EZ-PD™ CCG3PA Notebook Power Adapter Solution Demo User Guide

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Rev01

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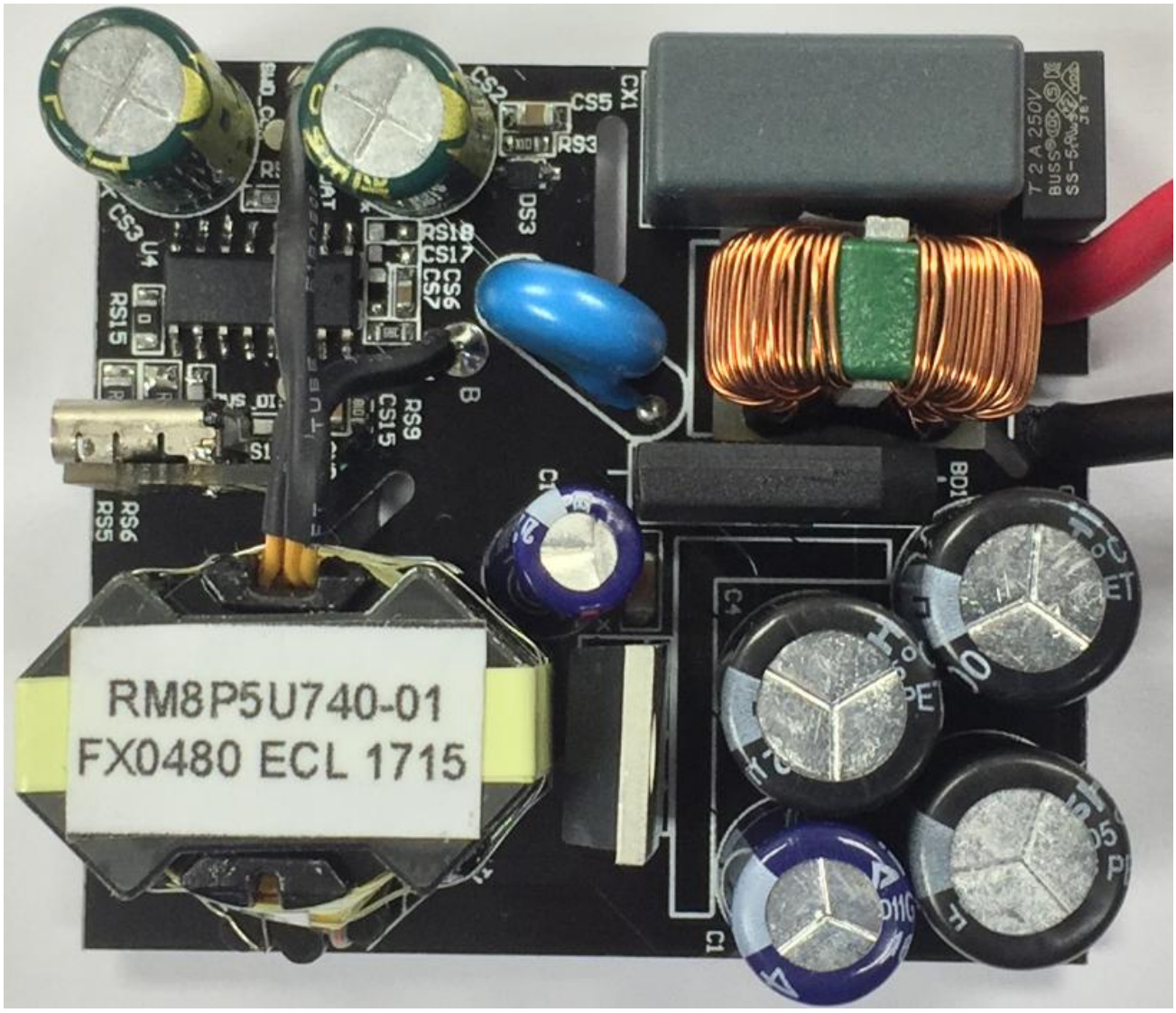
1. Introduction

The CCG3PA Notebook Power Adapter solution demo is based on the CCG3PA product family of Cypress's USB Type-C microcontrollers. This demo is primarily intended to be a platform to demonstrate the capability of the CCG3PA device in a Notebook Power Adapter application. Figure 1-1 shows the picture of the demo board.

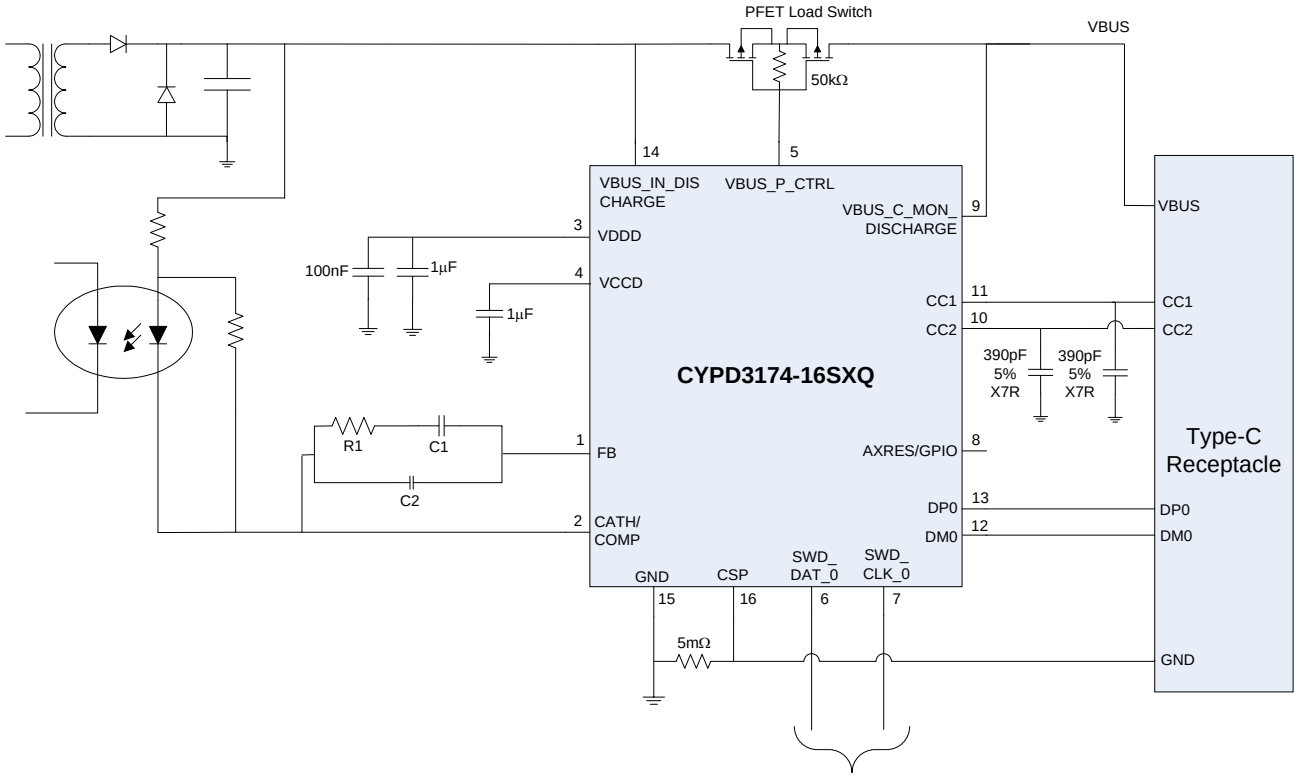
Figure 1-1. EZ-PD™ CCG3PA Notebook Power Adapter Solution Demo Board



1.1 Application Overview

This design is targeted towards Notebook Power Adapters. In this application, CCG3PA serves as a highly integrated USB Type-C port controller that complies with the latest USB Type-C and PD standards. This solution uses the HFC0500 controller from Monolithic Power Systems (MPS) as the AC-DC controller. CCG3PA regulates the VBUS voltage by controlling the feedback node of the AC-DC controller as shown in the below block diagram.

Figure 1-2. EZ-PD™ CCG3PA Notebook Power Adapter Application Diagram



Apart from the USB-PD charging protocol, this design also supports legacy charging protocols like BC 1.2, QC 2.0, QC 3.0 and AFC. This Power Adapter is optimized for PC/Notebook chargers and can support a maximum power profile of 45W (15V, 3A).

CCG3PA monitors and handles fault protection like Over-Voltage, Under-Voltage, Over-Current, Short-Circuit and Over-Temperature. CCG3PA drives the external PFET and also controls VBUS discharge with integrated discharge resistors. The default application firmware in CCGX SDK 3.2 supports all these features and any further customization can be done using the CCGX SDK 3.2 and EZ-PD™ Configuration utility (refer section 2.1.3 below for more details). The solution demo board schematics can be found on the CCG3PA USB-C Notebook Power Adapter webpage.

2. Demo Operation

2.1 Running the CCG3PA Notebook Power Adapter Solution Demo

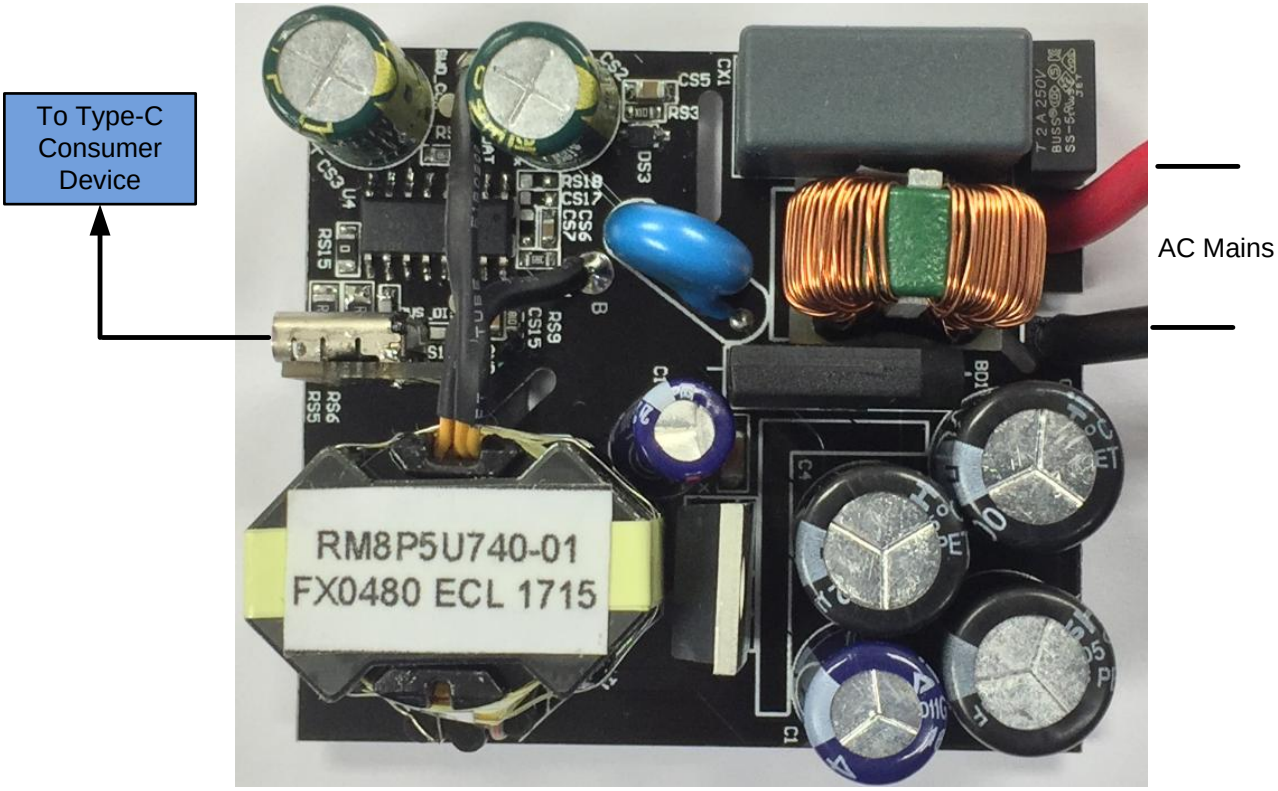
2.1.1 Items required

- CCG3PA Notebook Power Adapter solution demo board. Ensure that the CCG3PA device is programmed with the required application firmware.
- Type-C consumer device – any consumer device with a Type-C port would work.
- If needed, use the CY4500 EZ-PD™ Protocol Analyzer to monitor the traffic on the CC line and the VBUS voltage.

2.1.2 Steps to perform the demo

1. Connect the CCG3PA Notebook Power Adapter board to the AC mains.
2. Using a Type-C cable, connect the Power Adapter to any Type-C consumer device.
3. If using a consumer device like a mobile or a PC/Notebook, the charging status over the Type-C interface can be monitored on the device.
4. Alternatively, connect the CY4500 EZ-PD™ Protocol Analyzer between the Adapter and the consumer device to monitor the CC traffic and the VBUS levels.

Figure 2-1. EZ-PD™ CCG3PA Notebook Power Adapter solution demo setup



2.1.3 Updating Firmware for Demo

The CYPD3174-16SXQ is factory programmed with DFP CC with Direct Feedback Bootloader. The application firmware for this solution is available in CCGX SDK 3.2 and any firmware upgrade can be performed using the EZ-PD™ Configuration Utility. More details on how to update the firmware of the CCG3PA device can be found in the EZ-PD™ Configuration Utility User Manual or the CCG3PA datasheet.

A. Acronyms

Acronym	Definition
AFC	Adaptive Fast Charging
BC	Battery Charging
CC	Configuration Channel
QC	Qualcomm Charging
SDK	Software Development Kit
USB-PD	Universal Serial Bus Power Delivery

Revision History

Document Revision History

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