

SEnSE: Enabling Interrupts on a Self-Designed Microcontroller Platform



Motivation

Interrupts are a powerful mechanism to trigger events on microcontrollers. When an interrupt occurs, program execution is stopped and a so-called interrupt routine is handled. Goal of this work is to enable interrupt handling on a self-designed microcontroller platform. Interrupt handling should be integrated into the instruction-set simulator as well as the synthesizable hardware model. Correct functionality of the interrupt concept should be verified via simulations and tests on an FPGA. Resource usage introduced by the interrupt handling should be as low as possible. The interrupt handling can also be combined with a power-down function that holds the microcontroller in a power-save mode as long as no interrupts occur.

Project description

- Goals
 - Integrate interrupt handling to an existing microcontroller platform.
 - Test functionality of interrupt handling via simulations and on an FPGA.
- Tasks
 - Read into the topic
 - Get familiar with interrupt handling and the 8-bit microcontroller platform
 - Integrate a suitable interrupt-handling concept to the microcontroller platform
 - Simulate and test the interrupt-handling with a test program
 - Analyze/minimize hardware costs of interrupt handling
 - Optional: combine interrupt handling with a power-save mode

Literature

- Microchip.: [PICmicro x14 Architecture](#)
- Atmel.: [AVR-Tutorial: Interrupts](#)

Deliverables

- Project files (.zip, cleaned)
- Documentation (inline)
- Readme (getting started)
- Presentation (10 .ppt slides)

Project schedule

- Start Immediately
- Month 1 Reading, getting familiar with interrupts and microcontroller
- Month 2 Implement interrupt handler and simulate/test the suggested concept
- Month 3 Final deliverables

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Studies: INF SEW TEL

Prerequisites

- Basic knowledge of assembly and VHDL programming

Advisor / contact

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