Indian Institute of Technology Bombay
CS684/CS308 Embedded Systems Lab

Basics of Real-time operating systems & Installation of TI-RTOS

E.R.T.S. Lab

1 Lab Objective

OS (Operating System) is typically responsible managing the hardware resources of the computer. An RTOS (Real- time operating system) does this, but it is intended to be used for a specific purpose. One of the critical aspect of RTOS is its ability to run tasks with precise timing, reliability and almost instantaneous response to a catastrophic event.
This lab is intended to setup TI RTOS and to try out one example.

2 Pre-requisite

1. Interfacing Switches and LEDs on Tiva C launchpad - done in Lab-1.
2. PWM generation on TIVA C launchpad - done in Lab-3

3 Problem Statement

This lab involves installing TI-RTOS version 2.14 and checking it utility using the given examples

4 Relevant Theory

For performing this lab, follow Instructions as mentioned in section 5 and 6 of this document. More details about TI-RTOS is available on following links.

1. TI-RTOS 2.16 for TivaC - User Guide
2. TI RTOS Wiki Page

5 Procedure

5.1 Installation of TI RTOS

5.1.1 For Ubuntu based machine

Following steps are tried on Ubuntu 14.04 and Code Composer Studio (CCS)-6.1.3

- Click on *Help − > CCS App Center* to open CCS App Center
- In case App Center do not load, follow the instructions posted on TI e2e community
- Search for TI RTOS for TivaC. Click *select* checkbox
- click on *Install Software* (located in top left corner, below the App Center logo)
- Installation will take some time. Once installation is complete, CCS will ask for restart. Go ahead and restart CCS
  Bingo!! You are ready to use TI RTOS.

5.1.2 For Windows based machine

The following steps have been tested on Windows 7 and Code Composer Studio (CCS)-6.1.0

- Click on following TI RTOS download
- Scroll down the page and download the windows installer for RTOS - 2.14.04.31
- Start the installer and proceed as directed. Make sure the you install TI RTOS in the same folder where Tivaware is installed.
  If you followed standard installation procedure for CCS, Tivaware would be present at *C:\ti*
- Two folders named “tirtos” and “xdctools” will be present in the ti folder.
- Now, restart Code Composer Studio (CCS), you will see an option to add RTOS library to the current project. Click on ”Yes” and proceed further.

5.2 Importing Project

- Click on "View" and select "TI Resource Explorer".
- *TI-RTOS for Tiva C* $->$ *Tiva C Series* $->$ *Tiva TM4C123GH6PM* $->$ *EK-TM4C123GXL Evaluation kit*. You will get window similar to shown in Figure 1

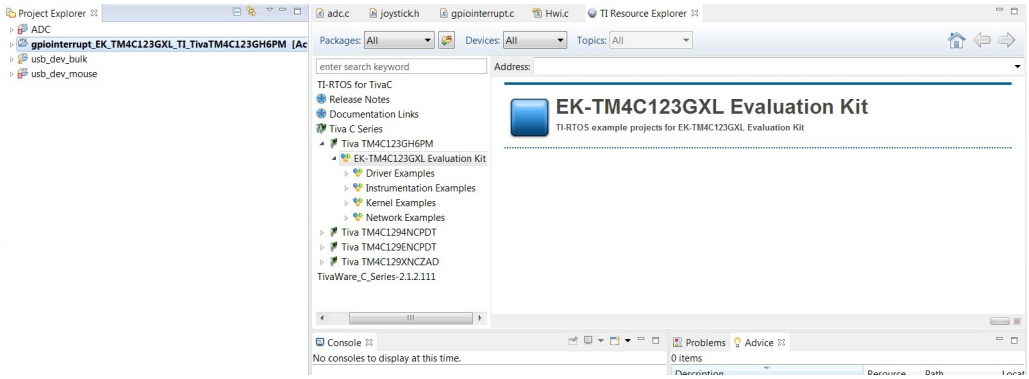

Figure 1: CCS Window 1

- You can import an existing TI RTOS project by following the steps below:
- *Driver Examples* $->$ *TI Driver Examples* $->$ *PWM Examples* $->$ *PWM Led*. You will get window similar to shown in Figure 2
- Finally, click on **"Import the example project into CCS"** to include the RTOS project in your project directory.

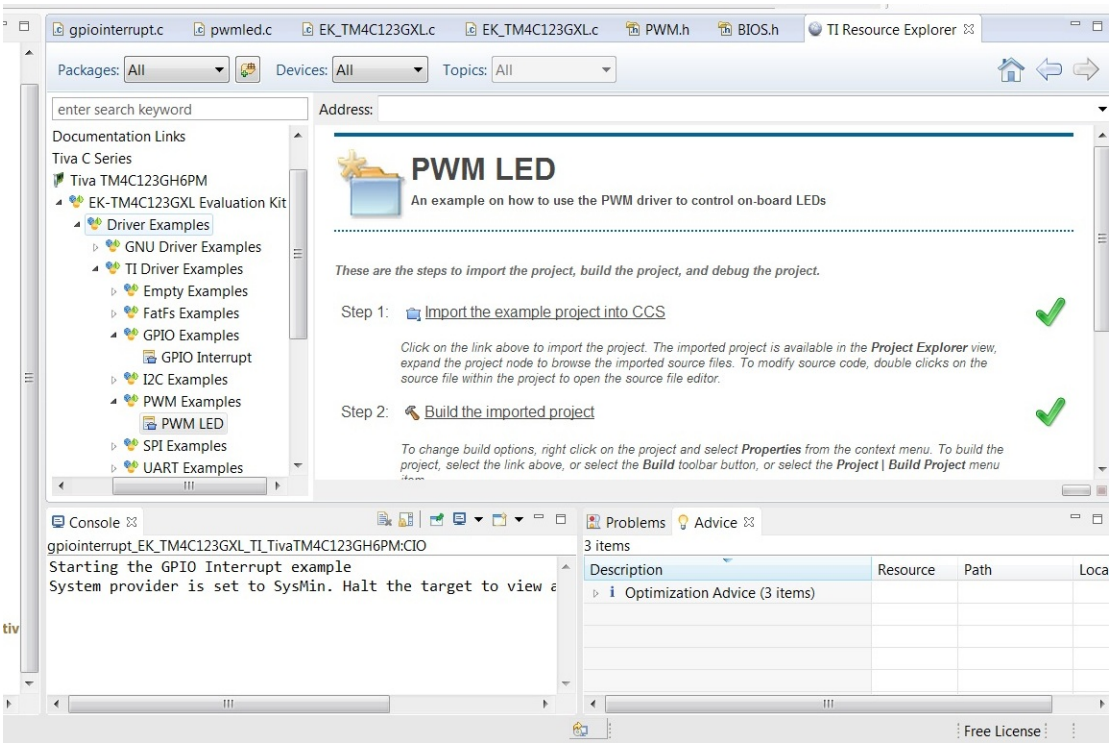

Figure 2: CCS Window 2

6 Demo and Submissions

- Your task is to follow the above instructions, import the PWM LED experiment and show the working to your respective TA.
- Next, try changing the PWM period and the PWM duty cycle increment, show the output to your respective TA.