

The background of the slide is a grayscale image of a printed circuit board (PCB) with various traces and circular components. A solid dark gray horizontal band runs across the middle of the image, serving as a background for the text.

Introduction to RTL-SDR

By Michael Champion N7UIC

What is RTL-SDR?

- RealTek Labs

- The RTL2832U chipset was originally designed for DVB-T which is European OTA digital television
- Through the combined efforts of Antti Palosaari, Eric Fry, and Osmocom, it was found to be an effective wideband SDR using drivers they authored.

- Software Defined Radio

- All signal processing is handled by software
 - This replaces mixers, filters, amplifiers, detectors, and modulators/demodulators.

Why RTL-SDR?

- Cheap Hardware

- The basic RTL2832U with the R820T2 tuner can be had for under \$25
- Frequency range is typically 24-1766MHz with the R820T2 tuner
- Some manufactures have added a low pass filter to receive below 26MHz using direct sampling.

Getting started

- What do you need?
 - Basics
 - USB RTL-SDR dongle
 - Build or buy an antenna for the desired frequencies
 - Download and install the drivers and software
 - Advanced
 - Filters – Low pass, high pass, or bandpass
 - Amplifiers – LNA (low noise amplifier)



Choosing a dongle

Typically can be found on eBay and Amazon

E4000 and R820T have the best bandwidth



\$9.25



\$79



\$65

Antennas

- **Adapters**

- The dongles come either with an **MCX style** or **SMA** connector. If you don't already have adapters then those are available (**Amazon, eBay**) as well.

- **Antennas**

- The included antenna is **very poor**
- A **wide-band** antenna like a **discone** is a good start. Otherwise your imagination is the limit.



Software and Drivers

- General Purpose Software

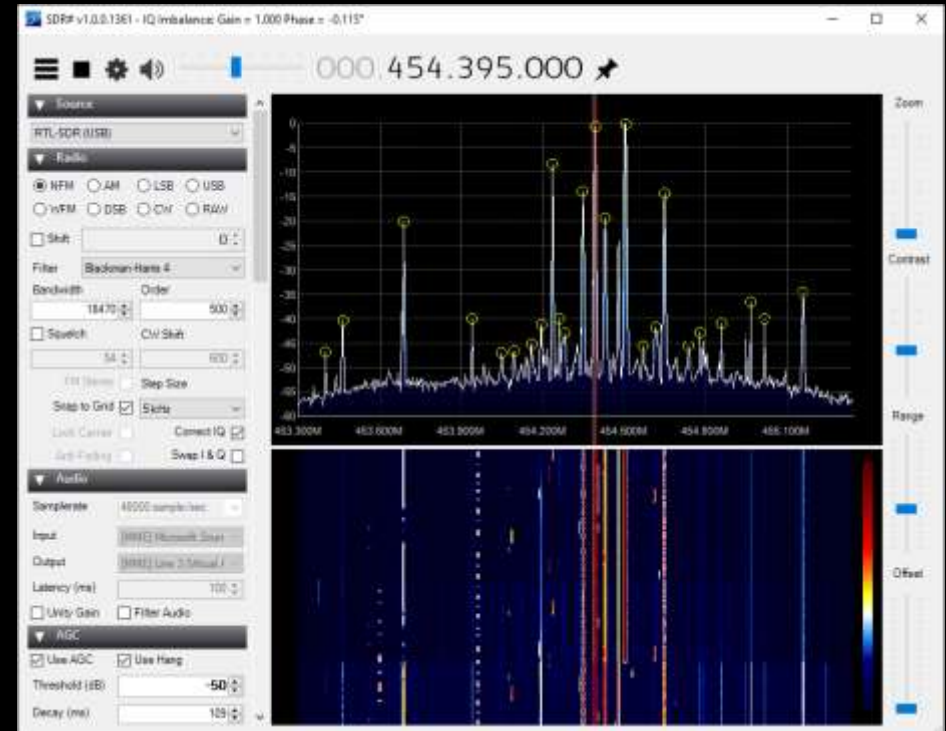
- SDR# (SDRSharp)
- HDSDR

- Specialized Software

- ADS-B
- ACARS
- DSDPlus – (Digital Radio)
 - P25, DMR, D-STAR, NXDN, MOTOTRBO

- Drivers

- Zadig WinUSB is typically needed to load the drivers



What can you do?

- SDR can run in any mode: SSB, AM, FM, CW, Wide FM (Broadcast)
- The following activities are possible:
 - 2 MHz wide panascope
 - Plane tracking (ADS-B)
 - Air traffic control
 - FM Broadcast Radio with RDS decoding (No HD radio at this time)
 - Police/Fire/EMS scanner (Including digital modes but not encrypted communications- duh!)
 - Amateur Radio (Including decoding Packet, D-Star, DMR, etc...)
 - Sniffing GSM signals
 - Act as a GPS receiver (with additional hardware)

Resources

RTL-SDR

- <https://www.rtl-sdr.com>
- <http://sdr.osmocom.org/trac/wiki/rtl-sdr>
- <http://www.reddit.com/r/rtlsdr>

ADS-B

- <http://www.virtualradarserver.co.uk>
- [http://www.arrl.org/files/file/QST/This Month in QST/January 2014/VirtualRadarJan2013QST.pdf](http://www.arrl.org/files/file/QST/This%20Month%20in%20QST/January%202014/VirtualRadarJan2013QST.pdf)