Microcontroller

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ARM

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

RISC	CISC
• Simpler instruction	• Complex instruction
• Instructions take a single clock to be executed	• Instructions may take more than a single clock cycle to get executed.
• Larger Code size	• Smaller Code size

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.
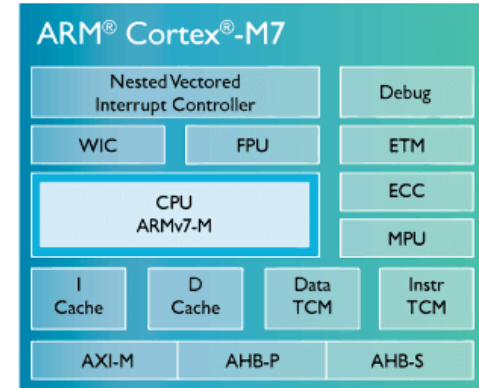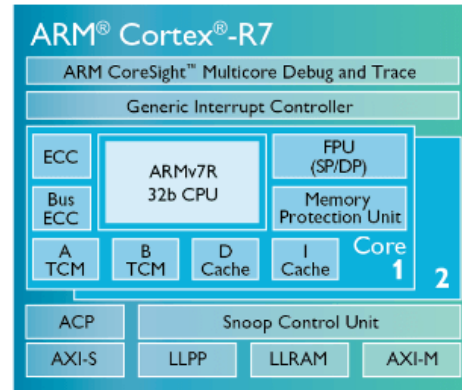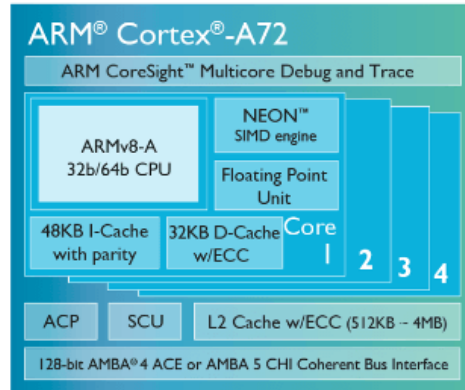
ARM cortex processors

ARM processors are divided into different families for various applications:
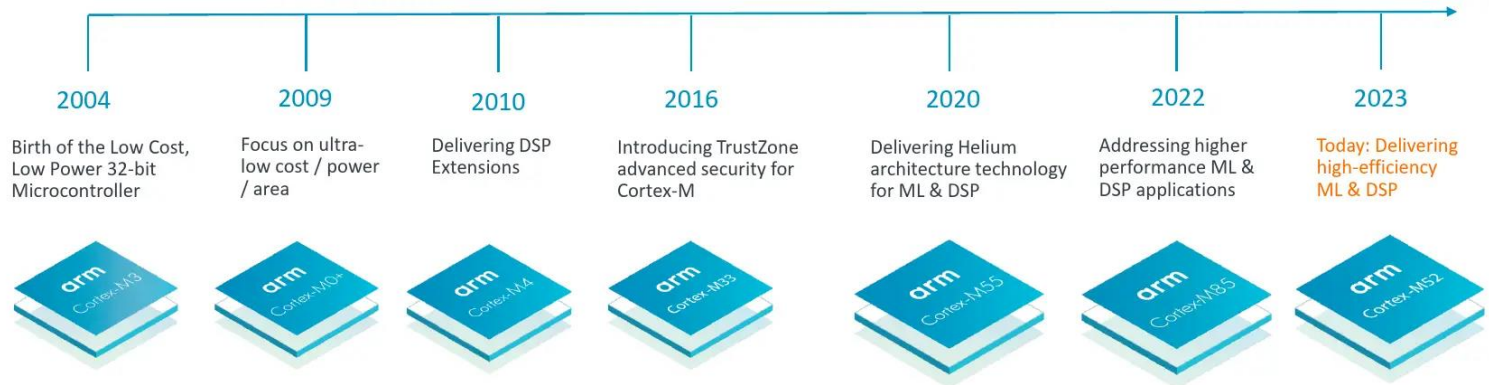
Cortex-M: Optimized for microcontrollers, embedded systems.

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

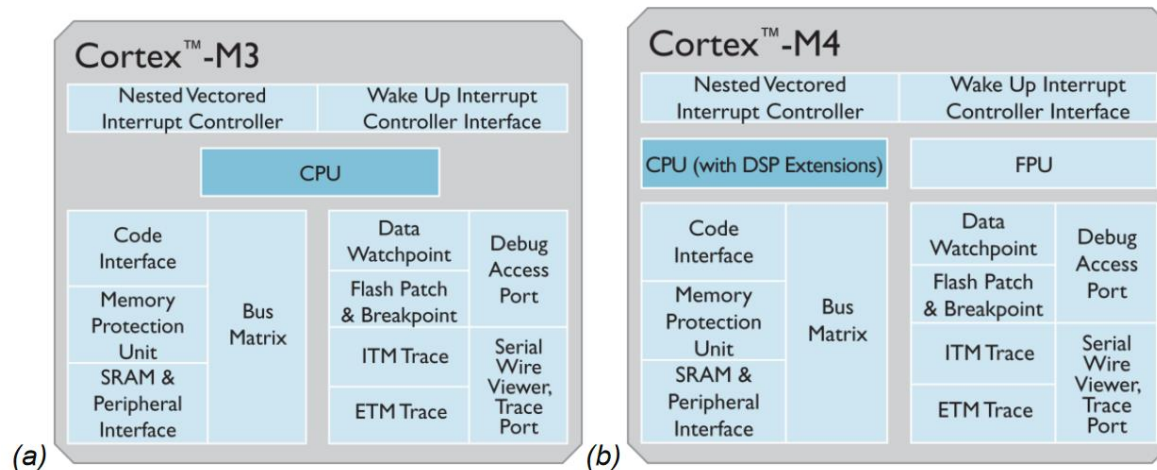**Cortex-R**: Real-time processors for safety-critical systems like automotive.

Cortex-M Series

2004	2009	2010	2016	2020	2022	2023
Birth of the Low Cost, Low Power 32-bit Microcontroller	Focus on ultra-low cost / power / area	Delivering DSP Extensions	Introducing TrustZone advanced security for Cortex-M	Delivering Helium architecture technology for ML & DSP	Addressing higher performance ML & DSP applications	Today: Delivering high-efficiency ML & DSP

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

STM32F103C8T6

F = General-purpose

103 = Performance-line

T = 36 Pins
C = 48 Pins
R = 64 Pins
V = 100 Pins

8 = 64 Kbyte of Flash memory
B = 128 Kbyte of Flash memory

6 : -40<Temp<85
7 : -40<Temp<105

H = BGA
I = 48 UFBGA
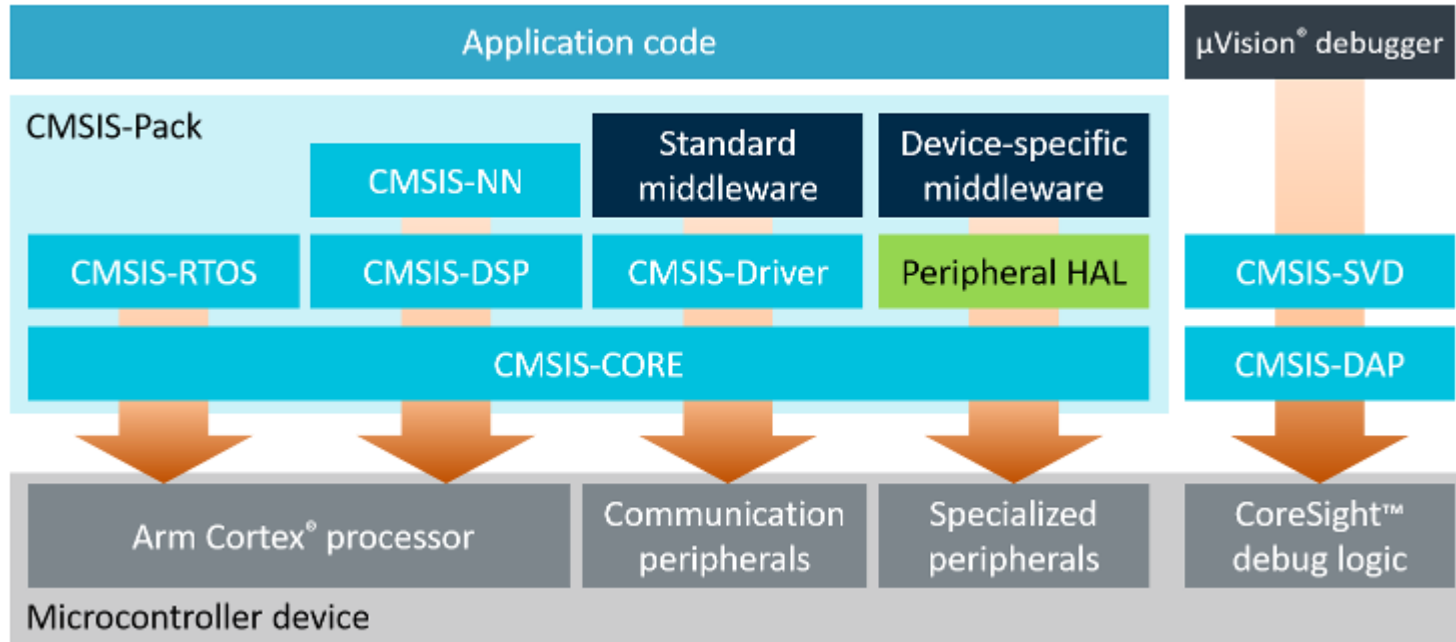T = LQFP
U = VFQQPN / UFQFPN

CMSIS

Software Development tools

Debugging STM32F103C6T8