CE220608 – PSoC 6 MCU Multi-Counter Watchdog Timer in Watchdog Mode

Objective

This example demonstrates how to use the PSoC® 6 MCU Multi-Counter Watchdog Timer (MCWDT) in watchdog mode.

Overview

The example starts an MCWDT counter in watchdog mode, clears the watchdog until a button is pressed, then the device is put into Deep Sleep mode. After the watchdog reset, an LED is flashed to confirm that the watchdog reset has occurred.

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 has an MCWDT_PDL PSoC Creator Component (MCWDT_0). MCWDT_0 has two 16-bit counters (Counter0 and Counter1) and one 32-bit counter (Counter2). Counter0 is configured to generate an interrupt on match, with a period of 488 ms. If the interrupt occurs three times without being cleared, then the system is reset. Counter0 is clocked by LFCLK (nominal 32 kHz). Counter1 and Counter2 are not used. ERROR_REDLED indicates MCWDT_0 initialization status. RESET_GREENLED flashes at device start-up, due to POR, XRES, or MCWDT reset. INTR_BLUELED toggles if MCWDT_0 Counter0 interrupt is serviced.

Figure 1. MCWDT Watchdog Example Schematic

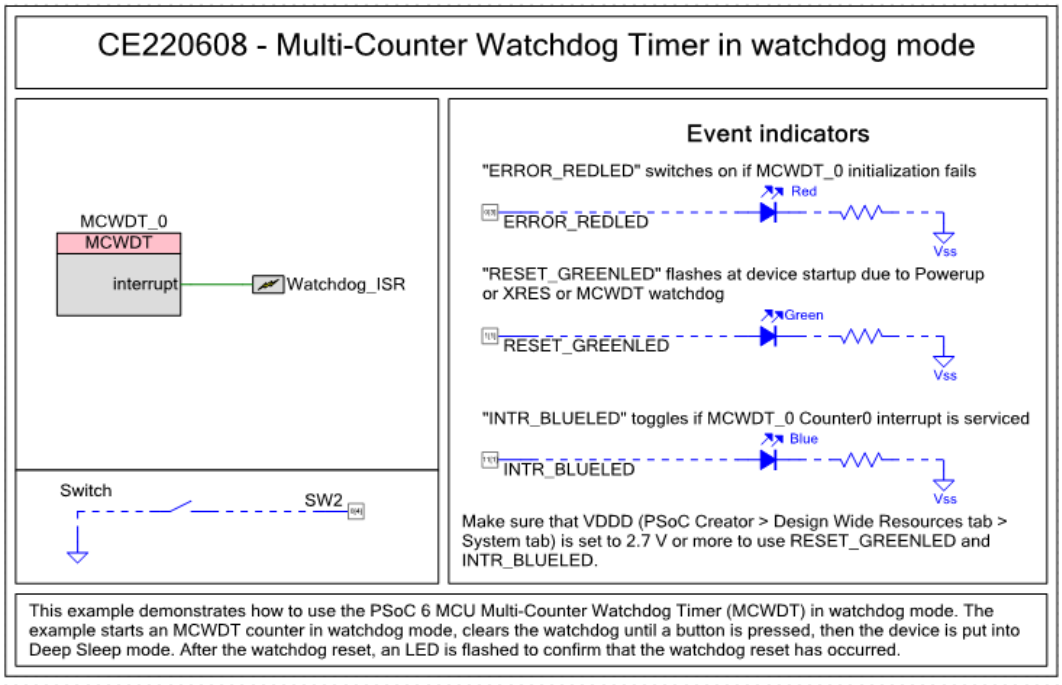
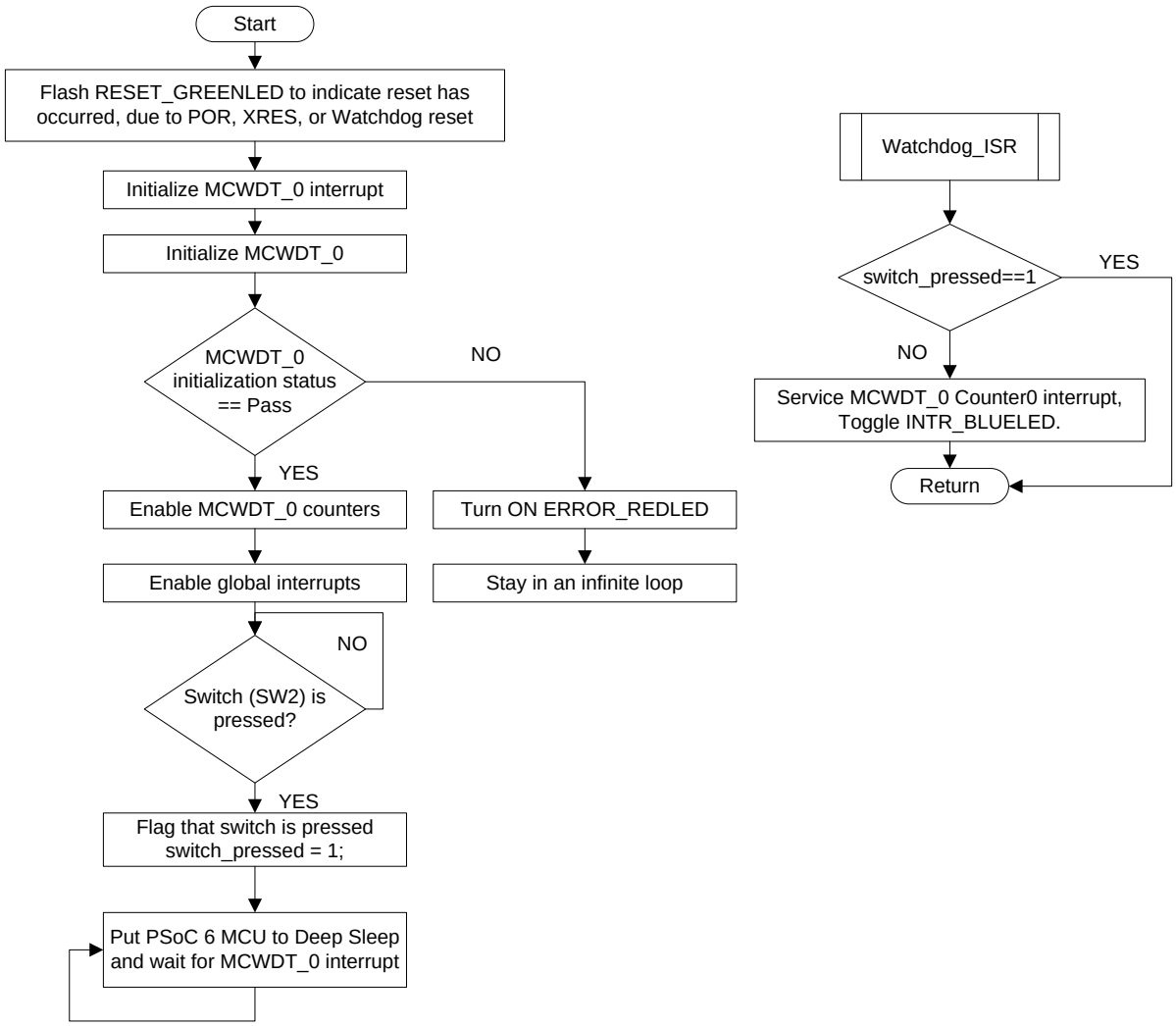


Figure 2 shows the firmware flowchart.

Figure 2. Firmware Flowchart



Design Considerations

This code example is designed to run on CY8CKIT-062-BLE with PSoC 6 MCU. To port the design to other PSoC 6 MCU devices and kits, change the target device in Device Selector, and change the pin assignments in the ***cydwr*** settings. For single-core PSoC 6 MCUs, port the code from *main_cm4.c* to *main.c* file because 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.

Make sure that the switch "SW5" is set to select "3.3V" as VDD on the CY8CKIT-062-BLE PSoC 6 BLE Pioneer Kit.

Operation

1. Connect CY8CKIT-062-BLE to a USB port on your PC.
2. Build and program the application into CY8CKIT-062-BLE. For more information on building a project or programming a device, see PSoC Creator Help.
3. Observe that RESET_GREENLED flashes to indicate a reset has occurred due to POR or XRES or watchdog reset.
4. Observe that INTR_BLUELED toggles to indicate that the MCWDT_0 Counter0 interrupt is serviced.
5. Press and release the switch (SW2) to make the firmware to stop servicing the MCWDT_0 Counter0 interrupt.
6. Observe that RESET_GREENLED flashes to indicate a reset has occurred due to POR or XRES or watchdog 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

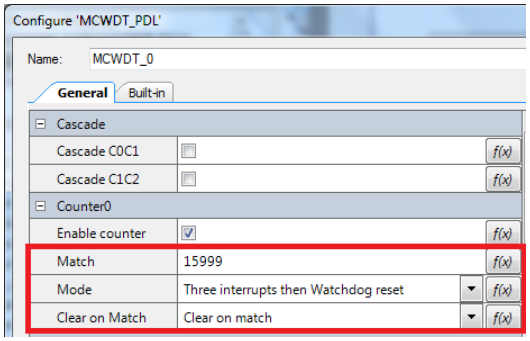
Component	Instance Name	Hardware Resources
Multi-Counter Watchdog (MCWDT_PDL)	MCWDT_0	One MCWDT block
System Interrupt (SysInt)	Watchdog_ISR	One entry in the device interrupt vector table
General-Purpose Input / Output (GPIO)	SW2, ERROR_REDLED, RESET_GREENLED, INTR_BLUELED	Four physical pins

Parameter Settings

Non-default settings for each Component is outlined in red in the following figure.

Figure 3 shows the MCWDT_0 Component parameter settings.

Figure 3. MCWDT_0 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 RESET_GREENLED and INTR_BLUELED.

Table 2 shows the pin assignment for the code example.

Table 2. Pin Names and Location

Pin Name	Location
ERROR_REDLED	P0[3]
INTR_BLUELED	P11[1]
RESET_GREENLED	P1[1]
SW2	P0[4]

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	
MCWDT_PDL	Supports Multi-Counter Watchdog with two 16-bit counters and one 32-bit counter
System Interrupt	Interrupt vectoring and control
General-Purpose Input / Output	Supports Analog, Digital I/O and Bidirectional signal types
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
**	5858253	VJYA	08/24/2017	New Code Example
*A	5918187	VJYA	11/03/2017	Updated project name
*B	6003203	VJYA	12/22/2017	Updated to the latest PSoC Creator build

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