Lab_0 Blinker
Embedded Systems
Lab #0
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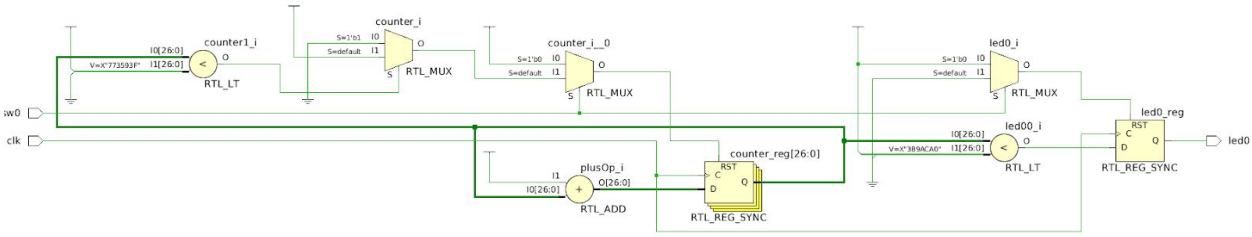
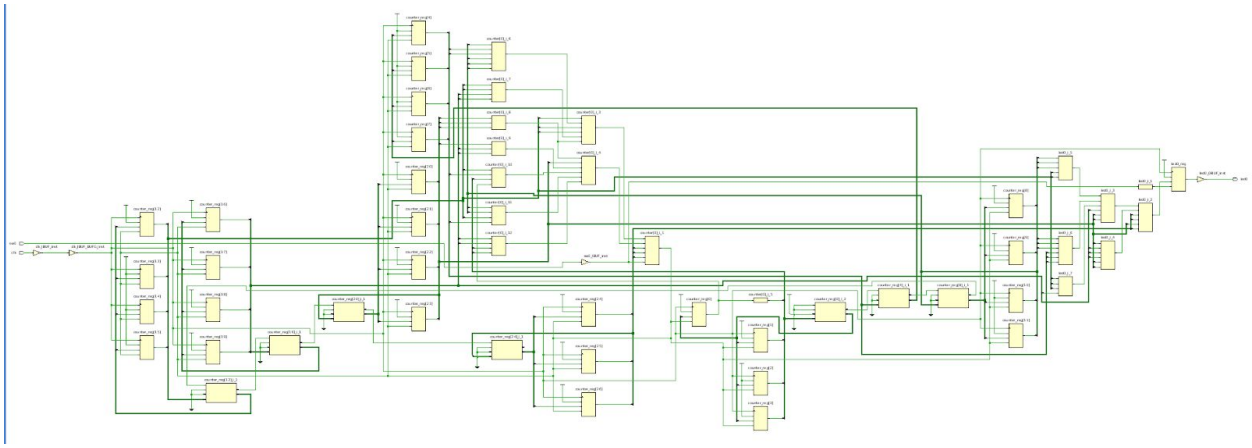
Date: 2/6/2020

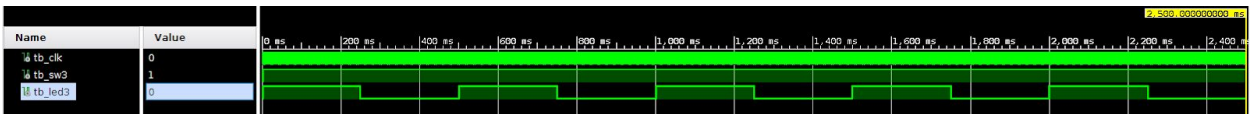
Purpose: The purpose of this lab was to explore the capabilities of the software and learn how to edit the config in order to change the interaction with the board.
Part 1 RTL



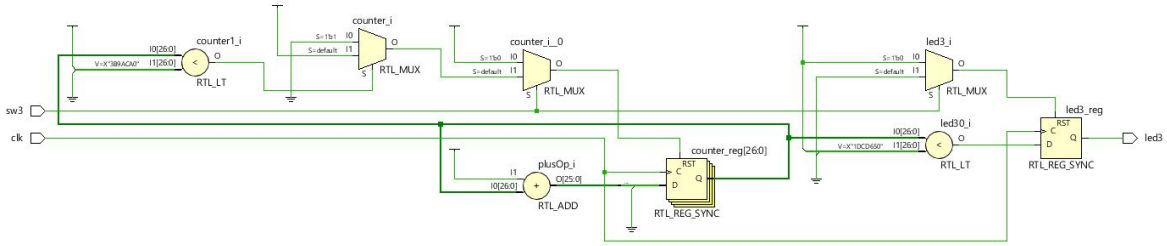
Part 1 Synthesis Schematic



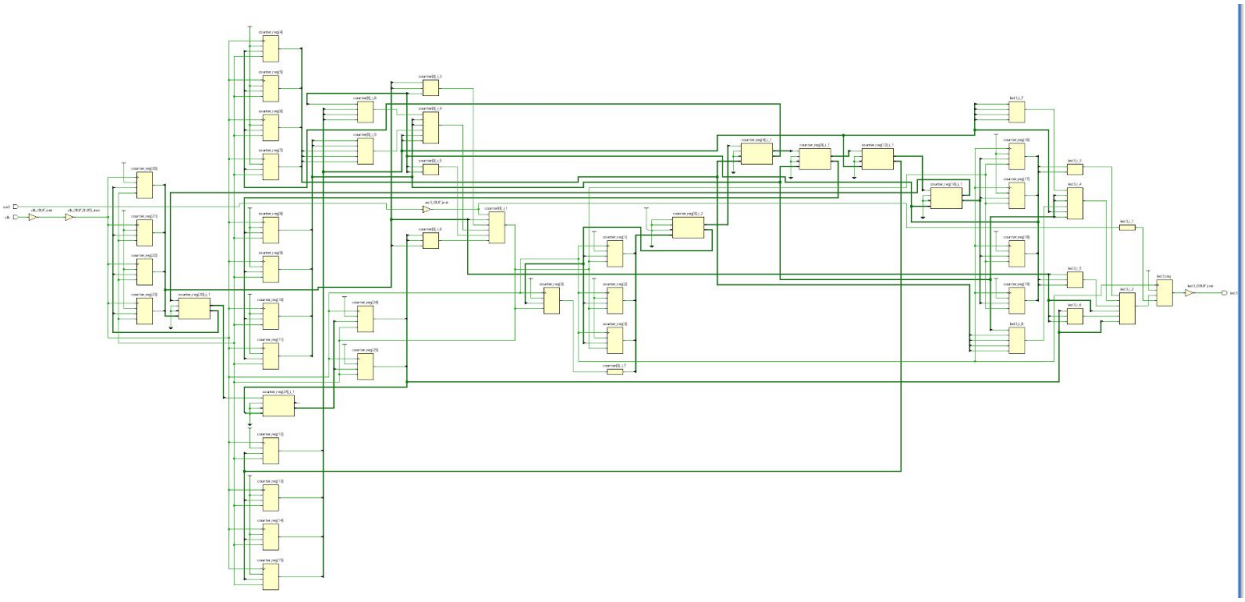
Part 2
Expected Outcome
The expected outcome for this part is that led3 will blink when sw3 is in the on position.
Synthesis



RTL Schematic



Implementation



Synthesis

Status:	✓ Complete
Messages:	1 warning
Part:	xc7z010clg400-1
Strategy:	Vivado Synthesis Defaults
Report Strategy:	Vivado Synthesis Default Reports
Incremental synthesis:	None

Implementation — Summary | Route Status

Status:	✓ Complete
Messages:	No errors or warnings
Part:	xc7z010clg400-1
Strategy:	Vivado Implementation Defaults
Report Strategy:	Vivado Implementation Default Reports
Incremental implementation:	None

DRC Violations

Summary: 1 warning

Implemented DRC Report

Timing — Setup | Hold | Pulse Width

Worst Negative Slack (WNS):	3.717 ns
Total Negative Slack (TNS):	0 ns
Number of Failing Endpoints:	0
Total Number of Endpoints:	53

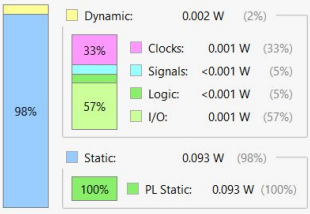
Implemented Timing Report

Utilization — Post-Synthesis | Post-Implementation

Graph | Table

Resource	Estimation	Available	Utilization %
LUT	12	17600	0.07
FF	27	35200	0.08
IO	3	100	3.00
BUFG	1	32	3.13

Power — Summary | On-Chip



In the Constraints file I needed to change the sw0 to sw3 and the led0 to led3. This was because we were using the 4th switch and led instead of the 1st one.

Discussion:

1. The new counter value is 31,250,000 which is half of the original number.
2. Another part of the code that needed to be changed was that every reference to led0 or sw0 needed to be changed to led3 and sw3. Also, in the config file led0 and sw0 needed to be changed to led3 and sw3.
3. The RTL designs were the same except for which led and switch were used. The synthesis design had double the amount of counters because the circuit had to count twice as fast.

Observations:

The changing of the clock rate of the circuit is much more complicated that I would have imagined. Also, the changing from one switch to another through the config and the code was expected though changing every reference and variable name seemed the best option.

Follow Up:

I feel that I fully understand the switches and leds in the config file. However I do not think that I fully understand the changing of the clock frequency for the circuit.