Clock Programmer Guide

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1. Introduction

This document describes the installation and use of Cypress' Clock Programmer software. This software is used as a standalone application to program Cypress Clock devices through the use of JEDEC files. If the information in this guide is not sufficient to resolve any issues while using the Clock Programmer, use the support resources listed in the next section.

The Clock Programmer is an additional utility bundled with the PSoC Programmer release. You must download and install PSoC Programmer to use the Clock Programmer.

1.1 Support

Free support for PSoC Programmer and Clock Programmer is available online at www.cypress.com. Resources include training seminars, discussion forums, application notes, PSoC consultants, TightLink technical support, Email/Knowledge Base, and Application Support Technicians.

Technical support is also available by phone at 1-800-541-4736.

Before using Cypress support services, know the version of PSoC Programmer and Clock programmer installed on your system. To determine the version, build, or service pack of PSoC Programmer, click **Help > About Clock Programmer**.

1.2 Product Upgrades

Cypress provides scheduled upgrades and version enhancements for PSoC Programmer and Clock Programmer free-of-charge. You can download them directly from www.cypress.com under **Support & Community > Software Tools**. Also provided are critical updates to system documentation under Design Resources or go to the Design Resources section at www.cypress.com.

1.3 Document Conventions

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 Designer 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**.
Text in gray boxes	Describes Cautions or unique functionality of the product.

2. Installation

The Clock Programmer is bundled with PSoC Programmer. You must install PSoC Programmer to use Clock Programmer. PSoC Programmer may be downloaded directly from www.cypress.com/psocprogrammer.

2.1 Setup

You can install only one version of PSoC Programmer on your computer. Clock Programmer is part of this installation package. Cypress recommends that you update to the latest release. Based on our product policy, it should be a superset of all previous releases (unless otherwise specified). The initial release of the Clock Programmer, version 1.0, was PSoC Programmer 3.05.

Downloading and installing from the Cypress website:

1. Go to www.cypress.com/psocprogrammer.
2. Locate *PSoC Programmer Setup.exe* and download the file.
3. Open *PSoC Programmer.exe* to start the setup wizard.
4. Follow the onscreen prompts to install PSoC Programmer - Typical Installation.

If an earlier version of PSoC Programmer is already installed, the Setup Wizard prompts you to delete the older version. The default PSoC Programmer installation folder is:

```
C:\Program Files (x86)\Cypress\Programmer
```

3. Using Clock Programmer

The Clock Programmer opens a JEDEC file, connects to a programming device, selects target devices, programs, reads, saves, verifies, and runs a checksum.

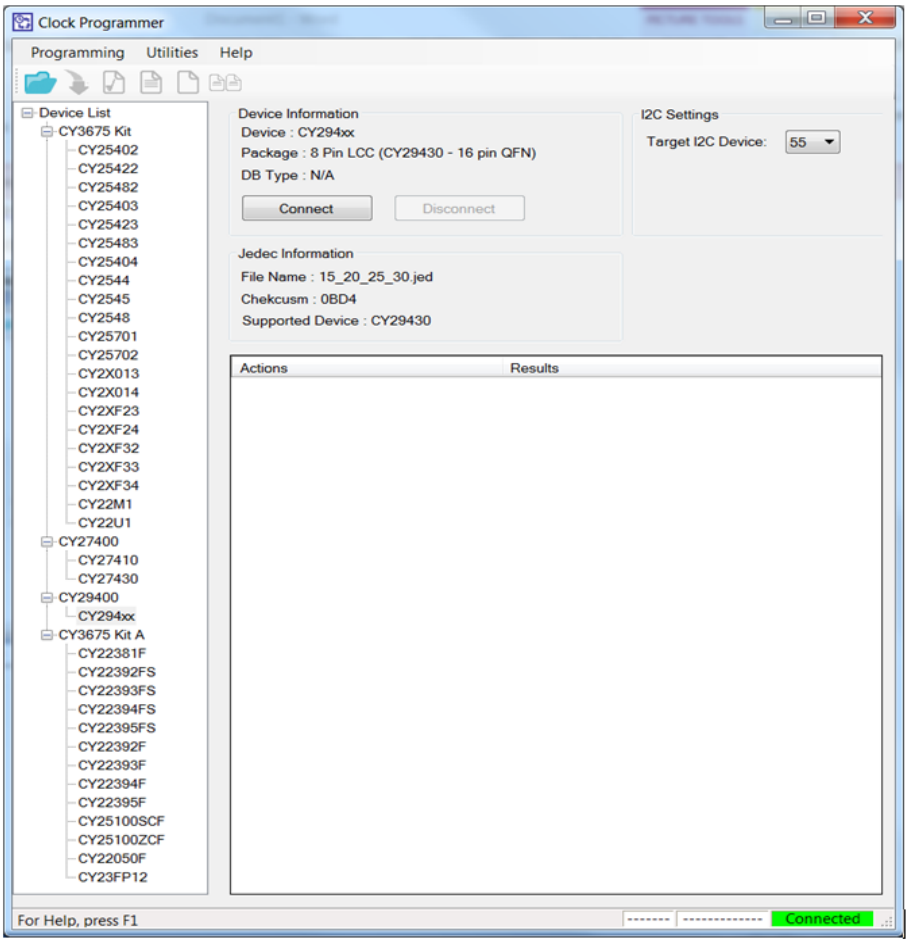
3.1 Starting the Clock Programmer

Follow these steps to start programming:

1. Set up all hardware, including the clock device to program (target device).
2. Start the Clock Programmer from the Microsoft Windows Start menu.

The alternate method to start Clock Programmer is to launch directly from: `[ProgrammerInstallationFolder]\ClockProgrammer.exe`

Figure 3-1. Clock Programmer



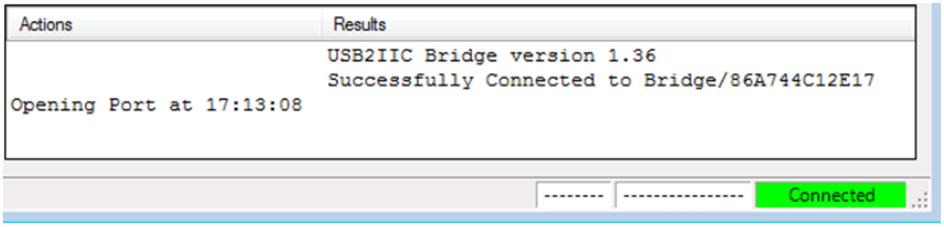
3.2 Connecting to a Programmer Tool

The Clock Programmer currently supports the following hardware programming tools:

- CY3240USB IIC Bridge (USB-I2C converter tool available as a part of CY3675 Kit).
  Note: the bridge is not compatible with the CY3676 and CY3677 EVKs;
- KitProg (built-in USB-I2C converter as a part of the CY367x Evaluation Kits);
- MiniProg3 (Versatile PSoC programmer/debugger that also includes USB-I2C converter tool).

At startup, the Clock Programmer automatically detects any programming device that is connected. The status bar at the bottom right of the GUI changes from **Not Connected** (red) to **Connected** (green). Additionally, the status text window will display messages as the Clock Programmer detects and opens the programming port (Figure 3.3). The connected USBIIC Bridge's (or other supported hardware) firmware version is also displayed.

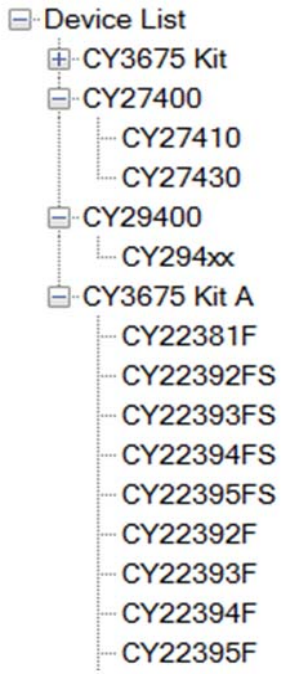
Figure 3-2. Successful Connection of USB-I2C Device



3.3 Selecting a Clock Device

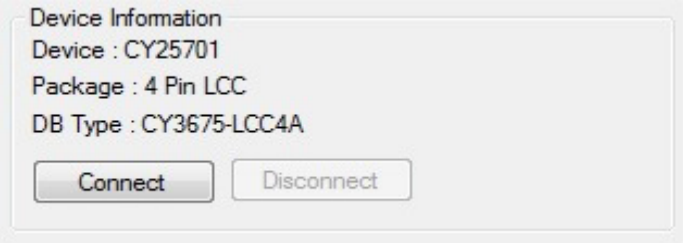
The Clock Programmer allows you to select a target Clock device from a Device List tree menu. The device selected must match the connected kit (and the type of Socket Adapter Board). To expand a collapsed tree, click the '+' icon next to the device family name. To collapse the device family tree, click the '–' icon. Select the device by clicking and highlighting the desired device.

Figure 3-3. Device List



Under the Device Information display area (see Figure 3-4), the selected clock device's information is displayed. This updates each time a new target clock device is selected.

Figure 3-4. Device Information



3.4 I2C Settings

If the selected target device belongs to the CY27400 or CY29400 family, then the I2C settings become available. The I2C address must be set manually to match the exact I2C address designed using the CyClockWizard configuration project. The corresponding address is also incorporated in the JEDEC file.

The default I2C device address must be used if you are programming an empty device for the first time. This can be found in the Clock Device Datasheet (for example, the CY27400 device's default address is 0x69 = 105 and the CY29400 device's default address is 0x55 = 85).

Clock Programmer will scan and try to program the I2C device. **Connect** fails if:

- No device is connected on the bus.
- The device connected does not correspond to the device selected in the Device List.
- Wrong I2C address.
- The CY29400 device is connected to the CY3240USB IIC Bridge.

3.5 Opening a JEDEC File

You must load a JEDEC file into the Clock Programmer before programming a device. The Clock Programmer programs devices only using the JEDEC file format.

To select a file for programming:

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

The status window will return with a successful message:

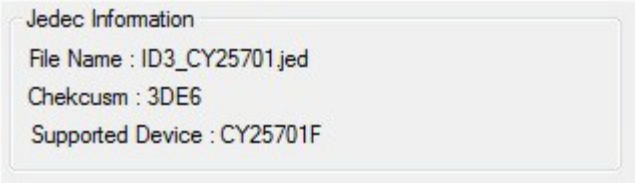
```
Active JEDEC file set at 1:47:18 PM| C:\Documents and Settings\wbz\Desk-
top\JEDEC_CY25402.jed
Frequency Information
```

(…additional data pertaining to the JEDEC file.)

```
Load JEDEC at 1:47:18 PM
```

After loading the JEDEC file, JEDEC Information displays critical information regarding the JEDEC file. These features include the file name, checksum, and supported devices. These fields are updated as new JEDEC files are loaded.

Figure 3-5. JEDEC Information



3.6 Connecting and Disconnecting

The Clock Programmer allows you to connect to the target device. The Connect and Disconnect buttons can initiate these actions. Before connecting to the target device, you must connect the programmer to the PC and the target device. When connected to the target clock device, you can disconnect using the **Disconnect** button.

When using the CY3240 USBIIC Bridge with the CY27400 devices, ensure that the INT pin is not connected to the target's XRES pin. Since the Bridge's INT pin is always set LOW, it is the active reset signal for this family.

Do not use the CY3240 USBIIC Bridge with the CY29400 devices.

MiniProg3 powers the device automatically (1.8 V) during connection if no external power is detected. The **Disconnect** button will power off the target.

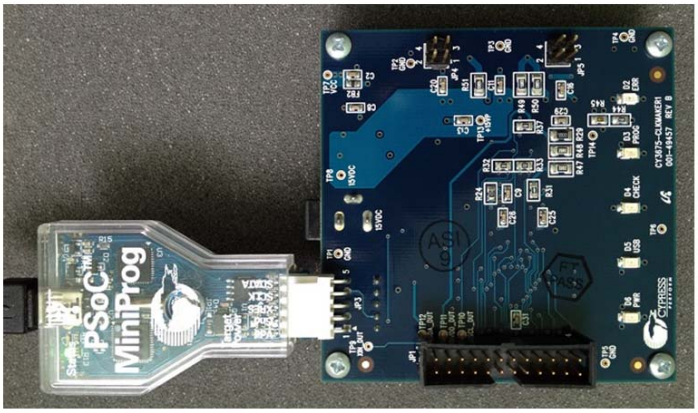
During connection, Clock Programmer checks the kit's firmware and hardware version. If an irrelevant kit is connected, then the appropriate message appears in the Log Window. For example, if you selected the CY22381F Clock Device but connected to the CY3675 Kit, then a warning message appears asking you to change the kit or kit's firmware.

3.6.1 Changing Firmware for CY3675 Kit A and CY3675 Kits

CY3675 Kit A is identical to the CY3675 Kit from a hardware standpoint. The only difference is the firmware required to support two sets of Clock Device MPNs. The default firmware supports one set of clock devices (for example, CY25701). The second set of clock devices, such as CY22381F, require a different firmware to be programmed on the CY3675 kit hardware. These clock MPNs that require a firmware change from the default shipped firmware are mentioned under the CY3675 Kit A category (see Figure 3-1).

1. Disconnect the USBIIC Bridge from the PC and Kit's Baseboard.
2. Connect the MiniProg1 programmer to the PC and Kit's Baseboard (Figure 3-6).
3. From the Windows Start Menu, open **Cypress** > **PSoC Programmer**.
4. Set PSoC Programmer Configuration:
   a. Programming Mode: Power Cycle
   b. Verification: On
   c. AutoDetection: On
   d. Protocol: ISSP
   e. Connector: 5p (5-pin header)
   f. Voltage: 5.0 V
5. Click **File > File Load** or press [F4].
6. Select necessary Kit Firmware: `[ProgrammerInstallationFolder]\Clock\Firmware`
7. Click **File > Program** or press [F5].

Figure 3-6. Kit Firmware Upgrading Setup



After successful firmware programming, the new kit version should be displayed, as described in Section 3.2 Connecting to a Programmer Tool on page 8.

3.7 Program

You must load a JEDEC file into the Clock Programmer to program a clock device.

To program a device:

1. Open the Clock Programmer.
2. Connect the programmer to the PC.
3. Load the JEDEC File.
4. Click **Connect**.
5. Click **Program** or press **[F5]**.

3.8 Checksum

When you press the **Checksum** button, the Clock Programmer will retrieve the checksum data from the target board.

To read the checksum from the device:

1. Open the Clock Programmer.
2. Connect the programmer to the PC.
3. Load the JEDEC file.
4. Click **Connect**.
5. Click **Checksum** or press **[F6].**

3.9 Read

Press the **Read** button to read out the target's clock device programmable memory content.

To read the data from the clock device:

1. Open the Clock Programmer.
2. Connect the programmer to the PC.
3. Click **Connect**.
4. Click **Read** or press **[F7]**.

3.10 Save

Click the **Save** button to save information into a text file.

To save the data from the clock device:

1. Open the Clock Programmer
2. Connect the programmer to the PC.
3. Click **Connect**.
4. Click **Save** or press **[F8]**.

3.11 Verify

You have the option to verify the contents on a target clock device against a selected JEDEC file. The Verify function reads/verifies the target clock device's contents and compares the checksums against the loaded JEDEC file.

To verify the configuration image in the clock device against the JEDEC file, execute the following:

1. Open the Clock Programmer.
2. Connect the programmer to the PC.
3. Load the JEDEC file.
4. Click **Connect**.
5. Click **Verify** or press **[F9]**.

3.12 Advanced Programming Information

The Clock Programmer uses the shared architecture with PSoC Programmer. PSoC Programmer provides a COM interface to generate user-specific applications by calling low-level API functions. In the PSoC Programmer root installation directory, the Examples and Documentation folders contain all the information to create unique applications with the PSoC Programmer COM.

3.13 Windows 8.1 Problems & Solutions

The Clock Programmer does not detect USB2IIC Bridge in Windows version 8.1 and later.

To fix this problem, follow these steps:

1. Connect MiniProg1 to USB2IIC Bridge as shown in Figure 3-8.
2. From the Windows **Start** menu, open PSoC Programmer.
3. Set PSoC Programmer Configuration:
   a. Programming Mode: Power Cycle
   b. Verification: On
   c. AutoDetection: On
   d. Protocol: ISSP
   e. Connector: 5p (5-pin header)
   f. Voltage: 5.0 V
4. Click **File > File Load** or press **[F4]**.
5. Select USBIIC Bridge Firmware: `[Programmer Installation Folder]\usbtoiic.hex`
6. Click **File > Program** or press **[F5]**.

After successful firmware programming, the new USBIIC Bridge version should be 1.36 or higher. Version 1.36 is the minimal requirement for normal operation under Windows 8.1 or later (see Figure 3-7).

Figure 3-7. Clock Programmer Running on Windows 8.1 OS

Figure 3-8. USBIIC Bridge Connected with MiniProg1

3.14 Error Codes

The Clock Programmer displays error messages on the status text window when there is any failure during runtime (only for CY3675 kit and CY3675 Kit A). Error codes are appended to the error messages.

Error Code	Description
	Communication error occurred while reset.
001	External power supply might not be connected.
	USBIIC might not be connected to the CyClockMaker.
	Communication error occurred while operating USB LED (D5).
002	External power supply might not be connected.
	USBIIC might not be connected to the CyClockMaker.
	Communication error occurred while operating ERR LED (D2).
003	External power supply might not be connected.
	USBIIC might not be connected to the CyClockMaker.
	Communication error occurred while operating Prog LED (D3).
004	External power supply might not be connected.
	USBIIC might not be connected to the CyClockMaker.

Error Code	Description
005	Communication error occurred while operating Chk LED (D4). External power supply might not be connected. USBIIC might not be connected to the CyClockMaker.
006	Communication error occurred while checking daughter board. External power supply might not be connected. USBIIC might not be connected to the CyClockMaker.
007	Communication error occurred while validating device. External power supply might not be connected. USBIIC might not be connected to the CyClockMaker.
008	Communication error occurred while reading data. External power supply might not be connected. USBIIC might not be connected to the CyClockMaker.
009	Read operation has failed. The device might be broken. The device in the socket might be placed in wrong direction. There might be no device in the socket.
010	Communication error occurred while shifting data. External power supply might not be connected. USBIIC might not be connected to the CyClockMaker.
011	Write operation has failed. The device in the socket might be placed in wrong direction. There might be no device in the socket.
012	Communication error occurred while programming data. External power supply might not be connected. USBIIC might not be connected to the CyClockMaker.
013	Communication error occurred while verifying programmed data. External power supply might not be connected. USBIIC might not be connected to the CyClockMaker.
014	Device Validation has failed. The device could have been programmed already. There could be no device in the socket. The device in the socket might be placed in wrong direction.

Revision History

Document Revision History

Document Title: Clock Programmer Guide Document Number: 001-50297				
Revision	**ECN#**	**Issue Date**	**Origin of Change**	**Description of Change**
**	2680210	03/30/2009	WBZ	New guide
*A	3221662	04/12/2011	WBZ/ RAVG	Sunset review; no content update
*B	4365119	04/29/2014	WBZ	Sunset review; no content update
*C	4530154	10/09/2014	LIRA	Update for Clock Programmer 1.4 release, which has added support of CY27410, CY27430 devices.
*D	4739665	04/24/2015	MAST	Added CY3675A Kit and CY3679 EVK. Added Kit Firmware Upgrade Instructions. Noted Windows 8.1 Issues and Solutions. Added I2C Settings menu description. Updated Device List tree description.
*E	4996350	10/30/2015	MAST	Changed CY3672A to CY3675 Kit A. Updated Figure 3-1 and Figure 3-3.
*F	5210675	04/07/2016	ASYVT-MP1	Updated 'Connecting to a Programmer Tool' 'I2C Settings', 'Connecting and Disconnecting' sections with CY29400 devices (CY367x EVKs). Updated Figure 3-1 and Figure 3-3. Update description of Save operation
*G	5840279	07/20/2017	VITA	Migrated to the new template.