CE215892 — FM0+ EXINT Toggling LED

The EXINT (External Interrupt) Component triggers an interrupt service routine that toggles the green LED.

Overview

A user switch (SW2) is used to trigger an external interrupt (EXINT) on a falling edge. The interrupt callback handler toggles the state of the green LED on every press.

Requirements

Tool: PSoC Creator 4.0

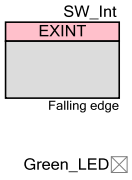
Programming Language: C (GCC 4.9.3)

Associated Parts: All S6E1C parts

Related Hardware: FM0-64L-S6E1C3

Design

The schematic file includes the EXINT and a GPIO Component, renamed as shown below. The EXINT Component is configured to generate an interrupt on a falling edge (switch pressed).



The firmware performs following functions:

1. Initialize the LED (off) for read and write
2. Set up the EXINT configuration struct
3. Select the pin for the EXINT interrupt
4. Initialize the SW pin interrupt and wait for switch presses
5. Toggle the LED in an ISR when the switch is pressed

Design Considerations

Pin Selection

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

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.

Hardware Setup

The EXINT is connected to a switch (active low) on the kit hardware. The GPIO is connected to the green LED.

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

Table 1. List of Pins

Pin	FM0-64L-S6E1C3
SW_Int:INT0	P30
Green_LED:GPIO	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_EXINT	1.0	GPIO pin (not NMI)
PDL_GPIO	1.0	GPIO pin

Parameter Settings

The EXINT Component uses default parameter settings, with these exceptions.

Table 3: Component Settings

Tab	Setting	Value
None	Name	SW_Int
Basic	enLevel	ExIntFallingEdge

Operation

Pressing the user switch (SW2) will cause the green LED to toggle on/off.

Related Documents

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

Table 4. Related Documents

PSoC Creator Component Datasheets	
PDL_EXINT	Supports external interrupts and NMI from pins (right-click on the component to access)
PDL_GPIO	Supports firmware access to physical pins (right-click on the component to access)
Device Documentation	
S6E1C	FM0+ S6E1C-Series Ultra Low Power ARM® Cortex®-M0+ Microcontroller (MCU) Family
Development Kit (DVK) Documentation	
FM0-64L-S6E1C3	ARM® Cortex®-M0+ MCU Starter Kit with USB and Digital Audio Interface

Document History

Document Title: CE215892 - FM0+ EXINT Toggling LED

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5397565	YFS	08/29/16	New Code Example.
*A	5448660	YFS	9/29/16	Added workspace file.
*B	5775164	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	5987575	YFS	12/7/17	Removing S6E1B support.

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