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CY3217

## MiniProg1 Kit User Guide

Spec. # 001-66541 Rev. \*A

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# Contents



<b>1. Introduction</b>	<b>5</b>
1.1 Kit Contents .....	5
1.2 Additional Learning Resources .....	5
1.3 Document History .....	6
1.4 Documentation Conventions .....	6
<b>2. Getting Started</b>	<b>7</b>
2.1 Installation.....	7
2.2 PSoC Designer .....	11
2.3 PSoC Programmer .....	12
<b>3. Using MiniProg1</b>	<b>13</b>
3.1 Introduction .....	13
3.2 Start PSoC Programmer .....	14
3.3 Select Programmer View Options.....	14
3.4 Select Programmer Options .....	15
3.4.1 Automatic Firmware Update.....	15
3.4.2 Automatic Chip Reset .....	15
3.5 Select Port .....	15
3.5.1 Programming Characteristics .....	16
3.6 Select Programming Mode .....	16
3.7 Select Hex File.....	17
3.8 Program a Device .....	17
3.8.1 Turn Verification Off.....	17
3.8.2 Verify Programming.....	17
3.9 Upgrade Firmware .....	17
3.10 Abort a Process .....	18
3.11 Read .....	18
3.12 Checksum.....	19
3.13 Erase Flash.....	19
3.13.1 Erase a Block.....	19
3.13.2 Erase Flash Contents.....	19
3.14 Patch Image.....	20
3.15 MiniProg1.....	20
3.15.1 Connect MiniProg1.....	20
3.15.2 Program with MiniProg1 .....	21
<b>A. Appendix</b>	<b>23</b>
A.1 Programming Header .....	23



# 1. Introduction



Thank you for your interest in the CY3217-MiniProg1 Kit. The MiniProg1 programmer is designed to help hardware, firmware, and software developers in building their own systems around the Cypress 8-bit PSoC<sup>®</sup> 1 devices. You can use the CY3217-MiniProg1 kit with PSoC Designer™ and PSoC Programmer. This kit can be used as an in-system serial programmer (ISSP) to program PSoC 1 devices. The MiniProg1 can also supply power to a target board at 5 V.

Cypress does not recommend the MiniProg1 in this kit for production programming. For production programming, see a list of qualified vendors on the [General PSoC Programming](#) page of the Cypress website.

## 1.1 Kit Contents

The CY3217-MiniProg1 Kit contains:

- MiniProg1 programmer
- USB A to Mini B cable
- CY3217-MiniProg1 kit CD
  - PSoC Designer installation file
  - PSoC Programmer installation file
  - Bridge Control Panel installation file (packaged along with PSoC Programmer)
  - Kit guide
  - Quick start guide
  - Release notes

Inspect the contents of the kit; if any parts are missing, contact your nearest Cypress sales office for further assistance.

## 1.2 Additional Learning Resources

Visit <http://www.cypress.com> for additional learning resources in the form of data sheets, technical reference manual, and application notes.

- For more information on PSoC Designer functionality, releases, and FAQ:  
<http://www.cypress.com/go/psocdesigner>
- For more information on PSoC Programmer, supported hardware, and COM layer:  
<http://www.cypress.com/go/psocprogrammer>
- For a list of PSoC Designer-related trainings:  
<http://www.cypress.com/?rID=40543>

## 1.3 Document History

Revision	PDF Creation Date	Origin of Change	Description of Change
**	07/21/2011	RKPM	Initial version of kit guide
*A	09/14/2011	RKPM	Updated images in section 2.1. Minor content updates throughout the document.

## 1.4 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\
<i>Italics</i>	Displays file names and reference documentation: Read about the <i>sourcefile.hex</i> file in the <i>PSoC Designer User Guide</i> .
<b>[Bracketed, Bold]</b>	Displays keyboard commands in procedures: <b>[Enter]</b> or <b>[Ctrl] [C]</b>
File > Open	Represents menu paths: File > Open > New Project
<b>Bold</b>	Displays commands, menu paths, and icon names in procedures: Click the <b>File</b> icon and then click <b>Open</b> .
Times New Roman	Displays an equation: $2 + 2 = 4$
Text in gray boxes	Describes cautions or unique functionality of the product.

## 2. Getting Started



This chapter describes how to install and configure the CY3217-MiniProg1 kit

### 2.1 Installation

To install the CY3217-MiniProg1 kit, follow these steps:

1. Insert the kit CD into the CD drive of your PC. The CD is designed to auto-run and the kit installer startup screen appears.

You can also download the latest installer from <http://www.cypress.com/go/CY3217-MiniProg1>. Three types of installers are available for download:

- a. CY3217-MiniProg1\_ISO: This file (ISO image) is an archive file of the optical disc provided with the kit. You can use this to create an installer CD or extract information using WinRar or similar tools.
  - b. CY3217-MiniProg1\_Single Package: This executable file installs the contents of the kit CD, which includes PSoC Programmer, PSoC Designer, and user documents.
  - c. CY3217-MiniProg1\_Single Package (without prerequisites): This executable file installs only the kit user documents.
2. Click **Install CY3217-MiniProg1 Kit Content** to start the installation, as shown in [Figure 2-1](#).

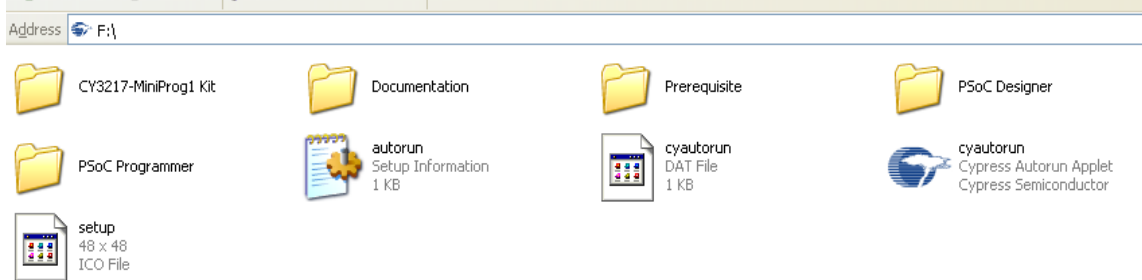
Figure 2-1. Kit Installer Startup Screen





**Note** If auto-run does not execute, double-click the *cyautorun.exe* file on the root directory of the CD, as shown in [Figure 2-2](#). To access the root directory, click **Start > My Computer > <drive:> CY3217-MiniProg1 Kit**.

Figure 2-2. Root Directory of the CD



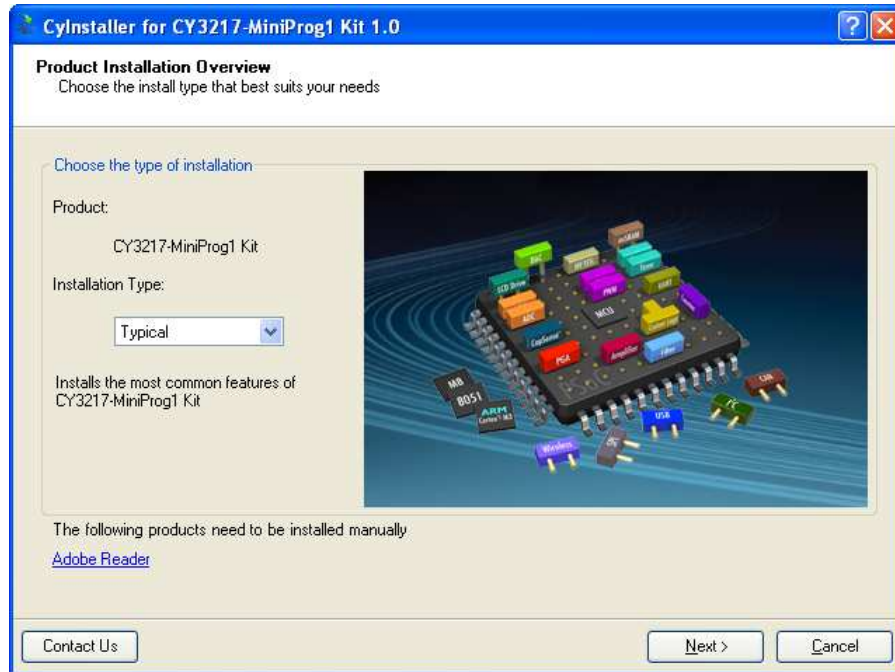
3. The **InstallShield Wizard** screen appears. On this screen, choose the folder location to install the setup files. You can change the location of the folder using **Change**, as shown in [Figure 2-3](#).
4. Click **Next** to launch the kit installer.

Figure 2-3. InstallShield Wizard



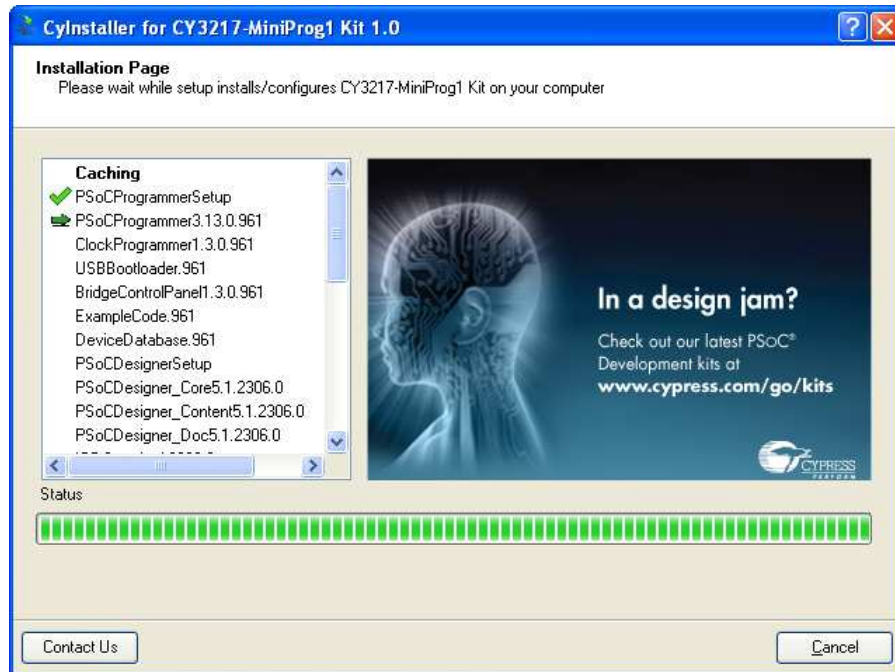
5. In the **Product Installation Overview** window, select the installation type that best suits your requirement. The drop-down menu has three options: **Typical**, **Complete**, and **Custom**, as shown in [Figure 2-4](#).
6. Click **Next** to start the installation.

Figure 2-4. Installation Type Options



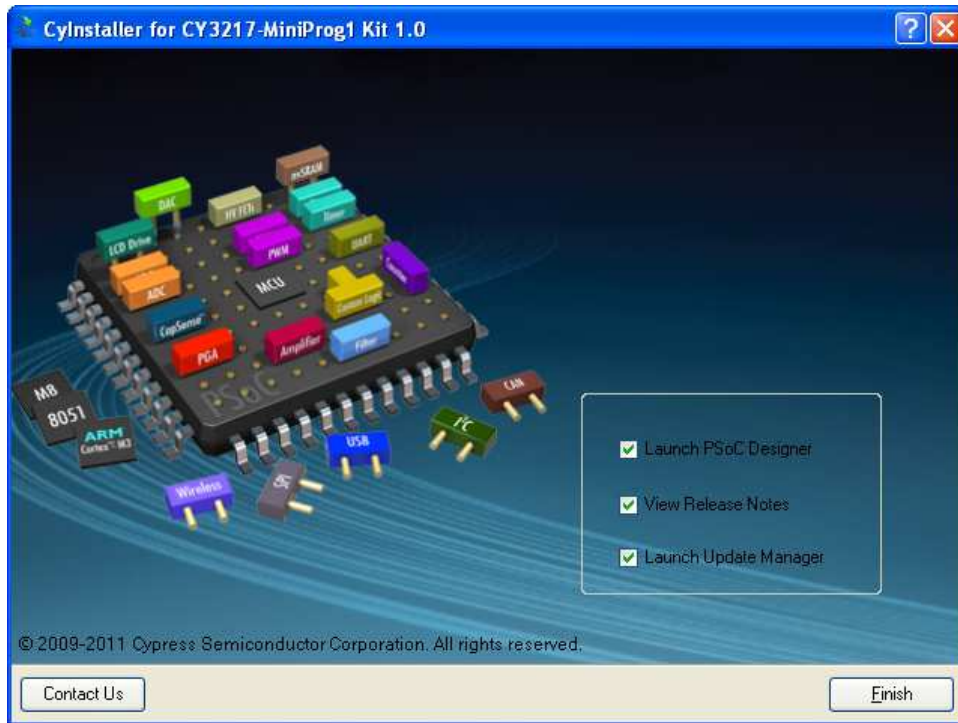
7. When the installation begins, a list of packages is displayed on the **Installation Page**. A green check mark appears adjacent to every package that is downloaded and installed, as shown in Figure 2-5.
8. Wait until all the packages are downloaded and installed successfully.

Figure 2-5. Installation Page



9. Click **Finish** to complete the installation, as shown in [Figure 2-6](#).

Figure 2-6. Installation Completion Page



After software installation, verify that you have all hardware and drivers set up for the CY3217-MiniProg1 Kit by connecting the kit to your PC via its USB interface. Because this is the first time you have connected the programmer to this PC, initial drivers are installed. Follow the instructions to complete the installation process.

Verify your installation and setup by opening PSoC Programmer with the MiniProg1 connected to USB.

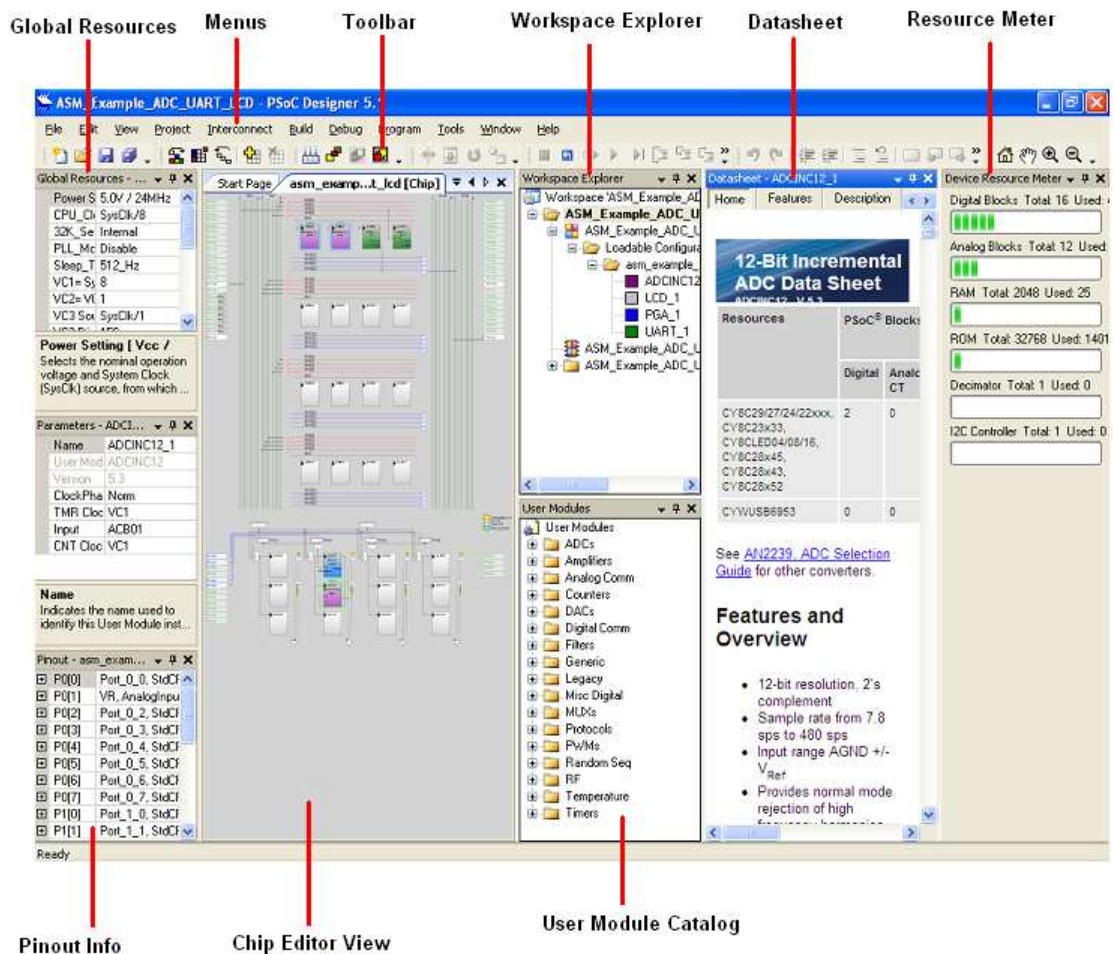
## 2.2 PSoC Designer

PSoC Designer is the integrated design environment (IDE) that enables you to customize your PSoC application. The latest version of PSoC Designer has many new features, bug fixes, and support for PSoC devices. Download and install the latest version from <http://www.cypress.com/go/psocdesigner>.

To open PSoC Designer:

1. Click **Start > All Programs > Cypress > PSoC Designer <version> > PSoC Designer <version>**.
2. To create a new project in PSoC Designer, click **File > New Project**.
3. To open an existing project in PSoC Designer, click **File > Open Project/Workspace...**

Figure 2-7. PSoC Designer Interconnect View



**Note** For more information on PSoC Designer, see the PSoC Designer IDE Guide located at: <Install\_Directory>:\Cypress\PSoC Designer\<version>\Documentation

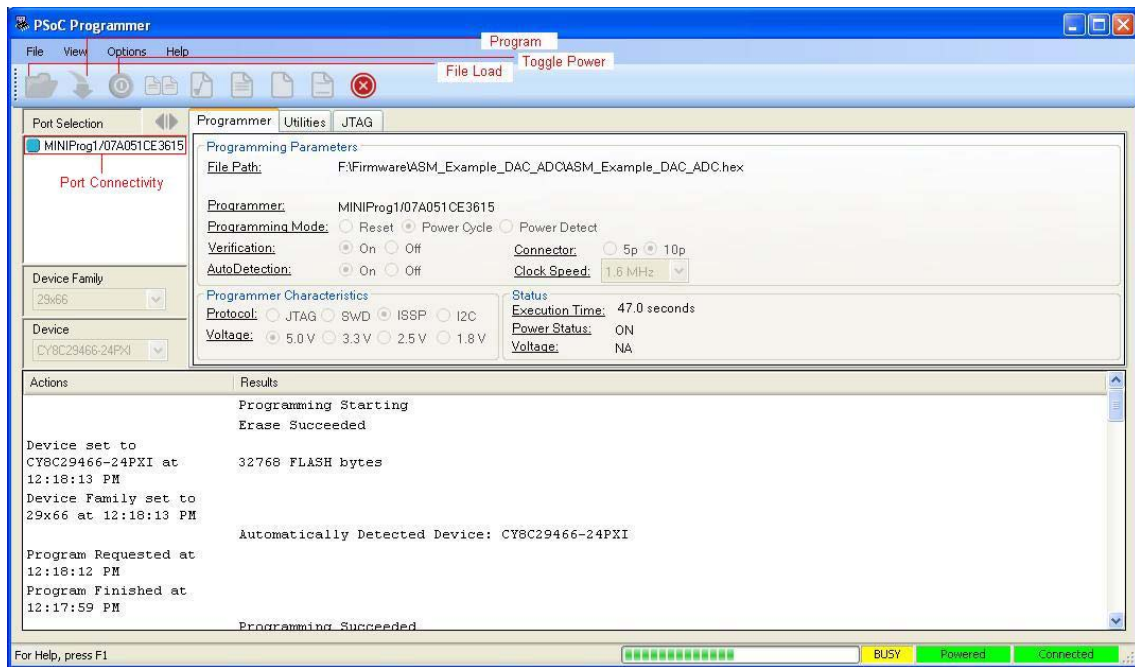
See [Additional Learning Resources](#) on page 5 for links to PSoC Designer training. The PSoC Designer quick start guide is available at: <http://www.cypress.com/?rID=47954>.

## 2.3 PSoC Programmer

PSoC Programmer provides programming support for all PSoC devices. Download and install the latest version of PSoC Programmer from <http://www.cypress.com/go/psocprogrammer>.

1. To open PSoC Programmer, click **Start > All Programs > Cypress > PSoC Programmer <version> > PSoC Programmer <version>**.
2. Select the MiniProg1 from **Port Selection**, as shown in [Figure 2-8](#).

Figure 2-8. PSoC Programmer Window



3. Click the **File Load** button to load the hex file.
4. Click **Program** to program the hex file.
5. Close PSoC Programmer.

**Note** For more information on PSoC Programmer, see the user guide located at: `<Install_Directory>\Cypress\Programmer\<version>\Documents`.

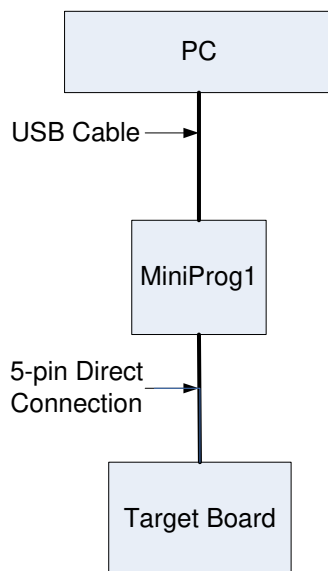
# 3. Using MiniProg1



## 3.1 Introduction

The CY3217-MiniProg1 Kit can be used as an ISSP to program PSoC 1 devices. The MiniProg1 is an interface that programs chips using PSoC Programmer. It enables the PC host software to communicate through high-speed USB to the target device to be programmed, as shown in [Figure 3-1](#).

Figure 3-1. PC to Target Board Interface



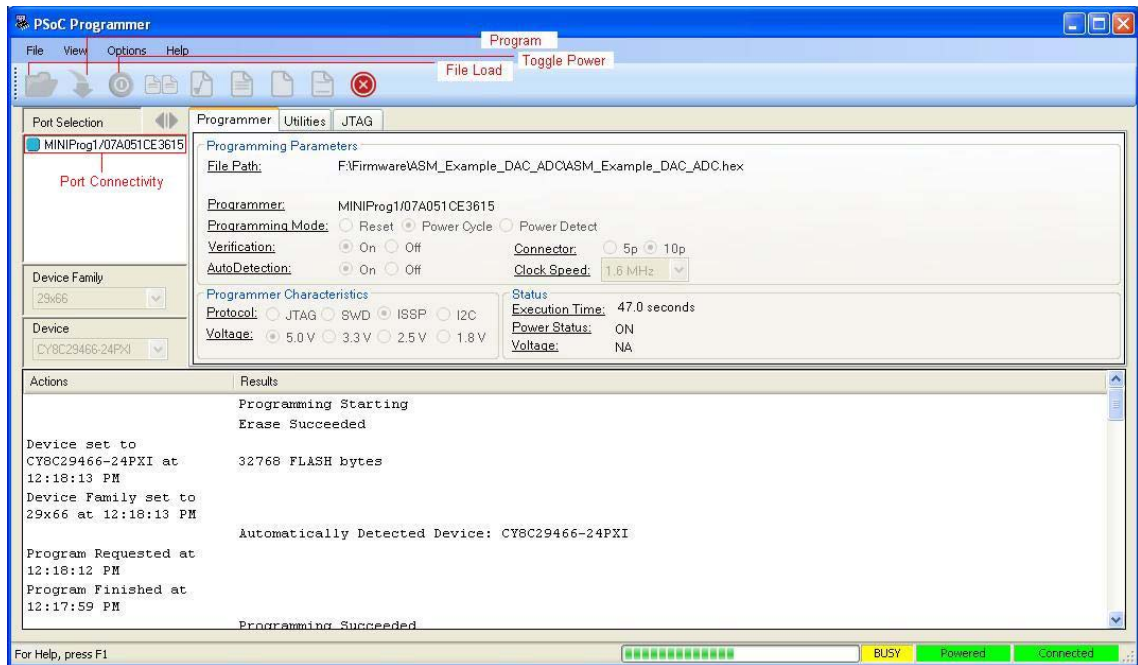
**Note** In-system serial programming (ISSP) is a Cypress legacy interface used to program the PSoC 1 family of microcontrollers. For more information about the ISSP interface, see the PSoC 1 Technical Reference Manual.

## 3.2 Start PSoC Programmer

You can start PSoC Programmer from the Windows desktop or through PSoC Designer. Set up all hardware, including the device to program, before you start PSoC Programmer.

1. To open PSoC Programmer from the desktop, click **Start > All Programs > Cypress > PSoC Programmer <version> > PSoC Programmer <version>**.

Figure 3-2. PSoC Programmer View



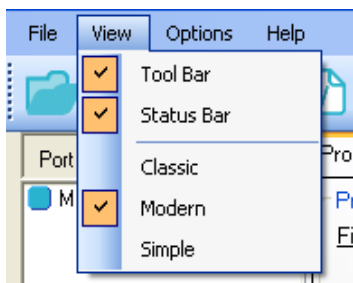
2. To open the program from within PSoC Designer, load the target project that contains the hex file and the device to program.
3. Select **Program > Program Part** to launch the embedded programmer.

## 3.3 Select Programmer View Options

PSoC Programmer can be run as a standalone application or can be called as a COM object from other programs. The programmer interface is flexible and can be presented from within other programs. You can choose an interface based on the requirements of your program.

To choose a new view of the programmer, select **View** menu for options.

Figure 3-3. Programmer View Options

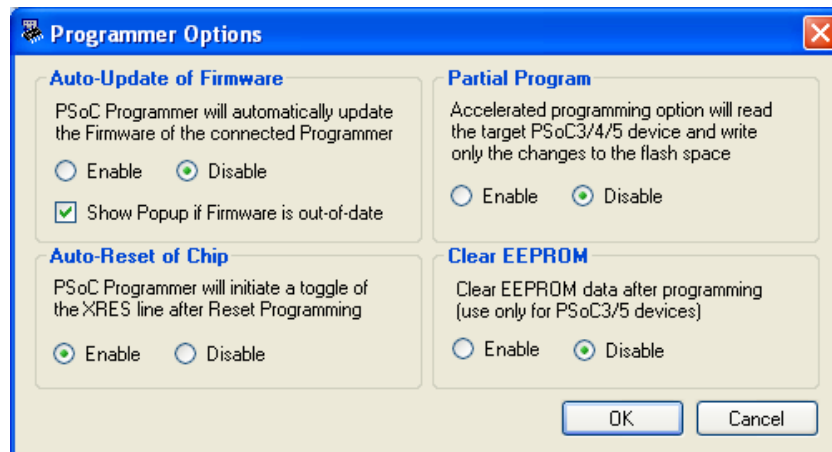


- **Classic:** This is similar to the Programmer 2.3x. Some updated features of Programmer 3.x are not available in this view. This mode retains the look and feel of PSoC Programmer 2.x. Cypress recommends using the Modern View.
- **Modern:** This is the default and most feature-rich view of PSoC Programmer.
- **Simple:** This is the basic view; load a hex file and program.

## 3.4 Select Programmer Options

Click **Options > Programmer Options** to view the following window.

Figure 3-4. Programmer Options



### 3.4.1 Automatic Firmware Update

The **Programmer Options** dialog provides the option to enable automatic firmware upgrades for programmer hardware. These automatic updates apply to all programmers that support in-field upgrade of firmware. The option can be changed at any time, even when programmer is not connected. You can enable or disable the automatic updates of firmware.

### 3.4.2 Automatic Chip Reset

The **Programmer Options** dialog also provides an option to enable or disable toggling of the XRES line after the programmer operation (such as Program, Checksum, and Read) is complete. This option is applicable only if the chip is acquired in Reset mode.

## 3.5 Select Port

To select a port, click the port you are using to connect to the programming device, as shown in [Figure 3-2](#).

When changing ports, PSoC Programmer attempts to connect to the selected port and displays the port status in the lower right corner of the window. If you are connected to a device on another port, PSoC Programmer disconnects from the original device before connecting to the new device.

USB ports are added to the port list automatically when a programming device is connected and removed from the list when disconnected.

Setting a base and part device allows the programming operations to perform actions based on the characteristics of the PSoC device. For example, CY8C24794 parts require Power Cycle Programming Mode because the reset pin is not available for Reset Programming Mode. Flash sizes are



determined by selecting a PSoC device. Flash size is important when the verify operation is performed. Changing the device enables or disables Acquire Mode options and displays flash size information in the status window.

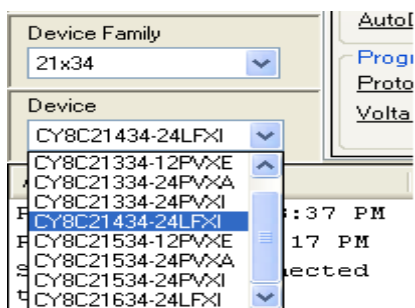
#### To select a device:

By default, PSoC Programmer is set to autodetect the device. Programmer queries the device and sets the device based on the result. Click the **Program** button when you are ready to program and the proper device is selected.

#### To select a device with autodetection off:

1. Click the **Device Family** drop-down list and select the target device family.
2. Click the **Device** drop-down box and select the target device associated with the target device family.

Figure 3-5. PSoC Programmer Device Selection



### 3.5.1 Programming Characteristics

Depending on the programmer capabilities, you can select various protocols. Some programmers are single protocols, but others allow you to select different protocols. The **Device Family** and **Device** drop-down menus adjust according to the protocol selected and the device to be programmed. It supports the ISSP protocol.

Voltage supplied by MiniProg1 to target board is 5 V and total current supplied by MiniProg1 to the target board being programmed is 302 mA.

**Note** Total current supplied to MiniProg1 from the USB port is 500 mA, current consumption is 198 mA. Hence, total current supplied to the target board is 302 mA (difference between total current supplied and current consumption).

## 3.6 Select Programming Mode

Programming mode determines how PSoC Programmer acquires the device for programming.

There are two modes:

1. **Reset** – Used for ISSP header programming on a self-powered target application board. In this mode, the target board supplies the power and the programmer uses the reset pin to acquire.
2. **Power Cycle** – Used when the programmer requires power. The programmer cycles power to acquire. Select the **Power Device** checkbox if your target board is not self powered.

**Note** You cannot use the Reset Programming Mode on devices that do not have an XRES pin.

## 3.7 Select Hex File

Load a hex file into PSoC Programmer before programming a device. PSoC Programmer only programs devices using hexadecimal files (\*.hex). If your project is not compiled into hexadecimal format, use PSoC Designer to prepare your project for programming before continuing.

To select a file for programming:

1. Click **File Load** or press **[F4]**.
2. In the Open dialog, browse to the folder containing the file, then select a file.
3. Click **Open**.

## 3.8 Program a Device

To program a device:

1. Load the hex file.
2. Click **Connect**.
3. Click **Program** or press **[F5]**.

The program operation erases, programs, verifies, protects, and performs a checksum. The verify is performed before the protect action, so all blocks are verified.

### 3.8.1 Turn Verification Off

When debugging your program, you may make changes, rebuild, and reprogram a device frequently. To save time during this process, turn the **Verification** stage off. This saves approximately 30 percent of the total programming time. Do not turn **Verification** off for production programming.

### 3.8.2 Verify Programming

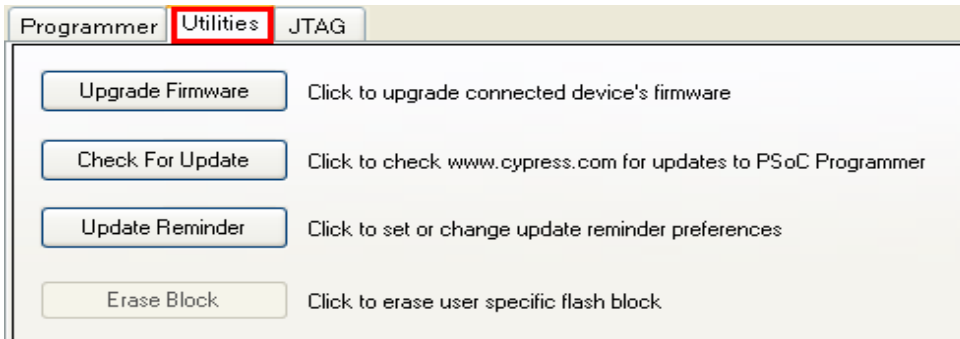
To verify device programming, click **File > Verify** or press **[F8]**. This is different from the verification done automatically during programming, as protected blocks are not verified. If the device is read protected, the verify operation fails. On completion, PSoC Programmer specifies the number of protected blocks.

The results of the verify procedure fills the text window, flowing up from the initial operation command. To save or copy the results, right-click the text window and select **Copy** or **Save As** from the drop-down menu.

## 3.9 Upgrade Firmware

Firmware for programmers must be updated to support new and updated PSoC devices and to ensure that the latest bug fixes are applied. When PSoC Programmer starts, or when a different port is selected, programmer checks the connected programming device firmware. To upgrade firmware, go to **Utilities > Upgrade Firmware**, as shown in [Figure 3-6](#).

Figure 3-6. Upgrade Firmware



### 3.10 Abort a Process

Programming and other long processes can be aborted. The **Abort** button is enabled only when PSoC Programmer is in a busy state. The busy state indicates that the programmer is executing an action such as Program, Verify, Checksum, Read, and Upgrade Firmware. You can click the **Abort** button at any time during a busy state. This aborts execution of the current operation.

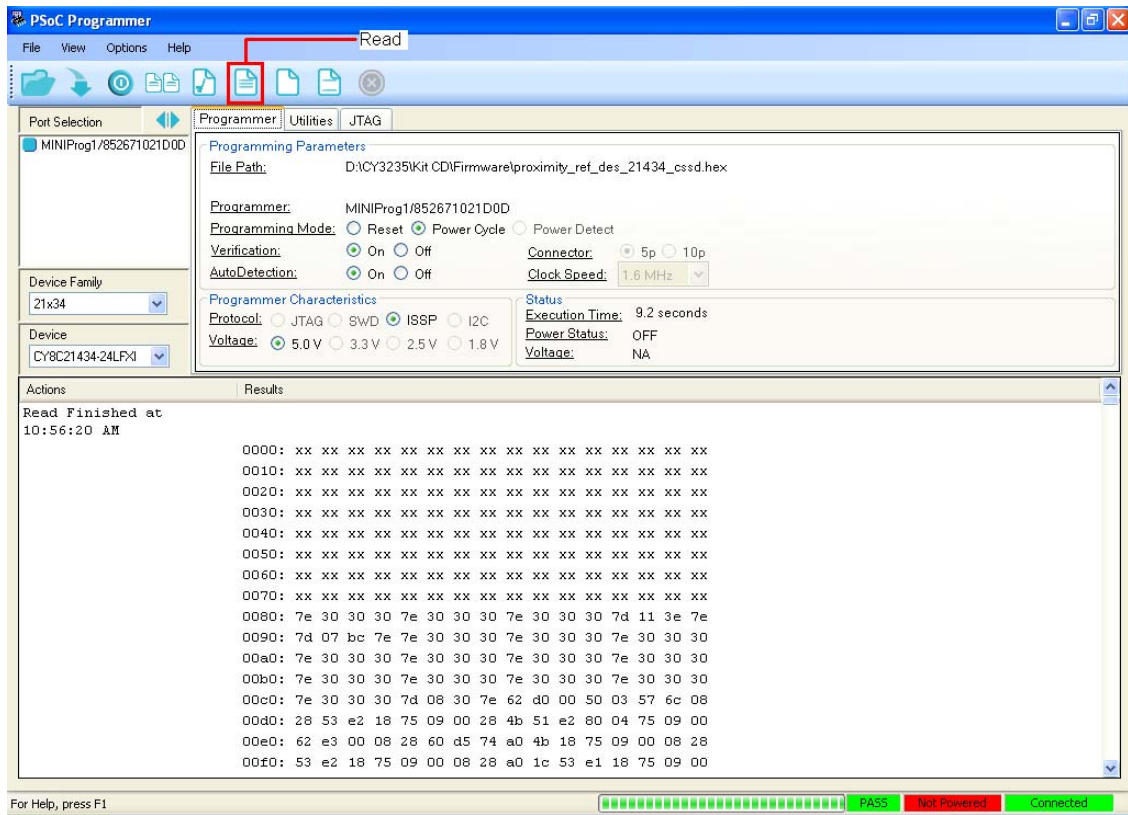
The abort function is useful when you click Program with the PSoC device not connected to the programmer or when attempting to acquire a device using the Reset mode, when the device is not powered. The Acquire operation takes about 20 seconds to time out. Use the **Abort** button to avoid waiting for timeout.

If you abort programming of the chip's flash contents, the chip can be in an unknown state. In this case, reprogram; otherwise, the device fails in execution.

### 3.11 Read

Click **Read** or press **[F7]** to read the contents of a device. Device contents are displayed in hexadecimal, as shown in [Figure 3-7](#).

Figure 3-7. PSoC Programmer



Flash security data is displayed along with the read values in the PSoC Programmer Results window. Unprotected blocks are displayed as 'U'. Protected blocks are displayed as 'xx'. See the PSoC Designer IDE Guide for information about protecting flash.

### 3.12 Checksum

Click **Checksum** or press [F6] to perform a checksum operation on a device. If a hex file is loaded, device values are compared to the loaded file. Read and Checksum operations may be completed without a loaded hex file.

### 3.13 Erase Flash

The flash on the device attached to the programmer can be erased completely, or block by block.

#### 3.13.1 Erase a Block

To erase a block, the flash security for the block must be set to U, unprotected. See the PSoC Designer IDE Guide for information about protecting flash.

#### 3.13.2 Erase Flash Contents

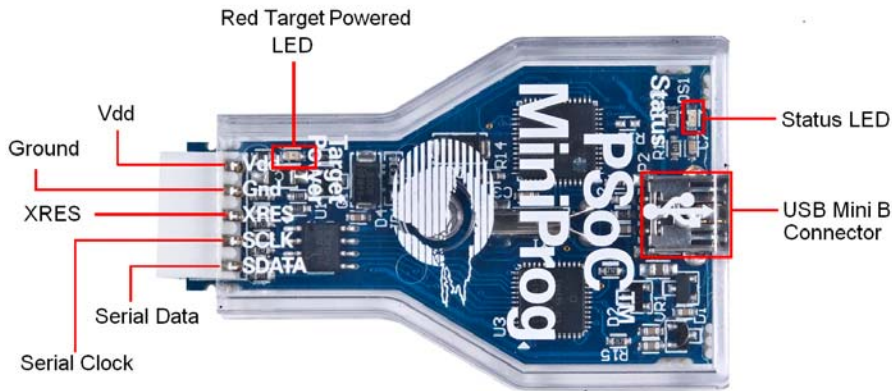
To erase all flash content, select **File > Erase All Flash** or press [F9]. The Erase All function performs a series of steps that destroys the data in the flash banks and resets the protection block in each flash bank to unprotected.

### 3.14 Patch Image

To use this option, select **File > Patch Image** or press **[F12]**. You can load a hex file and connect the MiniProg1 to the target device. PSoC Programmer reads the flash content on the target device and compares it with the selected hex file. Then, PSoC Programmer replaces the flash blocks. This feature is useful to replace calibration data or a manufacturing number.

### 3.15 MiniProg1

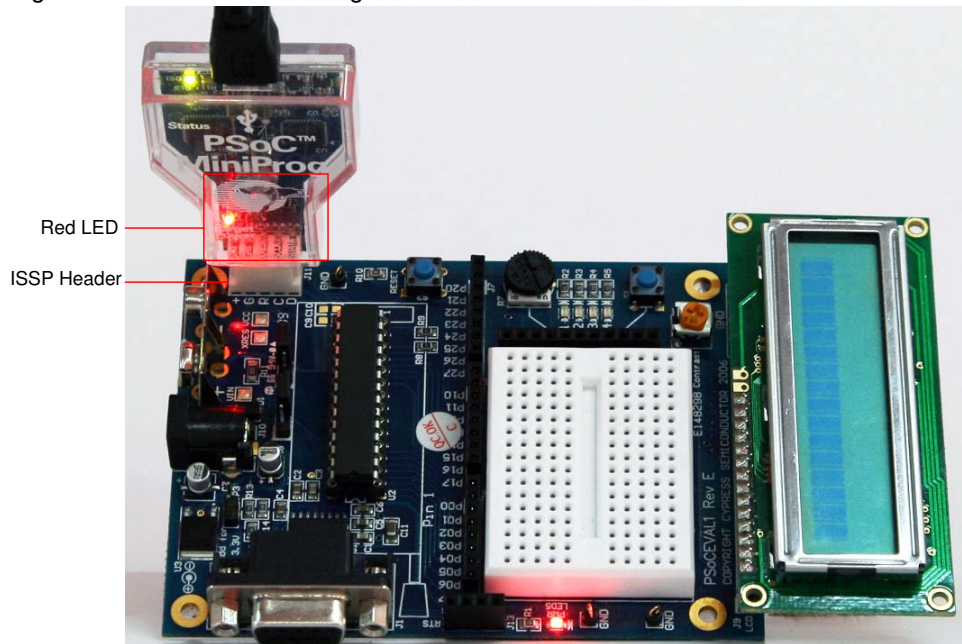
Figure 3-8. MiniProg1 Details



#### 3.15.1 Connect MiniProg1

The PSoC 1 device can be programmed using a MiniProg1 by connecting it to the ISSP header on the board, as shown in [Figure 3-9](#).

Figure 3-9. Connect MiniProg1



**Note** Ensure that the first pin (Vdd) of MiniProg1 is connected to the first pin (Vdd) of the ISSP programming header on the target board.

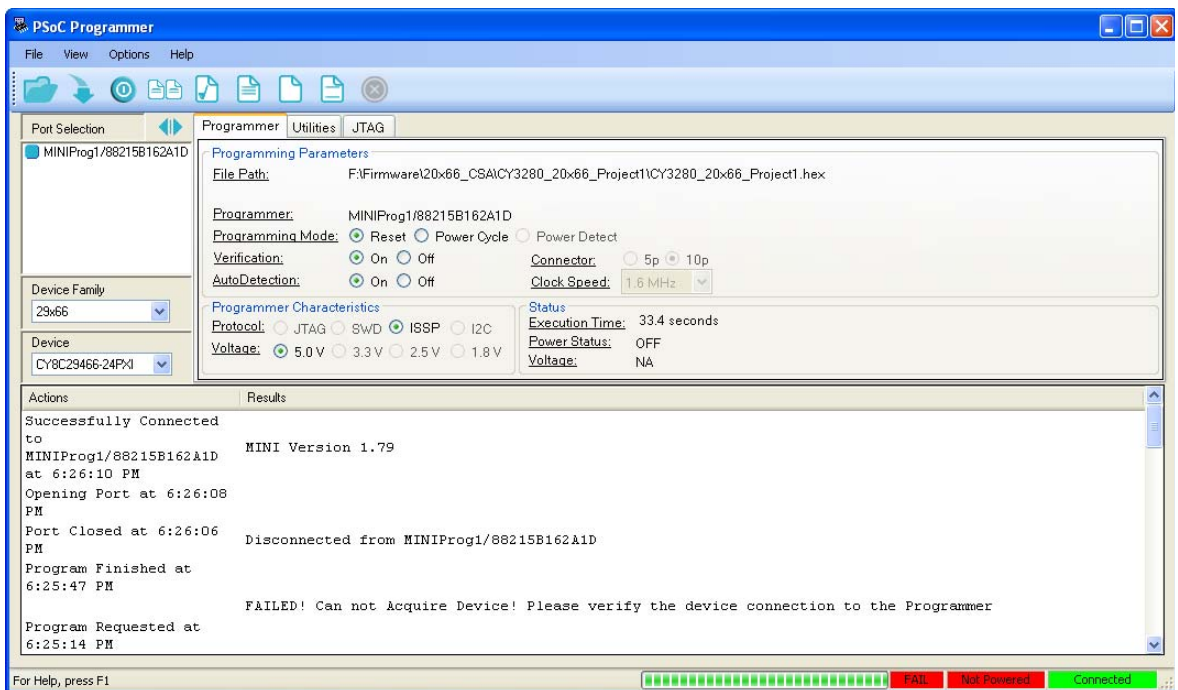
### 3.15.2 Program with MiniProg1

Follow these steps to program using MiniProg1:

1. Connect the USB cable to the PC and MiniProg1.
2. Plug in the MiniProg1 to the ISSP header on the target board.
3. When USB is connected to the MiniProg1, the green LED glows in the MiniProg1.
4. Open PSoC Programmer (see [Start PSoC Programmer on page 14](#) for details).
5. Click the **File Load** button and browse to the hex file location. Select the hex file and click **Open**.
6. Click **Connect** or double-click on the respective MiniProg under Port Selection to connect to the MiniProg.
7. Click **Program** or press **[F5]** to initiate programming (see [Program a Device on page 17](#) for details).
8. The green LED on the MiniProg1 blinks to indicate the progress of programming.
9. After successful programming, the red LED on the MiniProg1 is powered off.
10. Select the **Toggle Power** button in PSoC Programmer to power the board via MiniProg1 and verify output.

**Note** When MiniProg1 cable is unplugged from PC during programming, programming fails, as shown in [Figure 3-10](#).

Figure 3-10. PSoC Programmer





# A. Appendix



## A.1 Programming Header

This section discusses the design consideration and component selection for the programming header on the target board.

The 5-pin connector on MiniProg1 is configured as a single row with a 100-mil pitch. It is designed to mate with a Molex model 22-23-2051 (straight) or 22-05-3051 (right angle) male header, with a key tab. The signal assignment is shown in [Figure A-1](#).

Figure A-1. Signal Assignment

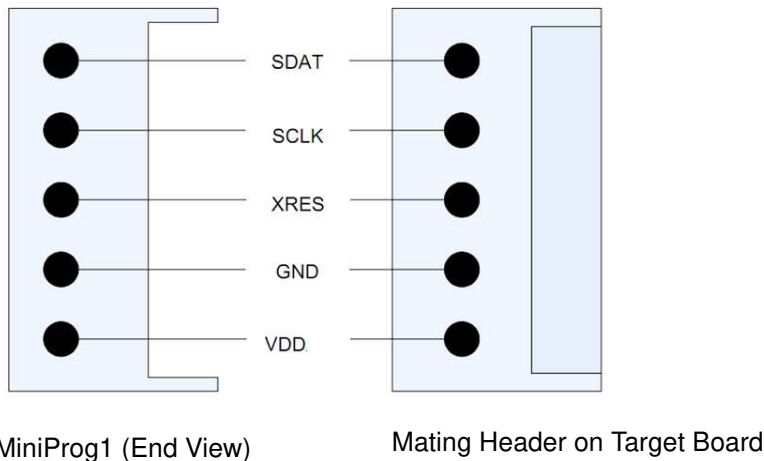
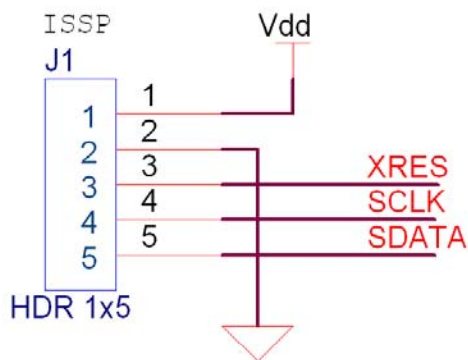


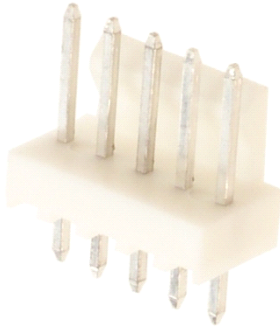
Figure A-2. Proposed Schematic for Mating Header (on target board)





See the respective PSoC 1 data sheet for pin SCLK and SDATA pin assignments.

Figure A-3. Proposed Header (on target board)



This is a five position, 2.54 mm (.100") pitch header from Molex Inc (Part No. 22-23-2051).

For details on the header, visit [http://www.molex.com/molex/products/datasheet.jsp?part=active/002232051\\_PCB\\_HEADERS.xml&channel=Products](http://www.molex.com/molex/products/datasheet.jsp?part=active/002232051_PCB_HEADERS.xml&channel=Products).