

PI3EQX8908A PI3EQX8908A PCIe x16 EVB Rev.B User Manual

By YT Tso, Anne Wu and Jerry Chou

- Introduce:**

PI3EQX8908A is a low power high performance 8.0Gbps signal Linear Re-Driver designed for PCIe gen3 protocol. The device provides programmable Equalization (EQ), Flat-Gain (FG) and output swing (SW) to optimize performance over a variety of physical mediums by reducing Inter-Symbol Interference (ISI)

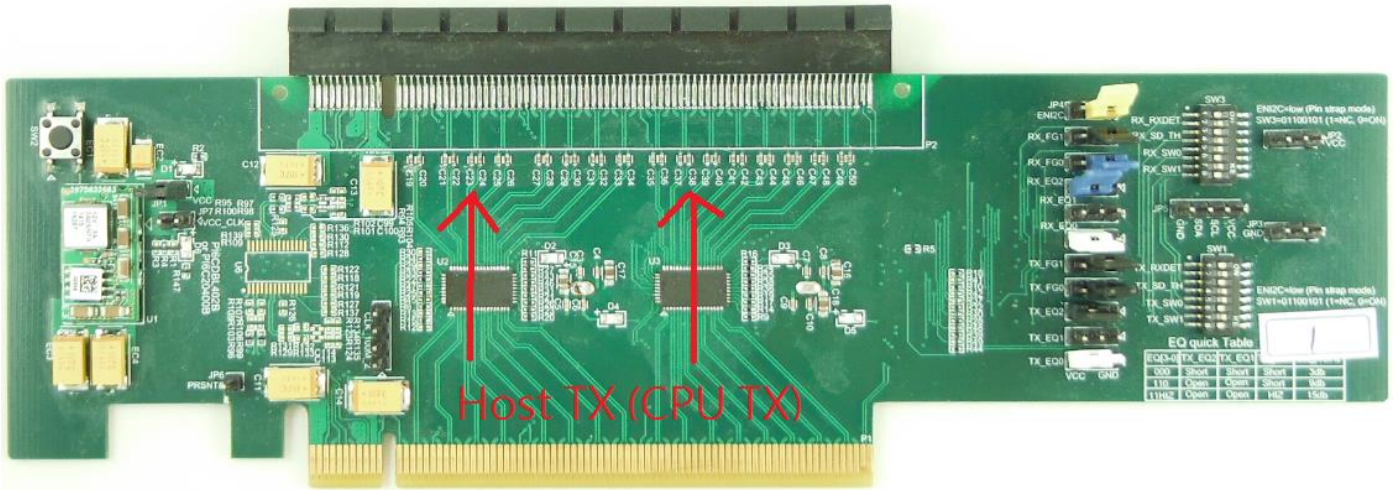


Figure 1(a) Top view of PI3EQX8908A PCIe x16 EVB

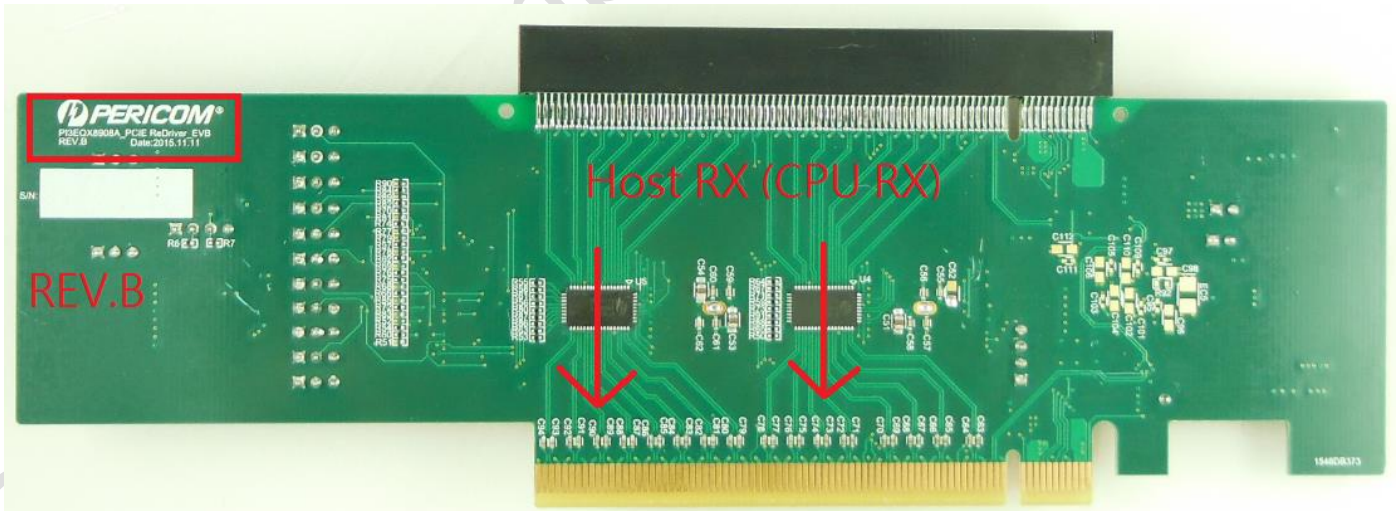


Figure 1(b) Bottom view of PI3EQX8908A PCIe x16 EVB

• **Quick Start — For Pin Strap control:**

To start-up the PI3EQX8908A EVB, complete the following steps:

1. Short **JP1** for power on Vdd=3.3V EVB
2. Check the head pin status setting follow Table 1

Table 1 Header pin is set as defaulted on EVB

DIP Switch #	Header pin #	Pin name for PI3EQX8908A	Default Switch status	Remark
	JP4	ENI2C	Short to GND	(1) Pin strap mode → Short to GND (2) EEPROM Master mode → NC (3) I2C mode → Short to High
	TX_FG0	FGA0/FGB0	Short to Gnd	Flat Gain setting for HOST TX side (Default is 0dB)
	TX_FG1	FGA1/FGB1	Short to Vdd	
	TX_EQ0	EQA0/EQB0	Short to Gnd	Equalizer setting for HOST TX side (Default is 5dB)
	TX_EQ1	EQA1/EQB1	Floating	
	TX_EQ2	EQA2/EQB2	Short to Gnd	
	RX_FG0	FGA0/FGB0	Short to Gnd	Flat Gain setting for HOST RX side (Default is 0dB)
	RX_FG1	FGA1/FGB1	Short to Vdd	
	RX_EQ0	EQA0/EQB0	Short to Gnd	Equalizer setting for HOST RX side (Default is 5dB)
	RX_EQ1	EQA1/EQB1	Floating	
	RX_EQ2	EQA2/EQB2	Short to Gnd	
SW1	SW1-1 SW1-2	RXDET	SW1-1=ON SW1-2=OFF	Receiver Detect Active setting for HOST TX side
	SW1-3 SW1-4	SD_TH	SW1-3=OFF SW1-4=ON	Input Threshold voltage for HOST TX side VTH ON=130mVppd, OFF=30mVppd
	SW1-5 SW1-6	SW0	SW1-5=ON SW1-6=OFF	Output Swing setting for HOST TX side = 1000 mV
	SW1-7 SW1-8	SW1(Change to GND pin)	SW1-7=OFF SW1-8=ON	
SW3	SW3-1 SW3-2	RXDET	SW1-1=ON SW1-2=OFF	Receiver Detect Active setting for HOST RX side
	SW3-3 SW3-4	SD_TH	SW1-3=OFF SW1-4=ON	Input Threshold voltage for HOST RX side VTH ON=130mVppd, OFF=30mVppd
	SW3-5 SW3-6	SW0	SW1-5=ON SW1-6=OFF	Output Swing setting for HOST RX side = 1000 mV
	SW3-7 SW3-8	SW1(Change to GND pin)	SW1-7=OFF SW1-8=ON	

Tips: Base on your input side insertion loss could follow Top side EQ Quick table at the Board.

EQ quick Table

EQ[3-0]	TX_EQ2	TX_EQ1	TX_EQ0	db@4GHz
000	Short	Short	Short	3db
110	Open	Open	Short	9db
11HIZ	Open	Open	HIZ	15db

Equalizer setting:

HIZ for floating pin header

1 for pull high vdd, 0 for pull low ground

Header pin #	Pin name for PI3EQX8908A	Default Switch status	Remark																																																																																																																														
HOST TX side TX_EQ0 TX_EQ1 TX_EQ2	EQA0/1/2 EQB0/1/2 (HOST TX Channel) IC Location: U2 and U3	HOST TX side TX_EQ0= Short to Ground TX_EQ1=NC TX_EQ2= Short to Ground	Table 1. Equalization Setting <table border="1"> <thead> <tr> <th colspan="7">Equalizer setting</th> </tr> <tr> <th>EQ2</th> <th>EQ1</th> <th>EQ0</th> <th>EQ4 bits</th> <th>@1.25 GHz</th> <th>@2.5 GHz</th> <th>@4 GHz</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0000</td><td>0.8</td><td>3.4</td><td>6.3 dB</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0001</td><td>1</td><td>4</td><td>7.3 dB</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>0010</td><td>1.3</td><td>4.6</td><td>8.2 dB</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0011</td><td>1.5</td><td>5.3</td><td>9 dB</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0100</td><td>2.8</td><td>6.2</td><td>9.8 dB</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0101</td><td>3</td><td>6.7</td><td>10.4 dB</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0110</td><td>3.2</td><td>7.2</td><td>11.1 dB</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>0111</td><td>3.5</td><td>7.7</td><td>11.6 dB</td></tr> <tr><td>HIZ</td><td>0</td><td>0</td><td>1000</td><td>4.4</td><td>8.4</td><td>12.2 dB</td></tr> <tr><td>HIZ</td><td>0</td><td>1</td><td>1001</td><td>4.6</td><td>8.8</td><td>12.7 dB</td></tr> <tr><td>HIZ</td><td>1</td><td>0</td><td>1010</td><td>4.8</td><td>9.2</td><td>13.1 dB</td></tr> <tr><td>HIZ</td><td>1</td><td>1</td><td>1011</td><td>5</td><td>9.5</td><td>13.5 dB</td></tr> <tr><td>0</td><td>0</td><td>HIZ</td><td>1100</td><td>6</td><td>10.3</td><td>14 dB</td></tr> <tr><td>0</td><td>1</td><td>HIZ</td><td>1101</td><td>6.2</td><td>10.6</td><td>14.4 dB</td></tr> <tr><td>1</td><td>0</td><td>HIZ</td><td>1110</td><td>6.4</td><td>10.9</td><td>14.7 dB</td></tr> <tr><td>1</td><td>1</td><td>HIZ</td><td>1111</td><td>6.6</td><td>11.2</td><td>15 dB</td></tr> </tbody> </table>	Equalizer setting							EQ2	EQ1	EQ0	EQ4 bits	@1.25 GHz	@2.5 GHz	@4 GHz	0	0	0	0000	0.8	3.4	6.3 dB	0	0	1	0001	1	4	7.3 dB	0	1	0	0010	1.3	4.6	8.2 dB	0	1	1	0011	1.5	5.3	9 dB	1	0	0	0100	2.8	6.2	9.8 dB	1	0	1	0101	3	6.7	10.4 dB	1	1	0	0110	3.2	7.2	11.1 dB	1	1	1	0111	3.5	7.7	11.6 dB	HIZ	0	0	1000	4.4	8.4	12.2 dB	HIZ	0	1	1001	4.6	8.8	12.7 dB	HIZ	1	0	1010	4.8	9.2	13.1 dB	HIZ	1	1	1011	5	9.5	13.5 dB	0	0	HIZ	1100	6	10.3	14 dB	0	1	HIZ	1101	6.2	10.6	14.4 dB	1	0	HIZ	1110	6.4	10.9	14.7 dB	1	1	HIZ	1111	6.6	11.2	15 dB
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Flat Gain setting:

1 for pull high vdd, 0 for pull low ground

Header pin #	Pin name for PI3EQX8908A	Default Switch status	Remark															
HOST TX side TX_FG0 TX_FG1	FGA0/1 FGB0/1 (Host TX) IC Location: U2 and U3	HOST TX side TX_FG0= Short to ground TX_FG1=Short to Vdd	<table border="1"> <thead> <tr> <th>FGA1 FGB1</th> <th>FGA0 FGB0</th> <th>(dB)</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>-4</td></tr> <tr><td>0</td><td>1</td><td>-2</td></tr> <tr><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>2</td></tr> </tbody> </table>	FGA1 FGB1	FGA0 FGB0	(dB)	0	0	-4	0	1	-2	1	0	0	1	1	2
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HOST RX side RX_FG0 RX_FG1	FGA0/1 FGB0/1 (Host RX) IC Location: U4 and U5	HOST RX side TX_FG0= Short to ground TX_FG1=Short to Vdd																

Output swing setting:

Header pin # (DIP SWITCH)	Pin name for PI3EQX8908A	Default Switch status	Remark															
HOST TX side SW1-5 SW1-6	SW0 (Host TX) IC Location: U2 and U3	HOST TX side SW1-5=ON SW1-6=OFF	Table 3. Output Swing Setting <table border="1"> <thead> <tr> <th></th> <th>SW0</th> <th>mVp-p</th> </tr> </thead> <tbody> <tr><td></td><td>0</td><td>900</td></tr> <tr><td></td><td>1</td><td>1,000</td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </tbody> </table>		SW0	mVp-p		0	900		1	1,000						
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Example

How to setting the DIP Switch for output swing setting?

DIP Switch

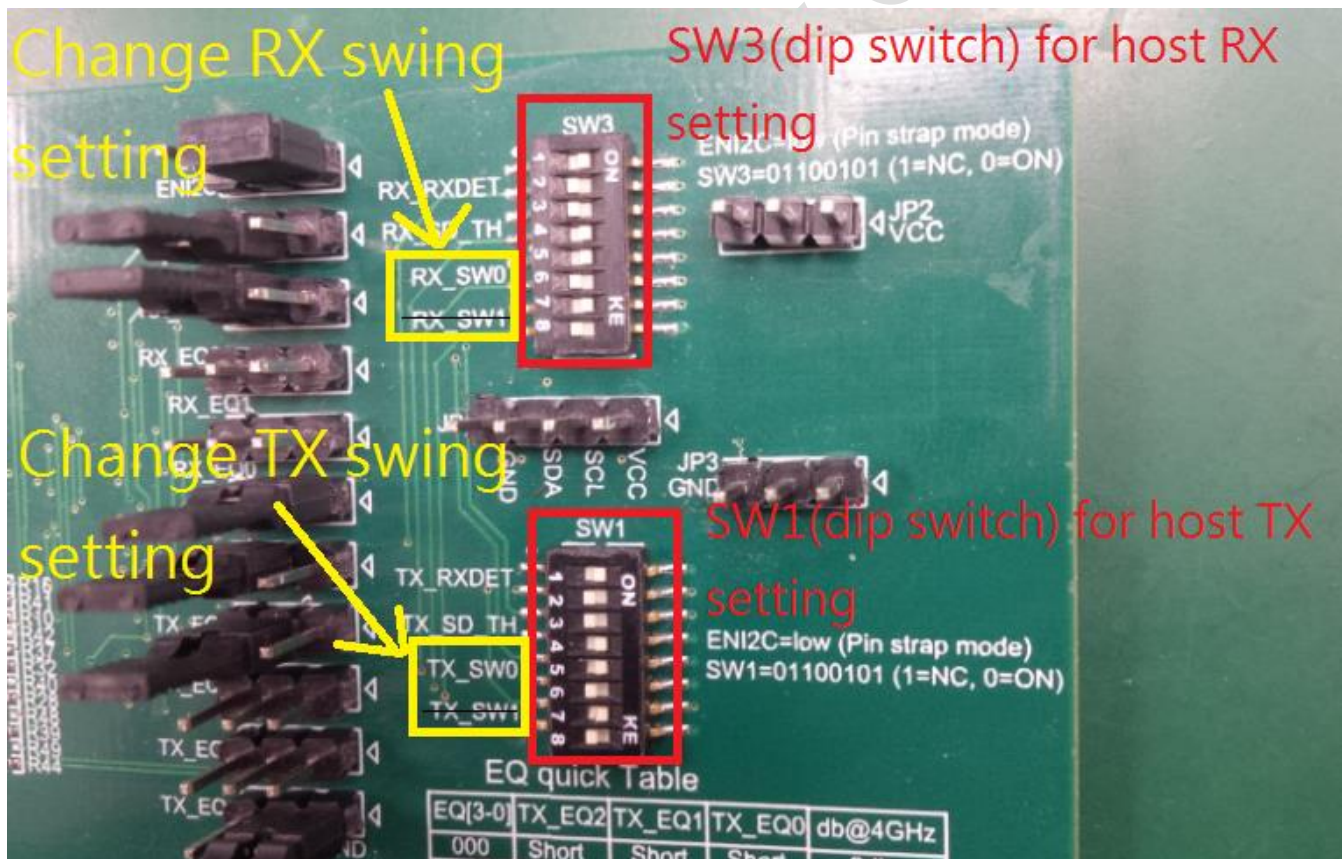
SW1 for **Host Channel TX** SW1-5/SW1-6/SW1-7/SW1-8 for output swing voltage

1	2	3	4	5	6	7	8	Function
ON	OFF	OFF	ON	ON	OFF	OFF	ON	Tx Vswing = 1000mV
ON	OFF	OFF	ON	OFF	ON	OFF	ON	Tx Vswing = 900 mV

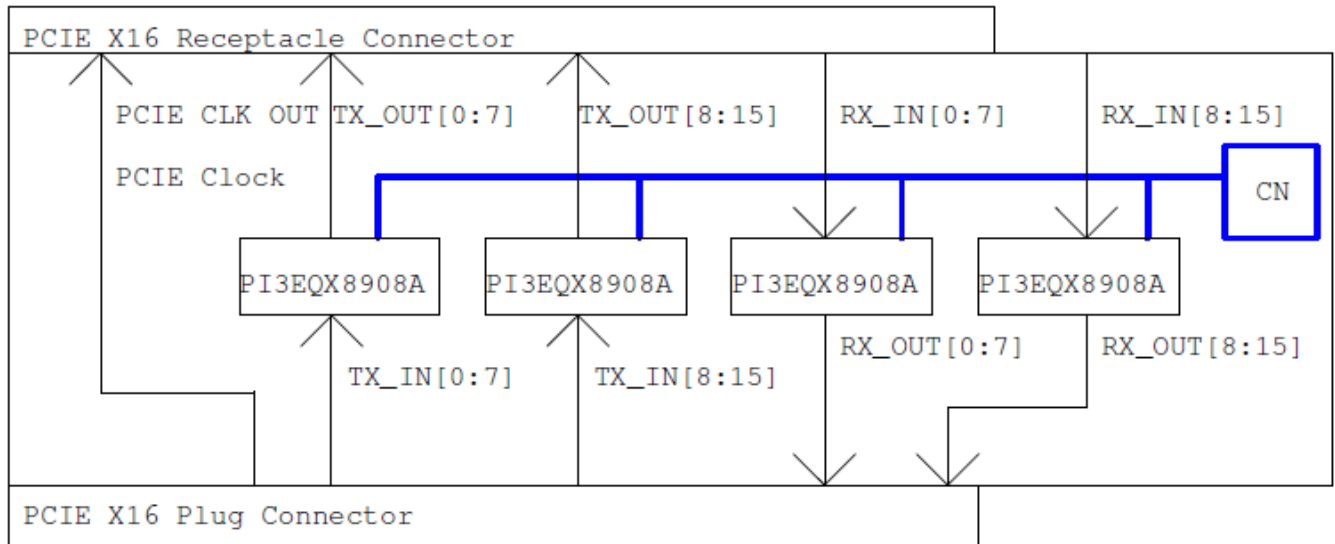
DIP Switch

SW3 for **Host Channel RX** SW3-5/SW3-6/SW3-7/SW3-8 for output swing voltage

1	2	3	4	5	6	7	8	Function
ON	OFF	OFF	ON	ON	OFF	OFF	ON	Tx Vswing = 1000mV
ON	OFF	OFF	ON	OFF	ON	OFF	ON	Tx Vswing = 900 mV



PI3EQX8908A EVB Schematic



PI3EQX8908A:PCIE Gen1/2/3 Linear Redriver

CN:Control Redriver EQ,FG,SW,VTh DIP Switch and Pin Header.

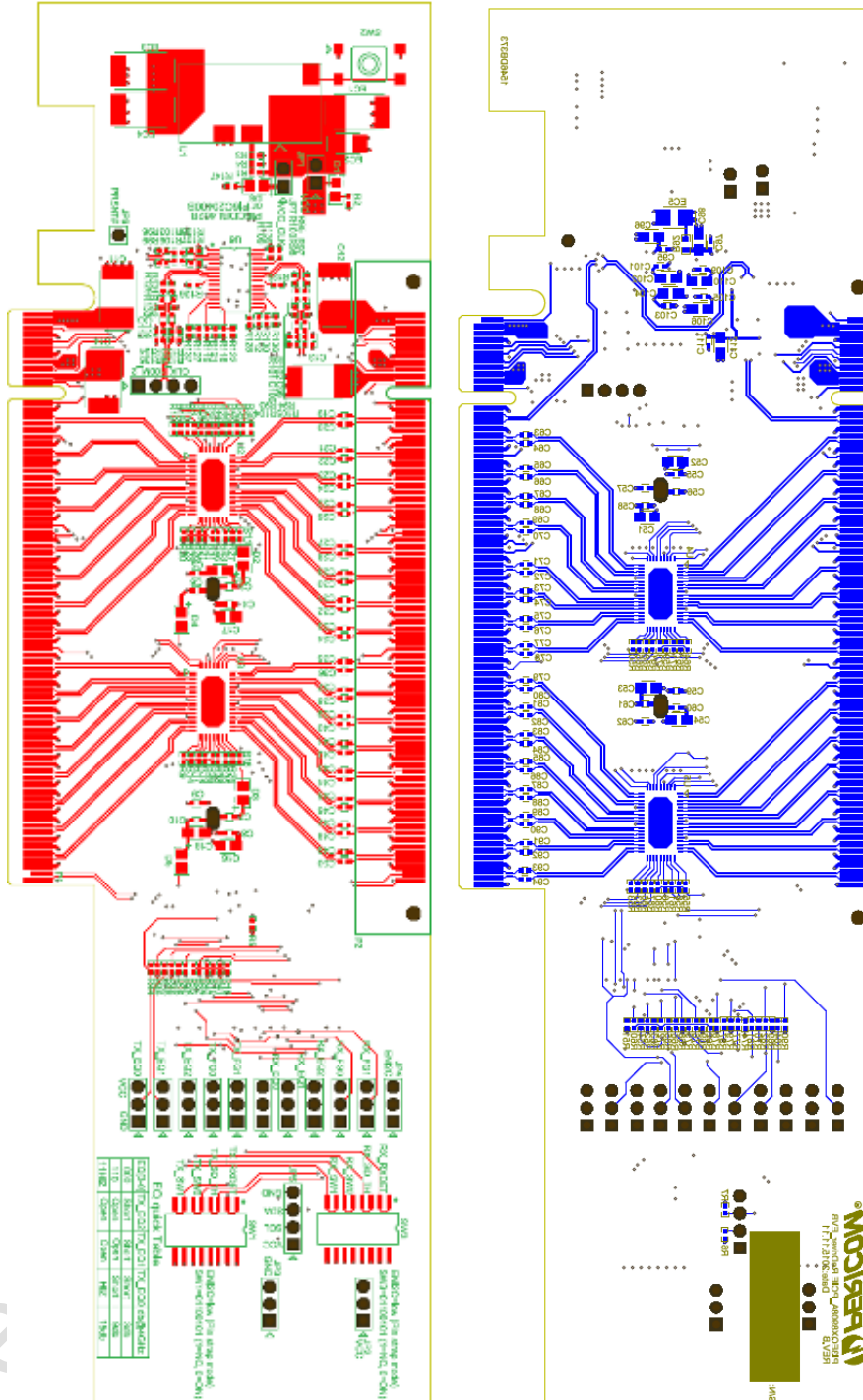
Please see attach file for PI3EQX8908A X16 Rev.B EVB Board schemaitc.



PI3EQX8908A_PCI
E_REDRIVER_EVB_

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PI3EQX8908A EVB Layout



Top/Bottom Side PI3EQX8908A X16 EVB Board Layout

