CY3660-enCoRe™ V and enCoRe V LV DVK Kit Guide

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Contents

1. Introduction

This guide provides the developer with a basic, hands-on understanding of the enCoRe V technology using the CY3660 Development kit. It presents detailed pictures and step-by-step instructions to use the following tutorial examples: HID_Example, BULK_Example, ISOC_Example and WUSB_Example.

1.1 Installation

1.1.1 PSoC Designer Installation

Install PSoC Designer 5.0 setup software from the included CY3660 DVK CD-ROM. This software can be downloaded online at www.cypress.com.

During the installation, if you have not already installed the HI-TECH compiler v9.61 PL4, a dialog will present you with the option of upgrading to the new version. The patch is necessary to support new devices and features in PSoC Designer 5.0 SP2.

1.1.2 PSoC Programmer Installation

Install PSoC Programmer setup software from the included CY3660 DVK CD-ROM. This software can be downloaded online at www.cypress.com.

1.1.3 Install the CY3660 DVK Software

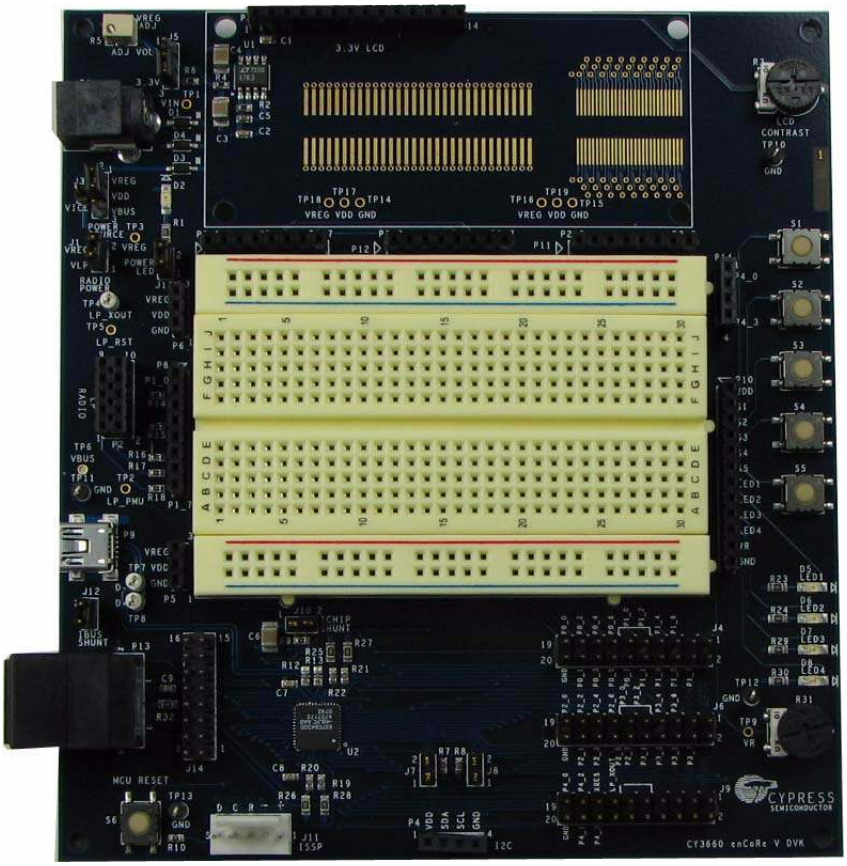
Install CY3660 enCoRe V/LV DVK setup software (Install_CY3660_DVK_xxx.exe) from the included CY3660 DVK CD-ROM. This software can be downloaded online at www.cypress.com.

1.2 Default Jumper Setting

The following is the default jumper setting for the CY3660 Board.

1. J1, place a jumper.
2. J3, place a jumper between VREG and VDD.
3. J5, place a jumper between Pin2 and 3.3V.
4. J12, place a jumper.
5. J13, place a jumper.
6. Leave other jumpers open.

Figure 1-1. CY3660 Board



1.3 Programming and Emulation Procedures

The following procedure provides a quick programming and emulation overview.

Note: Programming is done using either the PSoC MiniProg or the ICE-Cube. However, the ICE-Cube is required for emulation. The ICE-Cube is available in the PSoC development kit and can be ordered from Cypress's online store (PSoC Development Kit, CY3215-DK).

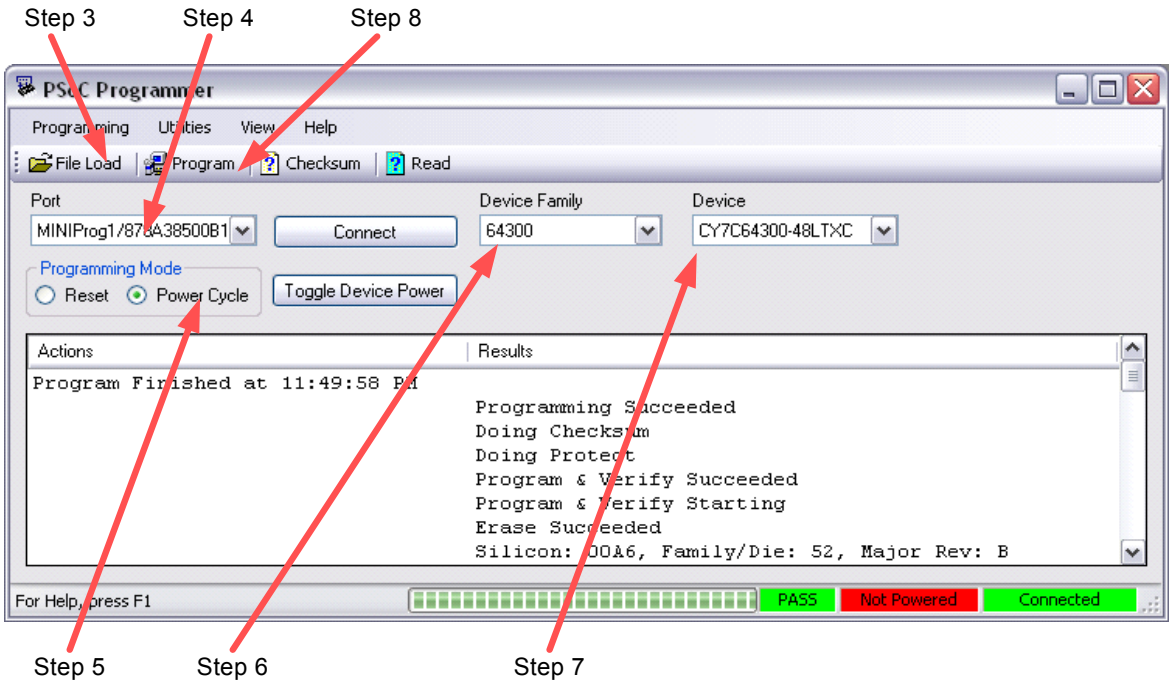
1.3.1 Programming Steps

1. If the LP Radio Module is connected to P2, remove it before the next step to avoid 5V being applied to the LP Radio Module. An alternative method is to use the CY3210-MPAdapt as a voltage translator. Please see the CY3210- MPAdapt Quick Start regarding how to use it.
2. Connect the USB cable to the PSoC MiniProg and to the PC. Connect the PSoC MiniProg to the 5-pin ISSP header on the CY3660 DVK board.

Figure 1-2. PSoC MiniProg

3. Launch PSoC Programmer version 3.00.0.92 or later. In PSoC Programmer, click **Programming** → **File Load** to load the desired binary (hex) file.
4. Select the MiniProg port. If the Actions column in the PSoC Programmer status box indicates "Firmware update required at ...", the MiniProg's firmware is out of date. Before attempting to program the target PSoC chip, go to **Utilities** → **Upgrade Firmware** to update the MiniProg's firmware.
5. For Programming Mode, select **Power Cycle**. Ensure the AC adapter is removed from P1, and the USB cable is unplugged from P9.
6. From the Device Family menu, select **64300**.
7. From the Device menu, select **CY7C64300-48LTXCT**.
8. Click **Program**. PSoC Programmer goes through programming and verification modes.
9. Once programming is finished, remove the MiniProg from the CY3660 DVK board.

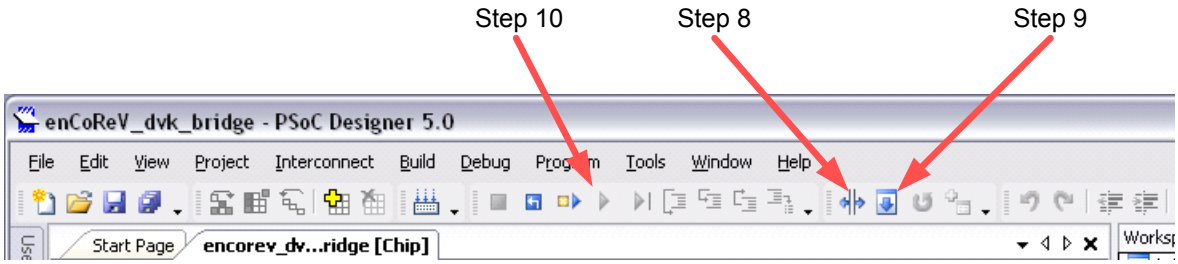
Figure 1-3. PSoC Programmer



1.3.2 Emulation Steps

1. Launch the desired .APP project file project from the `C:\CYPRESS\CY3660 DVK\Example\<example name>\[PSoC Project name\].`
2. Connect one end of the blue CAT 5e cable to the ICE-Cube.
3. Connect the other end of the blue CAT 5e cable to the CY3660 DVK Board.
4. Select **Build** → **Generate Configuration Files for '<Project name>' Project**.
5. Select **Build** → **Build '<Project name>' Project** or hit [**F7**].
6. Configure the debug port setting. Select **Project** → **Settings** → **Debugger** then select ICE CUBE.
7. Select the **Pod Power Source** and **Pod Supply Voltage.** If the **External only** is selected, please keep the default jumper setting. If the **ICE may power pod** is selected, please choose **3.3V** as **Pod Supply Voltage** and place a jumper between **VDD** and **VICE** at J3. Therefore, the LP radio voltage can meet the requirement.
8. Select **Debug** → **Connect**, or select the **Connect** icon.
9. Select **Debug** → **Download to Emulator**, or select the **Download to Emulator** icon.
10. Select **Debug** → **Go**, hit [**F5**], or select the **Go** icon.

Figure 1-4. PSoC Designers Toolbars



1.4 Conventions

These conventions are used throughout this guide.

Table 1-1. Documentation Conventions

Convention	Usage
`Courier New Size 12`	Displays file locations and source code: `C:\ …cd\icc\.`
Italics	Displays file names and reference documentation: *sourcefile.hex*
[**bracketed, bold**]	Displays keyboard commands in procedures: [**Enter**] or [**Ctrl**] [**C**]
Bold → With → Arrows	Represents menu paths, user entered text: **File → New Project → Clone**
Bold	Displays commands and selections, and icon names in procedures: Click the **Debugger** icon, and then click **Next**.
Note:	Displays functionality unique to PSoC Designer or the PSoC device.
WARNING:	Displays cautions that are important to the subject.

1.5 Document Revision History

Document Title: CY3660-enCoRe V and enCoRe V LV DVK Kit Guide Document Number: 001-16144				
Revision	**ECN#**	**Issue Date**	**Origin of Change**	**Description of Change**
**	1263046		SFVTMP3	New guide for CY3660 DVK

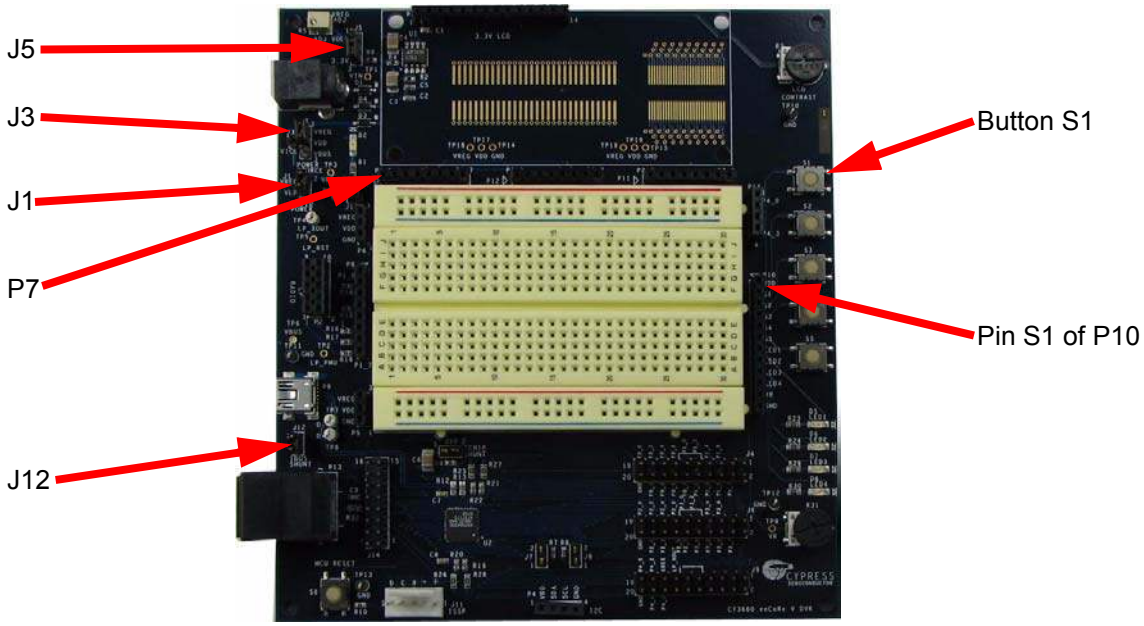
2. HID Example

The HID_Example demonstrates the basic functionality of a USB HID Mouse. A complete USB HID Descriptor is provided that allows enumerations on any USB host that supports a HID device. Follow the steps below.

2.1 HID Example Steps

1. Open the HID_Example project in PSoC Designer. The project file is located at `C:\CYPRESS\CY3660 DVK\Examples\HID_Example\HID_Example.app`. Go to **Project → Settings → Compiler** to choose the applicable compiler.
2. Select **Build → Generate Configuration Files for 'HID_Example' Project**.
3. Build the project. Select **Build → Build 'HID_Example' Project** or hit [**F7**].
4. Program the CY3660 DVK board with the hex file located at `C:\CYPRESS\CY3660 DVK\Examples\HID_Example\HID_Example\output\`. Select the **Program → PSoC Programmer** in **PSoC Designer**, and then follow the Programming Steps section on page 7.
5. Wire up Button S1. On the CY3660 DVK board, attach a wire from P0_0 on P7 to S1on P10.
6. Place a jumper on J12.
7. Place a jumper between VDD and VREG on J3.
8. J5 is used to select the fixed 3.3V VREG or Adjustable VREG from 3.66V to 1.63V. In the beginning, it is suggested to use fixed 3.3V VREG.
9. On a PC, open a simple drawing application (e.g., Paint).
10. On the PC, go to **Control Panel → Mouse → Pointer Options**, uncheck "**Enhance Pointer Precision**".
11. Connect the mini-B side of the USB A/Mini-B cable to the CY3660 DVK board.
12. Connect the A side of the USB A/Mini-B cable to the PC.
13. The HID_Example should enumerate on the PC as a USB Mouse HID device.
14. Press the button S1 on the DVK board to toggle the drawing in the drawing application.

Figure 2-1. HID_Example



2.2 HID Example Results

The HID_Example will enumerate on the PC as a bus powered USB Mouse device. It will transmit mouse down and mouse movement commands to the PC over the USB Interrupt pipe. Within a simle drawing or paint application, the word "USB" will be drawn when the S1 button is pressed. Pressing the S1 button again will stop drawing.

When using any of the enCoRe V examples provided, a USB analyzer can be used to inspect the USB transactions.

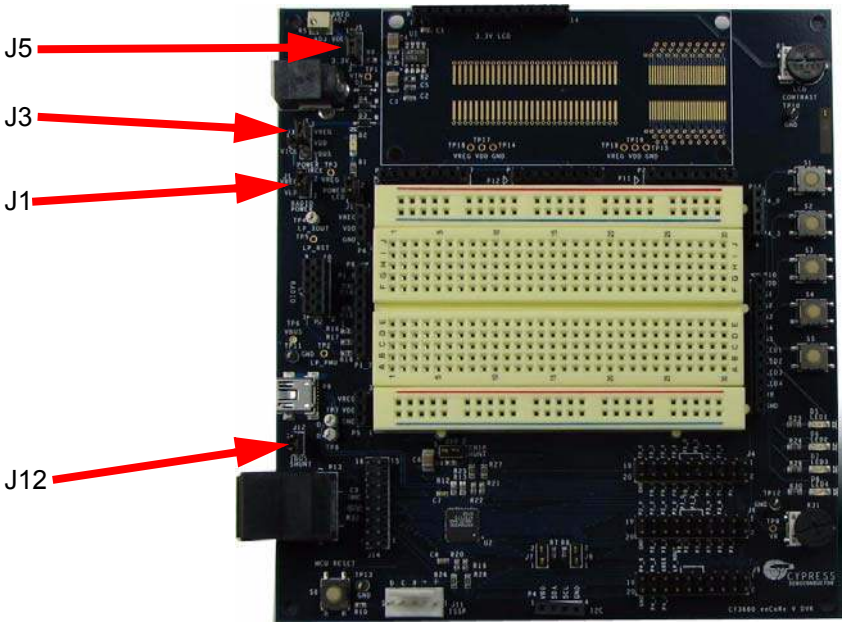
3. BULK Example

The BULK_Example shows the simplicity of accessing SRAM directly from the enCoRe V USB SIE. This example uses the BulkLoop application to send and receive data over the Bulk IN and OUT endpoints. To run the BULK_Example, follow the steps below:

3.1 Bulk Example Steps

1. Open the Bulk_Example project in PSoC Designer. The project file is located at `C:\CYPRESS\CY3660 DVK\Examples\BULK_Example\BULK_FW\BULK_FW.app`. Go to **Project → Settings → Compiler** to choose the applicable compiler.
2. Select **Build → Generate Configuration Files for 'BULK_FW' Project**.
3. Build the project. Select **Build → Build 'BULK_FW' Project** or hit [**F7**].
4. Program the CY3660 DVK board with the hex file located at `C:\CYPRESS\CY3660 DVK\Examples\BULK_Example\BULK_FW\BULK_FW\output\`. Select the **Program →PSoC Programmer** in **PSoC Designer**, and then follow the Programming Steps section on page 7.
5. Place a jumper on J12.
6. Place a jumper between VDD and VREG on J3.
7. J5 is used to select the fixed 3.3V VREG or Adjustable VREG from 3.66V to 1.63V. In the beginning, it is suggested to use fixed 3.3V VREG.
8. Connect the mini-B side of the USB A/Mini-B cable to the CY3660 DVK board.
9. Connect the A side of the USB A/Mini-B cable to the PC.
10. Driver matching sequence: Select the *cyusb.inf* file located at `C:\CYPRESS\CY3660 DVK\Examples\Driver_For_BULK_ISOC_Example\ <wxp>` or `<wnet>` or `<wlh>` or `<w2k>\<x86>` or `<amd64>\CyUSB.inf`. Please see the `C:\CYPRESS\CY3660 DVK\Examples\Driver_For_BULK_ISOC_Example\release_note.txt` for details about the driver.
11. Launch the *BulkLoop.exe* application located at `C:\CYPRESS\CY3660 DVK\Examples\BULK_Example\PC_Host_App\BulkLoop.exe`.

Figure 3-1. BULK_Example



3.2 Bulk Example Results

The BULK_Example enumerates on the PC using the cyusb.sys driver provided with the enCoRe V DVK. Using the BulkLoop.exe application provided, data can be transferred to and from the CY3660 DVK board.

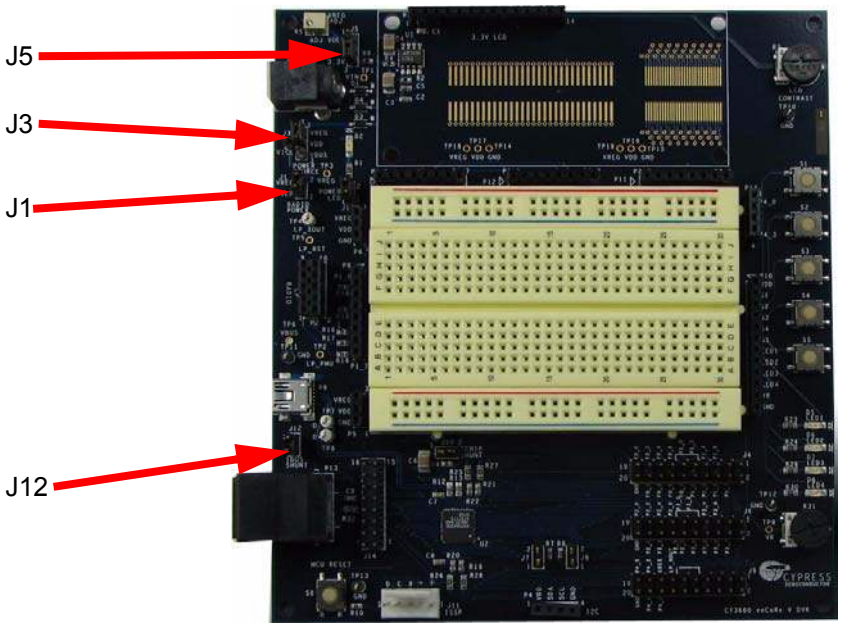
4. ISOC Example

The ISOC_Example shows how to create an alternate interface for isochronous applications. This example uses the Streamer application to send data over the ISOC IN endpoints. To run the ISOC_Example, follow the steps below:

4.1 ISOC Example Steps

1. Open the ISOC_Example project in PSoC Designer. The project file is located at `C:\CYPRESS\CY3660 DVK\Examples\ISOC_Example\ISOC_FW\ISOC_FW.app`. Go to **Project → Settings → Compiler** to choose the applicable compiler.
2. Select **Build → Generate Configuration Files for 'ISOC_FW' Project** .
3. Build the project. Select **Build → Build 'ISOC_FW' Project** or hit [**F7**].
4. Program the CY3660 DVK board with the hex file located at `C:\CYPRESS\CY3660 DVK\Examples\ISOC_Example\ISOC_FW\ISOC_FW\output\`. Select the **Program → PSoC Programmer** in **PSoC Designer**, and then follow the Programming Steps section on page 7.
5. Place a jumper on J12.
6. Place a jumper between VDD and VREG on J3.
7. J5 is used to select the fixed 3.3V VREG or Adjustable VREG from 3.66V to 1.63V. In the beginning, it is suggested to use fixed 3.3V VREG.
8. Connect the mini-B side of the USB A/Mini-B cable to the CY3660 DVK board.
9. Connect the A side of the USB A/Mini-B cable to the PC.
10. Driver matching sequence: Select the *cyusb.inf* file located at `C:\CYPRESS\CY3660 DVK\Examples\Driver_For_BULK_ISOC_Example\ <wxp>` or `<wnet>` or `<wlh>` or `<w2k>\<x86>` or `<amd64>\CyUSB.inf`. Please see the `C:\CYPRESS\CY3660 DVK\Examples\Driver_For_BULK_ISOC_Example\release_note.txt` for details about the driver.
11. Launch the Streamer application located at `C:\CYPRESS\CY3660 DVK\Examples\ISOC_Example\ PC_Host_App\Streamer.exe`.

Figure 4-1. ISOC_Example



4.2 ISOC Example Results

The ISOC_Example enumerates on the PC using the *cyusb.sys* driver provided with the enCoRe V DVK. The ISOC_Example demonstrates the correct behavior of an USB isochronous device by enmerating with a default interface that consumes no bandwidth. Then, when data is ready to be streamed to or from the USB device, the host application selects the alternate interface with the ischronous endpoint descriptor. Using the Streamer application provided, isochronous data can be streamed from the CY3660 DVK board.

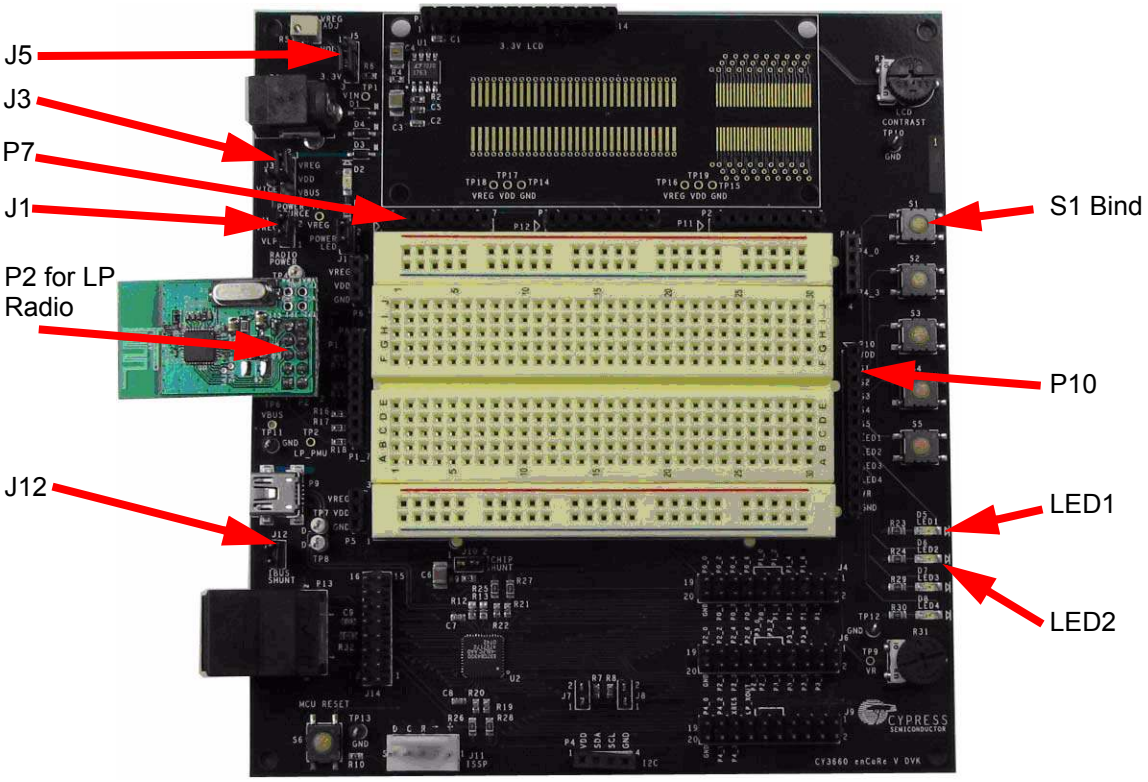
5. Wireless USB Example

The WUSB_Example demonstrates the basic functionality of a WirelessUSB HID Keyboard. Two dev boards with LP radio modules are used for this example. One board is used as a bridge, which will enumerate on the PC as a bus-powered USB composite device supporting keyboard and mouse. The other board is used as a keyboard, which will simulate a simple keyboard with three keys (Num Lock key, Caps Lock key and Scroll Lock key) and three LEDs (Num Lock LED, Caps Lock LED and Scroll Lock LED). Follow the steps below:

5.1 Wireless USB Bridge Steps

1. Open the WUSB_Example bridge project in PSoC Designer. The project file is located at `C:\CYPRESS\CY3660 DVK\Examples\WUSB_Example\enCoReV_dvk_bridge \enCoReV_dvk_bridge.app`. Go to **Project → Settings → Compiler** to choose the applicable compiler.
2. Select **Build → Generate Configuration Files for 'enCoReV_dvk_bridge' Project**.
3. Build the project. Select **Build → Build 'enCoReV_dvk_bridge' Project** or hit [**F7**].
4. Program the CY3660 DVK board with the hex file located at `C:\CYPRESS\CY3660 DVK\Examples\WUSB_Example\enCoReV_dvk_bridge\enCoReV_dvk_bridge\output\`. Select the **Program → PSoC Programmer** in **PSoC Designer**, and then follow the Programming Steps section on page 7.
5. Attach the WirelessUSB LP Radio module to P2.
6. Wire up Button S1 as a bind button. On the CY3660 DVK board, attach a wire from P0_2 on P7 to S1on P10.
7. Wire up LED1 and LED2. On the CY3660 DVK board, attach wires from P0_0 on P7 to LED1 on P10 and from P0_1 on P7 to LED2 on P10 separately.
8. Place a jumper on J1 and another jumper on J12.
9. Place a jumper between VDD and VREG on J3.
10. J5 is used to select the fixed 3.3V VREG or Adjustable VREG from 3.66V to 1.63V. In the beginning, it is suggested to use fixed 3.3V VREG.
11. Connect the mini-B side of the USB A/Mini-B cable to the CY3660 DVK board.
12. Connect the A side of the USB A/Mini-B cable to the PC.
13. The WUSB_Example bridge should enumerate on the PC as a Composite USB device supporting both keyboard and mouse.

Figure 5-1. WUSB_Example Bridge

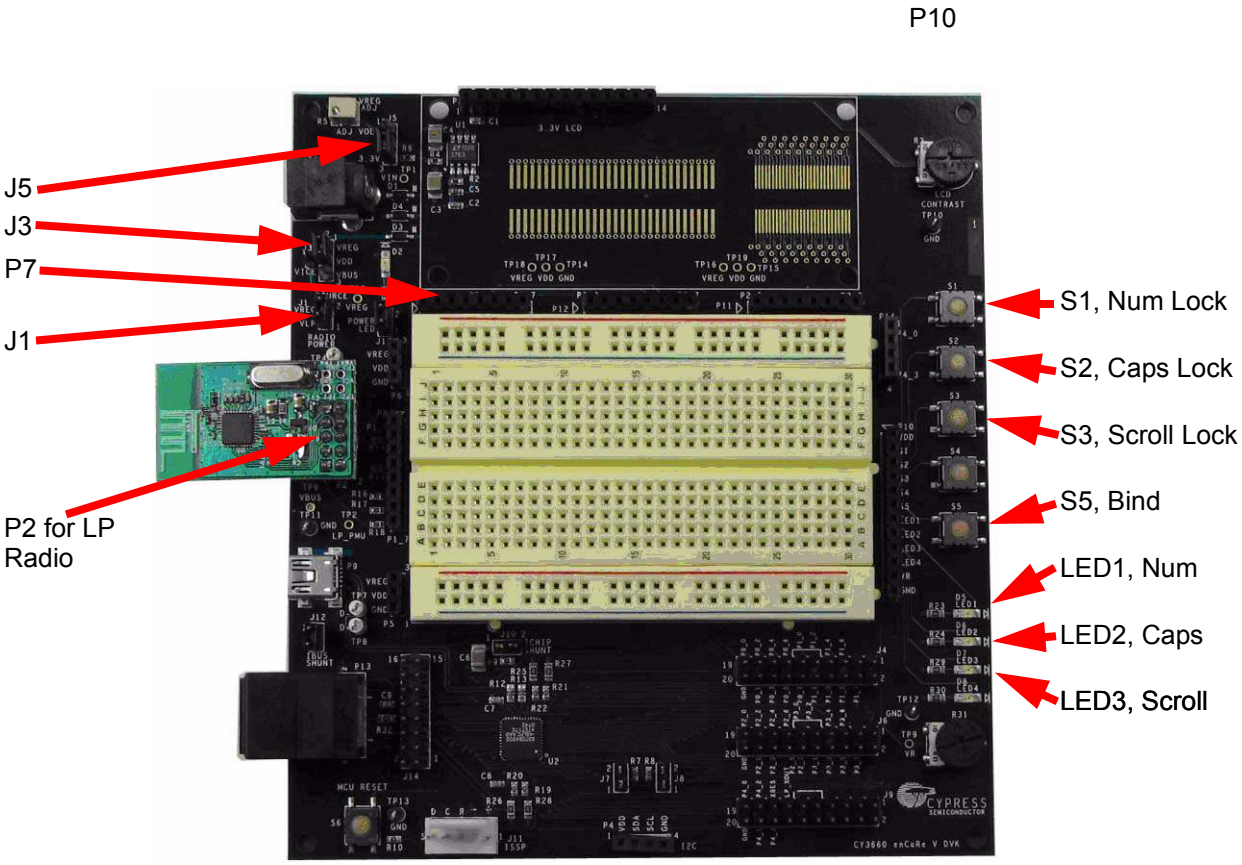


5.2 Wireless USB Keyboard Steps

1. Open the WUSB Example keyboard project in PSoC Designer. The project file is located at `C:\CYPRESS\CY3660 DVK\Examples\WUSB_Example\enCoReV_dvk_keyboard\enCoReV_dvk_keyboard.app`. Go to **Project → Settings → Compiler** to choose the applicable compiler.
2. Select **Build → Generate Configuration Files for 'enCoReV_dvk_keyboard' Project**.
3. Build the project. Select **Build → Build 'enCoReV_dvk_keyboard' Project** or hit [**F7**].
4. Program the CY3660 DVK board with the hex file located at `C:\CYPRESS\CY3660 DVK\Examples\WUSB_Example\enCoReV_dvk_keyboard\enCoReV_dvk_keyboard\output\`. Select the **Program → PSoC Programmer** in **PSoC Designer**, and then follow the Programming Steps section on page 7.
5. Attach the WirelessUSB LP Radio module to P2.
6. Wire up Button S5 as a bind button. On the CY3660 DVK board, attach a wire from P0_6 on P7 to S5 on P10.
7. Wire up Button S1 as a Num Lock key, Button S2 as a Caps Lock key and Button S3 as a Scroll Lock Key. On the CY3660 DVK board, attach wires from P0_3 on P7 to S1 on P10, from P0_4 on P7 to S2 on P10 and from P0_5 on P7 to S3 on P10 separately.
8. Wire up LED1 as a Num Lock LED, LED2 as a Caps Lock LED and LED3 as a Scroll Lock LED. On the CY3660 DVK board, attach wires from P0_0 on P7 to LED1 on P10, from P0_1 on P7 to LED2 on P10, and from P0_2 on P7 to LED3 on P10 separately
9. Place a jumper on J1.
10. Place a jumper between VDD and VREG on J3.

11. J5 is used to select the fixed 3.3V VREG or Adjustable VREG from 3.66V to 1.63V. In the beginning, it is suggested to use fixed 3.3V VREG.
12. Connect AC adapter to P1.

Figure 5-2. WUSB_Example Keyboard



5.3 Results for Bind

After the bridge is enumerated and the LEDs are off, press the Bind button S1 on the bridge and the Bind button S5 on the keyboard to complete the 'binding' process. While in the bind mode, the LED2 on the bridge blinks until the Bind button is pushed on the keyboard. The bridge LED2 stops blinking to indicate the keyboard is now ready for normal operation. Please notice that the bridge LED2 also will stop blinking after 20 seconds timeout without receiving any bind request from the keyboard.

5.4 Results for Key Pressing

User presses buttons on the keyboard that represent Num Lock key, Caps Lock key, and Scroll Lock key. The keystroke data will be sent through the air to the bridge, which will transfer this data to the PC. After receiving the data from the bridge, the PC will process the Num /Caps /Scroll Lock data and return the LED information to the bridge and then the keyboard. Finally, the keyboard OCD chip turns on/off the corresponding LEDs.