# ABSTRACT

Digital system now has become more complex as the development of IC technology can contain more component into one chip. The vlsi technology is made for a digital system which contain thousand to millions gates into one IC chip. FPGA is one of the IC that can be used for implementing a complex digital system, such as processor.

Processor is an important component that become the brain of computer. In this final project is designed 8 bit processor which will be implemented into FPGA. By implementing the design to FPGA, FPGA can be functionated as general purpose processor. This processor consists of CPU (register, ALU, and control unit), memori (ROM and RAM), and parallel I/O. All the component is connected by a bus system. In this design is using VHDL as the programming language, with structural architecture on the top level design.

For running a program to this processor, instructions are needed. Control unit on the CPU arrange the operation of the system to execute the instructions. On the program simulation can be seen the process of dataflow and the result of every program's instruction.

The simulation of VHDL program is using software ModelSim SE 6.0. The synthesize and implement design is using Xilinx ISE 8.1i. The design is be implemented to FPGA Xilinx Virtex-4 XC4VLX25-10SF363. This design implementation using 453 slices of 10752 (4%), flip-flop slices 468 of 21504 (2%), 822 LUTs of 21504 (3%), AND 32 IOB of 240 (14%).