Ideazione progettazione sviluppo elettronica scientifica
Conceiving, Planning and Development in Scientific Electronics

FPGA COURSES

IPSES organizes workshops and courses on FPGA and other programmable logics. The workshop includes: theoretical basis of operation and programming and some practical demonstrations.

Workshop on programmable logics

Theoretical introduction to programmable logic devices

- Devices theory
- Circuit description
- Hardware resources
- Programmable logic devices limits
- Spatial and sequential technologies comparison
- FPGA Microprocessors

Design with programmable logic devices

- FPGA hardware design
- How to practically realize a FPGA based design
- Producers offers
- Conclusions and future technology enhancements

Practical exercises using a programmable logic device such as:

- Creating a new design
- Switching ON a LED
- Flashing LED
- Two frequencies flashing LED
- Flashing LED with selectable frequency trough two pushbuttons
- Management of a rotary encoder.
- Generation of VGA 640x480 @ 60Hz screens
- Generations of VGA 800x600 @ 72Hz screens
- Control of a rectangle trough rotary encoder on a VGA 640x480 screen
- Microblaze (implementation of a FPGA microprocessor)
- Reading slide/push buttons
- Decoding a rotary encoder

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Workshop on development using Xilinx FPGA

Main features of Xilinx FPGA

The development environment: Xilinx ISE

Use of the inner resources of the FPGA : Xilinx Architecture wizard

The generator of hardware peripheral: Xilinx Core Generator

Management of the hardware constraints: Xilinx Pace

Environment of simulation and hardware debug: Chipscope Core Inserter

Environment of simulation and hardware debug: Chipscope Pro Analyzer

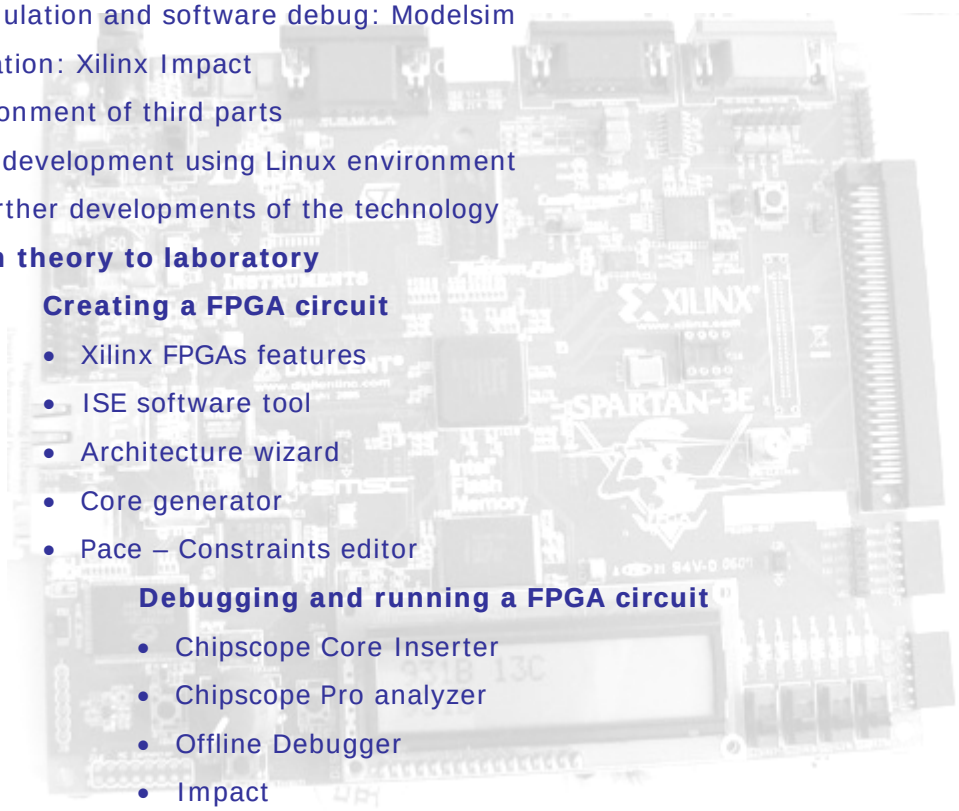
Environment of simulation and software debug: Modelsim

Hardware configuration: Xilinx Impact

Development environment of third parts

Some mentions on development using Linux environment

Conclusions and further developments of the technology



From theory to laboratory

Creating a FPGA circuit

- Xilinx FPGAs features
- ISE software tool
- Architecture wizard
- Core generator
- Pace – Constraints editor

Debugging and running a FPGA circuit

- Chipscope Core Inserter
- Chipscope Pro analyzer
- Offline Debugger
- Impact

Advanced exercises using a programmable logic device

- Advanced management of the device reset
- Advanced management of the clock
- Creation of a configuration register bank
- I2C peripheral interface demonstration
- PWM generation and management
- Management of interfaces using independent clocks trough FIFO structures
- Moving a rectangle on a VGA (640x480) monitor
- Hint on microprocessors in FPGA

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