

MPC5xx IMPLEMENTATION

Ref : 002591A

Duration : 4 days

OBJECTIVES

- This training highlights differences between MPC55x and MPC56x
- The hardware implementation is fully described, especially burst transfers
- A boot program has been developed
- Study the PowerPC EABI, which is fundamental for low level programmers
- A generic interrupt handler supporting nesting is introduced
- TPU3 functions are studied with the help of a logic analyser
- QADC operating modes are described
- The course details the internal debug facilities particularly the MPC56x nexus port

RELATED COURSES

- CAN bus training (reference 002601A)
- C language for real-time and embedded applications (002603A)

PARTNERS

- This training course is approved by FREESCALE

PREREQUISITES

- Experience of a microcontroller is recommended
- Knowledge of CAN bus is recommended

**WIND RIVER**

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Course also available
customized

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

TOPICS

MPC5xx OVERVIEW

- MPC5xx block diagram
- Internal resources base address definition
- Pinout and pad types
- PDMCR register programming

THE RCPU

- History buffer
- Propagation of instructions through the pipeline
- Compliance of the RCPU with the programming environment
- Branch unit, static prediction, MPC56x branch target buffer
- Load / store instructions
- Integer arithmetic and logic instructions
- IEEE754 basics
- Float load / store instructions
- Float arithmetic instructions
- The EABI
- Code and data sections, small data areas benefits
- Exception management : handler table, MSR update, automatic interrupt masking
- Requirements to support exception nesting
- Handler table relocation
- Program regions definition and determination of their attributes in the IMPU
- Data regions definition and determination of their attributes in the DMPU

THE USIU MODULE

- Interrupt controller
- IMB peripheral interrupt requests control
- Reset cause enumeration
- Hardware configuration at reset
- Clock synthesizer
- PLL multiplier selection
- System timers : decremter, time base, RTC, PIT

HARDWARE IMPLEMENTATION

- Endian modes clarification
- External bus interface, arbitration, read and write timing diagrams
- Dynamic bus sizing
- External decode logic design
- Non wrapping burst transfers
- Memory controller, boot chip select, address decode by means of BRx/ORx registers
- Glueless interface with SRAM and FEPROM

INTERNAL MEMORIES

- CDR3 Flash EPROM, read page buffers, programming and erasing sequences
- Margin reads

DOCUMENTATION

- Training manuals will be given to attendees during training in print.

- CALRAM : overlay mode operation
- DPTRAM : TPU emulation mode

QADCE MODULES

- Analog inputs multiplexing
- Conversion queue priority scheme
- External trigger
- Programming model
- Result formats

QSMCM MODULES

- UART controller, differences between SC1 and SC2
- Transmit and receive sequences
- SPI protocol explanation
- Command queue
- Transmit and receive sequences

DLCM2 MODULE

- Transceiver interface
- Block and 4x transfers
- J1850 frame format

MIOS14 MODULE

- Counter prescaler submodule
- Counter submodules
- Double action submodules
- PWM submodules
- Parallel port IO submodule
- Real Time clock submodules

TouCAN 2.0B MODULES

- TouCAN organization
- Label filters configuration through the mask registers
- Bit time phases initialization
- Automatique reply

TPU3 MODULES

- Real time hardware events processing
- Channel priority scheme
- Interchannel communication
- QOM and NITC functions introduction
- SPI port emulation

DEBUG FACILITIES

- BDM restrictions : no trace memory
- Watchpoints vs breakpoints
- MPC56X Readi module
- Windriver nexus solution