CE216031 – FM0+ GPIO Driving LEDs

This application cycles an RGB LED through 8 colors when SW2 is pressed.

Overview

This is a 3-bit counter that increments when the SW2 user switch is pressed. The count value is displayed on an RGB LED with the colors red (001), green (010), yellow (011), blue (100), magenta (101), cyan (110), white (111) and "black" (000). When the switch is pressed the LEDs are read, the bits are toggled on/off, and the new value written back to the LEDs. This demonstrates the use of GPIO for input and output and shows how to read the state of an output pin.

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 four GPIO components, renamed as shown below.



The firmware performs following functions:

1. Initialize the LED GPIOs (off) and enable read
2. Initialize the switch GPIO (pulled up)
3. Detect a switch press event
4. Read and update the state of the pins to simulate a 3-bit counter

Design Considerations

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 GPIO onto the appropriate pins 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.

Hardware Setup

The GPIO are connected to the SW2 switch and the red, green, and blue LEDs.

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

Table 1. List of Pins

Pin	FM0-64L-S6E1C3
Red_LED:GPIO	P3D
Green_LED:GPIO	P3E
Blue_LED:GPIO	P3F
SW2:GPIO	P30

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_GPIO	1.0	GPIO pin

Parameter Settings

All the components use their default parameter settings. Only the component instance names have been changed for readability.

Operation

Press the SW2 user switch repeatedly and observe the changes to the LED color.

Related Documents

Table 3 lists all relevant application notes, code examples, knowledge base articles, device datasheets, and Component datasheets.

Table 3. Related Documents

PSoC Creator Component Datasheets	
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: CE216031 - FM0+ GPIO Driving LEDs

Document Number: 002-16031

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5401642	YFS	08/25/16	New Code Example.
*A	5448681	YFS	9/29/16	Added workspace file.
*B	5775269	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	5987583	YFS	12/7/17	Removing S6E1B support.

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