FF5 - MCF5225X implementation + MQX

This course covers MCF5225X ColdFire MCUs, for instance the MCF52259

OBJECTIVES

- Courses detail the hardware implementation of the MCF5225x MCU.
- Courses focuse on low level programming of the ColdFire V2 core.
- The training helps become familiar with CodeWarrior IDE.
- Practical exemples of internal software drivers are provided.
- More detailed course description available on request at training@ac6-training.com

*New: *** Write your First NXP MQX" RTOS application ****

Prerequisites

- Experience of a 32 bit processor or DSP is mandatory.

Related courses

- Ethernet and switching, reference N1 - Ethernet and switchingcourse
- USB 2.0, reference IP2 - USB 2.0course
- CAN bus, reference IA1 - CAN buscourse

Course Environment

- Theoretical course
  - PDF course material (in English) supplemented by a printed version for face-to-face courses.
  - Online courses are dispensed using the Teams video-conferencing system.
  - The trainer answers trainees' questions during the training and provide technical and pedagogical assistance.
- Practical activities
  - Practical activities represent from 40% to 50% of course duration.
  - Code examples, exercises and solutions
  - For remote trainings:
    - One Online Linux PC per trainee for the practical activities.
    - The trainer has access to trainees' Online PCs for technical and pedagogical assistance.
    - QEMU Emulated board or physical board connected to the online PC (depending on the course).
    - Some Labs may be completed between sessions and are checked by the trainer on the next session.
  - For face-to-face trainings:
    - One PC (Linux ou Windows) for the practical activities with, if appropriate, a target board.
    - One PC for two trainees when there are more than 6 trainees.
  - For onsite trainings:
    - An installation and test manual is provided to allow preinstallation of the needed software.
    - The trainer come with target boards if needed during the practical activities (and bring them back at the end of the course).
- Downloadable preconfigured virtual machine for post-course practical activities
- At the start of each session the trainer will interact with the trainees to ensure the course fits their expectations and correct if needed

Target Audience

- Any embedded systems engineer or technician with the above prerequisites.

Evaluation modalities

- The prerequisites indicated above are assessed before the training by the technical supervision of the traineein his company, or by the trainee himself in the exceptional case of an individual trainee.
- Trainee progress is assessed in two different ways, depending on the course:
  - For courses lending themselves to practical exercises, the results of the exercises are checked by the trainer while, if necessary, helping trainees to carry them out by providing additional details.
  - Quizzes are offered at the end of sections that do not include practical exercises to verifythat the trainees have assimilated the points presented
- At the end of the training, each trainee receives a certificate attesting that they have successfully completed the course.
  - In the event of a problem, discovered during the course, due to a lack of prerequisites by the trainee a different or additional training is offered to them, generally to reinforce their prerequisites,in agreement with their company manager if applicable.

Plan

INTRODUCTION TO MCF52259

Overview

- Coldfire roadmap
- MCF52259 umbrella device
- 5225X block diagram
- Pinout
- Memory mapped I/O organization

CORE ARCHITECTURE

- V2 pipeline
- Addressing modes
- Branch, data transfer, arithmetic, logic, shift & rotate, bit instructions
- Mac instructions
- C to assembly interface
- Section definition, parameterizing the linker command file
- Exception management
- Internal SRAM
- 5225X cache operation
- Power management

DEBUG FACILITIES

- Intrusive vs non-intrusive debug
- BDM port
- Hardware breakpoints
- Trace port

PLATFORM

RESET

- Reset sources
- Clocking
- Reset control flow
- Chip Configuration Module [CCM]
- Requirements of the boot routine

SYSTEM PERIPHERALS

- SCM
- The interrupt controller
- The Edge Port Module
- Watchdog timer module
- Programmable Interrupt Timer Modules

THE DMA CONTROLLER

- Channel prioritization
- Bandwidth control
- Transfer termination
- Utilization of DMA timers

HARDWARE IMPLEMENTATION

- Dynamic bus sizing
- Address decoding
- Data transfer sequence
- Burst cycles

MEMORY

- The Flash memory controller
- The SRAM
- The Mini-FlexBus

INTEGRATED I/Os

COMMUNICATION CONTROLLERS

- The UART Module
- The QSPI
- The I2C controller
- The FlexCAN controller
- The USB OTG controller
- The Fast Ethernet Controller

Exercise: *With NXP MQX" software solutions*

CRYPTOGRAPHY

- Cryptographic Acceleration Unit (CAU)
- Random Number Generator (RNG)

Renseignements pratiques

Inquiry : 4 days