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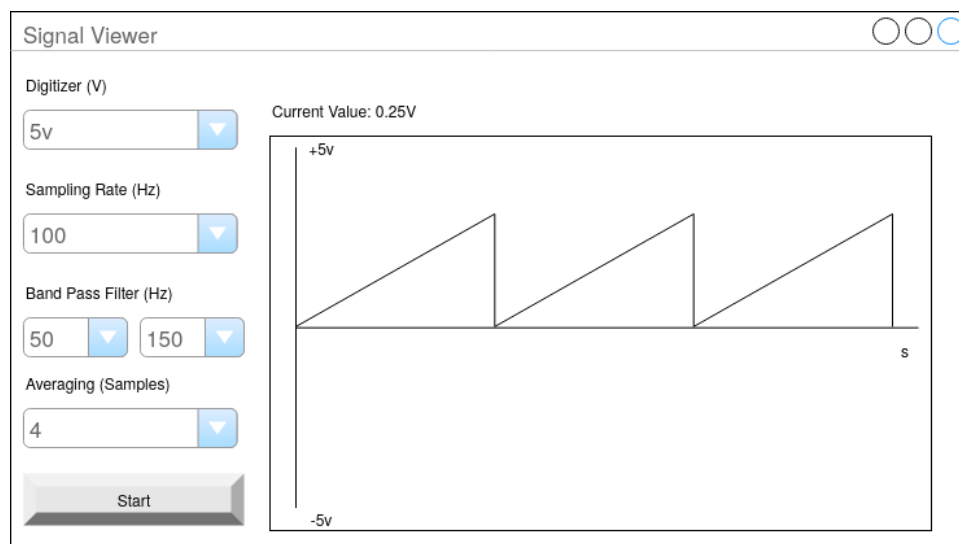
Embedded Systems Engineer Assignment

Objective

By using an FPGA evaluation board, develop a Linux desktop application that plots in real time the voltage of a signal connected to an analog input.

Specifications

The Linux application should have the following minimum structure:



1. A chart plotting the voltage of the analog input in a time scale:
 - a. Nice to have: zoom and pan capabilities.
2. A readout showing the current measured instant voltage value.
3. A digitizer selector (ADC scale).
4. A sampling frequency selector.
5. Ban-Pass filter selector for lower and upper frequencies:
 - a. The application should use these values to apply the correspondent filter to the acquired signal in order to remove noise and interferences.
6. Averaging filter selector:
 - a. The application should use this value to “smooth” the signal accordingly.
7. A button to start and stop the acquisition.

Implementation

The project is divided into three mayor stages:

1. UI implementation:
 - a. C++ must be used to develop the Linux executable.
 - b. The candidate can use any third-party libraries to implement the UI (Qt, GTK, .NET through Mono, etc.).
2. FPGA development:

- a. The candidate can use any FPGA evaluation board of his choice, although Xilinx chips are preferable (Innerspec can provide one if the candidate doesn't have a board).
3. Driver/Interface development:
 - a. The candidate must implement all the necessary low-level code needed to communicate the Linux application with the FPGA board in order to send configuration values, start/stop commands, and receive acquired signals.

Deliverables

Once the project is finished, the candidate must provide the following:

1. Screenshots of the application.
2. Video showing how the application is working with the FPGA board connected to the computer. The candidate can use a signal generator or any other source of voltage connected to the analog input on the FPGA board.
3. Source code for the Linux application.
4. VHDL code implemented for the FPGA BIT file.