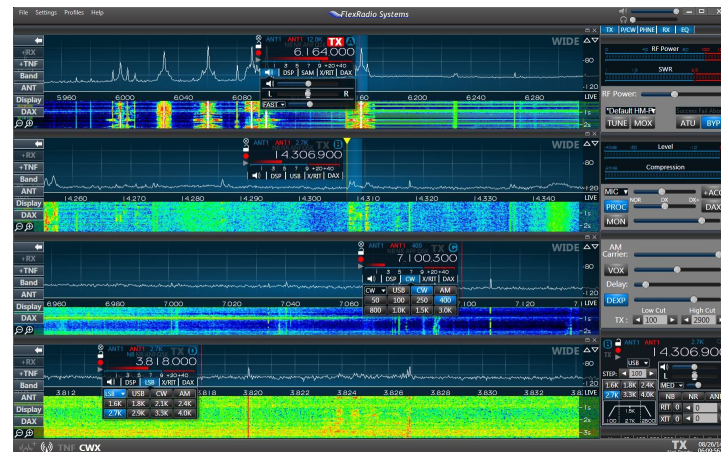# SDR & Flex Radio

SLSRC Meeting 10/27/17

Kyle Krieg (NØKTK)
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What is a SDR?

SDR (Software Defined Radio) - is a radio where components that have been traditionally implemented in hardware (mixers, filters, amps, modulators/demodulators, detectors, etc), are instead implemented in software.
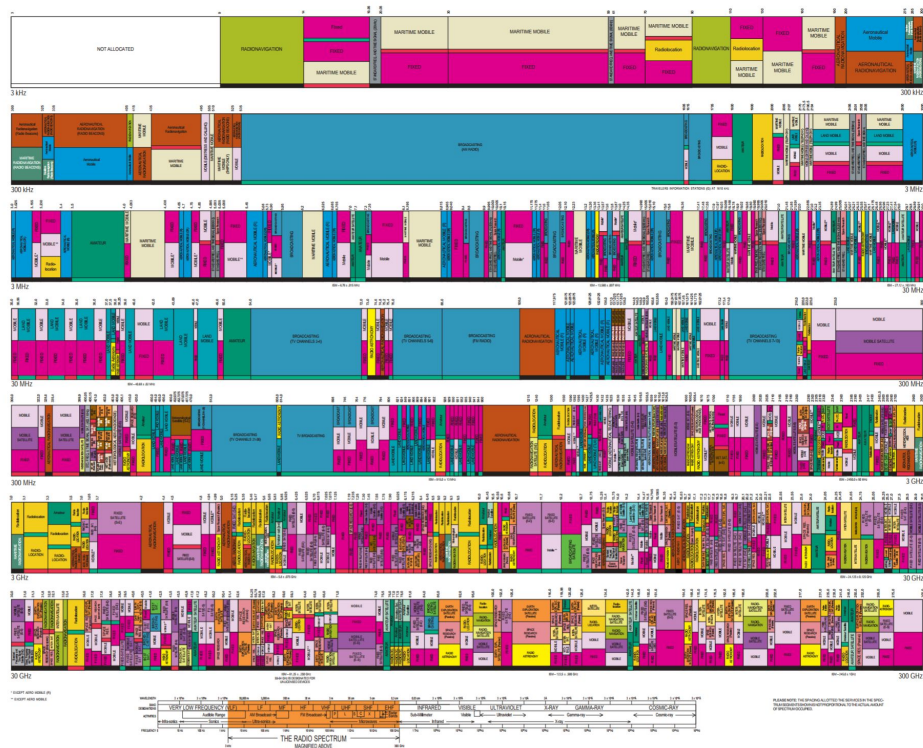

ICOM 7300

FlexRadio 6000 series

US Frequency Allocations

What makes an SDR a SDR?

Modulation using software & changeable? - YES

Digital Signal Processing in software? - YES

Control surface reconfigurable? - YES

Can add new features & new controls - YES

Radio controlled by software? - YES

Benefits of SDR's

Would your radio allow you to transmit a new mode? (FM, AM, SSB, CW). Most radios have fixed modes.

Does your radio allow you to define the button/knob settings? Most radios are vendor defined buttons & knobs.

Does your radio allow you to add a new feature or control?
Most radios have fixed features.

Disadvantages of SDR's

Must have a computer or interface to control the radio.

Analog to digital conversion and CPU clock cycles comes at a price.

Software reliability instead of a hardware based solution.

User adaption, I NEED KNOBS!

Getting Started - What do I need?

Computer - any computer made in the past 5 years can run almost any of the SDR software packages
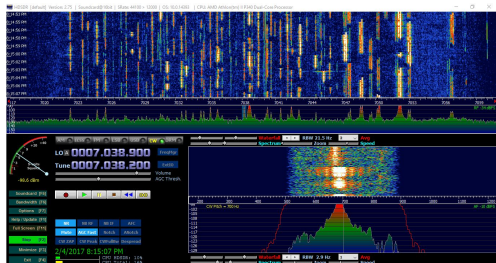

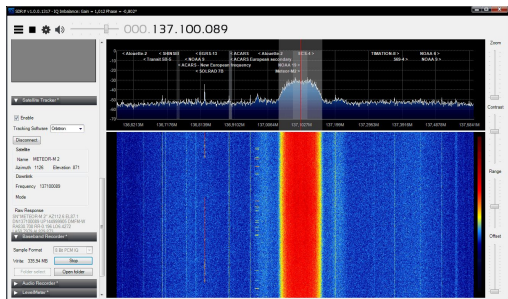SDR Software - downloaded from the internet, typically a free open source package

SDR Dongle - typically a USB hardware device with small antenna attached

SDR Software

HDSDR - www.hdsdr.de. Free SDR software, most popular, has built in drivers for most of the RTL-SDR dongles and IF output.

SDR# - www.sdrplay.com. Free SDR software. Designed to work with Airplay SDR, but will work with almost any RTL-SDR hardware.

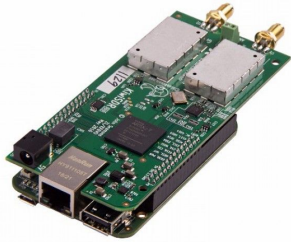For Mac and Linux try the following SDR packages : Linrad & GQRX

SDR Hardware

RTL-SDR - www.rtl-sdr.com. Amazon $25 bucks, can be used with almost any SDR software package. Good cheap entry level dongle.

SDRPlay- www.sdrplay.com $200, can be used with almost any SDR software package. Really good reviews with SDR community.

SDR Hardware (cont')

Kiwi SDR - www.kiwisdr.com. $299, software is open source and very configurable. Can stream signals to the web via sdr.hu account. Hardware is a Beagle board + SDR add on.

Hack RF - www.greatscottgadgets.com. $350, open source. One of the original SDRs in the hacker community. Has very minimal TX (50mA) capabilities.

Amateur Radio SDR's (RX/TX)

ELAD FM Duo
http://shop.elad-usa.com/

HF + 6m
QRP
Cost $1200

ICOM IC7300
http://shop.elad-usa.com/

HF + 6m
100W
#15 on Sherwood
Engineering Receiver Test
Cost $1400

FlexRadio 6000 Series
http://www.flexradio.com

HF + 6m
100W
#1 on Sherwood
Engineering Receiver Test
Cost $2000 to $7000

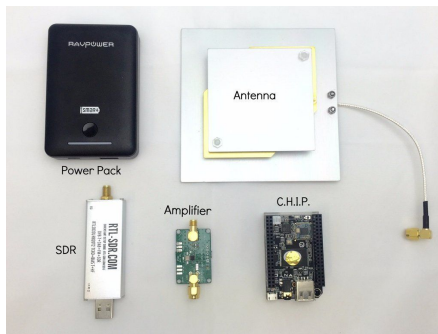# SDR Resources (Web Listening)

WebSDR - http://www.websdr.org/

Kiwi SDR - WebSDR - http://http://kiwisdr.com/
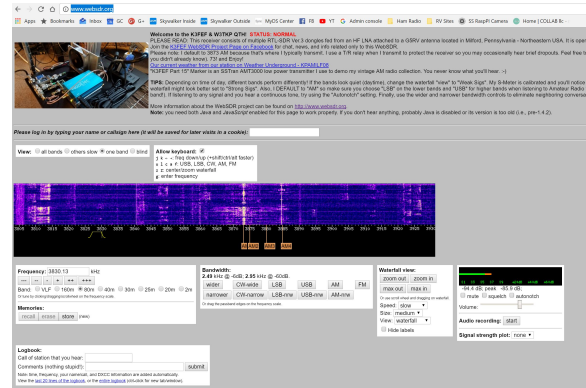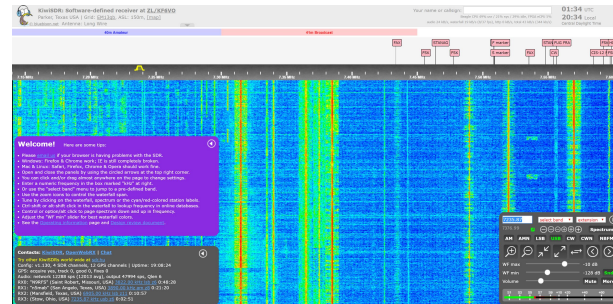
SDR Projects (Non Amateur Radio)

Flight Aware
www.flightaware.com

Ground station airplane tracking. Total investment is around $100 bucks.

Outernet
www.outernet.com

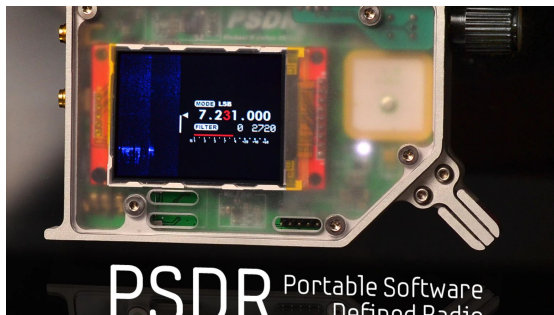Free satellite downlink (20m a day) for internet access to remote locations.

Portable SDR
https://www.rtl-sdr.com/a-portable-sdr-project/
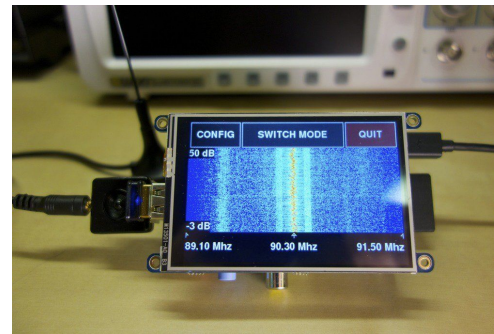
Cheap portable scanner with a Raspberry Pi and display

SDR Projects (Amateur Radio)

Built SoftRock RXTX Ensemble Transceiver
$124.00

The SoftRock RXTX Ensemble is a 1 watt SDR transceiver, built for oper...

larger image

- 160m
- 80m/40m
- 40m/30m/20m
- 30m/20m/17m
- 15m/12m/10m

Pocket SDR
www.kickstarter.com

Kickstarter project for
QRP portable operation

Softrock Transceiver
www.fivedash.com

Transceiver kits with
board and components.

SDR Resources (More Info)

RTL-SDR.COM

RTL-SDR (RTL2832U) and software defined radio news and projects. Also featuring Airspy, HackRF, FCD, SDRplay and more.

| HOME | ABOUT RTL-SDR | QUICK START GUIDE | FEATURED ARTICLES ▼ | SOFTWARE ▼ | SIGNAL ID WIKI | FORUM | RTL-SDR STORE | GUIDE BOOK | CONTACT |

List of software-defined radios

From Wikipedia, the free encyclopedia

This article provides a list of commercially available **software-defined radio** receivers.

Name	Type	Frequency range	Max bandwidth	TX capable	Sampling rate	Panadapters / Receivers	Host Interface	Windows	Linux	Mac	FPGA	Base price
ADAT ADT-200A[1]	Pre-built	10 kHz – 30 MHz (planned modules for 50–54 MHz, 70.0–70.5 MHz, and 144–148 MHz)	0.5–100 kHz		?	1/3	Embedded system (no computer needed), USB, Internet remote	Yes, with option R-1 & ADAT Commander	?	?		CHF 5,220
AD-FMCOMMS2-EBZ[2]	Pre-built	2400 – 2500 MHz		Yes	61.44 MSPS	2/2	FMC (to Xilinx board) then USB 2.0 or Gigabit Ethernet.	Yes	Yes	Yes		US$750

https://en.wikipedia.org/wiki/List_of_software-defined_radios

SDR Resources (More Info)

Software Defined Radio (SDR)
for Amateur Radio – An Overview

Steve Dick, K1RF

February 11, 2015

Comm Center
100 Fairfield Ave
Norwalk, CT

http://gnarc.org/wp-content/uploads/2015/02/Software-Defined-Radio-SDR-for-Amateur-Radio-2015-02-11.pdf

SDR's on Sherwood Engineering

http://www.sherweng.com/table.html - out of the top 25 receiving radios on the list, 12 are SDR's

Flex Radio Demo