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Calibrating SDR-AIS dongles

Calibrating DVB-T dongles accurately to receive AIS signal with OpenPlotter.

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INTRODUCTION

DVB-T dongles based on the Realtek RTL2832U chip can be used as a cheap one channel AIS receptors.

Every dongle will have a small frequency error as it is cheaply mass produced and not tested for accuracy. This frequency error can be adjusted entering a PPM (parts per million) offset value.

In this guide we will learn how to find that value to get accurate reads.



PARTS:

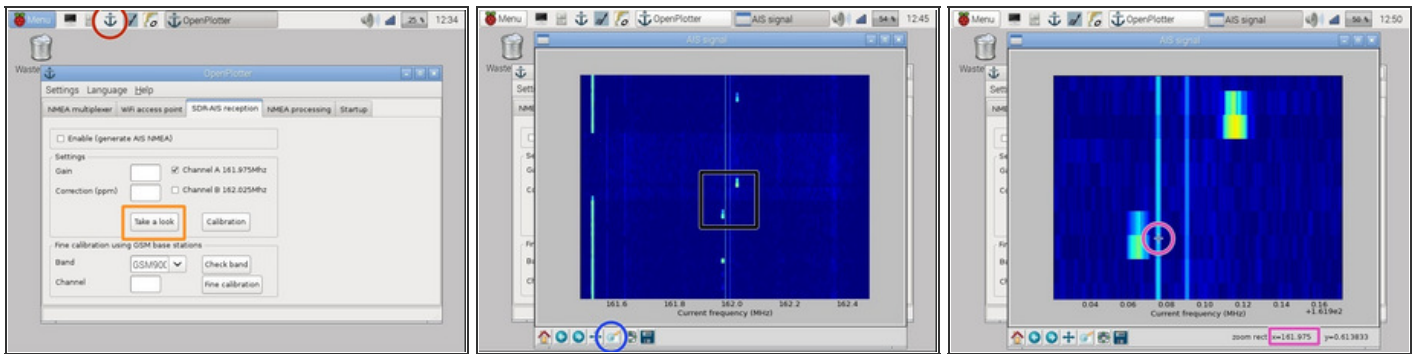
- [DVB-T / RTL-SDR dongle](#) (1)
New model

Step 1 — Connecting



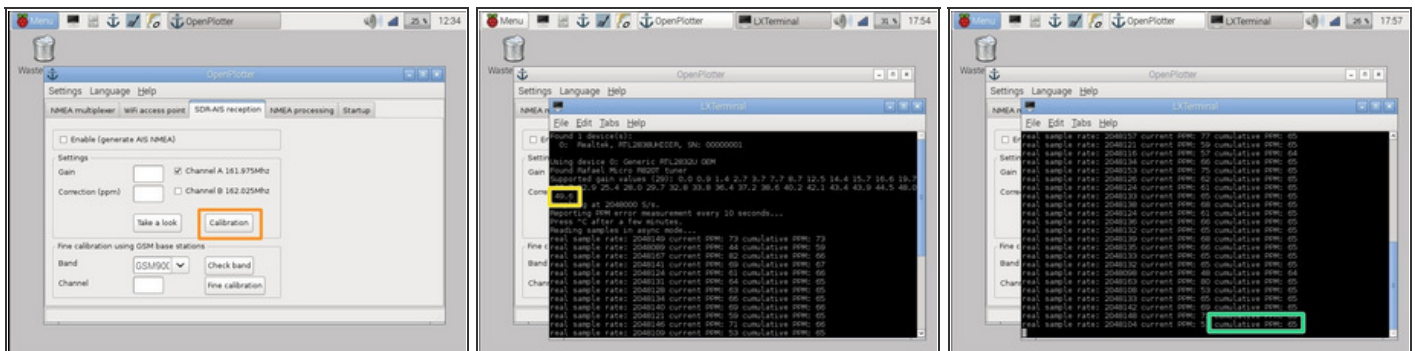
- Connect the dongle to a suitable antenna for AIS frequency with the right adapter or modify the connector of the supplied mini antenna. Some homemade antennas [here](#).
 - DVB-T dongles might need more power than the USB ports of your system can serve. In this case you should use an auto powered USB HUB.
- ⚠ Once connected, let it warm up for some minutes (10-20 minutes approx.) to reach its steady state operating temperature.

Step 2 — Take a look



- First, we will see if there are AIS signals around us and we are getting them.
- Open OpenPlotter
- Press *Take a look* and a new window will open with a waterfall representation of signals around AIS frequencies.
- That little marks are AIS signals from close boats. The left column is channel A (161.975Mhz) and the right one is channel B (162.025Mhz).
- Press the zoom button
- Select an area which incorporates both channels.
- Move the cursor through the screen until the x value is 161.975. The distance from the cursor to the center of the mark on the left is your ppm value.
- Let's find this value!

Step 3 — Pre-calibration



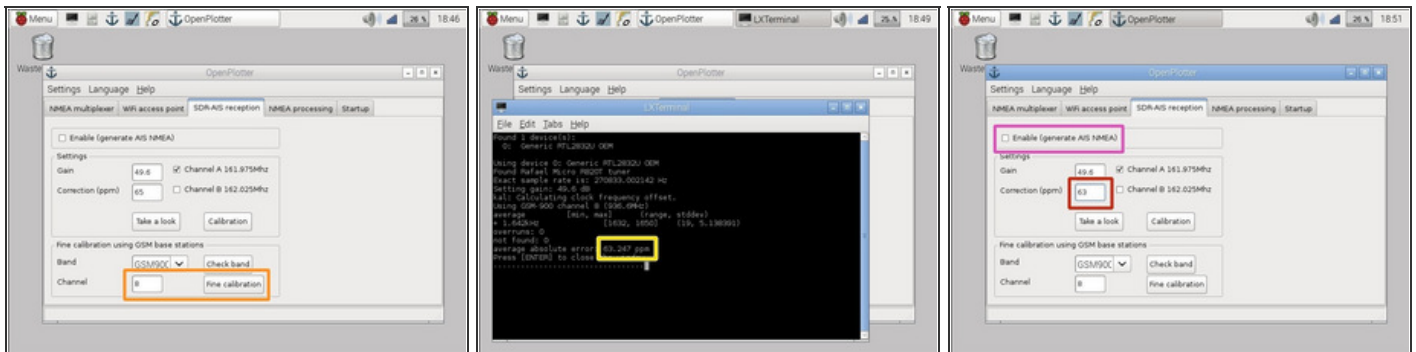
- Close the waterfall window and press *Calibration*. A new Terminal window will open.
- Write down the maximum supported gain value. In this case **49.6**.
- Wait for the cumulative ppm value to stabilize and write down it too. In this case **65**.

Step 4 — Fine calibration 1



- Close the Terminal window and fill in the *Gain* and *Correction* fields with the obtained values.
- Select the suitable band according to the map and press *Check band*.
- **i** GSM850: North America and Western South America. GSM900: Rest of the world.
- Wait for the system to check the band and write down the strongest channel (power). In this case channel **8**.

Step 5 — Fine calibration 2



- Close the Terminal window, fill in the *Channel* field with the obtained value and press *Fine calibration*.
- A new Terminal window will open. Wait for the system to check the channel and write down the *average absolute error*. In this case **63.247**.
- **This is your final ppm value!**
- Fill in the *Correction* field with your rounded ppm value. In this case **63**.
- Press *Enable* and that's all!

✦ AIS NMEA data will be present on **UDP localhost 10110**.

