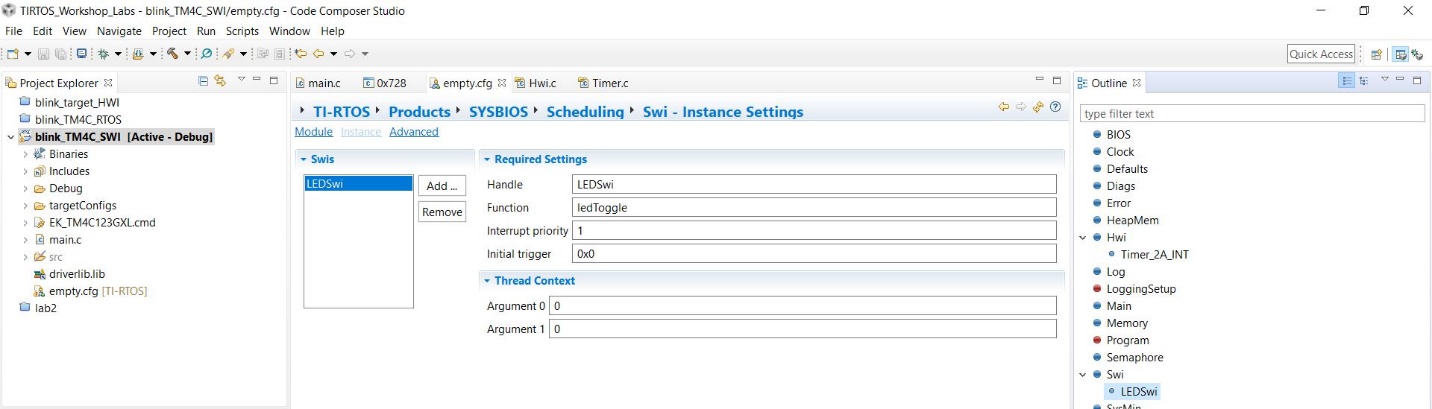
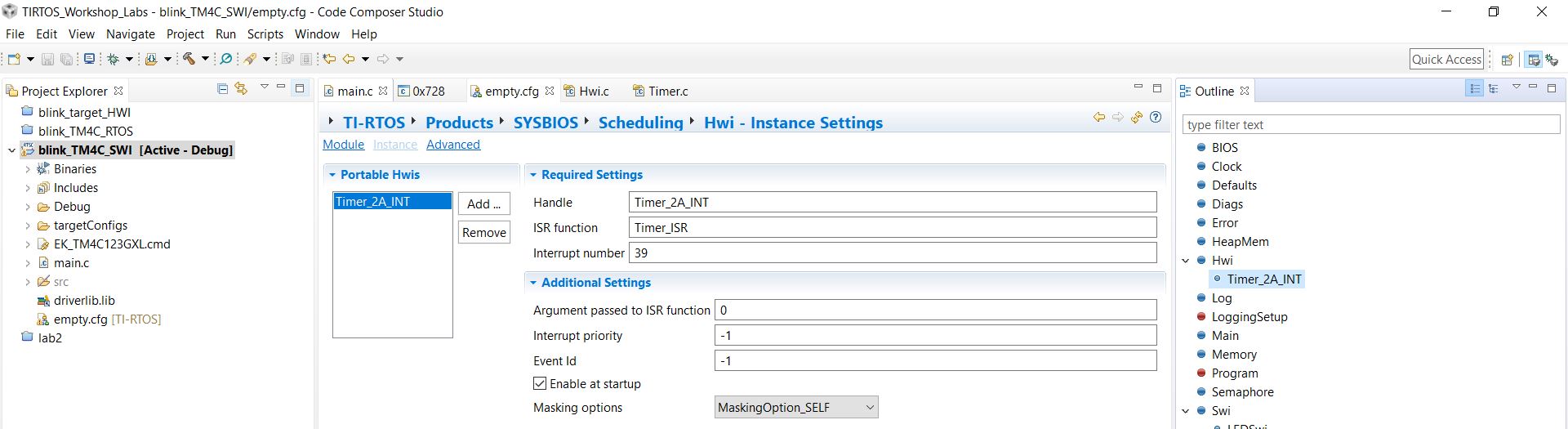
**Date Submitted: 11/09/18**

**Task 01:**

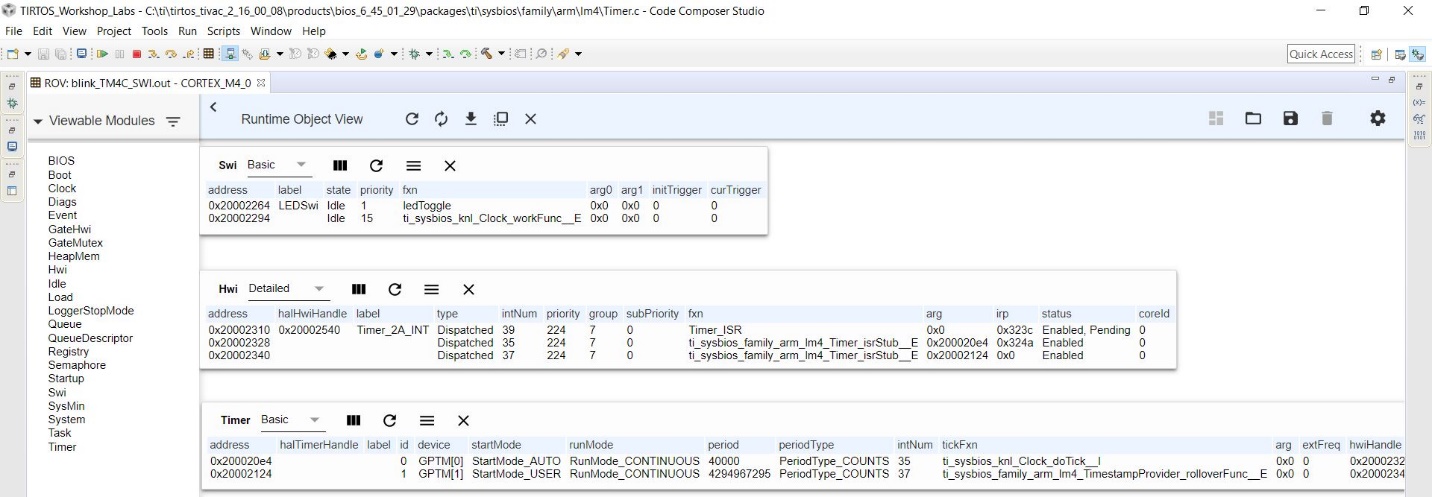
Youtube Link: <https://youtu.be/AdFe5PldTXQ>

The two images below show the modifications in the cfg file XGCONF.

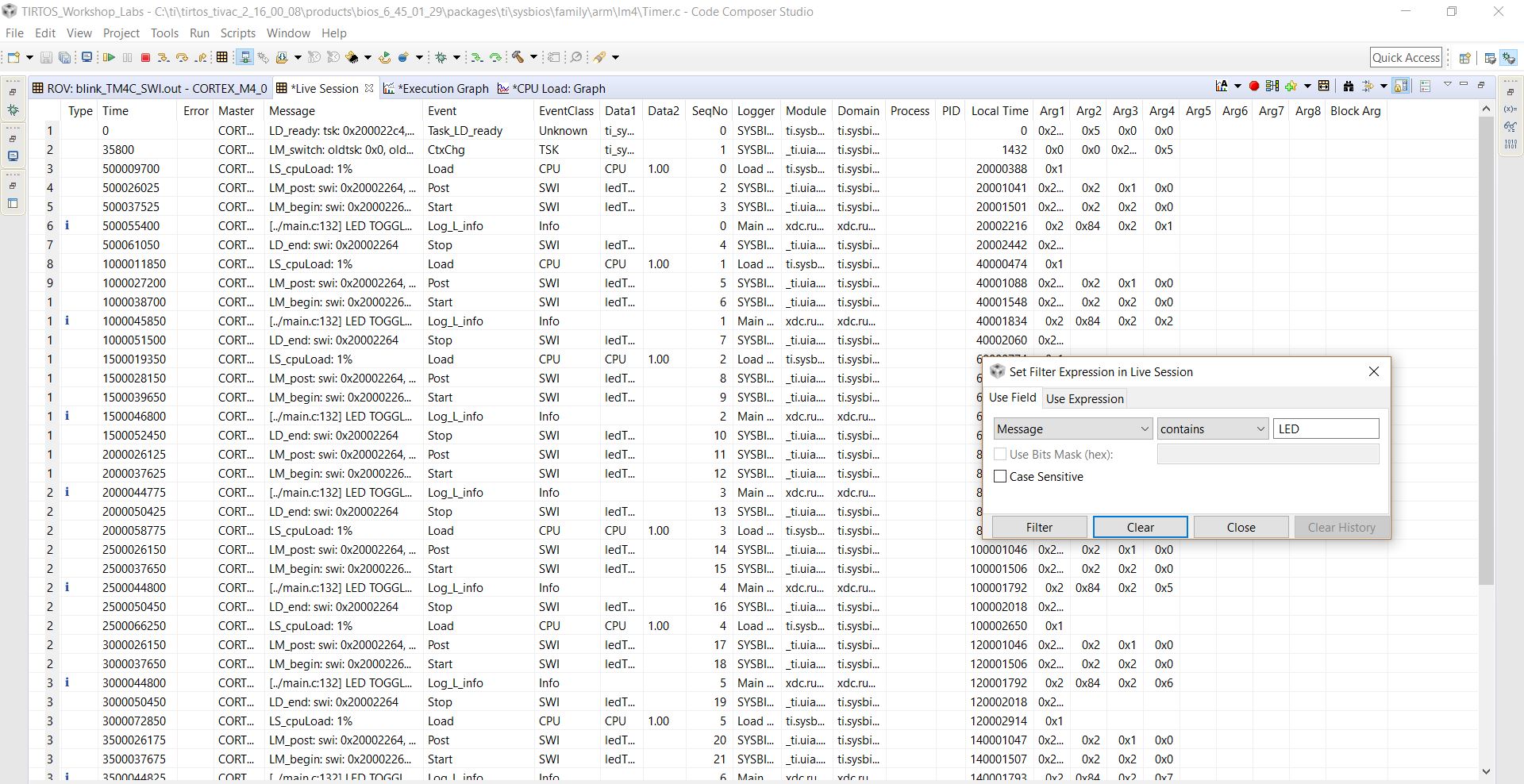




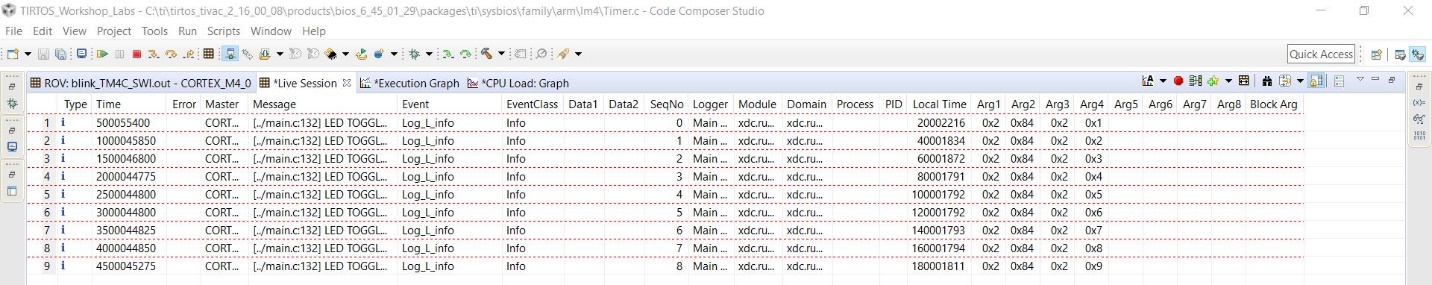
The image below shows the log variables using ROV.



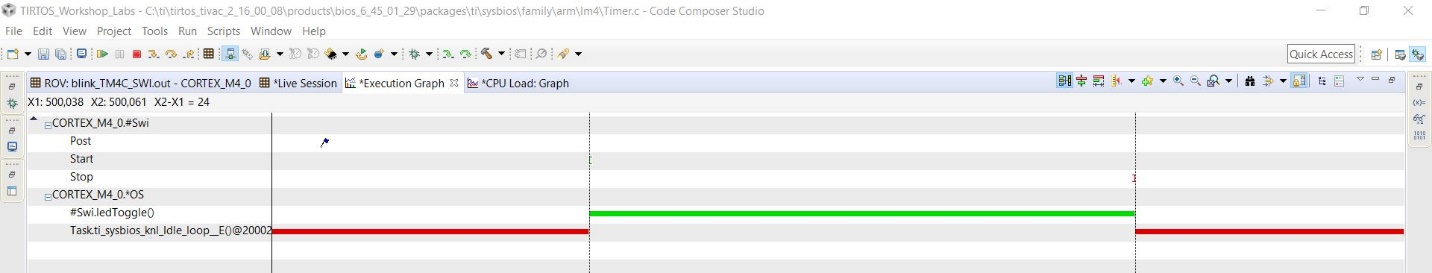
The image below shows live session after using the RTOS anaylzer



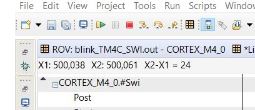
The image below shows the live session after filtering for ‘LED’



The image below shows the execution graph using the RTOS Analyzer.



As we can see from the image below there is a 24 micro second duration of when the LED is toggled.



**Modified Schematic (if applicable):**

**Modified Code:**

**// Insert code here**

//---------------------------------------------------------------------------------

// Project: Blink TM4C BIOS Using Swi (STARTER)

// Author: Eric Wilbur

// Date: June 2014

//

// Note: The function call TimerIntClear(TIMER2\_BASE, TIMER\_TIMA\_TIMEOUT) HAS

// to be in the ISR. This fxn clears the TIMER's interrupt flag coming

// from the peripheral - it does NOT clear the CPU interrupt flag - that

// is done by hardware. The author struggled figuring this part out - hence

// the note. And, in the Swi lab, this fxn must be placed in the

// Timer\_ISR fxn because it will be the new ISR.

//

// Follow these steps to create this project in CCSv6.0:

// 1. Project -> New CCS Project

// 2. Select Template:

// - TI-RTOS for Tiva-C -> Driver Examples -> EK-TM4C123 LP -> Example Projects ->

// Empty Project

// - Empty Project contains full instrumentation (UIA, RTOS Analyzer) and

// paths set up for the TI-RTOS version of MSP430Ware

// 3. Delete the following files:

// - Board.h, empty.c, EK\_TM4C123GXL.c/h, empty\_readme.txt

// 4. Add main.c from TI-RTOS Workshop Solution file for this lab

// 5. Edit empty.cfg as needed (to add/subtract) BIOS services, delete given Task

// 6. Build, load, run...

//----------------------------------------------------------------------------------

//----------------------------------------

// BIOS header files

//----------------------------------------

**#include** <xdc/std.h> //mandatory - have to include first, for BIOS types

**#include** <ti/sysbios/BIOS.h> //mandatory - if you call APIs like BIOS\_start()

**#include** <xdc/runtime/Log.h> //needed for any Log\_info() call

**#include** <xdc/cfg/global.h> //header file for statically defined objects/handles

//------------------------------------------

// TivaWare Header Files

//------------------------------------------

**#include** <stdint.h>

**#include** <stdbool.h>

**#include** "inc/hw\_types.h"

**#include** "inc/hw\_memmap.h"

**#include** "driverlib/sysctl.h"

**#include** "driverlib/gpio.h"

**#include** "inc/hw\_ints.h"

**#include** "driverlib/interrupt.h"

**#include** "driverlib/timer.h"

//----------------------------------------

// Prototypes

//----------------------------------------

**void** **hardware\_init**(**void**);

**void** **ledToggle**(**void**);

//---------------------------------------

// Globals

//---------------------------------------

**volatile** int16\_t i16ToggleCount = 0;

//---------------------------------------------------------------------------

// main()

//---------------------------------------------------------------------------

**void** **main**(**void**)

{

hardware\_init(); // init hardware via Xware

BIOS\_start();

}

//---------------------------------------------------------------------------

// hardware\_init()

//

// inits GPIO pins for toggling the LED

//---------------------------------------------------------------------------

**void** **hardware\_init**(**void**)

{

uint32\_t ui32Period;

//Set CPU Clock to 40MHz. 400MHz PLL/2 = 200 DIV 5 = 40MHz

**SysCtlClockSet**(SYSCTL\_SYSDIV\_5|SYSCTL\_USE\_PLL|SYSCTL\_XTAL\_16MHZ|SYSCTL\_OSC\_MAIN);

// ADD Tiva-C GPIO setup - enables port, sets pins 1-3 (RGB) pins for output

**SysCtlPeripheralEnable**(SYSCTL\_PERIPH\_GPIOF);

**GPIOPinTypeGPIOOutput**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3);

// Turn on the LED

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 4);

// Timer 2 setup code

**SysCtlPeripheralEnable**(SYSCTL\_PERIPH\_TIMER2); // enable Timer 2 periph clks

**TimerConfigure**(TIMER2\_BASE, TIMER\_CFG\_PERIODIC); // cfg Timer 2 mode - periodic

ui32Period = (**SysCtlClockGet**() /2); // period = CPU clk div 2 (500ms)

**TimerLoadSet**(TIMER2\_BASE, TIMER\_A, ui32Period); // set Timer 2 period

**TimerIntEnable**(TIMER2\_BASE, TIMER\_TIMA\_TIMEOUT); // enables Timer 2 to interrupt CPU

**TimerEnable**(TIMER2\_BASE, TIMER\_A); // enable Timer 2

}

//---------------------------------------------------------------------------

// ledToggle()

//

// toggles LED on Tiva-C LaunchPad

//---------------------------------------------------------------------------

**void** **ledToggle**(**void**)

{

// LED values - 2=RED, 4=BLUE, 8=GREEN

**if**(**GPIOPinRead**(GPIO\_PORTF\_BASE, GPIO\_PIN\_2))

{

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0);

}

**else**

{

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_2, 4);

}

i16ToggleCount += 1; // keep track of #toggles

Log\_info1("LED TOGGLED [%u] TIMES",i16ToggleCount); // send toggle count to UIA

}

//-----------------------------------------------------------------------------

**void** **Timer\_ISR**(**void**)

{

**TimerIntClear**(TIMER2\_BASE, TIMER\_TIMA\_TIMEOUT); // must clear timer flag FROM timer

Swi\_post(LEDSwi);

}

**------------------------------------------------------------------------------------**