Introduction to the Vivado ISE and the Zynq Processor System

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***Abstract*—This project that will be an introduction to the Vivado ISE and the Zynq Processor System. In exercises 1B and 1C the Zynq book presented a tutorial of how to create a Zynq embedded system with the block design tool and the IP Integrator. These tutorials also showed how to use the SDK software application and use the LEDs.**

I. INTRODUCTION

IN the Intro to Zynq lab in order to display the desired pattern the imported C file was changed. For this lab the object was to modify LED_test.c file to have the LEDs light one at a time from left ro right then from left to right and repeat 10 times then exit. The delay between each light turning on was one second on.

The specifications of the project are as follows.

- Follow the directions found in the Zynq book till tutorial 1C.
- Have the four LEDs light up left to right.
- LEDs turn on right to left.
- Repeat the pattern ten times and quit once the program.

To complete the project, code needs to be manipulated in the following way.

- One loop that will control the outer repetition of the pattern, which will repeat 10 times.
- Two loops inside the outer loop, which will control the LEDs turning on and off.

II. DISCUSSION

A. LED_test.c: "Pattern Creation"

In order to achieve the objective of this lab three loops are used. One loop will control the pattern repeating 10 times while the other two will control the pattern moving left to right to left. In order to achieve this pattern the initial value for the LED must be set to 8, which will be binary 1000. There will be a loop that will count till 3 including the number three which will use the bit operation shift left in order to create the pattern of moving left to right. The code used will be the >> operation. Once the code exits the loop the LED value will be set to 1 which is binary 0001 and using the << operation the LEDs will light from right to left.

III. CONCLUSION

The project was successfully implemented into the zybo board. Once the board is programmed the in order to implement it the option to run on hardware was choice. There was a problem when first trying to implement that design onto the board. The error received was "Error while running ps7_init method. Cannot Read from Target" in order to remove this error the run configuration was chance so the program would not run the ps7_init; this solved the error received.

In the code the line that would write to the LEDs was the "XGpio_DiscreteWrite(&Gpio, LED_CHANNEL, led);" line in the code. This would place the data in LED and then transmit it to the lights to turn on and off. The delay in the program was a while loop that would have nothing in it. This code was "for (Delay = 0; Delay < LED_DELAY; Delay++); ". In order to achieve a delay of 1 second the variable LED_DELAY was set to 25000000, in order to increase the delay the value of LED_DELAY would have to be increased.

IV. Appendix

Figure 1: Shows the block diagram created for the lab.

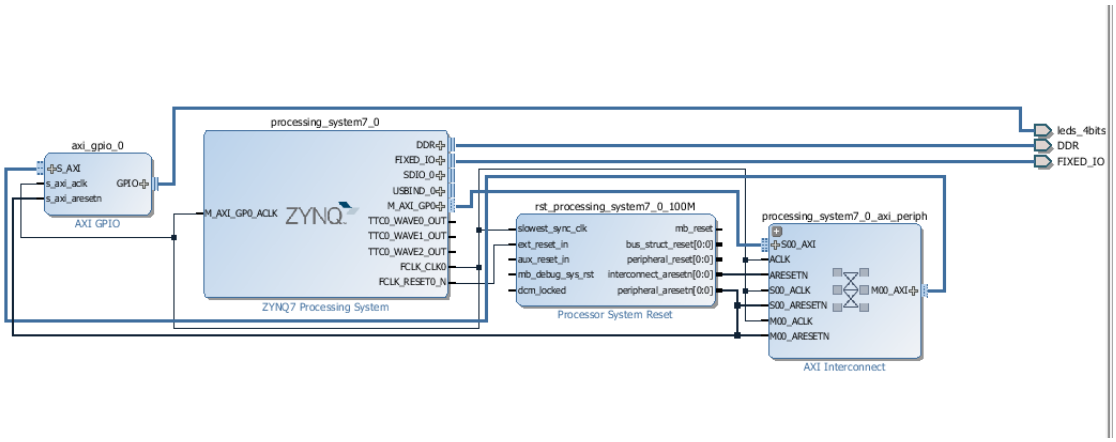

Figure 2: Shows the code that is modified in the LED_test.c file.

```
        /*Set the direction for the LEDs to output. */
        XGpio_SetDataDirection(&Gpio, LED_CHANNEL, 0x0);
int a = 0;
        /* Loop 10 times blinking the LED. */
            while (a <= 9)              {
                /* Write output to the LEDs. */
led = 8;
      int i = 0;
                    while(i<4){
                    XGpio_DiscreteWrite(&Gpio, LED_CHANNEL, led);
                    led = led >> 1;
                    /* Wait a small amount of time so that the LED blinking is visible. */
                    for (Delay = 0; Delay < LED_DELAY; Delay++);
                    i++;
                        }
led = 1;

int w = 0;
while(w<4){
    XGpio_DiscreteWrite(&Gpio, LED_CHANNEL, led);
                        led = led << 1;
                        /* Wait a small amount of time so that the LED blinking is visible. */
                        for (Delay = 0; Delay < LED_DELAY; Delay++);
                        w++;
            }


                    a++;
                                    }
        led = 0;
```