

ExaMAX® 56Gb/s High Speed Orthogonal Connector System

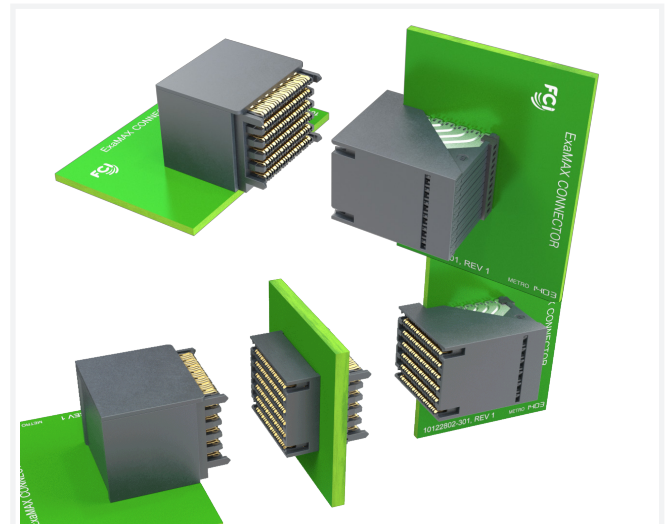
ExaMAX® high speed orthogonal connector system is designed to enable superior 56Gb/s electrical performance for increasing bandwidth requirements and the data rates used for high speed signaling.

To further expand the range of applications supported by the ExaMAX® connector system, Amphenol has added a 6-Pair Orthogonal right angle header connector solution. The connectors enable efficient implementation of Direct-Mate orthogonal and midplane orthogonal architectures.

Orthogonal architecture solutions eliminate long, complex traces, via stub effects, simplify signal links and reduce backplane layer count.

Amphenol Direct-Mate orthogonal connector system maximizes chassis cooling and airflow while improving signal integrity performance at a reduced cost. The mechanically robust connector design supports chassis alignment in a 25mm card slot configuration. The flexible connector design also enables designers to allocate rows to high speed signal, low speed signal, or integrated power.

The ExaMAX® high speed connector system is offered in industry standard packaging options including a broad range of backplane, coplanar, mezzanine, cable-to-board, orthogonal midplane and orthogonal direct configurations.



TARGET MARKETS



FEATURES

- Capable of supporting data rates of 25Gb/s with scalable migration path to 56Gb/s
- Unique beam-on-beam interface and skew equalized leadframes
- Hermaphroditic mating interface protects mating beams
- Simple efficient 92 Ω design
- 2.0mm pitch delivers 76 pair per inch density
- Modular, 2mm hard metric connector block design
- 0.36mm PTH for signals and 0.5mm for grounds
- Additional Signal Pin per IMLA
- Integrated guidance

BENEFITS

- Supports future system performance upgrades while eliminating costly redesign burden
- Superior signal integrity performance via impedance control, low cross-talk while eliminating insertion loss resonances. Mating forces reduced by 40% compared to traditional blade and beam designs
- Durable, reliable mating interface design. Eliminates crushed pins
- Supports both 85 and 100 Ω applications
- Industry leading density performance
- Modular design capability supports applications requiring high and low speeds, power, and mechanical guidance at lowest industry costs
- Friendly to PCB manufacturers, improving cost and yield
- Integrate High and low speed signals in the same connector
- Superior mating performance

TECHNICAL INFORMATION

MATERIAL

- Contacts: High performance copper alloy
- Plating(s): Performance-based plating at separable interface (Telcordia GR-1217-CORE) Tin over nickel on press-fit tails
- Housings: High temperature thermoplastic, UL 94 V-0

MECHANICAL PERFORMANCE

- Long mating wipe of > 2mm
- X capture: ±1.2mm
- Y capture: ±1mm
- Mating Force: 0.45N max. per contact
- Unmating Force: 0.10N min. per contact

ELECTRICAL PERFORMANCE

- Contact Resistance: <10mΩ change from initial reading after environmental exposure
- Current Rating (with 30° C T-rise above ambient)
 - Signal contact: 0.5A/Contact (both signal and ground contacts can carry current)

ENVIRONMENTAL

- Telcordia GR-1217-CORE Central Office qualification completed
- Operating Temperature Range: -55°C to +85°C

SPECIFICATION

- Amphenol Product Specification: GS-12-1096
- Amphenol Application Specification: GS-20-0361

INDUSTRY SPECIFICATIONS

Industry Specifications	Speed Performance
PCI Express (PCIe®) Gen 1/2/3/4/5	2.5Gb/s to 32Gb/s
CEI-56G-MR-PAM4 Long Reach Interface	56Gb/s PAM4
Intel 85Ω Performance (Intel QPI & UPI)	10Gb/s to 12Gb/s
Serial Attached SCSI (SAS) 1.1/2.1/3.0/4.0	3Gb/s to 24Gb/s
SATA Revision 1.x/2.x/3.x	1.5Gb/s to 6Gb/s
Fibre Channel (FC) Gen 1/Gen 2/Gen 3/Gen 4/Gen 5	1.0625Gb/s to 14.025Gb/s
InfiniBand (IB) SDR/DDR/QDR/FDR/EDR	2.5Gb/s to 25Gb/s
Ethernet 1Gbe/10Gbe/40Gbe/100Gbe/25Gbe	1.25Gb/s to 25.78125Gb/s

SIGNAL INTEGRITY PERFORMANCE

- See graphs below for Insertion Loss and power-summed crosstalk
- Impedance is tuned to 92Ω making ExaMAX® suitable for both 85Ω and 100Ω systems
- Test reports are available which show the performance in both 85Ω and 100Ω environments
- OIF Specification: OIF-CEI-25G-LR

TARGET MARKETS/APPLICATIONS



Hubs
Optical Transport
Router
Switches
Wireless Infrastructure



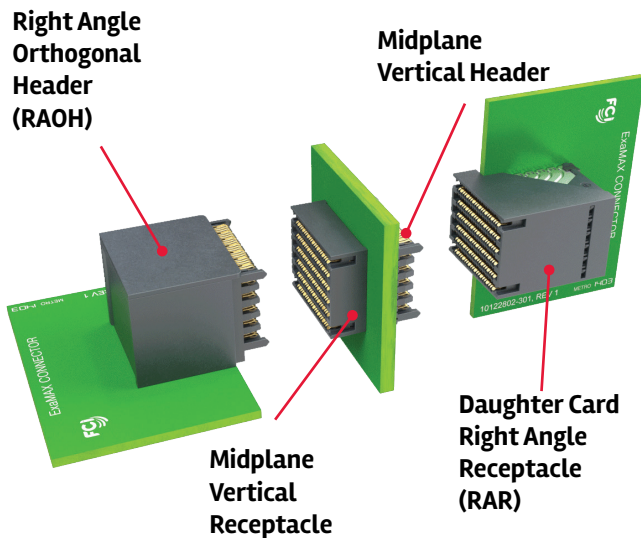
External Storage System
Server
Supercomputer



Emulation Equipment
Test Equipment

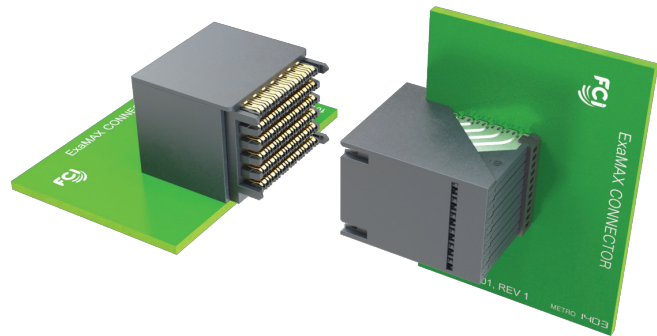
ORTHOGONAL ARCHITECTURES

MIDPLANE ORTHOGONAL



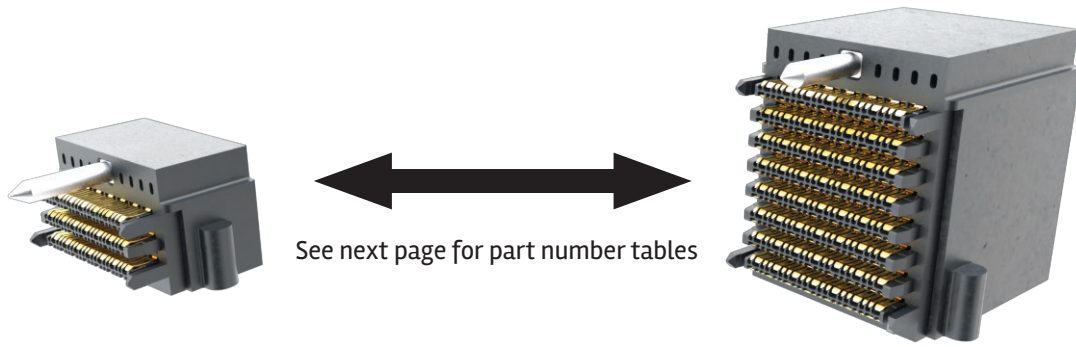
- Midplane orthogonal architecture reduces electrical length between switch chips and I/O transceivers
- Airflow Improvement: Midplane boards can block airflow needed to cool chassis
- Connector Quantity: Requires four connectors
- Connectivity: Provides connectivity through a shared via structure enabling data transfer from front to rear cards. Vertical Header (VH) and Vertical Receptacle (VR) are aligned on opposite sides of midplane and share same PC Hole
- Routing: Right Angle Orthogonal Header (RAOH) 90° rotation results in shorter channel lengths between transmitter and receiver simplifying routing; Reduces or eliminates the need for complex routing
- Board Layers: Requires fewer board layers
- Signal Loss: Orthogonal midplane via structure can result in additional signal losses due to impedance discontinuities
- Thicker PCB: May result in signal integrity degradation

DIRECT-MATE ORTHOGONAL (eliminating midplane)

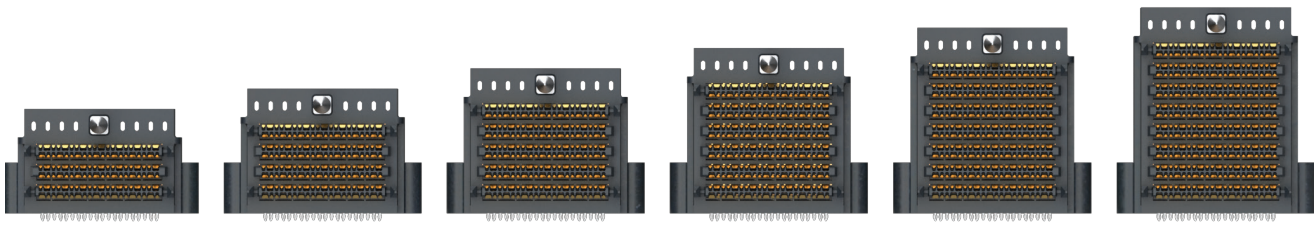


- Direct-Mate orthogonal architecture improves Signal Integrity performance while reducing applied costs
- Airflow Improvement: Enables direct connections from the front to rear card via open air flow chassis design; eliminates need for special plenums to cool system and rear cards; system efficiency is improved since cooling and airflow is optimized
- Connector Quantity: Requires two connectors
- Reduces cost: Eliminates midplane board and two connectors; components, cooling system, materials and testing is eliminated or reduced
- Mechanically Robust Connector System: Minimizes alignment challenges

6-PAIR ORTHOGONAL VARIATIONS



Integrated Guides*



6x6

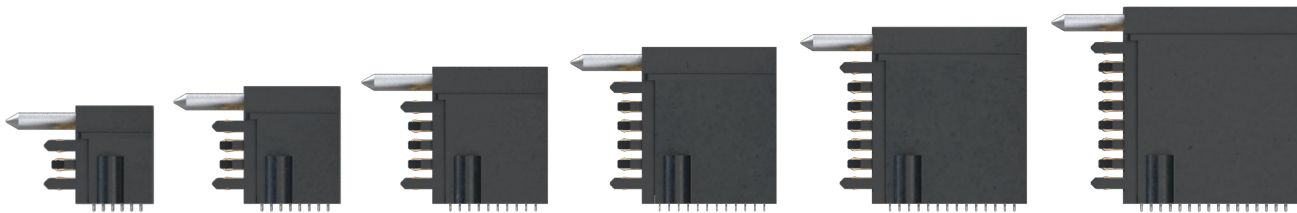
6x8

6x10

6x12

6x14

6x16



No Guides*



6x6

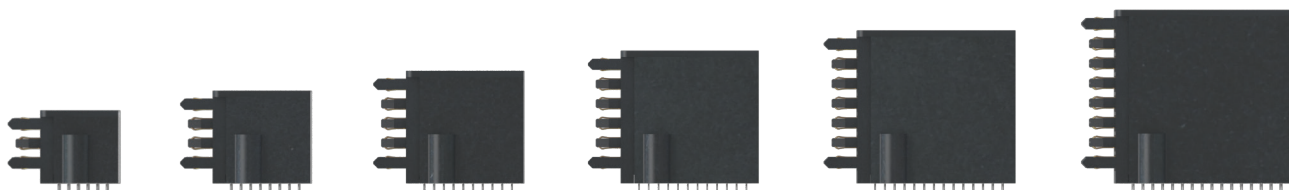
6x8

6x10

6x12

6x14

6x16



*Hold-down options are available for connectors with integrated guides and no guides

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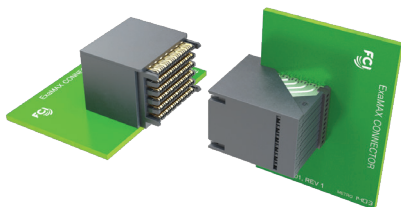
ExaMAX® DIRECT-MATE ORTHOGONAL: WITH INTEGRATED GUIDE PIN

Product Variation			Guide Pin		Mating Connector PN	
Pairs	Columns	Differential Pairs	Right Angle Orthogonal Header (RAOH)	Screw Mount	Right Angle Receptacle (RAR)	
					90° orientation	270° orientation
6	6	36	10129467-101LF	Yes	10131760-12JLF	10131760-11JLF
			10129467-103LF	No		
	8	48	10129470-101LF	Yes	10131762-12JLF	10131762-11JLF
			10129470-103LF	No		
	10	60	10130335-101LF	Yes	10131764-12JLF	10131764-11JLF
			10130335-103LF	No		
	12	72	10129181-101LF	Yes	10131766-12JLF	10131766-11JLF
			10129181-103LF	No		
	14	84	10130338-101LF	Yes	10131768-12JLF	10131768-11JLF
			10130338-103LF	No		
	16	96	10128316-101LF	Yes	10131770-12JLF	10131770-11JLF
			10128316-103LF	No		

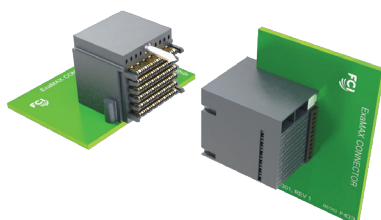
ExaMAX® DIRECT-MATE ORTHOGONAL: NO GUIDE

Product Variation			No Guide Pin		Mating Connector PN	
Pairs	Columns	Differential Pairs	Right Angle Orthogonal Header (RAOH)	Screw Mount	Right Angle Receptacle (RAR)	
					90° orientation	270° orientation
6	6	36	10129467-102LF	No	10131760-101LF	
			10129467-104LF	Yes		
	8	48	10129470-102LF	No	10131762-101LF	
			10129470-104LF	Yes		
	10	60	10130335-102LF	No	10131764-101LF	
			10130335-104LF	Yes		
	12	72	10129181-102LF	No	10131766-101LF	
			10129181-104LF	Yes		
	14	84	10130338-102LF	No	10131768-101LF	
			10130338-104LF	Yes		
	16	96	10128316-102LF	No	10131770-101LF	
			10128316-104LF	Yes		

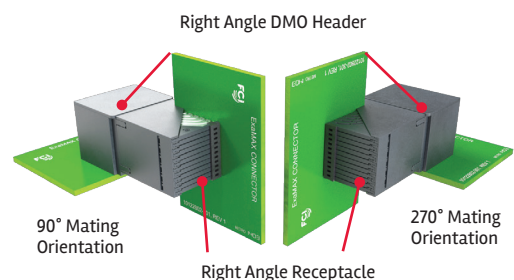
Direct-Mate Orthogonal (No Guides)



Direct-Mate Orthogonal (Guides)



Direct-Mate Orthogonal Mating Orthogonal (No Guides)

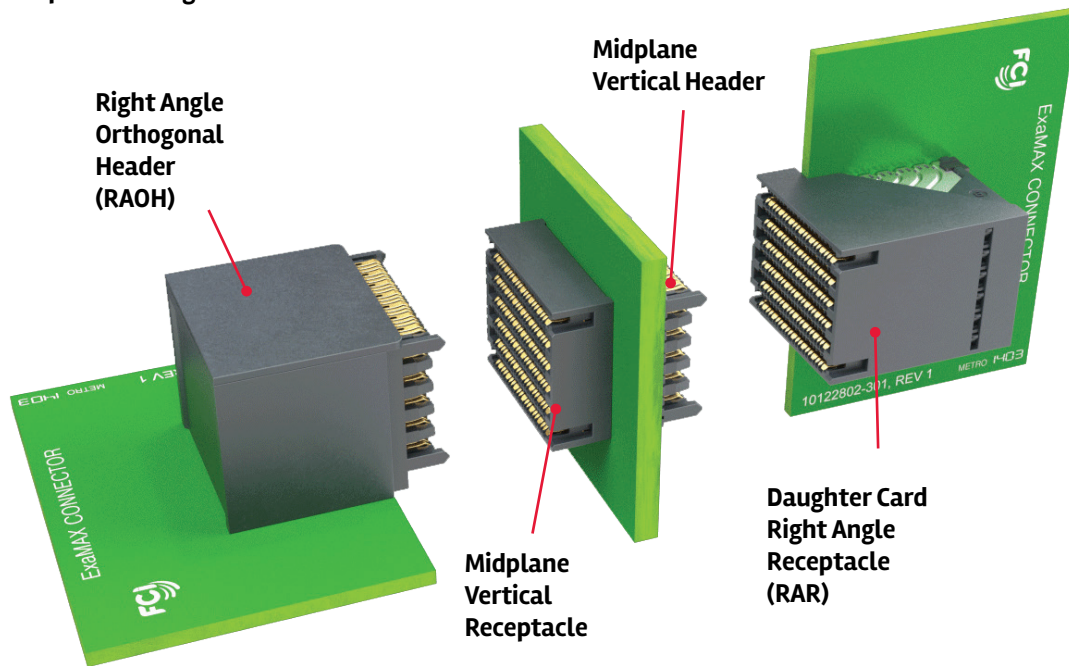


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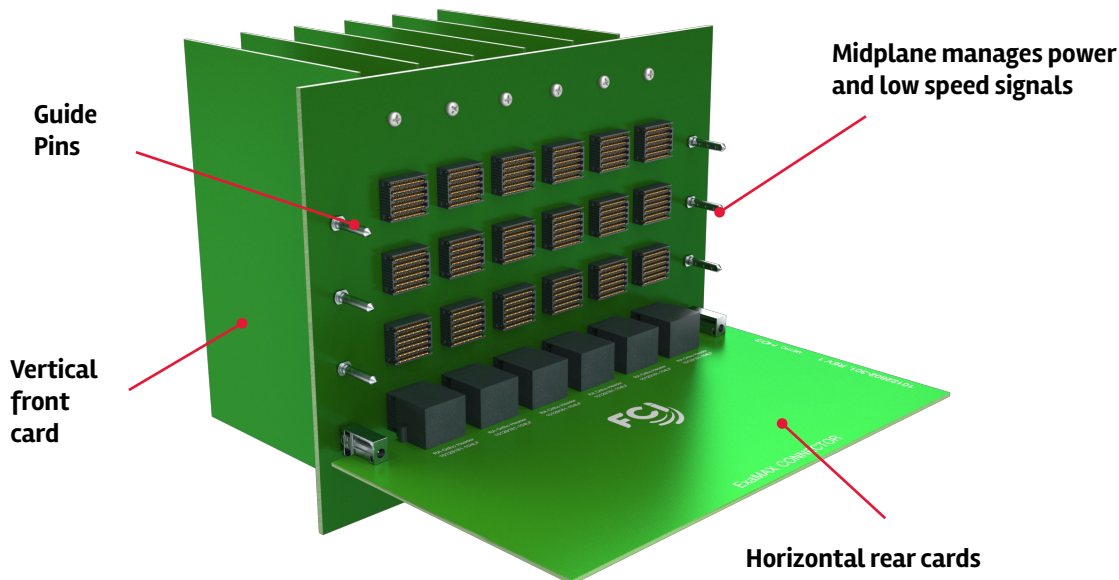
ExaMAX® MIDPLANE ORTHOGONAL

Product Variation			Mating Connector System			
			No Guide Pin			
Pairs	Columns	Differential Pairs	Right Angle Orthogonal Header (RAOH)	Vertical Receptacle (VR)	Vertical Header (VH)	Right Angle Receptacle (RAR)
6	6	36	10129467-102LF	10133092-101LF	10145395-101LF	10131760-101LF
	8	48	10129470-102LF	10128467-101LF	10145397-101LF	10131762-101LF
	10	60	10130335-102LF	10132687-101LF	10140096-101LF	10131764-101LF
	12	72	10129181-102LF	10126948-101LF	10140098-101LF	10131766-101LF
	14	84	10130338-102LF	10132689-101LF	10143710-101LF	10131768-101LF
	16	96	10128316-102LF	10129736-101LF	10147231-101LF	10131770-101LF

Midplane Orthogonal



Midplane Orthogonal Application



HSBPEXAMAXORTH00322EA4