BUILD YOUR OWN AIS RECEIVER

(PART 1)

OrSoft Mariner PRO Compatible, Low-Cost Dual-Channel AIS System Setup

There is no need to spend thousands of dollars on closed-box AIS devices. We have turned the smartphone in your pocket into a radar with OrSoft Mariner PRO. Now it's time to build our own hardware that will whisper the signals of other boats at sea to that radar.

By following the steps in this guide, you will build your own professional AIS receiver for a ridiculously low cost of around 50-60 USD. You don't need to be a software developer or an electronics expert; just read and apply!

STEP 1: Shopping List (Materials) First, we need to procure these 4 simple pieces of hardware online:

1. **Raspberry Pi:** A credit card-sized mini computer. (Raspberry Pi 3 or 4 model is more than enough).
2. **RTL-SDR USB Dongle:** A small USB radio receiver, usually blue or silver, with an antenna input at the end. (Any model with the RTL2832U chip). This device will be the "ear" of our system.
3. **VHF Antenna (Marine Type):** A standard marine antenna to catch marine radio frequencies (162 MHz). (You can mount it on your boat's stern pulpit, solar panel arch, or spreader).
4. **Memory Card and DC-DC Step Down Converter:** A high-quality MicroSD card of at least 16 GB. Also, a "12V/24V to 5V (Minimum 2.5 Amps) Type-C or Micro USB Converter" module to power the Raspberry Pi from your boat's 12V or 24V battery system. (This is essential for safely drawing power directly from the battery).

STEP 2: Preparing the Brain (OS Installation) To make the Raspberry Pi work, we need to install an operating system on the memory card. We will do this on your standard computer (Windows or Mac).

1. Download and install the Raspberry Pi Imager program (raspberrypi.com/software) on your computer.
2. Insert your memory card into your computer and open the program.
3. **CHOOSE DEVICE:** Select the Raspberry Pi model you have.
4. **CHOOSE OS:** Select "Raspberry Pi OS (32-bit)" from the list.
5. **CHOOSE STORAGE:** Select the memory card you inserted.
6. **VERY IMPORTANT (Settings):** Click the Gear (Settings) icon on the screen.
    - Check the "Enable SSH" box. (Select 'Use password authentication').
    - Set the username as "pi", and set a password you will not forget.
    - Check the "Configure wireless LAN" box and enter the name and password of the Wi-Fi network (router) on your boat. (Note: If there is no router on the boat, we will cover how to make the Raspberry Pi its own Wi-Fi network in "Part 2" of our guide).

7. Click **SAVE** and then **WRITE** to start the process. Remove the card from the computer when finished.

STEP 3: Assembly

1. Insert the prepared memory card into the slot underneath the Raspberry Pi.
2. Plug the RTL-SDR (Radio Receiver) device into an empty USB port on the Raspberry Pi.
3. Screw the cable of your VHF Antenna into the slot at the back of the RTL-SDR device.
4. Plug the end of your 12V/24V to 5V converter into the Raspberry Pi's power input to start powering the device from the boat battery. (The device will turn on and automatically connect to the Wi-Fi network on the boat).

STEP 4: Software Magic (AIS-Catcher Installation) Our device is now connected to the boat's Wi-Fi network. Now we will connect to this mini device from our computer to complete the installation.

1. Open the Command Prompt (Terminal or CMD) on your computer.
2. Type this command and press Enter: ssh pi@raspberrypi.local
3. If it asks if you are sure, type "yes" and enter the password you set. You are now inside the device!
4. Now copy and paste the following lines into the Terminal one by one, pressing Enter after each line (Wait for the text to finish scrolling on the screen as the system installs):

sudo apt-get update && sudo apt-get upgrade -y sudo apt-get install git make gcc g++ rtl-sdr librtlsdr-dev -y git clone https://github.com/jvde-github/AIS-catcher.git cd AIS-catcher make sudo make install

Congratulations! You have completed the software installation without any errors.

STEP 5: Broadcasting and Connection to OrSoft Mariner PRO In the final step, we will run the device and have it send the data it receives to your phone (OrSoft Mariner PRO) over the boat's Wi-Fi network.

1. Paste this command into the Terminal screen and press Enter:

AIS-catcher -u 0.0.0.0 10110

(This command runs AIS-catcher and broadcasts all the ship signals it finds over the air through UDP port 10110 within your boat's Wi-Fi network.)

What You Need to Do in OrSoft Mariner PRO:

1. Ensure that your phone/tablet is connected to the same Wi-Fi network as the Raspberry Pi.
2. Open the OrSoft Mariner PRO app and enter the Settings menu.
3. Select "Internal Data (Wi-Fi/NMEA)" as the Data Source.
4. Enter the IP address of the Raspberry PI device in the IP Address section, type 10110 in the UDP Port box, and press Save. (If you don't know the Raspberry IP, you can find it in seconds with a simple "Fing" or "Network Scanner" app on your mobile phone).

That's it, Captain! You will now start seeing zero-latency, real AIS targets coming entirely from the hardware you built yourself on the radar screen of your phone or tablet. Your collision avoidance system (CPA/TCPA) is active without needing any external world or internet connection. Fair winds!

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(PART 2)

For Boats Without a Router: Turning Raspberry Pi into an Independent Wi-Fi Network

We may not always have an internet router when out on the open seas or in secluded bays. No problem! In this guide, we will tell the Raspberry Pi we set up in Part 1, *"You are now a router, create your own Wi-Fi network."* This way, your mobile phone will connect directly to the Raspberry Pi.

STEP 1: Connecting to the Device *(You only need to do this once while connected to the same network at home or by sharing your phone's internet.)*

1. Open the **Command Prompt (Terminal or CMD)** on your computer.
2. Type `ssh pi@raspberrypi.local`, press Enter, and enter your password to connect to the device.

STEP 2: Creating Our Own Wi-Fi Network On modern systems, this is done with a single command. Copy and paste the following command into the Terminal screen and press Enter:

```
sudo nmcli device wifi hotspot ifname wlan0 ssid
OrSoft_AIS_Network password 12345678
```

(Note: This command creates a Wi-Fi network named "OrSoft_AIS_Network" with the password "12345678". You can change the network name and password in the command before pressing Enter if you wish).

STEP 3: Setting Auto-Start To ensure this Wi-Fi network starts automatically every time you turn on the boat's battery switch, enter the following command and press Enter:

```
sudo nmcli connection modify Hotspot connection.autoconnect yes
```

That's it! You can close the black screen on your computer. Your device is now broadcasting its own Wi-Fi network in the middle of the sea.

STEP 4: Connecting OrSoft Mariner PRO

1. Go to your phone's Wi-Fi settings, find and connect to the **OrSoft_AIS_Network** (Password: 12345678).
2. Open the OrSoft Mariner PRO app and enter the **Settings** menu.
3. Select **"Internal Data (Wi-Fi/NMEA)"** as the Data Source.
4. Type **10.42.0.1** (the default Hotspot address of the Raspberry Pi) in the IP Address box.
5. Type **10110** in the UDP Port box and press Save.

Congratulations, Captain! Even if you are in the middle of the ocean, you now have your own closed-circuit radar system, completely independent of the outside world. Your collision avoidance system is at your command. Fair winds!