CE220818 - PSoC 6 MCU I2C Master

Objective

This example demonstrates the use of I2C SCB (Serial Communication Block) resource for PSoC® 6 MCU in master mode. Three applications show the use of SDK APIs to communicate with I²C and EzI2C slave, using ModusToolbox™ IDE.

Requirements

Tool: ModusToolbox™ IDE 1.0

Programming Language: C

Associated Parts: All PSoC 6 MCU parts

Related Hardware: PSoC 6 BLE Pioneer Kit, PSoC 6 WiFi-BT Pioneer Kit, PSoC 6 WiFi-Prototyping Kit

Overview

The I²C master for PSoC 6 MCU is designed to send command packets to control the user LED on the slave. Three applications developed in this example are: I²C master using high-level APIs, I²C master using low-level APIs and I²C master communication with EzI2C slave.

Hardware Setup

This example uses the PSoC 6 WiFi-BT Pioneer Kit's default configuration. Refer to the kit guide to ensure the kit is configured correctly. You can also use PSoC 6 BLE Pioneer Kit or PSoC 6 WiFi-BT Stamp Board Kit by modifying the application to use the corresponding device on the board.

Note: The PSoC 6 BLE Pioneer kit and the PSoC 6 WiFi-BT Pioneer kit ship with KitProg2. ModusToolbox only works with KitProg3. Before using this code example, make sure that the kit is upgraded to KitProg3. See ModusToolbox Help > ModusToolbox IDE Documentation > User Guide; section PSoC 6 MCU KitProg Firmware Loader. If you do not upgrade, you will see an error like "unable to find CMSIS-DAP device" or "KitProg firmware is out of date".

Jumper wires are used to establish connection between the master and slave on WiFi-BT Pioneer Kit. P6[0] is connected to P9[0] and P6[1] is connected to P9[1] on the board.

Operation

1. Connect the Pioneer board to your PC using the provided USB cable through the USB connector.
2. Import the application into a new workspace. If you are unsure how to import an application, see KBA225201.
3. Build the application. Choose **Project** > **Build All**.
4. Program the PSoC 6 MCU device. Select the **mainapp** project. In the **QuickPanel**, scroll down and click the **Program Kitprog3** item.
5. Observe the KIT_LED2 blink with an interval of 1 second.

Debugging

You can debug the example to step through the code. Use the **Debug (KitProg3)** configuration. See KBA224621 to learn how to start a debug session with ModusToolbox IDE.

Design and Implementation

In all three applications, the Arm Cortex®-M4 (CM4) MCU controls both the Master and Slave SCB. Different pins are configured for SCL and SDA for Master and Slave. Master sends command packets to control the user LED (KIT_LED2).

Master APIs are divided into two categories: **Master High-Level** and **Master Low-Level**. See the SDK documentation to know more about high-level and low-level functions.

The SCB I2C resource is used in all three I2C Master applications. The Master sends different command packets to the Slave every one second. A command packet has the information to turn OFF or ON the user LED (KIT_LED2).

Resources

Table 1 lists the resources used in this example, and how they are used in the design.

Table 1. ModusToolbox Resources

Resource	Alias	Purpose	Non – Default Settings
SCB2, SCB3	mI2C, sI2C	Two SCB peripheral blocks	Figure 1, Figure 2
SCB2	sEzI2C	Single SCB peripheral block	Figure 3
GPIO	KIT_LED2	KIT_LED2	Figure 4

Parameter Settings

Non-default settings for each Resource are outlined in red in the following figures.

Figure 1. I2C Master Resource Parameter Settings

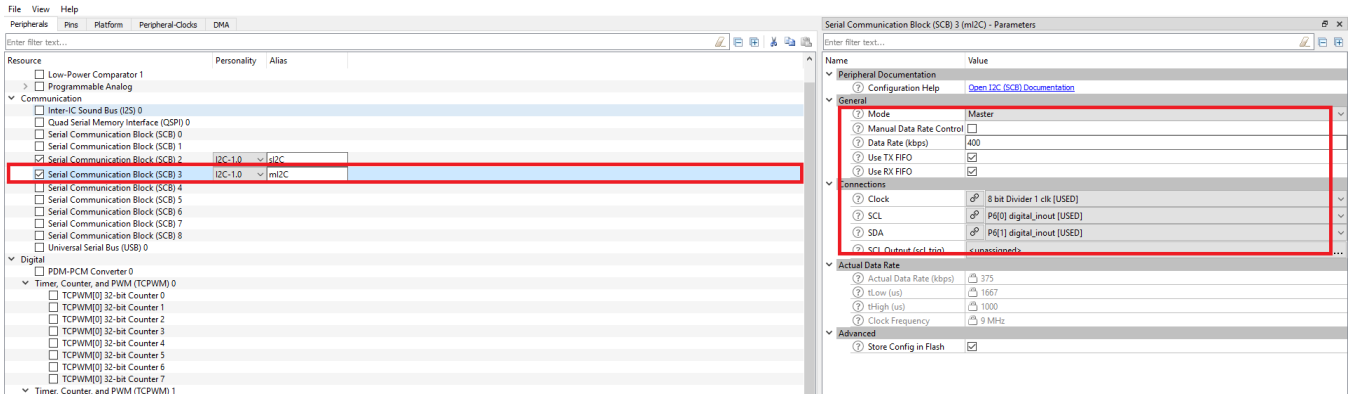


Figure 2. I2C Slave Resource Parameter Settings

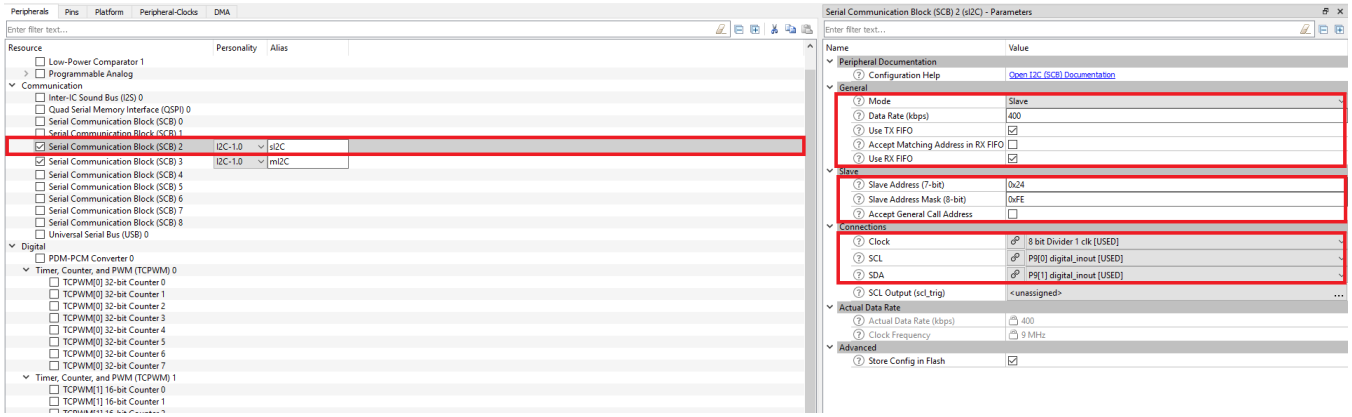


Figure 3. EzI2C Slave Resource Parameter Settings

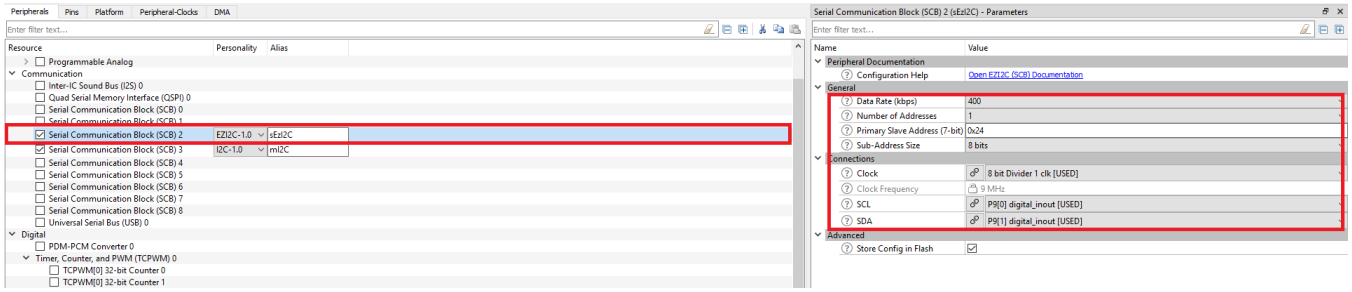
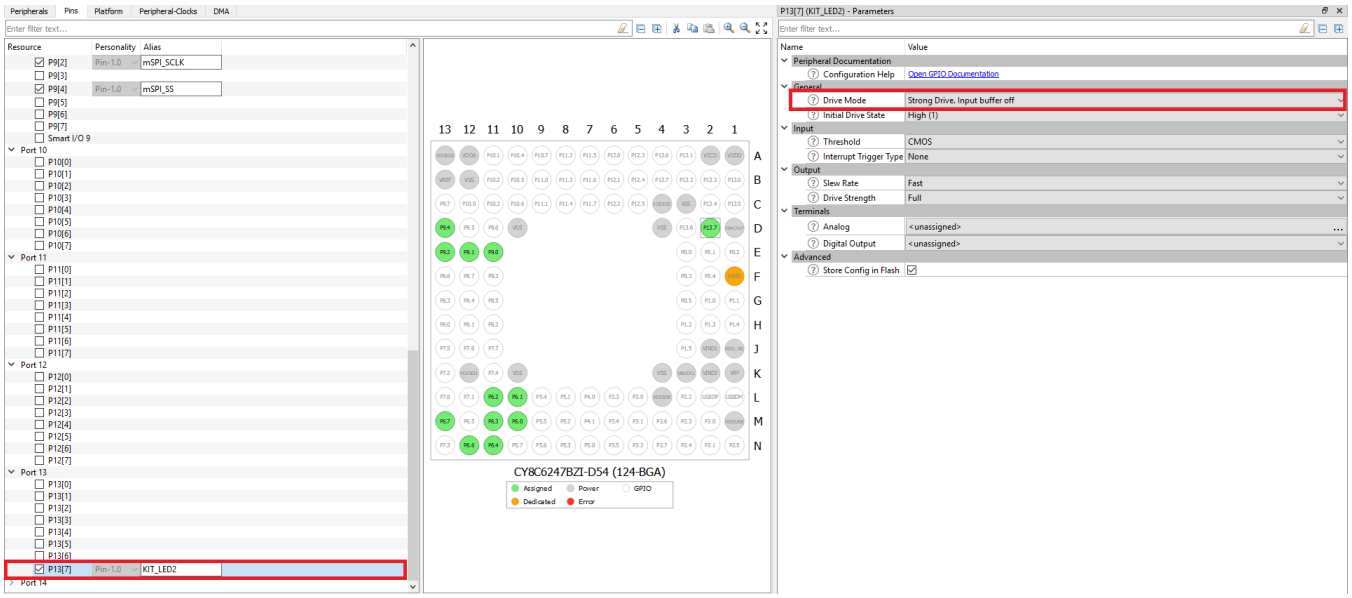


Figure 4. KIT_LED2 Configuration



Related Documents

For a comprehensive list of PSoC 6 MCU resources, see KBA223067 in the Cypress community.

Application Notes	
AN221774 - Getting Started with PSoC 6 MCU	Describes PSoC 6 MCU devices and how to build your first ModusToolbox application and PSoC Creator project.
AN210781 – Getting Started with PSoC 6 MCU with Bluetooth Low Energy (BLE) Connectivity	Describes PSoC 6 MCU with BLE Connectivity devices.
AN215656 – PSoC 6 MCU: Dual-CPU System Design	Describes the dual-CPU architecture in PSoC 6 MCU, and shows how to build a simple dual-CPU design.
Code Examples	
CE218472 - PSoC 6 MCU Comparing External Voltages Using a Low-Power Comparator	
Visit the Cypress GitHub site for a comprehensive collection of code examples using ModusToolbox IDE	
Device Documentation	
PSoC 6 MCU: PSoC 63 with BLE Datasheet	PSoC 6 MCU: PSoC 63 with BLE Architecture Technical Reference Manual
Development Kit Documentation	
CY8CKIT-062-BLE PSoC 6 BLE Pioneer Kit	
CY8CKIT-062-WiFi-BT PSoC 6 WiFi-BT Pioneer Kit	
CY8CPROTO-062-4343W PSoC 6 Wi-Fi BT Prototyping Kit	
Tool Documentation	
ModusToolbox	The Cypress IDE for IoT designers

Cypress Resources

Cypress provides a wealth of data at www.cypress.com to help you to select the right device, and quickly and effectively integrate the device into your design.

For the PSoC 6 MCU devices, see KBA223067 in the Cypress community for a comprehensive list of PSoC 6 MCU resources.

Document History

Document Title: CE220818 – PSoC 6 MCU I2C Master

Document Number: 002-25535

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	6369716	YEKT	11/02/2018	New Code Example

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