

**Signal Integrity Solutions from Pericom**



Poor signal quality can significantly impact system performance and reliability. Maintaining eye-pattern signal integrity at the receiver end-points in high-speed, serial-differential protocols, like PCI Express, SATA2 or USB 3.0, is a big challenge for system designers. At high transmission rates, signal integrity issues become increasingly restrictive on the length of PCB trace (or cable length), reducing flexibility and feature implementation. Pericom’s ReDriver™ signal conditioning products\* correct for signal level attenuation and noise (jitter) using equalization, pre-emphasis/de-emphasis techniques for low bit error rates with high-speed signal protocols including PCI Express®, USB, SATA/SAS standards. Pericom also offers many digital video switches that have proprietary technology for superior signal integrity.

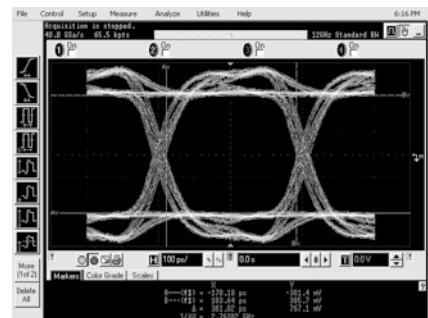
**ReDriver™ Product Features:**

- Protocol support for PCI Express®, SATA 3Gbps, SAS, USB 3.0
- Data rates of 2.5Gbps (PCIe), 3.0Gbps (SATA 3Gbps, SAS), 5.0Gbps (USB 3.0), 8.0Gbps (PCIe 3.0)
- Pin configured receiver equalization for each lane
- Pin configured transmitter de-emphasis & amplitude for each lane
- Input signal level detect & output squelch on all channels
- Electrical idle and OOB support
- Spread spectrum reference clock buffers available for signal conditioning
- 100-Ω differential CML I/O’s
- Low Power (100mW per channel)
- Standby mode – power down state
- Wide variety of package/feature options

High-speed Differential Signal Degradation



**Receiver input before ReDriver**

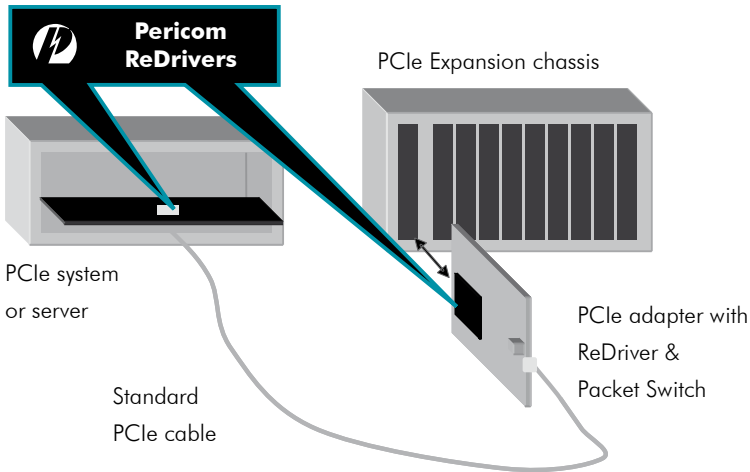


**After ReDriver eye is open**

**PCI Express® ReDriver Applications**

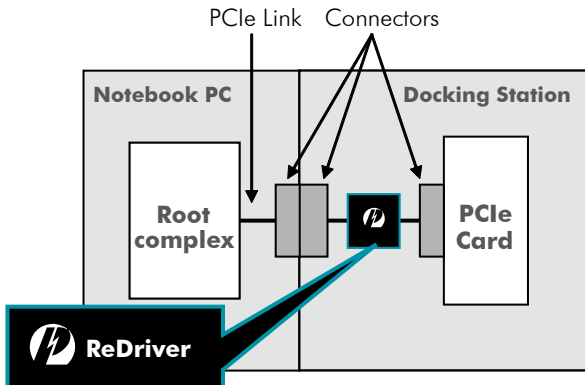


**PCIe Cable Extension:**



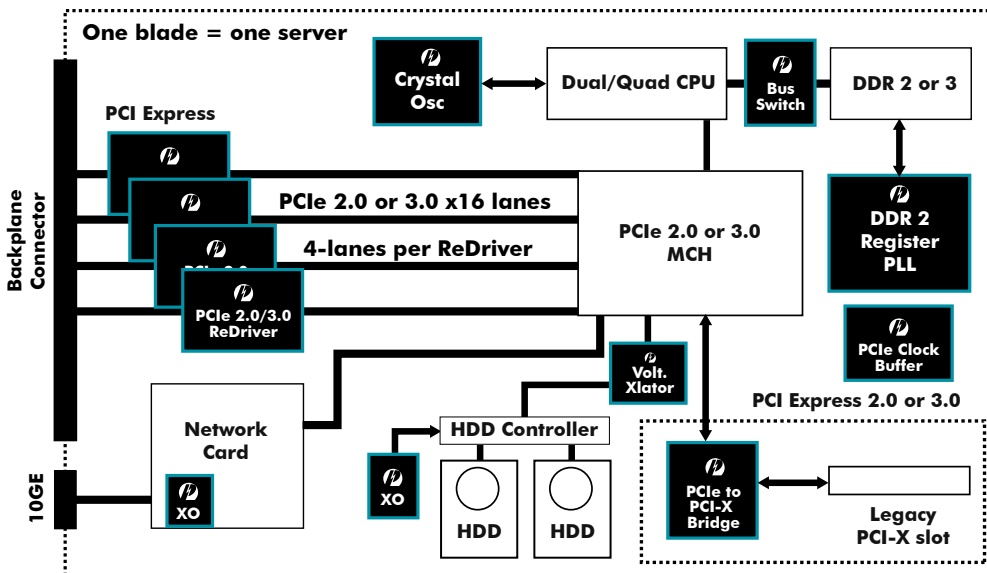
Cabled PCI Express® is widely used in servers for both internal and chassis-to-chassis connections, in consumer PCs and media systems, for instrumentation, medical equipment, video systems, industrial equipment, etc. Because of the PCIe Cable specification, PCIe direct-attached peripherals are certain to become a high-growth market segment.

**Notebook Docking:**



Signal conditioner assures signal integrity across multiple connectors and varying generations of hardware

**Blade/Rack Server:**



## PCIe ReDriver™ Signal Integrity Solutions



### PCI Express ReDriver

- 2.5 Gbps x1-lane and x2-lane serial PCI Express 1.0 signal conditioners
- 5.0 Gbps x4-lane PCIe 2.0 signal conditioners
- 8.0 Gbps for PCIe 3.0 - Contact Pericom Product Marketing for additional information

### PCI Express® ReDriver™

Part No.	Description	PCIe Rev	Data Rate Gbps	Channels	Input Equalization Options, dB	Output Level Options	Output Swing, mV Max	Output Emphasis, dB	Package
PI2EQX4401D	1-lane PCIe ReDriver with equalization and de-emphasis	PCIe 1.0	2.5	2	0, 2.5, 4.5, 6.5	1.0x, 1.2x	1300	0, -3.5	36-TQFN (ZF36)
PI2EQX4402D	2-lane PCIe ReDriver with equalization and de-emphasis	PCIe 1.0	2.5	4	0, 1.5, 2.5, 3.5, 4.5, 5.5, 6.5, 7.5	0.8x, 1.0x, 1.2x, 1.4x	1600	0, -2.5, -3.5, -4.5	84-LFBGA (NB84)
PI2EQX4432D	2-lane PCIe ReDriver/ equalizer with flow-through pinout	PCIe 1.0	2.5	4	2.5, 6.5	1.0x, 1.2x	1300	0, -3.5	48-TQFN (ZD48)
PI2EQX5804D	5.0Gbps 4-lane PCIe 2.0 ReDriver	PCIe 2.0	5.0	8	1.2, 1.5, 2.6, 4.3, 5.8, 7.1, 9.0, 12.3	0.5, 0.7, 0.9, 1.0	1000	0, -2.5, -3.5, -4.5, -5.5, -6.5, -7.5, 8.5	100-LBGA (NJ100)
PI2EQX5864D	5.0Gbps 4-lane PCIe 2.0 ReDriver with I2C control	PCIe 2.0	5.0	8	1.2, 1.5, 2.6, 4.3, 5.8, 7.1, 9.0, 12.3	0.5, 0.7, 0.9, 1.0	1000	0, -2.5, -3.5, -4.5, -5.5, -6.5, -7.5, 8.5	56-TQFN (ZF56)
PI3EQX5701	5.0Gbps 1-lane PCIe 2.0 ReDriver w/ Equalization & Emphasis	PCIe 2.0	5.0	2	5, 11	1.0x	1000	0, -3.5	20-TQFN (ZD20)
PI3EQX8804	4-lane PCIe 3.0 ReDriver w/ Equalization & Emphasis	PCIe 3.0	8.0	Contact Pericom for more info					
PI3EQX8864	4-lane PCIe 3.0 ReDriver w/ Equalization & Emphasis	PCIe 3.0	8.0	Contact Pericom for more info					

Note  
 $V_{DD} = 1.8V$  for most ReDriver parts listed except for \*\* ( $V_{DD} = 1.2V$ )

**PCI Express ReDriver Eval Boards**



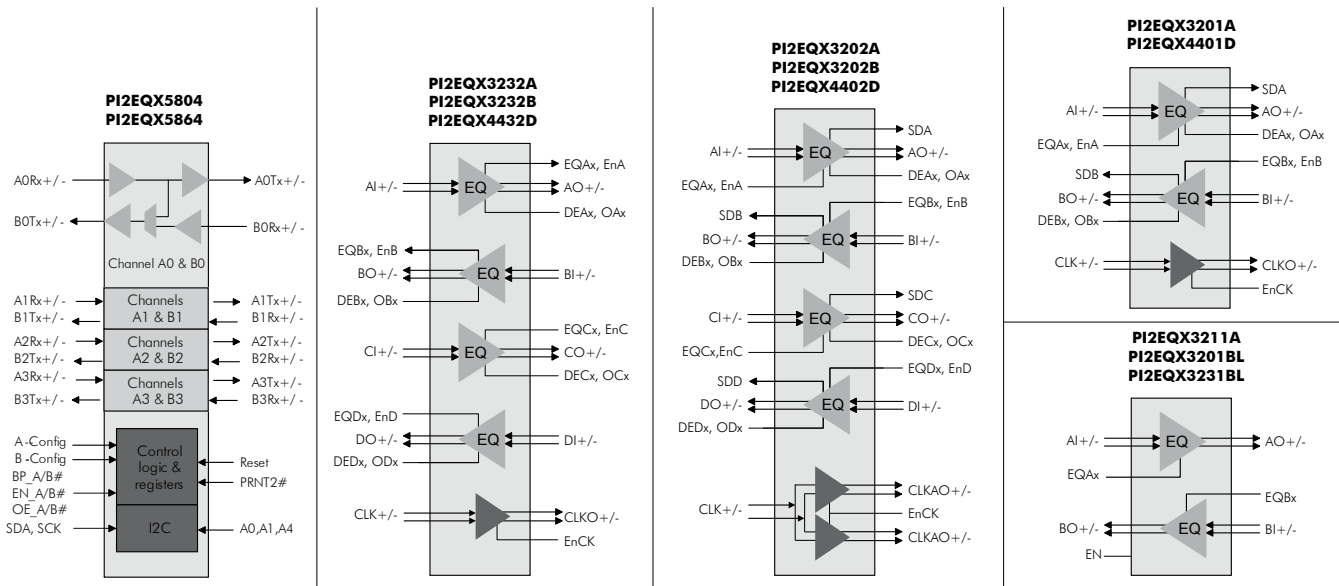
**PCI Express® ReDriver Evaluation Boards**

Part No. <sup>(1)</sup>	Description	Lanes	Data Rate Gbps	Configuration	Voltage <sup>(2)</sup>
PI2EQX4401D-EVBx	PCI Express ReDriver Eval Board	1	2.5	1:1 PCIe pass-through, plugs into 1-lane PCIe slot, and accepts 1-lane PCIe adapter card (Ethernet, SATA, etc.)	1.8

**SATA/SAS ReDriver Evaluation Boards**

Part No. <sup>(1)</sup>	Description	Ports	Data Rate Gbps	Configuration <sup>(3)</sup>	Voltage <sup>(4)</sup>
PI2EQX3202A-EVBx	SAS / SATAx ReDriver Eval Board	2	3	2:2 pass-through via cable, 2-channels with minimum trace, 2-channels with 48" trace (total)	1.8
PI2EQX3202B-EVBx	SATA i/m ReDriver Eval Board	2	3	2:2 pass-through via cable, 2-channels with minimum trace, 2-channels with 24" trace (total)	1.8

1. Contact Pericom Sales for the exact Evaluation Board part number, and for the correct product for your application since multiple versions may exist
2. Power is supplied via the host connector
3. Cables not supplied
4. Power must be provided to on board regulator



**ReDriver SAS/SATA2/XAUI Products**



**SAS/SATA2/XAUI ReDriver™**

Part No.	Description	Protocol	Data Rate Gbps	Input Eqx Options, dB	Output Level Options	Output Swing, mV max	Output Emphasis, dB	Package
PI3EQX4951B	3.3V, 1-port with equalization and OOB	SATA2 i/m	3.0	0, 2.5	1.0x	650	Variable: 0, -6.5	20-TQFN (ZD20)
PI3EQX3811C	3.3V, 1-port with equalization control	SATA2 i/m	3.0	3.5	1.0x	650	0, -3.5	20-SSOP (H20)
PI2EQX3231BL	1-port ReDriver	SATA2 i/m	3.0	1.5, 5.5	1.0x	600	0, -3.5	20-TQFN (ZH20)
PI2EQX3202B	2-port with equalization and OOB	SATA2 i/m	3.0	0, 1.5, 2.5, 3.5, 4.5, 5.5, 6.5, 7.5	0.8x, 1.0x, 1.2x, 1.4x	1000	0, -2.5, -3.5, -4.5	84-LFBGA (NB84)
PI2EQX3211B	1-port equalizer with flow-through pinout	SATA2 i/m	3.0	2.5, 6.5	1x	700	0	20-SSOP (H20)
PI2EQX3232B	2-port equalizer with flow-through pinout	SATA2 i/m	3.0	3.5, 7.5	1.0x, 1.2x	800	0, -3.5	48-TQFN (ZD48)
PI2EQX3421	1:2 port switch	SATA2, SAS, XAUI	3.2	1.5, 5.5	dual-mode	750/1300	0	28-TQFN (ZH28)
PI2EQX3431	1-port with equalizer	SATA2, SAS, XAUI	3.2	1.5, 5.5	dual-mode	750/1300	0	20-TQFN (ZH20)
PI2EQX6804-A*	6.5Gbps 4-port with equalization, Emphasis & OOB	SAS, SATA, XAUI	6.5	1.2, 1.5, 2.6, 4.3, 5.8, 7.1, 9.0, 12.3	0.5, 0.7, 0.9, 1.0	1000	0, 2.5, 3.5, 4.5, 5.5, 6.5, 7.5, 8.5	100-LBGA (NJ100)
PI2EQX6864**	6.5Gbps 4-port SAS2/SATA/XAUI ReDriver with I2C Control	SAS2, SATA, XAUI	6.5	1.2, 1.5, 2.6, 4.3, 5.8, 7.1, 9.0, 12.3	0.5, 0.7, 0.9, 1.0	1000	0, 2.5, 3.5, 4.5, 5.5, 6.5, 7.5, 8.5	56-TQFN (ZF56)
PI2EQX6701	6.5Gbps 1-port with emphasis & equalizer, OOB	SAS2, SATA3i/m, XAUI						20-TQFN (ZH20)
PI2EQX6814	6.5Gbps 4-port with emphasis & equalizer, OOB	SAS2, SATA3i/m, XAUI						100-LBGA (NJ100)
PI2EQX6874	6.5Gbps 4-port with Emphasis & equalizer, OOB with flowthru pinout	SAS2, SATA3i/m, XAUI						56-TQFN (ZF56)

V<sub>DD</sub> = 1.8V for most ReDriver parts listed except for \*\* (V<sub>DD</sub> = 1.2V)  
 SATA2 = SATA 3Gbps

**ReDriver USB 3.0 Products****USB 3.0 ReDriver™ Signal Conditioners**

<b>Part No.</b>	<b>Function</b>	<b>Package</b>
PI3EQX7701	5.0Gbps 1-port USB 3.0 ReDriver with Pin Adjustable Equalization and Emphasis	TQFN (ZD20)
PI3EQX7711	5.0Gbps 1-port USB 3.0 ReDriver with Adaptive Equalization and Emphasis	TQFN (ZD20)
PI3EQX7702	5.0Gbps 2-port USB 3.0 ReDriver with Adjustable Equalization and Emphasis	TQFN (ZH42)
PI3EQX7712	5.0Gbps 2-port USB 3.0 ReDriver with Adaptive Equalization	TQFN (ZH42)

## Signal Integrity for Digital Video

### Digital Video Switches for Signal Integrity

Part Number	Description	Configuration	Package
PI3HDMI101	HDMI/DVI buffer + I2C buffer for source applications	4-differential channel 1:1 with DDC 1:1 path	TQFN (ZH42)
PI3HDMI101-A	HDMI/DVI buffer + I2C buffer w/ Rx Term support for receiver applications	4-differential channel 1:1 with DDC 1:1 path	TQFN (ZH42)
PI3HDMI101-B	HDMI/DVI buffer + I2C buffer w/ auto-Rx Term support for receiver applications	4-differential channel 1:1 with DDC 1:1 path	TQFN (ZH42)
PI3HDMI201	2:1 HDMI/DVI switch with ActiveEye™	4-differential channel 2:1 + DDC/HPD 2:1	TQFN (ZF56)
PI3HDMI231-A	3:1 HDMI/DVI switch with ActiveEye™ and squelch	4-differential channel 3:1 + DDC/HPD 3:1	TQFN (ZF56)
PI3HDMI221-A	HDMI revision 1.3 switch with dual SEL for source applications	4-differential channel 2:1	TQFN (ZF56)
PI3HDMI415	1:2 Active DisplayPort and HDMI Demultiplexer for source w/ equalization, pre-emphasis, de-emphasis with 8KV ESD, 2.5Gbps with HDMI Deep Color support	4-differential channel 1:2	TQFN (ZD48)
PI3HDMI412AD	1:2 Active HDMI Switch for Source w/ Equalization, Pre-emphasis, and De-emphasis with 10KV ESD, Operating up to 2.5Gbps	Mux: 4 differential channel, 1:2	TQFN (ZB56)
PI3HDMI245-A	4:1 HDMI Switch with ActiveEye™	4-differential 3:1 + 3 Side Band	TQFN (ZL72)
PI3VDP411LSA	Dual Mode DisplayPort to DVI/HDMI Translator with DDC buffer & Output Squelch	4-differential channel 1:1 with DDC/HPD 1:1 path	TQFN (ZB48)
PI3VDP411LSR	Dual Mode DisplayPort to DVI/HDMI Translator	44-differential channel 1:1 with DDC/HPD	TQFN (ZD48)

**Signal Integrity Decision Tree**

