

# Chapter 15

## **ARM MCUs Architecture, Programming and Development Tools**

# Lesson 2

## **ARM Microcontrollers**

# ARM CPUs/MCUs

- CPUs ARM-7 and ARM-9
- CPUs PowerPC 750, ColdFire, TigerSHARC
- MCUs ST72x, LPC21xx, ...
- ARM Cortex M3 based MCU

# ARM MCUs ...

ST MicroElectronics

Philips

Atmel

Samsung

Others

# ST MicroElectronics

## ARM CPUs/MCUs

- ARM 7 core high-end 32-Bit single-VLSI MCUs

<http://www.st.com/stonline/products/support/micro/arm/str7/10-htm>

- STR71x (for examples, STR710 or STR711 or STR712)
- STR720 Derivatives

# ST MicroElectronics

## ARM CPUs/MCUs

- **STR710 ARM MCU**
- **16/32 bit ARM-based Flash microcontrollers with USB and CAN**

# ST CPUs/MCUs

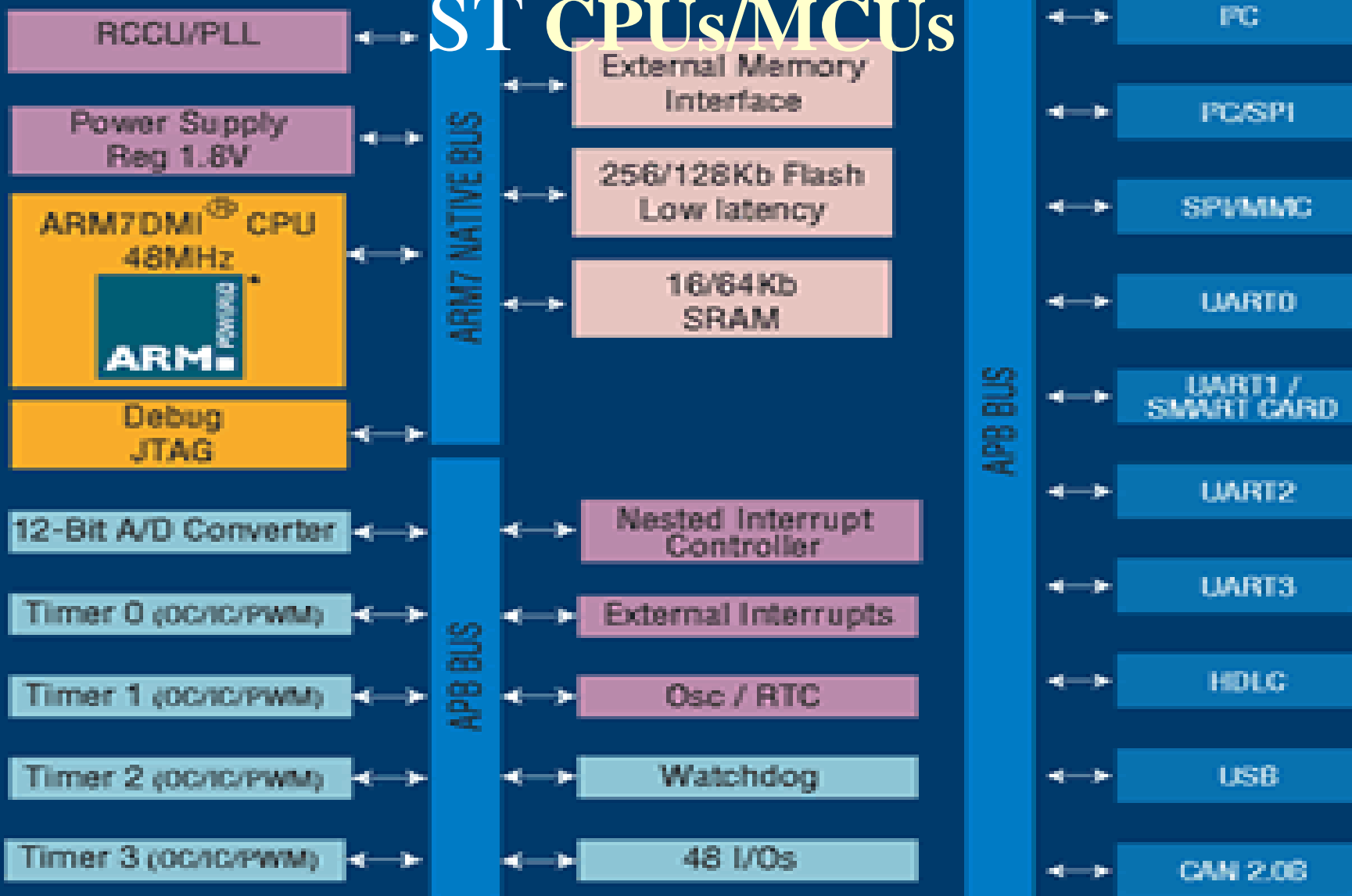


Figure 1

## **STR10 Features**

**MCU STR10F  
version 48MHz]**

**Internal 128K /  
256K embedded  
fast Flash**

**Internal 16 /64K  
high-speed SRAM**

**Low Power 4 Modes  
(Slow, Idle, Stop and  
Power-off)**



# STR10 Flash

(a) up to 30MHz with 0 wait states  
(without acceleration)

(b) Up to 48MHz with 0 wait states  
(with acceleration)

# Features....

## Basic Communication Devices

- Five SPI,
- UART and
- I<sup>2</sup>C

# Features....

- Additional MMC (Multi-Media Card) Interface

# Additional Devices ....

- Smart Card Interface
- Additional USB Interface

Atmel ARM 9 as core high-end 32-bit  
single-VLSI MCUs

(<http://www.atmel.com/products/AT91/>)

AT91RM3400, AT91 industrial  
controller

AT91SAM7A1 1 x CAN and  
AT91SAM7A2 4 x CAN  
controllers

**AT91RM9200**

**up to 256 Kbytes high-speed Flash,**

**large set of peripherals**

**USB 2.0 device**

**3 SSC, Smart Media MMC, SD card, I2C,**

**Internal up to 64 Kbytes SRAM**

**6-ch timers**

**4-Ch  
UARTS**

# Philips MCUs (Nexperia)

LPC2114

LPC2124

# LPC2114 and LPC2124 32-bit ARM MCU Applications

- New features and functionality, the new devices allow designers of embedded real-time control applications



# LPC21xx MCUs Devices...

- **Flash process enabling ultra low V 1.8 V 60MHz**
- **Up to 46 General-Purpose Input/Outputs**
- **Small outline 64-pin package**

**LPC21xx  
MCUs Devices**

**256K bytes of embedded  
Flash memory**

**Serial peripheral interface (SPI)**

**Pulse width modulation  
(PWM) timers,**

**Internal 16 /64K high-speed  
SRAM**

**10-bit A/D converters,**

**UARTS**

# LPC21xx Applications...

- Ideal for a wide range of applications including motor control, servo loop control, power management and data acquisition.

Samsung MCUs ARM 9TDMI  
ARM920T core 0.18  $\mu\text{m}$  CMOS 32-Bit  
single-VLSI MCUs  
[[http://www.pocketpccentral.net/  
help/samsung2410.htm](http://www.pocketpccentral.net/help/samsung2410.htm)] for PocketPC/PDA

S3C2410X01

**S3C2410X01  
MCU Devices**

**Embedded Flash memory**

**LCD controller STN/TFT**

**4-Ch DMA**

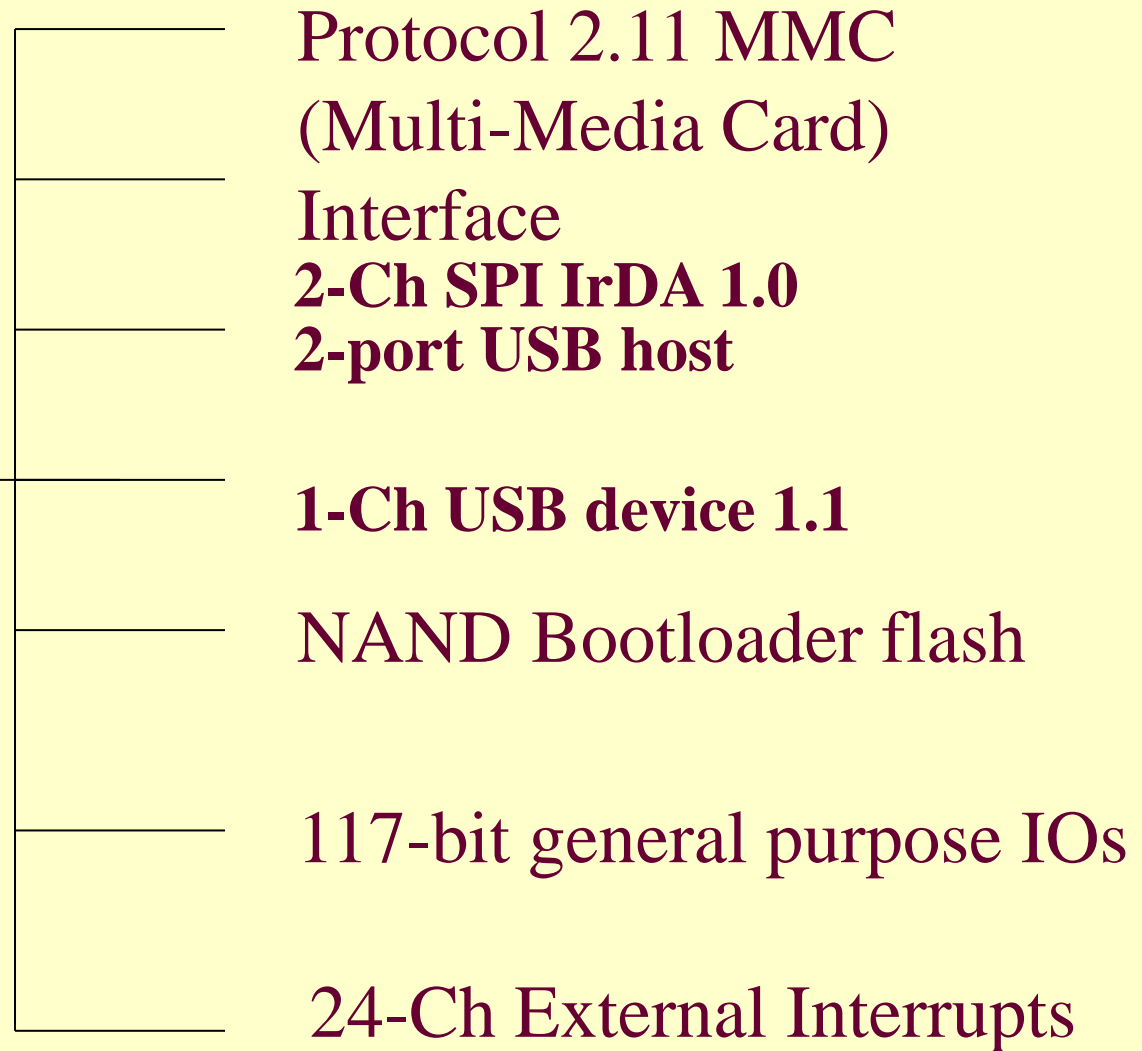
**8-ch 10-bit ADC**

**Internal 16 /64K high-speed  
SRAM**

**1-ch timer, 4-ch PWM timers**

**3-Ch  
UARTS**

**S3C2410X01  
MCU Other  
features**



# Summary

# We learnt

- ARM MCUs with large and fast flash memory for embedded real-time control applications -
- Sources of ARM Microcontrollers
- STMicroelectronics
- Philips Nexperia
- Samsung
- Atmel
- Others



# We learnt

**An ARM MCU  
Single Chip  
Example**

**up to 256 Kbytes high-speed Flash,**

**Large set of peripherals**

**USB 2.0 device**

**SSCs, Smart Media MMC, SD card, I2C,**

**Internal up to 64 Kbytes  
SRAM**

**Timers, ADCs, LCD controller**

**UARTs,  
SPIs,**

End of Lesson 6 –  
**ARM Microcontrollers**