# lamaPLC: Raspberryes

The RP2040 is a small, specially engineered silicon chip developed by Raspberry Pi to serve as the central controller for electronic devices.

The Raspberry Pi Pico is a compact green circuit board centered on the RP2040 chip, featuring a USB port, storage memory, and pin connections. This design allows for easy connection to a computer, enabling programming to control electronics such as sensors, lights, and motors.

| Feature | RP2040 (The Chip) | Pi Pico (Standard) | Pi Pico H | Pi Pico W | Pi Pico WH | RP2040-Zero | RP2040-ETH |
|---|---|---|---|---|---|---|---|
| **Manufacturer** | Raspberry Pi | Raspberry Pi | Raspberry Pi | Raspberry Pi | Raspberry Pi | Waveshare | Waveshare |
| **Dimensions** | 7 × 7 mm | 51 × 21 mm | 51 × 21 mm | 51 × 21 mm | 51 × 21 mm | 23.5 × 18 mm | 51 × 21 mm |
| **Flash Storage** | 0 MB | 2 MB | 2 MB | 2 MB | 2 MB | 2 MB | 4 MB |
| **USB Connector** | None | Micro-USB | Micro-USB | Micro-USB | Micro-USB | USB Type-C | USB Type-C |
| **Wireless (Wi-Fi/BT)** | None | None | None | 2.4GHz Wi-Fi & BT 5.2 | 2.4GHz Wi-Fi & BT 5.2 | None | None |
| **Wired Network** | None | None | None | None | None | None | RJ45 Ethernet Port |
| **Header Pins** | None | Unsoldered (Bare pads) | Pre-soldered | Unsoldered (Bare pads) | Pre-soldered | Unsoldered (Castellated) | Unsoldered |
| **Debug Connector** | None | None | 3-pin JST-SH | None | 3-pin JST-SH | None | None |
| **Onboard Light** | None | Green LED | Green LED | Green LED | Green LED | RGB NeoPixel | None |
| **Usable GPIO Pins** | 30 | 26 | 26 | 26 | 26 | 29 | 14 |
| **Logic Voltage (GPIO)** | 3.3V | 3.3V | 3.3V | 3.3V | 3.3V | 3.3V | 3.3V |
| **Input Voltage (VBUS/VIN)** | N/A (Requires exact 1.1V & 3.3V) | 1.8V to 5.5V | 1.8V to 5.5V | 1.8V to 5.5V | 1.8V to 5.5V | 5.0V (via USB-C or 5V pin) | 5.0V (via USB-C or 5V pin) |
| **Software Support** | C/C++, MicroPython, CircuitPython | C/C++, MicroPython, CircuitPython | C/C++, MicroPython, CircuitPython | C/C++, MicroPython, CircuitPython | C/C++, MicroPython, CircuitPython | C/C++, MicroPython, CircuitPython | C/C++, MicroPython (with special build) |
| **Network Libraries** | None | None | None | network (Wi-Fi), bluetooth | network (Wi-Fi), bluetooth | None | wiznet / custom CH9120 drivers |
| **Primary Usage** | Custom circuit design & commercial products | Learning code, DIY hobbies, basic automation | Prototyping without a soldering iron | Smart home, wireless IoT, web servers | Wireless IoT without a soldering iron | Tiny gadgets, wearable tech, macro pads | Hardwired network devices, industrial IoT |

## RP2040-Zero

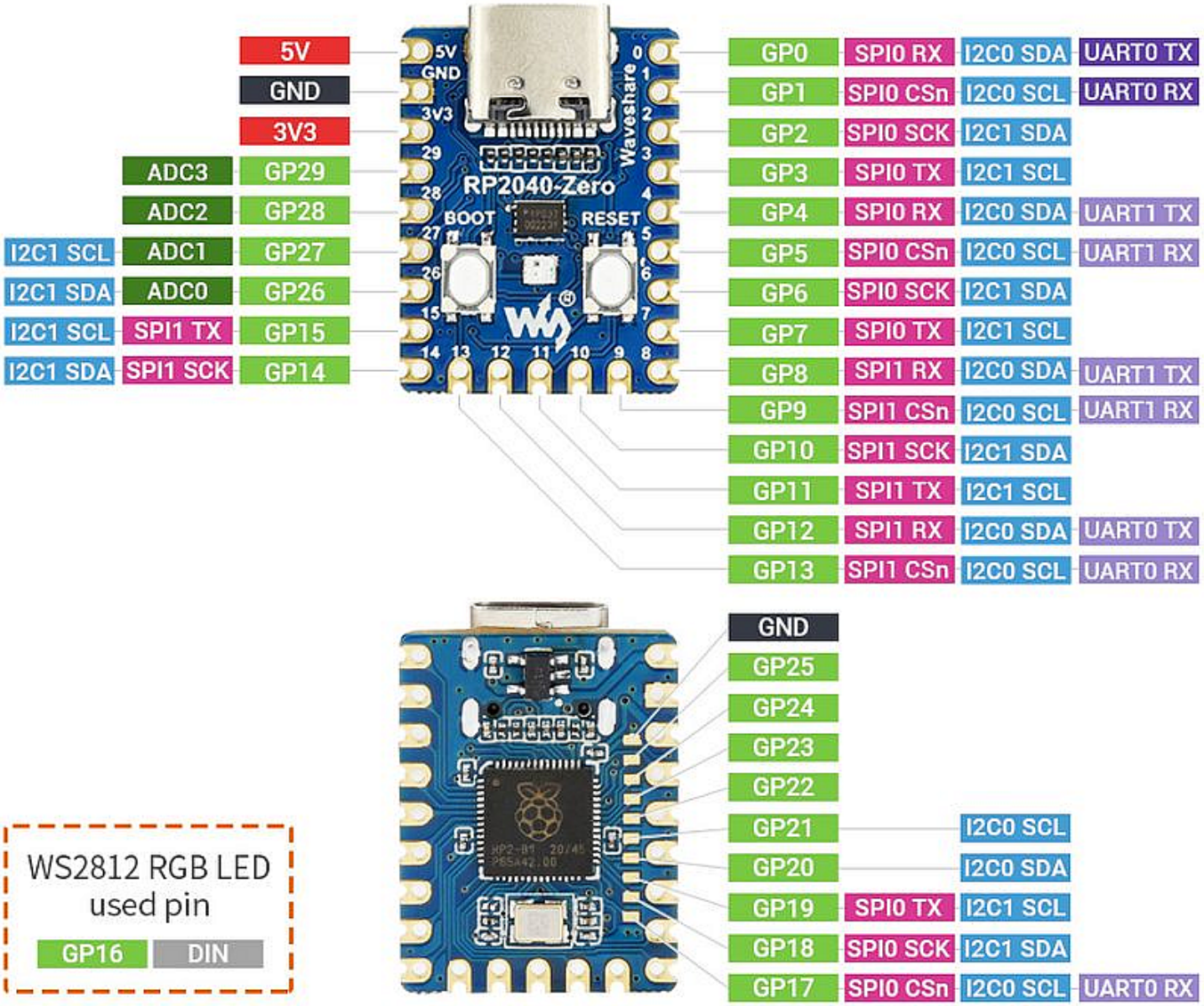
The RP2040-Zero is an ultra-compact, low-cost microcontroller development board designed by Waveshare. It is built around the Raspberry Pi RP2040 silicon chip, squeezing the processing power of a standard Raspberry Pi Pico into a tiny form factor roughly the size of a postage stamp.


More information from the board: https://www.waveshare.com/wiki/RP2040-Zero

### RP2040-Zero Core Hardware Specifications

- **Processor:** Dual-core ARM Cortex-M0+ clocked at 133 MHz.
- **Memory:** 264 KB of internal SRAM and 2 MB of onboard Flash storage for code.
- **USB Interface:** Upgraded USB Type-C port for programming and power.
- **Onboard LED:** Features a single WS2812 RGB LED (NeoPixel) that can be programmed to any color.
- **Pins:** Breaks out 29 GPIO pins (20 via outer pin headers, and 9 via solder pads on the back).

### RP2040-Zero Pinout

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