PI3EQX7741ST
PI3EQX7741ST (USB3.0) Evaluation Board User Manual

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Introduction

Pericom's PI3EQX7741ST is a low power high performance 5.0Gbps signal ReDriver designed for USB3.0 protocol. The device provides programmable Equalization (EQ) and De-Emphasis (DE) to optimize performance over a variety of physical mediums by reducing Inter-Symbol Interference (ISI)
The PI3EQX7741ST evaluation board (EVB) is designed to demonstrate the benefits, performance and key features of PI3EQX7741ST. This user manual describes the usage of this EVB and it will be divided into following sections:

- Overview
- Quick start
- Board Design information
  - PI3EQX7741ST EVB Schematic
  - PCB Layout
  - PCB Layout Reference
  - BOM List

Overview

Figure 1 is the block diagram of Pericom PI3EQX7741ST Evaluation board (EVB) and Figures 2(a) and (b) is the top and bottom view of EVB board. There is an USB3.0 Type-B Receptacle connector (JP6) which is used to connect PC's USB3.0 port through a USB3.0 cable and the USB3.0 Type-A receptacle connector (JP7) is used to connect USB3.0 HDD or Hub through a USB3.0 cable. The EQ and DE setting on SW1 are used to select the equalization and de-emphasis level on PI3EQX7741ST. JP2 is used to enable receive detect function. PI3EQX7741ST operation required +3.3V which was provided by the 3.3V LDO.

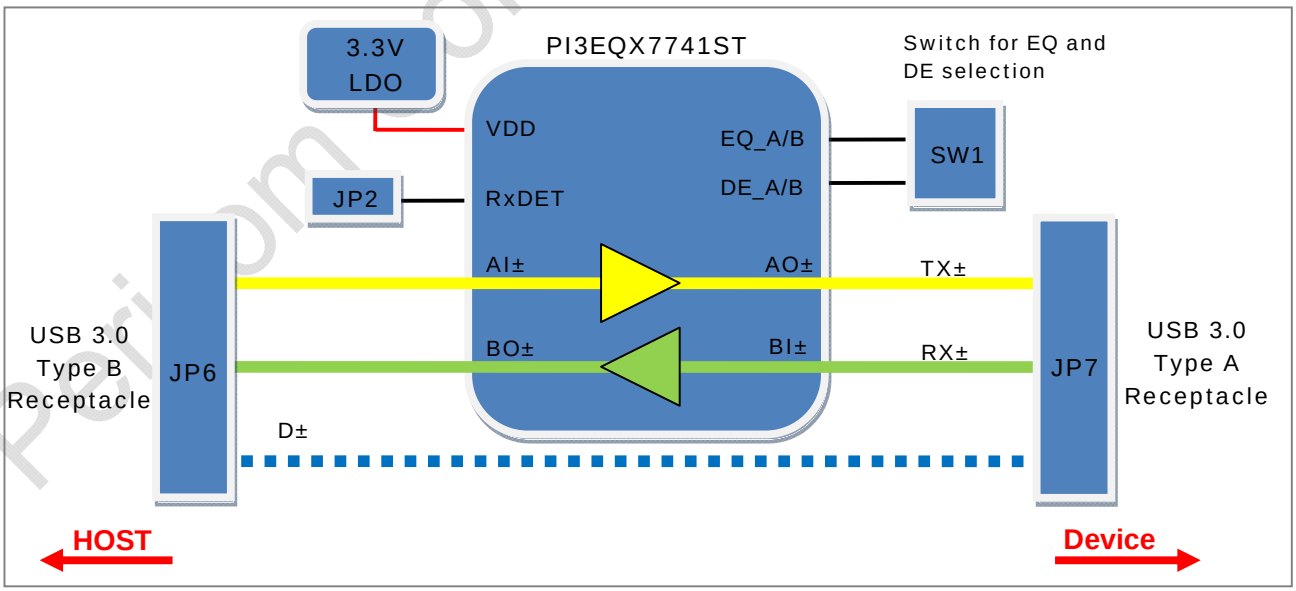


Figure 1, block diagram of PI3EQX7741ST EVB

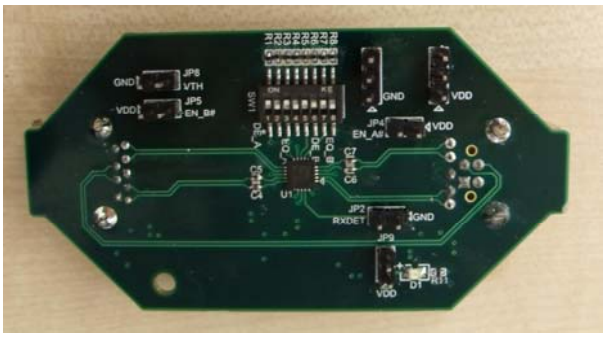


Figure 2(a), top view of PI3EQX7741ST EVB

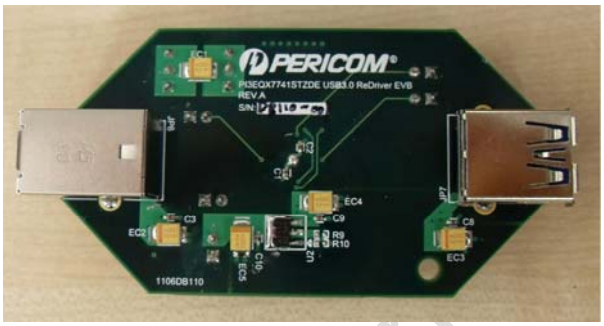


Figure 2(b), bottom view of PI3EQX7741ST EVB

Quick Start

To start-up the PI3EQX7741ST EVB, complete the following steps:

1. Check the head pin status and SW1 setting as described in Table 1
2. Connect the JP6 on EVB to PC's USB3.0 port through a USB3.0 Type A to B cable.
3. Plug the USB3.0 device into EVB USB Type-A connector JP7 through USB3.0 cable

Header pin is set as defaulted on EVB.

Header pin #	Pin name	Switch status	Remark
JP2	RxDet	Open	Enable Receive detect function
JP4	EN_A#	Open	Channel A enable
JP5	EN_B#	Open	Channel B enable
JP8	VTH*	Open	Pull HIGH for normal operation
JP9	VDD	Short	Use internal power from PC USB port
SW1 – 1 SW1 – 2	DE_A	SW1 – 1 = ON SW1 – 2 = OFF	De-emphasis setting on channel A = 0dB
SW1 – 3 SW1 – 4	EQ_A	SW1 – 3 = ON SW1 – 4 = OFF	Equalizer setting on channel A = 3dB
SW1 – 5 SW1 – 6	DE_B	SW1 – 5 = ON SW1 – 6 = OFF	De-emphasis setting on channel B = 0dB
SW1 – 7 SW1 – 8	EQ_B	SW1 – 7 = ON SW1 – 8 = OFF	Equalizer setting on channel B = 3dB

Remark: *header pin VTH is connected to RES pin on PI3EQX7741ST

Table 1, Header pin settings for EVB (header pins location refers to Figure 4)

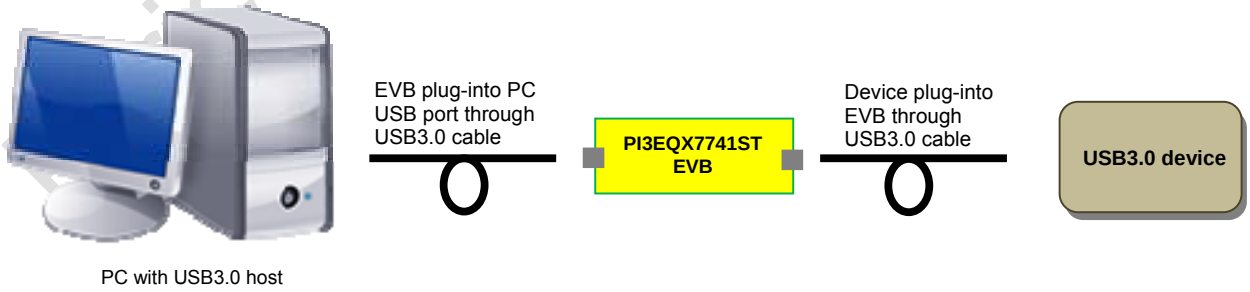


Figure 3, Connection of PI3EQX7741ST EVB

Detail Description

The functionality of header pins of switch are described in this section.

Functionality of Header Pins

Header Pin	Header Pin Name	Pins on PI3EQX7741ST	Description
JP2	RxDet	RxDet	Short = Receiver detect function disable Open = Receiver detect function ENABLE
JP4	EN_A#	EN_A#	Short = Channel A disable Open = Channel A ENABLE
JP5	EN_B#	EN_B#	Short = Channel B disable Open = Channel B ENABLE
JP8	VTH*	RES	Reserved pin – MUST tie HIGH for normal operation
JP9	VDD	VDD33	Short = Use internal power Open = Use external 3.3V power

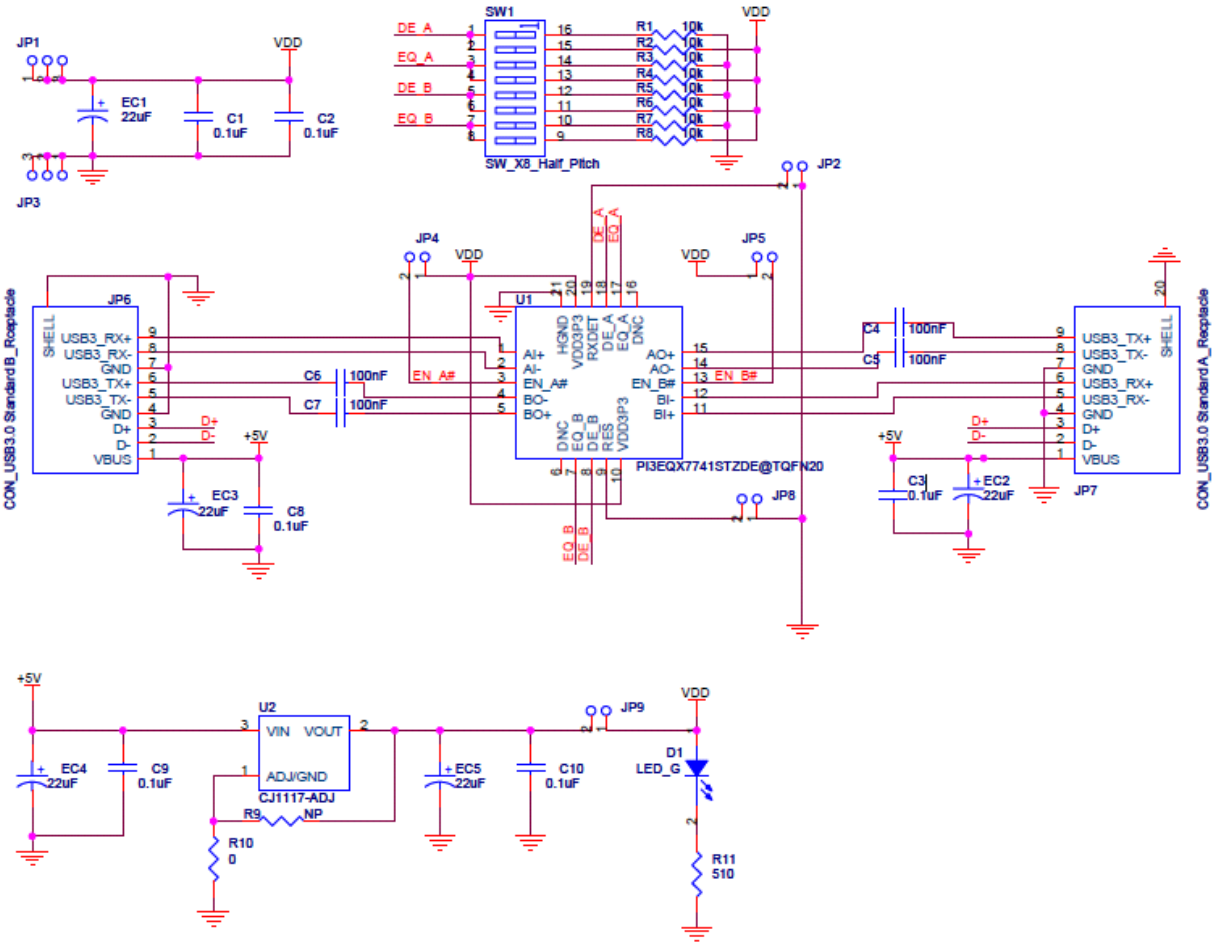
VTH is connected to RES pin on PI3EQX7741ST*

Functionality of Switch (SW1)

Switch - #	Pin on PI3EQX7741ST	Switch Status	Value
SW1 – 1 SW1 – 2	DE_A	SW1 – 1 = ON, SW1 – 2 = OFF	0dB
		SW1 – 1 = OFF, SW1 – 2 = OFF	-3.5dB
		SW1 – 1 = OFF, SW1 – 2 = ON	-6dB
SW1 – 3 SW1 – 4	EQ_A	SW1 – 3 = ON, SW1 – 4 = OFF	3dB
		SW1 – 3 = OFF, SW1 – 4 = OFF	6dB
		SW1 – 3 = OFF, SW1 – 4 = ON	9dB
SW1 – 5 SW1 – 6	DE_B	SW1 – 5 = ON, SW1 – 6 = OFF	0dB
		SW1 – 5 = OFF, SW1 – 6 = OFF	-3.5dB
		SW1 – 5 = OFF, SW1 – 6 = ON	-6dB
SW1 – 7 SW1 – 8	EQ_B	SW1 – 7 = ON, SW1 – 8 = OFF	3dB
		SW1 – 7 = OFF, SW1 – 8 = OFF	6dB
		SW1 – 7 = OFF, SW1 – 8 = ON	9dB

Board Design Information:

➢ PI3EQX7741ST EVB Schematic



➢ PCB Layout

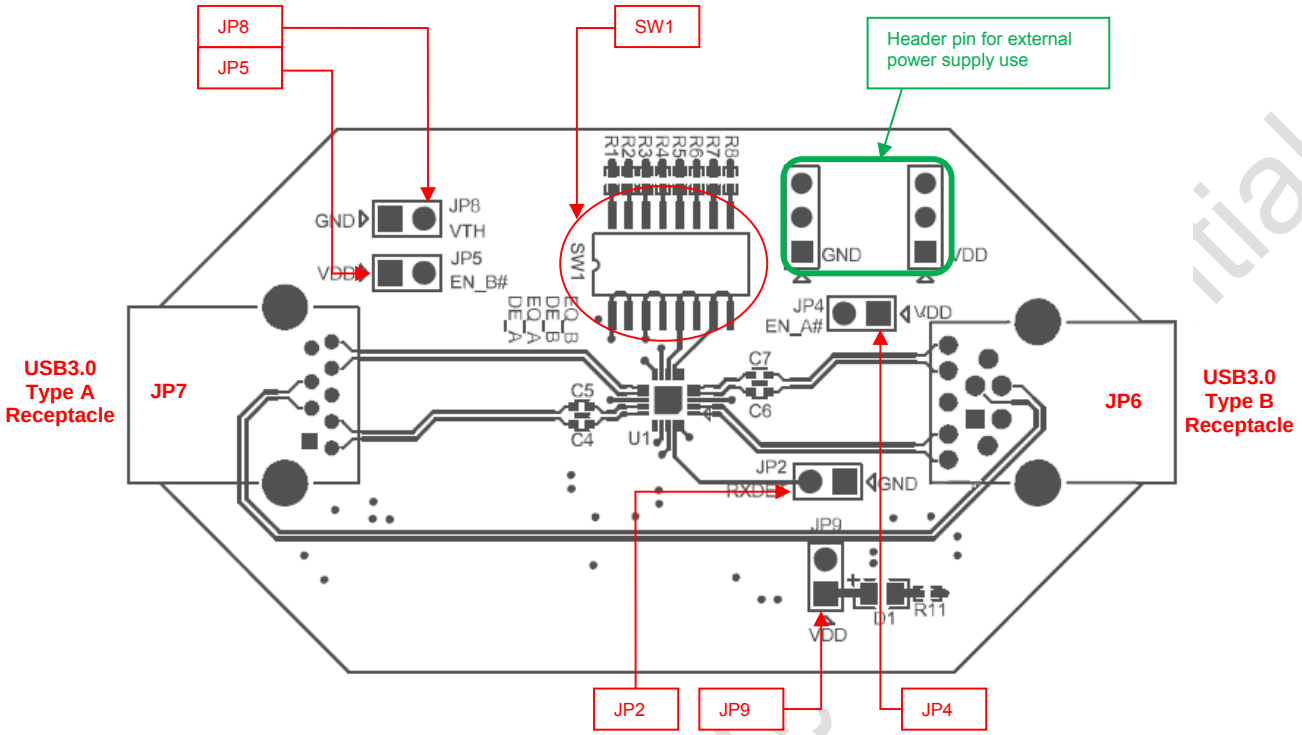


Figure 4, Top view of PI3EQX7741ST EVB Layout

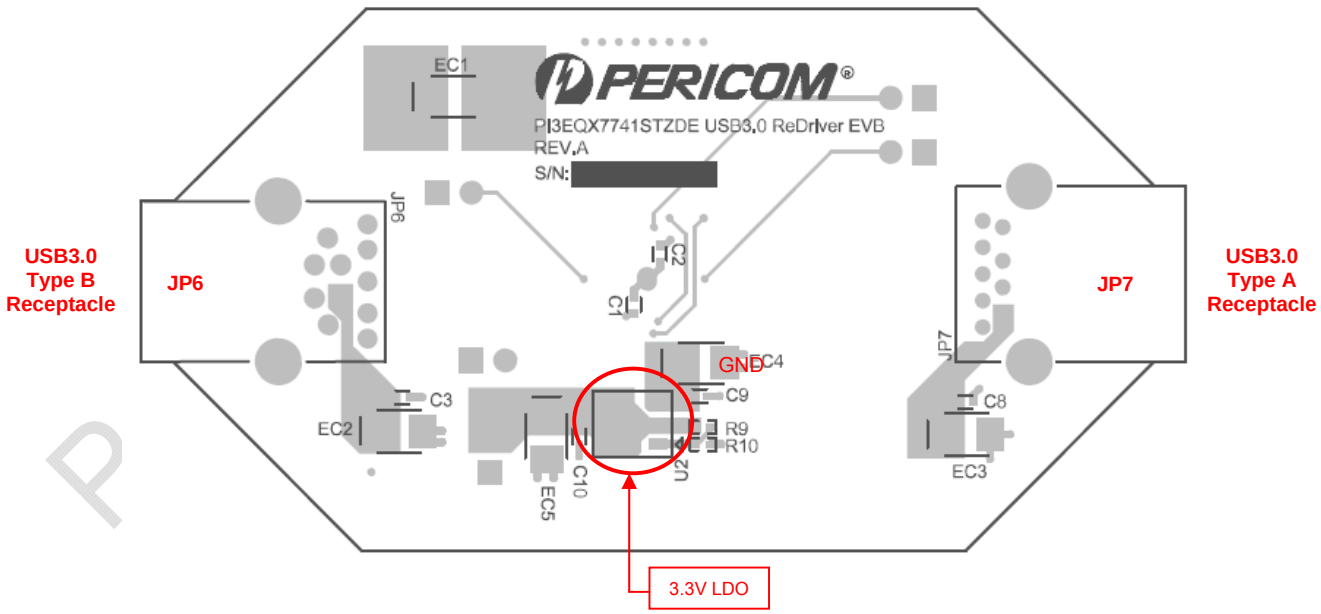


Figure 5, Bottom view of PI3EQX7741ST EVB Layout

➢ PCB Layout Requirements

a. Stack Up:

Layer #	Plane	Material Type	Thickness (mil)
	Solder Mask		0.4
Layer 1	Signal		1.2
	Prepreg	FR4 1080 FR4 2216	7.3
Layer 2	GND		1.2
	Core		44
Layer 3	Power		1.2
	Prepreg	FR4 2216 FR4 1080	7.3
Layer 4	Signal		1.2
	Solder Mask		0.4

b. Isolation Spacing = 25 mil

c. Width & Spacing (W/S) of 90Ω Differential Trace = 11 / 10 / 11 mil

➢ BOM List

Item	Quantity	Reference	Description
1	6	C1, C2, C3, C8, C9, C10	0.1uF Capacitor
2	4	C4, C5, C6, C7	0.01uF Capacitor
3	5	EC1, EC2, EC3, EC4, EC5	22uF Capacitor
4	1	D1	Green LED
5	2	JP1, JP3	3 x 1 Header Pin
6	5	JP2, JP4, JP5, JP8, JP9	2X1 Header Pin
7	1	JP6	USB3.0 Type B Receptacle connector
8	1	JP7	USB3.0 Type A Receptacle connector
9	8	R1, R2, R3, R4, R5, R6, R7, R8	10kΩ Resistor
10	1	R9	NP
11	1	R10	0Ω Resistor
12	1	R11	510Ω Resistor
13	1	SW1	SPDT switch
14	1	U1	PI3EQX7741ST
15	1	U2	CJ1117 – 3.3V