



# DMR Workshop

## *DIGITAL INSTRUCTORS*

- MARTY FITZGERALD – W5MF
- WALTER HOLMES – K5WH
- RON MATUSEK - WA6TQH



Digital Mobile Radio communications

Presentation by Ron Matusek – WA6TQH

10/18/2019

# Hotspot Overview

- ▶ *Parts list for Hotspot – Including pictures of each component*
- ▶ *Assembly of Hotspot*
- ▶ *Programming of Hotspot – pi-star configuration*
- ▶ *Interfacing with Brandmeister for APRS (Selfcare URL) – pictures of Brandmeister registration then selfcare to get URL*
- ▶ *Using Hotspot to link into the Brandmeister listed TG NARS 3146211 & Amsat TG 98006*
- ▶ *List configuration (freq) for Klein & Cypress Repeaters. Linked on NARS TG 3146211*
- ▶ *Overview of “code plug” for TYT and Anytone radios to configure NARS TG3146211.*  
*Note: CPS = “Customer Programming Software”*
- ▶ *Technical support is also available by contacting Walter Holmes K5WH using Zoom.*

# TYT MD-UV380 (GPS)

## MD-UV380

DMR Digital two-way radio



tyt888.en.alibaba.com

Digital mode, single call,  
group call, all call function

- Transmit interruption
- Group call match (Promiscuous)
- Private call match (Promiscuous)
- GPS Optional
- Dual band, dual wait, dual standby



**DMR**  
DIGITAL TWO-WAY RADIO



## MD-UV380

Use Time-Division Multiple-Access (TDMA) digital technology



### Main Functions

- GPS Optional
- Use Time-Division Multiple-Access (TDMA) digital function
- Dual time slot for repeater
- Dual time slot for point to point
- Firmware upgradeable
- Lone worker
- Encryption function
- Compatible with Mototrbo Tier I & II
- Single call, group call and all call
- Analog and digital combined
- Remote kill/stun and activate
- Comply with digital protocol ETSI TS 102 361-1,-2,-3
- Color LCD display
- Up to 3000 channels
- Transmit interruption
- Group call match (Promiscuous)
- Private call match (Promiscuous)
- 8 hours of recording

# Anytone D-878-UV W/Optional Blue Tooth

- **VHF/UHF DUAL BAND:** Features both DMR digital and analog modes. DMR Tier I and Tier II operation.
- **Bluetooth capabilities:** Hook up to your car, wireless speaker, or headphones, and talk hands-free with most of your Bluetooth audio devices.
- Over 24 hours of talk time on **Bluetooth PTT button**
- **Massive Memory:** 4,000 Memory Channels, 10,000 DMR Talk Groups, 200,000 Digital Contacts, 250 zones, up to 250 channels per zone.
- **High Power Output** - 6.0W, 4.0W, 2.5W, 1.0W selectable TX power output
- 136-174 / 400-480 MHz RX/TX
- Up to 35 hours between charges with the supplied **3100 mAh lithium-ion battery**
- Bandwidth 12.5 / 25.0 kHz Analog, and 12.5 kHz DMR Import/Export



# Types of Hotspot Hardware

| Hardware                 | Simplex / Duplex | Comments  |
|--------------------------|------------------|---|
| Zumspot                  | Simplex          | visibility of Time Slot #2 only   |
| Jumbospot                | Simplex          | Chinese version of above  |
| Pi-Zero WiFi board       | --               | used with above to provide wifi access  |
| Banana Pi<br>BPI-M2 Zero | --               | Chinese version of Pi Zero  |
| SharkRF Openspot         | Simplex          | Ver. 2 (WiFi)<br>Ver 1 (Ethernet) -- <b>Discontinued production 2018</b>  |
| Duplex board             | Duplex           | split channel operation visibility of Time Slots #1 & #2  |
| Raspberry Pi-3 b+        | --               | required for Duplex Board<br>adds more power & flexibility for addons<br>i.e. Larger display such as a Nexton LCD & |

# Zumspot Simplex Boards



<https://www.hamradio.com/detail.cfm?pid=H0-015993>

Zumspot with Pi-Zero W attached

# SharkRF Openspot SharkRF Openspot 1 & 2



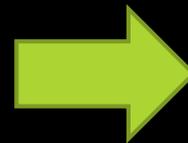
## Key features – SharkRF Openspot 2

- Web-based easy and fast Quick Setup
- No additional hardware required, works out of the box without a computer

*Supports cross modem modes (example: talk with your C4FM radio on DMR, and with your DMR radio on System Fusion networks).*

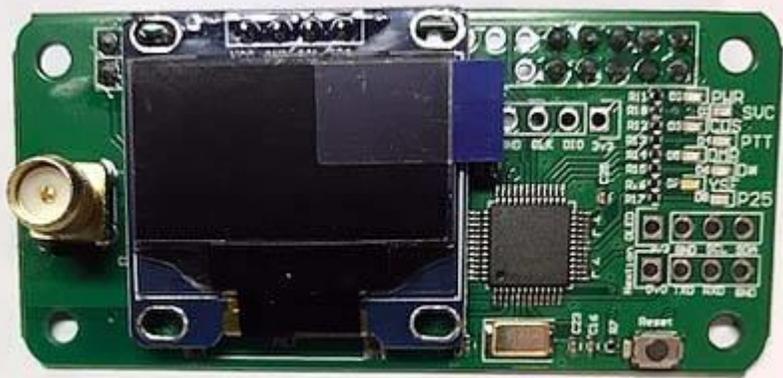
## SharkRF Openspot 1 – Discontinued production

- No Display
- Needs an adapter to do mobile Wi-Fi : TP-LINK Portable 3G/4G Wireless N Router Model No. TL-MR3020



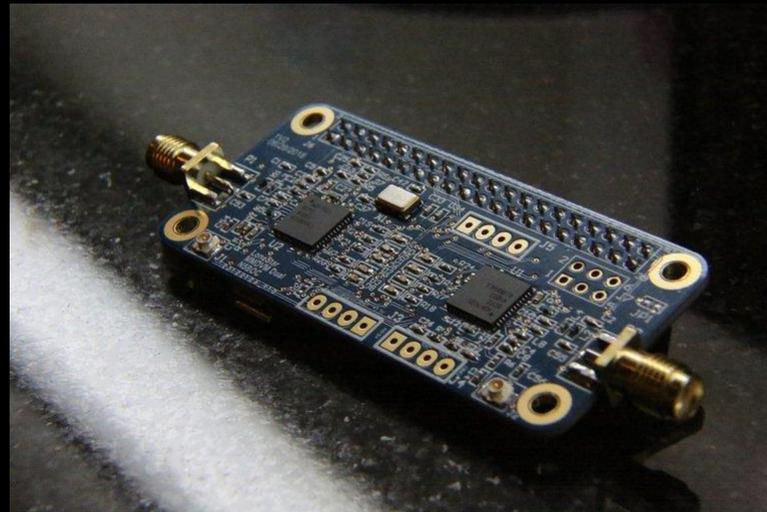
# JumboSpot Simplex & Tindie Duplex Boards

Simplex



Search JumboSpot on Amazon

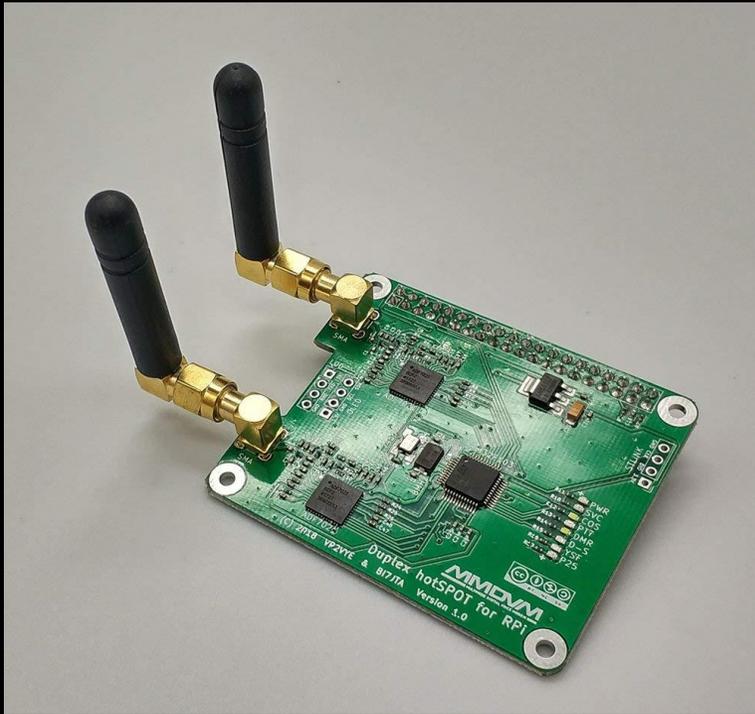
Duplex



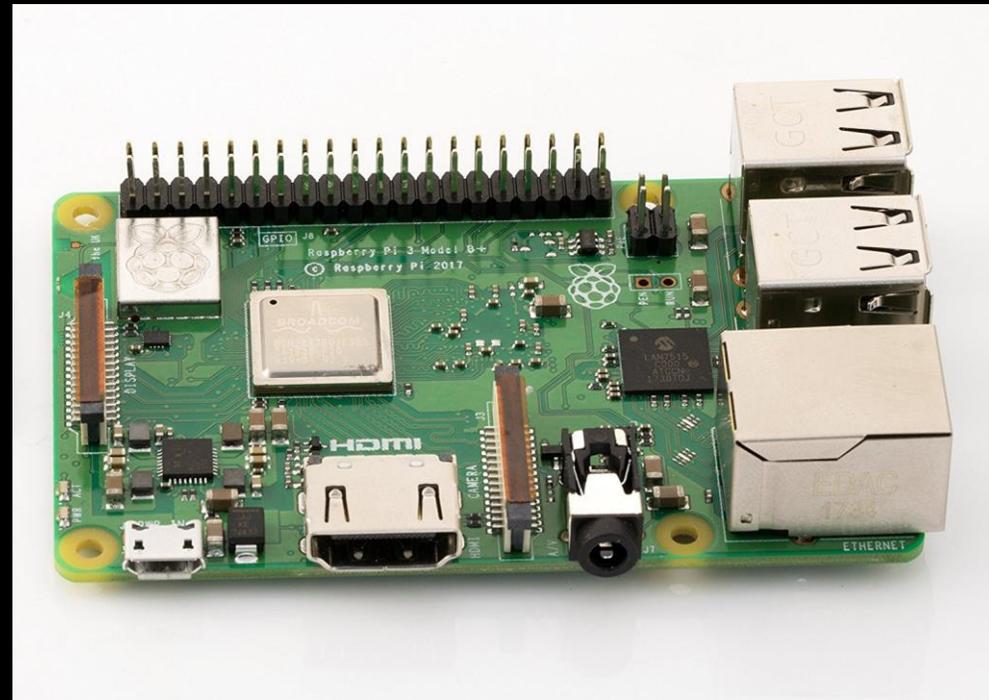
<https://www.tindie.com/products/dave31418/mm-dvm-duplex-in-pi-zero-form-factor-duplex/>

# Duplex Assembly with Pi-3 B+

Two Slot visibility & Nextion Display add-on

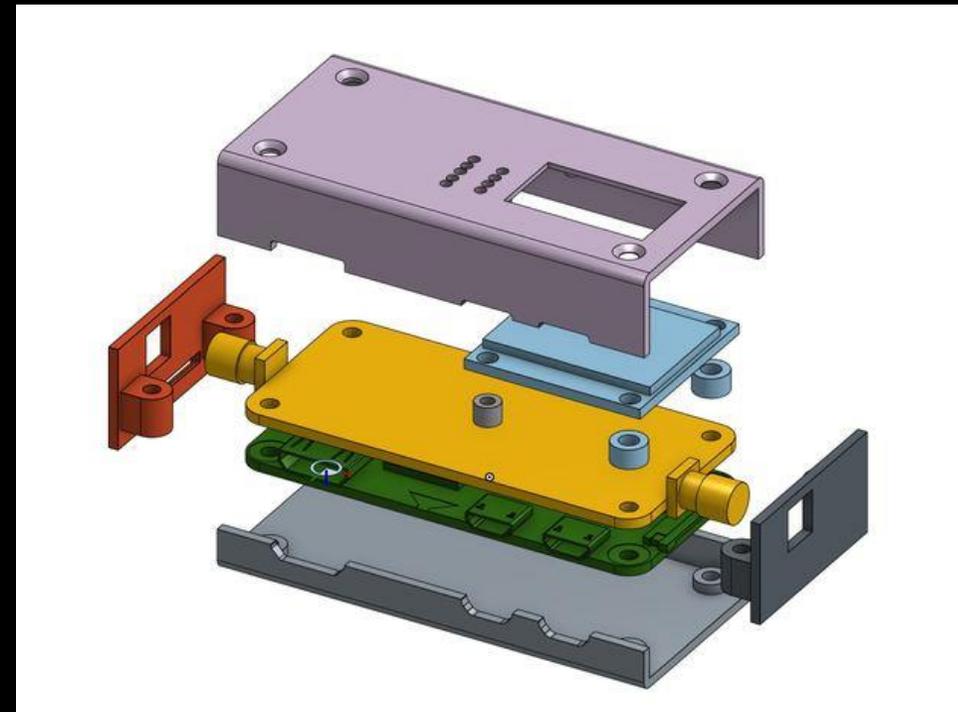


Winters Huang <bi7jta@gmail.com>



Raspberry Pi 3 B+

# Left Mini Duplexer with 3d case



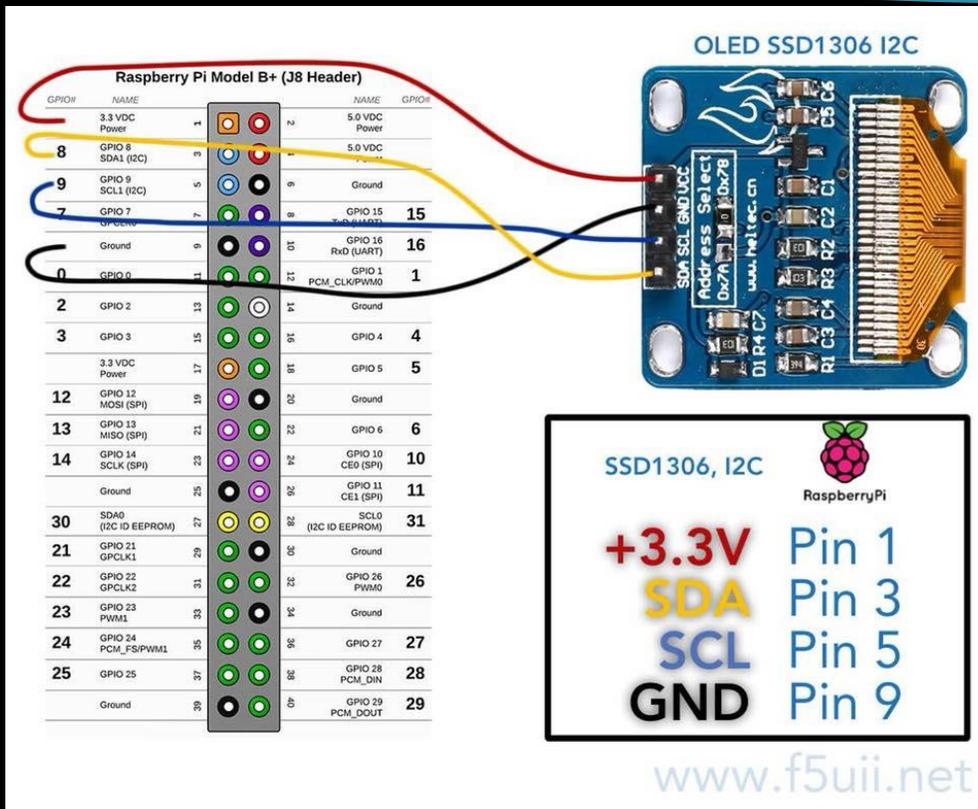
*Zum-Pi 3d Case is available at thingiverse*

# Raspberry Pi 3, 2 and B+ Case Aluminum or Plastic



[https://www.amazon.com/gp/product/B01LZ3I5R4/ref=oh\\_aui\\_detailpage\\_o09\\_s00?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B01LZ3I5R4/ref=oh_aui_detailpage_o09_s00?ie=UTF8&psc=1)

# Connecting OLED to Zumspot MUST USE GPIO PINS!



- Do NOT connect the OLED to the LCD pads on the Zumspot board.
- *The OLED is addressed from the Pi NOT the Zumspot*, the I2C pads are connected to the Zumspot processor.

# Recommended Software Tools

## HOTSPOT SETUP

1. Angry IP – <https://angryip.org/>
2. Pi-Star application - <https://www.pistar.uk/>
3. Obtain your Amateur Radio DMR ID = <https://www.radioid.net/#!>

## SD Card Formatter & Burning

1. Win32 Disk Imager  
<https://sourceforge.net/projects/win32diskimager/files/latest/download>
2. Etcher – <https://etcher.io/> image writing application for SD

# Recommended Software Tools

## TYT Radio Tools

1. *Firmware Updater for MD-UV380(GPS) Available at the TYT Website*  
<http://www.tyf888.com/?mod=download>
2. *CPS – Code Plug loader and Editor – CPS MD-UV390 Setup V 1.06 (GPS version)*

## Anytone Radio Tools

1. **AT-D878UV Programming Software(CPS), Firmware, and Driver Update 1.15**
2. **AnyTone JSON to CSV Converter**
3. <https://www.bridgecomsystems.com/pages/anytone-at-d878uv-support-page>

# How to Configure a HotSpot

- ▶ *The next few slides outline the steps to getting the HotSpot operational*
- ▶ *Download pi-star OS and create wifi .wpa file*
- ▶ *Locating the IP address of the Hotspot*
- ▶ *Use [Google Chrome](#) to access pi-star OS on the hotspot*
- ▶ *Initial configuration of the pi-star OS*
- ▶ *Testing communication between the Radio and HotSpot*
- ▶ *SSID = KVFD      PC: 123Fire!*

# Download Pi-Star

Using Google Chrome  
type in:  
<http://www.pistar.uk/>

1. SELECT DOWNLOADS
2. Select Correct Pi-Star Version

The screenshot shows the PiStar.UK website interface. At the top, there is a navigation bar with the text "PiStar.UK - Pi-Star Digital Voice Software". Below this is a sidebar menu with items: Home, Information, Help, Pi-Star Tools, BrandMeister Tools, DMR+ Tools, D-Star Tools, YSF/FCS Tools, P25 Tools, NXDN Tools, Downloads, Credits, and Links. The "Downloads" menu item is highlighted in red. A blue arrow points from the "Downloads" menu item to the "Pi-Star Downloads" section. The "Pi-Star Downloads" section contains a table of images available for download:

| Images available to Download                  |
|---|
| Pi-Star_NanoPi_Air_V3.4.16_10-Aug-2018.zip    |
| Pi-Star_NanoPi_V3.4.16_10-Aug-2018.zip        |
| Pi-Star_Odroid_XU4_V3.4.16_10-Aug-2018.zip    |
| Pi-Star_OrangePi_Zero_V3.4.16_10-Aug-2018.zip |
| Pi-Star_RPi_V3.4.16_10-Aug-2018.zip           |
| pi-star-flash-tools.zip                       |

Below the table is an "Information" section with the following text:

Remember, all you need to do, is download the zipped version of the image that is most suitable for your Pi / Single Board Computer, unzip the download, and then flash the image to your SD card (using your preferred image writing tool - see links below for some basic instructions), boot the Pi, wait 30-40 secs and then login to the admin portal in order to finish the setup your Pi-Star.

here: <http://pi-star/admin/>

Default Username: pi-star  
Default Password: raspberry

For help getting started, see this \*EXCELLENT\* video by Craig (WIMSG): [Here](#)

Windows Imaging Guide: [Here](#)  
Mac OS Imaging Guide: [Here](#)  
Linux Imaging Guide: [Here](#)

For support, please join our friendly Support Forum: <https://forum.pistar.uk/>  
or join our Facebook Support Group: <https://www.facebook.com/groups/pistar/>  
and/or make use of the Wiki: <http://wiki.pistar.uk>.

See below for a screenshot of the Pi-Star Dashboard and below that for the changelog

# Wifi Builder Tool

## Create initial WiFi wpa File

Home

Information

Help

Pi-Star Tools

BrandMeister Tools

DMR+ Tools

D-Star Tools

YSF/FCS Tools

P25 Tools

NXDN Tools

Downloads

Credits

Links

### Pi-Star WiFi Builder

This tool is used to create your "wpa\_supplicant.conf" for use with Pi-Star. All you need to do is enter your SSID (this is the name of your Wireless Network) and the matching PSK (this is the Pre-Shared Key, or Password) for this network, when you hit "Submit" the generated config file will download to your computer.

If you require a config to connect to any available open network, leave the SSID and PSK lines empty, the generated config will allow your Pi to connect to any available open network.

All you need to do then, is drop this onto the "Boot" volume of your Pi-Star SD card - this will appear as you complete writing the SD Card.

Once the Pi-Star system boots up, it will add the config file for the WiFi and reboot.

|                                       |                      |                      |                      |
|---------------------------------------|----------------------|----------------------|----------------------|
| SSID:                                 | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| PSK:                                  | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| <input type="button" value="Submit"/> |                      |                      |                      |

pi-star.uk website designed and developed by Andy Taylor (M0W0MWZ) - andy@m0w0mwz.co.uk  
© 2017-2018 M0W0MWZ. All rights reserved. All trademarks acknowledged.  
wifi\_builder.php last modified on 23/10/17 at 21:12 +0100

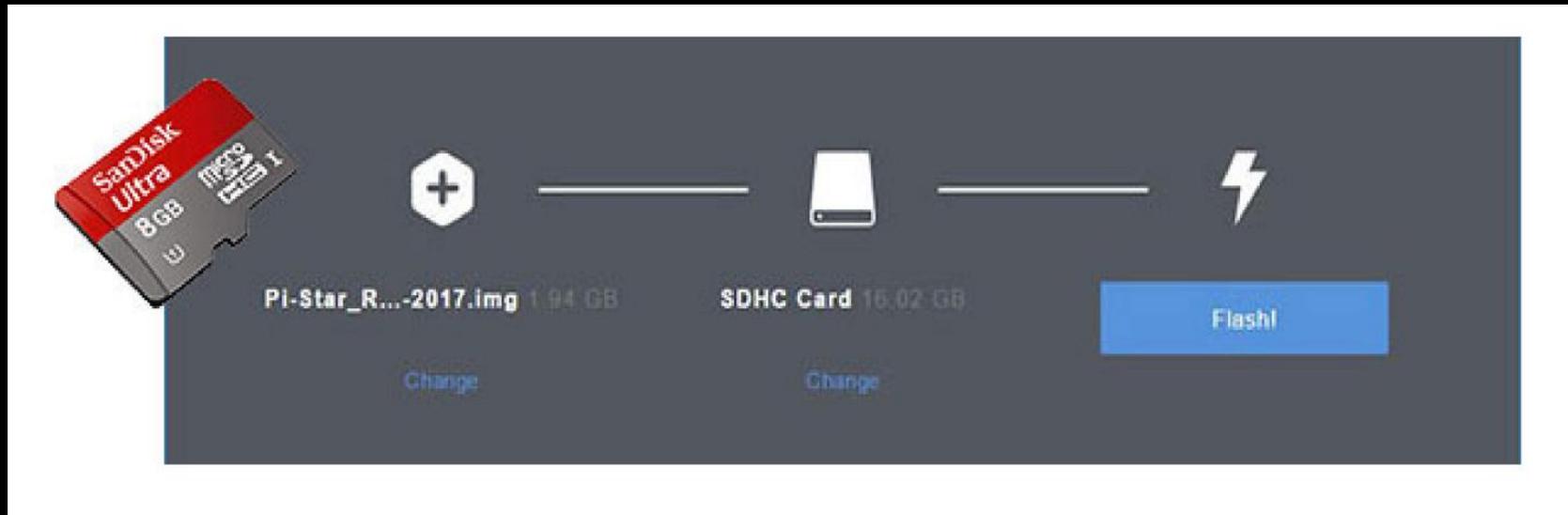
Enter Home Wifi login information or Cellphone hotspot information

## Copy Pi-Star .img to SD along with Wifi wpa File

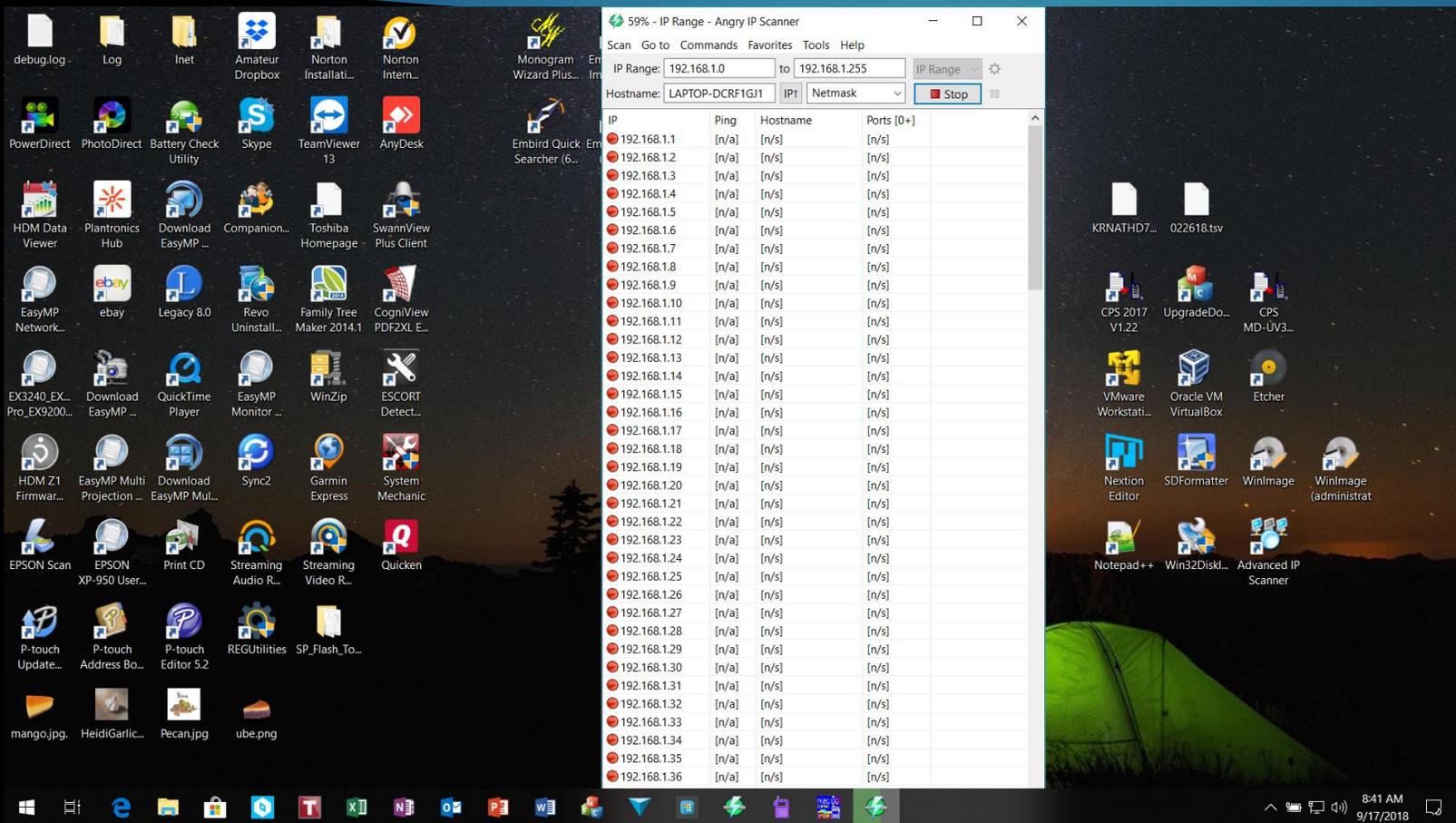
- ▶ *Un-Zip Pi-Star file to a local folder i.e. DMR Pi-Star Firmware*
- ▶ *Go to file location where .img file is located*
- ▶ *Using Win32 Disk Imager or Etcher Imager write the .img file to SD*
- ▶ *Copy the wifi file (wpa\_supplicant.conf) file to SD (boot dir)*
- ▶ *Insert the SD into the pi-star zero W board*
- ▶ *Apply 5V power to the board and wait for boot-up*
- ▶ *If using LCD screen it should reflect wifi connection IP on boot up*

# Copy Pi-Star .img file to SD

Etcher Application Example



# Run Angry IP Scanner to identify IP address



Note:

If you are at home, and are comfortable doing this, ...

Log into your router to get IP address

# Locate Pi-Star IP Address

192.168.1.99



Scan Go to Commands Favorites Tools Help

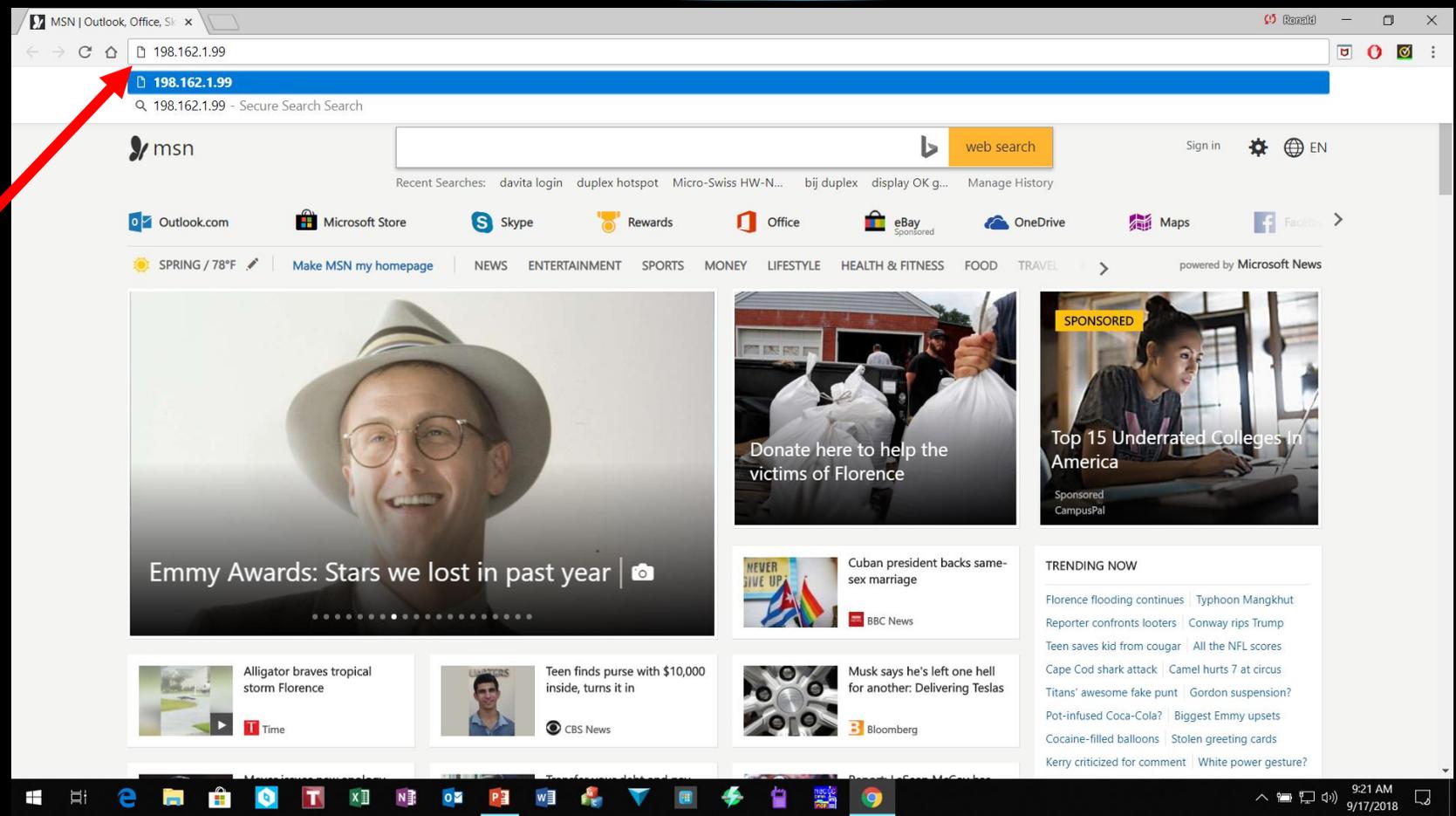
IP Range: 192.168.1.0 to 192.168.1.255 IP Range [v] [g]

Hostname: LAPTOP-DCRF1GJ1 IP↑ Netmask [v] [g] Start [g]

| IP            | Ping  | Hostname           | Ports [0+] |
|---------------|-------|--------------------|------------|
| 192.168.1.82  | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.83  | 20 ms | MyQ-681            | [n/s]      |
| 192.168.1.84  | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.85  | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.86  | 86 ms | android-ffdb482... | [n/s]      |
| 192.168.1.87  | 3 ms  | unknown94103E4...  | [n/s]      |
| 192.168.1.88  | 1 ms  | unknown6C33A9...   | [n/s]      |
| 192.168.1.89  | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.90  | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.91  | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.92  | 3 ms  | wemo               | [n/s]      |
| 192.168.1.93  | 31 ms | uverse_DVR_ETH_... | [n/s]      |
| 192.168.1.94  | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.95  | 2 ms  | unknown803773F...  | [n/s]      |
| 192.168.1.96  | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.97  | 5 ms  | EPSON731C3B        | [n/s]      |
| 192.168.1.98  | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.99  | 3 ms  | pi-star            | [n/s]      |
| 192.168.1.100 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.101 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.102 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.103 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.104 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.105 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.106 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.107 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.108 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.109 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.110 | 60 ms | SoundTouch-M-s...  | [n/s]      |
| 192.168.1.111 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.112 | [n/a] | [n/s]              | [n/s]      |
| 192.168.1.113 | 0 ms  | W550-0A9COD        | [n/s]      |
| 192.168.1.114 | [n/a] | [n/s]              | [n/s]      |

# Run Google Chrome Browser

Type in IP address from Angry IP scanner



# Login to Pi-Star now running on Hotspot

The screenshot shows a web browser window displaying the Pi-Star dashboard. A modal dialog box is open in the center, titled "Sign in", with the URL "http://192.168.1.99". The dialog contains a "Username" field with "pi-star" entered and a "Password" field with "raspberry" entered. There are "Sign in" and "Cancel" buttons. The background dashboard includes several sections:

- Modes Enabled:** A table with columns for mode and status. D-Star is enabled (DMR), YSF is enabled (P25), and YSF XMode is disabled (NXDN).
- Network Status:** A table showing network configurations for D-Star, YSF, and DMR.
- Radio Info:** Shows TX and RX frequencies (437.755000 MHz) and firmware version (MMDVM\_HS:v1.4.7).
- DMR Repeater:** Shows DMR ID (3148924), CC (1), and enabled status for TS1 and TS2.

At the bottom of the dashboard, there is a footer with copyright information: "Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MWZ) 2014-2018. 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."

**Username: pi-star**

**Password: raspberry**

# Initial Configuration Requirements

Example shows Duplex configuration

| Setting             | Value   |
|---------------------|---|
| Hostname:           | pi-star   |
| Node Callsign:      | WA6TQH  |
| CCS7/DMR ID:        | 3148924   |
| Radio Frequency RX: | 432.755.000 MHz   |
| Radio Frequency TX: | 437.755.000 MHz   |
| Latitude:           | 30.05794 degrees (positive value for North, negative for South) |
| Longitude:          | -95.59956 degrees (positive value for East, negative for West)  |
| Town:               | Tomball EM20eb  |
| Country:            | Country, US   |
| URL:                | http://www.qrz.com/db/wa6tqh                                    |
| Radio/Modem Type:   | MMDVM_HS_Dual_Hat (DB9MAT, DF2ET & DO7EN) for Pi (GPIO)         |
| Node Type:          | Private   |
| System Time Zone:   | America/Chicago   |
| Dashboard Language: | english_us  |

| Setting               | Value  |
|-----------------------|--|
| DMR Master:           | BM_United_States_3102  |
| BrandMeister Network: | Repeater Information   Edit Repeater (BrandMeister Selfcare) |
| DMR Color Code:       | 1  |
| DMR EmbeddedLConly:   | <input type="checkbox"/>                                     |
| DMR DumpTAData:       | <input checked="" type="checkbox"/>                          |

| Setting               | Value   |
|-----------------------|---------|
| Dashboard Access:     | Private |
| ircDDBGateway Remote: | Private |
| SSH Access:           | Private |
| Auto AP:              | On      |
| uPNP:                 | On      |

Call Sign  
DMR ID  
Frequency

Board Type

DMR Master  
BM\_US 3102

# Set Radio/Modem Type

Zumspot Board

Duplex Board

|                          |   |                        |    |               |    |
|--------------------------|---|------------------------|----|---------------|----|
| 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"/>  |                        |    |               |    |
| POCSAG:                  | <input type="checkbox"/>  | POCSAG Paging Features |    |               |    |
| MMDVM Display Type:      | DV-Mega on Bluestack (USB) - Single Band (70cm)<br>DV-Mega on Bluestack (USB) - Dual Band<br>GMSK Modem (USB DStarRepeater Only)<br>DV-RPTR V1 (USB)<br>DV-RPTR V2 (USB)<br>DV-RPTR V3 (USB)<br>DVAP (USB)<br>MMDVM / MMDVM_HS / Teensy / ZUM (USB)<br>STM32-DVM / MMDVM_HS - Raspberry Pi Hat (GPIO)<br>STM32-DVM (USB)<br>ZumSpot Libre (USB)<br>ZumSpot - USB Stick<br>ZumSpot - Raspberry Pi Hat (GPIO)<br>ZUM Radio-MMDVM for Pi (GPIO)<br>MicroNode Nano-Spot (Built In)<br>MicroNode Teensy (USB)<br>MMDVM F4M-GPIO (GPIO)<br>MMDVM F4M/F7M (F0DEI) for USB<br>MMDVM_HS_Hat (DB9MAT & DF2ET) for Pi (GPIO)<br>MMDVM_HS_Dual_Hat (DB9MAT, DF2ET & DO7EN) for Pi (GPIO) <b>Selected</b><br>MMDVM_HS_Dual_Hat (DB9MAT, DF2ET & DO7EN) for Pi (GPIO) |                        |    |               |    |
| <b>Setting</b>           |   |                        |    |               |    |
| Hostname:                |   |                        |    |               |    |
| Node Callsign:           |   |                        |    |               |    |
| CCS7/DMR ID:             |   |                        |    |               |    |
| Radio Frequency RX:      |   |                        |    |               |    |
| Radio Frequency TX:      |   |                        |    |               |    |
| Latitude:                |   |                        |    |               |    |
| Longitude:               |   |                        |    |               |    |
| Town:                    |   |                        |    |               |    |
| Country:                 |   |                        |    |               |    |
| URL:                     |   |                        |    |               |    |
| Radio/Modem Type:        | MMDVM_HS_Dual_Hat (DB9MAT, DF2ET & DO7EN) for Pi (GPIO)   |                        |    |               |    |
| Node Type:               | <input type="radio"/> Private <input checked="" type="radio"/> Public   |                        |    |               |    |
| System Time Zone:        | America/Chicago   |                        |    |               |    |
| Dashboard Language:      | english_us  |                        |    |               |    |
| Apply Changes            |   |                        |    |               |    |
| <b>DMR Configuration</b> |   |                        |    |               |    |
| <b>Setting</b>           |   |                        |    |               |    |
| <b>Value</b>             |   |                        |    |               |    |
| DMR Master:              | BM_United_States_3102   |                        |    |               |    |
| BrandMeister Network:    | Repeater Information   Edit Repeater (BrandMeister Selfcare)  |                        |    |               |    |
| DMR Color Code:          | 1   |                        |    |               |    |
| DMR EmbeddedLCOnly:      | <input type="checkbox"/>  |                        |    |               |    |

25



# Activate Function Settings

Activate Functions

OLED settings:  
MMDVM Display: OLED.

Port: /dev/ttyAMA0

Layout: ON7LDS

Settings shown are  
For Nexton LCD

admin/configure.php

IE DSTAR - User Log In Shark Forum Login Dashboard | BrandMe openSPOT beta firmw Imported From Edge T-Mobile ID | Login

Pi-Star:3.4.11 / Dashboard: 20180902

## 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  | 4.9.80-v7+ | Pi 3 Model B (1GB) - Sony, UK | 0.15 / 0.08 / 0.03 | 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 type="radio"/> Simplex Node <input checked="" 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"/>   |
| POCSAG:             | <input type="checkbox"/> POCSAG Paging Features                      |
| MMDVM Display Type: | Nextion Port: Modem Nextion Layout: ON7LDS L2                        |

Apply Changes

### General Configuration

| Setting             | Value                                      |
|---------------------|--|
| Hostname:           | pi-star Do not add suffixes such as .local |
| Node Callsign:      | WA6TQH                                     |
| CCS7/DMR ID:        | 3148924                                    |
| Radio Frequency RX: | 432.755.000 MHz                            |

# View Activity - Dashboard

WA6TQH - Digital Voice | x Ronald

Not secure | 192.168.1.99

Apps MSN.com - Hotmail, Imported From IE DSTAR - User Log In Shark Forum Login Dashboard | BrandM openSPOT beta firm Imported From Edge T-Mobile ID | Login Digital Radio Amateur Other bookmarks

Hostname: pi-star Pi-Star:3.4.11 / Dashboard: 20180902

## Pi-Star Digital Voice Dashboard for WA6TQH

Dashboard | Admin | Configuration

| Modes Enabled |         |
|---------------|---------|
| D-Star Net    | DMR Net |
| YSF           | P25     |
| YSF XMode     | NXDN    |

| Gateway Activity  |            |          |         |     |        |      |      |  |  |
|-------------------|------------|----------|---------|-----|--------|------|------|--|--|
| Time (CDT)        | Mode       | CallSign | Target  | Src | Dur(s) | Loss | BER  |  |  |
| 07:12:59 Sep 17th | DMR Slot 2 | KK4QBN   | TG 311  | Net | 1.9    | 56%  | 0.0% |  |  |
| 07:12:48 Sep 17th | DMR Slot 1 | WD4NBN   | TG 3100 | Net | 1.6    | 0%   | 0.0% |  |  |

| Local RF Activity |      |          |        |     |        |     |      |
|-------------------|------|----------|--------|-----|--------|-----|------|
| Time (CDT)        | Mode | CallSign | Target | Src | Dur(s) | BER | RSSI |

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

| Radio Info |                 |
|------------|-----------------|
| Trx        | HS-128-016      |
| Tx         | 437.755000 MHz  |
| Rx         | 432.755000 MHz  |
| Fk         | MMDVM_HS_v1.4.7 |

| DMR Repeater     |         |
|------------------|---------|
| DMR ID           | 3148924 |
| DMR CC           | 1       |
| TS1              | enabled |
| TG 3100/No Ref   |         |
| TS2              | enabled |
| TG 311/No Ref    |         |
| DMR Master       |         |
| BM United States | ..      |

**View communications activity here.  
Simplex Hotspot TS2 only  
Duplex TS1 & TS2**

Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MW2) 2014-2018.  
ircDDBGateway Dashboard by Hans-J. Barthen (DL5DI),  
MMDVMHost developed by Kim Habel (D6SWH).  
Need help? Click here for the Facebook Group  
or Click here to join the Support Forum  
Get your copy of Pi-Star from here.

Windows taskbar: 7:15 AM 9/17/2018

# Talk Group Visibility

- ▶ *In practical terms you are limited to the slots available.*
- ▶ *If you have a duplex hot spot, you have two talk groups available at a time,*
  - ▶ *1 on slot 1 and 1 on slot 2.*
- ▶ *A simplex hotspot 1 talk group / reflector only.*
- ▶ *Anyone listening to the transmission can hear any of the transmission provided that they have been made dynamically available or are fixed.*
- ▶ *You won't be able to hear two talk groups active on the same slot, unless the dynamic timeout is reached and there more fixed groups available on the slots, in other words, it's first come first served*

## Talk Group Visibility (cont'd)

- ▶ *There are no abilities for multiple radio's listen to multiple TG's.*
- ▶ *With a simplex board setup, whatever TG you are connected to will be the one transmitting.*
- ▶ *If you have multiple fixed static groups you could use a radio with an Rx channel for each static TG, but again only one can transmit at any given time, so you might miss an over or two on another radio.*
- ▶ *With a duplex MMDVM board you have the use of two timeslots which doubles the amount you could listen too.*

# ADJUSTING HOTSPOT FREQUENCY OFFSET

*PROCEDURE TO LOWER BIT  
ERROR RATE (BER)*

# Relationship of Radio to Hotspot

## BER Fine Tune

- ▶ *Try moving your radio farther from the hot spot.*
  - ▶ *Mine works best 10 to 15 feet from the hotspot.*
- ▶ *You may also have an issue with the quality of your wi-fi signal.*
- ▶ *Be sure to set your radio power output to LOW POWER!*

# Admin Page

## Fine tune BER adjustments

Hostname: pi-star Pi-Star:3.4.11 / Dashboard: 20180902

### Pi-Star Digital Voice Dashboard for WA6TQH

Dashboard | Admin | Live Logs | Power | Update | Configuration

#### Gateway Hardware Information

| Hostname | Kernel     | Platform                      | CPU Load           | CPU Temp         |
|----------|------------|-------------------------------|--------------------|------------------|
| pi-star  | 4.9.88-v7+ | Pi 3 Model B (1GB) - Sony, UK | 0.17 / 0.08 / 0.02 | 39.7°C / 103.5°F |

#### Service Status

| MMDV/Host      | DMRGateway    | YSFGateway | YSFPanrot       | P25Gateway    | P25Panrot     |
|----------------|---------------|------------|-----------------|---------------|---------------|
| D5StarRepeater | IncDDBGateway | TimeServer | PIStar-Watchdog | PIStar-Remote | PIStar-Keeper |

#### Modes Enabled

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

#### Active BrandMeister Connections

| BrandMeister Master   | Default Ref | Timeout(s) | Active Ref | Static Tgs | Dynamic Tgs |
|-----------------------|-------------|------------|------------|------------|-------------|
| BM United States 3102 | Not Set     | Not Set    | None       | None       | None        |

#### BrandMeister Manager

| Tools                     | Active Ref  | Link / Unlink  | Action           |
|---------------------------|---|--|------------------|
| Drop QSO Drop All Dynamic | None  | <input type="radio"/> Link <input checked="" type="radio"/> UnLink | Modify Reflector |
| Static Talkgroup          | Slot  | Add / Remove   | Action           |
|                           | <input type="radio"/> TS1 <input type="radio"/> TS2 | <input type="radio"/> Add <input type="radio"/> Delete             | Modify Static    |

#### Gateway Activity

| Time (CDT)        | Mode       | CallSign | Target  | Src | Dur(s) | Loss | BER  |
|-------------------|------------|----------|---------|-----|--------|------|------|
| 07:12:59 Sep 17th | DMR Slot 2 | KK4QBN   | TG 311  | Net | 1.9    | 56%  | 0.0% |
| 07:12:48 Sep 17th | DMR Slot 1 | WD4NBN   | TG 3100 | Net | 1.6    | 0%   | 0.0% |

#### Local RF Activity

| Time (CDT) | Mode | CallSign | Target | Src | Dur(s) | BER | RSSI |
|------------|------|----------|--------|-----|--------|-----|------|
|------------|------|----------|--------|-----|--------|-----|------|

#### Radio Info

|    |                 |
|----|-----------------|
| Tx | 437.755000 MHz  |
| Rx | 432.755000 MHz  |
| FW | MMDVM_HS:v1.4.7 |

#### DMR Repeater

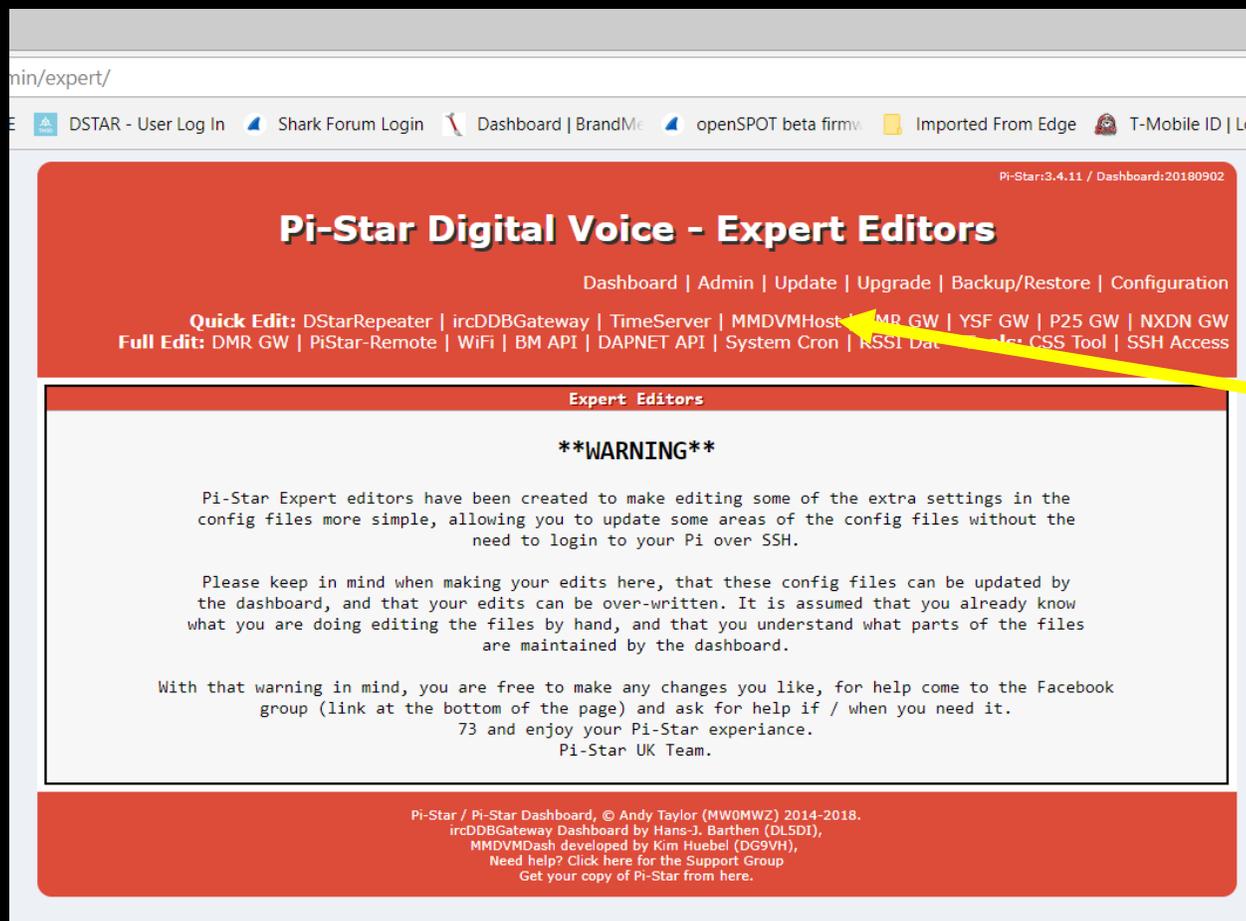
|                     |         |
|---------------------|---------|
| DMR ID              | 3148924 |
| DMR CC              | 1       |
| TS1                 | enabled |
| TG 3100/No Ref      |         |
| TS2                 | enabled |
| TG 311/No Ref       |         |
| DMR Master          |         |
| BM United States .. |         |

**Updates To current pi-star rev**

**RSSI value represent signal strength. i.e. S9+46**

**The reasonable goal is BER <= 1%. FINE TUNING FOR LOW BER (BIT ERROR RATE) Adjusting the RX & TX Offset: Testing with your radio. Adjust in small steps (+/- 10) until you achieve the optimal BER**

# Expert Editor



min/expert/

DSTAR - User Log In Shark Forum Login Dashboard | BrandMe openSPOT beta firmw Imported From Edge T-Mobile ID | Lo

Pi-Star:3.4.11 / Dashboard:20180902

## Pi-Star Digital Voice - Expert Editors

Dashboard | Admin | Update | Upgrade | Backup/Restore | Configuration

**Quick Edit:** DStarRepeater | ircDDBGateway | TimeServer | **MMDVMHost** | MR\_GW | YSF GW | P25 GW | NXDN GW  
**Full Edit:** DMR GW | PiStar-Remote | WiFi | BM API | DAPNET API | System Cron | RSSI Data | CSS Tool | SSH Access

### Expert Editors

**\*\*WARNING\*\***

Pi-Star Expert editors have been created to make editing some of the extra settings in the config files more simple, allowing you to update some areas of the config files without the need to login to your Pi over SSH.

Please keep in mind when making your edits here, that these config files can be updated by the dashboard, and that your edits can be over-written. It is assumed that you already know what you are doing editing the files by hand, and that you understand what parts of the files are maintained by the dashboard.

With that warning in mind, you are free to make any changes you like, for help come to the Facebook group (link at the bottom of the page) and ask for help if / when you need it.  
73 and enjoy your Pi-Star experience.  
Pi-Star UK Team.

Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MWZ) 2014-2018.  
ircDDBGateway Dashboard by Hans-J. Barthen (DLSDI),  
MMDVMDash developed by Kim Huebel (DG9VH),  
Need help? Click here for the Support Group  
Get your copy of Pi-Star from here.

Select  
MMDVMhost

# Expert Editors Page

Pi-Star - Digital Voice Data

Not secure | 192.168.1.99/admin/expert/edit\_mmdvmhost.php

Apps | MSN.com - Hotmail | Imported From IE | DSTAR - User Log In | Shark Forum Login | Dashboard | BrandMe | openSPOT beta firmw | Imported From Edge | T-Mobile ID | Login | Digital Radio Amateur | Other bookmarks

Pi-Star 3.4.11 / Dashboard:20180902

## Pi-Star Digital Voice - Expert Editors

Dashboard | Admin | Update | Upgrade | Backup/Restore | Configuration

**Quick Edit:** DStarRepeater | ircDDBGateway | TimeServer | MMDVMHost | DMR GW | YSF GW | P25 GW | NXDN GW  
**Full Edit:** DMR GW | PiStar-Remote | WiFi | BM API | DAPNET API | System Cron | RSSI Dat | **Tools:** CSS Tool | SSH Access

| General     |         |
|-------------|---------|
| CallSign    | WA6TQH  |
| Id          | 3148924 |
| Timeout     | 240     |
| Duplex      | 1       |
| RFModeHang  | 300     |
| NetModeHang | 300     |
| Display     | Nextion |
| Daemon      | 1       |

Apply Changes

| Info        |                              |
|-------------|------------------------------|
| RXFrequency | 432755000                    |
| TXFrequency | 437755000                    |
| Power       | 1                            |
| Latitude    | 30.05794                     |
| Longitude   | -95.59956                    |
| Height      | 0                            |
| Location    | Tomball EM20eb               |
| Description | Country, US                  |
| URL         | http://www.qrz.com/db/wa6tqh |

Apply Changes

| Log          |   |
|--------------|---|
| DisplayLevel | 0 |
| FileLevel    | 2 |

Scroll Down



# Setting Frequency Offset

The RXOffset and TXOffset are in Hz

min/expert/edit\_mmdvmhost.php

DSTAR - User Log In Shark Forum Login Dashboard | BrandMe openSPOT beta firmw Imported From Edge T-Mobile ID | Lo

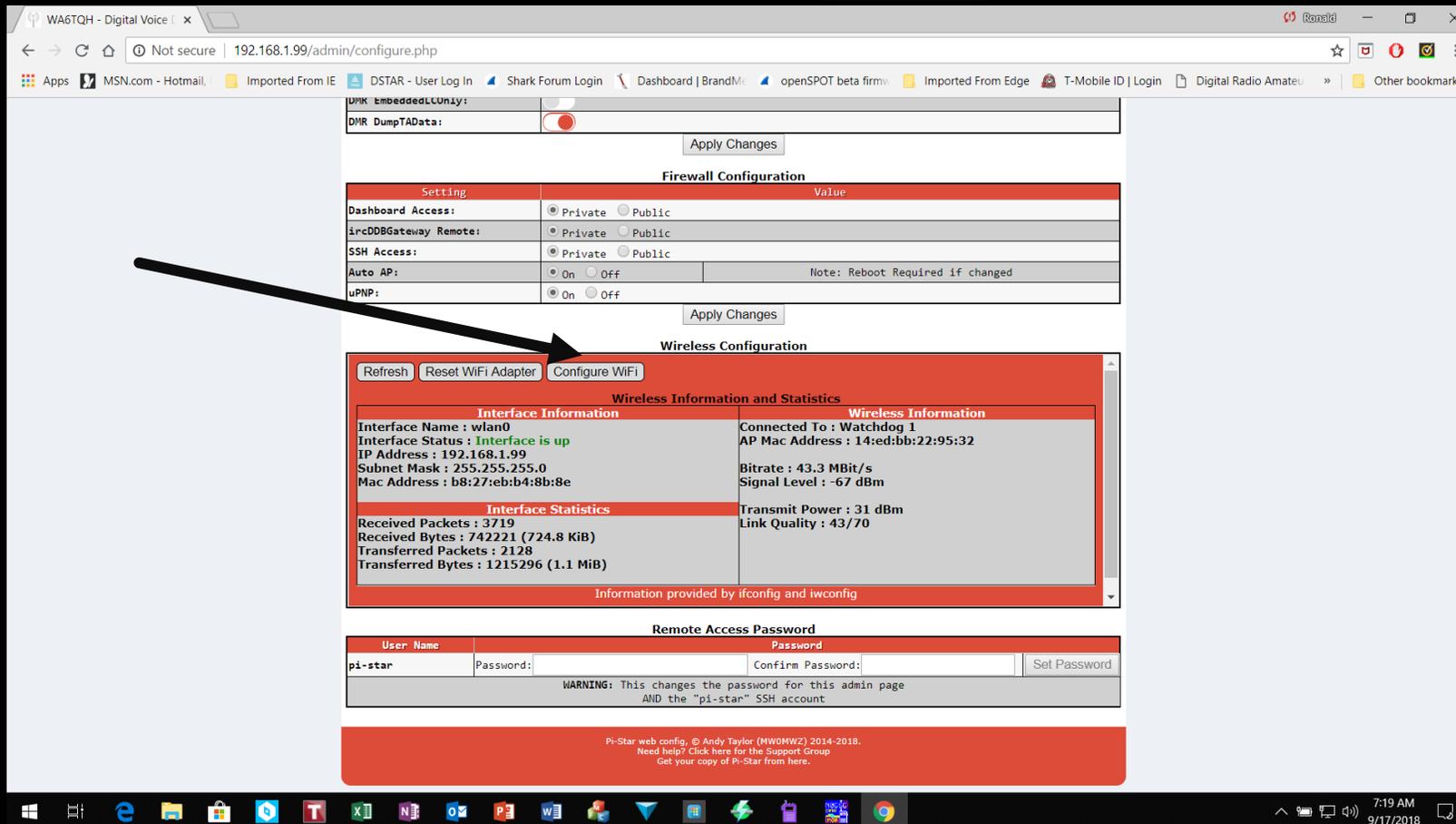
|               |                           |
|---------------|---------------------------|
| Description   | Country, US               |
| URL           | http://www.qrz.com/db/wa6 |
| Apply Changes |                           |
| Log           |                           |
| DisplayLevel  | 0                         |
| FileLevel     | 2                         |
| FilePath      | /var/log/pi-star          |
| FileRoot      | MMDVM                     |
| Apply Changes |                           |
| CW Id         |                           |
| Enable        | 0                         |
| Time          | 10                        |
| Apply Changes |                           |
| Modem         |                           |
| Port          | /dev/ttyAMA0              |
| TXInvert      | 1                         |
| RXInvert      | 0                         |
| PTTInvert     | 0                         |
| TXDelay       | 100                       |
| RXOffset      | 0                         |
| TXOffset      | 0                         |
| DMRDelay      | 0                         |
| RXLevel       | 50                        |
| TXLevel       | 50                        |

Typical settings are  
+/- 100 - 150  
TX & RX Offset

Minor Hz shift is  
supposed to  
reduce the BER%

# Setup WiFi Login Information

## Select configuration page

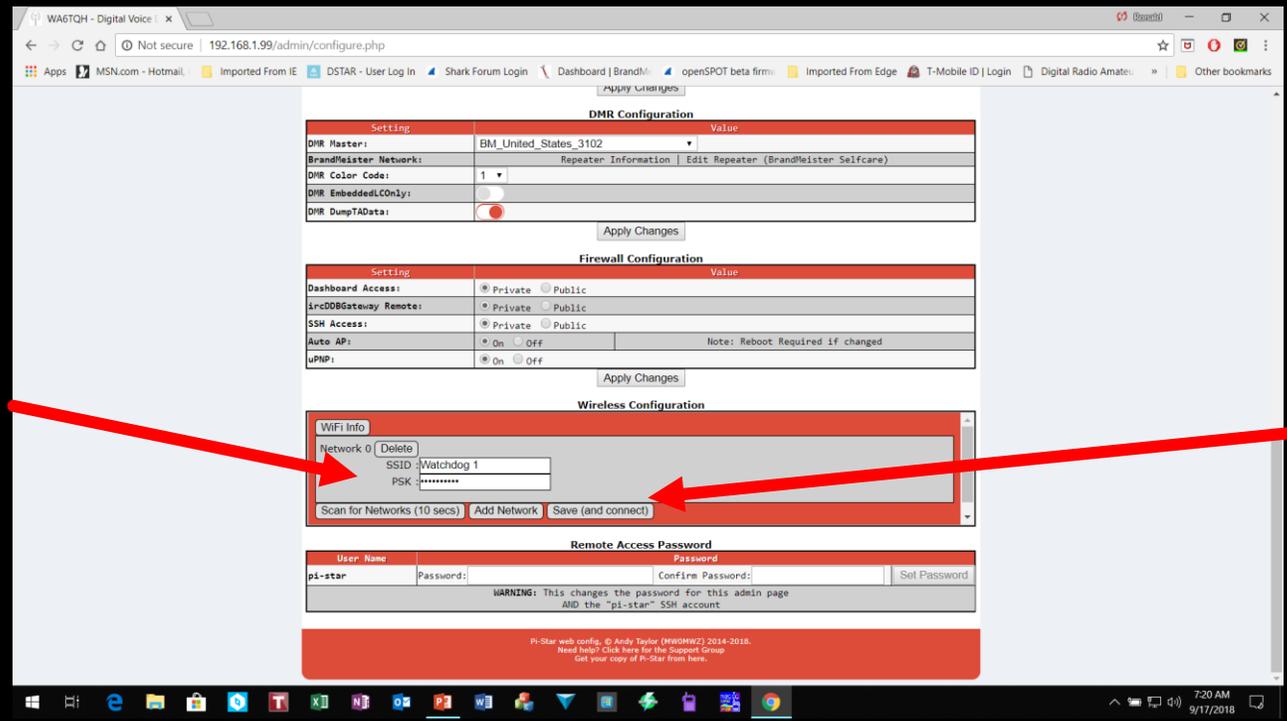


The screenshot displays the Pi-Star web configuration interface. The browser address bar shows the URL `192.168.1.99/admin/configure.php`. The page is divided into several sections:

- Firewall Configuration:** A table with columns for Setting and Value. It includes options for Dashboard Access, ircDDBGateway Remote, SSH Access, Auto AP, and uPNP. An "Apply Changes" button is located below the table.
- Wireless Configuration:** A section with buttons for "Refresh", "Reset WiFi Adapter", and "Configure WiFi". Below these buttons is a "Wireless Information and Statistics" box containing:
  - Interface Information:** Interface Name: wlan0, Interface Status: Interface is up, IP Address: 192.168.1.99, Subnet Mask: 255.255.255.0, Mac Address: b8:27:eb:b4:8b:8e.
  - Wireless Information:** Connected To: Watchdog 1, AP Mac Address: 14:ed:bb:22:95:32, Bitrate: 43.3 MBit/s, Signal Level: -67 dBm.
  - Interface Statistics:** Received Packets: 3719, Received Bytes: 742221 (724.8 KiB), Transferred Packets: 2128, Transferred Bytes: 1215296 (1.1 MiB).Information provided by ifconfig and iwconfig.
- Remote Access Password:** A form with fields for User Name (pre-filled with "pi-star"), Password, and Confirm Password, and a "Set Password" button. A warning message states: "WARNING: This changes the password for this admin page AND the 'pi-star' SSH account".

At the bottom of the page, there is a footer: "Pi-Star web config, © Andy Taylor (M0WHWZ) 2014-2018. Need help? Click here for the Support Group. Get your copy of Pi-Star from here."

# Input WiFi access Information



Input Home wifi login information or cell phone hotspot login

Must SAVE configuration and reboot to take affect

# Login to Brandmeister Network

## Manage Static TG within pi-star

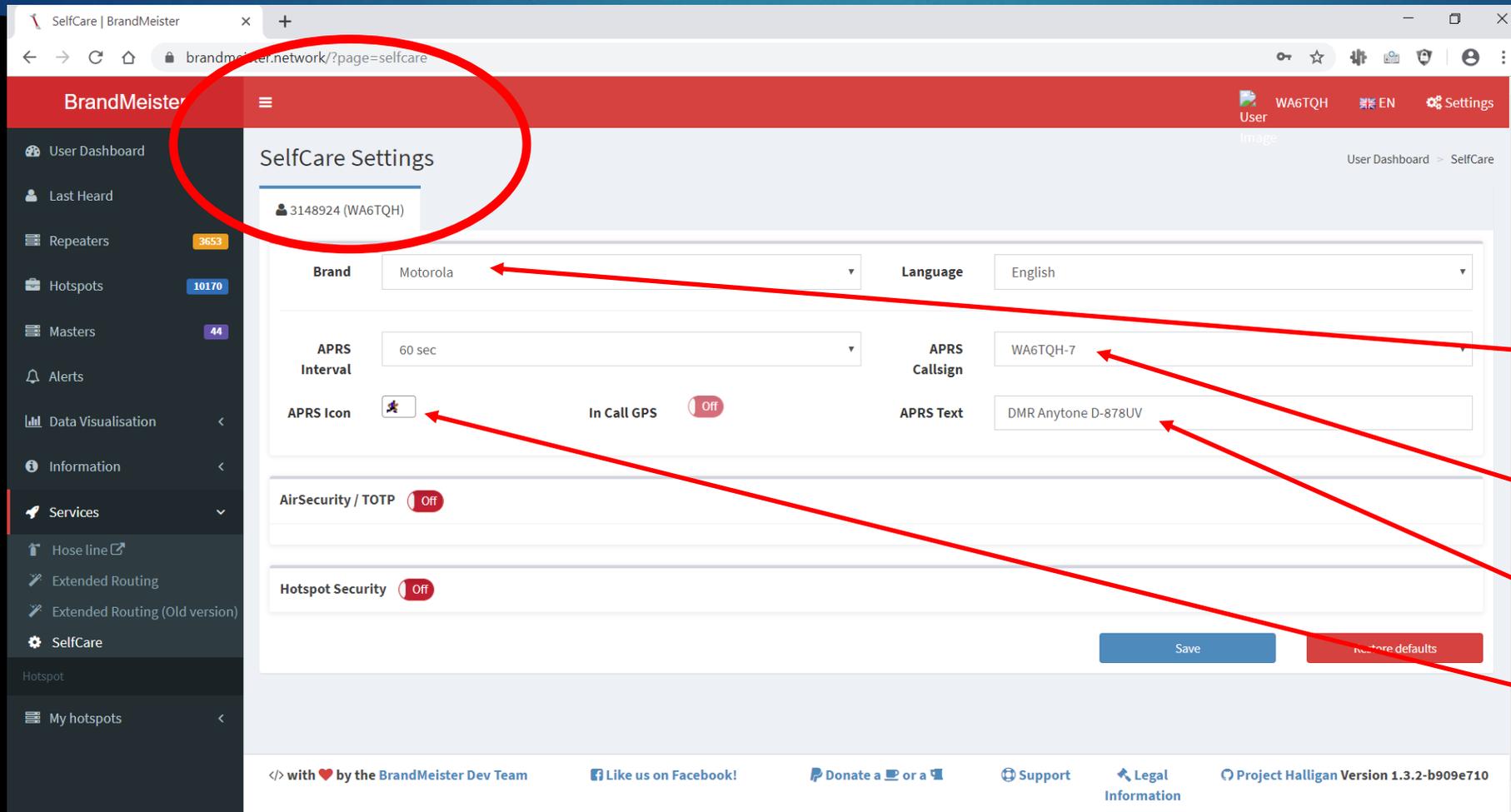
The screenshot displays the BrandMeister User Dashboard. The top navigation bar includes 'User', 'WA6TQH', 'EN', and 'Settings'. The main dashboard area features several statistics cards: REPEATERS (2393), HOTSPOTS (7284), MASTERS (43), and VOICE CALLS (10). Below these are three circular gauges for 'Repeater in RX' (19), 'Repeater in TX' (499), and 'External calls' (19). A world map is visible on the right side. A red callout box highlights the 'User Image' and 'WA6TQH' area, with a red arrow pointing to the 'Profile Settings' option in the dropdown menu. Another red arrow points to the 'WA6TQH' call sign in the top right navigation bar.

Login to Brandmeister.  
<https://brandmeister.network/> If you have not setup your static TG yet do so. Make any other adjustments.

Then click on your call sign in the top right hand side.

Choose Profile settings

# Brandmeister – APRS Setting



To Activate APRS select SelfCare Settings – set the following parameters:

Brand: Motorola

APRS Callsign i.e. Your Call-7

APRS Text:

APRS Icon:

SAVE Settings

# Manage your static TG within Pi-Star

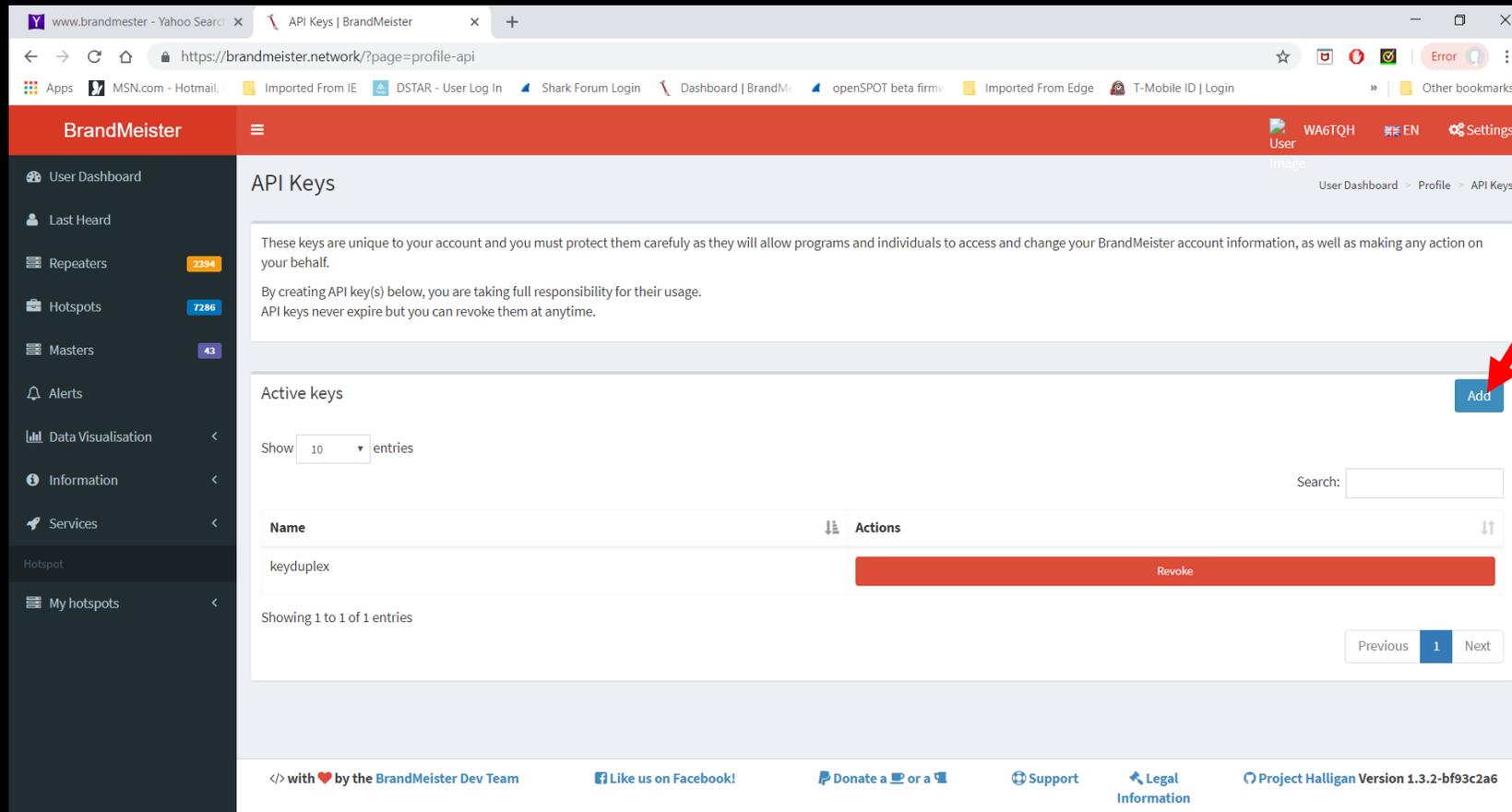
The screenshot shows the BrandMeister user profile edit page for user WA6TQH. The page is in 'Edit mode' and contains the following sections:

- Information:** Name: Ronald L, Email Confirmed: NO, Created On: 2017-02-02 16:40:17, Last Edit: TODO, Last Login: TODO.
- Profile Settings:** Email Address: ronm1@att.net. A 'Save Changes' button is located below this section.
- Security Settings:** Password, Confirm Password, and an 'Update Password' button. A blue button labeled 'API Keys' is located to the right of this section, highlighted by a red arrow.

The footer of the page includes: with ❤ by the BrandMeister Dev Team, Like us on Facebook!, Donate a ☕ or a 🍷, Support, Legal Information, and Project Halligan Version 1.3.2-bf93c2a6.

On this screen choose API Keys.

# Generate API Keys



BrandMeister

API Keys

These keys are unique to your account and you must protect them carefully as they will allow programs and individuals to access and change your BrandMeister account information, as well as making any action on your behalf.

By creating API key(s) below, you are taking full responsibility for their usage. API keys never expire but you can revoke them at anytime.

Active keys

Show 10 entries

Search:

| Name      | Actions |
|-----------|---------|
| keyduplex | Revoke  |

Showing 1 to 1 of 1 entries

Previous 1 Next

with ❤ by the BrandMeister Dev Team

Like us on Facebook!

Donate a ☕ or a 🍷

Support

Legal Information

Project Halligan Version 1.3.2-bf93c2a6

Click on Add.

You will be asked for a name for this key

Then you will get a pop up that shows the key and a QR code. Highlight and copy the key.

I would paste this into a text file and name it for safe keeping.

# Select Expert Editor

admin/expert/edit\_mmdvmhost.php

Dashboard | Admin | Update | Upgrade | Backup/Restore | Configuration

**Quick Edit:** DStarRepeater | ircDDBGateway | TimeServer | MMDVMHost | DMR GW | YSF GW | P25 GW | NXDN GW  
**Full Edit:** DMR GW | PiStar-Remote | WiFi | BM API | ...

**General**

|             |         |
|-------------|---------|
| Callsign    | WA6TQH  |
| Id          | 3148924 |
| Timeout     | 240     |
| Duplex      | 1       |
| RFModeHang  | 300     |
| NetModeHang | 300     |
| Display     | Nextion |
| Daemon      | 1       |

Apply Changes

**Info**

|             |           |
|-------------|-----------|
| RXFrequency | 432755000 |
|-------------|-----------|

In Pi-Star goto "Expert Editors" and choose "BM API"

# Add API Key

admin/expert/fulledit\_bmapikey.php

DSTAR - User Log In | Shark Forum Login | Dashboard | BrandMe | openSPOT beta firmw | Imported From Edge | T-Mobile ID

Pi-Star:3.4.11 / Dashboard:20180902

## Pi-Star Digital Voice - Expert Editors

Dashboard | Admin | Update | Upgrade | Backup/Restore | Configuration

**Quick Edit:** DStarRepeater | ircDDBGateway | TimeServer | MMDVMHost | DMR GW | YSF GW | P25 GW | NXDN GW  
**Full Edit:** DMR GW | PiStar-Remote | WiFi | BM API | DAPNET API | System Cron | RSSI Dat **Tools:** CSS Tool | SSH Access

| key    |  |
|--------|--|
| apikey | b\$50MLR3IPPFu1.p42tJVbtirf1GSTz1QE1znSD2FpI7KGwOJZuB7YTzbbc1<br>2L2Sn3pLW00yptG779WQ6oodkfNvqZwsIyi2CIOvIz15@Hc6R6XXui80xVgY<br>SNxjGzV |

Apply Changes

Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MWZ) 2014-2018.  
ircDDBGateway Dashboard by Hans-J. Barthen (DL5DI),  
MMDVMDash developed by Kim Huebel (DG9VH),  
Need help? Click here for the Support Group  
Get your copy of Pi-Star from here.

Paste your key into the api key and click on Apply Changes.

# Brandmeister Static TG Manager

Here you can add or delete TG. Action here will make changes in Brandmeister Network

Pi-Star:3.4.11 / Dashboard: 20180902

## Star Digital Voice Dashboard for WA6TQH

Dashboard | Admin | Live Logs | Power | Update | Configuration

### Gateway Hardware Information

| Kernel     | Platform                      | CPU Load           | CPU Temp         |
|------------|-------------------------------|--------------------|------------------|
| 4.9.80-v7+ | Pi 3 Model B (1GB) - Sony, UK | 0.19 / 0.16 / 0.08 | 40.2°C / 104.4°F |

### Service Status

|               |            |                 |               |               |
|---------------|------------|-----------------|---------------|---------------|
| DMRGateway    | YSFGateway | YSFPparrot      | P25Gateway    | P25Parrot     |
| ircDDBGateway | TimeServer | PiStar-Watchdog | PiStar-Remote | PiStar-Keeper |

### Active BrandMeister Connections

| BrandMeister Master   | Default Ref | Timeout(s) | Active Ref | Static TGs  | Dynamic TGs |
|-----------------------|-------------|------------|------------|---|-------------|
| BM United States 3102 | REF0        | 0(s)       | None       | TG0(2) TG93(1)<br>TG310(1)<br>TG311(2)<br>TG312(2)<br>TG313(2)<br>TG314(2)<br>TG315(2)<br>TG316(2)<br>TG317(2)<br>TG318(2)<br>TG319(2)<br>TG3100(1)<br>TG31489(2)<br>TG98006(2) | None        |

### BrandMeister Manager

|   |   |  |  |   |
|---|---|--|--|---|
| <b>Tools</b>                            |   | <b>Active Ref</b>  | <b>Link / Unlink</b>   | <b>Action</b>                                   |
| <input type="button" value="Drop QSO"/> | <input type="button" value="Drop All Dynamic"/> | None ▾   | <input type="radio"/> Link <input checked="" type="radio"/> UnLink | <input type="button" value="Modify Reflector"/> |
| <b>Static Talkgroup</b>                 |   | <b>Slot</b>  | <b>Add / Remove</b>  | <b>Action</b>                                   |
| <input type="text"/>                    |   | <input type="radio"/> TS1 <input checked="" type="radio"/> TS2 | <input checked="" type="radio"/> Add <input type="radio"/> Delete  | <input type="button" value="Modify Static"/>    |

### Gateway Activity

| Time (CDT)        | Mode       | Callsign | Target | Src | Dur(s) | Loss | BER  |
|-------------------|------------|----------|--------|-----|--------|------|------|
| 19:19:44 Sep 22nd | DMR Slot 1 | K8DET    | TG 310 | Net | TX     |      |      |
| 19:19:31 Sep 22nd | DMR Slot 1 | N5THL    | TG 310 | Net | 10.4   | 1%   | 0.0% |
| 19:19:20 Sep 22nd | DMR Slot 1 | KB6LED   | TG 310 | Net | 0.5    | 0%   | 0.0% |
| 19:19:19 Sep 22nd | DMR Slot 1 | VE3UC    | TG 310 | Net | 0.5    | 0%   | 0.0% |
| 19:19:14 Sep 22nd | DMR Slot 1 | KE6YGM   | TG 310 | Net | 0.5    | 0%   | 0.0% |

44

Select the ADMIN page

## DMR Technical Assistance

*If you need any help outside of the workshop sessions, you can find help here:*

- ▶ *Contact Walter Holmes K5WH on ZOOM.*
- ▶ *Amsat Talk Group – (98006) – Access this Amsat TG using your Hotspot*
- ▶ *NARS Talk Group – (3146211) Access this TG using your Hotspot*
- ▶ *Klein Local DMR Repeater – Direct Access*
- ▶ *Cypress Local DMR Repeater – Direct Access*
- ▶ *To use the local DMR repeater do the following:*
  - ▶ *Go to ZONE – Select Zone List – Select Klein TX – Select NARS TG*
  - ▶ *Go to ZONE – Select Zone List – Select Cypress TX – Select NARS TG*

# Questions

*If you have your Hotspot & Radio with you, we have a couple of laptop Computers in the back of the room with Elmers to help you with hotspot or radio programming needs.*