

ABSTRACT

FFT (Fast Fourier Transform) is a discrete splitting method developed from DFT (Discrete Fourier Transform). This method allows the calculation of sent signals to be faster and simpler, nowadays FFT is a widely used discrete splitting method. Now FFT is very important especially in communications that use BWA (Broadband Wireless Access). Because if FFT can run well then the communication process can run well too.

In this final project designed FFT 64 on an FPGA board with sinusoidal signal input, in the process of designing will be done some simulation that is by using MATLAB and MODELSIM before designing on FPGA. The simulation has its own purpose and function. The first process done in designing FFT 64 Point Radix 4 is to do the simulation using MATLAB, the purpose of this simulation so that the writer can get reference data for the next process. then the simulation using MODELSIM the purpose of this simulation is to make sure the algorithm in the VHDL programming language to be used is correct and can be used in the implementation on the FPGA.

Design and synthesis using QUARTUS, after synthesis and simulation on FPGA then the output output of the same graph with the output of MATLAB and MODELSIM, with the value of each point the same with the output of MATLAB and MODELSIM, so it can be concluded the implementation process of FFT 64 point Radix 4 on FPGA has been successfully done. From the design can be insured the amount of resources used such as total logic by 24%, total PIN 10%, total register 2524, total 16% memory bits, embedded replica element 9 bits 81%. As well as delays at every stage of MATLAB with delay average of 0.00245125s and average delay on MODELSIM calculate 0.788ns. MODELSIM delay is smaller because MODELSIM performs simulsion as if on FPGA.

Keywords : FFT, MATLAB, MODELSIM, QUARTUS, FPGA, VHDL