

This application demonstrates how to exit low power mode with a WKUP event.

Overview

The application reports wakeup (WKUP) reset events from low power mode with the red and blue LEDs. Firmware waits until the user presses the user switch (SW2) and then goes into low power (stop) mode indefinitely. A low level signal on either of the WKUP pins resets the device and firmware reports the wakeup source (reset cause) on the LEDs.

Requirements

Tool: PSoC Creator 4.0 and Peripheral Driver Library (PDL) 2.1

Programming Language: C (GCC 4.9.3)

Associated Parts: All S6E1B parts

Related Hardware: [FM0-100L-S6E1B8](#)

Design

The schematic file includes the LPM and two GPIO Components, renamed as shown below.



The firmware performs following functions:

1. Initialize the LEDs (off) and user switch (up)
2. If WKUP00 caused a reset, light the red LED
3. If WKUP11 caused a reset, light the blue LED
4. Light the green LED and wait for user to press SW2
5. Turn off the green LED and enter Deep Standby Stop Mode

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.

Hardware Setup

The LED GPIO are connected to the RGB LED. The SW2 GPIO is connected to the SW2 switch.

The two WKUP sources are connected to physical pins available on the kit headers. These pins should be connected with jumper wires to 3.3 V sources, which are also available on the headers. P0F (WKUP00) is pin 3 of CN14. P36 (WKUP11) is pin 1 of CN9 (also labelled D0).

Table 1 lists the pin connections required to use this code example on FM0-100L-S6E1B8 kits.

Table 1. List of Pins

Pin	FM0-100L-S6E1B8
LPM:WKUP00	P0F
LPM:WKUP11	P36
Red_LED:GPIO	P3D
Green_LED:GPIO	P3E
Blue_LED:GPIO	P3F
SW2:GPIO	P08

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_LPM	1.0	None
PDL_GPIO	1.0	GPIO pin

Parameter Settings

The GPIO and Components use their default parameter settings. Only the component instance names have been changed for readability.

The LPM Component uses mostly default parameter settings, with the following modifications.

Table 3: EXINT Component Settings

Tab	Setting	Value
None	Name	EXINT
Basic	WKUP00	true
Basic	WKUP11	true

Operation

Make the jumper wire connections as described in Hardware Setup above (power should be detached from the kit).

After programming, power up, or reset, the application lights the green LED and waits for the user to press the SW2 switch.

Press the switch to enter low power mode. The application turns off the LED to indicate that it is in the low power mode.

Move the P0F wire from a 3.3 V source to GND. The red LED lights to indicate a WKUP00 event.

Replace the wire onto the 3.3 V source, reset the kit, and press the user switch to enter the low power mode again.

Move the P36 wire from a 3.3 V source to GND. The blue LED lights to indicate a WKUP11 event.

Replace the wire onto the 3.3 V source and reset to repeat either WKUP test.

Note: The device is not programmable via CMSIS-DAP in low power mode. Always wake the device from the low power state to enable the programmer/debugger to gain control. If you modify this project such that your device cannot exit low power mode use the Cypress Flash MCU Programmer to re-program the device.

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_LPM	Includes the low power mode API (right-click on the Component to access)
PDL_GPIO	Supports firmware access to physical pins (right-click on the Component to access)
Device Documentation	
S6E1B	FM0+ S6E1B-Series Ultra Low Power ARM® Cortex®-M0+ Microcontroller (MCU) Family
Development Kit (DVK) Documentation	
FM0-100L-S6E1B8	ARM® Cortex®-M0+ MCU Starter Kit with USB and SD Card Interface

Document History

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5443173	YFS	09/20/16	New Code Example.
*A	5453500	YFS	09/28/16	Moved the PDF file.
*B	5457790	YFS	9/30/16	Changed the wakeup source from WKUP03 to WKUP11, which is more accessible on the header.
*C	5494787	YFS	10/26/16	Corrected the POF connection to use CN14 pin 3.
*D	5776651	YFS	6/16/17	Added search keyword so that user can quickly find Code Examples from the component instance popup menu. Updated logo and copyright date.

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