User's Guide

TUSB211 to TUSB216I Transition Guide

ABSTRACT

This document defines pinout and functional differences between the TUSB211 and the new TUSB216I and highlights the schematic and BOM changes needed to convert existing system designs from using the TUSB211 to the TUSB216I.

This document also applies to the transition of TUSB212 to TUSB216I which shares the same pinout and similar pin functions of the TUSB211.

Table of Contents

List of Tables

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1 Pinout Comparison

Table 1 lists the changes in the pin definitions of the TUSB211 and TUSB216I devices, and highlights pin configurations that may require change when using the TUSB216I to replace the TUSB211 in an existing system.

Table 1-1. TUSB211 to TUSB216I Schematic and BOM Changes

Pin	TUSB211	TUSB216I	Schematic and BOM Change Notes
1	D1M	D1M	No change required
2	D1P	D1P	No change required
3	TEST	SDA	GPIO mode: no change required
			I^2C mode: add a 4.7-kΩ pullup to 1.8 V or 3.3 V; connect to master SDA.
4	CD	SCL/CD	No change required, GPIO Mode: Recommended to connect the pin to a test point on the PCB.
			I^2C mode: add a 4.7-kΩ pullup to 1.8 V or 3.3 V; connect to master SCL.
5	RSTN	RSTN	No change required
6	EQ	BOOST	**BOM**: pulldown resistor value may need to change for optimal tuning, optional.
7	D2P	D2P	No change required
8	D2M	D2M	No change required
9	ENA_HS	RX_SEN/ENA_HS	No Change required. Mid RX_SEN setting is selected automatically if the pin is left disconnected. **Schematic** (Optional): resistor options can be added for RX_SEN tuning. Recommend connecting ENA_HS pin to a test point on the PCB.
10	GND	GND	No change required
11	VREG	CDP_ENZ	No change required If CDP is not in use.
12	VCC	VCC	No change required

2 VCC, RSTN, and GND pins

No changes are required for VCC, RSTN, and GND pins. The TUSB216I accepts wider VCC range (2.3 V–6.5 V). The TUSB211 only supports a 3.3-V power supply.

3 USB Data Pins

No changes are required for D1P, D1M, D2P, or D2M pins. Both the TUSB211 and TUSB216I require D1P and D1M to be shorted to D2P and D2M underneath the device. Ensure that polarity is conserved.

4 EQ versus BOOST Pins

No changes are required for RSTN, EQ, or VREG pins.

5 RX Sensitivity (RX_SEN)

The TUSB216I has a new RX_SEN setting (pin 9) to help recover signals in high loss environments. In most applications this pin can be left disconnected for the mid RX_SEN setting. The mid RX_SEN setting is used in most applications with typical USB 2 signal amplitudes. Tuning this setting is recommended when the expected signal as seen at TUSB216I USB data pins amplitude is outside the normal range. TUSB211 does not have this function.

The recommendation is to start with mid RX_SEN setting and then move to high or low settings based on the signal amplitude as measured at the TUSB216I. For example, if the signal amplitude is low after the signal traverses a very long cable, use the high RX_SEN setting. For the TUSB216I to recognize any change to the RX_SEN setting, the RSTN pin must be toggled.

6 TEST and CD Pins

The TEST and CD pins have changed from the TUSB211 to the TUSB216I. In the TUSB216I these pins are dual-function pins in the TUSB216I for the I^2C interface. If the TUSB216I is not configured to use I^2C, then there are no changes needed for these pins. TI recommends connecting the CD signal to a test point on the PCB. If the TUSB216I is configured to use I^2C, the test pin acts as the I2C SDA pin and CD acts as the I2C SCL pin. Both SDA and SCL should have a 4.7-kΩ pullup to 1.8 V or 3.3 V for I2C mode to be enabled in the TUSB216I.

7 VREG versus CDP_ENZ Pins

In the TUSB211, the VREG pin required a 0.1-µF external capacitor to GND to stabilize the core. When using the TUSB216I, the external capacitor used for the VREG pin of the TUSB211, is not required. It is still acceptable to connect the external capacitor to the CDP_ENZ pin. The TUSB216I includes an optional feature to enable an internal BC1.2 CDP controller for battery charging applications. If not required this pin can be left unconnected, the internal 500 kΩ pullup of the TUSB216I disables the BC1.2 controller. To enable BC1.2 CDP mode, use a 10-kΩ pulldown resistor to GND. The CDP_ENZ is sampled at reset.

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