



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





CY8CKIT-049-4xxx

PSoC[®] 4 Prototyping Kit Guide

Doc. #: 001-90711 Rev. *H

Cypress Semiconductor
198 Champion Court
San Jose, CA 95134-1709
Phone (USA): +1.800.858.1810
Phone (Intl): +1.408.943.2600
<http://www.cypress.com>

Copyrights

© Cypress Semiconductor Corporation, 2014-2017. 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, 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.

Contents



Safety Information	5
1. Introduction	7
1.1 Kit Contents	7
1.2 Getting Started.....	8
1.3 Additional Learning Resources	8
1.3.1 PSoC Creator.....	9
1.3.2 PSoC Creator Code Examples	10
1.3.3 PSoC Creator Help	11
1.3.4 Technical Support.....	12
1.4 Document Conventions	12
2. Software Installation	13
2.1 Before You Begin.....	13
2.2 CY8CKIT-049-41xx/CY8CKIT-049-42xx Software	13
2.3 Install Software	14
2.4 Install Hardware.....	14
2.5 Uninstall Software	14
2.6 Open the “PSoC 4 Code” Code Example in PSoC Creator	15
3. Kit Operation	16
3.1 Connecting the PSoC 4 Prototyping Kit to a Computer	16
3.2 CY8CKIT-049-4xxx USB COM Port	17
3.3 Programming a CY8CKIT-049-4xxx Project Using the Bootloader	18
3.4 USB-UART Default Settings	25
4. Hardware	26
4.1 Board Details	26
4.2 Theory of Operation.....	27
4.3 Functional Description	27
4.3.1 Power Supply System.....	27
4.3.2 Board Separation (Snapping).....	28
4.3.3 Header Connections	28
4.3.4 User and Passive Inputs	32

5. Code Examples	35
5.1 Bootloader Base Code Example.....	35
5.2 Bootloadable Code Example	36
5.3 Creating a New Bootloadable Project.....	37
5.4 Converting a Non-bootloadable Project.....	40
5.4.1 PWMExample	41
5.4.2 Entering Bootloader Mode from the Bootloadable Application.....	49
6. USB-Serial Configuration	53
6.1 USB-Serial Resources	53
6.2 USB-Serial Configuration Utility	54
6.2.1 Connecting to a USB-Serial Device	55
6.2.2 Configuring a Serial Port	56
6.2.3 Configuring GPIOs	59
6.2.4 Additional Features of the USB-Serial Device	61
A. Appendix	62
A.1 CY8CKIT-049-4xxx Schematics	62
A.2 Programming a CY8CKIT-049-4xxx Project Using MiniProg3.....	69
A.3 Bill of Materials	74
Revision History	75

Safety Information



Regulatory Compliance

The CY8CKIT-049-4xxx Prototyping Kit is intended for use as a development platform for hardware or software in a laboratory environment. The board is an open system design, which does not include a shielded enclosure. This may cause interference to other electrical or electronic devices in close proximity. In a domestic environment, this product may cause radio interference. In such cases, you may be required to take adequate preventive measures. In addition, this board should not be used near any medical equipment or RF devices.

Attaching additional wiring to this product or modifying the product operation from the factory default may affect its performance and cause interference with other apparatus in the immediate vicinity. If such interference is detected, suitable mitigating measures should be taken.

The CY8CKIT-049-4xxx Prototyping Kit, as shipped from the factory, has been verified to meet with requirements of CE as a Class A product.



The CY8CKIT-049-4xxx contains electrostatic discharge (ESD) sensitive devices. Electrostatic charges readily accumulate on the human body and any equipment, and can discharge without detection. Permanent damage may occur on devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store unused CY8CKIT-049-4xxx boards in the protective shipping package.



End-of-Life/Product Recycling

This kit has an end-of life five years from the date of manufacture mentioned on the back of the box. Contact your nearest recycler for discarding the kit.

General Safety Instructions

ESD Protection

ESD can damage boards and associated components. Cypress recommends that you perform procedures only at an ESD workstation. If such a workstation is not available, use appropriate ESD protection by wearing an antistatic wrist strap attached to the chassis ground (any unpainted metal surface) on your board when handling parts.

Handling Boards

CY8CKIT-049-4xxx boards are sensitive to ESD. Hold the board only by its edges. After removing the board from its box, place it on a grounded, static-free surface. Use a conductive foam pad if available. Do not slide board over any surface.

1. Introduction



Thank you for your interest in the PSoC[®] 4 CY8CKIT-049-4xxx family of prototyping kits. The prototyping kit is designed as an easy-to-use and inexpensive prototyping platform for users wishing to rapidly develop products using the PSoC 4 families and use the unique flexibility of the PSoC 4 architecture. Designed for flexibility, these kits offer an open footprint breakout board to maximize the end utility of the PSoC 4 device. These kits provide a low-cost alternative to device samples while providing a platform to easily develop and integrate the PSoC 4 device into your end system. In addition, the board includes the following features:

- Onboard CMOD capacitors to enable CapSense[®] development
- A bypass capacitor to ensure the high quality ADC conversions
- An LED to provide feedback
- A push button to provide a simple user input and trigger the bootloader programming mode
- The CY8CKIT-049-41xx PSoC 4 Prototyping kit has [CY8C4125AXI-483](#) device on-board and CY8CKIT-049-42xx PSoC 4 Prototyping kit has [CY8C4245AXI-483](#) device on-board

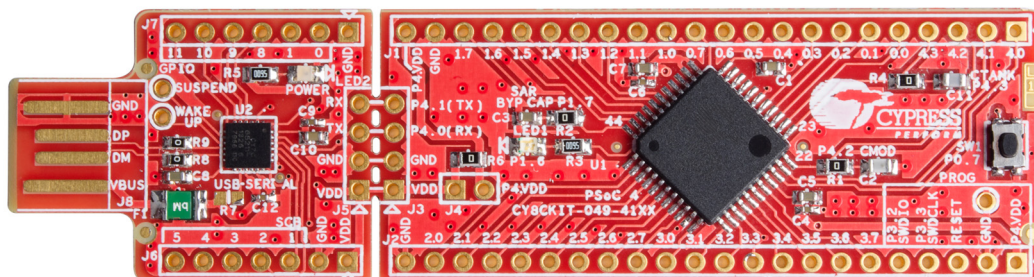
The CY8CKIT-049-4xxx development kit also supports the Cypress USB-Serial CY7C65211 Full-Speed USB controller that enables PC connectivity and serial interfaces, such as USB-UART, USB-I2C, USB-SPI, and USB-GPIO. The development kit includes a Cypress USB-Serial controller used to bootload the target PSoC 4 device. The PSoC 4 prototyping board is breakable, allowing you to separate the USB-Serial board from the PSoC 4 board.

This kit supports either 5 V or 3.3 V power supply voltages. The device can be programmed using the bootloader or the Cypress MiniProg3 programmer. The PSoC 4 Prototyping Kit supports boards based on the 4100 and 4200 device families, delivering a programmable platform for a wide range of embedded applications at a very low cost. The PSoC 4 is a scalable and reconfigurable platform architecture for a family of mixed-signal programmable embedded system controllers with an ARM[®] Cortex[™]-M0 CPU. It combines programmable and reconfigurable analog and digital blocks with flexible automatic routing.

1.1 Kit Contents

This kit contains only the PSoC 4 Prototyping Kit, either the 4100 or 4200 series device.

Figure 1-1. PSoC 4 CY8CKIT-049-4xxx Prototyping Kit



1.2 Getting Started

This user guide helps you to get acquainted with the PSoC 4 Prototyping Kit. The [Software Installation chapter on page 13](#) describes the installation of the PSoC Creator software. The [Kit Operation chapter on page 16](#) explains how to program the kit using a bootloader or a MiniProg3. The [Hardware chapter on page 26](#) details the hardware operation of the kit. The [Code Examples chapter on page 35](#) and [USB-Serial Configuration chapter on page 53](#) walk you through making projects and configuring the USB-Serial device on the kit. The [Appendix on page 62](#) provides the schematics, pin assignment, and bill of materials (BOM).

1.3 Additional Learning Resources

Cypress provides a wealth of data at www.cypress.com to help you to select the right PSoC device for your design, and to help you to quickly and effectively integrate the device into your design. For a comprehensive list of resources, see [KBA86521](#), [How to Design with PSoC 3, PSoC 4, and PSoC 5LP](#). The following is an abbreviated list for PSoC 4:

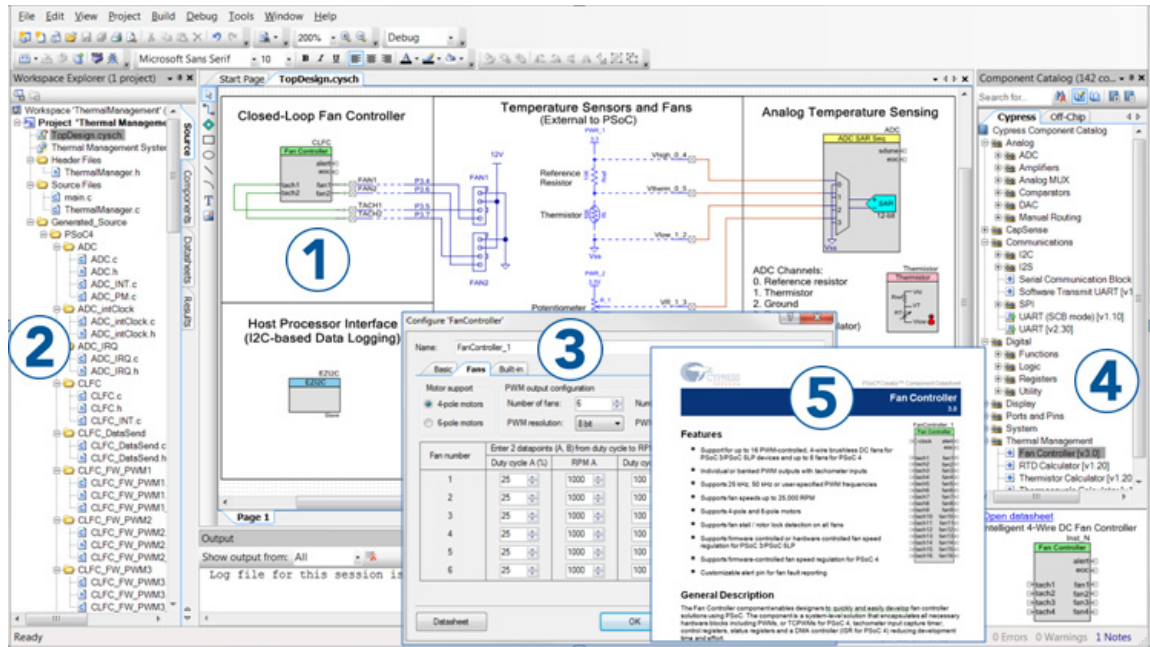
- **Overview:** [PSoC Portfolio](#), [PSoC Roadmap](#)
- **Product Selectors:** [PSoC 1](#), [PSoC 3](#), [PSoC 4](#), or [PSoC 5LP](#). In addition, PSoC Creator includes a device selection tool.
- **Datasheets:** Describe and provide electrical specifications for the [PSoC 4000](#), [PSoC 4100](#), and [PSoC 4200](#) device families.
- **CapSense Design Guide:** Learn how to design capacitive touch-sensing applications with the PSoC 4 family of devices.
- **Application Notes and Code Examples:** Cover a broad range of topics, from basic to advanced level. Many of the application notes include code examples. Visit the [PSoC 3/4/5 Code Examples](#) webpage for a list of all available PSoC Creator code examples. For accessing code examples from within PSoC Creator – see [PSoC Creator Code Examples on page 10](#). These code examples available across PSoC Creator, Application notes and kits for the most part will NOT be bootloadable. However, with a very small modification you can port them to a bootloadable project and use them with the CY8CKIT-049. Refer to [Converting a Non-bootloadable Project to a Bootloadable Project on page 40](#) for details.
- **Technical Reference Manuals (TRM):** Provide detailed descriptions of the architecture and registers in each PSoC 4 device family.
- **Development Kits:**
 - [CY8CKIT-042](#) and [CY8CKIT-040](#), PSoC 4 Pioneer Kits, are easy-to-use and inexpensive development platforms. These kits include connectors for Arduino™ compatible shields and Digilent® Pmod™ daughter cards.
 - [CY8CKIT-049](#) is a very low-cost prototyping platform for sampling PSoC 4 devices.
 - [CY8CKIT-001](#) is a common development platform for all PSoC family devices.
- The [MiniProg3](#) device provides an interface for flash programming and debug.
- **Knowledge Base Articles (KBA):** Provide design and application tips from experts on the devices/kits. For instance, [KBA93541](#), explains how to use CY8CKIT-049 to program another PSoC 4.

1.3.1 PSoC Creator

PSoC Creator is a free Windows-based Integrated Design Environment (IDE). It enables concurrent hardware and firmware design of systems based on PSoC 3, PSoC 4, and PSoC 5LP. See **Figure 1-2** – with PSoC Creator, you can:

1. Drag and drop Components to build your hardware system design in the main design workspace
2. Codesign your application firmware with the PSoC hardware
3. Configure Components using configuration tools
4. Explore the library of 100+ Components
5. Review Component datasheets

Figure 1-2. PSoC Creator Features



Visit [PSoC Creator training page](#) for video tutorials on learning and using PSoC Creator.

1.3.2 PSoC Creator Code Examples

PSoC Creator includes a large number of code example projects. These projects are available from the PSoC Creator Start Page, as [Figure 1-3](#) shows.

Example projects can speed up your design process by starting you off with a complete design, instead of a blank page. The example projects also show how PSoC Creator Components can be used for various applications. Code examples and datasheets are included, as [Figure 1-4 on page 11](#) shows.

In the Find Example Project dialog shown in [Figure 1-4 on page 11](#), you have several options:

- Filter for examples based on architecture or device family, i.e., PSoC 3, PSoC 4 or PSoC 5LP; category; or keyword
- Select from the menu of examples offered based on the Filter Options
- Review the datasheet for the selection (on the **Documentation** tab)
- Review the code example for the selection. You can copy and paste code from this window to your project, which can help speed up code development, or
- Create a new project (and a new workspace if needed) based on the selection. This can speed up your design process by starting you off with a complete, basic design. You can then adapt that design to your application.

Figure 1-3. Code Examples in PSoC Creator

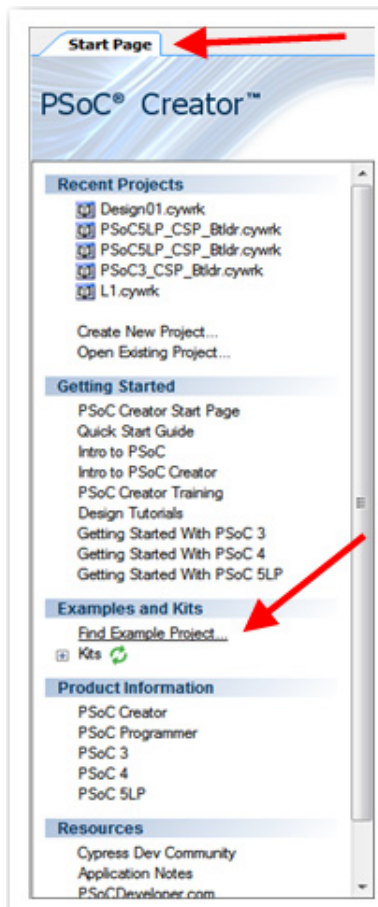
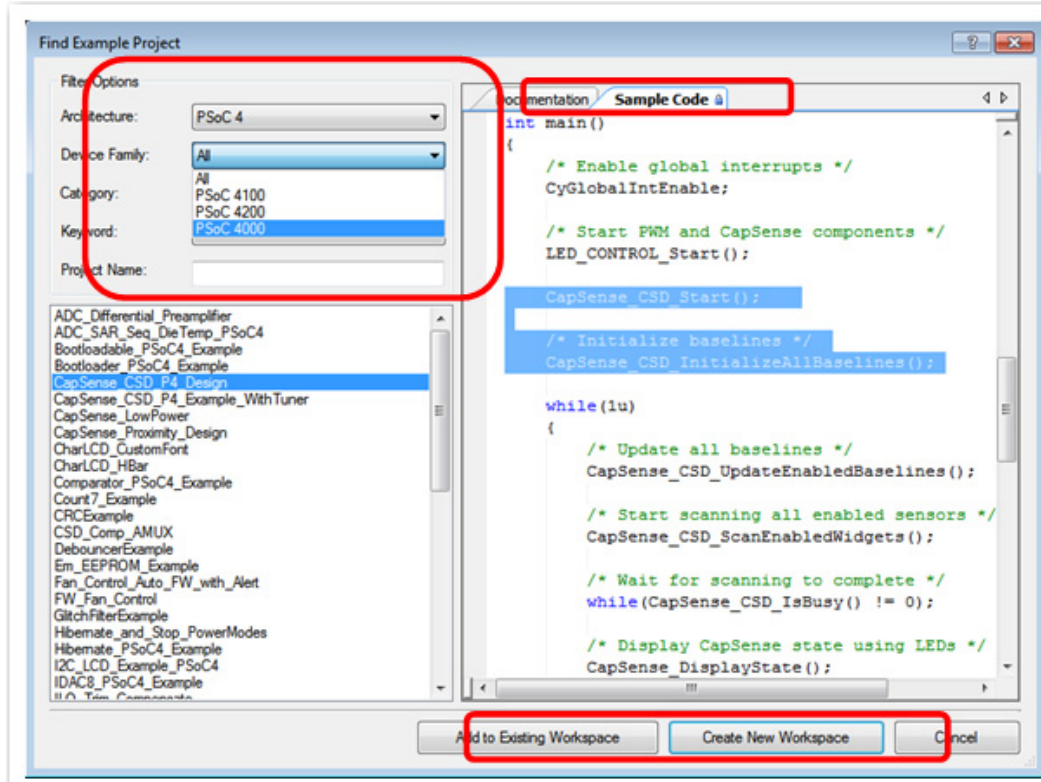


Figure 1-4. Code Example Projects, with Sample Code



1.3.3 PSoC Creator Help

Visit the [PSoC Creator home page](#) to download the latest version of PSoC Creator. Then, launch PSoC Creator and navigate to the following items:

- **Quick Start Guide:** Choose **Help > Documentation > Quick Start Guide**. This guide gives you the basics for developing PSoC Creator projects.
- **Simple Component example projects:** Choose **File > Open > Example projects**. These example projects demonstrate how to configure and use PSoC Creator Components.
- **Starter designs:** Choose **File > New > Project > PSoC 4 Starter Designs**. These starter designs demonstrate the unique features of PSoC 4.
- **System Reference Guide:** Choose **Help > System Reference > System Reference Guide**. This guide lists and describes the system functions provided by PSoC Creator.
- **Component datasheets:** Right-click a Component and select “Open Datasheet.” Visit the [PSoC 4 Component Datasheets](#) page for a list of all PSoC 4 Component datasheets.
- **Document Manager:** PSoC Creator provides a document manager to help you to easily find and review document resources. To open the document manager, choose the menu item **Help > Document Manager**.

1.3.4 Technical Support

If you have any questions, our technical support team is happy to assist you. You can create a support request on the [Cypress Technical Support](#) page.

If you are in the United States, you can talk to our technical support team by calling our toll-free number: +1-800-541-4736. Select option 2 at the prompt.

You can also use the following support resources if you need quick assistance.

- [Self-help](#)
- [Local Sales Office Locations](#)

1.4 Document Conventions

Table 1-1. Document Conventions for Guides

Convention	Usage
Courier New	Displays file locations, user entered text, and source code: <code>C:\...cd\icc\</code>
<i>Italics</i>	Displays file names and reference documentation: Read about the <i>sourcefile.hex</i> file in the <i>PSoC Creator User Guide</i> .
[Bracketed, Bold]	Displays keyboard commands in procedures: [Enter] or [Ctrl] [C]
File > Open	Represents menu paths: File > Open > New Project
Bold	Displays commands, menu paths, and icon names in procedures: Click the File icon and then click Open .
Times New Roman	Displays an equation: $2 + 2 = 4$
Text in gray boxes	Describes Cautions or unique functionality of the product.

2. Software Installation



2.1 Before You Begin

All Cypress software installations require administrator privileges, but these are not required to run the software after it is installed. Close any other Cypress software that is currently running before installing the kit software.

Note: The kit contents are installed in the C:\Program Files\Cypress folder by default. If the

Code examples are being run from the default install location, administrator privileges are required. If you do not have administrator privileges, copy the Firmware folder from the default install location to any other location on your PC and access the files

2.2 CY8CKIT-049-41xx/CY8CKIT-049-42xx Software

The kit requires Cypress' proprietary software, such as PSoC Creator, PSoC Programmer and the USB-Serial Configuration Utility, and generic software such as .NET Framework, Windows Installer, and Internet Explorer. The kit software is available on the kit web page in three formats:

Table 2-1. Kit Software Formats

Install Package	File Format	Usage
CY8CKIT-049-41xx_Kit ISO/ CY8CKIT-049-42xx_Kit ISO	ISO	This package can be used if the PC does not have any Cypress or non-Cypress prerequisite software installed. It first installs the prerequisites and then the kit content (firmware, hardware, and documentation files) in the specified location.
CY8CKIT-049-41xx_Kit Setup/ CY8CKIT-049-42xx_Kit Setup	EXE	This package can be used if the PC does not have any Cypress prerequisite software installed. If any non-Cypress prerequisites are found to be missing during installation, the installer provides links to download and install them and then installs the kit content (firmware, hardware, and documentation files) in the specified location.
CY8CKIT-049-41xx_Kit Only/ CY8CKIT-049-42xx_Kit Only	EXE	This package can be used if the PC has all the Cypress and non-Cypress prerequisites installed. It installs only the kit content (firmware, hardware, and documentation files) in the specified location. If any of the prerequisites are found missing during the installation process, the installer prompts you to install all the required software before attempting to install the kit. The installer redirects to the kit web page to download and install any missing Cypress software. Similarly, it provides links to download and install the missing non-Cypress prerequisites.

Note: The USB-Serial Configuration Utility requires Visual C++. If Visual C++ is not installed in the PC, the installer provides link to install the Visual C++ Redistributable package in the PC.

Note: Adobe Reader is required to view kit documents. If Adobe Reader is not installed on your PC, the installer provides the link to download and install it.

Note: PSoC Creator is provided with a free Keil C licence that has to be registered within 30 days of installing PSoC Creator. To register your Keil license, you will require an internet connection. Please read <http://www.cypress.com/?id=4&rID=38519> for more details. Please read <http://www.cypress.com/?id=4&rID=44355> if PSoC Creator needs to be used on a PC that does not have internet connection. The product ID for the Keil compiler is IKA1P-M6Q0E-8W7ST.

2.3 Install Software

1. Run *cyautorun.exe* in the kit ISO to start the installation process.
2. Click **Install CY8CKIT-049-41xx** to start CY8CKIT-049-41xx PSoC 4 Prototyping kit installation. Click **Install CY8CKIT-049-42xx** to start CY8CKIT-049-42xx PSoC 4 Prototyping kit installation.
3. Select the folder to install the kit files. Choose the directory and click **Next**. The installation directory is referred to as *<Install_Directory>* in this document.
4. When you click **Next**, the kit installer automatically installs the required software, if it is not present on your computer.
5. Select the installation type in the **Product Installation Overview** window. The drop-down menu contains three options: **Typical** (installs all the required features), **Custom** (lets you choose the features to be installed), and **Complete** (installs all the contents). Click **Next** after you select the installation type.

Note: It is recommended that you choose the **Complete** installation type.

6. Read and Accept the End-User License Agreement and click **Next** to proceed with the installation.
7. When the installation begins, a list of packages appears on the installation page. A green check mark appears adjacent to every package after successful installation.
8. After installing all the packages, the CyInstaller finish page opens up. Please provide the requested contact information or uncheck the “Continue Without Contact Information” checkbox and click on **Finish** button to complete the kit installation.

After the installation is complete, the kit contents are available at the following location:

1. For CY8CKIT-049-41xx: *<Install_Directory>\ CY8CKIT-049-41xx \<version>*
2. For CY8CKIT-049-42xx: *<Install_Directory>\ CY8CKIT-049-42xx \<version>*

2.4 Install Hardware

There is no additional hardware installation required for this kit.

2.5 Uninstall Software

To uninstall the software, do one of the following:

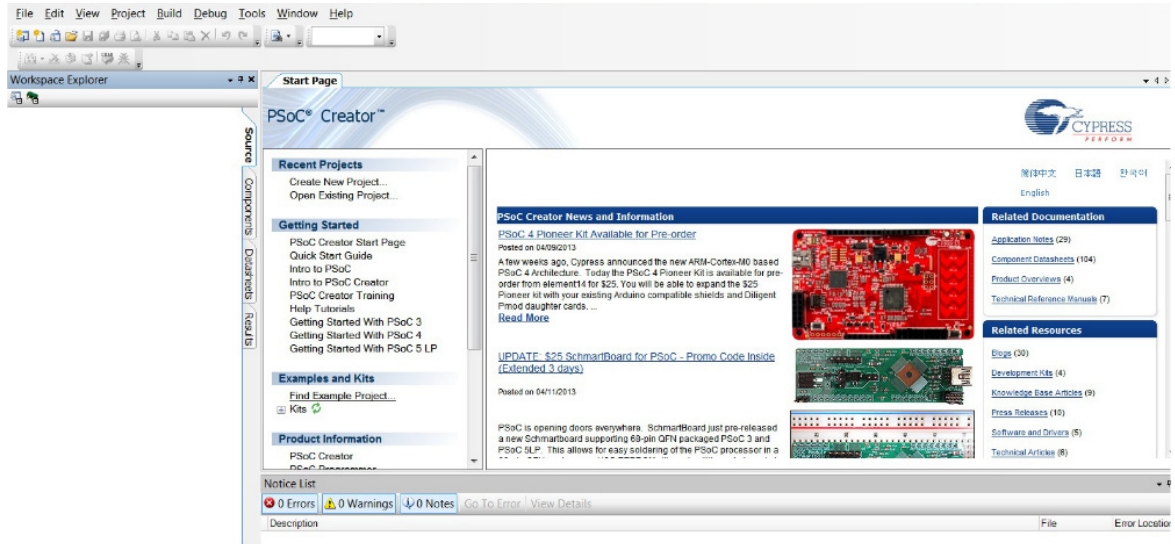
- Go to **Start > All Programs > Cypress > Cypress Update Manager > Cypress Update Manager**, and then select the **Uninstall** button corresponding to the kit software.
- Go to **Start > Control Panel > Programs and Features**, and then select the **Uninstall/Change** button corresponding to the kit software.

2.6 Open the “PSoC 4 Code” Code Example in PSoC Creator

Note: The code examples require administrator privileges if they are run directly from the default install location (C:\Program Files\Cypress). If you do not have administrator privileges, copy the *Firmware* folder from the default install location to any other location on your PC and use the files.

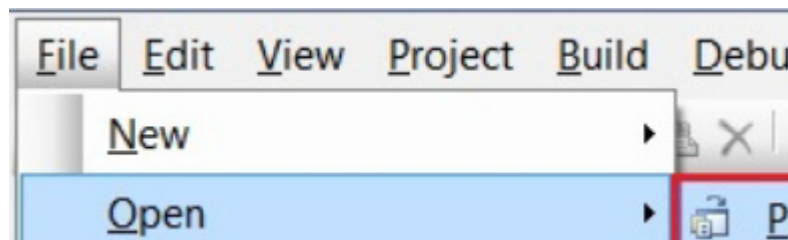
1. Launch the PSoC Creator software from the Start menu.

Figure 2-1. PSoC Creator Start Page



2. Open the *SCB_Bootloader.cywrk* workspace by choosing **File > Open > Project/Workspace** and navigating to the directory in which your project is present.

Figure 2-2. Open Project/Workspace



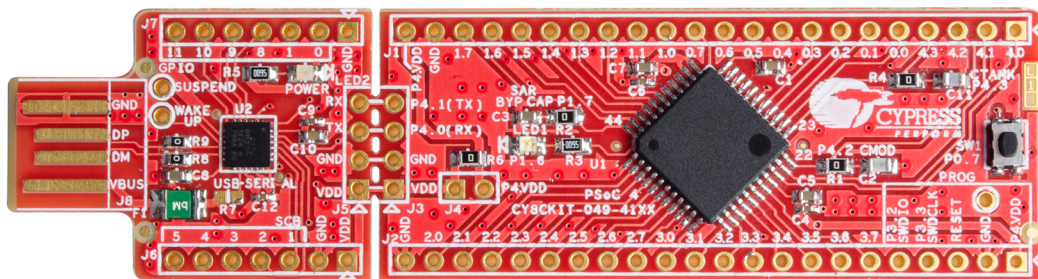
The workspace includes two sample projects linked in the **Workspace Explorer**. Subsequent chapters of this user guide show how to build, program, and understand the code examples supplied with this kit.

3. Kit Operation



The PSoC 4 Prototyping Kit is simplistic in design and focuses on providing you with complete access to develop applications using the PSoC 4 device family. The development kit supports a number of onboard functions such as an LED, push button, through-hole connections, USB-Serial connectivity to the PC, and a breakable board design to separate the two target boards.

Figure 3-1. PSoC 4 Prototyping Kit



3.1 Connecting the PSoC 4 Prototyping Kit to a Computer

To use the PSoC 4 Prototyping Kit, you need to connect the kit to a target PC. The kit is designed to be connected to the computer through USB. The USB connector will provide power to the target boards and enable serial communication. CY8CKIT-049-4xxx implements a PCB-based USB connector that makes connections to the USB port when plugged in. The amber LED turns on when the board is plugged into the port to indicate power.

Figure 3-2. Connecting the PSoC 4 Prototyping Kit to a Computer

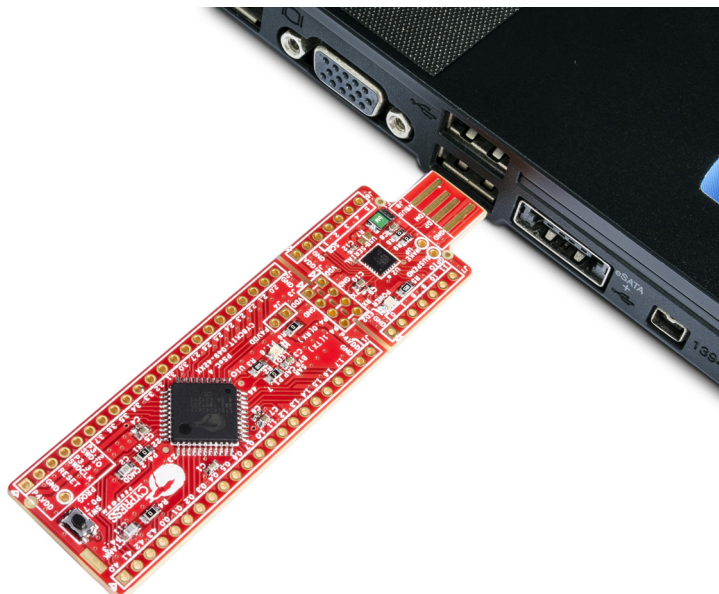
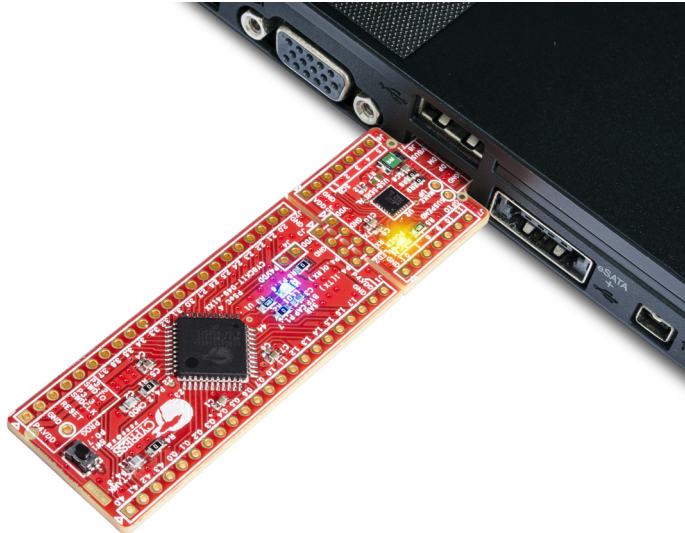


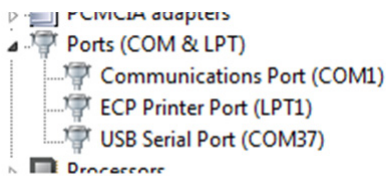
Figure 3-3. PSoC 4 Prototyping Kit Connected to the Computer



3.2 CY8CKIT-049-4xxx USB COM Port

When you connect the CY8CKIT-049-4xxx to the PC over a USB interface, it enumerates as a COM port device under the Device Manager window on the Windows OS. Often, the COM port number will be higher than any existing COM port value. For example, in the following image the CY8CKIT-049-4xxx enumerates as **COM37**.

Figure 3-4. CY8CKIT-049-4xxx USB COM Port in Device Manager



When connecting your CY8CKIT-049-4xxx to a computer for the first time or to any new USB port, it may take a moment to enumerate because the computer will complete an online check for the latest drivers.

Figure 3-5. Automatic Driver Software Installation for CY8CKIT-049-4xxx



Figure 3-6. Driver Software Installation Complete



Note: The baud rate settings do not apply to the virtual COM port as the data transmission is taking place using the Full-Speed USB bus at 12 Mbps. However, because of the virtual COM port driver that sits between the PC and the USB-Serial device, the operating system will see the device as a normal serial port and you will be able to set the baud rate. However, these settings may be ignored.

3.3 Programming a CY8CKIT-049-4xxx Project Using the Bootloader

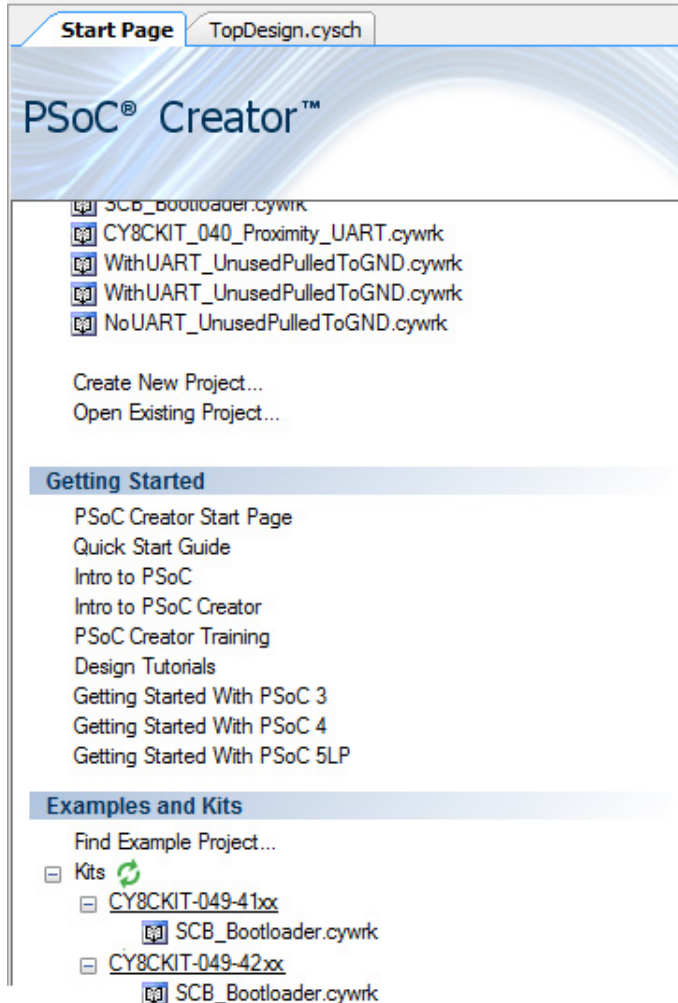
The following example shows how to bootload (program) a project into the PSoC 4 with the USB-Serial device, using the Bootloader Host. To use this method, the PSoC 4 device must contain the bootloader and the project must be configured as bootloadable. This is the default programming method for new users.

The following steps use the code example included in the kit installer.

1. Launch PSoC Creator from the Start menu.

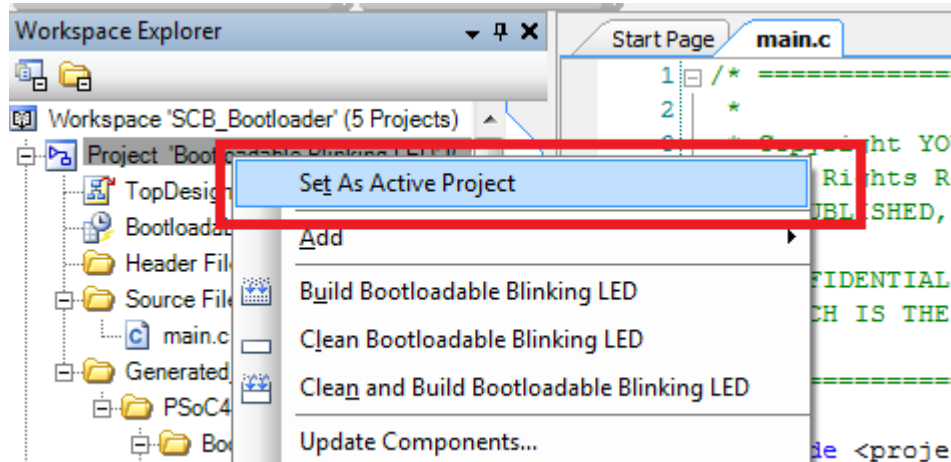
2. Open the *SCB_Bootloader.cywrk* workspace from **Examples and Kits > Kits**. Select CY8CKIT-049-41xx folder for CY8CKIT-049-41xx PSoC 4 Prototyping Kit and CY8CKIT-049-42xx folder for CY8CKIT-049-42xx PSoC 4 Prototyping Kit.
3. Select the folder where you want to save the project and click **OK**.

Figure 3-7. Open the Project



4. Click on **Build > Build All Projects**.
Note: The UART_Bootloader project is a dependency for the Bootloadable Blinking LED project. Hence, both example projects must be built by selecting **Build > Build All Projects**.
5. In the Workspace Explorer, right-click the *Bootloadable Blinking LED* project and select **Set As Active Project**.

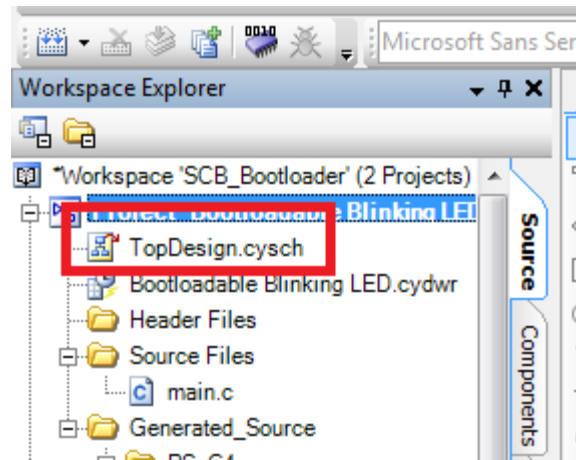
Figure 3-8. Set the Code Example as Active Project



The bootloadable project must be associated with the bootloader project's HEX and ELF files. This will ensure that the firmware code mapping aligns with the code on the target device.

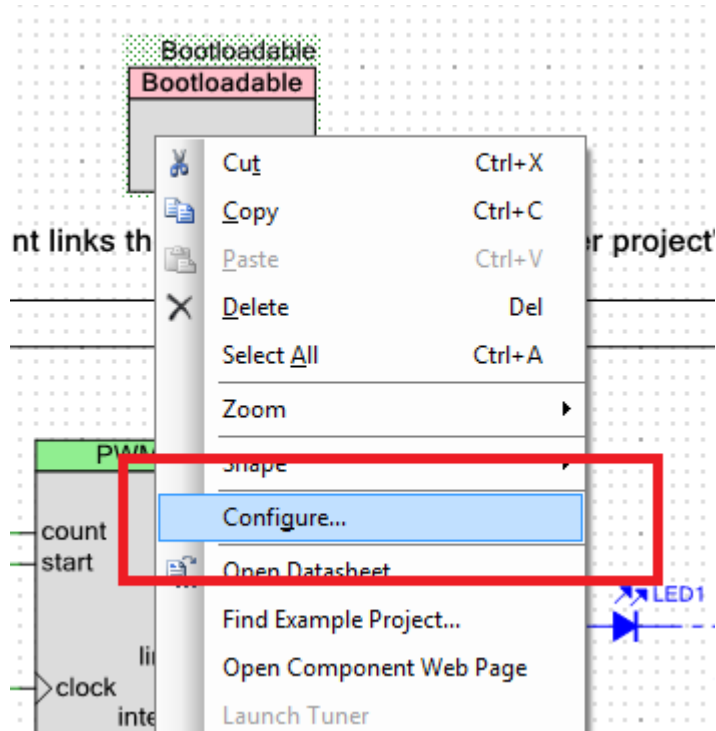
6. Under the 'Bootloadable Blinking LED' code example, double-click the '*TopDesign.cysch*' file to open the schematic view. Select the tab for the Bootloadable Project schematic page if it is not already selected.

Figure 3-9. Open Schematic View



7. In the schematic view, right-click the **Bootloadable** component and select **Configure**.

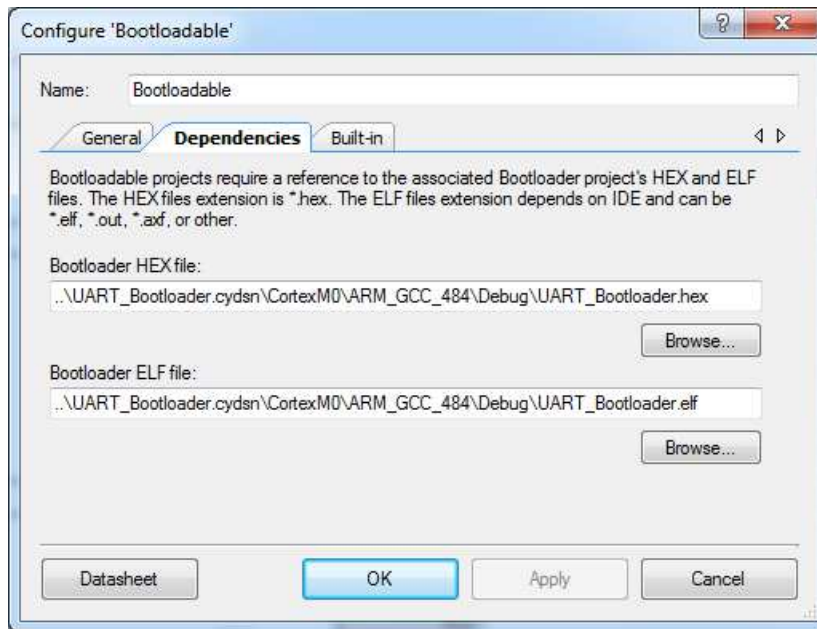
Figure 3-10. Configure the Bootloader Component



- In the configuration window, select the **Dependencies** tab and click the **Browse** button to point to the HEX and ELF files present in the 'Dependencies' folder under project directory; click **OK**. The file paths (assuming the CY8CKIT-040-42xx) will appear as follows:

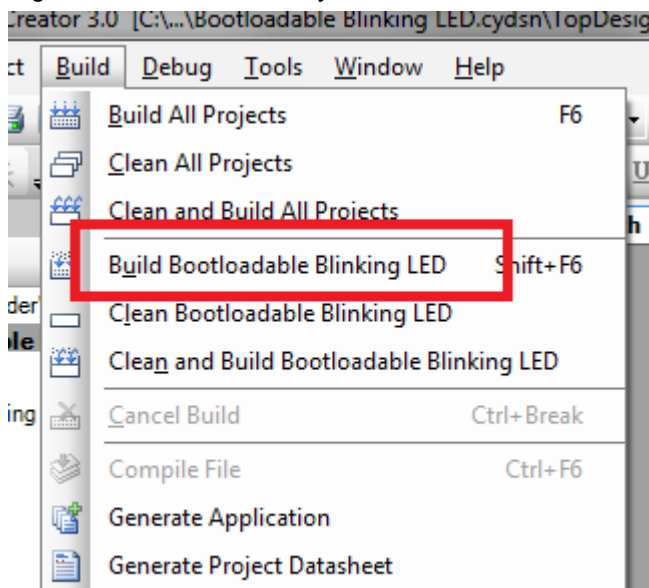
```
<Project_Directory>\SCB_Bootloader\UART_Bootloader.cydsn\CortexM0\
ARM_GCC_484\Debug\UART_Bootloader.hex
<Project_Directory>\SCB_Bootloader\UART_Bootloader.cydsn\CortexM0\
ARM_GCC_484\Debug\UART_Bootloader.elf
```

Figure 3-11. Configure Dependencies for Bootloader Component



- Select **Build > Build Bootloadable Blinking LED**.

Figure 3-12. Build the Project

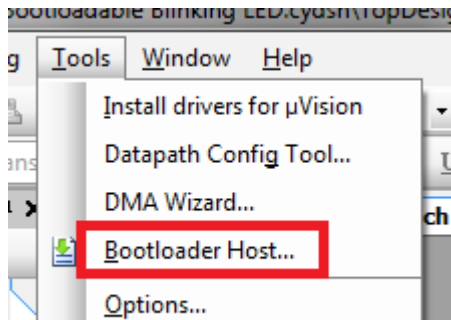


10. Connect the CY8CKIT-049-4xxx prototyping board to the PC. When connecting the kit to the port, depress the **SW1** button as it is plugged in.

You will notice that the blue LED begins to blink rapidly; this indicates that the PSoC 4 is in 'Bootloader Mode' and is ready to be loaded with the latest firmware. This must be done each time you bootstrap the PSoC 4.

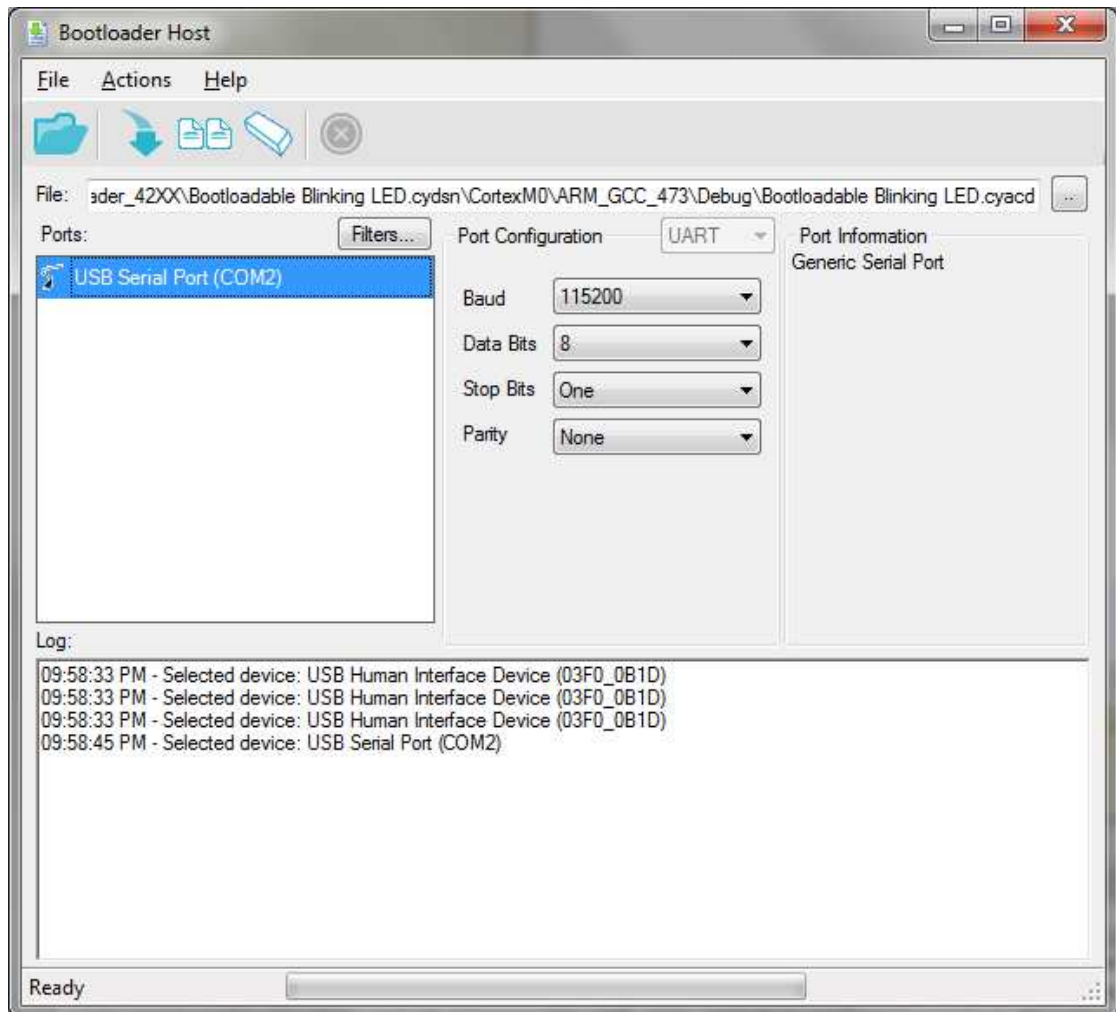
11. Select **Tools > Bootloader Host** to open the Bootloader Host tool.

Figure 3-13. Launch Bootloader Host Tool



The Bootloader Host tool opens.

Figure 3-14. Bootloader Host Tool



12. Click **Filters** and select the **Show UART Devices** option from the Port Filters window and click **OK**. This lists all COM devices connected to the computer.

Note: The PID of the Bootloader is F13B. You may enter this PID in the Port filters window to list only the Kit Bootloader.

Figure 3-15. Port Filters



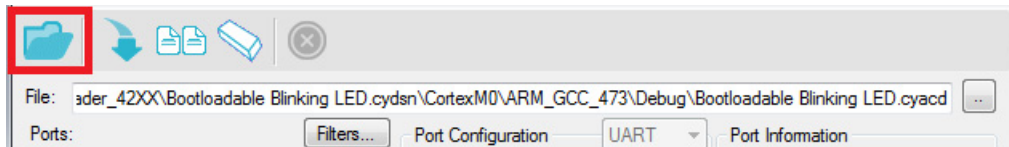
The Bootloader Host tool will now display all of the available UART based COM ports.

13. Click the COM port from the list of available ports and enter the UART configuration such as Baud Rate, Data Bits, Stop Bits, and Parity for the USB-UART configuration on the USB-Serial device.

The values for the UART are: 115200 baud rate, 8 data bits, 1 stop bit, and no parity.

14. Click **File > Open** and navigate to the *Bootloadable_Blinking_LED.cyacd* file generated in the CortexM0 folder in your project directory, and click **Open**.

Figure 3-16. Opening the Generated File



15. Click the **Program** button to flash the part with your new application code.

The status window provides output message and a status bar indicates the programming progress. When bootloading is complete, your application executes with the latest version of the application code.

Figure 3-17. Program the Device With Application Code



See application note [AN73854](#) for additional details on bootloading.

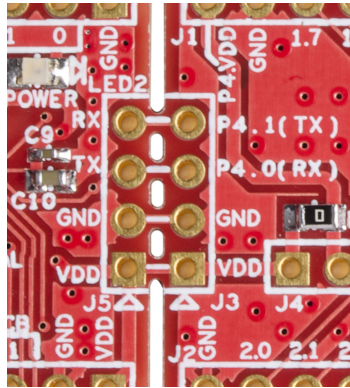
3.4 USB-UART Default Settings

The default configuration of the USB-Serial device on the CY8CKIT-049-4xxx prototyping kit is the USB-UART mode. The CY8CKIT-049-4xxx also enables a default UART connection between the USB-Serial device and the PSoC 4. This connection is indicated by two parallel 4-pin headers in the middle of the board. The default pin connections are shown in [Table 3-2](#).

Table 3-1. Pin Mapping for USB-Serial Port and PSoC 4 UART

USB-Serial UART	PSoC 4 UART
TX	P4.0 (RX)
RX	P4.1 (TX)
GND	GND
VDD	VDD

Figure 3-18. UART Pin Connections on CY8CKIT-049-4xxx



The USB-Serial device provides the PSoC 4 device with an interface to a PC. The USB-Serial device enumerates as a COM port to allow any terminal software to be used to communicate with the PSoC 4. To use the USB-UART functionality in the COM terminal software, select the corresponding COM port. Note that if the USB-Serial device board is separated from the PSoC 4 board, you will still be able to use the USB-Serial device to communicate with any UART device using the 4-pin header.

The USB-Serial device is by default configured as a USB-UART device with the following specifications. The USB-UART settings can also be configured from the Cypress USB-Serial Configuration Utility. The default settings are as shown in bold in the table below.

Table 3-2. USB-UART settings as seen in Cypress USB-Serial Configuration Utility

Parameter	Supported Values
Baud Rate	100, 200, 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 56000, 57600, 115200 , 230400, 460800, 921600, 1000000, 3000000
Type	2 pin , 4 pin, 6 pin
Data Bits	7 bits, 8 bits
Stop Bits	1 bit , 2 bits
Parity	None , Odd, Even, Mark, Space
Drop Packets on RX error	Disabled , Enabled
Disable CTS and DSR pull-up during suspend	Disabled, Enabled