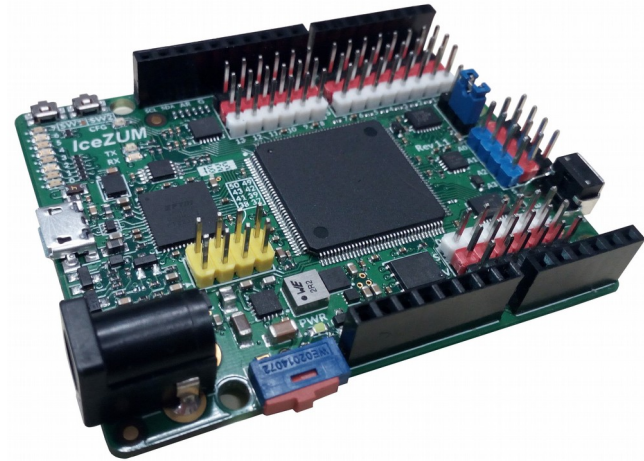
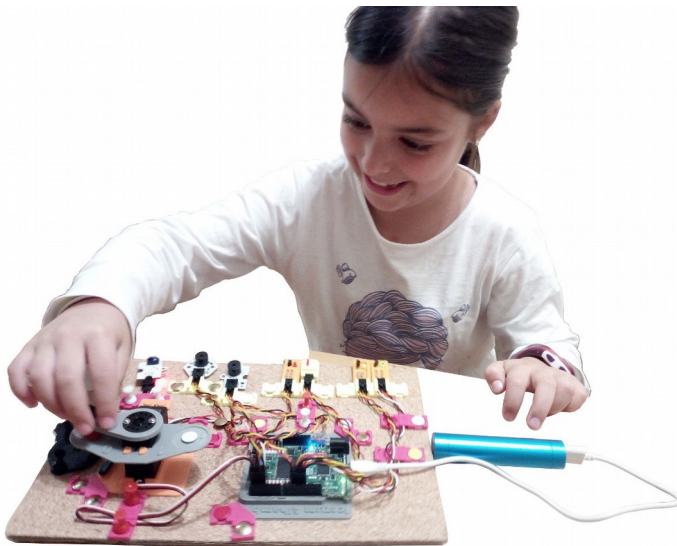


Funny Digital Electronics with Open Source FPGAs



<http://fpgawars.github.io/>

Juan González Gómez

@Obijuan_cube

<https://github.com/Obijuan>

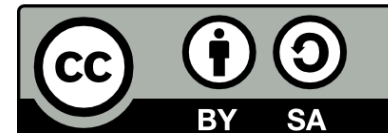


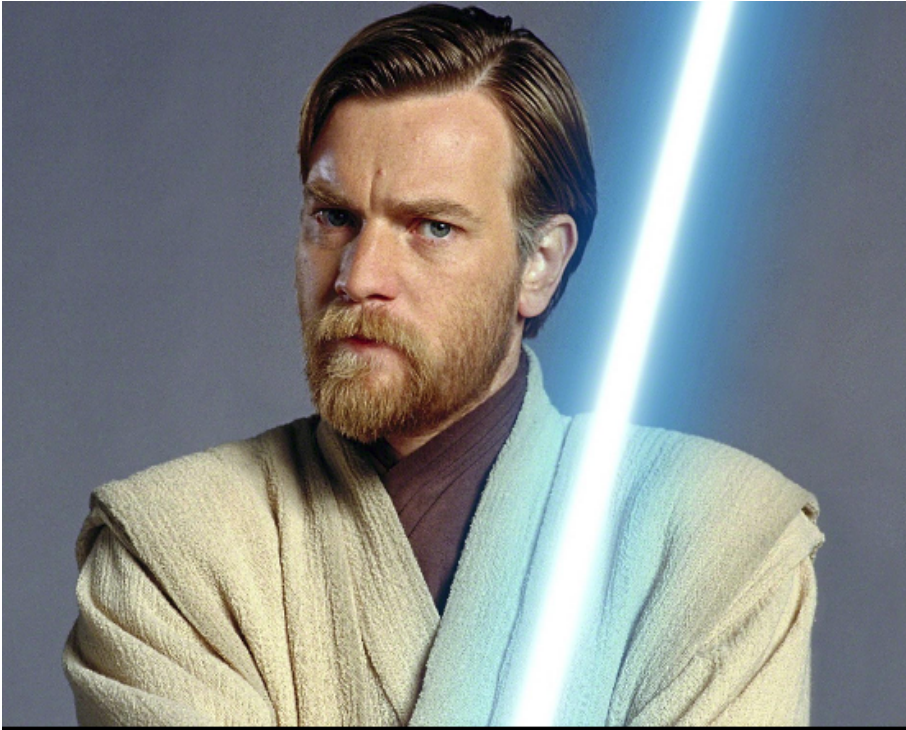
JdeRobot



FOSDEM '18

Brussels
3 & 4 February 2018





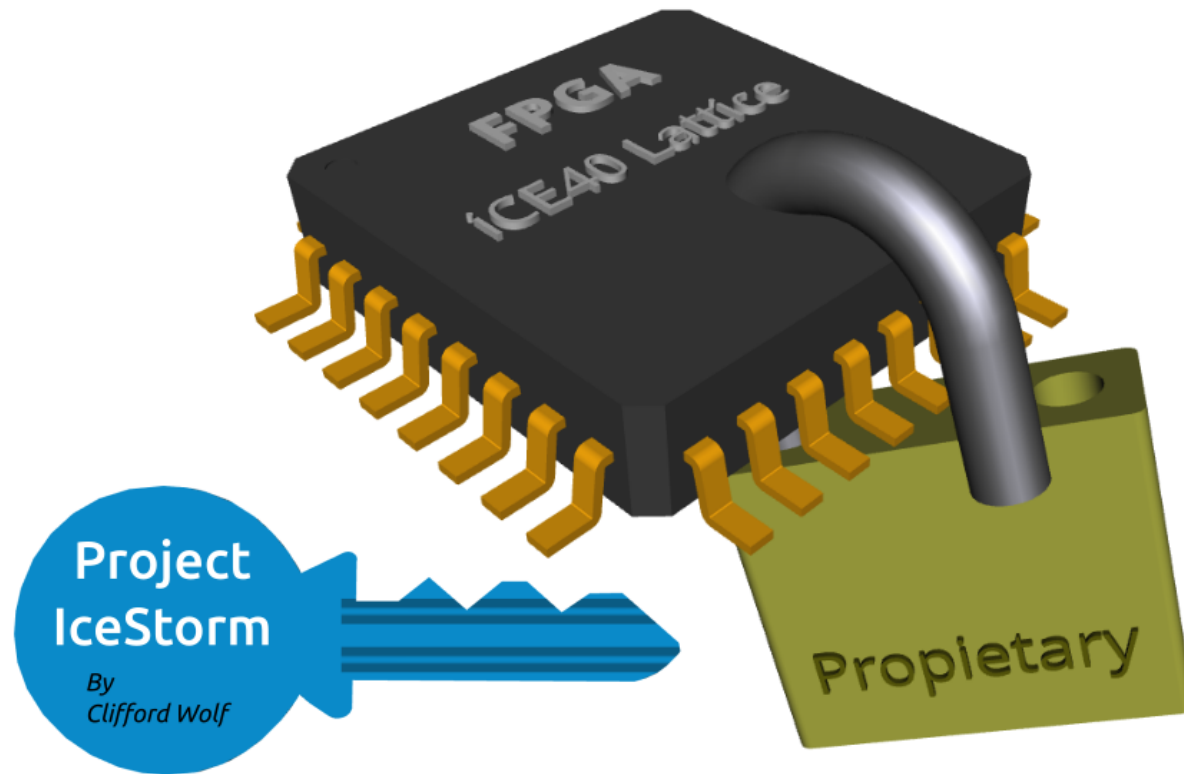
Obiwan



ObiJuan

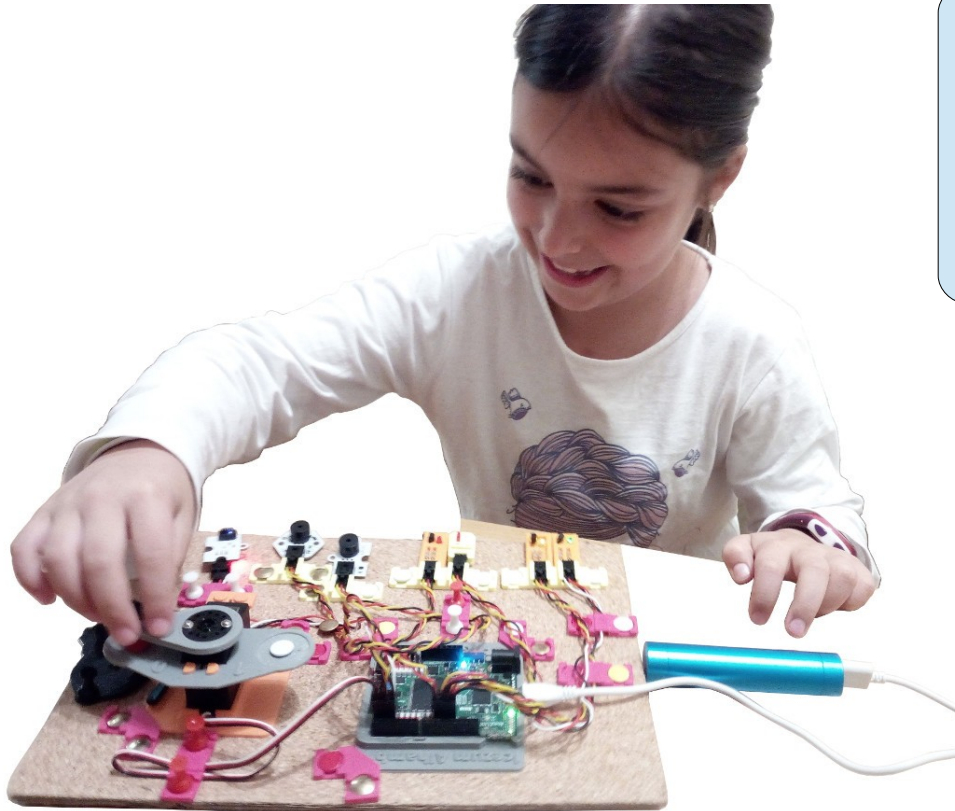
- I am not a Jedi, but I am trying...
- I am an assistant professor at Rey Juan Carlos University in Madrid, Spain
- I am also a researcher in Robotics at the Robotics Lab in Rey Juan Carlos University

Icestorm project: Thank you very much!



- Icestorm project (May, 2015): Clifford Wolf, Mathias Lasser
- The first **fully open source *toolchain*** in history

Motivation

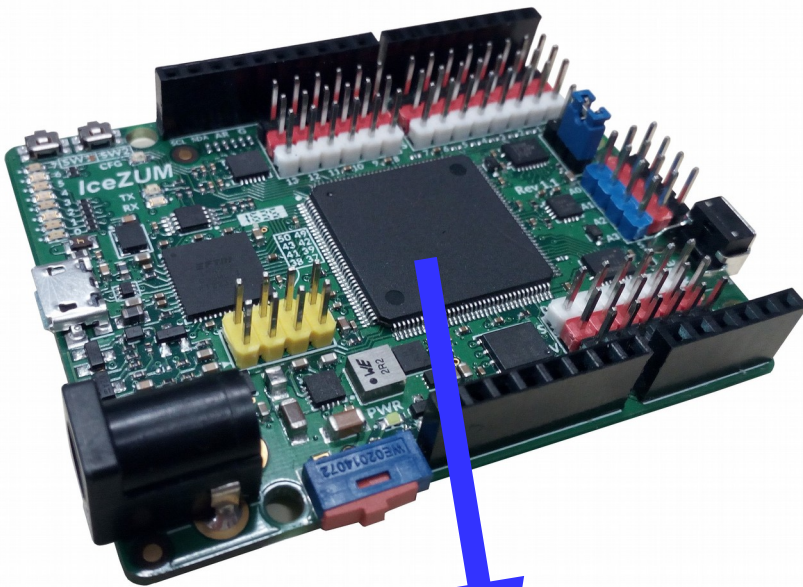


Is it possible for kids or non-tech people to design digital circuits?

Can we create libre tools for allowing them to learn digital electronics?

Icezum Alhambra v1.1

<https://github.com/FPGAwards/icezum/wiki>



**Open Source
FPGA**

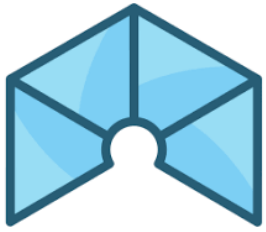
- Author: **Eladio Delgado**
- From en Pinos del Valle (Granada, Spain)
- Arduino-like board with and Open source **FPGAs**
- Arduino compatible
- Easy connection of sensors / actuators
- Really nice for making Educational open-source Robots

Made in Kicad

The screenshot displays the Kicad PCB editor interface. The title bar shows the file path: `/home/objuan/develop/icezum/src-kicad/icezum.kicad_pcb`. The menu bar includes File, Edit, View, Place, Route, Preferences, Dimensions, Tools, Design Rules, and Help. The toolbar contains various icons for file operations, navigation, and editing. The central workspace shows a detailed PCB layout with components like resistors (R1-R28), capacitors (C1-C28), integrated circuits (U1-U5), and connectors (J1, J2, J3, J4). The layout is color-coded by layer, and a grid is visible. The right-hand panel, titled 'Visibles', lists layers and their render status. The bottom status bar provides summary statistics for the PCB design.

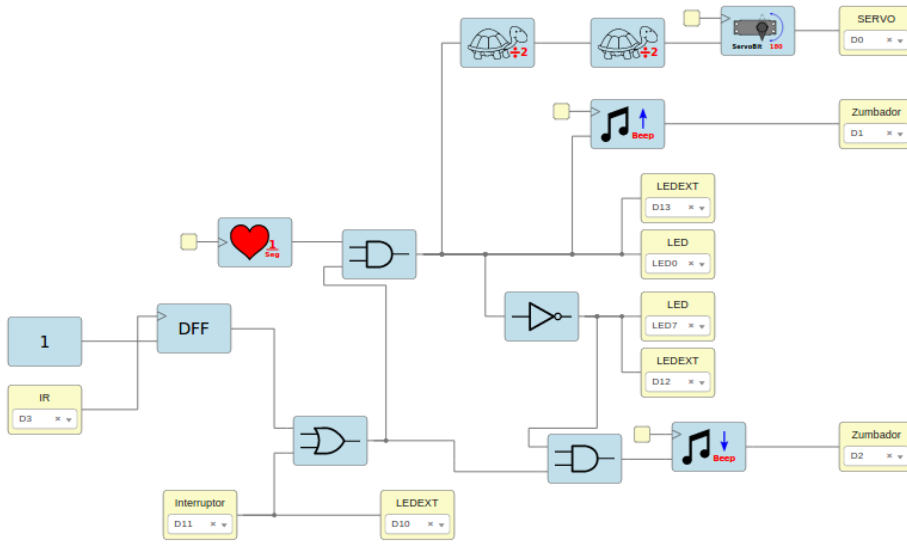
Pads	Vias	Track Segments	Nodes	Nets	Links	Connections	Unconnected
818	233	2204	807	240	568	568	0

Dimensions: Z 3,60 X 126,230000 Y 86,300000 dx 126,230000 dy 86,300000 dist 152,911 mm



Icestudio

Archivo ▾ Editar ▾ Ver ▾ Seleccionar ▾ Herramientas ▾ Ayuda ▾ Básico ▾ Bit ▾ Puertas ▾ Varios ▾



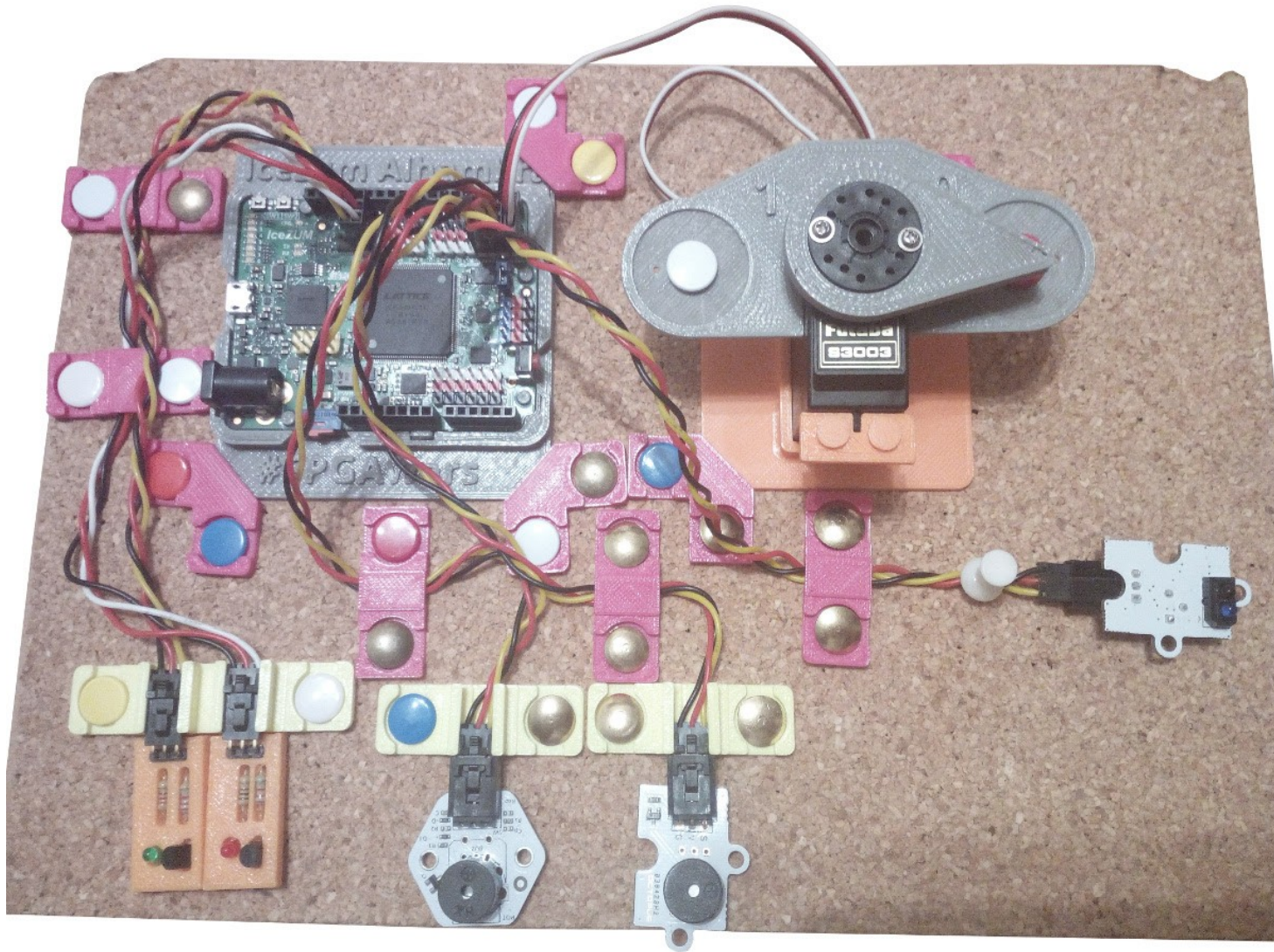
Malakabot-demo

IceZUM Alhambra

<https://github.com/FPGAwards/icestudio>

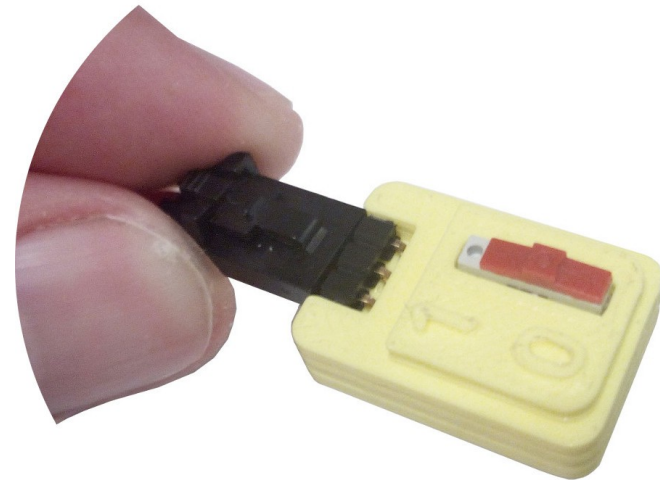
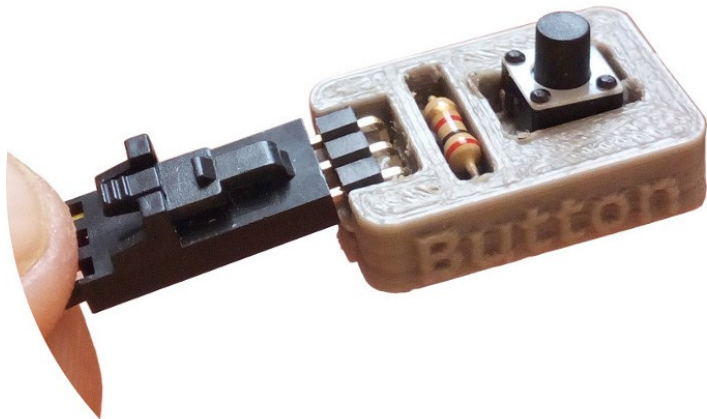
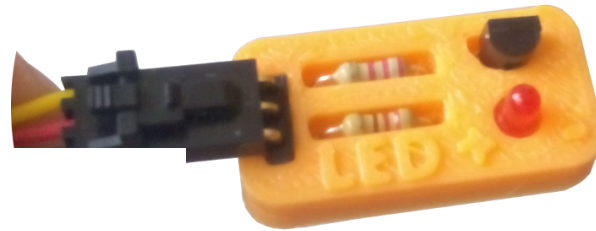
Author: **Jesús Arroyo**

Panel example

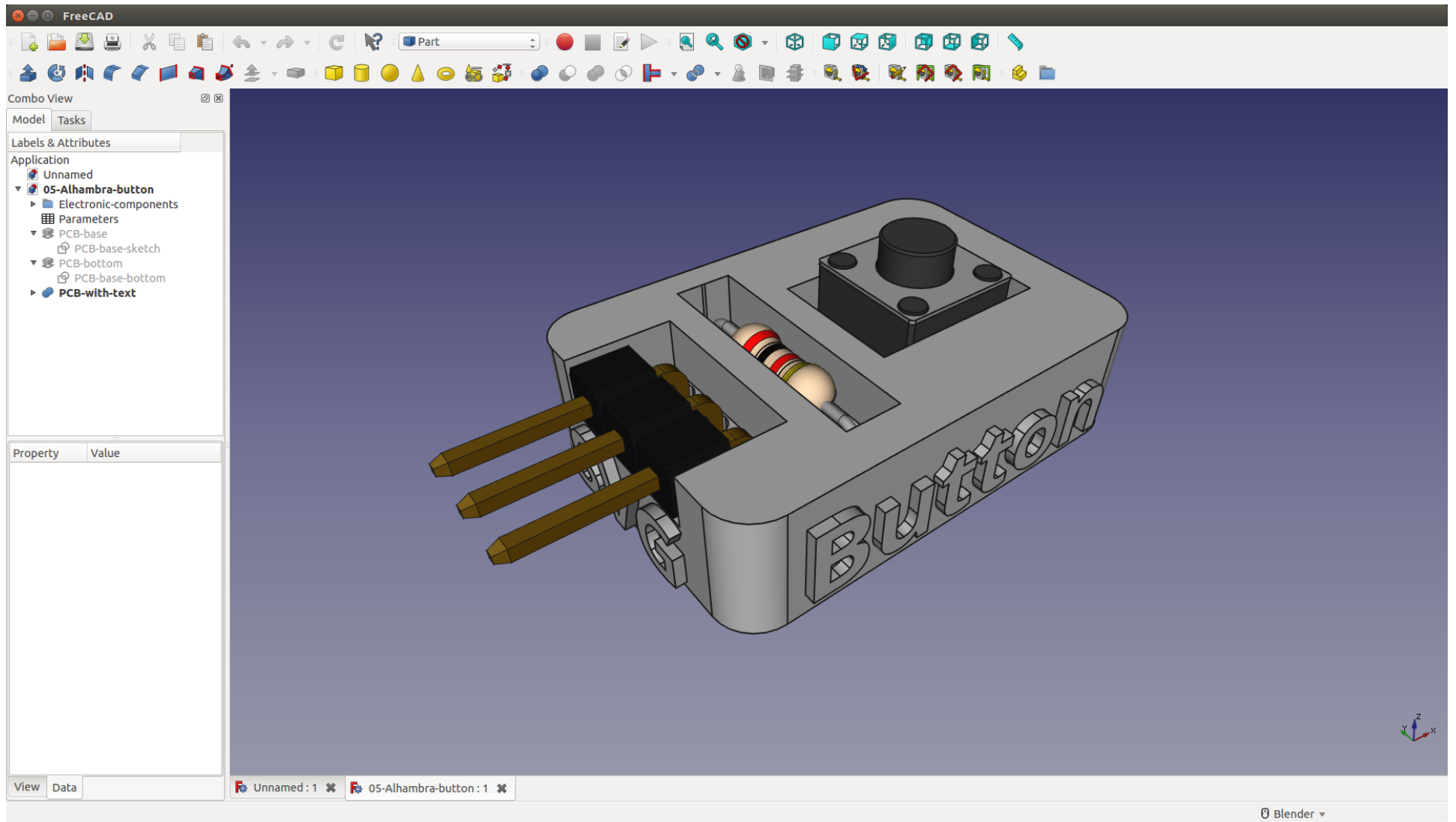


Peripherals

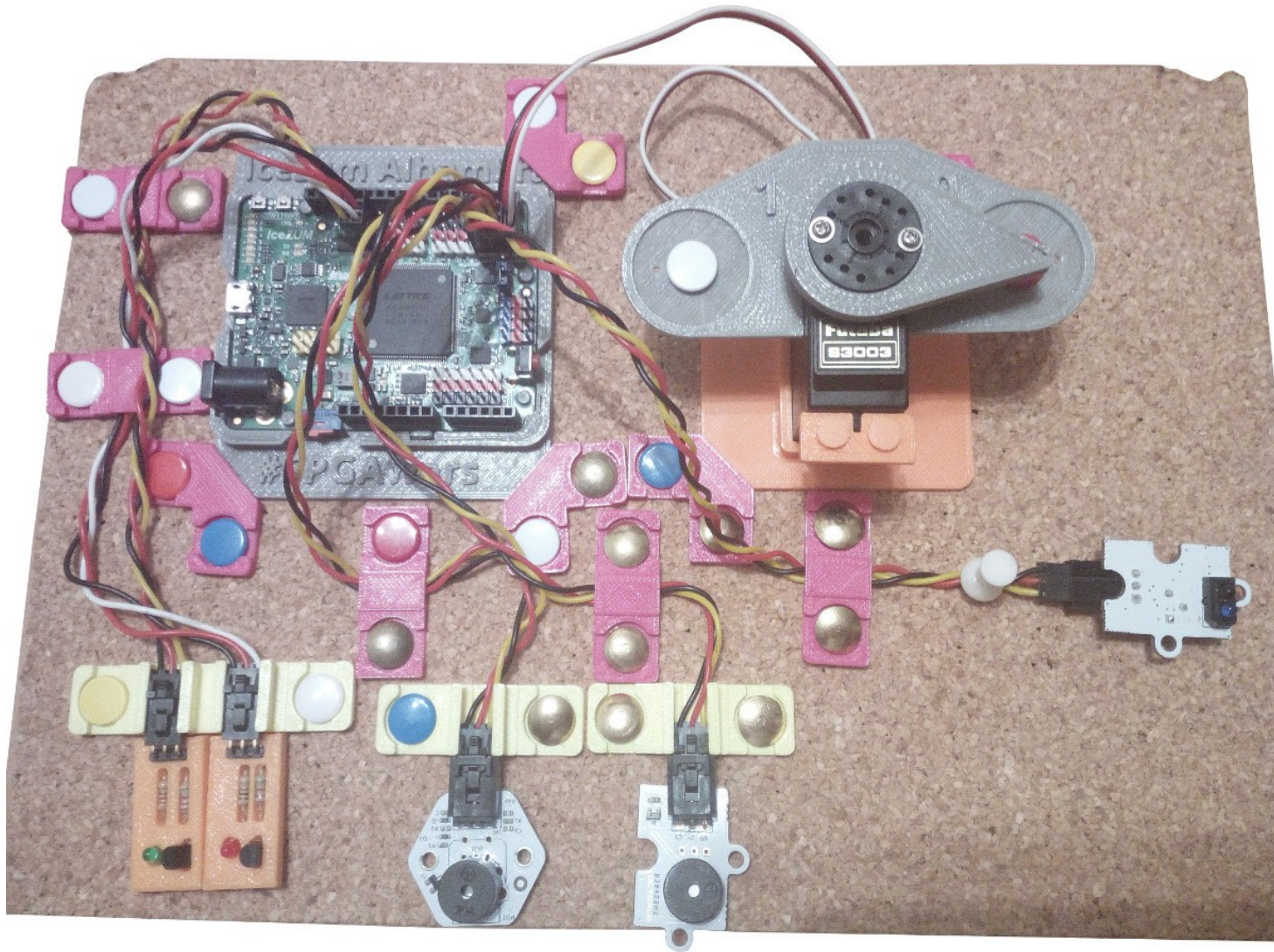
PCBprints: 3D printed boards



Made in FreeCAD



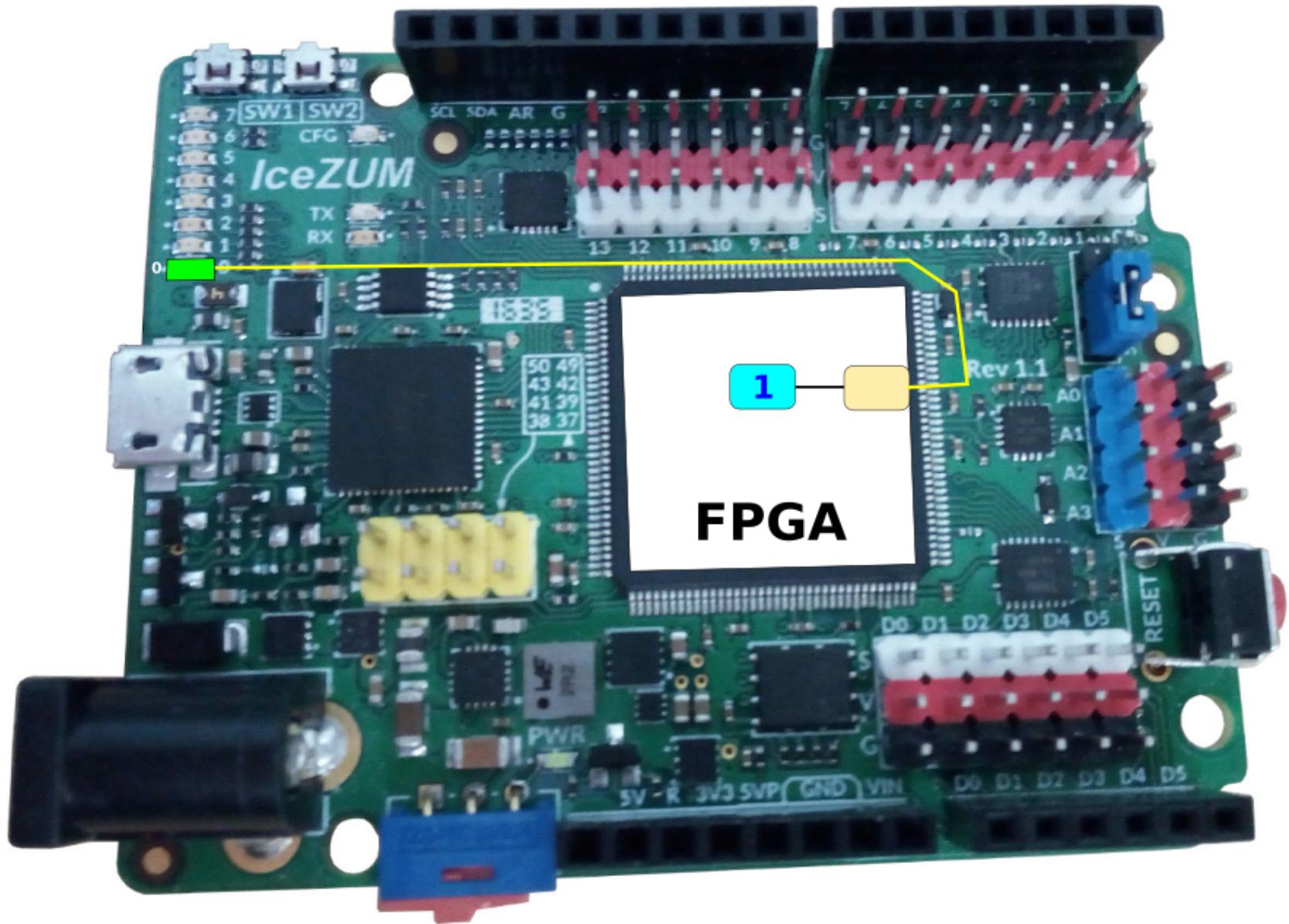
Demo!



Example 1: Hello world

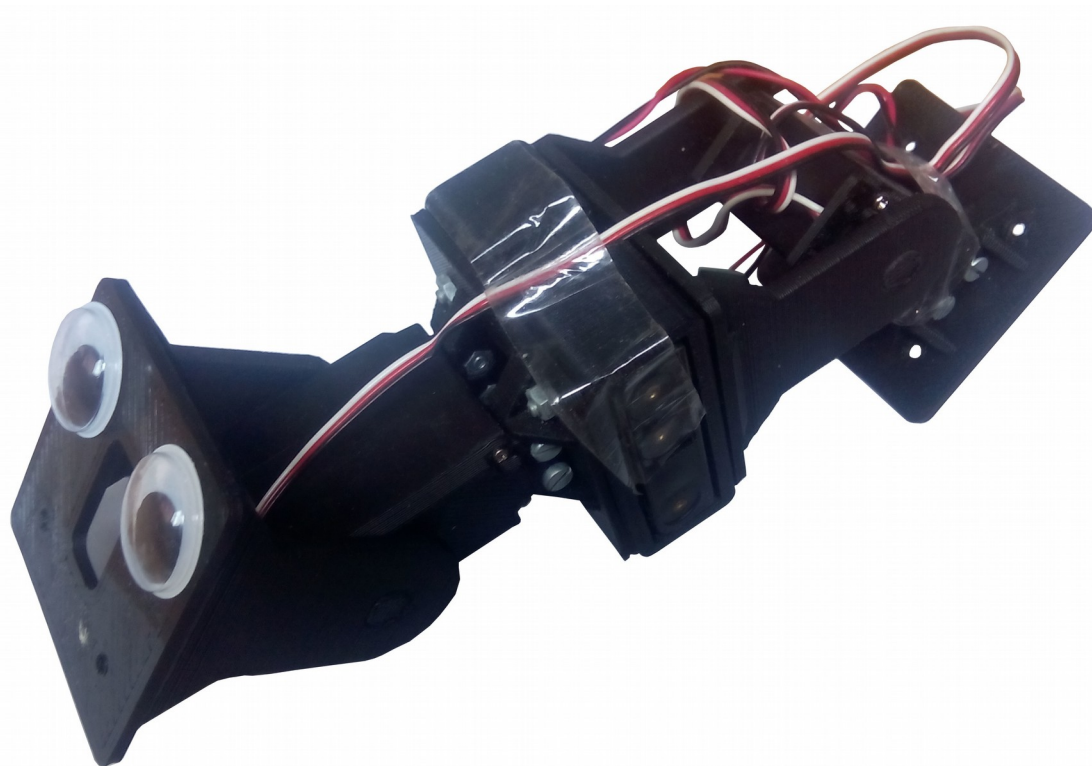


Hello world: Physical implementation



Live demo...

Modular Robot

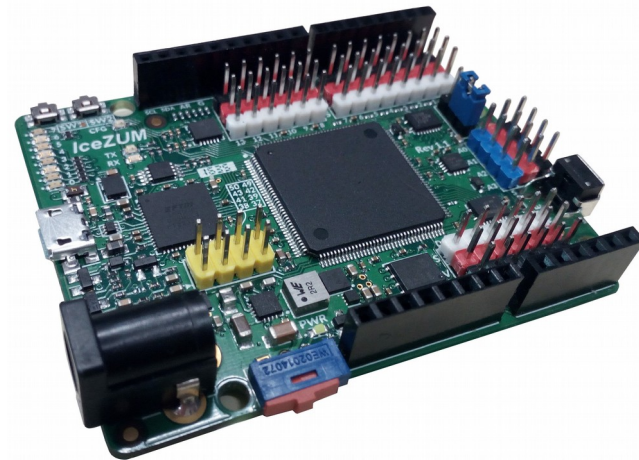
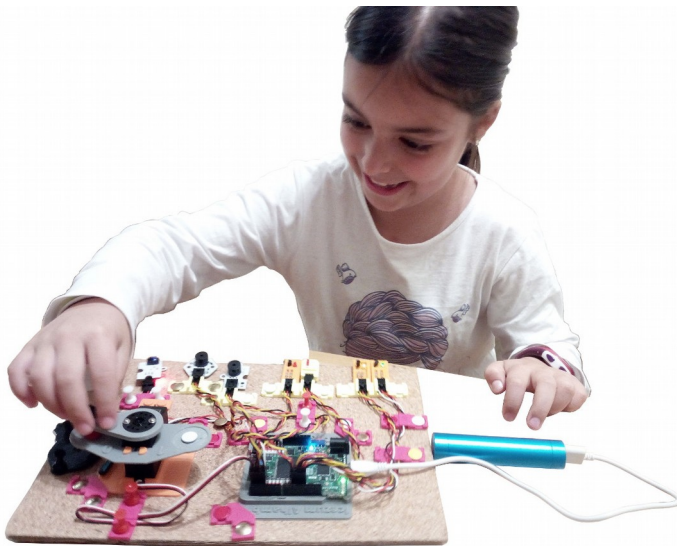


**May the Open Source FPGAs be
with you...**



Thanks! :-)

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<http://fpgawars.github.io/>

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