# Orbit BoosterPack™ Full Demo User Guide

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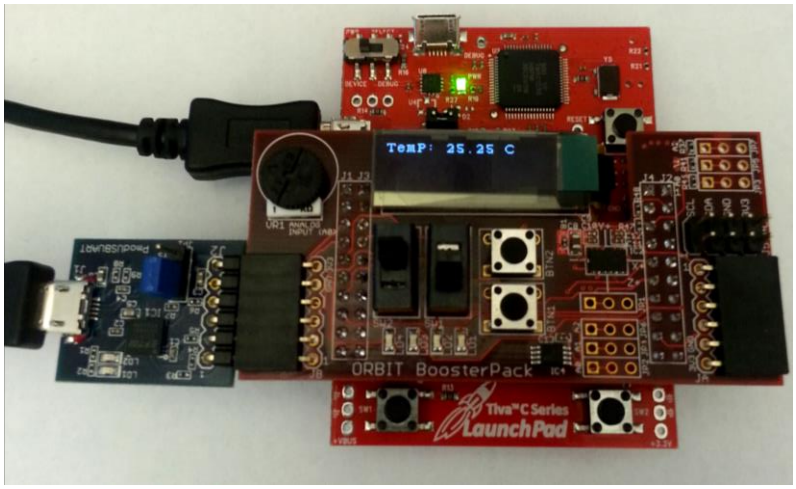
## Overview

The Orbit BoosterPack Full Demo is a simple program that extends the basic demo to show the functionality of some features on the board.




Tools Needed to Run the Demo:

- LM Flash Programmer™
- Stellaris® ICDI drivers
- Tiva C Series® LaunchPad
- Orbit BoosterPack™
- PmodUSBUART (optional)
- (2x) USB A to Micro B
- FTDI Device Drivers (optional)

Tools Needed to Alter the Demo:

- Code Composer Studio™ IDE v6
- Arm Compiler v5.1.6

## Functional Description

The demo project has four functionality modes. The functionality of the demo is chosen by altering the state of the two switches on the Orbit BoosterPack. The table below shows the operating modes. Note that the two switches in the picture above are in the “UP” position.

| SW2 | SW1 | Demo#/Part Featured | Functionality |
|---|---|---|---|
| DOWN | DOWN | 1. Potentiometer, buttons, LEDs | Orbit Demo banner is displayed on the OLED while the ADC reading is continuously updated to the display from the potentiometer. |
| DOWN | UP | 2. Pmod headers, EEPROM | A PmodUSBUART receives characters from a terminal application (such as Terra Term) running on a PC. Up to 25 received characters are stored in EEPROM and read back when the byte 0x0D is sent from the terminal application (this is the carriage return character, CR). |
| UP | DOWN | 3. Temperature Sensor | The temperature reading is displayed on the OLED |
| UP | UP | 4. Accelerometer | A small rocket ship is displayed on the OLED and rotating the Orbit BoosterPack about the Y-axis of the accelerometer will make the image move to the left or right. |

## Programming the Tiva C Series® LaunchPad

Please download the Stellaris® ICDI drivers and the LM® Flash Programmer available at www.ti.com. For assistance installing the drivers, please see the "Stellaris Driver Installation Guide" available at www.ti.com.

Follow these steps to program the Tiva C Series® LaunchPad with the Orbit BoosterPack demo project.

1. Set the "PWR SELECT" switch on the Tiva C Series® LaunchPad to "DEBUG"
2. Connect the Tiva C Series® LaunchPad to the host computer with a USB Type A to Micro B cable. Connect the Micro B plug to the Micro-B receptacle labeled "DEBUG" on the Tiva C Series® LaunchPad
3. Open LM Flash Programmer
4. In the "Configuration" Tab, select "TM4C123G LaunchPad" from the Quick Set drop down box
5. In the "Program" Tab, select the demo project binary file by clicking the "Browse" button and navigating to the "Binary" folder in the demo project download directory. Select the file named "OrbitBoosterDemo.bin".
6. Click the "Program" button.

## Running the Demo

In order to run the demo, press the reset button after the LM Flash Programmer indicates 'Program Complete.' Switch the Micro B plug to the Micro B receptacle labeled "DEVICE" on the Stellaris® LaunchPad, and turn the "PWR SELECT" switch to "DEVICE".

If a PmodUSBUART is used with this demo, there are a few extra items necessary. The host PC will recognize the PmodUSBUART only if the appropriate FTDI Device Drivers are present. Please download those files from http://www.ftdichip.com/Drivers/D2XX.htm, and follow the associated installation guide.

The PmodUSBUART will be recognized as a Serial COM port on the host PC. Please make sure this COM port is COM12 or lower. To change it, please open the Device Manager from the Control Panel. Right click on the COM port that the PmodUSBUART is associated with and go to Properties. Click on the Port Settings tab and click the Advanced… button. Change the COM port from that window. Choose a COM port that is free, or, if none of the COM ports below COM12 are free, replace any that are (in use).

If using Terra Term, 0x0D may need to be assigned to a specific key. In order to assign this character to the "Enter" or "Return" key on the host keyboard, open "keyboard.cnf" from the Terra Term install directory and add the following line to the bottom of the file:

UserEntr=28,0,#0D

Save the file. If this still does not work, running keycode.exe and pressing the "Enter" key will show the received keycode. If this number differs from the one in the key definition, please enter it in place of 28. After opening Terra Term, navigate to Setup->Load Key Map… and select the adjusted .cnf file.

The following are notes on each of the demo modes.

## 1. Potentiometer Demo

The potentiometer demo is the same as the Orbit Basic Demo. It simply reads the value from the analog to digital converter attached to the potentiometer. The potentiometer can be accessed using the black wheel labeled “VR1” on the top of the Orbit board. Turning this wheel will change the 12-bit value, represented in hexadecimal format, on the OLED display. The buttons on the top of the Orbit board can also be used in this mode to turn on the LEDs. Each button turns on two LEDs when pressed.

## 2. Pmod Demo

The PmodUSBUART must be attached to Pmod header JB for this demo to work. The UART on the Tiva C Series® LaunchPad is set up to run at 9600 baud, 8 bits, 1 stop bit, no parity, and no flow control. Please be sure to adjust the Serial Port settings on the host PC if this demo is not functioning as expected.

## 3. Temperature Demo

This demo simply reads the ambient temperature register from the temperature sensor on the Orbit BoosterPack. The temperature can be observed to change if the operator presses their thumb down on the IC. The temperature sensor IC is labeled IC4 and is located below BTN1.

## 4. Accelerometer

In this demo, a rocket ship is displayed on the Orbit BoosterPack OLED display. The on-board accelerometer is set up to detect tilt. Tilt the board to the right about the Y-axis (labeled on the top of the Orbit board) or to the left about the Y-axis to make the rocket move in that direction.

**Note:** For more information on the Orbit BoosterPack, see the Orbit BoosterPack Reference Manual at: www.digilentinc.com. For a detailed description of the Tiva C Series® LaunchPad, or for more information on the Tiva C Series® Peripheral Library, please refer to the user manual available at www.ti.com. The demo project uses a basic graphics library, called OrbitOled. For more information on the library, see the User Guide available with the library download at: www.digilentinc.com.