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# IoT and DIY Automation

An introduction

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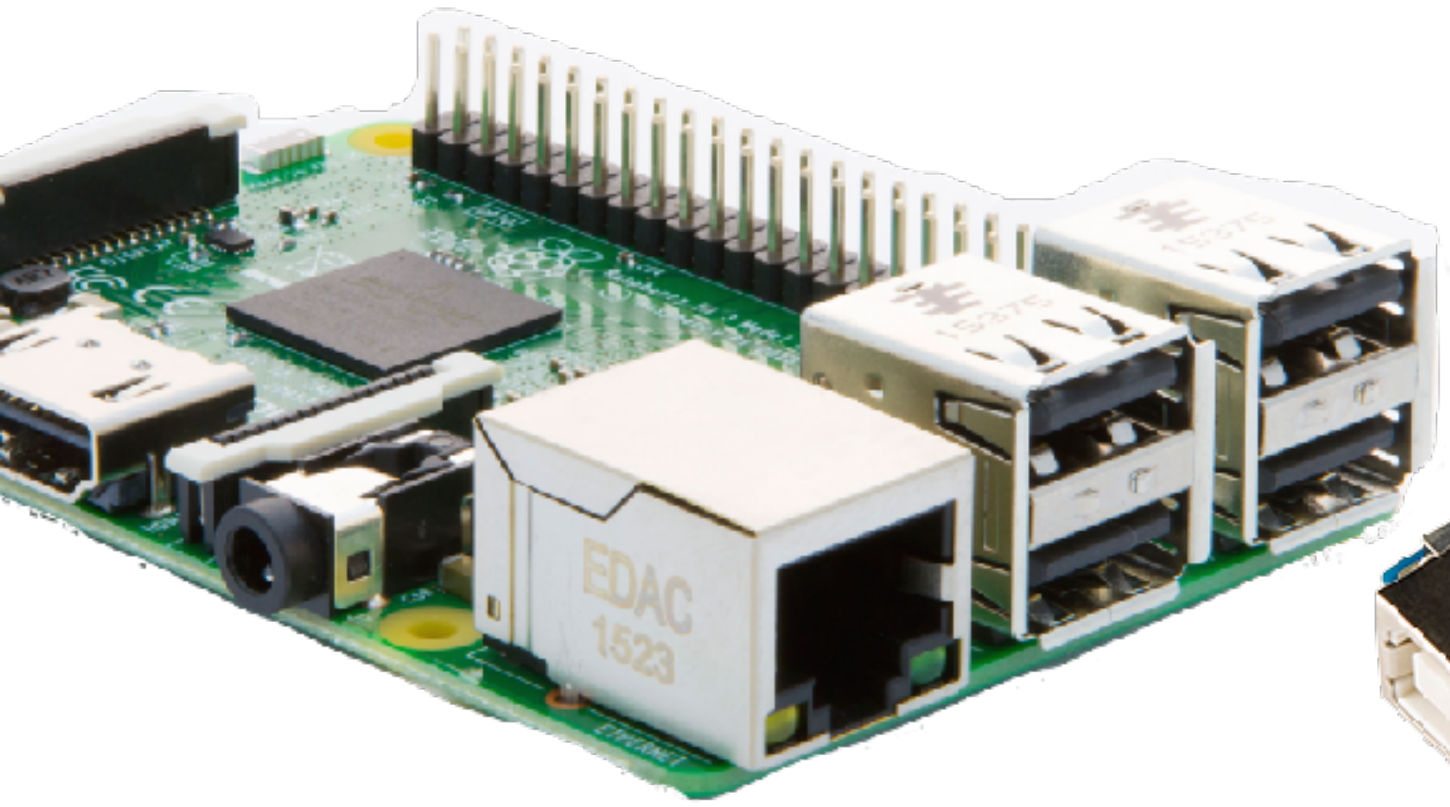
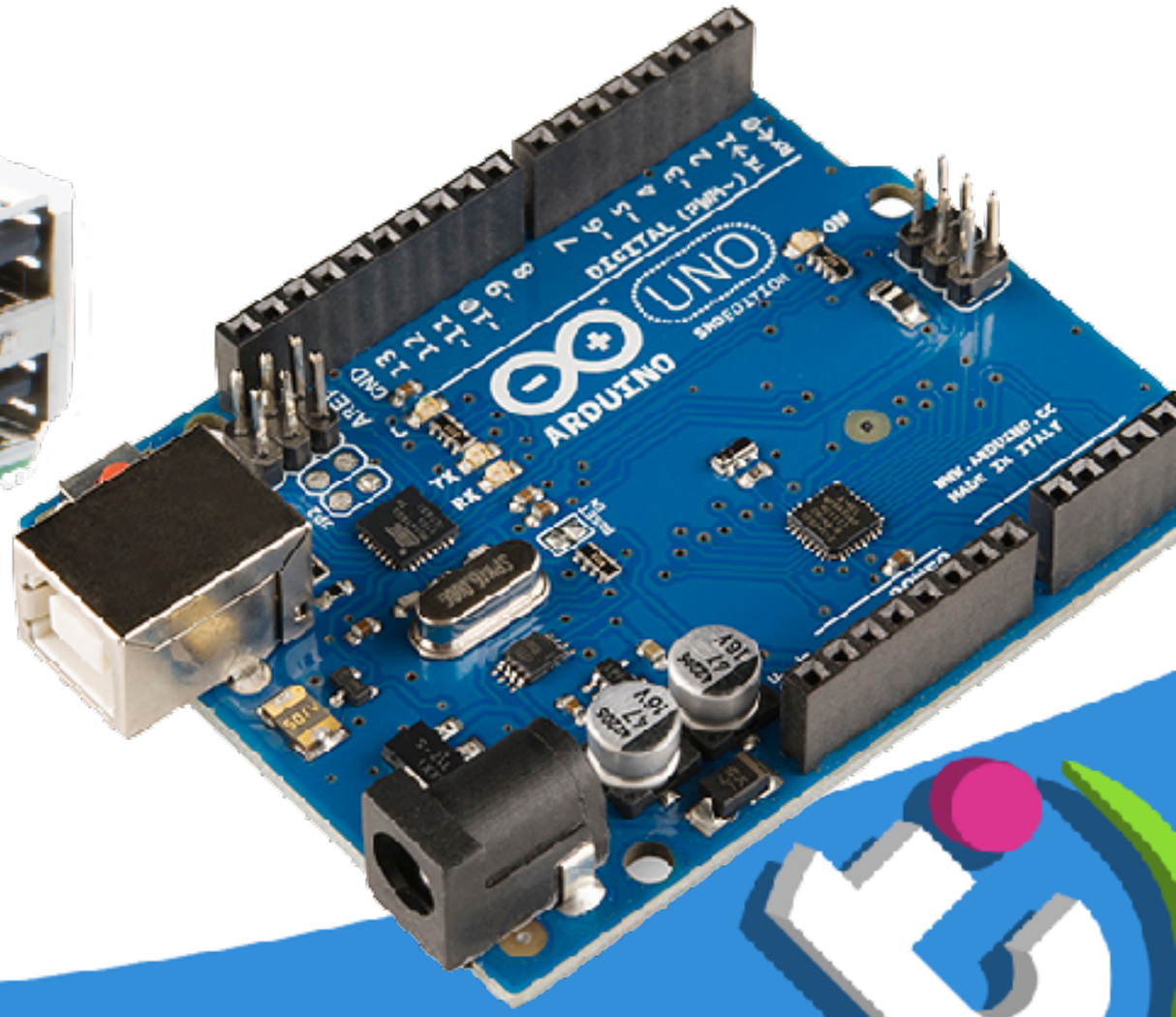
# Not …



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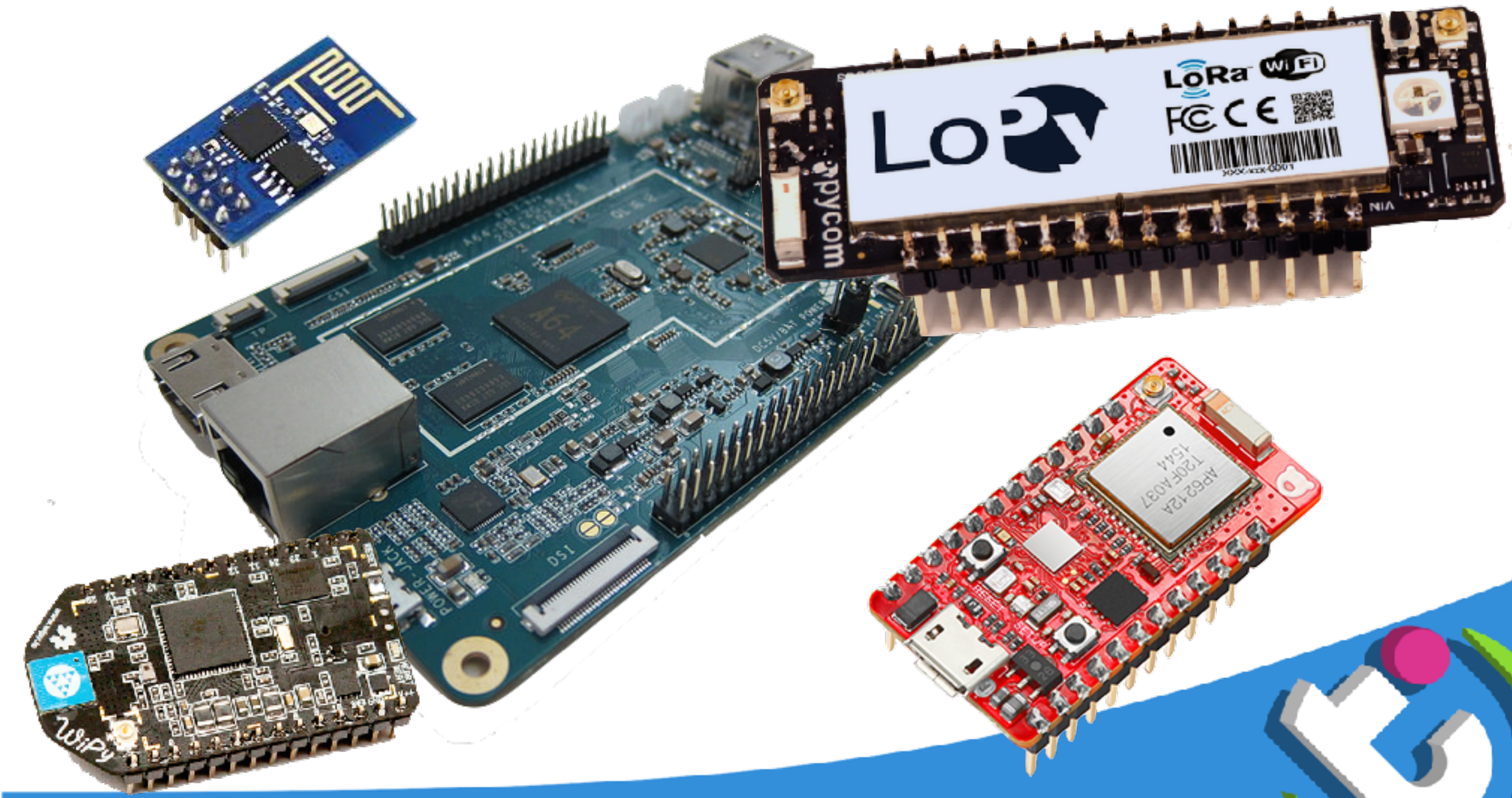
# But ...



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# Topics

- Devices
  - Development demos
- New wireless technology
- What to do with it?
- IoT Platforms
- Others
- How to get started?

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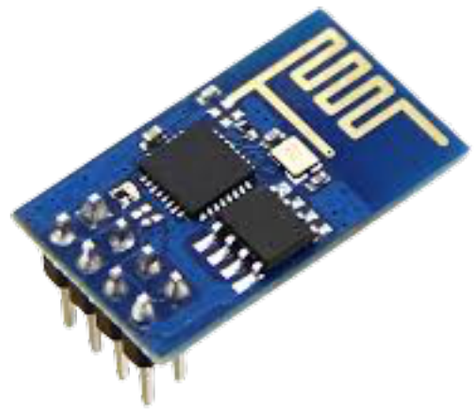
# ESP8266



- WiFi to Serial bridge
  - 802.11 b/g/n, WPA/WPA2, WEP/TKIP/AES
- Integrated TCP/IP stack
- low power 32-bit MCU
- SDIO, SPI, UART, I2C, I2S, IR Remote Control, PWM, GPIO
- 3.3V
- Up to 1Mb memory

Either offload WiFi traffic for other microcontroller, serial communication via AT commands.
Or runs own program.

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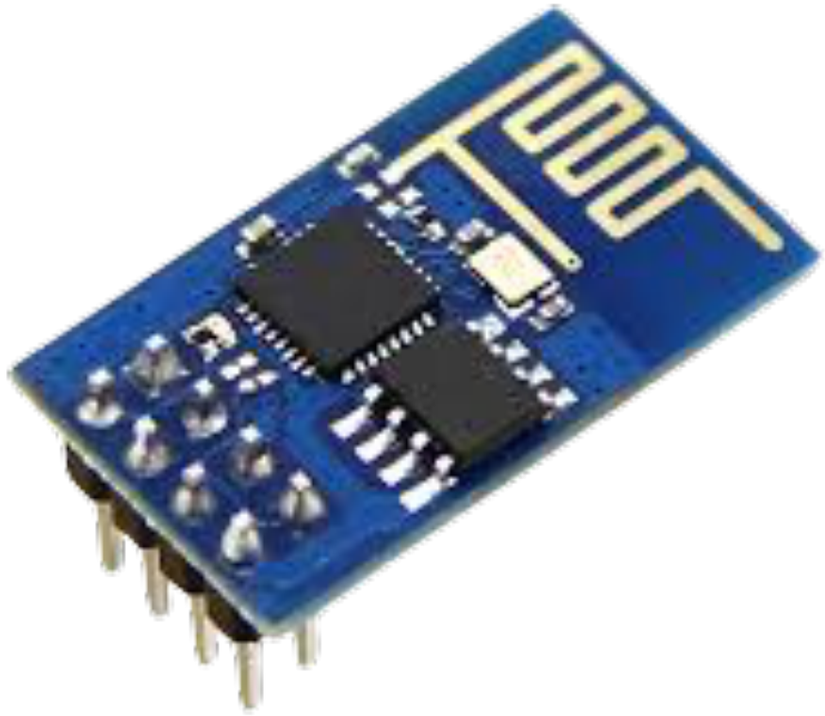
# ESP8266 Boards

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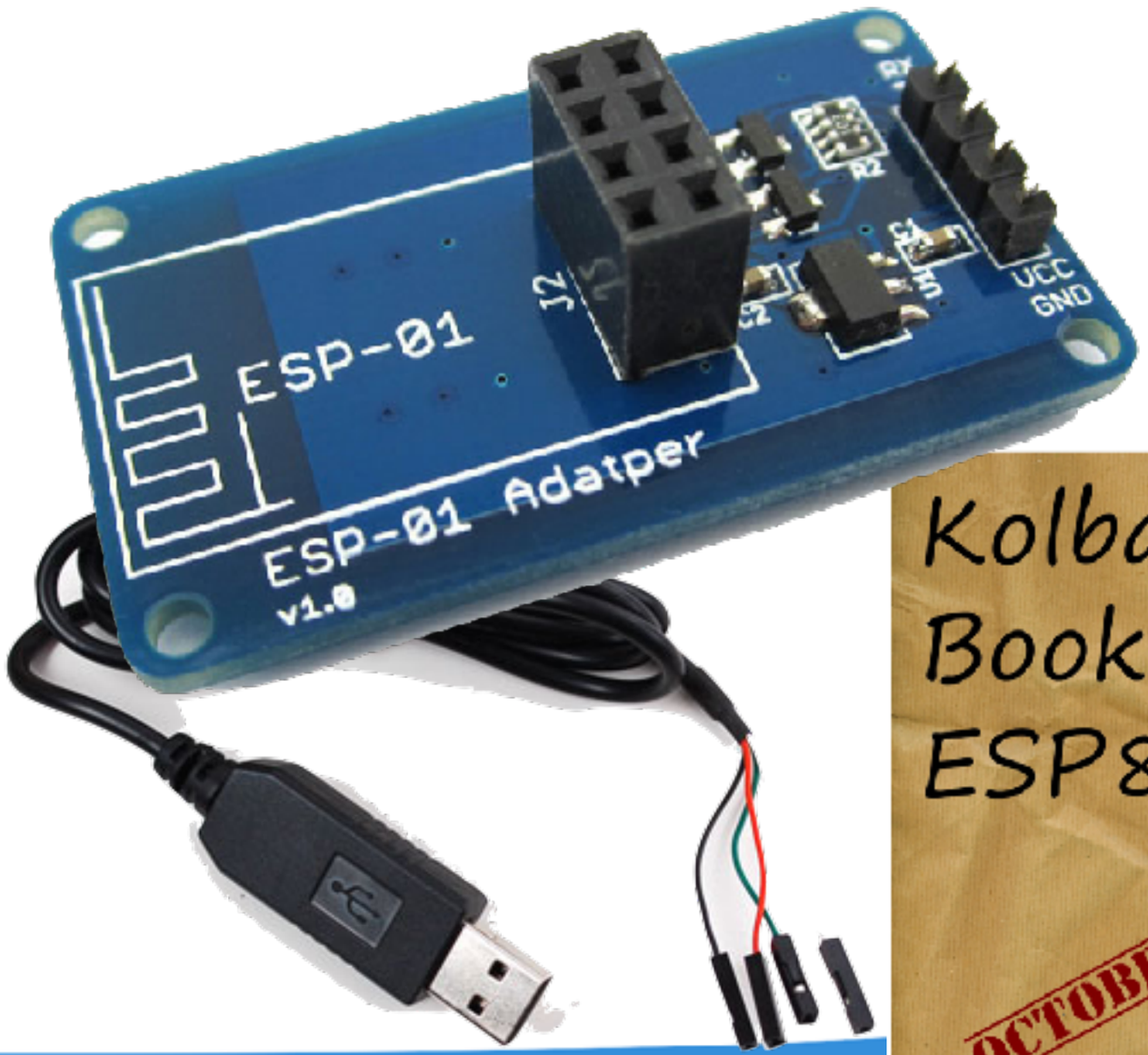
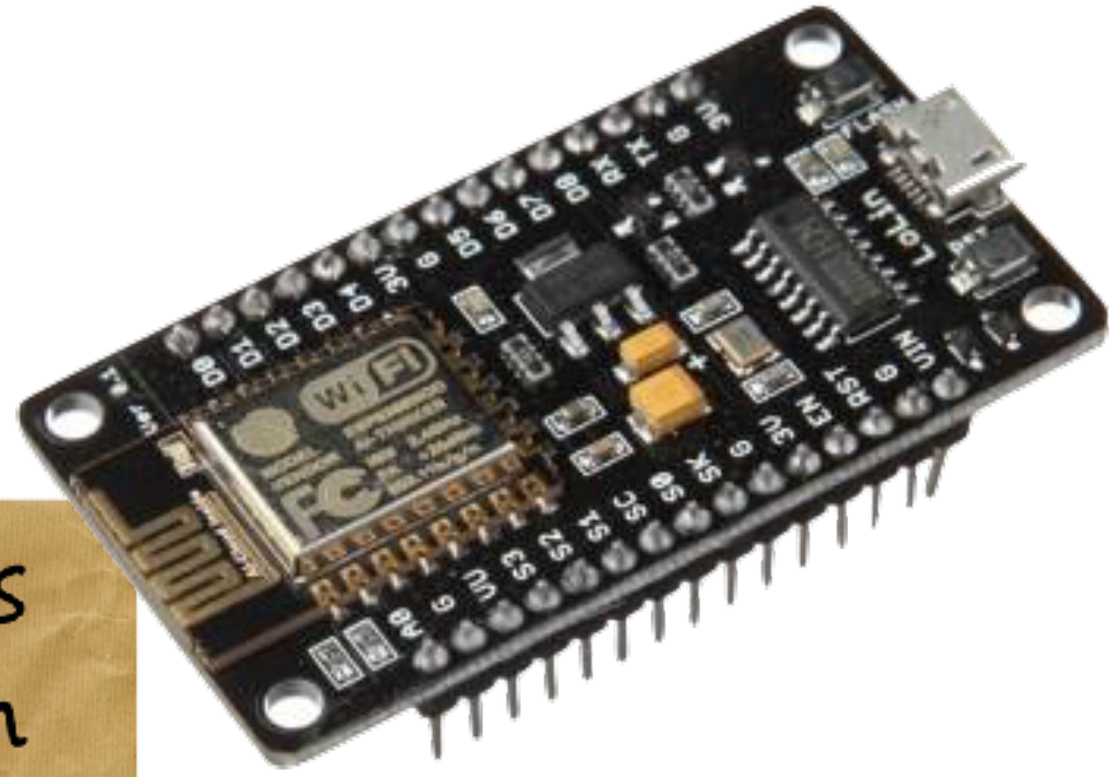
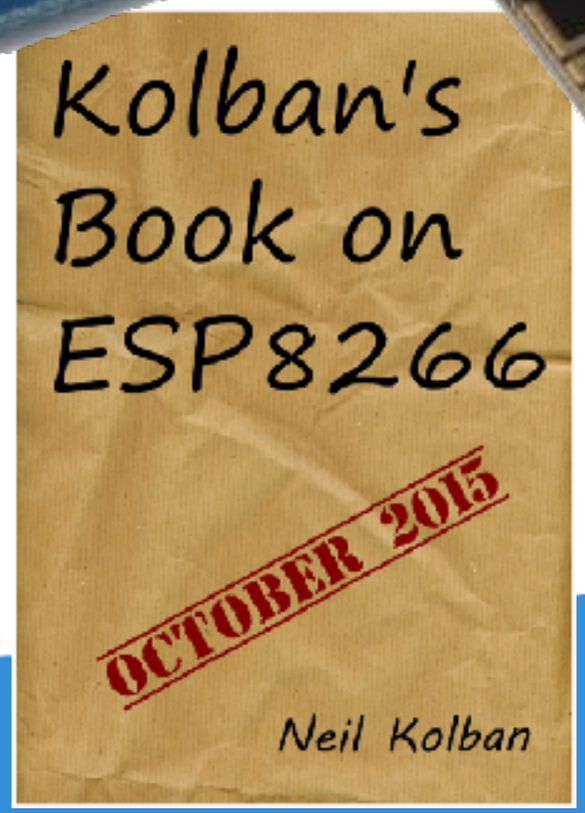
# ESP8266 Tools



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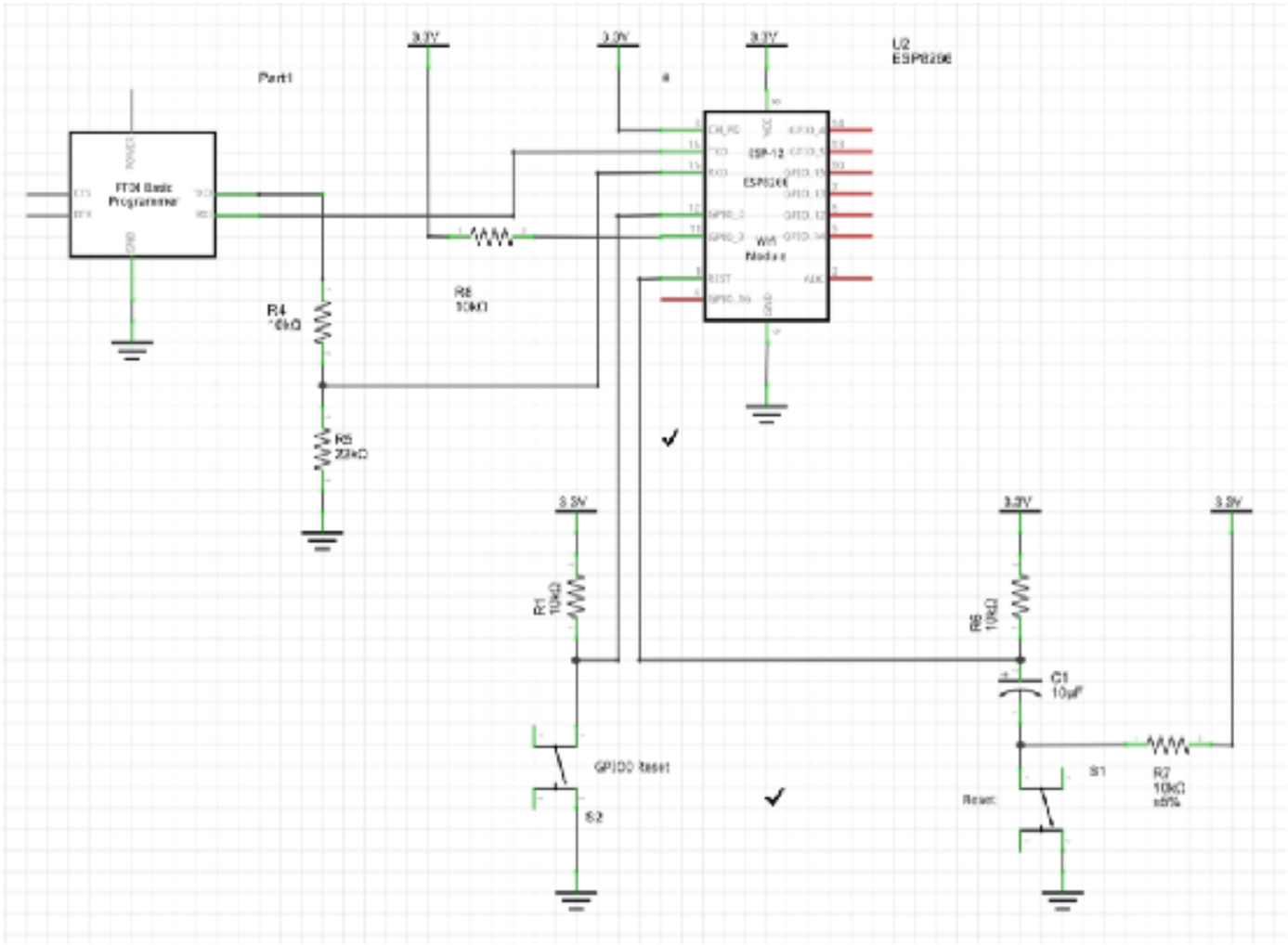
# ESP8266 Board



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# Developing for ESP8266

- Many languages:
  - C/C++, Lua, JavaScript, MicroPython
- Arduino IDE
- Sming - Docker container with Cloud9 IDE
- PlatformIO.org

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# PlatformIO

- Easy to setup C, C++ (Arduino-like) cross-build environment.
- IDE
- Library manager
- Supports many embedded platforms
- On multiple desktop platforms
- Extendable
- Many embedded boards
- Continuous integration

DEMO

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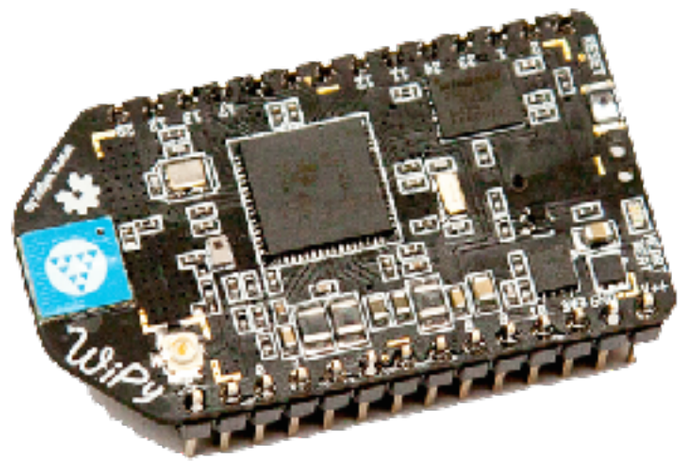
# WiPy




- Cortex-M4 @ 80Mhz
- 2Mb flash
- Wifi 802.11 b/g/n
- ultra low power (850uA with WiFi active)
- 100% Python programmable
- Lots of GPIO’s, interfaces and peripherals
  - 25 GPIO, UART, SPI, I2C, I2S, SD card, ADCs, timers, RTC
- OTA updates

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# Pine64

- Open source platform for both hardware and software
- Capable of running 64-bit Android and Linux
- CPU Cortex A53 (same as RPi 3)
- 1 or 2Gb DDR3
- RTC
- Gigabit ethernet
- HDMI - up to 4K, H.265, H.264
- Audio/mic
- additional ports (camera, touch panel, lcd panel)
- Extenable with Bluetooth, Z-wave, I/O board, WiFi

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# RedBear Duo

- WiFi + BLE board
- Cortex-M3 + Broadcom WiFi & BLE
- 2Mb flash
- 18 I/O pins
- RGB status led
- Arduino, JavaScript, Embed C
- Extension board for grove modules
- Works with Blynk

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# RedBear Duo

- Easy development with Particle.io

DEMO

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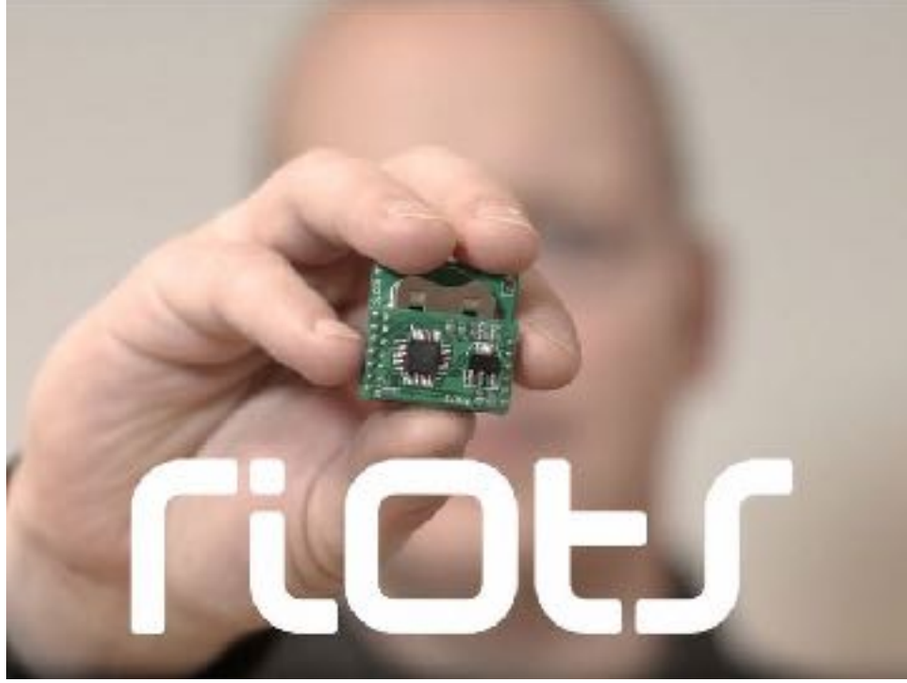
# Riots




- Affordable wireless IoT microcontrollers and sensors
- Open source hardware / software
- pre-programmed
- mesh network
- Arduino compatible
- Mamas and babies
  - Air, light sensor, gyro (movement), button, dc control, usb (programming)
- Cloud and mobile

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# New wireless technology

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# LoPy

- Dual processor + WiFi radio SoC
- Flash 1Mb internal, 4Mb external
- 25 GPIO, 2 UART, SPI, I2C, I2S
- Input 3.3V - 5V
- LoRaWAN (class A and C)
- BlueTooth Low Energy
- RTC

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# What to do with it?

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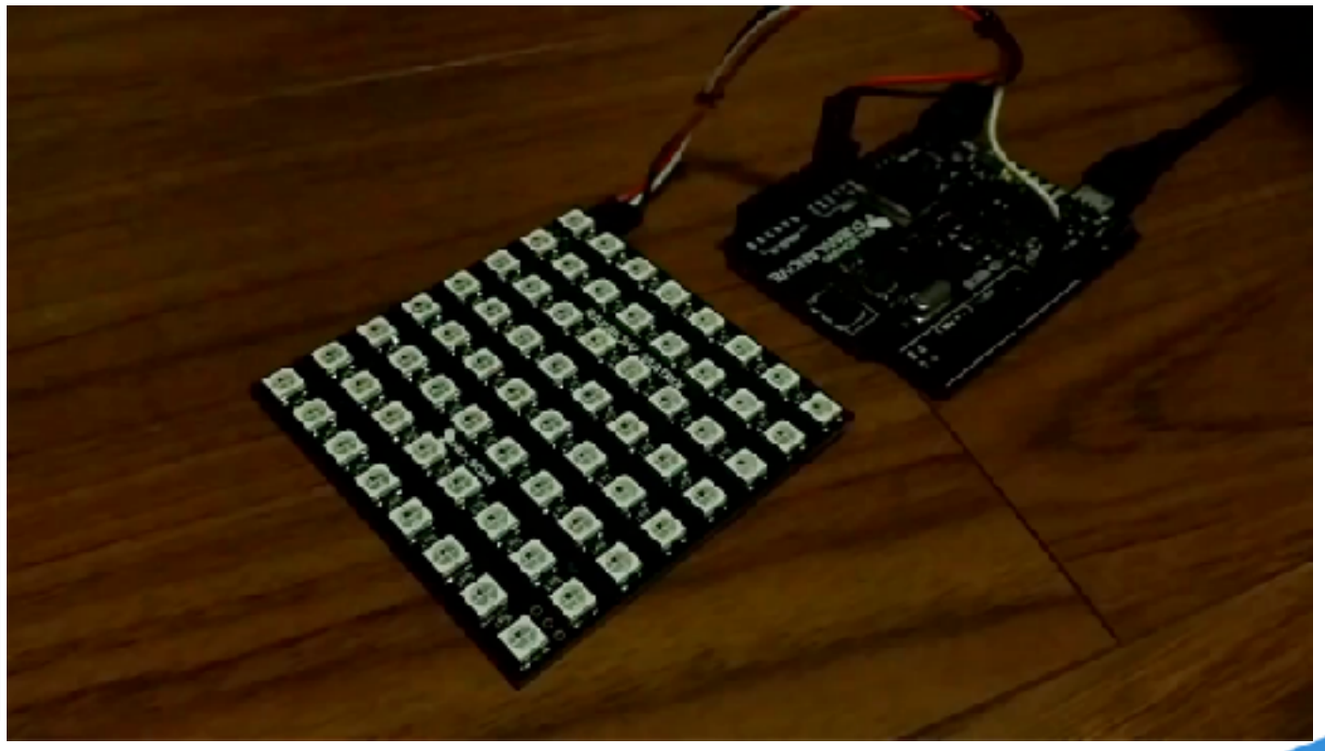
# WS2812B



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# LightSaga

# IoT Platforms

Many IoT platforms available.
Amazon AWS, Microsoft Azure, IBM BlueMix / Watson,
Oracle Cloud, SAP, …

But also:
Particle.io, thethings.io, KaaProject.org
and many others.

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# Home Automation

A Home Hub ‘War’ ?

Open source projects
Available in many languages
OpenHab, OpenRemote, …

New: Animus Home, Protonet Zoe

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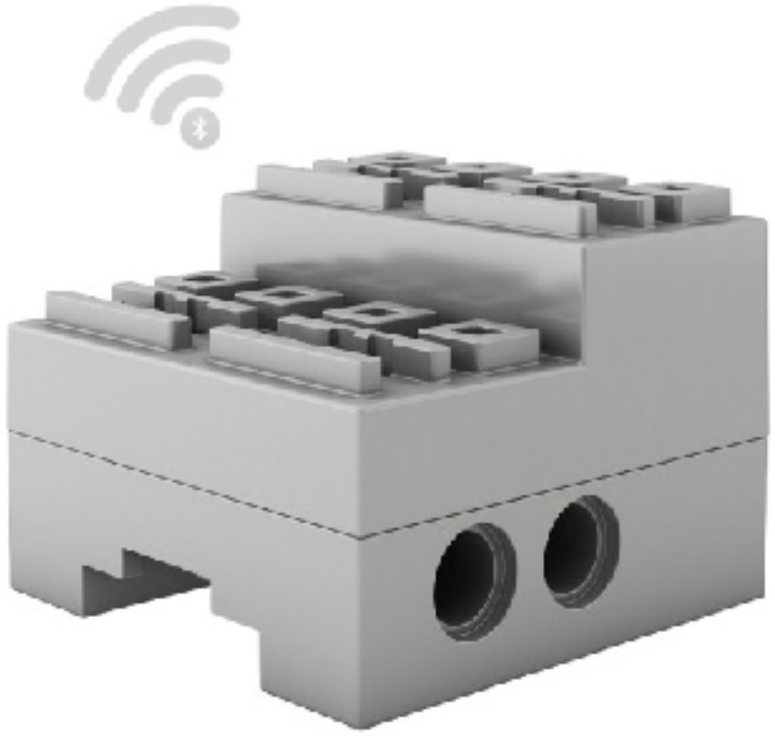
# Others

Angee

Jibo



SBrick

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# How to get started?

Question to ask yourself before you start

- Which device is suited for your project
- Which language to program your device?
  - C, C++ (Arduino-like)
  - Python
  - Jvm (Java, Groovy, Scala)
  - Go
- Setup program / cross build environment

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# Thank you