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CE220291 - PSoC 6 MCU TCPWM Square Wave

Objective

This code example demonstrates how to generate a square wave using the TCPWM Component configured as a PWM on a PSoC® 6 MCU device.

Requirements

Tool: PSoC Creator™ 4.2

Programming Language: C (Arm® GCC 5.4.1, Arm MDK 5.22)

Associated Parts: All PSoC 6 MCU parts

Related Hardware: CY8CKIT-062-BLE PSoC 6 BLE Pioneer Kit

Overview

This code example generates a square wave using the TCPWM Component configured as PWM. An LED is connected to the PWM output pin and blinks at approximately 2 Hz. If you are new to PSoC 6 MCU, see AN210781 – Getting Started with PSoC 6 MCU with Bluetooth Low Energy (BLE) Connectivity.

Hardware Setup

The code example works with the default settings on the CY8CKIT-062-BLE PSoC 6 BLE Pioneer Kit. If the settings are different from the default values, see the “Selection Switches” table in the kit guide to reset to the default settings.

Operation

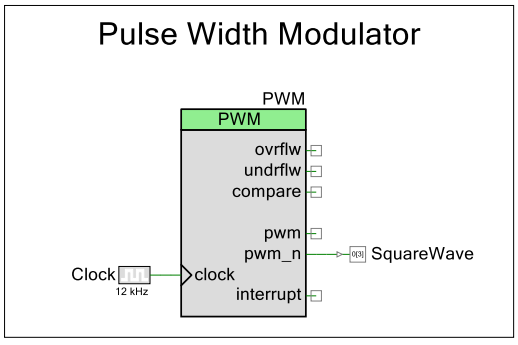
1. Open the *CE220291_TCPWM_Square_Wave* code example in PSoC Creator.
2. Build the project (**Build** > **Build CE220291_TCPWM_Square_Wave**).
3. Connect the CY8CKIT-062-BLE PSoC 6 BLE Pioneer Kit to your computer using the USB cable provided.
4. Program the PSoC 6 MCU (**Debug** > **Program**). See the kit guide for details on programming the kit.

The red LED (LED5) blinks at approximately 2 Hz.

Design and Implementation

Figure 1 shows the PSoC Creator schematics of this code example. This code example uses the TCPWM, Pin, and Clock Components.

Figure 1. TopDesign Schematic



The PWM Component is connected to a 12-kHz clock and its period is set to 5999 to give an approximate 2-Hz PWM output (Input Clock/Period). In this example, the PWM starts counting from 0 to the period value. This means to count to N cycles such as 6000, the period should be set to N-1. The compare value is set to 3000 so that the PWM output has a 50% duty cycle. The output of the PWM is connected to an LED that blinks at approximately 2 Hz.

Components and Settings

Table 1 lists the PSoC Creator Components used in this example, how they are used in the design, and the non-default settings required so they function as intended.

Table 1. List of PSoC Creator Components

Component	Instance Name	Purpose	Non-default Settings
PWM (TCPWM)	PWM	Generate square wave and bring out the signal to GPIO	**Period 0**: 5999 **Compare 0**: 3000
Digital Output Pin	SquareWave	Drive the PWM signal to LED	-
Clock	Clock	Drive the PWM at 12kHz	**Frequency**: 12 kHz

For information on the hardware resources used by a Component, see the Component datasheet.

Table 2 shows the pin assignment for the project done through the **Pins** tab in the **Design Wide Resources** window.

Table 2. Pin Names and Location

Pin Name	Location
LED	P0[3]

Reusing This Example

This code example is designed to run on CY8CKIT-062-BLE PSoC 6 BLE Pioneer Kit. To port the design to a different PSoC 6 MCU device and/or kit, change the target device in Device Selector, and update the pin assignments in the Design Wide Resources Pins settings as needed. For single-core PSoC 6 MCU devices, port the code from *main_cm4.c* to *main.c* file.

Related Documents

Application Notes	
AN210781 – Getting Started with PSoC 6 MCU with Bluetooth Low Energy (BLE) Connectivity	Describes PSoC 63 with Bluetooth Low Energy (BLE) Connectivity and how to build your first PSoC Creator project.
PSoC Creator Component Datasheets	
PWM	Supports fixed-function PWM implementation
Pins	Supports connection of hardware resources to physical pins
Clock	Supports local clock generation
Related Code Examples	
CE220290	PSoC 6 MCU: TCPWM Breathing LED
CE220292	PSoC 6 MCU: Frequency Measurement Using TCPWM
CE220169	PSoC 6 MCU: Periodic Interrupt Using TCPWM
CE220799	PSoC 6 MCU: Direction Detection Using Quadrature Decoder
Device Documentation	
PSoC 6 MCU: PSoC 63 with BLE Datasheet	PSoC 6 MCU: PSoC 63 with BLE Architecture Technical Reference Manual
Development Kit (DVK) Documentation	
CY8CKIT-062-BLE PSoC 6 BLE Pioneer Kit	

Document History

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Revision	ECN	Submission Date	Description of Change
*A	5845465	08/17/2017	Initial public release
*B	5991546	12/21/2017	Updated template and minor text changes. Updated project to PSoC Creator 4.2 Beta.
*C	6624012	07/20/2019	Updated template and minor text changes to document and PSoC Creator project

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