

Open Source Software Defined Radio

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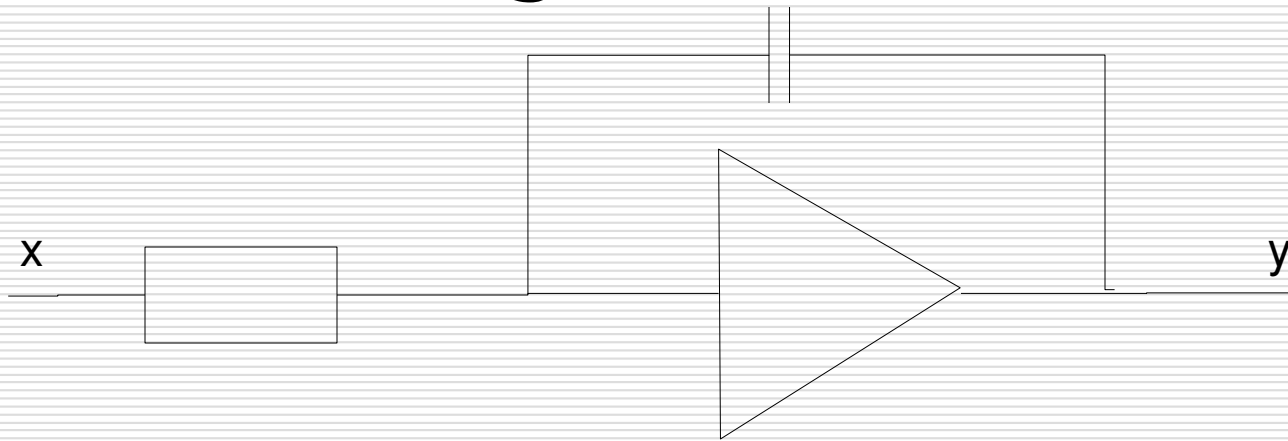


Outline

- Software Defined Radio
 - Digital Signal Processing
- HP SDR
- GNU Radio
- OSSIE
- Questions



Introduction to Digital Signal Processing



$$y = \int x dx$$

$$y_new = y_old + x;$$

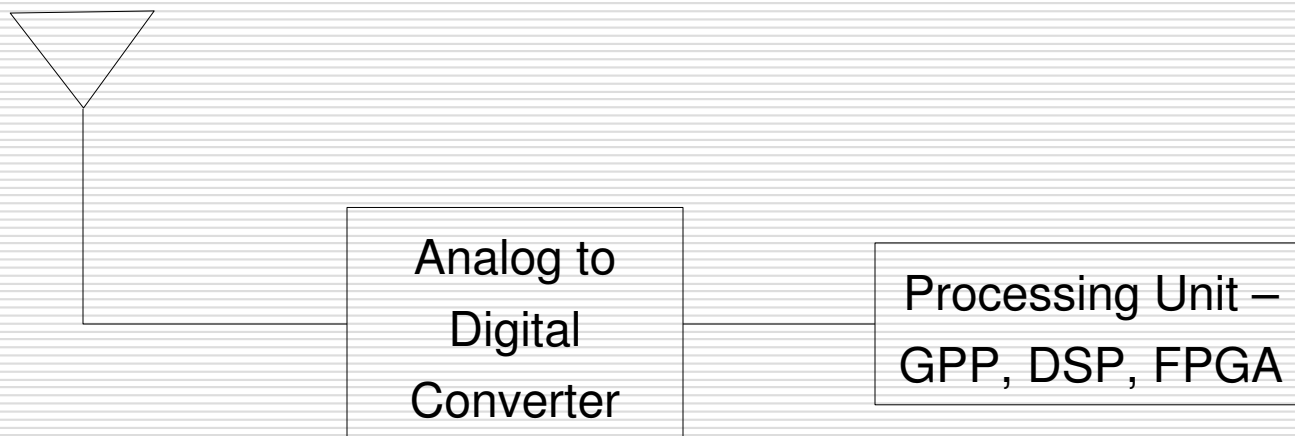


Digital Signal Processing

- Use mathematical operations to replace analog hardware
- Operate on sampled data, not continuous signals
- Processing Hardware
 - General Purpose Processors (GPP)
 - Digital Signal Processor (DSP)
 - FPGA
 - ASIC's ????? (Not reconfigurable)



Software Defined Radio



- Real implementation is far more complex

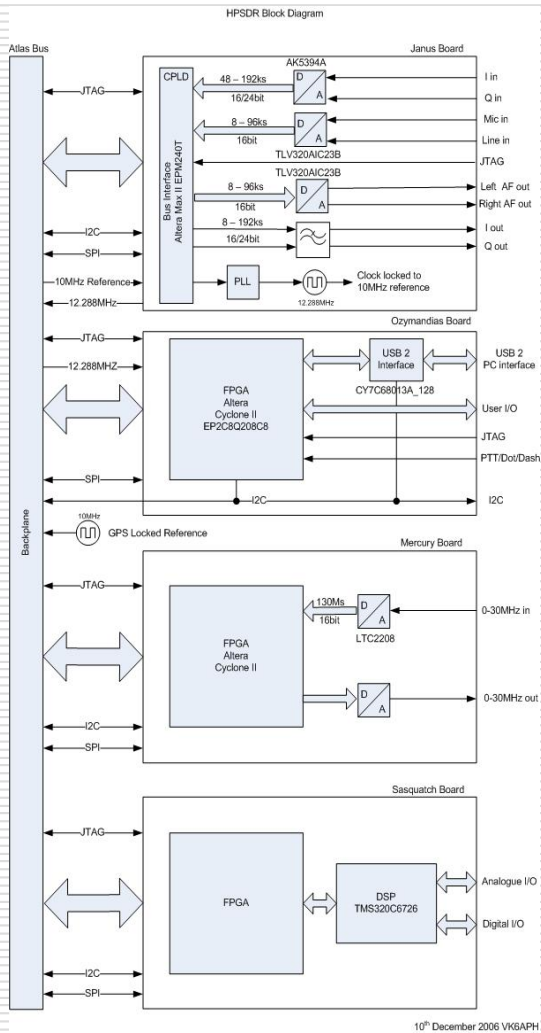


Open Source SDR

- Many projects
 - HPSDR – hardware centric
 - Focused toward amateur radio
 - <http://hpsdr.org/>
 - GNU Radio – PC centric
 - <http://gnuradio.org/trac>
 - Created the USRP
 - OSSIE
 - based on Software Communication Architecture
 - <http://ossie.mprg.org>



High Performance SDR

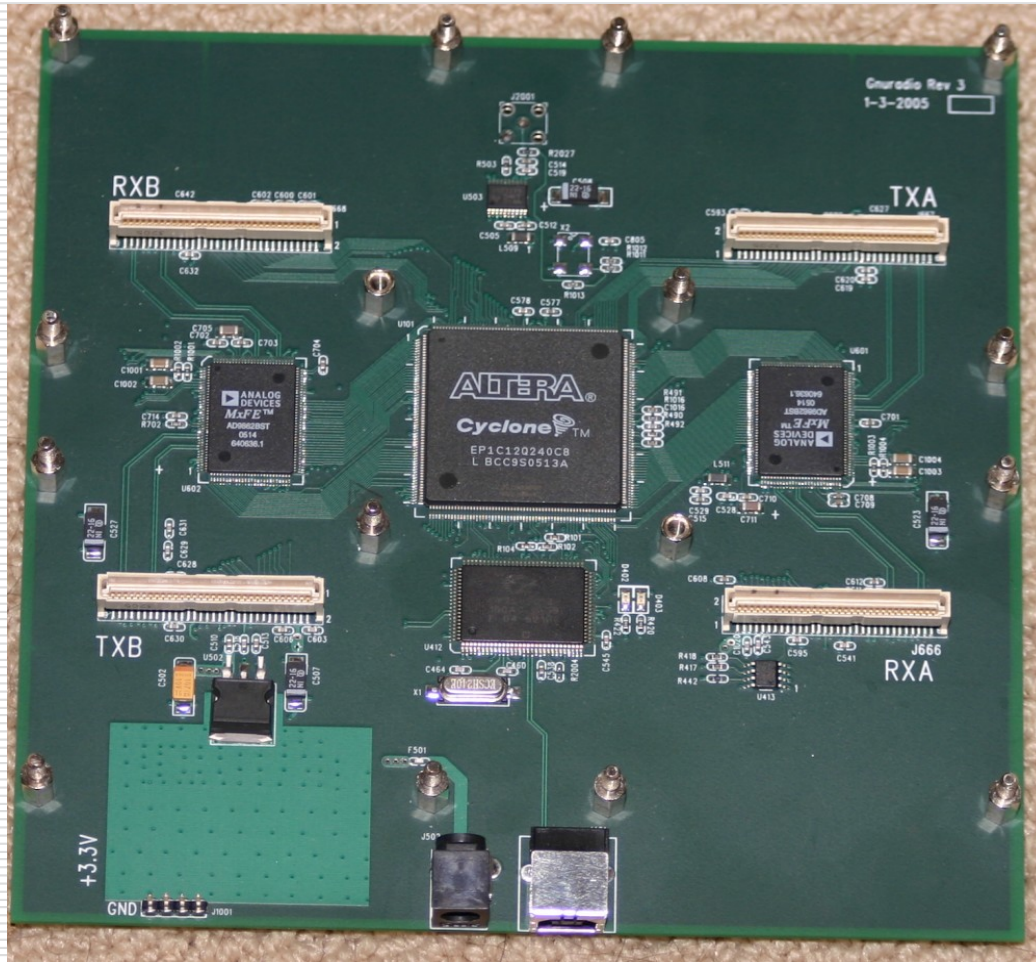


- Strong Amateur Radio focus
- Modular hardware
- Specialized hardware
 - FPGA and DSP
- Under development
 - Some boards complete



- Derived from the MIT Spectrumware project
 - Vanu is also related to Spectrumware
- Signal processing in C, configuration in python
- Developed the Universal Software Radio Peripheral (USRP)

USRP



- 4 A/D
- 4 D/A
- FPGA
- USB
- Daughterboards
- About 850 USD
 - With RF board



OSSIE

- Open Source SCA Implementation Embedded
- Based on Software Communication Architecture
 - Originally designed by US DOD
 - Some commercial interest
- Object Management Group is working on a standard based on the SCA



OSSIE continued

- Written in C++
 - Current development focused on Linux
 - Should work on other UNIX based OS'
- Uses OmniORB (CORBA) and XERCES(XML)
- First released in July 2004
- Development team composed of VT students
 - Graduate and under graduate students
- Project web page <http://ossie.mprg.org>



How did I end up here?

- OSSIE primarily runs on PC's
- My work involves SDR on small systems
- Open Embedded can build OSSIE
 - OMAP Starter Kit (OSK)
 - ARM + DSP
 - EFIKA
 - Power PC



Questions

- Outside
- Hacker room
- Bar

