

DIY IoT Hardware & Bottom-up Innovation

@tamberg

Internet

Computers, connected through Internet protocols

Display or manipulate **documents**

<http://blog.com/2011-09-15/todays-post.html>

Internet of Things (IoT)

Computers, **sensors** and **actuators** connected through Internet protocols

Measure or manipulate **physical properties**

<http://e-home.com/tamberg/kitchen/light>

DIY / DIWO / Make

Break stuff to learn how it works

Build whatever you want

Teach, learn, share

Connected Objects

John Romkey's Toaster (1990, http://www.livinginternet.com/i/ia_myths_toast.htm)
Jason's Fishcam (2006, <http://picobay.com/fishcam/>)
Botanicalls (2006, <http://www.botanicalls.com/kits/>)
Availabot (2006, <http://berglondon.com/projects/availabot/>)
Analogue Website (2007, <http://www.plummerfernandez.com/Analogue-Website-II>)
BakerTweet (2009, <http://www.bakertweet.com/>)
Bubblino (2009, <http://bubblino.com/>)
Rfish.net (2009, <http://rfish.net/>)
Tableau (2011, <http://johnkestner.com/tableau/>)
WhereDial (2011, <http://blog.mapme.at/wheredial/>)
Geigermaps (2011, <http://japan.failedrobot.com/>)
Homesense Bikemap (2011, <http://russelldavies.typepad.com/planning/2011/04/homesense-bikemap.html>)
Good Night Lamp (2011, <http://goodnightlamp.com/>)
Twine (2011, <http://supermechanical.com/twine/>)
ReaDIYmate (2011, <http://www.readiymate.com/>)
#AirQualityEgg (2011, <http://airqualityegg.com/>)
DIY Busstop Lampe (2012, <http://leumund.ch/d-i-y-busstop-lamp-arduino-0011112>)
DIY Traffic Counter (2012, <http://www.tomorrow-lab.com/lab16>)
Olly & Polly (2012, <http://ollyfactory.com/>)
Descriptive Camera (2012, <http://mattrichardson.com/Descriptive-Camera/>)
#OktoberfestOfThings (2012, <http://oktoberfestofthings.tumblr.com/>)

John Romkey's Toaster (1990)



http://www.livinginternet.com/ia_myths_toast.htm

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Availabot (2006)



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Analogue Website (2007)



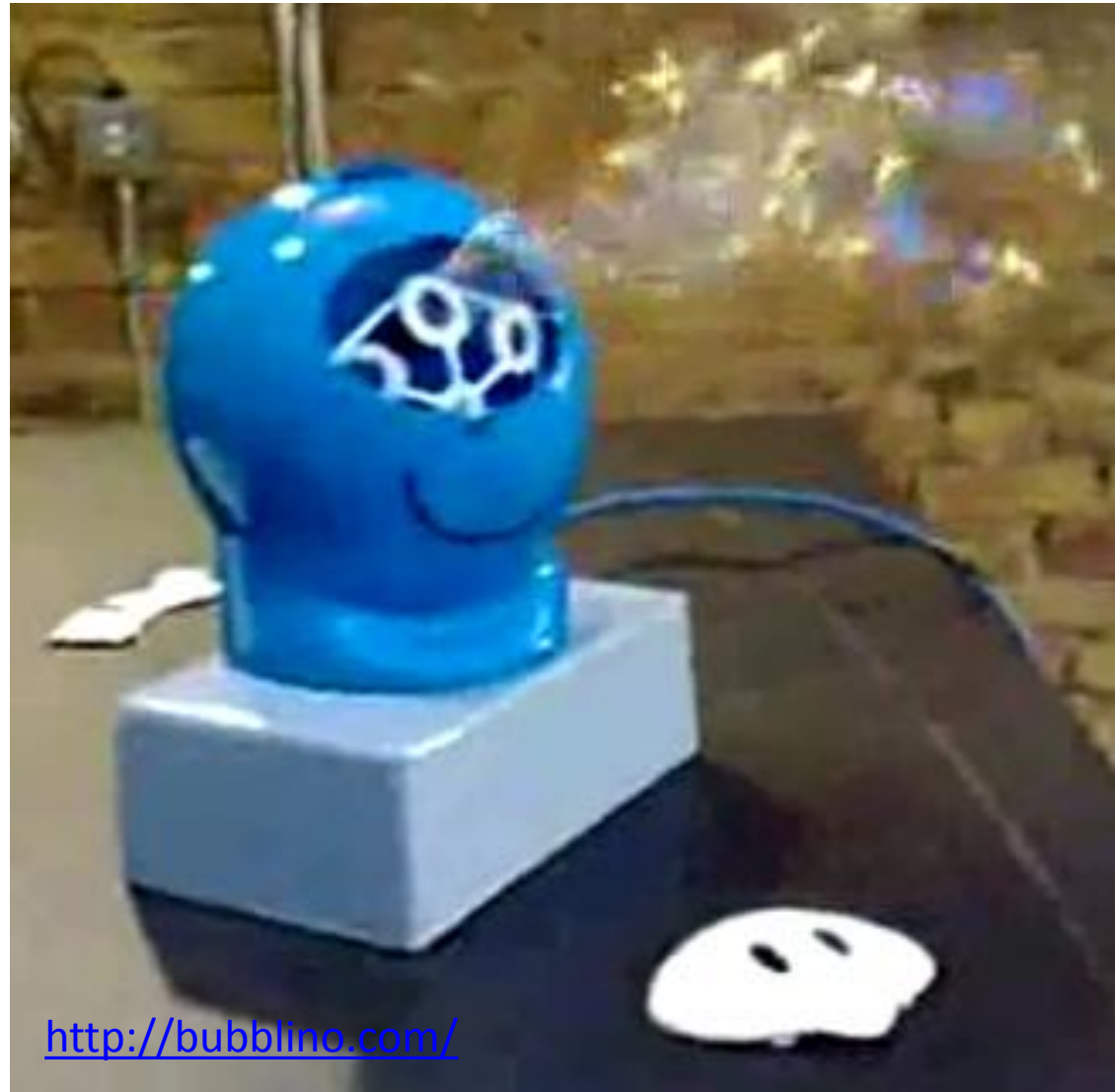
<http://www.plummerfernandez.com/Analogue-Website-II>

BakerTweet (2009)



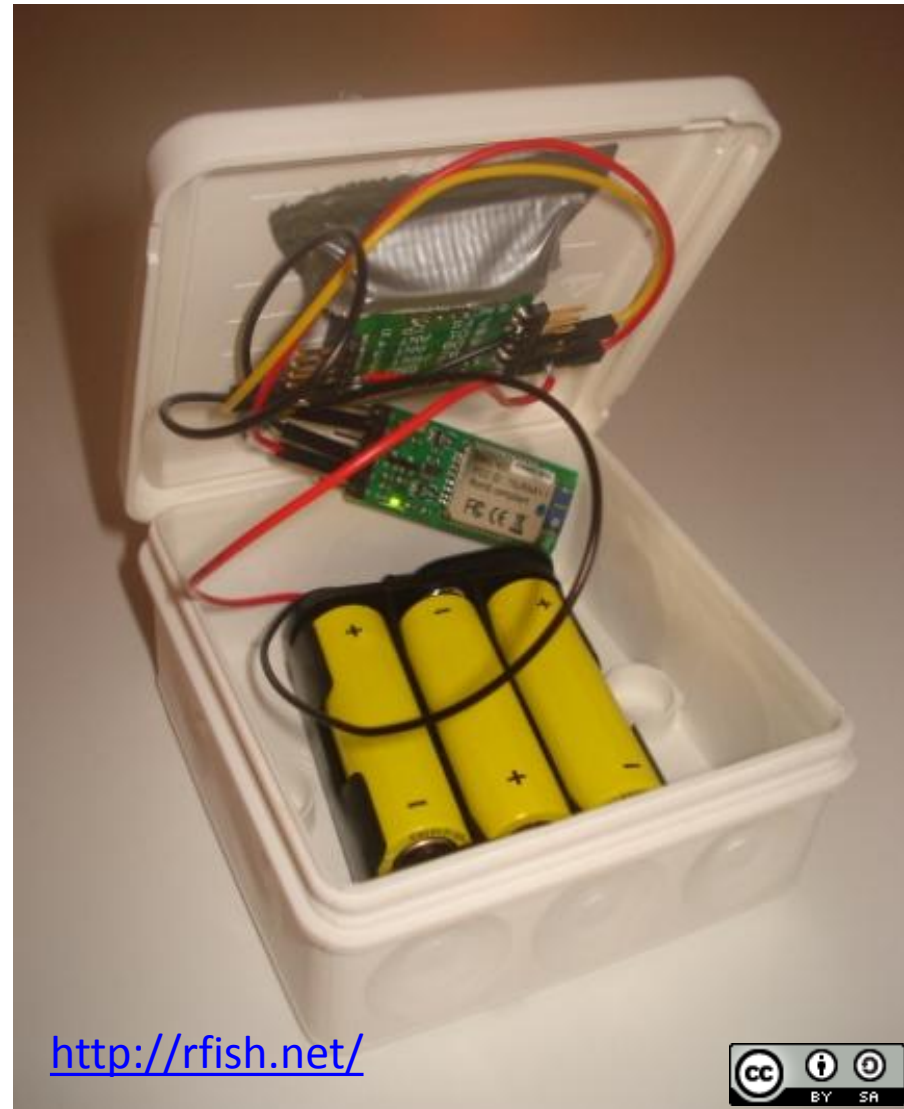
<http://www.bakertweet.com/>

Bubblino (2009)



<http://bubblino.com/>

Rfish.net (2009)



<http://rfish.net/>

Tableau (2011)



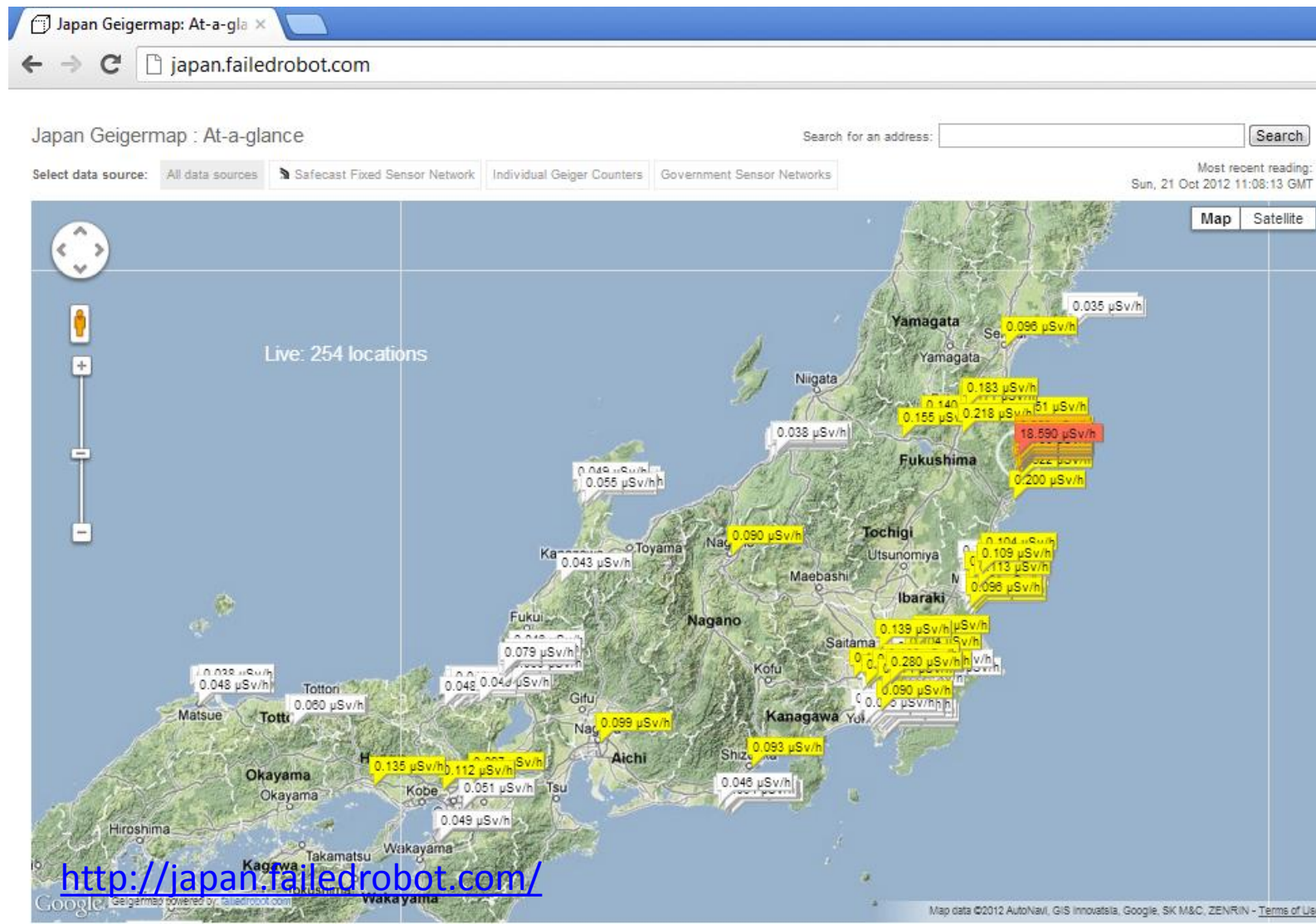
<http://johnkestner.com/tableau/>

WhereDial (2011)

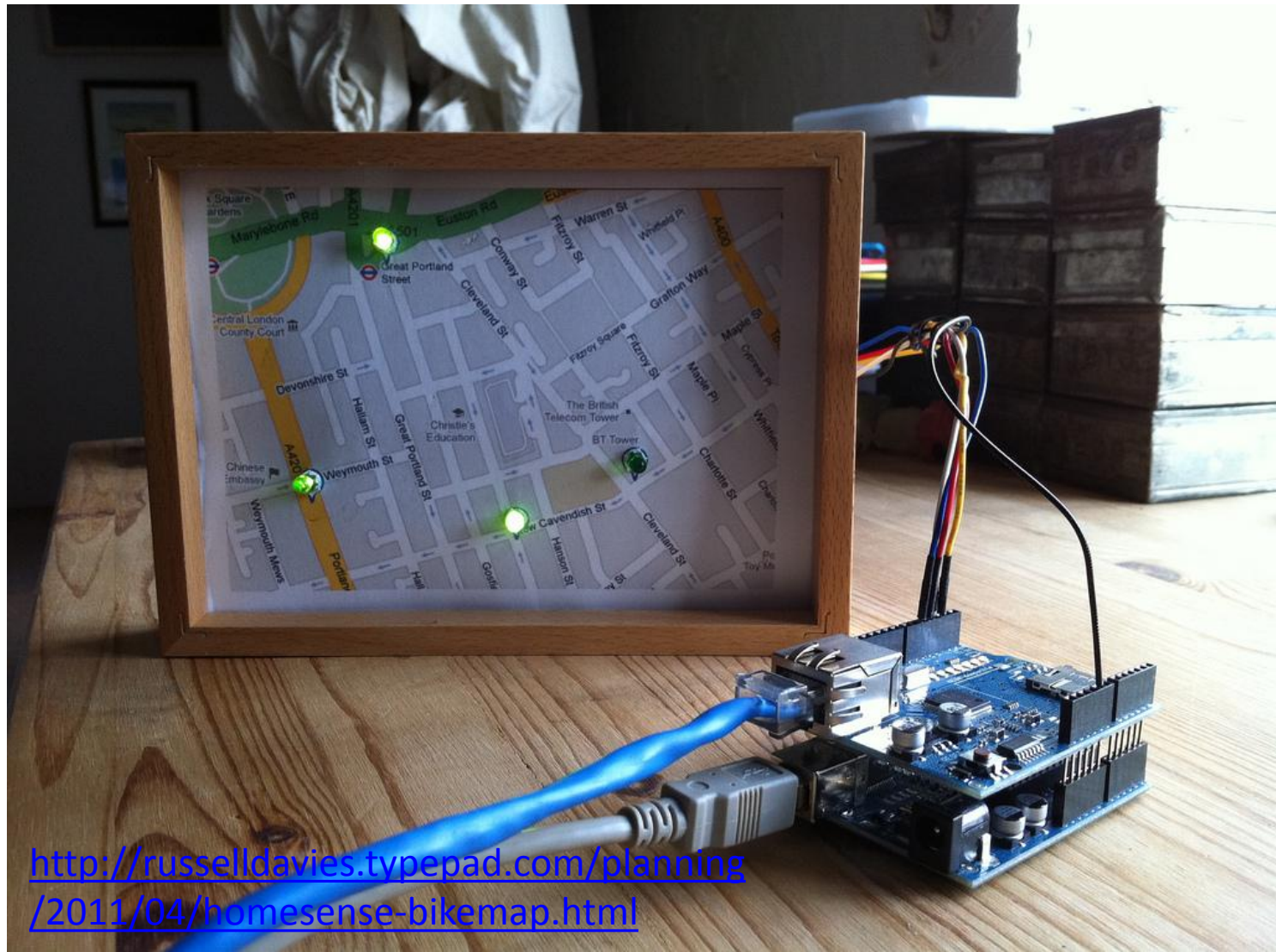


<http://blog.mapme.at/wheredial/>

Geigermaps (2011)



Homesense Bikemap (2011)



Good Night Lamp (2011)



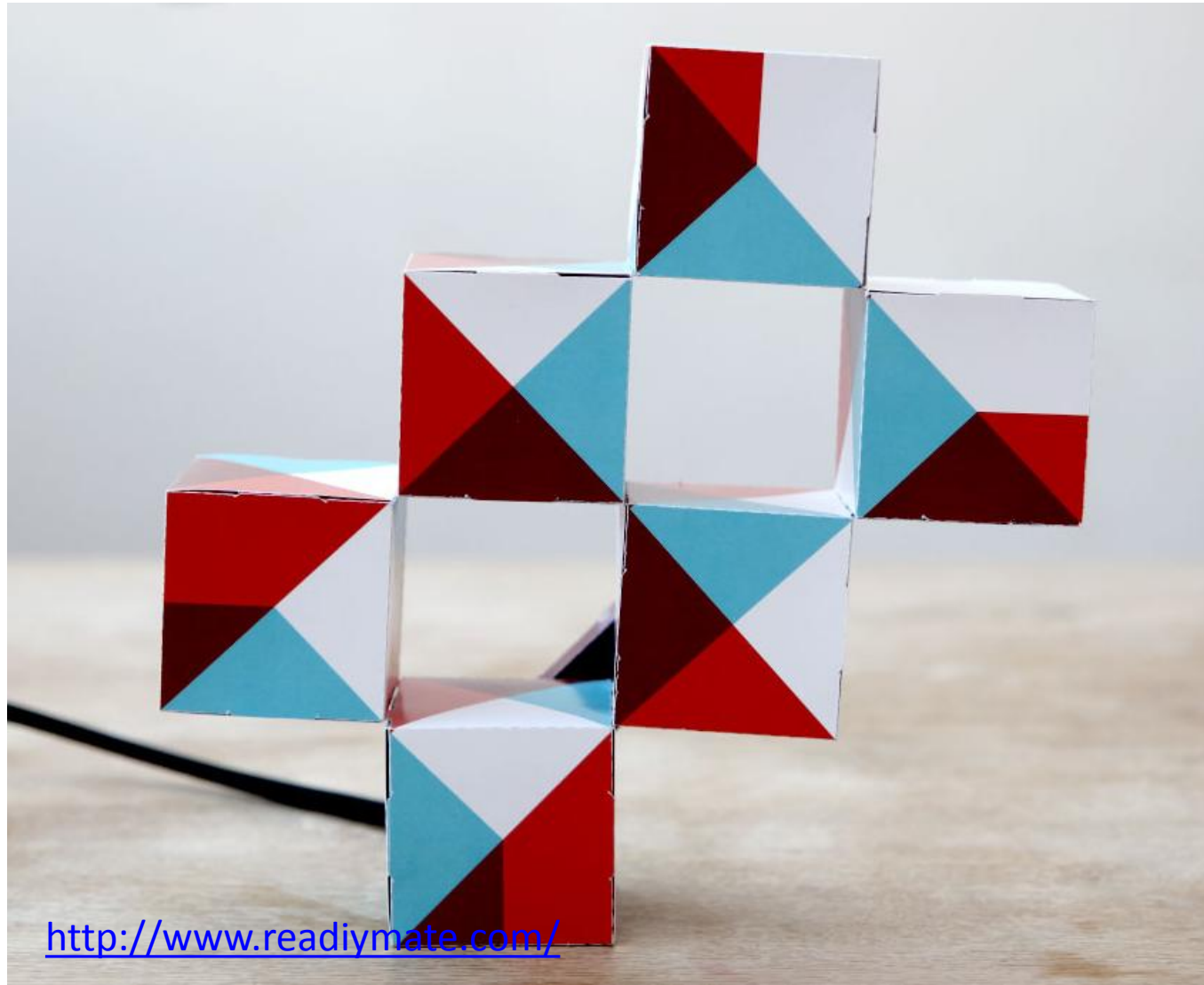
<http://goodnightlamp.com/>

Twine (2011)



<http://supermechanical.com/twine/>

ReaDIYmate (2011)



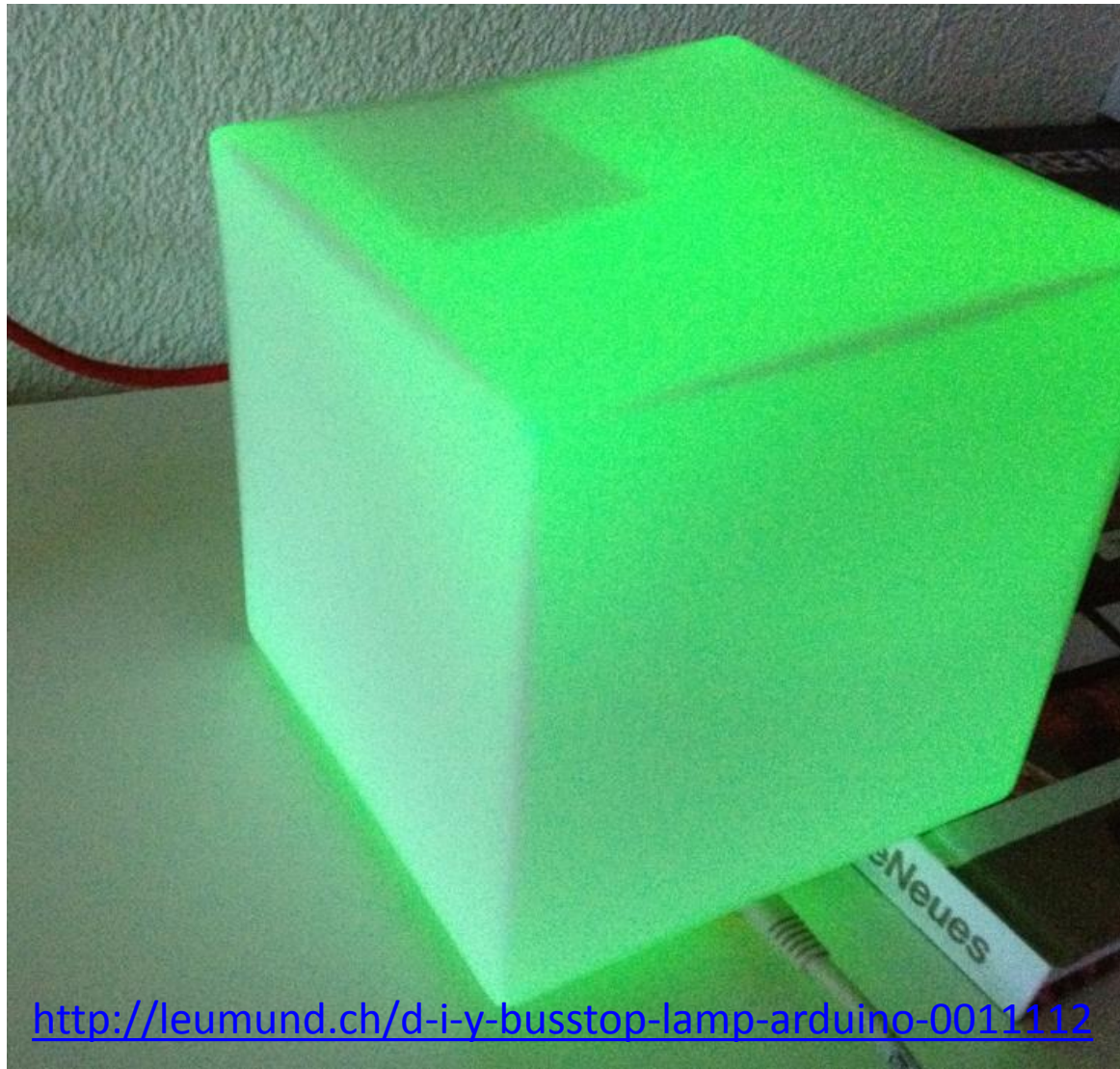
<http://www.readiymate.com/>

#AirQualityEgg (2011)



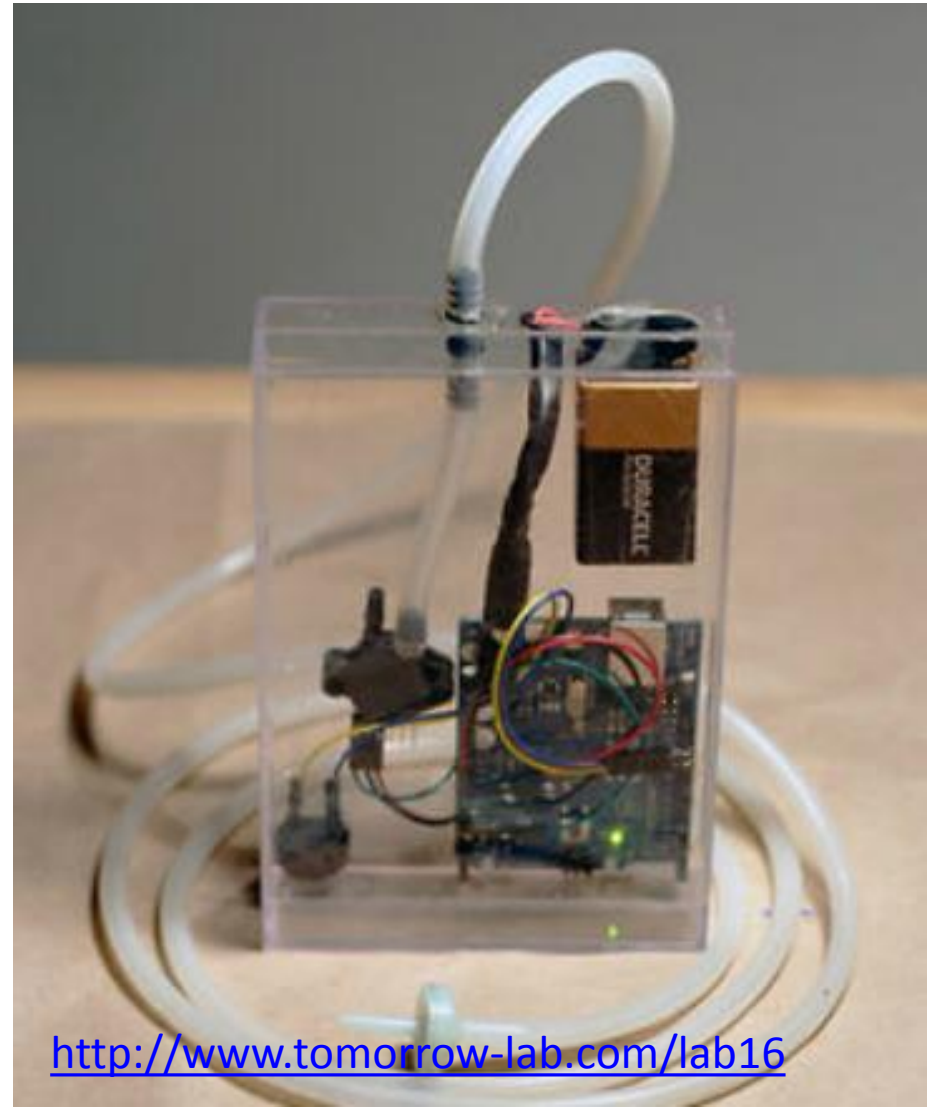
<http://airqualityegg.com/>

DIY Busstop Lampe (2012)



<http://leumund.ch/d-i-y-busstop-lamp-arduino-0011112>

DIY Traffic Counter (2012)



<http://www.tomorrow-lab.com/lab16>

Olly & Polly (2012)



<http://ollyfactory.com/>

Descriptive Camera (2012)



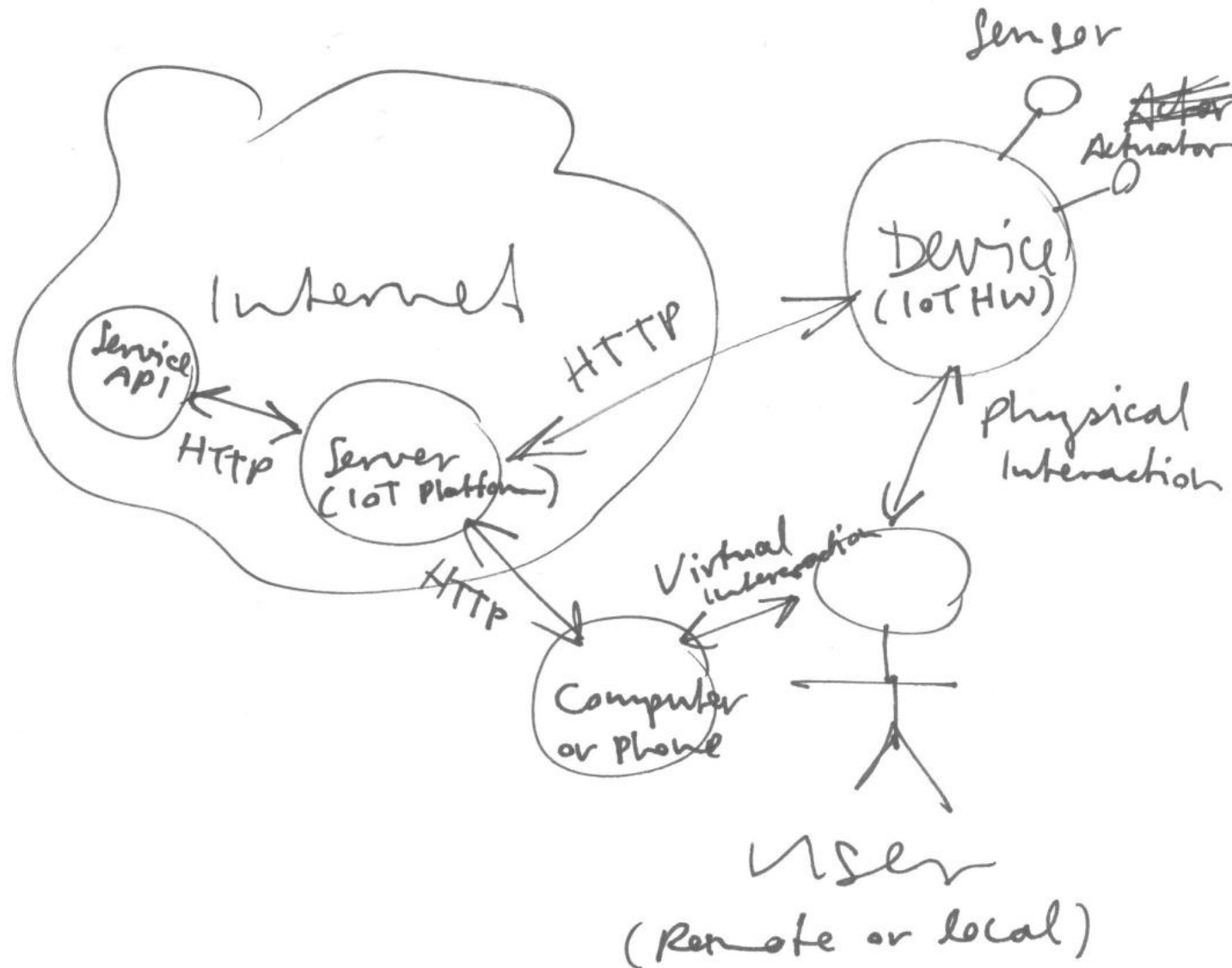
<http://mattrichardson.com/Descriptive-Camera/>

#OktoberfestOfThings (2012)



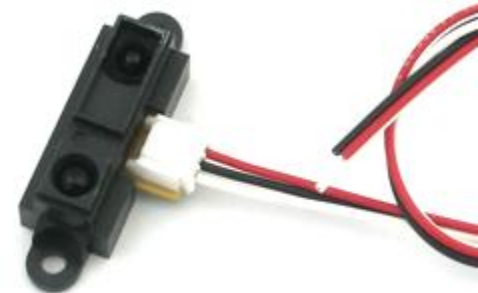
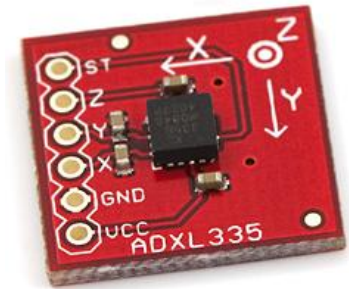
<http://oktoberfestofthings.tumblr.com/>

IoT reference model



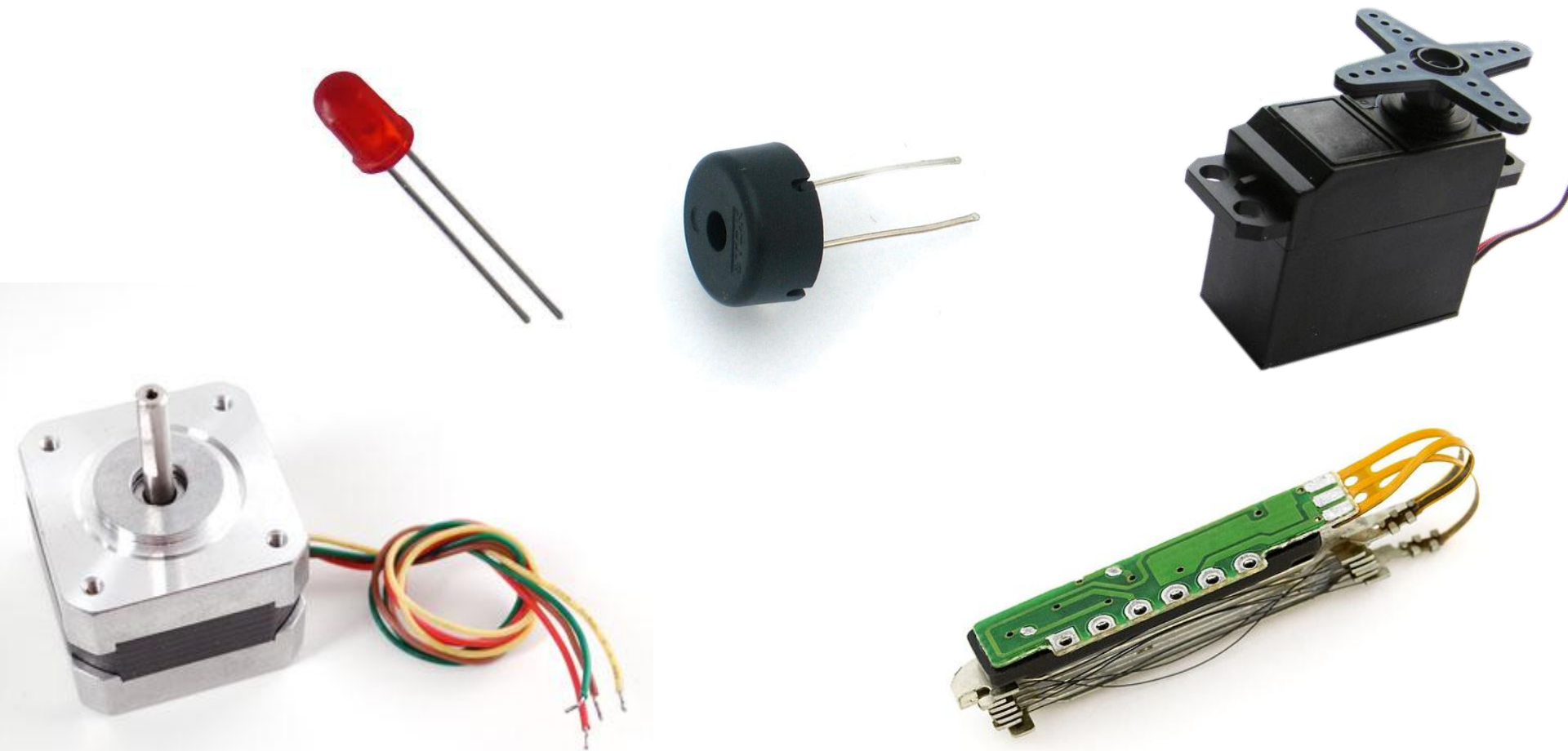
Sensors

Convert physical properties to electrical signals



Actuators

Convert electrical signals to physical properties



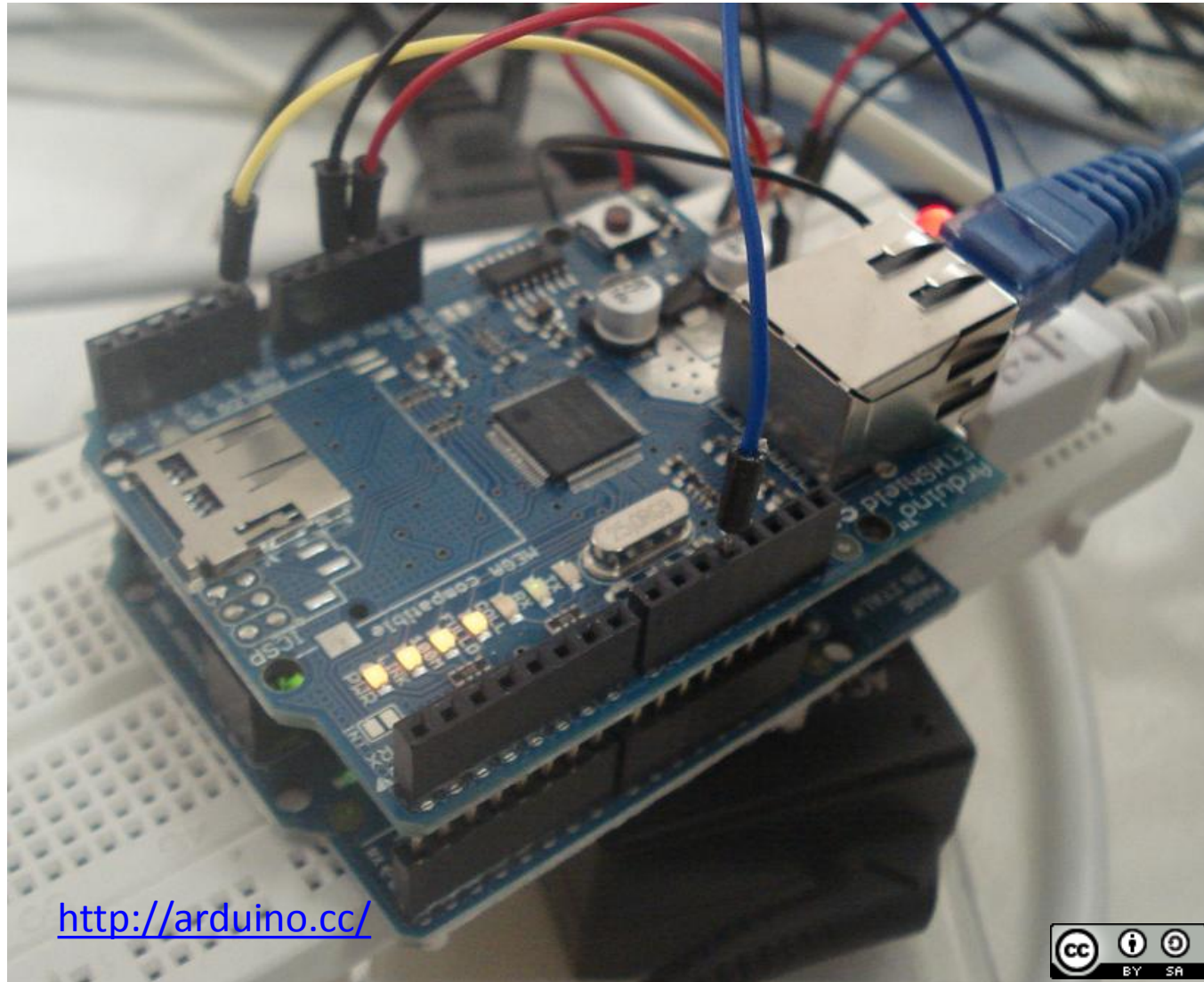
IoT hardware

Any Internet-connected computer with an **interface to the real world** (sensors, actuators)

Small => can be **embedded into things**

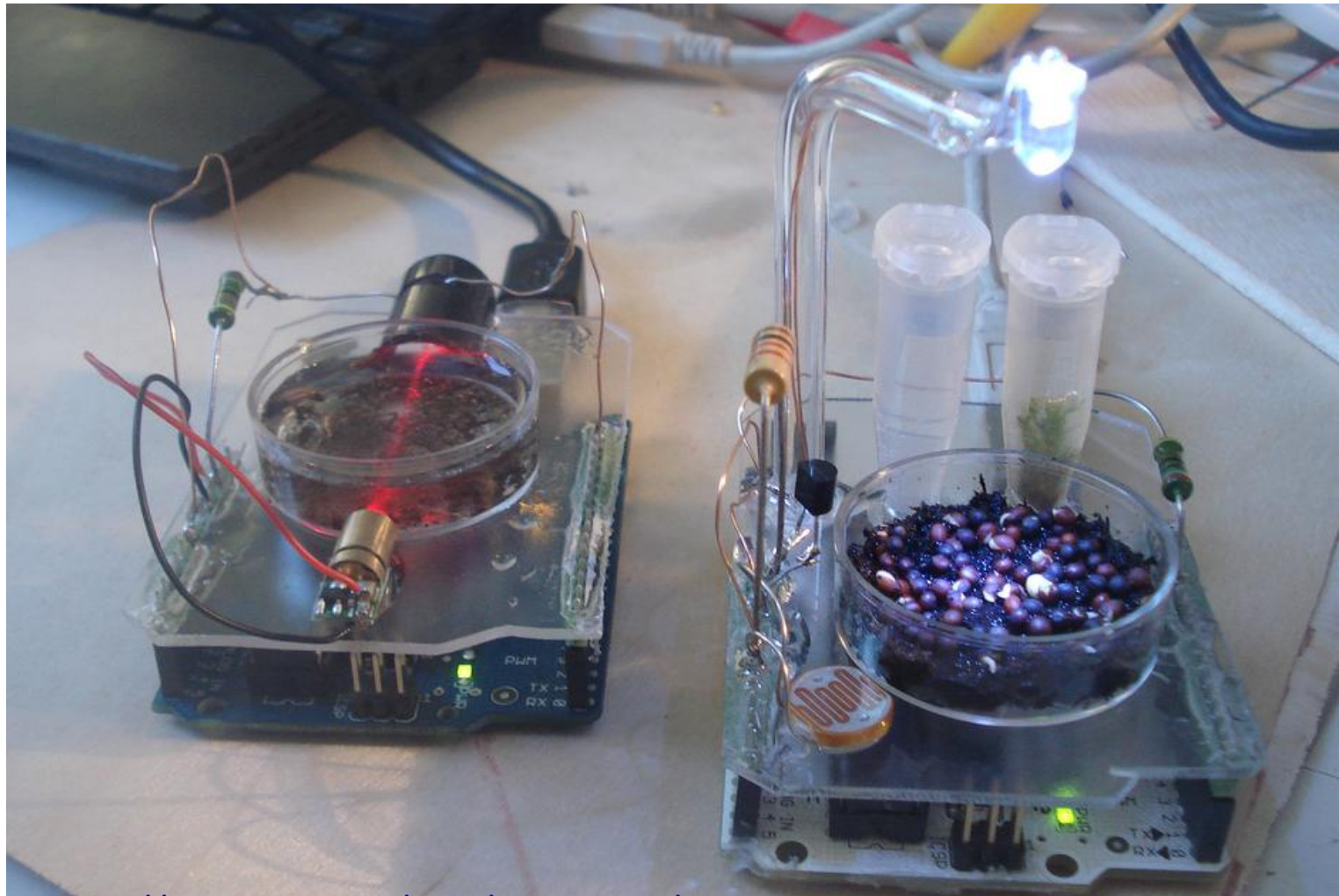
Connecting your board to the Internet via a desktop PC and USB is also fine, just a bit overkill

Arduino



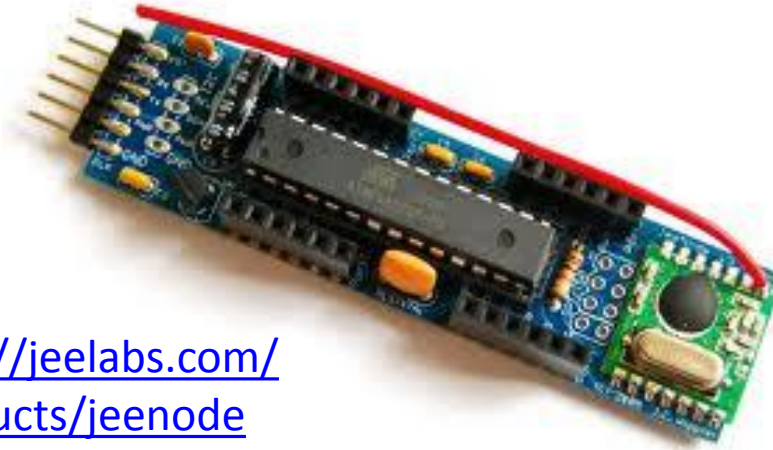
<http://arduino.cc/>

Arduino clones, shields

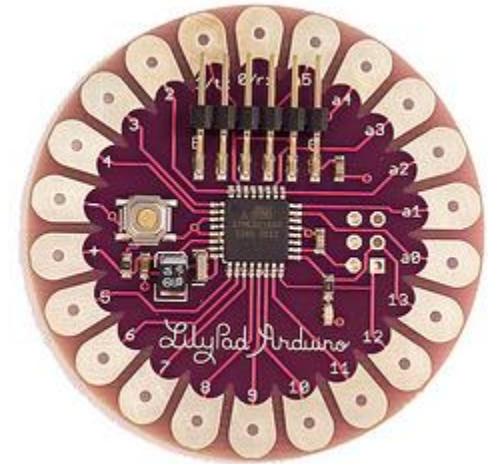


http://hackteria.org/wiki/index.php/DIY_spectrophotometer

Arduino form factors



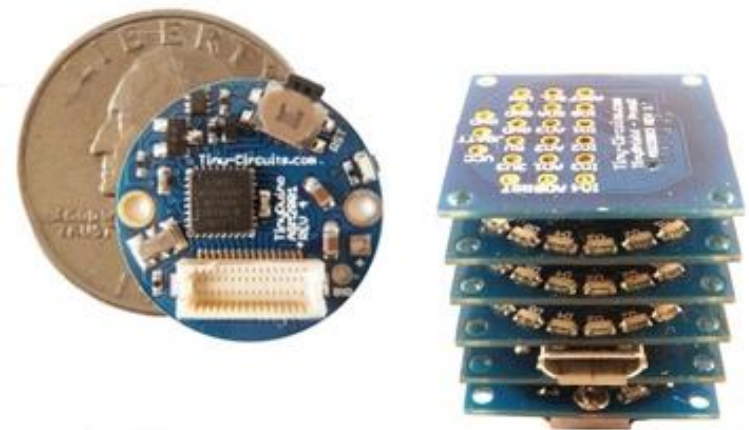
<http://jeelabs.com/products/jeenode>



<http://www.arduino.cc/en/Main/ArduinoBoardLilyPad>

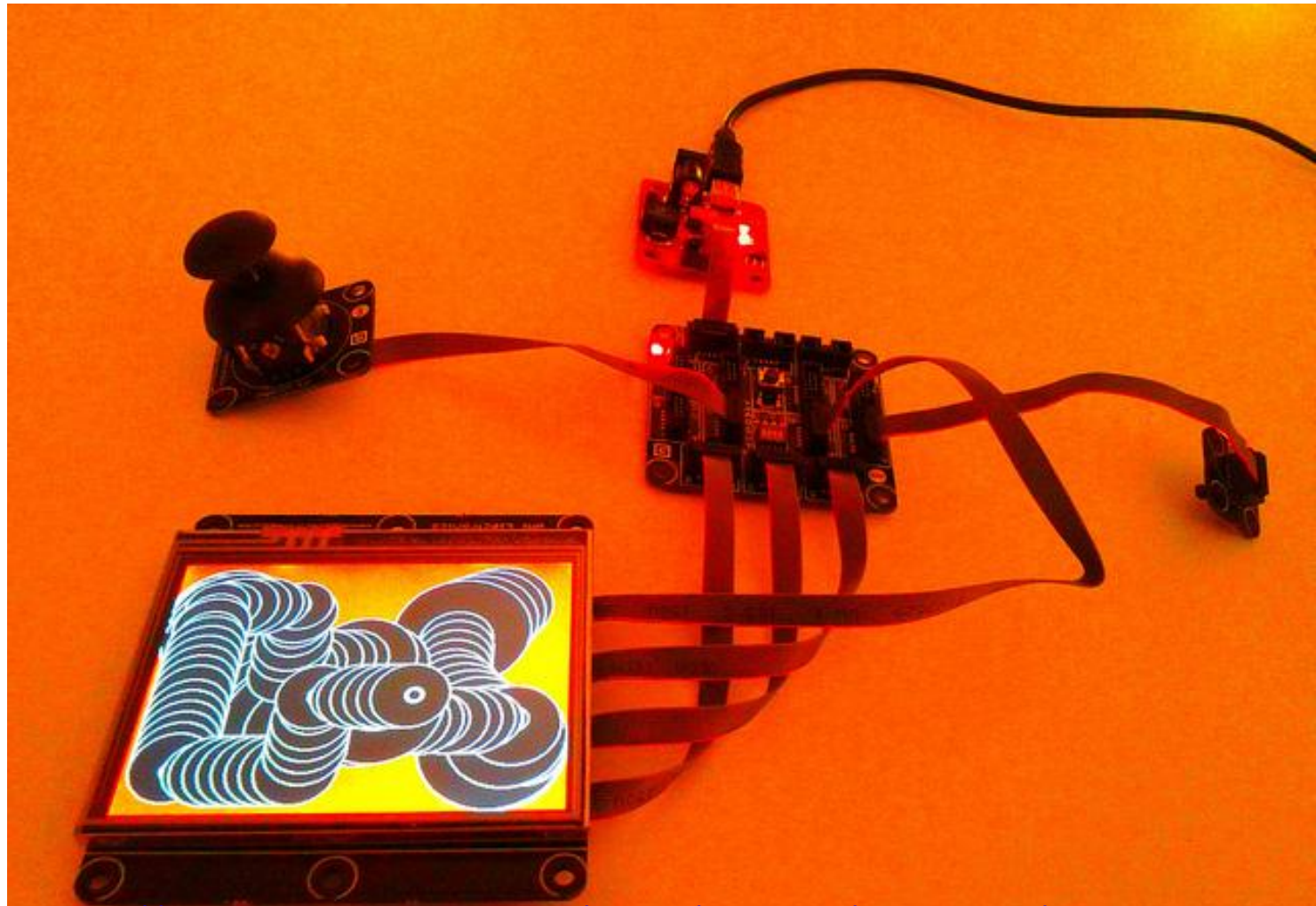


<http://hlt.media.mit.edu/?p=2182>



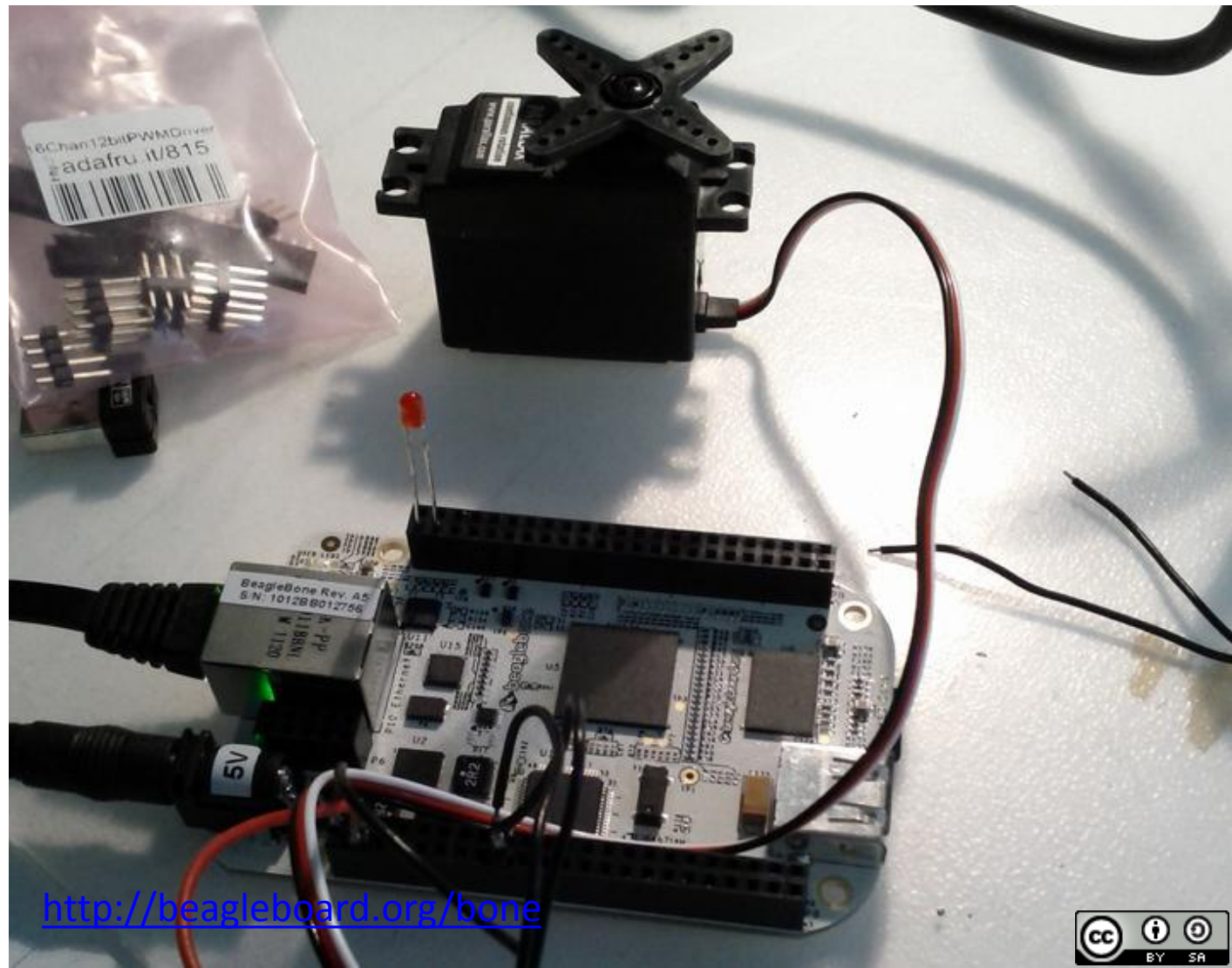
<http://tiny-circuits.com/products/tinyduino>

Gadgeteer



<http://research.microsoft.com/en-us/projects/gadgeteer/>

BeagleBone



<http://beagleboard.org/bone>

Raspberry Pi



<http://www.raspberrypi.org/>

IoT infrastructure

Pachube (now Cosm), to store and reuse sensor measurements
e.g. <https://pachube.com/feeds/36745>

Thingspeak, an open source "Pachube", Twitter for devices
e.g. <https://thingspeak.com/channels/9>

Twitter, allows objects to talk to humans or receive commands
e.g. [@twrbrdg_itself](#) (f.k.a. @towerbridge)

Yaler, enables remote access to Internet-connected devices
e.g. <http://try.yaler.net/~arduino/led> (*Disclosure: I'm a founder*)

Pachube (now Cosm)



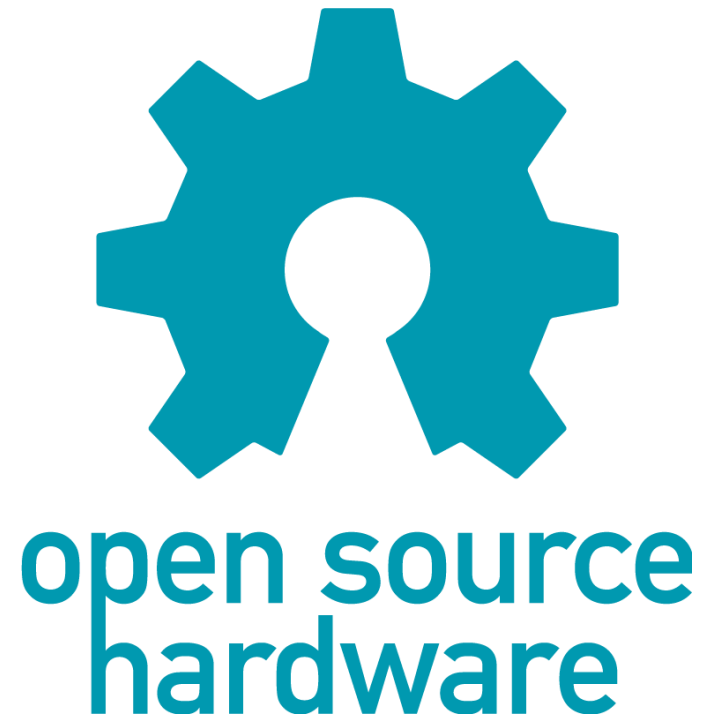
Open Licenses

Open source software and hardware, **Creative Commons** for works like docs, physical designs

Build on other people's work, sample, remix

(Collectively) own rights, get credits, without inhibiting innovation

Open Licenses



DIY kits

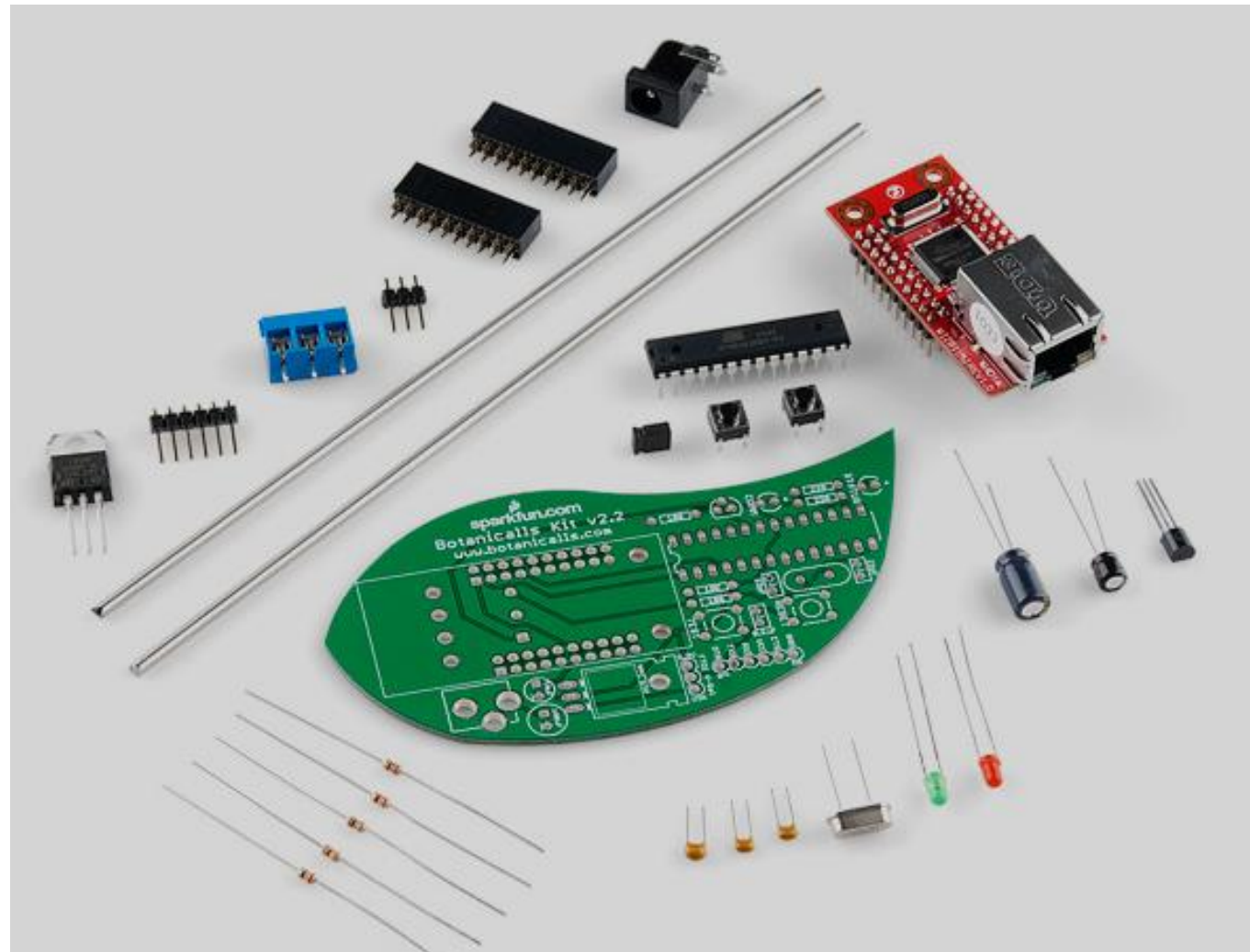
Good way to get started

Follow simple instructions, build awesome stuff

Reduced design space, full insight

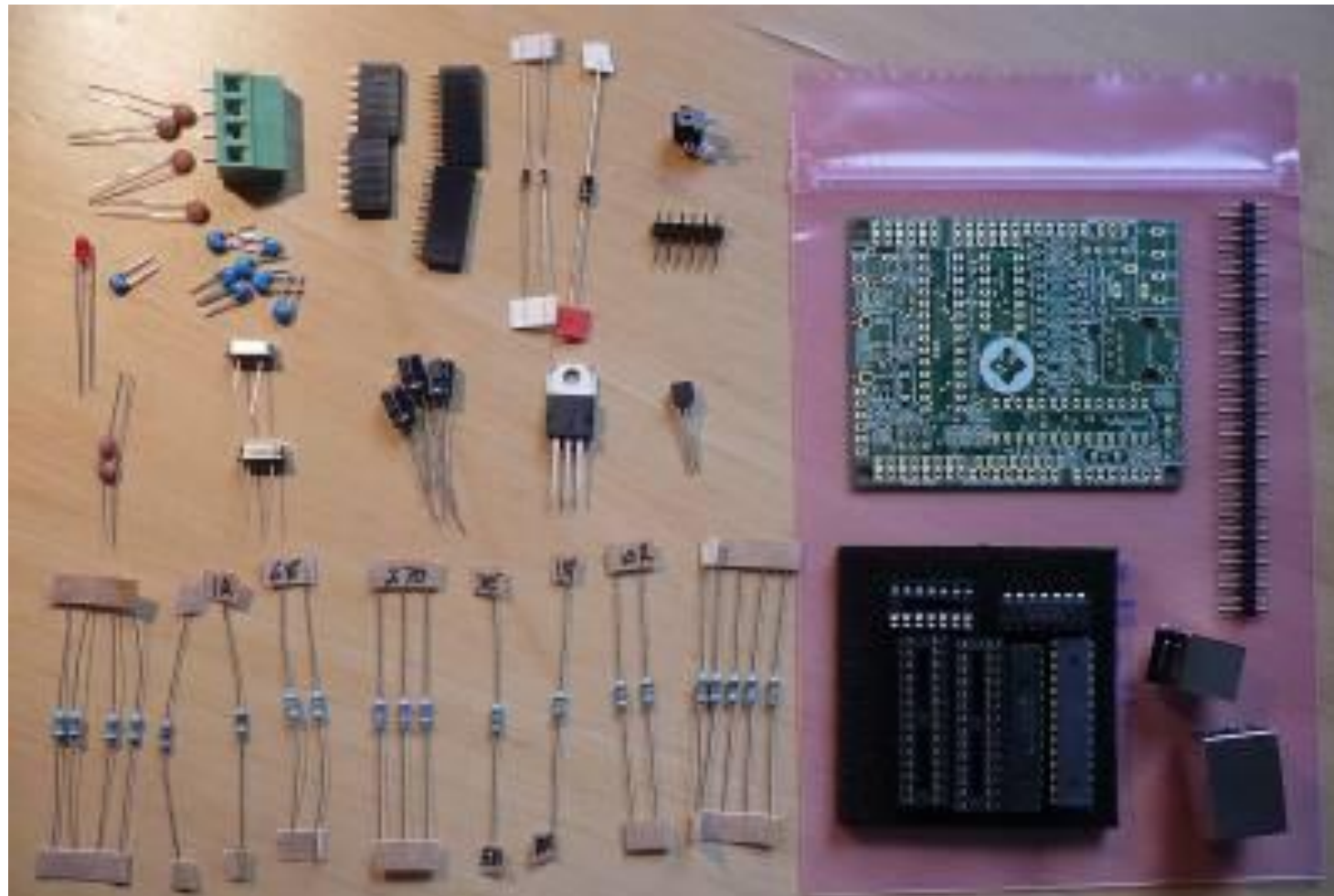
Sell your own kits for income

Botanicals kit



<https://www.sparkfun.com/products/10334>

Nanode 5 kit



<http://shop.nanode.eu/>

Thirsty Plant kit



<http://technologywillsaveus.org/resources/thirsty-plant/>

Communities

Open and **inclusive**, online and offline

Exposure and reputation makes it worth to document your project

Hackerspaces, FabLabs provide **access to tools** like solder stations, laser cutters, 3D printers; provide expert help, profit from your skills

Instructables

Web-controlled Twittering x

www.instructables.com/id/Web-controlled-Twittering-Roomba/

instructables share what you make

halloween TechShop LEDs

Create Explore Contests Community

Google Custom Search Go

Arduino Remote Control Robots Software Apple 3D Printing CNC Kits Electronics See More »

Web-controlled Twittering Roomba

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7 Followers Follow

Author: **PRO matchlighter**
I am a 15 year-old computer and electronics enthusiast. I love to program computers and design electronic circuits.

1



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7 Followers Follow

Author: **PRO matchlighter**
Published: Jun 16, 2011
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www.instructables.com/contest/makeittweet/

Hackaday

Web controlled watering can

hackaday.com/2010/09/09/web-controlled-watering-can/



HACK A DAY

Web controlled watering can

posted Sep 9th 2010 2:00pm by [Mike Szczys](#)
filed under: [home hacks](#)



Here's a watering can and water vortex that are [controlled with a webkit browser interface](#). The interface displays a drawing of the watering can on your browser. If you grab one of the handles on the circle around the image and move it, the can will rotate as well.

Okay, so this isn't going to change the world and actually presents a fairly useless watering setup. But [Ben] seems to be a master of fabrication and that's what we appreciate in this build. The watering can is solidly mounted and moves fluidly with

Hack a Day serves up fresh hacks each day, every day from around the web as well as hacking related news.
[Send us your hacks](#)

www.myrobot-shop.ch





HACKED PORTAL GUN

CELEBRATE INTERNATIONAL HACK DAY

**TIPS**

**FEED**

**STORE**

**FORUM**

SGMK OpenLab



<http://www.mechatronicart.ch/mechartlab/openlab>

Crowd funding

e.g. Kickstarter, WeMakelt.ch

Lean hardware startups

Not a store

Kickstarter

Twine : Listen to your world, talk to the Internet

by Supermechanical · You're a backer

Home Updates 27 Backers 3,966 Comments 310 Cambridge, MA Technology

Funded! This project successfully raised its funding goal on January 3, 2012.



PLAY

3,966 backers
\$556,541
pledged of \$35,000 goal
0
seconds to go

Project by Supermechanical
Austin, TX
Contact me

First created · 6 backed
Has not connected Facebook
Website: <http://supermechanical...>
[See full bio](#)

Like 13,309 people like this. Tweet Embed <http://kck.st/ruJgAV>

A wireless square with sensors

Getting started

Buy some hardware

<http://google.com/search?q=adafruit+starter+pack>

Learn the basics

<http://learn.adafruit.com/>

Learn from other people's projects

<http://google.com/search?q=instructables+web+controlled>

If you're in Zürich, join SGMK OpenLab on Tuesdays

<http://www.mechatronicart.ch/mechartlab/>

Thanks

tamberg@yaler.net

This presentation is online at
<http://goo.gl/6YQIm>

