

# Lab 4-1 Receiving Radio

💡 In this lab we are going to configure the RTL-SDR to receive radio signals, and discover the different features of SDR# (SDRSharp). You can either use the In-Class Windows Machines, or a personal device with an OS of your choice.

(Note: Setup for an OS other than Windows will vary.)

## Step 1: Configure the RTL-SDR drivers

Follow the instructions provided from the official documentation of the RTL-SDR linked [here](#). Navigate to the section titled “SDR# (SDRSharp) Set Up Guide” and follow the steps.

⚠️ **Be careful** when you reach the step where you are using Zadig.exe as you could accidentally overwrite an important driver on your machine! ⚠️

## Step 2: Configuring SDR#

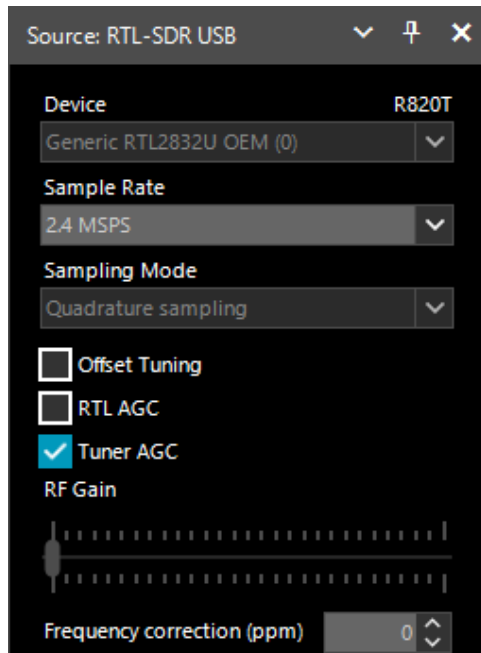
Now that the drivers are configured, we can begin exploring SDR#. There are many settings within SDR#, but we’re going to focus on a few to maximize the audio quality of the frequencies we’re receiving.

Under the *Radio* tab, we have several options to choose from. The main ones we’ll focus on are WFM, NFM, and AM.

- **WFM** (or Wideband Frequency Modulation) has a large frequency deviation, resulting in a wider spectrum usage. This allows for higher fidelity audio transmission, making it suitable for broadcasting applications like FM radio stations where high-quality audio is desired.
- **NFM** (or Narrowband Frequency Modulation) uses a narrower bandwidth. The frequency deviation is smaller, resulting in a narrower spectrum usage. This conserves bandwidth, making it suitable for applications where spectral efficiency is important, such as in two-way radio communication systems, walkie-talkies, and public safety radios.
- **AM** (or Amplitude Modulation) has historically been widely used for broadcasting, especially in the early days of radio. However, its usage has declined in favor of FM due to limitations in audio quality and susceptibility to interference. AM is still used in some broadcasting applications, particularly in regions with limited radio spectrum availability and for specific services like AM radio stations.

For the time being, select **WFM** (Wideband Frequency Modulation). But feel free to mess around with the other options when scanning and see their results!

Under the “Source: RTL-SDR USB” tab, check the ‘Tuner AGC’ box. Tuner AGC enables the RTL-SDR tuners Automatic Gain Control. The AGC's attempt to automatically optimize the signal-to-noise ratio of the signals.



Deliverable 1: Provide a screenshot of SDR# showing the RTL-SDR is recognized by the software (as shown above).

Deliverable 2: Provide a screenshot of SDR# showing you were successfully able to receive FM radio like the example below.

- What's the frequency?
- What type of content is being broadcasted?
- Is there any Metadata?

Deliverable 3: Record a 10-30 second snippet of the frequency you found. Can you hear it clearly? Did you use any additional techniques to “clear up” the frequency?

Tip: Noise Reduction can be your friend, if you can find it 😊

