CE216628 – FM0+ I2C Slave S6E1A

This application demonstrates I2C communication between a master (CE216627_I2C_Master_S6E1A) and slave (this project). The master periodically sends an on/off command to the slave, which controls an LED accordingly.

Overview

This Code Example requires two boards in order to show I2C communication. The master (CE216627_I2C_Master_S6E1A) connects to the slave and periodically sends single-byte commands. The slave reads these commands and turns its LED on or off as commanded.

Requirements

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

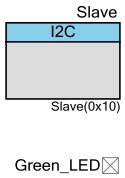
Programming Language: C (GCC 4.9.3)

Associated Parts: All S6E1A parts

Related Hardware: FM0-V48-S6E1A1

Design

The schematic file includes the MFS (I2C) and a GPIO Component, renamed as shown below.



The firmware performs following functions:

1. Initialize the slave LED (off)
2. Select the I2C pins
3. Initialize the MFS block for I2C
4. Wait for an address match on the bus
5. Check the transmission is from master to slave
6. Read the one-byte command
7. Write to the LED
8. Wait for another command (step #4)

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 is connected to a green LED.

The I2C pins are connected to header CN5-1 on the kit. SCK (SCL) is pin 4 and SOT (SDA) is pin 3. It is good practice to also connect GND between the kits using pin 24 on CN5-1 (or another convenient GND pin).

Table 1 lists the pin connections required to use this code example on FM0-V48-S6E1A1 kits.

Table 1. List of Pins

Pin	FM0-V48-S6E1A1
Green_LED:GPIO	P61
Slave:SCK	P52
Slave:SOT	P51

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_MFS	1.0	MFS block in I2C mode
PDL_GPIO	1.0	GPIO pin

Parameter Settings

The “Multi-Function Serial I2C” component macro uses mostly default parameter settings, with the following modifications.

Table 3: Component Settings

Tab	Setting	Value
None	Name	Slave
Basic	MFSConfig	I2C
I2C	enI2cMsMode	Slave
	u8SlaveAddress	0x10
	u8SlaveMaskAddr	0x00

Operation

Make the wiring connections between two kits as described in Hardware Setup above (power should be detached from the kits).

Connect the kits to your PC using the USB cables. Program one kit with the master (CE216627_I2C_Master_S6E1A) and another with the slave (this project). The application blinks the green LED on both kits in unison.

If the application does not work immediately press and hold the reset buttons on both kits, then release the slave kit, followed by the master. This ensures that the slave is “listening” when the master initiates communication.

Note that it is also possible to use this slave with master projects on the FM0-64L-S6E1C3 and FM0-100L-S6E1B8 kits. You must carefully wire the SDA and SCL pins according to the documentation for each kit.

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_MFS	Supports I2C, UART, LIN and CSIO (SPI) modes (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 5 V Robust ARM® Cortex®-M0+ Microcontroller (MCU) Family
Development Kit (DVK) Documentation	
FM0-V48-S6E1A1	ARM® Cortex®-M0+ FM0+ MCU Evaluation Board

Document History

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5437119	YFS	09/14/16	New Code Example.
*A	5453463	YFS	09/28/16	Changed the workspace folder name. Renamed the PDF file. Moved the PDF file. Corrected the Documentation entry in XML file.
*B	5776622	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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