



IJduino and beyond

Creating workshops around commodity parts

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ELECTRON JUNCTION

Pixelbar Rotterdam



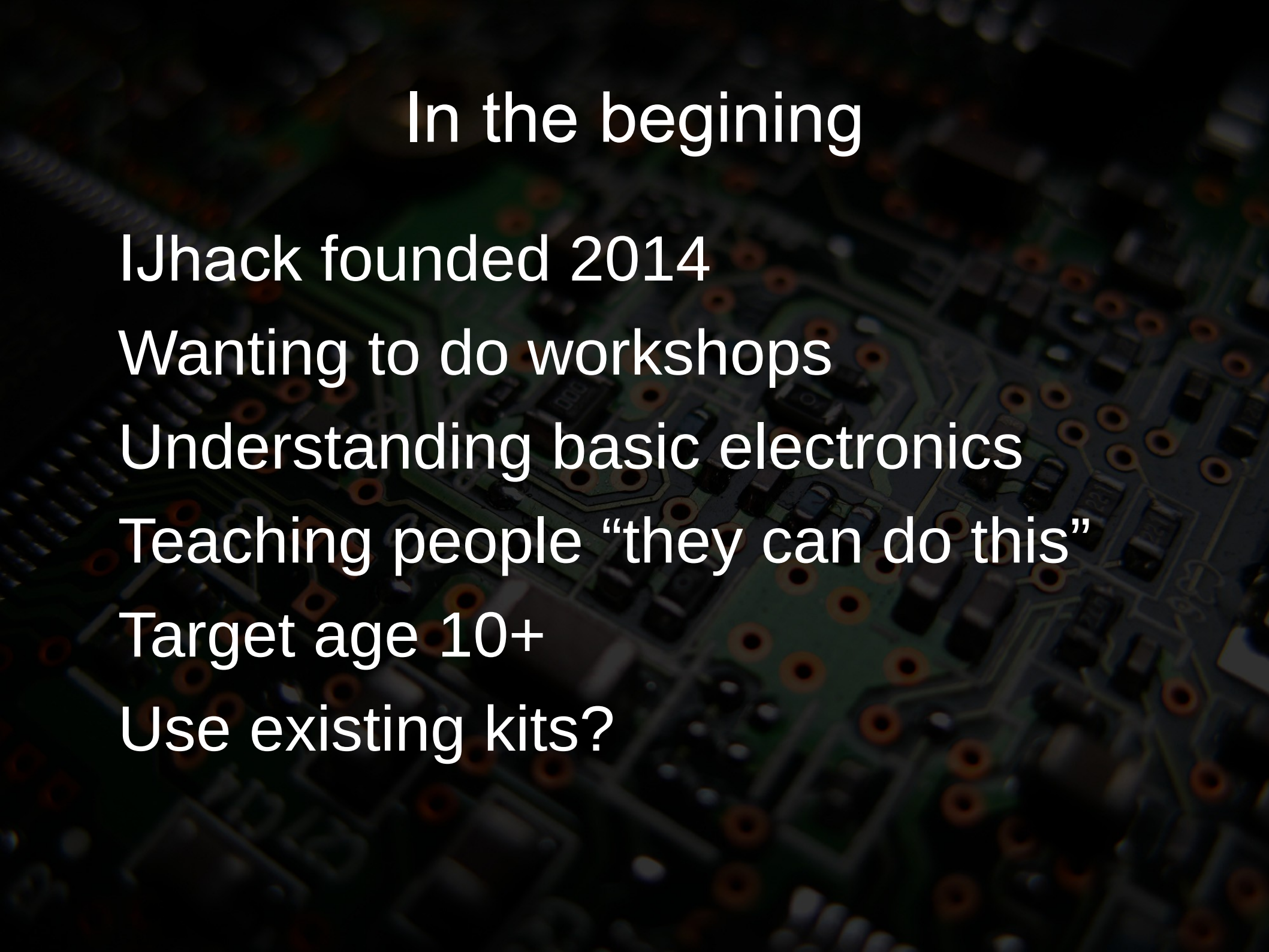
About me

Anne Jan Brouwer

Developer / Hacker

Co-founder of Ijhack

Creator of the IJduino



In the beginning

IJhack founded 2014

Wanting to do workshops

Understanding basic electronics

Teaching people “they can do this”

Target age 10+

Use existing kits?

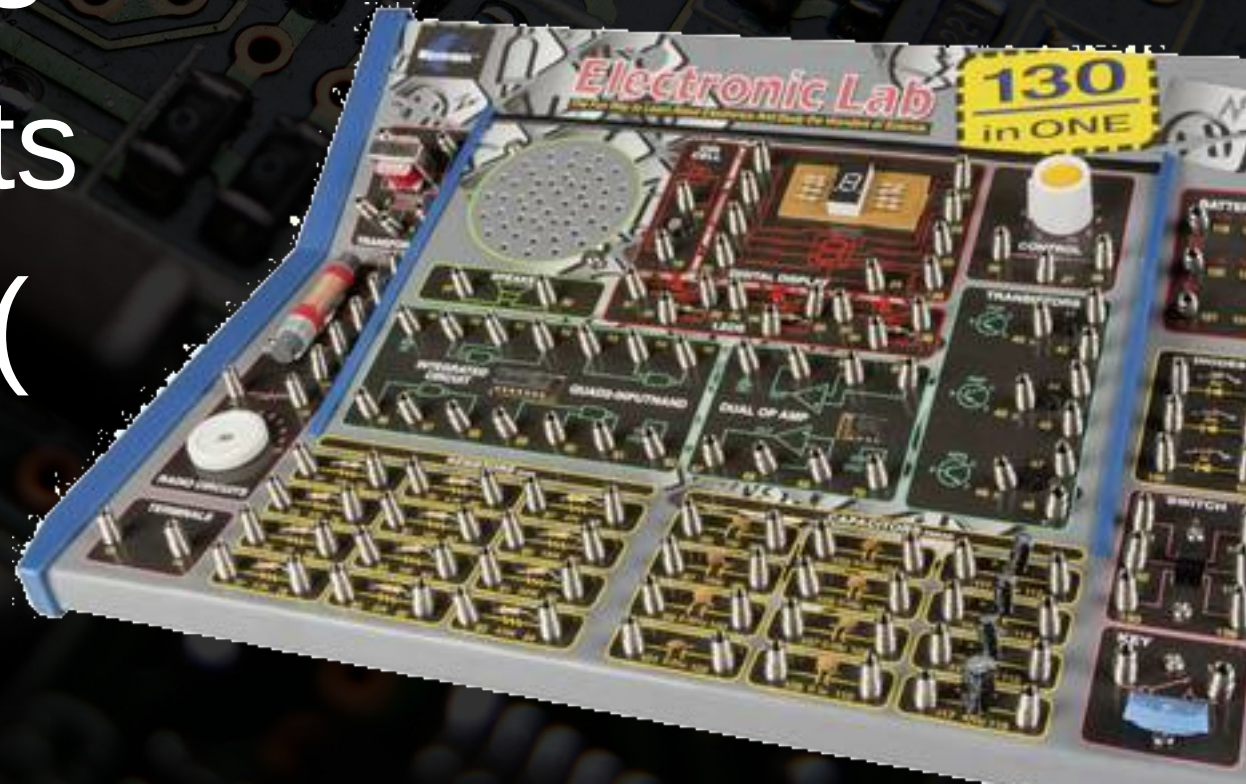
Inspiraion

What we had as kids

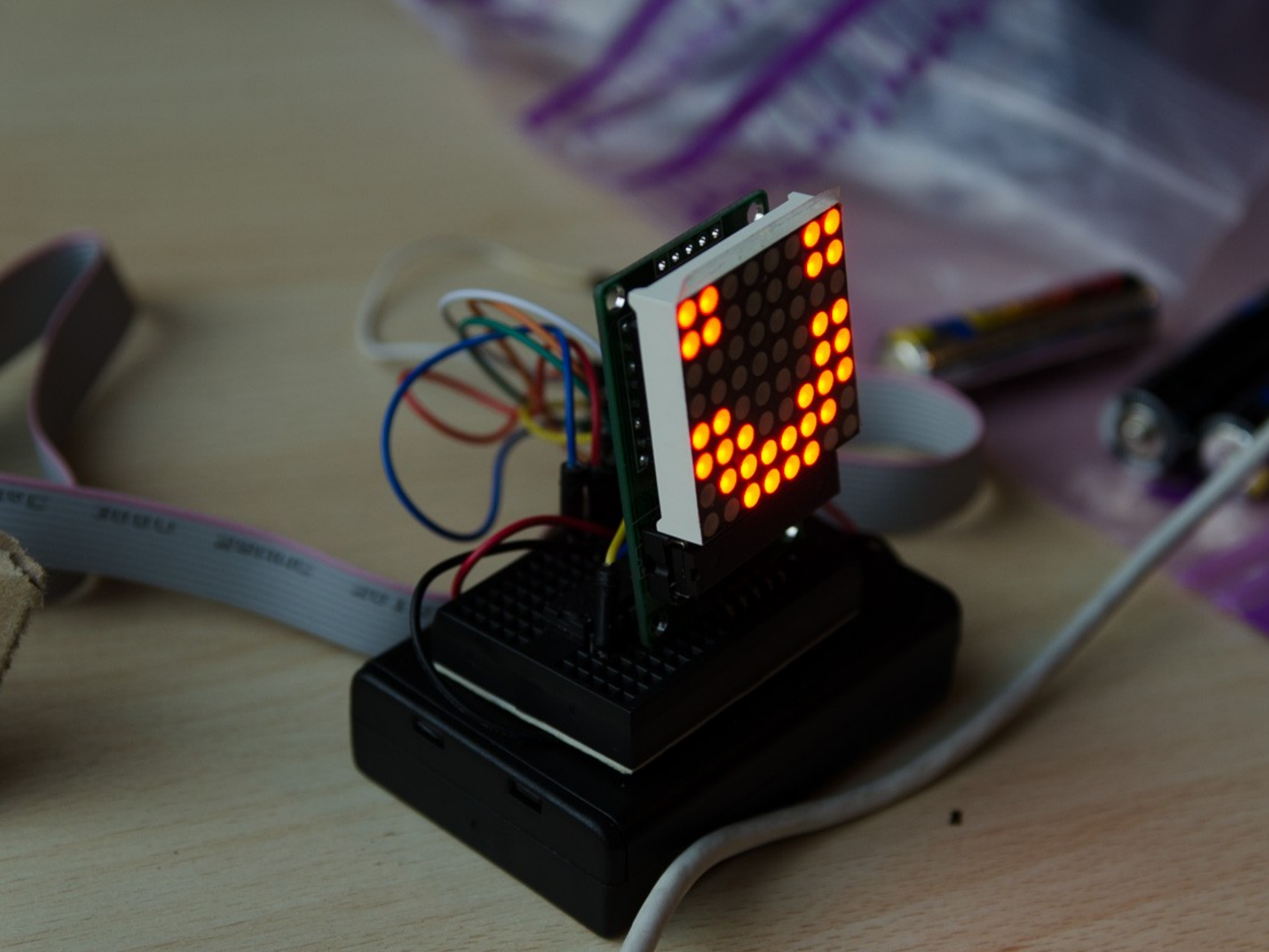
Spring pegs and proto
breadboards

Velleman kits

Expensive :(



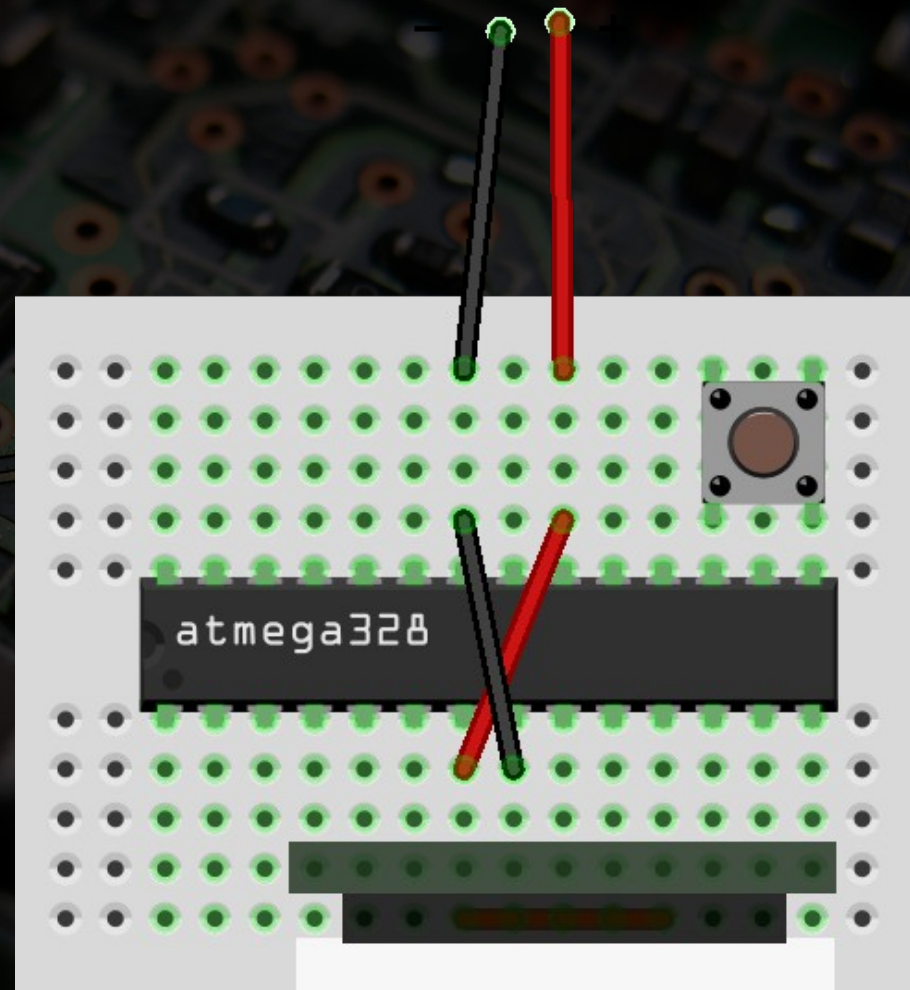




IJduino

Keep it simple

- Mini breadboard
- ATmega328
- Button
- Display
- Battery
- 2 wires



U HACK

fritzing

IJduino

Sourcing parts:

- Local is expensive
- ebay
- Bulk is cheap
- Email the seller for deals
- Get from multiple sources
 - Hedging the risk

IJduino

Cheap:

- Total cost including programmer €10
1 for price of 2
- Sponsoring less fortunate
Doing workshops for free in areas
- Extending with sensors and such
Thermometer, speaker, joystick

IJduino workshops

Soldering

- MAX7219
- Capacitors and resistors

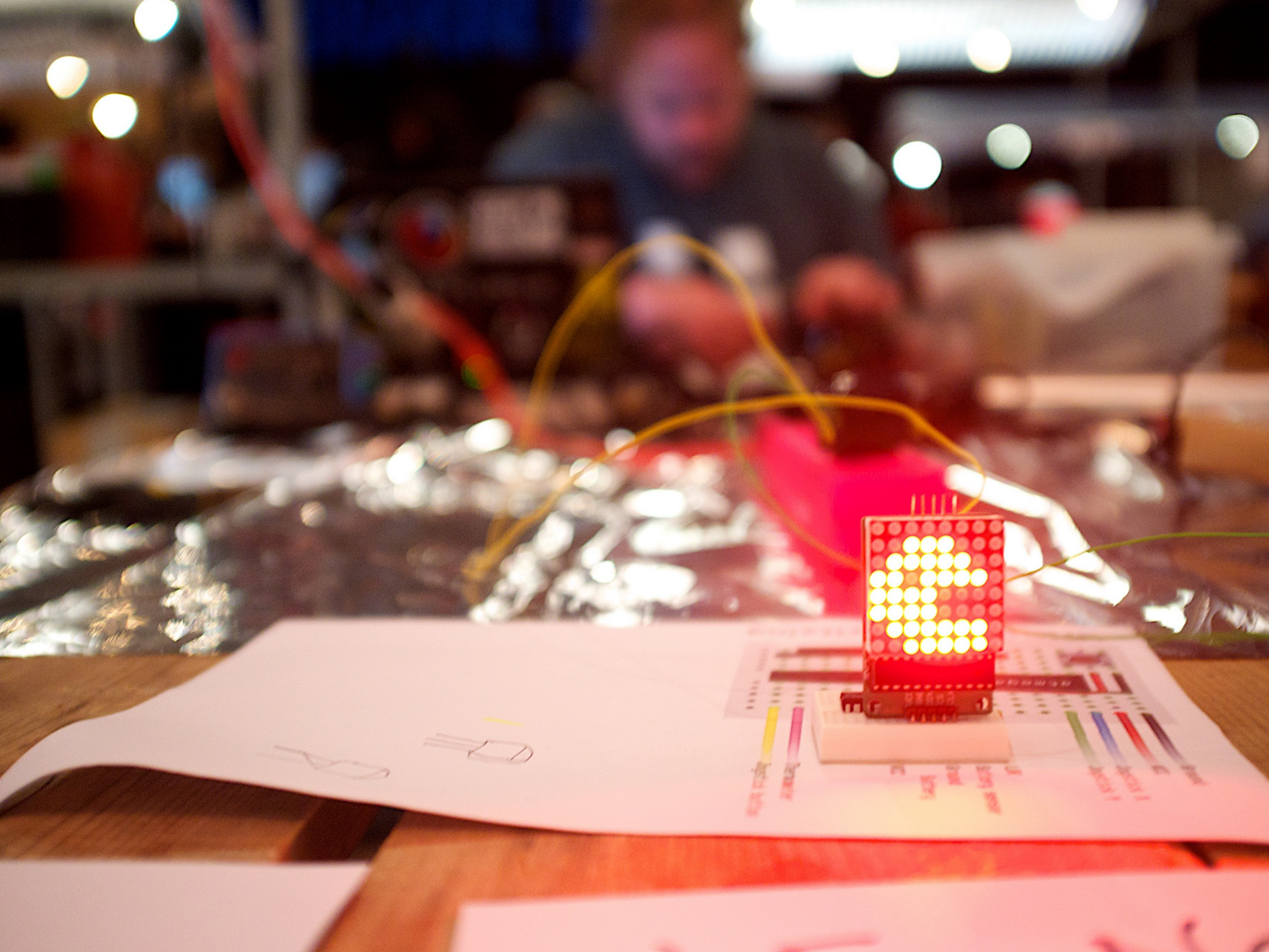
Programming

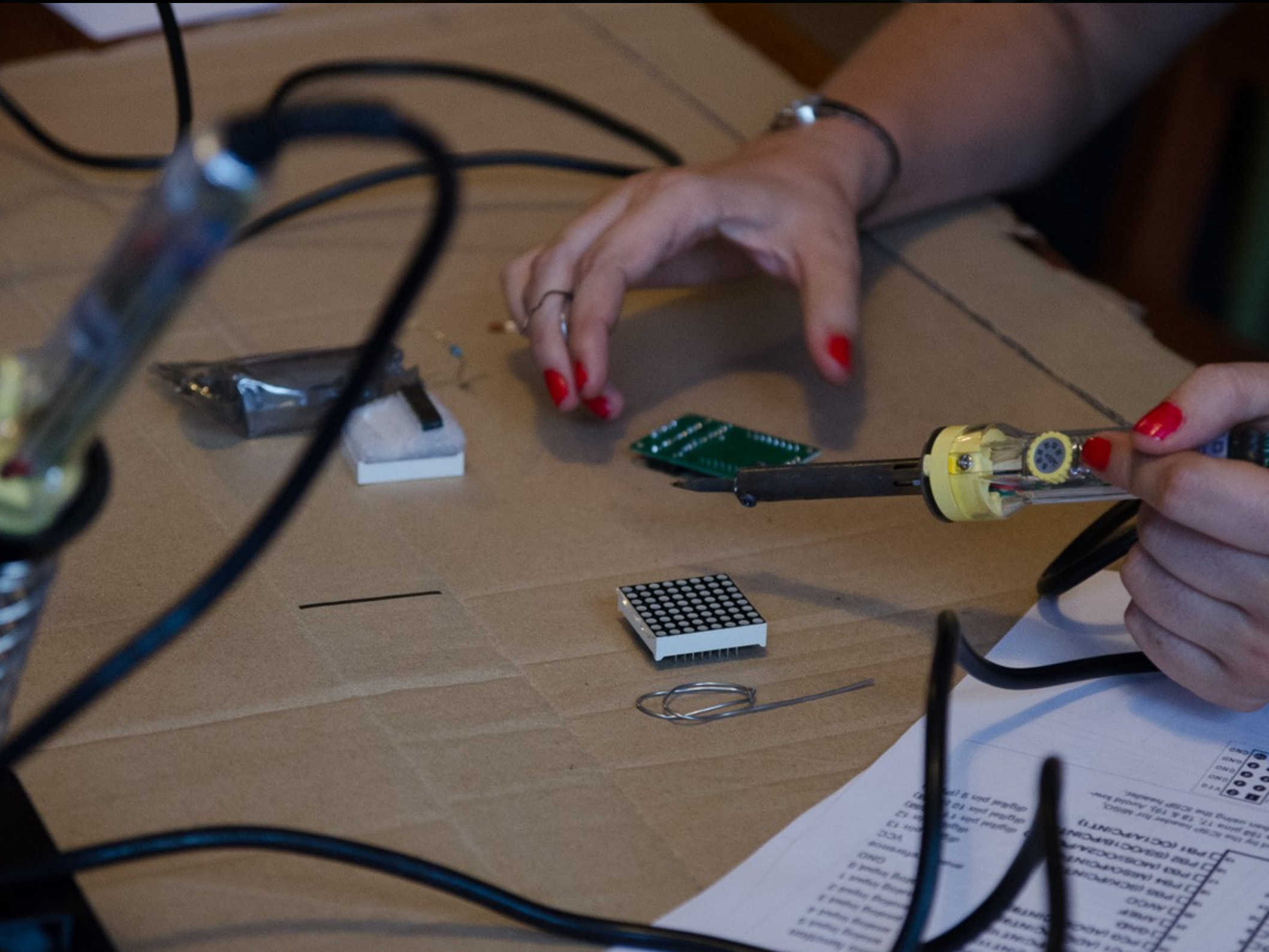
- Animations
- Sensors
- Games

IJduino workshops

What we found out:

- Kids are quicker on the pickup
- Workshops are fun
- Combination of soldering and programming
 - Something for everyone
- Sharing a spark





PCB (PRINTED CIRCUIT BOARD) LAYOUT

Pin 1 (GND)

Pin 2 (VCC)

Pin 3 (GND)

Pin 4 (VCC)

Pin 5 (GND)

Pin 6 (VCC)

Pin 7 (GND)

Pin 8 (VCC)

Pin 9 (GND)

Pin 10 (VCC)

Pin 11 (GND)

Pin 12 (VCC)

Pin 13 (GND)

Pin 14 (VCC)

Pin 15 (GND)

Pin 16 (VCC)

Pin 17 (GND)

Pin 18 (VCC)

Pin 19 (GND)

Pin 20 (VCC)

Pin 21 (GND)

Pin 22 (VCC)

Pin 23 (GND)

Pin 24 (VCC)

Pin 25 (GND)

Pin 26 (VCC)

Pin 27 (GND)

Pin 28 (VCC)

Pin 29 (GND)

Pin 30 (VCC)

Pin 31 (GND)

Pin 32 (VCC)

Pin 33 (GND)

Pin 34 (VCC)

Pin 35 (GND)

Pin 36 (VCC)

Pin 37 (GND)

Pin 38 (VCC)

Pin 39 (GND)

Pin 40 (VCC)

Pin 41 (GND)

Pin 42 (VCC)

Pin 43 (GND)

Pin 44 (VCC)

Pin 45 (GND)

Pin 46 (VCC)

Pin 47 (GND)

Pin 48 (VCC)

Pin 49 (GND)

Pin 50 (VCC)

Pin 51 (GND)

Pin 52 (VCC)

Pin 53 (GND)

Pin 54 (VCC)

Pin 55 (GND)

Pin 56 (VCC)

Pin 57 (GND)

Pin 58 (VCC)

Pin 59 (GND)

Pin 60 (VCC)

Pin 61 (GND)

Pin 62 (VCC)

Pin 63 (GND)

Pin 64 (VCC)

Pin 65 (GND)

Pin 66 (VCC)

Pin 67 (GND)

Pin 68 (VCC)

Pin 69 (GND)

Pin 70 (VCC)

Pin 71 (GND)

Pin 72 (VCC)

Pin 73 (GND)

Pin 74 (VCC)

Pin 75 (GND)

Pin 76 (VCC)

Pin 77 (GND)

Pin 78 (VCC)

Pin 79 (GND)

Pin 80 (VCC)

Pin 81 (GND)

Pin 82 (VCC)

Pin 83 (GND)

Pin 84 (VCC)

Pin 85 (GND)

Pin 86 (VCC)

Pin 87 (GND)

Pin 88 (VCC)

Pin 89 (GND)

Pin 90 (VCC)

Pin 91 (GND)

Pin 92 (VCC)

Pin 93 (GND)

Pin 94 (VCC)

Pin 95 (GND)

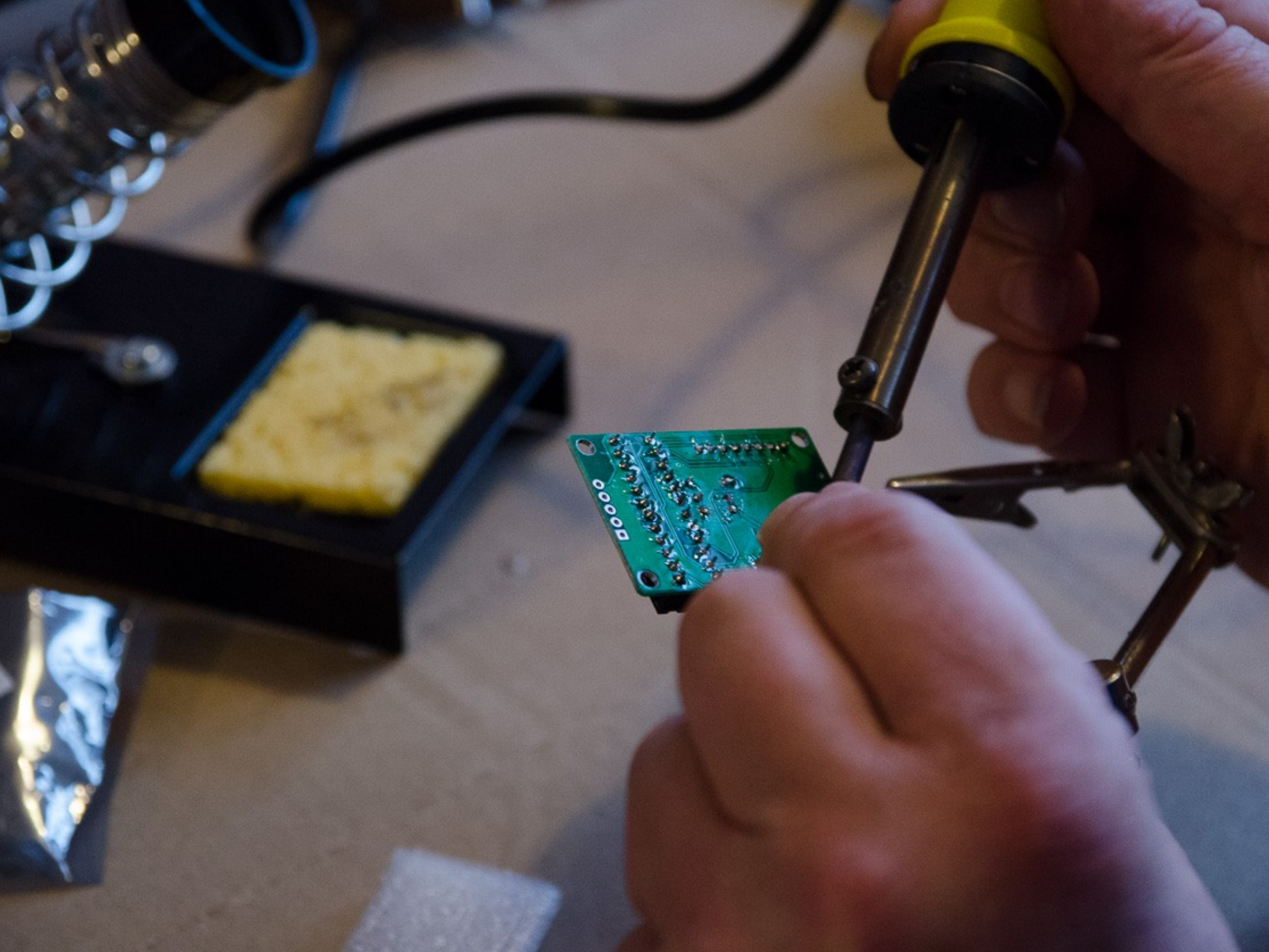
Pin 96 (VCC)

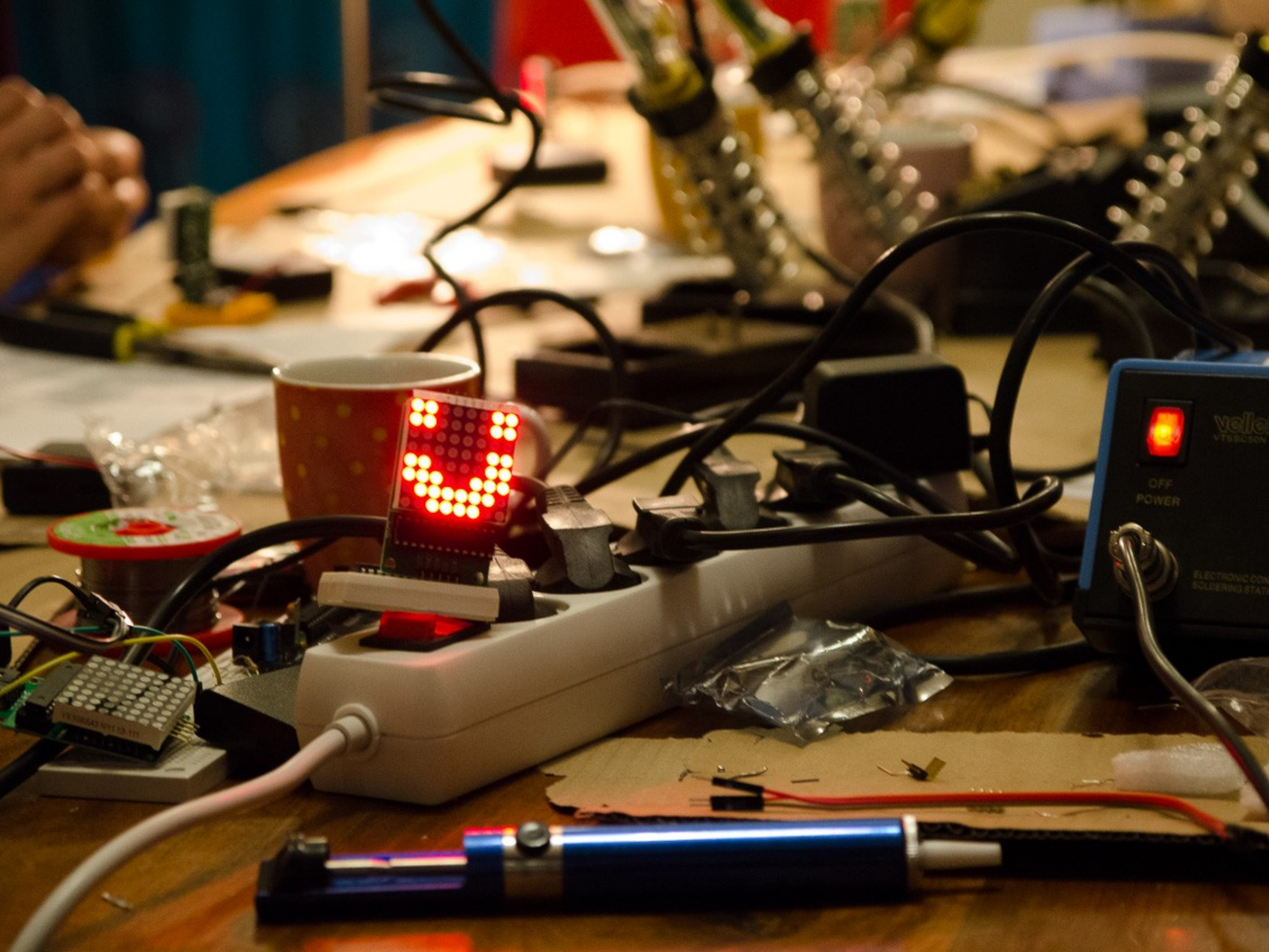
Pin 97 (GND)

Pin 98 (VCC)

Pin 99 (GND)

Pin 100 (VCC)







IJduino addons

Software

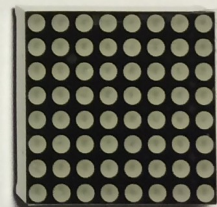
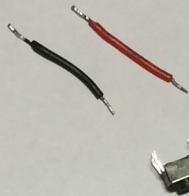
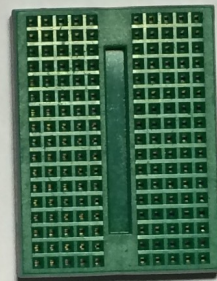
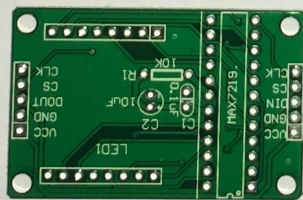
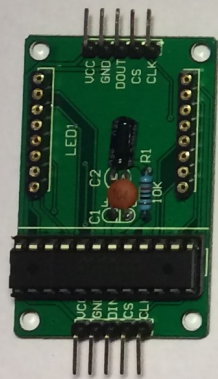
- Games
 - Pong (2 players potentiometer)
 - Tetris (2 screens)
 - FlappIJbird

Adding a second mini breadboard

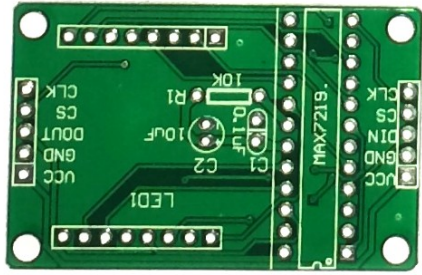
- Sensors
- Basic circuits

Creating the kit

- Documentation
- Pictures
- Step by step
- Proofreading



B



G



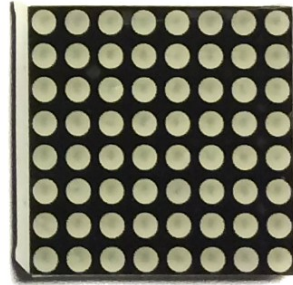
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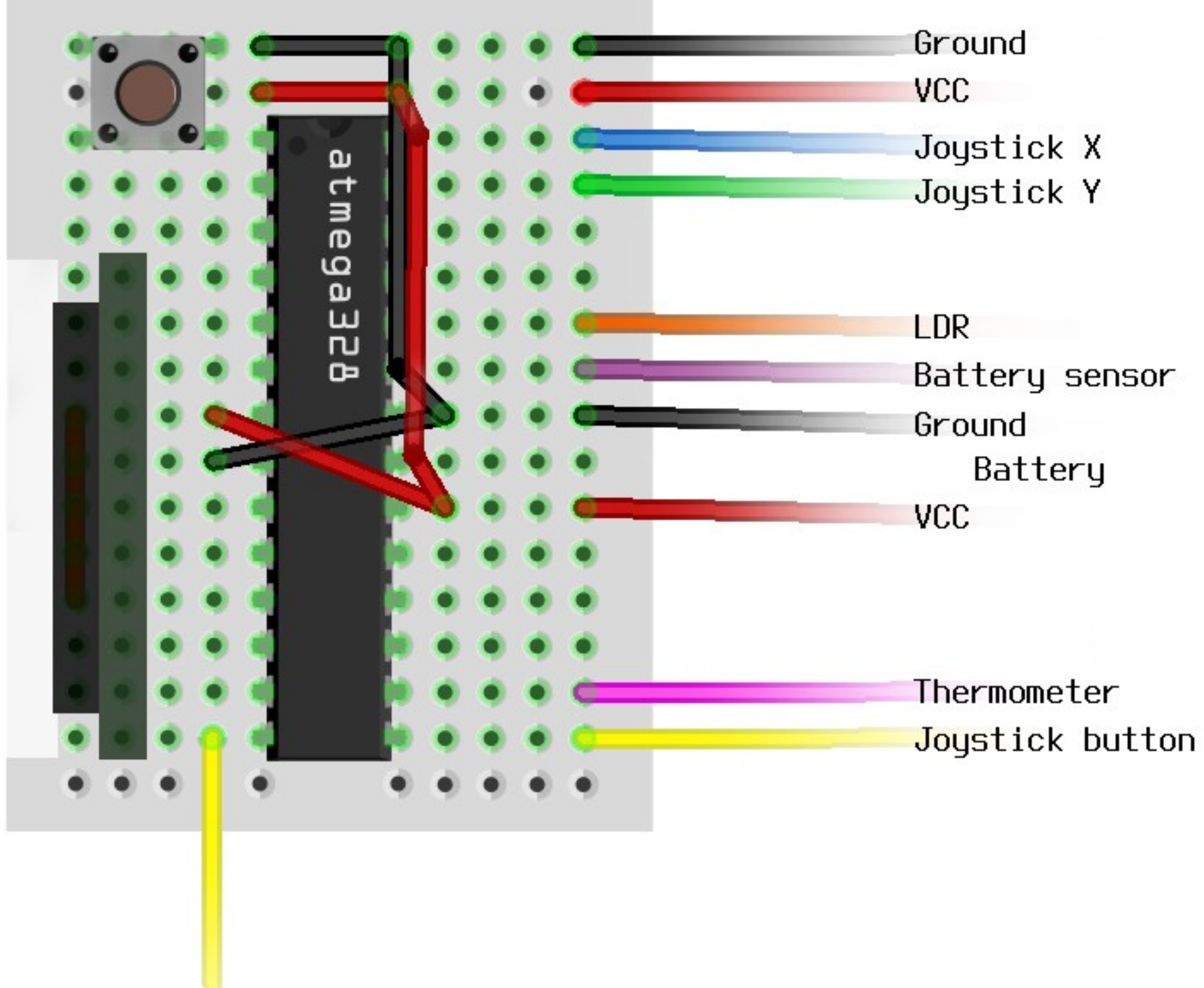
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Spreading

OpenSource

- <https://github.com/IJhack/IJduino>

OpenHardware

- Schema's
- Designs

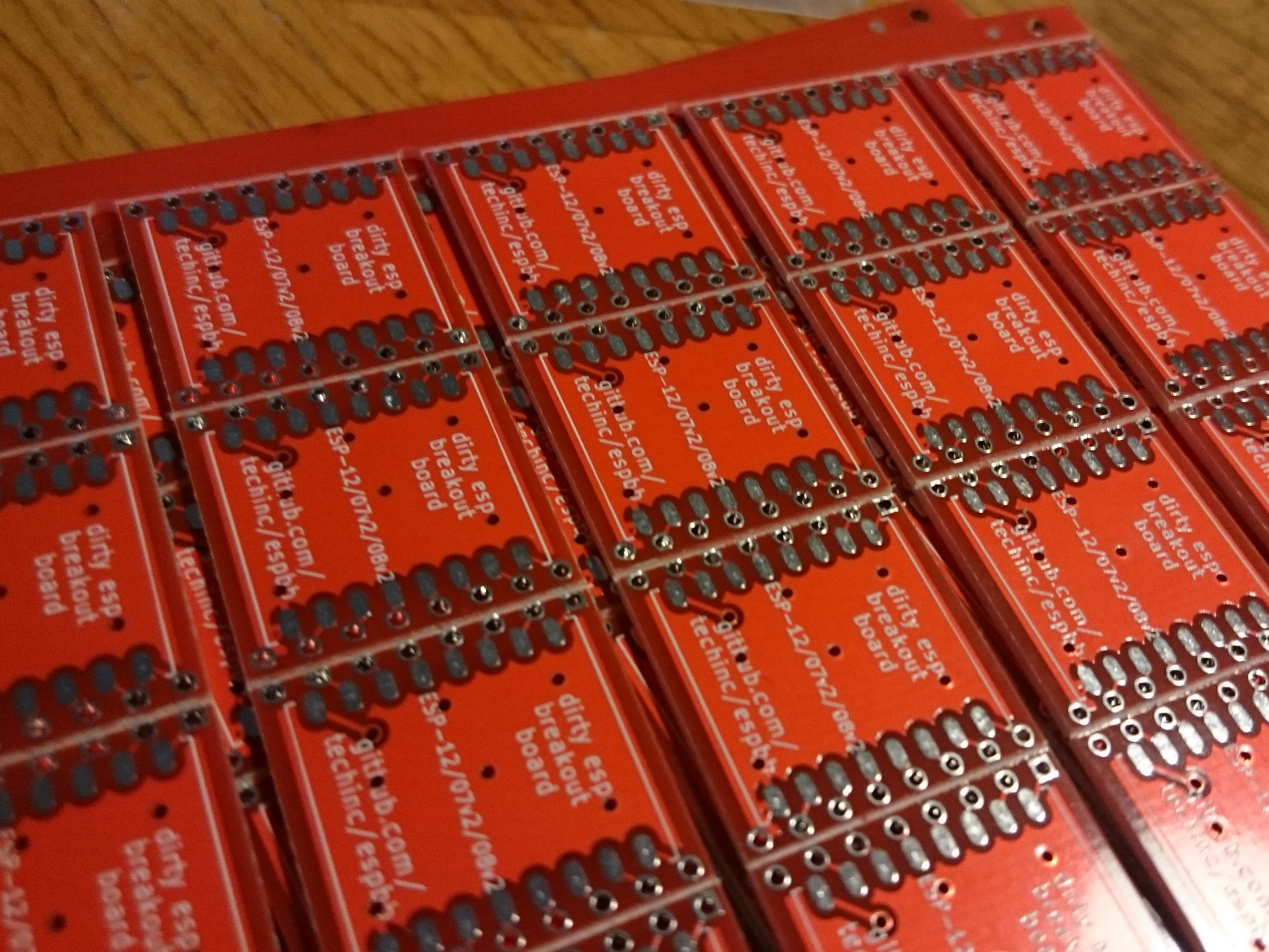
Beyond Arduino

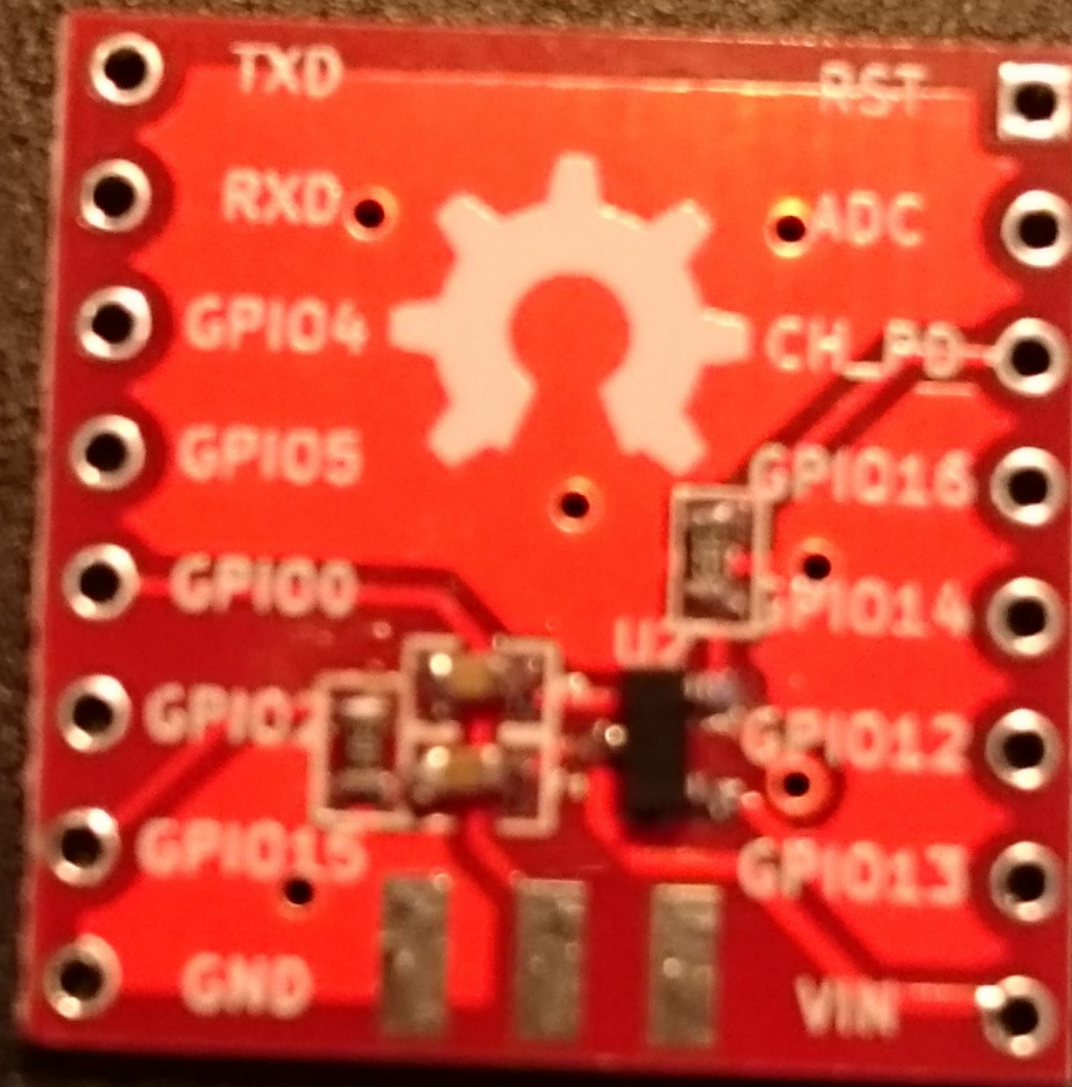
Full analogue

- Incredibly cheap :)
- Takes a lot of time :(

WiFi (IoT)

- ESP8266
- More powerful than the Atmega :)
- Needs a breakout :(





Issues

- SMD is too much of a step up
- Minimal clearance nice for breadboard
- Hard for people
- ESP32 programming is . . . challenging
- Could be done now with Arduino ESP

Lessons learned

- Creating workshops is fun
- All it takes is some time
- Don't undersell your kits
- Keep going

Keep going :)

Questions

