DCU School of Electronic Engineering Assignment Submission

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Programme:	**B.Eng in Electronic and Computer Engineering**
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Lecturer:	**X. Wang**
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Signed: ***Michael Lenehan***

Assignment 2

Michael Lenehan

Purpose

The purpose of this assignment is to complete the design of a 16-bit cryptographic co-processor. The design process is divided amongst the two sections of this assignment. Firstly, the combinational components of the design must be completed. These components include an ALU, capable of performing addition and subtraction operations, along with a number of logical operations, a Shifter, which can shift or rotate the input bits, and a Lookup module, which substitutes the input bits for a value specified in the provided lookup table.

The second section of this assignment focuses on the synchronous design elements, i.e. the memory registers used to store the values output from the combinational logic components.

Procedure

2.1 Combinational Logic Design

2.1.1 ALU Design

2.1.2 Shifter Design

2.1.3 Lookup Component Design

2.1.4 Structural Model

2.1.5 Testing

2.2 Synchronous Logic Design

2.2.1 Registers

2.2.2 Memory

2.2.3 Testing

Results

3.1 Combinational Logic

3.2 Synchronous Logic

3.3 Complete Crypto Co-Processor Test Program

Conclusion

Appendix