ExaMAX® 56GB/S HIGH SPEED ORTHOGONAL CONNECTOR SYSTEM

OVERVIEW

ExaMAX® high speed orthogonal connector system is designed to enable superior 25Gb/s electrical performance and provide a path to 56Gb/s in anticipation of further increases in bandwidth requirements and the data rates used for high speed signaling.

To further expand the range of applications supported by the ExaMAX® connector system, FCI 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.

FCI 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.

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

MATERIALS
• Contacts: High performance Copper Alloy
• Plating(s): Performance-based plating at separable interface (Telecordia GR-1217 CORE) tin over nickel on press-fit tails
• Housings: High temperature thermoplastic, UL 94 V-0

ELECTRICAL PERFORMANCE
• Contact Resistance: <10 mΩ change from initial reading after environmental exposure
• Current Rating (with <30°C temperature 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

MECHANICAL PERFORMANCE
• Long mating wipe of > 2mm
• X capture: +/-1.2mm
• Y capture: +/-1.1mm
• Mating Force: 0.36 N max. per contact
• Unmating Force: 0.10 N min. per contact
• Average press-fit insertion force: 15 N max. per contact

SPECIFICATIONS
• Product Specification: GS-12-1096
• Application Specification: GS-20-0361

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

TARGET MARKETS/APPLICATIONS
• Communications
• Hubs, switches, routers
• Telecom
• Optical Transport
• Wireless infrastructure
• Data
• Servers
• External storage systems
• Super computers
• Industrial & Instrumentation
• Test Equipment
• Emulation Equipment

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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 airflow 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® 56GB/S HIGH SPEED ORTHOGONAL CONNECTOR SYSTEM

## ExaMAX® DIRECT–MATE ORTHOGONAL: WITH INTEGRATED GUIDE PIN

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<th>Product Variation</th>
<th>Guide Pin</th>
<th>Mating Connector PN</th>
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## ExaMAX® DIRECT–MATE ORTHOGONAL: NO GUIDE

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## Direct–Mate Orthogonal (No Guides)

![Direct-Mate Orthogonal (No Guides)](image1)

## Direct–Mate Orthogonal (Guides)

![Direct-Mate Orthogonal (Guides)](image2)

## Direct–Mate Orthogonal Mating Orthogonal (No Guides)

![Direct-Mate Orthogonal Mating Orthogonal (No Guides)](image3)

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ExaMAX® MIDPLANE ORTHOGONAL

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Midplane orthogonal

Midplane orthogonal application

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