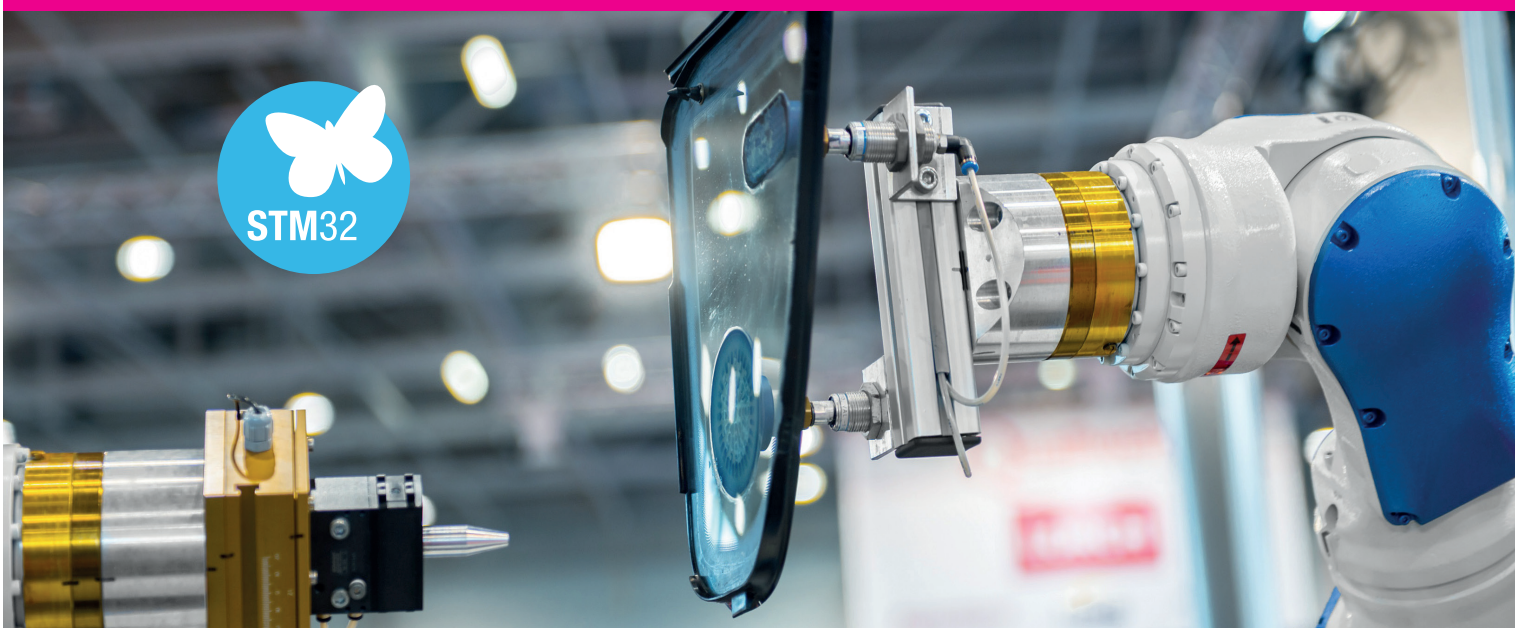
STM32F40x/41x

High-performance Access lines



STM32F4 Access lines: performance, less dynamic power, high integration, and rich connectivity for cost-conscious applications

Still an STM32F4

The STM32F4 Access lines, made of STM32F401, STM32F410, STM32F411, STM32F412 and STM32F413 MCUs, are the entry level devices of the STM32F4 wseries that target cost-conscious applications. These lines implement STM32 Dynamic Efficiency™ technology and solve the challenge of offering less dynamic power and more performance with high integration and lower cost.

With a new Batch Acquisition Mode (BAM) that optimizes power consumption during sensor data batching, the STM32F4 Access lines take Dynamic Efficiency to a new level.

PERFORMANCE

- Up to 100 MHz fCPU delivering 125 DMIPS/ 339 CoreMark performance executing from Flash memory, with 0-wait states using ST's ART Accelerator™

POWER EFFICIENCY

- ST's 90-nm process, ART Accelerator and dynamic power scaling enables the current consumption when executing from Flash memory to be as low as 89 µA/MHz. In Stop mode, the power consumption can be as low as 6 µA.

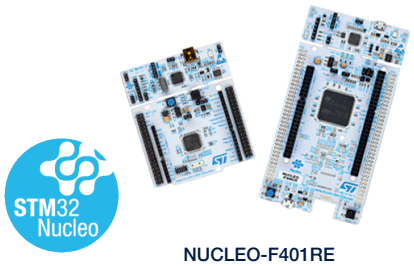
INTEGRATION

- Up to 1.5 Mbyte of Flash memory to 320 Kbytes of SRAM
- Available packages range from 36 to 144 pins
- 10x USARTs up to 12.5 Mbits/s
- Up to 5x SPI (mixed with I2S) up to 50 Mbit/s
- Up to 4x I²C up to 1 Mbits/s
- 1x SDIO up to 48 MHz
- 1x USB 2.0 OTG full speed1
- Up to 2x full-duplex and 3x simplex I²S up to 32-bit/192 kHz
- Up to 3x CAN (2.0B Active)
- 12-bit ADC reaching 2.4 MSPS
- Up to 2x 12-bit DAC²
- True random number generator2
- Up to 18x 16- and 32-bit
- Flexible external static memory controller with up to 16-bit data bus: SRAM, PSRAM, NOR Flash memory3

STM32F423 BLOCK DIAGRAM

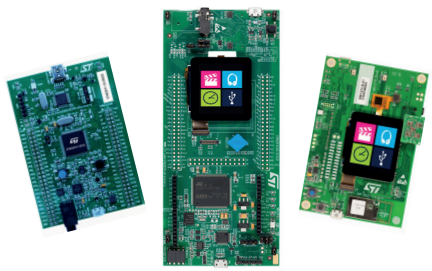
HARDWARE TOOLS

Nucleo boards



NUCLEO-F401RE
NUCLEO-F410RB
NUCLEO-F411RE
NUCLEO-F412ZG
NUCLEO-F413ZH
www.st.com/stm32nucleo

Discovery kits



STM32F411E-DISCO
STM32F412G-DISCO
STM32F413H-DISCO
www.st.com/stm32f4-discovery

SOFTWARE TOOLS

In addition to the wide set of partners and Arm® ecosystem solutions, the STM32F4 Access lines benefit from dedicated tools and software including STM32CubeF4 embedded software (HAL, Low-Layer APIs and CMSIS (CORE, DSP, RTOS), and a set of USB, TCP/IP, file system, RTOS, and graphic middleware components) with examples running on STM32 Nucleo, discovery kits and evaluation boards.

www.st.com/stm32cube

STM32F4 ACCESS LINES

Arm® Cortex®-M4 (DSP + FPU) – Up to 180 MHz

- ART Accelerator™
- SDIO
- USART, SPI, I²C
- I²S + audio PLL
- 16 and 32-bit timers
- 12-bit ADC (0.41 µs)
- True Random Number Generator
- Batch Acquisition Mode
- Low voltage 1.7 to 3.6 V
- Temperature:
- -40 °C to 125 °C

Product lines	FCPU (MHz)	Flash (Kbytes)	RAM (KB)	RUN current (µA/MHz)	STOP current (µA)	Small package (mm)	FSMC (NOR/PSRAM/LCD	QSPI	DFSDM	CAN 2.0B	DAC	TRNG	DMA Batch Acquisition Mode	USB 2.0 OTG FS
STM32F401	84	128 to 512	up to 96	Down to 128	Down to 10	Down to 3x3								•
STM32F410	100	64 to 128	32	Down to 89	Down to 6	Down to 2.553x 2.579					•	•	BAM	-
STM32F411	100	256 to 512	128	Down to 100	Down to 12	Down to 3.034x 3.22							BAM	•
STM32F412	100	512 to 1024	256	Down to 112	Down to 18	Down to 3.653x 3.651	•	•	•	•		•	BAM	• +LPM[1]
STM32F413[2]	100	1024 to 1536	320	Down to 115	Down to 18	Down to 3.951x 4.039	•	•	•	•	•	•	BAM	• +LPM[1]

Notes:
1. Link Power Management
2. The same devices are also found with embedded HW AES encryption (128-/256-bit) named STM32F423