CY4521

EZ-PD™ CCG2 Evaluation Kit Guide

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Contents

Safety Information

The CY4521 EZ-PD™ CCG2 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 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 CY4521 EZ-PD CCG2 EVK as shipped from the factory has been verified to meet with requirements of CE as a Class A product.

⚠	The CY4521 EZ-PD CCG2 Evaluation Kit 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 CY4521 EZ-PD CCG2 Evaluation Ki 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 CY4521 EZ-PD CCG2 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 CY4521 EZ-PD™ CCG2 Evaluation Kit (EVK) is based on the CCG2 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 platform to evaluate other features of Type-C such as SuperSpeed USB and DisplayPort data transfer.

1.1 Kit Contents

The CY4521 EZ-PD CCG2 EVK consists of the following contents:

- CCG EVK Base Board
- CY4521 CCG2 Daughter Card (mounted on the 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 2.0 Type-A to Mini-B Cable
- Quick Start Guide

1.1.1 Hardware Not Included With Kit

The CY4521 EZ-PD CCG2 EVK does not come with all of the hardware needed to perform the demonstrations documented in sections SuperSpeed USB Demo, DisplayPort Demo, SuperSpeed USB and DisplayPort Demo and Dead Battery Demo of the Kit Operation chapter. The following items are not included:

- SuperSpeed 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 and USB Type-C Multiport Adapter to connect a display monitor and a USB flash drive to the CY4521 EZ-PD CCG2 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 EVK base board.

- A USB Type-C Power Adapter for the Dead Battery Demo section

1.2   Getting Started

For instructions on how to run a quick demonstration and observe kit functionality, refer to the SuperSpeed USB Demo section. That section also provides complete instructions on configuring the CCG EVK base board and CY4521 CCG2 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 – the cables that you need will depend on the hardware you are connecting to the kit (i.e. the PC display output type and the monitor input type). 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	For Hardware	Manufacturer	MPN	Vendor Link
1	DisplayPort to DisplayPort Cable (6", gold plated)	PC with DisplayPort	Cable Matters	102005-6	Amazon Link
2	Mini DisplayPort to DisplayPort Cable (3", gold plated)	PC with Mini DisplayPort	Cable Matters	101007-BLACK-3	Amazon Link
3	Type-C to Display Port Adapter	Monitor with DisplayPort	Belinda	-	Amazon Link
4	Type-C to HDMI Adapter	Monitor with HDMI	Cable Matters	-	Amazon Link
5	Type-C to VGA Adapter	Monitor with VGA	Cable Matters	-	Amazon Link
6	Type-C Power Adapter that supports 9V or above	All	Apple	-	Apple Store Link
7	Type-C Multiport Adapter	Monitor with HDMI and USB SuperSpeed flash drive	Apple	-	Apple Store Link
		Monitor with VGA and USB SuperSpeed flash drive	Apple		Apple Store Link
		Monitor with HDMI and USB SuperSpeed flash drive	Samsung	-	Amazon Link

Use item 1 or 2 in Table 1-1 to connect the PC's DisplayPort or Mini-DisplayPort to the DisplayPort of CY4521 EZ-PD CCG2 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 CY4521 EZ-PD CCG2 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
CCG	Cable Controller Generation
DFP	Downstream Facing Port
DP	DisplayPort
DRP	Dual Role Port

Acronym	Definition
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
IC	Integrated Circuit
I²C	Inter-Integrated Circuit
IDE	Integrated Development Environment
LED	Light-Emitting Diode
PMIC	Power Management Integrated Circuit
PS	Power Supply
PSoC®	Programmable Systems-on-Chip
PWM	Pulse-Width Modulation
QFN	Quad Flat No-lead (package)
SS	SuperSpeed
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 the procedure to install the CY4521 EZ-PD CCG2 EVK software.

2.1 CY4521 EZ-PD™ CCG2 EVK Kit Software Installation

To install the kit software, follow these steps:

a. Download the latest kit software setup file "CY4521 EZ-PD CCG2 EVK Complete Setup" from the kit's website: www.cypress.com/CY4521. This package contains the kit hardware files, firmware binaries 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. CY4521 EZ-PD CCG2 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
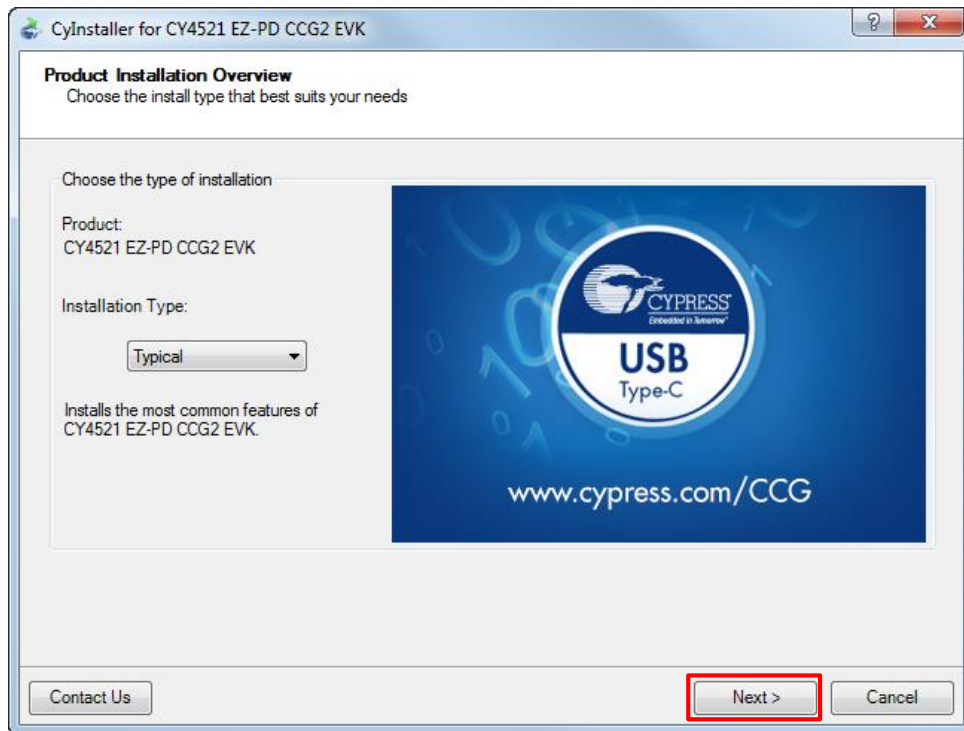
c. Accept the license agreement for the software components and click **Next** (Figure 2-3).

Figure 2-3. License Agreement
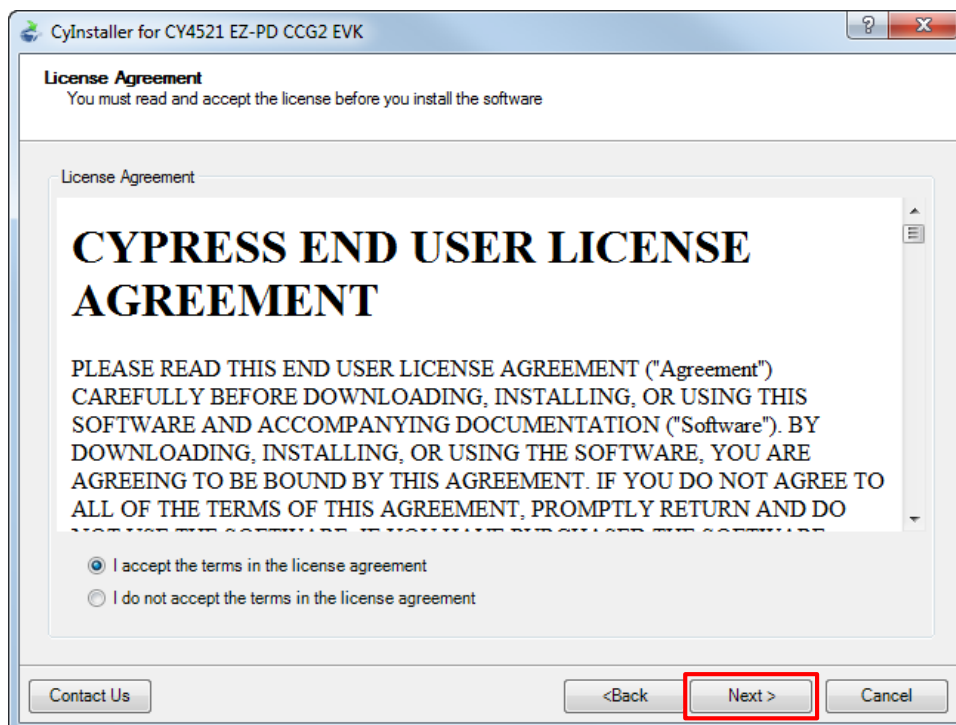
d.   Figure 2-4 shows the installation progress.

Figure 2-4. Installation Progress
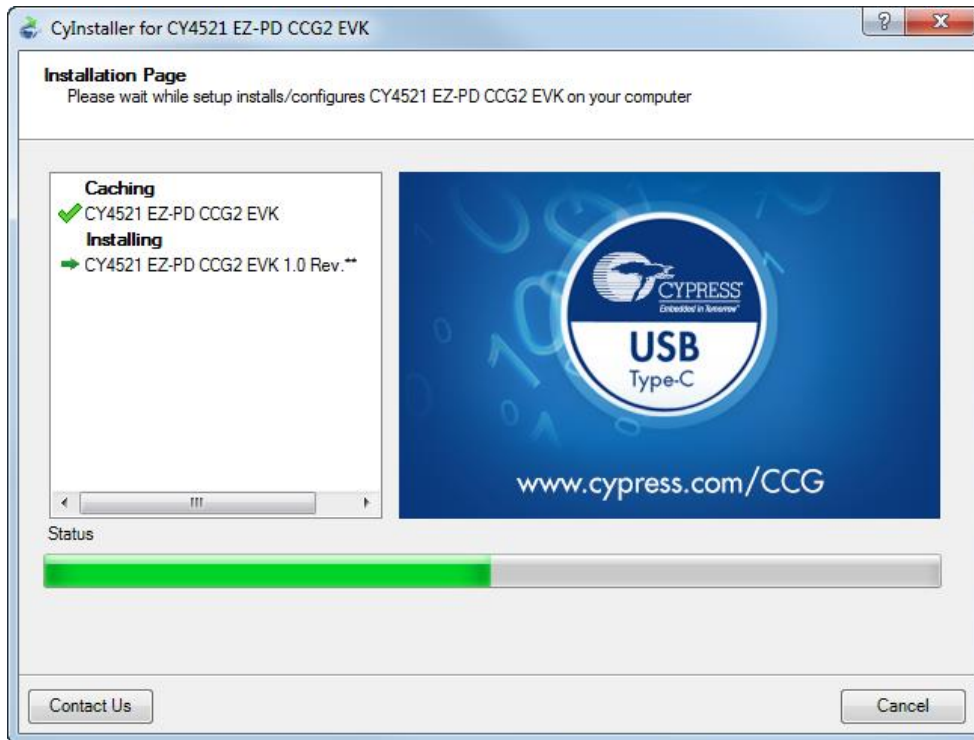
e.   Enter **Contact Information** or select **Continue Without Contact Information** and click **Finish**. (Figure 2-5).

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 CY4521 EZ-PD CCG2 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
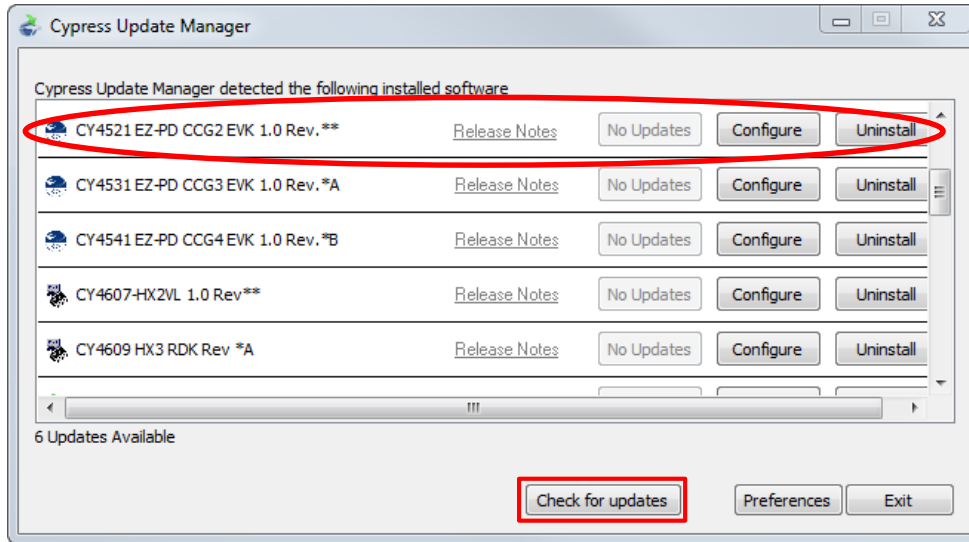
Note: You can launch the Cypress Update Manager at any time from **Start > All Programs > Cypress > Cypress Update Manager**.

g.   After the installation is complete, the contents are available at the following location: `<Install Directory>\CY4521 EZ-PD CCG2 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. CY4521 EZ-PD™ CCG2 EVK Hardware Details

The CY4521 EZ-PD CCG2 EVK consists of a CCG EVK base board and a CCG2 daughter card. The CCG2 device is mounted on the daughter card, which is connected to the base board. The hardware architecture of CY4521 is captured in Figure 3-1.

Figure 3-1: CY4521 EZ-PD CCG2 EVK Architecture

DP – DisplayPort
USB2.0 – Used only for programming
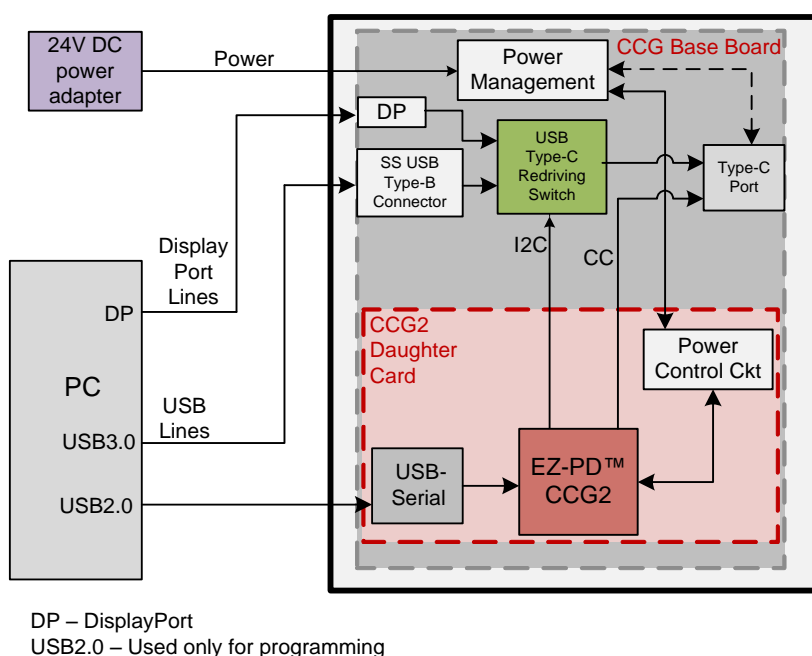
The CCG EVK base board consists of a DC input, a USB Type-C Redriving Switch IC, a DisplayPort input, a SuperSpeed Type-B port, and one Type-C port. The CCG2 daughter card consists of the CCG2 device and a USB-Serial IC to provide a USB interface for debugging and programming. The CC lines of the CCG2 device are connected to the Type-C port. The USB Type-C Redriving Switch IC is controlled by the CCG2 device over an I^{2}C interface.

The CY4521 EZ-PD CCG2 EVK has power provider and consumer path control circuitry to showcase EZ-PD CCG2'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 CCG2 device over SWD and I^{2}C 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 DisplayPort 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 daughter card interface connector to connect the CCG2 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 USB Type-C Redriving Switch controlled by the CCG2 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 CCG2 device. This CCG EVK base board along with the CCG2 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
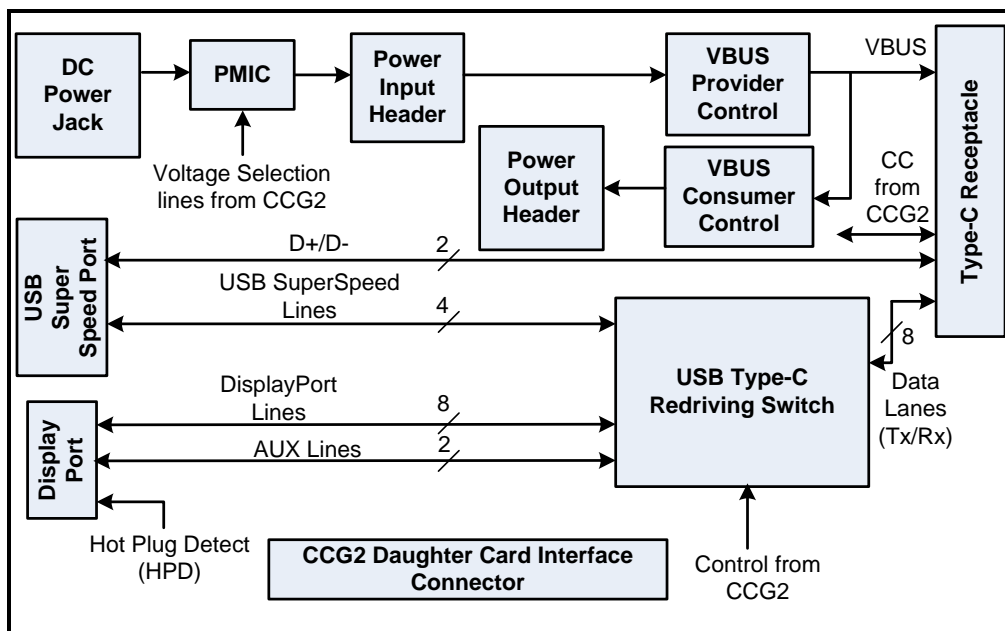
3.1.2 Features

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

Table 3-1: CCG EVK Base Board Features

Feature	Description
Power	The 24V input provided to the hardware is converted into the voltage to be provided on the Type-C port using a PMIC. The output voltage of the PMIC is controlled by CCG2. Power can also be consumed from Type-C connector for dead battery functionality. **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 5V DC power adapters.
CCG2 Daughter Card Interface Connector	Provides interface to connect the CCG2 daughter card to the CCG EVK base board
Type-C Plug orientation, Detection and Alternate modes	I^2C interface between the CCG2 device and the USB Type-C Redriving Switch to select between 'SuperSpeed USB and 2-lane DisplayPort or '4-lane DisplayPort' combinations
	Hot Plug Detect (HPD) for Display Port Alternate Mode 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
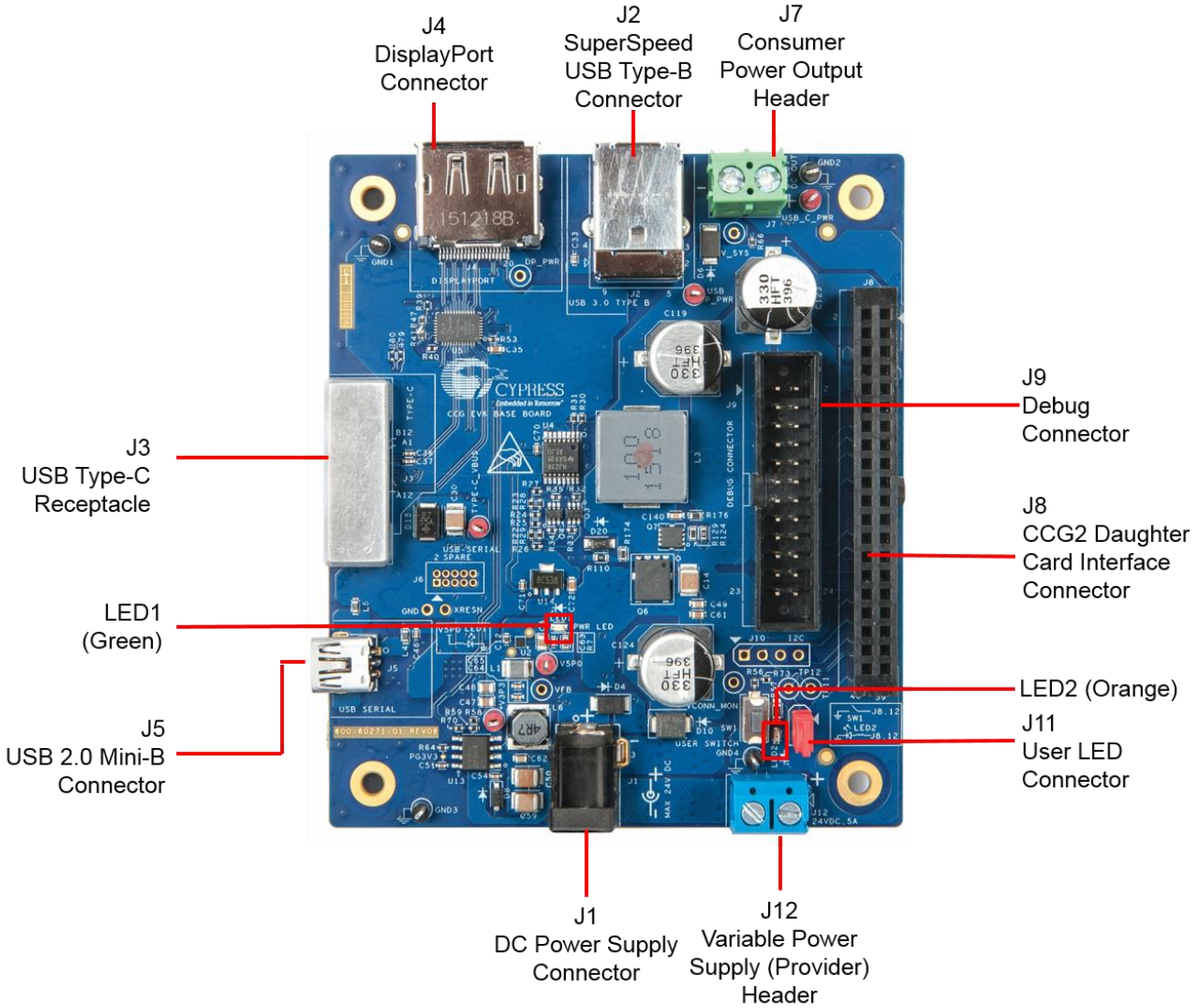
Table 3-2: CCG EVK Base Board Connector/Jumper Description

Connector/Jumper	Description	Default
J1	24V DC power jack to connect the DC power adapter to the CCG EVK 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

Connector/Jumper	Description		Default
J6	USB Serial Debug Header		This connector is not populated
J7	Header for voltage measurement when CCG2 acts as a power consumer or power output header		NA
J8	**CY4521 CCG2 Daughter Card Interface Connector**		NA
	Pin 1,2: Regulated input power from 24-VDC terminal (J12) of CCG EVK Base Board (USB_P_PWR)		
	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 CCG2 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 CCG2 acts as a power provider or power input header.		NA

3.2   CY4521 CCG2 Daughter Card

The CCG2 daughter card is equipped with the CYPD2122-24LQXIT of the CCG2 device family and a CY7C65215-32LTXI USB-Serial Bridge Controller to provide a USB interface for debugging and programming. This CCG2 daughter card, when assembled with the CCG EVK base board supports Type-C host applications such as notebooks and tablets.

3.2.1   Block Diagram

Figure 3-4 shows the CCG2 daughter card block diagram.

Figure 3-4 CCG2 Daughter Card Block Diagram
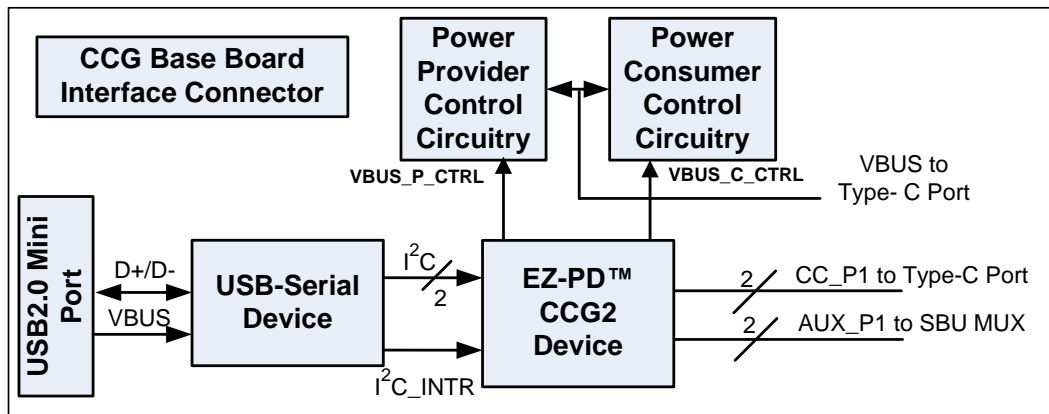
3.2.2   Features

Table 3-3 lists the features of the CCG2 daughter card.

Table 3-3: CCG2 Daughter Card Features

Feature	Description
CCG2 part number	CYPD2122-24LQXIT
CCG2 package	24-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
I²C interface	I²C pins and interrupt output pin for connecting to an Embedded Controller (EC)
Programming	SWD pins to debug/program CCG2 using Cypress MiniProg3

Feature	Description
Power	5 V from USB 2.0 Mini B (Connector J5 of CY4521 CCG2 daughter card)
	5 V from MiniProg3 (Connector J1 of CY4521 CCG2 daughter card)
	3.3 V/ 5 V power supply from the CCG EVK base board

3.2.3 Connectors and Jumper Settings

Figure 3-5 shows the CCG2 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: CCG2 Daughter Card Connectors/Jumper Settings

J1
Programming Header

J2: VSYS Selection Jumper
1-2 Short: 3.3V supply coming from CCG base board (Default Setting)
2-3 Short: Power from 5 V buck regulator of CCG base board

J4
CCG Base Board
Interface Connector

J3: IO Supply Selection Jumper
1-2 Short: Power from VSYS of CCG2
2-3 Short: Power from VDDD of CCG2 (Default Setting)

J5
USB 2.0 Mini-B
Receptacle
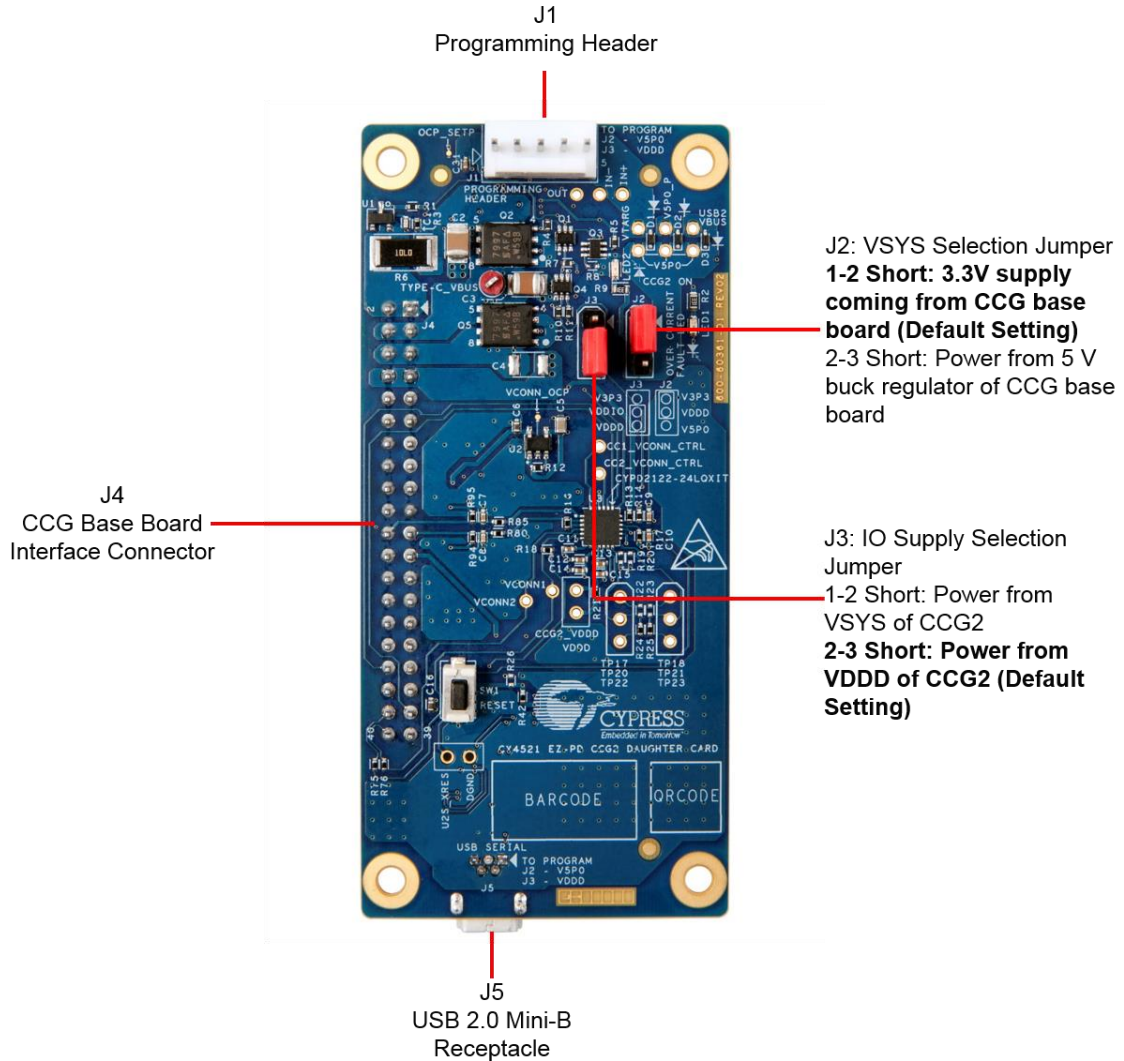
Table 3-4: CCG2 Daughter Card Connector/Jumper Description

Connector/Jumper	Description		Default
J1	Programming header Pin 1: VTARG Pin 2: GND Pin3: CCG2_XRES Pin4: CCG2_SWD_CLK Pin5: CCG2_SWD_IO		NA
J2	VSYS selection jumper: 1 and 2 short: Select the power from 3.3-V supply coming from the CCG EVK base board 2 and 3 short: Select the power from 5-V buck regulator of the CCG EVK base board		1 and 2 short
J3	I/O supply selection jumper: 1 and 2 short: Select the power from VSYS of CCG2 device 2 and 3 short: Select the power from VDDD of CCG2 device		2 and 3 short
J4	**CCG 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_Adapter_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	
J5	USB 2.0 Mini-B connector (receptacle) Connected to USB-Serial device and used for programming CCG2 device		NA

3.3   Powering the CY4521 EZ-PD CCG2 EVK Setup

The CY4521 EZ-PD CCG2 EVK setup can be powered by connecting the 24-V DC power adapter to connector J1 of the CCG EVK base board. LED1 on the CCG EVK base board and LED2 on CCG2 daughter card board will glow green and LED2 on the CCG EVK base board will blink orange continuously, to indicate a successful power connection. The CY4521 EZ-PD CCG2 EVK setup can also be powered by connecting 24-V DC from a variable power supply to the terminals of connector J12 of the CCG EVK 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 CCG2 daughter card.

4. Programming the EZ-PD™ CCG2 Device on the CY4521

The CCG2 device in the CY4521 EZ-PD CCG2 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 CY4521 EZ-PD CCG2 EVK webpage and in the CY4521 EZ-PD CCG2 EVK installer. The firmware version of the onboard CCG2 device can be verified by using the EZ-PD Configuration Utility as shown in Figure 4-4. If the onboard CCG2 device's firmware version does not match with the latest version on the CY4521 EZ-PD CCG2 EVK webpage, follow the steps in this chapter to reprogram the CCG2 device. Device configuration parameters (such as vendor ID, Power Data Objects (PDOs), and DisplayPort Mode) can be updated using the EZ-PD Configuration Utility. Refer to the EZ-PD Configuration Utility User Manual for more details.

The CCGx Software Development Kit (SDK) (version 3.0 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 CCG2 Device on the CCG2 Daughter Card

CCG2 firmware build design uses a two .cyacd file approach. The first .cyacd file is the firmware image and the second .cyacd file is the configuration data file. The EZ-PD Configuration Utility is a Windows Application, which can be used to configure and program the CCG2 device on the CCG2 daughter card. The steps to update the firmware running on the CCG2 device of the CCG2 daughter card are as follows:

1. Download and install the latest kit software setup file "CY4521 EZ-PD CCG2 EVK Complete Setup" from the kit's website: www.cypress.com/CY4521. This installs the EZ-PD Configuration Utility as well.

2. Ensure that the voltage selection jumper (J2) is set to 5 V (pins 2 and 3 of jumper J2 on the CCG2 daughter card are shorted). Note that this is NOT the default setting for this jumper. Also, ensure that the I/O supply selection jumper (J3) is set to VDDD of the CCG2 device (pins 2 and 3 of jumper J3 on the CCG2 daughter card are shorted).

3. Connect the USB Type-A to Mini-B cable from the host PC to the CCG2 daughter card's J5 connector as shown in Figure 4-1.

Figure 4-1: Programming CCG2 Device on CY4521 EZ-PD CCG2 EVK

Jumper	Setting
J2	2-3
J3	2-3

J5 (USB 2.0 recepatcle) on CCG2 daughter card

USB

USB Type-A to mini B Cable connected to J5
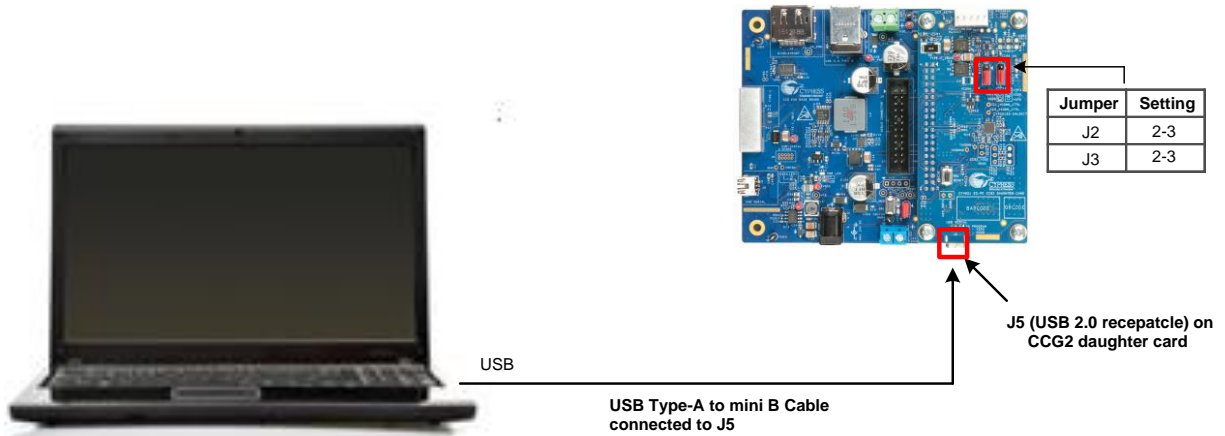
4. Launch the EZ-PD Configuration Utility as shown in Figure 4-2. After the installation, the EZ-PD Configuration Utility is available at the following location by default:

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

Figure 4-2: EZ-PD Configuration Utility
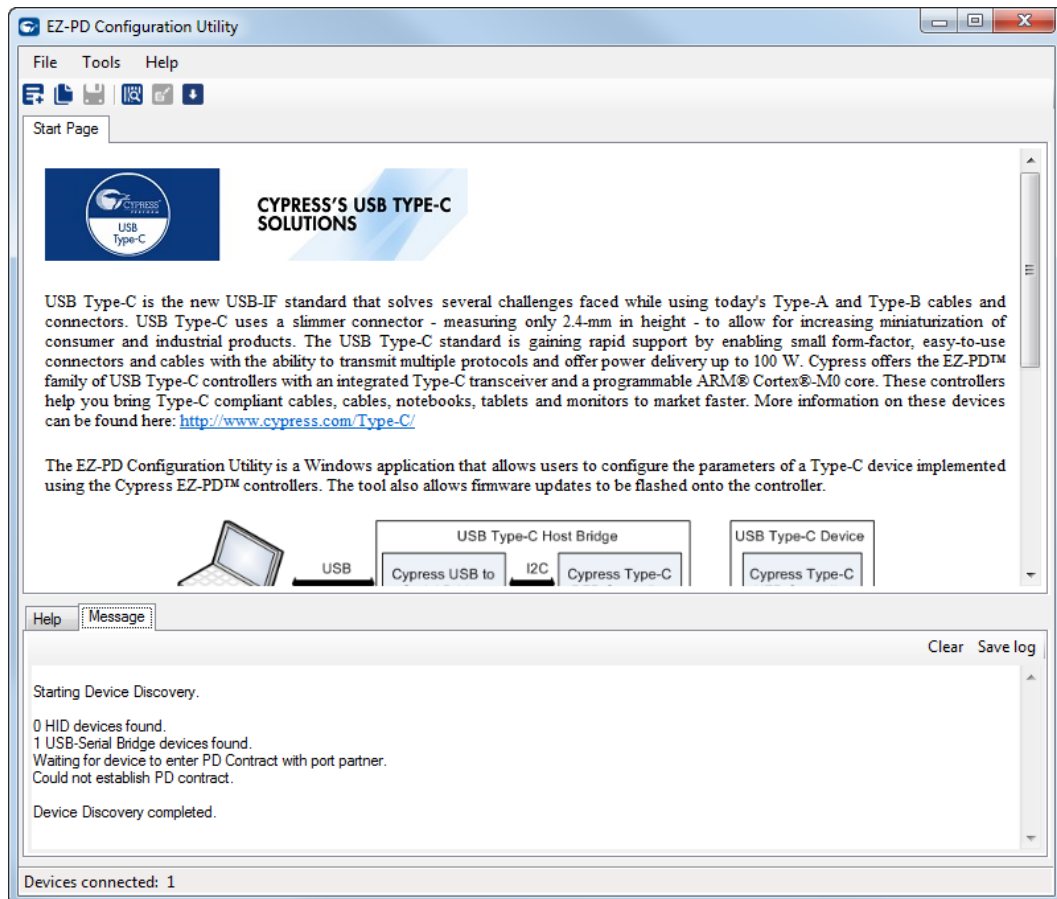
5. Select **Tools** > **Firmware Update** to update the firmware of the CCG2 device as shown in Figure 4-3. Refer to the EZ-PD Configuration Utility User Manual for more details. That document can also be opened by clicking **Help > User Manual** in the EZ-PD Configuration Utility.

Figure 4-3: Upgrading CCG2 Firmware
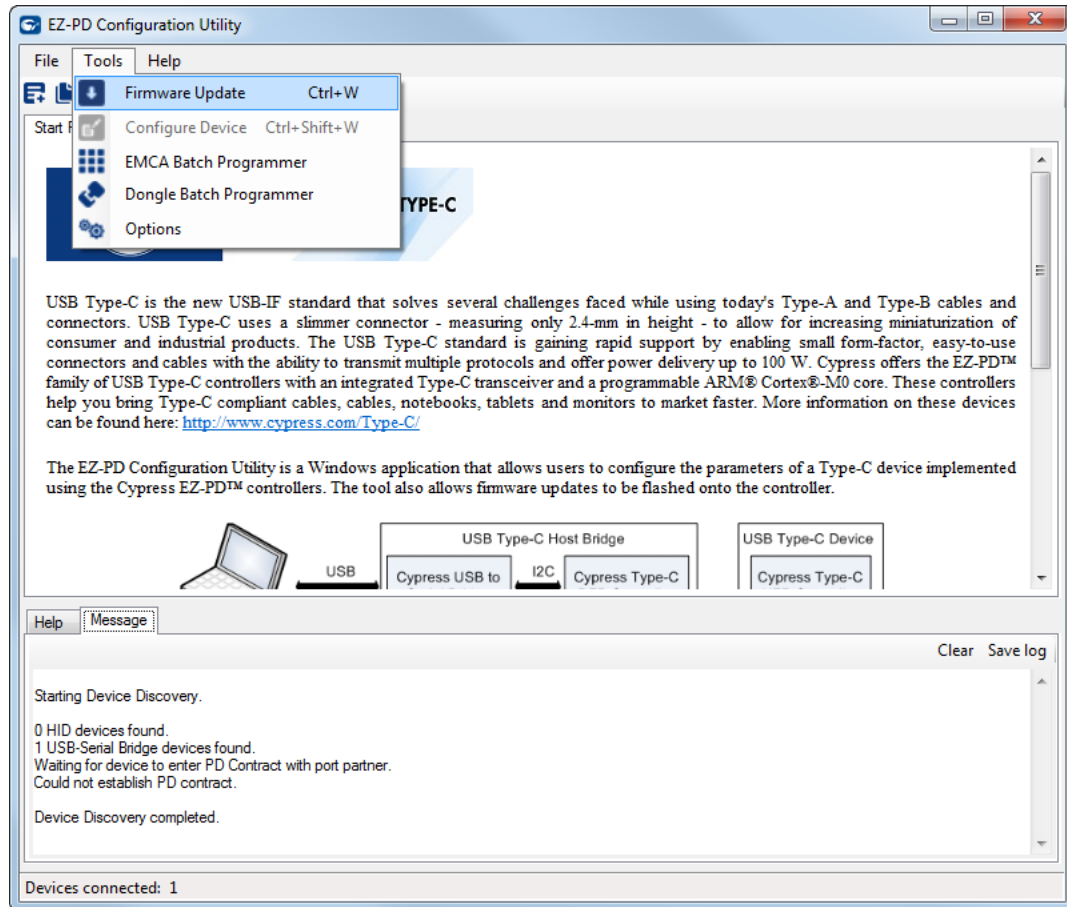
6. Download the latest firmware images from the CY4521 EZ-PD CCG2 EVK webpage. The CCG2 device firmware is provided in *.cyacd* format. Sample firmware binary for each application and standard part numbers are provided on the CY4521 EZ-PD CCG2 EVK webpage. The firmware image is also available at the following location after the CY4521 EZ-PD CCG2 EVK installation: `<Install_Directory>\CY4521 EZ-PD CCG2 EVK\1.0\Firmware`

7. Select **NOTEBOOK** from the **Select target** list shown in Figure 4-4. Click the button located in the **Firmware path 1** widget and select the FW image (CYPD2122-24LQXIT_notebook_x_x_x_xxx*_0_0_0_FW.cyacd). **Note *:** x_x_x_xxx refers to the firmware version.

Figure 4-4: Updating Firmware Using EZ-PD Configuration Utility
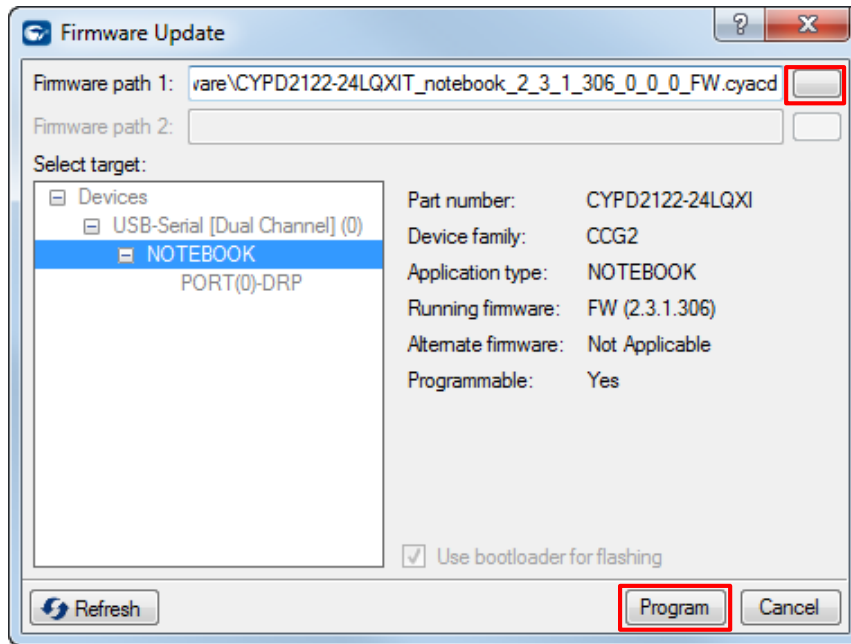
8. Upon clicking **Program**, the firmware update process is initiated over I^{2}C. The status bar at the bottom of the utility will show the progress; the Messages window will indicate the firmware update process.

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

9. Upon successful completion of the firmware update process, a window with the message "Firmware update succeeded" is displayed as shown in Figure 4-5. Click **OK**.

Figure 4-5: Firmware Update Process Complete

10. The above steps update the firmware image of the CCG2 device. In order to update the configuration data of the CCG2 device, select **File** > **Read from Device** as shown in Figure 4-6 to read the existing configuration data. Select **Notebook** and click on **Read** button.

Figure 4-6. Read Configuration Data from Device using EZ-PD Configuration Utility
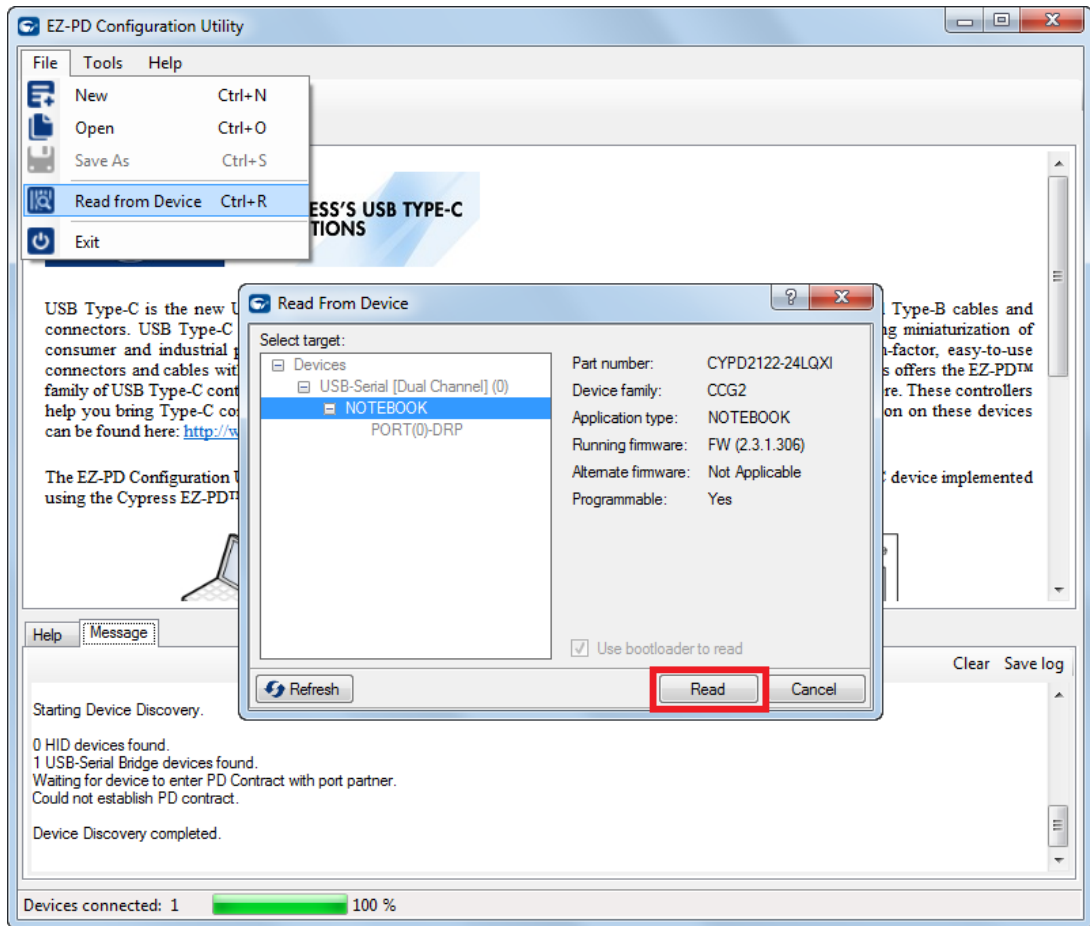
11. After reading the configuration data from the device, the EZ-PD Configuration Utility window looks similar to the screenshot shown in Figure 4-7.

Figure 4-7. Configuration Data of the CCG2 Device
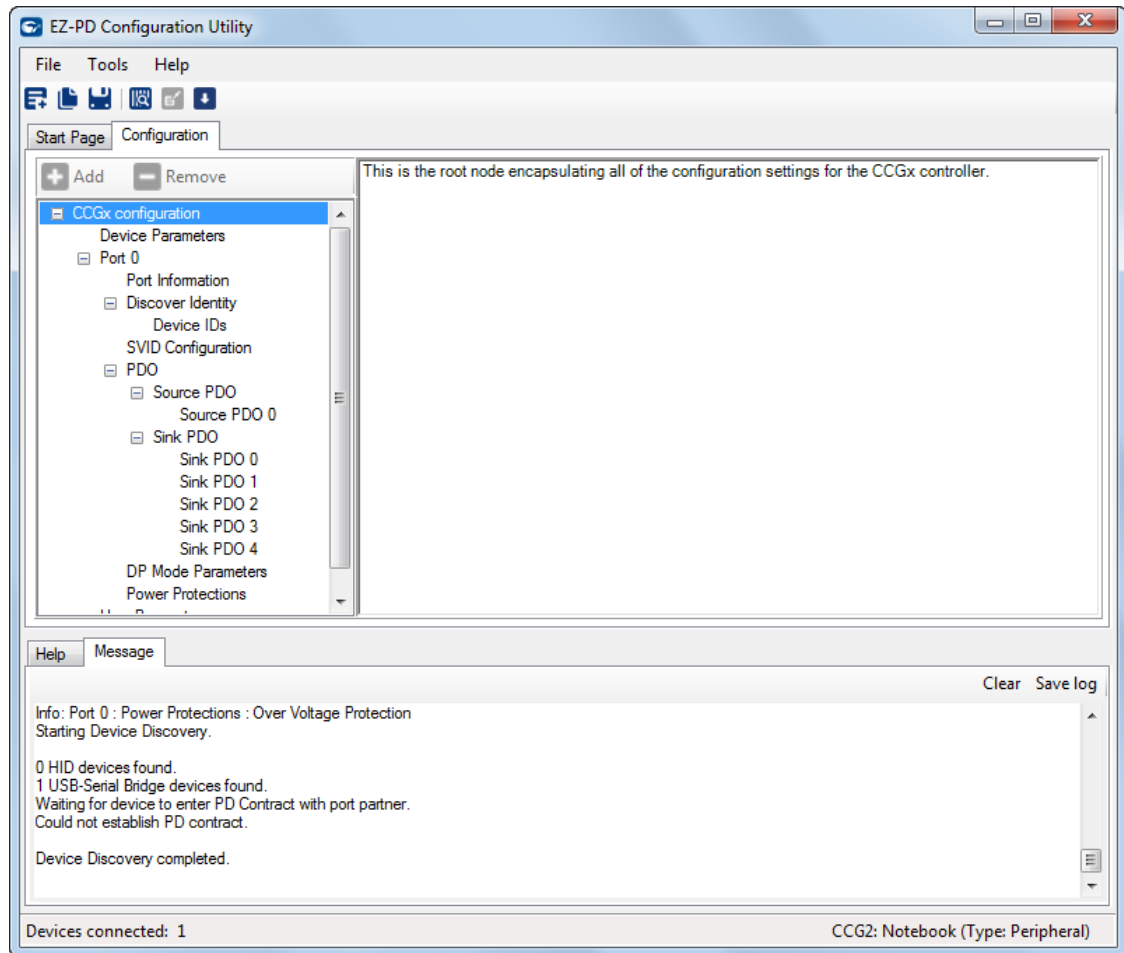
12. Click on **File** > **Save As** as shown in Figure 4-8 in order to save the read configuration data from the CCG2 device. This step is a pre-requisite to download the configuration data which is available at the following location after the CY4521 EZ-PD CCG2 EVK installation: `<Install_Directory>\CY4521 EZ-PD CCG2 EVK\1.0\Firmware`

Figure 4-8. Saving the Read Configuration File Using EZ-PD Configuration Utility
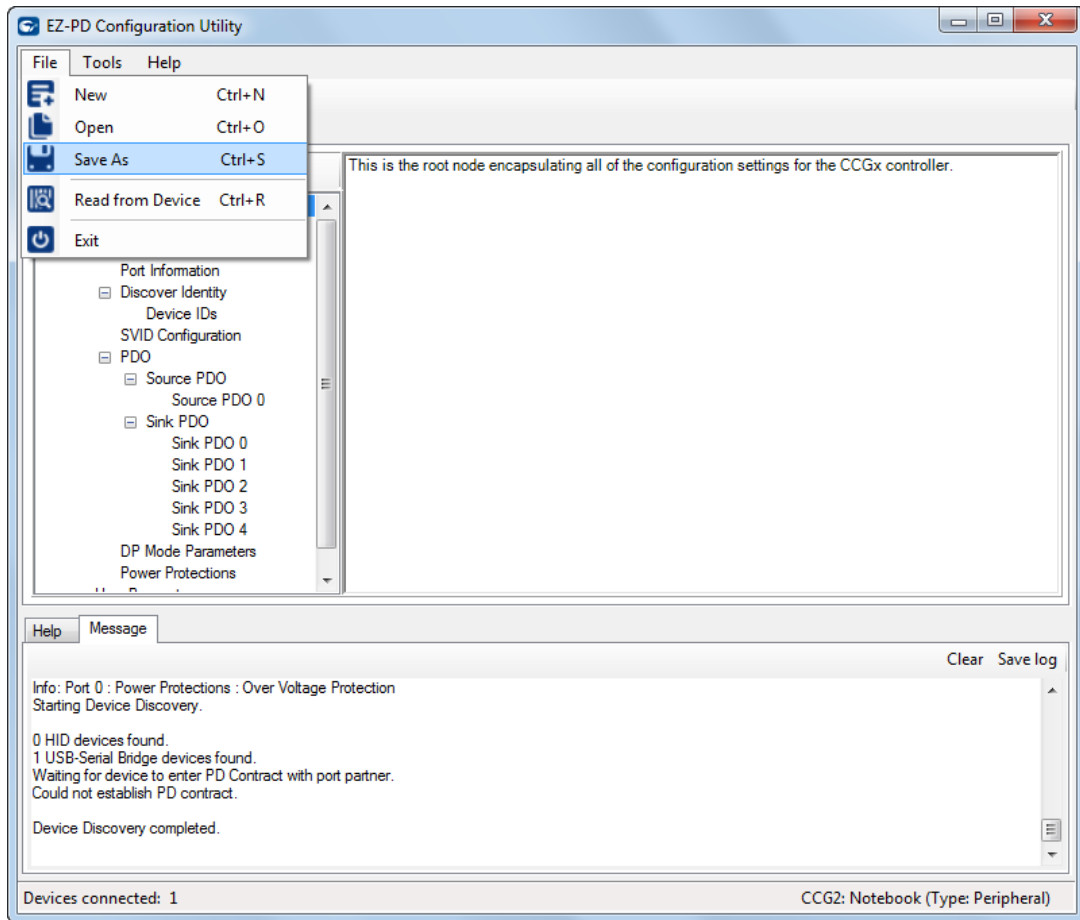
13. Click on **Tools** > **Configure Device** as shown in Figure 4-9 to update the device configuration.

Figure 4-9. Updating CCG2 Device Configuration Using EZ-PD Configuration Utility
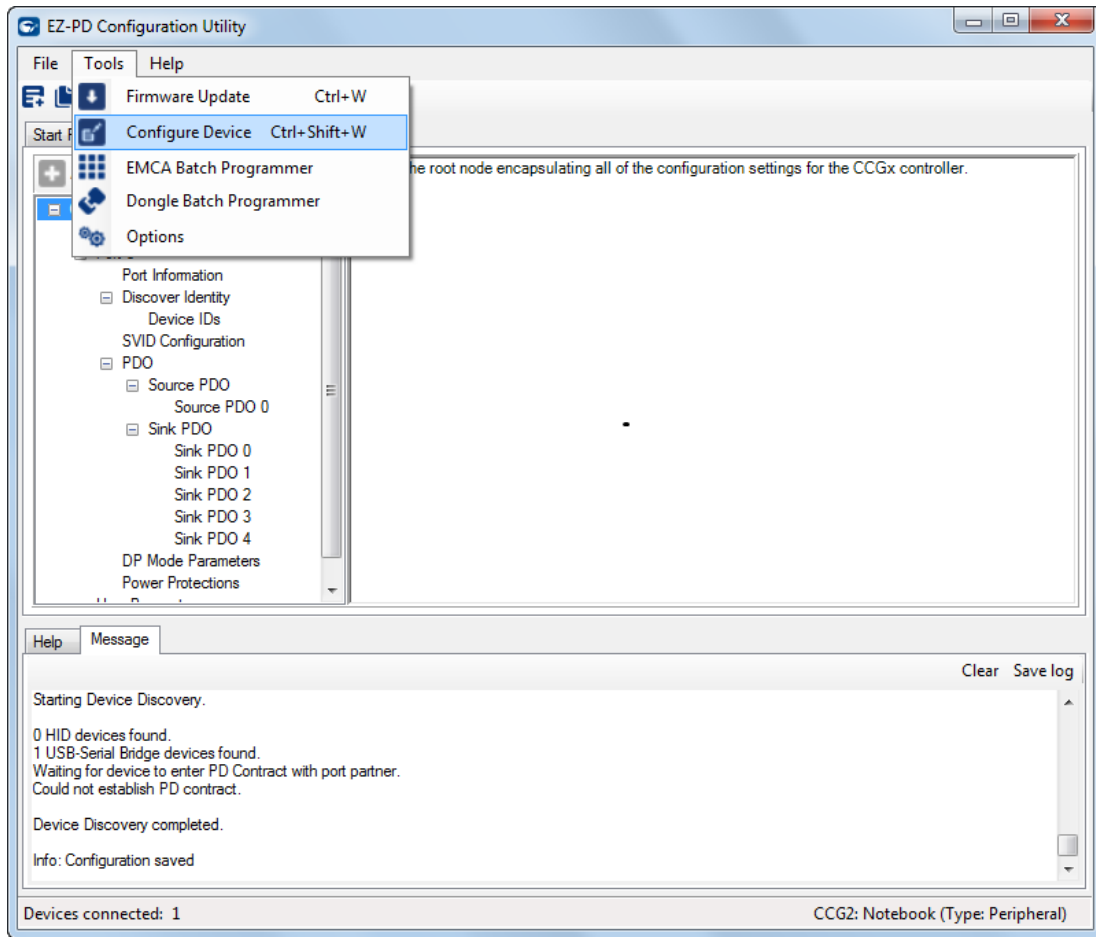
14. In the new window that opens as shown in Figure 4-10, select **NOTEBOOK** from the **Select target** list shown in Figure 4-4. Click the button located in the **Configuration File** widget and select the configuration file (CYPD2122-24LQXIT_notebook_x_x_x_xxx*_0_0_0_Config.cyacd).

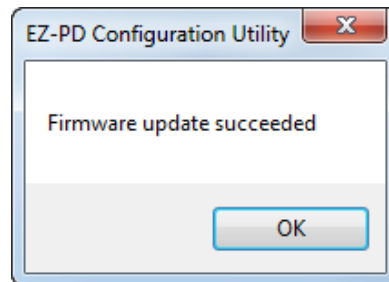Figure 4-10. Updating CCG2 Device Configuration
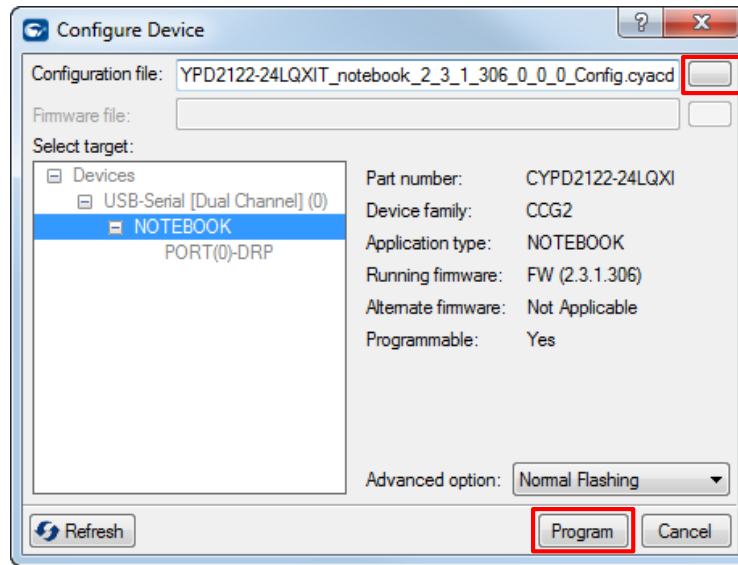
15. Upon clicking **Program**, the configuration update process is initiated over I^{2}C. The status bar at the bottom of the utility will show the progress; the Messages window will indicate the update process.

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

16. Once the configuration update is over, a window with the message "Flashing Configuration Succeeded" is displayed as shown in Figure 4-11. Click **OK**. This successfully completes of the configuration update process.

Figure 4-11. Configuration Update Process Complete
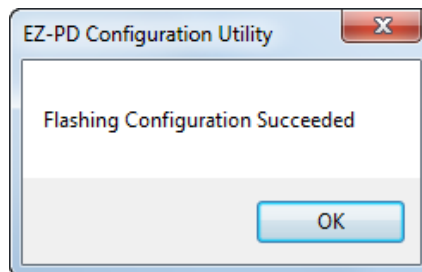
17. Press switch SW1 (XRES) on the CCG2 daughter card to reset the CCG2 device; the new firmware image will start executing.

5. Kit Operation

This chapter describes how to configure the CY4521 EZ-PD CCG2 EVK to demonstrate the functionality as a DRP (Dual Role Port) device. Four separate demonstrations are covered.

- SuperSpeed USB Demo
- DisplayPort Demo
- SuperSpeed USB and DisplayPort Demo
- Dead Battery Demo

The SuperSpeed USB demonstration provides details for connecting a host (PC) to a client (USB flash drive) through the CY4521 EZ-PD CCG2 EVK, also referred to as the "SuperSpeed USB Demo" in this kit guide. The DisplayPort demonstration provides details for connecting a host (PC) to a client (display monitor) through the CY4521 EZ-PD CCG2 EVK, also referred to as the "DisplayPort Demo" in this kit guide. The "SuperSpeed USB and DisplayPort Demo" is a combined demo of the "SuperSpeed USB Demo" and "DisplayPort Demo" using a Type-C multiport adapter. The dead battery demonstration emulates a scenario of a notebook with a dead battery, which can be charged by connecting the Type-C power adapter to its Type-C port.

5.1 SuperSpeed USB Demo

The SuperSpeed USB demo is a full end-to-end demo that demonstrates the following:

- Type-C connectivity between the DFP (host) and UFP (client)
- Reversibility of the Type-C connector.

5.1.1 Boards, Cables, and Accessories Needed

The following items are needed to perform this demo:

- Items provided with the kit:
    - o 24-V DC power adapter
    - o CY4521 EZ-PD CCG2 EVK boards (CCG EVK base board and CCG2 daughter card)
    - o USB 3.0 Type-A to Type-B cable
    - o USB Type-C to Type-A adapter
- Items not provided with the kit:
    - o USB host device (example: PC)
    - o USB flash or disc drive (It is recommended to use a SuperSpeed USB flash drive)

5.1.2 Running the SuperSpeed USB Demo

1. Use the default jumper settings shown in Figure 5-1 and Figure 5-2 to configure the CY4521 CCG2 EVK's base board and daughter card.

Figure 5-1: CCG EVK Base Board Jumper Settings for SuperSpeed USB Demo

J11
LED Jumper must
be loaded
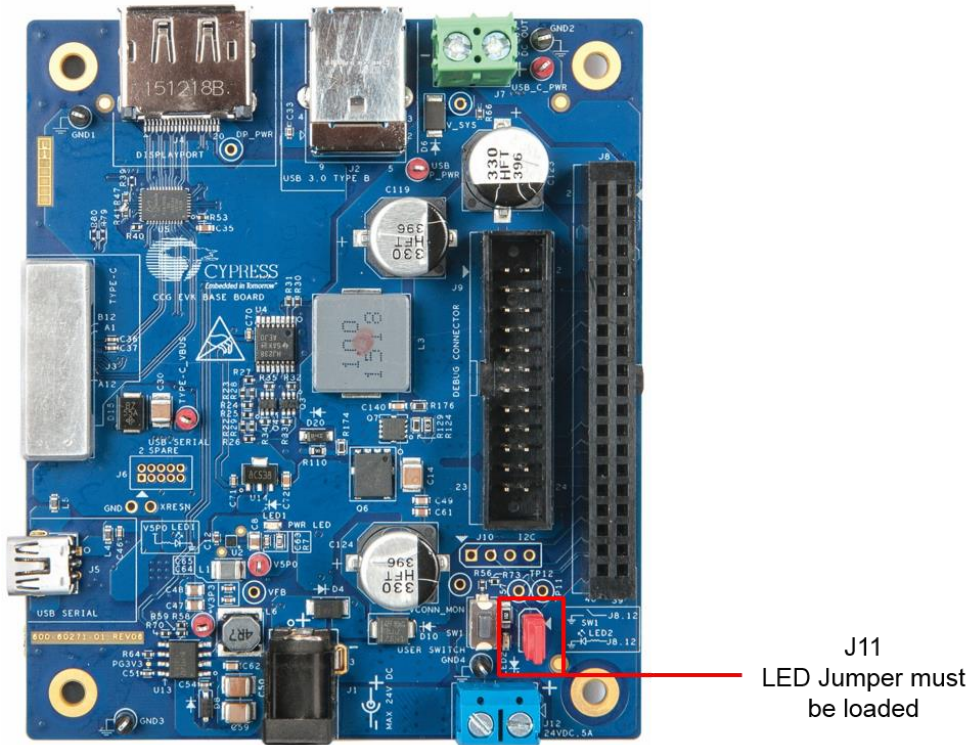
Figure 5-2: CCG2 Daughter Card Jumper Settings for SuperSpeed USB Demo

Jumpers J2 and J3
must be loaded in 1-2
and 2-3 positions
respectively.
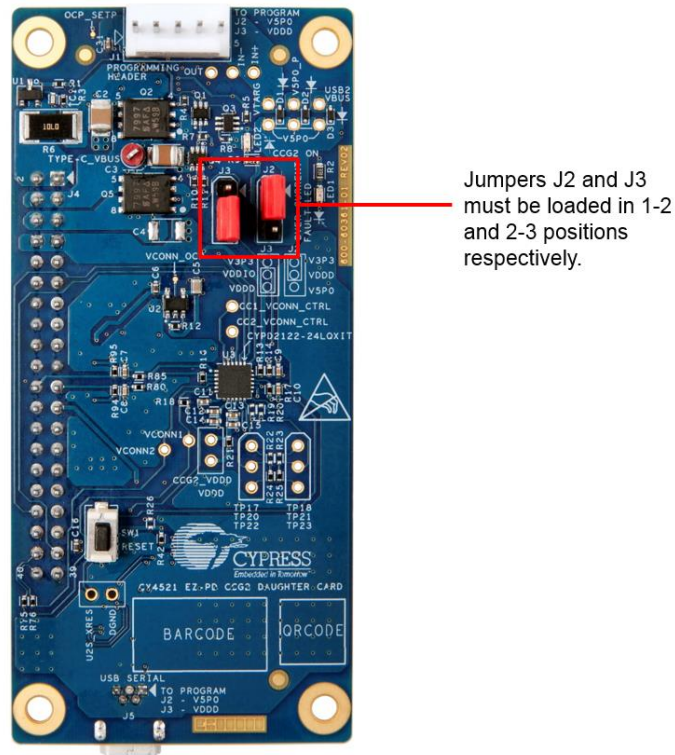
2. Use the USB 3.0 Type-A to Type-B cable to connect the CCG EVK base board to the PC.

3. Connect the 24-V DC power adapter provided with the kit to the CY4521 EZ-PD CCG2 EVK base board's power jack J1. Observe LED2 on the CCG2 daughter card and LED 1 of CCG EVK base board glow green to indicate power is ON, and LED2 on CCG EVK base board blinks orange to indicate the CCG firmware is executing.

4. Connect the USB Type-C to Type-A adapter provided with the CY4521 EZ-PD CCG2 EVK to the Type-C port (J3) of the CCG EVK base board.

5. Plug in a USB drive (not provided with the kit) into the Type-C to Type-A adapter board. Verify your setup as shown in Figure 5-3. To evaluate SuperSpeed USB data transfers, it is recommended to use a SuperSpeed USB flash drive.

Figure 5-3: Setup of SuperSpeed USB Demo Using CY4521 EZ-PD CCG2 EVK
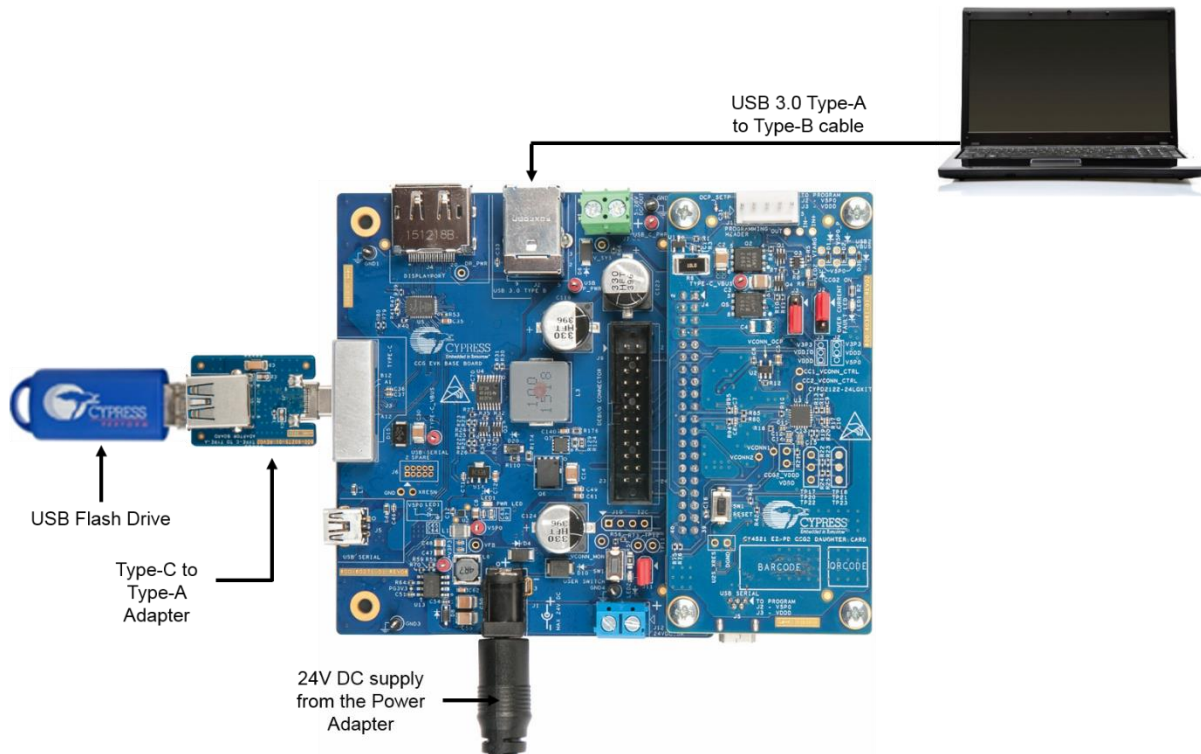
6. Observe the enumeration of the USB drive connected to the Type-C to Type-A adapter board on the host PC connected via the CY4521 EZ-PD CCG2 EVK. Verify functionality by accessing files on the connected USB drive from the PC.

7. Disconnect the Type-C to Type-A adapter board and connect it upside down to reconnect the USB drive.

8. Observe the enumeration of the USB drive connected to the Type-C to Type-A adapter board on the PC connected via the CY4521 EZ-PD CCG2 EVK even with the Type-C to Type-A adapter board flipped. Also observe the SuperSpeed USB data transfer speed by transferring files. This demonstrates orientation independence of the USB Type-C interface.

5.1.3 Explanation of Functionality

By flipping the USB Type-C to Type-A adapter and reconnecting to the setup, we reversed the orientation of the USB data channels from the original setup. The reverse order will not affect the enumeration process due to the reversible characteristics of Type-C connectors.

5.1.4 Common Problems and Troubleshooting

If the demo is not functional, follow these guidelines to troubleshoot.

1. Ensure that the CY4521 EZ-PD CCG2 EVK's base board and daughter card are powered by verifying that LED1 on the CCG EVK base board and LED2 on the CCG2 daughter card are glowing green and LED2 on the CCG EVK

base board is blinking orange. If LED2 on the CCG EVK base board is not blinking, the CCG2 device is not active. Assert and release the reset button (SW1) on the CCG2 daughter card.

2. Ensure that the CCG2 daughter card is mounted properly on the CCG EVK base board; all connections between the two boards must be completely mated.

3. If the SuperSpeed USB device does not enumerate as expected on the PC, unplug the device and then plug it back in.

5.2 DisplayPort Demo

The DisplayPort demo is a full end-to-end demo that demonstrates the following:

■ Type-C connectivity between the DFP (host) and UFP (client)

■ USB PD Alternate Mode (for DisplayPort): Delivers four-lane DisplayPort video from the host (PC) to client (display monitor).

5.2.1 Boards, Cables, and Accessories Needed

The following items are needed to perform this demo:

■ Items provided with the kit:

  o 24-V DC power adapter

  o CY4521 EZ-PD CCG2 EVK

■ Items not provided with the kit:

  o DisplayPort video source (example: PC)

  o DisplayPort monitor

  o DisplayPort cable that connects the CCG EVK base board to the PC. If the PC has a Mini DisplayPort plug, use a Mini DisplayPort to DisplayPort cable (see the List of Recommended Hardware section)

  o Type-C to DP/HDMI/VGA adapter that connects the CY4521 EZ-PD CCG2 EVK base board to the display monitor through the relevant cable (see the List of Recommended Hardware section)

5.2.2 Running the DisplayPort Demo

1. Use the default jumper settings shown in Figure 5-1 and Figure 5-2 to configure the CY4521 CCG2 EVK's base board and daughter card.

2. Mount the CCG2 daughter card on the CCG EVK base board of the CY4521 EZ-PD CCG2 EVK base board if not already mounted.

3. Connect the 24-V DC power adapter provided with the kit to the CY4521 EZ-PD CCG2 EVK base board power jack J1. Observe LED2 on the CCG2 daughter card and LED1 of CCG EVK base board glow green to indicate power is ON, and LED2 on the CCG EVK base board blinks orange to indicate the CCG firmware is executing.

4. Connect the Type-C port of Type-C to DP/HDMI/VGA adapter to J3 port (USB Type-C receptacle) of CCG EVK base board. Connect its other end to a display monitor that supports the interface using a DisplayPort/HDMI/VGA cable.

5. Connect the DisplayPort video source (i.e. from the PC) to the CCG EVK base board's DisplayPort connector J4.

6. After all connections, your set up should look similar to the setup shown in Figure 5-4.

Figure 5-4: Setup of DisplayPort Demo Using CY4521 EZ-PD CCG2 EVK
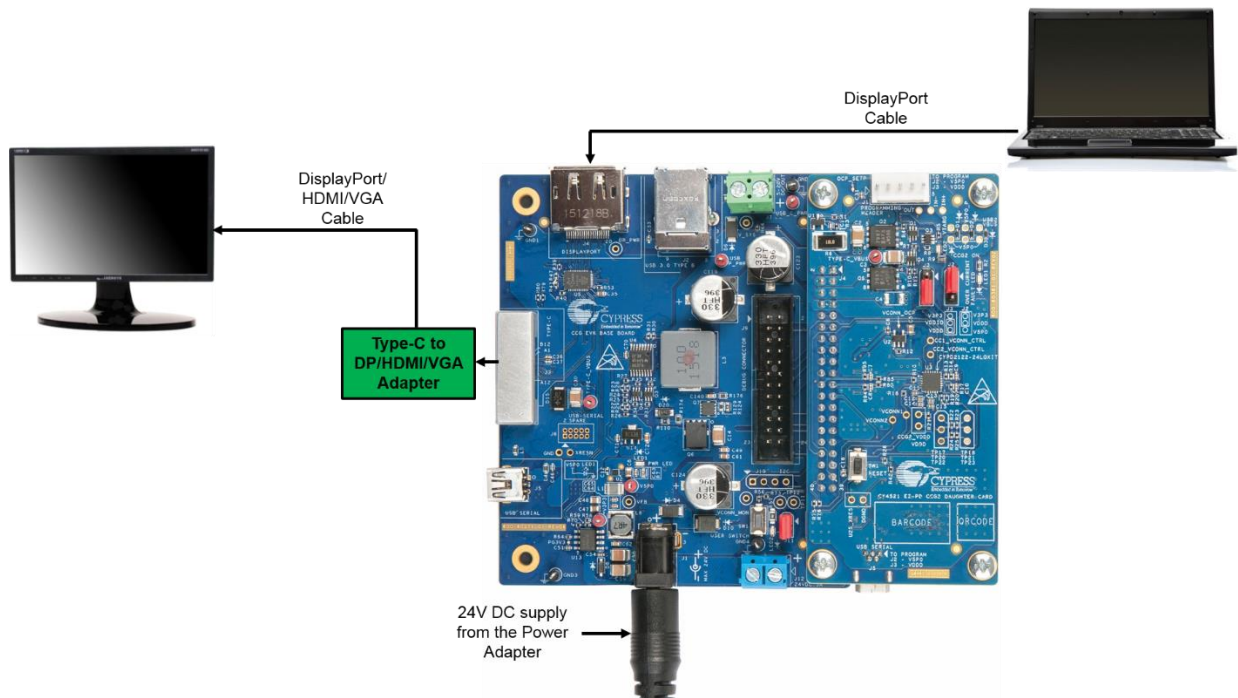
7. Ensure that the "Extended Display" feature is enabled in the host PC. For Windows users, this feature can be enabled by clicking **Extended Display**, available in the "Control Panel\All Control Panel Items\Display\Connect to a Projector" window. For Linux or Mac users, this feature can be enabled by checking the **Mirror image** option, available in "System Preferences (or Settings)\Display".

8. Observe that the DisplayPort video is transferred from the host (PC) to the display monitor through the USB Type-C port.

5.2.3 Common Problems and Troubleshooting

If the demo is not functional, follow these guidelines to troubleshoot:

1. Ensure that the CY4521 EZ-PD CCG2 EVK's base board and daughter card are powered by verifying that LED1 on the CCG EVK base board and LED2 on the CCG2 daughter card are glowing green and LED2 on the CCG EVK base board is blinking orange. If LED2 on the CCG EVK base board is not blinking, the CCG2 device is not active. Assert and release the reset button (SW1) on the CCG2 daughter card.

2. Ensure that the CCG EVK base board and CCG2 daughter card are powered before connecting the DisplayPort cables.

3. Ensure that the CCG2 daughter card is mounted properly on the CCG EVK base board. All connections between the two boards must be completely mated.

4. Ensure that "Extended Display" in enabled on the host PC.

5. If the PC video output is not displayed on the monitor, assert and release the reset button (SW1) on the CCG2 daughter card.

6. While connecting the video output from a Windows 7 (32 bit/64 bit) based PC to a 4K monitor through the CY4521 EVK, ensure that the PC uses the latest version of the driver for the Display adapter. Update the driver as required.

5.3   SuperSpeed USB and DisplayPort Demo

This demo is a combined demo of the SuperSpeed USB Demo and DisplayPort Demo using a multiport adapter. It demonstrates the following:

- Type-C connectivity capable of DisplayPort video data and SuperSpeed USB data simultaneously.

- Type-C connectivity between the DFP (host) and UFP (client).

- USB PD Alternate Mode (for DisplayPort): Delivers two-lane DisplayPort video from the host (PC) to client (display monitor).

5.3.1 Boards, Cables, and Accessories Needed

The following items are needed to perform this demo:

- Items provided with the kit:

  o 24-V DC power adapter

  o CY4521 EZ-PD CCG2 EVK

  o USB 3.0 Type-A to Type-B cable

- Items not provided with the kit:

  o USB host device and video source (example: PC)

  o Type-C Multiport Adapter that connects the CY4521 EZ-PD CCG2 EVK base board to the display monitor and USB flash drive through the relevant cable (see the List of Recommended Hardware section).

  o USB flash or disc drive (It is recommended to use a SuperSpeed USB flash drive)

  o DisplayPort monitor

  o DisplayPort cable that connects the CCG EVK base board to the PC. If the PC has a Mini DisplayPort plug, use a Mini DisplayPort to DisplayPort cable (see the List of Recommended Hardware section)

5.3.2 Running the SuperSpeed USB and DisplayPort Demo

1. Use the default jumper settings shown in Figure 5-1 and Figure 5-2 to configure the CY4521 EZ-PD CCG2 EVK's base board and daughter card.

2. Mount the CCG2 daughter card on the CCG EVK base board of the CY4521 EZ-PD CCG2 EVK base board if not already mounted. Use the USB 3.0 Type-A to Type-B cable to connect the CCG EVK base board to the PC.

3. Connect the 24-V DC power adapter provided with the kit to the CY4521 EZ-PD CCG2 EVK base board power jack J1. Observe LED2 on the CCG2 daughter card and LED1 of CCG EVK base board glow green to indicate power is ON, and LED2 on the CCG EVK base board blinks orange to indicate the CCG firmware is executing.

4. Connect the Type-C Multiport adapter (not provided with the kit) to J3 USB Type-C receptacle of CCG EVK base board. Connect its other end to a display monitor that supports DisplayPort/HDMI/VGA interface.

5. Plug in a USB drive (not provided with the kit) into the Type-C Multiport adapter. To evaluate SuperSpeed USB data transfers, it is recommended to use a SuperSpeed USB flash drive.

6. Connect the DisplayPort video source (i.e. from the PC) to the CCG EVK base board's DisplayPort connector J4.

7. After all connections, your set up should look similar to the setup shown in Figure 5-5.

Figure 5-5: Setup of SuperSpeed USB and DisplayPort Demo Using CY4521 EZ-PD CCG2 EVK
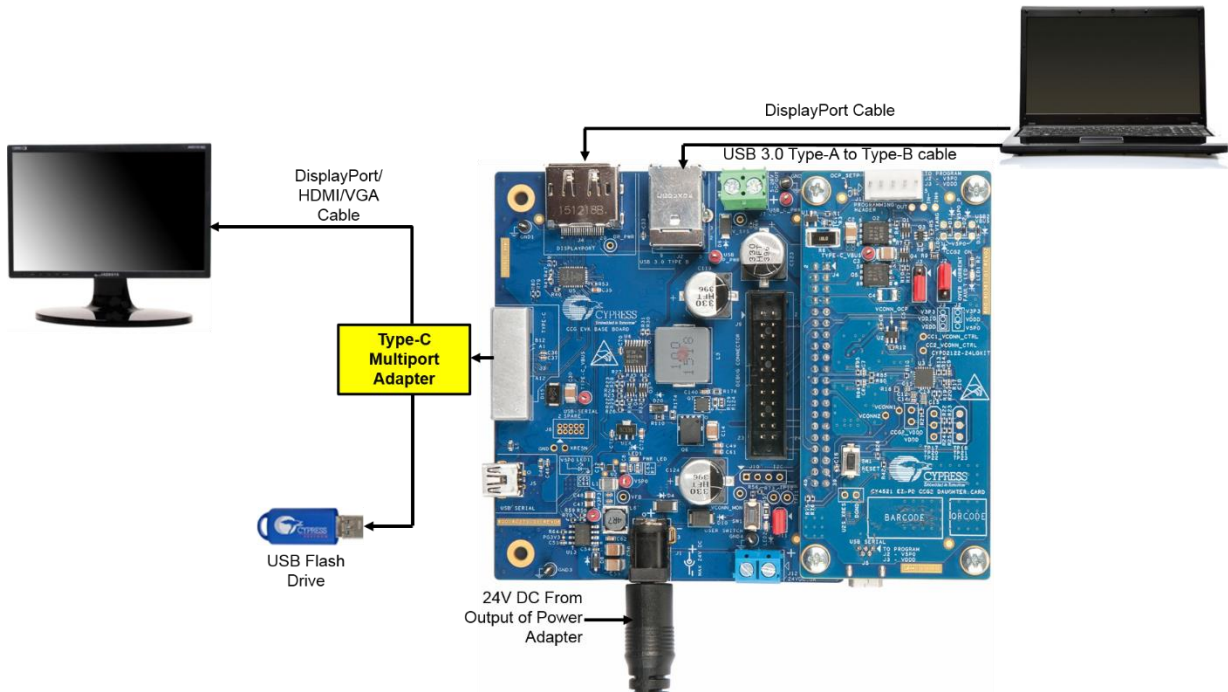
8. Ensure that the "Extended Display" feature is enabled in the host PC. For Windows users, this feature can be enabled by clicking **Extended Display**, available in the "Control Panel\All Control Panel Items\Display\Connect to a Projector" window. For Linux or Mac users, this feature can be enabled by checking the **Mirror image** option, available in "System Preferences (or Settings)\Display".

9. Observe that the DisplayPort video is transferred from the host (PC) to the display monitor through the USB Type-C port.

10. Also observe the enumeration of the USB drive connected to the Type-C Multiport adapter on the host PC connected via the CY4521 EZ-PD CCG2 EVK. Verify functionality by accessing files on the connected USB drive from the PC.

5.3.3 Common Problems and Troubleshooting

If the demo is not functional, follow these guidelines to troubleshoot:

1. Ensure that the CY4521 EZ-PD CCG2 EVK's base board and daughter card are powered by verifying that LED1 on the CCG EVK base board and LED2 on the CCG2 daughter card are glowing green and LED2 on the CCG EVK base board is blinking orange. If LED2 on the CCG EVK base board is not blinking, the CCG2 device is not active. Assert and release the reset button (SW1) on the CCG2 daughter card.

2. Ensure that the CCG2 daughter card is mounted properly on the CCG EVK base board. All connections between the two boards must be completely mated.

3. Ensure that the boards are powered before connecting the DisplayPort cables.

4. Ensure that "Extended Display" in enabled on the host PC.

5. If the PC video is not displayed on the monitor, assert and release the reset button (SW1) on the CCG2 daughter card.

6. If the SuperSpeed USB device does not enumerate as expected on the PC, unplug the device and then plug it back in. It should enumerate as a SuperSpeed USB device this time.

7. While connecting the video output from a Windows 7 (32 bit/64 bit) based PC to a 4K monitor through the CY4521 EVK, ensure that the PC uses the latest version of the driver for the Display adapters. Update the driver as required.

5.4   Dead Battery Demo

The Dead Battery demo demonstrates the following:

■   Emulates a scenario of a notebook with a dead battery, which can be charged by connecting a Type-C power adapter to its Type-C port.

■   Ability of the CCG2 device to perform the power role of a provider as well as a consumer.

5.4.1   Boards, Cables, and Accessories Needed

The following items are needed to perform this demo:

■   Items provided with the kit

   o CY4521 EZ-PD CCG2 EVK

■   Items not provided with the kit:

   o Type-C power adapter (see List of Recommended Hardware section)

   o Digital Multimeter to measure voltage

5.4.2   Running the Dead Battery Demo

1. Use the default jumper settings shown in Figure 5-1 and Figure 5-2 to configure the CY4521 EZ-PD CCG2 EVK's base board and daughter card.
2. In order to create a dead battery scenario, do not connect the 24V DC power adapter provided with the kit to the power jack J1 of the CCG EVK base board.
3. Because no power is connected to the EVK setup, the CCG2 device on the CCG2 daughter card is not powered, and thus emulates a dead battery scenario on a notebook. The CCG2 device in the EVK can be powered by connecting a Type-C power adapter to the Type-C port. As shown in Figure 5-6, connect a Type-C power adapter (not provided with the kit. See List of Recommended Hardware section) to Type-C port J3 of the CCG EVK base board. LED2 on the CCG2 daughter card and LED1 on the CCG EVK base board glow green to indicate power is ON, and LED2 on the CCG EVK base board blinks orange to indicate the CCG firmware is executing.

Figure 5-6: Setup of Dead Battery Demo Using CY4521 EZ-PD CCG2 EVK
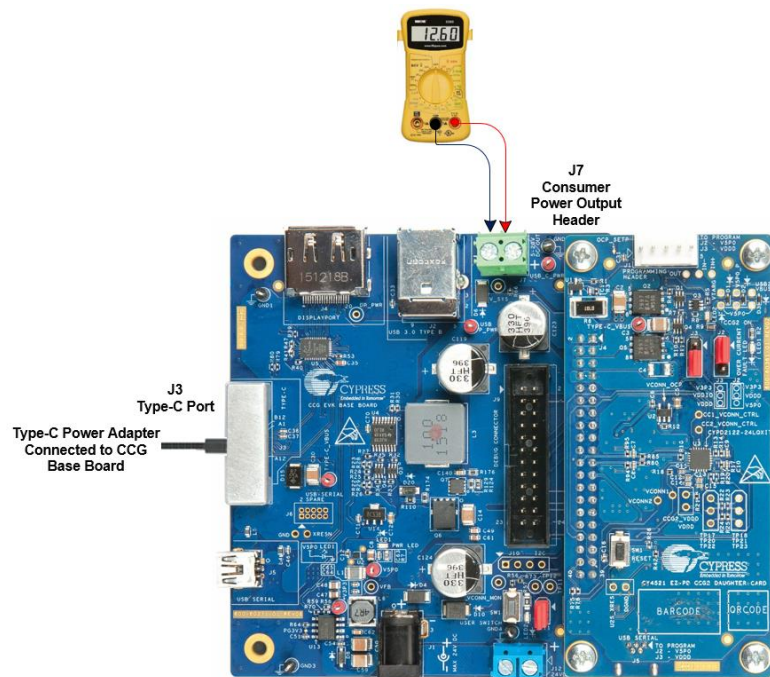
4. When the CCG2 device in the EVK is powered, it establishes a power contract with the Type-C power adapter and starts consuming power. This can be verified by connecting a digital multimeter to the consumer power output header (J7) of

the CCG EVK base board to measure the output voltage in the dead battery charging scenario. The output voltage at the consumer power output header (J7) is based on the power negotiation between the CCG2 device and the Type-C power adapter. Thus, it will vary based on the attached Type-C power adapter. This demonstrates that a CCG2 enabled notebook with a Type-C port can be charged from the dead battery condition.

5.4.3 Power Supply Connections

A PC/notebook with a USB 3.0 port and a DisplayPort, along with the CY4521 EZ-PD CCG2 EVK, is equivalent to a PD-enabled Type-C port Notebook as shown in Figure 5-7. In a real Type-C Notebook design, power from the power output header (J7) of the CCG EVK base board acting as the power adapter is connected to a Battery Charger Circuit (BCC) of a USB 3.0 Notebook/PC. On the CCG4521 EVK setup, the DC power jack J1 on the CCG EVK base board is provided for demonstration purposes only because the internal supply from the notebook is not available. In a real system, the DC power input header J12 of the CCG EVK base board would be connected to the power system of the notebook. A DC power adapter (if required, shown as "Notebook Power Adapter" block in Figure 5-7) would be connected to an "ORing Controller" block which supplies power to the Battery Charger Circuit.

Power being provided to the CY4521 EZ-PD CCG2 EVK setup would come from a PMIC in the Notebook, and the input source to that PMIC could be either the notebook battery, a DC power adapter or, a Type-C power adapter.

Figure 5-7: Type-C Notebook Design Using CY4521 EZ-PD CCG2 EVK
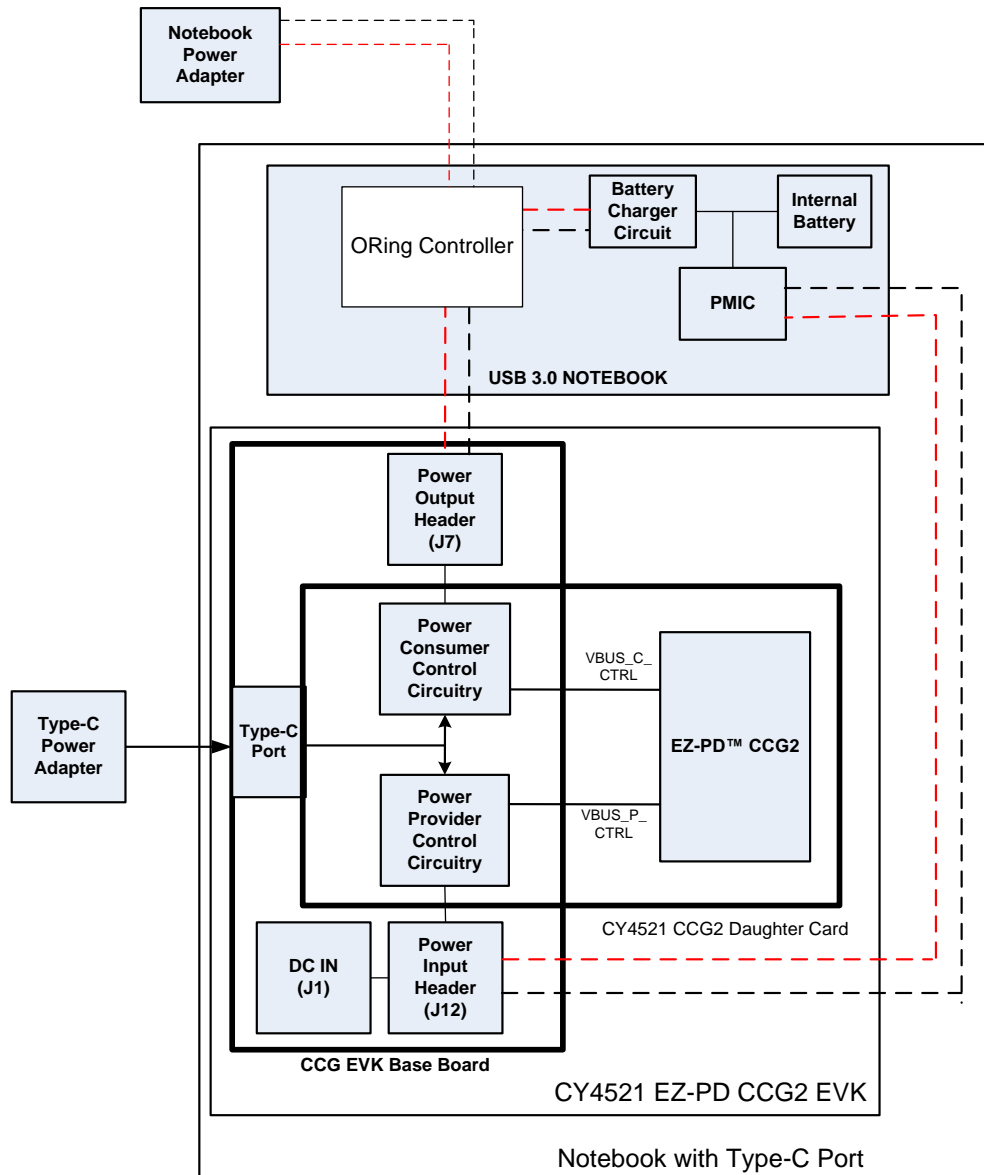
The CCG2 daughter card consists of both power provider and power consumer circuitry for the Type-C port. The CCG2 device controls this circuitry and decides the source of power for the CCG EVK base board and the CCG2 daughter card. The power input header on the CCG EVK base board can receive DC power directly. The power output header on the CCG EVK base board can source power directly when a Type-C power adapter is connected to the Type-C port.

In a CY4521 EZ-PD CCG2 EVK enabled Type-C PC design, the entire EVK can be powered using the following methods:

Method 1: A DC power adapter is connected to the DC power jack (J1) on CCG EVK base board. In this scenario, the CCG2 device turns on the power provider control circuitry and power is available on the power input headers.

Method 2: A Type-C power adapter is connected to the Type-C port. In this scenario, the CCG2 device turns on the power consumer control circuitry and power is available on the power output headers.

5.4.4 Common Problems and Troubleshooting

If the demo is not functional, follow these guidelines to troubleshoot:

1. Ensure that the CY4521 EZ-PD CCG2 EVK's base board and daughter card are powered by verifying that LED1 on the CCG EVK base board and LED2 on the CCG2 daughter card are glowing green and LED2 on the CCG EVK base board is blinking orange. If LED2 on the CCG EVK base board is not blinking, the CCG2 device is not active. Assert and release the reset button (SW1) on the CCG2 daughter card.

2. Ensure that the CCG2 daughter card is mounted properly on the CCG EVK base board. All connections between the two boards must be completely mated.

3. Ensure that the I/O Supply Selection jumper (J3) of the CCG2 daughter card is set to its default setting (2-3 short as shown in Figure 3-5).

4. If there is no voltage at jumper J7 of the CCG EVK base board, verify the connection of the Type-C Power Adapter to the CCG EVK base board. Also ensure that the connected Type-C power adapter supports a 5V to 20V power profile.

6. Appendix

6.1 Terminology

This guide assumes that the user of the CY4521 EZ-PD CCG2 EVK is familiar with the fundamentals of Type-C connectivity and the USB Power Delivery protocol. A brief description of Type-C terms is provided here for reference.

- Alternate Modes: A feature of a USB Type-C system whereby one or both of the SuperSpeed lanes may be repurposed for use with a different serial protocol, such as a DisplayPort, eSATA, or Thunderbolt.

- Client: A USB peripheral such as a hub, docking station, or monitor.
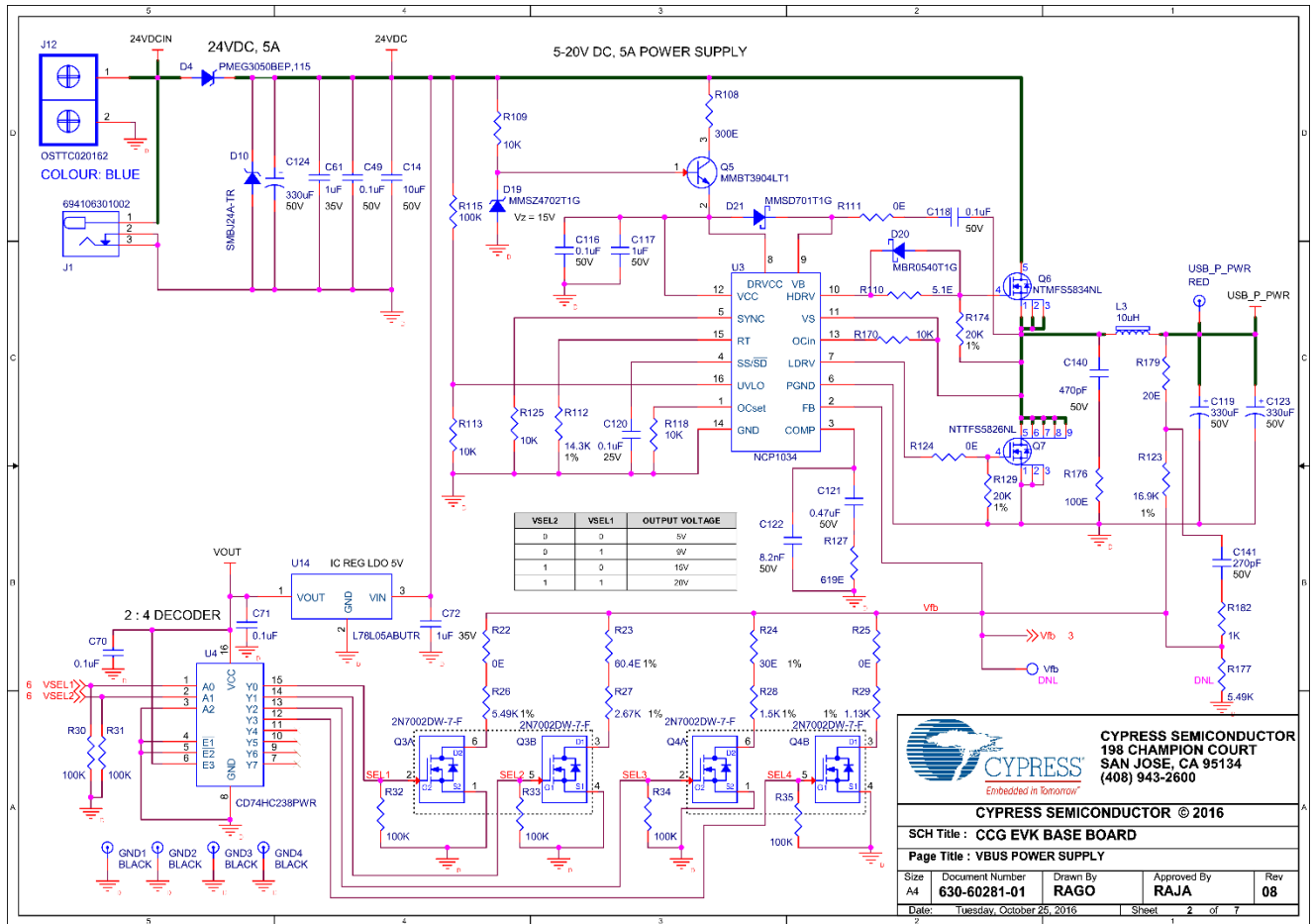
- Configuration channel (CC): A USB Type-C bus wire used to transmit protocol signals. This is a half-duplex 300-kHz signal.

- Consumer: A Type-C port that sinks power from VBUS.

- DisplayPort: A digital display interface standard developed by the Video Electronics Standards Association. It is used primarily to connect a video source to a display such as a computer monitor.

- Downstream facing port (DFP): A USB Type-C port on a host or a hub to which devices are connected.

- Dp, Dn: USB Type-C bus wires used to transmit and receive USB 2.0 data.

- Dual-role port (DRP): A USB Type-C port that can operate as either a DFP or a UFP.

- Electronically Marked Cable Assembly (EMCA): A USB cable that includes an IC that reports cable characteristics (such as current rating) to the Type-C ports.

USB3.0 Type-C Plug   **USB3.0 Type-C Receptacle**
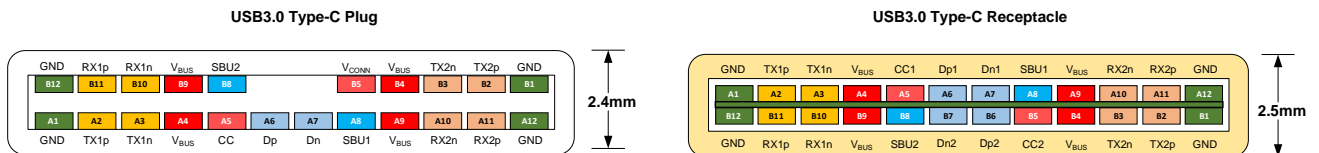
- Host: A USB Host system such as a PC, notebook, and laptop.

- Provider: A Type-C port that sources power over VBUS.

- Sideband use (SBU): A USB Type-C bus wire used for non-USB control signals, such as DisplayPort control signals.

- Type-C Transceiver: A transmitter/receiver that communicates over the CC.

- TX1p, TX1n, RX1p, RX1n, TX2p, TX2n, RX2p, and RX2n: USB Type-C bus wires used to transmit and receive SuperSpeed USB and PCIe or DisplayPort data.

- Upstream facing port (UFP): A USB Type-C port on a device or a hub that connects to a host or the DFP of a hub.

- USB Power Delivery (USB PD, PD): A new USB standard that increases maximum power delivery over USB from 7.5 W to 100 W.

- USB Type-C (Type-C): A new standard with a slimmer USB connector and a reversible cable, capable of sourcing up to 100 W of power and supporting Alternate Modes.

- VBUS: A USB Type-C bus wire used for power; initially 5 V, but can be increased up to 20 V on USB PD systems.

- VCONN: A USB Type-C bus wire used to power the IC in the EMCA.

6.2   CCG EVK Base Board

6.2.1   Schematics
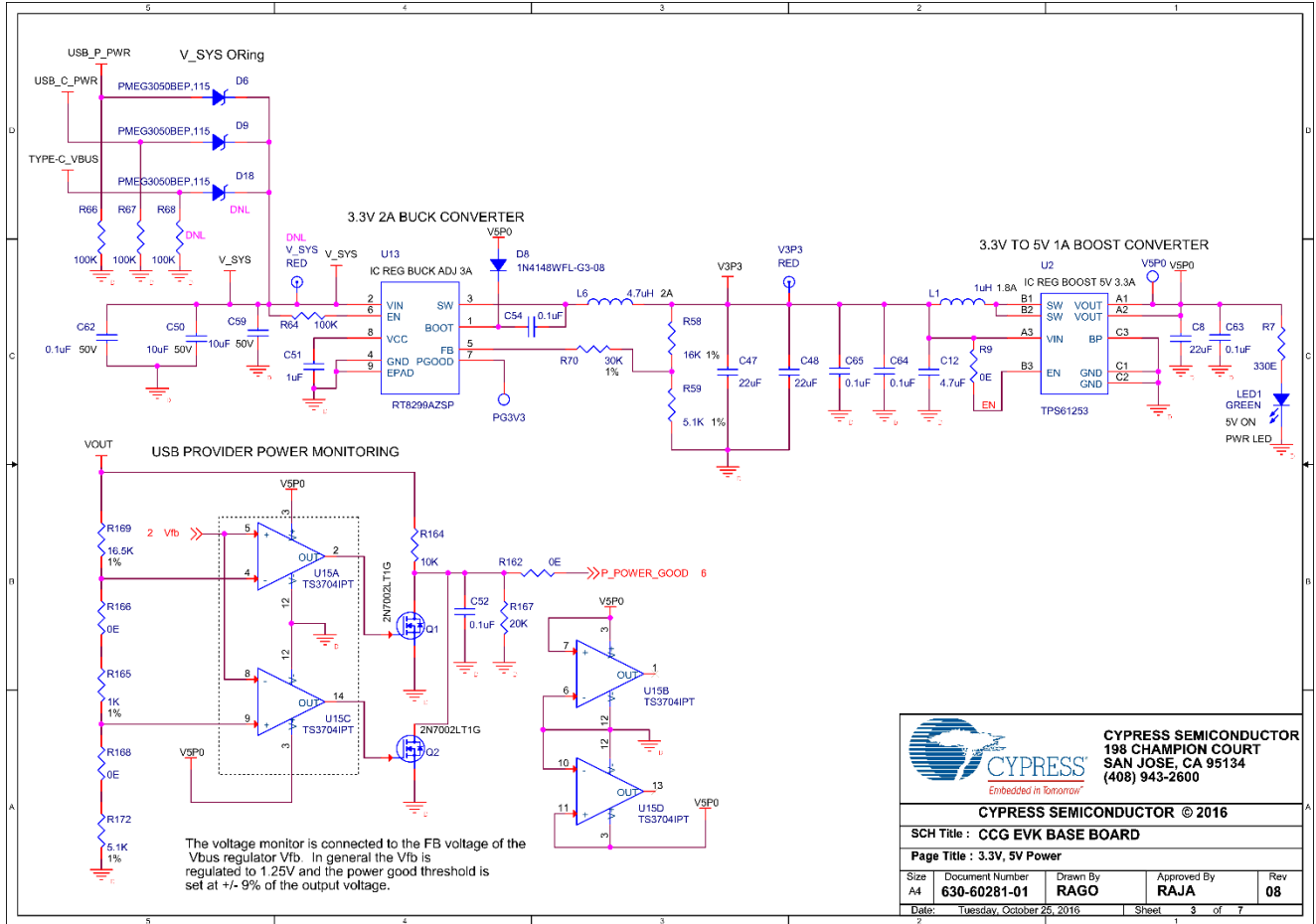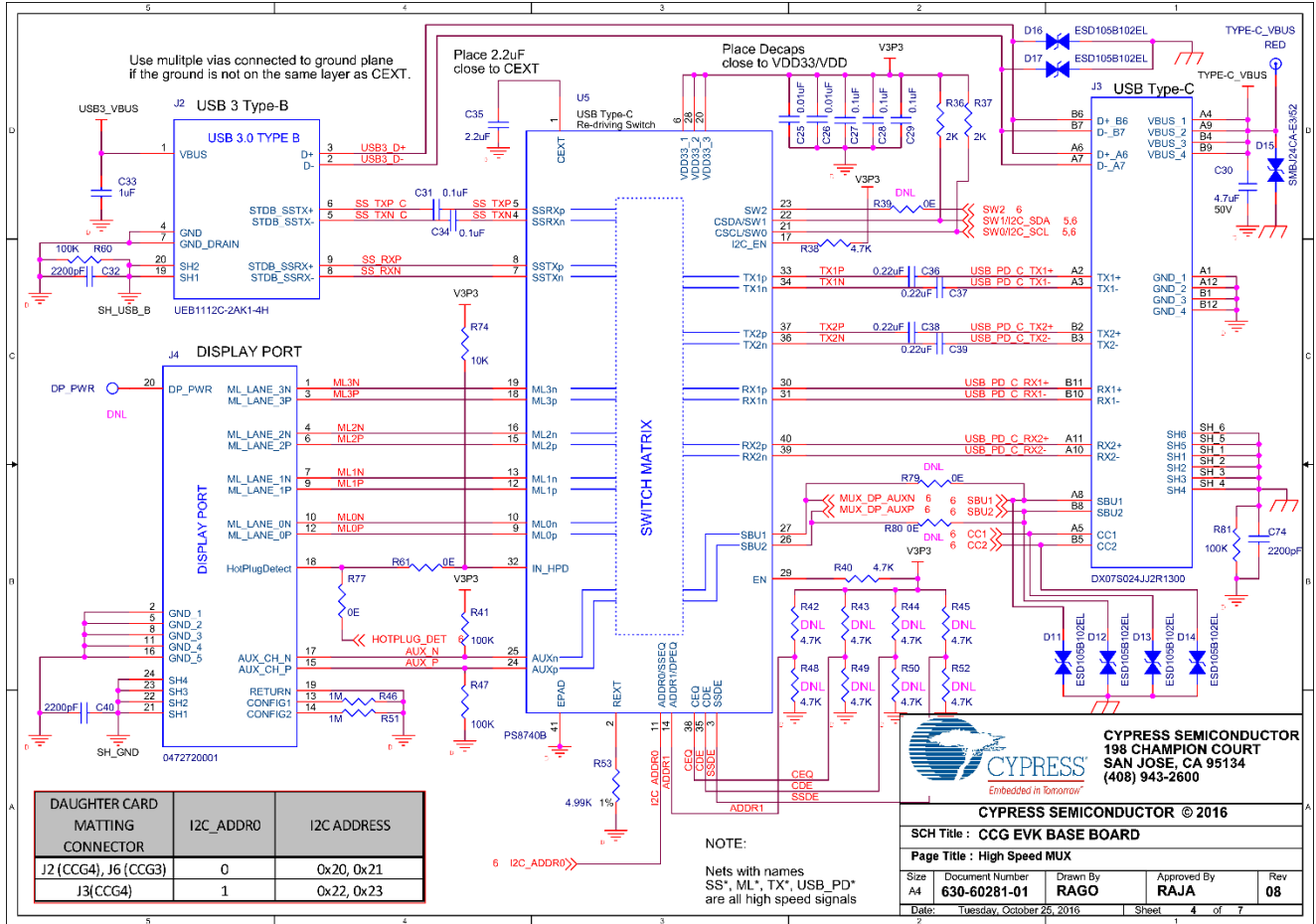
6.2.2 Gerber Files

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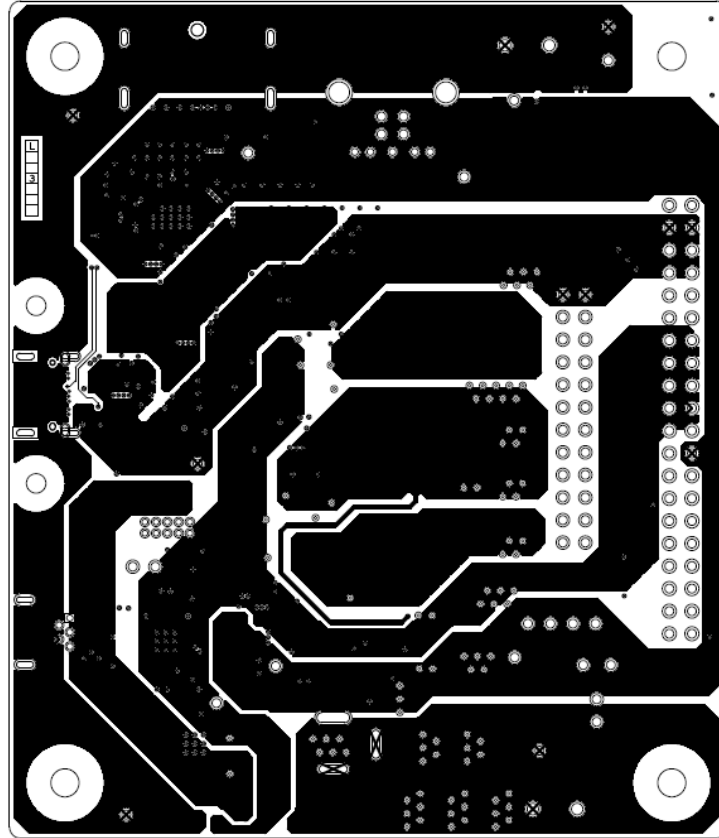
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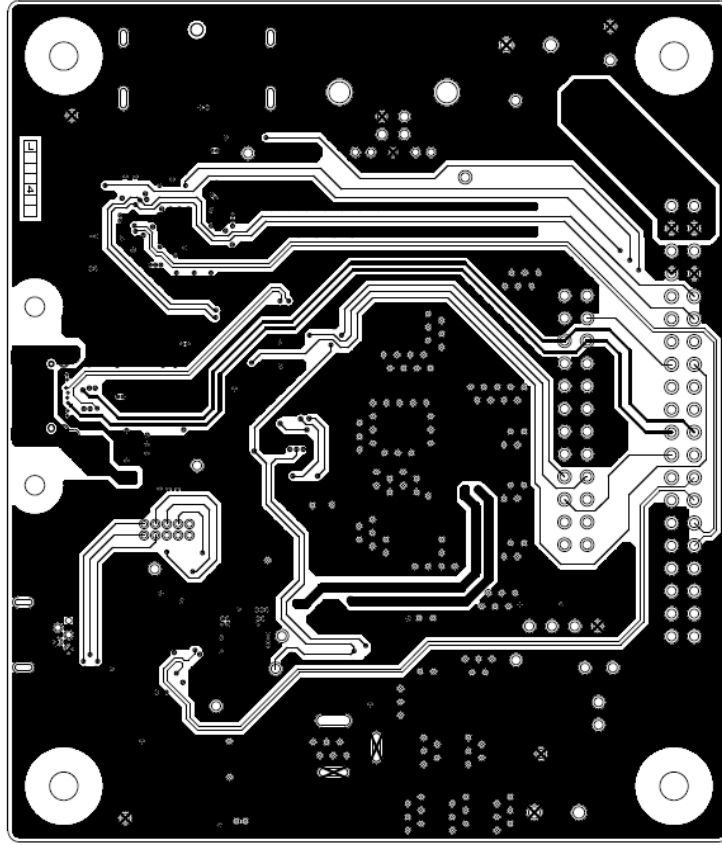
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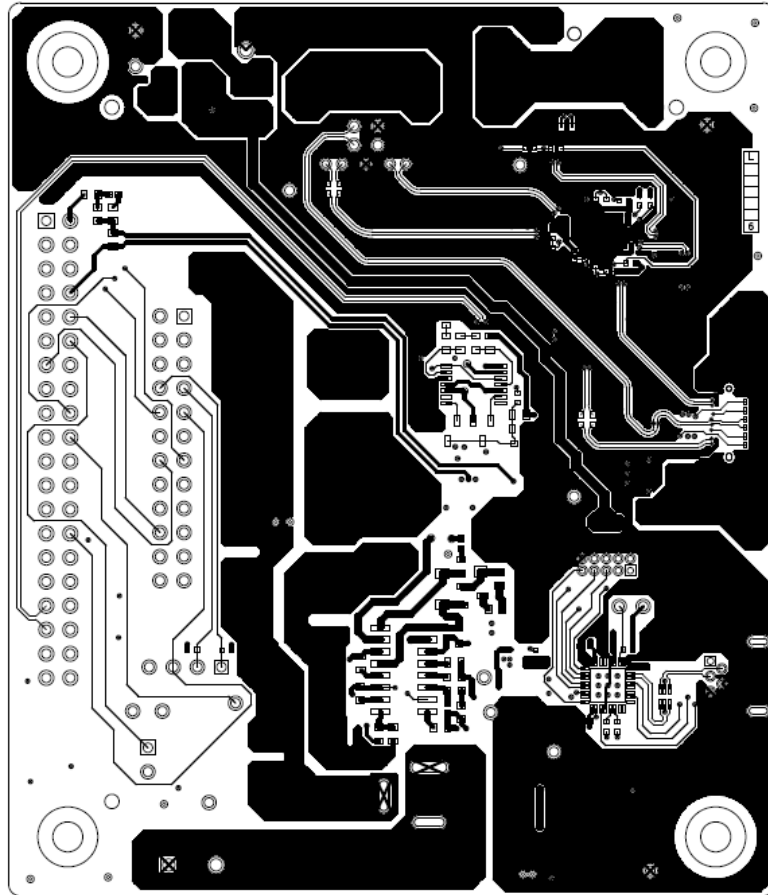
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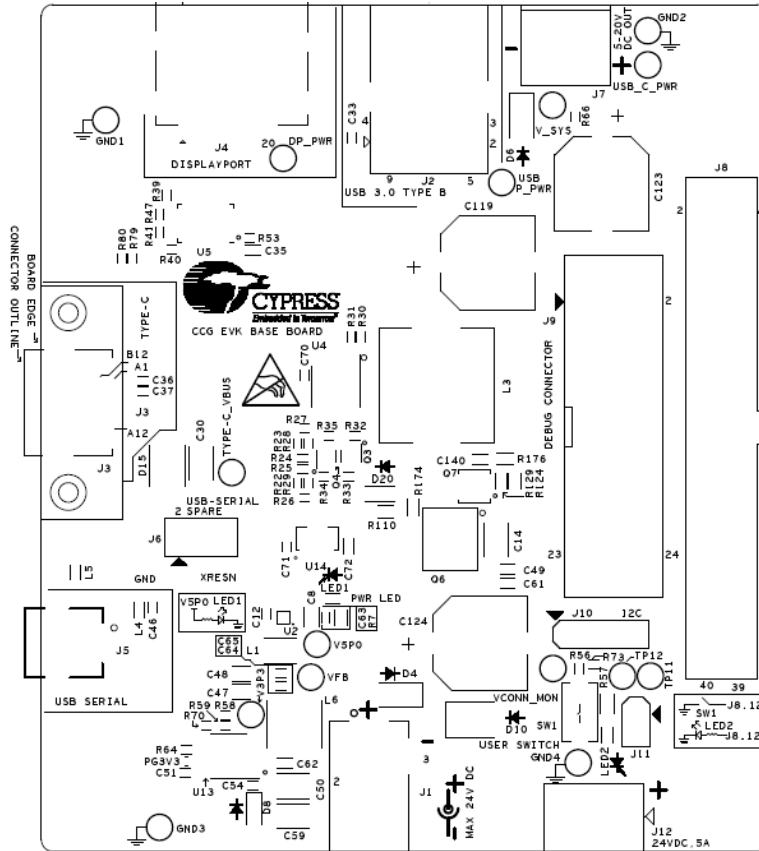
600-60271-01 REV06 PRIMARY SILKSCREEN
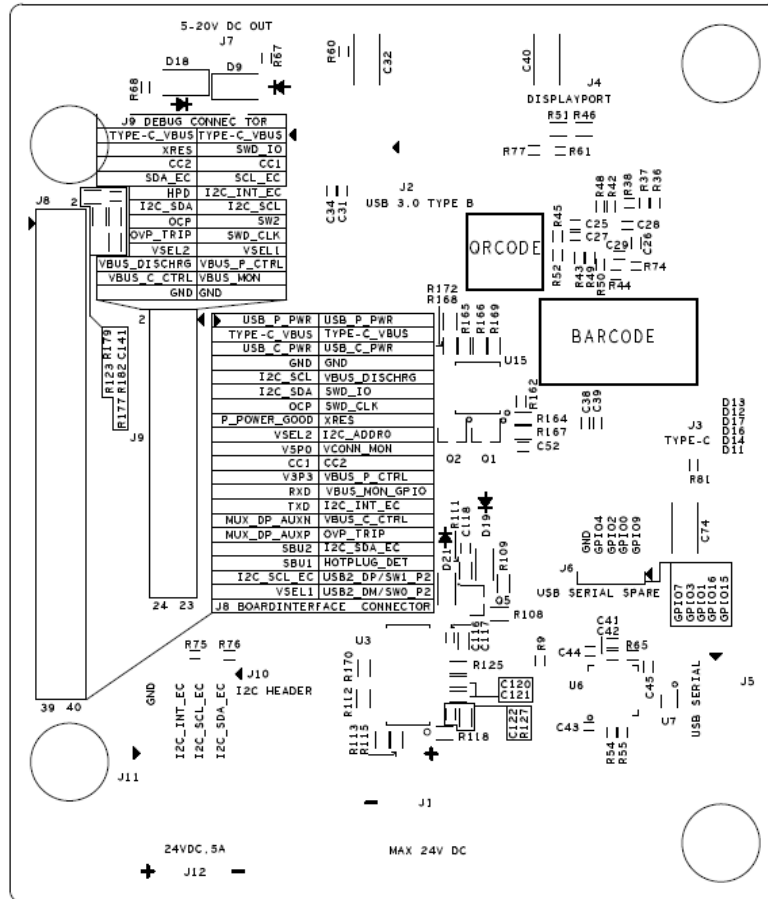
600-60271-01 REV06 SECONDARY SILKSCREEN

6.2.3 Bill of Materials

Item	Qty	Reference	Value	Description	Manufacturer	Mfr Part Number
1	1	N/A	600-60271-01	PCB, BARE, CCG EVK Base Board	Cypress Approved Manufacturer	600-60271-01
2	2	C25,C26	0.01uF	CAP CER 10000PF 25V 10% X7R 0402	AVX Corporation	04023C103KAT2A
3	15	C27,C28,C29,C31,C34,C42,C44,C46,C52,C54,C63,C64,C65,C70,C71	0.1uF	CAP CER 0.1UF 10V 10% X7R 0402	TDK Corporation	C1005X7R1A104K050BB
4	4	C36,C37,C38,C39	0.22uF	CAP CER 0.22UF 16V X7R 0402	Yageo	CC0402KRX7R7BB224
5	3	C14,C50,C59	10uF	CAP CER 10UF 50V X7R 1210	Murata Electronics North America	GRM32ER71H106KA12L
6	3	C33,C45,C51	1uF	CAP CER 1UF 10V X5R 0402	Murata Electronics North America	GRM155R61A105KE15D
7	2	C61,C72	1uF	CAP CER 1UF 35V X7R 0603	TDK Corporation	C1608X7R1V105K080AC
8	1	C35	2.2uF	CAP CER 2.2UF 25V 10% X5R 0603	TDK Corporation	C1608X5R1E225K080AB
9	3	C32,C40,C74	2200pF	CAP CER 2200PF 2KV 10% X7R 1808	Johanson Dielectrics Inc.	202R29W222KV4E
10	3	C8,C47,C48	22uF	CAP CER 22UF 10V X5R 0805	Murata Electronics North America	GRM219R61A226MEA0D
11	3	C12,C41,C43	4.7uF	CAP CER 4.7UF 10V 20% X5R 0402	TDK Corporation	C1005X5R1A475M050BC
12	2	C49,C62	0.1uF	CAP CER 0.1UF 50V 10% JB 0603	TDK Corporation	C1608JB1H104K080AA
13	1	C30	4.7uF	CAP CER 4.7UF 50V X7R 1210	Murata Electronics North America	GRJ32ER71H475KE11L
14	2	C116,C118	0.1uF	CAP CER 0.1UF 50V 10% X5R 0402	TDK Corporation	C1005X5R1H104K050BB
15	1	C120	0.1uF	CAP CER 0.1UF 25V 10% X7R 0603	Murata Electronics North America	GRM188R71E104KA01D
16	1	C121	0.47uF	CAP CER 0.47UF 50V 10% X7R 0603	TDK Corporation	C1608X7R1H474K080AC
17	1	C117	1uF	CAP CER 1UF 50V 10% X5R 0603	TDK Corporation	C1608X5R1H105K080AB
18	1	C141	270pF	Capacitor, 270pF, 50V, 5%, NPO, 0402	Murata Electronics North America	GRM1555C1H271JA01D
19	3	C119,C123, C124	330uF	CAP ALUM 330UF 50V 20% SMD	Panasonic Electronic Components	EEE-FT1H331AP
20	1	C140	470pF	Capacitor, 470pF, 50V, 10%, X7R, 0603	Murata Electronics North America	GRM188R71H471KA01D
21	1	C122	8.2nF	CAP CER 8200PF 50V 10% X7R 0402	Kemet	C0402C822K5RACTU
22	3	D4,D6,D9	PMEG3050BEP,115	DIODE SCHOTTKY 30V 5A SOD128	NXP Semiconductors	PMEG3050BEP,115

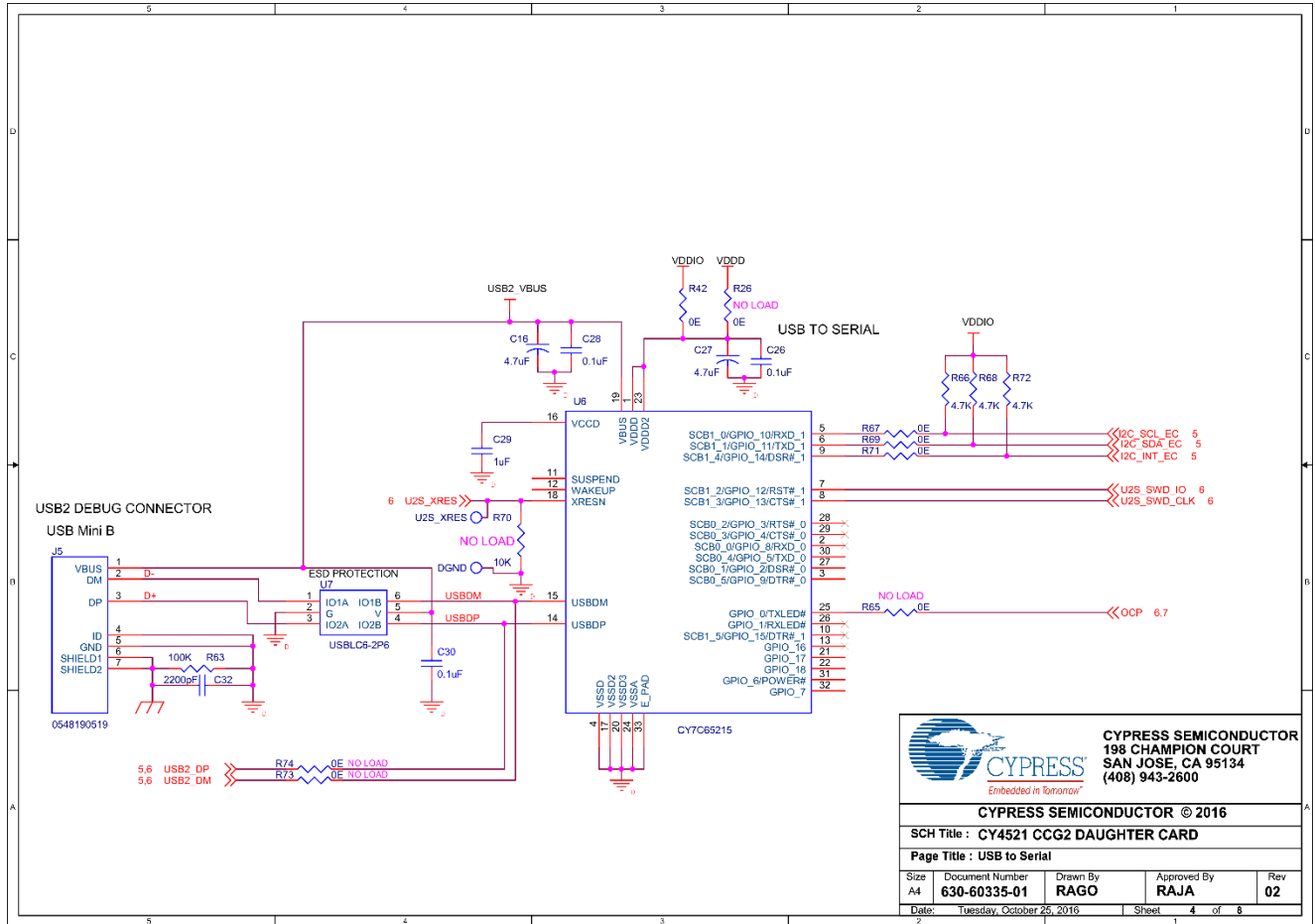| Item	Qty	Reference	Value	Description	Manufacturer	Mfr Part Number
23	1	D8	1N4148W FL-G3-08	DIODE GP 75V 150MA SOD123FL	Vishay Semiconductor Diodes Division	1N4148WFL-G3-08
24	1	D10	SMBJ24A-TR	TVS DIODE 24VWM 50VC DO214AA	STMicroelectronics	SMBJ24A-TR
25	6	D11,D12,D13,D14,D16,D17	ESD105B 102EL	TVS DIODE 5.5VWM 14VC TSLP2-2	Infineon Technologies	ESD105B102ELE 6327XTMA1
26	1	D15	SMBJ24C A-E3/52	TVS DIODE 24VWM 38.9VC SMB	Vishay Semiconductor Diodes Division	SMBJ24CA-E3/52
27	1	D19	MMSZ47 02T1G	Diode, Zener, 15V, 0.5W, SOD123	On Semiconductor	MMSZ4702T1G
28	1	D20	MBR0540 T1G	DIODE SCHOTTKY 40V 0.5A SOD123	On Semiconductor	MBR0540T1G
29	1	D21	MMSD70 1T1G	Diode, Shottky, 70V, 0.2A, SOD123	On Semiconductor	MMSD701T1G
30	1	J1	69410630 1002	CONN PWR JACK DC RIGHT ANGLE THROUGH HOLE	Wurth electronics	694106301002
31	1	J2	UEB1112 C-2AK1-4H	Connector Receptacle USB TypeB 3.0, Super Speed 9 Position Through Hole, Right Angle, Horizontal	Foxconn	UEB1112C-2AK1-4H
32	1	J3	DX07S02 4JJ2R1300	USB TYP C TP MNT DL RW SMT RECEP	JAE Electronics	DX07S024JJ2R1 300
33	1	J4	47272000 1	Connector Receptacle DisplayPort 20 Position Surface Mount, Right Angle, Horizontal	Molex, LLC	472720001
34	1	J5	54819051 9	Connector Receptacle USB - mini B 2.0 OTG 5 Position Through Hole, Right Angle, Horizontal	Molex, LLC	548190519
35	1	J7	1935161	TERM BLOCK PCB 2POS 5.0MM GREEN	Phoenix Contact	1935161
36	1	J8	SFH11-PBPC-D20-ST-BK	Connector Header 40 Position 0.100" (2.54mm) Gold Through Hole	Sullins Connector Solutions	SFH11-PBPC-D20-ST-BK
37	1	J9	SBH11-PBPC-D12-ST-BK	CONN HEADER VERT 24POS GOLD	Sullins Connector Solutions	SBH11-PBPC-D12-ST-BK
38	1	J11	961102-6404-AR	CONN HEADER VERT SGL 2POS GOLD	3M	961102-6404-AR
39	1	J12	OSTTC02 0162	TERMINAL BLOCK 5MM VERT 2POS PCB	On Shore Technology Inc.	OSTTC020162
40	1	L1	1uH	FIXED IND 1UH 1.8A 48 MOHM SMD	Murata Electronics North America	LQM32PN1R0M G0L
41	1	L3	10uH	FIXED IND 10UH 9A 25.5 MOHM SMD	Bourns Inc.	SRP1245A-100M
42	2	L4,L5	220Ohm @100MHz	FERRITE BEAD 220 OHM 0603 1LN 2.2A	TDK Corporation	MPZ1608S221A
43	1	L6	4.7uH	FIXED IND 4.7UH 2A 72 MOHM SMD	Bourns Inc.	SRN5020-4R7M
44	1	LED1	GREEN	LED GREEN CLEAR 0603 SMD	Lite-On Inc.	LTST-C190GKT
45	1	LED2	ORANGE	LED ORANGE CLEAR 0603 SMD	Lite-On Inc.	LTST-C190KFKT
46	2	Q3,Q4	2N7002D W-7-F	MOSFET 2N-CH 60V 0.23A SOT-363	Diodes Incorporated	2N7002DW-7-F

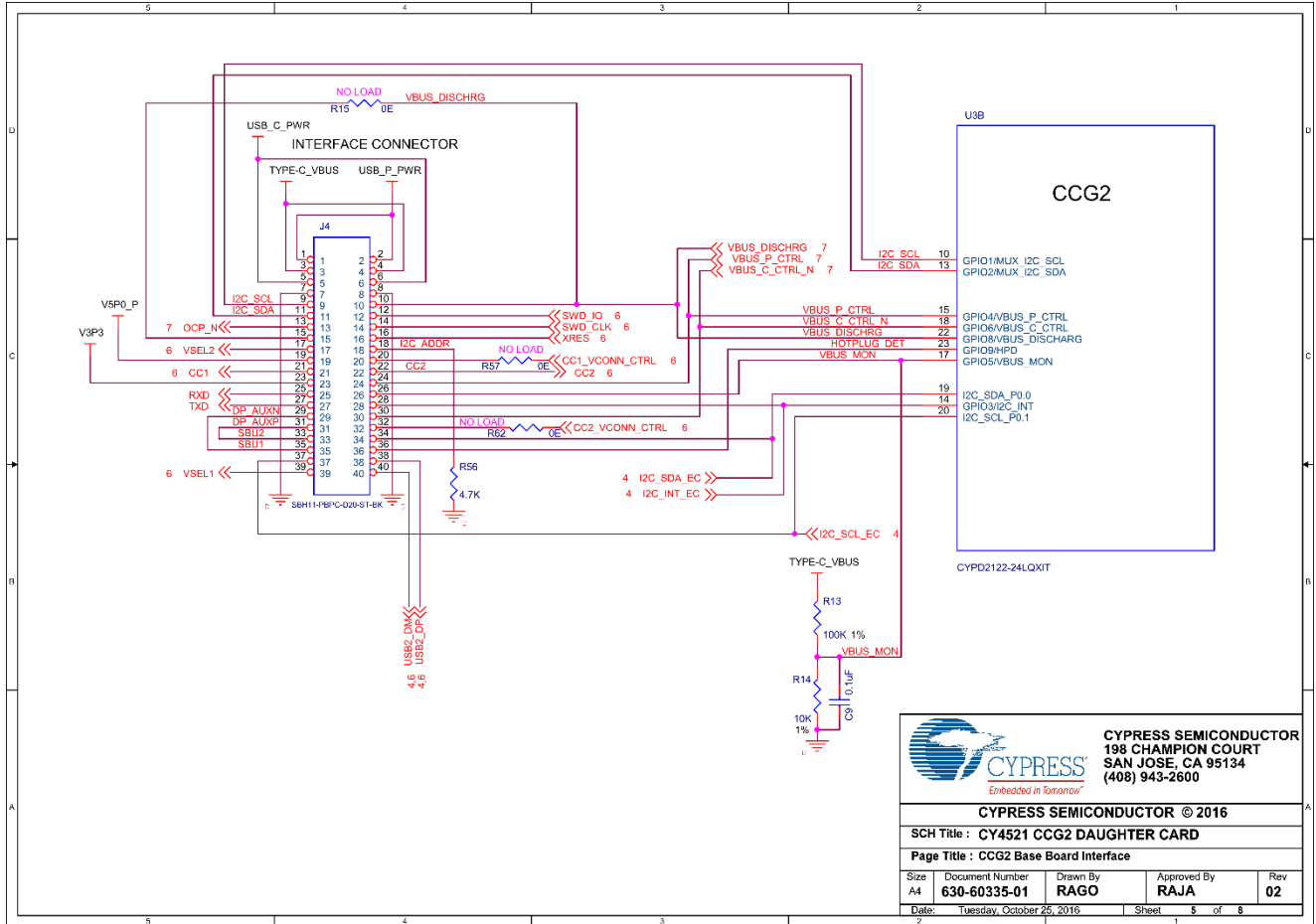| Item	Qty	Reference	Value	Description	Manufacturer	Mfr Part Number
47	2	Q1,Q2	2N7002LT1G	Transistor, 2N7002, N-Channel MOS-FET, 60V, 115mA, SOT-23	ON Semiconductor	2N7002LT1G
48	1	Q5	MMBT3904LT1	TRANS NPN 40V 0.2A SOT23	On Semiconductor	MMBT3904LT1G
49	1	Q6	NTMFS5834NL	MOSFET N-CH 40V 13A SO-8FL	On Semiconductor	NTMFS5834NLT1G
50	1	Q7	NTTFS5826NL	MOSFET N-CH 60V 8A 8-WDFN	On Semiconductor	NTTFS5826NLTAG
51	4	R111,R124,R166,R168	0E	RES SMD 0.0OHM JUMPER 1/10W 0603	Panasonic Electronic Components	ERJ-3GEY0R00V
52	7	R9,R22,R25,R61,R73,R77,R162	0E	RES 0.0 OHM 1/16W JUMP 0402 SMD	Vishay Dale	CRCW04020000Z0ED
53	13	R30,R31,R32,R33,R34,R35,R41,R47,R60,R64,R66,R67,R81	100K	RES SMD 100K OHM 5% 1/10W 0402	Panasonic Electronic Components	ERJ-2GEJ104X
54	1	R74	10K	RES 10K OHM 1/16W 1% 0402	Samsung Electro-Mechanics America, Inc	RC1005F103CS
55	1	R58	16K	RES SMD 16K OHM 1% 1/16W 0402	Yageo	RC0402FR-0716KL
56	1	R56	1K	RES SMD 1K OHM 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF1001X
57	1	R57	1K	RES SMD 1K OHM 5% 1/2W 0805	Panasonic Electronic Components	ERJ-P06J102V
58	2	R46,R51	1M	RES SMD 1M OHM 1% 1/10W 0603	Yageo	RC0603FR-071ML
59	2	R36,R37	2K	RES SMD 2K OHM 5% 1/16W 0402	Yageo	RC0402JR-072KL
60	1	R70	30K	RES SMD 30K OHM 1% 1/16W 0402	Yageo	RC0402FR-0730KL
61	1	R7	330E	RES SMD 330 OHM 5% 1/10W 0603	Yageo	RC0603JR-07330RL
62	2	R38,R40	4.7K	RES SMD 4.7K OHM 5% 1/16W 0402	Yageo	RC0402JR-074K7L
63	1	R53	4.99K	RES SMD 4.99K OHM 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF4991X
64	1	R59	5.1K	RES SMD 5.1K OHM 1% 1/16W 0402	Yageo	RC0402FR-075K1L
65	1	R29	1.13K	RES SMD 1.13K OHM 1% 1/16W 0402	Stackpole Electronics Inc.	RMCF0402FT1K13
66	1	R28	1.5K	RES SMD 1.5K OHM 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF1501X
67	1	R169	16.5K	RES SMD 16.5K OHM 1% 1/10W 0603	Stackpole Electronics Inc.	RMCF0603FT16K5
68	1	R27	2.67K	RES SMD 2.67K OHM 1% 1/16W 0402	Yageo	RC0402FR-072K67L
69	1	R24	30E	RES SMD 30 OHM 1% 1/16W 0402	Yageo	RC0402FR-0730RL
70	1	R26	5.49K	RES SMD 5.49K OHM 1% 1/16W 0402	Yageo	RC0402FR-075K49L
71	1	R23	60.4E	RES SMD 60.4 OHM 1% 1/16W 0402	Yageo	RC0402FR-0760R4L

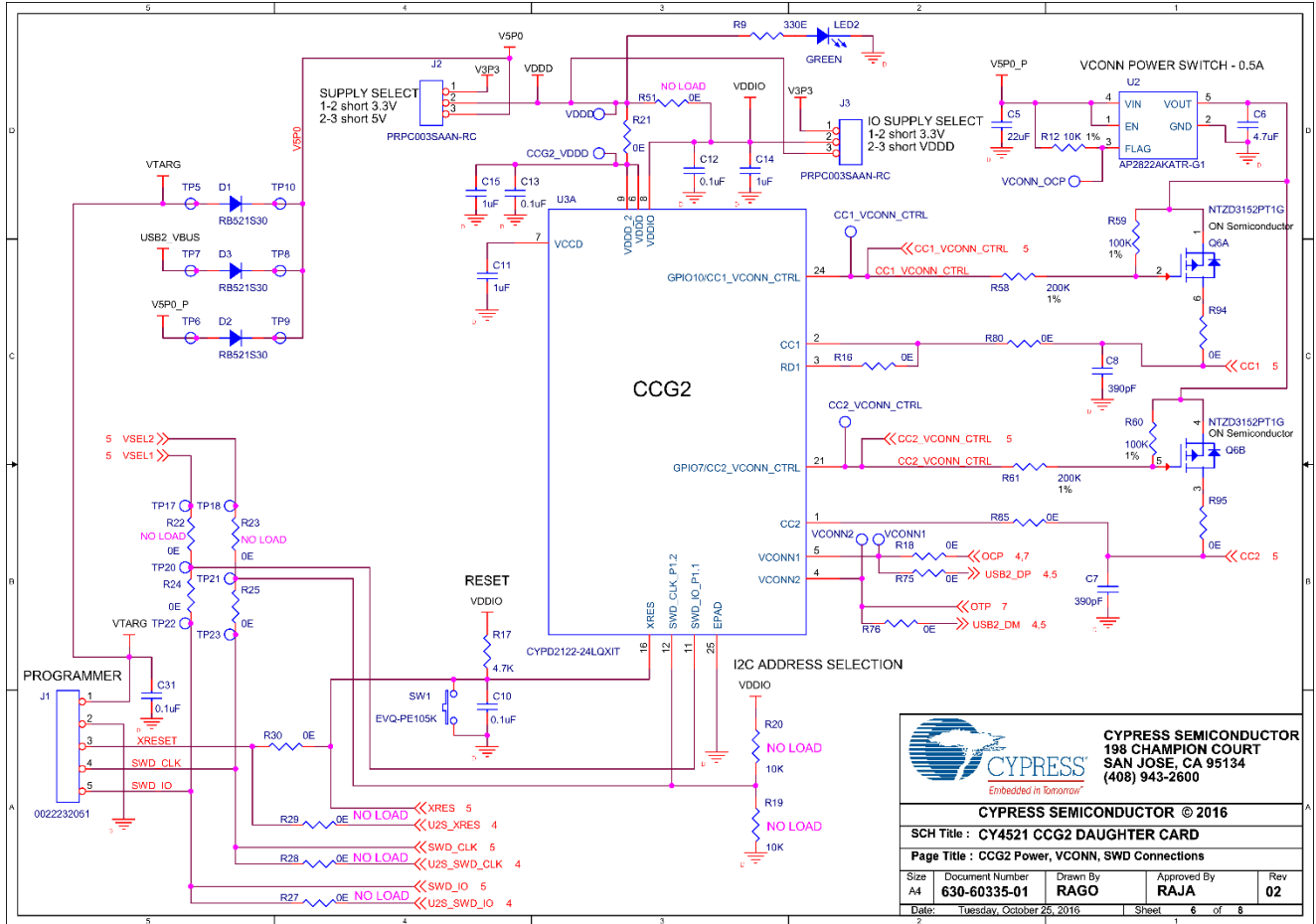| Item	Qty	Reference	Value	Description	Manufacturer	Mfr Part Number
72	1	R176	100E	RES SMD 100 OHM 1% 1/10W 0603	Panasonic Electronic Components	ERJ-3EKF1000V
73	6	R109,R113,R118,R125,R164,R170	10K	RES SMD 10K OHM 1% 1/10W 0603	Panasonic Electronic Components	ERJ-3EKF1002V
74	1	R112	14.3K	RES SMD 14.3K OHM 1% 1/10W 0603	Panasonic Electronic Components	ERJ-3EKF1432V
75	1	R115	100K	100k Ohm ±1% 0.1W, 1/10W Surface Mount Resistor Thick Film ±100ppm/°C 0603	Yageo	RC0603FR-07100KL
76	1	R123	16.9K	RES SMD 16.9K OHM 1% 1/10W 0603	Panasonic Electronic Components	ERJ-3EKF1692V
77	2	R165,R182	1K	RES SMD 1K OHM 1% 1/10W 0603	Panasonic Electronic Components	ERJ-3EKF1001V
78	1	R179	20E	RES SMD 20 OHM 5% 1/10W 0603	Panasonic Electronic Components	ERJ-3GEYJ200V
79	3	R129,R167,R174	20K	RES SMD 20K OHM 1% 1/10W 0603	Panasonic Electronic Components	ERJ-3EKF2002V
80	1	R108	300E	RES SMD 300 OHM 5% 1/10W 0603	Panasonic Electronic Components	ERJ-3GEYJ301V
81	1	R110	5.1E	RES SMD 5.1 OHM 5% 1/10W 0603	Vishay Dale	CRCW06035R10JNEA
82	1	R172	5.1K	RES SMD 5.1K OHM 1% 1/10W 0603	Panasonic Electronic Components	ERJ-3EKF5101V
83	1	R127	619E	RES SMD 619 OHM 1% 1/10W 0603	Panasonic Electronic Components	ERJ-3EKF6190V
84	1	SW1	EVQ-PE105K	SWITCH TACTILE SPST-NO 0.05A 12V	Panasonic Electronic Components	EVQ-PE105K
85	1	U2	TPS61253	IC REG BOOST 5V 3.3A SYNC 9DSBGA	Texas Instruments	TPS61253YFFR
86	1	U3	NCP1034	IC, PWM Buck Controller, 100V, NCP1034, SOIC16	On Semiconductor	NCP1034DR2G
87	1	U4	CD74HC238PWR	IC DECODER/DEMUX HS 3-8 16-TSSOP	Texas Instruments	CD74HC238PWR
88	1	U5	PS8740B	USB Type-C Redriving Switch for USB Host / DisplayPort Source	Parade Technologies Ltd	PS8740B
89	1	U6	CY7C65215	IC USB TO UART BRIDGE DUAL 32QFN	Cypress Semiconductor	CY7C65215-32LTXI
90	1	U7	USBLC6-2P6	TVS DIODE 5.25VWM 17VC SOT666	STMicroelectronics	USBLC6-2P6
91	1	U13	RT8299AZSP	IC REG BUCK ADJ 3A SYNC 8SOP	Richtek USA Inc.	RT8299AZSP
92	1	U14	L78L05ABUTR	IC REG LDO 5V 0.1A SOT89-3	STMicroelectronics	L78L05ABUTR
93	1	U15	TS3704IPT	IC COMP QUAD CMOS MCRPWR 14TSSOP	STMicroelectronics	TS3704IPT

Item	Qty	Reference	Value	Description	Manufacturer	Mfr Part Number
94	5	V3P3,V5P0,USB_P_PWR,USB_C_PWR,TYPE-C_VBUS	RED	TEST POINT PC MINI .040"D RED	Keystone Electronics	5000
95	4	GND1,GND2,GND3,GND4	BLACK	TEST POINT PC MINI .040"D BLACK	Keystone Electronics	5001
MISC components						
96	4	Bumper	NA	BUMPER CYLIN 0.312" DIA BLK	3M	SJ61A6
97	1	Type-C Clamping Bracket	NA	Type-C Connector Bracket	Global Technology Services	Type-C Connector Clamping Bracket
98	2	M2x5mm Screws	NA	SCREW, Pan Head, machined screws, M2 x 5mm		
99	1	Jumper Plug	NA	2.54MM JUMPER PLUG WITH TEST POINT	Wurth Electronics	609002115121
100	1	Label	NA	LBL, PCA Identification Label, Vendor Code, Datecode, Serial Number(YYWWVVXXXX)	Cypress Semiconductor	
No load components						
101	1	D18	PMEG3050BEP,115	DIODE SCHOTTKY 30V 5A SOD128	NXP Semiconductors	PMEG3050BEP,115
102	1	J6	302-S101	10 Positions Header, Shrouded Connector 0.100" (2.54mm) Through Hole Gold	On Shore Technology Inc.	302-S101
103	1	J10	M20-9990445	4 Positions Header, Unshrouded, Breakaway Connector 0.100" (2.54mm) Through Hole Gold	Harwin Inc.	M20-9990445
104	5	R39,R54,R55,R79,R80	0E	RES 0.0 OHM 1/16W JUMP 0402 SMD	Vishay Dale	CRCW04020000Z0ED
105	2	R75,R76	2K	RES SMD 2K OHM 5% 1/16W 0402	Yageo	RC0402JR-072KL
106	8	R42,R43,R44,R45,R48,R49,R50,R52	4.7K	RES SMD 4.7K OHM 5% 1/16W 0402	Yageo	RC0402JR-074K7L
107	1	R65	10K	RES 10K OHM 1/16W 1% 0402	Samsung Electro-Mechanics America, Inc	RC1005F103CS
108	1	R68	100K	RES SMD 100K OHM 5% 1/10W 0402	Panasonic Electronic Components	ERJ-2GEJ104X
109	1	R177	5.49K	RES SMD 5.49K OHM 1% 1/10W 0603	Panasonic Electronic Components	ERJ-3EKF5491V
110	3	TP11,TP12,VCONN_MON	YELLOW	TEST POINT PC MINI .040"D YELLOW	Keystone Electronics	5004
111	3	Vfb,V_SYS,DP_PWR	RED	TEST POINT PC MINI .040"D RED	Keystone Electronics	5000

6.3 CCG2 EVK Daughter Card

6.3.1 Schematics
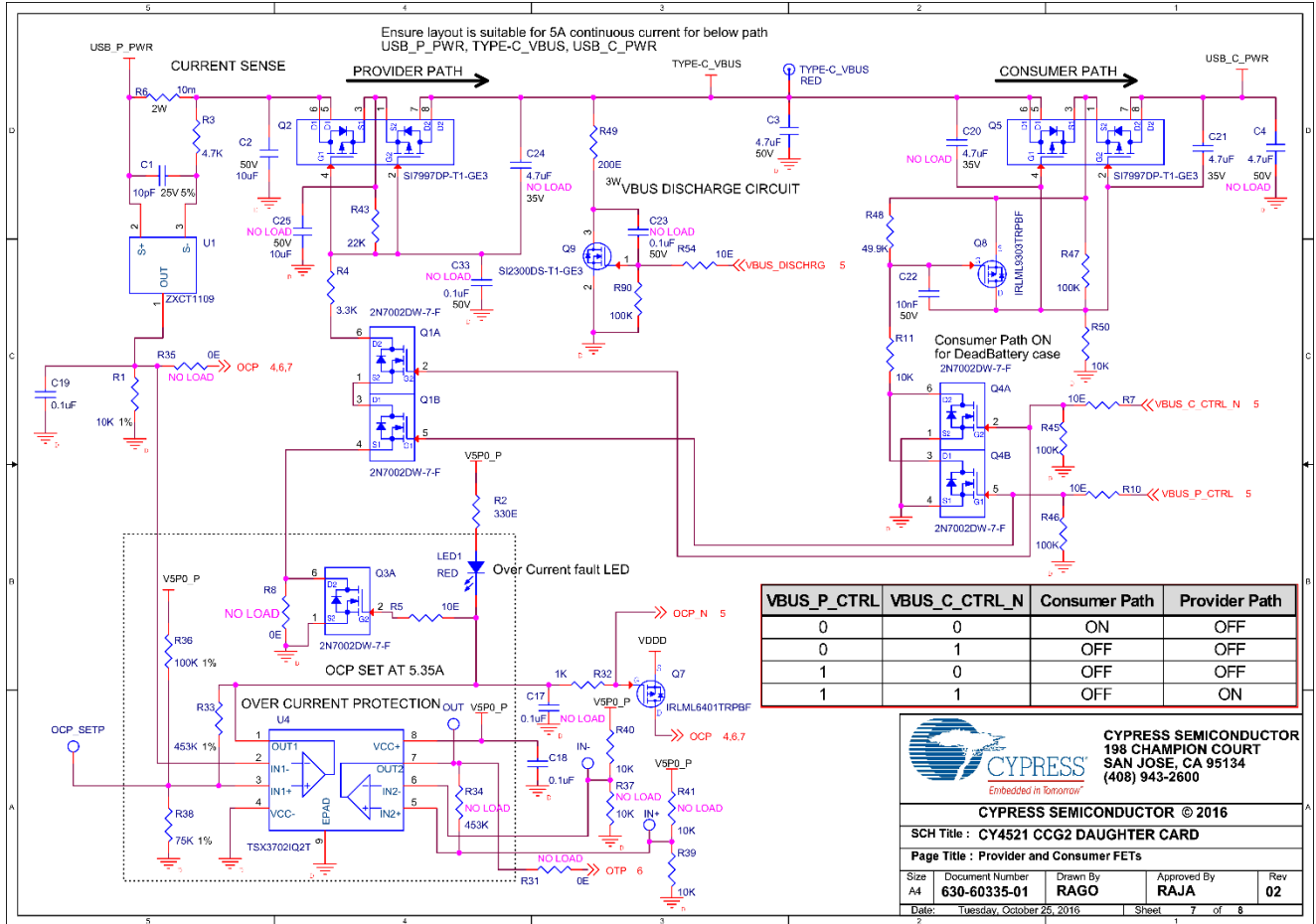
6.3.2   Gerber Files

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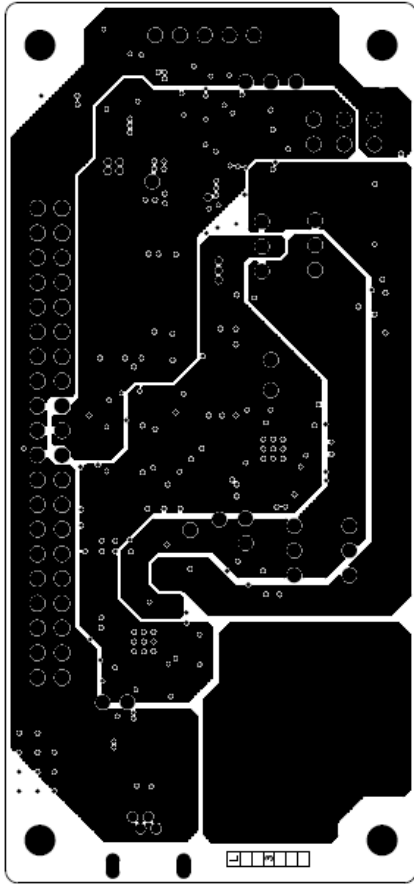
600-60361-01 REV02 POWER1 LAYER

600-60361-01 REV02 SIGNAL1 LAYER

600-60361-01 REV02 SECONDARY SIDE

600-60361-01 REV02 PRIMARY SILKSCREEN

600-60361-01 REV02 SECONDARY SILKSCREEN

6.3.3 Bill of Materials

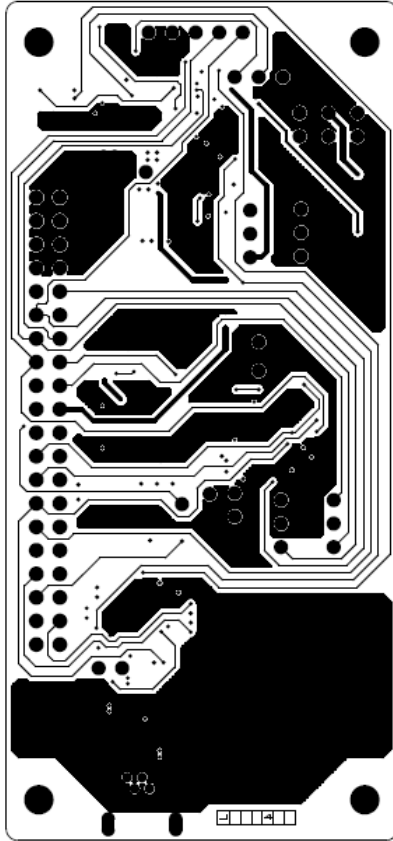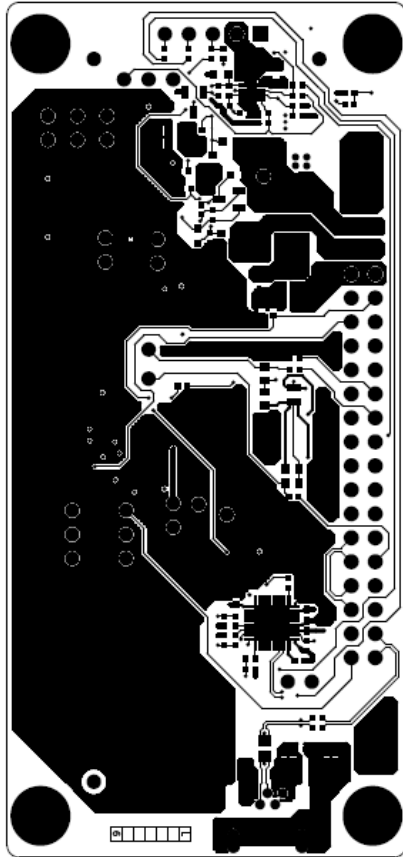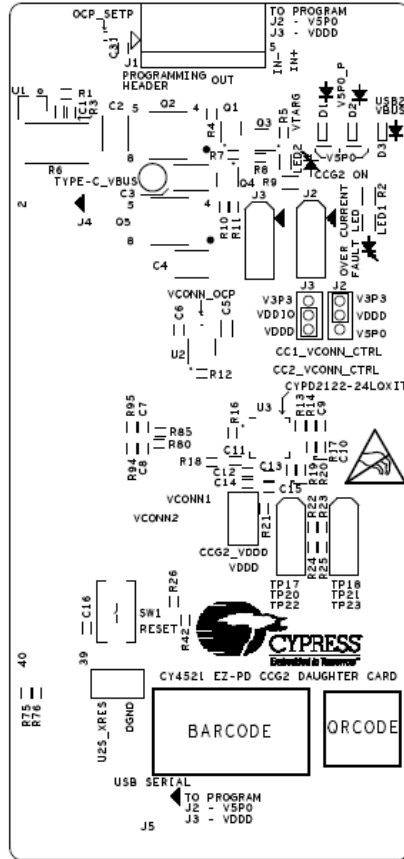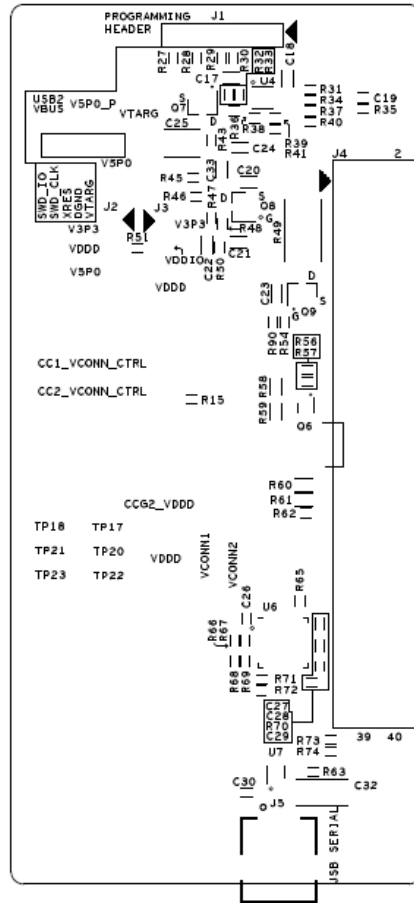| #	Qty	Reference	Value	Description	Manufacturer	Mfr Part #
1	1	C1	10pF	CAP CER 10PF 25V 5% NP0 0402	Kemet	C0402C100J3G ACTU
2	4	C11,C14,C15,C29	1uF	CAP CER 1UF 10V X5R 0402	Murata Electronics North America	GRM155R61A1 05KE15D
3	6	C12,C13,C19,C26,C 28,C30	0.1uF	CAP CER 0.1UF 50V X7R 0402	Murata Electronics North America	GRM155R71H1 04ME14D
4	1	C18	0.1uF	CAP CER 0.1UF 16V X7R 0603	Samsung Electro-Mechanics America, Inc.	CL10B104MO8 NNNC
5	1	C2	10uF	CAP CER 10UF 50V X7R 1210 ±10%	Samsung Electro-Mechanics America, Inc.	CL32B106KBJ NNWE
6	1	C21	4.7uF	CAP CER 4.7UF 35V X5R 0603	Murata Electronics North America	ZRB18AR6YA4 75KE05L
7	1	C22	10nF	CAP CER 10000PF 50V X7R 0603	Samsung Electro-Mechanics America, Inc.	CL10B103KB8 NCNC
8	1	C3	4.7uF	CAP CER 4.7UF 50V X7R 1210	Murata Electronics North America	GRJ32ER71H4 75KE11L
9	1	C32	2200pF	CAP CER 2200PF 2KV 10% X7R 1808	Johanson Dielectrics Inc.	202R29W222K V4E
10	1	C5	22uF	CAP CER 22UF 10V X5R 0603	Samsung Electro-Mechanics America, Inc.	CL10A226MP8 NUNE
11	3	C6,C16,C27	4.7uF	CAP CER 4.7UF 10V 20% X5R 0402	TDK Corporation	C1005X5R1A4 75M050BC
12	2	C7,C8	390pF	CAP CER 390PF 50V X7R 0402	Murata Electronics North America	GRM155R71H3 91KA01D
13	3	C9,C10,C31	0.1uF	CAP CER 0.1UF 10V 10% X7R 0402	TDK Corporation	C1005X7R1A1 04K050BB
14	3	D1,D2,D3	RB521S30	DIODE SCHOTTKY 30V 200MA SOD523F	Fairchild Semiconductor	RB521S30
15	1	J1	22232051	CONN HEADER 5POS .100 VERT TIN	Molex, LLC	22232051
16	2	J2,J3	CON3	CONN HEADER .100" SNGL STR 3POS	Sullins Connector Solutions	PRPC003SAAN -RC
17	1	J4	SBH11-PBPC-D20-ST-BK	40 Positions Header, Shrouded Connector 0.100" (2.54mm) Through Hole Gold	Sullins Connector Solutions	SBH11-PBPC-D20-ST-BK
18	1	J5	54819051 9	Connector Receptacle USB - mini B 2.0 OTG 5 Position Through Hole, Right Angle, Horizontal	Molex, LLC	548190519
19	1	LED1	RED	LED RED CLEAR 0603 SMD	Lite-On Inc.	LTST-C190EKT
20	1	LED2	GREEN	LED GREEN CLEAR 0603 SMD	Lite-On Inc.	LTST-C190GKT
21	3	Q1,Q3,Q4	2N7002D W-7-F	MOSFET 2N-CH 60V 0.23A SOT-363	Diodes Incorporated	2N7002DW-7-F

#	Qty	Reference	Value	Description	Manufacturer	Mfr Part #
22	2	Q2,Q5	SI7997DP-T1-GE3	MOSFET 2P-CH 30V 60A PPAK SO-8	Vishay Siliconix	SI7997DP-T1-GE3
23	1	Q6	NTZD3152PT1G	MOSFET 2P-CH 20V 0.43A SOT-563	ON Semiconductor	NTZD3152PT1G
24	1	Q7	IRLML6401TRPBF	MOSFET P-CH 12V 4.3A SOT-23	Infineon Technologies Americas Corp.	IRLML6401TRPBF
25	1	Q8	IRLML9303TRPBF	MOSFET P-CH 30V 2.3A SOT-23-3	International Rectifier	IRLML9303TRPBF
26	1	Q9	SI2300DS-T1-GE3	MOSFET N-CH 30V 3.6A SOT-23	Vishay Siliconix	SI2300DS-T1-GE3
27	7	R1,R11,R12,R14,R39,R40,R50	10K	RES 10K OHM 1/16W 1% 0402	Samsung Electro-Mechanics America, Inc	RC1005F103CS
28	3	R13,R36,R47	100K	RES SMD 100K OHM 1% 1/16W 0402	Yageo	RC0402FR-07100KL
29	16	R16,R18,R21,R24,R25,R30,R42,R67,R69,R71,R75,R76,R80,R85,R94,R95	0E	RES 0.0 OHM 1/16W JUMP 0402 SMD	Vishay Dale	CRCW04020000Z0ED
30	2	R2,R9	330E	RES SMD 330 OHM 5% 1/10W 0603	Yageo	RC0603JR-07330RL
31	6	R3,R17,R56,R66,R68,R72	4.7K	RES SMD 4.7K OHM 5% 1/16W 0402	Yageo	RC0402JR-074K7L
32	1	R32	1K	RES SMD 1K OHM 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF1001X
33	1	R33	453K	RES SMD 453K OHM 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF4533X
34	1	R38	75K	RES SMD 75K OHM 1% 1/16W 0402	Yageo	RC0402FR-0775KL
35	1	R4	3.3K	RES SMD 3.3K OHM 5% 1/10W 0402	Panasonic Electronic Components	ERJ-2GEJ332X
36	1	R43	22K	RES SMD 22K OHM 5% 1/10W 0402	Panasonic Electronic Components	ERJ-2GEJ223X
37	4	R45,R46,R63,R90	100K	RES SMD 100K OHM 5% 1/10W 0402	Panasonic Electronic Components	ERJ-2GEJ104X
38	1	R48	49.9K	RES SMD 49.9K OHM 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF4992X
39	1	R49	200E	RES SMD 200 OHM 1% 3W 2512	TE Connectivity AMP Connectors	3522200RFT
40	4	R5,R7,R10,R54	10E	RES SMD 10 OHM 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF10R0X
41	2	R58,R61	200K	200k Ohm ±1% 0.1W, 1/10W 0603	Yageo	RC0603FR-07200KL
42	2	R59,R60	100K	100k Ohm ±1% 0.1W, 1/10W 0603	Yageo	RC0603FR-07100KL

#	Qty	Reference	Value	Description	Manufacturer	Mfr Part #
43	1	R6	10m	RES SMD 0.01 OHM 1% 2W 2512	Rohm Semiconductor	PMR100HZPFU10L0
44	1	SW1	EVQ-PE105K	SWITCH TACTILE SPST-NO 0.05A 12V	Panasonic Electronic Components	EVQ-PE105K
45	1	TYPE-C_VBUS	RED	TEST POINT PC MINI .040"D RED	Keystone Electronics	5000
46	1	U1	ZXCT1109	IC CURR MONITOR HIGH SIDE SOT23	Diodes Incorporated	ZXCT1109SA-7
47	1	U2	AP2822AKATR-G1	IC USB POWER SWITCH SOT25	Diodes Incorporated	AP2822AKATR-G1
48	1	U3	CYPD2122-24LQXIT	IC MCU 32BIT 32KB FLASH 24QFN	Cypress Semiconductor	CYPD2122-24LQXIT
49	1	U4	TSX3702IQ2T	IC COMPARATOR 16V DUAL CMOS 8DFN	STMicroelectronics	TSX3702IQ2T
50	1	U6	CY7C65215	IC USB TO UART BRIDGE DUAL 32QFN	Cypress Semiconductor Corp	CY7C65215-32LTXI
51	1	U7	USBLC6-2P6	TVS DIODE 5.25VWM 17VC SOT666	STMicroelectronics	USBLC6-2P6
52	1	N/A	600-60361-01	PCB, BARE, CY4521 CCG2 Daughter Card	Cypress Approved Manufacturer	600-60361-01
MISC Components						
53	1	Jumper Plug	N/A	2.54MM JUMPER PLUG WITH TEST POINT	Wurth Electronics Inc	609002115121
54	1	Label	NA	LBL, PCBA Identification Label	Cypress Semiconductor	
NO LOAD Components						
55	1	C4	4.7uF	CAP CER 4.7UF 50V X7R 1210	Murata Electronics North America	GRJ32ER71H475KE11L
56	3	C17,C23,C33	0.1uF	CAP CER 0.1UF 16V X7R 0603	Samsung Electro-Mechanics America, Inc.	CL10B104MO8NNNC
57	2	C20,C24	4.7uF	CAP CER 4.7UF 35V X5R 0603	Murata Electronics North America	ZRB18AR6YA475KE05L
58	1	C25	10uF	CAP CER 10UF 50V X7R 1210 ±10%	Samsung Electro-Mechanics America, Inc.	CL32B106KBJNNWE
59	16	R8,R15,R22,R23,R26,R27,R28,R29,R31,R35,R51,R57,R62,R65,R73,R74	0E	RES 0.0 OHM 1/16W JUMP 0402 SMD	Vishay Dale	CRCW04020000Z0ED
60	5	R19,R20,R37,R41,R70	10K	RES 10K OHM 1/16W 1% 0402	Samsung Electro-Mechanics America, Inc	RC1005F103CS
61	1	R34	453K	RES SMD 453K OHM 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF4533X

Revision History

Document Revision History

Document Title: CY4521 EZ-PD™ CCG2 Evaluation Kit Guide			
Document Number: 002-15712			
Revision	Issue Date	Origin of Change	Description of Change
**	11/25/2016	VGT	New EVK user guide.
*A	01/04/2017	SELV	Added CE compliance details. Updates to address the feedback received on the Beta version of the document

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