Arm Cortex-M3/M4 Processors

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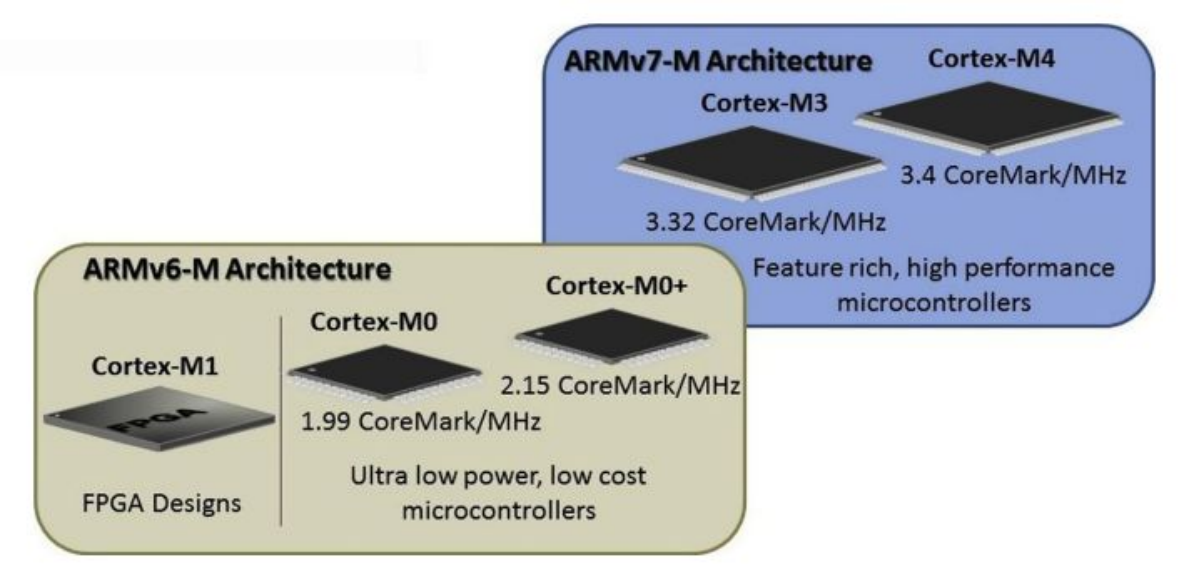
Introduction of ARM Cortex-M Processors

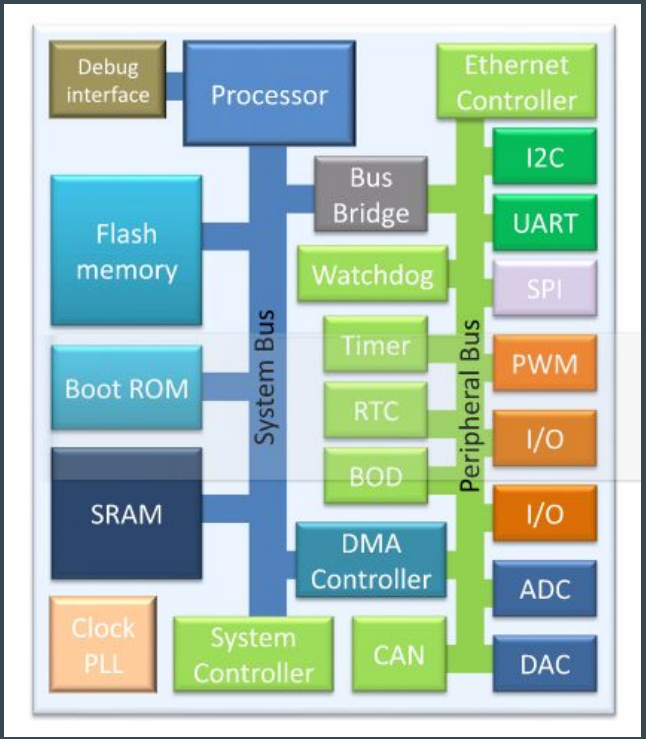
1. What are the ARM Cortex-M Processors?
2. Advantages of the Cortex-M Processors
3. Applications of the Cortex-M processors
4. Resources for using ARM processors and ARM microprocssors
5. Background and history

What are the ARM Cortex-M processors?

- ARM Cortex-M processors are RISC (Reduced Instruction Set Computing) processors. But rich instruction set and mixed instruction size are close to CISC



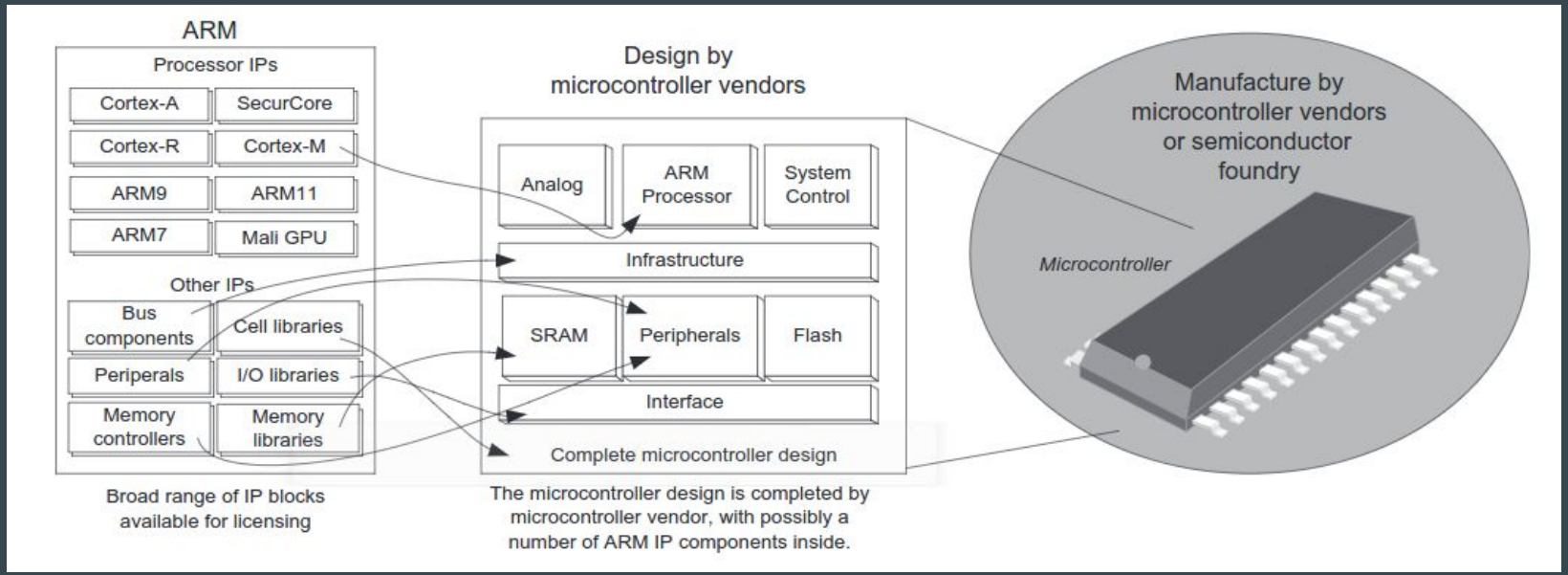
Difference between microprocessor and microcontroller



- ARM does not make microcontroller but makes microprocessor
- ARM designs IP (Intellectual Property) and sells its licensing
- Microcontroller contanis many different blocks

Selecting Cortex-M3/M4 microcontrollers

- Cortex-M System Design Kits
- Current Cortex-M3/M4 microcontroller vendors include: Analog Devices, Atmel, Cypress, EnergyMicro, Freescale, Fujitsu, Holtek, Infineon, Microsemi, Milandr, NXP, Samsung, Silicon Laboratories, ST Microelectronics, Texas Instrument, and Renesas



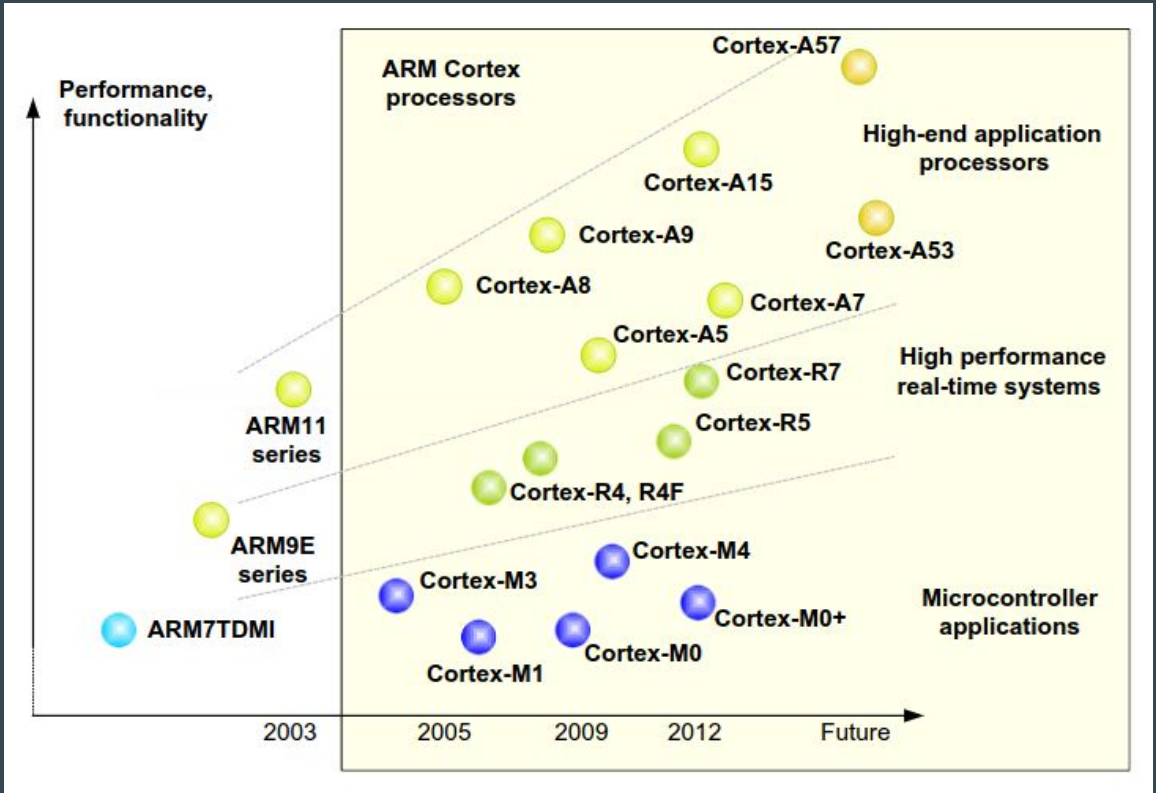
Advantages of Cortex-M processors

- Low power : < 200uA/MHz
- Performance
- Energy Efficiency
- Code density : Thumb ISA
- Interrupts : up to 240 interrupts
- C friendly
- Scalibility
- Debug Features
- OS support : over 30 RTOS
- Versitie system features
- Software portability : CMSIS
- Choices : devices, tools, OS, etc

Resources for using ARM processors and ARM microcontrollers

- ARM Infocenter : http://infocenter.arm.com
- Microcontroller vendors website : http://www.st.com/en/evaluation-tools/nucleo-l432kc.html
- Documentation from tools vendor : https://www.mbed.com/en

ARM processors evolution

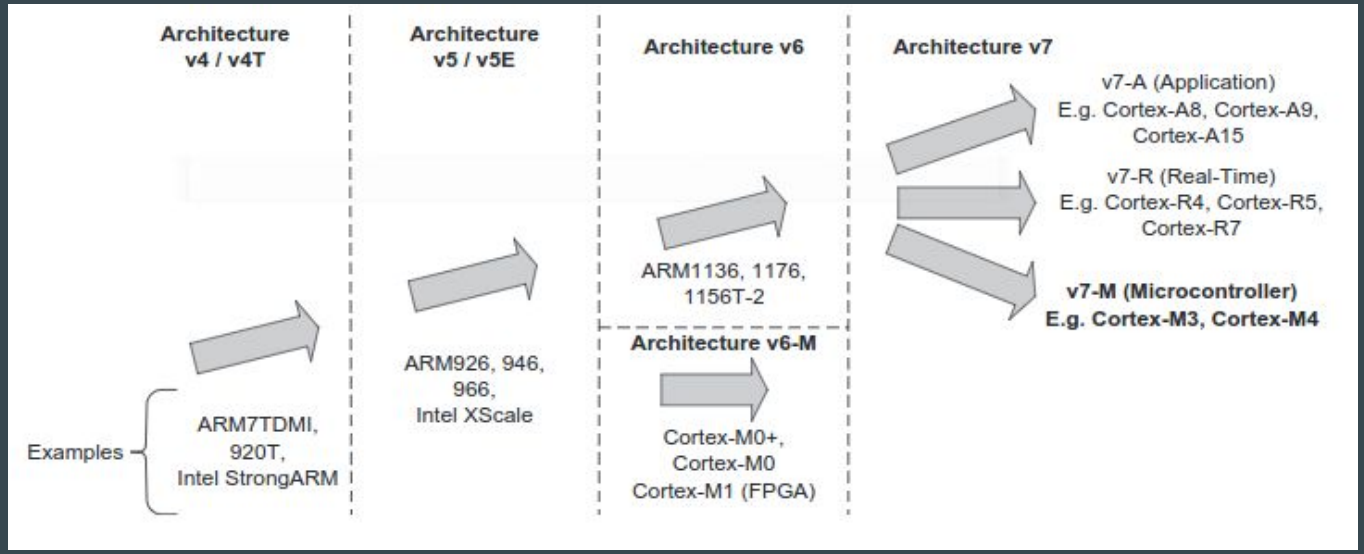


Cortex-A series : High performance application processor for high end OSes (Android, Linux, iOS and Windows)

Cortex-R series : Real time high performance processor

Cortex-M series : Smaller application such as microcontroller, low power, low cost, energy efficient and low interrupt latency.

ARM processors evolution



Cortex-A : ARMv7-A architecture
Cortex-R : ARMv7-R architecture
Cortex-M : ARMv6-M, ARMv7-M

E : Enhanced DSP Instruction

Relationship between Thumb instruction set & Cortex-M instruction set