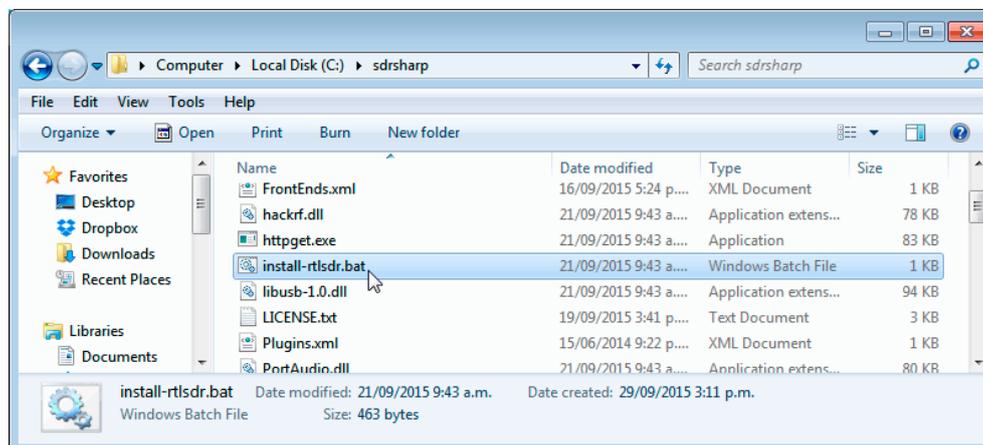


# SDR# (SDRSharp) Set Up Guide (Tested on Windows 10/8/7 32/64 Bit) (XP Incompatible)

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

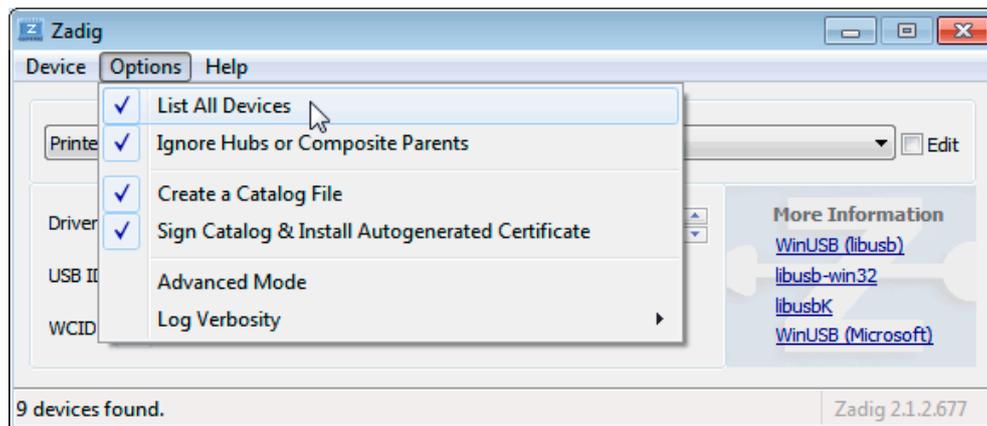
1. Purchase an RTL-SDR dongle. The cheapest and best for most applications is the R820T/R820T2 dongle. Information on purchasing one [can be found here](#).
2. You must have the Microsoft [.NET 4.6 redistributable](#) installed to use SDRSharp. Follow the link and install the redistributable. Most Windows 10 PCs should already have this installed by default, but PCs with older operating systems may need this to be installed in order to run SDR#. Note that .NET 4.6 is not compatible with Windows XP. If you are running XP please scroll down on this page and look for the HDSDR or SDR-Console install guides. Note that on some computers you may also need to install the [Visual C++ Runtime](#) if it is not already installed.
3. Go to [www.airspy.com](http://www.airspy.com) and find the downloads button on the top menu. Next to the “SDR Software Package” heading click on the download button to download sdrsharp.zip. [Note that we recommend downloading the x86 version](#) for now even if you have a 64-bit OS as the x86 version is a bit more stable currently.
4. **Extract** (unzip) sdrsharp.zip to a folder on your PC. (Important! Many people who have issues forget this step! Do not run the files from within the zip file or the following steps will fail). ([Also, do not extract into a folder within the Program Files directory](#), or installation may fail as these folders are often automatically made read only by Windows).
5. 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 (Check that the folder is not read only, [and not located in the Program Files directory](#)). If install-rtlsdr.dll fails, do a [manual driver installation](#).



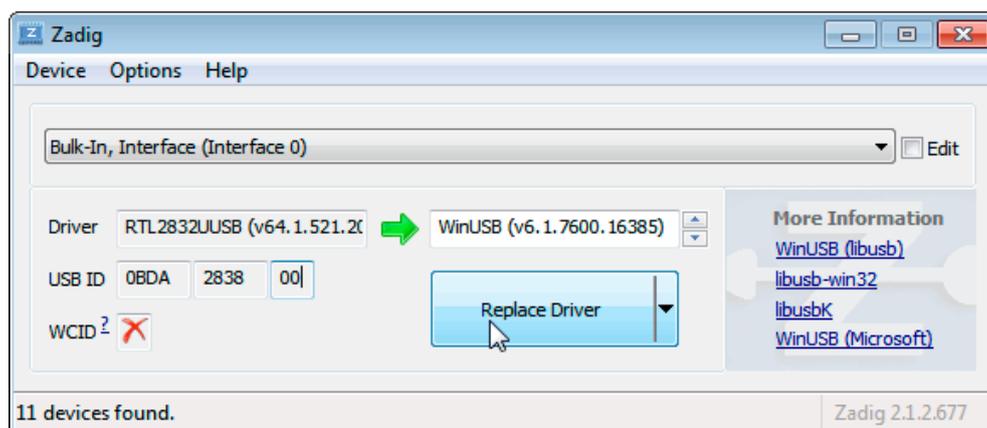
6. [Plug in your dongle](#). Do not install any of the software that it came with (if any), and ensure that you wait a few seconds for plug and play to finish *attempting* to install

the dongle (it will either fail or install Windows DVB-T drivers). If you've already installed the DVB-T drivers that came on the CD bundled with some dongles, uninstall them first.

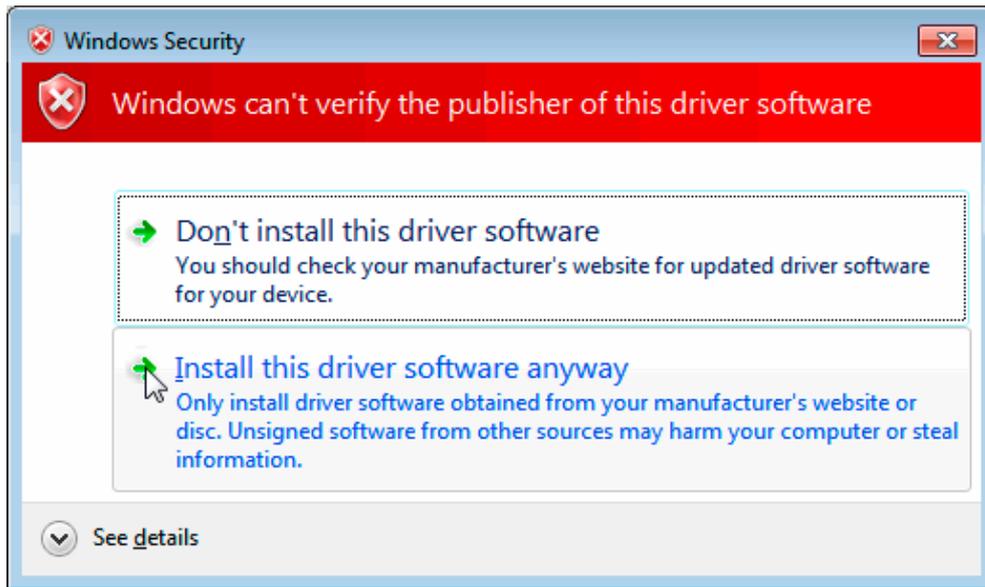
7. In the folder where you extracted the sdrsharp files find the file called **zadig.exe**. Right click this file and select **“Run as administrator”**.
8. In Zadig, go to **“Options->List All Devices”** and make sure this option is checked.



9. Select **“Bulk-In, Interface (Interface 0)”** from the drop down list. Note on some PCs you may see something like **RTL2832UHIDIR** or **RTL2832U** instead of the bulk in interface. This is also a valid selection. Do not select **“USB Receiver (Interface 0)”** however.
10. 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). – Note that there has been some confusion for a few people over this step. The goal is to install the WinUSB driver. So to be clear, the box to the left of the arrow shows the currently installed driver, whereas the box to the right of the arrow shows the driver that will be installed in the next step. The first time you open zadig the box on the left will show either 'None', or the default DVB-T drivers installed by Windows (RTL2832UUSB), depending on your Windows configuration and version.

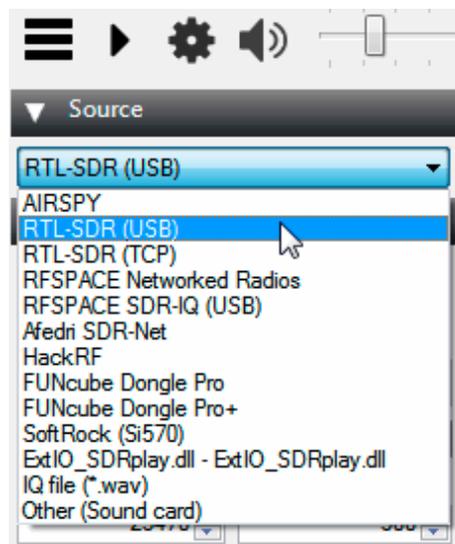


11. Click **Replace Driver**. On some PC's you might get a warning that the publisher cannot be verified, but just accept it by clicking on **“Install this driver software anyway”**. This will install the drivers necessary to run the dongle as a software defined radio. Note that you may need to run zadig.exe again if you move the dongle to another USB port, or want to use two or more dongles together.

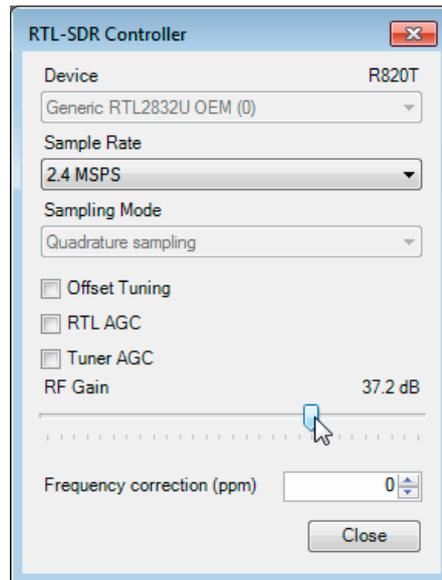


12. Open **SDRSharp.exe** (note that the first time you do this you may get a smartscreen message indicating that Windows has protected your PC, this is a false alarm. Simply click on “more info” and then “run anyway”). Set the drop down box in the “Source” tab on the top left to ‘RTL-SDR (USB)’.
13. Press the Play button (the right facing triangle). 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.

6



14. **Important!** Don't forget to also **adjust the RF gain settings** by pressing the Configure button (looks like a cog) 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.



## Next Steps

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

1. Check out all our [featured articles](#) on this blog for various RTL-SDR related projects and tutorials.
2. 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](#) (pdf).
3. If you are using your RTL-SDR for HF with an upconverter such as the [SpyVerter](#) 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.
4. Check out [our store](#) for various RF accessories such as filters, LNA's and antennas.

## Troubleshooting

- **I get the error “No Device Selected” when trying to start the dongle in SDR#.** Make sure you have run the install-rtlsdr.bat file, and that it has successfully downloaded the rtlsdr.dll file into the SDR# folder. If it is not downloaded, check that your folder is not set to “read only” (this sometimes happens automatically if you install into Program Files, so do not install into that folder). Another source of problems is if you have accidentally installed the WinUSB drivers to Bulk Interface **1** instead of **0** with Zadig. If you have done this, then SDR# will not recognise your dongle. TO fix it go into device manager or Devices and Printers and uninstall the driver for Bulk Interface **1**.
- **I get the error “No compatible devices found” when trying to start the dongle in SDR#**

Long low quality USB extension cables can sometimes cause this error. Some USB 3.0 ports are also incompatible with the dongle and cause this error. One user has had luck with this error by installing zadig from safe mode. Finally, there is a small chance that the dongle is actually faulty. If the dongle produces the same error on multiple computers the dongle is probably faulty and should be refunded or replaced.

- **Zadig just hangs when I try to install the driver**  
People with this problem have usually had success with an alternative zadig tool available at [visualgdb.com/UsbDriverTool](http://visualgdb.com/UsbDriverTool). Use the tool to install the WinUSB driver.
- **Zadig shows NONE in the driver install screen.**  
This is normal. The box on the left indicates the CURRENTLY installed driver. The box on the right indicates the driver THAT WILL BE installed after clicking on the install button.
- **My dongle was working before but today it no longer works and displays an error when I click on Play.**  
99% of the time this is because Windows automatic driver updates has automatically removed the SDR drivers and installed DVB-T drivers in its place. Make sure Windows automatic driver updates are [turned off](#), and rerun zadig to reinstall the WinUSB driver.
- **My dongle gets extremely hot and stops working, or doesn't work at all. USB current measures well above 0.3A.**  
There is a small number of RTL8232U chips that come from the factory faulty (we measure this at less than 0.3%). They draw very high current, cause excessive heat and eventually fail. Some units will work for a few minutes to hours before exhibiting issues, and others will fail instantly. QC cannot check for those that do not fail instantly. If you have a USB current meter you can check and see if the current draw is above 0.3A. If higher then something is wrong with the RTL2832U. If you suspect a fault like this contact the manufacturer of your dongle and ask for a refund or replacement.
- **I get the error "1 compatible devices have been found but are all busy" or "libusb Open error -12"**  
First check that another program is not using the RTL-SDR. To fix this it may be necessary to reinstall the drivers via zadig and to try every USB port on the PC. You may want to also try disconnecting all other USB devices connected to the PC. Also some USB 3.0 ports are buggy, switch to a USB 2.0 port. Some users have also had success with installing everything from Windows safe mode. Make sure you are **not** selecting the "USB Receiver (Interface 0)" in zadig, and instead are selecting the Bulk in interface, or one that may say RTL2838UHIDIR or something else prefixed with RTL. If you don't see this make sure that "Options->List All Devices" is checked and that "Ignore Hubs or Composite Parents" is unchecked. Another thing to try may be to disable Windows automatic driver installation. Instructions for disabling this can be [found here](#). This error also sometimes occurs after the computer has been suspended – to fix it simply disconnect and reconnect the dongle.
- **I get the error "Unable to load DLL 'rtlsdr': the specified module could not be found. (Exception from HRESULT: 0x8007007E)"**  
Usually installing the [Visual C++ Runtime](#) solves this problem. Most PCs have this

installed already, but if you are on a freshly installed version of Windows it may not have been installed yet.

- **There is a constant spike in the middle of the spectrum that won't go away**  
This is normal and is a side effect of the design of most RTL-SDR dongles. It can be removed algorithmically in the SDR# software by checking the "Correct IQ" box.
- **Zadig takes a long time to install the driver, then fails**  
You have probably not run zadig in administrator mode. Make sure to right click zadig, and select "Run as Administrator". If that fails to work try the alternative WinUSB installer at [visualgdb.com/UsbDriverTool](http://visualgdb.com/UsbDriverTool).
- **I don't see Bulk-In, Interface (Interface 0)**  
Ensure "Options->List All Devices" is checked. Sometimes you may also need to uncheck "Ignore Hubs or Composite Parents". Some people report seeing something else other than the bulk in interface. It may also show up as the brand of your dongle or something prefixed with "RTL", e.g. RTL2832U or RTL2832UHIDR. Any of those options should work too. In rare cases you may receive a faulty dongle that will not show up in Zadig no matter what USB port or computer you try it on. You should ask for a replacement in this case.
- **I don't see RTL-SDR/USB in SDRSharp**  
You may have downloaded a version without rtl-sdr support. Check that you have downloaded the official version from the [airspy.com](http://airspy.com) website.
- **USB 3.0 ports don't work**  
Unfortunately many USB 3.0 controllers are buggy and don't work with some USB 2.0 devices. Generally, USB 3.0 works fine with the RTL-SDR, but there are some controllers that will just not recognise the dongle. In this case use a USB 2.0 port instead.
- **When running install-rtlsdr.bat I get errors on the command line like "The system cannot find the file specified" and the sdrsharp folder is not downloaded**  
This is probably because you did not unzip the files and you are trying to run install-rtlsdr.bat from within the zip file. Remember to extract the files first, before running them.
- **When I run install-rtlsdr.bat a CMD/DOS window flashes on the screen briefly then disappears. Nothing is installed.**  
There seems to be a bug or misconfiguration with some versions of Windows where batch files cannot be run. One way around this is to install the RTL-SDR drivers manually. We have instructions for this here: [rtl-sdr.com/manual-installation-of-sdr](http://rtl-sdr.com/manual-installation-of-sdr). Some antivirus solutions are also overly restrictive and do not allow .bat files to be run. In this case either disable or install a better antivirus, or perform a manual driver install.
- **Reception in SDR# seems very poor/receiver is insensitive**  
Make sure you have increased the RF gain slider which can be accessed by clicking on the configure button. Also, in poor reception areas using the stock antenna indoors may not be sufficient. First test with the antenna placed up high outside. In some cases with the stock antenna the connection to the antenna can become disconnected in the

antenna base causing unexpectedly poor reception. In rare cases if you still cannot receive any strong signals and another radio can, then you may have received a broken dongle and should ask for a replacement.

- **SDR# gives error “Application failed to initialize properly (0xc0000135). Click OK to terminate.”**  
This might mean that you do not have the correct [.NET Framework](#) installed.
- **SDR# gives error “Object reference not not to an instance of an object”**  
This may mean that you do not have an audio driver properly installed on your PC, or that you do not have any output audio devices enabled. Enable them in the windows Sound Playback properties.
- **The dongle constantly disconnects from the USB port**  
First test to make sure that it is not the fault of a dodgy USB extension cable by plugging the dongle directly into the PC. If it still disconnects often the dongle may be faulty and you should ask for a replacement.
- **The dongle won't connect and the LED does not illuminate on models with an LED**  
The dongle is faulty and should be refunded or replaced.
- **It seems that my PC is not powerful enough to run SDR# as it uses near 100% CPU**  
For graphical GUI SDR software like SDR#, at least a dual core processor is recommended. If you have a borderline decent CPU and still experience high CPU usage, try reducing the sample rate to 1 MSPS or less, reducing the FFT display resolution (or turning it off), turning off Correct IQ and reducing the filter order.
- **I used zadig but it broke my keyboard/mouse/other device somehow**  
This is because you would have clicked the install button in Zadig after selecting the wrong device in the drop down menu. Make sure you select the correct RTL-SDR device, (Bulk-In Interface, Interface 0) first. Zadig overwrites previous drivers. To get the old drivers back you should be able to do so in Windows device manager, update driver software.
- **My R820T2 RTL-SDR shows up as an R820T when I run the diagnostic tool rtl\_test**  
The R820T2 and R820T are identical electronically except for some minor changes in the maximum IF filter widths that occurred by accident from using higher quality silicon in the R820T2. The accidentally different filters and higher quality silicon may be the reason the R820T2 has generally better performance and less manufacturing variability. Thus a R820T2 will show up as an R820T on the PC, since there is no distinction between them in the digital part of the circuit. You can confirm that you have a R820T2 by checking the markings on the chip.
- **My antivirus shows SDR# as a virus.**  
This is almost 100% a false positive. SDR# is updated often and thus a new .zip file is sometimes released almost daily. Poorly designed antivirus programs will sometimes assume that any file that is not downloaded often is a virus. With SDR# being updated

so often it takes a while for many people to download the new version and build up trust with the antivirus company.

- **The Mode selection buttons in SDR# are graphically glitching and I cannot click on them.**  
Some users have found that this bug is caused due to selection of a “custom scaling level” or “custom sizing options” in Windows. Reset this option [back to default](#) in Windows display settings to fix the bug.
- **When closing SDR# I get an error like “An error occurred loading a configuration file: Access to the path ‘C:\Program Files\SDR\s14i12qq.tmp’ is denied. (C:\Program Files\SDR\SDRSharp.exe.Config) —> System.UnauthorizedAccessException: Access to the path ‘C:\Program Files\SDR\s14i12qq.tmp’ is denied.”**  
This is usually because you have copied the SDR# files into a folder that is read only. In Windows folders located in “C:\Program Files” are usually automatically read only. To fix, install SDR# into a non read only folder that is not located in Program Files, for example “C:\SDR”.
- **My dongle came with a remote control. What is it for?**  
Some sellers opt to include the remote control that is used for changing TV channels. It is only useful for when the dongle is used for its original purpose – as a DVB-T HDTV receiver. The remote control has no purpose when the dongle is used as an SDR.
- **I want to watch DVB-T with my dongle, how do I do it?**  
The original purpose of the dongle was for DVB-T TV, and it can still do this. But please note that the DVB-T drivers and the SDR drivers are different, and they cannot both be installed at the same time. You can download the [DVB-T drivers here](#). We recommend using Prog-DVB as the TV software.

If you continue to have issues please feel free to post in the troubleshooting section of our [Forums](#).

## How to set the Gain

The gain can be adjusted in SDR# by clicking on the Configure button which looks like a cog. When tuning the RF gain you are trying to get the signal as strong as possible, whilst keeping the noise floor as low as possible. Start with a low gain setting, and slowly increase the gain slider. Watch in the frequency spectrum as the signal strength increases, but stop just before the point at which the noise floor starts to rise.

The noise floor is the part of the frequency spectrum where there are no signals.

## SDRSharp Plugins

The official list of SDRSharp plugins can be [found here](#) and our unofficial list of plugins can be [found here](#).

## SDRSharp Guide

A good guide to learning how to use SDRSharp and what all the options do can be [found here](#).  
Another great illustrated guide can be [found here](#).