



## Tutorial 3: Processor Based Design in an FPGA

### 1 Introduction

The aim of this tutorial is to give an introduction to the implementation of a processor-based design in an FPGA. This includes the creation of a design consisting of a processor and memory and also the associated software. Future tutorial sessions will use processor-based designs to practice material covered in lectures. The laboratory in the second half of the semester will also use processor cores.

Information on the processor core used in this tutorial and also another one which will be used in other tutorials can be found in the Lecture Notes Part II Appendix B.2 *Selected Components* section. The documents are also available as part of the help facility or on-line:

- CR0115 TSK51x MCU  
([http://www.altium.com/files/AltiumDesigner6/LearningGuides/CR0115\\_TSK51x\\_MCU.pdf](http://www.altium.com/files/AltiumDesigner6/LearningGuides/CR0115_TSK51x_MCU.pdf))
- CR0117 TSK80x MCU  
([http://www.altium.com/files/AltiumDesigner6/LearningGuides/CR0117\\_TSK80x\\_MCU.pdf](http://www.altium.com/files/AltiumDesigner6/LearningGuides/CR0117_TSK80x_MCU.pdf))

There is only one task to complete for this tutorial. Spend some time reading through the information on the processor cores to understand the function of all it's inputs and outputs.

### 2 Main Task

Complete the attached *Implementing a simple processor-based design in an FPGA* tutorial provided by Altium. This tutorial is also available as part of the help facility or on-line:

- TU0118 Implementing a simple processor-based design in an FPGA  
([http://www.altium.com/files/AltiumDesigner6/LearningGuides/TU0118\\_Implementing\\_a\\_Simple\\_Processor-Based\\_Design\\_in\\_an\\_FPGA.pdf](http://www.altium.com/files/AltiumDesigner6/LearningGuides/TU0118_Implementing_a_Simple_Processor-Based_Design_in_an_FPGA.pdf))

Use the Xilinx FPGA rather than the Altera FPGA. Try not to rush through the task. Consider both the design and also the methodology used in the design tools. You may also want to modify the sample code to perform other tasks than just counting.

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*NOTE: This is the shell version of Tutorial 3 and as such does not contain the attached material. However, the reference to the attached material is provided above.*