



MicroPython y el Microprocesador RISC-V

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UNIVERSIDAD
DEL QUINDÍO

**ARDUINO
DAYS 2025**

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ARM

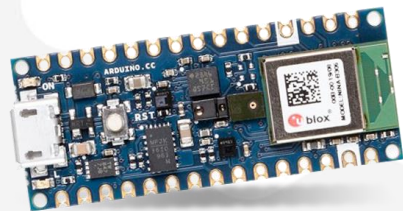
Arquitectura comercial para un repertorio de instrucciones RISC



Qualcomm



NORDIC[®]
SEMICONDUCTOR



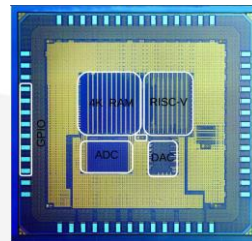
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Arquitectura **abierta** para un repertorio de instrucciones RISC
Escala: 32, 64 y 128 bits

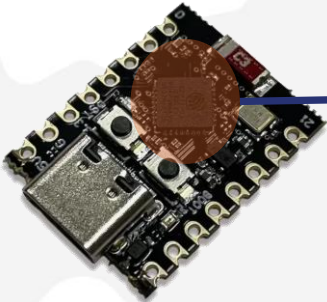


YosysHQ

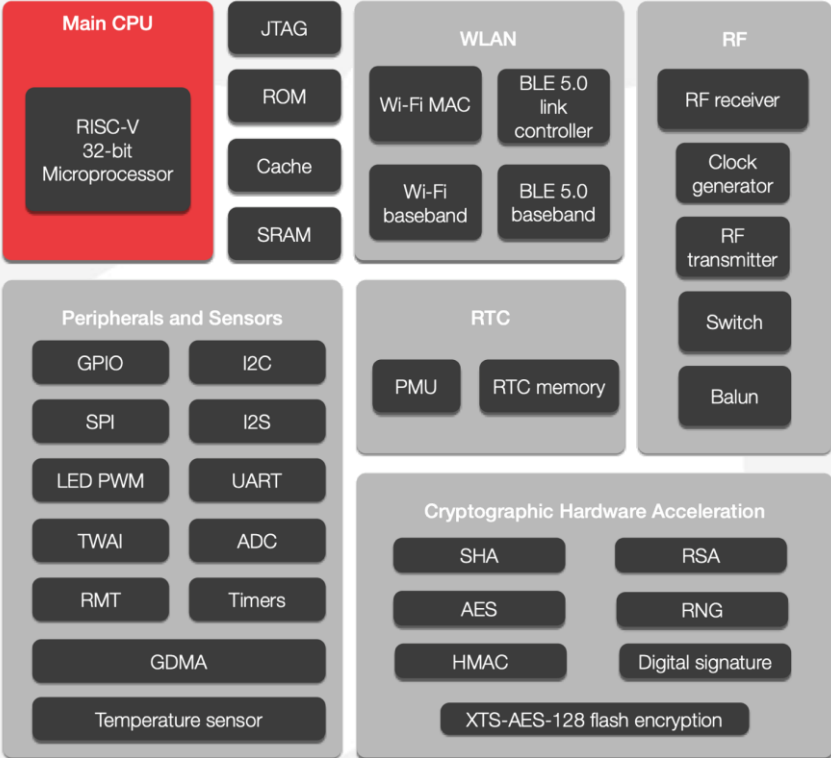


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**SRAM 400KB,
ROM 384KB
Flash 4MB (ESP32C3FN4)
160MHz**



Espressif's ESP32-C3 Wi-Fi + BLE SoC



https://www.espressif.com/en/news/ESP32_C3

Orientado a aplicaciones en IoT



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ESP32-C3
Development...

COP 15,522

Temu

★★★★★ (13)

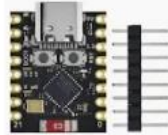


Esp32-c3 Super
Mini, Wifi,...

COP 25,000

36x COP 694

Mercadolibre ...



Placa de
desarrollo ESP3...

COP 6,872

AliExpress



Placa De
Desarrollo Esp3...

COP 45,753

36x COP 1,271

Mercadolibre ...



2 piezas de
Placas de...

COP 30,821

Temu

Free shipping



Esp32 C3 Super
Mini (4 Unidades)

COP 88,000

36x COP 2,444

Mercadolibre ...



Placa de
Desarrollo Supe...

COP 19,486

Temu

Free shipping



Placa De
Desarrollo Esp3...

COP 29,115 ...

12x COP 2,426

Mercadolibre ...



Esp32-c3 Super
Mini, Wifi, Bluetooth

COP 25,000.00 now...

Mercadolibre Colo...

4.5 ★★★★★ (8)



Seeed Studio XIAO
ESP32C3...

COP 26,441.19 (€6)

Kiwi Electr... & more

30-day returns



ESP32 Super mini
C3

COP 23,169.00

Cvr electronica

4.5 ★★★★★ (8)



ESP32-C3
Development Boa...

COP 53,552.33 (€12)

3DSVET.eu & more

4.5 ★★★★★ (8)



ESP32-C3 Mini
development board

ESP32 developm...

COP 14,391.48 (\$4)

Elecrow



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Lenguajes de Programación

Rendimiento, acceso al hardware
Manejo de memoria, No OOP



Rendimiento, escalable
Manejo de memoria , aprendizaje



Seguridad, concurrencia,
rendimiento
Aprendizaje, bibliotecas



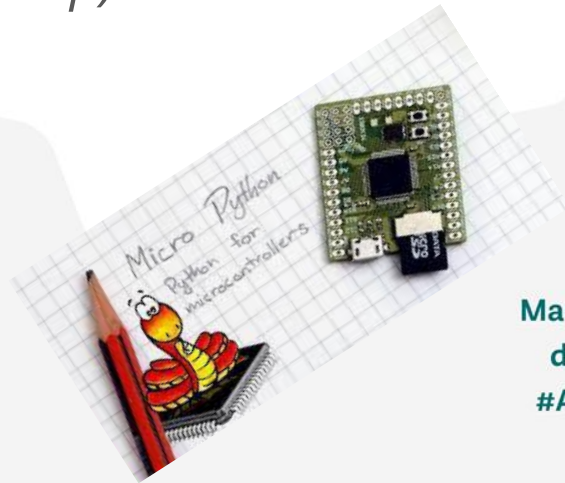
Tiempo desarrollo, versatilidad
Rendimiento (interpretado),
memoria usada



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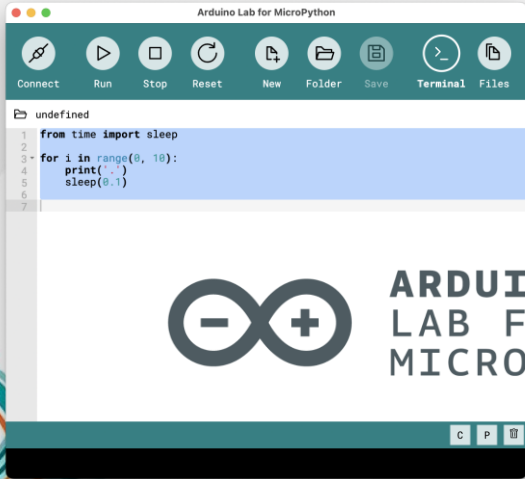
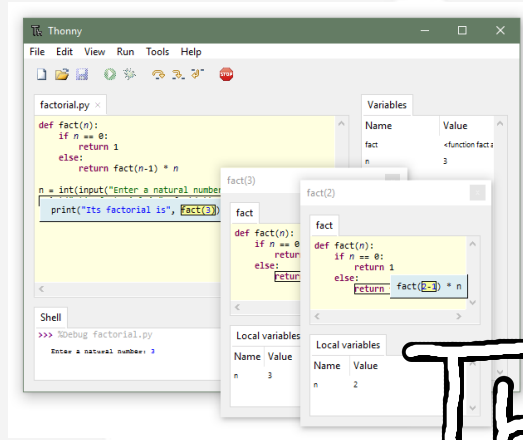
MicroPython

- Implementación ligera y eficiente de Python 3
- Optimizado para correr en microcontroladores
 - 256kiB flash + 16kiB RAM, aunque se recomienda al menos 512kiB flash + 128kiB RAM
- Interprete de Python en memoria flash del microcontrolador.
- Incluye el REPL (Read Evaluate Print Loop) a través de una conexión serial (USB) o WEB.



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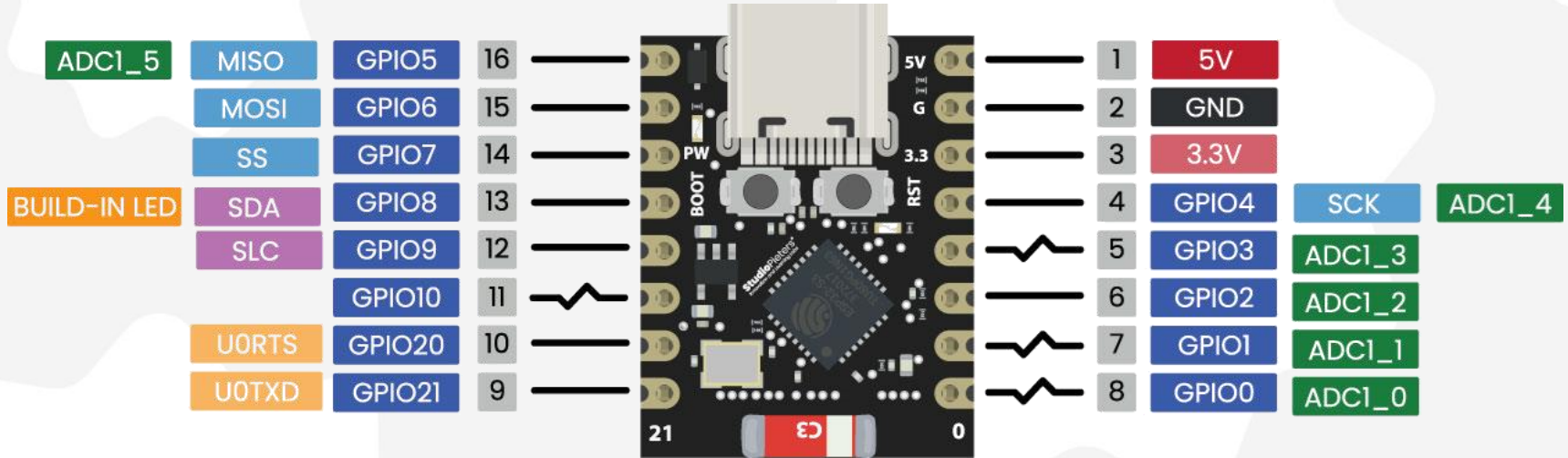
IDEs



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Pines MicroPython



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Pines digitales

Módulos

```
from machine import Pin
from utime import sleep_ms
```

Configuración
de los pines

```
LED = 8
BUTTON=9
led_pin = Pin(LED, Pin.OUT)
button_pin = Pin(BUTTON, Pin.IN)
```

Parpadeo
más lectura
de botón en
ciclo infinito

```
while True:
    print(button_pin.value())
    led_pin.value(not led_pin.value())
    sleep_ms(1000)
```



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Sensor de temperatura

```
from esp32 import mcu_temperature
from utime import sleep_ms

while True:
    tc = mcu_temperature()
    print(f"T = {tc} °C")
    sleep_ms(1000)
```



Modos de bajo consumo de energía



Activo

CPU se detiene
(gated clock)



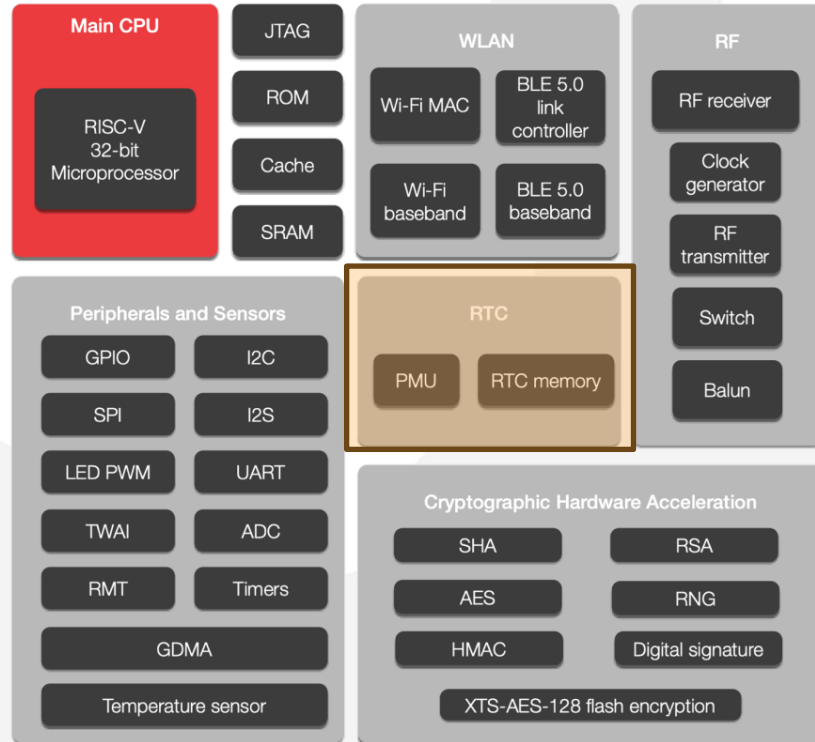
Light sleep

CPU se apaga y
reinicia



Deep sleep

Espressif's ESP32-C3 Wi-Fi + BLE SoC



Scripts boot.py y main.py

Conexión a red inalámbrica
WiFi/BLE

Reset



boot.py



Implementación de la
aplicación



main.py



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Conexión a WiFi

```
def do_connect():
    import network
    sta_if = network.WLAN(network.STA_IF)
    if not sta_if.isconnected():
        print('connecting to network...')
        sta_if.active(False) # TOGGING THIS FIRST PREVENTS "OSError: Wifi Internal Error"
        sta_if.active(True)
        sta_if.config(pm=sta_if.PM_NONE) # disable power management, seems to need active(TRUE) first
        sta_if.config(txpower=5) # Fixes wifi ESP32 C3 5x5 WS2812 boards
        sta_if.connect('Arduino-Day-2025', 'goodlife')
        while not sta_if.isconnected():
            pass
    print('network config:', sta_if.ifconfig())
```

do_connect()

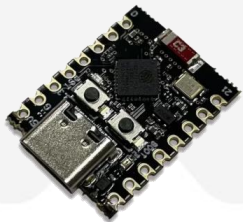
<https://github.com/orgs/micropython/discussions/13414#discussioncomment-8126226>



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Aplicación IoT mínima

Deep sleep



HTTP

Enviar temperatura de MCU

<https://api.thingspeak.com/channels/2050120/fields/1/last>



https://api.thingspeak.com/update?api_key=66DI1SILP1YFG9XN&field1=33



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