CE220169 – PSoC 6 MCU: Periodic Interrupt using TCPWM

Objective

This example demonstrates how to generate a periodic interrupt using the timer/counter pulse-width modulation (TCPWM) Component in Timer/Counter mode for PSoC® 6 MCU devices.

Overview

This example uses the TCPWM Component in the Timer/Counter mode to generate a periodic interrupt. An LED toggles whenever the interrupt occurs.

Requirements

Tool: PSoC Creator™ 4.2 with Peripheral Driver Library (PDL) 3.0.1

Programming Language: C (ARM® GCC 5.4.1 and ARM MDK 5.22)

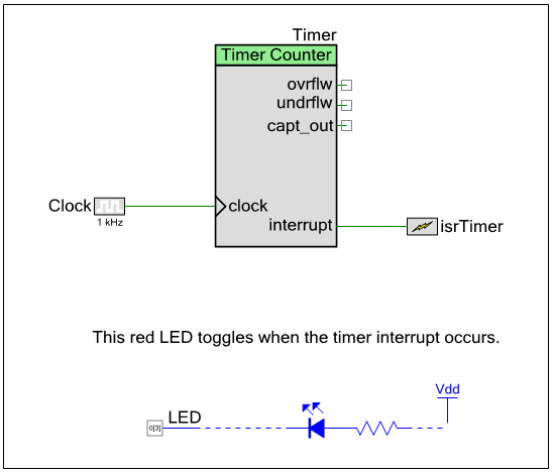
Associated Parts: All PSoC 6 MCU parts

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

Design

This example configures an instance of the TCPWM Component in continuous up counter mode to generate a periodic interrupt. The CPU enters sleep mode. It wakes up whenever the interrupt occurs and reenters sleep mode after servicing the interrupt. The interrupt handler simply toggles an LED. You can change the timer period by changing the `TIMER_PERIOD_MSEC` macro in the *main_cm4.c* file. Figure 1 shows the PSoC Creator schematic for this code example.

Figure 1. TopDesign Schematic



Design Considerations

This example runs on CY8CKIT-062-BLE. To port the design to other PSoC 6 MCU family devices and kits, change the target device in the PSoC Creator Device Selector and the pin assignments in the *.cydwr* file.

Hardware Setup

This example uses the CY8CKIT-062-BLE kit's default configuration. Refer to the kit guide to ensure the kit is configured correctly.

Operation

1. Plug the CY8CKIT-062-BLE kit board into your computer's USB port.
2. Build the project and program it into the PSoC 6 MCU device. Choose **Debug** > **Program**. For more information on device programming, see PSoC Creator Help. Flash for both CPUs is programmed in a single program operation.
3. The red LED toggles at one second interval.
4. Change the timer period by modifying the `TIMER_PERIOD_MSEC` macro in *main_cm4.c* file, program the device, and observe that the LED now blinks at a different rate.

Components

Table 1 lists the PSoC Creator Components used in this example, as well as the hardware resources used by each.

Table 1. PSoC Creator Components

Component	Instance Name	Hardware Resources
Digital Output Pin	LED	1 GPIO pin
Timer Counter (TCPWM)	Timer	1 counter instance of a TCPWM block
Clock	Clock	1 peripheral clock divider
Interrupt	isrTimer	None. It only generates the configuration for the TCPWM interrupt

Parameter Settings

Figure 2, Figure 3, and Figure 4 show the Component configuration with the changed settings highlighted. See the corresponding Component datasheet for information on these settings. To access the datasheet, right-click the Component and click **Open Datasheet**.

Figure 2. Digital Output Pin Component Configuration

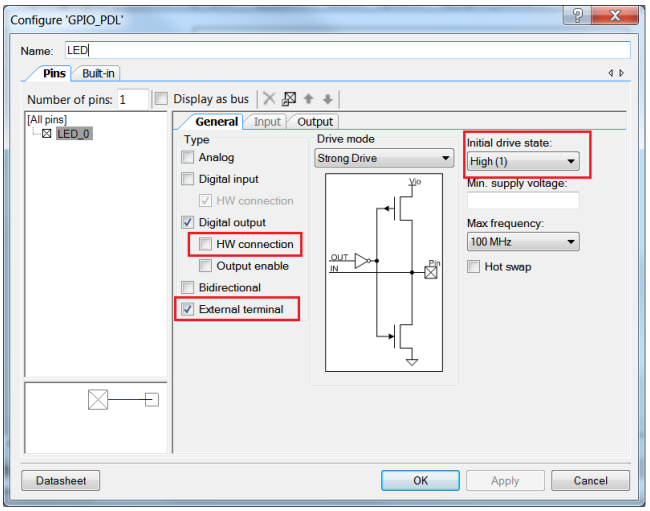


Figure 3. Timer Counter (TCPWM) Component Configuration

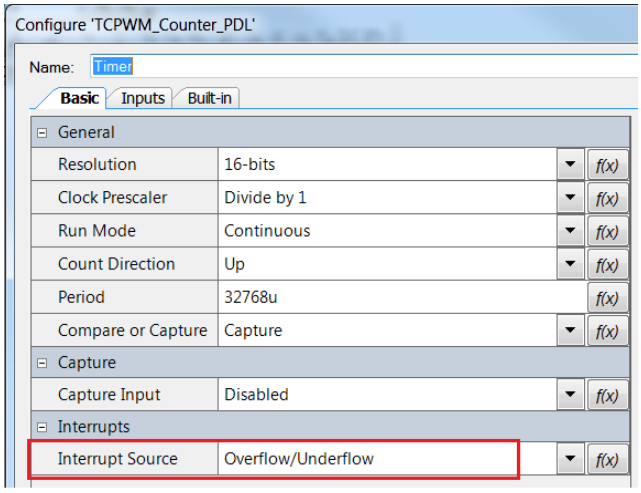
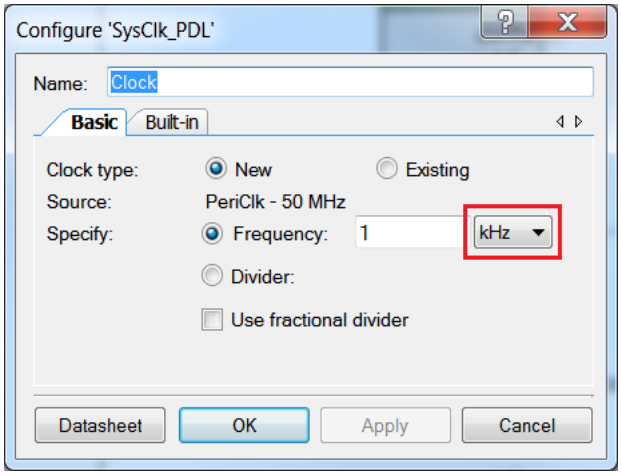


Figure 4. Clock Component Configuration



Design-Wide Resources

Figure 5 shows the pin assignment for the project done through the **Pins** tab in the **Design Wide Resources** window. These assignments are compatible with CY8CKIT-062-BLE.

Figure 5. Pin Assignments

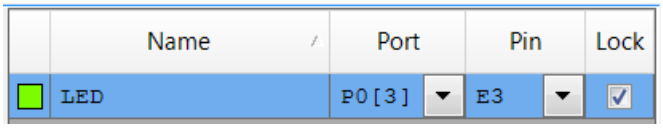
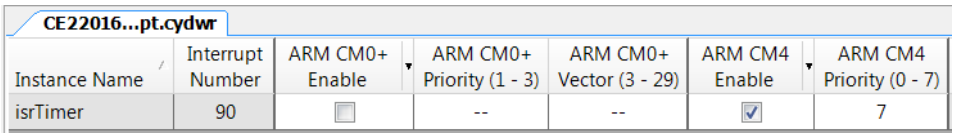


Figure 6 shows the interrupt assignment for the project done through the **Interrupts** tab in the **Design Wide Resources** window. PSoC Creator assigns the interrupt to CM4 by default, which works for this project because CM4 services the periodic interrupt generated by the TCPWM Component.

Figure 6. Interrupt Assignments



Related Documents

Application Notes	
AN210781 Getting Started with PSoC 6 MCU with BLE Connectivity	Describes PSoC 6 MCU with BLE Connectivity devices and how to build your first PSoC Creator project
AN215656 PSoC 6 MCU Dual-Core CPU system Design	Describes the dual-core CPU architecture in PSoC 6 MCU, and shows how to build a simple dual-core design
AN219434 Importing PSoC Creator Code into an IDE for a PSoC 6 MCU Project	Describes how to import the code generated by PSoC Creator into your preferred IDE
PSoC Creator Component Datasheets	
Pins	Supports connection of hardware resources to physical pins
Timer Counter (TCPWM)	Supports fixed-function Timer/Counter implementation
Clock	Supports local clock generation
Interrupt	Supports generating interrupts from hardware signals
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	Orig. of Change	Submission Date	Description of Change
*B	5891665	VAIR	09/21/2017	Initial public release

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