As of 31.05.2025

Arm7/ Arm9/ Arm10/ Arm11™: Architecture and Embedded Programming - Face-to-Face Training

Objectives

You know the Arm architecture and can write software in C and Assembler. You can locate programs in memory and test them. This is the perfect start for designing Arm based systems.

Participants

Software and hardware developers

Requirements

A basic understanding of ANSI-C and microcontrollers.

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Content

Arm Processor Architecture

- Operating modes, states, pipeline, register organization
- User mode, fast interrupt (FIQ) mode, interrupt (IRQ) mode
- Supervisor mode, system mode, undefined mode
- Thumb-2 state, Arm state, Thumb state, Jazelle state
- Arm register file
- Status register

Arm Processor Cores: Overview

- Arm7 / Arm9 / Arm10 / Arm11 processor core
- Cortex®-M, Cortex®-R, Cortex®-A processor cores

Arm, Thumb and DSP Instruction Sets

- v4, v4T, v5, v6 instructions
- v7 - Thumb-2 instruction set overview
- Arm/Thumb interworking
- Assembler directives

Exception Handling

- FIQ, IRQ, ABORT, UNDEF, SVC
- Vector table
- Exception handler templates
- Vectored interrupt controller (VIC)

System Control Coprocessor, CP15

- Arm coprocessor concept
- Overall system control & configuration
- Cache configuration and cache management
- Memory management unit (MMU) configuration
- System performance monitoring

VFP2 Floating Point Unit

- VFP2 architecture
- VFP2 instruction set overview

Level 1 Memory Interface

- Tightly coupled memory
- Cache architecture
- DMA interface

Level 2 Memory System

- Advanced microprocessor bus architecture (AXI)
- AXI bus masters
- AXI bus slaves
- Second level caches
- On-chip RAM, peripherals
- External memory

Memory Management Unit (MMU)

- Translation lookaside buffer (TLB)
- Page tables, attributes

Memory Protection Unit (MPU) for Embedded Systems

Clock, Reset and Power Control

Arm Debug Support

- Embedded trace macrocell (ETM)
- Performance monitoring unit (PMU)
- CoreSight debug components
- Debug coprocessor, CP14

Embedded Software Development

- Adjustment of library routines to HW (retargeting)
- Locating code and data in memory (scatter loading)
- Linker description file
- Reset, start-up, start-up file

Efficient C Programming for the Arm Architecture

- Compiler optimization, compiler options
- Interface C - assembler
- Programming guidelines for Arm compilers
- Efficient use of local and global variables

Hardware-near C

- C statements and their execution in Assembler
- Access to peripherals in C
- Software architecture for embedded systems
- Structured (object oriented) description of peripherals

Practical Exercises with Arm RealView Tools

- Different tools can be used on request
- All programs are tested on an evaluation board

FACE-TO-FACE TRAINING

Price *	Duration
2.800,00 €	4 days

Training code: E-ARM-7/9
* Price per attendee, in Euro plus VAT

Face-To-Face - German

Duration

4 days

Coaching

Our coaching services offer a major advantage: our specialists introduce their expertise and experience directly in

your solution process, thus contributing to the success of your projects.

We will be happy to provide you with further information or submit a quotation tailored to your requirements.