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CutiPy™ Industrial IoT ARM Board



See the Industrial IoT Development kit for the CutiPy™ at DEV-IIOTC

Getting started with the CutiPyTM:

- Getting started Wiki Page
- FreeRTOS Wiki Page
- MicroPython Wiki Page

STMicroelectronics STM32F407IGH6 ARM Cortex-M4 168MHz

Low Power Industrial IoT

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- Up to 1M of Flash
- 192 Kbytes of SRAM
- ° 2x USB 2.0 FS OTG (1x Internal, 1x External)
- 4x Serial Ports (1x Internal RS232, 1x Internal RS232/485, 2x TTL Shared)
- ° 2x CAN 2.0b (1x Internal Shared w/Transceiver, 1x External Shared w/o Transceiver)
- 2x SPI (1x Internal, 1x External)
- ° 3x I2C (1x Internal, 2x External)
- 1x SDIO Card Slot
- 8x External Dedicated High Drive Outputs
- 24x Timer/Counter/PWM/Capture/GPIOs
- ° 13x A/D 12-Bit Channels (3 unique A/Ds)/GPIOs
- ° 2x D/A 12-Bit Channels/GPIOs
- ° RTC with on-board battery backup
- Temperature Sensor
- Reset button

OS/Language: MicroPython or FreeRTOS

- Support for Amazon Web services "AWS"
- ° Message Queuing Telemetry Transport or MQTT support
- Webserver Running on both MicroPython and FreeRTOS
- ° Thonny IDE support for MicroPython

Silicon Labs RS9113/RS9116 (BT/Wi-Fi) with onboard antenna (optional)

- 802.11 a/b/g/n WiFi Wireless
- 802.11j (hosted mode)
- ° 802.15.1 Bluetooth Low Energy (BLE 5.0)
- ° external u.FL antenna connector on module

LI-ION Rechargeable Battery 3.7V 1.2AH, for system power (optional)

 \circ CutiPy comes with a built-in charging circuit for charging an LI-ION rechargeable battery from USB or 5V Vin Connector

LCD (128x32; SPI; NHD-C12832A1Z-FSW-FBW-3V3) (optional)

- 4 User Pushbuttons
- \circ 4 LEDs (front side of the board)

2x 50-Pin Expansion Connectors (MitiPy Pinout)

Power - 5.0 Volts @ 50mA (0.25 watts)

- Typical Running Current Consumption: ~50mA
- Sleep mode current: ~100?A

The CutiPy[™] is based on the STMicroelectronics STM32F407IGH6 which is an ARM Cortex-M4 processor running at 168MHz; with 192KB of SRAM, 1MB of internal flash and provides an SD card slot for additional storage. Standard IO interfaces are 2x USB 2.0 ports,

2x CAN 2.0B ports, 4x Serial ports, 2x SPI lines, 3x I2C connections, 24x GPIO connections (configurable as Timers, Counters, PWM, and GPIO), 8x High drive digital outputs, 13x 12-bit A/D ports, 2x 12-bit D/A ports and an onboard temperature sensor. The CutiPy™ can be used with a rechargeable Lithium-Ion battery connection for power, with built-in charging circuitry from USB or a 5v power connector. Wireless module options provide connectivity on Wireless 802.11 a/b/g/n and Bluetooth 5 & BLE networks. The CutiPyTM is ready for IoT success with simplified expansion. Two 50-pin expansion connectors offer access to most of the onboard IO connections through the use of a daughter card shield for a semi-custom approach to board design. The CutiPyTM is available with an optional 128x32 LCD, 4 userprogrammable buttons, and 4 LEDs. The CutiPyTM can be used as a local interface or configured as an IoT interface to connect to the cloud to capture, log and analyze data. The CutiPy[™] comes loaded with MicroPython or FreeRTOS operating system. The MicroPython allows for easy software development and testing with simple scripted commands. Built on Python3, MicroPython is a subset of the python language optimized to run on microcontrollers, MicroPython is packed full of advanced features such as an interactive prompt, arbitrary precision integer, closures, list comprehension, generators, exception handling, and more. EMAC's base install Including features commonly needed for Industrial IOT devices with MQTT support and a webserver. Whereas FreeRTOS is a market-leading real-time operating system (RTOS) for microcontrollers and small microprocessors. EMAC's implementation of FreeRTOS is ready to run and has a connection API for Amazon Web Services "AWS", MQTT for IIOT monitoring, and a webserver. Both platforms come ready to run and can easily get your Industrial IOT project connected to the cloud. See the Industrial IoT Development kit for the CutiPy at DEV-IIOTC. This Microcontroller Development Kit comes preloaded with Micropython operating software or FreeRTOS Operating software and includes basic hardware to get you started developing your IoT device the first day out of the box. The CutiPy™ is a low-power IOT board that can be powered from a Li-Ion rechargeable battery. The CutiPy[™] comes equipped with a Webserver, MODBUS & MQTT and has support for AWS Cloud services. The CutiPy™ provides a plethora of I/O including: RS233, RS485, CAN, USB, I2C, SPI, A/D, D/A, PWM, Hi-Drive GPIOG I CD with Pushbuttons and SD Card Socket in addition to WiFi Wireless and Bluetooth. Specifications TADE

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Processor Processor.

ST Microelectronics STM32F407IGH6 ARM Cortex-M4

Clock Speed:

168 MHz

Real Time Clock:

Memory Primary Frash: Up to 1M of Flash Secondary Flash: Micro SD Card Socket

Grive. 16x External Dedicated GPIOs (64x fully allocated) SDIO: 1x SDIO (wired to Micro SD Card Slot) USB: 2x USB 2.0 FS OTG (1x Internal 1x External) Serial Ports: 4x Serial Ports (1x Internal RS232 1x Internal RS232/485 2x TTL Shared) Watchdog: CCurv. 2x CAN 2.0B Timers/ Counters/ PWM:

24x Timer/Counter/PWM/Capture

LPT Port:

Keypad:

PS/2:

Analog on A. P. A/D Channels: 13 A/D Resolution: 12 bit D/A: D/A Channels: 2 D/A Resolution: 12 bit Dimensions 2.25×3.5 in Form Factor: Pico-ITX Power Requirements 5 V Sleep Current: 0.1 mA Typical Current: 50 mA Power Misc.: 5.0 Volts @ 50mA (0.25 watts) Typical Running Current Consumption: ~50mA

Sleep mode current: ~100?A

LI-ION Rechargeable Battery 3.7V 1.2AH, for system power (optional)

° CutiPy comes with built-in charging circuit for LI-ION rechargeable battery from USB or 5V Vin Connector

Low Operating Temperature: -40 C High Operating Temperature: 85 C Upper Operating Humidity: 90% Environmental Misc.: Rechargeable Batteries may limit overall system operating temperatures of the system if utilized. • 0 to 45C is the "charging" temperature range • -20 to 60 is the "discharging" temperature range. IOT-F407C-007

CutiPy Bare Micro-Python, STM32F407IGH6 168MHz, 192 KB SRAM, 1MB Flash, MicroSD Socket, 4x COM, 2x USB OTG, 13x A/D, 2x D/A, 24x GPIO, No Radio, No LCD, -40° to +85° C

\$110.00

Order:

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Parent Product:

IOT-F407C-000

CutiPy Standard Micro-Python, STM32F407IGH6 168MHz, 192 KB SRAM, 1MB Flash, MicroSD Socket, 4x COM, 2x USB OTG, 13x A/D, 2x D/A, 24x GPIO, WiFi, BLE, No LCD, -40° to +85° C

\$140.00

Order:

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Parent Product:

IOT-F407C-001

CutiPy Deluxe Micro-Python, STM32F407IGH6 168MHz, 192 KB SRAM, 1MB Flash, MicroSD Socket, 4x COM, 2x USB OTG, 13x A/D, 2x D/A, 24x GPIO, WiFi, BLE, 132x32 LCD, -40° to +85° C

\$165.00

Order:

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Parent Product:

IOT-F407C-017

CutiPy Bare FreeRTOS, STM32F407IGH6 168MHz, 192 KB SRAM, 1MB Flash, MicroSD Socket, 4x COM, 2x USB OTG, 13x A/D, 2x D/A, 24x GPIO, No Radio, No LCD, -40° to +85° C (PER-ADP-0031P required to modify software)

\$110.00

Order:

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Parent Product:

IOT-F407C-010

CutiPy Standard FreeRTOS, STM32F407IGH6 168MHz, 192 KB SRAM, 1MB Flash, MicroSD Socket, 4x COM, 2x USB OTG, 13x A/D, 2x D/A, 24x GPIO, WiFi, BLE, No LCD, -40° to +85° C (PER-ADP-0031P required to modify software)

\$140.00

Order:

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Parent Product:

IOT-F407C-011

CutiPy Deluxe FreeRTOS, STM32F407IGH6 168MHz, 192 KB SRAM, 1MB Flash, MicroSD Socket, 4x COM, 2x USB OTG, 13x A/D, 2x D/A, 24x GPIO, WiFi, BLE, 132x32 LCD, -40° to +85° C (PER-ADP-0031P required to modify software)

\$165.00

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