

RTL-SDR Blog V4L Datasheet

The RTL-SDR Blog V4L (Lite) is an improved RTL-SDR dongle. RTL-SDR dongles were originally designed for DVB-T HDTV reception, but they were found by hardware hackers to be useful as a general purpose SDR. The standard dongles are okay for DVB-T reception but are just barely suitable for SDR users/experimenters. The RTL-SDR Blog V4L was redesigned with SDR user needs in mind, instead of DVB-T HDTV users who typically have more relaxed requirements.

Tuner Chip	R828S
ADC Chip	RTL2832U 8-bits
Frequency Range	500 kHz to 1.766 GHz
Bandwidth	2.56 MHz stable (up to 3.2 MHz with drops)
Typical Input Impedance	50 Ohms
Typical Current Draw	250 – 270 mA
HF Implementation	Upconverter with 28.8 MHz LO
Input Connector	1x SMA
USB Connector	USB-A Male
Local Oscillator Stability	1PPM TCXO
Bias Tee	4.5V, 180mA (software switchable)
Enclosure	Aluminum
Heat Dissipation	Thermal Pad to Aluminum Enclosure
Front End RF Design	Diplexor
Transmit Capability	None

Improvements on the V4L model

- **Improved HF Reception.** Now uses a built in upconverter instead of using a direct sampling circuit. This means no more Nyquist folding of signals around 14.4 MHz, improved sensitivity, and adjustable gain on HF. Like the V3, the lower tuning range remains at 500 kHz and very strong reception may still require front end attenuation/filtering.
- **Improved phase noise on strong signals.** Due to an improved power supply design, phase noise from power supply noise has been significantly reduced.
- **Less heat.** Due to the improved power supply design the V4L uses slightly less current and generates slightly less heat compared to the V3.

Purchase at: www.rtl-sdr.com/store

Quickstart setup guide available at: www.rtl-sdr.com/qsg

Online Users Guide: <https://www.rtl-sdr.com/V4L>

Drivers

The RTL-SDR Blog V4L requires up to date drivers in order to function.

Modern actively maintained software like SDR#, SDR++, SDR-Console V3 and GQRX already ships with up-to-date drivers.

In Windows some older and unmaintained/abandoned software may require you to manually update the drivers by replacing a .dll file.

In Linux, you will need to update the system drivers.

Please consult www.rtl-sdr.com/V4L for information about updating the drivers if necessary.

Bias Tee

RTL-SDR Blog V3, V4, and V4L introduce a 4.5V bias tee that can be toggled entirely in software. The bias tee can continuously pull up to 180 mA of current.

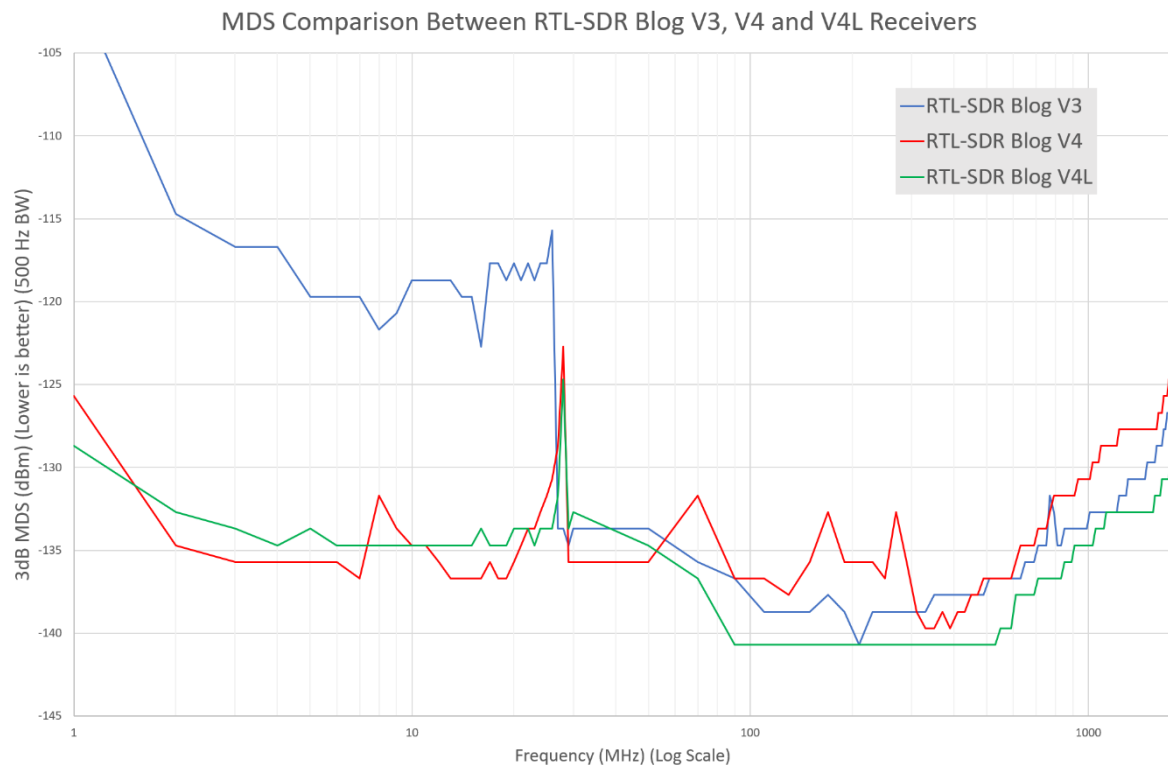
In software such as SDR# and SDR++ the bias tee can simply be activated by clicking on the “Bias Tee” checkbox.

For other software without a bias tee activation option, please consult www.rtl-sdr.com/V4L for information on activating the bias tee.

Minimum Discernible Signal Measurements

The minimum discernible signal (MDS) is a test we can do to determine what is the minimum power level that a receiver can detect.

The results show that the MDS has significantly improved for the V4 and V4L designed on the HF bands thanks to the upconverter design. The V4L design has better sensitivity than the V4L due to the lack of additional input filtering.



Two Tone Isolation & Desensitization Test

Strong out of band signals can cause an SDR to desensitize on other bands. For example, very strong broadcast FM (which is common), can cause signals being received on other frequencies to be received with a lower signal to noise ratio.

In this test we injected an "interference" tone (Tone A) at 95 MHz, and injected a second tone (Tone B) at another frequency. We then slowly increased the power on Tone A. When we noticed a 3 dB drop in the signal strength of Tone B we recorded the power level of Tone A that this occurred at.

As the V4L does not have additional input filtering, like the V4 model does, the two tone test results are identical to the V3 models.

