



INTRODUCTION TO D-STAR

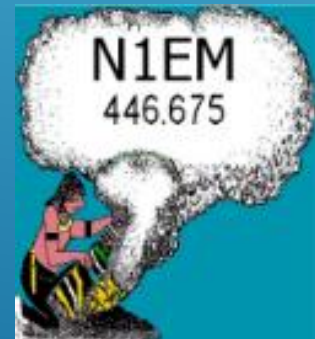
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Terry Stader – KA8SCP / ka8scp@wb1gof.org

D-STAR Admin / Reflector Admin



Presented to



Algonquin Amateur Radio Club



WHAT IS D-STAR

- D-STAR stands for Digital Smart Technologies for Amateur Radio
 - digital voice and data protocol designed for amateur radio.
 - developed in the late 1990's by the Japan Amateur Radio League (JARL) to bring digital technology to amateur radio.
- Capable of linking repeaters together locally and through the Internet utilizing callsigns for routing of traffic.
- Repeaters are linked via TCP/IP utilizing "gateway" software
- Allows amateur radio operators to talk to any other amateurs participating in a particular gateway "trust" environment.
 - The current master gateway in the United States is operated by the K5TIT group in Texas,
 - They were the first to install a D-STAR repeater system in the U.S.
 - USTRUST



WHAT IS D-STAR

- Advantages of digital voice modes
 - less bandwidth than older analog voice modes vs AM/FM.
 - The quality of the data received better than an analog signal
 - as long as the signal is above a minimum threshold and as long as there is no multipath propagation.
- D-STAR radios are available for HF, VHF, UHF, and microwave amateur radio bands.
 - In addition to the over-the-air protocol, spec'd for network connectivity,
 - To be used on the Internet or other networks
 - allowing streams of voice or packet data to be routed via amateur radio.



WHY D-STAR

- Long distance comms without big radios and antennas! (Although HF D-STAR now a “thing”)
- D-Star digital voice maintains its quality over a larger range of signal degradation than analog voice.
- Automatic call sign identification
 - Call sign routing
- Automatic position reporting
- Text and voice simultaneously

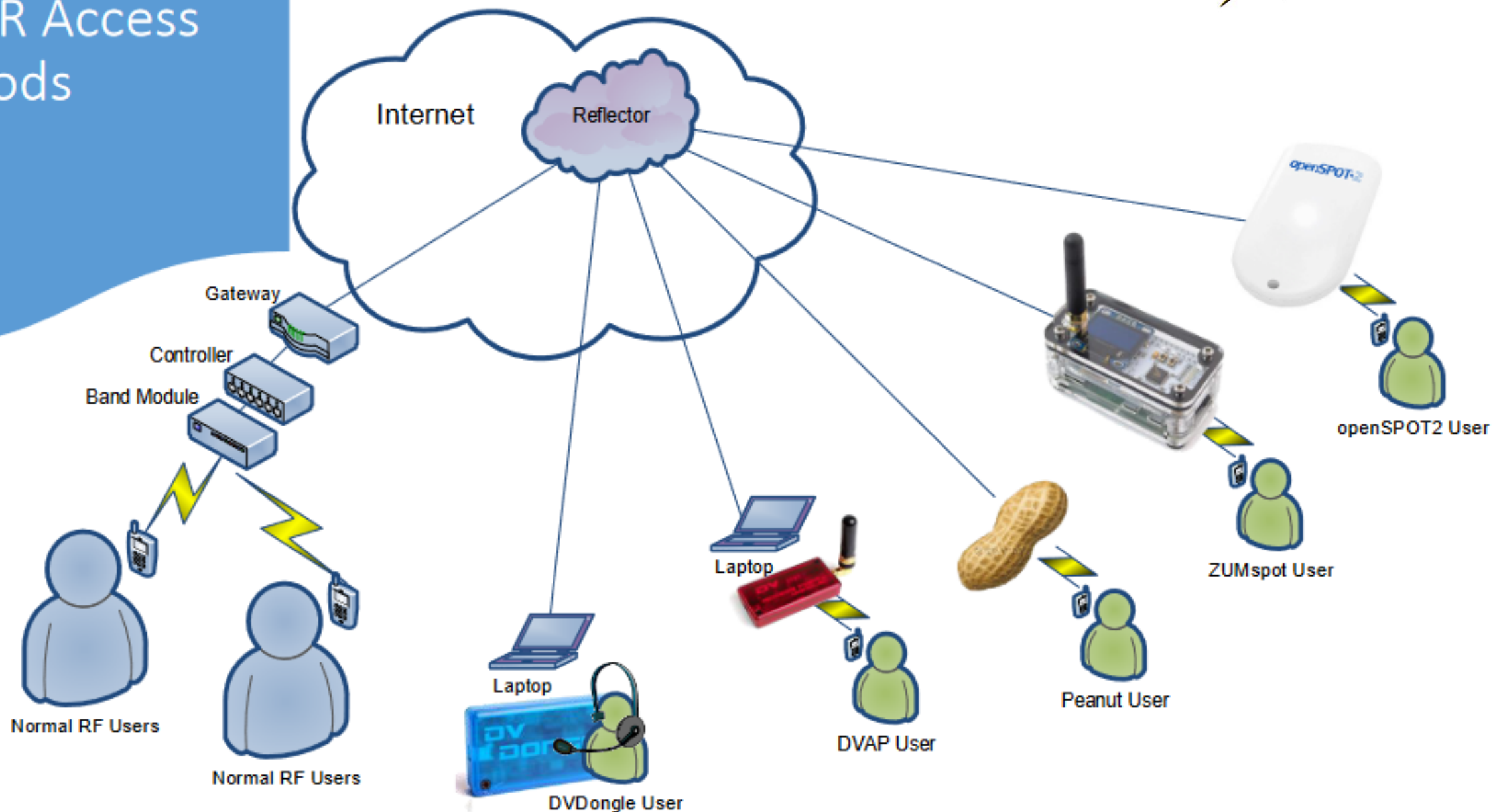


WHY D-STAR

- D-Star was designed for Amateur Radio with networking in mind and supports routing and name services
- Other modes: DMR, System Fusion, P25, NexEdge
 - DMR - 2 voice paths per channel, better fidelity, no GPS, repeater owner sets channels/talkgroups, not field programmable
 - Fusion – better audio/error correction, single manufacturer
 - P25 – “original” digital, limited connectivity options
 - NXDN/NextEdge – similar to DMR in capabilities



D-STAR Access Methods



➤ HF Transceivers, V/UHF Mobiles and Handhelds

➤ For local RF coverage

➤ DVAP, DVDongles, DV4mini

➤ HotSpots

➤ RPi based

➤ Based on G4KLX software

➤ Pi-Star <https://www.pistar.uk/>

➤ WPSD (new) <https://w0chp.radio/wpsd/>

➤ Use your own WiFi service

➤ In your car

➤ portable



ON THE ROAD

REGISTER!



- ▶ Every D-STAR user needs to “register” their call and at least one “Terminal ID” to get started on D-STAR
- ▶ Your call sign is the “foundation” of your registration
- ▶ You only need to register once at ONE “registration server”
- ▶ Best location to register is at <https://regist.dstargateway.org>
 - ▶ Instructions are found at <https://regist.dstargateway.org/instructions/>
 - ▶ Registration is a 3-step process: A-You register; B-Admin approves/validates your call; C-You add your terminals
 - ▶ PLEASE READ THEM and follow step by step. Follow all the steps

REGISTRATION



- You do NOT have to be registered to talk
- Registration allows:
 - Linking repeaters to reflectors
 - Access the D-STAR network from the internet (i.e. hotspot)
- Get on the air and then register
 - <http://regist.dstargateway.org>
 - Add 2 terminal IDs:
 - Default: just your call sign
 - Access Point: your call + Z

D-STAR Gateway System (REGIST)

The agreement document

Please register here IF YOU DO NOT HAVE A LOCAL D-STAR GATEWAY in your area that you can register with.

You can find a list of gateways with links to their registration page here:

<http://dstarusers.org/repeaters.php>

>>--> Do NOT request registration ON MORE THAN ONE GATEWAY - if you are already registered, DO NOT register again.

>>--> I agree to abide by the amateur radio rules and regulations of my country.
>>--> I understand that should I not comply, I may be removed from the D-Star network without

Do you agree?

YES: NO:

Enter your personal information!

CallSign : Equal to or less than 7 characters.

Name :

E-mail : Make sure you use a valid e-mail address.

Password : 8 to 16 characters.

Password confirm :

SUCCESSFUL REGISTRATION?

<https://regist.dstaragateway.org/regcheck>



D-STAR Gateway System (REGIST)

D-STAR Registration Validation

User Call:

- ✔ KC8YQL has been approved on: WB1GOF (on 2022-03-16 17:32:23)
- ✔ KC8YQL has terminals that are registered on: WB1GOF

KC8YQL Terminal Entries		
Terminal Call	Gateway	Notes
KC8YQL Z	WB1GOF	Access Point Terminal
KC8YQL	WB1GOF	Space/Primary Terminal

SUCCESSFUL
REGISTRATION?

CHECK IT

WB1GOF D-STAR Gateway Registration Check

Callsign:  SUBMIT

Registration Information:

Registr.Call	Registration Server	Date of Registration	IP-Address-Pool
KC8YQL	WB1GOF	2022-03-16 17:32:23	10.210.111.232- 10.210.111.239

Activated Terminal-IDs:

Device Call/ID	Registration Server	IP-Address	Last Heard	Repeater	Gateway
KC8YQL	WB1GOF	0.0.0.0	2022-03-16 17:33:17	W1AAD A	W1AAD
KC8YQL Z	WB1GOF	0.0.0.0	2022-03-16 17:33:17	KC8YQL Z	KC8YQL

Registration OK!

<https://wb1gof.dstargateway.org/cgi-bin/dstar-regcheck>





- ▶ You may find it beneficial to also register for a CCS7 number....
- ▶ A CCS7 number, also known as a CCS7 ID or DMR ID, is a unique 7-digit identifier used in digital mobile radio (DMR) systems and other digital modes like D-STAR and P25. It's essentially a digital "callsign" that allows users to be identified on these networks.
- ▶ REGISTER AT: <https://www.radioid.net>
- ▶ Check for registration at https://www.pistar.uk/dmr_regcheck.php or <https://radioid.net/database/search>



ADDITIONAL
REGISTRATION?



- ▶ TIP #1 –Icom provides FREE programming software their D-STAR radios!
 - ▶ Icom (search for your model number, ID-51A, IC-7100, etc.)
 - ▶ https://www.icomamerica.com/support/firmware_driver/
 - ▶ https://www.icomjapan.com/support/firmware_driver
 - ▶ Look for “Cloning software” usually part number begins with “CS”
 - ▶ [CS-7100, CS-52, CS-52PLUS, ID-51A PLUS, ID-51E PLUS, ID-51A Icom 50th Anniversary Limited Edition, ID-51E Icom 50th Anniversary Limited Edition, ID-51A PLUS2, ID-51E PLUS2, ID-51A, ID-51E](#)
- ▶ TIP #2 - First thing you should do is make get a copy of what is pre-loaded on your radio and save it to our computer



GETTING STARTED – ICOM RADIOS

- ▶ TIP #1 –Kenwood provides FREE programming software their D-STAR radios!



- ▶ Kenwood (search for your model number, TH-D74A, TH-D75A, etc.)
 - ▶ https://www.kenwood.com/i/products/info/amateur/mcp_d74_e.html
 - ▶ https://www.kenwood.com/i/products/info/amateur/mcp_d75_e.html
 - ▶ Look for “Memory Control Program” usually part number begins with “MCP”
- ▶ TIP #2 - First thing you should do is make get a copy of what is pre-loaded on your radio and save it to our computer

GETTING STARTED – KENWOOD RADIOS





DR MODE

Key Icom Radios with DR Mode

ID-51 Series: The ID-51A Plus and ID-51A Plus2 handhelds feature DR mode for easy repeater connection.

ID-31 Series: The ID-31A handheld also includes DR mode.

ID-5100 Series: The ID-5100A mobile radio is equipped with DR mode.

ID-52A: The ID-52A and PLUS and PLUS Anniversary versions, support DR mode for conventional FM and D-STAR operations.

IC-705: The IC-705 mobile/handheld radio supports DR mode.

IC-7100: This HF/VHF/UHF mobile radio also includes DR mode.

IC-9700: Another Icom radio that can connect through DR mode.



Kenwood Radios with DR Mode

TH-D74A: This Kenwood triband radio offers D-STAR with DR mode.

TH-D75A: The D75 model also supports DR mode and the repeater list

Check out - <https://www.charlottedstar.org/D-STAR%20DR%20Mode.pdf>

How DR Mode Works

Easy Setup:

DR mode makes it simple for beginners to configure D-STAR settings without needing advanced technical knowledge.

Menu-Driven Access:

The mode offers a menu-driven way to access D-STAR repeaters and reflectors and even your own hotspots!

Repeater Lists:

Radios with DR mode utilize pre-programmed or user-imported repeater lists for easy connection (can be updated)





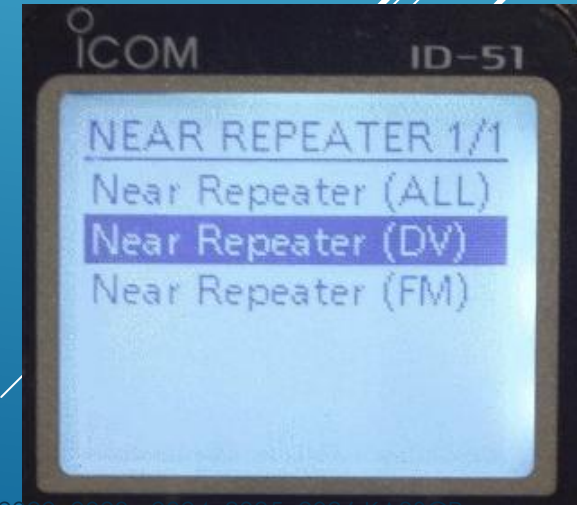
Using DR Mode

- DR Mode (Digital Repeater Mode) allows quick selection of repeaters and using linking commands
- Uses stored database of repeaters in memory and on SD card
- Press and hold DR button to activate DR Mode
- FROM – Sets local repeater you are using
- TO - Determines what you want to do with your signal



Selecting the Repeater

- Highlight From and then press blue center button
 - Repeater List – Select repeater (DV or FM) based on region
 - Near Repeater – Select nearest repeater
- Press blue again to select





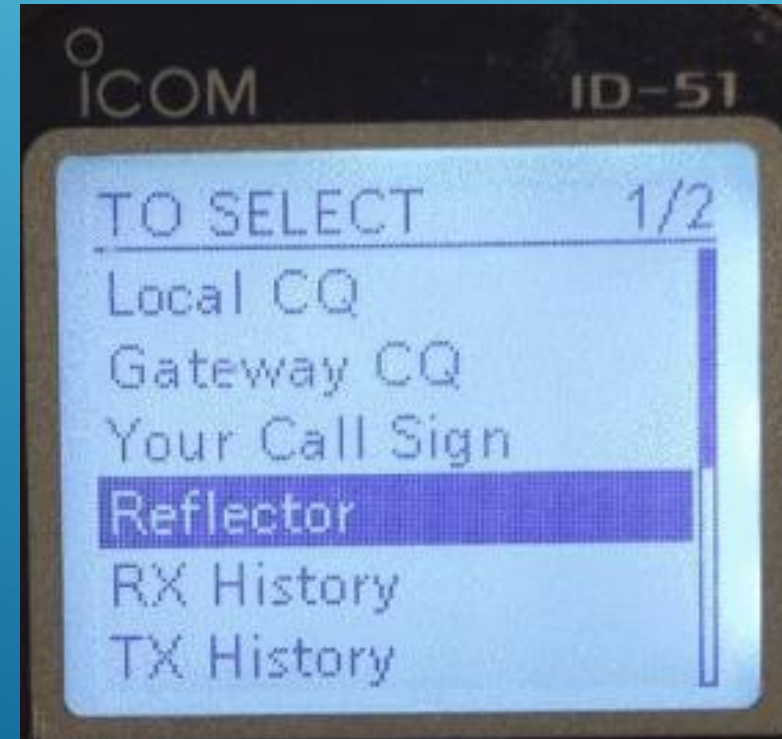
Selecting the Repeater

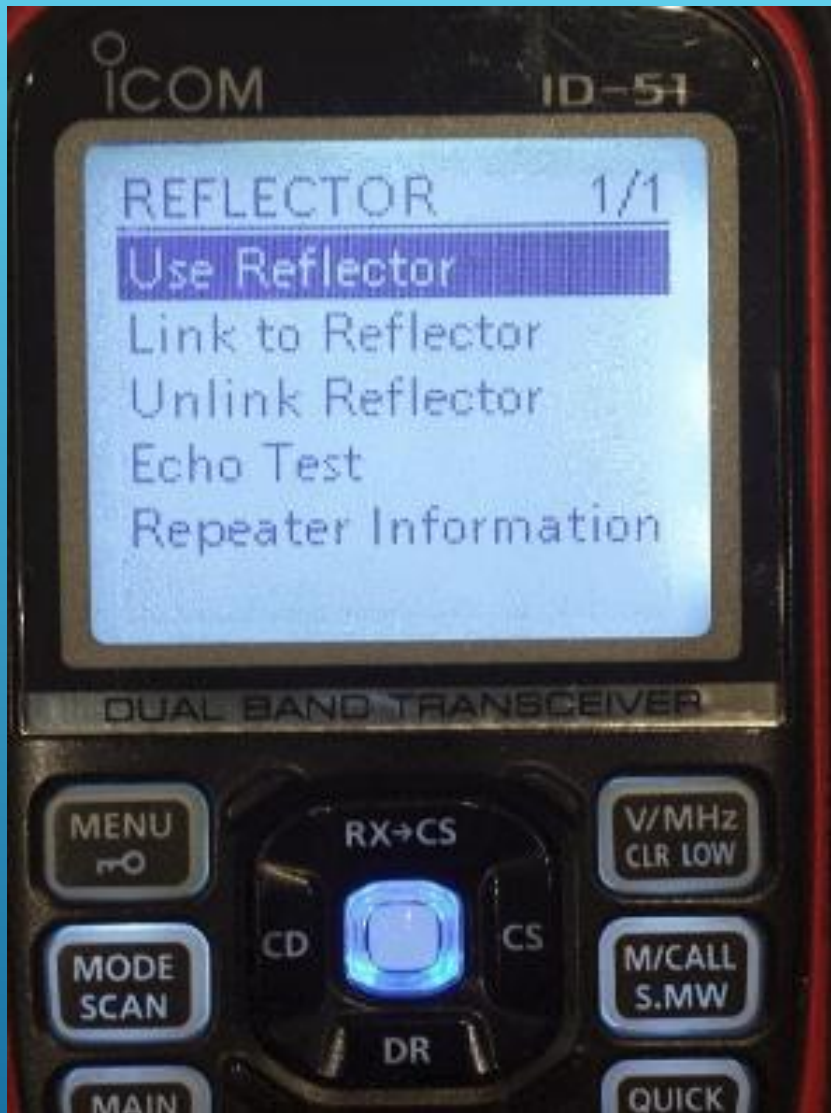
- Near Repeater – Select nearest repeater or scroll to your repeater choice
- Press blue again to select



What to Do (TO)

- Select TO field by pressing RX+CS button
- Most often, select Reflector



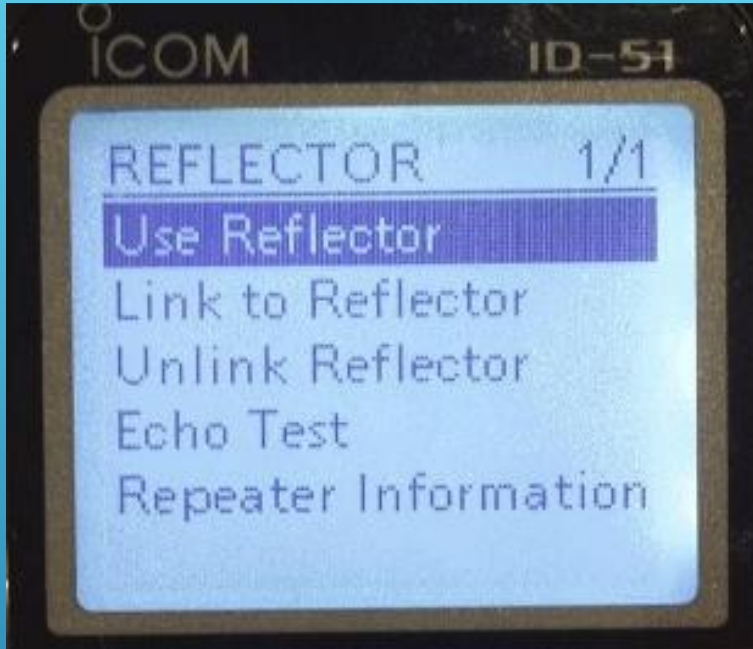


What to Do (TO)

- Use Reflector to use a reflector already connected to on the local repeater
- Link to Reflector – select to choose a reflector to link
- Unlink Reflector – select to unlink the local repeater from a connected reflector (you MUST do this first before linking to a new reflector choice)
- Echo Test – plays back your transmission
- Repeater Information – causes repeater to announce it's call and text to show connection status

Simple Rules for Linking and Unlinking

- If a repeater is already linked to a reflector, your radio will be heard by all on the local repeater and the connected reflector
- You must unlink before linking to another reflector
- Once a **Link** command is issued, go back to **Use Reflector** to talk



Callsign Routing - A “whiz-bang” feature - kinda works!

D-STAR call sign routing enables directly contacting another station via the internet gateway, regardless of which repeater they are currently using. By setting the "UR" (Destination) field to the recipient's call sign, the system routes the transmission to the last repeater that person keyed up, allowing for targeted communication without needing to know their location.

How to Perform Call Sign Routing:

Set URCALL: In your Icom radio or terminal software, set the **URCALL** field to the call sign of the station you want to contact (e.g., W1ABC or W1ABC__B if you know they are on a specific module).

Configure RPT1 & RPT2: Set RPT1 to your local repeater/hotspot (e.g., K1ABC B) and RPT2 to the gateway port, which is usually the repeater call sign followed by 'G' (e.g., K1ABC G).

Direct Input (ID-52/ID-50/IC-705): Navigate to the "**Direct Input UR**" option in the menu and manually enter the target call sign.



Callsign Routing - A “whiz-bang” feature - kinda works!

(continued)

Last Known Call: If the station is not on your local network, the system looks up the last repeater they used via the D-STAR global registration database.

Key Considerations:

8-Character Requirement: All call sign fields (UR, RPT1, RPT2) must be 8 characters long, using spaces to fill gaps before any module letter (e.g., K1ABC B)

Registration Needed: You must be registered on a D-STAR gateway for routing to function properly

Hotspot Use: When using a hotspot, the RPT1 is your hotspot call (e.g., K1ABC B), RPT2 (K1ABC G), and URCALL is the station call.

Alternatives: If not using direct call sign routing, you can "link" a repeater to a reflector (using REFxxxEL in URCALL) to join a general conversation.



WHERE ARE THE USERS?



DASHBOARD REPEATER

DPLUS Dashboard | Gateway Status and Control

Registration | WB1GOF Repeater System | DPLUS version 2.2p

Linked Gateways / Reflectors

Module	Linked to
A	unlinked
B	REF050 C
C	REF038 D
D	unlinked
E	unlinked

← Connected Reflectors

Remote Users

Callsign	User Message	Last TX on	Type

Last Heard

Callsign	User Message	Last TX on	Time
N1RHY	JAMIE 51A TEWKSBURY	B	2021/05/03 15:09:54
KA8SCP	Terry - Westford MA	B	2021/05/03 15:04:01
NQ1W	Brandon/Hamilton, MA	C	2021/05/03 13:03:55
W1DYS		B	2021/05/03 11:47:10
N1UBR	DAN/D74	B	2021/05/03 11:12:16
AA1HO	Art /MOBILE/VAN/5100	B	2021/05/03 09:46:25
N1RCB	Gordon Lawrence, Ma	B	2021/05/02 23:11:11
K1SOB		B	2021/05/02 21:24:24
K1VK	Paul Bedford MA	C	2021/05/02 21:10:01

← Last RF User Heard

Is the repeater Linked, if so, Where?

- I (Info) command from radio
- U (Unlink) command from radio before trying to link someplace else

DPLUS Dashboard | Gateway Status and Control

Registration | KA1EAR Repeater System | DPLUS version 2.2p

Linked Gateways / Reflectors

Module	Linked to
A	unlinked
B	REF039 C
C	unlinked
D	unlinked
E	unlinked

Remote Users

Callsign	User Message	Last TX on	Type

Last Heard

Callsign	User Message	Last TX on	Time

Status as of 2025/01/01 19:11:39



<https://wb1gof.dstargateway.org>

AA1HD REPEATER DASHBOARD



D-STAR Dashboard | G3 Gateway Status

Registration | AA1HD G3 Repeater System | CentOS 7

Gateway AA1HD

IRC	Ctry	Gateway	Last In (UTC)	Last Out (UTC)	Last Act (UTC)	QTH	Software-Rev	Package-Rev	Upd Err	WD	IRC Srv
		AA1HD	2023-08-25 03:50	2023-08-22 21:01	2023-08-25 11:28	Lnk Rptr Sys Connecticut	CIRCDDDB:1.2.4 linux:ircDDBGateway-20190402	rpm:ircddbgateway-20190402.2-1-2 - DEBUG	0		Nuremberg.ircDDB

Repeater

Nr.	RPT	Repeater	Last Act (UTC)	QTH	URL	Latitude Longitude	QRG/Offset (MHz)	Range AGL	Software version
1		AA1HD B	2023-08-15 21:22:05	Lnk Rptr Sys Connecticut		+41.80016 -072.45472	442.15000 5.000	40 km 300.0 m	icom_rp2c
2		AA1HD C	2023-08-25 11:28:40	Lnk Rptr Sys Connecticut		+41.80016 -072.45472	145.26000 -0.600	80 km 800.0 m	icom_rp2c

Configuration

ircDDB-Net	APRS-Host	CCS	DCS	DExtra	DPlus	D-Rats	Info	ircDDB	Echo	Log
group2-irc.ircddb.net	noam.aprs2.net									

<http://aa1hd.dstargateway.org:8211>

DASHBOARD REFLECTOR

DPLUS Dashboard | Reflector Status and Control

Registration | REF050 Reflector System | DREFD version 1.52

Linked Gateways

Module A	Module B	Module C	Module D	Module E
		K1HRO B		
		K1MRA C		
		W1DSR B		
		W1MRA B		
		WB1GOF B		

Connected Repeaters

Last Heard

Last Heard

Callsign	User Message	Last TX on	Time
W2DAN	DAVE - TIVERTON, RI.	C	2024/01/20 10:22:10
W1TG	Tom-Hampton, NH	E	2024/01/20 10:04:29
KO4PLT		C	2024/01/20 09:41:55
W1AST	W1AST Larry ID5100	C	2024/01/20 09:34:09
KD1UA	KD1UA/Jack	C	2024/01/20 09:04:57
OZ1ARQ	Kim QTH JO54WS	C	2024/01/20 08:39:00
N2XPM	ARTIE MOBILE FN30	C	2024/01/20 05:11:29
K1MIZ		C	2024/01/19 19:25:48
N1YIV		C	2024/01/19 17:13:54
KB1EJH	Carl	C	2024/01/19 17:07:01
N1RHY	Jamie Icom 5100	C	2024/01/19 14:32:02

Remote Users

Callsign	User Message	Last TX on	Type
K1DTC		listening	HotSpot
AJ1L		listening	HotSpot
KB1YAP D		listening	HotSpot
KU1U		listening	HotSpot
K1DDJ		listening	HotSpot
KC1PHF		listening	HotSpot
WZ3HMT		listening	HotSpot
NQ1W		listening	HotSpot
KB1IWE		listening	HotSpot
K1PGS		listening	HotSpot
W1DLO		listening	HotSpot
N1PCE		listening	HotSpot
KA1IKK		listening	HotSpot
K1AFS D		listening	HotSpot
N1MQR		listening	HotSpot
AB1VA		listening	HotSpot
KM7N		listening	HotSpot
KC1SUI		listening	HotSpot
KC1BEK		listening	HotSpot
N1HGD		listening	HotSpot
KA7VPR		listening	HotSpot
KA1UFE		listening	HotSpot
N1RHY		listening	HotSpot

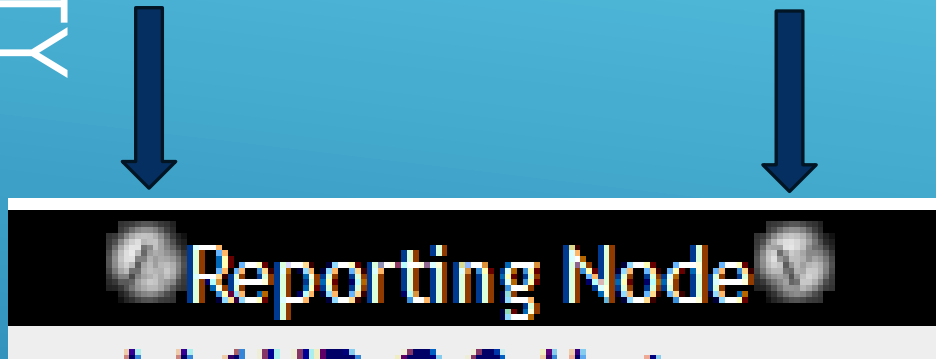
Remote Users Connected – hotspots, dongles

<http://ref050.dstargateway.org>

ACTIVITY – LAST HEARD

Callsign	Time Heard	Reporting Node	353 Unique callsigns heard in the last hour
IT9FRN	05/13/26 14:16:30 UTC	REF068 B 440 MHz DVD	Milan, Lombardy, Italy
W2NTN	05/13/26 14:16:25 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
NOAYK D	05/13/26 14:16:15 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
WX7S	05/13/26 14:16:15 UTC	REF001 Dongle User DVD	USA
KI4EYK D	05/13/26 14:16:15 UTC	REF001 Dongle User DVD	USA
E26CIP	05/13/26 14:16:12 UTC	E24DN C 2 Meters	Ubon Ratchathani, Ubon Ratchathani, Thailand
KL3JH	05/13/26 14:16:05 UTC	REF035 Dongle User DVD	Federal Way, WA, USA
VE4ACD	05/13/26 14:15:50 UTC	REF001 C 2 Meters DVD	USA
PD5JOS	05/13/26 14:15:35 UTC	REF055 Dongle User DVD	Albuquerque, NM, USA
N9NJS D	05/13/26 14:15:30 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
M6FWV D	05/13/26 14:15:30 UTC	REF020 Dongle User DVD	NJ, USA
SQ7FPH	05/13/26 14:15:10 UTC	REF032 Dongle User DVD	Radom, Poland
W9NDU	05/13/26 14:15:10 UTC	REF051 Dongle User DVD	Chicago, IL, USA
G4ANG D	05/13/26 14:15:10 UTC	REF001 Dongle User DVD	USA
ED2YAV	05/13/26 14:15:00 UTC	REF075 B 440 MHz DVD	Europe, Spain, Spain
W0HM	05/13/26 14:15:00 UTC	REF059 A 1.2GHz DVD	St. Louis, MO, USA
G0RRZ	05/13/26 14:14:55 UTC	REF001 C 2 Meters DVD	USA
M1EAG D	05/13/26 14:14:55 UTC	REF001 Dongle User DVD	USA
K8JXG	05/13/26 14:14:50 UTC	REF059 A 1.2GHz DVD	St. Louis, MO, USA
2E0OPU	05/13/26 14:14:45 UTC	REF001 Dongle User DVD	USA
MW6CCG	05/13/26 14:14:45 UTC	REF001 Dongle User DVD	USA
G8YMM	05/13/26 14:14:45 UTC	REF001 Dongle User DVD	USA
EA2BRH	05/13/26 14:14:41 UTC	ED2ZAA B 440 MHz	Zaragoza, Spain
K7VIW	05/13/26 14:14:39 UTC	KG7WZG C 2 Meters	Idaho Falls, ID, USA
DS5EEW	05/13/26 14:14:35 UTC	REF082 Dongle User DVD	South Korea
W8CTC D	05/13/26 14:14:30 UTC	REF038 Dongle User DVD	OH, USA
W8WCL	05/13/26 14:14:20 UTC	REF001 Dongle User DVD	USA
N7PNK	05/13/26 14:14:10 UTC	REF012 Dongle User DVD	CA, USA
SP7RB	05/13/26 14:13:59 UTC	REF032 Dongle User DVD	Radom, Poland
KD2TOO	05/13/26 14:13:59 UTC	REF001 Dongle User DVD	USA
N1ID	05/13/26 14:13:44 UTC	REF069 C 2 Meters DVD	CT, USA
VE3OOL	05/13/26 14:13:34 UTC	REF030 C 2 Meters DVD	Lawrenceville, GA, USA

ACTIVITY



Sort by "Node"
Click on the Reporting
Node column arrows

N8FM	08/05/23 18:38:34 UTC	W8DTW B 440 MHz	Westland, MI, USA
N8ASD	08/05/23 18:06:40 UTC	W8DTW B 440 MHz	Westland, MI, USA
VA3UG	08/05/23 18:38:11 UTC	W8DTW B 440 MHz DVD	Westland, MI, USA
W4WJR	08/05/23 18:12:11 UTC	W8DTW Dongle User DVD	Westland, MI, USA
N4RTD	08/05/23 18:12:11 UTC	W8DTW Dongle User DVD	Westland, MI, USA
KA8E	08/05/23 18:24:04 UTC	W8DTW Dongle User DVD	Westland, MI, USA
W8DR	08/05/23 18:12:11 UTC	W8DTW Dongle User DVD	Westland, MI, USA

K5HSV	08/05/23 18:32:03 UTC	REF030 C 2 Meters DVD	Lawrenceville, GA, USA
KD9URG	08/05/23 18:06:25 UTC	REF030 C 2 Meters DVD	Lawrenceville, GA, USA
N2NKP	08/05/23 18:32:13 UTC	REF030 C 2 Meters DVD	Lawrenceville, GA, USA
KD2BAN	08/05/23 18:23:13 UTC	REF030 C 2 Meters DVD	Lawrenceville, GA, USA
AG5XY	08/05/23 18:36:42 UTC	REF030 C 2 Meters DVD	Lawrenceville, GA, USA
K8CBR	08/05/23 18:27:30 UTC	REF030 C 2 Meters DVD	Lawrenceville, GA, USA
M0XLR	08/05/23 18:31:18 UTC	REF030 C 2 Meters DVD	Lawrenceville, GA, USA
K4QF	08/05/23 18:33:19 UTC	REF030 C 2 Meters DVD	Lawrenceville, GA, USA
OZ4ACA	08/05/23 18:40:32 UTC	REF030 C 2 Meters DVD	Lawrenceville, GA, USA
KF0HSR	08/05/23 18:31:53 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
VK3PLA	08/05/23 17:44:57 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
K2CSX D	08/05/23 18:34:19 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
W2LPC	08/05/23 18:21:12 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
VK2GV	08/05/23 18:34:24 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
KG5YEL D	08/05/23 18:36:12 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
VK2GMC	08/05/23 18:38:40 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
W9PVC	08/05/23 17:43:04 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
VE6MHD	08/05/23 17:58:09 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
N4HUD D	08/05/23 18:05:10 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
K3LJ	08/05/23 18:10:30 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
M5COL D	08/05/23 18:10:55 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
W0WDW D	08/05/23 18:11:40 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
N6GVG	08/05/23 18:31:43 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
VK3YAP	08/05/23 18:29:11 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
N3UPS D	08/05/23 17:45:07 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
KN4OSM	08/05/23 17:41:19 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
KI5FTB	08/05/23 17:57:28 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
PA0MBO	08/05/23 18:30:22 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
N3HPX	08/05/23 18:36:07 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
N4PNV D	08/05/23 17:43:55 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
KE4LPL	08/05/23 18:32:54 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
AG5XY D	08/05/23 18:36:07 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
WC9AAG D	08/05/23 18:40:12 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
K4OFV	08/05/23 18:15:39 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA
GI0UVD	08/05/23 18:35:37 UTC	REF030 Dongle User DVD	Lawrenceville, GA, USA



17:57:07	HB9EZX		HB9HD_C		.	.	.	00 00 00
17:57:08	<u>LU1BJW</u>		LU3AOC_B	LU3AOC_G	.	D-Star: DX w/o QRM	.	00 00 00
17:57:34	G4WXN 2421	CQCQCQ	MB6IBD_B	MB6IBD_G	REF055_D	Wed 1800UTC REF055D	53.8s S:0% E:0.0%	00 00 00
17:57:39	*****	CQCQCQ	DB0DOS_B	DB0DOS_G	DCS001_C	.	0.8s S:0% E:0.1%	08 00 00
17:57:59	VA6KRK ID51	REF030CL	VE6MHD_B	VE6MHD_G	.	Kelly - Med Hat AB	0.2s S:0% E:0.0%	00 00 00
17:58:15	F4IVO 9700	CQCQCQ	F5ZQT_B	F5ZQT_G	DCS033_C	Claude - IC-9700	0.9s S:0% E:0.0%	00 00 00
17:58:27	HB9TZS	CQCQCQ	HB9HD_C	HB9HD_G	.	Giuseppe, St. Gallen	4.3s S:0% E:0.0%	00 00 00
17:58:42	HB9TZS	CQCQCQ	HB9HD_C	HB9HD_G	.	Giuseppe, St. Gallen	5.3s S:0% E:0.0%	00 00 00
17:59:00	*****	CQCQCQ	W5NGU_B	W5NGU_G	.		1.0s S:0% E:0.0%	00 00 00
17:59:02	HB9EZX 7100		HB9HD_C	HB9HD_G	.	NASSOS/JN47RL	1.6s S:0% E:0.0%	00 00 00
17:59:28	*****	CQCQCQ	VA3AAR_B	VA3AAR_G	.		6.1s S:0% E:0.0%	00 00 00
17:59:55	*****	/DB0DWLB	DB0DOS_B	DB0DOS_G	.		0.6s S:0% E:0.0%	00 00 00
18:00:01	*****	CQCQCQ	VA3AAR_B	VA3AAR_G	.		8.2s S:0% E:0.0%	00 00 00
18:00:05	*****	CQCQCQ	DB0BBW_B	DB0BBW_G	.		0.6s S:0% E:0.0%	00 00 00
18:00:42	SQ6VRS TH74	CQCQCQ	SR6UKB_B	SR6UKB_G	.	Radek QTH: Nysa	1.9s S:0% E:0.0%	00 00 00
18:01:32	SQ6VRS TH74	CQCQCQ	SR6UKB_B	SR6UKB_G	.	Radek QTH: Nysa	0.8s S:0% E:13.0%	00 00 00
18:01:45	<u>LU1BJW</u>	CQCQCQ	LU3AOC_B	LU3AOC_G	.	D-Star: DX w/o QRM	.	00 00 00
18:02:32	SQ6VRS TH74	CQCQCQ	SR6UKB_B	SR6UKB_G	.	Radek QTH: Nysa	0.8s S:0% E:12.0%	00 00 00
18:02:35	LX2RV 5100	CQCQCQ	LX0DRD_B	LX0DRD_G	DCS270_B	73 de Roger	1.0s	40 00 00
18:02:42	*****	DCS039DL	T79DV_B	T79DV_G	DCS039_D		1.0s S:0% E:0.0%	00 00 00
18:03:32	SQ6VRS TH74	CQCQCQ	SR6UKB_B	SR6UKB_G	.	Radek QTH: Nysa	0.8s S:0% E:12.3%	00 00 00
18:04:31	*****	CQCQCQ	AA1HD_C	AA1HD_G	REF069_C		0.7s S:0% E:0.0%	00 00 00
18:04:33	SQ6VRS TH74	CQCQCQ	SR6UKB_B	SR6UKB_G	.	.	0.8s S:0% E:12.6%	00 00 00
18:04:43	*****	CQCQCQ	AA1HD_C	AA1HD_G	REF069_C		2.3s S:0% E:0.0%	00 00 00
You don't see your call sign here? Please read: http://ircddb.net/live-vis.html								
18:05:33	SQ6VRS TH74	CQCQCQ	SR6UKB_B	SR6UKB_G	.	Radek QTH: Nysa	0.8s S:0% E:12.6%	00 00 00
18:05:39	<u>LU1BJW</u>	CQCQCQ	LU3AOC_B	LU3AOC_G	.	D-Star: DX w/o QRM	3.6s S:0% E:0.0%	00 00 00
18:05:54	VA2DFK 5100	CQCQCQ	VE2RRJ_B	VE2RRJ_G	.	5100	2.4s S:0% E:10.8%	00 00 00
18:05:59	*****	CQCQCQ	ED7ZAD_B	ED7ZAD_G	DCS018_D		0.4s S:0% E:0.0%	00 00 00
18:06:08	<u>LU1BJW</u>	CQCQCQ	LU3AOC_B	LU3AOC_G	.	D-Star: DX w/o QRM	TX on	00 00 00
18:06:33	SQ6VRS TH74	CQCQCQ	SR6UKB_B	SR6UKB_G	.	Radek QTH: Nysa	0.8s S:0% E:12.3%	00 00 00



ACTIVITY - DPLUSMON

dplus Last Heard

Date / Time	Gateway	MyCall	UrCall	Reflector	RPT1	RPT2
2023-08-05 19:22:24 UTC	REF018	PU2PYC (5100)	CQCQCQ	REF018 C	PU2PYC B	REF018 C
2023-08-05 19:22:23 UTC	REF068	IZ2LPW (ID52)	CQCQCQ	REF068 B	REF068 G	REF068 B
2023-08-05 19:22:20 UTC	WA7HJR	WA7LZO (ID52)	CQCQCQ		WA7HJR B	WA7HJR G
2023-08-05 19:22:20 UTC	REF018	PY2TWI (2820)	CQCQCQ	REF018 C	PY2TWI D	REF018 C
2023-08-05 19:22:18 UTC	REF030	KE2BJJ (NATE)	CQCQCQ	REF030 C	KE2BJJ B	REF030 C
2023-08-05 19:22:17 UTC	REF018	PU2ORR (ID51)	CQCQCQ	REF018 C	PY2KGV B	REF018 C
2023-08-05 19:21:43 UTC	REF001	MM3GQT (AMBE)	CQCQCQ	REF001 C	MM3GQT C	REF001 C
2023-08-05 19:21:28 UTC	KJ4ZLL	KJ4VO (MARK)	CQCQCQ		KJ4VO	KJ4ZLL Z
2023-08-05 19:20:50 UTC	REF068	IT9FRN (ID52)	CQCQCQ	REF068 B	REF068 G	REF068 B
2023-08-05 19:20:29 UTC	REF001	2E0RPU (9700)	CQCQCQ	REF001 C	2E0RPU B	REF001 C
2023-08-05 19:20:14 UTC	GB7WC	M0XLR (4100)	CQCQCQ		GB7WC B	GB7WC G
2023-08-05 19:20:05 UTC	REF018	PY2RMF (ID51)	CQCQCQ	REF018 D	PY2RMF B	REF018 D
2023-08-05 19:19:06 UTC	REF018	PU2OIA (CAR)	CQCQCQ	REF018 C	PU2OIA C	REF018 C
2023-08-05 19:18:51 UTC	W7MOT	N7TWW (2820)	CQCQCQ		W7MOT B	W7MOT G
2023-08-05 19:18:47 UTC	REF024	KB8CXK (ID51)	CQCQCQ	REF024 C	KB8CXK B	REF024 C
2023-08-05 19:18:41 UTC	REF004	K5PNG (D74)	CQCQCQ	REF004 D	K5PNG D	REF004 D
2023-08-05 19:18:24 UTC	REF068	IZ2QLP (2820)	CQCQCQ	REF068 B	REF068 G	REF068 B
2023-08-05 19:18:15 UTC	REF055	G4WXN (2421)	CQCQCQ	REF055 D	MB6IBD B	REF055 D
2023-08-05 19:17:31 UTC	REF018	PY2LOC (ID52)	CQCQCQ	REF018 C	PY2LOC B	REF018 C
2023-08-05 19:17:19 UTC	REF014	K7NBO (5100)	CQCQCQ	REF014 C	K7NBO B	REF014 C
2023-08-05 19:16:35 UTC	W8MAI	KE8GIM (5100)	CQCQCQ		W8MAI B	W8MAI G
2023-08-05 19:16:22 UTC	REF096	OE5AYQ (705)	CQCQCQ	REF096 A	REF096 G	REF096 A
2023-08-05 19:16:20 UTC	REF030	G4LUE (ERNI)	CQCQCQ	REF030 C	G4LUE D	REF030 C
2023-08-05 19:16:10 UTC	REF030	AG5XY	CQCQCQ	REF030 C	AG5XY D	REF030 C
2023-08-05 19:16:04 UTC	W1SCC	KI5US	CQCQCQ		W1SCC B	W1SCC G
2023-08-05 19:15:17 UTC	REF096	OE5UAM (AMBE)	CQCQCQ	REF096 A	OE5UAM D	REF096 A



ACTIVITY - DPLUSMON

Put REF001 in Gateway box and then the Filter button

MyCall: Gateway: Filter

dplus Last Heard

Date / Time	Gateway	MyCall	UrCall	Reflector
2023-08-05 19:24:09 UTC	REF001	MM3GQT (AMBE)	CQCQCQ	REF001 C
2023-08-05 19:23:01 UTC	REF001	2E0RPU (9700)	CQCQCQ	REF001 C
2023-08-05 19:11:15 UTC	REF001	KO4JDP	CQCQCQ	REF001 C
2023-08-05 18:56:26 UTC	REF001	KB6RRX	CQCQCQ	REF001 C
2023-08-05 18:56:12 UTC	REF001	2E0XHG (INFO)	CQCQCQ	REF001 C
2023-08-05 18:53:53 UTC	REF001	DJ7FG (E880)	CQCQCQ	REF001 C
2023-08-05 18:50:39 UTC	REF001	GW1WRV	CQCQCQ	REF001 C
2023-08-05 18:48:11 UTC	REF001	G0SEC (9700)	CQCQCQ	REF001 C
2023-08-05 18:43:31 UTC	REF001	G6LTT (RON)	CQCQCQ	REF001 C
2023-08-05 18:36:44 UTC	REF001	VE6DZ (GARY)	CQCQCQ	REF001 C
2023-08-05 18:36:24 UTC	REF001	WD6CWE	CQCQCQ	REF001 C

Put REF030 in Gateway box and then the Filter button

MyCall: Firefox Home Page Gateway: Filter

dplus Last Heard

Date / Time	Gateway	MyCall	UrCall	Reflector
2023-08-05 19:28:20 UTC	REF030	KA2APD (AMBE)	CQCQCQ	REF030 C
2023-08-05 19:26:15 UTC	REF030	KE2BJJ (NATE)	CQCQCQ	REF030 C
2023-08-05 19:22:47 UTC	REF030	KN6KNE	CQCQCQ	REF030 C
2023-08-05 19:16:20 UTC	REF030	G4LUE (ERNI)	CQCQCQ	REF030 C
2023-08-05 19:16:10 UTC	REF030	AG5XY	CQCQCQ	REF030 C
2023-08-05 18:41:59 UTC	REF030	K4QF	CQCQCQ	REF030 C
2023-08-05 18:40:31 UTC	REF030	OZ4ACA (PETE)	CQCQCQ	REF030 C
2023-08-05 18:32:13 UTC	REF030	N2NKP (2820)	CQCQCQ	REF030 C
2023-08-05 18:32:04 UTC	REF030	K5HSV (D74A)	CQCQCQ	REF030 C
2023-08-05 18:27:26 UTC	REF030	K8CBR (ID51)	CQCQCQ	REF030 C
2023-08-05 18:23:13 UTC	REF030	KD2BAN (DVAP)	CQCQCQ	REF030 C
2023-08-05 18:14:11 UTC	REF030	W2LPC (9700)	CQCQCQ	REF030 C

PI-STAR & HOTSPOT ACTIVITY

Live Quadnet Info:

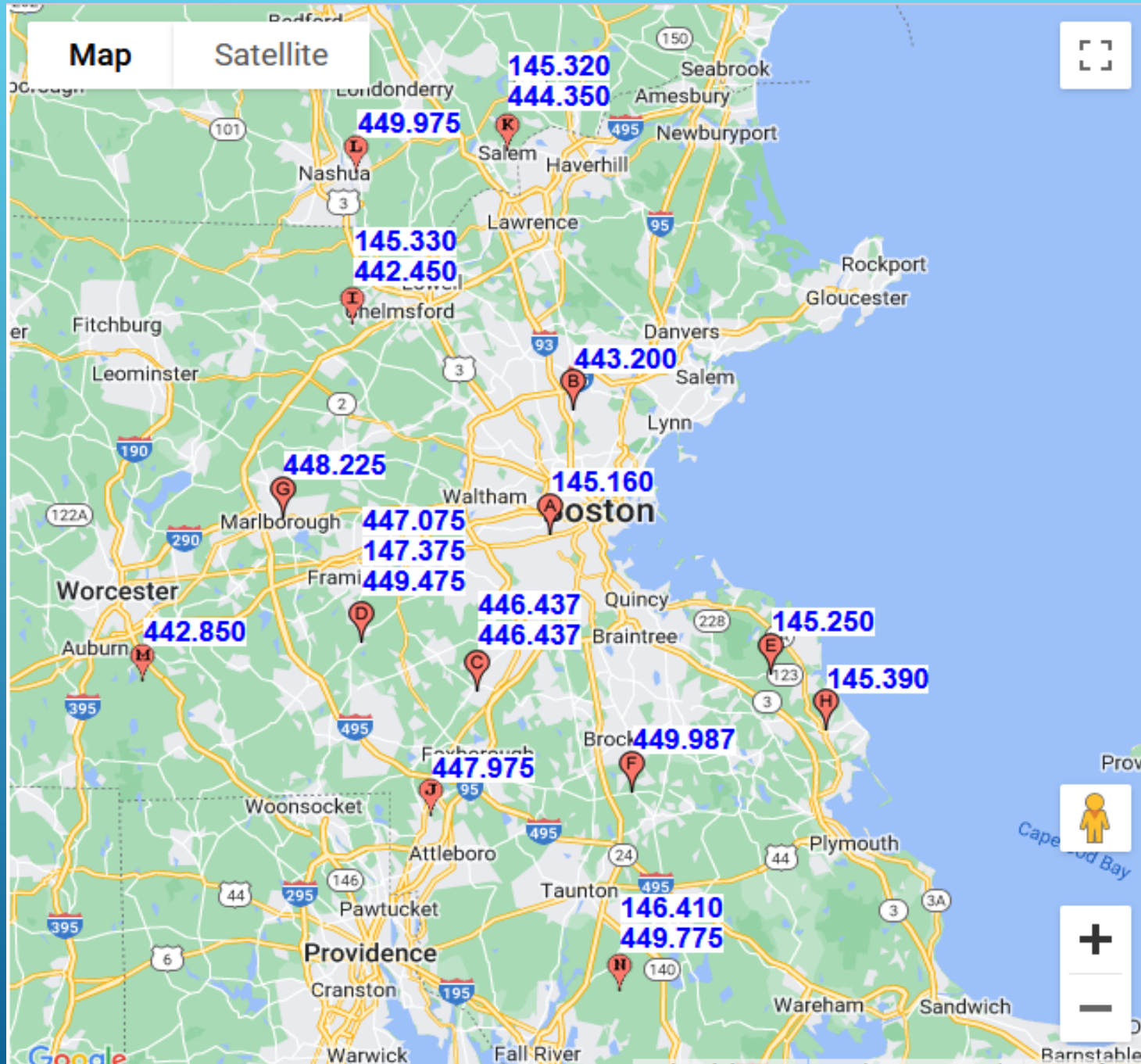
2023-08-05 18:08:58	0.16s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:08:50	0.08s:	0%: 0.0%	IZ6FGP_/4100	STN066_A	IZ6FGP_B	IZ6FGP_G	IR6L___F
2023-08-05 18:08:49	4.62s:	0%: 0.0%	WE0FUN_/DVSW	CQCQCQ_	WE0FUN_B	WE0FUN_G	XRF815_B
2023-08-05 18:08:40	0.22s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:08:39	1.24s:	0%: 0.0%	IZ6FGP_/4100	STN066_A	IZ6FGP_B	IZ6FGP_G	Mario-IZ6FGP,_CH-IT_ IR6L___F
2023-08-05 18:08:34	15.50s:	0%: 0.0%	DL7AC_/ID52	CQCQCQ_	DL7AC_B	DL7AC_G	Romeo_Ronneburg_TH_
2023-08-05 18:08:31	0.14s:	0%: 7.7%	F5SDM_/ID51	CQCQCQ_	F5SDM_B	F5SDM_G	DCS033_H
2023-08-05 18:08:19	0.44s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:08:19	7.44s:	0%: 0.0%	WE0FUN_/DVSW	CQCQCQ_	WE0FUN_B	WE0FUN_G	XRF815_B
2023-08-05 18:08:14	8.10s:	0%: 0.0%	D07JG_/ID52	XLX900GL	D07JG_B	D07JG_G	Juergen_aus_Gera_
2023-08-05 18:08:13	0.14s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:08:14	50.10s:	0%: 0.0%	IW9BZW_/51P2	DCS118FL	IW9BZW_C	IW9BZW_G	CIAO_DA_FRANCO_ DCS118_F
2023-08-05 18:08:08	0.88s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:07:59	2.82s:	0%: 0.0%	WE0FUN_/DVSW	CQCQCQ_	WE0FUN_B	WE0FUN_G	XRF815_B
2023-08-05 18:07:56	40.08s:	0%: 0.0%	DL7AC_/ID52	CQCQCQ_	DL7AC_B	DL7AC_G	Romeo_Ronneburg_TH_
2023-08-05 18:07:54	0.32s:	0%: 0.0%	IK2YYL_/ID52	_____I	IK2YYL_H	IK2YYL_G	_____
2023-08-05 18:07:53	0.28s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:07:51	1.42s:	0%: 0.0%	WE0FUN_/DVSW	CQCQCQ_	WE0FUN_B	WE0FUN_G	XRF815_B
2023-08-05 18:07:41	2.62s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:07:34	0.28s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:07:29	0.10s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:07:24	0.20s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:07:16	0.18s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:07:12	23.62s:	0%: 0.0%	D07JG_/ID52	XLX900GL	D07JG_B	D07JG_G	Juergen_aus_Gera_
2023-08-05 18:07:06	2.00s:	0%: 11.5%	KA3JSD_/DAVE	CQCQCQ_	KA3JSD_B	KA3JSD_G	_____
2023-08-05 18:07:00	1.28s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:06:56	1.18s:	0%: 0.5%	KA3JSD_/DAVE	CQCQCQ_	KA3JSD_B	KA3JSD_G	Dave_in_Latrobe,_PA_
2023-08-05 18:06:51	1.30s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:06:46	24.16s:	0%: 0.3%	DL7AC_/ID52	CQCQCQ_	DL7AC_B	DL7AC_G	Romeo_Ronneburg_TH_
2023-08-05 18:06:45	10.52s:	0%: 0.0%	IW9BZW_/51P2	DCS118FL	IW9BZW_C	IW9BZW_G	CIAO_DA_FRANCO_ DCS118_F
2023-08-05 18:06:45	1.18s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:06:38	2.86s:	0%: 0.0%	WE0FUN_/DVSW	CQCQCQ_	WE0FUN_B	WE0FUN_G	XRF815_B
2023-08-05 18:06:36	0.48s:	0%: 0.0%	IW4DGS_/9700	_____E	IK0CHU_B	IK0CHU_G	_____
2023-08-05 18:06:35	0.72s:	0%: 0.0%	KG4CWC_/BOB	_____I	KG4CWC_B	KG4CWC_G	Let`s_Go_Brandon_
2023-08-05 18:06:33	2.14s:	0%: 0.0%	WE0FUN_/DVSW	CQCQCQ_	WE0FUN_B	WE0FUN_G	XRF815_B
2023-08-05 18:06:30	2.48s:	0%: 0.0%	WE0FUN_/DVSW	CQCQCQ_	WE0FUN_B	WE0FUN_G	XRF815_B
2023-08-05 18:06:28	4.58s:	0%: 0.0%	WE0FUN_/DVSW	CQCQCQ_	WE0FUN_B	WE0FUN_G	XRF815_B
2023-08-05 18:06:26	1.34s:	0%: 0.4%	KA3JSD_/DAVE	CQCQCQ_	KA3JSD_B	KA3JSD_G	Dave_in_Latrobe,_PA_
2023-08-05 18:06:19	8.20s:	0%: 0.0%	D07JG_/ID52	XLX900GL	D07JG_B	D07JG_G	_____



WHERE ARE THE REPEATERS?

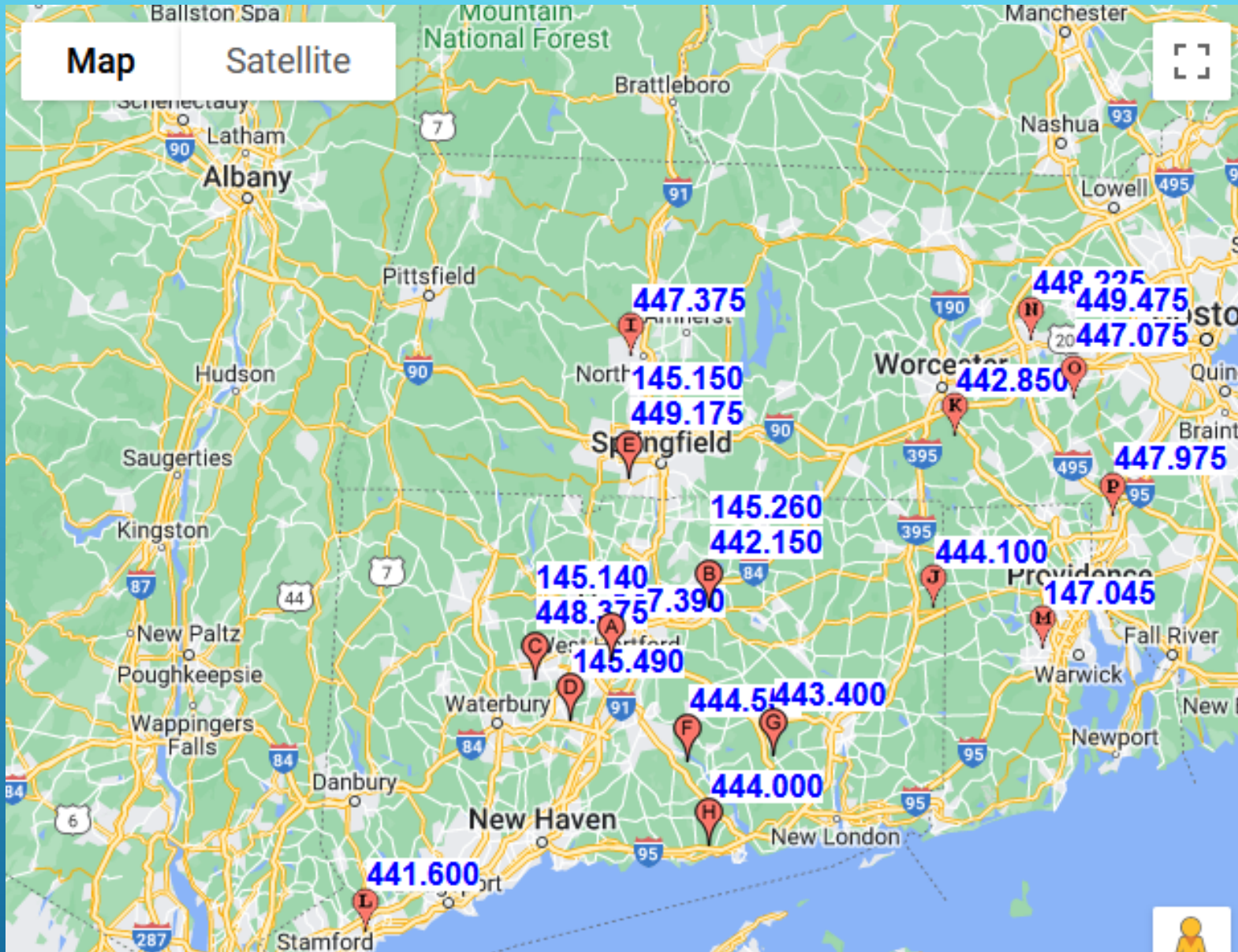


WHERE ARE D-STAR REPEATERS



- A Brookline: 145.160 (C) K1MRA**
- B Stoneham: 443.200 (146.2) WO1VES**
- C Walpole: 446.437 (B) WA1PLE**
Walpole: 446.437 (123.0) W1ZSA
- D Holliston: 447.075 (B) W1DSR**
Holliston: 147.375 (136.5) W1DSR
Holliston: 449.475 (136.5) W1NGS
- E Norwell: 145.250 (NAC250/RAN2/CC5/77.0) AC1M**
- F West Bridgewater: 449.987 (NAC293/B/RAN1/CC4) KA1GG**
- G Marlborough: 448.225 (B) W1MRA**
- H Marshfield: 145.390 (NAC293/RAN1/CC9/67.0) W1ATD**
- I Westford: 145.330 (C) WB1GOF**
Westford: 442.450 (B) WB1GOF
- J North Attleborough: 447.975 (88.5) NA1HS**
- K Salem: 145.320 (C) K1HRO**
Salem: 444.350 (B) K1HRO
- L Hudson: 449.975 (B/71.9/88.5) KB1UAP**
- M Sutton: 442.850 (B/CC1) KC1AZZ**
- N Freetown: 146.410 (C) K1BEP**
Freetown: 449.775 (B) K1BEP

WHERE ARE D-STAR REPEATERS



- A Newington: 147.390 (C) W1HQ
- B Vernon: 145.260 AA1HD
- Bolton: 442.150 AA1HD
- C Bristol: 145.140 W1IXU
- Bristol: 448.375 W1IXU
- D Meriden: 145.490 W1ECV
- E Feeding Hills: 145.150 (C) W1KK
- Feeding Hills: 449.175 (B) W1KK
- F Haddam: 444.550 (B) KB1UHS
- G Salem: 443.400 (B) KD1STR
- H Westbrook: 444.000 W1BCG
- I Florence: 447.375 AA1KK
- J Danielson: 444.100 (77.0) N1GAU
- K Sutton: 442.850 (B/CC1) KC1AZZ
- L Norwalk: 441.600 (B) W1NLK
- M West Warwick: 147.045 (C) W1HDN
- N Marlborough: 448.225 (B) W1MRA
- O Holliston: 449.475 (136.5) W1NGS
- Holliston: 447.075 (B) W1DSR
- P North Attleborough: 447.975 (88.5) NA1HS



WHERE ARE NE D-STAR REPEATERS 2 METERS



FREQ	OFS	ST	CITY	CALL	MODE	CODE IN	CODE OUT	STATUS	COUNTY	VOIP	LINKS/COMMENTS	Last Update
145.140	-	CT	Bristol	W1IXU	D-STAR	C			Hartford			2014/04/30
145.150	-	MA	Feeding Hills	W1KK	D-STAR	C			Hampden			2024/05/08
145.160	-	MA	Brookline	K1MRA	D-STAR	C			Norfolk		D-STAR REF050 C	2014/12/23
145.260	-	CT	Vernon	AA1HD	D-STAR	C			Tolland		D-STAR REF069 C	2015/01/28
145.300	-	RI	Portsmouth	W1AAD	D-STAR	C			Newport		[D-STAR REF069 C]	2019/01/04
145.320	-	NH	Salem	K1HRO	D-STAR	C		Local	Rockingham			2012/09/08
145.330	-	MA	Westford	WB1GOF	D-STAR	C			Middlesex			2014/03/11
145.380	-	NH	Madbury	N1HIT	D-STAR	C			Strafford			2015/11/30
145.400	-	NH	Kensington	KB1TIX	D-STAR	C			Rockingham			2012/09/08
145.420	-	MA	Fall River	K1RFI	D-STAR	C			Bristol		D-STAR REF050 C	2015/12/24
145.440	-	NH	Hampton	K1HBR	D-STAR	C			Rockingham		D-STAR REF050 C	2014/04/30
145.490	-	CT	Meriden	W1ECV	D-STAR	C			New Haven		D-STAR REF069 C	2015/01/28
146.985	-	ME	Cooper	W1SCV	D-STAR	C			Washington			2023/02/20
147.045	+	RI	West Warwick	W1HDN	D-STAR	C		OFF	Kent			2025/08/28
147.045	+	ME	Gray	KC1UKH	FM D-STAR	103.5 B			Cumberland			2024/11/10
147.150	+	ME	Biddeford	KC1ALA	D-STAR	C			York	E 642019		2014/08/20
147.390	+	CT	Newington	W1HQ	D-STAR	C			Hartford			2012/09/08

440

WHERE ARE NE D-STAR REPEATERS

FREQ	OFS	ST	CITY	CALL	MODE	CODE IN	CODE OUT	STATUS	COUNTY	VOIP	LINKS/COMMENTS	Last Update
441.600	+	CT	Norwalk	W1NLK	D-STAR	B			Fairfield		D-STAR REF069 C	2015/01/26
442.150	+	CT	Vernon	AA1HD	D-STAR	B			Tolland			2012/09/06
442.450	+	MA	Westford	WB1GOF	D-STAR	B			Middlesex		D-STAR REF050 C	2020/03/06
443.050	+	ME	Biddeford	KC1ALA	D-STAR	B			York			2014/06/20
443.300	+	ME	Greene	W1NPP	D-STAR	B		Local	Androscoggin			2024/11/11
443.300	+	ME	Livermore	W1NPP	D-STAR	B		OFF	Androscoggin			2019/06/01
443.400	+	CT	Salem	KD1STR	D-STAR	B			New London		D-STAR REF069 C	2015/01/26
444.000	+	CT	Westbrook	W1BCG	D-STAR	B			Middlesex		D-STAR REF069 C	2024/05/06
444.100	+	CT	South Killingly	N1GAU	D-STAR	B			Windham		D-STAR REF069 C	2015/01/26
444.300	+	ME	Knox	W1EMA	D-STAR	B		OFF	Waldo			2016/03/28
444.350	+	NH	Salem	K1HRO	D-STAR	B		Local	Rockingham		D-STAR REF050 C	2020/03/06
444.550	+	CT	Haddam	KB1UHS	D-STAR	B			Middlesex		D-STAR REF069 C	2017/01/20
446.4375	-	MA	Walpole	WA1PLE	D-STAR	B			Norfolk			2014/05/21
446.575	-	NH	Goffstown	NE1DV	D-STAR	B			Hillsborough			2012/09/07
446.725	-	NH	Greenland	KB1UVE	D-STAR	B		OFF	Rockingham			2022/05/27
447.075	-	MA	Holliston	W1DSR	D-STAR	B			Middlesex		D-STAR REF050 C	2014/05/26
447.225	-	NH	Derry	KB1UVD	D-STAR	B			Rockingham			2016/03/24
447.375	-	NH	Derry	K1QVC	FM D-STAR	85.4 B			Rockingham			2024/11/10
447.375	-	MA	Holyoke	AA1KK	D-STAR	B		OFF	Hampden			2024/05/06
447.575	-	ME	Phippsburg	KS1R	D-STAR	B			Sagadahoc			2014/12/11
448.375	-	CT	Bristol	W1IXU	D-STAR	B			Hartford			2012/09/06
448.875	-	NH	Madbury	N1HIT	D-STAR	B			Strafford			2015/11/30
448.975	-	CT	Mystic	KB1TMO	D-STAR	B		OFF	New London			2019/08/10
449.175	-	MA	Feeding Hills	W1KK	D-STAR	B			Hampden		D-STAR REF069 C	2024/05/06
449.475	-	NH	Hampton	K1HBR	D-STAR	B			Rockingham			2012/09/06
449.575	-	MA	Marlborough	W1MRA	D-STAR	B			Middlesex		D-STAR REF050 C	2024/03/04
449.675	-	NH	Sanbornton	W1VN	D-STAR	B			Belknap			2014/12/19
449.975	-	NH	Hudson	KB1UAP	FM D-STAR	71.9/88.5 88.5			Hillsborough	E 355114	RB:222/440	2015/12/01



WHAT ABOUT REFLECTORS?



REFLECTORS



- Multiple “reflectors” available:
- Good info at: <https://www.f4fxl.org/ref-xrf-dcs-mlx-whats-the-difference>
 - DPLUS reflectors (AA4RC) are REF001-REF097
 - Dashboards are: refxxx.dstargateway.org
 - <http://www.dstarinfo.com/reflectors.aspx>
 - XRF reflectors (DEXTRA)
 - Non-standard numbering
 - Example: <https://xrf757.openquad.net/>
 - MLX reflectors (multi-protocol)
 - Active MLX reflectors can be found on MLX dashboard
 - Example: <http://mlx978.dyndns.org/index.php?show=reflectors>



XLX Multiprotocol Gateway Reflector

XLX978 v2.5.3 - Dashboard v2.4.2 New England Reflector - G3 enabled - ne-dstar.org sponsored / Service uptime: 2 days 14:56:29

- Users / Modules
- Repeaters / Nodes (13)
- Peers (8)
- Modules list
- Reflectors list
- D-Star live

#	Flag	Callsign	Suffix	DPRS	Via / Peer	Last heard	
1		N1RHY			REF351 G / XLX351	23.01.2024 10:46	C
2		AA1HO	5100		REF351 G / XLX351	23.01.2024 10:46	C
3		N1JXX	DMR		XLX978 G / BM3104	23.01.2024 10:41	G
4		K1VK	PAUL		REF351 G / XLX351	23.01.2024 10:32	C
5		W3GAC	DMR		XLX978 G / BM3104	23.01.2024 08:56	G

Peanut:XLX978A CanNet OWDN ORCN REF038A XRF038A XLX044A(hub) DMR:BM302050 A	Maine Statewide REF039C B	REF050C via XLX351 C	Peanut:XLX978D REF038D DMR:BM312543 YSF85560 D	Peanut:XLX978G The Gathering Spot DMR:BM31801 G	D-STAR ONLY Peanut:REF069C REF069C H	Ohio Reflector REF038C I	DV Bot S
XRF221-A	KA8SCP-D	KA8SCP-H	PA7LIM-D	PA7LIM-D	XRF638-A	KA8SCP-Z	AA1HO-D
PA7LIM-D			KF0AXA-B	KA8SCP-N			
			XRF138-D				

<http://xlx978.dyndns.org>

MULTIPROTOCOL REFLECTOR AND "PORTAL"

XLX Multiprotocol Gateway Reflector



XLX405 v2.6.0 - Dashboard v2.4.6 Oh Canada, Our Home and Native Land / Service uptime: 1 days 02:36:26

- Users / Modules
- Repeaters / Nodes (42)
- Peers (4)
- Modules list
- Reflectors list
- D-Star live

Now featuring NXDN TG 405, P25 TG 405, and M17 TG 405 Bridged to XLX405A / BM302050 / YSF17206

We are aware that some users (e.g., with SharkRF Products) are unable to connect to XLX405. If you have difficulties, please connect to XLX380 (Ports A, B, and D are linked)

Callsign		Apply						Module		Apply	
#	Flag	Callsign	Suffix	DPRS	Via / Peer	Last heard					
1		VA3UV	92AD		XRF417 A	26.02.2026 20:45	A				
2		VE3LFD	BILL		VA3ODC C	26.02.2026 17:02	D				
3		VA3XLT	ADAM		VE3MUN C	26.02.2026 17:01	D				
4		VE3VPG	9700		VA3ODC C	26.02.2026 16:57	D				
5		VE3RUB	5100		VA3PMO B	26.02.2026 16:55	A				
6		VA3FZY	DCS		VA3FZY B	26.02.2026 16:54	A				
7		KA8SCP	DMR		XLX405 G / BM3021	26.02.2026 16:30	A				
8		VA3ZZA	ID50		VA3UJF B	26.02.2026 16:11	A				

FREE STAR Interconnect / BM302050 / YSF 17206	Stratford & Area	Chatham / Windsor
A	B	D
VA3WM-B	VA3WRA-B	VE3CRO-B
VA3DVI-B	VE3XBT-B	VE3VPG-B
XRF417-A	VE3DSL-C	VE3XII-B
VA3UJF-B	VA3TJS-B	VE3OEN-B
VA3UV-C	VE3ELX-B	VA3ODC-C
VE3HJ-B		VE3GUK-D
VE7VIC-C		VE3MUN-B
VA3FZY-B		VA3APW-B
VE3TTT-B		VE3INP-B
VE3FLK-B		VE3ESP-C
VE1JSR-C		VE3MUN-C

NEW TO XLX REFLECTORS – MULTIMODE SUPPORT

4		K1THF	DPLS		KB1SBJ A	26.02.2026 19:33	C
5		KC1QMS			KC1QMS B / XLX097	26.02.2026 19:25	B
6		K0SPY			KC1VAX B / XLX097	26.02.2026 19:25	B
7		YS1RJ	AMBE		YS1RJ A	26.02.2026 18:16	A
8		WW2DX	ID52		KB1SBJ A	26.02.2026 18:08	C
9		K1PXL			KC1VAX B / XLX097	26.02.2026 17:40	B
10		K1RPD			KC1VAX B / XLX097	26.02.2026 15:56	B
11		KQ4WJN			KQ4WJN B / XLX097	26.02.2026 15:55	B
12		M7IAG	P25		P2549	26.02.2026 15:45	C
13		N1TOP			N1TOP B / XLX097	26.02.2026 15:26	B
14		KA8SCP	52AP		KB1SBJ A	26.02.2026 14:51	C
15		I0IEN	P25		P2549	26.02.2026 14:50	C
16		WO1VES	EL		WO1VES B / XLX097	26.02.2026 14:10	B
17		KD1OQ			KC1VAX B / XLX097	26.02.2026 13:36	B
18		N1KXJ	RAY		N1KXJ B / XLX097	26.02.2026 13:32	B
19		AA9LP	74		KB1SBJ A	26.02.2026 12:28	C
20		W1RAC	ROB		KC1VAX B / XLX097	26.02.2026 11:40	B
21		W1GAN	PAUL		KB1SBJ A	26.02.2026 10:46	C
22		W1JOP	JOHN		W1JOP B / XLX097	26.02.2026 09:58	B

NEW ADDITIONS TO XLX REFLECTORS

Supporting transcoding of P25,
NXDN, DMR, Fusion and D-STAR.

Some support AllStar and Echolink

XLX Multiprotocol Gateway Reflector

XLX049 v2.6.0 - Dashboard v2.4.6 sister to REF049 - Northeast USA Reflector - G3 enabled - ne-dstar.org sponsored

Users / Modules

Repeaters / Nodes (17)

Peers (4)

Modules list

Reflectors list

DPLUS Dashboard | Gateway Status and Control

Registration | WB1GOF Repeater System | DPLUS version 2.2p

Linked Gateways / Reflectors

Module	Linked to
A	unlinked
B	REF050 C
C	REF038 D
D	unlinked
E	unlinked

Remote Users

Callsign	User Message	Last TX on	Type

Last Heard

Callsign	User Message	Last TX on	Time
N1RHY	JAMIE 51A TEWKSBURY	B	2021/05/03 15:09:54
KA8SCP	Terry - Westford MA	B	2021/05/03 15:04:01
NQ1W	Brandon/Hamilton, MA	C	2021/05/03 13:03:55
W1DYS		B	2021/05/03 11:47:10
N1UBR	DAND74	B	2021/05/03 11:12:16
AA1HO	Art /MOBILE/VAN/5100	B	2021/05/03 09:46:25
N1RCB	Gordon Lawrence, Ma	B	2021/05/02 23:11:11
K1SOB		B	2021/05/02 21:24:24
K1VK	Paul Bedford MA	C	2021/05/02 21:10:01

DPLUS Dashboard | Reflector Status and Control

Registration | REF050 Reflector System | DREFD version 1.48

Linked Gateways

Module A	Module B	Module C	Module D	Module E
		K1HRO B		
		K1MRA C		
		KB1ZEG C		
		W1DSR B		
		W1MRA B		
		WB1GOF B		

Remote Users

Callsign	User Message	Last TX on	Type
KB1AWZ		listening	HotSpot
KB1DNI		listening	HotSpot
N1OHI		listening	HotSpot
W1CH		listening	HotSpot
KC1BNE		listening	HotSpot
KA1VDZ		listening	HotSpot
N1DZS		listening	HotSpot
K1DDJ		listening	HotSpot
N1MPR	ED N1MPR FLORIDA	C	HotSpot
KA1BZE		listening	HotSpot
W1KFR		listening	HotSpot
W1BZJ		listening	HotSpot
K1WIZ D		listening	HotSpot
W1IF B		C	HotSpot
NX1W		listening	HotSpot
K1PGS		listening	HotSpot
VY2CGA		listening	HotSpot
N1PCE		listening	HotSpot
KA2CNN D		listening	HotSpot
N1JCM		listening	HotSpot



D-STAR INFO

INFORMATION, FAQs, AND MORE



ID-RP1200

For the love of ham r

[Home](#)[FAQ](#)[Conferences](#)[Nets](#)[Reflectors](#)[Downloads](#)[Repeater Maps & List](#)[Calculator](#)[Apps/Devices](#)[DV Pro](#)[D-RATS](#)[Contact Us](#)

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Repeater owners or administrator may update their information by going to www.DSTARInfo.com/update.

D-STAR Reflectors

Reflector	Usage	Location	Links	Speed
REF001B			Status	
REF001C	D-Star Mega Reflector		Status	
REF002A			Status	
REF002B				
REF002C				
REF003A	Ad-hock & Emergency Use - Australia	Australia	Status	
REF003B	Permalink for Repeaters, including all WIA Port B Repeaters - Australia	Australia	Status	
REF003C	Australian Nets	Australia	Status	
REF004A	Alternate for Southeastern US D-STAR Weather Net	United States	Status	1 Gbps
REF004B	Texas Permalink Repeaters	United States	Status	1 Gbps
REF004C	General Rag Chew (English only please)	United States	Status	1 Gbps
REF005A	UK Nets, Permalink Repeaters	London, England	Status Usage Guide Information	100 Mbps

Linked Gateways

Module A	Module B	Module C	Module D	Module E
K4GAR B	KA4RVT B	K1HRO C	WD4STR C	
WM8TG B	KJ4BDF B	K5URR B		
	KJ4KLD C	K6SOA C		
	KJ4KLE C	K7TUS C		
	KJ4PXX B	K8ETN B		
	KJ4YNR C	K8ETN C		
	KJ4ZLL C	K8WGR B		
	KK4SGC C	KC2TGB B		
	KK7QJR C	KG4NXO C		
	KN4PLO A	KJ4KLD B		
	W4AMI C	KJ4PXZ B		
	W4CBA B	KJ4PYA C		
	W4CBA C	KK4BXE B		
	W4PVW B	KK4SGC B		
	W4VO C	KM4LOD B		
	WC4RG C	KM4MCN C		
	WD4STR B	KN4EM C		
	WX4EMA C	KN5V B		
	WX4GPB C	KR4AIK B		
		VA3OTL B		
		VE4WDR B		
		VE6GHZ C		
		VE7RAG A		
		VK3RWN B		
		W4HHH B		
		W4LCO B		
		W4PVW C		
		W5BII B		
		W8DF B		
		W8VY B		
		W9BIL C		
		W9NTP B		
		WA2UMX B		
		WM8TG C		
		WX4GPB B		
		ZL3CHD B		

➤ REF001C and REF030C are some of the busiest reflectors in D-STAR

➤ Each reflector commonly has 50+ repeaters and 500+ hotspots connected from all over the world

➤ Please don't experiment or play with hotspots on these and other busy reflectors

➤ Don't connect two hotspots on the same frequency or computer

REPEATER ETIQUETTE

<http://ref030.dstargateway.org>

901 remote users - 50 gateways



ABOUT HOTSPOTS AND APPS?



Key D-STAR Applications:

▶ Communication & Access:

- ▶ **DroidStar (Android):** Connects to D-STAR, DMR, and M17 reflectors without needing a radio.
- ▶ **Peanut (Android):** Popular app for accessing D-STAR reflectors over Wi-Fi/data, often used without a transceiver.
- ▶ **BlueDV (Android/Windows):** Allows connecting to reflectors using a hardware dongle (like ThumbDV) or through a radio.
- ▶ **DVSwitch Mobile (Android):** A PTT app that links Android devices to D-STAR, DMR, and other modes.

▶ Radio Control & Data:

- ▶ **RS-MS1A/RS-MS11 (Icom):** Allows Android/iOS devices to connect to compatible Icom radios to send messages, pictures, and change settings remotely.
- ▶ **ST-40011/ST-4001A (Icom):** Used for creating and sending images from mobile devices to Icom radios.
- ▶ **D-RATS:** A PC-based tool for "data communications" (text messaging, file transfers, and mapping). <https://github.com/ham-radio-software/D-Rats>
- ▶ **Buster (macOS):** Connects to D-STAR reflectors on Mac computers using a hardware encoder. Last updated 2020.

Hostname: wpsd-mmdvm

WPSD Digital Voice Dashboard for KA8SCP

11:22:54, Jan 21

Profiles Live Caller

Radio Status	TX/RX Freq.	Radio Mode	Modem Port	Modem Speed	TCXO Freq.
IDLE	433.800 MHz	Simplex	/dev/ttyAMA0	115,200 bps	14.7456 MHz

Mode Status	
D-Star	DMR
YSF	P25
M17	NXDN
DMR X-Mode	YSF X-Mode
POCSAG	

Gateway Activity

Display TG Names Caller Det

Time (EST)	Callsign	Country	Mode	Target
03:02:48 Jan 21	KA8SCP/INFO		D-Star	CQCQCQ
21:05:23 Jan 20	KB1G/5100		D-Star	CQCQCQ
19:36:20 Jan 20	W1RAB		D-Star	CQCQCQ

The WPSD Project

<https://w0chp.radio/wpsd>

PI-STAR

<https://www.pistar.uk>

HOTSPOTS



Pi-Star Digital Voice Dashboard for KA8SCP

Dashboard | Admin | Configuration

Modes Enabled	
D-Star	DMR
M17	NXDN
P25	YSF
DMR XMode	YSF XMode
POCSAG	

Network Status	
D-Star Net	DMR Net
M17 Net	NXDN Net
P25 Net	YSF Net
DMR2NXDN	DMR2YSF

Gateway Activity

Time (EST)	Mode	Callsign	Target	Src	Dur(s)	Loss	BER
10:53:57 Jan 21st	D-Star	KW4KC/DMR (GPS)	CQCQCQ	Net	1.0	97%	0.0%
10:53:57 Jan 21st	DMR TS2	KW4KC (GPS)	TG 31801	Net	0.5	0%	0.0%
09:05:39 Jan 21st	DMR TS2	K4PMD (GPS)	TG 31801	Net	3.0	0%	0.0%
08:54:16 Jan 21st	DMR TS2	VA3KY (GPS)	TG 31801	Net	102.0	0%	0.0%
08:52:55 Jan 21st	DMR TS2	AC2ED (GPS)	TG 31801	Net	74.5	0%	0.0%
08:52:23 Jan 21st	DMR TS2	W3GAC (GPS)	TG 31801	Net	26.0	0%	0.0%
02:20:08 Jan 21st	D-Star	KC8YQL/DMR (GPS)	CQCQCQ via DCS978 G	Net	1.0	97%	0.0%
02:20:08 Jan 21st	DMR TS2	KC8YQL (GPS)	TG 31801	Net	25.6	4%	0.0%
23:54:38 Jan 20th	DMR TS2	KC9SIO (GPS)	TG 31801	Net	4.8	3%	0.1%
23:32:46 Jan 20th	D-Star	KC9SIO/DMR (GPS)	CQCQCQ via DCS978 G	Net	10.4	4%	0.0%

BlueDV



<https://www.pa7lim.nl/bluedv>

BlueDV for Windows

Menu Update AMBE About

DSTAR REF069 C Link Unlink REF DCS XRF XLX

By David PA7LIM Version 1.0.0.9632

SERIAL SERIAL

DMR DMR

DSTAR DSTAR

FUSION FUSION

NXDN NXDN

Donate

Frequency: DMR master 3102 US
Firmware: AMBE3000R
Dest: TG

LISTENING BER

CALL NAME CITY CNTRY INFO

IDLE Status: None

TX RX

Lastheard	AMBE	BM lookup	APRS chat
Time	Call	Name	Mode
11:33 AM	KA8SCP	Terry	DMR
11:34 AM	KA8SCP	Terry	DSTAR
11:34 AM	KA8SCP	Terry	DSTAR
11:38 AM	N1ID	John	DSTAR
11:43 AM	N1ID	John	DSTAR
11:43 AM	N1ID	John	DSTAR
11:58 AM	WA1RHG	Ron	DSTAR

DMR Call Status: Logged in to DMR

DSTAR Call Status: Linked to REF069 C

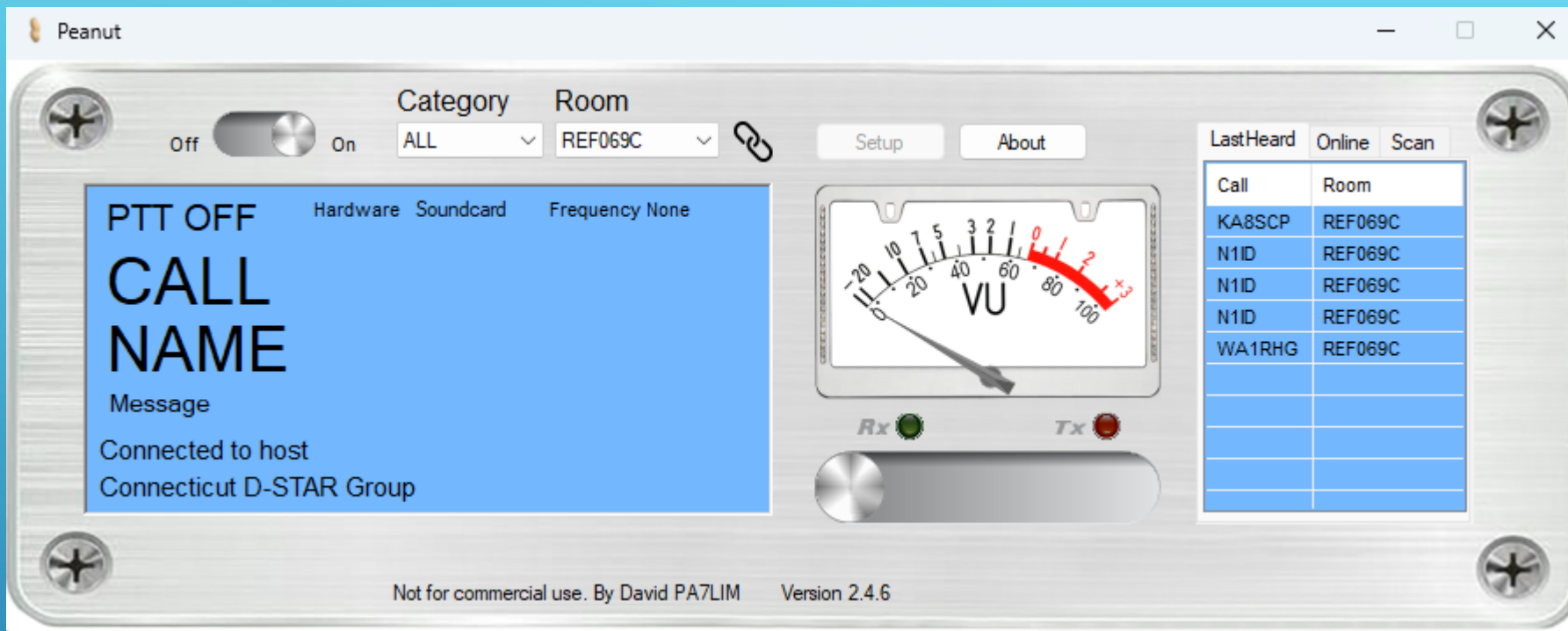
FUSION Call Status: Not Linked

NXDN Call Status: Not Linked

DMR DSTAR FUSION NXDN AMBE3000

Mute spk





THE PEANUT

<https://www.pa7lim.nl/peanut>

Android 9.x or higher
Windows 10 and higher
iOS 18 and MacOS 15



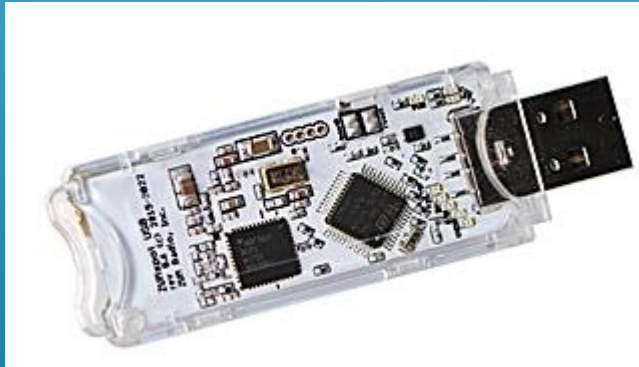
DVMEGA The Swiss army knife for Digital Voice

DVMEGA DVstick 30

<https://www.dvmega.nl/dvstick30>



Costs: approximately \$120-\$180



ZUM Radio ZUMspot-USB

<https://zumradio.com>



DVSI AMBE3000 Digital Voice Vocoder on USB

<https://nwdigitalradio.com>

DV STICK & THUMB DV



OPENSPOT4 PRO

- The openSPOT4 Pro has the **best voice quality** in cross mode operation
- **You don't need a transceiver** for the Pro! Use the free SharkRF Link app on your computer or phone to talk.
- Supports **D-STAR® cross modes**: use your D-STAR® transceiver to access DMR, C4FM, NXDN® networks, or your DMR, C4FM, NXDN® transceiver to access D-STAR® networks
- Supports **call audio playback** on the web interface



<https://www.sharkrf.com/products/openspot4>

OPENSPO4 COMPATIBLE DIGITAL RADIO PROTOCOLS AND NETWORKS



- **DMR** (BrandMeister, DMRplus, DMR-MARC, Phoenix, XLX, TGIF and others)
- **D-STAR®** (DCS, REF/DPlus, XRF/DExtra, XLX)
- **System Fusion®/C4FM** (FCS, YSFReflector, XLX)
- **NXDN®** (NXDNReflector)
- **P25** (P25Reflector)
- **POCSAG** (DAPNET)
- **APRS® messaging and location data forwarding** (APRS-IS)

Supports cross modes* (example: talk with your D-STAR® transceiver on DMR, or with your DMR transceiver on D-STAR® networks).



D-STAR ON HF



➤ To work HF simplex D-STAR on the HF bands you will need an HF D-STAR radio:

Icom 7100 Icom 9100 Icom 705

➤ HF D-STAR is allowed in the VOICE portions of the HF Bands, based on your license privileges.

➤ As always, monitor for activity whether AM or SSB, so as NOT to interfere with others.

6 mtrs 50.210 DV for 2 mins 10 mtrs 28.570 DV for 5 mins

12 mtrs 24.938 DV for 5 mins 15 mtrs 21.380 DV for 5 mins

17 mtrs 18.148 DV for 5 mins 20 mtrs 14.**340** DV for 5 mins

40 mtrs 7.285(or another open freq) DV for 5 mins 75 mtrs 3.855 DV for 5 mins



➤ There is a D-STAR net every Saturday at 7PM and Sunday at 10AM coordinated by Kent (KQ4KK) on REF030C. <http://ref030.dstargateway.org>

➤ All the Info is on his QRZ page: <https://www.qrz.com/db/KQ4KK>

Also <https://groups.io/g/HFDstar>

Info: Checkout the September 2023 issue of QST for a great article on “FREE DV”. It’s another way to operate HF Digital Radio!

- Started out with “digital” repeaters: D-STAR, DMR, Fusion, P25
- Now there are multi-mode repeaters based on MMDVM (Pi-Star and WPSD)
- Hotspots of all types
- Reflectors now are multimode: XLX
 - With transcoding devices to allow cross-mode operation

SO MANY WAYS TO CONNECT



SUMMARY / QUESTIONS





PRESENTER

Terry M. Stader - KA8SCP (KA8SCP@WB1GOF.org)

PART of Westford-WB1GOF, Senior Club Advisor

NESMC – EMA Director

MEMA Region 1 RACES Officer

WB1GOF Repeaters: FM-146.955, D-Star-145.330 & 442.450, DMR-146.450

Police Amateur Radio Team of Westford website: www.wb1gof.org

WB1GOF Repeaters: www.wb1gof.org/repeaters

PART forum: <https://groups.io/g/PARTofWestford>

WB1GOF D-STAR Users: <https://groups.io/g/wb1gof-dstar>

D-STAR Admin: WB1GOF-K1HRO-W1MRA-K1MRA (and more)

Reflector Admin: [REF038](#)-[REF039](#)-[REF040](#)-[REF049](#)-[XLX/XRF038](#)-[XLX049](#)-[XLX139](#)-[XRF221](#)-[XLX351](#)-[XLX839](#)-[XLX978](#)-NXDN TG49-P25 TG49-BM TG 312543

WB1GOF/R

Current

Icom
D-Star Controller
145.330 Repeater (18w)
442.450 Repeater (18w)

Wacom UHF (4)
BPBR/Duplexer

UHF Rcvr Bandpass
Cavity (1) & Preamp

Network Router/FIOS

HP DL580 G2 (4 way)
CentOS (Linux)
D-Plus Gateway
Routing Software
Link Scheduling
User Logging
D-Star Registration



D-Star Cab

FM Analog Cab

3 Open Repeaters
On the Air 24/7

21 Years of
Continuous
Public Service

146.955 TPL power
amp (55W/at Ant)

146.955 Kenwood TKR-
750 repeater

146.955 SCOM
controller & Spare

Phelps Dodge
145.330 (back) (6)
Duplexer

Wacom 146.955
(front) (4) Duplexer

AT&T Cell Site - Prospect Hill
Westford, Ma
579 feet/AMSL

