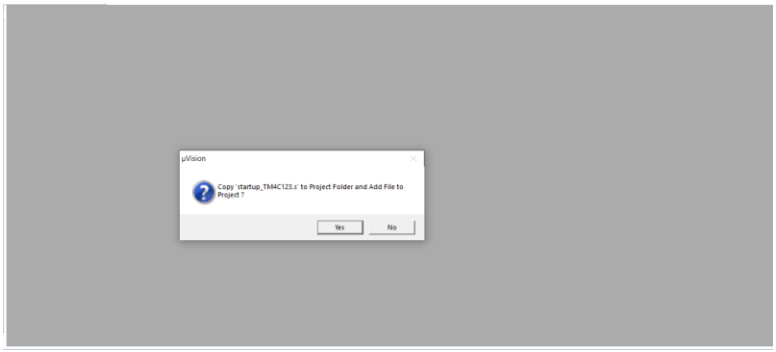
Lab 6

Introduction

To use the simulated ports of TivaC launchpad, follow the below steps:

1. Create new project.
2. Choose the target TM4C123GH6PM device.
3. Copy the start-up code of TM4C123GH6PM.

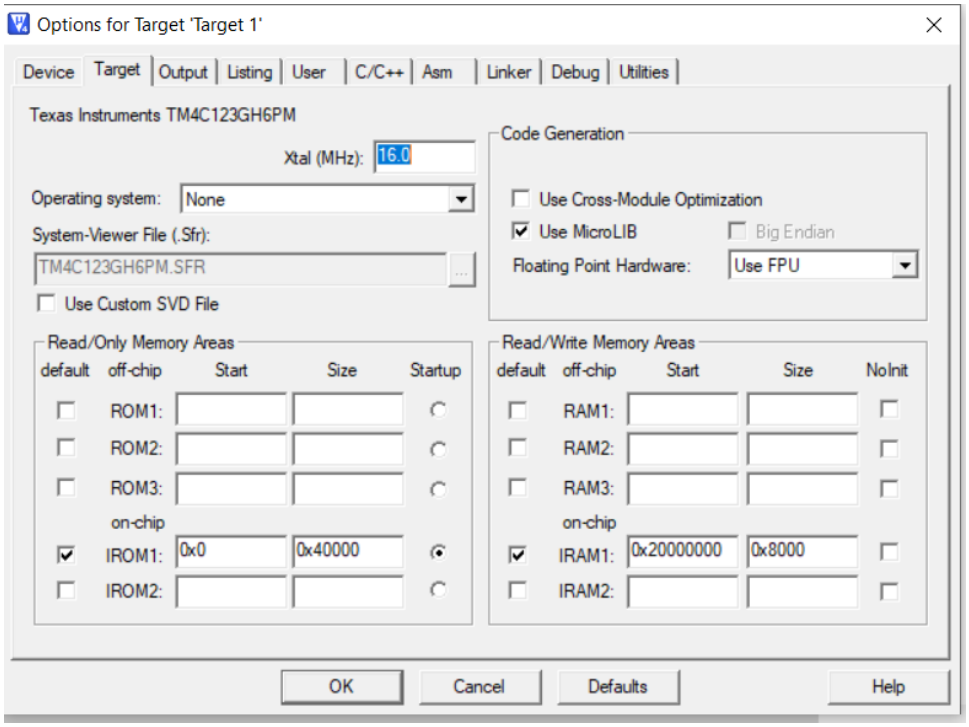


4. Remove instruction “IMPORT SystemInit”

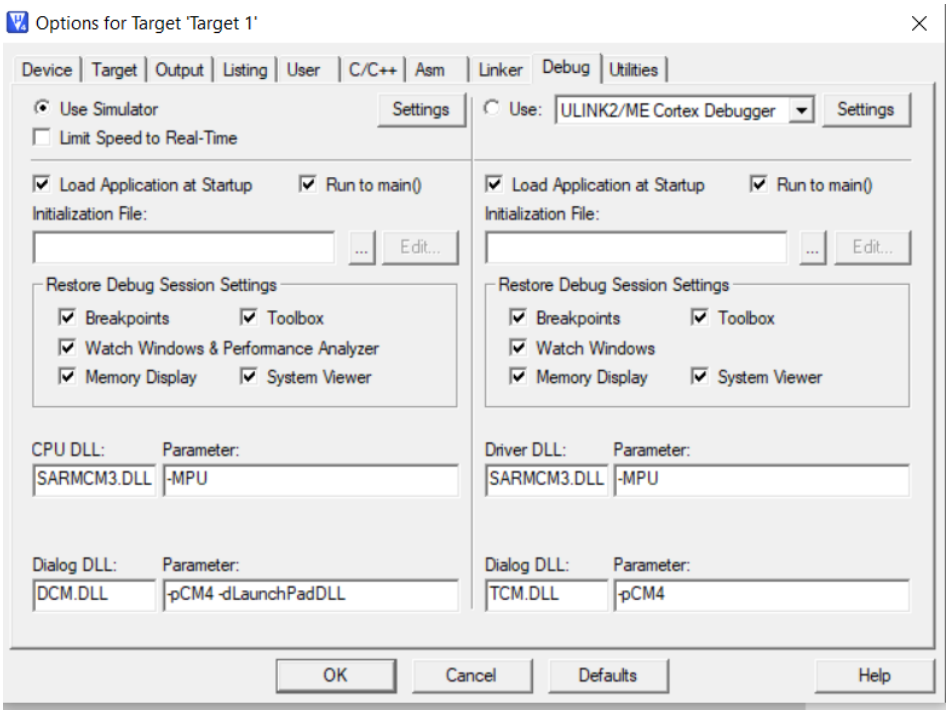
5. Remove instruction “LDR R0, =SystemInit”

6. Remove instruction “BLX R0” at line 236 as shown below

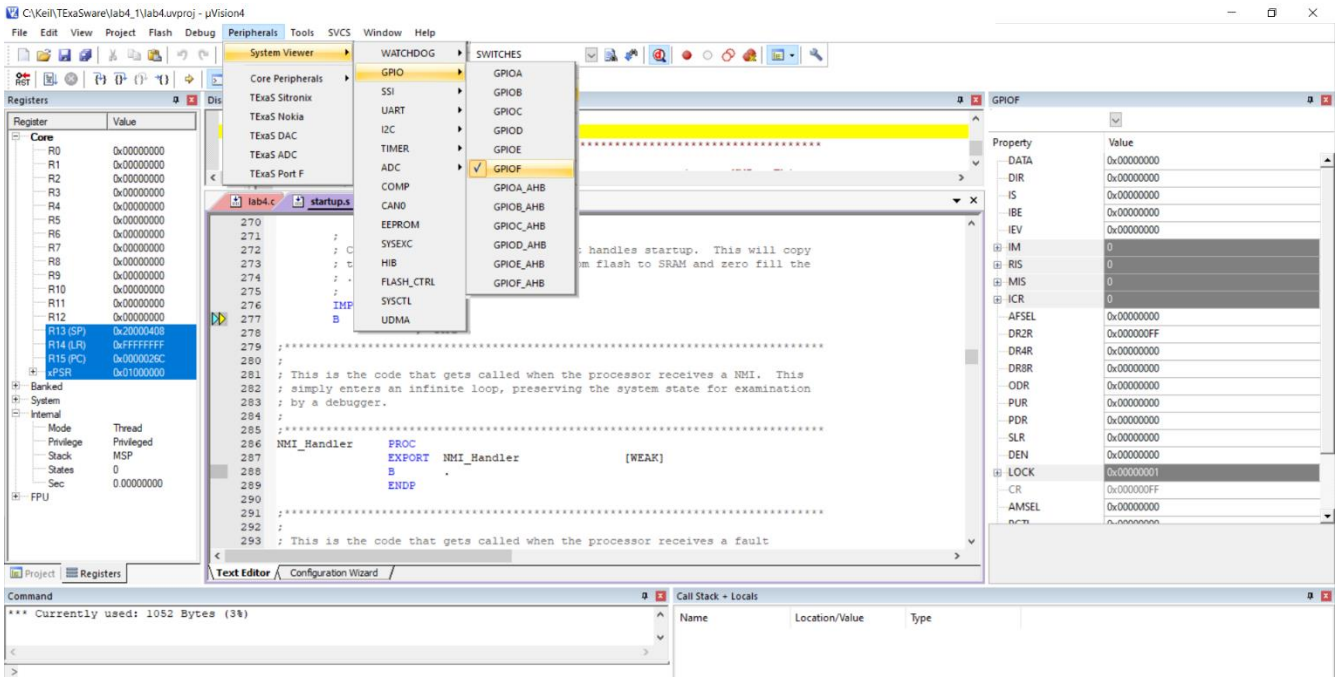
7. Adjust the settings of the target by checking MicroLIB field in Code Generation options.



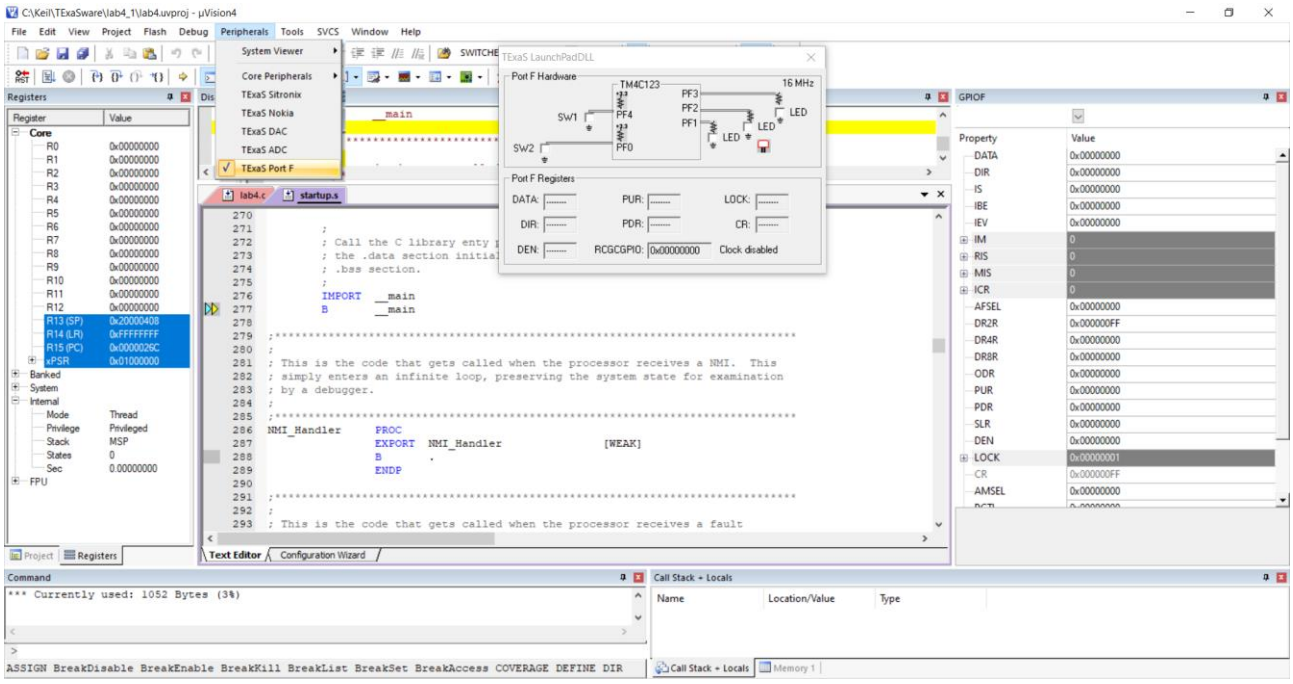
8. Adjust the settings of the target by adding "-dLaunchPadDLL" in Parameter field to support the simulation in Keil 4.



9. You can view the values of the port F through Peripherals in tool bar -> SystemViewer-> GPIO->GPIOF.



10. You can simulate the behavior of switches that are connected to port F in TivaC and check the behavior of the three built-in LEDs in the kit through Peripherals in tool bar -> TExaS PortF.



11. You can then use the simulated kit to check your behavior code in the following lab exercises.

Lab Exercises

Q1. Write using C, a function to initialize port F pin0 and pin 4 as digital inputs with negative edge triggered Interrupt with priority 1 and write the ISR which toggles Blue LED when interrupt occurs on pin 0 and toggles Green LED when interrupt occurs on pin 4.

Q2. Write using C, a function to initialize port F pins 1, 2, and 3 as digital outputs then write a program to toggle Green LED each 0.5 sec based on Systick timer interrupts.

Lab Submission

Q3. Write Embedded C program to increment “seconds” variable each 1 sec and toggle Green LED in SysTick_Handler(). The program also pauses the Systick timer and RED LED is turned on when SW1 is pressed, while it resumes the Systick timer and the RED LED is turned off when SW2 is pressed.

Upon starting the program, all the LEDS should be turned off. Assume the SysTick timer operates on 16 MHZ and its interrupt has priority of 1, while the priority of GPIOF interrupt has priority of 2.

For the lab submission, you should submit a pdf document contains the following.

1. Cover page that contains
    a. your name,
    b. your ID,
    c. your department
2. Place snapshots to show the state of the LED and the timer.
3. The snapshots must show the values of the GPIOF registers such as (DATA, DIR, AFSEL, … etc.) when you verify your code on simulation level.
4. Place your code in the document.
5. Your document will be submitted on LMS.