

# Part 2: How Can an SDR Help a Ham Radio Operator?

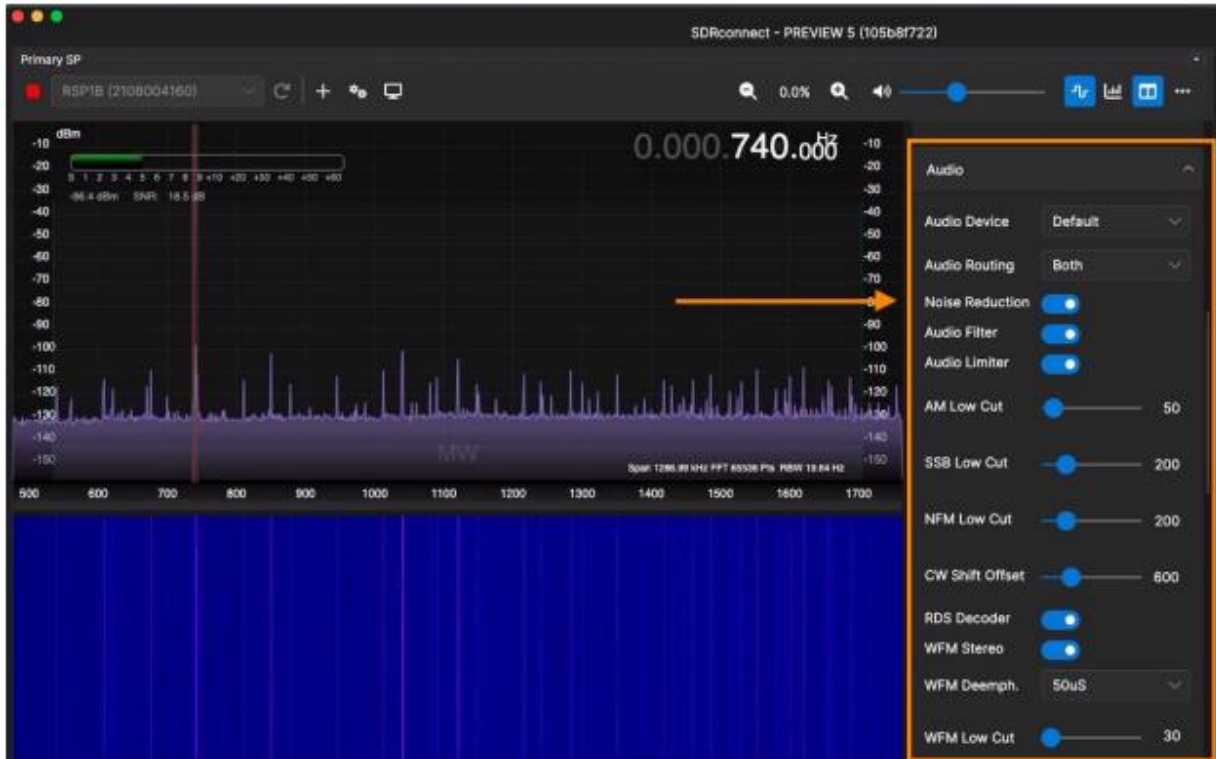
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Just a quick follow-up to last month's article on two issues. As I mentioned last month, the inexpensive 2' diameter [magnetic loop](#) worked very well in FT8 tests of the RTL-SDR versus my Kenwood TS-890S. However, the manufacturer could use better quality control. The antenna consists of the loop attached to a low-noise amplifier (LNA) and a power unit in the shack. Those are connected via RG-174 coax. When I received the loop, it was not very sensitive, the low-noise amplifier (LNA) did not work as it should and the battery did not appear to charge. Repeatedly pressing the power button is supposed to cycle from off to low, medium and high amplification levels; then back off again. The button appeared to only turn the LNA on and back off. Furthermore, the LNA only worked when the unit was powered by the USB cable even though it has a built-in, rechargeable 18650 battery.

Due to those issues, the first several hours of operation were very frustrating. Rather than contacting the Amazon seller and possibly waiting days for some resolution, I decided to open up the LNA and power units to check for obvious defects. I found that the 18650 battery in the power unit was loose in the battery holder. The holder did not incorporate a spring at the negative terminal as is typical. After prying the positive terminal of the battery holder towards the negative terminal, the battery fit tightly. With this fix, the LNA powered up on battery, worked as it should and the battery took a charge.

The second issue was that the cheap RTL-SDR was very susceptible to interference and birdies. As mentioned last month, the 10M band was almost useless and it took a lot of fiddling when changing bands to get good reception. I decided to purchase a better SDR. After researching mid-priced models, I decided on an [SDRplay RSP1b](#). Compared to the RTL-SDR, the RSP1b has a much wider bandwidth (10 MHz vs. 2.4 MHz), a 14-bit ADC (vs. 8-bit) and continuous coverage from 1 kHz to 2 GHz (vs. 500 kHz to 1.75 GHz). See the link above for the complete specs.

Another advantage is that SDRplay has a good software package ([SDRconnect](#)) which is similar to SDR# but optimized for SDRplay SDRs. There is good tutorials at the "[QuickStart](#)" page and a [support ticket](#) system where help can be obtained even if not using SDRplay software with your SDRplay SDR! The software is a 64-bit application that can run on x64 and ARM64 under Windows 10 / 11, MacOS, and Linux. The software is under active development as it will eventually replace the older SDRuno software. Unfortunately, SDRconnect does not yet have support for rig control using Omnirig. For this reason, you will need to use SDRuno or one of the two applications discussed last month (SDR#, SDR Console) to use the RSP1b as a true second receiver. However, I find the SDRuno software to be difficult to use and much prefer the single-window graphical user interfaces of the others. Below is a screenshot of SDRconnect tuned to the AM broadcast band and highlighting the noise reduction module.



I need to use the RSP1b and magnetic loop antenna more to draw firmer conclusions about their operation. So far, I have found the magnetic loop to be quite sensitive with a low noise floor. One thing that Dave Casler mentioned is that you can use a magnetic loop in the horizontal position to get an omnidirectional reception pattern. I have yet to try this and for now I just rotate the fiberglass pushup pole on which I mounted the loop antenna.

As far as the RSP1b goes, I have been impressed with the ability to change bands without a lot of user fiddling. The RSP1b with SDRconnect software seems to automatically adjust RF gain and perhaps other parameters as you move among the bands. It has a module with buttons to tune common bands including the amateur radio bands. If you select your IARU region in the app settings, the band definitions will be correct for your location. These buttons tune the SDR to over the entire band (14.000 to 14.350 MHz for 20M in the US as an example) while optimizing the bandwidth and RF gain. This is very helpful for band hopping.

Anyway, that's it for now, I need to play with the SDR some more!