

Clear roadmap for Open Hardware at Instrumentation Technologies

Borut Repič

Grenoble, 9th October 2011

Contents

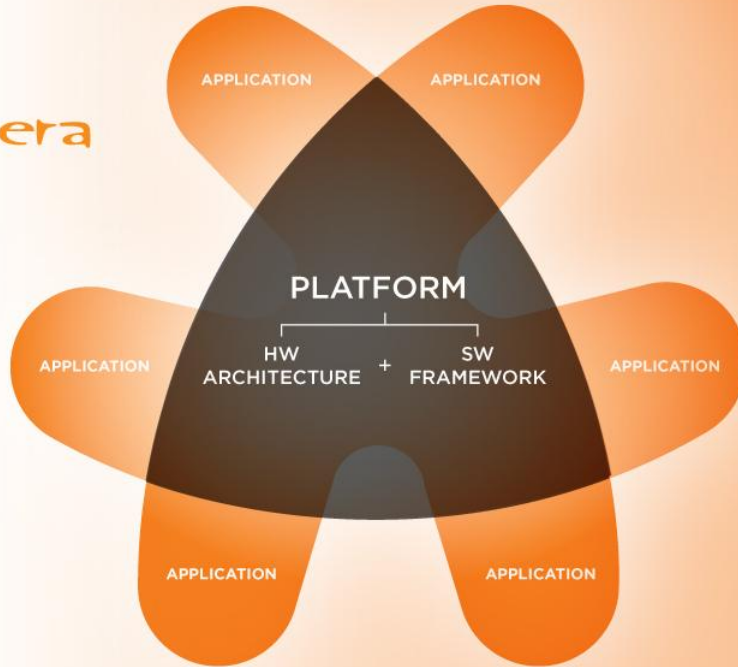
- Background
- Experience
- Design tools
- OHW licence criteria in Instrumentation Technologies
- Working together examples
- Our view of OHW

Company's Background

- Founded in 1998 in Solkan, Slovenia
- 50 employees, R&D focused
- Core business:
 - **Libera** Family: state-of-the-art instrumentation used at accelerators worldwide
 - Working together (collaborations, also including OHW)
- Main event: **Libera** Workshop: annual gathering of experts from global institutes in Solkan.

Last week, 7th in row, attended by 42 scientists from 23 institutes from 15 countries!

Libera



Instrumentation
Technologies

Working together.

Collaborations
OHW

Our experience

- Instrumentation in the particle accelerator field:
 - High performance analog and high speed digital design
 - Fast data acquisition
 - FPGA processing algorithms
 - High and Low Level Software
 - System design
- Electronic assembly and fast prototyping (several PCB assembly companies and several PCB manufacturers)
- In-house design of hardware and software supported by simulation tools (analog, SI, PI, thermal).
- Extensive FPGA programming support (System Generator, FDK – fpga devel. kit).
- Industrialization – design for manufacturing.
- Certification (EMI, EMC, LVD, ...)


Design tools

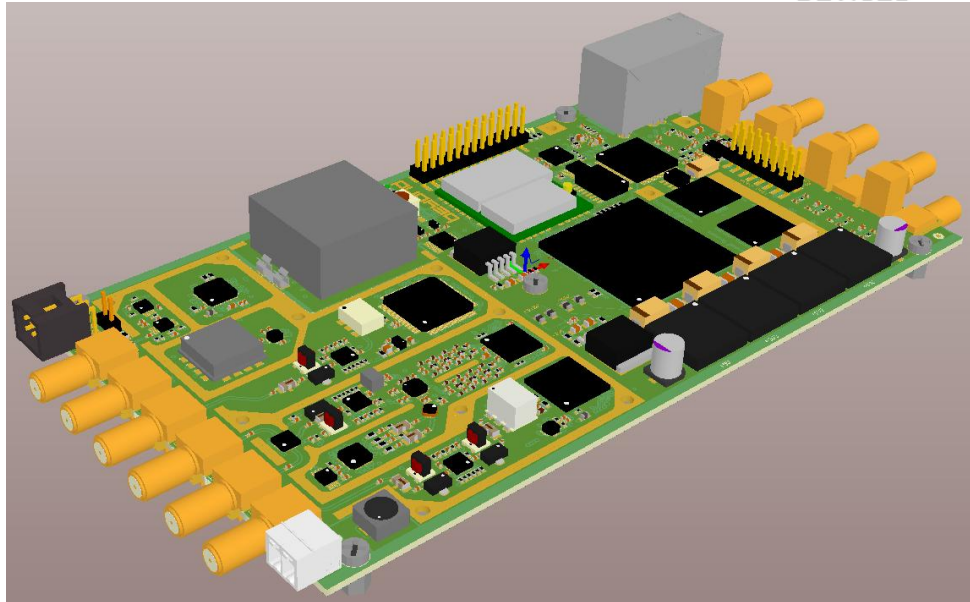
- PCB Design: Altium Designer
- Circuit and PCB Simulation: Spice, HyperLynx SI/PI/Thermal
- FPGA design: Xilinx ISE, System generator, ISP Lever
- FPGA simulation: ModelSim SE
- Software: Eclipse with GCC, Crossworks, Continuous integration tools for automatic compiling and testing

OHW license criteria in Instrumentation Technologies

- Up to now we were delivering our designs without license. Conditions and handover well defined by contract.
- HW design can be published under one of the OHW licenses:
 - By Instrumentation Technologies or
 - By the customer (he pays for development)
- There is no hard decision on preferred OHW license:
 - Depends on content
 - Depends on customer decision

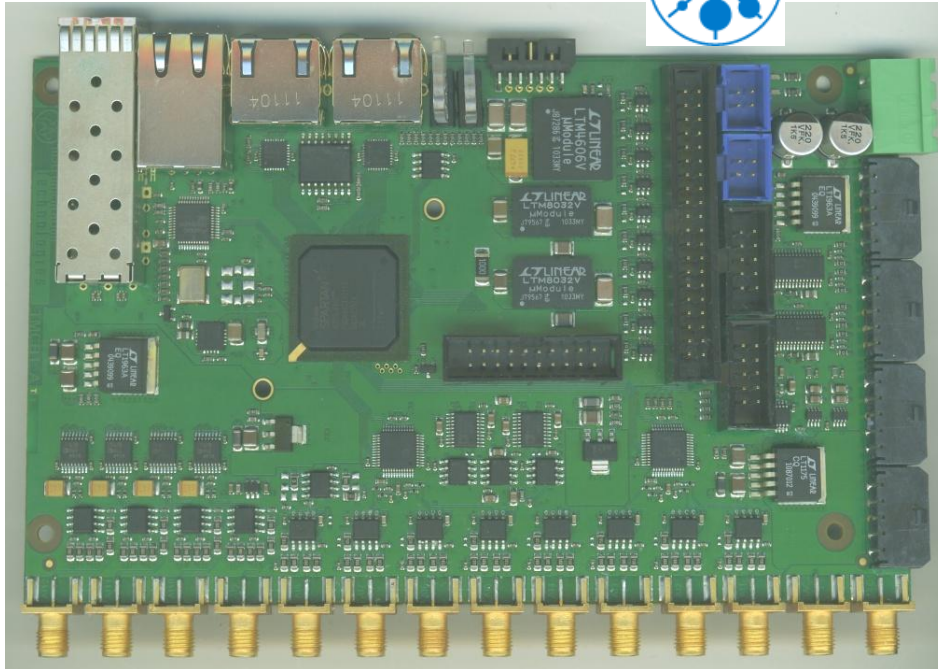
Working together example1: DVB-T/H modulator

- World's best performance all-in-one DVB modulator.
- Developed in collaboration with **BEYOND** 
DEVICES



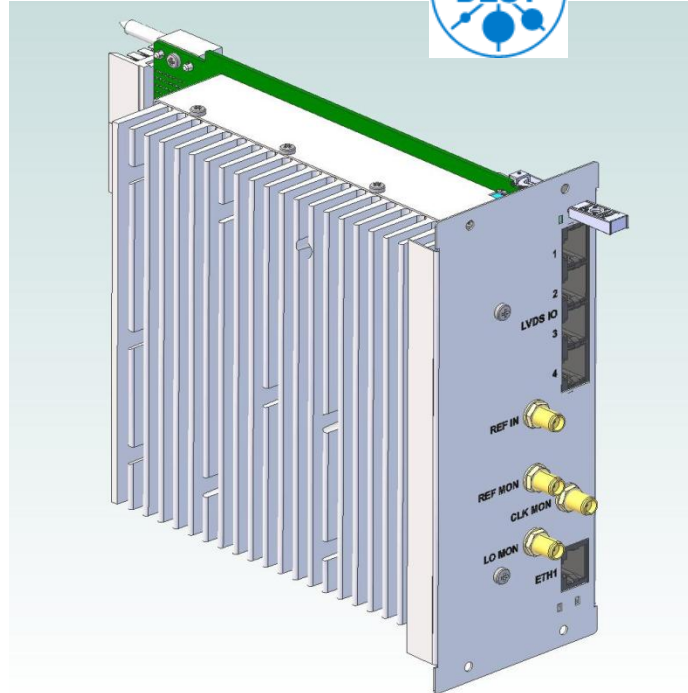
Working together example2: TMCB

- General purpose analog and digital I/O.
- Developed in collaboration with



Working together example3: uLOG

- Very high performance LO & sampling clock generator.
- Developed in collaboration with



Instrumentation Technologies view of OHW

In industry the bottom line must be a positive number at the end of the year.

- In this presentation we present practice and criteria for HW design to be published under OHW license
- Our background, warranty and long term support qualify us as one of the best options also for OHW initiatives