

Table of Contents

1	Introduction	2
2	Overview	2
3	Quick Start.....	4
4	Circuit Description.....	5
4.1	Port Setting.....	5
4.2	Mode Selection, I2C Address and I2C Bus	5
4.3	VBUS Power Supply	5
4.4	Disable/Low Power State.....	6
5	References.....	7
6	Appendix A: Demo Board Schematic.....	7

1 Introduction

PI5USB30216C provides a cost-effective solution for USB 2.0 Type-C connector applications. PI5USB30216C detects the plug-in orientation of the cable at a Type-C connector. It supports host mode, device mode and dual role mode ports with automatic configuration based on the voltage levels detected on CC pins. It is a fully-integrated solution with ultra-low power dissipation. PI5USB30216C enters power-saving mode when ENB pin is pulled up to VDD through an internal resistor.

PI5USB30216C supports both pin and I2C control base on ADDR pin setting. It allows the system choose between pin control and I2C control mode. In pin control mode, the PORT input pin determines the port setting in which host, device or dual-role port can be selected. In host mode, the system can monitor ID pin to know the connector status while default current mode is set. Systems running in device mode can monitor system VBUS for connector status as well as OUT1 and OUT2 pins for host's charging profile capability. Enabling I2C control mode allows higher flexibility for port control and communications through registers read/write in PI5USB30216C. There is also flexibility to support Default, 1.5A and 3A current modes. An interrupt signal for indicating changes with the I2C registers is sent to the master to notify the system any change in the Type-C connector while in parallel the system can still monitor ID pin.

This user manual describes the components and the usage of PI5USB30216C Demo Board Rev.A.

2 Overview

Figure 1 is the block diagram of Pericom PI5USB30216C demo board and figure 2 shows the demo board layout. A USB-C cable can be connected between the USB-C receptacle connector (J1) on PI5USB30216C demo board and another USB-C device. A USB-C to USB-A cable can be connected between J1 and a USB host, such as PC. A USB-C to USB-A receptacle adapter can be connected between J1 and a USB device, such as USB flash drive. One USB micro-AB connector (J2) is used to connect mobile phones/notebook/tablet/PC to transmit USB2 data to/from J1.

Slide switch at reference SW2 is used to set control mode (GPIO/I2C) and operating mode (Source/Sink/DRP) of PI5USB30216C.

Slide switch at reference SW3 is used to provide optional pull-up resistor (to VDD) or LED indicator to SDA/SCL/INTB/ID pins of PI5USB30216C. The processor can connect to SDA/SCL/INTB/ID/ENB pins through pin header JP21/JP22/JP23/JP24/JP16.

+5V can be employed to the demo board via VDD_EXT header pin (JP2) to power PI5USB30216C. VBUS can be connected to the USB-C receptacle connector via VBUS_EXT header pin (JP4).

PI5C3257 at reference U1 is added to the demo board to manually select whether transmitting USB2 D+/D- between USB-C connector (J1) and USB micro-AB connector (J2) or between J1 and another USB micro-AB connector (J3).

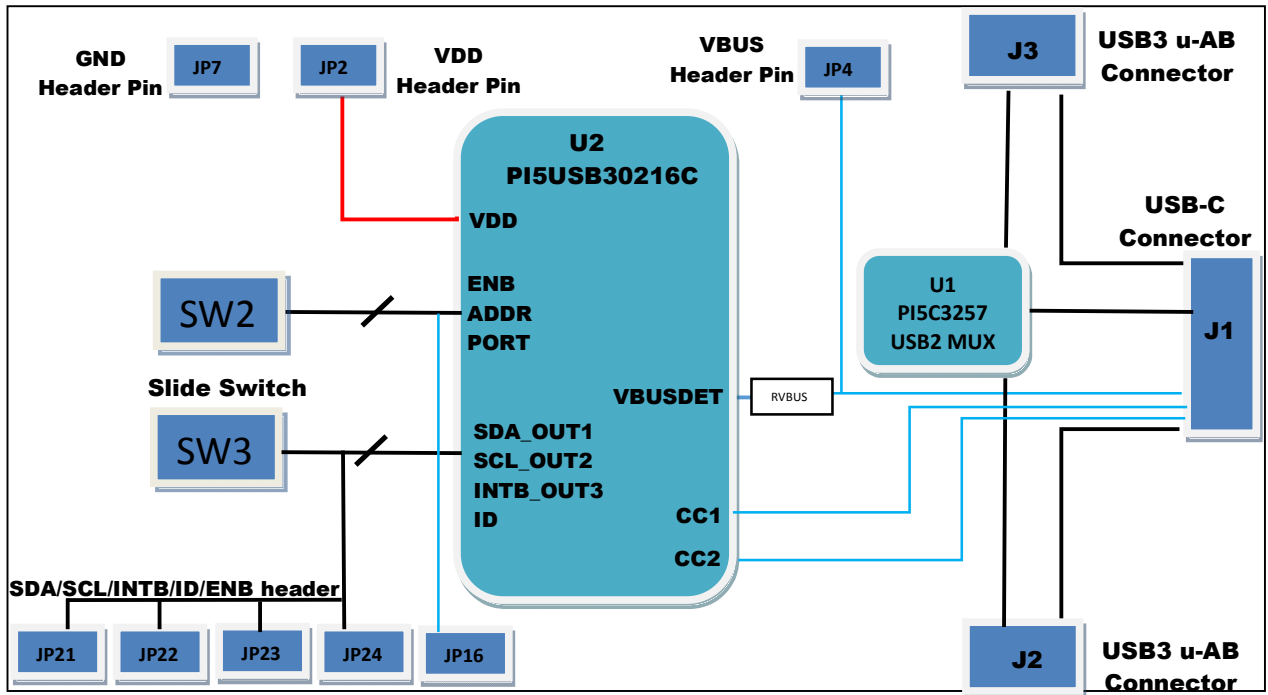


Figure 1: Block Diagram of PI5USB30216C Demo Board Rev.A

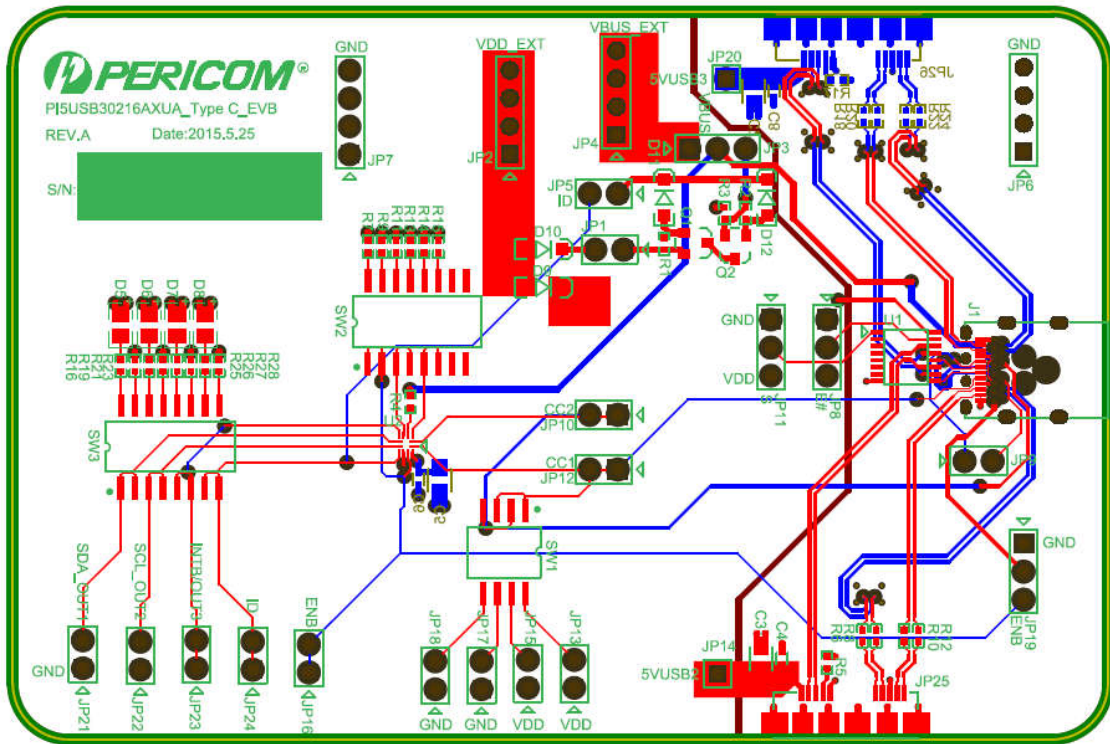


Figure 2: Layout of PI5USB30216C Demo Board Rev.A

3 Quick Start

To start-up the PI5USB30216C demo board rev.A in I2C DRP mode, complete the following steps:

1. Leave JP1, JP5 open to disable on-board VBUS switch.
2. Short pins 1 and 2 of JP3 to connect VBUS_EXT (JP4) to USB-C receptacle connector (J1).
3. Short pins 1 and 2 of JP8 and pins 1 and 2 of JP11 to allow USB2 data transmission between USB-C receptacle connector (J1) and USB micro-AB connector J2.
4. Short pins 1 and 2 of JP19.
5. Leave pins 1 of SW2 open and short pins 2 of SW2 to enable PI5USB30216C.
6. Leave pins 3 of SW2 open and short pins 4 of SW2 to select I2C mode (I2C slave address 0x1D).
7. Leave all pins of SW1 open.
8. Leave pins 5 and 6 of SW2 open to set DRP mode upon power-up.
9. Leave pins 1, 3, 5 and 7 of SW3 open.
10. Short pins 2 of SW3 if on-board SDA pull-up resistor is needed.
11. Short pins 4 of SW3 if on-board SCL pull-up resistor is needed.
12. Short pins 6 of SW3 if on-board INTB/OUT3 pull-up resistor is needed.
13. Short pins 8 of SW3 if on-board ID pull-up resistor is needed.
14. Connect VBUS to VBUS_EXT header pin (JP4).
15. Connect a USB2 OTG device, e.g. mobile phone, to the USB micro-AB connector J2.
16. Connect 5V to VDD_EXT (JP2).
17. Use MPU or I2C tool to read the detection results in registers. Turn-on OTG mode and drive VBUS when a Sink/UFP is detected.

4 Circuit Description

4.1 Port Setting (Pin Control Mode only)

PI5USB30216C can be configured as Source(DFP), Sink(UFP) and DRP with Try.SNK mode through PORT pin in pin control mode. In I2C mode, PI5USB30216C is always initialized as Sink/UFP mode regardless of PORT pin setting.

SW2-5	SW2-6	Port Mode
OFF	OFF	DRP with Try.SNK
OFF	ON	Sink/UFP
ON	OFF	Source/DFP

Table 1: Port Mode Selection (Pin Control Mode only) of PI5USB30216C Demo Board Rev.A

4.2 Mode Selection, I2C Address and I2C Bus

PI5USB30216C can be controlled via either GPIO or I2C mode. The control mode and I2C address is configured via ADDR pin. Pins 8 and 7 of PI5USB30216C are used for transmitting I2C SCL and SDA, respectively. External pull-ups may be required for SCL_OUT2 and SDA_OUT1 pins when reading/writing I2C. Alternatively, pull-ups for SCL_OUT2 and SDA_OUT1 can be enabled by short pins 2 and 4 of the slide switch SW3.

SW2-3	SW2-4	Control Mode
OFF	OFF	GPIO
OFF	ON	I2C mode; 0x1D
ON	OFF	I2C mode; 0x3D

Table 2: Mode Selection and I2C Address of PI5USB30216C Demo Board Rev.A

4.3 VBUS Power Supply

The system should drive 5V to VBUS of USB-C receptacle connector (J1) via VBUS_EXT (JP4) on demo board Rev.A when a sink/UFP is attached. If an external VBUS source is not available, a discrete VBUS switch is assembled on EVB, which is controlled by ID pin of PI5USB30216C could be used. This switch will turn on and drive VBUS, connecting VDD_EXT to VBUS, when a sink/UFP is attached. To use the on-board VBUS switch, please shorts JP1, JP5 and pins 2 and 3 of JP3.

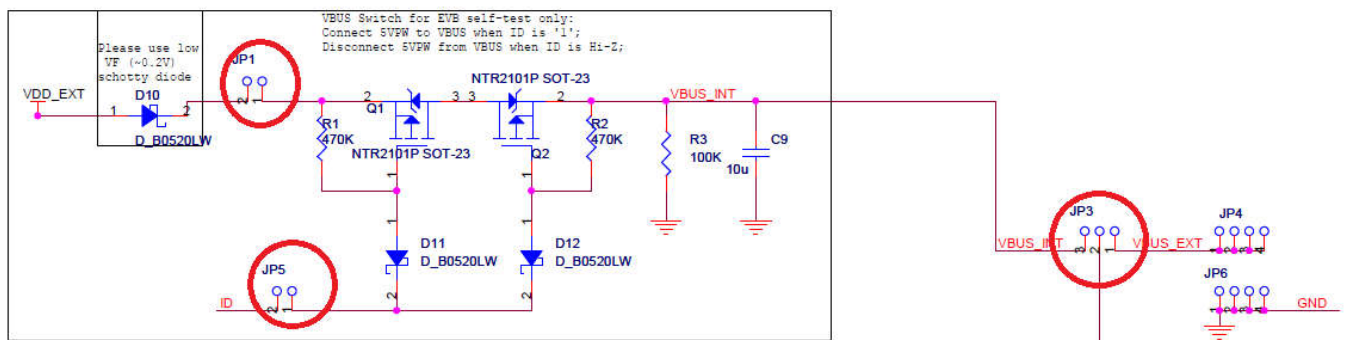


Figure 3: VBUS Power Supply of PI5USB30216C Demo Board Rev.A

If the system will provide VBUS through the USB micro-AB connector J2. Please connect JP14 to JP4.

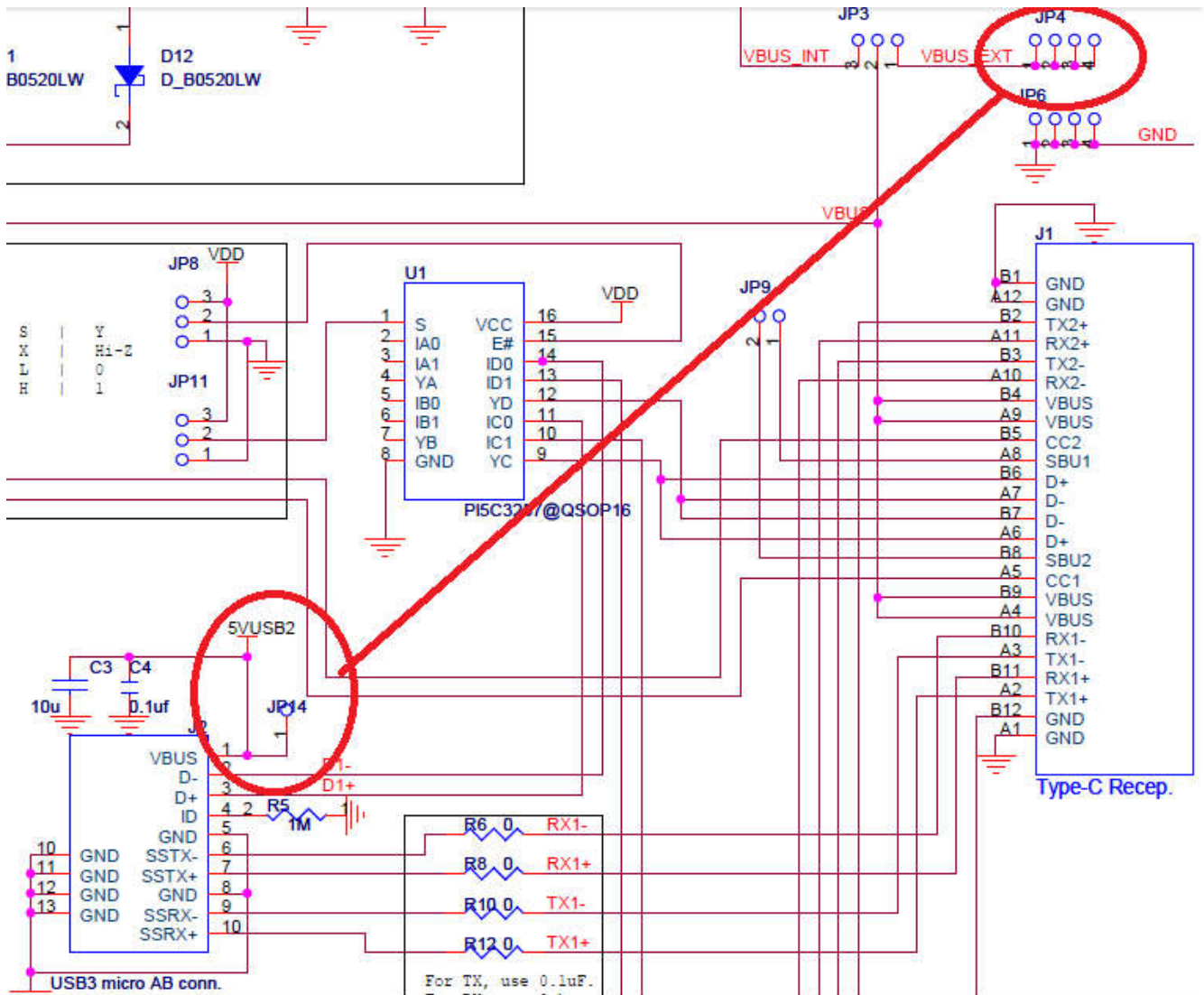


Figure 4: VBUS Power Supply via USB micro-AB connector of PI5USB30216C Demo Board Rev.A

4.4 Disable/Low Power State

PI5USB30216C can be disabled by setting ENB pin to a high voltage level.

SW2-2	PI5USB30216C
ON	Enabled/Active Mode
OFF	Disabled/Low Power State

Table 3: ENB Setting of PI5USB30216C Demo Board Rev.A

References

(1) Universal Serial Bus Type-C Cable and Connector Specification Version 1.1, April 3, 2015

5 Appendix A: Demo Board Schematic



PI5USB30216_TYP
E-C_EVB_RevA.pdf

For clearer view of schematic diagram, please click the PDF file icon on the right.

