



## **STR5 - STM32 F1-Series implementation**

**This course covers STM32F100XX, STM32F101XX, STM32F103XX, STM32F105XX and STM32F107XX ARM-based MCU family**

### **Objectives**

- This course has 5 main objectives:
  - Describing the hardware implementation and highlighting the pitfalls
  - Describing the ARM Cortex-M3 core architecture
  - Becoming familiar with the IDE and low level programming
  - Describing the units which are interconnected to other modules, such as clocking, interrupt controller and DMA controller, because the boot program generally has to modify the setting of these units
  - Describing independent I/O modules and their drivers.
- Note that this course has been designed from the architecture of the most complex STM32 F1-Series device, the STM32F107.
- Consequently, a chapter has been designed by Acsys for each possible integrated IP.
  - According to the actual reference chosen by the customer, some chapters may be removed.
- Products and services offered by ACSYS:
  - ACSYS is able to assist the customer by providing consultancies. Typical expertises are done during board bringup, hardware schematics review, software debugging, performance tuning.
  - ACSYS has also an expertise in FreeRTOS porting and uIP /LWIP stack or Interniche stack integration.

*A lot of programming examples have been developed by ACSYS to help the attendee to become familiar with the IDE he has chosen.*

*That is why the labs included in this course can be compiled and executed under 3 possible IDEs: IAR, Keil and GCC / Lauterbach Trace32.*

*A more detailed course description is available on request at [info@ac6-training.com](mailto:info@ac6-training.com)*

*This document is necessary to tailor the course to specific customer needs and to define the exact schedule.*

### **Prerequisites and related courses**

- This course provides an overview of the ARM Cortex-M3 core. Our course reference [RM2](#) details the operation of this core.
- The following courses could be of interest:
  - USB Full Speed High Speed and USB On-The-Go, reference [IP2](#)
  - Ethernet and switching, reference [N1](#)
  - IEEE1588, reference [N2](#)
  - CAN bus, reference [IA1](#)
  - SD / MMC, reference [IS2](#)

## Plan

### **ARCHITECTURE OF STM32F2 MCUs**

- ARM core based architecture
- Description of STM32F10X SoC architecture
- Clarifying the internal data and instruction paths: AHB-lite interconnect, peripheral buses, AHB-to-APB bridges
- Integrated memories
- SoC mapping

### **THE ARM CORTEX-M3 CORE**

- V7-M core family
- Core architecture
- Programming
- Exception behavior, exception return
- Basic interrupt operation, micro-coded interrupt mechanism

### **BECOMING FAMILIAR WITH THE IDE**

- Acsys covers 3 IDEs: Keil, IAR and GCC / Lauterbach
- Thus the customer has just to indicate which one he has chosen
  - Getting started with the IDE
  - Parameterizing the compiler / linker
  - Creating a project from scratch
  - C start program

### **PROGRAMMING AND DEBUGGING**

- Debug interface
- Programming

### **RESET, POWER AND CLOCKING**

- Power control
- Reset
- Clocking
- Low power modes

### **INTERNAL INTERCONNECT**

- Bus matrix
- DMA

### **HARDWARE IMPLEMENTATION**

- Power pins
- Pinout
- GPIO module
- External Interrupts

### **INTEGRATED MEMORIES**

- Embedded flash memory

- Internal SRAM

## MEMORY INTERFACE

- SDIO
- Flexible Static Memory Controller

## TIMERS

- Advanced-control timers TIM1 and TIM8
- General-purpose timers (TIM2 to TIM5)
- General-purpose timers (TIM9 to TIM14)
- Basic timers (TIM6 and TIM7)
- Real Time Clock
- Independent Watchdog
- Window Watchdog

## ANALOG MODULES

- 12-bit Analog-to-Digital Converter and Programmable Gain Amplifier
- 12-bit Digital-to-Analog Converter

## SECURITY AND INTEGRITY

- CRC calculation unit
- Device Electronic Signature

## CONNECTIVITY AND COMMUNICATION

- SPI
- SPI in I2S mode
- UART
- I2C
- bxCAN modules
- USB FS
- Fast ethernet with IEEE1588
- ISO7816 smartcard interface

## Renseignements pratiques

**Durée : 5 jours**  
**Prix : 1950 € HT**



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