



# Software Defined Radio (SDR)

- What it is
- Where you can get one
  - How you can use one
- How you can make one



# SDR

- According to [Wikipedia](#):
  - *Software-defined radio (SDR) is a radio communication system where components that have been traditionally implemented in hardware (e.g. mixers, filters, amplifiers, modulators/demodulators, detectors, etc.) are instead implemented by means of software on a personal computer or embedded system. While the concept of SDR is not new, the rapidly evolving capabilities of digital electronics render practical many processes which were once only theoretically possible.*



# SDR

- What does that actually mean?
  - Signal processing is done digitally
    - Digital signals can be amplified, filtered, modulated, demodulated & shifted in frequency without adding any **noise**
    - Analog radios are prone to creating **interference**.  
Digital signal processing in data buffers are not.
    - Narrow hardware filters are a technical challenge and can impact on **performance**. Digital filters do not have the same limitations.
    - **Cost**



# SDR

- But what does that actually mean?
  - Using a (cheap) signal receiver (a dongle) with an aerial
  - Free software
  - The sound card in your PC
  - And the processing power of the PC
- You can tune a very wide frequency range and listen to/interpret a range of signals.



# SDR

- Before looking at some practical examples of SDR receiving devices & software
  - SDR can be used for transmitting as well as receiving – but I'll leave that for another day
  - WebSDRs
    - [HackGreen](#)
    - [The fabulous G4PFH Top Band WebSDR](#)
    - [SUWS VHF/UHF WebSDR](#) in Farnham
    - [SDR.HU](#)
    - .....



# SDR

- The dongles
  - Wideband receiver
  - Usually based on DVB-T TV tuner with RTL2832U chipset
  - Start <£20
  - Either plugs into or cables into USB on the PC





# SDR

SDR	Tune Low (MHz)	Tune Max (MHz)	RX Bandwidth (MHz)	ADC Resolution (Bits)	Transmit? (Yes/No)	Price (\$USD)
RTL-SDR (R820T)	24	1766	3.2	8	No	~20
Funcube Pro+	0.15 410	260 2050	0.192	16	No	~200
Airspy	24	1800	10	12	No	199
SDRPlay	0.1	2000	8	12	No	149
HackRF	30	6000	20	8	Yes	299
BladeRF	300	3800	40	12	Yes	400 & 650
USRP 1	DC	6000	64	12	Yes	700



# SDR

- SDR Software (most free)
  - SDR#
  - HDSDR
  - SDR-Radio
  - cuSDR
  - PowerSDR
  - .....



# SDR

- Very brief introduction to SDR
  - Looked at what it is
  - Looked at some of the SDR devices that are available
  - Looked at some of the free software that is available
  - Touched briefly on SDR for transmitting
  - Mentioned WebSDR sites which are on your PC
- These notes will be in the [technical library](#)



# SDR

Some useful information links for SDR

- [RTL-SDR.com – everything about dongles & more](#)
- SDR by Andrew Barron ZL3DW (book), published by RSGB
- [AirSpy hardware & SDR# software](#)
- [RSGB WebSDR directory](#)