

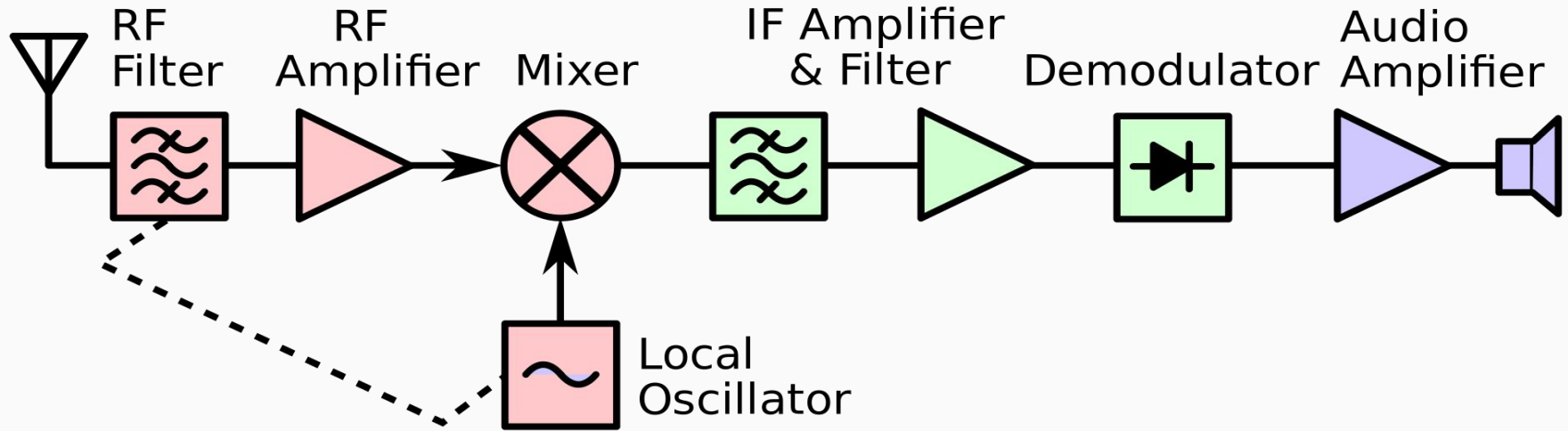
Cheap Software Defined Radio

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Superheterodyne Receiver



Superheterodyne Front End

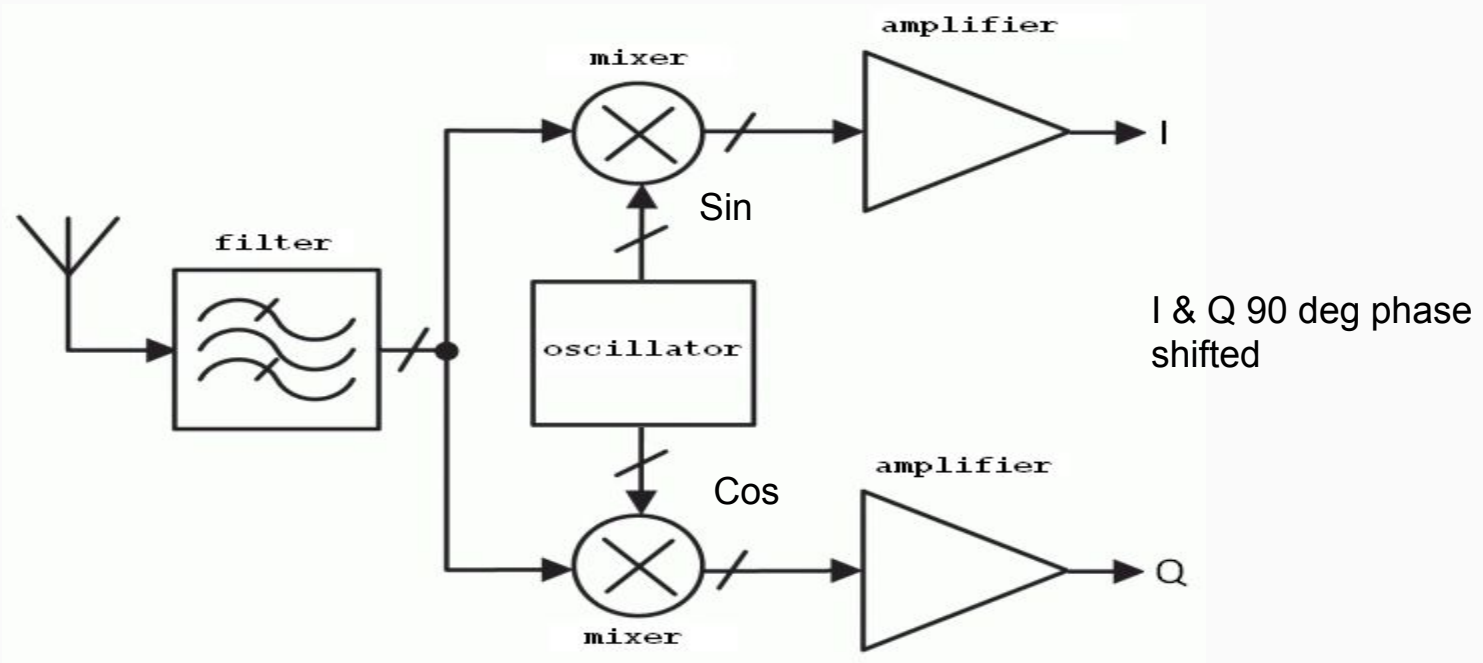
RF is fed into a non-linear mixer (ie: Gilbert cell or diode ring)

Mixer produces $f_{\text{RF}} + f_{\text{LO}}$ and $f_{\text{RF}} - f_{\text{LO}}$

Harmonics are also produced

IF filters pass the desired frequency

Software Defined Radio Front End



SDR Front End

LO feeds 2 mixers

LO sine waves are phase shifted 90 degrees (sin and cos)

Output is 2 IF signals - I and Q

With I and Q, any RF signal can be demodulated

I and Q

I and Q channels are fed into analog to digital converters

Data streams are processed in the Digital Signal Processor

Output stream is fed into a digital to analog converter

Analog output goes to sound card/speaker

Transmit - reverse the process

SDR DVB-T + DAB + FM dongles

Consists of Realtek RTL2832U and Raphael 820T2 chipset

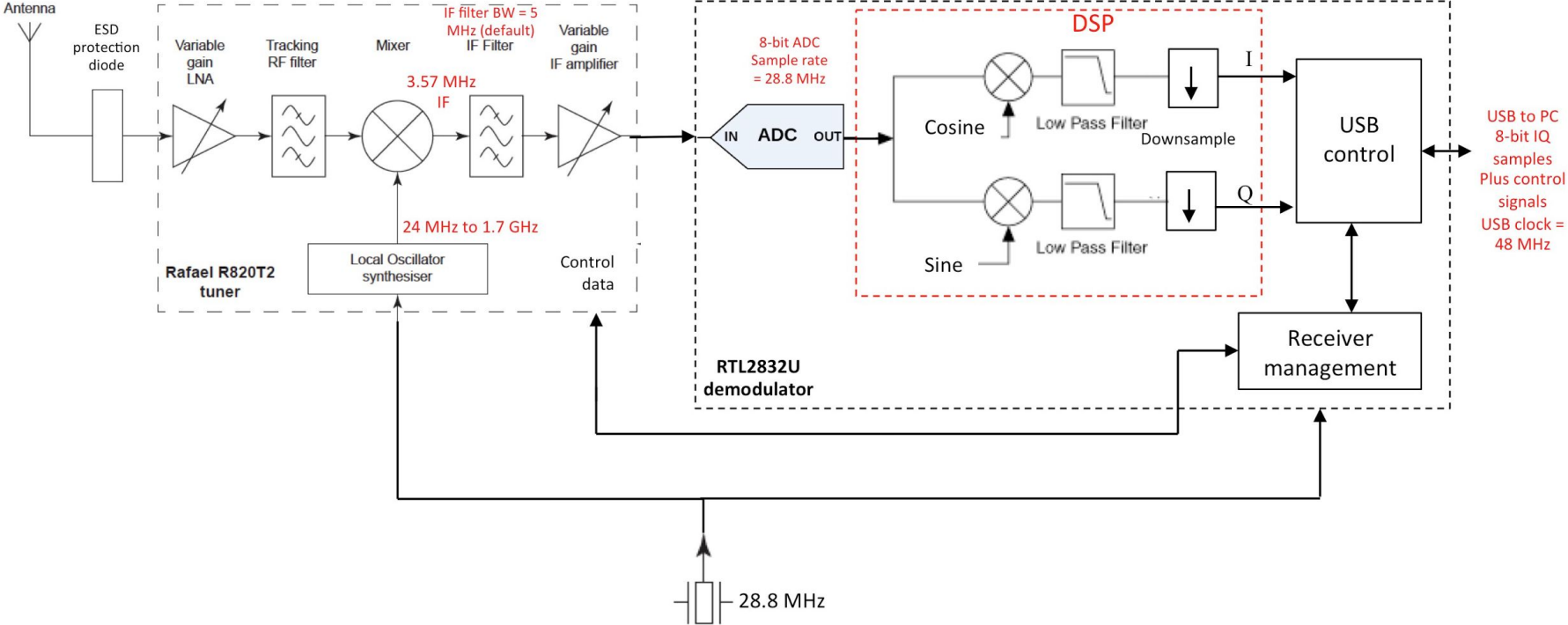
Developed for European digital TV and FM broadcasts

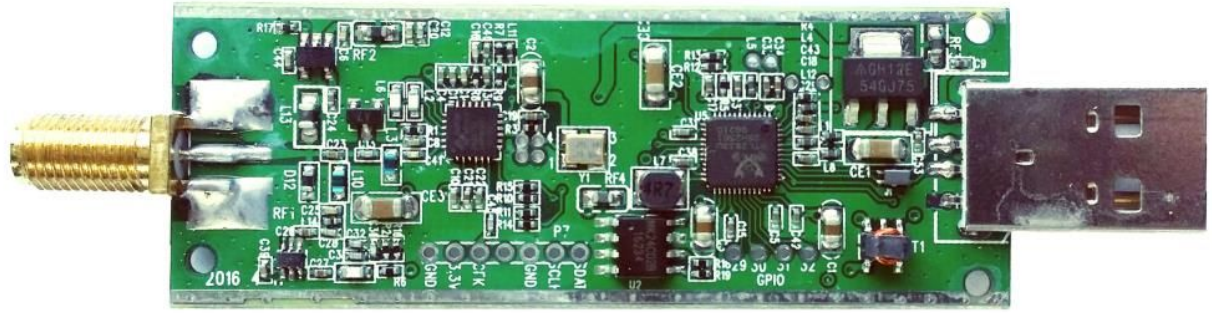
Freq range 28 Mhz - 1.7 Ghz (need upconverter for HF bands)

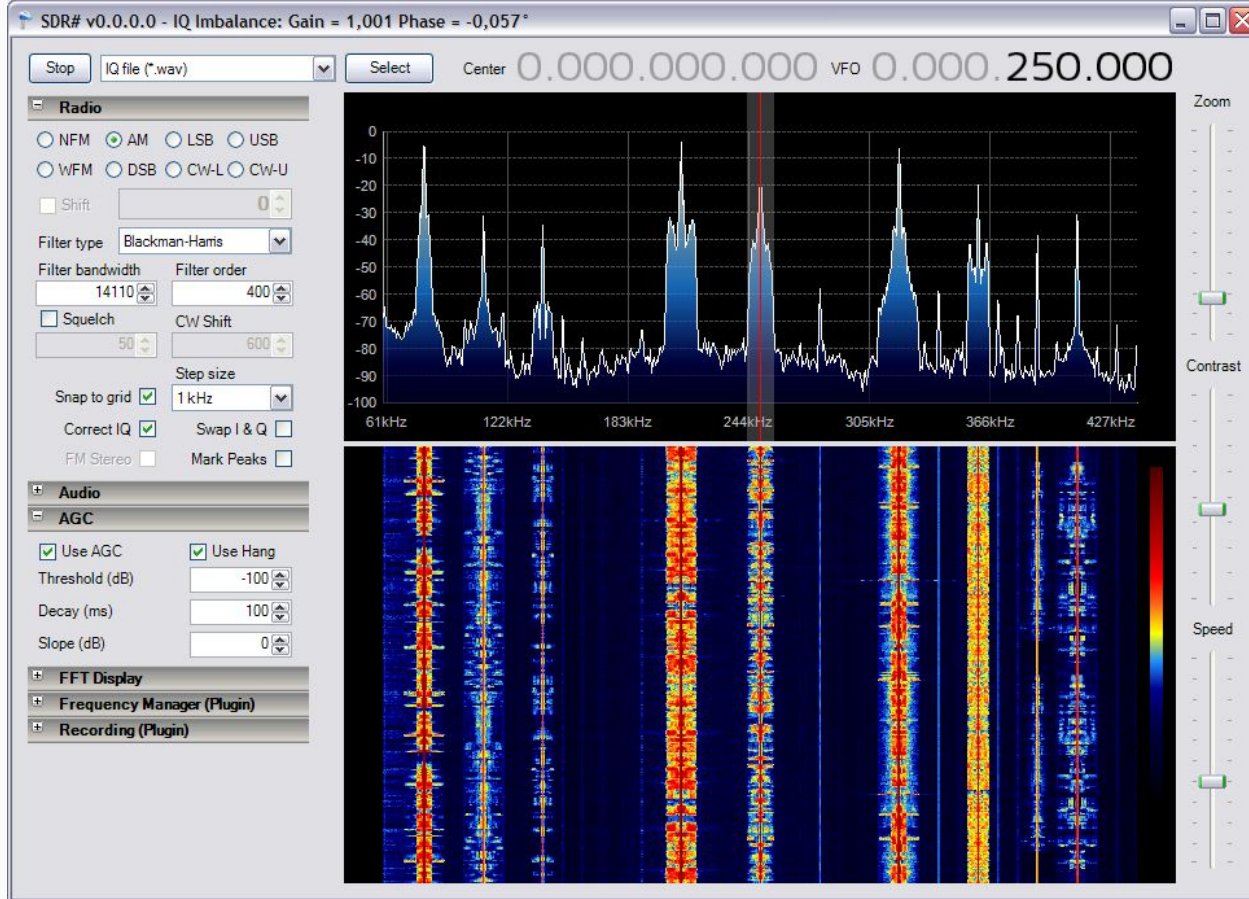
Panadapter bandwidth ~2.1 Mhz

USB powered

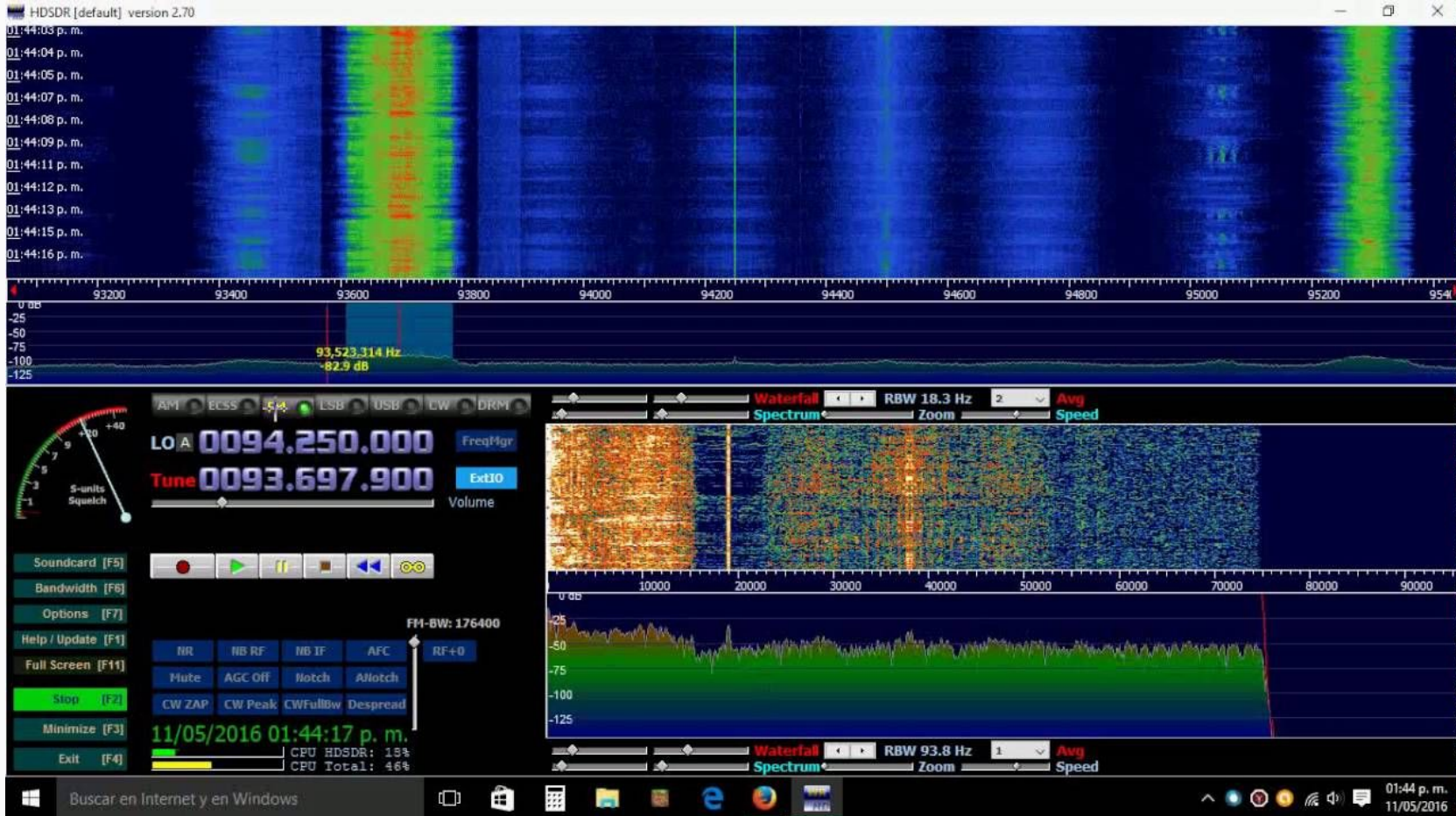
Simplified Block Diagram of NooElec RTL-SDR







SDR #



HDSDR

What to buy

RTL-SDR dongle (get the 820T2 tuner) \$15 - \$35

USB extension cable 3ft \$5

Upconverter for HF bands \$40 - \$70

Antenna and connectors \$5 - \$50

I recommend NooElec RTL-SDR dongle and Ham-it-up upconverter

Resources and Web-sites

RTL-SDR.COM - tons of SDR info and news

[Wikipedia - Software Defined Radio](#) - websites on the bottom of the page

DesktopSDR.com - MathLab and Simulink - free SDR book download

RTLSDR4everyone.blogspot.com

Thanks!

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