

JavaScript and the Internet of Things

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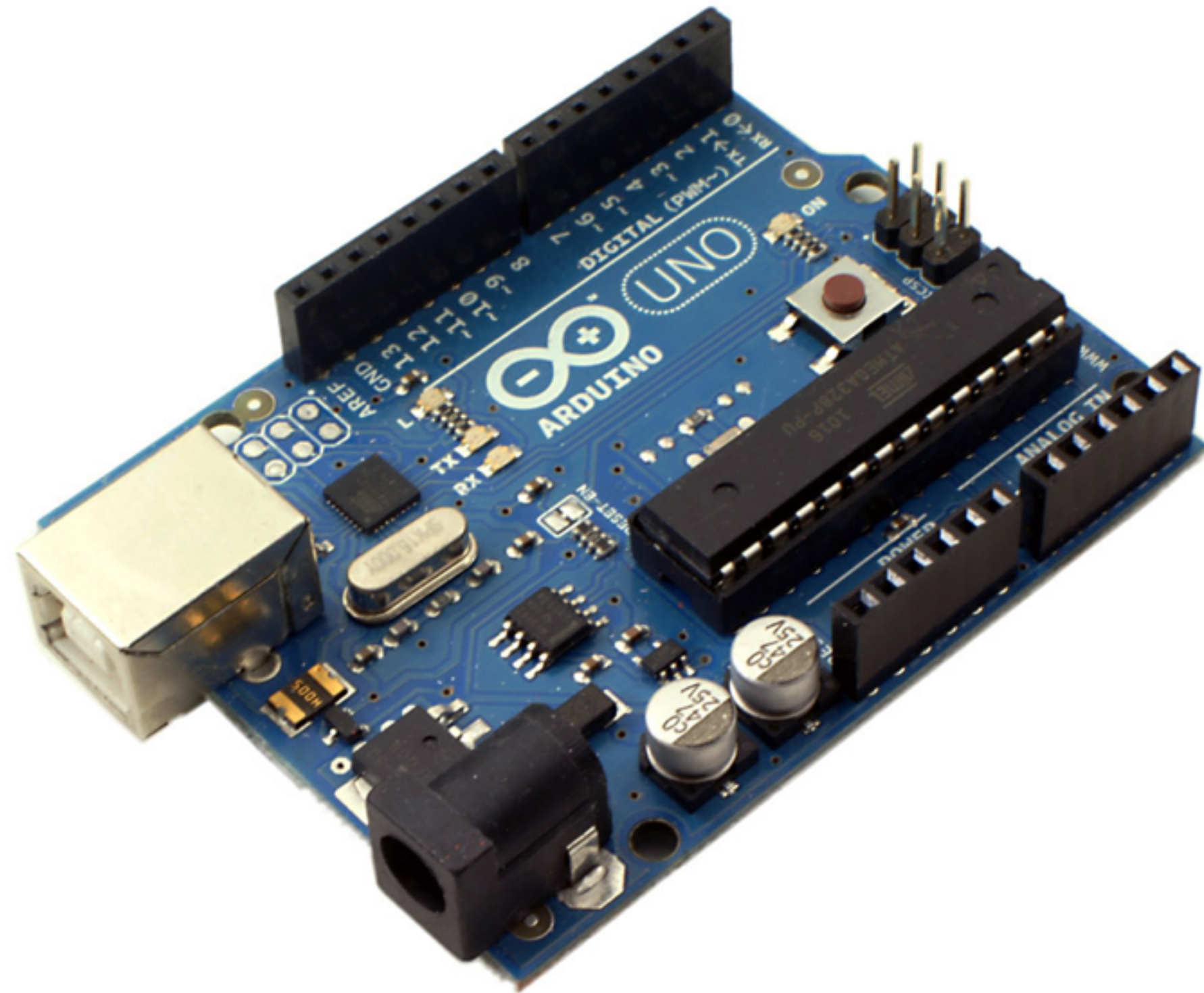
What is the Internet of Things? (IoT)

Physical objects with embedded with electronics, sensors and software connected to the internet*.

IoT Examples

- Smart Thermostat
- Security Systems
- Health Monitor
- Fitness Tracker
- Smart Mirror
- Weather Stations
- Real-time Price Displays
- Smart Locks
- Smart(er) Cars
- Energy Saving Apps

History of Hobbyist Electronics



- Pre-Arduino Era
 - High Friction / Expensive - 💰💰💰
- Arduino Era
 - Lower Friction / Cheaper - 💰
- Today
 - Moore's Law Means Powerful Devices...

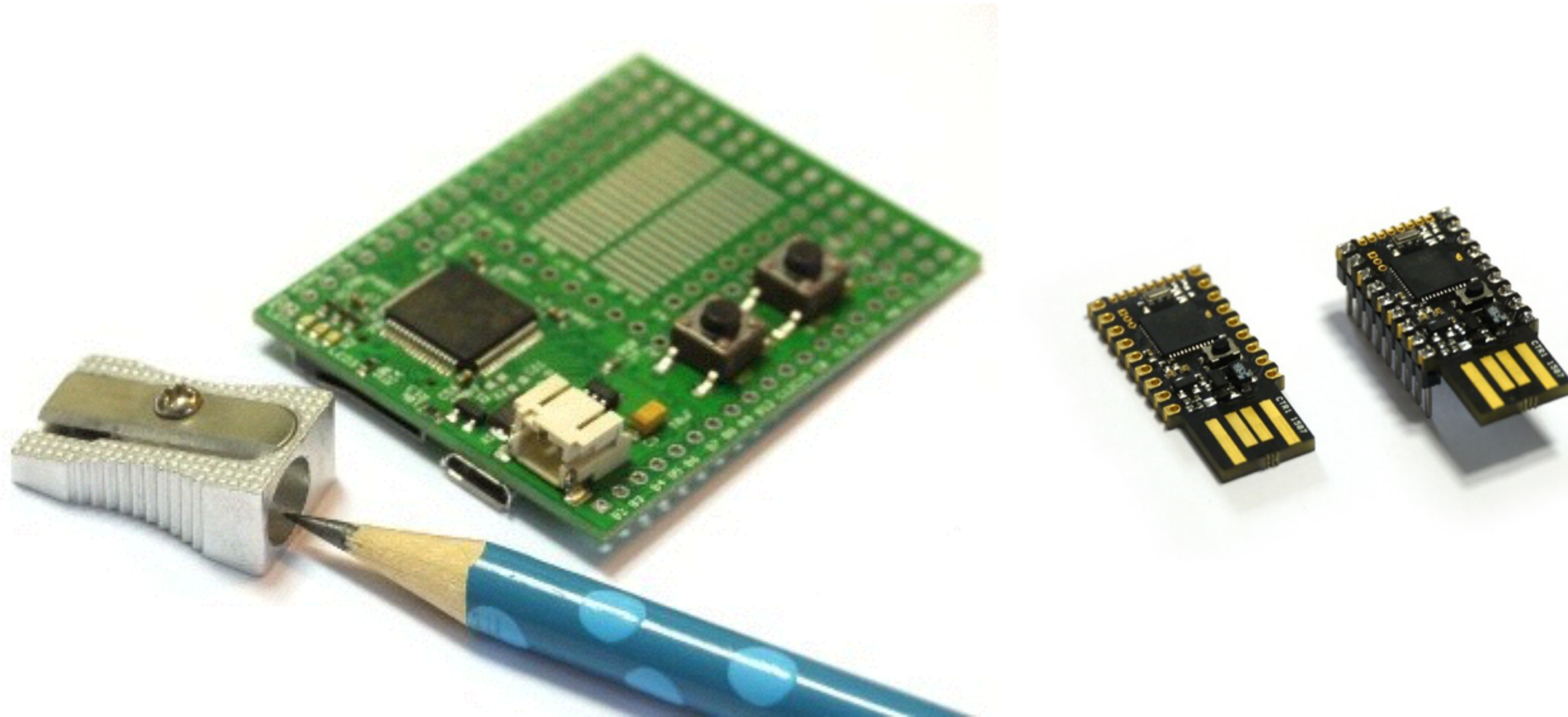
JavaScript

JavaScript IoT Strategies

- JavaScript Only Microcontrollers
- Emended Linux Devices /
Single Board Computers
- Hybrid Solutions / Client-Host

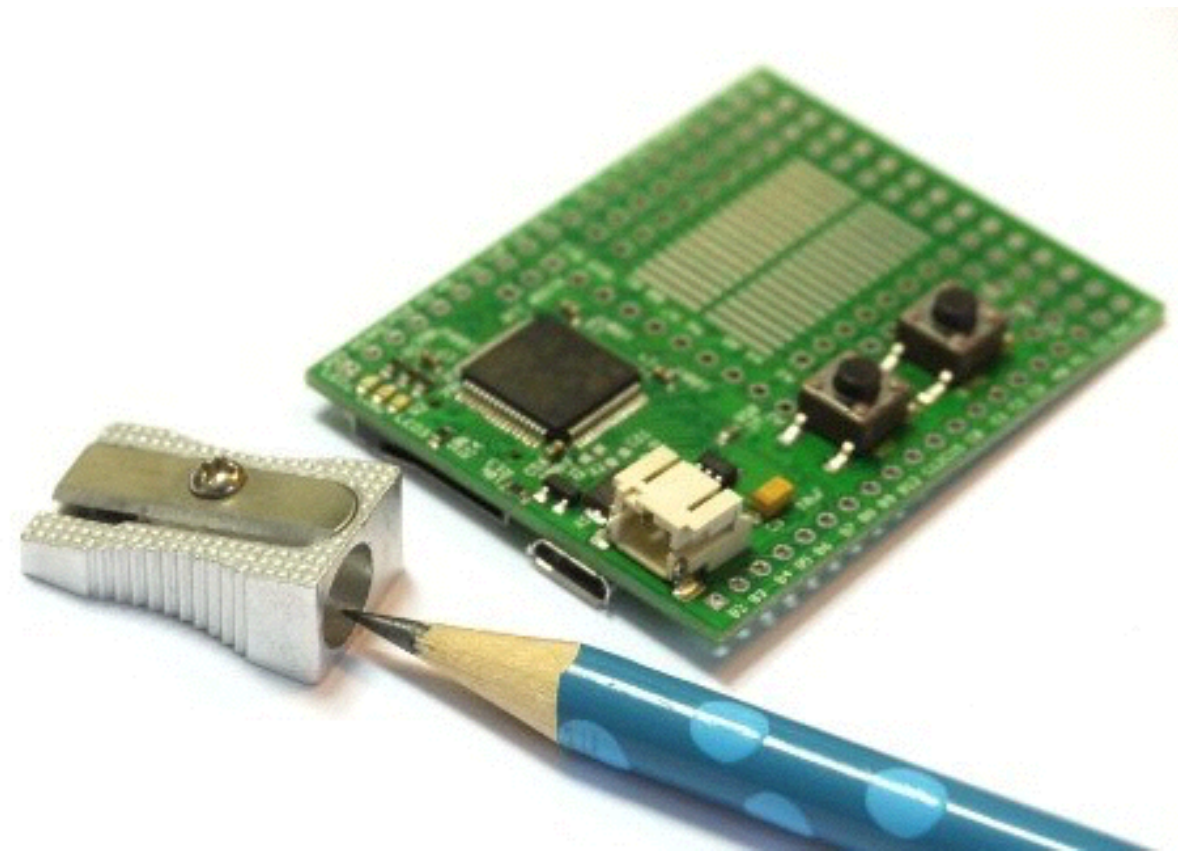
JavaScript Only Microcontrollers

- Espruino / Espruino Pico
- ESP8266 / NodeMCU* (and Family)

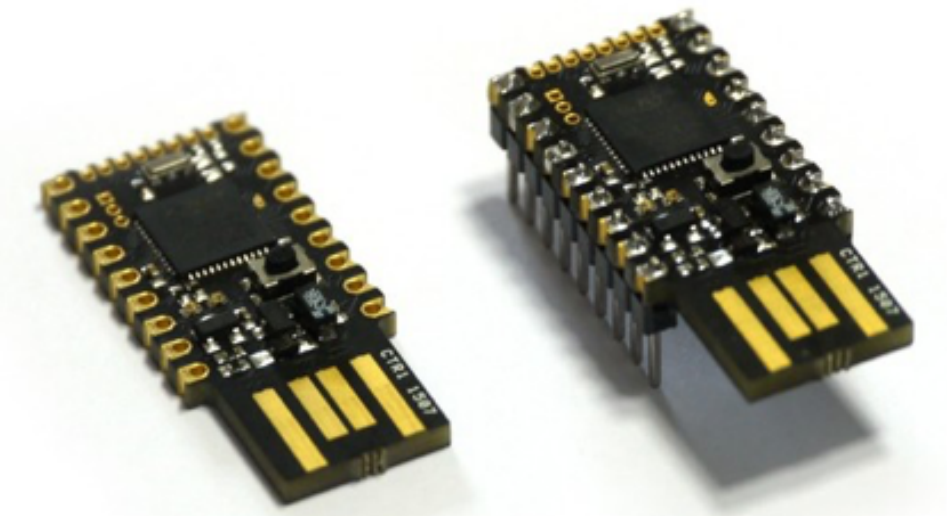


Espruino / Espruino Pico

Microcontroller
(JavaScript)



Espruino / Espruino Pico



Pros

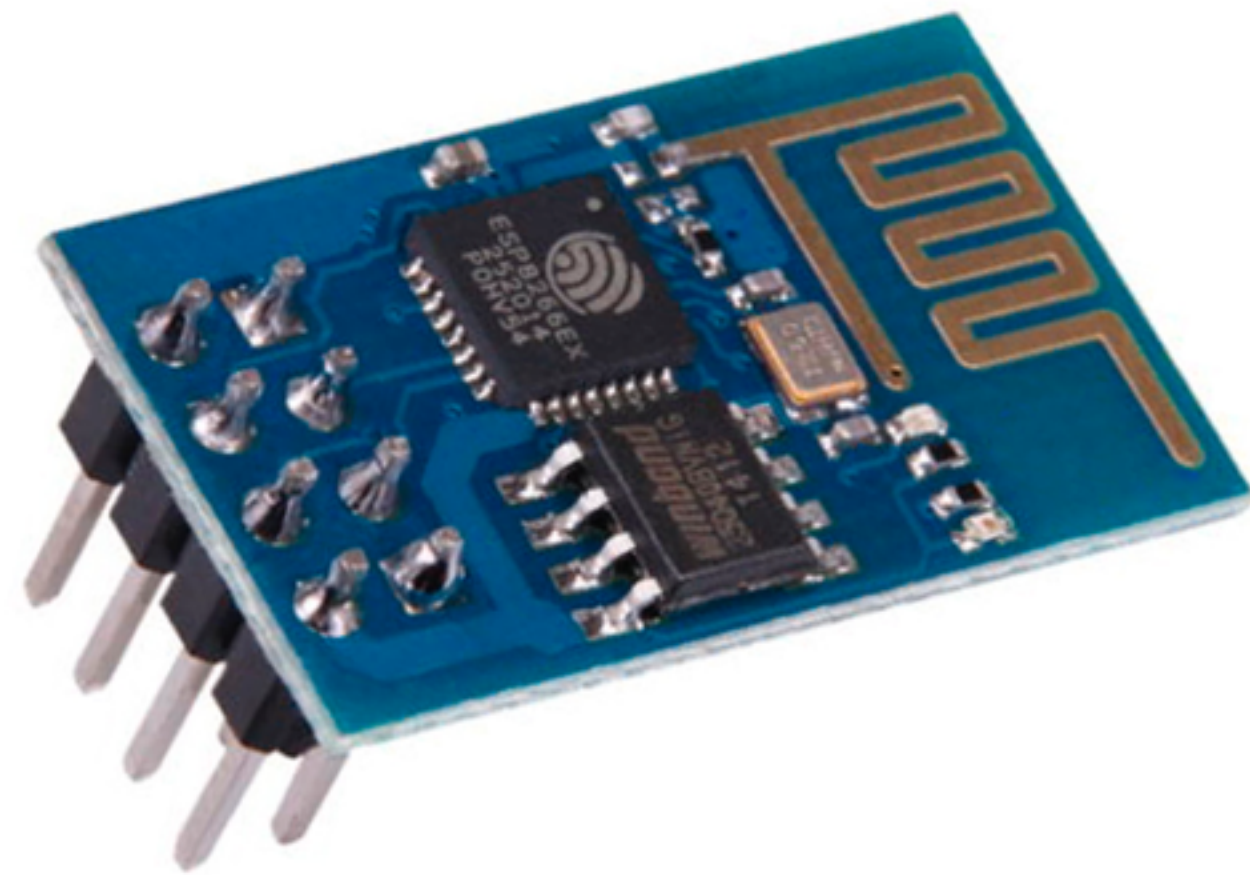
- Web IDE
- Small / easily embeddable
- Community Forum
- Compatible other boards

Cons

- Web IDE
- It's just a thing
- Lots of soldering
- Expensive*
- Uncharted seas

wifigotchi.com

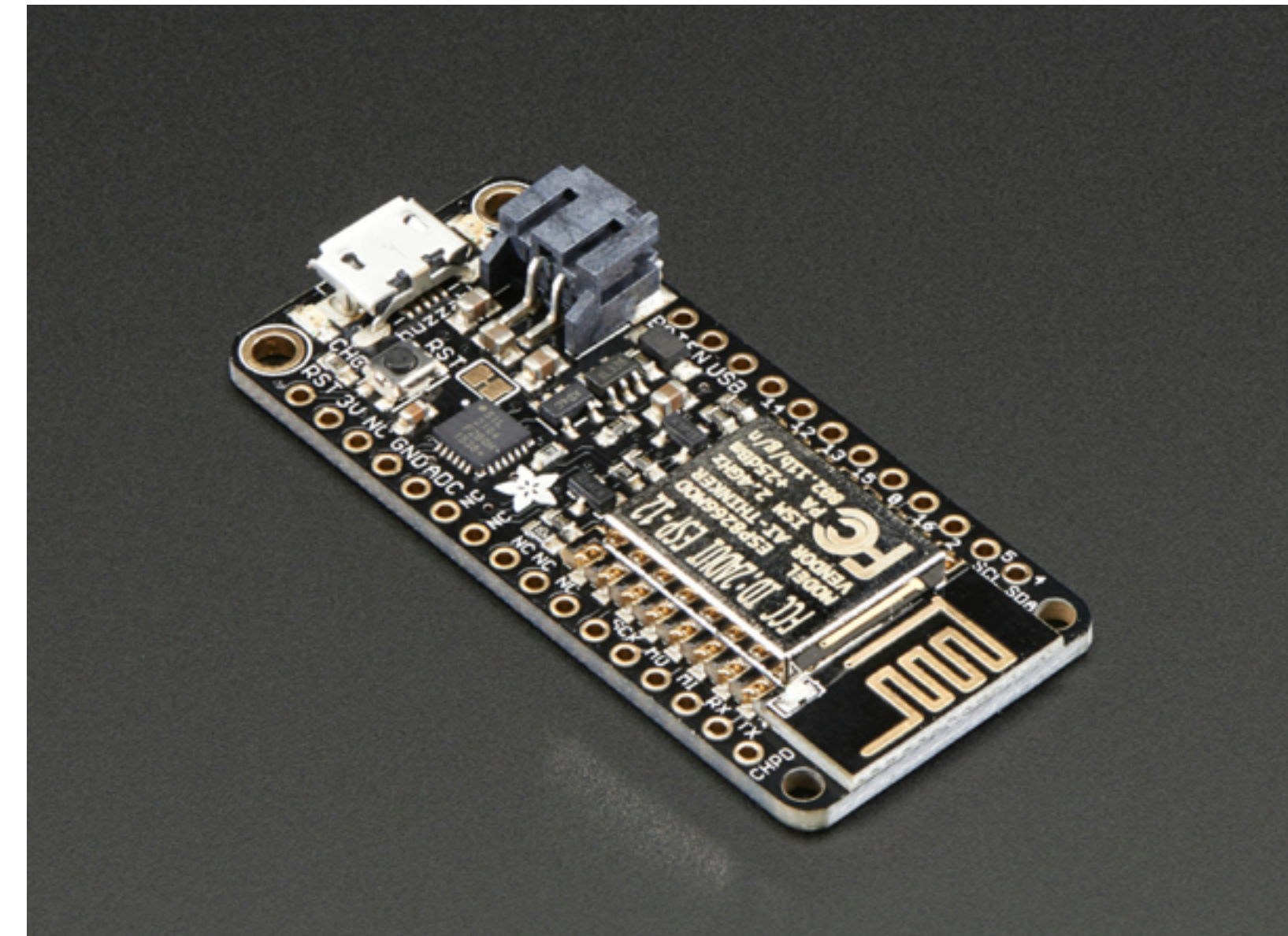
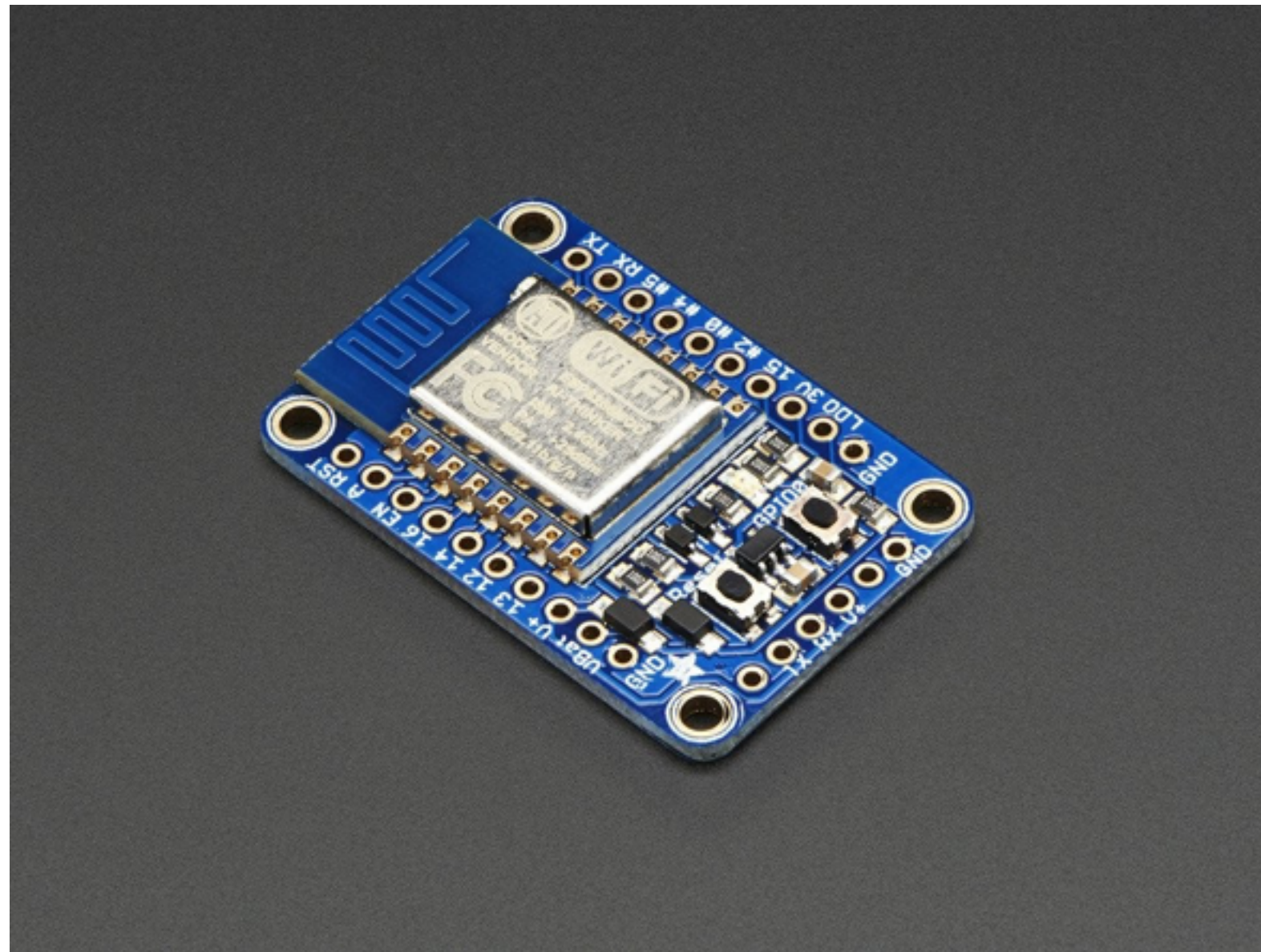




ESP8266 / NodeMCU

Microcontroller

(Arduino / Lua / Espruino's JavaScript Runtime)

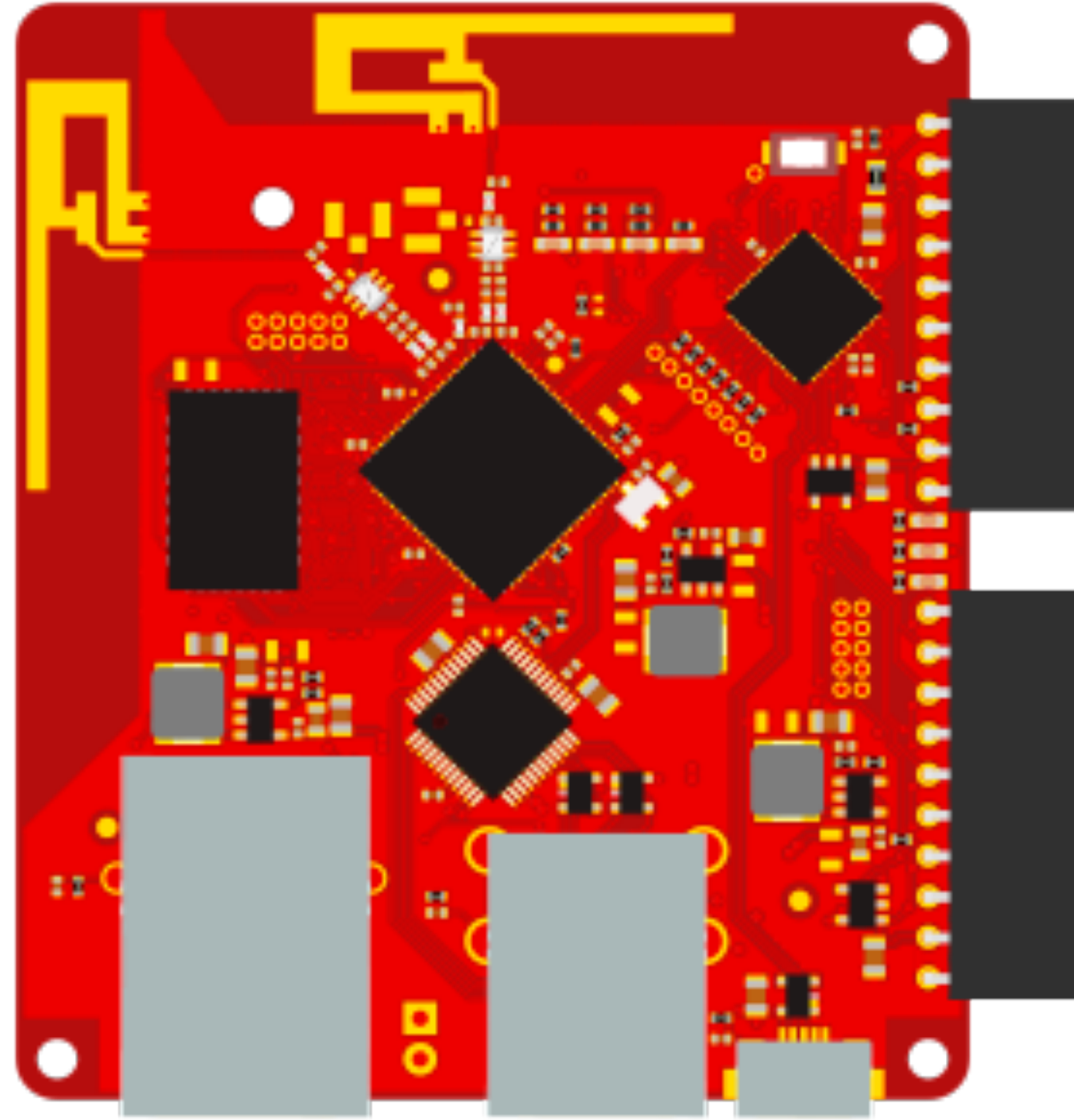


Adafruit Huzzah Family

ESP8266 Based Microcontroller
(Arduino / Lua / Espruino's JavaScript Runtime)

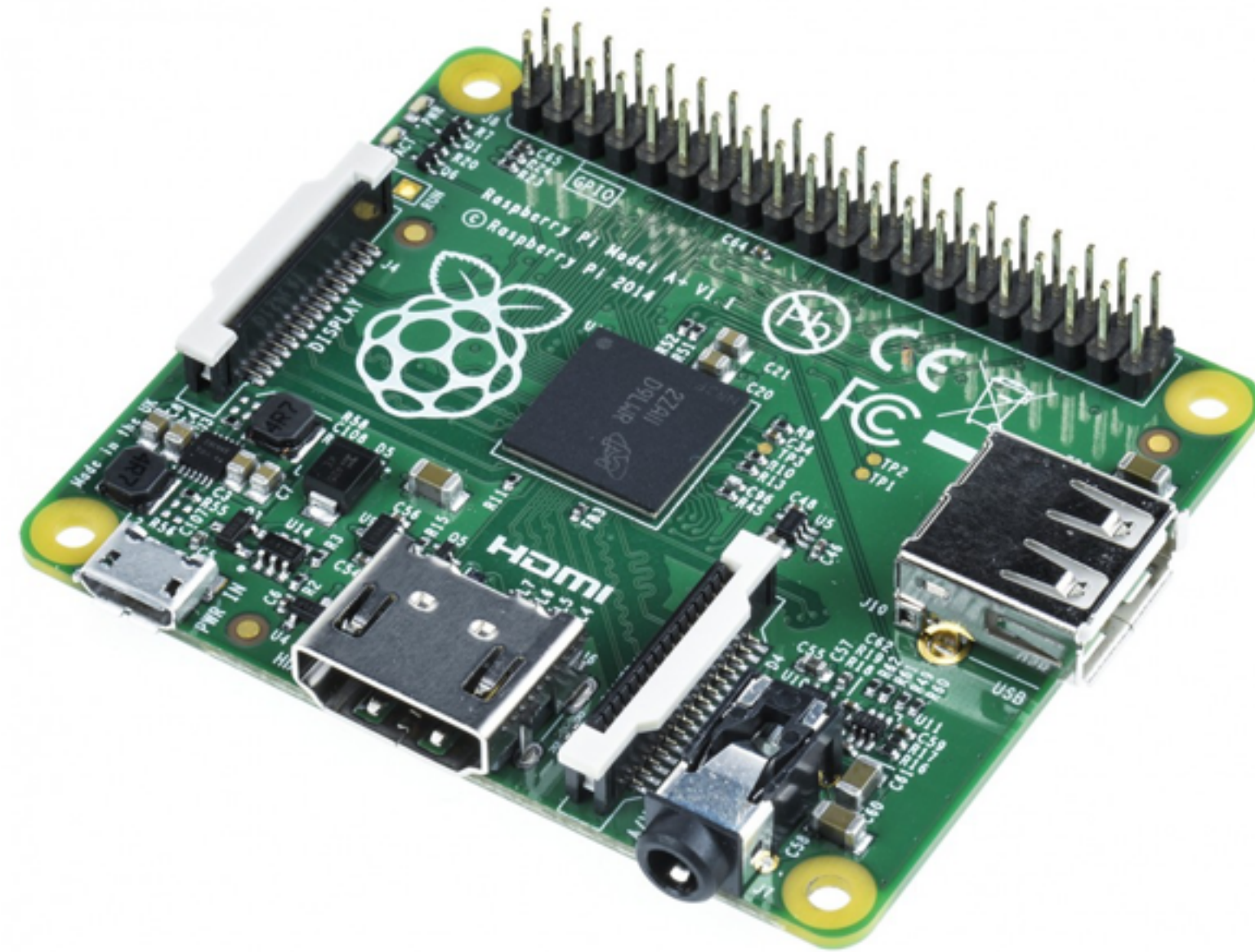
Embedded Linux Devices / Single Board Computers

- Tessel 2
- Raspberry Pi
- C.H.I.P.*



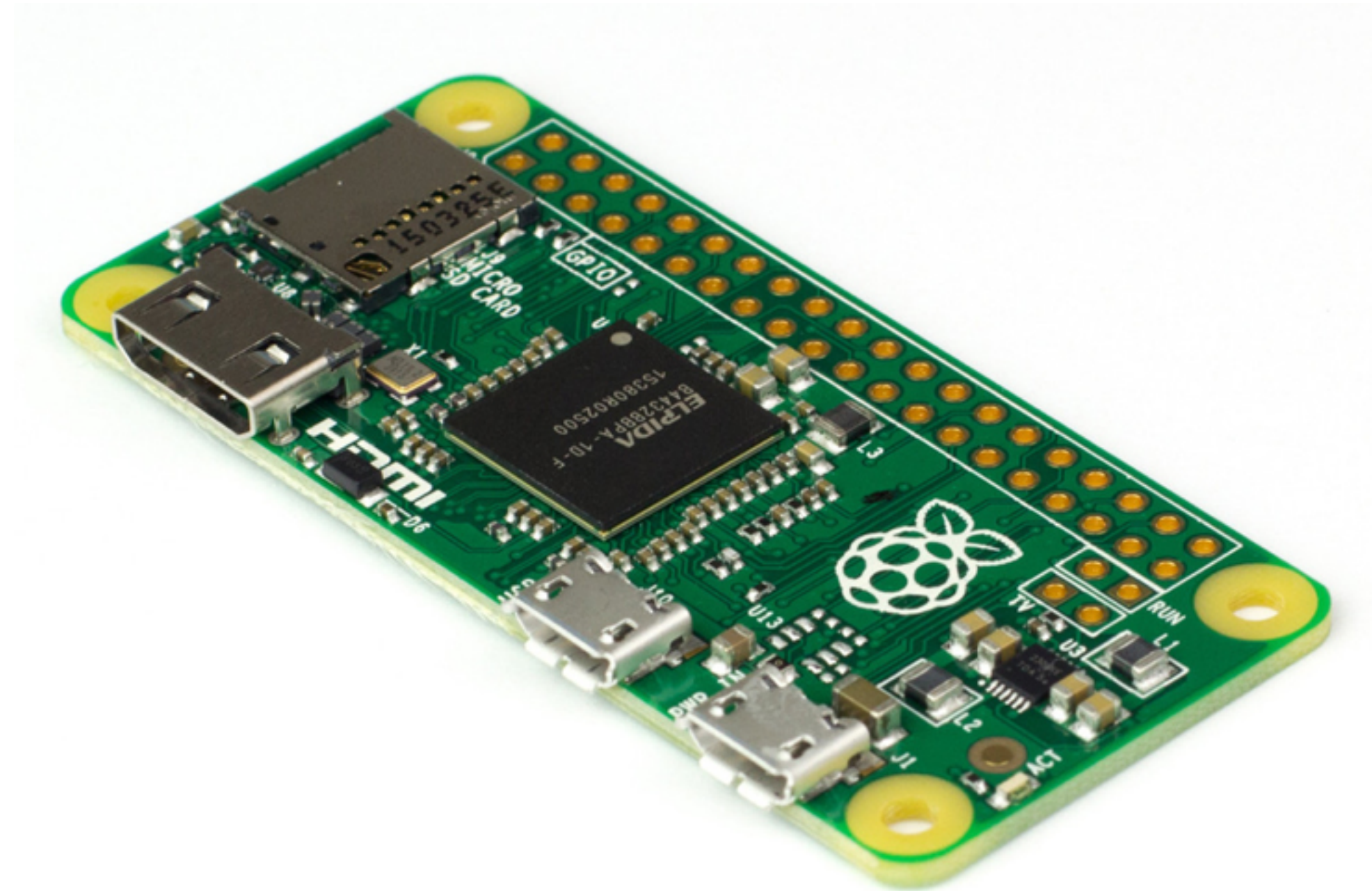
Tessel 2

Embedded Linux Device



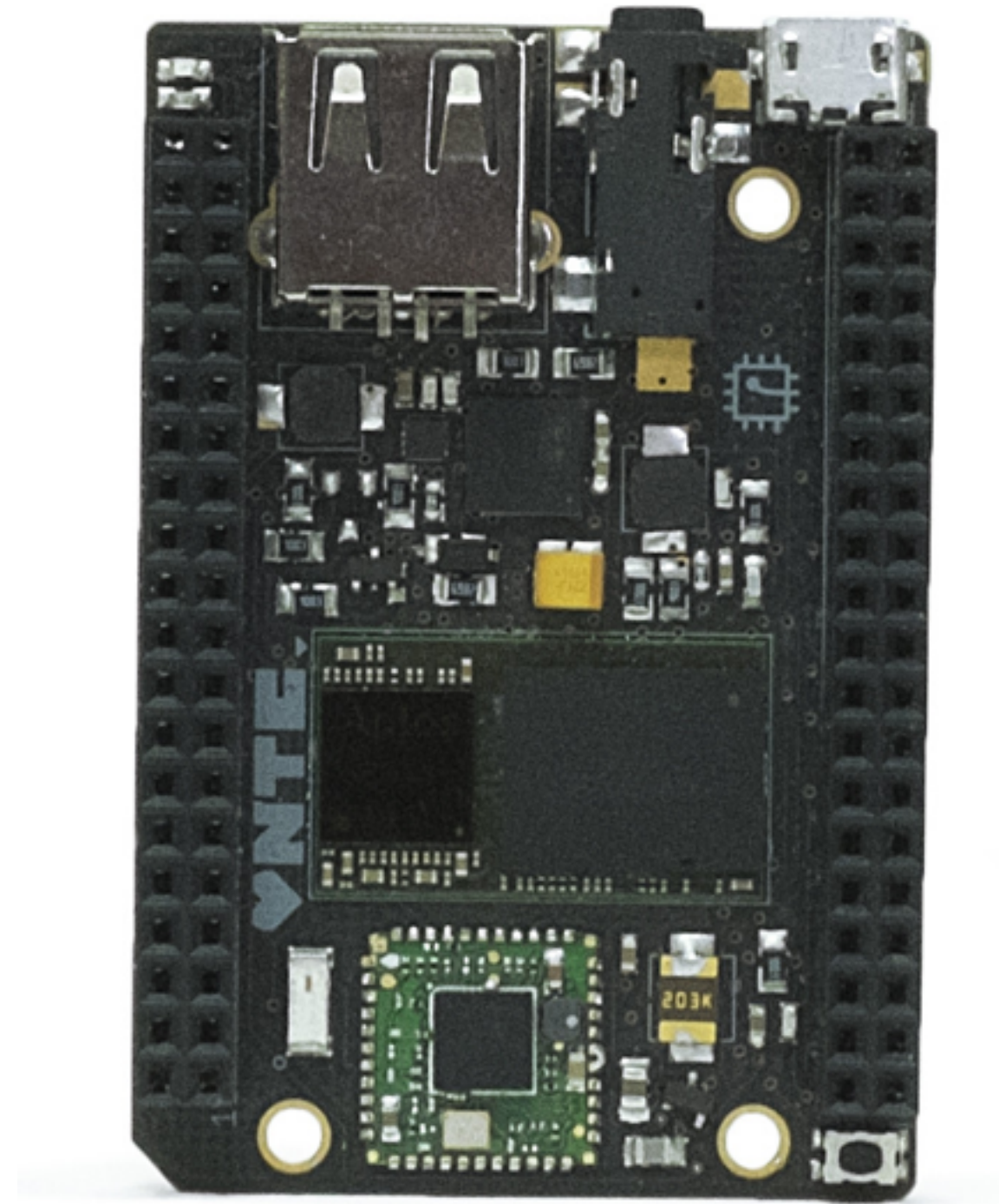
Raspberry Pi A+ / 3 B

Embedded Linux Device



Raspberry Pi Zero

Embedded Linux Device



C.H.I.P.*

Embedded Linux Device

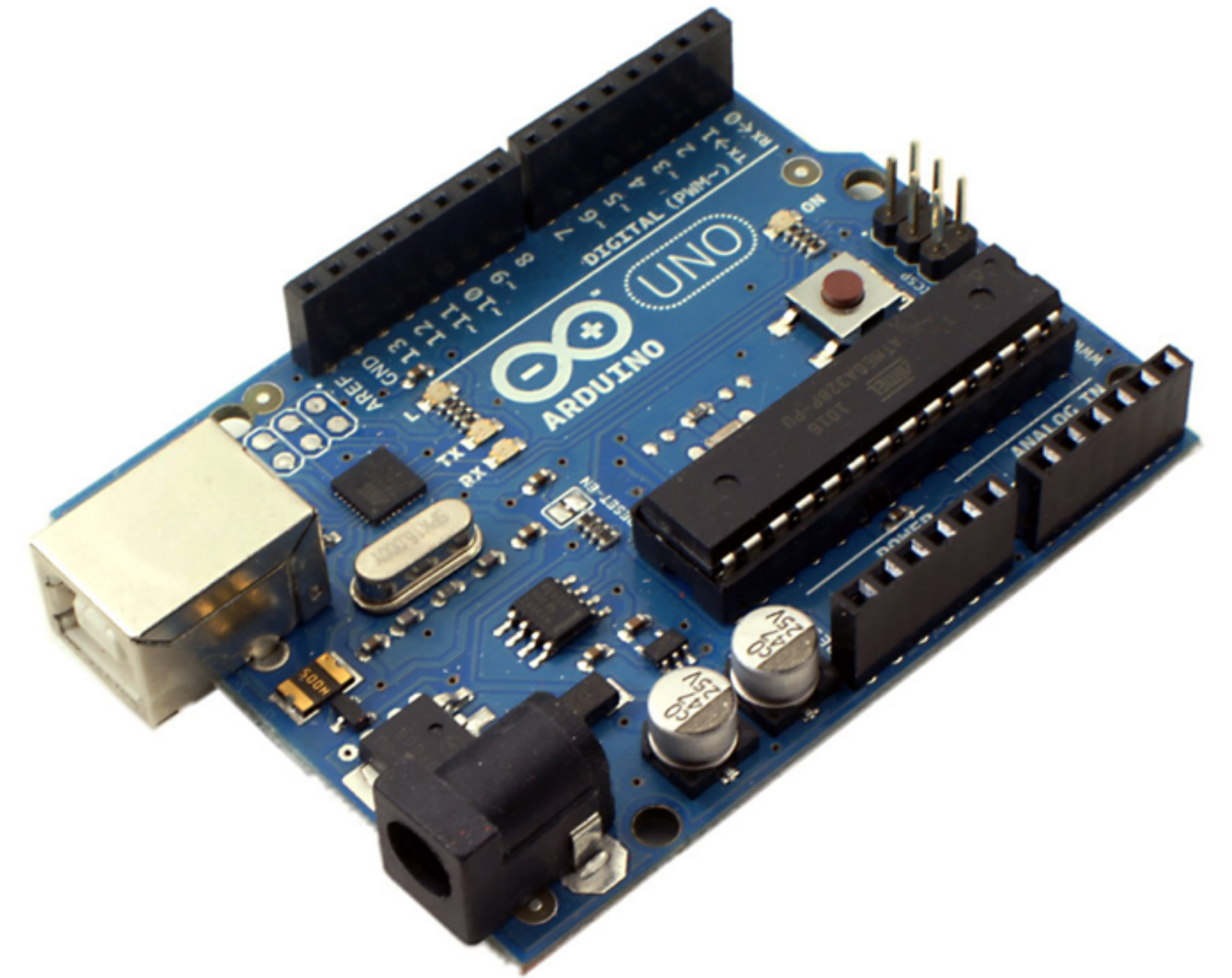
Embedded Linux Devices

Pros

- Runs any software
- Can be cheaper than microcontrollers
- Mature ecosystems

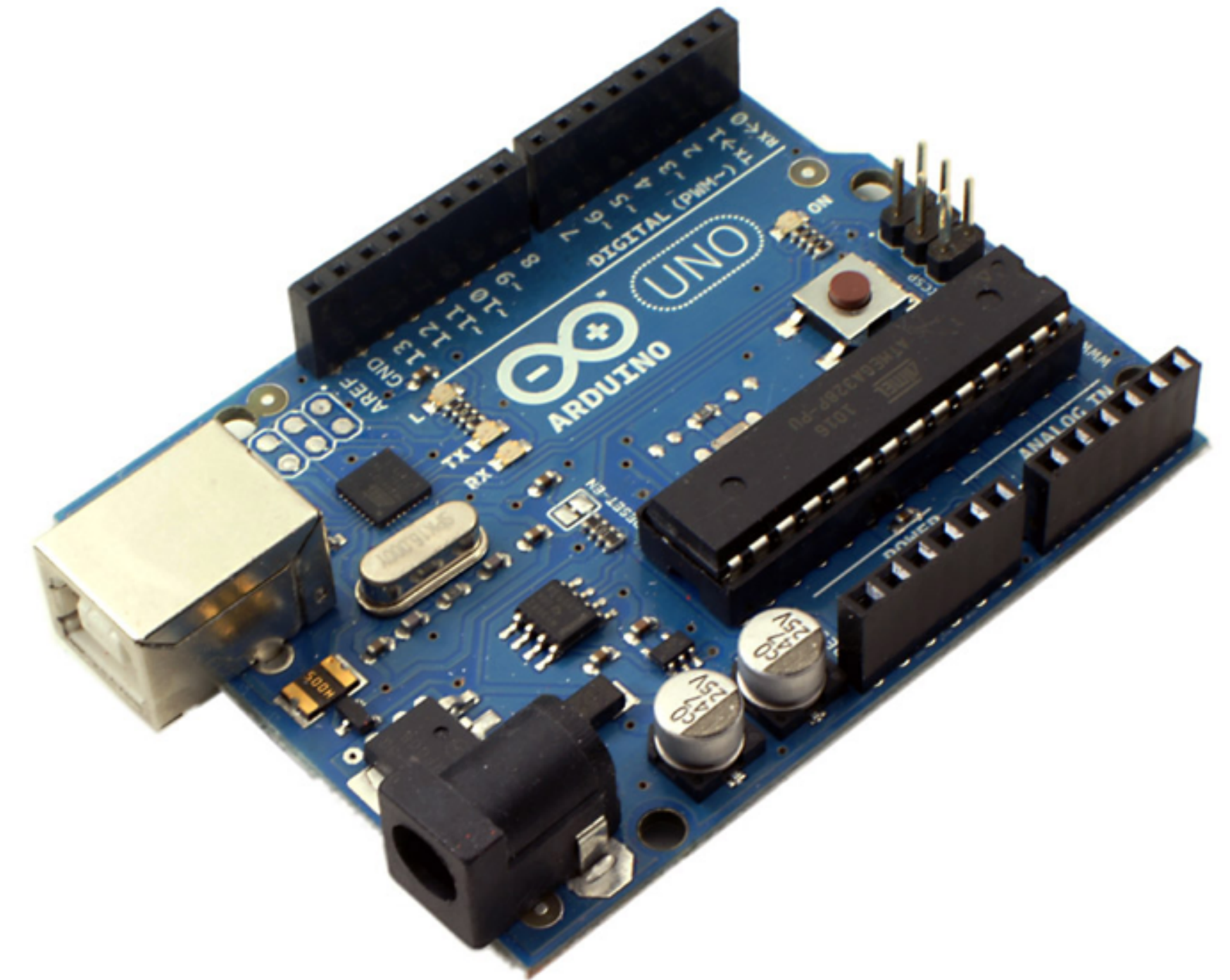
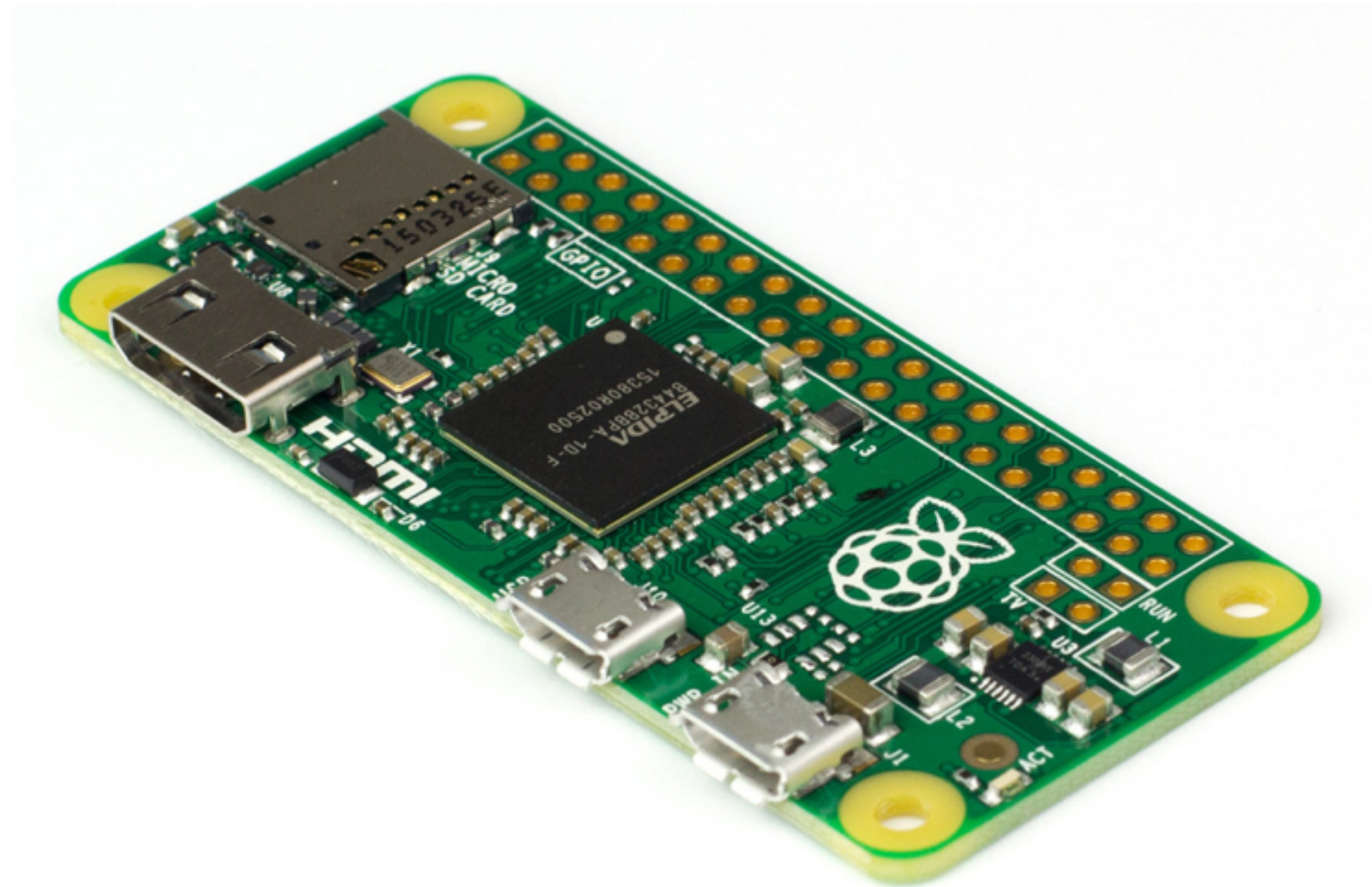
Cons

- Needs to boot up
- IO is not as responsive
- More points of failure and attack
- Still Expensive



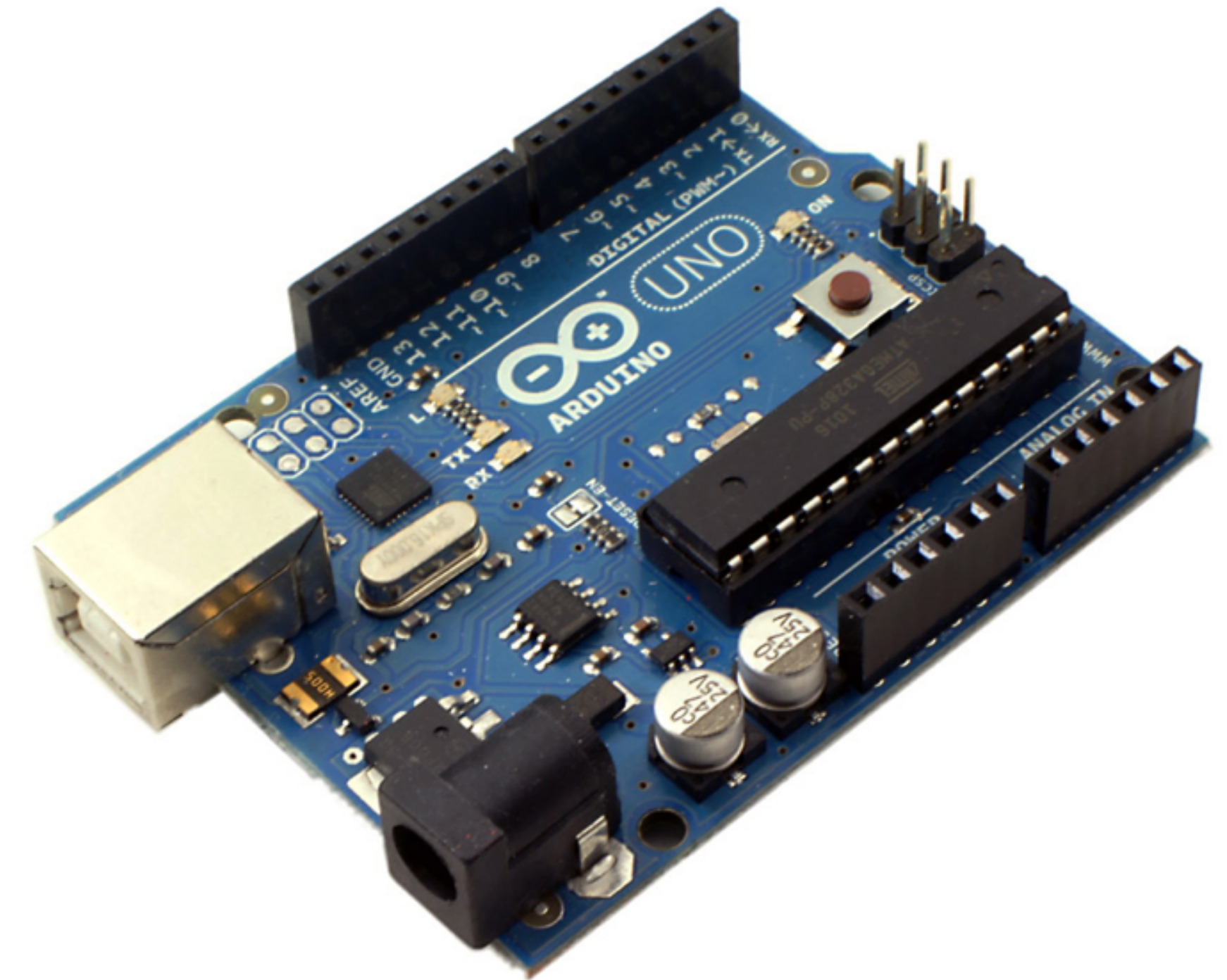
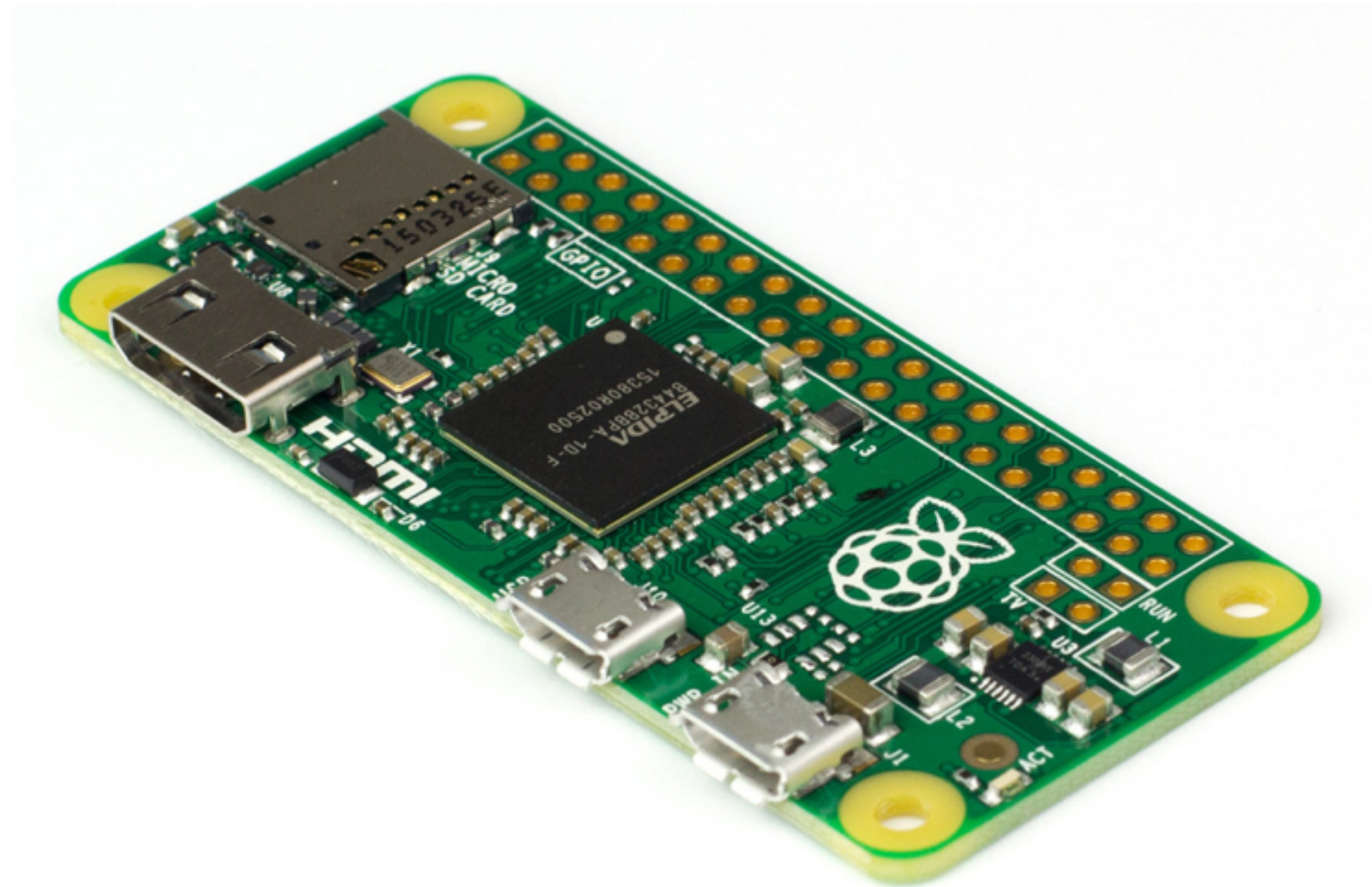
Hybrid Solution

Host PC with Client Microcontroller



Hybrid Solution

Host PC with Client Microcontroller



Hybrid Solution

Host PC with Client Microcontroller

<https://vine.co/v/Mum1MOA1TmX>

<https://vine.co/v/MuHdbYql3jp>

Hybrid Solution

Host PC with Client Microcontroller

Hybrid Solutions

Pros

- You can program at a high level
- Get the benefits of both worlds
 - modern platform
 - responsive IO

Cons

- You're dealing with more devices
- More hacky
- Even more points of failure / attack
- Most expensive

The Present (and Future) is *Awesome!*

- Cheaper Embedded Linux Computers **EVERYWHERE**
- Use Modern Full Stack JavaScript
- *Any Stack!*
- We need help to make it mature!

Questions

<http://twitter.com/chalkers>

<http://vine.co/chalkers>

<http://forefront.io>