LatticeFPGA_based_ColorMixing_Monitor_using_SPIbasedLCD
PSU ECE Department Capstone Project Program

Dec 2024

Project Requirements:

Using existing Lattice's TinyVision or UPduino board to interact with open source tool chain to generate FPGA bitstream. Interface the FPGA board with a SPI based LCD screen and display the different colors based on two button's on the board. One button is used to control the color changing and the other button is used to increase the intensity of the LCD screen.

Basic Outlined Requirements:

1. Buy an off the shelf TinyVision or UPduino board using Lattice UltraPlus or Crosslink FPGA
2. Use Opensource FPGA tool chain to built Lattice bitstream
    a. Ideally code written in Verilog
3. Final block diagram, schematics, BOM and user guide
4. Interface with a SPI based LCD from RaspPi or other low cost vendors.

Resources:

- Rahul to provide 2 development boards
- Students to help generate bitstream using OpenSource tool chain and Github resources
- Rahul will provide his engineering bandwidth to monitor the project and answer questions as needed

Deliverables:

1. A fully working SPI LCD display which used FPGA for changing colors
2. RTL source
3. Any associated apps or software for controlling the LCD display
4. User Guide
5. Bill of Materials

Skills required (4/5 team members):

- Verilog coding experience
- SPI/LCD based display experience would be very helpful
- Previous experience integrating complex embedded systems highly desired
- Soldering might be required