Iran University of
Science and Technology

Microcontroller

Department of Electrical Engineering
Iran University of Science and Technology

IUST
Iran University of Science and Technology

ARM

ARM (Advanced RISC Machine) is a family of reduced instruction set computing (RISC) architectures for computer processors.

RISC

- Simpler instruction
- Instructions take a single clock to be executed
- Larger Code size

CISC

- Complex instruction
- Instructions may take more than a single clock cycle to get executed.
- Smaller Code size

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ARM as a company

ARM was founded in 1990 as a joint venture between **Acorn** Computers, **Apple**, and **VLSI** Technology.

ARM Holdings is not a chip manufacturer. It licenses its architecture to companies like Apple, Samsung, Qualcomm, and STMicroelectronics.

Evolution of ARM Processors

1985: ARM1, the first processor, was introduced.
1991: ARM6 powered the first mobile phone (Nokia 6110).
1995: ARM7TDMI became the world's most popular 32-bit processor.
2004: Cortex family introduced, dividing into Cortex-A, Cortex-R, and Cortex-M series for specific markets.
2016: ARM acquired by SoftBank for $32 billion, boosting focus on IoT and cloud computing.

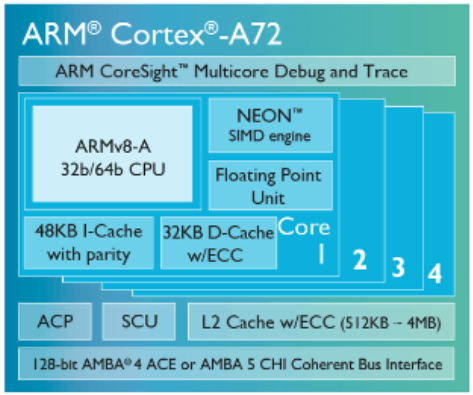
ARM cortex processors

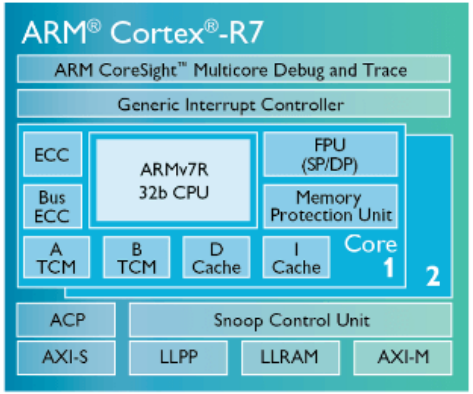
ARM processors are divided into different families for various applications:

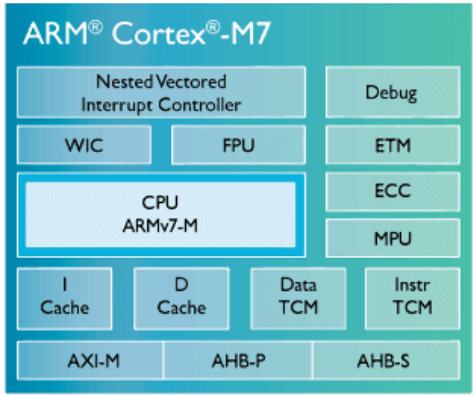
Cortex-M: Optimized for microcontrollers, embedded systems.

Cortex-A: Used in high-performance applications like smartphones.

Cortex-R: Real-time processors for safety-critical systems like automotive.







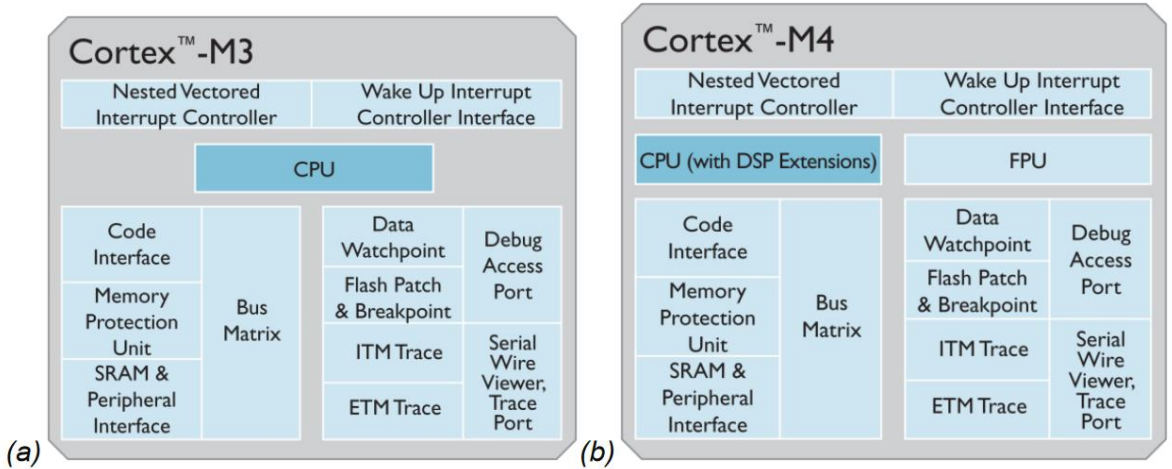
Cortex-M Series

Under embargo until Wednesday November 22nd 2023 at 6am PST / 2pm GMT

arm

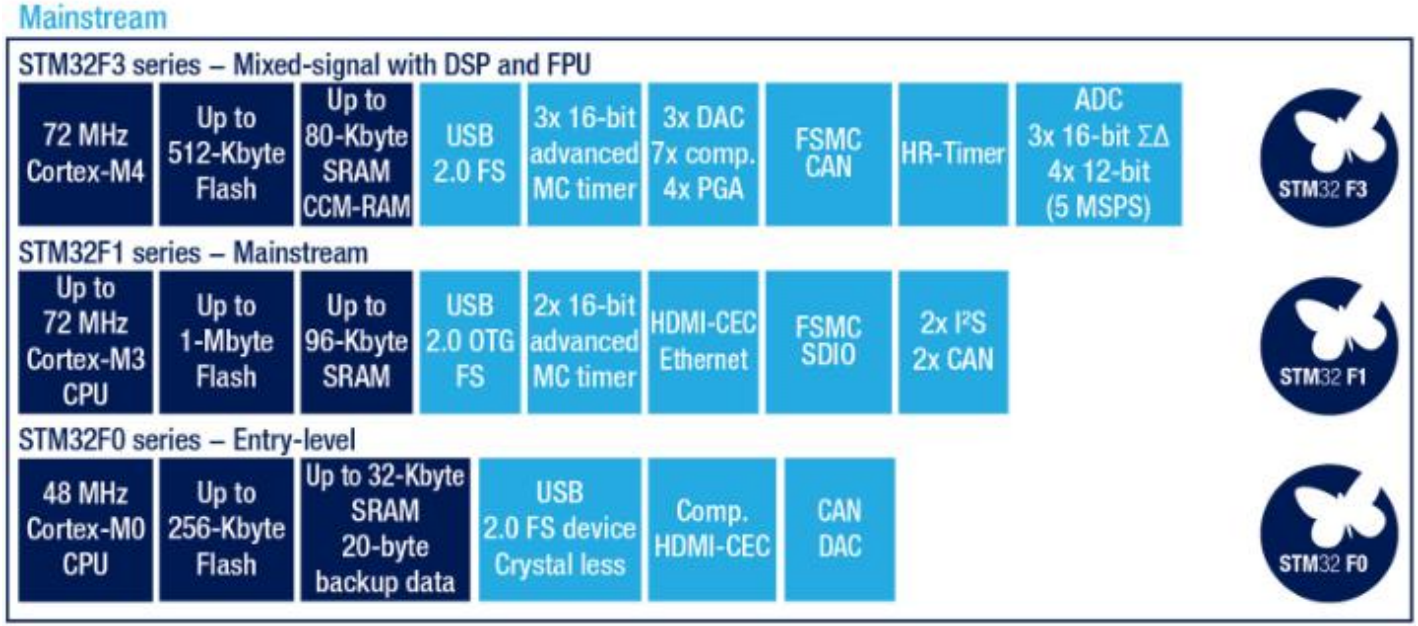
Cortex-M Series

- Cortex-M4 adds a range of SIMD instructions specifically optimized to handle **DSP** algorithm.
- Cortex-M3 would consume around **three times** the power that a Cortex-M4 would need for the same job.
- Floating point unit (FPU) on a Cortex-M4.

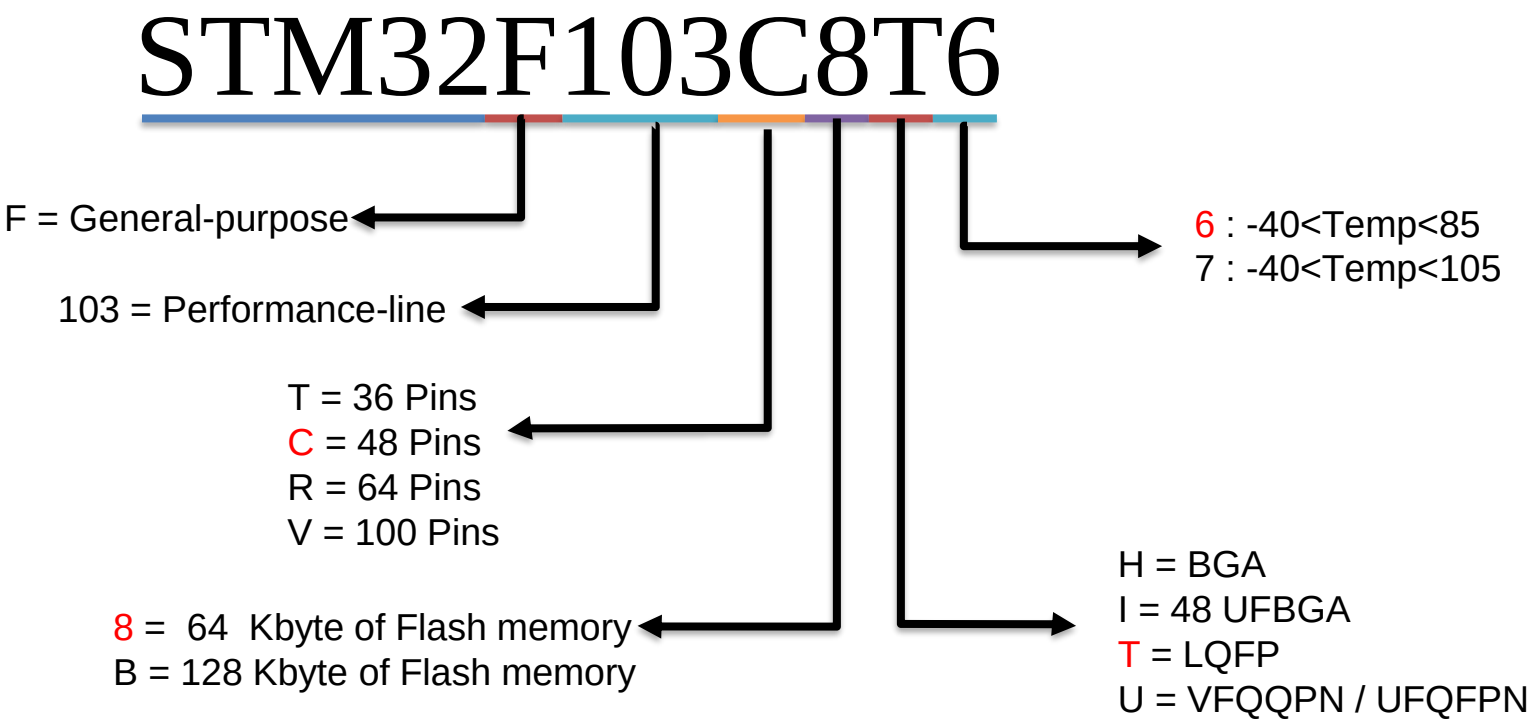


Top companies Powered by ARM Architecture

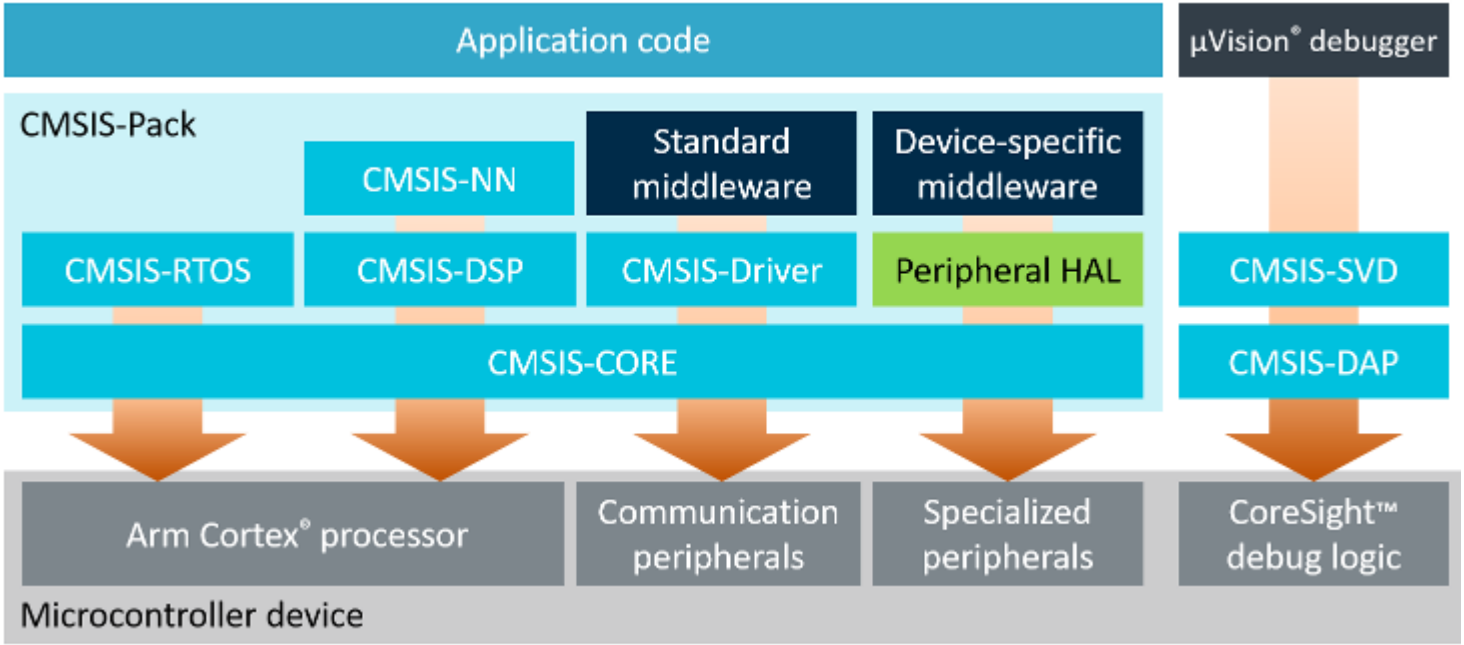
Overview of STM32 Families



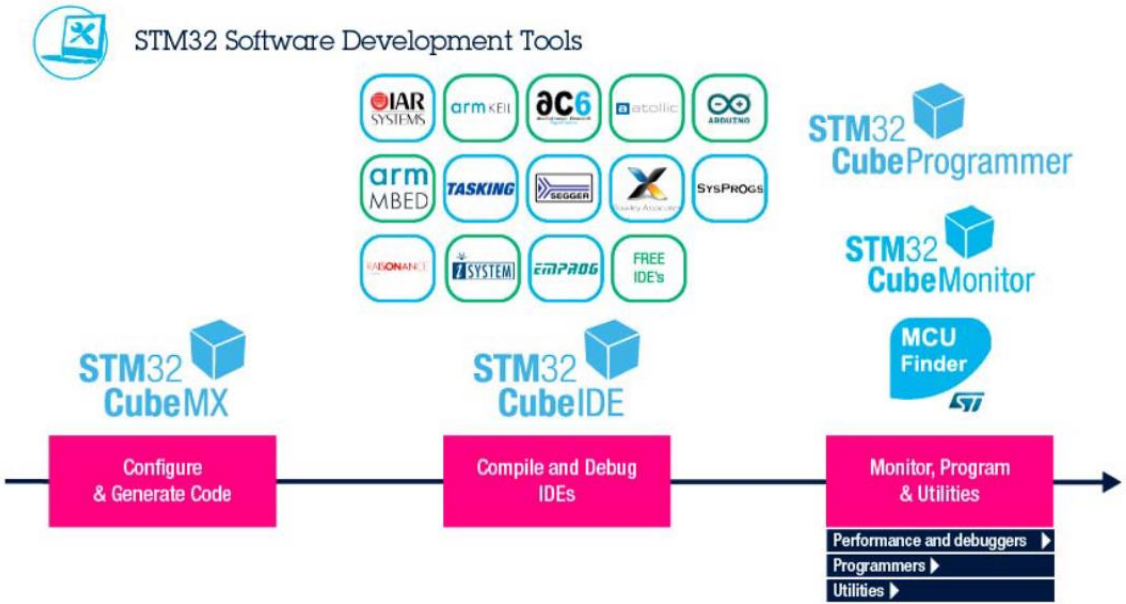
Part number Decoding



CMSIS


Application code
µVision® debugger
CMSIS-Pack
CMSIS-NN
Standard middleware
Device-specific middleware
CMSIS-RTOS
CMSIS-DSP
CMSIS-Driver
Peripheral HAL
CMSIS-SVD
CMSIS-CORE
CMSIS-DAP
Arm Cortex® processor
Communication peripherals
Specialized peripherals
CoreSight™ debug logic
Microcontroller device

Software Development tools



ARM® KEIL®
Microcontroller Tools

STM32 CubeIDE

IAR SYSTEMS

Debugging STM32F103C6T8