

Objective

This example demonstrates the basic use of FreeRTOS with the Cypress Peripheral Driver Library (PDL) on a PSoC® 6 device. The firmware runs on the CM4 core.

Overview

This code example project demonstrates how to use FreeRTOS with PSoC 6.

The code example creates two FreeRTOS tasks. The tasks communicate using a message queue. One task sends a message, the other receives the message. The receiving task toggles pin state depending on the received message.

Requirements

Tool: IAR 8.11, Keil uVision 5, GCC ARM Embedded 5.4-2016-q2-update, iSYSTEM winIDEA 9.12 or later

Programming Language: C

Associated Parts: All PSoC 6 parts

Related Hardware: [CY8CKIT-062-BLE](#)

Design

The design uses FreeRTOS to create two tasks communicating via message queue. See [Figure 1](#).

Hardware Setup

This example project runs on the [CY8CKIT-062-BLE](#) development kit from Cypress Semiconductor. No additional hardware setup is required.

Components / Drivers

[Table 1](#) lists the PDL Drivers used in this example, as well as the hardware resources used by each.

Table 1. List of PDL Drivers

Driver	Hardware Resources
GPIO	Digital Pin

Operation

1. Plug the [CY8CKIT-062-BLE](#) kit board into your computer's USB port.
2. Build and program the project into the development kit. Confirm that the kit's red LED blinks.

NOTE If you debug your project with the µVision IDE, you may need to install special debug support on some platforms (such as Windows 10). You add support for these probes by installing the *cypress.uvision_support.1.0.0.pack*. The pack is located here:

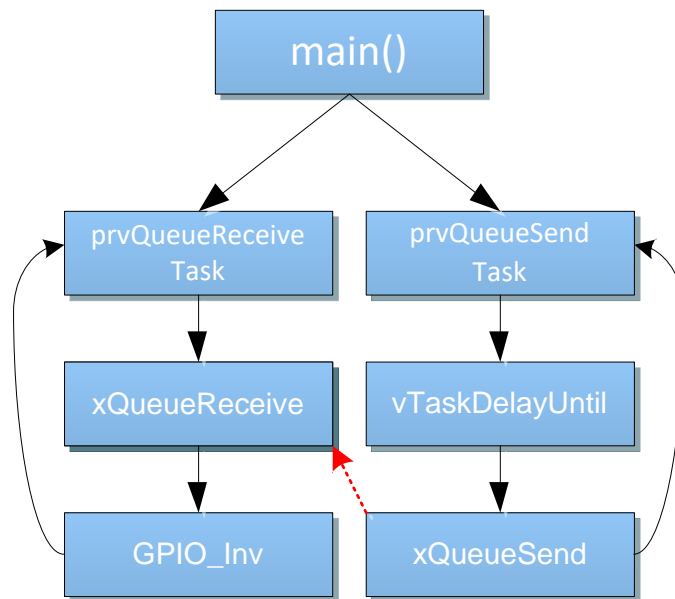
<PDL 3.x install folder>\tools\probes\cypress.uvision_support.1.0.0.pack

To install the pack, locate the file and double-click. The Pack Installer installs the necessary files in the µVision IDE. See Peripheral Driver Library User Guide for details.

Program Flow

The firmware implements a FreeRTOS message queue. It then creates two tasks. The prvQueueSendTask sends a message through the message queue. The second task, prvQueueReceiveTask, retrieves and verifies the message. If the message is correct, it inverts pin state. The prvQueueSendTask uses the RTOS delay feature to pause between messages. The receive task calls the FreeRTOS function xQueueReceive(), and then verifies the message. See [Figure 1](#).

Figure 1. Program flow.



Related Documents

[Table 2](#) lists all relevant application notes, code examples, knowledge base articles, device datasheets, and Component / user module datasheets.

Table 2. Related Documents

Application Notes		
AN210781	Getting Started with PSoC 6 BLE	Describes the PSoC 6 BLE, and how to build a basic code example.
AN215656	PSoC 6 Dual-Core MCU System Design	Presents theory and design considerations related to this code example.
PSoC Creator Component Datasheets		
Pins	Supports connection of hardware resources to physical pins	
Device Documentation		
PSoC 6 Datasheets	PSoC 6 Technical Reference Manuals	
Development Kit (DVK) Documentation		
PSoC 6 Kits		

Document History

Document Title: CE217911 - PSoC(R) 6 FreeRTOS Example Project

Document Number: 002-17911

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5607107	RODI	5/13/17	New code example
*A	5823238	TARM	7/19/17	Added project templates in GCC ARM Embedded, Atollic TrueSTUDIO and iSYSTEM winIDEA integrated development environments.
*B	6167527	VALK	5/7/18	Removed project template for Atollic TrueSTUDIO integrated development environments. Add note about using some probes.
*C	6249280	VALK	16/7/18	Updated project templates to support IAR 8.11

Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at [Cypress Locations](#).

Products

ARM® Cortex® Microcontrollers	cypress.com/arm
Automotive	cypress.com/automotive
Clocks & Buffers	cypress.com/clocks
Interface	cypress.com/interface
Internet of Things	cypress.com/iot
Lighting & Power Control	cypress.com/powerpsoc
Memory	cypress.com/memory
PSoC	cypress.com/psoc
Touch Sensing	cypress.com/touch
USB Controllers	cypress.com/usb
Wireless/Rf	cypress.com/wireless

PSoC® Solutions

[PSoC 1](#) | [PSoC 3](#) | [PSoC 4](#) | [PSoC 5LP](#)

Cypress Developer Community

[Forums](#) | [Projects](#) | [Videos](#) | [Blogs](#) | [Training](#) | [Components](#)

Technical Support

cypress.com/support

PSoC is a registered trademark and PSoC Creator is a trademark of Cypress Semiconductor Corporation. All other trademarks or registered trademarks referenced herein are the property of their respective owners.



Cypress Semiconductor
198 Champion Court
San Jose, CA 95134-1709

Phone : 408-943-2600
Fax : 408-943-4730
Website : www.cypress.com

© Cypress Semiconductor Corporation, 2017-2018. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, WICED, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit cypress.com. Other names and brands may be claimed as property of their respective owners.