

# PI.1.1 TEST PLAN

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*LED BLINKING MODULARIZATION*

*VERSION 1*

SEPT 18, 2017

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## 1 - TPP VERSION HISTORY

Version #	Implemented By	Revision Date	Approved By	Approval Date	Reason	Mark
1	Richard Constantine	09/18/2017				

## 2 - INTRODUCTION

### 2.1 PURPOSE OF THE TEST PLAN TEMPLATE DOCUMENT

The purpose of this test plan document is to test that the modularized/condensed C code of the LED Blink project (PI.1.1) behaves the same as the provided, non-modularized main.c file. To pass, the modularized version must successfully compile on the MX7cK development board and perform the identical task as the non-modularized version (i.e. the LEDs rotate in sequence).

## 3 - REFACTORING TESTING

### 3.1 TEST PLAN AND CASES

Item to Test	Test Description	Test Date	Responsibility
Modularized LED Blinking Code	The non-modularized version is run and the LEDs are observed to be blinking/rotating. Next, the modularized code is compiled and run to confirm identical functionality - ensuring that the LEDs are blinking in the same sequence and with approximately the same timing (less than 1s difference between the 2 versions of code).	Sept 18, 2017	Richard Constantine

### 3.2 TEST PROCEDURE

Instruction	P/F
1. Ensure the PC being used has an up-to-date version of Windows (Windows 7 or later) along with the MPLAB X IDE (currently version is 4.01), and XC32 compiler (currently version 1.44), and the PIC32 Legacy Peripheral Libraries (ensuring to install the libraries within the xc32/v1.44 folder). These tools can be found at <a href="http://www.microchip.com/mplab/">http://www.microchip.com/mplab/</a> along with more detailed instructions in the reference material [1].	
2. Connect the J3 Power Select (DBG jumper just above the Ethernet port) of the MX7cK board if it is not already connected. Then connect the MX7cK board to the PC running Windows via the J15 Debug USB connector (located just below the Ethernet connector) via the provided USB OTG cable. Power on the device using the power switch in the lower left corner - LEDs should light up which confirms that the device is receiving power.	
3. Go to the Google OneDrive URL sent via email. This should take you to a folder called Richard Constantine - 7686561 - ECE 3740 - Assignment 1. Download and extract the entire folder called	

	<p>Constantine_Richard_PI.1.zip, and place its contents in a directory called C:\Users\&lt;YourUsername&gt;\ECE3740\MPLABXProjects\Constantine_Richard_PI\.</p> <p>Note: This directory will need to be created in order to store the project.</p>	
4.	Start the MPLAB X IDE by clicking on MPLAB X in the taskbar (as explained by Step 1 of [1]) or find the MPLAB X IDE by going to Windows File Explorer, browsing to the folder or drive where MPLABX is installed, using Windows search (in the top right corner of the window) for "IDE" then scrolling until mplab.exe can be located and opened.	
5.	Open the LEDBlinking project by selecting File->Open Project within the MPLAB X IDE (top left corner of the window), and then browsing to the newly extracted directory: C:\Users\<YourUsername>\ECE3740\MPLABXProjects\Constantine_Richard_PI\PI.1\PI.1.1\ then selecting and opening the project called v1 (LEDBlinking).	
6.	Open the LEDBlinkingMod project by selecting File->Open Project within the MPLAB X IDE, and then browsing to the newly extracted directory: C:\Users\<YourUsername>\ECE3740\MPLABXProjects\Constantine_Richard_PI\PI.1\PI.1.1\ then selecting and opening the project called v2 (LEDBlinkingMod).	
7.	Select the LEDBlinking project by right-clicking on the LEDBlinking project name in the Projects tab of the MPLAB X IDE and build the project by selecting Build. The last message "BUILD SUCCESSFUL" should display in the Output window confirming the program was compiled and uploaded.	
8.	Run the project by right-clicking on the LEDBlinking project name in the Projects tab of the MPLAB X IDE and selecting Run. After many seconds, the last message "Programming/Verify complete" should display in the output window and the LEDs should be rotating on/off in the leftward direction starting with LD1 rotating through to LD4 and back to LD1.	
9.	Using a timing device with a seconds display, such as watch, time 10 rotations of the LEDs. In other words, find the time taken for the LEDs to completely rotate 10 times, and record this time.	
10.	Select the LEDBlinkingMod project by right-clicking on the LEDBlinkingMod project name in the Projects tab of the MPLAB X IDE and build the project by selecting Build. The last message "BUILD SUCCESSFUL" should display in the Output window confirming the program was compiled and uploaded.	
11.	Run the project by right-clicking on the LEDBlinkingMod project name in the Projects tab of the MPLAB X IDE and selecting Run. Again, after many seconds, the message "Programming/Verify complete" should display in the output window, at which point the LEDs should be rotating the same as in step 8.	
12.	Using a timing device with a seconds display, such as watch, time 10 rotations of the LEDs. In other words, find the time taken for the LEDs to completely rotate 10 times, and record this time.	
13.	Compare the times obtained from Steps 9 and 12. The difference in execution time between the modularized and non-modularized should not exceed 1s.	

#### **4 – TEST PLAN TEMPLATE APPROVAL**

The undersigned acknowledge they have reviewed the PI.1.1 Test Plan Template document and agree with the approach it presents. Any changes to this Requirements Definition will be coordinated with and approved by the undersigned or their designated representatives.

Required Signatures:

- TA - Nahiyah Kaiser

Signature:	_____	Date:	_____
Print Name:	_____		
Title:	_____		
Role:	_____		

## REFERENCES

- [1] K. Ferens, "ECE 3740 Systems Engineering Principles I," 15 September 2001. [Online]. Available: <http://ece.eng.umanitoba.ca/undergraduate/ECE3740/>. [Accessed 16 September 2017].