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CE220498 – PSoC 6 MCU - Free-Running Multi-Counter Watchdog Timer

Objective

This example demonstrates the operation of PSoC® 6 MCU multi-counter watchdog timer (MCWDT) counters in free-running mode.

Overview

This example shows how to use MCWDT counters in free-running mode to measure the time between two presses of a switch.

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 and Counter1 are configured in free-running mode. Counter0 is clocked by LFCLK (nominal 32 kHz) and Counter1 is clocked from Counter0 cascade. Counter1 and Counter0 count from 0x0 to 0xFFFFFFFF, which is equivalent to 131,072 sec (~1.5 day). The 32-bit counter, Counter2, is not used.

The switch SW2 is used as key press input. The UART Component outputs display messages to a terminal window. It is configured for 8N1, transmit only, at 115.2 kbps. The ERROR_LED indicates UART initialization status.

Figure 1. Free Running MCWDT Example Schematic

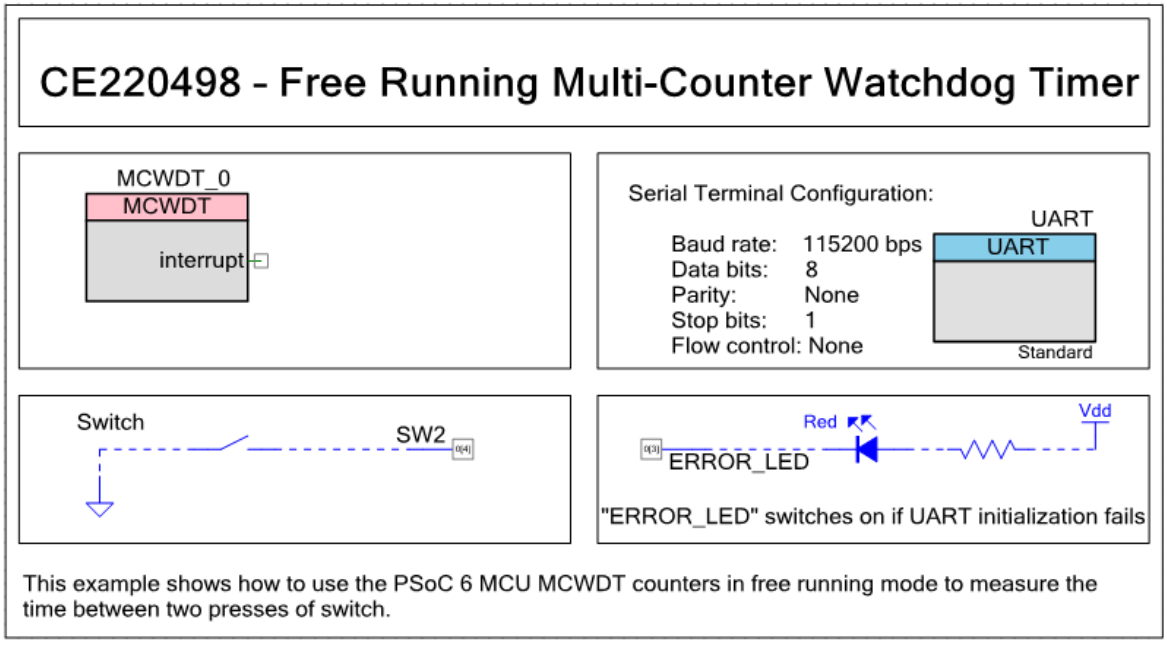
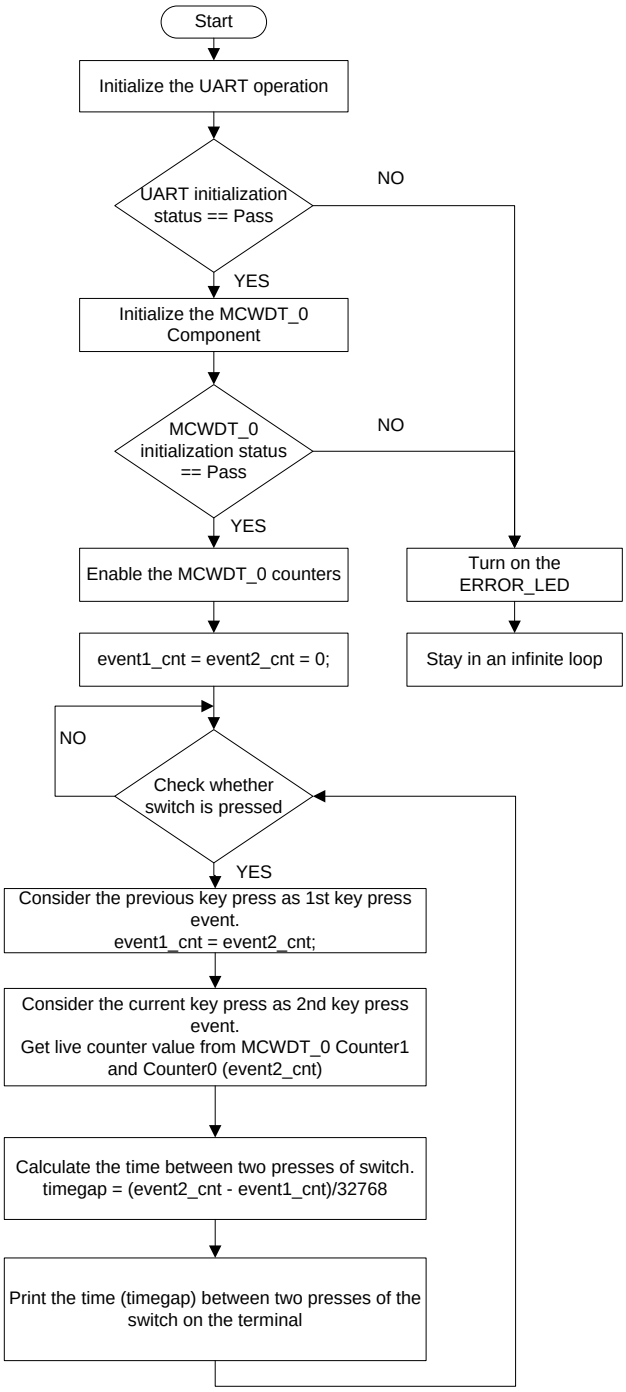


Figure 2 shows the firmware flowchart.

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. Open a serial port communication program such as Tera Term and select the corresponding COM port. Configure the terminal to match the configuration of the PSoC Creator UART Component in the project.
3. Build and program the application into CY8CKIT-062 BLE. For more information on building a project or programming a device, see PSoC Creator Help.
4. Press and release the switch twice, with random time delay between the presses, and observe the time between the presses on the terminal.

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

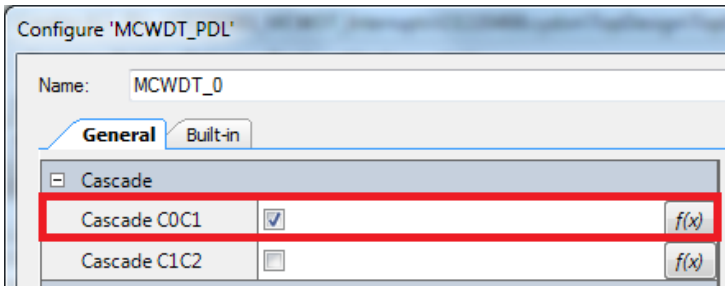
Component	Instance Name	Hardware Resources
Multi-Counter Watchdog (MCWDT_PDL)	MCWDT_0	One MCWDT block
UART (SCB_UART_PDL)	UART	Single SCB peripheral block
General-Purpose Input / Output (GPIO)	ERROR_LED, SW2	2 physical pins

Parameter Settings

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

Figure 3 shows the MCWDT_0 Component parameter setting.

Figure 3. MCWDT_0 Component Parameter Setting



Design-Wide Resources

Table 2 shows the pin assignment for the code example.

Table 2. Pin Names and Location

Pin Name	Location
UART:tx	P5[1]
ERROR_LED	P0[3]
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	Supports Multi-Counter Watchdog with two 16-bit counters and one 32-bit counter
UART	Supports UART communication
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
**	5856611	VJYA	08/23/2017	New code example
*A	5918162	VJYA	11/03/2017	Updated project name
*B	6003201	VJYA	12/22/2017	Updated to latest PSoC Creator build

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