Essential DSP implementation techniques for AMD FPGAs

COURSE DURATION

2 days - 14 hours

TARGET OBJECTIVES AND SKILLS

- 1 - Describe the advantages of using FPGAs over traditional processors for DSP designs, utilize fixed point binary arithmetic and identify how to use this knowledge to create efficient designs in FPGAs
- 2 - Recognize how both the CLB slices in FPGAs and the more advanced DSP48s are used to implement DSP algorithms
- 3 - Explain the dataflow through the device and how to use distributed memory, block RAM, registers, and SRLs to properly implement these designs
- 4 - Construct different FIR filter and FFT implementations and how to optimize these implementations in the FPGA

CONCERNED PUBLIC

- Technicians and Engineers in Digital Electronics
- All our training courses are given at a distance and are accessible to people with reduced mobility.
- People with disabilities may have special training needs. Our partner AGEFIPH accompanies us to implement the necessary adaptations related to your disability. Don't hesitate to to discuss your requirements.

PREREQUISITES

- Fundamental understanding of digital signal processing theory and an appreciation of the principles of the following :
  - Sample rates
  - FIR (Finite Impulse Response) and IIR (Infinite Impulse Response) filters
  - Oscillators and Mixers
  - FFT (Fast Fourier Transform) algorithm

NOTES

- Release date: 15/11/2024

COURSE CONTENT

DAY 1

- Objective 1
  - Back to basics {Lecture}
- Objective 2
  - Architecture of FPGAs {Lecture}
  - Mathematics of FPGAs {Lecture, Lab}
- Objective 3
  - Shift registers, memory and application {Lecture, Lab}
- Objective 4
  - The FIR filter {Lecture, Lab}

DAY 2

- Objective 4
  - Advanced filtering techniques {Lecture, Lab}
  - The Fast Fourier Transform {Lecture, Lab}

TEACHING METHODS AND SUPPORT - ASSESSMENT & RECOGNITION

- **Teaching methods :**
  - Alternating lectures, technical questionnaires and exercises on individual machines.
- **Pedagogical follow-up :**
  - Signed attendance sheet
- **Pedagogical assessment :**
  - Continuous assessment and progress sheet :
    - Technical questionnaire
    - Practical work results
    - Validation of objectives
- **Satisfaction survey :**
  - At the end of training: assessment form completed by the trainee
  - At 3 months: evaluation form completed by the trainee after application to the company
- **Certificate :**
  - Training certificate with assessment of learning provided to trainee
  - Certificate of completion provided to employer

TEACHING METHODS

- **Inter-company online training :**
  - Fast Internet connection, webcam, headset
  - Presentation by Webex by Cisco
  - Provision of course material in PDF format
  - Labs on individual Cloud PC by RealVNC
- **Intra-company face-to-face training on customer site : (details to be confirmed prior to training)**
  - Suggested supply by the customer :
    - Training room
    - Video projector
    - Whiteboard
    - Individual PC with AMD tools
  - Provided by MVD Training :
    - Course material in PDF format
    - Practical work on individual PCs (loan of equipment available on request)

RECOMMENDED COMPUTER HARDWARE

- **Inter-company online training :**
  - Recent computer OS Linux or Windows 64-bits
  - Fast Internet, webcam, headset
  - Software tool WebEx Cisco
  - ***AMD remote tools :***
    - Software tool RealVNC Viewer
  - ***AMD local tools :***
    - Software tool AMD Vivado
    - Software tool Matlab (or equivalent)
- **Face-to-face training on customer site :**
  - Recent computer OS Linux or Windows 64-bits
  - Software tool AMD Vivado
  - Software tool Matlab (or equivalent)

TEACHING STAFF

- **William Duluc, Electronics and Telecoms Engineer, AMD Expert since 2009 and AMD Trainer since 2017 :**
  - Expert AMD FPGA - Language VHDL/Verilog - RTL Design
  - Expert AMD SoC & MPSoC - Language C/C++ - System Design
  - Expert DSP & AMD RFSoC – HLS - Matlab - Design DSP RF
  - Expert AMD Versal – AI Engines – Heteregenous System Architect

TECHNICAL, EDUCATIONAL, ADMINISTRATIVE AND FINANCIAL CONTACT

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