TUSB211RPTR Evaluation Module

The TUSB211 is a High-Speed signal conditioner designed to compensate for ISI signal loss in a transmission channel. The TUSB211RPTREVM is designed to provide a simple means of demonstrating the signal conditioning capability of the TUSB211. The EVM is pre-configured and simply connects the Type B connector on the EVM to the Type A receptacle found on a Host PC with a standard USB cable, a USB device plugs into the Type A receptacle of the EVM board. The TUSB211RPTREVM requires no external power as the EVM will be powered from VBUS sourced from the Host port. Two LEDs indicate when a device is connected as well as when a high-speed connection is made and the TUSB211 is enabled.

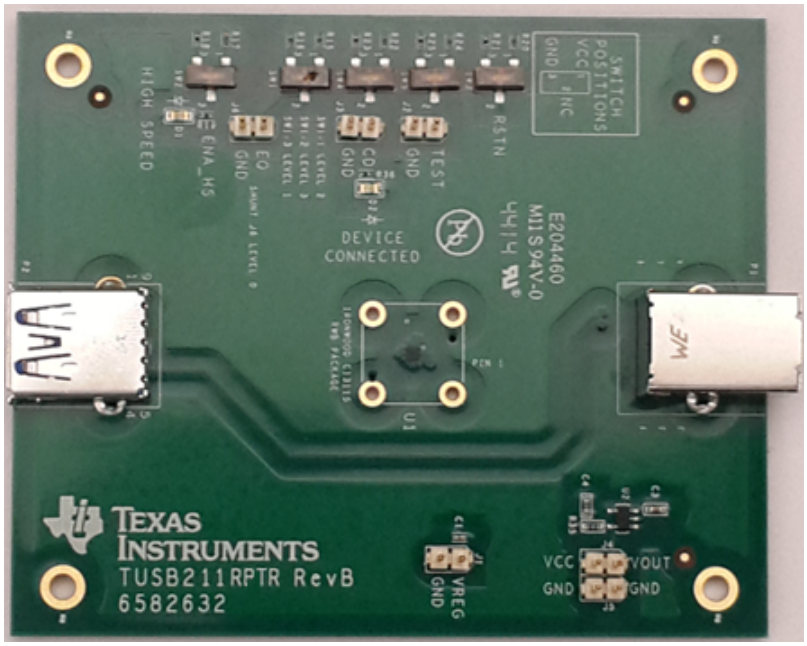


Figure 1. TUSB211RPTREVM Top View

Contents

1 Configuration Switches 2
2 Test Headers 2
3 EVM Operation 3
4 USB 2.0 High-Speed Eye Diagram Testing 3

List of Figures

1 TUSB211RPTREVM Top View 1

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1 Configuration Switches

The TI TUSB211RPTREVM has five sets of switches to facilitate configuration changes. Changing these switch settings without a complete understanding of the result is not recommended. Configuration inputs are only read by the TUSB211 during power on reset or after de-asserting the RSTN pin, changing these switch settings while the EVM is powered on will have no effect. Refer to the device datasheet (SLLSEM5) for detailed pin descriptions and functionality along with the EVM schematic for additional information.

The switch definitions are as follows:

SW1 EQ (USB High-Speed (HS) Boost):

1 – Level 2 EQ
2 – Level 3 EQ
3 – Level 1 EQ
Note: Shunt J6 = Level 0 EQ

SW2 ENA_HS (High-Speed Mode Indicator):

1 – VCC
2 – NC (Default Controls LED HS Indication)
3 – GND

SW3 RSTN (Device Disable/Enable):

1 – VCC (Device Enable)
2 – NC (Default)
3 – GND (Device Disabled)

SW4 CD (USB Device Attached Indicator):

1 – VCC
2 – NC (Default Controls LED Device Connected Indication)
3 – GND

SW5 TEST (No Function Available):

1 – VCC
2 – NC (Default)
3 – GND

2 Test Headers

The TUSB211RPTREVM includes headers for monitoring some device pins of the TUSB211 as well as power to the device.

Header J1:

This header is included to monitor the regulator output of the TUSB211, this is for test purposes only and should not be used as signal indicator.

Header J2:

This header is included to monitor the TEST pin of the TUSB211, this is for internal test purposes only.

Header J3:

This header is included to monitor the CD pin of the TUSB211, this header can be used as an external signal to indicate a connected device (Note: This signal is connected to the LED on the EVM which will result in a lower voltage on the header. The resistor connecting this pin to the LED can be removed, if desired).

Header J4, J5:

These headers are included to monitor power to the TUSB211, one side of header J4 connects to the power pins of the TUSB211, the other connects to the output of the regulator (5 V to 3.3 V).

Header J6:

This header is included to monitor the EQ pin of the TUSB211, refer to SW1 settings in Section 1 as well as the datasheet for details.

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3 EVM Operation

Install the EVM using the following steps:

1. Attach a USB2 or USB3 cable from a Host PC Type-A connector to the Type-B connector (P1) of the TUSB211RPTREVM.
2. Attach a USB device either via cable or directly plugged into the Type-A receptacle connector (P2) on the TUSB211RPTREVM:

   (a) When LED D2 is lit, this indicates a USB device connection.

   (b) When LED D1 is lit, this indicates a USB High-Speed connection with the TUSB211 active.

4 USB 2.0 High-Speed Eye Diagram Testing

When performing USB 2.0 Compliance Eye-Diagram testing with a Host or the downstream port of a HUB with the TUSB211, a scenario can occur where the TUSB211 signal boosting is not enabled. This can occur when the test packets are being transmitted before the USB Test Fixture is connected to the TUSB211. This scenario does not occur during Device Compliance Eye-Diagram testing as the USB Test Fixture must always be connected while testing a Device. This scenario only occurs during the Compliance testing with the USB Test Fixtures and does not affect normal operation with a Host, HUB, or Device.

Closely following the test procedures provided by the scope equipment vendor and USB-IF (links provided at the end of this section) will avoid this scenario. Specifically, the USB HS test fixture should be connected prior to executing the TEST PACKETS using the HSETT test tool. Alternatively, if the test fixture is hot-plugged to the Host or downstream HUB port after the command to send Test Packets has already been entered using the HSETT tool, it is necessary to select TEST PACKETS and click *Execute* again after the test fixture is connected to ensure the TUSB211 detects a compliance test set-up.

The following generic procedure can be used to take the USB 2.0 compliance eye-diagrams. Details are provided in the *Test Procedure* documents referenced at the end of this section:

1. **Connect the USB Test Fixture to the host, downstream HUB (+ TUSB211) Port or Device under test.**
2. **Configure the Host, or HUB, or Device using xHSETT or HSETT to send test packets using the procedure detailed in the HSETT documentation.**
3. **Start sending Test Packets.**
4. **Capture Test Packet on scope to display eye (Running Compliance software on the scope).**

USB 2.0 Compliance Eye-Diagrams can be taken on Host, Device, and HUB platform ports configured with the TUSB211 using the EHCI and xHCI High-Speed Electrical Test Tool application provided by the USB Implementers Forum.

Details for setting up and running the application are detailed in the *Test Tool Setup Instruction* document provided by the USB-IF at the following link:

http://www.usb.org/developers/tools/HSETT_Instruction_0_4_1.pdf

xHCI (USB 3.0 Host) – XHSETT test application:

http://www.usb.org/developers/tools/

EHCI (USB 2.0 Host) – EHSETT test application:

http://www.usb.org/developers/tools/usb20_tools/

Vendor-Specific Test Procedures:

http://www.usb.org/developers/compliance/electrical_tests/

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Revision History

Changes from Original (January 2015) to A Revision **Page**

- Changed capitalization and punctuation throughout the document for revision A. No technical changes..... 2
- Deleted schematic and bill of materials sections..... 3

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Revision History

Changes from A Revision (May 2015) to B Revision **Page**

- Changed TUSB211 EVM and TUSB211RWBEVM to TUSB211RPTREVM globally in the document. 1
- Changed *TUSB211RPTREVM Top View* image. 1

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
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