Implementation of Fire Alarm Controller using Glue Logic in FPGA

Abstract

This project is designed to help students understand the basics of VLSI, embedded systems, and analog circuits such as operational amplifiers and comparators. The objective is to implement a prototype safety system intended for use in diagnostic cubicles to ensure equipment safety. Students will learn the fundamentals of FPGAs, the design flow of FPGA-based systems, the basics of VHDL, and how to implement small glue logic applications such as gates, decoders, multiplexers, and counters. They will also gain experience with simulation tools, embedded systems, and 32-bit soft processor cores.

After completing the prerequisite training and hands-on experience with various basic features, students will develop VHDL software to implement a fire alarm controller on the provided development board and demonstrate its functionality. The project also includes understanding the development of embedded systems on FPGAs for communication, as well as hardware interfacing with external devices such as sensors and relay modules.

Scope of Work:
- Gaining familiarity with VHDL programming
- Understanding FPGA design flow, simulation, and synthesis
- Implementing glue logic circuits in an FPGA for the specified application

Academic Project Requirements:

1) Required No. of student(s) for academic project: 2

2) Name of course with branch/discipline: B.E./B.Tech. Electronics and Instrumentation Engineering

3) Academic Project duration:

(a) Total academic project duration: 8 Weeks
(b) Student's presence at IPR for academic project work: 5 Full working Days per week

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