

USB 3.0 A/B Breakouts

1 Overview

Group14 Technologies USB 3.0 A and B breakout boards are designed to connect high speed lines from a USB 3.0 A or B connector to SMA jacks. Each line is length matched with controlled impedances and uses FR408 high performance dielectric. Both USB 3.0 and legacy USB 1.x and 2 lines are connected as well as VBUS power connections.

2 Features

- USB 3.0, 2.0, and 1.x Compliant
- >10 Gbps signal capable: uses FR-408 Dielectric
- SMA connections to length matched high speed lines
- Rugged through hole SMA connectors
- Separate test points for VBUS
- Two boards available: USB 3.0 A and USB 3.0 B

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USB 3.0 A (left) and USB 3.0 B (right) Breakout Boards

3 Electrical Description

3.1 High Speed IO

The USB 3.0 high speed IO (SSTX+/- and SSRX+/-) are 50 Ohm single ended lines. USB 1.x and 2 connections (DP and DM) are 45 Ohm singled ended lines. The high speed dielectric used (Isola FR-408) ensures data rate compatibility for data rates greater than 5.0 Gbps (USB 1.x, 2, and 3.0). Off board connections are 50 ohm SMA.

Each IO line on the USB30A2SMA is length matched to 2.282" +/-0.060" and the attenuation is calculated to be 0.50 dB at 2.5 GHz (corresponding to 5.0 Gbps USB 3.0). Both the USB and SMA connectors will add approximately 0.5 dB of loss, bringing the loss introduced by the USB30A2SMA board to 1.50 dB.

Each IO line on the USB30B2SMA is length matched to 2.168" +/-0.002" and the attenuation is calculated to be 0.48 dB at 2.5 GHz (corresponding to 5.0 Gbps USB 3.0). Both the USB and SMA connectors will add approximately 0.5 dB of loss, bringing the loss introduced by the USB30B2SMA board to 1.48 dB.

3.2 Power

VBUS and GND are available as test points on the board. Test point connections are Harwin S1751-46R. There is a 0.1 μF capacitor between VBUS and GND.

3.3 Functional Overview

A block diagram of the electrical functions of the USB 3.0 Breakouts is given in Figure 1. Connectors and are described in Section 4.

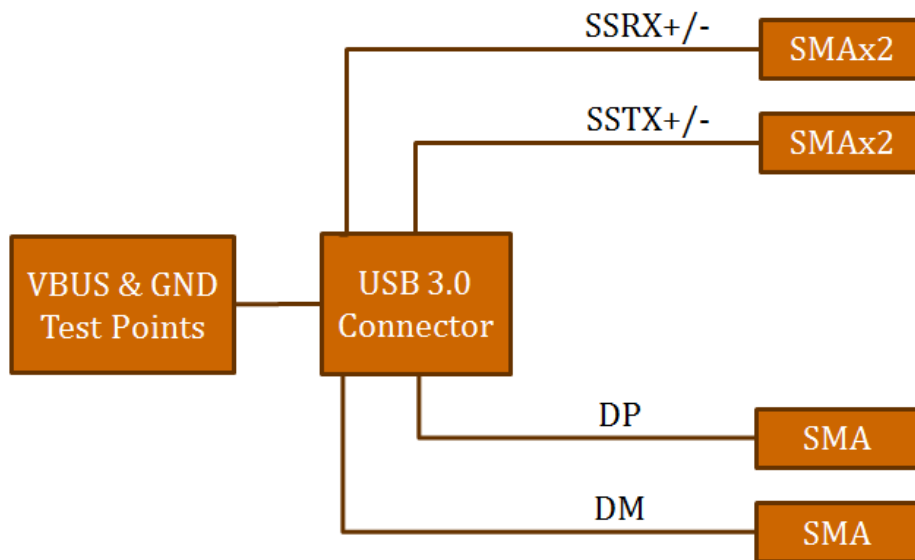


Figure 1 - USB 3.0 Breakout Block Diagram

4 Physical Description

4.1 Board Size & Locations

4.1.1 USB30A2SMA

The USB30A2SMA Breakout board is a 0.063" thick PCB measuring 2.660" x 2.650". It has four 0.120" mounting holes with dimensions as shown in Figure 2. Rubber feet come applied below mounting holes on rear of board by default, however they may be removed with minor pressure if another mounting style is more convenient.

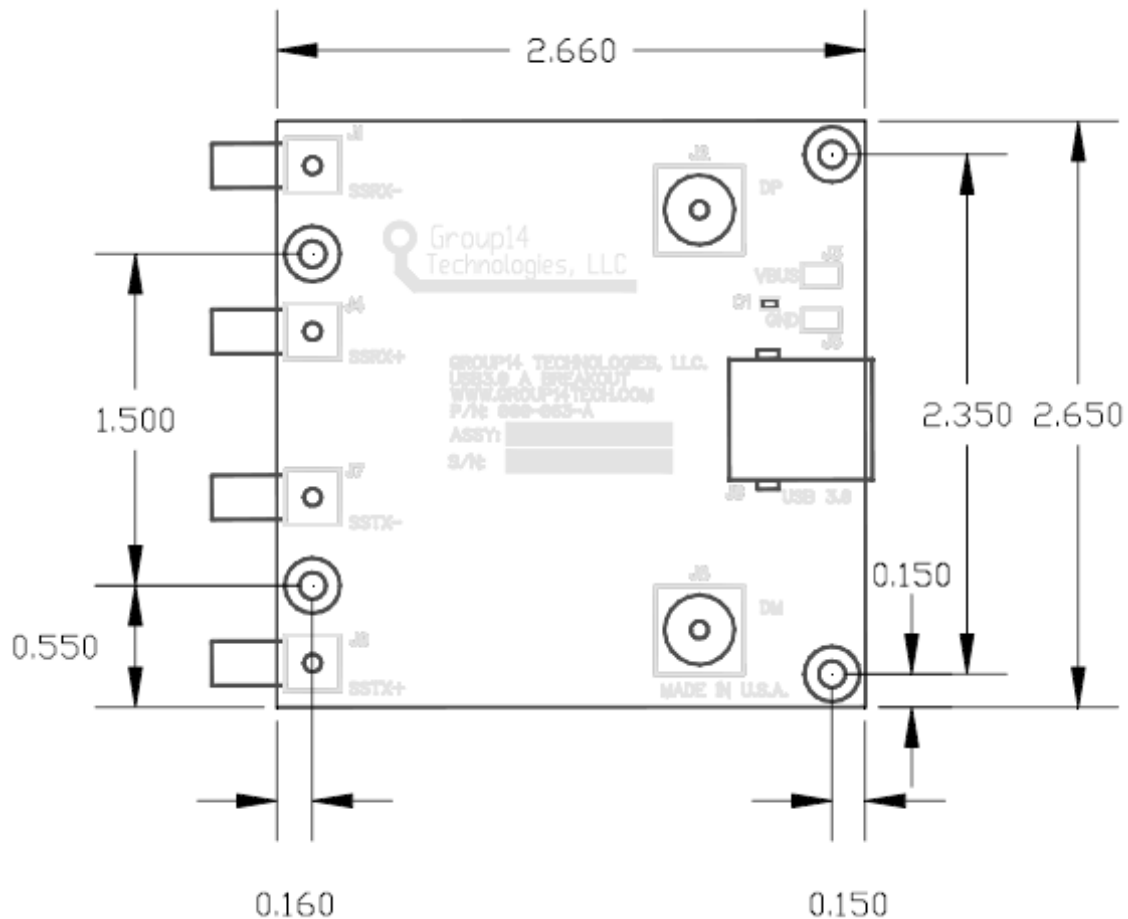


Figure 2 - USB30A2SMA Breakout Physical Dimensions (Dimensions are in Inches)

4.1.2 USB30B2SMA

The USB30B2SMA Breakout board is a .063" thick PCB measuring 2.600" x 2.650". It has four 0.120" mounting holes with dimensions as shown in Figure 3. Rubber feet come applied below mounting holes on rear of board by default, however they may be removed with minor pressure if another mounting style is more convenient.

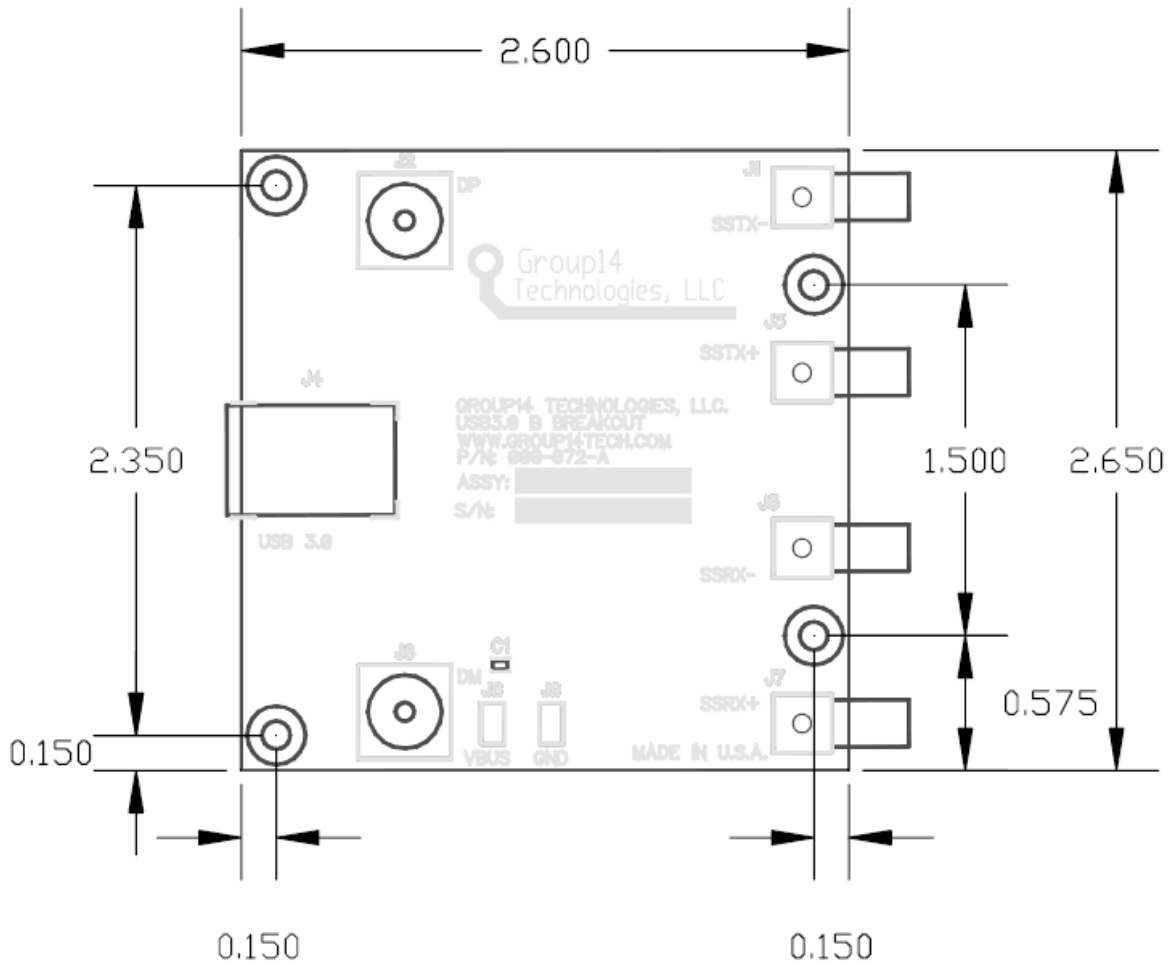


Figure 3 - USB30B2SMA Breakout Physical Dimensions (Dimensions are in Inches)

4.2 Board Connections

4.2.1 USB30A2SMA

Connector	Pin	Description
J1	SIG	SSRX-
J2	SIG	DP
J3	SIG	VBUS
J4	SIG	SSRX+
J5	SIG	GND
J6	1	VBUS
J6	2	D-
J6	3	D+
J6	4	GND
J6	5	SSRX-
J6	6	SSRX+
J6	7	GND DRAIN
J6	8	SSTX-
J6	9	SSTX+
J7	SIG	SSTX-
J8	SIG	DM
J9	SIG	SSTX+

4.2.2 USB30B2SMA

Connector	Pin	Description
J1	SIG	SSTX-
J2	SIG	DP
J3	SIG	SSTX+
J4	1	VBUS
J4	2	D-
J4	3	D+
J4	4	GND
J4	5	SSTX-
J4	6	SSTX+
J4	7	GND DRAIN
J4	8	SSRX-
J4	9	SSRX+
J5	SIG	SSRX-
J6	SIG	DM
J7	SIG	SSRX+
J8	SIG	VBUS
J9	SIG	GND

5 Ordering Information

- USB 3.0 A Breakout part number: *USB30A2SMA*
- USB 3.0 B Breakout part number: *USB30B2SMA*
- Sales phone: (937) 985-4140
- Sales email: contactus@group14tech.com
- Website: <http://www.group14tech.com>

6 Disclaimer & Warranty

All information contained in this document is believed to be accurate but subject to change without notice. Group14 Technologies, LLC products are not warranted or authorized for use in applications where their use may cause loss of life or injury.

All Group14 Technologies, LLC products carry a one year warranty from date of purchase. Product support will be provided for one year from date of purchase with further support provided on an “as available” basis.

7 Revision History

Date	Revision	Description
2014-01-20	DS104.0	Initial release