FK2 - Kinetis KL26z MCU Implementation

This course covers the NXP Kinetis KL26z ultra low power MCU

Objectifs

- This course has 4 main objectives:
  - Describing the hardware implementation
  - Describing the ARM Cortex-M0+ core architecture
  - Describing KL26Z128VLH4 microcontroller architecture
  - Becoming familiar with the IDE (KDS) and low level programming
- Products and services offered by ACSYS:
  - ACSYS is able to assist the customer by providing consultancies.
  - Typical expertizes are done during board bring up, hardware schematics review, software debugging, performance tuning.
  - ACSYS has also an expertise in FreeRTOS or MQX porting and uIP /LWIP stack or Interniche stack integration.

A more detailed course description is available on request at formation@ac6-formation.com
This document is necessary to tailor the course to specific customer needs and to define the exact schedule.

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.
- 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 by quizzes offered at the end of various sections to verify that 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

First Day

Architecture of Kinetis MCUs

- ARM core based architecture
- Description of KL26z SoC architecture

The ARM Cortex-M0+ Core

- V6-M core family
- Core architecture
- Thumb instruction set
- Exception behavior
- Basic interrupt operation, micro-coded interrupt mechanism , NVIC

Programming and Debugging with KDS and Open SDA

- Debug interface (Open SDA)
- Programming

Becoming Familiar with the IDE

- Getting started with the Kinetis Development Studio (KDS) IDE
- Parameterizing the compiler / linker
- Creating a project from scratch
- Cstart code

Second Day

Reset, Power and Clocking

- Reset
- Clocking
- Operation modes

KL26Z Low Power Modes

- Power and Clock gating
- LLS (Low Leakage Stop) mode
- VLLS (Very Low Leakage Stop modes)
- Low Power Timer
- Low Leakage Wakeup Unit
- Watchdog timer (WDOG)

Internal Interconnect

- Crossbar switch
- Direct Memory Access
  - DMA
  - DMA Multiplexer

Third Day

Hardware Implementation

- Power pins
- Pinout
- GPIO module

Integrated Memories

- Internal Flash
- Internal SRAM

Timers

- Timer/PWM module (TPM)
- Low power timer (LPTMR)
- Periodic Interrupt Timer
- Real Time Clock

Fourth Day

Analog Modules

- Analog-to-digital converters (ADC)
- Analog comparators
- 6-bit digital-to-analog converters (DAC)
- 12-bit digital-to-analog converters (DAC)
- Voltage Reference VREF (opt.)

USB

- USB Full-Speed OTG Controller
- USB Voltage Regulator (opt.)

Connectivity and Communication

- SPI
  - Overview and Functional description
  - Run mode
  - Low Power
- Wait mode
- Stop mode
- UART
  - Functional description
  - Register Definition
- I2C
  - Overview
  - I2C description
  - Memory map – Register definition

Human-machine interfaces

- General purpose input/output (GPIO)
  - Functional description
  - Register Definition

Renseignements pratiques

Inquiry : 4 days