

# Open Source Radio

## An Introduction to Software Defined Radio (SDR)

Schuyler St. Leger

23 January 2016



SCALE  
14x

The Fourteenth Annual  
Southern California Linux Expo

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# Radios In Your Life

Cellular  
WiFi  
Bluetooth  
GPS

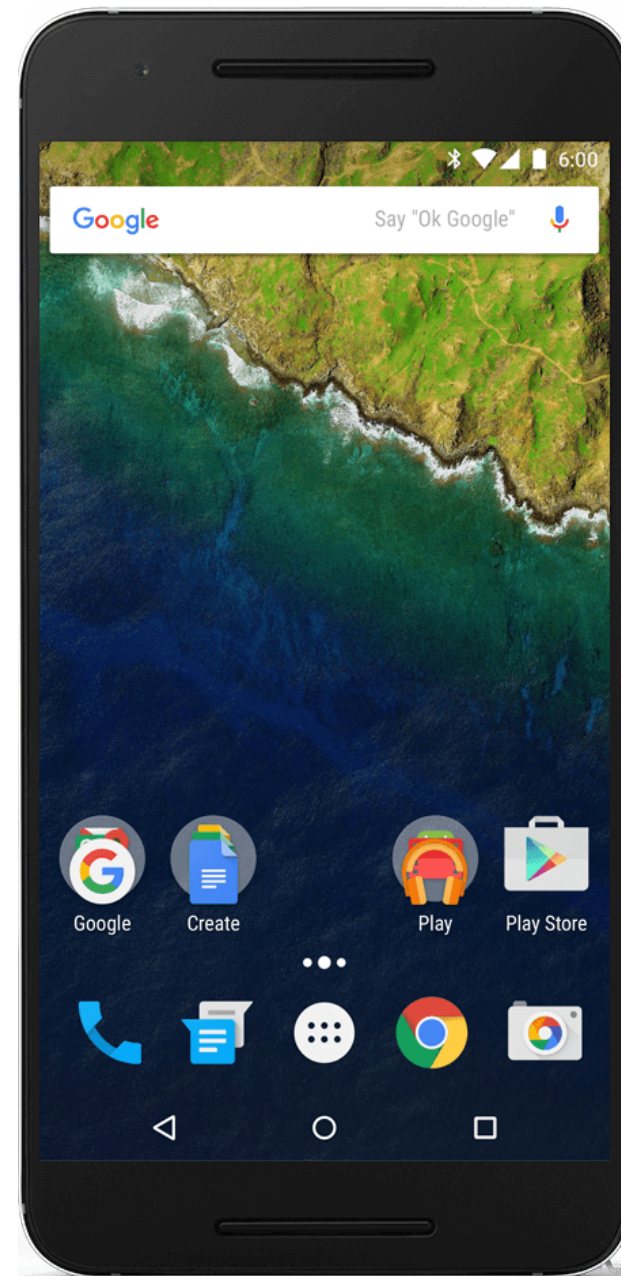


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SW > HW



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www.defenceimages.mod.uk  
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# What is it good for?



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# What Is SDR?

Using software to replace most of the hardware

Hardware is still needed for:

The RF front end

The ADC (Analog to Digital Converter) / DAC  
(Digital to Analog Converter)



# Radio Receiver

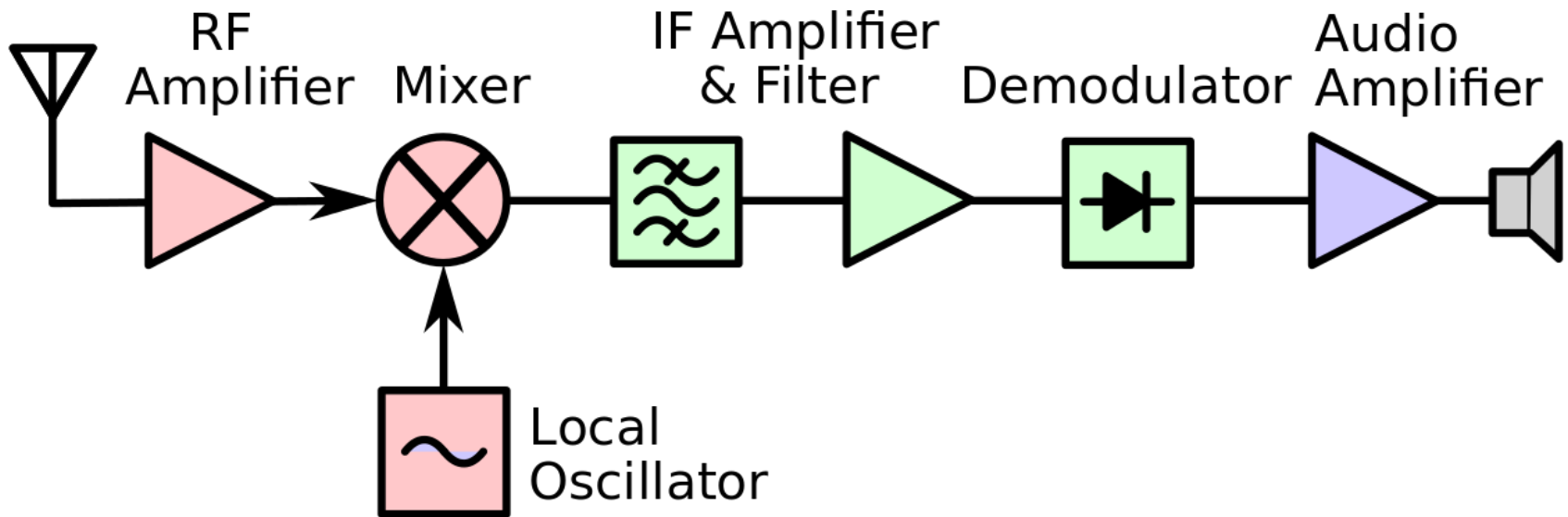


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# Hardware

## Low Cost:

RTL2832U – Realtek SDR dongle	24 – 1766 MHz	\$10 - \$30
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## Medium cost:

FunCube DonglePro +	150 kHz - 2.05 GHz	£124.99 ≈ \$200
HackRF One	10 MHz - 6 GHz	\$299
BladeRF	300 MHz - 3.8 GHz	\$420 or \$465

## High Cost:

USRP1		\$707
USRP B200	70 MHz - 6 GHz	\$675
USRP B210	70 MHz - 6 GHz	\$1100
UmTRX	300 MHz - 3.8 GHz	\$1500
Matchstiq	300 MHz - 3.8 GHz	\$4500+



# Software

Windows, Mac,  
and Linux

GNU Radio	Toolkit used by most SDR software Includes GNU Radio Companion	Open Source
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GrOsmoSDR	Library used to interface with hardware	Open Source
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Linrad	Spectrum viewer	Open Source
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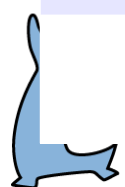
Windows

SDR#	Spectrum viewer	Closed Source
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HDSDR	Spectrum viewer	Closed Source
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Mac and Linux		
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Gqrx	Spectrum Viewer	Open Source
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# Software

## Android

SDR Touch	Free / \$9.99
RTL2832U driver	Driver for RTL-SDR
ADSB Receiver	Free
ADS-B on USB SDR RTL	\$1.50



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# Demo Time

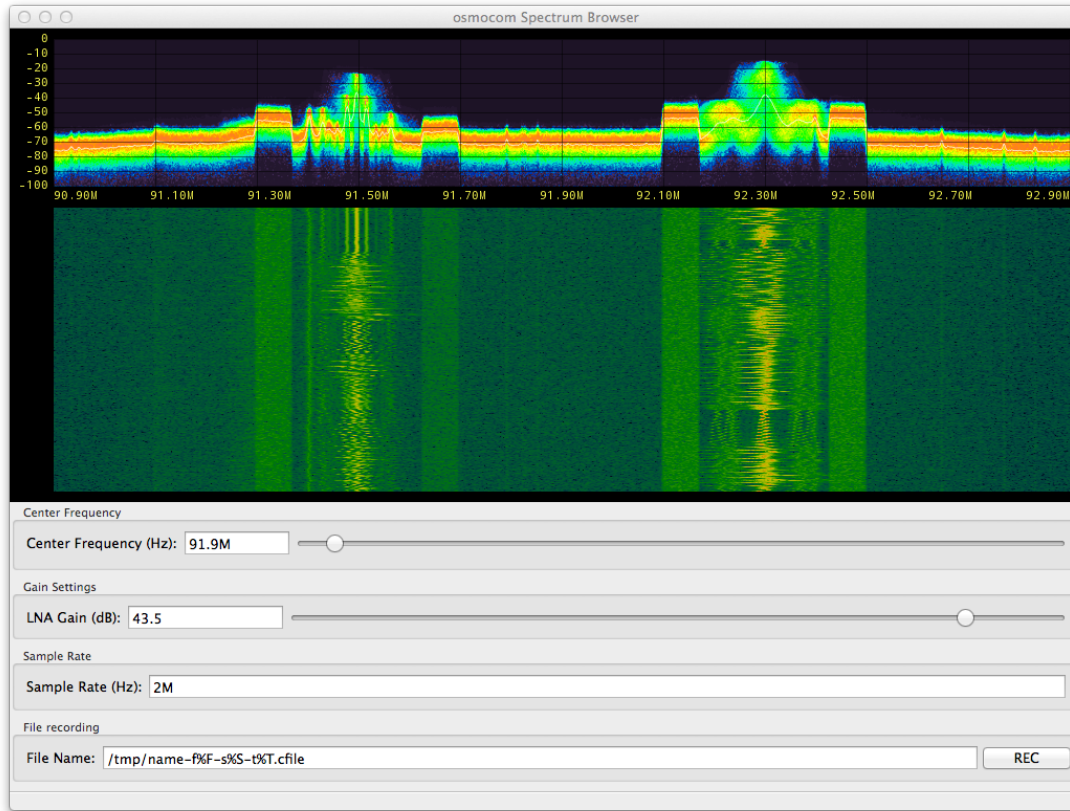
- Looking at the spectrum
- Receiving FM radio broadcasts



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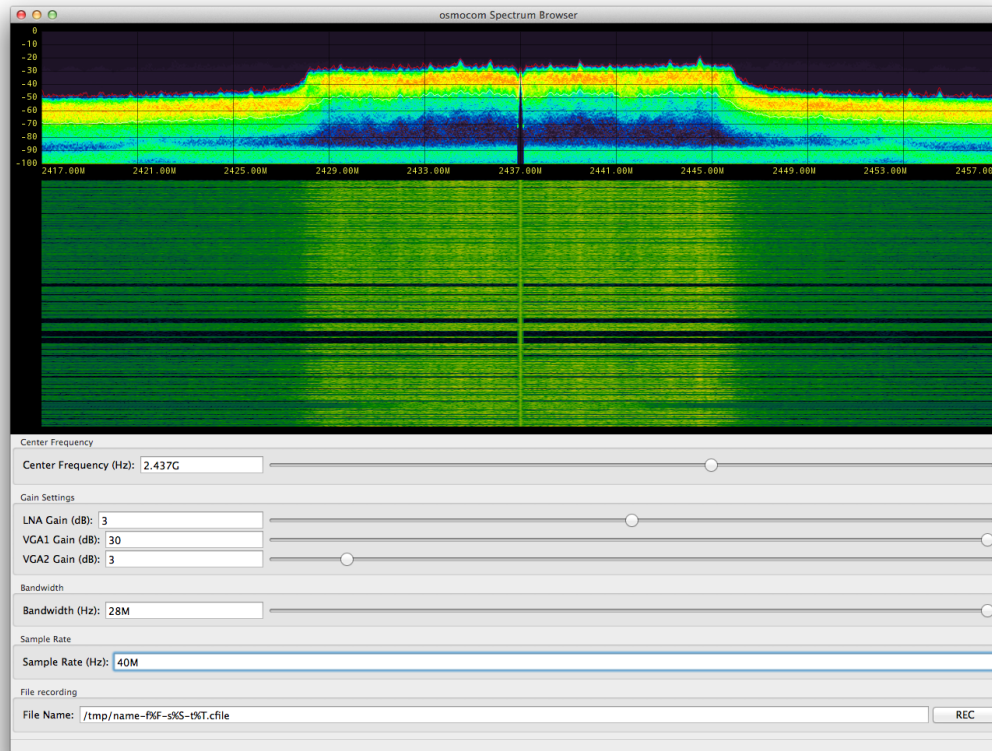
# FM Broadcast Band



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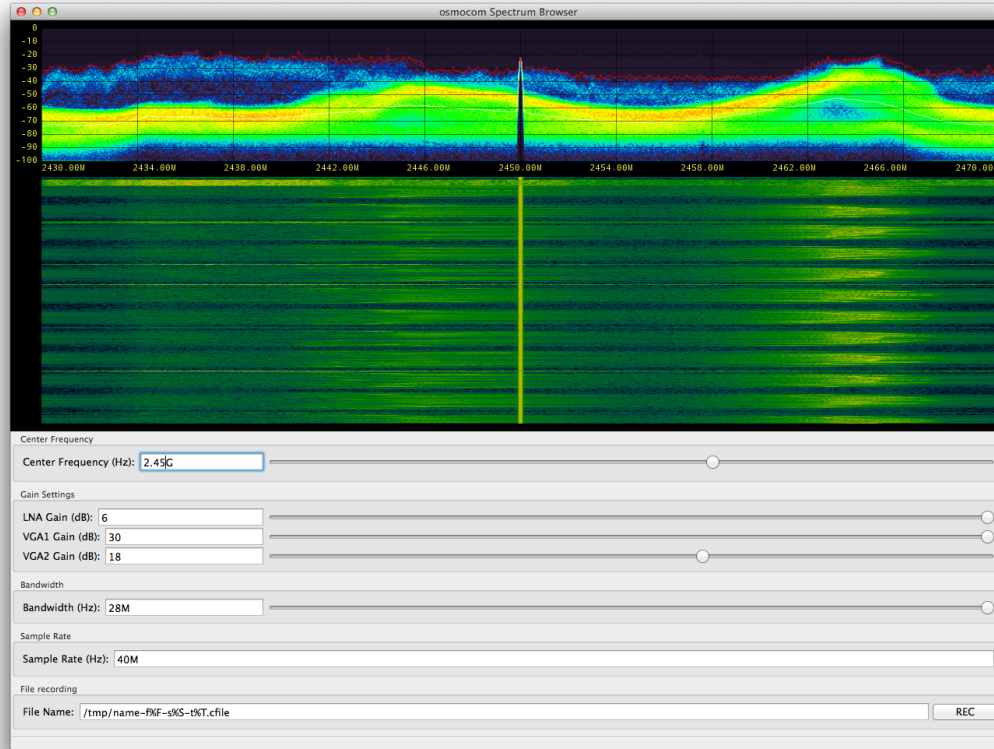
# WiFi



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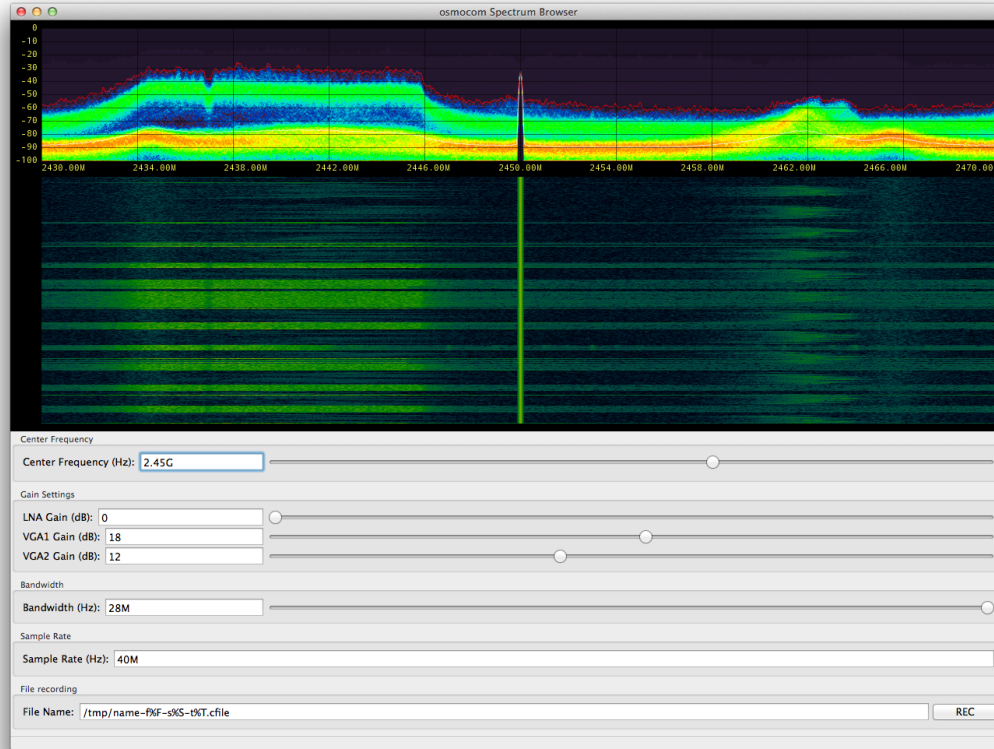
# Microwave



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# Microwave



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# Additional Resources

<http://sdr.ninja>

<http://www.rtl-sdr.com>

<https://www.radioreference.com/>

<http://greatscottgadgets.com/sdr/>



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# References

- <https://github.com/bastibl/gr-rds>



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# Thanks To

Jared Boone

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SCaLE team



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# Questions?



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# Thanks

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