JavaScript on Microcontrollers

I am Niels Leenheer

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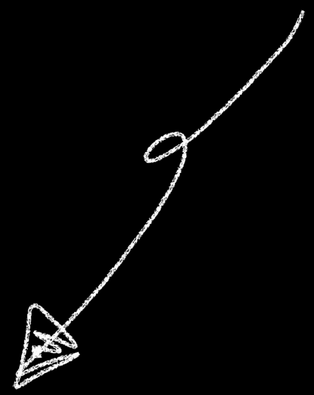
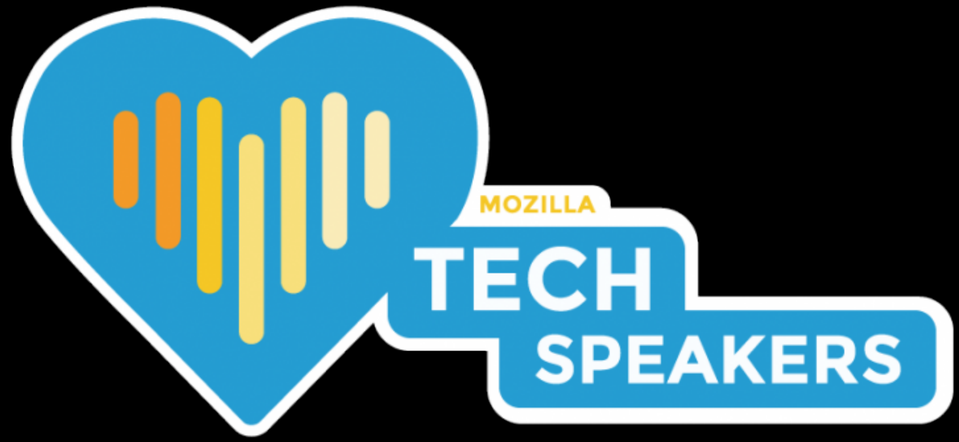


I’m from
The Netherlands


Experts
2019
Web Technologies
GDE

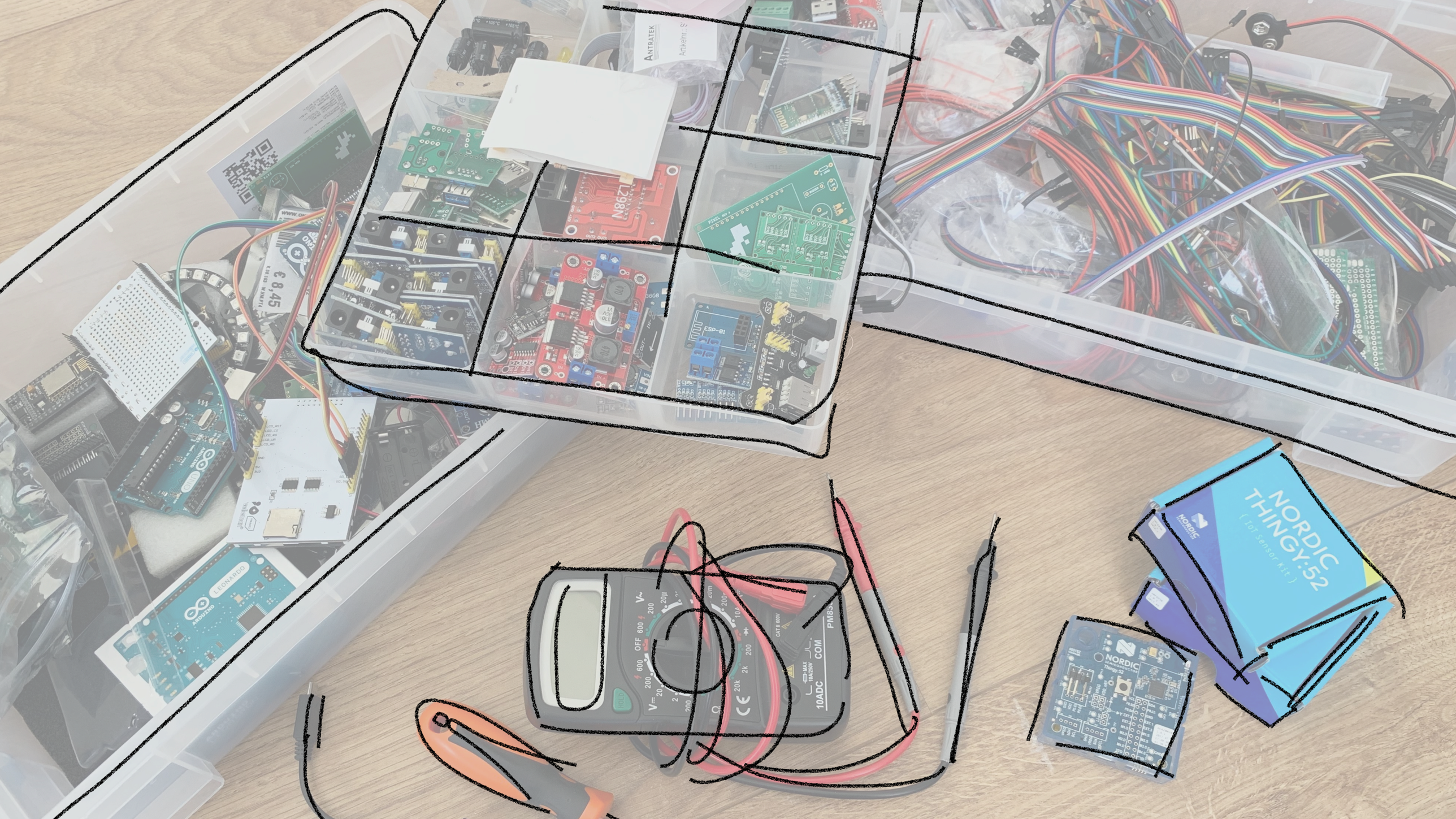

MOZILLA
TECH
SPEAKERS

I tweet at @html5test

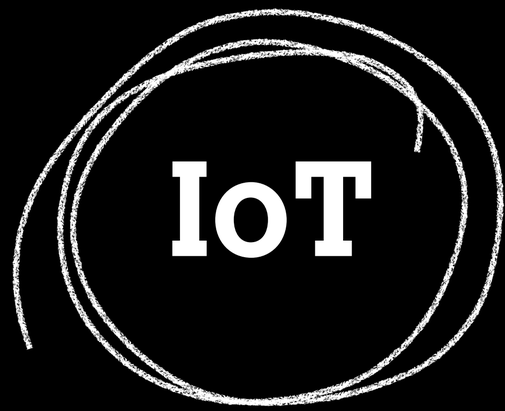
I  the web

I  electronics


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


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

Why should I care about this?

electronics + web = 

experimenting with

IoT can be very

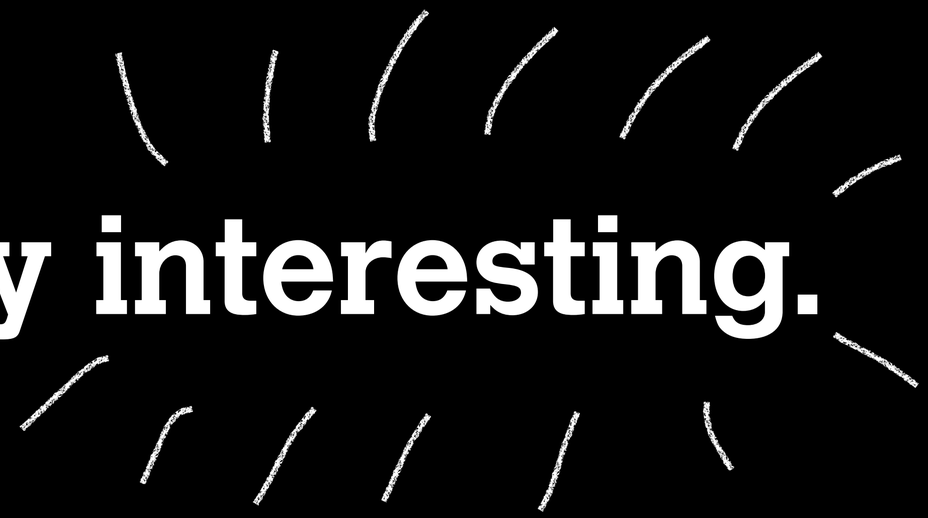
experimenting with

IoT can be very useful.

experimenting with

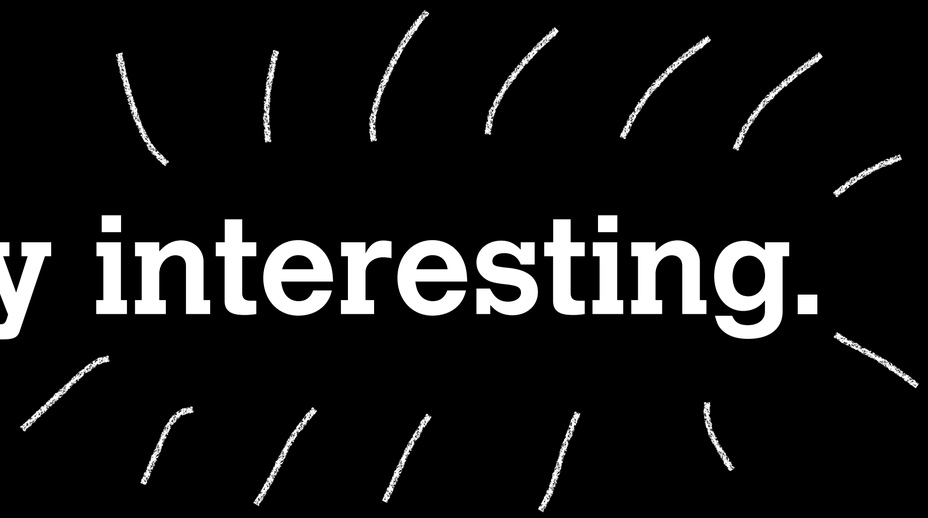
IoT can be very useful.

experimenting with



IoT can be very interesting.

experimenting with



IoT can be very interesting.

experimenting with

IoT can be very fun.

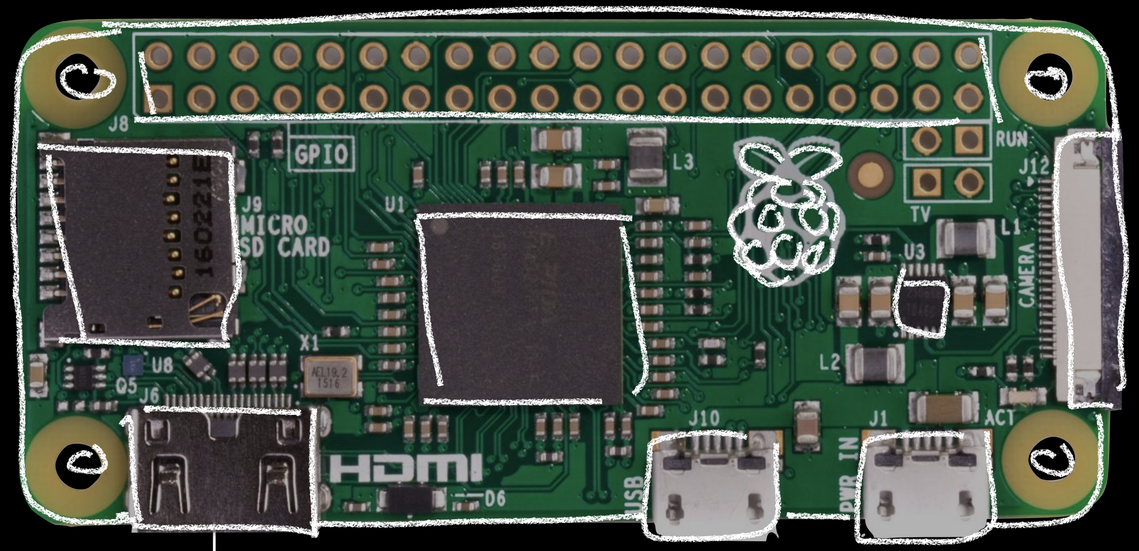
JavaScript on Microcontrollers

but . . .

Microcontrollers are slow.

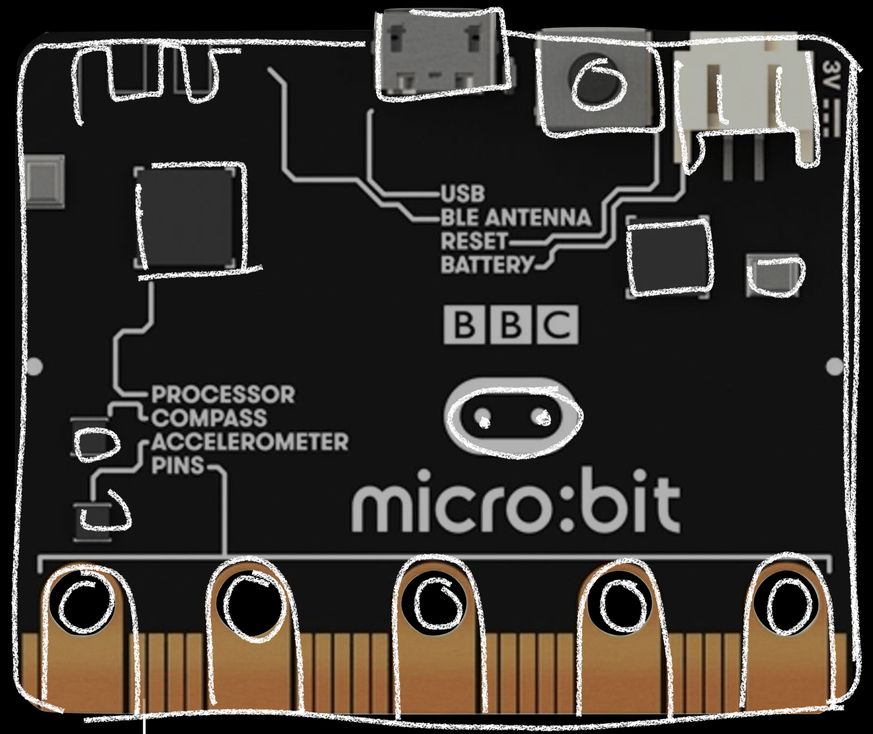
Microcontrollers are slow.

Microcontrollers are slow.



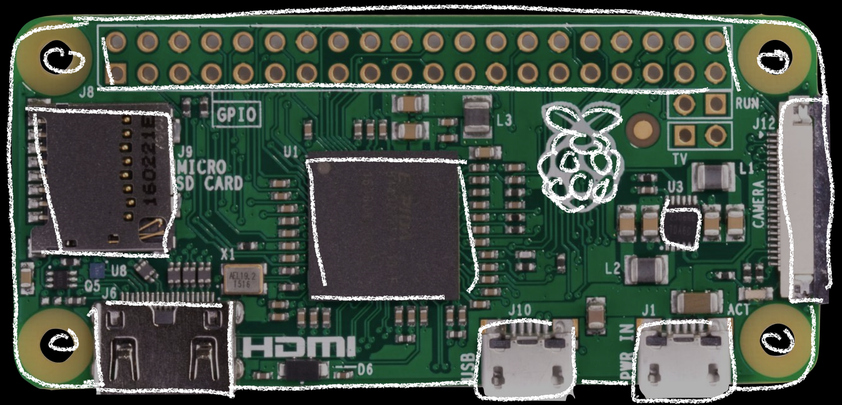
Raspberry Pi Zero W

1 GHz CPU and 512MB RAM

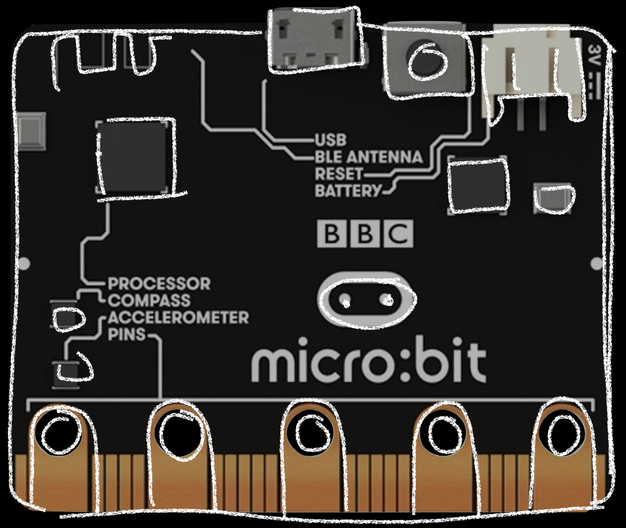


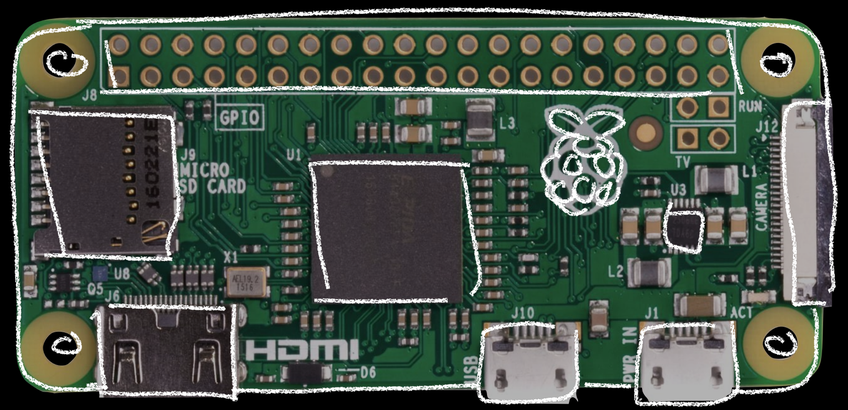
micro:bit

16 MHz CPU and 16KB RAM

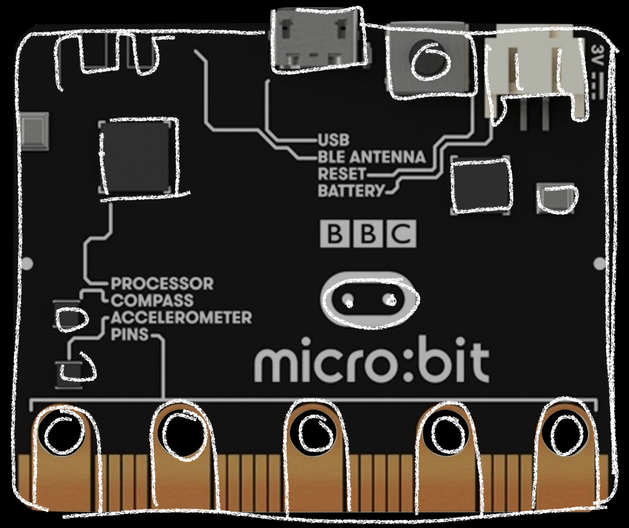

GPIO
MICRO SD CARD
HDMI
RUN
TV
CAMERA
ACT
PWR IN
USB

60 x faster


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



30.000 x memory



“

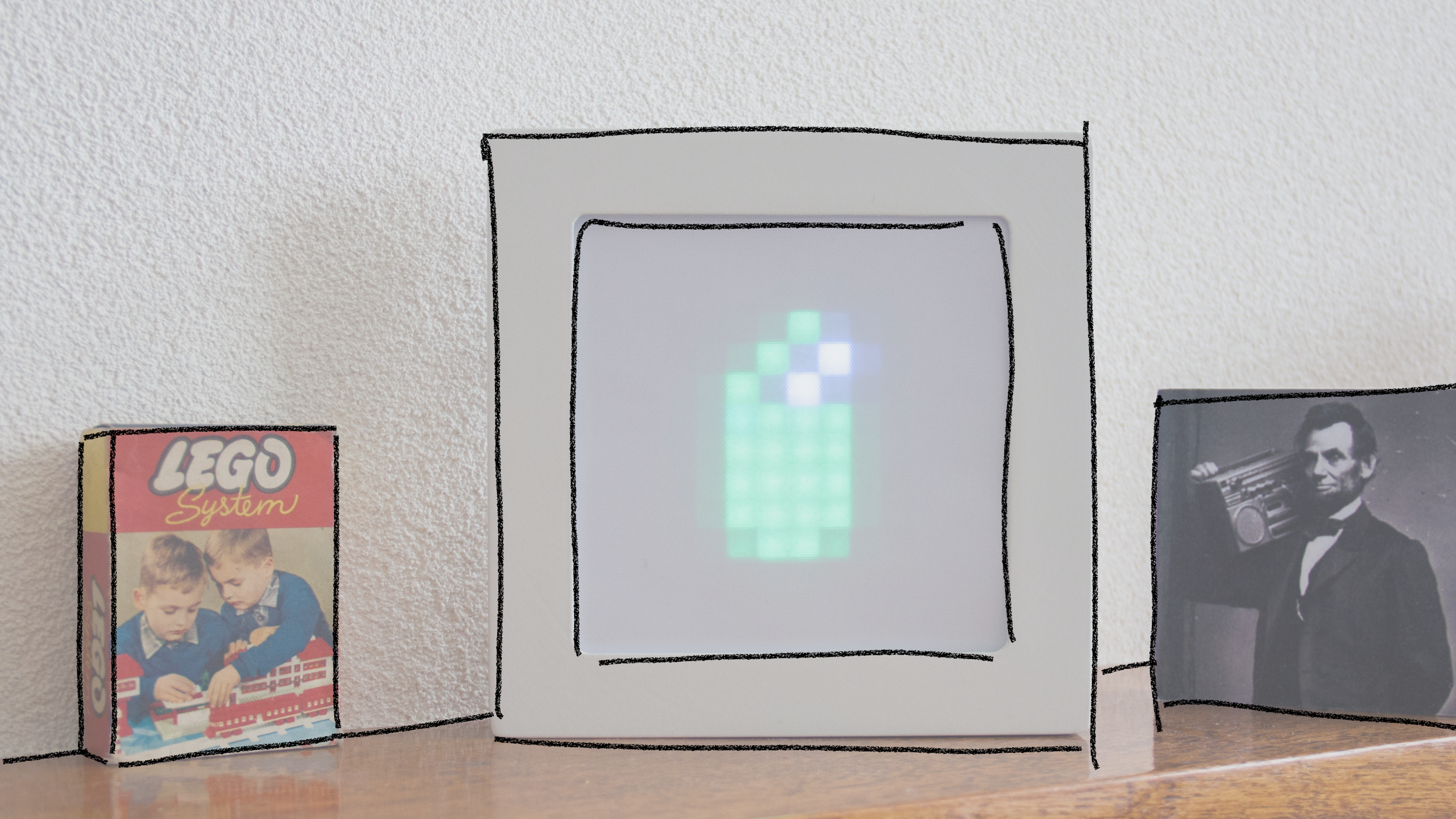
JavaScript on microcontrollers? Are you crazy?

Me – two years ago

JavaScript is easy.

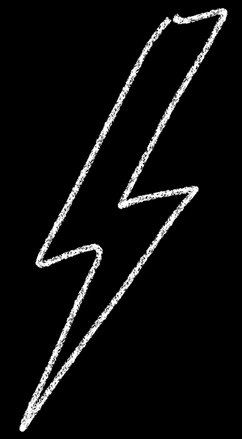
JavaScript is easy.

compared to C


LEGO
System
LEGO

Microcontrollers are very power efficient.

Microcontrollers are very power efficient.



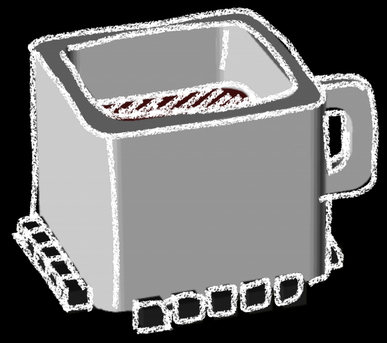
Microcontrollers only need to be fast enough to solve the probem.

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.

Espressif

ESP8266 & ESP32

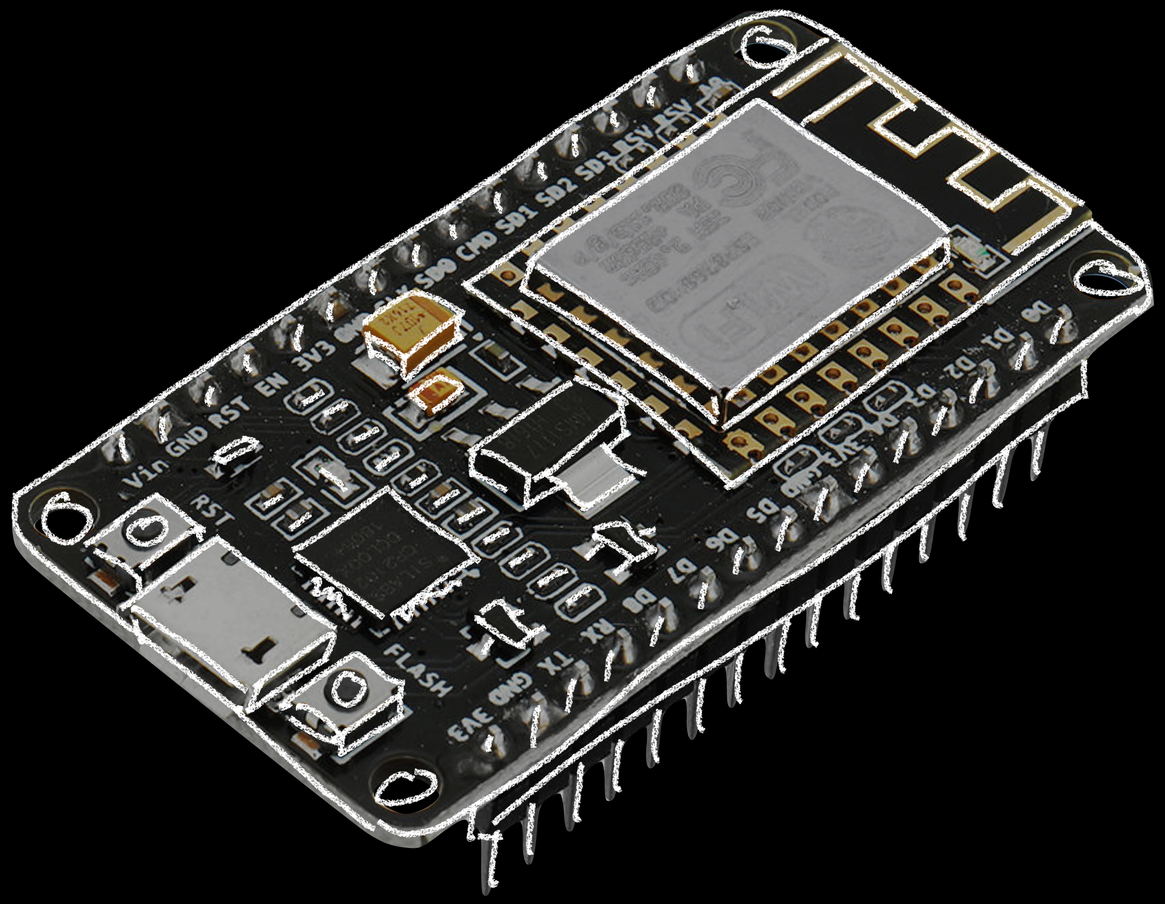
Espressif

ESP8266 & ESP32

Espressif

ESP8266 & ESP32

NodeMCU



NodeMCU

↗

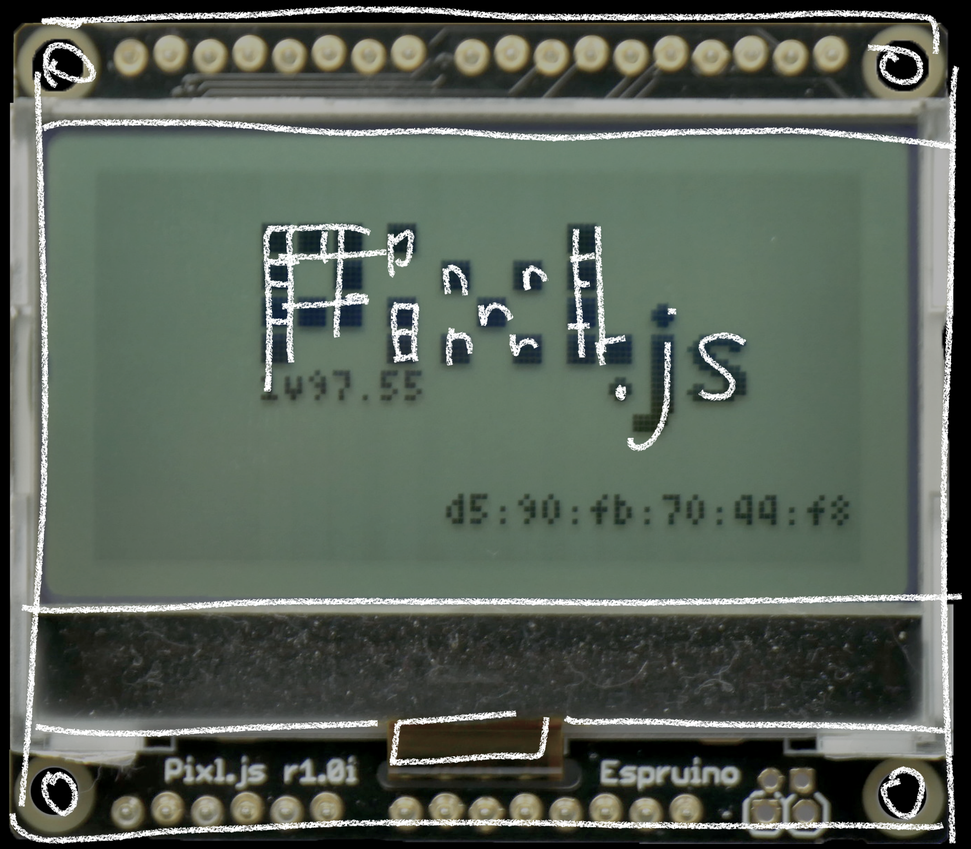
Not related to Node.js

Nordic Semiconductor nRF52

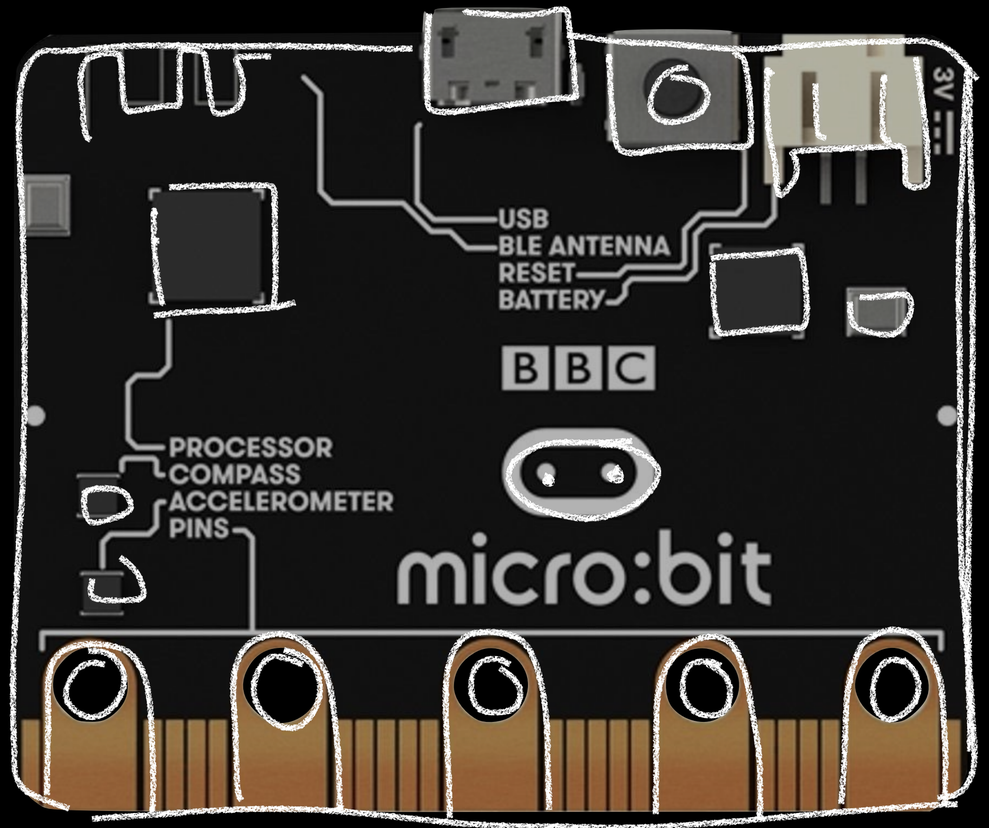
Nordic Semiconductor nRF52

Puck.js

Puck.js



Pixl.js


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

micro:bit

Thingy:52

kickstarter.com

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Bangle.js: the hackable Smart Watch

An open source, AI-enabled smart watch that can be easily customised

Gadgets Oxford, UK

€59,684
pledged of €14,603 goal

671
backers

13
days to go

Back this project

Remind me

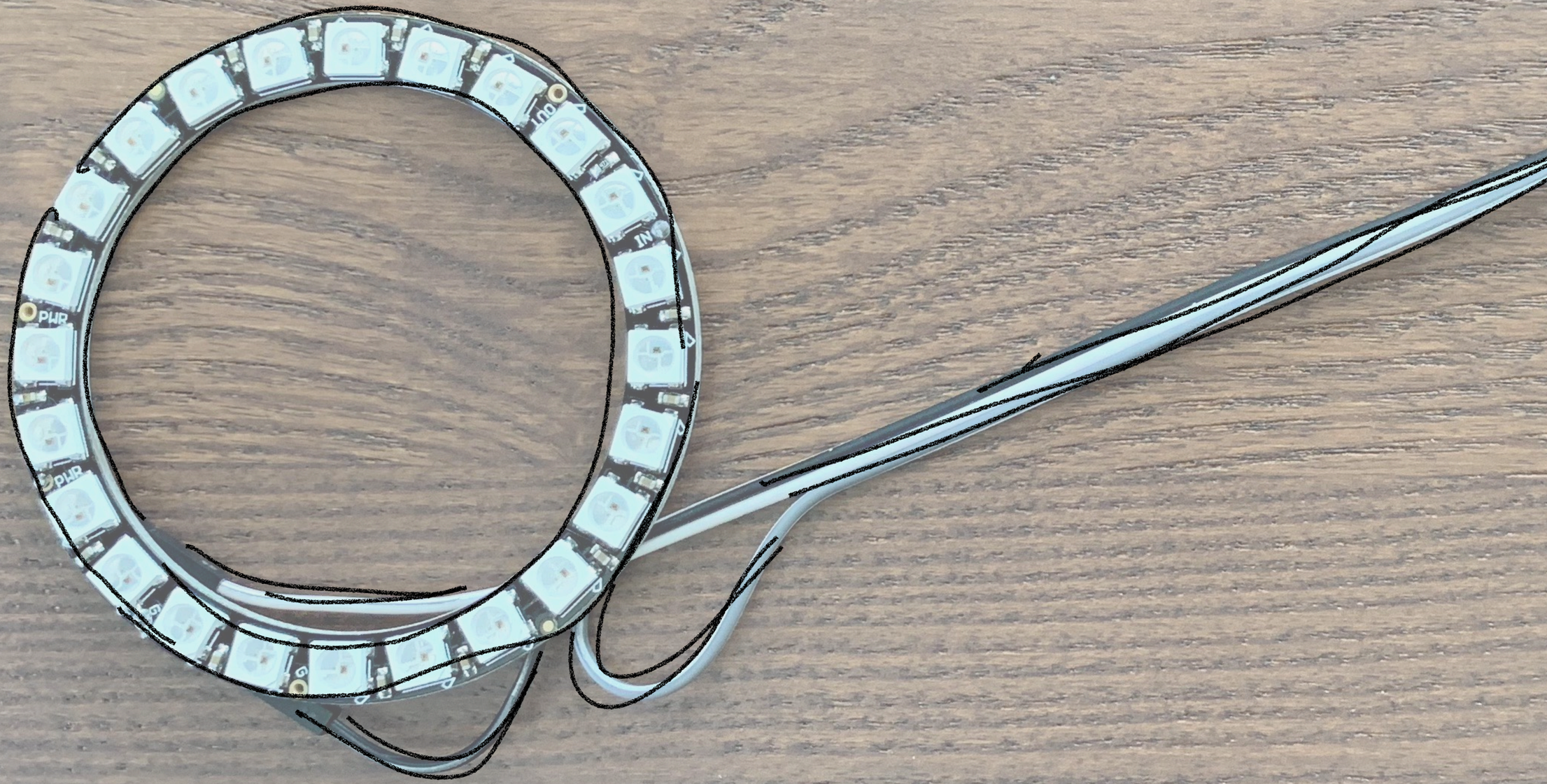
demo

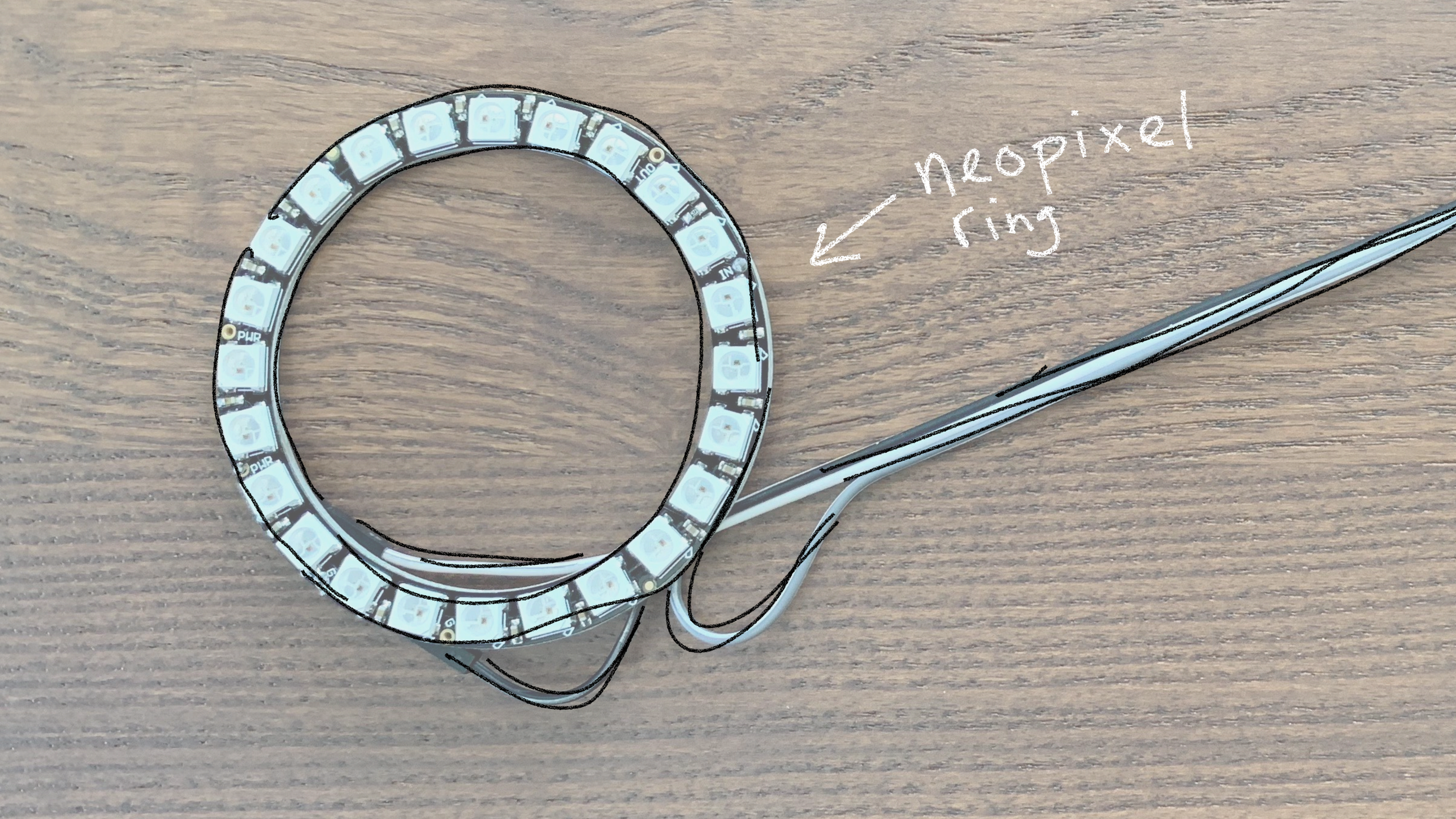
Experimental technology

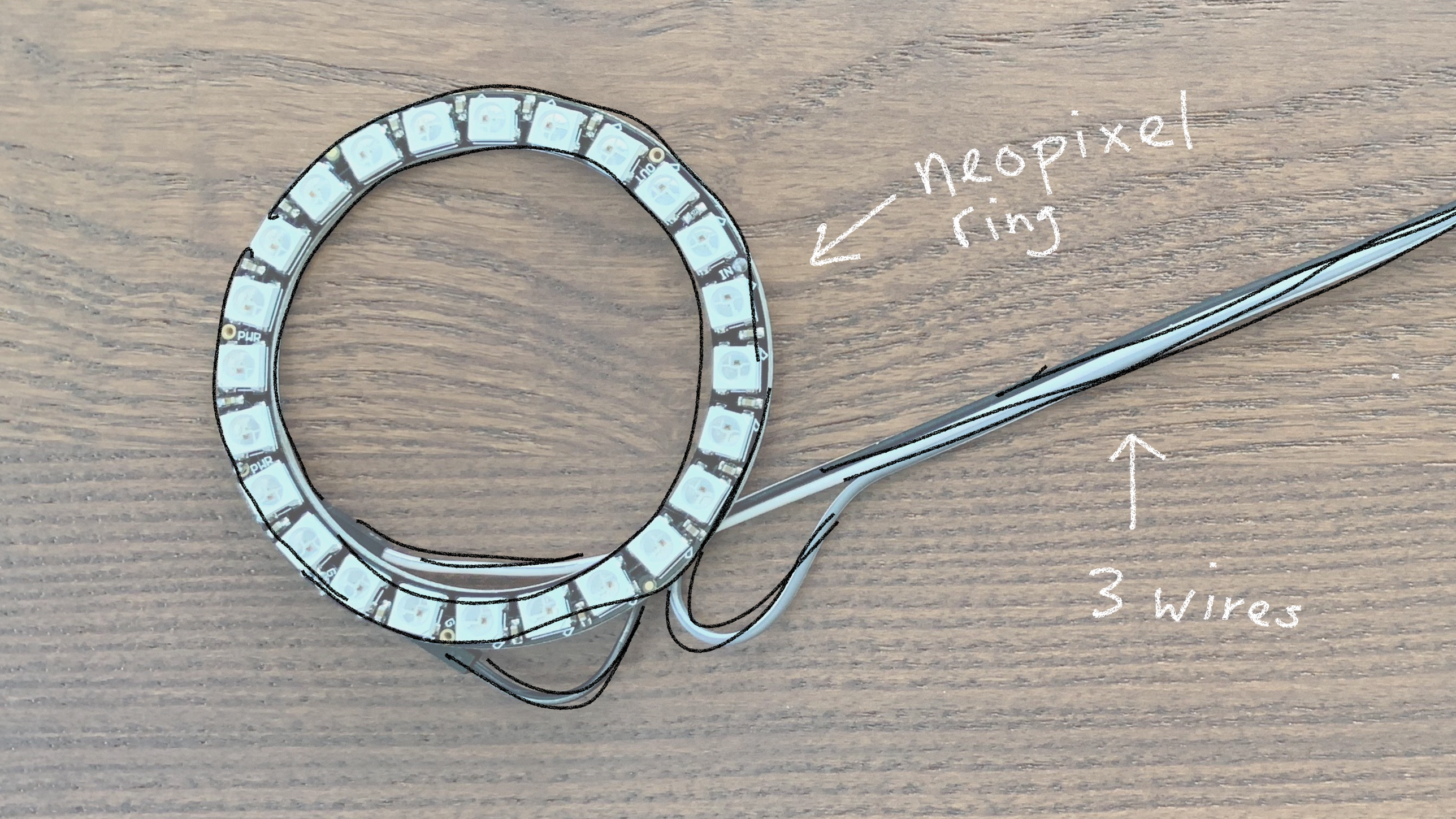
Setting low expectations

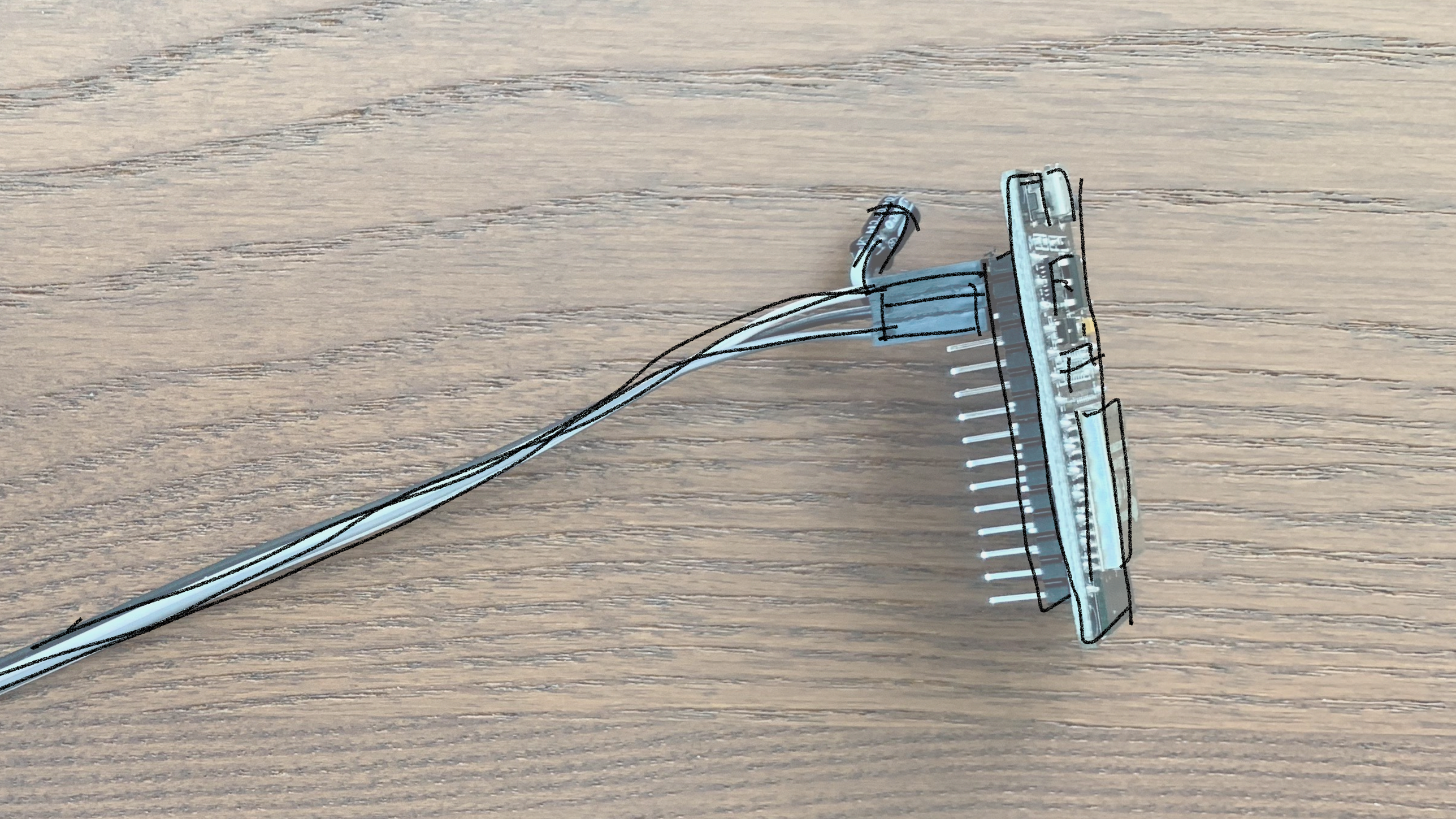
#1

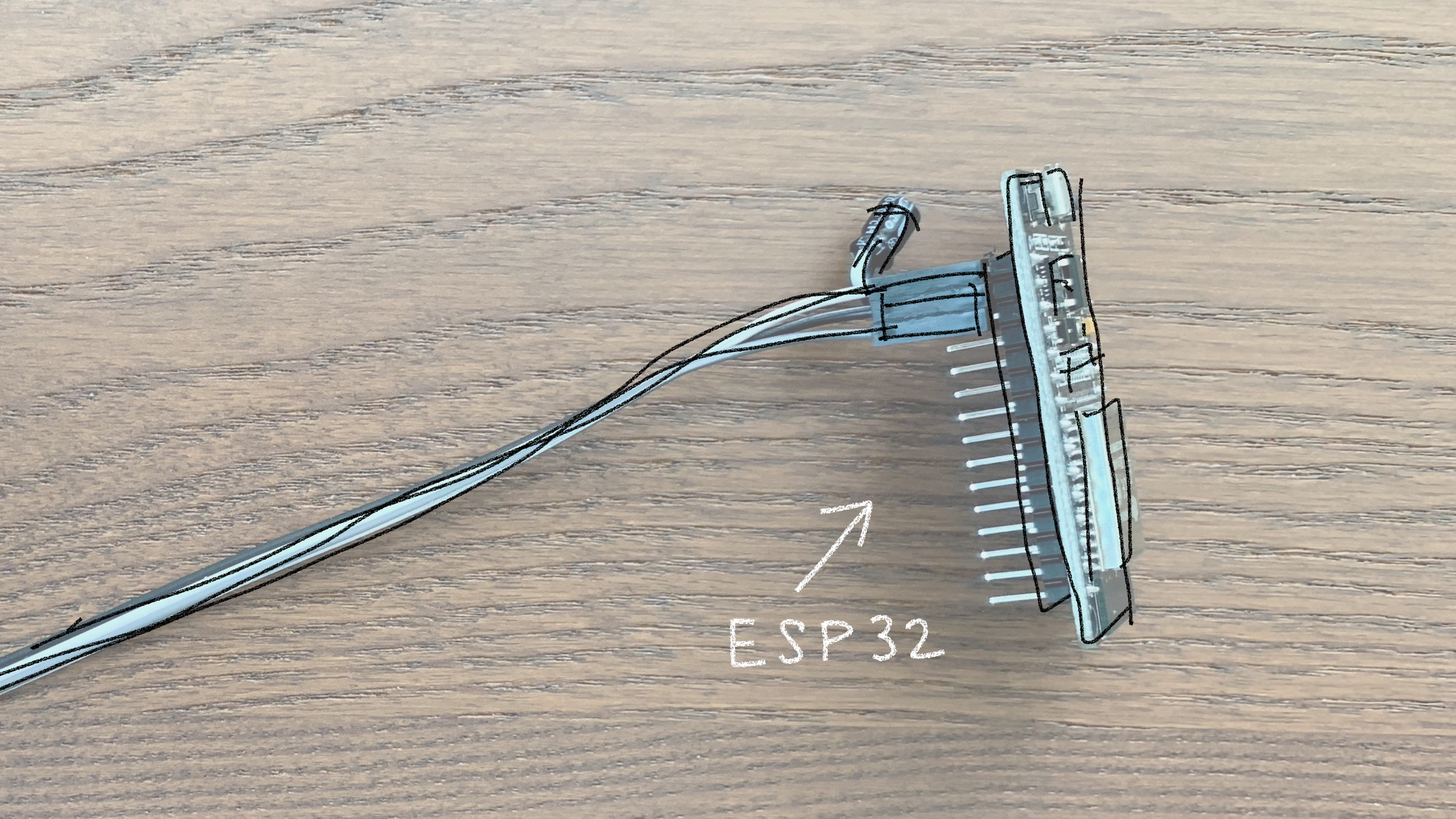
Connected lightbulb


OUT
IN
PWR
PWR


neopixel
ring
PWR
PWR
IN
OUT

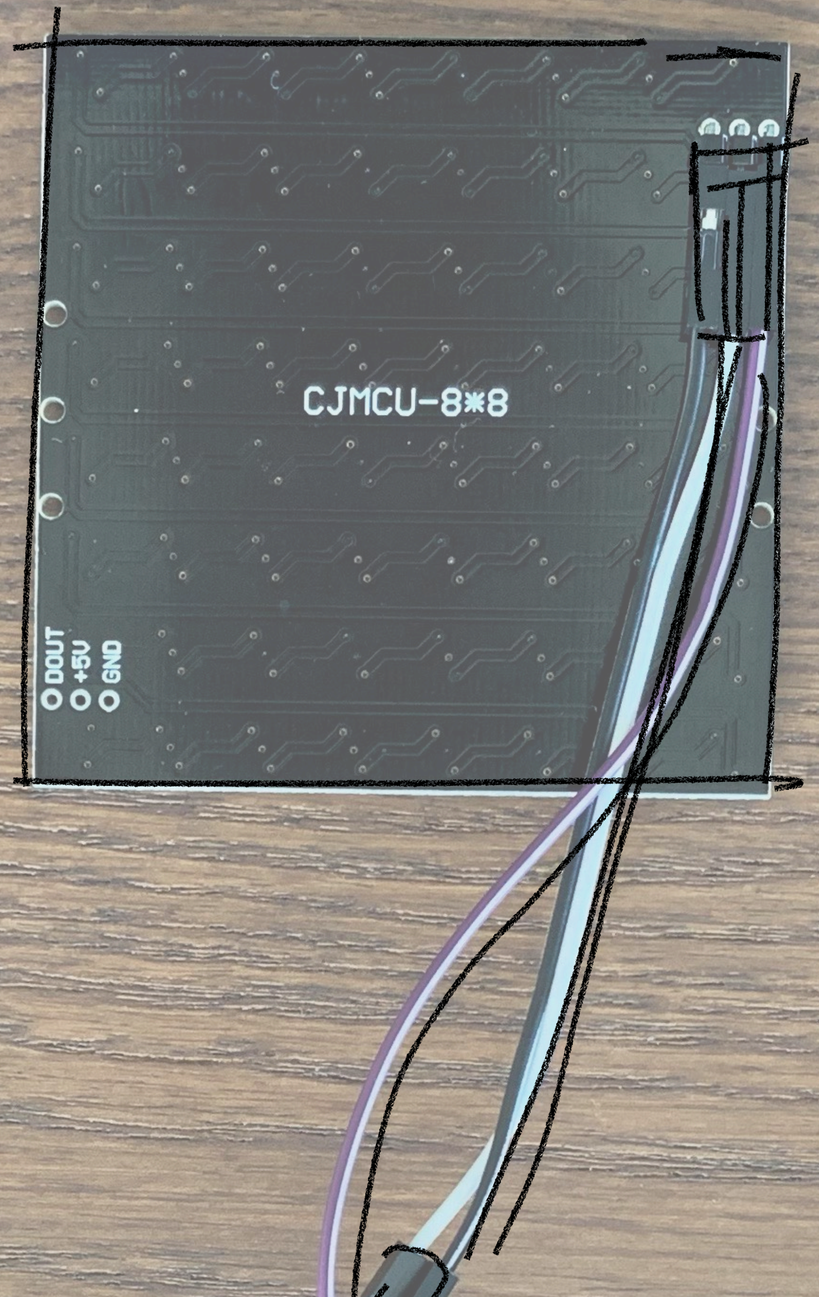

neopixel ring
3 wires

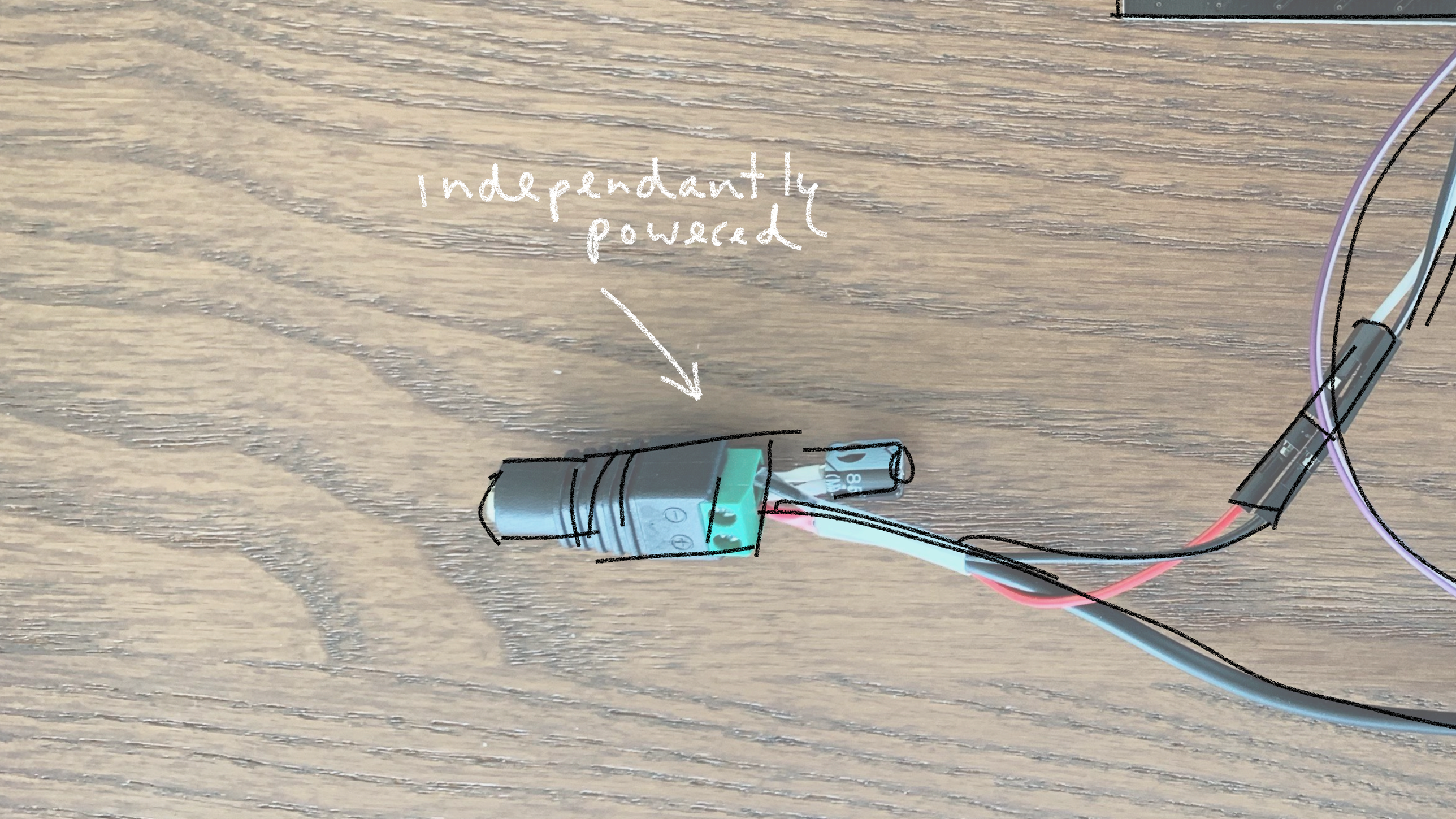


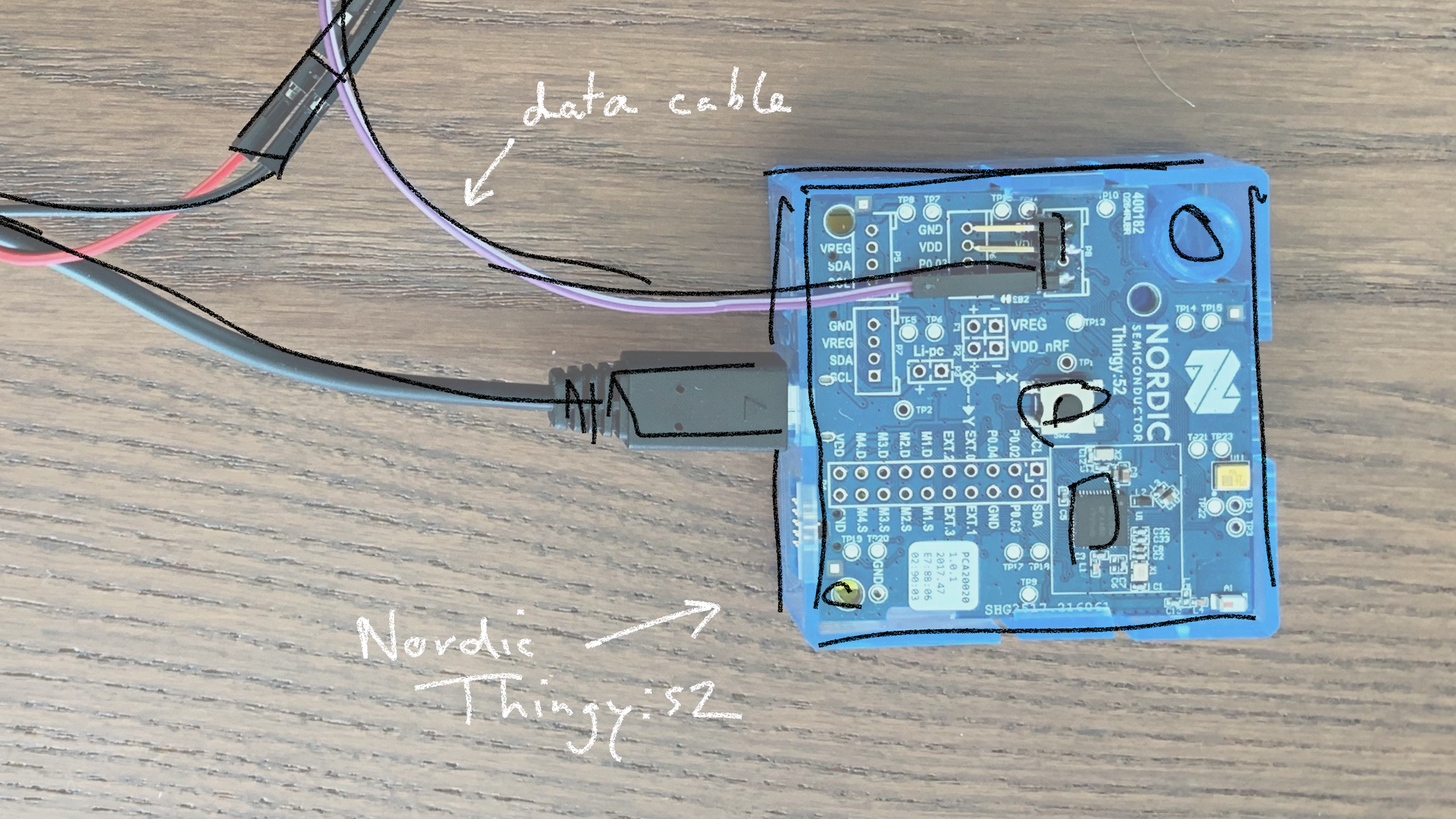

ESP32

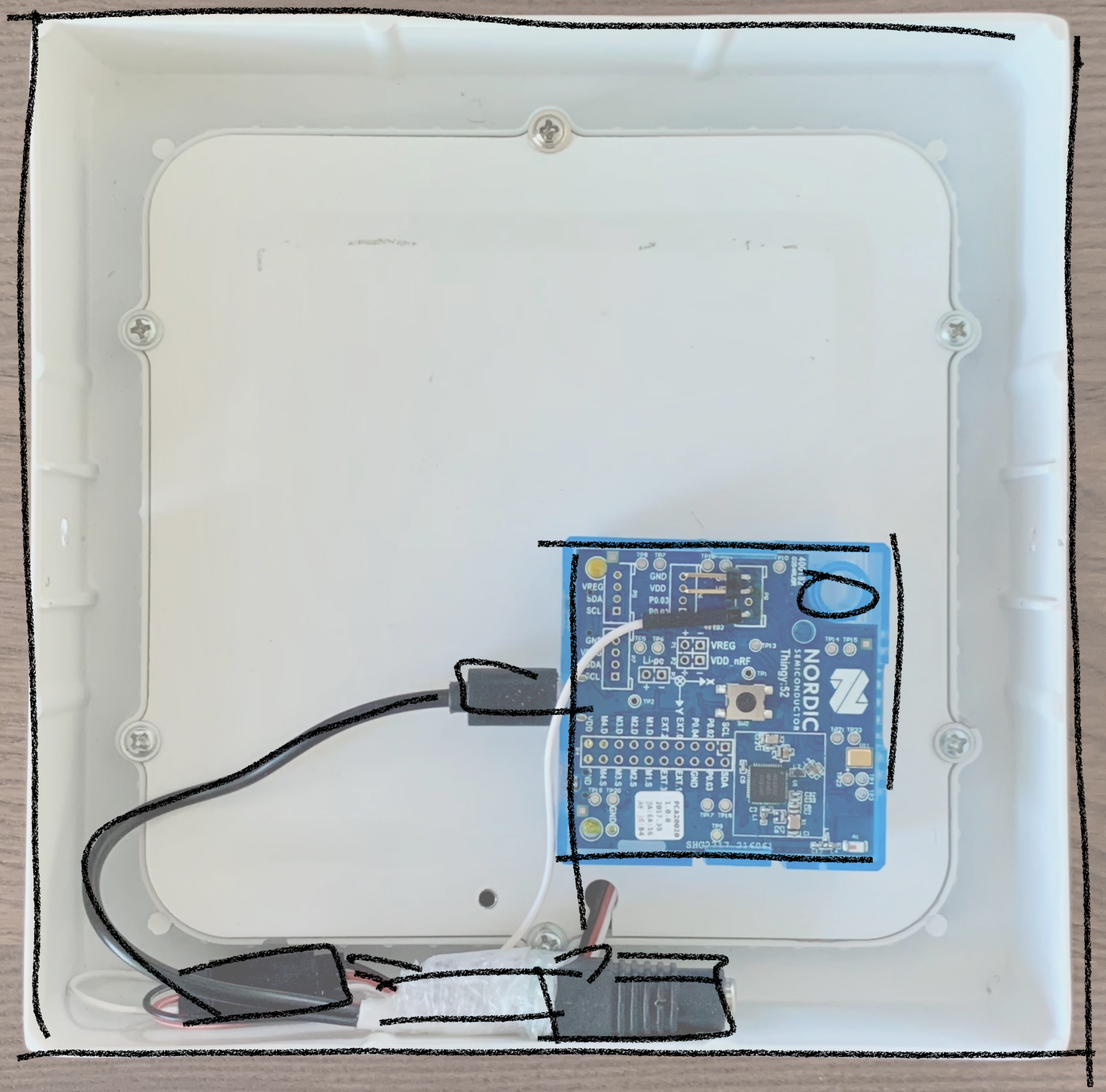
Pixelart display

8×8 neopixel grid



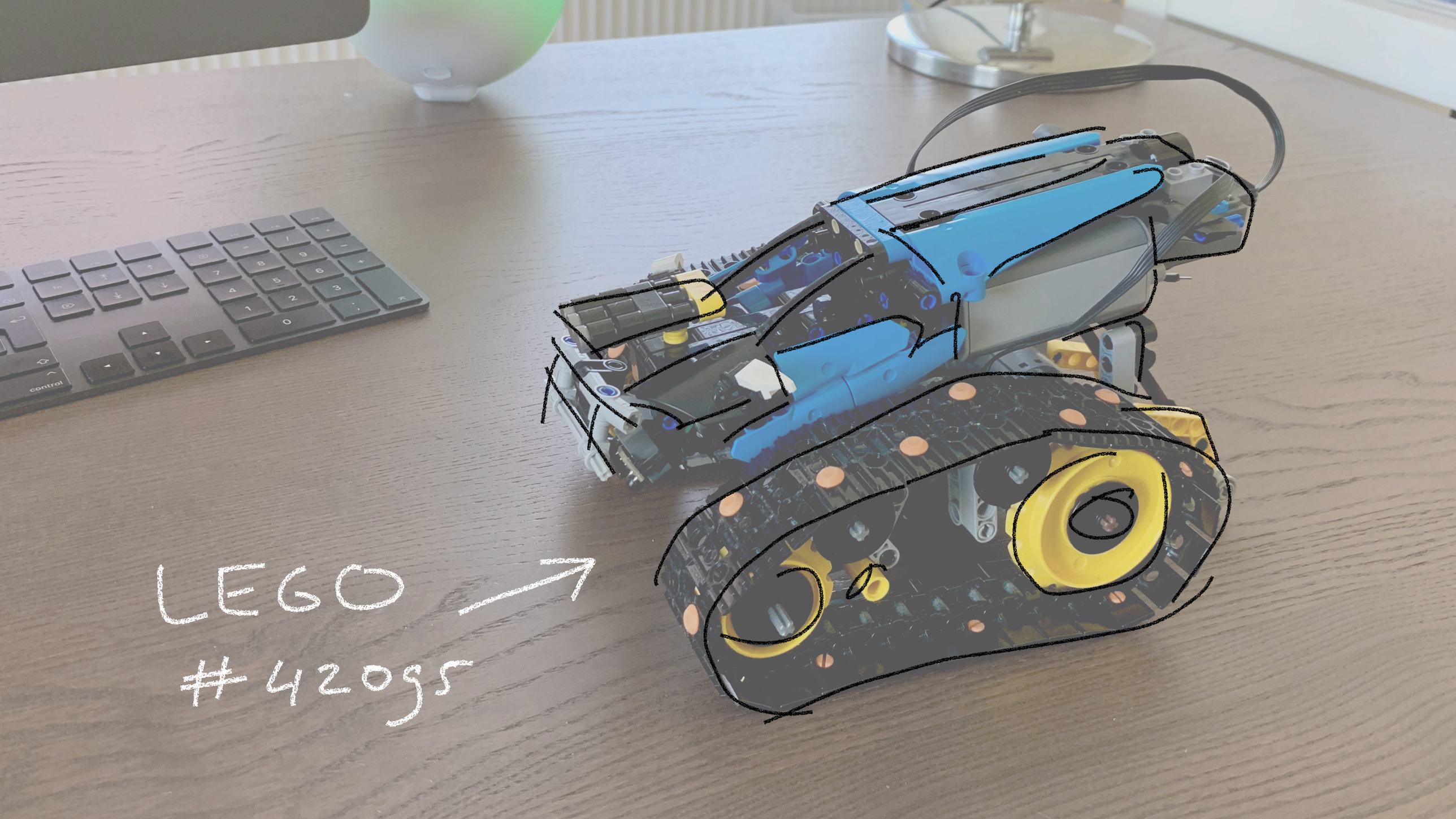

independantly
powered

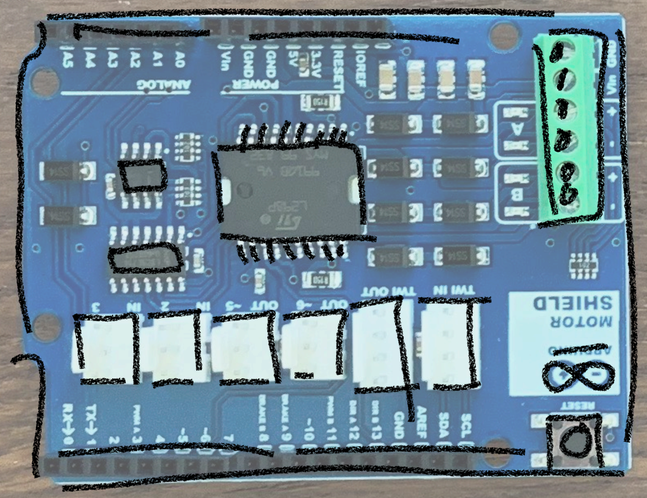

data cable
Nordic
Thingy:52

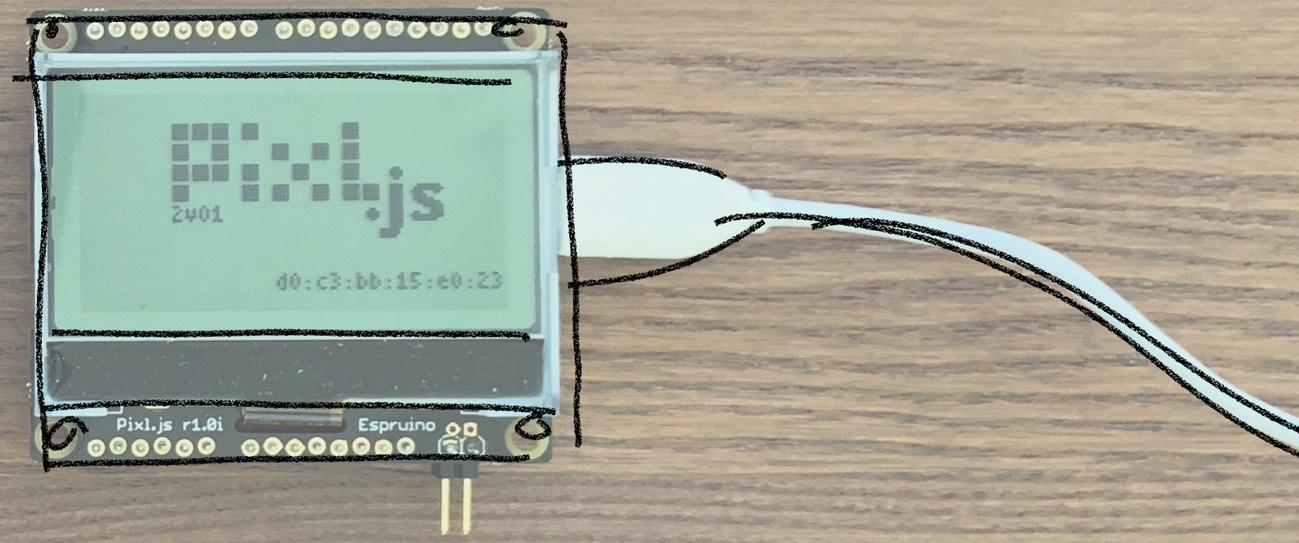

old
ceiling light

#3

Remote controlled car


LEGO
#42095

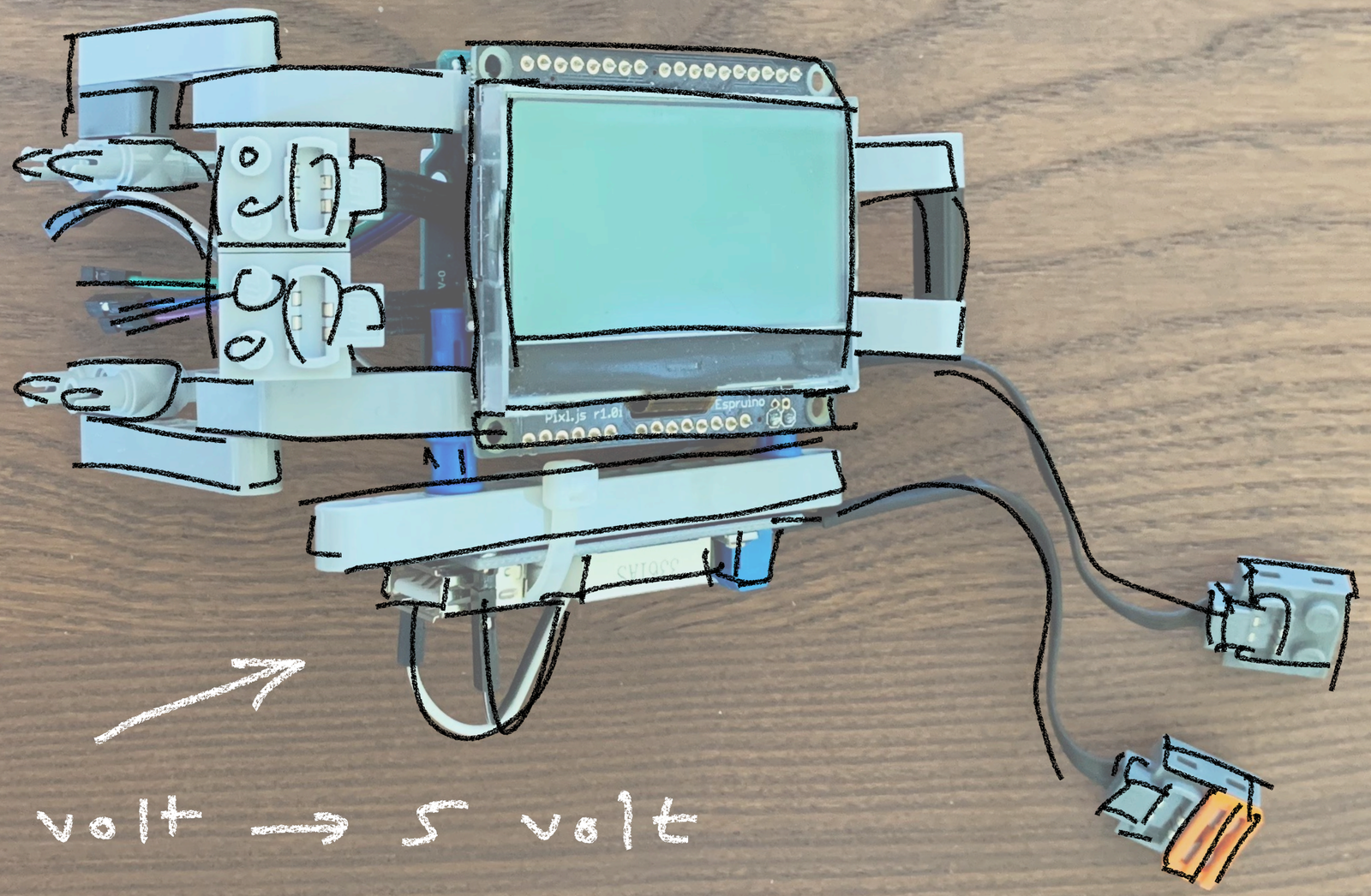




↑

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!