

C Forth on the RP2350? Yes, Please!

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└─ A (Welcome) Surprise in the (E)mail

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August 8, 2024 - the Raspberry Pi Pico 2 is announced

- ▶ *Raspberry Pi Pico 2, our new \$5 microcontroller board, on sale now*
- ▶ *Our RP2350 Partners made all this excellent stuff for you*
- ▶ *What's new in Raspberry Pi Pico 2*
- ▶ *RP2350: the brains of Raspberry Pi Pico 2*

Pico vs. Pico 2

	Pico	Pico 2
Processor	RP2040	RP2350
On-chip SRAM	256 KiB + 8 KiB	512 KiB + 8 KiB
Flash	2 MiB	4 MiB
Price (Quantity 1)	\$4US	\$5US

RP2040 vs. RP2350

	RP2040	RP2350
CPU	Arm Cortex M0+	Arm Cortex M33
Default clock	133 MHz	150 MHz
Cores	2	2 *
Integer divide	co-processor	machine instruction
32-bit floats	software	machine instructions
64-bit floats	software	co-processor
DSP instructions	no	yes
PSRAM support	no	yes

About that *

- ▶ The RP2350 actually has four cores!
- ▶ The two Arm Cortex M33 cores you know about, and
- ▶ Two RISC-V Hazard3 cores
- ▶ At boot time, you can boot up any two of the four cores.

So I bought a few partner boards

- ▶ Pimoroni Pico Plus 2
 - ▶ 16 MiB flash, 8 MiB of PSRAM
- ▶ SparkFun Pro Micro - RP2350
 - ▶ 16 MiB flash, 8 MiB of PSRAM
- ▶ iLabs Challenger+ RP2350 BConnect
 - ▶ 8 MiB flash, 8 MiB PSRAM
- ▶ iLabs Challenger+ RP2350 WiFi6/BLE5
 - ▶ 8 MiB flash, 8 MiB PSRAM, WiFi and Bluetooth!

The CLAMS Development Environment

A collection of command-line Linux tools

- ▶ Raspberry Pi Pico-series C/C++ SDK
- ▶ Raspberry Pi Pico Python SDK
- ▶ CircuitPython
- ▶ Arduino-Pico
- ▶ PlatformIO Core (CLI)
- ▶ Coming soon! Zephyr

A container to run them in!

- ▶ Many third parties have limited testing resources
- ▶ If they support Linux at all, it's RHEL (expensive), or
- ▶ Ubuntu 22.04 LTS aka "Jammy Jellyfish"
- ▶ So I built a Distrobox container running Ubuntu 22.04 LTS
- ▶ Hosted on Universal Blue Bluefin
- ▶ (But any Distrobox host will work - any recent Linux distro)

C Forth

Why C Forth?

URL: <https://github.com/MitchBradley/cforth>

- ▶ Optimized for microcontrollers
- ▶ Comprehensive - derived from Mitch Bradley's Open FirmWare
- ▶ Extensible in either C or Forth!
- ▶ Portable - I want to run Forth on other microcontrollers
- ▶ Linux build process is straightforward using PlatformIO

Demo

Questions?

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