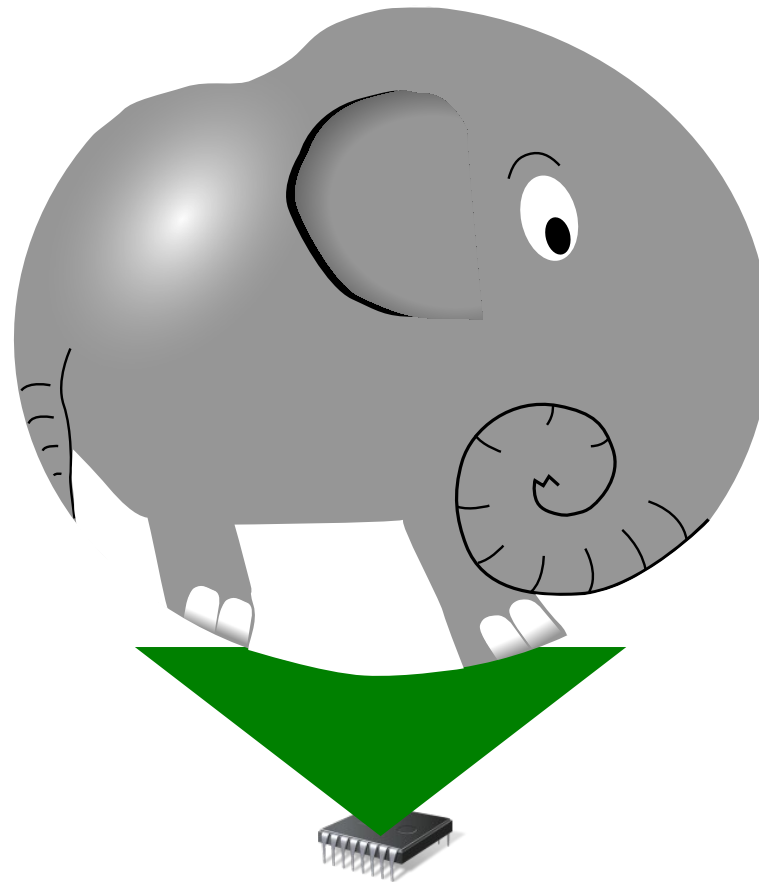


Professional Seminars II: Operating Systems for Embedded Systems

Software Defined Radio



R04
Ángel Perles

Contents

- Concept
- Hardware
- Software

Concept

- Software Defined Radio (SDR): Radio system where part of the typical radio elements are replaced by software running on digital processors

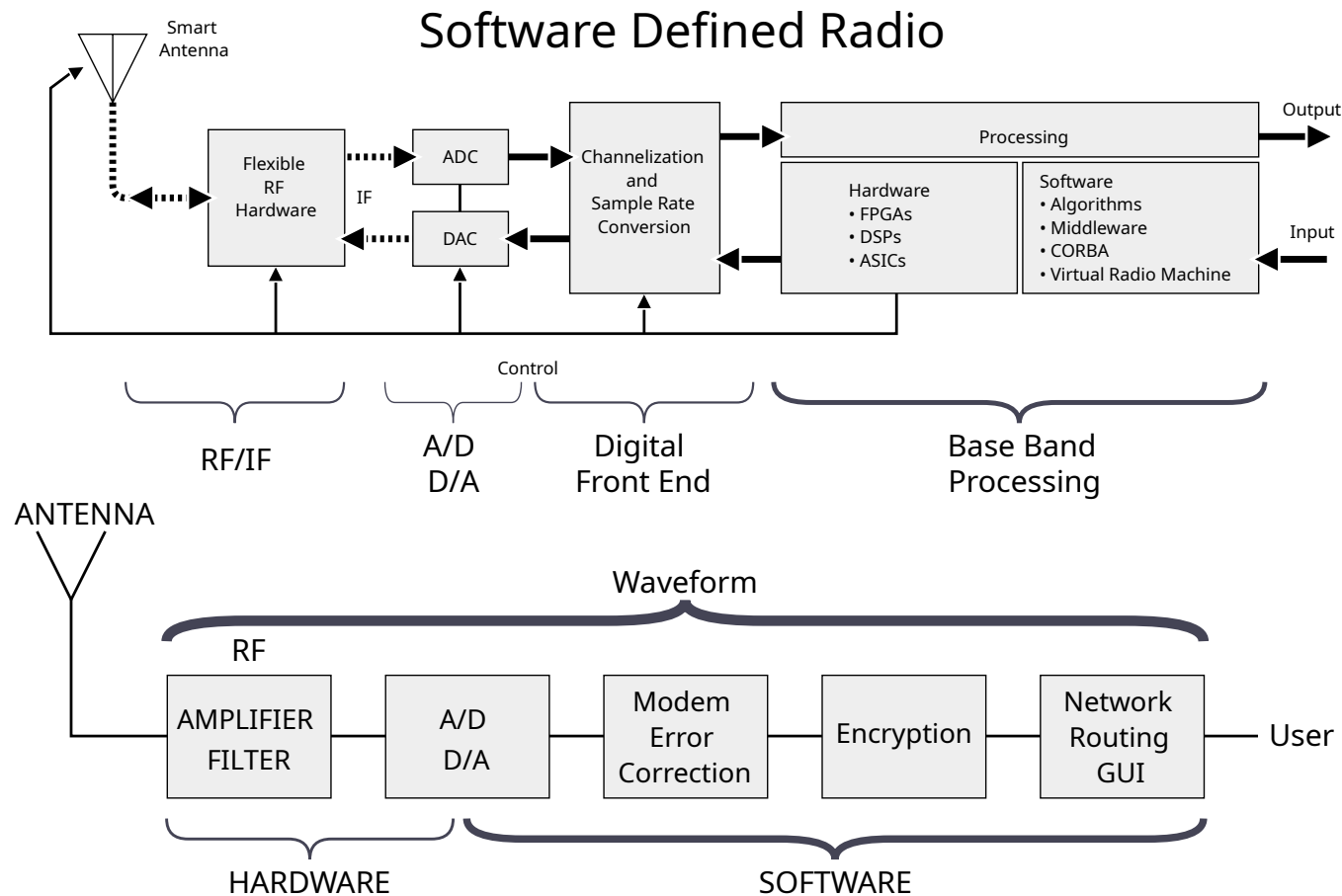


Image source: wikipedia

Concept

- Part of the signal processing is based on software
 - Increased flexibility incorporating known protocols
 - Increased adaptability to new protocols
 - Etc.
- Drawback → radio signals can be complex
 - Simple digital processors could be insufficient
 - High energy requirements → not for IoT



Hardware

- The simplest option is a PC computer with a sound card
- But it is desirable to use specific hardware



ETTUS USRP E310



HackRF One



LimeSDR



BladeRF



Hardware

- “Poor men” can use low cost hacked DVB-T USB receivers
 - RTL-SDR project <http://sdr.osmocom.org/trac/>
 - From 10 Eur.
 - Perfect for statrting with SDR



Software

- Depending on the elected hardware, part of the software runs in the hardware itself
 - FPGAs, microcontrollers, DSPs
- High level software runs in classical computers or embedded systems
 - Mostly open-source based (thanks to “hack”/amateur people). EA5CSW, ...
 - OS required → Linux is the king here



<https://www.kali.org/news/kali-linux-software-defined-radio-support/>

Software

- GNU Radio project is adequate for research purposes
 - <http://gnuradio.org/redmine/projects/gnuradio/wiki>

