



Mini-Workshop on Software Defined Radio Using the RTL-SDR

Setup of SDR#

This Quick Start Guide is also available at: <https://www.rtl-sdr.com/rtl-sdr-quick-start-guide/>

SDR# is the most commonly used SDR program on Windows. We recommend it as one of the easiest to setup and use with the RTL-SDR.

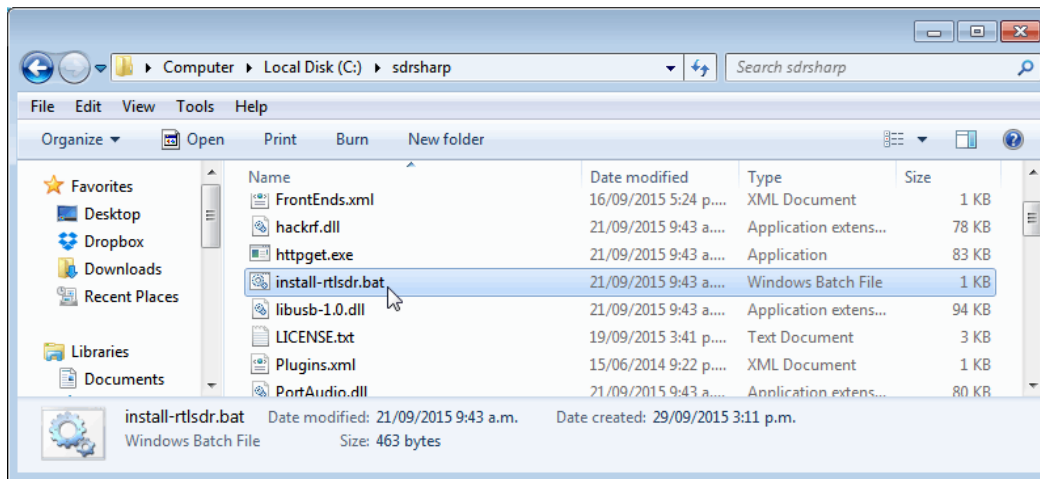
1. You must have the *Microsoft .NET 6.0 x86 Desktop Runtime* installed to use SDRSharp. Most modern PCs will have automatically updated to this already, unless you have specifically blocked these updates on your PC.
<https://dotnet.microsoft.com/en-us/download/dotnet/6.0>
2. Go to www.airspy.com and find the downloads button on the top menu. Next to the "Software Defined Radio Package" heading **click on the download button** to download *sdrsharp-x86.zip*. Do not download the community managed edition.
<http://www.airspy.com/>
3. Extract (unzip) *sdrsharp-x86.zip* to a folder on your PC. Do not run the files from within the zip file or the following steps will fail. Do not extract into a folder within the Program Files or Program Files (x86) directory or installation may fail as these folders are often automatically made read only by Windows. Create a file folder on the root directory as *C:\sdrsharp*
4. Double click on *install-rtlsdr.bat* from within the extracted folder. This will start a command prompt that will download all the drivers required to make SDRSharp work with RTL-SDR. The command prompt will automatically close after a few seconds when it is done. If the bat file ran successfully the files *rtlsdr.dll* and *zadig.exe* will be downloaded into the SDR# directory. If they were not downloaded then your PC or anti virus solution may be misconfigured and may have trouble running batch files.

If *install-rtlsdr.bat* fails to download the dll or zadig, do a manual driver installation.

<https://rtl-sdr.com/manual-installation-of-sdr>

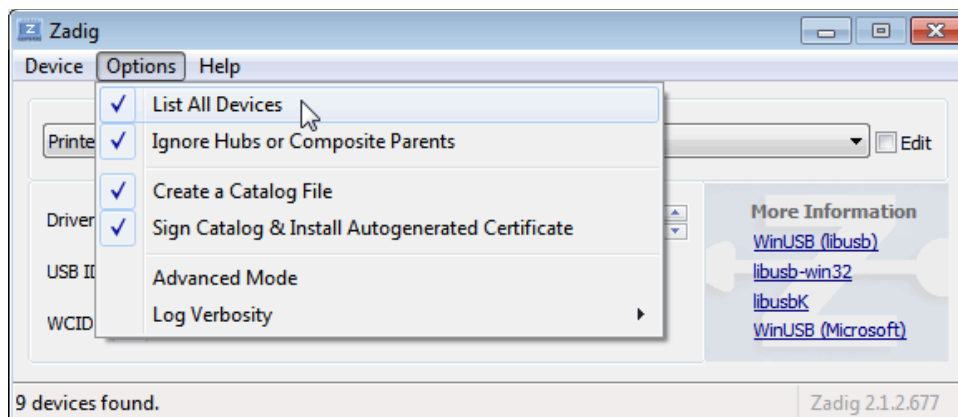
If Zadig is smaller than 5000 kB (5MB), the download has failed and you should download Zadig manually.

<https://zadig.akeo.ie/downloads/>



These steps from now on require you to have the RTL-SDR USB dongle which you receive at the Mini-Workshop and cannot be done now. They are given here for later reference.

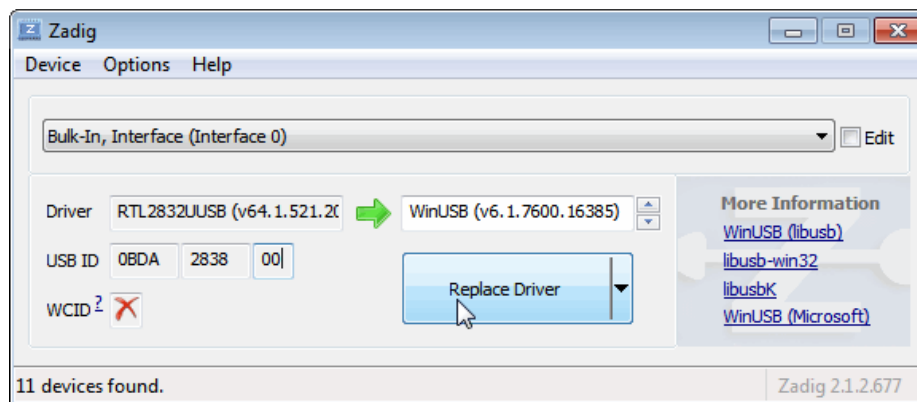
7. Plug in your dongle. Do not install any of the software that it came with (if any), and ensure that you wait a few seconds for plug and play to finish *attempting* to install the dongle (it will either fail or install Windows DVB-T TV drivers).
8. In the folder where you extracted the sdrsharp files find the file called *zadig.exe*. Right click this file and select "Run as administrator".
9. In Zadig, go to "*Options->List All Devices*" and make sure this option is checked. If you are using Windows 10 or 11, in some cases you may need to also uncheck "*Ignore Hubs or Composite Parents*".



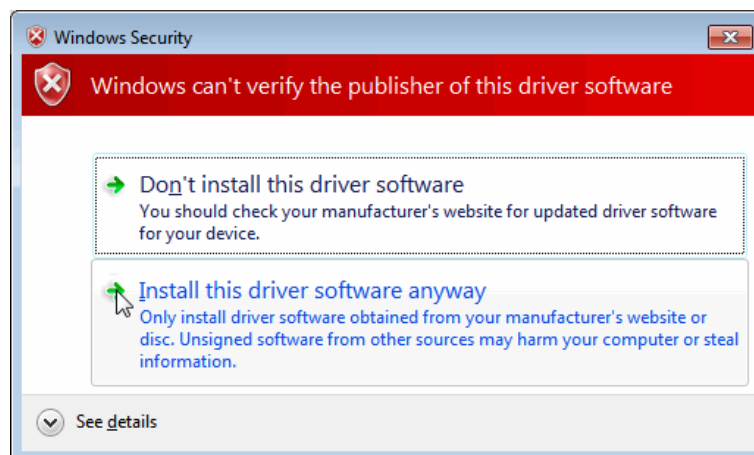
10. Select "*Bulk-In, Interface (Interface 0)*" from the drop down list. Make sure it is Interface 0 (ZERO), and not "1". On some PCs you may see something like *RTL2832UHIDIR* or *RTL2832U* instead of the bulk in interface. This is also a valid selection. Double check that USB ID shows "*0BDA 2838 00*" as this indicates that the dongle is selected.

WARNING: DO NOT select anything else or you will overwrite that device's driver! If you do you are likely to overwrite your mouse, keyboard, printer, soundcard drivers.

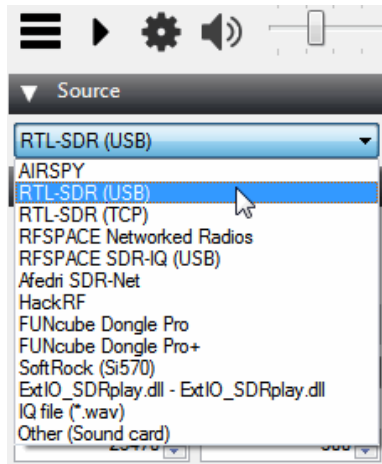
11. We need to install the *WinUSB* driver, so also ensure that *WinUSB* is selected in the box after the arrow next to where it says *Driver* (this is the default selection). The box to the left of the green arrow is not important, and it may show (NONE) or (RTL...). This left hand box indicates the currently installed driver, and the box to the right the driver that will be installed after clicking Replace/Install Driver.



11. Click *Replace Driver*. On some PC's you might get a warning that the publisher cannot be verified, but just accept it by clicking on "*Install this driver software anyway*". This will install the drivers necessary to run the dongle as a software defined radio.

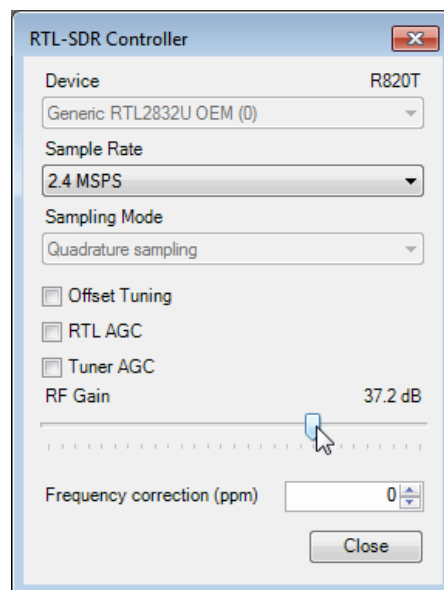


12. Open SDRSharp.exe and set the "Source" drop down box to 'RTL-SDR USB'.
This "Source" tab is on the lower left menu bar by default. On newer version of SDR# you may need to scroll down in the drop down box a little to find the RTL-SDR USB entry.
13. Press the Play button (the right facing triangle in the top left of the program).
Your RTL-SDR software radio should now be set up and ready to use. If everything has worked you should be able to start tuning to frequencies.



14. Don't forget to also adjust the RF gain settings by pressing the Configure button (looks like a cog/gear) up the top next to the Play button. By default the RF gain is set at zero. A gain of zero will probably receive nothing but very strong broadcast FM - increase the gain until you start seeing other signals.

To receive HF signals below 24 MHz with a RTL-SDR Blog V3, please see the V3 users guide at <https://www.rtl-sdr.com/v3>



After getting your RTL-SDR set up with SDR# we recommend investigating the following:

1. If you are using a RTL-SDR.com V3 dongle, view the V3 users guide to learn how to use the special features like HF direct sampling and the bias tee.
<https://www.rtl-sdr.com/v3>
2. Read our [SDR# Users Guide](https://www.rtl-sdr.com/sdrsharp-users-guide/) to learn what each setting in SDR# does.
<https://www.rtl-sdr.com/sdrsharp-users-guide/>
3. Check out all our [featured articles](https://www.rtl-sdr.com/category/article/) on this blog for various RTL-SDR related projects and tutorials at <https://www.rtl-sdr.com/category/article/>
4. Upgrade from the stock antenna. For optimal reception you should use an outdoor roof mounted antenna. The optimal antenna will depend on the frequency and project you are interested in, but for a general all purpose antenna we recommend a Discone or planar disk antenna.
<https://amzn.to/1PnZRQY>
<http://www.wa5vjb.com/references/PlanarDiskAntennas.pdf>
5. If you are using your RTL-SDR for HF with direct sampling mode or an upconverter then we recommended using SDR# with the special decimation drivers. This will allow you to zoom in on the small bandwidth signals used on HF without losing resolution.
<https://www.rtl-sdr.com/new-sdr-rtl-sdr-driver-lnamixervga-gain-settings-decimation/>
6. RTL-SDR.com has various RF accessories such as filters, LNA's and antennas for purchase.
<https://www.rtl-sdr.com/store>

