

Digital HotSpots

Ed Woodrick WA4YIH

Internet Repeater Linking Project

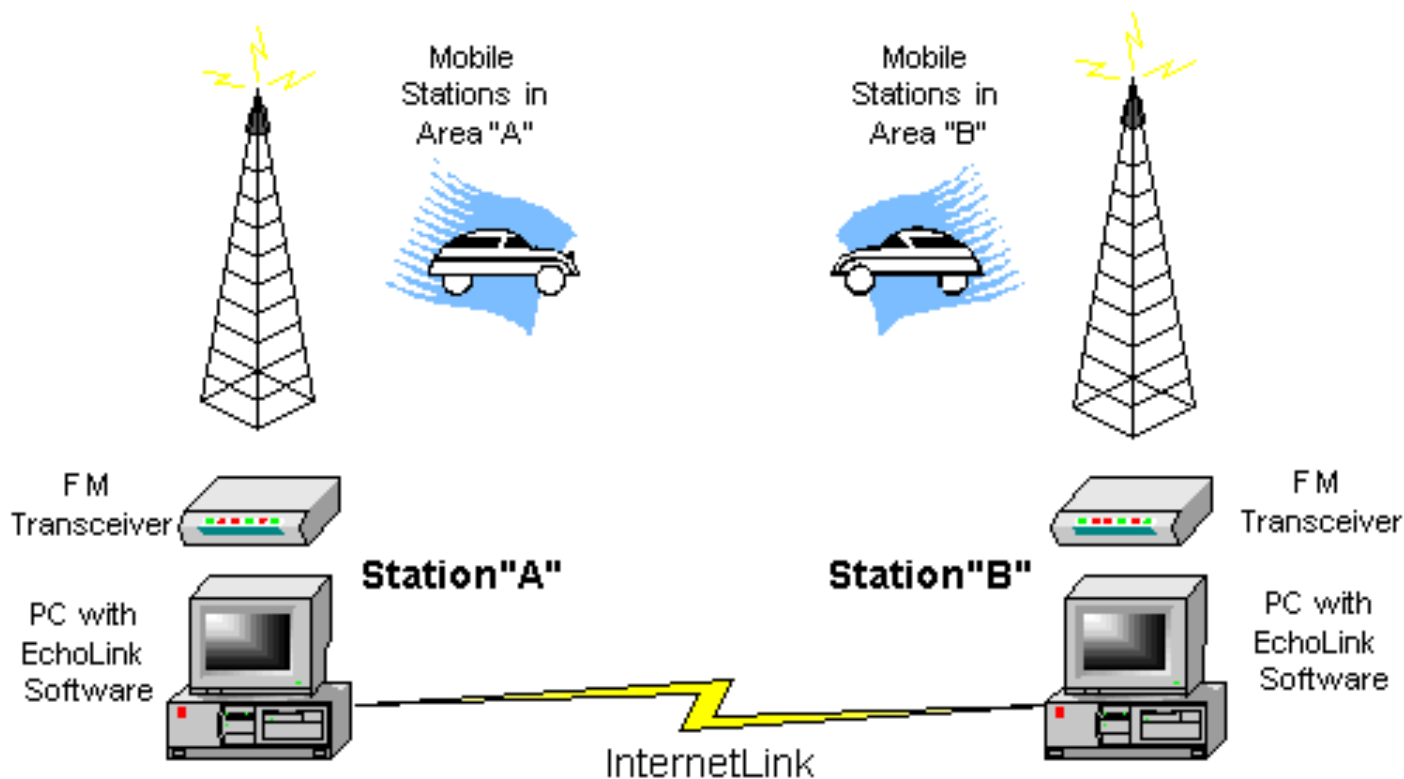
IRLP



4178	K4ZEC	Marietta	147.5500
4065	WB4GQX	Cumming	441.9000
4863	AI1U	Lawrenceville	446.8750
4801	W1KFR	Kingsland	445.3125
8619	K4KAH	Brunswick	446.8750

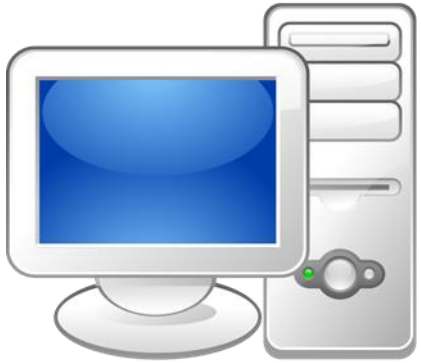
Echolink

Linking Example



Call	Description	Node	Freq (Mhz)	Tone (Hz)
N4RSW-R	In Conference *GEORGIA*	4505	146.460	
N4SBD-R	NF4GA-R/147.060 +100PL	522043	147.060	100.0
KD4HLV-L	Loganville, GA [0/20]	2844	.000	147
W4BOC-R	Stone Mountain, Georgia	330246	146.760	107.2
NF4GA-R	Atlanta GA	560686	145.470	100.0
N4HTC-R	Dahlonega, GA	934696	146.835	100.0
K9APD-R	Acworth GA K9APD	593209	145.430	107.2
KI4LMA-L	Atlanta GA 146.475pl100	306589	146.475	100.0
WA4ASI-R	Covington, Ga.	6925	146.925	88.5
K4IO-R	MANSFIELD GA.	165739	443.125	186.2
W4HHH-R	Ellijay, GA	672019	145.170	100.0
KI4FVI-L	McDonough, Ga [0/5]	906938	146.715	146.2
N8FLL-L	McDonough GA	789976	446.525	100.0
WB4QOJ-R	wb4qoj.webstarts.com (1)	3026	146.955	77.0
K4WOC-R	Calhoun, Georgia	498396	443.675	100.0
K4CTE-R	Brasstown, NC [0/20]	450080	147.315	103.5
K4CEG-L	Murphy NC [1/20]	902169	.000	
KC4CBQ-R	Allstar,Hayesville,NC [0/20]	758377	444.675	186.2
K4EGA-R	RPT 146.655 Eatonton GA	516125	146.655	186.2
WX4SKY-R	Pike County, GA. (2)	753461	.000	
KA4ELN-R	Cleveland, TN [0/20]	709112	147.375	123.0
K4KVE-L	Robbinsville, NC [0/20]	865773	.000	442
WD4LUQ-R	Dallas, Ga.	204551	444.700	77.0
WA4SSJ-R	Upstate SC	7226	443.450	110.9
WB4BXO-R	LaGrange, GA [0/8]	481355	.000	224
N9ZEN-R	Lookout Mtn, GA - K4SOD	68581	146.760	100.0
K4VCM-R	146.790 Chattanooga, TN [0/	79190	146.790	107.2
KB4RA-L	Greenwood, SC USA	563362	147.500	
N4LMC-L	Lookout & Signal Mountains,	94680	.000	
W4EDP-R	Lookout Mtn, GA - W4GTA	9058	444.100	107.2

The First - DVDongle



- ▶ Connect to Computer
- ▶ Connect to Internet
- ▶ Use Computer Headset
- ▶ Connect to D-STAR Network
- ▶ Developed by Robin AA4RC

Digital Voice Access Point DVAP



- ▶ Connect to Computer
- ▶ Connect to Internet
- ▶ Use D-STAR Radio
- ▶ Connect to D-STAR Network
- ▶ Developed by Robin AA4RC

Differences between FM and Digital

- ▶ Voice is encoded digitally at the radio
- ▶ Voice is decoded to analog at the radio
- ▶ CODEC (Coder and Decoder) is used to encode and decode
- ▶ AMBE® (Advanced Multi-Band Excitation) speech compression

Commercial Interruption

- ▶ ETSI GMR 1
- ▶ ETSI GMR 2+
- ▶ Inmarsat
- ▶ FAA Nexcom
- ▶ APCO Project 25
- ▶ SiriusXM
- ▶ MaxSat
- ▶ NXDN
- ▶ Thuraya
- ▶ Iridium
- ▶ D-STAR
- ▶ DMR
- ▶ dPMR
- ▶ Yaesu System Fusion



Hotspot Basics

- ▶ Require a computer (unless integrated)
- ▶ Require Internet Access
- ▶ Support multiple Digital Modes
- ▶ Provide access to the mode's network from anywhere
- ▶ Can sometimes use radio's commands



D-STAR

Yaesu WIRELESS-X



Yaesu Fusion



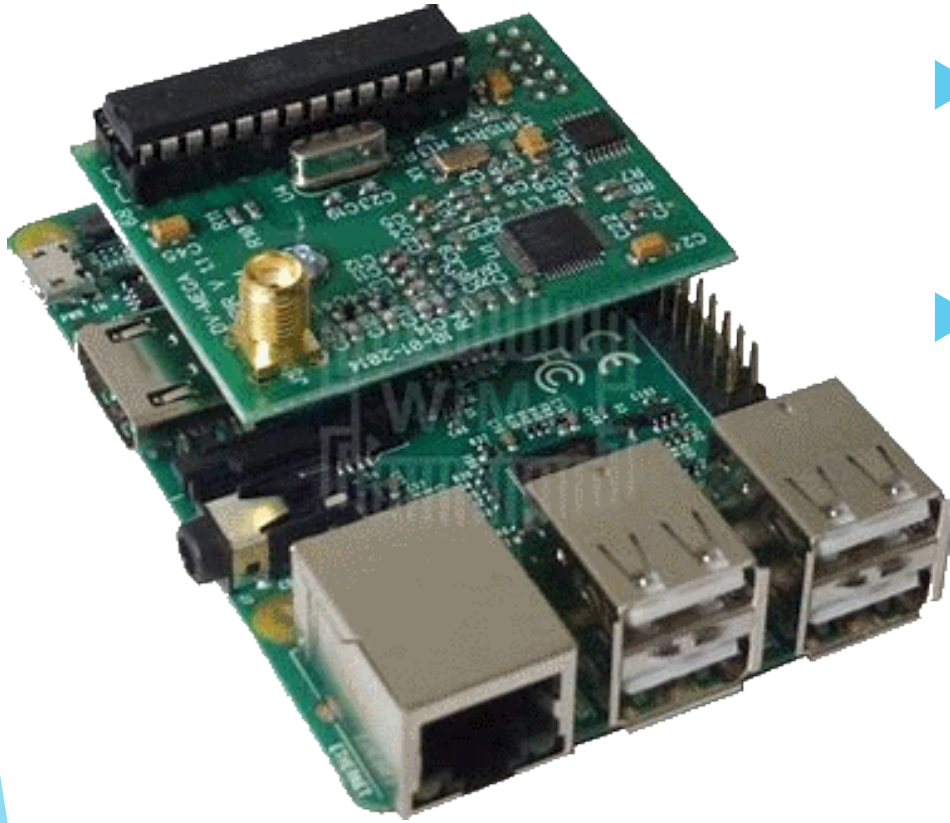
DMR



P-25



DV Mega



- ▶ GMRS Radio
- ▶ Connects to Raspberry Pi
- ▶ Developed by Guus PE1PLM
- ▶ Extended to support
 - ▶ DMR
 - ▶ Fusion
 - ▶ P25

SharkRF - openSPOT

- ▶ USB C powered
- ▶ Web Setup



Connectors DMR SMS Modem Settings Logout

DMR/Homebrew/MMDVM

Save

Modem receive frequency (MHz): 431.900000

Modem transmit frequency (MHz): 431.900000

Protocol: ☐ Homebrew ☒ MMDVM

Server: ipsc.grupporadiofirenze.net:55555

Server address: ipsc.grupporadiofirenze.net

Port: 55555

Add server Remove

Callsign: IT9A00

DMR ID: 2229040

URL: https://sharkrf.com/

Server password: password

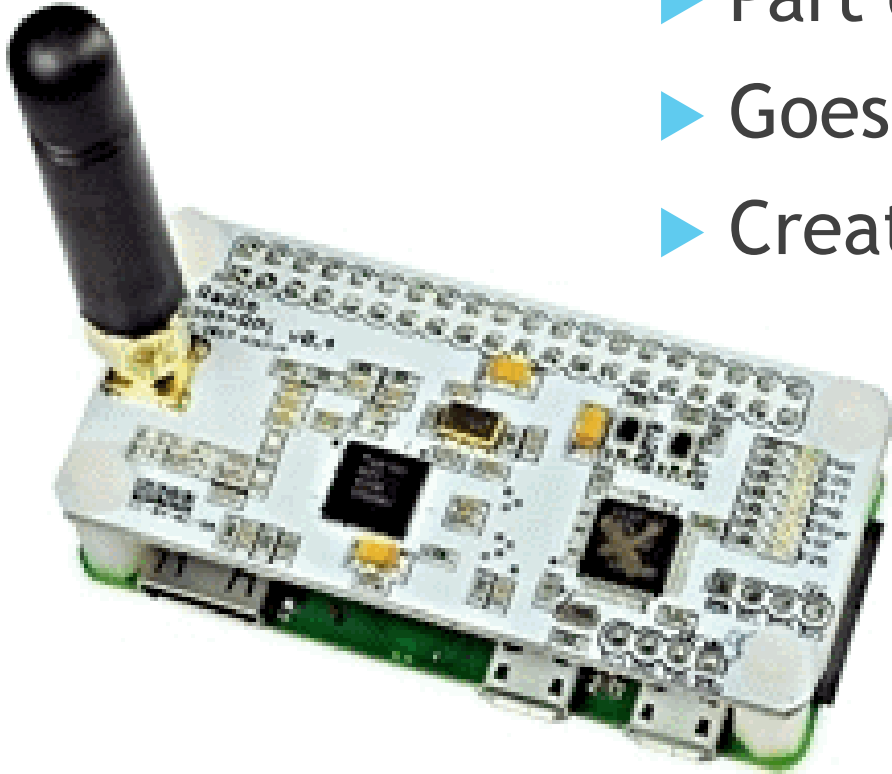
Backup server: ipsc.grupporadiofirenze.net:55555

Backup server address: ipsc.grupporadiofirenze.net

Backup server port: 55555

ZUM Spot

- ▶ Part of the MMDVM development
- ▶ Goes on a Raspberry Pi Zero WH
- ▶ Created by Jim KI6ZUM



www.PiStar.uk

W-Star 2.3.10 / Dashboard (20170524)

Pi-Star Digital Voice Dashboard for MW0MWZ

[Dashboard](#) | [Admin](#) | [Config](#)

Modes Enabled
D-Star DMR
YSF P25

Network Status
D-Star Net DMR Net
YSF Net P25 Net
Internet

Radio Info
Trx Listening
Tx 431.187500 MHz
Rx 431.187500 MHz
FW ZimLibre:20170414

D-Star Repeater
RPT1 MW0MWZ B
RPT2 MW0MWZ G
D-Star Network
APRS uk.aprs2.net
IRC rr.openquad.net
Linked to REF001 C
(DPlus Outgoing)

DMR Repeater
DMR ID 2353150
DMR CC 1
TS1 disabled
TS2 enabled
TG 91/not linked
DMR Master
bn-dmr.uk

Active Starnet Groups

Calisign	LogOff	Info	UTOT	GTOT
PISTAR B	PISTAR U	Pi-Star User Group on D-Star	30	30
GW6GM B	GW6GM U	Blackwood Club Members Group	30	30

Last 20 calls heard via this Gateway

Time (BST)	Mode	Callsign	Target	Src	Dur(s)	Loss	BER
2017-05-30 16:30:19	D-Star	#NVDH/DAVE	CQXCQCQ via REF001 C	Net	0.8	0%	0.2%
2017-05-30 16:27:55	DMR Slot 2	#EACWN	TG 91	Net	0.5	0%	0.1%
2017-05-30 16:25:15	DMR Slot 2	#KAS	TG 91	Net	10.5	8%	0.0%
2017-05-30 16:24:52	DMR Slot 2	#NGDN	TG 91	Net	18.1	0%	0.0%
2017-05-30 16:19:35	DMR Slot 2	LASHSP	TG 91	Net	1.6	0%	0.0%
2017-05-30 16:17:56	D-Star	#NMIC/5100	CQXCQCQ via REF001 C	Net	11.8	0%	0.0%
2017-05-30 16:17:23	D-Star	#KOC/DNGL	CQXCQCQ via REF001 C	Net	1.4	0%	0.0%
2017-05-30 16:16:36	D-Star	NLBA	CQXCQCQ via REF001 C	Net	0.7	0%	0.0%
2017-05-30 16:11:39	D-Star	LZSLC/d74	CQXCQCQ via REF001 C	Net	1.9	0%	0.5%
2017-05-30 16:10:44	D-Star	#NDML/INFD	CQXCQCQ via REF001 C	Net	7.1	0%	0.0%
2017-05-30 16:10:42	D-Star	#NDML/M	I	RF	0.7		0.0%
2017-05-30 16:09:28	D-Star	#AASG/WIN	CQXCQCQ via REF001 C	Net	1.2	0%	0.0%
2017-05-30 16:05:55	D-Star	ZJBNK/NEIL	CQXCQCQ	Net	7.9	0%	0.0%
2017-05-30 15:56:09	D-Star	#CBOM/DVAP	CQXCQCQ	Net	0.1	0%	10.3%
2017-05-30 15:54:49	D-Star	#MUL/ID51	CQXCQCQ	Net	1.2	96%	0.0%
2017-05-30 15:49:35	D-Star	GATQL	CQXCQCQ	Net	0.0	0%	0.0%
2017-05-30 15:48:20	D-Star	#EAKA/R SNC	CQXCQCQ	Net	0.4	0%	0.0%
2017-05-30 15:47:01	D-Star	SQW TB/TD31	CQXCQCQ	Net	0.2	0%	0.0%
2017-05-30 15:40:50	D-Star	DSSPL/SUN	CQXCQCQ	Net	0.4	0%	0.0%
2017-05-30 15:36:33	D-Star	#NDML/DNGL	CQXCQCQ	Net	6.8	0%	0.0%

Last 20 calls that accessed this Gateway

Time (BST)	Mode	Callsign	Target	Src	Dur(s)	BER
2017-05-30 16:10:42	D-Star	#NDML/M	I	RF	0.7	0.0%

Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MWZ) 2014-2017.
InCDBGateway Dashboard by Hans-J. Bartzen (DLSDI),
NM0VMDash developed by Kim I. Kuebel (DG5VU).
Need help? Click here for the Support Group
Get your copy of Pi-Star from here.

Pi-Star Digital Voice - Configuration

[Dashboard](#) | [Admin](#) | [Expert](#) | [Power](#) | [Update](#) | [Backup/Restore](#) | [Factory Reset](#)

Gateway Hardware Information

Hostname	Kernel	Platform	CPU Load	CPU Temp
zumspot1	4.9.35+	Pi Zero W Rev 1.1 (512MB)	0.78 / 0.77 / 0.59	40.6°C / 105.1°F

Control Software

Setting	Value
Controller Software:	☐ DStarRepeater ☒ MMDVMHost (DV-Mega Minimum Firmware 3.07 Required)
Controller Mode:	☒ Simplex Mode ☐ Duplex Repeater (or Half-Duplex on Hotspots)

Apply Changes

MMDVMHost Configuration

Setting	Value
DMR Mode:	☐ RF Hangtime: 20  Net Hangtime: 20
D-Star Mode:	☒ RF Hangtime: 120 Net Hangtime: 120
YSF Mode:	☐ RF Hangtime: 20 Net Hangtime: 20
P25 Mode:	☐ RF Hangtime: 20 Net Hangtime: 20
NXDN Mode:	☐ RF Hangtime: 20 Net Hangtime: 20
YSF2DMR:	☐
YSF2NXDN:	☐
YSF2P25:	☐
MMDVM Display Type:	None  Port: /dev/ttyAMA0  Nextion Layout: G4KLX 

General Configuration

Setting	Value
Hostname:	zumspot1 Do not add suffixes such as .local
Node Callsign:	WA4YIH
Radio Frequency:	438.700.000 MHz
Latitude:	34.11 degrees (positive value for North, negative for South)
Longitude:	-83.92 degrees (positive value for East, negative for West)
Town:	Buford, GA
Country:	USA
URL:	http://www.qrz.com/db/WA4YIH ☒ Auto ☐ Manual
Radio/Modem Type:	ZumSpot - Raspberry Pi Hat (GPIO) ▼
Node Type:	☒ Private ☐ Public
System Time Zone:	America/New_York ▼
Dashboard Language:	english_uk ▼

D-Star Configuration

Setting	Value	
RPT1 Callsign:	WA4YIH M	
RPT2 Callsign:	WA4YIH G	
Remote Password:	•••••••• 	
Default Reflector:	REF030 C	☒ Startup ☐ Manual
APRS Host:	england.aprs2.net	
ircDDBGateway Language:	English_(US)	
Time Announcements:	☒	
Use DPlus for XRF:	☐	Note: Update Required if changed

Apply Changes

Firewall Configuration

Setting	Value
Dashboard Access:	☒ Private ☐ Public
ircDDBGateway Remote:	☒ Private ☐ Public
SSH Access:	☒ Private ☐ Public
uPNP:	☒ On ☐ Off

Wireless Configuration

Wireless Information and Statistics

Interface Information

Interface Name : wlan0
Interface Status : **Interface is up**
IP Address : 172.16.10.12
Subnet Mask : 255.255.0.0
Mac Address : b8:27:eb:56:0f:d1

Interface Statistics

Received Packets : 110604
Received Bytes : 15734395 (15.0 MiB)
Transferred Packets : 47575
Transferred Bytes : 19309718 (18.4 MiB)

Wireless Information

Connected To : EDCOM-U
AP Mac Address : 80:2a:a8:84:46:d4

Bitrate : 72.2 MBit/s
Signal Level : -39 dBm

Transmit Power : 31 dBm
Link Quality : 70/70

Information provided by ifconfig and iwconfig

Remote Access Password

User Name

Password

pi-star

Password:



Confirm Password:



WARNING: This changes the password for this admin page
AND the "pi-star" SSH account

Wireless Configuration

WiFi Info

Network 0

Delete

SSID : IDOL 4S with Windows

PSK : ●●●●●●●●

Network 1

Delete

SSID : EDCOM-U

PSK : ●●●●●●●●

Network 2

Delete

SSID : EDCOM-T2

PSK : ●●●●●●●●

Network 3

Delete

SSID : EDCOM-Y

PSK : ●●●●●●●●

Scan for Networks (10 secs) Add Network Save (and connect)

Pi-Star Digital Voice Dashboard for WA4YIH

[Dashboard](#) | [Admin](#) | [Live Logs](#) | [Power](#) | [Update](#) | [Configuration](#)

Gateway Hardware Information

Hostname	Kernel	Platform	CPU Load	CPU Temp
zumspot1	4.9.35+	Pi Zero W Rev 1.1 (512MB)	0.26 / 0.24 / 0.31	38.5°C / 101.3°F

Service Status

MMDVMHost	DMRGateway	YSFGateway	YSFParrot	P25Gateway	P25Parrot
DStarRepeater	ircDDBGateway	TimeServer	PiStar-Watchdog	PiStar-Remote	PiStar-Keeper

Modes Enabled

D-Star	DMR
YSF	P25
YSF XMode	NXDN
DMR XMode	POCSAG

Network Status

D-Star Net	DMR Net
YSF Net	P25 Net
YSF2DMR	NXDN Net
YSF2NXDN	YSF2P25
DMR2NXDN	DMR2YSF

Radio Info

Trx	Listening
Tx	438.700000 MHz
Rx	438.700000 MHz
FW	ZUMspot:v1.0.1

D-Star Repeater

RPT1	WA4YIH M
RPT2	WA4YIH G

D-Star Network

APRS	england.aprs2.net
IRC	rr.openquad.net

Linked to REF030 C
(DPlus Outgoing)

D-Star Link Information

Radio	Default	Auto	Timer	Link	Linked to	Mode	Direction	Last Change (EST)
WA4YIH M	REF030 C	Auto	Never	Up	REF030 C	DPlus	Outgoing	20:30:12 Feb 18th

D-Star Link Manager

Radio Module	Reflector	Link / Un-Link	Action
WA4YIH M	REF030 C	☒ Link ☐ UnLink	<button>Request Change</button>

Gateway Activity

Time (EST)	Mode	Callsign	Target	Src	Dur(s)	Loss	BER
21:49:55 Feb 18th	D-Star	N4IRR/DVSW	CQCQCQ via REF030 C	Net	0.0	0%	0.0%
21:48:10 Feb 18th	D-Star	VE3DXL/D74A	CQCQCQ via REF030 C	Net	0.9	0%	0.0%
21:47:47 Feb 18th	D-Star	KG4QPU/Carl	CQCQCQ via REF030 C	Net	0.2	0%	0.0%
21:42:19 Feb 18th	D-Star	KA9RIX/ID1	CQCQCQ via REF030 C	Net	0.2	0%	0.0%
21:40:42 Feb 18th	D-Star	KF4OYS/RYAN	CQCQCQ via REF030 C	Net	0.7	0%	0.0%
21:38:05 Feb 18th	D-Star	N4IL/D74a	CQCQCQ via REF030 C	Net	0.1	0%	0.0%
21:36:01 Feb 18th	D-Star	KB4KP/DNGL	CQCQCQ via REF030 C	Net	0.7	0%	0.0%
21:35:06 Feb 18th	D-Star	N4AGK	CQCQCQ via REF030 C	Net	0.5	0%	0.0%
21:26:46 Feb 18th	D-Star	KJ8DO	CQCQCQ via REF030 C	Net	1.2	0%	0.0%
21:26:12 Feb 18th	D-Star	KC4ELV/TIM	CQCQCQ via REF030 C	Net	0.3	14%	0.0%
21:24:17 Feb 18th	D-Star	AG6WK B	CQCQCQ via REF030 C	Net	1.5	72%	0.0%
21:21:44 Feb 18th	D-Star	KN4NMO/GREG	CQCQCQ via REF030 C	Net	1.9	0%	0.0%
21:19:40 Feb 18th	D-Star	WA9LKZ	CQCQCQ via REF030 C	Net	0.4	0%	0.0%
21:12:22 Feb 18th	D-Star	W3AL/Alan	CQCQCQ via REF030 C	Net	1.9	1%	0.0%
21:10:30 Feb 18th	D-Star	ZL2GJ/RSNC	CQCQCQ via REF030 C	Net	0.5	0%	0.0%
21:05:53 Feb 18th	D-Star	M0BF/7100	CQCQCQ via REF030 C	Net	0.3	0%	0.0%
21:05:07 Feb 18th	D-Star	KI8A	CQCQCQ via REF030 C	Net	0.3	0%	0.0%
21:02:03 Feb 18th	D-Star	N7ERZ	CQCQCQ via REF030 C	Net	1.0	0%	0.4%
20:54:38 Feb 18th	D-Star	AI4LL/D74	CQCQCQ via REF030 C	Net	0.4	0%	0.0%
20:50:15 Feb 18th	D-Star	KA9KBD/VIC	CQCQCQ via REF030 C	Net	0.7	0%	0.4%

Local RF Activity

Time (EST)	Mode	Callsign	Target	Src	Dur(s)	BER	RSSI
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Brandmeister (DMR and Fusion)

www.brandmeister.network

My hotspots

31133304

311333011

311333012

311333013

311333014

311333015

(EIRP)

Height AGL in m

5

Save changes

Sysops

+ Add a sysop to WA4YIH

Callsign	Read Settings	Write Settings	Manage Sysops	Actions
WA4YIH	✓	✓	✓	

Actions

Get IP address

Drop call

Drop dynamic groups

Reset connection

Static Talkgroups

→

←

World-wide (91)

Scheduled static

+ Add Scheduled Static

Active Timed Statics:

Remove

ANY
QUESTIONS
?