AURSINC MMDVM Hotspot with Raspberry Pi Zero W

AURSINC MMDVM Hotspot User Manual

Model: MMDVM Hotspot with Raspberry Pi Zero W

1. INTRODUCTION

This manual provides comprehensive instructions for the setup, operation, and maintenance of your AURSINC MMDVM Hotspot. This device is a digital voice modem designed for amateur radio enthusiasts, enabling communication across various digital modes such as C4FM, YSF, NXDN, DSTAR, P25, and DMR. It integrates with a Raspberry Pi Zero W and comes with pre-installed Pi-Star software for ease of use.

The hotspot operates on specified UHF and VHF frequencies, providing a reliable link for digital voice communications. Please read this manual thoroughly before using the device to ensure proper functionality and to maximize your experience.

Figure 1.1: The AURSINC MMDVM Hotspot, including the main unit, antenna, Ethernet adapter, and an elbow connector.

2. WHAT'S INCLUDED

Please verify that all items listed below are present in your package:

- 1x MMDVM Hotspot Spot Radio Unit
- 1x Ethernet Cable
- 1x Elbow Connector (for antenna)
- 1x Micro USB Charging Cable

WHAT ARE INCLUDED

1x MMDVM Hotspot Spot Radio
1x Ethernet Cable
1x Elbow

Figure 2.1: Contents of the AURSINC MMDVM Hotspot package.

3. SETUP GUIDE

3.1 Initial Setup and Powering On

1. **Connect the Antenna:** Screw the included antenna onto the gold connector on the MMDVM Hotspot unit. If desired, use the elbow connector for a different antenna orientation.

2. **Power Connection:** Connect the micro USB charging cable to the hotspot unit and to a power source (e.g., power bank, laptop USB port, or USB wall adapter). The device will power on automatically.

3. **Initial Boot:** Allow the hotspot approximately 2 minutes to boot up and attempt to auto-connect to a Wi-Fi network. The Pi-Star software is preloaded on the TF card, eliminating the need for initial software installation.

3.2 Wi-Fi Configuration

The Raspberry Pi Zero W in the hotspot supports 2.4GHz Wi-Fi networks only. Ensure your Wi-Fi network's SSID is for a 2.4GHz band and the password type is WPA, not WEP.

1. **Access Pi-Star Configuration:** After the hotspot has been powered on for about 2 minutes, open a web browser on a computer connected to the same network and navigate to pi-star/admin/configure.php.

2. **Network Settings:** Within the Pi-Star configuration interface, locate the network settings section to enter your Wi-Fi SSID and password. Save the changes.
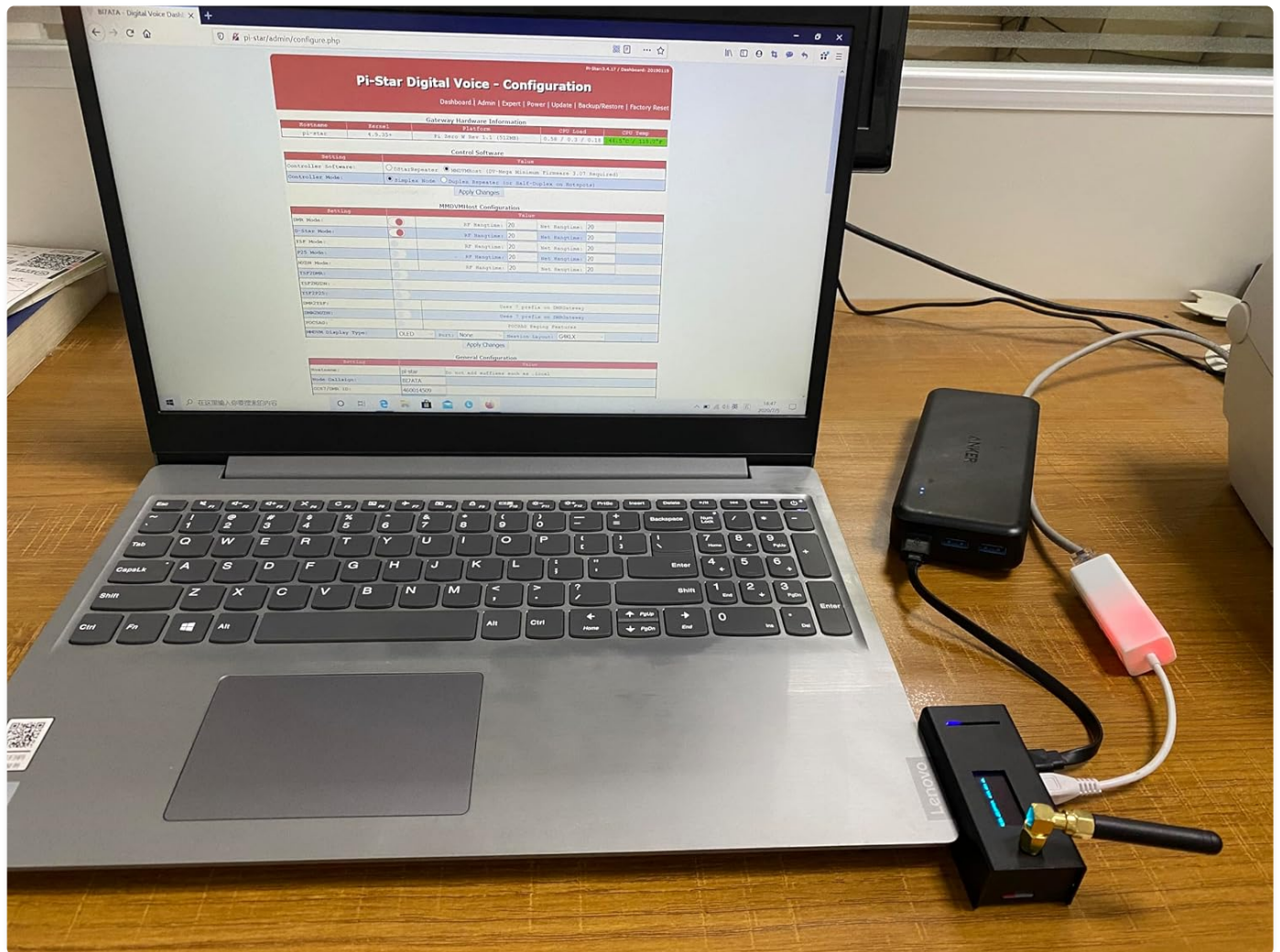
Figure 3.1: Pi-Star configuration interface accessed via a laptop.

3.3 Optimized System Recommendation

For enhanced performance and additional features, it is recommended to switch to an optimized system such as WPSD. Detailed instructions for installing WPSD can be found on their official website:

https://w0chp.radio/wpsd/
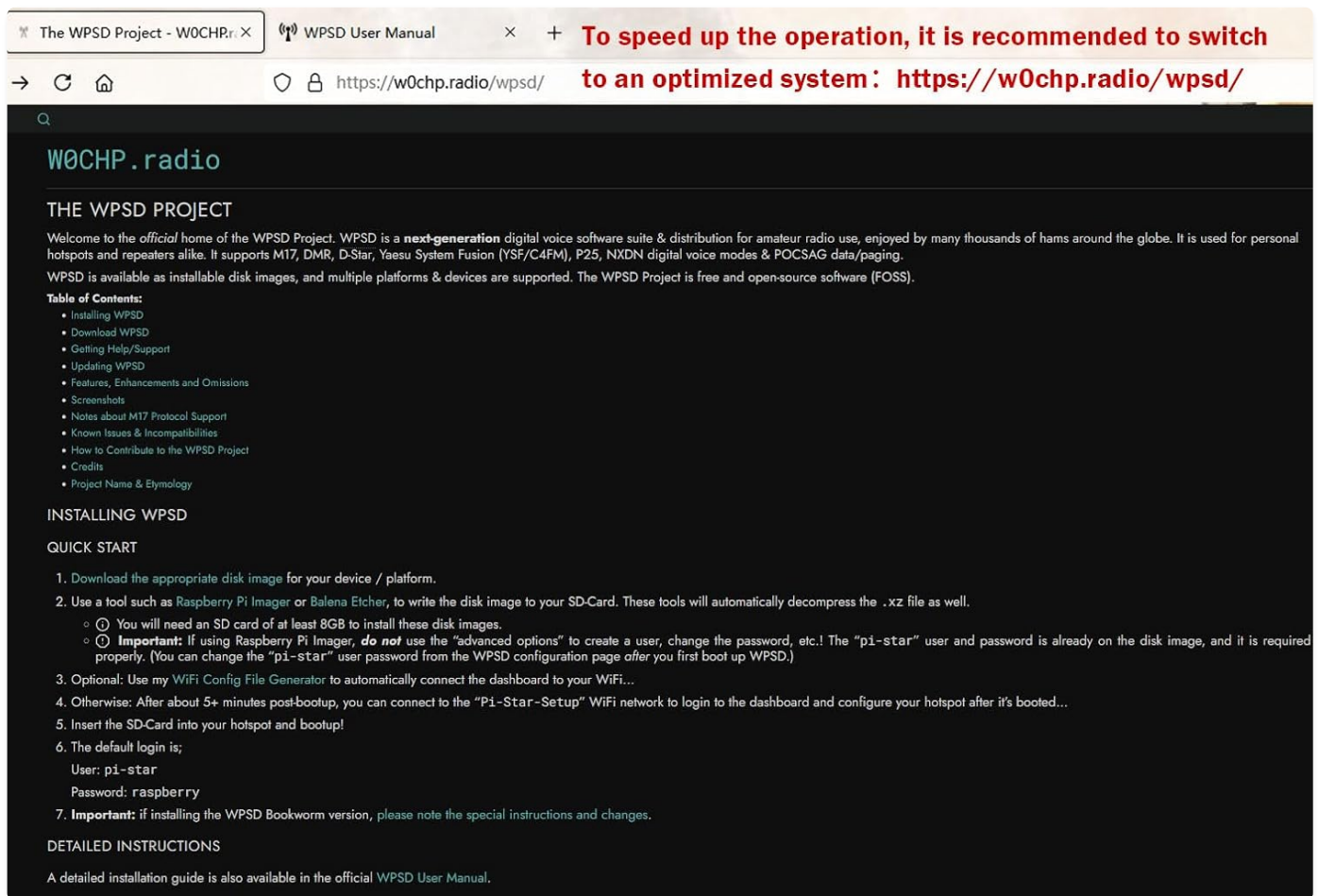
Figure 3.2: The WPSD Project website, a resource for an optimized hotspot system.

4. OPERATION

4.1 Supported Digital Modes

The AURSINC MMDVM Hotspot supports a wide range of digital voice modes, including:

- **C4FM (System Fusion)**
- **YSF (Yaesu System Fusion)**
- **NXDN**
- **DSTAR**
- **P25**
- **DMR (Digital Mobile Radio)**

The device defaults to working with UHF frequencies. Configuration for specific modes and parameters can be adjusted within the Pi-Star dashboard.

4.2 Radio Frequencies

The supported radio frequencies are:

- **UHF:** 430-440 MHz
- **VHF:** 144-146 MHz

This upgraded version of the hotspot does not require setting RXOFFSET and TXOFFSET; they are defaulted to 0.

WPSD Digital Voice Dashboard for W0CHP

03:20:21 PM, Dec 29 — 👥 Profiles | 📶 Live Caller | ⊞ Simple View | ☰ SysInfo | 🔒 Admin

CPU Load	CPU Temp	Memory Usage	Disk Usage	Network Traffic
12%	127°F / 53°C	169.7 MB of 474.69 MB	6.71 GB of 28.91 GB	100.05 MiB ↓ / 463.95 MiB ↑

Radio Status	TX Freq.	RX Freq.	Radio Mode	Modem Port	Modem Speed	TCXO Freq.	Modem Firmware
TX: DMR	433.817.500 MHz	438.817.500 MHz	Duplex	/dev/ttyAMA0	115,200 bps	14.7456 MHz	MMDVM_HS-Dual_Hat:v1.6.1

Mode Status

D-Star	DMR
YSF	P25
M17	NXDN
DMR X-Mode	YSF X-Mode
POCSAG	

Network Status

D-Star Net	DMR Net
YSF Net	P25 Net
M17 Net	NXDN Net
DMR2NXDN	DMR2YSF
YSF2DMR	YSF2NXDN
YSF2P25	APRS Net
POCSAG Net	

D-Star Status

RPT1	W0CHP B
RPT2	W0CHP G

D-Star Network
REF001 C DPlus/Out

ircDDB Host
ircv4.openquad.net

DMR Status

TS1	Enabled
TS2	Enabled
DMR ID	3170603
DMR CC	1

DMR Masters
BM 3103 United St...
DMR+ IPSC2-QUADNET
TGIF Network
SystemX United St...
XLX493 Module E

YSF Status [Linked]
US-America-Link
(YSF32592)

DG-ID Gateway Status
Current DG-ID
DG-ID: 0
(YSF: YSFGateway)
via Network

P25 Status

NAC	293
P25 Network	TG 31010 (P25-USA-ALABAMA)

NXDN Status

RAN	1
NXDN Network	TG 1200 (NX-1200-FLORIDA)

M17 Status

RPT	W0CHP-5 H
CAN	0
Reflector	M17-M17 C

APRS Gateway Status

Pool	noam.aprs2.net
Server	T2CAEAST

Publishing for Modes

DMR	ircDDB
YSF	DGId
NXDN	M17

Current / Last Caller Details

Callsign	Country	Name	Location	Mode	Target	Src	Dur(s)
W4WWM	🇺🇸	Will M Wright	Madison, Alabama, USA	DMR TS1	TG 8000321 (DMR+: Tech-Chat)	Net	TX 113+ sec

Gateway Activity

💬 Display TG Names [ON] — 🕑 Caller Details: [ON] — 🔇 Hide Kerchunks: [OFF]

Time (CST)	Callsign	Country	Name	Mode	Target		Src	Dur(s)	Loss	BER
03:18:28 PM Dec 29	W4WWM	🇺🇸	Will	DMR TS1	TG 8000321	(DMR+: Tech-Chat)	Net	TX		
03:18:16 PM Dec 29	W3XPT	🇺🇸	Michael	DMR TS1	TG 8000321	(DMR+: Tech-Chat)	Net	77.5	0%	0.0%
02:43:34 PM Dec 29	KB0MJH	🇺🇸	Christopher	DMR TS2	TG 3129	(BM: Missouri)	Net	0.5	0%	0.0%
02:21:04 PM Dec 29	WD9EKA	🇺🇸	Robert	DMR TS2	TG 3117	(BM: Illinois)	Net	2.0	54%	1.3%
02:15:00 PM Dec 29	VA1KMA	🇨🇦		YSF	DG-ID 0		Net	0.4	0%	0.0%
02:14:58 PM Dec 29	KJ4WNW	🇺🇸		D-Star	CQCQCQ		Net	36.8	0%	0.0%
02:14:19 PM Dec 29	DL4FCT/AMBE	🇩🇪		D-Star	CQCQCQ		Net	20.8	0%	0.0%
02:13:14 PM Dec 29	KB8LPR	🇺🇸		YSF	DG-ID 0		Net	34.6	0%	0.0%
02:11:19 PM Dec 29	KK4VTF/DZY	🇺🇸		D-Star	CQCQCQ		Net	20.8	0%	0.0%
02:09:43 PM Dec 29	N1ALF	🇺🇸	Aubrey	DMR TS1	TG 3100	(BM: USA Bridge)	Net	2.6	0%	0.0%
02:09:28 PM Dec 29	W9KHZ	🇺🇸	David	DMR TS2	TG 93	(BM: North America)	Net	0.5	0%	0.0%
02:09:12 PM Dec 29	KN6DKQ	🇺🇸	Dennis	DMR TS1	TG 3100	(BM: USA Bridge)	Net	3.0	0%	0.0%
02:08:12 PM Dec 29	W5RKD	🇺🇸	Sean	DMR TS1	TG 3100	(BM: USA Bridge)	Net	9.5	0%	0.0%
02:06:01 PM Dec 29	KN6QQO	🇺🇸	Gregory	DMR TS1	TG 3100	(BM: USA Bridge)	Net	31.8	3%	0.0%
02:03:00 PM Dec 29	N1MRI	🇺🇸	Kevin	DMR TS2	TG 93	(BM: North America)	Net	0.8	0%	0.0%
02:02:36 PM Dec 29	W9KHZ	🇺🇸	David	DMR TS1	TG 3100	(BM: USA Bridge)	Net	0.5	0%	0.0%
02:00:57 PM Dec 29	W6ALB	🇺🇸	Andrew	DMR TS2	TG 93	(BM: North America)	Net	0.5	0%	0.0%
02:00:00 PM Dec 29	W0CHP	🇺🇸		DMR TS2	TG 93	(BM: North America)	RF	0.4	0%	0.7%
01:59:15 PM Dec 29	W0CHP	🇺🇸		DMR TS1	TG 93	(BM: North America)	RF	0.4	0%	0.2%
01:57:36 PM Dec 29	W0CHP-Y	🇺🇸		YSF	DG-ID 0		Net	0.6	0%	0.0%
01:57:24 PM Dec 29	W0CHP/INFO	🇺🇸		D-Star	CQCQCQ		Net	2.6	0%	0.0%
01:56:50 PM Dec 29	N8XHZ	🇺🇸		YSF	DG-ID 0		Net	2.5	0%	0.0%
01:55:43 PM Dec 29	K2WJS	🇺🇸		YSF	DG-ID 0		Net	0.3	0%	0.0%
01:55:23 PM Dec 29	VE2AEE/ID51	🇨🇦		D-Star	CQCQCQ		Net	8.1	0%	0.0%
01:52:37 PM Dec 29	SP5NR	🇵🇱		YSF	DG-ID 0		Net	0.2	0%	0.0%
01:49:53 PM Dec 29	PE2K/RQM5	🇵🇱		D-Star	CQCQCQ		Net	1.2	0%	0.0%
01:48:37 PM Dec 29	G0GEP/705	🏴		D-Star	CQCQCQ		Net	1.4	0%	0.0%
01:46:46 PM Dec 29	G3TXA	🏴		D-Star	CQCQCQ		Net	0.3	0%	0.0%
01:44:31 PM Dec 29	WD5FBW	🇺🇸		YSF	DG-ID 0		Net	0.5	0%	0.0%
01:42:03 PM Dec 29	GM7VFR	🏴		YSF	DG-ID 0		Net	5.5	0%	0.0%
01:41:27 PM Dec 29	VE6DZ/GARY	🇨🇦		D-Star	CQCQCQ		Net	130.8	0%	0.0%
01:39:13 PM Dec 29	W0ZWA	🇺🇸		D-Star	CQCQCQ		Net	36.3	0%	0.0%
01:37:05 PM Dec 29	N6ADJ	🇺🇸		YSF	DG-ID 0		Net	0.4	0%	0.0%
01:32:53 PM Dec 29	DA6SPX	🇩🇪		YSF	DG-ID 0		Net	4.7	0%	0.0%
01:31:28 PM Dec 29	K8UHF	🇺🇸		YSF	DG-ID 0 at KB8DQQ		Net	5.7	0%	0.0%
01:27:50 PM Dec 29	KO4YFE	🇺🇸		YSF	DG-ID 0		Net	0.4	0%	0.0%
01:27:14 PM Dec 29	SQ5AKC	🇵🇱		M17	ALL		Net	2.2	---	---
01:27:10 PM Dec 29	SP5QIR	🇵🇱		M17	ALL		Net	12.6	---	---
01:26:27 PM Dec 29	KB2KBD-KEN	🇺🇸		YSF	DG-ID 0		Net	3.6	0%	0.0%
01:25:29 PM Dec 29	HC1TCH	🇪🇨		YSF	DG-ID 0		Net	1.1	0%	0.0%
01:24:26 PM Dec 29	KB8IWO	🇺🇸		NXDN	TG 1200	(NX-1200-FLORIDA)	Net	1.0	---	---
01:23:14 PM Dec 29	WB3GTM	🇺🇸		NXDN	TG 1200	(NX-1200-FLORIDA)	Net	1.3	---	---
01:23:07 PM Dec 29	N1JXX	🇺🇸		NXDN	TG 1200	(NX-1200-FLORIDA)	Net	8.1	---	---
01:19:20 PM Dec 29	WW4BB	🇺🇸		YSF	DG-ID 0		Net	0.3	0%	0.0%
01:09:51 PM Dec 29	KG6EBJ	🇺🇸		YSF	DG-ID 0		Net	4.6	0%	0.0%
01:05:19 PM Dec 29	WD9HBA	🇺🇸	David	DMR TS2	TG 3117	(BM: Illinois)	Net	4.1	0%	0.2%
01:04:08 PM Dec 29	PD0RAA	🇳🇱		YSF	DG-ID 0		Net	1.3	0%	0.0%

Local RF Activity

Time (CST)	Callsign	Mode	Target		Dur(s)	BER	RSSI
02:00:00 PM Dec 29	W0CHP	DMR TS2	TG 93	(BM: North America)	0.4s (1 hr ago)	0.7%	S9+46dB (-47 dBm)
01:59:15 PM Dec 29	W0CHP	DMR TS1	TG 93	(BM: North America)	0.4s (1 hr ago)	0.2%	S9+46dB (-47 dBm)

Figure 4.1: Pi-Star Digital Voice Dashboard, providing real-time operational status.

5. MAINTENANCE

5.1 Firmware Updates

The MMDVM hotspot board supports firmware updates. While it comes with Firmware V1.5.2, it can be updated to V1.6.1, especially if you switch to the WPSD system. Instructions for updating the MMDVM_HS firmware for WPSD 1.6.1 can be found at:

https://jumbo5566.github.io/

5.2 General Care

- Keep the device in a dry environment, away from direct sunlight and extreme temperatures.
- Avoid dropping the device or subjecting it to strong impacts.
- Clean the exterior with a soft, dry cloth. Do not use liquid cleaners.

6. TROUBLESHOOTING

6.1 Device Cannot Connect to Network

If the device fails to connect to the network after setup, try the following:

- **Verify Wi-Fi Settings:** Double-check that the Wi-Fi SSID and password entered in the Pi-Star configuration are correct and that the network is 2.4GHz with WPA encryption.
- **Reflash SD Card:** If connectivity issues persist, reflash the SD card using the provided firmware package. The package can be downloaded from: Google Drive Link.

6.2 Signal Reception or Transmission Issues

To test whether your device can receive or transmit signals, refer to the following website:

https://m7spi.co.uk/mmdvmcal/

If you continue to experience issues with signal reception or transmission, please contact AURSINC customer support for assistance.

7. SPECIFICATIONS

Feature	Detail
Product Dimensions	4 x 4 x 2 inches
Item Weight	4.6 ounces
Connectivity Technology	Wi-Fi (2.4GHz only)
Compatible Devices	Laptop (for configuration)
Total Ethernet Ports	1 (via adapter)
Color	Black
Radio Frequency	UHF: 430-440 MHz, VHF: 144-146 MHz
Supported Modes	C4FM, YSF, NXDN, DSTAR, P25, DMR
Firmware Version	V1.5.2 (upgradable to V1.6.1)

8. WARRANTY AND SUPPORT

For any technical assistance, troubleshooting, or inquiries regarding your AURSINC MMDVM Hotspot, please contact AURSINC customer support directly. While specific warranty details are not provided in this manual, extended protection plans may be available for purchase separately.
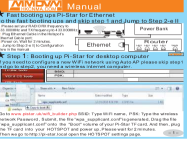
Please refer to your purchase documentation or the AURSINC official website for the most current support contact information and warranty policies.

You can also find additional resources and an installation manual (PDF) at the following link:Installation Manual (PDF).

Related Documents - MMDVM Hotspot with Raspberry Pi Zero W

	Amateur Radio Notes: Pi-Star - Comprehensive Guide Explore Pi-Star, a powerful software for amateur radio digital voice hotspots. This guide covers setup, configuration, troubleshooting, and links to essential resources, articles, and community forums.
	Duplex Hotspot User Manual: Setup and Configuration with Pi-Star A comprehensive guide for setting up and configuring a Duplex hotspot using Pi-Star software. Covers hardware connection, network configuration (LAN and WiFi), Pi-Star setup for DMR and YSF modes, radio programming for popular models, and troubleshooting common issues.
	Radioddity HOTSPOT Multi-Mode IP Gateway User Manual User manual for the Radioddity HOTSPOT, a DMR, YSF, P25, D-STAR Multi-Mode IP Gateway. Includes hardware specifications, setup instructions, and Pi-STAR configuration details for amateur radio enthusiasts.

[MMDVM Multi-Mode Digital Voice Modem User Manual and Configuration Guide](#)

This document provides a user manual and configuration guide for the MMDVM (Multi-Mode Digital Voice Modem) hotspot, detailing setup for simplex mode, hardware configuration, and FCC compliance information.

[MMDVM Pi-Star Hotspot: Setup, Configuration, and User Manual](#)

Comprehensive guide to setting up and configuring your MMDVM Pi-Star digital voice hotspot, covering Ethernet and WiFi connections, initial setup, wireless configuration, and general settings. Includes FCC warnings and troubleshooting tips.

[STM32-DVM-NanoPi v.1 Setup Guide - Repeater Builder](#)

A comprehensive setup guide for the Repeater Builder STM32-DVM-NanoPi v.1, an MMDVM Digital Voice Module. Learn how to connect, configure Pi-Star, and set up the OLED display.