

ECGR2181 Logic Design I Spring 2005: Lab 2

Objective

Design a priority encoder and a decoder using VHDL code and load the executable onto the Spartan-3 FPGA board.

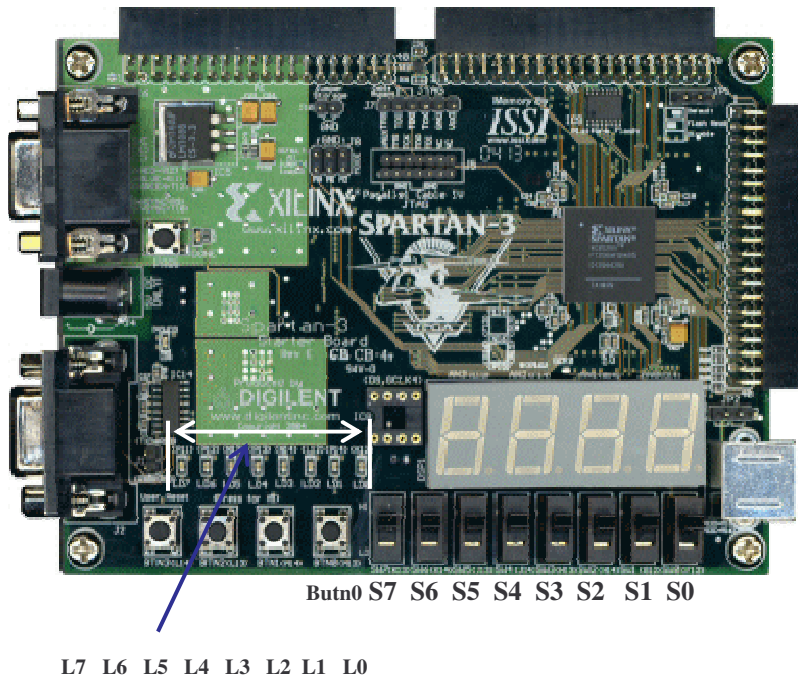
General Information

The general steps for this lab are:

1. Write the VHDL code. You can use an existing project file as a template.
2. Follow the instruction manual to synthesize the VHDL for your designs.
3. Obtain a development board and programming cable.
4. Load the Spartan-3 Board on PCs in Smith 347. Follow the instruction manual to download the decoder, then the encoder code onto the Spartan-3 board.
5. Build the project and load onto your board. Run the program and observe the operation.
6. Demonstrate for a TA.

Laboratory Assignment Requirements

1. Write two separate VHDL files to simulate a 3x8 Decoder and a 8x3 Priority Encoder, with enable lines
2. The code is well commented and easy to follow.
3. The code (and board) demonstrates the truth tables shown below.
4. Turn in a lab report with your VHDL code.



Port information for 3x8 Decoder

Inputs	Switch 3 -	Port H13	- Input Enable
	Switch 2 -	Port H14	- Input2
	Switch 1 -	Port G12	- Input1
	Switch 0 -	Port F12	- Input0
Outputs	LED0 -	Port K12	
	LED1 -	Port P14	
	LED2 -	Port L12	
	LED3 -	Port N14	
	LED4 -	Port P13	
	LED5 -	Port N12	
	LED6 -	Port P12	
	LED7 -	Port P11	

Truth Table

Switch 3	Switch 2	Switch1	Switch0	LED on
0	x	x	x	none
1	0	0	0	LED 0
1	0	0	1	LED 1
1	0	1	0	LED 2
1	0	1	1	LED 3
1	1	0	0	LED 4
1	1	0	1	LED 5
1	1	1	0	LED 6
1	1	1	1	LED 7

Port information for 8 Input Priority Encoder

Inputs	Switch 0 -	Port F12	- Input0
	Switch 1 -	Port G12	- Input1
	Switch 2 -	Port H14	- Input2
	Switch 3 -	Port H13	- Input3
	Switch 4 -	Port J14	- Input4
	Switch 5 -	Port J13	- Input5
	Switch 6 -	Port K14	- Input6
	Switch 7 -	Port K13	- Input7
Outputs	Button0	Port M13	- Input Enable
	LED0 -	Port K12	
	LED1 -	Port P14	
	LED2 -	Port L12	
	LED7 -	Port P11 (Output Enable)	

Truth Table

Switch	Button 0 (IE)	LED7 (OE)	LED2	LED1	LED0
x	0	0	0	0	0
Switch 0	1	1	0	0	0
Switch 1	1	1	0	0	1
Switch 2	1	1	0	1	0
Switch 3	1	1	0	1	1
Switch 4	1	1	1	0	0
Switch 5	1	1	1	0	1
Switch 6	1	1	1	1	0
Switch 7	1	1	1	1	1