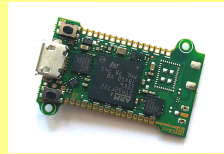


# The Evolution of MicroPython

**MicroPython firmware release v1.20** in April 2023, includes a new MicroPython package manager called **"mip"**

- software support for LoRa (but not LoRaWAN yet [currently in progress, nearly done])
- software support for user defined USB device and host [currently in progress]
- Improved documentation [currently in progress]



## Subthreshold Power Optimized Technology SPOT® platform

This new PYBD based on **Ambiq Apollo 4+** will change the world for low-power applications.

With a maximum power consumption of only 5m Amps in full power model

2023

2022

## MicroPython with Arduino

Arduino is adding the Python language as an additional option for programming microcontrollers. Their **platform** of choice is **MicroPython**



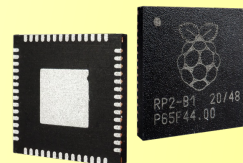
## Raspberry Pi RP2040 MCU and Pico board

The RP2040 is a new microcontroller designed by Raspberry Pi. With a large amount of RAM and many peripherals it is ideally suited to run MicroPython.

One major feature is the programmable IO, or PIO, which is a set of state machines that can independently control GPIO with precise timing. **MicroPython** includes a built-in PIO assembler to make it easy to program these state machines directly in Python code. As well as the standard MicroPython tools, the **Thonny IDE can be used as an easy drag-and-drop way to program MicroPython on the Pico board.**

## Raspberry RP2040 MCU

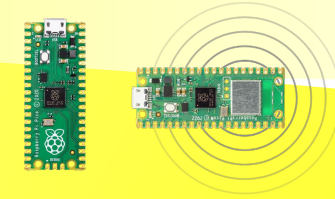
**RP2040**, the flagship microcontroller chip designed by Raspberry Pi in the UK



The Raspberry Pi Pico series is a range of tiny, fast, and versatile boards built using RP2040

MicroPython is officially supported as firmware for the Pico W board, and the WiFi driver is the same as that used on the Pyboard-D series.

21 mm × 51 mm form factor  
RP2040 microcontroller chip designed by Raspberry Pi in the UK  
Operating temperature -20°C to +85°C (Raspberry Pi Pico and Pico H); -20°C to +70°C (Raspberry Pi Pico W and Pico WH)  
Castellated module allows soldering direct to carrier boards (Raspberry Pi Pico and Pico W only)  
Drag-and-drop programming using mass storage over USB  
Low-power sleep and dormant modes  
Accurate on-chip clock  
Temperature sensor  
Accelerated integer and floating-point libraries on-chip  
Dual-core Arm Cortex-M0+ processor, flexible clock running up to 133 MHz  
264kB on-chip SRAM  
2MB on-board QSPI flash  
2.4GHz 802.11n wireless LAN (Raspberry Pi Pico W and WH only)  
26 multifunction GPIO pins, including 3 analogue inputs  
2 × UART, 2 × SPI controllers, 2 × I2C controllers, 16 × PWM channels  
1 × USB 1.1 controller and PHY, with host and device support  
8 × Programmable I/O (PIO) state machines for custom peripheral support  
Supported input voltage 1.8–5.5V DC  
Accelerated integer and floating-point libraries on-chip



2021

2020

## Pybricks

Pybricks is Python coding for smart LEGO® hubs. **Run MicroPython scripts directly on the hub**, and get full control of your motors and sensors.



## Git Hub Sponsors

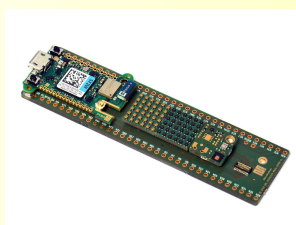
MicroPython is a reimplement of the Python programming language designed to run on microcontrollers and embedded systems. It is a liberally (MIT) licensed project used by a vast and diverse range of users all over the world, from hobbyists to education, research to industry. It is **used in many commercial products** and by entities such as the European Space Agency, Lego, Adafruit, the BBC micro:bit, and many others. Sponsorship is key to maintaining the long-term health of the project, and funds will go towards:



## continued maintenance of the software:

- recruiting additional maintainers for things like GitHub issue/PR triage and review;
- funding purchase of development boards for new platforms and other test equipment for maintainers and other contributors;
- offering bounties for finding and fixing critical bugs, and for improving test coverage;
- investigating opportunities for paid development and paid documentation improvements.

## Introduction of a modular system to easily build electronic devices

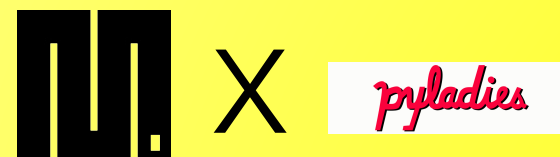


Modular system to easily build electronic devices for Makers, students and professionals

MicroPython on RealPython

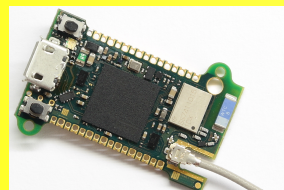


PyLadies workshop in Berlin



2019

2018



## We are pleased to announce the pyboard D!

The next generation pyboard, the pyboard D-Series

Cortex M7 runs at 216 MHz with 256k RAM  
WiFi and Bluetooth (BLE)  
PCB size: **33.5 mm × 19 mm**  
Easy to use low power modes: with RTC enabled and no wireless connection < 5 uA  
Weight: 2.4 gramms



## Space qualification and OBCPs

Over the past year or so we have been working with a Belgian company called **Spacebel** to help them qualify a version of **MicroPython for use in space as an On Board Control Procedure (OBCP) engine**. This builds on our previous work done for the European Space Agency to make MicroPython run on LEON targets, with a SPARC processor.

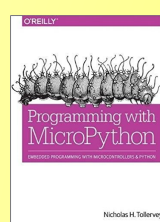
Damien George was added to the **Python Software Fellow** roster in 3rd Quarter 2017.

Damien George won the **Google Open Source Software award** in 2017 for the ongoing development of MicroPython.

## Learn how to use MicroPython to make cool stuff.

This practical book assumes **no previous knowledge of programming** and takes you on a journey from first steps to advanced projects. Written by the programmer who proposed, coordinated, and contributed to getting MicroPython on the BBC micro: bit, there's no better person to teach you this topic.

## MicroPython got a book

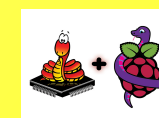


**Certificate from a national institute of metrology for a traffic measurement device**

MicroPython was used for the system architecture, allowing seamless integration of high speed signal processing with clean and efficient application programming avoiding the overhead of traditional operating systems.

State: in production

## CircuitPython



CircuitPython is a programming language designed to simplify experimenting and learning to code on low-cost microcontroller boards.  
**It is based on MicroPython**

2017

## MicroPython went Down Under

2016

## 2nd Kickstarter: MicroPython on the ESP8266

MicroPython run like clockwork on the bare metal for ESP8266 Wi-Fi

March 2016: **1384 backers raised 28 334 GBP** pure Software Campagne with multiple stretch goals



## Prestigious Community Service Award by Python Software Foundation

For Damien George's **extensive volunteer work on the BBC micro:bit and MicroPython**

[https://www.python.org/community/awards/psf-awards/...](https://www.python.org/community/awards/psf-awards/)  
In 2015 the BBC explained a staggering "moon-shot" project: to create a small, computing device to be delivered to **ALL year 7 children** (11-12 years old) **in the UK**. The newly christened BBC micro:bit would facilitate the first step towards inspiring digital creativity in a new generation of school children. Nicholas brought the BBC:MicroBit and Damien George together. Besides a couple of other programming languages it's now possible to run MicroPython on this device.

## MicroPython went to Space



**pyboard in a rocket!**  
(Rocket Launch for International Student Satellites (ARLIS))  
**A pyboard was used to measure acceleration in the rocket and it went up to 12,000 ft**

**George Robotics Limited** (the company behind MicroPython) is proud to announce that the **European Space Agency (ESA)** will be funding further development of MicroPython, to determine the suitability of the language for space-based applications, in particular for payloads. Research and development will focus on **making MicroPython more robust for critical embedded systems**, with emphasis on determinism of the virtual machine and memory management. The research program foresees the development of a port of MicroPython to the SPARC architecture, which will be made available under an ESA community license. ESA has generously agreed that all improvements to MicroPython that are made as part of this R&D program can be incorporated into the generic implementation.



2015

## MicroPython pyboards for everyone

2014

## 2 Talks at the PyCon UK:

Micro Python - Kickstarter Experience

Micro Python - shrinking Python down to run on a microcontroller

**George Robotics Ltd** – the company behind MicroPython was founded to continue the development of MicroPython. MicroPython stays Open Source with MIT license and everybody is welcome to contribute on GitHub.

Damien was born in Melbourne, Australia, and has been programming and playing with electronic circuits since primary school. He completed a **Bachelor of Engineering and Bachelor of Science** at the University of Melbourne, and then went on to complete a **PhD in theoretical physics**.

During his studies he participated in the international Robocup competition, programming autonomous robots to play soccer. He **wrote embedded software for scripted behavioural control** and motion, as well as building parts of the hardware. He has since continued in this area, **building robots, a CNC machine, and writing embedded software for many microcontrollers**.

He **worked** professionally as a **theoretical physicist** for 6 years, on various topics including **cosmology and the Higgs boson**. He then went on to **develop MicroPython** and ran a very successful **Kickstarter** campaign around this microcontroller language. He now **works full-time maintaining the MicroPython code-base and ecosystem**.

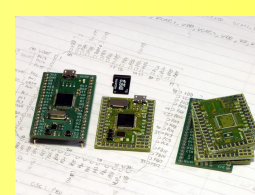
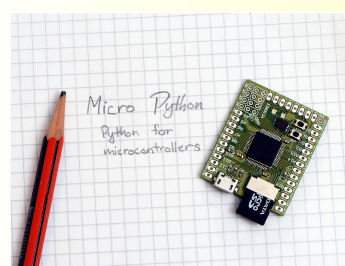
## MicroPython on Kickstarter

## EARLY DAYS of MicroPython

**April 2013:** The idea for MicroPython was born

**September 2013:** first flashing LED in MicroPython  
**October 2013:** REPL and filesystem

**Kickstarter Launch at 13 November 2013** with funding goal 15 000 GBP.  
**After 30 days 1931 backers raised 97 803 GBP** to make this project happen



## Stretch Goals:

- **40 000 GBP** Wi-Fi support via CC3000 module
- **50 000 GBP** Ethernet WIZ820Io
- **60 000 GBP** NRF24L01 low power wireless module

2013