Introduction to STM32 MCUs

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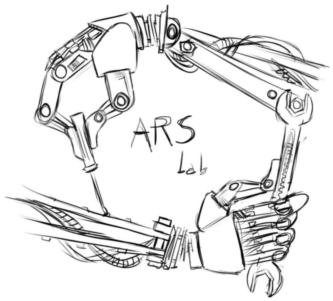

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The STM32 Family

STM32 is a family of microcontrollers by STMicroelectronics. MCUs of the family feature:

- 32-bit ARM-Cortex CPU (ARM=Advanced Risc Machine)
- CPU clock from 80 to 240 MHz
- Flash memory from 512K to 2M
- RAM from 512K to 2M
- DSP and FPU
- Several peripherals (digital, ADC, timers, SPI, I^2C, CAN, USB, Ethernet)

STM32 provides a series of **evaluation boards** (*Discovery* or *Nucleo* series) that include the MCU and the *STLink* interface for programming and debugging.

STM32 Processors

Mainstream

- STM32F0, Cortex-M0, 48 MHz, 256K flash, 32K SRAM
- STM32F1, Cortex-M3, 72 MHz, 1M flash, 96K SRAM
- STM32F3, Cortex-M4, 72 MHz, 512K flash, 80K SRAM

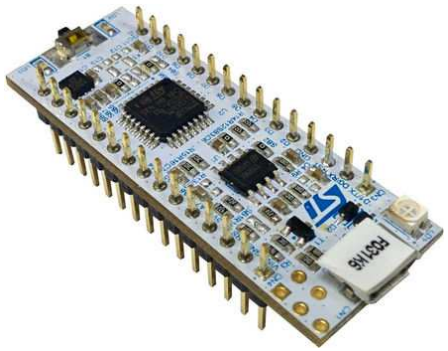
High Performances

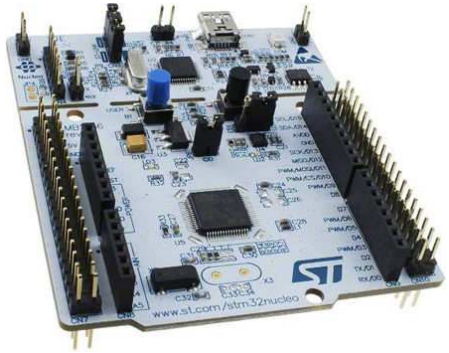
- STM32F2, Cortex-M3, 120 MHz, 1M flash, 128K SRAM
- STM32F4, Cortex-M4, 180 MHz, 2M flash, 384K SRAM
- STM32F7, Cortex-M7, 216 MHz, L1-cache, 2M flash, 512K SRAM
- STM32H7, Cortex-M7, 400 MHz, L1-cache, 2M flash, 512K SRAM

Ultra low-power

- STM32L0, Cortex-M0, 32 MHz, 192K flash, 20K SRAM
- STM32L1, Cortex-M3, 32 MHz, 512K flash, 80K SRAM
- STM32L4, Cortex-M4, 80 MHz, 1M flash, 160K SRAM

STM32 Nucleo Boards





- Nucleo-32, 32 I/O pins
- Nucleo-64, 64 I/O pins
- Nucleo-144, 144 I/O pins (+ Ethernet)
- All equipped with STLink programmer/debugger
- Connectors to host additional expansion boards (motion sensor, IMU, DC motor control, BLDC motor control, stepper motor control, etc.)

STM32 Programming Resources

- Language: C, C++
- Compiler: gcc-arm
- IDE:
  - IAR (commercial)
  - KEIL (commercial)
  - OpenSTM32 (free, based on Eclipse)
    `http://www.openstm32.org`
- Graphic Configurator: CubeMX (download from STM site)
  - Peripheral Configuration
  - Automatic Code Generation
- STM HAL libraries: Hardware Abstraction Libraries for a "seamsless" access to STM32 peripherals

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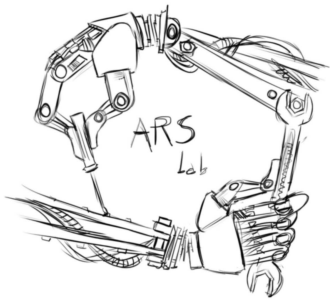

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