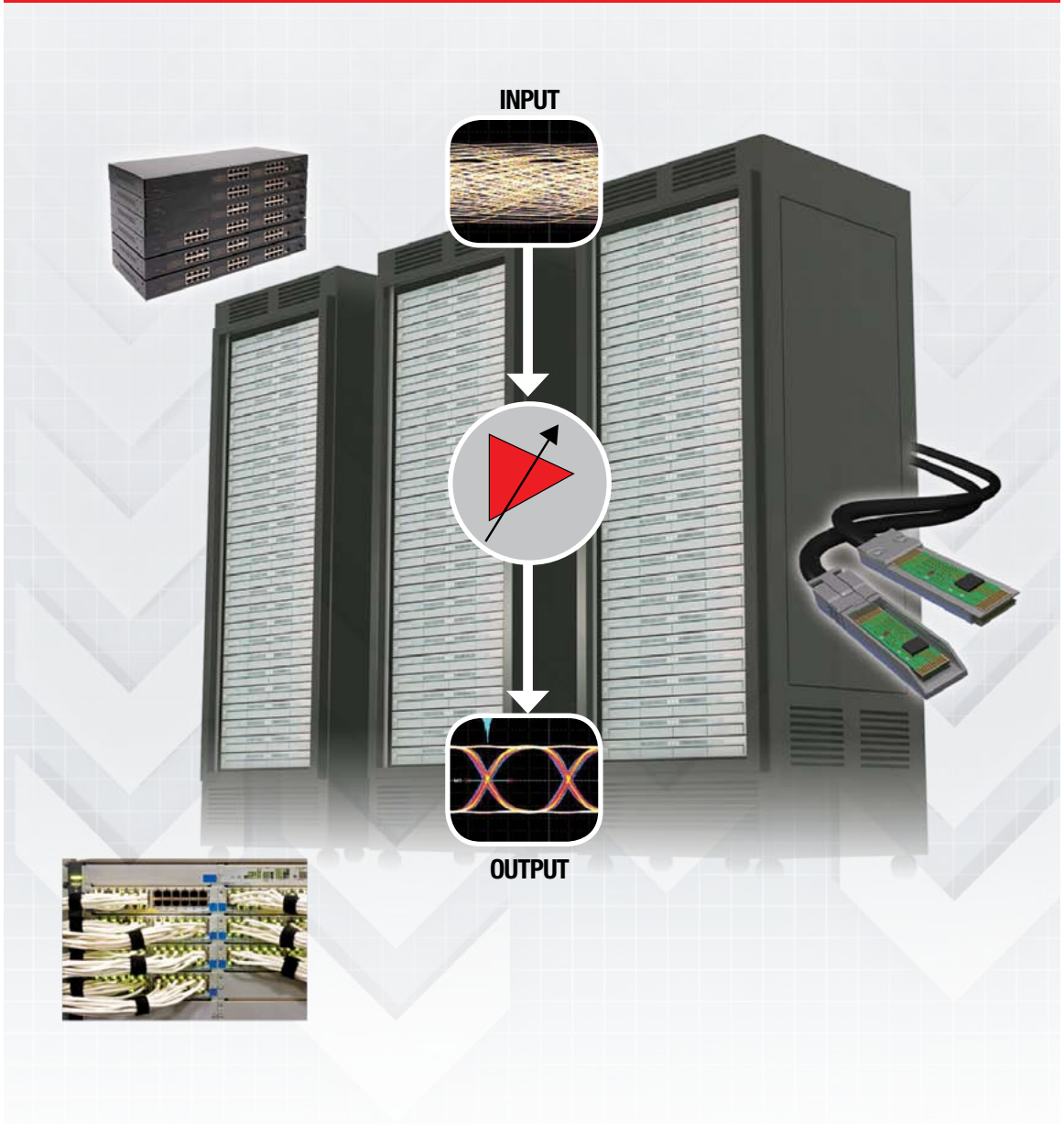


Twice the Reach, Half the Power

High-Speed Signal Conditioning Solutions
Infrastructure and Enterprise Applications



Advanced Signal Conditioning Made Easy

Combining cutting edge silicon process technology with advanced analog circuit design, TI offers the industry's highest signal conditioning performance at the lowest power consumption in a comprehensive portfolio of easy-to-use products.



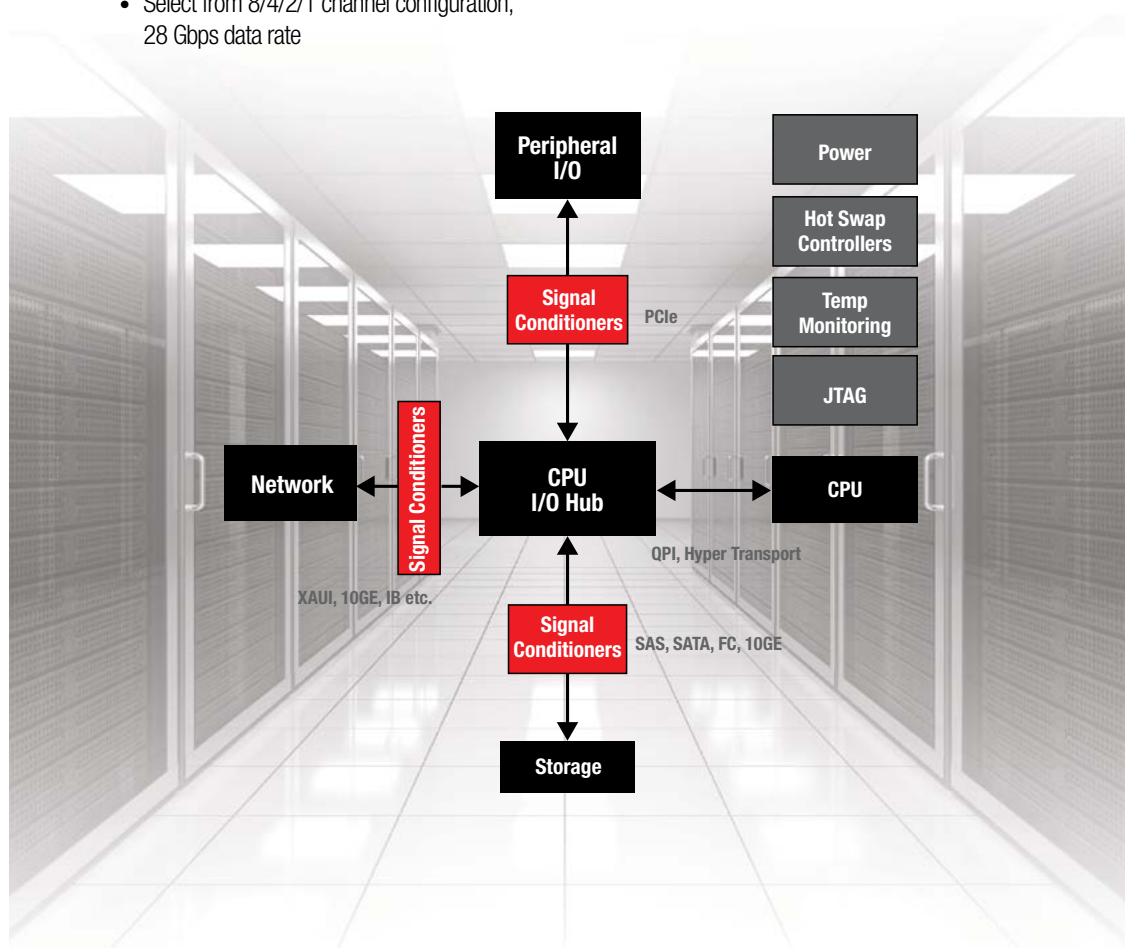
Industry's Best Analog Performance and Power Consumption

- Powered by BiCMOS SiGe process: 4x gain compared to CMOS
- 36 dB equalization at 5 GHz: up to 2x higher than competition
- 5 mW/Gbps power consumption: up to 2x lower than competition
- Less than 0.3UI residual jitter at 10 Gbps
- Select from 8/4/2/1 channel configuration, 28 Gbps data rate



Significantly Reduced System Design Complexity and BOM Cost

- Fully adaptive equalization
- No external reference clock needed
- Built-in eye monitor and PRBS generator
- Single power supply with integrated noise rejection filter
- Pin-compatible retimers and repeaters



Doubling Speed Increases Signal Integrity Challenges

Server and Storage Solutions

The explosion of multimedia content on the Internet, cloud computing, and the advent of multi-core virtualized servers is pushing interface bandwidth requirements in modern data center server and storage systems. Though the interface I/O speeds are doubling, interconnect length remains the same, which poses power and signal integrity issues.

Building on a foundation of low-power BiCMOS process technology, TI's signal conditioning repeaters for PCIe, SAS, SATA, InfiniBand, USB, 10/40/100G Ethernet, 10G-KR (802.3 ap) extend the reach of high-speed serial signals to 50" FR-4 or 20m cable and deliver the industry's lowest power-to-data rate ratio — 5 mW/Gbps compared to typical solutions at 10 mW/Gbps. System-aware features like SAS/SATA out-of-band (OOB) signal detection and rate adaptive signal conditioning for PCIe enable complex heterogeneous interconnects with guaranteed system interoperability.

Router and Switching Solutions

As transmission rates increase from 10 Gbps to 100 Gbps, signal integrity requirements become more stringent for interconnects in chip-to-chip, chip-to-module, and backplane applications in datacom and telecom routers. The integration of Ser/Des (PHY) function into switching ASICs and shrinking CMOS transistor geometry further compounds the problem by increasing jitter and lowering output signal amplitude.

Ti's comprehensive portfolio of retimers with referenceless clock data recovery (CDR) and adaptive decision feedback equalizer (DFE) deliver the industry's highest analog performance and lowest power consumption of 145 mW/channel to drive high speed protocols such as 10/40/100G Ethernet, InfiniBand, Fibre Channel, and SDH/SONET. Integrated features like adaptive equalization, on-chip eye monitor, test pattern generator, and direct-EEPROM load of configuration data reduce design time and system complexity.


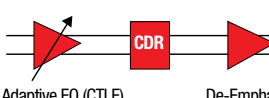
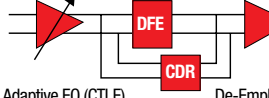
Cabling Solutions

Signal conditioners embedded inside the active copper cable assemblies ensure rack-to-rack connectivity, reduce system power consumption, and lower interconnect cost up to 50% compared to optical alternatives. By using TI's active copper technology, system installers can support up to 20 m cable reach at 10 Gbps while requiring very little power — just 55 mW per channel — performance that is 2x better than other available solutions.

Designed to support multiple standards, TI's comprehensive portfolio of signal conditioners address SFP+, QSFP, CXP, mini-SAS HD, and other common connector form factors.

Extend Signal Reach, Reduce Interconnect Cost

Application-Specific Signal Conditioners

	Repeaters	Retimers	Advanced Retimers
	Pin-Compatible		
			
Insertion Loss	✓	✓	✓
Jitter		✓	✓
Crosstalk			✓
Applications	Active Cables, Backplane	Front Port, Optical	Front Port, Backplane
Products	DSxxxBRxxx	DSxxxRTxxx	DSxxxDFxxx

Comprehensive Product Family with Easy Upgrade Options

Mux /Crosspoint	<div>PCIe Gen-1/2/3 2:1 Mux Buffer</div>	<div>SAS I/II 2:1 Mux Buffer 2/4 Lanes</div>	<div>10G-KR 2:1 Mux Buffer 2/4 Lanes</div>	<div>2/4/8/10/16G FC 2:1 Mux Buffer 2/4 Lanes</div>	<div>< 15 Gbps 4 Lanes</div>
	<div>PCIe Gen-1 FET Switch</div>	<div>SATA 1.5/3/6G 2:1 Mux Buffer 2/4 Lanes</div>	<div>10GbE 2:1 Mux Buffer 2/4 Lanes</div>	<div>DDR/QDR/FDR IB 2:1 Mux Buffer 2/4 Lanes</div>	<div>< 10 Gbps 2/4 Lanes</div>
Retimer			<div>10GbE 4 Channels</div>	<div>DDR/QDR/FDR IB 4 Channels</div>	<div>< 12.5 Gbps 4 Channels</div>
				<div>2/4/8/10G FC 4 Channels</div>	<div>< 10 Gbps 4 Channels</div>
Repeater/Redriver	<div>PCIe Gen-1/2/3 x1/x4/x8/x16</div>	<div>SAS I/II 1/2/4/8 Channels</div>	<div>10G-KR 2/4/8 Channels</div>	<div>DDR/QDR/FDR IB 2/4/8 Channels</div>	<div>< 15 Gbps 1/2/4/8 Channels</div>
	<div>USB 2.0/3.0 2 Channels</div>	<div>SATA 1.5/3/6G 1/2/4/8 Channels</div>	<div>10GbE 2/4/8 Channels</div>	<div>2/4/8/10/16G FC 2/4/8 Channels</div>	<div>< 10 Gbps 1/2/4/8 Channels</div>
					<div>< 5 Gbps 1/2/4/8 Channels</div>
	PCIe USB	SAS/SATA	10GbE 10G-KR	Fibre-Channel InfiniBand	Other Generic/ Proprietary Protocols

Application-Specific Solutions

Retimers - Solve Signal Reach, Jitter, and Crosstalk Issues

Device	Channels	Protocol	Data Rate (Gbps)	DfE	Input SigCon (dB)	Output SigCon (dB)	Power/Ch (mW)	Package
DS125DF410	4	Multi-protocol	9.8 to 12.5*	5-Tap	36	−12	175	QFN-48
DS125RT410	4	Multi-protocol	9.8 to 12.5*	—	36	−12	145	QFN-48
DS110DF410	4	Multi-protocol	8.5 to 11.3*	5-Tap	36	−12	175	QFN-48
DS110RT410	4	Multi-protocol	8.5 to 11.3*	—	36	−12	145	QFN-48
DS100DF410	4	Multi-protocol	1.25 and 10.3	5-Tap	36	−12	175	QFN-48
DS100RT410	4	Multi-protocol	1.25 and 10.3	—	36	−12	145	QFN-48

* Legacy rates (divide-by-2/4/8) supported

Repeaters/Redrivers - Solve Signal Reach Issues

Device	Channels	Protocol	Max Data (Gbps)	Input SigCon (dB)	Output SigCon (dB)	Power/Ch (mW)	Package
DS100KR401	8*	Multi-protocol***	10.3	36	−12	65	QFN-54
DS100KR800	8	Multi-protocol***	10.3	36	−12	65	QFN-54
DS100BR410	4	Multi-protocol**	10.3	36	−9	55	QFN-48
DS100BR111	2*	Multi-protocol**,***	10.3	36	−12	65	QFN-24
DS100BR210	2	Multi-protocol**,***	10.3	36	−12	65	QFN-24
DS80PCI402	8*	PCIe Gen-1/2/3	8	36	−12	65	QFN-54
DS80PCI800	8	PCIe Gen-1/2/3	8	36	−12	65	QFN-54
DS80PCI102	2*	PCIe Gen-1/2/3	8	36	−12	65	QFN-24
DS50PCI402	8*	PCIe Gen-1/2	5	26	−12	95	QFN-54
SN65LVPE501	2*	PCIe Gen-1/2	5	15	−9	165	QFN-24
DS64BR401	8*	Multi-protocol*	6.4	33	−12	95	QFN-54
SN75LVCP600S	1	Multi-protocol**	6	15	−1.5	106	QFN-10
SN75LVCP601	2*	Multi-protocol**	6	14	−7	110	QFN-20
SN65LVPE502CP	2*	USB 3.0	5	15	−7	165	QFN-24
DS42BR400	8*	Multi-protocol	4.2	5	−9	163	QFN-60
DS25BR440	4	Multi-protocol	3.125	5	6	134	QFN-40
DS25BR100	1	Multi-protocol	3.125	8	6	115	QFN-8

* Bidirectional channel ** Includes SAS/SATA OOB support *** Includes support for 10G-KR link training support

Switches and Muxes - Distribute Signals

Device	Protocol	Switch/Mux	Max Data (Gbps)	Input SigCon (dB)	Output SigCon (dB)	Total Power (mW)	Package
SN65LVCP114	Multi-protocol**	x4 (2:1/1:2)	14.2	EQ	De-E	1400	BGA-167
DS100MB203	Multi-protocol**	x2 (2:1/1:2)	10.3	EQ	De-E	390	QFN-54
DS64MB201	Multi-protocol*	x2 (2:1/1:2)	6.4	EQ	De-E	800	QFN-54
DS42MB200	Multi-protocol	x2 (2:1/1:2)	4.25	EQ	Pre-E	1000	QFN-48
DS42MB100	Multi-protocol	x1 (2:1/1:2)	4.25	EQ	Pre-E	450	QFN-36
SN65LVCP408	Multi-protocol	8 x 8	4.25	EQ	Pre-E	1452	HTQFP-64
SN65LVCP404	Multi-protocol	4 x 4	4.25	EQ	Pre-E	726	VQFN-48
DS25CP104A	Multi-protocol	4 x 4	3.125	EQ	Pre-E	518	QFN-40
DS25CP102	Multi-protocol	2 x 2	3.125	EQ	Pre-E	254	QFN-16

* Includes SAS/SATA OOB support ** Includes support for 10G-KR link training and SAS/SATA OOB support

New products are listed in **bold red**.

Design Resources and References



E2E Interface Forum

www.ti.com/e2einterface

Get more information on the high-speed signal conditioning family of products at www.ti.com/sigcon

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- Compare products
- Find companion products
- Find design and product support tools
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