



Cortex-A78 MPCore Software Development

Course Description

Cortex-A78 is the fourth generation high-performance CPU based on DynamIQ technology. The most efficient premium Cortex-A CPU.

Cortex-A78 MPCore software development is a 4 days ARM official course. The course goes into great depth and provides all necessary know-how to develop software for systems based on Cortex-A78 processors.

The course introduces the ARMv8-A architecture and its extensions, instruction set, and the new model to handle interrupts and exceptions.

The course continues by covering the Cortex-A78 MPCore architecture based on DynamIQ technology, memory management unit, memory model, cache and branch prediction, cache coherency, processes synchronization, boot process, barriers, virtualization, Generic Interrupt Controller (GIC), System MMU (SMMU), power management, debug, security, RAS support, and DynamIQ Shared Unit (DSU).

At the end of the course the participant will receive a certificate from ARM.

Course Duration

4 days

Goals

1. Become familiar with ARMv8-A Cortex-A78 architecture
2. Understand the advantages of DynamIQ technology
3. Become familiar with ARMv8-A instruction set
4. Understand the ARMv8-A AArch64 exception model
5. Be able to configure and use the ARMv8-A MMU
6. Be familiar with ARMv8-A memory model
7. Be familiar with ARMv8-A caches and branch prediction
8. Understand ARMv8-A cache coherency features and how to configure them
9. Be able to boot Cortex-A78 MPCore system
10. Implement synchronization processes using ARM primitives to build mutex/semaphore
11. Be able to add barriers instructions to control program flow order
12. Be able to program the GIC
13. Understand the use of System MMU
14. Become familiar with NEON coprocessor SIMD capabilities
15. Manage Cortex-A78 MPCore power modes
16. Be able to debug with invasive and non-invasive techniques
17. Become familiar with TrustZone infrastructure to build secured systems
18. Become familiar with Virtualization and its effect on the system

Target Audience

Software engineers that would like developing software and BSP for platforms based on ARMv8-A Cortex-A78 MPCore processor.

Prerequisites

- ARMv7-A architecture
- Computer architecture background
- C and Assembler
- Experience in developing embedded systems

Course Material

- ARM official course book

Agenda

Main Topics:

- Cortex-A78 Processor Overview
- Introduction to the ARMv8-A Architecture and its Extensions
- AArch64 A64 ISA Overview
- AArch64 Exception Handling
- ARMv8-A MMU
- ARMv8-A Memory Model
- ARMv8-A Caches and Branch Prediction
- ARMv8-A Cache Coherency
- Understanding Barriers
- Synchronization
- OS Support
- Booting a Cortex-A78 MPCore
- Programming the GIC
- Using the SMMU
- ARMv8-A Debug and Trace
- ARMv8-A Virtualization
- DynamIQ Shared Unit (DSU)
- DynamIQ RAS Support
- Cortex- A78 Power Management
- ARMv8-A Secure Environment using TrustZone