

# Open Source Hardware

## An introduction

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- 1 Logistics
- 2 What is OSHW?
- 3 Why OSHW?
- 4 How to do OSHW?
- 5 Conclusions

# Outline

- 1 **Logistics**
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# Logistics

## Wireless Internet access

Login: visitor

Password: ICALEPCS

## Keep it informal but. . .

- Wait for the end of talks, the breaks or the discussion session to ask questions.
- Take the mic to talk.
- Respect vendor stands and tables during coffee and lunch breaks.

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# There is an OSHW definition!

Check out <http://freedomdefined.org/OSHW>

- Made by the same people who organize the OH Summit. See Tom's talk.
- Inspired by the Open Source definition for software.
- Focuses on ensuring freedom to study, modify, distribute, make and sell designs or hardware based on those designs.
- Now we know exactly what we mean when we say OSHW!

There are licences compatible with it

- E.g. CERN Open Hardware Licence. But there are others, like TAPR OHL and the CC family.
- See Myriam's talk.

# There are many successful OSHW projects

## Arduino is probably the best known

- Huge community.
- A source of inspiration for many people.
- See David's talk.

## Designs hosted in [www.ohwr.org](http://www.ohwr.org)

- See Erik's talk on CERN designs.
- See Brandon's talk on Rhino.

And many many others... (see e.g. Pascale's talk on Soleil designs).

# Many companies already do it

## Have designed OSHW

- Creotech (see Greg's presentation).
- Seven Solutions (see Eduardo's presentation).
- Facebook (see John's presentation).

## Are seriously considering it

- National Instruments (see Ravi's presentation).
- I-Tech (see Borut's presentation).

And many many others. . .



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## Reasons for OSHW (designers)

### Avoid duplication

How many people are designing a 100 MS/s ADC board just in the ICALEPCS community right now?

### Get peer review and help

- From companies.
- From colleagues in other labs and universities.
- From great people you don't know!

### Tackle more ambitious projects

Imagine what the people in this room could do if working together. And that's very few people!

## Reasons for OSHW (companies)

### Peer review

Have other people, including your clients, help you in the design. Compensate your weak areas with external help.

### Lower entry barriers

Enter a new market with almost no risk.

### Build hybrid solutions

Complement your proprietary product line with OSHW gear and sell complete integrated systems.

## Reasons for OSHW (clients)

### No vendor lock-in, resulting in

- Vendors selected solely on their proficiency and quality of support.
- Reasonable prices.
- Easier management of obsolescence.

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# Put your stuff online!

## E.g. in the Open Hardware Repository

- A complete web-based collaborative environment made of FOSS itself.
- Best practice is to make it much more than a dump for design files: explanations, specifications, mailing list discussions. . .
- Version control for code (HDL, firmware. . . ) but also for schematics, PCB layout, etc.

# Use an OSHW definition-compliant licence

## E.g. the CERN OHL

- Give lots of freedom to licensees.
- Ensure modifications are fed back to the community.
- Deal properly with liability.

# Try to use FOSS tools for development

## For gateware

- Simulation: Icarus Verilog, GHDL. . . See Pawel's talks.
- Synthesis and P&R?! See Sebastien's talk.

## For PCB design

- gEDA: see Larry's presentation.
- Kicad: see Dick's presentation.
- Are we there yet? See Tom's presentation.



# Find a good commercial model

## Companies are your friends

- Expertise.
- Guarantee.
- Support.
- All these things are worth money! Can we change our mindset?

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## Some remarks before moving on

- Don't hesitate to challenge, ask, discuss. . . This is a workshop, on a very new paradigm.
- Have fun!