CE221773 – PSoC 6 MCU - Hello World Example

Objective

This code example demonstrates the implementation of simple UART communication and LED control using PSoC® 6 MCU. The UART and LED control tasks are executed by the Arm® Cortex®-M4 CPU of PSoC 6 MCU.

Overview

This example uses the Cortex-M4 (CM4) CPU of PSoC 6 MCU to execute two tasks: UART communication and LED control. At device reset the Cortex-M0+ (CM0+) CPU enables the CM4 CPU. The CM4 CPU uses UART Component to print a “Hello World” message in a UART terminal emulator and when the Enter Key is pressed by the user, the LED on the PSoC 6 MCU WiFi-BT Pioneer Kit starts blinking.

Requirements

Tool: PSoC Creator™ 4.2; Peripheral Driver Library (PDL) 3.0.1

Programming Language: C (Arm® GCC 5.4.1 and Arm MDK 5.22)

Associated Parts: All PSoC 6 MCU parts with dual CPU

Related Hardware: CY8CKIT-062-WiFi-BT PSoC 6 WiFi-BT Pioneer Kit, CY8CKIT-062-BLE PSoC 6 BLE Pioneer Kit

Hardware Setup

This example uses the PSoC 6 WiFi-BT Pioneer kit’s default configuration. Refer to the Kit user guide to ensure that the kit is configured correctly. You can also use PSoC 6 BLE Pioneer Kit to test this example by modifying the project to use the PSoC 6 MCU with BLE Connectivity device on the board.

Software Setup

This project uses Tera Term as a UART terminal emulator for displaying the output messages. You can use the terminal emulator software of your choice.

Operation

1. Plug the CY8CKIT-062-WiFi-BT Pioneer kit board into your computer’s USB port.
2. Build the project and program the PSoC 6 MCU device. Choose **Debug** > **Program** menu for this step. For more information on device programming, see PSoC Creator Help. Note that the flash for both CPUs is programmed in a single program operation.
3. Open a UART terminal emulator. Set the baud rate to 115200 bps.
4. Press the reset switch (SW1) on the Kit. Observe the “Hello World!!!” message on the UART terminal.
5. Press the Enter key to start blinking the LED on the kit.
6. Observe the LED blinking every second.

Figure 1. CY8CKIT-062-WiFi-BT PSoC 6 WiFi-BT Pioneer Kit

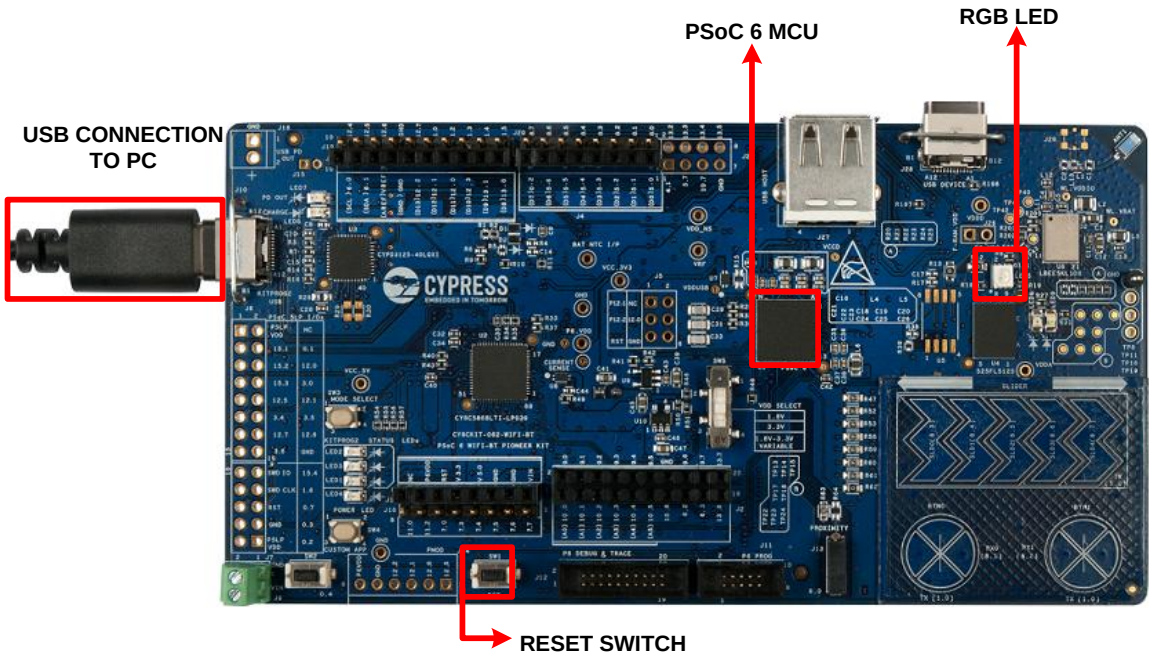
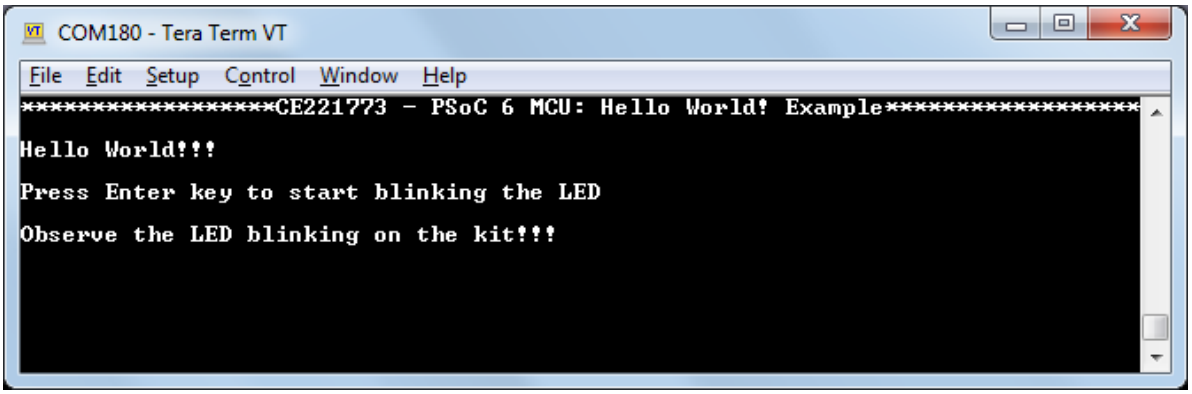


Figure 2. Output Message as Displayed on Tera Term



Design and Implementation

PSoC 6 MCU is a dual-CPU architecture MCU with Arm CM0+ and Arm CM4 CPUs. The CM0+ CPU enables the CM4 CPU on device reset. On enabling the CM4 CPU, the UART Component is started and prints a “Hello World!” message on the terminal emulator. A Timer Counter (TCPWM) Component is configured to generate an interrupt every second. At each interrupt, the CM4 CPU toggles the LED (**LED5**) state. Figure 3 shows the firmware flowchart for the design.

Figure 3. Firmware Flowchart

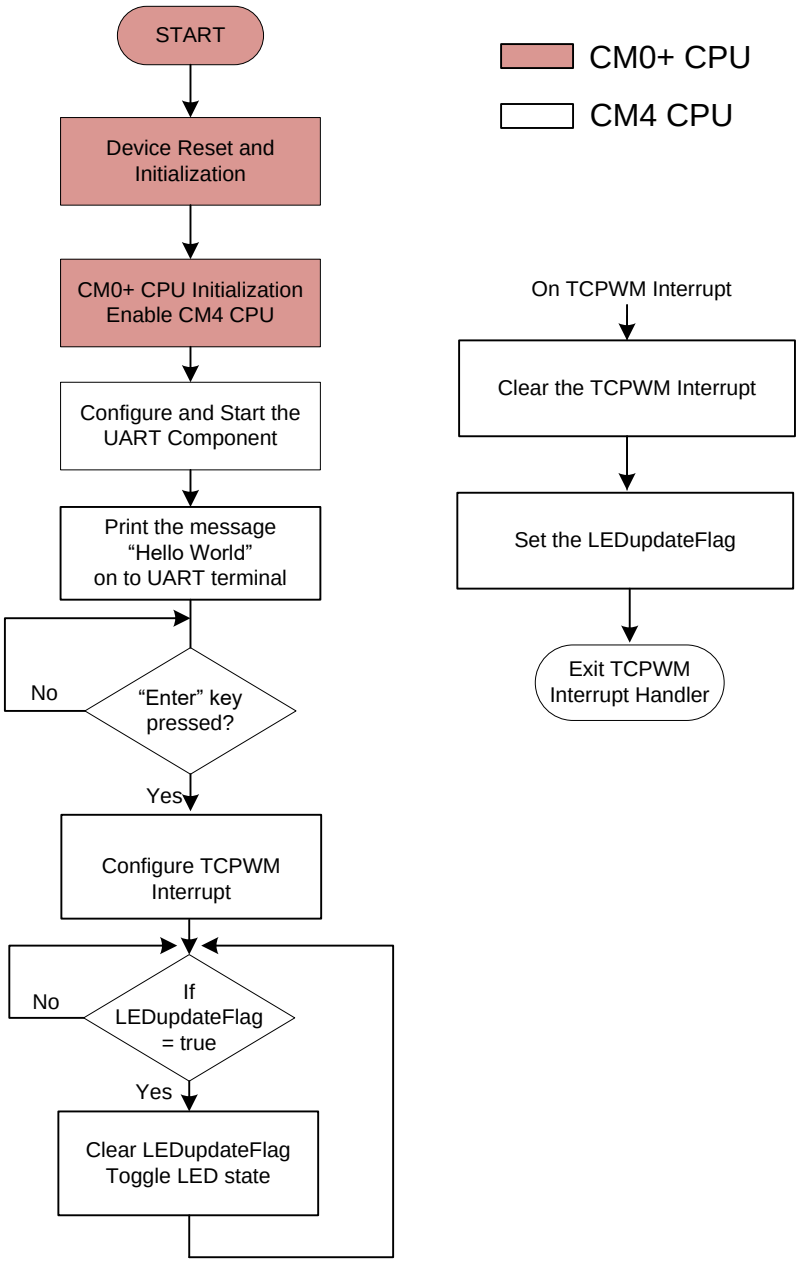
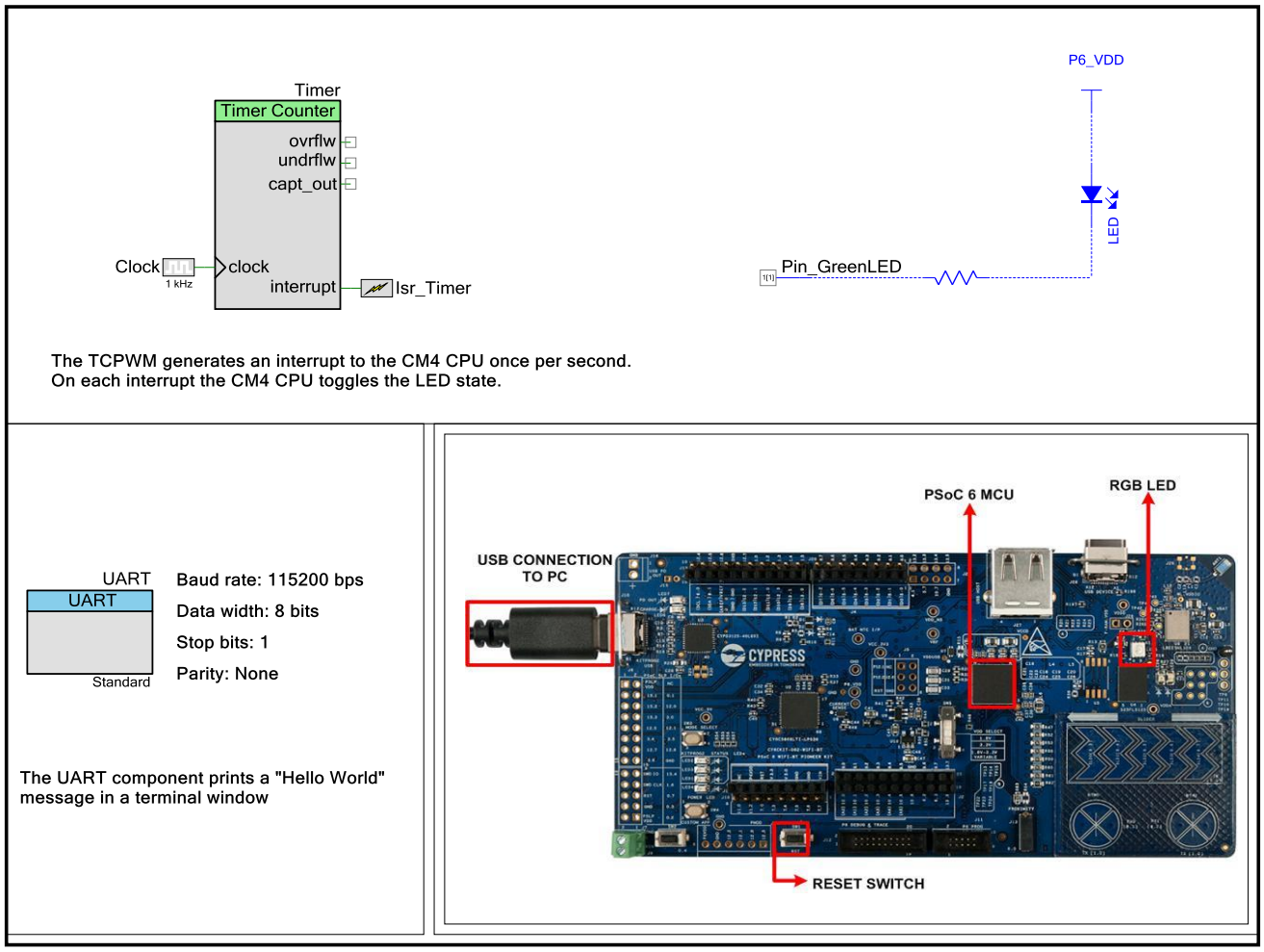


Figure 4 shows the PSoC Creator project schematic for this code example.

Figure 4. PSoC Creator Project Schematic



Components and Settings

Table 1 lists the PSoC Creator Components used in this example, and the non-default settings for each.

Table 1. PSoC Creator Components

Component	Instance Name	Purpose	Non-default Settings
UART	UART	Prints a message to a terminal window	Default settings used
Digital Output Pin	Pin_GreenLED	Drives the green element of the RGB LED	Clear HW connection checkbox Drive mode: Strong Drive Initial drive state: High (1)
Timer Counter (TCPWM)	Timer	Generates an interrupt once per second	Refer to igure 5
Interrupt	Isr_Timer	Routes the TCPWM interrupt to CM4 CPU	Default settings used

For information on the hardware resources used by a Component, see the Component datasheet.

Figure 5 shows the configuration settings for the Timer Counter Component. The Timer Counter Component is configured as a timer and generates an interrupt every second.

Figure 5. Timer Counter (TCPWM) Component Configuration Settings

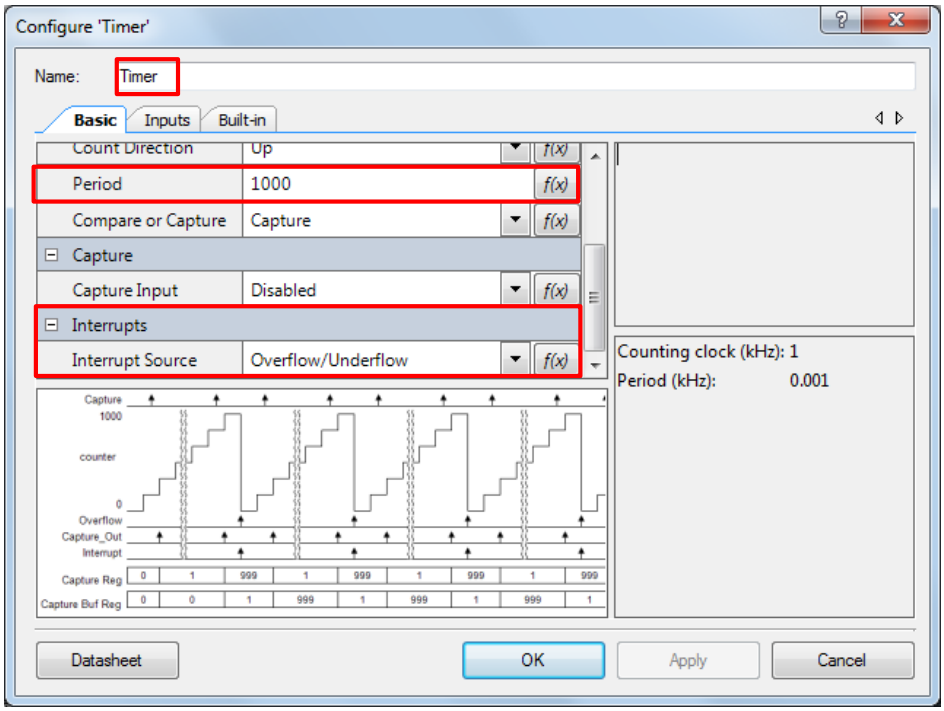


Figure 6 shows the system interrupt configuration used in this design.

Figure 6. System Interrupt Configuration

Instance Name	Interrupt Number	ARM CM0+ Enable	ARM CM0+ Priority (1 - 3)	ARM CM0+ Vector (3 - 29)	ARM CM4 Enable	ARM CM4 Priority (0 - 7)
Isr_Timer	90	☐	--	--	☑	7
UART_SCB_IRQ	46	☐	--	--	☐	--

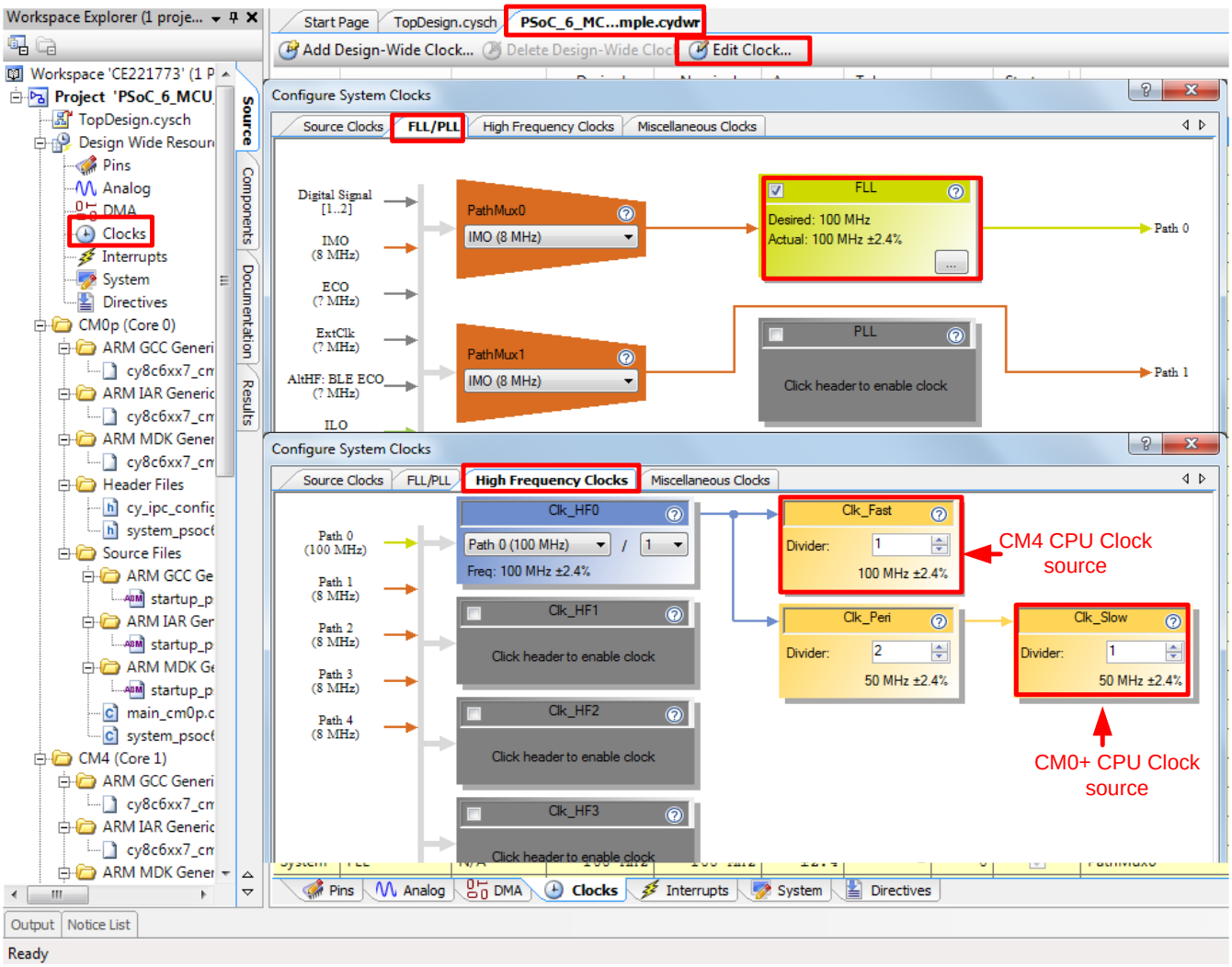
Figure 7 shows the pin assignment for the project. This is set up on the **Pins** tab of the **Design Wide Resources** window. This example uses the Kitprog2 USB-UART bridge to communicate with the UART terminal emulator running on your PC. Both kits use PSoC 6 MCU pin **P5[0]** as UART Rx pin and pin **P5[1]** as UART Tx pin.

Figure 7. Pin Assignments

Name	Port	Pin	Lock
\UART:rx\	P5[0]	N7	☑
\UART:tx\	P5[1]	L8	☑
Pin_GreenLED	P1[1]	G1	☑

Figure 8 shows the system clock configuration.

Figure 8. Clock Configuration



Reusing This Example

This example is designed for the CY8CKIT-062-WiFi-BT PSoC 6 WiFi-BT pioneer kit. To port the design to a different PSoC 6 MCU device and/or kit, change the target device using the Device Selector as needed.

Related Documents

Application Notes	
AN221774 – Getting Started with PSoC 6 MCU	Describes the PSoC 6 MCU, and how to build this code example
AN210781 – Getting Started with PSoC 6 MCU with Bluetooth Low Energy (BLE) Connectivity	Describes the PSoC 6 MCU with BLE Connectivity device family
PSoC Creator Component Datasheets	
UART	Provides asynchronous serial communications
TCPWM	Provides a timer
Pins	Supports connection of hardware resources to physical pins
Interrupt	Provides an interface to connect hardware signals to a CPU interrupt request line
Device Documentation	
PSoC 6 MCU: PSoC 62 Datasheet	PSoC 6 MCU: PSoC 62 Architecture Technical Reference Manual
PSoC 6 MCU: PSoC 63 with BLE Datasheet	PSoC 6 MCU: PSoC 63 with BLE Architecture Technical Reference Manual
Development Kit (DVK) Documentation	
CY8CKIT-062-WiFi-BT PSoC 6 WiFi-BT Pioneer Kit CY8CKIT-062-BLE PSoC 6 BLE Pioneer Kit	

Document History

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	6020769	VKVK	02/09/2018	New code example
*A	6091134	VKVK	03/07/2018	Initial Public Release

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