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## COLDFIRE 532X IMPLEMENTATION

Ref : 004393A

Duration : 4 days

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### OBJECTIVES

- The course details the low level programming of the V3 core
- An example of SDRAM controller initialization is provided
- Interfacing with external devices is explained
- The interrupt controller is viewed in detail
- DMA transfers terminated by interrupt is studied
- A programming example has been developed for each internal peripheral (USB, CAN, serial, I2C, timer)
- The course details the various operating modes supported by the Fast Ethernet Controller, particularly the frame filtering logic

### RELATED COURSES

- The training course called "C language for real time and embedded applications" could be useful for low level programming developers. This training has the reference 002603A.
- MVD offers a course on Ethernet (003367A)
- MVD offers a course on USB2.0 (002606A)
- MVD offers a course on CAN bus (002601A)

### PREREQUISITES

- Experience of a 32 bit processor or DSP is mandatory

### PARTNERS

- This training course is approved by FREESCALE



### Contact

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Course also available  
customized

Next sessions, see : <http://www.mvd-fpga.com/en/formationsCalend.html>

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### TOPICS

#### INTRODUCTION TO MCF532X

- Differences between ColdFires and 68K processors
- 5329 block diagram, differences between 5327, 5328 and 5329
- Internal data paths
- Crossbar switch module
- Memory mapped I/O organization

#### V3 CORE

- V3 core pipeline
- Addressing modes
- Branch instructions
- Data transfer instructions
- Mac instructions
- Control instructions
- Stack management, subroutine call and return
- C to assembly interface, organization of the stack frame
- Exception management : vector table, priority, masking
- Internal SRAM
- Cache basics
- Cache operation, software control
- Debug facilities

#### HARDWARE IMPLEMENTATION

- Clocking, power management
- Chip configuration module
- Reset control module
- System control module
- Real Time Clock
- Flexbus
- Data transfer sequence
- Burst cycles
- Bus error management
- General Purpose Input / Output module
- DRAM / SDRAM basics
- The 532X SDRAM controller

#### INTERRUPT CONTROLLERS AND TIMER MODULES

- Vectorized vs auto-vectorized mode
- Interrupt processing sequence

- Prioritization between interrupt controllers
- Low power wake-up operation
- The software watchdog
- Edge port module
- PWM module
- Programmable interrupt timer modules
- DMA timers

#### THE eDMA CONTROLLER

- EDMA microarchitecture
- Initialization
- Channel linking
- Transfer error management

#### LIQUID CRYSTAL DISPLAY CONTROLLER

- LCD screen format
- Graphic window on screen
- Display data mapping
- Black-and-White operation
- Color generation
- Frame Rate modulation control

#### COMMUNICATION CONTROLLERS

- The UART Module
- The SSI,
- The QSPI,
- The I2C controller
- The FlexCAN controller
- The Fast Ethernet Controller, Ethernet basics, addressing, frame format, clock recovery, MII hardware interface, auto-negotiation, buffer management, buffer chaining, address filtering, use of hash tables, full duplex operation, flow control, receive and transmit sequences, error management
- The USB Host module, USB basics, EHCI specification, functional description
- The USB On-The-Go module, ULPI interface, connection of an external PHY, device data structures, device operational model, deviations from the EHCI specification

#### CRYPTOGRAPHY MODULES

- Message Digest Hardware Accelerator

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- Random Number Generation
  - Symmetric key hardware accelerator, introduction to data encryption standards
  - Data flow, management of input and output FIFOs
  - Algorithms : AES, DES, 3DES
  - Cipher modes : ECB, CBC, CTR

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#### **DOCUMENTATION**

Training manuals will be given to attendees during training **both in pdf and in print.**

#### **CONTACT INFORMATIONS**

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