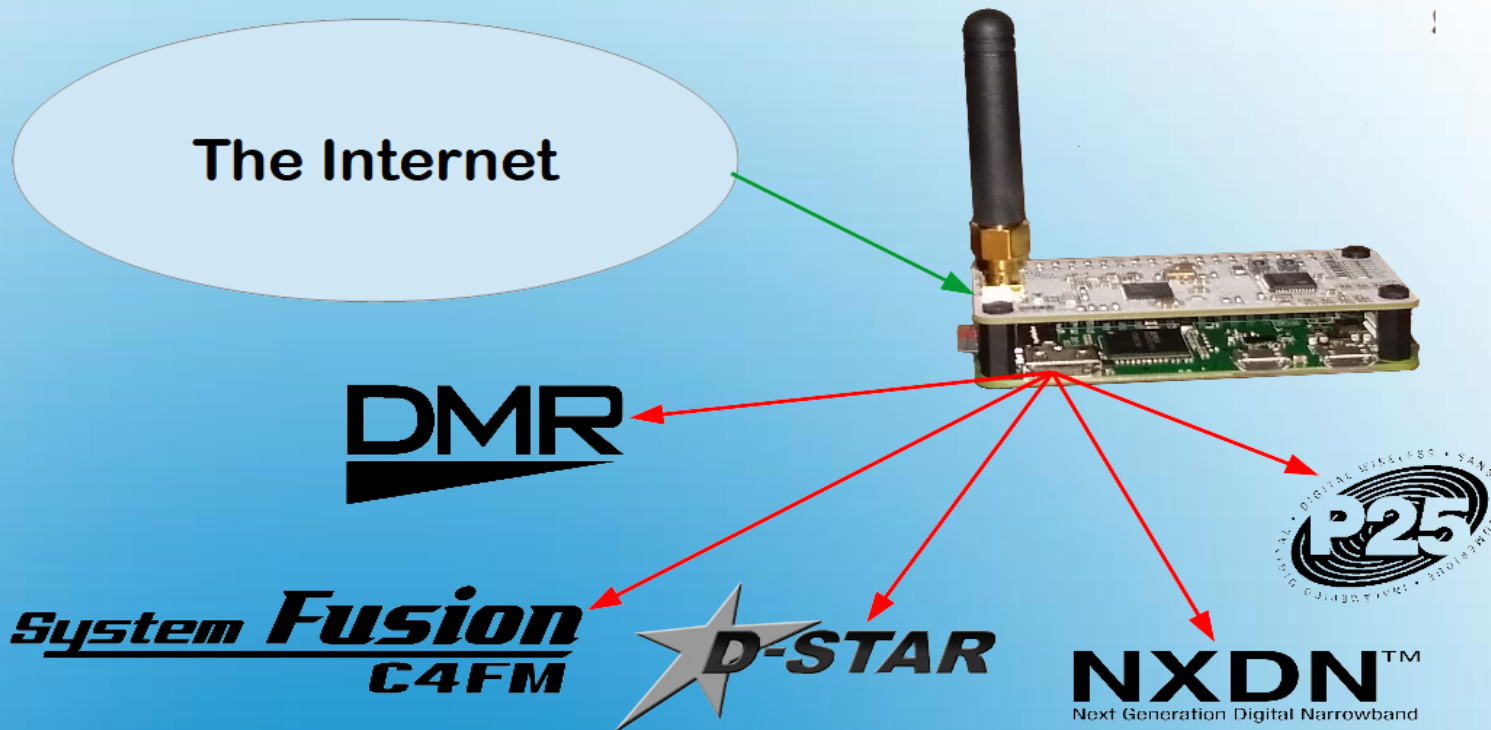
Hotspots



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Access internet connected reflectors/talkgroups over your own personal simplex node.



It does rely on the internet to work.

A Brief History Of:



- .Project started in late 2015
- .Software written by Jonathan Naylor G4GLK
- .Hardware developed by Jim McLaughlin, KI6ZUM
- .Powered by small microcontroller to run “modem” and Raspberry Pi to run “host”/gateway software

Through some evolution, we get....

ZUMspot



- .Designed by KI6ZUM – Technically only KI6ZUM boards are “ZUMSpots”**
- .Combines STM Microcontroller running MMDVM Modem firmware and radio**
- .Powered by Pi-Star, similar to all the other MMDVM projects**
- .Current version is evolution of multiple boards hacked together**
- .Available in USB version powered by PC or Raspberry Pi**

Several Versions of MMDVM+Radio Boards:

- .MMDVM_HS_HAT from N5BOC: \$unlisted
- .ZW_HotSpots from BI7JTA: \$35+ship from China
- .MMDVM_HS from DF2ET & DB9MAT: \$78.50+ship
- ...probably others I couldn't find listed.

Hotspot “kits” (fully assembled or DIY):

- .ZUMSpot “Complete” from HRO (assembly required, no case): \$139
- .ZW_Hotspot (board, Rpi, sdcard, case, cables): \$103+ship
- .NanoSpot from Micro-Node (fully assembled): \$299

Full Duplex MMDVM boards exist, but can be problematic

What many don't want me to tell you:

- .Many “unauthorized” clones exist on eBay from China.
- .Drastically cheaper, but many demand you don't buy them due to “open source violations”.
- .Can be as low as \$20 for basic MMDVM+RF board
- .Known by the name “JumboSpot” or by no name at all.

- .These are all over the place on eBay and Amazon; probably the basis for the sub-\$100 hotspots/kits that often include at least all boards and sometimes a case.
- .Might have issues, might not work, YMMV

“20 bucks is 20 bucks” - Geddy Lee

It's China...what did you expect? Don't want them ripping off your boards? Don't use them to manufacture them!

Pi-Star

- .Raspberry Pi distribution for MMDVM Boards**
- .Provides “Gateway” function of the hotspot**
 - .Configures the MMDVM software “under the hood”**
 - .Makes connections to networks and reflectors/gateways**
 - .Basically the other half of the brain for your hotspot**
- .Provides browser-based configuration as well as “dashboard”/status**
- .Auto-updates it's software, MMDVM firmware, and the host files for all the major modes**
- .Allows advanced users to tweak configuration files through the browser or by obtaining a shell on the underlying Linux OS.**

BlueDV Software for the ones plugged up to your PC via USB (either USB version or USB-to-TTL).

Cross Mode Operation

Use one type of radio with another system's groups/reflectors

System Fusion
C4FM

DMR

DMR



NXDN™
Next Generation Digital Narrowband

System Fusion
C4FM



- .No D-Star Cross-Mode (modulation and codec)
- .No NXDN or P25 radio crosses (yet)
- .No analog cross-mode (no AMBE codec chip)



- .Supports Dplus (REF), Dextra (XRF), and DCS reflectors**
- .Link and unlink reflectors from radio just like you would on a repeater**
- .Callsign routing not reliable (reflectors made it obsolete)**
- .Has “echo” and Info commands**
- .Can connect directly to repeater modules**

Some reflectors provide their own cross-mode with other systems, availability depends on the reflector.

System Fusion ***C4FM***

- .Supports “YSF” and DCS Reflectors
- .Does not directly get you on WIRES-X
- .Emulation for WIRES-X interface on radio for changing groups, also supports DTMF commands.
- .Changing DMR TGs currently a pain
 - .Pi-Star 4.0 (currently in Beta) fixes this
- .Supports the most cross-mode configurations
- .WIRES-X emulated group lists are LONG, often better to change using Pi-Star Dashboard or reflector number.

I personally have not tried P25 or NXDN cross-mode and do not know how they operate from a Fusion radio.

Some YSFReflectors provide links to specific WIRES-X rooms as well as to XLX reflectors, which can have DStar and DMR users if outfitted with AMBE transcoding. This again depends on the reflector configuration.

DMR



- .Supports the major DMR networks:**
 - .Brandmeister**
 - .DMR+**
 - .TGIF Network**
- .Dynamic and Static Talkgroups supported**
- .Brandmeister API support**
- .Seems to work like it does on a real DMR repeater, provided you set up your codeplug.**
- .TimeSlot 2 only (unless you have full-duplex MMDVM board)**

I have not done any cross-mode operation with a DMR radio, so I can't comment on how that “feels”.



NXDNTM

Next Generation Digital Narrowband

I haven't used either of these modes and have no clue what operating them is like from a native radio or cross-mode perspective

I've spent money enough on radios and I don't think the userbase is that large yet. From a DMR radio it probably works like normal talkgroups. Fusion probably similar to other Fusion cross-mode operation.

POCSAG (Post Office Code Standardization Advisory Group)



.It supports pagers. That's right. Pagers. You can get text messages over DAPNET (a decentralized paging network) using pagers tuned to operate in the 70cm band.

.You can apparently send DMR SMS to DAPNET and vice-versa (I didn't fully look in to this)

.I haven't looked in to this because it's 2019 and I'd feel silly buying a pager.

.Not interested enough to decode it using software and SDR.

.Apparently has web interface.

I don't honestly know the finer details of DAPNET; that is something you'd have to research should you be interested.

Compared to SharkRF OpenSpot & OpenSpot II

Both provide virtually same functionality!

- .Support for same modes
- .DMR limited to Timeslot 2
- .Similar cross-mode support
- .No direct WIRES-X access

But they do have their differences:

OpenSpot/OpenSpot II:

- .Ready-to-go self-contained product
- .Product support from company
- ."Closed" software – firmware updates from manufacturer only.
- .OpenSpot II has wifi and built-in battery
- .Boots faster
- .Costs a lot more than MMDVM/Zum

ZUMSpot/Jumbospot/MMDVM:

- .More DIY – requires Raspberry Pi
- .Community support only
- .Open source software – regularly updated
- .Wifi depends on your Pi
- .Requires external power
- .Slower Boot (Pi-Star 4 is working on this)
- .Cheaper than OpenSpot/II

Whichever route you go, adding a hotspot can be a lot of fun and give your usually idle HT's a workout.