

Programming DMR hot Spots

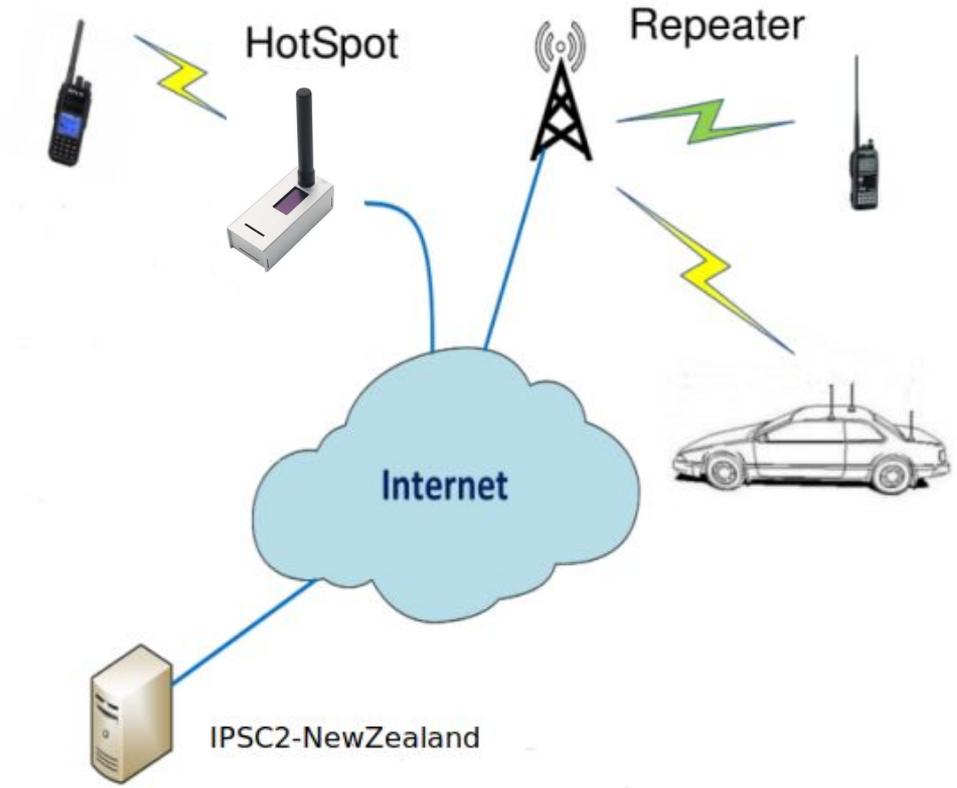
Presented by Paul ZL2BEZ

This talk will concentrate on inexpensive hotspots and their connection to the ZL-TRBO network.

Why you might need a DMR hotspot

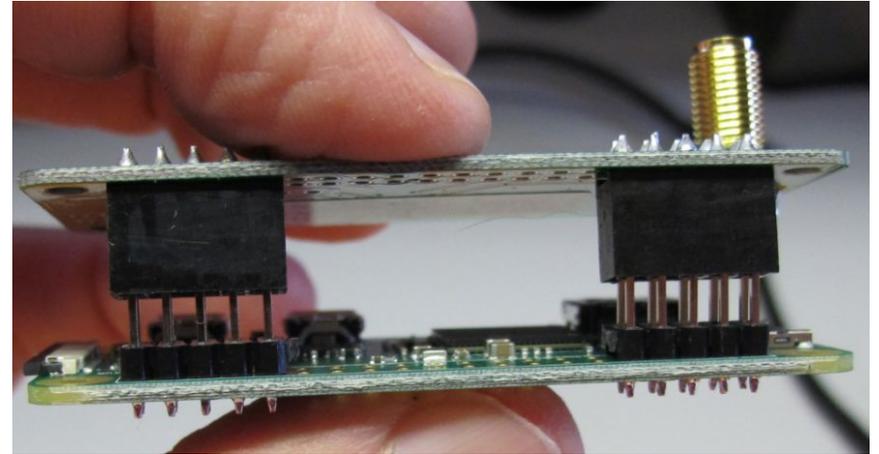
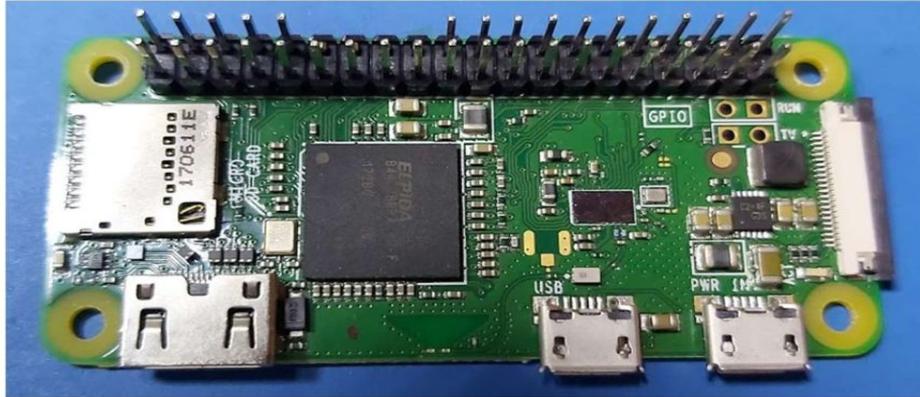
- DMR repeater coverage is not very good where you live.
- You are in an area of the country without DMR coverage.
- Access to other DMR networks.

Where DMR hotspots fit into the ZL-TRBO network.

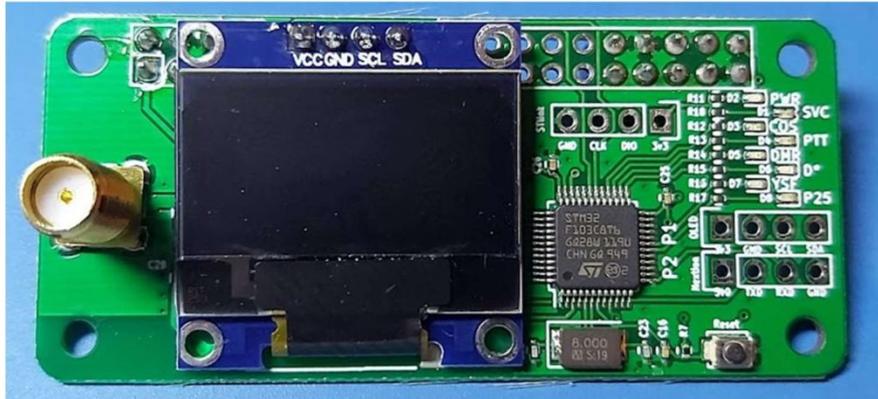


Hardware

Raspberry Pi Zero W

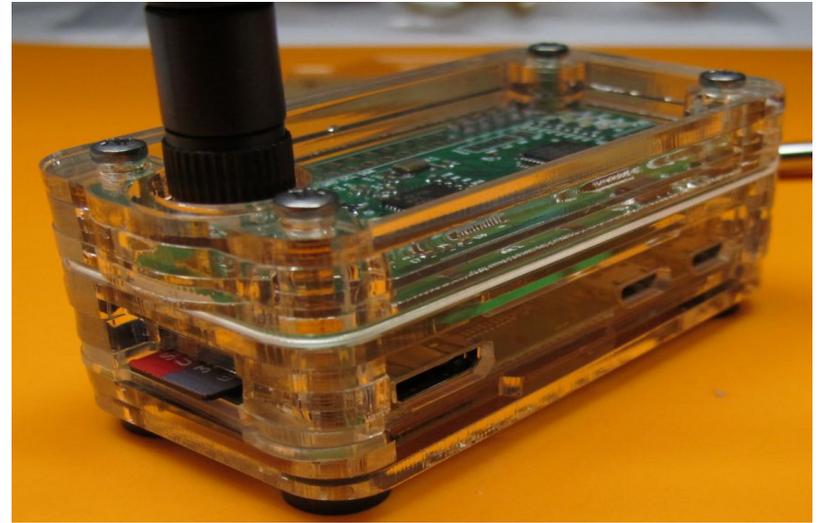


MMDVM



This board provides the RF interface between the Raspberry Pi and your DMR radio.

Hotspot cases



Software for the Pi-Star hotspot

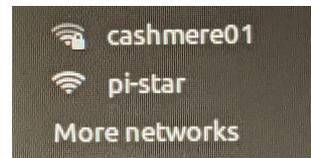


- Pi-Star web site. <https://www.pistar.uk/index.php>
Most recent Pi-Star is version 4.1.5.
- Good quality, fast micro SD card.
- Memory card burning apps, like etcher or rufus.
- Knowledge of your WiFi SSID and password
- IP address detection app, FING for Android / iPhone
- Pi-Star browser access by ip address. <http://192.168.1.8/>

Setting up Pi-Star Wifi



- Option 1. use wifi builder on the pi-star.uk web site.
- Option 2. Obtain a micro usb to ethernet adapter and manually configure pi-star wifi.
- Option 3. Search local wifi for SSID pi-star, log on and manually configure pi-star wifi.



- Note: Raspberry Pi Zero W wifi, 2.4 GHz only

Pi-Star WiFi settings



Wireless Configuration

Refresh

Reset WiFi Adapter

Configure WiFi

Wireless Information and Statistics

Interface Information

Interface Name : wlan0
Interface Status : **Interface is up**
IP Address : 192.168.1.189
Subnet Mask : 255.255.255.0
Mac Address : b8:27:xx:xx:xx:xx

Interface Statistics

Received Packets : 7424
Received Bytes : 781200 (762.8 KiB)
Transferred Packets : 6653
Transferred Bytes : 4010417 (3.8 MiB)

Wireless Information

Connected To : [redacted]
AP Mac Address : 0c:9d:xx:xx:xx:xx
Bitrate : 150.0 MBit/s
Signal Level : -37 dBm
Transmit Power : 31 dBm
Link Quality : 100 %
Channel Info : 2.4GHz Ch11 (2.462 GHz)
WiFi Country : NZ

Information provided by ifconfig and iwconfig

Pi-Star Initial Boot Screen



Hostname: pi-star

Pi-Star:4.1.4 / Dashboard: 20210208

Pi-Star Digital Voice Dashboard for M1ABC

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

Gateway Hardware Information

Hostname	Kernel	Platform	CPU Load	CPU Temp	
pi-star	5.10.11+	Pi Zero W Rev 1.1 (512MB)	2.22 / 1.99 / 1.38	39.5°C / 103.1°F	
Service Status					
MMDVMHost	DMRGateway	YSFGateway	YSFPParrot	P25Gateway	P25Parrot
DStarRepeater	ircDDBGateway	TimeServer	PiStar-Watchdog	PiStar-Remote	PiStar-Keeper

No Mode Defined...

I don't know what mode I am in, you probaly just need to configure me.

You will be re-directed to the configuration portal in 10 secs

In the mean time, you might want to register on the support page here: <https://www.facebook.com/groups/pistarusergroup/>
or the Support forum here: <https://forum.pistar.uk/>

Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MWZ) 2014-2021.
ircDDBGateway Dashboard by Hans-J. Barthen (DL5DI),
MMDVMDash developed by Kim Huebel (DG9VH),
Need help? [Click here for the Facebook Group](#)
or [Click here to join the Support Forum](#)
Get your copy of Pi-Star from here.

Pi-Star General Configuration



Pi-Star:4.1.5 / Dashboard: 20210721

Pi-Star Digital Voice - Configuration

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

Gateway Hardware Information

Hostname	Kernel	Platform	CPU Load	CPU Temp
pi-star	5.10.11-v7+	Pi 3 Model A+ (512MB) - Sony, UK	0 / 0.03 / 0.02	37°C / 98.6°F

Control Software

Setting	Value
Controller Software:	<input type="radio"/> DStarRepeater <input checked="" type="radio"/> MMDVMHost (DV-Mega Minimum Firmware 3.07 Required)
Controller Mode:	<input checked="" type="radio"/> Simplex Node <input type="radio"/> Duplex Repeater (or Half-Duplex on Hotspots)

MMDVMHost Configuration

Setting	Value
DMR Mode:	<input checked="" type="checkbox"/> RF Hangtime: 20 Net Hangtime: 20
D-Star Mode:	<input type="checkbox"/> RF Hangtime: 20 Net Hangtime: 20
YSF Mode:	<input type="checkbox"/> RF Hangtime: 20 Net Hangtime: 20
P25 Mode:	<input type="checkbox"/> RF Hangtime: 20 Net Hangtime: 20
NXDN Mode:	<input type="checkbox"/> RF Hangtime: 20 Net Hangtime: 20
YSF2DMR:	<input type="checkbox"/>
YSF2NXDN:	<input type="checkbox"/>
YSF2P25:	<input type="checkbox"/>
DMR2YSF:	<input type="checkbox"/> Uses 7 prefix on DMRGateway
DMR2NXDN:	<input type="checkbox"/> Uses 7 prefix on DMRGateway
POCSAG:	<input type="checkbox"/> POCSAG Paging Features
MMDVM Display Type:	Nextion <input type="button" value="v"/> Port: modem <input type="button" value="v"/> Nextion Layout: ON7LDS L3 HS <input type="button" value="v"/>

Pi-Star General Configuration



General Configuration

Setting	Value
Hostname:	<input type="text" value="pi-star"/>  Do not add suffixes such as .local
Node Callsign:	<input type="text" value="ZL2XYZ"/>
CCS7/DMR ID:	<input type="text" value="5309999"/>
Radio Frequency:	<input type="text" value="432.750"/> MHz
Latitude:	<input type="text" value="-41.0"/> degrees (positive value for North, negative for South)
Longitude:	<input type="text" value="174.0"/> degrees (positive value for East, negative for West)
Town:	<input type="text" value="Wellington, RE78yz"/>
Country:	<input type="text" value="New Zealand"/>
URL:	<input type="text" value="https://www.qrz.com/db/ZL2XYZ"/> <input checked="" type="radio"/> Auto <input type="radio"/> Manual
Radio/Modem Type:	<input type="text" value="STM32-DVM / MMDVM_HS - Raspberry Pi Hat (GPIO)"/> 
Node Type:	<input checked="" type="radio"/> Private <input type="radio"/> Public
APRS Host Enable:	<input type="checkbox"/>
APRS Host:	<input type="text" value="rotate.aprs2.net"/> 
System Time Zone:	<input type="text" value="Pacific/Auckland"/> 
Dashboard Language:	<input type="text" value="english_uk"/> 

Apply Changes

Pi-Star DMR settings



DMR Configuration

Setting	Value
DMR Master:	DMR+_IPSC2-NewZealand ▾
DMR Options:	Options= StartRef=4850;RelinkTime=60;
DMR ESSID:	5309999 None ▾
DMR Colour Code:	1 ▾
DMR EmbeddedLCOnly:	<input type="checkbox"/>
DMR DumpTADData:	<input checked="" type="checkbox"/>

Apply Changes

Reflector 4850



You may have noticed StartRef=4850, in the DMR Options.

This allows you to access reflector 4850 when the hotspot starts up.

Reflector 4850 translates your ZL TG 9 transmission to ZL-TRBO ZL TG 530.

Another use of Reflector 4850 is to warn you of any disruption to the hotspot Wifi signal.

This is especially useful when using the hotspot in a mobile environment.

Pi-Star Dashboard



Hostname: pi-star

Pi-Star:4.1.5 / Dashboard: 20210721

Pi-Star Digital Voice Dashboard for ZL2BEZ

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

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	432.762500 MHz
Rx	432.762500 MHz
FW	HS_Hat:v1.5.2
TCXO	14.7456 MHz

DMR Repeater

DMR ID	5301034
DMR CC	1
TS1	disabled
TS2	enabled

DMR Master

DMR+ IPSC2-NewZea..

Gateway Activity

Time (NZDT)	Mode	Callsign	Target	Src	Dur(s)	Loss	BER
18:50:04 Sep 27th	DMR TS2	ZL2BEZ (GPS)	TG 9	RF	1.8	0%	0.1%
18:18:01 Sep 27th	DMR TS2	4850	TG 9	Net	6.6	0%	0.0%
18:03:50 Sep 27th	DMR TS2	ZL2KI (GPS)	TG 9	Net	6.2	0%	0.0%

Local RF Activity

Time (NZDT)	Mode	Callsign	Target	Src	Dur(s)	BER	RSSI
18:50:04 Sep 27th	DMR TS2	ZL2BEZ (GPS)	TG 9	RF	1.8	0.1%	S9+46dB (-47 dBm)

DMR Radio hotspot zone - 1

Radio Configuration.

1. Please make sure you have the following talk groups in you digital contacts list.

Contact Name	Call ID	Call type
ZK	8	Group Call
LCL	9	Group Call
D+SP	153	Group Call

2. In the radio you should create the following channels.

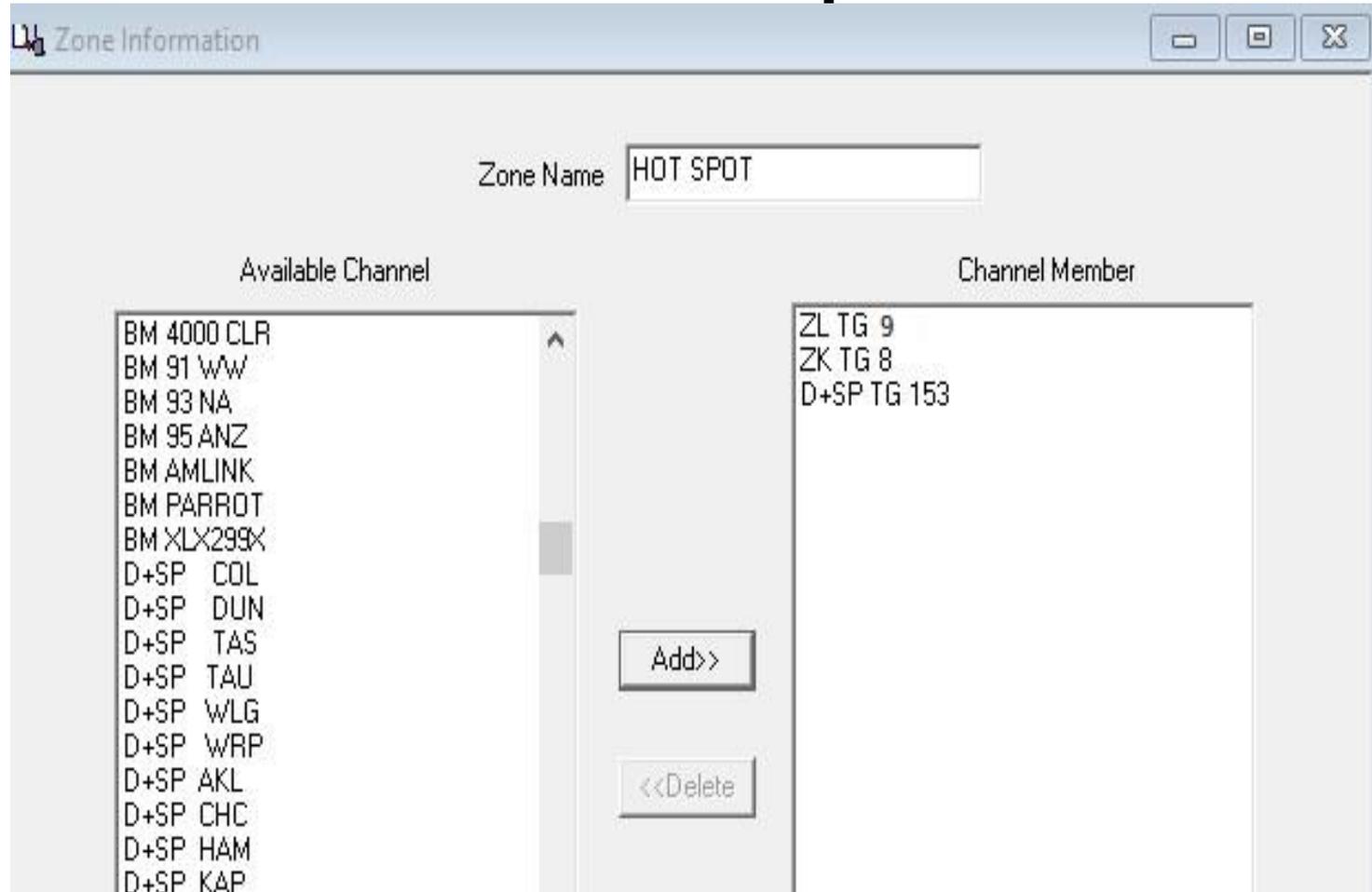
Mode	Channel Name	Tx power	Rx/Tx freq	Contact name	Rx Group List	Color Code	Time slot
Digital	ZL TG 9	Low	Hotspot freq	LCL	LCL	1	2
Digital	ZK TG 8	Low	Hotspot freq	ZK	ZK	1	2
Digital	D+SP TG 153	Low	Hotspot freq	D+SP	D+SP	1	2 *

* Hot spot Talk Group D+SP TG 153 does not reach the ZL-TRBO network.

You can use this TG to talk between hot spots or from hot spots to Droid-Star on phones.



DMR Radio Hotspot Zone - 2



DMR Web Dashboards

• IPSC2-NewZealand



IPSC2-NewZealand

REGISTERED (8.05.10) 2021-09-27 09:26:10												
STATUS	NR	REFLECTOR	CALL TS1			NET TS1	CALL TS2			NET TS2		
MONITOR												
MATRIX												
REMAP												
BRIDGE	WW-CQ active talkgroups: <											
DONGLE	NR	REPEATER	INFO	ID	TS1	CQ	LINK-STATUS	TS2	TS2-INFO	REF	START	HARDWARE
	1	ZL3DVR	MultiMode Repeater (30)	530305						4850/60	4850	MMDVM
	2	ZL4IND	Queenstown (29)	530306	153	CQ				4850/60	4850	MMDVM
	3	N2VYT	Fords FN20UN (29)	313453810								MMDVM
SERVICE	4	VK2FPSI	Waikane (21)	5051157				530		4850/15	4850	MMDVM
	5	ZL1CTS	Tauranga RF82BG (25)	530119003								MMDVM
SITE-INFO	6	ZL1DFA	Christchurch, RE66hl (27)	530304301	153					4850/15	4850	MMDVM
	7	ZL1GIU	Auckland (29)	5301211						4850/60	4850	MMDVM
	8	ZL1IA	Auckland (26)	5301164						4850/60	4850	MMDVM
	9	ZL1JHE	Tauranga, RF82ch, (21)	5300090						4850/60	4850	MMDVM
	10	ZL1KLP	Hunua, RF72 (27)	5301110				530				MMDVM
DMR+ IPSC2	11	ZL1LW	Puhoi (28)	5300277	8/0 153			530		4850/15	4850	MMDVM
	12	ZL1MY	Auckland (25)	5301216						4850/60	4850	MMDVM
	13	ZL1OW	Kawerau, RF81iv (25)	5300124						4850/60	4850	MMDVM
DG1HT DL5DI OE1KBC	14	ZL1RIC	ZL1RIC (30)	5301172								MMDVM
	15	ZL1TGS	Auckland (29)	5301117	8/0					4850/60	4850	MMDVM
	16	ZL1TOB	Whangarei (24)	5301162	153			530		4850/60	4850	MMDVM
	17	ZL1TOB	ZL1TOB (26)	530116211								MMDVM
	18	ZL1VIP	Toowoomba, QLD, AUS (28)	5300223								MMDVM
	19	ZL2BEZ	Wellington, RE78JS (24)	5301034						4850/60	4850	MMDVM
	20	ZL2DEK	Palmerston North (30)	5302140				530		4850/60	4850	MMDVM
	21	ZL2DOW	Wellington (23)	5300284	8/0 153					4850/15	4850	MMDVM
	22	ZL2JEL	Wanganui (21)	5302111				505		4850/60	4850	MMDVM
	23	ZL2JTD	Mobile (24)	5302022						4850/60	4850	MMDVM
	24	ZL2LO	Wanganui (26)	530214801								MMDVM
	25	ZL2MCP	Whanganui (23)	530214101						4850/60	4850	MMDVM
	26	ZL2NSA	ZL2NSA (30)	530201811								MMDVM
	27	ZL2ROR	New Zealand (29)	5301125						4850/15	4850	MMDVM
	28	ZL2TWS	ZL2TWS (25)	530101111								MMDVM
	29	ZL3PRA	Christchurch RE66GK (23)	530009101	8/0					4850/60	4850	MMDVM
	30	ZL3SI	ZL3SI (28)	5303206								MMDVM
	31	ZL3TIQ	Wellington (24)	530019301	8/0 153			530				MMDVM
	32	ZL3TJ	ZL3TJ (27)	5302016								MMDVM
	33	ZL4DE	Invercargill (22)	5303046						4850/60	4850	MMDVM
	34	ZL4FG	Invercargill (27)	5300099						4850/15	4850	MMDVM

DMR Web Dashboards



• Control Center ZL-TRBO

Control Center ZL-TRBO 09:34:56 September 27, 2021 UTC

Accept text Reject text

start time	duration	source peer alias	source radio alias	dest. bridge group	RSSI (dBm)	site name	loss rate
09:33:19.2 Sep 27	6.155	ZL2BEZ - P G - Wellington North Island 2 New Zealand -- 5301034	ZL2BEZ - Paul - Wellington North Island 2 New Zealand -- 5301034	ZL	N/A	IPSC2-NewZealand	0.0%
09:33:06.6 Sep 27	9.408	ZL2KO - Manawatu North Island 2 NZL -- 530205	ZL2GX - Giovanni - Palmerston North New Zealand -- 5300123	ZL	-83.4	ZL-TRBO	1.8%
09:32:58.0 Sep 27	3.699	ZL2BEZ - P G - Wellington North Island 2 New Zealand -- 5301034	ZL2BEZ - Paul - Wellington North Island 2 New Zealand -- 5301034	ZL	N/A	IPSC2-NewZealand	0.0%
09:32:28.4 Sep 27	5.453	ZL2KO - Manawatu North Island 2 NZL -- 530205	ZL2GX - Giovanni - Palmerston North New Zealand -- 5300123	ZL	-81.4	ZL-TRBO	0.0%
09:26:14.4 Sep 27	6.213	N5EOC - Grapevine Texas USA -- 314829	3184591	Worldwide-CORE	-83.8	DMR-MARC-CCEAST	0.0%
09:24:35.2 Sep 27	0.102	N9CWM - McCook Illinois USA -- 311746	WB9DZN - Donald - Justice Illinois United States -- 3100178	Worldwide-CORE	-126.9	DMR-MARC-CCEAST	0.0%
09:19:20.3 Sep 27	0.74	N9CWM - McCook Illinois USA -- 311746	WB9DZN - Donald - Justice Illinois United States -- 3100178	Worldwide-CORE	-127.0	DMR-MARC-CCEAST	0.0%
09:02:29.5 Sep 27	0.130	311961	KJ7OKE - Don - Tucson Arizona United States -- 3166693	Worldwide-CORE	-127.1	DMR-MARC-CCEAST	0.0%
07:33:29.9 Sep 27	4.761	N5EOC - Grapevine Texas USA -- 314829	3184591	Worldwide-CORE	-94.3	DMR-MARC-CCEAST	0.0%
07:16:44.2 Sep 27	0.101	N9CWM - McCook Illinois USA -- 311746	WB9DZN - Donald - Justice Illinois United States -- 3100178	WW English-CORE	-127.0	DMR-MARC-CCEAST	0.0%
06:42:29.1 Sep 27	0.83	N9CWM - McCook Illinois USA -- 311746	WB9DZN - Donald - Justice Illinois United States -- 3100178	Worldwide-CORE	-127.0	DMR-MARC-CCEAST	0.0%
05:58:12.4 Sep 27	2.931	ZL2BEZ - P G - Wellington North Island 2 New Zealand -- 5301034	ZL2BEZ - Paul - Wellington North Island 2 New Zealand -- 5301034	ZL	N/A	IPSC2-NewZealand	0.0%
05:57:58.1 Sep 27	11.222	530101111	ZL2TWS - John - Lower Hutt New Zealand -- 5301011	ZL	N/A	IPSC2-NewZealand	0.0%
05:57:42.2 Sep 27	11.932	ZL2BEZ - P G - Wellington North Island 2 New Zealand -- 5301034	ZL2BEZ - Paul - Wellington North Island 2 New Zealand -- 5301034	ZL	N/A	IPSC2-NewZealand	0.0%
05:57:23.9 Sep 27	11.878	530101111	ZL2TWS - John - Lower Hutt New Zealand -- 5301011	ZL	N/A	IPSC2-NewZealand	0.0%
05:57:13.7 Sep 27	7.614	ZL2BEZ - P G - Wellington North Island 2 New Zealand -- 5301034	ZL2BEZ - Paul - Wellington North Island 2 New Zealand -- 5301034	ZL	N/A	IPSC2-NewZealand	0.0%
05:56:21.8 Sep 27	47.692	530101111	ZL2TWS - John - Lower Hutt New Zealand -- 5301011	ZL	N/A	IPSC2-NewZealand	0.0%
05:56:41.5 Sep 27	0.70	N9CWM - McCook Illinois USA -- 311746	WB9DZN - Donald - Justice Illinois United States -- 3100178	Worldwide-CORE	-127.0	DMR-MARC-CCEAST	0.0%
05:56:01.2 Sep 27	15.533	ZL2BEZ - P G - Wellington North Island 2 New Zealand -- 5301034	ZL2BEZ - Paul - Wellington North Island 2 New Zealand -- 5301034	ZL	N/A	IPSC2-NewZealand	0.0%
05:55:46.7 Sep 27	9.615	530101111	ZL2TWS - John - Lower Hutt New Zealand -- 5301011	ZL	N/A	IPSC2-NewZealand	0.0%
05:55:34.2 Sep 27	9.413	ZL2BEZ - P G - Wellington North Island 2 New Zealand -- 5301034	ZL2BEZ - Paul - Wellington North Island 2 New Zealand -- 5301034	ZL	N/A	IPSC2-NewZealand	0.0%
05:55:13.9 Sep 27	14.616	530101111	ZL2TWS - John - Lower Hutt New Zealand -- 5301011	ZL	N/A	IPSC2-NewZealand	0.0%
05:54:59.2 Sep 27	10.491	ZL2BEZ - P G - Wellington North Island 2 New Zealand -- 5301034	ZL2BEZ - Paul - Wellington North Island 2 New Zealand -- 5301034	ZL	N/A	IPSC2-NewZealand	0.0%



The End

