Please note that Cypress is an Infineon Technologies Company.
The document following this cover page is marked as “Cypress” document as this is the company that originally developed the product. Please note that Infineon will continue to offer the product to new and existing customers as part of the Infineon product portfolio.

Continuity of document content
The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

Continuity of ordering part numbers
Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.

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

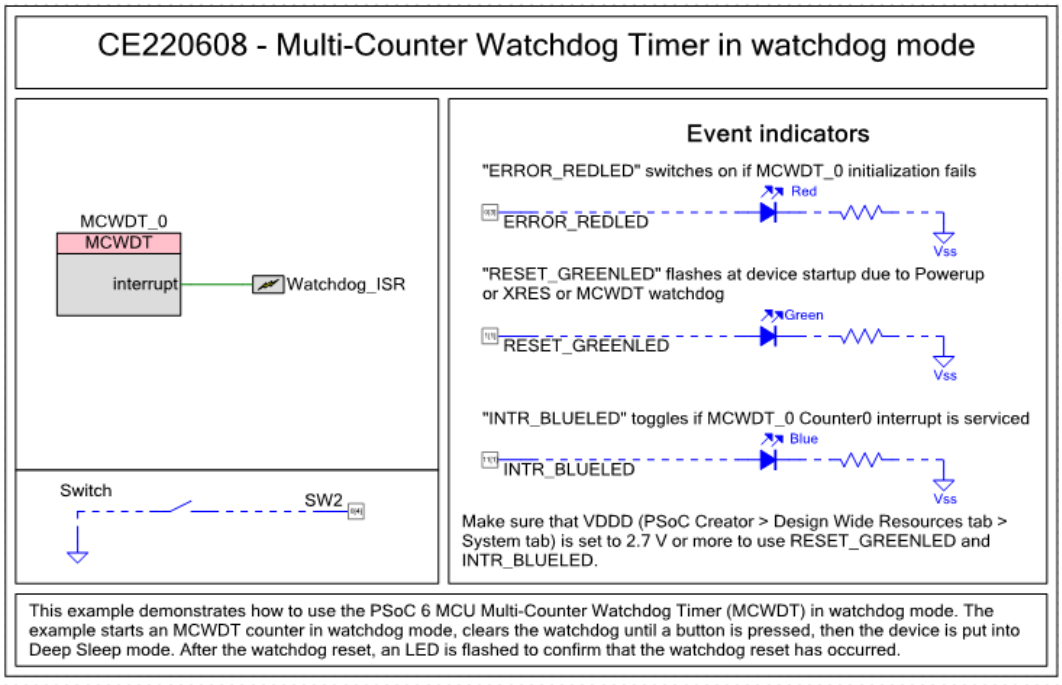
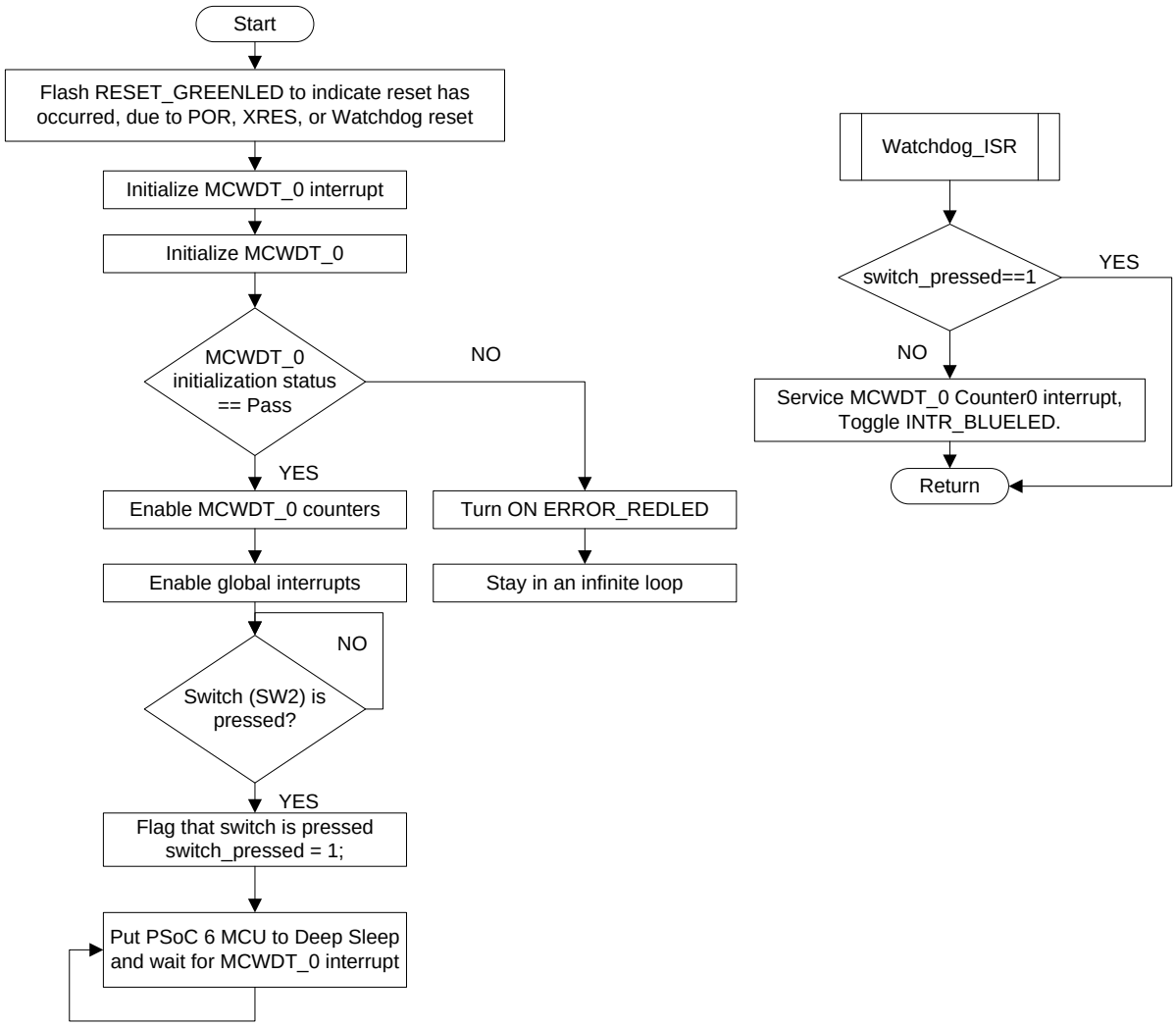


Figure 2 shows the firmware flowchart.

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

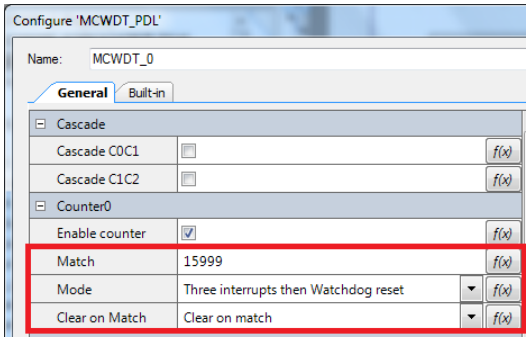
Component	Instance Name	Hardware Resources
Multi-Counter Watchdog (MCWDT_PDL)	MCWDT_0	One MCWDT block
System Interrupt (SysInt)	Watchdog_ISR	One entry in the device interrupt vector table
General-Purpose Input / Output (GPIO)	SW2, ERROR_REDLED, RESET_GREENLED, INTR_BLUELED	Four physical pins

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

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

Document Number: 002-20608

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

Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at Cypress Locations.

Products

Arm® Cortex® Microcontrollers	cypress.com/arm
Automotive	cypress.com/automotive
Clocks & Buffers	cypress.com/clocks
Interface	cypress.com/interface
Internet of Things	cypress.com/iot
Memory	cypress.com/memory
Microcontrollers	cypress.com/mcu
PSoC	cypress.com/psoc
Power Management ICs	cypress.com/pmic
Touch Sensing	cypress.com/touch
USB Controllers	cypress.com/usb
Wireless Connectivity	cypress.com/wireless

PSoC® Solutions

PSoC 1 | PSoC 3 | PSoC 4 | PSoC 5LP | PSoC 6 MCU

Cypress Developer Community

Forums | WICED IOT Forums | Projects | Videos | Blogs | Training | Components

Technical Support

cypress.com/support

All other trademarks or registered trademarks referenced herein are the property of their respective owners.

Cypress Semiconductor
198 Champion Court
San Jose, CA 95134-1709

© Cypress Semiconductor Corporation, 2017. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No computing device can be absolutely secure. Therefore, despite security measures implemented in Cypress hardware or software products, Cypress does not assume any liability arising out of any security breach, such as unauthorized access to or use of a Cypress product. In addition, the products described in these materials may contain design defects or errors known as errata which may cause the product to deviate from published specifications. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, WICED, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit cypress.com. Other names and brands may be claimed as property of their respective owners.