MicroPython

RevSpace februari 2019

Spreker

- Edward van Hazendonk
- Sinds 1993 IT engineer
  - Netwerken
  - Linux (Red Hat, CentOS, Suse, Raspbian)
  - af en toe met IoT bezig (vloerverwarming, bierbrouw monitoring)
  - Tenney (Homey Athom cloon)
- vrijetijdsfotograaf

MicroPython op microcontrollers

- Waarom een microcontroller i.p.v. bijv een Raspberry Pi voor Python code
  - stroomverbruik
  - kosten en uitbreidingsmogelijkheden
  - minder OS om je zorgen over te maken
  - veel meer I/O (UARTs, SPI, I2C, ADCs, DACs)

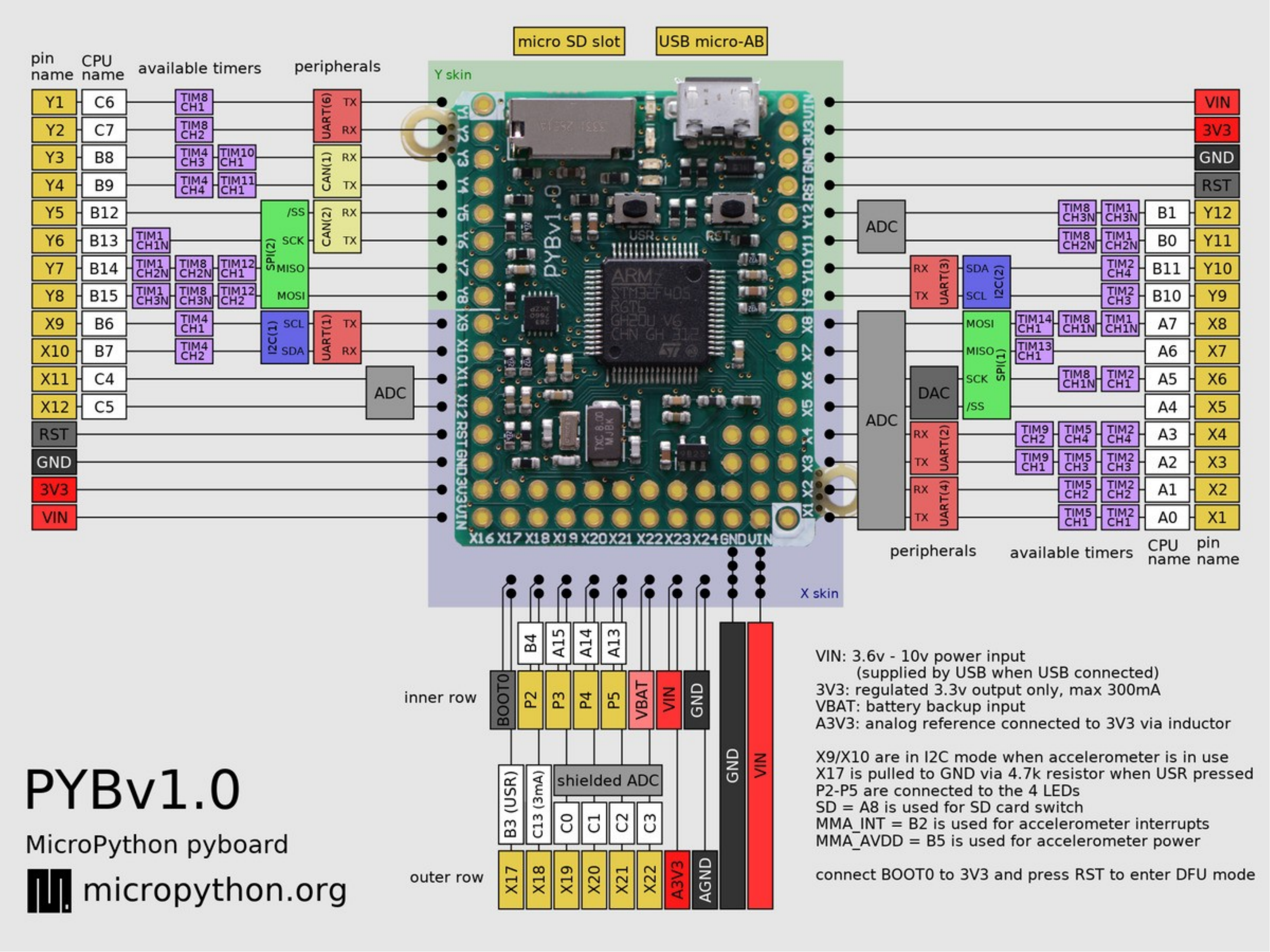
Python vs. Arduino

- Waarom Python i.p.v. Arduino (Processing/C) op Microcontrollers
  - REPL (eenvoudige CLI op de microcontroller voor snellere Python development, voorkomt continue compilatie en uploaden van microcode)
  - code is minder complex
  - wifi/bluetooth chips inclusief (Espressif)
  - Object Oriented vs. C alike

Ondersteunde microcontrollers

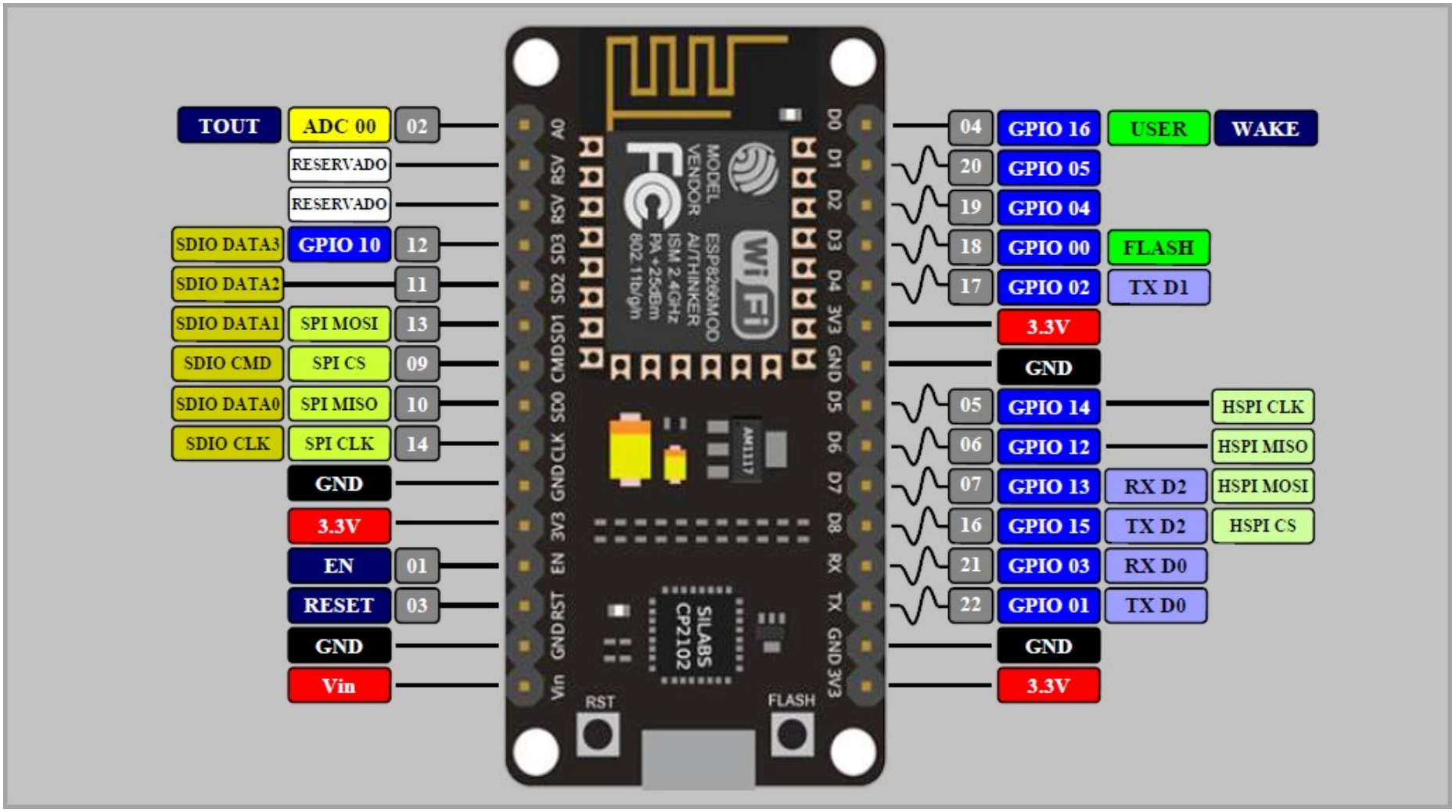
- pyboard
  - Kickstarter (2013, micropython ontwikkeling)
    - Damian George
  - STM32F405, 192 kB RAM, 1MB Flash, microSD
- ESP8266 (1core, 96kB RAM, 512kB-4MB Flash)
- ESP32 (2core, 500kB RAM, 4MB Flash)
- WiPy (ESP32, 4MB RAM, 8 MB Flash)
- http://docs.micropython.org/en/latest/index.html

Pyboard

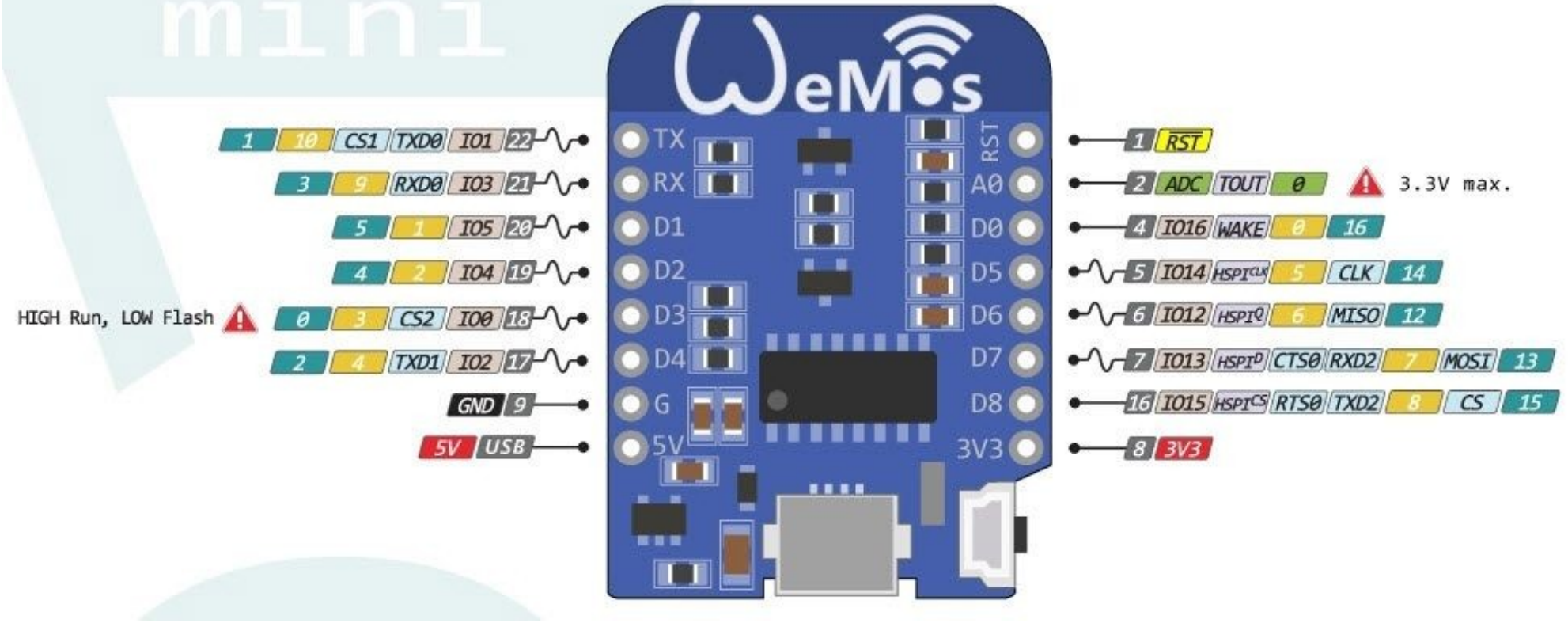


micro SD slot
USB micro-AB
pin name
CPU name
available timers
peripherals
Y skin
X skin
inner row
outer row
shielded ADC
PYBv1.0
MicroPython pyboard
micropython.org
VIN: 3.6v - 10v power input
(supplied by USB when USB connected)
3V3: regulated 3.3v output only, max 300mA
VBAT: battery backup input
A3V3: analog reference connected to 3V3 via inductor
X9/X10 are in I2C mode when accelerometer is in use
X17 is pulled to GND via 4.7k resistor when USR pressed
P2-P5 are connected to the 4 LEDs
SD = A8 is used for SD card switch
MMA_INT = B2 is used for accelerometer interrupts
MMA_AVDD = B5 is used for accelerometer power
connect BOOT0 to 3V3 and press RST to enter DFU mode

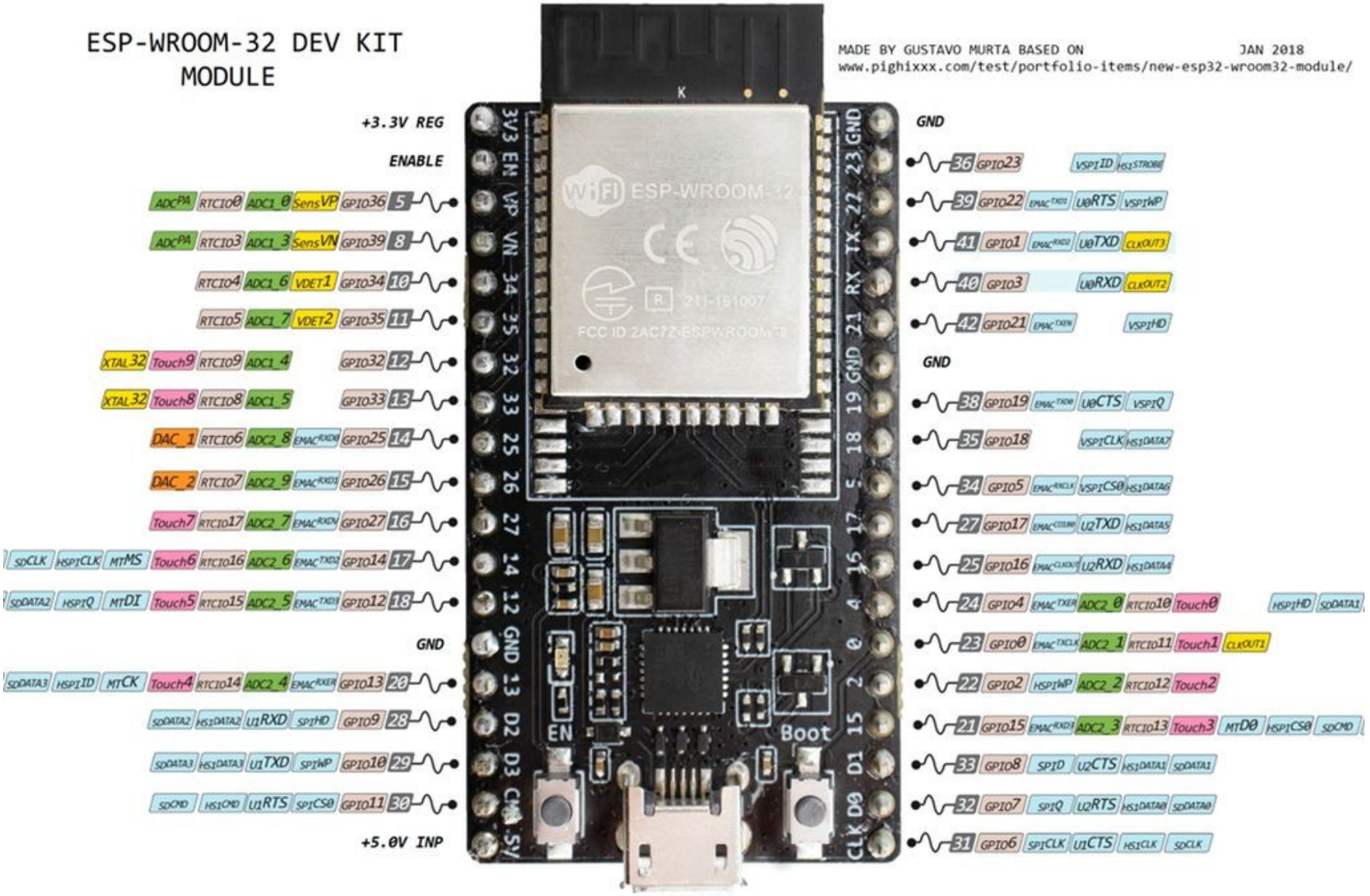
ESP8266/NodeMCU



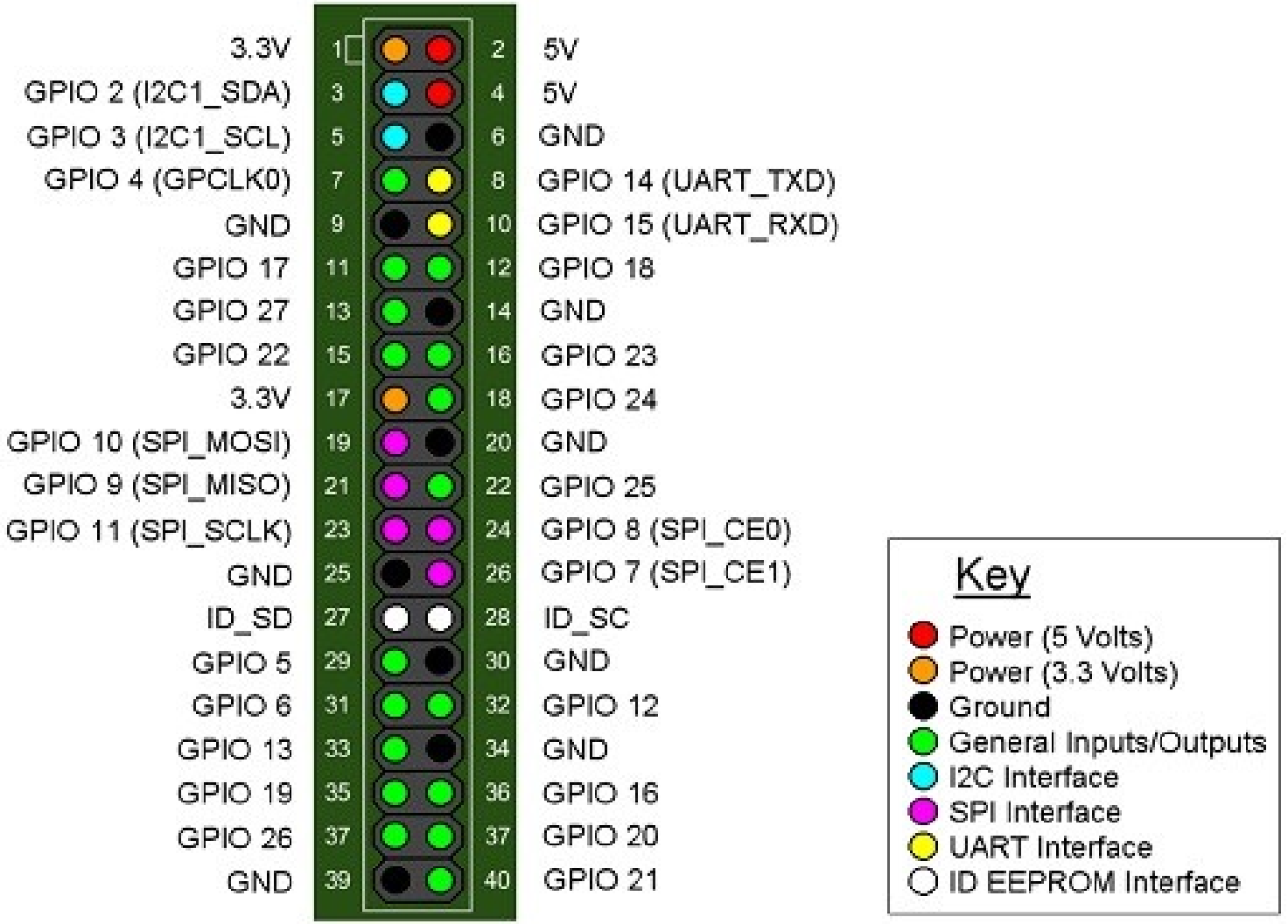
WeMOS mini D1 8266



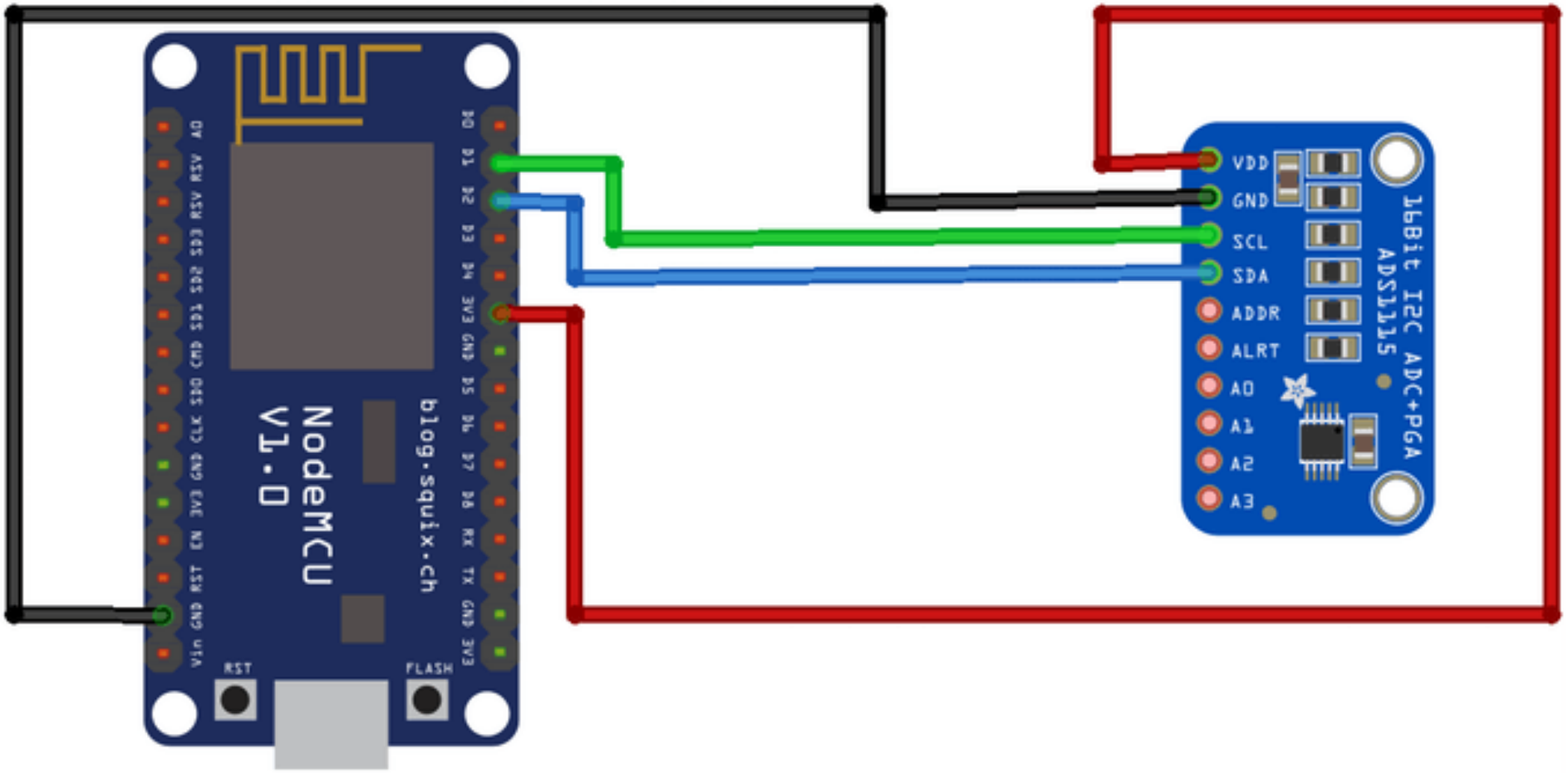
ESP32/WROOM kit



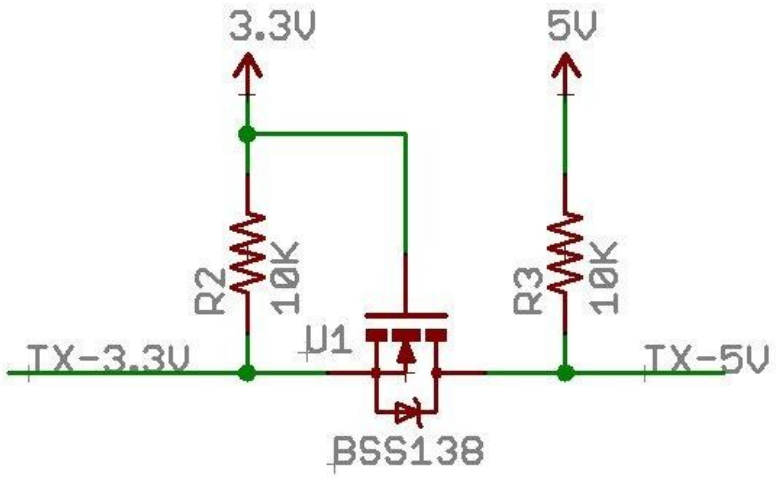
Raspberry Pi

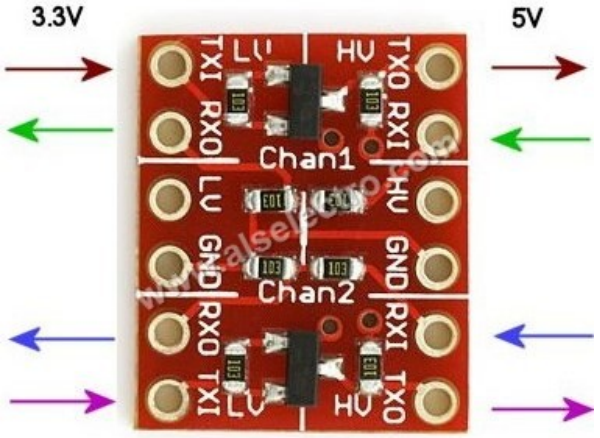


NodeMCU 8266 I2C schema



3v3 vs 5V I/O





- T.o.v. een Arduino ATMega zijn microcontrollers meestal niet 5V I/O compatible, volgend circuit kan dan helpen
- Een beetje zoeken op Ebay of Aliexpress kan je helpen een betaalbare meervoudige I/O omvormer te kopen
- https://hackaday.com/2016/12/05/taking-it-to-another-level-making-3-3v-and-5v-logic-communicate-with-level-shifters/

Adafruit Circuitpython

- Fork van MicroPython door Adafruit industries
- https://blog.adafruit.com/2017/01/09/welcome-to-the-adafruit-circuitpython-beta/
  - Atmel SAMD21, SAMD51 processoren
  - ESP8266, ESP32
  - simpelere interface, uniform API
  - striktere subset van Cpython
  - snellere ontwikkeling
  - https://github.com/adafruit/circuitpython#differences-from-micropython

PyCom

- Fork van MicroPython
- https://docs.pycom.io/gettingstarted/introduction.html
- ESP32 development boards voor
  - WiFi/Bluetooth LE
  - LORA
  - SigFox
  - LTE
  - NarrowBand

Handige Links

- MicroPython libraries
  - https://github.com/micropython/micropython-lib
- Circuitpython source
  - https://github.com/adafruit/circuitpython
- Circuitpython modules voor diverse sensoren
  - https://github.com/adafruit/Adafruit_CircuitPython_Bundle
- ESP8266 forum
  - https://www.esp8266.com/index.php