



MMDVM Duplex Hotspot Support DMR User Manual

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MMDVM Duplex Hotspot Support DMR



This guide just for the Products made by BI7JTA, Synchronous update www.youtube.com/winters-huang , www.bi7jta.org

Overview



Prepare

NOTE:

I have configuration your hotspot with default settings, if your purchase is from BI7JTA provider, you do not need to flash SD card .

Hardware

MMDVM Duplex Hat with Antennas,
Raspberry Pi 3B, 4B, ZeroW,
SD Card/ TF card 8G/16G,
Nextion Display, OLED (Option)
Power supply 5V2A

Software

Pi-Star OS (Raspbian integration MMDVMHost, Serial of DMR/YSF/P25/D-STAR/NXDN/POCSAG gateway services , Pi-Star Dashboard),
LAN IP devices address scan tools:

Fing , for iOS, Android, www.fing.com

IP Scan tools, for MAC OSX <https://apps.apple.com/cn/app/lanscan/id472226235?mt=12>

Advanced_IP_Scanner , for Microsoft Windows <http://www.advanced-ip-scanner.com/>

SDFormatter v4, for format your SD Card, just for install a new OS,

win32diskimager, just for install a new OS,

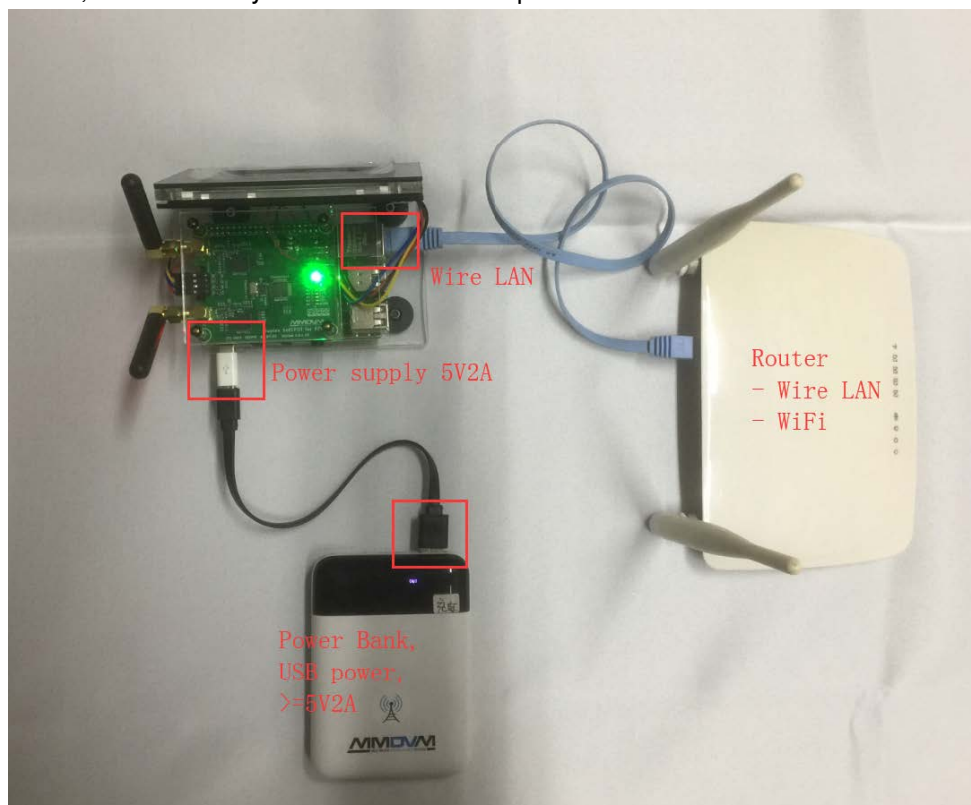
Web browser, Mobile default browser, Chrome, Firefox for Windows, Safari, Not support Microsoft IE



Step 1 Hardware connection

Use 5V2A Power supply, any MicroUSB Android power supply wire, but must stable , otherwise the power will affect your TX spectrum, cause high BER% .

Wire LAN recommend, the first time you use MMDVM hotspot.



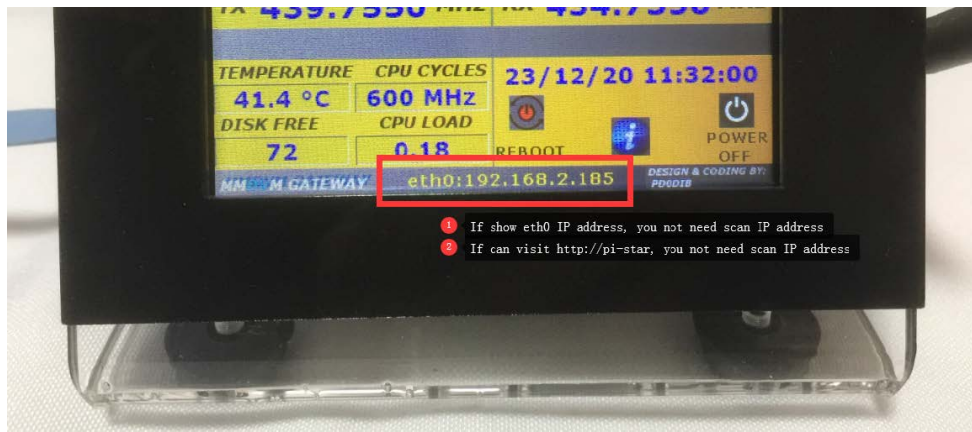
Step 2 Network Configuration

There are 3 methods to make MMDVM hotspot connect to internet

1, Wire LAN (Simple and Recommend)

NOTE:

- 1, This method cannot use in your Raspberry Pi ZW, not have LAN interface, Unless you buy a USB-LAN adapter.
- 2, If your hotspot with Raspberry Pi 3B/4B purchase from BI7JTA, one your plug-in Wire LAN ,the display will show the true IP address.

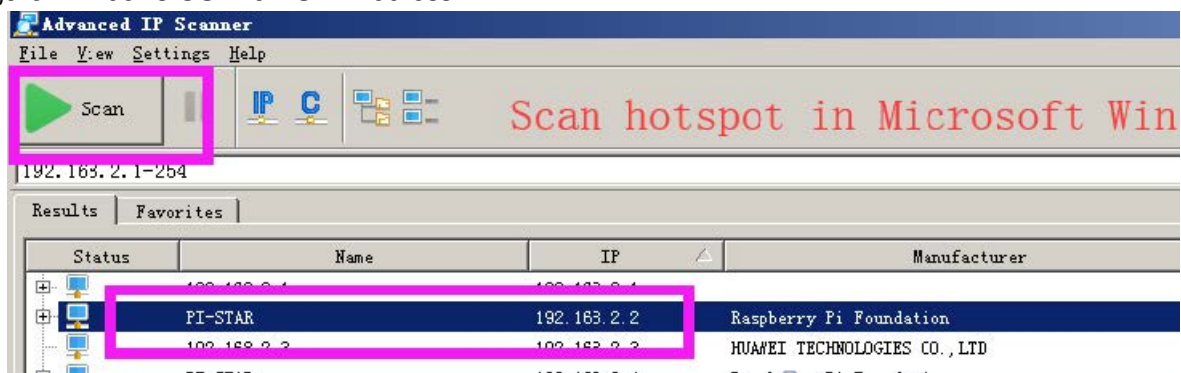


Steps one by one:

- Connect the Wire LAN between Raspberry Pi 3B/4B and Router,



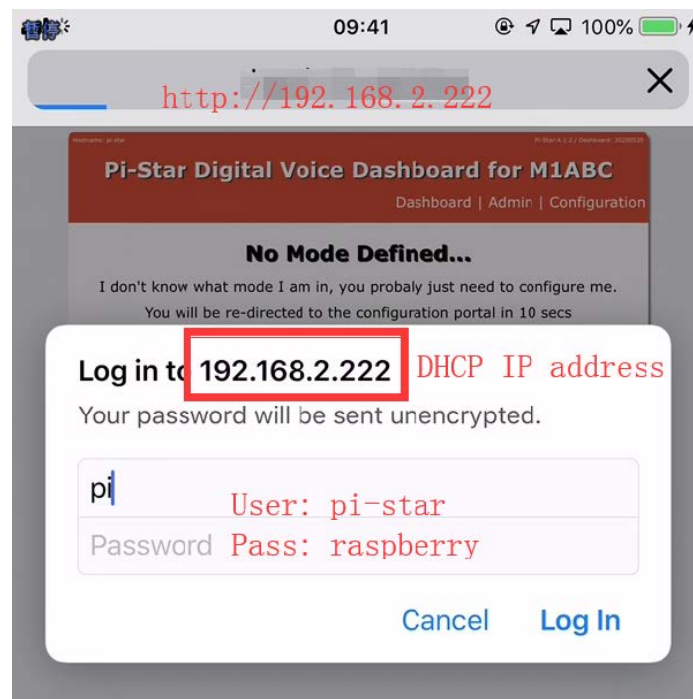
- The router assign IP address through DHCP ,
 - Scan your MMDVM hotspot IP address,
- See Figure: Windows OS find HS IP Address



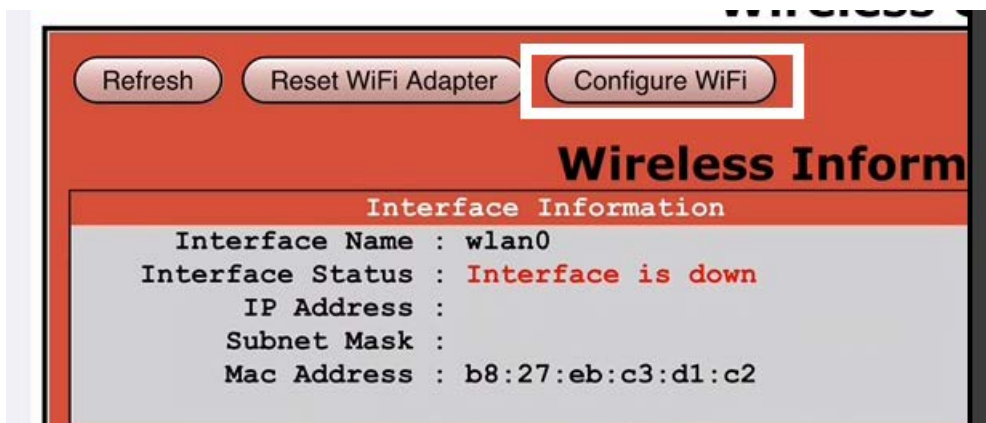
- Open your the default web browser , visit the URL ,as follow

<http://pi-star> (If your LAN have more than 1 hotspot , this possible not link to the hotspot you need)
<http://192.168.x.x> (the IP address you have scan from IP scan tools).

See Figure: Visit MMDVM Dashboard



– Add your home WiFi SSID/PSK, then reboot



– Finally you can use WiFi connection, instead of Wire LAN.

* The IP address here just a demo value , please use your true scan result value.

2, WiFi self AP (Complicated)

View Appendix → Configuration WiFi → WiFi Self AP

3, WiFi config file (Need SD Card adapter)

View Appendix → Configuration WiFi → WiFi Config file

Step 3 Pi-Star Configuration

Base settings

← → ↻ 192.168.2.185/admin/configure.php

Pi-Star:4.1.2 / Dashboard: 20200520

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-v7l+	Unknown ARM based System	0.63 / 0.26 / 0.13	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 Mode <input checked="" type="radio"/> Duplex Repeater (or Half-Duplex on Hotspots)

Apply Changes

General Configuration

Setting	Value
Hostname:	pi-star Do not add suffixes such as .local
Mode Callsign:	BI7JTA
CCS7/DMR ID:	4600724
Radio Frequency RX:	434.755.000 MHz
Radio Frequency TX:	439.755.000 MHz
Latitude:	50.00 degrees (positive value for North, negative for South)
Longitude:	-3.00 degrees (positive value for East, negative for West)
Town:	Town, LOC4TOR
Country:	Country for Duplex hotspot
URL:	http://www.grz.com/db/BI7JTA <input checked="" type="radio"/> Auto <input type="radio"/> Manual
Radio/Modem Type:	MMDVM_HS_Hat_Dual Hat (VR2VYE) for Pi (GPIO)
Mode Type:	<input type="radio"/> Private <input checked="" type="radio"/> Public
APRS Host:	euro.aprs2.net
System Time Zone:	Europe/London
Dashboard Language:	english_uk

DMR ID register www.radioid.net
 RX <--> Digital radio TX
 TX <--> Digital radio RX

Frequency range: 144MHz-148MHz, 420MHz-475MHz, 842MHz-950MHz
 avoid the following ranges: 145.8-146.000 MHz and 435-438.000 MHz, otherwise firmware will not start. See also https://github.com/juribeparada/MMDVM_HS/releases/tag/v1.4.12

Display Type:

DMR2NXDN: ☐ Uses 7 prefix on DMRGateway

POCSAG: ☐ POCSAG Paging Features

MMDVM Display Type: ☒ Nextion ☐ None ☐ OLED Type 3 ☐ OLED Type 6

Port: /dev/ttyNextionDriver ☐ /dev/ttyAMA0 ☐ /dev/ttyUSB0

Nextion Layout: ON7LDS L3 HS

Nextion/USART Display

Setting Value

Hostname: pi-star Do not add suffixes such as .local

Mode Callsign: TFT Serial

CCS7/DMR ID: 4600724

Radio Frequency RX: 434.755.000 MHz

POCSAG: ☐ POCSAG Paging Features

MMDVM Display Type: ☒ Nextion ☐ None ☐ Modem

Port: /dev/ttyNextionDriver ☐ /dev/ttyAMA0 ☐ /dev/ttyUSB0

Nextion Layout: ON7LDS L3 HS

USBtoTTL adapter

The board 4Pins Header

Setting Value

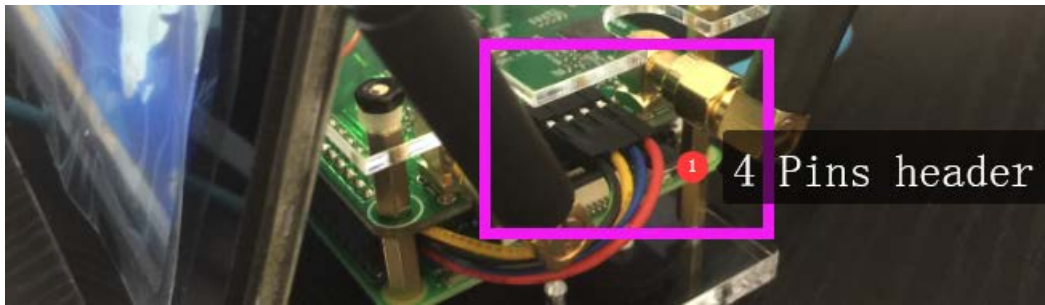
Hostname: pi-star Do not add suffixes such as .local

Mode Callsign: TFT Serial

CCS7/DMR ID: 4600724

Radio Frequency RX: 434.755.000 MHz

Install NextionDriver



POCSAG Paging Features

Nextion Driver: `/dev/ttyNextionDriver` Nextion Layout: **ON7LDS L3 HS** G4KLX ON7LDS L2 ON7LDS L3 ON7LDS L3 HS

Apply Changes

General Configuration

Setting	Value
Nextion Driver	<code>/dev/ttyNextionDriver</code>
Nextion Layout	ON7LDS L3 HS

not add suffixes such as .local

DMR Mode:

MMDVMHost Configuration

Setting	Value
DMR Mode:	<input checked="" type="checkbox"/>
RF Hangtime:	20
Net Hangtime:	20

DMR Configuration

Setting	Value
DMR Master:	BM_China_4601
Hotspot Security:	
BrandMeister Network:	Repeater Information
DMR ESSID:	4600724 83
DMR Colour Code:	1
DMR EmbeddedLCOnly:	<input type="checkbox"/>
DMR DumpTADData:	<input checked="" type="checkbox"/>

Apply Changes

YSF Mode:

MMDVMHost Configuration

Setting	Value
DMR Mode:	<input type="checkbox"/>
C4FM Mode:	<input checked="" type="checkbox"/>
YSF Mode:	<input checked="" type="checkbox"/>
SSB Mode:	<input type="checkbox"/>
WSDN Mode:	<input type="checkbox"/>

RF Hangtime: 20 Net Hangtime: 20

Setting	Value
Hostname:	pi-star
Node Callsign:	BI7JTA
CCSY/DMR ID:	4600724
Radio Frequency RX:	434.755.000 MHz
Radio Frequency TX:	439.755.000 MHz
Latitude:	50.00
Longitude:	-3.00
Town:	Town, L0C4T0R
Country:	Country
URL:	http://www.qrz.com/db/BI7JTA
Radio/Modem Type:	MMDVM_HS_Hat_Dual Hat (VR2VYE) for Pi (GPIO)
Mode Type:	<input type="radio"/> Private <input checked="" type="radio"/> Public
APRS Host:	euro.aprs2.net
System Time Zone:	Europe/London
Dashboard Language:	english_uk

Apply Changes

Apply Changes

Setting	Value
YSF Startup Host:	YSF80337 - CN CHINA 1 - W24166/TG46001
UPPERCASE Hostfiles:	YSF53710 - CA MARITIMES - CAN MARITIMES
WiresX Passthrough:	YSF48095 - CA M0C1 - C4FM RPTOR
	YSF19952 - CA NANIKANA - NANIKANA
	YSF36010 - CA ON-PROCOM - ON PROV COMMS
	YSF79602 - CAROLINA LINK - 79602
	YSF13339 - CA WEST CAN - WESTERN CANADA
	YSF63347 - CH 228 SWISS2 - HB-CONNECT
	YSF30998 - CH 228 SWISS - SWISS-CONNECT
	YSF15280 - CH HB9VD - RADIOAMATEURS
	YSF66049 - CHINALINK - CHINA YSF REFL
	YSF37664 - CH IT-SWISS - C4FM OM
	YSF52796 - CH JOTA - JOTA CH
	YSF72350 - CL CHILE - YSF TO TG730
	YSF34287 - CL CL CHILE - YSF HOTSPOT'S
	YSF19525 - CL EMCOMM - TG 730911
	YSF09627 - CL YSF - CHILE YSF ROOM
	YSF69058 - CNARN - CNARN
	YSF07333 - CN B4-C4FM - WELCOME TEST!
	YSF18829 - CN CC1 - TG 460501
	YSF80337 - CN CHINA 1 - W24166/TG46001
	changed
uPNP:	<input checked="" type="radio"/> On <input type="radio"/> Off

Apply Changes

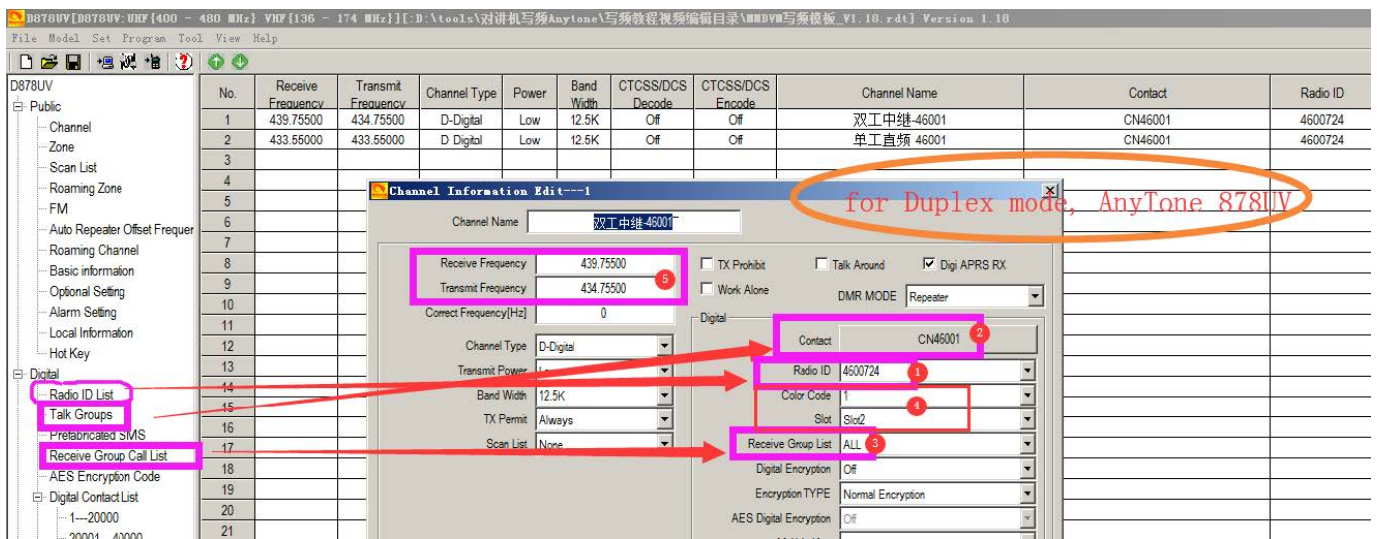
Step 4 Radio Programming

DMR Mode:

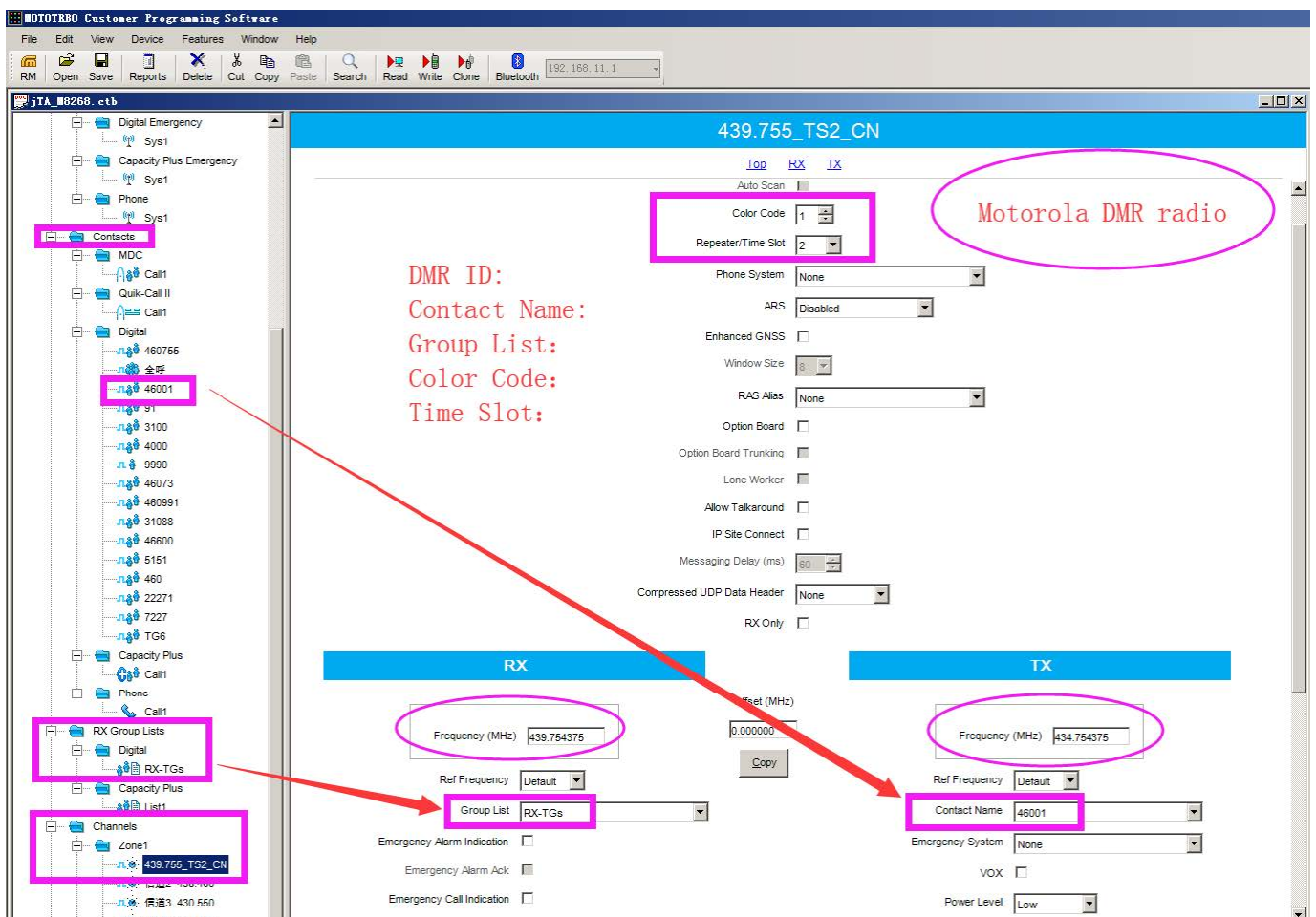
AnyTone 878UV,

Also apply to other model DMR radios, such TYT, Baofeng, Motorola, GD77 The key items:

- 1, DMRID,
- 2, Talkgroup,
- 3, Receive Group CallList,
- 4, Color Code, Slot,



Motorola P8668i, XPR4550



YSF

YSF the BER around 1% is ok, you can also adjust by set RXOffset, TXOffset in Pi-Star expert mode.



Step 5 QSO & Testing

Hostname: pi-star Pi-Star:4.1.2 / Dashboard: 20200520

Pi-Star Digital Voice Dashboard for BI7JTA

Dashboard | Admin | Configuration

Modes Enabled

D-Star Net **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 DMR**

Tx 439.755000 MHz

Rx 434.755000 MHz

FW MMDVM_HS:v1.5.2

TCXO 14.7456 MHz

DMR Repeater

DMR ID 4600724

DMR CC 1

TS1 **enabled**

No TG/No Ref

TS2 **enabled**

No TG/No Ref

DMR Master

BM China 4601

Gateway Activity

Time (GMT)	Mode	Callsign	Target	Src	Dur(s)	Loss	BER
17:56:29 Dec 23rd	DMR Slot 2	9990	BI7JTA	Net	5.5	0%	0.0%
17:56:20 Dec 23rd	DMR Slot 2	BI7JTA	9990	RF	5.4	0%	0.5%

Local RF Activity

Time (GMT)	Mode	Callsign	Target	Src	Dur(s)	BER	RSSI
17:56:20 Dec 23rd	DMR Slot 2	BI7JTA	9990	RF	5.4	0.5%	S9+46dB (-47 dBm)

- Private Call 9990 echo voice test
- Group call 4000 disconnect voice test
- Trx show just when you radio success transmit data to hotspot
- Full logs in [Admin] -> [live log] -> [download]

Troubleshooting

* Believe me , your board I have tested full, please do not doubt the board issue, need patience to make it work.

BER too high

Most Motorola radio, Hytera, Baofeng DMR radio ,will has big offset more than -300Hz

192.168.1.17/admin/expert/edit_mmdvmhost.php

Expert mode Configuration -> Expert -> MMDVMHost

Motorola, Hytera, Baofeng always have -300 to -500Hz offset

RXOffset = TXOffset

try:
-300,-200,-100
100,200,300 ...

Hz

RXOffset = ?
TXOffset = ?

RXoffset=0
TXoffset=0

Local RF Activity

Time (GMT)	Mode	Callsign	Target	Src	Dur(s)	BER	RSSI
22:55:41 Mar 6th	DMR Slot 2	BI7JTA	TG 6	RF	2.9	0.1%	S9+46dB

DMR: <=0.5% YSF: <1.5%

UHF

Cannot open repeater

Possible,

- 1) RX, TX not invert with Hat and radio;
- 2, BER too high,
- 3, Other, such as frequency be interferences, Power supply not stable,

Cannot continue listen network TG, in DMR mode

– Duplex mode(Simplex Hat not support duplex mode)

Register BM account and setup your static Talkgroup for TS1,TS2

<https://www.bi7jta.org/wiki/index.php?title=Main-Page#Set-Static-Talkgroups>

– Simplex mode

Simplex mode default use Dynamic talkgroup, will continue listen the last TG you have press PTT, on your DMR radio. YOU can also set more than one static Talkgroup for TS2

Cannot connect to Modem

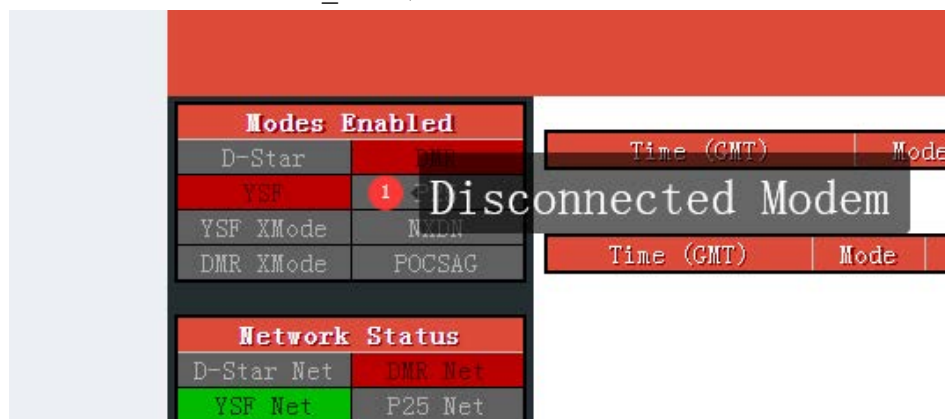
Possible reason:

- 1) satellite

Frequency restrictions to avoid satellite interference. Please avoid the following ranges: 145.8-146.0 MHz and 435-438 MHz, otherwise firmware will not start.

`tail -100f /var/log/pi-star/MMDVM-2018-11-21.log`

Error message Received a NAK to the SET_FREQ command from the modem

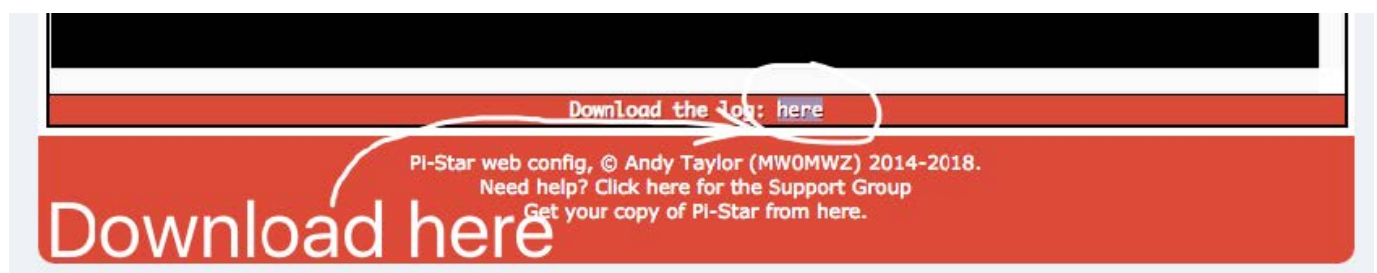


- 2) Factory Reset cause NextionDriver not normal

Ask me for help

Before ask me for help, please analysis Pi-Star running logs first,

http://pi-star/admin/download_modem_log.php



- 1) Download Pi-Star full logs
- 2) your radio channel settings detail screenshots
- 3) Send to email bi7jta@gmail.com

Too large size video please upload to Youtube.com, then send me a link. Remote Desktop: Microsoft Teams, Teamviewer

Demo video

https://www.youtube.com/winters_huang

Reference

BI7JTA Wiki <https://www.bi7jta.org>

Pi-Star <http://pistar.uk>

MMDVM Project <https://github.com/g4klx/MMDVM>

Appendix

Frequency range:

144MHz-148MHz, 420MHz-475MHz, 842MHz-950MHz

avoid the following ranges: 145.8-146.000 MHz and 435-438.000 MHz, otherwise firmware will not start.

See also https://github.com/juribeparada/MMDVM_HS/releases/tag/v1.4.12

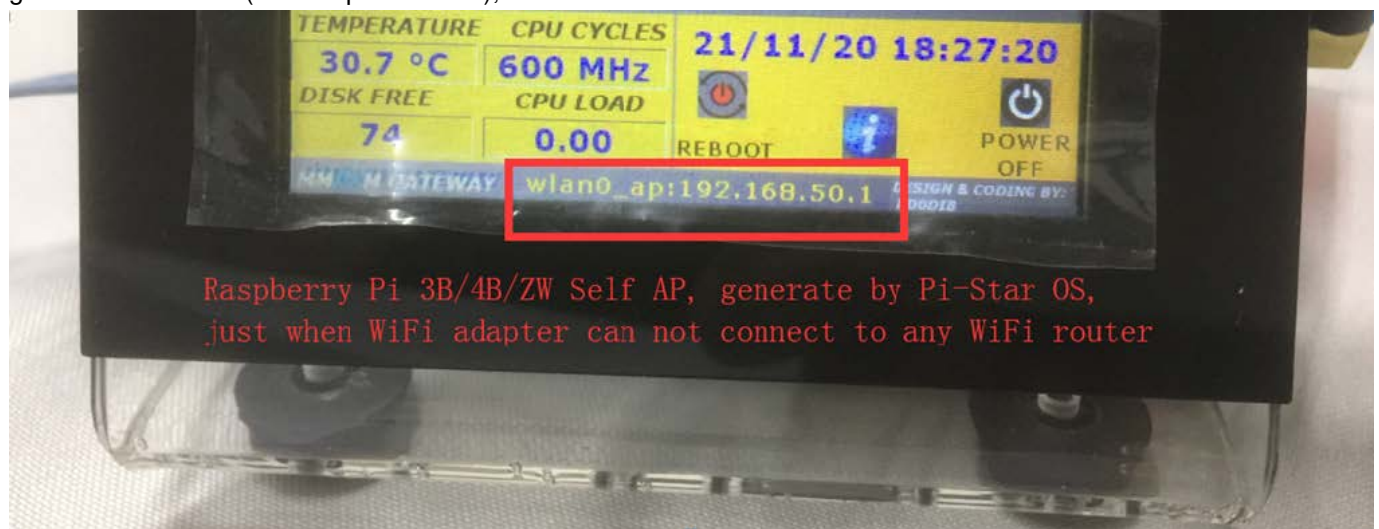
Other method for Configuration WiFi

WiFi self AP,

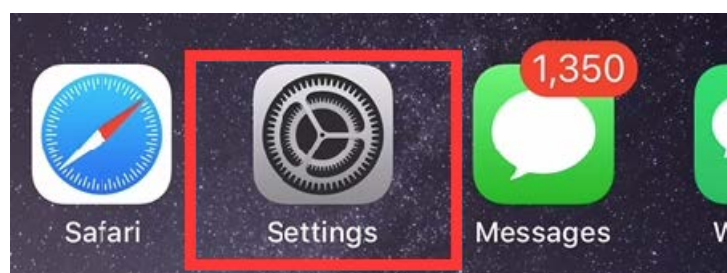
NOTE: This method cannot use in your NanoPi NEO, Raspberry Pi 2B not have inner WiFi model.

Steps one by one:

– Power on your hotspot , after 2 or 3 minutes , if MMDVM hotspot cannot join any WiFi network, Pi-Star OS will generate a WiFi AP(access point/router),



– Open your iOS or Android , PC with WiFi adapter, join the Pi-Star WiFi AP,





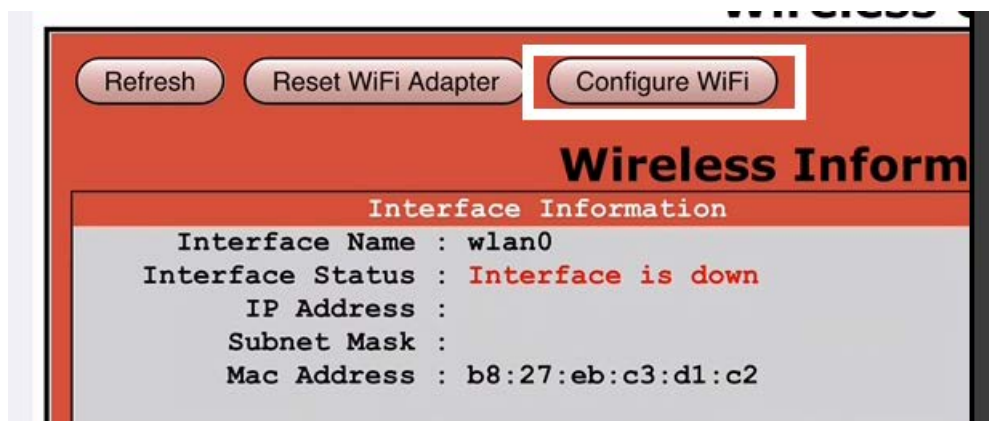
– Open your the default web browser , visit the URL ,as follow (Must join this WiFi AP)

<http://pi-star> or

<http://192.168.50.1> (the IP address is fix, if your display show this 50.1 address, means hotspot WiFi have not connect to internet). Figure: Visit management page



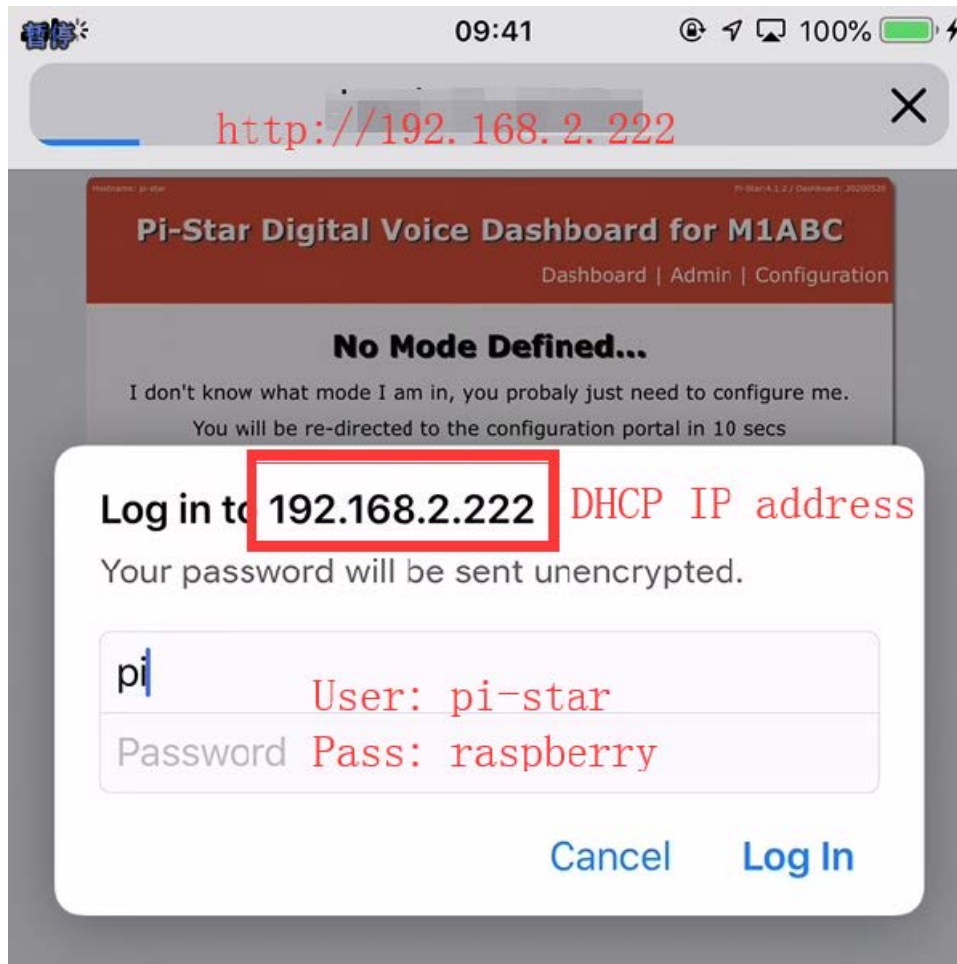
– Add your home WiFi SSID/PSK, then reboot



– Use Fing APP or IP scan tools in Windows/OSX, find the Pi-Star hostname and DHCP IP



– Finally you have made the MMDVM hotspot connect to your router, do the next step



Known issue:

- 1, Some Android OS will reject join the WiFi network without internet connection.
- 2, One you have reset factory settings ,re-flash SD card , MMDVM Hat Modem connect failed, the Nextion Display or OLED will not show normal data (connecting always), but do not worry , the WiFi AP will be made, ignore the display data, Nextion/OLED display not a System Monitor.

WiFi config file

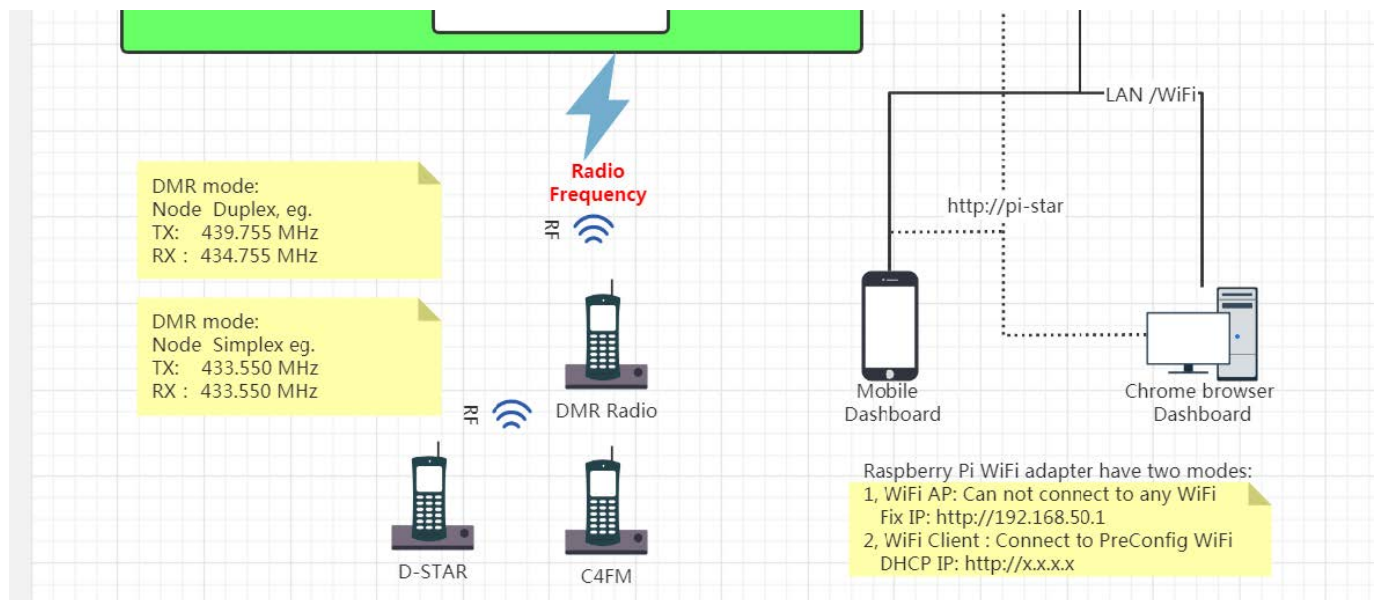
https://www.pistar.uk/wifi_builder.php

- Input your home WiFi SSID/PSK
- Submit to download, the file wpa_supplicant.conf
- Copy this file to the root of Pi-Star SD card
- Power on again ,if all correct , your MMDVM hotspot will connect to your WiFi router

WiFi Country Code: GB	
Your WiFi	SSID: <input type="text"/>
	PSK: <input type="text"/>
<input type="button" value="提交查询"/>	



(Continue and not the end) Write by bi7jta@gmail.com www.bi7jta.org 2020.12.24



Documents / Resources

	<p>MMDVM Duplex Hotspot Support DMR [pdf] User Manual Duplex Hotspot, Duplex Hotspot Support DMR</p>
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