Objective

This example demonstrates the operation of watchdog timer (WDT) in PSoC® 6 MCU.

Overview

This example demonstrates the use cases of the watchdog timer (WDT) in PSoC 6 MCU: WDT enabled to reset the device, WDT as a Deep Sleep wakeup source, and WDT generating a periodic interrupt.

Requirements

Tool: PSoC Creator™ 4.2

Programming Language: C (Arm® GCC 5.4-2016-q2-update, Arm MDK 5.22)

Associated Parts: All PSoC 6 MCU parts

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

Design

The design shown in Figure 1 consists of a PSoC Creator Global Signal Reference Component and a System Interrupt Component (WDTIsr). GlobalSignal_1 is configured to connect a WDT interrupt signal to WDTIsr. The WDT counter generates an interrupt every 250 ms and a device reset on a third unserved interrupt.

At the beginning of the main function, the reset cause is determined. If the reset is due to power up or XRES, RED_LED_RESET is flashed for 0.7 s. If the reset cause is the third unserved interrupt from WDT, GREEN_LED_WDT_RESET is flashed for 0.7 s. WDT interrupt is serviced for ten iterations following device startup. For each interrupt from the WDT counter, BLUE_LED_WDT_INT is toggled in WDTIsr.
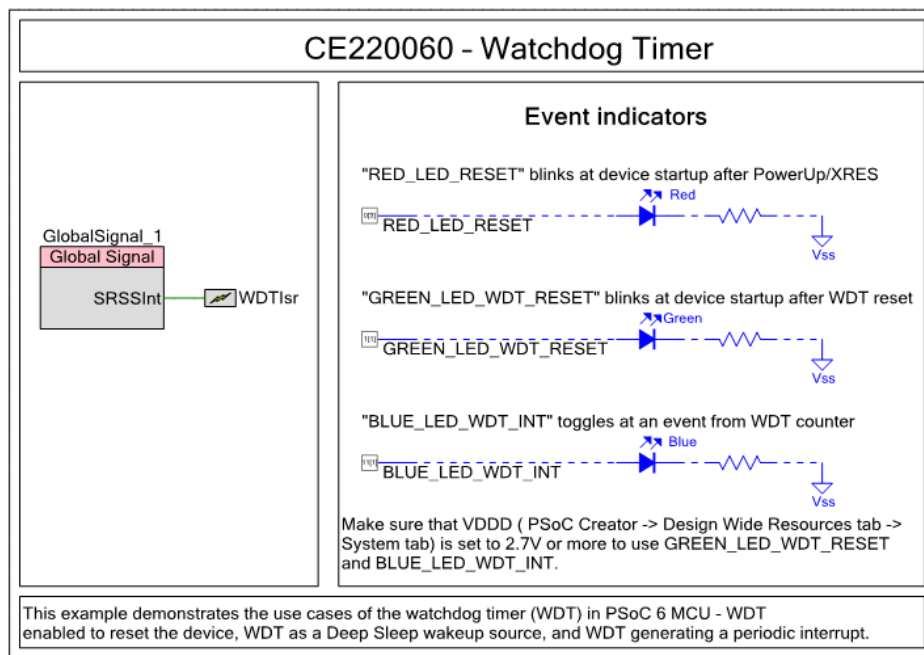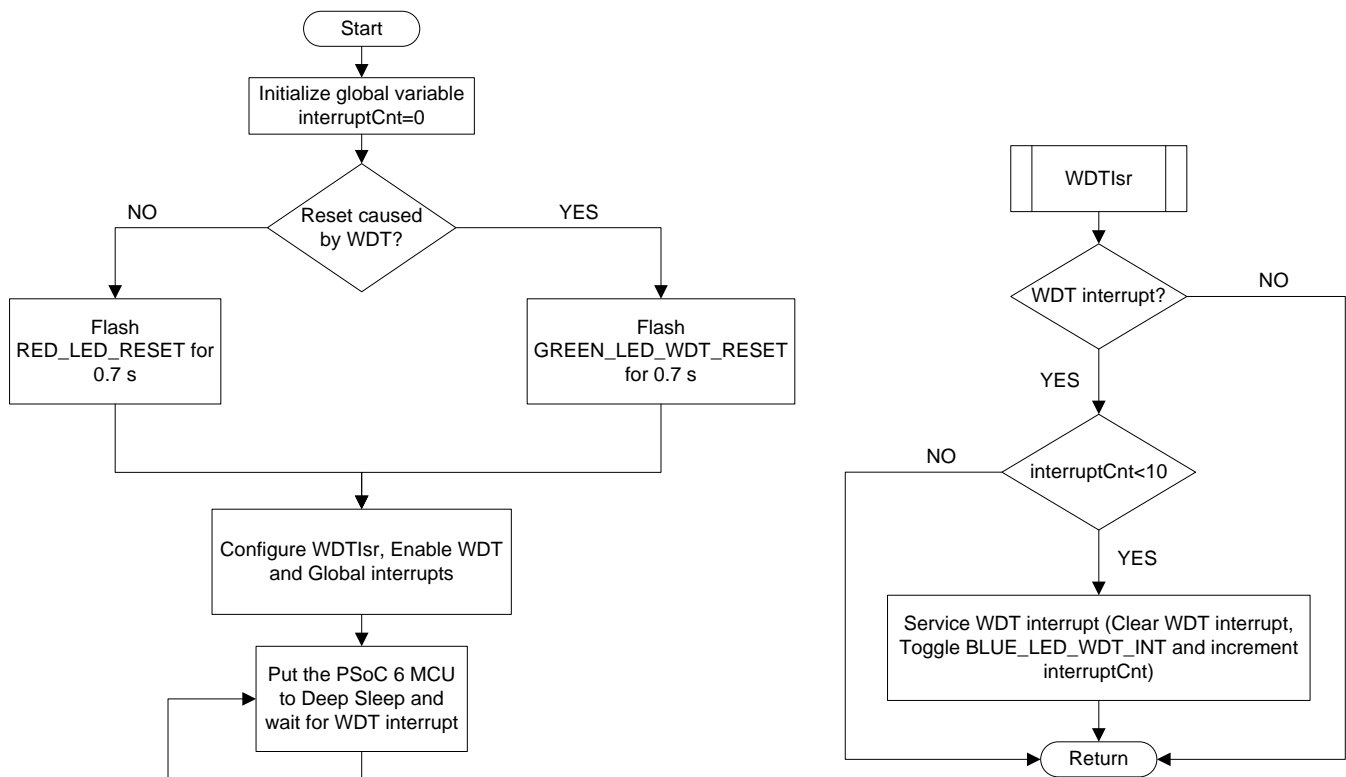
Figure 1. WDT Watchdog Example Schematic

Figure 2 shows the firmware flowchart.

Figure 2. Firmware Flowchart

Design Considerations

This code example is designed to run on CY8CKIT-062-BLE with the PSoC 6 MCU device. To port the design to other PSoC 6 MCU family devices and kits, you must change the target device in Device Selector, and change the pin assignments in the *cydwr* settings. For single-core PSoC 6 MCU devices, port the code from *main_cm4.c* to *main.c* file as CM0+ CPU is not used in this code example.

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. Connect CY8CKIT-062 BLE to a USB port on your PC.

2. Build and program the WDT Watchdog application into CY8CKIT-062 BLE. For more information on building a project or programming a device, see PSoC Creator Help.

3. Probe the following signals on an oscilloscope – RED_LED_RESET (P0[3]), GREEN_LED_WDT_RESET (P1[1]) and BLUE_LED_WDT_INT (P11[1]). Confirm that LED outputs match with Figure 3.

Figure 3 shows the expected LED output. LED signals are active LOW.

Figure 3. Expected LED Output

(A) Device StartUp after XRES

(B) Event from WDT counter

(C) Device Startup after WDT reset
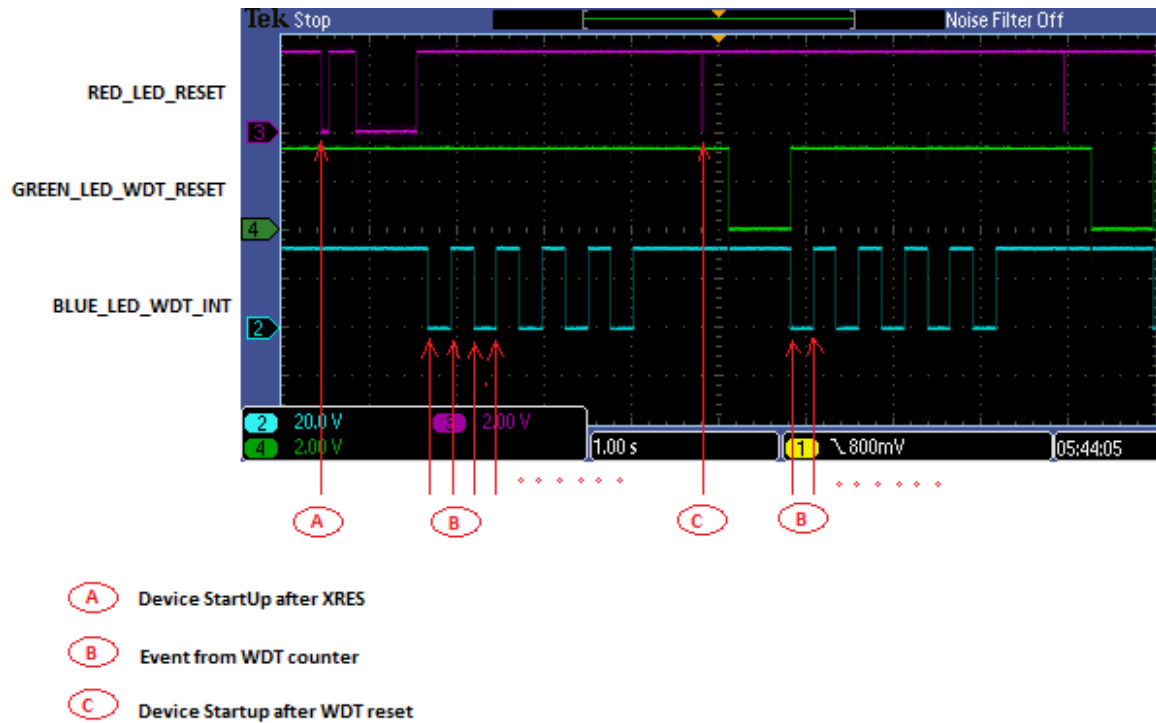
Components

Table 1 lists the PSoC Creator Components used in this example and the hardware resources used by each Component.

Table 1. PSoC Creator Components

Component	Instance Name	Hardware Resources
Global Signal Reference (GSRef)	GlobalSignal_1	None
System Interrupt (SysInt)	WDTIsr	One entry in the device interrupt vector table

Parameter Settings

Non-default settings for each Component are outlined in red in the following figures.

GlobalSignal_1 Component parameter settings are shown in Figure 4.

Figure 4. GlobalSignal_1 Component Parameter Settings
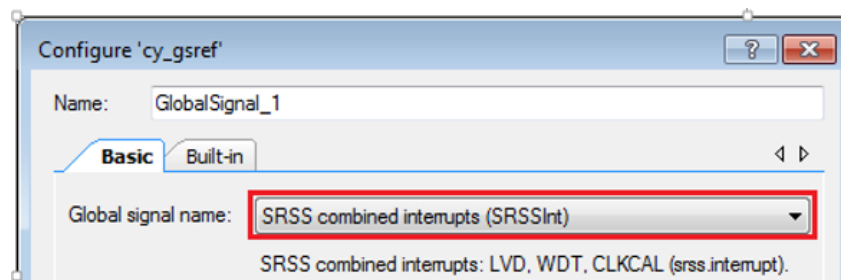
Design-Wide Resources

Make sure that V_{DDD} (**PSoC Creator** > **Design Wide Resources** tab > **System** tab) is set to 2.7 V or more to use BLUE_LED_WDT_INT and GREEN_LED_WDT_RESET.

Table 2 shows the pin assignment for the code example.

Table 2. Pin Names and Location

Pin Name	Location
BLUE_LED_WDT_INT	P11[1]
GREEN_LED_WDT_RESET	P1[1]
RED_LED_RESET	P0[3]

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	
Global Signal Reference	Connections to device global signals
System Interrupt	Interrupt vectoring and control
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
*A	5856603	VJYA	08/23/2017	Initial public release
*B	5918159	VJYA	11/03/2017	Updated project name

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