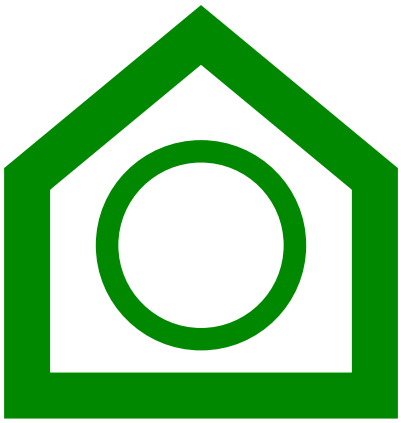
P2P Food Lab

Get started



Make 3D vegetables !

How to make the P2P Food Lab greenhouse and sensorbox, and how to start growing food.

Early draft, Sept 2013

P2P Food Lab is a project of the Sustainability Group at the Sony Computer Science Laboratory Paris.

Greenhouse
1. structure
2. cover
3. finishing

Sensorbox
1. hardware
2. software

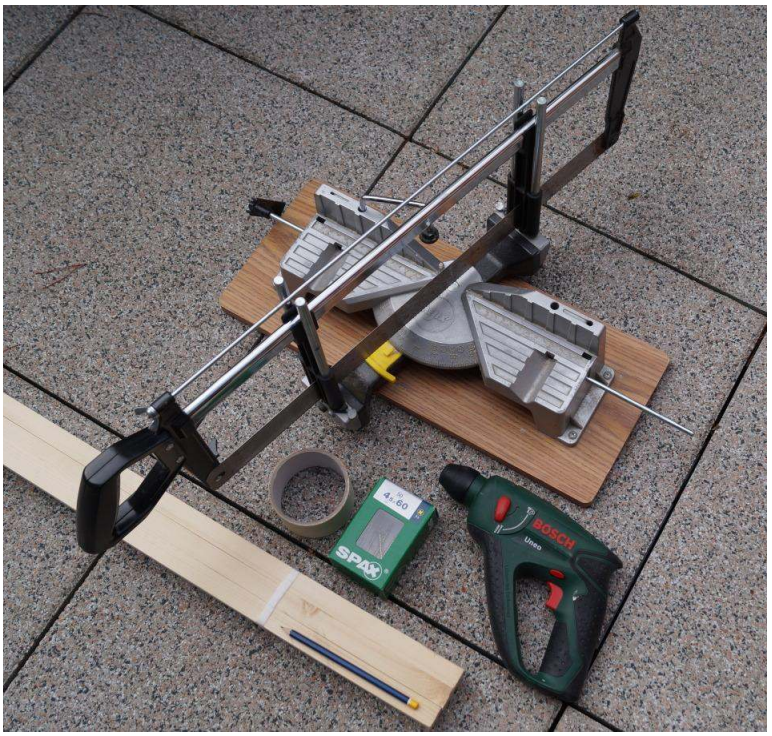
Web site
1. sensor data
2. know-how & sharing

Make food !

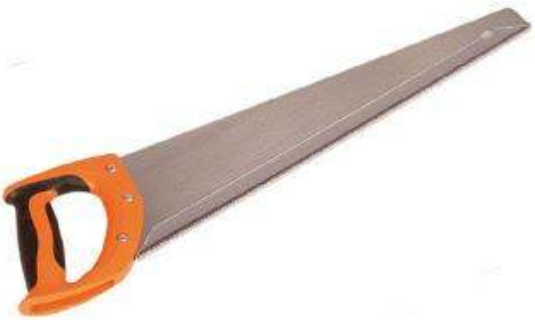
re-Make the world !

Greenhouse

1. structure


SPAX
BOSCH


SPAX
3,5 30
spax.com
SPAX



P2P Food Lab - Mozilla Firefox

Firefox | P2P Food Lab

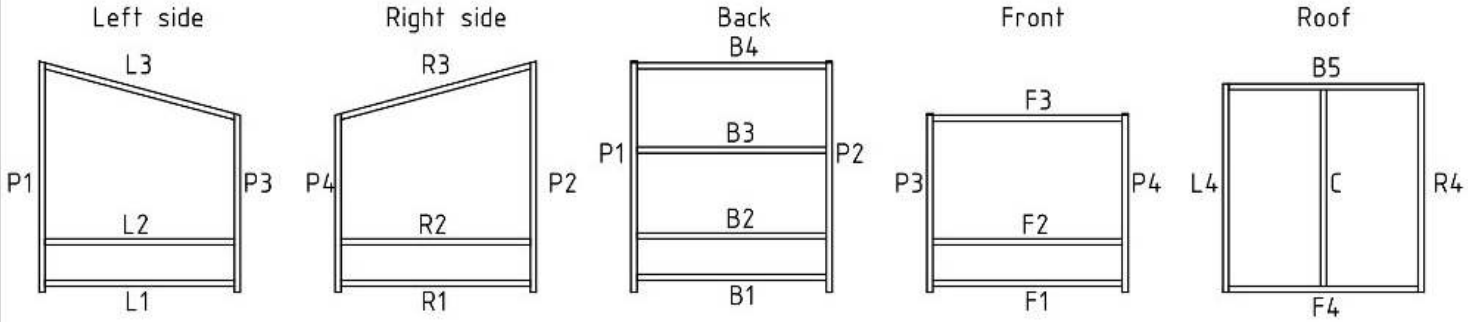
localhost/p2pfoodlab/greenhouse-dimensions.php

maker

The dimensions of the greenhouse elements

Inside width of the greenhouse, in centimeters:	120
Inside depth of the greenhouse, in centimeters:	120
Inside height of the greenhouse, in centimeters:	144.3
Length of the battens from which the greenhouse will be made:	250
Section of the battens (square):	2
Thickness of the board used to make the box:	2

Calculate



Summary of the dimensions:

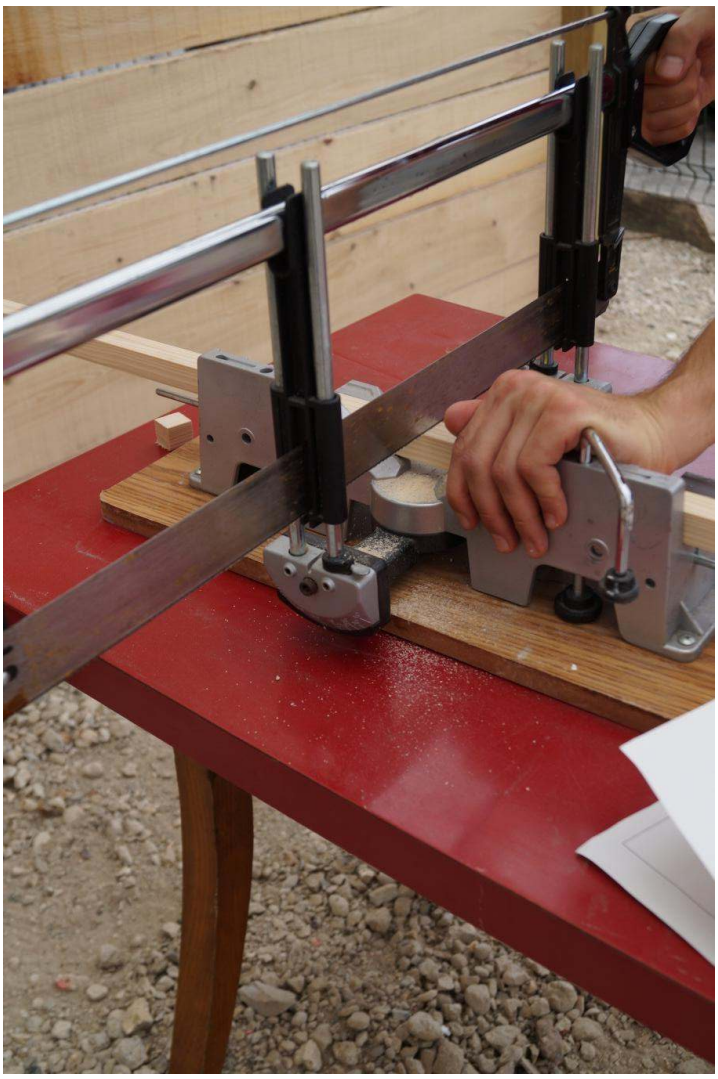
Inside dimensions (WxDxH)	120.0 x 120.0 x 144.3
Outside dimensions (WxDxH)	128.0 x 128.0 x 146.4
Number of battens (250 cm)	15

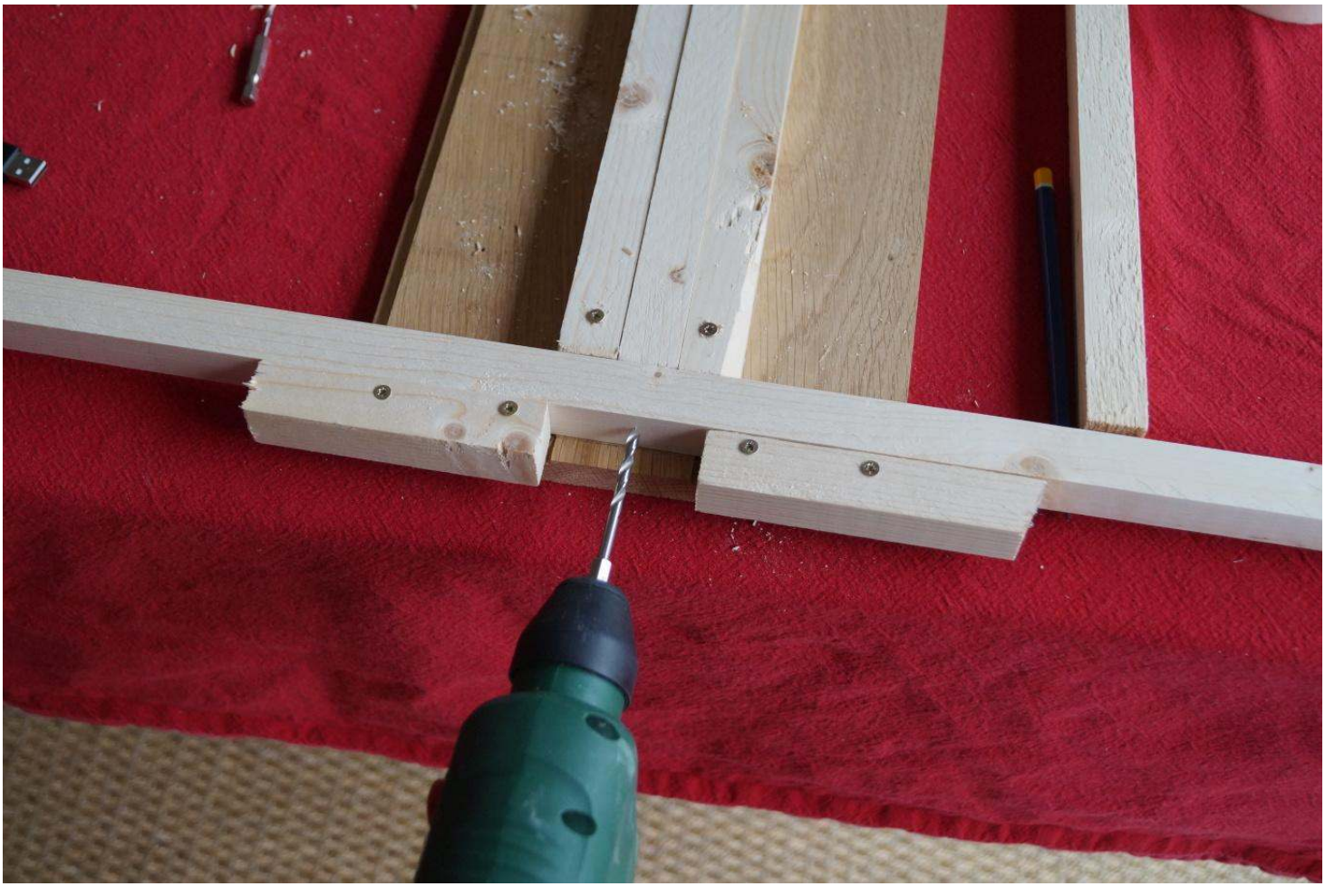
The complete list of elements, with their name and length, is given below:

Name	Length (cm)	Length including edges	Angles	Batten
P1	144.3		90, 75	Batten 1
P2	144.3		90, 75	Batten 2
P3	110.5		90, 75	Batten 3
P4	110.5		90, 75	Batten 4
L1	124.0		90, 90	Batten 14
L2	124.0		90, 90	Batten 15
L3	128.4	128.9	75, 75	Batten 7
L4	132.5		90, 90	Batten 3
R1	132.5		90, 90	Batten 4
R2	132.5		90, 90	Batten 5


64 65 66 67 68 69 70 71 72 73 74 75 76 77 78

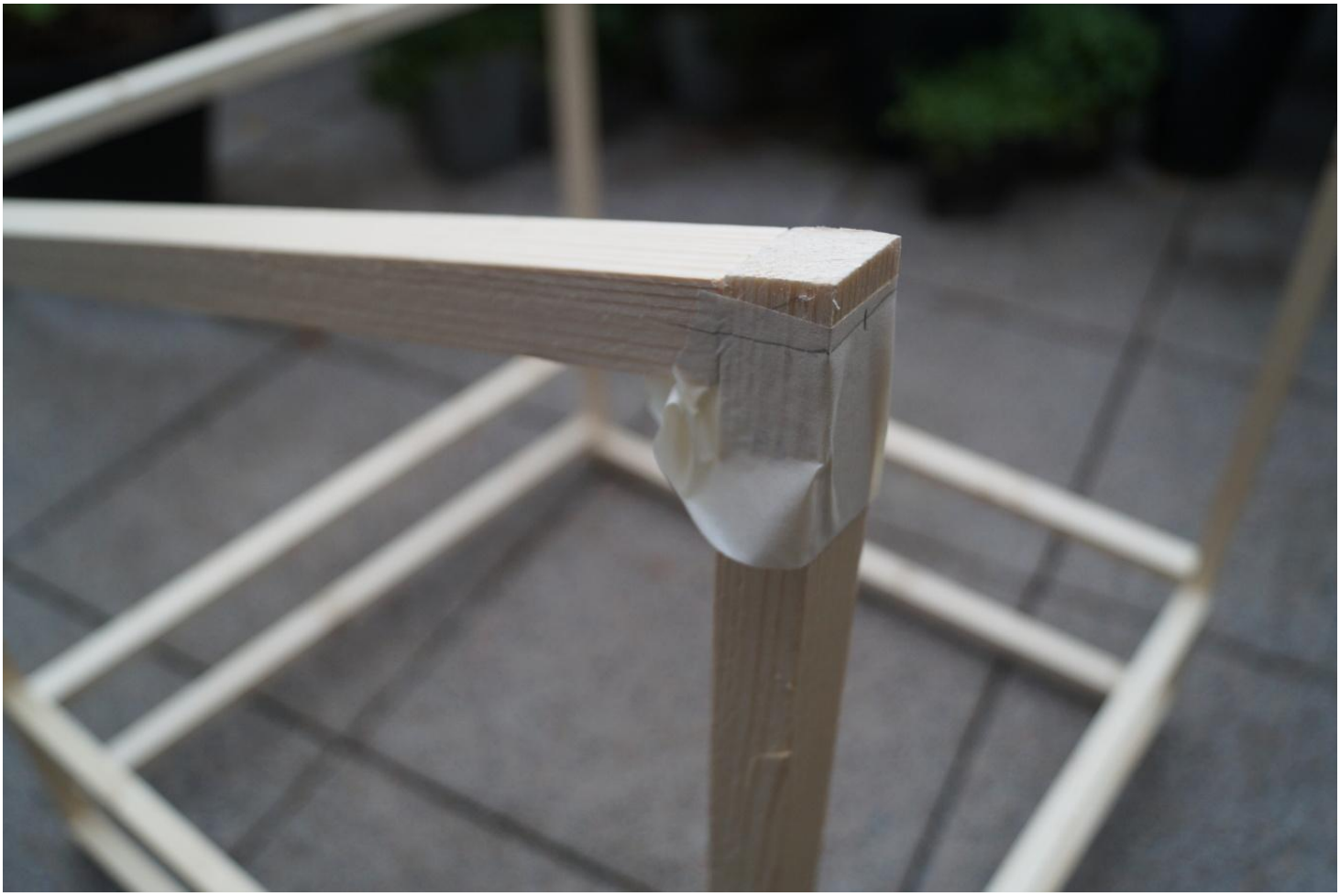

MEJIX
75°
90°

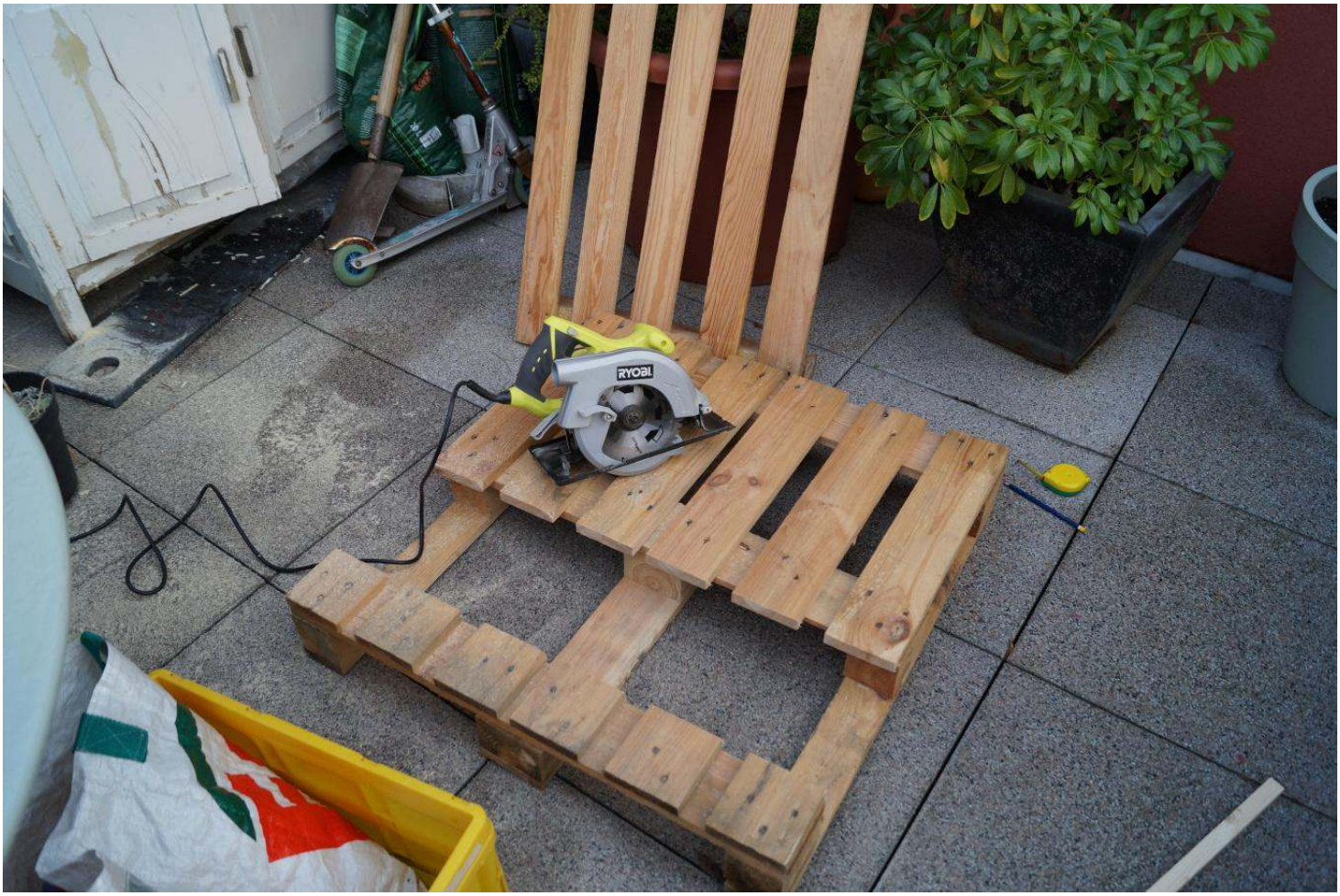





makita
8280D


12
14
16
8280D

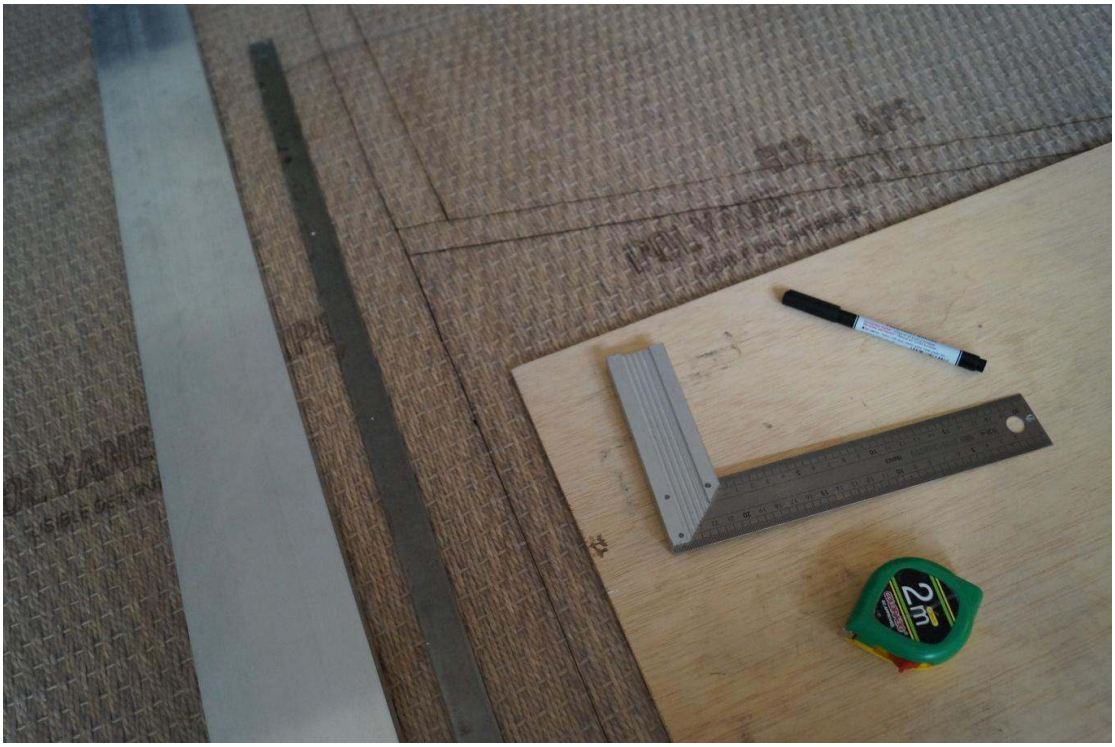



RYOBI

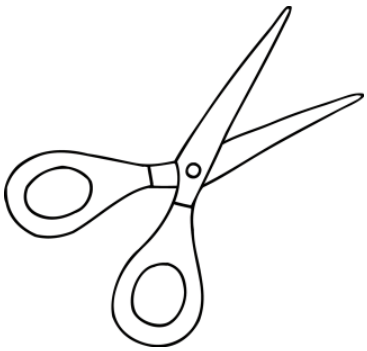

STANLEY
STANLEY
JET CUT

Greenhouse

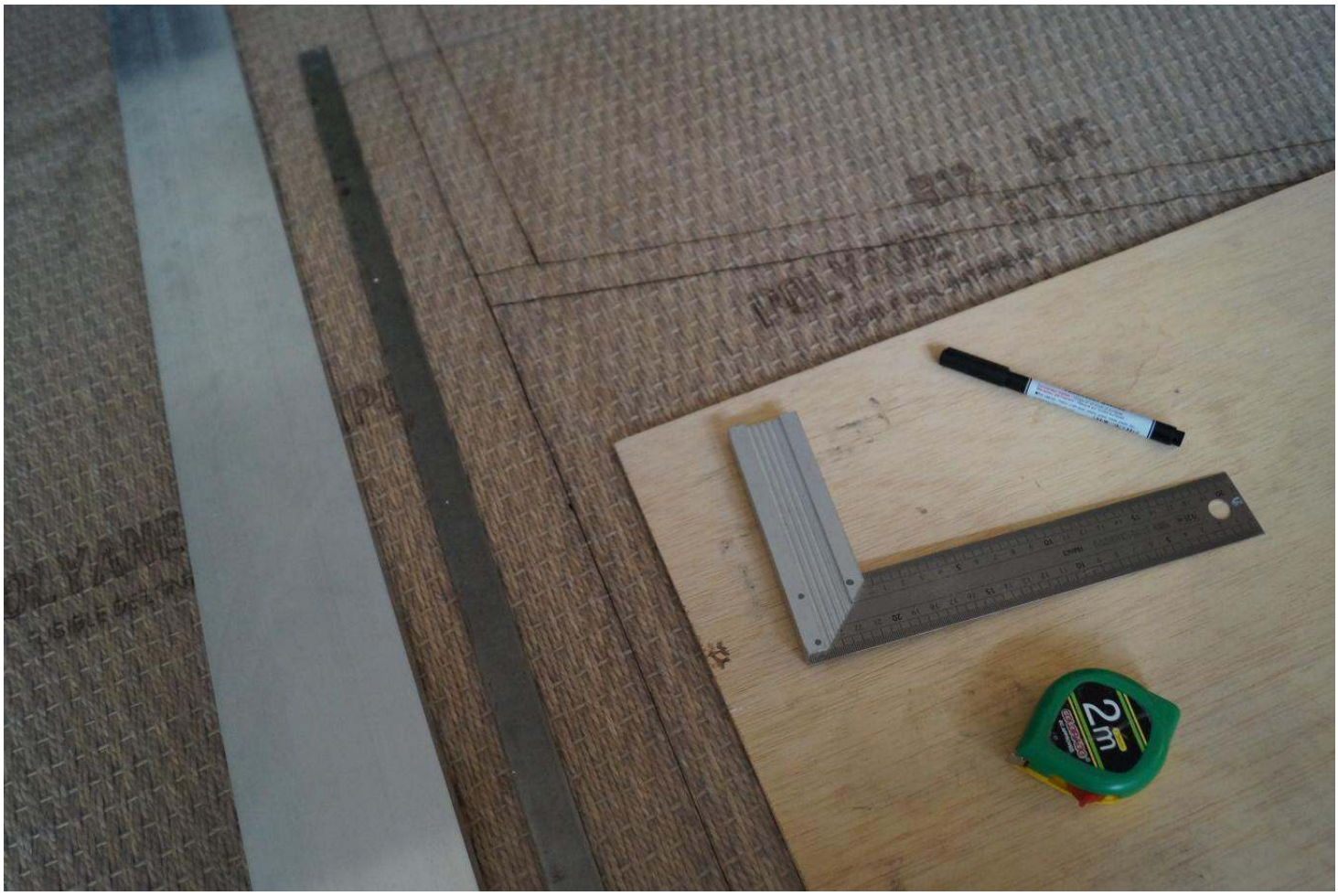
2. cover

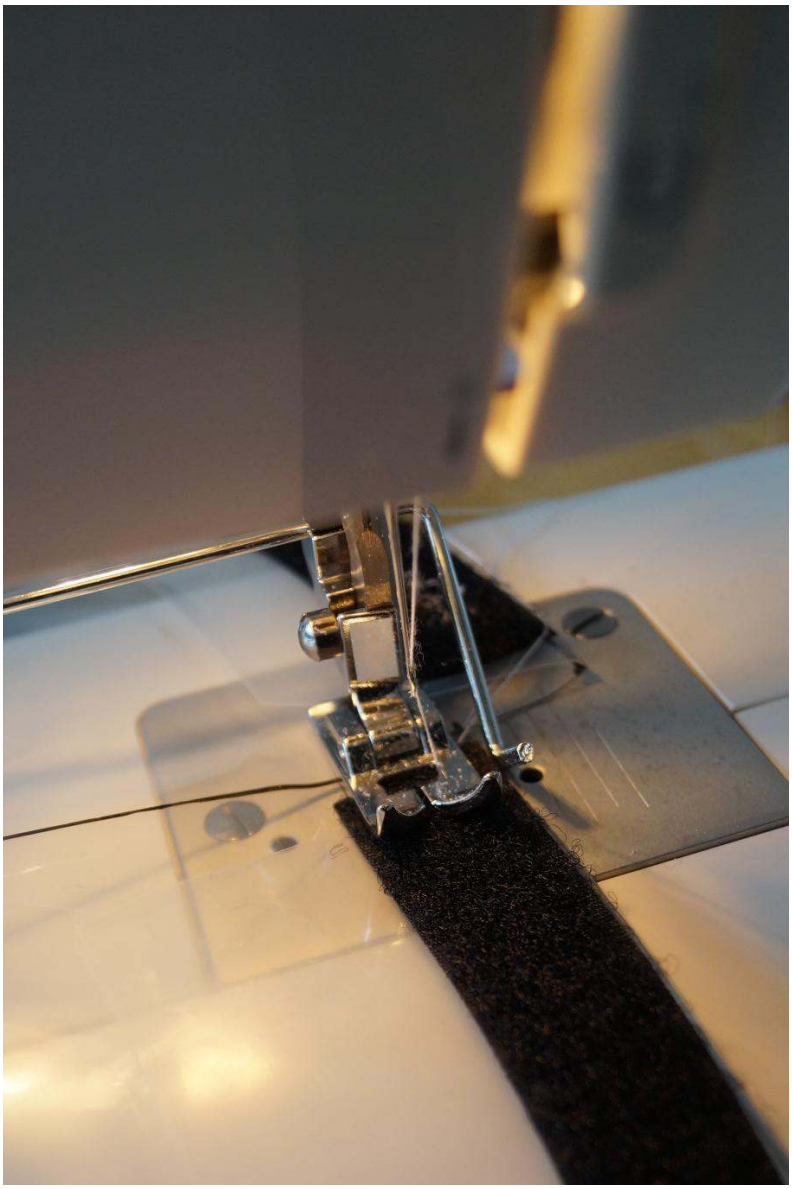

2m


calor




SINGER
Tradition


2m

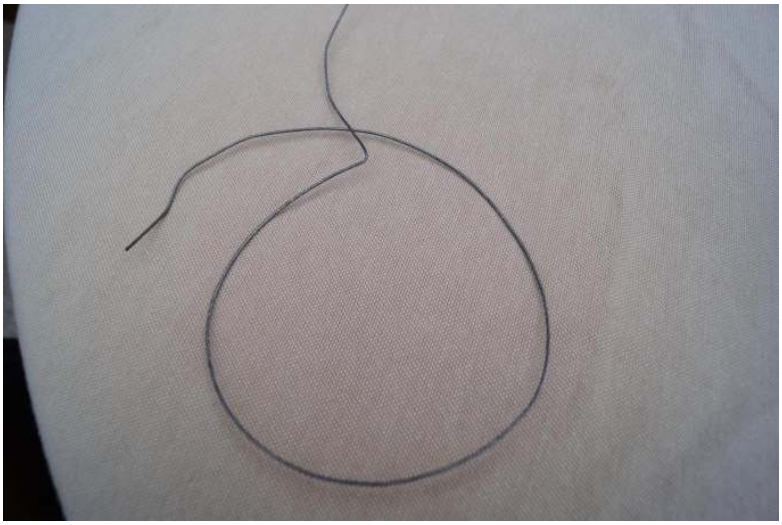


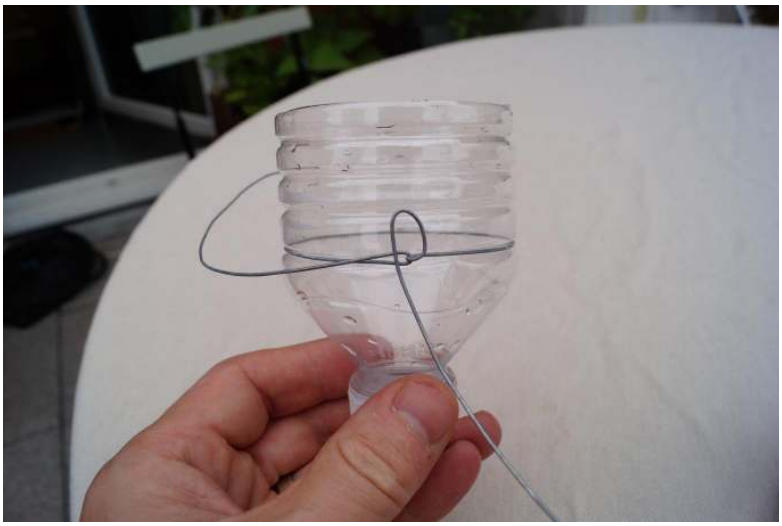

DEXTER

Greenhouse

3. finishing


POLYANE
VISIBLE DE L'INTERIEUR




Vanilla

Cost

TODO

* Improve insulation
  to keep the greenhouse warm in winter

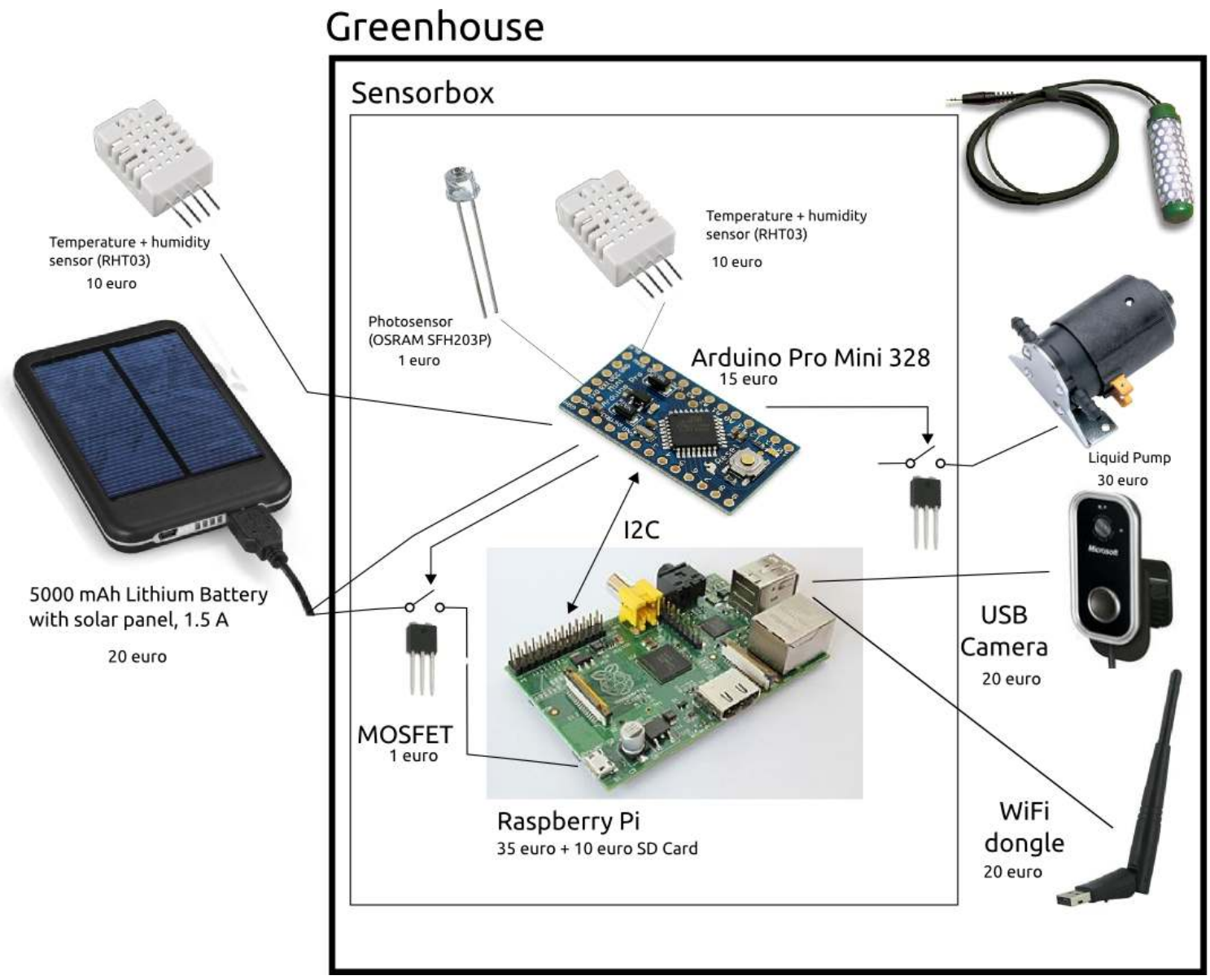
* Improve heat storage
  to avoid overheating in summer
  (sun screen, heat storage)
  to retain warmth of winter sun

* Improve ventilation

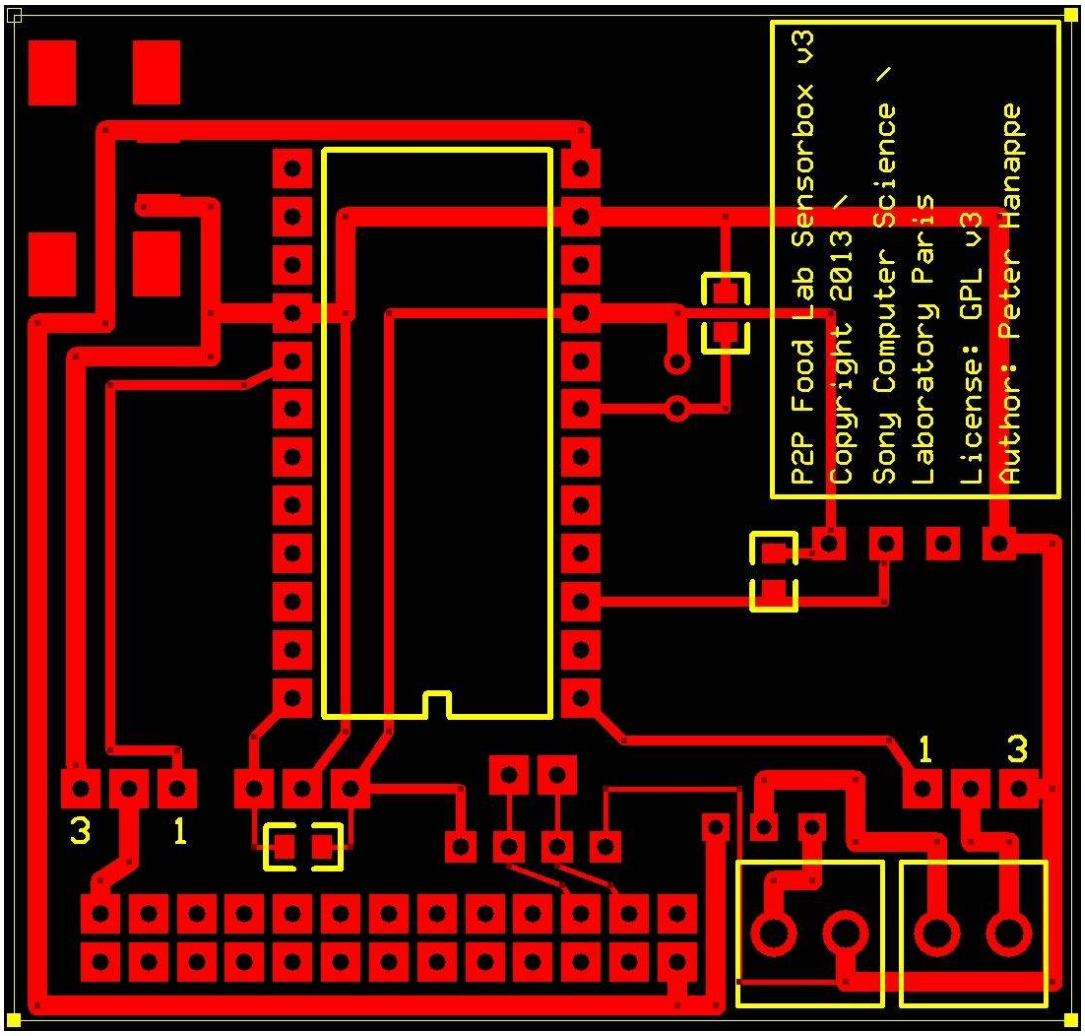
* Add frame for vertical crops.

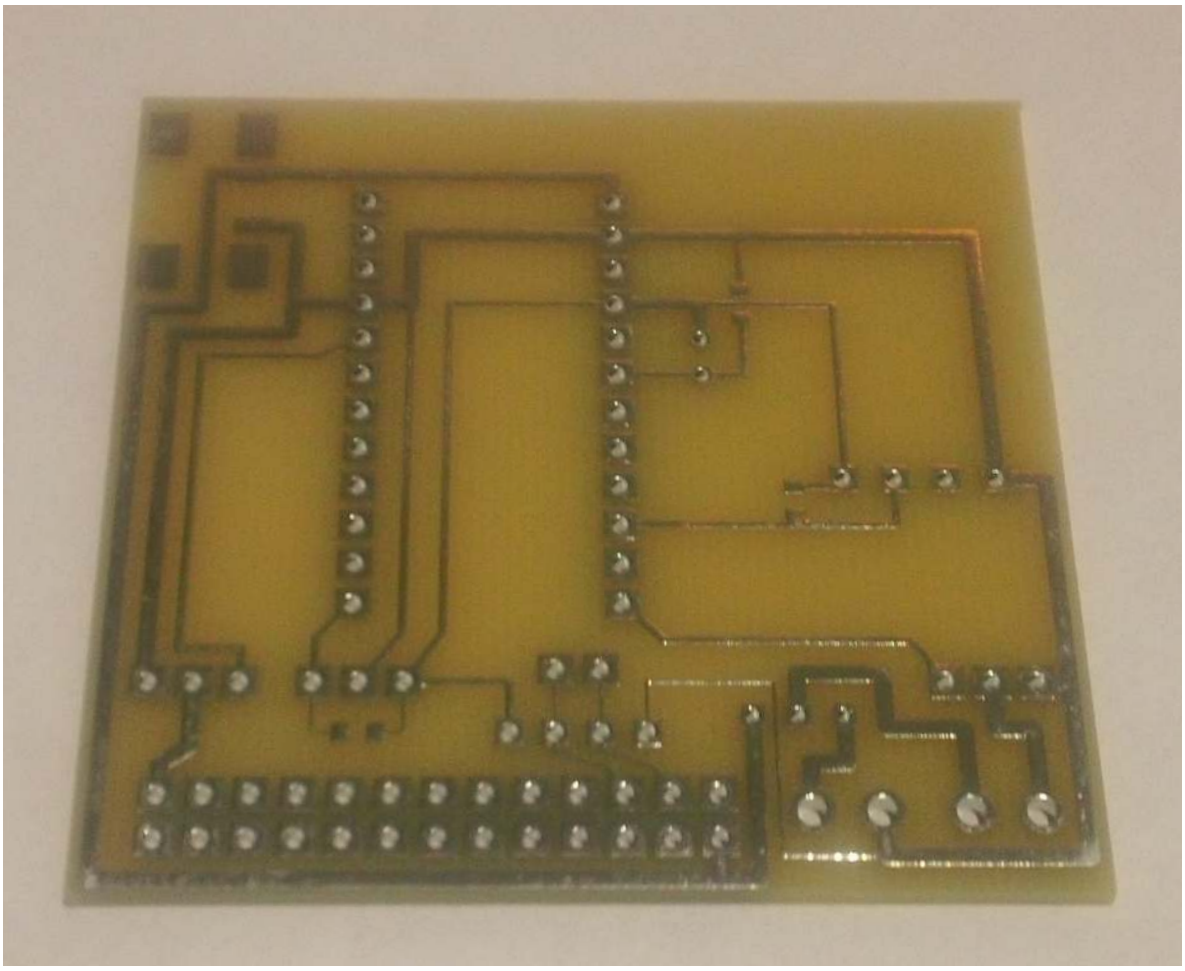
Sensorbox

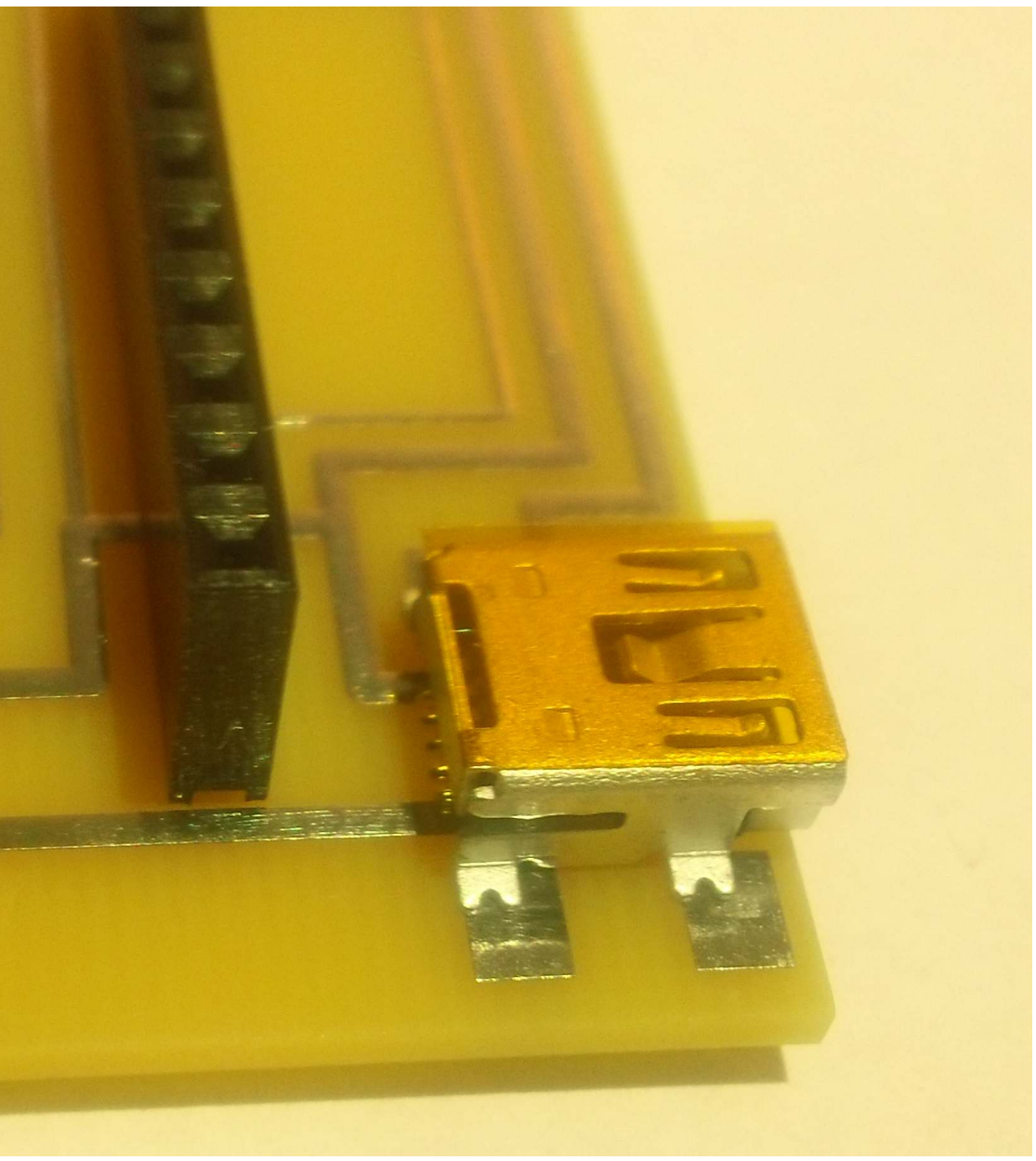
1. hardware

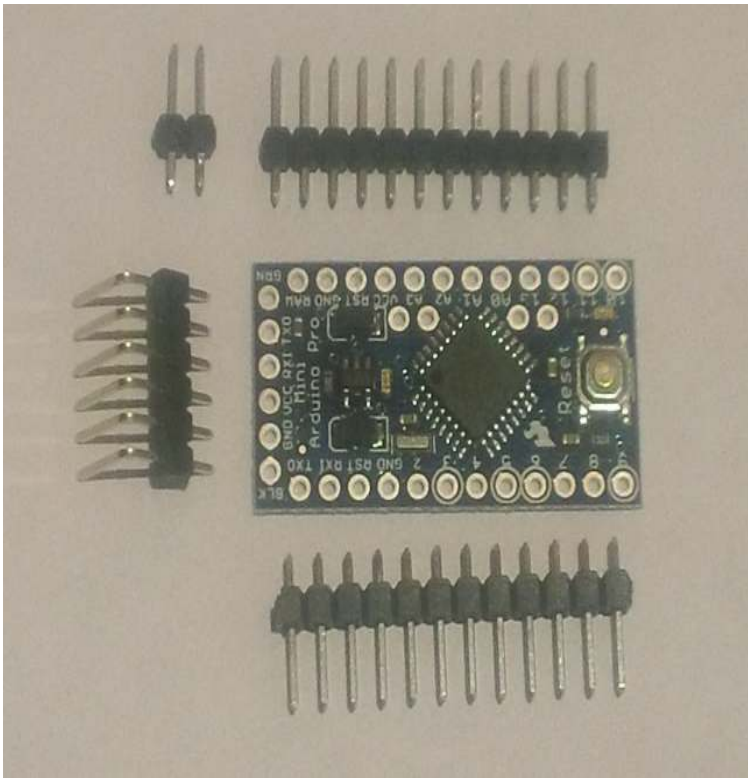

Greenhouse
Sensorbox
Temperature + humidity sensor (RHT03)
10 euro
Temperature + humidity sensor (RHT03)
10 euro
Photosensor (OSRAM SFH203P)
1 euro
Arduino Pro Mini 328
15 euro
Liquid Pump
30 euro
I2C
5000 mAh Lithium Battery with solar panel, 1.5 A
20 euro
MOSFET
1 euro
Raspberry Pi
35 euro + 10 euro SD Card
USB Camera
20 euro
WiFi dongle
20 euro

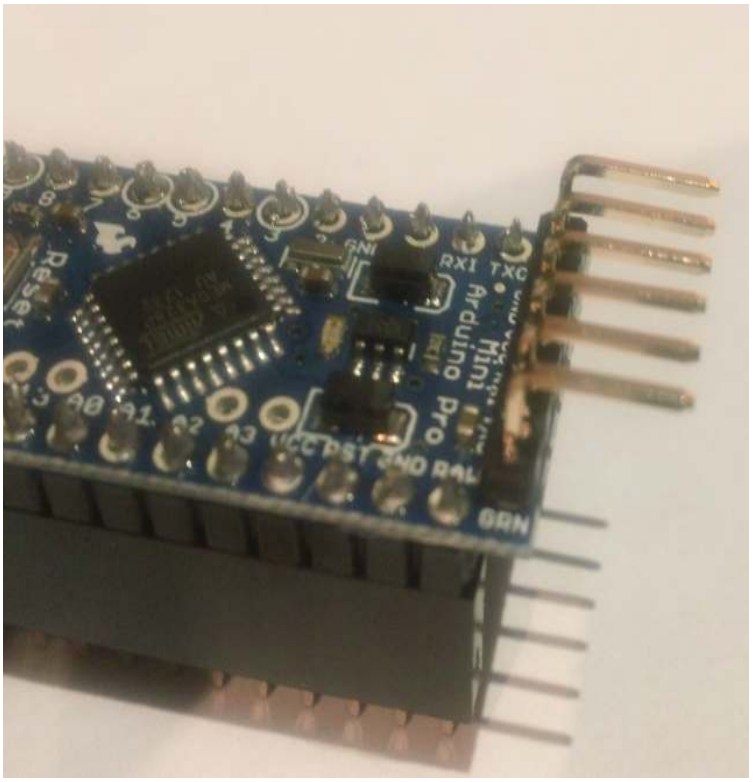
Component list

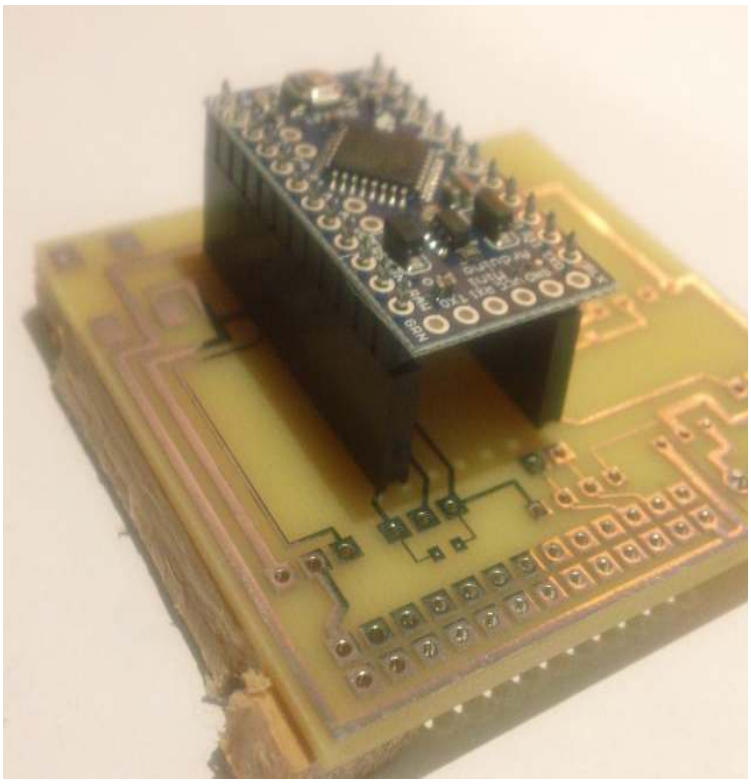

P2P Food Lab Sensorbox v3
Copyright 2013 \
Sony Computer Science \
Laboratory Paris
License: GPL v3
Author: Peter Hanappe
3
1
1
3

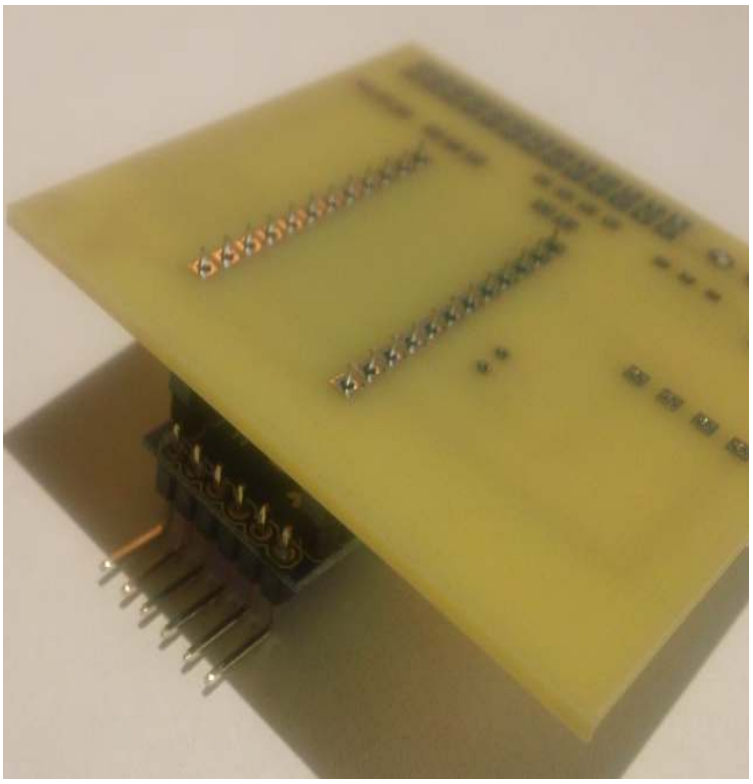


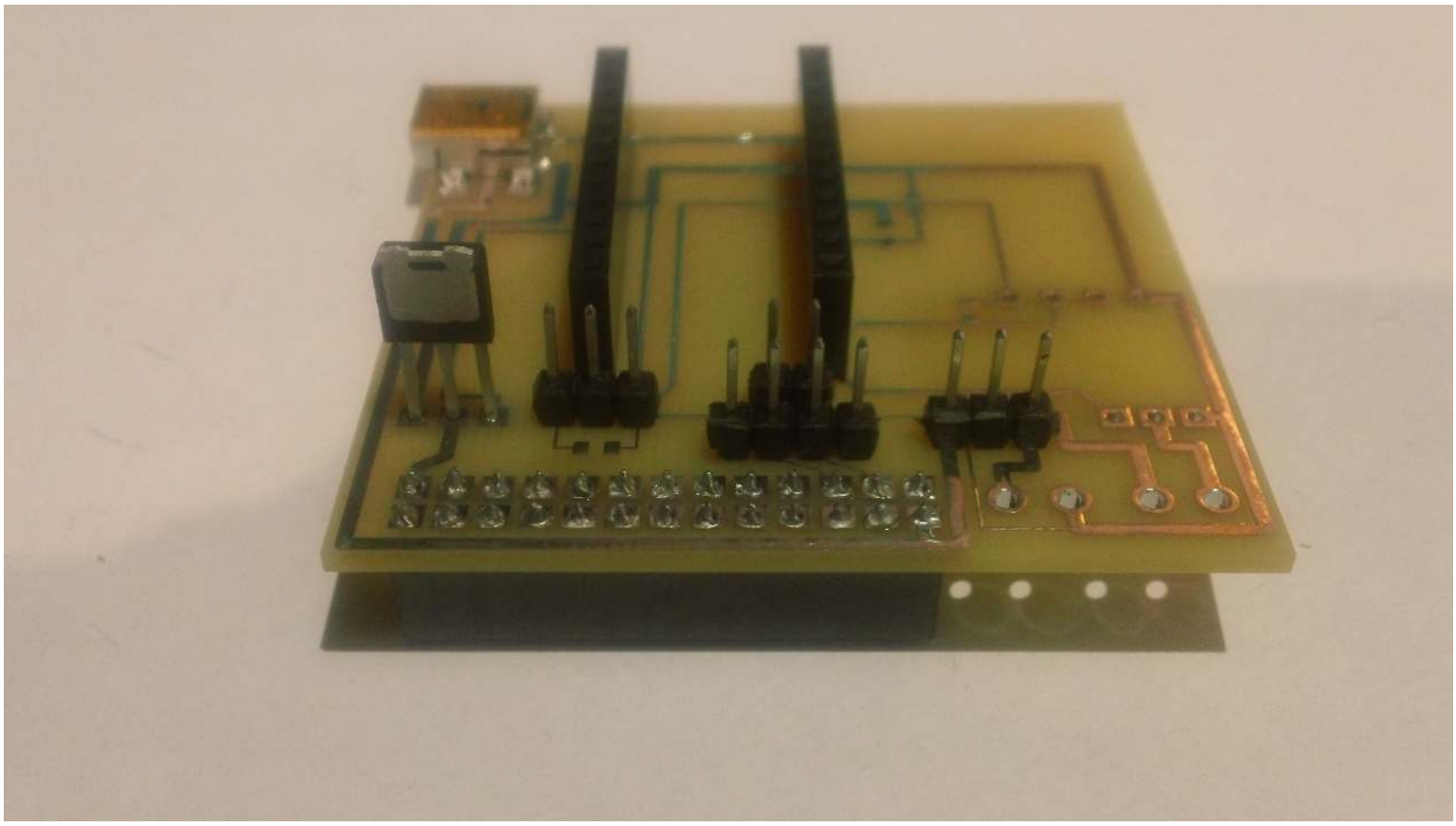


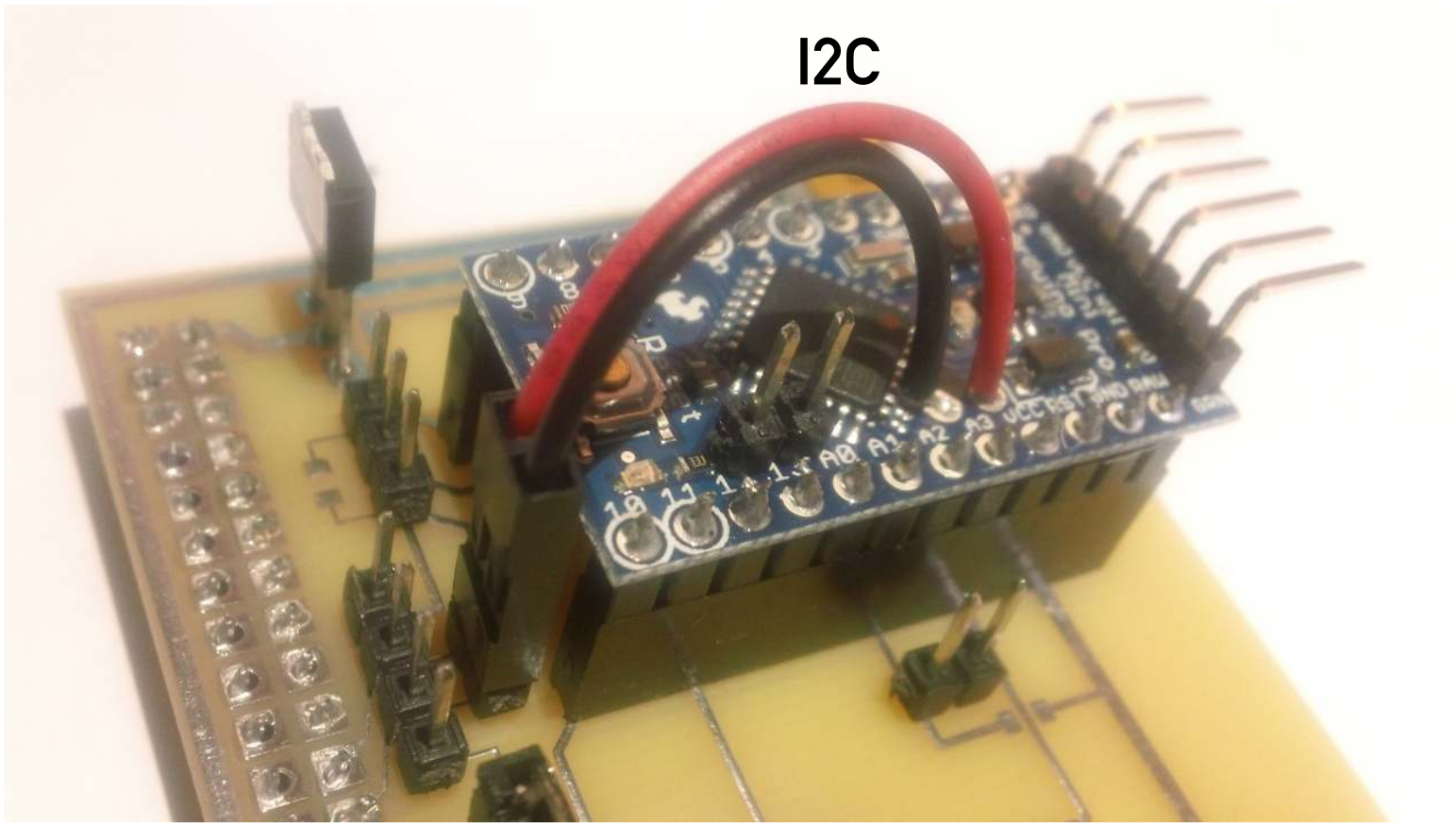

Reset
Arduino Pro Mini

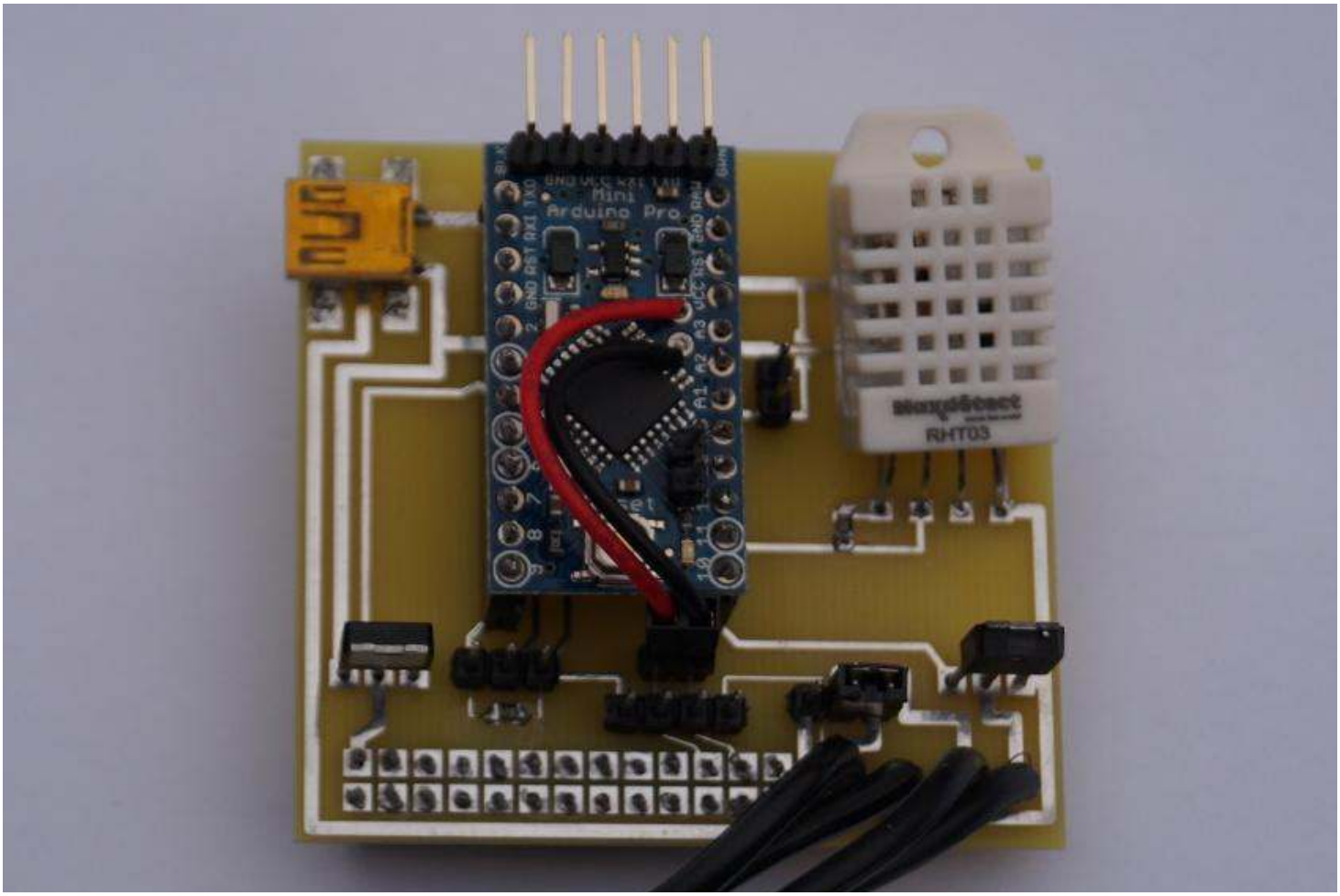

Reset
Arduino Pro Mini

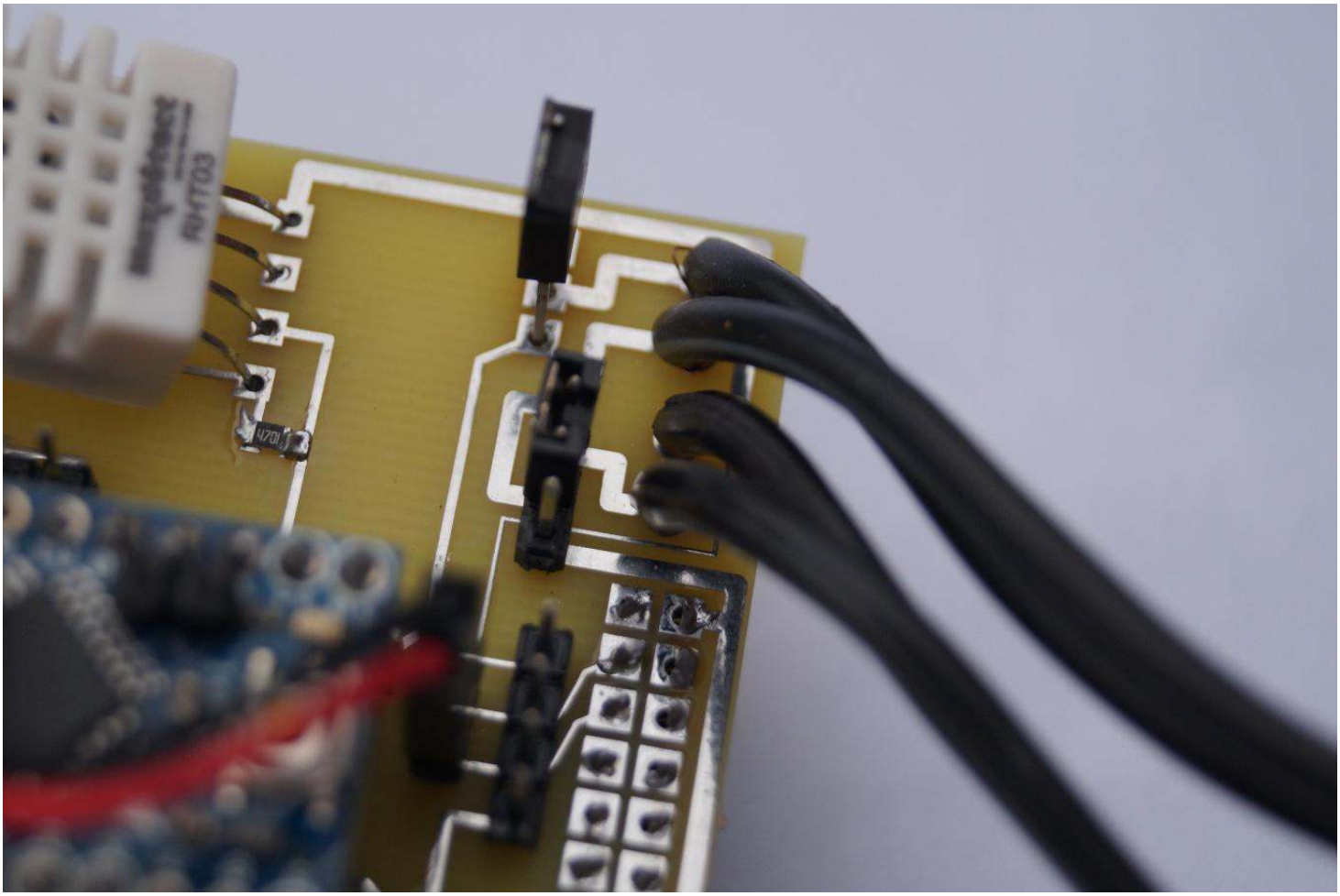


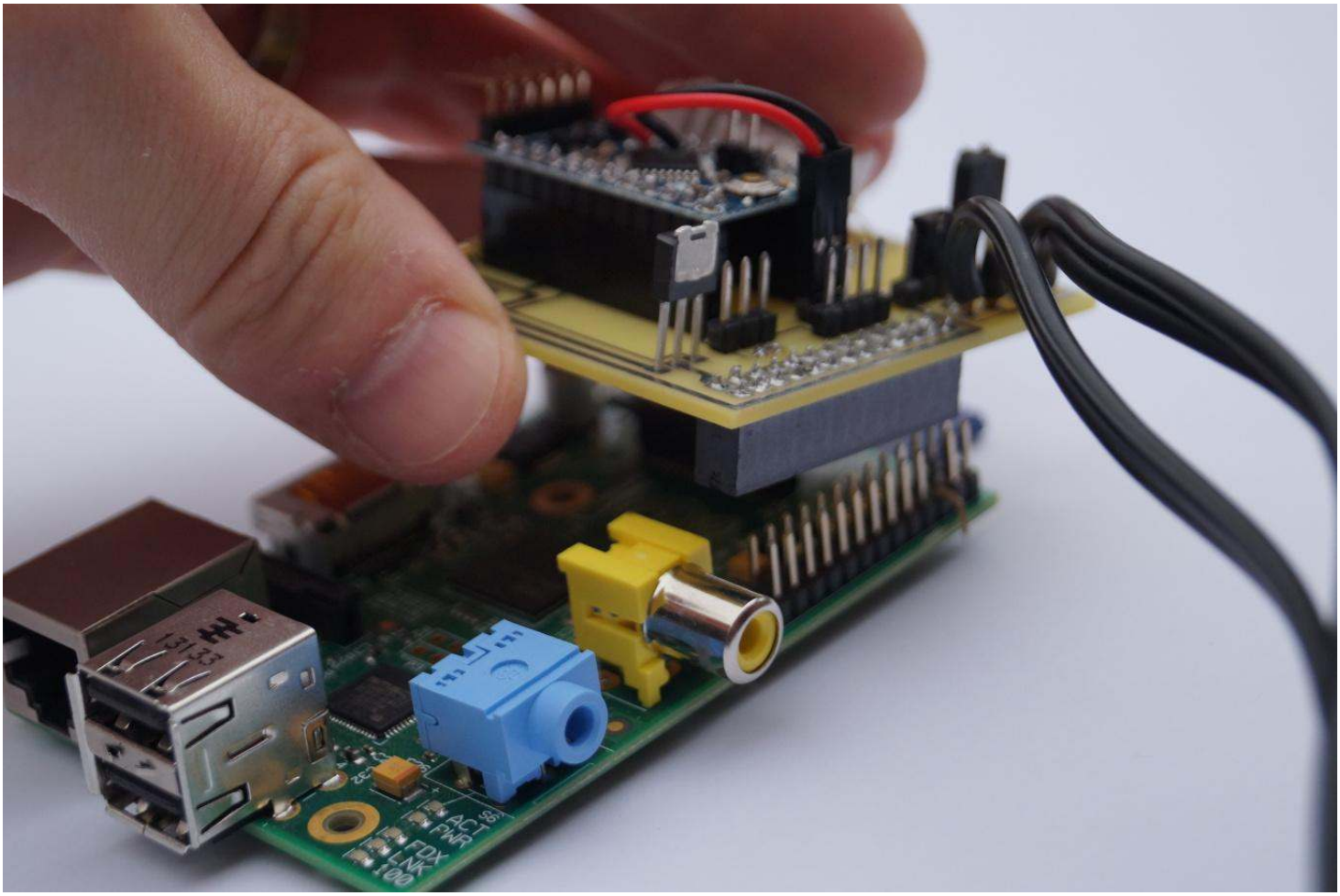


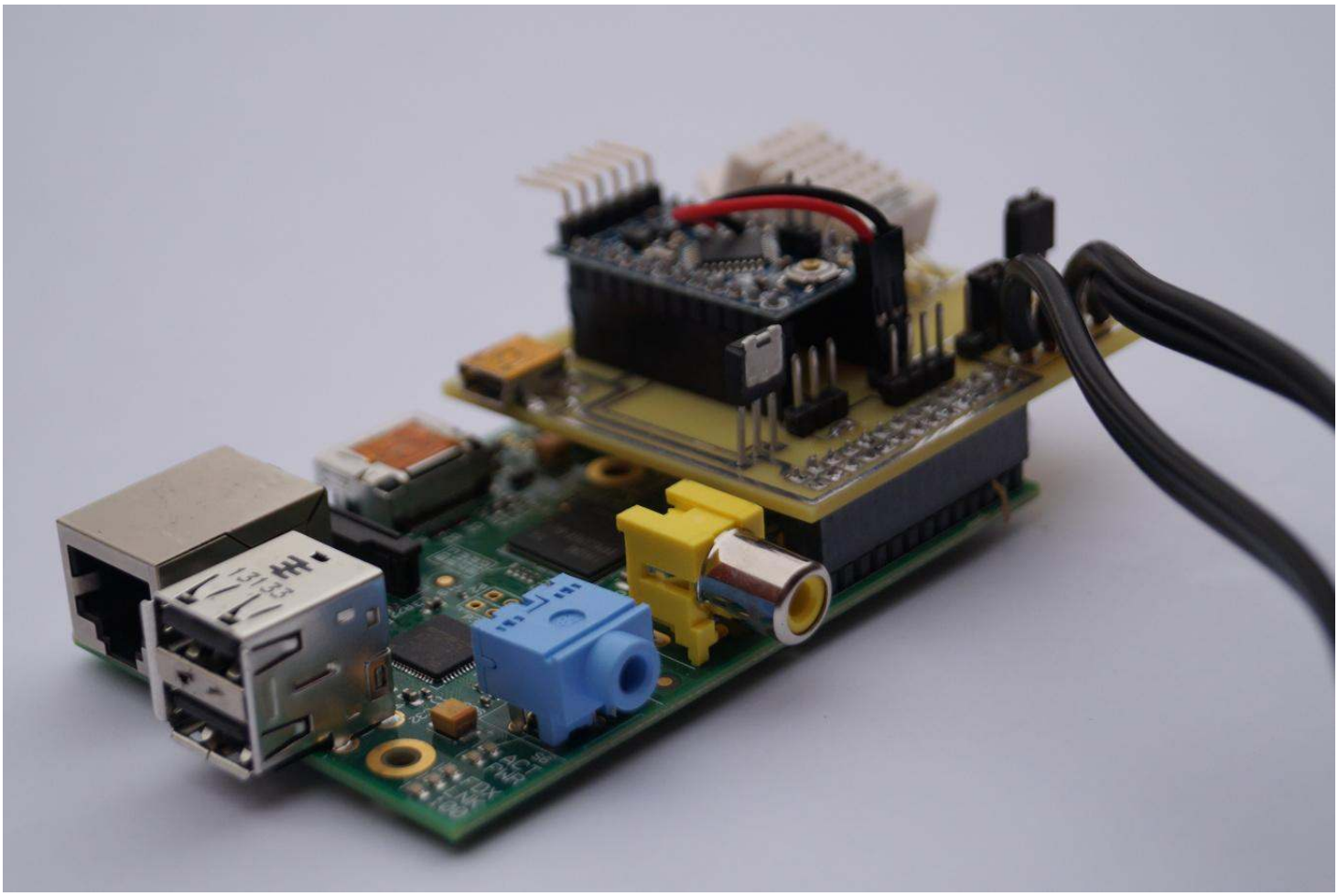


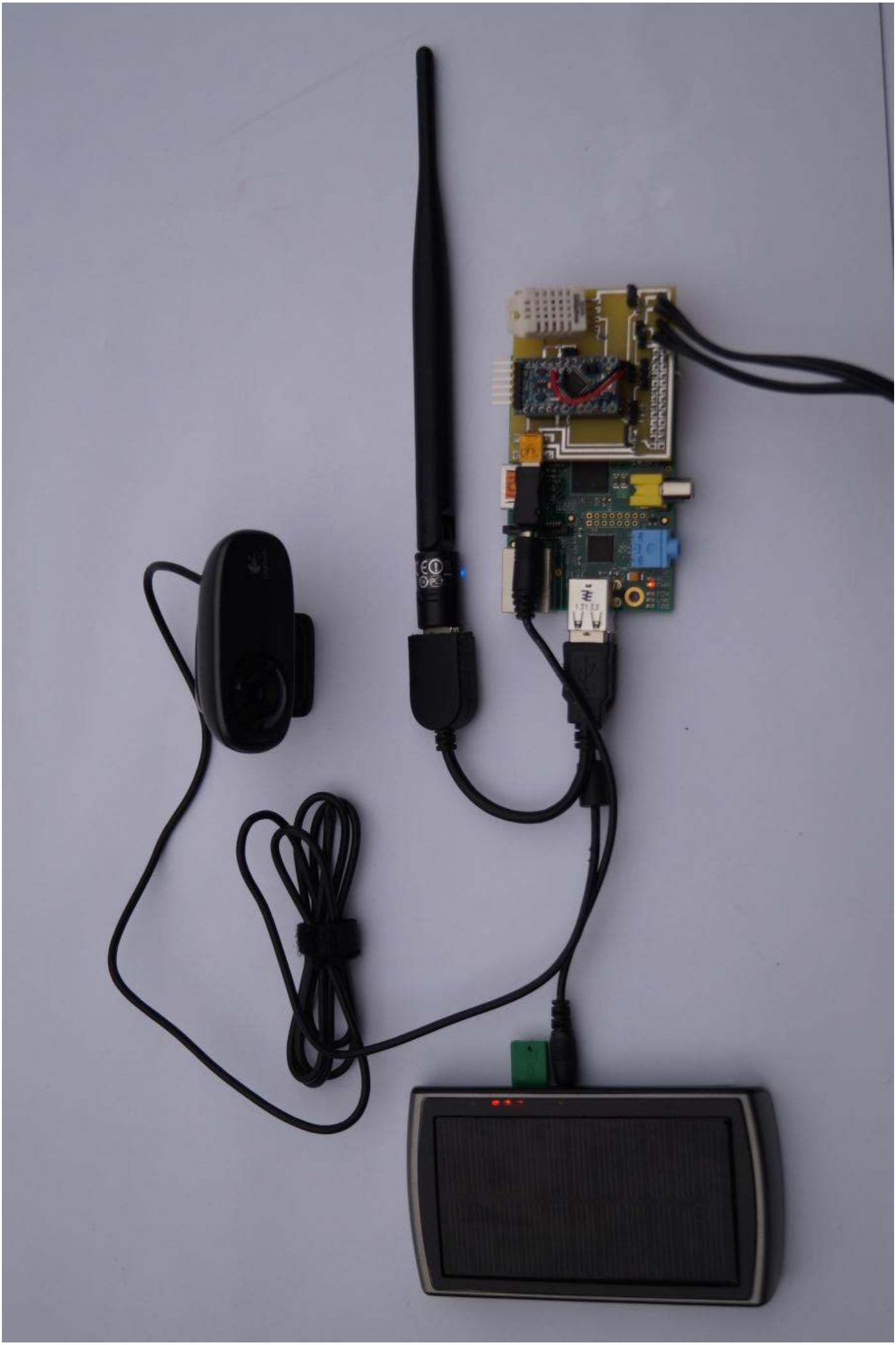

I2C

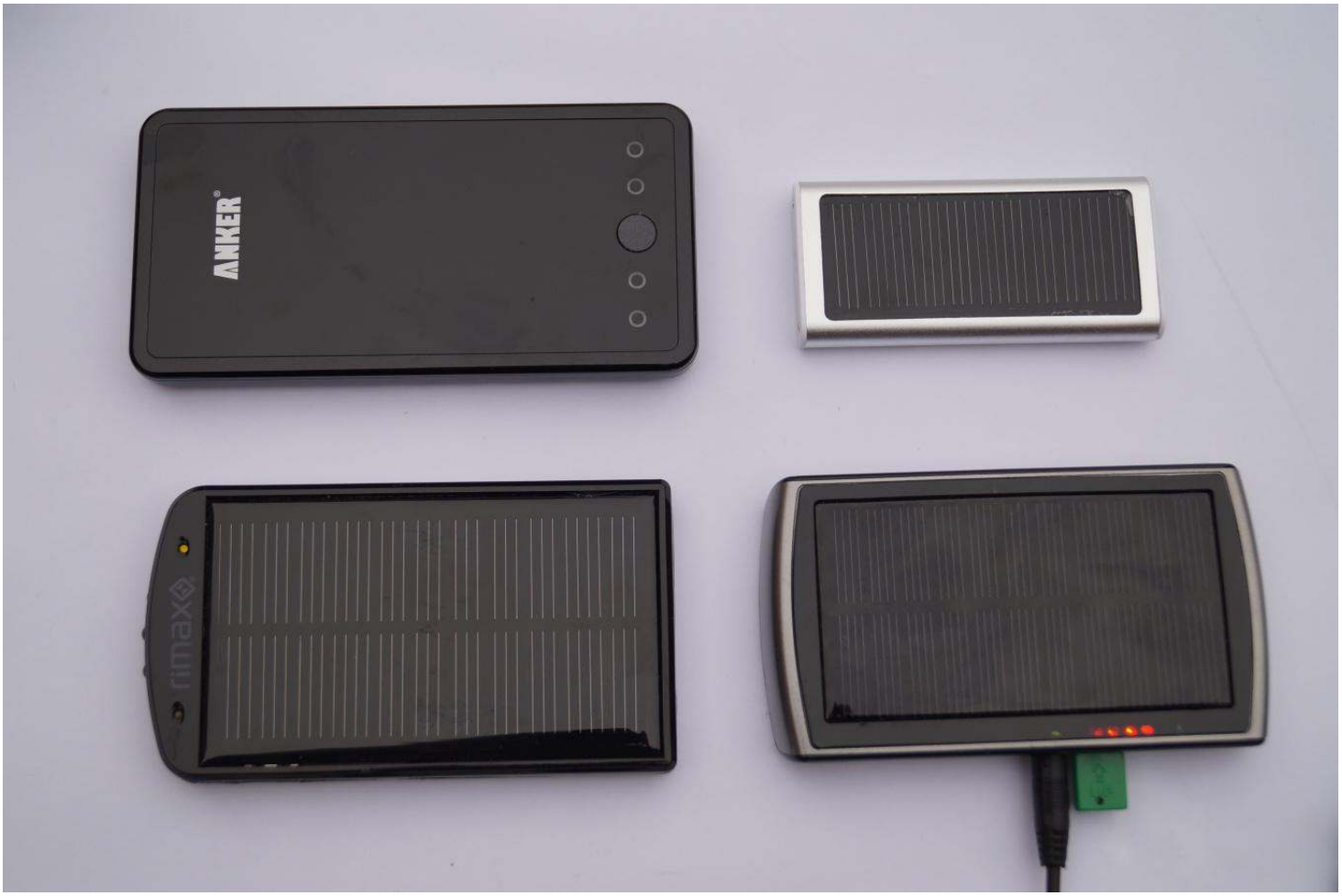

Mini
Arduino Pro
RHT03


RHT03


ACT
PWR
FDX
LNK
100

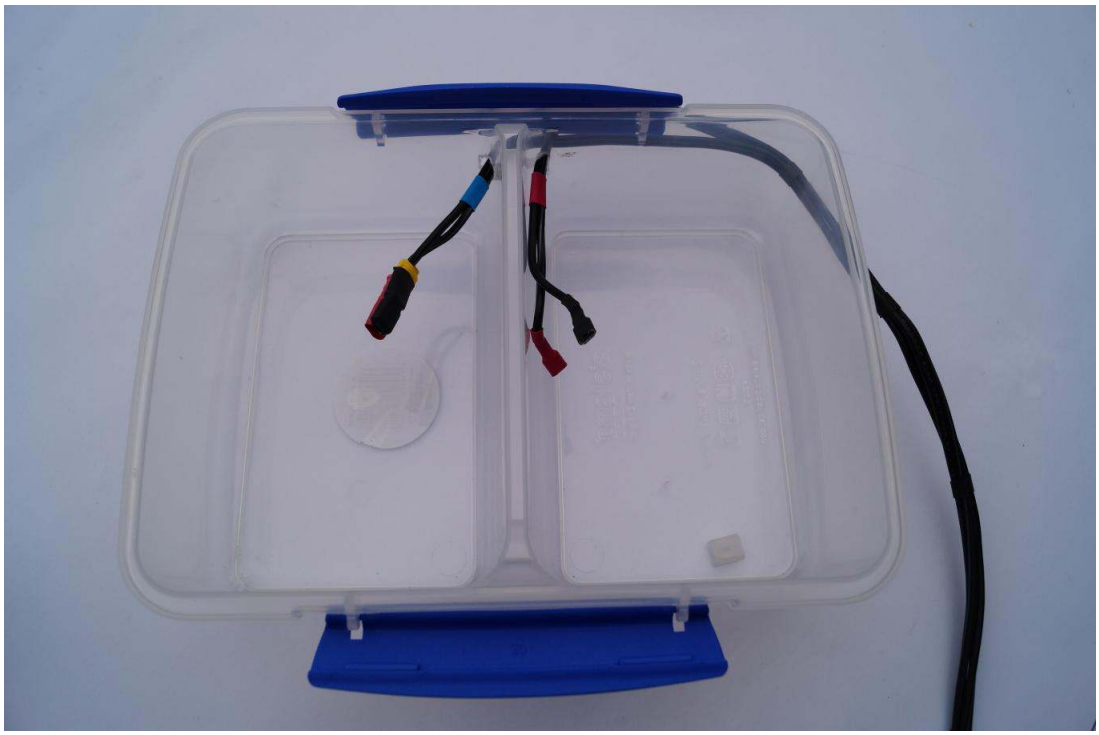


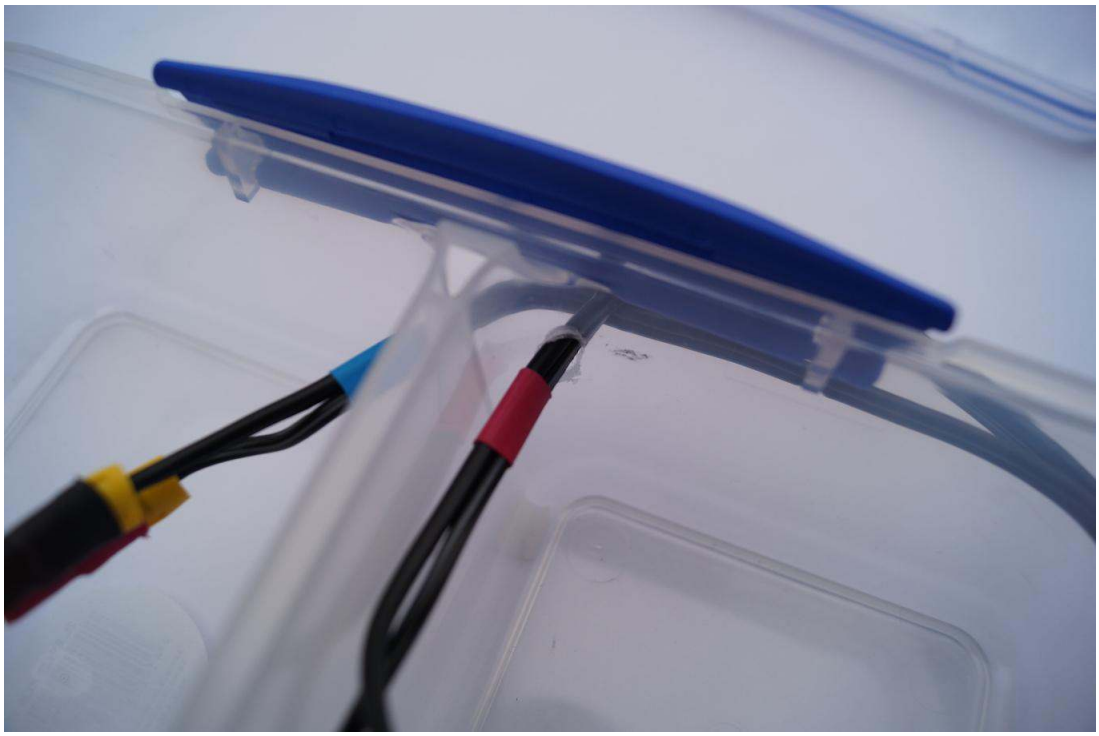



ANKER
rimax


CRISTALLO
EXTRA
6x9 mm - 5 m
2007/19/EC a-b-c
Made in EC
CRISTALLO EXTRA
HI-FITT

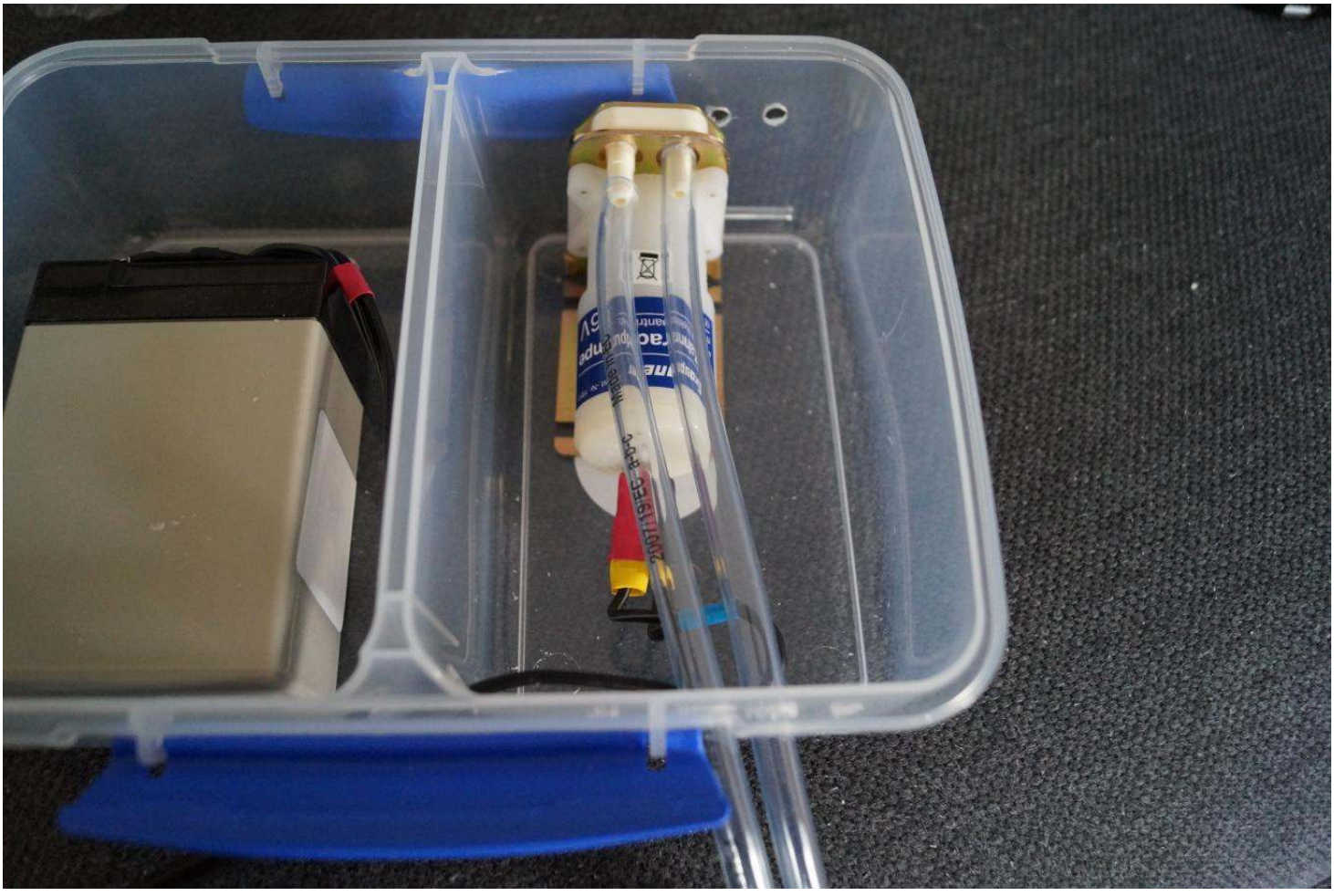

Zahnradpumpe
Elektroantrieb
6V

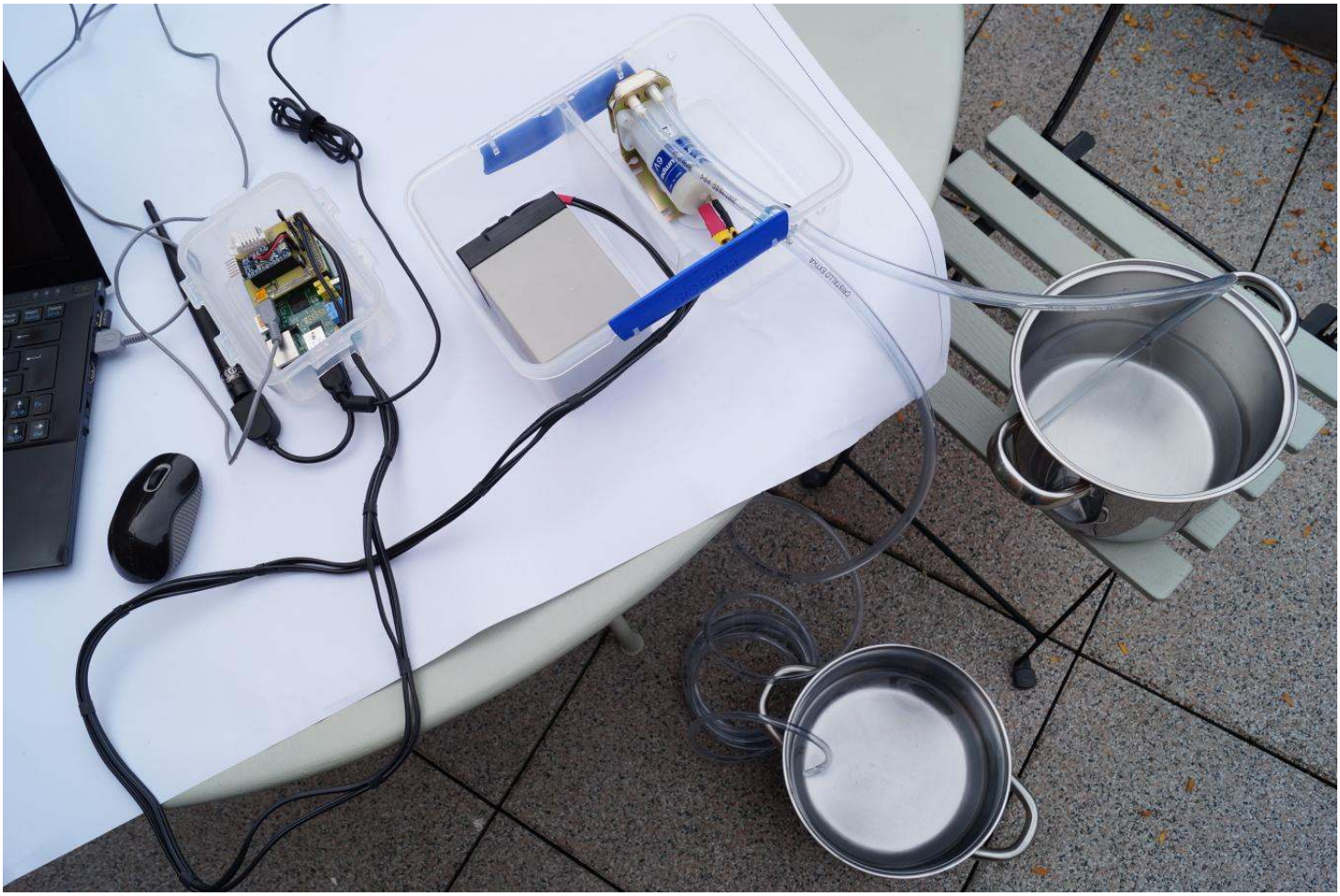





Graupner
Zahnradpumpe
Elektroantrieb
6V


sistema






CARTE D'OR
Vanille

TODO

* more testing of solar batteries
* use one or two batteries?
* detect water level / improve pump
* cheap and reliable soil humidity sensor
* renewable power source
* network of sensors for large gardens?

Sensorbox

2. software

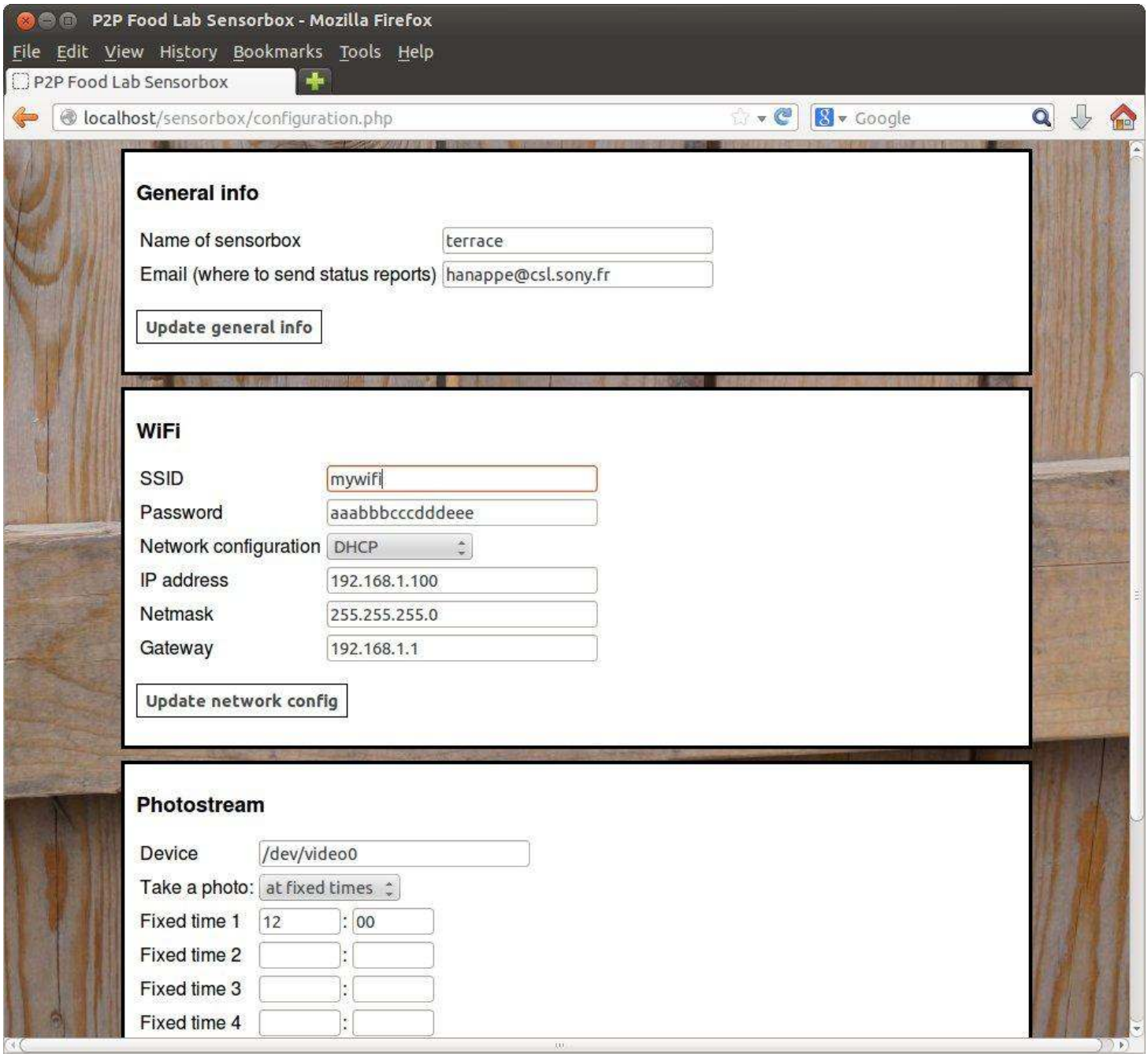
Ethernet cross-cable

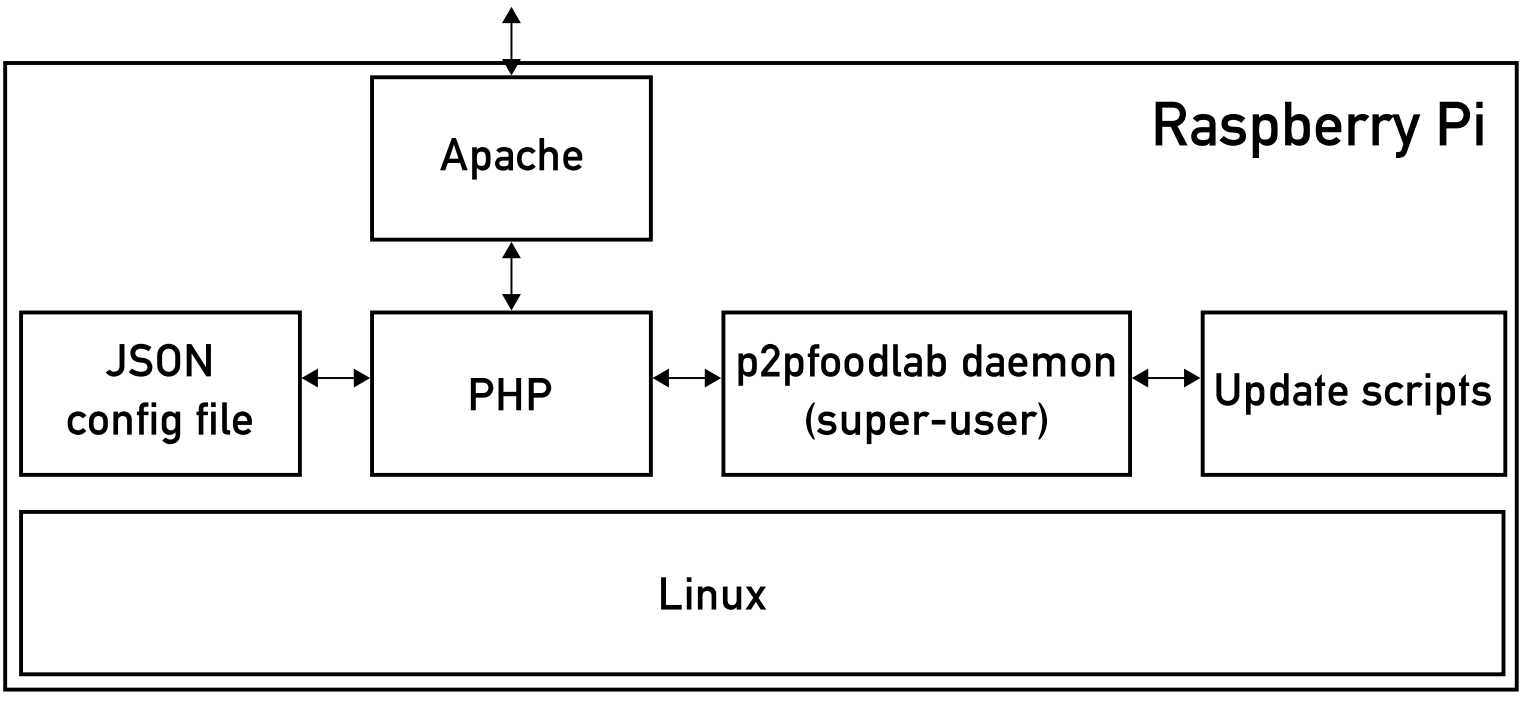
or

Ethernet switch

DHCP server
& HTTP server
IP 192.168.3.14

Configuring the sensorbox

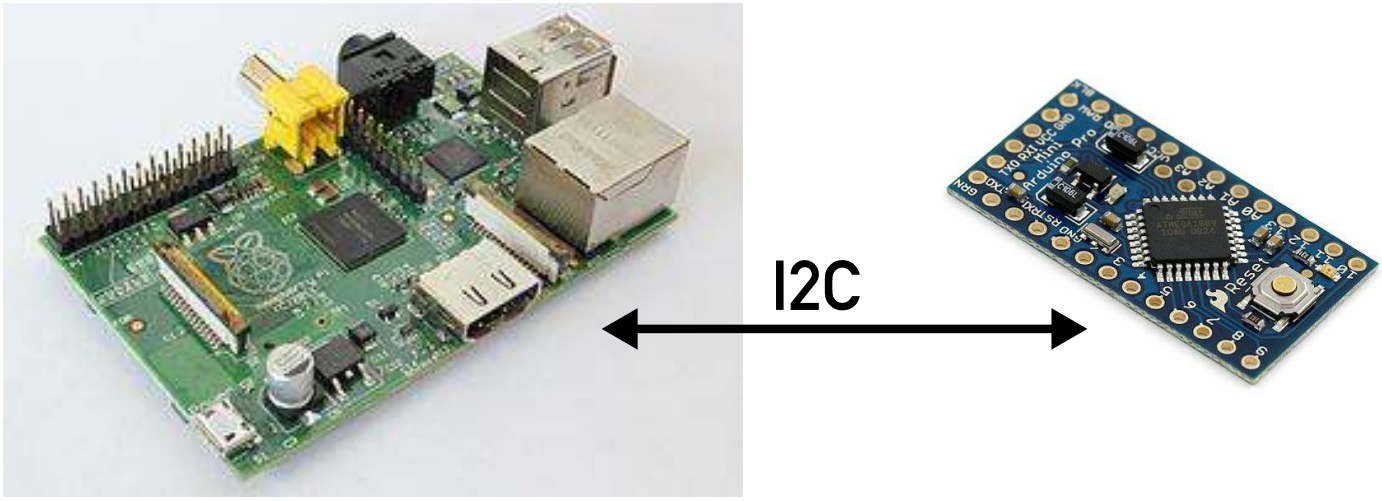




Communicating with the arduino:

We developed a small utility to talk to the arduino:

```
$ arduino --help
arduino [command] [options]
Commands:
- enable-sensors flags      Enable sensors
- store-data                Download and store sensor data
- poweroff minutes          Shutdown the Raspberry Pi
- millis                    Get the current clock
- pump seconds              Turn on/off the pump
```



Linux: C-interface <linux/i2c-dev.h>

Arduino: Wire library

Keeping time

The Raspberry Pi does not have a "real-time clock". This means that it does not know the current time when it starts.

It updates its time by asking another machine on the network, using the Network Time Protocol (NTP). For remote usage, over GSM networks for example, NTP is not reliable. The software package "fake-hwclock" assures that clock is set to the date and time that the RPi shut down.

We improved this strategy by adjusting the RPi clock using arduino‘s clock.

Web site

1. sensor data

OpenSensorData.net

P2P Food Lab web site
- view images
- view data

Data analyses

- amount of sunlight
- temperature efficiency of greenhouse
- growth patterns of plants

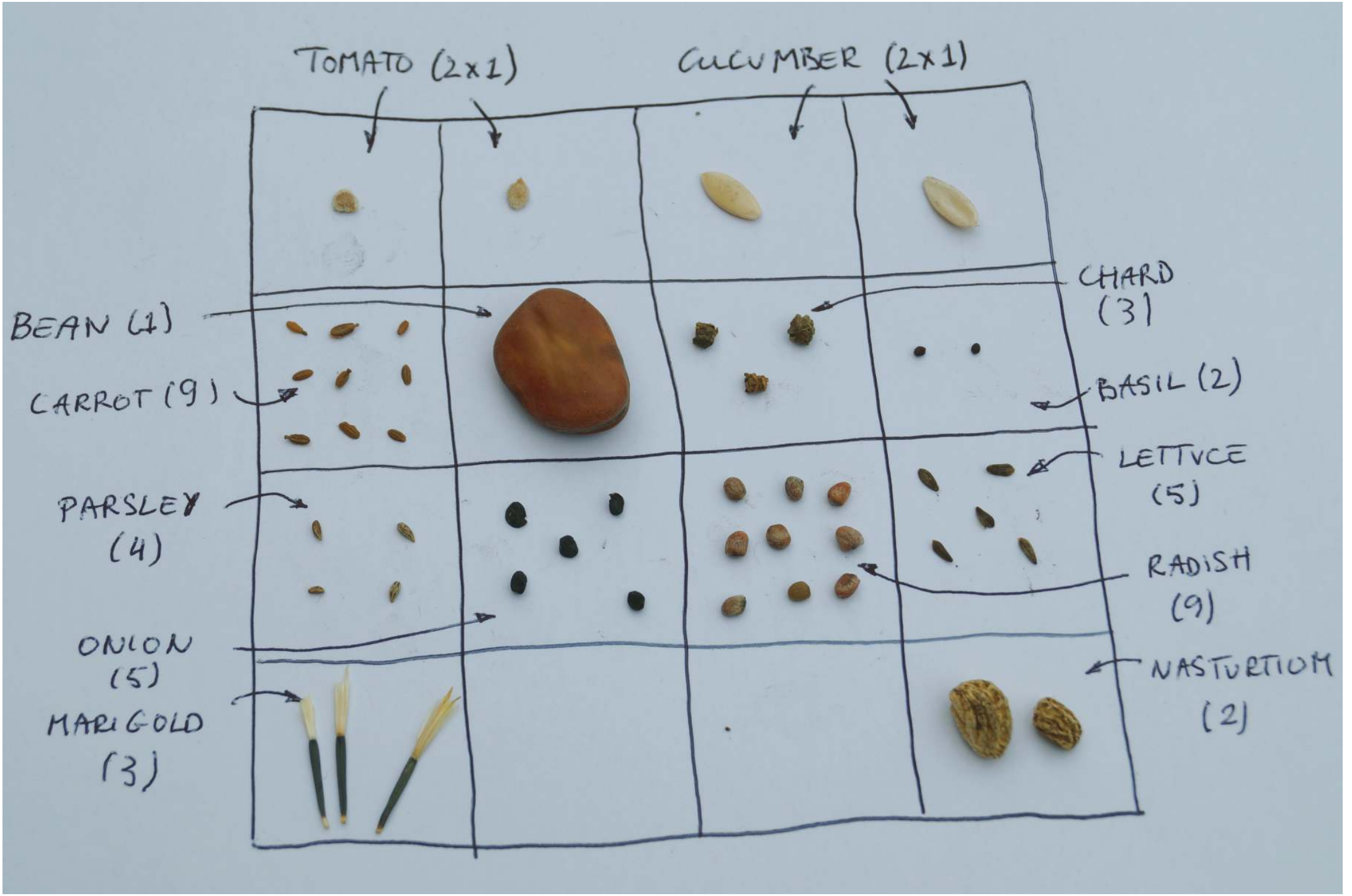
Web site

2. know-how & sharing

Make food !

Square-foot gardening

Images by
- Dale Calder
- Océane Peisey / Michka Mélo
- Peter Hanappe
- Stephen Ticehurst (mrmole)
- Erica Smith


TOMATO (2x1)
CUCUMBER (2x1)
CHARD (3)
BEAN (1)
BASIL (2)
CARROT (9)
LETTUCE (5)
PARSLEY (4)
RADISH (9)
ONION (5)
NASTURTIUM (2)
MARIGOLD (3)

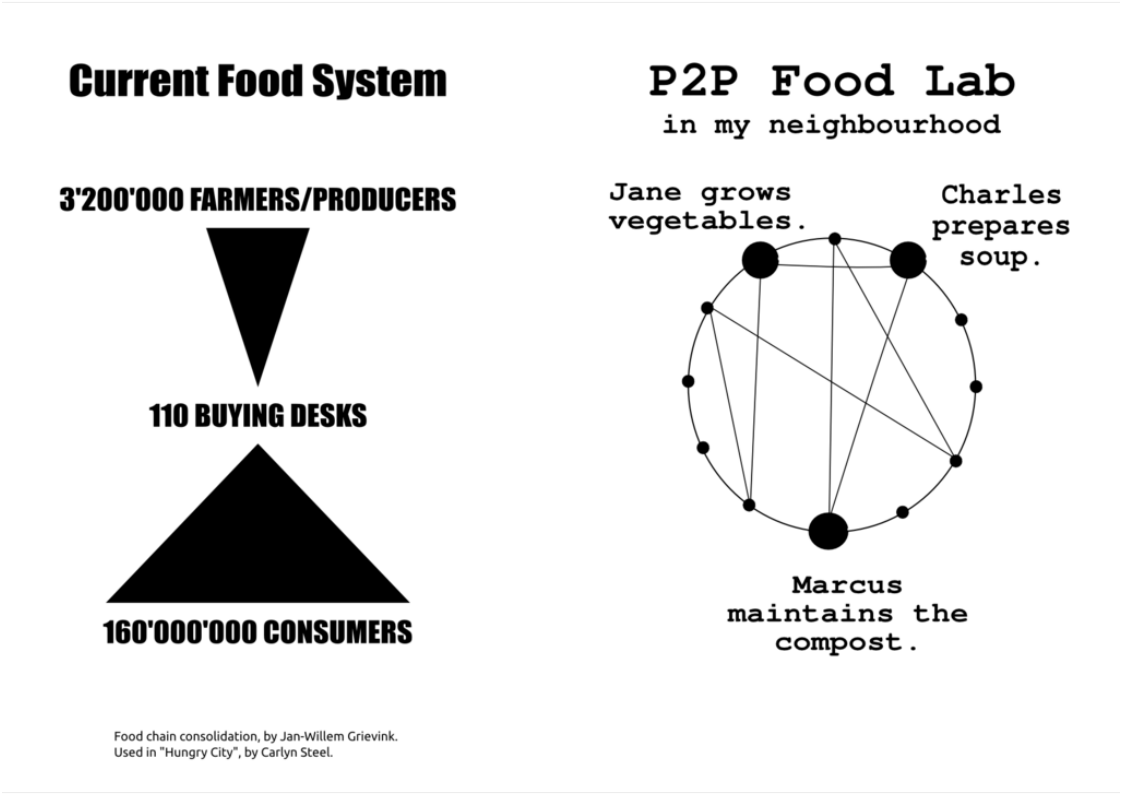
tomato		cucumber	
carrot	bean	chard	basil
parsley	onion	radish	lettuce
marigold			nasturtium

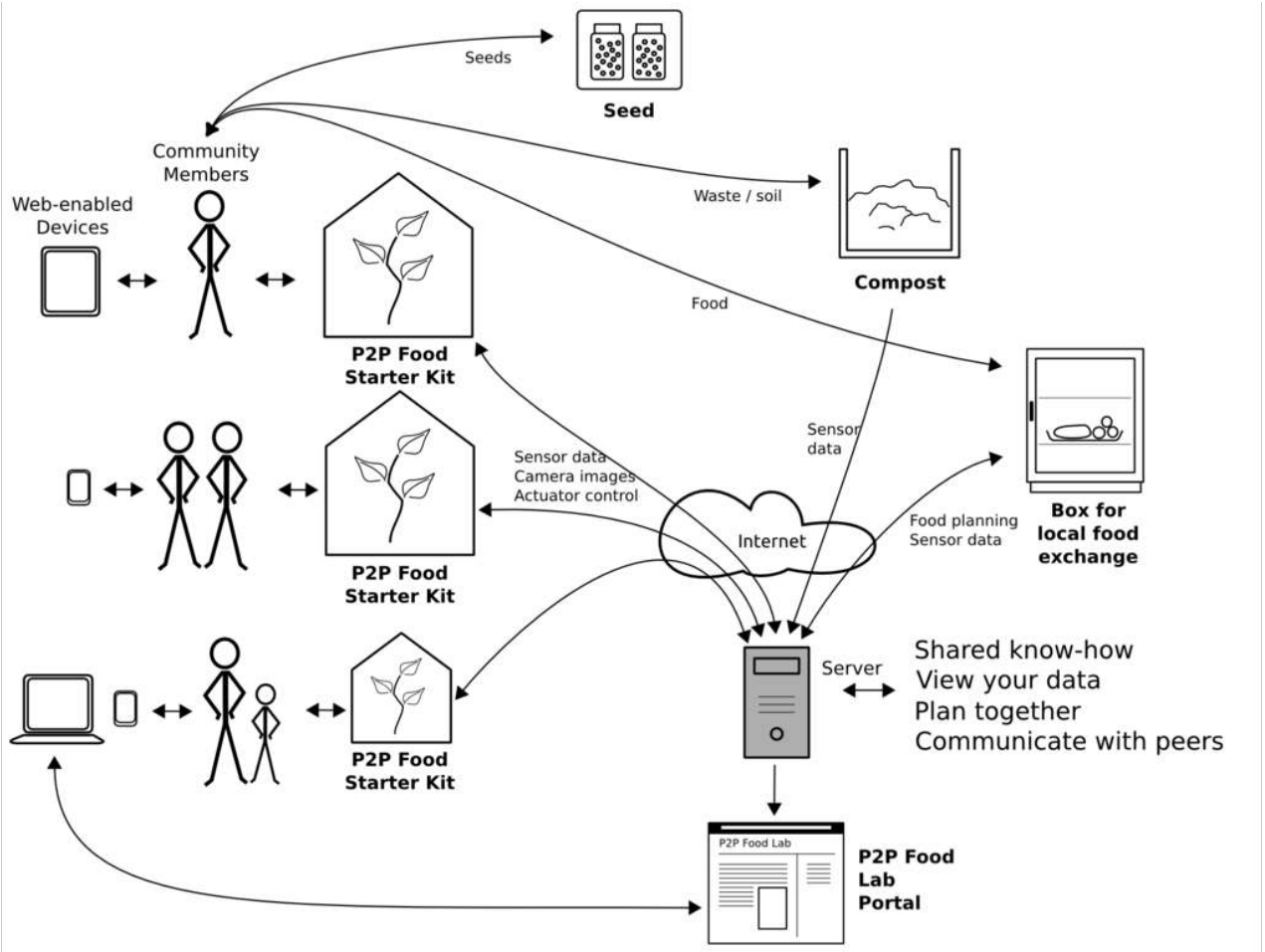
All vegetable seeds are natural and free of rights. They were purchased from Kokopelli. Exception: the flower seeds (marigold and nasturtium). Below you find the english name and the french name of its variety.

Basil	Basilic "Grec"
Carrot	Carotte "COSMIC PURPLE"
Cucumber	Concombre "Long Vert d'Alan"
Chard	Côte de Blette "À Cardes Rouges Red Rhubarb"
Bean	Fève "D'Aquadulce"
Lettuce	Laitues à couper "Emerald Oak"
Onion	Oignon "Rouge de Huy"
Parsley	Persil "Persil simple (plat)"
Radish	Radis "Flamboyant"
Tomato	Tomates jaunes-oranges "Coeur de Boeuf Orange"

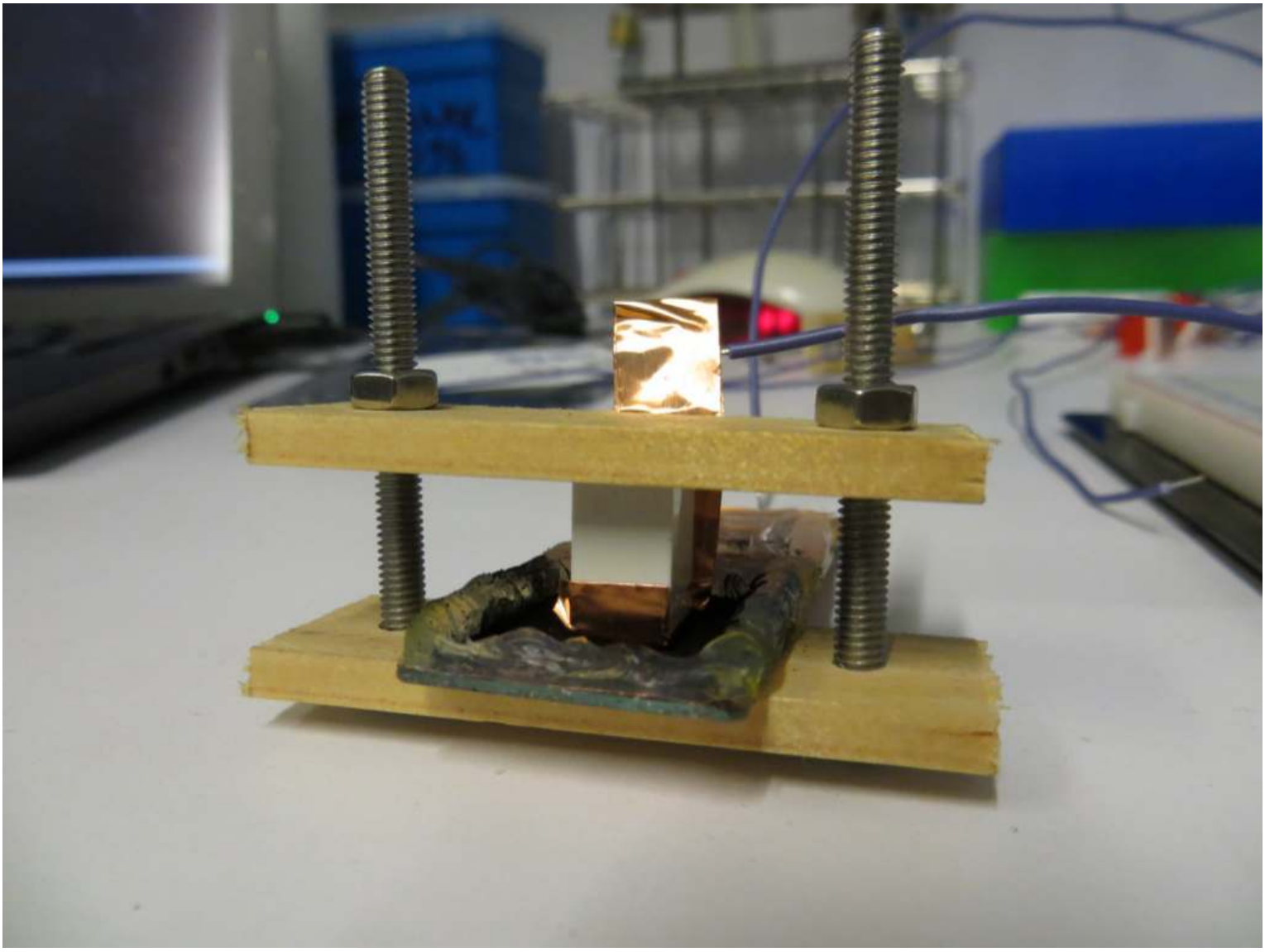
re-Make the world !

P2P Food Lab is not a product. It‘s a cause.

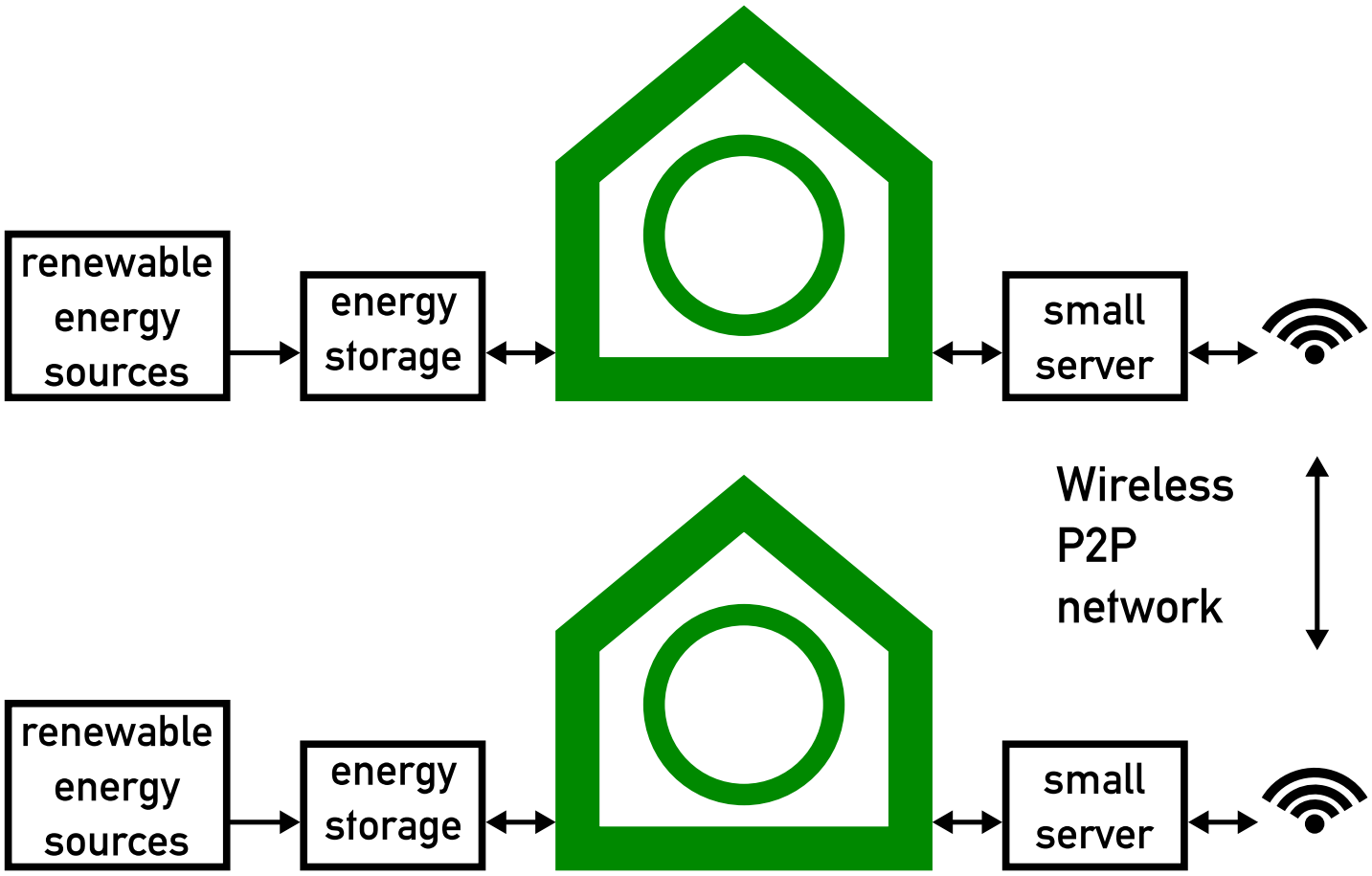




Bio-degradable electronics
(see neighbours)



The greenhouse as an energy and communication hub.



Join the P2P Food Lab project!

Build a greenhouse and tell us your experience.

Improve the design and share it with us.

Grow food and send us the pictures.

Provide tips and help for others on the web site.