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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

CY4531

EZ-PD™ CCG3 Evaluation Kit Guide

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Cypress Semiconductor
198 Champion Court
San Jose, CA 95134-1709
Phone (USA): 800.858.1810
Phone (Intnl): 408.943.2600
www.cypress.com

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Contents

1. Introduction 7

1.1 Kit Contents 7

1.1.1 Hardware Not Included With Kit 7

1.2 Getting Started 8

1.3 List of Recommended Hardware 8

1.3.1 Recommended Cables and Adapters 8

1.4 Acronyms 8

2. Kit Installation 10

2.1 CY4531 EZ-PD CCG3 EVK Kit Software Installation 10

3. CY4531 EZ-PD CCG3 EVK Hardware Details 14

3.1 CCG EVK Base Board 15

3.1.1 Block Diagram 15

3.1.2 Features 15

3.1.3 Connectors and Jumper Settings 16

3.2 CY4531 CCG3 Daughter Card 18

3.2.1 Block Diagram 18

3.2.2 Features 18

3.2.3 Connectors and Jumper Settings 19

3.3 Powering the CY4531 EZ-PD CCG3 EVK Setup 20

4. Programming the CCG3 Device on CY4531 CCG3 EVK 21

4.1 Programming the CCG3 Device on the CCG3 Daughter Card 21

5. Kit Operation 26

5.1 SuperSpeed USB Demo 26

5.1.1 Boards, Cables, and Accessories Needed 26

5.1.2 Running the SuperSpeed USB Demo 26

5.1.3 Explanation of Functionality 28

5.1.4 Common Problems and Troubleshooting 28

5.2 DisplayPort Demo 29

5.2.1 Boards, Cables, and Accessories Needed 29

5.2.2 Running the DisplayPort Demo 29

5.2.3 Common Problems and Troubleshooting 30

5.3 Dead Battery Demo 30

5.3.1 Boards, Cables, and Accessories Needed 31

5.3.2 Running the Dead Battery Demo 31

5.3.3 Power Supply Connections 32
5.3.4 Common Problems and Troubleshooting 33

6. Appendix 35

6.1 Terminology 35
6.2 CCG3 EVK Base Board 36
6.2.1 Schematics 36
6.2.2 Gerber Files 41
6.2.3 Bill of Materials 47
6.3 CCG3 EVK Daughter Card 52
6.3.1 Schematics 52
6.3.2 Gerber Files 55
6.3.3 Bill of Materials 61

Revision History 63

Document Revision History 63

Safety Information

The CY4531 EZ-PD™ CCG3 EVK 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. Due to 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, take adequate preventive measures. Also, do not use this board 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 must be taken.

The CY4531 EZ-PD CCG3 EVK as shipped from the factory has been verified to meet with requirements of CE as a Class A product.

	The CY4531 EZ-PD CCG3 Evaluation Kit Guide boards contain ESD-sensitive devices. Electrostatic charges readily accumulate on the human body and any equipment, which can cause a 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 CY4531 EZ-PD CCG3 Evaluation Kit Guide boards in the protective shipping package.
	End-of-Life/Product Recycling The end-of-life cycle for this kit is five years from the date of manufacture mentioned on the back of the box. Contact the 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

The boards provided with CY4531 EZ-PD CCG3 Evaluation Kit are sensitive to ESD. This also applies to the boards that are provided with a plastic casing when they are removed from the casing. Hold the boards only by the edges. After removing a board from the box/casing, place it on a grounded, static-free surface. Use a conductive foam pad, if available. Do not slide the board over any surface.

1. Introduction

The CY4531 EZ-PD™ CCG3 Evaluation Kit (EVK) is based on the CCG3 product family of Cypress's USB Type-C microcontrollers. This EVK is primarily intended to be an evaluation vehicle for USB Type-C host and client systems that house a Type-C connector as well as for notebook applications. For USB Power Delivery (PD), the base board and daughter card can be configured as a downstream facing port (DFP) or an upstream facing port (UFP). The kit also serves as a vehicle to evaluate several features for Type-C, using a SuperSpeed USB demo and a DisplayPort demo, as examples.

1.1 Kit Contents

The CY4531 EZ-PD CCG3 EVK consists of the following contents:

- CCG EVK Base Board
- CY4531 CCG3 Daughter Card (mounted on CCG EVK Base Board)
- 24-V DC 65 W Power Adapter (24 V, 2.7 A)
- USB 3.0 Type-A to Type-B cable
- USB Type-C to Type-A adapter
- USB 3.1 EMCA (Electronically Marked Cable Assembly) Type-C cable
- USB 2.0 Type-A to Mini-B Cable
- Quick Start Guide

1.1.1 Hardware Not Included With Kit

The CY4531 EZ-PD CCG3 EVK does not come with all of the hardware needed to perform the demonstrations documented in sections SuperSpeed USB Demo, DisplayPort Demo, and Dead Battery Demo of the Kit Operation chapter. The following items are not included:

- USB flash drive needed for the SuperSpeed USB Demo section.
- DisplayPort cables needed for the DisplayPort Demo section. They are required to make connections from a PC to the CCG EVK base board. If the PC has a mini-DisplayPort, then a mini-DisplayPort to DisplayPort cable will be required. If the PC has a DisplayPort, then a DisplayPort to DisplayPort cable will be required. Recommended cables are listed in Recommended Cables and Adapters section.
- USB Type-C to DP/HDMI/VGA adapter to connect a display monitor to the CY4531 EZ-PD CCG3 EVK. Recommended adapters and cables needed for them to connect to monitors are listed in Recommended Cables and Adapters section.
- A digital multimeter to measure voltage for the Dead Battery Demo section. A standard multimeter is required to measure the output voltage on the CCG base board to successfully demonstrate dead battery functionality along with a USB Type-C Power Adapter.

1.2 Getting Started

For instructions on how to run a quick demonstration and observe kit functionality, refer to the SuperSpeed USB Demo section. This section also provides complete instructions on configuring the CY4531 EZ-PD CCG3 EVK base board and daughter card.

1.3 List of Recommended Hardware

1.3.1 Recommended Cables and Adapters

See Table 1-1 to obtain a set of cables recommended to work with this kit. This kit is not shipped with these cables and adapters and they are required to run the DisplayPort Demo and Dead Battery Demo.

Table 1-1. List of Recommended Cables and Adapters

No.	Description	Manufacturer	MPN	Vendor Link
1	DisplayPort to DisplayPort Cable (6”, gold plated)	Cable Matters	102005-6	Amazon Link
2	Mini DisplayPort to DisplayPort Cable (3”, gold plated)	Cable Matters	101007-BLACK-3	Amazon Link
3	Type-C to Display Port Adapter	Belinda	-	Amazon Link
4	Type-C to HDMI Adapter	Cable Matters	-	Amazon Link
5	Type-C to VGA Adapter	Cable Matters	-	Amazon Link
6	Type-C Power Adapter that supports 9V or above	Apple	-	Apple Store Link

Use item 1 or 2 in Table 1-1 to connect the PC’s DisplayPort or Mini-DisplayPort to the DisplayPort of CY4531 EZ-PD CCG3 EVK. Depending on the display monitor you have, use item 3, 4 or 5 in Table 1-1 to connect from the USB Type-C port of the CY4531 EZ-PD CCG3 EVK to the display monitor itself. Use item 6 to run the Dead Battery Demo.

1.4 Acronyms

Table 1-2. Acronyms Used in this Document

Acronym	Definition
ADC	analog-to-digital converter
CC	configuration channel
DFP	downstream facing port
DRP	dual role port
EC	embedded controller
EMCA	electronically marked cable assembly
EMI	electromagnetic interference
ESD	electrostatic discharge
EVK	evaluation kit
FET	field-effect transistor
GPIO	General-purpose input/output
HID	human interface device
HPD	hot plug detect

Acronym	Definition
IC	integrated circuit
I^2C	inter-integrated circuit
IDE	integrated development environment
LED	light-emitting diode
PSoC®	Programmable Systems-on-Chip
PWM	pulse-width modulation
QFN	quad flat no-lead (package)
SWD	serial wire debug
UART	universal asynchronous receiver transmitter
UFP	upstream facing port
USB	Universal Serial Bus
USB PD	Universal Serial Bus Power Delivery
XRES	External Reset I/O Pin

2. Kit Installation

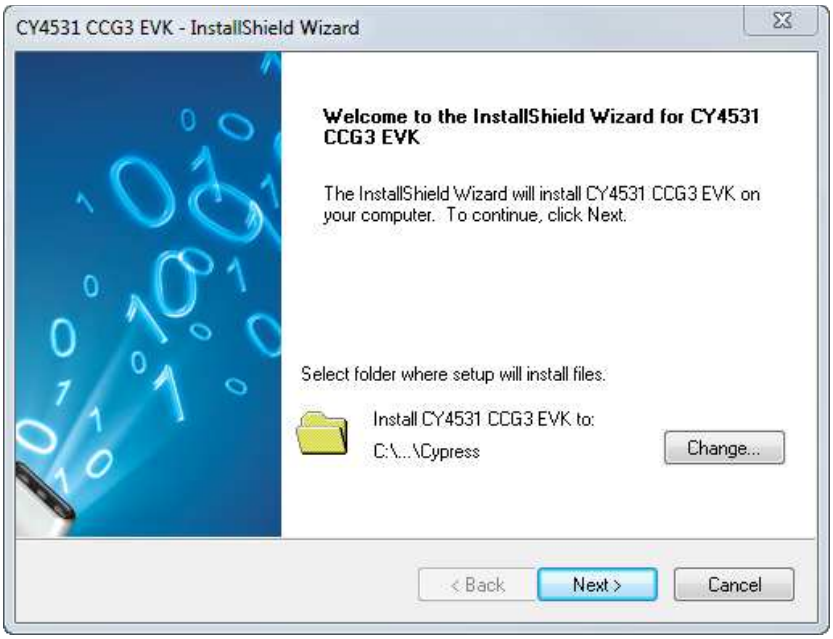
This chapter describes how to perform the installation steps for the CY4531 EZ-PD CCG3 EVK.

2.1 CY4531 EZ-PD CCG3 EVK Kit Software Installation

To install the kit software, follow these steps:

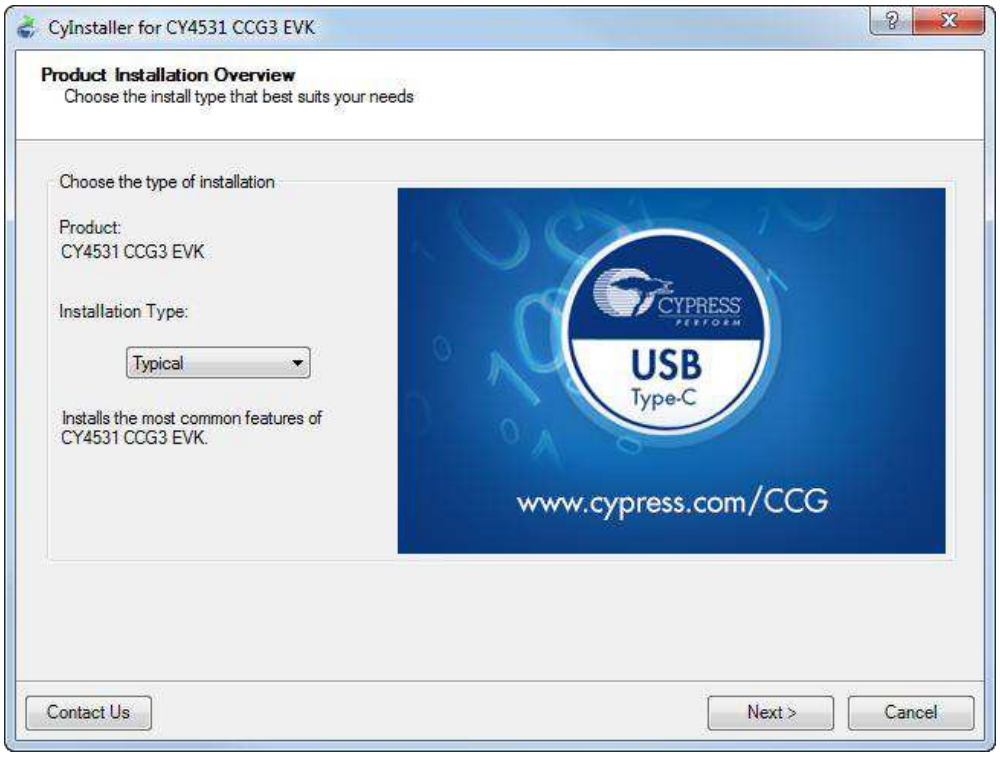
a. Download the latest kit software setup file "CY4531 EZ-PD CCG3 EVK Complete Setup" from the kit's website: www.cypress.com/CY4531. This package contains the kit hardware files and the kit documentation (User Guide, Quick Start Guide, and Release Notes). Double-click on the executable to start the installation. Click **Next** when the screen shown in Figure 2-1 appears.

Figure 2-1. CY4531 EZ-PD CCG3 EVK Installer Screen



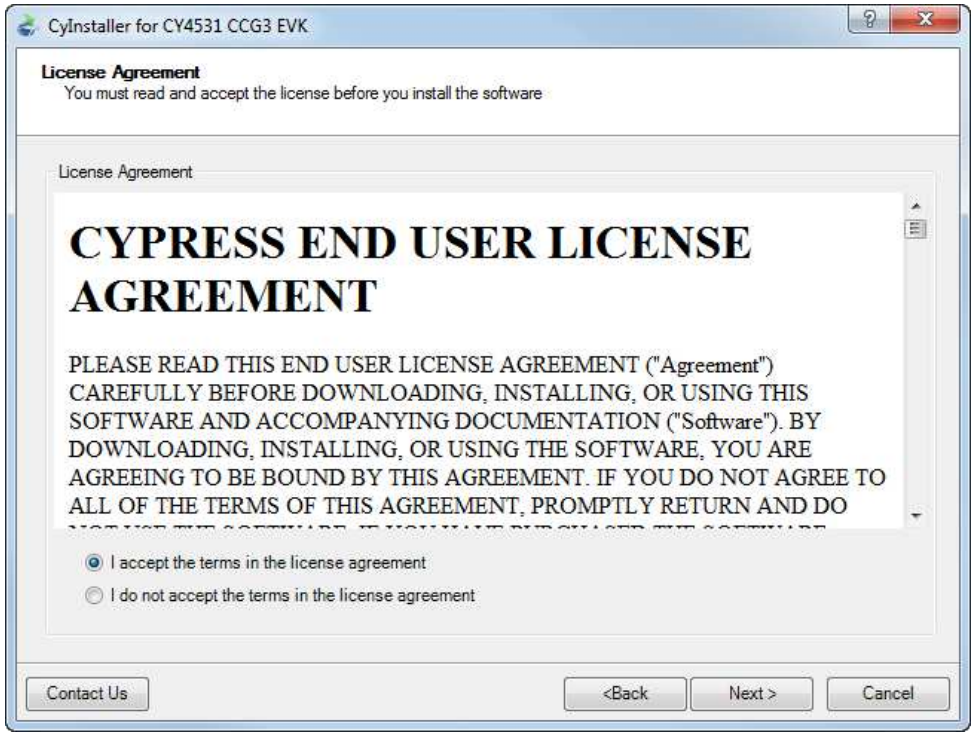
b. Select the required **Installation Type** and click **Next** to start the install (Figure 2-2). For first-time installation, it is recommended that you select "Typical" as the **Installation Type**.

Figure 2-2. Installation Wizard



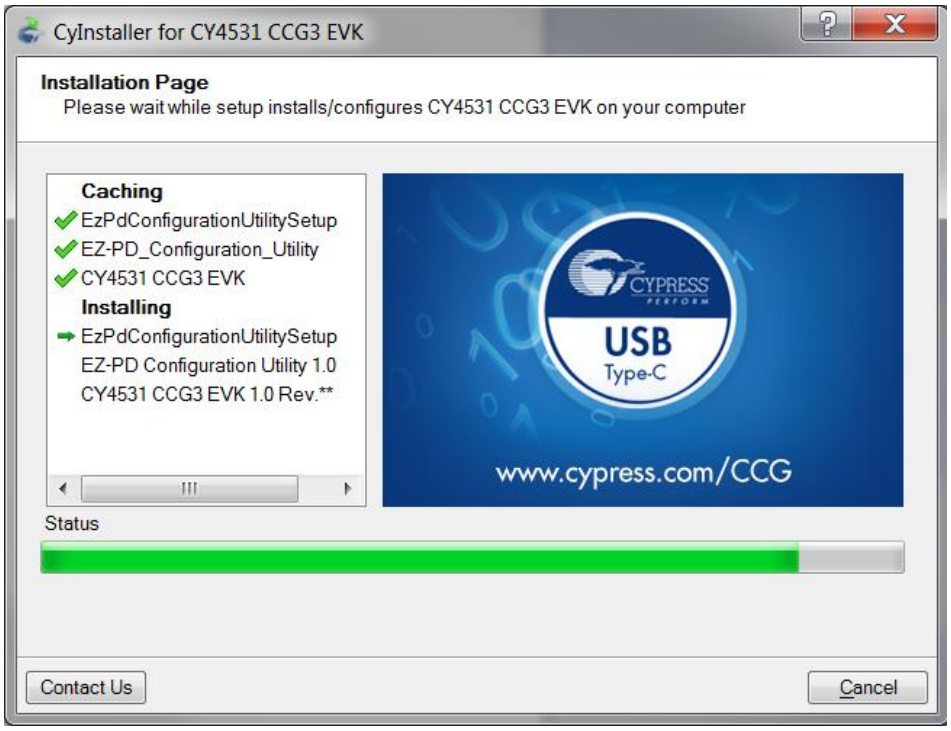
c. Accept the license agreement for the software components and click **Next** (Figure 2-3).

Figure 2-3. License Agreement



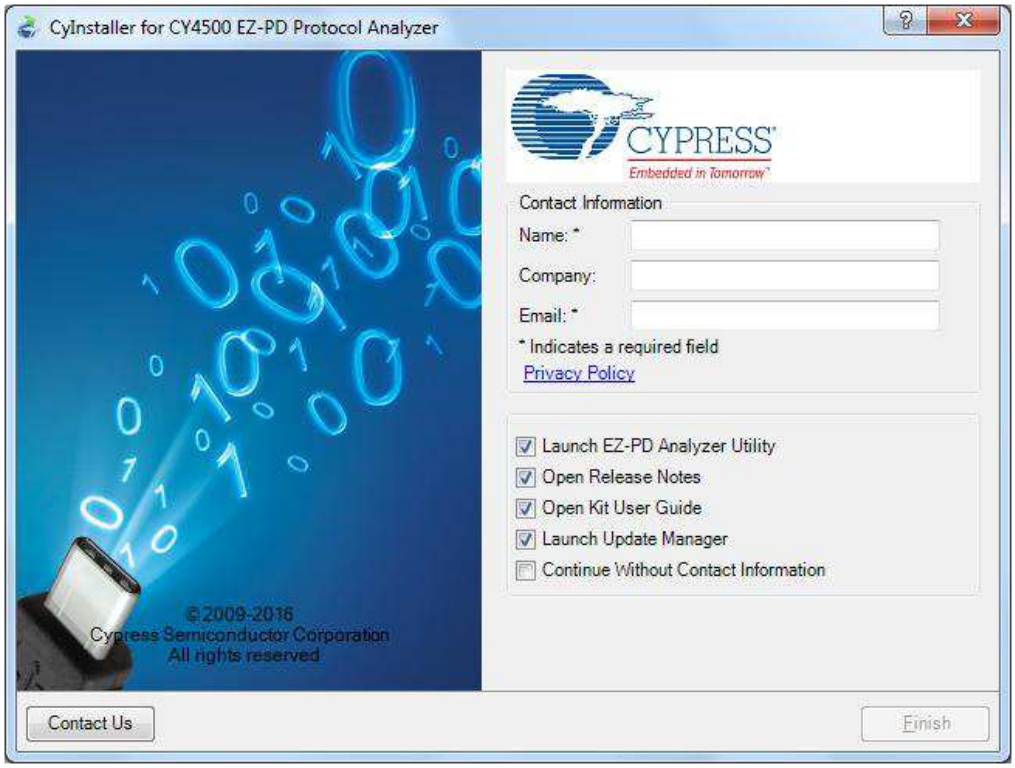
d. Figure 2-4 shows the installation progress.

Figure 2-4. Installation Progress



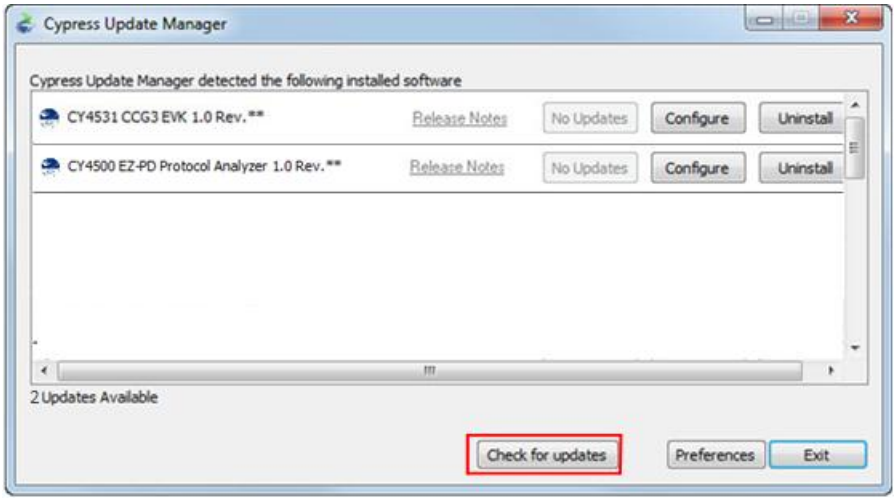
e. Click **Finish** when complete (Figure 2-5).

Figure 2-5. Software Installation Complete



f. When installation is complete, you have the option to **Launch Cypress Update Manager** (Figure 2-6) to ensure you have the latest software package. Click the **Check for updates** button at the bottom of the window. If "No Updates" appears adjacent to the CY4531 EZ-PD CCG3 EVK, click the **Exit** button. If there are updates, click the **Update** button to download and install the latest kit package.

Figure 2-6. Cypress Update Manager



Note: You can launch the Cypress Update Manager at any time from **Start > All Programs > Cypress > Cypress Update Manager**.

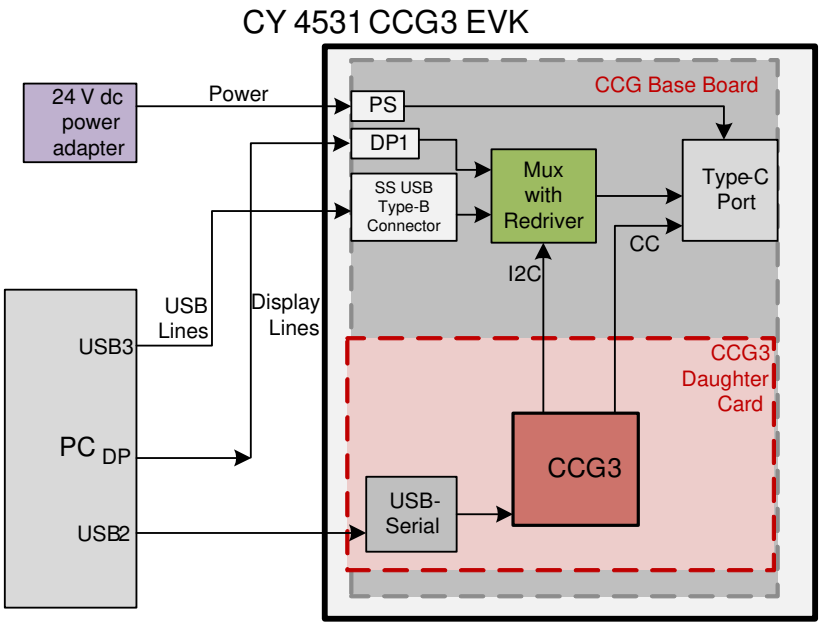
g. After the installation is complete, the contents are available at the following location: `<Install Directory>\CY4531 CCG3 EVK\1.0`.

Note: On the Windows 32-bit platform, the default <Install Directory> is `C:\Program Files\Cypress`; on the Windows 64-bit platform, it is `C:\Program Files(x86)\Cypress`.

3. CY4531 EZ-PD CCG3 EVK Hardware Details

The CY4531 EZ-PD CCG3 EVK consists of a base board and a daughter card. The CCG3 device is mounted on the daughter card, which is connected to the base board to evaluate the CCG3 device's Type-C port functionality as shown in Figure 3-1.

Figure 3-1: CY4531 EZ-PD CCG3 EVK Architecture



The CCG base board consists of a DC input power supply, a Display multiplexer, one Display port, a SuperSpeed Type-B port, and one Type-C port. The CCG3 daughter card consists of the CCG3 device and a USB-Serial IC to provide a USB interface for debugging and programming. The CC lines of the CCG3 device are connected to the Type-C port. The Display multiplexer is controlled by the CCG3 device over an I^2C interface.

The CY4531 EZ-PD CCG3 EVK has a power provider and consumer path control circuitry to showcase EZ-PD CCG3's ability to switch its power role from a provider to a consumer and vice versa. This EVK has over-voltage and over-current protection circuitry for VBUS and it also supports programming of the EZ-PD CCG3 device over SWD and I^2C interfaces. The EVK supports PCs, notebooks, tablets, and other applications that would host a Type-C interface. It is primarily intended as an evaluation vehicle for USB host systems that house a Type-C connector.

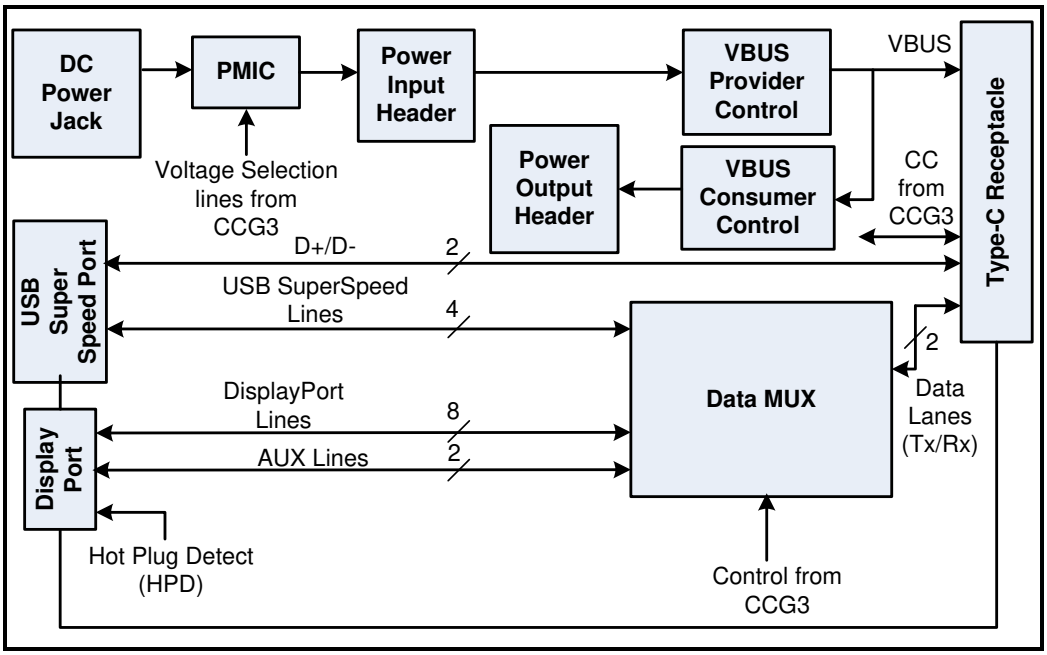
3.1 CCG EVK Base Board

The CCG EVK base board is an evaluation board equipped with a Type-C port, a SuperSpeed USB Type-B port, and a Display Port interface. It is primarily intended as a demonstration board for notebook designs that house a Type-C connector. The board also serves as a vehicle to evaluate the alternate modes for Type-C, using the DisplayPort demo as an example.

3.1.1 Block Diagram

The block diagram of the CCG EVK Base board is shown in Figure 3-2. It has an on-board Type-C connector for the USB-PD interface and a CCG3 daughter card interface connector to connect the CCG3 daughter card. It also includes a SuperSpeed USB Type-B port, and a Display Port connector to source video. The SuperSpeed USB signals and Display Port signals are connected to the Type-C connector through a high-speed multiplexer controlled by the CCG3 device. A DC power adapter provides input voltage to the onboard Power Management IC (PMIC). The output voltage from the PMIC can be selected using two voltage selection lines, controlled by the CCG3 device. This CCG base board along with the CCG3 daughter card helps to convert any desktop or notebook PC with legacy USB ports to operate as a Type-C USB host.

Figure 3-2: CCG EVK Base Board Block Diagram



3.1.2 Features

Table 3-1 shows the features of the CCG EVK base board.

Table 3-1: CCG EVK Base Board Features

Feature	Description
Power	Negotiated power from the DC power adapter controlled by PMIC and CCG3. 5 V from the Type-C connector (for dead battery support). **Note:** The DC power adapter provided with the kit can support only up to 2.7A (at 24 V). This kit will not work with 5-V DC power adapters.
CCG3 Daughter Card Interface Connector	Provides interface to connect the CCG3 daughter card to the CCG EVK base board
Type-C Plug orientation, Detection and Alternate modes	I2C interface between the CCG3 device and a display multiplexer to select between SuperSpeed USB and 2-lane/4-lane DisplayPort
	Hot Plug Detect (HPD) for Display Port Alternate Mode of operation

3.1.3 Connectors and Jumper Settings

Figure 3-3 shows the CCG EVK base board connectors and default settings of the jumpers. Table 3-2 contains the detailed description of the connectors and jumper settings.

Figure 3-3: CCG EVK Base Board Connectors

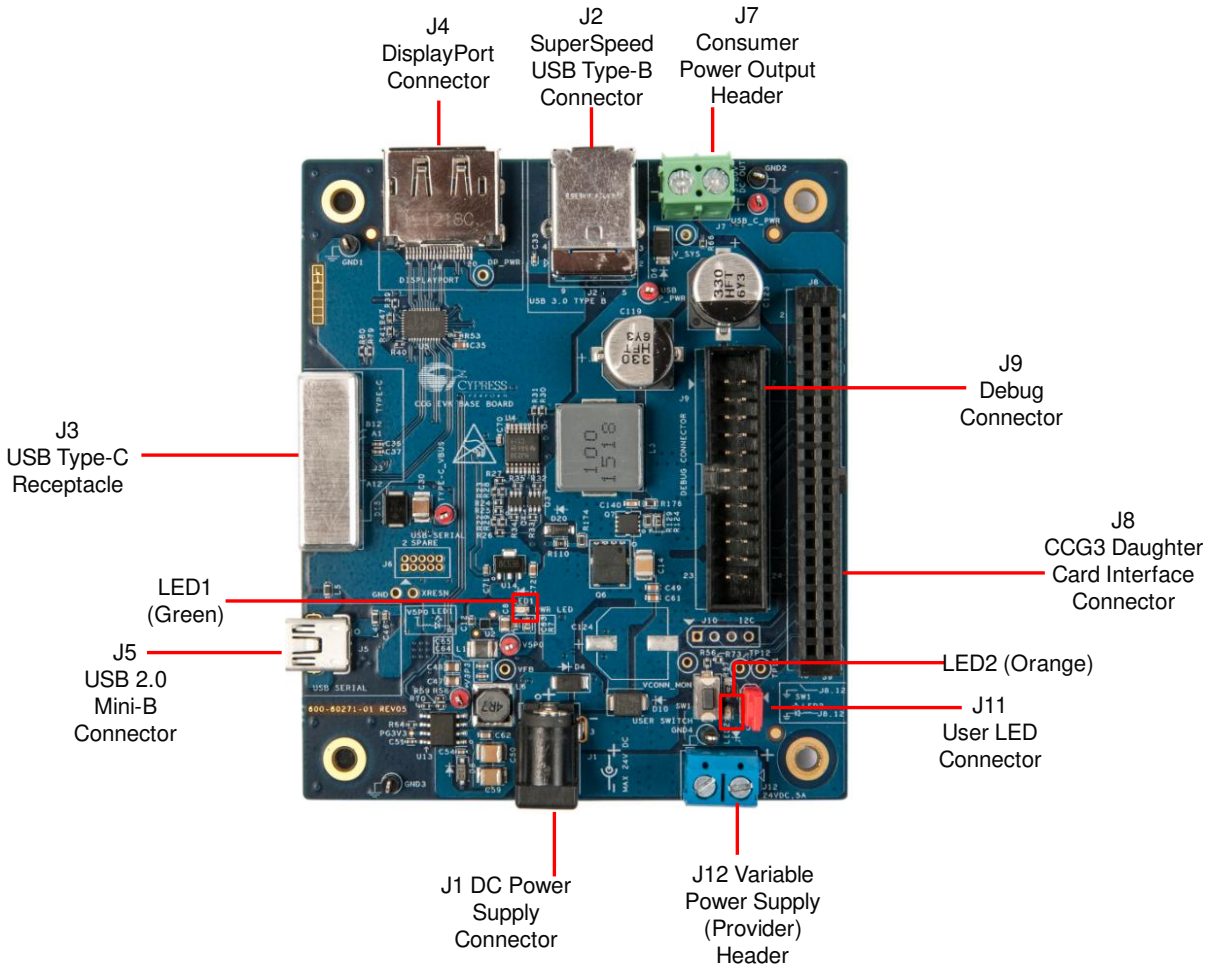


Table 3-2: CCG EVK Base Board Connector/Jumper Description

Connector/Jumper	Description	Default
J1	DC power jack to connect the DC power adapter to the CCG base board	NA
J2	SuperSpeed USB Type-B connector (receptacle)	NA
J3	USB Type-C Connector (receptacle)	NA
J4	DisplayPort Connector	NA
J5	USB 2.0 Mini-B Connector (Receptacle)	NA
J6	USB Serial Debug Header	This connector is not populated
J7	Header for voltage measurement when CCG3 acts as a power consumer or power output header	NA
J8	**CCG3 Daughter Card Interface Connector**	NA
	Pin 1,2: Regulated input power from 24-VDC terminal (J12) of CCG EVK Base Board (USB_P_PWR)	

Connector/Jumper	Description		Default
	Pin 3,4: Power from VBUS of Type-C Connector (Type-C_VBUS)		
	Pin 5,6: Regulated output power to 20-Vdc terminal (J7) from USB_C_PWR pin of CCG3 daughter card		
	Pin 7: GND	Pin 8: GND	
	Pin 9: I2C_SCL	Pin 10: VBUS_DISCHRG	
	Pin 11: I2C_SDA	Pin 12: CCGx SWDIO	
	Pin 13: Over Current Protection Pin	Pin 14: CCGx SWD_CLK	
	Pin 15: AC_Adapter_Detect	Pin 16: CCGx XRES	
	Pin 17: VSEL2	Pin 18: I2C_ADDR0	
	Pin 19: 5 V	Pin 20: VCONN Monitor	
	Pin 21: CC1	Pin 22: CC2	
	Pin 23: 3.3 V	Pin 24: VBUS_P_CTRL	
	Pin 25: RXD	Pin 26: VBUS Monitor	
	Pin 27: TXD	Pin 28: I2C_INT_EC	
	Pin 29: MUX_DP_AUXN	Pin 30: VBUS_C_CTRL	
	Pin 31: MUX_DP_AUXP	Pin 32: Over Voltage Protection Pin	
	Pin 33: SBU2	Pin 34: I2C_SDA_EC	
	Pin 35: SBU1	Pin 36: Hotplug Detect	
	Pin 37: I2C_SCL_EC	Pin 38: TP12	
	Pin 39: VSEL1	Pin 40: TP11	
J9	**Debug Connector**		NA
	Pin 1,2: Power from VBUS of Type-C Connector (Type-C_VBUS)		
	Pin 3: CCGx SWDIO	Pin 4: CCGx XRES	
	Pin 5: CCGx CC1	Pin 6: CCGx CC2	
	Pin 7: I2C_SCL_EC	Pin 8: I2C_SDA_EC	
	Pin 9: I2C_INT_EC	Pin 10: Hotplug Detect	
	Pin 11: I2C_SCL	Pin 12: SW1/I2C_SDA	
	Pin 13: SW2	Pin 14: Over Current Protection Pin	
	Pin 15: CCGx SWD_CLK	Pin 16: Over Voltage Protection Pin	
	Pin 17: VSEL1	Pin 18: VSEL2	
	Pin 19: VBUS_P_CTRL	Pin 20: VBUS_DISCHRG	
	Pin 21: VBUS_Monitor GPIO	Pin 22: VBUS_C_CTRL	
	Pin 23: GND	Pin 24: GND	
J10	**I2C Connector**		This connector is not populated
	Pin 1: I2C_SDA_EC	Pin 2: I2C_SCL_EC	
	Pin 3: I2C_INT_EC	Pin 4: GND	
J11	User LED jumper for connecting LED to GPIO Pin 1: SWD_IO Pin 2: LED		Shorted
J12	Header for voltage measurement when CCG3 acts as a power provider or power input header.		NA

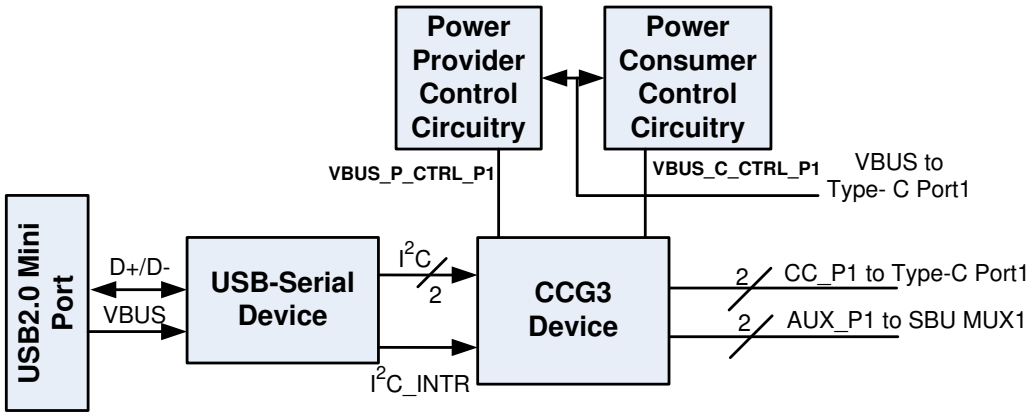
3.2 CY4531 CCG3 Daughter Card

The CCG3 daughter card is equipped with the CYPD3125-40LQXIT of the CCG3 device family and a CY7C65215-32LTXI USB-Serial Bridge Controller to provide a USB interface for debugging and programming. This CCG3 daughter card, when assembled with the CCG base board supports Type-C host applications such as note books and tablets.

3.2.1 Block Diagram

Figure 3-4 shows the CCG3 daughter card block diagram.

Figure 3-4 CCG3 Daughter Card Block Diagram



3.2.2 Features

Table 3-3 lists the features of the CCG3 daughter card.

Table 3-3: CCG3 Daughter Card Features

Feature	Description
CCG3 part number	CYPD3125-40LQXIT
CCG3 package	40-pin QFN
USB PD/ Type-C	Ability to support DRP, DFP, and UFP
	Type-C VBUS current setting via a jumper that selects one of the three Rp values. These three values correspond to the three currents as defined in the Type-C specification.
	VBUS provider field-effect transistor (FET) control for cold socket
	VBUS consumer FET control
	VBUS discharge FET control
	Ability to present either Rd or Rp on CC line
	Dead battery support
OVP and OCP	VCONN or VBUS over-current protection
	VBUS over-voltage protection
Plug orientation, Detection and Alternate modes	Five MUX-select pins to select between SuperSpeed USB and 2-lane or 4-lane DisplayPort
	Hot Plug Detect (HPD) for DisplayPort Alternate Mode of operation
USB 2.0 Type-B Mini	USB 2.0 Mini-B receptacle connected to USB-to-Serial device
I^2C interface	I^2C pins and interrupt output pin for connecting to an Embedded Controller (EC)
Programming	SWD pins to debug/program CCG3 using Cypress MiniProg3

Feature	Description
Power	5 V from USB 2.0 Mini (Connector J7 of CCG3 daughter card) 5 V from MiniProg3 (Connector J1 of CCG3 daughter card) 5 V to 20 V from Type-C connector (Connector J3 of CCG base board) 24V DC from DC Power Supply Connector (Connector J1 of CCG base board)

3.2.3 Connectors and Jumper Settings

Figure 3-5 shows the CCG3 daughter card connectors and default settings of the jumpers. Table 3-4 contains the detailed description of the connectors and jumper settings.

Figure 3-5: CCG3 Daughter Card Connectors/Jumper Settings

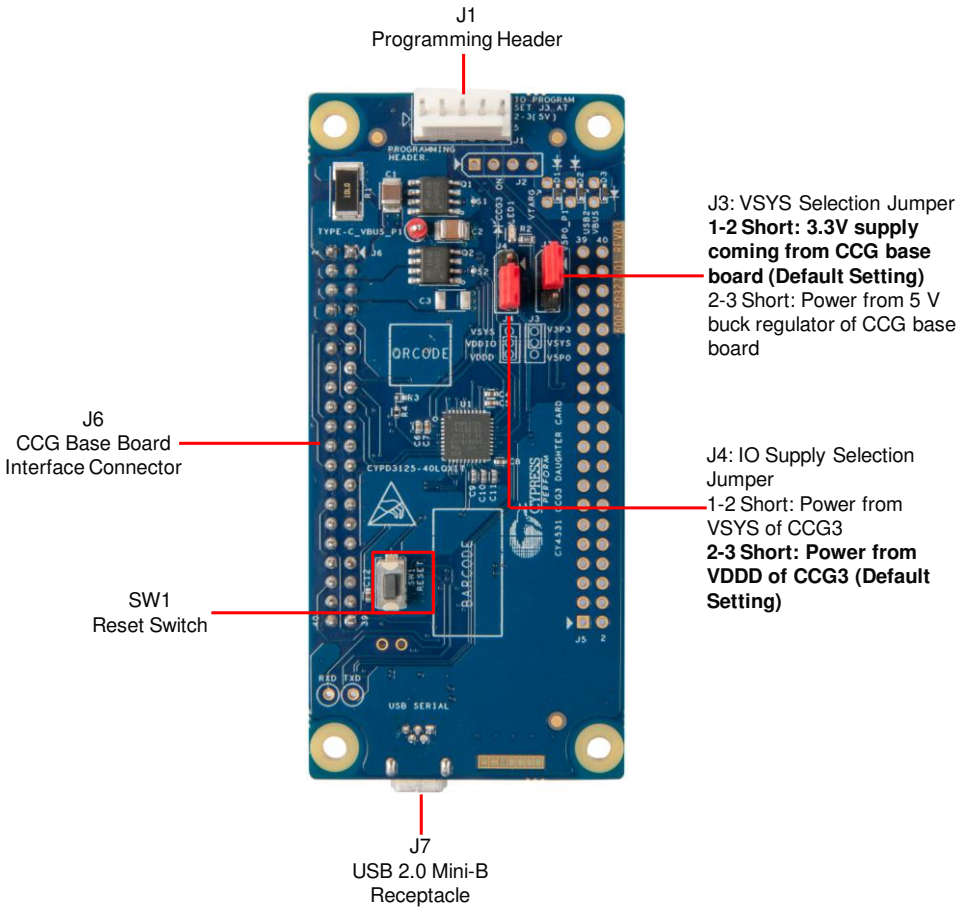


Table 3-4: CCG3 Daughter Card Connector/Jumper Description

Connector/Jumper	Description	Default
J1	Programming header Pin 1: VTARG Pin 2: GND Pin3: CCG3_XRES Pin4: CCG3_SWD_CLK Pin5: CCG3_SWD_IO	NA
J2	Debug header connected to gate driver pins of the CCG3 device	This connector is

Connector/Jumper	Description		Default
	Pin 1: NC	Pin 2: VBUS_P_CTRL1	not populated
	Pin 3: VBUS_C_CTRL1	Pin 4: GND	
J3	VSYS selection jumper: 1 and 2 short: Select the power from 3.3-V supply coming from the CCG base board 2 and 3 short: Select the power from 5-V buck regulator of the CCG base board		1 and 2 short
J4	I/O supply selection jumper: 1 and 2 short: Select the power from VSYS of CCG3 device 2 and 3 short: Select the power from VDDD of CCG3 device		2 and 3 short
J5	Spare 40-pin connector		This connector is not populated
J6	**CCGx Base Board Interface Connector**		NA
	Pin 1,2: Regulated input power from 24-VDC terminal (J12) of the CCG EVK Base Board (USB_P_PWR_P1)		
	Pin 3,4: Power from VBUS of Type-C Connector of the CCG EVK Base Board (TYPE-C_VBUS_P1)		
	Pin 5,6: Regulated output power to 20-VDC terminal (J7) of the CCG EVK Base Board (USB_C_PWR_P1)		
	Pin 7: GND	Pin 8: GND	
	Pin 9: I2C_SCL	Pin 10: VBUS_DISCHRG_P1	
	Pin 11: I2C_SDA	Pin 12: SWDIO	
	Pin 13: USB Provider Power Sense Pin	Pin 14: SWD_CLK	
	Pin 15: AC_Adaptor_Detect	Pin 16: XRES	
	Pin 17: VSEL2	Pin 18: UART2_RX	
	Pin 19: 5 V	Pin 20: UART2_TX	
	Pin 21: CC1	Pin 22: CC2	
	Pin 23: 3.3 V	Pin 24: VBUS_P_CTRL0	
	Pin 25: TXD	Pin 26: VCONN	
	Pin 27: RXD	Pin 28: I2C_INT_EC	
	Pin 29: DP_AUXN_P1	Pin 30: VBUS_C_CTRL0	
	Pin 31: DP_AUXP_P1	Pin 32: GPIO/P2.4	
	Pin 33: SBU2	Pin 34: I2C_SDA_EC	
	Pin 35: SBU1	Pin 36: Hotplug Detect	
	Pin 37: I2C_SCL_EC	Pin 38: DPlus	
	Pin 39: VSEL1	Pin 40: DMinus	
J7	USB 2.0 Mini-B connector (receptacle) Connected to USB-Serial device and used for programming CCG3 device		NA

3.3 Powering the CY4531 EZ-PD CCG3 EVK Setup

The CY4531 EZ-PD CCG3 EVK can be powered by connecting the 24-V DC power adapter to connector J1 of the CCG EVK base board. LED1 on both the boards glow green and LED2 on the base board blinks orange continuously, to indicate a successful power connection. The CY4531 EZ-PD CCG3 EVK can also be powered by connecting 24-V DC from a variable power supply to the terminals of connector J12 of the CCG base board.

Note: Check the jumper positions before you power the board. See Figure 3-3 and Figure 3-5 for default jumper settings of the CCG EVK base board and CCG3 daughter card.

4. Programming the CCG3 Device on CY4531 CCG3 EVK

The CCG3 device in the CY4531 CCG3 EVK is pre-programmed with the latest cyacd firmware binary image at the time of manufacturing. However, a newer *.cyacd* file may be available on the CY4531 CCG3 EVK webpage and in the CY4531 CCG3 EVK installer. The firmware version of the onboard CCG3 device can be verified by using the EZ-PD Configuration Utility as shown in Figure 4-4. If the onboard CCG3 device's firmware version does not match with the latest version on the CY4531 CCG3 EVK webpage, follow the steps in this chapter to reprogram the CCG3 device. This firmware update is necessary for successful kit operation.

The EZ-PD Configuration Utility (installed as a part of CY4531 EZ-PD CCG3 EVK Kit Software Installation) can be used to make minor updates to the configuration table of the CCG3 device (for example, changing PDOs and Vendor ID changes). Refer to the EZ-PD Configuration Utility User Manual for more details. For making application specific modifications, users can use the EZ-PD CCGx Software Development Kit (SDK) (Version 2.2 or later).

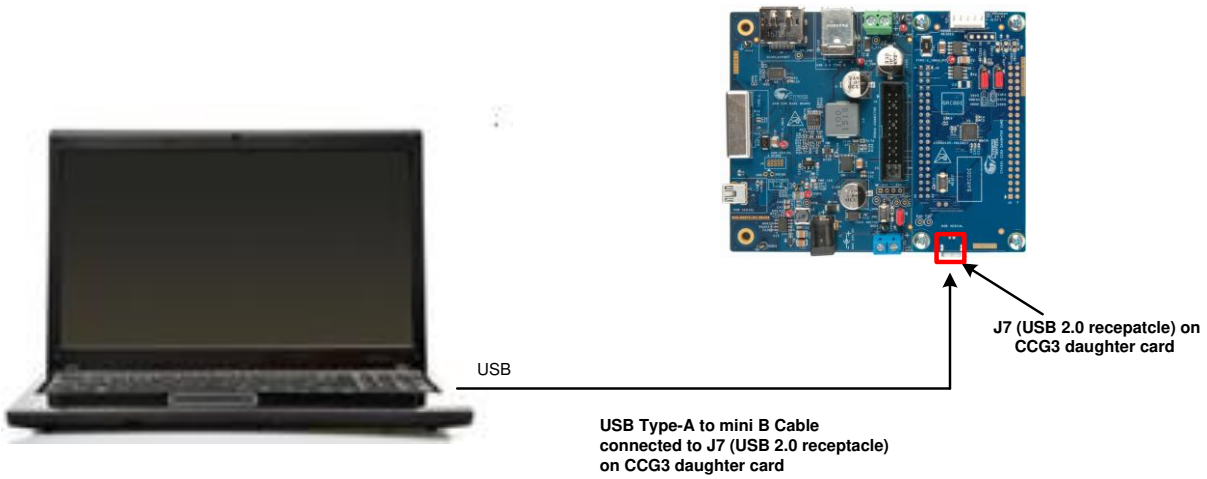
The CCGx Software Development Kit (SDK) (version 2.2 or later) along with PSoC® Creator™ (version 3.3 SP2 or later) allows users to harness the capabilities of Cypress's CCG families of Type-C Controllers. It provides a Type-C and USB-PD specification compliant firmware stack along with the necessary drivers and software interfaces required to implement applications using CCG controllers. The CCGx SDK also includes reference projects implementing standard Type-C applications and documentation that guides users in customizing existing applications, or creating new ones. For more information on the CCGx SDK, refer to the CCGx SDK User Guide. Click here to go to the CCGx SDK webpage and download and install the latest version.

4.1 Programming the CCG3 Device on the CCG3 Daughter Card

The EZ-PD Configuration Utility is a Microsoft Windows Application, which can be used to configure and program the CCG3 device on the CCG3 daughter card. The steps to update the firmware running on the CCG3 device of the CCG3 daughter card are as follows:

1. Download and install the latest kit software setup file "CY4531 EZ-PD CCG3 EVK Complete Setup" from the kit's website: www.cypress.com/CY4531. This installs the EZ-PD Configuration Utility as well.
2. Ensure that the voltage selection jumper (J3) is set to 5 V (pins 2 and 3 of jumper J3 on the CCG3 daughter card are shorted). Also, ensure that the I/O supply selection jumper (J4) is set to VDDD of the CCG3 device (pins 2 and 3 of jumper J4 on the CCG3 daughter card are shorted).
3. Connect the USB Type-A to Mini-B cable from host PC to CCG3 daughter card as shown in Figure 4-1.

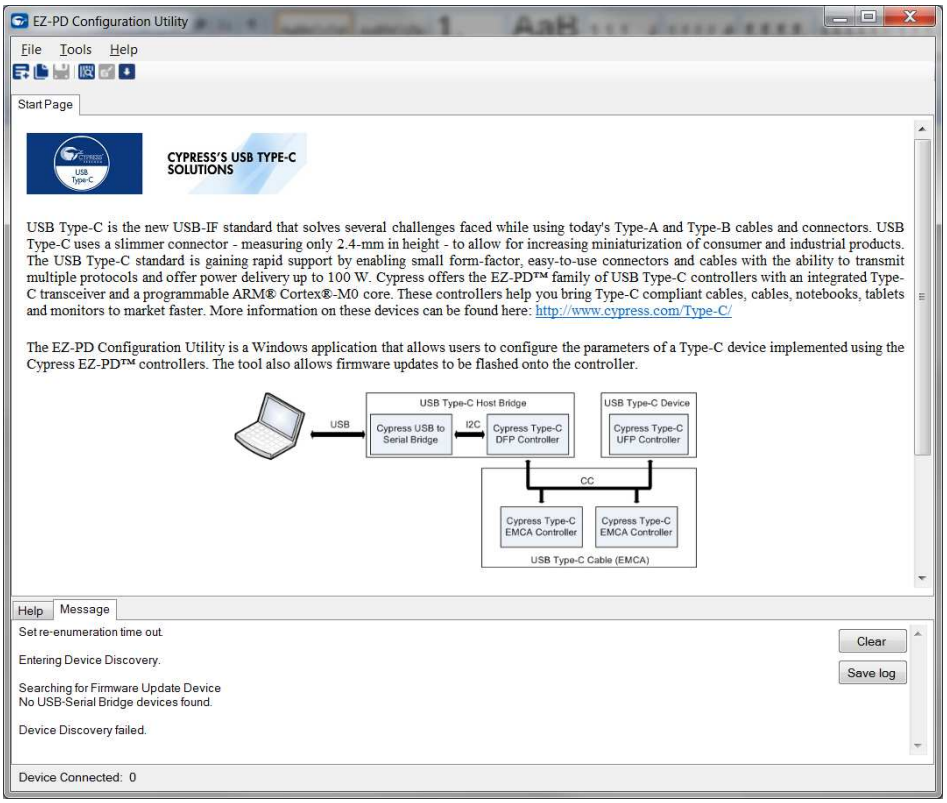
Figure 4-1: Programming CCG3 Device on CY4531 CCG3 EVK



4. Launch the EZ-PD Configuration Utility as shown in Figure 4-2. After the installation, the EZ-PD Configuration Utility is available at the following location by default:

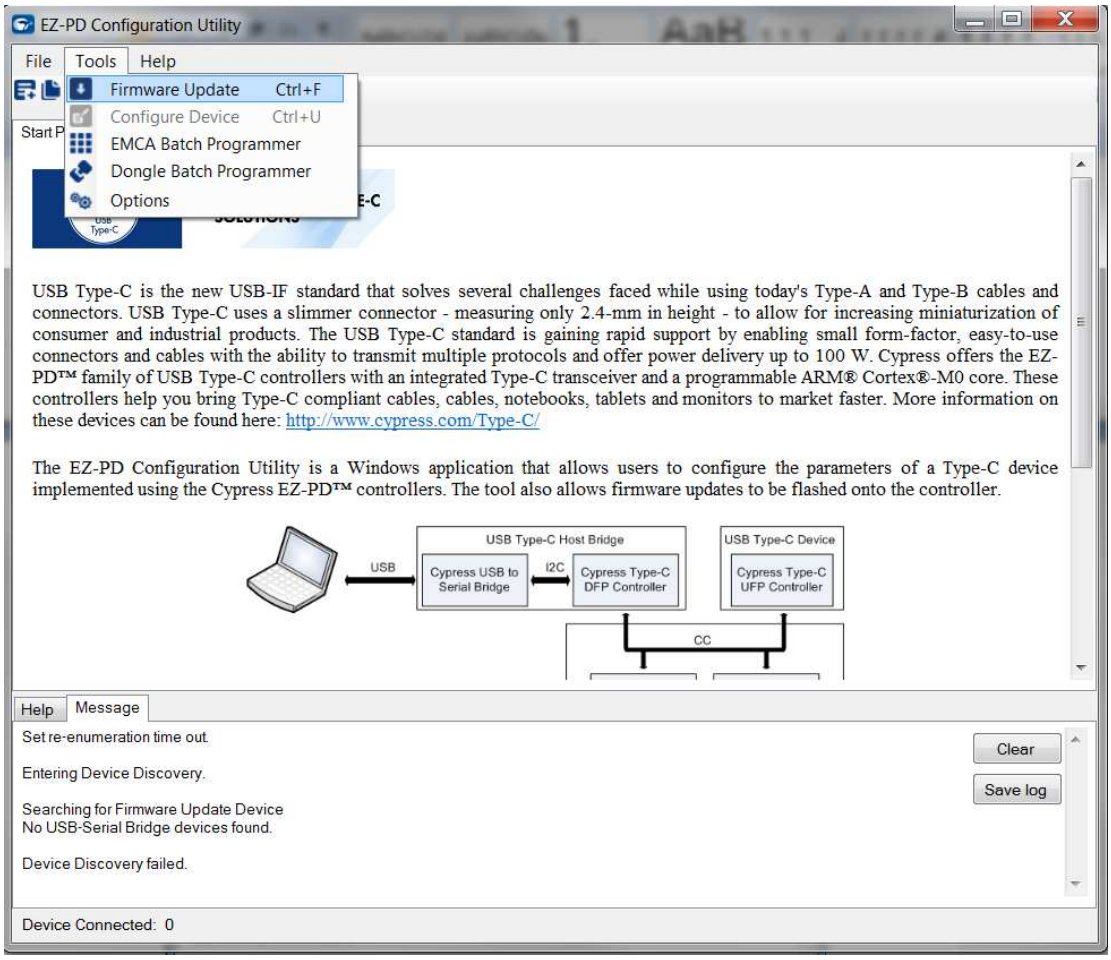
   `Windows > Start > All Programs > Cypress > EZ-PD Configuration Utility > EZ-PD Configuration Utility`

Figure 4-2: EZ-PD Configuration Utility



5. Select **Tools** > **Firmware Update** to update the firmware of the CCG3 device as shown in Figure 4-3. Refer to the EZ-PD Configuration Utility User Manual for more details. This document can also be opened by clicking **Help > User Manual** in the EZ-PD Configuration Utility.

Figure 4-3: Upgrading CCG3 Firmware



6. CCG3's internal device flash contains two copies of firmware that can mutually update each other. These copies are called FW1 and FW2, and are designed to be placed at different flash locations.
   If the CCG3 device is currently running FW1, only FW2 can be updated and vice-versa. The user can specify one or both firmware binaries in the **Firmware Update** window shown in Figure 4-4 and the appropriate firmware binary will be used for the update operation. If the device is currently running FW1, the utility will select the FW2 binary file from the two file locations provided and update FW2 during the process. If no FW2 path is provided by the user, then an error will be reported.
   It is possible to update both FW1 and FW2 binaries simultaneously by using the "**Bootloader Flashing**" option shown in Figure 4-4. In this case, the CCG device enters bootloader mode and updates both firmware banks. Depending on the status of the CCG3 device and the chosen selections, the ways the firmware update operation can be run can vary. Table 4-1 shows the possible firmware update options based on the CCG3 device status and user selection.
   After a firmware update process is complete and the CCG3 device is reset, the running firmware automatically switches to the most recently updated firmware.

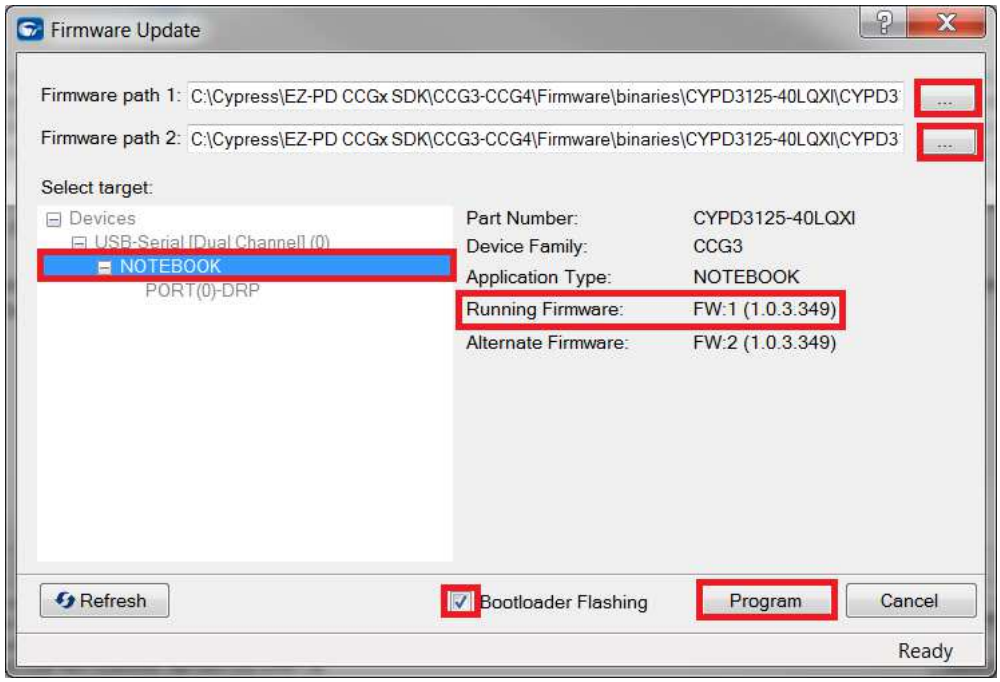
Table 4-1. Possible “Firmware Update” options based on CCG3 device status and user selection

No.	Firmware Status	Firmware Update with “Bootloader Flashing” unchecked	Firmware Update with “Bootloader Flashing” checked
1	FW1 and FW2 Invalid	Can update FW1, FW2 or both*	Can update FW1, FW2 or both*
2	Only FW1 valid	Can update FW2 only	
3	Only FW2 valid	Can update FW1 only	
4	FW1 and FW2 valid, currently running FW1	Can update FW2 only	
5	FW1 and FW2 valid, currently running FW2	Can update FW1 only	

* **Note**: Firmware will be updated for the bank/s a valid file path is provided.

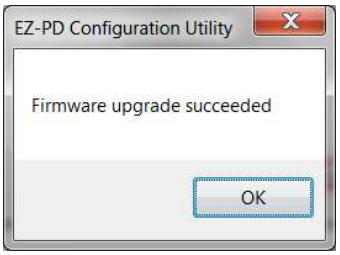
7. Download the latest firmware images from the CY4531 CCG3 EVK webpage. The CCG3 device firmware is provided in *.cyacd* format. Sample firmware binaries for each application and standard part numbers are provided on the CY4531 CCG3 EVK webpage. The firmware images are also available at the following location after the CY4531 CCG3 EVK installation: `<Install_Directory>\CY4531 CCG3 EVK\1.0\Firmware`
8. Select **NOTEBOOK** from the **Select target** list shown in Figure 4-4. Click **Browse (…)** in the **Firmware path 1** widget and select the FW1 image (CYPD3125-40LQXI_notebook_**one**_1_0_3_xxx*_0_0_0_nb.cyacd). Click **Browse (…)** in the **Firmware path 2** widget and select the FW2 image (CYPD3125-40LQXI_notebook_**two**_1_0_3_xxx*_0_0_0_nb.cyacd). Enable the **Bootloader Flashing** option by clicking on it. Click **Program**.
   Note*: Here, xxx refers to the firmware version.

Figure 4-4: Updating Firmware Using EZ-PD Configuration Utility



9. Upon clicking **Program**, the firmware update process is initiated over I^2C. The status bar at the bottom of the utility will show the progress; the Messages window will indicate the firmware update process. The old and new firmware versions are also displayed in the Messages window at the end of a successful firmware update.
10. Upon successful completion of the firmware update process, a window with the message “Firmware upgrade succeeded” is displayed as shown in Figure 4-5. Click **OK**.

Figure 4-5: Firmware Update Process Complete



11. Press switch SW1 (XRES) on the CCG3 daughter card to reset the CCG3 device; the new firmware image will start executing.
12. CCG3 devices can also be programmed with a hex file (downloaded as a part of latest firmware images from the CY4531 CCG3 EVK webpage) using SWD header J1 on the CCG3 daughter card. Refer to the Knowledge Base Article for more details. A MiniProg3 device (not provided with the kit) is required to perform SWD programming. The MiniProg3 device can be purchased on the Cypress website (click here).

    Warning: Do not disconnect the EVK from the PC while the firmware update is in progress.