

Guide for RTL-SDR.com dongle V3

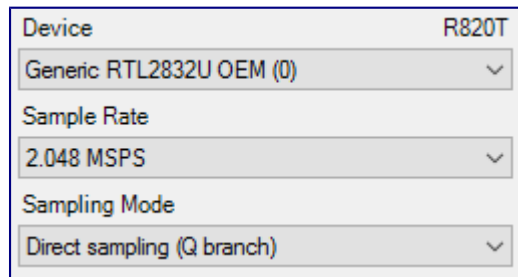
Version 3 of the customized RTL-SDR.com dongles brought out 3 extra new features explained in this guide that can be download at : <https://uk.passion-radio.com/gb/cles-rtl-sdr/rtlsdr-tcxo-472.html>

Feature 1: Direct Sampling HF Mode

This feature allows you to listen to HF signals between about 500 kHz to 28.8 MHz.

To use direct sampling mode

1. Connect an appropriate HF antenna to the SMA antenna port (this is the same port where you connect your VHF/UHF antenna).
2. In SDR# select the Q-branch in the configure menu (the cog icon next to the play button). (If it is greyed out make sure you stop the SDR first, by clicking the stop button in SDR# first)
3. Press Play and tune to 500 kHz – 30 MHz.



VHF antennas like small discones or short whip antennas will probably not pick up HF signals very well, if at all. If you have no such antenna you can try extend the large telescopic antenna to its maximum length of 1.5m, or use the screw nut provided with the antenna base to clamp on a long wire antenna. Ideally you should use a 9:1 unun with the long wire antenna for optimal reception. Even more ideally you'd use an antenna tuner, though this is expensive.

Other software like HDSDR can also support direct sampling. It may entail setting a device string, and for the Q-branch, the value should be 2.

To go back to listening to frequencies above 28.8 MHz remember to change the sampling mode back to “Quadrature Sampling”.

Note that this feature makes use of *direct sampling* and so aliasing will occur. The RTL-SDR samples at 28.8 MHz, thus you may see mirrors of strong signals from 0 – 14.4 MHz while tuning to 14.4 – 28.8 MHz and the other way around as well. To remove these images you need to use a low pass filter for 0 – 14.4 MHz, and a high pass filter for 14.4 – 28.8 MHz, or simply filter your band of interest.

Feature 2: Software Selectable Bias Tee

V.1. and V.2. of our dongles included a bias tee which could manually be enabled by opening the case and soldering two pads on the PCB together. V.3. introduces a bias tee which can be enabled entirely in software.

WARNING: Before using the bias tee please ensure that you understand that you should not use this option when the dongle is connected to a DC short circuited antenna. Short circuiting the bias tee for a period of time could damage the bias tee circuit permanently. Only use it while connected to an actual powered device, like an LNA, active antenna or the Spyverter.

To make things clearer: DC Short Antenna -> LNA -> Coax -> V3(bias tee on) is absolutely fine. What's not good and makes no real sense anyway is DC Short Antenna -> Coax -> V3(bias tee on). DC Short Antenna -> Coax -> V3(bias tee off) is fine.

To enable the bias tee in Windows:

1. Download and extract all the files in [this zip file](#) to a folder on your PC. It contains two batch files that can be run.
2. Make sure all SDR software like SDR# / HDSDR / SDR-Console etc is fully closed.
3. Run the `biasteer_on.bat` file to turn the bias tee on. It will run and open a CMD prompt that will briefly say "Found Rafael Micro R820T Tuner". The CMD prompt will close soon after upon success.
4. The bias tee is now on. To turn it off repeat steps 2 & 3, but instead run the `biasteer_off.bat` batch file. Alternatively, simply disconnect and then reconnect the SDR to turn the bias tee off.

If you have multiple dongles connected you'll need to edit the batch file to specify what dongle's bias tee you want to activate. Open the bat file with any text editor, like Notepad, and add the dongle selector "-d" flag. For example to activate the bias tee on the dongle that was plugged in second you'd need to change it to "`rtl_biast -b 1 -d 1`".

If you get a Smart Screen message, click on More Info, and then on Run Anyway. Also note that some versions of Windows may fail to run batch files due to misconfiguration or aggressive antivirus software. If you cannot fix these problems with Windows or your antivirus, run the command manually on the CMD line.

To run it manually on the CMD line first browse to the directory where the bias tee software is stored using "cd" (e.g. `cd C:\SDR\bias_tee_folder`), and then run:

1. **ON:** `rtl_biast -b 1`
2. **OFF:** `rtl_biast -b 0`
3. If needed select a particular RTL-SDR device with the -d flag.

In Linux or MacOS download the source from git, compile it the same way you do the regular RTL-SDR drivers, and then run `./rtl_biast -b 1` to turn the bias tee on and `./rtl_biast -b 0` to turn the bias tee off. The procedure is:

```
git clone https://github.com/rtlsdrblog/rtl_biast
cd rtl_biast
mkdir build
cd build
cmake ..
make
cd src
./rtl_biast -b 1
```

If you want to be able to run the bias tee program from anywhere on the command line you can also run "sudo make install".

If you have trouble running the bias tee please contact us at rtlsdrblog_AT_gmail.com.

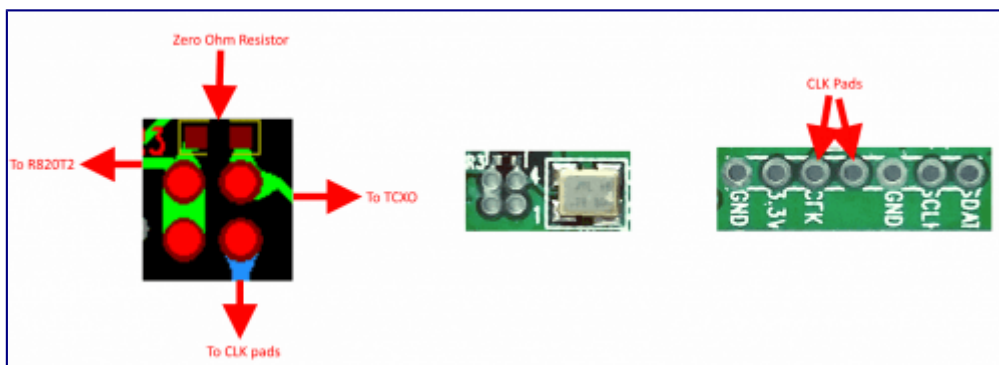
Feature 3: Selectable Clock & Expansion Headers

This is for advanced users who need to daisy chain clocks together for coherent experiments, or need to access other ports. You can either bridge the clock selector the directly with a solder bridge, or solder on a 1.27mm 2×2 header pin jumper.

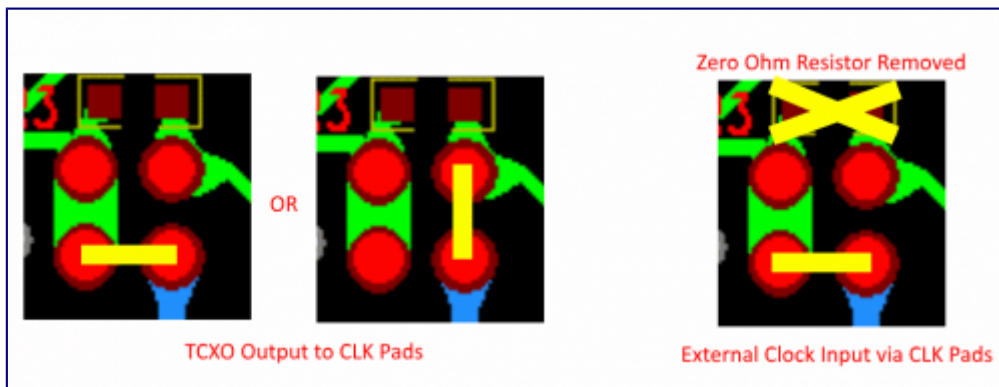
To add a jumper to the CLK selector header.

1. Carefully remove the 0 Ohm resistor.
2. Very carefully solder a 1.27mm 2×2 header onto the clock selector pads.
3. You can now select your clock input.

How to connect the CLK jumpers:



The first position allows you to output the dongles clock to the CLK pads. The second position allows you to input an external clock.



An example of CLK daisy chaining is shown below. One dongles TCXO is connected to two other dongles who have disconnected clocks.

