Pontificia Universidad Católica de Chile
Escuela de Ingeniería
Departamento de Ingeniería Eléctrica
IEE2463 Sistema electrónicos programables

Laboratory 10

ZYBO-Z7 Communication of Zybo with Peripherals

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1. Laboratory Goals

The goals of this laboratory are:

- To understand how is built the base hardware and software for communicating the ZYBO Z7 with a booster development kit.
- To understand how to develop and configure hardware and software for SPI and I2C communication.
- To manipulate the ZYBOZ7 and booster board to setup all peripherals.

2. Previous Requirements

These requirements are mandatory to perform the laboratory. Not accomplishing them count as missing the laboratory.

- You must have previously installed vitis/vivado version 2020.1.
- You must read the ZYbo Z7 Board Reference.
- You must understand the design flow between vitis and vivado to program a microprocessor.

Note: **Version of the software 2020.1 is mandatory**. This is important to avoid compatibility problems.

3. Laboratory Activities

Open the given **Vivado** aproject:

- Understand the project.
- Generate bitstream and export hardware.

Launch Vitis

- Study the provided code to initialize the UART, SPI, I2C and LCD display.
- Study the logic to draw the screen, and read/write the peripherals: microphone, temperature sensor, light sensor, two booster buttons, joysticj position, joystick button, buzzer, accelerometer, two potentiometer into the extension board.

Program the hardware, play the the peripherals and read the measurements into the LCD display and through UART in vitis console.

4. Complementary Homework

To fulfill this homework is mandatory, but not evaluated.

- Modify the hardware and software to :
  - Control a variable named amplitude with potentiometer 1
  - Control a variable named frequency with potentiometer 2
  - Send the controlled PWM signal to the buzzer. So you can control the frequency (20Hz-"0kHZ) and amplitud of the tone with your potentiometer.
- Draw on te screen the corresponding frequency and amplitud of the tone.