STM32 32-bit Cortex™-M MCUs

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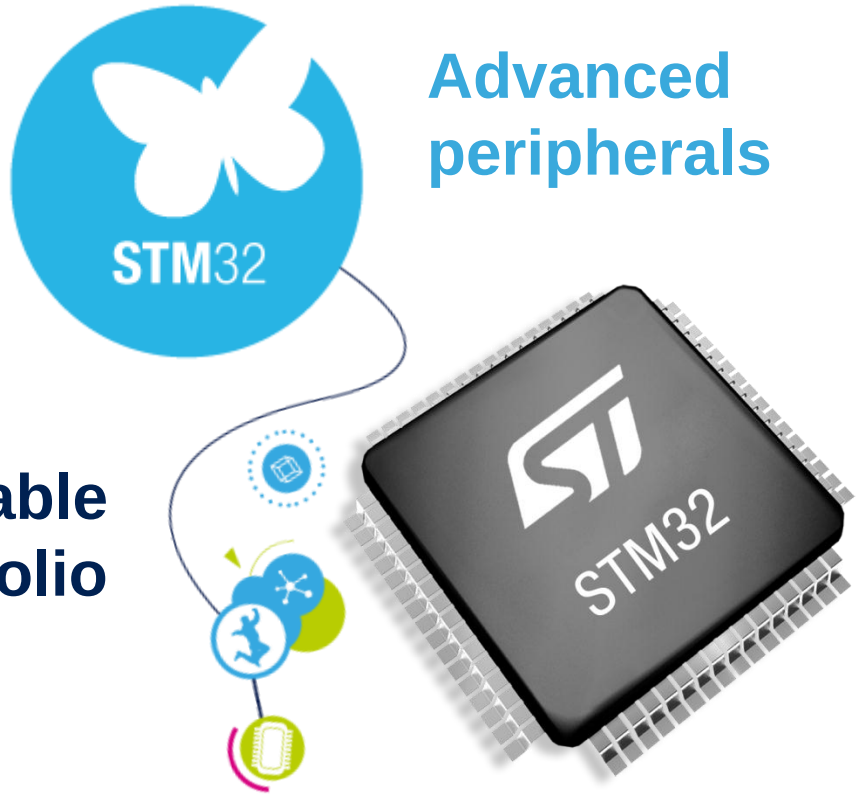
What does a developer want in an MCU?



Advanced peripherals

Cost sensitive

Scalable device portfolio

Software libraries

Rich choice of tools

Ultra-low-power

Leading edge core

STM32 platform key benefits

Real-time performance Cortex Intelligent Processors by ARM	Outstanding power efficiency	Superior and innovative peripherals	Maximum integration	Extensive ecosystem
ART Accelerator, Chrom-ART Accelerator, CCM-SRAM, Multi-AHB bus matrix, Excellent real-time up to 180 MHz/225 DMIPS zero-wait state execution performance from Flash	< 1 µA RTC in V_{BAT} mode, ultra-low dynamic power consumption 140 µA/MHz 1.65 to 3.6 V V_{DD}, 0.45 µA Stop mode and 0.3 µA Standby mode	USB-OTG High Speed, camera interface, Ethernet, CAN, TFT controller, crypto/hash processor, PGA, sigma-delta 16-bit ADC and 12-bit ADC (up to 5 MSPS), external memory interface, CEC	Reset circuitry, voltage regulator, internal RC oscillator, PLL	ARM + ST ecosystem (eval boards, discovery kits, software libraries, RTOS)

More than **450 compatible devices**

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STM32 a comprehensive platform

Flash size (bytes)

2 M

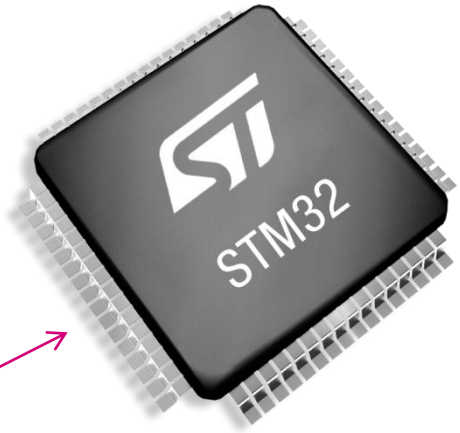
16 K

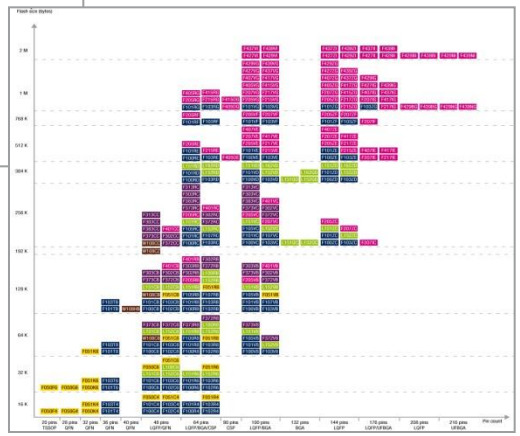
Select your fit product inside a wide, compatible portfolio

Cortex™-M3/M4/M0
Flash – High performance

STM32 F0 STM32 F1 STM32 F2 STM32 F3 STM32 F4

STM32 L1 STM32 W





20 pins

216 pins

STM32 – 7 product series

STM32 F4 2MB block diagram

System

- Power supply 1.2 V regulator POR/PDR/PVD
- Xtal oscillators 32 kHz + 4 to 26 MHz
- Internal RC oscillators 32 kHz + 16 MHz
- PLL
- Clock control
- RTC/AWU
- 1x SysTick timer
- 82/114/140/168 I/Os
- 2x watchdogs (independent and window)
- Cyclic redundancy check (CRC)

ART Accelerator™

ARM Cortex-M4 180 MHz

- Floating point unit (FPU)
- Nested vector interrupt controller (NVIC)
- MPU
- JTAG/SW debug/ETM

- Up to 2-Mbyte dual bank Flash
- 256-Kbyte SRAM
- TFT LCD controller
- Chrom-ART Accelerator™
- FMC/SRAM/NOR/NAND/ CF/SDRAM
- 80-byte + 4-Kbyte backup SRAM
- 512 OTP bytes

Connectivity

- Camera interface
- 6x SPI, 2x I²S, 3x I²C[3]
- Ethernet MAC 10/100 with IEEE 1588
- 2x CAN 2.0B
- 1x USB 2.0 OTG FS/HS[1]
- 1x USB 2.0 OTG FS
- 1x SDIO
- 4x USART + 4 UART LIN, smartcard, IrDA, modem control
- 1x SAI (Serial audio interface)

Control

- 2x 16-bit motor control PWM Synchronized AC timer
- 5x 16-bit timers 2x 32-bit timers
- 3x 16-bit timers

Multi-AHB bus matrix

- 16-channel DMA

Crypto/hash processor[2]

- 3DES, AES 256, GCM, CCM
- SHA-1, SHA-256, MD5, HMAC

- True random number generator (RNG)

Analog

- 2-channel 2x 12-bit DAC
- 3x 12-bit ADC 24 channels / 2 MSPS
- Temperature sensor

Notes:
1. HS requires an external PHY connected to the ULPI interface
2. Crypto/hash processor on STM32F415, STM32F417, STM32F437 and STM32F439
3. With digital filter feature

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ST has licensed Cortex-M processors

- **Forget traditional 8/16/32-bit classifications and get**
  - Seamless architecture across all applications
  - Every product optimized for ultra-low power and ease of use

Cortex-M0	Cortex-M3	Cortex-M4
8/16-bit applications	16/32-bit applications	32-bit/DSC applications

Binary and tool compatible

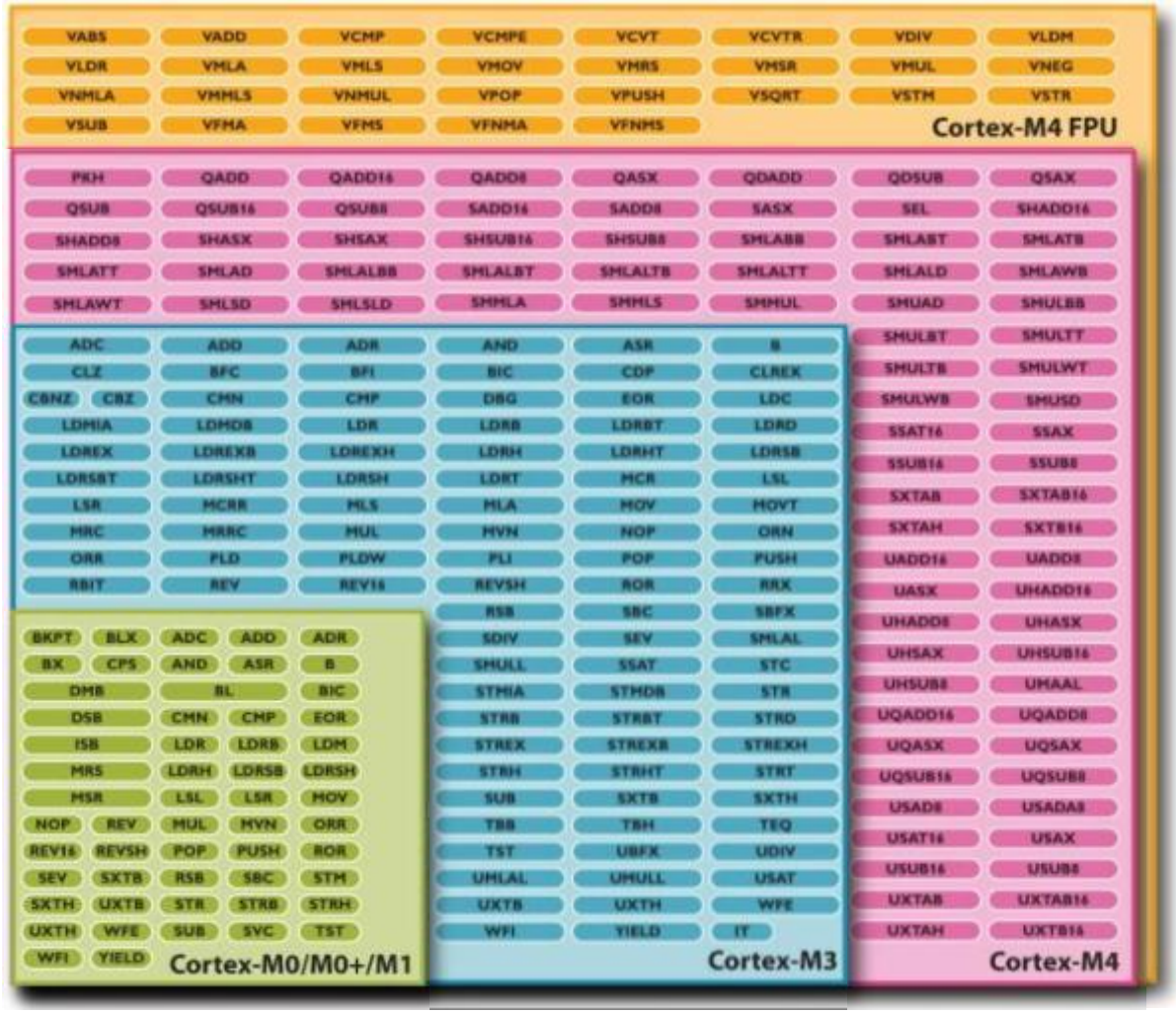
Cortex-M processors binary compatible

Floating Point Unit (FPU)

DSP (SIMD, fast MAC)

Advanced data processing
Bit field manipulations

General data processing
I/O control tasks



Source: ARM

STM32 applications

- Industrial
  - PLC
  - Inverters
  - Printers, scanners
  - Industrial networking
  - Solar inverters

- Medical
  - Glucose meters
  - Portable medical care
  - VPAP, CPAP
  - Patient monitoring

- Buildings and security
  - Alarm systems
  - Access control
  - HVAC
  - Power meters

- Appliances
  - 3-phase motor drives
  - Application control
  - User interfaces
  - Induction cooking

- Consumer
  - Home audio
  - Gaming
  - PC peripherals
  - Digital cameras, GPS

A large community of partners

Hardware Development Tools

- Discovery Kits

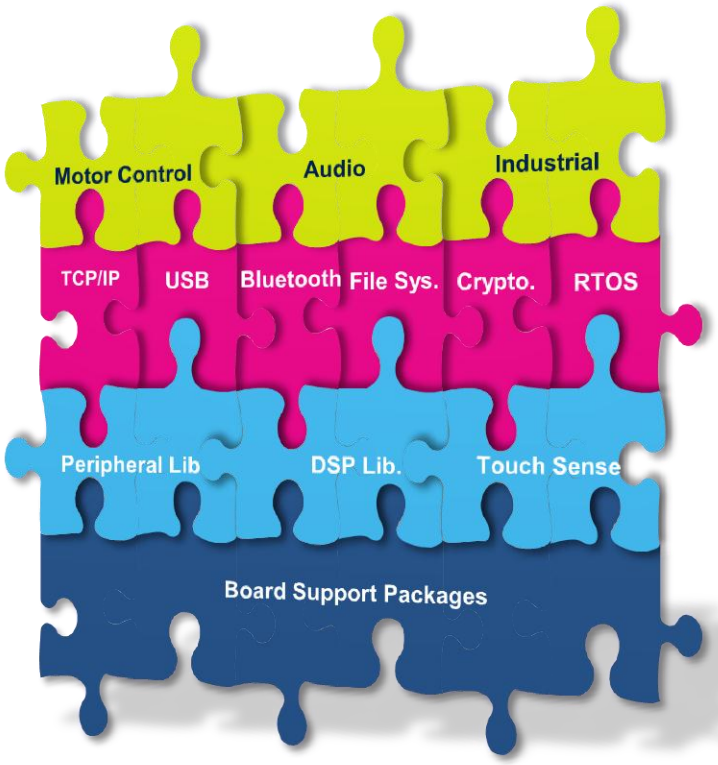
- Evaluation Boards

- Open Hardware Boards
  - Arduino-based
    - Leaflabs Maple, Olimexino-STM32, Netduino,…
  - Microsoft Gadgeteer-based
    - Netduino Go, Mountaineer, GHI…

- Debug Probes and Programming Tools
  - ST-Link
  - J-Link
  - Ulink

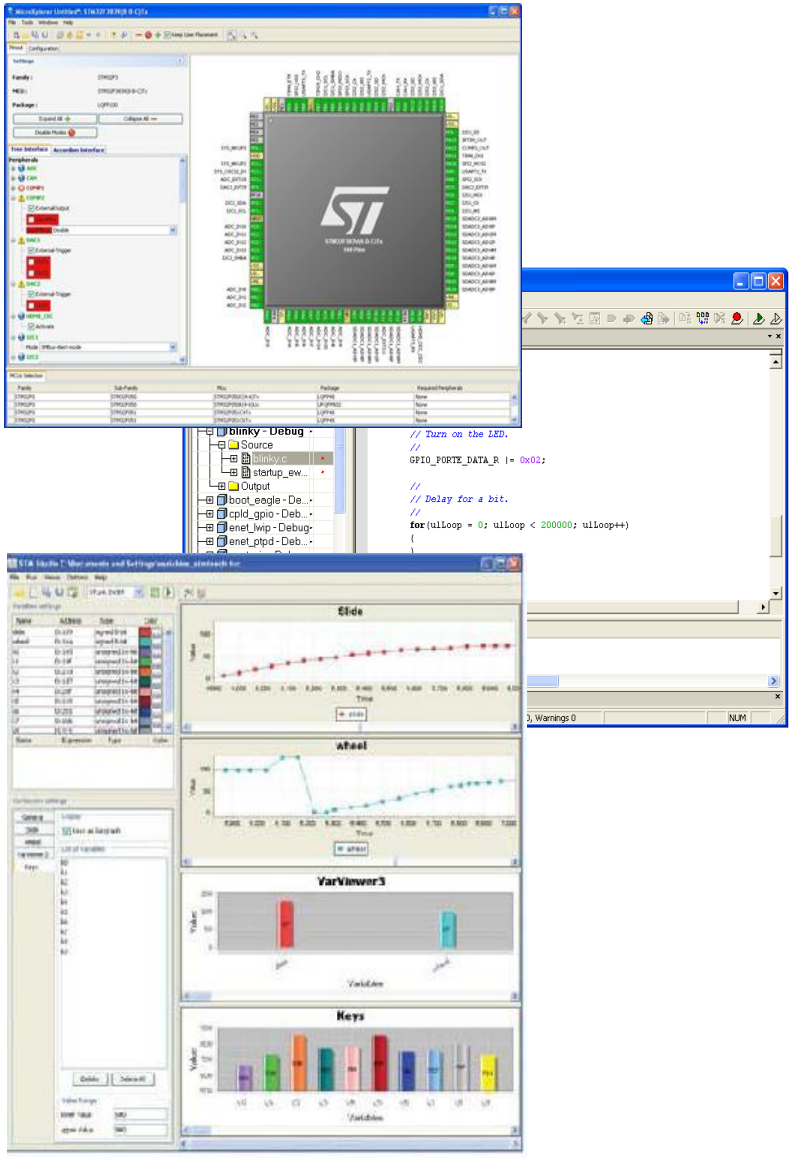
Embedded Software (Firmware)

- HAL / Drivers
  - ST Boards Support Packages (BSP)
  - Peripheral Libraries (Drivers)
  - DSP Library
- RTOS / Firmware Stacks
  - RTOS
  - Cryptographic
  - USB
  - TCP/IP
  - File Systems
  - BlueTooth
  - Zigbee
  - Graphism
  - Touch sensing
- Application Bricks
  - Audio
  - Industrial
  - Motor Control
- High Level Frameworks (STM32 only)
  - Java
  - Microsoft .Net Micro Framework
  - Matlab/Simulink

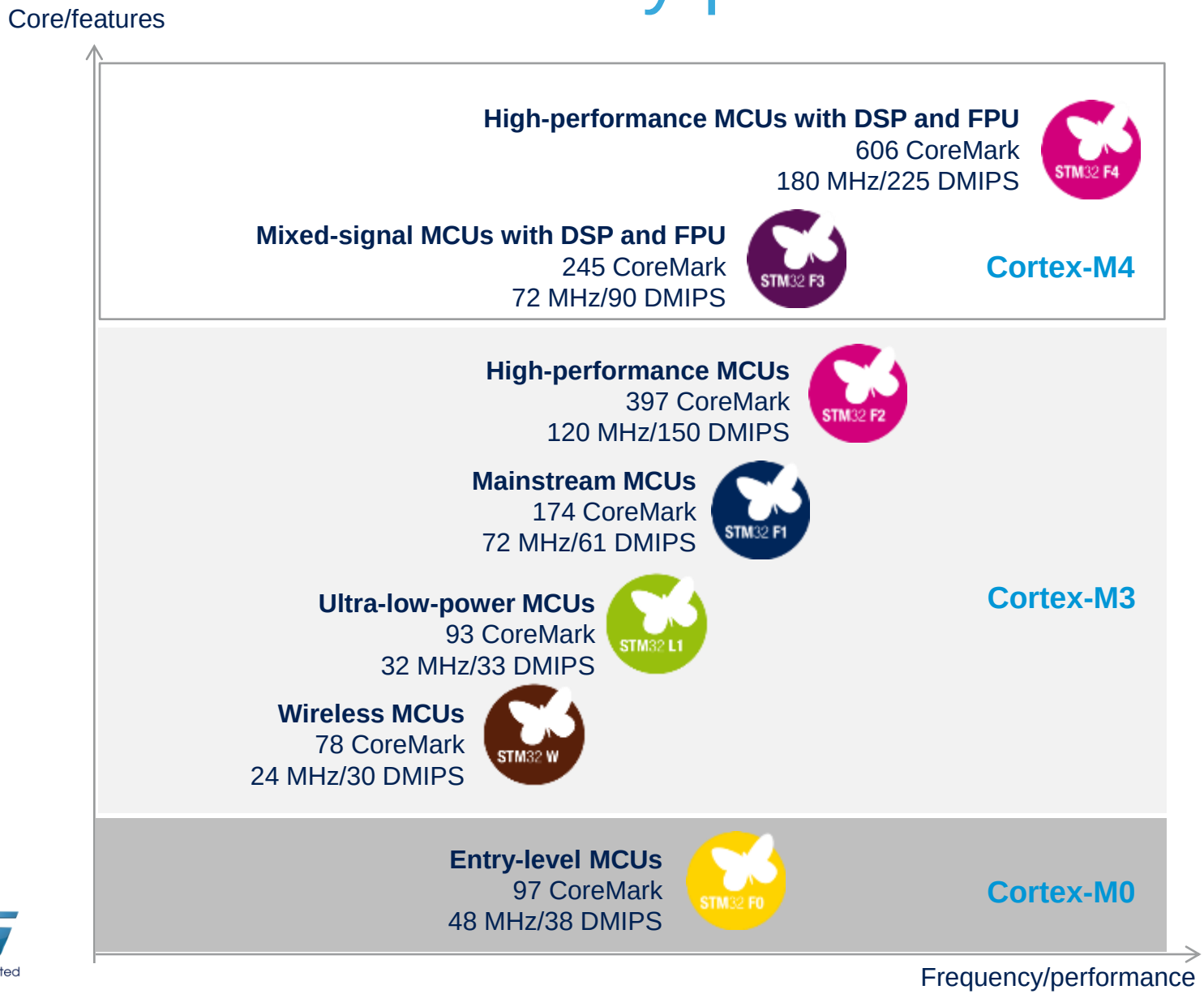


Software Development Tools

- Configuration Tools
  - µXplorer
- Development and Debugging Tools
  - IAR EWARM
  - Keil MDK
  - Atollic TrueStudio
  - Rowley CrossWorks
  - Embest CooCox
  - Segger emIDE
  - Code Red RedSuite
  - Raisonance Ride
  - Altium Tasking
  - Cosmic Idea
  - Yagarto…
- Monitoring Tools
  - STMStudio



STM32 offer by performance core



Thank you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www.st.com/stm32