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CE215900 - FM0+ Base Timer PWM

This code example uses the base timer in PWM mode to drive the green LED.

Overview

This example uses the base timer (BT) in PWM mode. The timer runs continuously. When the timer reaches zero, the underflow interrupt modifies the duty cycle. The output pin for the BT_PWM is connected to the green LED. The LED brightness varies with the PWM duty cycle.

Requirements

Tool: PSoC Creator 4.0

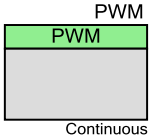
Programming Language: C (GCC 4.9.3)

Associated Parts: All S6E1C parts

Related Hardware: FM0-64L-S6E1C3

Design

The schematic includes the PDL_BT Component, configured as a PWM. The **bPwmUnderflowIrq** field is set to true. The **ConnectTIOA** field is also set to true. The design sets that output pin (PWM:TIOA) to drive the green LED.



The firmware performs following functions:

1. Sets the pin function for the PWM output pin.
2. Initializes the PWM peripheral
3. Sets the count value for the down counter
4. Sets the initial PWM duty cycle
5. Starts the peripheral and triggers the PWM
6. In the underflow interrupt handler, modify the duty cycle

Design Considerations

PDL Installation

The project assumes that you have installed the PDL in the location specified in the **Project Management** panel of the **Tools** > **Options** dialog. If that location is incorrect, you will see the build error “The given PDL path is invalid. Unable to find required PDSC file.” To correct this problem in a newly-created project, open the **Project** > **Properties** dialog and enter the correct path to the PDL. To avoid the problem in projects you create in the future, make sure you put the correct path in the **Tools** > **Options** dialog.

Hardware Setup

As configured, the PWM Component uses one output pin. Table 1 lists the pin connections required to use this code example on supported FM0+ kits.

Table 1. List of Pins

Pin	FM0-64L-S6E1C3
PWM:TIOA	P3E

Components

Table 2 lists the PSoC Creator Components used in this example, as well as the hardware resources used by each.

Table 2. List of PSoC Creator Components

Component	Version	Hardware Resources
PDL_BT as a PWM	1.0	BT block, one GPIO pin

Parameter Settings

The PWM Component uses default parameter settings, with these exceptions.

Table 3: Component Settings

Tab	Setting	Value
Basic	ConnectTIOA	True
Interrupts	bPwmUnderflowIrq	True
	bTouchNvic	True

Operation

Program the kit, then click the Resume Execution button. The green LED starts out bright, fades, and then reverts to bright as the PWM duty cycle changes.

Related Documents

Table 4 lists relevant application notes, code examples, knowledge base articles, device datasheets, and Component datasheets.

Table 4. Related Documents

PSoC Creator Component Datasheets	
PDL_BT	Supports PWM, PPG, PWC, and Reload timers, in either continuous or one-shot mode
Device Documentation	
S6E1C	FM0+ S6E1C-Series Ultra Low Power ARM® Cortex®-M0+ Microcontroller (MCU) Family
Development Kit (DVK) Documentation	
FM0-64L-S6E1C3	ARM® Cortex®-M0+ MCU Starter Kit with USB and Digital Audio Interface

Document History

Document Title: CE215900 - FM0+ Base Timer PWM

Document Number: 002-15900

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5419492	JETT	07/29/16	New Code Example.
*A	5448672	YFS	9/25/16	Added workspace file.
*B	5453277	YFS	9/28/16	Changed the workspace folder name. Moved the PDF file. Corrected the Documentation entry in XML file.
*C	5775223	YFS	6/15/17	Added search keyword so that user can quickly find Code Examples from the component instance popup menu. Updated logo and copyright date.
*D	5987580	YFS	12/7/17	Removed S6E1B support.

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