CE216112 – FM0+ Periodic Dual Timer Interrupt

The Dual Timer (DT) generates a periodic interrupt once per second and the callback function toggles an LED.

Overview

This application uses the Dual Timer (DT) to blink an LED. The timer channel is configured to generate an interrupt every second and the callback function toggles the pin.

Requirements

Tool: PSoC Creator 4.0 and Peripheral Driver Library (PDL) 2.1.0

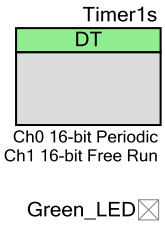
Programming Language: C (GCC 4.9.3)

Associated Parts: All S6E1 parts

Related Hardware: FM0-V48-S6E1A1 and FM0-64L-S6E1C3

Design

The schematic file includes the DT and a GPIO component, renamed as shown below.



The firmware performs following functions:

1. Initialize the LED (off) and DT
2. Set the DT load value, enable the interrupt, and start counting
3. Loop forever
4. Toggle the LED in the interrupt callback function

Design Considerations

Channel 1 Not Supported

The DT driver in PDL 2.1.0 (and earlier) has a defect that makes channel 1 unusable. You should not use channel 1 in your project. A future release of PDL shall fix the defect. Contact Cypress technical support for more information.

PDL Installation

The project assumes that you have installed the PDL in the location specified in the **Project Management** panel of the **Tools** > **Options** dialog. If that location is incorrect you will see the build error “The given PDL path is invalid. Unable to find required PDSC file.” To correct this problem in a newly-created project, open the **Project** > **Properties** dialog and enter the correct path to the PDL. To avoid the problem in projects you create in the future, make sure you put the correct path in the **Tools** > **Options** dialog.

Pin Selection

The project includes control files to automatically place the LED IO onto the appropriate pin for the supported kit hardware. To change the pin selection, delete the control file or over-ride the control file selection in the Design Wide Resources Pin Editor.

Hardware Setup

The GPIO is connected to a green LED.

Table 1 lists the pin connections required to use this code example on FM0+ kits.

Table 1. List of Pins

Pin	FM0-V48-S6E1A1	FM0-64L-S6E1C3
Green_LED:GPIO	P61	P3E

Components

Table 2 lists the PSoC Creator Components used in this example, as well as the hardware resources used by each.

Table 2. List of PSoC Creator Components

Component	Version	Hardware Resources
PDL_DT	1.0	DT block (2 channels)
PDL_GPIO	1.0	GPIO pin

Parameter Settings

Table 3 shows the parameter settings for the Timer1s component.

Table 3. Timer1s Component Parameters

Tab	Parameter	Value
Timer	u8Ch0Mode	Periodic
	enCh0PrescalarDiv	256
Interrupt	bCh0IrqEnable	true
	bCh0TouchNvic	true

Operation

The green LED toggles once per second (0.5 Hz).

Related Documents

Table 4 lists relevant application notes, code examples, knowledge base articles, device datasheets, and Component datasheets.

Table 4. Related Documents

PSoC Creator Component Datasheets	
PDL_ADC	Supports scan and priority conversions on multiple channels (right-click on the component to access)
PDL_GPIO	Supports firmware access to physical pins (right-click on the component to access)
Device Documentation	
S6E1A	FM0+ S6E1A-Series 5V Robust ARM® Cortex®-M0+ Microcontroller (MCU) Family
S6E1C	FM0+ S6E1C-Series Ultra Low Power ARM® Cortex®-M0+ Microcontroller (MCU) Family
Development Kit (DVK) Documentation	
FM0-V48-S6E1A1	ARM® Cortex®-M0+ FM0+ MCU Evaluation Board
FM0-64L-S6E1C3	ARM® Cortex®-M0+ MCU Starter Kit with USB and Digital Audio Interface

Document History

Document Title: CE216112 - FM0+ Periodic Dual Timer Interrupt

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5408342	YFS	08/29/16	New Code Example.
*A	5448694	YFS	9/29/16	Added workspace file.
*B	5775339	YFS	6/15/17	Added search keyword so that user can quickly find Code Examples from the component instance popup menu. Updated logo and copyright date.
*C	5987652	YFS	12/7/17	Removed S6E1B support.

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