

Duplex hotspot User's Manual _v2020_12_23 #MMDVM

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

目录

Duplex hotspot User's Manual _v2020_12_23 #MMDVM	1
Overview	2
Prepare:	2
Hardware.....	2
Software.....	2
LAN IP devices address scan tools:.....	2
Step 1 Hardware connection.....	3
Step 2 Network Configuration.....	3
1, Wire LAN (Simple and Recommend)	3
2, WiFi self AP (Complicated).....	5
3, WiFi config file (Need SD Card adpater).....	5
Step 3 Pi-Star Configuration	5
DMR Mode:.....	7
YSF Mode:.....	7
Step 4 Radio Programming	8
DMR Mode:.....	8
AnyTone 878UV,	8
Motorola P8668i, XPR4550	9
YSF	9
Step 5 QSO & Testing.....	10
Troubleshooting.....	11
BER too high	11
Cannot open repeater.....	12
Cannot connect to Modem.....	12
Ask me for help	13
Demo video	13
Reference	13
Appendix.....	13
Frequency range:	13
Other method for Configuration WiFi.....	13

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



Fing - Network Scanner 4+

Fing Limited

Designed for iPad

#161 in Productivity

★★★★★ 4.7 • 71.4K Ratings

Free · Offers In-App Purchases

iOS/Android appstore scan "Fing"

Screenshots [iPad](#) [iPhone](#)

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.

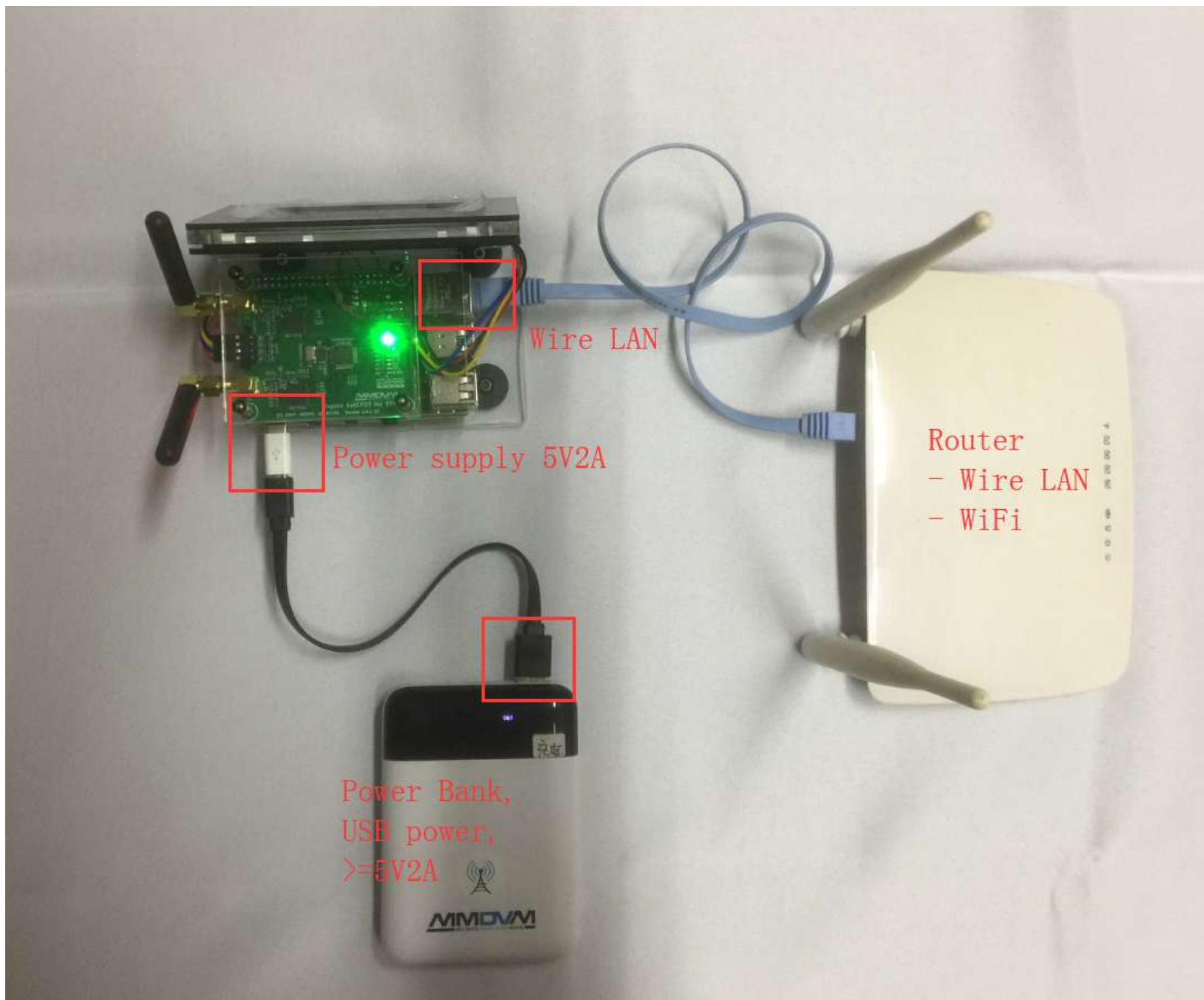


Figure: hardware wiring diagram

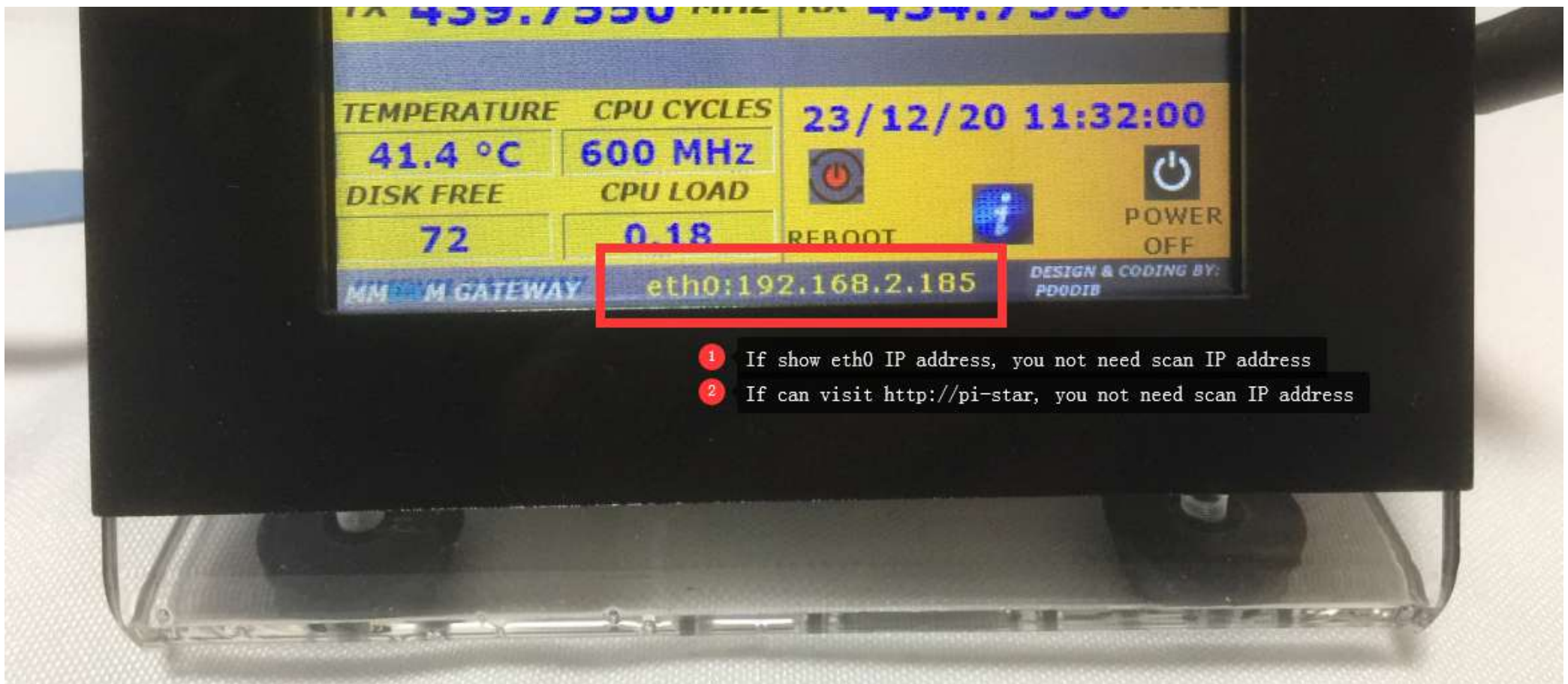
Step 2 Network Configuration

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,



Figure: iOS/Android find HS IP Address

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

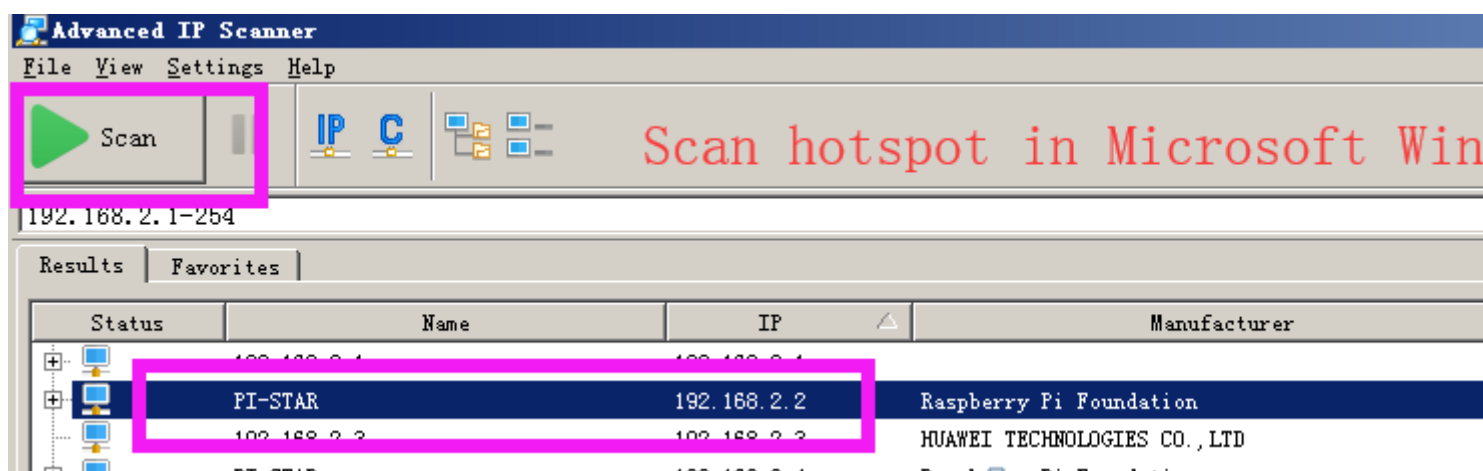


Figure: Windows OS find HS IP Address

- 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

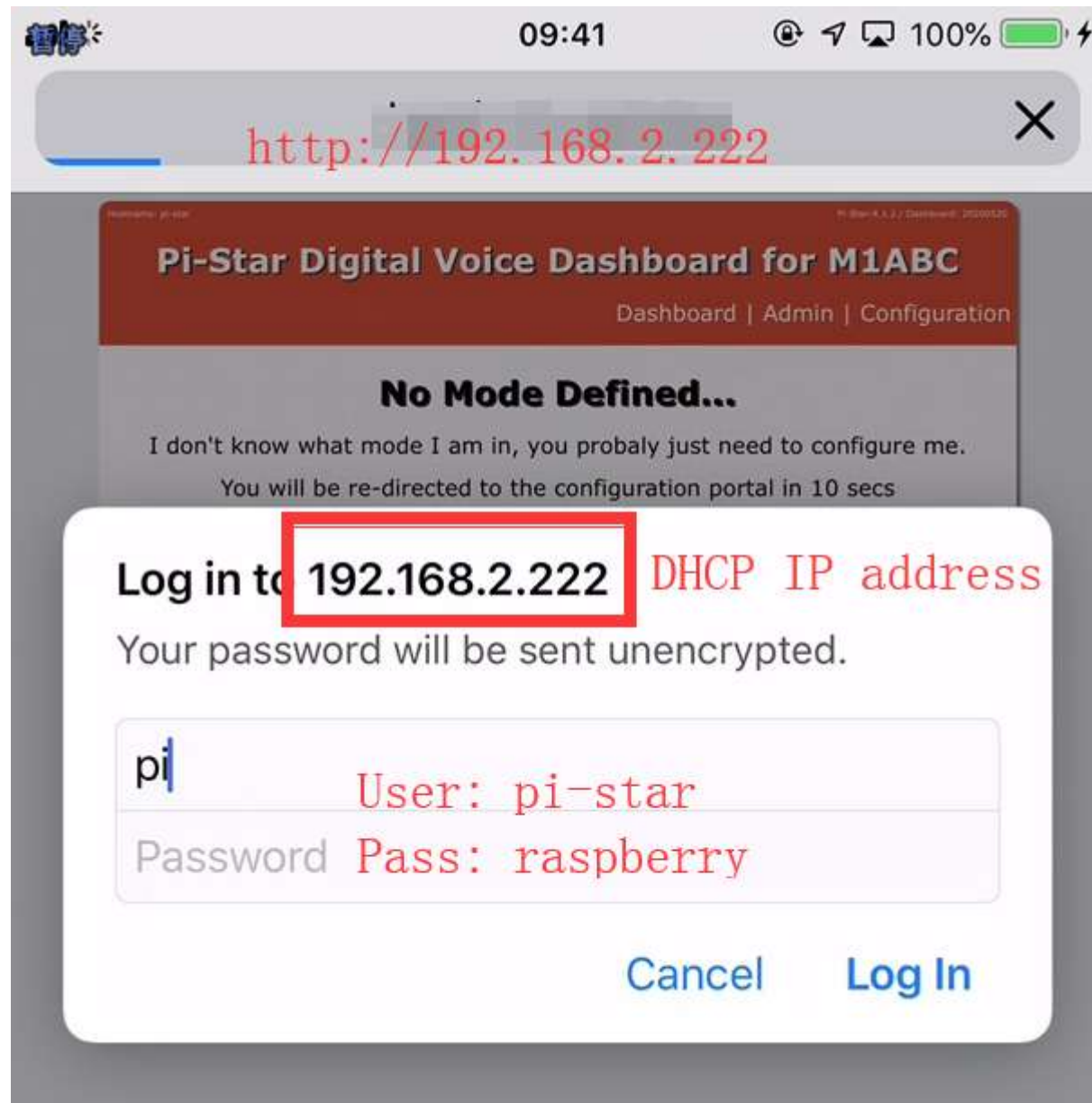


Figure: Visit MMDVM Dashboard

- 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 adpater)

View *Appendix --> Configuration WiFi --> WiFi Config file*

Step 3 Pi-Star Configuration

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
Node Callsign:	BI7JTA
CCS7/DMR ID:	4600724 DMR ID register www.radioid.net
Radio Frequency RX:	434.755.000 MHz RX <--> Digital radio TX
Radio Frequency TX:	439.755.000 MHz TX <--> Digital radio RX
Latitude:	50.00 degrees (positive value for North, negative for South)
Longitude:	-3.00 degrees (positive value for East, negative for West)
Town:	Town, LO4TOR
Country:	Country for Duplex hotspot
URL:	http://www.arz.com/db/BI7JTA <input checked="" type="radio"/> Auto <input type="radio"/> Manual
Radio/Modem Type:	MMDVM_HS_Hat_Dual Hat (VR2VYE) for Pi (GPIO)
Node Type:	<input type="radio"/> Private <input checked="" type="radio"/> Public
APRS Host:	euro.aprs2.net
System Time Zone:	Europe/London
Dashboard Language:	english_uk

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:

Must select the correct Display Type

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

Port: /dev/ttyNextionDriver

Nextion Layout: ON7LDS L3 HS

Nextion/USART Display

Apply Changes

USBtoTTL adapter

The board 4Pins Header

Install NextionDriver

Setting: Nextion, Port: /dev/ttyNextionDriver

General Configuration

Setting	Value
Hostname:	pi-star <small>Do not add suffixes such as .local</small>
Node Callsign:	BI7JTA ²
CCS7/DMR ID:	4600724
Radio Frequency RX:	434.755.000 MHz
Radio Frequency TX:	439.755.000 MHz
Latitude:	50.00 ¹ <small>degrees (positive value for North, negative for South)</small>
Longitude:	-3.00 <small>degrees (positive value for East, negative for West)</small>
Town:	Town, LOC4T0R
Country:	Country
URL:	http://www.gz.com/db/BI7JTA <input checked="" type="radio"/> Auto <input type="radio"/> Manual
Radio/Modem Type:	MMDVM_HS_Hat_Dual Hat (VR2VYE) for Pi (GPIO) ³
Node 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

Yaesu System Fusion Configuration

Setting	Value
YSF Startup Host:	YSF80337 - CN CHINA 1 - W24166/TG46001
UPPERCASE Hostfiles:	YSF53710 - CA MARITIMES - CAN MARITIMES
WiresX Passthrough:	YSF48095 - CAMCAST - YSF REFLECTOR
	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,

D878UV [D878UV: UHF [400 - 480 MHz] VHF [136 - 174 MHz]] [D:\tools\对讲机写频Anytone\写频教程视频教程\编辑目录\DMR\写频模板_V1.18.rdt] Version 1.18

File Model Set Program Tool View Help

No.	Receive Frequency	Transmit Frequency	Channel Type	Power	Band Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID
1	439.75500	434.75500	D-Digital	Low	12.5K	Off	Off	双工中继-46001	CN46001	4600724
2	433.55000	433.55000	D-Digital	Low	12.5K	Off	Off	单工直频-46001	CN46001	4600724

Channel Information Edit

Channel Name: 双工中继-46001

Receive Frequency: 439.75500
Transmit Frequency: 434.75500
Correct Frequency[Hz]: 0

Channel Type: D-Digital
Transmit Power: []
Band Width: 12.5K
TX Permit: Always
Scan List: None

TX Prohibit
 Talk Around
 Digi APRS RX
 Work Alone
 DMR MODE: Repeater

Contact: CN46001
 Radio ID: 4600724
 Color Code: 1
 Slot: Slot2
 Receive Group List: ALL

Digital Encryption: Off
Encryption TYPE: Normal Encryption
AES Digital Encryption: Off

for Duplex mode, AnyTone 878UV

Motorola P8668i, XPR4550

MOTOROLA Customer Programming Software

File Edit View Device Features Window Help

RM Open Save Reports Delete Cut Copy Paste Search Read Write Clone Bluetooth 192.168.11.1

jTA_M8268.ctb

439.755_TS2_CN

Top RX TX

Auto Scan

Color Code: 1
Repeater/Time Slot: 2

Phone System: None
ARS: Disabled
Enhanced GNSS:
Window Size: 8
RAS Alias: None
Option Board:
Option Board Trunking:
Lone Worker:
Allow Talkaround:
IP Site Connect:
Messaging Delay (ms): 60
Compressed UDP Data Header: None
RX Only:

RX: Frequency (MHz): 439.754375
 Ref Frequency: Default
 Group List: RX-TGs

TX: Frequency (MHz): 434.754375
 Ref Frequency: Default
 Contact Name: 46001
 Emergency System: None
 VOX:
 Power Level: Low

DMR ID:
Contact Name:
Group List:
Color Code:
Time Slot:

Motorola DMR radio

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-starPi-Star:4.1.2 / Dashboard: 20200520

Pi-Star Digital Voice Dashboard for BI7JTA

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 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	
EM 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)	

- 1 Private Call 9990 echo voice test
- 2 Group call 4000 disconnect voice test
- 3 Trx show just when you radio success transmit data to hotspot
- 4 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 ...

Enable	Time	CW Id
0	10	

Port	Modem
/dev/ttyAMA0	

TXInvert	1
RXInvert	0
PTTInvert	0
TXDelay	100 Hz
RXOffset	0
TXOffset	0
DMRDelay	0
RXLevel	50
TXLevel	50
RXDCOffset	0
TXDCOffset	0
CWIdTXLevel	50
D-StarTXLevel	50
DMRTXLevel	50
YSFTXLevel	50
P2STXLevel	50

RXoffset = ?
TXoffset = ?

RXoffset=0
TXoffset=0

Time (HKT)	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%

Enable	UIM
0	

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

Modes Enabled	
D-Star	DMR
YSF	1
YSF XMode	NXDN
DMR XMode	POCSAG

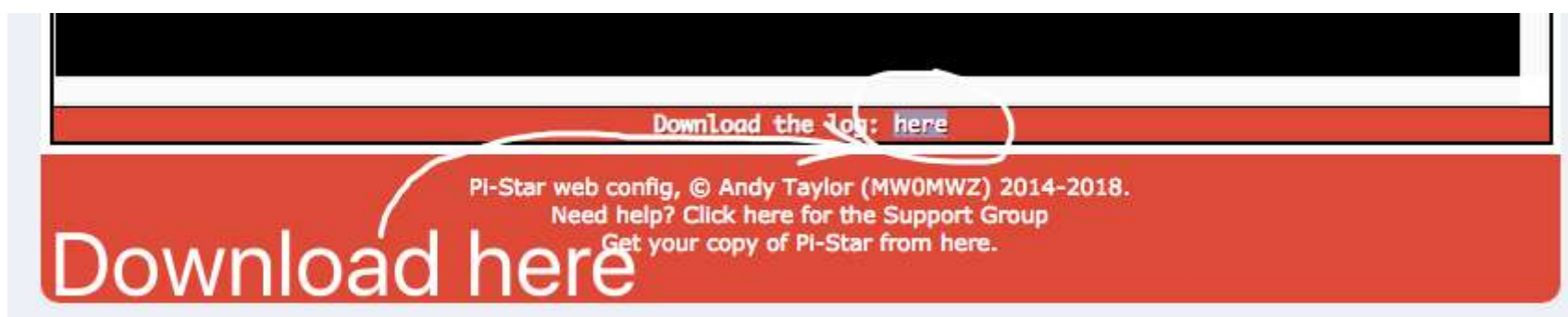
Disconnected Modem

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

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 netwok, Pi-Star OS will generate a WiFi AP(access point/router),

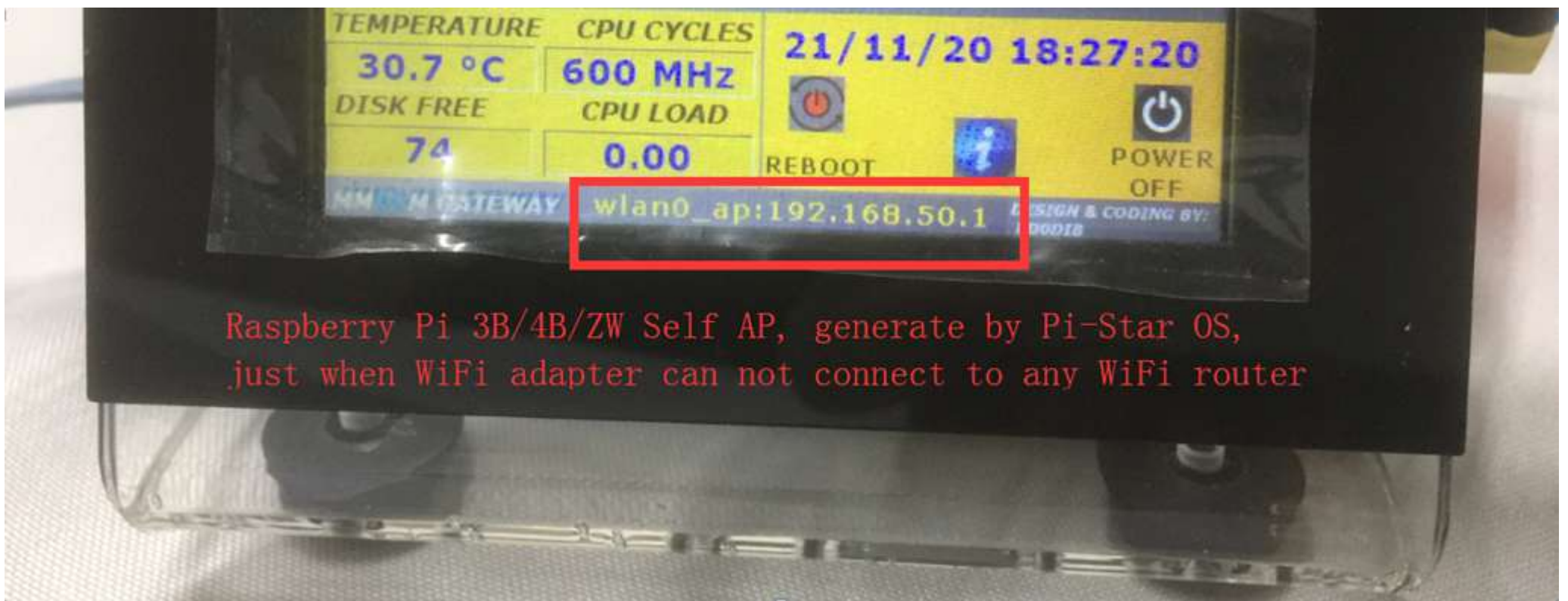


Figure: MMDVM Self AP

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



Figure: Join WiFi Self 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



Figure: Visit management page

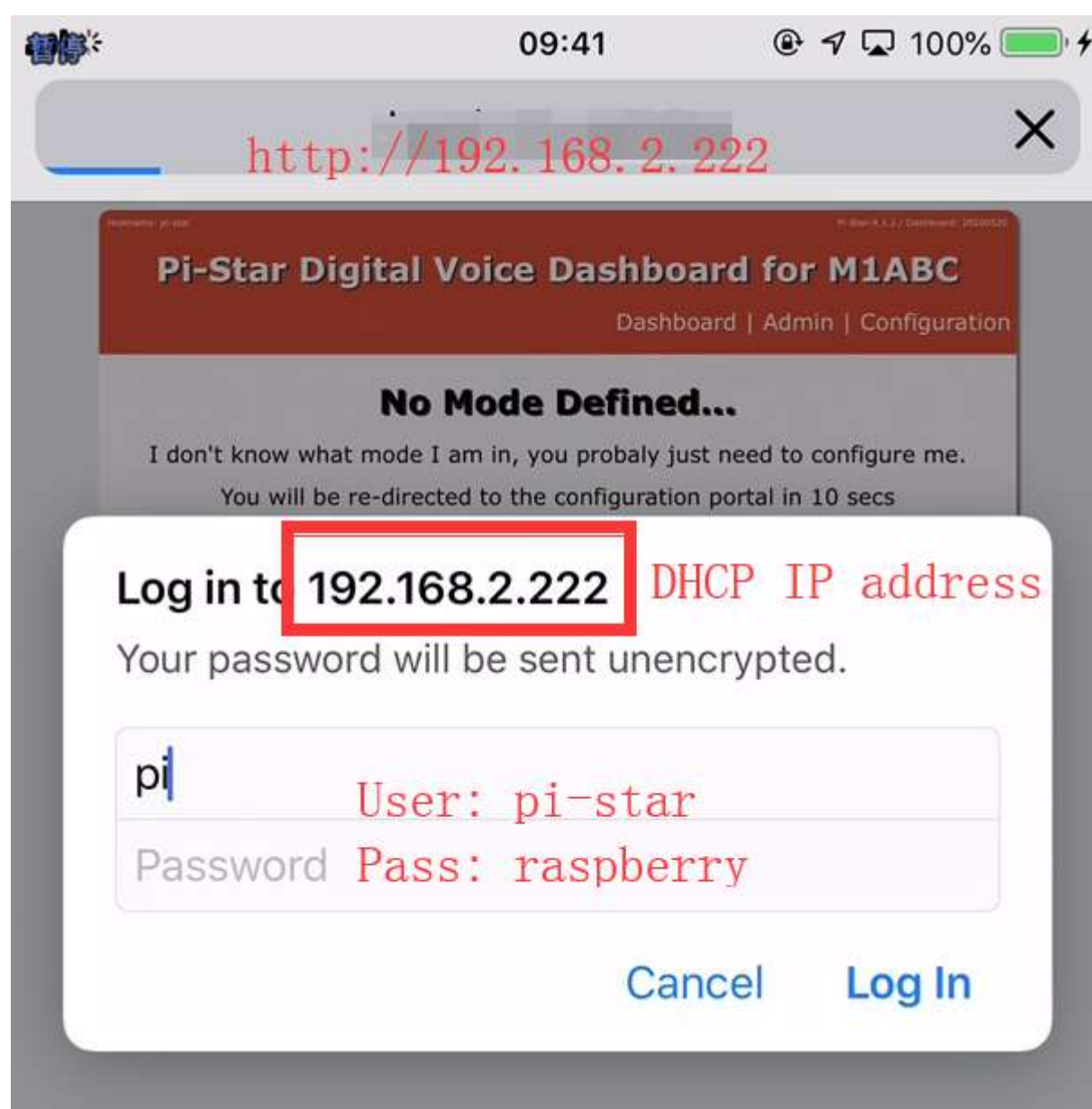
- Add your home WiFi SSID/PSK, then reboot



- 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
SSID:	
PSK:	
提交查询	

Your WiFi



(Continue and not the end)

Write by bi7jta@gmail.com www.bi7jta.org 2020.12.24

 **PASSION RADIO**

MMDVM Network Diagram (Overall)

@BI7JTA 2020.12.23

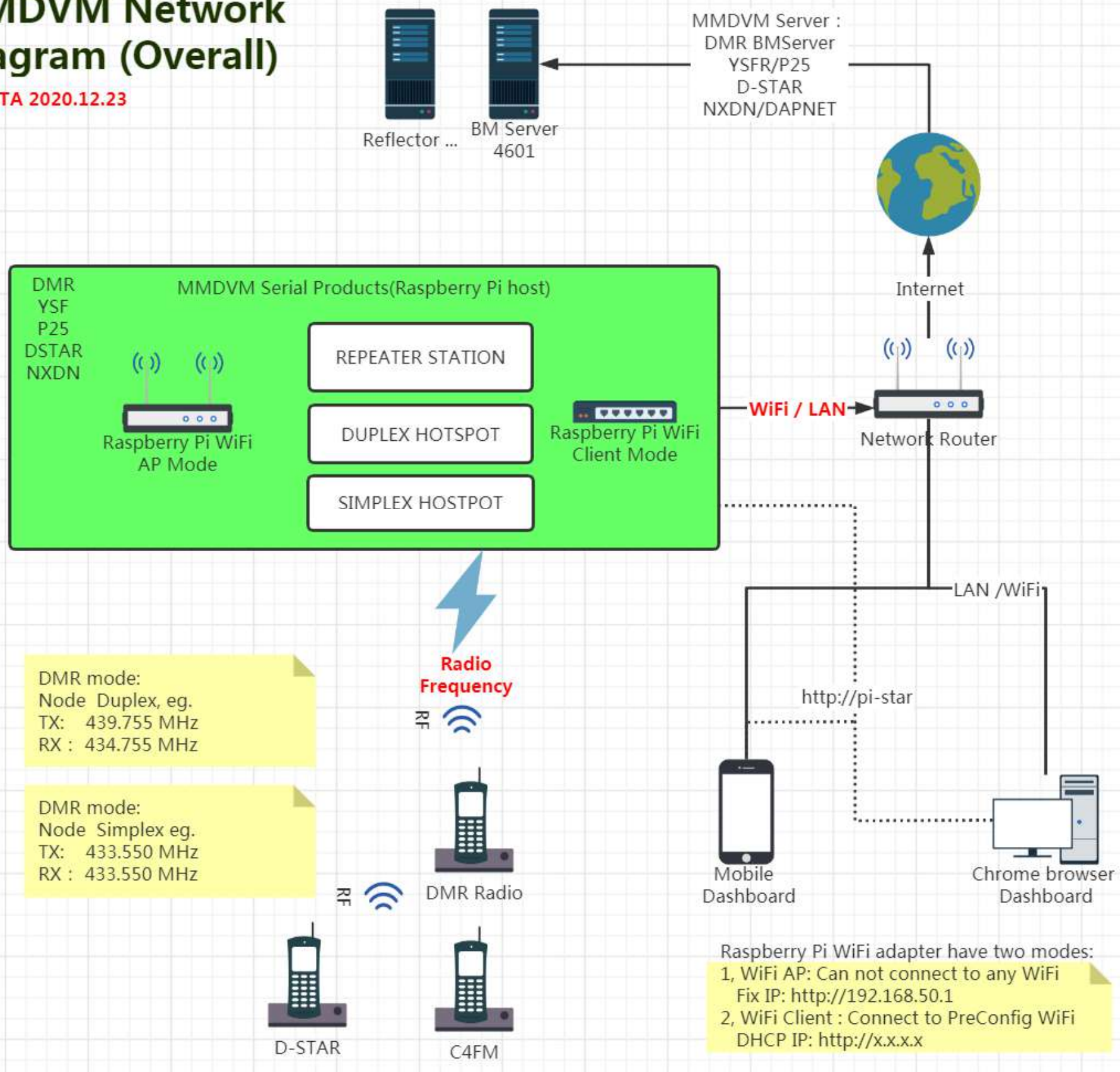


Figure: MMDVM Network diagram(Overall)