



Lab 2: Introduction to WARP Design Flows

Siddharth Gupta and Patrick Murphy

Rice University

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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.