AURSINC 20200

AURSINC MMDVM Duplex Hotspot Module V1.5.2 with OLED Display User Manual

Model: 20200

1. Introduction

The AURSINC MMDVM Duplex Hotspot Module V1.5.2 is designed for digital amateur radio communication, supporting various modes such as DMR, P-25, D-Star, and System Fusion. This module features a 0.96-inch OLED display and is compatible with a range of Raspberry Pi models, including Pi 1, 2/2B, 3/3B/3B+, 4/4B, Pi Zero, and Pi Zero 2W. It utilizes a 32-bit ARM processor and offers up to 10mW RF power. The duplex design allows for two time slots on DMR, enhancing communication capabilities.

Figure 1: AURSINC MMDVM Duplex Hotspot Module with antennas and SMA connectors.

2. Package Contents

Verify that all items listed below are included in your package:

- 1x MMDVM Duplex Hotspot Module
- 2x Antenna
- 2x SMA socket (right-angle adapters)

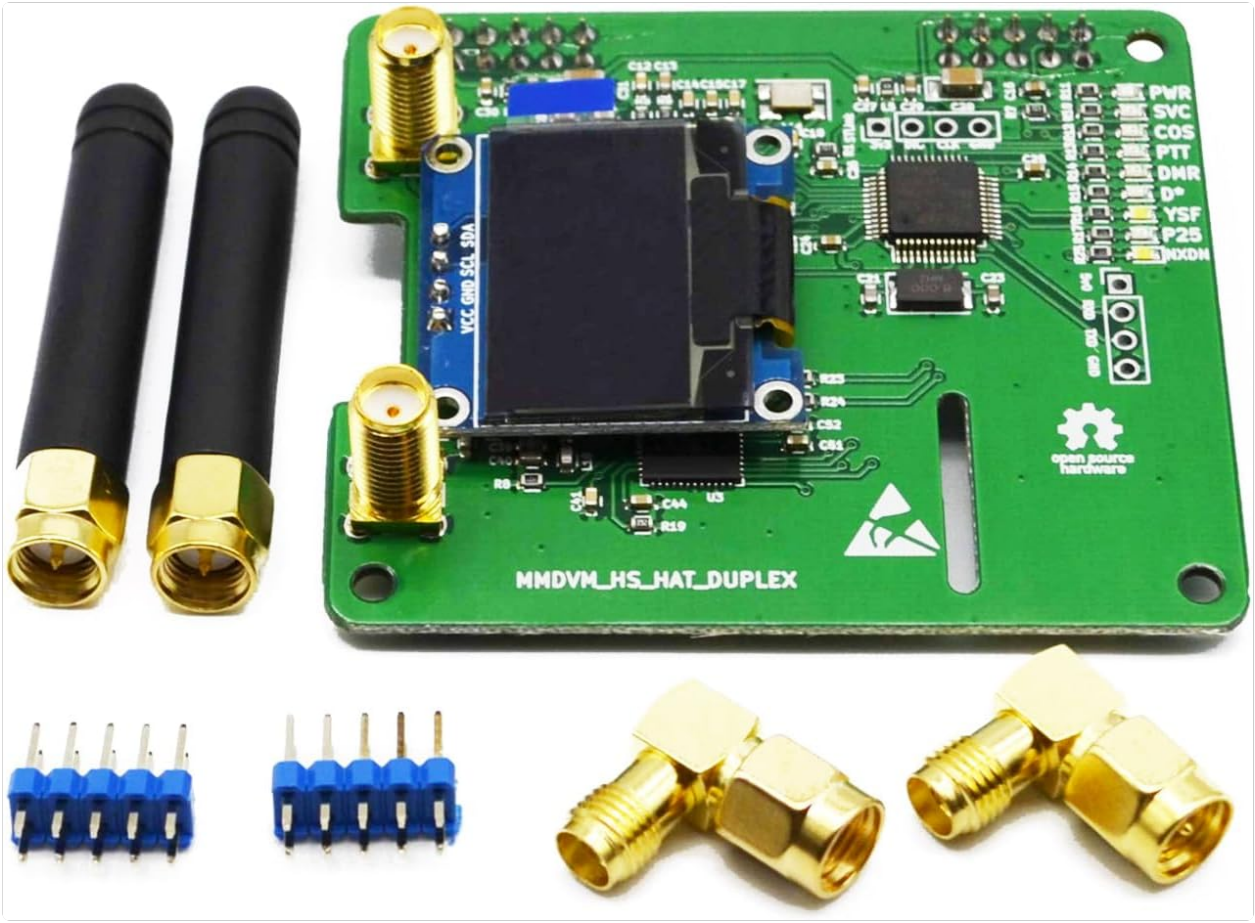


Figure 2: Contents of the AURSINC MMDVM Duplex Hotspot Module package, including the module, two antennas, and two SMA right-angle adapters.

3. Setup

This section outlines the steps to physically set up your AURSINC MMDVM Duplex Hotspot Module with a Raspberry Pi.

3.1 Compatibility

The module is compatible with the following Raspberry Pi models:

- Raspberry Pi 1
- Raspberry Pi 2/2B
- Raspberry Pi 3/3B/3B+
- Raspberry Pi 4/4B
- Raspberry Pi Zero
- Raspberry Pi Zero 2W

3.2 Physical Assembly

1. **Attach the Module to Raspberry Pi:** Carefully align the 40-pin GPIO header on the MMDVM Duplex Hotspot Module with the corresponding pins on your Raspberry Pi. Gently press down until the module is securely seated.
2. **Connect Antennas:** Screw the two provided antennas onto the SMA connectors on the MMDVM module. Ensure they are finger-tight.
3. **(Optional) Connect SMA Sockets:** If your enclosure requires it, attach the two SMA right-angle adapters to the module's SMA ports before screwing on the antennas.

4. **Power Supply:** Connect a stable 5V power supply to your Raspberry Pi. A power supply rated for at least 3.5A is recommended to prevent operational issues.

Figure 3: Installation examples showing the MMDVM Duplex Hotspot Module mounted on different Raspberry Pi models, including Pi Zero and standard Pi boards, within various enclosures.

4. Operation

Once the module is physically connected and your Raspberry Pi is powered on with appropriate software (e.g., Pi-Star), the module will begin operation. The onboard 0.96-inch OLED display provides real-time status information, and LEDs indicate various operational states.

4.1 LED Indicators

The module features several LEDs to indicate its status:

- **PWR:** Power indicator.

- **SVC:** Service indicator.
- **COS:** Carrier Operated Switch.
- **PTT:** Push-To-Talk indicator.
- **DMR:** Digital Mobile Radio mode indicator.
- **YSF:** Yaesu System Fusion mode indicator.
- **P25:** Project 25 mode indicator.
- **NXDN:** Next Generation Digital Narrowband mode indicator.

Figure 4: A detailed view of the MMDVM Duplex Hotspot Module, highlighting the 0.96-inch OLED display and the array of status LEDs (PWR, SVC, COS, PTT, DMR, YSF, P25, NXDN).

4.2 Duplex Functionality

This module supports duplex operation, allowing for two independent time slots on DMR. This enables more

efficient use of the radio spectrum and can facilitate simultaneous communication paths.

5. Configuration Tips

Proper software configuration is essential for optimal performance. These tips are primarily for use with Pi-Star software.

5.1 Pi-Star Settings

- **Modem Selection:** In the Pi-Star configuration, select STM32_HS_GPIO as the modem type. Any modem type ending in GPIO should be supported.
- **Radio/Modem Type:** Set this to STM32-DVM/MMDVM_HS-Raspberry pi Hat(GPIO).
- **Frequency Settings:**
  - UHF: 433-900MHz
  - VHF: 144-220 MHz (Main band: 144-148, 219-225, 420-475, 842-950)
  - Recommended amateur band: 430-440 MHz.
  - **Note:** Set TX = 0, RX = 0 in the frequency configuration.
- **OLED Display Configuration:**
  - To ensure the screen remains on:
    a. In the Pi-Star configuration, set "OLED Type" to "OLED Type 3".
    b. Set "Port" to "modem".
    c. In the Expert section, navigate to "MMDVM host" and scroll to the "OLED" section.
    d. Set LogoScreensaver to 1. This setting prevents the screen from going blank when idle.
- **Mode Selection:** Choose between DUPLEX Mode and SIMPLE Mode based on your operational requirements.

5.2 Firmware Update

To update the firmware, access the Pi-Star terminal via SSH (user:pi-star, pass: raspberry) and run the following command:

```
sudo pistar-mmdvmhshatflash hs_dual_hat
```

If the above command does not work, refer to the official MMDVM documentation or community resources for alternative update methods.

6. Maintenance

The AURSINC MMDVM Duplex Hotspot Module is designed for reliable operation with minimal maintenance. Adhering to these guidelines will help ensure its longevity:

- **Cleanliness:** Keep the module free from dust and debris. Use a soft, dry cloth for cleaning. Avoid liquid cleaners.
- **Environmental Conditions:** Operate the module in a dry environment, away from extreme temperatures and humidity.
- **Power Supply:** Always use a stable and appropriately rated 5V power supply for your Raspberry Pi to prevent damage or erratic behavior.
- **Firmware Updates:** Periodically check for and apply firmware updates as recommended by the Pi-Star community or AURSINC to benefit from performance improvements and bug fixes.

7. Troubleshooting

If you encounter issues with your MMDVM Duplex Hotspot Module, refer to the following common problems and solutions:

7.1 OLED Display Not Lighting Up

- **GPIO Conflicts:** Ensure no other HATs or devices are connected to the Raspberry Pi's GPIO pins that might conflict with the OLED display's pins. Remove any conflicting accessories and retest.
- **Software Configuration:** Verify that "OLED Type 3" is selected in Pi-Star's display type field and "Port" is set to "modem". Also, confirm that LogoScreensaver is set to 1 in the MMDVM host expert settings.
- **Secure Connection:** Ensure the MMDVM module is securely seated on the Raspberry Pi's GPIO header.

7.2 Module Not Functioning Correctly (e.g., No Transmit/Receive)

- **Power Supply:** An underpowered Raspberry Pi can cause instability. Use a robust 5V power supply rated for at least 3.5A.
- **Modem Selection:** Double-check that STM32_HS_GPIO is correctly selected as the modem type in Pi-Star.
- **Frequency Settings:** Confirm that TX and RX frequencies are correctly configured (TX=0, RX=0) and within the module's operating range.
- **Firmware:** Ensure the module's firmware is up to date. Refer to the firmware update section.
- **Antenna Connection:** Verify that both antennas are securely connected to the module.

7.3 General Instability or Errors

- **Pi-Star Logs:** Check the Pi-Star dashboard logs for any error messages that might indicate the root cause.
- **Re-flash Pi-Star:** If software configuration becomes problematic, consider re-flashing your Pi-Star SD card with a fresh image.
- **Community Support:** Consult online forums and communities dedicated to MMDVM hotspots and Pi-Star for further assistance.

8. Specifications

Feature	Detail
Model Number	20200
Processor	32-bit ARM
RF Power	Up to 10mW
Frequency Range (UHF)	433-900MHz
Frequency Range (VHF)	144-220 MHz (Main band: 144-148, 219-225, 420-475, 842-950)
Supported Modes	DMR, P-25, D-Star, System Fusion, NXDN
Display	0.96-inch OLED

Feature	Detail
Crystal	Original ECS-TXO-3225-147.4-TR from USA
Duplex Operation	Yes (two time slots on DMR)
Compatibility	Raspberry Pi 1, 2/2B, 3/3B/3B+, 4/4B, Pi Zero, Pi Zero 2W
Item Weight	2.46 ounces
Package Dimensions	3.7 x 3.66 x 1.26 inches

9. Warranty and Support

9.1 Customer Support

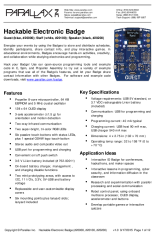
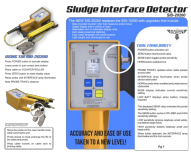
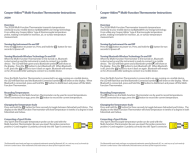
AURSINC is dedicated to providing professional electronic products and customer satisfaction. If you have any questions, concerns, or require assistance with your MMDVM Duplex Hotspot Module, please contact AURSINC customer support. You can typically find contact information on the official AURSINC website or through your purchase platform.
For additional resources and community support, consider visiting online forums and groups dedicated to MMDVM hotspots and Pi-Star software, where experienced users often share valuable insights and troubleshooting tips.

9.2 Product Warranty

Specific warranty details may vary by region and retailer. Please refer to the documentation provided with your purchase or contact AURSINC customer support for information regarding the product warranty.

Related Documents - 20200

	NanoVNA Resources: Firmware, Software, and User Guides Find essential resources for the NanoVNA, including firmware downloads, VNA-QT software, NanoVNA-Saver, and user guides. Access the latest updates and community information.

	[PI-STAR V4.1.5 Software Package: Troubleshooting and Reflashing Guide] Download and instructions for the PI-STAR V4.1.5 software package to resolve common MMDVM hotspot issues like WiFi and internet connectivity loss. Includes guidance on reflashing the MicroSD card and understanding device modes.
	[Hackable Electronic Badge: Features, Specifications, and Applications] Explore the Parallax Hackable Electronic Badge (#20000, #20100, #20200). This guide details its features, including an 8-core Propeller microcontroller, OLED display, accelerometer, RGB LEDs, and prototyping areas, along with application ideas for events and education.
	[Raven SID-20200 Sludge Interface Detector | Technical Specifications and Operation] Detailed information on the Raven SID-20200 Sludge Interface Detector, including features, specifications, tool familiarity, usage instructions, and maintenance.
	[Cooper-Atkins 20200 Multi-Function Thermometer Instructions] Instructions for the Cooper-Atkins 20200 Multi-Function Thermometer, detailing its features, operation, and specifications, including Bluetooth connectivity and temperature measurement capabilities.