Arm-Cortex-M-Efficient-System-Design-and-Development

Summary
Arm Cortex-M training courses are designed to help engineers working on new or existing Cortex-M system designs. Whether you’re working on design, verification, validation, or developing software for a Cortex-M system, the course can be configured according to your team’s needs.

Courses include fundamental topics to enable a solid platform of understanding. The rest of the course then builds on from this with optional topics and can be tailored appropriately. Some key topics are delivered via pre course on-demand video.

Learning activities such as interactive workbooks, walkthrough examples and quizzes are incorporated into the training to help bring the learning to life.

A pre course call with the engineer delivering the training will help you discuss your team’s individual training requirements.

At the end of the course delegates will be able to:
- Describe different Cortex-M processors features and their use.
- Explain the fundamentals of the M-profile architecture.
- Identify and solve key Cortex-M system design issues.
- Make appropriate system design choices.
- Decide on the best configuration options for their system.
- Develop standardised and efficient software for Cortex-M processor.
- Debug issues on Cortex-M processors.

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<tr>
<th>Course Length</th>
<th>Delivery Method</th>
<th>Location</th>
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<tr>
<td>2-4 days</td>
<td>Classroom</td>
<td>Virtual or Onsite</td>
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Audience
- Embedded Software Engineers
- Firmware Engineers
- Hardware Design Engineers
- Security Engineers
- System Architects
- Technical Authors
- Validation/Verification Engineers
- Project/Product Managers

Prerequisites
- Knowledge of programming in C.
- Experience of assembler programming is not required but would be beneficial.
- Knowledge of embedded systems.
- A basic awareness of Arm is useful but not essential.
Related Products

Topics
Agendas will be created from the following list of fundamental and optional topics

<table>
<thead>
<tr>
<th>Fundamental Topics</th>
<th>Optional Architecture &amp; Software Development Topics</th>
<th>Optional Hardware Design Topics</th>
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<tr>
<td>• Introduction to the Arm Architecture ♥</td>
<td>• Assembly Language Programming</td>
<td>• Cortex-M Processor Core</td>
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<td>• Introduction to Armv7-M ♥</td>
<td>• Booting &amp; Initialisation</td>
<td>• AMBA AHB</td>
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<tr>
<td>• Introduction to Armv8-M ♥</td>
<td>• Compiler and Linker Fundamentals</td>
<td>• AMBA APB</td>
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<tr>
<td>• Introduction to TrustZone for M-profile ♥</td>
<td>• Further Compiler Hints and Tips</td>
<td>• AMBA AXI</td>
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<tr>
<td>• CMSIS Overview ♥</td>
<td>• Further Linker Hints and Tips</td>
<td>• Cortex-M Clocks, Reset and Power Management</td>
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<td>• Cortex-M Overview</td>
<td>• Synchronization</td>
<td>• SysTick Timer</td>
</tr>
<tr>
<td>• Programmers Model</td>
<td>• Cache Management</td>
<td>• Introduction to CoreSight</td>
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<tr>
<td>• Memory Model</td>
<td>• MPU Programming</td>
<td>• Cortex-M Configuration</td>
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<tr>
<td>• Exception Handling</td>
<td>• Security Extension (TrustZone-M)</td>
<td>• Cortex-M System Interfaces</td>
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<tr>
<td>• Debug and Trace</td>
<td>• Floating-point Extension</td>
<td>• Micro Trace Buffer (MTB)</td>
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<tr>
<td>• Migrating from other Arm Systems</td>
<td>• DSP Extension</td>
<td>• Safety Features (Cortex-M7 only)</td>
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<tr>
<td>• Physical Protection (SecurCore and Cortex-M35P only)</td>
<td>• MVE (Helium)</td>
<td>• Arm Platform Security Extension (PSA)</td>
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♥ = Online and on-demand.

Related face-to-face and on-demand courses
• CoreSight Training
• Cryptocell-312 Training
• Introduction to Arm DS ♥
• Introduction to Keil MDK ♥
• Introduction to Fast Models ♥
• PSA Threat Analysis
Example Training Courses

"Cortex-M33 Fundamentals (2 Days)"

- Cortex-M33 Overview
- Programmers Model
- Memory Model
- Assembly Language Programming
- Exception Handling
- MPU Programming
- Security Extension
- Booting & Initialisation

"Cortex-M7 Software Development (3 Days)"

- Cortex-M7 Overview
- Programmers Model
- Memory Model
- Assembly Language Programming
- Cortex-M7 Processor Core
- Exception Handling
- Cache Management
- Synchronization
- MPU Programming
- Compiler Hints and Tips
- Further Compiler Hints and Tips
- Further Linker Hints and Tips
- Debug and Trace
- DSP Extension
- Floating-point Extension

"Cortex-M23 Hardware Design" (3 Days)

- Cortex-M23 Overview
- Programmers Model
- Memory Model
- Memory Protection
- Assembly Language Programming
- Cortex-M23 Processor Core
- AMBA 5 AHB
- Exception Handling
- Clocks, Reset and Power
- SysTick Timer
- Debug & Trace
- Introduction to CoreSight
- Security Extension
- Cortex-M23 Configuration
- Cortex-M23 System Interfaces
"Cortex-M33 System Design" (4 Days - combined Hardware Design and Software Development course)

- Cortex-M33 Overview
- Programmers Model
- Memory Model
- AMBA 5 AHB
- Cortex-M33 Processor Core
- Assembly Language Programming
- Exception Handling
- Cortex-M33 Clocks, Reset and Power
- SysTick Timer
- Debug
- MPU Programming
- Security Extension
- Synchronization
- Compiler Hints and Tips
- Booting and Initialisation
- Introduction to CoreSight
- Debug & Trace
- Cortex-M33 Configuration
- Cortex-M33 System Interfaces

"Migrating from Cortex-M0 to Cortex-M23" (2 Days)

- Cortex-M23 Overview
- Cortex-M23 Programmers Model
- AMBA AHB5
- Memory Protection
- Security Extension
- Synchronization
- Clocks, Reset and Power Management
- Cortex-M23 Configuration
- Cortex-M23 System Interfaces