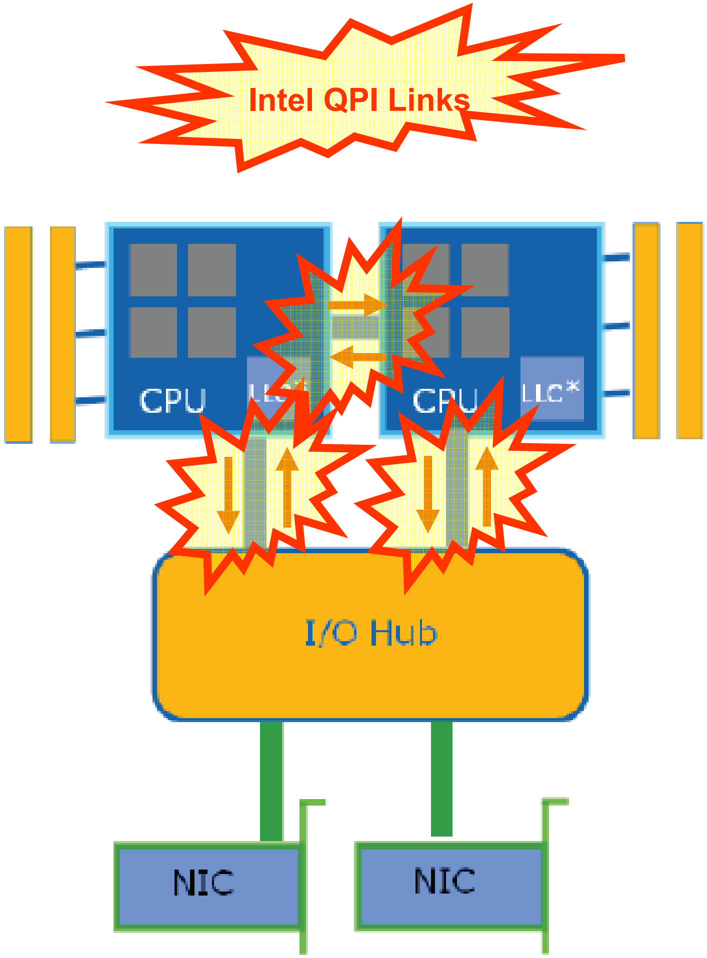
AirMax VS® 85Ω Connectors for Intel® QuickPath Interconnect (QPI®) Links

AirMax VS® 85Ω Connectors for Intel® QuickPath Interconnect (QPI®) Links

What is Intel® QuickPath Interconnect (QPI®) ?

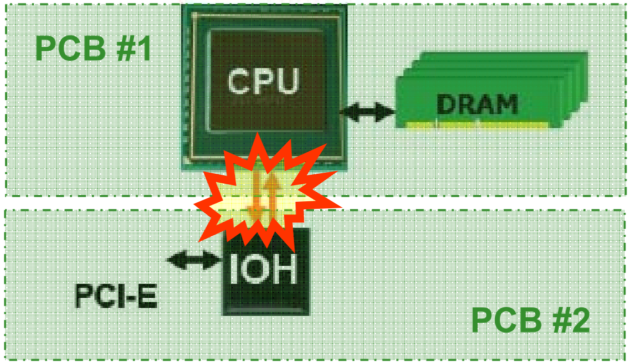
- High bandwidth, low-latency point-to-point interconnect
  - 21 high-speed differential pairs per direction
    - 20 signals pairs plus clock
  - Transfer rates up to 6.4 GT/s per pair
  - Yields a data rate up to 25.6 GB/s per link-pair
- Links processors and I/O controllers in servers and workstations
- Next-generation server platforms can scale to multi-port 10 GbE
- Implemented in Intel CPUs at the start of 2009
  - "Nehalem" – Xeon® 5500 & 3500 Series
- Visit: www.intel.com/technology/quickpath/ to learn more



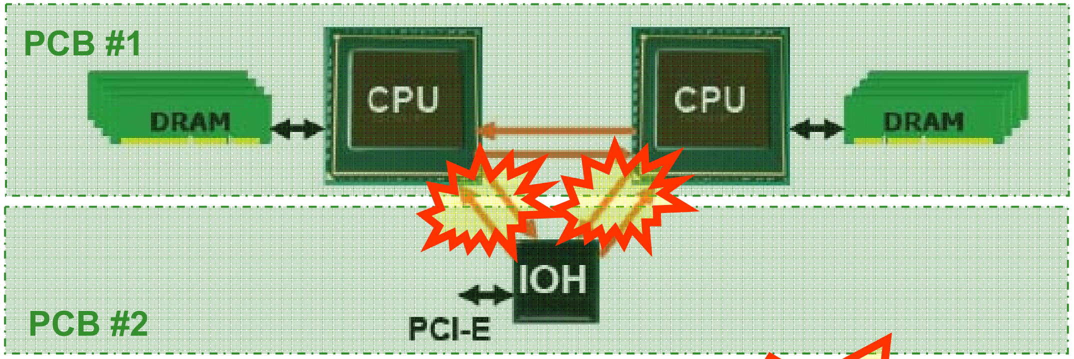
Where are connectors used in QPI Links?

- 1-Socket & 2-Socket Server Platform Examples

1 Socket with memory

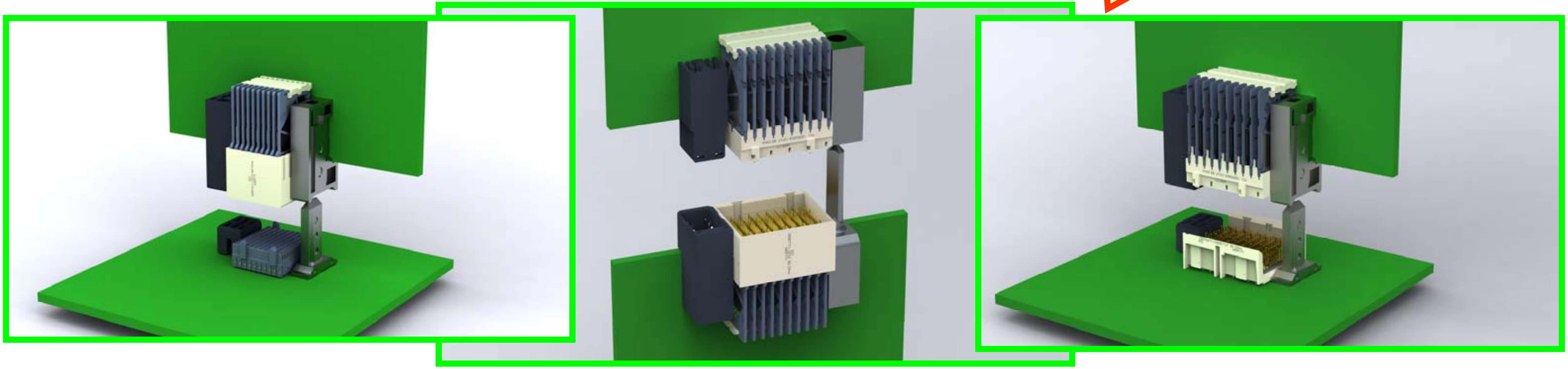


2 Sockets with memory



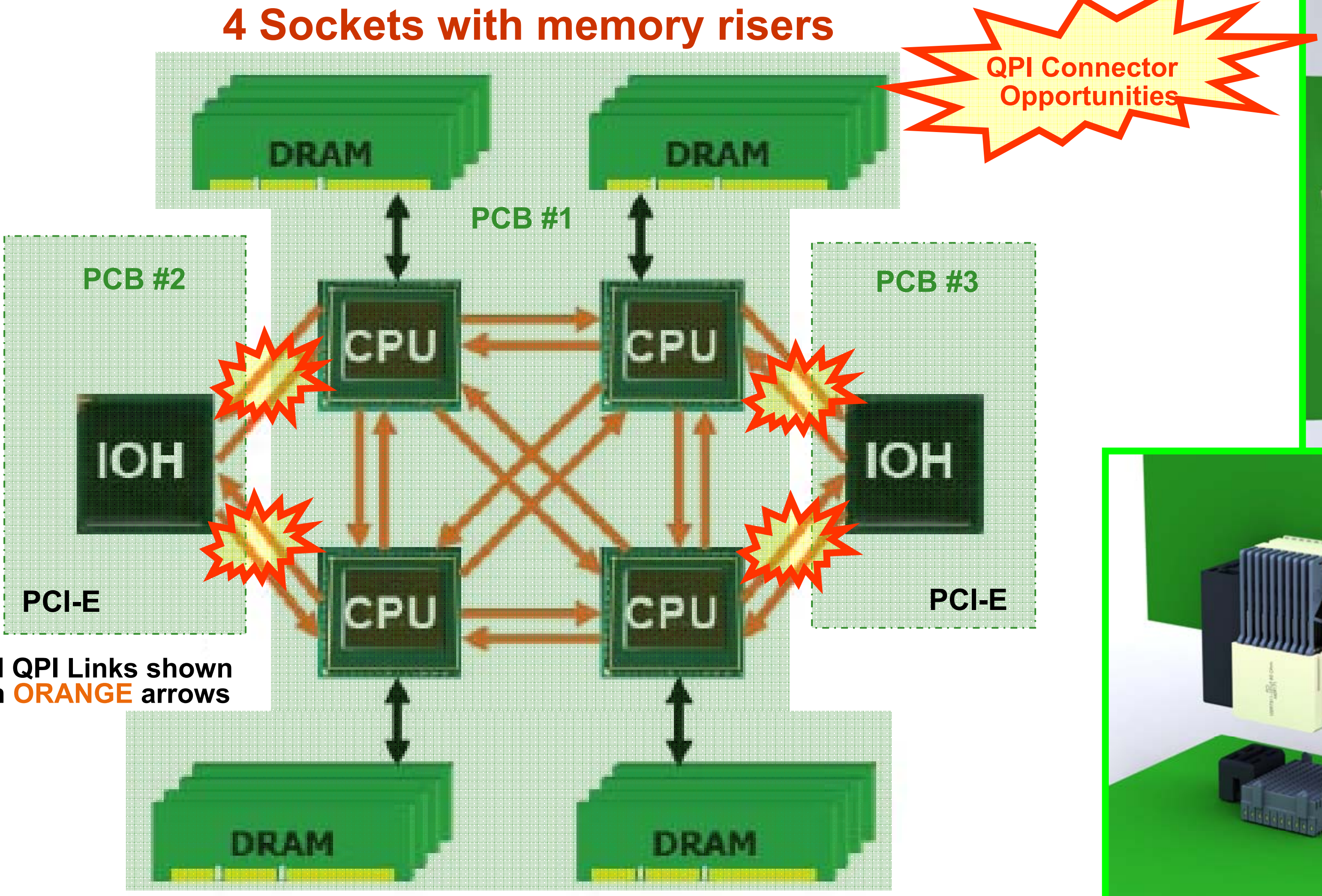
Intel QPI Links shown with ORANGE arrows

QPI Connector Opportunities

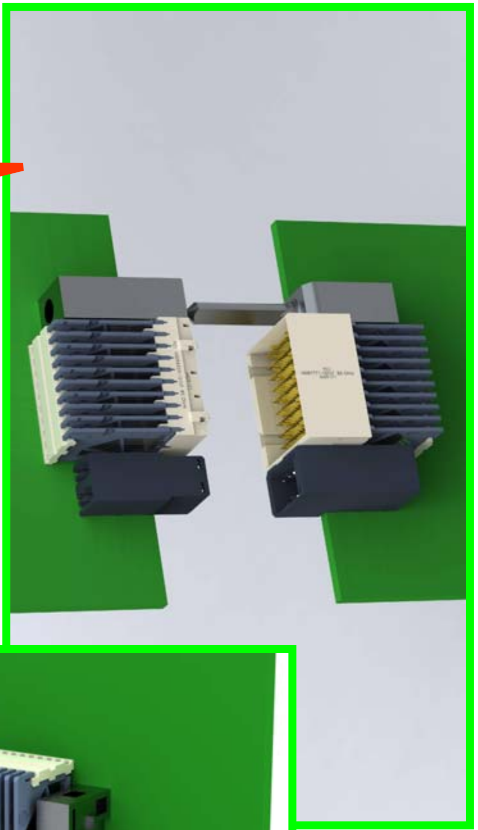


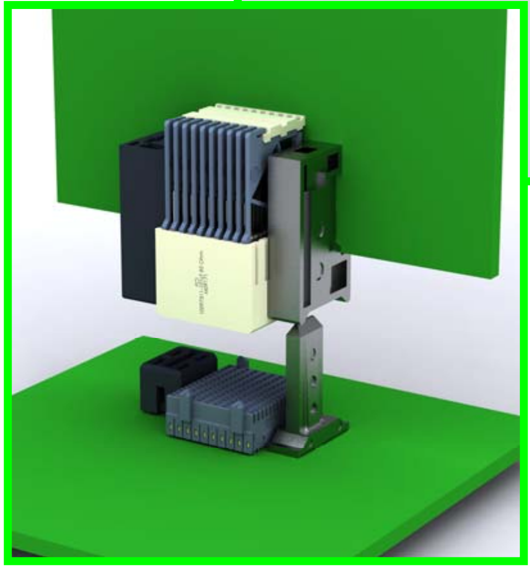
Where are connectors used in QPI Links?

- 4-Socket Server Platform Example



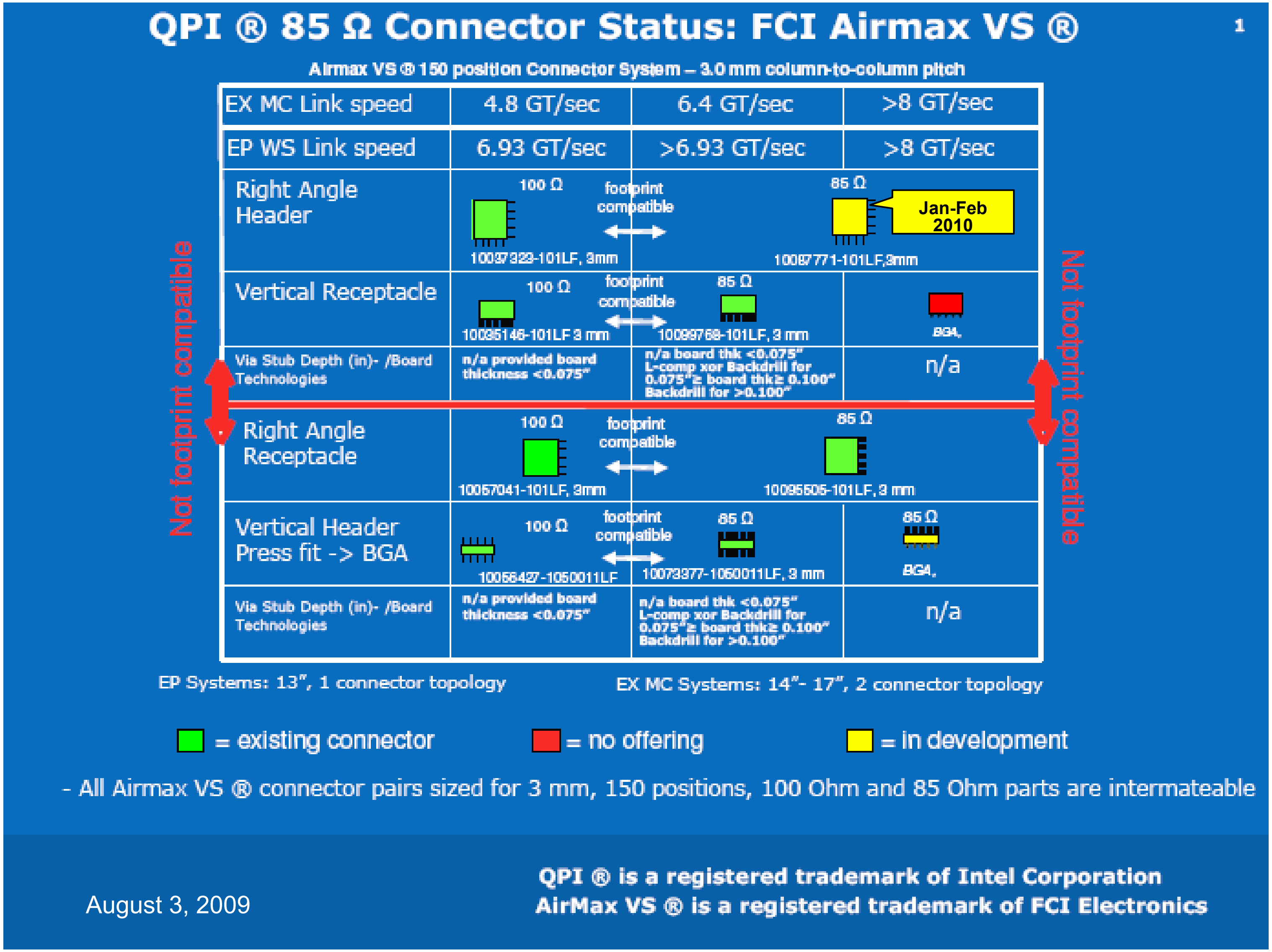
Intel QPI Links shown with ORANGE arrows





AirMax VS® Products on Intel® QPI® Roadmap

- 5 pairs/column x 10 columns on 3mm column spacing = 150 total contacts



QPI ® 85 Ω Connector Status: FCI Airmax VS ®

1

Airmax VS ® 150 position Connector System – 3.0 mm column-to-column pitch

EX MC Link speed	4.8 GT/sec	6.4 GT/sec	>8 GT/sec
EP WS Link speed	6.93 GT/sec	>6.93 GT/sec	>8 GT/sec
Right Angle Header	100 Ω 🟩 10037323-101LF, 3mm	footprint compatible ↔ 85 Ω 🟨 Jan-Feb 2010 10087771-101LF,3mm	
Vertical Receptacle	100 Ω 🟩 10035146-101LF 3 mm	footprint compatible ↔ 85 Ω 🟩 10099768-101LF, 3 mm	🟥 BGA,
Via Stub Depth (in)- /Board Technologies	n/a provided board thickness <0.075"	n/a board thk <0.075" L-comp xor Backdrill for 0.075"≥ board thk≥ 0.100" Backdrill for >0.100"	n/a
Right Angle Receptacle	100 Ω 🟩 10057041-101LF, 3mm	footprint compatible ↔ 85 Ω 🟩 10095505-101LF, 3 mm	
Vertical Header Press fit -> BGA	100 Ω 🟩 10056427-1050011LF	footprint compatible ↔ 85 Ω 🟩 10073377-1050011LF, 3 mm	85 Ω 🟨 BGA,
Via Stub Depth (in)- /Board Technologies	n/a provided board thickness <0.075"	n/a board thk <0.075" L-comp xor Backdrill for 0.075"≥ board thk≥ 0.100" Backdrill for >0.100"	n/a

Not footprint compatible

Not footprint compatible

EP Systems: 13", 1 connector topology

EX MC Systems: 14"- 17", 2 connector topology

🟩 = existing connector 🟥 = no offering 🟨 = in development

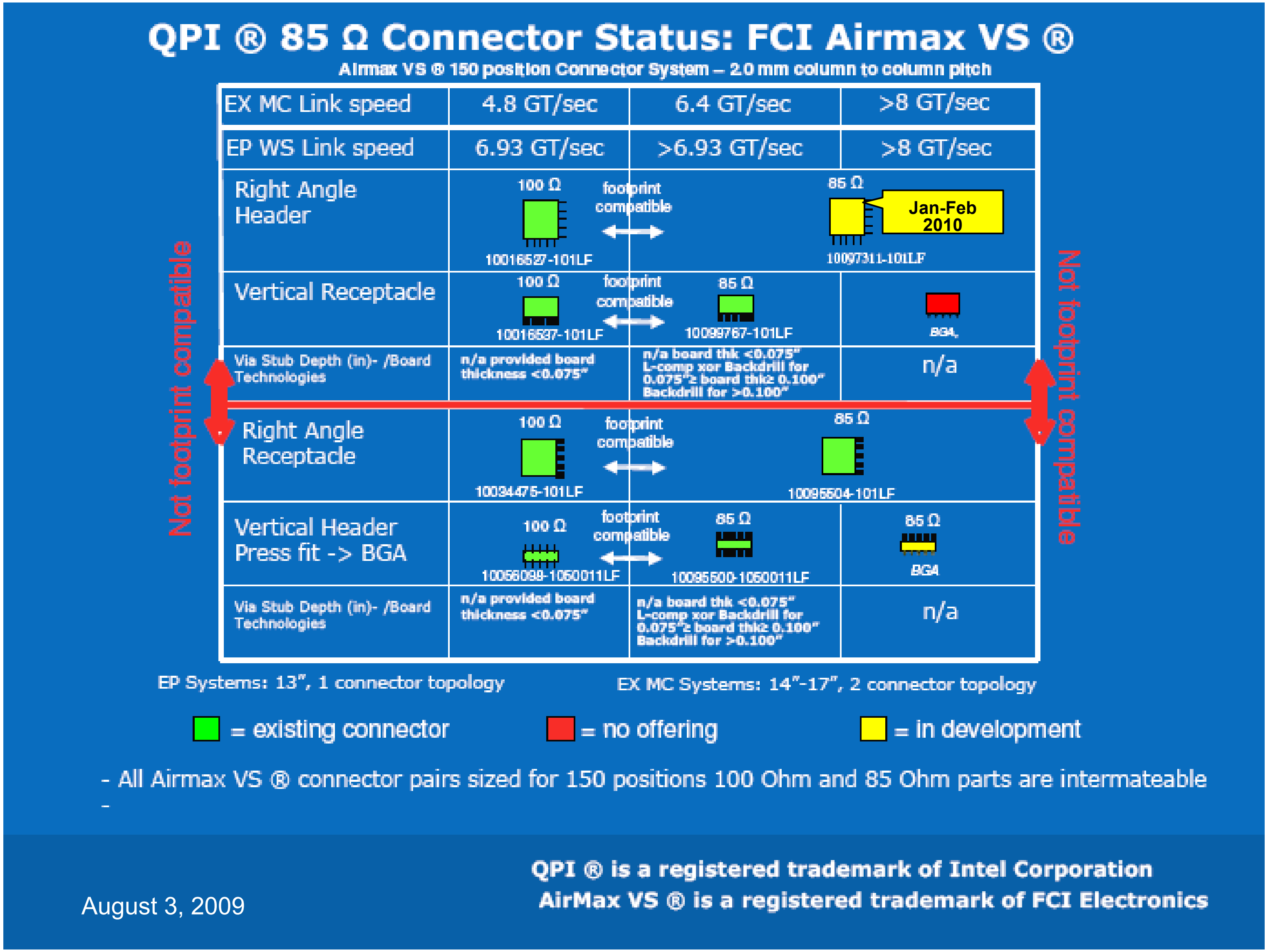
- All Airmax VS ® connector pairs sized for 3 mm, 150 positions, 100 Ohm and 85 Ohm parts are intermateable

August 3, 2009

QPI ® is a registered trademark of Intel Corporation
AirMax VS ® is a registered trademark of FCI Electronics

AirMax VS® Products on Intel® QPI® Roadmap

- 5 pairs/column x 10 columns on 2mm column spacing = 150 total contacts



QPI ® 85 Ω Connector Status: FCI Airmax VS ®

Airmax VS ® 150 position Connector System – 2.0 mm column to column pitch

EX MC Link speed	4.8 GT/sec	6.4 GT/sec	>8 GT/sec
EP WS Link speed	6.93 GT/sec	>6.93 GT/sec	>8 GT/sec
Right Angle Header	100 Ω 🟩 10016527-101LF	footprint compatible ↔ 85 Ω 🟨 Jan-Feb 2010 10097311-101LF	
Vertical Receptacle	100 Ω 🟩 10016537-101LF	footprint compatible ↔ 85 Ω 🟩 10099767-101LF	🟥 BGA
Via Stub Depth (in)- /Board Technologies	n/a provided board thickness <0.075"	n/a board thk <0.075" L-comp xor Backdrill for 0.075"≥ board thk≥ 0.100" Backdrill for >0.100"	n/a
Right Angle Receptacle	100 Ω 🟩 10034475-101LF	footprint compatible ↔ 85 Ω 🟩 10095504-101LF	
Vertical Header Press fit -> BGA	100 Ω 🟩 10056098-1050011LF	footprint compatible ↔ 85 Ω 🟩 10095500-1050011LF	85 Ω 🟨 BGA
Via Stub Depth (in)- /Board Technologies	n/a provided board thickness <0.075"	n/a board thk <0.075" L-comp xor Backdrill for 0.075"≥ board thk≥ 0.100" Backdrill for >0.100"	n/a

EP Systems: 13", 1 connector topology

EX MC Systems: 14"-17", 2 connector topology

🟩 = existing connector 🟥 = no offering 🟨 = in development

- All Airmax VS ® connector pairs sized for 150 positions 100 Ohm and 85 Ohm parts are intermateable
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August 3, 2009

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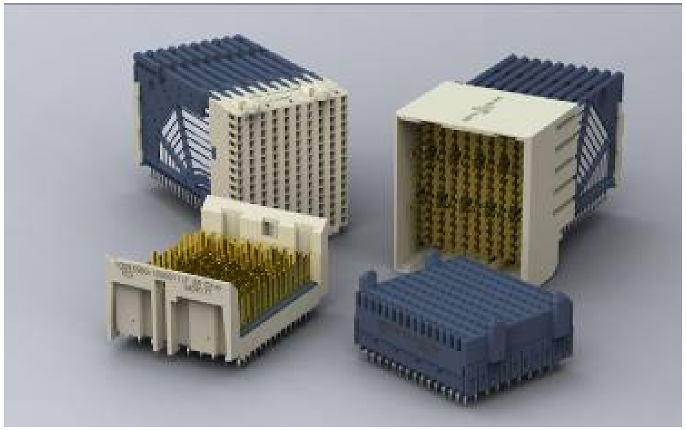
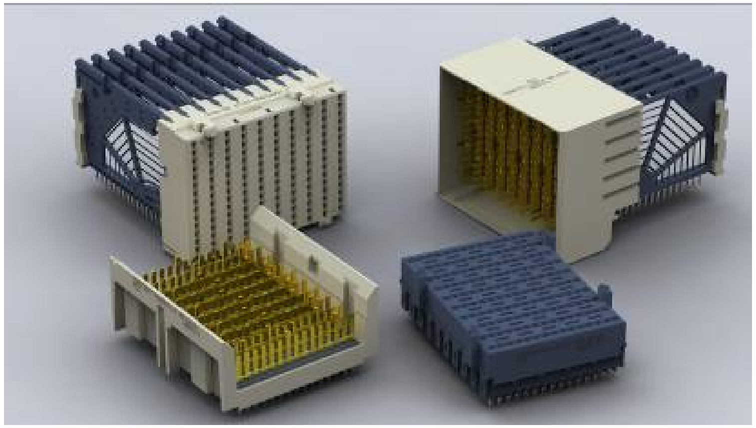
AirMax VS ® is a registered trademark of FCI Electronics

AirMax VS® 85Ω Connectors Enable Intel® QPI Links





- **85-ohm connectors to support Intel® Quick Path Interconnect (Intel® QPI) links between processors or processors and I/O controllers.**
  - **Support increased QPI link speeds of 6.4 and >8 GT/s (Gb/s)**
  - **Fully compliant with Intel® QPI specifications for differential IL, XT & Z**
- **Connector configurations enable backplane or coplanar connections**
- **Backwards-compatible to 100Ω mating interfaces & footprints**
- **2mm or 3mm column pitch**
- **Compatible with Hard Metric design practice**
- **Complemented by HM or HCI® power modules & rugged die-cast guides**
- **Can also use to minimize impedance discontinuities in other designs using 85Ω differential trace impedance for data pairs.**
  - **5 GT/s capable PCI Express Gen2 links**
  - **Storage Bridge Bay (SBB) controller interface**

85Ω AirMax VS® Products – Application Types & Availability

QPI

SBB

Application	Column Pitch	Configuration	Header Type	Right-Angle Header	Vertical Receptacle
Backplane	2mm	5 pairs/column x 10 columns (50 differential pairs)	4-wall	10097311-101LF* Jan-Feb 2010	10099767-101LF Available Now
Backplane	3mm	5 pairs/column x 10 columns (50 differential pairs)	4-wall	10087771-101LF* Jan-Feb 2010	10099768-101LF Available Now
Backplane	2mm	3 pairs/column x 6 columns (18 differential pairs)	4-wall	10097256-101LF* Dec 09 – Jan 2010	10096461-101LF Available Now

QPI

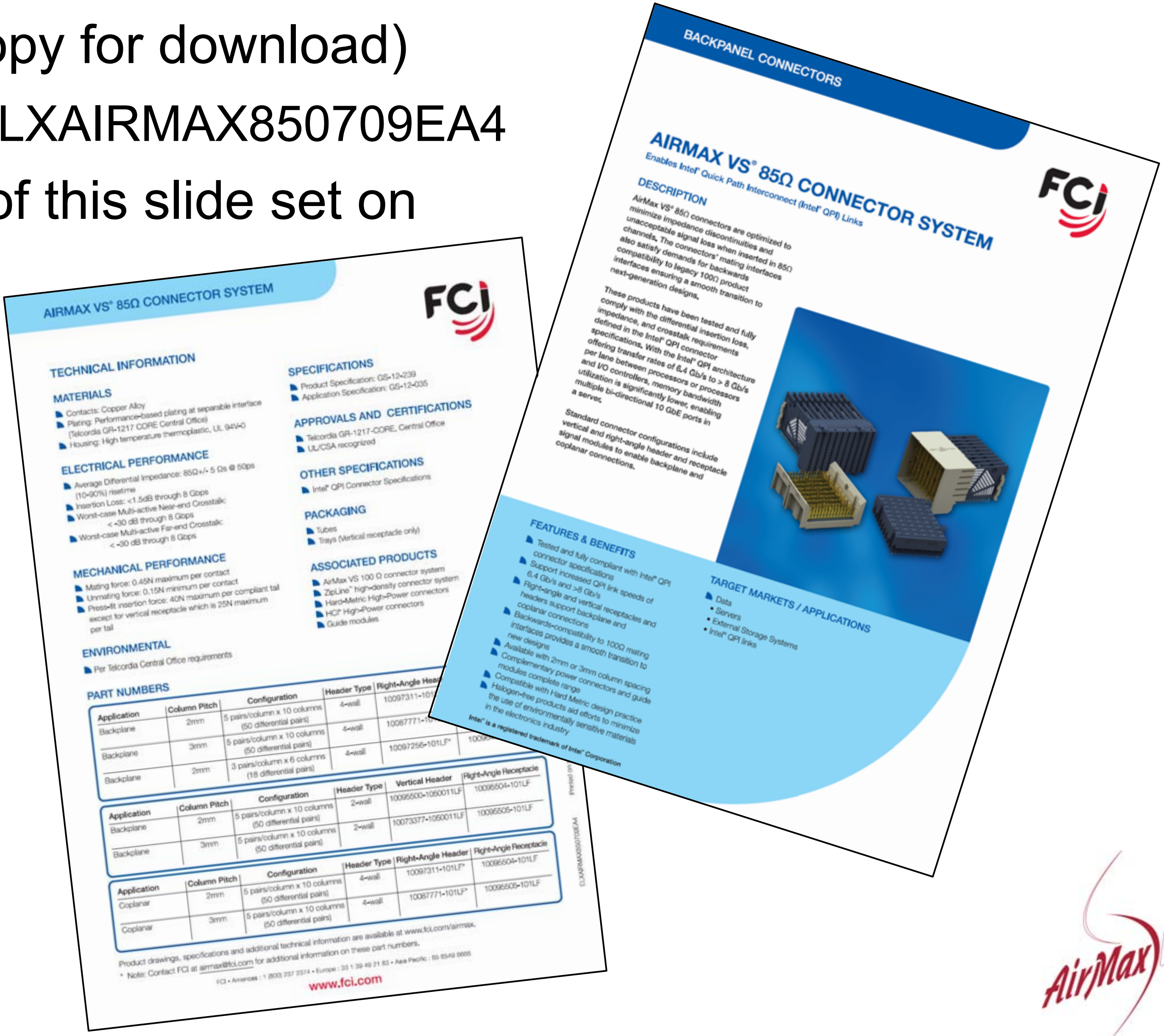
Application	Column Pitch	Configuration	Header Type	Vertical Header	Right-Angle Receptacle
Backplane	2mm	5 pairs/column x 10 columns (50 differential pairs)	2-wall	10095500-1050011LF Available Now	10095504-101LF Available Now
Backplane	3mm	5 pairs/column x 10 columns (50 differential pairs)	2-wall	10073377-1050011LF Available Now	10095505-101LF Available Now

QPI

Application	Column Pitch	Configuration	Header Type	Right-Angle Header	Right-Angle Receptacle
Coplanar	2mm	5 pairs/column x 10 columns (50 differential pairs)	4-wall	10097311-101LF* Jan-Feb 2010	10095504-101LF Available Now
Coplanar	3mm	5 pairs/column x 10 columns (50 differential pairs)	4-wall	10087771-101LF* Jan-Feb 2010	10095505-101LF Available Now

Sales aids

- Data Sheet (soft copy for download)
  - Publication ID: ELXAIRMAX850709EA4
- Customer version of this slide set on Intranet



BACKPANEL CONNECTORS

AIRMAX VS® 85Ω CONNECTOR SYSTEM

Enables Intel® Quick Path Interconnect (Intel® QPI) Links

DESCRIPTION

AirMax VS® 85Ω connectors are optimized to minimize impedance discontinuities and unacceptable signal loss when inserted in 85Ω channels. The connectors' mating interfaces also satisfy demands for backwards compatibility to legacy 100Ω product interfaces ensuring a smooth transition to next-generation designs.

These products have been tested and fully comply with the differential insertion loss, impedance, and crosstalk requirements defined in the Intel® QPI connector specifications. With the Intel® QPI architecture offering transfer rates of 6.4 Gb/s to > 8 Gb/s per lane between processors or processors and I/O controllers, memory bandwidth utilization is significantly lower, enabling multiple bi-directional 10 GbE ports in a server.

Standard connector configurations include vertical and right-angle header and receptacle signal modules to enable backplane and coplanar connections.

FEATURES & BENEFITS

- Tested and fully compliant with Intel® QPI connector specifications
- Support increased QPI link speeds of 6.4 Gb/s and >8 Gb/s
- Right-angle and vertical receptacles and headers support backplane and coplanar connections
- Backwards-compatibility to 100Ω mating interfaces provides a smooth transition to new designs
- Available with 2mm or 3mm column spacing
- Complementary power connectors and guide modules complete range
- Compatible with Hard Metric design practice
- Halogen-free products aid efforts to minimize the use of environmentally sensitive materials in the electronics industry

TARGET MARKETS / APPLICATIONS

- Data
  - Servers
  - External Storage Systems
  - Intel® QPI links

Intel® is a registered trademark of Intel® Corporation

AIRMAX VS® 85Ω CONNECTOR SYSTEM

TECHNICAL INFORMATION

MATERIALS

- Contacts: Copper Alloy
- Plating: Performance-based plating at separable interface (Telcordia GR-1217 CORE Central Office)
- Housing: High temperature thermoplastic, UL 94V-0

ELECTRICAL PERFORMANCE

- Average Differential Impedance: 85Ω+/- 5 Ωs @ 50ps (10-90%) risetime
- Insertion Loss: <1.5dB through 8 Gbps
- Worst-case Multi-active Near-end Crosstalk < -30 dB through 8 Gbps
- Worst-case Multi-active Far-end Crosstalk < -30 dB through 8 Gbps

MECHANICAL PERFORMANCE

- Mating force: 0.45N maximum per contact
- Unmating force: 0.15N minimum per contact
- Press-fit insertion force: 40N maximum per compliant tail except for vertical receptacle which is 25N maximum per tail

ENVIRONMENTAL

- Per Telcordia Central Office requirements

SPECIFICATIONS

- Product Specification: GS-12-239
- Application Specification: GS-12-035

APPROVALS AND CERTIFICATIONS

- Telcordia GR-1217-CORE, Central Office
- UL/CSA recognized

OTHER SPECIFICATIONS

- Intel® QPI Connector Specifications

PACKAGING

- Tubes
- Trays (Vertical receptacle only)

ASSOCIATED PRODUCTS

- AirMax VS 100 Ω connector system
- ZipLine™ high-density connector system
- Hard-Metric High-Power connectors
- HCI® High-Power connectors
- Guide modules

PART NUMBERS

Application	Column Pitch	Configuration	Header Type	Right-Angle Head
Backplane	2mm	5 pairs/column x 10 columns (50 differential pairs)	4-wall	10097311-101
Backplane	3mm	5 pairs/column x 10 columns (50 differential pairs)	4-wall	10087771-10
Backplane	2mm	3 pairs/column x 6 columns (18 differential pairs)	4-wall	10097256-101LF*

Application	Column Pitch	Configuration	Header Type	Vertical Header	Right-Angle Receptacle
Backplane	2mm	5 pairs/column x 10 columns (50 differential pairs)	2-wall	10095500-1050011LF	10095504-101LF
Backplane	3mm	5 pairs/column x 10 columns (50 differential pairs)	2-wall	10073377-1050011LF	10095505-101LF

Application	Column Pitch	Configuration	Header Type	Right-Angle Header	Right-Angle Receptacle
Coplanar	2mm	5 pairs/column x 10 columns (50 differential pairs)	4-wall	10097311-101LF*	10095504-101LF
Coplanar	3mm	5 pairs/column x 10 columns (50 differential pairs)	4-wall	10087771-101LF*	10095505-101LF

Product drawings, specifications and additional technical information are available at www.fci.com/airmax.

* Note: Contact FCI at airmax@fci.com for additional information on these part numbers.

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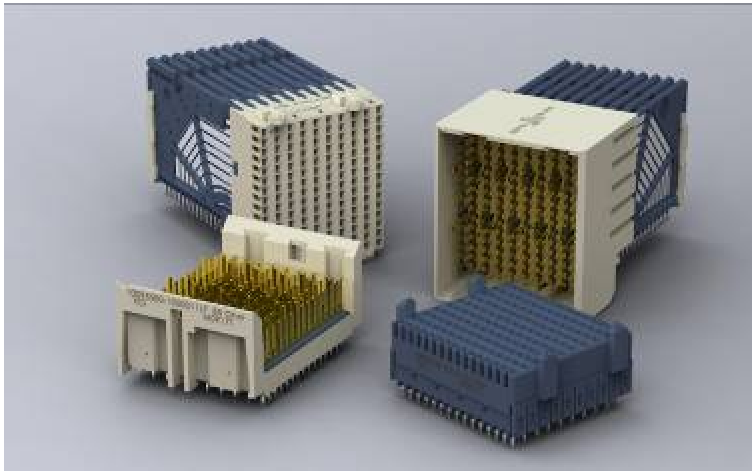
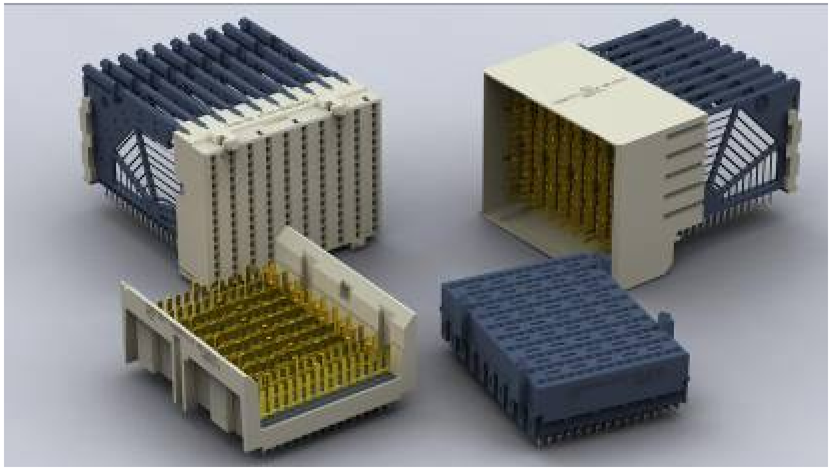
To Learn More





- Use direct web links to access product drawings, models, specifications and additional technical information for AirMax VS® products at:
  - www.fci.com/airmax85ohms
  - www.fci.com/airmax
- Contact us at airmax@fci.com
- Contact your local FCI sales representative, manufacturers' representative or distributor for assistance.

Associated Products

- FCI also offers a wide range of additional interconnect products for server or workstation platforms

- Information on these products may be found at

Power products	www.fci.com/powersolutions
High Speed products	www.fci.com/highspeed
Backplane connectors	www.fci.com/backplane
Mezzanine connectors	www.fci.com/mezzselect
High-speed I/O products	www.fci.com/hsio
Storage Interface connectors	www.fci.com/storageinterface
Memory sockets	www.fci.com/memory
PCIe card edge connectors	www.fci.com/pciexpress

- Contact us at electronics.us@fci.com

- Contact your local FCI sales representative, manufacturers’ representative or distributor for assistance.

Questions?

Thank You


FCi