JavaScript on Microcontrollers

I am Niels Leenheer

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I’m from
The Netherlands

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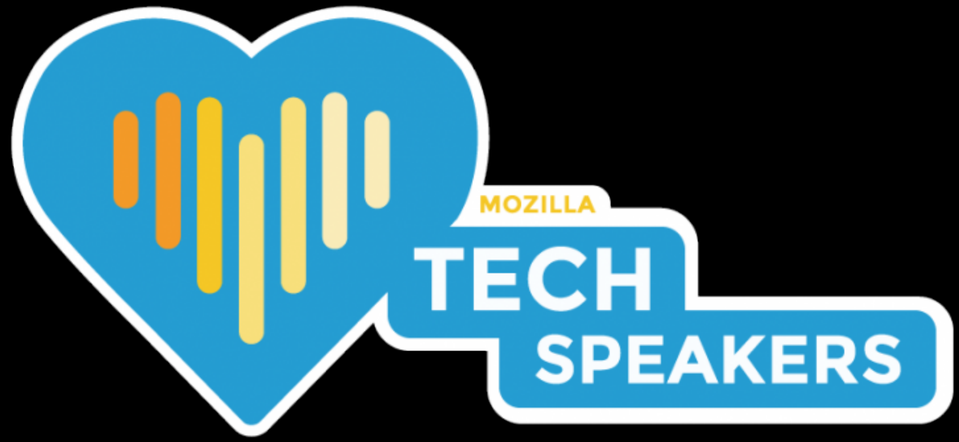
The Netherlands

fun with
bluetooth
161

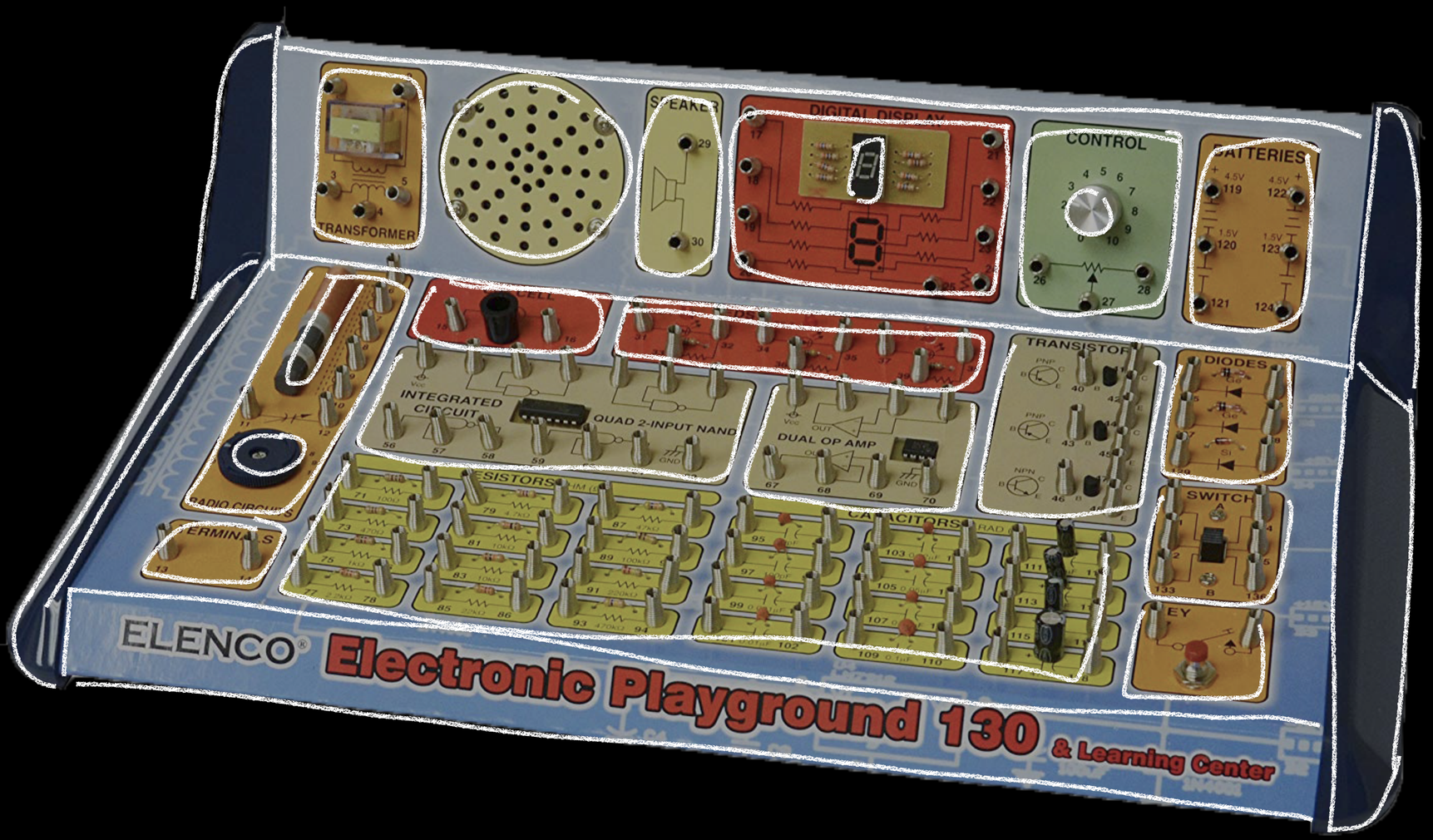
Experts
2019
Web Technologies
GDE

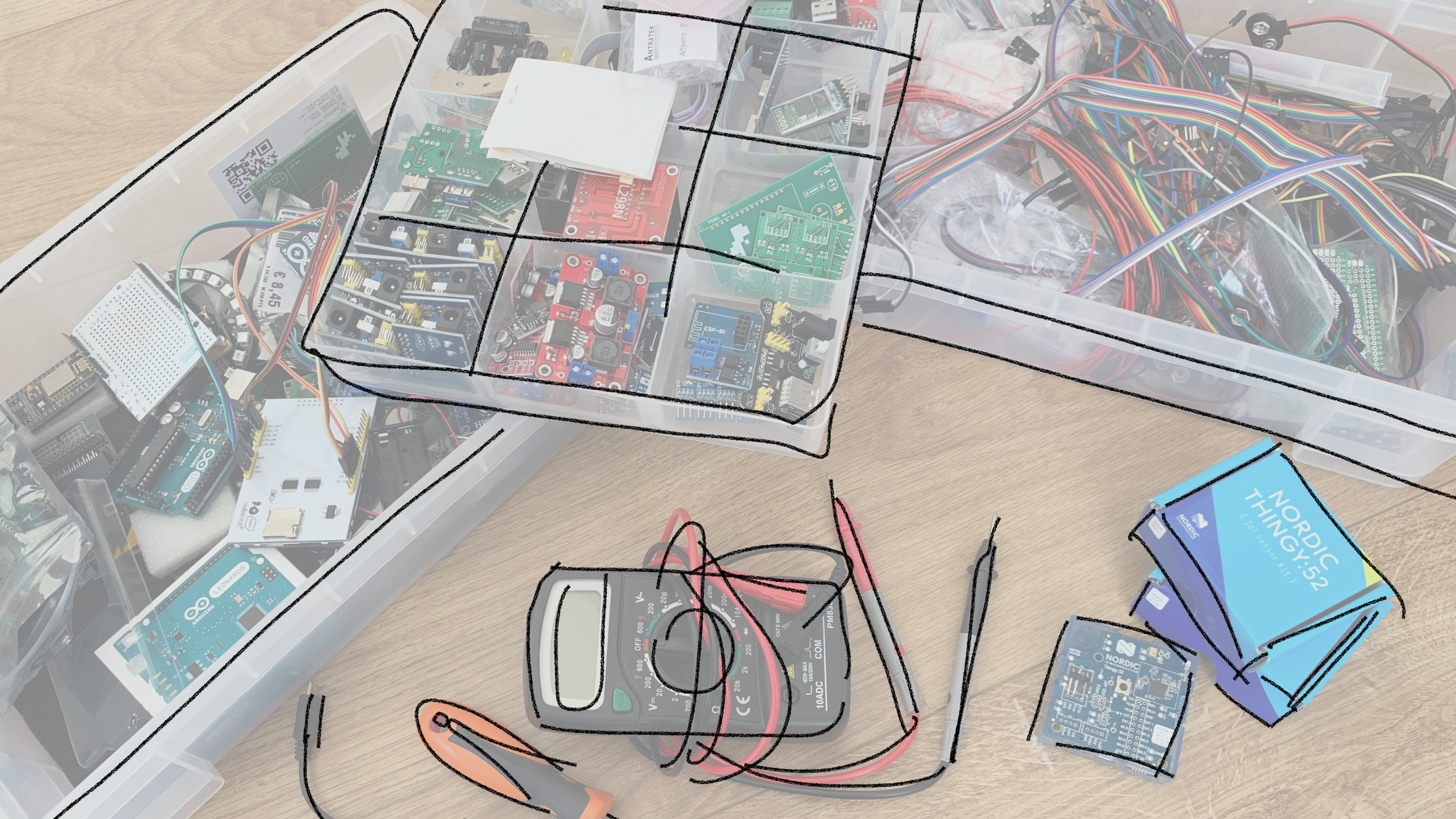

MOZILLA
TECH
SPEAKERS

I tweet at @html5test

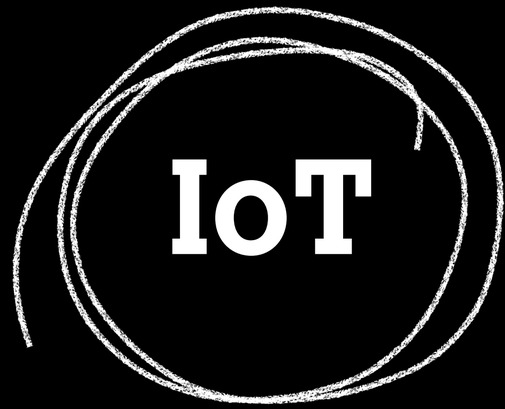
I the web

I electronics


TRANSFORMER
SPEAKER
DIGITAL DISPLAY
CONTROL
BATTERIES
INTEGRATED CIRCUIT
QUAD 2-INPUT NAND
DUAL OP AMP
TRANSISTORS
DIODES
SWITCH
KEY
ELENCO®
Electronic Playground 130
& Learning Center


L298N
ESP-01
ARDUINO
LEONARDO
NORDIC
THINGY:52
(IoT Sensor Kit)
10ADC
COM

Why should I care about this?

electronics + web = 

JavaScript on Microcontrollers

but . . .

Microcontrollers are slow.

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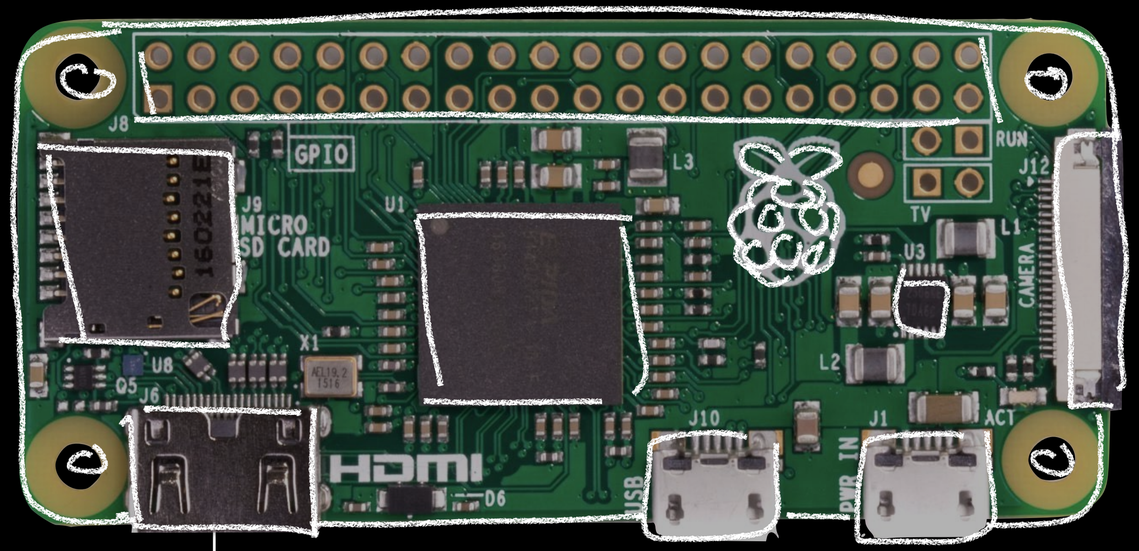
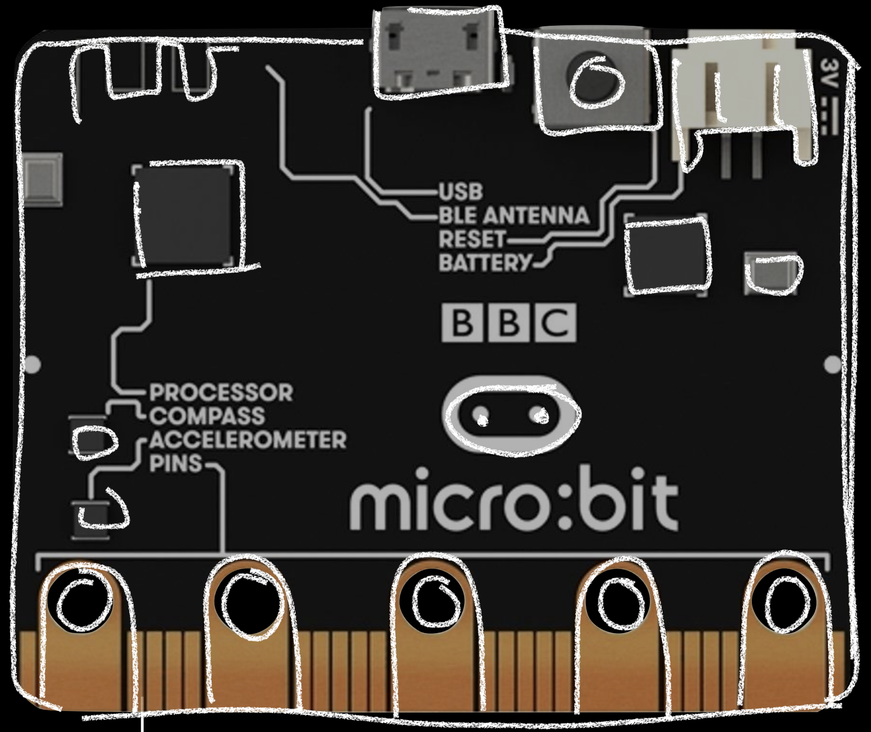
Microcontrollers are slow.



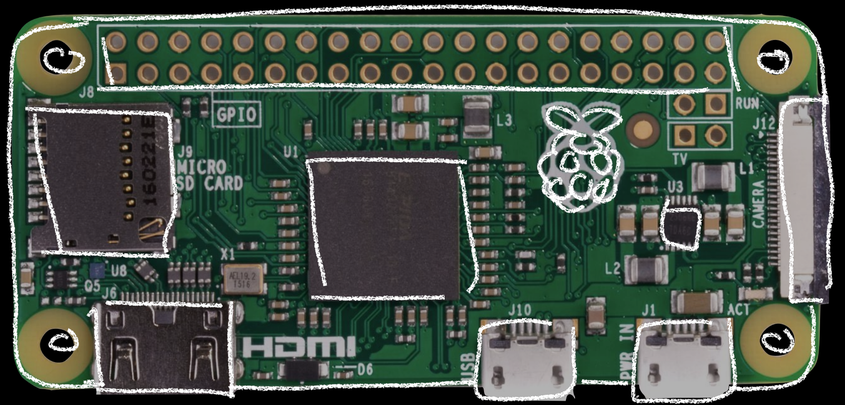
Raspberry Pi Zero W

1 GHz CPU and 512MB RAM

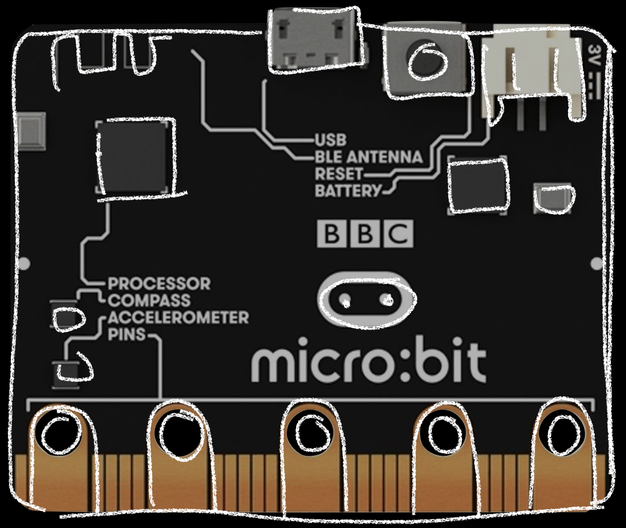


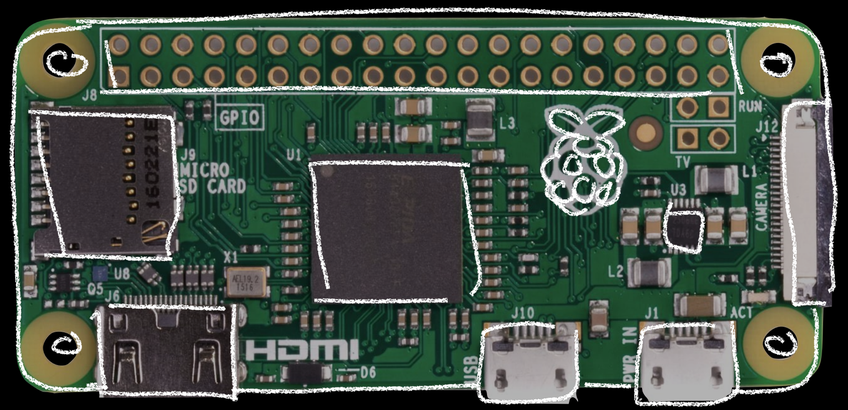
micro:bit

16 MHz CPU and 16KB RAM

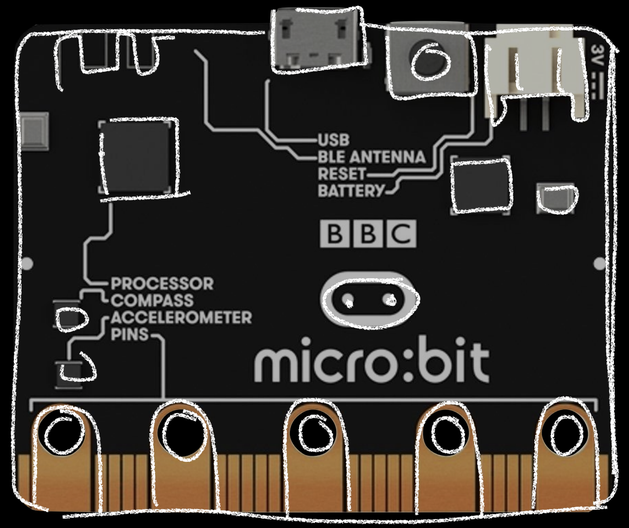

GPIO
MICRO SD CARD
HDMI
RUN
TV
CAMERA
ACT
PWR IN
USB

60 x faster


USB
BLE ANTENNA
RESET
BATTERY
BBC
PROCESSOR
COMPASS
ACCELEROMETER
PINS
micro:bit
3V



30.000 x memory



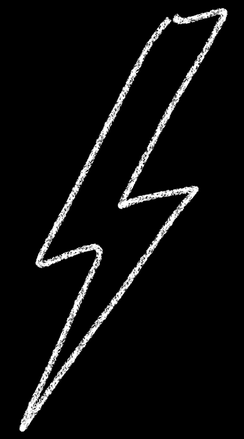
“

JavaScript on microcontrollers? Are you crazy?

Me – two years ago

Microcontrollers are very power efficient.

Microcontrollers are very power efficient.



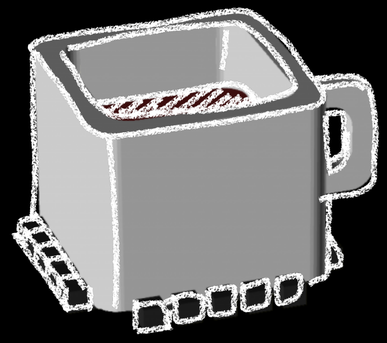
Microcontrollers only need to be fast enough to solve the probem.

Microcontrollers only need to be fast enough to solve the probem.

Microcontrollers do not have an operating system.

Microcontrollers do not need 45 seconds to boot.

how?



Espruino

Espruino is a JavaScript interpreter for microcontrollers.

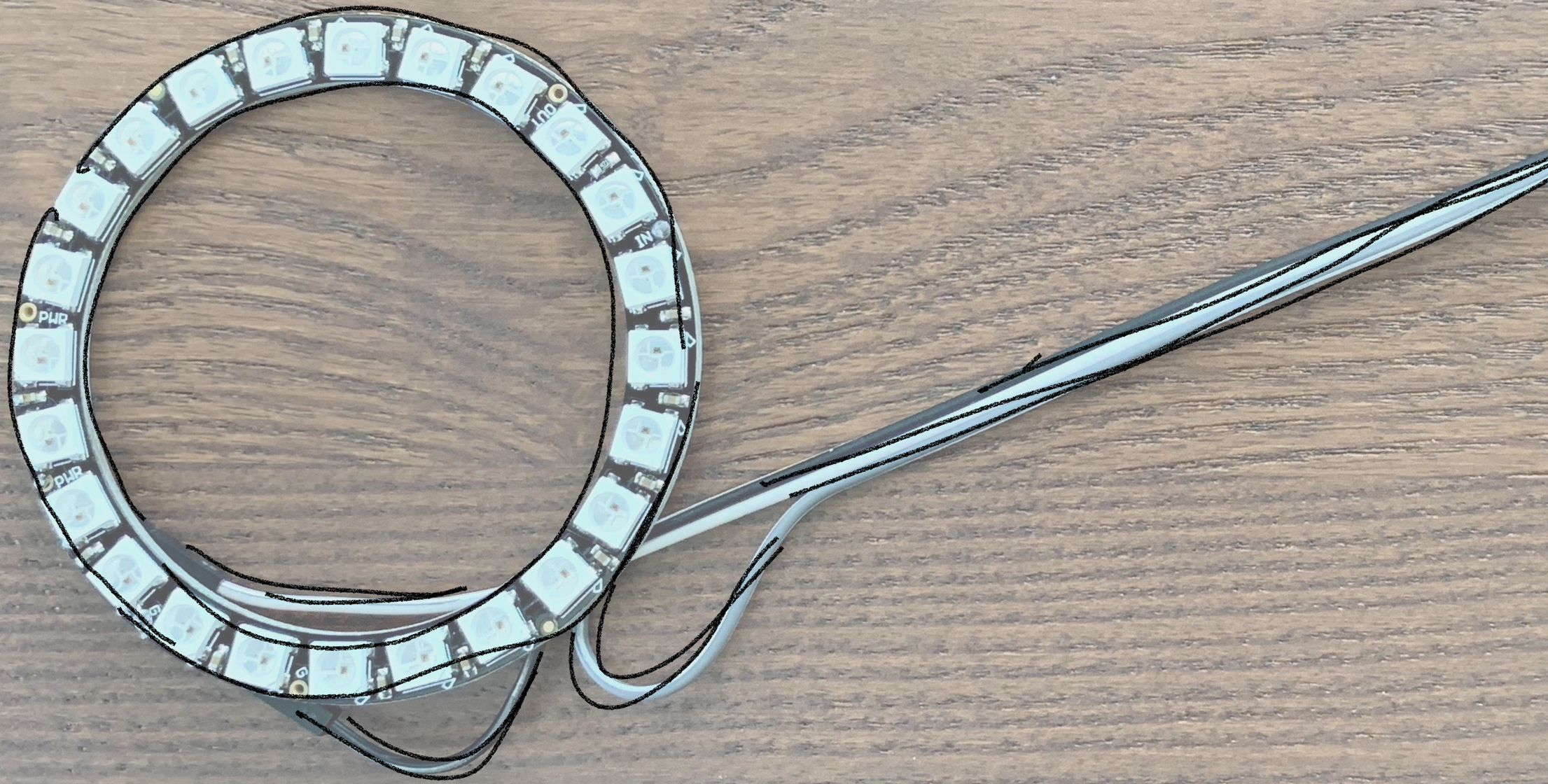
demo

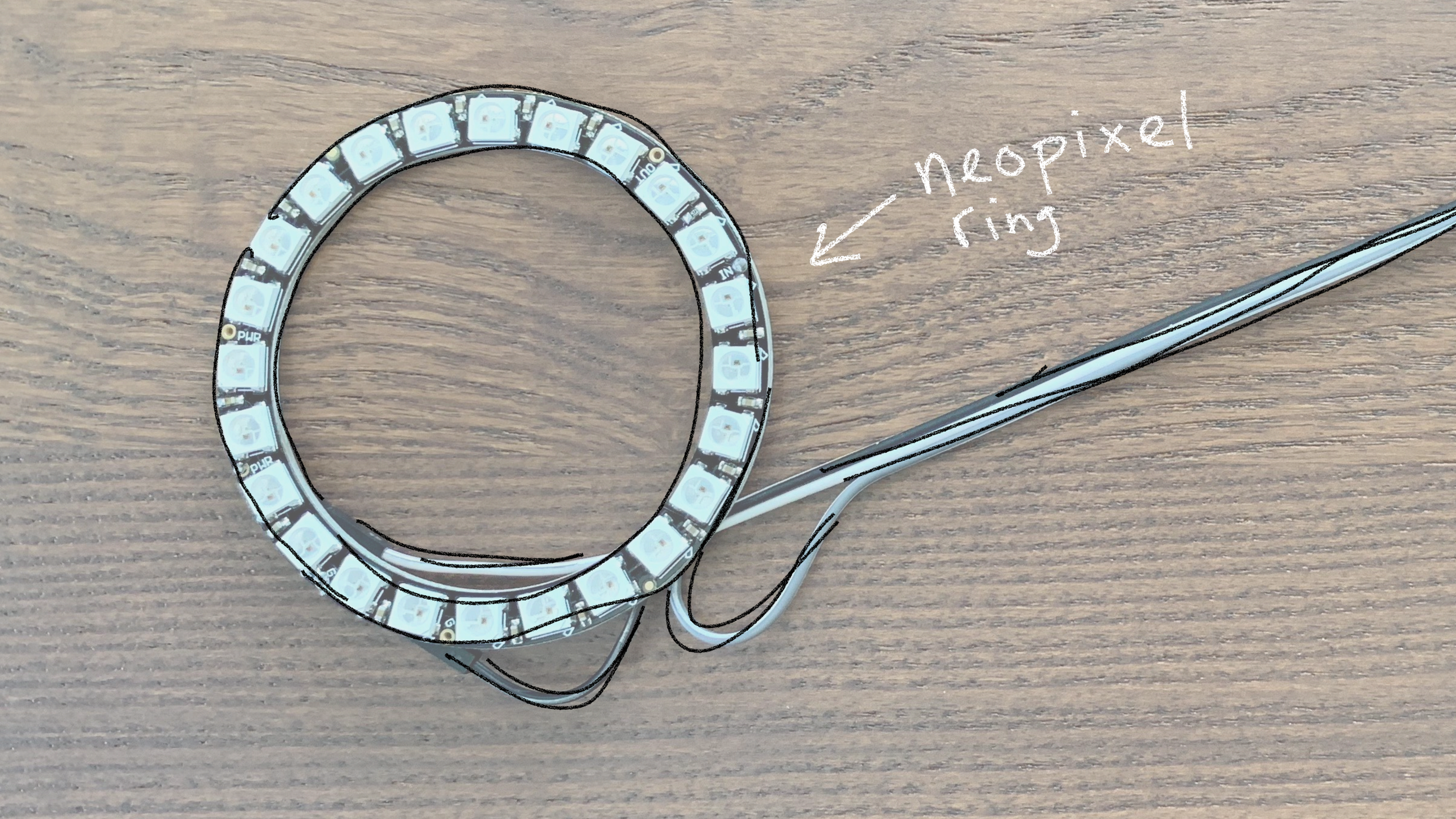
Experimental technology

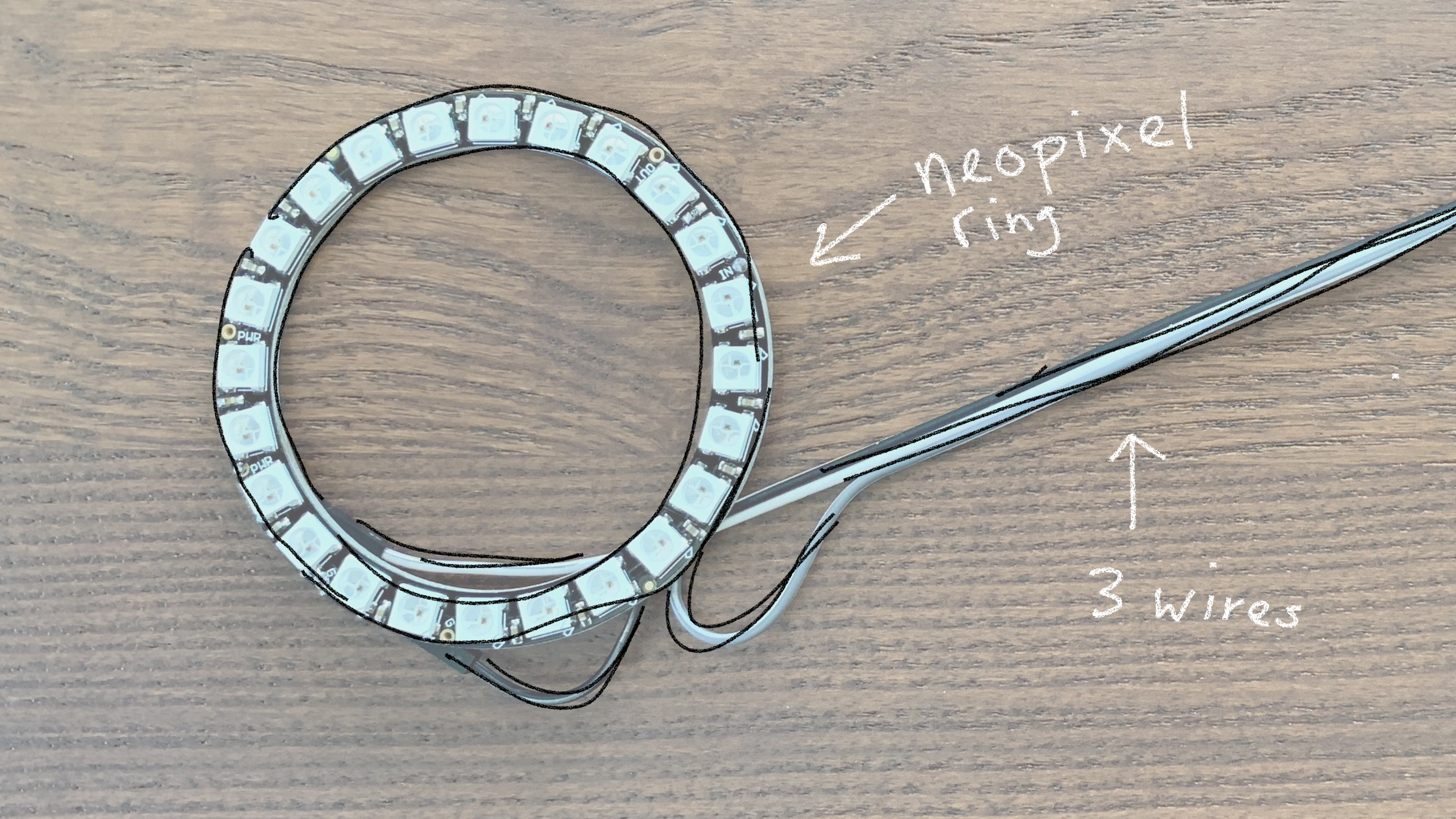
Setting low expectations

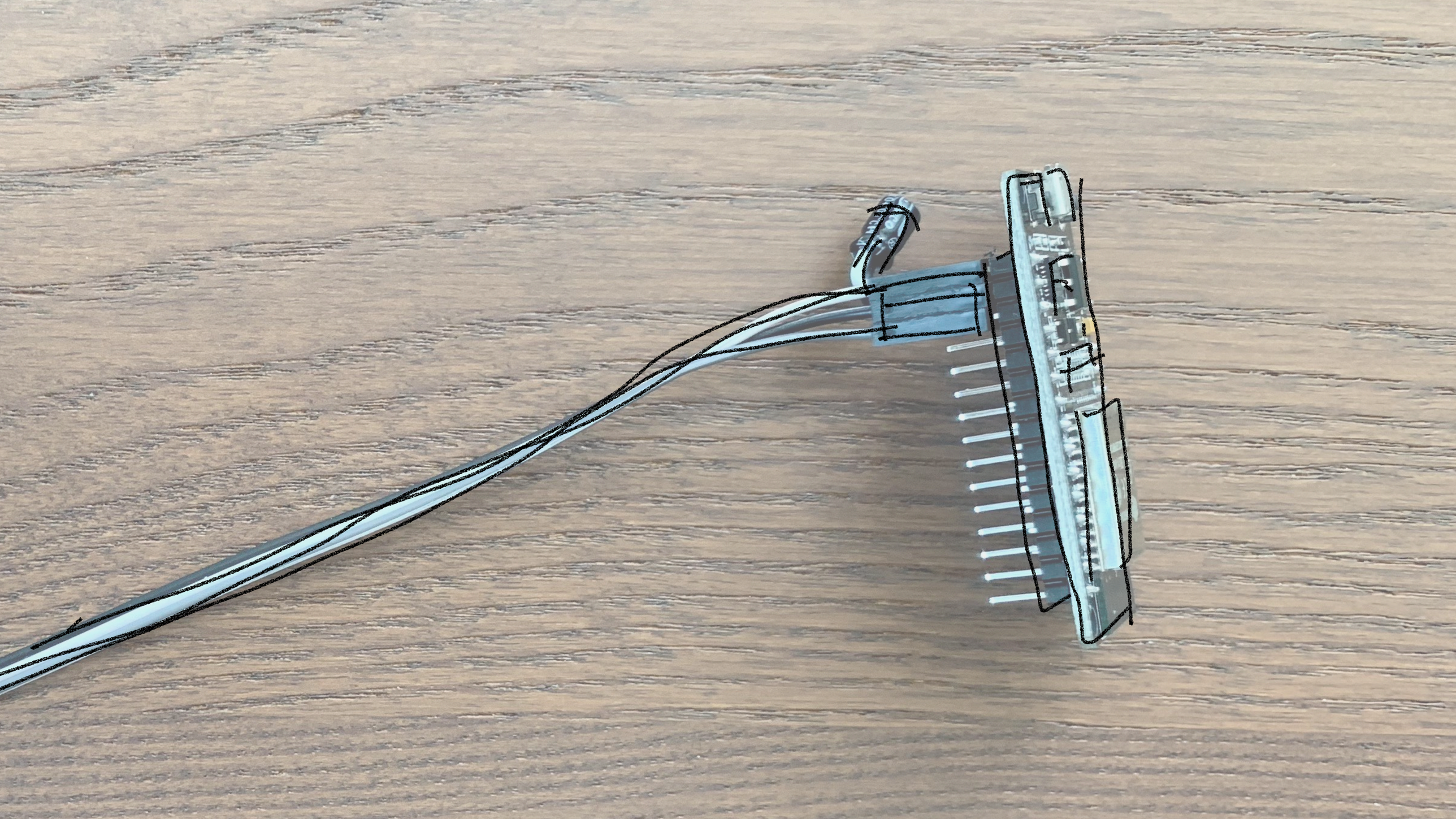
#1

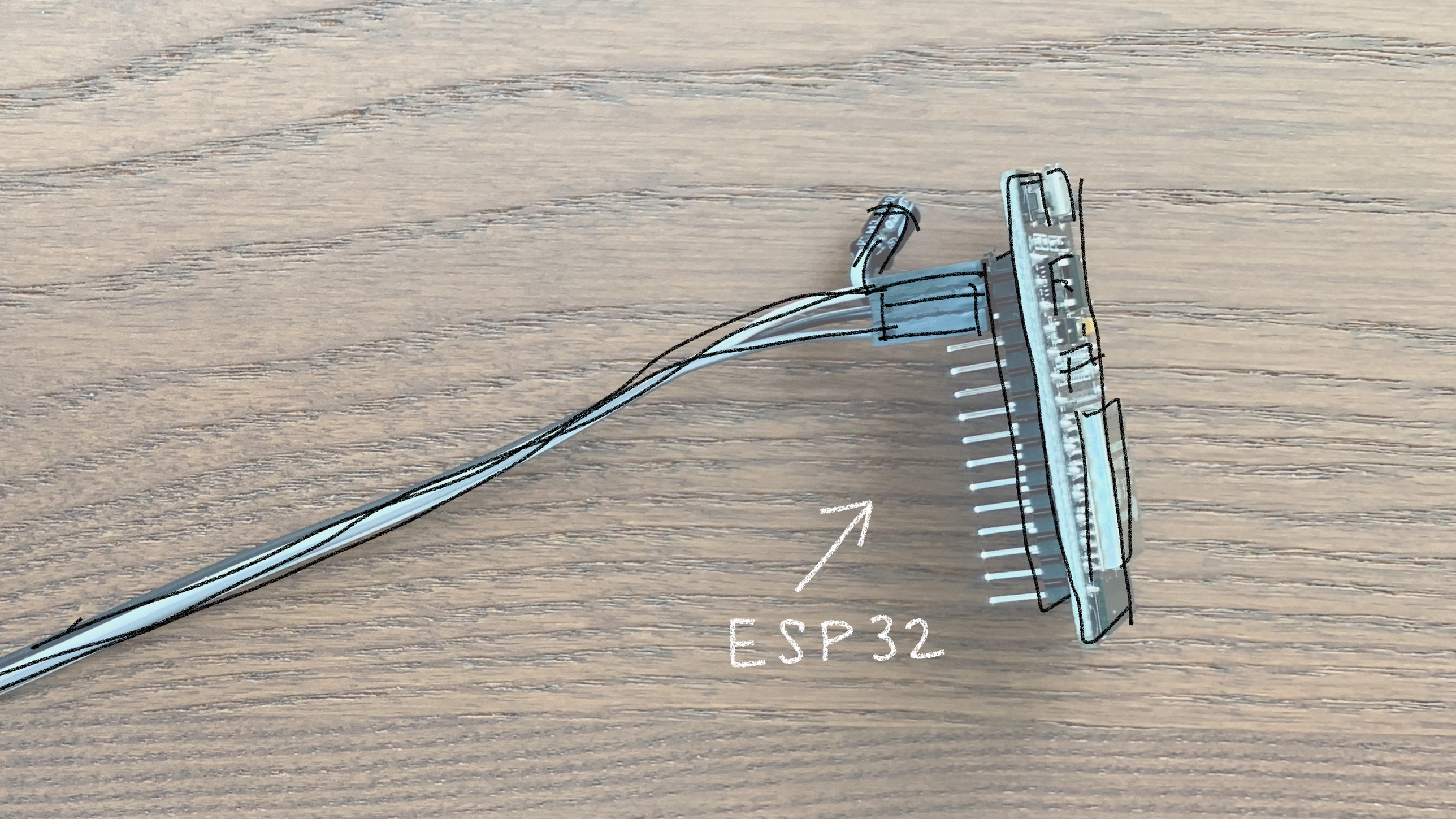
Connected lightbulb


OUT
IN
PWR
PWR


neopixel
ring
PWR
PWR
IN
OUT


neopixel ring
3 wires

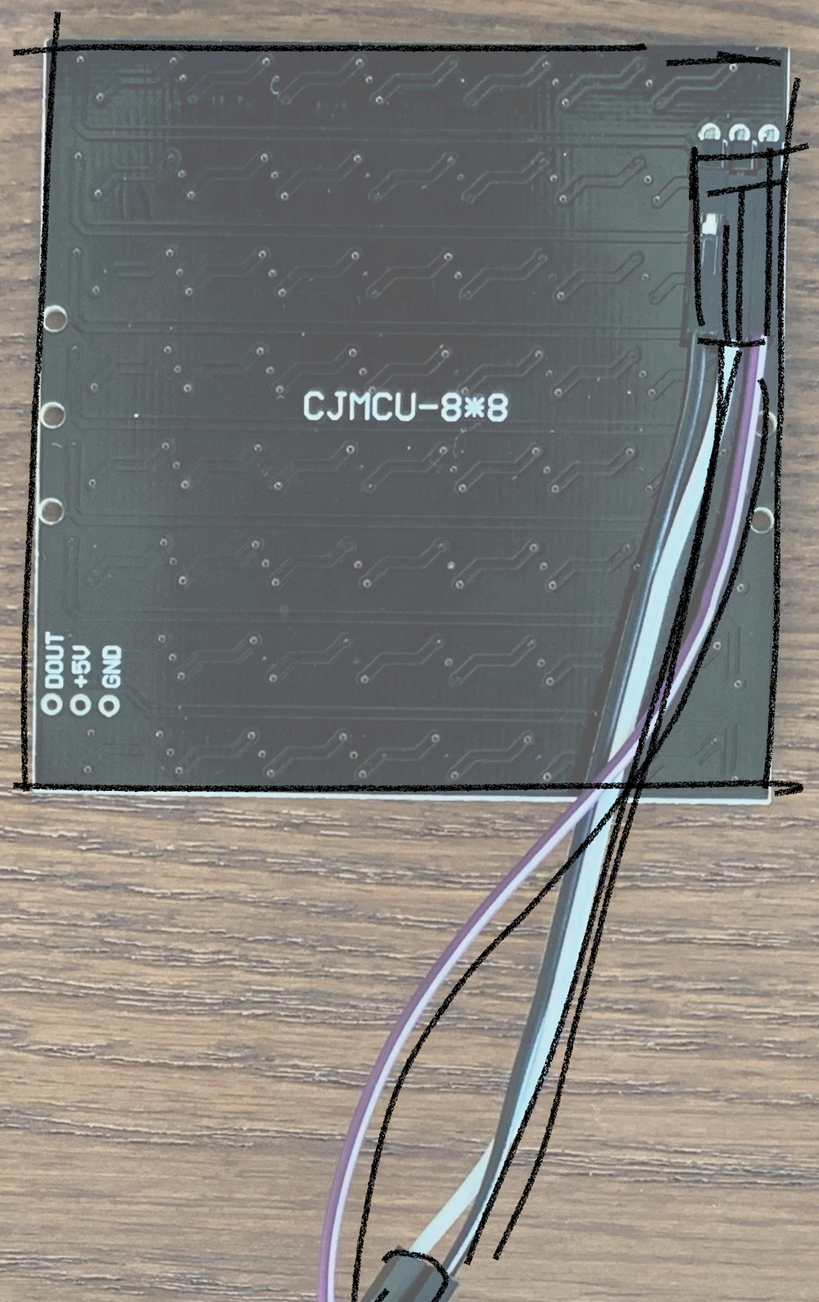


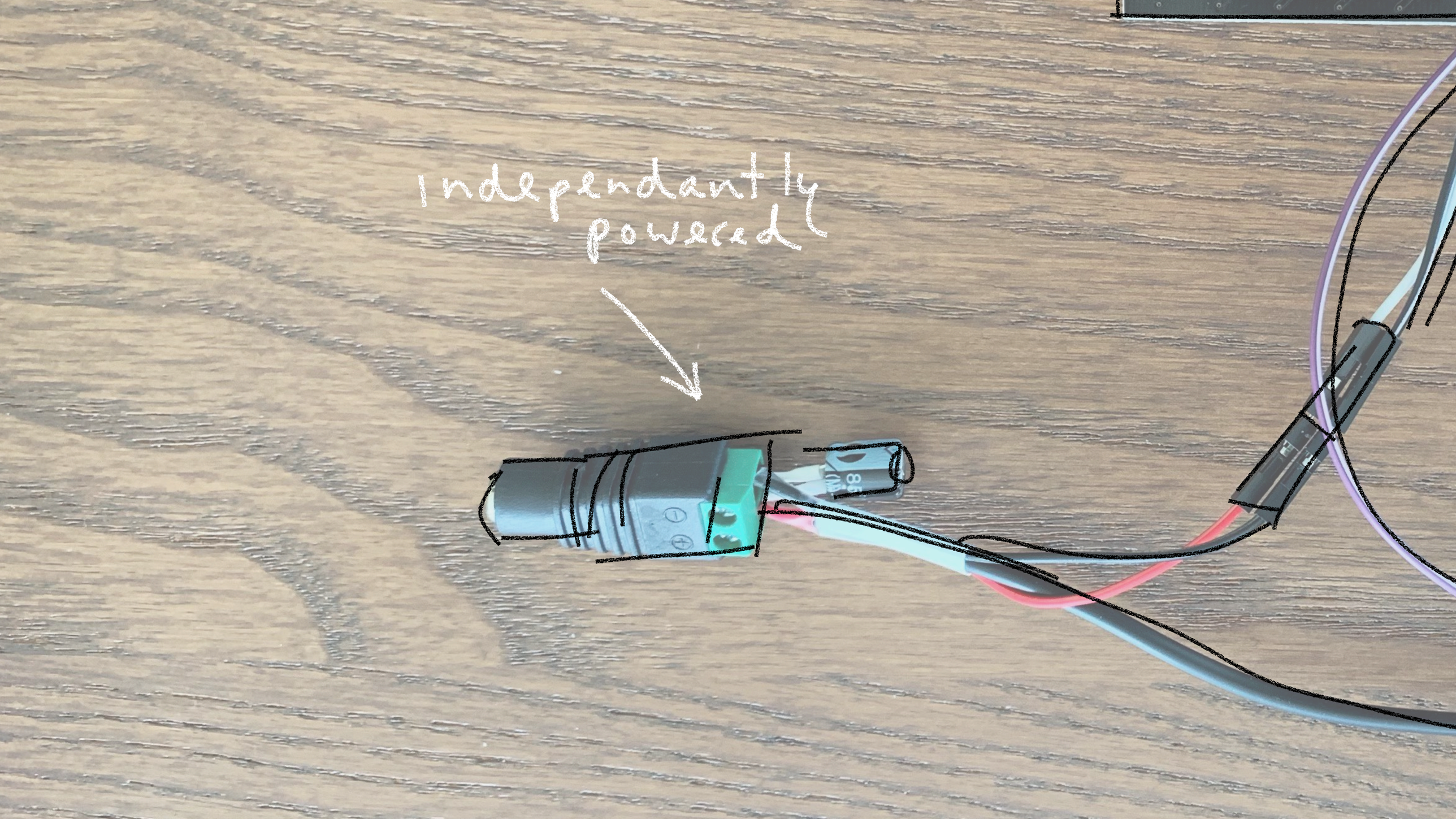

ESP32

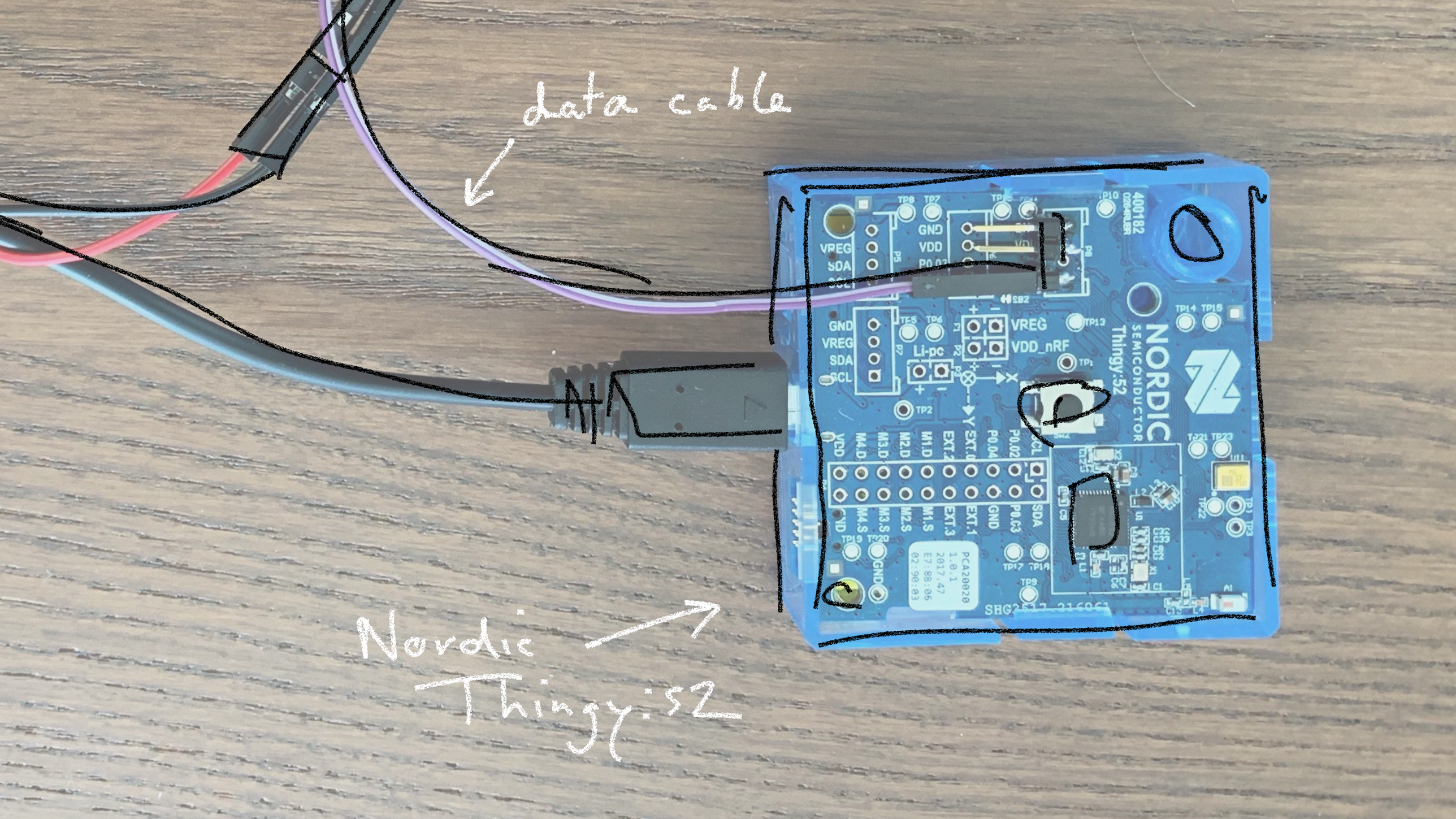
#2

Pixelart display

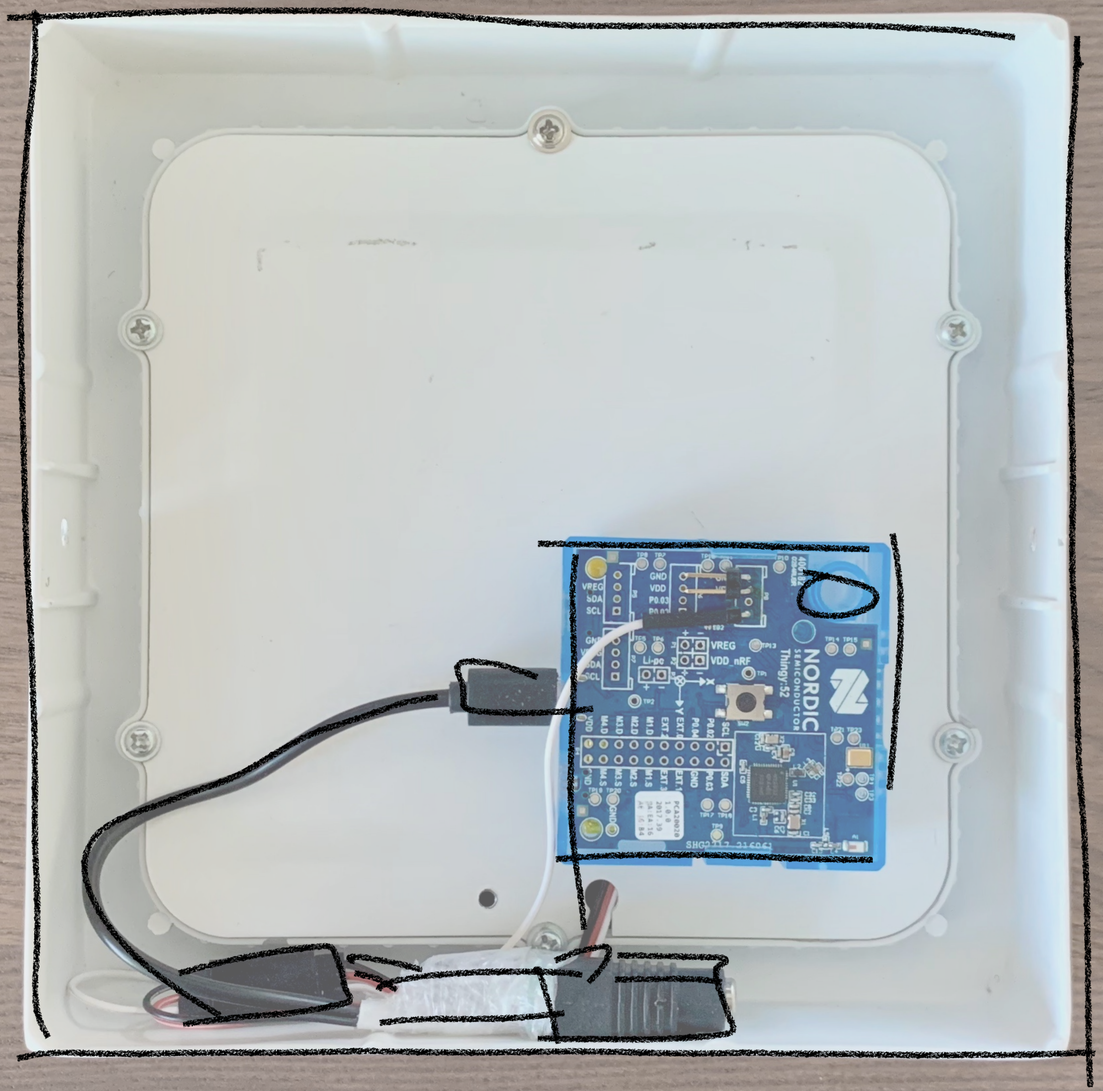
8x8 neopixel grid




independantly
powered

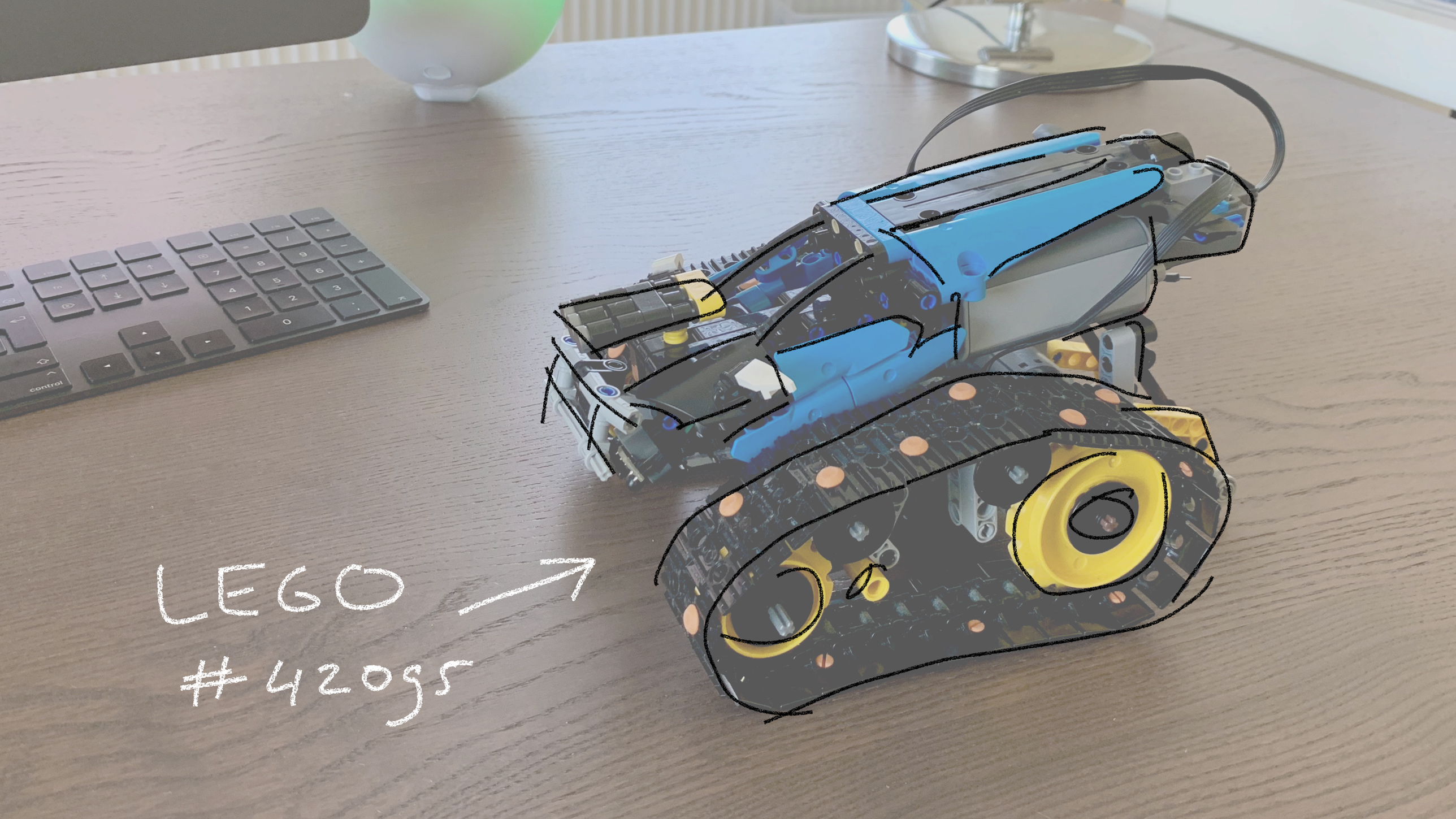

data cable
Nordic
Thingy:52
NORDIC
SEMICONDUCTOR
Thingy:52
VREG
SDA
GND
VDD
VDD_nRF
Li-pc
SCL

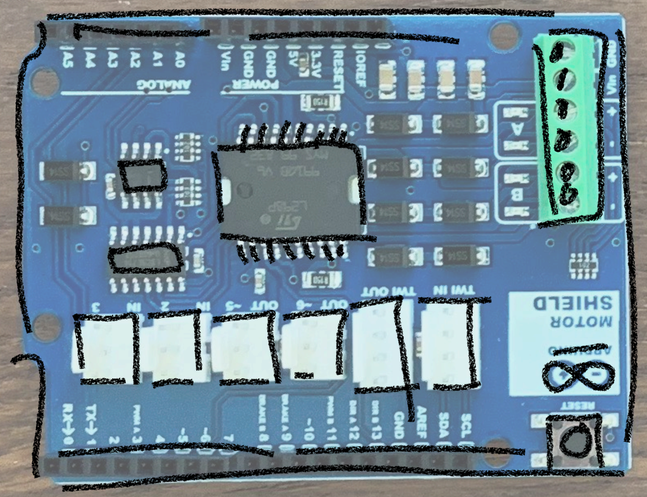
old ceiling light

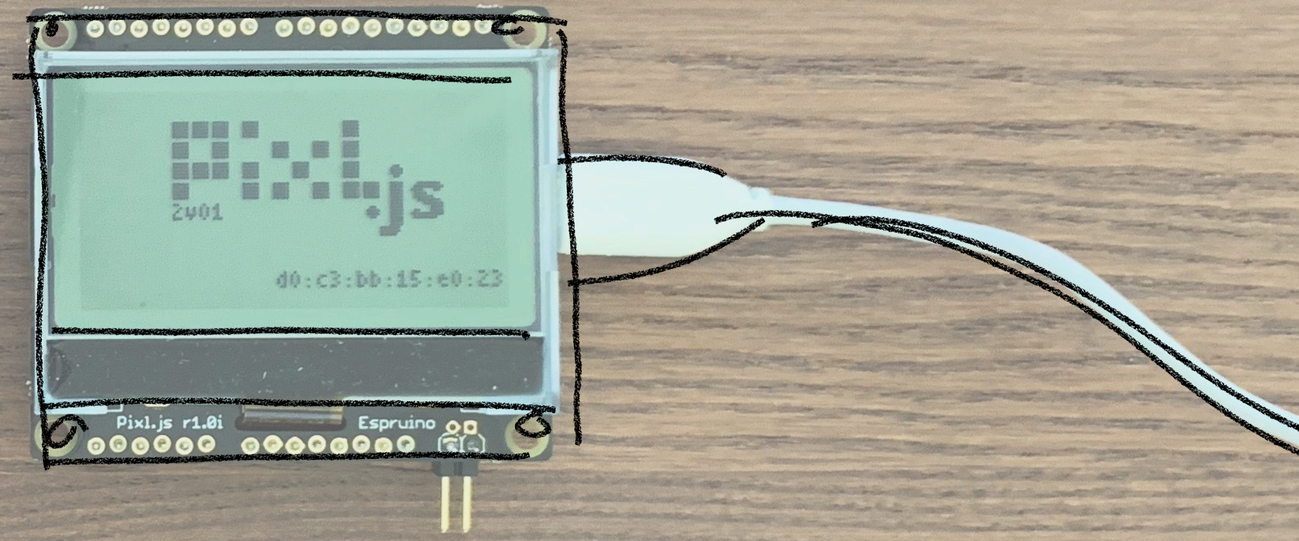


#3

Remote controlled car


LEGO
#42095

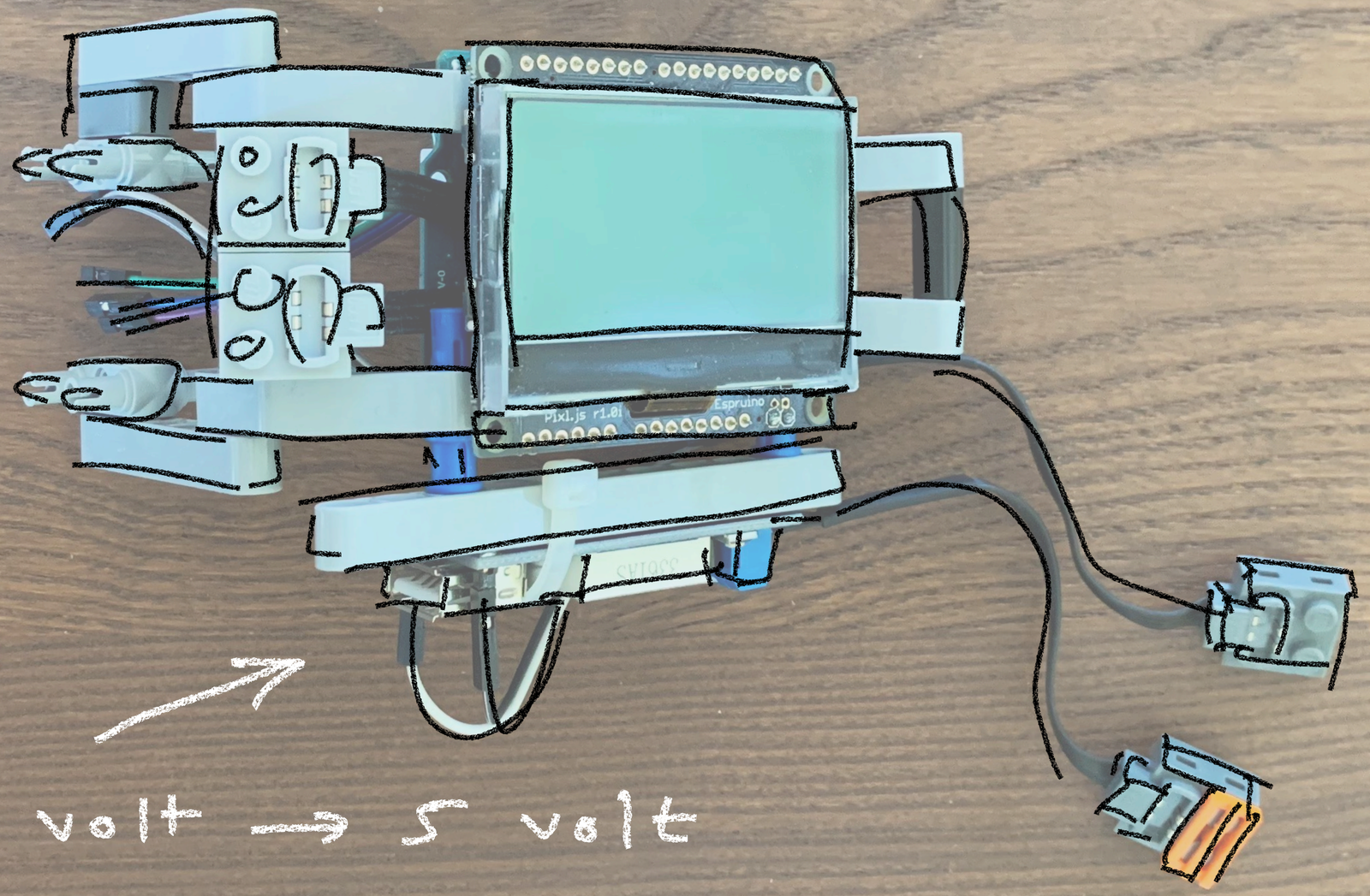




↑

Arduino Motorshield V3

Pixl.js
2v01
d0:c3:bb:15:e0:23
Pixl.js r1.0i
Espruino

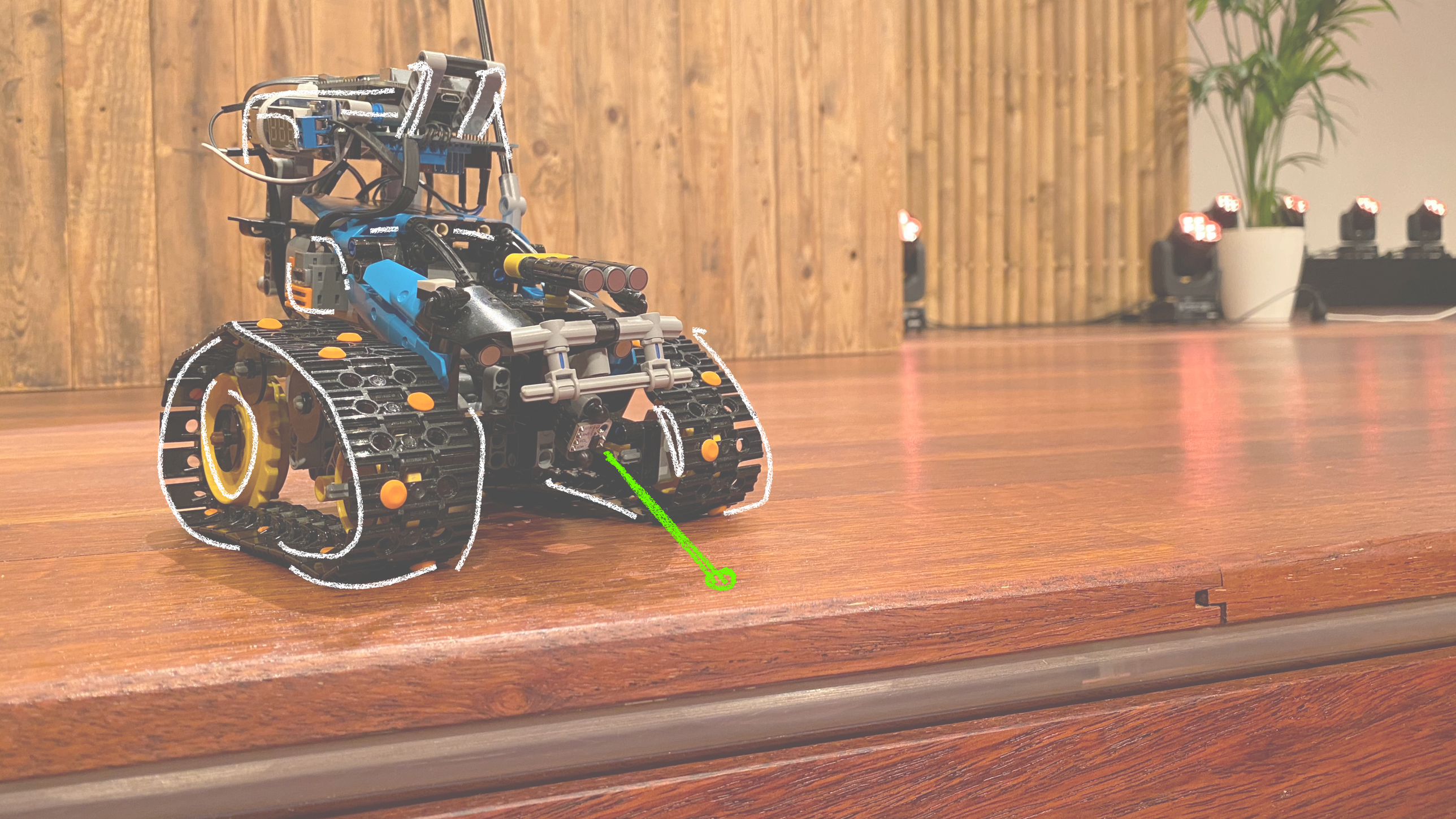
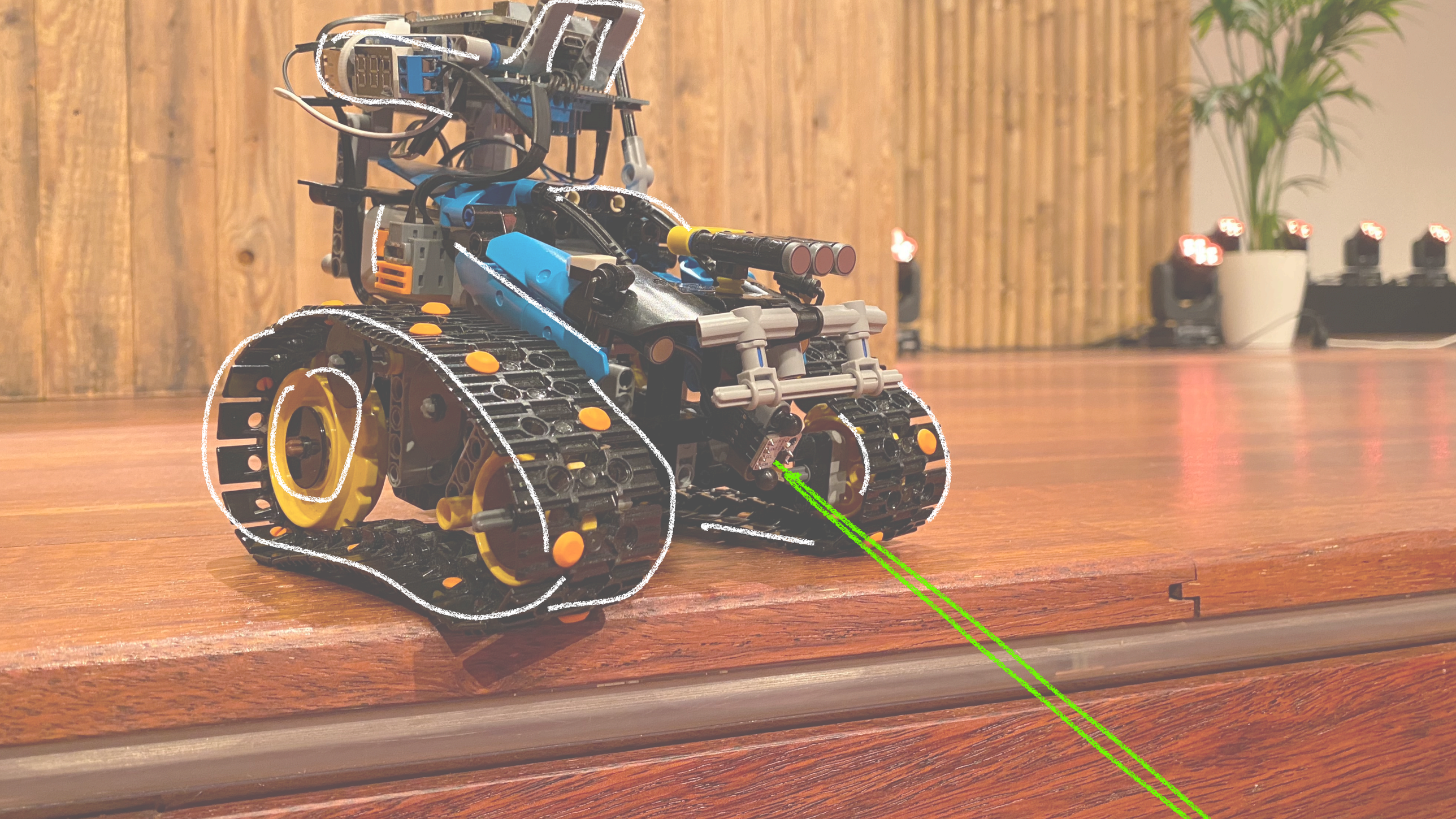

Pixl.js r1.0i
Espruino
9 volt → 5 volt

Pixl.js
2v02
c9:06:6b:07:03:7b
Pixl.js r1.0i
Espruino

Lasers!

Invisible

Lasers!

tiny
invisible

Lasers!