imall

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-040

PSoC[®] 4000 Pioneer Kit Guide

Doc. # 001-91316 Rev. *C

Cypress Semiconductor 198 Champion Court San Jose, CA 95134-1709 Phone (USA): 800.858.1810 Phone (Intnl): +1.408.943.2600 www.cypress.com



Copyrights

© Cypress Semiconductor Corporation, 2014-2015. The information contained herein is subject to change without notice. Cypress Semiconductor Corporation assumes no responsibility for the use of any circuitry other than circuitry embodied in a Cypress product. Nor does it convey or imply any license under patent or other rights. Cypress products are not warranted nor intended to be used for medical, life support, life saving, critical control or safety applications, unless pursuant to an express written agreement with Cypress. Furthermore, Cypress does not authorize its products for use as critical components in life-support systems where a malfunction or failure may reasonably be expected to result in significant injury to the user. The inclusion of Cypress products in life-support systems application implies that the manufacturer assumes all risk of such use and in doing so indemnifies Cypress against all charges.

Any Source Code (software and/or firmware) is owned by Cypress Semiconductor Corporation (Cypress) and is protected by and subject to worldwide patent protection (United States and foreign), United States copyright laws and international treaty provisions. Cypress hereby grants to licensee a personal, non-exclusive, non-transferable license to copy, use, modify, create derivative works of, and compile the Cypress Source Code and derivative works for the sole purpose of creating custom software and or firmware in support of licensee product to be used only in conjunction with a Cypress integrated circuit as specified in the applicable agreement. Any reproduction, modification, translation, compilation, or representation of this Source Code except as specified above is prohibited without the express written permission of Cypress.

Disclaimer: CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS MATE-RIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Cypress reserves the right to make changes without further notice to the materials described herein. Cypress does not assume any liability arising out of the application or use of any product or circuit described herein. Cypress does not authorize its products for use as critical components in life-support systems where a malfunction or failure may reasonably be expected to result in significant injury to the user. The inclusion of Cypress' product in a life-support systems application implies that the manufacturer assumes all risk of such use and in doing so indemnifies Cypress against all charges.

Use may be limited by and subject to the applicable Cypress software license agreement.

PSoC and CapSense are registered trademarks and PSoC Components, PSoC Creator, and SmartSense are trademarks of Cypress Semiconductor Corporation. All other products and company names mentioned in this document may be the trademarks of their respective holders.

Purchase of I²C components from Cypress or one of its sublicensed Associated Companies conveys a license under the Philips I²C Patent Rights to use these components in an I²C system, provided that the system conforms to the I²C Standard Specification as defined by Philips. As from October 1st, 2006 Philips Semiconductors has a new trade name - NXP Semiconductors.

Flash Code Protection

Cypress products meet the specifications contained in their particular Cypress Datasheets. Cypress believes that its family of products is one of the most secure families of its kind on the market today, regardless of how they are used. There may be methods, unknown to Cypress, that can breach the code protection features. Any of these methods, to our knowledge, would be dishonest and possibly illegal. Neither Cypress nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Cypress is willing to work with the customer who is concerned about the integrity of their code. Code protection is constantly evolving. We at Cypress are committed to continuously improving the code protection features of our products.

Contents



	Safety I	nformation	5
1.	Introdu	ction	7
	1.1 1.2	Kit Contents PSoC Creator 1.2.1 PSoC Creator Code Examples 1.2.2 Kit Code Example 1.2.3 PSoC Creator Help	7
	1.3	Getting Started	
	1.4 1.5	Additional Learning Resources	13
	1.6	Documentation Conventions	14
2.	Softwa	re Installation	15
	2.1	Before You Begin	15
	2.2	Install Software	15
	2.3	Install Hardware	
	2.4	Uninstali Software	
3.	Kit Ope	eration	19
	3.1	Kit Overview	
	3.2	KIT USB Connection	
	5.5	3.3.1 Using the Onboard PSoC 5I P Programmer and Debugger	22
		3.3.2 Using the CY8CKIT-002 MiniProg3 Programmer and Debugger	
	3.4	USB-I2C Bridge	
	3.5	USB-UART Bridge	27
	3.6	Updating the Onboard Programmer Firmware	28
4.	Hardwa	are	31
	4.1	Board Details	31
	4.2	Block Diagram	
	4.3	Kit Component Details	
		4.3.1 CY8CKIT-040 Baseboard Components	
_			
5.	Code E	xamples	51
	5.1	Overview	51
	F 0	5.1.1 Programming the Example Projects	
	5.2	FIDJECL BIINKING LED	



		5.2.2 Project Description	57
		5.2.3 Verify Output	58
	5.3	Project: CapSense Proximity and UART	59
		5.3.1 Project Overview	59
		5.3.2 Project Description	60
		5.3.3 Verify Output	69
	5.4	Project: CapSense Touchpad with I2C Tuner	76
		5.4.1 Project Overview	76
		5.4.2 Project Description	78
		5.4.3 Verify Output	81
	5.5	Project: Color Palette	86
		5.5.1 Project Overview	86
		5.5.2 Project Description	86
		5.5.3 Verify Output	103
	5.6	ADC in PSoC 4000	104
		5.6.1 Using PSoC Creator Code example: ADC_VoltageInput	104
6 Ad	lvance	ed Tonics	107
V. Au			107
	0.1	Using FN24W256 F DAM	
	0.2	USING FIVI24VV250 F-RAIVI	
		6.2.2 Write/Pead Operation	
		6.2.3 Example Eirmware	
	63	Using PSoC 5LP as a USB-UART Bridge	
	64	Developing Applications for PSoC 5LP	133
	0.4	6.4.1 Building a Bootloadable Project for PSoC 5I P	134
		6.4.2 Building a Normal Project for PSoC 5I P	142
	65	PSoC 5I P Factory Program Restore Instructions	144
	0.0	6.5.1 PSoC 5I P Programmed with a Bootloadable Application	
		6.5.2 PSoC 5LP Programmed with a Standard Application	
	6.6	Using µC/Probe Tool	
A. Ap	pendi	lix	161
	A.1	CY8CKIT-040 Schematics	161
	A.2	Pin Assignment Table	166
	A.3	Program and Debug Headers	168
	A.4	Use of Zero-ohm Resistors and No Load	169
	A.5	KitProg Status LED States	170
	A.6	Bill of Materials	
	A.7	Irackpad/ Fouchpad Sticker Details	
	A.8	Regulatory Compliance Information	
	A.9	inigrating projects across different Pioneer series kits	1/5

Revision History

179

Safety Information



Regulatory Compliance

The CY8CKIT-040 PSoC[®] 4000 Pioneer 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. For this reason, the board 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, the user may be required to take adequate preventive measures. Also, 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-040 as shipped from the factory has been verified to meet with requirements of CE as a Class A product.





The CY8CKIT-040 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 to devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store unused CY8CKIT-040 boards in the protective shipping package.

End-of-Life/Product Recycling

The end of life for this kit is five years from the date of manufacture mentioned on the back of the box. Contact your nearest recycler to discard the kit.



General Safety Instructions

ESD Protection

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

Handling Boards

CY8CKIT-040 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 the board over any surface.



Thank you for your interest in the PSoC[®] 4000 Pioneer Kit. The kit is designed as an easy-to-use and inexpensive development kit, highlighting the unique flexibility of the PSoC 4000 architecture. Designed for flexibility, this kit offers footprint compatibility with several third-party Arduino[™] shields. In addition, the board features an RGB LED, integrated USB programmer/debugger, a program/ debug header, USB-UART/I²C bridges, a proximity header, and an Arduino-compatible CapSense[®] Trackpad shield. This kit supports either 5 V or 3.3 V as power supply voltages.

The PSoC 4000 Pioneer Kit is based on the PSoC 4000 device family, delivering a programmable platform for a wide range of embedded applications. The PSoC 4000 is the smallest member of the PSoC 4 platform with support for CapSense, Timer Counter Pulse Width Modulator (TCPWM), I²C master or slave, and up to 20 GPIOs. PSoC 4000 is a cost-optimized, entry-level PSoC 4 device targeted as socket replacements for obsolete and/or proprietary 8-bit and 16-bit MCUs. PSoC 4000 with its ARM Cortex-M0 core provides 32 programmable peripherals including CapSense.

1.1 Kit Contents

The PSoC 4000 Pioneer Kit contains the following (see Figure 1-1):

- PSoC 4000 Pioneer Kit board
- Trackpad shield board with a color palette sticker
- Quick start guide
- USB Standard A to Mini-B cable
- 6 jumper wires

Note: Trackpad and Touchpad denote the same in the context of this document and can be used interchangeably.



Figure 1-1. Kit Contents



Inspect the contents of the kit; if you find any part missing, contact your nearest Cypress sales office for help: www.cypress.com/go/support.

Download the latest version of the kit setup file from www.cypress.com/CY8CKIT-040.



1.2 **PSoC Creator**

PSoC Creator[™] is a state-of-the-art, easy-to-use integrated design environment (IDE). It introduces revolutionary hardware and software co-design, powered by a library of preverified and precharacterized PSoC Components. 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



PSoC Creator also enables you to tap into an entire tool ecosystem with integrated compiler chains and production programming programmers for PSoC devices.

For more information, visit www.cypress.com/psoccreator. Visit PSoC Creator training page for video tutorials on learning and using PSoC Creator.



1.2.1 PSoC Creator Code Examples

PSoC Creator includes a large number of code examples. These examples are available from the PSoC Creator Start Page, as Figure 1-3 shows.

Code examples can speed up your design process by starting you off with a complete design, instead of a blank page. The code examples also show how PSoC Creator Components can be used for various applications. Code examples and documentation are included, as shown in Figure 1-4 on page 11.

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, that is, PSoC 3, PSoC 4, or PSoC 5LP; project name; or keyword.
- Select from the menu of examples offered based on the **Filter Options**.
- Review the example project's description (on the **Documentation** tab).
- Review the code from the Sample Code tab. You can copy the code from this window and paste to your project, which can help speed up code development.
- 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





ind Example Projec	t	ି
Filter Options Device Family: Keyword: Project Name: ADC_VolkageInp Bootloader_PSO4 CapSense_CSD_P	All	
CapSense_CSD_P4_LevAmple_Wihtuner CapSense_CSD_P4_LevPower CapSense_CSD_P4_Proximity_Design Clock_P4_Example CSD_Comp_ANUX Em_EEPROIM_Example Flash_Example Interrupts_Example QuadDecExample QuadDecExample RTC_P4_SysTick_Example SCB_E12cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SCB_I2cCommSlave SVT_K_UART_Example UniqueID_Example UniqueID_Example UniqueID_Example		 Conversion result (m/s) is transmitted to PC using UART. 1.2 V Internal reference is used for CSD_ADC conversion. General Description This project example demonstrates the usage of CSD_ADC as a voltage ADC with multiple input electrons. The ADC result is ent to PC (plating Windows terminal) via UART component for monitoring of stata collecting purpose. This project example (yes a basic usage of an analog component (CSD_ADC) combined with the dominunication component (UART). This example will help user to Understand about imegration of exercise component inductions to perform asing the task (measuring an Input voltage). The CSD_ADC component can be used for measuring an analog input voltage within specific range (O' - SV in this example). One of the usages of this CSD_ADC is for measuring a basines voltage.
		Development Kit Configuration. This sector describes the lipot and output concections on the CY8CKIT-640 board for testing CSD_ADC with multiple inputs sector. 1. Bet the power jumper(J9) to SV mode on the CY8CKIT-640 board. 2. Connect a 1 MegD resistor from the Amazous B Out PD(1) to CSD_ADC Sense in PD(0, This lipot resistor is used for converting input values into an input dument. 3. Connect a 220 KD resistor from the CM00 pin PD(2) to the GND pin. CM00 22nF is already provided on the development board.
		Create New Workspace Cancel

Figure 1-4. Code Example Projects with Sample Code

1.2.2 Kit Code Example

In addition to the examples built into PSoC Creator, this kit includes a simple example, which can be used to quickly evaluate the functionality of this kit. The example is described in the Code Examples chapter on page 51. In addition, the chapter also includes a section explaining how to use PSoC Creator code examples with the kit by taking one example.



1.2.3 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 > Example project.... These example projects demonstrate how to configure and use PSoC Creator Components.
- Starter designs: Choose File > New > Project > PSoC 4000 Starter Designs. These starter designs demonstrate the unique features of PSoC 4.
- System Reference Guide: Choose Help > System Reference Guides. This guide lists and describes the system functions provided by PSoC Creator.
- Component datasheets: Right-click a Component and select Open Datasheet, as shown in Figure 1-5 on page 12. 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.

CapSense CapSense CSD	2		
<u>ا</u> ـــــــــــ	*	Cu <u>t</u>	Ctrl+X
		<u>С</u> ору	Ctrl+C
	12	<u>P</u> aste	Ctrl+V
	×	<u>D</u> elete	Del
		Select <u>A</u> ll	Ctrl+A
		Zoom	•
		Shape	•
		Configure	
		Disab <u>l</u> e	
	Ð,	Open Datasheet	

Figure 1-5. Opening Component Datasheet



1.3 Getting Started

This guide helps acquaint you with the PSoC 4000 Pioneer Kit.

- The Software Installation chapter on page 15 describes the installation of the kit software.
- The Kit Operation chapter on page 19 explains how to program the PSoC 4 with a programmer and debugger, either the onboard PSoC 5LP or the external MiniProg3 (CY8CKIT-002).
- The Hardware chapter on page 31 details the hardware operation.
- The Code Examples chapter on page 51 describes the example projects that are provided with the kit.
- The Advanced Topics chapter on page 107 deals with topics such as building projects for PSoC 5LP, using onboard F-RAM, USB-UART functionality, and USB-I²C functionality of PSoC 5LP.
- The Appendix on page 161 provides schematics, pin assignments, information on the use of zero-ohm resistors, troubleshooting details, and the bill of materials (BOM).

1.4 Additional Learning Resources

Cypress provides a wealth of information 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 and 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 4 device family.
- 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. To access code examples from within PSoC Creator, see PSoC Creator Code Examples on page 10.
- Technical Reference Manuals (TRM): Provide detailed descriptions of the architecture and registers in each PSoC 4 device family.
- Development Kits:
 - CY8CKIT-040, CY8CKIT-042, and CY8CKIT-044 are easy-to-use and inexpensive development platforms. These kits include connectors for Arduino-compatible shields and Digilent Pmod peripheral modules.
 - CY8CKIT-049 and CY8CKIT-043 are very low-cost prototyping platforms for sampling PSoC 4 devices.
 - □ The MiniProg3 kit provides an interface for flash programming and debug.
- Knowledge Base Articles (KBA): Provide design and application tips from experts on using the device.
- PSoC Creator Training: Visit www.cypress.com/go/creatorstart/creatortraining for a comprehensive list of video trainings on PSoC Creator.
- Learning From Peers: Visit www.cypress.com/forums to meet enthusiastic PSoC developers discussing the next generation embedded systems on Cypress Developer Community Forums.



1.5 Technical Support

If you have any questions, you can create a support request at 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. If you are outside United States, you can talk to our technical support team by calling: +1 (408) 943-2600 Ext. 2.

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

- Self-help
- Local Sales Office Locations

1.6 Documentation Conventions

Table 1-1. Document Conventions for Guides

Convention	Usage
Courier New	Displays file locations, user-entered text, and source code: C:\cd\icc\
Italics Displays file names and reference documentation: Read about the sourcefile.hex file in the PSoC Creator User Guide.	
[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 a unique functionality of the product.



This section describes the installation of the CY8CKIT-040 PSoC 4000 Pioneer Kit software and the prerequisites.

2.1 Before You Begin

2.

All Cypress software installations require administrator privileges. However, this is not the case for installed software. Before you install the kit software, close any other Cypress software that is currently running.

2.2 Install Software

Follow these steps to install the CY8CKIT-040 PSoC 4000 Pioneer Kit software:

1. Download the CY8CKIT-040 software.

Software Installation

The CY8CKIT-040 software is available in three different formats for download:

- a. CY8CKIT-040 Kit Setup: This installation package contains the files related to the kit. However, it does not include the Windows Installer or Microsoft .NET framework packages. If these packages are not on your computer, the installer directs you to download and install them from the Internet.
- b. CY8CKIT-040 Kit Only: This executable file installs only the kit contents, which include kit code examples, hardware files, and user documents. This package can be used if all the software prerequisites listed in step 5 are installed on your PC.
- c. CY8CKIT-040 CD ISO: This file is a complete package, stored in a CD-ROM image format that you can use to create a CD or extract using ISO extraction programs, such as WinZip or WinRAR. The file can also be mounted like a virtual CD using virtual drive programs such as Virtual CloneDrive or MagicISO. This file includes all the required software, utilities, drivers, hardware files, and user documents.



- 2. If you have downloaded the ISO file, mount it in a virtual drive. Extract the ISO contents if you do not have a virtual drive to mount. Double-click *cyautorun.exe* in the root directory of the extracted content or mounted ISO if 'Autorun from CD/DVD' is not enabledd in the PC. The installation window shown in Figure 2-1 will appear automatically. **Note:** If you are using the 'Kit Setup' or 'Kit Only' file, then go to step 6 for installation.
- 3. Click Install CY8CKIT-040 to start the kit installation, as shown in Figure 2-1.

Figure 2-1. Kit Installer Startup Screen



- 4. Select the folder in which you want to install the CY8CKIT-040 kit-related files. Choose the directory and click **Next**.
- 5. When you click **Next**, the CY8CKIT-040 ISO installer automatically installs the required software, if it is not present on your computer.

Following is the required software:

- a. PSoC Creator 3.1 Service Pack 1 or later: Download the latest version from www.cypress.com/psoccreator.
- b. PSoC Programmer 3.22.2 or later: Download the latest version from www.cypress.com/programmer.



6. Choose the **Typical/Custom/Complete** installation type in the Product Installation Overview window, as shown in Figure 2-2. Click **Next** after you select the installation type.

Figure 2-2. Product Installation Overview Window

Choose the type of installation		
CY8CKIT-040 PSoC 4000 Pioneer Kit		
nstallation Type:		
Tuning	1	
Typicai		
nstalls the most common features of CY8CKIT-040 PSoC 4000 Pioneer Kit.	900000	
	The second second	

- 7. Read and Accept the End-User License Agreement and click **Next** to proceed with the installation.
- 8. When the installation begins, a list of packages appears on the installation page. A green check mark appears next to each package after successful installation.
- 9. Enter your contact information or select the check box **Continue Without Contact Information**. Click **Finish** to complete the CY8CKIT-040 kit installation.
- 10. After the installation is complete, the kit contents are available at the following location:

```
<Install_Directory>\CY8CKIT-040 PSoC 4000 Pioneer Kit\<version>
Default location:
```

Windows 7 (64-bit):

C:\Program Files (x86)\Cypress\CY8CKIT-040 PSoC 4000 Pioneer Kit\<version> Windows 7 (32-bit):

C:\Program Files\Cypress\CY8CKIT-040 PSoC 4000 Pioneer Kit\<version>

Note: For Windows 7/8/8.1 users, the installed files and the folder are read only. To change the property, right-click the folder and choose **Properties > Attributes**; disable the **Read-only** check box. Click **Apply** and **OK** to close the window.

2.3 Install Hardware

There is no additional hardware installation required for this kit.



2.4 Uninstall Software

You can uninstall the CY8CKIT-040 PSoC 4000 Pioneer Kit software using one of the following methods:

- Go to Start > All Programs > Cypress > Cypress Update Manager > Cypress Update Manager. Select the Uninstall button that corresponds to the kit software.
- Go to Start > Control Panel > Programs and Features (or Add/Remove Programs for Windows XP). Select the Uninstall/Change button that corresponds to the kit software.



3.1 Kit Overview

The PSoC 4000 Pioneer Kit can be used to develop applications using the PSoC 4000 family of devices. The kit includes two boards – an Arduino-compatible baseboard and a CapSense-based Trackpad shield board. Figure 3-1 is an image of the PSoC 4000 Pioneer Kit baseboard and shield board with a markup of the onboard components.











3.2 Kit USB Connection

The PSoC 4000 Pioneer Kit connects to the PC over a USB interface (see Figure 3-2). The kit enumerates as a composite device and three separate devices appear under the **Device Manager** in the Windows operating system. See Table 3-1, and Figure 3-3.

Figure 3-2. Kit USB Connection



Table 3-1. PSoC 4000 Pioneer Kit in Device Manager After Enumeration

Port	Description
USB Composite Device	Composite device
USB Input Device	USB-I ² C bridge, KitProg command interface
KitProg	USB-I ² C bridge, programmer and debugger
KitProg USB-UART	USB-UART bridge, which appears as the COM# port

Figure 3-3. KitProg Driver Installation Complete

Driver Software Installation		X
Your device is ready to use		
USB Composite Device USB Input Device KitProg (3.4.1.20) KitProg USB-UART (COM16)	 Ready to use 	
		Close



3.3 **Programming and Debugging PSoC 4000**

The kit allows programming and debugging of the PSoC 4 device in two modes:

- 3.3.1 Using the Onboard PSoC 5LP Programmer and Debugger
- 3.3.2 Using the CY8CKIT-002 MiniProg3 Programmer and Debugger

3.3.1 Using the Onboard PSoC 5LP Programmer and Debugger

The default programming interface for the kit is a USB-based, onboard programming interface. Before trying to program the device, PSoC Creator and PSoC Programmer must be installed. See Install Software on page 15 for information on installing the kit software.

 To program the device, plug the USB cable into the programming USB connector J10, as shown in Figure 3-4. The kit will enumerate as a composite device. See Kit USB Connection on page 21 for details.

Figure 3-4. Connect USB Cable to J10



2. The onboard PSoC 5LP uses serial wire debug (SWD) to program the PSoC 4 device. See Figure 3-5.

Note: Figure 3-5 is provided only for reference, all connections are hardwired on the board itself.

Figure 3-5. SWD Programming of PSoC 4000 Using PSoC 5LP





 The kit's onboard programmer will enumerate on the PC and in the software tools as KitProg. Open an example project in PSoC Creator (such as Project: Blinking LED on page 56) and initiate the build by choosing Build > Build Project or pressing [Shift] [F6]. See Figure 3-6.

Figure 3-6. Build Project in PSoC Creator

Bui	ld <u>D</u> ebug <u>T</u> ools <u>W</u> i	indow <u>H</u> elp
	Build CY8CKIT_040_Blink	king_LED Shift+F
	Clean CY8CKIT_040_Blin	king_LED
Æ	Clean and Build CY8CKT	T_040_Blinking_LED
à	<u>C</u> ancel Build	Ctrl+Brea
1	Compile File	Ctrl+F
13	Generate Application	
	Generate Project Datash	eet

 After the project is built without errors and warnings, choose Debug > Program or press [Ctrl] [F5] to program the device. See Figure 3-7.

Debug Tools Window Help Windows Program Ctrl+F5 Select Debug Target ... 2 * Debug F5 ×. Debug without Programming Alt+F5 Attach to Running Target ... 5 Toggle Breakpoint F9 New Breakpoint 0 Delete All Breakpoints Ctrl+Shift+F9 Enable All Breakpoints

Figure 3-7. Program Device From PSoC Creator

The onboard programmer supports only the RESET programming mode. When using the onboard programmer, the board can either be powered by the USB (VBUS) or by an external source such as an Arduino shield (see Power Supply System on page 38). If the board is already powered from another source, plugging in the USB programmer does not damage the board.

3.3.2 Using the CY8CKIT-002 MiniProg3 Programmer and Debugger

The PSoC 4 on the kit can also be programmed using a MiniProg3 (CY8CKIT-002). To use MiniProg3 for programming, use the J6 connector on the board, as shown in Figure 3-8. With MiniProg3, programming is similar to the onboard programmer; however, it enumerates as MiniProg3 instead of KitProg.

The board can also be powered from the MiniProg3. To do so, choose **Tool** > **Options** in PSoC Creator. In the Options window, expand **Program/Debug** > **Port Configuration**; click **MiniProg3** and select the settings shown in Figure 3-9. Choose **Debug** > **Program** to program and power the board.



Note The CY8CKIT-002 MiniProg3 is not part of the PSoC 4000 Pioneer Kit contents. It can be purchased from the Cypress Online Store.

Figure 3-8. PSoC 4 Programming/Debug Using MiniProg3



Figure 3-9. MiniProg3 Configuration in PSoC Creator



Note: Ensure that both MiniProg3 (with or without power) on header J6 and KitProg are not connected to the onboard PSoC 4 at the same time. This will result in failed device acquisition from both.