

Bellbrook Amateur Radio Club



- Welcome to Tech Night Hotspot Presentation!
- John Westerkamp, W8LRJ
 - Hotspot 101
 - JumboSpot MMDVM Raspberry Pi HAT
 - DMR through Brandmeister
- Lyle Steinhardt, KE0CZV
 - ZUMSpot (pre-built on RPi Zero)
 - Crossmode Examples DMR2YSF and YSF2DMR
- Brian Garber, WB8AM
 - OpenSpot3
 - Configuration and examples (including D-Star)





Hotspot 101

BARC Tech Night

August 13, 2020

Hotspot 101



- A hotspot is your own personal digital repeater
- Allows you to connect when a repeater is not reachable (hotel, mobile)
- Radio talks to hotspot via RF; Hotspot connects to Internet
- Hotspots all support DMR, D-STAR, System Fusion, P25, and NXDN
- Hotspots all support *Crossmode* connections (connect DMR radio to YSF Reflector and vice-versa)*
- *Ultimate goal is to allow all digital modes to connect with each other*



* Only OpenSpot3 provides crossmode support to and from D-STAR

DMR Repeater Overview



DMR Radio TG 310557



DMR Radio
TG 310557



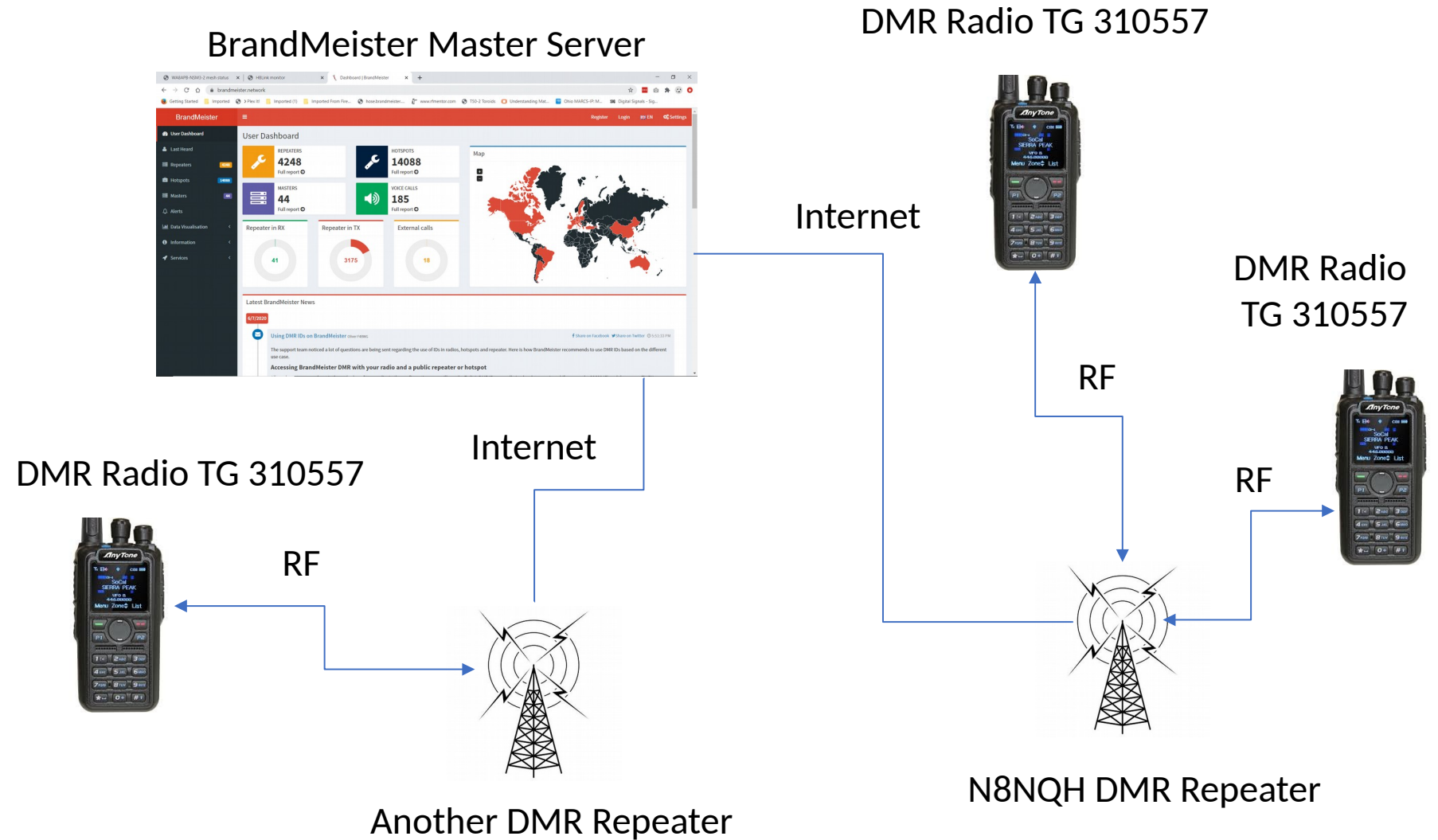
RF

RF



N8NQH DMR Repeater

BrandMeister Overview



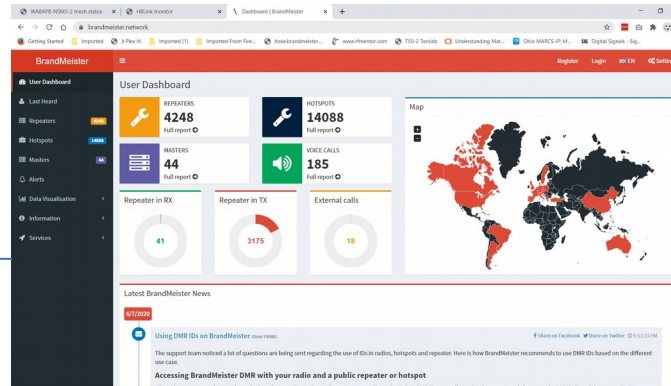
BrandMeister Hotspot Overview



DMR Radio TG 310557

DMR Radio TG 310557

BrandMeister Master Server



Internet

Internet

Internet

DMR Radio TG 310557

DMR Radio TG 310557

RF

RF

RF

RF

CALabs

Hotspot

Another DMR Repeater

N8NQH DMR Repeater

BrandMeister Hotspot Overview



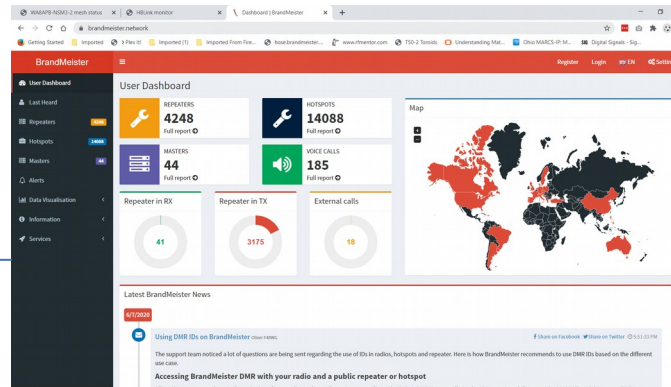
DMR Radio TG 310557



*Or YSF Radio
Or D-Star Radio (OpenSpot3)*

Internet

BrandMeister Master Server



DMR Radio TG 310557



Internet

DMR Radio
TG 310557



RF

RF



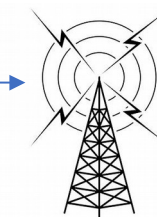
N8NQH DMR Repeater

DMR Radio TG 310557

Internet



RF



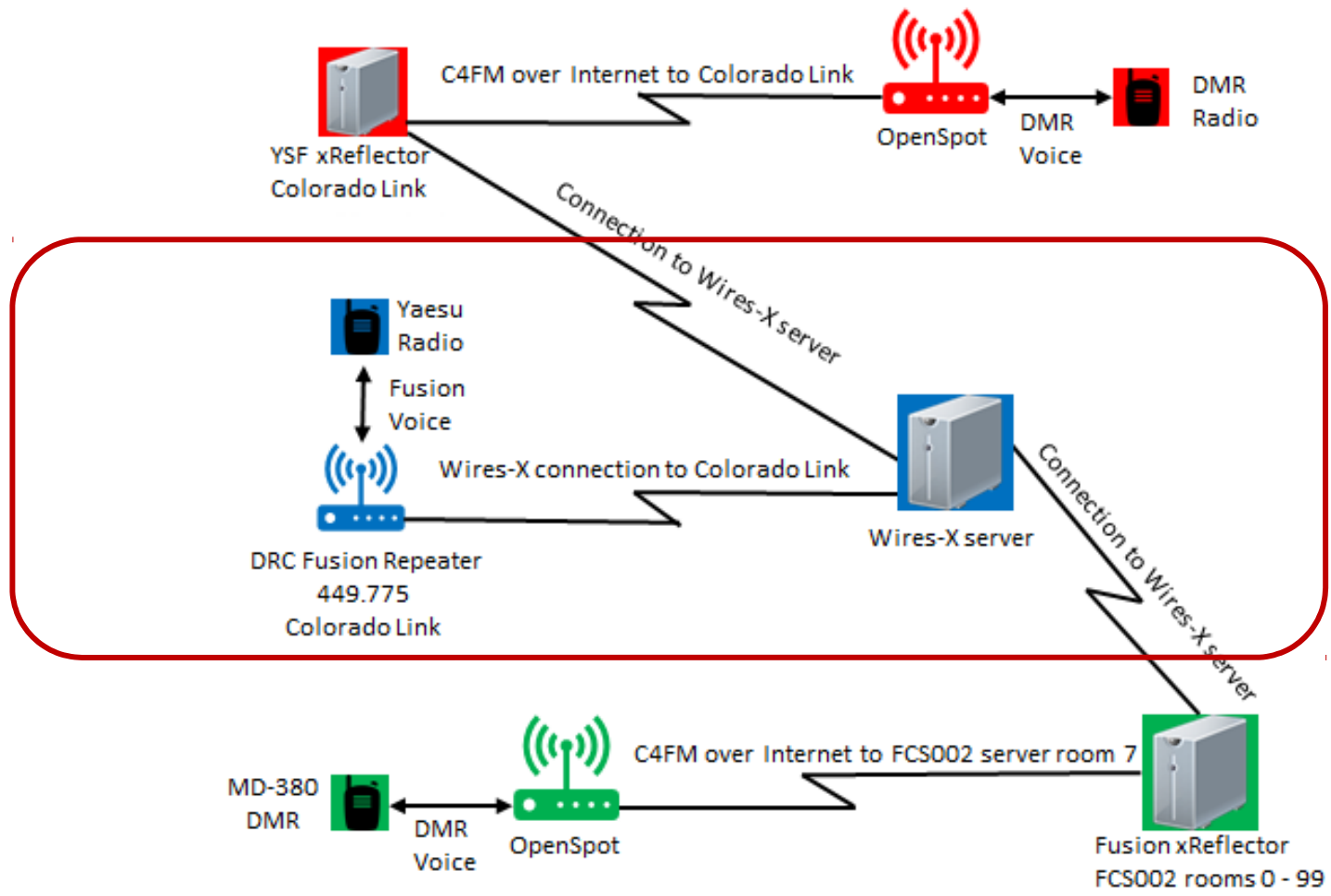
Another DMR Repeater



Hotspot

CALabs

Crossmode Overview



DMR Radio to OpenSpot Hotspot

Yaesu System Fusion Repeater

DMR Radio to OpenSpot Hotspot



JumboSpot MMDVM Hat Hotspot

BARC Tech Night Presentation

August 13, 2020

BLUF – Bottom Line Up Front



- MMDVM – MultiMode Digital Voice Modem
- Good for a tinkerer and cheapest option
- Less than \$20 (if you already have a Raspberry Pi)
- Aliexpress.com (or Amazon but all are shipped from China)
- DMRspot.com for Made in the USA Premium pre-built hotspots
- Just need to solder the SMA connector for the antenna onto the MMDVM board and then attach the HAT (Hardware Attached on Top) to the Raspberry Pi GPIO header
- Download and write Pi-Star image at pistar.uk to microSD card
- Insert the microSD card and boot the Raspberry Pi
- Configure your hotspot through a browser to Pi-Star node using the address `pi-star.local`



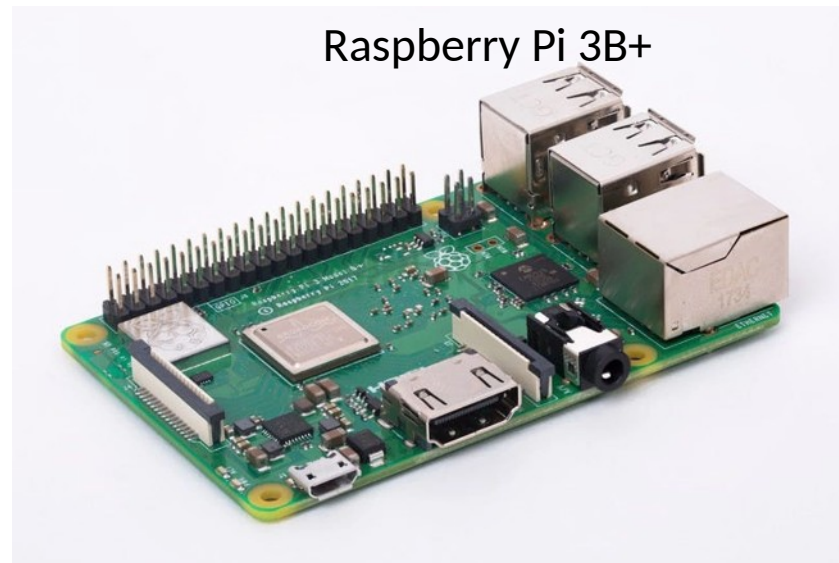
Description



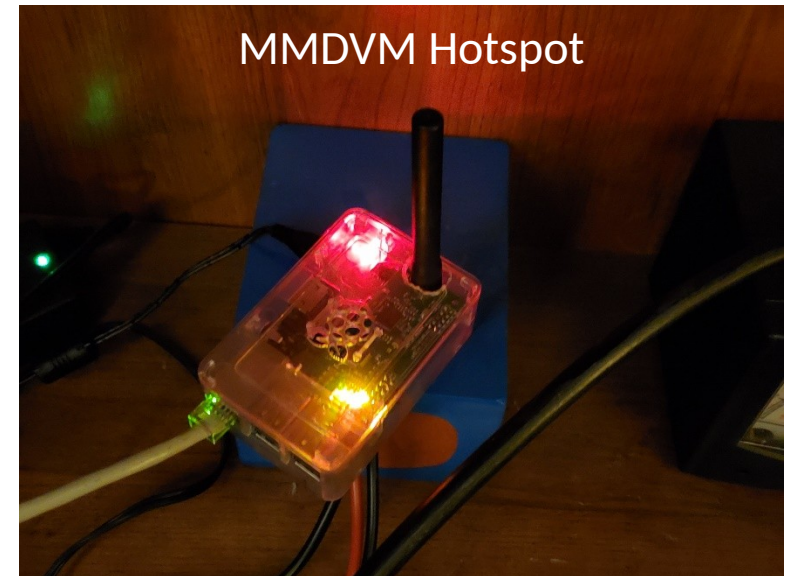
- Pi-Star is a software image built initially for the Raspberry Pi for Digital Voice on Amateur Radio
- Pi-Star based on software developed by Jonathan Naylor ([G4K LX](#)) as well as MMDVMHost
- Pi-Star is highly configurable



MMDVM Hat



Raspberry Pi 3B+



MMDVM Hotspot

Capabilities



- Supports DMR, System Fusion, D-Star, P25, and NXDN radios
- Supports crossmode among all modes except D-Star
- Available for VHF, UHF, or both
- Available as simplex or duplex node
- Will provide location to APRS-IS servers
- Wifi or Ethernet connection (depends on Raspberry Pi)
- Excellent setup video by W1MSG

<https://www.youtube.com/watch?v=B5G4gYDdJeQ>



DMRspot.com

Pi-Star Interface



URL: pi-star.local
User: pi-star
Password: raspberry

Browser tabs: WA8APB-NSM9-2 mesh stati, Mesh Map 2020-05-09, HBLink monitor, W8LRJ - Digital Voice Dashb, Inbox (1) - westerkampj@gm, Pi-Star initial setup - YouTu

Address bar: Not secure | 10.179.222.124/admin/configure.php

Navigation: Getting Started, Imported, Plex It!, Imported (1), Imported From Fire..., hose.brandmeister..., www.rfmentor.com, T50-2 Toroids, Understanding Mat..., Ohio MARCS-IP: M..., SIG Digital Signals - Sig...

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	4.19.97-v7+	Pi 3 Model B+ (1GB) - Sony, UK	0 / 0.02 / 0	59.1°C / 138.4°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)

Apply Changes

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:	None Port: /dev/ttyAMA0 Nextion Layout: G4KLX

Apply Changes

General Configuration

Setting	Value
Hostname:	pi-star Do not add suffixes such as .local
Node Callsign:	W8LRJ
	3100336

Waiting for 10.179.222.124...

Pi-Star Configuration



WA8APB-NSM3-2 mesh stat... | Mesh Map 2020-05-09 | HBLINK monitor | W8LRJ - Digital Voice Dashb... | What is Pi-Star? - pistar.uk | mmdvm - Google Search

Not secure | pi-star/admin/configure.php

Getting Started | Imported | Plex It! | Imported (1) | Imported From Fire... | hose.brandmeister... | www.rfmentor.com | T50-2 Toroids | Understanding Mat... | Ohio MARCS-IP: M... | SIG Digital Signals - Sig...

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:	None Port: /dev/ttyAMA0 Nextion Layout: G4KLX

Apply Changes

General Configuration

Setting	Value
Hostname:	pi-star Do not add suffixes such as .local
Node Callsign:	W8LRJ
CCS7/DMR ID:	3100336
Radio Frequency:	446.500.000 MHz
Latitude:	39.692014 degrees (positive value for North, negative for South)
Longitude:	-84.07483 degrees (positive value for East, negative for West)
Town:	Beavercreek, EM79xq
Country:	OH, USA
URL:	http://www.qrz.com/w8lrj <input type="radio"/> Auto <input checked="" type="radio"/> Manual
Radio/Modem Type:	MMDVM_HS_Hat (DB9MAT & DF2ET) for Pi (GPIO)
Node Type:	<input checked="" type="radio"/> Private <input type="radio"/> Public
APRS Host:	rotate.aprs2.net
System Time Zone:	America/New_York
Dashboard Language:	english_us

Apply Changes

DMR Configuration

Setting	Value
DMR Master:	BM_United_States_3102
Hotspot Security:	*****
BrandMeister Network:	Repeater Information Edit Repeater (BrandMeister Selfcare)
DMR ESSID:	3100336 10
DMR Color Code:	1
DMR EmbeddedLCOonly:	<input type="checkbox"/>
DMR DumpTAData:	<input checked="" type="checkbox"/>

Apply Changes

Pi-Star Configuration



W8LRJ-hAP setup | HBLink monitor | Edit Repeater | BrandMeister | W8LRJ - Digital Voice Dashboard | pi-star wifi - Google Search

Not secure | 192.168.11.135/admin/configure.php

Getting Started | Imported | Plex It! | Imported (1) | Imported From Fire... | hose.brandmeister... | www.rfmentor.com | T50-2 Toroids | Understanding Mat... | Ohio MARCS-IP: M... | S16 Digital Signals - Sig...

System Time Zone: America/New_York
Dashboard Language: english_us
Apply Changes

DMR Configuration

Setting	Value
DMR Master:	BM_United_States_3102
Hotspot Security:	*****
BrandMeister Network:	Repeater Information Edit Repeater (BrandMeister Selfcare)
DMR ESSID:	3100336 10
DMR Color Code:	1
DMR EmbeddedLCOnly:	<input type="checkbox"/>
DMR DumpTADData:	<input checked="" type="checkbox"/>

Apply Changes

Firewall Configuration

Setting	Value
Dashboard Access:	<input checked="" type="radio"/> Private <input type="radio"/> Public
ircDDBGateway Remote:	<input checked="" type="radio"/> Private <input type="radio"/> Public
SSH Access:	<input checked="" type="radio"/> Private <input type="radio"/> Public
Auto AP:	<input checked="" type="radio"/> On <input type="radio"/> Off Note: Reboot Required if changed
uPNP:	<input checked="" type="radio"/> On <input type="radio"/> Off

Apply Changes

Wireless Configuration

Refresh | Reset WiFi Adapter | Configure WiFi

Wireless Information and Statistics

Interface Information	Wireless Information
Interface Name : wlan0	Connected To :
Interface Status : Interface is down	AP Mac Address :
IP Address :	Bitrate :
Subnet Mask :	Signal Level :
Mac Address : b8:27:eb:85:52:42	
Interface Statistics	
Received Packets :	WiFi Country : US
Received Bytes :	
Transferred Packets :	
Transferred Bytes :	

Information provided by ifconfig and iwconfig

BrandMeister Self-Care Setup



The screenshot shows the BrandMeister Self-Care Settings page for user 3100336 (W8LRJ). The page is divided into several sections:

- BrandMeister Header:** Includes the user's call sign W8LRJ, language EN, and a Settings icon.
- Left Sidebar:** Contains navigation links for User Dashboard, Last Heard, Repeaters (4251), Hotspots (14041), Masters (45), Alerts, Data Visualisation, Information, Services, Hotspot, My hotspots (3100336, 310033610, 310033611), Sysop Menu, Sysop Dashboard, and My Repeaters.
- Self-Care Settings:**
 - Brand:** Chinese Radio
 - Language:** English
 - APRS Interval:** 60 sec
 - APRS Callsign:** W8LRJ-7
 - APRS Icon:** Car icon
 - In Call GPS:** Off
 - APRS Text:** John's 868UV 147.045
 - AirSecurity / TOTP:** Off
 - Hotspot Security:** On
 - Password:** Enter new Password
- Buttons:** Save and Restore defaults.

At the bottom of the page, there is a footer with the following text: </> with ❤️ by the BrandMeister Dev Team, Like us on Facebook!, Donate a ☕ or a 🍷, Support, Legal Information, and Project Halligan Version 1.3.2-c5353c94.

BrandMeister Self-Care Setup



A screenshot of a web browser showing the BrandMeister interface for editing a repeater. The browser tabs include "WA8APB-NSM3-2 mesh status", "HBLink monitor", and "Edit Repeater | BrandMeister". The address bar shows "brandmeister.network/?page=rep-edit&id=310033611". The interface has a top navigation bar with buttons: "Get IP address", "Drop call on slot 1", "Drop dynamic groups on slot 1", "Drop call on slot 2", "Drop dynamic groups on slot 2", and "Reset repeater connection". Below this is the "Reflector Settings" section with fields for "Active reflector", "Default reflector", and "Reflector timeout (sec)", each with a "Set" button. The "Static Talkgroups" section is split into two slots. "Timeslot 1" is empty. "Timeslot 2" is highlighted with a red box and contains a talkgroup ID of "(310557)". Below are "Clusters" and "Scheduled static" sections, both with "Add" buttons and "Remove" buttons at the bottom. The footer contains: "</> with ❤️ by the BrandMeister Dev Team", "Like us on Facebook!", "Donate a 🍷 or a 🍷", "Support", "Legal Information", and "Project Halligan Version 1.3.2-c5353c94".

Pi-Star Dashboard



Browser tabs: WA8APB-NSM3-2 mesh stati, Mesh Map 2020-05-09, HBLINK monitor, W8LRJ - Digital Voice Dashb, What is Pi-Star? - pistar.uk, mmdvm - Google Search

Address bar: Not secure | pi-star/

Navigation: Getting Started, Imported, Plex It!, Imported (1), Imported From Fire..., hose.brandmeister..., www.rfmentor.com, T50-2 Toroids, Understanding Mat..., Ohio MARCS-IP: M..., Digital Signals - Sig...

Hostname: pi-star Pi-Star:4.1.0 / Dashboard: 20200706

Pi-Star Digital Voice Dashboard for W8LRJ

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	446.500000 MHz
Rx	446.500000 MHz
FW	HS_Hat:v1.4.7
TCXO	14.7456 MHz

DMR Repeater	
DMR ID	3100336
DMR CC	1
TS1	disabled
TS2	enabled

DMR Master	
BM United States	..

Gateway Activity								
Time (EDT)	Mode	Callsign	Target	Src	Dur(s)	Loss	BER	
18:36:56 Aug 8th	DMR Slot 2	9990	W8LRJ	Net	5.2	0%	0.0%	
18:36:48 Aug 8th	DMR Slot 2	W8LRJ	9990	RF	5.0	0%	0.2%	
15:03:22 Aug 8th	DMR Slot 2	KD8RER	TG 310557	Net	0.5	0%	0.0%	
14:21:00 Aug 8th	DMR Slot 2	N8NQH	TG 310557	Net	8.8	0%	0.0%	
17:00:04 Aug 7th	D-Star	W8LRJ/TIME	CQCQCQ	Net	3.7	0%	0.0%	
16:52:22 Aug 7th	DMR Slot 2	W8LRJ	TG 310557	Net	7.0	0%	0.0%	

Local RF Activity								
Time (EDT)	Mode	Callsign	Target	Src	Dur(s)	BER	RSSI	
18:36:48 Aug 8th	DMR Slot 2	W8LRJ	9990	RF	5.0	0.2%	S9+46dB (-47 dBm)	

Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0HWZ) 2014-2020.
ircDBGateway Dashboard by Hans-J. Barthen (DLSD1),
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.

Summary



- Inexpensive way to test the hotspot waters, especially if you already own a Raspberry Pi
- Do need to solder one connector
- Very simple to setup and use
- Use UHF DMR/C4FM Simplex Frequency (less traffic) and Low Power
 - 446.500 MHz, 446.075 MHz, and 433.450 MHz
- Do not use VHF or UHF National Calling Frequencies (146.520 MHz and 446.000 MHz)
- Do not use a frequency reserved for satellites (see ARRL Band Plan)

Configuration Videos



- <https://www.youtube.com/watch?v=B5G4gYDdJeQ>
- https://www.youtube.com/watch?v=DDZMY_6qjjl&feature=youtu.be
- Detailed MMDVM Pi-Star hotspot configuration for DMR

DMR2YSF Crossmode



Browser tabs: wa8apb-nsm3-2.local.mesh | HBLink monitor | W8LRJ - Digital Voice Dashboard | +

Address bar: Not secure | pi-star/admin/configure.php

Navigation: Getting Started | Imported | Plex It! | Imported (1) | Imported From Fire... | hose.brandmeister... | www.rfmentor.com | T50-2 Toroids | Understanding Mat... | Ohio MARCS-IP: M... | SIG Digital Signals - Sig...

Pi-Star:4.1.0 / Dashboard: 20200706

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	4.19.97-v7+	Pi 3 Model B+ (1GB) - Sony, UK	0.15 / 0.32 / 0.33	67.1°C / 152.8°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)

Apply Changes

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 checked="" 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:	None Port: /dev/ttyAMA0 Nextion Layout: G4KLX

Apply Changes

General Configuration

Setting	Value
Hostname:	pi-star Do not add suffixes such as .local
Node Callsign:	W8LRJ
CCS7/DMR ID:	3100336

DMR2YSF Crossmode



Browser tabs: wa8apb-nsm3-2.local.mesh, HBLink monitor, W8LRJ - Digital Voice Dashboard

Address bar: Not secure | pi-star/admin/configure.php

Language: english_us [Apply Changes]

DMR Configuration

Setting	Value
DMR Master:	DMRGateway
BrandMeister Master:	BM_United_Kingdom_2341
BM Hotspot Security:	*****
BrandMeister Network ESSID:	3100336 None
BrandMeister Network Enable:	<input checked="" type="checkbox"/>
BrandMeister Network:	Repeater Information Edit Repeater (BrandMeister Selfcare)
DMR+ Master:	DMR+_IPSC2-Australia
DMR+ Network:	Options=
DMR+ Network ESSID:	3100336 None
DMR+ Network Enable:	<input type="checkbox"/>
XLX Master:	XLX_950
XLX Startup Module:	Default
XLX Master Enable:	<input type="checkbox"/>
DMR Color Code:	1
DMR EmbeddedLCOonly:	<input type="checkbox"/>
DMR DumpTAData:	<input checked="" type="checkbox"/>

[Apply Changes]

Yaesu System Fusion Configuration

Setting	Value
YSF Startup Host:	YSF08106 - US-Triangle-Net - Triangle Net
UPPERCASE Hostfiles:	<input type="checkbox"/> Note: Update Required if changed
WiresX Passthrough:	<input type="checkbox"/>

[Apply Changes]

Firewall Configuration

Setting	Value
Dashboard Access:	<input checked="" type="radio"/> Private <input type="radio"/> Public
ircDDBGateway Remote:	<input checked="" type="radio"/> Private <input type="radio"/> Public
SSH Access:	<input checked="" type="radio"/> Private <input type="radio"/> Public
Auto AP:	<input checked="" type="radio"/> On <input type="radio"/> Off Note: Reboot Required if changed
uPNP:	<input checked="" type="radio"/> On <input type="radio"/> Off

[Apply Changes]

DMR2YSF Crossmode



- Using DMR Gateway in the DMR Configuration allows you to select DMR Talkgroups or YSF/FCS Reflectors
- Pi-Star 4.0 and above allows you to control the reflector selection with your DMR HT
- For YSF reflectors: add 70 to beginning of reflector number after expanding reflector number to 5 digits with 0's, if needed
- For FCS reflectors: add 71 to beginning of reflector number after expanding reflector number to 5 digits with 0's, if needed

Ex: AmericaLink YSF21080



Browser tabs: wa8apb-nsm3-2.local.mesh | HBLink monitor | W8LRJ - Digital Voice Dashboard

Address bar: Not secure | pi-star/

Hostname: pi-star | Pi-Star4.1.0 / Dashboard: 20200706

Pi-Star Digital Voice Dashboard for W8LRJ

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	TX DMR Slot 2
Tx	446.500000 MHz
Rx	446.500000 MHz
FW	HS_Hat:v1.4.7
TCXO	14.7456 MHz

DMR Repeater	
DMR ID	3100336
DMR CC	1
TS1	disabled
TS2	enabled

DMR Master	
BM United States ..	
DMR2YSF Cross-over	

YSF Network	
Room: AmericaLink	

Gateway Activity								
Time (EDT)	Mode	Callsign	Target	Src	Dur(s)	Loss	BER	
10:55:12 Aug 11th	DMR Slot 2	KJ4KVC	TG 7021080	Net				TX 30+ sec
10:52:44 Aug 11th	DMR Slot 2	W8LRJ	TG 7021080	Net	65.6	0%	0.0%	
10:50:27 Aug 11th	DMR Slot 2	K04CUO	TG 7021080	Net	7.0	0%	0.0%	
10:50:15 Aug 11th	DMR Slot 2	N0AKX	TG 7021080	Net	24.2	0%	0.0%	
10:38:57 Aug 11th	DMR Slot 2	KC1HTY	TG 7021080	Net	0.8	0%	0.0%	
10:38:44 Aug 11th	DMR Slot 2	N2CTK	TG 7021080	Net	8.0	0%	0.0%	
10:35:23 Aug 11th	DMR Slot 2	G4TKO	TG 7021080	Net	13.1	0%	0.0%	
10:27:11 Aug 11th	DMR Slot 2	K0WBC	TG 7021080	Net	3.0	0%	0.0%	
10:18:16 Aug 11th	DMR Slot 2	W8LGZ	TG 7021080	Net	1.6	0%	0.0%	
09:55:05 Aug 11th	DMR Slot 2	KC3MGF	TG 7021080	Net	1.2	90%	0.0%	
09:45:02 Aug 11th	DMR Slot 2	N8TLI	TG 7021080	Net	0.8	0%	0.0%	
09:40:02 Aug 11th	DMR Slot 2	ZL2AUS	TG 7021080	Net	0.8	0%	0.0%	
09:38:17 Aug 11th	DMR Slot 2	WA0UAY	TG 7021080	Net	1.6	0%	0.0%	
09:24:06 Aug 11th	DMR Slot 2	KD7ARM	TG 7021080	Net	0.5	0%	0.0%	
09:01:25 Aug 11th	DMR Slot 2	KM4ZXN	TG 7021080	Net	12.4	0%	0.0%	
08:46:35 Aug 11th	DMR Slot 2	VA3TBH	TG 7021080	Net	0.5	0%	0.0%	
08:22:29 Aug 11th	DMR Slot 2	WJ9E	TG 7021080	Net	8.0	0%	0.0%	
08:11:07 Aug 11th	DMR Slot 2	WU3U	TG 7021080	Net	0.8	0%	0.0%	
08:07:33 Aug 11th	DMR Slot 2	M7ANI	TG 7021080	Net	1.2	0%	0.0%	
08:00:13 Aug 11th	DMR Slot 2	K1DWZ	TG 7021080	Net	19.9	0%	0.0%	

Local RF Activity								
Time (EDT)	Mode	Callsign	Target	Src	Dur(s)	BER	RSSI	

Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MWZ) 2014-2020.
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 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.

