WARP

WIRELESS OPEN-ACCESS RESEARCH PLATFORM

Lab 2: Introduction to WARP Design Flows

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WARP Project

1   Introduction

In this lab, you will use Xilinx Platform Studio and Base System Builder to construct a simple hardware & software platform, then test your design on the WARP FPGA Board. The instructions for this exercise are on the WARP web site.

Note: All files are stored in `C:\workshop\userN\` where `userN` is your user login location. This location will be referred to as `.\` for the rest of the lab.

2   Building Your Base System

Please visit http://warp.rice.edu/svn/WARP/Documentation/Tutorials/XPS_Intro/html/XPS_Intro.html to build the bitstream for this lab.

The link will guide you through a step-by-step process of creating your own base system, but keep the following things in mind.

- The hardware build takes around 10-15 minutes.

- Save your project in `.\Lab2_EDK\xps\system.xmp`.

- The software files (`UserIO_Demo.c` and `warp_userio.h`) are already installed in the `.\Lab2_EDK\xps\src\` folder. You do not need to download these.

- You'll use the remote server to implement the design and your local PC to download your FPGA bitstream and test the design.

3   Downloading Your Bitstream

Here we will use the local machine to download the bitstream to the FPGA board.

1. Open the Xilinx iMPACT (Xilinx ISE 9.1i → Accessories → iMPACT) on the local machine.

2. Cancel the first dialog box and double-click `Boundary Scan`.

3. Click Initialize Chain from the File menu.

4. Bypass the first device on the chain.

5. For the second configuration file, navigate to `W:\Lab2_EDK\xps\implementation`.

6. Select `download.bit` and hit Ok. The program will prompt with a warning, it can be ignored.

7. Left-click on the FPGA device (2nd device) on the chain and select `Program` from the Operations menu.

8. Select Ok for the last dialog box. After a short while, the FPGA should program with the bitstream you created.

9. If the bitstream downloaded correctly, the hex displays and LEDs on the board should be counting from 0 to 16.

10. Open Tera Term Pro with COM1 on the computer. In the Setup menu click Serial Port and change the Baud Rate to 57600.

11. If the serial link is working correctly, Tera Term should be writing out the same values as the board hex displays.

4   Optional Exercises

- We have provided a second source file (`UserIO_Intr_Demo.c`) that uses the interrupt controller. The callbacks for the push button interrupts are blank. Create a new software application project with this `UserIO_Intr_Demo.c` and the `warp_userio.h` and customize the interrupts to do something interesting.